

PRINCO DDR3-1800 user guide and testing for ASUS Crosshair IV Motherboard

AMD 1090T 3.20G



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 select [Manual]
3. Select [CPU Bus Frequency] item , and increase to higher Base clock rate (ex:225). Then select [DRAM Frequency] item , and set the DDR3 memory to higher clock rate (ex:1800MHz). Don't forget setting [CPU Ratio] item to suitable ratio (ex:14.0)
4. Select[DRAM Voltage] item , and set the value to [1.60000]

Step 1 : Ai Overclock Tuner

Set [Manual]

Step 2 : CPU Bus Frequency

Set [225]

Step 2 : DRAM Frequency

Set [1800MHz]

Step 3 : CPU Ratio

Set [14.0]

Step 4 : DRAM Voltage

Set [1.60000]

Crosshair IV Formula BIOS Setup Version 1005

Extreme Tweaker Main Advanced Power Boot Tools Exit

OC Tuner Utility

Ai Overclock Tuner [Manual] Step 1

CPU Ratio [14.0] Step 4

AMD Turbo CORE technology [Auto]

CPU Bus Frequency [225] Step 2

PCIE Frequency [100]

DRAM Frequency [1800MHz] Step 3

CPU/NB Frequency [Auto]

HT Link Speed [Auto]

▶ DRAM Timing Configuration

▶ DRAM Driving Configuration

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

Extreme OU [Disabled]

CPU & NB Voltage Mode [Offset]

CPU Offset Voltage 1.270 [Auto]

CPU/NB Offset Voltage 1.158 [Auto]

CPU UDDA Voltage 2.514 [Auto]

DRAM Voltage 1.488 [1.60000] Step 5

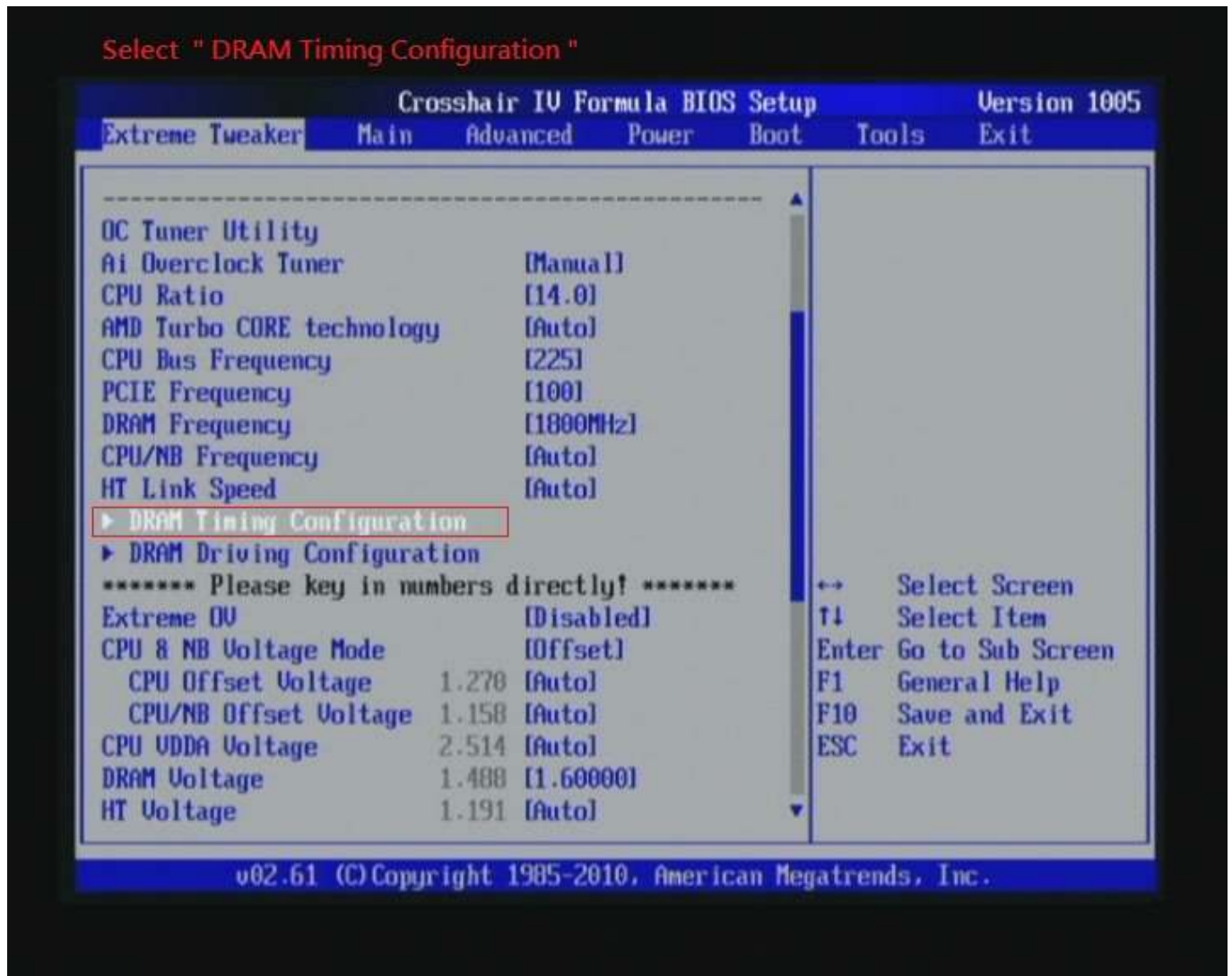
HT Voltage 1.191 [Auto]

Min = 1.20000V
Max = 2.90000V
Interval = 0.01250V
Standard = 1.50000V

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

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5. Enter [DRAM Timing Configuration] item



6. set [DRAM CAS# Latency] item to [8 CLK]

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

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

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

set [DRAM Command Rate] item to [1T]

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 Command Rate Set [1T]

Crosshair IV Formula BIOS Setup Version 1005

Extreme Tweaker

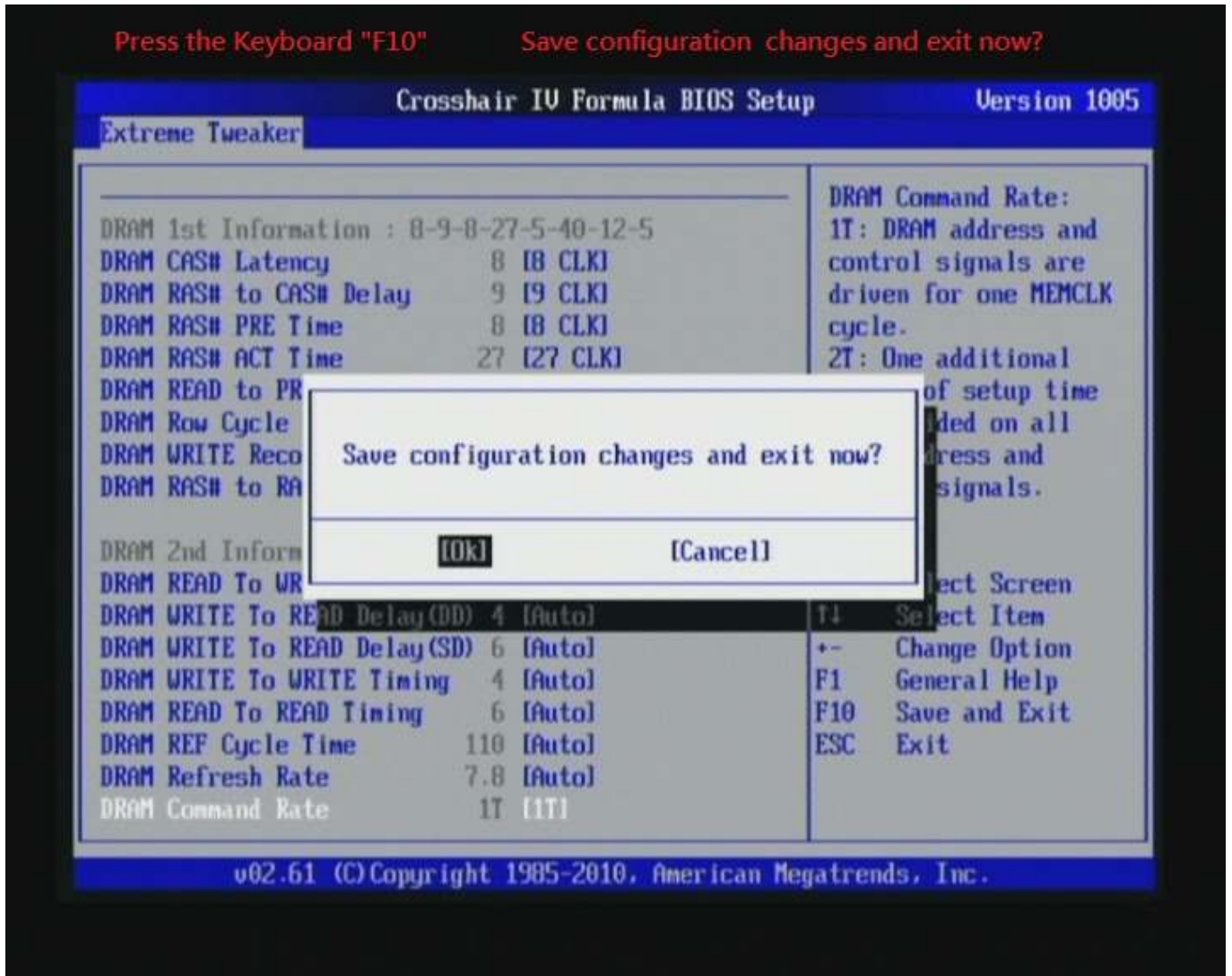
DRAM 1st Information : 8-9-8-27-5-40-12-5	
DRAM CAS# Latency	8 [8 CLK]
DRAM RAS# to CAS# Delay	9 [9 CLK]
DRAM RAS# PRE Time	8 [8 CLK]
DRAM RAS# ACT Time	27 [27 CLK]
DRAM READ to PRE Time	5 [Auto]
DRAM Row Cycle Time	40 [Auto]
DRAM WRITE Recovery Time	12 [Auto]
DRAM RAS# to RAS# Delay	5 [Auto]
DRAM 2nd Information : 6-4-6-4-6-110-7.8ms-1T	
DRAM READ To WRITE Delay	6 [Auto]
DRAM WRITE To READ Delay (DD)	4 [Auto]
DRAM WRITE To READ Delay (SD)	6 [Auto]
DRAM WRITE To WRITE Timing	4 [Auto]
DRAM READ To READ Timing	6 [Auto]
DRAM REF Cycle Time	110 [Auto]
DRAM Refresh Rate	7.8 [Auto]
DRAM Command Rate	1T [1T]

DRAM Command Rate:
1T: DRAM address and control signals are driven for one MEMCLK cycle.
2T: One additional MEMCLK of setup time is provided on all DRAM address and control signals.

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

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7. 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 : $903.0 \times 2 = 1806$, timing : 8, 9, 8, 27, multi-core test => pass!)

The image shows six instances of the MemTest application. Each window displays the test configuration (580 MB RAM) and the results. The results are as follows:

- Top-left: 128.4% Coverage, 0 Errors
- Top-right: 127.3% Coverage, 0 Errors
- Middle-left: 127.2% Coverage, 0 Errors
- Middle-right: 129.1% Coverage, 0 Errors
- Bottom-left: 128.2% Coverage, 0 Errors
- Bottom-right: 140.5% Coverage, 0 Errors

CPU-Z Processor tab showing details for the AMD Phenom II X6 1095T processor.

Name	AMD Phenom II X6 1095T		
Code Name	Thuban	Brand ID	
Package	Socket AM3 (938)		
Technology	45 nm	Core Voltage	1.260 V
Specification	AMD Phenom(tm) II X6 1090T Processor		
Family	F	Model	A Stepping 0
Ext. Family	10	Ext. Model	A Revision PH-E0
Instructions	MMX(+), 3DNow!(+), SSE (1, 2, 3, 4A), x86-64, AMD-V		

Clocks (Core #0): Core Speed 3160.7 MHz, Multiplier x 14.0, Bus Speed 225.8 MHz, HT Link 2031.9 MHz.

Cache: L1 Data 6 x 64 KBytes 2-way, L1 Inst. 6 x 64 KBytes 2-way, Level 2 6 x 512 KBytes 16-way, Level 3 6 MBytes 48-way.

Selection: Processor #1, Cores 6, Threads 6.

CPU-Z Mainboard tab showing motherboard details.

Manufacturer	ASUSTeK Computer INC.	
Model	Crosshair IV Formula	
Chipset	AMD	890F
Southbridge	AMD	SB850
LPCIO	ITE	IT8720

BIOS: Brand American Megatrends Inc., Version 1005, Date 08/06/2010.

Graphic Interface: Version, Link Width x16, Side Band.

CPU-Z Memory tab showing memory configuration and timings.

General: Type DDR3, Size 4096 MBytes, Channels # Dual, DC Mode Unganged, NB Frequency 2031.8 MHz.

Timings:

DRAM Frequency	903.0 MHz
FSB:DRAM	1:4
CAS# Latency (CL)	8.0 clocks
RAS# to CAS# Delay (tRCD)	9 clocks
RAS# Precharge (tRP)	8 clocks
Cycle Time (tRAS)	27 clocks
Bank Cycle Time (tRC)	40 clocks
Command Rate (CR)	1T
DRAM Idle Timer	
Total CAS# (tRDRAM)	
Row To Column (tRFC)	

CPU-Z Memory Slot Selection tab showing slot configuration and JEDEC timings.

Slot #1: DDR3, Module Size 2048 MBytes, Max Bandwidth PC3-10700 (667 MHz), Manufacturer, Part Number PRINCO-DR3-1800CL8, Serial Number.

Timings Table:

	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

Windows taskbar showing shortcuts for CPU-Z and MemTest. CPU-Z is labeled 'cpuz64 - 捷徑' and MemTest is labeled 'memtest - 捷徑'.

Windows Task Manager showing system performance. CPU usage is at 100%. Memory usage is at 3.76 GB.

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 [CPU Bus Frequency] item , and increase to higher Base clock rate (ex:243). Then select [DRAM Frequency] item , and set the DDR3 memory to higher clock rate (ex:1944MHz). Don't forget setting [CPU Ratio] item to suitable ratio (ex:13.0)

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

4. Select[DRAM Voltage] item , and set the value to [1.65000]

Step 1 : Ai Overclock Tuner	Set [Manual]
Step 2 : CPU Bus Frequency	Set [243]
Step 2 : DRAM Frequency	Set [1944MHz]
Step 3 : CPU Ratio	Set [13.0]
Step 4 : DRAM Voltage	Set [1.65000]

Version 1005

Crosshair IV Formula BIOS Setup

Extreme Tweaker Main Advanced Power Boot Tools Exit

DC Tuner Utility

Ai Overclock Tuner	[Manual]	Step 1
CPU Ratio	[13.0]	Step 4
AMD Turbo CORE technology	[Auto]	
CPU Bus Frequency	[243]	Step 2
PCIE Frequency	[100]	
DRAM Frequency	[1944MHz]	Step 3
CPU/NB Frequency	[Auto]	
HT Link Speed	[Auto]	
▶ DRAM Timing Configuration		
▶ DRAM Driving Configuration		
***** Please key in numbers directly! *****		
Extreme OU	[Disabled]	
CPU & NB Voltage Mode	[Offset]	
CPU Offset Voltage	1.270 [Auto]	
CPU/NB Offset Voltage	1.151 [Auto]	
CPU UDDA Voltage	2.514 [Auto]	
DRAM Voltage	1.693 [1.65000]	Step 5
HT Voltage	1.191 [Auto]	
NB Voltage	1.111 [Auto]	

Min = 1.20000U
 Max = 2.90000U
 Interval = 0.01250U
 Standard = 1.50000U

↔ Select Screen
 T4 Select Item
 F1 General Help
 F10 Save and Exit
 ESC Exit

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5. Enter [DRAM Timing Configuration] item



6. set [DRAM CAS# Latency] item to [9 CLK]

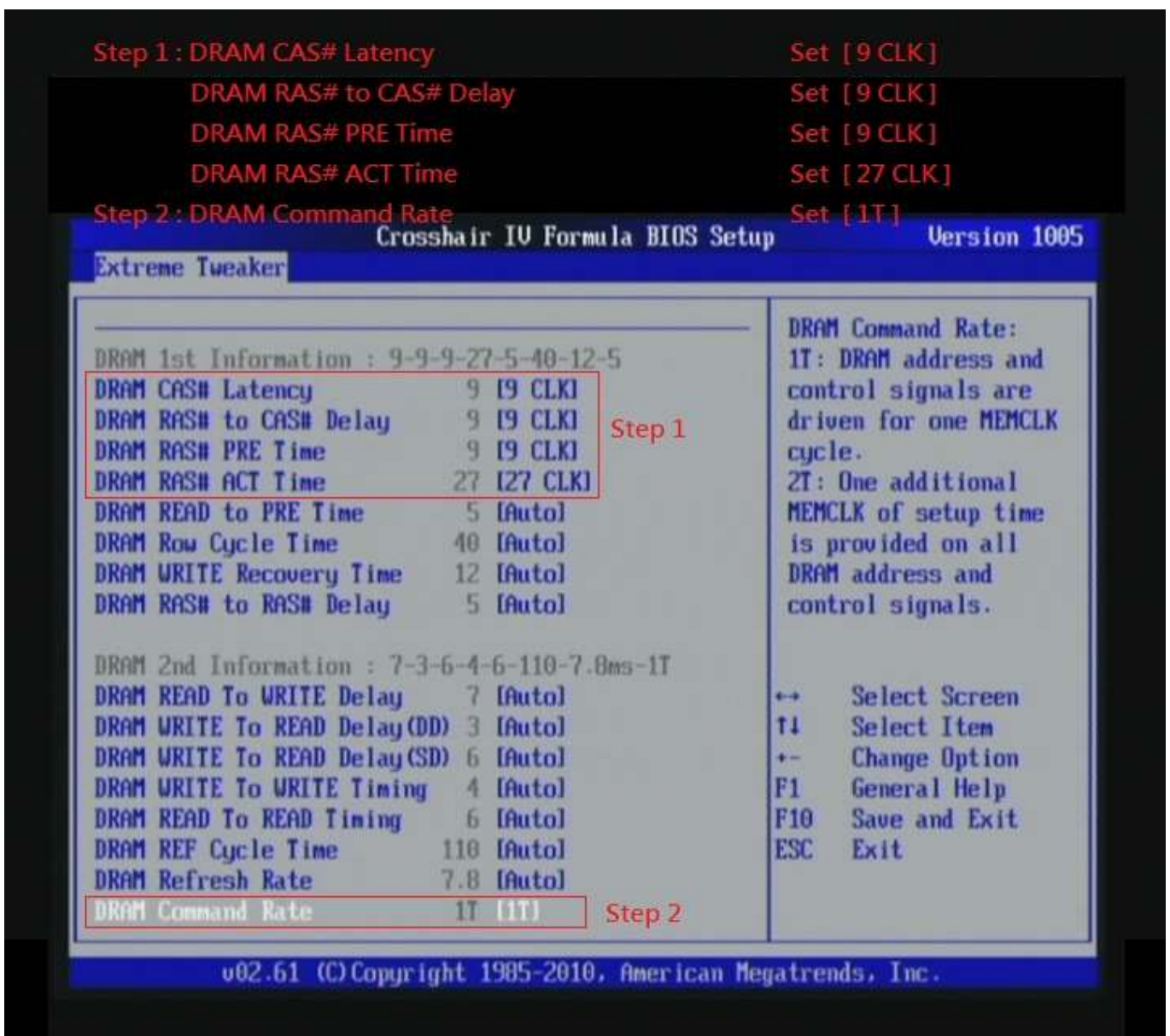
set [DRAM RAS# to CAS# Delay] item to [9 CLK]

set [DRAM RAS# PRE Time] item to [9 CLK]

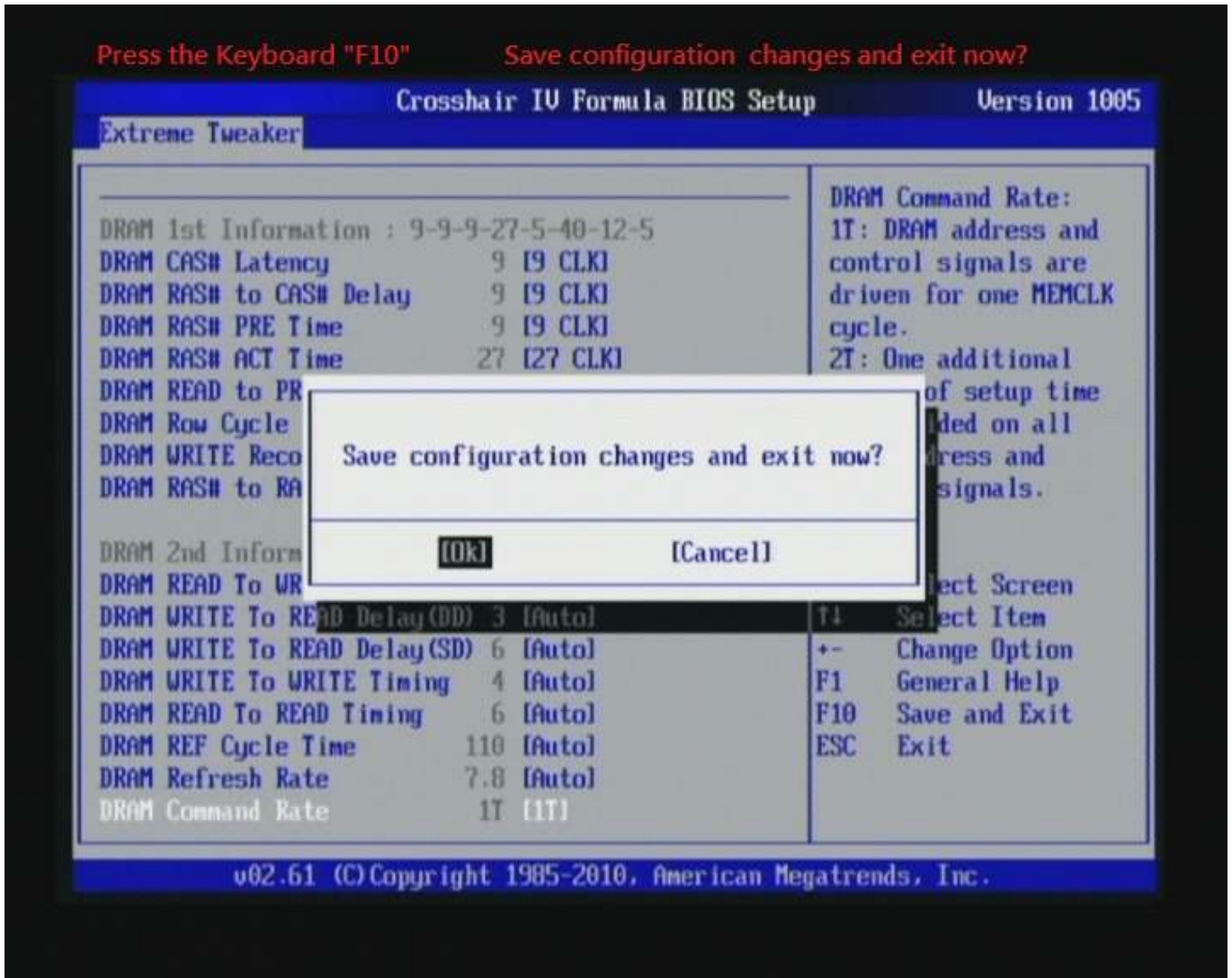
set [DRAM RAS# ACT Time] item to [27 CLK]

set [DRAM Command Rate] item to [1T]

then return to previous to [Ai Overclock Tuner] menu



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 DDR3-1800 potential.

(Data rate : $975.8 \times 2 = 1952$, timing : 9, 9, 9, 27, multi-core test => pass!)

The image shows six instances of the MemTest86 application. Each window displays the test configuration (580 MB RAM) and the results. The results are as follows:

- Top-left: 102.2% Coverage, 0 Errors
- Top-right: 100.8% Coverage, 0 Errors
- Middle-left: 100.5% Coverage, 0 Errors
- Middle-right: 102.0% Coverage, 0 Errors
- Bottom-left: 101.2% Coverage, 0 Errors
- Bottom-right: 102.2% Coverage, 0 Errors

CPU-Z Processor tab showing details for the AMD Phenom II X6 1095T processor.

Name	AMD Phenom II X6 1095T		
Code Name	Thuban	Brand ID	
Package	Socket AM3 (938)		
Technology	45 nm	Core Voltage	1.260 V
Specification: AMD Phenom(tm) II X6 1090T Processor			
Family	F	Model	A
Ext. Family	10	Ext. Model	A
Stepping	0	Revision	PH-E0
Instructions	MMX(+), 3DNow!(+), SSE (1, 2, 3, 4A), x86-64, AMD-V		

Clocks (Core #0)		Cache	
Core Speed	3169.7 MHz	L1 Data	6 x 64 KBytes 2-way
Multiplier	x 13.0	L1 Inst.	6 x 64 KBytes 2-way
Bus Speed	243.8 MHz	Level 2	6 x 512 KBytes 16-way
HT Link	1950.6 MHz	Level 3	6 MBytes 48-way

Selection: Processor #1 | Cores: 6 | Threads: 6

CPU-Z Mainboard tab showing motherboard details.

Manufacturer	ASUSTeK Computer Inc.
Model	Crosshair IV Formula
Chipset	AMD
Southbridge	AMD
LPCIO	ITE

Brand	American Megatrends
Version	1005
Date	08/06/2010

Version	
Link Width	x16
Side Band	

CPU-Z Memory tab showing memory configuration and timings.

Type	DDR3	Channels #	Dual
Size	4096 MBytes	DC Mode	Unganged
		NB Frequency	1951.6 MHz

DRAM Frequency	975.8 MHz
FSB:DRAM	1:4
CAS# Latency (CL)	9.0 clocks
RAS# to CAS# Delay (tRCD)	9 clocks
RAS# Precharge (tRP)	9 clocks
Cycle Time (tRAS)	27 clocks
Bank Cycle Time (tRC)	40 clocks
Command Rate (CR)	1T

CPU-Z Memory Slot Selection and Timings Table.

Slot #1	DDR3
Module Size	2048 MB
Max Bandwidth	PC3-10700 (12.8 GB/s)
Manufacturer	
Part Number	PRINCO-DR3-4096
Serial Number	

	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

Windows taskbar and desktop icons. The taskbar shows the CPU-Z icon (cpu264 - 捷徑) and the MemTest86 icon (memtest - 捷徑). The desktop background is black with a green checkmark icon.

Windows Task Manager performance tab showing CPU and memory usage.

CPU 使用率	100 %
CPU 使用率記錄	
記憶體	3.71 GB
實體記憶體使用記錄	