Modular Diagnostic Software (MODS)

MODS Release 75.X Documentation (7/1/2005)

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1.0 Introduction

This document describes the NVIDIA Modular Diagnostic Software (MODS). MODS is a powerful software program that allows users to test the NVIDIA hardware. MODS is used for three primary purposes. Firstly, MODS is used for chip and board functional validation. Secondly, MODS is used for chip and board failure analysis and debug. Thirdly, MODS is used for architectural verification.

MODS is currently supported under the following operating systems*:

Operating System	*Referred to in Document*
Microsoft DOS	DOS
Microsoft Windows 2000 and XP	Windows
Mac OS X	Mac
Linux	Linux

* Mods MCP tests are only supported under DOS.

MODS has the following features.

Unified Diagnostic Architecture (UDA) — works on all NVIDIA GPU, IGP, and MCP chips.

Embedded JavaScript (version 1.4) and ANSI C preprocessor.

All low level functionality exposed to the scripting language — GPU, APU, ACI, MCI, USB, 1394, MAC, and ATA drivers are all exposed.

Failure analysis and debug functionality is included — read and write registers, memory, PIO, and PCI address spaces, clock setting, and step utilities.

Easy to use and learn.

One script will run on all supported operating systems with out any modification.

Online regular expression help.

MODS does not test all of the capabilities of the NVIDIA hardware. It is assumed that the silicon has undergone a normal screening process prior to shipping to the customer and that the primary purpose of the test is to determine if the board manufacturing process has completed successfully and all solder connections and components are working properly.

2.0 Usage Overview

Normally, MODS is invoked by using the command-line:

```
mods gputest.js –mfg          (for graphics products)

mods mcptest.js               (for platform products)

mods mcptest.js –mcp_cfg_file filename.cfg (for platform products)
```

This will run the normal suite of tests.

MODS is usually distributed to customers in a package with a part number like “618-60506-3501-CX0.” These packages have been qualified to test a particular product and contain release notes and batch files tailored to that card. The directions in those release notes should be followed instead of running the command-lines above.

MODS has an interactive mode that can be invoked with “mods –s”. This is a useful tool for debugging problems, but its use is beyond the scope of this document. To exit interactive mode, type “Exit()”.

MODS will return 0 to the shell under normal operation. If an error occurs, MODS will return 1 to the shell.

MODS produces a log file named “mods.log.”

3.0 Software

Distribution Package

MODS is typically distributed with the following files:

File	**Description**
aci.js	Aci test script.
Aputrace.zip	This file contains traces used by the Nforce audio processing test (ApuTest).
arghndlr.js	Script file that parses command-line arguments.
Aza.js	Azalia test script.
Blkwhite.mcs	MPEG trace file. This test is used by the Class1774 and Class3174 tests.
boards.js	This file contains a table describing various NVIDIA boards.
cabltest.txt	Document describing how to use mac.js with MODS.
comnargs.js	Command-line arguments shared by multiple scripts.
comngpu.js	Common gpu-related script shared by multiple scripts.
comnmcp.js	Common mcp-related script shared by multiple scripts.
comntest.js	Common script that “test” scripts share.
cpupatrn.js	Cpu Pattern Test script.

drf.h	This file contains a table describing various NVIDIA boards.
edid.js	Used the EDID's specified in this file instead of reading them from the ROM when –edid command line argument is specified.
fpk_comm.h	Contains code used for selecting "intelligent" random values during graphics tests.
Glrandom.js	3D random test script.
glr_comm.h	Header file for 3D random test script.
golden??.bin	Database files containing "golden" CRC values. These values are used by tests to check if the rendered images are correct.
gpramtst.js	GPU RAM test script.
gpu.js	Utility for obtaining information about the GPU being tested. To run this utility, type "mods gpu.js".
gpuargs.js	Script file that implements and interprets GPU-specific command-line arguments.
gpudma.js	Random DMA test script.
gputest.js	GPU manufacturing test.
gray1280.tga	Image file used by some interactive display tests for finding flickering pixels on flat panels.
intrutil.js	Useful script for interactive mode.
js.dll	JavaScript DLL — Windows only.
mac.js	Ethernet MAC test script.
mats.exe	Stand-alone memory test. See section 3.5.
mcp_cfg.js	Configuration file for MCP tests. This is needed for Nforce motherboards that deviate from the NVIDIA reference design.
mcptest.js	MCP manufacturing test.
mfgmcp.pdf	Instructions for how to modify mcp_cfg.js.
mods.exe	MODS executable.
mods.h	Main include header file.
mods.js	Utilities used during failure analysis and debug.
mods.pdf	This document.
progtv.js	Test script used with video capture, TV tuner and FM tuner cards.
prntutil.js	Shared script used for printing chip/system information.
quickref.pdf	Example of simple MODS commands.
random2d.js	2D random test script.
relnotes.txt	Release notes (updated with every MODS release)
testobjs.js	Miscellaneous initialization code.

3.1 Version

The MODS version may be obtained by running the following command.

```
mods -v
```

The version is in the following format XX.YY where XX is the major version number, and YY is the minor version number. MODS uses NVIDIA's "unified software architecture" and much of the code base is shared with the drivers. A version of MODS with the version XX.YY (e.g., 60.4) has a lot of shared code with a driver that also starts with XX (e.g., 60.10).

3.2 System Requirements

DOS

Intel Pentium, AMD K6, or VIA C3 CPU or higher.

At least 256MB of system memory.

Microsoft DOS version 6.22 or higher.

You may optionally load HIMEM.SYS.

EMM386.EXE not supported. If EMM386.EXE is loaded, MODS will exit with an error.

NVIDIA NV4-based video card or higher

Windows

Intel Pentium, AMD K5, or VIA C3 CPU or higher.

256MB of system memory.

Microsoft Windows 2000, XP or higher.

NVIDIA NV4-based video card or higher.

Mac

PowerMac or iMac

Mac OS X or higher

NVIDIA NV11-based video card or higher.

3.3 Usage

```
Usage: mods.exe [options] [file] [arguments]
  -a           append to log file
  -c reference display reference
  -C           enable circular buffer, set to 'debug' level & dump on
                 exit
  -d           set 'debug' level output
  -e script    execute script
  -F string    set a filter for serial and circular sinks
  -g           do not log return codes
  -h or -?     print help
  -i file      import file
  -l file      log file name; do not log if file is 'null'
  -L           only write the log file if there is an error
  -m script    execute script before main()
  -n script    execute script after main()
  -o           do not run main()
  -p           enable a small Mats test right after VBIOS is POSTED.
  -P           enable circular buffer, set to 'debug' level & dump at
                 normal priority on exit
  -r           record user input
  -R           remote user interface (run over network)
  -s           script user interface
  -S level     enable serial sink and set it its level (from 1 to 4)
  -t           macro user interface
  -T           remote terminal user interface (telnet)
  -U ip port   remote terminal user interface (client mode)
  -w           raw user interface
  -v           print MODS version
```

If no script file is specified, mods.js is used. If no log file is specified, mods.log is used. On the Mac the command line arguments are specified in the *mods.arg* file. MODS parses the specified script file and any imported script files, and then executes the script method *main()*. You may optionally specify *begin()* and *end()* methods that are guaranteed to be called before and after *main()*, respectively.

Command line arguments for *gputest.js*.

-agp1x	Use AGP 1x transfer.
-agp2x	Use AGP 2x transfer.
-agp4x	Use AGP 4x transfer.
-agp8x	Use AGP 8x transfer.
-agp_clk X	Set AGP clk to X MHz.
-agpwr	Enable AGP writes.
-allow_inst_in_sys	Allow relocation of instmem to sysmem.
-arg X	Pass to wrapper scripts
-bgstress	Start the background 3d stress task.
-br02	Run Msi test on Br02.
-bus_width X	Test for specific framebuffer bus width
-check_display	Run the CheckDisplay test.
-check_display_bar	Run the CheckDisplayBar test.
-check_display_bars	Run the CheckDisplayBars test.
-check_displays	Run the CheckDisplay test on all displays.
-check_features X	Test for a specific set of feature bits.
-check_fp_gray	Run the gray CheckDisplays test on flat panels
-check_fp_stripes	Run the stripe CheckDisplays test on flat panels
-check_pxl X	Test for explicit number of PCI-X lanes
-check_sp_exact X	Test for explicit mumber of shader pipes
-check_sp_min X	Test for minimum mumber of shader pipes
-check_ve_exact X	Test for explicit mumber of vertex engines
-check_ve_min X	Test for minimum mumber of vertex engines
-chipargs X	Pass arbitrary arguments to the chip library.
-chipset X	Configure chipset as a generic 'type'.
-csum_report	Report checksum differences for quals.
-dd_scaler_mode X	Digital display scaler mode; native, scaled or centered.
-dev X	Select a resman device
-display X	Run the tests on the specified 'display'.
-display_config	Get the display configuration.
-dyn_eng_ctrl X	Enable (1 or 2) or disable (0) dynamic engine control.
-dynamic_clocks	Allow dynamic clock adjustment in RM.
-dynamic_voltage	Enable dynamic core voltage.
-engr	Run the engr manufacture tests.
-ext_banks X	Test for explicit number of external banks
-fb_mask X	Set FB enable mask.
-fbi_check X	Check for marginal memory and FBI.
-fct	Setup CpuPattern test to run in FCT

-fm_freq X	Set FM tuner frequency.
-framelock	Run the Full FrameLock tests.
-framelock_auto	Run the Only the automated part of FrameLock tests.
-framelock_skip_lock	Don't check lock status on framelock boards.
-fw	Enable AGP fast write.
-gclk X	NV (geometry) clock in MHz.
-glr_pp X	Use PowerPusher in GLRandom for the specified interval.
-gpu_num X	Set which graphics processor to test (default 0).
-grctx X	Set context switching mode. 1=hybrid, 2=hw, 3=sw
-id	Prompt user for test ID.
-logcmp	Dump logcmps.
-loops X	Loop the tests 'count' times.
-matsinfo	If a mats-derived test fails, print out more info.
-maxframes X	Limit max frames per test (shorten test times).
-mboard	Treat 2 boards as one SLI device.
-mclk X	Memory clock in MHz.
-mclk_percent X	Set mclk to X % of default. 50 <= X <= 150
-mcp	Run the mcp manufacture tests.
-mfg	Run the manufacturing tests.
-mode X Y Z W	Set mode X x Y @ Z bpp at W Hz.
-mpeg_in_fb	Run MPEG tests out of framebuffer rather than AGP.
-msi_interrupts	Use MSI protocol for GPU interrupts.
-no_agpwr	Disable AGP writes.
-no_backdoor	Disable FB backdoor.
-no_compress	Disable FB compression.
-no_copy_fb	Check golden values in the framebuffer
-no_ext_power	Do not check if external power is connected.
-no_fw	Disable AGP fast write.
-no_gart	Disable NVGART.
-no_gold	Do not load golden values.
-no_inst_in_sys	Disable relocation of instmem to sysmem.
-no_pll_change	Do not change PLLs in CpuPatternsTest
-no_rc	Disable robust channels.
-no_recal_drvslew	Do not continuously recal the drive/slew.
-no_require_fos	Allow glr_display to pass even if we can't FOS because we are on head 1.
-no_sb	Disable AGP side band.
-no_wc	Disable write-combining.
-no_zcull	Disable Zcull.
-non_coherent	Force all tests except Class1774 and Class3174 to use NonCoherent memory.
-notest	Get ready to run tests, but don't actually run them.
-notiled	Do not use tiled surfaces.
-num_iterations X	Number of times we try to lock the PLLs before we fail
-nvclk X	NV (g,s,r) clock in MHz.
-nvclk_percent X	Set nvclk to X % of the default. 50 <= X <= 150
-nvclk_slowdown X	Enable (1) or disable (0) NV clock slowdown.
-old_gold	Using old golden values.
-oven_soak X Y	Set the oven temperature to X and soak for Y minutes.

-override	Execute the script 'file' to override GPU settings.
-pass_rate X	Minimum Percentage of runs that lock PLLs correctly
-pci	Disable AGP
-perfmode X	Set "silent running" mode: 0(=disable), 1, 2, or 3(default).
-poll_interrupts	Poll for GPU interrupts.
-power_mizer X	Set PowerMizer 'level'.
-printcsv	Enable Golden.PrintCsv mode.
-progtv	Program non-volatile I2C on TV tuner cards
-rclk X	NV (raster-op) clock in MHz.
-restore_agp X	restore_agp 1: restore orginal agp rate after test is run
-revision X	Check the NVIDIA chip revision.
-rgb_display_detect	Use all channels to detect displays.
-rom X	Check the rom 'version'.
-run_on_error	Continue running if error occurs.
-run_only_gold	Only run tests that use golden values.
-run_only_hw_crc	Only run tests that use DacCrc, TmdsCrc, and/or TvCrc.
-safe_dmas	Use 'safe' DMA protocol rather than 'fast'.
-sb	Enable AGP side band.
-sclk X	NV (shader) clock in MHz.
-screen_off	Disable output to the screen during tests.
-seed X	Random number seed.
-serial_ports X	Total number of serial ports to be tested.
-shd_mask X	Set nv4x shader enable mask.
-show_gold	Display contents of goldenXX.bin file.
-show_mem_used	Show MODS memory usage
-simulate_dfp X	Simulate a flat panel with the specified EDID.
-simulate_tv	Simulate a TV is attached .
-skip X	Skip the specified test(s) when running -mfg or -engr.
-skip_board_detect	Skip board detection in the MemSize test.
-slt	Setup CpuPattern test to run in SLT
-sm_mask X	Set SM enable mask.
-soak X	Soak the chip for given 'seconds'.
-stereo	Run the stereo test.
-strap_fb X	Set the framebuffer strap in megabytes.
-subdev X	Select a resman subdevice.
-subsystem X Y	Check the subsystem vendor and device ID's.
-swap_endian	Run GPU in big endian mode on a little endian computer.
-switchbox	Run the external VIVO switchbox test.
-tco	Allow Nforce systems to reboot automatically in a crash
-temp X	Control gpu fan to reach given temperature (if tgt < 0, just report temps).
-test X	Run the specified test(s) when running -mfg or -engr.
-time	Record duration of tests.
-tmds_crc	Use TMDS/LVDS CRCs.
-tpc_mask X	Set TPC enable mask.
-tuner	Run the TV RF-in test

-tv_encoder X	Type of TV encoder.
-tv_freq X	Set TV tuner RF frequency.
-tv_in X	Type of TV-in connector; auto, composite or svideo.
-tv_out X	Type of TV-out connector; auto, composite or svideo,
-tvo	Run the internal TV encoder test.
-verbose	Run the tests in verbose mode.
-video_in	Digitize the TV-IN and display on the screen
-vivo	Run the TV Video-in, Video-out test.
-voltage_and_mask X	AND mask for voltage
-voltage_or_mask X	OR mask for voltage
-vpe_mask X	Set nv4x vertex processor enable mask.
-zcull_mask X	Set nv4x zcull enable mask.
-help or -h or -?	Print command line options.

3.4 Installation

Place all distribution package files in to single directory.

On MacOSX, click on the ".tgz" package to unpack it. To run MODS, type "./mods gputest.js" or another command line in the "Mods.app/Contents/Resources" directory. Alternately, you can edit "Mods.app/Contents/Resources/mods.arg" to contain the command line you want to run, then click on the MODS icon

3.5 Stand-alone MATS.EXE (DOS only)

In certain situations MODS can not initialize the GPU due to marginal frame buffer interface timings or defective memory. In such situations you can try running the stand alone MATS which does not require initializing the GPU. This utility will do a rudimentary test of the framebuffer. It prints its results to the screen and also to a file named “report.txt.”

4.0 IGP and MCP Test Setup

To run the IGP and MCP tests the following configuration is required.

A PS2 mouse and keyboard connected to their respective ports.

One ATA hard drive attached as primary master (system drive).

One ATA hard drive attached as secondary master. Ata-133 drive is preferred.

One ATA CD-ROM drive attached as secondary slave. A non-blank CD must be inserted in the drive.

ATA-133 cables must be used to attach the test drive for high DMA speed test.

Attached SATA drives to the SATA ports which will be tested.

One floppy drive must be attached to the floppy port. A 1.44MB floppy diskette must be inserted in the floppy drive.

If testing MAC and PHY, attach an Ethernet loopback cable to Ethernet port.

Regular 10/100 external loopback cable: RJ45 connector with: pin1-to-pin3; pin2-to-pin6

Special GIGE loopback cable for Marvell: pin1-to-pin3; pin2-to-pin6, pin4-to-pin5, pin7-to-pin8

Audio loopback wire plugged in to IN and OUT audio ports.

Attach a USB compliant device to every USB port that will be tested.

Attach a USB2.0 compliant device (for Usb2 test) to every USB port that will be tested.

Attach a FireWire compliant device to every FireWire port that will be tested.

Each on board firewire port connect to on PCI firewire card

Attach serial loopback plug to serial port. Serial loopback plug pins connect as follows: 2-to-3, 4-to6, and 7- to-8.

Attach parallel loopback plug to parallel port. Parallel loopback plug pins connect as follow: 2-to-15, 3-to-13, 4-to-12, 5-to-10, and 6-to-11.

Attach PCIE device or loopback card on PCIE slot for PCIE loopback test.

Attach PCIE ethernet card for PCIE cfg cycle test.

One NVIDIA based AGP card attached to AGP slot.

One NVIDIA based PCI card attached to any PCI slot.

If testing Azalia high-definition audio, at least one audio loopback cable. Which ports it connects to depends on the specific board being tested. Also, you must disable AC97/MC97 in the system bios in order to test Azalia.

5.0 GPU Tests

A generic GPU test performs the following operations:

Disable the windowing system to take over the entire screen.

Set the display mode and refresh rate.

Loop N times:

Exercise some aspect of the graphics hardware.

Read back the display memory, and depth buffer for 3D tests. Calculate a 32-bit CRC, or optionally checksum, to compare against known correct value (golden value) for this GPU version and platform. For video and cursor tests use the hardware DAC CRC.

On miscompare, report error and abort the loop. Optionally, capture image file(s) in .TGA format for failure analysis.

Restore previous display mode and refresh rate.

Release screen to windowing system.

Report test status.

Each test carefully chooses the random test parameters, i.e. invalid values are avoided, edge cases are properly covered, and proper weighting is given to more common cases.

HostBusTest.Run

Platforms: DOS, Windows, Linux Test #29

AGP stress test. This test writes stressful patterns into main memory and then DMAs them to framebuffer memory using AGP read cycles.

AppleGL.Run

Platforms: MacOSX Test #71

A port of Apple's OpenGL test.

ByteTest

Platforms: Not run on any platforms by default. Test #18

Just like Mats, except perform 8 bit reads/writes instead of 32 bit read/writes.

CheckDisplay

Platforms: Not run on any platforms by default. Test #22

Display a red-green-blue-white diagonal image on the specified display head and display type for a visual inspection.

CheckDisplayBar

Platforms: Not run on any platforms by default. Test #42

Display red-green-blue-white bars on the specified display head and display type for a visual inspection.

CheckDisplayBars

Platforms: Not run on any platforms by default. Test #34

Display red-green-blue-white bars on all display heads for a visual inspection.

CheckDisplays

Platforms: Not run on any platforms by default. Test #35

Display a red-green-blue-white diagonal image on all display heads for a visual inspection.

CheckFpGray

Platforms: Not run on any platforms by default. Test #38

Display a special gray image on all flat panels for a visual inspection.

CheckFpStripes

Platforms: Not run on any platforms by default. Test #45

Display a special stripe image on all flat panels for a visual inspection.

CheckFrameLock

Platforms: Not run on any platforms by default. Test #53

Check framelock board with loopback setup and external HD signal. To run the test, use -framelock, -framelock_auto, -framelock_skip_lock command line argument to gputest.js.

CheckPCIExpressSlots

Platforms: Not run on any platforms by default Test #78

Check that there is a GPU in the primary slot if there is a GPU in the secondary slot.

CheckHiResCrcs

Platforms: Not run on any platforms by default. Test #69

Check that DAC can handle hi-res modes

CheckOvertemp

Platforms: Not run on any platforms by default. Test #65
Checks if the GPU is overheated

CheckRevision

Platforms: DOS, Windows, Linux Test #30
Check if the GPU revision is correct. The version is specified by the revision command line argument to gputest.js.

CheckRomVersion

Platforms: DOS, Windows, Linux Test #1
Check if the ROM (BIOS/FCODE) version is correct. The ROM version is specified by the rom command line argument to gputest.js.

CheckSubsystemIds

Platforms: DOS, Windows, Linux Test #25
Check if the subsystem vendor and device ID's matches the expected value(s). The ID's are specified by the subsystem command line argument to gputest.js.

CheckThermalSanity

Platforms: DOS, Windows, Linux Test #31
If there is a thermal measuring device on-board, this test makes sure that the values returned are reasonable and not out of bounds.

CheckTvEncoderType

Platforms: DOS, Windows, Linux Test #40
Check if the TV encoder type is correct. The TV encoder is specified by the -tv_encoder command line argument to gputest.js.

CheckTvo

Platforms: Not run on any platforms by default. Test #51
Check the GPU's internal TV encoder. A television must be connected to the TV ouput connector, and the board must not use an external TV encoder.

Class038.Run

Platforms: Not run on any platforms by default. Test #13
Test the acceleration circuitry that blends a YUV and RGB image to produce a final RGB image.

Class039.Run

Platforms: DOS, Windows, Linux Test #5
Test the DMA engine and memory interface. In particular, this test stresses the AGP bus and finds any noise or marginality issues with the bus. The following DMA transactions are tested:

> Frame buffer to frame buffer.
>
> System memory (AGP or PCI - specified by test parameter) to frame buffer.
>
> Frame buffer to system memory.
>
> Optionally, system memory to system memory.

Class046.Run

Platforms: Not run on any platforms by default. Test #6

Test the cursor rendering circuitry. This test randomly positions the cursor and performs a DAC CRC to verify if the rendered cursor is correct.

Class047.Run

Platforms: Not run on any platforms by default. Test #14
Test the GPU's overlay video circuitry. This test reads a given YUV image from specific location with certain size, and renders it as an RGB image at a specific screen location, pixel size, and magnification. A DAC CRC is used to verify if the rendered image is correct.

Class04a.Run

Platforms: DOS, Windows, Linux Test #7
Test the GPU's acceleration circuitry to render clipped and unclipped rectangles, and clipped monochrome images.

Class04d.Run

Platforms: Not run on any platforms by default. Test #37
Test video-in and video-out (VIVO).

Class05c.Run

Platforms: Not run on any platforms by default. Test #8
Test the GPU's solid line and line strip acceleration circuitry.

Class05d.Run

Platforms: Not run on any platforms by default. Test #55
Test the GPU's triangle and triangle fan acceleration circuitry.

Class05f.Run

Platforms: DOS, Windows, Linux Test #10
Test the GPU's BLIT circuitry. BLIT is a graphics term for "BLock Image Transfer". A BLIT is a high-speed transfer of data from one part of the framebuffer to another.

Class061.Run

Platforms: Not run on any platforms by default. Test #11
Test the GPU's ability of reading an image (color array) from the CPU than rendering the image on the screen according to the format selected. This test generates a color array and renders the image with a programmed format and position.

Class064.Run

Platforms: Not run on any platforms by default. Test #12
Test GPU's ability of interpreting an indexed image from CPU to an RGB output. This test stores a color palette, than generates the color index array, and renders an image with a programmed format and position.

Class077.Run

Platforms: DOS, Windows, Linux Test #15
Test the GPU's image filtering acceleration circuitry. This test takes a memory location (system or frame buffer) as source, than DMA's the source image with specified magnifications parameters to the frame buffer destination surface.

Class07a.Run

Platforms: DOS, Windows Test #21
Similar to Class047 plus has support for dual head devices.

Class07c.Run

Platforms: DOS, Windows Test #20
Test the cursor rendering circuitry. This test randomly positions the cursor and performs a DAC CRC to verify if the rendered cursor is correct. This test cycles through all combinations of display devices so that all heads get tested.

Class07c.RunSingle

Platforms: Not run on any platforms by default. Test #64
This is like Class07c.Run, except that only a single head and display device are tested.

Class089.Run

Platforms: DOS, Windows, Linux Test #48
Test the GPU's 'scaled image from memory' functionality.

Class1774.Run

Platforms: Not run on any platforms by default. Test #32
Test the GPU's image MPEG acceleration logic.

Class3097.Run

Platforms: Not run on any platforms by default. Test #59
This test stresses the GPU by doing high-speed rendering using the 3D pipeline.

Class3174.Run

Platforms: Not run on any platforms by default. Test #49
Test the GPU's image MPEG acceleration logic.

Class3174Gr.Run

Platforms: DOS, Windows, MacOSX. Test #67
Test the GPU's image MPEG acceleration logic.

Class4075.Run

Platforms: DOS, Windows. Test #68
Test the GPU's MPEG encoding logic.

Class4176.Run

Platforms: DOS, Windows, MacOSX. Test #47
Test the GPU's video processor logic.

Class417a.Run

Platforms: DOS, Windows, MacOSX. Test #66
Test the GPU's video overlay logic.

CpuPatternsTest

Platforms: DOS, Windows, MacOSX. Test #63
Uses the CPU to write blocks of data to the frame buffer, the GPU to blit back to system memory, and the CPU to check the end result.

CrystalStrap.Run

Platforms: DOS Test #44
Tests if the crystal strap and the crystal frequency match.

DmaTest.RunTest

Platforms: DOS, Windows, Linux Test #61

Modernized and more configurable version of the Class039.Run test. Test the DMA engine and memory interface. In particular, this test stresses the host bus and finds any noise or marginality issues with the bus. The following DMA transactions are tested:

Frame buffer to frame buffer.

System memory to frame buffer.

Frame buffer to system memory.

FastMats.Run

Platforms: DOS, Windows, Linux Test #19
Similar to Mats, except use GPU hardware writes instead of CPU writes.

GetDisplayConfig

Platforms: Not run on any platforms by default. Test #33
Get the display configuration, i.e. print the attached display devices on each display head.

glr_display

Platforms: DOS, Windows Test #46
Test the FSAA functionality of the 3-D graphics engine using the OpenGL driver.

glr_hwtest

Platforms: DOS, Windows, Linux Test #16
Test the 3-D graphics engine by issuing random graphics operations through OpenGL driver. This test enables all 3-D features immediately.

glr_pro10

Platforms: Not run on any platforms by default. Test #28
Test the 3-D graphics engine by issuing random graphics operations through OpenGL driver. This test progressively enables each 3-D feature one at a time, until everything is enabled. This test helps to isolate which section of the 3-D hardware has the defect since each section is individually enabled.

GpuRamTst.Run

Platforms: Not run on any platforms by default. Test #62

I2CTest.Run

Platforms: Not run on any platforms by default. Test #50
Check if the GPU's external I2C bus is properly equipped with pull-up resistors.

JsPowerPusher

Platforms: Not run on any platforms by default. Test #39
JsPowerPusher is an OpenGL test that tries to get the GPU to pull maximum power.

MarchTest

Platforms: MacOSX. Test #52
This is an alternate way to call the Mats test (see below). This version does a "marching ones and zeros" memory pattern.

Mats.Run

Platforms: DOS, Windows, Linux Test #3

A generic frame buffer memory test designed to catch coupling faults within memory arrays. Stepping both up and down through the array as well as alternating reads and writes is important for catching certain cases of array-coupling faults. The test indicates which data bits fail, front or back banks, which memory lane, and read or write fail.

MemInterface.Run

Platforms: OS_MAC Test #4

Test the GPU's memory interface. This test performs read-modify-writes on large blocks of frame buffer memory using the GPU's memory interface unit (Frame Buffer Interface - FBI). During board level testing we use this test to detect any marginal frame buffer memory and marginality in the FBI. By moving the source surface we also test memory bank issues.

MemPatt.Run

Platforms: OS_MAC Test #23

Test the GPU's memory interface. This test performs writes on large blocks of frame buffer memory using the GPU's memory interface unit (Frame Buffer Interface - FBI). The pattern used for the test is specifically designed to cause worst-case switch noise. The complete frame buffer is tested.

MemRefresh.Run

Platforms: DOS, Windows, Linux Test #26

Test the GPU's memory interface. This test performs read-modify-writes on large blocks of frame buffer memory using the GPU's memory interface unit (Frame Buffer Interface - FBI). During board level testing we use this test to detect any marginal frame buffer memory and marginality in the FBI. The complete frame buffer is tested.

MemSize.Run

Platforms: DOS, Windows, Linux Test #17

This tests checks if the BIOS/FCODE sized the memory correctly. It also checks if the "GL-ness" for workstation boards is set correctly, and if the board has the correct number of shader pipes and vertex engines.

Old05d.Run

Platforms: Not run on any platforms by default. Test #9

This is an older, less stressful version of the Class05d.Run test.

PatternTest

Platforms: MacOSX. Test #70

This is an alternate way to call the Mats test. This version uses a memory pattern supplied by Apple..

PllTest.Run

Platforms: DOS, Windows, Linux Test #56

Test the GPU's PLLs using the PLL test counters.

ProgramTvRom

Platforms: Not run on any platforms by default. Test #41

Program the I2C ROM on cards with TV tuner capability.

Rnd2dTest.FancyRun

Platforms: DOS, Windows, Linux Test #58

This is a combined 2d rendering test. It tests blit (rectangular pixel region copy), 2d line, triangle, rectangle, and text drawing, texture downloading and format conversion including palette lookup and dithering, image scaling and stretching, and video colorspace conversion with compositing.

This test is a more thorough replacement for the older tests Class038, Class04a, Class05c, Class05d, Class05f, class061, Class064, Class077, and Class089.

RunFwTest

Platforms: Not run on any platforms by default. Test #47
Test the IEEE 1394 FireWire controller integrated with some GPUs.

StereoTest.Run

Platforms: Not run on any platforms by default. Test #36
Check if the stereo hardware.

StressBaseline

Platforms: Not run on any platforms by default. Test #24
Shmoo the graphics clock upwards to find the maximum frequency that the internal stress test can run at. Then, patch the vbios to record this baseline information.

TagRamTest.Run

Platforms: Not run on any platforms by default. Test #57
Test the GPU's internal compression tag ram.

VgaTest.Run

Platforms: Not run on any platforms by default. Test #43
Test the framebuffer memory memory through legacy VGA functionality.

VgaTest.RunDac

Platforms: DOS Test #60
Set various legacy DOS VESA modes and captures DAC CRCs. This tests the logic that scans out framebuffer data.

6.0 MCP Tests

For detail configuration parameters, refer to mfgmcp.pdf.

RunAtaTest

Platforms	DOS	Devices	ALL	Test # 1

Test the ATA interface using an attached ATA hard drive. This test writes, reads, and verifies one or more sectors on the disk using PIO and DMA transfers. Sectors are addressed using both CHS and LBA.

Cfg Parameters:

g_Mcp_Cfg_Ata_Drive, g_Mcp_Cfg_Ata_UseIntr, g_Mcp_Cfg_Ata_PioMode_Array, g_Mcp_Cfg_Ata_DmaMode_Array, g_Mcp_Cfg_Ata_Is100, g_Mcp_Cfg_Ata_Is133

RunAtapiTest

Platforms	DOS	Devices	ALL	Test # 2

Test the ATAPI interface using an attached CDROM drive with a CD inserted. This test reads and verifies a number of logical blocks on the disk using PIO and DMA transfers.

Cfg Parameter:

g_Mcp_Cfg_Atapi_Drive, g_Mcp_Cfg_Atapi_IsWrite, g_Mcp_Cfg_Atapi_PioMode_Array, g_Mcp_Cfg_Atapi_DmaMode_Array

RunFloppyTest

Platforms DOS Devices ALL Test # 3

Test the floppy drive using an attached floppy drive with a formatted disk inserted. This test writes a test file, reads it back, and verifies the contents.

RunNvEthernetTest

Platforms DOS, XOS Devices ALL Test # 4

Test the NVidia MAC and PHY using an external loopback cable. This test checks whether the MAC is present and its registers can be accessed. It then tries to find a PHY. Next, it tests the transmitter by sending contiguous as well as fragmented packets. Finally, it tests the receiver by receiving loopback packets into contiguous buffers.

Cfg Parameter:

g_Mcp_Cfg_NvEnet_Devices, g_Mcp_Cfg_PhyType, g_Mcp_Cfg_Nf3Type, g_Mcp_Cfg_NvEnet_IsTxOffload, g_Mcp_Cfg_NvEnet_IsRxOffload, g_Mcp_Cfg_NvEnet_Params

RunAciTest

Platforms DOS Devices ALL Test # 5

Test the Audio Codec input and output using a loopback setup for Line In, Mic, Phone, Cd In, Aux In, and SpdifOut->SpdifIn loopback

Cfg Parameter:

g_Mcp_Cfg_Aci_Default, g_Mcp_Cfg_Aci_Spdif, g_Mcp_Cfg_Aci_Spdif2, g_Mcp_Cfg_Aci_Size, g_Mcp_Cfg_Aci_Out , g_Mcp_Cfg_Aci_Conn , g_Mcp_Cfg_Aci_In

RunSmbusTest

Platforms DOS Devices MCP1 Test # 6

Test the SMBus. This test checks all SMBus ports.

Cfg Parameters:

g_Mcp_Cfg_Smb_Num_Ports, g_Mcp_Cfg_Smb_PortArray

RunApuTest

Platforms DOS, XOS Devices MCP1, MCP2 Test # 7

Test the Audio Processing Unit. This test runs the APU on trace files and checks the output.

RunUsbTest

Platforms DOS Devices ALL Test # 8

Test the USB controller. This test checks the USB controller using a configuration cycle on attached devices.

Cfg Parameters:

g_Mcp_Cfg_Usb_Max_Num_Ports, g_Mcp_Cfg_Usb1_PortArray

RunMciTest

Platforms DOS Devices ALL Test # 9

Test the Modem Codec.

RunSerialTest

Platforms DOS Devices ALL Test #10

Test the serial port using an attached loopback device. This test performs internal loopback as well as external loopback.

Cfg Parameters:

g_Mcp_Cfg_Serial_Max_Num_Ports, g_Mcp_Cfg_Serial_PortArray

RunParallelTest

Platforms DOS Devices ALL Test #11

Test the parallel port using an attached loopback device.

RunRtcTest

Platforms DOS Devices ALL Test #12

Test the Real-Time Clock. This test checks RTC accuracy, registers, alarm, and interrupts.

RunPs2Test

Platforms DOS Devices ALL Test #13

Test the PS2 port using an attached PS2 mouse.

RunTimerTest

Platforms DOS Devices ALL Test #14

Test the system timer. This test checks timer accuracy.

RunGameTest

Platforms DOS Devices MCP1, MCP2 Test #15

Test the game port using a loopback cable.

RunSystemMemoryTest

Platforms DOS Devices ALL Test #16

Test the system memory.

RunSystemStressTest

Platforms	DOS	Devices	ALL	Test #17

Test the MCP by creating a variety of traffic through the chipset. The test spawns a number of threads, each which performs some memory reference. The threads implemented so far are a CPU driven mem to mem copy, which provides much of the bandwidth stress on the chipset, an ATA DMA thread, which copies data to a secondary drive and back again, Audio, which adds a real-time DMA access, and Ethernet, which provides yet another source of IO traffic. Run3DTrace can run graphics traces in order to generate traffic through texture accesses and the pushbuffer, as well as ensure the GPU can function in a high stress situation.

Cfg Parameters:

g_Mcp_Cfg_Stress_DoAta , g_Mcp_Cfg_Stress_DoEth , g_Mcp_Cfg_Stress_DoAci, g_Mcp_Cfg_Stress_IsGige, g_Mcp_Cfg_PhyType (used in test 4)

RunTcomEthernetTest – no longer exist

RunSmbus2Test

Platforms	DOS	Devices	MCP2 and up	Test #19

Test the SMBus2. This test checks all 2 SMBus2 ports.

Cfg Parameters:

g_Mcp_Cfg_Smb_Num_Ports, g_Mcp_Cfg_Smb_PortArray

RunUsb2Test

Platforms	DOS	Devices	MCP2 and up	Test #20

Test the USB controller. This test checks the USB controller by running a configuration cycle on attached devices.

Cfg Parameters:

g_Mcp_Cfg_Usb_Max_Num_Ports, g_Mcp_Cfg_Usb2_PortArray

RunFwTest

Platforms	DOS	Devices	MCP2	Test #21

Test the IEEE 1394 FireWire controller. Requires at least one attached FireWire device. Two test modes are permitted: Device Mode, and Loopback Mode.

Cfg Parameters:

g_Mcp_Cfg_Fw_Max_Num_Ports, g_Mcp_Cfg_Fw_Loopback, g_Mcp_Cfg_Fw_PortArray

RunSBiosTest

Platforms	DOS	Devices	MCP1	Test #22

Test System BIOS default value before ACI test.

RunAcrEEPROMTest

Platforms	DOS	Devices	MCP1, MCP2, CK8 and MCP2S	Test #23

Test EEPROM on Acr card.

RunApuMatTest

Platforms	DOS	Devices	MCP2	Test #24

Test memory inside Apu.

AcpiTimerTest

Platforms	DOS	Devices	ALL	Test #25

Test Acpi Timer by compare with system timer.

RunApicTest

Platforms	DOS	Devices	MCP2 and up	Test #26

Reroute Real time clock interrupt to Apic interrupt table, and test interrupt still occur correctly.

RunSataTest

Platforms	DOS	Devices	Mcp2S, Ck8S and up	Test #27

Test the SATA interface using an attached SATA hard drive. This test writes, reads, and verifies one or more sectors on the disk using PIO and DMA transfers. Sectors are addressed using both CHS and LBA.

Cfg Parameters:

g_Mcp_Cfg_Sata_IsRandom_Aligned, g_Mcp_Cfg_Sata_UseIntr, g_Mcp_Cfg_Sata_UseMsi, g_Mcp_Cfg_Sata_IsExtened, g_Mcp_Cfg_Sata0_Channels, g_Mcp_Cfg_Sata1_Channels, g_Mcp_Cfg_Slv_Sata0_Channels, g_Mcp_Cfg_Slv_Sata1_Channels

RunSatapiTest

Platforms	DOS	Devices	Mcp2S, Ck8S and up	Test #28

Test the SATA ATAPI interface using an attached CDROM drive with serial bridge with a CD inserted. This test reads and verifies a number of logical blocks on the CD using PIO and DMA transfers.

Cfg Parameter:

g_Mcp_Cfg_Satapi0_Channels, g_Mcp_Cfg_Satapi1_Channels, g_Mcp_Cfg_Slv_Satapi0_Channels, g_Mcp_Cfg_Slv_Satapi1_Channels, g_Mcp_Cfg_Satapi_IsWrite, g_Mcp_Cfg_Satapi_PioMode_Array, g_Mcp_Cfg_Satapi_DmaMode_Array

RunAdmaTest

Platforms	DOS	Devices	CK804 and up	Test #29

Test the SATA interface using an attached SATA hard drive. This test writes, reads, and verifies one or more sectors on the disk using PIO and DMA transfers. Sectors are addressed using both CHS and LBA.

Cfg Parameters:

g_Mcp_Cfg_Adma_IsDma, g_Mcp_Cfg_Adma_IsDmaStress

Shared with SataTest (Test 27)

g_Mcp_Cfg_Sata0_Channels, g_Mcp_Cfg_Sata1_Channels, g_Mcp_Cfg_Slv_Sata0_Channels, g_Mcp_Cfg_Slv_Sata1_Channels,

RunAdmapiTest

Platforms	DOS	Devices	CK804 and up	Test #30

Test the SATA ATAPI interface using an attached CDROM drive with serial bridge with a CD inserted. This test reads and verifies a number of logical blocks on the CD using PIO and DMA transfers.

Cfg Parameter:

g_Mcp_Cfg_Admapi_IsDma, g_Mcp_Cfg_Admapi_IsDmaStress

Shared with Sata Atapi test:

g_Mcp_Cfg_Satapi0_Channels, g_Mcp_Cfg_Satapi1_Channels, g_Mcp_Cfg_Slv_Satapi0_Channels, g_Mcp_Cfg_Slv_Satapi1_Channels,

RunAzaliaTest

Platforms	DOS	Devices	MCP51	Test #36

Test Azalia high-definition audio via an audio loopback cable.

Cfg Parameters:

g_Mcp_Cfg_Aza_Map, g_Mcp_Cfg_Aza_Loopback

7.0 Test Result

Test Log

As each test is executed, it is logged to the log file when it begins, and when it ends. By default the log file name is mods.log. The log file name can be changed via the ‘-l’ command line argument to MODS.

When a test begins, the following message is printed to the log file.

```
Enter Class05f.Run Thu Jan 11 14:42:47 2001
```

Field	*Meaning*
Enter	Entering the test.
Class05f.Run	Name of test that is executing.
Thu Jan 11 14:42:47 2001	Test start time. This field is only displayed if the ‘-time’ command line argument is specified.

When a test ends, the following message is printed to the log file.

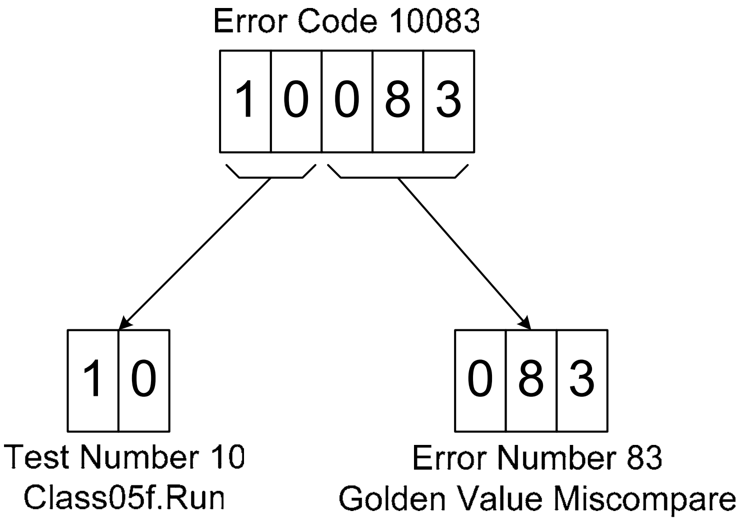
```
Exit 10083 : Class05f.Run golden value miscompare [5.293 seconds]
```

Field	*Meaning*
Exit	Exiting the test.
10083	Error code.
Class05f.Run	Name of test that just executed.
golden value miscompare	Error message.
[5.293 seconds]	Duration of test. This field is only displayed if the ‘-time’ command line argument is specified.

7.1 Error Codes

The error code is calculated by combining the two-digit test number with the three-digit error number. Errors are between 1 and 999. The test numbers start at 1 and end at 64.

For example, an error code of 10083 would mean that the Class05f test failed with an 83 error, which is a golden value miscompare.



GPU Test Numbers

Test#	Test Name	Test#	Test Name	Test#	Test Name
1	CheckRomVersion	25	CheckSubsystemIds	50	I2CTest.Run
2	GLStress.Run	26	MemRefresh.Run	51	CheckTvo
3	Mats.Run	28	glr_pro10	52	MarchTest
4	MemInterface.Run	29	HostBusTest.Run	53	CheckFrameLock
5	Class039.Run	30	CheckRevision	54	glr_ctxsw
6	Class046.Run	31	CheckThermalSanity	55	Class05d.Run
7	Class04a.Run	32	Class1774.Run	56	PllTest.Run
8	Class05c.Run	33	GetDisplayConfig	57	WfMatsMemToMem
9	Rnd2dTest.NcRun	34	CheckDisplayBars	58	Rnd2dTest.FbRun
10	Class05f.Run	35	CheckDisplays	59	RmStress.Run
11	Class061.Run	36	StereoTest.Run	60	VgaTest.RunDac
12	Class064.Run	37	Class04d.Run	61	DmaTest.RunTest
13	Class038.Run	38	CheckFpGray	62	GpuRamTest.RunTest
14	Class047.Run	39	JsPowerPusher	63	CpuPatternsTest
15	Class077.Run	40	CheckTvEncoderType	64	Class07c.RunSingle
16	glr_hwtest	41	ProgramTvRom	65	CheckOvertemp
17	MemSize.Run	42	CheckDisplayBar	66	Class417a.Run
18	ByteTest	43	VgaTest.Run	67	Class3174Gr.Run
19	FastMats.Run	44	CrystalStrap.Run	68	Class4075.Run
20	Class07c.Run	45	CheckFpStripes	69	CheckHiResCrcs
21	Class07a.Run	46	glr_display	70	PatternTest
22	CheckDisplay	47	Class4176.Run	71	AppleGL.Run
23	MemPatt.Run	48	Class089.Run	72	VideoBridge
24	Deleted2	49	Class3174.Run	73	Thermal.RunStress
				78	CheckPCIExpressSlots

MCP Test Numbers

Test#	Test Name	Test#	Test Name	Test#	Test Name
1	RunAtaTest	12	RunRtcTest	23	RunAcrEEPROMTest
2	RunAtapiTest	13	RunPs2Test	24	RunApuMats
3	RunFloppyTest	14	RunTimerTest	25	AcpiTimerTest
4	RunNvEthernetTest	15	RunGameTest	26	RunApicTest
5	RunAciTest	16	RunSystemMemoryTest	27	RunSataTest
6	RunSmbus1Test	17	RunSystemStressTest	28	RunSatapiTest
7	RunApuTest	18	Run3ComEthernetTest	29	RunAdmaTest
8	RunUsb1Test	19	RunSmbus2Test	30	RunAdmapiTest
9	RunMciTest	20	RunUsb2Test	31	PcieLBTest
10	RunSerialTest	21	RunFwTest	32	SataLBTest
11	RunParallelTest	22	RunSBiosTest	33	RunCK804BondTest

Error codes

#	Error description
1	exit
2	software error
3	function is not supported
4	did not install singleton
5	bad command line argument
6	on entry failed
7	bad help string
8	bad parameter passed to function
9	cannot allocate memory
10	cannot open file
11	file does not exist
12	failed while reading a file
13	cannot log method
14	cannot log functions
15	method is still being logged
16	user aborted the script
17	could not create JavaScript engine
18	could not create a JavaScript method
19	could not create a JavaScript object
20	could not initialize the JavaScript standard classes
21	script failed to execute
22	script failed to compile and execute
23	could not compile file
24	cannot convert integer to a jsval
25	cannot convert jsval to an integer
26	cannot convert boolean to a jsval
27	cannot convert jsval to a boolean
28	cannot convert jsval to a float
29	cannot convert float to a jsval
30	cannot convert jsval to a string
31	cannot convert string to a jsval
32	cannot convert jsval to an array
33	cannot convert array to a jsval
34	cannot convert jsval to an object
35	cannot convert jsval to a function
36	invalid object property
37	cannot enumerate object
38	cannot get element
39	cannot set element
40	bad format specification
41	cannot hook interrupt
42	did not initialize resource manager
43	did not initialize resource manager hardware abstraction layer
44	did not map device in to resource manager
45	did not initialize client
46	NVRM invalid base
47	NVRM invalid class
48	NVRM invalid client
49	NVRM invalid device
50	NVRM invalid event
51	NVRM invalid flags
52	NVRM invalid index
53	NVRM invalid limit
54	NVRM invalid object buffer
55	NVRM invalid object error
56	NVRM invalid object new
57	NVRM invalid object old
58	NVRM invalid object parent
59	NVRM invalid offset
60	NVRM invalid param struct
61	NVRM insufficient resources
62	NVRM invalid function
63	NVRM invalid owner
64	NVRM invalid heap
65	NVRM multiple memory types
66	NVRM object has children
67	NVRM object in use
68	NVRM operating system error
69	NVRM protection fault
70	NVRM was not created properly
71	NVRM cannot unload state
72	NVRM cannot load state
73	NVRM no free memory
74	NVRM generic error
75	NVRM invalid root
76	error occurred while preprocessing file
77	timeout error
78	unsupported depth
79	unsupported surface offset
80	unsupported color format
81	expanded memory manager (EMM) is loaded
82	stored golden value not found
83	golden value miscompare
84	file parse error
85	syntax error in FancyPicker configuration
86	incorrect file format
87	failed while writing a file
88	failed to copy memory
89	bad data in trace file or unsupported trace file feature
90	unsupported 3D primitive class
91	failed to render a solid rectangle
92	cannot disable user interface
93	cannot enable user interface
94	memory location must be one of Memory::Agp, Memory::Pci, or Memory::Fb
95	golden value miscompare in Z buffer
96	test configuration has invalid channel type, try TestConfiguration.DmaChannel
97	test configuration has invalid memory type, must be Memory::Pci, or Memory::Agp
98	cannot initialize OpenGL
99	unknown GL error
100	OpenGL error INVALID_ENUM
101	OpenGL error INVALID_VALUE
102	OpenGL error INVALID_OPERATION
103	OpenGL error STACK_OVERFLOW
104	OpenGL error STACK_UNDERFLOW
105	OpenGL error OUT_OF_MEMORY
106	OpenGL error TABLE_TOO_LARGE
107	OpenGL util error INVALID_ENUM
108	OpenGL util error INVALID_VALUE
109	OpenGL util error OUT_OF_MEMORY
110	OpenGL util error INVALID_OPERATION
111	OpenGL util error NURBS_ERROR(n)
112	OpenGL util error TESS_ERROR(n)

113 OpenGL util error TESS_MISSING_BEGIN_POLYGON
114 OpenGL util error TESS_MISSING_BEGIN_CONTOUR
115 OpenGL util error TESS_MISSING_END_POLYGON
116 OpenGL util error TESS_MISSING_END_CONTOUR
117 OpenGL util error TESS_COORD_TOO_LARGE
118 OpenGL util error TESS_NEED_COMBINE_CALLBACK
119 RestartPointLoops must be > 0
120 ATA/ATAPI/DAMA channel must be Pri(0x00) or Sec(0x01)
121 ATA/ATAPI/DAMA drive/device must be Master(0x00) or Slave(0x10)
122 ATA Test: invalid config
123 ATA/ATAPI/DAMA invalid device params for max cylinders, heads, sectors number
124 ATA Error
125 ATA drive error
126 ATA bios requested programming interface failed
127 ATA/ADMA device not ready or busy
128 ATA invalid register to read/write
129 ATA invalid buffer index of descriptor table
130 ATA/ATAPI invalid transfer mode
131 ATA/ATAPI invalid page size for dtable buffer alignment
132 ATA/ATAPI invalid pci transfer mode
133 ATA verify read or write result fail
134 ATA set feature command rejected
135 ATA seek command rejected
136 ATA command: verify sector rejected
137 invalid window
138 AUDIO invalid register
139 ETHERNET invalid register
140 ETHERNET cannot access this table/ring entry.
141 ETHERNET no Tx entry.
142 ETHERNET no Rx entry.
143 ETHERNET no active Rx buffer.
144 ETHERNET not enough Rx buffer to hold the Rx Data.
145 ETHERNET Invalid Receive buffer size.
146 ETHERNET Invalid transmit buffer size.
147 ETHERNET buffer cross 8K boundary.
148 ETHERNET Rx Data Mismatch Expected.
149 MODEM invalid register
150 USB invalid register
151 USB invalid interrupt interval
152 USB invalid RhPort
153 USB invalid list type
154 USB invalid control state
155 USB invalid Ed direction
156 USB invalid port state
157 USB invalid recipient for request
158 USB invalid request
159 USB invalid interrupt table entry
160 USB invalid transfer descriptor pointer (NULL)
161 USB invalid endpoint descriptor pointer (NULL)
162 USB Reg_Bits not set as expected
163 USB reg not set as expected
164 USB setup packet fail
165 USB descriptor type did not match the requested type
166 USB data mismatch
167 USB DataIn packet fail
168 USB DataOut packet fail
169 registry key not found
170 registry error
171 incorrect rom version
172 golden check found bad pixel, continuing
173 stored golden values have wrong NumCodeBins
174 golden value miscompare
175 invalid z pitch
176 IRQ not assigned
177 invalid IRQ
178 invalid NV base address
179 invalid NV size
180 invalid FB base address
181 invalid max AGP requests
182 cannot set state
183 invalid AGP request depth
184 invalid AGP data rate
185 cannot set pixel clock
186 cannot set memory clock
187 cannot set graphics clock
188 bad dac
189 invalid channel
190 invalid subchannel
191 bad format
192 put caught up to get
193 invalid ram amount
194 bad memory
195 EDVR: system error
196 ECIC: not CIC or lost CIC during command
197 ENOL: write detected no listeners
198 EADR: board not addressed correctly
199 EARG: bad argument to function call
200 ESAC: function requires board to be SAC
201 EABO: asynchronous operation was aborted
202 ENEB: non-existent board
203 EDMA: DMA hardware error detected
204 EBTO: DMA hardware uP bus timeout
205 EOIP: new I/O with old I/O in progress
206 ECAP: no capability for intended operation
207 EFSO: file system operation error
208 EOWN: Shareable board exclusively owned
209 EBUS: bus error
210 ESTB: serial poll queue overflow
211 ESRQ: SRQ line 'stuck' on
212 ETAB: the return buffer is full
213 ELCK: board or address is locked
214 unknown GPIB Error
215 could not allocate a GPIB buffer
216 Could not find the specified GPIB device
217 pci bios is not present
218 pci function is not supported
219 pci invalid vendor identification
220 pci device not found
221 pci invalid register number
222 cpuid instruction is not supported
223 cpu does not support MTRR

224 cpu is not supported
225 invalid register number
226 invalid address
227 could not map physical address
228 could not free physical memory map
229 hardware was not initialized
230 invalid graphics aperture base
231 invalid graphics aperture size
232 wrong bios
233 bad NVIDIA chip
234 error occurred while reading or writing serial data
235 could not set environment variable
236 the expected value and the destination memory value do not match
237 unable to set mode
238 specified video mode not found in mode timings table
239 invalid display type
240 invalid tv standard
241 invalid head
242 failed to set image offset
243 failed to disable the cursor
244 feature is not supported in the hardware
245 TIMEOUT: Timeout occurred on WaitSRQ
246 SRQ from Unknown source.
247 Javascript method is not defined
248 AUDIO buffer unaligned
249 AUDIO all descriptor entries have buffer
250 AUDIO no valid buffer in descriptor.
251 AUDIO invalid 16bit sample number.
252 CANNOT enable Io or Mem Space.
253 CANNOT enable Bus Master.
254 MemSize detected an invalid framebuffer size.
255 AUDIO not any buffer get freed.
256 MODEM all descriptor entries have buffer
257 MODEM buffer unaligned
258 MODEM not any buffer get freed.
259 Golden testname or recname too long.
260 CODEC NOT ready.
261 golden value miscompare in instance memory
262 oven communication error
263 couldn't read target temperature
264 temperature value not valid
265 CRC error while communicating with oven
266 must first initialize oven
267 ATA bios requested programming interface failed
268 ATAPI Invalid Register code
269 ATAPI Device not ready
270 ATAPI Invalid parameter for packet command
271 ATAPI Invalid packet command size
272 ATAPI Invalid data length
273 ATAPI packet command finished with error
274 ATAPI command finished with error
275 ATAPI test read result mismatch the expected value
276 ATAPI test invalid Pio transfer mode selected
277 ATAPI test invalid Dma transfer mode selected
278 ATAPI test invalid input value
279 ETHERNET cannot config phy to the desired setting.
280 ETHERNET Test settings are conflict.
281 ATA Dma command finished with error.
282 ATA Pio command fail.
283 Incorrect OpenGL driver version.
284 SMBUS Pci register: Cannot enable IO reg space.
285 SMBUS device busy.
286 SMBUS Read Register fail.
287 SMBUS Command fail.
288 SMBUS Host-Slave snoop loopback fail.
289 SMBUS access invalid register.
290 SMBUS invalid write data size for the protocol.
291 SMBUS invalid read data size for the protocol.
292 SMBUS invalid command(protocol) type.
293 SMBUS command finished with error.
294 Cannot use loops with PIO channel.
295 Must set a jump point before writing a jump.
296 Subsequent channel writes wrote over jump location.
297 No loop to stop.
298 Usb port not connected to any device
299 Usb Test Fail at configuration
300 AUDIO Test Fail
301 AUDIO Loopback test frequency mismatch
302 floppy test failed
303 MODEM Test Fail
304 MODEM Loopback test frequency mismatch
305 incorrect subsystem id
306 PARRALLEL TEST Invalid Parallel port number
307 PARRALLEL TEST Invalid Io base address
308 PARRALLEL TEST loopback data mismatch.
309 SERIAL TEST Invalid Parallel port number
310 SERIAL TEST Invalid Io base address
311 SERIAL TEST loopback data mismatch.
312 bad index into FancyPicker array
313 RTC TEST Invalid property to set
314 RTC TEST Invalid register
315 RTC TEST invalid rate selected
316 RTC TEST Register value not correct.
317 RTC TEST NO interrupt generated
318 RTC TEST time mismatch
319 RTC TEST time and alarm mismatch
320 RTC TEST Ram value mismatch
321 RTC TEST ticket number mismatch the expected
322 RTC TEST interrupt or flag not set correctly
323 Ps2 Test Invalid Command
324 PS2 Test Invalid Mouse Command
325 Invalid Mouse return code
326 Ps2 Test Data Compare mismatch
327 TIMER TEST Invalid Counter number
328 TIMER TEST No counter value Returned
329 TIMER TEST timer ticket number doesn't match the expected
330 Audio Invalid Aci Type
331 Hardware does not support this FSAA mode
332 GameTest not Initialized
333 GameTest Resistor value out of range
334 GameTest Button Released
335 TimerTest not Initialized
336 TimerTest Invalid Wait Time
337 Pool CANNOT allocate anymore memory

338 Pool exceed maxim size
339 Pool invalid request size
340 Pool Invalid address to free
341 Buffer mismatch
342 Audio secondary audio Codec not ready
343 Audio Requested channels cannot be enabled
344 Underflow error on Ethernet
345 Ethernet CRC error.
346 Hardware error triggered on Ethernet
347 The Current Codec doesn't have loopback mode.
348 Fail to reset phy.
349 Out of date golden file.
350 incorrect chip revision
351 memory not strapped correctly
352 AUDIO Loopback test amplitude mismatch
353 Ps2Test controller command fail
354 Ps2Test mouse command fail
355 Audio Processing Unit timeout
356 Audio Processing Unit CRC miscompare
357 Audio Processing Unit failed to get resources
358 Audio Processing Unit error
359 Each board description must be unique
360 Audio timeout Error
361 Ata timeout Error
362 Ethernet timeout Error
363 ATAPI Byte Count read 0 when data expected
364 Audio CODEC power down register has wrong value
365 CRTC FIFO underflow occurred
366 The order of commands in the MPEG stream was not correct
367 Found a bad command in the MPEG stream
368 MPEG hardware sent the wrong number of notifiers
369 Audio Resource Manager initialization failed
370 bad stereo glasses connector
371 Device Register PIO Access not enabled
372 Device Register Memory Access not enabled
373 Device DMA not enabled
374 Not High Speed Device connected to Usb2 port
375 The user determined that the TV quality was unacceptable
376 Firewire Invalid phy Reg
377 Firewire Fail to enable Link
378 Firewire Invalid Dma Type, or Dma Type mismatch
379 Firewire Fail to add block
380 Firewire Invalid Iso context number
381 Firewire Invalid selfId
382 Firewire selfId Error
383 Firewire Invalid PhyId
384 Firewire Invalid number of descriptor in one block
385 Firewire Invalid descriptor type or type not match the requirement
386 Firewire Invalid size of descriptor block
387 Firewire Invalid descriptor block
388 Firewire Invalid input for function
389 Firewire Invalid address or data to initialize descriptor
390 Firewire fail to Force root
391 Firewire check status fail
392 Firewire check interrupt fail
393 Firewire Phy packet validation fail
394 Firewire Asy or Iso Recv packet validation fail
395 Firewire fail to set the Iso recv mode.
396 FirewirePkt Invalid Recv_Rsp_header
397 Firewire Phy Cmd fail
398 Firewire Asy Xmit fail
399 Firewire Asy Recv fail
400 Firewire Asy Cmd fail
401 Firewire Iso Xmit fail
402 Firewire Iso Recv fail
403 FwTest failed to initialize the test
404 FwTest StoreValue() Value miscompare
405 FwTest check status fail
406 FwTest AsyRd fail
407 FwTest test fail. See Log file for the actual failure point.
408 incorrect TV encoder type
409 Ethernet adapter context failure.
410 Ethernet could not open phy.
411 Ethernet transmit queue full.
412 Ethernet phy initialization failure.
413 Ethernet unspecified adapter error.
414 Remote Controller Test Not ALL Key were tested.
415 Remote Controller Test Key Pressed Mismatch expected.
416 Remote Controller Test Register value Mismatch expected.
417 Network is not initialized.
418 Network cannot create socket.
419 Network socket cannot bind to the specified port.
420 Network socket cannot connect to peer.
421 Network socket is not connected.
422 Network socket is already connected.
423 Network read error.
424 Network write error.
425 Network cannot determine host address.
426 A network error has occurred.
427 atapi DTable hasn't been setup yet.
428 Data vector size mismatch expected.
429 Data vector value miscompare with expected.
430 error occurred trying to write a call pushbuffer instruction
431 not enough pushbuffer memory
432 The user determined that the cdrom audio quality was unacceptable
433 The user determined that the avpod audio quality was unacceptable
434 The user determined that the tuner audio quality was unacceptable
435 Ethernet incorrect packet size received.
436 Ethernet link timeout.
437 Ethernet transmit timeout.
438 Ethernet receive timeout.
439 vbe call failed
440 wrong vbe signature
441 wrong vbe version
442 Ethernet not initialized.
443 Ethernet already initialized.
444 Ethernet not open.

445 Ethernet is open.
446 incorrect mode
447 incorrect vga windows
448 File size would become larger than the implementation can support.
449 File exists but cannot be accessed with given flags.
450 File write followed a nonblocked write before the latter was complete.
451 File argument isn't valid file descriptor or isn't open for writing.
452 File device or resource is busy.
453 No child process.
454 File deadlock.
455 File open with O_CREAT and O_EXCL set but the file already exists.
456 File bad address.
457 File is too large.
458 File operation was interrupted by a signal.
459 File argument not valid.
460 File I/O error
461 The open operation was interrupted by a signal.
462 The process has too many files open.
463 Too many file links.
464 Filename is too long.
465 The system has too many files open.
466 No such device in file operation.
467 No such file or directory.
468 Exec() format error in file operation.
469 The system has run out of file lock resources.
470 Not enough memory for file operation.
471 Not enough disk space left.
472 File function not implemented.
473 File argument is not a directory.
474 Directory isn't empty.
475 Inappropriate I/O control operation.
476 No such device or address in file operation.
477 File operation not permitted.
478 Write to pipe or FIFO that isn't open for reading by any process
479 File on read-only file system and invalid flags are set.
480 Illegal file seek.
481 Invalid process during file operation.
482 Invalid cross-device link during file operation.
483 Unknown file error.
484 golden value miscompare on 2nd GPU
485 golden value miscompare in Z buffer on 2nd GPU
486 timeout waiting for notifier from GPU
487 timeout waiting for notifier from 2nd GPU
488 Cannot access device registers.
489 the memory or frame buffer interface is marginal
490 Cannot set AGP data rate.
491 Cannot set AGP sideband addressing mode.
492 Cannot set AGP fastwrite mode.
493 Couldn't lock on to the input signal.
494 Couldn't lock on to the chroma data.
495 Actual crystal value does not match the strapped crystal value.
496 invalid display mask
497 failed to get image offset
498 Invalid device Id
499 SBIOS test failed
500 HPNA phy test failed
501 Usb Port cannot be remapped
502 Invalid Mfgtest test number
503 Invalid Mfgtest test mode
504 last release 25 error
505 AUDIO Loopback Left and Right Channel Crossed
506 Firewire check time stamp fail
507 FirewirePkt Invalid Recv_Rqs_header
508 Invalid Mcp Version
509 Not an NV Device
510 Test Cannot run on this Mcp Chip Version
511 Required chip library interface not found
512 Ethernet receive error.
513 Ethernet framing error.
514 Ethernet packet overrun error.
515 Ethernet bad packet received.
516 Ethernet packet loss error.
517 Cannot access MAC EEPROM.
518 Usb Port mapping value is wrong.
519 Ata selected channel is not enabled.
520 Ata invalid device.
521 Number of Channel and number of input mismatch.
522 Invalid Number of Pdrs.
523 Ethernet Cannot find phy.
524 Smbus Invalid slave address.
525 Smbus Invalid data size for command.
526 Smbus Invalid data for command.
527 System Control Invalid IO Base.
528 Adm Test Invalid Register.
529 Audio Test Invalid Input.
530 Ethernet Test eeprom checksum mismatch.
531 Usb invalid device.
532 Usb invalid base.
533 Usb invalid input data.
534 Firewire 2 OHCI are not connected, loopback cannot perform.
535 Firewire CapPtr wrong.
536 Firewire invalid device.
537 Firewire set register failed.
538 Firewire clear register failed.
539 Firewire packet error.
540 Firewire Invalid Speed.
541 Firewire Invalid transmit type.
542 Firewire Invalid transmit type.
543 Firewire invalid destination Node ID.
544 Firewire Invalid Data size.
545 Firewire Invalid request type.
546 Firewire interrupt count failed.
547 Invalid CPU Frequency measured.
548 Invalid parameter for utility functions.
549 Game Test invalid status bit.
550 System Stress Test invalid input.
551 Real Time Clock test invalid input.
552 Real time clock test failed to restore.
553 Atapi Status return error.
554 Graphics fifo method error.
555 GPU channel fifo software method error.
556 GPU channel fifo unknown method error.

557 GPU channel fifo channel busy error.
558 GPU channel fifo runout overflow error.
559 GPU channel fifo parse error.
560 GPU channel fifo PTE error.
561 GPU channel fifo idle timeout error.
562 GPU channel instance lookup failure.
563 GPU channel debug single-step.
564 GPU channel missing hardware error.
565 GPU channel software method.
566 GPU channel software notify.
567 GPU channel fake error.
568 GPU channel scan line timeout error.
569 GPU channel vblank callback error.
570 GPU channel software method parameter error.
571 Ata Invalid classcode.
572 The required function is not supported by present CODEC.
573 Audio CODEC failure.
574 Firewire fix cannot be enabled in pci cfg.
575 Firewire phy failed to be set.
576 Audio Test Invalid loopback Mode.
577 Could not acquire I2C port.
578 I2C SCL pull-up resistor missing.
579 I2C SDA pull-up resistor missing.
580 The auxiliary power connector is not plugged in.
581 can not generate golden values using an official release
582 gpu stress test found pixel miscompares
583 thermal sensor reports overheating
584 Failed to do Internal/External graphics switch.
585 failed to capture internal TV encoder crc
586 the internal TV encoder is bad
587 Smbus Cannot set DDC base.
588 invalid EDID
589 FramLock Test Check Reg Fail
590 FramLock Test Invalid DispalySync Unit of Invalid Displays
591 FramLock Test Invalid input
592 FramLock Test Set display(s) to Master fail
593 FramLock Test Set display(s) to Slave fail
594 FramLock Test Loopback Test fail
595 FramLock Test Sync Test fail
596 FramLock Test Sync Test, User and Auto result mismatch
597 NVRM not supported
598 temperature not stable
599 fan does not seem to cool the chip
600 Usb failure related to port mapping, port number.
601 Acpi timer failure.
602 NVRM bad channel
603 NVRM timeout
604 the counter overflowed
605 the frequency is incorrect
606 Apple API call never returned
607 Bad compression-tag-ram in GPU
608 Interrupt request line stuck asserted
609 Interrupt request mechanism does not work
610 last release 40 error
611 Audio Test Invalid Output Channel.
612 Invalid value for Mcp configuration variable(s).
613 Invalid Mcp configuration filename.
614 Extra golden code miscompare
615 Extra golden code miscompare on 2nd GPU
616 ApicTest: Cannot enable apic
617 ApicTest: Invalid register to access
618 ApicTest: Apic not enabled yet
619 ApicTest: failed check status of IO pic
620 ApicTest: Invalid Irq number
621 ApicTest: Test fail
622 ApicTest: interrupt vector Error.
623 Serial Ata error.
624 Error in VBIOS DCB tables.
625 ATA/ATAPI/ADMA AddressMode must be Chs(0x00) or Lba(0x40).
626 ATA/ADMA Hardrive has no valid sectors.
627 Supplied mode not supported by the display.
628 The framebuffer base address register is too small
629 Memory leak detected.
630 DLL could not be loaded.
631 Memory access spans page boundary.
632 Memory access to unmapped page.
633 Write access to read-only page.
634 Read access to write-only page.
635 Memory model must be one of: AgpSys, PCIExpressSys, or DefaultSys
636 could not create a JavaScript property
637 Invalid clock domain specified for perfmon
638 Perfmon could not be reserved
639 Perfmon was not reserved
640 Perfmon was already running an experiment
641 MsiTest of BR02 Failed.
642 ATaPi: Invalid value for bytes_per_sector/block
643 ATaPi: Invalid data vector to perform write
644 ATaPi: Invalid byte count or number of blocks to read/write
645 ATA/ATAPI/SATA: Not device connected to the specified drive location
646 ATaPi Test: Device type not supported
647 ATaPi Test: Meduim not formatted
648 ATaPi Test: Device is not writable
649 Last release 50 error
650 Bad RAM in the GPU.
651 GPU did not get the expected number of lanes
652 Ethernet Test Rx Offload Failure.
653 Last release 55 error
654 nvrm invalid parameter
655 nvrm too many primaries
656 memory invalid input
657 memory size mismatch expected
658 memory data mismatch expected
659 memory fragment invalid input
660 memory fragment size mismatch expected
661 memory fragmenet data mismatch expected
662 wrong number of shader pipes detected
663 wrong number of vertex engines detected
664 wrong number of PCI express lanes detected
665 incorrect feature set for this SKU
666 could not set NV_PBUS_FS to the desired values
667 could not meet floorsweeping requirements
668 Requested function not supported by Codec
669 Requested function not supported by Aci

670 Invalid input for Audio function
671 ATA/SATA/ATAPI function not supported by drive
672 ATA/SATA/ATAPI null descriptor table pointer
673 ATA cannot enable legacy ata mode
674 Pci Express 1x slot test faile
675 Msi is not supported for this device
676 Cannot enable Intx in Pci Cfg Space
677 Cannot enable Msi in Pci Cfg Space
678 Cannot disable Intx in Pci Cfg Space
679 Cannot disable Msi in Pci Cfg Space
680 Invalid input/test setting for Sata Loopback Test
681 Sata Loopback Test fail
682 NVRM address space
683 NVRM card not present
684 NVRM in use
685 NVRM invalid access type
686 NVRM invalid argument
687 NVRM invalid bar
688 NVRM invalid command
689 NVRM invalid data
690 NVRM invalid group
691 NVRM invalid method
692 NVRM invalid pointer
693 NVRM invalid put
694 NVRM invalid registry key
695 NVRM invalid state
696 NVRM invalid string length
697 NVRM no device
698 method count too large
699 pushbuffer too small
700 NRM_MCPInit failed
701 NRM_NPUInit failed
702 NRM AttachInterface failed
703 NRM Hmac hw init failed
704 NRM Hmac ASF getSec0 failed
705 NRM Hmac ASF WrEepromAndSetup failed
706 NRM Hmac SetCommonData failed
707 NRM Hmac SetPacketFilter failed
708 NRM Hmac GetNodeAddress failed
709 NRM Hmac ReadPhy failed
710 NRM Hmac WritePhy failed
711 Unhook ISR failed
712 NRM Hmac NicStart failed
713 NRM Hmac NicStop failed
714 NRM Hmac NicDeinit failed
715 NRM Hmac NicInit failed
716 selected device is not supported
717 invalid starting number of VPEs and/or SHDs
718 UNSUPPORTED Azalia device
719 Failed to push command(s) onto the Azalia CORB
720 Corb Memory Error detected
721 Corb cannot be enabled
722 Rirb is not set up
723 Response from invalid codec address
724 Codec is not active
725 Encountered an unexpected unsolicited response
726 Encountered an unexpected unsolicited response
727 Azalia invalid register
728 Could not find Azalia device
729 Timeout waiting for Azalia controller to reflect a state change
730 Invalid/unknown Azalia CORB size requested
731 Invalid/unknown Azalia CORB size reported by Azalia controller
732 Invalid/unknown Azalia RIRB size requested
733 Invalid/unknown Azalia RIRB size reported by Azalia controller
734 Azalia FIFO flush failed
735 Azalia interrupt status inconsistency detected
736 Dma position buffer is not set up
737 Azalia buffer descriptor list is not empty upon buffer creation
738 Azalia buffer descriptor list empty upon use
739 Invalid Azalia buffer descriptor list size
740 Invalid number of Azalia BDLEs
741 Invalid Azalia buffer size requested
742 Invalid range in Azalia buffer write
743 Azalia buffer segment has invalid address
744 Azalia codec does not support stream format
745 Could not find Azalia stream
746 Unable to allocate Azalia stream hardware
747 Invalid Azalia stream sample size
748 Cannot reserve Azalia stream
749 Unknown stream state detected
750 Error occured synchronously starting or stopping streams
751 Stream did not halt properly
752 Timeout waiting for a solicited response from an Azalia codec
753 Azalia Test failed
754 Azalia Test failed because of timeout

8.0 Debugging Techniques

If a card fails, you may wish to try these experiments:

- Try lowering mclk and nvclk.

  ```
  mods gputest.js –mfg -mclk 100 -nvclk 100
  ```

  ```
  mods gputest.js –mfg –mclk_percent 85 –nvclk_percent 85
  ```

  Note: Some DDR Drams require that the mclk be above a certain frequency for the DLL to work.

  Some products require that you keep mclk and nvclk in less than a 2:1 ratio.

- Try looping the test that is failing.

  ```
  mods gputest.js -mfg -test 5 -loops 100
  ```

- Look at the debug-level mods.log output file.

  ```
  mods -C gputest.js –mfg
  ```

  ```
  mods gputest.js –mfg –verbose
  ```

  ```
  mods –d gputest.js -mfg
  ```

- If MODS is crashing, you can send the debug-level output to serial port COM1 in DOS.

  ```
  mods –S 1 gputest.js -mfg
  ```

- On an AGP card, try changing AGP rate or using only PCI.

  ```
  mods gputest.js -agp2x
  ```

  ```
  mods gputest.js -pci
  ```

- If Mats.Run(), FastMats.Run(), VgaTest.Run() or GLStress.Run() is failing, you can get extra information on the failure in the log file by using the –matsinfo command-line option.

  ```
  mods gputest.js –mfg -matsinfo
  ```