# Understanding Videodisc Control and Video Playback on the Computer

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How is control of a videodisc player and video playback accomplished from within an authoring environment such as HyperStudio, HyperCard, Toolbook, or Director? Although the precise answer to this question varies from program to program, the basic processes are the same regardless of the system. Let's see what those processes are.

All modern industrial videodisc players have a built-in serial port. A computer is able to direct the actions of the videodisc player by sending appropriate signals through the serial port, in much the same way that the computer communicates with a modem. To accomplish videodisc control from the computer, one simply needs an appropriate cable connection from the computer's serial port to the videodisc player's serial port and software that can communicate with the serial port. (Note: the needed cable is specific to videodisc players and should be ordered from a vendor that deals in videodisc players.) Codes sent by the computer tell the videodisc player what to do. See the Pioneer videodisc commands following for information about the Pioneer two-letter codes. (Sony uses a numeric system we will not explore.)

Software that can communicate with the serial port is a key requirement. Most modern authoring tools do *not* have the capability to communicate with the computer's serial port directly. As a result, some sort of add-on or special software is needed. This software is known as driver software; it is low-level software (often written in C or assembly language) that controls the interplay between the authoring environment on the computer and the videodisc player. Some drivers are designed specifically for videodisc control, while others merely establish serial port communication and rely on the user to send the appropriate codes.

Among the authoring packages that we will use, the solutions vary. HyperStudio and Toolbook both have modules that must be installed for the computer to be able to work with a videodisc player. These allow the program to control a videodisc player to display still frames or motion sequences. They are functional but somewhat limited in terms of flexibility. Refer to HyperStudio and Toolbook handouts for more information.

In the case of HyperCard and Director, we will rely on a serial port driver (an XCMD in HyperCard and an XObject in Director). This approach requires some additional work, because the author must script the codes to control the videodisc player, but it results in greater flexibility and power. With direct access to the serial port, the author can make the videodisc player do anything that it is capable of doing.

With a two monitor videodisc system, control of the videodisc player is the only concern. The computer sends signals to the player to access frames or motion sequences, and the user views them on a separate monitor. The author's only concerns are accessing the videodisc at appropriate times, and providing cues for the user regarding where to look at any given time. For example, the message "Look at the video now" can be displayed on the computer screen to prompt the user to look at the videodisc monitor. The videodisc display can be set to a blue screen (using the pause command) after the display of video as a visual cue to let the user know it is time to return to the computer.

With a single monitor system, however, the videodisc video is displayed on the same screen as the computer information. How is this accomplished? First, it is important to point out that most computers *cannot* display videodisc video directly. In order to display videodisc video (or any other analog video) on a computer's screen, the computer must be equipped with analog video inputs. Audio-visual Macintosh computers and Windows computers equipped with video capture cards, among others, have the ability to display live video on the computer screen. However, software is needed to interface with this hardware capability.

The manufacturers of video cards, or the makers of authoring packages, sometimes provide software interfaces for displaying video on the computer's screen. A generic solution is now provided by Apple's QuickTime software that provides an interface between authoring tools and many video capture/display devices. Using QuickTime, many authoring packages can display live video in a window on the computer's screen. Most of the authoring tools that we will use rely on QuickTime to do the real work in displaying live video on the computer.

HyperStudio and Toolbook, as was the case with videodisc control, have the capability to display video in a window through the use of built-in modules. For HyperCard and Director, we will again rely on add-on software (an XCMD in HyperCard and an Xtra in Director). Each of these programs allows one to designate an area on the screen, by drawing a square or placing a square object such as a button or field, that will hold the video. Once initialized, live video comes through this window. Only one window can be active on the screen at one time.

It is important to realize that when you are using a single monitor system, controlling the video is a *two step process*. One step is that you must open a video window. A second step is that you must tell the videodisc to display the proper video. Both steps are required for proper action. Timing is also important. For best effect, do the initial steps of videodisc access (e.g., initializing the player, searching to a specific frame) *before* opening the video window. This hides the activities of the player from the user. (Note: HyperStudio does not allow for fine control of timing.) Then, open the video window. Complete the videodisc actions, if necessary (e.g., play a motion sequence). Finally, close the video window when it is no longer needed. As a final step in HyperCard and Director, be sure to release the resources associated with the external code modules prior to exiting the program; failure to do so can have unexpected consequences and may cause the system to crash.

These are the basics of how the process works. Refer to documentation specific to particular authoring packages for information about the details of using that package.

# Pioneer Videodisc Player Commands

| Command | Videodisc Action |
|---|---|
| argument AD | Audio control |
| CH | Chapter mode |
| CL | Clear |
| argument CM | Communication control |
| CO | Close door |
| CS | Clear overlay screen |
| argument DS | Display control |
| FR | Frame mode |
| argument KL | Key lock |
| LO | Lead out symbol |
| (address) MF | Multi-speed forward |
| (address) MR | Multi-speed reverse |
| NF | Scan forward |
| NR | Scan reverse |
| OP | Open door |
| PA | Pause |
| (address) PL | Play |
| argument PR | Print to overlay |
| RJ | Reject |
| argument RA | Register A (display) |
| SA | Start (initialize) |
| address SE | Search |
| SF | Step forward |
| address SM | Stop marker |
| argument SP | Speed |
| SR | Step reverse |
| ST | Still |
| TM | Time mode |
| argument VD | Video control |
| ?C | Chapter number request |
| ?D | Disc status request |
| ?F | Frame number request |
| ?M | CCR mode request |
| ?P | Player active mode request |
| ?T | Time code request |
| ?X | Player model request |

## Guidelines

- Command mnemonics use ASCII alpha characters and ? and $. Commands are not case sensitive.
- Arguments and addresses use ASCII numerals.
- Parentheses ( ) denote optional parameters.
- Commands may be up to 20 characters and are terminated by a carriage return code (ASCII 13).

## Selected Arguments

AD
0 - audio off
1 - channel 1 (left) only
2 - channel 2 (right) only
3 - stereo

DS
0 - master overlay off
1 - master overlay on

RA
0 - no overlay
1 - display frame or time
2 - display chapter
3 - display frame and chapter
4 - display overlay text
5 - display overlay text and frame
6 - display overlay text and chapter
7 - display all

SP240 - 4x normal speed
180 - 3x normal speed
120 - 2x normal speed
60 - normal speed
30 - 1/2 normal speed
15 - 1/4 normal speed
10 - 1/6 normal speed

VD
0 - video off
1 - video on