YAMAHA
Make Waves

THE YAMAHA GUIDE TO CHOOSING A
KEYBOARD

THERE ARE SO MANY DIGITAL KEYBOARDS — from synthesizers and digital pianos to a variety of workstations — that it's crucial to know the differences. This guide will help you decide which features, functions and specifications best suit your needs, playing style and budget.

COMMON KEYBOARD FEATURES

There are features and terms common to most categories of keyboards — basics you should be familiar with before getting too deep into the specifics of any keyboard category. For help with keyboard-related terms, check the Glossary at the end of this guide.

Number of Keys: Keyboards are available with anywhere between 25-88 keys. When deciding which one is right for you, consider any space restrictions where the keyboard will be placed as well as the type of music you'll be playing.

Action: There are various terms related to keybed response known as the "action." Weighted, semi-weighted and synth action each have a different feel. If you're accustomed to the feel of an acoustic piano, a keybed that's weighted or semi-weighted may be the best choice. To enhance response, weighted and semi-weighted actions use mechanical hammers for a traditional acoustic piano touch. If you play fast lead passages, a synth action keybed may be better suited to you. A synth's action is like an organ's — there's little resistance and the keys can be played very quickly.

Touch or Velocity Sensitivity: This is the ability of a keyboard to sense the force or speed at which a key is pressed so it can change a sound, play variations on that sound, and/or send a MIDI message accordingly.

Polyphony: The number of notes a keyboard can generate at one time. Keyboards with extensive polyphonic capabilities and sufficient instrument voices can mimic an entire orchestra.

Multitimbrality: The number of different voices the keyboard can play at once — i.e., flute, drums, strings, piano. Multitimbrality should not be confused with polyphony.

MIDI Compatibility: MIDI (Musical Instrument Digital Interface) is a communication protocol created in the 1980s for electronic instruments and computers. MIDI messages have no sounds — they send instructions that tell a hardware or software instrument what notes to play and at what velocity. For example, a MIDI passage could be sent to a keyboard that would play the passage with any of the sounds available in the instrument. MIDI compatibility enables a keyboard to send and receive MIDI messages.

SYNTHESIZERS

Synthesizers give you the capability to deeply edit and interact with sounds as well as to expressively play imitative voices — like pianos, strings, brass and more — using the keyboard and controls. FM synthesis, which was popularized by Yamaha in the 80s, enabled musicians to easily make new, custom sounds. Current Yamaha Montage and MODX synthesizers include over 2,000 preset sounds and, by using the company's Soundmondo service, you can add an additional 60,000! If the goal is to plug in and start playing, a synthesizer with a lot of presets is a great choice.

Yamaha Montage

Yamaha MODX

Yamaha MX88

Yamaha reface

SYNTH TERMS YOU SHOULD KNOW

The world of synthesizers is wide and diverse, and many synths have different features. Becoming familiar with basic synthesizer terms is a good place to start.

Frequency Modulation (FM): This synthesizer technology modulates the frequency of a waveform via a modulator. The frequency of an oscillator is altered "in accordance with the amplitude of a modulating signal." FM synthesis can create both harmonic and inharmonic sounds.

Operator: This hybrid synthesizer combines FM with subtractive and additive synthesis. Operator uses oscillators with the ability to change waveforms and modulate each other's frequencies, allowing for complex timbres.

Algorithm: An algorithm is a configuration of operators in an FM synthesizer. Different algorithms rearrange the order of carrier and modulator waves inside the synthesis engine to produce different sonic textures.

Monophonic vs. Polyphonic: A monophonic synthesizer plays one note at a time, while polyphonic synths play multiple notes at once.

MIDI: Musical Instrument Digital Interface is the name for the connection type and language by which computers, synths, drum machines, and other hardware communicate.

KEYBOARD WORKSTATIONS

A keyboard workstation is primarily used for composing, recording and production. Workstations are equipped with recording features, including the ability to record audio on an internal hard drive and perform multitrack recording. Workstations can provide the keyboard professional, experienced songwriter or producer with the tools needed to create, record, edit, and finish songs and intricate patches.

The [Montage](#) is a performing synth and a workstation.

When choosing a workstation, it's important to be sure it has enough polyphony to manage the passages you'll play and record. When doing multitrack sequencing, the notes on any track are subtracted from the workstation's total polyphony. The more notes the unit can manage, the more you'll be able to make good use of its recording and sequencing capabilities.

The sound sets in most workstations are equipped with large sound libraries. There is typically a huge array of on-board instrument voices like, pianos, guitars, horns, strings, drums and more. This is also true for the Yamaha Montage and MODX synthesizers.

Computer connectivity is an important function in a workstation, too. It allows you to easily sync the workstation with computer recording software. Workstations come with MIDI and USB connections that send MIDI and audio data to and from other devices in the recording network. Workstations usually supply audio inputs as well so you can record instruments directly.

ARRANGER KEYBOARDS

Arrangers like the Yamaha Genos are portable-style keyboards with professional sound engines and several compositional tools to enhance the songwriting process. Sometimes referred to as a "band-in-a box," an arranger supplies sounds and sequencing tools necessary to help create a complete song. The strength of an arranger is the ability to arrange music in real-time.

Arrangers offer a good selection of the main sounds needed for a live-band feel, like drums, piano, organ, horns, etc. They also offer several backing/accompaniment styles that let you tailor the instrument to different types of music. This means you can create the chord progression, choose a style, and have a full digital band playing in sync behind you.

Arrangers can also be learning tools that familiarize you with the voices and patterns of various styles of music. Because they're more automated than workstations, arrangers can help you work backwards through different styles to fully understand all their elements.

PORTABLE KEYBOARDS

Portable keyboards, like the Yamaha PSR-EW425, are a good choice for beginning players. Their sequencing functions are more basic than those of an arranger, making them easier to learn and master.

Portables keyboards also feature USB connectivity for connecting to a computer, saving projects, or downloading samples or songs. If you're a beginning player, or perhaps you play another instrument and would like to have a high-quality keyboard to learn or experiment with, portable is a good choice.

STAGE KEYBOARDS

Most stage piano/organs today, like the Yamaha YC series, use modeling, which incorporates drawbars, like a traditional organ, to modify the sound. Stage keyboards also include features like effects, pitch bend and modulation wheels as well as MIDI compatibility.

SUMMING UP

By now you should have a fairly good idea of the important things to look for when considering a keyboard or digital piano. Armed with that information, you are now better equipped to find the right gear to match your needs and budget.

LEARN MORE

Please visit our website to see the full lineup of Yamaha keyboards. If you have any questions or would like more information on Yamaha products in worship, please visit our worship site and select Contact Us from the top menu. We look forward to hearing from you.

GLOSSARY

A/D and D/A Conversion: The process of converting an analog signal to a digital one (A/D) or a digital signal to an analog one (D/A).

Aftertouch: A control activated by pushing a key past the point where the note sounds.

Arpeggiator: A keyboard function that generates an arpeggio when a single note is played.

Assignable: The ability to have a keyboard control, affect specified parameters that are selected by the user.

Auto-Accompaniment: A keyboard feature that plays backing performances, often made up of different instruments.

Bit Depth: The number of bits captured in one sample, or slice, of an audio signal as it's converted from analog to digital by an A/D converter — measured in bits and represented as 16-bit, 24-bit, 32-bit, 48-bit, etc. Higher bit depths show more dynamic range.

Damper Pedal: A pedal that, when pressed, keeps the sustain of a note until it's released.

DSP: Digital signal processing. The means by which most keyboards produce effects, equalization, filters, etc., that can be applied to an audio signal.

Effects: Processes that change a tone or tones, such as reverb, delay, vibrato, etc.

Envelope: An electronic circuit that changes a selected setting by a desired amount at certain intervals. Commonly used to alter basic waveform pitch settings.

Filter: An electronic circuit that alters a tone by removing specific frequencies.

Hammer Action: A keybed that uses small hammers to trigger notes to re-create the feel of an acoustic piano.

Keybed: The keys of a keyboard and their underlying mechanisms.

Layer: A function that lets you create a sound by layering different tones.

MIDI: Acronym for Musical Instrument Digital Interface. A protocol that allows musical instruments and digital devices to communicate.

Modulation Wheel (MOD Wheel): A keyboard controller that can alter various elements of a tone when rolled forward or back.

Multitimbrality: The ability of a keyboard to play different sounds at once, i.e., flute, drums, strings, piano, etc. Multitimbrality should not be confused with Polyphony.

Pitch Bend Wheel: A keyboard controller that alters the pitch of the note being played up or down.

Polyphony: The number of tones a keyboard can produce together at one time.

Sample Rate: The number of times an audio signal is measured (sampled) per second as it is converted from analog to digital by an A/D converter. Measured in kHz and represented as 44.1kHz, 48kHz, 88kHz, 96kHz, etc. The higher the sample rate the greater the musical fidelity.

Sampler: A device that records digital audio and allows it to be altered and played back in various ways.

Sequencer: A hardware or software device that records MIDI performance data and plays it back in a user-programmed sequence.

Sostenuto Pedal: A keyboard pedal that mimics the pedal of the same name found on grand pianos. It sustains only the notes that are being held down when the pedal is pressed.

Split: A keyboard function that allows the user to divide the keybed into different sections and assign various tones, instruments, or styles to each one.

Style: A musical passage, complete with instruments, built into a keyboard's memory.

Tones (Waveforms): The sounds that a synthesizer or keyboard produces. Waveforms have different shapes that give them unique tonal properties. The most common shapes are sawtooth, square and sine.

Touch Sensitivity: The ability of a keybed to respond to player actions with tone variations, depending on the velocity or pressure keys are pressed.

USB: Universal serial bus, a common connection protocol for computers.

Weighted/Semi-Weighted: A weighted keybed has key resistance to replicate the feel of an acoustic piano.