2.5 Program Format

The following is a brief description of the two parts of a Level II instruction used to control the LD-V8000 videodisc player — the arguments and the command. Also included is an overview of Level II program code structure and of command execution speed. Specific Level II commands and arguments are described in ***Chapter 4, Level II Commands for the LD-V8000.***

2.5.1 Arguments

An argument is attached to a command to provide a numeric parameter useful for the command's execution. Arguments represent integer data, CAV or CLV frame numbers, time codes, chapter numbers, program addresses, register numbers, time delays, or other values. In Level II Programs, the argument, if any, is always placed before the command.

Any number of digits can be placed before the command to form the argument. However, only the lower-order seven digits are used for a CLV frame number, the lower two digits for a chapter number, and the lower five digits for most other parameters.

In addition to the ten digits (0 - 9), several other program codes (ARG, DIN, DRP, etc.) are also considered to be argument codes, because they generate argument digits for the command that immediately follows them. For example, 123 ARG DRP ARG 12 ARG is a nine-code argument that creates argument digits for a following command (such as "Search").

NOTE: Usually, the arguments generated in this manner are five digits (they can be more) and they may be taken modulo 65536. Usually extra high-order digits are ignored. But Beware, the instruction 90000 DRP SC does not search to frame 9000 but the instructions 12345 GET 0 ARG DRP 7 SC may indeed find frame 23457.

Some commands don't require arguments; others do, often because the default argument (usually zero) does not make sense. When the argument is optional, there is usually a meaningful default or an implied argument can be taken from the active register. Unless otherwise specified, no argument is equivalent to a zero argument.

Each numeric digit of an argument is internally represented as a one-byte code. Thus, each digit (or other argument code) occupies one memory location.

Note: Registers can only hold the values 0 through 65535.

2.5.2 Commands

The Level II command set represents the functions available for development of a Level II program. Many of the commands are direct counterparts of buttons on the RCU (e.g., SEARCH, AUDIO1, DISPLAY, etc.) and they cause corresponding operations to be performed by the player. Other commands are used for controlling program interpretation, directing the path of execution, managing registers, etc. A command is stored as a one-byte code in the active memory.

Any argument must be placed before the command. An argument, if any, and the following command make an instruction. See ***Chapter 4, Level II Commands for the LD-V8000***, for a description of each Level II command. Refer also to ***Appendix B, Alphabetical Listing of Level II Commands Available on the LD-V8000.***

Many commands can be executed directly by the player or entered into RAM from the RCU with a single button press. All codes and any data byte can be entered into RAM as a hexadecimal code, with three button presses on the RCU. See the procedure described in ***Section 3.1.3, Entering Level II Code with the RCU.***

When the programmer enters arguments, commands, and data from the RCU, the video display shows the byte codes on-screen as command or digit mnemonics whenever possible. Unrecognized codes are displayed as two-character hex values.

2.5.3 Program Structure

A Level II program segment, when stored in memory, is a continuous string of one-byte codes. The string is processed by the player's Level II program interpreter beginning at the location specified or implied by the RUN command. As each byte is examined, argument codes are accumulated until an executable command code is found. Some commands have explicit arguments, others have implied arguments, default arguments, or no arguments.

As an example, the two instructions 1000 SC 2000 AS are internally represented as codes 0F, 3F, 3F, 3F, F7, 8F, 3F, 3F, 3F, F3. Starting with the first byte, 0F, the argument is accumulated while the codes are scanned for a command code. In this example, the Search command code, F7, is detected. The SC command, using the currently accumulated argument (0F, 3F, 3F, 3F), instructs the player to position the laser read head at frame 1000.

When the player is executing Level II program code (in *Automatic Mode*), succeeding commands from memory are not processed until the function specified by the "current" command has been completed. The Play command and the INN command are the exceptions. A Play command instructs the videodisc player to begin playing audio-video material and continue until instructed to do something else by another command.

2.5.4 Execution Speed

Note: The LD-V8000 player performs command processing only once in every field time (16.7 ms). Also, it processes a maximum of eight bytes (codes) in that field time. As a result, a seven-digit argument and a single command (eight-bytes of program code) is the maximum that can be processed in one field time. Two fields (33.4 ms) are required to process an eight-digit argument and a command. As mentioned earlier, ARG, DRP, RND, DIN, and BIN are considered argument codes codes (codes that indicate/generate arguments). Thus, except for commands that take some extended time to finish execution (for example, Search, Autostop, Wait, etc.), each "normal length" Level II instruction is executed in one field time (1/60 second).