English Edition

Visit our website (www.zalman.co.kr) and watch the TNN 500A installation video to facilitate the installation process.

Welcome

Congratulations on your purchase of ZALMAN Tech's TNN 500A, the ultimate answer to every computer user's dream of creating a silent computing environment with total system stability.

With the TNN 500A, you will experience the true comforts of silence.

## Contents

1. Safety Notice

1. Keep the product away from heat sources such as heaters and out of direct sunlight.

2. Do not put anything on top of the product.

3. The product should be placed on s flat, level solid surface.

4. Make sure to switch the system off before attempting to disassemble it.

5. Always make sure of the correct voltage, i.e., 110V or 220V.

6. Use the product when it is in an upright position.

7. Never spill liquid on the product.

8. Do not open the back cover while system is working.

9. Do not insert anything into system while it is working.

10. Be sure to put down the caster mount to fix the product before system works.

11. If you are moving the product very far, place it in the original packing box or similar protective packaging.

12. Do not shock or drop the product when it is in transit

13. Before you are going to open the left heatsink plate, refer to below diagrams.
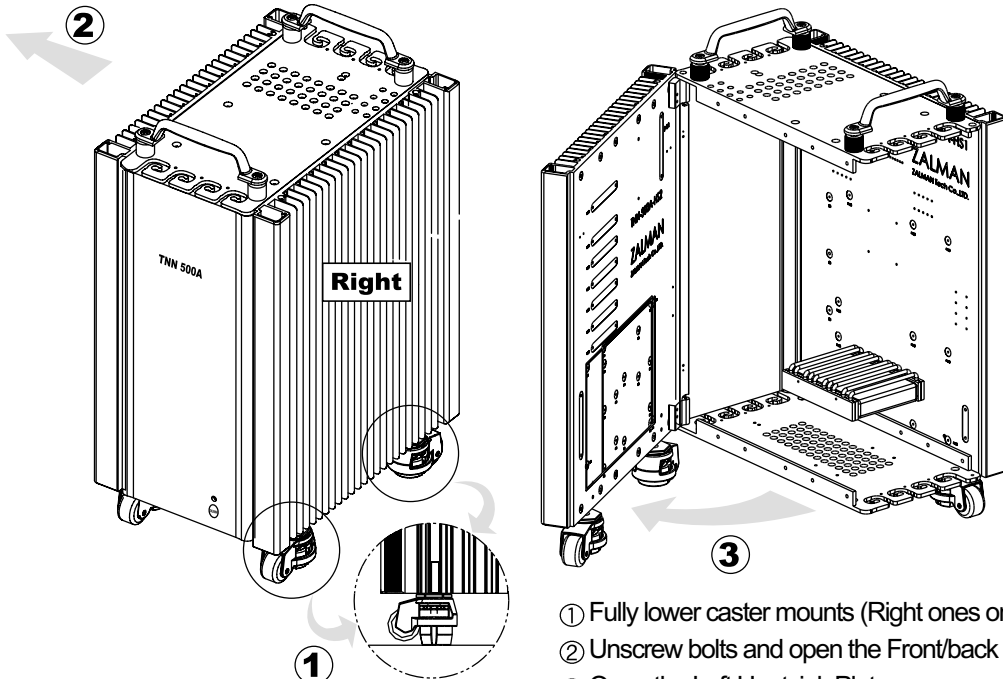
① Fully lower caster mounts (Right ones only)
② Unscrew bolts and open the Front/back door
③ Open the Left Heatsink Plate.

2. Features

The TNN 500A is the world's first absolutely noiseless computer case for high-end systems that has been developed with Heatpipe Technology, HSC (Heat Source Contact) Power Technology, a High Capacity Extrusion Technique, and FMS (Flexible Mounting Structure) Design Technology by ZALMAN Tech Co., Ltd. The TNN 500A package includes a high performance aluminum computer case with an absolutely noiseless cooling solution that does not require the use of a fan, making it suitable for storage servers, workstations, high-end home systems, and sound studio computer systems.
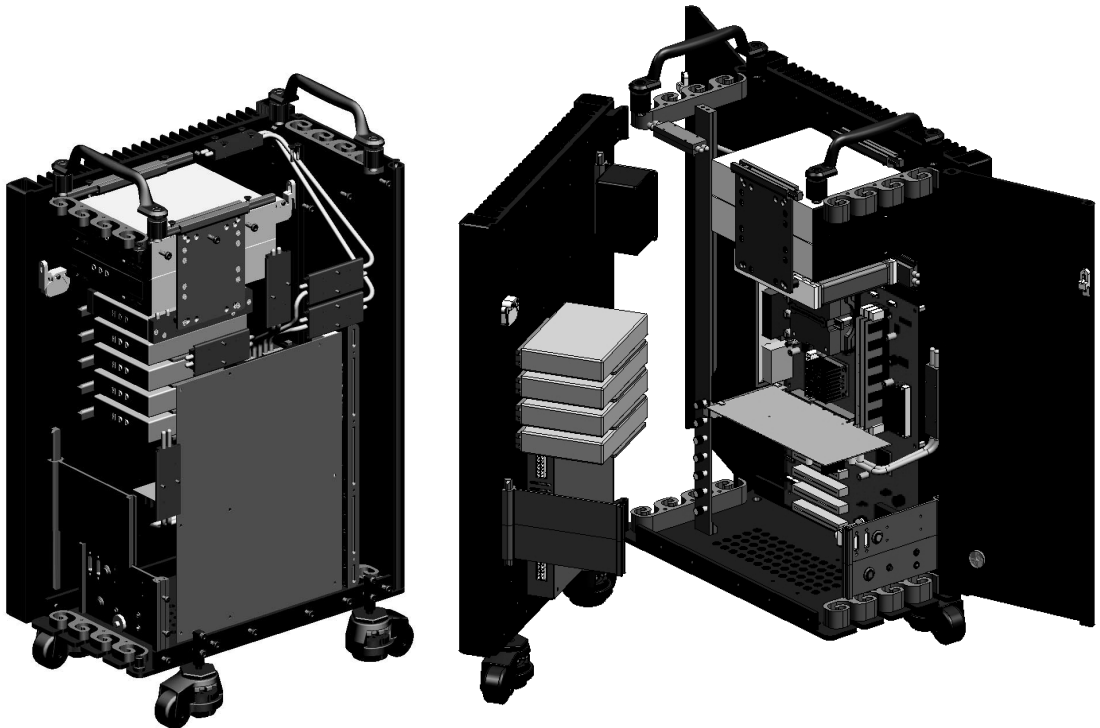
2.1 Aluminum Heatsink Case

The TNN 500A consists of two large aluminum heatsink plates. These heatsink plates transfer all heat from the GPU, CPU, etc., to the exterior through natural convection. Since natural convection requires no moving components, a system equipped with TNN 500A is absolutely silent and has an unlimited life cycle. It is also 100% recyclable, making it environmentally friendly.
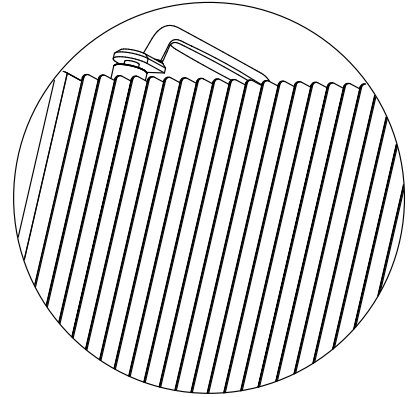
2.2 Heatpipe CPU Cooler

The CPU cooler in the TNN 500A transfers heat from the CPU to the heatsink case using six 6mm heatpipes. Since this CPU cooling solution does not require any power source or fan, the cooler is absolutely free from noise and has an unlimited life cycle. The six heatpipes transfer about 150W/sec from the CPU, which is ample cooling even for the hottest CPUs on the market. The CPU block is made of pure copper to ensure the highest cooling performance.
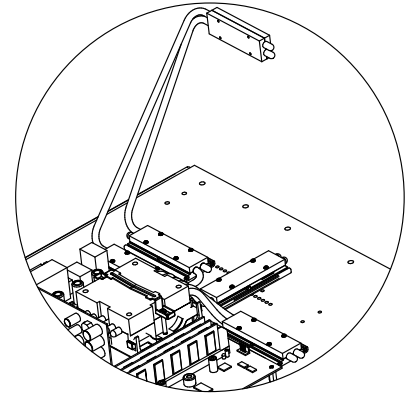
2.3 Heatpipe VGA Cooler
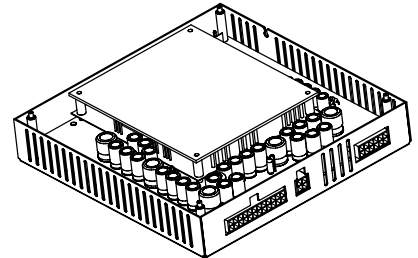
The VGA cooler in the TNN 500A transfers heat from the GPU (VPU) to the heatsink case using two 6mm heatpipes. Since this VGA cooling solution does not require any power source or fan, the cooler is absolutely free from noise and has an unlimited life cycle. These two heatpipes drain enough heat from the GPU (VPU) at the rate of 50W/sec, to cool the hottest video cards on the market.
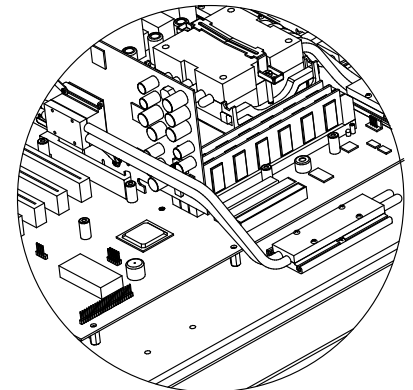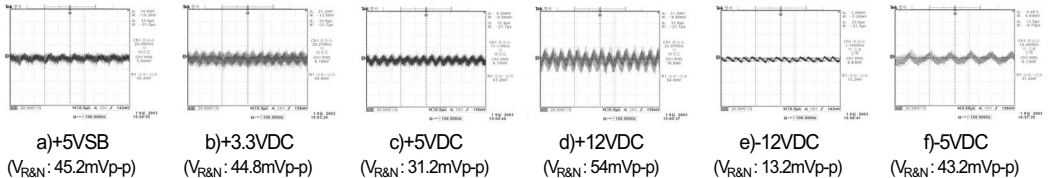
2.4 No-Fan Power Supply

The PSU in the TNN 500A employs Multi PCB Transformer technology, high-efficiency FETs, and Heat Source Contact technology to pump out enough power (300W/sec) without any help from an active cooling device. The heat from the PSU components is transferred to the heatsink case through an aluminum panel, which is in direct contact with the heatsink case. This PSU features a lifespan of 50,000 hours and an impressive 78% AC/DC conversion efficiency, which is about 10% higher than most power supplies.

■ DC Output Ripple and Noise Measurement Graphs

a)+5VSB	b)+3.3VDC	c)+5VDC	d)+12VDC	e)-12VDC	f)-5VDC
($V_{R\&N}$: 45.2mVp-p)	($V_{R\&N}$: 44.8mVp-p)	($V_{R\&N}$: 31.2mVp-p)	($V_{R\&N}$: 54mVp-p)	($V_{R\&N}$: 13.2mVp-p)	($V_{R\&N}$: 43.2mVp-p)

※ The data above was measured according to the Intel ATX Ver.2.03/ATX12V Power Supply specifications.

The above data was obtained by connecting a bypass made of a 0.1μF ceramic capacitor and a 10μF electrolytic capacitor at each of the DC outputs and measuring with an oscilloscope with an input impedance of 1MΩ at a frequency of 20MHz. The waveforms may vary depending on measurement conditions.

2.5 Complete Silence

Since the TNN 500A cooling solution does not utilize fans, the system does not produce any noise. In addition, the sturdy aluminum case (5 to 7mm thick) blocks HDD noise to achieve completely silent computing.

※ **Note :** TNN500A's noise level is below 20dB and cannot be measured. (The anechoic room used by ZALMAN has an ambient noise level of 20dB.)

2.6 Electricity Savings

Since the TNN 500A is equipped with a highly efficient power supply unit and does not utilize fans, it uses 10 to 15% less power than a normal computer with the same configuration. When a user upgrades to a TNN 500A system, power consumption can be reduced by 20 to 30W/sec. About $200 to $700 can be saved (in Korea, 24hrs/day usage) in 5 years depending on the power usage of the user.

1) Test Systems Graph

Power Consumption Test Results

	Idle	Full Loading		Idle	Full Loading
Normal PC	87	169	TNN 500A	60	132
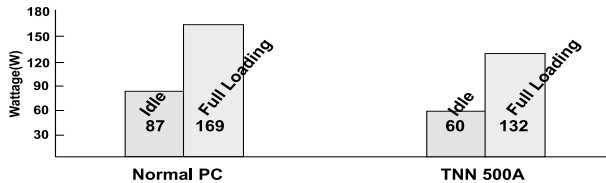
2) Test Systems Configuration

|	Normal PC System	TNN 500A System
Case	Micronics TH1100	TNN 500A
CPU	P4 3.0C GHz	P4 3.0C GHz
CPU Cooler	CNPS7000	No Fan Heatpipe Cooler
Mainboard	Intel D875PBZLK	Intel D875PBZLK
HDD	Seagate Barracuda 40G	Seagate Barracuda 40G
ODD	Combo Samsung 52X SM-352B	Combo Samsung 52X SM-352B
RAM	DDR 512MB	DDR 512MB
Graphics Card	ATI Radeon 9600 Pro 128M	ATI Radeon 9600 Pro 128M
Graphics Card Cooler	40mm 5600 RPM	No Fan Heatpipe Cooler
Power Supply	ZM300A-APF	No Fan ZM350
Exhaust Fan	ZM-F1 X 2	Non

3) Testing Equipment and Programs

■ **CPU Loading Program**
P4MAX(Intel Inc.) 81.9W/sec Loading

■ **Measurement Instrument**
Personal Daq/56 (Iotech,Inc.) KIKUSUI PCR 1000L

■ **Temperature Measurement Program**
DaqView(Iotech, Inc.) & Intel Active Monitor

2.7 Shielding from EMI (Electro-Magnetic Interference)

The sturdy aluminum case (5 to 7mm thick), the EMI Interception Block, and the Clamp Filter [see diagram] effectively prevent EMI. (See measurement data below)

EMI Measurement Data Graph

EMI Interception Block   Clamp Filter
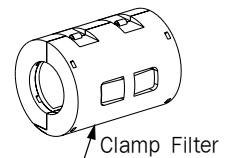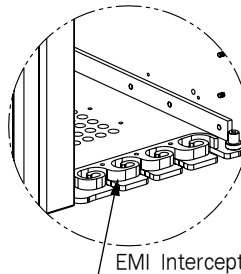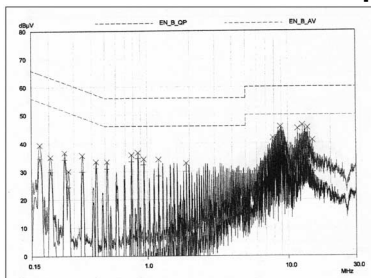
2.8 Testing Equipment and Programs

(1) Normal fans last about 20,000 to 50,000 hours. Since the TNN 500A does not utilize a fan, the system is not affected by malfunctioning fans.

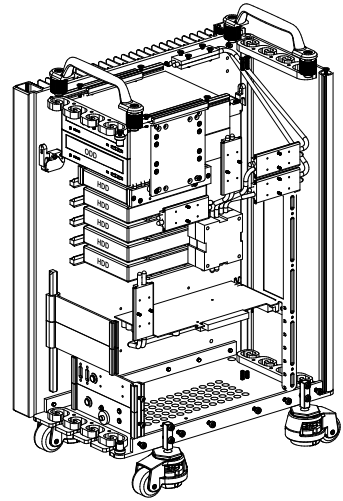(2) Heatpipes, which are used to cool the CPU and GPU, do not have any moving parts, which can break down, therefore preventing system crashes due to overheating.

(3) Due to the characteristics of natural convection, the amount of inflowing air is very small, and consequently the system will gather significantly less dust, reducing dust-related system crashes.

※ Thermal Tests

1) Test Data

Room Temperature : 30℃

	Component	Allowable Temperature	Normal PC System	TNN 500A System	Remark
1	CPU	⟨ 70℃	67.0	63.0	Active monitor
2	VGA	⟨ 100℃	45.2	45.3	Daq/56
3	Northbridge	⟨ 99℃	50.8	62.8	Daq/56
4	Southbridge	⟨ 99℃	51.0	50.6	Daq/56
5	Mainboard	⟨ 60℃	49.0	49.0	Active monitor
6	Case inside		36.1	34.8	Daq/56

2) Test Graph

Thermal Test Resutls
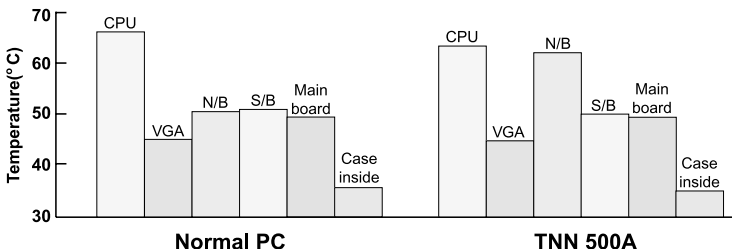
3) Test System Configuration

Test System Room Temperature : 30 ℃

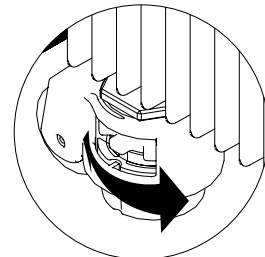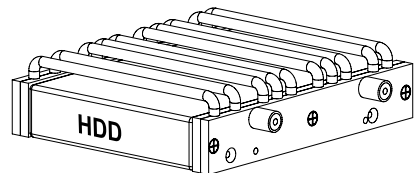|	Normal PC System	TNN 500A System
Case	Micronics TH1100	TNN 500A
CPU	P4 3.0C GHz	P4 3.0C GHz
CPU Cooler	CNPS7000	No Fan Heatpipe Cooler
Mainboard	Intel D875PBZLK	Intel D875PBZLK
HDD	Seagate Barracuda 40G	Seagate Barracuda 40G
ODD	Combo Samsung 52X SM-352B	Combo Samsung 52X SM-352B
RAM	DDR 512MB	DDR 512MB
Graphics Card	ATI Radeon 9600 Pro 128M	ATI Radeon 9600 Pro 128M
Graphics Card Cooler	40mm 5600 RPM	No Fan Heatpipe Cooler
Power Supply	ZM300A-APF	No Fan ZM350
Exhaust Fan	ZM-F1 X 2	Non

4) Testing Equipment and Programs

▣ CPU Loading Program
   P4MAX (Intel, Inc.) 81.9W/sec Loading
▣ Measurement Instrument
   Personal Daq/56 (Iotech,Inc.) KIKUSUI PCR 1000L
▣ Temperature Measurement Program
   DaqView (Iotech, Inc.) & Intel Active Monitor

The TNN 500A System does not use an internal fan, so the system monitoring program may report a high internal temperature. Notably, the TNN 500A system's northbridge temperature may be as high as 62.8 ℃, which is about 10 ℃ higher than a normal system. However, this is significantly cooler than the maximum allowed northbridge temperature of 99 ℃. Thus, the northbridge in a TNN 500A System functions normally. If you wish to lower the northbridge temperature to 50.8 ℃ as in a normal system, use the optional northbridge heatpipe cooler available separately.

2.9 Other Features

• Heatpipe HDD cooler reduces vibration and noise transferred to computer case and cools HDD

• TNN 500A comes with 4 casters which can support up to 4 tons, and are equipped with sliding protection and height adjustment features.

• Convenient flexible mounting structure of TNN 500A allows up to 3 ODDs and 6 HDDs to be installed.

3. Components

Right Heatsink Plate

M/B EMI Bracket

Case Block Cover
Case Block2 Base
Case Block1 Base
Case Block Cover
CPU Block Base
Case Block Cover
Case Block1 Base

Case Block1 Base

Case Block3 Base
CPU Heatpipe
CPU Block Cover
CPU Block Cover

Case Block3 Cover
Case Block Cover
CPU Heatpipe
Clip Support
VGA Heatpipe

Front Door

Top Plate

ZM-2HC1
Clip

VGA Block Cover
Panel Fix Bar~L
AUX Panel
LED Lamp Panel
LED Lens
Panel Fix Bar~S

Case Handle

ODD/HDD Bracket
Power Inlet Housing
VGA Block Base

Switch Panel

EMI Interception Block

Top Nipple

Panel Fix Bar~L
Hinge
Panel Fix Bar~L
Power Inlet Panel

PSU
PSU Cover

Hinge

Bottom Plate

Card Fix Bar
Card Fix Bolt
ODD/HDD Bracket
Panel Fix Bar~L

Back Door

Left Heatsink Plate

※ Parts Number List

No.	TNN Part Name	Part No.	Part Name	Spec. (size)	Qt.	Note
1	Power Supply Set	T5A-01	PSU	300W	1	
			PSU Cover		1	180.4(W)x190.9(L)x33.1(H)
			Power Cables(4P)	550mm	1	
			Power Cables(24P)	430mm	1	
			PSU Cover Fix Bolt	PH M3*5	8	
			PSU Cover Nipple-L	6*26.5	4	
			PSU Cover Nipple-S	6*11.5	4	
2	HDD Cooler	T5A-02	Ground Wire(Packing)		1	
			Damper		4	
			Pan Head Bolt	PH #6-32X7	4	
			Flathead Bolt(Packing)	PH #6-32x13	4	
3	Handle Set	T5A-03	Case Handle		2	
			Top Nipple	16*10	4	
			Bottom Nipple	18*16	4	
			Nipple Cap	24*22	4	
			Flat Head Bolt	FH M5x12	4	
			Pan Head Bolt	PH M5x12	4	
4	Caster Set	T5A-04	Caster	GD-40 "S"	4	
			Caster Fix Bolt	10*48	4	
			Pan-Washer Head Bolt	PWH M5x18	8	
			Spring Washer	M8	4	
5	Switch Set	T5A-05	Switch Panel		1	
			Power Switch		1	
			Reset Switch		1	
			Power S/W Jump Cable(2P)	300mm	1	
			Reset S/W Jump Cable(2P)	300mm	1	
			HDD LED Jump Cable(2P)	300mm	1	
			Power LED Jump Cable(3P)	300mm	1	
			Power LED Jump Cable(2P) (Spare_Packing)	300mm	1	
			LED Cap Nut	11.5*7	2	HDD LED, Power LED
			LED Cap Bolt	12*10	2	HDD LED, Power LED
6	USB & LED Lamp Set	T5A-06	LED Lamp PCB Ass' y	5 LED*10	1	FR-1
			LED Lamp Panel		1	
			LED Lamp Switch		1	
			LED Lamp Cable(3P)	300mm	1	
			USB Cable(5P)	350mm	2	
			O-ring		8	
			Pan Head Bolt	PH M3x10	4	PCB
			Flat Head Bolt	FH M3x8	4	USB Cable
			Reset S/W_Cap	11.5*6	1	
7	CPU Cooler Set	T5A-07	CPUBlock Base	68*68(L)	1	
			CPUBlock Cover	68*68(L)	1	
			CPU HP (A,B,C,D,E,F)	6	6	4TYPE 6개
			CPUBlock Clip(Packing)		1	
			Clip Support(Packing)		2	For Intel 478
			CPUBlock Bushing	6.35*20.2	4	For Packing Only
			CaseBlock1 Base	38.8*80(L)	1	CPU Sides
			CaseBlock2 Base	38.8*80(L)	1	CPU Center
			CaseBlock Cover	26*80(L)	4	
			CaseBlock3 Base	21.6*70(L)	1	For Back HP
			CaseBlock3 Cover	21.6*70(L)	1	For Back HP
			Back HP (A,B)	6	2	2TYPE 2개
			AMD Athlon 64 Nipple(Packing)	9*29	2	For AMD Athlon 64
			Pan Head Bolt (Packing)	PH M4x20	4	CPUBlock & Cover Join Bolt
			Pan Head Bolt	PH M3x10	16	CaseBlock Cover Fix Bolt
			Pan Head Bolt	PH M3x7	8	CaseBlock Base Fix Bolt
			Flat Head Bolt	FH M3x16	4	Back CaseBlock Fix Bolt
			Pan Head Bolt	PH M3x60	4	For Packing Only
			Clip Fix Bolt(Packing)	#6-32x52	2	For Intel 478(Hand Bolt)
			Clip Fix Bolt(Packing)	#6-32x38.5	2	For AMD Athlon 64(Hand Bolt)
			Paper Washer(Packing)		1	
8	EMI Bracket Set	T5A-08	EMI Bracket	59*300	1	
			Bind Head Bolt	BH M3x4	4	

| No.	TNN Part Name	Part No.	Part Name	Spec. (size)	Qt.	Note
9	VGA Cooler Set	T5A-09	VGABlock Base-S(Packing)	35.6*36(L)	1	
			VGABlock Cover-S(Packing)	21.6*36(L)	1	
			VGABlock Base-L(Packing)	35.6*46(L)	1	
			VGABlock Cover-L(Packing)	21.6*46(L)	1	
			CaseBlock1 Base	38.8*80(L)	1	
			CaseBlock Cover	26*80(L)	1	
			VGA HP	6	2	2TYPE 2개
			VGA Nipple(Packing)	M3_NUT"A"	2	M3-tap (nipple), VGA Block
			Pan Head Bolt	PH M3x10	6	CaseBlock Cover Fix Bolt VGA Card & VGABlock Join Bolt
			Pan Head Bolt	PH M3x7	4	CaseBlock Base Fix Bolt
			O-ring(Packing)		4	
			Pan Head Bolt(Packing)	PH M2x4	4	VGA Joint
			VGABlock Base & Cover Join Bolt	PH M3x8	4	Hand Bolt(Packing)
10	Left Heatsink Plate	T5A-10	Left Heatsink Plate	400*500(L)	1	
			Socket Head Bolt	SH M5x12	6	
			Guide Bolt	M5x12	4	
			Pan Head Bolt	PH M4x12	12	Panel Fix Bar-L
11	Right Heatsink Plate	T5A-11	Right Heatsink Plate	400*500(L)	1	
			Socket Head Bolt	SH M5x12	12	
			Pan Head Bolt	PH M4x12	4	Panel Fix Bar-S
			M/B Nipple	6*15	10	M3
12	Top Plate	T5A-12	Top Plate	400(L)	1	
			Flat Head Bolt	M4x10	4	Panel Fix Bar-L
13	Bottom Plate	T5A-13	Bottom Plate	400(L)	1	
14	Front Door	T5A-14	Front Door	199.4*488.2(L)	1	
			PW LED Lens	15_Acryl	1	6*20
			Logo Label		1	Sticker
15	Back Door	T5A-15	Back Door	199.4*488.2(L)	1	
16	Door Packing	T5A-16	Packing	14x11	4	
			Flat Head Bolt	FH M4x20	4	
			Spring Washer	M4	4	
			O-ring	AS568A-10	8	Inside Diameter- 6.07mm Thickness - 1.78mm
17	Front AUX Panel	T5A-17		146.3*40(L)	2	
18	ODD/HDD Bracket	T5A-18		122.5*100(L)	6	
19	Panel Fix Bar-L	T5A-19		12.7*100(L)	8	
20	Panel Fix Bar-S	T5A-20		12.7*80(L)	1	
21	Push Lock Set	T5A-21	Push Lock	Mold(white)	2 set	
			Pan Head Bolt	PH M3x16	4	
			Pan Head Bolt	PH M3x5	2	
			Pan Head Bolt	PH M2x8	2	
			Washer	M3	4	
22	Card Fix Bar Set	T5A-22	Card Fix Bar	Spacer 5700	1	
			Card Fix Bolt	8.9*22	5	Hand Bolt
			Flat Head Bolt	FH M4x10	4	Card Fix Bar
23	EMI Interception Block Set	T5A-23	EMI Interception Block-A	161*11(L)	2	TP Front, BP Back
			EMI Interception Block-B	161*11(L)	2	TP Back, BP Front
			Pan Head Bolt	PH M4x12	12	
24	Power Inlet Set	T5A-24	Power Inlet Housing		1	
			Power Inlet Panel		1	
			Power Line Main		1	
			Power Line Sub		1	
			Select Switch Main		1	
			Select Switch Sub		1	
			Lead Set		1	
			Inlet		1	
			ON/OFF S/W		1	
			Pan Head Bolt	PH M3x5	8	
25	Hinge Set	T5A-25	Hinge-T	34*18*35	1	
			Hinge-B	34*18*35	1	
			Bushing	5.8*9.5	2	
			Spring Washer	M4	6	
			Pan Head Bolt	PH M4x14	4	
			Flat Head Bolt	FH M4x16	2	

· PH : Pan Head   · FH :Flat Head   · SH : Socket Head   · PWH : Pan-Washer Head

3.1 TNN 500A
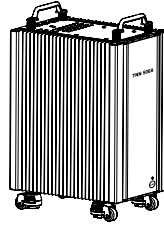
One (1) Set of TNN

3.2 CPU Cooler Set   (One (1) Bag)
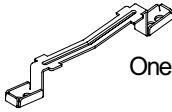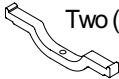
One (1) CPU Block Clip   Four(4) PH M4X20 Bolts

1) Components for Intel Pentium 4 (Socket 478)

Two (2) CPU Block Clip Supports   Two(2) Intel Hand bolts(#6-32X52)

2) Components for AMD Athlon 64 (Socket 754)
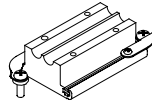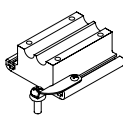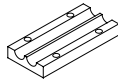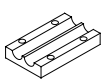
One (1) AMD Backplate   Two(2) AMD Hand bolts(#6-32X40)

3.3 VGA Cooler Set   (One (1) Bag)

Two (2) PH M3X10 Bolts

Two (2) M3 Top Nipples   Thermal Grease

Four(4) VGA Hand Bolts(M3X13)

Four (4) O-Rings

VGA Blocks L,S Size (One (1) Each)
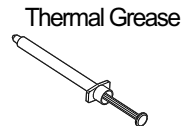
3.4 HDD Cooler Set   (One (1) Bag)

Four (4) FH #6-32X13 Bolts

One (1) Ground Wire

English
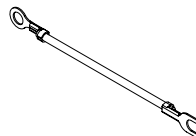
3.5 Bolts for HDD Installation ✎ (One (1) Bag)

Twenty Four (24) PH #6-32X10 Bolts

3.6 Bolts for ODD Installation ✎ (One (1) Bag)

Sixteen (16) PH M3X10 Bolts

3.7 Bolts for Motherboard Installation ✎ (One (1) Bag)

Ten (10) PWH M3X5 Bolts

3.8 Clamp Filters ✎ (One (1) Bag)

Two (2) 30 ∅   Four (4) 20 ∅

3.9 Tools ✎ (One (1) Bag)

L- Wrench   Screwdriver for Bolt Fastening

## 3.10 Spare LEDs ✎ (One (1) Bag)
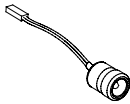
One (1) 2-Pin Power LED Wire

Note) The 3-Pin Power LED Wire comes pre-installed. If your motherboard requires a 2-Pin Power LED connector, replace with the 2-Pin Power LED Wire.

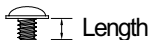## 3.11 Spare Parts ✎ (One (1) Bag)

※ **Interpreting the Bolt Designation**

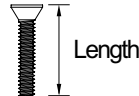PH M4X20 : PH (Pan Head) Type, Metric Screw, 4mm in Diameter, 20mm in Length
FH #6-32X8 : FH (Flat Head) Type, Screw #6, 32 Pitches per Inch, 8mm in Length

Length   Length   Length   Length
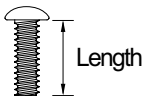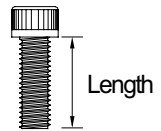
Pan Head   Pan-Washer Head   Flat Head   Socket Head
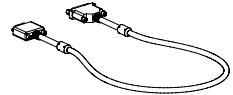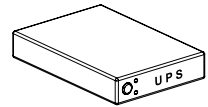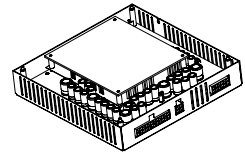
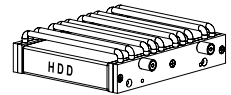## 4. Options
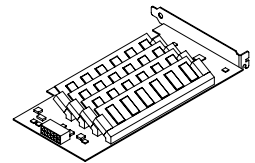
4.1 Heatpipe Northbridge Cooler
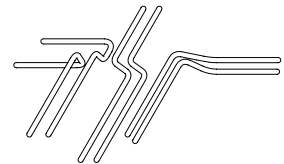
4.2 DVI VGA Cable

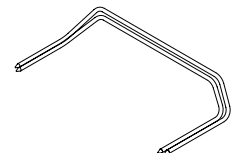4.3 UPS

4.4 400W PFC Power

4.5 Additional Heatpipe HDD cooler

4.6 RAM-Drive

4.7 CPU Heatpipe-L Set

4.8 VGA Heatpipe-D Set

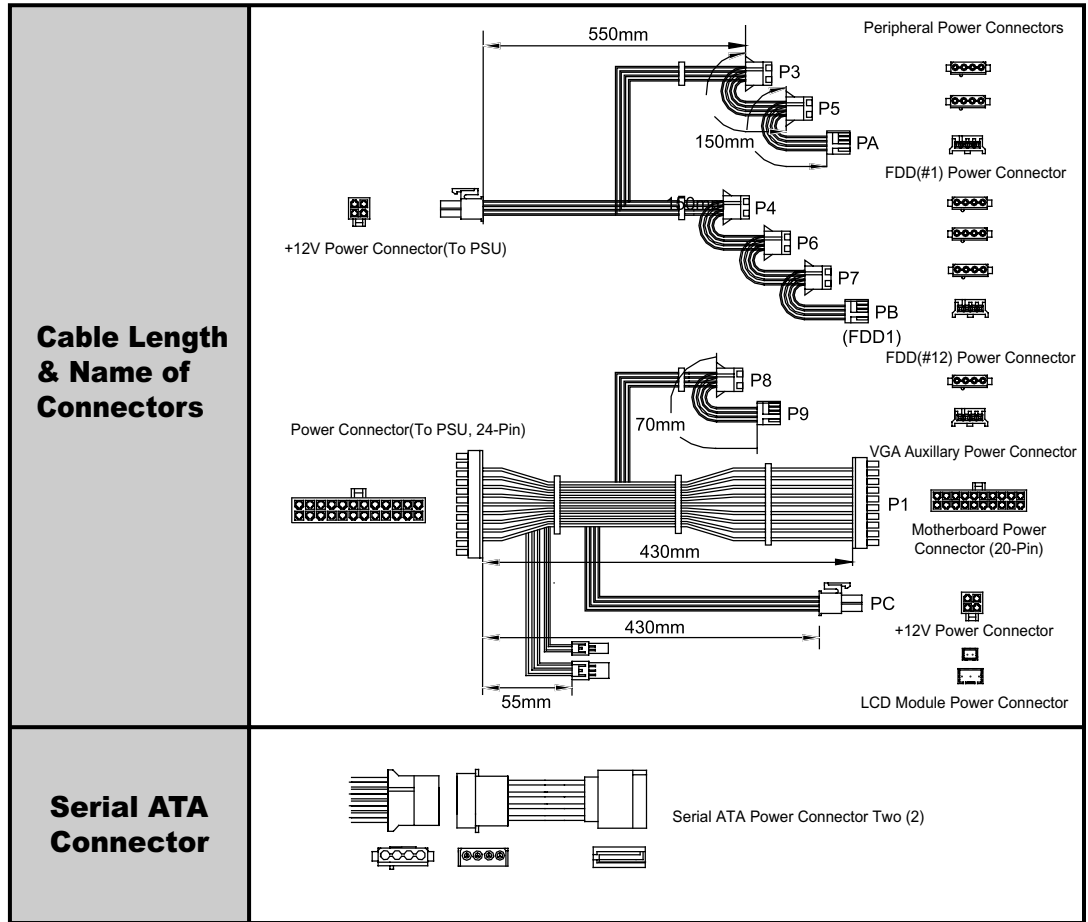ZALMAN   TNN 500A

5. Specifications

TNN 500A

1. Dimension : 400(L) x 286(W) x 607(H) mm

2. Weight : 25Kg

3. CPU Cooler : ZMC 6HA (150W/sec)

4. VGA Cooler : ZMV 2HA (50W/sec)

5. HDD Cooler : ZM-2HC1 (10 heatpipes)

6. Power Supply : ZM350(300W)

■ ZM350 Electrical Characteristics

AC Input Range	Voltage	100VAC / 240VAC ±10%	Output V.	Output Load Range			Combined (Imax)
	Frequency	47Hz~63Hz		Imin	Imax	Ipeak	
AC Input Current (Sustained)	115VAC	7.0A	+5VSB	0.0A	1.5A	1.5A	
	230VAC	3.0A	+3.3VDC	0.5A	10A	12A	160W 284W
Inrush Current Limit (@ 25℃ Cold Start)	115VAC	60A	+5VDC	0.5A	16A	25A	
	230VAC	90A	+12VDC	0.5A	10A	12A	
Efficiency	75% Min. @ 230VAC (Full Load)		−12VDC	0.0A	0.6A	0.6A	
			−5VDC	0.0A	0.3A	0.3A	

DC Output Voltage Stability	Output V.	Stable Range			
	+5VSB	±5%	+4.75V	~	+5.25V
	+3.3VDC	±5%	+3.14V	~	+3.45V
	+5VDC	±5%	+4.75V	~	+5.25V
	+12VDC	±5%	+11.4V	~	+12.6V
	−12VDC	±10%	−10.8V	~	−13.2V
	−5VDC	±10%	−4.50V	~	−5.50V

At Full Load

DC Output Ripple & Noise	Output V.	Standard Range
	+5VSB	50mV
	+3.3VDC	50mV
	+5VDC	50mV
	+12VDC	120mV
	−12VDC	120mV
	−5VDC	100mV

At Full Load

Protection Features
Over−Voltage Protection(OVP)
Over−Current Protection (OCP)
Short−Circuit Protection (SCP)
EMC(EMI & EMS)
FCC Part 15 Class 'B',CISPR22 Class'B'

■ Output Power Cable

Cable Length & Name of Connectors	 550mm P3 P5 150mm PA +12V Power Connector(To PSU) Peripheral Power Connectors FDD(#1) Power Connector 150mm P4 P6 P7 PB (FDD1) FDD(#12) Power Connector Power Connector(To PSU, 24-Pin) P8 70mm P9 VGA Auxillary Power Connector P1 Motherboard Power Connector (20-Pin) 430mm PC 430mm +12V Power Connector 55mm LCD Module Power Connector
Serial ATA Connector	 Serial ATA Power Connector Two (2)

6. Patent Applications

■ **Korean Patent Application No. 03-30358**

■ **Korean Design Application No. 03-19970**

■ **PCT Patent pending in 30 countries including Europe, USA, & Japan**

7. Cautions Before Use

7.1 Operating Environment

(1) Supported CPUs : Intel P4, AMD Athlon 64

Type	Usable Range
Intel P4 (Socket 478)	Upto P4 3.2CGHz
AMD Athlon64 (Socket 754)	Upto 2.2GHz(3400+)

Note1) For CPUs that are released in the future (with capabilities beyond the P4 3.4GHz and the AMD Athlon64 3400+), zalman will perform tests to determine usability, and continuously update the information on our website.

Note2) In general , AMD Athlon64 CPU users would be wise to use the optional Heatpipe-L Set(ZM-CHPL1).

(2) Operating Temperature

· CPU 80W or Higher : 0-30℃ (Room Temperature)   · CPU 80W or Lower : 0-35℃ (Room Temperature)

· CPU 60W or Lower : 0-45℃ (Room Temperature)

※ **Recommended : 15-28℃ (Room Temp.)**
- The most comfortable temperature range for humans is also

※ **Intel Pentium 4 CPU Wattage & Temp. Limit**   (As of Sep. 1, 2003)

| Front Side Bus Frequency	Processor and Core Frequency	Thermal Design Power (W)	Maximum Tcase (∞C)	Notes
400MHz	**Processors with VID=1.500 V**			
	2A GHz	52.4	68	
	2.20 GHz	55.1	69	
	2.40 GHz	57.8	70	
	2.50 GHz	59.3	71	
	Processors with VID=1.525 V			
	2A GHz	54.3	69	
	2.20 GHz	57.1	70	
	2.40 GHz	59.8	71	
	2.50 GHz	61	72	
	2.60 GHz	62.6	72	
	Prosessors with multiple VIDS			
	2A GHz	54.3	69	
	2.20 GHz	57.1	70	
	2.40 GHz	59.8	71	
	2.50 GHz	61	72	
	2.60 GHz	62.6	72	
533MHz	**Processors with VID=1.500 V**			
	2.26 GHz	56	70	
	2.4B GHz	57.8	70	
	2.53 GHz	59.3	71	
	Processors with VID=1.525 V			
	2.26 GHz	58	70	
	2.4B GHz	59.8	71	
	2.53 GHz	61.5	71	
	2.66 GHz	66.1	74	
	2.80 GHz	68.4	75	
	Prosessors with multiple VIDS			
	2.26 GHz	58	70	
	2.4B GHz	59.8	71	
	2.53 GHz	61.5	72	
	2.66 GHz	66.1	74	
	2.80 GHz	68.4	75	
	3.06 GHz	81.8	69	
800MHz	**Prosessors with multiple VIDS**			
	2.40C GHz	66.2	74	
	2.60C GHz	69	75	
	2.80C GHz	69.7	75	
	3 GHz	81.9	70	
	3.20C GHz	82	70	

※ **AMD Athlon 64 CPU Wattage & Temp. Limit**
- Relevant data for AMD Athlon 64 CPUs has not been released by AMD as of September 1, 2003. Visit AMD's website (www. amd.com) for updated information.
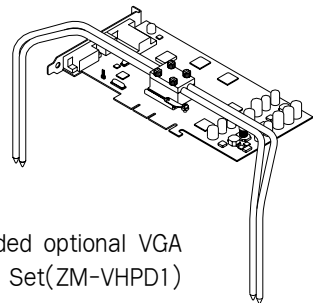
7.2 Compatible Components

(1) Video : All graphics cards with heatsink mounting holes

Type	Usable Range
ATI	Upto Radeon 9700
nVidia	Upto geForce FX 5700

Note1) For ATI Radeon 9800 or Faster models and nVidia geForce FX5800 or Faster models, the separately sold VGA Heatpipe-D Set(ZM-VHPD1) must be used.
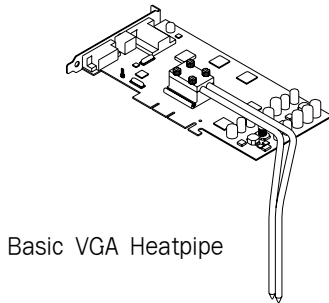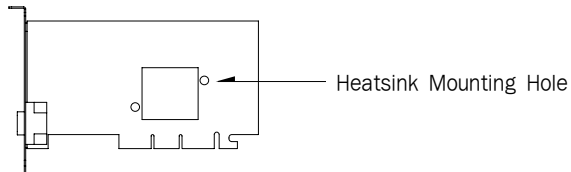
Basic VGA Heatpipe

Recommended optional VGA Heatpipe-D Set(ZM-VHPD1)

Note2) Graphics cards that have any onboard components that interfere with this product cannot be used. If you encounter interference during installation, stop installing and return the product.

Heatsink Mounting Hole

(2) HDD : (As of Sep. 1, 2003)

Brand	Model Number	Model Name	Capacity	Interface	RPM	Seek Time	System Type
Seagate	ST340015A	Barracuda 5400.1	40 GB	Ultra ATA/100	5400 rpm	12.5 ms avg	low-profile
	ST340015ACE	Barracuda 5400.1	40 GB	Ultra ATA/100	5400 rpm	12.5 ms avg	low-profile
	ST340014A	Barracuda 7200.7	40 GB	Ultra ATA/100	7200 rpm	8.5 ms avg	1-inch
	ST380011A	Barracuda 7200.7	80 GB	Ultra ATA/100	7200 rpm	8.5 ms avg	1-inch
	ST380013AS	Barracuda 7200.7	80 GB	Serial ATA	7200 rpm	8.5 ms avg	1-inch
	ST3120022A	Barracuda 7200.7	120 GB	Ultra ATA/100	7200 rpm	8.5 ms avg	1-inch
	ST3120026AS	Barracuda 7200.7	120 GB	Serial ATA	7200 rpm	8.5 ms avg	1-inch
	ST3120026A	Barracuda 7200.7	120 GB	Ultra ATA/100	7200 rpm	8.5 ms avg	1-inch
	ST3160021A	Barracuda 7200.7	160 GB	Ultra ATA/100	7200 rpm	8.5 ms avg	1-inch
	ST3160023AS	Barracuda 7200.7	160 GB	Serial ATA	7200 rpm	8.5 ms avg	1-inch
	ST3160023A	Barracuda 7200.7	160 GB	Ultra ATA/100	7200 rpm	8.5 ms avg	1-inch

Brand	Model Number	Model Name	Capacity	Interface	RPM	Seek Time	System Type
Seagate	ST320011A	Barracuda ATA IV	20 GB	Ultra ATA/100	7200 rpm	9 ms avg	1-inch
	ST340016A	Barracuda ATA IV	40 GB	Ultra ATA/100	7200 rpm	9 ms avg	1-inch
	ST360021A	Barracuda ATA IV	60 GB	Ultra ATA/100	7200 rpm	9.5 ms avg	1-inch
	ST380021A	Barracuda ATA IV	80 GB	Ultra ATA/100	7200 rpm	9.5 ms avg	1-inch
	ST340017A	Barracuda ATA V	40 GB	Ultra ATA/100	7200 rpm	9 ms avg	1-inch
	ST360015A	Barracuda ATA V	60 GB	Ultra ATA/100	7200 rpm	9 ms avg	1-inch
	ST380023A	Barracuda ATA V	80 GB	Ultra ATA/100	7200 rpm	9.4 ms avg	1-inch
	ST3120023A	Barracuda ATA V	120 GB	Ultra ATA/100	7200 rpm	9.4 ms avg	1-inch
	ST3120024A	Barracuda ATA V	120 GB	Ultra ATA/100	7200 rpm	9.4 ms avg	1-inch
	ST380023AS	Barracuda Serial ATA V	80 GB	Serial ATA	7200 rpm	9 ms avg	1-inch
	ST3120023AS	Barracuda Serial ATA V	120 GB	Serial ATA	7200 rpm	9 ms avg	1-inch
Samsung	SP1614N/DOM	SpinPoint P80	160GB	Ultra ATA/133	7200 rpm	8.9 ms avg	1-inch
	SP1604N/DOM	SpinPoint P80	160GB	Ultra ATA/133	7200 rpm	8.9 ms avg	1-inch
	SP1203N/DOM	SpinPoint P80	120GB	Ultra ATA/133	7200 rpm	8.9 ms avg	1-inch
	SP1213N/DOM	SpinPoint P80	120GB	Ultra ATA/133	7200 rpm	8.9 ms avg	1-inch
	SP0802N/DOM	SpinPoint P80	80GB	Ultra ATA/133	7200 rpm	8.9 ms avg	1-inch
	SP0612N/DOM	SpinPoint P80	60GB	Ultra ATA/133	7200 rpm	8.9 ms avg	1-inch
	SP0401N/DOM	SpinPoint P80	40GB	Ultra ATA/133	7200 rpm	8.9 ms avg	1-inch
	SV1604N/DOM	SpinPoint V80	160GB	Ultra ATA/133	5400 rpm	8.9 ms avg	1-inch
	SV1203N/DOM	SpinPoint V80	120GB	Ultra ATA/133	5400 rpm	8.9 ms avg	1-inch
	SV0802N/DOM	SpinPoint V80	80GB	Ultra ATA/133	5400 rpm	8.9 ms avg	1-inch
	SV0612N/DOM	SpinPoint V80	60GB	Ultra ATA/133	5400 rpm	8.9 ms avg	1-inch
	SV0401N/DOM	SpinPoint V80	40GB	Ultra ATA/133	5400 rpm	8.9 ms avg	1-inch

(3) ODD : Fanless products are recommended.

(4) Motherboard   (As of Sep. 1, 2003)

Brand	Model Name	Processor	Chipset	Vendor
ABIT	BH7	Pentium4 (478pin)	i845PE	ABIT Computer
Albatron	PM845GE	Pentium4 (478pin)	i845GE	Albatron
	PX865PE Pro	Pentium4 (478pin)	i865PE	Albatron
	K8X800 ProII	Ahtlon64 (754pin)	K8T400	Albatron
AOpen	AX4PER-GN	Pentium4 (478pin)	i845PE	AOpen
	AX4SG	Pentium4 (478pin)	i865G	AOpen
	AX4SG Max	Pentium4 (478pin)	i865G	AOpen
	MX4SG-N	Pentium4 (478pin)	i865G	AOpen
	AX4SPE Max	Pentium4 (478pin)	i865PE	AOpen
	AX4SPE-N	Pentium4 (478pin)	i865PE	AOpen
	AX4C MAX 2	Pentium4 (478pin)	i875P	AOpen
ASRock	P4I45D	Pentium4 (478pin)	i845D	ASRock
	P4I45G	Pentium4 (478pin)	i845G	ASRock
	P4I45PE	Pentium4 (478pin)	i845PE	ASRock
ASUSTek	P4XP-X	Pentium4 (478pin)	i845D	ASUSTek Computer
	P4PE Black Pearl	Pentium4 (478pin)	i845PE	ASUSTek Computer
	P4P8X	Pentium4 (478pin)	i865P	ASUSTek Computer
	P4P800	Pentium4 (478pin)	i865PE	ASUSTek Computer
	P4P800 Deluxe	Pentium4 (478pin)	i865PE	ASUSTek Computer
	P4C800 Deluxe	Pentium4 (478pin)	i875P	ASUSTek Computer
	K8V Deluxe	Ahtlon64 (754pin)	K8T800	ASUSTek Computer

Brand	Model Name	Processor	Chipset	Vendor
Biostar	K8NHA Pro	Ahtlon64 (754pin)	nForce3 150	Biostar
	K8NHA-M	Ahtlon64 (754pin)	nForce3 150	Biostar
	K8VHA Pro	Ahtlon64 (754pin)	K8T800	Biostar
	K8VHA-M	Ahtlon64 (754pin)	K8T800	Biostar
Chaintech	9EJL4 (Summit)	Pentium4 (478pin)	i845PE	Chaintech Computer
	9PJL1 (Summit)	Pentium4 (478pin)	i865PE	Chaintech Computer
DFI	PS35-BL	Pentium4 (478pin)	i865G	DFI
	PS83-BL	Pentium4 (478pin)	i865PE	DFI
	LANPARTY PRO875	Pentium4 (478pin)	i875P	DFI
FIC	K8-800T	Ahtlon64 (754pin)	K8T800	FIC
DNDCOM	Dream 845S	Pentium4 (478pin)	i845	Lucky Star Technology
	Dream 845SD	Pentium4 (478pin)	i845D	Acorp International
Gigabyte	GA-8IE800	Pentium4 (478pin)	i845E	Gigabyte Technology
	GA-8PE800	Pentium4 (478pin)	i845PE	Gigabyte Technology
	GA-K8VT800	Ahtlon64 (754pin)	K8T800	Gigabyte Technology
	GA-K8VT800M	Ahtlon64 (754pin)	K8T800	Gigabyte Technology
Intel	D845EBG2	Pentium4 (478pin)	i845E	Intel
	D845EPI	Pentium4 (478pin)	845E	Intel
	D845EPT2L	Pentium4 (478pin)	i845E	Intel
	D845GEBV2	Pentium4 (478pin)	i845GE	Intel
	D845GERG2	Pentium4 (478pin)	i845GE	Intel
	D845GLLY	Pentium4 (478pin)	i845GL	Intel
	D845GVAL	Pentium4 (478pin)	i845GL	Intel
	D845GVAD2	Pentium4 (478pin)	i845GV	Intel
	D845GVADEL	Pentium4 (478pin)	i845GV	Intel
	D845GVSR	Pentium4 (478pin)	i845GV	Intel
	D845PEBT2	Pentium4 (478pin)	i845PE	Intel
	D845PECE	Pentium4 (478pin)	i845PE	Intel
	D845PESV	Pentium4 (478pin)	i845PE	Intel
	D850EMV2	Pentium4 (478pin)	i850E	Intel
	D850EMVR	Pentium4 (478pin)	i850E	Intel
	D850EVD2	Pentium4 (478pin)	i850E	Intel
	D865GBF	Pentium4 (478pin)	i865G	Intel
	D865GLC	Pentium4 (478pin)	i865G	Intel
	D865GLCL	Pentium4 (478pin)	i865G	Intel
	D865PERL	Pentium4 (478pin)	i865PE	Intel
	D865PERLK	Pentium4 (478pin)	i865PE	Intel
	D865PESO	Pentium4 (478pin)	i865PE	Intel
	D865PERC	Pentium4 (478pin)	i865PE	Intel
	D875PBZ	Pentium4 (478pin)	i875P	Intel
	D875PBZLK	Pentium4 (478pin)	i875P	Intel
Meditech	CompuRIX 4BDAE533 Plus	Pentium4 (478pin)	i845D	EPoX Computer
	CompuRIX 4BEA800	Pentium4 (478pin)	i845E	EPoX Computer
	CompuRIX 4PEA800	Pentium4 (478pin)	i845PE	EPoX Computer
	CompuRIX 845 PE (EP-4PEAD)	Pentium4 (478pin)	i845PE	EPoX Computer

English

Brand	Model Name	Processor	Chipset	Vendor
MSD	MiniStar 845GE (L4IGEM2)	Pentium4 (478pin)	i845GE	ECS Group
	Red 845GE (L4IGEA2)	Pentium4 (478pin)	i845GE	ECS Group
MSI	848P NEO	Pentium4 (478pin)	i848P	MSI International
	845GEM-L (MS-6714)	Pentium4 (478pin)	i845GE	MSI International
	865GM2	Pentium4 (478pin)	i865G	MSI International
	K8T Neo-FIS2R	Ahtlon64 (754pin)	K8T800	MSI International
Rex Technology	R845PE	Pentium4 (478pin)	i845PE	Matsonic Computer
Shuttle	AN50R	Ahtlon64 (754pin)	nForce3 150	Shuttle
Soltek	SL-85DR2-C	Pentium4 (478pin)	i845E	Soltek Computer
	SL-85DR3-C	Pentium4 (478pin)	i845PE	Soltek Computer
SOYO	SY-P4I845PE	Pentium4 (478pin)	i845PE	SOYO
	P4I865PE	Pentium4 (478pin)	i865PE	SOYO
	SY-P4I875P (Sample)	Pentium4 (478pin)	i875P	SOYO
SUMA	Superior P4D533 (P4I45D)	Pentium4 (478pin)	i845D	ASRock
	Superior 4BEA 800	Pentium4 (478pin)	i845E	EPoX Computer
	4PEA (EP-4PEAD)	Pentium4 (478pin)	i845PE	EPoX Computer
	845PE LAN	Pentium4 (478pin)	i845PE	EPoX Computer
	Superior 4PEA 800	Pentium4 (478pin)	i845PE	EPoX Computer
	SUPERIOR 4PDA-Lan	Pentium4 (478pin)	i865PE	EPoX Computer
Unitech	845E Pro	Pentium4 (478pin)	i845E	MSI International
	845PE BRAIN	Pentium4 (478pin)	i845PE	BIOSTAR
	865G BRAIN-μ	Pentium4 (478pin)	i865G	BIOSTAR
	865PE BRAIN	Pentium4 (478pin)	i865PE	BIOSTAR

※ The list includes motherboards released between January and August of 2003. Selection criteria for the motherboard were that they do not have a do not physically interference with parts near the CPU socket.

※ Notes About Interference

Motherboards not complying with Intel's "10.2mm motherboard component height restriction" as seen in Figure 2 may have components that interfere with the CPU Block Clip. If interference does occur, the motherboard is incompatible and cannot be used.

10.2mm Motherboard component height restriction

Clip
Motherboard component

TOP VIEW   TOP VIEW

Clip

Motherboard component

4mm
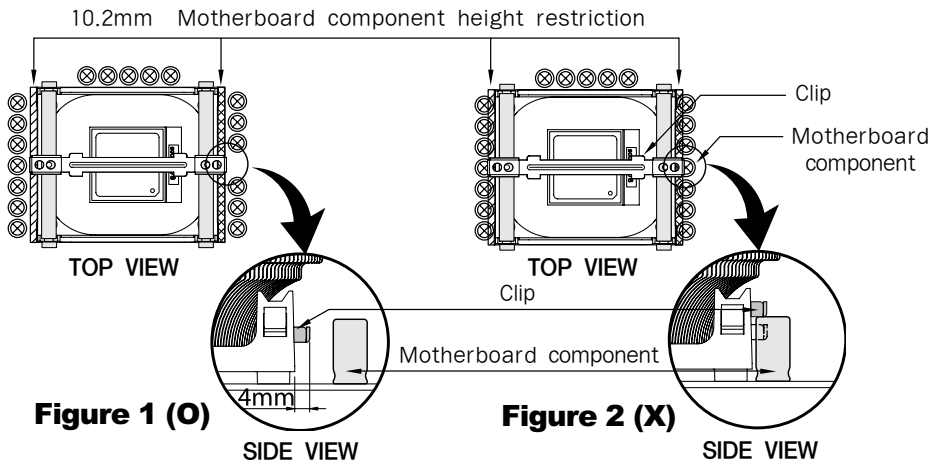
Figure 1 (O)   **Figure 2 (X)**

SIDE VIEW   SIDE VIEW

8. Cautions During Use

8.1 Cautions When Booting

When booting the computer, it may automatically power down after an alarm sound is generated by a system monitoring program to indicate that the rotation of the CPU fan is slow. If this happens, connect the fan on the stock CPU cooler to the 3-pin connector for the CPU cooler on your motherboard. Boot the system and set "CPU Fan Detected" to "Disabled" in the BIOS settings. Then, turn the system off, remove the CPU cooler fan, and reboot.

Note 1) Some motherboards do not boot if the rotation of the CPU fan is not detected. There might not be a "CPU Fan Detected" setting in the BIOS setup, but updating the BIOS could solve this problem. For more information on updating the BIOS, please refer to your motherboard manufacturer's website.

Note 2) When using an Intel motherboard, if you remove the motherboard from an existing system and attach it to the TNN 500A, the system's Active Monitor may generate an alarm sound with a warning that there is no CPU fan. Remove Active Monitor using the Add/Remove Programs applet in Control Panel and reinstall to solve this problem.

8.2 Using the Caster Mount

The leveler (red-colored) on the TNN 500A's caster is used to lock or free the caster. When moving the TNN 500A, slide the caster's leveler in a clockwise direction so that the mount lifts up, enabling the system to move around via the casters. To lock the TNN 500A into place, slide the caster's leveler in a counterclockwise direction so that the mount touches down, locking the TNN 500A down. If installing the TNN 500A on a uneven surface, you can use the TNN 500A's leveler to stop it from rocking.To reduce noise from vibration, lower the mount on the caster when using the system (the mount is made of a type of rubber).

1. Lock

2. Free

English
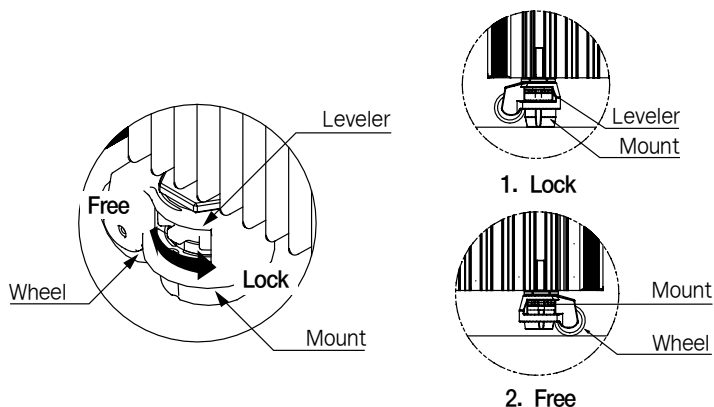
9. How to Install

9.1 Disassembling TNN 500A Case and Installing Motherboard

1. Open the Front Door and remove the EMI Interception Block. Then, unscrew the HDD/ODD Bracket's upper and side fastening bolts (PH M4X12, FH M4X10) counterclockwise by one turn so that they become loose. The HDD/ODD Bracket should then be removed and stored in a safe place.

   Note) The HDD/ODD Bracket's fastening bolts (PH M4X12, FH M4X10) should never be completely unscrewed or removed.
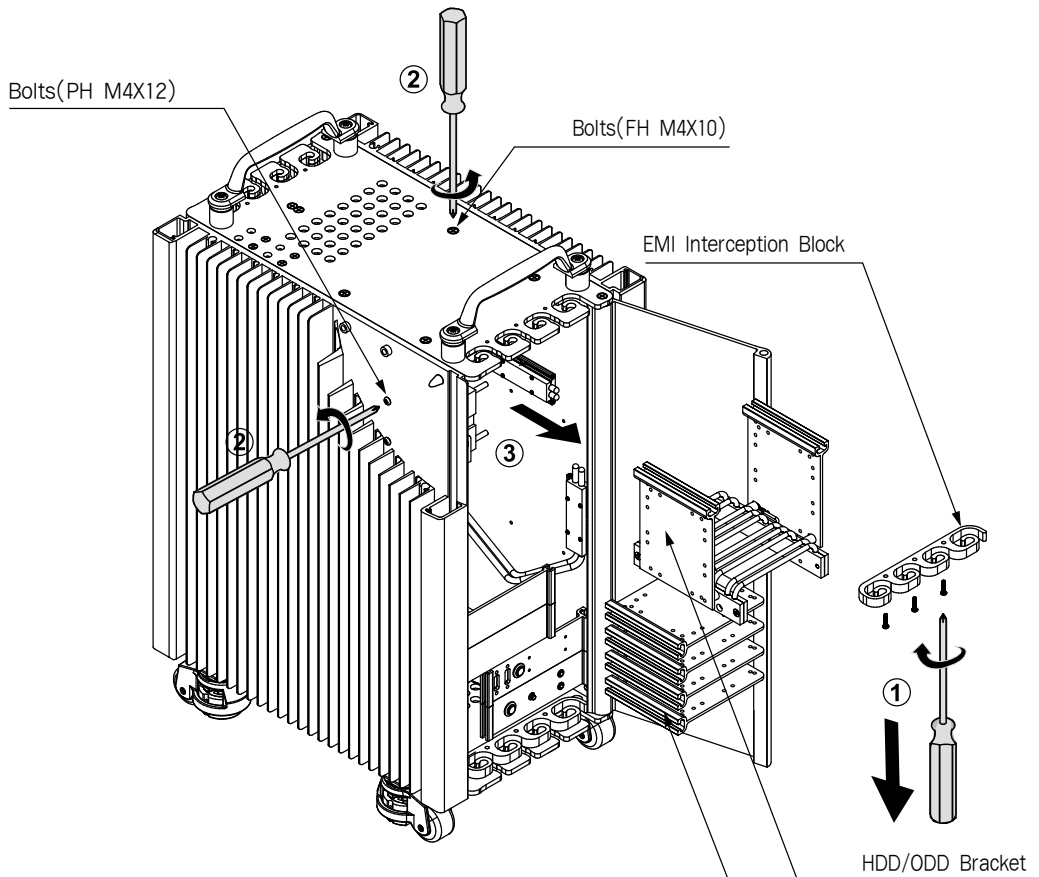
2. As shown in the diagram, carefully lay down the TNN500A on a flat surface and open the Front/Back doors completely. Remove the 10 socket-head bolts (SH M5x12) of the Left Heatsink Plate using the provided L-wrench. Now pull the Left Heatsink Plate out.

    Note) 1) Do not unscrew the parts fastened with caster bolts (PH M5X16).

          2) Front/Back doors must be opened prior to pulling the Left Heatsink Plate out.

L-Wrench

Bolts(SH M5X12) ②

Left Heatsink Plate

③

①   ①

Back Door

Caster

Front Door
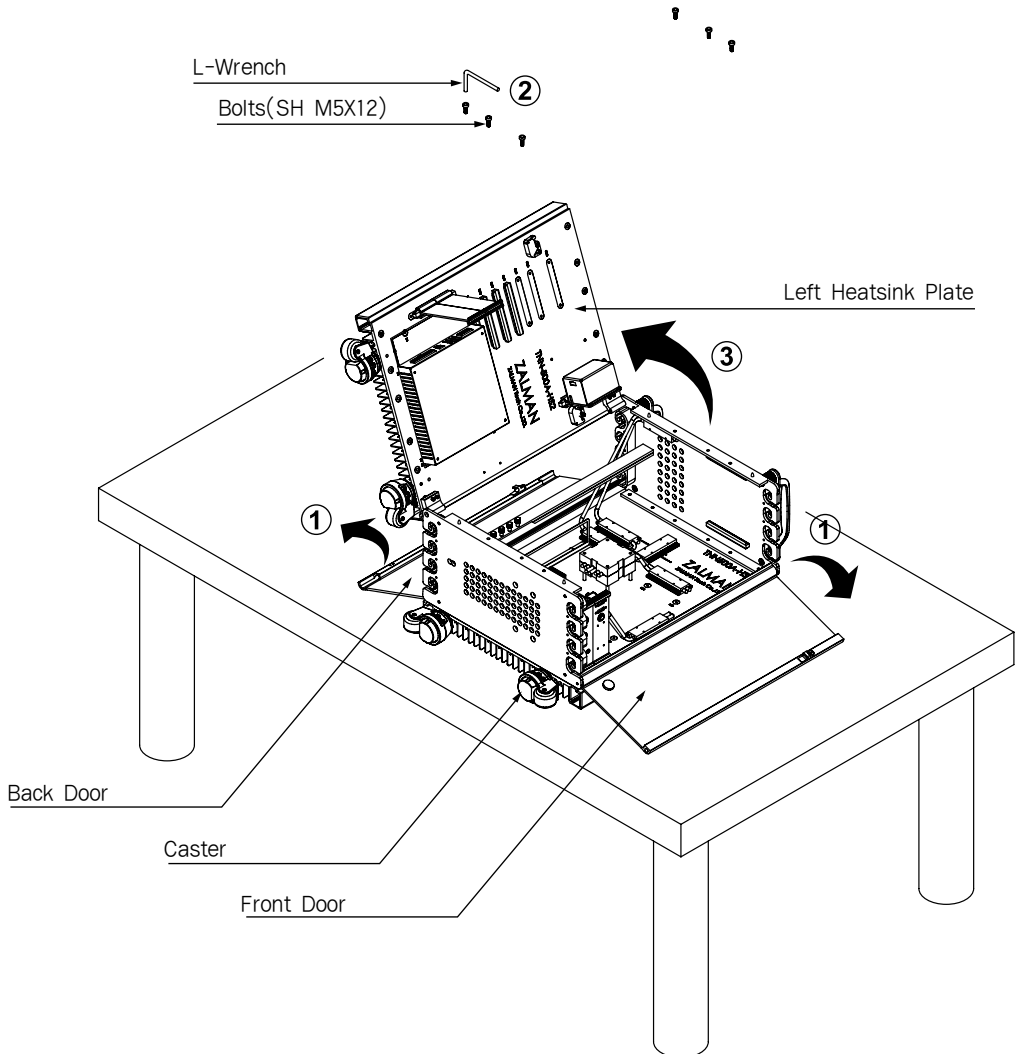
3. Remove the CPU Block Base, CPU Block Cover, Case Block Cover, VGA Case Block Cover, CPU Heatpipes, and VGA Heatpipes in an orderly fashion and store them in a safe place.

Note) 1) Heatpipes should be organized in the order in which they are removed, as they will be reassembled in the some order after installing the motherboard.

2) The bushings (20mm) and bolts (PH M3X60) separated at the time of the CPU Block removal are not used for the actual assembly of the system.

CPU Block Cover
CPU Block Base
Case Block Covers
CPU Heatpipes
Bolts (PH M3X10)
VGA Case Block Cover
VGA Heatpipes
Bolts (PH M3X60)
Bushings (20mm)

Packaging Parts
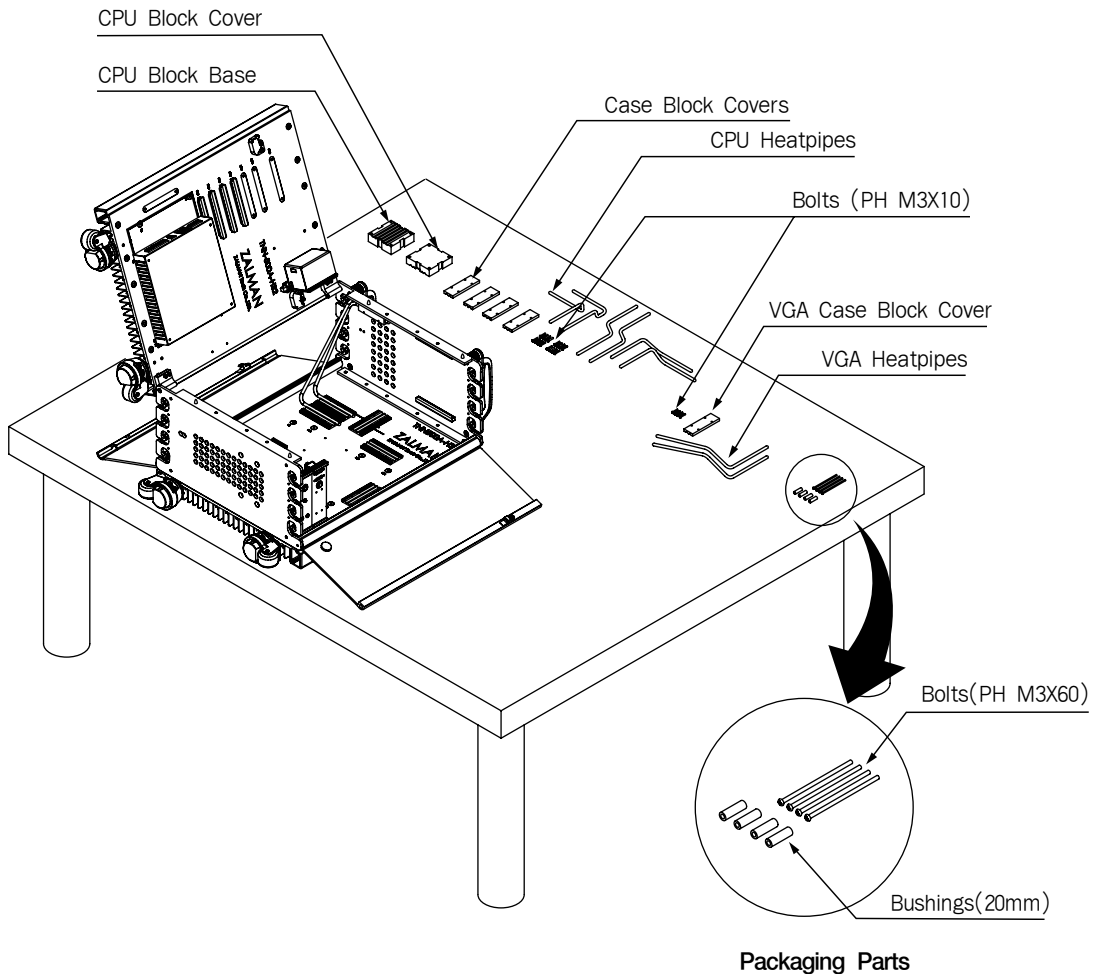
4. Install the I/O Shield that came with the motherboard onto the EMI Bracket.

I/O Shield

EMI Bracket
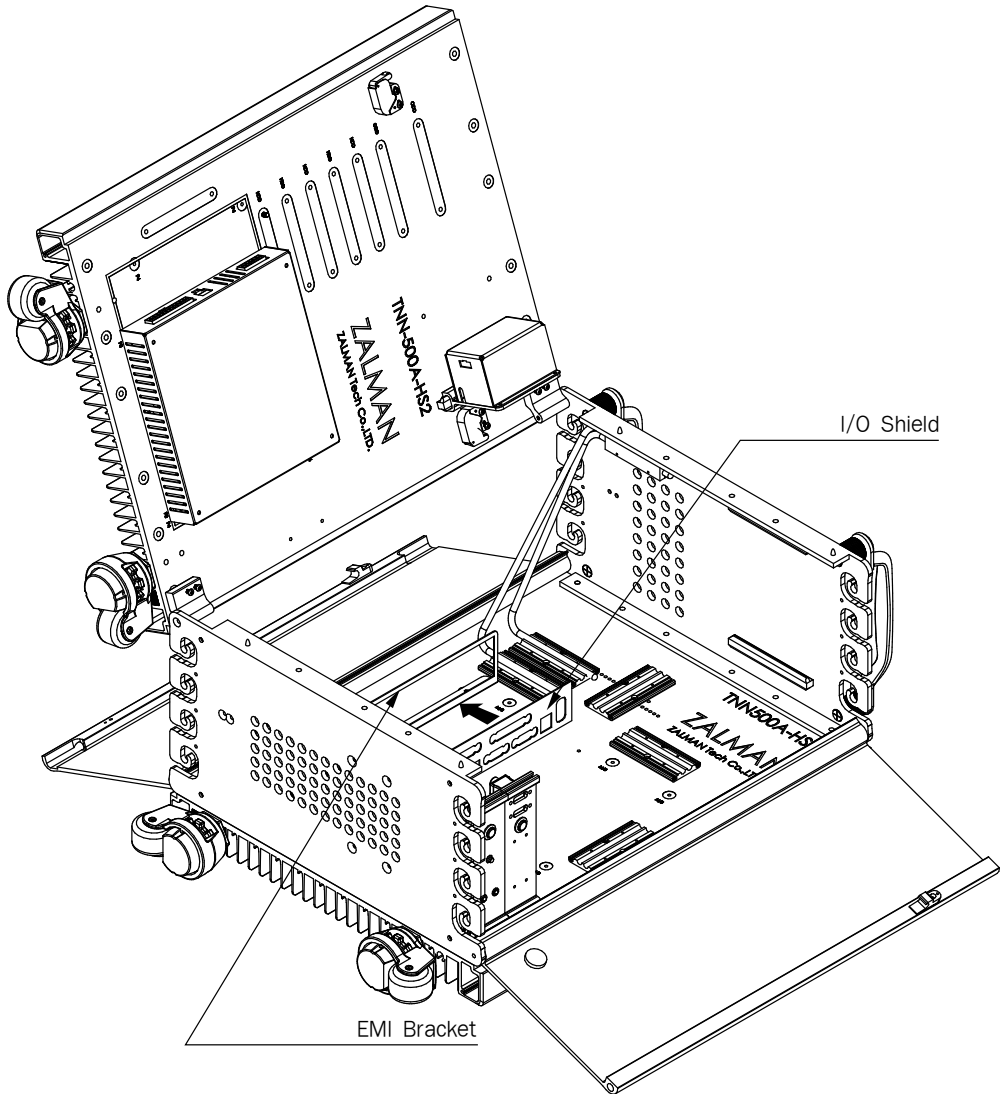
5. Installing CPU and RAM

   1) For Intel Pentium 4 Motherboard

      (1) Install CPU and RAM as instructed in the motherboard manual.

      (2) Place two (2) Clip Supports on the notches of the CPU Retention Guide.

   2) For AMD Athlon 64 Motherboard

      (1) Install CPU and RAM as instructed in the motherboard manual.

      (2) As shown below, insert the AMD Nipples through the Retention Frame holes and screw them into the Backplate. If there are bolts already present, remove them and use the AMD Nipples.
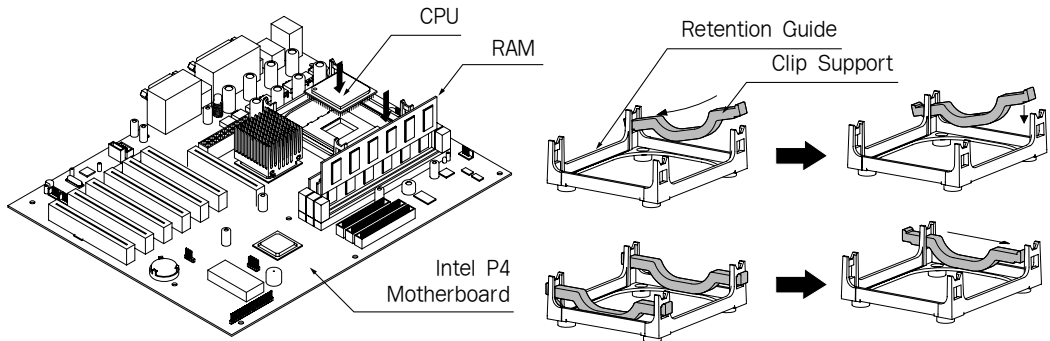
Installing Intel Pentium 4 Motherboard
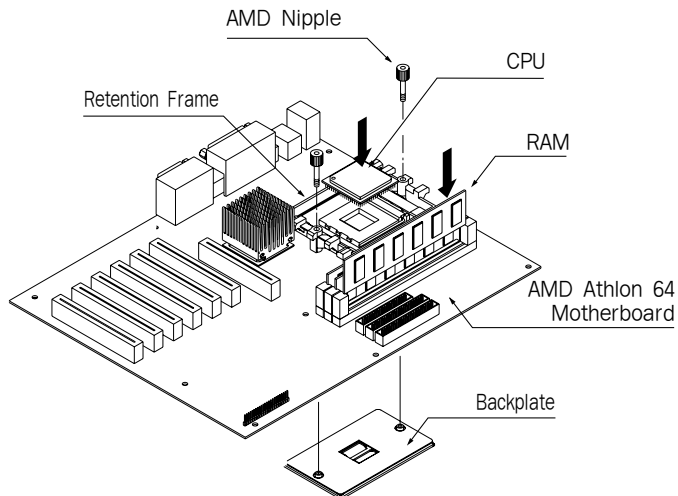
Installing AMD Athlon 64 Motherboard

6. Install the motherboard using the bolts (PWH M3X5).

Note) The Motherboard Nipples on the case must line up with the holes on the motherboard. Remove any unnecessary nipples before installing the motherboard. If you do not remove the unnecessary nipples, the motherboard may become short-circuited.

Bolts(PWH M3X5)

Motherboard

M/B Nipple(M3)
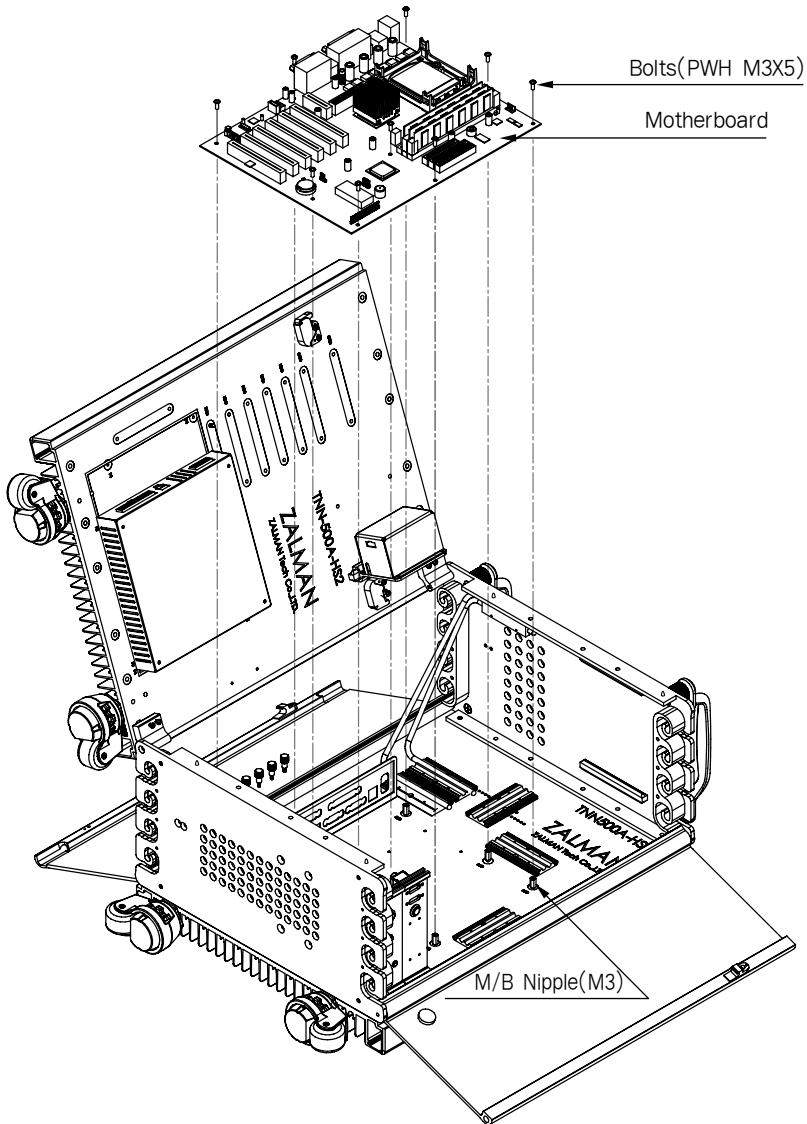
9.2 Assembling CPU Block

Parts needed for assembling the CPU Block are as follow : CPU Block Base, CPU Block Cover, CPU Heatpipes, Bolts (4 types), AMD Nipples, Case Block Cover, Clip Supports and Clips

CPU Block Base

CPU Block Cover

Case Block Covers

CPU Heatpipes

Bolt(PH M3X10)

Bolt(PH M4X20)

AMD Nipple

AMD Hand Bolt
(#6-32X40)

Clip Support

Clip

Intel Hand Bolt
(#6-32X52)
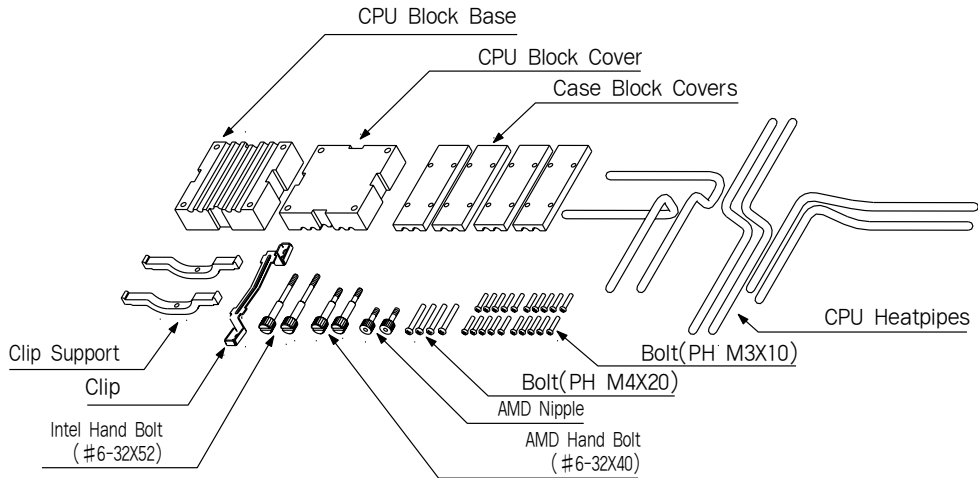
1. Installing CPU Block Base

Spread the thermal grease thinly onto the surface of the CPU core. Then, install the CPU Block Base in a manner that the Heatpipe Grooves are facing upwards, as seen in the diagram.

Thermal Grease

CPU Block Base

CPU Heatpipe Groove
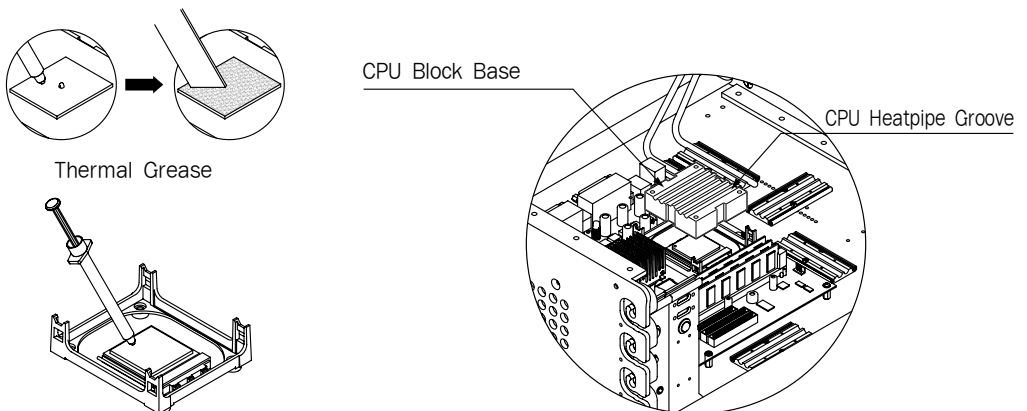
2. Determining Location to place CPU Heatpipes

(1) Taking note of the diagram below, place the CPU Heatpipes on the CPU Block Base in the order shown. Check to see that the CPU Heatpipes are fitted properly into the Heatpipe Grooves on the CPU Block Base.

Note) 1) The opposite ends of the heatpipe look different (round vs. sharp). The round end should be placed toward the heat source (CPU Block).

2) If CPU heatpipes are not fully inserted into the CPU Block Base due to distance, Use longer heatpipes named as "CPU Heatpipe-L" instead. "CPU Heatpipe-L" is optional.

Case Block Base

Case Block Base

TNN 500A-HS1

ZALMAN
ZALMAN Tech Co.,Ltd.

TNN 500A-HS1

ZALMAN
ZALMAN Tech Co.,Ltd.

CPU Heatpipes

CPU Heatpipes

CPU Block Base

CPU Block Base
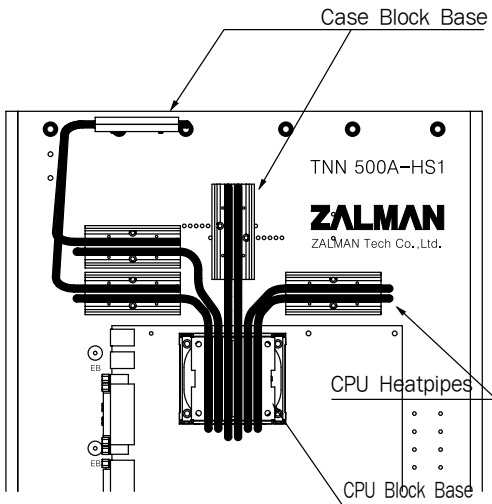
Originally provided CPU-Heatpipe fits!
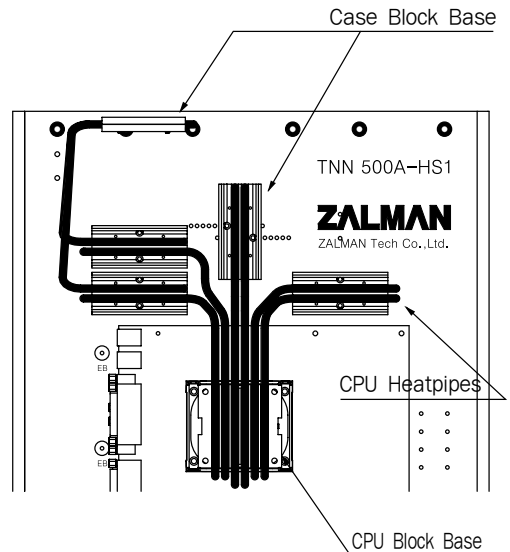
Only CPU Heatpipe-L fits!
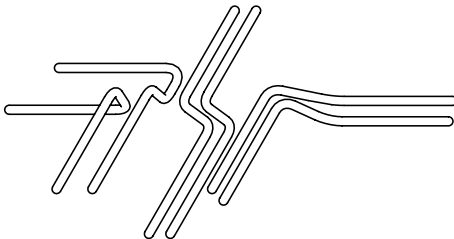
CPU Heatpipe Set
(Originally Provided with TNN 500A)
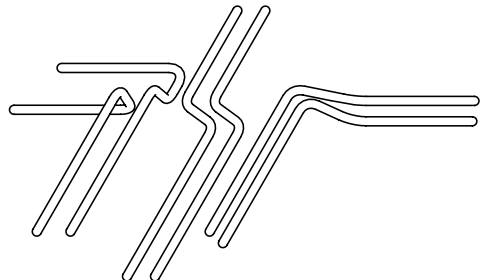
CPU Heatpipe-L Set
(Option)

English

2. In order to properly apply the thermal grease and determine the proper location for the CPU heatpipes, the Case Block Bases on the Right Heatsink Plate must be removed. Unscrew the Case Block Base fastening bolts located on top of the bases (FH M3X6) counterclockwise by one turn, and completely unscrew the Case Block Base fastening bolts located on the Right Heatsink Plate (PH M3X7) so the Case Block Bases can be moved to the left and right and the CPU Heatpipes can be fitted properly. Apply thermal grease to the bottom of each of the Case Block Bases, and using the Case Block Base fastening bolts for the Top Plate (FH M3X16) and those for the Right Heatsink Plate (PH M3X7), reinstall the Case Blocks.

Note) The bottoms of the Case Block Bases, except for the one for the Top Plate, do not initially have thermal grease applied thereon.

Case Block Base

CPU Block Base

CPU Heatpipe

Appropriately position the Case Blocks

Installation Holes for installing Case Blocks in various positions

Thermal Grease

Case Block Base

Case Block Cover

Bolt(FH M3X16)

Top Plate

Bolts(PH M3X7)
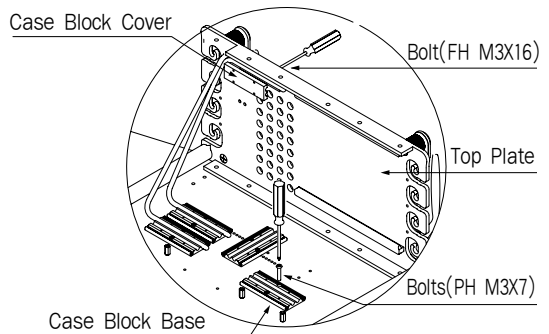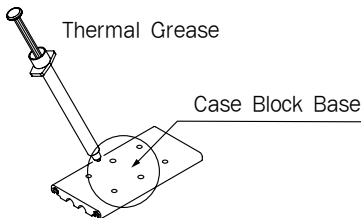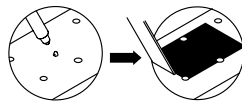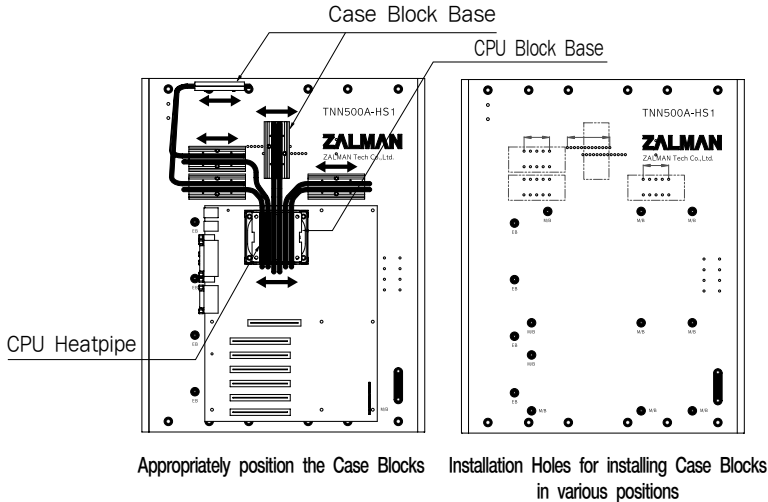
Case Block Base

3. To install the CPU Heatpipes,

　the CPU Block Base and the Case Block Base should first
　have thermal grease spread thinly on the heatpipe grooves
　where the heatpipes are to be placed.

Case Block Base
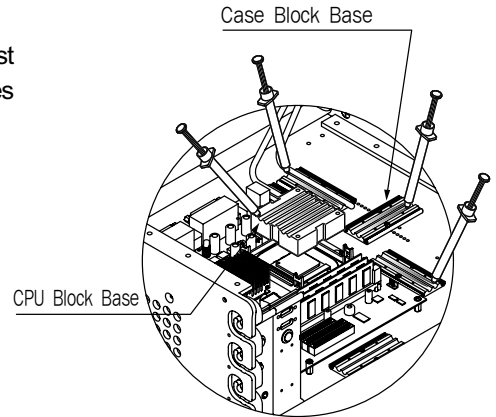
CPU Block Base

4. Fasten the CPU Block cover onto the CPU Block
　Base using bolts (PH M4X20).

　Note) Make sure the CPU Heatpipes over the Case Block
　　　　Bases are not hovering or movable.

CPU Heatpipe

Bolts(PH M4X20)
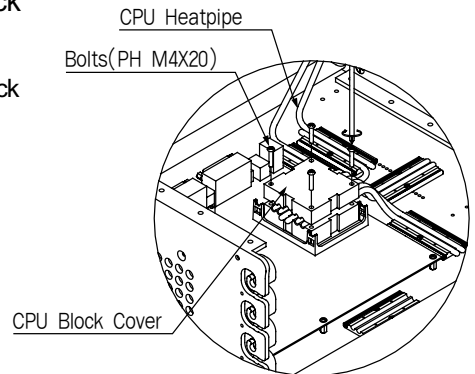
CPU Block Cover

5. Fasten the four (4) Case Block Covers onto the
　Case Block Bases using the unscrewed bolts
　(PH M3X10).

Case Block Cover

Bolts(PH M3X10)
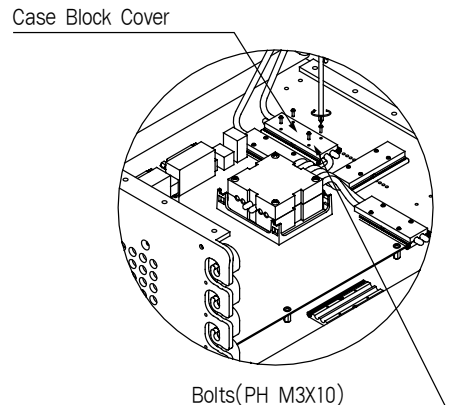
6. Fastening the CPU Block Cover

1) For Intel Pentium 4 CPU

(1) Place the Clip on the CPU Block Cover and insert the Intel hand bolts (#6-32X52) into the Inner Holes.

(2) Screw the bolts on the both sides of the clip support slightly, then tighten them incrementally in an alternating manner until complete.

Intel Hand Bolt
(♯6-32X52)

CPU Block Cover

Clip

Inner Hole

Clip Support

Intel P4(Socket 478)
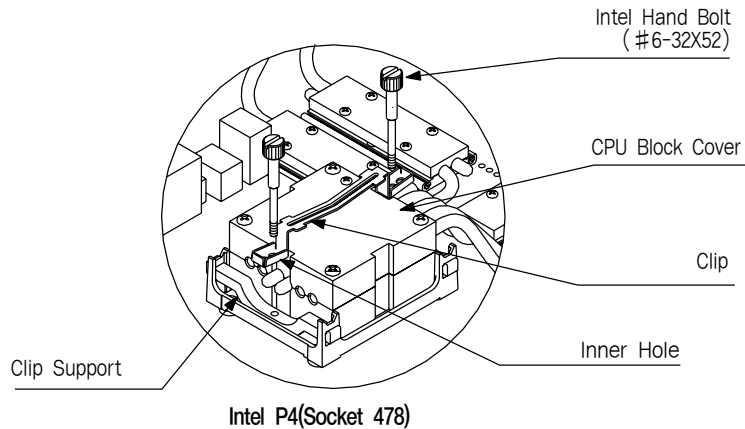
2) For AMD Athlon 64 CPU

(1) Place the Clip on the CPU Block Cover and insert the AMD hand bolts (#6-32X40) into the Outer Holes.

(2) Screw the bolts on the both of the AMD Nipples slightly, then tighten them incrementally in an alternating manner until complete.

AMD Hand Bolt
(♯6-32X40)

Clip

Outer Hole

AMD Nipple

AMD Athlon 64(Socket 754)
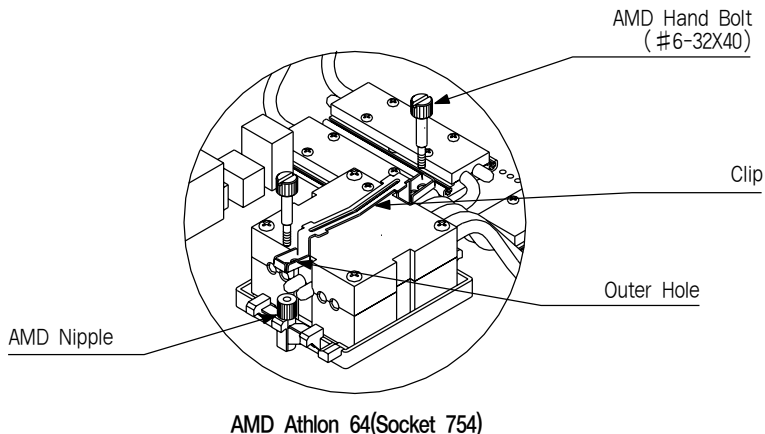
9.3 Graphics Card & VGA Cooler

1. Parts needed for assembling the VGA Block are as follows : VGA Block Base Assembly, VGA Block Cover, VGA Case Block Cover, VGA Heatpipes, Bolts (2 types), VGA Nipples, and Rubber Rings.

   Note) VGA Heatpipes should be organized in the order in which they are removed, as they will be reassembled in the same order.

VGA Block Base Assembly   VGA Block Cover

VGA Case Block Cover   Bolt (PH M3X10)   VGA Hand Bolt (M3X13)   VGA Nipple   Rubber Ring   VGA Heatpipe
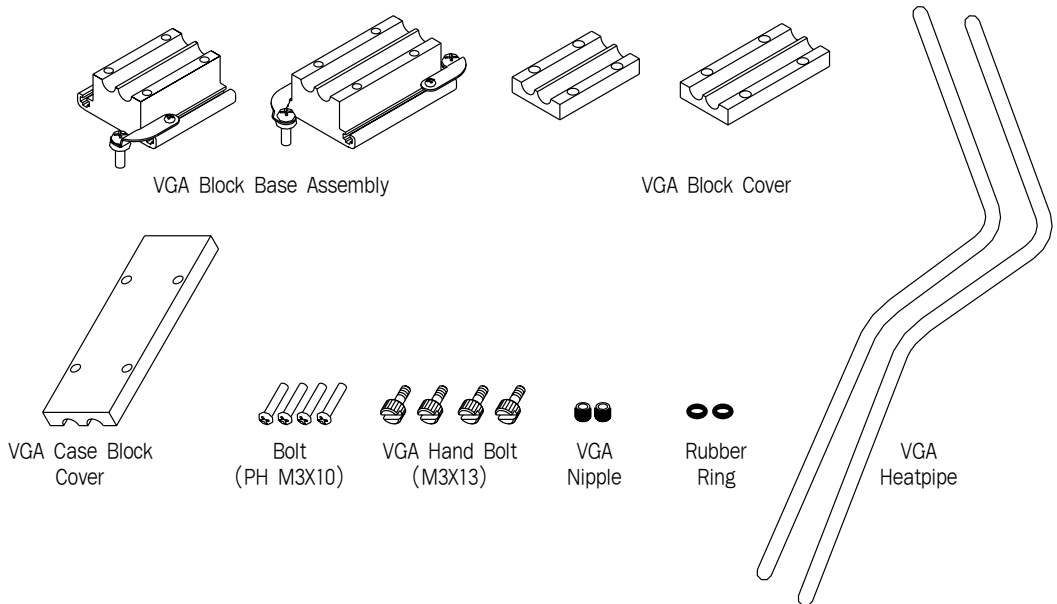
2. Remove the stock cooler on the graphics card and spread the thermal grease thinly onto the exposed GPU (VPU).

    Note) 1) Clean off the contact surfaces of the GPU (or VPU, Video Chipset) and the VGA Block Base thoroughly.

        2) When spreading the thermal grease thinly onto the GPU (VPU), a piece of cardboard paper can be used to aid in spreading. (Most GPUs (VPUs) located on the video card have a concave surface and need more thermal grease at the center.GPUs (VPUs) with a protective frame for the core especially need to have a lot of thermal grease applied.)

Thermal Grease

GPU (VPU)

Protective Frame for Core

Graphics Core

‹When Protective Frame for Core is Present›
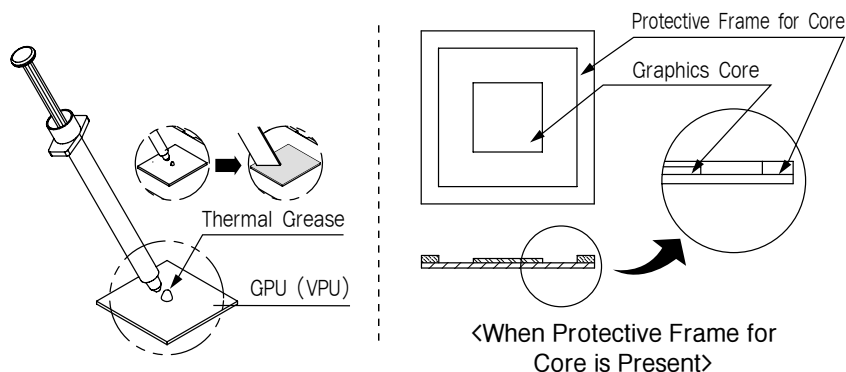
3. Check the holes around the core and choose the right VGA Block Base for Assembly.

    Note) This product has VGA Block Bases of two (2) different sizes. If your video card is based on the GeForce4 Ti or your video card has heatsink mounting holes that are spaced far apart, it is necessary for you to use VGA Block Base B. Otherwise, use VGA Block Base A. (The difference between VGA Block Base A and B is that A is shorter than B.)
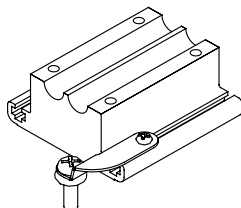
VGA Block Base Assembly A
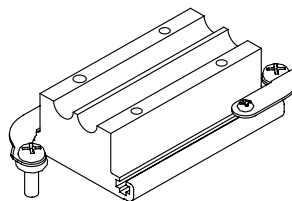
VGA Block Base Assembly B

4. Installing VGA Block Base

   1) The VGA Block Base should be centered and tightly pressed onto the center of the GPU (VPU).

   2) Unscrew the bolts (PH M2X4) one turn, and rotate the Plate Spring to insert the bolts (PH M3X10) into the Heatsink Mounting Hole.

     Note) 1) Do not unscrew the bolts (PH M2X4) completely.

           2) If the Plate Spring separates from the VGA Block Base, fasten the bolt (PH M2X4) and the nut onto the Plate Spring and insert the Plate Spring into the groove on the VGA Block Base.

  3) After the VGA Block Base is properly centered on the GPU (VPU), tighten the bolts (PH M2X4).

     Note) VGA Block Base A and VGA Block Base B have different types of Plate Springs. Use the Plate Springs that do not interfere with the components of the graphics card.

English
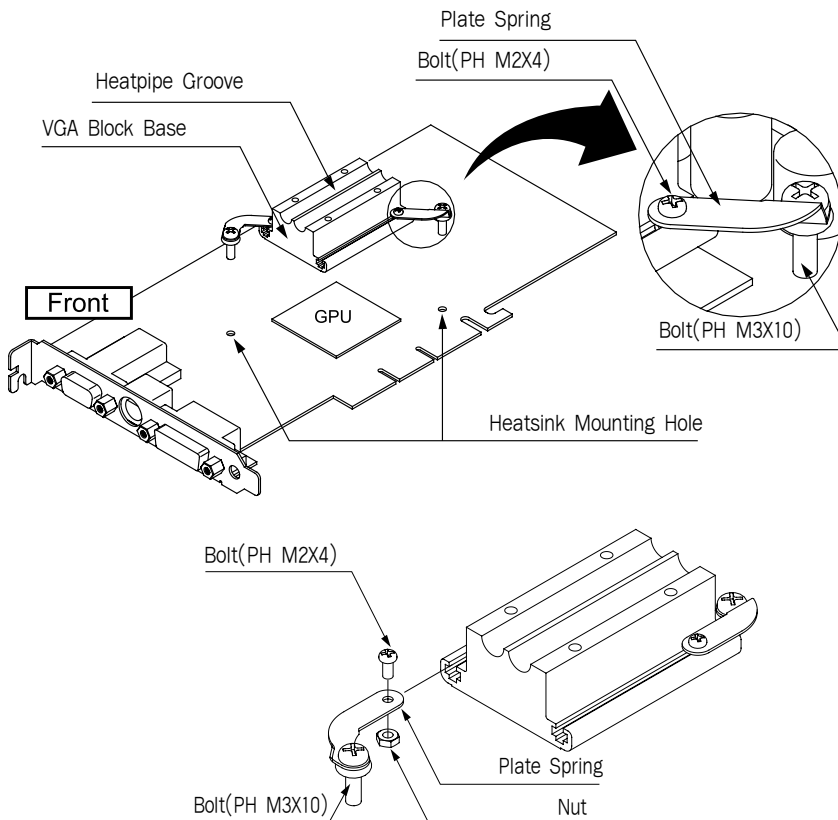
5. Assembling Rubber Rings and VGA Nipples

    1) Slide a Rubber Ring onto each bolt (PH M3X10) protruding out of the back of the graphics card.

    2) Screw the VGA Nipples onto the bolts by holding the VGA Nipple with one hand and tightening the bolt with a screwdriver in the other.

    Note) Do not rotate the nipple, but tighten only with the screwdriver, in order to avoid tearing the Rubber Ring.
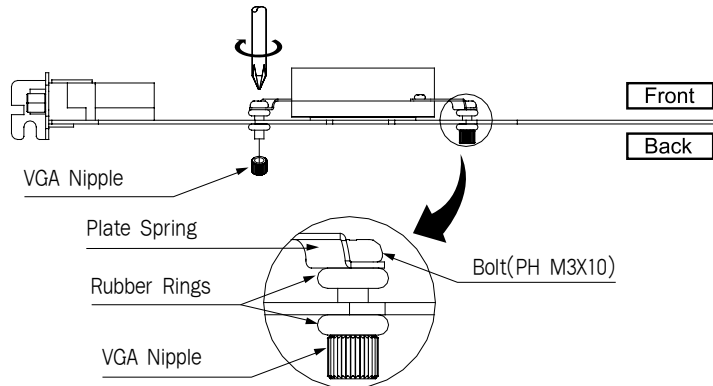
6. Evenly spread the thermal grease onto the grooves in the VGA Block Base. Then, place the VGA Heatpipes as shown in the diagram and screw on the VGA Hand Bolts (M3 X 13) just enough for movement of the VGA Heatpipes to be possible.

    Note) 1) There are two types of VGA Heatpipes. Refer to the diagram for proper installation of each. As shown below, the shorter heatpipe goes below the longer heatpipe.

        2) The opposite ends of the heatpipe look different (round vs. sharp). The round end should be placed toward the heat source (VGA Block).

Correct Placement of the Two VGA Heatpipes
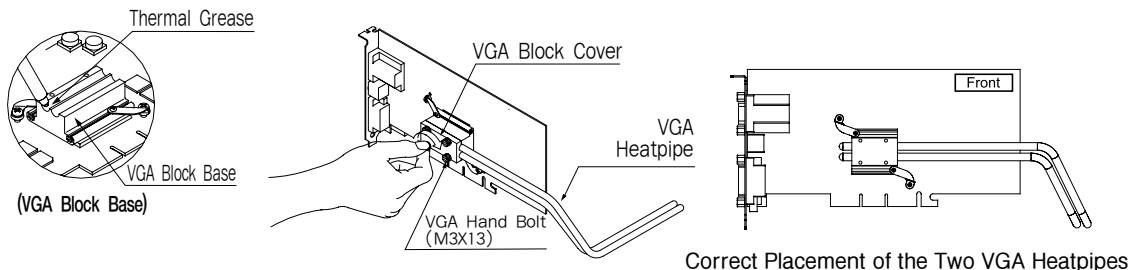
7. Insert into the AGP slot the graphics card with the VGA Heatpipes installed and move the VGA Heatpipes around until they properly fit the grooves of the VGA Case Block Base. If the VGA Case Block and VGA Heatpipe do not fit well, either disassemble the VGA Block Base and move it, or modify the VGA Heatpipe's shape slightly and determine where the VGA Block Base will be located in regards to the Right Heatsink Plate.

Note) 1) The graphics card will be reinstalled once more, so the card should not yet be fixed to the Card Fix Bar using the Card Fix Bolts.

2) There are many types of graphics cards. Thus, the VGA heatpipes may not fit well in the grooves on the Case Block Base. In this case, the user needs to reshape the heatpipes to better fit the grooves.

3) If the VGA Heatpipes for the VGA Cooler bend below the Datum Line, the heatpipes will not function properly and the GPU (VPU) may become damaged. Check if this is the case before proceeding.
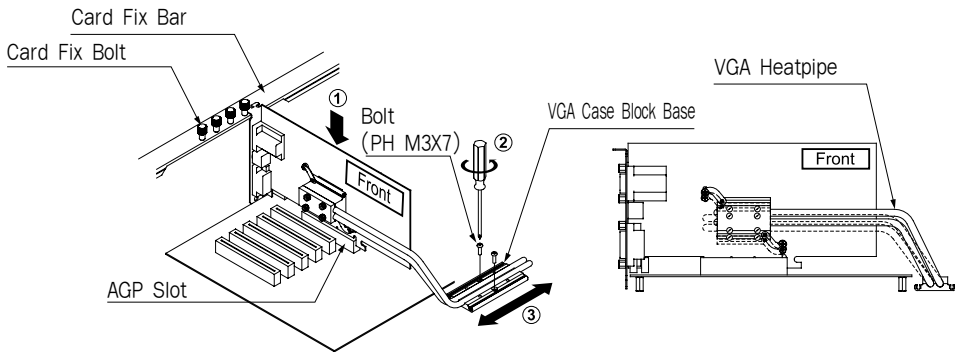
Disassembly of VGA Case Block Base   Heatpipe Modification
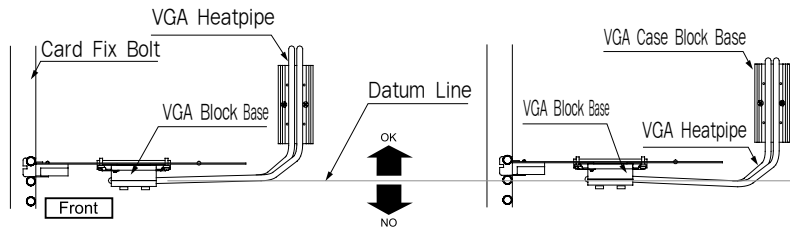
Heatpipe Properly Installed (O)   Heatpipe Improperly Installed (X)

Proper Installation of the Heatpipe for the VGA Cooler

8. Remove from the AGP slot the graphics card with the VGA Heatpipes installed and spread thermal grease on the bottom of the VGA Case Block Base. Then, fasten the VGA Case Block Base onto the Right Heatsink Plate using the bolts (PH M3X7) and spread thermal grease where the VGA Heatpipes will come in contact with the VGA Case Block Base.
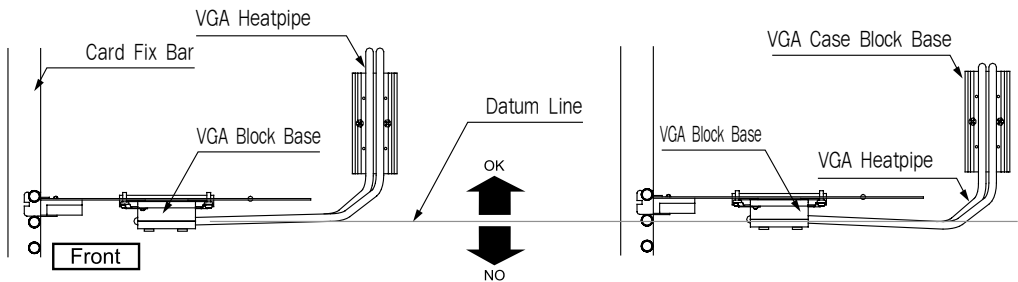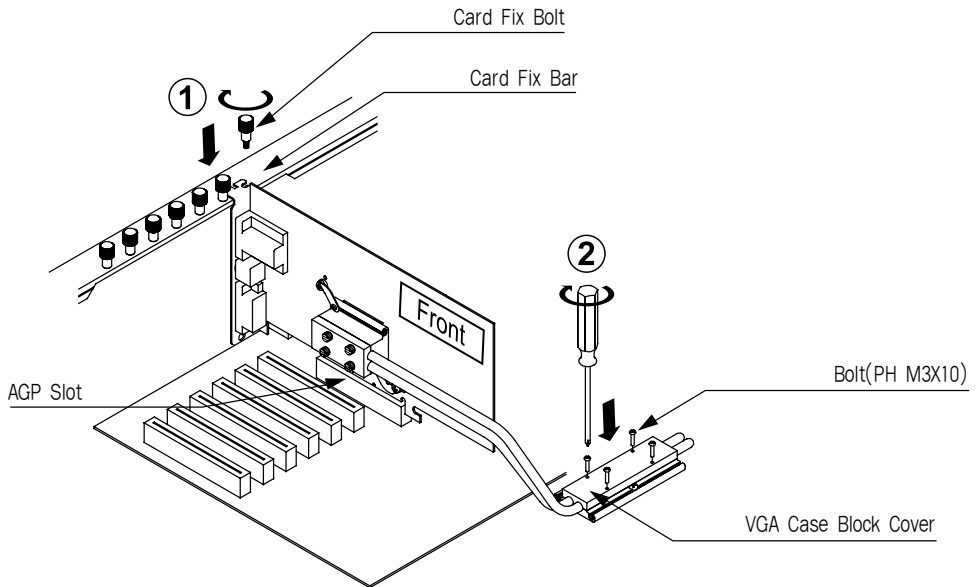

Thermal Grease

Bolt(PH M3X7)

English
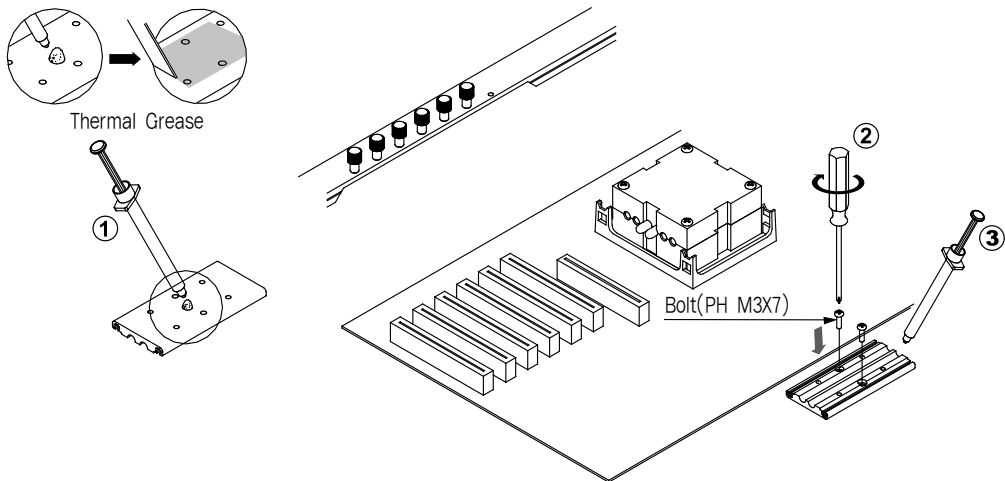
9. On the graphics card, completely tighten the VGAblock Base and the VGAblock Cover together with the VGA hand bolts (M3X13).

VGA Hand Bolt(M3X13)

VGA Block Heatpipe

VGA Block Base

ZALMAN
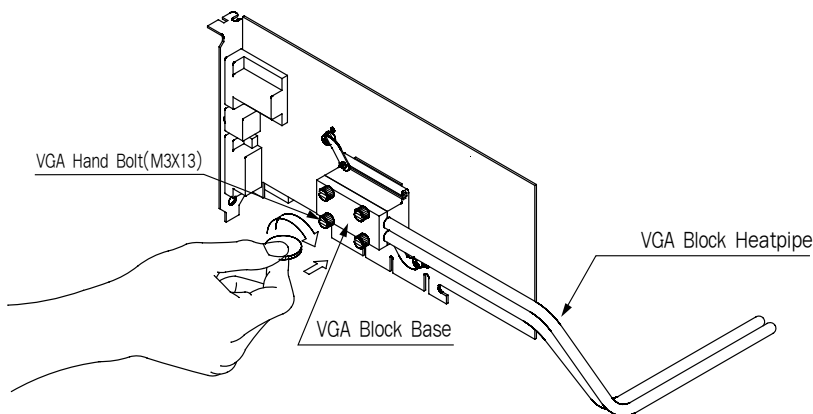
10. Reinsert into the AGP slot the graphics card with the completely assembled VGA Block and fix the card to the Card Fix Bar using the Card Fix Bolt. Completely tighten the VGA Case Block Cover with the bolts (PH M3X10).

Note) Confirm once more that the VGA Heatpipes are properly installed as in the following diagram.

Card Fix Bolt

Card Fix Bar

①

②

Front

AGP Slot

Bolt(PH M3X10)

VGA Case Block Cover

VGA Heatpipe

Card Fix Bar

VGA Case Block Base

VGA Block Base

Datum Line

VGA Block Base

OK

VGA Heatpipe

Front

NO

Heatpipe Properly Installed (O)   Heatpipe Not Properly Installed (X)

Proper Installation of the Heatpipe for the VGA Cooler

English

9.4 Connecting Cables

1. Connect the power cables to the HDD/ODD/Motherboard/ Graphics Card and the data cables to the HDD/ODD.

2. Refer to the motherboard installation manual and insert the Switch Panel connectors into the correct jumper pins on the motherboard.The Switch Panel's Power LED uses a 3-pin connector by default : if the motherboard requires a 2-pin connector, replace the Switch Panel connector accordingly (a 2-pin connector is included with the product).

   Note) 1) Each of the switch Panel's connectors have labels indicating which jumper pins to connect the to.
      2) Unscrewing the Right Heatsink Plate's bolts (PH M4X12) counterclockwise by one turn enables the panel's location to be adjusted or completely disassemble.

Switch Panel
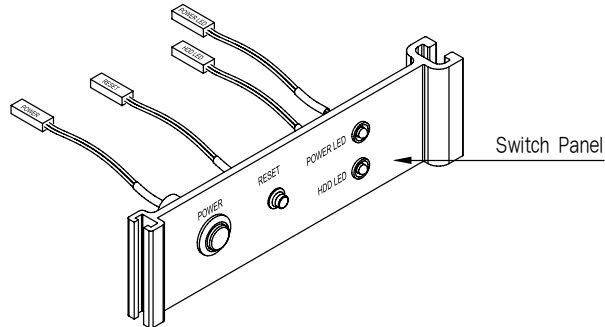
3. Refer to the motherboard installation manual and connect the USB lines to the USB extension header and the LED Lamp's 3-pin connector to the motherboard's 3-pin fan header. Opening the TNN 500A's Front and Back Door and turning the LED Lamp switch on will let you see the USB's working state by light.

   Note) Unscrewing the Right Heatsink Plate's bolts (PH M4X12) counterclockwise by one turn enables the panel's location to be adjusted or completely disassembled.


USB & LED Lamp Panel

ZALMAN
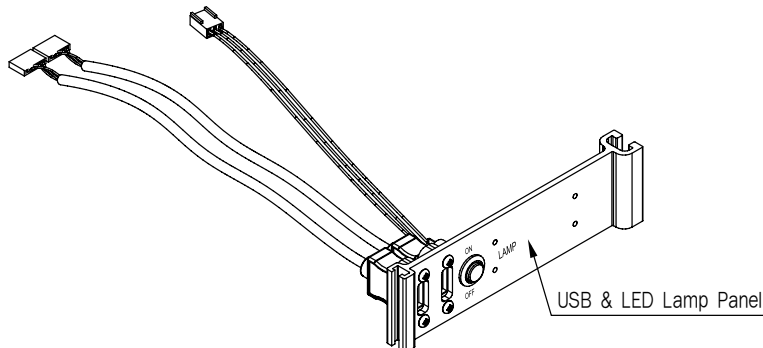
9.5 Reassembling the Left Heatsink Plate

Reassemble the Left Heatsink Plate which was initially removed. The reassembly steps are the reverse of the disassembly steps.

L-Wrench

Bolt(SH M5X12)

②

③

Left Heatsink Plate

①

①

Back Door

Caster

Front Door

English
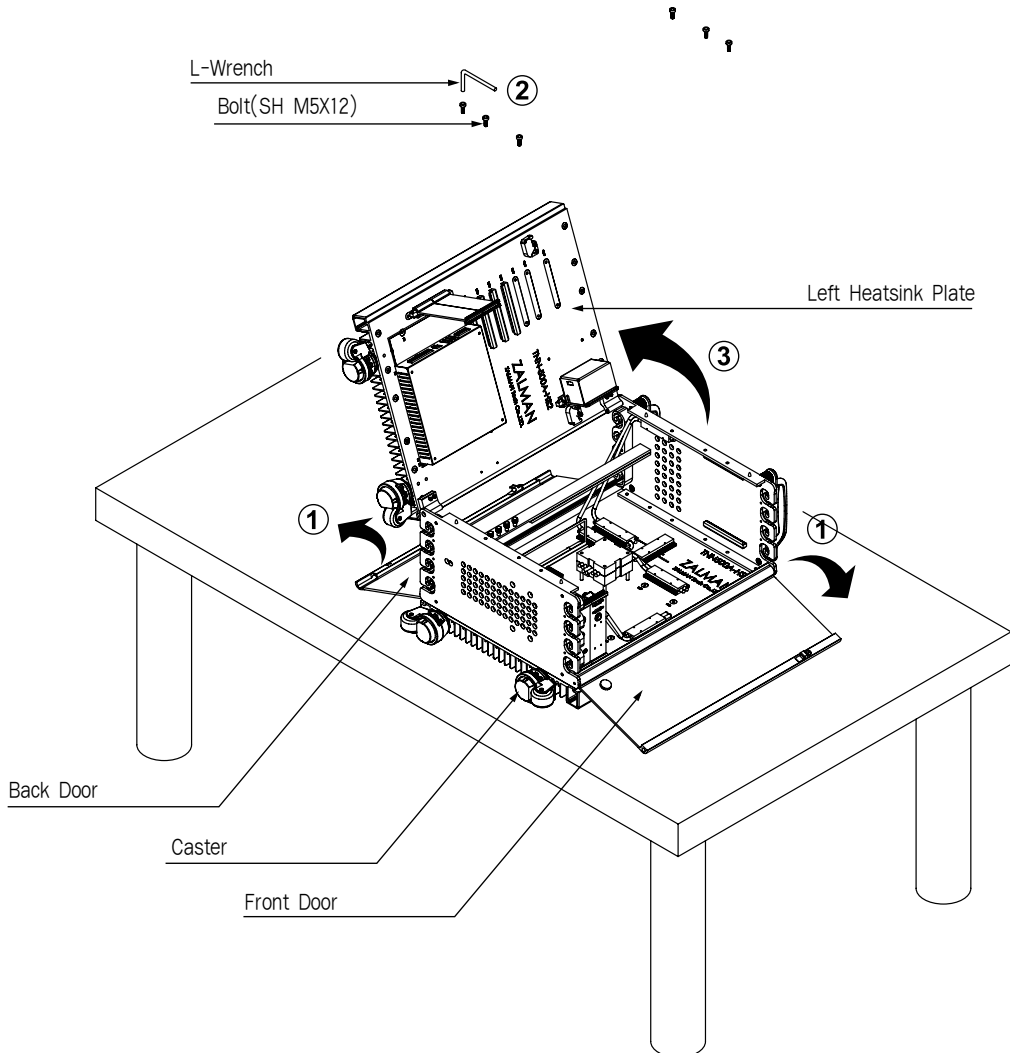
9.6 Adjusting the Front/Back Door

If the Front/Back Door does not fit well, you can adjust the Push Lock, which is located on the Left Heatsink Base, by unscrewing its bolts (PH M3X15) by a small fraction of a turn.
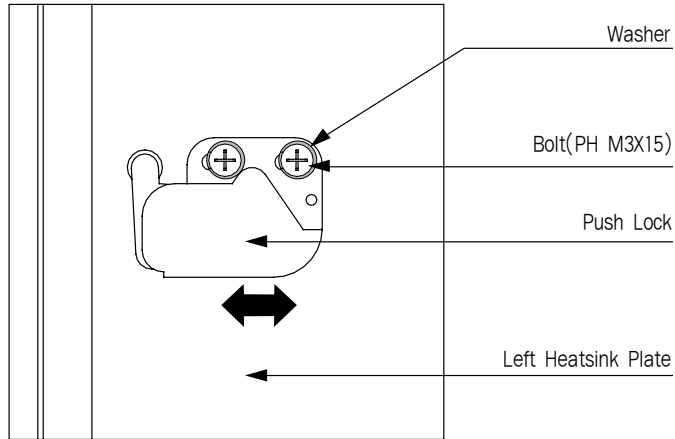
9.7 Installing the HDD & ODD

1. The HDD and ODD can be installed either on the HDD/ODD Bracket or on the bottom of the case as shown in the diagram. Determine the installation location of your HDD/ODD.
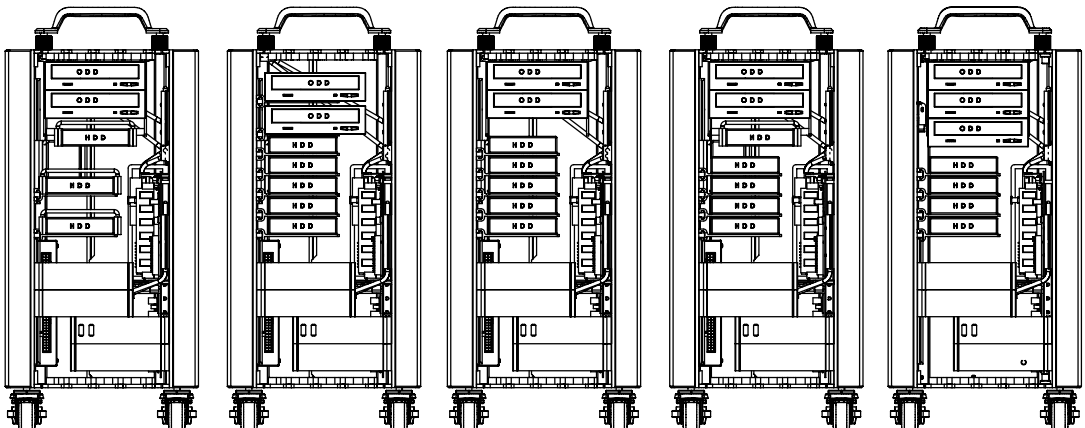
Five Examples of HDD & ODD Installations

2. Installing the HDD Cooler

Parts required for assembling the HDD Cooler are:Bolts (2 types), Ground Wire, and Damper.
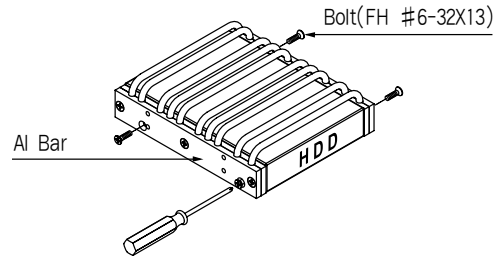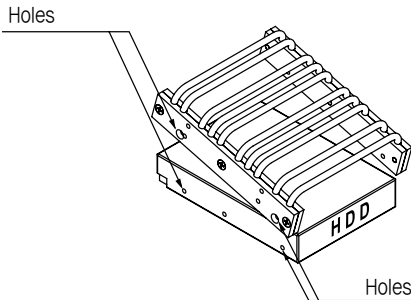
Damper　　　　　Bolt(PH #6-32X7)　Bolt(FH #6-32X13)　　　　　　Ground Wire
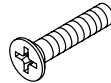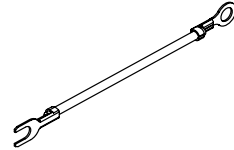
1) Confirm the location of the holes and place the HDD Cooler over the HDD. Using four (4) bolts (FH #6-32X13), fasten the HDD onto the Al Bar.
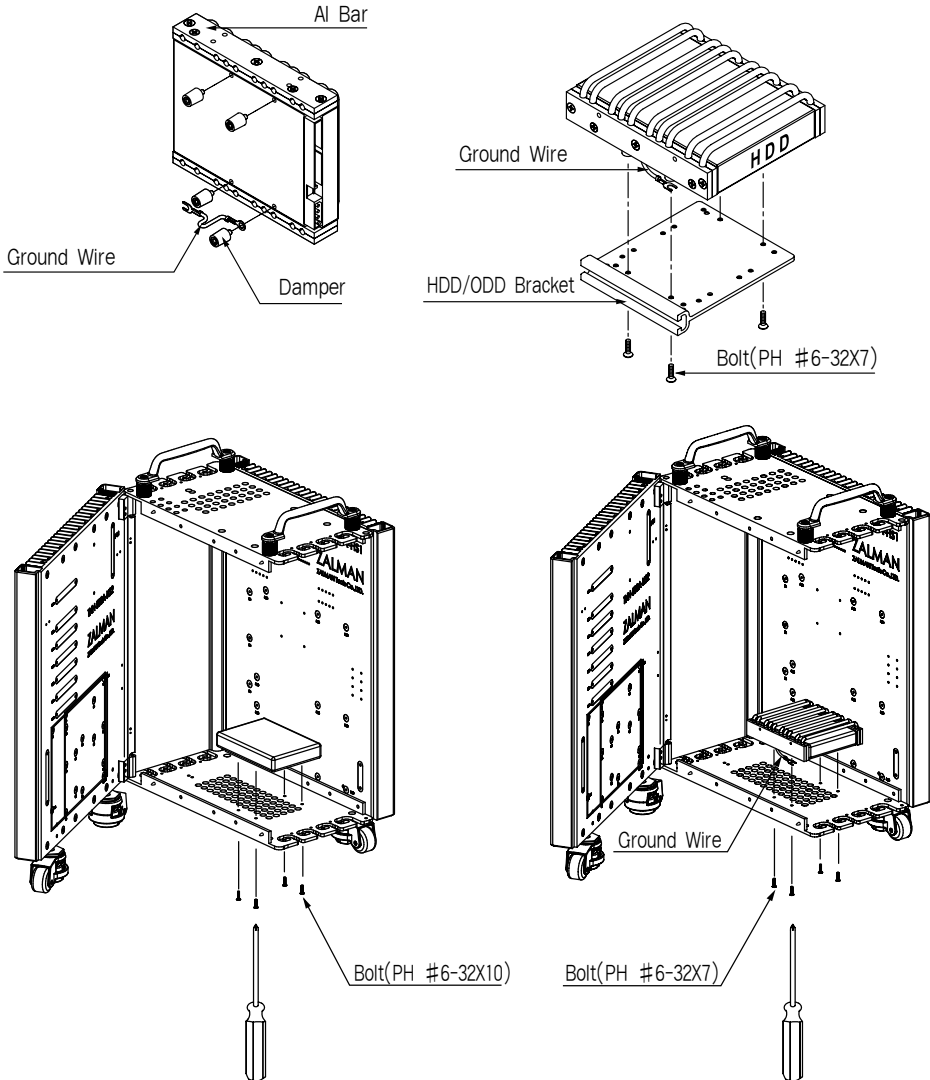
Holes

Bolt(FH #6-32X13)

Al Bar

Holes

2) Install on the HDD/ODD Bracket
　(1) Put four (4) Dampers on the Al Bar. While doing this, use one of the Dampers to connect the round terminal of the Ground Wire to the Al Bar. Fasten the completed assembly onto the HDD/ODD Bracket. Then, connect the Y terminal of the Ground Wire to the HDD/ODD Bracket.

HDD/ODD Bracket

Damper

Ground Wire

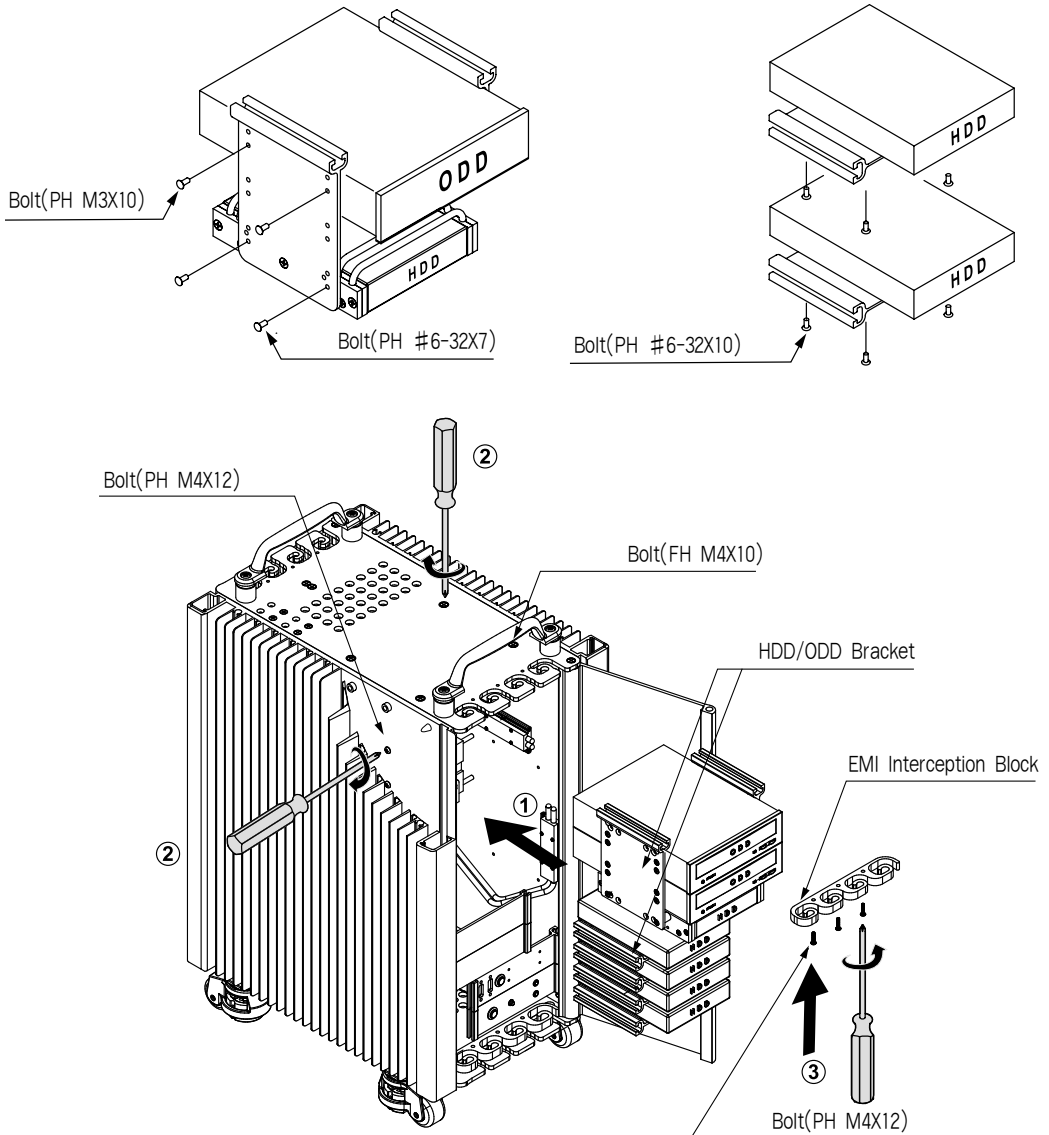Al Bar

Ground Wire

Bolt(PH #6-32X7)

English
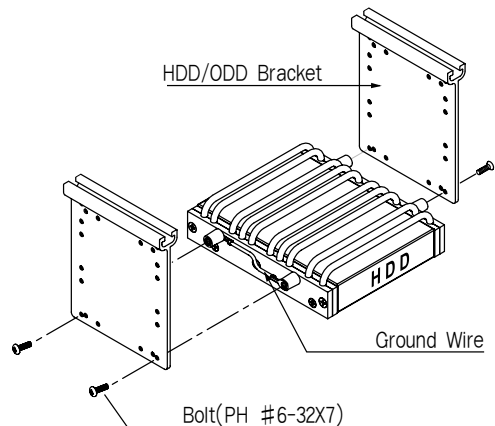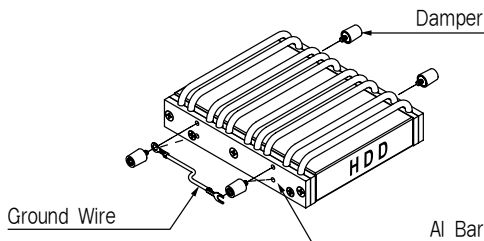
(2) Put four (4) Dampers on the holes on the bottom of the HDD. While doing this, use one of the Dampers to connect the round terminal of the Ground Wire to the Al Bar. Fasten the completed assembly onto the HDD/ODD Bracket. Then, connect the Y terminal of the Ground Wire to the HDD/ODD Bracket or the case.

Note) The HDD can be installed on the bottom of the case as shown in the diagram.

Al Bar

Ground Wire

Ground Wire

Damper

HDD

HDD/ODD Bracket

Bolt(PH #6-32X7)

Bolt(PH #6-32X10)   Bolt(PH #6-32X7)

Ground Wire

ZALMAN

3. After installing the HDD and ODD on the HDD/ODD Bracket as shown in the diagram, slide the bracket
into the TNN 500A. Using a screw driver, tighten the bracket fastening bolts (PH M4X12, FH M4X10) on
the top and side of the TNN 500A and install the EMI Interception Block.

Bolt(PH M3X10)

ODD

HDD

Bolt(PH #6-32X7)

HDD

HDD

Bolt(PH #6-32X10)

Bolt(PH M4X12)

②

Bolt(FH M4X10)

HDD/ODD Bracket

EMI Interception Block

①

②

③

Bolt(PH M4X12)

9.8 Installing a PCI Card

Insert the desired PCI card into a PCI slot and use the Card Fix Bolt to fix the card to the Card Fix Bar.

Note) If you wish to install a PCI card after assembling the case, do not separate the Left Heatsink Plate, but simply open the Back Door and use the Card Fix Bolt to install.

9.9 Installing the Clamp Filter

1) Insert the power cable into the middle of the Clamp Filter and make a loose loop.

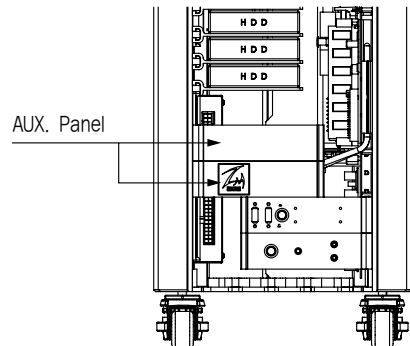2) Close the Clamp Filter and pull both ends of the power cable tightly so that the Clamp Filter does not dangle.

> **Note)** Where to use the Clamp Filter :
>   · 30 ∅ : Power cable, video cable, printer cable, etc.
>   · 20 ∅ : Mouse & keyboard cable, LAN cable, etc.
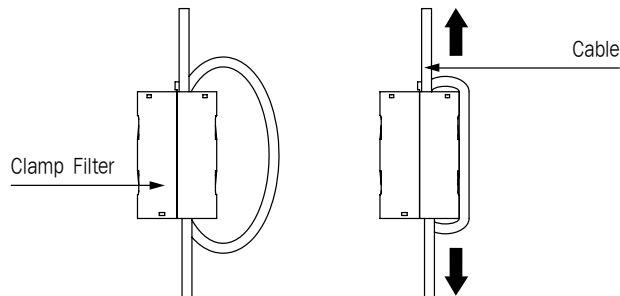
9.10 AUX. Panel

The AUX. Panel can be modified to install accessories or devices of choice.

10. Checklist before plugging in

1. Has thermal grease been applied to all eight block bases of the CPU, the VGA card and the Case?

2. Hase thermal grease be applied to the contact area of CPU/VGA/Case blocks that touch the heatpipes?

3. Have all heatpipes tightened?

4. Are the VGA heatpipes installed as in the picture below?
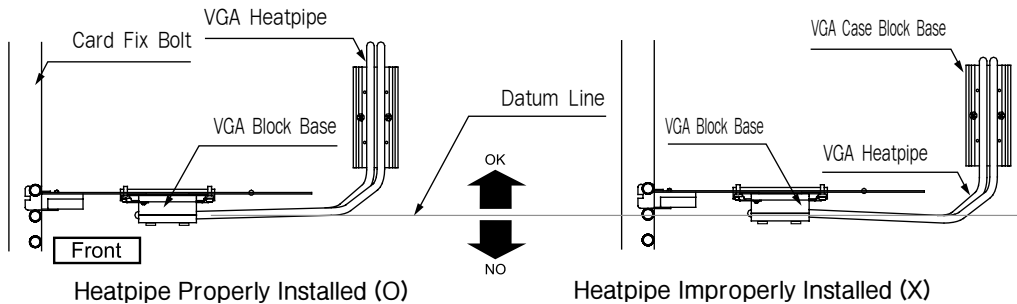
Proper Installation of the Heatpipe for the VGA Cooler

5. Have unused motherboard retaining nipples been removed?

6. Is the ground wire of the HDD Cooler is connected?

7. Is the system installed on a flat, level and solid surface?

8. Has the power supply been set to the correct voltage, i.e., 110V or 220V?

9. Has the product been fixed with the caster mounts?

10. Please be fully aware of the safety notice on the inside of the back door.

11. Miscellaneous

English

If attempting to overclock, use an electric fan to cool the system.

Zalman Tech Co., Ltd. is not responsible for any damage to a system or a CPU caused by overclocking.