

# PRINCO DDR3-1800 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 DDR3-1800 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 DDR3-1800  
DIMM board*
3. Enter [eXtreme Memory Profile] item and select [Profile #2]  
*Ps : [profile #2] for 1800Mhz  
[profile #1] for 1600Mhz*

Step 1: Select "Extreme Tweaker"

Step 2: Ai Overclock Tuner

Set [X.N.P.]

Step 3: eXtreme Memory Profile

Set [Profile #12]

**BIOS SETUP UTILITY**

Extreme Tweaker Main Advanced Power Boot Tools Exit

**Step 1**

Configure System Performance Settings

Target CPU Frequency: 3600MHz  
Target DRAM Frequency: 1804MHz

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

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**AI Overclock Tuner** [X.N.P.] **Step 2**

**eXtreme Memory Profile** [Profile #2] **Step 3**

Profile Info : 1800MHz-8-9-8-27-1N-1.60V-1.30V

CPU Ratio Setting [20.0]

► CPU Configuration

•Intel(R) SpeedStep(TM) Tech [Disabled]  
BCLK Frequency [180]  
DRAM Frequency [DDR3-1800MHz]  
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 DDR3-1800 DIMM board, We use the strictest stress testing, that is, multi-core MemTest in window 7.

(Data rate :  $902.9 \times 2 = 1800$ , timing : 8, 9, 8, 27, multi-core test => pass!)

Two MemTest windows showing 100.3% Coverage, 0 Errors. The RAM test size is set to 950 MB.

Two MemTest windows showing 100.6% Coverage, 0 Errors and 236.3% Coverage, 0 Errors. The RAM test size is set to All unused RAM.

Windows Task Manager screenshot showing CPU usage at 100% and memory usage at 93%.

實體記憶體 (MB)		系統	
總共	4086	控制代碼	8037
快取的	261	執行緒	363
可用	252	處理程序	33
未使用	4	存留時間	0:00:23:10
		認可 (MB)	4025 / 8170

CPU-Z Processor tab showing Intel Core i5 670 specifications.

Name	Intel Core i5 670		
Code Name	Clarkdale	Brand ID	
Package	Socket 1156 LGA		
Technology	32 nm	Core Voltage	1.224 V
Specification	Intel(R) Core(TM) i5 CPU 670 @ 3.47GHz		
Family	6	Model	5
Ext. Family	6	Ext. Model	25
		Stepping	2
		Revision	C2
Instructions	MMX, SSE (1, 2, 3, 3S, 4.1, 4.2), EM64T, VT-x, AES		

CPU-Z Mainboard tab showing ASUSTeK Computer Inc. Maximus III Formula motherboard.

Manufacturer	ASUSTeK Computer INC.		
Model	Maximus III Formula		
Chipset	Intel	Havendale/Clarkdale	
Southbridge	Intel		
LPCIO	Winbond	WB365	

CPU-Z Memory tab showing DDR3 4096 Mbytes, 902.9 MHz.

Type	DDR3	Channels #	Dual
Size	4096 Mbytes	DC Mode	Symmetric
		NB Frequency	3250.4 MHz

CPU-Z Memory Slot Selection tab showing PRINCO-DR3-1800CL8.

Slot #1	DDR3
Module Size	2048 Mbytes
Max Bandwidth	PC3-10700 (667 MHz)
Part Number	PRINCO-DR3-1800CL8

CPU-Z Timings tab showing 902.9 MHz DRAM Frequency.

DRAM Frequency	902.9 MHz
FSB:DRAM	4:20
CAS# Latency (CL)	8.0 clocks
RAS# to CAS# Delay (tRCD)	9 clocks
RAS# Precharge (tRP)	8 clocks
Cycle Time (tRAS)	27 clocks
Row Refresh Cycle Time (tRFC)	88 clocks
Command Rate (CR)	1T

CPU-Z Timings Table showing JEDEC #3 and #4 specifications.

	JEDEC #3	JEDEC #4
Frequency	609 MHz	685 MHz
CAS# Latency	8.0	9.0
RAS# to CAS#	8	9
RAS# Precharge	8	9
tRAS	22	25
tRC	30	34
Command Rate		
Voltage	1.50 V	1.50 V

# Advanced Overclocking and Testing

## Part II : Heavy test

*If you want to know the potential of PRINCO DDR3-1800? 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:192). Then select [DRAM Frequency] item , and set the DDR3 memory to higher clock rate (ex:DDR3-1920). 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 [192]

Step 4: DRAM Frequency

Set [DDR3-1920MHz]

Step 5: CPU Ratio Setting

Set [17.0]

The screenshot shows the BIOS Setup Utility interface. At the top, the title bar reads "BIOS SETUP UTILITY". Below it, a menu bar contains "Extreme Tweaker", "Main", "Advanced", "Power", "Boot", "Tools", and "Exit". The "Extreme Tweaker" menu is selected and highlighted. The main area is titled "Configure System Performance Settings" and contains the following information:

- Target CPU Frequency: 3264MHz
- Target DRAM Frequency: 1924MHz
- 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 [192] (Step 3)
- PCIE Frequency [100]
- DRAM Frequency [DDR3-1920MHz] (Step 4)
- QPI Frequency [Auto]
- Start auto tuning OC Tuner [Turbo Profile]

On the right side, there is a help text box that reads: "Sets the ratio between CPU Core Clock and the FSB Frequency. NOTE: If an invalid ratio is set in CMOS then actual and setpoint values may differ." Below this, a legend lists navigation keys: "+>" for "Select Screen", "↑↓" for "Select Item", "F1" for "General Help", "F10" for "Save and Exit", and "ESC" for "Exit". At the bottom of the screen, the version and copyright information are displayed: "v02.61 (C) Copyright 1985-2009, American Megatrends, Inc."

#### 4. Enter [DRAM Timing Control] item

Select " DRAM Timing Control "





5. set [DRAM CAS# Latency] item to [8 DRAM Clock]

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

set [DRAM RAS# PRE Time] item to [8 DRAM Clock]

set [DRAM RAS# ACT Time] item to [27 DRAM Clock]

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

then return to previous to [Ai Overclock Tuner] menu

Step 1 : DRAM CAS# Latency

Set [ 8 CLK ]

DRAM RAS# to CAS# Delay

Set [ 9 CLK ]

DRAM RAS# PRE Time

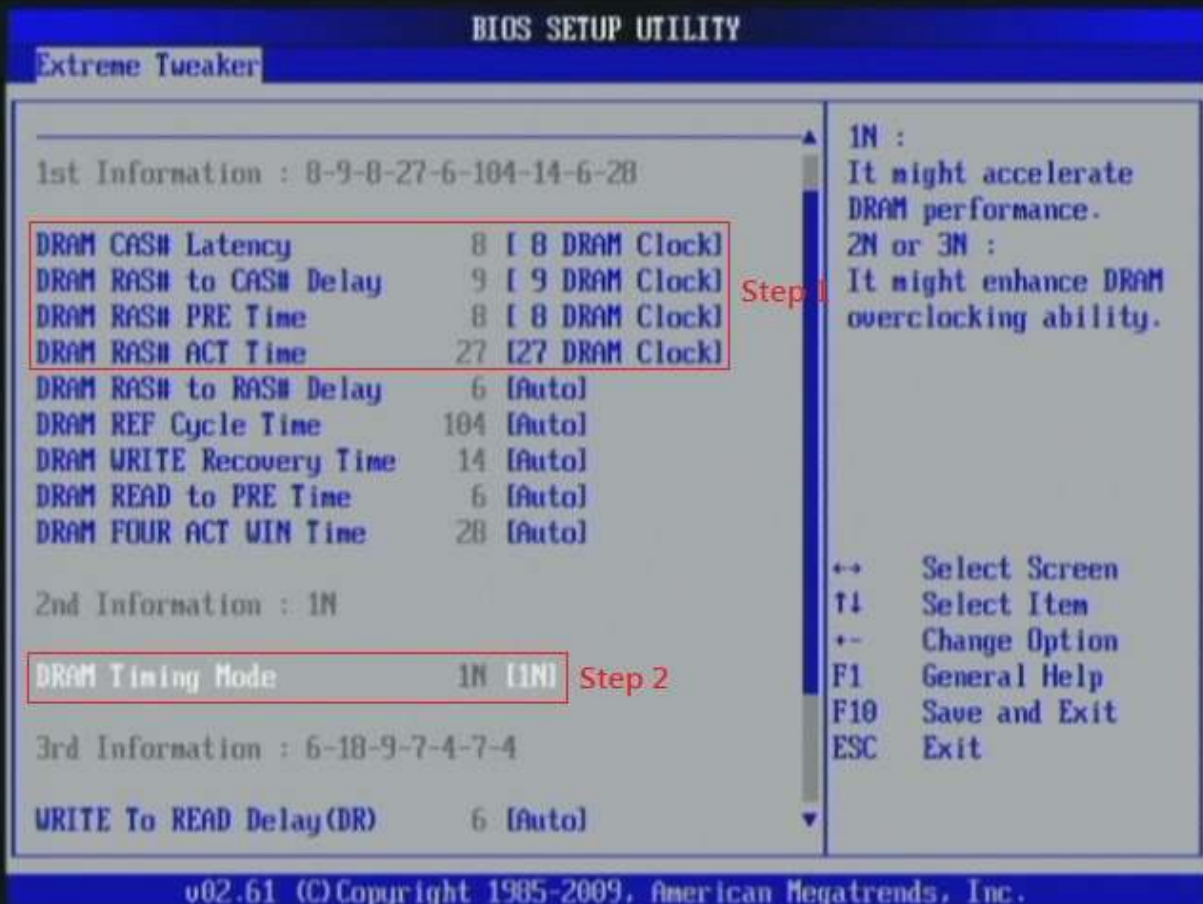
Set [ 8 CLK ]

DRAM RAS# ACT Time

Set [ 27 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

Press the Keyboard "F10"

Save configuration changes and exit now?



# Test result?

We use the strictest stress testing, multi-core MemTest in window 7, to show you PRINCO DDR3-1800 potential.

(Data rate :  $963.4 * 2 = 1927$ , timing : 8, 9, 8, 27, multi-core test => pass!)

Four MemTest86 windows showing test results. Each window displays '0 Errors' and a coverage percentage. The first two windows show 104.2% and 106.3% coverage. The last two windows show 107.2% and 179.4% coverage. The text 'All unused RAM' is visible in the third window.

Windows Task Manager screenshot showing system performance. CPU usage is at 100%. Memory usage is 3.71 GB. The task manager shows 33 running processes.

實體記憶體 (MB)	系統
總共 4086	控制代碼 7916
快取的 284	執行緒 360
可用 281	處理程序 33
未使用 3	存留時間 0:00:28:41
	認可 (MB) 4009 / 8170

CPU-Z Processor tab screenshot showing Intel Core i5 670 specifications. Processor Name: 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.

CPU-Z Memory tab screenshot showing DDR3 memory specifications. Type: DDR3, Size: 4096 MBytes.

CPU-Z Memory tab screenshot showing memory slot selection and timing information. Type: DDR3, Channels #: Dual, DC Mode: Symmetric, NB Frequency: 3468.3 MHz.

CPU-Z Memory tab screenshot showing memory slot selection and timing table. Slot #1: DDR3, Module Size: 2048 MB, Max Bandwidth: PC3-10700 (E), Part Number: PRINCO-DR3-1800.

	JEDEC #3
Frequency	609 MHz
CAS# Latency	8.0
RAS# to CAS#	8
RAS# Precharge	8
tRAS	22
tRC	30
Command Rate	
Voltage	1.50 V