

PRV-LX1

IEEE-1394 Interface Protocol

March 2005

Version 3.02

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1.0 Foreword

The PRV-LX1 can be controlled externally using IEEE-1394 commands. Control is applied through the 4-pin connection located on the rear of the recorder. Set the IEEE-1394 REMOTE controls through the main menu. With a monitor connected to the PRV-LX1, press the **Function** button on the PRV-LX1's front panel to access the menu. Control Settings are accessed through the **Setup/Operation** menu.

Note: This document is valid for PRV-LX1 System Version 3.01/1.04 or later.



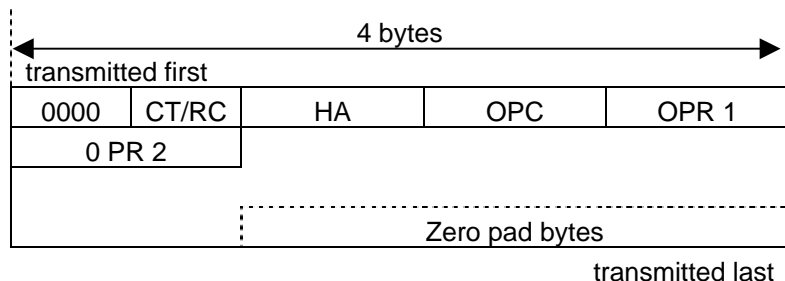
Note: The recorder's DV Recording must be set for Remote (under Status > Control Settings > Control) to have the unit recognize IEEE-1394 external control options (see image below).



2.0 Command Block Format

The PRV-LX1 supports the following commands based on AV/C commands in the IEEE-1394 specification.

Note: Pad with 0 from Byte 0 to Byte 3 to make the command size (Bytes) a multiple of 4.

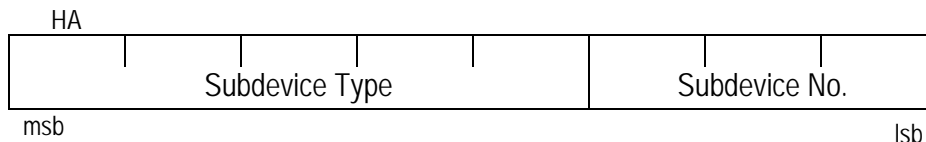


CT/RC

Command Type and Response Code are as follows.

CT/RC	Command Type
0 0 0 0	Control Command
0 0 0 1	Status Inquiry Command
0 0 1 0	Support Inquiry Command
0 0 1 1	Report Inquiry Command
0 1 0 0	(Reserved)
0 1 0 1	(Reserved)
0 1 1 0	(Reserved)
0 1 1 1	(Reserved)

CT/RC	Response Code
1 0 0 0	NOT IMPLEMENTED
1 0 0 1	ACCEPTED
1 0 1 0	REJECTED
1 0 1 1	IN TRANSITION
1 1 0 0	IMPLEMENTED/STABLE
1 1 0 1	CHANGED
1 1 1 0	(Reserved)
1 1 1 1	BUSY



HA

Header Address (HA) specifies the Device or the Sub-device in the Device.

The following two values can be specified for HA on a PRV-LX1.

Device/Subdevice	HA	Subdevice Type	Subdevice No.
Device	FF	11111	111
Video Cassette Recorder (VCR)	20	00100	000

OPC

Specifies Operation Code

OPR

Specifies Operand

3.0 Command Table

Command	Sequence	Return Data
Connect (Sub-device)	01:FF: 20:00	0C:FF: 20:A0:00:00:20:20
Connect (Plug)	01:FF: 20:02	0C:FF: 20:5A:FF: FF:00:00
In Plug Signal Format Inquiry	01:FF: 19:XX: FF: FF: FF: FF	0C:FF: 19:XX: 80:YY:00:00
Out Plug Signal Format Inquiry	01:FF: 18:XX: FF: FF: FF: FF	0C:FF: 18:XX: 80:YY:00:00
Device Information Inquiry	01:FF: 30:FF: FF: FF: FF: FF	0C:FF: 30:07:20:XX: XX: XX
Sub-device Information Inquiry	01:FF: 31:XX: FF: FF: FF: FF	0C:FF: 31:XX: 20:FF: FF: FF
Record	00:20:C2: 75	09:20:C2: 75
Record Pause	00:20:C2: 7D	09:20:C2: 7D
Play Forward	00:20:C3: 75	09:20:C3: 75
Play Forward Pause	00:20:C3: 7D	09:20:C3: 7D
Play Reverse Pause	00:20:C3: 6D	09:20:C3: 6D
Slow/Fast Forward	00:20:C3: 3X	09:20:C3: 3X
Slow/Fast Reverse	00:20:C3: 4X	09:20:C3: 4X
Stop	00:20:C4: 60	09:20:C4: 60
Rewind	00:20:C4: 65	09:20:C4: 65
Fast Forward	00:20:C4: 75	09:20:C4: 75
Search	00:20:51:20:DATA	09:20:51:20:DATA
Title Search	00:20:00:00:E0: 36:11:DATA	09:20:00:00:E0: 36:11:DATA
Chapter Search	00:20:00:00:E0: 36:21:DATA	09:20:00:00:E0: 36:21:DATA
Chapter Mark	00:20:00:00:E0: 36:22	09:20:00:00:E0: 36:22
Title Delete	00:20:00:00:E0: 36:71:DATA	09:20:00:00:E0: 36:71:DATA
Trimming Title Preset	00:20:00:00:E0: 36:72:DATA	09:20:00:00:E0: 36:72:DATA
Trimming In Preset	00:20:00:00:E0: 36:73:DATA	09:20:00:00:E0: 36:73:DATA
Trimming Out Preset	00:20:00:00:E0: 36:74:DATA	09:20:00:00:E0: 36:74:DATA
Trimming	00:20:00:00:E0: 36:75	09:20:00:00:E0: 36:75
Mecha-Mode Status Inquiry	01:20:D0: 7F	0C: 20:DATA
Medium Position Inquiry Time-code?	01:20:51:71:FF: FF: FF: FF	0C: 20:51:71:DATA
Title Number Sense	01:20:00:00:E0: 36:81:00:00	0C: 20:00:00:E0: 36:91:DATA
Chapter Number Sense	01:20:00:00:E0: 36:82:00	0C: 20:00:00:E0: 36:92:DATA
HDD Capacity Sense	01:20:00:00:E0: 36:83:00:00	0C: 20:00:00:E0: 36:93:DATA
Mode Sense	01:20:00:00:E0: 36:8F:00	0C: 20:00:00:E0: 36:9F:DATA

Padding data is not described in the above table.

Pad each command with 0 to make the command size (Bytes) a multiple of 4.

4.0 Command Formats

Detailed specification of command

Padding data is not described below.

Pad each command with 0 to make the command size (Bytes) a multiple of 4.

01:FF: 20:00 **Connect (Subdevice)**

Return "0C:FF: 20:A0:00:00:20:20"

01:FF: 20:02 **Connect (Plug)**

Return "0C:FF: 20:5A:FF: FF:00:00"

01:FF: 19:XX: FF: FF: FF: FF **In Plug Signal Format Inquiry**

Return "0C:FF: 19:XX: 80:YY:00:00"

XX is the same value as the command. YY is set to 00 when the TV system mode is NTSC. Set the value to 80 when using the PAL mode.

01:FF: 18:XX: FF: FF: FF: FF **Out Plug Signal Format Inquiry**

Return "0C:FF: 18:XX: 80:YY:00:00"

XX is a same value as the command. YY is set to 00 when the TV system mode is NTSC. Set the value to 80 when using the PAL mode.

01:FF: 30:FF: FF: FF: FF: FF **Device Information Inquiry**

Return "0C:FF: 30:07:20:XX: XX: XX". XX: XX"

XX specifies GUID that is unique to each device.

01:FF: 31:XX: FF: FF: FF: FF **Subdevice Information Inquiry**

Return "0C:FF: 31:XX: 20:FF: FF: FF"

XX is the same value as the command.

00:20:C2: 75 **Record**

Start Recording from a Stop condition.

00:20:C2: 7D **Record Pause**

Pause recording from a Record condition.

00:20:C3: 75 **Play Forward**

Start playing Title 1 from a Stop condition. If [Operation]-[HDD Recording]-[Time-Shift PLAY] setting is Enabled and the HDD is recording when this command is received, the PRV-LX1 tries to Time-Shift PLAY the title being recorded. Status Data retains the Play condition while in Time-Shift PLAY

00:20:C3: 7D **Play Forward Pause**

00:20:C3: 6D **Play Reverse Pause**

Transfer from the Play condition to a Pause condition.

00:20:C3: 3X **Slow/Fast Forward**

00:20:C3: 4X **Slow/Fast Reverse**

Execute Step/Slow/Scan playing from a Play condition.

3X	Speed	4X	Speed
30	Step Forward	40	Step Reverse
31	1/90 Slow Forward	41	1/90 Slow Reverse
32		42	
33	1/30 Slow Forward	43	1/30 Slow Reverse
34	1/16 Slow Forward	44	1/16 Slow Reverse
35	1/8 Slow Forward	45	1/8 Slow Reverse
36	1/4 Slow Forward	46	1/4 Slow Reverse
37	1/2 Slow Forward	47	1/2 Slow Reverse
38	1x Forward	48	1x Reverse
39	6x Scan Forward	49	6x Scan Reverse
3A	12x Scan Forward	4A	12x Scan Reverse
3B	24x Scan Forward	4B	24x Scan Reverse
3C	48x Scan Forward	4C	48x Scan Reverse
3D	96x Scan Forward	4D	96x Scan Reverse
3E	192x Scan Forward	4E	192x Scan Reverse
3F		4F	

00:20:C4: 60 **Stop**

Transfer to the Stop condition from a Play or Record condition. When this command is received in Time-Shift PLAY mode while Recording, the unit stops Time-Shift Play then transfers to a Stop condition.

00:20:C4: 65 **Rewind**

Execute 192x speed Scan Reverse from Play or Time-Shift PLAY condition then transfer to a Play/Pause condition at the beginning of the title.

00:20:C4: 75 **Fast Forward**

Executes 192x speed Scan Forward from a Play condition then transfers to a Play/Pause condition at the end of the title. In Time-Shift PLAY mode, executes 192x speed Scan Forward then transfers to a Play condition when the Recording stops (1- 6 minutes).

00:20:51:20:FF: SS: MM: HH **Search**

Search to the position specified by FF: SS: MM: HH in the currently playing title. The meaning of the data is as follows.

FF		SS		MM		FF	
10	1	10	1	10	1	10	1
Frames	Frame	Seconds	Second	Minutes	Minute	Hours	Hour
MSD	LSD	MSD	LSD	MSD	LSD	MSD	LSD

00:20:00:00:E0: 36:11:TT: TT **Title Search** (Original command on the PRV-LX1)

Executes a title search to the title number given by TT: If the [Operation]-[HDD Recording]-[Time-Shift PLAY] setting is Enabled while recording and the Search Title number is same as Record Title number, then Time-Shift PLAY executes. If the Search Title number is lower than the Record Title number, another title plays while recording. The meaning of the data is as follows. From 1 to 255 is available for Title Number.

TT		TT	
10	1	always	100
Titles	Title	0	Titles
MSD	LSD	MSD	LSD

00:20:00:00:E0: 36:21:NN **Chapter Search** (Original command on the PRV-LX1)

Executes a Chapter Search on the currently playing title. Chapter number is represented by NN. The meaning of DATA-2 is as follows. From 1 to 99 is available for a chapter number.

NN	
10 Chapters	1 Chapter
MSD	LSD

00:20:00:00:E0: 36:22 **Chapter Mark** (Original command on the PRV-LX1)

If a unit is recording and [Recording]-[Others]-[Auto Chapter] is set to Manual when this command is received, the chapter is plotted or marked at the current point.

00:20:00:00:E0: 36:71:TT: TT **Title Delete** (Original command on the PRV-LX1)

If the PRV-LX1 receives this command while in a Stop condition, the title specified by TT is deleted: With "01:20:00:00:E0: 36:8F Mode Sense" command, it is possible to know if the deletion process is complete. Issue the "01:20:00:00:E0: 36:81 Title Number Sense" command before and after the deletion to confirm that the number of titles in the selected project have been reduced. If the number of titles has not been reduced, the title deletion has failed so error handling should be executed. Data format is same as the format of the "00:20:00:00:E0: 36:11:TT: TT Title Search" command.

00:20:00:00:E0: 36:72:TT: TT **Trimming Title Preset** (Original command on the PRV-LX1)

In a Stop condition, trimming title number executed by the "00:20:00:00:E0: 36:75 Trimming" command is specified by TT: TT and the preset title number is in the memory. Data format is same as the format of the "00:20:00:00:E0: 36:11:TT: TT Title Search" command.

00:20:00:00:E0: 36:73:FF: SS: MM: HH **Trimming In Preset** (Original command on the PRV-LX1)

In a Stop condition, the trimming IN point is executed by the "00:20:00:00:E0: 36:75 Trimming" command, specified by FF: SS: MM: HH, and the preset point in the memory. Data format is same as the format of the "00:20:51:20:FF: SS: MM: HH Search" command.

00:20:00:00:E0: 36:74:FF: SS: MM: HH **Trimming Out Preset** (Original command on the PRV-LX1)

In a Stop condition, the trimming OUT point is executed by the "00:20:00:00:E0: 36:75 Trimming" command, specified by FF: SS:MM:HH, and the preset point in the memory. Data format is same as the format of the "00:20:51:20:FF: SS: MM: HH Search" command.

00:20:00:00:E0: 36:75 **Trimming** (Original command on the PRV-LX1)

In a Stop condition, trimming of the title is specified by the "00:20:00:00:E0: 36:72:TT: TT Trimming Title Preset" command from the IN point specified with "00:20:00:00:E0: 36:73:FF: SS: MM: HH Trimming In Preset" to the OUT point specified with "00:20:00:00:E0: 36:74:FF: SS: MM: HH Trimming Out Preset". Another title is created. With "01:20:00:00:E0: 36:8F Mode Sense" command, it is possible to know if the trimming is complete. Issue the "01:20:00:00:E0: 36:81 Title Number Sense" command before and after the trimming to confirm that the number of titles in the selected project have increased after the trimming. If the number of titles has not increased, the trimming has failed so error handling should be executed.

01:20:D0: 7F **Mecha-Mode Status Inquiry**

Returns current Mecha-Mode of the PRV-LX1

Mecha-Mode	Response
Record	0C: 20:C2: 75
Record Pause	0C: 20:C2: 7D
Slow/Scan Forward	0C: 20:C3: 3X
Slow/Scan Reverse	0C: 20:C3: 4X
Play	0C: 20:C3: 75
Play Pause	0C: 20:C3: 7D
Play Rev Pause	0C: 20:C3: 6D
Fast Forward	0C: 20:C4: 75
Rewind	0C: 20:C4: 65
Stop	0C: 20:C4: 60
Eject	0C: 20:C1: 60

01:20:51:71:FF: FF: FF: FF **Medium Position Inquiry Time-code?**

Returns the current time code of Recording or Playing title with "0C: 20:51:71:FF: SS: MM: HH". The format is the same as the format of the "00:20:51:20:FF: SS: MM: HH Search" command. While recording in the Time-Shift PLAY mode, current time code for the playing title is returned.

01:20:00:00:E0: 36:81:00:00 **Title Number Sense** (Original command on the PRV-LX1)

Returns the total number of titles in the Stop condition caused by the "0C: 20:00:00:E0: 36:91:TT: TT" command. The unit returns the recording title number in the Record condition or returns the playing title number in the Play or Time-Shift PLAY condition. Data format is same as the format of the "00:20:00:00:E0: 36:11:TT: TT Title Search" command.

01:20:00:00:E0: 36:82:00 **Chapter Number Sense** (Original command on the PRV-LX1)

Returns the recording chapter number executed by a "0C: 20:00:00:E0: 36:92:NN" command. The unit returns the recording chapter number in the Record condition or returns the playing chapter number in the Play or Time-Shift Play condition. Data format is same as the format of the "00:20:00:00:E0: 36:21:NN Chapter Search" command.

01:20:00:00:E0: 36:83:00:00 **HDD Capacity Sense** (Original command on the PRV-LX1)

The remaining capacity of PRV-LX1's internal HDD is returned with 0C: 20:00:00:E0: 36:93:NN: NN". Data format is as follow. (Data is listed in Gbytes)

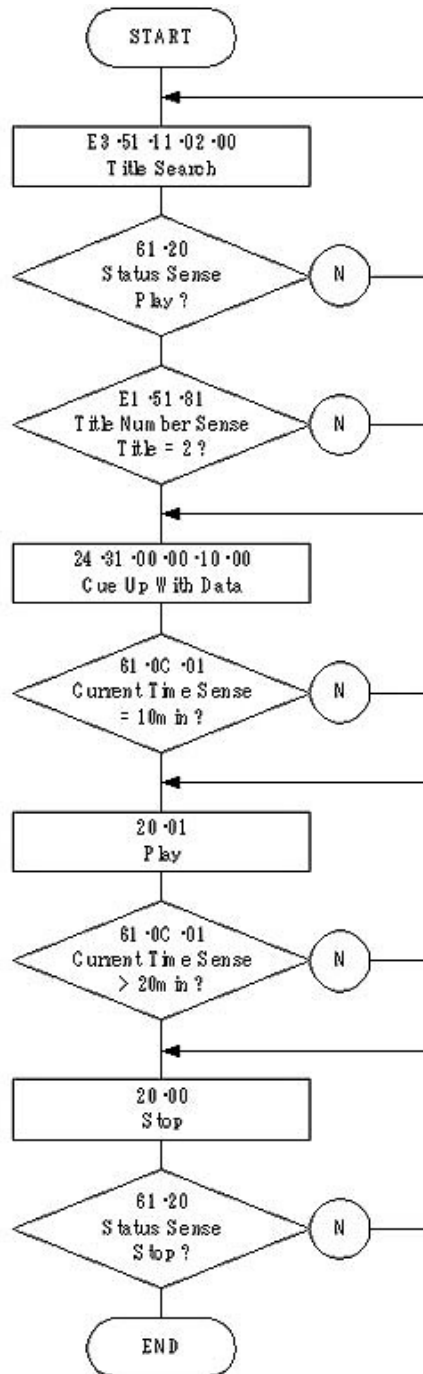
NN		NN	
10	1	always	100
GB	GB	0	GB
MSD	LSD	MSD	LSD

01:20:00:00:E0: 36:8F:00 **Mode Sense** (Original command on the PRV-LX1)

This command queries the status of the PRV-LX1. Current condition of PRV-LX1 is reported by "0C: 2.

XX	Status of PRV-LX
01	In Record condition Include Time-Shift PLAY mode in Record condition
FF	Record Error
71	Executing Title Delete
75	Executing Trimming

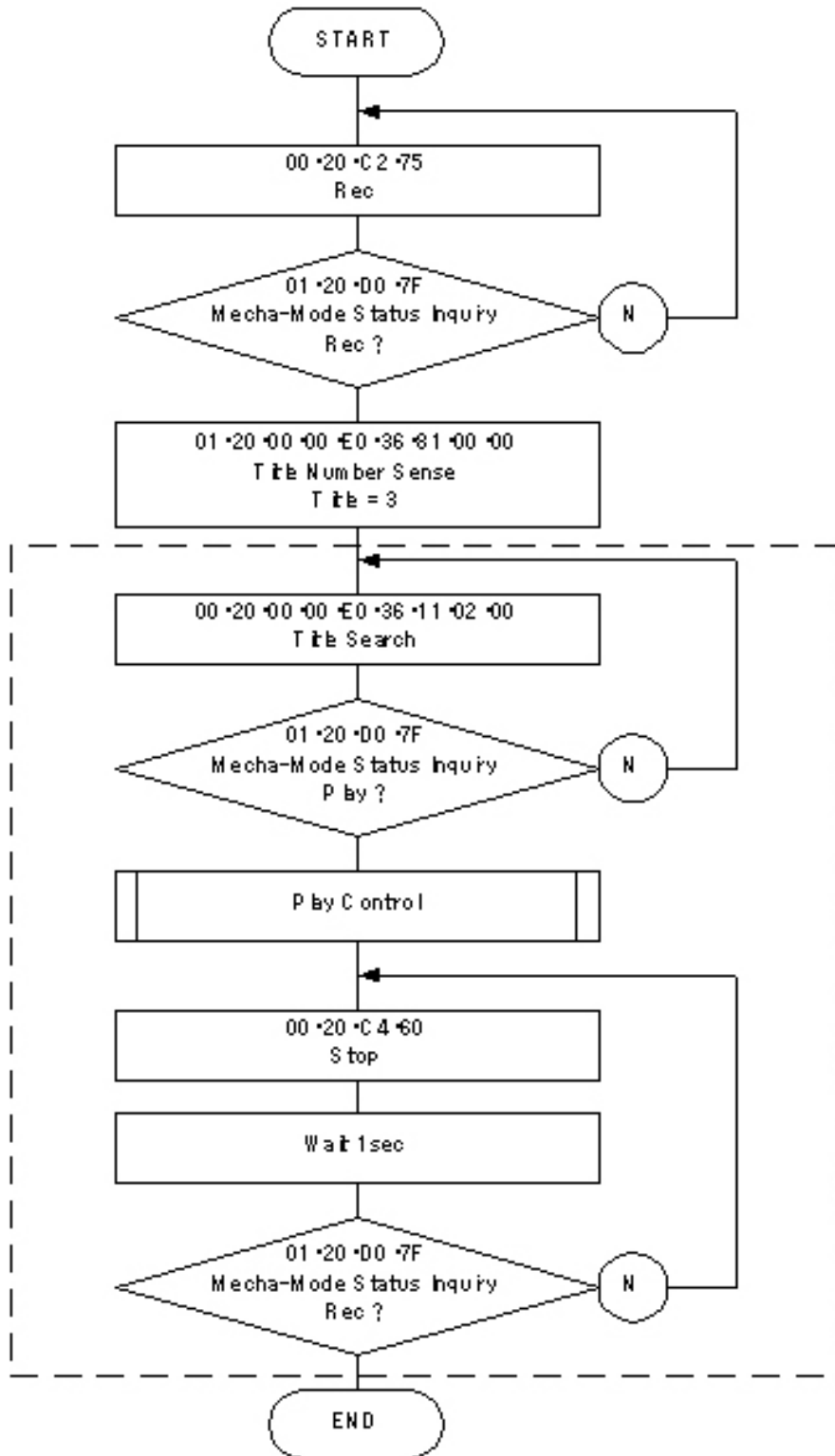
5.0 Procedure for Issuing Command



Example: playing Title 2, from the scene10 minutes to 20 minutes

“Drive Select” and “Selecting the project” are not available when using the remote control. Issue a "01:20:00:00:E0:36:81:00:00" "Title Number Sense" command from Stop to get the total number of titles for the current project.

Total time of the title cannot be acquired directly by a remote command. However, when a title is played by remote commands (e.g. "0C:20:C4:75 Fast Forward"), the title is Paused at the end of the title. To calculate the total time of the title, use the "01:20:51:71:FF:FF:FF:FF Medium Position Inquiry Time-code" command when PAUSE is returned by the "01:20:D0:7F Mecha-Mode Status Inquiry" command.



Example: playing Title 2, while recording title 3 to HDD

On HDD Rec, it is possible to play a title other than the recording title when Time Shift PLAY setting is Enable. The “00:20:C4:60 Stop” command stops Play during recording using TimeShift PLAY and stops recording when in the Rec condition. It is not possible to start recording while in Playback or to stop recording directly during Time-Shift PLAY. To stop Time-Shift PLAY, first stop recording.

6.0 Product-Specific Notes

6.1 Recording Delay

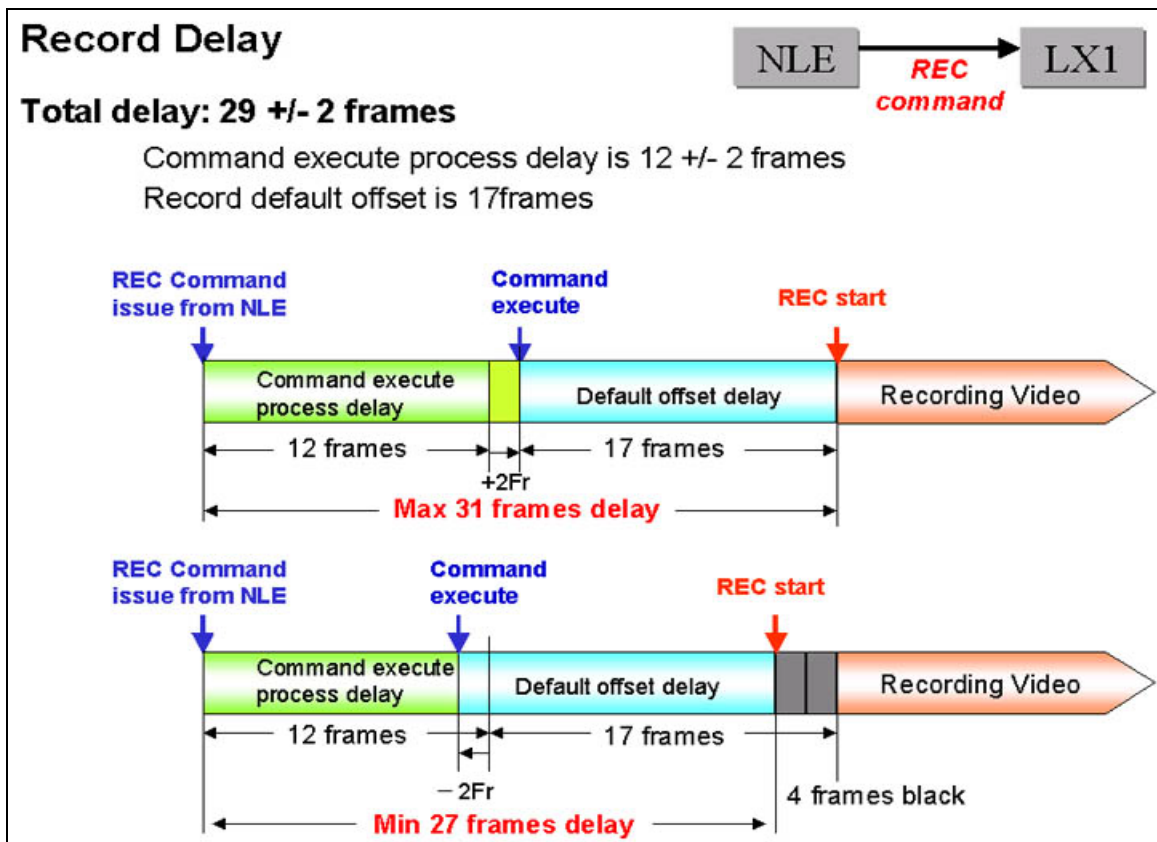
There is a short delay of approximately 29 \pm 2 frames between when the PRV-LX1 is issued a record command and the command is executed.

This delay is a result of the following:

- Requires +12 frames for encoding system setup
- Execution of the command may take +2 frames
- Execution of the command may take -2 frames
- Record default offset for the LX1 is 17 frames

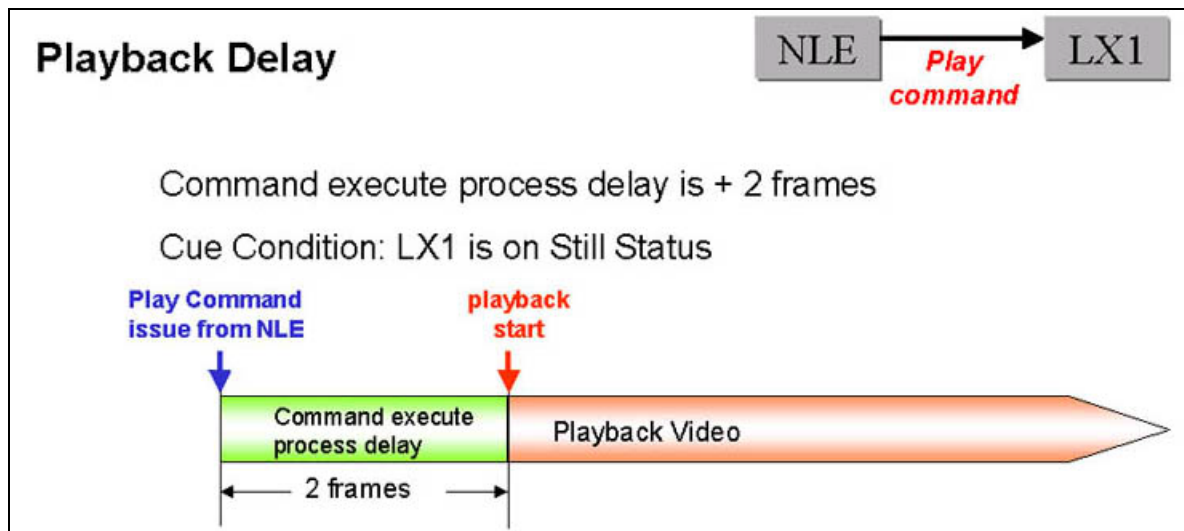
The above delay shows the calculation of a maximum +29 frames \pm 2 frames delay.

Pioneer Electronics suggest that PRV-LX1 users pad these frame times to the head/tail of the selected I/O points to ensure that an entire video sequence is recorded.



6.2 Playback Delay

When the PRV-LX1 is issued a play command it experiences up to a +2 frames delay in the execution of the command. This delay is a result of the command being sent from the NLE system/edit controller via serial control to the recorder's internal HDD for processing. This action takes approximately 2 frames to accomplish.



6.3 PRV-LX1 as Recording Device

When issuing a “pause” command while recording, the PRV-LX1 continues recording within the same title/clip, maintaining continuous time-code.

- To issue a “pause” command the user must issue a “shuttle 0” command. This pauses recording to insert a chapter mark at the closest GOP of encoded video then recording continues. The [Auto Chapter] setting should be set to Manual.
- Issuing a “stop” command closes the recorded title/clip as defined by the DVD spec. All subsequent recordings via serial control start with a new title/clip. The PRV-LX1 generates new time-code within that title/clip.

6.4 PRV-LX1 as Source Device

When the PRV-LX1 is the source device being controlled via serial control with an NLE or edit control device the following limitation applies.

- When an external device is controlling the PRV-LX1 and a “Search and Play” command is sent via serial control, the PRV-LX1 reports back frame numbers every 50ms. The PRV-LX1 cannot return the precise time-code. The unit may return the same value as requested earlier or may skip the frame while Recording or Playing.

** Pioneer Electronics suggest manually recording without using serial control when the recorder is to be used as a source. Or, if the external control device offers the ability to change the time-code query speeds, change the device to 50ms to match the PRV-LX1.*

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