iSDM™ MONITOR COMMANDS A

A.1 INTRODUCTION

This appendix briefly describes the iSDM System Debug Monitor commands in alphabetical order. A command directory listing the functional groups and page references precedes the command descriptions. For examples and more detailed information about the commands, see the *iSDM™ System Debug Monitor User's Guide*.

A.2 COMMAND DIRECTORY

This section provides a brief summary of all iSDM monitor commands listed by functions. Each entry in the following summary contains along with the command name a brief description of the command and a page reference where you can find more information on the command.

* *Command requires an attached development system.*

A.3 COMMAND DESCRIPTIONS

This section provides brief descriptions for iSDM monitor commands in an easily
referenced alphabetical order. For more information on command parameters, syntax, and
options, refer to the *iSDM™ System Debug Monitor User's Guide*.

A.3.1 B--Bootstrap Load

The B command passes control to the bootstrap loader to load absolute object code from
secondary storage into your target system memory. The Bootstrap Loader loads the file
into the target system at the memory address specified in the file. After the bootstrap
loader finishes loading the file, the code begins executing. To use the B command
correctly, you must be operating in real mode.

If either the file you specified or the default file does not exist, the bootstrap loader halts
and takes action according to how it is configured.

A.3.2 C--Compare

The C command compares the contents of one block of memory defined by a range with the contents of another block of memory that begins at a destination address. The iSDM monitor expects the blocks to be equal in length. If the iSDM monitor encounters any mismatched bytes, it displays them in the following format:

```
aaaa:bbbb   xx   yy   aaaa:bbbb
```

where "aaaa:bbbb" are the addresses of the bytes that do not match and "xx" and "yy" are the bytes themselves.

A.3.3 D--Display Memory/Descriptor Tables/Disassembled Instructions

The D command is actually three commands in one. You can use it to display the contents of a specified block of memory, the contents of an 80286/386 descriptor table, or the contents of a specified block of memory in disassembled form. If you are operating in real mode, you cannot display descriptor table entries. However, if you are operating in protected mode, you can use both functions of this command.

A.3.4 E--Exit

The E command enables you to exit the loader program by returning control from the loader program to the development operating system. Upon return, the iSDM monitor loses all symbol information.

When using the E command, you must use it on a line by itself; do not use multiple commands on a line with the E command. Also, your system must include an attached development system before you can use this command.

When you reinvoke the iSDM monitor after exiting the loader program, one of two things happens:

- The iSDM monitor prints either a single or double prompt depending upon whether you were operating in real or protected mode when you exited.

- The iSDM monitor prints its usual sign-on message and re-initializes itself if you reset your target system between the time you exited the loader and the time you reinvoked the iSDM monitor.

A.3.5 F--Find

The F command searches the block of memory you specified to determine if it contains the sequence of hexadecimal digits you chose in the data parameter. Each time the iSDM monitor finds a match, it displays the address of the first matching byte.

A.3.6 G--Go

The G command instructs the iSDM monitor to begin executing your application program. In response to the G command, the iSDM monitor single steps the first instruction, then executes all succeeding instructions at full speed.

Your application program must have at least 12 bytes of stack available for the iSDM monitor to use. If you are operating in protected mode, each task in your program must contain at least 12 bytes of stack at privilege level 0 for the iSDM monitor to use.

With 80286 and 386 boards, a special situation arises when you execute the G command and you specify a breakpoint address but not a starting address. If the breakpoint is in an interrupt handler and the current CS:IP is at a software interrupt instruction (INT x, INTO, BOUND), the iSDM monitor single steps the interrupt instruction, executing the interrupt handler at full speed and bypassing the breakpoint you set. To get around this 80286/386 operational anomaly, make sure that the CS:IP is pointing to the (or any) instruction preceding the software interrupt instruction before you execute the G command.

A.3.7 I--Port Input

The I command retrieves and displays a byte or word from the port you specify. Byte and word formats are different. (See the *iSDM™ System Debug Monitor User's Guide* for byte and word format descriptions).

A.3.8 K--Echo File

The K command copies all console output to a development system file you specify. Repeating the K command without specifying a file causes the iSDM monitor to stop copying console output. Your system must include an attached development system in order to use this command.

A.3.9 L--Load Absolute Object File

The L command loads absolute 8086 or 80286 object files into target system memory. The iSDM monitor loads the data from the file into the memory location that you specified when you used the LOC86 or BLD286 commands. When loading the data, the iSDM monitor discards all previously loaded symbol information and loads the new symbol information, but it retains all user-defined symbols. If the file contains a register initialization record, the iSDM monitor sets the appropriate registers to the values the file specifies. Your system must include an attached development system in order to use this command.

The L command cannot load relocatable modules. If you are operating in real mode, you can load only 8086 absolute object files. If you are operating in protected mode, you can load only 80286 absolute object files.

When you load an 80286 object file, the iSDM monitor initializes the first 40 global descriptor table (GDT) entries for its own use. In addition, the iSDM monitor initializes any uninitialized interrupt descriptor table (IDT) entries. If the access byte is equal to zero, the iSDM monitor assumes that the descriptor table entry is not initialized. Refer to Intel's *Microprocessor and Peripheral Handbook*, *Microsystem Components Handbook*, or *80286 Operating System Writer's Guide* for more information about the descriptor tables.

A.3.10 M--Move

The M command copies the contents of a block of memory to a memory address you specify.

A.3.11 N--Execute Single Instructions

The N command displays and executes one or more disassembled instructions at a time. Going through your application line-by-line is called "single-stepping." Single-stepping allows you to begin at a CS:IP you specify and check your application for problems in an instruction-by-instruction manner.

Your application program must have at least 12 bytes of stack available for the iSDM monitor to use. If you are operating in protected mode, each task in your program must contain at least 12 bytes of stack at privilege level 0 for the iSDM monitor to use.

When you are single-stepping instructions, you should be aware of some special considerations. See the *iSDM™ System Debug Monitor User's Guide* for more information about these special considerations when using the N command.

A.3.12 O--Port Output

The O command allows you to enter data (a byte or word) at the console and send it to a port you select.

A.3.13 P--Print

The P command allows you to display either the value of an expression or the value of the base (or selector) and offset portions of an address. The values are displayed on your console terminal screen. The iSDM monitor always displays an address in hexadecimal form. If you enter "P" plus an expression, the iSDM monitor prints the value in hexadecimal. If you enter "PT" or "PS" plus an expression, the iSDM monitor prints the value in decimal or signed decimal form, respectively.

In this command, the comma acting as a separator also causes the iSDM monitor to add a space between the addresses or expressions it displays.

A.3.14 Q--Enable Protection (80286 or 386™ Only)

The Q command changes the 80286- or 386-based system from real mode to protected mode. The iSDM monitor displays the following message when you use the Q command:

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Now in Protected Mode
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When you invoke this command, the iSDM monitor initializes the entries it needs in the GDT and the IDT. The iSDM monitor then places itself at privilege level zero. If you are already operating in protected mode when you invoke this command, the iSDM monitor re-initializes the GDT and IDT entries. The only way you can return to real mode is to reset the 80286 or 386 hardware.

A.3.15 R--Load and Go

The R command is a combination of the Load command (L) and the Go command (G). This command loads an absolute object file from a development system into target system memory then executes this program. This command causes the iSDM monitor to discard all previously loaded symbol information and load new symbol information; however, the iSDM monitor retains all user-defined symbols. Your system must include an attached development system in order to use this command.

The iSDM monitor loads the data from the file into the memory location that you specified when you used the LOC86 or BLD286 commands. If the file contains a register initialization record, the iSDM monitor sets the appropriate registers to the values the file specifies.

The R command cannot load relocatable modules. If you are operating in real-addressing mode, you can load only 8086 absolute object files. If you are operating in protected mode, you can load only 80286 bootloadable (absolute) files.

When you load an 80286 object file, the iSDM monitor initializes the first 40 global descriptor table (GDT) entries for its own use. In addition, the iSDM monitor initializes any uninitialized interrupt descriptor table (IDT) entries. Refer to Intel's *Microprocessor and Peripheral Handbook, Microsystem Components Handbook*, or *80286 Operating System Writer's Guide* for more information about the 80286 component's descriptor tables.

After the iSDM monitor loads the file and sets the appropriate registers to the values the file specifies, it begins to execute the program at the location specified by the CS and IP registers.

Your application program must have at least 12 bytes of stack available for the iSDM monitor to use. If you are operating in protected mode, each task in your program must contain at least 12 bytes of stack at privilege level 0 for the iSDM monitor to use.

A.3.16 S--Substitute Memory/Descriptor Table Entry

The S command is actually two commands in one. You can use it to display and (optionally) modify either the contents of memory or the contents of descriptor table entries. If you are operating in real mode, you cannot display and modify descriptor table entries. However, if you are operating in protected mode, you can use both functions of this command.

If you enter the S command without an equal sign (=), the iSDM monitor displays a special hyphen (-) prompt. Then, it waits for you to enter either

- A continuation comma instructing the iSDM monitor to display the next memory location.

- A single expression or a list of expressions separated by slashes (/). By entering an expression (or expressions), you instruct the iSDM monitor to substitute these values in place of those already in the memory location you specified.

The iSDM monitor continues to issue hyphen prompts until you enter a carriage return.

A.3.17 X--Examine/Modify Registers

The X command allows you to examine and (optionally) modify the contents of your system's NPX and microprocessor registers.

If you use the X command with no parameters, the iSDM monitor displays all the 8086, 286, and 386 registers (except for control and debug registers).

If you use both the register name and an expression, (for example, CS = XXXX), the value you entered (XXXX) is placed in the specified register.

You can use the X command to set the 8086 family and NPX registers and the task state segment contents to any value. If you used any invalid values, the iSDM monitor reports them when you execute the application program.

A.3.18 Y--Symbols (80286 or 386™ Only)

The Y command allows you to display and define symbol information generated by 80286 translators. If you use the Y command with no parameters, the iSDM monitor displays all the symbols stored in the current domain module or in all modules if you set no domain. You can also choose to have the iSDM monitor display the symbols and their values in a particular module or you can use this command to define your own symbols. To use this command, you must be operating in protected mode, with an attached development system.