

Thermal Test Report

Model : YY-5603

Thermal Performance Contest

Date:Apr.19, 2004

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1. Introduction

The purpose of this evaluation is to find the best performance thermal solution by system operated as for Intel P4 3.2G processor .

2. References

ATX spec <http://formfactors.org>

3. Thermal Test

3.1 Test Configuration

Chassis	YY-5603
Power Supply	Delta GPS-350BB-100A
Chassis Fan	JAMICON JF1225BILS Speed: 1600RPM(low Speed) JAMICON JF1225BIMS Speed: 2200RPM (Middle Speed) <i>System config. To be tested with various modes, please refer to table 4.1 & 4.2</i>
Processor	Intel P4 Prescott FMB1.5 3.2GHz/800MHz, Quantity:1
Processor Thermal solution	GlacialTech Igloo 4360, Cooler Fan(8cm) Speed:2400 RPM,dBA:26
Motherboard	GIGA-BYTE 8S648FX-RZ
Memory	Kingston DDR400 512MB, Quantity: 2
Hard Drive	SEAGATE 40G, Quantity: 1
CD ROM	Cyber CD526D, Quantity: 1
Floppy Drive	Mitsumi D359M3, Quantity: 1
AGP Card	Albatron FX5200, Quantity: 1
PCI-Sound Card	ESS SC1938, Quantity: 1
PCI-Lan Card	D-LINK DFE-530TX, Quantity: 1
PCI-Modem Card	GM56-AMI2019, Quantity: 1

3.2 Test Equipment Used

FULL SYSTEM OPERATION

Fluke Hydra 2635A

Software: Intel P4 Prescott MAXPOWER (85% & 100%)

3.3 Test Process

The peripherals listed in section 1 were installed in the chassis and thermocouples were attached at the points designated in section 4. The chassis was tested in a controlled temperature held at a constant 35°C. The thermal readings communicated from the sensors on the test board to the test software. The system was exercised until the initial thermal gradient reached a consistent level with a slope-nearing zero. During testing, the ambient temperature was monitored approximately 2" from the front bezel of the chassis.

3.4 Data Recorded

Temperature readings are measured at the following location(s):

- Ambient -- Hotbox ambient temperature (2" from the front center of the chassis)

- Tinlet1 – Internal ambient temperature of the processor heatsink .5” away from the center of fan hub (near the rear port)
- Tinlet2 – Internal ambient temperature of the processor heatsink .5” away from the center of fan hub (near the PSU)
- Tinlet3 – Internal ambient temperature of the processor heatsink .5” away from the center of fan hub (near the DIMM slot)
- Tinlet4 – Internal ambient temperature of the processor heatsink .5” away from the center of fan hub (near the chipset)
- Tcase -- Processor case temperature

4. Test Result (see table 4.1), & Test mode details (Table 4.2)

5. Summary: *PASS*

- The tests intends to understand what different from the test results between run trace software 85% level and 100%, and disconnect PCI card and connect 3 x 8w PCI card?. We may try to compare the test result of mode 1,2 and 3,4. We found the chassis do provide a good ambient (Tambient) with its thermal performance however on 85% or 100%. And the AGP card's temperature may rise up about 6°C when the system connected 3 x PCI cards, however both result is PASS to the spec.
- The tests intends to understand how thermal solution improved if the chassis have engineering changes to meet CAG design guide rev.1.1? We may try to compare the test result of mode 4 and mode 5. We found the chassis meets CAG design guide rev.1.0 have 1.8°C up(Tambient vs. Ambient). And Tambient is keeping the same as Ambient in the chassis meets CAG design guide rev.1.1. It shown the CAG rev.1.1 design guide provided thermal advantages.
- The test s intends to understand what different if we installed difference fan speed of system fans? Some customers maybe care the acoustic issues. We may try to compare the test result of mode 4 and mode 6. We found the chassis built low speed system fan (mode 6) may rise Tambient up about 1.8°C compare to the system built in middle-speed system fan. However both result is PASS to the spec. We suggest customer may decide to select low speed or middle speed depends on the system configuration and acoustic requirement.
- The test s intends to understand how is the system fan in the front side performed?. We may try to compare the test result of mode 4 and mode 7. We found the chassis built two system fans (one in the rear side, another in the front side) could supply better ambient for HDD area. But seems the system fan in the front side doesn't impact to Tambient.
- The test s intends to understand how is the result in the **worse case of normal operation?** we try to test it in ambient 30°C.

We may try to compare the test result of mode 4 and mode 8. We found the Tambient is keeping the same as Ambient in the chassis meets CAG design guide rev.1.1. It again shown the CAG rev.1.1 design guide provided thermal advantages.

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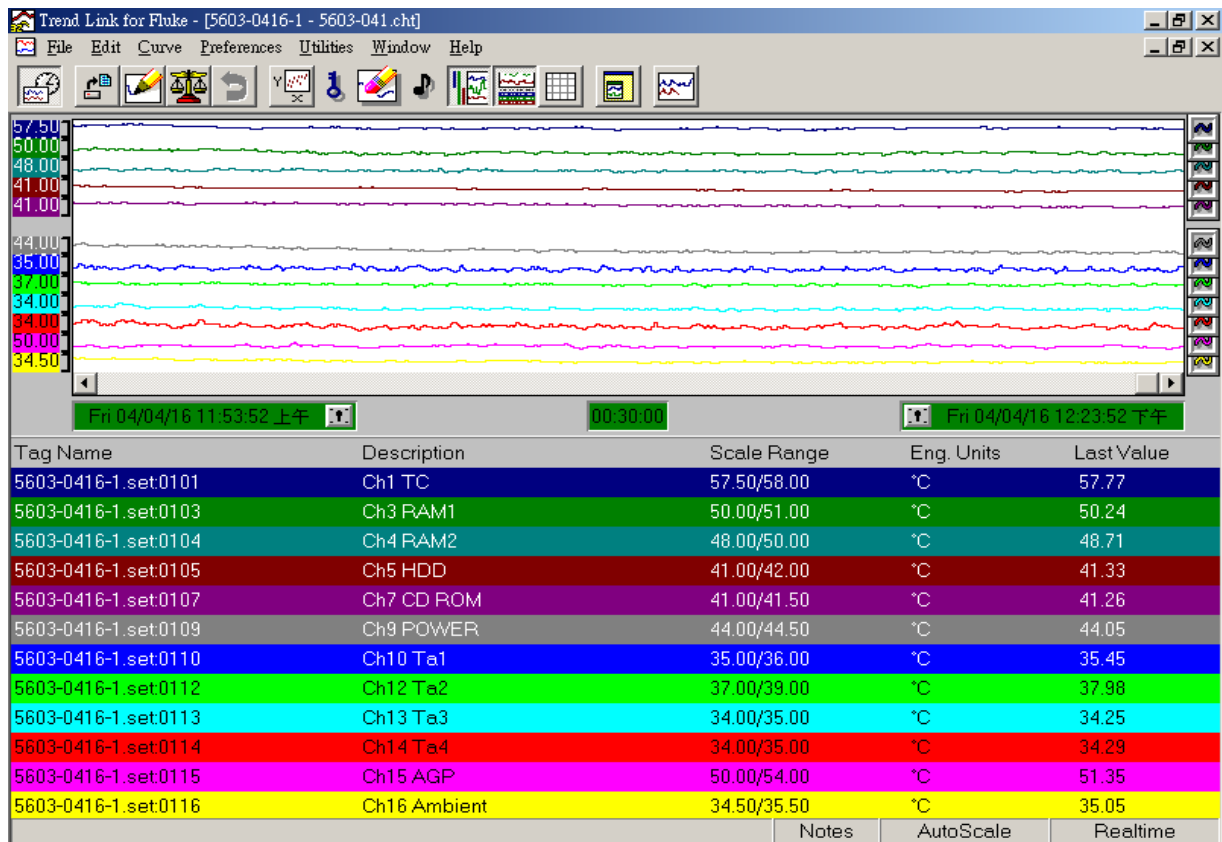
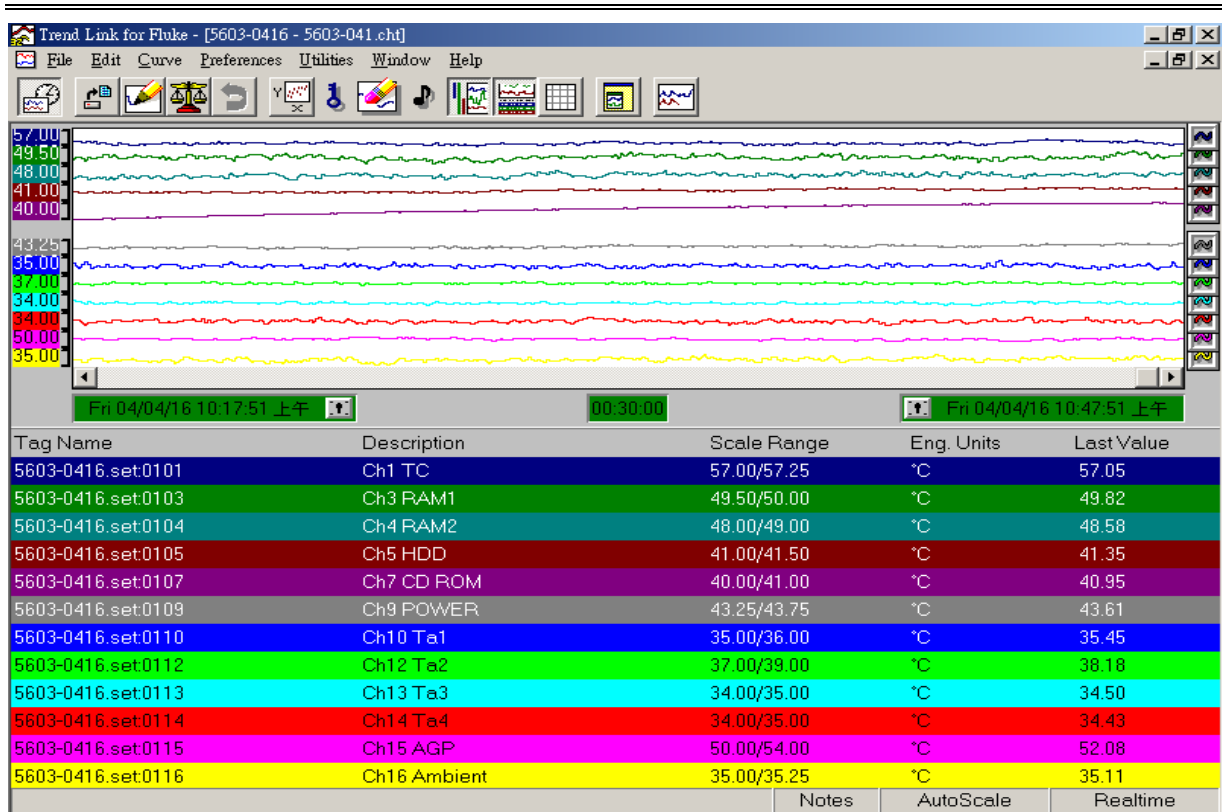
Table 4.1
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Mode Introductions	Mode 1	Mode 2	Mode 3	Mode 4	Mode 5	Mode 6	Mode 7
Power Model	Delta GPS-350BB-100A (with 12cm Fan for airflow in, vents for air flow out)						
System Fan (Mounted in rear side of chassis)	Yes-M Speed	Yes-M Speed	Yes-M Speed	Yes-M Speed	Yes-M Speed	Yes-L Speed	Yes-M Speed
System Fan - low speed (Mounted in front side of chassis)	Yes	Yes	Yes	Yes	Yes	Yes	No
Airguide CAG1.1	Yes	Yes	Yes	Yes	CAG1.0	Yes	Yes
PCI Card Install	Disconnect	Disconnect	Yes	Yes	Yes	Yes	Yes
Run the test under the software on 85% or 100% level	85%	100%	85%	100%	100%	100%	100%
Test Result (values was according to the screens of Fluke monitor)							
DIMM-1	49.8	50.2	50.5	50.6	52	52.4	49.1
DIMM-2	48.6	48.7	49	49.4	49.7	51.1	47.7
HDD	41.4	41.3	41.3	41.4	41	42.6	49.2
CD ROM	41	41.3	41.4	41.5	40	43.1	40.6
POWER	43.6	44.1	43.9	44.4	46.9	45.5	43.9
AGP	52.1	51.4	57.6	57.4	70.5	63.2	55.7
T-inlet 1	35.5	35.5	35.4	35.3	38.4	37.9	36.1
T-inlet 2	38.2	38	37.8	38.2	38.5	40.6	38.4
T-inlet 3	34.5	34.3	34.4	34.4	36.9	36	34.2
T-inlet 4	34.4	34.3	34.6	34.4	36.2	35.2	34.5
T-inlets average Tambient(1~4)	<u>35.7</u>	<u>35.5</u>	<u>35.6</u>	<u>35.6</u>	<u>37.5</u>	<u>37.4</u>	<u>35.8</u>
T-case	<u>57.1</u>	<u>57.8</u>	<u>57.2</u>	<u>57.9</u>	<u>59.3</u>	<u>59.2</u>	<u>58</u>
Ambient(case outside)	35.1	35.1	35.1	35.1	35.1	35.1	35.2

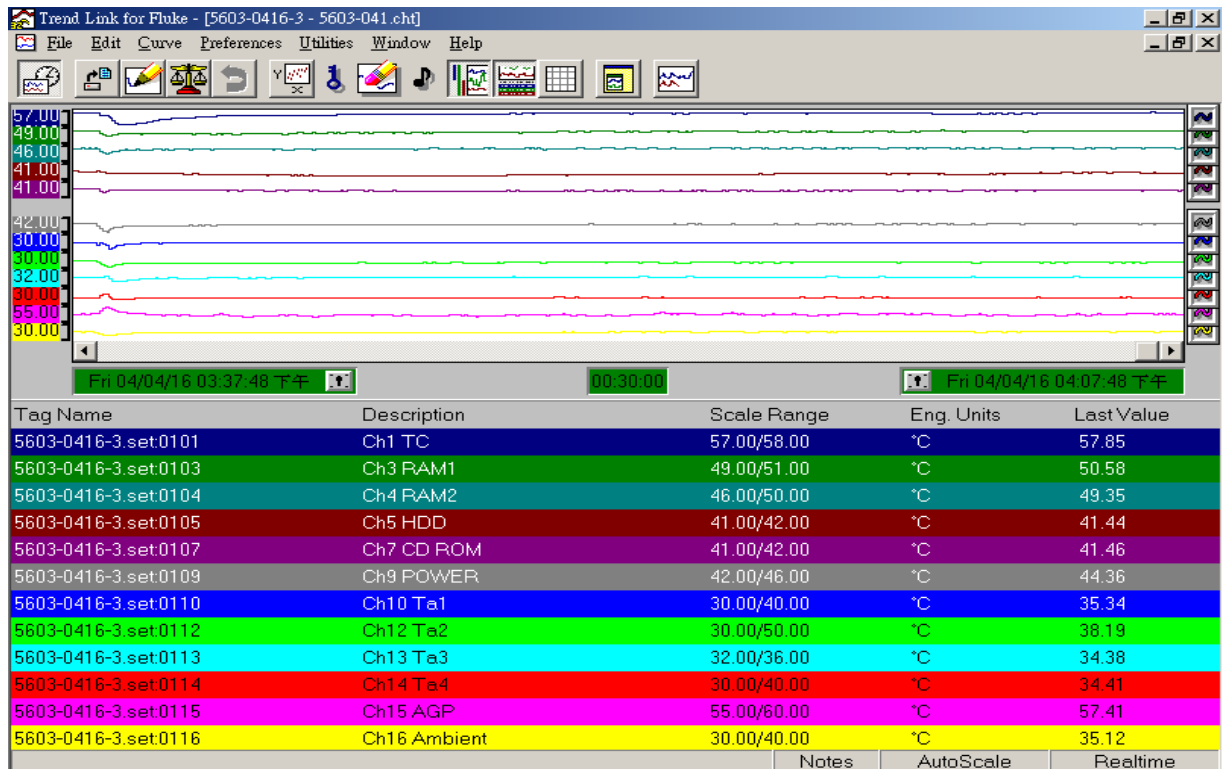
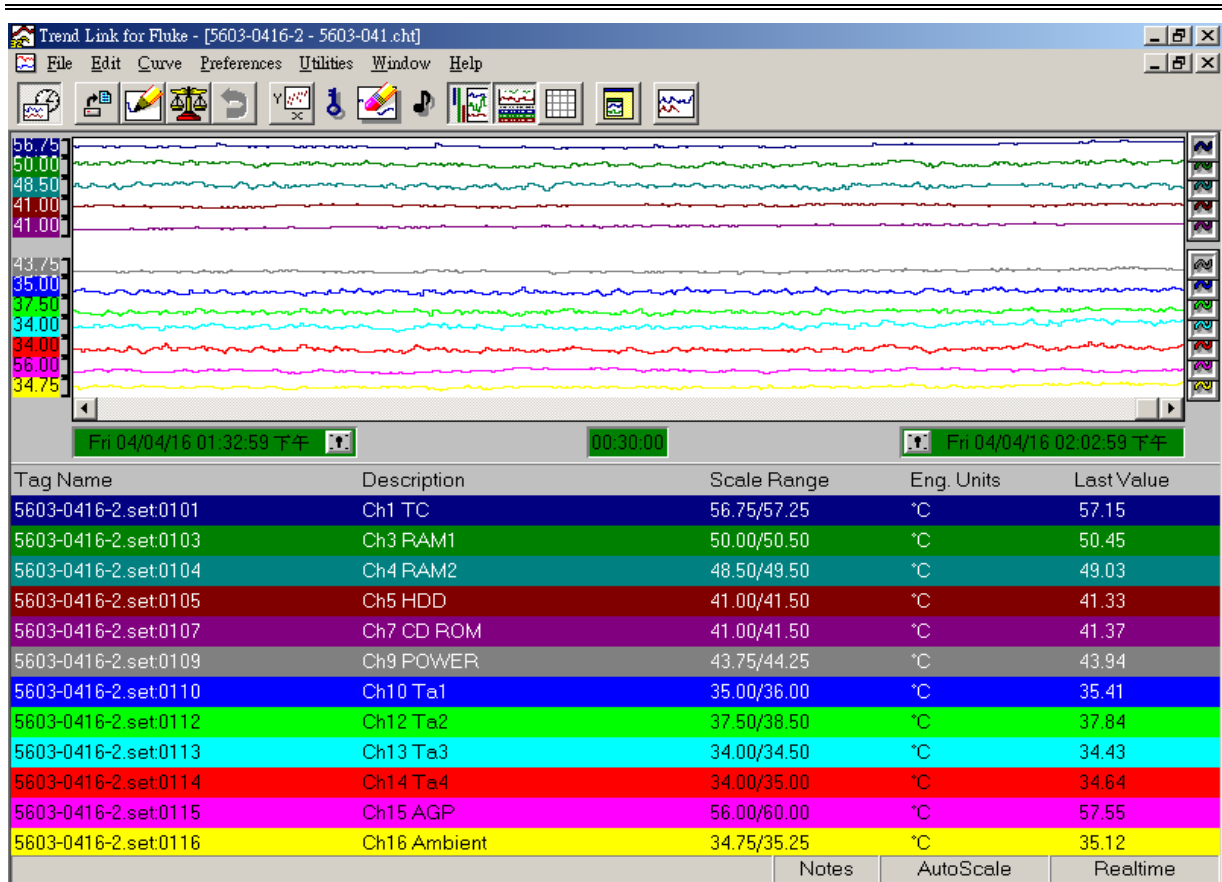
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Mode Introductions	Mode 8
Power Model	Delta GPS-350BB-100A (with 12cm Fan for airflow in, vents for air flow out)
System Fan (Mounted in rear side of chassis)	Yes- M Speed
System Fan - low speed (Mounted in front side of chassis)	Yes
Airguide CAG1.1	Yes
PCI Card Install	Yes
Run the test under the software on 85% or 100% level	100%
Test Result (values was according to the screens of Fluke monitor)	
DIMM-1	46
DIMM-2	45.1
HDD	37.3
CD ROM	36.4
POWER	39.9
AGP	51.7
T-inlet 1	30.2
T-inlet 2	32.8
T-inlet 3	29.2
T-inlet 4	29.4
T-inlets average Tambient(1~4)	<u>30.4</u>
T-case	<u>54.1</u>
Ambient(case outside)	<u>30.1</u>

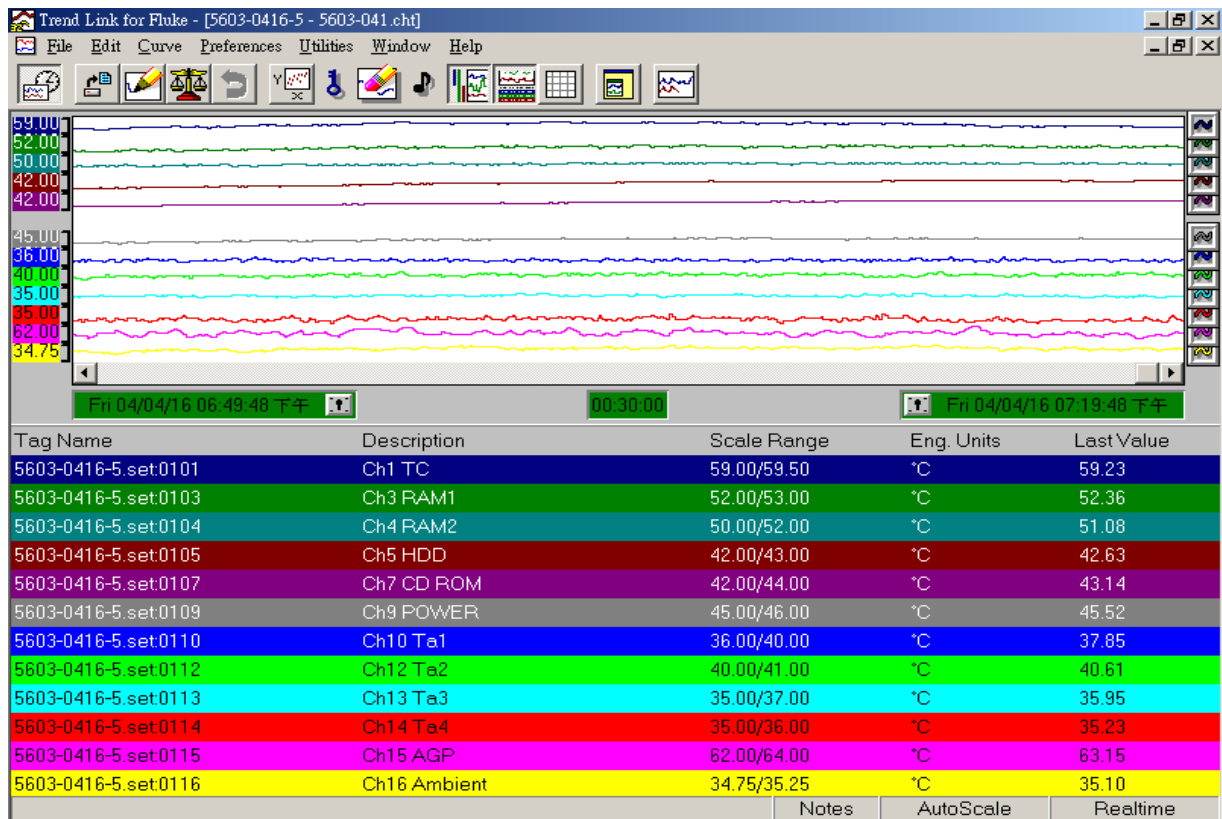
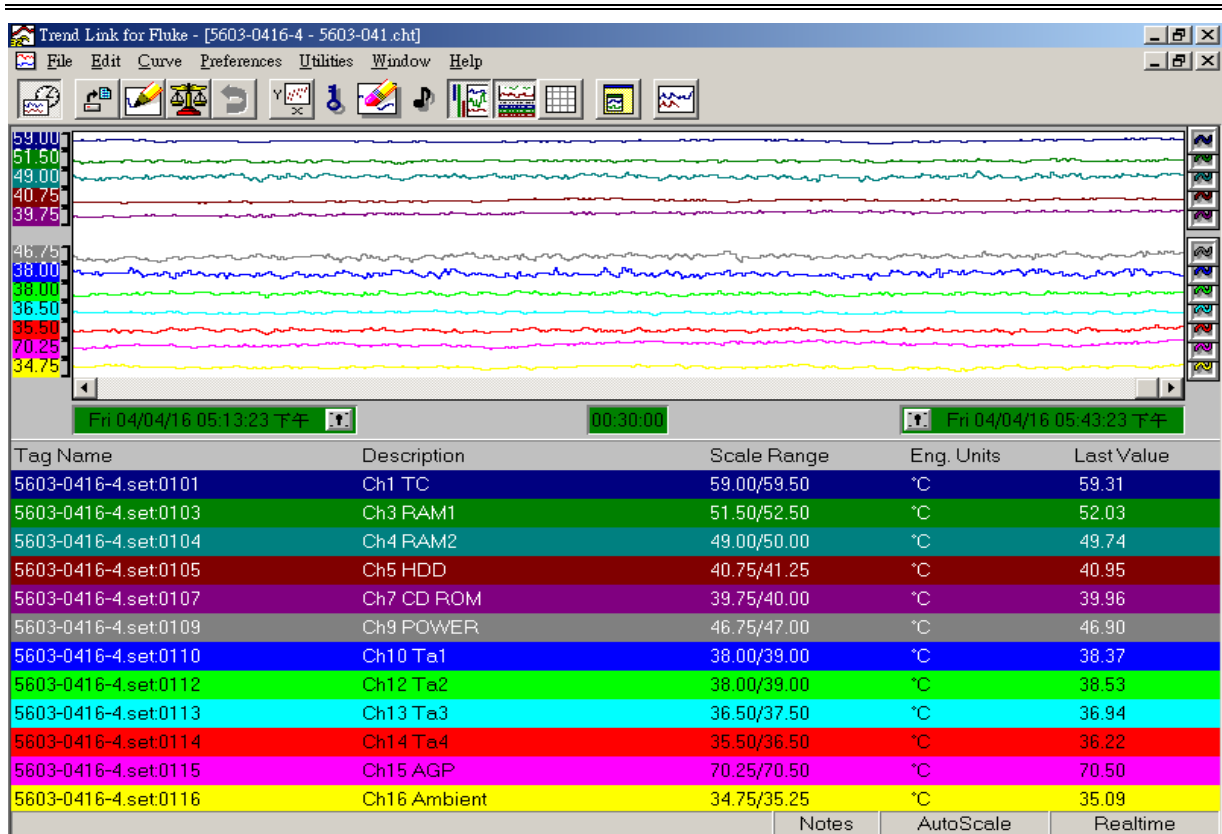
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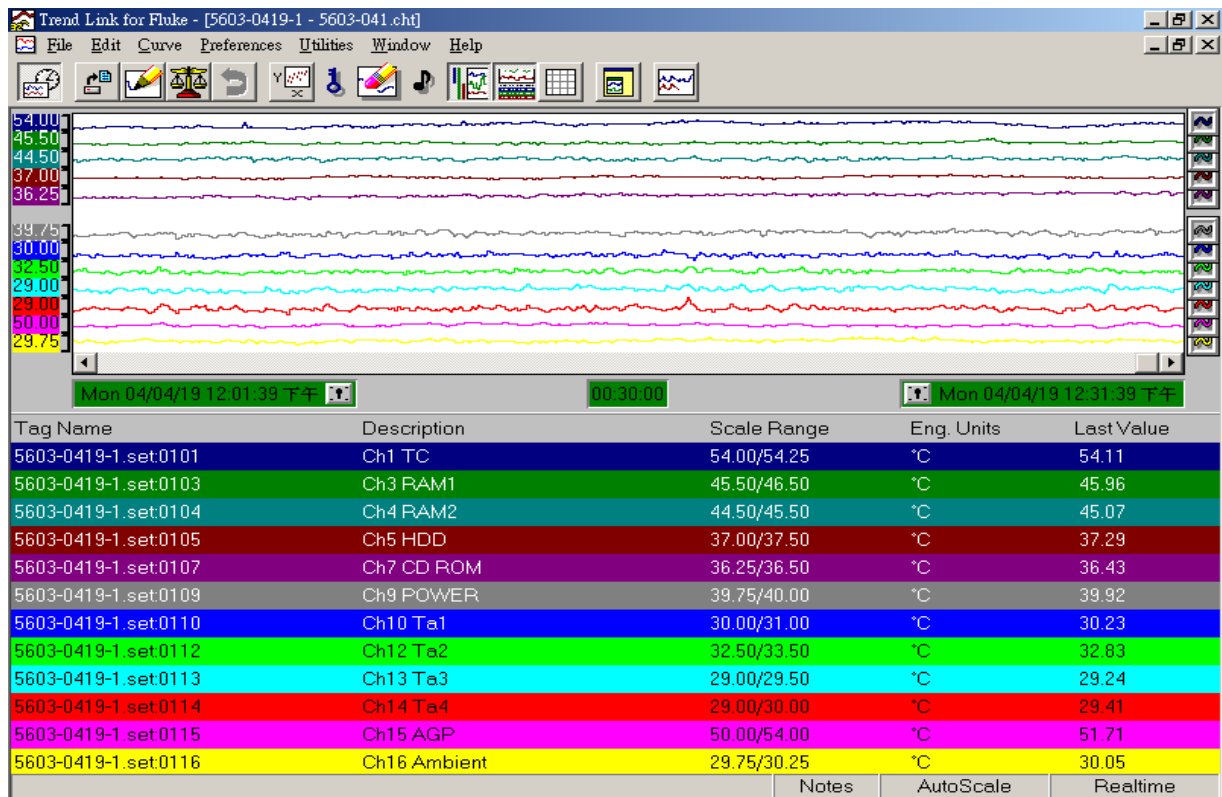
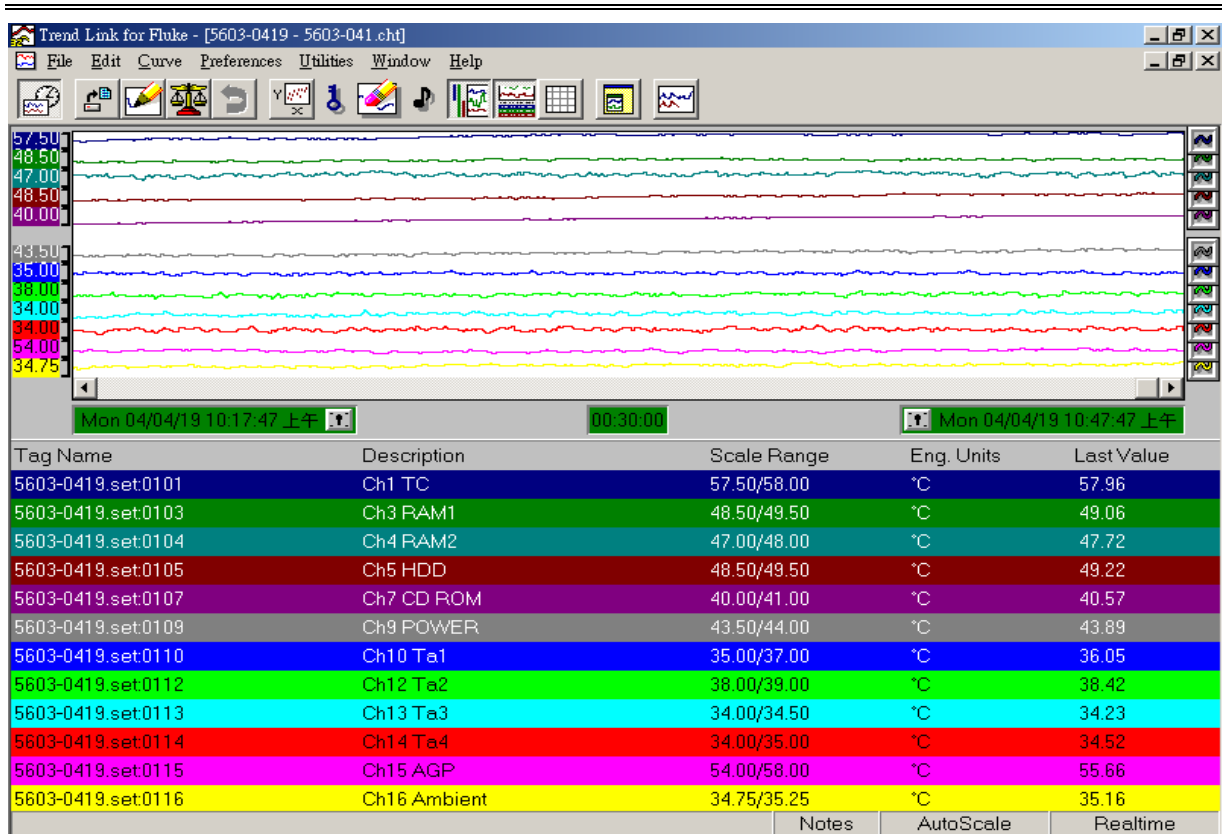


Table 4.2



The view of the chassis front side.



The view of the chassis right side.



The view of the chassis left side.



The view of the chassis back side.



The view of the thermocouples connections.

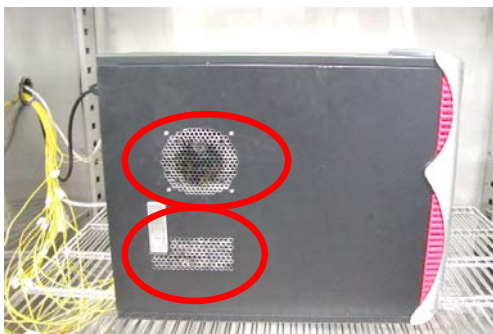


The view of Air Guide, meets CAG 1.1 (the diameter of guide is enlarged)
The tested unit is a Prototype



The view of CPU Vents - before Engineering Change for CAG1.1

Called CAG1.0, i.e. the design meets CAG design guide rev.1.0



The view of CPU Vents & PCI Vents, meet CAG 1.1 (bigger Air Guide venting area and add vents for AGP, PCI area)