

Introduction To DAWs

After completing this lesson, you should be familiar with the following concepts:

- DAWs are computers which have been specially outfitted to act as audio recorders.
- DAWs have eight parts: CPU, Monitor, keyboard, mouse (or trackball), hard drive, audio card, audio interface, and the software they run.
- DAWs and tape recorders share a lot of terminology and functionality. DAWs use tracks, and arm/safe controls just like tape recorders.
- To make a basic recording on a DAW, a line level source must be connected to an input on the DAW's audio interface. A track must be created and its input and output assigned. The track must be armed and record pressed.
- Keyboard shortcuts allow you to accomplish certain tasks on a DAW without lifting your hands from the keyboard. It is important to memorize the most crucial shortcuts for programs, especially shortcuts used for the transport controls.

Glossary for this Lesson:

Audio Card- An audio card is a circuit board which fits into a slot inside a DAW's CPU. It allows you to get audio into and out of the DAW, and in some cases, attach an audio interface.

Audio Drive- A hard drive which can transfer a lot of data at very high speeds, and has a large capacity.

Audio Interface- A rack mountable box with inputs and outputs. Audio interfaces attach to audio cards in a CPU to provide inputs and outputs for DAWs. The advantage of having the inputs and outputs moved far away from the CPU is that inputs and outputs in or near the CPU can pick up electrical noise.

Central Processing Unit- The DAW's brain. A box which contains audio cards, hard drives, the DAW's memory, and the device which coordinates all of the DAW's functions.

CPU- A abbreviation for Central Processing Unit.

DAW- A digital audio workstation. Daws are computers outfitted with special equipment to allow them to act like super high quality tape recorders. DAWs have many advantages over tape recorders, however.

Hard Drive- A disc drive which is either contained within the CPU or in a separate box very near the CPU. The DAW stores recorded sounds on the hard drive.

Keyboard- The keyboard allows you to enter data into the DAW by typing.

Keyboard Equivalent- A series of keys you can press on the DAW's keyboard to quickly accomplish a task which would take longer if you used the mouse.

Keyboard Shortcut- Another name for a keyboard equivalent.

Monitor- The monitor is the DAW's screen. It allows the DAW to give you information.

Mouse- Along with the keyboard, the mouse allows you to interact with the information you see on the monitor.

Shuttle Control- A shuttle control is a device which allows you to move forward and backward in a piece by turning a wheel. Most shuttle controls also have additional controls for editing recordings.

Trackball- A track ball is an alternative to a mouse. Instead of moving the entire mouse around, on a trackball, you just move a large ball inset into the device. Trackballs also usually offer several buttons for additional control.

DID YOU KNOW?

Special tape recorders called DAT (digital audio tape) recorders can record sounds without all of the hiss generated by normal tape recorders. Because DAWs can be very bulky to haul around and take a lot of time to set up, many recording engineers use DAT decks instead, and then transfer the recordings they make into their DAW when they get home.

Introduction To DAWs

GET YOUR PAWS ON A DAW

A **DAW** is a digital audio workstation. A DAW is basically a software version of a multitrack tape recorder. DAWs come in many shapes and sizes, but they all have a few things in common. Most DAWs have eight main parts to them.

The **central processing unit** or **CPU** is the main boxlike part of a computer which holds all of the drives, memory, and cards. The CPU is the brain of the DAW. The **monitor** allows the user to see what is going on and get feedback from the DAW, while the **keyboard** and **mouse** allow you to interact with the DAW and tell it what to do. Not all DAWs have standard keyboards and mice. Sometimes **trackballs** are used (see lower left), or **shuttle controls** (see lower right). Sometimes the DAW doesn't have a traditional keyboard at all, just specialized buttons to control it. Some DAWs also include other controllers which are specialized to help with DAW operations. Controllers with faders and knobs to simulate mixers are common.

One of the parts of the DAW that is rarely seen is the **hard drive**. (You can see a picture of a hard drive in the upper right hand corner of this page.) A hard drive is a disk which can store a lot of data. It is usually kept inside the CPU or in its own box very near to the CPU. DAWs usually have one hard drive that allows them to run software just

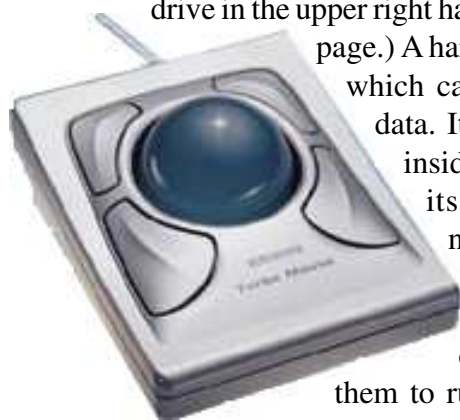
like a normal computer does, but then they usually have a second hard drive which is just used for storing the massive amounts of data that recording creates. These **audio drives** are usually very

high capacity (hold a lot of information), and are usually very fast.

The other two important parts of the DAW are also less obvious. Most DAWs have an **audio card** which also sits in the CPU. (You can see an audio card on the next page.) The audio card allows you to get sounds into and out of the computer. Cheap audio cards have input and output jacks right on them. The problem with this design is that the parts that are the most susceptible to electrical

interference are in the absolute worst place in the whole studio: inside your CPU. Better audio cards have a cable which attaches to an external **audio interface**. (You can see an audio interface above the audio card on the next page.) This might be a rack mount box with several inputs and outputs on it.

The final, and most important part of the DAW is the software the DAW is running. Without the right software, a DAW is just a computer. It is the software that makes all of the parts of the DAW work together like it is all one machine. Some common examples of DAW software include Digital Performer, Logic Audio, Cubase, and Cakewalk.



AS DIFFERENT AS CAN BE

It might begin to seem that DAWs and tape machines have almost nothing in common. After all, we aren't going to find any capstans on a DAW. However, when we begin to look at the DAW software, we can easily begin to see how similar the two are. When companies created DAWs, they didn't re-



invent the wheel. Since most of their potential customers knew how to use a tape recorder, they made DAW software act like a tape recorder in many respects.

To begin with, all DAWs feature the same kind of transport controls that are found on tape machines. Below, you can see a picture of the transport controls from a typical DAW.

DAWs also still use tracks. Instead of using a particular part of tape, tracks appear as a particular part of the screen. You can see two tracks named audio-1 and audio-2 below. The really cool thing about DAWs is that the number of tracks isn't fixed. The number of tracks you can record and play back depends on several things, including how fast your

computer is, how much memory it has, and the speed of the hard disk. Even on an old computer, a DAW can typically play back as many as 48 tracks easily!

Just like tape recorders, DAWs also have arm/safe controls for their tracks. The arm controls appear on the screen (usually next to each track). In the picture below, the arm buttons are at the far left side

of each track in the column labeled "rec". Tracks that are armed have a red triangle next to them in this DAW program.

Tape machines typically have a counter. This is a numeric

display which shows (usually in minutes and seconds) where you are in the tape. The trouble

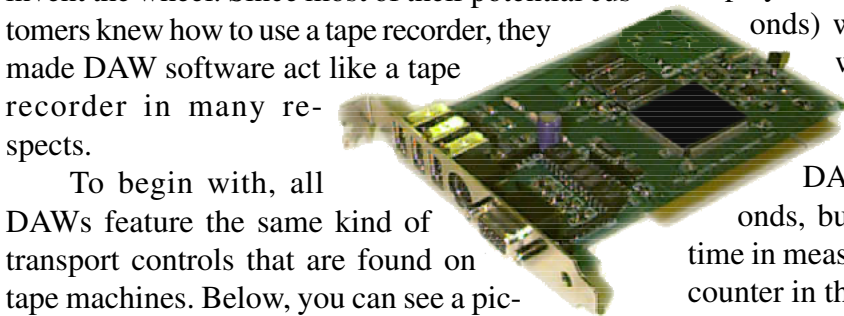
with this system is that it won't help you much if you need to find the spot on the tape where measure 57 beat 3 is. A

DAW can display time in minutes and seconds, but almost every DAW can also display time in measures and beats. You can see this DAW's counter in the picture below. The top display shows measures, beats, and parts of beats. Below this display is a smaller display which shows how much time has gone by.

NAME THAT DIFFERENCE

While DAWs are very similar to tape recorders in many respects, they are also very different. Many differences are physical ones. The DAW doesn't have all of the mechanical parts a tape machine has to use

to record tape. DAWs don't even have tape. Instead, they store recordings on their hard disks. While a hardware tape machine has a limited set of features, a DAW is always changing and evolving as software companies



continually upgrade DAW software. By changing the software a DAW is running, you can actually add features to it. A tape recorder, on the other hand, will never gain any additional features.

USING DAWs To RECORD

Using a DAW to make a recording is very similar to using a tape recorder. You connect your source to the audio interface (you will have to use a preamplifier first if your signal isn't line level. Most audio interfaces don't have mic pres built into them.) Once you have connected your audio source, you need to make sure that you have a track to record onto. Most DAWs don't start out showing you a lot of tracks when you start them. Instead, you have to manually make tracks as you need them. (That way you don't waste any of the computer's power playing back empty tracks.)

In Digital Performer, you can make a new track by going to the mini menu in the track overview window and selecting "Add Mono Voice" if you want to create a mono track or "Add stereo Voice" if you want to create a stereo track.

Once you have created the tracks you need, you must tell the DAW which inputs on the audio interface you want to feed each track. On the picture on the bottom of page 14, you can see two columns labeled input and output. By choosing different inputs and outputs from the pop-up lists here, you can assign each track to certain inputs and outputs on the audio interface. After setting up the track's inputs and outputs, you simply have to arm the track and click on the record button.

PLAY ON MY KEYBOARD

While every DAW software program works a little bit differently, almost every program allows you to use **keyboard equivalents** or **keyboard shortcuts** to operate the DAWs transport controls. A keyboard equivalent is a key or group of keys you can press on the computer's keyboard to accomplish a specific task. For instance, on almost every DAW, pushing the space bar will start the DAW playing if it is stopped, and will stop it if it is playing. The reason keyboard shortcuts are so important is that when your hands are already on the keyboard, it is faster to push a few keys than to move your hand over to the mouse, then move the cursor on the screen to the right place, then pull down a menu, and let it go. Each program has slightly different keystrokes to control different functions. On more advanced DAW programs, you can set up keystrokes to do whatever you want them to do. For instance, you could set up the program so that it would start recording instead of playing when you push the space bar. However you decide to configure the keyboard shortcuts, you should set them and leave them.

It is not essential for you to memorize every single keyboard shortcut that a particular program has to offer. Some programs have several hundred shortcuts and that number is multiplied times the number of different programs you use in your studio (often as many as 10 or 12). You should, however, memorize all of the keystrokes which operate the DAW's transport as you will be using these controls a lot and this knowledge will save you a lot of time in the long run.

Experiments:

1. Locate and identify each part of a DAW. Where is the hard drive?
2. Find the transport controls on a DAW and try each of them.
3. Create several new tracks and try arming and disarming them.
4. Record a small amount of sound, following the directions given in this lesson. How long does it take to 'rewind' when you are finished?

Let's Review

1. What are some of the things that are different about tape recorders and DAWs What are some things which are the same?
2. What are the parts of a DAW? What does each part do?
3. What are some advantages of DAWs over tape?
4. How many tracks do DAWs allow you to use?
5. How is recording on a DAW different from recording on a tape machine?
6. What are keyboard shortcuts and why should you take the time to learn them?
7. What keyboard equivalents have you learned so far?

Words To know:

Audio Card
Audio Drive
Audio Interface

Central Processing Unit

CPU

DAW

Hard Drive

Keyboard

Keyboard Equivalent

Keyboard Shortcut

Monitor

Mouse

Shuttle Control

Trackball

On the Web:

Check out the following sites for more information about DAWs:

<http://www.mackie.com>

<http://www.motu.com/>

<http://www.digidesign.com/>

<http://www.emagic.de/>

<http://www.ensoniq.com/>

<http://www.fairlightesp.com.au/>

<http://www.steinberg.net/>

DID YOU KNOW?

DAWs have only come into use in studios very recently. One of the first albums ever recorded using only a modern DAW was Thomas Dolby's *Astronauts and Heretics*. (1992) To record this album, Mr. Dolby went all around the world recording musicians to a special digital tape which was then fed into the DAW and compiled into musical pieces for the album.