



Memtune User Guide

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Revision History

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1. Overview

- Memtune is a command line utility with features to determine the memory margin for GPUs with GDDR6 memory. It also provides options to check various memory parameters and memory training errors.

1.1 Supported OS

- Linux (Ubuntu 12.04/14.04/16.04/18.04)

1.2 Hardware Required

- A system equipped with at least one AMD discrete graphics device with GDDR6 memory.

2. Setup

2.1 Download

- **GPU**

- Go to <http://gpudiagnostics.amd.com/release/>
- Click on Diagnostic Tools tab
- Select Memtune in the list of Diagnostic Tools on the left
- Select the Linux - 64-bit OS version, and download the latest Memtune version.

2.2 Installation

- **Linux**

- Download the linux package in tar.gz format
- Unzip the tar.gz file to any folder.
- Launch the tool with root privileges by running “./memtune”
- Latest version of AGT and diag suite are required to run the margin tests.

3. Commands supported

3.1 “i”

- This command displays the version number and a list of all present AMD graphics Devices

```
root@test:~$ ./mementune
MEMTUNE Linux version 1.0.2.88
Copyright(C) 2020 Advanced Micro Devices Inc.
Instance      Description
-----
0  VendorID: 0x1002 DeviceID: 0x73a2 SSID: 0x0e38 (0000:03:00.0) (D417MC-NAVI21)
```

- Use “-i=#”, where # is the instance number listed above, to specify the GPU device on which the commands needs to be run.

3.2 “mc”

- This command displays various memory settings and, GPU and DRAM vref values per channel as shown below.

```
root@test:~$ ./mementune mc

=====+===== DQ ===== WCK ===== CK ===== CA =====
GPU P-TERM : 0x28
GPU PSTR_OFF: 0x37 | 0x37 | 0x29 | 0x29
GPU NSTR_OFF: 0x35 | 0x35 | 0x29 | 0x29
TXDEEMP_PSTR: 0x0 | 0x0
TXDEEMP_NSTR: 0x0 | 0x0
GPU TX EQ : Auto | Auto | Auto | Auto
GPU CTLE : 0x4(en) | 0x4(en)
GPU DFE : 0x6
DRAM STR : 48/40 Ohm (+3/+3)
MEM TX EQ : 0x0 - 0x0 | 0x0 - 0x0
DRAM DFE : Byte0 - 0x8 Byte1 - 0x8

-----
CH_A0 CH_A1 CH_B0 CH_B1 CH_C0 CH_C1 CH_D0 CH_D1 CH_E0 CH_E1 CH_F0 CH_F1 CH_G0 CH_G1 CH_H0 CH_H1
GPU VREF 0x41 0x42 0x42 0x41 0x40 0x42 0x43 0x43 0x3f 0x42 0x42 0x42 0x43 0x42 0x43 0x43
DRAM VREF 0x2a 0x2a 0x2a 0x2a 0x2a 0x2a 0x2a 0x2a 0x2a 0x2a 0x2a 0x2a 0x2a 0x2a 0x2a 0x2a
```

3.3 Margin test commands

3.3.1 “marginscript”

- This is a helper command which generates the ‘margintest.sh’ (also generates other diag test and config files to be used in this script) to run the training mode margin test.

```
root@test:~$ ./mementune marginscript
root@test:~$
root@test:~$ cat margintest.sh
./agt_internal -i=0 -ppmode=1
./agt_internal -i=0 -ppdpmforce=mclk,max
./mementune -i=0 margintest -testfile=2dx.sh
```

3.3.2 “marginscript_strobe”

- This helper command generates the ‘margintest_strobe.sh’ (also generates the diag test and config files to be used in the script), to run the strobe mode margin test.

```
root@test:~$ ./memtune marginscript_strobe
root@test:~$ cat margintest_strobe.sh
./agt_internal -i=0 -ppmode=1
./agt_internal -i=0 -ppdpmforce=mclk,min
./memtune -i=0 margintest_strobe -testfile=2dx.sh
```

3.3.3 “margintest”

- This command runs the training mode margin test. This requires an additional parameter ‘-testfile=test_file’ to specify the diag test file to be run at each margin point. Or user can run the ‘margintest.sh’ script directly.
- The purpose of this command is to check if there is enough margin depending on the voltage, process and temperature variance.
- Training mode margin is checked for below parameters on GPUs with GDDR6 memory
 - GPU Vref
 - DRAM Vref
 - RxPhase Offset
 - TxPhase Offset
- After the test, overall margin test result for each margin point will be displayed on the console, also the results will be logged in MarginResult.csv per channel.

```
-----
VendorID: 0x1002 DeviceID: 0x73a2 SSID: 0x0e38 (0000:03:00.0) (D417MC-NAVI21)
Memory CLK : 875MHz - Training mode test
Sun Jun 7 10:49:34 2020
Test duration : 0 Hours 0 Minutes 19 Seconds
-----
```

***** READ Result *****

Margin Point	Result
Default (Trained Value)	PASS
Phase Right (+1)	PASS
Phase Left (-1)	PASS
Vref High (+5)	PASS
Vref Low (-5)	PASS

***** WRITE Result *****

Margin Point	Result
Default (Trained Value)	PASS
Phase Right (+1)	PASS
Phase Left (-1)	PASS
Vref High (+4)	PASS
Vref Low (-4)	PASS

3.3.4 “margintest_strobe”

- This command runs the training mode margin test. This requires an additional parameter ‘-testfile=test_file’ to specify the diag test file to be run at each margin point. Or user can run the ‘margintest_strobe.sh’ script directly.
- Strobe mode margin is checked for below parameters on GPUs with GDDR6 memory
 - Read Delay (RDQ and RDQS Delay)
 - Write Delay (WCK and DQ tx phase)
- After the test, overall margin test result for each margin point will be displayed on the console, also the results will be logged in MarginResult.csv per channel.

```

=====
VendorID: 0x1002 DeviceID: 0x73a2 SSID: 0x0e38 (0000:03:00.0) (D417MC-NAVI21)
Memory CLK : 875MHz - Strobe mode test
Sun Jun  7 11:20:49 2020
Test duration : 0 Hours 0 Minutes 1 Seconds
=====

***** READ Result *****

-----
      Margin Point      Result
-----
Default (Trained Value)  PASS
Delay Right (+1)         PASS
Delay Left  (-1)         PASS

```

3.4 “trainingcheck”

- This command helps to detect if there is a memory training failure on any channel during GPU bootup.

```

root@test:~$ ./memtune trainingcheck
No failed channel detected!

```

```

root@test:~$ ./memtune trainingcheck
Failed Channels      : B0 D1

```