Dynamix®

DYNAMIX VC-S4

4 Ethernet VDSL Modem Slave

USER'S MANUAL

VDSL Point to Point Solution

4 Ethernet VDSL modem slave utilizes Ethernet to/from VDSL subscriber-site conversion bridge. The Dynamix VC-S4 uses QAM-based 4-band VDSL technology which supports high bandwidth up to 25Mbps symmetrical data service.

The Dynamix VC-S4 also works with Dynamix DV-8 and Dynamix DV-24 VDSL IP DSLAM, together to form a cost-effective solution for services such as remote lecturing, telemedicine, video conferencing, Video-on-Demand (VoD), IP-TV, Internet access and various high-speed data applications.

The front panel provides LEDs indication of system and interface status. The built-in POTS/ISDN splitter allows a standard POTS phone or ISDN device to be connected. Full- or half-duplex mode of LAN operations is automatically sensed and configured. VDSL link rates are configured by local IP DSLAMs over a fix speed and auto speed function.

Therefore, 4 Ethernet VDSL Modem slave supports fix speed, auto speed, plug and play operations in the subscriber site and form an ideal solution for delivering cost effective, high performance broadband/multimedia services to Multi-Dwelling Units (MDU) and Multi-Tenant Units (MTU) environments such as hotels, campus, hospitals and telecom.

Safety Warnings

For your safety, be sure to read and follow all warning notices and instructions before device use.

- DO NOT open the device or unit. Opening or removing covers can expose you to dangerous high voltage points or other risks. ONLY qualified service personnel can service the device. Please contact your vendor for further information.
- Use ONLY the dedicated power supply for your device. Connect the power cord or power adaptor to the right supply voltage (110V AC in North America or 230V AC in Europe).
- DO NOT use the device if the power supply is damaged as it might cause electrocution. If the power supply is damaged, remove it from the power outlet. DO NOT attempt to repair the power supply. Contact your local vendor to order a new power supply.
- Place connecting cables carefully so that no one will step on them or stumble over them. DO NOT allow anything to rest on the power cord and do NOT locate the product where anyone can work on the power cord.
- DO NOT install nor use your device during a thunderstorm. There may be a remote risk of electric shock from lightning.
- DO NOT expose your device to dampness, dust or corrosive liquids.
- DO NOT use this product near water, for example, in a wet basement or near a swimming pool.
- Connect ONLY suitable accessories to the device. Make sure to connect the cables to the correct ports.
- DO NOT obstruct the device ventilation slots, as insufficient airflow may harm your device.
- DO NOT store things on the device.
- DO NOT use the device outside, and make sure all the connections are indoors. There may be a remote risk of electric shock from lightning.
- Be careful when unplugging the power, because the transformer may be very hot.
- Keep the device and all its parts and accessories out of children's reach.
- Clean the device using a soft and dry cloth rather than liquid or atomizers. Power off the equipment before cleansing it.
- This product is recyclable. Dispose of it properly.

Table of Contents

1. Unpacking Information

Check List

Carefully unpack the package and check its contents against the checklist.
Package Contents

- 4 Ethernet VDSL Modem slave
- Four rubber feet
- User Manual
- AC To DC Power Adapter
- RJ-45 cable
- RJ-11 cable

Please inform your dealer immediately for any missing or damaged parts.
If possible, retain the carton including the original packing materials.
Use them to repack the unit in case there is a need to return for repair.

2. Installing the Modem

Hardware Installation

This chapter describes how to install the Modem and establishes network connections. You may install the Modem on any level surface (e.g. a table or shelf). However, please take note of the following minimum site requirements before you begin. Stick the 4 rubber feet at the bottom to avoid scratches.

Pre-installation Requirements

Before you start the actual hardware installation, make sure you can provide the right operating environment including power requirements, sufficient physical space and proximity to other network devices that are to be connected.

Verify the following installation requirements:

- Power requirements: DC 12V/1A or above.
- The Modem should be located in a cool dry place with at least 10cm/4in of space at the front and back for ventilation.
- Place the Modem out of direct sunlight and away from heat sources or areas with a high amount of electromagnetic interference.
- Check if network cables and connectors needed for installation are available.

General Rules

Before making any connections to the Modem, note the following rules:

- Ethernet Port (RJ-45)
  All network connections to the Modem Ethernet port must be made using Category 5 UTP for 100Mbps, Category 3, 4 UTP for 10Mbps.
  No more than 100 meters of cabling may be use between the MUX or HUB and an end node.
- VDSL Port (RJ-11)
  All Home network connections to the RJ-11Port made using 24~26 Gauge phone wiring.
- We do not recommend using 28 Gauge or above phone line.

Connecting the Modem

The Modem has four Ethernet port which support connection to Ethernet operation. The devices attached to these ports must support auto-negotiation or 10Base-T OR 100Base-TX unless they will always operate at half duplex. Use any of the Ethernet ports to connect to devices such as NIC, Switch, bridge or router.

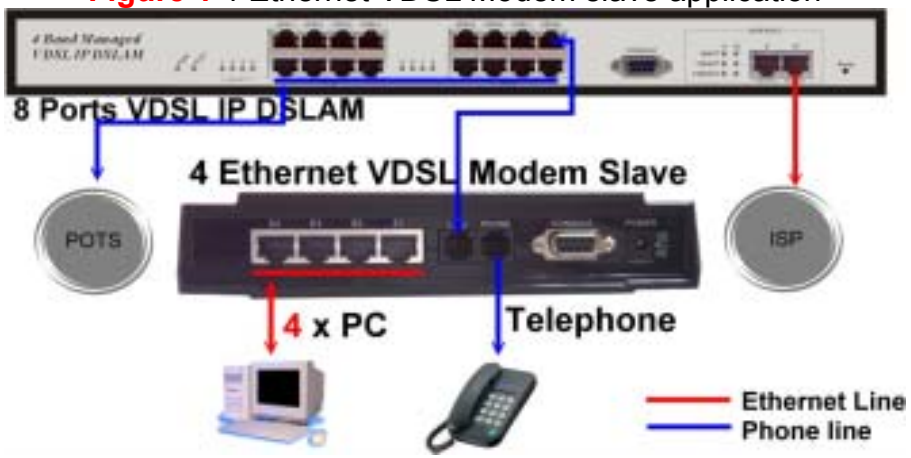
The RJ11 Line port is used to connect to the wall RJ-11 modular socket (outlet) that is connecting to VDSL 4-Band CO Modem side (Point to point solution).

The RJ11 Phone port of the Modem can be connected to a telephone for making calls.

Connecting the RJ-11 / RJ-45 Ports

1. The Modem's RJ-11 ports supports maximum distance up to 1.9km at 5M/5M or maximum speed at 25M/25M symmetrical with distances up to 800m data service across existing phone wiring without interfering with standard voice transmissions, it is easy to use and does not require the installation of any additional wiring. Every RJ-11 modular phone jack in the home can become a port on the LAN. Networking devices can be installed on a single telephone wire that can span within 1.9km or 800m (depend on speed) between the two farthest points. **(Figure 1)**.

Figure 1 4 Ethernet VDSL Modem slave application



2. 4 Ethernet VDSL Modem slave has embedded Splitter between every VDSL side (Line) and POTS (Phone) side. It permits you to deliver broadband service on the same lines as Plain Old Telephone Service (POTS), PBX, ISDN traffic and VDSL Signal.

3. The RJ-11 port support maximum distance 1.9km at 5M/5M or max speed 25M/25M symmetrical and distances up to 800m data service. When inserting a RJ-11 plug, be sure to tab on the plug clicks into position to ensure that it is properly seated.

4. Do not plug a RJ-11 phone jack connector into the Ethernet port (RJ-45 port). This may damage the modem. Instead, use only twisted-pair cables with RJ-45 connectors that conform to Ethernet standard.

Notes:

1. Be sure each twisted-pair cable (RJ-45) does not exceed 100 meters (333 feet).
2. RJ-11 port use 24 ~ 26 gauge phone wiring, we do not recommend 28 gauge or above.
3. We advise using Category 3, 4, 5 cables for Cable Modem or Router connections to avoid any confusion or inconvenience in the future when you upgrade attached to high bandwidth devices.
4. Be sure phone cable has been installed before 4 Ethernet VDSL Modem slave powered on.

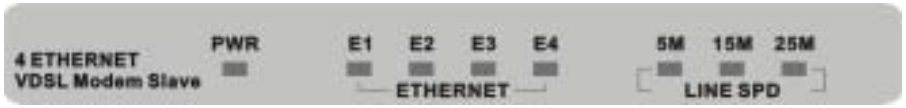
3. Hardware Description

This section describes the important parts of the Modem. It features the front indicators and rear connectors.

Front Panel

The following figure shows the front panel. **(Figure 2)**

Figure 2 Front Panel of 4 Ethernet VDSL Modem slave



At a quick glance of the front panel, it is easy to tell if the CPE Modem has power, if it has signal from its Ethernet RJ-45 port and if there is phone line signal on RJ-11 port.

Front Indicators

The Modem has SEVEN LED indicators. The following Table shows the description. **(Table 1)**

Table 1 LED Indicators Description and Operation

LEDs	Color	Status	Descriptions
PWR (Power LED)	Green	On	The device is receiving the power and functioning properly.
		Off	The device is not ready or has malfunctioned.
E1~E4 (Ethernet LED)	Green	On	The device has a good Ethernet connection.
		Blinking	The device is sending or receiving data.
		Off	The LAN is not connected.
5M (VDSL LED)	Green	On	VDSL is in good linkage at 5Mbps data rate.
		Off	The VDSL connection is down.
15M (VDSL LED)	Green	On	VDSL is in good linkage at 15Mbps data rate.
		Off	The VDSL connection is down.
25M (VDSL LED)	Green	On	VDSL is in good linkage at 25Mbps data rate.
		Off	The VDSL connection is down.

Rear Panel

The following figure shows the rear connectors. **(Figure 3)**

And the table shows the description. **(Table 2)**

Figure 3 Rear connectors

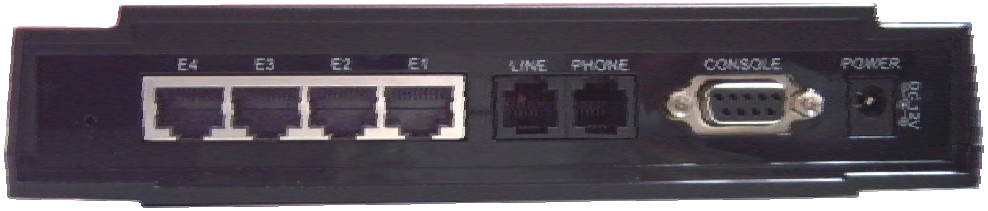


Table 2 Description of the Modem rear connectors

Connectors	**Type**	**Description**
Line	RJ-11	For connecting to the VDSL Modem.
Phone	RJ-11	For connecting to the telephone or Fax, ISDN modem*
Ethernet	RJ-45	For connecting to a Ethernet equipped device

* If it is needed to connect to the ISDN modem, please refer to Appendix C for further details.

4. Firmware Description

Speed function description:

Dynamix VC-S4 is a 4band VDSL solution with 4 Ethernet ports which supports real plug & play, auto and manual selection of the data speed. As the setting of the data speed depends on the phone cable length limit, they can support 5M/15M/25M symmetrical data service but depends on installation environment. If 4 Band VDSL CO modem or IP DSLAM try to link at 25Mbps data speed but fails to do so then 4 Band VDSL CO modem or IP DSLAM data speed must be lower due to the limitation of the phone cable length. If the cable length is unsure, then auto selection of the data speed at the default setting is recommended. Power must be unplug before changing of data speed then powered on and wait for VDSL to link again at the correct data speed function.

Speed mode limitation:

5M/5M mode within 1.9km (6333 ft.)
15M/15M mode within 1.3km (4333 ft.)
25M/25M mode within 800m (2666 ft.)
* With the above phone cable length limit base only without PBX noise.

Note:

We recommend phone cable that must meet Cat 3 standard or above and without clustering, otherwise the above guarantee will be void.

Appendix A: Cable Requirements

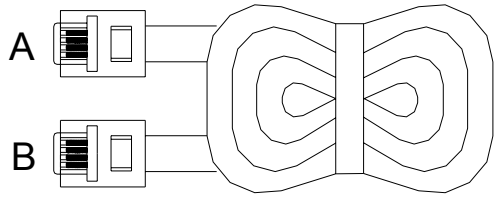
A CAT 3, 4 or 5 UTP (Unshielded Twisted Pair) cable is typically used to connect the Ethernet device to the modem. A 10Base-T cable often consists of four pairs of wires, two of which are used for transmission. The connector at the end of the 10Base-T cable is referred to as an RJ-45 connector and it consists of eight pins. The Ethernet standard uses pins 1, 2, 3 and 6 for data transmission purposes. **(Table 3)**

Table 3 RJ-45 Ethernet Connector Pin out Assignments

PIN	MNEMONIC	FUNCTION
1	TX+	Ethernet differential Transmit signal (+)
2	TX-	Ethernet differential Transmit signal (-)
3	RX+	Ethernet differential receive signal (+)
4	NC	Unused
5	NC	Unused
6	RX-	Ethernet differential receive signal (-)
7	NC	Unused
8	NC	Unused

Standard telephone wire of any gauge or type-flat, twisted or quad is used to connect the modem to the telephone network. A telephone cable typically consists of three pairs of wires, one of which is used for transmission. The connector at the end of the telephone cable is called RJ-11 connector and it consists of six pins. POTS (plain old telephone services) use pins 3 and 4 for voice transmission. A telephone cable is shown below. **(Figure 4)**

Figure 4 Telephone cable



The A and B connectors on the rear of the modem are RJ-11 connectors. These connectors are wired identically. The RJ-11 connectors have six positions, two of which are wired. The modem uses the center two pins. The pin out assignment for these connectors is presented below. **(Table 4)**

Table 4 RJ-11 Pin out Assignments

Pin#	**MNEMONIC**	**FUNCTION**
1	NC	Unused
2	NC	Unused
3	TIP	POTS
4	RING	POTS
5	NC	Unused
6	NC	Unused

Appendix B: Product Specification

Key Features & Benefits

- Supports Universal Plug & Play(UPnP)
- Compliant with IEEE802.3 10BASE-T and IEEE802.3u 100BASE-TX standard
- Compliant with ETSI, ITU, ANSI standards
- Supports high bandwidth up to 25Mbps symmetrical
- Supports 1 * RJ-11 connector for Ethernet over VDSL
- Supports 1 * RJ-11 connector for telephone/PBX connection
- Supports 4 * RJ-45 port for 10/100Mbps Ethernet with Auto MDI/MDIX
- Supports Auto-speed and full duplex for VDSL port
- Supports long packet size up to 1536 bytes
- Supports POTS/ISDN voice pass
- Supports 4wires phone set pass through
- Voice and Data work on the same telephone line
- Spectral compatibility with xDSL, ISDN (2B1Q/4B3T)
- Supports flow control IEEE802.3x for Full Duplex & Back Pressure for Half Duplex
- Supports Surge protection
- Provides Power LED and LED indication Link/Active Status for Ethernet port and 5/15/25Mbps Link/Speed for VDSL port

Product Specification

Standard:	IEEE802.3 standard IEEE802.3u standard Compliant with ETSI, ITU, ANSI standards
Interface:	4 * RJ-45 10/100Mbps Ethernet port 1 * RJ-11 connector for EoVDSL 1 * RJ-11 connector for telephone connection 1 * RS-232C / 19200bps for Console port
Cable Connections:	RJ-45 (Ethernet): Category 3, 4, 5 UTP/STP RJ-11 (EoVDSL): Twisted-Pair phone wire
LED indication:	Power Link/Active Status for Ethernet port 5/15/25Mbps Link/Speed for VDSL port
VDSL Frequency Spectrum:	Transmitter: 4MHz ~ 7.9MHz Receiver: 900 kHz ~ 3.9MHz
POTS/ISDN pass filter Spectrum:	0 ~ 630kHz

Power Consumption:	6W
Operating Temperature:	0°C ~ 50°C (41°F ~ 122°F)
Storage Temperature:	-20°C ~ 65°C (-4°F ~ 149°F)
Humidity:	10 to 90% (non-condensing)
Dimensions:	184mm x 146mm x 40mm (7.2" x 5.74" x 1.57")
External Power Adapter	Input: AC 85~240 volts/50~60Hz Output: DC 12V/1A

Appendix C: Troubleshooting

Diagnosing the Modem's Indicators

The modem can be easily monitored through its comprehensive panel indicators. These indicators assist the network manager in identifying problems the hub may encounter. This section describes common problems you may encounter and possible solutions.

1. **Symptom:** POWER indicator does not light up (green) after power on.
   Cause: Defective External power supply
   Solution: Check the power plug by plugging in another that is functioning properly. Check the power cord with another device. If these measures fail to resolve the problem, have the unit power supply replaced by a qualified distributor.

2. **Symptom:** Link indicator does not light up (green) after making a connection.
   Cause: Network interface (ex. a network adapter card on the attached device), network cable, or switch port is defective.
   Solution: 2.1 Power off and re- power on the VDSL modem.
   2.2 Verify that the switch and attached device are powered on.
   2.3 Be sure the cable is plugged into both the switch and corresponding device.
   2.4 Verify that the proper cable type is used and its length does not exceed specified limits.
   2.5 Check the modem on the attached device and cable connections for possible defects.
   2.6 Make sure phone wire must be connected between VDSL CO modem and 4 Ethernet VDSL

Modem slave first, when both are powered on.

2.7 Replace the defective modem or cable if necessary.

3. **Symptom:** VDSL Link cannot be established

   Cause: VDSL auto speed failed, or phone cable length is over specification with the limit of 1.9km or not a 24 gauge phone wire with twist pair.

   Solution: 3.1 Please make sure phone wire must be connected between VDSL CO modem and 4 Ethernet VDSL Modem slave when both are power on. VDSL CO modem will do auto speed function depending on phone wire length, therefore if VDSL CO modem can't detect 4 Ethernet VDSL Modem slave over phone wire while both power on, this will cause the link to fail.

   3.2 Please check phone cable must be 24 gauge with twist pair and without rust, and the length is not over 1.9km.

   Note: Phone cable must meet Cat 3 standard or above and without clustering, otherwise will cause more cross talk issue to reduce DSL power driver.

4. **Symptom:** VDSL always Link on 5M/5M speed mode at short phone cable.

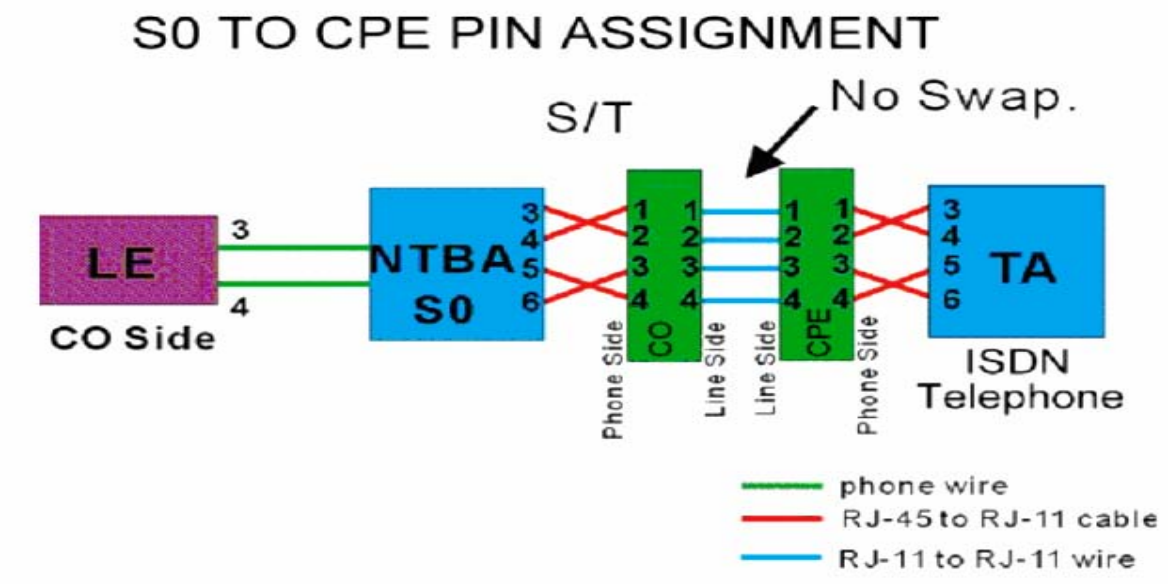
   Cause: VDSL auto-speed stop functioning.

   Solution: Please re-plug in phone cable between VDSL CO modem and 4 Ethernet VDSL Modem slave, or re-power on VDSL CO modem and 4 Ethernet VDSL Modem slave again.

   Note: VDSL CO modem will do auto-speed function while phone cable re-plug in or re-power on.

5. **Symptom:** We tested with a regular S0 bus from an NTBA - data works, but ISDN telephone does not.

   Cause: You must connect according to the following chart if you want to connect CO and CPE with NTBA.



System Diagnostics

Power and Cooling Problems

If the POWER indicator does not turn on when the power cord is plugged in, you may have a problem with the power outlet, power cord or internal power supply as explained in the previous section. However, if the unit power is off after running for a while, check for loose power connections, power losses or surges at the power outlet and verify that the fan on back of the unit is unobstructed and running prior to shutdown. If you still cannot isolate the problem then the internal power supply may be defective. In this case, please contact your local dealer.

Installation

Verify that all system components have been properly installed. If one or more components appear to be malfunctioning (e.g. the power cord or network cabling), test them in an alternate environment where you are sure that all the other components are functioning properly.

Transmission Mode

The default method of selecting the transmission mode for RJ-45 ports is 10/100 Mbps ETHERNET, for RJ-11 port are 5/15/25Mbps VDSL. Therefore, if the link signal is disrupted (e.g. by unplugging the network cable and plugging it back in again, or by resetting the power), the port will try to reestablish communications with the attached device via auto-negotiation. If auto-negotiation fails, then communications are set to half duplex by default. Based on this type of industry-standard connection policy, if you are using a full-duplex device that does not support auto-negotiation, communications can be easily lost (e.g. reset to the wrong mode) whenever the attached device is reset or experiences a power fluctuation. The best way to resolve this problem is to upgrade these devices to a version that support Ethernet and VDSL.

Physical Configuration

If problems occur after altering the network configuration, restore the original connections, and try to track the problem down by implementing the new changes, one step at a time. Ensure that cable distances and other physical aspects of the installation do not exceed recommendations.

System Integrity

As a last resort verify the switch integrity with a power-on reset. Turn the power to the switch off and then on several times. If the problem still persists and you have completed all the preceding diagnoses, then contact your dealer.

Appendix D: Compliance and Safety Information

FCC Radio Frequency Interference Statement

This equipment has been tested and found to comply with the limits for a computing device, pursuant to Part 15 of FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, 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:

1. Reorient or relocate the receiving antenna.
2. Increase the separation between the equipment and receiver.
3. The equipment and the receiver should be connected to outlets on separate circuits.
4. Consult the dealer or an experienced radio/television technician for help.

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

If this telephone equipment causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be required. But if advance notice isn't practical, the telephone company will notify the customer as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary.

The telephone company may make changes in its facilities, equipment, operations or procedures that could affect the proper functioning of your equipment. If they do, you will be notified in advance in order for you to make necessary modifications to maintain uninterrupted service.

This equipment may not be used on coin service provided by the telephone company. Connection to party lines is subject to state tariffs.

Important Safety Instructions

Caution: The direct plug-in wall transformer serves as the main disconnect for the product. The socket outlet shall be installed near the product and be readily accessible.

Caution: Use only the power supply included with this product. In the event the power supply is lost or damaged: In the United States, use only with CSA certified or UL listed Class 2 power supply, rated 12Vdc 1A or above. IN Europe, use only with CE certified power supply, rated 12Vdc 1A or above.

Do not use this equipment near water, for example in a wet basement. Avoid using a telephone during an electrical storm. There may be a remote risk of electrical shock from lightning.

Do not use the telephone to report a gas leak in the vicinity of the leak.

If trouble is experienced with this unit, please contact customer service at the address and phone listed below. Do not disassemble this equipment. It does not contain any user serviceable components.

FCC Warning

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at its own expense.

CE Mark Warning

This is a CE class A product. In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate measures.

Warranty

The original owner that the product delivered in this package will be free from defects in material and workmanship for one year parts after purchase.

There will be a minimal charge to replace consumable components, such as fuses, power transformers, and mechanical cooling devices. The warranty will not apply to any products which have been subjected to any misuse, neglect or accidental damage, or which contain defects which are in any way attributable to improper installation or to alteration or repairs made or performed by any person not under control of the original owner.

The above warranty is in lieu of any other warranty, whether express, implied, or statutory, including but not limited to any warranty of merchantability, fitness for a particular purpose, or any warranty arising out of any proposal, specification, or sample. We shall not be liable for incidental or consequential damages. We neither assume nor authorize any person to assume for it any other liability.

WARNING:

DO NOT TEAR OFF OR REMOVE THE WARRANTY STICKER AS SHOWN, OR THE WARRANTY IS VOID.