

PRINCO DDR3-1800 user guide and testing for GA-X58A-UD3R Motherboard

CPU i7-950 3.07G



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 [MB Intelligent Tweaker(M.I.T.)] menu

Select "MB Intelligent Tweaker (M. I. T.)"



2. Enter [Advance Memory Setting] item

Select "Advanced Memory Settings"

CMOS Setup Utility - Copyright (C) 1984-2010 Award Software
MB Intelligent Tweaker(M.I.T.)

	[Press Enter]	Item Help
▶ M.I.T Current Status	[Press Enter]	
▶ Advanced Frequency Settings	[Press Enter]	
▶ Advanced Memory Settings	[Press Enter]	Menu Level ▶
▶ Advanced Voltage Settings	[Press Enter]	Configure DRAM Features
▶ Miscellaneous Settings	[Press Enter]	

BIOS Version	FB
BCLK	159.05 MHz
CPU Frequency	3022.15 MHz
Memory Frequency	1908.70 MHz
Total Memory Size	6144 MB
CPU Temperature	59.0 °C
Vcore	1.312 V
DRAM Voltage	1.584 V

↑↓←→:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5:Previous Values F6:Fail-Safe Defaults F7:Optimized Defaults

3. Enter [Extreme Memory Profile(X.M.P.)] item and choose [Profile 2] option , BIOS will load X.M.P parameter in SPD on DIMM board , which are performance optimized for PRINCO DDR3-1800 DIMM board

Step 1 : Select " Extreme Memory Profile (X. M. P.) "

Step 2 : In the pop menu, select " Profile2 "



4. Save BIOS changes [F10] and exit

Press the Keyboard "F10"

Save to CMOS and EXIT (Y/N)? Y

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Advanced Memory Settings

	Item Help
Extreme Memory Profile(X.M.P.) [Profile2]	
System Memory Multiplier (SPD) [Auto]	
Memory Frequency(Mhz) 1800 1800	Menu Level >>
Performance Enhance [Turbo]	
DRAM Timing Selectable (SPD) [Auto]	
Profile DDR Voltage 1.6V	
Profile QPI Voltage 1.3V	
x Channel Interleaving 6 Auto	
x Rank Interleaving	
>>>>> Channel A	
▶ Channel A Timing	
▶ Channel A Turnaro	
>>>>> Channel B	
▶ Channel B Timing Settings [Press Enter]	
▶ Channel B Turnaround Settings [Press Enter]	
>>>>> Channel C	
▶ Channel C Timing Settings [Press Enter]	
▶ Channel C Turnaround Settings [Press Enter]	

SAVE to CMOS and EXIT (Y/N)? Y

↑↓←→:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5:Previous Values F6:Fail-Safe Defaults F7:Optimized Defaults

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 : $900.0 \times 2 = 1800$, timing : 8, 9, 8, 27, multi-core test => pass!)

The image is a collage of screenshots from Windows 7. On the left, there are eight MemTest windows arranged in a 4x2 grid. Each window shows a test configuration for 700 MB of RAM. The status bars at the bottom of each window indicate 0 errors and various coverage percentages: 113.8%, 112.4%, 112.2%, 111.7%, 108.1%, 110.5%, 108.6%, and 282.2%. The MemTest interface includes a text input for RAM size, 'Start Testing' and 'Stop Testing' buttons, and an 'About MemTest' button. A message at the bottom of each window encourages purchasing the PRO or Deluxe versions.

On the right side, there are four CPU-Z windows. The top two show the 'CPU' tab, displaying details for an Intel Core i7 950 processor, including its name, code name (Bloomfield), package (Socket 1366 LGA), technology (45 nm), and core voltage (1.280 V). It also shows the processor's specification as Intel(R) Core(TM) i7 CPU 950 @ 3.07GHz, with 6 cores and 8 threads. The bottom two CPU-Z windows show the 'Memory' tab, detailing the installed memory as 6144 MB of DDR3 at 3600.0 MHz. The 'Timings' section lists various parameters such as DRAM Frequency (900.0 MHz), CAS# Latency (8.0 clocks), and RAS# to CAS# Delay (9 clocks). The 'Timings Table' compares JEDEC #3 and JEDEC #4 specifications for Frequency (609 MHz vs 685 MHz), CAS# Latency (8.0 vs 9.0), RAS# to CAS# (8 vs 9), RAS# Precharge (8 vs 9), tRAS (22 vs 25), tRC (30 vs 34), and Command Rate (1.50 V vs 1.50 V).

At the bottom right, a screenshot of the Windows Task Manager is shown, displaying the 'Performance' tab. It indicates that the CPU is at 100% usage and that 5.67 GB of memory is in use.

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 [MB Intelligent Tweaker(M.I.T.)] menu



2. Enter [Advance Frequency Setting] item

Select "Advanced Frequency Settings"

The screenshot shows the CMOS Setup Utility interface. At the top, it reads "CMOS Setup Utility - Copyright (C) 1984-2010 Award Software" and "MB Intelligent Tweaker (M.I.T.)". The main menu lists several options, with "Advanced Frequency Settings" highlighted by a red box. Below the menu, various system parameters are displayed, including BIOS Version, BCLK, CPU Frequency, Memory Frequency, Total Memory Size, CPU Temperature, Vcore, and DRAM Voltage. A legend at the bottom explains the navigation keys.

CMOS Setup Utility - Copyright (C) 1984-2010 Award Software MB Intelligent Tweaker (M.I.T.)	
▶ M.I.T Current Status	[Press Enter]
▶ Advanced Frequency Settings	[Press Enter]
▶ Advanced Memory Settings	[Press Enter]
▶ Advanced Voltage Settings	[Press Enter]
▶ Miscellaneous Settings	[Press Enter]

BIOS Version	FB
BCLK	133.28 MHz
CPU Frequency	3198.51 MHz
Memory Frequency	1599.38 MHz
Total Memory Size	6144 MB
CPU Temperature	52.0 °C
Vcore	1.184 V
DRAM Voltage	1.584 V

↑↓←→:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5:Previous Values F6:Fail-Safe Defaults F7:Optimized Defaults

3. Set [Base Clock(BCLK) Control] item to [Enabled] , Select [BLCK Frequency(Mhz)] item , and increase to higher Base clock rate (ex:136). Then set [System Memory Multiplier (SPD)] item to [14.0]. Don't forget setting [CPU Ratio Setting] item to suitable ratio [ex:22]

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

Step 1 : Base Clock(BCLK) Control Set [Enabled]

Step 2 : BCLK Frequency(Mhz) Set [136]

Step 3 : System Memory Multiplier (SPD) Set [14.0]

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Advanced Frequency Settings

Item	Value	Step
CPU Clock Ratio	[22 X]	Step 4
CPU Frequency	2.99GHz (136x22)	
▶ Advanced CPU Core Features	[Press Enter]	
QPI Clock Ratio	[Auto]	
QPI Link Speed	4.89GHz	
Uncore Clock Ratio	[Auto]	
Uncore Frequency	3800MHz	
>>>>> Standard Clock Control		
Base Clock(BCLK) Control	[Enabled]	Step 1
BCLK Frequency(Mhz)	[136]	Step 2
Extreme Memory Profile(X.M.P.)	[Disabled]	
System Memory Multiplier (SPD)	[14.0]	Step 3
Memory Frequency(Mhz)	1866 1904	
PCI Express Frequency(Mhz)	[Auto]	
>>>>> Advanced Clock Control		
CPU Clock Drive	[800mV]	
PCI Express Clock Drive	[900mV]	
CPU Clock Skew	[0ps]	
IOH Clock Skew	[0ps]	

↑↓←→:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5:Previous Values F6:Fail-Safe Defaults F7:Optimized Defaults

Step 4 : CPU Clock Ratio Set [22 X]

then return to previous to

[MB Intelligent Tweaker(M.I.T.)] menu

4. Enter [Advance Memory Setting] item

Select "Advanced Memory Settings"

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MB Intelligent Tweaker(M.I.T.)

		Item Help
▶ M.I.T Current Status	[Press Enter]	
▶ Advanced Frequency Settings	[Press Enter]	
▶ Advanced Memory Settings	[Press Enter]	Menu Level ▶
▶ Advanced Voltage Settings	[Press Enter]	Configure DRAM Features
▶ Miscellaneous Settings	[Press Enter]	

BIOS Version	FB
BCLK	146.04 MHz
CPU Frequency	3066.89 MHz
Memory Frequency	2044.50 MHz
Total Memory Size	6144 MB
CPU Temperature	55.0 °C
Vcore	1.168 V
DRAM Voltage	1.584 V

↑↓←→:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5:Previous Values F6:Fail-Safe Defaults F7:Optimized Defaults

5. Set [DRAM Timing Selectable (SPD)] item to [Quick]

6. Enter [Channel A Timing Settings] item

Step 1 : DRAM Timing Selectable (SPD)

Set [Quick]

Step 2 : Select "Channel A Timing Setting"

into Timing Settings



7. set [CAS Latency Time] item to [8]

set [tRCD] item to [9]

set [tRP] item to [8]

set [tRAS] item to [27]

set [DRAM Timing Mode] item to [1]

Step 1 : CAS Latency Time Set [8]
 tRCD Set [8]
 tRP Set [8]

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CMOS Setup Utility - Copyright (C) 1984-2010 Award Software
Channel A Timing Settings

>>>>> Channel A Standard Timing Control
CAS Latency Time      7 [ 8 ]
tRCD                  7 [ 9 ]
tRP                   7 [ 8 ]
tRAS                  20 [ 27 ]

>>>>> Channel A Advanced Timing Control
tRC                   27 [Auto]
tRRD                  4 [Auto]
tWTR                  4 [Auto]
tWR                   8 [Auto]
tWTP                  19 [Auto]
tWL                   7 [Auto]
tRFC                  60 [Auto]
tRTP                  4 [Auto]
tFAW                  16 [Auto]
Command Rate(CMD)    1 [ 1 ]
>>>>> Channel A Misc Timing Control
B2B CAS Delay        - [Auto]
Round Trip Latency   59 [Auto]

Item Help
Menu Level  >>>

↑↓←→:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
F5:Previous Values  F6:Fail-Safe Defaults  F7:Optimized Defaults
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 tRAS Set [27]
Step 2 : Command Rate(CMD) Set [1]

then return to previous to

[MB Intelligent Tweaker(M.I.T.)] menu

8. Enter [Advance Voltage Setting] item

Select "Advanced Voltage Settings"

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MB Intelligent Tweaker (M.I.T.)

	Item Help
▶ M.I.T Current Status [Press Enter]	
▶ Advanced Frequency Settings [Press Enter]	
▶ Advanced Memory Settings [Press Enter]	Menu Level ▶
▶ Advanced Voltage Settings [Press Enter]	
▶ Miscellaneous Settings [Press Enter]	

BIOS Version	FB
BCLK	146.05 MHz
CPU Frequency	3066.88 MHz
Memory Frequency	2044.60 MHz
Total Memory Size	6144 MB
CPU Temperature	54.0 °C
Vcore	1.168 V
DRAM Voltage	1.584 V

↑↓←→:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5:Previous Values F6:Fail-Safe Defaults F7:Optimized Defaults

9. Select [CPU Vcore] item to [1.20008V]

Select [QPI/Vtt Voltage] item , and set the value to [1.580].

Select[DRAM Voltage] item , and set the value to [1.640V]

Step 1 : CPU Vcore Set [1.20000V]

Step 2 : QPI/Vtt Voltage Set [1.580V]

Step 3 : DRAM Voltage Set [1.640V]

CMOS Setup Utility - Copyright (C) 1984-2010 Award Software
Advanced Voltage Settings

***** Mother Board Voltage Control *****			Item Help
Voltage Types	Normal	Current	

>>> CPU			
Load-Line Calibration		[Auto]	
CPU Vcore	1.11875V	[1.20000V]	Step 1
x Dynamic Vcore(DVID)	+0.00000V	Auto	
QPI/Vtt Voltage	1.200V	[1.580V]	Step 2
CPU PLL	1.800V	[Auto]	
>>> MCH/ICH			
PCIE	1.500V	[Auto]	
QPI PLL	1.100V	[Auto]	
IOH Core	1.100V	[Auto]	
ICH I/O	1.500V	[Auto]	
ICH Core	1.100V	[Auto]	
>>> DRAM			
DRAM Voltage	1.500V	[1.640V]	Step 3
DRAM Termination	0.750V	[Auto]	
Ch-A Data VRef.	0.750V	[Auto]	

Menu Level >>>
[Standard]
Follow Intel Spec
[Level 1]
Slightly adjusts
Vdroop
[Level 2]
Moderately adjusts
Vdroop
Note: Increasing
CPU voltage may result
in damage to your CPU
or reduce the useful
life of the CPU

↑↓←→:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5:Previous Values F6:Fail-Safe Defaults F7:Optimized Defaults

10. Save BIOS changes [F10] and exit

Press the Keyboard "F10"

Save to CMOS and EXIT (Y/N)? Y

CMOS Setup Utility - Copyright (C) 1984-2010 Award Software
Advanced Voltage Settings

***** Mother Board Voltage Control *****			Item Help
Voltage Types	Normal	Current	

>>> CPU			
Load-Line Calibration		[Auto]	[Standard]
CPU Vcore	1.11875V	[1.20000V]	Follow Intel Spec
x Dynamic Vcore(DVID)	+0.80000V	Auto	
QPI/Vtt Voltage	1.200V	[1.500V]	[Level 1]
CPU PLL			ightly adjusts
>>> MCH/ICH			
PCIE			roop
QPI PLL			Level 2]
IOH Core			oderately adjusts
ICH I/O	1.500V	[Auto]	roop
ICH Core	1.100V	[Auto]	
>>> DRAM			
DRAM Voltage	1.500V	[1.640V]	Note: Increasing
DRAM Termination	0.750V	[Auto]	CPU voltage may result
Ch-A Data VRef.	0.750V	[Auto]	in damage to your CPU
			or reduce the useful
			life of the CPU

SAVE to CMOS and EXIT (Y/N)?

↑↓←→:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5:Previous Values F6:Fail-Safe Defaults F7:Optimized Defaults

Test result?

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

(Data rate : $952.2 \times 2 = 1904$, timing : 8, 9, 8, 27, multi-core test => pass!)

The image displays a collage of software windows. On the left, eight instances of MemTest are shown in a grid, each reporting 0 errors and various coverage percentages (e.g., 153.4%, 152.5%, 152.4%, 149.8%, 339.5%). The MemTest interface includes a field for RAM size (700 MB) and 'Start Testing'/'Stop Testing' buttons. On the right, four instances of CPU-Z are shown, displaying system information:

- CPU-Z (Mainboard):** Processor: Intel Core i7 950 (Bloomfield, Socket 1366 LGA, 45 nm, 3.07GHz). Cache: L1 Data (4x 32 KBytes, 8-way), L1 Inst (4x 32 KBytes, 4-way), Level 2 (4x 256 KBytes, 8-way), Level 3 (8 MBytes, 16-way). Cores: 4, Threads: 8.
- CPU-Z (Memory):** Type: DDR3, Size: 6144 MBytes, Channels #: Triple, NB Frequency: 3808.6 MHz. Timings: DRAM Frequency (952.2 MHz), FSB:DRAM (2:14), 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) (106 clocks), Command Rate (CR) (1T).
- CPU-Z (Memory Slot Selection):** Slot #1: DDR3, Module Size: 2048 MBytes, Max Bandwidth: PC3-10700 (6600), Part Number: PRINCO-DR3-1800, Voltage: 1.50 V.

At the bottom, a Windows Task Manager window shows 'CPU 使用率' at 100% and '記憶體' at 5.67 GB.