MOTLoad Firmware Package

User's Manual

MOTLODA/UM2

July 2003 Edition

Safety Summary

The following general safety precautions must be observed during all phases of operation, service, and repair of this equipment. Failure to comply with these precautions or with specific warnings elsewhere in this manual could result in personal injury or damage to the equipment.

The safety precautions listed below represent warnings of certain dangers of which Motorola is aware. You, as the user of the product, should follow these warnings and all other safety precautions necessary for the safe operation of the equipment in your operating environment.

Ground the Instrument.

To minimize shock hazard, the equipment chassis and enclosure must be connected to an electrical ground. If the equipment is supplied with a three-conductor AC power cable, the power cable must be plugged into an approved three-contact electrical outlet, with the grounding wire (green/yellow) reliably connected to an electrical ground (safety ground) at the power outlet. The power jack and mating plug of the power cable meet International Electrotechnical Commission (IEC) safety standards and local electrical regulatory codes.

Do Not Operate in an Explosive Atmosphere.

Do not operate the equipment in any explosive atmosphere such as in the presence of flammable gases or fumes. Operation of any electrical equipment in such an environment could result in an explosion and cause injury or damage.

Keep Away From Live Circuits Inside the Equipment.

Operating personnel must not remove equipment covers. Only Factory Authorized Service Personnel or other qualified service personnel may remove equipment covers for internal subassembly or component replacement or any internal adjustment. Service personnel should not replace components with power cable connected. Under certain conditions, dangerous voltages may exist even with the power cable removed. To avoid injuries, such personnel should always disconnect power and discharge circuits before touching components.

Use Caution When Exposing or Handling a CRT.

Breakage of a Cathode-Ray Tube (CRT) causes a high-velocity scattering of glass fragments (implosion). To prevent CRT implosion, do not handle the CRT and avoid rough handling or jarring of the equipment. Handling of a CRT should be done only by qualified service personnel using approved safety mask and gloves.

Do Not Substitute Parts or Modify Equipment.

Do not install substitute parts or perform any unauthorized modification of the equipment. Contact your local Motorola representative for service and repair to ensure that all safety features are maintained.

Observe Warnings in Manual.

Warnings, such as the example below, precede potentially dangerous procedures throughout this manual. Instructions contained in the warnings must be followed. You should also employ all other safety precautions which you deem necessary for the operation of the equipment in your operating environment.

Warning

To prevent serious injury or death from dangerous voltages, use extreme caution when handling, testing, and adjusting this equipment and its components.

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About This Manual

The *MOTLoad Firmware Package User's Manual* provides information on the MOTLoad firmware. It is intended to be used in conjunction with a specific Motorola board level product, on which this firmware resides, such as the HXEB100 or the MVME5500.

This manual provides general information on how to use the firmware, as well as a detailed description of each command. It also provides information on special features provided by MOTLoad (see Appendicies).

Summary of Changes

The following changes were made to this document since the last release.

Date	Change
July 2003	The MOTLoad prompt throughout this document was changed to a generic MOTLoad> from a specific product prompt, which will vary depending upon which product was purchased. Some command descriptions were modified and added to Chapter 3, as well as corrections to font and text throughout to reflect more accurately screen displays.

Overview of Contents

This manual is divided into the following chapters and appendices:

Chapter 1, *Introduction*, includes an overview of the MOTLoad firmware, a brief description of the firmware's implementation and memory requirements, command types, utility applications and tests.

Chapter 2, *Using MOTLoad*, provides instructions on how to interact with the firmware including a description of the command line interface, encompassing command line help and command line rules; command

history buffer, encompassing pseudo-VI Mode; command line execution modes and MOTLoad manual page formats.

Chapter 3, *MOTLoad Commands*, provides a list of all current MOTLoad commands followed by a detailed description of each command.

Appendix A, *MOTLoad Non-Volatile Data*, provides a description of the various types of non-volatile data: VPD, GEV and SPD. Also provides explanations and examples of existing VPD and GEV commands. SPD is not covered at this time.

Appendix B, *Remote Start*, describes the remote interface provided by MOTLoad to the host CPU via the backplane bus, which allows the host to obtain information about the target board, download code and/or data, modify memory, and execute a downloaded program.

Appendix C, *Related Documentation*, lists various documents releated to specific devices and industry specifications that are used in conjunction with the MOTLoad product.

Comments and Suggestions

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In all your correspondence, please list your name, position, and company. Be sure to include the title and part number of the manual and tell how you used it. Then tell us your feelings about its strengths and weaknesses and any recommendations for improvements.

Conventions Used in This Manual

The following typographical conventions are used in this document:

bold

is used for user input that you type just as it appears; it is also used for commands, options and arguments to commands, and names of programs, directories and files.

italic

is used for names of variables to which you assign values, for function parameters, and for structure names and fields. Italic is also used for comments in screen displays and examples, and to introduce new terms.

`courier`

is used for system output (for example, screen displays, reports), examples, and system prompts.

<Enter>, **<Return>** or **<CR>**

represents the carriage return or Enter key.

Ctrl

represents the Control key. Execute control characters by pressing the Ctrl key and the letter simultaneously, for example, Ctrl-d.

Introduction 1

Overview

MOTLoad is a PowerPC firmware package developed for Motorola's single board computers. The first boards using MOTLoad employ a Marvell GT64260A bridge. Subsequent products will use MOTLoad in conjunction with the most recent industry designed bridge devices. MOTLoad is continuously being developed and extended to support newly developed Motorola products. As new features are added and changes are made, this document will be updated.

The main purpose of the MOTLoad firmware package is to serve as a board power-up and initialization package, and to serve as a vehicle from which user applications can be booted. Although MOTLoad was not specifically designed as a diagnostics application, the test suites and the individual tests (with their various options) provide the user with a significant amount of information that can be used for debug and diagnostic purposes. To use the MOTLoad firmware package successfully, the reader should have some familiarity with MCG products and firmware methodology.

MOTLoad is controlled through an easy to use, UNIX-like, command line interface. Its format was designed with the application oriented needs of the end user. Consequently, the MOTLoad software package is similar to that of many end user applications designed for the embedded market, such as an embedded real time operating systems currently available. Functionally, this design allows MOTLoad to detect typical system level product devices.

MOTLoad Implementation and Memory Requirements

The implementation of MOTLoad and its memory requirements are product specific. Each of the Motorola Computer Group's Single Board Computers (SBC) are offered with a wide range of memory (e.g. DRAM, external cache, FLASH). Typically, the smallest amount of on board DRAM that an MCG SBC has is 32 megabytes. Each supported MCG

product line has its own unique MOTLoad binary image(s). Currently the largest MOTLoad compressed image is less than 1 megabyte. During board initialization, the MOTLoad image is decompressed into DRAM, where it executes. Currently, the largest MOTLoad decompressed image is 2.5MB.

MOTLoad Commands

MOTLoad supports two types of commands (applications): utilities and tests. Both types of commands are invoked from the MOTLoad command line in a similar fashion. Beyond that, MOTLoad utilities and MOTLoad tests are distinctly different.

MOTLoad Utility Applications

The definition of a MOTLoad utility application is very broad. Simply stated, it is a MOTLoad command that is not a MOTLoad test. Typically, MOTLoad utility applications are applications that aid the user in some way. From the perspective of MOTLoad, examples of utility applications are: configuration, data/status displays, data manipulation, help routines, data/status monitors, etc.

Operationally, MOTLoad utility applications differ from MOTLoad test applications in several ways:

- ❏ Only one utility application may be operating at any given time (i.e. - multiple utility applications can not be executing concurrently).
- ❏ Utility applications may interact with the user. Most test applications do not.

MOTLoad Tests

A MOTLoad test application determines whether or not the hardware meets a given standard. Test applications are validation tests. Validation is conformance to a specification. Most MOTLoad tests are designed to directly validate the functionality of a specific SBC subsystem or

component. These tests validate the operation of such SBC modules as: dynamic memory, external cache, NVRAM, real time clock, etc.

All MOTLoad tests are designed to validate functionality with minimum user interaction. Once launched, most MOTLoad tests operate automatically without any user interaction. There are a few tests where the functionality being validated requires user interaction (i.e. - switch tests, interactive plug-in hardware modules, etc.). Most MOTLoad test results (error-data/status-data) are logged, not printed. All MOTLoad tests are described in detail in Chapter 3 of this manual.

All devices that are available to MOTLoad for validation/verification testing are represented by a unique device path string. Most MOTLoad tests require the operator to specify a test device at the MOTLoad command line when invoking the test.

A listing of all device path strings can be displayed through the devShow command. If a SBC device does not have a device path string it is not supported by MOTLoad and can not be directly tested. There are a few exceptions to the device path string requirement, like testing RAM, which is not considered a true device and can be directly tested without a device path string. Refer to the devShow command page in this manual for more information..

Most MOTLoad tests can be organized to execute as a group of related tests (a testSuite) through the use of the testSuite command. The expert operator can customize their testing by defining and creating a custom testSuite(s). The list of built-in and user defined MOTLoad testSuites, and their test contents, can be obtained by entering: “testSuite -d” at the MOTLoad prompt. All testSuites that are included as part of a product specific MOTLoad firmware package are product specific. For more information refer to the testSuite command page in this manual.

Test results and test status are obtained through the testStatus, errorDisplay, and taskActive commands. Refer to the appropriate command page(s) in this manual for more information.

Using MOTLoad 2

Overview

This chapter describes various command line characteristics, as well as the MOTLoad Manual Page Format.

Interaction with MOTLoad is performed via a command line interface through a serial port on the SBC, which is connected to an X-terminal or other terminal emulator (ex. Window's Hypercomm, etc.). The default MOTLoad serial port settings are: 9600 baud, 8 bits, no parity.

Command Line Interface

The MOTLoad command line interface is similar to a UNIX command line shell interface. Commands are initiated by entering a valid MOTLoad command (a text string) at the MOTLoad command line prompt and pressing the carriage-return key to signify the end of input. MOTLoad then performs the specified action. The MOTLoad command line prompt is shown below (note: the generic command prompt designation of MOTLoad is for documentation purposes only. The exact command prompt designation is determined by the product being purchased, e.g., MOTLoad, MVME5500).

Example: `MOTLoad>`

If an invalid MOTLoad command is entered at the MOTLoad command line prompt, MOTLoad will display a message that the command was not found.

Example:

```
MOTLoad> mytest
"mytest" not found
MOTLoad>
```

If the user enters a partial MOTLoad command string that can be resolved to a unique valid MOTLoad command and presses the carriage-return key,

the command will be executed as if the entire command string had been entered. This feature is a user input shortcut that minimizes the required amount of command line input. MOTLoad is an ever changing firmware package, so user input shortcuts may change as command additions are made.

Example:

```
MOTLoad> version
Copyright: Motorola Inc. 1999-2003, All Rights Reserved
MOTLoad RTOS Version 2.0
PAL Version 1.1 RM01
Mon Mar 10 12:01:28 MST 2003
```

Example:

```
MOTLoad> ver
Copyright: Motorola Inc. 1999-2003, All Rights Reserved
MOTLoad RTOS Version 2.0
PAL Version 1.1 RM01
Mon Mar 10 12:01:28 MST 2003
```

If the partial command string cannot be resolved to a single unique command, MOTLoad will inform the user that the command was ambiguous.

Example:

```
MOTLoad> te
"te" ambiguous
MOTLoad>
```

Command Line Help

Each MOTLoad firmware package has an extensive, product specific, help facility that can be accessed through the help command. The user can enter help at the MOTLoad command line to display a complete listing of all available tests and utilities.

Example:

```
MOTLoad>help
```

For help with a specific test or utility the user can enter: help <command_name> at the MOTLoad prompt. The help command also supports a limited form of pattern matching. Refer to the help command page.

Example:

```
MOTLoad>help testRam
Usage: testRam [-aPh] [-bPh] [-iPd] [-nPh] [-tPd] [-v]
Description: RAM Test Directory
Argument/Option Description
-a Ph: Address to Start (Default = Dynamic Allocation)
-b Ph: Block Size (Default = 16MB)
-i Pd: Iterations (Default = 1)
-n Ph: Number of Bytes (Default = 1MB)
-t Ph: Time Delay Between Blocks in OS Ticks (Default = 1)
-v 0 : Verbose Output
MOTLoad>
```

Command Line Rules

There are a few things to remember when entering a MOTLoad command:

- ❏ Multiple commands are permitted on a single command line, provided they are separated by a single semicolon(";").
- ❏ Spaces separate the various fields on the command line (command/arguments/options).
- ❏ The argument/option identifier character is always preceded by a hyphen (“-”) character
- ❏ Options are identified by a single character
- ❏ Option arguments immediately follow (no spaces) the option
- ❏ All commands, command options, device tree strings, etc, are case sensitive

Example:

```
MOTLoad> flashProgram -d/dev/flash0 -n00100000
```

Command History Buffer

MOTLoad saves command line inputs into a command history buffer. Up to 128 previously entered commands can be recalled, edited, and reentered at the command line. Once the desired command appears on the command line it can be re-executed by pressing the carriage-return key.

pseudo-Vi Mode

MOTLoad supports a pseudo-VI editor command recall through the ESC and the j and k keys. Typing ESC and then k moves backwards through the history command buffer and displays the preceding commands. Typing ESC and then j moves forward through the history command buffer and displays the more recent commands. After the ESC key is pressed the j and/or k key may be pressed as often as needed to bring up the desired command from the command history buffer.

Command Line Execution Modes

MOTLoad utilities such as help always executes in the foreground. MOTLoad tests can be executed in the foreground (sequentially) or in the background (concurrently) as background tasks.

Note Not all tests can execute in background mode. As an example, cache tests must run in the foreground.

When a sequential test starts executing in the foreground, no new MOTLoad tests can execute until the current test running in the foreground is complete. This does not apply to background tests.

Example:

```
MOTLoad>testRam
```

In concurrent test mode, each test gets a time sliced share of the CPU execution time. The amount of user control over the background task time slicing operations is determined by the underlying OS. The operator specifies concurrent test execution by ending the test command line with the ampersand “&” character (prior to the carriage-return). The MOTLoad command prompt reappears after a concurrent test is started.

Example:

```
MOTLoad>testRam &
```

After the MOTLoad prompt reappears another test or utility may be started (in the foreground or background execution mode) as long as it does not interfere (use the same computer resources) with the operations of other test(s) running in background mode. The test execution status of a test(s) running in background mode can be monitored through the use of the taskActive and testStatus commands. Refer to the appropriate man pages for more details.

Copying/Transferring MOTLoad Images

To copy, i.e., Flash, a MOTLoad image from soldered Flash to socketed Flash, or visa versa, perform one of the following steps depending upon the transfer direction.

To copy MOTLoad from socketed Flash to soldered Flash:

MOTLoad (Flash 1 -> 0)
flashProgram -d/dev/flash0 -o01f00000 -sfff00000 -v

To copy MOTLoad from soldered Flash to socketed Flash:

MOTLoad (Flash 0 -> 1)
flashProgram -d/dev/flash1 o00700000 -sf3f00000 -v

To move one part of a vxWorks image from one part of Flash to another, perform the following:

flashProgram -d/dev/flash0 -o00000000 -sf3f00000 -v

MOTLoad Command Description Page Format

All MOTLoad command pages follow the format described below.

Name: This field names the test or utility as it would appear on the MOTLoad command line. It also provides a descriptiion of the command.

Example:

errorDisplay-displays the Contents of the MOTLoad Test Error Status Table

Synopsis: This field shows command line usage or syntax of a command, test, or utility. This consists of the name of the command, test or utility, and a list of all possible arguments/options.

Example:

```
errorDisplay [-eP*] [-nP*] [-sP*]
```

If an argument is optional, it is enclosed in a set of braces [ ], otherwise it is required.

If an asterisk (*) or other symbol follows an option, another argument is required with that option.

The asterisk (*) symbol means that a number of valid numeric base conversion option arguments are possible. Refer to the table titled *Number Base Specifiers* for more information.

An attempt has been made to standardize the meaning of option arguments but the exact meaning of an option and its arguments is test specific. Exact option information can be displayed through the use of the help command or by referring the appropriate man page.

SEE ALSO: This field lists tests/utilities that are functionally related to the described command.

Example: **clear, testStatus**

Parameters: This field shows how the command, test, or utility is typically used. The command line invocation of the command, test, or utility and the subsequent displayed results are shown. In some cases extensive examples are provided.

Example:

```
MOTLoad> errorDisplay
tName =testDisk -d/dev/ide0/hdisk2 -n5000
sPID=00000011 ePID=00000014 eS.eM = 2.1 entryNo = 00000001
sErrNo=00000000 eErrNo=0C0000002C errCnt=00000001 loopCnt-00000000
sTime=43:48:15 fTime=43:48:15 eTime=00:00:00 1Time=15:51:54
Error Messages:
```

```
Data Comparison Failure in Block Range 0-255
Write/Read Data : 05F0436F/00000000
Write/Read Address : 008E1000/00*C0000
Device-Name =/dev/ide0/hdisk2
```

User Download Buffer: In order to accommodate for the storage of data generated by one or more MOTLoad commands that are not given a specific memory path or location, MOTLoad employs a temporary memory buffer, known as the user download buffer.

MOTLoad Commands 3

Overview

This chapter lists the current valid MOTLoad commands. The remainder of the chapter describes each command in detail.

MOTLoad Command List

The following table provides a list of all current MOTLoad commands. Products supported by MOTLoad may or may not employ the full command set. Typing `help` at the MOTLoad command prompt will display all commands supported by MOTLoad for a given product.

Note The command prompt designation for this manual is "MOTLoad"; however, the command prompt for your specific version of MOTLoad will be the product designator for your particular board, e.g., HXEB100, MVME5500.

Table 3-1. MOTLoad Commands

Command	Description
as	One-Line Instruction Assembler
bcb bch bcw	Block Compare Byte/Halfword/Word
bdTempShow	Display Current Board Temperature
bfb bfh bfw	Block Fill Byte/Halfword/Word
blkCp	Block Copy
blkFmt	Block Format
blkRd	Block Read
blkShow	Block Show Device Configuration Data
blkVe	Block Verify
blkWr	Block Write

Table 3-1. MOTLoad Commands (continued)

Command	Description
bmb bmh bmw	Block Move Byte/Halfword/Word
br	Assign/Delete/Display User-Program Break-Points
bsb bsh bsw	Block Search Byte/Halfword/Word
bvb bvh bvw	Block Verify Byte/Halfword/Word
cdDir	ISO9660 File System Directory Listing
cdGet	ISO9660 File System File Load
clear	Clear the Specified Status/History Table(s)
cm	Turns on Concurrent Mode (connect to Host)
devShow	Display (Show) Device/Node Table
diskBoot	Disk Boot (Direct-Access Mass-Storage Device)
downLoad	Down Load S-Record from Host
ds	One-Line Instruction Disassembler
echo	Echo a Line of Text
elfLoader	ELF Object File Loader
errorDisplay	Display the Contents of the Test Error Status Table
eval	Evaluate Expression
execProgram	Execute Program
fatDir	FAT File System Directory Listing
fatGet	FAT File System File Load
fdShow	Display (Show) File Discriptor
flashProgram	FLASH Memory Program
flashShow	Display FLASH Memory Device Configuration Data
gd	Go Execute User-Program Direct (Ignore Break-Points)
gevDelete	Global Environment Variable Delete
gevDump	Global Environment Variable(s) Dump (NVRAM Header + Data)

Table 3-1. MOTLoad Commands (continued)

Command	Description
gevEdit	Global Environment Variable Edit
gevInit	Global Environment Variable Area Initialize (NVRAM Header)
gevShow	Global Environment Variable Show
gn	Go Execute User-Program to Next Instruction
go	Go Execute User-Program
gt	Go Execute User-Program to Temporary Break-Point
hbd	Display History Buffer
hbx	Execute History Buffer Entry
help	Display Command/Test Help Strings
l2CacheShow	Display state of L2 Cache and L2CR register contents
l3CacheShow	Display state of L3 Cache and L3CR register contents
mdb mdh mdw	Memory Display Bytes/Halfwords/Words
memShow	Display Memory Allocation
mmb mmh mmw	Memory Modify Bytes/Halfwords/Words
mpuFork	Execute program from idle processor
mpuShow	Display multi-processor control structure
mpuSwitch	Resets board switching master MPU
netBoot	Network Boot (BOOT/TFTP)
netShow	Display Network Interface Configuration Data
netShut	Disable (Shutdown) Network Interface
netStats	Display Network Interface Statistics Data
noCm	Turns off Concurrent Mode
pciDataRd	Read PCI Device Configuration Header Register
pciDataWr	Write PCI Device Configuration Header Register
pciDump	Dump PCI Device Configuration Header Register

Table 3-1. MOTLoad Commands (continued)

Command	Description
pciShow	Display PCI Device Configuration Header Register
pciSpace	Display PCI Device Address Space Allocation
ping	Ping Network Host
portSet	Port Set
portShow	Display Port Device Configuration Data
rd	User Program Register Display
reset	Reset System
rs	User Program Register Set
set	Set Date and Time
sromRead	SROM Read
sromWrite	SROM Write
sta	Symbol Table Attach
stl	Symbol Table Lookup
stop	Stop Date and Time (Power-Save Mode)
taskActive	Display the Contents of the Active Task Table
tc	Trace (Single-Step) User Program
td	Trace (Single-Step) User Program to Address
testDisk	Test Disk
testEnetPtP	Ethernet Point-to-Point
testFlash	Flash Memory Erase/Write/Verify
testI2cRomRd	I2C ROM Read
testNvramRd	NVRAM Read
testNvramRdWr	NVRAM Read/Write (Destructive)
testRam	RAM Test (Directory)
testRamAddr	RAM Addressing

Table 3-1. MOTLoad Commands (continued)

Command	Description
testRamAlt	RAM Alternating
testRamBitToggle	RAM Bit Toggle
testRamBounce	RAM Bounce
testRamCodeCopy	RAM Code Copy and Execute
testRamEccMonitor	Monitor for ECC Errors
testRamMarch	RAM March
testRamPatterns	RAM Patterns
testRamPerm	RAM Permutations
testRamQuick	RAM Quick
testRamRandom	RAM Random Data Patterns
testRtcAlarm	RTC Alarm
testRtcReset	RTC Reset
testRtcRollOver	RTC Rollover
testRtcTick	RTC Tick
testSerialExtLoop	Serial External Loopback
testSeriallntLoop	Serial Internal Loopback
testStatus	Display the Contents of the Test Status Table
testSuite	Execute Test Suite
testSuiteMake	Make (Create) Test Suite
testUsb	Usb [Directory] (factory use only)
testUsbDevice	Usb Device (factory use only)
testUsbOscillator	Usb Oscillator
testUsbVok	Usb Vok
testWatchdogTimer	Tests the accuracy of the watchdog timer device.
tftpGet	TFTP Get

Table 3-1. MOTLoad Commands (continued)

Command	Description
tftpPut	TFTP Put
time	Display Date and Time
transparentMode	Transparent Mode (Connect to Host)
tsShow	Display Task Status
upLoad	Up Load Binary-Data from Target
version	Display Version String(s)
vmeCfg	Manages user specified VME configuration parameters
vpdDisplay	VPD Display
vpdEdit	VPD Edit
waitProbe	Wait for I/O Probe to Complete

as - One-Line Instruction Assembler

Name

as—provides access to the one-line assembler. By default, the memory location to place the user entered PowerPC assembly instructions is the User Down Load Buffer.

Synopsis

as [-a]

Parameter

```
-a Ph: Assembly Address (Default = User Down Load Buffer)
```

Example

The following example depicts a typical result of entering the **as** command.

```
MOTLoad> as -a00560000
00560000 00000000 word        0x00000000? lwz r3, 0x0(x3)
-- the above line will be replaced with the following --
00560000 80630000 lwz         r3,0x0(r3)
```

See Also

br, ds, gd, gn, go, gt, rd, rs, tc, td

bcb bch bcw - Block Compare Byte/Halfword/Word

Name

bcb bch bcw—compares the contents of two memory blocks as specified by the commnd-line options.

Synopsis

```
bcb/bch/bcw -a -b -c
```

Parameters

```
-a Ph: Starting Address of Block 1
-b Ph: Ending Address of Block 1
-c Ph: Starting Address of Block 2
```

Example

The following example shows a typical result of entering the bcw, bch, and bcb commands.

MOTLoad> bcw -a100000 -b100004 -c560000
00100000|7C3043A6 00560000|80630000

MOTLoad> bch -a100000 -b100004 -c560000
00100000|7C30 005600000|8063
00100002|43A6 005600002|0000

MOTLoad> bcb -a100000 -b100004 -c560000
00100000|7C 00560000|80
00100001|30 00560001|63
00100002|43 00560002|00
00100003|A6 00560003|00

See Also

bfb, bfh, bfw, bmb, bmh, bmw, bsb, bsh, bsw, bvb, bvh, bvw

bdTempShow - Board Temperature Display

Name

bdTempDisplay—displays the current board temperature(s). The information displayed may vary dependent upon the hardware.

Synopsis

```
bdTempShow
```

Parameters

```
none
```

Example

The following example shows a typical result of entering the **bdTempShow** command:

```
MOTLoad> bdTempShow
Cpu TAU Temp=030C Therm Sensor = 27.0C
MOTLoad>
```

See Also

bfb bfh bfw - Block Fill Byte/Halfword/Word

Name

bfb bfh bfw—fills the contents of a memory block with a pattern, as specified by the command-line options.

Synopsis

```
bfb/bfh/bfw -a -b -d [-i]
```

Parameters

```
-a Ph: Starting Address of Block
-b Ph: Ending Address of Block
-d Ph: Fill Data Pattern
-i Ph: Fill Data Increment (Default = 00000000/0000/00)
```

Example

The following example shows a typical result of entering the bfw, bfh and bfb commands:

```
MOTLoad> bfw -a100000 -b100004 -d00000004 -il
MOTLoad> bfh -a1000000 -b100004 -d0008 -il
MOTLoad> bfb -a100000 -b100004 -dFF -il
```

See Also

bcb, bch, bcw, bmb, bmh, bmw, bsb, bsh, bsw, bvb, bvh, bvw

blkCp - Block Copy

Name

blkCp—copies the number of blocks, specified by the user, from the device to the destination device. This command will only operate on ’block devices.’

Synopsis

```
blkCp -a -b [-n] [-s]
```

Parameters

```
-a Ps: Device Name of Source
-b Ps: Device Name of Destination
-n Ph: Number of Blocks (Default = 1)
-s Ph: Starting Block Number (Default = 0)
```

Example

The following example shows a typical result of entering the blkCP command:

```
MOTLoad> blkCp -a/dev/ide0/hdisk0 -b/dev/ide0/hdisk0 -n200
```

See Also

blkFmt, blkRd, blkShow, blkVe, blkWr

blkFmt - Block Format

Name

blkFmt—formats a block device specified by the user. This command will only operate on ’block devices.’

Synopsis

```
blkFmt [-d] [-i]
```

Parameters

```
-d Ps: Device Name (Default = /dev/fd0)
-i 0 : Ignore Grown Defect List
```

Example

The following example shows a typical result when blkFmt is entered.

```
MOTLoad> blkFmt -d/dev/ide0/hdisk0
```

See Also

blkCp, blkRd, blkShow, blkVe, blkWr

blkRd - Block Read

Name

blkRd—reads the number of blocks, specified by the user, from the specified device to a memory address. This command will only operate on 'block devices.'

Synopsis

```
blkRd [-d] [-m] [-n] [-s] [-t]
```

Parameters

```
-d Ps: Device Name (Default = /dev/fd0)
-m Ph: Memory Address (Default = User Download Buffer)
-n Ph: Number of Blocks (Default = 1)
-s Ph: Starting Block Number (Default = 0)
-t 0 : Display Elapsed Time
```

Example

The following examples shows a typical response from entering the blkRd command.

```
MOTLoad> blkRd -d/dev/ide0/hdisk0 -n20 -t
blkRd( ):   number of bytes         =  00004000 (&16384)
blkRd( ):   number of micro-seconds =  00004170 (&16752)
blkRd( ):   bytes/second             =  (not measurable)
```

See Also

blkCp, blkFmt, blkShow, blkVe, blkWr

blkShow - Block Show

Name

blkShow—displays all MOTLoad configured block devices. This command's purpose is to display all MOTLoad configured block devices.

Synopsis

```
blkShow
```

Examples

The following examples show a typical output when a blkShow command is entered.

```
MOTLoad> blkShow

 Block-Device        N-Blocks     B-Size       Type
 /dev/nvram          00007FF0     00000001     NVRAM
 /dev/i2c/srom/90    00000002     00000001     SROM
 /dev/i2c/srom/A0    00000100     00000001     SROM
 /dev/i2c/srom/A2    00000100     00000001     SROM
 /dev/i2c/srom/A4    00000100     00000001     SROM
 /dev/i2c/srom/A6    00002000     00000001     SROM
 /dev/i2c/srom/A8    00002000     00000001     SROM
 /dev/i2c/srom/AA    00002000     00000001     SROM
 /dev/ide0/hdisk2    026016F0     00000200     Disk
```

See Also

blkCp, blkFmt, blkRd, blkVe, blkWr

blkVe - Block Verify

Name

blkVe—verifies the number of blocks, specified by the user, between the source device to the destination device. This command will only operate on ’block devices.’.

Synopsis

```
blkVe  -a -b [-n] [-s]
```

Parameters

```
-a Ps: Device Name of Source
-b Ps: Device Name of Destination
-n Ph: Number of Blocks (Default = 1)
-s Ph: Starting Block Number (Default = 0)
```

Example

The following example indicates a typical display when using the blkVe command.

```
MOTLoad> blkVe -a/dev/ide0/hdisk0 -b/dev/ide0/hdisk1 -n8

blkVe(): data miscompare:  offset = 00000000,  data = 80/05
blkVe(): data miscompare:  offset = 00000001,  data = 08/F0
blkVe(): data miscompare:  offset = 00000002,  data = 04/43
blkVe(): data miscompare:  offset = 00000003,  data = 0D/6F
blkVe(): data miscompare:  offset = 00000004,  data = 0A/03
blkVe(): data miscompare:  offset = 00000005,  data = 01/F5
blkVe(): data miscompare:  offset = 00000006,  data = 48/82
blkVe(): data miscompare:  offset = 00000007,  data = 00/4A
```

See Also

blkCp, blkFmt, blkRd, blkShow, blkWr

blkWr - Block Write

Name

blkWr—writes the number of blocks, specified by the user, from the memory address to the specified device. This command will only operate on ’block devices.’.

Synopsis

```
blkWr  [-d] [-m] [-n] [-s] [-t]
```

Parameters

```
-d Ps: Device Name (Default = /dev/fd0)
-m Ph: Memory Address (Default = User Download Buffer)
-n Ph: Number of Blocks (Default = 1)
-s Ph: Starting Block Number (Default = 0)
-t 0: Display Elapsed Time
```

Example

The following example indicates a typical display when using the blkVe command.

```
MOTLoad> blkWr -d/dev/ide0/hdisk0 -n20 -t
blkWr(): number of bytes         = 00004000 (&16384)
blkWr(): number of micro-seconds = 00000283 (&643)
blkWr(): bytes/second            = (not measurable)
```

See Also

blkCp, blkFmt, blkShow, blkVe, blkWr

bmb bmh bmw - Block Move Byte/Halfword/Word

Name

bmb/bmh/bmw—moves (copies) the contents of a memory block from one location to another, as specified by the command-line options.

Synopsis

```
bmb/bmh/bmw -aPh -bPh -cPh
```

Parameters

```
bmb
-a Ph: Starting Address of Source Block
-b Ph: Ending Address of Block
-c Ph: Starting Address of Destination Block
bmh
-a Ph: Starting Address of Source Block (half-word aligned)
-b Ph: Addr of Last Source Half-Word to be copied (half-word
aligned)
-c Ph: Starting Address of Destination Block
bmw
-a Ph: Starting Address of Source Block (word aligned)
-b Ph: Addr of Last Source Word to be copied (word aligned)
-c Ph: Starting Address of Destination Block
```

Example

The following example indicates a typical display when using the bmb, bmh, and bmw commands.

```
MOTLoad> bmw -a00560000 -b00560020 -c00560040
MOTLoad> bmh -a00560000 -b00560020 -c00560040
MOTLoad> bmb -a00560000 -b00560020 -c00560040
```

See Also

bcb, bch, bcw, bfb, bfh, bfw, bsb, bsw, bvb, bvh, bvw

br - Assign/Delete/Display User-Program Break-Points

Name

br—assigns, deletes, or displays user-program break points.

Synopsis

```
br [ -a]  [ -c] [-d]
```

Parameters

```
-a Ph: Address
-c Pd: Cound (Default = 0)
-d 0: Delete Specified/All Break-Points
```

Example

The following example indicates a typical display when using the bmb, bmh, and bmw commands.

```
MOTLoad> br -a00100000 <---Adds a break-point
Address  Count    Label
00100000 00000000 evtbl+0x000

MOTLoad> br           <---Displays all break-points
Address  Count    Label
00100000 00000000 evtbl+0x000
00100100 00000002 evtbl+0x100

MOTLoad> br -a00100100 -d <---Deletes break-point at
specified address
Address  Count    Label
00100000 00000000 evtbl+0x000

MOTLoad> br -d       <---Deletes all break-points
```

See Also

as, ds, gd, gn, go, gt, rd, rs, tc, td

bsb bsh bsw - Block Search Byte/Halfword/Word

Name

bsb, bsh, bsw—searches the contents of a memory block for a specific data pattern, as specified by the command-line options.

Synopsis

```
bsb/bsh/bsw -a  -b -d [-n] [-z]
```

Parameters

```
-a Ph: Starting Address of Block
-b Ph: Ending Address of Block
-d Ph: Search Data Pattern
-n 0: Non-Matching Data (Default = Matching)
-z Ph: Search Data Mask (Default = FFFFFFFF/FFFF/FF)
```

Example

The following example indicates a typical display when using the bsb, bsh, and bsw commands.

```
MOTLoad> bsw -a00560000 -b00560010 -d12345678
pattern not found


MOTLoad> bsw -a00560000 -b00560010 -d11111111
00560000|11111111
```

See Also

bcb, bch, bcw, bfb, bfh, bfw, bmb, bmh, bmw, bvb, bvh, bvw

bvb bvh bvw - Block Verify Byte/Halfword/Word

Name

bvb, bvh, bvw—verifies the contents of a memory block for a specific data pattern, as specified by the command-line options. Only non-matching data patterns are displayed.

Synopsis

```
bvb/bvh/bvw -a  -b -d [-i]
```

Parameters

```
-a Ph: Starting Address of Block
-b Ph: Ending Address of Block
-d Ph: Verify Data Pattern
-i Ph: Fill Data Increment (Default = 00000000/0000/00)
```

Example

The following example indicates a typical display when using the bsb, bsh, and bsw commands.

```
MOTLoad> mdw -a00560000 -c4
00560000 11111111 22222222 33333333 44444444

MOTLoad> bvw -a00560000 -b00560010 -d22222222
00560000|11111111  00560008|33333333 0056000C|44444444
```

See Also

bcb, bch, bcw, bfb, bfh, bfw, bmb, bmh, bmw, bsb, bsh, bsw

cdDir - ISO9660 File System Directory Listing

Name

cdDir—displays the contents of a CDROM that is formated with an ISO9660 file system (8.3 naming convention). Caveats: Symbolic links are not supported. ISO9660 extensions are not supported (e.g., RockRidge).

Synopsis

```
cdDir [-ddevicename] [-fpathname] [-v]
```

Parameters

```
-d Ps: Device Name (Default = /dev/ide0/cdrom1)
-f Ps: File Name. (specify preceding '*' for wildcard)
-v 0: Full Listing.
```

Example

The following example indicates a typical display when using the **cdDir** command.

```
MOTLoad> cdDir -d/dev/scsi0/cdrom6 -f*.exe -v
  496368 /quick1.exe

    1257 /moveit~2.exe
```

See Also

cdGet

cdGet - ISO9660 File System File Load

Name

cdGet—copies (GETs) the specified file from a CDROM that is formated with an ISO9660 file system (8.3 naming convention). Caveats: Symbolic links are not supported. ISO9660 extensions are not supported (e.g., RockRidge). If the specified file name matches more than one file on the CD, the first matching file encountered will be loaded.

Synopsis

```
cdGet [-ddevicename] -ffilename [-laddress]
```

Parameters

```
-d Ps: Device Name (Default = /dev/ide0/cdrom1)
-f Ps: File Name.
-l Ph: Load Address (Default = User Down Load Buffer.
```

Example

The following example indicates a typical display when using the **cdGet** command.

```
MOTLoad> cdGet -d/dev/idel/cdrom1 -ftest1.elf
cdGet(): 00011E66 (&73318) bytes loaded at address 006B6000

MOTLoad> cdGET -d/dev/idel/cdrom1 -f*.elf -l800000
cdGet(): 00011E66 (&73318) bytes loaded at address 00800000
```

See Also

cdDir, diskBoot

clear - Clear the Specified History Table(s)

Name

clear—clears the tables specified by the command-line options. By default this command clears the MOTLoad command history buffer.

Synopsis

```
clear [-c] [-e] [-h]
```

Parameters

```
-c 0: Test Completion (Pass/Fail) Status History Table
-e 0: Test Error (Error Messages) Status History Table
-h 0: Command-Line History Table
```

Example

The following example indicates a typical display when using the **clear** command.

```
MOTLoad> errorDisplay
  tName =testDisk -d/dev/ide0/hdisk2 -n5000
    sPID=00000011 ePID=00000014 eS.eM=2.1 entryNo=00000001
    sErrNo=00000000 eErrNo=0C00002C errCnt=00000001 loopCnt=00000000
    sTime=43:48:15 fTime=43:48:15 eTime=00:00:00 lTime=15:51:54
  Error Messages:
  Data Comparison Failure in Block Range 0-255
  Write/Read Data   : 05F0436F/00000000
  Write/Read Address: 008E1000/00*C0000
  Device-Name = /dev/ide0/hdisk2

MOTLoad> clear -e
```

See Also

errorDisplay, hbd, hbx, testStatus

cm - Turn on Concurrent Mode

Name

cm—mirrors the debug port to a second onboard serial port that is specified by the command options.

Synopsis

```
cm [-bPd] [-dPs] [-pPs] [-sPd] [-wPd]
```

Parameters

```
-b  Pd: Baud Rate (Default = 9600)
-d  Ps: Serial-Port Device Name (Default = /dev/com2)
-p  Ps: Parity (e/o) (Default = No)
-s  Pd: Stop Bits (1/2) (Default = 1)
-w Pd: Word Size (7/8) (Default = 8)
```

Example

The following example indicates a typical display when using the **cm** command.

```
MOTLoad> cm
Concurrent Mode Activated

MOTLoad>
```

See Also

noCM

diskBoot - Disk Boot (Direct-Access Mass-Storage Device)

Name

diskBoot—boots the specified file from the specified device.

Synopsis

```
diskBoot [-a] [-e] [-f] [-h] [-p] [-v]
```

Parameters

```
-a Ph: Boot File Load Address (Default=Dynamic/User Download Buffer)
-e Ph: Boot File Execution Address Offset (Default = 0)
-f Ps: Boot File Path (Format = Device-Name[,Partition[,File-Name]])
-h 0: Do Not Execute Loaded File
-p Ps: PReP Boot Device Type List (Format Example = Floppy/CDROM/Disk)
-v 0 : Verbose Mode
```

Example

The following example indicates a typical display when using the **diskBoot** command.

```
MOTLoad> diskBoot -f/dev/fd0[\l[\\boot.bin]]

---the above method can also be accomplished by defining a GEV
variable as follows---
MOTLoad> gevEdit mot-boot-path
(Blank line terminates input.)
/dev/fd0[\l[\\boot.bin]]

MOTLoad>
```

See Also

netBoot, tftpGet

downLoad - Down Load S-Records from Host

Name

downLoad—decodes and downloads an S-Record from the host into the target MOTLoad machine's memory. The serial-port device name (device path file name) can be the full path name to the S-Record. This file MOTLoad must have read permission enabled.

Synopsis

```
downLoad [-a] [-b] [-d]
```

Parameters

```
-a P*: Destination Memory Address (Default = User Down Load Area)
-b Pd: Baud Rate (Default = 9800)
-d Ps: Device Path Name (Default = /dev/com2)
```

Example

The following example indicates a typical display when using the **downLoad** command.

```
MOTLoad> downLoad
```

See Also

execProgram, flashProgram, upLoad

ds - One-Line Instruction Disassembler

Name

ds—provides access to the one-line disassembler. By default, the memory location to disassemble PowerPC assembly instructions is the User Down Load Buffer.

Synopsis

```
ds [-a] [-n]
```

Parameters

```
-a Ph: Disassembly Address (Default = User Down Load Buffer)
-n Pd: Number of Instructions (Default = 8)
```

Example

The following example indicates a typical display when using the **ds** command.

```
MOTLoad> ds -a00560000 -n2
00560000 80630000 lwz     r3,0x0(r3)
00560004 00000000 word    0x00000000
```

See Also

as, br, gd, gn, go, gt, rd, rs, tc, td

echo - Echo a Line of Text

Name

echo—echos a line of text.

Synopsis

```
echo
```

Parameters

Example

The following example indicates a typical display when using the **echo** command.

```
MOTLoad> echo "this is a test\r\n"
this is a test
MOTLoad>
```

See Also

elfLoader - ELF Object File Loader

Name

elfLoader—loads, and attaches if specified, an ELF object to the MOTLoad environment.

Synopsis

elfLoader [-a] [-s] [-v]

Parameters

```
-a Ph: Load Address of ELF Object File (Default = User Down
Load Buffer)
-s 0: Add Symbols to Dynamic Symbol Table
-v 0: Verbose Mode
```

Example

The following example indicates a typical display when using the **elfLoader** command.

```
MOTLoad> dla = malloc 0x100000
return = 008C0000 (&9175040)
errno = 00000000

MOTLoad> tftpGet -c192.168.1.3 s192.168.1.3 -fperfCode.o -adla
Network Loading from: /dev/enet0
Loading File: perfCode.o
Load Address: 008C0000

Client IP Address = 192.168.1.3
Server IP Address = 192.168.1.33
Gateway IP Address = 192.168.1.253
Subnet IP Address Mask = 255.255.255.0

Network File Load in Progress...

Bytes Received =&2500, Bytes Loaded =&2500
Bytes/Second =&2500, Elaspsed Time =1 Second(s)
```

```
MOTLoad> elfLoader -adla -s
Section Loaded: Address =009C4000, Size =0000002C, Name =.text
Section Loaded: Address =009C5000, Size =00000014, Name =.rodata
MOTLoad> testFunction
This is a test
return = 00000010 (&16)
errno = 00000000
MOTLoad
```

See Also

errorDisplay - Display Contents of Test Error Status Table

Name

errorDisplay—displays the MOTLoad test error status table (log). The error status table contains test error information and task related information from previously executed tests that failed and logged the failure information in the error log. Most of the fields in this table are described below. The user can, through the -e option (in hexadecimal values), and the -n and -s options, (in decimal values), specify which error log entry(ies) to display. In addition to the information below, each error will display a unique test specific message.

Synopsis

```
errorDisplay [-e] [-n] [-s]
```

Parameters

```
-e P*: Executive Process/Task Identifier of Entry to Display
-n P*: Number of Entries to Display
-s P*: Specific Entry Number (1 to n) to Display
```

Field Name	Field Description
sPID	OS Process ID
ePID	Executive Process ID
eS.eM	Executive State.Executive Mode
entryNo	Test task entry number
sErrNo	OS Error number
eErrNo	Executive Error number
errCnt	Test Error count
loopCnt	Test Loop count

Field Name	Field Description
sTime	Test Start time
fTime	Test Finish time
eTime	Test Elapsed time
lTime	Time the error was logged

Example

The following example indicates a typical display when using the **errorDisplay** command.

```
MOTLoad> errorDisplay
  tName =testDisk -d/dev/ide0/hdisk -n5000
   sPID=00000011  ePID=00000014  eS.eM = 2.1 entryNo = 00000001
   sErrNo=00000000  eErrNo=0C0002C  errCnt=00000001  loopCnt=00000000
    sTime=43:48:15  fTime=43:48:15  eTime=00:00:00 lTime=15:51:54
  Error Messages:
  Data Comparison Failure in Block Range 0-255
  Write/Read Data     :  05F0436F/00000000
  Write/Read Address  :  008E1000/00*C0000
  Device-Name = /dev/ide0/hdisk
```

See Also

clear, testStatus

eval - Evaluate Expression

Name

eval—evaluates the specified expression using the specified option.

Synopsis

```
eval expression [-a] [-b] [-l] [-o]
```

Parameters

```
-a 0 : Display Evaluated Expression in ASCII (if possible)
-b 0 : Display Evaluated Expression in Binary (Big-Endian Bit
Ordering)
-l 0 : Display Evaluated Expression in Binary (Little-Endian
Bit Ordering)
-o 0 : Display Evaluated Expression in the Octal Number Base
```

Number Base Identifiers	
$	Hexadecimal
&	Decimal
@	Octal
%	Binary
^	ASCII Control
Operators	
+	Addition
-	Subtraction
*	Multiplication
/	Division
%	Remainder
^	Raise a Number to a Power
&	Logical AND
|	Logical OR

<<	Left Shift
>>	Right Shift
Modifiers	
-	Negative (2's Complement)
~	1's Complement

Example

The following example indicates a typical display when using the **eval** command.

```
MOTLoad> eval lf678
          0001F678 = &1F678 = &128632
```

See Also

execProgram - Execute Program

Name

execProgram—executes a program that has been downloaded into the memory of a SBC running MOTLoad firmware. This allows the user to run executable programs without having to overwrite any existing programs in the flash rom. Immediately prior to transferring control, MOTLoad does these things:
>> disable network interfaces
>> disable all interrupts
>> lock, flush, and invalidate any enabled caches
>> clear the MPU, MSR register
>> clear the MPU.SPR275 register (ECD pointer)
>> illuminate the board fail light

Synopsis

```
execProgram [-e] [-l] [-s] [-x]
```

Parameters

```
-e Ph : Execution Address Offset (Default = 0)
-l Ph : Load Address (Default = User Down Load Area)
-s Ph : Program/Object Size (Default = 2MB)
-x Ph : Execution Argument (Default = 0)
```

Example

The following example indicates a typical display when using the **execProgram** command.

```
MOTLoad> tftpGet -c192.168.1.190 -s192.168.1.33 -d/dev/enet0
-f/tmp/hxeb100.rom
MOTLoad> execProgram
```

See Also

downLoad

fatDir - FAT File System Directory Listing

Name

fatDir—displays the contents of a device that is formated with a FAT file system.

Synopsis

```
fatDir [-d] [-f] [-p] [-t]
```

Parameters

```
-d Ps : Device Name (Default = /dev/fd0)
-f 0  : Full Listing
-p Ph : Partition Number (Default = 1)
-t 0  : Display Partition-Table/BPB
```

Example

The following example indicates a typical display when using the **fatDir** command.

```
MOTLoad> fatDir
```

See Also

fatGet

fatGet - FAT File System File Load

Name

fatGet—copies (GETs) the specified file from a device that is formated with a FAT file system.

Synopsis

```
fatGet [-d] -f [-l] [-p]
```

Parameters

```
-d Ps : Device Name (Default = /dev/fd0)
-f Ps : File Name
-l Ph : Load Address (Default = User Down Load Buffer)
-p Pd : Partition Number (Default = 0)
```

Example

The following example indicates a typical display when using the **fatGet** command.

```
MOTLoad> fatGet
```

See Also

fatDir

fdShow - Display (Show) File Discriptor Table

Name

fdShow—displays the file discriptor table for all MOTLoad configured devices.

Synopsis

```
fdShow [-d]
```

Parameters

```
-d Ps : Device Name
```

Example

The following example indicates a typical display when using the fdShow command.

```
MOTLoad> fdShow
Name                        Type     Mode     Argument Count    Priority
/dev/com1                   00000001 00000004 00000000 00000000 FFFFFFFF
Open     Close    Read     Write    IOctl    Specific Link     Position
0011C074 0011C0C4 0011B6F4 0011BA30 0011BE2C 002ADE74 002B84E4 00000000

Name                        Type     Mode     Argument Count    Priority
/dev/com1                   00000001 00000004 00000000 00000001 FFFFFFFF
Open     Close    Read     Write    IOctl    Specific Link     Position
0011C074 0011C0C4 0011B6F4 0011BA30 0011BE2C 002ADE74 002B84E4 00000000

Name                        Type     Mode     Argument Count    Priority
/dev/com1                   00000001 00000004 00000000 00000002 FFFFFFFF
Open     Close    Read     Write    IOctl    Specific Link     Position
0011C074 0011C0C4 0011B6F4 0011BA30 0011BE2C 002ADE74 002B84E4 00000000

Name                        Type     Mode     Argument Count    Priority
/pipeConsoleI               00000005 00000001 00000000 00000000 00000004
Open     Close    Read     Write    IOctl    Specific Link     Position
```

```
0011A834 0011A928 0011A280 0011A438 0011A6CC 0055D000 002B8724 00000000

Name                      Type     Mode     Argument Count    Priority
/pipeConsoleO             00000005 00000002 00000000 00000000 00000004
Open     Close    Read     Write    IOctl    Specific Link     Position
0011A834 0011A928 0011A280 0011A438 0011A6CC 0055F000 002B8764 00000000
```


See Also

devShow

flashProgram - FLASH Memory Program

Name

flashProgram—flashes an image into the specified FLASH device on a given MCG SBC. The image is flashed (written) into the device's flash ROM as specified by the -d, -n, and -s options.

Synopsis

```
flashProgram [-d] [-i] [-n] [-o] [-s] [-v]
```

Parameters

```
-d Ps : Flash Memory Device Name (Default = /dev/flash0)
-i 0  : Disable Interactive Confirmation
-n Ph : Number of Bytes to Program (Default = $00100000)
-o Ph : Offset Address of Flash Memory (Default = $00000000)
-s Ph : Source Address (Default = User Down Load Area)
-v 0  : Verbose Mode
```

Example

The following example indicates a typical display when using the **flashProgram** command.

MOTLoad> tftpGet -c192.168.1.190 -s192.168.1.33 -d/dev/enet0 -f/tmp/hxeb100.rom
MOTLoad> flashProgram -df3f00000 -o0010000 -n00100000

See Also

downLoad

flashShow - Display FLASH Memory Device Configuration Data

Name

flashShow—displays all MOTLoad configured flash devices.

Synopsis

```
flashProgram -d
```

Parameters

-d Ps : Device Name (Default = All Flash Memory Devices)

Example

The following example indicates a typical display when using the **flashShow** command.

```
MOTLoad> flashShow
Device-Name  Base-Address,Size    Device-Size,Count     Boot  Type
/dev/flash0     F2000000,02000000  01000000,00000002  Yes   Intel 28F128
/dev/flash1    FF800000,00200000  00080000,00000004  No    AMD 29LV040
```

See Also

flashProgram

gd - Go Execute User-Program Direct Ignore Break-Points

Name

gd—directly executes the user-program, bypassing any break-point previously defined.

Synopsis

```
gd -a
```

Parameters

```
-a Ph : Address
```

Example

The following example indicates a typical display when using the **gd** command.

```
MOTLoad> gd
```

See Also

gn, go, gt

gevDelete - Global Environment Variable Delete

Name

gevDelete—deletes a MOTLoad global environment variable.

Synopsis

```
gevDelete name
name is the name of the MOTLoad global variable to be deleted
```

Parameters

Example

The following example indicates a typical display when using the **gevDelete** command.

```
MOTLoad> gevDelete mot-boot-path
```

See Also

gevDump, gevEdit, gevinit, gevShow

Refer also to Appendix A, *MOTLoad Non-Volatile Data*

gevDump - Global Environment Variable(s) Dump (NVRAM Header + Data)

Name

gevDump—displays (dump) the values of the MOTLoad global environment variables from NVRAM in a hex dump format.

Synopsis

```
gevDump
```

Parameters

Example

The following example indicates a typical display when using the **gevDump** command.

```
MOTLoad> gevDump
 0000  00 00 03 00 00 00 00 01  40 08 00 20 00 00 00 00  ........@.. ....
0010  00 00 00 00 00 00 80 00  00 80 00 00 04 00 00 00  ................
0020  00 00 20 10 00 00 00 01  00 00 00 00 40 00 00 00  .. .........@...
0030  00 02 00 11 00 01 00 00  40 01 00 00 00 00 00 00  ........@.......
0040  14 00 00 00 00 00 00 00  02 00 42 01 00 00 00 00  ..........B.....
 .
 .
 .
00C0  01 01 00 00 09 00 00 00  00 40 00 00 04 00 40 04  .........@....@.
00D0  00 00 00 00 00 00 00 00  00 08 08 C0 00 00 00 80  ................
00E0  40 00 00 80 01 00 20 00  00 00 00 00 00 00 0A 42  @..... ........B
00F0  00 00 00 20 24 00 00 00  10 04 01 10 20 00 00 00  ... $....... ...
```

See Also

gevDelete, gevEdit, gevinit, gevShow

Refer also to Appendix A, *MOTLoad Non-Volatile Data*

gevEdit - Global Environment Variable Edit

Name

gevEdit—creates and modifies (edits) a MOTLoad environment variable.

Synopsis

```
gevEdit name
name is the name of the MOTLoad global variable to be edited
```

Parameters

Example

The following example indicates a typical display when using the **gevEdit** command.

```
MOTLoad> gevEdit mot-boot-path
(Blank line terminates input.)
/dev/fd0[\l[\\boot.bin]]

MOTLoad>
```

See Also

gevDelete, gevDump, gevinit, gevShow

Refer also to Appendix A, *MOTLoad Non-Volatile Data*

gevInit - Global Environment Variable Area Initialize (NVRAM Header)

Name

gevInit—initializes (clears) the MOTLoad global environment variable area in NVRAM.

Synopsis

```
gevInit
No argument description
```

Parameters

No parameters

Example

The following example indicates a typical display when using the **gevEdit** command.

MOTLoad> gevInit

```
Update Global Environment Area of NVRAM (Y/N)? y
Warning: This will DELETE any existing Global Environment
Variables!
Continue? (Y/N)? y
MOTLoad>
```

See Also

gevDelete, gevDump, gevEdit, gevList, gevShow

Refer also to Appendix A, *MOTLoad Non-Volatile Data*

gevList - Global Environment Variable Labels (Names) Listing

Name

gevList—lists by name the Global Environment Variable Labels currently defined.

Synopsis

```
gevList
```

Parameters

No parameters

Example

The following example indicates a typical display when using the **gevList** command.

```
MOTLoad> gevList

Total Number of GE Variables =0, Bytes Utilized =0, Bytes Free =3592
```

See Also

gevDelete, gevDump, gevEdit, gevInit, gevShow

Refer also to Appendix A, *MOTLoad Non-Volatile Data*

gevShow - Global Environment Variable Show

Name

gevShow—displays the name(s) and value(s) of the MOTLoad global environment variable(s) that are contained in the NVRAM. If the optional [name] argument is omitted all the environment variables are shown.

Synopsis

```
gevShow
No argument description
```

Parameters

No parameters

Example

The following example indicates a typical display when using the **gevShow** command.

```
MOTLoad> gevShow
mot-boot-path=/dev/fd0[\l[\\boot.bin]]
Total Number of GE Variables =1, Bytes Utilized =39, Bytes
Free =2273
```

See Also

gevDelete, gevDump, gevEdit, gevShow

Appendix A, *MOTLoad Non-Volatile Data*

gn - Go Execute User-Program to Next Instruction

Name

gn—executes the user-program, stopping on the next instruction.

Synopsis

```
gn
No argument description
```

Parameters

No parameters

Example

The following example indicates a typical display when using the **gn** command.

```
MOTLoad> gn
```

See Also

gd, go, gt,

go - Go Execute User-Program

Name

go—starts the execution of the user-program.

Synopsis

```
go -a
```

Parameters

```
-a Ph: Address
```

Example

The following example indicates a typical display when using the **go** command.

```
MOTLoad> go
```

See Also

gd, gn, gt, td, tc

gt - Go Execute User-Program to Temporary Break-Point

Name

gt—starts the execution of the user-program to its temporary break-point.

Synopsis

```
gt -a [-c]
```

Parameters

```
-a Ph: Address
-c Pd: Count (Default = 0)
```

Example

The following example indicates a typical display when using the **gt** command.

```
MOTLoad> gt -a73FC88
```

See Also

gd, go, gn

hbd - Display History Buffer

Name

hbd—displays the contents of the command-line history buffer. By default all entries are displayed. Optionally, the user can display a specified number of the most recent entries. Currently, the command-line history buffer limit is 128 entries.

Synopsis

```
hbd [-n]
```

Parameters

```
-n Ph: Number of Entries to Display
```

Example

The following example indicates a typical display when using the **hbd** command.

```
MOTLoad> hbd
1 help
2 help help
3 help taskActive
4 help clear
5 help taskActive errorDisplay
6 help
7 help hbd
8 taskActive -a
9 test8
10 hbd

MOTLoad> hbd -n3
19 testStatus
20 hbd
21 hbd -n3
```

See Also

clear, hbx

hbx - Execute History Buffer Entry

Name

hbx—executes the specified command-line history buffer entry.

Synopsis

```
hbx -n
```

Parameters

```
-n Pd: Number of the Entry to Execute
```

Example

The following example indicates a typical display when using the **hbx** command.

```
MOTLoad> hbd
1 help
2 help help
3 help taskActive
4 help clear
5 help taskActive errorDisplay
6 help
7 help hbd
8 taskActive -a
9 test8
10 hbd
11 help testSuite
12 testSuite -nait

MOTLoad> hbx -n12
MOTLoad> testSuite -nait
```

See Also

clear, hbd

help - Display Command/Test Help Strings

Name

help—displays the help information about MOTLoad tests and utilities. The command can be used several ways. When used by itself, a display of all available commands (for that product) with a brief command description is shown. When used with a resolvable command name(s) argument, the specified command(s) with the command command-line syntax and a brief description of each command argument/option is/are displayed. If the command name argument cannot be resolved an error message ("ambiguous") will be displayed. If the optional '/' precedes a partial command string (pattern), all commands beginning with that string will be listed. If no command matches the pattern, nothing is displayed.

Synopsis

```
help -[/][commands . . . ]
```

Parameters

```
commands>>   any one (or more) of the available commands
[/][pattern] list all commands beginning with pattern
```

Example

The following example indicates a typical display when using the **help** command.

```
MOTLoad> help
clear         Clear the Specified Table(s)
errorDisplay Display the Contents of the Test Error Status
Table
eval          Evaluate Expression
help          Display Command/Test Help Strings
hbd           Display History Buffer
hbx           Execute History Buffer Entry
reset         Reset System
taskActive    Display the Contents of the active Task Table
testSuite     Executive Test Suite
testStatus    Display the Contents of the Test Status Table
version       Display Version String(s)
```

```
MOTLoad>help/testSu
testSuite     Execute Test Suite
testSuiteMake Make (Create/Modify) Test Suite
MOTLoad>
```

See Also

l2CacheShow - Show L2 Cache Contents

Name

l2CacheShow—displays L2 Cache State and Control Register contents.

Synopsis

```
l2CacheShow
```

Parameters

No parameters

Example

The following example indicates a typical display when using the **l2CacheShow** command.

```
MOTLoad> l2CacheShow
MPU-Int Cache(L2) =256K, Enabled, DParity On, L2CR:0xC0000000
```

See Also

l3CacheShow

l3CacheShow - Show L3 Cache Contents

Name

l3CacheShow—displays L3 Cache State and Control Register contents.

Synopsis

```
l3CacheShow
```

Parameters

No parameters

Example

The following example indicates a typical display when using the **l3CacheShow** command.

```
MOTLoad> l3CacheShow
MPU-Ext Cache(L3) =2M, Enabled, DParity On, L3CR:0xDF838000
```

See Also

l2CacheShow

mdb mdh mdw - Memory Display Bytes/Halfwords/Words

Name

mdb/mdh/mdw—displays the contents of a memory block as specified by the command-line options.

Synopsis

```
mdb/mdh/mdw -a [-c] [-s]
```

Parameters

```
-a Ph : Starting Address
-c Ph : Number of Elements to Display
-s 0 : Byte Swap
```

Example

The following example indicates a typical display when using the **mdb, mdh, or mdw** commands.

```
MOTLoad> mdw -a00560000 -c8
00560000  00000000  00000000  00000000  00000000 ........
00560010  00000000  00000000  00000000  00000000 ........

MOTLoad> mdh -a00560000 -c10
00560000  0000 0000 0000 0000 0000 0000 0000 0000 .......
00560000  0000 0000 0000 0000 0000 0000 0000 0000 .......

MOTLoad> mdb -a00560000 -c20
00560000 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ..
00560000 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ..
```

See Also

mmb, mmh, mmw

memShow - Display (Show) Memory Allocation

Name

memShow—displays the current memory that is free and that is allocated.

Synopsis

```
memShow  [-d]
```

Parameters

```
-d 0: Displays Allocated Blocks in Detail
```

Example

The following example indicates a typical display when using the **memShow** command.

```
MOTLoad> memShow
Current Allocated/Free Memory Statistics:
Total Size of Memory........10000000 (&268435456)
Free........................OD742000 (&225714176)
Allocated...................024BE000 (&38526976)
Average Block Size..........00027311 (&160529)
Maximum Block Size..........02000000 (&33554432)
Minimum Block Size..........00001000 (&4096)
Number of Blocks............000000F0 (&240)
Largest Free Block Size.....0C000000 (&201326592)
Largest Free Block Address..04000000:0FFFFFFF
Reserved Block Address......00000000L003FFFFF
User Buffer/Block Address...00560000:0075FFFF
```

See Also

mmb mmh mmw - Memory Modify Bytes/Halfwords/Words

Name

mmb/mmh/mmw—modifies the contents of a memory block as specified by the command-line options. To terminate modifications, enter a period (".").

Synopsis

```
mmb/mmh/mmw -a [-i] [-n] [-s]
```

Parameters

```
-a Ph : Starting Address
-i Pd : Number of Elements to Increment
-n 0  : Disable Read/Verify
-s 0  : Byte Swap
```

Example

The following example indicates a typical display when using the **mmb, mmh,** and **mmw** commands.

```
MOTLoad> mmw -a00560000
00560000 00002341? 12345678
00560004 00001324? 87654321
00560008 00000000? .
MOTLoad>

MOTLoad> mmh -a00560000
00560000 1234? 3333
00560002 5678? 2222
00560004 8765? .
MOTLoad>

MOTLoad> mmb -a00560000
00560000 33? 55
00560001 33? 66
00560002 22? .
MOTLoad>
```

See Also

mdb, mdh, mdw

mpuFork - Fork Idle MPU

Name

mpuFork—issues an execution command to an idle processor allowing it to begin executing target code at the address specified by the -a option. Results will depend on board configuration and the presence of an idle processor. Before execution begins, the value specified by the -b option is loaded into processor register r3. The execution address must not be zero and an MPU must be in the idle state in order to accept this command. This command is for multi-processor boards only.
To inquire about idle processors, refer to the mpuShow command.

Synopsis

```
mpuFork [-aPh] [-aPh]
```

Parameters

```
-a Ph: Memory Address (Default = User Download Buffer)
-b Ph: Argument Data For R3 (Default = 0)
```

Example

The following example indicates a typical display when using the **mpuFork** command.

Example 1: Executing a program loaded at address 0x00001000

```
MOTLoad> mpuFork -a1000 -b12341234
MPU 0 is to begin execution at 00001000 with 12341234 in r3
Correct (Y/N)? n
MOTLoad>
```

Example 2: Executing a program loaded at an address where memory has been allocated to the label "mputest".

```
MOTLoad> mputest = malloc 1000
```

Next, create or load a program to "mputest" area by any means. Passing the programs own starting address in the register r3.

```
MOTLoad> mpuFork -amputest -bmputest
MPU 0 is to begin execution at 00A73000 with 00A73000 in r3
Correct (Y/N)? y
Command Issued. . . Accepted.
MOTLoad>
```

Example 3: Zero is not allowed as an execution address.

```
MOTLoad> mpuFork -a0 -b12341234
ERROR Invalid Execution Address.
MOTLoad>
```

Example 4: If there is not a processor in the idle state.

```
MOTLoad> mpuFork -amputest -bmputest
Cannot Find An Idle MPU.
MOTLoad>
```

See Also

mpuShow, mpuSwitch

mpuShow - Display MPU Configuration

Name

mpuShow—Displays the multi-processor control structure which holds current status information for each MPU.

Synopsis

```
mpuShow
```

Parameters

No parameters

Example

The following example indicates a typical display when using the **mpuShow** command.

```
MOTLoad> mpuShow
MPU   mMpuCt1  login cmdip    cmdid     cmdarg
0     0000A2C8 MAST 00000000 00000000 00000000
1     0000A2D8 IDLE 00000000 00000000 00000000

MOTLoad> mpuShow
MPU    mMpuCt1 login cmdip    cmdid     cmdarg
0     0000A2C8 MAST 00000000 00000000 00000000
1     0000A2D8 IDLE 00000000 00000000 00000000

MOTLoad> mpuShow
MPU    mMpuCt1 login cmdip    cmdid     cmdarg
0     0000A2C8 EXEC 00000000 00000000 00000000
1     0000A2D8 MAST 00000000 00000000 00000000
```

See Also

mpuFork, mpuSwitch

mpuSwitch - Reset and Switch to Alternate MPU

Name

mpuSwitch—Resets the board switching the master MPU. If MPU0 is the master and MPU1 is idle then mpuSwitch will reset and startup with MPU1 as master and MPU0 will be idle. This command is for multi-processor boards only.

Synopsis

```
mpuSwitch
```

Parameters

No parameters

Example

The following example indicates a typical display when using the **mpuSwitch** command.

```
MOTLoad> mpuSwitch
Master Is Now MPU-Number = 0
Reconfigure and Reset to the Other Processor (Y/N)? y
```

See Also

mpuShow, mpuFork

netBoot - Network Boot (BOOT/TFTP)

Name

netBoot—performs various network boot functions.

Synopsis

```
netBoot
  Boot File : [-a] [-e] -f [-l] [-o]
  IP Address: [-b] [-c] [-g] [-m] [-s]
  BOOT/RARP : [-p] [-u]
  General   : [-d] [-h] [-r] [-v] [-z]
```

Parameters

```
-a Ph: Boot File Load Address (Default=Dynamic/User Download Buffer)
-b Ps: Broadcast IP Address (Default=255.255.255.255)
-c Ps: Client IP Address (Default = 0.0.0.0.)
-d Ps: Device Name (Default=/dev/enet0)
-e Ph: Boot File Execution Address Offset (Default = 0)
-f Ps: Boot File Name
-g Ps: Gateway IP Address (Default = n.n.n.253)
-h 0 : Do Not Execute Loaded File
-l Ph: Boot File Length (Default = Entire File)
-m Ps: Subnet Mask (Default = 255.255.255.0)
-o Ph: Boot File Offset (Default = 0)
-p 0 : BOOTP/RARP Request Force (Default = When Needed)
-r Pd: Retry Count (Default = Forever)
-s Ps: Server IP Address (Default = 0.0.0.0)
-u 0 : BOOTP/RARP Replay Configuration Update Disable (Default=Yes)
-v 0 : Verbose Mode
-z 0 : PReP Mode
```

Example

The following example indicates a typical display when using the **netBoot** commands.

```
MOTLoad> netBoot -d/dev/enet0 -f/directory/file.o -
c144.191.16.99
MOTLoad. -s144.191.11.33 -g144.191.16.253

Network Loading from: /dev/enet0

Client IP Address      = 144.191.16.99
Server IP Address      = 144.191.11.33
Gateway IP Address     = 144.191.16.253
Subnet IP Address Mask = 255.255.255.0
Boot File Name         = /directory/file.o
Load Address           = 02000000


Network Boot File Load Start - Press <ESC> to Bypass, <SPC>
to Continue.

Network Boot File Load in Progress - Press <CTRL-C> to Abort

Bytes Received =&1048576, Bytes Loaded =&1048576
Bytes Received =&209715, Elapsed Time =5 Second(s)


Moving File/Image to User Download Buffer (00710000)


Boot Device       =/dev/enet0
Boot File         =/directory/file.o
Load Address      =00710000
Load Size         =00100000
Execution Address =00710000
Execution Offset  =00000000


Passing control to the loaded file/image.
```

See Also

netShow, netShut, netStats, tftpGet

netShow - Display Network Interface Configuration

Name

netShow—displays all MOTLoad configured network devices.

Synopsis

```
netShow [-d]
```

Parameters

```
-d Ps: Device Name (Default=All Network Interfaces)
```

Example

The following example indicates a typical display when using the **netShow** commands.

```
MOTLoad> netShow
Interface       EAddress       Status  Speed  Duplex
/dev/enet0    0001AF07C491  Up     10MBS Half
```

See Also

netBoot, netShut, netStats, tftpGet

netShut - Disable (Shutdown) Network Interface

Name

netShut—disables a MOTLoad configured network device.

Synopsis

```
netShut [-d]
```

Warning Exercise caution when using this command. A board reset is the only way to reactivate the network interface, and some errors messages may result in the meantime, if any operations take place while the network is disabled.

Parameters

```
-d Ps: Device Name (Default=All Network Interfaces)
```

Example

The following example indicates a typical display when using the **netShut** commands.

```
MOTLoad> netShut
/dev/enet0    Disabled
```

See Also

netBoot, netShow, netStats, tftpGet

netStats - Display Network Interface Statistics Data

Name

netStatus—displays the network statistics for a MOTLoad configured network device.

Synopsis

```
netStats [-d]
```

Parameter

```
-d Ps: Device Name (Default=All Network Interfaces)
```

Example

The following example indicates a typical display when using the **netStats** commands.

```
MOTLoad> netStats
Interface   TX-Frames=Okay:Error        RX-Frames=Okay:Error
/dev/enet0              0:0                         0:0
```

See Also

netBoot, netShow, netShut, tftpGet

noCm - Turn off Concurrent Mode

Name

noCm—turns off the concurrent mode.

Synopsis

```
noCm
No argument description
```

Parameter

```
No parameters
```

Example

The following example indicates a typical display when using the **noCm** commands.

```
MOTLoad> noCm
Concurrent Mode Terminated
```

See Also

cm

pciDataRd - Read PCI Device Configuration Header Register

Name

pciDataRd—reads and displays the PCI configuration header register contents of a PCI device, as specified by the command line arguments.

Synopsis

```
pciDataRd [-b] [-d] [-f] [-i] [-o] [-x]
```

Parameters

```
-b Pd: Bus Number (Default = 0)
-d Ps: Device Name (Default = 0)
-f Pd: Function Number (Default = 0)
-i Pd: Bus Instance (Default = 0)
-o Ph: Offset (Default = 0)
-x Pd: Element Size: 1/2/4 (Default = 4)
```

Example

The following example indicates a typical display when using the **pciDataRd** commands.

```
MOTLoad> pciDataRd  -il  -b0  -dZ  -f0  -o0 -x4
Read Data =10088086
```

See Also

pciDataWr, pciDump, pciShow, pciSpace

pciDataWr - Write PCI Device Configuration Header Register

Name

pciDataWr—writes a data value to the PCI configuration header register of a PCI device, as specified by the command line arguments.

Synopsis

```
pciDataWr [-b] [-d] [-f] [-i] [-o] [-x] [-z]
```

Parameters

```
-b Pd: Bus Number (Default = 0)
-d Pd: Device Number (Default = 0)
-f Pd: Function Number (Default = 0)
-i Pd: Bus Instance (Default = 0)
-o Ph: Offset (Default = 0)
-x Pd: Element Size: 1/2/4 (Default = 4)
-z Ph: Data to Write
```

Example

The following example indicates a typical display when using the **pciDataWr** commands.

```
MOTLoad> pciDataRd  -il  -b0  -dZ  -f0  -o0 -x4
Read Data =02300007

MOTLoad>pciDataWr -il -b0 -d2 -f0 0o4 -x4 -z0

MOTLoad>pciDataRd -il -b0 -d2 -f0 -o4 -x4
Read Data =02300000
```

See Also

pciDataRd, pciDump, pciShow, pciSpace

pciDump - Dump PCI Device Configuration Header Register

Name

pciDump—dumps (displays) the PCI configuration header register contents of a PCI device, as specified by the command line arguments.

Synopsis

```
pciDump [-b] [-d] [-f] [-i] [-n] [-s] [-x]
```

Parameters

```
-b Pd: Bus Number (Default = 0)
-d Pd: Device Number (Default = 0)
-f Pd: Function Number (Default = 0)
-i Pd: Bus Instance (Default = 0)
-n Ph: Number of Elements (Default = 64)
-s Pd: Starting Offset: (Default = 0)
-x Pd: Element Size: 1/2/4 (Default = 4)
```

Example

The following example indicates a typical display when using the **pciDump** commands.

```
MOTLoad> pciDump  -il  -b0  -dZ  -f0  -n4 -x4
0000  02300000 02000002 00008008 B1100000    .0............
```

See Also

pciDataRd, pciDataWr, pciShow, pciSpace

pciShow - Display PCI Device Configuration Header Register

Name

pciShow—displays the entire PCI configuration header register contents of each PCI device, as specified by the command line arguments.

Synopsis

```
pciShow [-b] [-d] [-f] [-i] [-n] [-s] [-x]
```

Parameters

```
-b Pd: Bus Number (Default = 0)
-d Pd: Device Number (Default = 0)
-f Pd: Function Number (Default = 0)
-i Pd: Bus Instance (Default = 0)
-m 0 : Multi-Function Device Rule Mode
-p 0 : Probe
-s 0 : Short Display Mode
```

Example

The following example indicates a typical display when using the **pciShow** commands.

```
MOTLoad> pciShow
Instance/Bus/Device/Function            :   00 00 06 00
Vendor/Device Identifier : 8086 B154
Class      : 06 Bridge Controller/Device
Sublcass   : 04 PCI-to-PCI Bridge
0000 80 86 B1 54 00 07 02 B0 00 00 04 06 08 80 01 00 ...T..
0010 00 00 00 00 00 00 00 00 00 00 01 01 80 91 A1 22 A0 ..."..
0020 80 90 80 90 FF F1 00 01 FF FF FF FF 00 00 00 00 ......
0030 00 00 00 00 DC 00 00 00 00 00 00 00 00 00 00 00 ......
```

See Also

pciDataRd, pciDataWr, pciDump, pciSpace

pciSpace - Display PCI Device Address Space Allocation

Name

pciSpace—displays the PCI I/O and Memory Space allocation for all MOTLoad configured PCI devices.

Synopsis

```
pciSpace
```

Parameters

No parameters

Example

The following example indicates a typical display when using the **pciSpace** commands.

```
MOTLoad>
Device 00.00.00.00  Range 01000000:010FFFFF  32-Bit Memory
Device 01.00.02.00  Range 00010000:00010FFF  32-Bit I/O
Device 01.00.04.00  Range 00011000:00011FFF  32-Bit I/O
Device 01.00.04.01  Range 00012000:00012FFF  32-Bit I/O
Device 01.00.00.00  Range 01000000:010FFFFF  32-Bit Memory
Device 01.00.02.00  Range 01100000:0111FFFF  32-Bit Memory
Device 01.00.02.00  Range 01120000:0113FFFF  32-Bit Memory
Device 01.00.04.00  Range 01140000:01140FFF  32-Bit Memory
Device 01.00.04.00  Range 01142000:01143FFF  32-Bit Memory
Device 01.00.04.01  Range 01141000:01141FFF  32-Bit Memory
Device 01.00.04.01  Range 01144000:01145FFF  32-Bit Memory
Device 01.01.07.00  Range 00009000:0000900F  16-Bit I/O
Device 01.01.07.00  Range 00009010:0000901F  16-Bit I/O
Device 01.01.07.00  Range 00009020:0000902F  16-Bit I/O
Device 01.01.07.00  Range 00009030:0000903F  16-Bit I/O
Device 01.01.07.00  Range 00009040:0000904F  16-Bit I/O
Device 01.01.06.00  Range 00900000:00900FFF  32-Bit Memory
Device 01.01.06.01  Range 00901000:00901FFF  32-Bit Memory
Device 01.01.06.02  Range 00902000:00902FFF  32-Bit Memory
```

See Also

pciDataRd, pciDataWr, pciDump, pciSpace

ping - Ping Network Host

Name

ping—broadcasts a generic network packet to a specified server (host).

Synopsis

```
ping -c [-d] [-n] [-p] [-r] -s [-t] [-s]
```

Parameters

```
-c Ps: Client IP Address
-d Ps: Device Name (Default =/dev/enet0)
-n Pd: Packet Count (Default = 1)
-p Pd: Packet-To-Packet Delay Count (Default - 1 Second)
-r Pd: Retry Count (Default = Forever)
-s Ps: Server (Host to Ping) IP Address
-t Pd: Time-Out Delay Count (Default = 10 Seconds)
-s Pd: Packet Size (Default = 128 Bytes/Octets)
```

Example

The following example indicates a typical display when using the ping commands.

```
MOTLoad> ping -c192.168.1.16.3 -s192.168.1.253
Client (Source) IP Address      = 192.168.1.3
Server (Destination) IP Address = 192.168.1.253
Server/Host Found, E-Address    = 00E04FD04940
170 (128+42) bytes from 192.168.1.253: icmp_seq=0 time=114216 us
Packets Transmitted =1, Packets Received =1, Packets Lost =0 (0%)
Round-Trip Min/Avg/Max = 114216/114216/114216 uS
```

See Also

tftpGet, tftpPut

portSet - Port Set

Name

portSet—sets the communication mode(s) for a serial port.

Synopsis

```
portSet [-b] [-d] [-p] [-s] [-w]
```

Parameters

```
-b Pd: Baud Rate (Default = 9600)
-d Ps: Serial-Port Device Name (Default = /dev/com2)
-p Ps: Parity (e/o) (Default = No)
-s Pd: Stop Bits (1/2) (Default = 1)
-w Pd: Word Size (7/8) (Default = 8)
```

Example

The following example indicates a typical display when using the **portSet** commands.

```
MOTLoad> portSet -b14400 -d/dev/com2
```

See Also

portShow - Port Show

Name

portShow—displays the configuration of all detected serial ports. Information on baud rate, length, number of stop bits, parity, and port usage is provided. The possible usage types are:
I - Standard Input
O - Standard Output
E - Standard Error

Synopsis

```
portShow
```

Parameters

No parameters

Example

The following example indicates a typical display when using the **portShow** command.

```
MOTLoad> portShow
Port-Device  Baud-Rate  Length  Stop-Bits Parity Usage
/dev/com1       9600       8        1        None  IOE
/dev/com2       9600       8        1        None
/dev/com3       9600       8        1        None
/dev/com4       9600       8        1        None
```

See Also

portSet

rd - User Program Register Display

Name

rd—displays the contents of the PowerPC register set.

Synopsis

```
rd [-n]
```

Parameters

```
-n Ps: Register Name
```

Example

The following example indicates a typical display when using the **rd** commands.

```
MOTLoad> rd
ip  =00560000  msr =0000B030  cr  =00000000  xer =00000000
r0  =00000000  r1  =00760000  r2  =00000000  r3  =00000000
r4  =00000000  r5  =00000000  r6  =00000000  r7  =00000000
r8  =00000000  r9  =00000000  r10 =00000000  r11 =00000000
r12 =00000000  r13 =00000000  r14 =00000000  r15 =00000000
r16 =00000000  r17 =00000000  r18 =00000000  r19 =00000000
r20 =00000000  r21 =00000000  r22 =00000000  r23 =00000000
r24 =00000000  r25 =00000000  r26 =00000000  r27 =00000000
r28 =00000000  r29 =00000000  r30 =00000000  r31 =00000000
lr  =00000000  ctr =00000000  tbu =00000000  tbl =00000000
00560000 00000000  word        0x00000000

MOTLoad> rd -nr3
r3  =00000000
```

See Also

rs

reset - Reset System

Name

reset—resets the system.

Synopsis

```
reset
```

Parameters

No parameters

Example

The following example indicates a typical display when using the **reset** commands.

```
MOTLoad> reset
Copyright Motorola Inc. 1999-2002, All Rights Reserved
MOTLoad RTOS Version 2.0
PAL Version 0.1 (Motorola HXEB100)

               ***  Proto Build For Early Access ***

MPU-Int Clock Speed  =900MHz
MPU-Ext Clock Speed  =100MHz
MPU-Type             =MPC7455

Reset/Boot Vector    =BankA

Local Memory Found   =10000000 (&268435456)
User Buffer Location =00560000:0075FFFF

MOTLoad> time
FRI JUN  7 13:51:27.00 2002
MOTLoad>
```

See Also

rs - User Program Register Set

Name

rs—sets a specified PowerPC register with the specified value.

Synopsis

```
rs [-d] [-n]
```

Parameters

```
-d Ph: Register Data
-n Ps: Register Name
```

Example

The following example indicates a typical display when using the **reset** commands.

```
MOTLoad> rs -d0010 -nr4
r4 =00000010
```

See Also

rd

set - Set Time and Date

Name

set—sets the Month, Day, Year, Hour, Minute, and Seconds of the real time clock (RTC) in products that support RTC hardware. The user must specify the "***-t***" option for this utility to modify the RTC. If no option is specified, an error message is displayed.

Synopsis

```
set [-d] -t
```

Parameters

```
-d Ps: Device Name (Default = /dev/rtc)
-t Ps: Date/Time String (MMDDYYHHMMSS)
```

Example

The following example indicates a typical display when using the **set** commands.

```
MOTLoad> set -t060702164500
MOTLoad> time
FRI JUN  7 16:45:02.00 2002

For SBC's without a Real-Time Clock device, the PowerPC time
base can be set/displayed
MOTLoad> set -d/dev/ppctb -t060702164500

MOTLoad> time -d/dev/ppctb
FRI JUN  7 16:45:02.00 2002
```

See Also

time

sromRead - Read SROM

Name

sromRead—reads the contents of a SROM device into a memory buffer, as specified by the command line arguments.

Synopsis

```
sromRead [-a] -d [-n] [-o]
```

Parameters

```
-a Ph: Address of Data Buffer (Default = User Down Load Area)
-d Ps: Device Name
-n Ph: Number of Bytes (Default = Entire Device)
-o Ph: Starting Byte Offset (Default = 0)
```

Example

The following example indicates a typical display when using the **sromRead** commands.

```
MOTLoad> sromRead -d/dev/i2c0/srom/AA -n20
Reading SROM contents...
Read Complete
SROM contents located at memory address 0x00560000

MOTLoad> mdb -a00560000 -c20

00560000 FF FF FF FF FF FF FF FF  FF FF FF FF FF FF FF FF  .....
00560010 FF FF FF FF FF FF FF FF  FF FF FF FF FF FF FF FF  ....2
```

See Also

sromWrite

sromWrite - Write SROM

Name

sromWrite—writes the contents of a memory buffer to an SROM device, as specified by the command line arguments.

Synopsis

```
sromWrite [-a] -d [-n] [-o]
```

Parameter

```
-a Ph: Address of Data Buffer (Default = User Down Load Area)
-d Ps: Device Name
-n Ph: Number of Bytes (Default = Entire Device)
-o Ph: Starting Byte Offset (Default = 0)
```

Example

The following example indicates a typical display when using the **sromWrite** command.

```
MOTLoad> mmb -a00560000
00560000 FF? 12
00560000 FF? 34
00560000 FF? 56
00560003 FF? .

MOTLoad> sromWrite -d/dev/i2c0/srom/AA -n4

Device ID                    = /dev/i2c0/srom/AA
Source Starting Address      = 0x00560000
Destination Offset           = 0x00000000
Number of Effective Bytes    = 0x00000020

Program SROM Memory (Y/N)? y
Writing SROM contents... Write Complete
```

See Also

sromRead

sta - Symbol Table Attach

Name

sta—loads and attaches the symbols from the specified address.

Synopsis

```
sta [-a]
```

Parameters

```
-a Ph: Memory Address of Loaded Symbol Tables
```

Example

The following example indicates a typical display when using the **sta** command.

```
MOTLoad> sta -a00560000
```

See Also

stl

stl - Symbol Table Lookup

Name

stl—dislays all symbol table entries that match the *name* argument supplied by the user.

Synopsis

```
stl [name] (B = .bss, D = .data, T = .text)
B = Built-In Symbol Table Entry
D = Dynamic Symbol Table Entry
U = User-Defined Symbol Table Entry
```

Parameters

```
The name argument is the name of the MOTLoad symbol being
searched.
```

Example

The following example indicates a typical display when using the **stl** command.

```
MOTLoad> stl testRam
B:0015AE80 T testRamEccMonitor
B:0015F3E8 T testRam
B:0015F56C T testRamAddressing
B:0015F614 T testRamAlternating
B:0015F6BC T testRamBitToggle
B:0015F764 T testRamBounce
B:0015F80C T testRamCodeCopy
B:0015F8D8 T testRamMarch
B:0015F980 T testRamPatterns
B:0015FA28 T testRamPermutations
B:0015FAD0 T testRamQuick
B:0015FB78 T testRamRandom
B:001811C8 D testRamEccMonitorFullExplanation
B:00182584 D testRamFullExplanation
B:00182684 D testRamAltFullExplanation
B:0019C3F0 D testRamRandomSeed
```

See Also

sta

stop - Stop Date and Time (Power-Save Mode)

Name

stop—turns off the oscillator in the RTC chip. The board is shipped with the RTC oscillator stopped to minimize current drain from the onchip battery. Normal cold start of the board with the MOTLoad FLASH devices installed gives the RTC a "kick start" to begin oscillation.
Use **set** command to restart the clock.

Synopsis

```
stop
```

Parameters

No parameters

Example

The following example indicates a typical display when using the **stop** command.

```
MOTLoad> stop
(Clock is in Battery Save Mode)
MOTLoad>
```

See Also

set

taskActive - Display the Contents of the Active Task

Name

taskActive—displays information about active MOTLoad tasks. By default, only test tasks are displayed and the active task table is scanned once. The **-a** option displays ***all*** tasks. Options **-l, n,** and **-t** control continuous task table monitoring. Options **-i, -j, -q** and **-s** control how the output is displayed. Numerical values are decimal numbers. The **-q** option overrides the other options.

Synopsis

```
taskActive [-a] [-i] [-d] [-l] [-n] [-q] [-s] [-t]
```

Parameters

```
-a O : Display All Types of Tasks
-i P*: Delay Interval in Seconds Between Entries of the Active
Task Table
-j P*: Delay Interval in Seconds Between Entry Lines of the
Active Task Table
-l P*: Number of Loops Through the Active Task Table
-n O : Loop Display Till No Further Test Tasks are Active
-q O : Quick One-Line Status - Running/Stopped
-s O : Keep All Output on a Single Line
-t P*: Loop Display Till this Number of Seconds has Expired
```

Example

The following example indicates a typical display when using the **stl** command.

```
MOTLoad> testRam
MOTLoad> taskActive
tName: testRam
  sPID=00000011 ePID=00000012 eS.eM-1.1 errCnt=00000000 sStatus=00
  sTime=17:14:43 eTime=00:00:07 sErrNo=00000000 eErrNo=00000000

MOTLoad> taskActive -q
Running
```

```
MOTLoad> taskActive -q
Stopped
```


See Also

testSuite

tc - Trace (Single-Step) User Program

Name

tc—single-steps through the user-program.

Synopsis

```
tc [-c]
```

Parameters

```
-c Pd: Count (Default = 1)
```

Example

The following example indicates a typical display when using the **tc** command.

```
MOTLoad>tc
```

See Also

as, br, ds, gd, gn, go, gt, rd, rs, td

td - Trace (Single-Step) User Program to Address

Name

td—trace single-steps through a user-program to the specified.

Synopsis

```
td -a [-c]
```

Parameters

```
-a Ph: Address
-c Pd: Count (Default = 1)
```

Example

The following example indicates a typical display when using the **tc** command.

```
MOTLoad>tc
```

See Also

as, br, ds, gd, gn, go, gt, rd, rs, td

testDisk - TestDisk

Name

testDisk—validates the operation of the interface (control paths/signals) to the specified test disk device. The command also validates the operation of the test disk device.

Synopsis

```
testDisk [-b] -d [-e] [-n] [-p]  [-r] [-s] [-t] [-v] [-w]
```

Parameters

```
-b Ph: Memory Buffer/Transaction Size (Default = 131072 Bytes)
-d Ps: Disk Device
-e Ph: Ending Block (Default = Last Block of Device)
-n Ph: Number of Blocks (Default = Entire Device)
-p O : Use Test Pattern (Default = Random Pattern)
-r O : Read-Only Mode (Default = Write/Read/Verify Mode)
-s Ph: Starting Block (Default = 0)
-t O : Elapsed Time Report
-v O : Verbose Output
-w O : Write-Only Mode (Default = Write/Read/Verify Mode)
```

Example

The following example indicates a typical display when using the **testDisk** command.

```
MOTLoad> testDisk -n2 -d/pci0/scsi0/disk0 -v
disk(/pci0/scsi0/disk0) : Disk Diagnostic Test Parameters:
disk(/pci0/scsi0/disk0) : Starting 1 iterations of
(SEQUENTIAL) operations on block range 0-2
disk(/pci0/scsi0/disk0) : (VERIFY) starting iteration 1
disk(/pci0/scsi0/disk0) : Writing blocks 0-2
disk(/pci0/scsi0/disk0) : Reading blocks 0-2
disk(/pci0/scsi0/disk0) : Verifying blocks 0-2
disk(/pci0/scsi0/disk0) : (VERIFY) completing iteration 1
disk(/pci0/scsi0/disk0) : Summary Results for device
disk(/pci0/scsi0/disk0) : No errors found
```

testEnetPtP - Ethernet Point-to-Point

Name

testEnetPtP—verifies the point-to-point connectivity of the Ethernet devices addressed, including the completeness of the data being transferred.

Synopsis

```
testEnetPtP  [-d] [-e] [-f] [-l] [-n] [-s] [-t] [-v] [-w] [-x]
```

Parameters

```
-d  Ps: TxD Ethernet Device/Interface Name (Default = /dev/enet0)
-e  Ps: RxD Ethernet Device/Interface Name (Default = /dev/enet1)
-f  0 : Filter Broadcast Frames
-l  Pd: Acceptable Loss in Number of Frames (Default = 0)
-n  Pd: Number of Frames (Default = 512)
-s  Pd: Frame Size (Default = 512)
-t  Pd: RxD Time Out (Default = 30 Seconds)
-v  0 : Enable Verbose Mode
-w  Pd: Frame to Frame Delay (Default = 0)
-x  0 : Disable Data Verification
```

Example

The following example indicates a typical display when using the **testEnetPtP** command.

```
MOTLoad> TestEnetPtP -d/dev/enet0 -e/dev/enet1 -s1500
-n100000
```

See Also

testEnetLoopBack, testEnetBlast

testFlash - Flash Memory Erase/Write/Verify

Name

testFlash—tests the Flash Rom device. The test application optionally erases the flash rom and then writes test data patterns to and reads/verifies them from the flash rom. Normally the original flash data is restored, provided no serious errors are found. For purposes of testing this, test should **not** be executed an **excessive** number of times. This number must be well below the flash device's maximum specified number of rewrite cycles.

Synopsis

```
testFlash  -d [-n] [-o] [-r] [-v]
```

Parameters

```
-d  Ps: Device Name
-n  Ph: Number of Bytes (Default = 1MB)
-o  Ph: Starting Offset (Default = 0)
-r  O : No Save/Restore Operation Performed
-v  O : Verbose Mode
```

Example

The following example indicates a typical display when using the **testFlash** command.

```
MOTLoad> testFlash -d/dev/flash0 -sff800000 -n20000 -v
```

See Also

testI2cRomRd - I2C ROM Read

Name

testI2cRomRd—validates the operation of the I2C interface/access to a SROM that is addressed through the I2C bus.

Synopsis

```
testI2cRomRd -d [-n] [-o]
```

Parameters

```
-d Ps: Device Name
-n Pd: Number of Bytes (Default = Entire Device)
-o Pd: Starting Byte Offset (Default = 0)
```

Example

The following example indicates a typical display when using the **testI2cRomRd** command.

```
MOTLoad> testI2cRomRd -d/dev/i2c0/srom/A6 -n8 -o16

MOTLoad> testStatus
Passed (ePID=0000001A):testI2cRomRd -d/dev/i2c0/srom/A6 -n8 -o16
```

See Also

testI2cDimmSpd, testI2cRomRdWr

testI2cRomRdWr - I2C ROM Read/Write (Factory Use Only)

Name

testI2cRomRdWr—validates the operation of the I2C interface/access to an SROM that is addressed through the I2C bus. Both read and write operations are performed.

Synopsis

```
testI2cRomRdWr -d [-n] [-o]
```

Parameters

```
-d Ps: Device Name
-n Pd: Number of Bytes (Default = Entire Device)
-o Pd: Starting Byte Offset (Default = 0)
```

Example

The following example indicates a typical display when using the **testI2cRomRdWr** command.

```
MOTLoad> testI2cRomRdWr -d/dev/i2c0/srom/A6 -n8 -o16

MOTLoad> testStatus
Passed (ePID=0000001D): testI2cRomRdWr -d/dev/i2c0/srom/A6 -n8 -o16
```

See Also

testI2cDimmSpd, testI2cRomRd

testNvramRd - NVRAM Read

Name

testNvramRd—validates read operations to an NVRAM device.

Synopsis

```
testNvram [-d] [-i] [-o]
```

Parameters

```
-d Ps: Device Name (Default = /dev/nvram)
-n Pd: Number of Bytes (Default = Entire Device)
-o Pd: Starting Byte Offset (Default = 0)
```

Example

The following example indicates a typical display when using the **testNvramRd** command.

```
MOTLoad> testNvramRd -d/dev/nvram -n20

MOTLoad> testStatus
Passed (ePID=00000020): testNvramRd -d/dev/nvram -n20
```

See Also

testNvramWr

testNvramRdWr - NVRAM Read/Write (Destructive)

Name

testNvramRdWr—validates the operation of the NVRAM. Both read and write operations are supported. The test application assures that each byte of the NVRAM is addressable, readable, and writable. This test does not alter the contents of NVRAM if no system error or reset occurs. The actual test operates as follows:: write alternating patters: 00x0, 0xFF, 0x55, 0xAA, 0xC3, and 0x3C to NVRAM and verify it.

Synopsis

```
testNvramRdWr [-d] [-n] [-o]
```

Parameters

```
-d Ps: Device Name (Default = /dev/nvram)
-n Pd: Number of Bytes (Default = Entire Device)
-o Pd: Starting Byte Offset (Default = 0)
```

Example

The following example indicates a typical display when using the **testNvramRdWr** command.

```
MOTLoad> testNvramRd -d/dev/nvram -n20

MOTLoad> testStatus
Passed (ePID=00000020): testNvramRd -d/dev/nvram -n20
```

See Also

testNvramRd

testRam - testRam (DIRECTORY)

Name

testRam—executes each of the tests shown below in the order listed. Each test is given a copy of the command line arguments (if any are specified). The following are standard tests: testRamAddr, testRamAlt, TestRamBitToggle, testRamBounce, testRamCodeCopy, testRamMarch, testRamPatterns, testRamPerm, testRamQuick, testRamRandom.

Synopsis

```
testRam [-a] [-b] [-i] [-n] [-t] [-v]
```

Parameters

```
-a Ph: Address to Start (Default = Dynamic Allocation)
-b Ph: Block Size (Default = 16KB)
-i Pd: Iterations (Default = 1)
-n Ph: Number of Bytes (Default = 1MB)
-t Pd: Time Delay Between Blocks in OS Ticks (Default = 1)
-v 0: Verbose Output
```

Example

The following example indicates a typical display when using the **testRam** command.

```
MOTLoad> testRam -v
Executing RAM Addressing:  PASSED
Executing RAM Alternating:  PASSED
Executing RAM Bit Toggle:  PASSED
Executing RAM Bounce:  PASSED
Executing RAM Code Copy:  PASSED
Executing RAM March:  PASSED
Executing RAM Patterns:  PASSED
Executing RAM Permutations:  PASSED
Executing RAM Quick:  PASSED
Executing RAM Random:  PASSED
```

See Also

testNvRamAddr, testRamAlt, testRamBitToggle, testRamBounce, testRamCodeCopy, testRamMarch, testRamPatterns, testRamPerm, testRamQuick, testRamRandom

testRamAddr - Ram Addressing Test

Name

testRamAddressing—assures addressability of memory, using a memory test block. Addressing errors are sought by using a memory location address as the data for that location. This test proceeds as follows: (1) A Locations Address is written to its location (n). (2) The next location (n+4) is written with its address complemented. (3) The next location (n+8) is written with the most significant (MS) 16 bits and least significant (LS) (4) Steps 1, 2, and 3 are repeated throughout the memory block. (5) The memory is read and verified for the correct data pattern(s) and any errors are reported. (6) The test is repeated using the same algorithm as above (steps 1 through 5) except that inverted data is used to insure that every data bit is written and verified at both "0" and "1".

Synopsis

```
testRamAddressing [-a] [-b] [-i] [-n] [-t] [-v]
```

Parameters

```
-a Ph: Address to Start (Default = Dynamic Allocation)
-b Ph: Block Size (Default = 16KB)
-i Pd: Iterations (Default = 1)
-n Ph: Number of Bytes (Default = 1MB)
-t Pd: Time Delay Between Blocks in OS Ticks (Default = 1)
-v 0: Verbose Output
```

Example

The following example indicates a typical display when using the **testRam** command.

```
MOTLoad> testRamAddr -v
Executing RAM Addressing:  PASSED
```

See Also

testRam, testRamAlt, testRamBitToggle, testRamBounce, testRamCodeCopy, testRamMarch, testRamPatterns, testRamPerm, testRamQuick, testRamRandom

testRamAlt - Ram Alternating Test

Name

testRamAlt—assures addressability of memory, using a memory test block. Addressing errors are sought by writing an alternating pattern of all zeros and all ones. This test proceeds as follows: (1) Location (n) is written with data of all bits 0. (2) The next location (n+4) is written with all bits. (3) Steps 1 and 2 are repeated throughout the memory block. (4) The memory is read and verified for the correct data pattern(s) and any errors are reported.

Synopsis

```
testRamAlternating [-a] [-b] [-i] [-n] [-t] [-v]
```

Parameters

```
-a Ph: Address to Start (Default = Dynamic Allocation)
-b Ph: Block Size (Default = 16KB)
-i Pd: Iterations (Default = 1)
-n Ph: Number of Bytes (Default = 1MB)
-t Pd: Time Delay Between Blocks in OS Ticks (Default = 1)
-v 0: Verbose Output
```

Example

The following example indicates a typical display when using the **testRam** command.

```
MOTLoad> testRamAlt -v
Executing RAM Addressing:  PASSED
```

See Also

testRam, testRamAddr, testRamBitToggle, testRamBounce, testRamCodeCopy, testRamMarch, testRamPatterns, testRamPerm, testRamQuick, testRamRandom

testRamBitToggle - Ram Bit Toggle Test

Name

testRamBitToggle—assures that each memory location in the memory test block is written with the test data pattern. Each memory location in the memory block is then written with the test data pattern complemented. The memory under test is read back to verify that the complement test data is properly retained. Each memory location in the memory block is then written with the test data pattern. The memory under test is read back to verify that the test data is properly retained. The test proceeds as follows: (1) Random data seed is copied into a work register. (2) Work register data is shifted right one bit position. (3) Random data seed is added to work register using unsigned arithmetic. (4) Data in the work register may or may not be complemented. (5) Data in the work register is written to current memory location.

Synopsis

```
testRamBitToggle [-a] [-b] [-i] [-n] [-t] [-v]
```

Parameters

```
-a Ph: Address to Start (Default = Dynamic Allocation)
-b Ph: Block Size (Default = 16KB)
-i Pd: Iterations (Default = 1)
-n Ph: Number of Bytes (Default = 1MB)
-t Pd: Time Delay Between Blocks in OS Ticks (Default = 1)
-v 0: Verbose Output
```

Example

The following example indicates a typical display when using the **testRamBitToggle** command.

```
MOTLoad> testRamBitToggle -v
Executing RAM Addressing:  PASSED
```

See Also

testRam, testRamAddr, testRamBounce, testRamCodeCopy, testRamMarch, testRamPatterns, testRamPerm, testRamQuick, testRamRandom

testRamBounce - Ram Bounce Test

Name

testRamBounce—writes all one's to all memory addresses within the default or specified memory block, then performs a read-back and verifies of each memory address. If a mis-compare is detected, an error is logged. This operation is repeated a second time but the write data is all zero.

Synopsis

```
testRamBounce [-a] [-b] [-i] [-n] [-t] [-v]
```

Parameters

```
-a Ph: Address to Start (Default = Dynamic Allocation)
-b Ph: Block Size (Default = 16KB)
-i Pd: Iterations (Default = 1)
-n Ph: Number of Bytes (Default = 1MB)
-t Pd: Time Delay Between Blocks in OS Ticks (Default = 1)
-v 0: Verbose Output
```

Example

The following example indicates a typical display when using the **testRamBounce** command.

```
MOTLoad> testRamBounce -v
Executing RAM Bounce:  PASSED
```

See Also

testRam, testRamAddr, testRamAlt, testRamBitToggle, testRamCodeCopy, testRamMarch, testRamPatterns, testRamPerm, testRamQuick, testRamRandom

testRamCodeCopy - Ram Code Copy Test

Name

testRamCodeCopy—copies a small test code application to memory and executes it. This test code then copies itself to the next higher memory address and executes the new copy. This process is repeated until the memory buffer supplied by the "-n" option has been exhausted. This test application will not attempt execution from an address which does not reside within system memory(RAM). Due to bus latencies between instruction fetechs across a PCI or VME bus, the processor would timeout and generate an exception.

Synopsis

```
testRamCodeCopy [-a] [-b] [-i] [-n] [-t] [-v]
```

Parameters

```
-a Ph: Address to Start (Default = Dynamic Allocation)
-b Ph: Block Size (Default = 16KB)
-i Pd: Iterations (Default = 1)
-n Ph: Number of Bytes (Default = 1MB)
-t Pd: Time Delay Between Blocks in OS Ticks (Default = 1)
-v 0: Verbose Output
```

Example

The following example indicates a typical display when using the **testRamBounce** command.

```
MOTLoad> testRamCodeCopy -v
Executing RAM Code Copy:  PASSED
```

See Also

testRam, testRamAddr, testRamAlt, testRamBitToggle, testRamBounch, testRamMarch, testRamPatterns, testRamPerm, testRamQuick, testRamRandom

testRamEccMonitor - Ram ECC Monitor

Name

testRamEccMonitor—monitors system hardware for the indication of an ECC single bit error or an ECC multiple bit error. This test will not execute if the memory controller is not configured to support ECC memory devices.

Synopsis

```
testRamEccMonitor [-d] [-e] [-q] [-t] [-v]
```

Parameters

```
-d Ps: Device Instance (Default = 1)
-e Pd: Error Threshold (Default = 1)
-q Pd: Query Interval, in Seconds (Default = 3)
-t Pd: Time in Seconds to Run Test (Default = 60, 0 = Run Forever)
-v 0: Verbose
```

Example

The following example indicates a typical display when using the **testRamEccMonitor** command.

```
MOTLoad> testRamEccMonitor -v
Single bit RAM ECC error(s) detected. Single bit error count = 3.
Address of first detected error - 00105678. Erroneous bit = 19.
Memory Controller 0

MOTLoad> testRamEccMonitor -v
MOTLoad> There are NO configured ECC Memory Controllers
```

See Also

testRam, testRamAddr, testRamAlt, testRamBitToggle, testRamBounch, testRamCodeCopy, testRamMarch, testRamPatterns, testRamPerm, testRamQuick, testRamRandom

testRamMarch - Ram Marching Test

Name

testRamMarch—assures addressability of memory, using a memory test block. Addressing errors are sought by writing a pattern and its complement to each location. The test proceeds as follows: (1) Starting at the beginning test address and proceeding towards the ending address, each location is written with the starting pattern. (2) Starting at the beginning test address and proceeding towards the ending address, each location is verified to contain the starting pattern and is written with the complement of the starting pattern. (3) Starting at the ending test address and decreasing to the starting test address, each location is verified to contain the complement of the starting pattern and is then written with the starting pattern.

Synopsis

```
testRamMarch [-a] [-b] [-i] [-n] [-t] [-v]
```

Parameters

```
-a Ph: Address to Start (Default = Dynamic Allocation)
-b Ph: Block Size (Default = 16KB)
-i Pd: Iterations (Default = 1)
-t Pd: Time Delay Between Blocks in OS Ticks (Default = 1)
-v 0: Verbose Output
```

Example

The following example indicates a typical display when using the testRamMarch command.

```
MOTLoad> testRamMarch -v
Executing RAM March: PASSED
```

See Also

testRam, testRamAddr, testRamAlt, testRamBitToggle, testRamBounch, testRamCodeCopy, testRamMarch, testRamPatterns, testRamPerm, testRamQuick, testRamRandom

testRamPatterns - Ram Patterns Test

Name

testRamPatterns—assures addressability of memory, using a memory test block. Memory in the test block is initialized with all ones(0xFFFFFFFF). For each location in the test block, the following patterns are used: 0x00000000 0x01010101 0x03030303 0x07070707, 0x0F0F0F0F 0x1F1F1F1F 0x3F3F3F3F 0x7F7F7F7F. Each location in the test block is, individually, written with the current pattern and the 1's complement of the current pattern. Each write is read back and verified.

Synopsis

```
testRamPatterns [-a] [-b] [-i] [-n] [-t] [-v]
```

Parameters

```
-a Ph: Address to Start (Default = Dynamic Allocation)
-b Ph: Block Size (Default = 16KB)
-i Pd: Iterations (Default = 1)
-n Ph: Number of Bytes (Default = 1MB)
-t Pd: Time Delay Between Blocks in OS Ticks (Default = 1)
-v 0: Verbose Output
```

Example

The following example indicates a typical display when using the **testRamPatterns** command.

```
MOTLoad> testRamPatterns -v
Executing RAM Patterns: PASSED
```

See Also

testRam, testRamAddr, testRamAlt, testRamBitToggle, testRamBounch, testRamCodeCopy, testRamMarch, testRamPerm, testRamQuick, testRamRandom

testRamPerm - RAM Permutations Test

Name

testRamPermutations—aperforms a test which verifies that the memory test block can accommodate 8-bit, 16-bit, and 32-bit writes and reads in any combination. This test performs three data size test phases in the following order: 8, 16, and 32 bits. Each test phase writes a 16-byte data pattern (using its data size) to the first 16 bytes of every 256-byte block of memory in the test block. The test phase then reads and verifies the 16-byte block using 8-bit, 16-bit, and 32-bit access modes.

Synopsis

```
testRamPermutations [-a] [-b] [-i] [-n] [-t] [-v]
```

Parameters

```
-a Ph: Address to Start (Default = Dynamic Allocation)
-b Ph: Block Size (Default = 16KB)
-i Pd: Iterations (Default = 1)
-n Ph: Number of Bytes (Default = 1MB)
-t Pd: Time Delay Between Blocks in OS Ticks (Default = 1)
-v 0: Verbose Output
```

Example

The following example indicates a typical display when using the **testRamPermutation** command.

```
MOTLoad> testRamPerm -v
Executing RAM Permutations: PASSED
```

See Also

testRam, testRamAddr, testRamAlt, testRamBitToggle, testRamBounch, testRamCodeCopy, testRamMarch, testRamPatterns, testRamQuick, testRamRandom

testRamQuick - RAM Quick Test

Name

testRamQuick—performs a test which verifies that the memory test block can be written to and read from using data patterns. Each pass of this test fills the test block with a data pattern by writing the current data pattern to each memory location from a local variable and reading it back into that same register. The local variable is verified to be unchanged only after the write pass through the test range. This test uses a first pass data pattern of 0x00000000 and 0xFFFFFFFF for the second pass.

Synopsis

```
testRamQuick [-a] [-b] [-i] [-n] [-t] [-v]
```

Parameters

```
-a Ph: Address to Start (Default = Dynamic Allocation)
-b Ph: Block Size (Default = 16KB)
-i Pd: Iterations (Default = 1)
-n Ph: Number of Bytes (Default = 1MB)
-t Pd: Time Delay Between Blocks in OS Ticks (Default = 1)
-v 0: Verbose Output
```

Example

The following example indicates a typical display when using the **testRamQuick** command.

```
MOTLoad> testRamQuick -v
Executing RAM Quick: PASSED
```

See Also

testRam, testRamAddr, testRamAlt, testRamBitToggle, testRamBounch, testRamCodeCopy, testRamMarch, testRamPatterns, testRamPerm, testRamRandom

testRamRandom - RAM Random Test

Name

testRamRandom—assures addressability of memory, using a memory test block. Addressing errors are sought by writing a random pattern and its complement to each location. The test proceeds as follows: (1) A random pattern is written throughout the test block. (2) The random pattern complemented is written throughout the test block. (3) The complemented pattern is verified. (4) The random pattern is rewritten throughout the test block. (5) The random pattern is verified.

Synopsis

```
testRamRandom [-a] [-b] [-i] [-n] [-t] [-v]
```

Parameters

```
-a Ph: Address to Start (Default = Dynamic Allocation)
-b Ph: Block Size (Default = 16KB)
-i Pd: Iterations (Default = 1)
-n Ph: Number of Bytes (Default = 1MB)
-t Pd: Time Delay Between Blocks in OS Ticks (Default = 1)
-v 0: Verbose Output
```

Example

The following example indicates a typical display when using the **testRamRandom** command.

```
MOTLoad> testRamRandom -v
Executing RAM Quick: PASSED
```

See Also

testRam, testRamAddr, testRamAlt, testRamBitToggle, testRamBounch, testRamCodeCopy, testRamMarch, testRamPatterns, testRamPerm, testRamQuick

testRtcAlarm - RTC Alarm

Name

testRtcAlarm—assures proper addressability of the RTC device. The test proceeds as follows: (1) Clear the interrupt counter used by the RTC interrupt handler. (2) Enable the RTC interrupt function in the RTC device. (3) Set the RTC ALARM function to generate interrupts once a second. (4) Sleep the test application for a preset amount of time (seconds). This allows the RTC interrupt handler time to collect interrupts and increment the interrupt counter. (5) When the test application wakes up, immediately turn off the RTC interrupt function. (6) Get the interrupt counter value and compare it with the number of seconds the test application was asleep. If the comparison is outside an expected range, the test has failed. (7) Disable the RTC ALARM function.

Synopsis

```
testRtcAlarm [-d]
```

Parameters

```
-d Ps: Device Name (Default = /dev/rtc)
```

Example

The following example indicates a typical display when using the **testRtcAlarm** command.

```
MOTLoad> testRtcAlarm
```

See Also

testRtcRollOver, testRtcTick, testRtcReset

testRtcReset - RTC Reset

Name

testRtcReset—ensures the RTC is capable of generating a board level reset. The test proceeds as follows: (1) Set the time delay to 1 second. (2) Set the RTC's watchdog timer to drive the reset pin. (3) Start the watchdog timer. (4) Wait up to 4 seconds for a reset to occur. (5) If no reset is generated, log an error indicating the occurance, and report the watchdog expiration status. (6) Disable the operation of the RTC watchdog.

Synopsis

```
testRtcReset [-d]
```

Parameters

```
-d Ps: Device Name (Default = /dev/rtc)
```

Example

The following example indicates a typical display when using the **testRtcReset** command.

```
MOTLoad> testRtcReset
```

See Also

testRtcRollOver, testRtcTick

testRtcRollOver - RTC Rollover

Name

testRtcRollOver—verifies the ’roll-over’ operation of the Real Time Clock (RTC). The test proceeds as follows: (1) Check the RTC STOP bit, and if set, turn on the RTC CLOCK. (2) Set the RTC date to "December 31, 1999 at 23 hours, 59 minutes, and 59 seconds. (3) Verify the RTC day/month/year and hours/minutes/seconds have rolled over. (4) Restore the original day/month/year and hours/minutes/seconds values. (5) If the RTC STOP bit, which disables the RTC.

Synopsis

```
testRtcRollOver [-d]
```

Parameters

```
-d Ps: Device Name (Default = /dev/rtc)
```

Example

The following example indicates a typical display when using the **testRtcAlarm** command.

```
MOTLoad> testRtcRollOver
```

See Also

testRtcAlarm, testRtcTick, testRtcReset

testRtcTick - RTC Tick

Name

testRtcTick—verifies the functionality of the Real Time Clock (RTC). This test does not check clock accuracy. This test application will destroy the value in the SECONDS register. The test proceeds as follows: (1) Check the RTC STOP bit, and if set, turn on the RTC CLOCK and initializes to default values. (2) Verify the SECONDS register is being updated. If this register is not updating, return a failure. (3) Set the SECONDS register to zero and delay the test application for a few seconds. When the test application wakes up, read the SECONDS register and verify the value has changed. (4) If the RTC STOP bit was originally set, restore the STOP bit, which disables the RTC.

Synopsis

```
testRtcTick [-d]
```

Parameters

```
-d Ps: Device Name (Default = /dev/rtc)
```

Example

The following example indicates a typical display when using the **testRtcTick** command.

```
MOTLoad> testRtcTick
```

See Also

testRtcAlarm, testRtcRollOver testRtcClock, testRtcReset

testSerialExtLoop - Serial External Loopback

Name

testSerialExtLoop—validates the operation of the external serial loopback path. This is a generic serial external loopback test application that requires an external loopback connector (configuration of connector is dependent upon the specific hardware design of the board). The test application verifies the ability of a serial port device to send and receive random ASCII characters. **NOTE:** This test **cannot** be executed on internal serial devices (i.e., no access for loopback connector) or serial devices that are needed for essential functions (ex. MOTLoad console port).

Synopsis

```
testSerialExtLoop [-d] [-n] [-t] [-v]
```

Parameters

```
-d Ps: Device Name (Default = /dev/com2)
-n Pd: Number of Characters (Default = 8192)
-t Pd: RxD Time Out (Default = 30 seconds)
-v 0 : Enable Verbose Mode
```

Example

The following example indicates a typical display when using the **testSerialExtLoop** command.

```
MOTLoad> testSerialExtLoop -d/dev/com3
```

See Also

testSerialIntLoop

testSerialIntLoop - Serial Internal Loopback

Name

testSerialIntLoop—validate the operation of the internal serial loopback path. This is a generic serial internal loopback test application that does not require an external loopback connector. The test application verifies the ability of a serial port device to send and receive random ASCII characters to its internal registers.

Synopsis

```
testSerialIntLoop [-d] [-n] [-t] [-v]
```

Parameters

```
-d Ps: Device Name (Default = /dev/com2)
-n Pd: Number of Characters (Default = 8192)
-t Pd: RxD Time Out (Default = 30 seconds)
-v 0 : Enable Verbose Mode
```

Example

The following example indicates a typical display when using the **testSerialIntLoop** command.

```
MOTLoad> testSerialIntLoop -d/dev/com3
```

See Also

testSerialExtLoop

testStatus - Display the Contents of the Test Status

Name

testStatus—displays pass/fail status information of completed test tasks. If no test tasks have completed, no status is displayed. By default all test status entries are displayed. To simplify status queries for automated testing the **-q** option returns a concise Passed or Failed message. The **-l** option provides more detailed test status information. The **-n** and **-s** options take decimal number arguments. The **-e** option requires a hexadecimal argument. These options allow the user to display the status of user specified test status entries. The status fields displayed by this command are equivalent to those used in the **errorDisplay** command.

Synopsis

```
testStatus [-eP] [-l] [-nPd] [-q] [-sPd]
```

Parameters

```
-e Ph: Executive Process/Task Identifier of Entry to Display
-l  0: Long (Detailed) Display
-n Pd: Number of Entries to Display
-q 0 : Quick Summary Display
-s Pd: Specific Entry Number (1 to n) to Display
```

Example

The following example indicates a typical display when using the **testStatus** command.

```
MOTLoad> testStatus
-d/dev/com3Failed (ePID=00000015):testI2cDimmSpd -d/dev/i2c0/srom/A0 -n1

Passed (ePID=00000017):testI2cDimmSpd -d/dev/i2c0/srom/A0 -n0


MOTLoad> testStatus -l
tName =testI2cDimmSpd -d/dev/i2c0/srom/A0 -n1
  entryNumber=00000001 errCnt=00000001 loopCnt=00000000
  sPID=00000011 ePID=00000015 eS.eM=2.1 sErrNo=00000000 eErrNo=0A000021
  sTime=10:55:09 fTime=10:55:12 eTime=00:00:03
```

```
tName =testI2cDimmSpd -d/dev/i2c0/srom/A0 -n0
  entryNumber=00000002 errCnt=00000000 loopCnt=00000000
  sPID=00000011 ePID=00000017 eS.eM=2.1 sErrNo=00000000 eErrNo=00000000
  sTime=10:55:18 fTime=10:55:22 eTime=00:00:04
```


See Also

clear, errorDisplay

testSuite - Execute Test Suite

Name

testSuite—executes the specified test suite. The test suite is specified by either the -n option (MOTLoad built-ins or user-created) or by the -a option (memory resident). The -l option displays the contents of the specified test suite. The -c, -t and -s options control the loop and execution aspects of the test suite. The -r option overrides the -c and -q options, allowing only one iteration of the test suite, which is run in the background with no console messages whatsoever. Control may be returned to the console before the testSuite has completed with the -r option; use testStatus to determine the outcome of the background suite. Options -c, -t and -w take decimal numbers as arguments. The -m (multi-line mode) causes the on-going test status information to scroll the display rather than overwriting the previous line. The -q (quiet) option reduces the amount of displayed information to only error and warnings, the on-going test status info, and the test summary output. The -w (wait-time) option speeds up the console display, for those times when test time is critical.

Synopsis

```
testSuite [-aP*] [-cP*] [-d] [-k] [-l] [-m] [-nPs] [-q] [-r]
[-s] [-tP*] [-wP*]
```

Parameters

```
-a P*: Memory Address of Test Suite
-c P*: Number of Loops to Execute Test Suite (Default =1)
-d O : Display All Test Suites
-k O : Terminate (Kill) Defunct Test-Tasks
-l O : Display Contents of Test Suite, Test Suite Must be
Specified
-m O :Multi-Line display of running test status
-n Ps: Name of Test Suite (Built-Ins/Created) to Execute
-q O : Quiet output (ignored if -r is used)
-r O : Remote Execution (Silent, Background, -c, -q Ignored)
-s O : Stop On Error
-t P*: Number of Seconds to Execute Test Suite (Time To Live)
-w P*: Wait-time between status lines output, in sec(def=1)
```

Example

The following example indicates a typical display when using the **testSuite** command. Note: the same testSuite was used for both examples, but the options of the second example reduced the console I/O, and thus the test execution time.

```
MOTLoad> testSuite -ns
Started (ePID=00000043): testRamAddr
Started (ePID=00000044): testRamBounce
Passed (ePID=00000043): testRamAddr
Passed (ePID=00000044): testRamBounce
TestSuite Name: s
  Start Time   =13:31:42 ElapsedTime=00:00:05
  Total Time =000:00:05 Error Count =00000000
  LoopCount =00000001 Cpu TAU Temp =090C Therm Sensor =N/A

PASSED

MOTLoad> testSuite -ns -w0 -q
TestSuite Name: s
  Start Time =13:31:34 Elapsed Time =00:00:02
  Total Time =000:00:02 Error Count =00000000
  Loop Count = 00000001 Cpu Tau Temp =090C Therm Sensor =N/A

PASSED
```

See Also

testSuiteMake, testStatus

testSuiteMake - Make (Create) Test Suite

Name

testSuiteMake—allows the user to create a custom test suite. Entering this command at the MOTLoad command line prompt puts the user into edit mode. Pressing the “Ctrl-C” keys or entering an empty string will exit the edit mode during creating a test suite. The testSuiteMake command executes as a utility task.

Note: The number of tests that can be included in a testSuite is limited by the number of active tasks or processes, subtracted from the maximum number of processes MOTLoad allows. If too many tests are included, an error similar to the following will occur when the testSuite is executed (the number of tests allowed depends upon the specific board product the tests are running on, but as a general rule, no more than 50 tests are allowed):

Internal Error: Fork of "xxxx" Failed

Synopsis

```
testSuiteMake -n
```

Parameters

```
-n Ps: Name of Test Suite to Make (Create)
```

Example

The following example indicates a typical display when using the **testSuiteMake** command.

```
MOTLoad> testSuiteMake -nTest1
testRam
testNvramRd
testRtcTick

1 testRam
2 testNvramRd
3 testRtcTick
```

```
MOTLoad> testSuite -1 -nTest1
1 testRam
2 testNvramRd
3 testRtcTick
```


See Also

testSuite

testUsbOscillator - USB Oscillator Test Application

Name

testUsbOscillator—verifies the oscillator of the USB device (on board the UUT) is ticking at the expected rate by measuring the amount of time that the USB controller allocates to each frame (should be 1 ms). A USB device does not need (but may be) to be connected to the USB port. The test does the following operations: (1) Wait for frame count register to change. (2) Read the system time base register and wait for frame count register to change again. (3) Read the system time base register and calculate the elapsed time. Verify that the elapsed time was as expected (1 millisecond).

Synopsis

```
testUsbOscillator  [-dPs] [-iPd] [-v]
```

Parameters

```
-d Ps: Device Tree Node (default = /pci0/usb0)
-i Pd: Number of Iterations (default = 1)
-v O: Verbose (default = FALSE)
```

Example

The following example indicates a typical display when using the **testUsbOscillator** command.

```
MOTLoad> testUsbOscillator -d/pci0/usb0 -i5 -v
```

See Also

testUsbVok - USB Voltage Test Application

Name

testUsbVok—verifies the USB voltage status register is not indicating an ’overvoltage’ condition. A USB device does not need (buy may be) to be connected to the USB port. If the status register indicates that a USB port is indicating overvoltage, the test will fail.

Synopsis

```
testUsbVok [-dPs] [-iPd] [-v]
```

Parameters

```
-d Ps: Device Tree Node (default = /pci0/usb0)
-i Pd: Number of Iterations (default = 1)
-v O: Verbose (default = FALSE)
```

Example

The following example indicates a typical display when using the **testUsb** command.

```
MOTLoad> testUsbVok -d/pci0/usb0 -i5 -v
```

See Also

testWatchdogTimer - Watchdog Timer

Name

testWatchdogTimer—tests the watchdog timer device. The test application will check for timer accuracy allowing a tolerance of 30 microseconds. Both interrupt and reset modes are validated through this test.

Synopsis

```
testWatchdogTimer -d [-r] [-t] [-v]
```

Parameters

```
-d Ps: Device Name
-r 0 : Set to Reset Mode (Default = Interrupt Mode)
-t Pd: Time in Milliseconds to Run Test (Default = 5000)
-v 0 : Enable Verbose Mode
```

Example

The following example indicates a typical display when using the **testWatchdogTimer** command.

```
MOTLoad> testWatchdogTimer -d/dev/wdt0 -t1000 -v
```

See Also

tftpGet - TFTP Get

Name

tftpGet—downloads a file from the specified server to local memory.

Synopsis

```
tftpGet [-a] -c [-d] -f [-g] [-m] [-r] -s [-v]
```

Parameters

```
-a  Ph: Memory Address (Default = User Download Buffer)
-c  Ps: Client IP Address
-d  Ps: Device Name (Default = /dev/enet0)
-f  Ps: Boot File Name
-g  Ps: Gateway IP Address (Default = n.n.n.253)
-m  Ps: Subnet Mask (Default = 255.255.255.0)
-r  Pd: Retry Count (Default = Forever)
-s  Ps: Server IP Address
-v  O : Verbose Mode
```

Example

This example is a typical display when using the **tftpGet** command.

```
MOTLoad> tftpGet -c192.168.1.190 -s192.168.1.33 -d/dev/enet0
-f/tmp/hxeb100.rom
Network Loading from: /dev/enet0
Loading File: /tmp/hxeb100.rom
Load Address: 00560000

Client IP Address      = 192.168.1.190
Server IP Address      = 192.168.1.33
Gateway IP Address     = 192.168.1.253
Subnet IP Address Mask = 255.255.255.0

Network File Load in Progress...

Bytes Received =&1048576, Bytes Loaded =&1048576
Bytes/Second =&209715, Elapsed Time =5 Second(s)
```

See Also

tftpPut

tftpPut - TFTP Put

Name

tftpPut—uploads a local memory buffer to the specified server.

Synopsis

```
tftpPut [-a] [-b] -c [-d] -f [-g] [-m] -n [-r] [-s] [-v]
```

Parameters

```
-a  Ph: Memory Address (Default = User Download Buffer)
-b  Ps: Broadcase IP Address (Default = 255.255.255.255)
-c  Ps: Client IP Address (Default = 0.0.0.0.)
-d  Ps: Device Name (Default = /dev/enet0)
-f  Ps: Boot File Name
-g  Ps: Gateway IP Address (Default = n.n.n.253)
-m  Ps: Subnet Mask (Default = 255.255.255.0)
-n Ph: Number of Bytes to Send (Put)
-r  Pd: Retry Count (Default = Forever)
-s  Ps: Server IP Address (Default = 0.0.0.0.)
-v  0 : Verbose Mode
```

Example

The following example indicates a typical display when using the **tftpPut** command.

```
MOTLoad> tftpPut -c192.168.1.190 -s192.168.1.33 -d/dev/enet0
-f/tmp/hxeb100.rom
Network Uploading from: /dev/enet0
Uploading File: /tmp/hxeb100.rom
Upload Address: 00560000

Client IP Address      = 192.168.1.190
Server IP Address      = 192.168.1.33
Gateway IP Address     = 192.168.1.253
Subnet IP Address Mask = 255.255.255.0
```

```
Network File Upload in Progress...

Bytes Sent     =&1048576
Bytes/Second   =&209715, Elapsed Time =5 Second(s)
```


See Also

tftpGet

time - Display Date and Time

Name

time—displays the current date and time.

Synopsis

```
time  [-d] [-s]
```

Parameters

```
-d  Ps: Device Name (Default = /dev/rtc)
-s  0: Short Option (MMDDYYHHMMSS)
```

Example

The following example indicates a typical display when using the **time** command.

```
MOTLoad> time
FRI JUN 7 16:45:02.00 2002
```

For SBC's without a Real-Time Clock device, the PowerPC time base can be displayed

```
MOTLoad> time -d/dev/ppctb
FRI JUN 7 16:45:02.00 2002
```

See Also

set

transparentMode - Transparent Mode (Connection to Host)

Name

transparentMode—establishs a serial connection to another host (ex. a UNIX host) through the currently active serial connection. This is useful if the device to which the transparent serial connection is being made does not have a physical serial port (ex. a PrPMC slave module). Once a connection is established, the MOTLoad prompt from the new host becomes active and all MOTLoad commands supported by the new host become available. The original serial port connection can be re-established by typing in the Ctrl-A exit sequence.

Synopsis

```
transparentMode  [-b] [-d] [-e] [-p] [-s] [-w]
```

Parameters

```
-b Pd: Baut Rate (Default = 9600)
-d Ps: Device Name (Default = /dev/rtc)
-e Ph: Exit Character (Default = Ctrl-A)
-p Ps: Parity (e/o) (Default = No)
-s Pd: Stop Bits (1/2) (Default = 1)
-w Pd: Word Size (7/8) (Default = 8)
```

Example

The following example indicates a typical display when using the **transparentMode** command.

```
MOTLoad> transparentMode -b9600
```

See Also

tsShow - Display Task Status

Name

tsShow—displays the current operating system tasks.

Synopsis

```
tsShow  [-a]
```

Parameters

```
-a 0: All Operating Systems Tasks
```

Example

The following example indicates a typical display when using the **tsShow** command.

```
MOTLoad> tsShow
Priority Identifier Status StackPtr EventPtr ErrNo     Name
00000000  00105984  01  001A8BD0  002B448C  00000000  tRoot
00000001  0011C368  04  001ACBF0  002B449C  00000000  tLogMessage
00000002  0011E850   01  001B0C10  002B44AC  00000000  tWatchDogTimer
00000004  0011FB98  02  001B88E0  002B4B4C  00000000  tTestShell
00000010  0012E878   00  001E8DC0  00000000  00000000  taskStatusShow
0000003F  00112DB8  00  002B40E0  00000000  00000000  OSTaskIdle
```

See Also

upLoad - Up Load Binary-Data from Target

Name

upLoad—uploads (sends) binary data to the host serial port from the specified memory buffer.

Synopsis

```
upLoad  [-a] [-b] [-d] [-f] [-n] [-s] [-t]
```

Parameters

```
-a P*: Source Memory Address (Default = User Down Load Area)
-b Pd: Baud Rate (Default = 9600)
-d Ps: Serial-Port Device Name (Default = /dev/com2)
-f P*: Blocking Factor in Bytes (Default = Default Byte Count)
-n P*: Number of Bytes (Default = 1048576 Decimal)
-s 0 : S-Record Mode
-t Pd: Blocking Factor Delay in Ticks (Default - 0)
```

Example

The following example indicates a typical display when using the **upLoad** command.

```
MOTLoad> upLoad
```

See Also

downLoad

version - Display Version String(s)

Name

version—displays the release version ID of the MOTLoad program that is being executed.

Synopsis

```
version
```

Parameters

The following example indicates a typical display when using the **version** command.

```
MOTLoad> version
Copyright Motorola Inc. 1999-2002, All Rights Reserved
MOTLoad RTOS Version 2.0 PAL Version 1.1 RM01
Mon Mar 10 12:01:28:01:28 MST 2003
```

See Also

vmeCfg - Manage VME Configuration Parameters

Name

vmeCfg—manages user specified VME Configuration parameters. It does this by allowing the user to create/edit, show, and delete VME Configuration parameters. These parameters are used at start-up time to configure the VME device. If user specified VME Configuration parameters do not exist, default values will be used instead.
Note: The VME Configuration parameters created by this utility will be stored in NVRAM as Global Environment Variables.

Synopsis

```
vmeCfg [-d] [-e] [-iPd] [-m] [-oPd] [-rPh] [-s] [-z]
```

Parameters

```
-d O : Delete User Setting
-e O : Edit/Create User Setting
-i Pd: Inbound Window Number (0-7)
-m O : Master Enable
-o Pd: Outbound Window Number (0-7)
-r Ph: Vme Chip Requester Offset (184/188/400/404/40C/F70)
-s O : Show User/Default Setting
-v O : Verbose Mode
-z O : Restore Default Settings
```

Example

The following example indicates a typical display when using the **vmeCfg** command.

```
MOTLoad> vmeCfg -e -o3
MOTLoad> vmeCfg -s -r40c
MOTLoad> vmeCfg -d -i2
MOTLoad> vmeCfg -z
```

vpdDisplay - VPD Display

Name

vpdDisplay—displays the MOTLoad VPD data packets from the on-board VPD SROM.

Synopsis

```
vpdDisplay [-d] [-i] [-z]
```

Parameters

```
-d Ps: Device Name (Default = Primary Onboard Device)
-i 0 : Ignore SROM Size Field
-z 0 : Data Only Mode
```

Example

The following example indicates a typical display when using the **vpdDisplay** command.

```
MOTLoad> vpdDisplay
Product Identifier : HXEB100
Manufacturing Assembly Number : 01-W3791F01A
Serial Number : 4786834
SROM/EEPROM CRC : E1998770 (&-510032016)
Flash Memory Configuration : FF FF FF FF FF FF FF FF
                           : FF FF FF FF
```

See Also

vpdEdit
Refer also to Appendix A, *MOTLoad Non-Volatile Data*

vpdEdit - VPD Edit

Name

vpdEdit—edit the MOTLoad VPD data packets from the on-board VPD SROM. The contents of the VPD SROM are copied to a memory buffer, then a byte-by-byte editor is provided to make changes. A single period (".") terminates the edit mode, followed by a final prompt to either update or not update the VPD SROM.

Synopsis

```
vpdEdit [-d] [-n]
```

Parameters

```
-d Ps: Device Name (Default = Primary Onboard Device)
-n Ph: Number of Bytes to Read (Default = Full VPD Packet)
```

Example

The following example indicates a typical display when using the **vpdEdit** command.

```
MOTLoad> vpdEdit
Reading VPD SROM...
008C2000 4D?
008C2001 4E? 4F.
Program VPD SROM (Y/N)? y
Writing VPD SROM...  Complete
```

See Also

vpdDisplay

Refer also to Appendix A, *MOTLoad Non-Volatile Data*

waitProbe - Wait for I/O Probe to Complete

Name

waitProbe—waits until the probe and initialization of the I/O subsystem has completed. This is accomplisted by polling a global initialization flag to be set..

Synopsis

```
waitProbe [-i] [-t]
```

Parameters

```
-i Pd: Wake Up Interval in Seconds (Default = 1)
-t Pd: Time to Live in Seconds (Default = 0, Forever)
```

Example

The following example indicates a typical display when using the **waitProbe** command.

```
MOTLoad> waitProbe
Waiting for System I/O Probe to Compete...
System I/O Probe Complete
MOTLoad>

MOTLoad> waitProbe
System I/O Probe Complete
```

See Also

MOTLoad Non-Volatile Data

A

Introduction

Non-volatile data is stored data that remains in memory after power-down. Some of the data is meant to be permanent and fixed, while other portions can be temporary and changed. Most of the fixed or permanent data is entered by the factory, at the time the product is built, while the temporary data or variable data is entered by the user, after the product is up and running. There are three types of non-volatile data in MOTLoad:

1. Vital Product Data (VPD): describes the unique characteristics of a specific board, such as marketing product number, serial number, assembly number, processor family, hardware clock frequencies, and component configuration information. Because most of the information is unique to that board, it is considered permanent, and is not usually changed by the user. Since the firmware uses certain VPD information during the boot process, changing this information can prevent the firmware from coming on-line (i.e., no firmware prompt) and render the board inoperable or unstable.
2. Global Environment Variables (GEVs): any stored information that the user may want to define on a board-by-board basis for use from one power-up to another. Boards can operate without any GEV, but errors may occur. However, even if errors occur, or the GEV is missing, the firmware should still come on-line and display a prompt.
3. Device-specific parameters, such as Serial Presence Detect (SPD) information for memory devices. This data is determined by the device itself and is stored in a private non-volatile storage device. SPD information is not described in this section, but is usually listed in an appendix in the board installation manual.

Vital Product Data (VPD) Use

This section briefly explains the purpose of VPD, and describes how to read, archive, and edit that information.

Purpose

The purpose of the Vital Product Data (VPD) portion of non-volatile data is to store board-specific information that is not easily retrievable from other software sources. It is considered permanent and should not be changed by a non-technical person. The information is useful during board initialization, configuration and verification. The firmware (in this case MOTLoad) uses some of this information during the boot process. This information can also be accessed by the user. Refer to the appendix titled "Programmable Configuration Data" in the appropriate board level installation guide for more information on the contents of this information. Refer to the remainder of this section to learn how to access and read this information.

The VPD values for a specific board are unique for that board and should not be used on any other board. Hardware and software developers, as well as factory analysis technicians, may need to change certain VPD values, but non-technical users should not, since improper modifications can degradate board operation, functionality, or prevent access to firmware prompts.

Note If a firmware prompt is not available, the Safe Start option should be used to bring up a prompt on the system console, from which the VPD can be manually restored.

How to Read VPD Information

VPD information is stored in a fixed address portion of memory, usually SROM or EEPROM. It can be viewed by entering the following MOTLoad command:

vpdDisplay

If the VPD is valid, vpdDisplay provides a formatted output of all the VPD packets in the SROM. The VPD Specification should be referenced to determine the meaning of each field of the various packet types.

For most hardware products, the following elements are defined at the factory:

- ❏ Product Identifier (e.g., HXEB100-101)
- ❏ Manufacturing Assembly Number (e.g., 01-w3822F01)
- ❏ Serial Number (of the assembled board product)
- ❏ Processor Family Number (e.g., 7410)
- ❏ Hardware clock frequencies (e.g., internal, external, fixed, PCI bus)
- ❏ Component configuration information (e.g., connectors, Ethernet address(es), other addresses, Flash bank ID, L2 or L3 cache ID)
- ❏ Security Information (VPD type, version and revision data, 32-bit crc protection)

How to Archieve VPD Information

Even though VPD information should not be altered by the typical user, there may be a need to do so. If that is the case, the following procedure should be followed.

Prior to modifying any elements of VPD, create an archive copy of the initial VPD contents. The archive copy can be used later to restore the VPD to its original state, if necessary.

The procedure below illustrates how to archive the current VPD contents. (More detailed explanations of the syntax of these commands are available elsewhere in this manual.)

1. Read the VPD into the default user area of memory with a command similar to:

   ```
   sromRead -d/dev/i2c0/srom/A8 -n400
   ```

2. Create a file of it with a command similar to:

```
tftpPut -n0x400 -cBOARD_IP_HERE -fpath_and_filename -
d/dev/enet2 -sSERVER_IP_HERE
```

Note The command lines shown above must be customized for the board being used. The VPD SROM device string passed to sromRead must match the board. The Ethernet device string must also be for that board, as well as the IP addresses being used. The -n (size) option should match the MOTLoad SROM size, which is defined by the Vital Product Data Specification.

The resulting file (path_and_filename) will be a binary file whose length is determined by the -n (size) option. Save this binary file, it can be used later to restore the board VPD if necessary.

Restoring the Archive

As mentioned in the previous section, prior to modifying any elements of VPD, an archive copy of the initial VPD contents should be created (see previous section for instructions). This archive can be used to restore VPD to its previous contents, if necessary.

Extreme care must be taken when writing to the VPD SROM. Incorrect VPD values can prevent a board from reaching the MOTLoad command prompt. If this occurs, Safe Start, a jumper option on some hardware products, should be used.

The following sequence illustrates how to restore the archived VPD contents. (More detailed explanations of the syntax of these commands are available in Chapter 3 of this manual.)

```
tftpGet -n0x400 -cBOARD_IP_HERE -fpath_and_filename -
d/dev/enet2 -sSERVER_IP_HERE

sromWrite -d/dev/i2c0/srom/A8 -n400
```

Note The command lines shown above must be changed to reflect the specific board being used. The VPD SROM device string passed to sromWrite needs to match the board. The Ethernet device string needs to be appropriate for the board, as do the IP

addresses being used. It is very important to use the data file for the exact board to which the restoration is being done. The -n (size) option should match the MOTLoad SROM size, which is defined by the Vital Product Data Specification.

Editing VPD

The MOTLoad vpdEdit command allows VPD to be interactively edited. Ensure that the proper safeguards have been put in place prior to editing VPD. For example, the VPD should be both understood, and archived, prior to applying any changes. Incorrect VPD values can prevent a board from reaching the MOTLoad command prompt. If this occurs, Safe Start, a jumper option on some hardware products, should be used.

The edit session will prompt the user with each byte currently in VPD, and the user has the option of changing the byte by typing in a new value (a byte in hexadecimal), or the user can keep the existing value by entering a carriage return. The meaning of each byte of data can be determined by studying MOTLoad's Vital Product Data Specification.

The following edit session entries have special meaning:

^ (caret) - reverse edit order. This is helpful if the byte needing to be changed has been passed up during the edit session.

v (lowercase v) - edit in "normal" order again. This is handy after having used the ^, described above.

. (period) - stop editting and query user as to whether edits are to be saved in SROM.

Here is an example of an edit session. Note that the addresses increment until the ^ is entered, then decrement until the "v" is entered.

```
vpdEdit

00A67000 4D?

00A67001 4F?

00A67002 54?

00A67003 4F?
```

```
00A67004 52?

00A67005 4F? ^

00A67004 52?

00A67003 4F?

00A67002 54? v

00A67003 4F?

00A67004 52?

00A67005 4F? .


Program VPD SROM (Y/N)? n
```

If the "Program VPD SROM (Y/N)?" question is answered affirmatively, then the edits are written to the VPD SROM. A new checksum is calculated and written as well. Answering negatively prevents any change to the existing SROM contents.

Global Environment Variables (GEVs)

Global Environment Variables are used to store nearly any value for later retrieval, even after loss of power or hardware reset. Each value saved needs a unique label, the label being defined at the same time as the value. Global Environment Variables in MOTLoad are based loosely on the GEV concept presented in the PReP Specification. However, MOTLoad does not claim compliance to that specification.

GEVs are typically stored in NVRAM. MOTLoad requires 8K bytes at the top end of NVRAM. The amount of space set aside in the NVRAM for storage of GEVs is 3592 bytes.

Viewing GEV Values

All GEVs currently stored in NVRAM may be viewed with the gevShow command. The order of the GEVs will be the order in which they were

created. Each GEV will be shown as label=value. If the value is comprised of more than one line of data, the label will be shown on a separate line, above the value line(s).

```
gevShow
example1=Hi 12345 Hi
example2=Come Back Soon
jazz=
a
b
c
e
d
g
e
t
lkjkj
jsjs
ieie
vnvnv
s’s’s’s
c

apple=apple GEV
jazz3=short jazz3
example3=August 7, 2002
Total Number of GE Variables =6, Bytes Utilized =160, Bytes
Free =3432
```

Viewing GEV Labels

The labels of all currently-defined GEVs can be listed with the gevList command. The order of the GEVs are in the order in which they were created as:

```
gevList
example1
example2
jazz
apple
```

```
jazz3
example3
Total Number of GE Variables =6, Bytes Utilized =160, Bytes
Free = 3432
```

Creating GEVs

The gevEdit command is used to create a new GEV. Execute gevEdit, and provide a label name which is currently not used, as in this example of a GEV labeled "example3" with a value of "August 7, 2002":

```
gevEdit example3
(Blank line terminates input.)
August 7, 2002


Update Global Environment Area of NVRAM (Y/N)? y
```

GEV labels can be up to 255 bytes long. The label itself is stored in NVRAM, along with the GEV value. Therefore, as GEV space is limited, users are encouraged to select labels of appropriate length.

GEV values are stored as ASCII strings, which may be up to 511 bytes long.

GEV labels and values are both case-sensitive.

If there is insufficient space remaining for storage of the new GEV, a message similar to the following is displayed:

```
Not all variables were copied, 1 remaining
```

The newly-added variable is not added, even if the "Update Global Environment Area of NVRAM (Y/N)? " question is answered affirmatively.

Editing GEVs

The gevEdit command is used to modify the value of an existing GEV. Simply execute gevEdit, and provide the label of the GEV to be modified, as:

```
gevEdit example2
example2=goodbye 54321 goodbye
(Blank line terminates input.)
Come Back Soon.


Update Global Environment Area of NVRAM (Y/N)? y
```

Entering a "y" or "Y" will replace the original GEV value with the new. Any other answer will preserve the original GEV.

Deleting GEVs

To remove a GEV from NVRAM, use the gevDelete command, and provide the GEV label, as:

```
gevDelete jazz2
jazz2=
jsjsjs
sjjsjs
eieieie
82828282
xxxxx


Update Global Environment Area of NVRAM (Y/N)?
```

Entering a "y" or "Y" will delete the GEV label and value. Any other answer will preserve the GEV.

When a GEV is deleted, its label can be reused. Also, the NVRAM space which was used to store both the deleted label and value is made available by the deletion.

Initializing the GEV Storage Area

The gevInit command is used to initialize the GEV area of the NVRAM device. Execution of this command will delete all currently defined GEVs, and will prepare the GEV area for its first variable. This command should be used with caution, as re-entry of all removed GEVs (as with gevEdit) can be time-consuming.

```
HXEB100> gevInit

Initialize Global Environment Area of NVRAM
Warning: This will DELETE any existing Global Environment
Variables!
Continue? (Y/N)?
```

Entering a "y" or "Y" will delete all GEV labels and values. Any other answer will preserve the GEV area.

Remote Start B

Introduction

This appendix describes the remote interface provided by MOTLoad to the host CPU via the backplane bus. This interface allows the host to obtain information about the target board, download code and/or data, modify memory on the target, and execute a downloaded program.

Note Code may also be downloaded to the target via other methods, and then executed using Remote Start. Other download methods may be faster than using the Remote Start interface and may be preferable to use for large downloads.

Overview

MOTLoad uses one 32-bit location as the Inter-Board Communication Address (IBCA in this document) between the Host and the Target. This location is typically a register in the backplane bridge device . The address of the IBCA is defined in the board product's Installation and Use Manual, along with other board-specific Remote Start information.

The IBCA is divided into the following five sections:

- ❏ An ownership flag When set, indicates that the host "owns" the ICBA and is free to write a new command into it. It also indicates that the previous command, if any, has been completed and the results, if any, have been provided. When the host writes a new command to the ICBA, it must clear the ownership flag to indicate to the target that the ICBA contains a command to be processed.
- ❏ A 'command opcode'. This is a numeric field that specifies the command the host wants performed.
- ❏ An error flag, which is used to provide command completion status from the Target to the Host.

- A ‘command options field. This field further qualifies the specifics of the command to be performed. The meaning of the option field is specific to each command opcode.
- A command data and result field. This field provides the data, if any, needed by the command and provides the response from the Target upon command completion. The meaning of the bits in this field are specific to each command opcode.

Additionally, certain commands require more information than can be contained within the data and result fields of the ICBA. To provide this information, the interface provides four "virtual" registers. The contents of these virtual registers are used in certain commands. The contents of the registers can be read and written via Remote Start commands. The virtual registers are identified as VR0, VR1, VR2 and VR3.

After board reset, the ICBA is written with a specific reset pattern, "RST", in the lower 24 bits. The "host owns" bit is also set. This indicates that the target CPU has been reset and is ready to accept commands.

MOTLoad uses certain areas of memory and I/O devices for its own operation. This interface allows the host CPU to write and read any location on the target CPU bus, including those in use by the firmware. Host software can avoid overwriting memory which is in use by the firmware by using the allocate memory and the firmware / payload query commands. Overwriting target locations in use by the firmware may result in erratic behavior of the target.

Inter-Board Communication Address Description

MOTLoad uses one 32-bit location as the Inter-Board Communication Address (IBCA in this document) between the Host and the Target. The address of the IBCA is provided in the board’s Installation and Use Manual.

Note In the IBCA description, and the following command descriptions, references to the upper half of the register refer to bits 0 through 15, and references to the lower half of the register refer to bits 16 through 31.

Big Endian format of Inter-Board Communication Address:

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
OWN	Command opcode							ERR	Command Options							Command Data/Result															

At reset, hardware clears this register. After reset, MOTLoad writes this register with the value 0x80525354 (RST). This value indicates that a reset event has occurred and the interface is ready to accept commands.

Note For boards that use a Little Endian backplane bridge, such as a PCI-to-VME bridge, or a a PCI-to-PCI bridge, the values written to the IBCA will need to be byte-swapped. (See "Demonstration of the Host Interface", later in this appendix for an example of a PCI-to-VME bridge device.)

Bit 0 — The ownership flag (OWN). A value of 1 indicates the 'host' owns the IBCA. A value of 0 indicates that the target cpu owns the IBCA.

NOTE: It is critically important that only the owner of the IBCA write to it. The Remote Start interface may deadlock if a non-owner changes the value of the IBCA.

Bits 1 - 7 — 7 bit command opcode field. The following values are valid:

Opcode 0x01: Write/Read Virtual Register

Opcode 0x02: Initialize Memory

Opcode 0x03: Write/Read Memory

Opcode 0x04: Checksum Memory

Opcode 0x05: Memory Size Query

Opcode 0x06: Firmware / Payload Query

Opcode 0x07: Execute Code

Opcode 0x08: Allocate Memory

Each command is described in more detail in following sections.

Bit 8	Global error status flag (ERR). If the command completed successfully, then this bit is written by the firmware with the value 0 at command completion. If the command fails, it will be written with the value 1. Additional command specific error status may be returned in other fields of the IBCA.
Bit 9 to 15	7 bit command option field. Each command specifies the particular meaning of each of the command option bits. Option bits that are unused are considered reserved and should be written to 0 to ensure compatibility with future implementations of this interface. NOTE: For most commands, bit 9 is used to specify verbose/non-verbose mode target command processing. In verbose mode, command related information is printed on the target console as the host command is processed. Verbose mode is selected when bit 9=0, non-verbose mode is set when bit 9=1
Bits 16 to 31	16 bit data/result field. When a command is sent to the target, these bits may contain command-specific data for the target. The target will use the same field for returning command results to the host. The meaning of this field is specific to each command opcode. Error codes have the same meaning across all commands. Refer to Table 5-1 on page 5-8 for Remote Start error code definitions.

Opcode 0x01: Write/Read Virtual Register

This command allows the host to read and write the contents of any of the four virtual registers. The specific operation (write or read) and the "register" to be accessed are determined by the command options field.

Write data is contained in the command data field. Read data is returned in the result field. Note that it takes two writes to completely modify all 32 bits of a Virtual Register, as well as two reads to completely read one.

Command option bits affect the operation as follows:

- ❏ Bit 15 indicates read (0) or write (1) operation
- ❏ Bit 14 indicates whether to access either the lower half (0) or upper half (1) of the virtual register.
- ❏ Bit 11 & 12 specify which virtual register is to be accessed (0b00 = VR0, 0b01 = VR1, 0b10 = VR2, 0b11 = VR3).

Opcode 0x02: Initialize Memory

This command allows the host to initialize, with a single byte pattern, areas of target RAM without incurring the overhead of writing each location via the Remote Start write memory command.

The command options field is unused and must contain 0.

The lower 8 bits of the data field need to contain the byte pattern to be written.

Memory starting at the address contained in VR0 and the byte count contained in VR1 is initialized with the value contained in the lower 8 bits of the data field.

Note This command does not guarantee that the memory is initialized using any particular ordering or alignment. Do not use it to initialize any area of memory that has alignment or ordering requirements (e.g., device registers).

Opcode 0x03: Write/Read Memory

This command allows the host to Read or Write individual address locations on the target's address bus. Data sizes of 8, 16 and 32 bits are supported. The specific operation and size are determined by the command options field.

Note Verbose mode target command processing is not available with this command; command register bit 9 is ignored.

- ❏ The data to be written is specified in the data field. If the options specifies 32 bit writes, then the upper half of VR1 sources the

upper 16 bits of the data (i.e. the data field can only provide the lower 16 bits). On reads, the read data is 0 extended to 32 bits and is stored in VR1. The lower 16 bits of VR1 are returned in the result field.

- ❏ The address to be used for the access is taken from VR0.

  Command option bits affect the operation as follows:

- ❏ Bit 15 indicates read (0) or write (1) operation.
- ❏ Bit 14 indicates whether to auto-increment VR0 after the access is performed. If 0, the contents of VR0 is unaffected by this command. If 1, the contents of VR0 is incremented by 1,2 or 4 depending on the size of the access.

  The autoincrement feature may be used during downloads of sequential data to avoid the overhead of issuing an additional write virtual register command after each datum is written.

- ❏ Bits 12 and 13 specify the size of the access. 00 indicates an 8 bit, 01 indicates a 16 bit and 10 indicates 32 bits.

Opcode 0x04: Checksum Memory

This command calculates a 16 bit checksum over a specified range of target addresses. The checksum algorithm used is specified at the end of this chapter in the section titled Reference Function: srom_crc.c. The checksum is returned in the result field. The Checksum Memory command is useful for determining whether a download image is intact without incurring the overhead of reading each location in the image using the memory read command.

- ❏ The starting target address of the area to checksum is taken from VR0.
- ❏ The number of bytes to checksum is taken from VR1.

Opcode 0x05: Memory Size Query

This command allows the host to determine the size and target-local address of target memory. A series of two commands is necessary, one to

provide the beginning memory address on the target, another to determine the ending address. The addresses are each stored in VR1, which may then be read using the read virtual register command.

The options field specifies specifics of the command as follows:

- Bit 15 specifies whether to return information about the actual (0) or available (1) target RAM. Information about the actual target RAM does not take into account the areas of RAM that the firmware is using. Information about the available RAM will return values which reflects the area of RAM which the firmware is not using. **NOTE**: Memory allocated by the allocate memory Remote Start command is considered "used" by the target firmware.
- Bit 14 specifies whether to return the beginning (0) or ending address (1) of the RAM.

Opcode 0x06: Firmware/Payload Query

This command allows the host to access details of various hardware components present on the board, as well as the firmware revision. A board payload structure (struct bdPayload, below) will be written to the target address provided in VR1 by the host.

> VR1 contains the address (as viewed from the target's processor) to which the payload structure will be written.

The host must ensure the address in VR1 is allocated via Opcode 0x08, Allocate Memory, prior to calling the Firmware / Payload Query command. The size of the allocation must be sufficient to contain the bdPayload structure. Upon completion of the command, the host could use Opcode 0x03, Write/Read Memory, to copy the structure from the target to the host. The options field is unused and must contain 0.

```
/*
 * This structure defines the organization of pci data that's returned
 * by the Remote Start Firmware Query command.
/*
typedef struct pciPopulation {
 unsigned char busInstand;
```

```
 unsigned char bus;
 unsigned char device;
 unsigned char function;
 unsigned short vendorID;
 unsigned short deviceID;
 unsigned char class;
 unsigned char subClass;
 unsigned char unused[6];
}pciPopulation_t;

/*
 *This structure defines the organization of board payload information
 *that's returned by the Remote Start Firmware Query command.
 */
typedef struct bdPayload {
char processorType[16];   /*offset0 */
char boardType[32];   /*    offset 9x10 */
char boardAssy[32];  /*    offset 0x30  */
double memTotal;     /*     offset 0x50  */
double memAvail;    /*      offset 0x58  */
char os_major;         /*      offset  0x60  */
char os_minor;        /*      offset   0x61  */
char fw_major;        /*      offset  0x62   */
char fw_minor;        /*      offset 0x63    */
unsigned short numCPU;        /*  offset 0x64 */
unsigned short numPciDevs; /* offset 0x66 */
unsigned char unused[8];     /* offset 0x68 */
/*
 * Assuming all busses are 33mhz, allow room for 10 devices,
 * 8 func per device, on each PCI bus on board.
 */
} bdPayload_t;
```

Note In the bdPayload structure, the NUM_PCI_INSTANCES value should be set to the number of PCI Bus Instances on the target board to match the generous estimate of the number of possible pciPopulation_t entries used by MOTLoad. A PCI bus instance is an independent PCI bus, not to be confused with a PCI sub-bus, which could exist as a child of a PCI bus instance. (Sub-bus

devices are not reported by the Firmware Query / Payload command.) The actual number of pciPopulation_t entries is very likely to be fewer than the generous estimate; the actual number is dynamically determined and provided by the target firmware in the numPciDevs element.

Opcode 0x07: Execute Code

This command allows the host to cause the target CPU to transfer control to a specific execution address on the card. The execProgram command, documented in the Commands section of this manual, is executed on the target by Remote Start to facilitate the transfer of control.

- ❏ VR0 contains the address (as viewed from the target's processor) to begin execution at.
- ❏ VR2 contains the value that is loaded into CPU register R3 when control is transferred to the execution address, ie it is an argument for the executable code.
- ❏ The state of CPU registers R0 through R2, and R4 through R31 are indeterminate when control is passed to the address.

Note This command does not return. The OWN flag bit in the IBCA remains clear.

Opcode 0x08: Allocate Memory

This command allows the host to allocate memory on the target using the target firmware's available memory pool.

- ❏ VR0 contains the number of bytes to allocate
- ❏ VR2 contains the alignment of the allocation, which must be a power of 2
- ❏ The starting address of the allocated memory on the target will be provided in VR1.

Note It is important to verify that the response from the target does not indicate an error. If the allocation fails for some reason, the ERR bit will be set, and the Allocation Failed error code will be provided, along with a 0 in VR1. Use of the returned 0 as the start address of an allocated area is not recommended.

Note There is no way to "free" memory allocated with this command, except by resetting the board.

Remote Start Error Codes

These are the 16-bit values that the target board returns in the Data/Result field of the IBCA when the target board detects an error in the processing of a host command. These error codes are valid only if the ERR bit was set in the IBCA

Table B-1. Command/Response Error Codes

Error Code	Associated Opcode:Command	Definition of the Error Code
0x0001	0x03:Write/Read memory	illegal access size requested
0x0002	n/a	unsupported command opcode requested
0x0003	Allocate Memory	Allocation Failed

VME Remote Start

Remote Start in a VME chassis adheres to the protocol defined throughout this chapter. In addition, several Global Environment Variables (GEVs) control various aspects of VME Remote Start. These GEVs are stored in NVRAM, and may be accessed with standard MOTLoad GEV utilities (gevEdit, gevShow, gevDelete, gevList). Note that GEVs are always case-

sensitive, so they must be provided exactly as shown, below. The GEVs, and their meanings, are:

- mot-vmeRemoteStartMBox

  This GEV selects which VME bridge device mailbox is used as the Inter-Board Communication Address (IBCA). Valid values are 0 - 3. The default mailbox is mailbox 0. If the GEV is missing, or set to an invalid value, the default mailbox is used.

- mot-vmeRemoteStartOff

  This GEV allows the user to disable Remote Start for the VME board. When Remote Start is disabled, the board will not modify or monitor the IBCA for Remote Start commands. If the GEV does not exist, remote start services will be provided. If the GEV does exist, but is set to a value of 0, remote start services will be provided. All non-zero values of mot-vmeRemoteStartOff GEV will disable remote start services.

VMEbus interrupts are not generated by the Remote Start feature. The host should poll the IBCA OWN bit to determine if a command has completed, and not write to the IBCA unless the OWN bit is set.

The target processor will receive an interrupt each time the target's IBCA is written by the host. Although it is most efficient if the host writes the entire command word in a single VME write, it is acceptable to build a command in incremental fashion, as long as the OWN bit is cleared in the very last write. The target will process the command when the OWN bit is cleared; no other action is required by the host.

The VMEbus address of the VME Bridge mailbox register is controlled by the VME configuration of the board. This is documented in the board's Installation and Use Manual.

If the VME Bridge converts from PCI to VME, then the IBCA will be viewed in a byte-swapped order from the processor. Therefore, the bit-orders shown in this chapter will need to be byte-swapped when viewed directly using MOTLoad. For instance, the IBCA after reset is said to contain the "RST" flag as, 0x80525354. However, when viewed from the processor's perspective using MOTLoad's mdw command, the "RST" flag

is: 0x54535280. See "Demonstration of the Host Interface", below, for detailed examples of this.

CompactPCI Remote Start

Remote Start in a CompactPCI chassis adheres to the protocol defined throughout this chapter. The Intel 2155x PCI-to-PCI bridge device Scratch 7 register is used as the Inter-Board Communication Address (IBCA). The Intel 2155x Secondary Doorbell 0 is used to notify the target of a command to be processed.

PCI interrupts are not generated onto the Compact PCI backplane by the Remote Start feature. The host should poll the IBCA OWN bit to determine if a command has completed.

The PCI address of the PCI-to-PCI Bridge Scratch7 and Doorbell register is controlled by the PCI configuration of the board.

Issuing a Remote Start command is a three step process. In the first step, the host ensures the OWN bit is set in the IBCA. In the second step, the 32-bit command opcode is written by the host to the IBCA. In the third step, the host notifies the target that a command is waiting by writing a 16-bit value, with the Secondary Doorbell 0 bit set, to the Secondary Interrupt Request register. The target will respond to the doorbell interrupt, clear the Doorbell 0 request, and set the OWN bit in the IBCA. The host should poll the OWN bit, and ensure it is set, prior to writing another opcode.

The IBCA, which exists in PCI space, will be viewed in a byte-swapped order from the processor. Therefore, the bit-orders shown in this chapter will need to be byte-swapped when viewed directly using MOTLoad. For instance, the IBCA after reset is said to contain the "RST" flag as, 0x80525354. However, when viewed from the processor's perspective using MOTLoad's mdw command, the "RST" flag is: 0x54535280. See "Demonstration of the Host Interface", below, for detailed examples of this.

Demonstration of the Host Interface

The following example demonstrates the use of MOTLoad's Remote Start capability in an VME system. In this example, Remote Start is used to allocate a 1 megabyte memory range to the host by the target. Following allocation, the memory on the target is initialized via Remote Start by the host. Both the host and the target are MVME5500 boards. Each section is demarked with "TARGET-" or "HOST-".

The board that is being "remotely started" is referred to as the Target. The board that is initiating the remote start action is referred to as the Host.

Note that an outbound window needs to exist on the Host. This window will allow the Host to access (read/write) the Inter-Board Communication Address (IBCA) on the Target. In this example, the Target's IBCA is mapped to 0xa267f348 on the Host. Please see the Installation and Use Manual for the boards, for more information regarding the mapping and the actual register used for ICBA.

Note that the IBCA in this example is accessed through PCI, so the values being provided in the mmw commands are byte-swapped when compared to the IBCA description earlier in this chapter.

HOST - store the Target's IBCA address into a variable to make things easier:

```
MVME5500> IBCA = a267f348

return = A267F348 (&-1570245816)

errno = 00000000
```

HOST-ensure the Target is ready (OWN bit set

```
MVME5500> mdw -aIBCA -c1

A267F348 54535280
```

HOST-allocate 0x100000 target memory for the image, aligned on 4-byte boundary:

Important: Ensure the OWN bit is set prior to each modification of the IBCA!

HOST-write lower half of size into VR0:

```
MVME5500> mmw -aIBCA

A267F348 54535280? 00000101

A267F34C 00000000? .
```

TARGET-Because the Verbose bit was clear in the command, the target console will show:

"Remote Start: host wrote 0000 to lower half of vr0"

HOST-write upper half of size into VR0:

```
MVME5500> mmw -aIBCA

A267F348 00000181? 10000301

A267F34C 00000000? .
```

TARGET-Because the Verbose bit was clear in the command, the target console will show:

```
"Remote Start: host wrote 0010 to upper half of vr0"
```

HOST-write lower half of alignment into VR2:

```
MVME5500> mmw -aIBCA

A267F348 10000381? 04001101

A267F34C 00000000? .
```

TARGET-Because the Verbose bit was clear in the command, the target console will show:

```
Remote Start: host wrote 0004 to lower half of vr2
```

HOST-write upper half of alignment into VR2:

```
MVME5500> mmw -aIBCA

A267F348 04001181? 00001301

A267F34C 00000000? .
```

TARGET-Because the Verbose bit was clear in the command, the target console will show:

```
Remote Start: host wrote 0000 to upper half of vr2
```

HOST-send allocate memory command:

```
MVME5500> mmw -aIBCA

A267F348 00001381? 00000008

A267F34C 00000000? .
```

TARGET-Because the Verbose bit was clear in the command, the target console will approximate:

```
"Remote Start: allocate mamory

 number of bytes=00100000, alignment=00000004

 Remote Start: allocate memory: address=01920000"
```

HOST-Initialize the allocated memory on the target to a pattern using Remote Start Initialize Memory (Opcode 2).

HOST-write lower half of target memory starting address into VR0:

```
MVME5500> mmw -aIBCA

A267F348 92010381? 00000101

A267F34C 00000000? .
```

TARGET-Because the Verbose bit was clear in the command, the target console will show:

```
"Remote Start: host wrote 0000 to lower half of vr0"
```

HOST-write upper half of target memory starting address into VR0:

```
MVME5500> mmw -aIBCA

A267F348 00000181? 92010301

A267F34C 00000000? .
```

TARGET-Because the Verbose bit was clear in the command, the target console will show:

```
"Remote Start: host wrote 0192 to upper half of vr0:
```

HOST-write lower half of the byte count into VR1:

```
MVME5500> mmw -aIBCA

A267F348 92010381? 00000901

A267F34C 00000000? .
```

TARGET-Because the Verbose bit was clear in the command, the target console will show:

```
"Remote Start: host wrote 0000 to lower half of vr1"
```

HOST-write upper half of the byte count into VR1:

```
MVME5500> mmw -aIBCA

A267F348 00000981? 10000b01

A267F34C 00000000? .
```

TARGET-Because the Verbose bit was clear in the command, the target console will show:

```
"Remote Start: host wrote 0010 to upper half of vr1"
```

TARGET-View the memory that is going to be initialized:

```
MVME5500> mdw -a01920000 -c4

MVME5500> mdw -a01a1fff0
```

HOST-Send the Initialize Memory command:

```
MVME5500> mmw -aIBCA

A267F348 10000B81? 5a000002

A267F34C 00000000? .
```

TARGET-Because the Verbose bit was clear in the command, the target console will show:

```
"Remote Start: initialize memory:

address=01920000, byte count=00100000, data=5A"
```

TARGET-View the memory that was initialized:

```
MVME5500> mdw -a01920000 -c4

01920000 5A5A5A5A 5A5A5A5A 5A5A5A5A 5A5A5A5A

MVME5500> mdw -a01a1fff0

01A1FFF0 5A5A5A5A 5A5A5A5A 5A5A5A5A 5A5A5A5A
```

Reference C Function: rsCrc

The following screen shot is an example of the command sequence necessary to produce the CRC.

```
/*
 * rsCrc - generate CRC data for the passed buffer
 * description:
 *    This function's purpose is to generate the CRC for the
passed
 *    buffer.
 * call:
 *   argument #1 = buffer pointer
 *   argument #2 = number of elements
 * return:
 *  CRC data
 */


static unsigned int
rsCrc (elements_p, elements_n)
unsigned char *elements_p;
unsigned int elements_n;
{
   unsigned int crc;
   unsigned int crc_flipped;
   unsigned char cbyte;
   unsigned int index, dbit, msb;

   crc = 0xffffffff;
   for (index = 0; index < elements_n; index++) {
       cbyte = *elements_p++;
```

```
 for (dbit = 0; dbit < 8; dbit++) {
    msb = (crc >> 31) & 1;
    crc <<= 1;


    if (msb ^ (cbyte & 1)) {

     crc ^= 0x04c11db6;
     crc | = 1;
   }
     cbyte >>= 1;
  }
}
    crc_flipped = 0;
    for (index = 0; index < 32; index++) {
       crc_flipped <<= 1;
       dbit = crc & 1;
       crc_flipped += dbit;
   }


   crc = crc_flipped ^ 0xffffffff;
   return (crc & 0xffff);
}
```

Related Documentation

C

This appendix provides a listing of additional documents that may be helpful when using MOTLoad firmware in conjunction with other hardware and software products. The appendix is currently divided into two sections. The first section provides a listing of Microprocessor and Controller documents related to devices typically found on Motorola products that use MOTLoad firmware. The second section provides a listing of Related Specifications that apply to industry standards that may be related to the operation of MOTLoad firmware. You can obtain paper or electronic copies of third party documents by accessing the company's web site, or by calling them directly. You can obtain paper or electronic copies of other Motorola documents by:

- ❏ Contacting your local Motorola sales office, or
- ❏ By visiting Motorola Computer Group's World Wide Web literature site at http://www.motorola.com/computer/literature

Microprocessor and Controller Documents

For additional information, refer to the following table for manufacturer's data sheets or user's manuals. A contact source and/or web site URL is also provided for the listed documents. In some cases, the information may be

preliminary, and in most cases the revision levels of the documents are subject to change without notice.

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Table C-1. Microprocessor and Controller Documents

Document Title and Source	Publication Number
MPC7455 RISC Microprocessor Technical Summary, R0 Motorola Literature Distribution Center Telephone: (800) 441-2447 or (303) 675-2140 FAX: (602) 994-6430 or (303) 675-2150 WebSite: http://merchant.hibbertco.com/mtrlext/ Email: Idcformotorola@hibbertco.com	MPC7455TS/D
MPC7455TM RISC Microprocessor User's Manual Literature Distribution Center for Motorola Semiconductor Products Telephone: (800) 441-2447 FAX: (602) 994-6430 or (303) 675-2150 WebSite: http://merchant.hibbertco.com/mtrlext/ Email: Idcformotorola@hibbertco.com OR IBM Microelectronics Programming Environment Manual WebSite: http://www.chips.ibm.com/techlib/products/powerpc/manuals	MPC7455UM/D G522-0290-01
PowerPCTM Microprocessor Family: The Programming Environments Literature Distribution Center for Motorola Telephone: 1-800-441-2447 FAX: (602) 994-6430 or (303) 675-2150 http://merchant.hibbertco.com/mtrlext/ Email: ldcformotorola@hibbertco.com OR IBM Microelectronics Programming Environment Manual WebSite: http://www.chips.ibm.com/techlib/products/powerpc/manuals	MPCFPE32B/AD G522-0290-01
Intel 82554EI Gigabit Ethernet PCI Bus Controller with Integrated PHY - External Design Specification; Intel Corporation http://developer.intel.com/design/network/products/lan/controllers/82544.htm	73825902.pdf

Table C-1. Microprocessor and Controller Documents (continued)

Document Title and Source	Publication Number
21154 Transparent PCI-to-PCI Bridge Advance Information Users Manual Intel Corporation Literature Center 19521 E. 32nd Parkway Aurora, CO 80011-8141 WebSite: http://www.intel.com/design/litcentr/index.htm	278321-001
3 Volt Synchronous Intel Strata FLASH Memory, 28F640K3, 28F640K18, 28F128K3, 28F128K18, 28F256K3, 28F256K18 (x16) Intel Corporation Website: http://www.intel.com/design/litcentr/index.htm	290737-003
3 Volt Intel Strata FLASH Memory, 28F128J3A, 28F640J3A, 28F320J3A Intel Corporation Website: http://www.intel.com/design/litcentr/index.htm	290667-005
LXT971A 10/100Mbit PHY Intel Corporation WebSite: http://www.intel.com/design/litcentr/index.htm	
TL 16C550C UART Texas Instruments WebSite: http://www.ti.com	SLLS177C
AT24C01A/02/04/08/16/64/256/512 2-Wire Serial CMOS E^2PROM ATMEL Nonvolitile Memory Data Book Atmel Corporation Must request documentation at: http://www.atmel.com/atmel/support/	AT24Cxxx AT93CV6
CMD PCI 646U2 5V Ultra ATA/33 PCI-IDE Controller Users Manual Must request documentation at: http:/www.cmd.com/ProductInfo.cfm?ProdID=158	Man-0646602-000
GT-64260 System Controller for PowerPC Processors MV-64360 System Controller for PowerPC Processors Marvell Semiconductor Inc. WebSite: http://www.marvell.com	MV-S100414-00 Rev A August 29, 2001

Table C-1. Microprocessor and Controller Documents (continued)

Document Title and Source	Publication Number
DS1621 Digital Thermometer and Thermostate Datasheet Dallas Semiconductor http://pdfserv.maxim-ic.com/arpdf/DS1621.pdf	DS1621
SYM53C1010R PCI - Dual Ultra 160 SCSI Multifunction Controller Technical Manual LSI Logic 1-800-574-4286 www.lsilogic.com	Version 2.1 May 2001 S14053.A
uPD720100A USB 2.0 Host Controller NEC Corporation www.nec.com	SBB-Z-3004 March 12, 2001
Universe II User Manual Tundra Semiconductor Corporation WebSite: http://www.tundra.com/page.cfm?tree_id=100008#Universe II (CA91C042)	8091142_MD300_01.pdf
3.3V-5V 256Kbit (32Kx8) Timekeeper SRAM ST Microelectronics 1000 East Bell Road Phoenix, AZ 85022 WebSite: http://eu.st.co/stonline/index.shtml	M48T37V

Related Specifications

Table C-2 lists the related specifications that may be used in conjunction with this document for various application or reference purposes. In some cases, the information may be preliminary and the revision level of the document may be subject to change, without notice. Users are advised to

verify that they are retrieving the latest copy on the web site when accessing material.

Table C-2. Related Specifications

Document Title and Source	Publication Number
MicroC/OS-II - The Real Time Kernel Publishers Group West P.O. Box 8843 EmeryVille, CA 94662 Web site: http://www.micrium.com	ISBN: 0-87930-543-6
PowerPC Embedded Application Binary Interface, 32-Bit Implementation, Version 1.0 Motorola Microcontroller Technologies Group 6501 William Canon Drive West Austin, TX 78735 Stephen Sobek MS-OE45 steve@avar.sps.mot.com	
PCI Local Bus Specification - Revision 2.1, 2.2, PCI-X PCI Special Interest Group Portland, OR	
SCSI-2 Draft Proposed, X3.131-199x American National Standards Institute Web site: http://www.ansi.org	
Portable Operating Systems Interface (POSIX) -- Part 1: System Application Program Interface (API) [C Language] Web site: http://www.ansi.org	ISO/IEC 9945-1:1996
Portable Operating Systems Interface (POSIX) -- Part 2: Shell and Utilities Web site: http://www.ansi.org	ISO/IEC 9945-2:1993

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