The Open Captioning & Closed Captioning Solution
For Digital Video & Streaming Media
(Takes the Place of Closed Caption Encoder Hardware)

CCaption-DV
CCaption-NLE

(Windows 98/XP/2000 & Macintosh OS 9)

Includes patented [#6,895,166] software engine

Version 5.2

User's Guide

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The Industry Leader Since 1985

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Overview

This User Manual is intended for both the Macintosh version as well as the Windows version of CCaption-DV and CCaption-NLE. Where a program feature is only applicable to the Macintosh version the term "(Macintosh only)" is used. Where a feature is only applicable to the Windows version the term "(Windows only)" is used.

With CCaption you can:

- Add close-captioning, television program rating information and Interactive Television links to your video program during the editing process without the need for special purpose encoding hardware.
- Generate open captions for your streaming QuickTime and RealVideo movies.
- Generate closed captions and ITV Links for DVD media.
- Add open captions to your video material.
- Decode closed captions in existing digital video material The CCaption software program can interactively generate single closed captions and Interactive Television links. It can also read a previously prepared closed caption ASCII text description file to generate multiple closed captions, open captions and streaming QuickTime and RealVideo captions. Description files can be created using any standard text editing software. CCaption can also accept data files produced by the CPC Window's based CaptionMaker® software (*.onl) and Cheetah Systems' Captivator software (*.asc).

CCaption reads and writes a variety of closed caption and open caption file descriptions. It also directly produces closed captioned video with the use of a non-linear editing system or a computer capable of editing Digital Video.

Adding Closed Captions for NLE and DV Editing Systems

CCaption allows non-linear editing systems as well as DV editing systems to directly produce closed captioned video.

Captions for a QuickTime Text Track

CCaption will put open captions directly into the text track of a QuickTime movie. This text will appear whenever the QuickTime movie is played. Besides the text itself you can also specify the font, text positioning and text size in a CCaption description file.

Captions for Real Video

CCaption will generate a RealNetwork text description file that can be associated with a RealVideo data file. The text will appear as the video is being displayed by the end user.

Captions for DVD

CCaption will generate a closed caption description file that can be used in conjunction with a DVD authoring system to put closed captions onto DVD.

Open Captions

In addition to generating closed captions, CCaption can also put an exact representation of the closed caption text that will appear on the customer's television receiver into an external data file. You then place these images directly onto your video program from within a computer video editing system. This allows you to easily make open captions from a previously constructed closed caption description file.

Decoding Closed Captions

CCaption can decode the closed captions that are present in a DV movie. These captions are placed in a text file along with the approximate time code of where they appear.

Adding Closed Captions (How it really works)

CCaption will directly add closed captions to video in the Digital Video format and in the Non Linear Editing system format. Digital Video or DV format is video that is transferred in and out of the computer via a FireWire or an IEEE 1394 interface. Non Linear Editing system or NLE format is video that is edited using more traditional non-linear editing hardware such as Avid and Media 100. Note that Avid Xpress DV is DV format and not NLE format since it gets its video via an IEEE 1394 interface. If you purchased CCaption-NLE you received the NLE processing mode as well as the CCaption-DV processing mode.

DV processing adds closed caption data directly into a special 2 byte storage area located within the DV data stream.

NLE processing creates a new QuickTime or AVI file (Windows only) containing a 2-D graphical image of the closed caption data. The data in this file is then combined with your video material by using your non-linear editing system. The NLE processing mode can not be used to add close-caption data to a DV movie. This is because the image size of the DV format is 720x480 pixels and a size of 720x486 is required to properly handle closed caption data in picture form.

You must use the Digital Video options within CCaption to add closed captions to video data stored in DV format. When processing Digital Video, CCaption copies a pre-existing DV QuickTime data file such as one created by Apple Computer's Final Cut Pro or iMovie, Adobe Systems' Premiere, or Digital Origin's MotoDV into a target DV data file while modifying the file's embedded closed caption data storage area.

The resulting movie is then written to a MiniDV, DVCAM, or DVCPRO videocassette and played in a VCR. The VCR puts the embedded closed caption data area onto line 21 of the video signal so that a closed caption decoder will recognize it. Digital Video cameras generally do not interpret this embedded closed caption data area. You must playback your videocassette on an appropriate VCR to recreate the closed captions.

The Digital Video processing mode only deals with video data that is formatted with the DV-NTSC codec. With the exception of the user specified closed caption data all pre-existing closed caption data in the input DV data file is copied to the target DV data file.

The NLE processing mode creates a new QuickTime or AVI movie using the codec of your choice. Each frame within the movie is mostly black with a couple of lines of gray scale information towards the top of each frame and a couple of lines of gray scale information towards the bottom of each frame. These lines are the 2-D pictorial representation of VBI (Vertical Blanking Interval) line 21 closed caption control codes.

This movie is then imported into your non-linear editing system where through the use of a picture-in-picture effect or crop effect two of its lines are merged with your video program material. On output the NLE takes care of mapping the closed caption information to line 21 of the VBI. The NLE must support a 720x486 pixel frame size for this to work properly. Video editing hardware from Avid, Media 100, Matrox and Pinnacle Systems, among others, supports this capability. For a Windows system to produce a QuickTime movie QuickTime must be installed. The DV processing mode as well as NLE processing mode is selected by the dialog box that shows up after pressing Process in the CCaption Control Window.

Feature Comparisons

Features	**CCaption-DV**	**CCaption-NLE**
Closed captioning with Avid, Media 100, TARGA and DigiSuite, AJA Io, Video Toaster etc.	No	Yes
Add Closed Captions to Digital Video (DV25)	Yes	Yes
Add captions/subtitles to video to be played by 1. QuickTime Player 2. RealVideo Player	Yes	Yes
Generates DVD closed caption description file (to be used with a DVD authoring systems like) 1. Sonic Solutions 2. Spruce 3. Apple DVD Studio Pro. Etc.	Yes	Yes
DV FireWire input and output	Yes	Yes
Retrieve closed captions from 1. DV25video 2. DV Video via FireWire	Yes	Yes
Direct open caption insertion into DV QuickTime movies	Yes	Yes

Hardware & Software Requirements

Macintosh

CCaption-NLE requires CCaption-DV requires a Macintosh G4 or higher and an iMac with a minimum of 512 MB of RAM, 32 bit QuickDraw, QuickTime 6.0 (not 7.0) and OS System 9.

Windows

CCaption-NLE and CCaption-DV require a minimum of 512 MB of RAM, Windows 98/XP/2000 and QuickTime 6.0.

To add closed captions using a non-linear editing system the NLE must be capable of

- 720x486 pixel resolution, and
- Mapping two lines from the 2-D visual space onto line 21 of the television vertical blanking interval (VBI).

Many NLE systems, such as Avid, Media 100, TARGA and DigiSuite, AJA Io, Video Toaster support this type of closed captioning.

CCaption can also put closed caption data directly into a finished digital video, QuickTime movie. When this QuickTime movie file is put onto a digital video tape, the playback digital video VCR reconstructs the closed captions from the closed caption data inserted by CCaption. Many digital video VCRs will work with CCaption.

CPC Protection Key (CPK)

A CPC Protection Key (USB type) is supplied with CCaption software. The CPK must be attached to a USB port on the computer for CCaption to work. CCaption is protected by this hardware.

After you install CCaption software, you need to install the driver (HASP) for the CPC protection key. All CPC software is protected by a USB hardware key. The hardware key is manufactured by Aladdin. The most recent driver for the keys may be found at the following link: http://www.ealaddin.com/support/hasp/hasp4/enduser.asp

Warning: If you lose the CPC Protection Key, you will not be able to run the software! You will have to pay a hefty price to replace it. You may move the Protection Key from computer to computer, allowing different users to operate the CaptionMaker software on different computers, but only one user may run the software at a time.

You may also get the driver from the CPC software distribution CD.

HASP Driver Installation

CPC software distribution CD has a folder containing two files – one for Windows and one for Macintosh.

After you run the Hasp driver software you are ready to run CCaption. You must have the USB CPC software protection key attached to a USB port.

CCaption-DV

CCaption-DV works with DV25 video. You can create your DV video in any NLE system or simply import from a video tape format.

The following VCRs and video cameras can be used with CCaption-DV to put DV closed caption data onto analog video.

- Panasonic AJ-D650, AJ-D455
- SONY DHR-1000
- SONY DSR-11, DSR-20, DSR-30, DSR-40, DSR-80
- SONY GV-D300 portable
- SONY DCR-TRV110, TRV720, TRV820 Digital8 camcorder
- SONY DVMC-DA1 and DVMC-DA2 Media Converter

The following VCRs and Video Cameras are NOT able of directly displaying the output of CCaption-DV. These VCRs and Video Cameras can be used to record closed captioned Digital Video onto videotape even though you can not playback the video with captions from these machines. However, after recording on one of these machines, you can then use one the machines listed above to play back the video with captions or record it with captions onto analog tape (like VHS).

- CANON XL-1 camcorder
- SONY DSR-PD100
- SONY DSR-85
- Panasonic AG-DV1000

Compatibility Check for Captioning DV

There are many other hardware devices, which work with CCaption. To check whether CCaption works with your specific hardware:

Take a commercial video with closed captions and save it on your hard drive uncompressed. Now send the uncompressed video out of your computer to a TV with its closed caption decoder turned on. If you see captions, your hardware is most likely compatible, and you should proceed to step 2.

CCaption-NLE

CCaption-NLE/MPEG has been tested and works with the following video non-linear editing systems.

- AJA Io LA
- Avid Symphony and SOFTIMAGE DS
- Avid Media Composer and Avid Xpress with the ABVB hardware board
- Avid with Meridien hardware
- Avid with Adrenaline hardware
- Blackmagic DeckLink Extreme
- Media 100 Finish
- Media 100 Macintosh Release 5 and above
- Matrox DigiSuite hardware including
    - Adobe Premiere RT
    - Discreet edit
    - In-sync Speed Razor RT
    - IMC Incite
    - United Media On-Line Express
- NewTek Video Toaster 3
- Pinnacle Systems
    - TARGA 1000 PRO
    - TARGA 2000 RTX
    - TARGA 2000 DTX

- TARGA 2000 PRO
- TARGA 2000 SDX
- TARGA 3000

Compatibility Check for Captioning with NLE systems

There are many other hardware devices, which work with CCaption.

Complete Check

Take a commercial video with closed captions and save it on your hard drive uncompressed. Now send the uncompressed video out of your computer to a TV with its closed caption decoder turned on. If you see captions, your hardware is most likely compatible, and you should proceed to step 2.

Alternate Check

If you do not have a video with closed captions, you may download four sample black movies (Sample NLE 720x486 black movies with closed captions) with closed captions created by CCaption from www.ccaption.com/nccdownload.shtml. Now send the uncompressed video out of your computer to a TV with its closed caption decoder turned on.

Each movie uses its own specific setting. These settings can be found by going to the NLE tab under Preferences in CCaption and selecting the appropriate NLE preset. There are two small movies and two big movies. The difference is whether or not each NLE preset sets the "Small QuickTime" check box.

Note: All video editing systems that natively edit in QuickTime DV are compatible with CCaption.

Software Installation

Quick Start

For those of you in a hurry, we suggest that you read the chapter Overview to acquaint yourself with the general operation of CCaption.

Included Files

- quickstart.txt Getting started quickly with CCaption.
- CCaptionManual.pdf This file is in PDF format.
- CCaption Executable program.
- Alpha Mask Image file that can be used to isolate the VBI data line.
- Welcome.txt Sample closed caption description file.
- Demo.onl Sample CPC-715 CaptionMaker onl file
- Demo_DV_720x480.avi Sample 720x480 avi file
- DVD folder Sample DVD caption files created by CCaption
- RealVideo folder containing sample realtext file

Installation

Macintosh users: To install the CCaption software double click on the CCaption installer icon and follow the instructions.

Windows users: To install the CCaption software double click on the setup.exe icon and follow the instructions. When you start CCaption for the first time you will be asked to personalize your copy. Please enter the requested information.

CPC Protection Key (CPK)

A CPC Protection Key (USB type) is supplied with CCaption software. The CPK must be attached to a USB port on the computer for CCaption to work. CCaption is protected by this hardware.

Warning: If you lose the CPC Protection Key, you will not be able to run the software! You will have to pay a hefty price to replace it. You may move the Protection Key from computer to computer, allowing different users to operate the CCaption software on different computers, but only one user may run the software at a time.

After you install CCaption software, you need to install the driver (HASP) for the CPC protection key. All CPC software are protected by a USB hardware key. The hardware key is manufactured by Aladdin. The most recent driver for the keys may be found at the following link: http://www.ealaddin.com/support/hasp/hasp4/enduser.asp

For Windows CCaption Software
If you have an internet connection to the computer you are running the CCaption software, you can install the driver for the USB key via internet.

After you install the CCaption, go to Start > Program > CCaption > Install HASP USB Driver. You will see a window poping up. After a few seconds, you will be informed that the HASP driver is installed successfully.

If you do not have internet connection to the computer, you can get the driver from the CPC software distribution CD.

HASP Driver Installation
CPC software distribution CD has two folders - one for Windows one for Mac.

Folder: HASP_Setup_ForWindows
File > HASPUserSetup.exe
File > HASPUserSeup-CommandLine.exe

Folder: HASP_Setup_ForMacOS-9-X
File > HaspDriverForMacOS-9-X.sit.hqx

You run the appropriate file on your computer.

Now you are ready run the CCaption software. You must have the USB CPC software protection unit attached to a USB port.

HASP not working: Remove all drivers

If somehow the HASP driver is corrupted, you need to uninstall the driver and install it again. You might need to force remove the driver to make sure to remove all drivers, in case more that one driver had been installed at different times.

Importing a Third Party Caption File

If you are working with a video longer than about 30 seconds, you should have a prepared time coded caption file. CCaption can accept the following types of caption files.

- CaptionMaker file (*.onl) from CPC (Computer Prompting & Captioning Co.)
- Captivator file (*.asc) from Cheetah Systems, Inc.
- DVD binary file (*.cc or *.scc)

If you are working with a video 30 seconds or less, you may create a caption file directly inside CCaption as explained in the chapter for *Working with a Short Video.*

If you are working with a video longer than 30 seconds or so and do not have a third party prepared caption file, you may create a CCaption Description file as explained in the chapter *Creating CCaption Description File.*

CPC CaptionMaker (*.onl) File

To generate an Online description file do the following steps within the CaptionMaker software. From the **File Menu** choose the Export option and then select “CPC-715 Online File (*.onl)”.

Cheetah (*.asc) File

Generate a “.asc” description file according to the Captivator software manual.

Take the saved file to the computer running the CCaption software, and in the CCaption Control Window select **Reset**. Next click the “Take Input from” check box and select the appropriate input source from the “Take Input from” pop up menu. Cheetah software users should select **Cheetah "*.asc." file**. CPC software users should select **CPC-715 Online File “*.onl”**. Click on the **Select** button, navigate to the file you wish to use and then choose **Open**. In the Control Window select a Time Code Offset if appropriate. Use **Verify** to check your input data file and then use **Process** to generate a DV, QuickTime or AVI output file.

DVD Binary (*.scc, *.cc) Caption File

All DVD authoring systems use a binary file (*.cc and *.scc) to add captions to a DVD. Most Captioning software like CaptionMaker and MacCaption can produce these files.

Working with a Short Video

If you are working with a video 30 seconds or less, you may create a caption file directly inside CCaption as described in this chapter.

If you are working with a video longer than 30 seconds or so and do not have a third party prepared caption file, you may create a CCaption Description file as explained in the chapter *Creating CCaption Description File.*

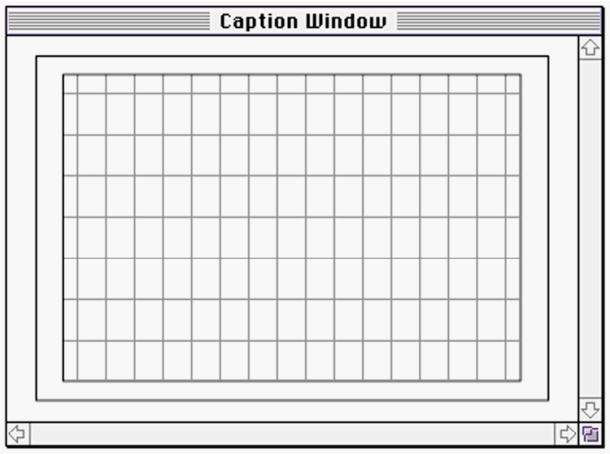
If you are working with a long video, you should have a prepared time coded caption file. CCaption can accept the following types of caption files.

- CaptionMaker file (*.onl) from CPC (Computer Prompting & Captioning Co.)
- Captivator file (*.asc) from Cheetah Systems, Inc.
- DVD binary file (*.cc or *.scc)

The WYSIWYG Editor

The **Caption Window** from the main screen allows you to create and edit one closed caption at a time. Generating one closed caption at a time is an effective method for adding closed captions to short video programs using an NLE. Longer form programs and adding multiple closed captions to DV data is more easily accomplished with data description files.

The Caption Window has a superimposed grid and represents a TV screen where you can see the location of each character position you may modify. The size of the Caption Window may be changed in the **Special** pull down menu.



The Caption Window supports five different closed caption data formats: **Pop-on**, **Paint-on**, **Roll-up 2**, **Roll-up 3** and **Roll-up 4**. You can change modes by using the buttons under the **Take Input from**: **Caption Window** selection in the Control Window.

When you first start CCaption you are in Pop-on mode. Pop-on mode is indicated by a single input cursor that appears at the location you click on in the Caption Window. By clicking at a different location within the Caption Window you can change the input cursor location.

Using Pop-on Mode
To use the Pop-on mode, click at a location in the Caption Window and begin typing. Your text will appear as you type. The return key drops you down a line and positions the text input cursor directly under the start of the previous row of characters. To change the look of the text, click and drag over the text to select the characters you wish to modify and then choose a new style from the **Style** menu. You can highlight groups of characters in the Caption Window and use the arrow keys to move them wherever you want. Shift-arrow moves highlighted characters 4 times as fast. **Edit:Cut**, **Edit:Copy** and **Edit:Paste** work within the Caption Window.

When you are satisfied with the placement of text in the Caption Window, select **Take Input from** and choose **Caption Window** in the Control Window. Then select the **Process** button in the Control Window.

A file name consisting of your starting text characters is created as a prototype file name in the file save dialog box as a way of helping you create a unique file name reference for your data. If you wish to include Rating or Program Information along with your closed caption data select these options in the Control Window.

Using Roll-up Mode
The Roll-up mode is indicated by a vertical line two, three or four rows in height in the Caption Window. The base row line is a light colored gray line. Directly above it are solid vertical lines that indicate the extent of the Roll-up window. Roll-up 2 mode has a vertical line two rows high, Roll-up 3 mode has a vertical line three rows high and Roll-up 4 mode has a vertical line four rows high. In Roll-up mode, text can only be entered at the bottom most row, the base row. While in Roll-up mode you can change the text input base row by option clicking in the Caption Window.

Edit:Cut, **Edit:Copy** and **Edit:Paste** work within the base row in Roll-up mode. When you wish to save your base line of text, type a return character in the Caption Window or select **Process** in the Control Window. CCaption then will then generate an output file representing the base row Roll-up text input line.

There is one level of Undo in the Caption Window. The **Edit:Clear** command will clear the Caption Window of all highlighted characters.

Macintosh users
The process output file dialog allows you to select Sequential PICT file output. Since there are 30 frames per second and 60 seconds per minute, there are 1800 frames each minute. Therefore it is easy to generate many PICT files for a very small closed caption. The software will not allow you to generate more than 9,999 PICT files at a time.

To assist in text placement use the **File:Open** command to superimpose a background image in the Caption Window. The background image size should be 720 x 486.

Placing individual closed captions on the Timeline
If you are creating individual captions you must import each of your QuickTime files into your NLE. For Pop-on mode closed captions in the timeline you should position the tail end of each imported file at the beginning of the respective spoken dialog. Captions are placed this way because Pop-on text should appear on the screen just before the dialog is spoken. In the Pop-on mode a caption pops on the screen all at once, as soon as the last character of the caption is sent to the closed caption decoder.

In contrast, Roll-up text appears on the television screen as the characters are being received and it is natural for Roll-up captions to appear as they are being spoken. For this reason the beginning of a file containing Roll-up captions should be positioned at the beginning of the spoken dialog.

You should follow the steps outlined in the chapter for Exporting Captions for NLE systems **to merge the imported data with your program material.**

Closed caption information will remain on a television screen for a few seconds after the time it is first displayed. You generally want closed caption text to remain on the screen until the next closed caption text is displayed. To accomplish this you need to fill the space between each text caption with idle frame data. Additionally, it is necessary to maintain synchronization between the closed caption decoder and the television broadcast signal for the duration of the program. This is accomplished by putting continuous idle frame data between each imported closed caption.

Idle frame data can be created by selecting **Reset**, entering the needed **Duration**, and selecting **Process** in the Control Window. Be sure to put the same video effect on each idle frame clip as was done for each closed caption.

Closed caption data can be immediately erased from the screen by the use of an End Caption command directive.

Macintosh users
An End Caption sequence can be created by selecting **Reset**, then **Take Input from** and then **Text I/O Window** in the Control Window. The single line "*ERASE" is entered into the Text I/O Window and then **Process** is pressed in the Control Window. Place the resulting movie on the timeline where you want the caption to disappear.

Windows users
An End Caption sequence can be created by selecting **Reset**, then **Take Input from** and then **CCaption Description File** in the Control Window. Create a text file with the one line "*ERASE" in it, **Select** the file from the Control Window and then use **Process** to generate a QuickTime or AVI movie. Place the resulting movie on the timeline where you want the caption to disappear.

It is very important to use the idle frame clip in front of, in between and behind all of the manually placed closed caption segments you have entered onto the timeline. Failure to do so may result in random captions or no closed captions being decoded by the television receiver.

Positioning each closed caption and idle frame QuickTime video segment on the time line is only necessary when doing manual captioning. When using a Text I/O Window or an external description file as input all of the intermediate idle frames are automatically generated in the output file.

Closed Captioning Text Considerations

The purpose of closed captioning is to provide clear and readable text of the accompanying dialog so that hearing impaired individuals can understand a program's content without needing to hear any sound. The text should be displayed in an easy to understand manner and should be readable and uncluttered. For a basic understanding and appreciation of closed caption text placement, enable closed caption decoding on your TV, turn down the sound and watch network TV broadcasts of programs that are closed captioned.

If you do this you will notice the following:

1. All text is white characters on a black background. There is rarely any colored text used.
2. Dialog spoken by someone on the screen is all in CAPITAL LETTERS.
3. All sentences end with a punctuation mark of some kind.

The closed caption transmission protocol will insert from one to three spaces before a character style change. Usually a style change space is hidden by a naturally occurring text space, however, if you place multiple style changes on a single word you may find the end of the preceding word is overwritten by one or two spaces. If this happens you need to put additional spaces before your newly stylized word.

Closed caption decoders will display a maximum of four lines of text. If you attempt to display more than four lines of text at the same time undefined results may occur.

Creating CCaption Description File

If you are working with a video longer than 30 seconds or so and do not have a third party prepared captions file available for the video, you may want to create a CCaption Description file. This is a much more convenient way to insert captions onto a video than creating captions one by one as described in the chapter *Working with a Short Video*.

If you are working with a long video, you should have a prepared time coded caption file. CCaption can accept the following types of caption files.

- CaptionMaker file (*.onl) from CPC (Computer Prompting & Captioning Co.)
- Captivator file (*.asc) from Cheetah Systems, Inc.
- DVD binary file (*.cc or *.scc)

Creating Description File and a Text I/O Window

Macintosh users
Closed caption commands can be processed from an on-screen **Text Window** or from an external **CCaption Description File**. In either case the command directives are the same. For example, you can use Text Window input for composing command scripts on the fly and use an external description file for more lengthy command scripts. You can use the standard Macintosh cut and paste commands with the on-screen Text Window to import data from other software applications. The total number of characters that can be processed in an on-screen Text Window is limited to approximately 32,000.

Windows users
Closed caption commands can be processed from an external **CCaption Description File**. This file can contain a series of command directives that are processed by CCaption.

The generation of accurate closed captioning is dependent on having a complete and error free description of the closed caption information. The **Verify** button in the Control Window allows you to check the syntax and data of a closed caption description file. You should repeatedly use the **Verify** function on a given description file until all of the detected errors have been eliminated. Once the verification is error free you should then use the **Process** option.

The following are examples of closed caption description files:

Lines that start with ** are comments. Lines that start with * are command directives.

Example #1

```
** This is a complete description file to generate
** 2 line Roll-up closed captions with a delay of
** 1 second between each caption. The closed captions
** are left justified on row 15 at column 4.
*NonDropFrame
*Delay 1:00
*TimeCodeOffset 0:00:00:00
*NoProgramName
*NoProgramType
*NoProgramLength
*NoRating
*RollUp2
*Left 15,4
FIRST LINE OF DIALOG.
SECOND LINE OF DIALOG.
THIRD LINE OF DIALOG.
FOURTH LINE OF DIALOG.
FIFTH LINE OF DIALOG.
```

There is no automatic text wrap around when generating Roll-up captions, so be sure to have a return character in your closed caption description files at each place you want the text to Roll-up. The maximum number of characters that can be displayed by a closed caption decoder is 32 characters per line. Television closed caption decoders do not wrap around.

Example #2

```
** This is a complete description file to generate a
** Pop-on closed caption sequence with time code
** positioning for each caption.
*NonDropFrame
*TimeCodeOffset 0:00:00:00
*Duration 30:00
*NoProgramName
*NoProgramType
*NoProgramLength
*NoRating
*PopOn
*Center 15,16
** This is the first Pop-on caption
*TC 00:00:10:05
FIRST LINE OF DIALOG.
SECOND LINE OF DIALOG.
** This is the second Pop-on caption
*TC 00:00:15:21
THIRD LINE OF DIALOG.
** This is the third Pop-on caption
*Right 3,30
*TC 00:00:19:00
FOURTH LINE OF DIALOG.
FIFTH LINE OF DIALOG.
*Erase 00:00:24:10
```

A summary of command directives can be found in APPENDIX.

The following pull down menu commands are available:

File Menu*

New	Command-N	Create a new Text Window
Open	Command-O	Open an image and put in View Window
Close	Command-W	Close window
Save	Command-S	Save current window
Save As	Save current window in a new file	
Quit/Exit	Command-Q	Quit the application

*New, Open, Close, Save and Save As are only applicable to the Macintosh version of CCaption

Edit Menu

Undo	Command-Z	Undo last operation
Cut	Command-X	Cut text and put in clipboard
Copy	Command-C	Copy text to clipboard
Paste	Command-V	Paste text from clipboard
Clear	Clear the window	
Select All	Command-A	Select All text
Preferences		Set preferences

Style Menu

Plain	Set text style to Plain	
Italic	Command-I	Set text style to *Italic*
Underline	Command-U	Set text style to Underline
Flash	Set text style to Flash	

Align Left	Command-L	Align text at left edge of screen
Align Middle	Command-M	Align text at horiz. center of screen
Align Right	Command-R	Align text at right edge of screen
Align Bottom	Command-B	Align text at bottom edge of screen

White	Set character color to White
Green	Set character color to Green
Blue	Set character color to Blue
Cyan	Set character color to Cyan
Red	Set character color to Red
Yellow	Set character color to Yellow
Magenta	Set character color to Magenta

Special Menu

Safe Titles	Command-F	Toggle Safe Title in Caption Window
Grid	Command-G	Toggle Grid in Caption Window
Half Size Screen	Command-0	Set Caption Window to Half Size
Normal Size Screen	Command-1	Set Caption Window to Full Size

Special Characters

Caption text may contain certain special characters. These special characters can be generated either with a '\' backslash character in combination with a second character or with a specific combination of Macintosh keyboard characters.

Character desired	**Backslash combination**	**Specific Macintosh keyboard combination**
á	\'a	Option-e then a
à	\`a	Option-` then a
â	\^a	Option-i then a
é	\'e	Option-e then e
ê	\^e	Option-i then e
ç	\c	Option-c
í	\'i	Option-e then i
î	\^i	Option-i then i
Ñ	\N	Option-n then N
ñ	\n	Option-n then n
ó	\'o	Option-e then o
ô	\^o	Option-i then o
ú	\'u	Option-e then u
û	\^u	Option-i then u
÷	\=	Option-=
°	\o	Option-shift-8
¢	\$	Option-4
£	\l	Option-3
®	\r	Option-r
™	\t	Option-2
1/2	\v	Option-v
¿	\?	Option-shift-?
Music note	\b	Option-b

Arrow keys Shift selected text in the indicated direction

The \E character can be used to indicate the end of a multi line pop up or Paint-on caption.

Changing Character Styles

Caption text may contain special character styles such as color, italic, underline or flash. Style information is inserted into a closed caption by the use of the '\' (backslash) character and a specific style code.

To change the character color of the text of a line use the following codes before the first character whose color you wish to change. Capitalization is required.

White	\W
Green	\G
Blue	\B
Cyan	\C
Red	\R
Yellow	\Y
Magenta	\M

To change to italic use \I
To change to underline use \U
To change to flashing use \F

A character style change takes affect until the end of the given line. All lines begin with the default of white characters and a plain character style.

To return to plain style before the end of a line use \P

Command Directives

An external description file or an on screen Text I/O Window (Macintosh only) can contain all of the information necessary to create closed captions, program rating, and interactive television links for a video program.

When processing a command line the following rules are followed:

- Lines that contain no characters, including no blank characters, are ignored.
- Lines that begin with a single asterisk '*' character are keyword lines.
- Lines that start with two asterisk characters '**' are treated as comments and can be used for file annotation.
- All other lines are text data lines.
- Keywords may be entered in upper case or lowercase characters. For example, the keywords "*DROPFRAME", "*dropframe" and "*DropFrame" are equivalent.

- The time code data fields are of the form HH:MM:SS:FF or +HH:MM:SS:FF. Time codes are interpreted from right to left so a time code data field with one number, such as 15, indicates 15 frames and a time code data field with two numbers, such as +45:15, indicates an additional 45 seconds and 15 frames from the current time marker.

The bracket characters, '[' and ']', indicate optional parameters in each of the keywords and they should not be typed. A summary of all of the keywords can be found in Appendix.

CCaption recognizes the following keywords:

*DROPFRAME
*DF

Indicates the time code values in this file are to be interpreted as drop frame time codes.
Example: *DF
This command causes subsequent absolute time code data to be interpreted as drop frame time code values.

*NONDROPFRAME
*NDF

Indicates the time code values in this file are to be interpreted as non drop frame time codes.
Example: *NDF
This command causes subsequent absolute time code data to be interpreted as non drop frame time code values.

*POPON

Indicates the subsequent text lines are to be interpreted as Pop-on closed caption data.
Example: *POPON
This command causes subsequent closed captions to be displayed with Pop-on mode.

*PAINTON

Indicates the subsequent text lines are to be interpreted as Paint-on closed caption data.
Example: *PAINTON
This command causes subsequent closed captions to be displayed with Paint-on mode.

*ROLLUP2,*ROLLUP3, ROLLUP4
*RU2, *RU3, *RU4

Indicates the following text lines are to be interpreted as Roll-up closed caption data with a window size of 2, 3, or 4 rows.
Example: *ROLLUP2
This command establishes Roll-up 2 as the current closed caption mode.

*LEFT r[, c]
*L r[,c]
*LEFTLEFT r[, c]
*LEFTCENTER r[, c]
*LEFTRIGHT r[, c]

Indicates left edge alignment of caption information at position r,c. Row numbers range from 1 to 15 and column numbers range from 1 to 32. The left keyword must precede the actual text data. If the column number is omitted the previous column number is used.
Example: *LEFT 4,6
This command places text so that its left edge is located at Row 4 and Column 6.
The leftcenter and leftright directives will cause the longest row to be left justified and the remaining rows to be center justified or right justified respectively around the longest row.

*RIGHT r,[c]
*R r[,c]
*RIGHTRIGHTr[, c]
*RIGHTLEFT r[, c]
*RIGHTCENTER r[, c]

Indicates right edge alignment of caption information at position r,c. Row numbers range from 1 to 15 and column numbers range from 1 to 32. The right keyword must precede the actual text data. If the column number is omitted the previous column number is used.
Example: *RIGHT 12,28
This command places text so that its right edge is located at Row 12 and Column 28.
The rightleft and rightcenter directives will cause the longest row to be right justified and the remaining rows to be left justified or center justified respectively around the longest row.

*CENTER r[,c]
*C r[,c]
*CENTERCENTER r,[c]
*CENTERLEFT r,[c]
*CENTERRIGHT r,[c]

Indicates center alignment of caption information around the indicated row and column. Row numbers range from 1 to 15 and column numbers range from 1 to 32. The center keyword must precede the actual text data. If the column number is omitted the previous column number is used.
Example: *CENTER 15,16
This command places text on row 15 in such a way that the horizontal center of each caption line is located at Column 16. Row numbers range from 1 to 15 and the column numbers range from 1 to 32. The left keyword must precede the actual text data. If the column number is omitted the previous column number is used.

The centerleft and centerright directives will cause the longest row to be center justified and the remaining rows to be left justified or right justified respectively around the longest row.

*IMMEDIATE r,c
*I r,c

Forces the left edge of the next caption to be positioned at row r column c. Both the row and column must be specified. Row numbers range from 1 to 15 and the column numbers range from 1 to 32. This command must immediately precede the actual text data. The row and column numbers are in effect for this operation only.

Example: *IMMEDIATE 10,4
This command positions the left edge of the next caption at Row 10 Column 4.

*CAPTIONGROWDOWN
*GROWDOWN
Indicates that the caption row grows down from a row number.
Example: *GROWDOWN

*CAPTIONGROWUP
*GROWUP
Indicates that the caption row grows up from a row number.
Example: *GROWUP

*ITVLINK
*ITV
Indicates the following data lines are to be interpreted as an Interactive Television crossover link.
Example: *ITV
<http://www.ccaption.com>[n:CPC]
<http://www.whitehouse.gov>[n:See Congress]
A checksum field of the form [XXXX] is automatically generated and appended to the input data if it is not present.

*TIMECODE [+]HH:MM:SS:FF
*TC [+]HH:MM:SS:FF
*T [+]HH:MM:SS:FF
Set the current time marker to the indicated time code data value. If the plus (+) character is present, the current time marker is advanced by the indicated amount.
Example: *TC 10:15
Set the time marker to 10 seconds, 15 frames.

*ERASE[+] [HH:MM:SS:FF]
*E [+][HH:MM:SS:FF]
Erase the current caption from the screen at the indicated time code.
Example 1: *ERASE 1:5:10
This example will set the time marker to 1:05:10 and erase the screen at that time. If the time code data portion of this keyword is not included, the erase command will erase the screen at the current time marker. For example, the above erase command is equivalent to:
*TC 1:5:10
*ERASE
Example 2: *ERASE +2:10
This example will advance the time marker by 2 seconds 10 frames and cause the screen to be erased.

*PAD [MM:SS:FF]
Increase the current time code index by the indicated amount. If no time code value is specified the PAD command defaults to one second.

Example: *PAD 0:25
This command will advance the current time code index by 25 frames.
Example: *PAD
This command will advance the current time code index by 1 second.

*DELAY HH:MM:SS:FF
Set the amount of time to insert between rollup text lines if no TIMECODE keyword is present between each rollup data line.
Example: *DELAY 1:05
This command will insert a 35 frame delay between text Roll-up lines.

*DURATION MM:SS:FF
Set the total duration of the generated video data.
Example: *DURATION 10:00:00
This command will cause the generated video to be 10 minutes in length. Video frames at the end are filled with rating data and program information data if specified.

*TIMECODEOFFSET HH:MM:SS:FF
*TCOFFSET HH:MM:SS:FF
Establishes an offset value for all of the absolute time code values in a description file.
Example: *TCOFFSET 1:30:00:00
This command establishes 1 hour 30 minutes as the offset value for all absolute time code numbers in a description file.

*PARENTALGUIDERATING [Y,Y7,G,PG,14,MA,NONE][FV,V,S,L,D]
*PGRATING [Y,Y7,G,PG,14,MA,NONE][FV,V,S,L,D]
Indicates U.S. Parental Guidelines television rating information. One of the following values must be selected Y, Y7, G, PG, 14, MA and NONE. One or more of the following values may be selected FV, V, S, L and D.
Example: *PGRATING 14
This example will establish TV-14 Parental Guide rating information for this program.

*MOTIONPICTUREASSOCIATIONOFAMERICARATING
[NA,G,PG,PG13,R,NC17,X,NR]
*MPAARATING [NA,G,PG,PG13,R,NC17,X,NR]
Indicates Motion Picture Association of America movie rating information. One of the following values must be selected NA, G, PG, PG13, R, NC17, X and NR.
Example: *MPAARATING PG13
This example will establish PG13 MPAA rating information for this program.

*CANADIANENGLISHLANGUAGERATING [E,C,C8,G,PG,14,18]
*CERATING [E,C,C8,G,PG,14,18]
Indicates Canadian English Language rating information. One of the following values must be selected E, C, C8, G, PG, 14, 18.
Example: *CERATING PG
This example will establish a PG Canadian English Language rating for this program.

*CANADIANFRENCHLANGUAGERATING [E,G,8,13,16,18]

*CFRATING [E,G,8,13,16,18]

Indicates Canadian French Language rating information. One of the following values must be selected E, G, 8, 13, 16, 18.

Example: *CFRATING E

This example will establish an E Canadian French Language rating for this program.

*NORATING

Turns off program rating generation at the current time index.

Example: *NORATING

*PROGRAMNAME NAME

Specifies program name information. The name must be between 2 and 32 characters in length.

Example: *PROGRAMNAME THE AVENGERS

This example will set the program name to “THE AVENGERS”.

*NOPROGRAMNAME

Turns off program name generation at the current time index.

Example: *NOPROGRAMNAME

*PROGRAMLENGTH HH:MM

This command specifies the programs running time. It should indicate the scheduled length of the show.

Example: *PROGRAMLENGTH 30

This example sets the scheduled program length to 30 minutes.

*NOPROGRAMLENGTH

Turns off program length data generation at current time index.

Example: *NOPROGRAMLENGTH

*PROGRAMTYPE [Basic Keywords][Detail Keywords]

This command sets the program type to the value of the parameters. At least one basic keyword must be chosen. Some detail keywords may be chosen. The hex codes associated with each of the keywords may be used in place of the actual descriptive keyword. No more than 32 keywords may be selected.

See Appendix for a list of the Basic Keywords, Detail Keywords and corresponding hex codes.

Example: *PROGRAMTYPE ENTERTAINMENT,34,55,SPECIAL

This example sets the program type to the basic keyword “entertainment” with the detail keywords “comedy”, “international” and “special”.

*NOPROGRAMTYPE

Turns off program type generation at the current time index.

Example: *NOPROGRAMTYPE

Exporting Captions to DV & NLE Systems

Overview

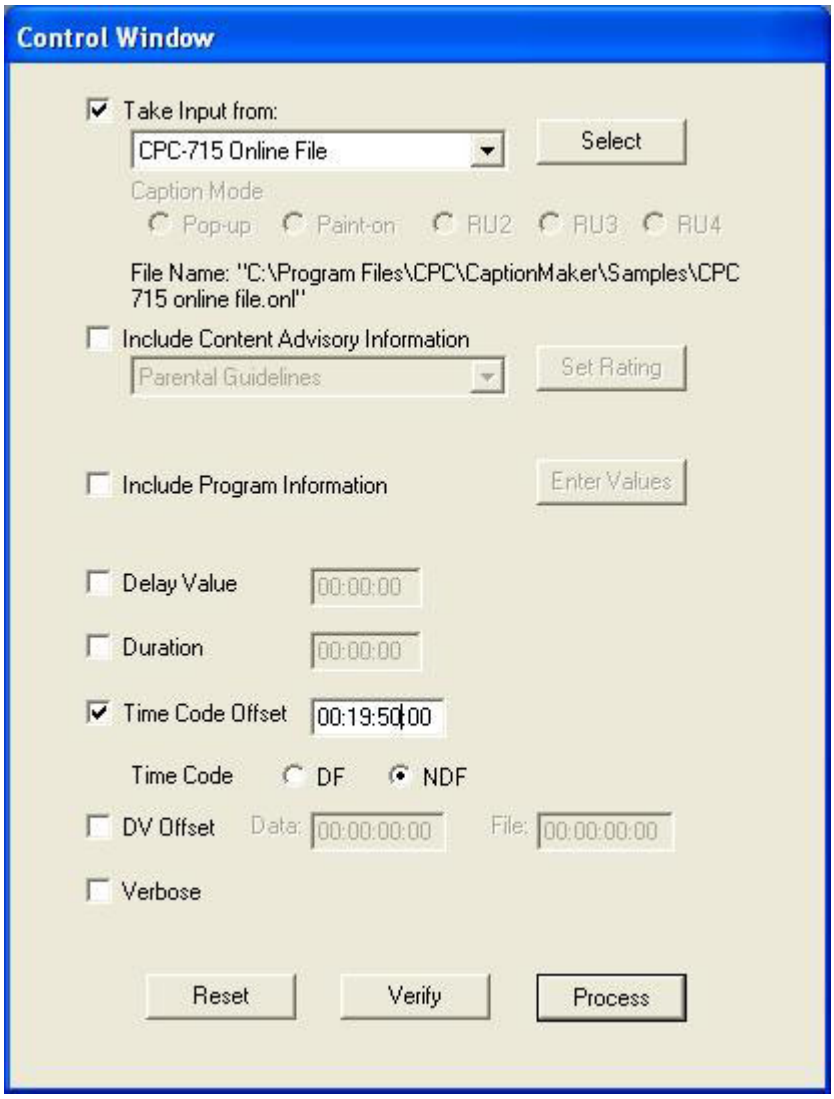
With CCaption you can

- Add closed captioning, television program rating information and Interactive Television links to your video program during the editing process without the need for special purpose encoding hardware.
- Generate open captions for your streaming QuickTime and RealVideo movies.
- Generate closed captions and ITV Links for DVD media.
- Add open captions to your video material.
- Decode closed captions in existing digital video material The CCaption software program can interactively generate single closed captions and Interactive Television links. It can also read a previously prepared closed caption ASCII text description file to generate multiple closed captions, open captions and streaming QuickTime and RealVideo captions. Description files can be created using any standard text editing software. CCaption can also accept data files produced by CPC (Computer Prompting & Captioning Co.) CaptionMaker® and Cheetah Systems' Captivator software.

CCaption reads and writes a variety of closed caption and open caption file descriptions. It also directly produces closed captioned video with the use of a non-linear editing system or a computer capable of editing Digital Video.

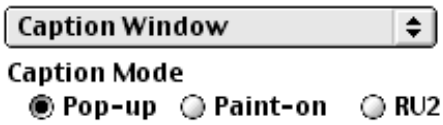
The Control Window

When starting CCaption you are presented with the **Control Window**. This window allows you to control the input source and allows you to specify what specific information the output file will contain.



The **Take Input from** check box allows you to choose whether or not to process input data and the source of that data. You may choose from among the following input source options in this pop up menu.

Choose



to generate a single caption. You must also select whether you want Pop-up, Paint-on, or 2, 3 or 4 Row Roll-up captions.

Choose

to process a list of command directives from a local on-screen text window. (Macintosh only)

Choose

to generate an output file consisting of a single Interactive Television Link.

Choose

to take a list of command directives from a user produced text file.

Choose

to interpret command directives from a ".asc" file produced by the Captivator™ software from Cheetah Systems, Inc.

Choose

to interpret command directives from an Online file produced by the CaptionMaker® software from CPC - Computer Prompting & Captioning Company.

Choose

to read a DVD closed caption description file.

The **Include Content Advisory Information** check box allows you to choose whether or not to include content advisory information and allows you to manually specify that information. CCaption supports the following rating systems:

- Parental Guidelines
- Motion Picture Association of America
- Canadian English Language
- Canadian French Language
- Only one rating system may be used at a time. A description of these four rating systems and how to generate them can be found in the chapter for WebTV Links and V-Chip.

The **Include Program Information** check box allows you to choose whether or not to include Program Title, Type, Length, and Time-In-Show information and allows you to manually specify that information. A complete description of the Program Information Window can be found in the chapter for WebTV Links and V-Chip.

The **Delay Value** check box defines the amount of time in minutes, seconds and frames, MM:SS:FF, to insert between closed captions if no other explicit time code directive is

encountered. To make use of the Delay Value with Pop-on and Paint-on captions, the \E, end of caption code must be used as the last characters in each closed caption text block.

The **Duration** check box defines the minimum running time of the generated output file in QuickTime and AVI mode. The final running time may be slightly more than the amount specified in the duration data field due to closed caption placement timing considerations. For example, you can use a duration of 00:30:00 to make sure a 30 second commercial has a 30 second duration.

Time Code Offset: The CCaption software expects time code values that it reads to be between 00:00:00:00 and 02:00:00:00. The Time Code Offset check box allows the program to process time code values that are outside of this range. The Time Code Offset value is the amount of time to subtract from each explicit time code data value to reduce that value to be in the range of 00:00:00:00 to 2:00:00:00. For example, a data description file may have time code values ranging from 3:00:00:00 to 4:00:00:00. In this case the Time Code Offset value should be set to 03:00:00:00. If a data description file has time code values starting at 1:00:00:00 the Time Code Offset should be set to 1:00:00:00.

Time Code DF and NDF radio buttons: The Time Code DF / NDF radio buttons indicate whether CCaption is interpreting time code values in Drop Frame or Non-Drop Frame Mode. If a CCaption Description file does not contain a DropFrame or a NonDropFrame directive then you can specify the time code mode using one of these two buttons.

DV File Offset and **DV Data Offset** are used when processing Digital Video data. When creating a DV data output file there are two ways to adjust where the closed captioning information that you've created will be placed in a DV data output file.

The **DV File Offset** is where the closed captioning data will be placed relative to the beginning of your *input file* video clip. If you are a video editor, you can think of it as the "in point" for your "record machine", the place in your video clip where you want to begin inserting your closed captioning information. If you are only inserting a single event, like an ITV link, this number should simply be the time code where you want your single event to go. If you are inserting multiple events using a description file, the DV File Offset defines the point in your video clip where the closed captioning data should begin. For example: you have an input video clip that's ten minutes long, but you want your closed captioning data to begin three minutes into the program. The **DV File Offset** should be 3:00:00.

The **DV Data Offset** is used only for description files containing multiple captioning events. You can think of it as the in-point of your source or playback machine, where the source is the caption description file itself. This allows you to use only a part of your description file to build the final video clip. For example: you have a data description file that specifies one hundred captioning events over a span of ten minutes' running time. You have a three minute video clip, and you want to insert the *last* three minutes of captioning data into that clip. The **DV Data Offset** should be 7:00:00.

The **Verbose** check box provides visual feedback of caption text positioning in the Caption Window during the Verify and Process operations. If Verbose is checked each caption is

displayed as it is being processed. The use of this option will cause the Verify and Process operations to take more time since each caption will briefly appear in the Caption Window.

The **Reset** Button clears all of the Check Boxes within the Control Window and also clears all of the associated rating data and program information data.

The **Verify** Button checks all of the information in the input source for consistency and reports errors in an Information Window. All of these errors should be corrected before the final output is generated.

The **Process** Button generates the final output.

Video Size

The Normal View Window size is 720 x 486 in rectangular D1 pixels.

The Half Size View Window is 360 x 243 in rectangular D1 pixels.

Images imported into CCaption should be 720 x 486 in rectangular D1 pixels.

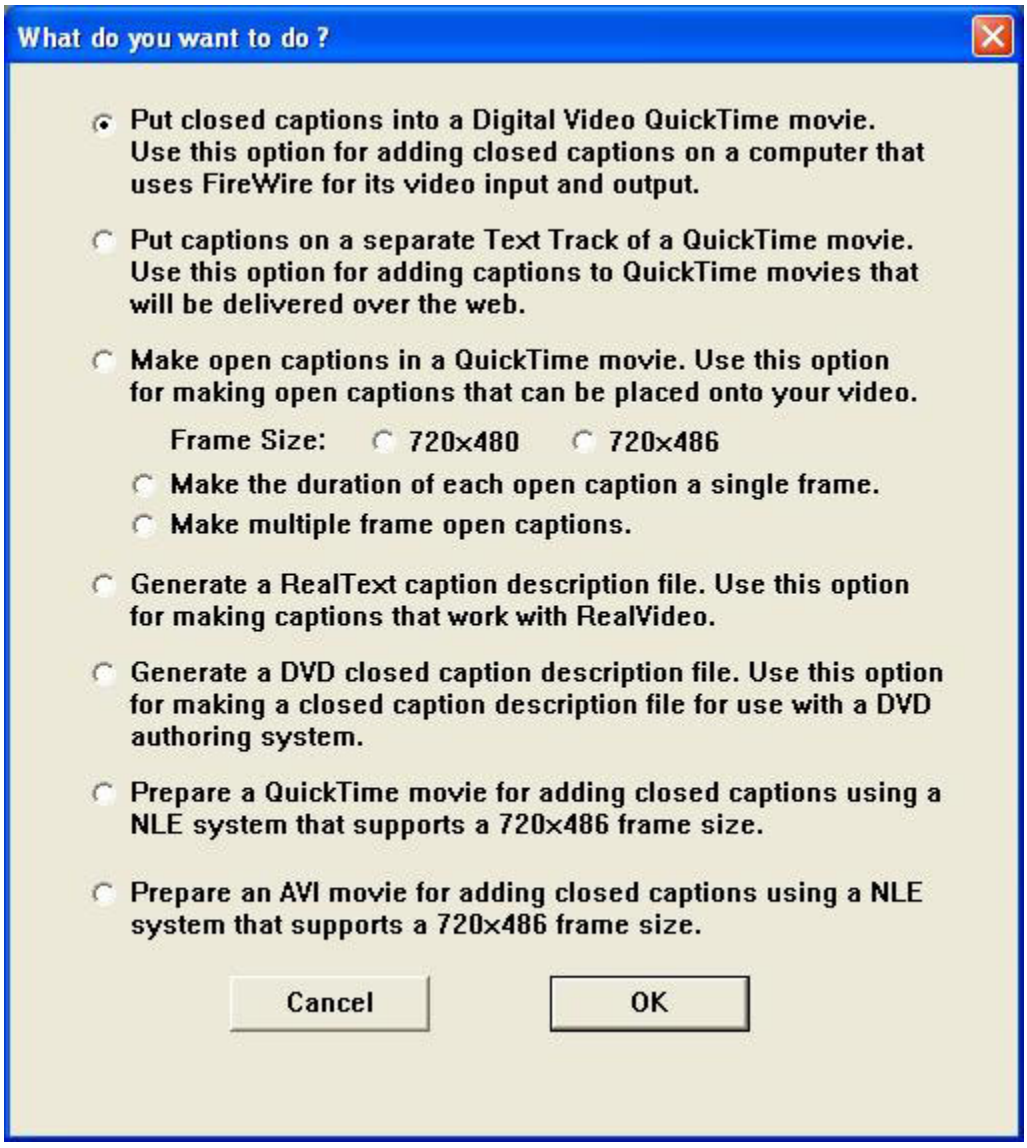
The Preferences box can be used for fine adjustment of closed caption data positioning within a QuickTime or AVI output data file. Once these values are set you should not have to modify them.

Preference fields:

Primary Row	Primary Row for closed caption data output. Range is 0 to 484.
Secondary Row	Secondary Row for closed caption data output. Range is 0 to 484.
Starting Column	Starting column mid point for closed caption data output. Range is 14 to 39.

What to do Next

The **Process** button brings up another dialog that allows you to select what do you want to do.



Your choices are:

- **Put closed captions into a Digital Video QuickTime movie**. Use this option for adding closed captions to DV on a computer that uses FireWire for its video input and output.

Macintosh users: Select an output file name and click Save.
Windows users: Click OK, Select an Output file name and click Save.

You will be presented with another dialog box. In this dialog box enter the Input DV data file name. CCaption will copy the input data file to the output data file inserting closed captions during this process. The output DV data file contains the closed captions.

- **Put captions on a separate Text Track of a QuickTime movie**. Use this option for adding captions to QuickTime movies that will be delivered over the Web.

Macintosh users: Select an output file name and click Save.
Windows users: Click OK, Select an Output file name and click Save.

You will be presented with another dialog box. In this dialog box enter the name of an input QuickTime movie. CCaption will copy the input movie to the output movie inserting a Text Track during this process. The output QuickTime movie will contain the Text Track.

- **Make open captions in a QuickTime movie**. Use this option for making open captions that can be placed onto your video.

Choose the Frame Size: Use 720x480 for DV and 720x486 for NLE.
Select whether the duration of each caption should be one frame long or if the duration of each caption should be the actual number of frames it should be visible on the final video.

Macintosh users: Select an output file name and click Save.
Windows users: Click OK, Select an Output file name and click Save.

You will be presented with another dialog box. In this dialog box select the compressor to use to create the QuickTime movie. The output QuickTime movie will contain the captions. The black background behind the letters is slightly higher in value than the rest of the black background. This allows the use of a luminance key to superimpose these captions onto your video.

- **Generate a RealText caption description file**. Use this option for making captions that work with RealVideo.

Macintosh users: Select an output file name and click Save.
Windows users: Click OK, Select an Output file name and click Save.

The output file will contain a RealText file. See the chapter *Exporting Captions to DVD, QuickTime & RealVideo* for instructions on linking this RealText file with a RealVideo file.

- **Generate a DVD closed caption description file**. Use this option for making a description file that can be used with a DVD authoring system to add closed captions to a DVD movie.

Macintosh users: Select an output file name and click Save.
Windows users: Click OK, Select an Output file name and click Save.

The output file will contain a DVD closed caption description file. See the chapter *Exporting Captions to DVD, QuickTime & RealVideo* for additional information on DVD closed caption description files.

- **Prepare a QuickTime movie for adding closed captions using a NLE system that supports a 720x486 frame size**.

Macintosh users: Select an output file name and click Save.
Windows users: Click OK, Select an Output file name and click Save.

You will be presented with another dialog box. In this dialog box select the compressor to use to create the QuickTime movie. The compressor should be the native compressor type for your NLE system. See the chapter *Exporting Captions for DV & NLE Systems* for combining this QuickTime movie with your video material.

- **Prepare an AVI movie for adding closed captions using a NLE system that supports a 720x486 frame size**. (Windows only)

Click OK, Select an Output file name and click Save. You will be presented with another dialog box. In this dialog box select the compressor to use to create the AVI movie. The compressor should be the native compressor type for your NLE system. See the chapter *Exporting Captions for DV & NLE Systems* for combining this AVI movie with your video material.

- **Prepare sequential PIC files for adding closed captions using a NLE system that supports a 720x486 frame size**. (Macintosh only)

Select an output file name and click Save. CCaption will create sequentially numbered PICT files that contain a pictorial representation of closed caption control codes. These individually numbered files should be used exactly like their corresponding QuickTime counterpart in **Prepare a QuickTime movie for adding closed captions** above.

Be careful when selecting the Sequential PICT files option. This option will produce 900 individual files for a 30 second commercial. The software imposes a 9,999 PICT file count limit. This is about 5 1/2 minutes of video.

The **Verify** and **Process** operations can be aborted by pressing the command and "." keys at the same time (Macintosh only) or by pressing the Cancel button in the Progress dialog box (Windows only).

During **Verify** and **Process** operations error messages are posted to the Information Window. At the conclusion of a **Verify** and **Process** operation the running time of the final movie as well as the elapsed processing time and any errors are displayed in this Window.

More About the Control Window

The Control Window allows you to establish the starting values for rating information and program information. It also allows you to set the starting data values for delay, duration and time code offset. An external description file or a local on-screen Text I/O Window (Macintosh only) can contain commands that can change any of this information. When commands are processed from a text file or from an on-screen Text I/O Window they immediately take precedence over any information that has been manually set in the Control Window data fields.

A QuickTime file containing closed captions can be produced as follows:
A data description file containing closed caption time codes and caption text is prepared and written to a standard text file.

- The Control Window is used to select **Take Input from,** the **CCaption Description File** pop up window is chosen and the **Select** button is used to navigate to the named data description file.

- If **Content Advisory Information** and **Program Information** is not needed, these two check boxes in the Control Window are left blank. If this type of information is desired the appropriate check boxes should be selected and the corresponding information manually specified.

- A **Delay Value**, **Duration** and **Time Code Offset** information is entered if necessary.

- **Verify** is used to correct the data description file of any errors.

- **Process** is used to produce the final output.

A QuickTime file containing only program rating information can be produced as follows:

- Click **Reset** to clear all of the Control Window fields to zero.

- Select **Include Content Advisory Information** and select the type of rating system that is desired, click on the **Set Rating** Button and select the appropriate rating.

- Select the **Duration** check box and enter the desired video duration.

- Select **Verify** and correct any errors.

- Select **Process** to generate the final output.

The Preference Dialog

Video non-linear editing systems from different vendors require specific set up values to generate proper closed caption image data files. The preference dialog is used to set these vendor specific data values. The preference dialog can be found under the **Edit:Preferences** pull down menu.

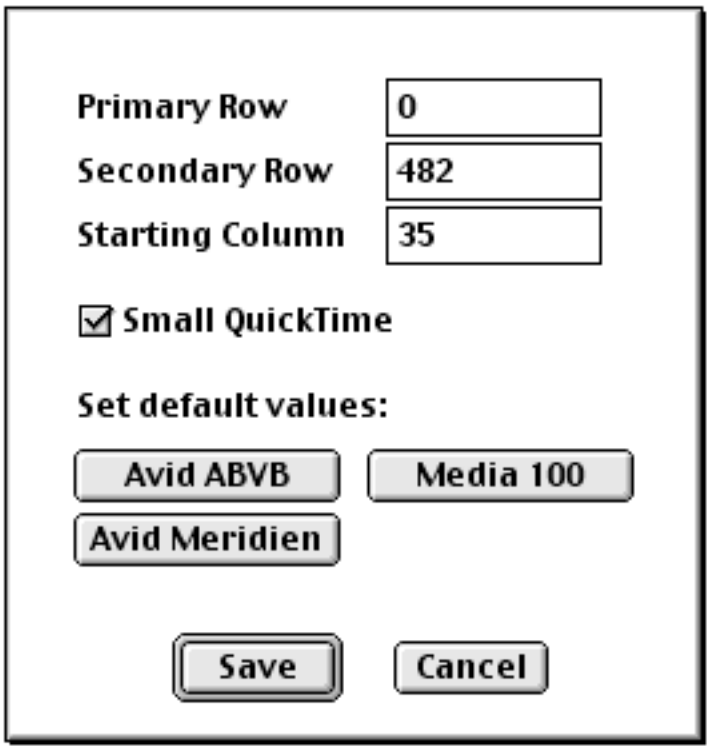
Macintosh users:
Select **Avid ABVB** for an Avid Media Composer with the ABVB hardware board set, select **Avid Meridien** for an Avid NLE with the Meridien hardware board set, or select **Media 100** for an Apple Macintosh Media 100 running system software Release 5. This operation only has to be done once.

Primary Row is the row number where field 1 data will be placed. Field 2 data will be put on Primary Row + 1. The Primary Row data value must be between 0 and 484 inclusive.

Secondary Row is the alternate row number where field 1 data will be placed. Field 2 alternate data will be put on Secondary Row + 1. The Secondary Row data value must be between 0 and 484 inclusive.

Starting Column is the column offset for the center point of the first closed caption clock run-in bit. The Starting Column data value must be between 14 and 39 inclusive.

Small QuickTime allows the generation of QuickTime data files that reuse a previously compressed image frame. For example, the QuickTime frame corresponding to the closed caption binary values of 0, 0 occurs fairly often in a closed caption QuickTime movie. With Small QuickTime selected, when a second 0, 0 frame is about to be compressed a pointer is built into the QuickTime file that references the previously compressed 0, 0 image frame. The use of the previously compressed image frame saves both the time needed to compress the image as well as the space needed to store it. A QuickTime movie file created in this manner is significantly smaller in size than one created without this option, however, not all non-linear editing systems are able to display video that is compressed with these type of previously referenced frames. Deselecting Small QuickTime can turn off this feature.



Windows users
The Windows Preferences dialog box is similar in functionality to the Macintosh Preference dialog box. The main difference is the number and names of the default systems and the addition of a check box labeled Small AVI. The Small AVI check box does for AVI files what the Small QuickTime check box does for QuickTime files. See the preceding description of Small QuickTime.

Inserting Closed Captions into a DV Data File

Prepare a short QuickTime movie using an editing package such as Final Cut Pro or Adobe Premiere.

Click **Reset** in the CCaption Control Window.

In the Control Window, select the **Take Input from** check box and select **CCaption Description File** in the pop up menu. Click the **Select** button and navigate to the **Welcome.txt** file included in this distribution.

Select **Verify** and check for any errors and then select **Process**. Select DV as the output movie type and click **Save**. In the "Select DV Input File" dialog box select your input source movie and click **Open**.

The CCaption program will create the output file and insert the closed captions into it.

Next, take the newly created DV file and put it onto a MiniDV, DVCAM or DVCPRO tape using your editing software. Play the tape in a VCR and the text message

WELCOME TO CCAPTION BY
COMPUTER PROMPTING AND
CAPTIONING CO.

will appear superimposed on your video. If you do not see this message check your monitor's menu and make sure the CC1 mode is selected.

Also, when you play the **Welcome** message be sure to start the playback a few frames before the start of the **Welcome** message clip. All of the clip must be played into a closed caption decoder for the decoder to correctly interpret the message.

If this message does not appear on your monitor see the chapter *Troubleshooting***.**

Inserting Open Captions to a Video

CCaption will generate Open Captions that may be placed onto your video from within a nonlinear editing system. Open captions use the same mono space font that a television will use to display its closed captions.

You can either make the duration of each caption a single frame or make it multiple frames to correspond with the actual video time code with which it should be appearing. The black rectangles behind each of the letter are at a slightly higher video level than the rest of the black background. This allows you to put a luminance key on the open caption and makes it easy to merge it with your underlying video.

Closed Captions and NLE Systems

Non-Linear Editing system format / NLE format is video that is edited using more traditional non-linear editing hardware such as Avid and Media 100. Note that Avid Xpress DV is DV format and not NLE format since it gets its video via an IEEE 1394 interface.

Use the **Black 720x486 NLE Movie with Closed Captions** option under the File Export menu to add closed captions to video stored in the NLE 720x486 format. The NLE processing mode creates a new QuickTime movie using the codec of your choice. Each frame within the movie is mostly black with a couple of lines of gray scale information towards the top of each frame and a couple of lines of gray scale information towards the bottom of each frame. These lines are the 2-D pictorial representation of VBI (Vertical Blanking Interval) line 21 closed caption information.

From the **Preferences menu** you can change the image file data generation lines. You must specify the type of NLE system you are using in the **Preferences menu** before creating a black 720x486 NLE Movie.

When exporting the black video, choose the Codec used by the NLE system which is going to import the black video, otherwise choose Animation Codec. For example, if you are using Avid system, make sure you have Avid Codec on the computer you are running CCaption. If you do not have that Codec, you can get the proper Codecs from:
www.avid.com/onlineSupport/browse.asp?productID=92&topicID=404&browse=go

This black 720x486 movie is then imported into your non-linear editing system, where through the use of a picture-in-picture effect or crop effect, two of its lines are merged with your video program material. On output, the NLE maps the closed caption information to line 21 of the VBI. The NLE must support a 720x486 pixel frame size for this to work properly. Video editing hardware from Avid, Media 100, Matrox and Pinnacle Systems, among others, supports this capability.

The NLE processing mode cannot be used to add closed captions to a DV movie. This is because the image size of the DV format is 720x480 pixels and a size of 720x486 is required to properly handle closed caption data in picture form.

Notes on Animation Codec

Animation codec is lossless. When you compress an image with the animation codec it preserves all of the data. You should not use this codec on normal video because it generates very big files but since the NLE file is about 98% black the animation codec is very good for this purpose.

The millions of colors+ generates a movie that contains an alpha track. The resulting video will contain 32 bits per pixel (8 bits for each of R, G, B and alpha). A millions of colors video only contains R, G and B data. Millions of colors+ makes the file 33% bigger (24 bits to 32 bits per pixel) but it also means that you can use an alpha track effect on the imported clip when you import the movie into your NLE. It is not necessary to use millions of colors + if you do not use alpha channel to merge the black video to your NLE video.

If you use Animation codec, the **Quality** option should not do anything since it is lossless but it should be at 100% anyway.

Black Video File Size If you use Animation codec or any uncompressed codec to generate the black video, the size of the file would be enormous. If you need to transfer the file to a different location, it is advisable to zip the file before transfer, Typically the file will be reduced to less than 5% of the original file.

Alpha Channel You can select either AVI file output or QuickTime file output if QuickTime is installed. The selection of “Millions of Colors+” in the QuickTime codec dialog box will generate a 32-bit output file containing an alpha channel. Other output selections generate 24 bit movies. Note: If you generate an alpha channel you should set

the Secondary Row equal to the Primary Row in the Preferences dialog, to prevent a second occurrence of closed caption data from being inserted into your video program.

Configuring CCaption for NLE Systems

Preset caption data location for known NLE systems

CCaption has configuration presets for certain NLE systems. The values in these presets determine how CCaption maps the 2-D visual space of the NLE system into closed caption line 21 of the final output movie. The *Primary Row* and *Starting Column* values are used by CCaption to generate an image that contains properly positioned closed captions.

Please note that NLE hardware takes the closed caption information from the 720x486 video and converts it to Line 21 of NTSC video. Neither CCaption nor your NLE software has control over this process.

The following NLE presets can be found under Preferences > NLE.

NLE System	Primary Row	Starting Column
AJA IO LA	1	24
AJA Kona LS	1	24
AVID ABVB	0	35
AVID DS Equinox	1	26
AVID Meridien	1	26
Avid Adrenaline	1	26
Blackmagic DeckLink Extreme	0	26
Matrox	1	30
Media 100	1	26
NewTek Video Toaster 3	1	19
Targa 1000-3000	1	26

NLE Presets

If your NLE system is not listed in CCaption Preference

CCaption can be used to determine the preset values for your NLE system if it is not listed in CCaption's NLE presets table.

Here are two 720x486 4-minute video files which can be used to find the primary row and column number where caption data are encoded on your NLE system. We created this video in both .mov and .avi formats and they are available from

1. NLE calibration movie in mov: www.cpc-usa.com/1ccaption/NLE_Calibrate_MOV.zip
2. NLE calibration movie in avi: www.cpc-usa.com/1ccaption/NLE_Calibrate AVI.zip

The closed caption content of the first 5 seconds of the movie is "R 0, C 14" and it is generated with Primary Row set to 0 and Starting Column set to 14; the next 5 seconds of the movie has the CC content of "R 0, C 15" and is generated with Primary Row set to 0 and Starting Column set to 15. This continues through Row 0 and Column 40 at which time it shifts to Row 1 Column 15. The last movie segment is Row 3 Column 40. The entire movie is approximately 4 minutes long.

When the you import the video into your NLE system, put it on the timeline and play the video through your NLE hardware to a TV with the built-in closed caption decoder set to CC1 channel, you will see the content of the Primary Row and Starting Column only when it successfully decodes the captions. You just have to watch the TV screen for up to 4 minutes until you see a few captions like
R 0, C 21
R 0, C 22
R 0, C 23
.
.
R 0, C 29

To avoid errors, we will pick the mid value of all visible column numbers. In this example it is C 25. So the preset NLE values for your NLE system is Primary Row: 0 and Starting Column: 25. Once you have determined these values you need to go to the NLE tab in CCaption Preferences and enter the numbers into the appropriate boxes. You do not need to change the number in the Secondary Row box and the check box labeled Small QuickTime should be unchecked.

Primary Row and Starting Column If your system is not listed, you need to know the primary Row and Starting Column numbers for your NLE system. If you know those values from the test described earlier in this chapter, please enter those numbers here. *Note: Secondary Row information is not important.*

Compatibility check

Another way to determine whether your NLE system supports closed captioning is to take a commercial video with closed captions and save it uncompressed as a 720x486 video on your hard drive. Then send the video out of your computer to a TV with its closed caption decoder turned on. If you see captions, your hardware is most likely compatible.

Sample 720x486 black videos with captions on the Web

We have prepared sample black 720x486 videos for the following NLE systems:

AJA IO LA
AVID ABVB
AVID DS Equinox
AVID Meridien
AVID Adrenaline
Blackmagic DeckLink Extreme
Media 100
NewTek Video Toaster 3
Targa

These videos can be found at:

1. QuickTime .mov format: www.cpc-usa.com/1ccaption/NLE_MOV_Exports.zip
2. AVI format: www.cpc-usa.com/1ccaption/NLE_AVI_Exports.zip

You can download the sample videos and import the one compatible with your NLE system. When you play the video out of your computer to a TV with its closed caption decoder turned on, you should see captions on the TV. You can also add the black video to your video on your NLE system using special effect like *Crop* to eliminate all the rows except the first two rows that contain closed caption data. Now your video will have closed captions.

Inserting Closed Captions with an NLE System

To test the software start CCaption and, if you have not already done so, choose a NLE system hardware preference under Edit:Preferences. Next, click **Reset** in the Control Window.

In the Control Window, select the **Take Input from** check box and select **CCaption Description File** in the pop up menu. Click on the **Select** button and navigate to the **Welcome.txt** file included in this distribution.

Select **Verify** and check for any errors and then select **Process** to create an output QuickTime or AVI movie. Macintosh users should choose QuickTime file output. PC users can select either AVI file output or QuickTime file output if QuickTime is installed. The selection of "Millions of Colors+" in the QuickTime codec dialog box will generate a 32-bit output file containing an alpha channel. Other output selections generate 24 bit movies. Note: If you generate an alpha channel you should set the Secondary Row equal to the Primary Row in the Preferences dialog, to prevent a second occurrence of closed caption data from being inserted into your video program.

Windows users should specify the suffix .mov or .avi when naming their output file.

The CCaption software will generate an output movie with a frame size of 720 x 486. Minimal compression should be used when generating the output movie. Two video field output should be specified.

- Avid Media Composer ABVB hardware users should select the Media Composer codec at AVR75 or AVR77.
- Avid Meridien users can use either an AVI codec or a QuickTime codec. Select NTSC, Meridien Interlaced, Odd Field Dominant under the AVI codec options.
- Media 100 users should select the Media 100 720 codec.
- Matrox DigiSuite users should select the DigiSuite codec and set the compression to be minimal.
- TARGA users should select the Animation codec and specify 30 fps and Millions of Colors+. Note: TARGA users can also select JPEG-B or the TARGA Video codec, however, due to hardware conflicts the TARGA Video codec can only be used by

CCaption if the NLE software that uses the hardware is not concurrently running and vice versa.

In your NLE system create a project, import the resulting QuickTime or AVI file and place this clip on the timeline. There should be some black before and after the clip on the timeline. TARGA users should highlight the clip produced with the Animation codec, select Clip:Video:Transparency, and select Key Type - Alpha Channel.

When you play this clip into a monitor capable of close-caption decoding, the text message

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will appear superimposed on a black background and then disappear in a few seconds. If you do not see this message check your monitor's menu and make sure the CC1 mode is selected.

Also, when you play the **Welcome** message be sure to start the playback a few frames before the start of the **Welcome** message clip. All of the clip must be played into a closed caption decoder for the decoder to correctly interpret the message.

If this message does not appear on your monitor see the chapter *Troubleshooting*.

Putting It All Together Using an NLE

Adding Closed Captions using AJA Io Hardware

To use AJA Io hardware with CCaption the Final Cut Pro time line must be configured for a video size of 720x486. Export an NLE video from CCaption using the Animation codec at the uncompressed resolution and import it into FCP. When you play the imported video clip the closed captioned video will appear on the SDI, component and composite video outputs. To merge the imported closed caption video with the underlying video material put the imported clip on a higher video track than the rest of the video and crop the imported clip up from the bottom leaving the closed caption data at the top. When cropping the imported clip you should leave one extra line of black below the closed caption data to act as a clean separator line between the closed caption data and your video program. The AJA Io hardware can not be used to export video containing closed captions in DV video.

Adding Closed Captions using Avid ABVB Hardware

To superimpose closed caption data onto an actual video image, place the QuickTime movie onto its own video track above your background image. Place a Blend:Picture-In-Picture effect onto the imported clip and set the PIP Size to 100 and V Position to -941 for a Media Composer Version 6 or to -991 for a Media Composer Version 7. This PIP effect positions the closed caption control codes that are located towards the bottom of the QuickTime image file to line 1 of the NLE image. Line 1 of the NLE image corresponds to Line 21 of the VBI output signal.

This has been found to be the most reliable way to superimpose clean image data onto line 21 of the VBI.

Adding Closed Captions using Avid Meridien Hardware

Avid Meridien users should use the Meridien QuickTime codec. Select NTSC, Meridien Interlaced, Odd Field Dominant. To superimpose closed caption data onto an actual video image, place the AVI movie onto its own video track above your background image. Place a Blend:Picture-In-Picture effect onto the imported clip and set the Crop Bottom value to -989. Set the Width and Height scaling to 100%.

On Macintosh Avid systems without real time effects the PIP effect must be rendered and is time consuming. This can be avoided by the use of the Alpha Mask file as follows. Place your background clip on V1 and place the Alpha Mask file on V2. Step Into the Alpha Mask clip and put the imported QuickTime movie onto the Graphic Fill portion, V2, of the Alpha Mask image. Step Out of the track and play the timeline. You should see a closed caption message superimposed on the output video image. Using this method you are using closed caption information located on the first line of the generated image file.

Adding Closed Captions using the Media 100

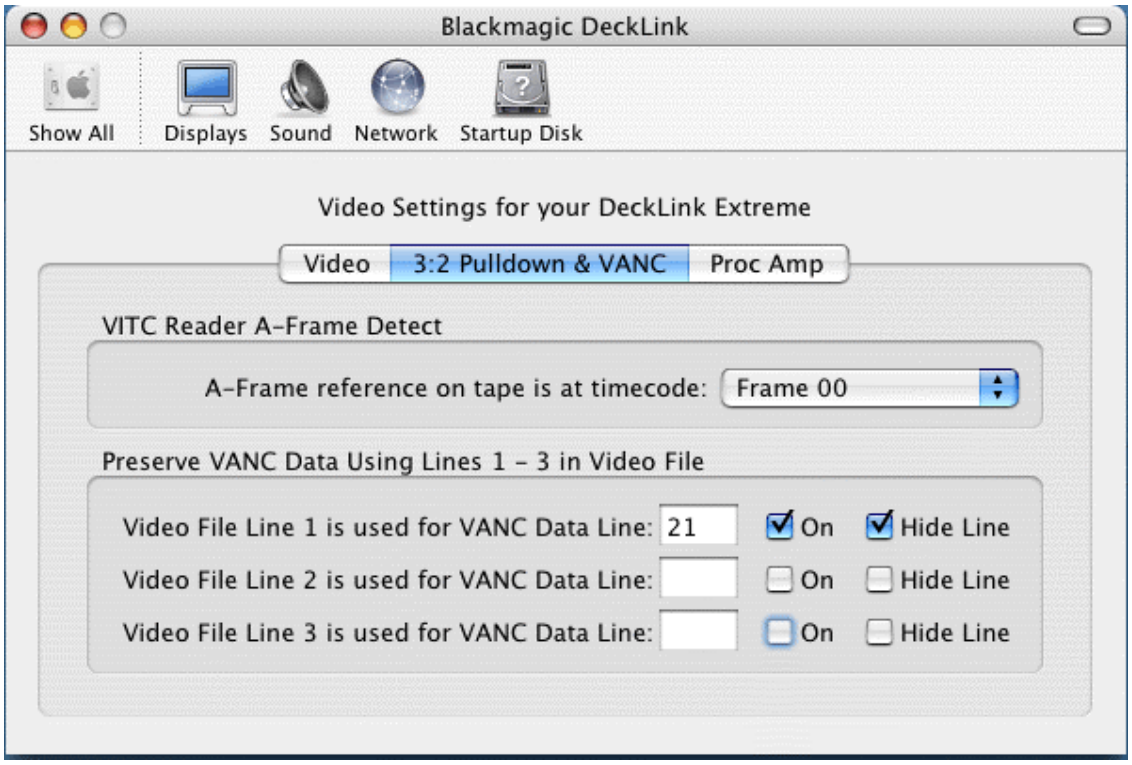
To superimpose closed caption data onto an actual video image, place the QuickTime movie onto a video track. Place a Picture-In-Picture effect onto the imported clip, set the PIP Size to 100 and V Position to 479. This PIP effect positions the closed caption control codes that are located towards the bottom of the QuickTime image file to line 1 of the NLE image. Line 1 of the NLE image corresponds to Line 21 of the VBI output signal. This has been found to be the most reliable way to superimpose clean image data onto line 21 of the VBI. Using the **Preferences NLE Tab** you can change the image file data generation lines.

Adding Closed Captions using Pinnacle Systems

(TARGA 2000 RTX, DTX, PRO and SDX and TARGA 1000 PRO)
To superimpose close-caption data onto an actual video image the QuickTime movie should be created with the Animation codec at 30 fps and Millions of Colors+. Place the QuickTime movie onto its own video track above your background image. Highlight the clip, select **Clip: Video: Transparency** and select Key Type - Alpha Channel.

Adding Closed Captions using Blackmagic Design DeckLink Extreme

The Blackmagic Design DeckLink Extreme hardware requires a specific video setting to work with close captions. To configure DeckLink Extreme hardware to work with close captions open the Macintosh System Preferences, find the DeckLink Extreme control panel and set up the 3:2 Pull down & VANC settings as follows:



You can verify that closed captions are being properly handled by DeckLink Extreme by digitizing an analog video broadcast signal containing closed captions and then playing it back into a TV receiver to display the closed captions. Now generate a QuickTime movie containing just closed captions. To superimpose closed caption data onto an actual video image, place the QuickTime movie onto a video track and crop the video keeping just the close caption lines that are located near the very top of the video frame.

Exporting Captions to DVD, QuickTime & RealVideo

Exporting Captions to DVD

CCaption will generate a closed caption file to be used with

- Sonic Solutions
- Spruce and
- Daikin Scenarist

DVD authoring system software. Daikin and Spruce DVD closed caption files typically have a ".scc" file suffix and the Sonic Solutions' closed caption description file typically has a ".cc" file suffix. These files are specially encoded Binary text files. The first line of each of these files is "Scenarist_SCC V1.0".

CCaption will generate a DVD caption file from any of the input sources available in the "Take Input From" dialog boxes in the Control Window. Simply choose the "Generate a DVD closed caption description file" radio button after you select Process in the Control Window.

Exporting Captions to a QuickTime Movie Text Track

CCaption can add a text track to a QuickTime movie. This text track becomes part of the movie itself and will be displayed when the movie is played. The text itself is displayed within a small text box that appears when the QuickTime movie is played.

The following special command directives are used to control the form and placement of text within a QuickTime movie. These directives are used in a CCaption description file:

```
*FONTNAME fontname
FONTNAME specifies the font to display the text.

*FONTSIZE size
*TEXTSIZE size
FONTSIZE or TEXTSIZE specifies the font size

*TEXTPOSITION X, Y, X Width, Y Height
```

TEXTPOSITION specifies the position of the box that the text will be appearing in. X and Y are the upper left most coordinate of the box. X Width and Y height are the box's width and height, respectively. The coordinate 0, 0 are the upper left most coordinate of the QuickTime movie itself.

To display a descending box underneath a NTSC-DV movie you should use the following command directive:

```
*TEXTPOSITION 0,480,600,100
```

```
*TEXTLEFT
*TEXTCENTER
*TEXTRIGHT
```

These commands specify the type of text justification, left, center, or right that the text should occupy within the text box.

*TEXTDURATION HH:MM:SS:FF
TEXTDURATION sets the maximum time that each caption will appear within the text box.

QuickTime itself does not allow any of the above directives to be changed during the display of the text track. Once a directive is set it remains fixed throughout the entire text track display.

The following CCaption Description file is a complete example of what is needed to put text into a QuickTime Movie:

```
**********************************
** CCaption-DV Description File
**
** This is a complete CCaption description
** file to put text images into a QuickTime
** text track.
**
** Lines beginning with "**' are comments
** Lines beginning with '*' are directives
** Lines with text are captions to be inserted
**
** Leading zeros in Time Code directives can be omitted
**********************************
*NONDROPFRAME
*POPON
*left 2,1
*FONTNAME HELVETICA
*FONTSIZE 20
*TEXTPOSITION 0,480,500,100
*TEXTCENTER
*TEXTDURATION 00:00:03:00

** Caption 1
*T 00:00:01:18
ONCE UPON A TIME
FAR FAR AWAY. . .

** Caption 2
```

```
*T 00:00:03:20
THERE LIVED THREE BEARS.

** Caption 3
*T 00:00:6:07
THEY WERE VERY HAPPY
LIVING IN THEIR COZY DEN

** Caption 4
*T 00:00:8:19
BECAUSE IT WAS COMFORTABLE
AND WARM ALL THE TIME.
```

After you create the QuickTime movie the captions can be directly repositioned through the use of QuickTime Player. To do this select the information window, Command-J on the Macintosh and Control-I on Windows, select Text Track and Size from the information dialog pull down menu, then click Adjust. You can then drag the caption window to a new position within the QuickTime display window. When you are finished repositioning your captions click *Done*.

Exporting Captions to a RealVideo Movie

CCaption quickly and easily produces text captions for RealVideo movies. CCaption generates RealText directly from an input description file. Simply choose the "Generate a RealText caption description file" radio button after you select Process in the Control Window. RealText caption files end with the ".rt" suffix. The following RealText file was created from the QuickTime text track description file in the Section above**.**

Once you have created a .rt file you must link it to a RealVideo file so that they play together. You do this by creating a ".smi" file that references both the RealText file as well as your RealVideo file. Copy the sample .smi file and change the name of the. rt file and the video file.

When you click on the .smi file your text will display when your RealVideo movie plays. But if you put the smi file on the web, you can create another dummy .rm file. See the details below.

Sample example of a .smi file (RealVideoDemo.smi)

The .smi file contains the name of the .rt file and the video file.

```
<smil>
  <head>
    <meta name="author" content="CPC CCaption"/>
    <layout>
      <root-layout height="360" width="350" background-color="black"/>
      <region id="top" width="340" height="250" left="5" top="0" />
        <region id="video" width="340" height="240" left="5" top="5"
        fit="fill"/>
      <region id="bottom" width="340" height="270" left="5" top="255" />
      </layout>
  </head>

  <body>
```

```
    <par>
      <video src="RealVideoDemo.mpg" region="video"/>
      <seq>
      <textstream src="RealVideoDemo.rt" region="bottom" />
      </seq>
    </par>
  </body>
</smil>
```

Sample example of a .rt file (RealVideoDemo.rt)

```
<window type="teleprompter"
       duration="41.00"
       width="320"
       height="324"
       loop=true
       bgcolor="black"/>

<time begin="0.00" />

<font face="Arial" size=4 color="white">

<center/>

<time begin="7.00" /><br/><clear/>I'm at the left<br/>of the screen.
<time begin="8.96" /><br/><clear/>So captions<br/>of what I say
<time begin="10.30" /><br/><clear/>appear at the left<br/>of the screen, too.
<time begin="13.53" /><br/><clear/>Now I'm at the right<br/>of the screen,
<time begin="15.50" /><br/><clear/>so my captions appear<br/>at the right.
<time begin="17.83" /><br/><clear/>
<time begin="18.70" /><br/><clear/><i/>Now I am off screen.</i>
<time begin="20.53" /><br/><clear/><i/>To indicate that<br/>I'm off screen,</i>
<time begin="22.20" /><br/><clear/><i/>whatever I say<br/>is italicized.</i>
<time begin="24.10" /><br/><clear/>Now my name appears at<br/>the bottom of the
screen,
<time begin="27.00" /><br/><clear/>we put captions<br/>of what I say at the top,
<time begin="29.50" /><br/><clear/>so that my name<br/>is not covered by captions.
<time begin="32.46" /><br/><clear/>Up until now, we have been<br/>using pop-on
captions.
<time begin="36.53" /><br/><clear/>When a new caption pops on,<br/>the old caption
disappears.

</center>

</font>
</window>
```

Sample example of a .rm file (RealVideoDemo.rm)

```
If you wish to host this RealVideo with captions on the web, yon would need to
create another file .rm which should contain one line as below:

http://www.website.com/RealVideo/RealVideoDemoLink.smi
```

Hosting the RealVideo files on the web

Copy all four files to the folder RealVideo on your web site www.website.com:

- RealVideoDemo.rm

- RealVideoDemo.rt
- RealVideoDemo.smi
- RealVideoDemoLink.rm

Now make a link to the file RealVideoDemoLink.rm and when you click on this link, RealVideo is going to be launched and display the video with captions.

Note: You can play RM, AVI and MPEG video files on RealOne Player.

Decoding Closed Captions

Decoding Existing Closed Captions in Digital Video

The **Process:Decode DV** pull-down menu can be used to decode existing closed caption text within a Digital Video data file.

Select **Decode DV** in the **Process** pull-down menu Next select the input DV data file name from the input dialog box and then select the output file name from the output dialog box. CCaption will scan the DV data file and copy the closed caption text to an output file of your choice. The text will be preceded by its associated time code position within the DV data file. If **DV Offset File** is selected in the Control Window, closed caption decoding starts at the specified DV Offset time code File value.

WebTV Links & V-Chip

Generating an Interactive Television (WebTV) Link

Interactive Television Links allow the general television audience to access World Wide Web pages to compliment what they are watching on television. Both the broadcast television signal and the targeted web page work in conjunction with each other to create an interactive environment. CCaption generates the necessary Interactive Television Link command codes that are broadcast with the TV program material.

CCaption supports the following data and modifier fields when generating Interactive TV links: URL, Type, Name, Expires, Script, View and Abbreviated. It is beyond the scope of this document to discuss the detailed use of each of these fields, however, in order to achieve the best interactivity between the television program and the web site, the web site referenced by the URL field should be prepared with specific interactive television HTML code.

Individual Interactive TV Link codes can be accessed from the **Take Input from** pop up window or from the Process pull down menu. See figure for the Interactive Television Link Generator dialog box.

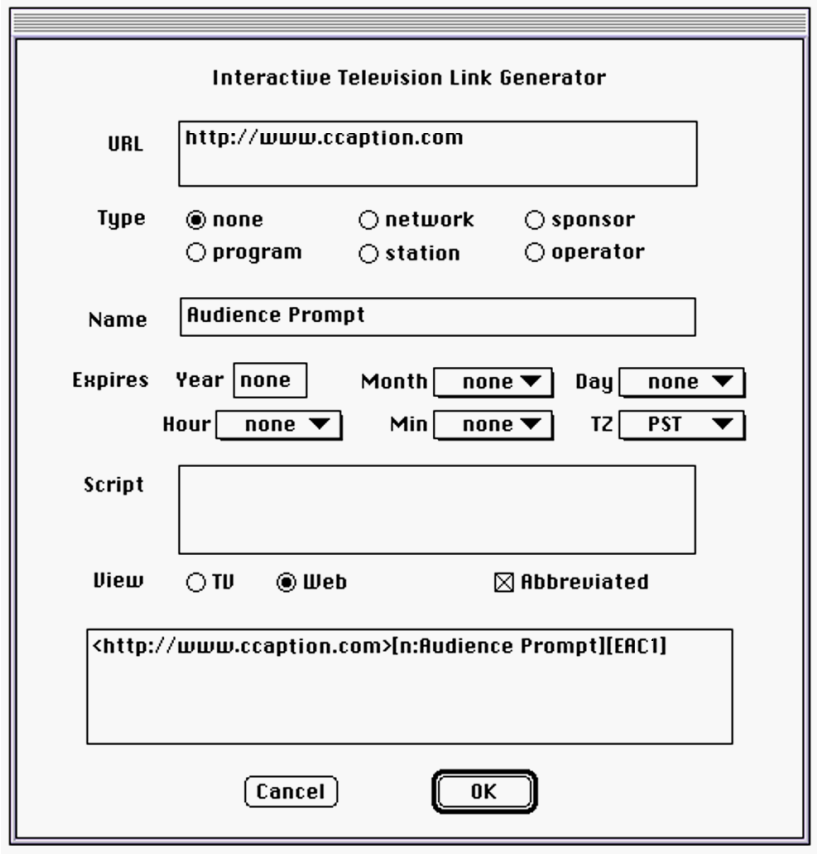
To generate a single Interactive TV Link select **ITV Link Window** from the **Take Input from** pop up menu and click the **Select** button. When the Interactive Television Link Generator window appears enter data into the appropriate fields. After data has been entered, select "OK" to save the link specification. In the Control Window click on **Verify** then **Process** to generate an ITV Link DV, QuickTime or AVI movie.

To combine this ITV Link information with a video program see the chapter *Exporting Captions for DV & NLE Systems* for putting an ITV Link directly into a DV data file. NLE users can import the movie file into the NLE system and place it on the timeline at the position where you want the Interactive Television Link data to be sent to the user.

Process Menu

Interactive TV Link		Set Interactive TV Link Data for WebTV
US TV Parental Guidelines		Set TV Parental Guidelines Rating for V-Chip
Motion Picture Guidelines		Set Motion Picture Rating for V-Chip
Canadian English Lang.		Set Canadian English Rating for V-Chip
Canadian French Lang.		Set Canadian French Rating for V-Chip
Program Information		Set Program Information for V-Chip
Decode DV	Command-D	Decode closed captions from a DV file

Click on *Interactive TV Link* from the *Process* Menu and you will see the following screen.



The following example shows the commands necessary to create one file containing many Interactive TV Links. These commands can be put in a local on screen Text I/O Window (Macintosh only) or put in an external description file.

```
** This is a complete description file to generate
** three ITV Links within one movie file.
** Set time code to non drop frame
*NonDropFrame

** Set the total duration of the movie to 1 minute
*Duration 1:00:00

** Specify that ITV Link information will follow
*ITVLink

** Set an ITV Link to appear at 5 seconds
*TC 5:00
<http://www.ccaption.com>[n:CPC Prompt]

** Set an ITV Link to appear at 20 seconds
*TC 20:00
<http://www.microsoft.com>[n:Microsoft Prompt]

** Set an ITV Link to appear at 40 seconds 5 frames
```

```
*TC 40:05
<http://www.whitehouse.gov>[v:0][n:whitehouse]
```

An easy way to generate an ITVLink data line is to copy and paste the line from the Interactive TV Link Generator dialog window into a window of your choosing.

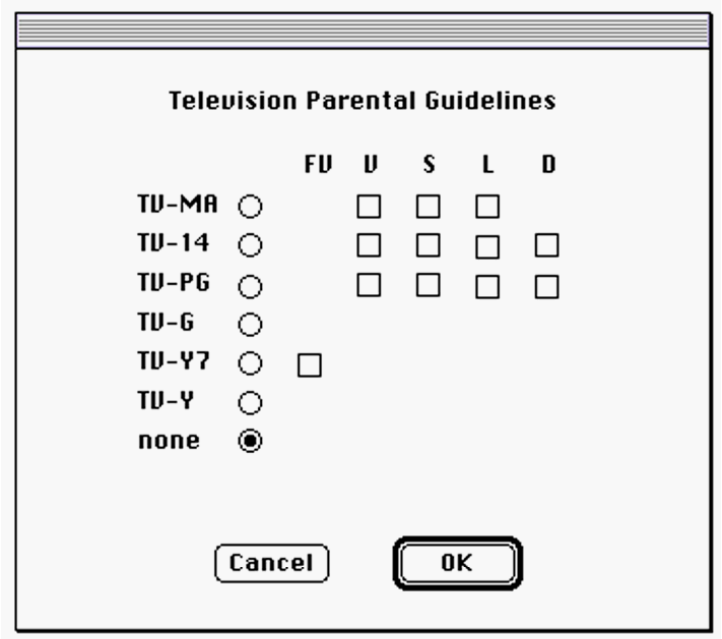
Specific Interactive TV Link data may be entered by typing directly into the bottom most data window of the Interactive Television Link Generator window. This window is reset to the data contained in the other data entry fields if any other data entry field is changed. CCaption will generate an Interactive TV link checksum if it is not present.

V-Chip Ratings

Generating a Parental Guideline Content Advisory Rating

Motion Picture, Canadian French Language or Canadian English Language

CCaption generates rating information for the Television Parental Guideline Rating system, the Motion Picture Association of America (MPAA) Rating system, the Canadian English Language Rating System and the Canadian French Language Rating System. Each of these rating systems is accessible from the Process pull down menu and from the Control Window.

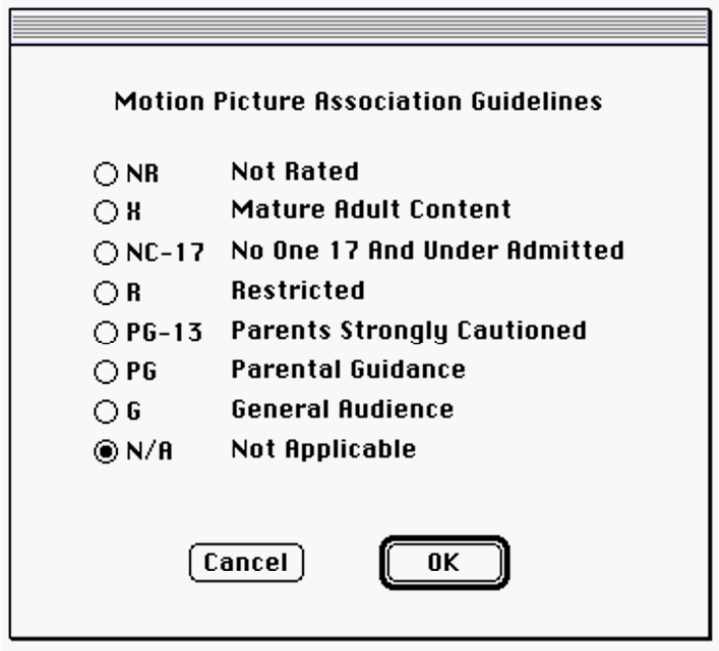


The rating system is chosen from the pop up menu that appears when the **Include Content Advisory Information** check box is selected in the Control Window.

To generate a DV, QuickTime, or AVI movie containing just Television Parental Guide Rating information, select **Reset** from the Control Window, click in the **Include Content Advisory**

Information check box, select the "Parental Guidelines" rating from the pop up menu and click on **Set Rating**. In the Television Parental Guide dialog box that appears select the desired rating. Setting the Duration value in the Control Window can be used to create a content advisory rating of any length. Select **Process** to generate the rating information. Other rating types are generated in a similar manner.

In the United States the Television Parental Guide rating system should be used for all productions that are not motion pictures.



To include rating information into a DV, QuickTime or AVI movie containing closed captions the **Include Content Advisory Information** check box in the Control Window must be selected. In addition one of the individual content advisory ratings and its associated data must be set. The manual rating choice selected in the Control Window can be over written by a rating directive from the Text I/O Window or an external description file.

A television rating decoder expects to receive frequent rating packets in a broadcast transmission, therefore rating information is repeated at 2 second intervals within the movie. By changing a rating within a description file a broadcast program can vary its rating. Depending on previous closed caption activity a rating change may require a few seconds to take effect.

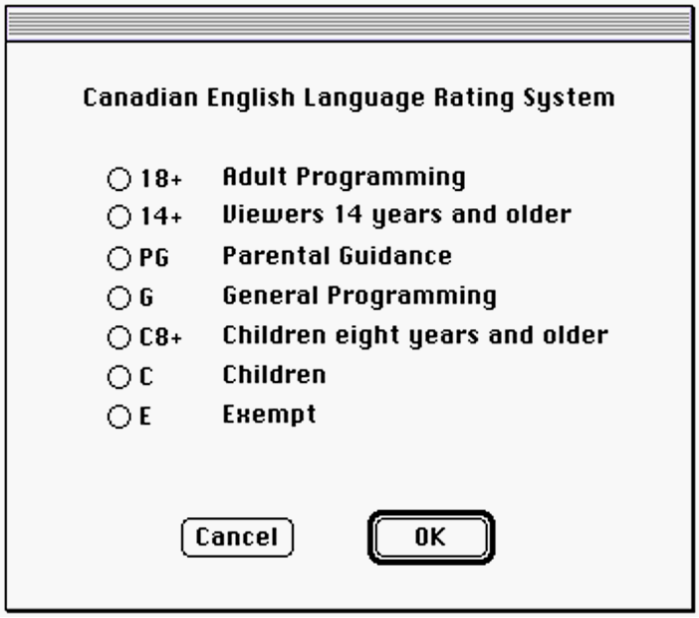
The following commands show how to change a program's rating.

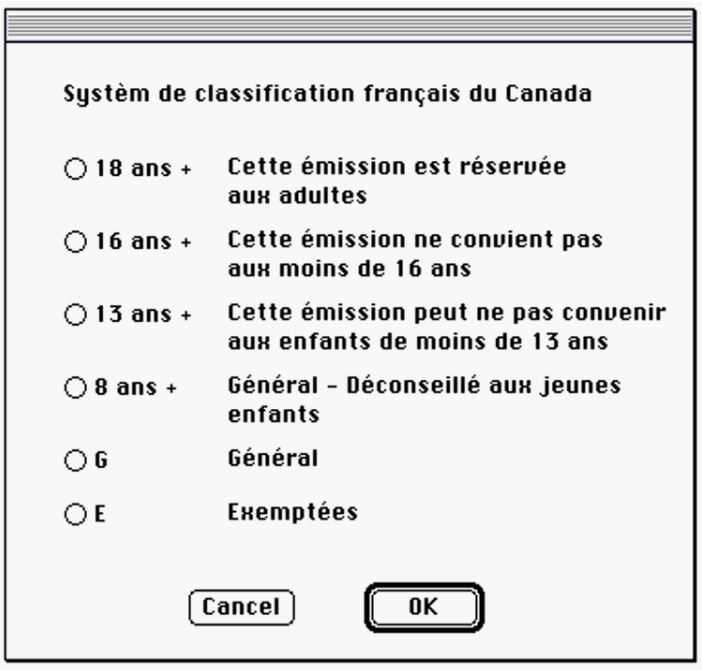
```
** Start this program with a MPAA PG-13 rating
*TC 0:00:00:00
* MPAARATING PG13

** Switch to MPAA NR rating at 10 minutes
*TC 10:00:00
*MPAARATING NR
```

```
** Switch back to MPAA PG-13 at 10 minutes 30 seconds
*TC 10:30:00
*MPAARATING PG13
```

The following rating system command directives are allowed in a Text Window or in an external description file:

```
*PGRATING [Y,Y7,G,PG,14,MA,NONE][FV,V,S,L,D]
*MPAARATING [NA,G,PG,PG13,R,NC17,X,NR]
*CERATING [E,C,C8,G,PG,14,18]
*CFRATING [E,G,8,13,16,18]
*NORATING
```



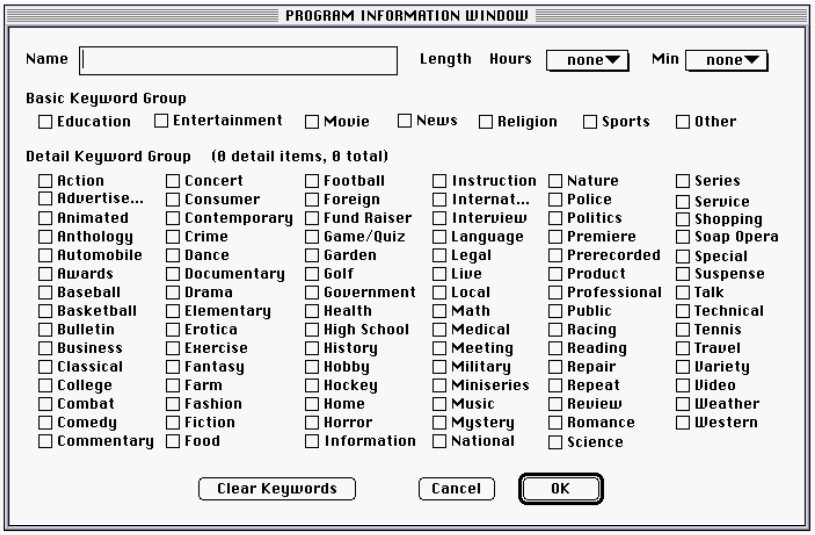


Generating Program Information

CCaption can generate Program Information data that will be sent to the television viewer along with closed captions and Content Advisory Information. Program information can be set from the Program Information Window. The Program Information Window is accessible from the Process pull down menu and from the Control Window.

To include Program Information data into a DV, QuickTime or AVI movie containing closed captions the **Include Program Information** check box in the Control Window must be selected. In addition some information must be selected within the Program Information Window.

Manually entered Program Information data selected from the Control Window will be over written by a Program Information directive from an external description file.



The following Program Information command directives are allowed in a Text Window (Macintosh only) or in an external description file:

```
*PROGRAMNAME NAME
*NOPROGRAMNAME
*PROGRAMLENGTH HH:MM
*NOPROGRAMLENGTH
*PROGRAMTYPE [Basic Keywords][Detail Keywords]
*NOPROGRAMTYPE
```

The Basic Keywords and Detail Keywords can be entered in hexadecimal notation or as ASCII text keywords.

Program Type Basic Keywords

HEX CODE	DESCRIPTIVE KEYWORD	HEX CODE	DESCRIPTIVE KEYWORD
20	Education	24	Religious
21	Entertainment	25	Sports
22	Movie	26	OTHER
23	News		

Program Type Detail Keywords

HEX CODE	DESCRIPTIVE KEYWORD	HEX CODE	DESCRIPTIVE KEYWORD
27	Action	3D	Elementary

28	Advertisement	3E	Erotica
29	Animated	3F	Exercise
2A	Anthology	40	Fantasy
2B	Automobile	41	Farm
2C	Awards	42	Fashion
2D	Baseball	43	Fiction
2E	Basketball	44	Food
2F	Bulletin	45	Football
30	Business	46	Foreign
31	Classical	47	Fund Raiser
32	College	48	Game/Quiz
33	Combat	49	Garden
34	Comedy	4A	Golf
35	Commentary	4B	Government
36	Concert	4C	Health
37	Consumer	4D	High School
38	Contemporary	4E	History
39	Crime	4F	Hobby
3A	Dance	50	Hockey
3B	Documentary	51	Home
3C	Drama	52	Horror
53	Information	6A	Public
54	Instruction	6B	Racing
55	International	6C	Reading
56	Interview	6D	Repair
57	Language	6E	Repeat
58	Legal	6F	Review
59	Live	70	Romance
5A	Local	71	Science
5B	Math	72	Series
5C	Medical	73	Service
5D	Meeting	74	Shopping
5E	Military	75	Soap Opera
5F	Miniseries	76	Special
60	Music	77	Suspense
61	Mystery	78	Talk
62	National	79	Technical
63	Nature	7A	Tennis
64	Police	7B	Travel
65	Politics	7C	Variety
66	Premiere	7D	Video
67	Prerecorded	7E	Weather
68	Product	7F	Western
69	Professional		

Caption Tips

Closed captioning 101

There are three styles of operation for closed caption display:

- Pop-on style
- Roll-up style and
- Paint-on

Pop-on style displays up to four rows of text positioned anywhere on the screen. Typically the text suddenly pops on under the appropriate speaker and then disappears after the dialog is spoken and the viewer has had a chance to read it. Pop-on text typically appears just before a speaker's dialog is heard. In addition to spoken dialog, Pop-on text typically includes music lyrics and other sounds present in a program such as
"TIRES SQUEALING" or
"KNOCK ON DOOR".

Roll-up style displays text in 2, 3 or 4 consecutive rows on the screen. The text is left justified and appears character by character on a specific row of the screen and then rolls up the screen one row at a time with the receipt of characters for the next line. The bottom most row of the Roll-up text window is known as the base row. Rollup text is frequently used to close-caption live events such as TV news shows and sporting events.

Paint-on text style is similar to Pop-on style except that the individual characters accumulate on the screen instead of appearing all at once.

CCaption supports all three of these styles of closed captioning text. A television signal consists of 30 images or frames of information per second. Each frame consists of two fields, field 1 and field 2. Two characters of closed caption information are transmitted as binary data to television receivers on line 21 in the vertical blanking interval (VBI) of field 1 of each TV frame. This is the line that immediately precedes the first line of picture information.

Interactive television link, content advisory and program information are also transmitted over Line 21. A standard television set typically has to be programmed through its hand held remote control unit to display closed caption information.

Special receiver hardware such as a Parental Guide V-Chip decoder box or a WebTV set top decoder is required to interpret the other VBI signals.

The television screen display area for close-captioning information consists of 15 lines of 32 columns each. The upper most left position is designated as Row 1 Column 1. The bottom most right position is designated as Row 15 Column 32. At any given time there can be a maximum of four lines of closed caption text being displayed.

Suggestions for Breaking Lines

You should watch captioned programs on the television to get an idea how professional captioning is done. You will learn a lot in regards to breaking text into individual captions, positioning the captions and use of time sequencing. You will notice, many times professional captioners adjust the timing of the captions to give uniform readability.
There are various signs that will indicate that text needs to be broken into separate captions.

1. End a caption at the end of a sentence. The import file option can make these breaks automatically (“.”, “?”, and “!”)
2. End captions at commas and semicolons if they come at a natural pause in the dialog and conclude a phase. The import file option can make these breaks automatically as well, but there are many commas in English that are NOT good places to break text.

However, when you break text into individual captions, they should make grammatical sense. Here is an example:

Unformatted, Raw Text:

On the way to the airport, I got caught in traffic and ended up being late for my flight. I had to wait around for five hours to catch the next available flight.

A poor way to caption it:

On the way to the airport, I got caught in
traffic and ended up being late for my flight. I had to wait
around for five hours to catch the next available flight.

A good way to caption it:

On the way to the airport, I got caught in traffic
and ended up being late for my flight.
I had to wait around

for five hours
to catch the next available flight.

We will go over some basic captioning guidelines. The first basic convention in captioning concerns the difference between how you represent on-screen and off-screen speakers. The words spoken by off-screen speakers (commonly narrators) appear in italics (but italics can be skipped if the speaker comes in and out of view). The words of on-screen speakers appear in the normal (Roman) font.

The next convention concerns centering and non-centering. However, if centering the caption would interfere with a graphic and/or important on-screen visual information, then the caption should be moved to another location.

The main objective is to have each caption represent a single thought. There is no single right way to caption a video, but a few additional guidelines may help:

1. Your captioning style should be consistent throughout the video.
2. Whenever possible, you should break captions into logical phrases. Captions randomly broken up may convey a different meaning than intended.
3. Captions can indicate the location of the speaker. For instance, a caption on the left side of the screen will indicate the speaker is on the left, while a centered caption shows that only one person is speaking throughout a scene.
4. Words can be emphasized by underlining.
5. Use *Insert Music Symbol* to place a musical note at the beginning and end of musical lyrics. Never paraphrase lyrics. Use the title of the song when possible.
6. Indicate sound effects in parentheses in lower case: (boom), (applause).

Suggested Styles and Conventions

Caption Media Program (National Association of Deaf) has created a style guide, which is available from www.cpcweb.com/dowload/CaptionKey2005.pdf

This is a very helpful guide to understand the styles and conventions used to caption a video. We strongly encourage you to read this document before producing captioned video.

The Media access group at WGBH Boston publishes a guide called "Suggested Styles and Conventions for Closed Captioning." It is available from:

Media Access Group at WGBH
125 Western Avenue
Boston, MA 02134
(617) 300-3600 V/TTY
(617) 300-1020 Fax

http://main.wgbh.org/wgbh/pages/captioncenter/ccstyles.html

Suggested Styles and Conventions for Closed Captioning

This brief description of captioning style was distilled from The Caption Center's in-house reference manual. It is being made available in the hope that exchanging our ideas might move the captioning industry at large toward a greater consistency of style.

Just as the English language has a multitude of exceptions to its general rules, so does captioning. It is not an exact science. The practices we describe here are the result of 25 years of experience in the captioning industry, an industry which is constantly evolving. Therefore, use this material as a basis for making individual decisions about readability, not as a set of rules to be followed without question. However, the captioner is strongly advised to consider consistency when making decisions about caption style. Aim for a style that consistently conveys information in a clear, logical manner, using stylistic rules and conventions in a way that makes it easy for the viewer to understand and interpret the text.

Resources

The captioner should have easy access to a set of reference materials. Most important are an English-language manual of style, such as The Chicago Manual of Style, and an unabridged dictionary, such as Webster's New International Dictionary. Also recommended are encyclopedias, almanacs, atlases and foreign-language dictionaries. For those with Internet access, the World Wide Web can be a very valuable resource.

For a complete technical description of the line-21 system and its capabilities, we suggest you read the FCC Rules (FCC 91-119 and FCC 92-157) and EIA-608.

Styles of Captioning

Two styles of line-21 caption display are currently in common use: Pop-on and Roll-up. A third display style, Paint-on, was added to the decoder specification in 1985. However, because it is incompatible with the original TeleCaption adapter (also known as the TeleCaption I), it is not yet in widespread use.

This paper is divided into two sections, one for Pop-on captions and one for Roll-up captions. Unless indicated otherwise, most of the rules for Pop-on captions apply to Roll-up as well.

Section I: Pop-on Captioning

A Pop-on caption is usually one or two rows long. When a sentence must be divided into two or more captions, break it at a logical phrase rather than at a random point. For example:

Preferred:	To be avoided:
MY, WHAT DANGEROUS GAMES	MY, WHAT DANGEROUS GAMES
WE USED TO PLAY	WE USED
IN THE RUINS OF THIS CITY.	TO PLAY IN THE RUINS
	OF THIS CITY.

If a caption has more than one row, break the row in a similarly logical place:

Preferred:	To be avoided:
MY, WHAT DANGEROUS GAMES	MY, WHAT DANGEROUS
WE USED TO PLAY...	GAMES WE USED
	TO PLAY...

A period usually indicates the end of a caption, and the next sentence starts with a new caption. For example:

Preferred:	To be avoided:
WELCOME TO THE CITY	WELCOME TO THE CITY
OF LINCOLN.	OF LINCOLN. WE HOPE
WE HOPE YOU ENJOY YOUR STAY.	YOU ENJOY YOUR STAY.

Editing

When captioning first began over 25 years ago, editing text for both language level and reading speed was customary. The rationale for this was that this type of editing would make it easier for the deaf and hard-of-hearing audience to understand the program. Experience has shown, however, that much of the caption-viewing audience prefers to have a verbatim or near-verbatim rendering of the audio; therefore, any editing that occurs nowadays is usually for reading speed

only. Strive for a reading speed that allows the viewer enough time to read the captions yet still keep an eye on the program video. Once you reach a decision on caption reading speed, use that speed consistently in your work.

When editing becomes necessary because of limited reading time, try to maintain precisely the original meaning and flavor of the language as well as the personality of the speaker. Avoid editing only one single word from a sentence as this does not really extend reading time. Similarly, avoid substituting one longer word for two shorter words (or a shorter word for a longer word) or simply making a contraction from two words (e.g., contracting "should not" to "shouldn't").

Children's programs are customarily edited more heavily for a slower reading speed (and for linguistic simplicity). "Classic" literature, poetry, film, songs and direct quotes from public figures should be captioned verbatim whenever possible. If editing is absolutely necessary, cut whole phrases rather than paraphrasing.

Identification Placement

Captions are used not only to convey what is being said, but also who is saying it and how it is being expressed. These attributes may be indicated via the placement and timing of the text.

When considering the placement of captions, keep in mind what action is occurring in a given scene. If only one person talks throughout a scene, captions are generally placed at bottom center. If there are multiple characters in a scene, caption placement on or near individual speakers is used to indicate who is saying what.

Currently, four rows at the top and four rows at the bottom of the picture are available for caption display. Additionally, there are eight indents to allow left-to-right placement of captions. Full 15-row by 32-column screen addressing has been specified by the FCC for decoders mandated by the TV Decoder Circuitry Act. This expanded specification can be used compatibly with TeleCaption II and later decoders, but it is incompatible with
the original TeleCaption (TeleCaption I) adapter.

Under normal circumstances, a speaker is identified through the placement of his/her caption. However, when it is not possible to use placement to indicate the speaker (i.e., if the speaker is off screen), an ID may be added to the caption. Since this is not spoken information, it should be distinguished in some way from captioning representing
the rest of the soundtrack. The Caption Center's convention is to show IDs in upper and lower case, rendered in roman and set off with a colon. Parentheses or brackets may also be considered. For example, a bottom-center caption with an ID might look like this:

Narrator:
THE RIVERS RAN DRY
WITH DEVASTATING EFFECTS.

A left-placed caption:

Sue Ellen:

WHY ON EARTH
WOULD HE DO THAT?

A right-placed caption:

Sue Ellen:
WHY ON EARTH
WOULD HE DO THAT?

IDs for characters (and the method for identifying them) should be consistent throughout a program. For example, in dramas, use the name by which the character is most generally known.

Timing

To convey pacing appropriate to humor, suspense and drama, as well as to indicate who is speaking, captions may be timed to appear and disappear precisely when the words are spoken. The text may be timed to change with shot changes for readability and aesthetic purposes. In applying timing conventions, consider that logical caption division should not be sacrificed for exactitude in timing. Readability should always be the first priority.

In order to increase reading time, a series of captions may sometimes be timed to begin before the corresponding audio begins, and/or to end after the audio has ended. If the speaker's lips are visible, however, it may be disconcerting to the viewer to see captions while no one is apparently speaking.

Sound Effects

Sound-effect captions are used to describe sounds that add to the narrative. As with IDs, these are not words actually contained in the audio and should be distinguished as such. See the previous section for suggested practices. The Caption Center's practice, for example, is to show sound-effect captions in lower-case italics enclosed in parentheses:

(dog barking) (child screaming) (shutter clicks)

Sound-effect captions may also be used to indicate the source of the sound through the use of placement. Such captions may be used to describe the manner in which something is spoken. For example:

(whispering): (giggling):
PLEASE OPEN THE DOOR! or
WASN'T THAT FUNNY?

Typography

For ease of reading in today's caption displays, caption text is generally rendered in upper-case roman font. Refer to EIA-608 for a full description of all 112 characters available in the line-21 system.

Italics and underline

As in printed text, upper- and lower-case italics and underlining may be used to indicate emphasis. You may use standard print methods of setting off the text of a speaker who is not physically present in a scene, such as a narrator, the voice in a dream, a flashback, or the voiceover reading of a letter. For example, these may be rendered in italics. (In documentaries, however, a frequently heard voice such as the narrator's is usually in roman.)

Similarly, set off the names of television series, books, periodicals, newspapers, movies, plays and large musical works with italics or underline. Television episodes, stories, essays, articles, songs and poems should also be distinguished; for example, render them in roman set off with quotes. Consult your chosen style manual for particulars concerning foreign languages, names of newspapers, periodicals, legal cases, vehicles, etc.

Music

When captioning music, use the musical note available as part of the line-21 character set to differentiate song from the spoken word. The musical note may be placed at the beginning and end of each caption, for example, to indicate that the words displayed are being sung and not spoken. Songs and jingles should be captioned verbatim. Punctuate them sparingly, but insert some punctuation to indicate the end of the song.

Instrumental music may be described as well. Use the title of a song whenever possible. (Many caption viewers have usable hearing or lost their hearing later in life, and may know or recall song titles and lyrics.)

Numbers

Consult your English style manual for standard conventions dealing with numbers. The Caption Center's practice is to spell out the numbers one through ten (inclusive); numbers over ten are rendered as numerals. However, if a large number is the only word in a caption, spell it out. Numerals of 1,000 and larger are written with commas. Dates are written conventionally (1957, not 1,957).

Punctuation and Spelling

Captioning follows the conventional rules for punctuation and spelling as outlined in standard English style manuals and dictionaries. Make your choice of spelling consistent-- for example, when more than one spelling of a word is allowed by the dictionary, The Caption Center's practice is to use the spelling listed first.

Render contractions in a consistent manner that is clear to the viewer. For example, use only the most standard:
DON'T, DOESN'T, DIDN'T, WON'T, WOULDN'T, etc. In general, avoid hard-to-read awkward contractions or using 'S for anything other than possessives.

When representing dialect, it is best to have a convention that dictates when to deviate from standard English spellings and when not to. The Caption Center has chosen to use forms such as GONNA, THINKIN', DOIN', and GOIN' only when these usages are important in the depiction of a particular character.

SECTION II: Roll-up Captioning

Unless specifically addressed here, suggested stylistic practices for Roll-up captioning follow the conventions described above.

Roll-up captions are usually verbatim. Each new sentence begins a new row, and each speaker change is indicated with a speaker-change symbol (two "greater-than" symbols plus a space). The FCC decoder specification allows Roll-up captions to be relocated to various vertical screen placements by the caption provider.
If you use this feature, bear in mind that existing set-top adapters will continue to display Roll-up captions at the bottom of the picture. It is advisable, therefore, to include any identifying information that may be obscured by the captions. For example:

>> Smith: WELCOME TO
THE CITY OF LINCOLN.
WE HOPE YOU WILL BE ABLE
TO SPEND SOME TIME
IN OUR HISTORIC DISTRICT.
>> James Moore, Long-time
Lincoln resident: THE HISTORIC
DISTRICT IS LOCATED AT
THE NORTH END OF TOWN.
YOU CAN REACH IT BY CAR,
TRAIN OR BUS.

Timing

Roll-up captions are timed with audio. A new caption row is generally displayed just as the speaker begins to say the first words in the row. The caption display is usually erased when there is a significant pause in the audio.

Conclusion

The caption styles that have been summarized in this paper show that captioning is, in fact, more than simply rendering spoken words into text. In addition to displaying what is being said, captions convey all the concomitant non-dialog information that the hearing audience takes for granted. Widespread use of captioning will create further opportunities for industry-wide discussion regarding stylistic practices. While there will be stylistic differences among captioning agencies, consistency will, in the end, best serve the caption viewer.

Troubleshooting

Transferring files between Mac and PC
Use a stand alone FireWire Disk that is formatted for the PC and plug it into the Mac's FireWire port. The Mac will recognize it and allow you to read and write it. Then drag the files you wish to copy from the Macintosh disk to the PC FireWire disk icon. This will copy the file(s). When the copy is complete drag the FireWire disk icon into the trash to unmount the disk. Take the disk to the PC, plug it in, and you should be able to read the files on the PC.

Self contained QuickTime Movie
You should be aware that CCaption only process movies that are "Self Contained". This means that all of the QT movie's data must be present within the movie file itself and that there cannot be any references to movie data in other files. A QuickTime movie can be made self-contained by using the QuickTime Player Application, choosing Save As and making sure the Save As Self Contained box is checked. Most of the movies on the Macintosh are self contained but occasionally someone will attempt to play a non self-contained movie in CCaption. CCaption only makes self-contained movies. By using Command-J in QuickTime Player you can examine what files a given QuickTime movie uses. Also if a QuickTime movie seems very small, like 4KB or so, it is not self-contained.

I do not get closed captioning output on my video monitor when I play a closed caption from my NLE system.

- Verify you have set the correct hardware values in the Edit:Preferences dialog box.
- Verify your video time line and your generated QuickTime or AVI movie are set to 720 x 486 pixels. Media 1000 users should be using a 720 project.
- Verify that CC1 is selected in your monitor's menu or your television monitor.
- Verify your monitor is decoding closed caption information by connecting the monitor to a broadcast TV signal that contains closed caption information.
- Verify that closed caption information is present on line 21 of your non-linear editing system by looking at the output video using the under scan feature of a video monitor. Closed caption information begins with seven evenly spaced dashes at the beginning of a line. These dashes should be visible at the top of your video output.
- Digitize a portion of a TV broadcast that contains closed captioning. Play it back from your computer into your monitor. You should get closed caption text characters appearing on the monitor.

Using my NLE system I get closed caption output text on my monitor but I can't combine closed caption output with my video program material.

- Be sure to play back the sequence starting before the closed caption clip and ending after the clip.

- Verify your NLE settings according to **Section 16, Putting It All Together**.

- If you are using a PIP or crop effect in your NLE system it may be that the effect isn't moving the closed caption commands to the correct vertical position. Decrease the Vertical Position values by 1, then by 2, then by 3 and play your sequence each time. The easiest way to determine the correct vertical position for the effect is to digitize a TV broadcast that contains closed caption information. Using monitor with the under scan feature examine the position of the digitized close-caption information and adjust your vertical position so that the output of your image with the effect matches the same vertical position as your digitized image.

My closed captioned program generates random characters or no characters sometimes when I play it from my NLE.

- Verify that you have used the **CCaption idle frame** clip in front of, in between and behind all of the closed caption segments you have entered onto the timeline.

- TARGA hardware users should verify they are using 30 fps when generating their QuickTime movie.

My Interactive TV Link hardware or Ratings decoder box does not respond to output from the NLE.

- Follow the directions given in **Troubleshooting CCaption Problem #1** and **#2** and verify the NLE effect is properly applied.

- Verify all hardware connections to the decoder boxes.

I only get one ITV Link displayed from my WebTV box.

- The WebTV box will only recognize one occurrence of an interactive crossover link. To re-arm the WebTV hardware box change channels on the WebTV box.

I can not create a DV output file.

- Make sure that your output file is not currently in use by another application such as QuickTime Player.

I play my DV output tape but I don't see any closed captions.

- Use the CCaption pull-down menu option **Process:Decode DV** command in CCaption to decode the DV output file you just created. Your closed caption text should appear in your chosen output file. See **Section 26** for additional information on decoding DV data files.

- Verify that your Digital Video player is able to reconstruct closed caption data from a DV data stream by using a video monitor with under scan. Play your tape in a VCR and look for varying closed caption data bits at the very top of the picture image. Video cameras generally do not reconstruct closed captions from a DV data stream.

Closed caption output generates random characters or no characters

- Verify that you have used the CCaption idle frame clip in front of, in between and behind all of the closed-caption segments you have entered onto the timeline.

- The idle frame is simply a standard closed caption single frame picture image with no actual closed caption data present (it is the 0, 0 data case). The idle frame consists of the 7 run-in bits, a space, a longer dash and then two more dashes later on in the image frame line. These are the CC data frames that don't wiggle when you play them back and they are found between each block of actual caption data.

- All you have to do is use your NLE to take some of these non-wiggly frames and edit them into your video.

- The purpose of having these idle frames before CC data is to make sure that the TV CC decoder is synchronized and is set up to recognize the closed captions. The reason to have these idle frames after CC data is to make sure that the TV CC decoder continues to display the CC data that you have sent it.

- Each frame of the video image you are adding closed captions to, must have either some actual CC data in it or a CC idle frame. In CCaption this is important to know because you sometimes make one caption at a time and then manually position each caption in the video. The space between each caption must contain these idle frames. In CCaption this is less of an issue because CCaption builds everything you need for an NLE. In CCaption you can set the duration check box to something more than your actual caption length and the end of the generated QuickTime movie will contain many idle frames. If you are making individual captions and set the duration to 00:00:10:00 you will have plenty of idle frames.

Appendix

Command Directive Quick Reference

General Control

```
*DROPFRAME      *NONDROPFRAME
*ITVLINK              *TC [+]HH:MM:SS:FF
*ERASE [+][HH:MM:SS:FF]    *DELAY HH:MM:SS:FF
*DURATION MM:SS:FF    *PAD [MM:SS:FF]
*TCOFFSET HH:MM:SS:FF
```

Caption Control

```
*POPON                *PAINTON
*ROLLUP2              *ROLLUP3   *ROLLUP4
*LEFT r[, c]                *RIGHT r,[c]     *CENTER r[,c]
*LEFTLEFT r[, c]            *LEFTCENTER      r[, c]
*LEFTRIGHT r[, c]           *CENTERLEFT r[, c]
*CENTERCENTER r[, c] *CENTERRIGHT r[, c]
*RIGHTLEFT r[, c]           *RIGHTCENTER r[, c]
*RIGHTRIGHT r[, c]          *IMMEDIATE r[,c]
*GROWDOWN       *GROWUP
```

Program Rating Commands

```
*PGRATING [Y,Y7,G,PG,14,MA,NONE][FV,V,S,L,D]
*MPAARATING [NA,G,PG,PG13,R,NC17,X,NR]
*CERATING [E,C,C8,G,PG,14,18]
*CFRATING [E,G,8,13,16,18]
*NORATING
```

Program Information Commands

```
*PROGRAMNAME NAME          *NOPROGRAMNAME
*PROGRAMLENGTH HH:MM *NOPROGRAMLENGTH
*PROGRAMTYPE [Basic Keywords][Detail Keywords]
*NOPROGRAMTYPE
```

QuickTime Text Track Quick Reference

```
*FONTNAME fontname
*TEXTNAME fontname    *FONT fontname
*FONTSIZE size        *TEXTSIZE size
*TEXTLEFT       *TEXTCENTER           *TEXTRIGHT
*TEXTPOSITION X, Y, X Width, Y Height
*TEXTDURATION HH:MM:SS:FF
```