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PIONEER NEW MEDIA TECHNOLOGIES, INC.

**CLD-V2800**



CLD-V2800

LASERDISC/COMPACT DISC PLAYER

**LEVEL III**

**USER'S MANUAL**

**PROGRAMMER'S REFERENCE GUIDE**

*Pioneer Technical Publication TP 120 V. 1.0 10/95*



PIONEER NEW MEDIA TECHNOLOGIES, INC.

# CLD-V2800

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**CLD-V2800 Level III Documentation**  
**For Computer Control**

**Note to Users**

This manual is based on the most up-to-date information for Level III program development and delivery on the CLD-V2800 available at the time of publication. It is subject to change without notice. Although every reasonable effort has been made to include accurate information, the statements in this document are not warranties.

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Laser Vision Player  
**CLD-V2800 Level III User's Manual/Programmer's Reference Guide**  
**TP 120 Version 1.0 10/95**  
Pioneer New Media Technologies, Inc.

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**CLD-V2800**  
**Level I & III Documentation**  
**For Computer Control**

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**CLD-V2800 LEVEL III DOCUMENTATION**  
***For Computer Control***

Note to Users  
User Registration Form

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# **1. Introduction**

## **1.1 Scope of Level III Manual**

## **1.2 Features of the CLD-V2800**

## **1.3 Chapter Highlights**

**CHAPTER**

**1**

**CLD-V2800**

**LEVEL III**

USER'S MANUAL

Programmer's Reference Guide



# 1 Introduction

Please refer first to the **Operating Instructions** packaged with the CLD-V2800, for essential information about player operation and safety.

## 1.1 Scope Of Level III Manual

This manual is a reference guide to assist programmers and developers in using the Pioneer Industrial Combination LaserDisc/Compact Disc Player, Model CLD-V2800 under computer control. It contains technical information to assist programmers in the design and development of Level III program applications.

All Pioneer Industrial Laser Videodisc Players, Models CLD-V2800, CLD-V2600, CLD-V2400, LD-V4400, LD-V8000, LD-V2200, and the LD-V2000, can be used as stand-alone systems. When connected to a television or video monitor, they become self-contained interactive audio-video retrieval and display systems for Level I use. They may also be connected to and controlled by an external computer for Level III applications, often working in conjunction with computer databases.

The player can also be connected to a stereo amplifier and speaker system for playback of high quality digital sound. This is especially useful when playing compact audio discs or LaserDiscs with digital audio.

## 1.2 Features of the CLD-V2800

- Playback of LaserDiscs (LDs), compact audio discs (CDs) and compact disc video (CDVs). The CLD-V2800 *does not* playback CD-ROM discs.
- Playback of digital audio or analog audio playback from LaserDiscs.
- RS-232C interface, compatible with the Pioneer CLD-V2600, CLD-V2400, LD-V8000, LD-V2200, LD-V4400 and the LD-V4200 (discontinued), LC-V330 Autochanger, the LD-V4100 (PAL player), and the CLD-V2300D & LD-V4300 (Dual Standard NTSC/PAL players).
- Built-in LaserBarcode™, LaserBarcode 2™, and Barcode-CD™ capability. Use the Pioneer barcode reader UC-V108BC, UC-V109BC or the discontinued UC-V104BC, with either a wired connection or infra-red signal. (If using the UC-V104BC, make sure the switch inside the battery compartment is set to mode 2.)
- Wireless/wired remote control with the CU-V113 or the RU-V103.
- Fully automatic disc loading system.

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LaserBarcode™ and LaserBarcode 2™ are Registered TradeMarks of Pioneer Electronics Corp. Barcode-CD™ is a Registered Trademark of SONY, Inc.

- The CLD-V2800 is well-suited to use in kiosks, due to its small footprint. Dimensions in inches: 12-5/8" (w) x 15-11/16" (d) x 5-1/16" (h) .
- It has a 10 line x 20 character user display. (The same number of lines as the CLD-V2400).
- The CLD-V2800 responds to a superset of RS-232C Level III commands available on the CLD-V2600 and CLD-V2400. It responds to all the same commands plus one additional command, the Picture Stop Command. This command enables or disables picture stops that are encoded on a disc.
- The headphone jack with volume control and the front panel illuminated display help to make this player ideal for use in individual work stations or as part of multimedia "creation stations".
- Composite Video or RF Modulated Video outputs provide for connection to a video or TV monitor.
- The CLD-V2800 player can be used for **Level I** or **Level III** control of LaserDiscs (LDs), compact audio discs (CDs) or compact video discs (CDVs). The three player control methods are:
  - **Level I**— Manual Control using a remote control unit (CU-V113 & RU-V103), using a Pioneer barcode reader, or using the player's front panel buttons. (LD/CD)
  - **Level II**— Internal Program Control by loading Level II programs into a Level II compatible player's memory. Usually the programs are specially encoded onto a Level II videodisc. *The CLD-V2800 player does not have built in Level II capability.* The LD-V8000 is the only industrial level model with Level II capability.
  - **Level III**— External Computer Control by sending commands from a computer to the player via the RS-232C serial interface. (LD/CD)

**NOTE:** The use of the term CD in this manual refers primarily to CD audio discs and includes, by inference, CDVs.

**NOTE:** For information about Level I control of the player using front panel buttons, remote control unit or LaserBarcode, please see the **Operator's Instructions** that ship with the player.

## 1.3 Chapter Highlights

This manual is divided into chapters providing the following information:

### **Chapter One — Introduction**

This chapter describes the scope **Pioneer CLD-V2800 Level III User's Manual**, features of the player, and explains how information is organized.

### **Chapter Two— Operational Basics**

This chapter gives an overview of the player's internal operating processes, *Operating Modes* and *Active States*, and describes the player's RS-232C serial interface and the RS-232C port. There is also a section describing the player's Function Switches.

### **Chapter Three — External Computer Control — Level III**

This chapter explains how commands are sent to the CLD-V2800 from an external computer to control playback of LDs or CDs. It also describes error messages that may be returned, the default settings, a basic list of Level III commands and descriptions of each command.

Commands are described by categories: Player Control Commands, Player Control Switch Commands, Display Control Commands, Request Commands, Communication Control Commands, Register Control Commands, and Input Device Commands.

For additional information see the attached Appendices:

- Appendix A** Level III commands on the CLD-V2800
- Appendix B** CLD-V2800 Interface Cable Specifications
- Appendix C** CLD-V2800 Internal Player Controls
- Appendix D** CLD-V2800 Internal Player Registers
- Appendix E** Additional Notes

Further questions should be referred to:

### **Pioneer New Media Technologies, Inc.**

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## **2. Operational Basics**

**2.1 Internal Operations**

**2.2 RS-232C Interface**

**2.3 Function Switches**

**CHAPTER**

**2**

**CLD-V2800**

**LEVEL III**

**USER'S MANUAL**

**Programmer's Reference Guide**

## 2 Operational Basics

This chapter provides an overview of the player's internal operations — Operating Modes and the player's Active States; RS-232C Interface, and Function Switches. Before developing or presenting programs on the CLD-V2800 the user should read this chapter and become familiar with the operational basics. (See **Appendix B, C, and D for details on CLD-V2800 Interface Cable Specifications, Internal Player Controls and Internal Player Registers.**)

### 2.1 Internal Operations

The player's internal operating processes are classified into two groups: *Operating Modes* indicating player operation status, and *Active States* indicating player processing status.

#### 2.1.1 Operating Modes

The CLD-V2800 has the following two *Operating Modes*: *Normal Control Mode* and *Test Mode*. (See **Figure 2-A** on next page.)

These modes are defined as follows:

##### 1) Normal Control Mode

When the player's power is turned on, the player enters *Normal Control Mode*. In this mode, the player can be controlled by pressing buttons on the front panel, by pressing buttons on the remote control unit, by sending commands via the Pioneer barcode reader, or by sending commands from a computer via the RS-232C connector.

##### 2) Test Mode

The *Test Mode* is set in Register C under computer control. (See page 4-43) It is used for player maintenance and management. This mode is used primarily by Authorized Service Company (ASC) personnel to determine key part numbers of the player and to service the player. Generally, the player is not controlled in this mode.

#### 2.1.2 Active States

CLD-V2800 processing is performed within several distinct *Active States*. When a command is executed, the *Active State* changes inside the player. If you consider player processing as a series of events within the *Active States* listed below, it is easier to understand the effects of various commands. The player's five main *Active States* are:

- *Door Open*
- *Park*
- *Spin Up*
- *Random Access*
- *Spin Down*

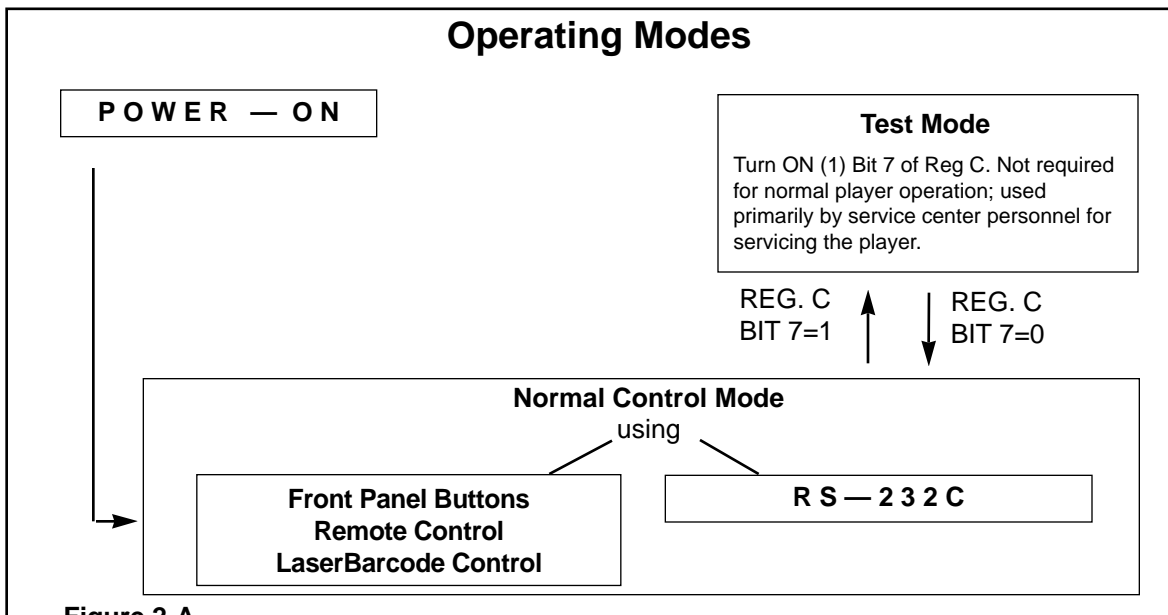


Figure 2-A

The player is in *Door Open* before the disc is loaded into the disc tray. After the door is closed, the player enters *Park*. When a START or PLAY command is input while the player is in *Park*, the disc starts rotating and the player enters *Spin Up*. When the player is ready to play images, it enters *Random Access*. *Random Access* is further divided into *Play*, *Still*, *Scan*, *Pause*, *Multi-Speed*, *Skip (Chapter and Track)* and *Search*.

When a REJECT command is received, the player enters *Spin Down Mode*. Image playback stops immediately, and disc rotation is gradually stopped, then the player enters *Park*. **Figure 2-B**, describes how the active states change within the player.

*Transitions Between Active States*

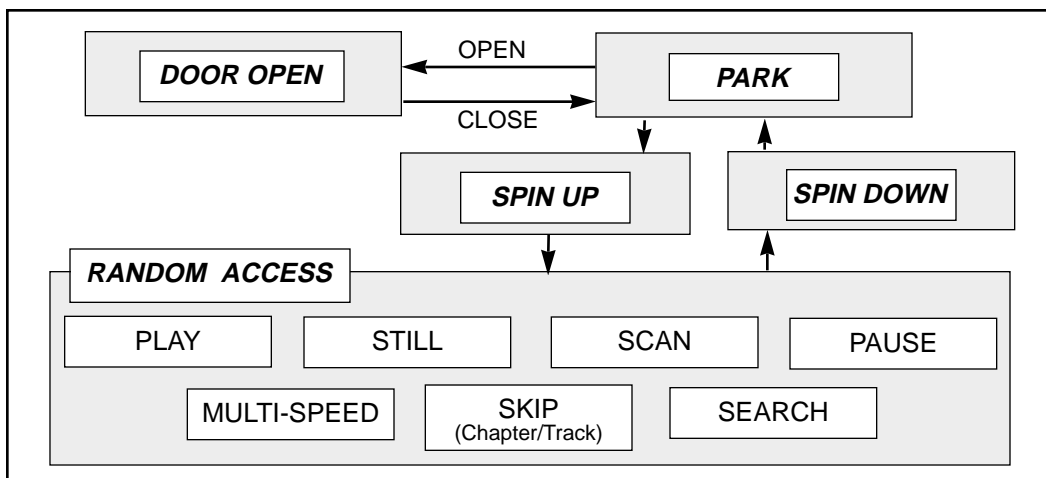


Figure 2-B

## 2.2 RS-232C Interface

The **RS-232C port** receives signals from an external computer or controller via the appropriate RS-232C cable. Use Pioneer CC-12 cable for PC & compatibles with a DB-25 connector. Use CC-13 cable for PC & compatibles with DB-09 connector. Use CC-04 cable for Macintosh computers with Apple Circular 8 connector.

### 2.2.1 RS-232C Interface Connector

The CLD-V2800 can be controlled by a computer connected to the RS-232C port on the back of the player. This section gives specific information about: 1.) The RS-232C Connector, 2.) The pin outs of the Serial Interface, 3.) Signal Characteristics, 4.) Connection to a computer.

#### 1) The RS-232C Connector:

15-pin D-SUB connector, female, on the player.

15-pin D-SUB connector, male, on the cable.

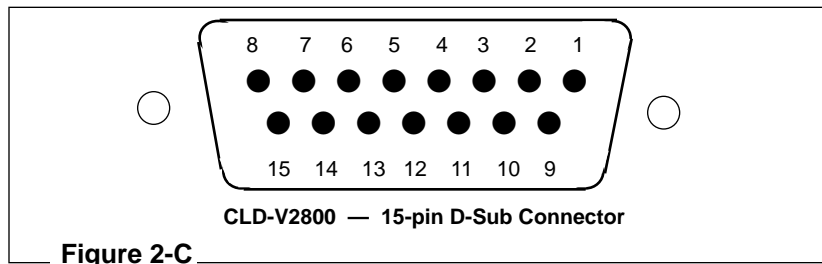


Figure 2-C

#### 2) Serial Interface Pin Outs

Pin #	Terminal	Input/Output	Level
1	GND		GROUND
2	TXD	OUTPUT	RS-232C
3	RXD	INPUT	RS-232C
4	DTR	OUTPUT	RS-232C
5	No Connection		
6	No Connection		
7	No Connection		
8	No Connection		
9	No Connection		
10	No Connection		
11	GND		GROUND
12	No Connection		
13	No Connection		
14	No Connection		
15	GND		GROUND

Figure 2-D

### 3) The Serial Interface

#### **The Signal Level**

The signal level for the RS-232C is  $\pm 12v$ .

#### **The Data type**

- Parity bit : No parity.
- Data length : 8 bits.
- Stop bit : 1 bit.

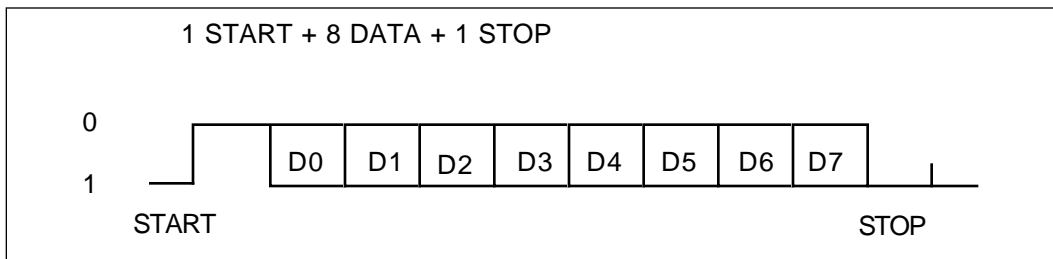


Figure 2-E

#### **The Transmission speed**

9600, 4800, 2400, or 1200 baud can be selected by using Dip Switches 1 and 2 on the back of the player: The Factory default setting is 4800 BAUD.

BAUD	SW1	SW2
9600	UP	UP
4800	DOWN	UP
2400	UP	DOWN
1200	DOWN	DOWN

**NOTE:** A BAUD rate of 4800 or 1200 can also be set by sending a Level III command to Set Register C. See page 3-42 for details.



#### 4) Connection to a Computer

The player can be connected to a computer via the RS-232C port as shown below. It is connected with three lines: One line transmits commands from the computer to the player to control operations. Another line transmits status responses from the player to the computer. The third line is Ground.

The player does not use hardware handshaking. Therefore, control or “handshaking” lines other than TxD and RxD are not required, even if the computer provides them.

Some computers, however, may require hardware handshaking. The player makes a line available to be used, as needed, by the computer. The DTR signal is always pulled high internally, within the CLD-V2800.

The player is connected to the RS-232C port of the computer as follows:

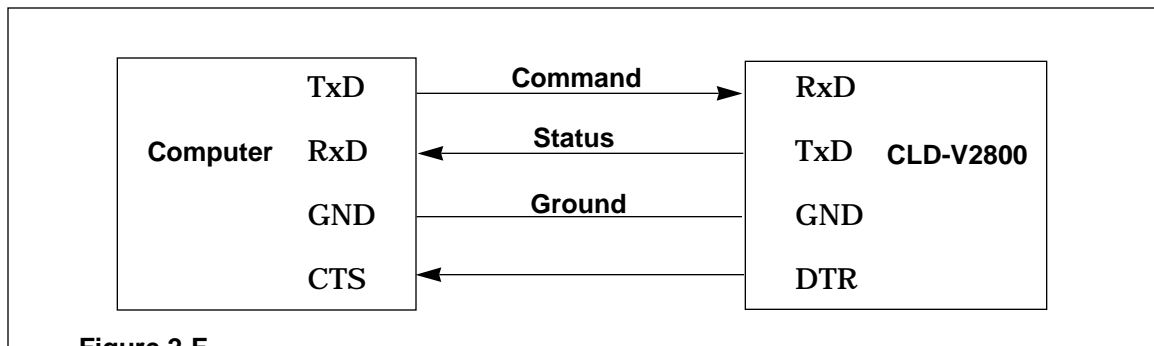


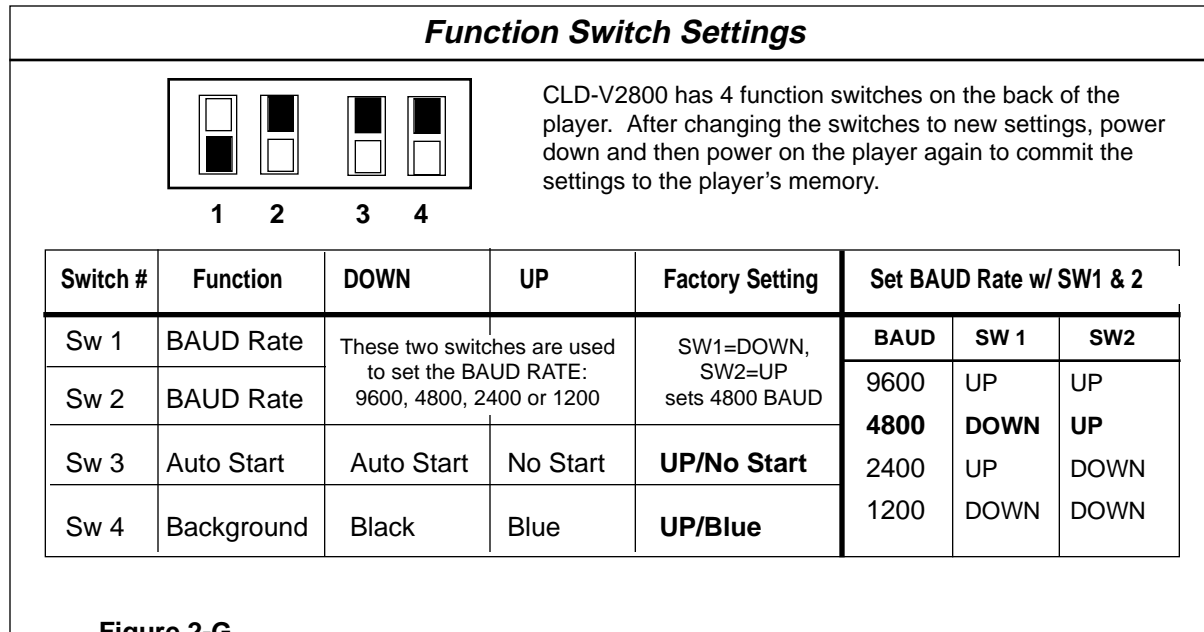
Figure 2-F

See **Appendix B** for specific interface cable pin configurations to use to connect various computers to the CLD-V2800.

### 2.3 Function Switches

The CLD-V2800 videodisc player has four physical dip-switches, #1-4, on the rear panel of the player (See **Figure 2-G** below.) These are used to set several function parameters.

All switches are set as follows when the players are shipped from the factory:  
 Switch 1: DOWN and Switch 2: UP sets the BAUD set to 4800; Switch 3: UP Auto Start set to OFF; Switch 4: UP Squelch is Blue.



**SW1 and SW2:** These two switches are used to set the BAUD rate of the Player for RS-232C communications to 9600, 4800, 2400, or 1200 BAUD. The factory set default is 4800 BAUD, with Switch 1 DOWN and Switch 2 UP.

**SW3:** Auto Start Automatic playback starts when a disc is inserted and SW3 is DOWN=ON. Default is No Auto Start: UP=OFF.

**SW4:** Background for setting squelch color: Black is DOWN=ON; Blue is UP=OFF. Default is Blue: UP=OFF.

**NOTE:** Settings for Load Start, Power-On Start, 4800 or 1200 BAUD Rate, and Background Color can be modified by entering data into Register C from a computer via the RS-232C port. (See **Section 3.7.6 Register Control Commands, Register C Set**, page 3-42.)

## **3. External Computer Control — Level III**

- 3.1 Command and Status**
- 3.2 Error Messages**
- 3.3 Initial Settings**
- 3.4 Level III Commands for LD & CD Control**
- 3.5 Command Formats**
- 3.6 Status Returns**
- 3.7 Level III Command Descriptions**

**CHAPTER**

**3**

**CLD-V2800**

**LEVEL III**

**USER'S MANUAL**

**Programmer's Reference Guide**

### 3 External Computer Control — Level III

This chapter describes the computer control protocol and specific commands used for Level III control of the CLD-V2800 player. To attach a computer to the player via the RS-232 port, refer to **Appendix C, Interface Cable Specifications**. See **Section 2.4 On-Screen Function Switches**, page 2-6, to select Baud Rate.

#### 3.1 Command and Status

In the CLD-V2800 external computer control protocol, the computer transmits a command; when the player completes execution of the command, it returns an “R”. ASCII character codes are used for the actual commands and status responses. The command mnemonic is expressed as two ASCII characters. In most cases, there is no distinction between the use of uppercase or lowercase letters, and the use of uppercase letters is recommended.

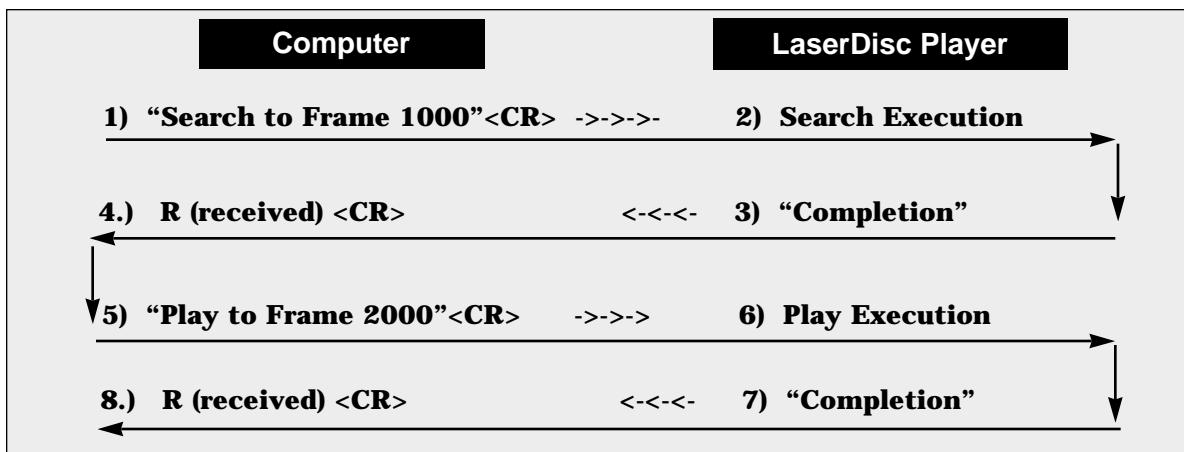


Figure 3-A

Arguments may be set to specify the frame number, speed or other values for a command. The argument is always placed before the command. The command is also used as the terminator of the argument. In the simplest protocol, the player immediately executes one command as soon as the terminator of the command line, a <CR> (carriage return), is received.

**Example:** 1000SE<CR> : Search to frame 1000.

The player has a command buffer that allows multiple commands to be sent from the external controller in the same command string.

**Example:** 1000SE 2000PL <CR> : Search to frame 1000, then play to frame 2000.

In this example, when the <CR> is received, commands are executed sequentially from the first command of the buffer. The “R” is returned to the computer after the play segment is completed. If a <CR> is sent before a command or command string has completed execution, the command is cleared and execution is cancelled.

See **Section 3.5**, page 3-7 & 8 for more information about command formats. In the command line, codes such as <SPACE> or <LF> (line feed) that do not affect player operation are ignored. The length of the command line is limited to the buffer size. For the CLD-V2800 the length of a command string is limited to 20 characters. The <CR> or <LF> are not included in the buffer size.

When all the commands in a string are completely executed, the player transmits the “completion” message. (It sends an “R” <CR>.) If an error occurs, an error message such as E04 <CR> is returned by the player. This indicates the error occurrence, along with the error code. See **Sec. 3.2 Error Messages**, page 3-3.

The automatic return of an “R” following command execution is called *Automatic Status*. *Automatic Status* is very useful when working with some computer programs, because it allows the program to know the appropriate time to send the next command. If this function is not used, the command processing time must be taken into consideration before the next command is sent. (To set Automatic Status ON or OFF, see the Level III command for **Communication Control** on page 3-38.)

### 3.1.1 Request Status

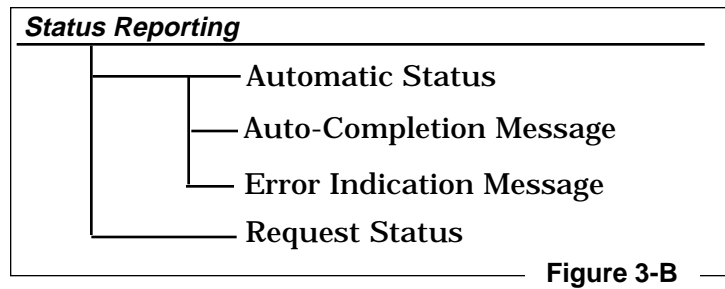
When an error message is received, it may be necessary to determine the player’s current status in order to continue a program. A variety of conditions can occur which may cause an error code to be sent. Since actual hardware failure in the player is a relatively rare event, other conditions may be detected which would allow a program to recover and continue operation. Even when there is no error, there are occasions when player status or disc information is useful. In such a case, the *Request Status* function can be used.

The user may want to find out the current frame number even if there is no error. *Request Status* commands can be useful under these conditions. On the CLD-V2800 players, some of the main *Request Status* commands in Level III are as follows:

- 1) To know the active mode of the player: ?P
- 2) To know the current frame, time, or chapter number for LDs: ?F, ?T, ?C
- 3) To know the current track, time, block index or p-block numbers for CDs: ?R ?T ?B, ?I or ?A

**NOTE:** These and additional *Request* commands are described in **Section 3.7.4** on page 3-31 through **Section 3.7.7** on page 3-45.

The status functions are summarized in **Figure 3-B** on the next page:



### 3.2 Error Messages

Code	Message	Meaning
E00	Communication error	Communication line error, framing error, buffer overflow error.
E04	Feature not available	Non-usable function has been tried. The command mnemonic is wrong. A command specific to CAV or CLV is sent while the wrong type of disc is in the drawer. Standard User Code is not found on the disc.
E06	Missing argument	Necessary parameter is not specified.
E11	Disc is not loaded	There is no disc in the disc tray.
E12	Search error	Search address cannot be found.
E13	De-focusing error	Laser error: Unfocused
E15	Picture stop	Playing has been stopped by a picture stop code.
E16	Other device Input	The command(s) sent via the serial line were not executed before commands were sent from the front panel keys, and/or the RCU.
E99	Panic	Unrecoverable error occurred. Disc cannot be loaded. Playing cannot be continued.

**Figure 3-C**

### 3.3 Initial Settings

The internal registers and switches are set to the following conditions when power is turned on. The settings are not re-initialized when the player is put into *Park* or *Door Open Mode*. Do not forget to set them to the parameters needed when creating an application program. Some of the switch settings can be set only via Register Commands under computer control; others can be set by using the DIP Switches on the rear panel of the player or via Registers. For more information see **Section 3.7.6 Register Control Commands**, page 3-39, and **Section 2.3 Function Switch Settings**, page 2-6.

Register/Switch	Initial Setting	Status
Key lock	0	Unlocked
Video switch	1	ON
Audio switch	7	Digital Stereo (If digital audio is encoded on the disc.)
Display switch	0	OFF
Address flag	3	Frame - CAV; Time - CLV Track - CD, CDV
Speed parameter	60	Normal (X1) speed
Communication Control	Mode 3	Automatic Status
REG. A	3	Frame/Chapter - LD; Track/Time - CD, CDV
REG. B	0	Normal squelch
REG. C	1	Side Repeat ON and Blue Squelch. (BAUD Rate can be set using SW 1 & 2, Auto Start can be set using SW 3, and Squelch color of Blue or Black can be selected with SW 4 on the back of the CLD-V2800. Some of these options can also be set through Register C under Level III control.)

Figure 3-D

### 3.4 Level III Commands for LD & CD Control

The following commands are available in Level III with the CLD-V2800 player. Check marks indicate whether the command functions during LD or CD playback. The page number refers to the page that contains a detailed description and examples of how to use the specific command. **NOTE:** An address or argument contained in parentheses can be omitted.

	Command	Mnemonic	Page	LD	CD
1	Door Open	OP	3-11	✓	✓
2	Door Close	CO	3-11	✓	✓
3	Reject	RJ	3-12	✓	✓
4	Start	SA	3-12	✓	✓
5	Play	(Address) PL	3-13	✓	✓
6	Pause	PA	3-14	✓	✓
7	Still	ST	3-14	CAV	
8	Step Forward	SF	3-15	CAV	
9	Step Reverse	SR	3-15	CAV	
10	Scan Forward	NF	3-15	✓	✓
11	Scan Reverse	NR	3-15	✓	✓
12	Multi-Speed Forward	(Address) MF	3-16	CAV	
13	Multi-Speed Reverse	(Address) MR	3-16	CAV	
14	Speed Set	Integer SP	3-17	CAV	
15	Search	Address SE	3-18	✓	✓
16	Stop Marker	Address SM	3-20	✓	✓
17	Frame Set	FR	3-21	✓	
18	Chapter Set	CH	3-21	✓	
19	Time Set	TM	3-22	CLV	✓
20	Track Set	TR	3-22		✓
21	Index Set	IX	3-23		✓
22	Block Set	BK	3-23		✓
23	Clear	CL	3-24	✓	✓
24	Lead-Out	LO	3-24	✓	✓
25	Audio Control	Integer AD	3-25	✓	✓
26	Video Control	Integer VD	3-25	✓	✓
27	Key Lock	Integer KL	3-27	✓	✓

Figure 3-E

List of commands continued on next page



List of Level III Commands for the CLD-V2800 (continued)

	Command	Mnemonic	Page	LD	CD
28	Display Control	Integer DS	3-28	✓	✓
29	Clear Screen	CS	3-29	✓	✓
30	Print Character	Integer PR	3-30	✓	✓
31	Frame Number Request	?F	3-31	✓	
32	Chapter Number Request	?C	3-31	✓	
33	Time Number Request	?T	3-32	CLV	✓
34	Track Number Request	?R	3-32		✓
35	Index Number Request	?I	3-33		✓
36	Block Number Request	?B	3-33		✓
37	P-Block Number Request	?A	3-33		✓
38	TOC Information Request	?Q	3-34		✓
39	Player Active Mode Request	?P	3-35	✓	✓
40	Disc Status Request (LD)	?D	3-36	✓	
41	Disc Status Request (CD)	?K	3-36		✓
42	LVP Model Name Request	?X	3-37	✓	✓
43	Communication Control	Integer CM	3-38	✓	✓
44	CCR Mode Request	?M	3-38	✓	✓
45	Register A Set (Display)	Integer RA	3-39	✓	✓
46	Register B Set (Squelch Control)	Integer RB	3-41	✓	✓
47	Register C Set (Miscellaneous)	Integer RC	3-42	✓	✓
48	Register A Request (Display)	\$A	3-43	✓	✓
49	Register B Request (Squelch Control)	\$B	3-43	✓	✓
50	Register C Request (Miscellaneous)	\$C	3-44	✓	✓
51	Input Unit Request	#I	3-45	✓	✓
52	Input Number Wait	?N	3-45	✓	✓
53	Picture Stop	Integer PS	3-46	CAV	

Figure 3-E (continued from previous page)

See **Appendix A** for Alphabetical Listing of all Level III commands available on the CLD-V2800 player; also included is a separate list of LD-commands available and a separate list of CD-commands available.

### 3.5 Command Formats

Level III commands on the CLD-V2800 are expressed as “Command Mnemonics”, so they are easy to remember. “Command Mnemonics” are also used for Level III control of the CLD-V2600, CLD-V2400, LD-V8000, LD-V4400, the LD-V2200, & LD-V4200 (a discontinued models), the LC-V330 Autochanger, as well as for the LD-V4100 (PAL player), CLD-V2300 (NTSC/PAL) and the LD-V4300D (NTSC/PAL player). Some commands are preceded by an “argument” expressed as an integer. These may indicate a specific “address” location on the disc or set function parameters.

**Command Mnemonic** — Each Level III command is expressed as two ASCII alphabetic characters, representing the command mnemonic. There is no distinction between uppercase letters and lowercase letters. **Example:** PL (Play); Pl (Play); pl (Play).

**Argument** —An argument is expressed in ASCII digits and it is placed before the command. When a command requiring an argument has no argument, an error (E06) is returned. An argument consists of either an address or an integer:

**1) An Address** — The address can be a frame, time, or chapter number (LDs) or time, block, track or index number (CDs) depending how the address flag is set. When an address larger than the maximum allowable value is input, correct evaluation cannot be made. Addresses may be expressed as numbers indicated below:

<b>LDs</b>	<b>Frame number</b> xxxxx	<b>CAV:</b> N1 N2 N3 N4 N5 minimum = 0 0 0 0 0 » maximum = 65535
	<b>Chapter number</b> xx	<b>CAV, CLV</b> N1 N2 minimum = 00 » maximum = 79
	<b>Time numbers</b> H:MM:SS  <b>Extended Time numbers</b> H:MM:SS:FF	<b>CLV:</b> N1 N2 N3 N4 N5 (N1=hour, N2 N3=minutes, N4 N5=seconds) minimum = 00000 » maximum = 95959  <b>CLV:</b> N1 N2 N3 N4 N5 N6 N7 (N1=hour, N2 N3=minutes, N4 N5=seconds, N6 N7 Frame No.) minimum = 00000 » maximum = 9595929
<b>CDs</b>	<b>Time</b> N1 N2 N3 N4 MM:SS  <b>Block numbers</b> N1 N2 N3 N4 N5 N6 MM:SS:BB	<b>CD</b> N1 N2 N3 N4 N1 N2=minutes, N3 N4=seconds, N5=blocks  N1 N2 N3 N4 N5 N6 Minutes 00-99, Seconds 00-59, Blocks 00-74 minimum = 00000 » maximum = 995974
	<b>Track numbers</b> xx	<b>CD</b> N1 N2 minimum = 01 » maximum = 99
	<b>Index numbers</b> xx-xx	<b>CD</b> N1 N2 N3 N4 N1 N2 = Track , N3 N4= Index Track = 01-99, Index = 00-99 minimum = 0100 » maximum = 9999

Figure 3-F

**2) Integer** — This indicates that the argument should be an integer number. The value is used to set a control register to some specified value or condition.

N1 N2 N3 N4 N5  
minimum = 00000 » maximum = 65535

**NOTE:** The maximum value used to set a control register is 255. For details see **Section 3.7.6 Register Control Commands**, page 3-39.

A Search command can accept up to the last frame, chapter or time number encoded on a LaserDisc. Maximum number of frames on one side of a LaserVision standard videodisc is 54,000 (CAV), Chapters, 0-79 (CAV or CLV), time numbers 59.59 (CLV). (One side of CLV disc holds one-hour of full motion video, time numbers can be encoded that describe *running time* of a program taking up several sides of several discs up to 9:59.59.) If a frame, chapter or time number larger than the last one encoded on a LaserDisc is entered, the player will search to the highest number encoded on the disc and then enter *Still* (CAV) or *Pause Mode* (CLV). If a block, index or time number larger than the last one encoded on a CD is entered, the player will not execute the search.

**3) (Address) or (Integer)** — When an argument, an address or an integer, is indicated in parentheses, it is optional and can be omitted.

**Command String** — A command string consists of multiple commands. The maximum length of a command string is 20 characters and it is terminated by the <C/R> code (0D hex). **Example:** FR2000SE 2300PL <C/R>

- After the termination, the command string is evaluated, and executed sequentially from the first command.
- The <L/F> code (0A hex) and <SPACE> code (20 hex), even if contained in the command string, will be ignored because <L/F>, <C/R> and <SPACE> are not included in the number of characters which can be transmitted in the command string.
- When an error occurs, subsequent commands in a string will not be executed.
- If a new command string is input before execution of a current string has been completed, the remaining commands are cleared and execution is cancelled. Thus, in order to cancel a currently executing string, simply send the <C/R> without a preceding command. This does not cancel PA, SE, or RJ.
- When the player is put into *Spin-Up*, *Spin-Down* or *Search Mode*, by external commands SA, RJ, or SE, subsequent commands issued will be executed and an “R” will be returned *after* the *Spin-Up*, *Spin-Down* or *Search Mode* cycle is finished, due to the player’s communication protocol. To check the player’s status, send a command to request status, ?P, ?D, ?T, ?R etc. To set player address flags send CH, FR, TM, BL, IX. *If these commands are sent while the mode cycles are in progress, the player will process the command, but won’t send a completion status.*

### 3.6 Status Returns

The player can return codes to the computer indicating certain status conditions:

#### 1) *Completion Message*

The completion message used in Automatic Status is “R”.

R <C/R>

#### 2) *Error Message*

The error message is indicated by the letter “E” followed by a two-character error number.

E N1 N2 <C/R>

The error message occurs when the given command is non-executable and hinders continued control. A list of the error messages appears in **Section 3.2 Error Messages**, page 3-3

#### 3) *Request Status Return*

- In response to a single request command, the status is displayed as the appropriate character string with a termination code at the end. A termination code of either <C/R> or <C/R> <L/F> can be selected by using Register C.
- If multiple request commands are sent to the player within the same command string, each status value is returned as the appropriate character string with a <C/R> (or <C/R> <L/F>) termination code.

?C?F<C/R> 02 <C/R> 10260 <C/R>

- When the request command is at the end of the command string, “R” of the completion message is omitted.

ST?F <C/R> 23005 <C/R>  
 ?FST <C/R> 23005 <C/R> R <C/R>

#### 4) Timing

The timing from the receipt of a command to the return of the status value is as follows:

- T1 is the time from the receipt of <C/R> at the end of the command string to the start of command execution, and is within a maximum of 20 ms.
- T2 is the command execution time, and is at least 14 ms.  
T2 (before the <C/R>) increases depending on the type of command.
- The minimum processing time for any command (total of T1 and T2) is 14 ms.

Timing Diagram

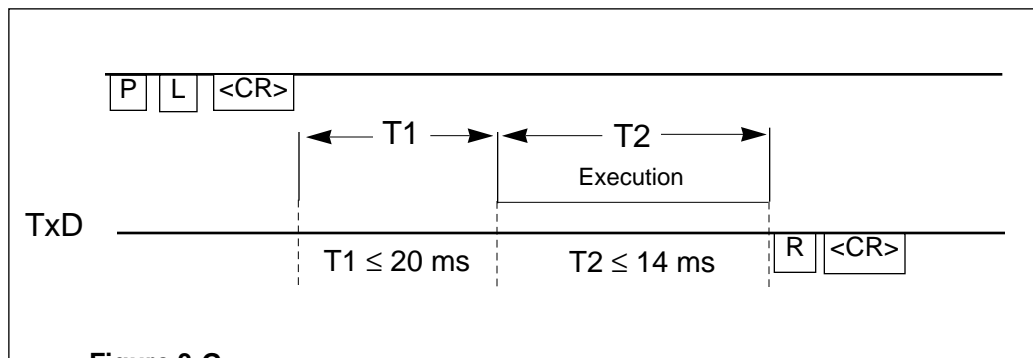


Figure 3-G

### 3.7 Level III Command Descriptions

This section of the manual contains a detailed explanation of each Level III command available for use when controlling the CLD-V2800 from an external computer or controller. The format used to describe each command is as follows:

- Title:** The command name with a notation indicating whether the command applies to a LaserDisc, Compact Disc or both.
- Function:** A description of what the command does.
- Format:** The command mnemonic used to send the command to the player.
- Explanation:** A description of how the command is executed.
- Execution:** An example of how to execute the command.

#### 3.7.1 Player Control Commands

##### 1) DOOR OPEN LD/CD

Function: Door is opened.

Format: OP or OOP opens the LD tray; 1OP opens the CD tray

Explanation: The *Door Open Mode* is the state where the disc tray is opened to change the disc, or the tray is drawn out.

If this command is sent when the player is in *Park*, the door is opened and the *Door Open Mode* starts. This command is also effective in other modes; disc rotation stops and then the door is opened. An error, E04, is returned if the door is already opened.

**NOTE:** If an LD is loaded, the LD disc tray will open even if the 1OP command is sent.

Execution: \* Park Mode  
 O P <C/R>                      R <C/R>  
 \* Door Open Mode

##### 2) DOOR CLOSE LD/CD

Function: Door is closed.

Format: C O

Explanation: When the player door is open and this command is received, the player closes the door and enters *Park*. The completion status is returned just after the door has closed. If this command is sent when the player is in some mode other than *Door Open*, or if the door is already closed, an error message, E04, will be returned.

Execution: \* Door Open Mode  
 C O <C/R>                      R <C/R>

\* Park Mode

**3) REJECT LD/CD**

Function: Disc rotation is stopped.

Format: R J

Explanation: If this command is sent when the player is in *Random Access Mode* or *Setup Mode*, the *Reject Mode* starts and disc rotation stops. When disc rotation completely stops, the completion status is returned, and the player enters *Park*. **NOTE:** If this command is sent while the player is in *Park*, the LD disc tray is opened.

Execution: \* Random Access Mode  
R J <C/R>                      R <C/R>  
\* Park Mode

**IMPORTANT NOTE**

*When using the PLAY command with an address, the auto stop function will be released if any other command, including a status request, is sent to the player before the specified address is reached.*

*Use the Stop Marker command to achieve an auto stop PLAY function that will allow for status requests and maintain the end address marker.*

**4) START LD/CD**

Function: Disc rotation is started.

Format: S A

Explanation: If this command is sent when the player is in *Open*, *Park* or *Reject Mode*, the *Setup Mode* begins and disc rotation is started. When the player is ready to begin playing the audio and video content of the disc, it enters *Pause Mode* at the first position in the program area of the disc. Then the completion status is returned.

Execution: \* Park Mode, disc in tray.  
S A <C/R>                      R <C/R>  
\* Pause Mode: Disc is successfully loaded.  
or



\* Park Mode, no disc in tray.

S A <C/R>                      E 11 <C/R>

\* Park Mode: There is no disc in the disc tray.

**5) PLAY LD/CD**

Function: Pictures and sound are played back.

Format: (Address) P L

Explanation: 1) If this command is sent when the player is in *Random Access Mode*, video and audio are played at normal speed. *Play Mode* is the only mode in which sound is automatically reproduced with video on LaserDiscs.

2) If an address is specified, the player will play to that address and stop automatically. The specified address is written in the Mark Frame/Time/Block, or Mark Chapter/Track Register and compared with the current address. When both values are equal, *Still Mode* (CAV) or *Pause Mode* (CLV, CDs) occurs; then the completion status is returned. Command completion also occurs when lead-out is found before the specified address is reached.

3) If this command is sent when the player is in *Open, Park* or *Spin-Up Mode*, it is executed and the disc plays from the beginning of the program area. Once playback begins, the completion status is returned. Playback continues until another motion command is received.

Execution #1: \* *Park, Spin Up* or *Pause Mode* (CLV or CAV) or *Still Mode* (CAV)  
 (LDs) P L <C/R> R <C/R>  
 \* *Play Mode*

Execution #2: \* *Spin Up, Still* or *Pause Mode* (CAV)  
 (LDs-CAV) F R 3 2 4 0 0 P L <C/R>  
 \* Plays to Frame 32400 and enters *Still Mode* R <C/R>

Execution #3: \* *Spin Up* or *Pause Mode* (CLV)  
 (LDs- CLV) T M 2 0 2 8 P L <C/R>  
 \* Plays to 20 minutes 28 sec. and enters *Pause Mode* R <C/R>

Execution #4: \* *Pause Mode*  
 (LDs-CLV) F R 2 0 2 8 0 4 P L <CR>  
 \* Plays to 20 min., 28 sec., 04 frames and enters *Pause* R<C/R>  
**NOTE:** The On-Screen Display will only show 20:28 but if a ?F is issued, the player will return the extended time number: 202804.

Execution #5: \* *Pause Mode*  
 (CDs) T M 0 4 0 4 P L <CR>  
 \* Plays to 04 min. 04 seconds then, enters *Pause Mode*. R

<C/R>

Execution #6: \* *Pause Mode*  
(CDs) B K 0 3 2 8 1 2 P L <CR>  
\* Plays to 3 min. 28 sec., blk. 12 & enters *Pause Mode*. R <C/R>  
**NOTE:** The On-Screen Display shows 3:28 but if a ?B is sent to the player via computer, the player will return 032812.

**6) PAUSE LD/CD**

Function: Playback ceases and pausing occurs.

Format: P A

Explanation: If this command is sent to the player while it is in *Random Access Mode*, pausing occurs at the current disc location, video and/or audio playback ceases and a blue (or black) screen appears on the monitor.

**IMPORTANT NOTE**

*When using the MULTI-SPEED command with an address, the auto stop function will be released if any other command, including a status request, is sent before the specified address is reached.*

*Use the Stop Marker command to achieve an auto stop MULTI-SPEED function. This will allow for status requests and maintain the end address marker.*

Execution: \* *Play Mode*  
P A <C/R> R <C/R>  
\* *Pause Mode*  
P L <C/R> R <C/R>  
\* *Play Mode*

**7) STILL LD (CAV Only)**

Function: Playback is stopped with picture displayed.

Format: S T

Execution #2: \* *Still Mode*  
F R 3 4 5 0 0 M F 3 4 5 0 0 S M<sup>†</sup> ?F <C/R>  
\* *Multi-Speed Mode*, returns current frame number  
Frame 34500 reached R <C/R>  
\* *Still Mode*

<sup>†</sup>**Note:** Without the Stop Marker, the player would return the current frame number, then play past frame 34500.

**Explanation:** If this command is sent to the player when it is in *Random Access Mode*, playback stops at that position and *Still Mode* occurs.

**Execution:** \* Play Mode  
 S T <C/R> R <C/R>  
 \* Still Mode  
 P L <C/R> R <C/R>  
 \* Play Mode

**8) STEP FORWARD LD (CAV Only)**

**9) STEP REVERSE LD (CAV Only)**

**Function:** Pictures are moved one frame forward or reverse.

**Format:** S F - STEP FORWARD  
 S R - STEP REVERSE

**Explanation:** If this command is sent to the player when it is in *Random Access Mode*, the pictures will move one frame forward or reverse, and

Integer†	Possible range of integers	Speed	Integer†	Possible range of integers	Speed
180	150-255	X3	15	12-22	1/4
120	91-149	X2	7	6-11	1/8
60	46-90	X1	4	3-5	1/16
30	23-45	1/2	2	0-2	Step 1**

Figure 3-H

then *Still Mode* occurs.

**Execution:** \* Play Mode  
 S F <C/R> R <C/R>  
 \* Still Mode  
 S R S R S R <C/R> R <C/R>  
 \* Still Mode

**\*\* NOTE:** 2SP plays one frame every second (Step 1) on the CLD-V2800/2600/2400. Similarly, 2SP sets a Step 1 to play one frame every second on the Pioneer LD-V2200, LD-V4400 and LD-V8000. Early versions of the CLD-V2400 played 1 frame every three seconds (Step 3) if a 0SP or 1SP were sent to the player. Later production units of the CLD-V2400, however, all play Step 1 if a 0SP, 1SP or 2SP is sent to the player. To achieve compatibility across the player line for a one frame per second playback speed, send the 2 SP command, followed by MF (Multi-Speed Forward).

**10) SCAN FORWARD LD/CD**

**11) SCAN REVERSE LD/CD**

Function: Rapid forward or reverse scanning of the disc.

Format: N F - SCAN FORWARD  
N R - SCAN REVERSE

Explanation: If this command is sent to the player when it is in the *Random Access Mode*, the pictures on a LaserDisc will move at high speed about 500 frames forward or reverse and audio is squelched. This movement is referred to as *Scan Mode*. On a CD, program material is still audible but is scanned at a high speed. When the *Scan* is completed, the original mode is restored and the completion status is returned.

Execution 1: \* Play Mode  
N F <C/R> R <C/R>  
\* Play Mode  
N R N R N R <C/R> R <C/R>  
\* Play Mode

Execution 2: \* Still Mode  
N F <C/R> R <C/R>  
\* Still Mode

**12) MULTI-SPEED FORWARD LD (CAV Only)**

**13) MULTI-SPEED REVERSE LD (CAV Only)**

Function: Playing is done at the speed set in the speed register.

Format: (Address) M F - MULTI-SPEED FORWARD Maintains Chapter Mode,  
Searches to beginning of Chapter 6)  
(Address) M R - MULTI-SPEED REVERSE

Explanation: 1) If this command is sent to the player when it is in *Random Access Mode*, the *Multi-Speed Mode* occurs. In *Multi-Speed Mode*, the video is played back at a speed specified by the Speed Register.

2) If an address is specified, playing is done at the speed specified in the Speed Register. The specified address is written in the Mark Frame Register or Mark Chapter Register and compared with the current address. When both values are the same, *Still Mode* occurs. Then the completion status is returned.

Execution #1: \* Play Mode  
M F <C/R> R <C/R>  
\* Multi-Speed Mode

Execution #2: \* Still Mode  
F R 3 4 5 0 0 M F <C/R>  
\* Multi-Speed Mode  
Frame 34500 reached R <C/R>  
\* Still Mode

**14) SPEED SET LD (CAV Only)**

Function: Speed for Multi-Speed playing is specified.

Format: Integer S P

Explanation: Contents of the Speed Register are rewritten with this command. Immediately, the completion status is returned. The active mode of the player does not change. This command is accepted even when *Multi-Speed Mode* is in effect.

The speed parameter indicates the number of fields moved per second, and it is specified in range from 1 to 255. It is 60 (with a range from 45 to 90) for normal play. The initial value is 60.

The relationship between representative play speeds and parameters is as follows:

† These integers provide compatibility with LD-V8000, LD-V4400 and the LD-V2200. Programs written for the LD-V8000 or LD-V4400 using the “range of integers” in column two will play on the CLD-V2800/2600/2400 at the corresponding speeds in column one.

Execution: \* Play Mode  
3 0 S P M F <C/R> R <C/R>

Address Flag	Range of Address
Time:	Minutes 00-99, Seconds 00-59*
Block:	Minutes 00-99, Seconds 00-59, Blocks 00-74
Tracks:	01-99
Index	Track 01-99 Index 00-99
* 74 minutes is the maximum playing time on a CD.	

Figure 3-1

**16) STOP MARKER LD/CD**

**Function:** Stop marker is set to the specified address.

**Format:** Address S M

**Explanation:** The specified address is written in the Mark Frame/Time/Block Register or Mark Chapter/Track Register as indicated by the address flag, and the completion status “R” is returned immediately. When the stop marker address is reached in *Play* or *Multi-Speed*, or *Step Mode* with a CAV Disc, *Still Mode* occurs; with a CLV disc or CD, *Pause Mode* occurs. In both cases, when the stop marker address is reached, the stop marker is cleared from the mark register. The stop marker is also cleared when a step command is issued to step through the address marker on a CAV disc.

Here, the completion status “R” is returned when the command is received and the stop marker is set, not when the address marker is reached, as described in the Play command. Issue a disc location request command (?F,?C,?T,?R etc.) to determine whether not the stop marker address has been reached. If a Clear or Reject command is sent before the stop marker is reached, the stop marker in the the mark register is cleared.

The stop marker is functionally similar to the auto stop operation of the Play and the Multi-Speed commands. However, the auto stop and the stop marker return a completion status at different times. In an auto stop operation, the completion status is returned when the marked address is reached. In the stop marker operation, the completion status is returned when the stop marker is set. *The stop marker command must be used when status requests are sent to the player before the address marker is reached. It is also useful when the operation mode is changed before the marked address is reached.*

**Execution #1:** \* Still Mode

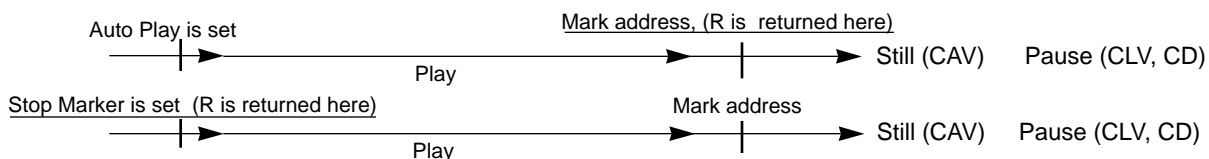
LD (CAV) F R 3 2 427 S M P L <C/R> R <C/R>

\* Plays to time number frame value 3 min. 24 sec. 27 frames, then enters *Still Mode*

\* Still Mode

3 0 S P 3 5 0 12 S M M F <C/R> R <C/R>

\* Plays at one-half speed to time number frame value 3min. 50 sec. 12 frames and then enters *Still Mode*



**Figure 3-J**

**17) FRAME SET LD**

Function: Address flag is set to “frame.”

Format: F R

Explanation: When a CAV LaserDisc is playing, this command sets the address flag to “frame” prior to searches. The player recognizes this address flag until a command indicating a different one is sent. If a CD is playing, this command is unavailable and an error, E04, is returned.

**Note:** CLV Time Number Frame Value can be searched to when a CLV disc is playing and the address flag is set to Frame. The player will search to the exact minute, second and frame number location, then land in Pause. The frame number will not be displayed on the front panel display or on the screen, but it can be verified by issuing the ?F command. See **Section 3.7.4 Request Commands, #31 Frame Number Request, page 3-31 and Appendix E-1, Notes.**

Execution: \* CAV Disc, Play Mode  
 F R 1 2 4 1 6 S E <C/R> R <C/R>  
 \* Searches to Frame 12416 on a CAV LaserDisc, and holds a still frame.

\* CLV Disc, Play Mode  
 F R 1 5 2 3 1 2 S E <C/R> R <C/R>  
 \* Searches to 15 minutes, 23 seconds, 12 frames and lands in Pause. on a CLV LaserDisc. **NOTE:** In this example, 12:23 will appear on the front panel display and on the On-Screen display, but ?F <CR> will return 152312.

**18) CHAPTER SET LD**

Function: Address flag is set to “chapter.”

Format: C H

Explanation: If this command is given, the address flag is set to “chapter,” on a CAV or CLV LaserDisc that is encoded with chapters. The subsequent addresses to be handled are evaluated as chapter numbers. If no chapters are encoded on the disc, or if a CD is playing, an error, E04 is returned.

Execution: \* Address flag = frame  
 C H <C/R> R <C/R>  
 \* Address flag = chapter  
 1 5 S E <C/R> R <C/R>  
 \* Search to Chapter 15



**19) TIME SET LD (CLV Only) & CD**

Function: Address flag is set to "time."

Format: T M

Explanation: If this command is sent when a CLV LaserDisc or a CD is being played, the address flag is set to "time," and the subsequent addresses to be handled are evaluated as time numbers. Time number searches on CLV LaserDiscs includes hours, minutes and seconds up to a maximum number of 95959 (9 hrs. 59 min. 59 sec.). CLV videodiscs contain a maximum capacity of one-hour of playing time on a single side of a disc. Time numbers may be encoded, however, in running succession disc-side to disc-side. If a CAV disc is playing and this command is sent to the player, an error message, E04, will be returned.

Time number searches on CDs include minutes and seconds up to a maximum number of 9959 (99 min. 59 sec.). CDs contain a maximum capacity of 74 minutes of playing time on a single side.

Execution#1:\* CLV Disc, Play Mode

(LDs) T M 1 2 4 1 6 S E<C/R> R <C/R>

\* Search 1 Hr. 24 Min. 16 Sec.

Execution#2:\* CD, Play Mode

(CDs) T M 1 2 4 1 S E<C/R> R <C/R>

\* Search 12 Min. 41 Sec.

**20) TRACK SET CD**

Function: Address flag is set to "track."

Format: TR

Explanation: If this command is given, the address flag is set to "track". When a CD is playing, the subsequent addresses to be handled are evaluated as track numbers (01-99). If this command is sent while a LaserDisc is playing, an error message, E04, will be returned.

Execution: \* Address flag = Time, a CD is playing

TR <C/R> R <C/R>

\* Address flag = track

1 5 S E <C/R> R <C/R>

\* Search to Track 15

**21) INDEX SET CD**

Function: Address flag is set to "index."

Format: IX

Explanation: If this command is sent, the address flag is set to "index," when a CD is playing and the subsequent addresses to be handled are evaluated as index numbers of a specific track. Up to 99 tracks (01-99) and 100 indices (00-99) may be encoded on a CD. An index number is entered as a four digit number that includes the track and index number on the disc (0100-9999). The actual index location can be obtained in Level III computer control by sending a query to the player ?I. Index searches are not accessible using the remote control. If this command is sent while a LaserDisc is playing, an error message, E04, is returned.

Execution: \* Address flag = block  
 I X <C/R> R <C/R>  
 \* Address flag = index  
 1 4 1 5 S E <C/R> R <C/R>  
 \* Search to track 14, index 15.

**22) BLOCK SET CD**

Function: Address flag is set to "block."

Format: B K

Explanation: If this command is sent, the address flag is set to "block," when a CD is playing and the subsequent addresses to be handled are evaluated as time numbers which include blocks. A block number is entered as a six digit number that includes the minute, second, and block of the elapsed time on the disc. The maximum number is 995974, 99 minutes, 59 seconds and 74 blocks. The actual block location can be obtained in Level III computer control by sending a query to the player ?B. Block mode is not accessible using the remote control. If this command is sent while a LaserDisc is playing, an error message, E04, is returned.

Execution: \* Address flag = track  
 B K <C/R> R <C/R>  
 \* Address flag = block  
 1 4 1 5 1 6 S E <C/R> R <C/R>  
 \* Search to 14 minutes 15 seconds and the 16th block.

**23) CLEAR LD/CD**

Function: To clear a value entry or a player mode.

Format: C L

Explanation: 1) Contents of the digit buffer (input value) are cleared. Immediately, the completion status is returned.

2) *Search, Auto Stop, Auto Stop Multi-Speed* or *Stop Marker Mode* are released. If cleared during a search, the clearance is made near the current pickup position, and *Still Mode* occurs if a CAV disc is in the disc tray, or *Pause Mode* occurs if a CLV disc or CD is being used.

If cleared during an *Auto Stop* or *Stop Marker* operation, normal play occurs. If cleared during *Auto Stop Multi-Speed* operation when a CAV LaserDisc is playing, normal multi-speed play occurs.

Execution: \* Play Mode  
2 2 0 0 0 C L 2 3 0 0 0 S E <C/R>  
\* Search mode  
C L <C/R> R <C/R>  
\* Still mode

**24) LEAD-OUT LD/CD**

Function: Lead-out is set for an address.

Format: L O

Explanation: The lead out symbol can be used in place of a number as the target address of a search or auto-play operation. If the leadout command is sent while an LD is playing, the "LO" value can be estimated as follows:

Frame number	65535 (CAV), 9595929 (CLV)
Time Code	95959 (9 hour 59 minutes 59 seconds)
Chapter number	79

When a lead-out search is made on the CLD-V2800, the convergence occurs immediately before the lead-out area, i.e. at the end of the program area. During CD playback, in some cases the actual lead out is longer than the lead out time recorded in the TOC information.

Execution #1: L O S E <C/R> R <C/R>  
?F <C/R> 5 0 4 0 0 <C/R>  
\* The last address of the program area on a LaserDisc is searched and the value is returned in response to ?F.

Execution #2: L O P L <C/R> R <C/R>  
\* Plays to last chapter, frame or time number before lead-out when the last address is unknown. Set Chapter, Frame or Time Mode first.

3.7.2 Player Control Switch Commands

25) **AUDIO CONTROL** LD/CD

Function: The audio output condition is selected.

Format: Integer A D

Explanation: The contents of the Audio Control Register are rewritten. The completion status is returned immediately. The relationship between the contents of the register specified by the integer and the output audio channel is indicated in **Figures 3-K** and **3-L** on the next page.

Execution: 3 A D <CR> R <CR>  
 \* Play stereo analog tracks only

Arg.	Setting	Arg.	Setting
0	OFF	4	OFF
1	ANALOG CH 1	5	DIGITAL CH 1
2	ANALOG CH 2	6	DIGITAL CH 2
3	ANALOG STEREO	7	DIGITAL STEREO

26) **VIDEO CONTROL** LD/CD

Function: Video switch is turned ON/OFF.

Format: Integer V D

Explanation: The Video Control Register is reset. The initial value of the register is 1 (the video switch is ON). In this condition, the Video output is controlled by the Squelch Switch. When in *Park* or *Search* or *Pause Mode*, the Squelch Switch is OFF and a blue screen appears. (See **Figure 3-M** on page 3-27.)

When the video switch is turned OFF, the screen is squelched at all times. The squelch condition may be set to show a blue screen or a black screen by adjusting the background color selection parameter in Register C.

Integer	Function	Video Switch
0	Off	0
1	On (Normal)	1

**Audio Control Register**

ARG.	FUNCTION	S0	S1	S2	S3	S4	S5	S6	S7	S8	S9
0	OFF	0	0	0	0	0	0	1	0	1	0
1	ANALOG CH1	1	0	1	1	0	1	1	0	1	0
2	ANALOG CH2	0	1	1	0	1	1	1	0	1	0
3	ANALOG STEREO	1	1	0	1	1	0	1	0	1	0
4	OFF	0	0	0	0	0	0	0	1	0	1
5	DIGITAL CH1	1	0	1	1	0	1	0	1	0	1
6	DIGITAL CH2	0	1	1	0	1	1	0	1	0	1
7	DIGITAL STEREO	1	1	0	1	1	0	0	1	0	1

Figure 3-K

**CAUTION:** If a disc contains only analog or only digital audio, S6 through S9 are set as indicated:

FUNCTION	S6	S7	S8	S9
Analog Audio Only	1	0	1	0
Digital Audio Only	0	1	0	1

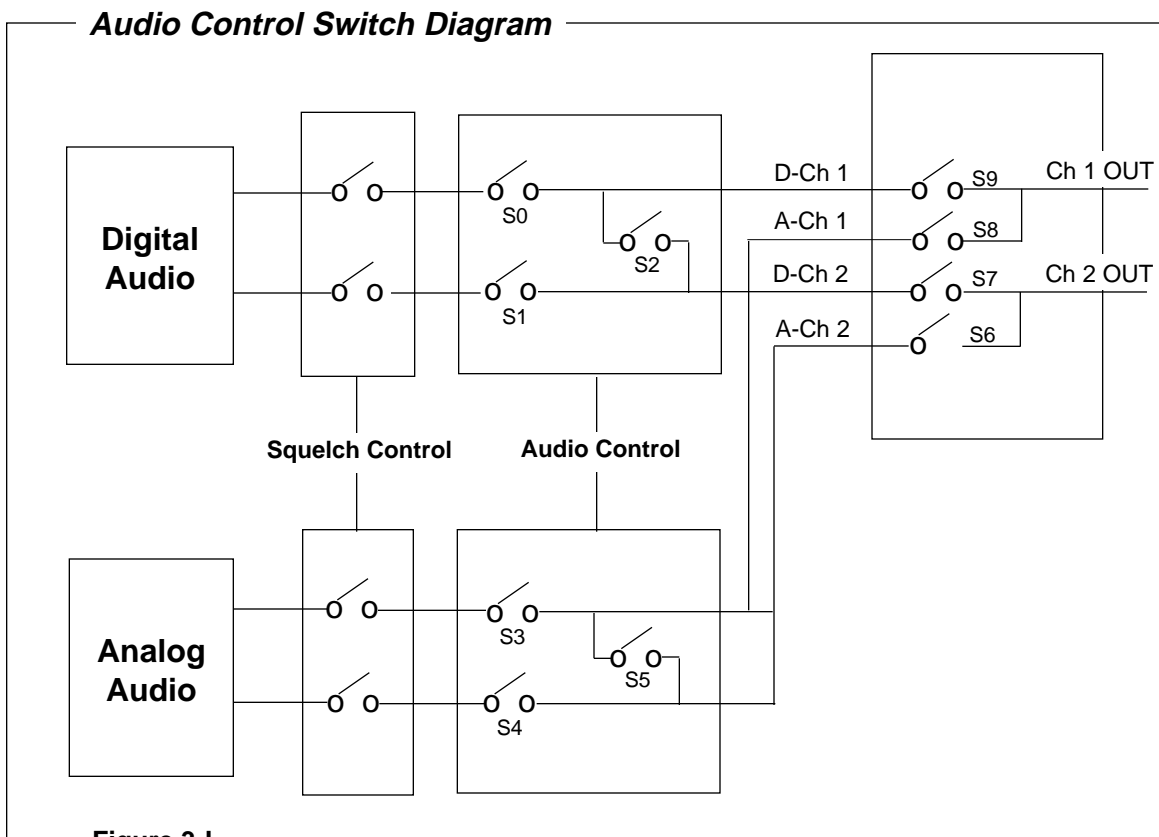


Figure 3-L

**Video Control Diagram**

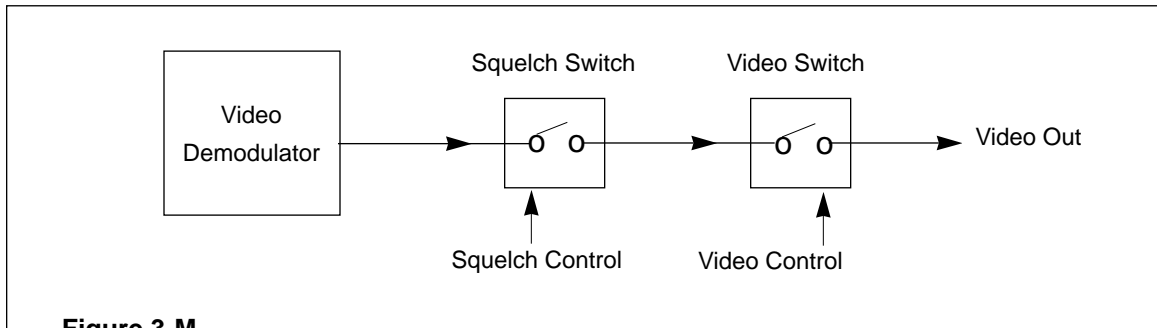


Figure 3-M

Execution:      \* Video Switch = ON  
                   O V D <C/R>              R <C/R>  
                   \* Video Switch = OFF

**27) KEY LOCK    LD/CD**

Function:        The key lock switch is turned ON/OFF.

Format:         Integer    K L

Explanation:    Operation of the front panel keys and RCU input are locked or unlocked.

The completion status is returned immediately. The initial value, 0, OFF means the Keys on the front panel and RCU are unlocked. A value of 1 means ON, locked. At that time, the key lock LED is set ON and operation of all front panel control keys on the player and the remote control unit are locked out. The power switch can be used.

**KEY LOCK SWITCH**

Integer	Function
0	Unlock
1	Lock

Execution:      1 K L <C/R>              R <C/R>  
                   \* Key Lock ON  
                   0 K L <C/R>              R <C/R>  
                   \* Key Lock OFF

### 3.7.3 Display Control

#### 28) DISPLAY CONTROL LD/CD

Function: Character display is turned ON/OFF.

Format: Integer D S

Explanation: Contents of the Display Control Register are displayed.

The initial value of the register is 0 and the display switch is OFF. When it is turned on, (1DS) the chapter number, frame number or time number and the user's area can be displayed if an LD is playing and if chapters are encoded on the disc. If a CD is playing track, index, time numbers and the user's area can be displayed. The display lines are determined by the Register A setting. At power-on, the default setting for Register A is 3RA. This makes available the frame or time number on LDs and chapter numbers if they are encoded on the disc. If a CD is playing, track and time are available. The actual items to be displayed are determined by the contents of Register A. See page 3-39 for details about Register A.

Integer	Function	Display Switch
0	Display Off	0
1	Display On	1

Execution: \* Display switch = OFF.  
 1 D S <C/R> R <C/R>  
 \* Display switch = ON

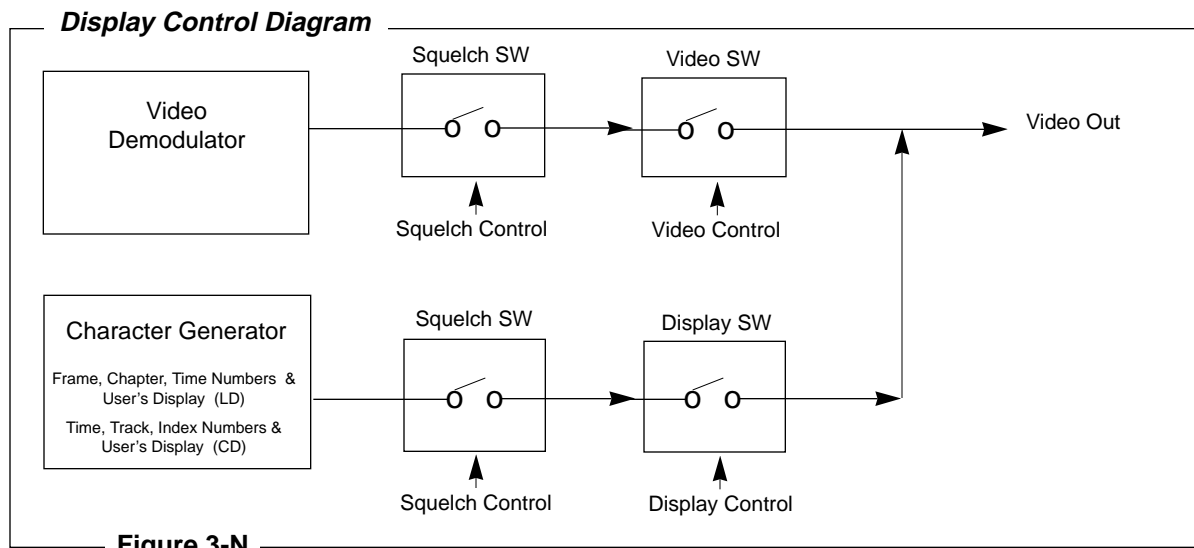


Figure 3-N

**29) CLEAR SCREEN LD/CD**

**Function:** The characters shown in the User Display Area are cleared.

**Format:** C S

**Explanation:** Characters on all of the lines are cleared. To clear only a particular line, overwrite the line with spaces by means of the PR command.

**Execution:** C S 3 P R <C/R> R <C/R>  
 HELLO ! <C/R> R <C/R>  
 \* All the lines are cleared and a string of seven characters is written in Line 3.

4 P R <C/R> R <C/R>  
 SELECT A MENU ITEM <C/R> R <C/R>  
 \* A string of 18 characters is written in Line 4.

3 P R <C/R> R <C/R>  
 string of seven spaces <C/R> R <C/R>  
 \* Spaces overwrite the seven character word in line 3, so it appears only line 3 is cleared.

CS<C/R> R<C/R>  
 \* All lines are cleared.



**30) PRINT CHARACTER LD/CD**

**Function:** Characters are written into the User's Display Area.

**Format:** Integer P R <C/R>  
 Character string <C/R>

**Explanation:** The character string for one line in the User Display Area is written with this command. It is effective when the user's display specification of Register A is set to ON (4RA).

First, specify the line number using an integer. (Lines 0-9 are selectable on the CLD-V2800.) After the command character PR is entered, it is terminated with the <C/R> code. In the next command line, specify the character string. A character string up to 20 characters is allowed. Any commands subsequent to the command character (PR <CR>), but prior to the character string's <C/R>, are interpreted as characters to be printed to the User Display Area.

Usable characters are shown in the **Character Code Table** below.

		Low-order Byte															
		0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
High-order Byte	2	!	"	#	\$	%	&	'	(	)	*	+	,	-	.	/	
	3	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
	4	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
	5	P	Q	R	S	T	U	V	W	X	Y	Z	←	¥	→	■	_
	6	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
	7	p	q	r	s	t	u	v	w	x	y	z	↑		↓		
	8	ç	ü	é	â	ä	à	á	ç	ê	ë	è	ì	î	ì	Ä	Â
	9	É	æ	Æ	ô	ö	ò	û	ù	ÿ	Ö	Ü	ø	£	ß	Pt	f

The character "7F" is not available.

Figure 3-O

**Execution:** 4 R A 1 D S <C/R> R <C/R>  
 4 P R <C/R> R <C/R>  
 \*\*\*\*\* <C/R> R <C/R>

5 P R <C/R> R <C/R>  
 \* PROGRAM START \* <C/R> R <C/R>

6 P R <C/R> R <C/R>  
 \*\*\*\*\* <C/R> R <C/R>

### 3.7.4 Request Commands

#### 31) FRAME NUMBER REQUEST LD

**Function:** The frame number which is currently being played is returned.

**Format:** ? F

**Explanation:** Contents of the current Frame Register are returned.

During playback of a CAV disc, a 5-digit frame number is returned. During playback of a CLV disc, a 7-digit frame number is returned. (See **Appendix E-1, Notes** for details.) Correct values are not shown if the player is not in *Random Access Mode*, or if the player is in the lead-in or lead-out area of a disc.

As seen in the example, continuous frame numbers may not be received due to timing delays between the computer and the player. If a frame number code on the disc cannot be correctly read, the previous value is used. An error (E04) is returned if this query is sent to the player while a CD is playing.

<b>Execution:</b>	* Play Mode (CAV)		* Play Mode (CLV)
	? F <C/R>	0 2 0 4 4 <C/R>	? F <C/R> 0 010442<C/R>
	? F <C/R>	0 2 0 4 5 <C/R>	? F <C/R> 0 010446<C/R>
	? F <C/R>	0 2 0 4 5 <C/R>	? F <C/R> 0 010502<C/R>
	? F <C/R>	0 2 0 4 7 <C/R>	? F <C/R> 0 010507<C/R>

#### 32) CHAPTER NUMBER REQUEST LD

**Function:** The chapter number which is currently being played is returned.

**Format:** ? C

**Explanation:** Contents of the Chapter Number Register are returned.

The chapter number is a 2-digit integer (00-79). Some LaserDiscs are not encoded with chapter numbers. When playing a disc without chapters, an error is returned when this request is issued. Correct values will not be shown if the player is not in *Random Access Mode*, or if the player is in the lead-in or lead-out area of a disc. An error (E04) is returned if this query is sent to the player while a CD is playing.

<b>Execution:</b>	* Play Mode	
	? C <C/R>	1 2 <C/R>

### 33) TIME NUMBER REQUEST LD (CLV Only) & CD

Function: The time number indicating the current disc address is returned when a CLV LaserDisc or when a CD is played.

Format: ? T

Explanation: Contents of the current Time Register are returned.

When a CLV disc is being played, time numbers are contained in the Frame Register. Time numbers encoded on most discs manufactured since the early 80's consist of extended time numbers: hour, minutes, seconds, and frames. The CLD-V2800 will access the hours, minutes and seconds encoded on the disc. Older discs may only be encoded with hours and minutes. When a disc not encoded with seconds is played, the seconds unit is fixed to 0. (To determine CLV time number frame values on discs encoded with hours, minutes, seconds and frame numbers, send a ?F to the player. See page **3-31, Frame Set**, also **Appendix E-1, Notes**.)

Correct values will not be shown if the player is not in *Random Access Mode*, or if the player is in the lead-in or lead-out area of a disc. If a time number on the disc cannot be correctly read, the previous number is used. When a CD is played, the player returns a four digit number minutes (00-99) and seconds (00-59). A single side of a CD contains a maximum of 74 minutes of playing time.

Execution #1: \* Play Mode, CLV LaserDisc playing  
(LD's) ? T <C/R> 0 3 2 1 3 <C/R>  
(0 hour, 32 minutes, 13 seconds)

Execution #2: \* Play Mode, CD playing  
(CD's) ? T <C/R> 0 3 2 1 <C/R>  
(3 minutes, 21 seconds)

### 34) TRACK NUMBER REQUEST CD

Function: The track number which is currently being played is returned.

Format: ? R

Explanation: Contents of the Track Number Register are returned.

The track number is a 2-digit integer. Correct values will not be shown if the player is not in *Random Access Mode*, or if the player is in the lead-in or lead-out area of a disc. An error (E04) is returned if this query is sent to the player while a LaserDisc is playing.

Execution: \* Play Mode, Track 12 of a CD is playing  
? R <C/R> 1 2 <C/R>

**35) INDEX NUMBER REQUEST CD**

**Function:** The index number which is currently being played is returned.

**Format:** ? I

**Explanation:** Contents of the Index Number Register are returned.

The index number is returned with the track number as a 4-digit integer: track number (01-99) and index number (00-99). Correct values will not be shown if the player is not in *Random Access Mode*, or if the player is in the lead-in or lead-out area of a disc. An error (E04) is returned if this query is sent to the player while a LaserDisc is playing.

**Execution:** \* Play Mode, Track 12, Index 03 of a CD is playing  
 ? I <C/R> 1203 <C/R>

**36) BLOCK NUMBER REQUEST CD**

**Function:** The block number which is currently being played is returned.

**Format:** ? B

**Explanation:** Contents of the Block Number Register are returned.

The block number is returned as part of a 7-digit integer: minutes (00-59), seconds (00-59) and block number (00-74). Correct values will not be shown if the player is not in *Random Access Mode*, or if the player is in the lead-in or lead-out area of a disc. An error (E04) is returned if this query is sent to the player while a LaserDisc is playing. Block locations are not available through the on-screen display. If the block number of the disc cannot be read correctly, the previous number will be returned. The value of hours is set to 0. An absolute time number is returned.

**Execution:** \* Play Mode plays to 12 minutes, 05 seconds, block 15 of a CD.  
 ? B <C/R> 120515 <C/R>

**37) P-BLOCK NUMBER REQUEST CD**

**Function:** The current track, index and P-time (elapsed time of current track) numbers are returned.

**Format:** ? A

**Explanation:** Contents of the P-Time Number Register are returned.

The current track, index and P-time (elapsed time of current track) are returned together as a 10-digit integer. If this command is used when playing the disc at normal speed, the block numbers are renewed even while communication is taking place. As shown in the example below, continuous block numbers may not be received.

Correct values will not be shown if the player is not in *Random Access Mode*, or when playback is in the lead-in or lead out area of the disc. If a block number code of the disc cannot be correctly read, the previous value is retained.

Execution:      \* Play Mode  
                   ? A <C/R>                    0401022546 <C/R>  
                   \* Track 4, Index 1, 2 minutes, 25 seconds, 46 blocks  
                   ? A <C/R>                    0401022547 <C/R>  
                   \* Track 4, Index 1, 2 minutes, 25 seconds, 47 blocks  
                   ? A <C/R>                    0401022550 <C/R>  
                   \* Track 4, Index 1, 2 minutes, 25 seconds, 50 blocks  
                   ? A <C/R>                    0401022552 <C/R>  
                   \* Track 4, Index 1, 2 minutes, 25 seconds, 52 blocks

### 38) TOC INFORMATION      CD

Function:        TOC information is returned.

Format:         ? Q

Explanation:    This command returns a 10-digit integer that includes: The track number of the first track, the track number of the last track and the absolute time before lead-out in the following format. See example below:

C1   C2   C3   C4   C5   C6   C7 C8   C9   C10

C1 C2                                    : Track number of the first track

C3 C4                                    : Track number of the last track

C5 C6 C7 C8 C9 C10   : absolute time before lead-out.

Execution:      \* Play Mode  
                   ? Q <C/R>                    0112253540 <C/R>  
                   \* First track =01;  
                   Last track = 12;  
                   Absolute time before lead-out =  
   25 minutes, 35 seconds, 40 blocks

**39) PLAYER ACTIVE MODE REQUEST LD/CD**

**Function:** The value representing the current active mode of the player is returned.

**Format:** ? P

**Explanation:** Active modes are returned according to the classification shown in the following table. This command is useful in confirming whether the player has already been started and placed in *Random Access Mode*.

<i>Player Active Mode Request Codes</i>			
Code	Player Mode	Code	Player Mode
P00	Door Open	P05	Still
P01	Park	P06	Pause
P02	Set Up	P07	Search
P03	Disc Unloading	P08	Scan
P04	Play	P09	Multi-Speed

**Figure 3-P**

- P00 (Door Open): Door is open, disc tray is out.
- P01 (Park): Disc rotation is stopped or disc tray is closing or disc tray is closed and no disc is loaded
- P02 (Set Up): Preparing to play
- P03 (Disc Unloading): Disc tray is opening
- P04 (Play): Images and sound are played back at normal speed
- P05 (Still): Picture is displayed as a still
- P06 (Pause): Pausing occurs without picture display
- P07 (Search): Searching for a specific address
- P08 (Scan): Scanning; high speed playback in forward or reverse
- P09 (Multi-Speed): Playing in multi-speed, as it has been set.

**Execution:**

- \* Play Mode
- ? P <C/R> P 0 4 <C/R>
- S T <C/R> R <C/R>
- \* Still Mode
- ? P <C/R> P 0 5 <C/R>

**40) DISC STATUS REQUEST LD**

Function: Attributes of the disc being played are returned.

Format: ? D

Explanation: Status information concerning the disc is returned in the following format. If this command is sent while a CD is playing, an error code, E04, is returned.

C1	C2	C3	C4	C5	<C/R>
C1: disc loading	0 = not loaded		1 = loaded		
			A=LDROM <sup>†</sup>		X = unknown
C2: CAV/CLV	0 = CAV		1 = CLV		X = unknown
C3: disc size	0 = 12 inch		1 = 8 inch		X = unknown
C4: disc side	0 = Side 1		1 = Side 2		X = unknown
C5: chapter code	0 = no		1 = yes		X = unknown

Execution: ? D <C/R>                      0 X X X X <C/R>

\* Disc is not loaded.

? D <C/R>                              1 0 0 0 1 <C/R>

\* The disc loaded is a CAV 12-inch disc, Side 1, with chapters.

<sup>†</sup>**NOTE:** LD-ROM discs will not play on the CLD-V2800 player.

**41) DISC STATUS REQUEST CD or CDV**

Function: Attributes of the disc being played are returned.

Format: ? K

Explanation: Status information concerning the disc is returned in the following format. If this command is sent while a LaserDisc is playing, an error code, E04, will be returned.

C1	C2	C3	C4	C5	C6	C7	C8	<C/R>
C1: disc loading		0 = not loaded		1 = loaded				X = unknown
C2: Unused		fixed as		X = unknown				
C3: Unused		fixed as		X = unknown				
C4: CD or CDV		0 = CD		1 = CDV				X = unknown
C5: (Reserved)		fixed as		X = unknown				
C6: (Reserved)		fixed as		X = unknown				
C7: (Reserved)		fixed as		X = unknown				
C8: (Reserved)		fixed as		X = unknown				

See Execution on next page:

Execution: ? K <C/R> 0 X X X X X XX <C/R>  
 \* Disc is not loaded.  
 ? D <C/R> 1 X X0X X X X <C/R>  
 \* A CD is loaded.  
 ? D <C/R> E04 <C/R>  
 \* A LaserDisc is loaded.

**42) LVP MODEL NAME REQUEST LD/CD**

Function: Player's model number is returned.

Format: ? X

Explanation: The model number of the CLD-V2800 is returned as: P1537XX.

First 3 characters (P15) indicate the player is a Pioneer LaserDisc Player. The next two characters (37 in the example above) indicate the player series or model number. **The last two digits (XX) represent the player version number and they are updated periodically as running changes are made to the players.**

Execution: ? X <C/R> P 1 5 37 0 1 <C/R>

In this example the last two digits (XX) = 01, which was the first version number of the CLD-V2800.

For more information see **Technical Bulletin #148A, Pioneer Industrial LaserDisc Player Model Numbers.**

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**NOTE:** The CLD-V2800 player does not support the ?U command allowing access to Standard User's Code that may be encoded on LaserDiscs.



### 3.7.5 Communication Control Commands

#### 43) COMMUNICATION CONTROL LD/CD

Function: Communication mode is selected.

Format: Integer C M

Explanation: Contents of the communication control register (CCR) are rewritten. For the CLD-V2800, the Automatic Status can be selected ON or OFF. When Automatic Status is ON the Player returns an “R” upon execution of a command, when it is OFF, it does not.

Integer	Mode	Auto-Status
2	MODE-2	OFF — “R” not returned
3	MODE-3	ON — “R” returned

The initial value (default value) of the CCR is set to Mode 3. With this command, it is possible to change the communication mode as required. If an unsupported mode is specified, an error occurs.

Execution:

- \* CCR = 3      Player’s set to CCR Mode 3; no “R” is returned
- 2 C M <C/R>      (Note: No “R” is returned here, as player is in currently in CCR Mode 3.)
- \* CCR = 2      Player is in CCR Mode 2, “R” is returned
- 3 C M <C/R>      R <C/R> (Note: “R” is returned, as player is in CCR Mode 2.)
- \* CCR = 3      Player is in CCR Mode 3, no “R” returned

#### 44) CCR MODE REQUEST LD/CD

Function: Current communication mode is returned.

CM2	MODE-2
CM3	MODE-3

Format: ? M

Explanation: Contents of the communication control register (CCR) are returned, indicating the current communication mode.

Execution:

- \* CCR = 3
- ? M <C/R>      CM3 <C/R>

**3.7.6 Register Control Commands**

**45) REGISTER A SET LD/CD**

**Function:** Changes the current setting of Register A. (Display)

**Format:** Integer R A

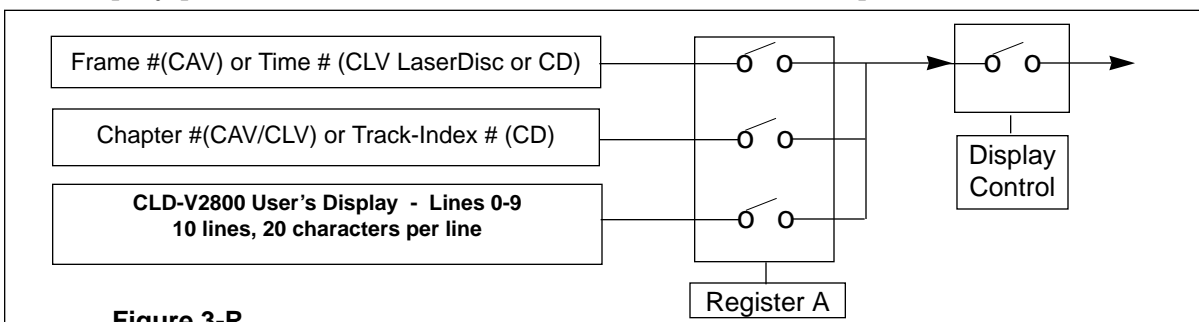
**Explanation:** Register A sets detailed attributes of the display. The CLD-V2800 has three types of display settings: Frame number (LD-CAV) or Time number (LD-CLV, CD); Chapter number (LD-CAV or CLV) or Track-Index number (CD); and User's Display for user-generated messages, lines 0-9. Available combinations of the display settings are shown in the following table. Initial value is 3.

Integer	Function	User's	Chapter/ Track	Frame/ Time
0	Display Off	0	0	0
1	Frame or Time Number	0	0	1
2	Chapter or Track Number	0	1	0
3	Frame or Time and Chapter or Track	0	1	1
4	User's Display	1	0	0
5	User's Display and Frame or Time	1	0	1
6	User's Display and Chapter or Track	1	1	0
7	User's Display and Frame or Time, and Chapter or Track	1	1	1

**Figure 3-Q**

All the character displays are turned ON/OFF by the display control command. The display contents are determined by Register A.

\* CD Track and Index numbers are processed in the Chapter Register. CD Block numbers are processed as part of the time number in the Frame/Time Register. The display positions on the screen for the CLD-V2800 are pictured below:



**Figure 3-R**

Line 0 is used for displaying chapter, frame, time and track numbers.

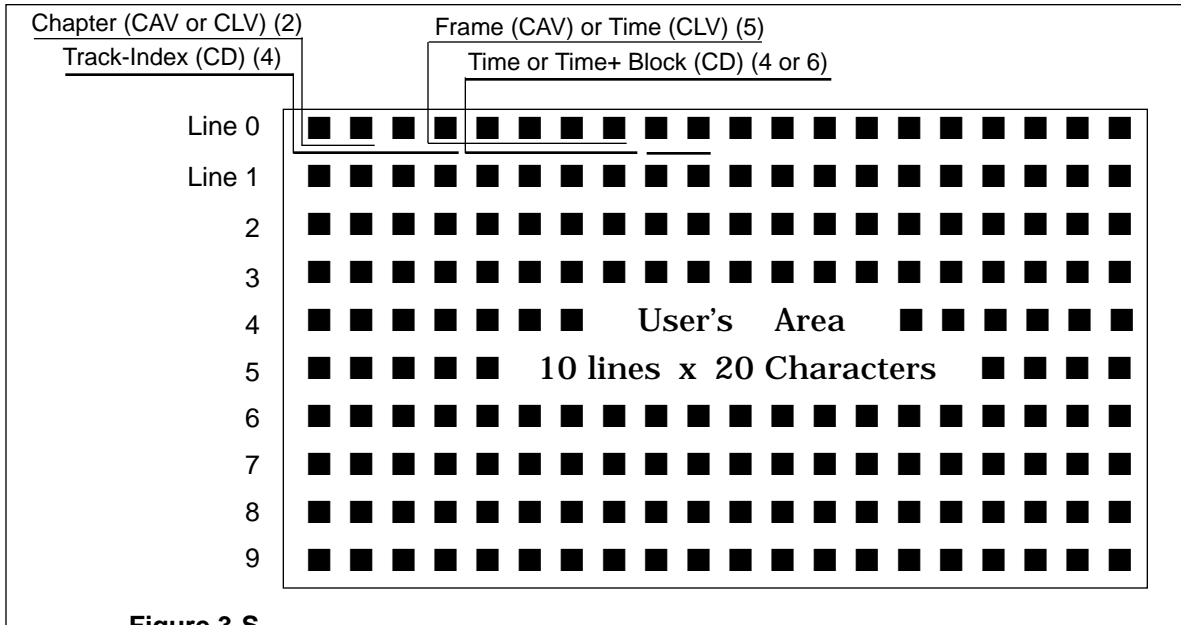


Figure 3-S

Line 0 and 1 are sometimes used for displaying remote control inputs. Line 2 to 9 are used exclusively as the User's Display Area on the CLD-V2800.

If all lines of the User's Display Area are required for user defined messages, the 4RA command can be sent to the player. This will reserve all lines (including lines 0 and 1) in the display for user messages.

**NOTE:** Lines 0 & 1 are usually reserved for frame/time and chapter/track addresses and the address flag status.

**To activate the User Display Area:**

- Set the User's Display using the Register A command.
- Turn ON the display switch. (1DS)
- Identify the line on which the characters will appear by using the Print Character command (PR) <CR>. (See page 3-30.)
- Then send the character string to be displayed followed by <C/R>.

**NOTE:** The display switch can be turned ON or OFF at any time. However, if Register A is changed so that the User's Display Area is disabled, the contents of the User's Display Area will be cleared. Also, if the Print Character command is issued before Register A is set for the User's Display Area, the character string will not be seen. The Power-On default for display control is 3RA. This allows Frame/Time, Chapter/Track numbers to be seen when the display is turned on, depending on the type of disc that is in the tray. Register A may be changed for different displays. See example below:

Execution:      \* Display OFF, CAV LaserDisc is in the tray  
                   1DS <C/R>                      R <C/R>  
                   \* Display ON - Frame, Chapter Display  
                   1RA <C/R>                      R <C/R>  
                   \* Only frame number is displayed  
                   4RA <C/R>                      R <C/R>  
                   \* User's Display lines only are displayed  
                   3PR <C/R>                      R <C/R>  
                   \* Print the following string of characters to Line 3 of the display  
                   HELLO WORLD                  R <C/R>  
                   \* The message "HELLO WORLD" is displayed on Line 3 of  
                   User's Display Area.

**46) REGISTER B SET LD/CD**

Function:        Changes the current setting of Register B. (Squelch Control)

Format:         Integer    R B

Explanation:    Attributes concerning the squelch switch for video and audio are set in Register B. The squelch switch is normally controlled automatically in accordance with the operating mode of the player. In the modes where pictures and sound are not clearly played back, the squelch switch prevents the "noise" from being displayed or heard. (eg. During scanning on LaserDiscs, audio is squelched.) By rewriting the contents of the Register B, it is possible to make the squelch switch invalid. In this state, the video and audio signals are output continually. The initial value is 0. This operation must be fully understood before this function is used.

Integer	Function	Video	Audio
0	Normal	0	0
64	Audio Squelch Invalid	0	1
128	Video Squelch Invalid	1	0
192	VD/AD Squelch Invalid	1	1

Figure 3-T

Execution:      \* Disable the video squelch during searching.  
                   128 R B 23000 S E 0 R B <C/R>      R <C/R>  
                   \* Play at 1/2 speed while outputting sound.  
                   64 R B 30 S P M F <C/R>          R <C/R>  
                   \* Set to Still and return to normal squelch.  
                   STORB <C/R>                      R <C/R>

**47) REGISTER C SET LD/CD**

**Function:** Changes the current setting of Register C. (Miscellaneous)

**Format:** Integer R C

**Explanation:** When power is turned ON, the Side Repeat function of Register C is set to ON. If Function Switch 3 on the rear panel of the player is ON (DOWN), the Load Start and Power-On Start functions of Register C are also set to ON. If Function Switch 4 is ON (DOWN), background color will be set to Black. Baud Rates of 9600 and 2400 cannot be set with this command. Note that some functions, such as Test Mode, may suspend playback or disable further control. *Test Mode is for use only by Authorized Service Centers, for evaluating player operations.*

The functions listed below can be set. To set a function to ON, give the value indicated by the integer. To set multiple functions to ON, the integer values must be added up. All eight functions can be specified in combination by using the decimal values from 0 to 255. The completion status is returned immediately.

**NOTE:** When “Repeat Side”, “Chapter Repeat” or “Track Repeat” is selected by the RCU, the “Side Repeat” function of Register C goes to “ON” and when “Auto Return” is selected by the RCU, the “Side Repeat” function of Register C goes to “OFF”.

Integer	Function	1	0
1	Side-Repeat	ON	OFF
2	Load-Start	ON	OFF
4	Power-on-Start	ON	OFF
8	(Not Used)	—	—
16	Background Color	BLACK	BLUE
32	TxD Terminator	<CR+LF>	<CR>
64	BAUD Rate	1200	4800
128	Test Mode	ON	OFF

**Figure 3-U**

**Execution:**

- \* Initial value 0
- 3 R C <C/R> R <C/R>
- \* Side-Repeat, Load-Start to ON, background color BLUE
- 1 6 R C <C/R> R <C/R>
- \* Background Color BLACK; Side-Repeat and Load-Start to OFF

**48) REGISTER A REQUEST LD/CD**

Function: Returns the contents of Register A. (Display)

Format: \$ A

Explanation: Returns detailed attributes of Register A in the following format:

```

A          C8 C7 C6 C5 C4 C3 C2 C1 <C/R>
C1:       Frame number display      1 = ON; 0 = OFF
C2:       Chapter number display     1 = ON; 0 = OFF
C3:       User Area display          1 = ON; 0 = OFF
C4 to C8 are set to "0".
    
```

Execution: 7 R A <C/R> R <C/R>  
 \$ A <C/R> A 0 0 0 0 1 1 1 <C/R>  
 \* Frame number, chapter number and User's Display are enabled.

**49) REGISTER B REQUEST LD/CD**

Function: Returns the contents of Register B. (Squelch Control)

Format: \$ B

Explanation: Returns Register B video and audio squelch attributes in the following format:

```

B          C8 C7 C6 C5 C4 C3 C2 C1 <C/R>
C8:       Video squelch disabled;    1 = ON; 0 = OFF
C7:       Audio squelch disabled     1 = ON; 0 = OFF
C1 to C6 are set to "0".
    
```

Execution: 1 2 8 R B <C/R> R <C/R>  
 \$ B <C/R> B 1 0 0 0 0 0 0 0 <C/R>  
 \* Video squelch is disabled; Audio squelch is enabled.

1 9 2 R B <C/R> R <C/R>  
 \$ B <C/R> B 1 1 0 0 0 0 0 0 <C/R>  
 \* Video and audio squelch are both disabled.

0 R B <C/R> R <C/R>  
 \$ B <C/R> B 0 0 0 0 0 0 0 0 <C/R>  
 \* Video and audio squelch are both enabled

**50) REGISTER C REQUEST LD/CD**

**Function:** Returns the contents of Register C. (Miscellaneous)

**Format:** \$ C

**Explanation:** Returns function switch setting data in the following format:

C	C8	C7	C6	C5	C4	C3	C2	C1 <C/R>
C1:	Side Repeat				1: ON		0: OFF	
C2:	Load Start				1: ON		0: OFF	
C3:	Power-On Start				1: ON		0: OFF	
C4:	Not Used							
C5:	Back Color Select				1: Black		0: Blue;	
C6:	TxD Terminator				1: CR+LF		0: CR	
C7:	BAUD Rate				1:1200		0: 4800	
C8:	Test Mode				1: ON		0: OFF	

**Execution:** \* R C = 0

16R C <C/R> R <C/R>

\* Background color set to Black

\$ C <C/R> C 0 0 0 1 0 0 0 0 <C/R>

\* Indicates that background color has been set to Black.

\* R C = 16

1 R C <C/R> R <C/R>

\* Side Repeat ON, background color set to Blue.

\$ C <C/R> C 0 0 0 0 0 0 0 1 <C/R>

\* Indicates Side Repeat is ON, background color set to Blue.

### 3.7.7 Input/Output Device Control Commands

#### 51) INPUT UNIT REQUEST LD/CD

Function: Reports input data from the remote control unit.

Format: # I

Explanation: The RCU input data is always returned as two ASCII-HEX codes. After several buttons are pressed, the latest digit will be returned.

Once the data has been read out and no buttons are pressed, "No Key" (FF) is returned until the next remote control input is made.

Execution: \* No RCU button previously pressed  
 # I <C/R> FF <C/R>  
 \* Key Input 23517  
 # I <C/R> 07 <C/R>  
 \* The last digit is returned, in this case, "7".

#### 52) INPUT NUMBER WAIT LD/CD

Function: Awaits digit input data from remote control.

Format: ? N

Explanation: When this command is entered, the player returns the first digit that is entered through the remote control (0-9). Only one digit is returned and any other character or non-digit button is ignored.

Execution: \* RCU  
 ? N <C/R>  
 \* Digit 1 Input 1 <C/R>

**Note:** To regain control of the player if no button is pressed, use the CLEAR command.



### 3.7.8 New Command

#### 53) PICTURE STOP LD (CAV only)

Function: Enables or disables picture stops encoded on a LaserDisc.

Format: Integer PS

Explanation: The default is picture stops enabled 0PS. By sending 1PS, however, picture stops can be disabled or over-ridden so the disc can be played through without interruption.

Execution: \* Picture Stops are enabled  
1PS <C/R>  
\* Picture Stops are disabled and the player plays the video material without holding a still frame at the picture stops. <C/R>  
0PS <C/R>  
\* Picture Stops are enabled and player stops at the picture stops encoded on a CAV disc until another motion command is sent to the player.

**Note:** Picture stops are encoded on CAV discs only, by request. Picture stops cannot be encoded on CLV discs.

## **Appendix A: Level III Commands for the CLD-V2800**

- *LD & CD Command List*
- *LD Command List*
- *CD Comand List*

**APPENDIX**

**A**

**CLD-V2800**

**LEVEL III**

USER'S MANUAL

Programmer's Reference Guide

# Level III Commands for CLD-V2800

	Command	Mnemonic	Page	LD	CD
<b>Player Control Commands</b>					
1	Door Open	OP	3-11	✓	✓
2	Door Close	CO	3-11	✓	✓
3	Reject	RJ	3-12	✓	✓
4	Start	SA	3-12	✓	✓
5	Play	(Address) PL	3-13	✓	✓
6	Pause	PA	3-14	✓	✓
7	Still	ST	3-14	CAV	
8	Step Forward	SF	3-15	CAV	
9	Step Reverse	SR	3-15	CAV	
10	Scan Forward	NF	3-15	✓	✓
11	Scan Reverse	NR	3-15	✓	✓
12	Multi Speed Forward	(Address) MF	3-16	CAV	
13	Multi Speed Reverse	(Address) MR	3-16	CAV	
14	Speed	Integer SP	3-17	CAV	
15	Search	Address SE	3-18	✓	✓
16	Stop Marker	Address SM	3-20	✓	✓
17	Frame Set	FR	3-21	✓	
18	Chapter Set	CH	3-21	✓	
19	Time Set	TM	3-22	CLV	✓
20	Track Set	TR	3-22		✓
21	Index Set	IX	3-23		✓
22	Block Set	BK	3-23		✓
23	Clear	CL	3-24	✓	✓
24	Lead Out Symbol	LO	3-24	✓	✓
<b>Control Switch Commands</b>					
25	Audio Control	Integer AD	3-25	✓	✓
26	Video Control	Integer VD	3-25	✓	✓
27	Key Lock	Integer KL	3-27	✓	✓

# Level III Commands for CLD-V2800 (cont.)

	Command	Mnemonic	Page	LD	CD
<b>Display Control Commands</b>					
28	Display Control	Integer DS	3-28	✓	✓
29	Clear Screen	CS	3-29	✓	✓
30	Print Character	Integer PR	3-30	✓	✓
<b>Request Control Commands</b>					
31	Frame Number Request	?F	3-31	✓	
32	Chapter Number Request	?C	3-31	✓	
33	Time Request	?T	3-32	CLV	✓
34	Track Number Request	?R	3-32		✓
35	Index Number Request	?I	3-33		✓
36	Block Number Request	?B	3-33		✓
37	P-Block Number Request	?A	3-33		✓
38	TOC Information Request	?Q	3-34		✓
39	Player Active Mode Request	?P	3-35	✓	✓
40	Disc Status Request (LD)	?D	3-36	✓	
41	Disc Status Request (CD)	?K	3-36		✓
42	LVP Model Name Request	?X	3-37	✓	✓
<b>Communication Control Commands</b>					
43	Communication Control	Integer CM	3-38	✓	✓
44	CCR Mode Request	?M	3-38	✓	✓
<b>Register Control Commands</b>					
45	Register A Set (Display)	Integer RA	3-39	✓	✓
46	Register B Set (Squelch Control)	Integer RB	3-41	✓	✓
47	Register C Set (Miscellaneous)	Integer RC	3-42	✓	✓
<b>Register Request Commands</b>					
48	Register A Request (Display)	\$A	3-43	✓	✓
49	Register B Request (Squelch Control)	\$B	3-43	✓	✓
50	Register C Request (Miscellaneous)	\$C	3-44	✓	✓
<b>Input/Output Device Control Commands</b>					
51	Input Unit Request	#I	3-45	✓	✓
52	Input Number Wait	?N	3-45	✓	✓
<b>New LD Command</b>					
53	Picture Stop	Integer PS	3-46	CAV	—

# Level III Commands for CLD-V2800 — LD

	Command	Mnemonic	Page	LD
<b>Player Control Commands</b>				
1	Door Open	OP	3-11	✓
2	Door Close	CO	3-11	✓
3	Reject	RJ	3-12	✓
4	Start	SA	3-12	✓
5	Play	(Address) PL	3-13	✓
6	Pause	PA	3-14	✓
7	Still	ST	3-14	CAV
8	Step Forward	SF	3-15	CAV
9	Step Reverse	SR	3-15	CAV
10	Scan Forward	NF	3-15	✓
11	Scan Reverse	NR	3-15	✓
12	Multi Speed Forward	(Address) MF	3-16	CAV
13	Multi Speed Reverse	(Address) MR	3-16	CAV
14	Speed	Integer SP	3-17	CAV
15	Search	Address SE	3-18	✓
16	Stop Marker	Address SM	3-20	✓
17	Frame Set	FR	3-21	✓
18	Chapter Set	CH	3-21	✓
19	Time Set	TM	3-22	CLV
23	Clear	CL	3-24	✓
24	Lead Out Symbol	LO	3-24	✓
<b>Control Switch Commands</b>				
25	Audio Control	Integer AD	3-25	✓
26	Video Control	Integer VD	3-25	✓
27	Key Lock	Integer KL	3-27	✓

# Level III Commands for CLD-V2800 — LD (cont.)

	Command	Mnemonic	Page	LD
<b>Display Control Commands</b>				
28	Display Control	Integer DS	3-28	✓
29	Clear Screen	CS	3-29	✓
30	Print Character	Integer PR	3-30	✓
<b>Request Control Commands</b>				
31	Frame Number Request	?F	3-31	✓
32	Chapter Number Request	?C	3-31	✓
33	Time Request	?T	3-32	CLV
39	Player Active Mode Request	?P	3-35	✓
40	Disc Status Request (LD)	?D	3-36	✓
42	LVP Model Name Request	?X	3-37	✓
<b>Communication Control Commands</b>				
43	Communication Control	Integer CM	3-38	✓
44	CCR Mode Request	?M	3-38	✓
<b>Register Control Commands</b>				
45	Register A Set (Display)	Integer RA	3-39	✓
46	Register B Set (Squelch Control)	Integer RB	3-41	✓
47	Register C Set (Miscellaneous)	Integer RC	3-42	✓
<b>Register Request Commands</b>				
48	Register A Request (Display)	\$A	3-43	✓
49	Register B Request (Squelch Control)	\$B	3-43	✓
50	Register C Request (Miscellaneous)	\$C	3-44	✓
<b>Input/Output Device Control Commands</b>				
51	Input Unit Request	#I	3-45	✓
52	Input Number Wait	?N	3-45	✓
<b>New Command</b>				
53	Picture Stop	Integer PS	3-46	CAV

# Level III Commands for CLD-V2800 — CD

	Command	Mnemonic	Page	CD
<b>Player Control Commands</b>				
1	Door Open	OP	3-11	✓
2	Door Close	CO	3-11	✓
3	Reject	RJ	3-12	✓
4	Start	SA	3-12	✓
5	Play	(Address) PL	3-13	✓
6	Pause	PA	3-14	✓
10	Scan Forward	NF	3-15	✓
11	Scan Reverse	NR	3-15	✓
15	Search	Address SE	3-18	✓
16	Stop Marker	Address SM	3-20	✓
19	Time Set	TM	3-22	✓
20	Track Set	TR	3-22	✓
21	Index Set	IX	3-23	✓
22	Block Set	BK	3-23	✓
23	Clear	CL	3-24	✓
24	Lead Out Symbol	LO	3-24	✓
<b>Control Switch Commands</b>				
25	Audio Control	Integer AD	3-25	✓
26	Video Control	Integer VD	3-25	✓
27	Key Lock	Integer KL	3-27	✓
<b>Display Control Commands</b>				
28	Display Control	Integer DS	3-28	✓
29	Clear Screen	CS	3-29	✓
30	Print Character	Integer PR	3-30	✓

# Level III Commands for CLD-V2800 — CD (cont.)

	Command	Mnemonic	Page	CD
<b>Request Control Commands</b>				
33	Time Request	?T	3-32	✓
34	Track Number Request	?R	3-32	✓
35	Index Number Request	?I	3-33	✓
36	Block Number Request	?B	3-33	✓
37	P-Block Number Request	?A	3-33	✓
38	TOC Information Request	?Q	3-34	✓
39	Player Active Mode Request	?P	3-35	✓
41	Disc Status Request (CD)	?K	3-36	✓
42	LVP Model Name Request	?X	3-37	✓
<b>Communication Control Commands</b>				
43	Communication Control	Integer CM	3-38	✓
44	CCR Mode Request	?M	3-38	✓
<b>Register Control Commands</b>				
45	Register A Set (Display)	Integer RA	3-39	✓
46	Register B Set (Squelch Control)	Integer RB	3-41	✓
47	Register C Set (Miscellaneous)	Integer RC	3-42	✓
<b>Register Request Commands</b>				
48	Register A Request (Display)	\$A	3-43	✓
49	Register B Request (Squelch Control)	\$B	3-43	✓
50	Register C Request (Miscellaneous)	\$C	3-44	✓
<b>Input/Output Device Control Commands</b>				
51	Input Unit Request	#I	3-45	✓
52	Input Number Wait	?N	3-45	✓



## Appendix B: CLD-V2800 Interface Cable Specifications

**APPENDIX**

**B**

**CLD-V2800**

**LEVEL III**

USER'S MANUAL

Programmer's Reference Guide

# Interface Cable Specifications

## Connecting the CLD-V2800 to IBM & Compatible Computers

The CLD-V2800 use these cables to attach to the computers listed below:

Computer	Pioneer Cable #	Connections
IBM PC/XT & Compatibles	CC - 12	DB-15 male to DB-25 female
IBM PS/2 & Commodore Amiga	CC - 12	DB-15 male to DB-25 female
IBM AT & Compatibles	CC - 13	DB-15 male to DB-9 female
IBM Info Window	CK - 15P	DB-15 male to DB-25 male

## Pin Configurations for Specific Cables

CC-12	DB-15 male to DB-25 female	CC-13	DB-15 male to DB-9 female																																																
	<table border="0"> <tr> <td>LD Player</td> <td></td> <td>Computer</td> </tr> <tr> <td>GND 1</td> <td>—————</td> <td>7 GND</td> </tr> <tr> <td>TxD 2</td> <td>—————</td> <td>3 RxD</td> </tr> <tr> <td>RxD 3</td> <td>—————</td> <td>2 TxD</td> </tr> <tr> <td>DTR 4</td> <td>—————</td> <td>5 CTS</td> </tr> <tr> <td></td> <td></td> <td>6 DSR</td> </tr> <tr> <td>Conn. Housing</td> <td>—————</td> <td>Conn. Housing</td> </tr> <tr> <td></td> <td>Shield</td> <td></td> </tr> </table>	LD Player		Computer	GND 1	—————	7 GND	TxD 2	—————	3 RxD	RxD 3	—————	2 TxD	DTR 4	—————	5 CTS			6 DSR	Conn. Housing	—————	Conn. Housing		Shield			<table border="0"> <tr> <td>LD Player</td> <td></td> <td>Computer</td> </tr> <tr> <td>GND 1</td> <td>—————</td> <td>5 GND</td> </tr> <tr> <td>TxD 2</td> <td>—————</td> <td>2 RxD</td> </tr> <tr> <td>RxD 3</td> <td>—————</td> <td>3 TxD</td> </tr> <tr> <td>DTR 4</td> <td>—————</td> <td>8 CTS</td> </tr> <tr> <td></td> <td></td> <td>1 Carrier Detect</td> </tr> <tr> <td></td> <td></td> <td>4 DTR</td> </tr> <tr> <td></td> <td></td> <td>6 DSR</td> </tr> </table>	LD Player		Computer	GND 1	—————	5 GND	TxD 2	—————	2 RxD	RxD 3	—————	3 TxD	DTR 4	—————	8 CTS			1 Carrier Detect			4 DTR			6 DSR
LD Player		Computer																																																	
GND 1	—————	7 GND																																																	
TxD 2	—————	3 RxD																																																	
RxD 3	—————	2 TxD																																																	
DTR 4	—————	5 CTS																																																	
		6 DSR																																																	
Conn. Housing	—————	Conn. Housing																																																	
	Shield																																																		
LD Player		Computer																																																	
GND 1	—————	5 GND																																																	
TxD 2	—————	2 RxD																																																	
RxD 3	—————	3 TxD																																																	
DTR 4	—————	8 CTS																																																	
		1 Carrier Detect																																																	
		4 DTR																																																	
		6 DSR																																																	
			Jumper pins 1, 4, & 6 together on DB-9																																																

The CC-12 is an RS-232C cable which interfaces Pioneer's CLD-V2800, CLD-V2600, CLD-V2400, LD-V4400, LD-V8000, LD-V4200 (discontinued), LD-V2200 videodisc players and the LC-V330 AutoChanger to Commodore Amigas and any IBM PC or compatible computer that supports a DB-25 female connector.

The CC-13 is an RS-232C cable which interfaces Pioneer's CLD-V2800, CLD-V2600, CLD-V2400, LD-V4400, LD-V8000, LD-V4200 (discontinued), LD-V2200 videodisc players and the LC-V330 AutoChanger to IBM PC/ATs or compatibles that support a 9-pin female D-Sub Connector.

## CK-15P Kit DB-15 male to DB-25 male

LD Player		Computer
GND 1	—————	7 GND
TxD 2	—————	3 RxD
RxD 3	—————	2 TxD
DTR 4	—————	5 CTS
		6 DSR
Conn. Housing	—————	Conn. Housing
	Shield	

### with two WRAP PLUGS

Male 25-PIN D-Sub Connector	Female 15-PIN D-Sub Connector
Internal Jumper List	Internal Jumper List
2 ————— 3	2 ————— 3
4 ————— 5	4 ————— 5
6 ————— 20	6 ————— 20

This kit contains the CC-03 cable, an RS-232C cable designed to interface Pioneer's CLD-V2800, CLD-V2600, CLD-2400, LD-V4400, LD-V8000, LD-V4200 (discontinued), LD-V2200 videodisc players to the IBM InfoWindow. However, the CC-03 can also be used to interface the above videodisc players to Pioneer's UC-V102 Videodisc Controller and, with a 25-pin female-to-female adapter, to an IBM PC or compatible that supports a 25-pin RS-232C port. Two wrap plugs, used to test the RS-232C cable in the InfoWindow configuration, are included.

### BASIC Sample Program to Test Interface Connections on IBM / Compatible Computers:

```
10 OPEN "COM1: 4800,N,8,1,CS1,DS0,CD0" AS#1
20 INPUT C$: PRINT #1, C$
30 INPUT #1, S$: Print S$
40 GOTO 20
```

(If the adapter is set to #2, the device name is COM2. **PC-DOS access:** If LDP. SYS is registered in CONFIG. SYS, access can be made as LDP. If both adapters #1 and #2 of the serial interface are connected, #2 has priority.

# Interface Cable Specifications

## Connecting the CLD-V2800 to Macintosh and Apple II Computers

The CLD-V2800 uses the following cables to attach to the computers listed below:

Computer	Pioneer Cable #	Connection
Macintosh Plus, SE, II & Apple IIGS	CC - 04	DB-15 male to Mini-Din 8 male
Apple II, II+, IIE with Super Serial Card	CC - 03	DB-15 male to DB-25 male

## Pin Configurations for Specific Cables

CC-03	DB-15 male to DB-25 male	
	LD Player	Computer
	GND 1	7 GND
	TxD 2	3 RxD
	RxD 3	2 TxD
	DTR 4	5 CTS
		6 DSR
	Conn. Housing	Conn. Housing
	Shield	

The CC-03 is an RS-232C cable which interfaces Pioneer's CLD-V2800, CLD-V2600, CLD-V2400, LD-V4400, LD-V8000, LD-V4200 (discontinued), LD-V2200 videodisc players and the LC-V330 AutoChanger to the IBM InfoWindow\*, the Apple II series Super Serial Card and to Pioneer's UC-V102 Videodisc Controller. **Note:** With a 25 pin female-to-female adapter, the CC-03 can be used to connect the players to an IBM PC or compatible that supports a 25 pin RS-232C port.

CC-04	DB-15 male to Mini-Din 8 male	
	LD Player	Computer
	GND 1	4 Frame Ground
		8 RxD +
	TxD 2	5 RxD -
	RxD 3	3 TxD -
	DTR 4	1 HS OUT
	Conn. Housing	Conn. Housing
	Shield	

The CC-04 is an RS-232C cable which interfaces Pioneer's CLD-V2800, CLD-V2600, CLD-V2400, LD-V4400, LD-V8000, LD-V4200 (discontinued), LD-V2200 videodisc players and the LC-V330 AutoChanger to the Macintosh Plus, SE, Macintosh IIs, and Apple II GS computers. It connects the 15-pin RS-232C port on the player to the Circular-8 Modem port on the Apple/Macintosh.

\*IBM InfoWindow does not support the LC-V330 AutoChanger.

## Appendix C: CLD-V2800 Internal Player Controls

**APPENDIX**

**C**

**CLD-V2800**

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# CLD-V2800 Internal Player Controls

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## **CLD-V2800 Control Blocks**

The following control blocks are used within the CLD-V2800.

- 1.) Communication control block
- 2.) Player control block

### **1) Communication control block**

The communication control block is divided into eleven units. It analyzes commands sent via various input methods, and executes the commands.

#### **Front Panel Buttons**

The CLD-V2800 has these buttons on the front panel: POWER ON, CD-OPEN/CLOSE, LD-OPEN/CLOSE, PLAY/PAUSE, STILL/STEP FORWARD & REVERSE, SKIP/SCAN FORWARD & REVERSE, and STOP .

#### **Wireless Remote Control Unit**

This is the remote sensor on the front panel. It converts the infrared Barcode or RCU code to an electric signal.

#### **Wired Remote Control Unit**

This is the Barcode terminal on the front panel. It receives the Barcode or RCU code via the stereo pin jack.

#### **Head Phone Jack (CLD-V2600 only)**

This is the jack for a headphone on the front panel. There is also a volume control.

#### **Key Decoder**

When a front panel button (key) is pressed, the key decoder generates data corresponding to the pressed button and sends it to the Key/RCU Command Processor.

#### **RCU Decoder**

When an RCU button (key) is pressed, the RCU decoder generates data corresponding to the pressed button and sends it to the Key/RCU Command Processor.

#### **Key/RCU Command Processor**

This command processor analyzes the front panel button /RCU command data received from the Key Decoder or the RCU Decoder, for execution.

#### **RS-232C Command Processor**

The RS-232C command processor analyzes RS-232C command data received from the RS-232C buffer for execution.

#### **RS-232C Buffer Unit**

The RS-232C buffer unit receives input from the 15-pin D-SUB connector on the rear panel. The unit consists of an input command data buffer and an output status data buffer.

# CLD-V2800 Internal Player Controls

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## **Character Generator**

The CLD-V2800 can generate character signals to be superimposed on the video signals displayed by the player. Character data is sent from the command processor to the character generator. The CLD-V2800 can generate characters on Lines 0-9, ten lines with up to 20 characters each.

## **Status display LED**

The CLD-V2800 has a display window that provides status information.

## **LED Driver**

The LED driver turns on the LED indicators.

## **2) Player control block**

The player control block analyzes player control commands received from the command processor of the communication control block and executes them to control the player accordingly.

### **Servo Control Unit**

This unit communicates with the digital servo unit and controls player processing.

### **Video Control Unit**

This unit analyzes video control commands received from the communication control block to control output video signals.

### **Audio Control Unit**

This unit analyzes audio control commands received from the communication control block to control output audio signals.

### **Focus Servo Unit\***

This unit controls the focus servo mechanism.

### **Tracking Servo Unit**

This unit controls the tracking servo mechanism.

### **Slider Servo Unit**

This unit controls the slider servo mechanism.

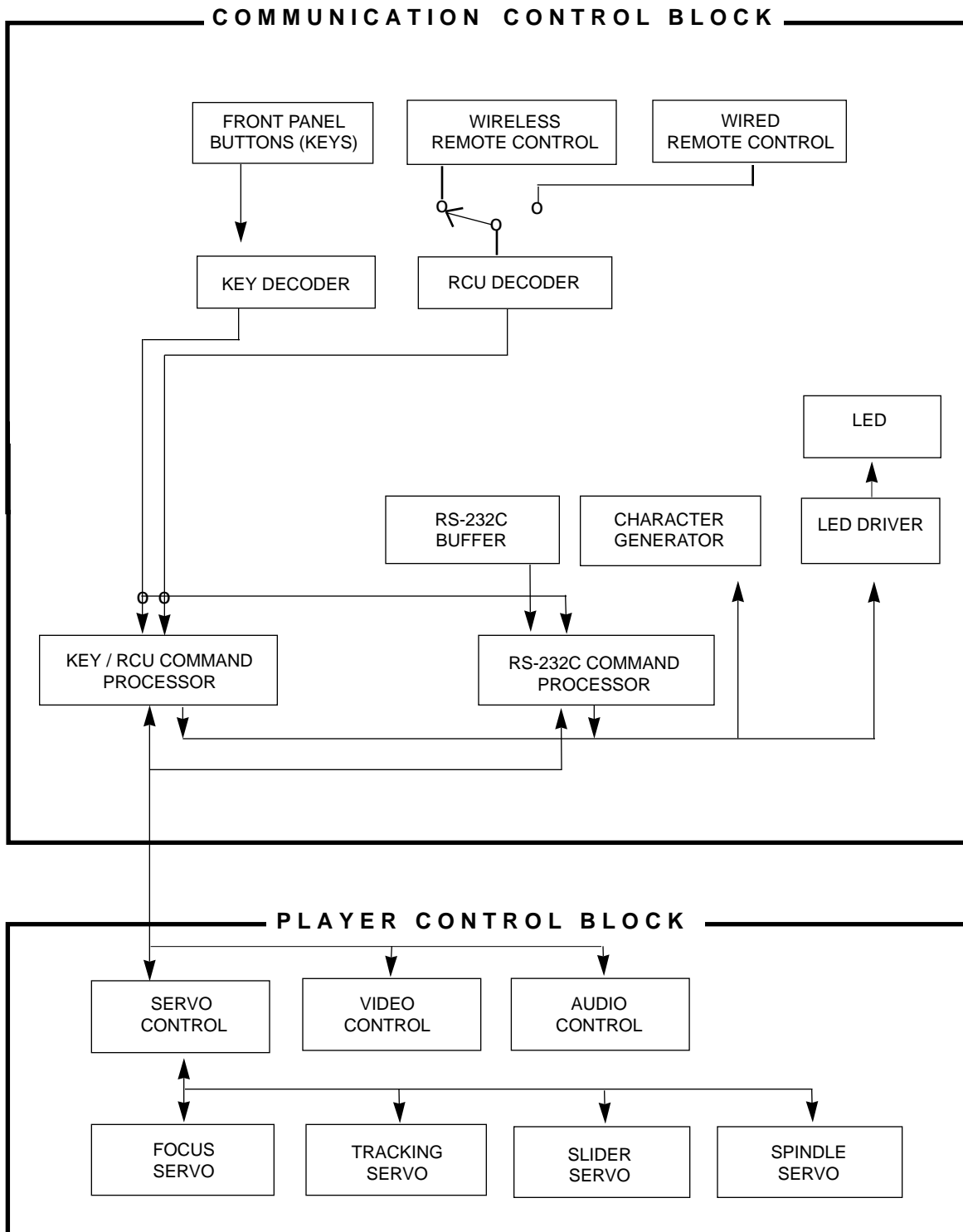
### **Spindle Servo Unit**

This unit controls the spindle servo mechanism.

(See Player Control Block diagram on next page.)

\* A *servo unit* constantly takes readings for focus, tracking, spindle operations, etc, and provides information to the player so it can make appropriate adjustments.

# CLD-V2800 Internal Player Controls



# CLD-V2800 Internal Player Controls

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## ***Independent Command Processor***

The CLD-V2800 player can be controlled by several different methods: From the Front Panel Buttons, the Remote Control Unit or Barcode Reader (Level I) or from an external computer via the RS-232 port (Level III).

An independent command processor inside the player assures the most appropriate operating environment is used. Because of this, the same commands may perform differently, depending on the control method.

Most of the commands input to the player have arguments such as frame number, chapter number, time number, track number or various parameters. An argument storage area and an address flag indicating the frame, chapter, time, track, index or block number are provided for each control method. Therefore, arguments input for one particular control method do not affect operations performed with another method.

## ***Internal Player Components***

### ***Address Specification Flag Register (computer control)***

This register indicates whether a particular address argument sent from a computer is a frame, chapter, track, index, time, or block number.

### ***Digit Buffer (computer control)***

This buffer stores the numeric values of arguments sent from an external computer. The contents of this buffer are sent to the specified registers for command execution.

### ***Command Processor (computer control)***

This processor reads the contents of the RS-232C buffer. It sends the arguments to the digit buffer, or executes commands.

### ***RS-232C Buffer***

This is the RS-232C Input/Output data buffer. Twenty-two bytes are used for input and another 22 bytes are used for output.

### ***Address Specification Flag Register (manual control)***

This register indicates whether the address arguments are frame numbers, chapter numbers, time numbers or track numbers for normal control operations.

### ***Digit Buffer (manual control)***

This buffer stores the numeric values of arguments for normal control operations. The contents of this buffer are sent to the specified register for command execution.



# CLD-V2800 Internal Player Controls

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## **Command Processor (manual control)**

This reads the contents of the RCU/key decoder and sends the contents to the digit buffer if they are arguments, or executes the command if the RCU/key decoder contains a command.

## **RCU/Key Decoder**

This monitors RCU/key inputs. If arguments and commands are input, the decoder generates the internal code corresponding to the input data.

## **Current Frame or Time Register**

This register stores the current frame number (LD-CAV) or the current time number (LD-CLV or CD).

## **P-Time Register**

This register stores the P-Time (elapsed time within a track) location on a CD.

## **Current Chapter or Track Register**

This register stores the current chapter number if an LD encoded with chapters is playing. It stores the current track number if a CD is playing.

## **Current Index Register**

This register stores the current index of a specific track on a CD.

## **Search Frame or Time Register**

This register stores the frame number (LD-CAV) or time number (LD-CLV or CD) of the search destination. The search operation is performed by comparing the contents of this Search Frame or Search Time Register and the contents of the Current Frame or Current Time Register.

## **Search Chapter or Track Register**

This register stores the chapter (LD) or track (CD) number of the search destination. The search operation is performed by comparing the contents of this Search Chapter Register or Search Track Register and the contents of the Current Chapter Register or the Current Track Register.

## **Search Index Register**

This register stores the index number of the search when a CD is playing.

## **Mark Frame or Mark Time Register**

This register stores a frame (LD-CAV) or time (LD-CLV or CD) number marker. If a marker is set and the address specification flag indicates frame or time, the contents of this register are compared with the current frame or time. If they match, the player automatically holds a still frame or pauses at a specific time location.

# CLD-V2800 Internal Player Controls

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## ***Mark Chapter or Mark Track Register***

This register stores a chapter (LD) or track (CD) number marker. If a marker is set and the address specification flag indicates chapter or track, the contents of this register are compared with the current chapter or track. If they match, the player automatically pauses at the chapter or track.

## ***Mark Index Register***

This register stores an index (CD) number marker. If a marker is set and the address specification flag indicates index, the contents of this register are compared with the current index. If they match, the player automatically pauses at the index.

## ***Speed Register***

This register stores the speed used for multi-speed play.

## ***Audio/Video Control Register***

This register controls audio/video output.

## ***Display Control Register***

This register controls the display of frame numbers/time numbers, chapter numbers, track numbers and specific user-generated characters.

## ***Display Buffer***

This buffer holds character data. It provides up to 20 characters on 3 lines for the system and up to 20 characters on up to 10 lines for the user.

## ***REG. A to REG. C***

These are switches used to set specific CLD-V2800 functions. The settings Load Start, Power-On Start and Baud Rates of 4800 or 1200 are read into Register C from the Function Switches at power-ON.

## **Appendix D: CLD-V2800 Internal Player Registers**

**APPENDIX**

**D**

**CLD-V2800**

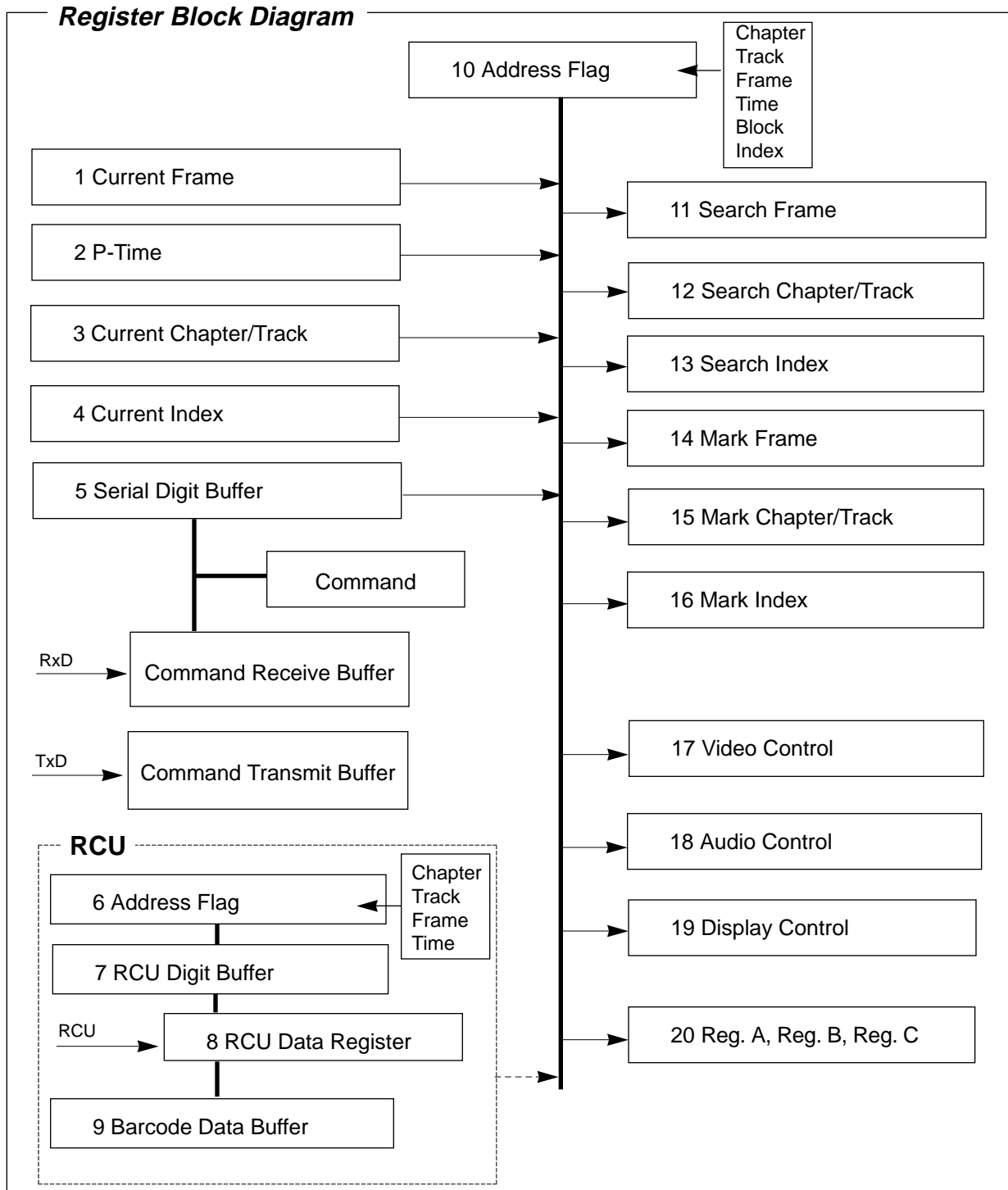
**LEVEL III**

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# CLD-V2800 Internal Player Registers

Many commands given to the player are accompanied by such arguments as frame number or chapter number. These values are set in the respective registers of the player. The following figure shows a model of the internal registers of the CLD-V2800. It illustrates the relationship between the registers. This model is helpful in understanding the initial state of a particular register or how a given command changes the contents of a register.



# CLD-V2800 Internal Player Registers

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The registers have the following functions.

**1. Current Frame or Time (including Block number)**

Contains the current picture frame number (LD-CAV), or contains the current time number (LD-CLV or CD) or time and block numbers (CD).

**2. P-Time**

Contains the track internal elapsed time. This is mainly for display purposes.

**3. Current Chapter or Track Number**

Contains the current chapter number (LD) or track number (CD).

**4. Current Index**

Contains the current index number.

**5. Serial Digit Buffer**

The command line argument values are contained here while the commands are placed in a separate exclusive register. When the command evaluation is made, the contents of this buffer are transferred to a specified register.

**6. Remote Control-Use Address Flag**

When the remote control unit is used to perform a Search, this flag specifies whether the address is assigned as a chapter, track, frame or time.

**7. Remote Control Digit Buffer**

Contains the numbers input by remote control.

**8. Remote Control Data Register**

Temporarily contains the data input by remote control.

**9. LaserBarcode Buffer**

Transmits LaserBarcode compatible data from among the data input by remote control.

**10. Serial-Use Address Flag**

Under serial command, this flag specifies whether the address is assigned as a chapter, track, frame, time, block or index.

# CLD-V2800 Internal Player Registers

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## **11. Search Frame or Time (including Block)**

Contains the frame number (LD-CAV), time (LD-CLV, CD) or time including block number (CD) to be searched. The search operation is performed while comparing the contents of the Search Frame or Time Register and Current Frame or Time Register.

## **12. Search Chapter or Track**

Contains the chapter number (LD) or track number (CD) to be searched. Its use is the same as that of the Search Frame or Time Register.

## **13. Search Index**

Contains the index number searched. Its use is the same as that of the Search Frame or Time Register.

## **14. Mark Frame or Time (including Block)**

Contains the frame number (LD-CAV), time (LD-CLV, CD) or time including block number (CD) for the marker which is used to indicate the end point of auto play. When auto play is engaged the contents of the Mark Frame or Time Register and the Current Frame or Time Register are compared.

## **15. Mark Chapter or Track**

Contains the chapter (LD) or track number (CD) for the marker. Its use is the same as that of the Mark Frame or Time Register.

## **16. Mark Index**

Contains the index number for the marker. Its use is the same as that of the Mark Frame or Time Register.

## **17. Video Control**

The video ON/OFF switch.

## **18. Audio Control**

The audio selection switch.

## **19. Display Control**

The frame number and chapter character display ON/OFF switch.

## **20. Register A, Register B, Register C**

These switches are concerned with the special functions of the CLD-V2800.

## Appendix E: Additional Notes

**APPENDIX**

**E**

**CLD-V2800**

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# CLD-V2800 Notes

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- 1) The model number of the CLD-V2800 in response to ?X is P1537XX
- 2) If a picture stop code is recorded on currently playing CAV LaserDisc, the player enters *Still Mode* at the stop code point. If a picture stop is encountered during a stop marker or auto stop segment play, an error message is returned. With the new Picture Stop Command, Integer PS, picture stops can be disabled and played through (1PS) or enabled (0PS).
- 3) If a frame specified by an auto stop or by a stop marker is missing, the player enters *Still Mode* just beyond the specified frame.
- 4) When the CLD-V2800 is controlled by a computer, command execution may sometimes be suspended if front panel buttons or remote control buttons are pressed. To prevent this, use the Key Lock (KL) command to lock out front panel and remote control input.
- 5) CLV frame mode (for CLV discs encoded with seconds) is available on the CLD-V2800 by using the Frame Set (FR) command. See pages 3-21 and 3-18 for details. CLV frame numbers do not appear on the front panel or on-screen display, but can be verified by issuing the ?F command.
- 6) If the video area of a CDV has been recorded using the PAL system, sound only will be reproduced when it is played on a CLD-V2800. (The disc is treated as a CD.)
- 7) The CLD-V2800 does **not** support the ?U command, allowing access to the Standard User's Code that may be encoded on LDs.
- 8) If a non-existent address is specified via computer control while a CD is playing, an error code (E04) is returned. Users can access the CD's Table of Contents (TOC) by issuing the ?Q command via computer control. The following information is returned: first track, last track, and total playing time (absolute time) of the CD. See **Section 3.7.4 Request Commands, #38 TOC Information** on page 3-34.
- 9) CDV playback begins from the video area. When the video playback is completed, playback may end or the video may be replayed depending on how the player's *Repeat Mode* is set. When you want to play back audio, search for the track you want to hear. When audio playback is completed, playback may end or the audio may be replayed again, depending on the *Repeat Mode*.
- 10) During CD and CDV playback, if the stop marker is set to  $\pm 1$  block from the start point after a Pause, the player will not hold the stop marker.
- 11) During LD CLV playback, if the stop marker is set to  $\pm 1$  frame, from the start point after a Pause, the player will not hold the stop marker.
- 12) During CD playback, it is not possible to search for the absolute time address 0 minutes, 0 seconds, 0 block.

Laser Vision Player **CLD-V2800 Level III User's Manual/Programmer's Reference Guide**  
**TP 120 Version 1.0 10/95** Pioneer New Media Technologies, Inc.

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