Lanner

Telecom Datacenter Appliances

Innovative Platforms for Next Generation Network Infrastructure

HLM-1101
User Manual

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About this Document

This manual describes the overview of the various functionalities of this product, and the information you need to get it ready for operation. It is intended for those who are:
- responsible for installing, administering and troubleshooting this system or Information Technology professionals.
- assumed to be qualified in the servicing of computer equipment, such as professional system integrators, or service personnel and technicians.

The latest version of this document can be found on Lanner's official website, available either through the product page or through the Lanner Download Center page with a login account and password.

Icons Descriptions

This document utilizes different icons to make selected text more transparent and explicable to users. Please note that this document contains the following conventions:

Icon	Usage
Note or Information	This mark indicates that there is something you should pay special attention to while using the product.
Warning or Important	This mark indicates that there is a caution or warning and it is something that could damage your property or product.

Online Resources

To obtain additional documentation resources and software updates for your system, please visit the Lanner Download Center. As certain categories of documents are only available to users who are logged in, please be registered for a Lanner Account at http://www.lannerinc.com/ to access published documents and downloadable resources.

Technical Support

In addition to contacting your distributor or sales representative, you could submit a request to our Lanner Technical Support, where you can fill in a support ticket to our technical support department.

Documentation Feedback

Your feedback is valuable to us, as it will help us continue to provide you with more accurate and relevant documentation. To provide any feedback, comments or to report an error, please email to contact@lannerinc.com, Thank you for your time.

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Federal Communication Commission Interference Statement

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

► Reorient or relocate the receiving antenna.
► Increase the separation between the equipment and receiver.
► Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
► Consult the dealer or an experienced radio/TV technician for help.

FCC Caution

► Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.
► This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Note

1. An unshielded-type power cord is required in order to meet FCC emission limits and also to prevent interference to the nearby radio and television reception. It is essential that only the supplied power cord be used.

2. Use only shielded cables to connect I/O devices to this equipment.

3. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Important

1. Operations in the 5.15-5.25GHz band are restricted to indoor usage only.

2. This device meets all the other requirements specified in Part 15E, Section 15.407 of the FCC Rules.

Safety Guidelines

Follow these guidelines to ensure general safety:
- ► Keep the chassis area clear and dust-free during and after installation.
- ► Do not wear loose clothing or jewelry that could get caught in the chassis. Fasten your tie or scarf and roll up your sleeves.
- ► Wear safety glasses if you are working under any conditions that might be hazardous to your eyes.
- ► Do not perform any action that creates a potential hazard to people or makes the equipment unsafe.
- ► Disconnect all power by turning off the power and unplugging the power cord before installing or removing a chassis or working near power supplies
- ► Do not work alone if potentially hazardous conditions exist.
- ► Never assume that power is disconnected from a circuit; always check the circuit.

Consignes de sécurité

Suivez ces consignes pour assurer la sécurité générale :
- ► Laissez la zone du châssis propre et sans poussière pendant et après l'installation.
- ► Ne portez pas de vêtements amples ou de bijoux qui pourraient être pris dans le châssis. Attachez votre cravate ou écharpe et remontez vos manches.
- ► Portez des lunettes de sécurité pour protéger vos yeux.
- ► N'effectuez aucune action qui pourrait créer un danger pour d'autres ou rendre l'équipement dangereux.
- ► Coupez complètement l'alimentation en éteignant l'alimentation et en débranchant le cordon d'alimentation avant d'installer ou de retirer un châssis ou de travailler à proximité de sources d'alimentation.
- ► Ne travaillez pas seul si des conditions dangereuses sont présentes.
- ► Ne considérez jamais que l'alimentation est coupée d'un circuit, vérifiez toujours le circuit. Cet appareil génère, utilise et émet une énergie radiofréquence et, s'il n'est pas installé et utilisé conformément aux instructions des fournisseurs de composants sans fil, il risque de provoquer des interférences dans les communications radio.

Lithium Battery Caution

- ► There is risk of explosion if the battery is replaced by an incorrect type.
- ► Dispose of used batteries according to the instructions.
- ► Installation should be conducted only by a trained electrician or only by an electrically trained person who knows all installation procedures and device specifications which are to be applied.
- ► Do not carry the handle of power supplies when moving to another place.
- ► Please conform to your local laws and regulations regarding safe disposal of lithium battery.
- ► Disposal of a battery into fire or a hot oven, or mechanically crushing or cutting of a battery can result in an explosion.
- ► Leaving a battery in an extremely high temperature environment can result in an explosion or the leakage of flammable liquid or gas.
- ► A battery subjected to extremely low air pressure may result in an explosion or the leakage of flammable liquid or gas.

Avertissement concernant la pile au lithium

- ► Risque d'explosion si la pile est remplacée par une autre d'un mauvais type.
- ► Jetez les piles usagées conformément aux instructions.
- ► L'installation doit être effectuée par un électricien formé ou une personne formée à l'électricité connaissant toutes les spécifications d'installation et d'appareil du produit.
- ► Ne transportez pas l'unité en la tenant par le câble d'alimentation lorsque vous déplacez l'appareil.

Operating Safety

- ► Electrical equipment generates heat. Ambient air temperature may not be adequate to cool equipment to acceptable operating temperatures without adequate circulation. Be sure that the room in which you choose to operate your system has adequate air circulation.
- ► Ensure that the chassis cover is secure. The chassis design allows cooling air to circulate effectively. An open chassis permits air leaks, which may interrupt and redirect the flow of cooling air from internal components.
- ► Electrostatic discharge (ESD) can damage equipment and impair electrical circuitry. ESD damage occurs when electronic components are improperly handled and can result in complete or intermittent failures. Be sure to follow ESD-prevention procedures when removing and replacing components to avoid these problems.

- Wear an ESD-preventive wrist strap, ensuring that it makes good skin contact. If no wrist strap is available, ground yourself by touching the metal part of the chassis.
- Periodically check the resistance value of the antistatic strap, which should be between 1 and 10 megohms (Mohms).

Sécurité de fonctionnement

- L'équipement électrique génère de la chaleur. La température ambiante peut ne pas être adéquate pour refroidir l'équipement à une température de fonctionnement acceptable sans circulation adaptée. Vérifiez que votre site propose une circulation d'air adéquate.
- Vérifiez que le couvercle du châssis est bien fixé. La conception du châssis permet à l'air de refroidissement de bien circuler. Un châssis ouvert laisse l'air s'échapper, ce qui peut interrompre et rediriger le flux d'air frais destiné aux composants internes.
- Les décharges électrostatiques (ESD) peuvent endommager l'équipement et gêner les circuits électriques. Des dégâts d'ESD surviennent lorsque des composants électroniques sont mal manipulés et peuvent causer des pannes totales ou intermittentes. Suivez les procédures de prévention d'ESD lors du retrait et du remplacement de composants.
- Portez un bracelet anti-ESD et veillez à ce qu'il soit bien au contact de la peau. Si aucun bracelet n'est disponible, reliez votre corps à la terre en touchant la partie métallique du châssis.
- Vérifiez régulièrement la valeur de résistance du bracelet antistatique, qui doit être comprise entre 1 et 10 mégohms (Mohms).

Mounting Installation Precautions

The following should be put into consideration for rack-mount or similar mounting installations:

- Do not install and/or operate this unit in any place that flammable objects are stored or used in.
- The installation of this product must be performed by trained specialists; otherwise, a non-specialist might create the risk of the system's falling to the ground or other damages.
- Lanner Electronics Inc. shall not be held liable for any losses resulting from insufficient strength for supporting the system or use of inappropriate installation components.
- Elevated Operating Ambient - If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature (Tma) specified by the manufacturer.
- Reduced Air Flow - Installation of the equipment in a rack should be such that the amount of airflow required for safe operation of the equipment is not compromised.
- Mechanical Loading - Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.
- Circuit Overloading - Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.
- Reliable Grounding - Reliable grounding of rack mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g. use of power strips).

Electrical Safety Instructions

Before turning on the device, ground the grounding cable of the equipment. Proper grounding (grounding) is very important to protect the equipment against the harmful effects of external noise and to reduce the risk of electrocution in the event of a lightning strike. To uninstall the equipment, disconnect the ground wire after turning off the power. A ground wire is required and the part connecting the conductor must be greater than 4 mm2 or 12 AWG.

Consignes de sécurité électrique

- Avant d'allumer l'appareil, reliez le câble de mise à la terre de l'équipement à la terre.
- Une bonne mise à la terre (connexion à la terre) est très importante pour protéger l'équipement contre les effets néfastes du bruit externe et réduire les risques d'électrocution en cas de foudre.
- Pour désinstaller l'équipement, débranchez le câble de mise à la terre après avoir éteint l'appareil.
- Un câble de mise à la terre est requis et la zone reliant les sections du conducteur doit faire plus de 4 mm2 ou 12 AWG.

Table of Contents

CHAPTER 1: PRODUCT OVERVIEW

The HLM-1101 switch blade provides 14x 100GbE QSFP28 fabric interface. It use Barefoot Tofino T10-032D switch controller. It can be installed into Lanner HTCA-6000 Series network appliances to provide 100 GbE fabric connectivity.

- ▶ Fabric interface switch blade with 14x 100GbE QSFP28
- ▶ Barefoot Tofino T10-032D 3.2Tbps bandwidth Multilayer Switch
- ▶ Compatible with HTCA-6000 Series

Package Content

Your package contains the following items:

- ▶ 1x HLM-1101 Switch Blade

Ordering Information

SKU No.	Main Features
HLM-1101A	14x 100GbE QSFP28 Switch Blade for HTCA-6000 Series w/ control board

Optional Accessories

Model	Description
Timing Module Card Kit	IEEE1588 Timing Module Kit

System Specification

Model		HLM-1101
Controller		Barefoot Tofino T10-032D switch controller
Fabric Interface		Up to 14x 100GbE Fabric Interface channels, for 6-blade system
Front Panel Interface		14x 100GbE QSFP28 Ports 2x RJ45 Ports for management and console 1x USB 2.0 Port
System Compatibility		HTCA-6000 Series
Environmental Parameters	Temperature	0 to 40°C Operating -40 to 70°C Storage
	Humidity (RH)	5% to 90% Non-condensing
System Dimensions	(WxDxH)	283.68 x 187.46 x 40mm
	Weight	3kg
Certification	CE	Class A
	FCC	Class A

Front Panel

No.	Description	
F1	LAN Port	6x 100GbE QSFP28 Ports
F2	LAN Port	4x 100GbE QSFP28 Ports
F3	LAN Port	4x 100GbE QSFP28 Ports
F4	RST Button	1x Reset Button
F5	Management Port	1x RJ45 Management Port
F6	Console Port	1x RJ45 Console Port
F7	USB Port	1x USB 2.0 Port

Motherboard Information

Block Diagram

The block diagram indicates how data flows among components on the motherboard. Please refer to the following figure for your motherboard's layout design.
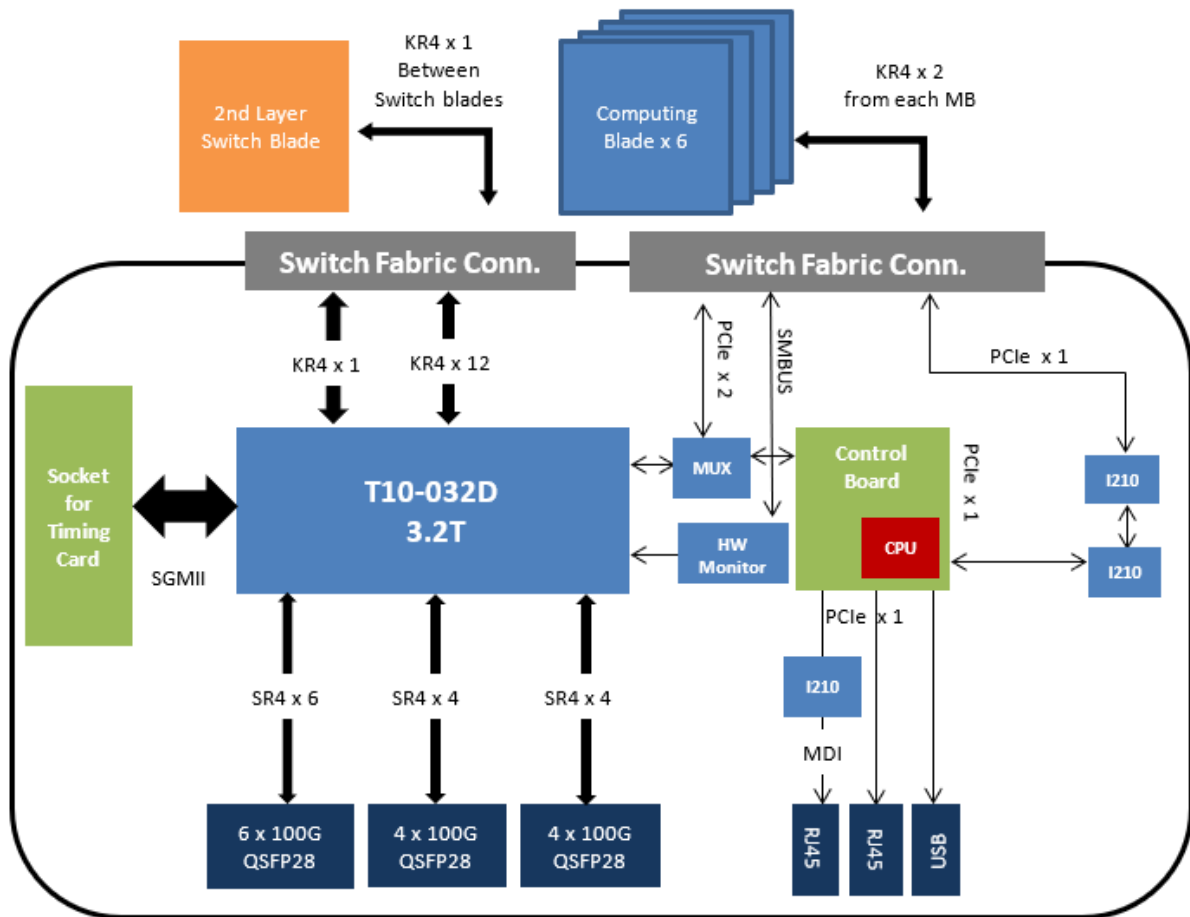
Motherboard Layout

The motherboard layout shows the connectors and jumpers on the board. Refer to the following picture as a reference of the pin assignments and the internal connectors.

Internal Jumper & Connectors

CON3: IEEE1588 Timing Card connector
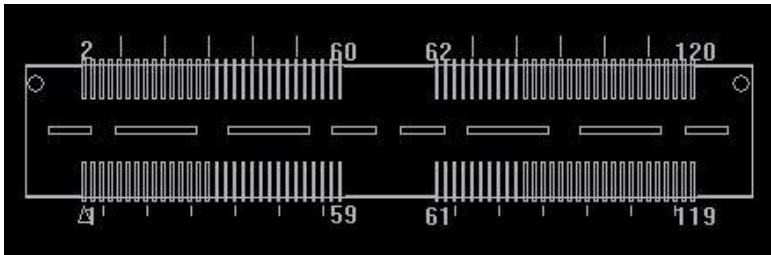
Pin	Description	Pin	Description	Pin	Description	Pin	Description
1	+12V	2	GND	61	NC	62	BSC_SCLK
3	+12V	4	GND	63	GND	64	MDIO
5	+12V	6	GND	65	NC	66	MDC
7	NC	8	FC5_TP3	67	GND	68	GND
9	NC	10	FC5_TN3	69	NC	70	NC
11	GND	12	GND	71	GND	72	NC
13	NC	14	FC5_RP3	73	25M_CLKP	74	TS_GP0_SYNC

Pin	Desc	Pin	Desc	Pin	Desc	Pin	Desc
15	NC	16	FC5_RN3	75	25M_CLKN	76	NC
17	GND	18	GND	77	GND	78	NC
19	NC	20	MGT_TP0	79	NC	80	TS_GP1_SYNC
21	NC	22	MGT_TN0	81	NC	82	GND
23	GND	24	GND	83	NC	84	IP_GPIO3_SYNC
25	NC	26	MGT_RP0	85	NC	86	NC
27	NC	28	MGT_RN0	87	GND	88	NC
29	GND	30	GND	89	156_CLKP	90	NC
31	NC	32	NC	91	156_CLKN	92	GND
33	NC	34	NC	93	GND	94	IP_GPIO1_4K
35	GND	36	GND	95	NC	96	IP_GPIO2_1PPS
37	NC	38	NC	97	NC	98	GND
39	NC	40	NC	99	GND	100	Module_Reset#
41	GND	42	GND	101	N/A	102	N/A
43	NC	44	NC	103	N/A	104	N/A
45	NC	46	NC	105	N/A	106	N/A
47	GND	48	GND	107	N/A	108	N/A
49	DPLL_CLK2	50	NC	109	N/A	110	N/A
51	GND	52	UART_TX	111	N/A	112	N/A
53	DPLL_CLK1	54	UART_RX	113	N/A	114	N/A
55	GND	56	NC	115	N/A	116	N/A
57	NC	58	NC	117	N/A	118	N/A
59	GND	60	BSC_SDAT	119	N/A	120	N/A

P1: Power Connector (Press-fit)

Pin	Description	Pin	Description
B1A	+12V	A1A	GND
B1B	+12V	A1B	GND
B1C	+12V	A1C	GND
B1D	+12V	A1D	GND
B1E	+12V	A1E	GND
B1F	+12V	A1F	GND
B1G	+12V	A1G	GND
B1H	+12V	A1H	GND
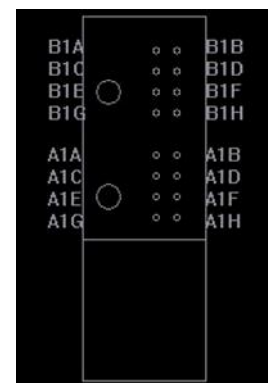
CHAPTER 2: HARDWARE SETUP

To access some components and perform certain service procedures, you must perform the following procedures first.

⚡ **Warning**: To reduce the risk of personal injury, electric shock, or damage to the equipment, remove the power cord to remove power from the server. The front panel Power ON/Standby button does not completely shut off system power. Portions of the power supply and some internal circuitry remain active until AC power is removed.

Accessing the Switch Blade(s)

The HTCA-6000 series is a system that provides two to six externally accessible LAN I/O blades, and/or switch blades, varies depending on ordered configurations. Please follow the steps below to access the switch blades.

1. Select a switch blade you wish to access. Pull the two lever locks inwards.

2. Then, rotate and loosen the captive screws above the lever locks.

3. Hold on to the two lever locks on each side and push outwards to gently pull out the switch blade.

4. Repeat the steps to insert a new switch blade.

CHAPTER 3: ONIE INSTALLATION MANUAL

Files Required:

Install ONIE binary and boot Image:

[ONIE boot ISO image](#)

[ONIE installation binary](#)

ONIE version: 2021.05-rc1

Make bootable ONIE USB from ISO

Copy bootable ONIE ISO (onie-recovery-x86_64-lanner_hmb_1100-r0.iso) into USB(/dev/sdb)

```
dd if=onie-recovery-x86_64-lanner_hmb_1000-r0.iso of=/dev/sdb
```

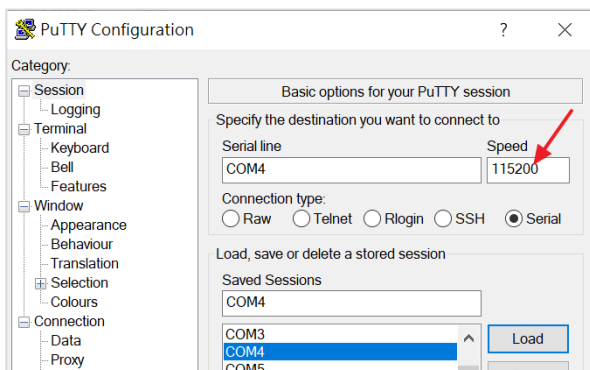## Make ONIE installation binary

Format USB drive to FAT32 Copy updater-x86_64-lanner_hmb_1100-r0 into USB

Hardware Setup

1. Plugin console port on the switch

2. Plugin USB drive on the switch

3. Set console serial baud rate on putty to 115200

4. Power on the compute blade to power up the switch blade.

BIOS Boot with ONIE USB

GRUB select Embed ONIE

Install ONIE to HD

1. Clear storage device (SDA) partition table inside HLM-1101 Switch Blade.

```
ONIE-RECOVERY:/ # onie-stop
discover: ONIE embed mode detected.
Stopping: discover... done.
ONIE-RECOVERY:/ # dd if=/dev/zero of=/dev/sda bs=1M count=20
20+0 records in
20+0 records out
20971520 bytes (20.0MB) copied, 0.120636 seconds, 165.8MB/s
ONIE-RECOVERY:/ # fdisk /dev/sda
Device contains neither a valid DOS partition table, nor Sun, SGI, OSF or
GPT disklabel
Building a new DOS disklabel. Changes will remain in memory only,
until you decide to write them. After that the previous content
won't be recoverable.
```

```
The number of cylinders for this disk is set to 15566.
There is nothing wrong with that, but this is larger than 1024,
and could in certain setups cause problems with:
1) software that runs at boot time (e.g., old versions of LILO)
2) booting and partitioning software from other OSs
   (e.g., DOS FDISK, OS/2 FDISK)

Command (m for help): p

Disk /dev/sda: 128.0 GB, 128035676160 bytes
255 heads, 63 sectors/track, 15566 cylinders
Units = cylinders of 16065 * 512 = 8225280 bytes

   Device Boot      Start         End      Blocks  Id System

Command (m for help): w
The partition table has been altered.
Calling ioctl() to re-read partition table
```
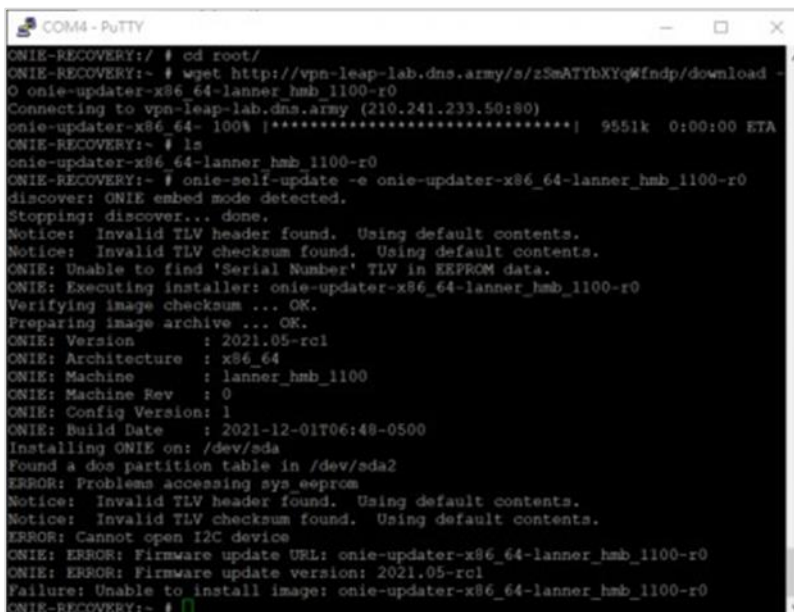
2. Change USB stick (sdb) to install stick.

```
ONIE-RECOVERY:/ # mount /dev/sdb1 /mnt/
ONIE-RECOVERY:/ # onie-self-update -e /mnt/onie-updater-x86_64-
lanner_hmb_1100-r0
discover: ONIE embed mode detected.
Stopping: discover... done.
Notice:  Invalid TLV header found.  Using default contents.
Notice:  Invalid TLV checksum found.  Using default contents.
ONIE: Unable to find 'Serial Number' TLV in EEPROM data.
ONIE: Executing installer: /mnt/onie-updater-x86_64-lanner_hmb_1100-r0
Verifying image checksum ... OK.
Preparing image archive ... OK.
ONIE: Version      : 2021.05-rc1
ONIE: Architecture : x86_64
ONIE: Machine      : lanner_hmb_1100
ONIE: Machine Rev  : 0
ONIE: Config Version: 1
ONIE: Build Date   : 2021-12-01T06:48-0500
Installing ONIE on: /dev/sda
ERROR: Problems accessing sys_eeprom
Notice:  Invalid TLV header found.  Using default contents.
Notice:  Invalid TLV checksum found.  Using default contents.
ERROR: Cannot open I2C device
ONIE: ERROR: Firmware update URL: /mnt/onie-updater-x86_64-lanner_hmb_1100-
r0
ONIE: ERROR: Firmware update version: 2021.05-rc1
Failure: Unable to install image: /mnt/onie-updater-x86_64-lanner_hmb_1100-
r0
ONIE-RECOVERY:/ # reboot
ONIE-RECOVERY:/ # discover: ONIE embed mode detected.
Stopping: discover...start-stop-daemon: warning: killing process 1004: No
```

```
such process
 done.
Stopping: dropbear ssh daemon... done.
Stopping: telnetd... done.
Stopping: klogd... done.
Stopping: syslogd... done.
Info: Unmounting kernel filesystems
umount: devtmpfs busy - remounted read-only
umount: can't unmount /: Invalid argument
The system is going down NOW!
Sent SIGTERM to all processes
Sent SIGKILL toreboot: Restarting system
```


Note: The last 4 lines of installation error can be ignored since we do not have an I2C device.

4. Reboot switch blade after complete.

```
reboot
```

5. After reboot, in GRUB menu choose Install OS to install any Open Network Linux under ONIE environment.
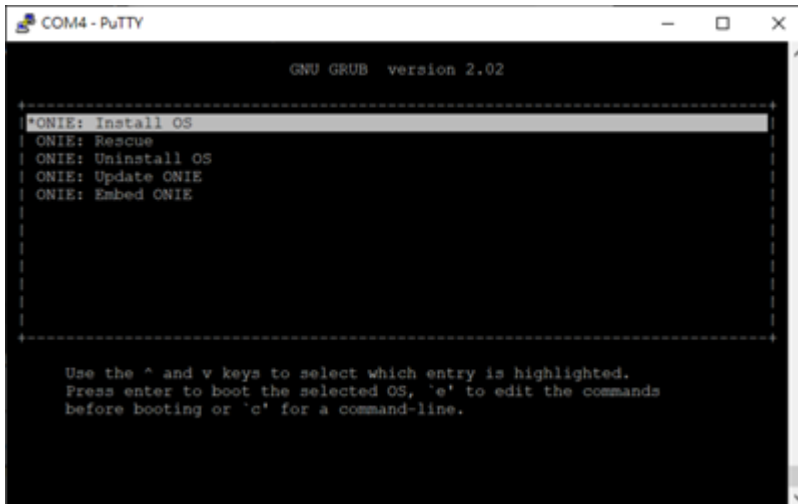
CHAPTER 4: UBUNTU INSTALLATION ON SWITCH

Files Required:

1. Ubuntu Image: Download Ubuntu server 20.04.3 from Ubuntu official website

2. Intel Software Development Environment (SDE): Download from Intel website

3. Lanner Board Support Platform (BSP) for HLM-1101: Obtain from Lanner support team

Make bootable Ubuntu installation USB from ISO

Use Rufus to make installation USB
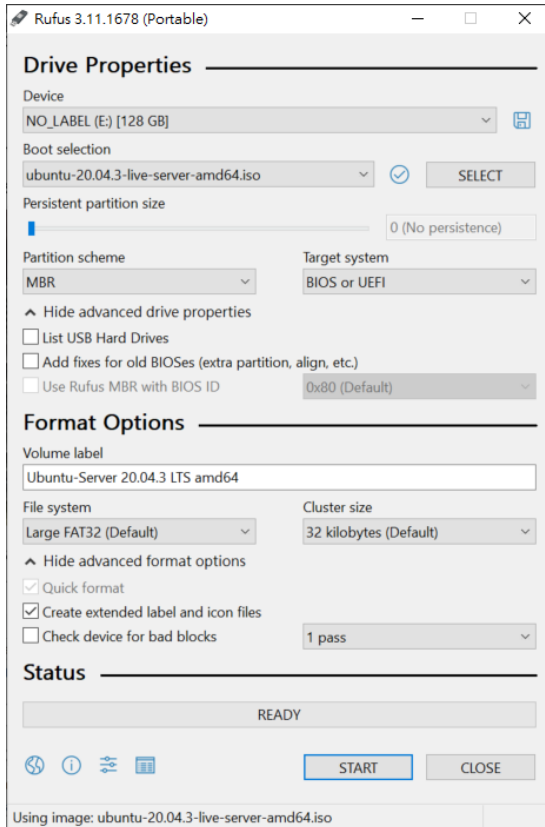
Modify Ubuntu default installation method to console serial

1. Edit USB:\\boot\grub\grub.cfg file
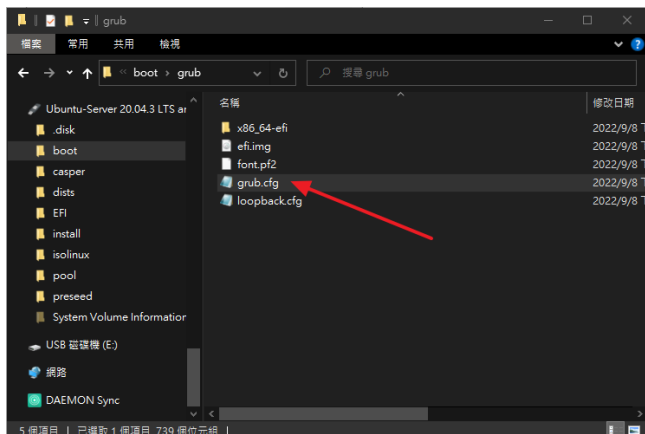
2. Under "Install Ubuntu Server" menuentry

Replace "quiet" to "console=ttyS0,115200n8"
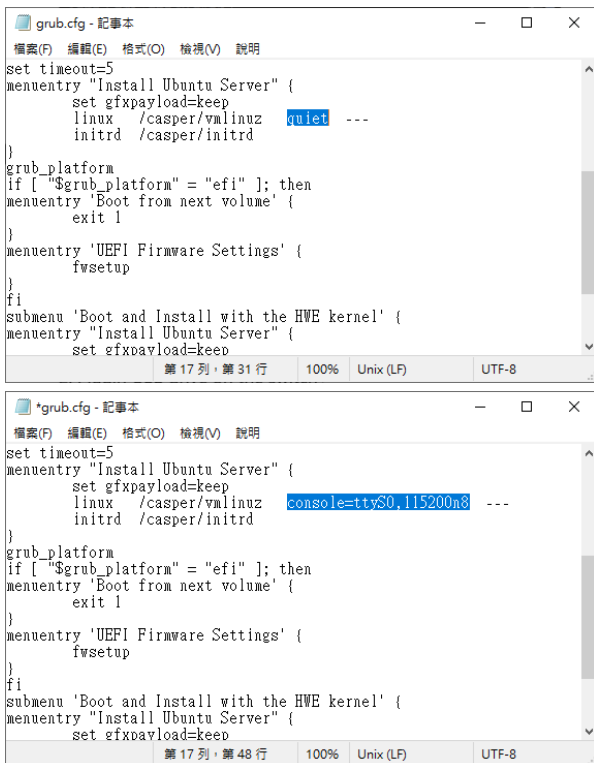
3. Save the file and remove USB thumb drive from computer.

Hardware Setup

1. Plugin console port on the switch

2. Plugin USB drive on the switch

3. Set console serial baud rate on putty to 115200
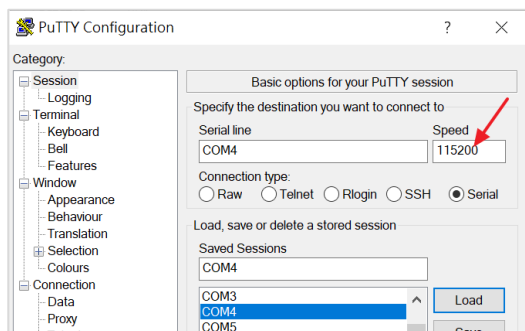
4. Power on the compute blade to power up the switch blade.

BIOS Boot with USB drive

1. Ubuntu installation will start automatically after 5 sec of blank screen

2. After 5 sec. Ubuntu installation process starts

3. Choose basic mode for serial installation wizard

4. Follow Ubuntu installation wizard to complete installation

```
COM5 - PuTTY                                               —    □    ×
===========================================================================
Guided storage configuration                              [ Help ]
===========================================================================
Configure a guided storage layout, or create a custom one:

(X)  Use an entire disk
                                                              x
     [ TS128GMSA370 local disk 119.242G              v ]x
       _G595770354                                          x
                                                              x
     [X]  Set up this disk as an LVM group                 x
                                                              x
          [ ]  Encrypt the LVM group with LUKS             x
                                                              x
                      Passphrase:                           x
                                                              x
                                                              x
               Confirm passphrase:                          x
                                                              x
                                                              v
                       [ Done       ]
                       [ Back       ]
```

5. Under Ubuntu, to view HLM-1101 switch network interfaces description by following command:

lshw -c network –businfo

enp2s0 – Network interface on front panel of the HLM-1101 switch

enp3s0 – Network interface connects to compute blade on the back of the HLM-1101 switch.

```
COM4 - PuTTY                                               —    □    ×
lanner@1101:~$ sudo lshw -c network -businfo
[sudo] password for lanner:
Bus info            Device     Class       Description
=========================================================================
pci@0000:02:00.0    enp2s0     network     I210 Gigabit Network Connection
pci@0000:03:00.0    enp3s0     network     I210 Gigabit Backplane Connection
lanner@1101:~$
```
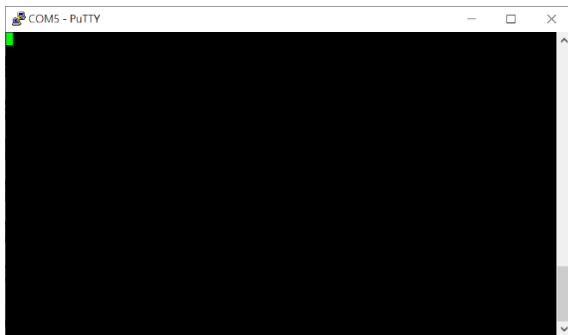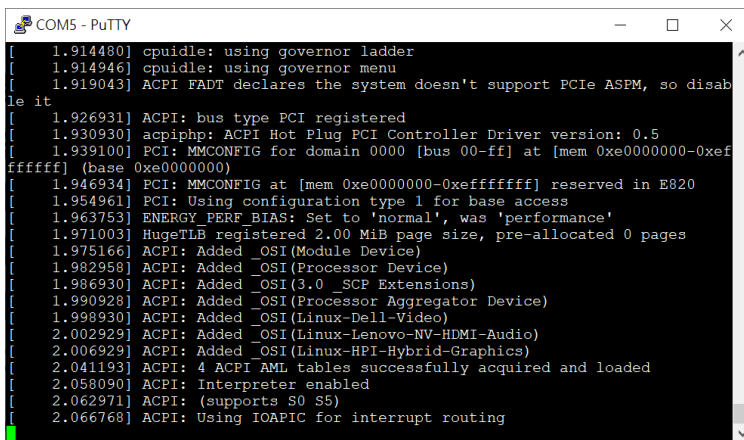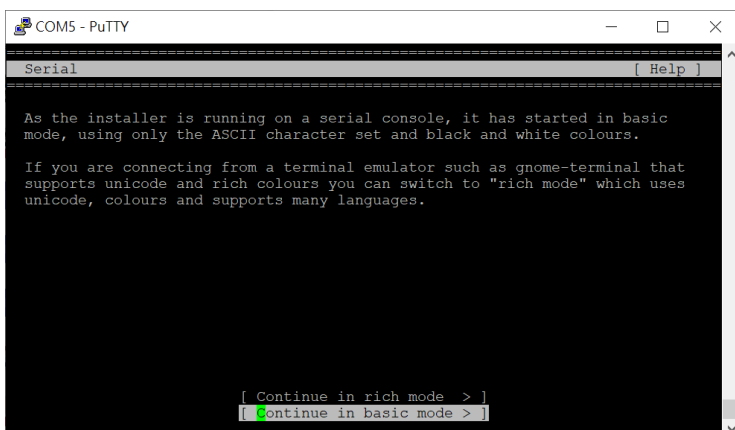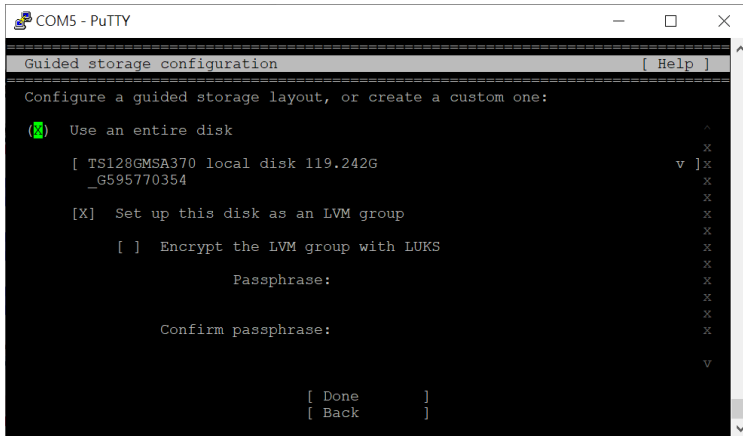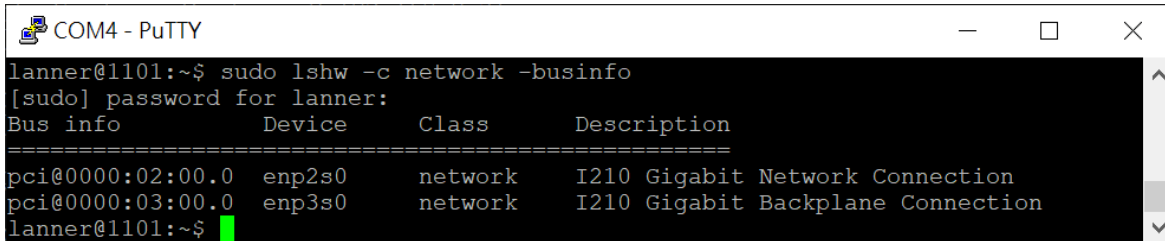
Below is the compute blade view on network interface.

In this example, enp134s0 connects directly to HLM-1101 switch enp3s0.

```
lanner@V3-Blade1:~                                         —    □    ×
[lanner@V3-Blade1 ~]$ sudo lshw -c network -businfo
Bus info            Device      Class       Description
=========================================================================
pci@0000:03:00.0    enp3s0      network     I210 Gigabit Network Connection
pci@0000:04:00.0    enp4s0      network     I210 Gigabit Network Connection
pci@0000:3b:00.0    enp59s0f0   network     Ethernet Controller E810-C for backplane
pci@0000:3b:00.1    enp59s0f1   network     Ethernet Controller E810-C for backplane
pci@0000:86:00.0    enp134s0    network     I210 Gigabit Backplane Connection
pci@0000:af:00.0    enp175s0f0  network     Ethernet Controller E810-C for backplane
pci@0000:af:00.1    enp175s0f1  network     Ethernet Controller E810-C for backplane
[lanner@V3-Blade1 ~]$
```

Tofino Switch ASIC

The Tofino ASIC is connected to the CPU's PCIe root complex over PCIe 2x operating in Gen2 mode. Upon boot up, the BIOS and the OS enumerate the PCIe bus and sets up the Base Address Registers for Tofino. To confirm this setup from the Ubuntu shell, use the lspci command as below:

sudo lspci -v -d 1d1c:

```
🖳 COM4 - PuTTY                                          —    □    ✕
lanner@1101:~$ sudo lspci -v -d 1d1c:
01:00.0 Unassigned class [ff00]: Device 1d1c:0010 (rev 10)
        Subsystem: Device 1d1c:0010
        Flags: fast devsel, IRQ 11
        Memory at 90000000 (64-bit, prefetchable) [disabled] [size=64M]
        Memory at 94004000 (64-bit, prefetchable) [disabled] [size=16K]
        Memory at 94000000 (64-bit, prefetchable) [disabled] [size=16K]
        Capabilities: [80] Express Endpoint, MSI 00
        Capabilities: [d0] MSI-X: Enable- Count=512 Masked-
        Capabilities: [e0] MSI: Enable- Count=1/2 Maskable+ 64bit+
        Capabilities: [f8] Power Management version 3
        Capabilities: [100] Vendor Specific Information: ID=1556 Rev=1 Len=008 <
?>
        Capabilities: [200] Advanced Error Reporting

lanner@1101:~$
```
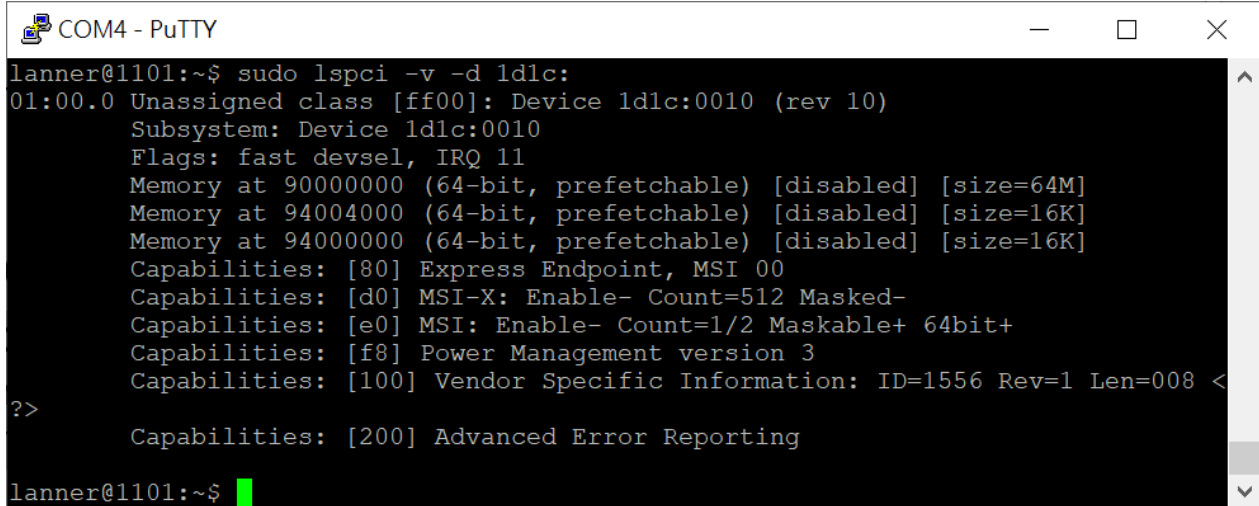
To fully operate Tofino switch, ASIC will require Intel Software Development Environment (SDE) installed on the operating system.

1. Download SDE from Intel website.

2. After downloading and installing SDE, please request Lanner to provide Board Support Platform (BSP) for HLM-1101 with installation instructions.

APPENDIX A: LED INDICATOR EXPLANATIONS

100G QSFP28 (Port 1 ~ 14)

1. The two LED on the left side are Link LED;
2. The downward triangle is for Port 2, the upward triangle is for Port 1;
3. After SDK is loaded, and when no Transceiver is plugged in, the LED light turn OFF. After the transceiver is plugged in and Linked, the LED light will steady ON with green LED color.
4. The two LED on the right side are Active LED;
5. The downward triangle is for Port 2, the upward triangle is for Port 1;
6. After SDK is loaded, and when no Transceiver is plugged in, the LED light will turn OFF. When the Transceiver is plugged in, and Linked, the LED light will steady ON with green LED color. When Data is being transmitted, the LED light will flash, in LED color green.
7. The left is Link LED, the right is Active LED

Status	LED-Left(Green)	LED-Right(Green)
Link	ON	ON
Active	ON	Flash
Non-Link	OFF	OFF

Front Panel (I/O):

1. The left side is orange-color Link/Active LED;
2. When no cable is plugged in, the LED light will turn OFF.   When the cable is plugged in and linked, the LED light will steady ON, in orange color. When Data is being transmitted, the orange LED light will keep flashing.
3. The right side is bi-color (green/orange) Speed LED.
4. When the System is on standby or Power ON :
   A. No LAN cable is plugged in, the LED light will turn OFF.
   B. When a LAN cable is plugged in, and Link to 1G, the LED will turn steady ON, in orange color.
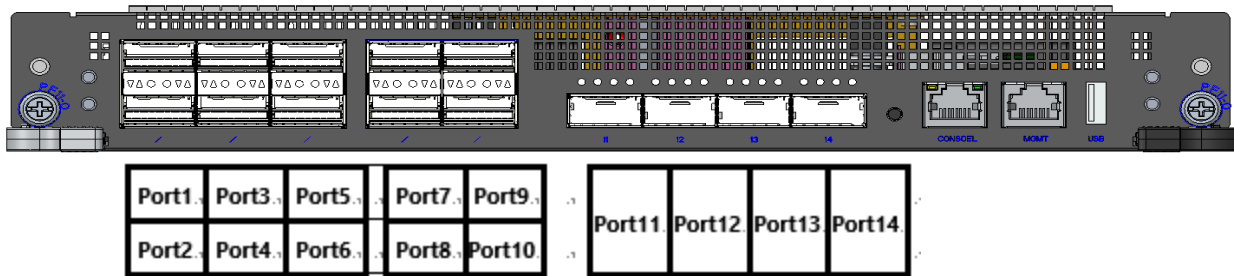   C. When Link to 100M , the LED light will turn steady ON, green color.

Speed	Amber(Link/Active)	Green/Amber(Speed)
10M	Steady/Flash	OFF
100M	Steady/Flash	ON(Green)
1G	Steady/Flash	ON(Amber)

APPENDIX B: PORT MAP

The Port Map below is based on Ubuntu and Cent OS using HMB-6110 computing blade.

HLM-1101

| Port1 | Port3 | Port5 | | Port7 | Port9 | | Port11 | Port12 | Port13 | Port14 |
| Port2 | Port4 | Port6 | | Port8 | Port10 | | | | | |

Layer 1				
	PCI Bus	**Switch Side**	**Ethernet Name**	**Compute Board**
HMP-6600	0000:3b:00.1	Port 15	enp59s0f1	Layer 1 HMB-6110
	0000:af:00.1	Port 16	enp175s0f1	
	0000:3b:00.1	Port 17	enp59s0f1	Layer 2 HMB-6110
	0000:af:00.1	Port 18	enp175s0f1	
	0000:3b:00.1	Port 19	enp59s0f1	Layer 3 HMB-6110
	0000:af:00.1	Port 20	enp175s0f1	
	0000:3b:00.1	Port 21	enp59s0f1	Layer 4 HMB-6110
	0000:af:00.1	Port 22	enp175s0f1	
	0000:3b:00.1	Port 23	enp59s0f1	Layer 5 HMB-6110
	0000:af:00.1	Port 24	enp175s0f1	
	0000:3b:00.1	Port 25	enp59s0f1	Layer 6 HMB-6110
	0000:af:00.1	Port 26	enp175s0f1	

Layer 2				
	PCI Bus	**Switch Side**	**Ethernet Name**	**Compute Board**
HMP-6600	0000:3b:00.0	Port 15	enp59s0f0	Layer 1 HMB-6110
	0000:af:00.0	Port 16	enp175s0f0	
	0000:3b:00.0	Port 17	enp59s0f0	Layer 2 HMB-6110
	0000:af:00.0	Port 18	enp175s0f0	
	0000:3b:00.0	Port 19	enp59s0f0	Layer 3 HMB-6110
	0000:af:00.0	Port 20	enp175s0f0	
	0000:3b:00.0	Port 21	enp59s0f0	Layer 4 HMB-6110
	0000:af:00.0	Port 22	enp175s0f0	
	0000:3b:00.0	Port 23	enp59s0f0	Layer 5 HMB-6110
	0000:af:00.0	Port 24	enp175s0f0	
	0000:3b:00.0	Port 25	enp59s0f0	Layer 6 HMB-6110
	0000:af:00.0	Port 26	enp175s0f0	

APPENDIX C: TERMS AND CONDITIONS

Warranty Policy

1. All products are under warranty against defects in materials and workmanship for a period of one year from the date of purchase.

2. The buyer will bear the return freight charges for goods returned for repair within the warranty period; whereas the manufacturer will bear the after service freight charges for goods returned to the user.

3. The buyer will pay for the repair (for replaced components plus service time) and transportation charges (both ways) for items after the expiration of the warranty period.

4. If the RMA Service Request Form does not meet the stated requirement as listed on "RMA Service, "RMA goods will be returned at customer's expense.

5. The following conditions are excluded from this warranty:

   ► Improper or inadequate maintenance by the customer

   ► Unauthorized modification, misuse, or reversed engineering of the product

   ► Operation outside of the environmental specifications for the product.

RMA Service

Requesting an RMA#

1. To obtain an RMA number, simply fill out and fax the "RMA Request Form" to your supplier.

2. The customer is required to fill out the problem code as listed. If your problem is not among the codes listed, please write the symptom description in the remarks box.

3. Ship the defective unit(s) on freight prepaid terms. Use the original packing materials when possible.

4. Mark the RMA# clearly on the box.

> **Note**
>
> Customer is responsible for shipping damage(s) resulting from inadequate/loose packing of the defective unit(s). All RMA# are valid for 30 days only; RMA goods received after the effective RMA# period will be rejected. Your computer will reboot during restart in order to change State of the Device.

RMA Service Request Form

When requesting RMA service, please fill out the following form. Without this form enclosed, your RMA cannot be processed.

RMA No:	Reasons to Return: □ Repair(Please include failure details) □ Testing Purpose		
Company:	Contact Person:		
Phone No.	Purchased Date:		
Fax No.:	Applied Date:		
Return Shipping Address: _____ Shipping by: □ Air Freight □ Sea □ Express_____ □ Others:_____			

Item	Model Name	Serial Number	Configuration

Item	Problem Code	Failure Status

*Problem Code:

01:D.O.A.	07: BIOS Problem	13: SCSI	19: DIO
02: Second Time R.M.A.	08: Keyboard Controller Fail	14: LPT Port	20: Buzzer
03: CMOS Data Lost	09: Cache RMA Problem	15: PS2	21: Shut Down
04: FDC Fail	10: Memory Socket Bad	16: LAN	22: Panel Fail
05: HDC Fail	11: Hang Up Software	17: COM Port	23: CRT Fail
06: Bad Slot	12: Out Look Damage	18: Watchdog Timer	24: Others (Pls specify)

Request Party   **Confirmed By Supplier**

_____   _____

Authorized Signature / Date   **Authorized Signature / Date**