

PRINCO DDR3-1600 user guide and testing for ASUS P7H55-M Motherboard

CPU i3-540 3.07G



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 [Ai 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 [High Performance]

Step 1 : Select " Ai Tweaker "

Step 2 : Ai Overclock Tuner

eXtreme Memory Profile

Set [X. M. P.]

Set [High Performance]

BIOS SETUP UTILITY

Main **Ai Tweaker** Advanced Power Boot Tools Exit

Step 1

Configure System Performance Settings

| | |
|--|--------------------|
| Ai Overclock Tuner | [X.M.P.] |
| eXtreme Memory Profile | [High Performance] |
| Profile Info : 1600MHz-7-9-7-24-1N-1.60V | Step 2 |
| CPU Ratio Setting | [20.0] |
| Xtreme Phase Full Power Mode | [Auto] |
| BCLK Frequency | [160] |
| DRAM Frequency | [DDR3-1600MHz] |
| QPI Frequency | [Auto] |

▶ DRAM Timing Control

| | |
|----------------------------|--------|
| CPU Differential Amplitude | [Auto] |
| CPU Clock Skew | [Auto] |

***** Please key in numbers directly! *****

| | |
|------------------|----------|
| CPU Voltage Mode | [Manual] |
| Fixed Voltage | [Auto] |

High Performance :
Standard profile defined by Intel
High Frequency :
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

v02.61 (C) Copyright 1985-2010, American Megatrends, Inc.

4. Save BIOS changes [F10] and exit

Press the Keyboard "F10" Save configuration changes and exit now?



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 : $800.0 \times 2 = 1600$, timing : 7, 9, 7, 24, multi-core test => pass!)

The image displays a collage of screenshots from a Windows 7 system during a stress test. The top row shows four MemTest86 windows, all reporting 0 errors and 100% coverage. The middle row shows CPU-Z windows providing detailed system information: an Intel Core i3 540 processor at 3.07GHz, ASUSTeK P7H55-M motherboard, and PRINCO DDR3-1600 memory. The bottom row shows Windows Task Manager with CPU usage at 100% and memory usage at 93%.

MemTest86 Results:

- Window 1: 106.3% Coverage, 0 Errors
- Window 2: 101.7% Coverage, 0 Errors
- Window 3: 101.4% Coverage, 0 Errors
- Window 4: 102.1% Coverage, 0 Errors

CPU-Z System Information:

- Processor:** Intel Core i3 540 (Clarkdale), 3.07GHz, 32nm, Socket 1156 LGA.
- Clocks (Core #0):** Core Speed 3228.1 MHz, Multiplier x 20.0, Bus Speed 161.4 MHz, QPI Link 3551.0 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).
- Memory:** Type DDR3, Size 4096 MBytes, Channels # Dual, DC Mode Symmetric, NB Frequency 2560.2 MHz.
- Memory Slot Selection:** Slot #1, Module Size 2048 MBytes, Max Bandwidth PC3-10700 (667 MHz).
- Timings Table:**

| | JEDEC #2 | JEDEC # |
|----------------|----------|---------|
| 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 |

Windows Task Manager Performance:

- CPU 使用率: 100%
- 記憶體: 3.61 GB
- 實體記憶體 (MB): 3965 (總共), 268 (快取的), 262 (可用), 5 (未使用)
- 系統: 控制代碼 7961, 執行緒 356, 處理程序 33, 存留時間 0:00:21:43, 認可 (MB) 3895 / 7930

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 [Ai 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:16.0)

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

4. Select[DRAM Voltage] item , and set the value to [1.650]

Step 1: Select " Ai Tweaker "

Step 2: Ai Overclock Tuner

Set [Manual]

Step 3: BCLK Frequency

Set [190]

Step 4: DRAM Frequency

Set [DDR3_1900]

Step 5: CPU Ratio Setting

Set [16]

Step 6: DRAM Bus Voltage

Set [1.650V]

BIOS SETUP UTILITY

Main **Ai Tweaker** Advanced Power Boot Tools Exit

Step 1

Configure System Performance Settings

| | | |
|------------------------------|----------------|--------|
| Ai Overclock Tuner | [Manual] | Step 2 |
| CPU Ratio Setting | [16.0] | Step 5 |
| Xtreme Phase Full Power Mode | [Auto] | |
| BCLK Frequency | [190] | Step 3 |
| DRAM Frequency | [DDR3-1900MHz] | Step 4 |
| QPI Frequency | [Auto] | |

▶ DRAM Timing Control

| | | |
|----------------------------|--------|-----------------|
| CPU Differential Amplitude | [Auto] | ↔ Select Screen |
| CPU Clock Skew | [Auto] | ↑↓ Select Item |

***** Please key in numbers directly! *****

| | | |
|------------------|----------|-------------------|
| CPU Voltage Mode | [Manual] | F1 General Help |
| Fixed Voltage | [Auto] | F10 Save and Exit |
| IMC Voltage | [Auto] | ESC Exit |
| DRAM Voltage | [1.650] | Step 6 |

Min = 1.200V
Max = 2.445V
Standard = 1.500V

v02.61 (C) Copyright 1985-2010, American Megatrends, Inc.

5. Enter [DRAM Timing Control] item

Select " DRAM Timing Control "



6. 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]

The screenshot shows the BIOS Setup Utility interface. At the top, it says "BIOS SETUP UTILITY" and "Ai Tweaker". The main section is titled "DRAM Timing Control" and contains a list of settings. The first four settings are highlighted with a red box and labeled "Step 1":

| | |
|-------------------------|-----------------|
| DRAM CAS# Latency | [7 DRAM Clock] |
| DRAM RAS# to CAS# Delay | [9 DRAM Clock] |
| DRAM RAS# PRE Time | [7 DRAM Clock] |
| DRAM RAS# ACT Time | [24 DRAM Clock] |

The remaining settings are:

| | |
|--------------------------------|-------------|
| DRAM RAS# to RAS# Delay | [Auto] |
| DRAM REF Cycle Time | [Auto] |
| DRAM WRITE Recovery Time | [Auto] |
| DRAM READ to PRE Time | [Auto] |
| DRAM FOUR ACT WIN Time | [Auto] |
| DRAM Timing Mode | [1N] Step 2 |
| DRAM WRITE To READ Delay (DR) | [Auto] |
| DRAM WRITE To READ Delay (SR) | [Auto] |
| DRAM READ To WRITE Delay (S/D) | [Auto] |
| DRAM READ To READ Delay (DR) | [Auto] |
| DRAM READ To READ Delay (SR) | [Auto] |
| DRAM WRITE To WRITE Delay (DR) | [Auto] |
| DRAM WRITE To WRITE Delay (SR) | [Auto] |

On the right side, there is a legend for the settings:

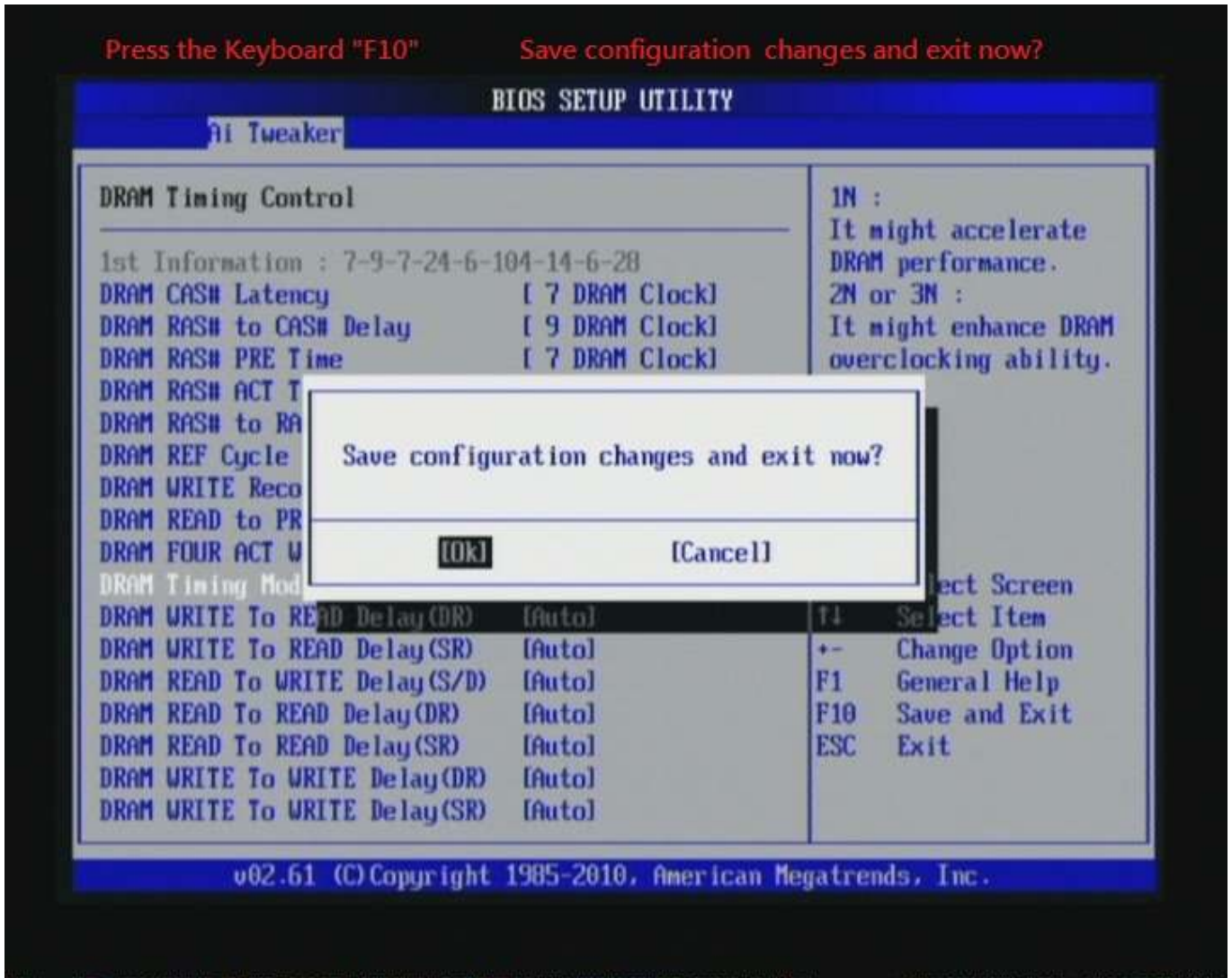
- 1N : It might accelerate DRAM performance.
- 2N or 3N : It might enhance DRAM overclocking ability.

At the bottom, there is a legend for navigation keys:

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

At the very bottom, it says "v02.61 (C) Copyright 1985-2010, American Megatrends, Inc."

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 : $950.1 \times 2 = 1900$, timing : 7, 9, 7, 24, multi-core test => pass!)

Four screenshots of MemTest running on Windows 7. Each window shows '0 Errors' and a coverage percentage: 101.5%, 100.3%, 100.6%, and 114.2%. The RAM test size is set to 850 MB, and the final test covers 'All unused RAM'.

CPU-Z Version 1.56 - Processor tab. Processor: Intel Core i3 540, Clarkdale, Socket 1156 LGA, 32 nm, Core Voltage 1.216 V, Intel(R) Core(TM) i3 CPU 540 @ 3.07GHz. Clocks (Core #0): Core Speed 3040.3 MHz, Multiplier x 16.0, Bus Speed 190.0 MHz, QPI Link 4180.5 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.

CPU-Z Version 1.56 - Caches tab. L1 D-Cache: Size 32 KBytes, Descriptor 8-way set associati. L1 I-Cache: Size 32 KBytes, Descriptor 4-way set associ. L2 Cache: Size 256 KBytes, Descriptor 8-way set associ. L3 Cache: Size 4 MBytes, Descriptor 16-way set associ.

CPU-Z Version 1.56 - Memory tab. General: Type DDR3, Size 4096 MBytes, Channels # Dual, DC Mode Symmetric, NB Frequency 3040.2 MHz. Timings: DRAM Frequency 950.1 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, Voltage 1.50 V.

CPU-Z Version 1.56 - Memory Slot Selection. Slot #1: DDR3, Module Size 2048 MB, Max Bandwidth PC3-10700 (4), Part Number PRINCO-DR3. Timings Table: 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 工作管理員 (Task Manager) Performance tab. CPU 使用率: 100%. 記憶體: 3.58 GB. 實體記憶體 (MB): 總共 3965, 快取的 291, 可用 297, 未使用 5. 系統: 控制代碼 8001, 執行緒 366, 處理程序 33, 存留時間 0:00:19:16, 認可 (MB) 3898 / 7930. 資源監視器 (R)...