

PRINCO DDR3-1600 user guide and testing for ASUS MAXIMUS III FORMULA Motherboard

CPU i5-670 3.47G



Part I : Standard test

It's the easiest way to enjoy overclock benefit by using PRINCO DDR3-1600 DIMM board

How to use?

0. Clear BIOS to mainboard initial setting
1. Enter BIOS setup and [Extreme Tweaker] menu
2. Enter [Ai Overclock Tuner] item and choose X.M.P option
BIOS will load X.M.P parameter in SPD on DIMM board , which are performance optimized for PRINCO DDR3-1600 DIMM board
3. Enter [eXtreme Memory Profile] item and select [Profile #1]

Step 1: Select "Extreme Tweaker"

Step 2: Ai Overclock Tuner

Set [X.N.P.]

Step 3: eXtreme Memory Profile

Set [Profile #1]

BIOS SETUP UTILITY

Extreme Tweaker Main Advanced Power Boot Tools Exit

Step 1

Configure System Performance Settings

Target CPU Frequency: 3520MHz
Target DRAM Frequency: 1604MHz

CPU Level Up [Auto]
Memory Level Up [Auto]

Ai Overclock Tuner [X.N.P.] Step 2
eXtreme Memory Profile [Profile #1] Step 3
Profile Info : 1600MHz-7-9-7-24-1N-1.60V

CPU Ratio Setting [22.0]

▶ CPU Configuration

*Intel(R) SpeedStep(TM) Tech [Disabled]
BCLK Frequency [160]
DRAM Frequency [DDR3-1600MHz]
QPI Frequency [Auto]

Start auto tuning
OC Tuner [Turbo Profile]

Profile #1 :
Standard profile
defined by Intel
Profile #2 :
Optional profile
created by memory
vendor

Note : Only valid
profiles can be
shown on the list.

↔ Select Screen
↑↓ Select Item
+- Change Option
F1 General Help
F10 Save and Exit
ESC Exit

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4. Save BIOS changes [F10] and exit



Test result?

In order to demonstrate the performance and stability of PRINCO DDR3-1600 DIMM board, We use the strictest stress testing, that is, multi-core MemTest in window 7.

(Data rate : $803.4 * 2 = 1606$, timing : 7, 9, 7, 24, multi-core test => pass!)

The image displays a Windows 7 desktop environment with several windows open, demonstrating system performance and hardware details during a stress test.

MemTest Windows (4 instances): Each window shows "0 Errors" and "Coverage: 0 Errors" (e.g., 106.2%, 102.9%, 104.5%, 108.0%). The RAM size is set to 870 MB. One window shows "All unused RAM".

CPU-Z Windows (4 instances):

- Processor:** Intel Core i5 670, Clarkdale, Socket 1156 LGA, 32 nm, Core Voltage 1.152 V, Intel Core i5 inside logo.
- Specification:** Intel(R) Core(TM) i5 CPU 670 @ 3.47GHz, Family 6, Model 5, Stepping 2, Ext. Family 6, Ext. Model 25, Revision C2, Instructions MMX, SSE (1, 2, 3, 3S, 4.1, 4.2), EM64T, VT-x, AES.
- Clocks (Core #0):** Core Speed 3534.7 MHz, Multiplier x 22.0, Bus Speed 160.7 MHz, QPI Link 3856.1 MHz.
- Cache:** L1 Data 2 x 32 KBytes 8-way, L1 Inst. 2 x 32 KBytes 4-way, Level 2 2 x 256 KBytes 8-way, Level 3 4 MBytes 16-way.
- Selection:** Processor #1, Cores 2, Threads 4.
- Version 1.56**

Windows Task Manager (工作管理員):

- CPU 使用率:** 100%
- 記憶體:** 3.75 GB
- 實體記憶體 (MB):** 總共 4086, 快取的 248, 可用 242, 未使用 0.
- 系統:** 控制代碼 8553, 執行緒 385, 處理程序 36, 存留時間 0:00:22:45, 認可 (MB) 4046 / 8170.
- 資源監視器 (R)...**
- Taskbar:** 處理程序: 36, CPU 使用率: 100%, 實體記憶體: 94%

Additional CPU-Z Windows:

- Memory:** Type DDR3, Size 4096 MBytes, Channels # Dual, DC Mode Symmetric, NB Frequency 2892.2 MHz.
- Timings:** DRAM Frequency 803.4 MHz, FSB-DRAM 4:20, CAS# Latency (CL) 7.0 clocks, RAS# to CAS# Delay (tRCD) 9 clocks, RAS# Precharge (tRP) 7 clocks, Cycle Time (tRAS) 24 clocks, Row Refresh Cycle Time (tRFC) 88 clocks, Command Rate (CR) 1T.
- Memory Slot Selection:** Slot #1 DDR3, Module Size 2048 MBytes, Max Bandwidth PC3-10700 (667 MHz), Part Number PRINCO-DR3-1600CL8.
- Timings Table:**

	JEDEC #2	JEDEC #3
Frequency	533 MHz	609 MHz
CAS# Latency	7.0	8.0
RAS# to CAS#	7	8
RAS# Precharge	7	8
tRAS	20	22
tRC	27	30
Command Rate		
Voltage	1.50 V	1.50 V
- Version 1.56**

Advanced Overclocking and Testing

Part II : Heavy test

If you want to know the potential of PRINCO DDR3-1600? Following are step-by-step howto.

How to use?

0. Clear BIOS to mainboard initial setting
1. Enter BIOS setup and [Extreme Tweaker] menu
2. Enter [Ai Overclock Tuner] item and select [Manual]
3. Select [BLCK Frequency] item , and increase to higher Base clock rate (ex:190). Then select [DRAM Frequency] item , and set the DDR3 memory to higher clock rate (ex:DDR3-1900). Don't forget setting [CPU Ratio Setting] item to suitable ratio (ex:17.0)

(In this case we only focus on memory over clocking, not CPU)

Step 1 : Select " Extreme Tweaker "

Step 2 : Ai Overclock Tuner

Set [Manual]

Step 3 : BCLK Frequency

Set [190]

Step 4 : DRAM Frequency

Set [DDR3-1900MHz]

Step 5 : CPU Ratio Setting

Set [17.0]

BIOS SETUP UTILITY

Extreme Tweaker Main Advanced Power Boot Tools Exit

Step 1

Configure System Performance Settings

Target CPU Frequency: 3230MHz
Target DRAM Frequency: 1904MHz

You can OC based on "OC From CPU/Memory Level Up"

Ai Overclock Tuner [Manual] Step 2

OC From CPU Level Up [Auto]

OC From Memory Level Up [Auto]

CPU Ratio Setting [17.0] Step 5

▶ CPU Configuration

*Intel(R) SpeedStep(TM) Tech [Disabled]

BCLK Frequency [190] Step 3

PCIE Frequency [100]

DRAM Frequency [DDR3-1900MHz] Step 4

QPI Frequency [Auto]

Start auto tuning

OC Tuner [Turbo Profile]

Forces a DDR3 frequency slower than the common tCK detected via SPD.

↔ Select Screen
↑↓ Select Item
←→ Change Option
F1 General Help
F10 Save and Exit
ESC Exit

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4. Enter [DRAM Timing Control] item

Select "DRAM Timing Control"



5. set [DRAM CAS# Latency] item to [7 DRAM Clock]

set [DRAM RAS# to CAS# Delay] item to [9 DRAM Clock]

set [DRAM RAS# PRE Time] item to [7 DRAM Clock]

set [DRAM RAS# ACT Time] item to [24 DRAM Clock]

set [DRAM Timing Mode] item to [1N]

then return to previous to [Ai Overclock Tuner] menu

Step 1 : DRAM CAS# Latency

Set [7 CLK]

DRAM RAS# to CAS# Delay

Set [9 CLK]

DRAM RAS# PRE Time

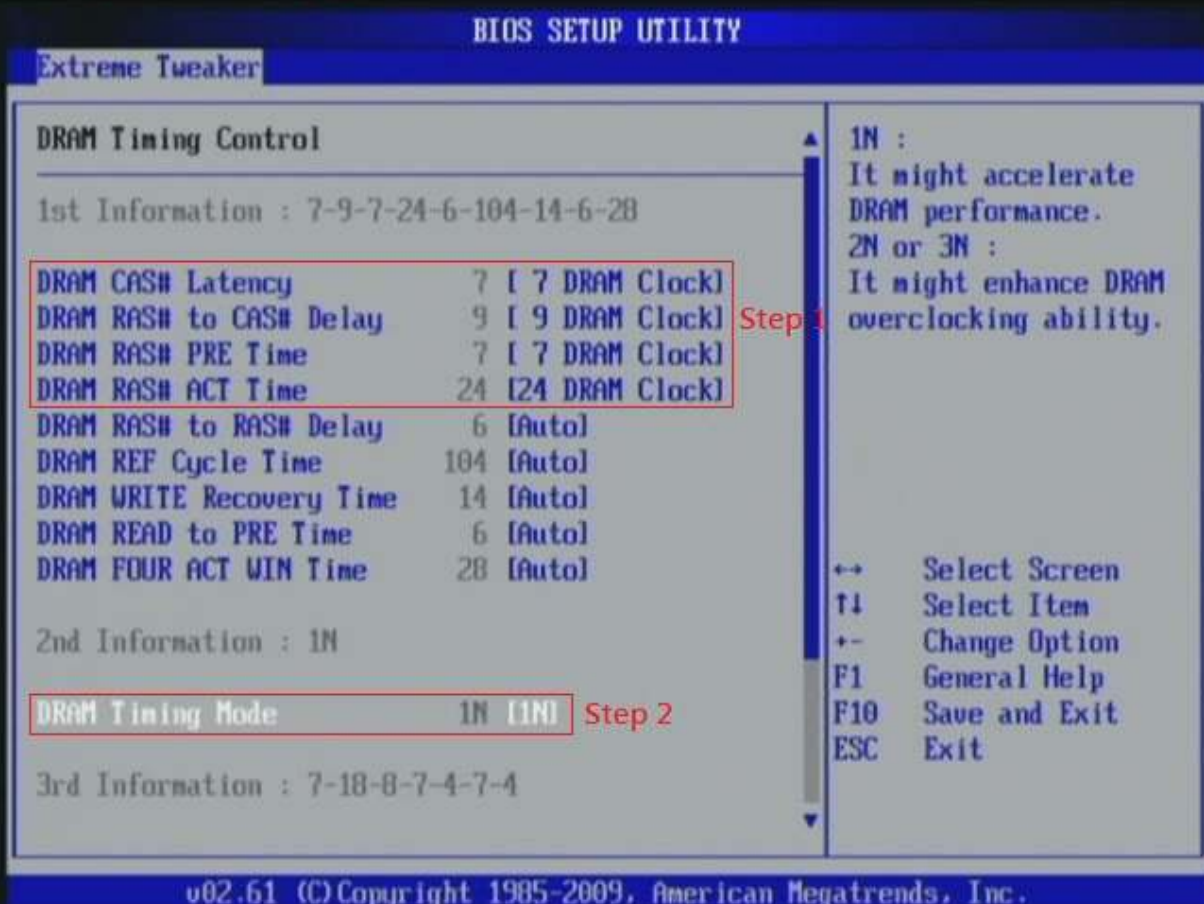
Set [7 CLK]

DRAM RAS# ACT Time

Set [24 CLK]

Step 2 : DRAM Timing Mode

Set [1T]



6. Select [IMC Voltage] item , and set the value to [1.35150].

Select[DRAM Bus Voltage] item , and set the value to [1.64300]

Step 1 : IMC Voltage

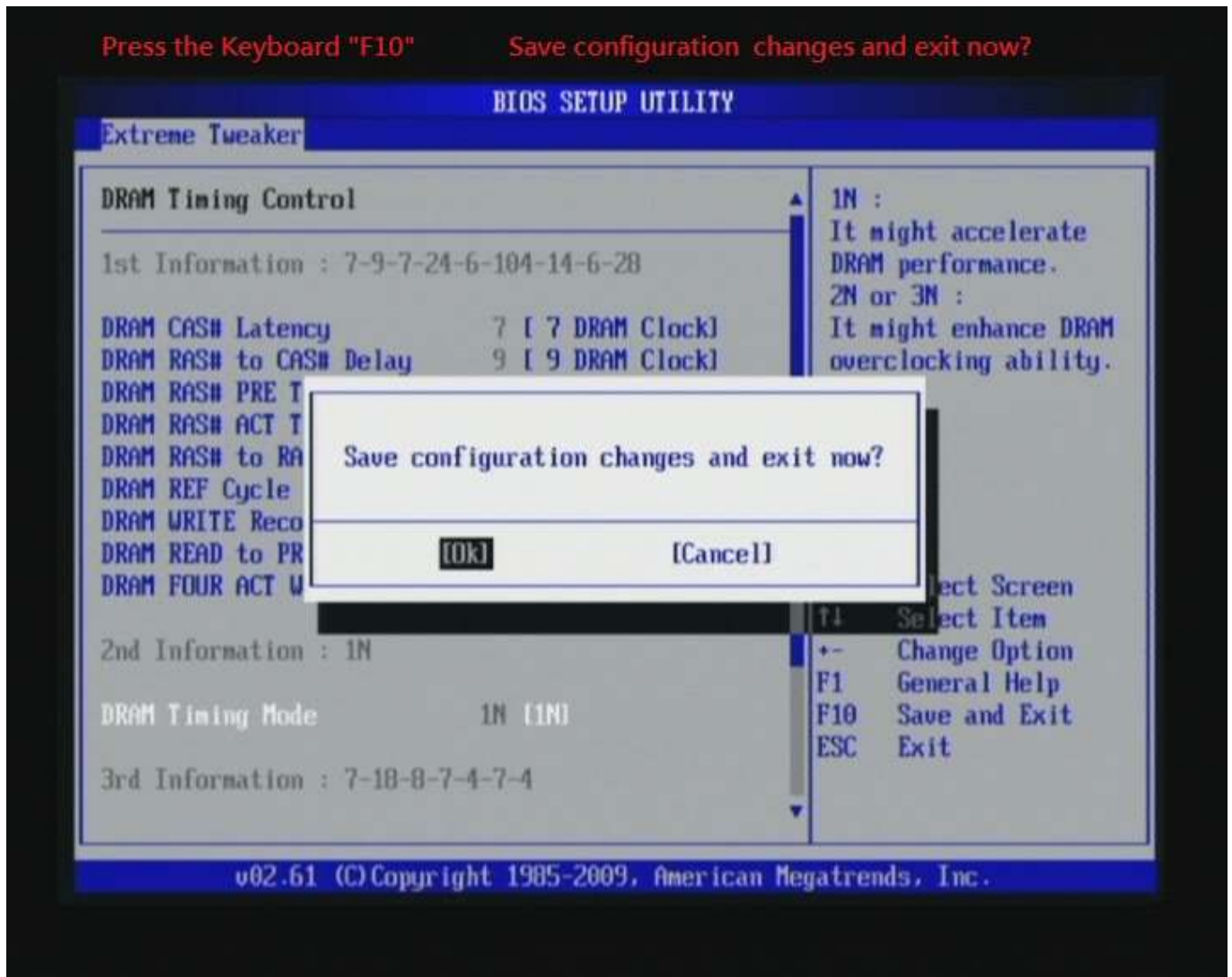
Set [1.35150]

Step 2 : DRAM Voltage

Set [1.64300]



7. Save BIOS changes [F10] and exit



Test result?

We use the strictest stress testing, multi-core MemTest in window 7, to show you PRINCO DDR3-1600 potential.

(Data rate : $952.5 * 2 = 1905$, timing : 7, 9, 7, 24, multi-core test => pass!)

The image displays a collage of screenshots from a Windows 7 system, illustrating the results of a multi-core MemTest and CPU-Z benchmarks.

MemTest Results: Four instances of MemTest are shown, all reporting 0 errors. The coverage percentages are 132.8%, 132.1%, 143.4%, and 369.8%. The RAM size tested is 1024 MB. The last instance shows "All unused RAM".

CPU-Z Processor Information:

- Processor: Intel Core i5 670
- Code Name: Clarkdale
- Package: Socket 1156 LGA
- Technology: 32 nm
- Core Voltage: 1.224 V
- Specification: Intel(R) Core(TM) i5 CPU 670 @ 3.47GHz
- Clocks (Core #0): Core Speed 3238.2 MHz, Multiplier x 17.0, Bus Speed 190.5 MHz, QPI Link 4571.6 MHz
- Cache: L1 Data 2 x 32 KBytes 8-way, L1 Inst. 2 x 32 KBytes 4-way, Level 2 2 x 256 KBytes 8-way, Level 3 4 MBytes 16-way
- Cores: 2, Threads: 4

CPU-Z Memory Information:

- Type: DDR3
- Size: 4096 MBytes
- Channels #: Dual
- DC Mode: Symmetric
- NB Frequency: 3428.9 MHz
- Timings: DRAM Frequency 952.5 MHz, FSB-DRAM 4:20, CAS# Latency (CL) 7.0 clocks, RAS# to CAS# Delay (tRCD) 9 clocks, RAS# Precharge (tRP) 7 clocks, Cycle Time (tRAS) 24 clocks, Row Refresh Cycle Time (tRFC) 104 clocks, Command Rate (CR) 1T

CPU-Z Memory Slot Selection:

- Slot #1: DDR3
- Module Size: 2048 MB
- Max Bandwidth: PC3-10700
- Part Number: PRINCO-DR3
- JEDEC #2: Frequency 533 MHz, CAS# Latency 7.0, RAS# to CAS# 7, RAS# Precharge 7, tRAS 20, tRC 27, Command Rate, Voltage 1.50 V

Windows Task Manager Performance Tab:

- CPU 使用率: 100%
- 記憶體: 3.88 GB
- 實體記憶體 (MB): 總共 4086, 快取的 134, 可用 103, 未使用 0
- 系統: 控制代碼 8109, 執行緒 369, 處理程序 34, 存留時間 0:00:51:13, 認可 (MB) 4243 / 8170
- 資源監視器 (R)...

Taskbar: 處理程序: 34 | CPU 使用率: 100% | 實體記憶體: 97%