Appendix II · Using Timecode

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>What Is Timecode?</td>
<td>AII-3</td>
</tr>
<tr>
<td>Timecode and the SSL Studio Computer</td>
<td>AII-3</td>
</tr>
<tr>
<td></td>
<td>AII-4</td>
</tr>
<tr>
<td>Timecode Standards</td>
<td>AII-4</td>
</tr>
<tr>
<td>Timecode Wiring</td>
<td>AII-4</td>
</tr>
<tr>
<td>Generating Timecode</td>
<td>AII-4</td>
</tr>
<tr>
<td>Synchronisation</td>
<td>AII-5</td>
</tr>
<tr>
<td>Synchronised Audio Machines</td>
<td>AII-6</td>
</tr>
<tr>
<td>Synchronised Audio and Video Machines</td>
<td>AII-6</td>
</tr>
<tr>
<td>Things To Remember</td>
<td>AII-7</td>
</tr>
</tbody>
</table>
Appendix II

Introduction

This appendix provides a general introduction to the use of timecode and includes instructions, aimed at new users of the SSL Studio Computer, for recording timecode on audio or video tape.

What is Timecode?

Timecode is an electronic digital signal that is recorded on to an audio, cue or timecode channel of a tape machine.

The purpose of timecode is to provide a method of uniquely 'labelling' audio, video and magnetic film media. These labels allow sections of the tape to be located automatically and provide information to allow more than one tape machine to be synchronised. Timecode can thus be thought of as 'electronic sprocket holes'.

Each section of the tape is labelled by a 'time' consisting of hours, minutes, seconds and frames. Each second is divided into multiples of frames for more precise identification. The number of 'frames per second' is determined by the timecode standard selected.

Timecode is based on the 24 hour clock. At midnight the timecode reverts to zero hours, zero minutes, zero seconds and zero frames i.e. 00:00:00.00.

Timecode and the SSL Studio Computer

The SSL Studio Computer has the ability to control a single tape machine transport. Using tach and timecode, the computer can 'autolocate' to a specific and unique point (address) on the tape. Timecode is only read by the computer when the tape machine is in PLAY. When the machine is spooling, the computer interprets tach pulses generated by the machine's transport to determine the approximate position of the tape. The computer also uses timecode and tach to generate the necessary timing references used in the Mix System.
Timecode Standards

The SSL computer will operate with four standards of timecode:

<table>
<thead>
<tr>
<th>Standard</th>
<th>Frame Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>FILM</td>
<td>24</td>
</tr>
<tr>
<td>EBU</td>
<td>25</td>
</tr>
<tr>
<td>Dropframe (DF TC)</td>
<td>29.97</td>
</tr>
<tr>
<td>SMPTE</td>
<td>30</td>
</tr>
</tbody>
</table>

Briefly: 24 frame FILM (EBU) is for use in Film applications, 25 frame EBU is the standard devised by the European Broadcast Union for audio and video applications. 30 frame SMPTE and 29.97 DF TC are timecode standards devised by the Society of Motion Picture and Television Engineers and are in common use in the USA and Japan.

Although the SSL Studio Computer will only generate 25 frame EBU and 30 frame SMPTE, it is capable of reading all the above standards.

Timecode Wiring

Patchbays on the SL 4000 and 6000 Consoles are fully wired to accommodate timecode sends and returns for up to three machines. The output of the SSL Studio Computer timecode generator appears at the point SMPTE GEN. For use in a single machine installation this should be connected to the appropriate machine input. The input of the SSL timecode reader is labelled READ. This should be connected to the appropriate machine output. Where a SSL Synchroniser System is fitted, all necessary timecode interconnections will be prewired. As the SSL Studio Computer reads timecode, it automatically re-shapes code that will appears on the patch at the SMPTE GEN point.

SL 5000 consoles have timecode send and return XLR connectors provided on the main connector panel of the computer mainframe.

Generating Timecode with the SSL Studio Computer

The SSL Studio Computer can be used to generate timecode, although if you have the SSL Synchroniser System option, you can leave the computer free to do other tasks by using the Synchroniser timecode generator.
In order to generate timecode from the SSL, first select the timecode standard by entering the frame rate (25 or 30) in the Session page of the Setup Menu (see Appendix I). Then:

Patch the timecode generator output on the patchbay to the appropriate machine input

Note: timecode generated by the Studio Computer is set to output at the correct level for most applications. For some tape machines it may be necessary to increase the level through a channel on the console.

Select the machine or console local track Record Ready

Press the RECORD ENABLE key (by the computer keyboard)

To start timecode generation:

Type: STRIPE or SMPTE or EBU (whatever takes your fancy) EX

The instructions on the screen will prompt you for further information. You can select from three options:

To start the timecode from 00:00:00.00 automatically

To start the timecode from a specified time

To start the generator in sync with an externally produced timecode signal fed into the timecode reader input. This option is initiated by pressing the JOIN key and is used when an existing section of recorded timecode has to be lengthened.

When you have finished recording the code, pressing the CANCEL key stops the timecode generator and returns the computer to normal operation.

Synchronisation

The SSL Studio Computer can be fitted with the SSL Synchroniser System which enables the computer to control and synchronise up to five machines.

Typical uses include locking audio to video, so that audio tracks may be laid down in 'lip sync' and running two multi-track audio recorders together to provide additional tracks.
Once timecode has been recorded on all machines, the synchroniser reads timecode from one machine, referred to as the 'Master', and compares it with that of the other machines, which are the 'slaves'. Speed control signals are applied to the slaves in order to synchronise them to the master. The master machine does not usually receive speed control signals and would normally be the VTR in a video production system. When running two or three audio tape recorders in parallel, any machine can be the master.

Using Synchronised Audio Machines

When distributing an audio recording between two timecode-locked audio tape recorders, variations in sync of fractions of a frame interval may be clearly audible as phasing effects. For this reason the accuracy of the lock must be at least one hundredth of a frame interval and where possible, similar sounding melodic or harmonic tracks and stereo pairs should be on the same machine.

The SSL Synchroniser System has a mode of operation called SLOW LOCK which ensures that any corrections applied to the slave machine to maintain the lock are applied slowly so as not to give rise to audible frequency shifts. This mode should be selected in the Synchroniser page of the Setup Menu, if the master timecode track contains dropout errors.

Synchronised Audio and Video Machines

When synchronising audio tracks to video, the system is much more tolerant of short term variations in sync and often up to one complete frame interval of error is acceptable. However, a sub-frame or bit offset adjustment may usefully be employed to trim the lip-sync.
Things To Remember

1. First decide upon the correct timecode standard, bearing in mind the difficulties in converting to alternative standards at a later date.

2. Record timecode at the same tape speed as the material to be recorded on the other tracks.

3. Make sure that the timecode track cannot be accidentally erased, by placing that channel of the recorder in 'Record Safe' mode.

4. Do not physically edit the tape once continuous code has been recorded; the Mix System will not tolerate discontinuous code.
Now, go back and DO this manual at least once each month for the next two years.