P.p1 hard drive is used to read from

p.

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0px 0. 0px 0. 0px 0. 0px; line-height: 15. 0px; font: 11. 0px ‘ Helvetica Neue’; color: #00a2ff; -webkit-text-stroke: #00a2ff; background-color: #ffffff}li. li1 {margin: 0. 0px 0.

0px 0. 0px 0. 0px; font: 11. 0px Helvetica; color: #00a2ff; -webkit-text-stroke: #00a2ff}span. s1 {font-kerning: none}span.

s2 {font: 13. 2px Helvetica}ul. ul1 {list-style-type: disc}Section 1: A Hard drive is used to read from and write to a hard disk on a computer or software system. The read and write speed of a hard drive determines how fast data is opened/downloaded from the hard drive (read speed) and how fast data can be stored/dowloaded on to the hard drive (write speed). Because audio files can contain a lot of data it is important that the read and write speed of your hard drive is high enough to handle downloading and storing data efficiently enough. Data transfer protocol is a way of transmitting data between two devices. Two types of data transfer protocols are USB and Thunderbolt. Different audio interfaces use different data transfer protocols.

USB is a common audio interface type. Older models had slower data transfer rates. However, this data transfer protocol was recently updated to USB 2. 0 which has a relatively fast data transfer rate. This allows a greater I/O count meaning more instruments can be recorded at once.

The most recent data transfer protocol is Thunderbolt. This has a very fast data transfer rate which allows the effective and smooth recording of as many instruments at once as desired. The transfer rates of 3 Protocols in bits per second (bps) are: USB 1. 0 – 12MbpsUSB 2. 0 – 480MbpsThunderbolt – 10GbpsSection 2: When an audio signal is recorded, the waveform comes directly from the instrument itself that is being played and will play back the actual sound that that instrument has made.

An audio recording will be recorded on an audio track. A MIDI signal is recorded on a MIDI track. A keyboard is generally used when working with MIDI. MIDI signal is recorded by a note being pressed and the data

connected with that note is then recorded. A MIDI recording can only be played back when you connect it to a sound generator; for example when using protools you assign an instrument to the MIDI track.

The most common MIDI data types are: absolute and relative. Absolute mode relates to the physical position of the dial/fader on the controller. For example if the fader is at 5 then the software will also be set to 5. Relative mode is determined by what is set on the software rather than what is set on the hardware (dials/faders etc). The MIDI controller being used determines which relative mode should be used. A MIDI velocity measurement's intended use is to mimic, for example, how soft or hard a key is hit on a MIDI keyboard. It reflects the timbre and attack of the note. Dynamic range is the range of the largest to the smallest signal that can be produced or recorded by a recording system.

This is measured in decibels. In audio equipment dynamic range is used to measure a components maximum output signal and to rate a system's noise floor. This is the total noise produced by all noise sources and unwanted signals within the dynamic range. Bit depth in relation to dynamic range is as follows: the higher the bit depth the greater dynamic range. Having a higher bit depth allows more headroom to be available when recording which can help to avoid clipping. Bit depth is the number of bits available in each sample.

The higher the bit depth the higher the quality. A bit (binary digit) is the smallest unit of data in a computer and is represented as either 1 or 0. They are designed to store data and carry out instructions. When it comes to

recording, different bit depths can reproduce volumes in a more realistic way, up to a certain point. When working on a digital audio workstation (DAW) the bit depth selected determines how much space is available for information. Most analogue to digital converters work at 24 bit when in comes to audio recording. In some cases this is regardless of which bit depth is chosen on the DAW.

If a 32 or 64 bit depth is chosen, the audio will only change from 24 bit after it has been processed further. Generally this means that the audio will be put through a plugin effect at 32 bit and occasionally 64 bit. However it is important to mention by selecting a higher bit depth the audio does not automatically become better, rather there is just more data space to play around with. For recording it is important to look at the sample rate, measured in Hz. This deals with frequency and the sample rate size determines how high a frequency can be recorded.

Humans can hear only a range from 20Hz to 20kHz. CD’s use a sample rate of 44. 1kHz. Using Nyquist’s theorem, the highest frequency that can be recorded then at this level is 20kHz. Nyquist’s theorem is that the sampling rate should be more than twice the highest frequency that is being recorded. This is why 44. 1kHz is used to record audio where the highest frequency is 20kHz. Section 3: A peripheral is a device which is connected to a computer and used to put information on to or receive information from the computer.

Examples include an audio interface or a MIDI keyboard. An audio interface is a device that allows a source sound, for example a voice, to be recorded

by connecting the instrument and recording equipment (e. g. a microphone) to a computer.

In order to get MIDI messages into and out of the computer a MIDI interface is required. This can be in the form of a USB port connection. However, many audio interfaces have a MIDI input/output connection. This means that a MIDI keyboard controller or a synth can also be connected to it. With a MIDI interface the computer sends MIDI messages to the MIDI interface which in turn sends it to the attached instrument and this is how MIDI software can play MIDI instruments. A MIDI interface contains a MIDI input and a MIDI output.

This is where cables are connected to send the messages to and from the computer and MIDI instrument. An operating system manages peripherals using programs called drivers. A peripherals driver must be downloaded to a computers operating system for the computer to manage that peripheral. The driver manages communication between the peripheral and the computer, directs where communications from the peripheral are to be sent and turns the peripheral on and off. Section 4: A music sequencer is a piece of hardware or software that can record, edit and play back music. A sequencer works by executing tasks related to note information, such as pitch or timbre, given usually in the form of audio or MIDI.

Hardware sequencers are easier to use and tend to be used in live performances of studio sessions. Hardware sequencers work in a similar way to a control interface where a command can be entered and executed. Hardware sequencers have similar basic functions as software-based

programs. This includes recording, playback and editing functions. Software sequencers are more commonly used nowadays. This is because they can use the processing power of modern computers more effectively. Software sequencers usually allow for more control over more settings, such as levels, which is in contrast to most hardware sequencers.

Often today many DAW programs, such as Pro Tools or Logic, have built in software sequencers. Mixing and editing an audio or MIDI track(s) can involve balancing levels, cutting unwanted parts of the track, adding effects etc. Tracks can be mixed in mono, stereo or surround sound.

The approach to mixing and editing tracks largely depends on personal taste and genre and the person doing the mixing will mix the track to their liking. Once a final mix is reached the mix then needs to be bounced down into a single audio track file. Sampling is where a section of audio is extracted from an already existing piece of music. This can be as little as a drum beat or guitar riff. In essence it can be described as ‘ copying’ and ‘ pasting’.