GarrettCom™

Ethernet at Its Best℠

Magnum TB14 and TB14H
10Mb/s Media Converters

Installation and User Guide

Magnum™ TB14 and TB14H 10Mb/s Media Converters

Installation and User Guide

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> **Important:** The Magnum TB14 andTB14H 10 Mb/s Media Converters contains no user serviceable parts. Attempted service by unauthorized personnel shall render all warranties null and void. If problems are experienced with Magnum TB14/TB14H 10 Mb/s Media Converters products, consult Section 5, Troubleshooting, of this User Guide.

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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Revisions

Rev C 09/04: Minor updates on UL Requirements on power supplies
Rev C 06/04: Minor updates on Agency approvals and power supplies
Rev C 07/03: Minor Update, MK3 units in Series.
Rev B 02/03: Minor Update 10/02 for LEDs, corrected **3.6 Connecting Media**
Rev A 08/02 : Initial release of this user manual, for TB14 and TB14H.

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

1.0 SPECIFICATIONS

1.1 Technical Specs Model TB14 and TB14H (Standard TP and BNC media)

Performance:

Data Rate: 10 Mbps (IEEE 802.3), half duplex mode

Network Standards:

Ethernet: IEEE 802.3, 10BASE2, 10BASE-T

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

Number of Media Converters in series:

Experience shows that no more than 3 BNC units can be used in series between repeaters or NICS. For 4 or more in series, noise build-up will typically preclude proper operation. See also Section 3.5, Calculating Segment Distances.

Maximum Standard Ethernet Segment Lengths:

10BASE-T (twisted pair):	100 m (328 ft)
10BASE2 ThinNet (BNC):	185 m (607 ft)

Note: *Magnum Media Converters* DO NOT *support full length Ethernet segments. See Section 3.2 of this manual for media lengths and segment distance calculations.*

Operating Environment:

Ambient Temperature: (0°C to 40°C) TB14-d, TB14-i
: (0°C to 50°C) TB14-Hd, TB14-Hi
(-40°C to 55°C) TB14H-Hd, TB14H-Hi
(-40°C to 75°C) TB14H-12VDC, TB14H-24VDC, TB14H-48VDC

Storage Temperature: -40°C to 85°C
Ambient Relative Humidity: 5% to 95% (non-condensing)

Power Supply These products are intended to be supplied by a Listed, Direct Plug-In power unit, marked “Class 2”, or a Listed ITE Power Supply, marked “LPS”, which has suitably rated output voltage (i.e. 9vdc, 12vdc, 24vdc, 48vdc), and suitably rated output current (i.e. 100mA to 500mA).When connected to a 48 V centralized dc source these products shall be provided with a Listed 5 A DC fuse in the supply circuit.

Power Supply (AC-DC Adapter, External):

Power input 12V DC jack is 2.5mm center +ve jack, with 6ft. cord

120V AC at 60 Hz, for **“-d”** North American models with IEC320 connectors built-in

230V AC at 50 Hz, IEC built in, for **“-i”** intl models with IEC320 connectors built-in

100-240V AC at 50-60Hz, for **"-Hd"** high temp.
with IEC320 connectors built-in

100-240V AC at 50-60Hz, for **"-Hi"** high temp
with IEC320 connectors built-in

DC to unit: 12V DC, 2.5mm jack, center +ve, 6ft. cord

Power Supply (Direct DC): built-in terminal block for +, -, gnd. The 12V DC jack is also present.

12V DC internal (range of 8 to 15V DC),

24V DC internal (range of 18 to 36V DC)

-48V DC internal (range of 36 to 60V DC)

Power Consumption: 3 watts typical and 5 watts max. for all models

Connectors, for Media:

RJ-45 Port: Modular 8-Pin female, with "cross-over" up-link switch

BNC Port: Standard BNC connector, RG-58 ThinNet with internal term sw.

Packaging:

Enclosure: Rugged sheet metal (Steel).

Dimensions, Media Converter unit: Height x Width x Depth

TB14 and TB14H: 3.5 in H x 3.0 in W x 1.0 in D (8.9 cm x 7.6 cm x 2.5 cm)

Weight: TB14 and TB14H: 7.9 oz. (225g);

power supply –d, and -i : 5.8 oz (165g)

power supply –Hd, and =Hi: 3.8 oz 110g)

Cooling Method: Convection, plus the case is used as a heat sink on "H" models

Media Converter LED Indicators:

LED	TB14	TB14H	Description
PWR	unit	unit	Steady ON when power is applied
Link	TP,	TP	Steady ON when proper link is established at both ends of the segment.*
RX/A	TP, BNC	TP, BNC	Blinking indicates activity, port is receiving packets. (Steady On or Off = no RX activity).
POL	TP	TP.	Indicates the unit has detected a TP receive wire-pair signal inversion (polarity).
COL* .	TP, BNC.	TP, BNC	Indicates unit is simultaneously transmitting and receiving data from the cables.
JAB*	n.a.	unit	Indicates jabber (illegal packet length fault) condition. when lit,

Segment is partitioned, .**NOTE:**

*COL and JAB LEDs, only on TB14 and TB14H units, are indicators applicable to standard Ethernet collision domains with only half-duplex operation.

Metal Mounting clips : included

DIN-Rail mounting option: Model # DIN-RAIL KIT

Rack-mount option: MC14-TRAY, see http://www.garrettcom.com/mc_tray.htm

Agency Approvals:

UL Listed (UL60950), cUL, CE, Emissions meet FCC Part 15, Class A.
NEBS L3 and ETSI compliant
H model: IEEE P1613 Env. Std. for Electric Power Substations
H model: NEMA TS-2 and TEES for traffic control equipment
H model: designed for UL2043 above-the-ceiling installation
IEC61850 EMC and Operating Conditions Class C for Power Substations

Warranty: Three years, return to factory Made in USA

1.2 Summary of models and descriptions:

TB14-d = TP to BNC, half-duplex, 120V 60Hz AC power supply (office use)

TB14-i = TP to BNC, half-duplex, 230V 50Hz AC power supply (office use)

TB14-Hd = TP to BNC, half-duplex, 100- 240V 50-60Hz AC power supply (Industrial use)

TB14-Hi = TP to BNC, half-duplex, 100- 240V 50-60Hz AC power supply (Industrial use)

TB14H-Hd = TP to BNC, half-dpx, 100-240V 50-60Hz, AC power supply (Extended Temperature)

TB14H-Hi = TP to BNC, half-dpx, 100-240V 50-60Hz, AC power supply (Extended Temperature)

TB14H-12V DC = TP to BNC, half-duplex, 12V DC Internal power supply (Extended Temperature)

TB14H-24V DC = TP to BNC, half-duplex, 24V DC Internal power supply (Extended Temperature)

TB14H-48V DC = TP to BNC, half-dpx, -48V DC Internal power supply (Extended Temperature)

MC14-TRAY = 19" Rack-mount tray for 14-series Media Converters, up to 16 units

2.0 INTRODUCTION

This section describes the TB14 and TB14H models, including appearance, features and typical applications.

2.1 Inspecting the Package and the Product

Examine the shipping container for obvious damage prior to installing this product; notify the carrier immediately 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 TB14 or TB14H Media Converter Unit
1	External Power Supply, (except for internal DC power supply models)
1 set	Metal mounting clips and screws, 2 each
1	Velcro® Tape section, approximately 3 inches in length
1	User Guide, i.e., this manual

(continued next page)

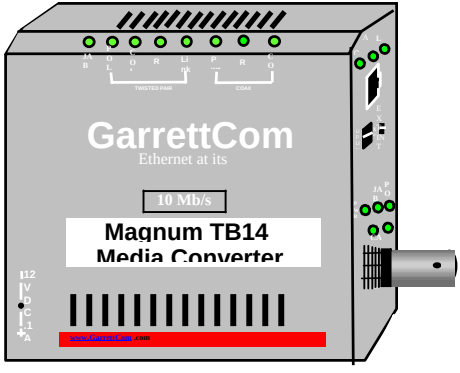
Remove the Magnum Media Converter from the shipping container. Be sure to keep the shipping container should you need to ship the unit at a later date.

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.

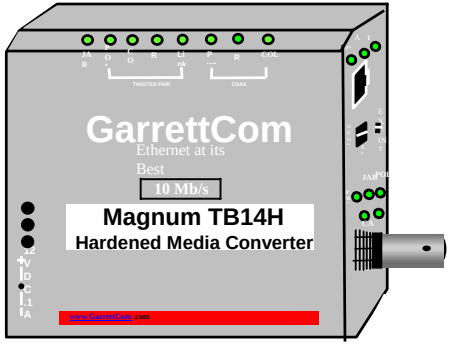
2.2 Product Description

Rugged packaging, a selection of extended temperature models, choice of AC and DC power types, ease-of-use features, and energy-efficiency are the primary characteristics of the Magnum 10Mb TB14 and TB14H Media Converters. All models offer a graceful way to convert and transmit data between twisted pair and thin coaxial BNC network cables for media flexibility in new or expanded 10Mb Ethernet networks. They provide standard collision detection and indication, and comply with the Ethernet V1.0 / 2.0 specifications and the IEEE 802.3 standards. Power consumed in use is only 3 watts.

The TB14 regular-package units are for office and wiring closet environments and use an external AC power supply for either 0° to 40°C or the more stressful industrial



Magnum TB14



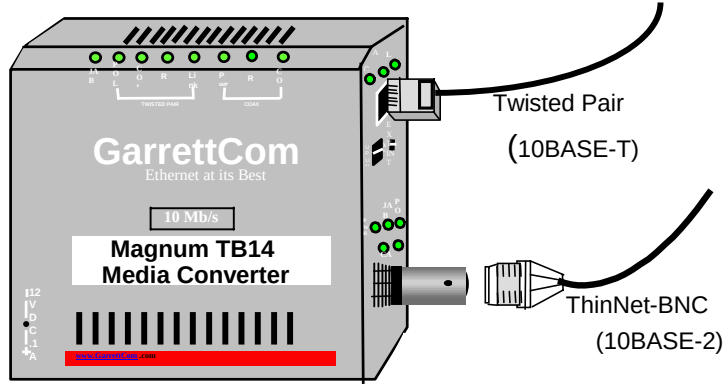
Magnum TB14H

0° to 50°C ambient temperature. A rugged metal case with convection cooling is featured. The units can be mounted securely on a closet wall or the side of cabinet, or by using the metal mounting clips included.

The TB14H Hardened unit features a sealed metal case which is also used as a heat sink. No air flow is required for cooling, so the TB14H resists dust, dirt, moisture, smoke and insects, and is plenum rated. Choices of models for external AC or internal DC power are available. Ambient temperature rating is up to –40°C to +75°C depending on the power source used. The TB14H is suitable for temperature un-controlled outdoor applications. Mounting options include panel-mounting, DIN-rail, or rack-mount tray.

The "TB14" series offer a graceful way to convert and transmit data among twisted pair, and thin coaxial network cabling environments. TB14 Media Converters cost significantly less than full repeaters and can be used whenever media distance

limitations will not be exceeded in the segment. All units are compatible with Ethernet V 1.0 / 2.0 specifications and comply with IEEE 802.3 standards.



Magnum TB14s 10Mb Media Converters are designed for quick and easy installation even in very tight spaces. Media cables are easily attached to the corresponding Media Converter. Because of their compact size, Magnum Media Converters can be Velcro®-mounted on an office wall or the side of a desk or cabinet. Mounting options include panel-mounting, DIN-rail and rack-mount tray(MC14-TRAY) that neatly holds the units and associated power supplies is available.

The standard "1-per-unit" external power supply plugs into a nearby AC wall socket or power strip. The TB14H (Hardened) media converter is also available with extended temperature power supply AC/DC (External/Internal) to qualify for un-controlled and Industrial application. Each converter features two full sets of LEDs that convey essential diagnostic and status information at any angle. See Section 4.1 and 4.4, for power supply and LED function specifications.

All of the Magnum "TB14s" Media Converters comply with the IEEE 802.3 10BASE-T specification for 10 Mb/sec traffic via shielded (STP) or unshielded twisted pair (UTP) segments. They feature an up-link or cross-over switch to eliminate the need for a special cross-over cable when connecting to a hub or concentrator and also an ($\propto$ - 50Ω) internal termination switch to control the BNC port by eliminating the TEE – Connector. The BNC connector complies with IEEE 802.3 10BASE2 specifications.

Note: experience shows that the maximum number of 10Mb Media Converters that can be used in series is three. The cumulative signal noise from 4 or more units together in series may cause packet alignment errors.

2.3 Features and Benefits

- **Reduces Network Costs**

  Magnum Media Converters offer the ideal solution to efficiently and inexpensively connect Twisted Pair with ThinNet media within an expanding Ethernet network where full repeaters are not required.

- **No added Repeater Hop Count**

  Media Converters do not add signal timing delays associated with full repeaters, and can be installed without increasing the repeater hop count of an existing network.

- **Two sets of LEDs for viewing status from any angle.**
  Each TB14 Media Converter is equipped with a two sets (front and side) of LEDs to provide status information when viewed at any angle or mounting arrangement, rack-mount (MC14- Tray) or wall-mount**.**

- **Rugged metal case, industrial grade**

  TB14s Media Converters have a robust design and are packaged in a rugged sheet metal enclosures to ensure high reliability and durability even when placed in extended temp; e.g industrial or outdoor applications.

- **AC and DC Power Supplies with extended temperature ratings**

  TB14H Media Converters are designed for use in temperature **un**-controlled applications, and are available with variety of ratings, external AC and internal DC power supplies. See Specs, Section 1.1 for details.

- **Compact design, mount anywhere**

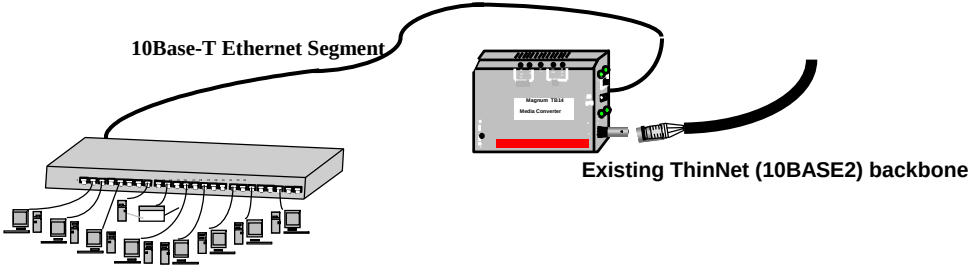
  Featuring a compact steel case with an external AC power supply, Magnum TB14 Media Converters can be installed in minimal space in rack mount cabinets like MC14-TRAY, on table-tops or wall-mounted.

2.4 Applications

The primary function of a 10Mb Ethernet Media Converter is to permit two different 10Mb media types to coexist inexpensively within the same network by allowing data to be transmitted and received between different media types.

Magnum “TB14s” Media Converters are typically used where new 10BASE-T networking equipment is being installed and connected to existing BNC Ethernet cabling. Magnum “TB14” Media Converters have an external AC power supply and internal DC Power supply, enabling them to be used to convert signals among media that does not have a power source as part of the cabling system, such as twisted pair and BNC. The wide variety of options of AC and DC power supply qualify the TB14 s for use in office locations as well as industrial and even outdoor applications.

In this application, in a Industrial environment where extended temp. supported units is a requirement, the existing BNC network needs to connect with RJ-45 ports in a hub / switch to expand the existing application. The rugged Magnum TB14s with various extended temperature features easily qualifies to be deployed in this requirement and smoothly serve the needs by changing BNC media to RJ-45.



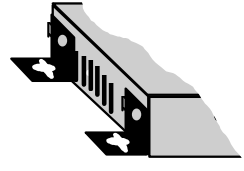
The TB14 10Mb Ethernet Media Converter connects twisted-pair cabling to existing BNC cabling. The operation is half-duplex in all situations. See Section 3.5 for calculations of cable distance limits.

3.0 INSTALLATION

This section describes the installation of the Magnum TB14s Media Converters, including location, segment distance calculation and media connection.

3.1 Locating the Media Converter Unit

All the TB14-series operate in transparent half-and full-duplex mode. For half-duplex traffic, the TB14-series work correctly but do not detect or indicate collisions.



Secure attachment of mounting clips for wall mounting

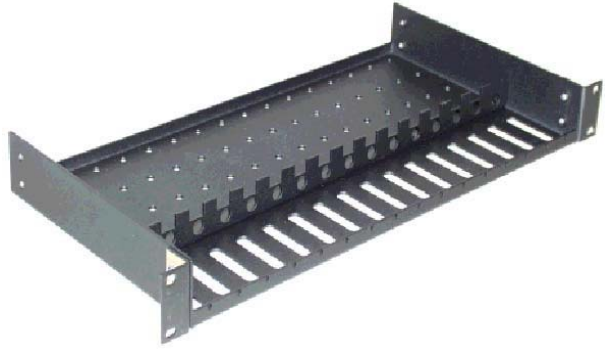
The compact and lightweight design of the Magnum Media Converter allows it to be easily installed in almost any location. A Velcro strip is included for mounting the unit on a vertical surface such as a wall or cabinet, or for securing the unit on a table-top or shelf. Alternatively, metal

mounting clips and screws are included for a rugged and secure mounting in any orientation.

Installation of the Magnum TB14 and TB14H Media Converters is a simple procedure. The installation location is dependent upon the physical layout of the Ethernet network and associated cabling. Make sure the unit is installed in a location that is easily accessible to an AC power outlet or power strip, and where convection cooling is not inhibited. The green Power (PWR) Led must turn ON, when power is applied through the internal DC input 12V, 24V or –48V DC or external AC through 12V DC jack.

3.2 MC14-TRAY for Rack Mounting of TB14 and TB14H Media Converters

For 19" rack-mounting of Magnum TB14s Media Converters, a rack-mount tray is available, MC14-TRAY. The Media Converter units are mounted with their RJ-45 port and DC power jack in the back, with either fiber or BNC cable in the front. Any mix of the TB14-type Media Converters may be placed on a tray, up to a maximum of 16 units. (The mounting spaces of the MC14-TRAY are specific to the "14"-series, and do not permit other models).



A typical installation of the model MC14-TRAY, 19" rack-mount tray will hold a few (often three to eight) 14-series Media Converters, with their power supplies plugged into power strips (not included) in the rear area of the tray. Metal mounting screws in the bottom-front hold the Media Converters firmly in place. The beveled-top edge of the units permits the LEDs of each unit to be viewed for operational status, even when the units are very close together.

3.3 MC14-TR+PS9 & MC14-TR+PS9X2 for Rack Mounting Media Converters

The MC14-TR+ PS9 and MC14-TR+PS9X2 are another option available for Rack Mounting the mix-match of 10Mbps and 100Mbps Media Converters together in 19" rack-mount tray. These models comes with built-in common universal AC power supply rated at 55 watts at 50°C ambient, 9VDC output, and supporting up to 10 MC for MC14-TR+PS9 and 16 units of Fiber media converters for MC14-TR+PS9X2. The

MC14-TR+PS9X2 Model has two groups of eight units per power supply. These models are equipped with auto-ranging AC input to the power supplies for use worldwide.

(The MC mounting spaces of the MC14 -TR models are specific to the Magnum 10Mbps (TB14) and 100MB (14E) series, and do not permit other models or other sizes to be put in the tray).

The side-view picture shown here is an example of an installation of the model MC14-TR+PS9, 19" rack-mount tray, holding a few 10Mbps TB14s and 100Mb 14E Media Converters, each with their power input plugged into the built-in common AC power supply in the rear area of the tray. (PS units that come with the MC's are not used).

Metal mounting screws in the bottom-front hold each of the media converters secure in the tray, separately removable for service. The dual LEDs permit viewing operating status of the Media Converters from any angle.

3.4 DIN-Rail mounting option

The Magnum TB14 and TB14H Media Converters, designed for use in "Factory Floor" Industrial Ethernet environments, are also available for DIN-Rail mounting in an enclosure having DIN Rails.

The metal DIN-Rail mounting hardware is optional and needs to be ordered as a separate item, e.g. Model # DIN-RAIL-MC2. It comes with four screws to attach the bracket to the MC unit. The rail clip is spring-loaded with a pull-up latch at the top for easy "snap-on" attachment and removal.

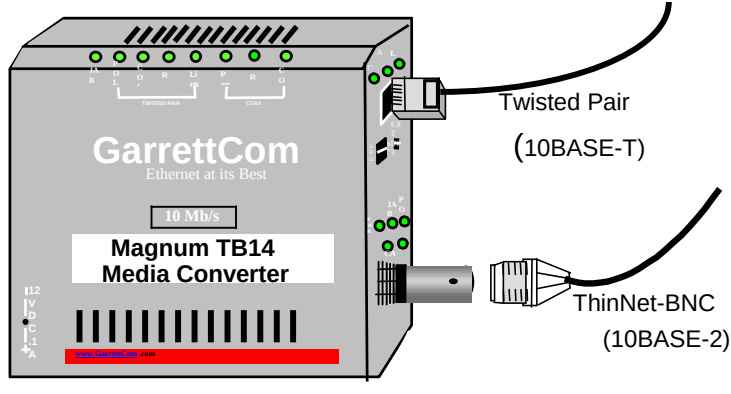
The Magnum TB14 Models with "HR" have 24VDC power, and have the DIN-Rail-MC2 bracket included and assembled at the factory.

A Magnum TB14H is shown alongside the DIN-Rail-MC2 bracket

3.5 Calculating Overall Segment Distance

Important Note: Special consideration must be given to maximum cable segment lengths of a Magnum TB14 and TB14H Media Converter. It is recommended that IEEE 802.3 specifications for overall maximum segment distances be adhered to in order to maintain optimum network performance. (See also Technical Specs, Maximum Standard Ethernet Segment Distances, Section 1.1 of this manual.)

When installing the Magnum TB14s Media Converter, it is important to consider the combined overall segment length of both of the attached media types. The overall segment length is calculated by adding together the segment lengths on both sides of the Magnum Media Converters. Cable segment length on each side of the Media Converter is measured as a percentage of the maximum allowable standard media distance for the given media type. The percentages, when added together, must not exceed 100%.



Connectivity between ThinNet and TP Ethernet Media.

Media Distance Formula for Magnum Media Converters:

X% + Y% ≤ 100%

Where **X** = The segment distance on one side of the Magnum Media Converter divided by the Standard Maximum Media Distance for that media type, x 100%.
Where **Y** = The segment length on the other side of the Magnum Media Converter divided by the Standard Maximum Media Distance for that media cabling type, x 100%

A Distance Calculation Example:

Connectivity between ThinNet and TP Ethernet Media.

In this example, the length of Segment X is 72m (216 ft). This is 39% of the maximum allowable distance for 10BASE2 media (185 m) [72/185 x 100% = 39%]. The length of Segment Y is 55m (165 ft). This is 55% of the maximum allowable distance for UTP 10BASE-T media (100 m) [55/100 x 100% = 55%]. The total of the two percentages (39% + 55%) is 94%, which is allowable.

Note 1: Where more than one media converter is used in one segment run, the percentages for all of the cabling lengths in the run must be added together and must not exceed 100%.

Note 2: If the total segment distance calculation result is greater than 100%, consider using a Magnum Repeater so that each cable type can be 100% of its maximum allowed length.

Note 3: The maximum number of 10Mb Magnum BNC Media Converters that can be used in series is three. The cumulative noise from more units together causes packet alignment errors and excessive dropped packets.

3.6 Connecting Ethernet Media

It is recommended that both of the media (TP and BNC) be connected with power off so that both ports are connected when power is applied to the logic in the electronics. If power is on, connect the Twisted Pair media before the BNC media. If BNC is connected before TP with power on, it can create a Jabber condition, in which case the JAB LED will come on and no packets will be processed.

See Sections 4.4 for details of the LEDs on the media converter models.

3.6.1 Connecting Twisted Pair (RJ-45 ports)

The following procedure describes how to connect a 10BASE-T twisted pair segment to the RJ-45 port on the Magnum Media Converters. The procedure is the same for both unshielded and shielded twisted pair segments.

1. Using standard 10BASE-T media, insert either end of the cable with an RJ-45 plug into the RJ-45 connector of the Magnum Media Converter.

2. Connect the other end of the cable to the corresponding device.

Use the LINK LED to ensure proper connectivity by noting that the LED will be illuminated when the units are powered and proper connections established. If the LINK LED is not illuminated, change the setting of the up-link switch (See Section 4.6 for up-link switch information.) If this does not help, ensure that the cable is connected properly at both ends and is not defective.

3.6.2 Connecting ThinNet (10BASE2)

Note: connect TP media before connecting BNC media if power is on in the Media Converter unit. See Section **3.6 Connecting Media** above.

Connect the ThinNet coax cable to the BNC connector on the TB14s Media Converter in the same manner as is done for any standard BNC connection. Be sure that the BNC segment is properly terminated using a standard "T" connector.

The TB14s media converter is also equipped with "Terminator Switch" (∝-50Ω), which can be used to eliminate the standard "T" connector by moving the "Terminator Switch" to 50Ω. See Section **4.5 BNC port, Internal Termination Switch** for details.

4.0 OPERATION

This section describes the operation of the Magnum TB14 and TB14H 10Mb Media Converters, including power supply requirements, up-link switch functionality, and a description of all LEDs.

4.1 Power Requirements, Power Supply Types for TB14 and TB14H

-d **-i**

Magnum TB14 Media Converters are power-efficient and can work with an external AC-DC Adapter power supply. Magnum TB14 Media Converters require a nominal 12VDC input. The –d regular PS version is used for light duty offices, whereas the extended temperature –Hd version (0° to 50°C) is used for heavy duty and industrial applications. The TB14 & TB14H media converters are designed to be used with UL listed Class II power supplies.

The 12V DC power input has a plug of 2.5mm, center +ve , with 6 ft. cord. All the other AC power supply info detail is provided in Technical Specifications Section 1.1.

The TB14H are specially designed to provide reliable operation, withstand higher temperature environment and provide the various choice to the user to deploy in uncontrolled temperature environment. The extended temp. AC version of TB14H uses the external power supply with (100-240v) AC range at 50-60 Hz.

12VDC **24VDC** **-48VDC**

The Internal 12V DC (8 – 15V DC)

has a built-in terminal block for +, -, ground. The 12V DC jack is also present. Detail

information about the 12 VDC, the 24V DC and the –48V DC is provided in the Technical Specifications Section 1.1.

The various models of power type and extended ambient temperature power supplies are optional and choice needs to be called out on your order.

Note: When connected to a -48 V centralized dc source these products are to be installed only in Restricted Access Areas (dedicated equipment rooms, electrical closets or the like).

4.2 Powering the TB14H (Direct DC) with 12V, 24V or –48V DC power input

Each Magnum TB14H is equipped with an internal Direct DC power supply,

and have built-in screw terminals for secure attachment of the power leads. Three models support a range of power input types. The three model choices are for use with 12VDC, 24VDC or -48VDC power. DC power input may be chosen for high-availability.

The extended temperature capability of the DC-powered TB14H's can go temperature uncontrolled environments, rated at –40`C to +75`C. If indoors, the DC jack is also present and optionally can be used with an external AC power supply.

DC Power Terminals (built-in terminal block): "+", "-", floating

GND: Terminal for "earth" or ground wire connection to the TB14H chassis

Input Voltage: 8 - 15V DC (12V DC)

18 – 26V DC (24V DC)

30 – 60V DC (-48V DC)

Input current: 0.8 amp max.(9V DC)

0.4 amp max.(24V DC)

0.2 amp max.(-48V DC)

Power Consumption: 3 watts typical, 3.5 watts maxm.

4.3 TB14H, DC-powered, -48VDC, 24VDC and 12VDC Installation

This section describes the proper connection of the -48VDC leads (or 24VDC, 12VDC leads) to the DC power terminal block on the Magnum TB14H hardened media converter (as shown in Figure above)**.** The DC terminal block on the Magnum TB14H is located on the left side of the unit and is equipped with three (3) screw-down lead posts. The power terminals are identified as positive (+) and negative (-), and they are floating inside the unit so that either of the terminal may be grounded by the user if desired. The chassis is "earth" or ground (GND).

The connection procedure is straightforward. Simply insert the DC leads to the TB14H's power terminals, positive (+) and negative (-) screws. The use of Ground (GND) is optional; it connects to the TB14H chassis. Ensure that each lead is securely tightened from the top, as shown here.

NOTE: Always use a voltmeter to measure the voltage of the incoming power supply and figure out the +ve potential lead or -ve potential lead. The more +ve potential lead will connect to the post labeled "+ve" and the rest to the "-ve".

The GND can be hooked up at the last.

When power is applied, the green PWR LED will illuminate.

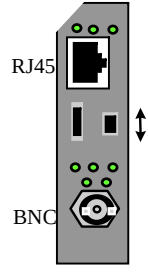
4.4 Dual LEDs, front-panel and side-panel (Magnum TB14 and TB14H)

LED	Description
PWR	Illuminates GREEN to indicate power applied.
LINK/L	(TP) Illuminates GREEN, to indicate proper connectivity on the 10BASE-T network segment. LINK will turn off in the event connectivity is lost between the ends of the twisted pair segment or a loss of power occurs in the unit or remote device.
RX/A	Blinking GREEN indicates data is being received, receive activity. (Steady ON or steady OFF indicates no receive activity).
POL/PO	(TP) Illuminates AMBER to indicate inverse polarity detected.
JAB	Illuminates AMBER to indicate jabber (illegal packet length). See also Section **3.5 Connecting Media** instructions on attaching TP before BNC.

COL/C (per port) Illuminates AMBER to indicate a collision on the segment.

4.5 TB14s, BNC Internal Termination Switch

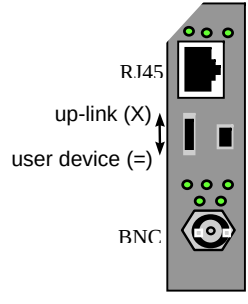
An internal termination switch (∝ - 50Ω) is provided on the TB14s Model. The BNC port is specially equipped with an internal termination switch that eliminates the need to use a "tee" connector when the BNC cable is ending at the TB14. When the switch is in the "50Ω" position, the connection is internally terminated. When switched to the "∝" position, external termination (using a "tee" connector, not supplied) is required. Some applications may require a "tee" connector, used as a tap, to allow the 10BASE2 coax segment to continue on past the TB14 and TB14H port connection.



End view. TB14's

4.6 Up-Link (Cross-over) Switch

The TB14 and TB14H Media Converter is equipped with an Up-Link slide switch. When set to the UP position (X), the Media Converter is wired with cross-over functionality for direct up-link to a network hub, switch or concentrator. When set to the DOWN position (=), the Magnum Media Converter is wired for normal twisted-pair connection to a user node device. Some Ethernet Switch ports may be of either polarity, and this feature is most convenient with such switches.



End view, TB14, TB14H

5.0 TROUBLESHOOTING

All Magnum Ethernet products are designed to provide reliability and consistently high performance in all network environments. The installation of Magnum TB14s 10 Mb/s Media Converters is a straightforward procedure (see INSTALLATION, Section 3.0); the operation is also straightforward and is discussed in Section 4.

Should problems develop during installation or operation, this section is intended to help locate, identify and correct these types of problems. Please follow the suggestions listed below prior to contacting your supplier. However, if you are unsure of the procedures described in this section or if the Magnum TB14/TB14H 10 Mb/s Media Converter is not performing as expected, do not attempt to repair the unit; instead contact your supplier for assistance or contact GarrettCom Customer Support.

5.1 Before Calling for Assistance

1. If difficulty is encountered when installing or operating the unit, refer back to the Installation Section of the applicable chapter of this manual. Also check to make sure that the various components of the network are interoperable.

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. Make sure that an AC power cord is properly attached to each Magnum TB14/TB14H 10 Mb/s Media Converters unit. Be certain that each AC power cord is plugged into a functioning electrical outlet. Use the PWR LEDs to verify each unit is receiving power.

4. If the problem is isolated to a network device other than the Magnum TB14/TB14H 10 Mb/s Media Converters product, it is recommended that the problem device is 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 TB14/TB14H 10 Mb/s Media Converters and its associated cables are functioning properly.

5. If the problem continues after completing Step 4 above, contact your supplier of the Magnum TB14/TB14H 10 Mb/s Media Converters unit or if unknown, contact GarrettCom, Inc by fax, phone or email (*support@garrettcom.com*) 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 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, please use this URL - **https://rma.garrettcom.com/rma/rma_request_noaccount.php** to fill out the form. Please have the following information readily available:

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 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, the unit will be returned as:

No Problem Found.

GarrettCom 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, 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 is not responsible for your return shipping charges.

4. Ship the package to:

GarrettCom, Inc.

47823 Westinghouse Dr.

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.

During this warranty period, GarrettCom 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.

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

GarrettCom 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 within two weeks of your purchase.