YAMAHA

Empowering Worship

YAMAHA GUIDE TO CHOOSING A KEYBOARD

From synthesizers and digital pianos to keyboard workstations, it is important to know what you are looking for. This guide will help you determine which features, functions and specifications best suit your needs, playing style and budget.

Common Keyboard Features

There are many 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 you may be unfamiliar with, check the Glossary at the end of this guide.

Number of keys

Keyboards are available with key counts from 25 to 88. A few things to consider when deciding how many keys may be right for you, what are the space restrictions where the keyboard will be placed, and, what type of music will you be playing.

Action

There are various terms related to keybed response known as “the action”; weighted, semi-weighted and synth action all have a different feel when played. If you are accustomed to the feel of an acoustic piano, a keybed that is 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 feel. If you play fast lead passages, a synth-action keybed may be better suited for your style. Synth action is like an organ’s; there is little resistance, and the keys can be played very quickly.

Touch or Velocity Sensitivity

The ability of a keyboard to sense the force or speed a key is pressed, create a sound and variations on that sound, 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 ability of a keyboard to play different sounds 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 established in the 1980s for electronic instruments and computers. MIDI messages contain no sounds as such, rather serving as instructions that tell a hardware or software instrument what notes to play and with what velocity. For example, a MIDI passage could be sent to a keyboard that in turn could play the same passage with any of the sounds available in the instrument. MIDI compatibility enables a keyboard to send and receive MIDI messages.

Computer Connectivity

Keyboards come equipped with USB and MIDI ports that can connect directly to a computer. Increasingly, keyboards also offer iOS and Android capabilities giving access to practice and recording apps, as well as cloud-based storage and musical collaborations using tablets or smartphones.

Sequencer

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

Arpeggiator

An arpeggio is a chord whose notes are played in succession rather than all at once. An arpeggiator can electronically create an arpeggio when a single note is played on the keyboard.

Input/Output (I/O)

If the keyboard is to be used as a digital audio workstation, having audio ins/outs can save you from having to purchase a separate interface. Audio outputs that connect to external amplifiers and audio mixers are necessary if you plan to play the keyboard live.

Storage

Most keyboards offer external storage options using flash drives. With USB connectivity, data can be easily transferred between a computer and mobile devices.

Synthesizers

Yamaha MODX8 Synthesizer

Yamaha Reface CS Analog Modeling Synth

Synthesizers give you the ability for deep editing and interaction with the sounds. The ability to expressively play imitative sounds like pianos, strings, brass and more, using the keyboard and controls. With FM synthesis popularized by Yamaha in the 80s, you gain the ability to easily make new, unheard of custom sounds. Synthesizers like Yamaha's MONTAGE and MODX include over 2,000 preset sounds, and using Yamaha's Soundmondo service, are expandable to over an additional 60,000 free sounds. If the goal is to immediately plug in and start playing, a synthesizer with a lot of presets is a great choice.

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): Frequency modulation synthesis is a form of sound synthesis whereby the frequency of a waveform is changed by modulating its frequency with 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: Operator is a hybrid synthesizer that combines frequency modulation (FM) with subtractive and additive synthesis. Operator utilizes 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 have several recording features, the ability to record audio on an internal hard drive, multitrack recording, as well as many others. Workstations can provide the keyboard professional, experienced songwriter or producer, the tools needed to create, record, edit, and finalize songs and intricate patches.

When choosing a workstation, it's important to be sure it provides enough polyphony to handle 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 handle, the more you will be able to make good use of its recording and sequencing capabilities.

Yamaha Montage 8 Synthesizer / Workstation

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

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 transmit MIDI and audio data to and from other devices in the recording network. Workstations usually provide audio inputs as well so you can record instruments directly.

Arranger Keyboards

Arrangers 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 provides sounds and sequencing tools necessary to help create a complete song. The strength of an arranger is to arrange music in real-time.

Yamaha PSR900 Arranger Keyboard

Arrangers offer a good selection of the main sounds needed for a live-band feel, like drums, piano, organ, horns, etc.

Arrangers 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 sounds and patterns of various styles of music, because they are more automated than workstations, arrangers can help you work backwards through different styles to fully understand all its elements.

Portable Keyboards

Portable keyboards like Yamaha's PSR-EW410 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.

Many portables also feature USB connectivity for connecting to a computer, saving projects, or downloading samples or songs. If you are 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 option.

Yamaha PSR-EW410 Portable Keyboard

Digital Pianos

Digital pianos can be divided into two categories depending on their intended use. Console pianos are generally intended for use in the home, while stage pianos are designed for the performing musician who needs something more portable. The major difference in these categories is the exterior design. Console pianos incorporate not only the sounds of a piano, but traditional cabinet design elements as well. Console pianos are an ideal choice for the home.

Yamaha P-125 Electric Piano

Important elements to consider when buying a digital piano are the responsiveness of the keys, the number of keys in the keybed, and its overall ergonomic design.

Weighted keybeds will provide a more realistic piano feel as you play, especially if you are transitioning from an acoustic piano to an electric. Digital pianos can have 88, 71 or 73 keys, and some just 61 keys, try each keybed to see which one matches you're playing style best.

The sound a digital piano produces is dependent on the samples that have been programmed into its memory. Yamaha uses samples from our high-end acoustic pianos including Bosendorfer, producing very high-quality sounds.

Yamaha CP73 Digital Stage Piano

Stage Keyboards

Most stage piano/organs today use modeling, that incorporate drawbars like a traditional organ to change the sound. Stage keyboards also include features like effects, pitch bend, modulation wheels and MIDI compatibility.

Yamaha YC61 Stage Keyboard

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.

To request information, please visit our Contact Us page.

For more product information, please visit our Website.

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 selected by the user.

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

Bit Depth: The number of bits captured in one sample, or slice, of an audio signal as it is 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 more dynamic range.

Damper Pedal: A pedal that, when pressed, maintains the sustain of a note until 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 modify 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 keyboard function that lets you create a sound by layering several 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 the memory of a keyboard.

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 provides resistance in order to replicate the feel of an acoustic piano.