GT3-BH Technical Whitepaper
“aEnthusiast”
Test Data on a Typical Gaming GT3-PC System Build
Version 1.0

The “aEnthusiast” PC configuration as detailed below, represents a typical high-end GT3 PC configuration optimized for PC Gaming, utilizing GTR's GT3-BH Chassis. The below data includes an exhaustive component list, necessary system settings, configuration details, including acoustic, thermal, performance, and power consumption data.

Configuration Objective: Maximize performance against overall cost, while maximizing system stability.

Configuration Overview

- ✔ Extremely Quiet: 39.1dB(silent = 38.5dB)
- ✔ Low Power Consumption: 121Watts typical, 221Watts Max
- ✔ High Performance
  - ✔ Windows Experience Index - Processor, Memory of 6.9 and 7.3, respectively.
  - ✔ 13,697 3DMark '06 Score

System Configuration

- 1 x GTR Tech GT3-BH
- 1 x AMD Phenom II X3 720 2.8GHz 3 x 512KB L2 Cache 6MB L3 Cache Socket AM3 95W Triple-Core Black Processor - Retail
- 1 x GIGABYTE GA-MA790XT-UD4P AM3 DDR3 AMD 790X ATX AMD Motherboard
- 1 x G.SKILL 4GB (2 x 2GB) 240-Pin DDR3 SDRAM DDR3 1600 (PC3 12800) Dual Channel Kit Desktop Memory
- 1 x XFX HD-485X-YDDC Radeon HD 4850 XXX 512MB 256-bit GDDR3 PCI Express 2.0 x16 HDCP Ready CrossFire Supported Video Card - Retail
- 1 x Western Digital Caviar Black WD1001FALS 1TB 7200 RPM 32MB Cache SATA 3.0Gb/s 3.5" Hard Drive
- 1 x Sony Optiarc Black 8X DVD+R 8X DVD+RW 6X DVD+R DL 8X DVD-R 6X DVD-RW 5X DVD-RAM 8X DVD-ROM 24X CD-R 24X CD-RW 24X CD-ROM 2MB Cache SATA Slim 8X Slot Loading DVD Burner – OEM
- 1 x Cables To Go #27391
- 1 x Circuit Assembly Slimline SATA Cable SlimSATA Cable – SKU U709089-0.5M
- Windows 7 x86 RC Build 7057

CPU Settings	*Memory Settings*	*Misc. Motherboard*
Frequency: 3.4Ghz	Frequency: 1600(DDR)	BIOS Version: F3
Multiplier: x 17 Clock: 200	Multiplier: x 8 Clock: 200 Memory timings set to SPD	
Voltage: 1.475V	Voltage: 1.65V	Fan Control in BIOS set to “Enabled”

Build Notes
Video card air-flow outlet, adjacent to video card's 6-pin power connector, blocked to improve through-the-chassis, air-flow. This was done using high temp 3M tape. Effective loaded GPU temperature dropped 5 degrees Celsius as a result.
Lower bracket on feature module and lower support bracket on chassis removed to accommodate video card length.
Upper **and** Lower Fans connected to “Sys 1” fan header(Sys 1 header is the only header with fan control). Use “Cable to Go #27391” to connect the upper and lower fan to the “Sys 1” header.

CONFIGURATION DATA RESULTS

Test Environment Variables/Reference Data

Power Consumption “Off”: 1.3Watts
Office environment in dB, as measured “quiet”: 38.5dB
(Test environment: a typical office environment, measured “silent” at 38.5dB; no appliances running, A/C, Fans, computers, etc.)
Ambient Room Temperature: 78-80F
Humidity: 40-50%
Windows 7 Software/Drivers: All device drivers installed by Windows 7, video card drivers: Catalyst 9.4 Beta

Usage Model 1 – Desktop Use

Windows 7 Experience Index Base Score: 5.9
- Processor: 6.9
- Memory: 7.3
- Graphics: 6.5
- Gaming Graphics: 6.5
- Primary Hard Disk: 5.9

Typical Power Consumption: 121Watts
Acoustics: 39.1- 39.3dB
(Hard drive activity increases dB output to - 39.5dB)
Max CPU Core Temperature: 42.6C
Max Graphics Core Temperature: 48.0C

Usage Model 2 – Hardware-Accelerated 3D Graphics

(3DMark '06, Default Settings)
3DMark '06 Score – 13,697 Marks
Max Power Consumption: 221Watts
Max Acoustics: 46dB
Max CPU Core Temperature: 52.2C
Max Graphics Core Temperature: 69.0C

Usage Model 3 - Non-Conforming Usage Model, Synthetic Test

(“The Crusher-Tribute” Test*)
Max Power Consumption: 288Watts
Max Acoustics: 48.9dB
Max CPU Core Temperature: 61.5C
Max Graphics Core Temperature: 72.0C

CONCLUSIONS AND OBSERVATIONS

General Conclusions and Observations

1) Actual power consumption data illustrate the disparity between real world power supply requirements versus consumer's perceived needs and vendor's power supply recommendations, ie vendor recommendations for this system include 450 to 550 Watt power supplies(Nvidia, ATI). Whereas, this system consumes no more than 225 “real world” Watts and 288 “synthetic” Watts.

2) GT3 supports all processors in the market, to date. Intel provides actual power requirement data for processor support(Reference), AMD does not(4/19/09 - AMD1, AMD2). Therefore, Intel processor support is explicit and AMD support is implicit, meaning AMD processors do not exceed GT3's power supply output.

Intel:
GT3's Power supply conforms to Intel's Core i7 Power Supply Requirements: "The Intel Core i7 processor requires a minimum of 8 Amps continuous and 13 Amps peak for 10ms on 12V2"(Reference). GT3's Power Supply provides 8.5A continuous and 16.0A peak on the 12V2 rail****.

AMD:
No known GT3-PC AMD based builds exceed or come close to, under “real world” or “synthetic” workloads, GT3 Power Supply's maximum system configuration of 454Watts of A/C Outlet power consumption***.

3) GT3's Power Supply's maximum output is 370 Watts with a resulting efficiency of 78.1%**. Resulting in a maximum system configuration of 454Watts of A/C Outlet power consumption***.

3) Motherboard Manufacturers Asus and Gigabyte provide proper fan control to optimize thermal and acoustic efficiency based on system load.

> 3a) Gigabyte's fan control implementation, controls **one** “Sys Fan” header. Therefore, both upper and lower GT3 intake fans need to be connected to this header.
> Use 1 x Cables To Go #27391 adaptor to run both fans to this fan header.
>
> 3b) Asus' fan control, successfully controlled both upper and lower fans when connected two two different fan header connectors.

4) By implementing a system build with effective fan control, acoustics under desktop use drop from the mid to high 40dB range, to the hi 30dB range – virtually silent, ideal for office use.

5) Hard drives are a significant contributor to overall noise levels and inhibits a distraction-free compute environment. Choose your hard drive carefully if acoustics are a factor for your GT3 PC build. The hard drives used in these Technical Whitepapers consist of GTR's recommendations.

Specific Conclusions and Observations

1) The following aEnthusiast settings offered the most robust system use

CPU Settings	***Memory Settings***	***Misc. Motherboard***
Frequency: 3.0Ghz	Frequency: 1333(DDR)	BIOS Version: F4a
Multiplier: x 15 Clock: 200	Multiplier: x 8 Clock: 200 Memory timings set to SPD	
Voltage: 1.400V	Voltage: 1.65V	Fan Control in BIOS set to “Enabled”

3.4Ghz and DDR 1600 presented infrequent system instability in Call of Duty 5(Steam version). The above system-settings provided rock-solid system stability under every application under test. This may be a Windows 7 issue, though this problem presented itself in Windows 7, Build 7100 as well. Windows XP Pro was not tested.

APPENDIX

*GTR's "Crusher-Tribute" Test
(Note: this test is a tribute, to the best benchmark of all time)
Prime 95 " In Place Large FTTs" executed in parallel with 3DMark '06 tests "GT2" and "HDR2" in loop mode.
3DMark 06 Tests: GT2 - Firefly Forest, HDR2 – Deep Freeze executed with "Loop All Selected Tests"
Test executed for 60 Minutes

**Maximum Power Supply Output Measured at 25C(Link)

***Power Consumption Calculation Data

	GT3's Power Supply Power Output						Total
Power Rail	+3.3v	+5v	+12v1	+12v2	-12v	+5vsby	
DC Voltage	3.3	5	12	12	12	5	
Amps	20	17	8.5	8.5	0.5	2.5	57.00
Watts	66	85	102	102	6	12.5	373.50
Efficiency							78.41%
Wall consumption							454.14

****GT3 Power Supply Specification(Link)