



## Preparing Line 21 Data

The Scenarist DVD authoring software package supports Closed Captioning (Line 21) data for CC, TEXT, and XDS information. Although some early-model DVD players do not support Line 21, most players manufactured today do support it. The Line 21 data is embedded in the digital MPEG-2 video stream as *user data*. DVD players that support Line 21 extract this information and modulate it into the out-bound video signal for decoding by the attached television. Players that do not support Line 21 simply ignore the extra data in the stream. Line 21 data can be modulated by the DVD player into either Field 1 or Field 2 of the video signal, depending on the nature of the Line 21 content. Field 1 contains the data for CC1 & 2 and TEXT1 & 2. Field 2 contains the data for CC3 & 4, TEXT3 & 4, and XDS.

To include Line 21 data in a DVD title, it is necessary to include the data for each field in a separate Scenarist Closed Captioning (.SCC) file, as described below. The data within this file must correspond to the EIA-608 specification, RECOMMENDED PRACTICE FOR LINE 21 DATA SERVICE. (This document may be purchased online via <http://global.ihc.com>.)

### SCC File Format

The Scenarist Closed Captioning (.SCC) file contains the exact text “Scenarist\_SCC V1.0” on the first line of the file, and is case sensitive. Subsequent lines should contain the time code (HH:MM:SS:FF) of the beginning of the caption followed by the caption data in 2-byte (4-digit) hexadecimal format, as shown below:

```
Scenarist_SCC V1.0
01:02:53:14    94ae 94ae 9420 9420 947a 947a 97a2 97a2 a820 68ef f26e 2068 ef6e 6be9 6e67 2029 942c 942c 8080 8080 942f 942f
01:02:55:14    942c 942c
01:03:27:29    94ae 94ae 9420 9420 94f2 94f2 c845 d92c 2054 c845 5245 ae80 942c 942c 8080 8080 942f 942f
```

Each 2-byte grouping will occupy the Line 21 position for one video frame. The first 2-byte pair on the line will appear in the video frame defined by the time code at the beginning of the line. Each subsequent pair will occupy the subsequent video frames.

Each 2-byte pair includes either a single Line 21 control code or two character codes (as defined in EIA-608). The lower order seven bits of each byte contain the actual control code or character data. The eighth bit (MSB) includes the parity for the byte. For example, the value 0x94ae in the sample above would translate to the Line 21 control code ENM (0x142e) when the parity bit is stripped out of each byte.

The same file format is used for both Field 1 and Field 2 Line 21 data. Each file is specified separately from within the authoring software (see “Line 21 Switch 1” and “Line 21 Switch 2,” respectively). Scenarist makes no attempt to interpret the Closed Captioning data within the SCC files. It simply adds it byte-for-byte as *user data* in the final multiplexed video stream. If Scenarist encounters any problems reading the file(s), it will issue an error message when the file is first added to the project. If there are any playback problems of the Closed Captioning data, it is due to having invalid Line 21 data in the files or a poor video connection between DVD player and television.