Synchronization

SE-03-0988

SMPTE synchronization

You can synchronize any Synclavier sequence to film or video using SMPTE time code.

This section is a brief overview of SMPTE; complete instructions for synchronizing to SMPTE are in the manual *Studio Operations*.

SMPTE time code

SMPTE* time code is a digital sync signal that keeps track of elapsed time with a 24-hour clock. SMPTE allows you to locate any event in a sequence and play back or record in sync from that point.

The video and film industries use four time code modes, each of which is used for synchronization to a different type of visual medium. Each mode measures elapsed time in **frames per second (fps).**

Non-drop SMPTE (30 fps)	American black-and-white video.
Drop-frame SMPTE	American color.
25-frame SMPTE (25 fps)	European video.
24-frame SMPTE (24 fps)	American and European film..

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* SMPTE stands for the Society of Motion Picture and Television Engineers.

For further information on SMPTE time code, see Walter A. Hickman, *Time Code Handbook*, Boston: Cipher Digital, 1984.

Preparing to receive SMPTE time code

When triggering the current sequence from incoming SMPTE time code, the time format must be set to SMPTE and the SMPTE mode selected.

1. Select SMPTE time format on the Sequence Editor Locator panel.

2. Select Settings from the Sequence Editor Commands panel.

   The Settings dialog appears in the dialog panel.

3. Step or scroll the SMPTE Mode field to select the desired mode.

   The field steps through the four modes.

   Drop Frame
   Non-Drop
   25-Frame
   24-Frame

If the selected mode does not match the incoming time code, an error message appears.

Incoming SMPTE signal does not match SMPTE mode.

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Setting a SMPTE offset

A SMPTE offset defines the start time of the sequence.

To assure precise synchronization of the first click of the sequence, there should be a pre-roll SMPTE signal of at least one second before the SMPTE starting time used for playback. For example, if the SMPTE signal recorded on tape starts at 00:00:00:00.00, the starting time for playback of the sequence should be at least 00:00:01:00.00.

To set the offset time

1. Click in the Offset field in the Settings dialog.

2. Type in a SMPTE offset time or nudge segments of the SMPTE offset time to the desired values.

You can nudge the offset time while the sequence is playing to precisely control the time relationships between the sequence and taped tracks.

Recording or playing back a sequence with SMPTE

Once the SMPTE time format is chosen, the correct SMPTE mode selected and an offset time set, you can record a sequence synchronized to incoming time code.

1. Feed the SMPTE time code source into the SMPTE IN jack on the Synclavier control unit.

2. Click RECD.

   The sequence does not start; it is waiting for the incoming time code to trigger it. If you play on the keyboard, the notes do not sound.

3. Start the SMPTE time code.

   If the incoming time code starts before the SMPTE offset time, the sequence waits for the offset time before beginning. If the incoming time code starts after the offset time, the sequence automatically advances to the correct time.

Note: While SMPTE is turned on, all motion control buttons are inactive except for START and RECD. The MARK switch is also inactive, although mark points remain in memory.

MIDI synchronization

You can synchronize the Synclavier to any MIDI device using MIDI synchronization.

This section is a brief overview of MIDI synchronization; complete instructions for recording with MIDI are in the manual *Studio Operations*.

Setting MIDI synchronization

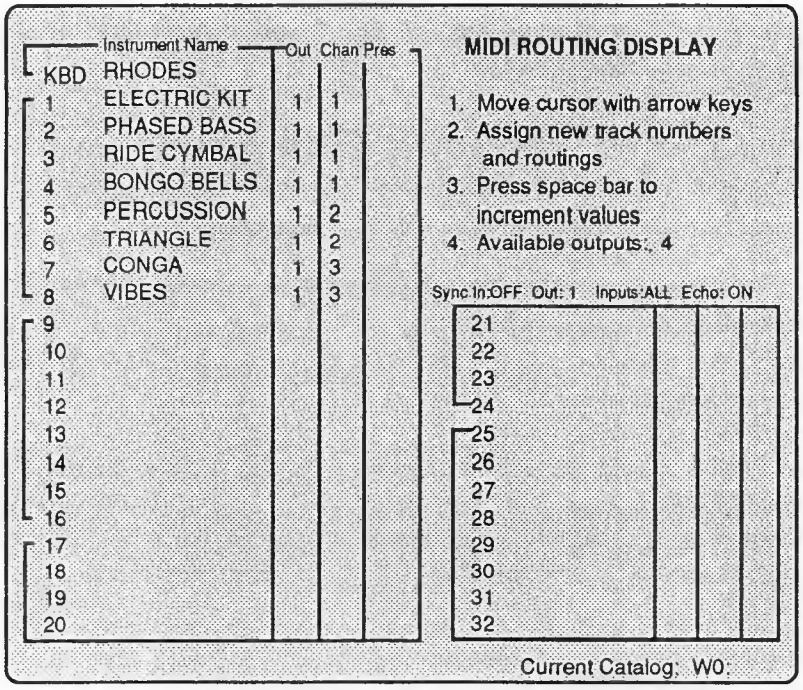
When the Synclavier is connected as a slave to a MIDI network, you turn on MIDI synchronization input using the MIDI Display. You can also select a specific input channel.

1. Select the Sync In: field.
2. Press the Spacebar to toggle the field to INPUT.
3. If you want to receive MIDI data on a specific channel, select the Inputs: field and type in the desired channel number.

   Any incoming MIDI sync signal is automatically sent out through the MIDI OUT port to which the current timbre is routed.

   If you do not want the signal sent out, select the ECHO field and toggle it to OFF.

The Sync In setting is set to OFF whenever a new timbre is recalled.


Instrument Name
Out Chan Pres
KBD RHODES
1 ELECTRIC KIT 1 1
2 PHASED BASS 1 1
3 RIDE CYMBAL 1 1
4 BONGO BELLS 1 1
5 PERCUSSION 1 2
6 TRIANGLE 1 2
7 CONGA 1 3
8 VIBES 1 3
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20
MIDI ROUTING DISPLAY
1. Move cursor with arrow keys
2. Assign new track numbers and routings
3. Press space bar to increment values
4. Available outputs: 4
Sync In:OFF Out: 1 Inputs:ALL Echo: ON
21
22
23
24
25
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27
28
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31
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Current Catalog: W0:

Synchronizing to audio

You can synchronize a sequence to an external source using external synchronization modes other than SMPTE and MIDI.

This section is a brief overview of audio synchronization. Complete instructions are in the manual *Studio Operations*.

The 50 Hz and beat modes

Two modes are available for synchronizing the current sequence to audio tape.

- The **50 Hz mode** synchronizes the sequence to a series of pulses at a frequency of 50 pulses per second. Each pulse is 10 milliseconds wide.
- The **beat mode** synchronizes the sequence to a pulse with a frequency determined by the current click rate and click rate multiplier settings. Each pulse is 15 ms wide.

You can generate either of these signals for recording onto the sync track of a multitrack tape recorder. You can then feed the signal back into the Synclavier and record a sequence synchronized to the tape recorder.

Synchronizing a Synclavier sequence to tape

When you synchronize the system to tape, you need tape machines capable of recording and playing tracks independently. Three-head machines must have a **sync** mode which allows the use of the RECORD head as a PLAY head.

Step 1. Select the beat sync or 50 Hz synchronization mode.

The selected mode determines the signal produced at the EXTERNAL SYNC OUT jack.

Step 2. Connect the EXTERNAL SYNC OUT jack through a pulse conditioner to the sync input channel of the tape recorder.

Step 3. Record a sync track on tape that is as long as the sequence you want to synchronize.

Step 4. Feed the sync channel output of the tape recorder into the EXTERNAL CLOCK IN jack on the Synclavier.

Step 5. Start the Memory Recorder.

The sequence in the Memory Recorder waits for the incoming sync signal.

Step 6. Start the tape recorder.

As soon as the signal is received at the EXTERNAL CLOCK IN, the sequence plays. When the signal stops, the sequence stops.