

PRINCO DDR3-1600 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 DDR3-1600 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 select [Auto]
3. Select [DRAM Frequency] item , and set the DDR3 memory to higher clock rate (ex:1600MHz). Don't forget setting [CPU Ratio] item to suitable ratio (ex:16.0)
4. Select[DRAM Voltage] item , and set the value to [1.60000]

Step 1 : Select " Extreme Tweaker "

Step 2 : DRAM Frequency

Set [1600MHz]

Step 3 : CPU Ratio

Set [16.0]

Step 4 : DRAM Voltage

Set [1.60000]

Crosshair IV Formula BIOS Setup Version 1005

Extreme Tweaker Main Advanced Power Boot Tools Exit

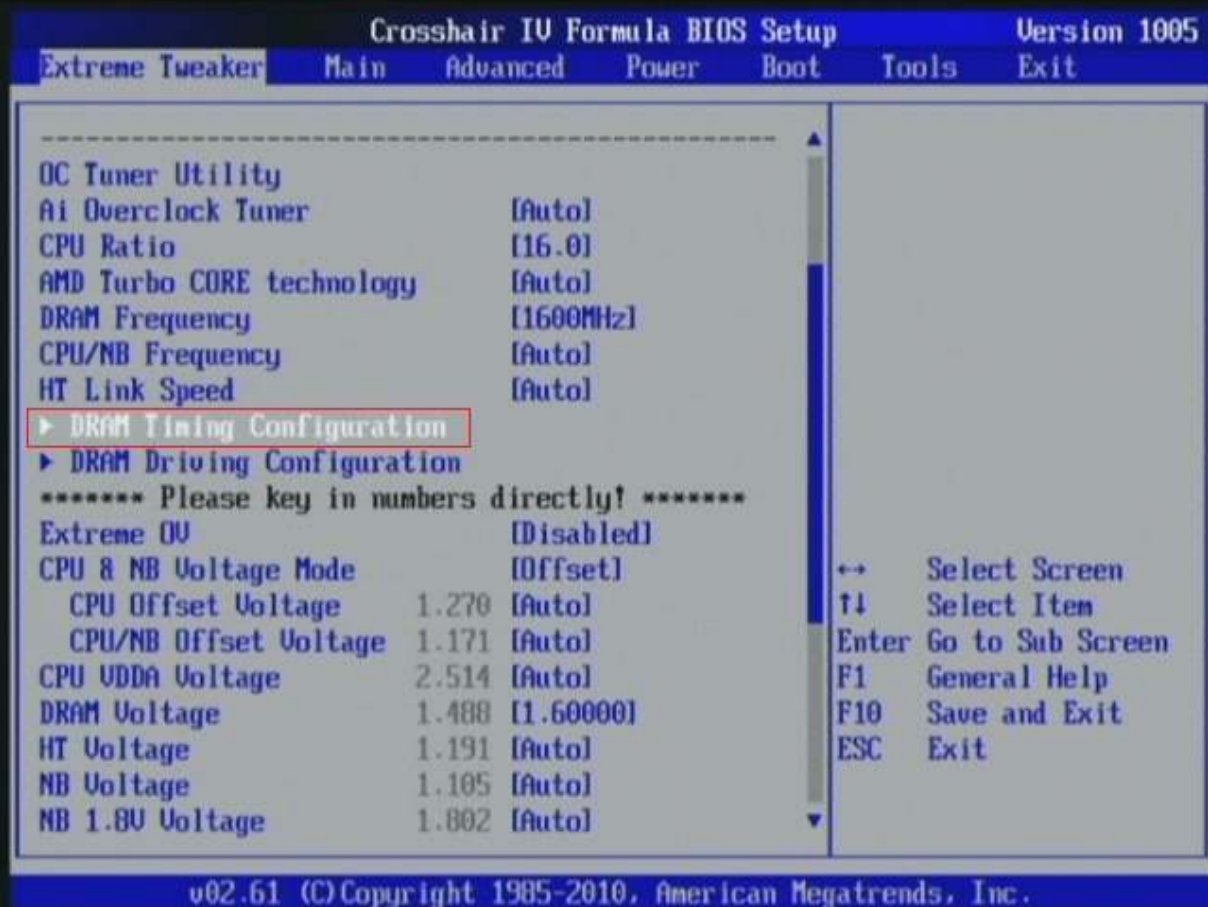
----- Step 1 -----

DC Tuner Utility			Min = 1.20000U
AI Overclock Tuner	[Auto]		Max = 2.90000U
CPU Ratio	[16.0]	Step 3	Interval = 0.01250U
AMD Turbo CORE technology	[Auto]		Standard = 1.50000U
DRAM Frequency	[1600MHz]	Step 2	
CPU/NB Frequency	[Auto]		
HT Link Speed	[Auto]		
▶ DRAM Timing Configuration			
▶ DRAM Driving Configuration			
***** Please key in numbers directly! *****			
Extreme OV	[Disabled]		
CPU & NB Voltage Mode	[Offset]		↔ Select Screen
CPU Offset Voltage	1.270 [Auto]		↑ Select Item
CPU/NB Offset Voltage	1.171 [Auto]		F1 General Help
CPU VDDA Voltage	2.514 [Auto]		F10 Save and Exit
DRAM Voltage	1.488 [1.60000]	Step 4	ESC Exit
HT Voltage	1.191 [Auto]		
NB Voltage	1.111 [Auto]		
NB 1.8V Voltage	1.802 [Auto]		

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5. Enter [DRAM Timing Configuration] item

Select " DRAM Timing Configuration "



6. set [DRAM CAS# Latency] item to [7 CLK]

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


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

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

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

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 Command Rate	Set [1T]



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Extreme Tweaker

DRAM 1st Information : 9-9-9-24-4-33-10-4

DRAM CAS# Latency	9 [7 CLK]	Step 1
DRAM RAS# to CAS# Delay	9 [9 CLK]	
DRAM RAS# PRE Time	9 [7 CLK]	
DRAM RAS# ACT Time	24 [24 CLK]	
DRAM READ to PRE Time	4 [Auto]	
DRAM Row Cycle Time	33 [Auto]	
DRAM WRITE Recovery Time	10 [Auto]	
DRAM RAS# to RAS# Delay	4 [Auto]	

DRAM 2nd Information : 8-2-5-4-4-110-7.8ms-1T

DRAM READ To WRITE Delay	8 [Auto]	
DRAM WRITE To READ Delay (DD)	2 [Auto]	
DRAM WRITE To READ Delay (SD)	5 [Auto]	
DRAM WRITE To WRITE Timing	4 [Auto]	
DRAM READ To READ Timing	4 [Auto]	
DRAM REF Cycle Time	110 [Auto]	
DRAM Refresh Rate	7.8 [Auto]	
DRAM Command Rate	1T [1T]	Step 2

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

Press the Keyboard "F10"

Save configuration changes and exit now?

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Extreme Tweaker

DRAM 1st Information : 9-9-9-24-4-33-10-4	DRAM Command Rate:
DRAM CAS# Latency 9 [7 CLK]	1T: DRAM address and control signals are driven for one MEMCLK cycle.
DRAM RAS# to CAS# Delay 9 [9 CLK]	2T: One additional of setup time added on all address and signals.
DRAM RAS# PRE Time 9 [7 CLK]	
DRAM RAS# ACT Time 24 [24 CLK]	
DRAM READ to PR	
DRAM Row Cycle	
DRAM WRITE Reco	
DRAM RAS# to RA	
DRAM 2nd Inform	
DRAM READ To WR	Select Screen
DRAM WRITE To READ Delay(DD) 2 [Auto]	T4 Select Item
DRAM WRITE To READ Delay(SD) 5 [Auto]	+ - Change Option
DRAM WRITE To WRITE Timing 4 [Auto]	F1 General Help
DRAM READ To READ Timing 4 [Auto]	F10 Save and Exit
DRAM REF Cycle Time 110 [Auto]	ESC Exit
DRAM Refresh Rate 7.8 [Auto]	
DRAM Command Rate 1T [1T]	

Save configuration changes and exit now?

[OK] [Cancel]

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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 : $802.7 \times 2 = 1605$, timing : 7, 9, 7, 24, multi-core test => pass!)

The screenshot displays a Windows 7 desktop environment during a stress test. On the left, six MemTest86 windows are arranged in a 3x2 grid, each showing 580 MB of RAM being tested with 0 errors and coverage percentages ranging from 86.5% to 117.7%. The CPU-Z utility is open in multiple instances, providing detailed system information:

- CPU-Z Processor:** AMD Phenom II X6 1090T (Thuban), Socket AM3 (938), 45 nm technology, 1.260 V core voltage. 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.
- CPU-Z Caches:** 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).
- CPU-Z Memory:** Type: DDR3, Size: 4096 MBytes, Channels #: Dual, DC Mode: Unganged, NB Frequency: 2006.7 MHz.
- CPU-Z Timings:** DRAM Frequency: 802.7 MHz, FSB:DRAM: 1:4, CAS# Latency (CL): 7.0 clocks, RAS# to CAS# Delay (tRCD): 9 clocks, RAS# Precharge (tRP): 7 clocks, Cycle Time (tRAS): 24 clocks, Bank Cycle Time (tRC): 40 clocks, Command Rate (CR): 1T.

At the bottom, the Windows Task Manager Performance tab is visible, showing CPU usage at 100% and memory usage at 3.85 GB. Desktop icons for CPU-Z and MemTest86 are also present.

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 [CPU Bus Frequency] item , and increase to higher Base clock rate (ex:238). Then select [DRAM Frequency] item , and set the DDR3 memory to higher clock rate (ex:1904MHz). 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 [238]

Step 2 : DRAM Frequency

Set [1904MHz]

Step 3 : CPU Ratio

Set [13.0]

Step 4 : DRAM Voltage

Set [1.65000]

Crosshair IV Formula BIOS Setup Version 1005

Extreme Tweaker Main Advanced Power Boot Tools Exit

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OC Tuner Utility

Ai Overclock Tuner [Manual] Step 1

CPU Ratio [13.0] Step 4

AMD Turbo CORE technology [Auto]

CPU Bus Frequency [238] Step 2

PCIE Frequency [100]

DRAM Frequency [1904MHz] 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 1.171 [Auto]

CPU UDDA Voltage 2.514 [Auto]

DRAM Voltage 1.693 [1.65000] Step 5

HT Voltage 1.197 [Auto]

▼

Min = 0.800000V

Max = 2.000000V

Interval = 0.01250V

Standard = 1.200000V

+/- : Raise/Reduce

↔ Select Screen

F4 Select Item

F1 General Help

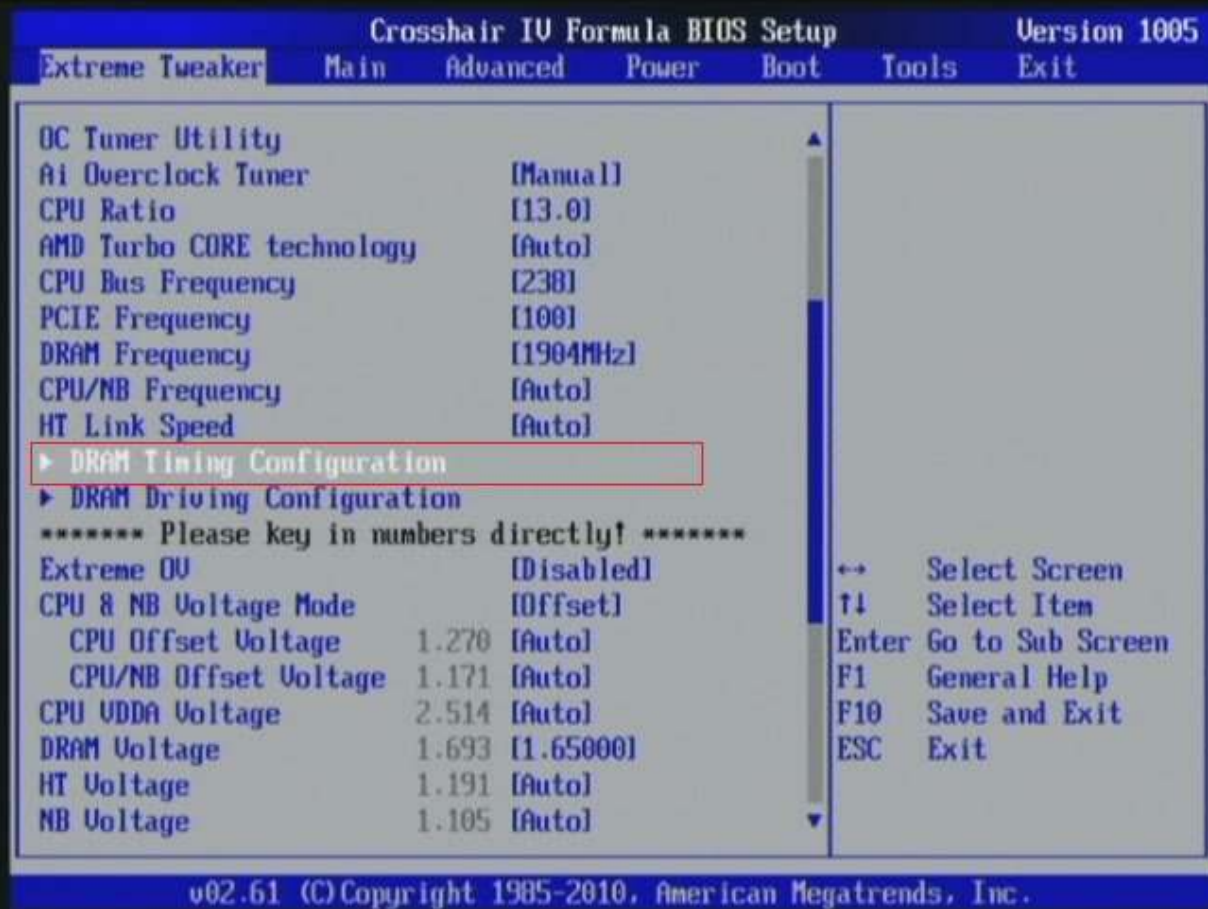
F10 Save and Exit

ESC Exit

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5. Enter [DRAM Timing Configuration] item

Select "DRAM Timing Configuration"



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

Step 1 : DRAM CAS# Latency	Set [9 CLK]
DRAM RAS# to CAS# Delay	Set [9 CLK]
DRAM RAS# PRE Time	Set [9 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 : 9-9-9-27-5-40-12-5

DRAM CAS# Latency	9 [9 CLK]	Step 2
DRAM RAS# to CAS# Delay	9 [9 CLK]	
DRAM RAS# PRE Time	9 [9 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 : 7-3-6-4-6-110-7.8ms-1T

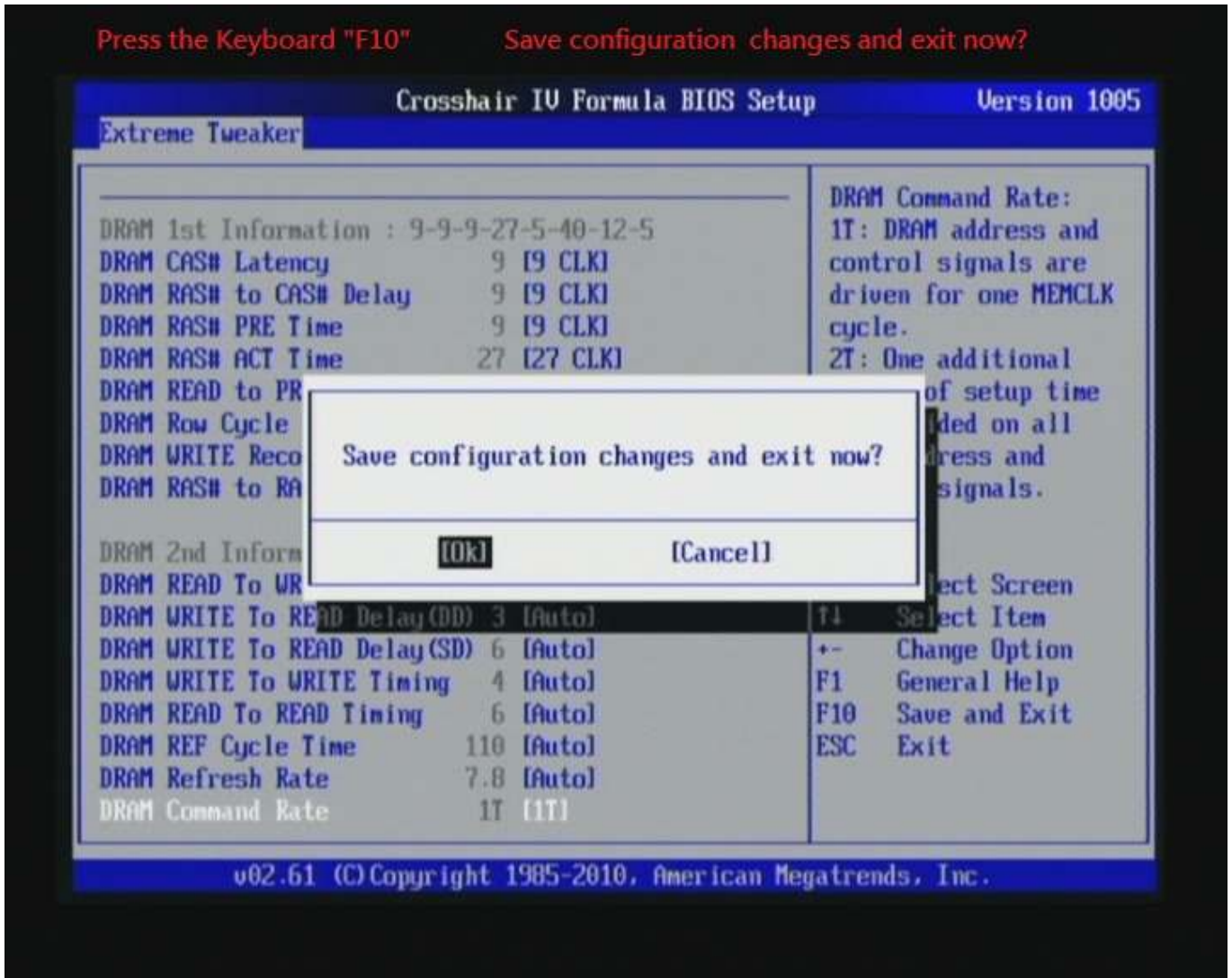
DRAM READ To WRITE Delay	7 [Auto]	Step 2
DRAM WRITE To READ Delay (DD)	3 [Auto]	
DRAM WRITE To READ Delay (SD)	6 [Auto]	
DRAM WRITE To WRITE Timing	4 [Auto]	
DRAM READ To READ Timing	6 [Auto]	
DRAM REF Cycle Time	110 [Auto]	
DRAM Refresh Rate	7.8 [Auto]	
DRAM Command Rate	1T [1T]	

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?

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

(Data rate : 955.3*21910, timing : 9, 9, 9, 27, multi-core test => pass!)

MemTest86 windows showing test results. Each window displays '0 Errors' and 'Coverage' percentages:

- Top-left: 114.5% Coverage, 0 Errors
- Top-right: 113.7% Coverage, 0 Errors
- Middle-left: 112.4% Coverage, 0 Errors
- Middle-right: 111.7% Coverage, 0 Errors
- Bottom-left: 112.3% Coverage, 0 Errors
- Bottom-right: 126.2% Coverage, 0 Errors

CPU-Z Processor tab showing details for AMD Phenom II X6 1095T:

- Processor Name: AMD Phenom II X6 1095T
- Code Name: Thuban
- 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 3104.4 MHz, Multiplier x 13.0, Bus Speed 238.8 MHz, HT Link 1910.4 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
- Model: Crosshair IV Form
- Chipset: AMD
- Southbridge: AMD
- LPCIO: ITE
- BIOS: Brand American Megatrends, 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, Channels # Dual, DC Mode Unganged, NB Frequency 1910.5 MHz
- Timings: DRAM Frequency 955.3 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, Part Number PRINCO-DR3, Serial Number
- Timings Table: JEDEC #2, Frequency 533 MHz, CAS# Latency 7.0, RAS# to CAS# 7, RAS# Precharge 7, tRAS 20, tRC 27, Command Rate 1.50 V

Shortcuts for CPU-Z and MemTest86:

- cpu264 - 捷徑
- memtest - 捷徑

Windows Task Manager performance tab showing system usage:

- CPU 使用率: 100%
- 記憶體: 3.74 GB
- CPU 使用率記錄: [Graph]
- 實體記憶體使用記錄: [Graph]