

October 12, 1998

VS-840 Synchronization

The VS-840's built-in synchronization capabilities allow you to integrate the VS-840 with other recording and/or MIDI devices in your studio. For example, you can synchronize the VS-840 with another recording device, such as the VS-880, to gain more recording tracks. You can also synchronize the VS-840 with your MIDI sequencer, enabling you to record non MIDI instruments such as acoustic guitar or vocals along with your MIDI sequences. The purpose of this document is to demonstrate the synchronization capabilities of the VS-840. First, we will provide definitions of some of the common terms related to synchronizing recording devices. Next, we will show you how to synchronize the VS-840 with the VS-880. Then, we will show you how to setup the VS-840 to synchronize with a drum machine. Finally, we will show how to setup the VS-840 to synchronize with a computer sequencer.

I. Common Terms

The following is a list of terms you might encounter regarding the VS-840 and synchronization:

Digital Clock	Digital Clock is a timing reference on digital recording devices that is generated from an internal quartz crystal oscillator. It is used to provide timing stability during the recording process. Whenever a signal is recorded digitally between two devices, the clock signal from the source device is used for the timing reference. This ensures that there will be no timing irregularities during the recording process.
MIDI Clock	MIDI Clock is a stream of digital timing pulses that provides information about the current tempo of a song or sequence. It is commonly used with hardware sequencers and drum machines. While it is commonly used by many devices today, it is not precise enough to control a hard disk recorder like the VS-840. However, the VS-840 can generate MIDI Clock to control other devices. MIDI Clock works in conjunction with other MIDI messages including Start, Stop, Continue, and Song Position Pointer.
MIDI Machine Control (MMC)	MIDI Machine Control consists of controller messages sent from one device to another via MIDI to start recording, playing, and arming tracks for recording. This communication data does not contain any timing information.
MIDI Time Code (MTC)	MIDI Time Code is a synchronization signal that is digitally sent through MIDI for synchronization of absolute time between audio devices. Similar to SMPTE, MTC can have different frame rates for synchronization. MTC can be converted to SMPTE time code by using a device such as the Video Syncman by MIDIMan. See SMPTE for more details.
SMPTE	SMPTE is an acronym for Society of Motion Picture and Television Engineers. It also refers to a common standard for measurement of intermodulation distortion (IM), and for a standard reference code for identification of frames of film or videotape; SMPTE code is also used for synchronization of two or more audio tape recorders. See SMPTE Time Code for more details.
SMPTE Time Code	A synchronization code developed for video designed for frame edge lockup of multiple video and audio devices. SMPTE is calculated in Hours:Minutes:Seconds:Frames. There are several different types of SMPTE frame rates, i.e.: 30 frames per second, 29.97 fps non-drop, 29.97 fps drop, 25 fps (European standard), and 24 fps (used for film). The VS-840 supports all types of MTC which corresponds to all types of SMPTE. You will need to use the MIDIMan 'Video Syncman' unit to interface between a SMPTE source and the VS-840. The VS-840 will also resolve (exactly lock to) the frame edge of the SMPTE or MTC. This means that the lock will not drift or go out of sync even if the song or project is very long.

II. Syncing the VS-840 with the VS-880 Using MIDI Machine Control and Digital Clock

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