RICi-E1, RICi-T1

Fast Ethernet over E1/T1 Network Termination Units

Version 2.1

RAD
data communications
The Access Company

RICi-E1, RICi-T1

Fast Ethernet over E1/T1 Network Termination Units

Version 2.1

Installation and Operation Manual

Notice

This manual contains information that is proprietary to RAD Data Communications Ltd. ("RAD"). No part of this publication may be reproduced in any form whatsoever without prior written approval by RAD Data Communications.

Right, title and interest, all information, copyrights, patents, know-how, trade secrets and other intellectual property or other proprietary rights relating to this manual and to the RICi-E1, RICi-T1 and any software components contained therein are proprietary products of RAD protected under international copyright law and shall be and remain solely with RAD.

The RICi-E1, RICi-T1 product name is owned by RAD. No right, license, or interest to such trademark is granted hereunder, and you agree that no such right, license, or interest shall be asserted by you with respect to such trademark. The RAD name, logo, logotype, and the terms EtherAccess, TDMoIP and TDMoIP Driven, and the product names Optimux and IPmux, are registered trademarks of RAD Data Communications Ltd. All other trademarks are the property of their respective holders.

You shall not copy, reverse compile or reverse assemble all or any portion of the Manual or the RICi-E1, RICi-T1. You are prohibited from, and shall not, directly or indirectly, develop, market, distribute, license, or sell any product that supports substantially similar functionality as the RICi-E1, RICi-T1, based on or derived in any way from the RICi-E1, RICi-T1. Your undertaking in this paragraph shall survive the termination of this Agreement.

This Agreement is effective upon your opening of the RICi-E1, RICi-T1 package and shall continue until terminated. RAD may terminate this Agreement upon the breach by you of any term hereof. Upon such termination by RAD, you agree to return to RAD the RICi-E1, RICi-T1 and all copies and portions thereof.

For further information contact RAD at the address below or contact your local distributor.

Limited Warranty

RAD warrants to DISTRIBUTOR that the hardware in the RICi-E1, RICi-T1 to be delivered hereunder shall be free of defects in material and workmanship under normal use and service for a period of twelve (12) months following the date of shipment to DISTRIBUTOR.

If, during the warranty period, any component part of the equipment becomes defective by reason of material or workmanship, and DISTRIBUTOR immediately notifies RAD of such defect, RAD shall have the option to choose the appropriate corrective action: a) supply a replacement part, or b) request return of equipment to its plant for repair, or c) perform necessary repair at the equipment's location. In the event that RAD requests the return of equipment, each party shall pay one-way shipping costs.

RAD shall be released from all obligations under its warranty in the event that the equipment has been subjected to misuse, neglect, accident or improper installation, or if repairs or modifications were made by persons other than RAD's own authorized service personnel, unless such repairs by others were made with the written consent of RAD.

The above warranty is in lieu of all other warranties, expressed or implied. There are no warranties which extend beyond the face hereof, including, but not limited to, warranties of merchantability and fitness for a particular purpose, and in no event shall RAD be liable for consequential damages.

RAD shall not be liable to any person for any special or indirect damages, including, but not limited to, lost profits from any cause whatsoever arising from or in any way connected with the manufacture, sale, handling, repair, maintenance or use of the RICi-E1, RICi-T1, and in no event shall RAD's liability exceed the purchase price of the RICi-E1, RICi-T1.

DISTRIBUTOR shall be responsible to its customers for any and all warranties which it makes relating to RICi-E1, RICi-T1 and for ensuring that replacements and other adjustments required in connection with the said warranties are satisfactory.

Software components in the RICi-E1, RICi-T1 are provided "as is" and without warranty of any kind. RAD disclaims all warranties including the implied warranties of merchantability and fitness for a particular purpose. RAD shall not be liable for any loss of use, interruption of business or indirect, special, incidental or consequential damages of any kind. In spite of the above RAD shall do its best to provide error-free software products and shall offer free Software updates during the warranty period under this Agreement.

RAD's cumulative liability to you or any other party for any loss or damages resulting from any claims, demands, or actions arising out of or relating to this Agreement and the RICi-E1, RICi-T1 shall not exceed the sum paid to RAD for the purchase of the RICi-E1, RICi-T1. In no event shall RAD be liable for any indirect, incidental, consequential, special, or exemplary damages or lost profits, even if RAD has been advised of the possibility of such damages.

This Agreement shall be construed and governed in accordance with the laws of the State of Israel.

Product Disposal

To facilitate the reuse, recycling and other forms of recovery of waste equipment in protecting the environment, the owner of this RAD product is required to refrain from disposing of this product as unsorted municipal waste at the end of its life cycle. Upon termination of the unit's use, customers should provide for its collection for reuse, recycling or other form of environmentally conscientious disposal.

General Safety Instructions

The following instructions serve as a general guide for the safe installation and operation of telecommunications products. Additional instructions, if applicable, are included inside the manual.

# Safety Symbols

⚠️ *Warning*	This symbol may appear on the equipment or in the text. It indicates potential safety hazards regarding product operation or maintenance to operator or service personnel.

⚡	Danger of electric shock! Avoid any contact with the marked surface while the product is energized or connected to outdoor telecommunication lines.

⏚	Protective ground: the marked lug or terminal should be connected to the building protective ground bus.
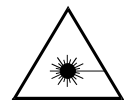
⚠️ *Warning*	Some products may be equipped with a laser diode. In such cases, a label with the laser class and other warnings as applicable will be attached near the optical transmitter. The laser warning symbol may be also attached. Please observe the following precautions:

- Before turning on the equipment, make sure that the fiber optic cable is intact and is connected to the transmitter.
- Do not attempt to adjust the laser drive current.
- Do not use broken or unterminated fiber-optic cables/connectors or look straight at the laser beam.
- The use of optical devices with the equipment will increase eye hazard.
- Use of controls, adjustments or performing procedures other than those specified herein, may result in hazardous radiation exposure.

ATTENTION: The laser beam may be invisible!

In some cases, the users may insert their own SFP laser transceivers into the product. Users are alerted that RAD cannot be held responsible for any damage that may result if non-compliant transceivers are used. In particular, users are warned to use only agency approved products that comply with the local laser safety regulations for Class 1 laser products.

Always observe standard safety precautions during installation, operation and maintenance of this product. Only qualified and authorized service personnel should carry out adjustment, maintenance or repairs to this product. No installation, adjustment, maintenance or repairs should be performed by either the operator or the user.

Handling Energized Products

General Safety Practices

Do not touch or tamper with the power supply when the power cord is connected. Line voltages may be present inside certain products even when the power switch (if installed) is in the OFF position or a fuse is blown. For DC-powered products, although the voltages levels are usually not hazardous, energy hazards may still exist.

Before working on equipment connected to power lines or telecommunication lines, remove jewelry or any other metallic object that may come into contact with energized parts.

Unless otherwise specified, all products are intended to be grounded during normal use. Grounding is provided by connecting the mains plug to a wall socket with a protective ground terminal. If a ground lug is provided on the product, it should be connected to the protective ground at all times, by a wire with a diameter of 18 AWG or wider. Rack-mounted equipment should be mounted only in grounded racks and cabinets.

Always make the ground connection first and disconnect it last. Do not connect telecommunication cables to ungrounded equipment. Make sure that all other cables are disconnected before disconnecting the ground.

Some products may have panels secured by thumbscrews with a slotted head. These panels may cover hazardous circuits or parts, such as power supplies. These thumbscrews should therefore always be tightened securely with a screwdriver after both initial installation and subsequent access to the panels.

Connecting AC Mains

Make sure that the electrical installation complies with local codes.

Always connect the AC plug to a wall socket with a protective ground.

The maximum permissible current capability of the branch distribution circuit that supplies power to the product is 16A. The circuit breaker in the building installation should have high breaking capacity and must operate at short-circuit current exceeding 35A.

Always connect the power cord first to the equipment and then to the wall socket. If a power switch is provided in the equipment, set it to the OFF position. If the power cord cannot be readily disconnected in case of emergency, make sure that a readily accessible circuit breaker or emergency switch is installed in the building installation.

In cases when the power distribution system is IT type, the switch must disconnect both poles simultaneously.

Connecting DC Power

Unless otherwise specified in the manual, the DC input to the equipment is floating in reference to the ground. Any single pole can be externally grounded.

Due to the high current capability of DC power systems, care should be taken when connecting the DC supply to avoid short-circuits and fire hazards.

DC units should be installed in a restricted access area, i.e. an area where access is authorized only to qualified service and maintenance personnel.

Make sure that the DC power supply is electrically isolated from any AC source and that the installation complies with the local codes.

The maximum permissible current capability of the branch distribution circuit that supplies power to the product is 16A. The circuit breaker in the building installation should have high breaking capacity and must operate at short-circuit current exceeding 35A.

Before connecting the DC supply wires, ensure that power is removed from the DC circuit. Locate the circuit breaker of the panel board that services the equipment and switch it to the OFF position. When connecting the DC supply wires, first connect the ground wire to the corresponding terminal, then the positive pole and last the negative pole. Switch the circuit breaker back to the ON position.

A readily accessible disconnect device that is suitably rated and approved should be incorporated in the building installation.

If the DC power supply is floating, the switch must disconnect both poles simultaneously.

Connecting Data and Telecommunications Cables

Data and telecommunication interfaces are classified according to their safety status.

The following table lists the status of several standard interfaces. If the status of a given port differs from the standard one, a notice will be given in the manual.

Ports	Safety Status	
V.11, V.28, V.35, V.36, RS-530, X.21, 10 BaseT, 100 BaseT, Unbalanced E1, E2, E3, STM, DS-2, DS-3, S-Interface ISDN, Analog voice E&M	SELV	Safety Extra Low Voltage: Ports which do not present a safety hazard. Usually up to 30 VAC or 60 VDC.
xDSL (without feeding voltage), Balanced E1, T1, Sub E1/T1	TNV-1	Telecommunication Network Voltage-1: Ports whose normal operating voltage is within the limits of SELV, on which overvoltages from telecommunications networks are possible.
FXS (Foreign Exchange Subscriber)	TNV-2	Telecommunication Network Voltage-2: Ports whose normal operating voltage exceeds the limits of SELV (usually up to 120 VDC or telephone ringing voltages), on which overvoltages from telecommunication networks are not possible. These ports are not permitted to be directly connected to external telephone and data lines.
FXO (Foreign Exchange Office), xDSL (with feeding voltage), U-Interface ISDN	TNV-3	Telecommunication Network Voltage-3: Ports whose normal operating voltage exceeds the limits of SELV (usually up to 120 VDC or telephone ringing voltages), on which overvoltages from telecommunication networks are possible.

Always connect a given port to a port of the same safety status. If in doubt, seek the assistance of a qualified safety engineer.

Always make sure that the equipment is grounded before connecting telecommunication cables. Do not disconnect the ground connection before disconnecting all telecommunications cables.

Some SELV and non-SELV circuits use the same connectors. Use caution when connecting cables. Extra caution should be exercised during thunderstorms.

When using shielded or coaxial cables, verify that there is a good ground connection at both ends. The grounding and bonding of the ground connections should comply with the local codes.

The telecommunication wiring in the building may be damaged or present a fire hazard in case of contact between exposed external wires and the AC power lines. In order to reduce the risk, there are restrictions on the diameter of wires in the telecom cables, between the equipment and the mating connectors.

Caution	To reduce the risk of fire, use only No. 26 AWG or larger telecommunication line cords.

Attention	Pour réduire les risques s'incendie, utiliser seulement des conducteurs de télécommunications 26 AWG ou de section supérieure.

Some ports are suitable for connection to intra-building or non-exposed wiring or cabling only. In such cases, a notice will be given in the installation instructions.

Do not attempt to tamper with any carrier-provided equipment or connection hardware.

Electromagnetic Compatibility (EMC)

The equipment is designed and approved to comply with the electromagnetic regulations of major regulatory bodies. The following instructions may enhance the performance of the equipment and will provide better protection against excessive emission and better immunity against disturbances.

A good ground connection is essential. When installing the equipment in a rack, make sure to remove all traces of paint from the mounting points. Use suitable lock-washers and torque. If an external grounding lug is provided, connect it to the ground bus using braided wire as short as possible.

The equipment is designed to comply with EMC requirements when connecting it with unshielded twisted pair (UTP) cables. However, the use of shielded wires is always recommended, especially for high-rate data. In some cases, when unshielded wires are used, ferrite cores should be installed on certain cables. In such cases, special instructions are provided in the manual.

Disconnect all wires which are not in permanent use, such as cables used for one-time configuration.

The compliance of the equipment with the regulations for conducted emission on the data lines is dependent on the cable quality. The emission is tested for UTP with 80 dB longitudinal conversion loss (LCL).

Unless otherwise specified or described in the manual, TNV-1 and TNV-3 ports provide secondary protection against surges on the data lines. Primary protectors should be provided in the building installation.

The equipment is designed to provide adequate protection against electro-static discharge (ESD). However, it is good working practice to use caution when connecting cables terminated with plastic connectors (without a grounded metal hood, such as flat cables) to sensitive data lines. Before connecting such cables, discharge yourself by touching ground or wear an ESD preventive wrist strap.

FCC-15 User Information

This equipment has been tested and found to comply with the limits of the 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 Installation and Operation manual, may cause harmful interference to the 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 his own expense.

Canadian Emission Requirements

This Class A digital apparatus meets all the requirements of the Canadian Interference-Causing Equipment Regulation.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

Warning per EN 55022 (CISPR-22)

Warning	This is a class A product. In a domestic environment, this product may cause radio interference, in which case the user will be required to take adequate measures.
Avertissement	Cet appareil est un appareil de Classe A. Dans un environnement résidentiel, cet appareil peut provoquer des brouillages radioélectriques. Dans ces cas, il peut être demandé à l'utilisateur de prendre les mesures appropriées.
Achtung	Das vorliegende Gerät fällt unter die Funkstörgrenzwertklasse A. In Wohngebieten können beim Betrieb dieses Gerätes Rundfunkströrungen auftreten, für deren Behebung der Benutzer verantwortlich ist.

Mise au rebut du produit

Afin de faciliter la réutilisation, le recyclage ainsi que d'autres formes de récupération d'équipement mis au rebut dans le cadre de la protection de l'environnement, il est demandé au propriétaire de ce produit RAD de ne pas mettre ce dernier au rebut en tant que déchet municipal non trié, une fois que le produit est arrivé en fin de cycle de vie. Le client devrait proposer des solutions de réutilisation, de recyclage ou toute autre forme de mise au rebut de cette unité dans un esprit de protection de l'environnement, lorsqu'il aura fini de l'utiliser.

Instructions générales de sécurité

Les instructions suivantes servent de guide général d'installation et d'opération sécurisées des produits de télécommunications. Des instructions supplémentaires sont éventuellement indiquées dans le manuel.

Symboles de sécurité

Ce symbole peut apparaitre sur l'équipement ou dans le texte. Il indique des risques potentiels de sécurité pour l'opérateur ou le personnel de service, quant à l'opération du produit ou à sa maintenance.

Avertissement

Danger de choc électrique ! Evitez tout contact avec la surface marquée tant que le produit est sous tension ou connecté à des lignes externes de télécommunications.

Mise à la terre de protection : la cosse ou la borne marquée devrait être connectée à la prise de terre de protection du bâtiment.
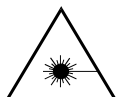
⚠ **Avertissement**

Certains produits peuvent être équipés d'une diode laser. Dans de tels cas, une étiquette indiquant la classe laser ainsi que d'autres avertissements, le cas échéant, sera jointe près du transmetteur optique. Le symbole d'avertissement laser peut aussi être joint.

Veuillez observer les précautions suivantes :

- Avant la mise en marche de l'équipement, assurez-vous que le câble de fibre optique est intact et qu'il est connecté au transmetteur.
- Ne tentez pas d'ajuster le courant de la commande laser.
- N'utilisez pas des câbles ou connecteurs de fibre optique cassés ou sans terminaison et n'observez pas directement un rayon laser.
- L'usage de périphériques optiques avec l'équipement augmentera le risque pour les yeux.
- L'usage de contrôles, ajustages ou procédures autres que celles spécifiées ici pourrait résulter en une dangereuse exposition aux radiations.

ATTENTION : Le rayon laser peut être invisible !

Les utilisateurs pourront, dans certains cas, insérer leurs propres émetteurs-récepteurs Laser SFP dans le produit. Les utilisateurs sont avertis que RAD ne pourra pas être tenue responsable de tout dommage pouvant résulter de l'utilisation d'émetteurs-récepteurs non conformes. Plus particulièrement, les utilisateurs sont avertis de n'utiliser que des produits approuvés par l'agence et conformes à la réglementation locale de sécurité laser pour les produits laser de classe 1.

Respectez toujours les précautions standards de sécurité durant l'installation, l'opération et la maintenance de ce produit. Seul le personnel de service qualifié et autorisé devrait effectuer l'ajustage, la maintenance ou les réparations de ce produit. Aucune opération d'installation, d'ajustage, de maintenance ou de réparation ne devrait être effectuée par l'opérateur ou l'utilisateur.

Manipuler des produits sous tension

Règles générales de sécurité

Ne pas toucher ou altérer l'alimentation en courant lorsque le câble d'alimentation est branché. Des tensions de lignes peuvent être présentes dans certains produits, même lorsque le commutateur (s'il est installé) est en position OFF ou si le fusible est rompu. Pour les produits alimentés par CC, les niveaux de tension ne sont généralement pas dangereux mais des risques de courant peuvent toujours exister.

Avant de travailler sur un équipement connecté aux lignes de tension ou de télécommunications, retirez vos bijoux ou tout autre objet métallique pouvant venir en contact avec les pièces sous tension.

Sauf s'il en est autrement indiqué, tous les produits sont destinés à être mis à la terre durant l'usage normal. La mise à la terre est fournie par la connexion de la fiche principale à une prise murale équipée d'une borne protectrice de mise à la terre. Si une cosse de mise à la terre est fournie avec le produit, elle devrait être connectée à tout moment à une mise à la terre de protection par un conducteur de diamètre 18 AWG ou plus. L'équipement monté en châssis ne devrait être monté que sur des châssis et dans des armoires mises à la terre.

Branchez toujours la mise à la terre en premier et débranchez-la en dernier. Ne branchez pas des câbles de télécommunications à un équipement qui n'est pas mis à la terre. Assurez-vous que tous les autres câbles sont débranchés avant de déconnecter la mise à la terre.

Connexion au courant du secteur

Assurez-vous que l'installation électrique est conforme à la réglementation locale.

Branchez toujours la fiche de secteur à une prise murale équipée d'une borne protectrice de mise à la terre.

La capacité maximale permissible en courant du circuit de distribution de la connexion alimentant le produit est de 16A. Le coupe-circuit dans l'installation du bâtiment devrait avoir une capacité élevée de rupture et devrait fonctionner sur courant de court-circuit dépassant 35A.

Branchez toujours le câble d'alimentation en premier à l'équipement puis à la prise murale. Si un commutateur est fourni avec l'équipement, fixez-le en position OFF. Si le câble d'alimentation ne peut pas être facilement débranché en cas d'urgence, assurez-vous qu'un coupe-circuit ou un disjoncteur d'urgence facilement accessible est installé dans l'installation du bâtiment.

Le disjoncteur devrait déconnecter simultanément les deux pôles si le système de distribution de courant est de type IT.

Connexion d'alimentation CC

Sauf s'il en est autrement spécifié dans le manuel, l'entrée CC de l'équipement est flottante par rapport à la mise à la terre. Tout pôle doit être mis à la terre en externe.

A cause de la capacité de courant des systèmes à alimentation CC, des précautions devraient être prises lors de la connexion de l'alimentation CC pour éviter des courts-circuits et des risques d'incendie.

Les unités CC devraient être installées dans une zone à accès restreint, une zone où l'accès n'est autorisé qu'au personnel qualifié de service et de maintenance.

Assurez-vous que l'alimentation CC est isolée de toute source de courant CA (secteur) et que l'installation est conforme à la réglementation locale.

La capacité maximale permissible en courant du circuit de distribution de la connexion alimentant le produit est de 16A. Le coupe-circuit dans l'installation du bâtiment devrait avoir une capacité élevée de rupture et devrait fonctionner sur courant de court-circuit dépassant 35A.

Avant la connexion des câbles d'alimentation en courant CC, assurez-vous que le circuit CC n'est pas sous tension. Localisez le coupe-circuit dans le tableau desservant l'équipement et fixez-le en position OFF. Lors de la connexion de câbles d'alimentation CC, connectez d'abord le conducteur de mise à la terre à la borne correspondante, puis le pôle positif et en dernier, le pôle négatif. Remettez le coupe-circuit en position ON.

Un disjoncteur facilement accessible, adapté et approuvé devrait être intégré à l'installation du bâtiment.

Le disjoncteur devrait déconnecter simultanément les deux pôles si l'alimentation en courant CC est flottante.

Declaration of Conformity

Manufacturer's Name:	RAD Data Communications Ltd.
Manufacturer's Address:	24 Raoul Wallenberg St.
	Tel Aviv 69719
	Israel

Declares that the products:

Product Names:	RICi-E1, RICi-T1

Conform to the following standard(s) or other normative document(s):

EMC:	EN 55022: 1998	Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement.
	EN 55024: 1998	Information technology equipment – Immunity characteristics – Limits and methods of measurement.
Safety:	EN 60950:2000	Safety of information technology equipment.

Supplementary Information:

The products herewith comply with the requirements of the EMC Directive 89/336/EEC, the Low Voltage Directive 73/23/EEC and the R&TTE Directive 99/5/EC for wired equipment. The products were tested in a typical configuration.

Tel Aviv, 22 August 2004

Haim Karshen
VP Quality

European Contact:	RAD Data Communications GmbH
	Otto-Hahn-Str. 28-30, 85521 Ottobrunn-Riemerling, Germany

Glossary

Address	A coded representation of the origin or destination of data.
Agent	In SNMP, this refers to the managed system.
Analog	A continuous wave or signal (such as human voice).
ANSI	American National Standards Institute.
Attenuation	Signal power loss through equipment, lines or other transmission devices. Measured in decibels.
AWG	The American Wire Gauge System, which specifies wire width.
Balanced	A transmission line in which voltages on the two conductors are equal in magnitude, but opposite in polarity, with respect to ground.
Baud	Unit of signaling speed equivalent to the number of discrete conditions or events per second. If each signal event represents only one bit condition, baud rate equals bps (bits per second).
Bit	The smallest unit of information in a binary system. Represents either a one or zero ("1" or "0").
Bit Interleaving/Multiplexing	A process used in time division multiplexing where individual bits from different lower speed channel sources are combined (one bit from one channel at a time) into one continuous higher speed bit stream.
bps (Bits Per Second)	A measure of data transmission rate in serial transmission.
Bridge	A device interconnecting local area networks at the OSI data link layer, filtering and forwarding frames according to media access control (MAC) addresses.
Buffer	A storage device. Commonly used to compensate for differences in data rates or event timing when transmitting from one device to another. Also used to remove jitter.
Bus	A transmission path or channel. A bus is typically an electrical connection with one or more conductors, where all attached devices receive all transmissions at the same time.
Carrier	A continuous signal at a fixed frequency that is capable of being modulated with a second (information carrying) signal.
Cell	The 53-byte basic information unit within an ATM network. The user traffic is segmented into cells at the source and reassembled at the destination. An ATM cell consists of a 5-byte ATM header and a 48-byte ATM payload, which contains the user data.

Channel	A path for electrical transmission between two or more points. Also called a link, line, circuit or facility.
Clock	A term for the source(s) of timing signals used in synchronous transmission.
Congestion	A state in which the network is overloaded and starts to discard user data (frames, cells or packets).
Data	Information represented in digital form, including voice, text, facsimile and video.
Data Link Layer	Layer 2 of the OSI model. The entity, which establishes, maintains, and releases data-link connections between elements in a network. Layer 2 is concerned with the transmission of units of information, or frames, and associated error checking.
Diagnostics	The detection and isolation of a malfunction or mistake in a communications device, network or system.
Digital	The binary ("1" or "0") output of a computer or terminal. In data communications, an alternating, non-continuous (pulsating) signal.
E1 Line	A 2.048 Mbps line, common in Europe, that supports thirty-two 64 kbps channels, each of which can transmit and receive data or digitized voice. The line uses framing and signaling to achieve synchronous and reliable transmission. The most common configurations for E1 lines are E1 PRI, and unchannelized E1.
E3	The European standard for high speed digital transmission, operating at 34 Mbps.
Encapsulation	Encapsulating data is a technique used by layered protocols in which a low level protocol accepts a message from a higher level protocol, then places it in the data portion of the lower-level frame. The logistics of encapsulation require that packets traveling over a physical network contain a sequence of headers.
Ethernet	A local area network (LAN) technology which has extended into the wide area networks. Ethernet operates at many speeds, including data rates of 10 Mbps (Ethernet), 100 Mbps (Fast Ethernet), 1,000 Mbps (Gigabit Ethernet), 10 Gbps, 40 Gbps, and 100 Gbps.
Flow Control	A congestion control mechanism that results in an ATM system implementing flow control.
Frame	A logical grouping of information sent as a link-layer unit over a transmission medium. The terms packet, datagram, segment, and message are also used to describe logical information groupings.
Framing	At the physical and data link layers of the OSI model, bits are fit into units called frames. Frames contain source and destination information, flags to designate the start and end of the frame, plus information about the integrity of the frame. All other information, such as network protocols and the actual payload of data, is encapsulated in a packet, which is encapsulated in the frame.

Full Duplex	A circuit or device permitting transmission in two directions (sending and receiving) at the same time.
FXO (Foreign Exchange Office)	A voice interface, emulating a PBX extension, as it appears to the CO (Central Office) for connecting a PBX extension to a multiplexer.
FXS (Foreign Exchange Subscriber)	A voice interface, emulating the extension interface of a PBX (or subscriber interface of a CO) for connecting a regular telephone set to a multiplexer.
G.703	An ITU standard for the physical and electrical characteristics of various digital interfaces, including those at 64 kbps and 2.048 Mbps.
Gateway	Gateways are points of entrance and exit from a communications network. Viewed as a physical entity, a gateway is that node that translates between two otherwise incompatible networks or network segments. Gateways perform code and protocol conversion to facilitate traffic between data highways of differing architecture.
Half Duplex	A circuit or device capable of transmitting in two directions, but not at the same time.
Impedance	The combined effect of resistance, inductance and capacitance on a transmitted signal. Impedance varies at different frequencies.
Interface	A shared boundary, defined by common physical interconnection characteristics, signal characteristics, and meanings of exchanged signals.
IP Address	Also known as an Internet address. A unique string of numbers that identifies a computer or device on a TCP/IP network. The format of an IP address is a 32-bit numeric address written as four numbers from 0 to 255, separated by periods (for example, 1.0.255.123).
Jitter	The deviation of a transmission signal in time or phase. It can introduce errors and loss of synchronization in high speed synchronous communications.
Laser	A device that transmits an extremely narrow and coherent beam of electromagnetic energy in the visible light spectrum. Used as a light source for fiber optic transmission (generally more expensive, shorter lived, single mode only, for greater distances than LED).
Loopback	A type of diagnostic test in which the transmitted signal is returned to the sending device after passing through all or part of a communications link or network.
Manager	An application that receives Simple Network Management Protocol (SNMP) information from an agent. An agent and manager share a database of information, called the Management Information Base (MIB). An agent can use a message called a traps-PDU to send unsolicited information to the manager. A manager that uses the RADview MIB can query the RAD device, set parameters, sound alarms when certain conditions appear, and perform other

	administrative tasks.
Mark	In telecommunications, this means the presence of a signal. A mark is equivalent to a binary 1. A mark is the opposite of a space (0).
Multiplexer	At one end of a communications link, a device that combines several lower speed transmission channels into a single high speed channel. A multiplexer at the other end reverses the process. Sometimes called a mux. See **Bit Interleaving/Multiplexing**.
Network	(1) An interconnected group of nodes. (2) A series of points, nodes, or stations connected by communications channels; the collection of equipment through which connections are made between data stations.
Node	A point of interconnection to a network.
Packet	An ordered group of data and control signals transmitted through a network, as a subset of a larger message.
parameters	Parameters are often called arguments, and the two words are used interchangeably. However, some computer languages such as C define argument to mean actual parameter (i.e., the value), and parameter to mean formal parameter. In RAD CLI, parameter means formal parameter, not value.
Payload	The 48-byte segment of the ATM cell containing user data. Any adaptation of user data via the AAL will take place within the payload.
Physical Layer	Layer 1 of the OSI model. The layer concerned with electrical, mechanical, and handshaking procedures over the interface connecting a device to the transmission medium.
Port	The physical interface to a computer or multiplexer, for connection of terminals and modems.
Protocol	A formal set of conventions governing the formatting and relative timing of message exchange between two communicating systems.
Router	An interconnection device that connects individual LANs. Unlike bridges, which logically connect at OSI Layer 2, routers provide logical paths at OSI Layer 3. Like bridges, remote sites can be connected using routers over dedicated or switched lines to create WANs.
Routing	The process of selecting the most efficient circuit path for a message.
Serial Transmission	A common mode of transmission, where the character bits are sent sequentially one at a time instead of in parallel.
Single Mode	Describing an optical wave-guide or fiber that is designed to propagate light of only a single wavelength (typically 5-10 microns in diameter).

Space	In telecommunications, the absence of a signal. Equivalent to a binary 0.
Sync	See **Synchronous Transmission**.
Synchronous Transmission	Transmission in which data bits are sent at a fixed rate, with the transmitter and receiver synchronized.
T1	A digital transmission link with a capacity of 1.544 Mbps used in North America. Typically channelized into 24 DS0s, each capable of carrying a single voice conversation or data stream. Uses two pairs of twisted pair wires.
Telnet	The virtual terminal protocol in the Internet suite of protocols. It lets users on one host access another host and work as terminal users of that remote host. Instead of dialing into the computer, the user connects to it over the Internet using Telnet. When issuing a Telnet session, it connects to the Telnet host and logs in. The connection enables the user to work with the remote machine as though a terminal was connected to it.
Timeslot	A portion of a serial multiplex of timeslot information dedicated to a single channel. In E1 and T1, one timeslot typically represents one 64 kbps channel.
VLAN Stacking	A technique that lets carriers offer multiple virtual LANs over a single circuit. In essence, the carrier creates an Ethernet virtual private network to tunnel customer VLANs across its WAN; this helps avoid name conflicts among customers of service providers who connect to the carrier. Stacking works by assigning two VLAN IDs to each frame header. One is a "backbone" VLAN ID used by the service provider; the other one has up to 4,096 unique 802.1Q VLAN tags.

Quick Start Guide

RICi-E1, RICi-T1 should be installed by an experienced technician. If you are familiar with RICi-E1, RICi-T1, use this quick guide to prepare RICi-E1, RICi-T1 for operation.

1.   Installing RICi-E1, RICi-T1

Connecting the Interfaces

➤ **To connect RICi-E1, RICi-T1 to the network:**

1. Connect the network to the RJ-45 connector designated **E1** or **T1**.

2. Connect the user LAN to the RJ-45 connector designated **10/100 BaseT**.

3. Connect the ASCII terminal to the CONTROL connector at the rear panel.

   OR

   Connect a Telnet host, a PC running a Web browser or an SNMP management station to the Ethernet port.

Connecting the Power

- Connect the power cable to the power connector on the rear panel.

  The unit starts running.

2.   Configuring RICi-E1, RICi-T1

Configure RICi-E1, RICi-T1 to the desired operation mode via an ASCII terminal connected to the rear panel CONTROL port. Alternatively, you can manage RICi-E1, RICi-T1 over Telnet, a PC running a Web browsing application, or SNMP via the Ethernet or E3 port.

Note   *Remote management requires assigning an IP address.*

Starting a Terminal Session

➤ **To start a terminal session:**

1. Connect an ASCII terminal to the CONTROL port at the front panel. The default settings are as follows:

   ▪ **Baud Rate**: 115,200 bps

   ▪ **Data Bits**: 8

   ▪ **Parity**: None

   ▪ **Stop Bits**: 1

   ▪ **Flow Control**: None.

2. To optimize the view of the system menus, do the following:

   ▪ Set the terminal emulator to **VT100**.

   ▪ If you are using HyperTerminal, set the terminal mode to the 132-column mode.

3. Enter your user name and password and proceed with the management session.

Note   *The RICi-E1, RICi-T1 default user name is* **su** *(lower case). The default password is* *1234.*

Configuring Basic Parameters

The Quick Setup menu allows you to configure mandatory elements. For additional information on parameters and the menus, refer to *Chapter 4*.

➤ **To configure RICi-E1, RICi-T1:**

1. Navigate to Main › Configuration › **Quick Setup**.

2. Configure the following parameters:

   ▪ **Host IP Address**

   ▪ **Host IP Mask**

   ▪ **Default Gateway**

- **Host Tagging** (untagged/tagged). If you select **Tagged**, additional parameters appear as follows:

  □ **Host VLAN ID**

  □ **Host VLAN Priority**

- **Forwarding Mode** (transparent or filter)

- **VLAN Tag Stacking** (enable/disable)

- **E1/T1 configuration**:

  □ **Administrative Status** – specify whether the network port is enabled (Up) or disabled (Down)

  □ **Clock** – select the clock source (internal or LBT)

  □ **Frame Type** – select the E1/T1 framing mode

  □ **Receiver Sensitivity** – define the receiver sensitivity

    (E1: -10 dB/ -43 dB) (T1: -15 dB/-36 dB)

  □ **Line Code** – Select the transmission line code:

    (E1: HDB3 or AMI) (T1: B8ZS or AMI)

  □ **Timeslot Assignment** – Configure timeslots to carry data or idle code.

  □ **Line Mode** (T1 only) – Select the T1 line interface type: (DSU or CSU)

  □ **Line Build Out** (T1 only):

    DSU – The length of a cable in feet between T1 port connector and the network access point

    CSU – The attenuation in dB relative to the nominal T1 transmit level.

    (E1: HDB3 or AMI) (T1: B8ZS or AMI)

Contents

Chapter 1

Introduction

1.1   Overview

RICi-E1, RICi-T1 is Ethernet customer-located equipment (CLE) and provides a demarcation point between the private LAN and the operator's network. RICi-E1, RICi-T1 serves as an Ethernet to E1/T1 media converter that bridges a Fast Ethernet LAN interface and an unframed E1 or framed T1 interface. RICi-E1, RICi-T1 features autonegotiation, fault management and flow control capabilities. The internal bridge supports VLAN tagging and priority labeling. The unit can be managed via a local terminal port or inband from any of the ports. The unit can be managed via a local terminal port (out-of band) or any of the ports (inband). RICi-E1, RICi-T1 includes a DHCP client utility that automatically obtains an IP address, an IP mask and a default gateway. RICi-E1, RICi-T1 supports industry-standard HDLC, RAD proprietary HDLC, and GFP protocols.

This manual provides instructions on installing and operating RICi-E1 and RICi-T1 units. Screen images illustrate the workflow and usually apply to both RICi-E1 and RICi-T1. If a screen image only applies to RICi-E1 or RICi-T1, it carries the respective title.

Device Options

Device options include:

- **Interface type**: E1 or T1

- **Temperature-hardened option**: A temperature-hardened option is available, significantly extending the permitted operating temperature range.

- **Power supply**: RICi-E1, RICi-T1 can be supplied with a wide-range AC/DC power supply or 24 VDC power supply (available only with temperature-hardened option).

Application

Figure 1-1 illustrates a typical application in which RICi-E1, RICi-T1 provides a demarcation point between the carrier's and the customer's networks.
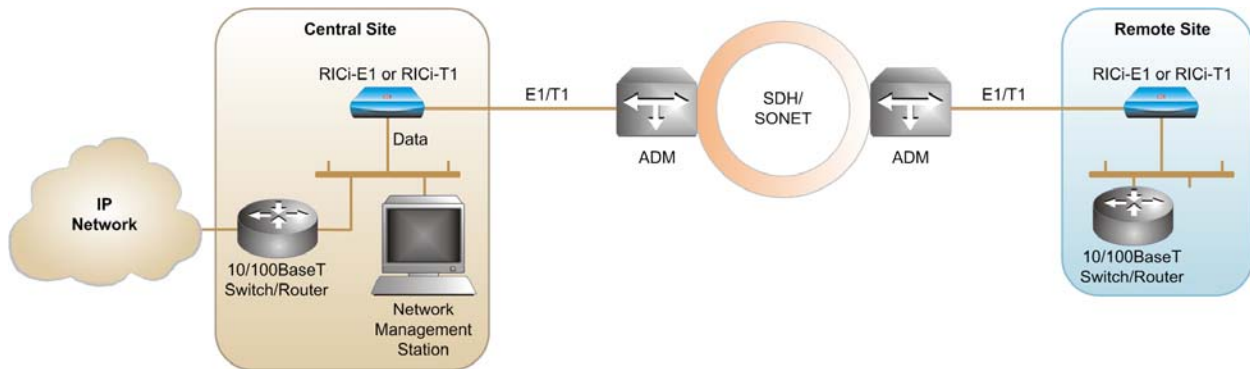

Figure 1-1. Typical Application

Features

RICi-E1, RICi-T1 offers the features specified below.

Network Interface

The network interface terminates in an RJ-45 E1 or T1 network port.

User Interface

The user interface terminates in a 10/100BaseT port, operating in half or full duplex. The 10/100BaseT user port supports autonegotiation and flow control.

Fault Management

RICi-E1, RICi-T1 provides a fault propagation mechanism. In case of error conditions on the TDM port, the fault propagation feature removes the link integrity from the Fast Ethernet port, thus indicating the error to the Ethernet network. This enables connected routers to reroute the traffic as required.

Internal Bridge

The internal bridge of the unit operates in four modes:

- **Transparent** – no learning is performed, each received packet is forwarded to the other port. Filtering is performed on static MAC address entries.

- **Filter** – learning and filtering are enabled.

- **VLAN Tag Stacking** – enable or disable double VLAN stacking at ingress.

- **QoS** – four different transmit traffic queues with strict priorities between them. In accordance with IEEE 802.1p.

Management

To configure, monitor, and test RICi-E1, RICi-T1, use one of the following methods:

- **Out-of-band management** – via an ASCII terminal connected to the V.24/RS-232 DTE control port
- **Inband management** – via the Ethernet port, using Telnet, ConfiguRAD, or RADview-Lite (SNMP). RICi-E1, RICi-T1 allows up to five concurrent management sessions in addition to an ASCII terminal session.

Inband Management

For inband management, the IP host of RICi-E1, RICi-T1 can be configured to operate in tagged or untagged mode:

- When tagging is enabled, frames are forwarded with the host VLAN tag, creating a dedicated management VLAN due to the separation of management and user packets.

- When tagging is disabled, frames are forwarded without the host VLAN tag.

ConfiguRAD

ConfiguRAD is a user-friendly Web-based terminal management system enabling remote device configuration and maintenance. It is embedded in the unit and provided at no extra cost. ConfiguRAD can be run from any standard Web browser.

RADview-Lite

RADview-Lite is a user-friendly and powerful SNMP-based element management application, used for planning, provisioning and managing heterogeneous networks. RADview-Lite provides monitoring capabilities for RAD products and networks via their SNMP agents. Configuration and diagnostic capabilities are available via a GUI-cut-through to ConfiguRAD.

DHCP Client

When the unit is starting up and if the DHCP client is enabled, the DHCP server automatically assigns an IP address, an IP mask and a default gateway to the unit.

Diagnostic Tools

A built-in ping utility allows checking IP connectivity by pinging remote IP hosts.

Trace Route application can quickly trace a route from RICi-E1, RICi-T1 to any other network device.

1.2   Physical Description

Figure 1-2 illustrates a RICi-E1 and RICi-T1 unit.

Figure 1-2. RICi-E1, RICi-T1, 3D View

LEDs on the front panel display the status of power, Ethernet links, E1/T1 links, and alarms. For a detailed description of the front panel, refer to *Chapter 3*.

The rear panel is equipped with a power connector for AC and DC power supply, a V.24 terminal connector, network and user Ethernet ports. For a detailed description of the rear panel, refer to *Chapter 2*.

1.3   Functional Description

This section provides a functional description of RICi-E1, RICi-T1 by means of a block diagram (*Figure 1-3*).

Network
Interface

Ethernet
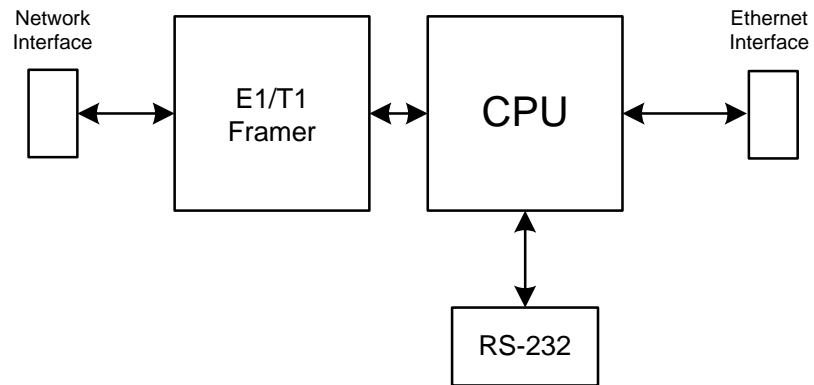Interface

E1/T1
Framer

CPU

RS-232

Figure 1-3. Block Diagram of RICi-E1, RICi-T1

The RICi-E1, RICi-T1 media converter consists of the following major modules:

- **E1/T1 framer** – formats data for transmission and extracts data for reception at T1 and E1 line speeds.

- **CPU** – controls the RICi-E1, RICi-T1 operation.

- **User Ethernet interface** – connects RICi-E1, RICi-T1 to the user LAN.

- **Network E1/T1 interface** – connects RICi-E1, RICi-T1 to the packet-switched network.

- **RS-232 port** – communicates with the ASCII terminal.

1.4   Technical Specifications

Network Interface

E1

Type	E1 (balanced and unbalanced)
Interface Type, Connector	Electrical, RJ-45, coax
Compliance	G.703, G.704
Framing	Unframed/Framed (G.732N with or without CRC)
Line Impedance	120Ω, balanced 75Ω, unbalanced with CBL-RJ45/2BNC/E1 adapter cable
Data Rate	2.048 Mbps
Line Code	HDB3 AMI
Transmit clock	Internal or loop back timing
Loopbacks	Remote

T1

Type	T1 (balanced)
Interface Type, Connector	Electrical, RJ-45
Compliance	AT&T TR62411, ANSI T1.403
Framing	Unframed Framed (D4 or ESF)
Line Impedance	100Ω, balanced
Data Rate	1.544 Mbps
Line Code	B8ZS AMI
Transmit clock	Internal or loop back timing
Loopbacks	Remote

User Interface

Type	10/100BaseT

Network Interface

	Interface type, connector	Electrical, RJ-45
	Operation Mode	Autonegotiation for 10/100M, half/full duplex, flow control
	Compliance	IEEE 802.3, 802.3u
WAN	*Protocols*	GFP (G.8040, G.7041/Y.1303) RAD proprietary HDLC compatible with RAD products Industry-standard HDLC
Internal Bridge	*Forwarding Mode*	Transparent or filter
	MAC Addresses	512 (maximum)
Management	*Out-of-Band*	Via dedicated terminal port; V.24/RS-232 DCE; 9.6, 19.2, 115.2 kbps; DB-9 female connector
	Inband	Via either the Ethernet or E1 port
Front Panel Indicators	*PWR (green)*	On – RICi-E1, RICi-T1 is on Off – RICi-E1, RICi-T1 is off
	TST/ALM (yellow/red)	Yellow – test in progress Red – alarm detected Blinking – test in progress and alarm detected Off – no test in progress and no alarm detected
	LOS for E1 (red)	On – network LOS (Loss of Signal) detected Off – network signal uninterrupted
	LOS for T1 (red/yellow)	Red – network LOS (Loss of Signal) detected for unframed T1, network RED alarm detect for framed T1. Yellow – network YELLOW alarm for framed T1 Off – network signal uninterrupted.
	ETH LINK (green)	Ethernet Link Integrity On – link is connected Off – link is disconnected

Rear Panel Indicators	*LINK (green)*	Ethernet Link Integrity:
		On – link is connected Off – link is disconnected
	ACT (yellow)	Ethernet Activity:
		Blinking – frame received or sent within the last second Off – no frame received or sent within the last second
Power	*AC /DC Source*	100 to 240 VAC or 48/60 VDC (40 to 72 VDC)
	DC Source	24 VDC nominal (18 to 36 VDC), available only with temperature-hardened option
	Power Consumption	5W max
Physical	*Height*	43.7 mm (1.7 in)
	Width	220 mm (8.6 in)
	Depth	170 mm (6.7 in)
	Weight	0.5 kg (1.1 lb)
Environment	*Temperature*	Regular option: 0 to 50°C (32 to 122°F)
		Temperature-hardened option: -22° to 70°C (-7.6° to 158°F)
	Humidity	Up to 90%, non-condensing

Chapter 2

Installation and Setup

This chapter describes installation and setup procedures for the RICi-E1, RICi-T1 unit.

After installing the unit, refer to *Chapter 3* for the operating instructions.

If a problem is encountered, refer to *Chapter 6* for test and diagnostic instructions.

⚠️
Warning

Internal settings, adjustment, maintenance, and repairs may be performed only by a skilled technician who is aware of the hazards involved.

Always observe standard safety precautions during installation, operation, and maintenance of this product.

⚠️
Grounding

For your protection and to prevent possible damage to equipment when a fault condition, e.g., a lightning stroke or contact with high-voltage power lines, occurs on the cables connected to the equipment, RICi-E1, RICi-T1 must be properly grounded at any time. Any interruption of the protective (grounding) connection inside or outside the equipment, or the disconnection of the protective ground terminal can make this equipment dangerous. Intentional interruption is prohibited.

2.1   Site Requirements and Prerequisites

AC-powered RICi-E1, RICi-T1 units should be installed within 1.5m (5 ft) of an easily-accessible grounded AC outlet capable of furnishing the voltage in accordance with RICi-E1, RICi-T1 nominal supply voltage.

DC-powered RICi-E1, RICi-T1 units require a -48 VDC power source, which must be adequately isolated from the main supply.

Note

Refer also to the sections describing connections of AC and DC mains at the beginning of the manual.

The ambient operating temperature of RICi-E1, RICi-T1 is 0 to 50°C (32 to 122°F), at a relative humidity of up to 90%, non-condensing. If you ordered the temperature-hardened version, the ambient operating temperature is -22° to 70°C (-7.6° to 158°F).

Allow at least 90 cm (36 in) of frontal clearance for operating and maintenance accessibility. Allow at least 10 cm (4 in) clearance at the rear of the unit for signal lines and interface cables. If you ordered the wide-range power supply version with temperature-hardened enclosure, then when operating at temperatures

higher then 50°C (122°F), allow at least 1U of vertical clearance at the top and bottom of the unit.

2.2   Package Contents

The RICi-E1, RICi-T1 package includes the following items:

- One RICi-E1 or RICi-T1 unit
- CBL-RJ45/2BNC/E1 interface adapter for RICi-E1 with unbalanced E1 interface.
- CBL-DB9F-DB9M-STR control port cable (if ordered)
- AC power cord
- DC adapter
- DC terminal block connector for temperature-hardened version (if ordered)
- RM-33-2 rack mount kit (if ordered)

2.3   Mounting the Unit

RICi-E1, RICi-T1 is designed for installation as a desktop unit. You may also mount two units into a 19″ rack or attach one unit to a wall.

- For rack mounting instructions, refer to the RM-33-2 installation kit manual.
- For wall mounting instructions, see the drilling template at the end of this manual.
- If RICi-E1, RICi-T1 is to be used as a desktop unit, place and secure the unit on a stable, non-movable surface.

Refer to the clearance and temperature requirements in *Site Requirements and Prerequisites*.

2.4   Connecting the Interface Cables

Figure 2-1 illustrates the rear panel of a typical RICi-E1 unit. The RICi-T1 unit is similar, except for a T1 interface instead of the E1 interface. *Appendix A* specifies the RICi-E1, RICi-T1 connector pinouts.
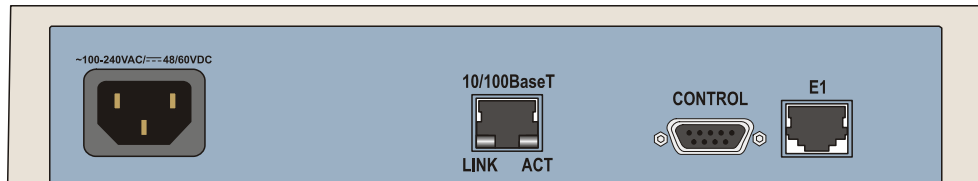

Figure 2-1. RICi-E1 Rear Panel

Note   *When connecting Fast Ethernet and/or Gigabit Ethernet cables longer than 30m, it is recommended to use shielded cables.*

➤ **To connect the Ethernet interface:**

- Connect the user LAN to the RJ-45 socket labeled **10/100BaseT**.

➤ **To connect the E1 or T1 interface:**

- In case of balanced E1, connect the network to the balanced RJ-45 connector labeled **E1** on RICi-E1.

- In case of unbalanced E1, use the CBL-RJ45/2BNC/E1 adapter cable to convert the balanced RJ-45 connector to a pair of unbalanced BNC coaxial connectors.

- In case ofT1, connect the network to the RJ-45 connector labeled **T1** on RICi-T1.

2.5   Connecting to the ASCII Terminal

You may connect RICi-E1, RICi-T1 to an ASCII terminal using the 9-pin D-type female CONTROL connector at the rear panel. Refer to *Appendix A* for the connector pinout.

➤ **To connect the ASCII terminal to the CONTROL port:**

1. Connect the male 9-pin D-type connector of the CBL-DB9F-DB9M-STR Control Port cable to the connector labeled **CONTROL**.

2. Connect the other end of this cable to an ASCII terminal.

Caution   Terminal cables must have a frame ground connection. Use ungrounded cables when connecting a supervisory terminal to a DC-powered unit with floating ground. Using improper terminal cable may result in damage to supervisory terminal port.

2.6   Connecting to Power

The following power options are available for RICi-E1, RICi-T1:

- 100 to 240 VAC or 48/60 VDC power through the same power inlet

- 24 VDC connected via terminal block unit.

⚠️ **Warning**

Before connecting or disconnecting any communication cable, the unit must be grounded by connecting its power cord to a power outlet with a ground terminal, and by connecting the ground terminal on the panel (if provided) to a protective ground.

Interrupting the protective (ground) conductor inside or outside the unit, or disconnecting the protective ground terminal may render this unit dangerous. Intentional interruption is prohibited.

Connecting AC Power

AC power is supplied to the RICi-E1, RICi-T1 through a standard 3-prong socket as illustrated in *Figure* 2-1.

AC power should be supplied via a 1.5m (5 ft) standard power cable terminated by a standard 3-prong socket. A cable is provided with the unit.

➤ **To connect AC power:**

1. Connect the power cable to the power connector on the RICi-E1, RICi-T1 rear panel.

2. Connect the power cable to the mains outlet.

    The unit automatically turns on once it has been connected to the mains.

Connecting DC Power

A special IEC 60320 adapter for 48/60 VDC power is available for the AC/DC power supply option. A 24 VDC terminal block connector with adapter is available for the 24 VDC option.

➤ **To connect DC power:**

- Refer to the relevant DC power supply connection supplement for instructions on wiring the DC adapters, and to the *Handling Energized Products* section.

Chapter 3

Operation

This chapter:

- Explains how to turn RICi-E1, RICi-T1 on and off

- Provides a detailed description of the front panel controls and indicators and their functions

- Defines the default settings

- Provides the configuration alternatives

- Illustrates the management menus.

For additional information on parameters and menus, refer to *Chapter 4*.

3.1 Turning On the Unit

➤ **To turn on the RICi-E1, RICi-T1 unit:**

- Connect the power cord to the mains.

    The PWR indicator lights up and remains lit as long as RICi-E1, RICi-T1 receives power.

Once installed, RICi-E1, RICi-T1 does not require further attention with the exception of occasional monitoring of front panel indicators. RICi-E1, RICi-T1 only requires configuring the unit to comply with its operational requirements, or for testing.

3.2 Indicators

The unit's LEDs are located at the front panel as illustrated in *Figure 3-1*. *Table 3-1* lists the functions of the RICi-E1, RICi-T1 LED indicators.
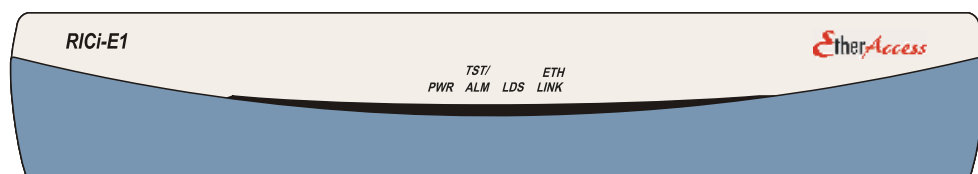

Figure 3-1. RICi-E1 Front Panel

Table 3-1. RICi-E1, RICi-T1 LEDs and Controls

Name	Color	Function
PWR	Green	On – power connected
		Off – power disconnected
TST/ALM	Yellow/Red	Yellow – test in progress
		Red – alarm detected
		Blinking – test in progress and alarm detected
		Off – no test in progress and no alarm currently detected
LOS (E1)	Red	On – loss of signal (LOS) detected
		Off – network signal detected
LOS (T1)	Red/Yellow	Red – loss of signal (LOS) detected for unframed T1, network RED alarm for framed T1
		Yellow – network YELLOW alarm for framed T1
		Off – network signal detected
ETH LINK	Green	On – link connected
		Off – link disconnected

3.3 Default Settings

Table 3-2 lists the default settings of the RICi-E1, RICi-T1 configuration parameters.

Table 3-2. Default Settings

Type	Parameter	Default Value
System		
Host	IP address	0.0.0.0
	IP mask	255.255.255.0
	Default gateway	0.0.0.0
	Default IP	0.0.0.0
	DHCP	Enable
	Read community	public
	Write community	private
	Trap community	public
Device Info	Name	RICi-E1, RICi-T1
	Description	E1/T1 Intelligent Ethernet Converter
	Location	The Location of the Device
	Contact Person	Name of Contact Person
Management Access	Telnet	Enable
	SNMP access	Enable
	Web access	Enable
User Access	User name for superuser	su (full control)
	User name for guest user	user (read-only)
Encapsulation	Host Tagging	Untagged
	Host VLAN ID	1
	Host VLAN Priority	0
Alarm Trap Mask	Alarm ID	1
	Trap Status	Active
Control Port	Baud Rate	115200 bps
	Set Scrolling Window Size	4
	Security Timeout	10

Type	Parameter	Default Value
Physical Ports		
Ethernet User	Administrative Status	Up
	Flow Control	Enable
	Autonegotiation	Enable
	Max Capability Advertised	100base – TX Full Duplex
	MDIX Auto Cross Over	Enable
E1	Administrative Status	Up
	Clock	LBT
	Frame Type	Unframed
	Protocol	HDLC
	Idle Code	7C
	Receiver Sensitivity	-43 db
	Line Code	HDB3
T1	Administrative Status	Up
	Clock	LBT
	Frame Type	Unframed
	Protocol	HDLC
	Idle Code	7C
	Sync	Fast
	Receiver Sensitivity	-36 db
	Line Code	B8ZS
Bridge		
	Forwarding Mode	Transparent
	Aging Time	300
Bridge Port		
	VLAN Tag Stacking	Disable
	Port VID/Stacking VID	2
	Copy Origin Priority	Disable
	Default Priority	0
QoS		
	User Priority 1-7	Traffic Class 0

Type	Parameter	Default Value
Diagnostics		
Ping	Destination IP Address	0.0.0.0
	Number of Frames to Send	1
Loopback	Loopback State	Disable
	Time To Start	0
	Duration	300

3.4   Configuration Alternatives

Configuration and monitoring operations are performed locally from an ASCII terminal connected to the control port or from a PC on the network via ConfiguRAD or RADview-Lite.

The following functions are supported by the RICi-E1, RICi-T1 management software:

- Viewing system information

- Modifying configuration and mode of operation, including setting system default values and resetting the unit

- Monitoring RICi-E1, RICi-T1 performance

- Initiating connectivity tests

- Upgrading software.

Working via ASCII Terminal

RICi-E1, RICi-T1 includes a V.24/RS-232 asynchronous DCE port, designated CONTROL and terminated in a 9-pin D-type female connector. The CONTROL port continuously monitors the incoming data stream and immediately responds to any input string received through this port.

You may configure the RICi-E1, RICi-T1 control port to communicate at 9.6, 19.2, or 115.2 Kbps. To communicate with a PC, you have to set it to communicate at 115. 2 Kbps.

➤ **To start a terminal control session:**

1. Make sure all RICi-E1, RICi-T1 cables and connectors are properly connected.

2. Connect RICi-E1, RICi-T1 to a PC equipped with an ASCII terminal emulation application such as HyperTerminal or Procomm.

3. Connect an ASCII terminal to the CONTROL port at the front panel. The default settings are as follows:

   - **Baud Rate**: 115,200 bps

   - **Data Bits**: 8

   - **Parity**: None

   - **Stop Bits**: 1

   - **Flow Control**: None.

4. To optimize the view of the system menus, do the following:

   ▪ Set the terminal emulator to VT100.

   ▪ If you are using HyperTerminal, set the terminal mode to the 132-column mode.

5. Power up RICi-E1, RICi-T1.

   When the unit has initialized and completed the self-test, a menu appears displaying initialization and self-test results.

Logging In

➤ **To log in:**

1. Enter the default user name su for superuser.

2. Enter the default password **1234**.

Note
- *It is recommended to change default passwords to prevent unauthorized access to the unit.*
- *If you do not enter at least one character within 5 minutes, you will have to log in again.*

Selecting Options

➤ **To select an option:**

1. Type the number corresponding to the option and press ‹**Enter**›.

2. If you performed a change, **Save** appears as the last option in the menu.

3. Type the number corresponding to the **Save** option in the current menu, and press ‹**Enter**› to save your change.

   RICi-E1, RICi-T1 updates its database with the new value or displays a new menu for the selected option.

4. If you press ‹**ESC**› to exit the menu without saving your changes, the following message appears:

   "`Do you want to save changes (Y/N/C)?`"

   Type the appropriate letter, **Y**es, **N**o, or **C**ancel.

Note
*When a menu option has only two values, typing the option number and pressing ‹**Enter**› will toggle between the available values.*

Navigating Tables

Some RICi-E1, RICi-T1 management screens, such as the Inventory table and Manager table exceed the screen height and/or width and require scrolling to navigate between parameters.

To navigate a table, use the keys listed below:

- ‹Ctrl›+L – scroll left, **Left Arrow** – move left,

- ‹Ctrl› + R – scroll right, **Right Arrow** – move right

- **Up Arrow** – move up

- **Down Arrow** – move down

- ‹Tab› – select next changeable cell

- G‹row number›, ‹col number› - navigate to the specified cell.

Note
- *You can display these navigation keys by pressing ‹?› from a table.*
- *The navigation keys are case sensitive.*

Working with ConfiguRAD

ConfiguRAD is a Web-based remote access terminal management software. It provides a user-friendly interface for configuring, collecting statistics and performing tests.

Requirements for Web Based Management

- Internet Explorer 6.0 and up, running on Windows™

- Netscape Communicator 7.0 and up, running on Windows™, HPOV or Linux

- Firefox 1.0.4 and up, running on Windows™

- Mozilla 1.4.3 and up, running on Linux.

➤ **Before you start using a Web browser for remote management or monitoring:**

- Enable scripts.

- Configure the firewall that might be installed on your PC to allow access to the destination IP address.

- Disable pop-up blocking software, such as Google Popup Blocker. You may also have to configure spyware and adware protecting software to accept traffic from/to the destination IP address.

- To prevent configuration errors, you must flush the browser's cache whenever you return to the same screen.

Logging In

➤ **To log in from a Web browser:**

1. Connect the Ethernet port to the LAN.

2. Verify that an IP address has been assigned to the relevant unit, using an ASCII terminal.

3. Open the Web browser.

4. Disable any pop-up blocking software, such as Google Popup Blocker.

5. In the address field, enter the IP address of RICi-E1, RICi-T1 and then press ‹**Enter**›. The address line reads something like **http://172.16.100.253**.

    The Opening window appears.

6. Click **LOGIN**; you are asked for the user name and the password.

7. Enter your user name and the password. The default user name for read/write permission is **su** and the default password is **1234**.

    The ConfiguRAD Main menu appears.

Notes
- *It is recommended to change default passwords to prevent unauthorized access to the unit.*
- *RICi-E1, RICi-T1 allows two management sessions to be active simultaneously: one network session (Telnet, ConfiguRAD, RADview-Lite) and one ASCII terminal session.*
- *If no user input is detected for 5 minutes during a ConfiguRAD session, RICi-E1, RICi-T1 automatically disconnects from the management station.*

Navigating the ConfiguRAD Menus

ConfiguRAD is a Web-based remote access terminal management software. It provides a user-friendly interface for configuring, collecting statistics and performing diagnostic tests on the RICi-E1, RICi-T1 units. Menus and available options are identical to the ones available using Telnet or an ASCII terminal.

At the left-hand bottom corner, ConfiguRAD are the auxiliary management tools:

- **Status**. Shows the number of users currently managing RICi-E1, RICi-T1

- **Trace**. Opens an additional pane for system messages, progress indicators such as ping, software and configuration file downloads, and alarms. It is recommended to keep the trace pane open all the time.

- **Refresh All**. Refreshes performance registers.

➤ **To choose an option:**

1. Click a link in the ConfiguRAD screen to display the next menu.

2. Once the target screen appears, select a value from the drop-down list or enter it in into a text field.

Working with RADview-Lite

RADview-Lite is a user-friendly and powerful SNMP-based element management system (EMS), used for planning, provisioning and managing heterogeneous networks. RADview-Lite provides monitoring capabilities for RAD products and networks using their built-in SNMP agents.

Configuration and diagnostic capabilities are available via a GUI-cut-through to ConfiguRAD.

For additional information on RADview-Lite, contact your local distributor.

3.5   Overview of Menu Operations

Use these menu trees as a reference aid while performing configuration and control functions. *Chapter 4* illustrates menus and explains parameters. *Table* 3-2 lists default values.
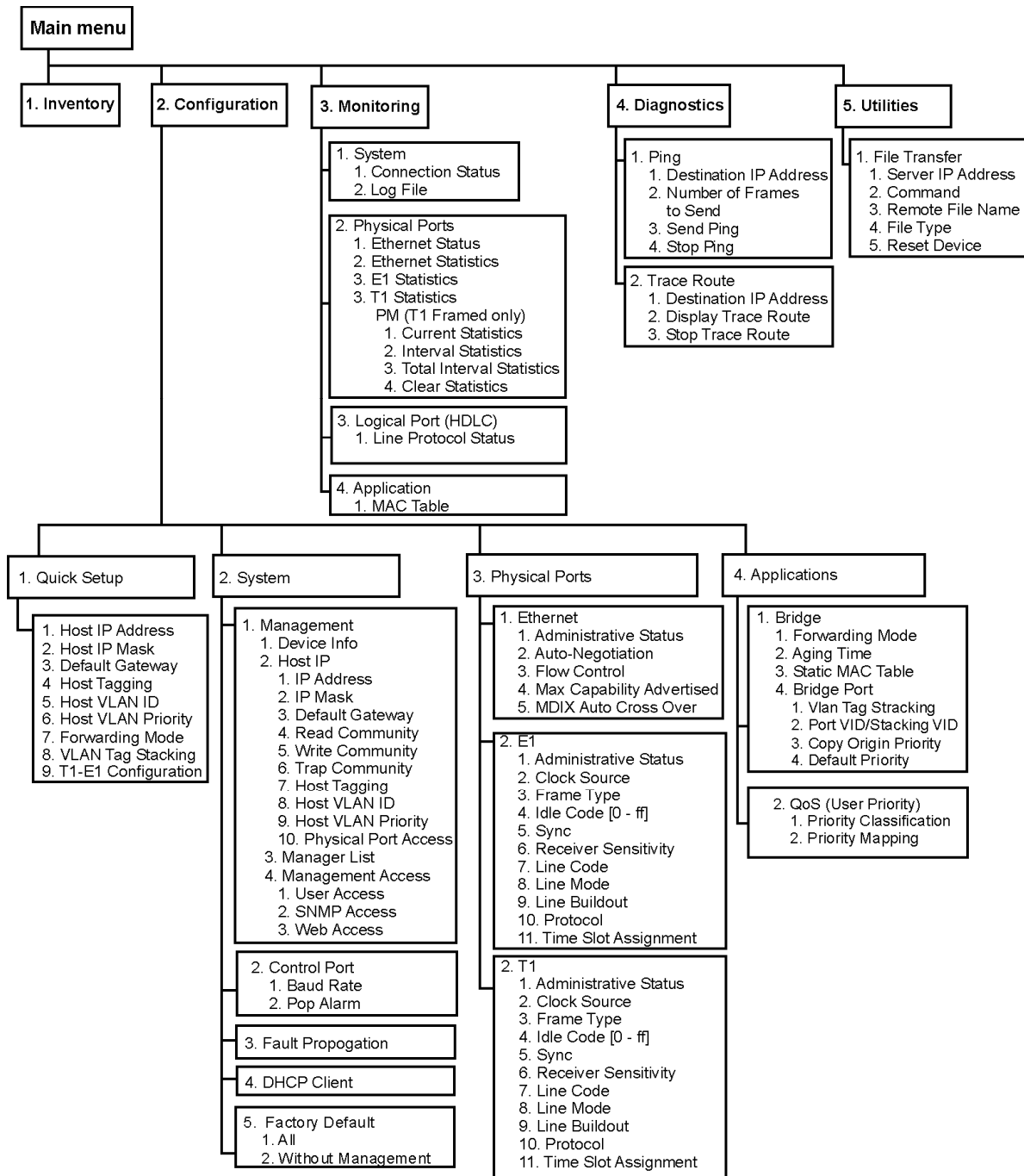
Figure 3-2. Menu Map

3.6 Turning Off the Unit

➤ **To turn off the unit:**

- Remove the power cord from the power source.

Chapter 4

Configuration

This chapter illustrates the RICi-E1, RICi-T1 configuration screens and explains their parameters.

For quick reference, a menu tree of the RICi-E1, RICi-T1 management software is available in *Chapter 3*.

The remaining sections in this chapter explain the parameters available via the respective options in the Main menu.

For convenience, parameters that are mandatory for configuration, such as IP parameters of the RICi-E1, RICi-T1 host or forwarding mode, are provided in the Quick Setup menu (**Main menu** > **Configuration** > **Quick Setup**). For information on this menu, refer to the *Quick Start Guide* at the beginning of this manual. For additional information on the associate parameters, refer to the relevant sections in the configuration chapter.

Note
Menus are illustrated for both RICi-E1 and RICi-T1. The menus are the same unless specified otherwise

4.1   Configuring for Management

For first use, you have to configure management parameters via an ASCII terminal connected to the CONTROL port. Once the host IP parameters are set, you may access RICi-E1, RICi-T1 via ConfiguRAD or RADview to continue configuring for operation. To configure RICi-E1, RICi-T1 for management, do the following:

- Configuring IP Host Parameters

- Entering Device Information

- Configuring Communities

- Configuring the Host Encapsulation

- Configuring the Network Managers

- Controlling the Management Access

Configuring IP Host Parameters

You may manage RICi-E1, RICi-T1 using a network management station on the LAN that is connected to RICi-E1, RICi-T1. In order to establish a proper connection, you have to configure the host IP address, the subnet mask and the default gateway. It is also possible to automatically receive these host IP parameters via the DHCP client when starting the unit.

Configuring the DHCP Client

RICi-E1, RICi-T1 maintains a DHCP client that requests an IP address from a DHCP server, when the unit is connected to the network. The DHCP client can be enabled or disabled. RICi-E1, RICi-T1 ships with the DHCP disabled by default.

Note   *You have to configure the DHCP client via an ASCII terminal or an SNMP manager such as RADview. This option is masked for Telnet and ConfiguRAD sessions.*

➤ **To enable the DHCP client:**

1. Navigate to Main Menu › Configuration › System › **DHCP Client**.

    The DHCP Client menu appears as illustrated in *Figure 4-1*.

```
                         RICi-E1, RICi-T1
Configuration>System>DHCP Client
1.   DHCP Client                    (Disable)
>
ESC-prev menu; !-main menu; &-exit                          1 user(s)
```

Figure 4-1. DHCP Client Menu

2. From the DHCP Client menu, select **DHCP Client** and choose **Enable**.

    RICi-E1, RICi-T1 receives all required host IP parameters once the DHCP server has been identified.

Note   *You have to log on again once the unit has been reset.*

➤ **To disable the DHCP client:**

•   From the DHCP Client menu, select **DHCP Client** and choose **Disable**.

    RICi-E1, RICi-T1 releases the current IP address and then resets. You have to manually reconfigure the host IP parameters as explained under *Managing IP Parameters*.

Managing IP Parameters

➤ **To define host IP parameters manually:**

1. Navigate to Main Menu › Configuration › System › Management › **Host IP**.

   The Host IP menu appears as illustrated in *Figure 4-2*.

```
                       RICi-E1, RICi-T1
Configuration>System> Management >Host IP
1. IP Address                              ... (0.0.0.0)
2. IP Mask                                 ... (0.0.0.0)
3. Default gateway                         ... (0.0.0.0)
4. Read community                          ... (public)
5. Write community                         ... (private)
6. Trap community                          ... (public)
7. Host Tagging                            ... (untagged)


>


ESC-prev menu; !-main menu; &-exit;          1 user(s)
```

Figure 4-2. Host IP Menu

2. From the Host IP menu, perform the following:

   ▪ Select **Host IP List** to define the IP address of the SNMP host.

   ▪ Select **IP Mask** to define the host IP subnet mask.

   ▪ Select **Default Gateway** to set the default gateway IP address.

3. Select **Save**.

Note   *The default gateway must belong to the same subnet as the host.*

Entering Device Information

The RICi-E1, RICi-T1 management software allows you to assign a name to the unit, specify its location to distinguish it from the other devices installed in your system, and assign a contact person.

➤ **To enter device information:**

1. Navigate to Main Menu › System ›Management › **Device Info**.

   The Device Info menu appears as illustrated in *Figure 4-3*.

2. From the Device Info menu, select **Device Name** and enter a desired name for the RICi-E1, RICi-T1 unit.

3. Select **Device Location** and enter the desired name for the current RICi-E1, RICi-T1 location.

4. Select **Contact Person** and enter name of a contact person.

5. Select **Save.**

```
                         RICi-E1


Configuration>System>Management>Device Information
   Description          (E1 Intelligent Ethernet Converter)
1. Device Name     ... (RICi-E1)
2. Location        ... (The Location of the Device)
3. Contact Person ... (Name of Contact Person)


>


ESC-prev menu; !-main menu; &-exit;                    1 user(s)
```

Figure 4-3. Device Information Menu

Configuring Communities

In order to establish a proper management link, you have to specify the SNMP trap, read and write communities.

➤ **To configure communities:**

1. Navigate to Main Menu › Configuration › System › Management › **Host IP**.

   The Host IP menu appears as illustrated in *Figure 4-2.*

2. From the Host menu, do the following:

   ▪ Select **Read Community** to enter the name of a community with read-only authorization.

   ▪ Select **Write Community** to enter the name of a community with write authorization.

   ▪ Select **Trap Community** to enter the name of a community to which RICi-E1, RICi-T1 sends traps.

Configuring the Host Encapsulation

The RICi-E1, RICi-T1 management software allows you to separate traffic. You can choose to allow packets to be received by the network port, the user port, by both or none of them. To separate traffic, you have to tag the VLAN packets and specify the VLAN ID, the priority and ports to be open to the relevant packets.

➤ **To configure the host encapsulation:**

1. Navigate to Main Menu › Configuration › System › Management › **Host IP**.

   The Host IP menu appears as illustrated in *Figure 4-2.*

2. Select **Host Tagging** to enable or disable VLAN tagging performed by the host as follows:

   ▪ **Untagged**. The host sends and receives only untagged frames to/from the bridge.

   ▪ **Tagged**. The host receives frames only if they are tagged with the host VLAN ID, and it sends frames to the bridge with this tag.

   If you select **Tagged**, three additional parameters appear as illustrated in *Figure 4-4*:

   ▪ **VLAN ID**. Specify a value between 1 and 4094.

   ▪ **VLAN Priority**. Specify the priority level for the host VLAN (0–7).

   ▪ **Physical Ports Access**. Specify which port(s) can receive the IP host packets. The following options are possible:

   □ **All**

   □ **Network Port Only**

   □ **User Port Only**

   □ **None**

3. Select **Save**.

```
                        RICi-E1
Configuration>System> Management >Host IP
1. IP Address                         ... (0.0.0.0)
2. IP Mask                            ... (0.0.0.0)
3. Default gateway                    ... (0.0.0.0)
4. Read community                     ... (public)
5. Write community                    ... (private)
6. Trap community                     ... (public)
7. Host Tagging                       ... (Tagged)
8. Host VLAN ID [1-4094]              ... ( )
9. Host VLAN priority [0-7]           ... ( )
10. Physical Ports Access          ... (Network port only)


>
ESC-prev menu; !-main menu; &-exit;                    1 user(s)
```

Figure 4-4. Host IP Menu (Host Tagging selected)

Configuring the Network Managers

Define or modify the network managers to which the SNMP agent of RICi-E1, RICi-T1 sends traps. Up to ten network managers can be defined. Entering the IP address and corresponding subnet mask defines each manager. In addition, you can temporarily prevent a network manager from receiving traps by masking the network manager. Before editing the manager list, it is necessary to add at least one network manager.

➤ **To add a network manager:**

1. From the Management menu, select **Manager List**.

    The Manager List menu appears as illustrated in *Figure 4-5*.

```
                          RICi-E1
Configuration>System>Management>Manager List
 Manager ID    Manager IP            Manager IP Mask    Manager
Trap Mask
     1.          1.1.1.1        255.255.255.0  Disable
     2.          2.2.2.2        255.255.255.0  Disable
     3.          3.3.3.3        255.255.255.0  Disable
     4.          4.4.4.4        255.255.255.0  Disable


 1. Change cell                     ....(1.1.1.1)
>
x - Clear Table
ESC-prev menu; !-main menu; &-exit; ?-help          1 user(s)
```

Figure 4-5. Manager List Menu

2. In the Manager List menu, press ‹**A**› to add a manager.

    The Manager List menu switches to the Add mode as illustrated in *Figure 4-6*.

```
                          RICi-E1
Configuration>System>Management>Manager List
1. Manager ID                         (1)
2. Manager IP                         ... (1.1.1.1)
3. Manager IP Mask                    ... (255.255.255.0)
4. Manager Trap Mask                  ... (Disable)
5. Save all


>


ESC-prev menu; !-main menu; &-exit;              1 user(s)
```

Figure 4-6. Manager List Menu, Add Mode

3. When in Add mode, do the following:

    ▪ Select **Manager IP**, and enter the IP address of the management station.

    ▪ Select **Manager IP Mask**, and enter the subnet mask of the management station.

- ▪ Select **Manager Trap Mask**, and select **Enable** or **Disable** to mask or unmask traps for the selected management station.

- ▪ Select **Save all** to save the network manager.

- ▪ Press ‹**Esc**› to return to the Edit mode.

➤ **To edit the manager list:**

1. In the Management List menu, move the cursor to the Manager IP cell by pressing ‹**Tab**›. The selected cell is highlighted and the value displayed in the "Change cell" field.

2. Press ‹**1**›, and then press ‹**Enter**› to enter a new IP address for the selected network manager.

3. Move the cursor to the Manager IP Mask cell, and change or enter a new subnet mask value as required.

4. Move the cursor to the Trap Mask field and toggle between **Enable** and **Disable** to mask or unmask traps for the selected network manager.

➤ **To remove a network manager:**

1. From the Manager List, select the desired network manager.

2. Press ‹**R**› to remove the selected network manager.

➤ **To remove all network managers:**

- • Press ‹**X**› to remove all network managers from the Manager list.

Controlling the Management Access

You can enable or disable access to the RICi-E1, RICi-T1 management system via SNMP, Telnet or Web-based applications. By disabling SNMP, Telnet or Web, you prevent unauthorized access to the system when security of the RICi-E1, RICi-T1 IP address has been compromised. When SNMP, Telnet and Web access are disabled, you can only manage RICi-E1, RICi-T1 via an ASCII terminal connected to the Control port.

➤ **To define the management access method:**

1. From the Management menu, select **Management Access**.

   The Management Access menu appears as illustrated in *Figure 4-7*.

```
                      RICi-E1, RICi-T1
Configuration>System>Management>Management Access
1. User Access                          >
2. TELNET access                        >  (Enable)
3. SNMP access                          >  (Enable)
4. WEB access                           >  (Enable)


>
ESC-prev menu; !-main menu; &-exit                    1 user(s)
```

Figure 4-7. Management Access Menu

Note
- *During a Telnet session, Telnet Access is masked.*
- *During a SNMP session, SNMP Access is masked.*
- *During a Web session, Web Access is masked.*

2. From the Management Access menu, select **TELNET access** to configure Telnet access, select **SNMP access** to configure SNMP access, or select **WEB access** to configure Web access.

3. Select **Save**.

Configuring Control Port Parameters

RICi-E1, RICi-T1 embedded software enables you to configure the serial port parameters, which include specifying terminal baud rate, and scrolling window size.

The user-configurable size of the scrolling window specifies the height of the area that is reserved for status information. This area is located at the bottom of the screen.

Note
The Baud Rate parameter is masked during Telnet and ConfiguRAD management sessions.

➤ **To modify the control port parameters:**

1. Navigate to Main Menu › Configuration › System › **Control Port**.

   The Control Port menu appears as illustrated in *Figure 4-8*.

```
                        RICi-E1, RICi-T1
Configuration>System>Control Port
1. Terminal Type                         (VT100)
2. Baud Rate                             (115200 bps)
3. Set Scrolling Window Size[0 - 11]     (4)


>
ESC-prev menu; !-main menu; &-exit                      1 user(s)
```

Figure 4-8. Control Port Menu

2. From the Control Port menu, select **Baud Rate.**

3. Type in the desired baud rate. Available baud rates are 9600, 19200, and 115200 bps.

4. Select **Set Scrolling Window Size** to set the size of the status information section at the bottom of the screen in the range of **0** to **11**.

5. Select **Save.**

4.2   Configuring for Operation

Configuring RICi-E1, RICi-T1 includes the following steps:

- Configuring network and user interfaces at the physical layer

- Configuring the internal bridge

- Configuring QoS parameters.

Configuring Interfaces on the Physical Layer

RICi-E1, RICi-T1 includes one network E1 or T1 port and one user Ethernet port. The Ethernet and E1 or T1 configuration menus can be accessed from the Physical Ports menu. In addition, you are able to configure fault propagation.

Configuring Fault Propagation

RICi-E1, RICi-T1 supports fault propagation. When fault propagation is enabled:

- 'Port down' status on the WAN network port (E1 or T1) will lead to 'port down' status on the User port (Ethernet).

- 'Port down' status on the User port (Ethernet) will not cause 'port down' status on the network port.

➤ **To enable or disable fault propagation:**

1. Navigate to Main Menu › Configuration › System › **Fault Propagation**.

    The selected value toggles between **Enabled** and **Disabled**.

2. Select **Save.**

Configuring the Ethernet Port

RICi-E1, RICi-T1 includes an Ethernet port. You can configure its parameters at the physical level as follows:

- Autonegotiation

- Data rate and duplex mode, only when autonegotiation is disabled

- Maximum advertised capability for autonegotiation procedure.

➤ **To configure the Ethernet port:**

1. Navigate to Main Menu › Configuration › Physical Ports menu › **Ethernet**.

    The Ethernet menu appears as illustrated in _Figure 4-9_.

```
                              RICi-E1, RICi-T1
Configuration>Physical Ports>Ethernet
1. Administrative Status          (Up)
2. Auto-Negotiation               (Enable)
3. Flow Control                   (Enable)
4. Max Capability Advertised      (100base - TX Full Duplex)
5. MDIX Auto Cross Over           (Disable)


ESC-prev menu; !-main menu; &-exit                              1 user(s)
```

Figure 4-9. Ethernet Menu

2. From the Ethernet menu, configure the following:

- **Administrative Status**

  □ Up – the network port is open

  □ Down – the network port is closed

- **Autonegotiation**

  □ Enable – autonegotiation is enabled

  □ Disable – autonegotiation is disabled.

- **Flow Control**

  □ Enable – flow control is enabled

  □ Disable – flow control is disabled.

- **MDIX Auto Cross Over**

  □ Enable – MDIX auto cross over is enabled

  □ Disable – MDIX auto cross over is disabled.

- **Max Capability Advertised**. The highest traffic handling capability to be advertised during the autonegotiation process:

  □ 10baseT Half Duplex

  □ 10baseT Full Duplex

  □ 100baseTX Half Duplex

  □ 100baseTX Full Duplex

3. Select **Save** to complete the network Ethernet port configuration.

Configuring the E1 Port

RICi-E1 includes an E1 port. You can configure its parameters at the physical level as follows:

➤ **To configure the E1 port:**

1. From the Physical Ports menu, select **E1**.

   The E1 menu appears as illustrated in *Figure 4-10*.

```
                            RICi-E1
Configuration>Physical Ports>E1
1. Administrative status        (Up)
2. Clock Source                 (Internal Clock)
3. Frame Type                   (G.732N)
4. Idle Code[0 - ff]        ... (7C)
5. Sync                        >(FAST)
6. Receiver Sensitivity         (-43 db)
7. Line code                    (HDB3)
8. Line Mode                    (CSU)
9. Line BuildOut               >(0 dB)
10. Protocol                    (HDLC)
11. Time Slot Assignment        []>
ESC-prev menu; !-main menu; &-exit                    1 user(s)
```

Figure 4-10. E1 Menu

2. Configure the following:

- **Administrative Status**
  - □ Up – the network port is enabled
  - □ Down – the network port is disabled.

- **Clock Source**. Specifies the clock source
  - □ Internal Clock
  - □ LBT.

- **Frame Type**. E1 framing mode
  - □ Unframed
  - □ Framed – G.732N - CRC4
  - □ Framed – G.732N.

- **Idle Code**. Idle code value to be transmitted on the Not Connected (NC) time slots: 00 to FF

- **Receiver Sensitivity**
  - □ -10 dB
  - □ -43 dB.

- **Line code**. The transmission line code
  - □ HDB3
  - □ AMI.

- **Protocol**
  - □ HDLC – Native HDLC
  - □ HDLC (IS) – Industry standard HDLC
  - □ GFP – refer to *Setting GFP Protocol* below.
- **Time Slot Assignment**. Refer to *Assigning Time Slots* below.

3. Select **Save** to complete the user E1 port configuration.

Assigning Time Slots

E1 time slots have to be configured to carry data or idle code.

➤ **To assign time slots:**

1. From the E1 menu, select **Time Slot Assignment**.

    The Time Slot Assignment screen appears as illustrated in *Figure 4-11*.

2. Assign each time slot to carry data (DATA) or idle code (NC).

Note   *Time slot changes are applied immediately, without selecting* **Save**.

```
                            RICi-E1
Configuration>Physical Ports>E1>Time Slot Assignment

 1. NC
 2. DATA
 TS  1   TS  2   TS  3   TS  4   TS  5   TS  6   TS  7   TS  8
 NC      NC      NC      NC      NC      NC      NC      DATA


 TS  9   TS 10   TS 11   TS 12   TS 13   TS 14   TS 15   TS 16
 NC      NC      NC      NC      NC      NC      NC      NC


 TS 17   TS 18   TS 19   TS 20   TS 21   TS 22   TS 23   TS 24
 NC      NC      NC      NC      NC      NC      NC      NC


 TS 25   TS 26   TS 27   TS 28   TS 29   TS 30   TS 31
 NC      NC      NC      NC      NC      NC      NC
>
ESC-prev.menu; !-main menu; &-exit; @-debug; ?-help   1 user(s)
```

Figure 4-11. Time Slot Assignment Menu for E1

Configuring the T1 Port

RICi-T1 includes a T1 port. You can configure its parameters at the physical level as follows:

➤ **To configure the T1 port:**

1. From the Physical Ports menu, select **T1**.

    The T1 menu appears as illustrated in *Figure 4-12*.

```
                          RICi-T1
Configuration>Physical Ports >T1


1. Administrative Status          (Up)
2. Clock Source                   (LBT)
3. Frame Type                    >(Framed-ESF)
4. Idle Code[0 - ff]        ... (7C)
5. Sync                          >(FAST)
6. Receiver Sensitivity          (-15 db)
7. Line Code                     (B8ZS)
8. Line Mode                     (CSU)
9. Line BuildOut                >(0 dB)
10.Protocol                     >(HDLC)
11.Time Slot Assignment          []>


ESC-prev menu; !-main menu; &-exit                 1 user(s)
```

Figure 4-12. T1 Menu

2. From the T1 menu, configure the following:

    ▪ **Administrative Status**

        ▫ Up – the network port is enabled

        ▫ Down – the network port is disabled.

    ▪ **Clock Source**

        ▫ Internal

        ▫ LBT.

    ▪ **Frame Type**. T1 framing mode

        ▫ Unframed

        ▫ Framed–ESF

        ▫ Framed–D4.

    ▪ **Idle Code**. The Idle Code value is to be transmitted on the Not Connected (NC) timeslots 00 to FF.

- **Sync**. Available for T1 framed only
  - FAST
  - AT&T 62411.
- **Receiver Sensitivity**
  - -15 dB / -36 dB.
- **Line Code**. The transmission line code
  - B8ZS
  - AMI.
- **Line Mode**. The T1 line interface type
  - DSU
  - CSU.
- **Line BuildOut**. DSU line mode: The length of a cable in feet between T1 port connector and the network access point
  - 0 feet – 0 to 133 ft
  - 133 feet – 133 to 266 ft
  - 266 feet – 266 to 399 ft
  - 399 feet – 399 to 533 ft
  - 533 feet – 533 to 655 ft.
- **Line BuildOut**. CSU line mode: The attenuation in dB relative to the nominal T1 transmit level
  - -7.5 dB
  - -15 dB
  - 0 dB.
- **Protocol**
  - HDLC – Native HDLC
  - HDLC (IS) – Industry standard HDLC
  - GFP – Refer to *Setting GFP Protocol* below.
- Time Slot Assignment. Refer to *Assigning Time* Slots below.

3. Select **Save** to finish the user T1 port configuration.

Assigning Time Slots

E1 time slots have to be configured to carry data or idle code.

➤ **To assign time slots:**

1. From the T1 menu, select **Time Slot Assignment**.

    The Time Slot Assignment screen appears as illustrated in *Figure 4-13*.

2. Assign each time slot to carry data (DATA) or idle code (NC).

Note   *Time slot changes apply immediately, without selecting* **Save**.

```
                               RICi-T1
Configuration>Physical Ports>T1>Time Slot Assignment
 1. NC
 2. DATA
 TS  1  TS  2  TS  3  TS  4  TS  5  TS  6  TS  7  TS  8
 NC     NC     NC     NC     NC     NC     NC     DATA


 TS  9  TS 10  TS 11  TS 12  TS 13  TS 14  TS 15  TS 16
 NC     NC     NC     NC     NC     NC     NC     NC


 TS 17  TS 18  TS 19  TS 20  TS 21  TS 22  TS 23  TS 24
 NC     NC     NC     NC     NC     NC     NC     NC


>
ESC-prev.menu; !-main menu; &-exit; @-debug; ?-help   1 user(s)
```

Figure 4-13. Time Slot Assignment Menu for T1

Setting GFP Protocol

If you select the GFP protocol, the E1/T1 menu appears as follows:

```
                           RICi-T1
Configuration>Physical Ports >T1


1. Administrative Status        (Up)
2. Clock Source                 (LBT)
3. Receiver Sensitivity         (-15 db)
4. Line Code                    (B8ZS)
5. Line Mode                    (CSU)
6. Line BuildOut              >(0 dB)
7. Protocol                   >(GFP)
8. Gfp PFI                       (Send Payload FCS)


ESC-prev menu; !-main menu; &-exit                      1 user(s)
```

Figure 4-14. T1 Menu

- Under **Gfp PFI**, toggle between **Send Payload FCS** and **Don't Send Payload FCS**.

Configuring the Bridge

The internal bridge of RICi-E1, RICi-T1 connects the ports of the unit. It must be configured to properly process the VLAN tags to maintain priority of the data flow.

The bridge operates in Transparent mode (learning and filtering are disabled) or Filtered mode (learning and filtering are enabled).

You configure the internal bridge from the Applications menu.

➤ **To configure the internal bridge:**

1. Navigate to Main Menu › Configuration › Applications › **Bridge**.

   The Bridge menu appears as illustrated in *Figure 4-15*.

```
                           RICi-E1
Configuration>Applications>Bridge
1. Forwarding Mode                        (Transparent)
2. Aging Time [300 - 4080]                (300)
3. Static MAC Table                       []>
4. Ethernet Bridge Port


ESC-prev menu; !-main menu; &-exit                      1 user(s)
```

Figure 4-15. Bridge Menu

2. From the Bridge menu, configure the following:

- **Forwarding Mode**. Operation mode of the internal bridge:

  □ **Transparent**. No learning or filtering is performed. Each received packet is automatically forwarded to the other port (user or network).

  □ **Filtering**. Learning and filtering are enabled.

- **Aging Time**. Amount of time a LAN node (station) is allowed to remain inactive before it is removed from the network: 300 to 4080 seconds.

Configuring the MAC Table

Static MAC addresses are stored in the MAC table.

➤ **To add a static MAC address:**

1. From the Bridge menu, select **Static MAC Table**.

    The Static MAC Table appears as illustrated in *Figure 4-16*.

```
                          RICi-E1
Configuration>Applications>Bridge>Static MAC Table
            |     Address          |  Received Bridge Port  |
         +_____+
            |    00-00-12-34-54-55  |        E1              |
            |    00-00-44-44-44-44  |        ETH             |
            |    00-12-23-23-23-23  |        ETH             |
         +_____+
ESC-prev menu; !-main menu; &-exit; ?-help          1 user(s)
```

Figure 4-16. Static MAC Table

2. In the Static MAC Table, press ‹**A**› to add a static MAC address.

    The Static MAC Table display switches to the Add mode as illustrated in *Figure 4-17*.

```
                          RICi-E1
Configuration>Applications>Bridge>Static MAC Table
1. MAC Address                           ... (000000000000)
2. Receive Bridge Port              >    (UNDEFINED)
3. Save all
>
ESC-prev menu; !-main menu; &-exit;             1 user(s)
```

Figure 4-17. Static MAC Table, Add Mode

3. In Add mode, perform the following:

- Select **MAC Address** and enter a new MAC address.

- Select **Receive Bridge Port** and select an interface to which this MAC address will be attached.

- Select **Save** to save the MAC address.

- Press ‹**Esc**› to return to the Static MAC Table.

➤ **To remove a static address from the table:**

- From the Static MAC Table, select the desired MAC address and press ‹**R**›.

    The selected MAC address is deleted from the table.

➤ **To clear the MAC table:**

1. In the Static MAC Table, press ‹**X**›.

    RICi-E1, RICi-T1 displays the following message: **Are you sure (Y/N)?**

2. Press ‹**Y**› to confirm your request.

Configuring the Bridge Port

➤ **To configure the bridge port:**

1. From the Bridge menu, select **Bridge Port**.

    The Bridge Port menu appears as illustrated in *Figure 4-18*.

```
                           RICi-E1
Configuration>Applications>Bridge>Bridge Port
1. Vlan Tag Stacking                      (Disable)
2. Port VID/Stacking VID [1 – 4094]       (1)
3. Copy Origin Priority                   (Enable)
4. Default Priority              [0-7]    (0)
>
ESC-prev menu; !-main menu; &-exit;                   1 user(s)
```

Figure 4-18. Bridge Port Menu

2. From the Bridge Port menu, configure the following:

    ▪ **VLAN Tag Stacking**

        ▫ Enabled – Double VLAN tagging at ingress is enabled

        ▫ Disabled – Double VLAN tagging at ingress is disabled

    ▪ **PVID** (PVID to be assigned to frames that do not contain a VLAN ID)

    ▪ **Copy Origin Priority**

        ▫ Enabled – Copying priority is enabled

        ▫ Disabled – Copying priority is disabled

    ▪ **Default Priority**. Specifies a default priority value to be assigned if no other priority value is explicitly assigned.

        ▫ 0–7

3. Select **Save** to complete the bridge port configuration.

Configuring the QoS Priorities

RICi-E1, RICi-T1 supports four different transmit traffic classes, with strict priority between them. The highest priority queue is allocated for management, and an additional four priorities are allocated for user traffic classes. These traffic classes can be assigned according to the level of service represented by each class, in accordance with IEEE 802.1p or according to IP precedence. There are eight priority levels (0–7), which are assigned into the four traffic classes, where traffic class 3 has the highest priority.

➤ **To select priority classification method:**

1. Navigate to *Main Menu* > *Configuration* > *Applications* > **QoS**.

    The QoS menu appears.

2. From the QoS menu, select **Priority Classification** and define the priority classification method: 802.1p or IP-Precedence.

➤ **To assign the traffic queues to priority levels:**

1. From the QoS menu, select **Priority Mapping**, and assign each user priority (8021.p classification method) or tag value (IP Precedence classification method) to a traffic class (0–3). Each traffic class can be assigned to more than one priority.

2. Select **Save**.

```
                        RICi-E1
Configuration>Applications>QoS>Priority Mapping
1. User Priority 0  >  <Traffic Class 0>
2. User Priority 1  >  <Traffic Class 0>
3. User Priority 2  >  <Traffic Class 1>
4. User Priority 3  >  <Traffic Class 1>
5. User Priority 4  >  <Traffic Class 2>
6. User Priority 5  >  <Traffic Class 2>
7. User Priority 6  >  <Traffic Class 3>
8. User Priority 7  >  <Traffic Class 3>


>
Traffic Class '3' has the Highest Priority
ESC-prev menu; !-main menu; &-exit;                1 user(s)
```

Figure 4-19. Priority Mapping Menu (8021.p Method)

```
                              RICi-E1
Configuration>Applications>QoS>Priority Mapping
 1. Tag Value 0          >    (Traffic Class 0)
 2. Tag Value 1          >    (Traffic Class 0)
 3. Tag Value 2          >    (Traffic Class 0)
 4. Tag Value 3          >    (Traffic Class 0)
 5. Tag Value 4          >    (Traffic Class 0)
 6. Tag Value 5          >    (Traffic Class 0)
 7. Tag Value 6          >    (Traffic Class 0)
 8. Tag Value 7          >    (Traffic Class 0)


>
Traffic Class '3' has the Highest Priority
ESC-prev menu; !-main menu; &-exit;
          1 user(s)
```

Figure 4-20. Priority Mapping Menu (IP Precedence Method)

4.3   Additional Tasks

This section describes additional operations available supported by the RICi-E1, RICi-T1 management software, including the following:

- Displaying inventory
- Displaying RICi-E1, RICi-T1 status at the system, physical and application levels
- Changing user name and password
- Transferring software and configuration files
- Resetting RICi-E1, RICi-T1.

Displaying the Inventory

The Inventory screen displays a description of the unit, its hardware revision and the power supply type.

➤ **To display the inventory:**

1. From the Main menu, select **Inventory**.

   The Inventory table appears as illustrated in *Figure 4-21*.

2. In the Inventory table, use the arrow keys to navigate.

```
                              RICi-E1
Inventory


ID   Description              Vendor type     Class   Entity name              HWRev

1    RAD. RICi-E1.chassis                       0     RICi-E1.Chassis          1.0
->>
2    RAD. RICi-E1.PS                            0     RICi-E1.Power Supply


ESC-prev menu; !-main menu; &-exit;                                   1 user(s)
```

Figure 4-21. Inventory Screen

Displaying the Status

RICi-E1, RICi-T1 provides access to the following status information:

- **System Level** – MAC address, connection status
- **Physical Level** – Ethernet status
- **Application Level** – MAC table.

The status information is available via the Monitoring menu.

Displaying System Status Information

The System menu specifies MAC address of the RICi-E1, RICi-T1 unit and provides access to the information on the interface connection status. For a description of RICi-E1, RICi-T1 system messages, which are displayed via the Log File screen, refer to Chapter 6.

➤ **To display interface connection information:**

- Navigate to Main Menu › Monitoring › System › **Connection Status**.

   The Connection Status screen appears as illustrated in *Figure 4-22* for RICi-E1 and *Figure 4-23* for RICi-T1 respectively.

The Connection Status screen includes the following information:

▪ **Interface Description**. ETH (user) and E1 or T1 (network)

▪ **Type**. Type of the interface according to the INF TYPE MIB

▪ **Status**. Administrative status of the link (Up or Down), as set via the following menus:

   □ Ethernet menu, *Figure 4-9*

   □ E1 menu, *Figure 4-10*

   □ T1 menu, *Figure 4-12*.

▪ **Operation**. Current operational status of the link (Up or Down)

```
                               RICi-E1
Monitoring>System>Connection Status
 Index    Description          Type               Status    Operation  Speed
 1        ETHERNET PORT        Fast Eth copper    Up        Up         100000000
 2        E1 PORT - BL/UnBL    E1                 Up        Up         2048000
r - Refresh Table
ESC-prev menu; !-main menu; &-exit; ?-help                            1 user(s)
```

Figure 4-22. E1 Connection Status Screen

```
                               RICi-T1
Monitoring>System>Connection Status
 Index    Description          Type               Status    Operation  Speed
 1        ETHERNET PORT        Fast Eth copper    Up        Up         100000000
 2        T1 PORT              T1                 Up        Up         1544000
r - Refresh Table
ESC-prev menu; !-main menu; &-exit; ?-help                            1 user(s)
```

Figure 4-23. T1 Connection Status Screen

Displaying the Physical Ports Status

You can view the status of the RICi-E1, RICi-T1 physical port connections. For a description of the RICi-E1, RICi-T1 Ethernet and E1 or T1 ports statistics, refer to *Chapter 6*.

➤ **To display the Ethernet port status:**

- Navigate to Main Menu › Monitoring › Physical Ports › **Ethernet Status**.

  The Ethernet Status screen appears as illustrated in *Figure 4-24*.

  The Ethernet Status screen includes the following information:

  - **Administrative Status**. Administrative status of the link (Up or Down), as set via the Ethernet menu as illustrated in *Figure 4-9*.

  - **Operational Status**. Actual operational status of the link (Up or Down).

  - **Actual Speed & Duplex**. Current data rate and duplex mode of the link.

```
                          RICi-E1
Monitoring>Physical Ports>Ethernet Status

Administrative Status              (Up)

Operational Status                 (Up)

Actual Speed & Duplex              (100base - FX Full Duplex)
>

ESC-prev menu; !-main menu; &-exit;                    1 user(s)
```

Figure 4-24. Ethernet Status Screen

Displaying the Application Level Status

At the application level RICi-E1, RICi-T1 provides information of the MAC addresses (static and learned) and their bridge port assignments.

➤ **To display the MAC table:**

- Navigate to Main Menu › Monitoring › Applications › **MAC Table**.

  The MAC Table screen appears as illustrated in *Figure 4-25*.

  The MAC Table screen includes the following information:

  - **MAC Address**. Existing MAC address

  - **Type**. Static or learned

  - **Bridge Port**. Ethernet user or Ethernet network.

```
                          RICi-E1
Monitoring>Application>MAC Table

          +-------------------------------------------------+
          |     MAC Address    |    Type    |  Bridge Port  |
          +-------------------------------------------------+
          |   00-00-12-34-54-55  |   static   |   E1        |
          |   00-00-44-44-44-44  |  learned   |   E1        |
          |   00-12-23-23-23-23  |   static   |   ETHERNET  |
          +-------------------------------------------------+


r - Refresh Table
ESC-prev menu; !-main menu; &-exit; ?-help             1 user(s)
```

Figure 4-25. MAC Table

Changing User Name and Password

From the User Access menu you can change current user name and password. RICi-E1, RICi-T1 supports two user names and password, meaning that no additional user names can be defined. The unit ships with the following default user names and password:

- **User names**

  - **su** – Super user with read/write permissions

  - **user** – Guest with read-only permissions.

- **Password**

  - **1234** – This password applies to both users.

➤ **To change the current user name and password:**

1. Navigate to Main Menu › Management › Management Access › **User Access**.

   The User Access menu appears as illustrated in *Figure 4-26*.

2. From the User Access menu, select **User Name**, and enter a new user name (case-sensitive).

3. Select **Password**, and assign a new password to the new or existing user name.

4. Select **Verify Password** to confirm the new password.

5. Select **Save**.

```
                        RICi-E1
Configuration>System>Management>Management Access>User Access
User Name      .         ...(user)
Password                 ...(****)
Verify Password          ...()


>
ESC-prev menu; !-main menu; &-exit                     1 user(s)
```

Figure 4-26. User Access Menu

Transferring Software and Configuration Files

This section presents procedures for installing new software releases into the RICi-E1, RICi-T1 units and transferring configuration files.

RICi-E1, RICi-T1 stores two software versions, each of them in one of the two partitions of its flash memory, which also contains a boot program. The software is stored in compressed format. The active version is decompressed and loaded into the RICi-E1, RICi-T1 RAM upon power-up. The passive software is kept for backup purposes. If the active software becomes corrupted, you can swap it with the backup. By default, RICi-E1, RICi-T1 is delivered with active software only.

New software releases are distributed as ***.img** files, which are downloaded to RICi-E1, RICi-T1. When starting a download, the current backup is erased and the new software placed in the backup partition. When downloading is complete, the unit checks the integrity of the new software file. If it is correct, the backup and active files are swapped. The new software release becomes active and the former active software becomes the backup. If a failure occurs during downloading, the new version is erased. In this case, only one version is left stored in the flash memory.

Configuration files can be uploaded for storage and backup.

Management software allows file transfer via TFTP only. The software files can also be downloaded to RICi-E1, RICi-T1 via Boot Manager, using XMODEM or TFTP, as explained in *Appendix B*.

➤ **To transfer files via TFTP:**

1. Navigate to Main menu › Utilities › **File Transfer**.

    The File Transfer menu appears as illustrated in *Figure 4-27*.

```
                          RICi-E1
Utilities>File Transfer
Server IP Address                          ... (0.0.0.0)
Remote File Name                           ... ()
File Type                                  (IMG)
Command                                    >


>


ESC-prev menu; !-main menu; &-exit;                 1 user(s)
```

Figure 4-27. File Transfer

2. Select **Server IP Address,** and enter IP address of TFTP server.

3. Select **Remote File Name** and enter a file name:

    ▪ When downloading, specify name of the file to be downloaded to RICi-E1, RICi-T1.

    ▪ When uploading, specify a file name for the file that you are about to save on the remote server.

4. Select **File Type**, and choose whether you intend to transfer a software (IMG) or configuration (Configuration) file.

5. Select **Save** to save the changes.

6. Select **Command** to start the desired procedure:

   ▪ **Upload**. Saving a software or configuration file on a remote server.

   ▪ **Download**. Transferring a software or configuration file to RICi-E1, RICi-T1.
   RICi-E1, RICi-T1 starts file transfer.

The TFTP file transfer process is logged by the following system messages, which are stored in the log file. Refer to *Chapter 6* for further information:

- TFTP – Starting Upload

- TFTP – Starting Download

- TFTP – Upload Failed

- TFTP – Download Failed.

Resetting RICi-E1, RICi-T1

RICi-E1, RICi-T1 supports two types of reset:

- Reset to the default setting

- Overall reset of the device.

Resetting to the Default

You can reset RICi-E1, RICi-T1 to the factory default settings.

➤ **To reset RICi-E1, RICi-T1 to the factory default settings:**

1. From the System menu, select **Set Factory Defaults**.

   You are asked to confirm the reset:

   ```
   The device will restart. Do you want to proceed? (Y/N)
   ```

2. Press ‹**Y**› to confirm your request.

   RICi-E1, RICi-T1 resets all parameters to the factory default settings.

Resetting the Unit

You can perform an overall reset of RICi-E1, RICi-T1.

➤ **To reset RICi-E1, RICi-T1:**

1. From the System menu, select **Reset Device**.

   You are asked to confirm your request:

   ```
   The device will restart. Do you want to proceed? (Y/N)
   ```

2. Type ‹**Y**› to confirm your request.

   RICi-E1, RICi-T1 resets, preserving the last-saved settings.

Chapter 5

Configuring Typical Applications

This chapter provides detailed instructions for configuring RICi-E1 or RICi-T1 for a typical application.

5.1 Application Requirements

Figure 5-1 illustrates a typical application, where a RICi-E1 or RICi-T1 unit provides a demarcation point between the carrier and customer networks.
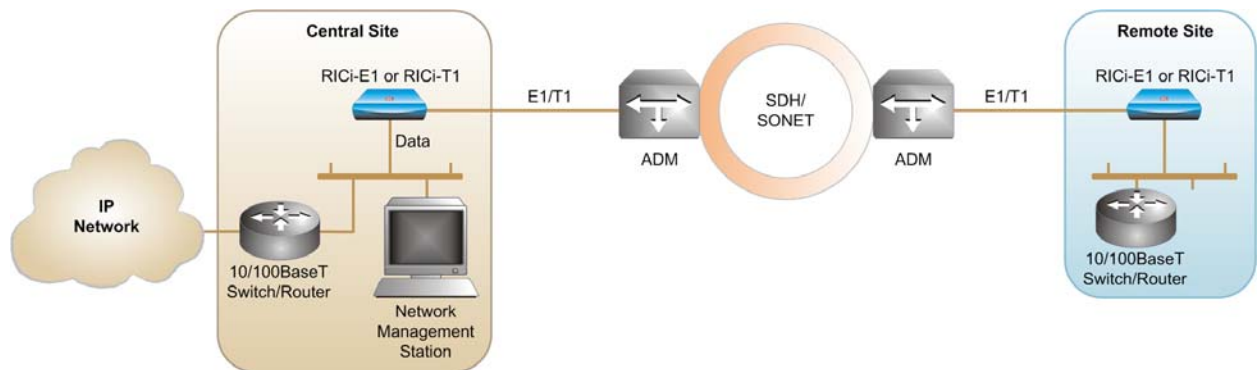
Figure 5-1. Typical RICi-E1, RICi-T1 Application

In order to operate to operate RICi-E1, RICi-T1, the central site has to comply with the following requirements:

- User 10/100 Base T connection to a switch or router switching to the IP network

- E1/T1 link to the SONET/SDH network

- Network management station for management via SNMP.

You configure the RICi-E1, RICi-T1 using an ASCII terminal connection. The configuration procedure consists of four main stages:

- Defining system parameters

- Configuring physical port parameters (10/100 BaseT and E1)

- Configuring the bridge

- Assigning QoS levels to the priority queues.

5.2   Configuring the System Parameters

Make sure that the RICi-E1, RICi-T1 is properly installed and connected to an ASCII terminal.

Configuring Parameters via ASCII Terminal

➤ **To configure the RICi-E1, RICi-T1 system parameters:**

1. Configure an ASCII terminal to a baud rate of 115200 bps, one start bit, eight data bits, no parity, one stop bit, no flow control and VT100 emulation.

2. Connect the terminal to the local RICi-E1, RICi-T1 DB-9 CONTROL port.

3. Press ‹**Return**› to initiate the control session and then enter the user name and password.

4. Configure the system parameters necessary for SNMP management such as the Host IP address, the IP mask, and SNMP read/write communities (**Main Menu › Configuration › System › Management › Host IP**).

5. Define the manager(s) (**Main Menu › Configuration › System › Management › Manager List**).

5.3 Configuring the Physical Ports

Configure the following physical ports:

- E1 or T1 port
- Ethernet port.

Configuring the E1 Port

➤ **To configure the E1 port parameters:**

- Display the E1 Physical Port menu (**Main Menu › Configuration › Physical Ports › E1**) and configure the E1 parameters values according to the network equipment:
    - Administrative status
    - Clock
    - Framing mode
    - Idle code
    - Receiver sensitivity
    - Line code
    - Timeslot assignment
    - Protocol.

Configuring the T1 Port

➤ **To configure the T1 port parameters:**

- Display the T1 Physical Port menu (**Main Menu › Configuration › Physical Ports › T1**) and configure the T1 parameter values according to the network equipment requirements:

  ▪ Administrative status

  ▪ Clock

  ▪ Framing mode

  ▪ Idle code

  ▪ Sync

  ▪ Receiver sensitivity

  ▪ Line code

  ▪ Line mode

  ▪ Line buildout

  ▪ Timeslot assignment

  ▪ Protocol.

Configuring the Ethernet Port

➤ **To configure the Ethernet port parameters:**

- Display the Ethernet Physical Port menu (**Main Menu › Configuration › Physical Ports › Ethernet**) and configure the Ethernet parameter values according to the requirements of the deployment:

  ▪ Administrative status

  ▪ Autonegotiation

  ▪ Speed & duplex (only if autonegotiation is disabled)

  ▪ Max capability advertised (the highest traffic handling capability to be advertised during the autonegotiation process).

5.4 Configuring the Internal Bridge

Internal bridge must be configured to properly process the VLAN tags in order to maintain priority of the data flows.

The following steps must be performed:

- Configure the bridge parameters

- Configure the static MAC table

- Configure the bridge port.

Configuring the Bridge Parameters

➤ **To configure the bridge parameters:**

- Display the Bridge menu (**Main Menu › Configuration › Applications › Bridge**) and configure the following:

  ▪ Forwarding mode

  ▪ Aging time.

Configuring the Bridge Port

➤ **To configure the bridge port:**

- Display the Bridge Port menu (**Main Menu › Configuration › Applications › Bridge › Bridge Port**) and configure the bridge port parameter values:

  ▪ VLAN tag stacking

  ▪ PVID

  ▪ Copy origin priority

  ▪ Default priority.

5.5   Configuring the QoS Priorities

The seven QoS levels must be assigned to four priority queues.

➤ **To assign the traffic queues to priority levels:**

1. Navigate to Main Menu › Configuration › Applications › **QoS**.

   The QoS menu appears.

2. Select Priority Classification Method.

Assign each user priority (8021.p classification method) or tag value (IP Precedence classification method) to a traffic class (0–3).

Chapter 6

Troubleshooting and Diagnostics

This chapter contains information on the following topics:

- *Monitoring Performance*
- *Detecting Errors*
- *Handling Alarms*
- *Troubleshooting*
- *Testing RICi-E1, RICi-T1*
- *Troubleshooting*

6.1   Monitoring Performance

You can monitor the performance of the E1 and T1 interfaces.

➤ **To monitor the E1/T1 performance:**

1. Navigate to Main Menu › Monitoring › Physical Ports › E1/T1 Statistics › **PM**.

    The PM screen appears as illustrate in *Figure 6-1*.

2. Select **Current Statistics**, **Interval Statistics**, or **Total Interval Statistics**.

```
                            RICi-T1
Monitoring>Physical Ports>E1/T1 Statistics>PM
 1. Current Statistics                    >
 2. Interval Statistics                   []
 3. Total Interval Statistics             >
 4. Clear Statistics


>
ESC-prev.menu; !-main menu; &-exit;                   1 user(s)
```

Figure 6-1. PM Screen

Table 6-1. Performance Monitoring Parameters

Parameter	Description
ES	Errored Seconds
SES	Severely Errored Seconds
UAS	Unavailable Seconds
CSS	Controlled Slip Seconds
BES	Bursty Errored Seconds

Traps

You can also monitor the performance of RICi-E1, RICi-T1 by setting traps. RICi-E1, RICi-T1 support the following traps:

- Cold start
- Link up
- Link down
- Line status change
- Authentication failure
- TFTP status change
- Agent status change
- E1\T1 status change (in framed mode).

6.2   Detecting Errors

You can display statistical data for the both the Ethernet and E1 or T1 ports.

Displaying Ethernet Statistics

➤ **To display the Ethernet statistics:**

1. Navigate to Main Menu › Monitoring › Physical Ports › **Ethernet Statistics**.

    The Ethernet Statistics screen appears as illustrated in *Figure 6-2*.

2. Press ‹**C**› to reset the counters or ‹**R**› to refresh the screen.

```
                              RICi-E1
Monitoring>Physical Ports>Ethernet Statistics        Last Clear Time: 0:00:00
 Rx Correct Frames                          (0)
 Rx Correct Octets                          (0)
 Rx Alignment Error                         (0)
 Rx FCS Errors                              (0)
 Tx Correct Frames                          (0)
 Tx Correct Octets                          (0)
 Tx Single Collision                        (0)
 Tx Multiple Collision                      (0)
 Tx Deferred Transmissions                  (0)
 Tx Late Collisions                         (0)
 c – Clear Statistics    r – Refresh Statistics
>
ESC-prev.menu; !-main menu; &-exit;                            1 user(s)
```

Figure 6-2. Ethernet Statistics

Table 6-2. Ethernet Statistics Parameters

Parameter	Description
Rx Correct Frames	The total number of correct frames received
Rx Correct Octets	The total number of octets (bytes) received
Rx Alignment Error	Total number of frames received with a valid length, but with invalid FCS and a non-integral number of octets
Rx FCS Errors	Total number of frames received with a valid length, but with invalid FCS and an integral number of octets
Tx Correct Frames	The number of frames successfully transmitted
Tx Correct Octets	The number of octets successfully transmitted
Tx Single Collision	Total number of successfully transmitted frames that experienced exactly one collision
Tx Multiple Collision	Total number of successfully transmitted frames that experienced more than one collision
Tx Deferred Transmissions	Total number of successfully transmitted frames that are delayed because the medium is busy during the first attempt
Tx Late Collisions	Total number of times a collision is detected later than 512 bit-times into the transmission of a frame

Displaying E1/T1 Statistics

➤ **To display the E1/T1 statistics:**

1. Follow the path: Main Menu › Monitoring › Physical Ports › E1/T1 **Statistics**.

   The E1/T1 Statistics screen appears as illustrated in *Figure 6-3*.

2. Press ‹**C**› to reset the counters or ‹**R**› to refresh the screen.

```
                              RICi-E1
Monitoring>Physical Ports>E1 Statistics               Last Clear Time: 0:00:00


 Rx Total Frames                        (0)
 Rx Total Octets                        (0)
 Rx Total Errors                        (0)
 Tx Total Frames                        (0)
 Tx Total Octets                        (0)
 Tx Total Errors                        (0)
 Tx Congestion Dropped Frames           (0)
>
c – Clear Statistics    r – Refresh Statistics
ESC-prev.menu; !-main menu; &-exit;                              1 user(s)
```

Figure 6-3. E1 Statistics

Table 6-3. E1/T1 Statistics Parameters

Parameter	Description
Rx Total Frames	The total number of frames received
Rx Total Octets	The total number of octets (bytes) received
Rx Total Errors	The total number of errors received
Tx Total Frames	The total number of frames transmitted
Tx Total Octets	The total number of octets (bytes) transmitted
Tx Total Errors	The total number of errors transmitted
Tx Congestion Dropped Frames	The total number of transmitted frames that are discarded due to a lack of buffer space

6.3   Handling Alarms

RICi-E1, RICi-T1 maintains a log file, which can hold up to 100 system alarms. All events are time-stamped.

Displaying System Alarms

➤ **To access the event log:**

1. Navigate to Main Menu › Monitoring › System › **Log File**.

    The Log File screen appears as illustrated in *Figure 6-4*.

2. In the Log File screen, use the Up and Down keys to scroll the alarm list up and down.

```
                          RICi-E1
Monitoring>System>Log File


  Code   Description                           Severity    Time
  10     LINK_UP: E1 Port                       Major       0:00:00
  10     LINK_UP: Ethernet Port                 Major       0:00:00
  40     SNMP_AUTH_FAIL: By address 100.50.24.94  Event      3:57:39
  20     LINK_DOWN: E1 Port                     Major       21:20:45
  20     LINK_DOWN: ETH Port                    Major       0:0:0


>
x - Clear Log File    r – Refresh Table


ESC-prev.menu; !-main menu; &-exit;   ?-help                      1 user(s)
```

Figure 6-4. Log File

Table 6-4 presents the event types that appear in the event log:

Table 6-4. Event List

Code	Event	Description
10	LINK_UP	E1/Network Ethernet port has been connected
20	LINK_DOWN	E1/Network Ethernet port has been disconnected
40	SNMP_AUTH_FAIL	SNMP Authentication Failure trap has been received
50	WEB_START	ConfiguRAD session has been initiated
51	WEB_FINISH	ConfiguRAD session has been finished
52	WEB_FAILURE	ConfiguRAD session has failed
60	TELNET_START	Telnet session has been initiated

Code	Event	Description
61	TELNET_FINISH	Telnet session has been finished
62	TELNET_FAILURE	Telnet session has failed
70	TFTP_START	TFTP session has been initiated
71	TFTP_FINISH	TFTP session has been finished
72	TFTP_FAILURE	TFTP session has failed
73	AIS_Occurred	AIS has been detected on E1 port

Clearing Alarms

➤ **To clear the alarm log**

- On the Log File screen, press ‹**X**›.

6.4   Troubleshooting

Use the chart shown in *Table 6-5* to identify and remedy problems in unit operation.

Table 6-5. Troubleshooting Chart

Fault	Probable Cause	Remedial Action
Power LED off	No power supplied to unit	1. Check power source. 2. Check power cable connected and correctly wired.
Ethernet Link LED off	• No Ethernet link detected. • Ethernet port in the switch and RICi-E1, RICi-T1 are not set to the same speed or duplex mode.	1. Make sure that the cables are connected and correctly wired. 2. Check the switch and the RICi-E1, RICi-T1 Ethernet port configuration (negotiation, speed, duplex mode). 3. Use the log file to follow up on recent events.
E1/T1 local or remote Sync Loss LED on	No E1/T1 link detected at the local or remote site.	1. Make sure that the cables are connected and correctly wired. 2. Check the physical E1/T1 connection (use loopbacks). 3. Check the configuration of E1/T1 lines at local and remote sites. 4. Use the log file to follow up on recent events.
No traffic between two units	Configuration or logical layer problems	1. Use the System Interface Status screen for assistance. All active ports that show Activation–Up should show Operation–Up. 5. Use the log file to follow up on recent events. 6. Check the RICi-E1, RICi-T1 configuration and RICi-E1, RICi-T1 parameters as necessary.
Partial Traffic Flow	The timing configuration is not properly set.	1. Check the timing settings.

6.5   Testing RICi-E1, RICi-T1

RICi-E1, RICi-T1 checks network integrity by running ping, trace route, or loopback tests.

Running a Ping Test

You can ping the remote IP host to check the RICi-E1, RICi-T1 IP connectivity.

➤ **To ping an IP host:**

1. Navigate to Main Menu › Diagnostics › **Ping**.

    The Ping menu appears as illustrated in *Figure 6-5*.

2. From the Ping menu, configure the following:

    ▪ **Destination IP Address**. The IP address of the host that you intend to ping, which may range from 0.0.0.0 to 255.255.255.255.

    ▪ **Number of Frames to Send**. 0–50. To send a continuous stream of frames, select **0**.

3. Select **Send Ping** to start sending pings.

4. Select **Stop Ping** to stop the ping test.

```
                            RICi-E1
Diagnostics>Ping
1. Destination IP Address                 ... (0.0.0.0)
2. Number of Frames to Send[0 - 50]     .  .. (1)
3. Send Ping
4. Stop Ping


>


ESC-prev.menu; !-main menu; &-exit;                    1 user(s)
```

Figure 6-5. Ping Menu

Tracing the Route

This Diagnostic utility traces the route through the network from RICi-E1, RICi-T1 to the destination host.

➤ **To trace a route:**

1. Navigate to Main Menu › Diagnostics › **Trace Route**.

    The Trace Route menu appears as displayed in *Figure 6-6*.

2. From the Trace Route menu, select **Destination IP Address** and enter the IP address of the host to which you intend to trace the route.

3. Select **Display Trace Route** to start tracing.

    RICi-E1, RICi-T1 starts tracing the route, displaying the IP addresses of all hop nodes.

4. Select **Stop Trace Route** to stop the tracing.

```
                          RICi-E1
Diagnostics> Trace Route
1. Destination IP Address                    ... (0.0.0.0)
2. Display Trace Route
3. Stop Trace Route


>


ESC-prev.menu; !-main menu; &-exit;                  1 user(s)
```

Figure 6-6. Trace Route Menu

Performing a Loopback Test

This diagnostic utility executes a remote loopback test. The purpose of the loopback test is to determine the source of a break in the data flow.

➤ **To execute a loopback test:**

1. Navigate to Diagnostics › **Loopback**.

    The Loopback menu appears as illustrated in *Figure 6-7*.

2. From the Loopback menu, configure the following:

    ▪ Select Loopback State and set it to **Remote** to perform remote loopback.

    ▪ Select **Time To Start** and set it to the amount of time to wait before starting the loopback test.

    ▪ Select **Duration** and set it to the amount of time for which to execute the loopback test.

➤ **To disable loopback test:**

    ▪ From the Loopback menu, select Loopback State and set it to **Disable** to disable loopback testing.

```
                        RICi-E1
Diagnostics>Loopback
1. E1 Loopback state…                    > (disable)
2. Time To Start (sec) [0 - 600]         ...(0)
3. Duration (sec) [0 - 3600]             ...(300)


>


ESC-prev.menu; !-main menu; &-exit;                 1 user(s)
```

Figure 6-7. Loopback Menu

6.6   Frequently Asked Questions

This section contains commonly asked questions about RICi-E1, RICi-T1.

Q. Does RICi-E1 support static routing?

A. Yes, up to 60 entries.

Q. What is the algorithm used by RICi-E1 to manage its 3 queues?

A. RICi-E1 uses strict priority.

Q. When RICi-E1 routes a management VLAN to a specific queue, does it get a higher priority than other user VLANs with lower priority?

A. All management traffic is transmitted using a dedicated queue with the highest priority. The Host VLAN priority is the value assigned in the VLAN tag added to management traffic.

Q. Can the RICi-E1 "independently mark" untagged user traffic with a specific VLAN priority?

A. RICi-E1 doesn't add VLAN tags to untagged traffic. The only option to add a tag is by using the stacking option. The priority used for untagged traffic is the "default priority" as configured. When no stacking is defined and untagged traffic is received, it will be transmitted using the traffic class '0' (as defined in the standard).

6.7   Technical Support

Technical support for this product can be obtained from the local distributor from whom it was purchased.

For further information, please contact the RAD distributor nearest you or one of RAD's offices worldwide. This information can be found at www.rad.com (in the **Where to Buy > End Users** page).

Appendix A

Pinouts

A.1   Ethernet Connector

The 10/100BaseT Ethernet electrical interface terminates in an 8-pin RJ-45 connector, wired according to *Table A-1*.

Table A-1. 10/100BaseT Ethernet Connector Pinouts

Pin	Function
1	Tx+
2	Tx–
3	Rx+
4, 5	–
6	Rx–
7, 8	–

A.2   E1/T1 Connector

The E1 or T1 electrical interface terminates in an 8-pin RJ-45 connector, wired according to *Table A-2*.

Table A-2. E1 or T1 Connector Pinouts

Pin	Function
1	Rx+
2	Rx–
3	–
4	Tx+
5	Tx–
6	–
7	–
8	–

A.3   CONTROL Connector

The control terminal interface terminates in a V.24/RS-232 9-pin D-type female DCE connector. *Table A-3* lists the control connector pin assignments.

Table A-3. CONTROL Connector Pinout

Pin	Function
1	Data Carrier Detect (DCD)
2	Receive Data (RD)
3	Transmit Data (TD)
4	Data Terminal Ready (DTR)
5	Ground (GND)
6	Data Set Ready (DSR)
7	Request to Send (RTS)
8	Clear to Send (CTS)
9	Ring Indication (RI)

Appendix B

Boot Manager

This appendix provides a description of the RICi-E1, RICi-T1 boot procedure via an ASCII terminal for downloading software.

The RICi-E1, RICi-T1 software resides on flash memory in two sections, in the boot sector and in the file system. The boot sector accommodates a boot program that calls the rest of the program from the file system.

The file system can hold two compressed copies of the RICi-E1, RICi-T1 code. One copy is called the operating file, and the other is called the backup file. The operating file is the default-executable RICi-E1, RICi-T1 code. The backup file is used whenever the operating file is absent or corrupted.

B.1   Booting RICi-E1, RICi-T1

RICi-E1, RICi-T1 boots up automatically after connecting to the power. Once powered up, no further user intervention is required, unless you wish to access the file system to modify or update the software or the RICi-E1, RICi-T1 configuration.

Accessing the Boot Manager

The Boot Manager menu is an option that allows you to perform basic file transfer operations. These operations are all optional.

➤ **To access the Boot Manager menu:**

- Press ‹**Enter**› several times immediately after powering RICi-E1, RICi-T1 up.

    The Boot Manager menu appears as displayed *Figure B-1*.

```
Boot Version 1.12 (Apr 11 2006)
Boot Manager Version 10.04 (Apr 11 2006)

0 - Exit boot-manager
1 - Dir
2 - Set active software copy
3 - Delete software copy
4 - Download boot manager or an application by XMODEM
5 - Format flash
6 - Show basic hardware information
7 - Reset board
8 - System configuration
9 - Download boot manager or an application by TFTP
Press the ESC key to return to the main menu.
Select:
```

Figure B-1. Typical Boot Manager Menu

From the Boot Manager menu, you can do the following:

- Listing all files stored in the flash memory

- Exchanging the operating and backup files

- Deleting the operating file; the backup file becomes the operating file

- Download a new operating file (via XMODEM or TFTP); the previous operating file is saved as the backup file

- Deleting all software and configuration files

- Displaying the basic hardware information, such as RAM, ROM size etc.

- Resetting the RICi-E1, RICi-T1 board

- Configuring the RICi-E1, RICi-T1 IP address, IP mask and default gateway for the consecutive file download via TFTP.

Note   *If you choose to exchange or delete a file, you are prompted to confirm your request.*

B.2   Transferring the Software and Configuration Files

New software releases are distributed as separate files, which are downloaded to RICi-E1, RICi-T1 using the XMODEM protocol or TFTP from the Boot Manager menu. Alternatively, you may download a new software release via TFTP, when the RICi-E1, RICi-T1 management software is already running. To do so, you have to navigate to Main menu > Utilities > **File Transfer**.

The TFTP protocol may also be used for uploading configuration files that contain the RICi-E1, RICi-T1 database to the management station. Administrators may use this capability to distribute verified configuration files to all other units that use a similar configuration.

Downloading Application Files via XMODEM

You download application files using the XMODEM protocol from the Boot Manager menu.

➤ **To download application file via XMODEM:**

1. Configure your ASCII terminal or terminal emulation utility running on your PC to a data rate of 115.2 kbps.

2. Navigate to the Boot Manager menu.

   The Boot Manager menu appears as illustrated in *Figure B-1*.

3. From the Boot Manager menu, select **Download Files or an Application by XMODEM**.

   RICi-E1, RICi-T1 displays the following message:
   Select Copy number for download (0)

4. Select the backup partition by typing its number, **0** or **1**.

   RICi-E1, RICi-T1 replies with the following message:
   Please start the XMODEM download.

5. Send the software release file to RICi-E1, RICi-T1 using the XMODEM utility of your terminal application.

   Once the downloading is completed, RICi-E1, RICi-T1 saves the new release as an active partition. The previously active partition becomes the backup and the boot sequence continues normally.

   If an error occurs during the download, the partially downloaded software file is erased and only active software is left in the flash memory.

Downloading Application Files via TFTP

➤ **To download application file via TFTP**

1. From the Boot Manager menu, select **System Configuration**.

2. Configure the IP address, the IP mask and the default gateway of RICi-E1, RICi-T1. These parameters are valid only for the TFTP file transfer via the Boot Manager.

3. Start a TFTP application.

4. Configure the TFTP communication parameters as follows:

   ▪ **Connection timeout** – more than 30 seconds to prevent an automatic disconnection during the backup partition deletion (about 25 seconds)

   ▪ **Block size** – 512 bytes

   ▪ **UDP port** – 69.

5. Select a local software release file to download.

6. Enter the RICi-E1, RICi-T1 IP address.

7. Start downloading.

RICi-E1, RICi-T1 automatically erases the backup partition (it takes about 25 seconds). Once the downloading is completed, RICi-E1, RICi-T1 saves the new release as an active partition; the former active partition turns into backup.

Index

AC/DC Adapter (AD) Plug

for DC Power Supply Connection

Note *Ignore this supplement if the unit is AC-powered.*

Certain units are equipped with a wide-range AC/DC power supply. These units are equipped with a standard AC-type 3-prong power input connector located on the unit rear panel. This power input connector can be used for both AC and DC voltage inputs.

For DC operation, a compatible straight or 90-degree AC/DC Adapter (AD) plug for attaching to your DC power supply cable is supplied with your RAD product (see *Figure 1* and *Figure 2*).

Connect the wires of your DC power supply cable to the AD plug, according to the voltage polarity and assembly instructions provided on *page 2*.

*Figure 1. Straight AD Plug*

Figure 2. 90-Degree AD Plug

Caution Prepare all connections to the AD plug **before** inserting it into the unit's power connector.

RAD
data communications
The Access Company

➤ **To prepare the AD plug and connect it to the DC power supply cable:**

1. Loosen the cover screw on the bottom of the AD plug to open it (see *Figure 3*).

2. Run your DC power supply cable through the removable cable guard and through the open cable clamp.

3. Place each DC wire lead into the appropriate AD plug wire terminal according to the voltage polarity mapping shown. Afterwards, tighten the terminal screws closely.

4. Fit the cable guard in its slot and then close the clamp over the cable. Tighten the clamp screws to secure the cable.

5. Reassemble the two halves of the AD plug and tighten the cover screw.

6. Connect the assembled power supply cable to the unit.

Note: You have to flip over the non-90-degree AD plug type by 180 degrees to insert it into the unit. After inserting it, verify that the blue (negative) wire is connected to the POWER and the brown (positive) wire is connected to the RETURN.
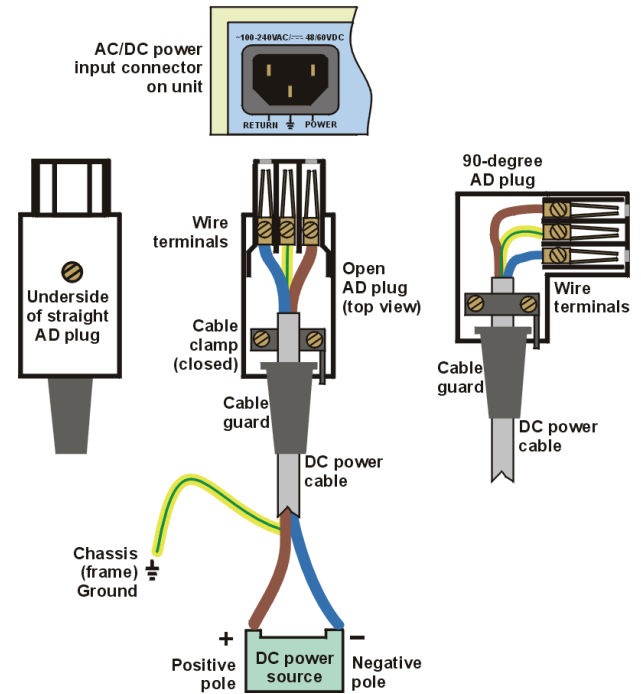
Figure 3. AD Plug Details

Warning

- Reversing the wire voltage polarity will not cause damage to the unit, but the internal protection fuse will not function.

- Always connect a ground wire to the AD plug's chassis (frame) ground terminal. Connecting the unit without a protective ground, or interrupting the grounding (for example, by using an extension power cord without a grounding conductor) can damage the unit or the equipment connected to it!

- The AD adapter is not intended for field wiring.

Terminal Block Connector

for DC Power Supply Connection

Note   *Ignore this supplement if the unit is AC-powered.*

Certain DC-powered units are equipped with a plastic 3-pin VDC-IN power input connector, located on the unit rear panel. Different variations of the connector are shown in *Figure 1*. All are functionally identical.

Supplied with such units is a kit including a mating Terminal Block (TB) type connector plug for attaching to your power supply cable.

Connect the wires of your power supply cable to the TB plug, according to the voltage polarity and assembly instructions provided on the following pages.
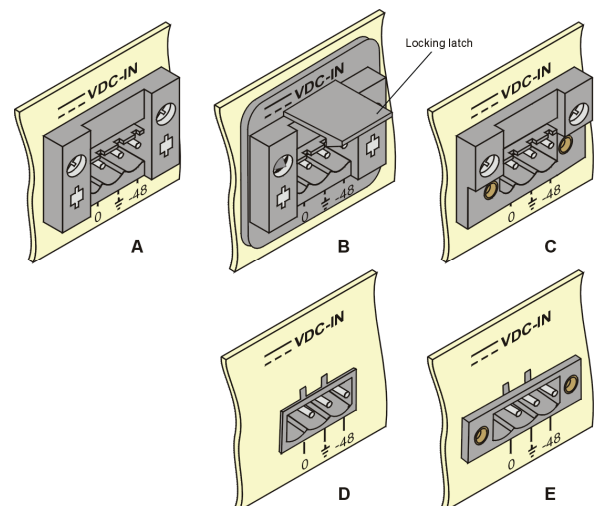
Figure 1. TB DC Input Connector Types Appearing on Unit Panels

Caution   Prepare all connections to the TB plug **before** inserting it into the unit's VDC-IN connector.

➤ **To prepare and connect the power supply cable with the TB Plug:**

Note: Refer to Figure 2 for assistance.

1. Strip the insulation of your power supply wires according to the dimensions shown.

2. Place each wire lead into the appropriate TB plug terminal according to the voltage polarity mapping shown in *Figure 3*. (If a terminal is not already open, loosen its screw.) Afterwards, tighten the three terminal screws to close them.

3. Pull a nylon cable tie (supplied) around the power supply cable to secure it firmly to the TB plug grip, passing the tie through the holes on the grip.

4. Isolate the exposed terminal screws/wire leads using a plastic sleeve or insulating tape to avoid a short-circuit.

5. Connect the assembled power supply cable to the unit by inserting the TB plug into the unit's VDC-IN connector until it snaps into place.
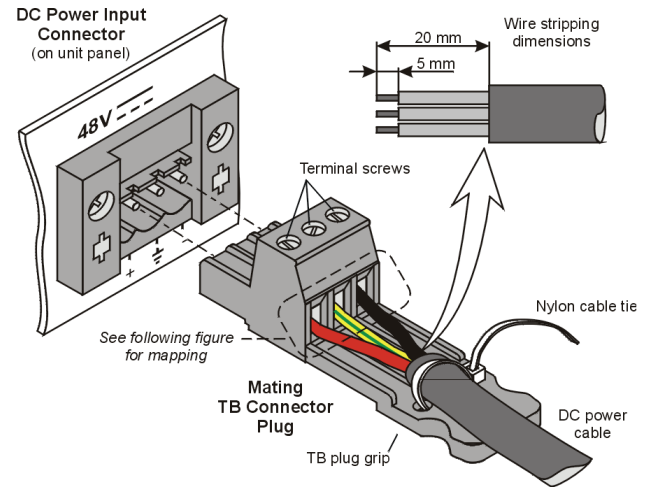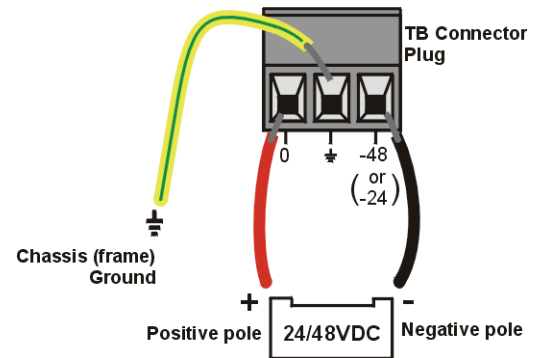

Figure 2.   TB Plug Assembly

Figure 3.   Mapping of the Power Supply Wire Leads to the TB Plug Terminals

Warning

- **Reversing the wire voltage polarity can cause damage to the unit!**
- **Always connect a ground wire to the TB plug's chassis (frame) ground terminal. Connecting the unit without a protective ground, or interruption of the grounding (for example, by using an extension power cord without a grounding conductor) can cause harm to the unit or to the equipment connected to it!**

Note: *Certain TB plugs are equipped with captive screws for securing the assembled cable's TB plug to the unit's VDC-IN connector (C and E types only). To secure the plug, tighten the two screws on the plug into the corresponding holes on the sides of the input connector as shown in* *Figure 4.*
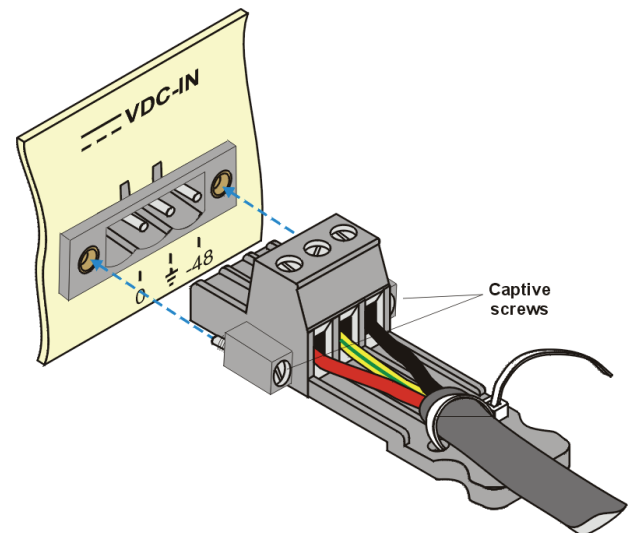

Figure 4. TB Plug with Captive Screws (optional)

➤ **To disconnect the TB plug:**

1. If the TB plug is equipped with captive screws, loosen the captive screws (see *Figure 4*).

2. If the unit's VDC-IN connector is type B, lift the locking latch (see *Figure 1*).

3. Pull out the TB plug carefully.

Caution   Always lift the locking latch of type B connectors before disconnecting the TB plug, to avoid damaging the TB plug.

Supplement
Drilling Template for Wall Installation

Front Panel

176 mm (6.92 in)

101.6 mm (4 in)

1

3

2

3

2

1
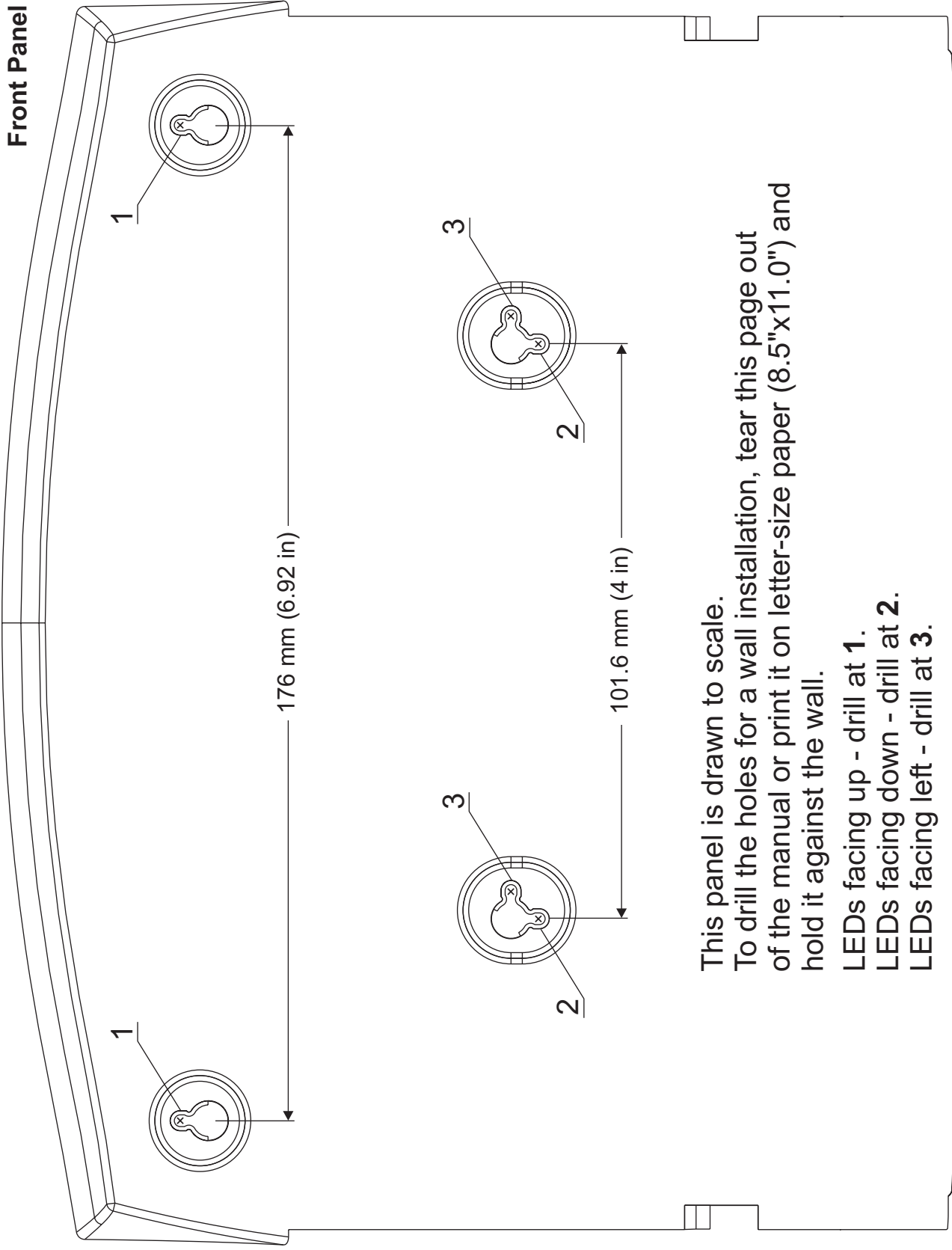
This panel is drawn to scale.
To drill the holes for a wall installation, tear this page out
of the manual or print it on letter-size paper (8.5"x11.0") and
hold it against the wall.

LEDs facing up – drill at **1**.
LEDs facing down – drill at **2**.
LEDs facing left – drill at **3**.

Customer Response Form

RAD Data Communications would like your help in improving its product documentation. Please complete and return this form by mail or by fax or send us an e-mail with your comments.

Thank you for your assistance!

Manual Name: RICi-E1, RICi-T1 Ver. 2.1

Publication Number: 385-200-08/08

Please grade the manual according to the following factors:

	Excellent	*Good*	*Fair*	*Poor*	*Very Poor*
Installation instructions	❏	❏	❏	❏	❏
Operating instructions	❏	❏	❏	❏	❏
Manual organization	❏	❏	❏	❏	❏
Illustrations	❏	❏	❏	❏	❏
The manual as a whole	❏	❏	❏	❏	❏

What did you like about the manual?

_____

_____

_____

_____

Error Report

Type of error(s) or
problem(s):

- ❐ Incompatibility with product
- ❐ Difficulty in understanding text
- ❐ Regulatory information (Safety, Compliance, Warnings, etc.)
- ❐ Difficulty in finding needed information
- ❐ Missing information
- ❐ Illogical flow of information
- ❐ Style (spelling, grammar, references, etc.)
- ❐ Appearance
- ❐ Other _____

Please list the exact page numbers with the error(s), detail the errors you found (information missing, unclear or inadequately explained, etc.) and attach the page to your fax, if necessary.

_____

_____

_____

_____

Please add any comments or suggestions you may have.

_____

_____

_____

You are:

- ❐ Distributor
- ❐ End user
- ❐ VAR
- ❐ Other

Who is your distributor? _____

Your name and company: _____

Job title: _____

Address: _____

Direct telephone number and extension: _____

Fax number: _____

E-mail: _____

International Headquarters

24 Raoul Wallenberg Street
Tel Aviv 69719, Israel
Tel. 972-3-6458181
Fax 972-3-6498250, 6474436
E-mail market@rad.com

North America Headquarters

900 Corporate Drive
Mahwah, NJ 07430, USA
Tel. 201-5291100
Toll free 1-800-4447234
Fax 201-5295777
E-mail market@radusa.com

www.rad.com

RAD
data communications
The Access Company