

Thermal Test Report
Model : YY-5408
Thermal Performance Contest

Date:Apr.29, 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-5408
Power Supply	Delta GPS-350BB-100A
Chassis Fan	JAMICON JF1225BIMS Speed: 2100RPM (Middle Speed) JAMICON JF1225BILS Speed: 1600RPM (Low Speed) TOP DF1209BB Speed: 2600RPM (Middle Speed)
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

In the conditions of the system must build a middle-speed cooling fan in the rear side of chassis. In the meanwhile the chassis' side openings must be compliant with CAG1.1 design, however to adopt an air guide or not.

- 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 may not pass Ta38 spec. if the chassis didn't upgrade as CAG1.1 compliant., however in 85% or 100% loading, and however connect or disconnect PCI cards.
- 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.
Mode 5 meet Ta 38°C spec and the AGP temperature have big improvement too.
It approve CAG1.1 designed side cover may perform better result for AGP and PCI area.
- The tests 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 5 and mode7. We found the Tambient just rise up 1.2°C to Ambient. It again shown the CAG rev.1.1 design guide provided thermal advantages.
- Because YY-54xx chassis' top cover is U shaped design, which will difficult for user to install air guide well. The tests intends to understand how thermal solution improved if the chassis just have engineering changes as CAG1.1 for the vents on CPU and PCI area, but come without an air guide?
We may try to look at the test result of mode 8~mode 11
The conclusion should be:
The chassis may meet Ta 38°C spec when built in a middle-speed cooling fan in the rear side of chassis. And the vents for PCI area performs well thermal result for AGP (see mode 8 & 9)
If try to change the cooling fan as low-speed, the result may fail. (see model 10)

Furthermore, if try to add one more cooling fan in the side panel, the performance of Ta got big advance. (see mode 11)

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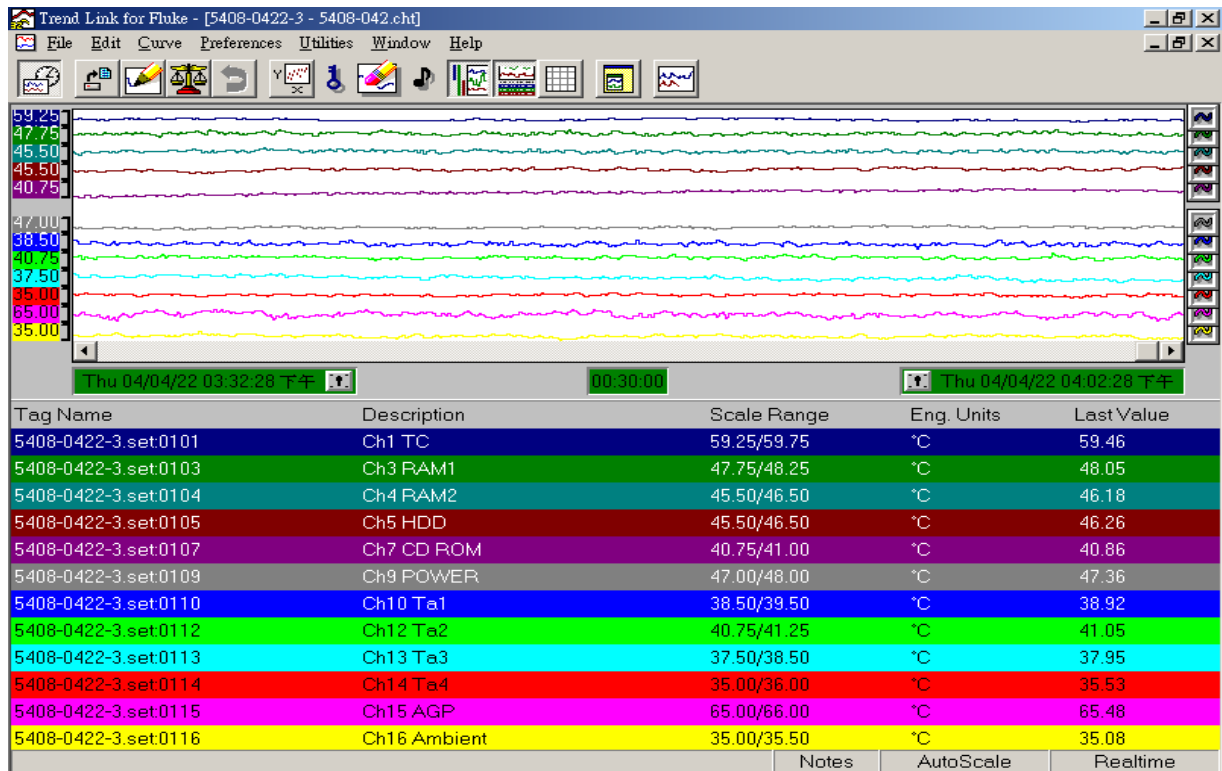
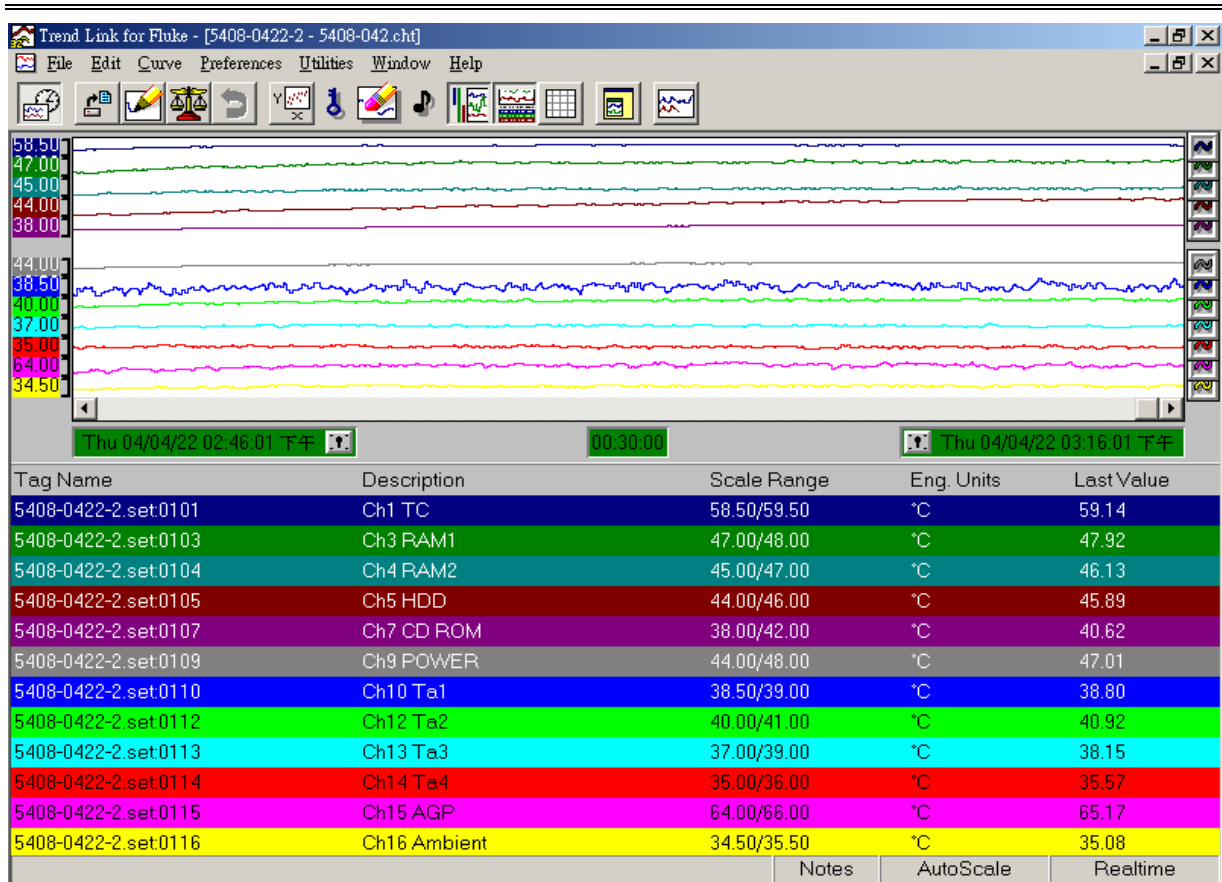
Table 4.1
Date: Apr.29..2004

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-M Speed	Yes-M Speed
Airguide CAG1.0	Yes	Yes	Yes	Yes	CAG1.1	Yes	CAG1.1
PCI Card Install	Disconnect	Disconnect	Yes	Yes	Yes	Yes	Yes
Side Panel PCI Vents	No	No	No	No	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	47.9	48.1	48.6	48.1	47.7	48.1	42.5
DIMM-2	46.1	46.2	46.3	46.5	44.9	44.9	39.4
HDD	45.9	46.3	46	46.2	47.9	46.6	43
CD ROM	40.6	40.9	40.6	40.6	42.3	41.1	36.8
POWER	47	47.4	47.8	47.9	45.4	46.8	40.5
AGP	65.2	65.5	69.2	69.8	60.5	67.1	52.5
T-inlet 1	38.8	38.9	39.1	39.4	37.3	37.1	29.8
T-inlet 2	40.9	41.1	41.6	42.6	37.9	40.9	31.8
T-inlet 3	38.3	38	38.9	37.2	37.8	38.4	33.6
T-inlet 4	35.5	35.5	35.9	36.1	35	35.7	29.4
T-inlets average Tambient(1~4)	<u>38.4</u>	<u>38.4</u>	<u>38.9</u>	<u>38.8</u>	<u>37</u>	<u>38</u>	<u>31.2</u>
T-case	<u>59.1</u>	<u>59.5</u>	<u>60.5</u>	<u>60</u>	<u>58.9</u>	<u>60.1</u>	<u>54.8</u>
Ambient(case outside)	35.1	35.1	35.1	35.1	35.1	35.1	30

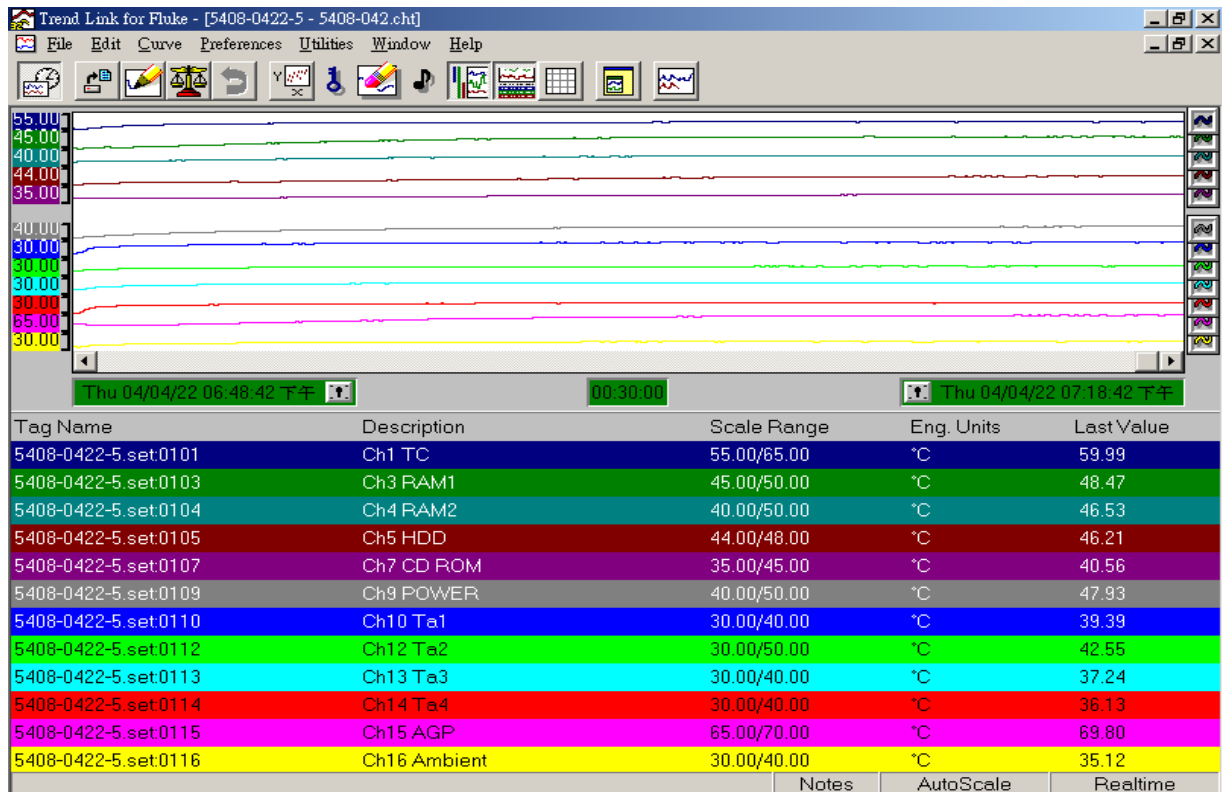
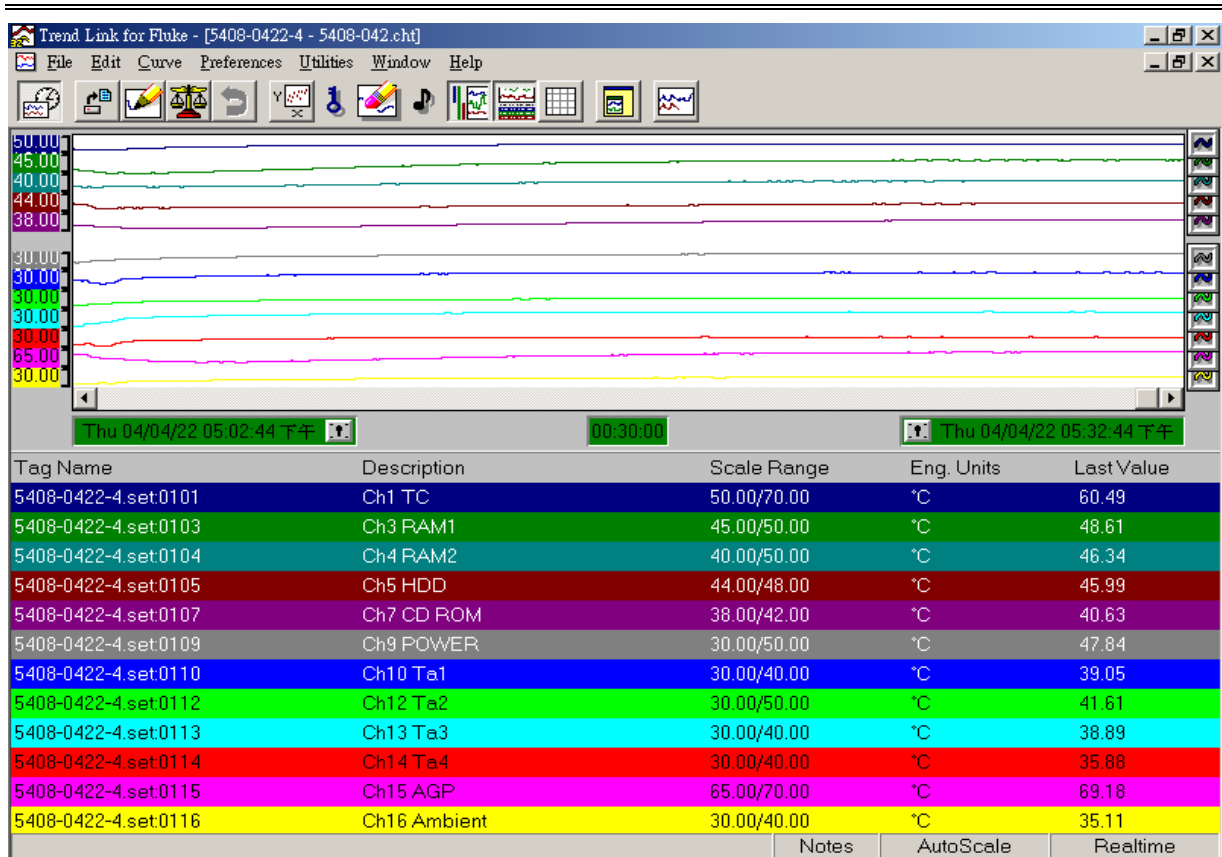
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Mode Introductions	Mode 8	Mode 9	Mode 10	Mode 11
Power Model	Delta GPS-350BB-100A (with 12cm Fan for airflow in, vents for air flow out)			
System Fan (Mounted in rear side of chassis)	Yes- M Speed	Yes- M Speed	Yes- L Speed	Yes- M Speed
Airguide CAG1.0	CAG1.1 (without airguide)	CAG1.1 (without airguide)	CAG1.1 (without airguide)	CAG 1.1 vents add 9cm Fan(Flow in)
PCI Card Install	Yes	Yes	Yes	Yes
Side Panel PCI Vents	Yes	No	Yes	Yes
Run the test under the software on 85% or 100% level	100%	100%	100%	100%
Test Result (values was according to the screens of Fluke monitor)				
DIMM-1	47.4	46.7	49.7	41.7
DIMM-2	49.2	48.9	51.3	43.9
HDD	47.7	47.2	50.2	48.3
CD ROM	41.6	40.6	43.8	41
POWER	45	45.2	45.7	42.6
AGP	57.7	70.4	63.6	67.5
T-inlet 1	39.4	39.1	40.2	37
T-inlet 2	36.9	37.6	39	36.1
T-inlet 3	36.1	36.1	37.8	36.1
T-inlet 4	38.3	37.9	39.3	38.4
T-inlets average Tambient(1~4)	<u>37.7</u>	<u>37.7</u>	<u>39.1</u>	<u>36.9</u>
T-case	<u>59.3</u>	<u>59.1</u>	<u>60.2</u>	<u>60</u>
Ambient(case outside)	35.2	35.1	35.1	35.1

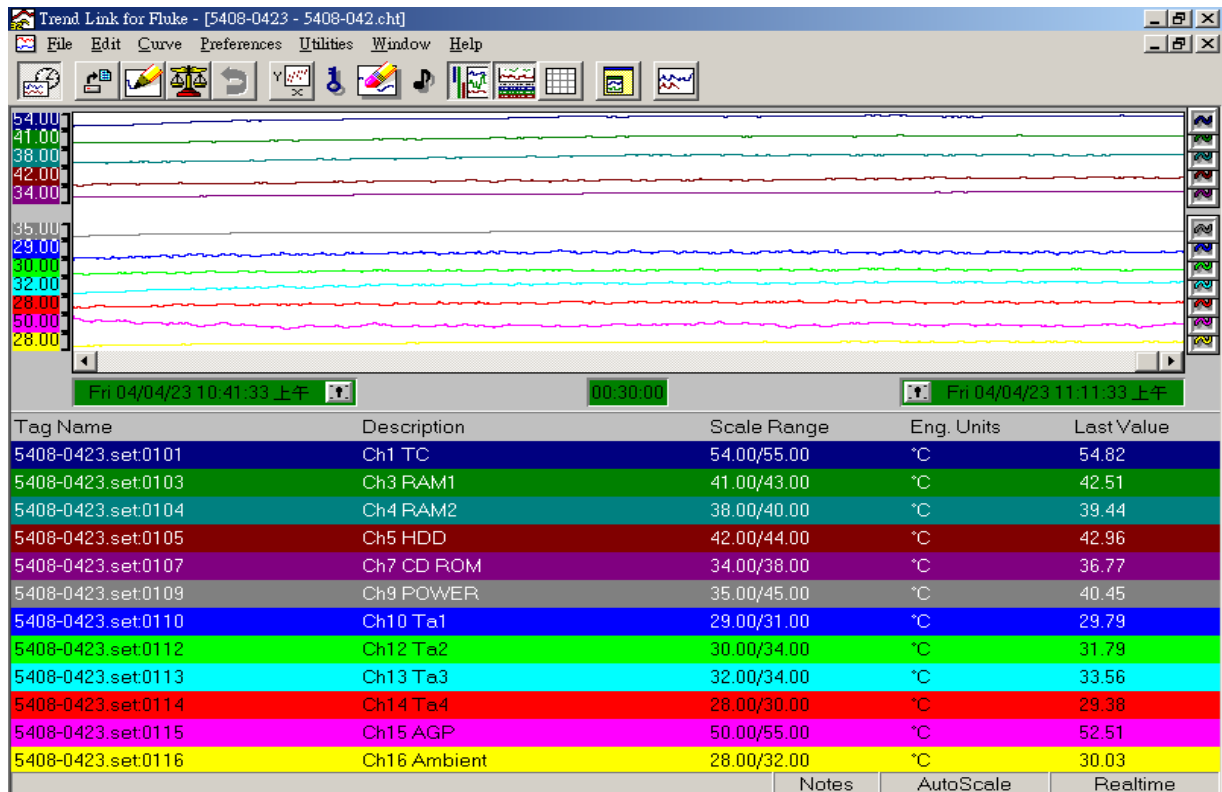
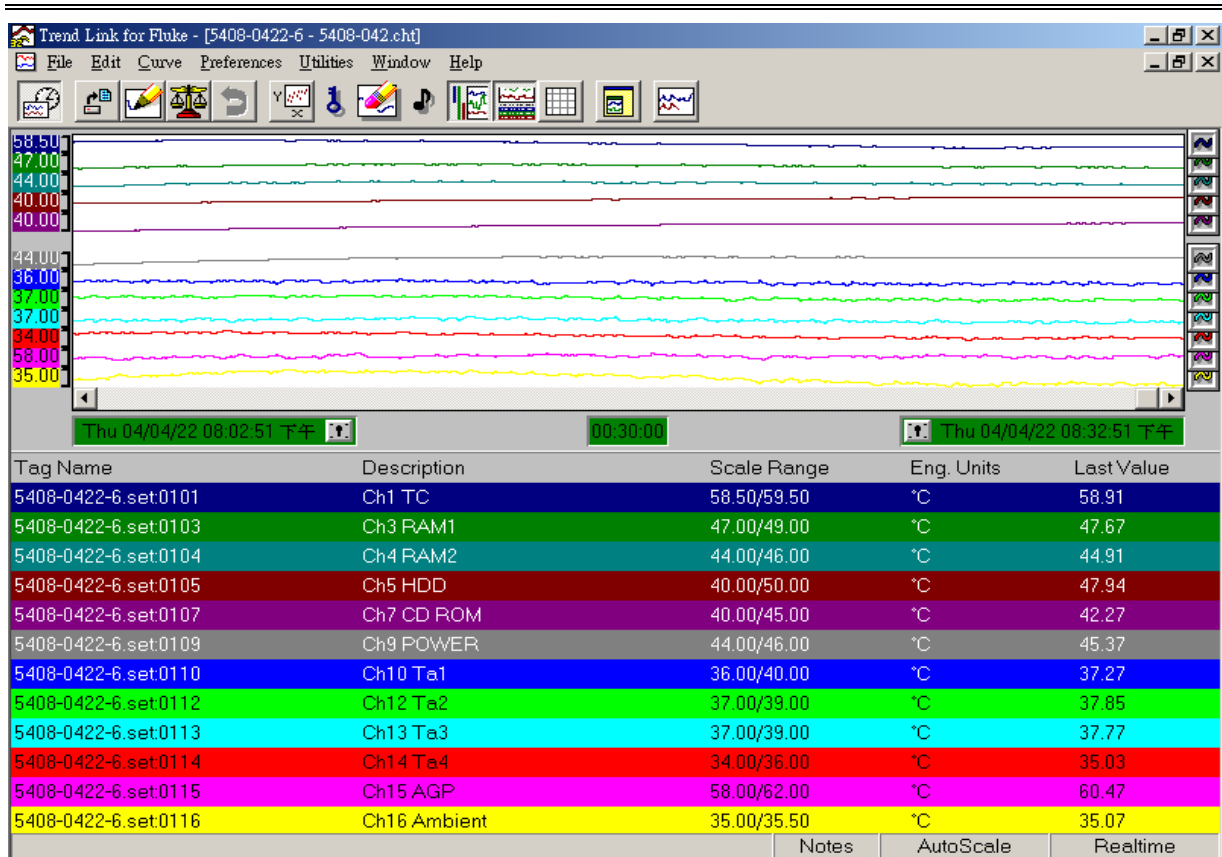
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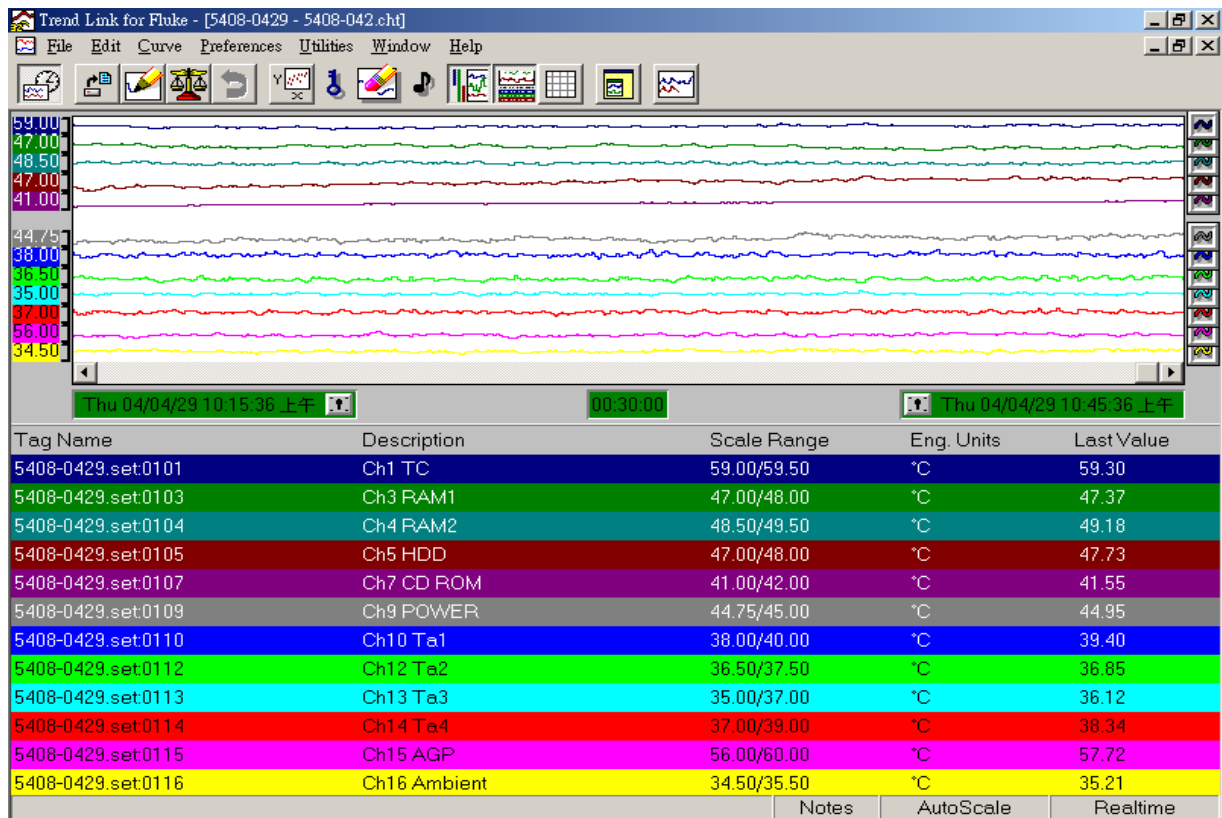
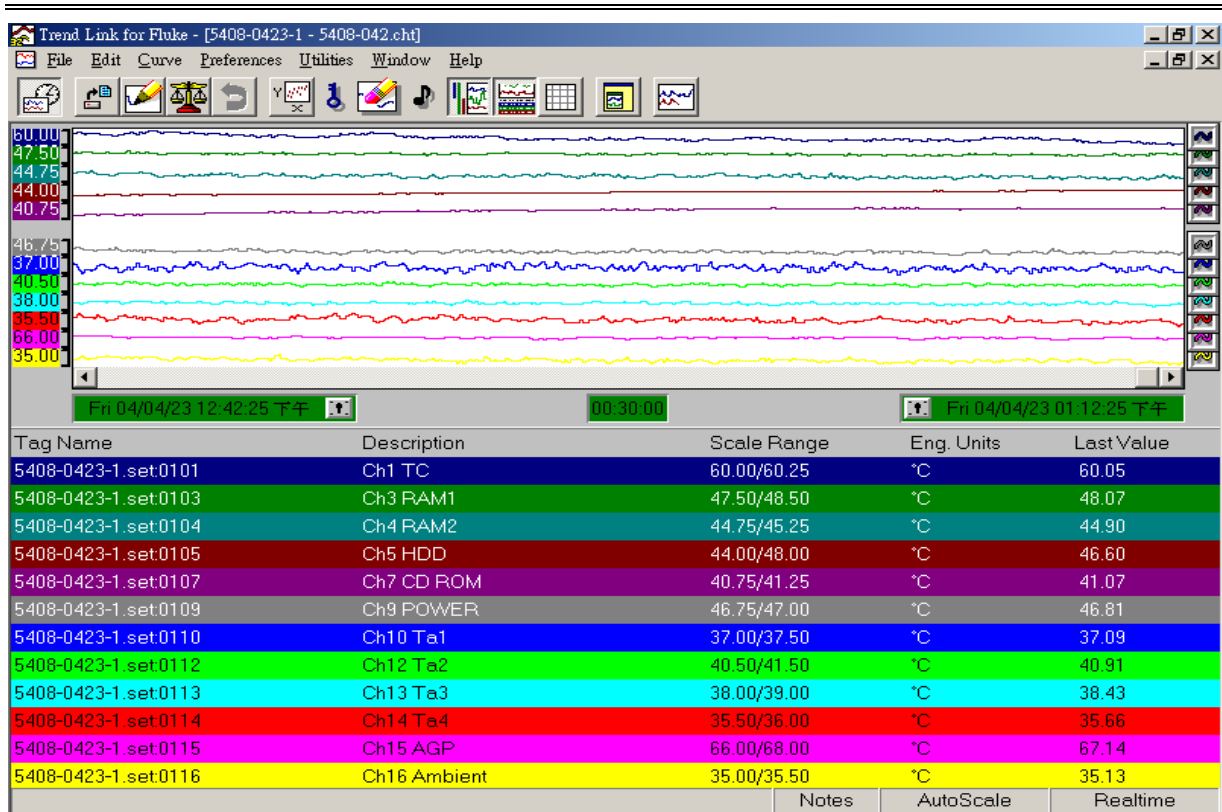
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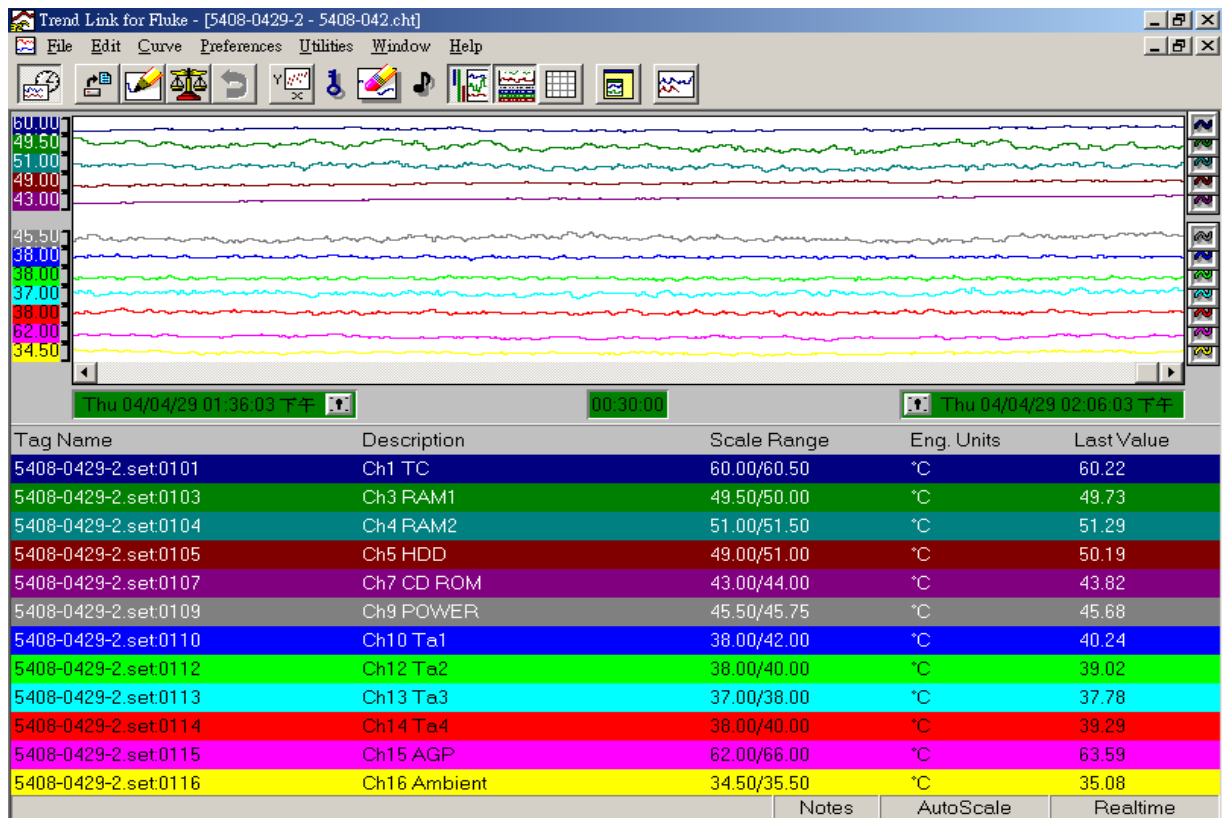
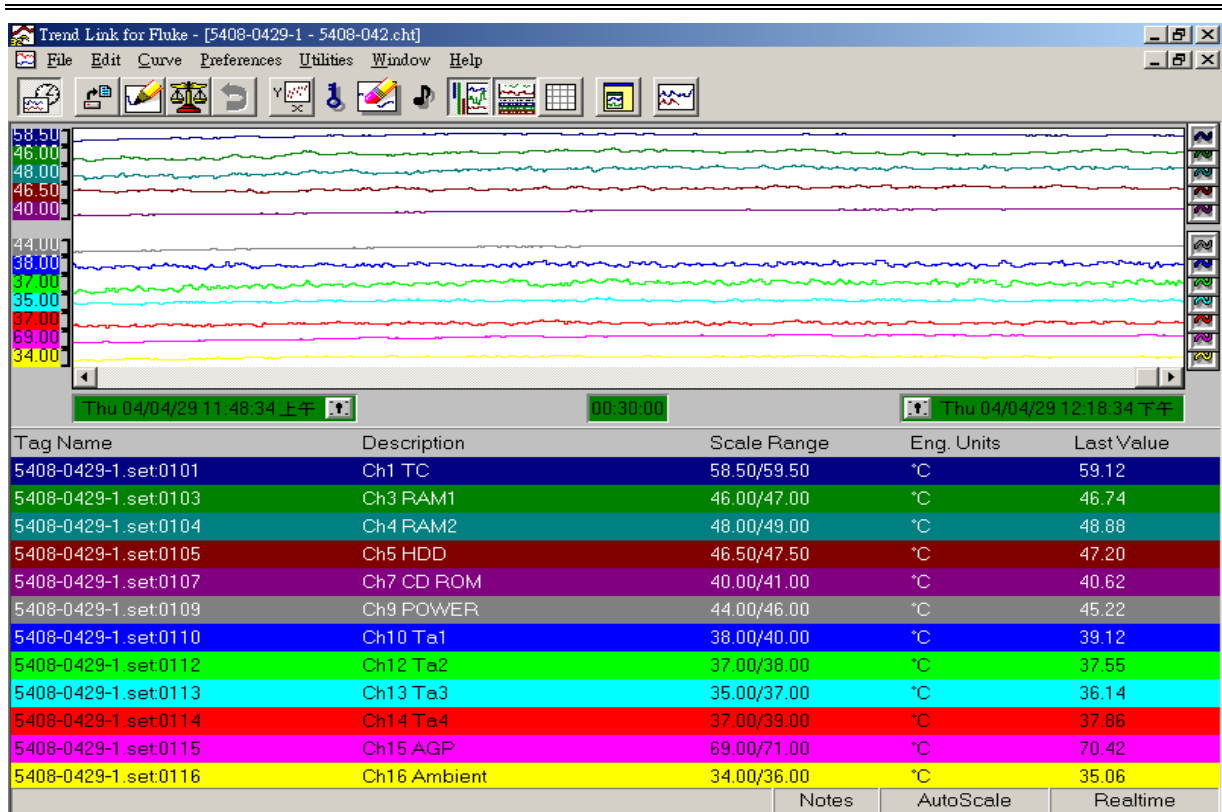
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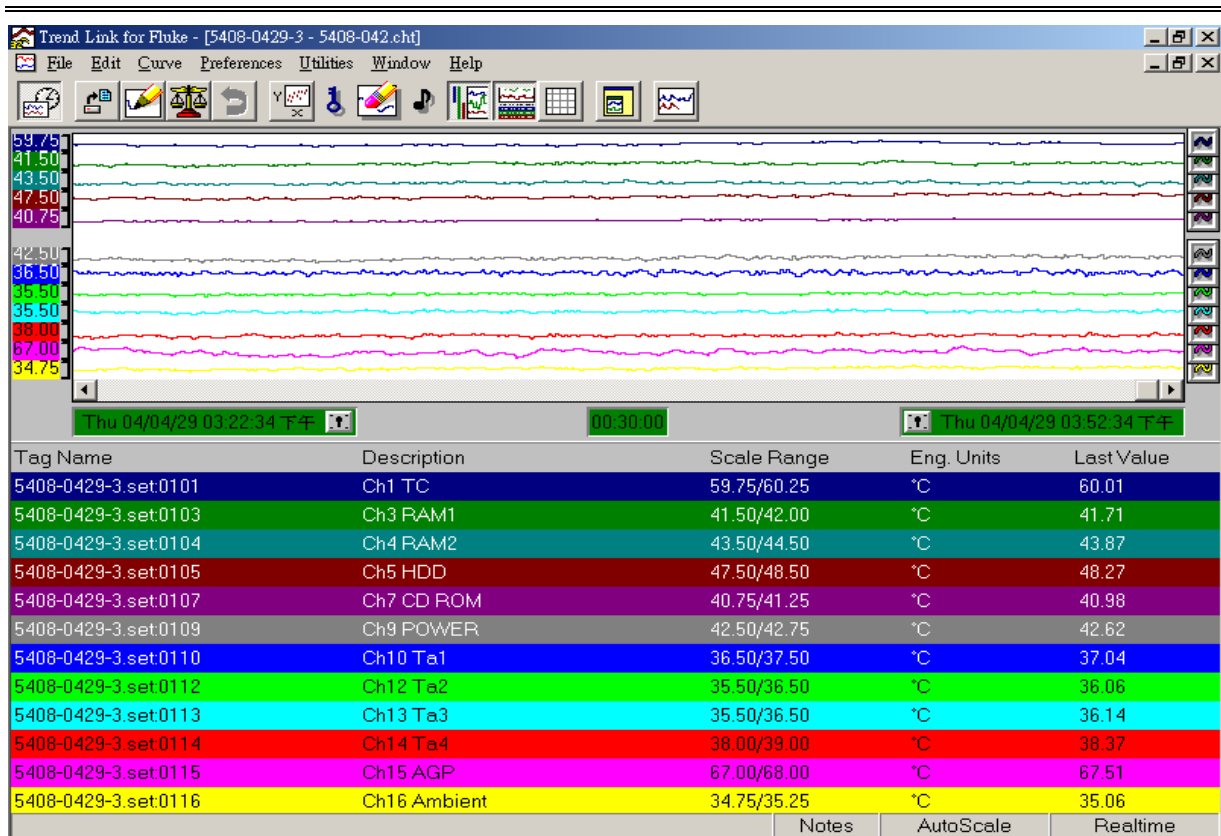


Table 4.2



The view of the chassis front side.



The view of chassis right side.



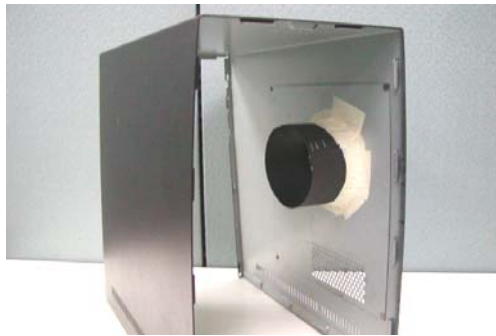
The view of the chassis left side.



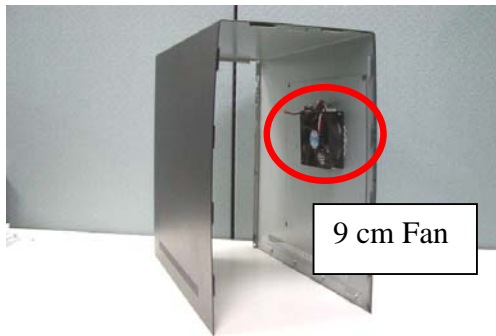
The view of the chassis back side.



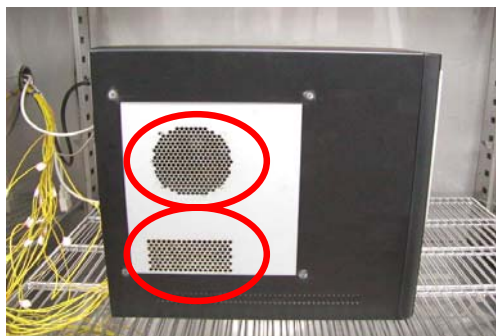
The view of the thermocouples connections.



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 Add 9cm middle speed Fan.



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