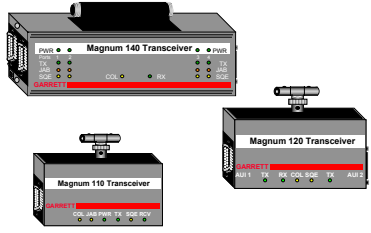
GarrettCom

Ethernet at its Best™

Magnum Coax Transceivers



Installation and User Guide

Magnum™ Coax Transceivers

Installation and User Guide

Part #: 84-00005 (R7/95)

Trademarks

UL is a registered trademark of Underwriters Laboratories

Ethernet is a trademark of Xerox Corporation

Velcro is a trademark of Velcro U.S.A.

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Magnum is a trademark of GarrettCom Inc, Inc.

Important: Magnum Coax Transceivers contain no user serviceable parts. Attempted service by unauthorized personnel shall render any and all warranties null and void. If problems are experienced with a Magnum Transceiver, consult Section 5, Troubleshooting, of this User Guide.

Printed in the United States of America.

Contacting GarrettCom Inc

Please use the mailing address and phone and fax numbers listed below:

GarrettCom Inc

47823 Westinghouse Drive.

Fremont, CA 94539

Phone (510) 438-9071

Fax (510) 438-9072

support@garrettcom.com

Federal Communications Commission

Radio Frequency Interference Statement

This equipment generates, uses and can radiate frequency energy and if not installed and used properly, that is in strict accordance with the manufacturer's instructions, may cause interference to radio communication. It has been tested and found to comply with the limits for a Class A computing device in accordance with the specifications in Subpart J of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

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MAGNUM

ETHERNET CONNECTIVITY PRODUCTS

"DESIGNED AND MANUFACTURED IN THE USA"

Overview

GarrettCom Inc offers the Magnum line of Ethernet LAN physical layer connectivity products with industry-standard functionality. Magnum products are available worldwide through OEMs, integrators, representatives, and international distributors.

For detailed product information, contact:

GarrettCom Inc
213 Hammond Ave
Fremont, CA 94539
Phone (510) 438-9071
Fax (510) 438-9072
sales@garrettcom.com

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1.0 SPECIFICATIONS

1.1. Technical Specifications

Performance

Data Rate: 10 Mbps

Maximum Ethernet Segment Lengths:

AUI, DTE (AUI Drop Cable)	-	50m (164 ft)
ThinNet (10BASE2, BNC)	-	185m (607 ft)
ThickNet (10BASE5)	-	500m (1,640 ft)

Network Standards:

Ethernet V1.0/2.0 IEEE 802.3: 10BASE5, 10BASE2

(Magnum Coax Transceivers are physical layer standard Ethernet products, and operate independently of all software.)

Operating Environment:

Ambient Temperature: 32°F to 122°F (0°C to 50°C)
Storage Temperature: -20°C to 60°C
Ambient Relative Humidity: 10% to 95% (non-condensing)

Connectors:

AUI:	D-Sub 15-Pin Female (with Slide Lock)
DTE:	D-Sub 15-Pin Male (with lock posts)
ThinNet:	BNC

Switches:

SQE Switches per port on Model 140

Input Current:

Model **110**: 230 mA typ., 300 mA max
Models **120** & **140**: 370 mA typ., 450 mA max

Input Voltage:

8 - 16 v (all models)

Packaging:

Enclosure: High strength sheet metal, convection cooled.
Suitable for wiring closet shelf, wall or desktop mounting.

Dimensions: **110**: 3.5 in x 2.5 in x 1.125 in (8.9 cm x 6.4 cm x 2.9 cm)
120: 4.25 in x 3.0 in x 1.5 in (10.8 cm x 7.6 cm x 3.8 cm)
140: 6.75 in x 2.75 in x 1.75 in(17.1 cm x 7.0 cm x 4.4cm)

Weight: **110**: 6.8 oz(0.19 Kg), **120**: 7.5 oz(0.21 Kg), **140**: 16 oz(0.45 Kg)

Agency Approvals

UL Listed (UL 478)
Emissions: meets FCC Part 15 Class A requirements

Warranty

Three years, return to factory Made in USA

1.2 Ordering Information

Magnum Coax Transceivers

	Network Connector Options			
No. of AUI Ports	**No Tap**	**Cable Piercing**	**N-Series**	**BNC-tee**
One	110-0	110-1	110-2	110-3
Two	120-0	120-1	120-2	120-3
Four	140-0	140-1	140-2	140-3

GarrettCom Inc reserves the right to change specifications, performance characteristics and/or model offerings without notice.

2.0 INTRODUCTION

2.1 Inspecting the Package and Product

Examine the shipping container for obvious damage prior to installing this product; notify the carrier of any damage which you believe occurred during shipment or delivery. Inspect the contents of this package for any signs of damage and ensure that the items listed below are included.

This package should contain:

1	Magnum Coax Transceiver
1	Tap (if optionally ordered)
1	User Guide
1	Product Registration Card

Remove the Magnum Coax Transceiver from the shipping container. Be sure to keep the shipping container should you need to ship the unit at a later date. To validate the product warranty please complete and return the enclosed Product Registration Card to GarrettCom Inc as soon as possible.

In the event there are items missing or damaged contact your supplier. If you need to return the unit use the original shipping container. Refer to Section 5, Troubleshooting, for specific return procedures.

2.2 Product Description

Magnum Coax Transceiver products offer a simple, cost-effective method for direct connection of network devices to the Ethernet backbone. Magnum Coax Transceivers comply with Ethernet V1.0/2.0 as well as IEEE 802.3 specifications to support ThickNet (10BASE5) and ThinNet (10BASE2) backbones. Using a single network tap (BNC-T, N-Type, or Cable Piercing), Magnum Coax Transceivers allow from one up to four devices to be easily added to the network.

Magnum Coax Transceivers provide a convenient and cost effective way of increasing the number of available AUI ports on an Ethernet network from a single backbone tap. Each Magnum Coax Transceiver is manufactured with a metal enclosure, ensuring reliability and durability in addition to meeting FCC emission standards.

Compact and durable, Magnum Coax Transceivers are suitable for installation

above drop ceilings adjacent to air supply ducts or plenums. There is no necessity to wall mount or install these units on a table top.

Each unit also features a set of LEDs to simplify installation and diagnostics. All LEDs are positioned on the front of the unit for ease of readability. In additon to LEDs, Magnum Coax Transceivers offer the ability to enable or disable SQE depending on network requirements. (See Section 4.4, SQE Test)

Because Magnum Transceivers derive power from the network and do not require a separate AC power supply unit, the costs and installation issues associated with power supplies are eliminated.

The complete family of Magnum Coax Transceivers is represented by 12 different configurations among three models. Depending on application requirements, Magnum Coax Transceivers are optionally configured at the time of order with either no

tap, a BNC-T connector, a Cable Piercing tap, or an N-Series connector.

The Magnum Coax Transceiver family includes these three models:

Magnum Transceivers

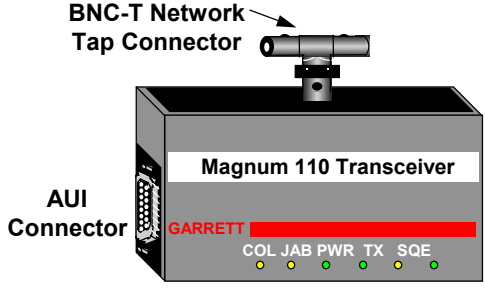
Magnum 110

Magnum 120

Magnum 140

Magnum 110

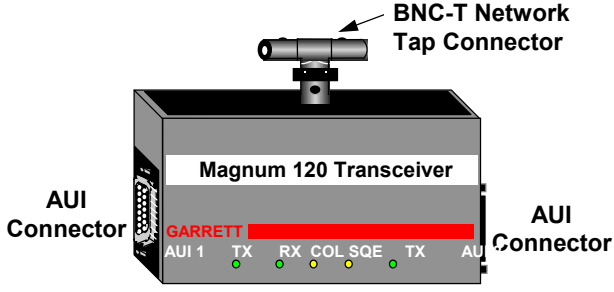
The Magnum 110 is equipped with a single AUI station port and an optional network tap. As with all Magnum Transceivers, the Magnum 110 is configured with one of four tap options: no tap, cable piercing, N-series, or BNC-T. The Magnum 110 includes six LEDs to indicate power (PWR), SQE, transmit (TX), receive (RCV), collision (COL) and jabber (JAB). Additionally, the Magnum 110 is designed with an SQE jumper located as shown in Section 4.4. The SQE jumper allows this unit to be installed in applications where SQE Test may or may not be required.


BNC-T Network
Tap Connector
AUI
Connector
Magnum 110 Transceiver
GARRETT
COL JAB PWR TX SQE

Magnum 110

Magnum 120

The Magnum 120 is a two port transceiver equipped with two AUI connectors and an optional single network tap. Four network tap options are available: no tap, cable piercing, N-series, or BNC-T. The Magnum 120 includes five LEDs: two LEDs represent transmit (TX) for each AUI connector, and one LED each for SQE, collision (COL), receive (RX). Additionally, the Magnum 120 features an SQE jumper located as shown in Section 4.4. The SQE jumper allows this unit to be used where SQE Test may or may not be required.

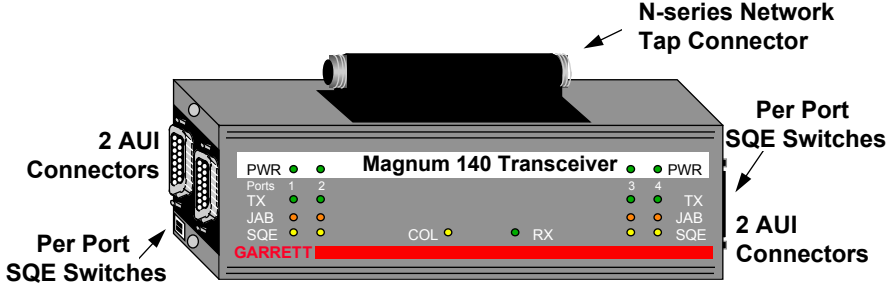

BNC-T Network
Tap Connector
Magnum 120 Transceiver
AUI
Connector
AUI
Connector
GARRETT
AUI 1
TX
RX
COL
SQE
TX
AU

Magnum 120

Magnum 140

The Magnum 140 is a multiport transceiver equipped with a single network tap and four AUI connectors. The network tap is available in one of four configurations: no tap, cable piercing, N-series, or BNC-T. Magnum 140 transceivers are designed with 18 LEDs to monitor data traffic,network activity and power.

Specific LEDs include: power (PWR), transmit (TX), jabber (JAB), SQE, collision (COL), and receive (RX). Individual SQE switches provide per-port SQE enable/disable configurability to match network connectivity requirements.



Magnum 140 Transceiver

2.3 Features and Benefits

- **Low Cost Network Expansion**

  Offers an inexpensive way of adding from one up to four devices to an Ethernet 10BASE2 and 10BASE5 network from a single tap.

- **LEDs Simplify Network Installation and Maintenance**

  Magnum Coax Transceivers are equipped with LEDs to provide status about basic network activity.

- **Lightweight and Durable for Installation Versatility**

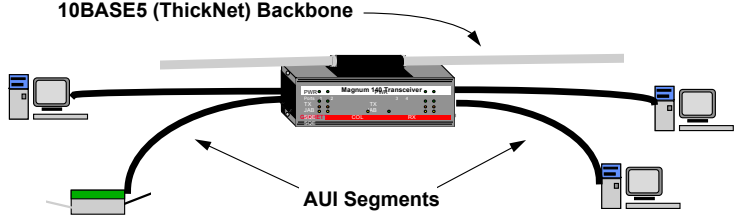
  Packaged in a rugged sheet metal case, Magnum Coax Transceivers are easily installed in almost any location. Magnum Coax Transceivers may be installed above drop ceilings in areas adjacent to air supply ducts or plenums.

- **Compliance with IEEE 802.3 Network Standards**

  Magnum Coax Transceivers comply with 10BASE2 (ThinNet) or 10BASE5 (ThickNet) networks.

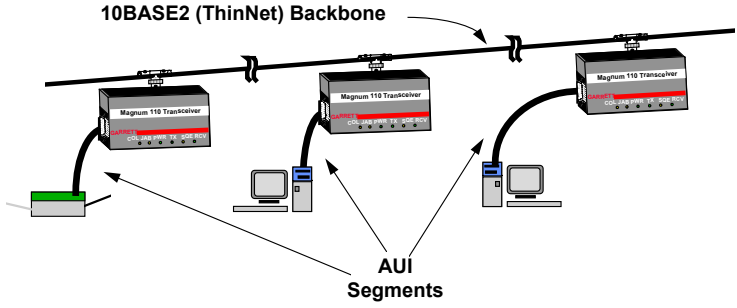
2.4 Applications

Magnum Coax Transceivers are conveniently used to provide up to four AUI connections to a ThinNet or ThickNet backbone. When multi-port models are used, Magnum Coax Transceivers reduce the cost per drop and allow additional devices to be easily added to the network without going beyond standard Ethernet tap limitations.



Magnum 140 Adds Four AUI Device Connections

In another application, several low cost Magnum Coax Transceivers maximize the number of devices that are attached to the network in a cost-effective manner.



Magnum 110 Transceivers Cost-Effectively Add Devices to Network

3.0 INSTALLATION

Tthis section descibes the installation of Magnum Coax Transceivers, including locating, installation and cable connection.

3.1 Locating Magnum Coax Transceivers

Installation of Magnum Transceivers is dependent on the physical layout of the network and the area to be served. Place the unit in a location that will accommodate easy and equal access to planned network devices. Locate the transceiver so that all AUI cables attached to their corresponding Ethernet devices are of a nominal length; the deciding factor is adherence to Ethernet specifications for aggregate AUI cable length (see details in 3.3 below). The compact, lightweight design of the units allow them to be installed in the ceiling area. Wall-mounting or shelf-mount is not necessary.

3.2 Installing the Coax Transceiver Tap

Installing any one of the optional network taps is easy. Follow these 3 steps:

1. Remove the screws on the front or rear panel of the transceiver case.
2. Align the connector pins on the tap with the connector inside the transceiver. Then, slowly and firmly push the tap into position.
3. Once inserted, secure the tap by replacing the screws removed in Step 1.

Once the tap is installed, the unit is ready to be connected to the network.

3.3 AUI Segment Length Considerations

The following information is provided to assist with the proper location and placement of Magnum Coax Transceivers being attached to the network. When installing a Magnum Coax Transceiver, it is important to consider the AUI segment distance to the attached device(s).

The maximum transmission distance between the transceiver tapped into the backbone cable and the network device linked to that transceiver depends on the network configuration. When the network device is attached to a transceiver that is connected directly to the backbone, the full AUI segment length (50 m) is allowed. If the device is connected to a transceiver that has been cascaded from another transceiver, the maximum AUI segment length is reduced.

According to Ethernet standards, the maximum distance from the transceiver

AUI connector and the attached device is 50m (165 ft.). The maximum transmission distance is *decreased* by 6m (19.5 ft.) for every addional level of network transceiver device "dropped" or "cascaded" from that transceiver.

3.4 AUI Segment Connection (all models)

Measure all cable lengths before you proceed with installation. Ensure that all cables to be used will easily reach the devices being installed. Follow the five steps listed on the next page to connect an AUI segment to a Magnum Coax Transceiver:

1. Allow for the most direct path between the Ethernet transceiver and the device being connected to the network; avoid excessive bending and crimping of the AUI cable.
2. Attach the female end of the AUI cable to the 15-pin D-subminiature male connector on the transceiver.
3. Attach the male end of the AUI cable to the 15-pin D-subminiature female connector to individual Ethernet devices (workstations, servers, etc.).
4. If the connectors contain slide locks, the connector clip must be properly engaged or locked.
5. Make sure that the AUI cables do not pull on either the transceiver or the device. If possible, support each AUI cable approximately six to eight inches from the transceiver. Use a tie wrap to strap the AUI cable to the network backbone cable or whatever is convenient in the installation area. This method will prevent unnecessary strain on the AUI connectors.

Table 3.4: AUI Pin Assignments

Pin	Function	Pin	Function
1	Control In Circuit Shield	10	Data Out Circuit B
2	Control In Circuit A	11	Data Out Circuit Shield
3	Data Out Circuit A	12	Data In Circuit B
4	Data In Circuit Shield	13	Voltage Plus (+)
5	Data In Circuit A	14	Voltage Shield
6	Voltage Common	15	Control Out Circuit B
7	Control Out Circuit A	SHELL	Protective Ground
8	Control Out Circuit Shield (conductive shell)		
9	Control In Circuit B		

NOTES: 1) Voltage Plus (pin #13) and Voltage Common (pin # 6) use a single twisted pair in the AUI cable.
2) Pins 4, 8, 11 and 14 may be connected to pin #1.

4.0 OPERATION

This section details the various operational features of Magnum Coax Transceivers including polarity requirements, power, SQE, and a description of the LEDs. Every model within the Magnum Transceiver line is fully compatible with Ethernet V1.0/2.0/IEEE 802.3 transceiver specifications for 10 Mbbs operation.

4.1 Powering Magnum Coax Transceivers

Magnum Coax Transceivers derive power from the network and therefore do not require external power supplies. This allows maximum installation flexibility depending on the physical constraints of the network environment.

4.2 Polarity Requirements

Magnum Coax Transceivers each have the same requirement for polarity voltage, and require that all host units attached must supply the same polarity power. The polarity supplied by the hosts must be all positive or all negative.

Note: Do not mix polarity among hosts.

The majority of computers on the market today, including PCs and mini's, use positive polarity voltage. If their is a question about the device being connected to the network, run a voltage test on the output plug of the network interface card installed in the device. Use the polarity information below to determine positive or negative.

Positive Polarity: Pin 13 (to shell) +11v to +16 v; Pin 6 (to shell) +/- 0.5v
Negative Polarity: Pin 13 (to shell) +/- 0.5v; Pin 6 (to shell) -11v to -16 v

4.3 LED Description & Operation

Each Magnum Coax Transceiver has a set of front-panel LEDs to allow for a quick visual assessment of the operational condition of the unit and of network activity.

Magnum 110

LED	*Description*
PWR	Illuminates GREEN to indicate that the unit is receiving power.
SQE	Illuminates YELLOW when SQE is enabled.
TX	Illuminates GREEN as data is transmitted by the attached station.
RCV	Illuminates GREEN to indicate data is being received.
JAB	One each for AUI ports; illuminates AMBER to indicate a jabber (illegal packet length) condition has occurred.
COL	Illuminates YELLOW to indicate a collision has occurred.
Jumper Setting	
SQE	Jumper setting Enables or Disables SQE.

Magnum 120

LED	*Description*
TX	One each for AUI ports; illuminates GREEN when data is transmitted by the attached station.
SQE	Illuminates YELLOW when SQE is enabled.
COL	Illuminates YELLOW to indicate a collision has occurred.
RX	Illuminates GREEN to indicate data is being received.

Jumper Setting

SQE	Jumper setting Enables or Disables SQE.

Magnum 140

LED	*Description*
TX	One each for AUI ports; illuminates GREEN when data is transmitted by the attached station.
JAB	One each for AUI ports; illuminates AMBER to indicate a jabber (illegal packet length) condition has occurred.
SQE	Illuminates YELLOW when SQE is enabled.
COL	Illuminates YELLOW to indicate a collision has occurred.
RX	Illuminates GREEN to indicate data is being received.

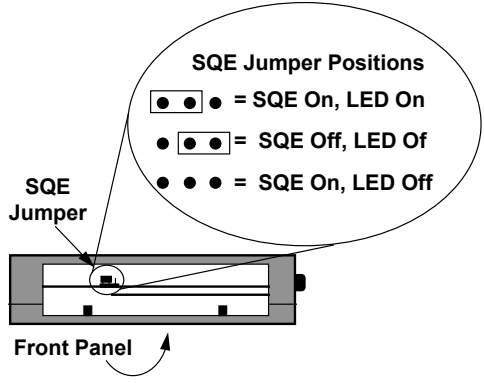
Switch Setting

SQE	Switch Enables or Disables SQE independently on each port.

4.4 SQE Configuration

Each Magnum Coax Transceiver features either an SQE jumper (models 110, 120) or an SQE switch (model 140 only). The factory setting for SQE is "Off". When configured in the "On" position, the SQE LED is illuminated. If the SQE jumper block is missing, SQE will be enabled but the LED will not be illuminated. The figure on the next page illustrates the location of the SQE jumper on the Magnum 110 and 120, including the various setting positions.

The Magnum 140 SQE Enable/Disable switches are located on each end of the unit, just beside the AUI connectors. Each SQE switch allows the SQE setting to be either On or Off for each AUI connector.



Top view - Magnum 110 and 120 Coax Transceivers with tap connector removed

5.0 TROUBLESHOOTING

All Magnum Ethernet products are designed to provide reliability and consistently high performance in all network environments. The installation of Coax Transceivers is a simple procedure (see Section 3.0, INSTALLATION); operation is very simple and is described in Section 4.0, OPERATION.

Should problems develop during installation or operation, this section should help to locate, identify and correct such problems. Please follow the suggestions listed below prior to contacting your supplier. However, if you are unsure of any procedure described in this section, or if the Magnum Coax Transceiver is not operating as expected, do not attempt to repair or alter the unit. Contact your supplier (or if unknown, contact GarrettCom Inc) for assistance.

5.1 Before Calling for Assistance

1. If difficulty is encountered when installing or operating the Magnum Coax Transceiver, refer back to Section 3.0, Installation and Section 4.0, Operation. Check to make sure that the various other components of the network are operable.

2. Check the cables and connectors to ensure that they have been properly connected, and the cables/wires have not been crimped or in some way impaired during installation. (About 90% of network downtime can be attributed to wiring and connector problems.)

3. Use the PWR LEDs to verify the unit is receiving proper power.

4. If the problem is isolated to a network device other than the Magnum Coax Transceiver, it is recommended that the problem device be replaced with a known good device. Verify whether or not the problem is corrected. If not, go to Step 5 below. If the problem is corrected, the Magnum Coax Transceiver and its associated cables are functioning properly.

5. If the problem continues after completing Step 4 above, contact your supplier of the Magnum Coax Transceiver (or if unknown, contact GarrettCom Inc) by fax, phone or email for assistance.

5.2 When Calling for Assistance

Please be prepared to provide the following information.

1. A complete description of the problem, including the following points:
   a. The nature and duration of the problem;
   b. Situations when the problem occurs;
   c. The components involved in the problem;
   d. Any particular application that, when used, appears to create the problem;
2. An accurate list of GarrettCom Inc product model(s)involved, with serial number(s). Include the date(s) that you purchased the products from your supplier.
3. It is useful to include other network equipment models and related hardware, including personal computers, workstations, terminals and printers; plus, the various network media types being used.
4. A record of changes that have been made to your network configuration prior to the occurrence of the problem. Any changes to system administration procedures should all be noted in this record.

5.3 Return Material Authorization (RMA) Procedure

All returns for repair must be accompanied by a Return Material Authorization (RMA) number. To obtain an RMA number, contact GarrettCom Inc Customer Support at (510) 438-9071 (office hours: 8AM - 5PM Pacific Standard Time) or send email to *support@garrettcom.com*. Please have the following information available when calling:

Name and phone number of your contact person.
Name of your company / institution
Your shipping address
Product name
Serial Number (or Invoice Number)
Packing List Number (or Sales Order Number)
Date of installation
Failure symptoms, including a full description of the problem.

GarrettCom Inc will carefully test and evaluate all returned products, will repair products that are under warranty at no charge, and will return the warranty-repaired units to the sender with shipping charges prepaid (see Warranty Information, Appendix A, for complete details). However, if the problem or condition causing the return cannot be duplicated by GarrettCom Inc, the unit will be returned as:

No Problem Found.

GarrettCom Inc reserves the right to charge for the testing of non-defective units under warranty. Testing and repair of product that is not under warranty will result in a customer (user) charge.

5.4 Shipping and Packaging Information

Should you need to ship the unit back to GarrettCom Inc, please follow these instructions:

1. Package the unit carefully. It is recommended that you use the original container if available. Units should be wrapped in a "bubble-wrap" plastic sheet or bag for shipping protection. (You may retain all connectors and this Installation Guide.)

CAUTION

Do not pack the unit in Styrofoam "popcorn" type packing material. This material may cause electro-static shock damage to the unit.

2. Clearly mark the Return Material Authorization (RMA) number on the outside of the shipping container.
3. GarrettCom Inc is not responsible for your return shipping charges.
4. Ship the package to:

GarrettCom Inc

47823 Westinghouse Drive

Fremont, CA 94539

Attn.: Customer Service

APPENDIX A: Warranty Information

GarrettCom Inc warrants its products to be free from defects in materials and workmanship for a period of three (3) years from the date of shipment by GarrettCom Inc.

During this warranty period, GarrettCom Inc will repair or, at its option, replace components in the products that prove to be defective at no charge other than shipping and handling, provided that the product is returned pre-paid to GarrettCom Inc.

This warranty will not be effective if, in the opinion of GarrettCom Inc, the product has been damaged by misuse, misapplication, or as a result of service or modification other than by GarrettCom Inc.

GarrettCom Inc reserves the right to make a charge for handling and inspecting any product returned for warranty repair which turns out not to be faulty.

Please complete the warranty card as this acts as a product registration, and mail it to GarrettCom Inc within two weeks of your purchase.