

# DXC-4

E1/T1 Grooming Device

Version 1.0



**data communications**

Innovative Access Solutions



# DXC-4

E1/T1 Grooming Device

Version 1.0

## Installation and Operation Manual

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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**

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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.

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

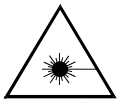
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Protective earth: the marked lug or terminal should be connected to the building protective earth bus.

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**Warning**

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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!**

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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 earth terminal. If an earth lug is provided on the product, it should be connected to the protective earth at all times, by a wire with a diameter of 18 AWG or wider. Rack-mounted equipment should be mounted only in earthed 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.

## 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 earthing 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.

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

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

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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 earth 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 earth 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 earth 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)

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**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.

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**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.

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**Achtung**

Dieses ist ein Gerät der Funkstörgrenzwertklasse A. In Wohnbereichen können bei Betrieb dieses Gerätes Rundfunkstörungen auftreten, in welchen Fällen der Benutzer für entsprechende Gegenmaßnahmen verantwortlich ist.

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# Declaration of Conformity

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

declares that the product:

**Product Name:** DXC-4

conforms 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 50024 (1998): Information technology equipment, immunity characteristics, limits and methods of measurement.

**Safety:** EN 60950: 2000 Safety of information technology equipment.

## Supplementary Information:

The product herewith complies with the requirements of the EMC Directive 89/336/EEC, the Low Voltage Directive 73/23/EEC and the R&TTE Directive 1999/5/EC for wired equipment. The product was tested in a typical configuration.

Tel Aviv, 14 November 2004



Haim Karshen  
VP Quality

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

# Quick Start Guide

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Installation of DXC-4 should be carried out only by an experienced technician. If you are familiar with DXC-4, use this guide to prepare the units for operation.

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## 1. Installing DXC-4

### Setting the DIP Switch

If you are working with an unbalanced E1 interface, set the bottom DIP switch to UNBAL.

### Connecting the Interfaces

1. Connect the E1/T1 uplink port.
2. Connect the link channel ports.
3. Connect the station clock port, if needed.
4. Connect an ASCII terminal or a PC running a terminal emulation software.
5. Connect the LAN management port, if needed.

### Connecting the Power

Connect the power to the DXC-4 unit.

The unit has no power switch. Operation starts when the power is applied to the rear panel power connector.

**Note** *DXC-4 is supplied with either a straight or 90° angled power connector that is used for AC power sources. For connection details, see the supplement at the end of the manual.*

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## 2. Configuring DXC-4

Configure DXC-4 to the desired operation mode via an ASCII terminal connected to the rear panel CONTROL port. Alternatively, you can manage DXC-4 over Telnet or a PC running a Web browsing application via one of the Ethernet ports.

## Starting a Terminal Session

► **To start a terminal session:**

1. Connect the terminal cable to the CONTROL connector of DXC-4.
2. Run the control terminal software.
3. Configure the terminal to the default communication parameters:  
115,200 bps, no parity, one stop bit.
4. Disable any type of flow control.

You are now ready to start a control session.

---

**Note** *The DXC-4 default user name is **su** (case-sensitive); default password is **1234**.*

---

## Configuring the Clock Source

► **To configure the system clock source:**

From the System Configuration menu, select **Source Clock** and configure the appropriate clock source by choosing **LBT from Uplink**, **Internal**, **Station Clock**, **LBT from Port** or **Automatic**.

## Configuring the Management Parameters

DXC-4 can be managed by a network management station located on the LAN connected to the unit's ETH port, or via a dedicated timeslot from the E1 link connecting the DXC-4 device with the remote device. In both cases, it is necessary to configure the host IP address, IP mask, and default gateway.

► **To configure the host parameters:**

1. From the System Configuration menu, select **Management**, followed by **Host IP from Ethernet Port** or **Host IP from Dedicated Timeslot**, in accordance with desired management mode, and configure the **host IP address**, **IP mask**, and **default gateway** parameters.
2. Reset the DXC-4 by turning it off and on, or by selecting **Reset** from the System Configuration menu.

## Mapping E1/T1 Uplink Timeslots

- **To assign E1/T1 Uplink timeslots to carry data/voice from the channels:**
  1. From the Link Parameters menu, select each of the two **Time Slot Matrix for Uplink** screens.
  2. For each timeslot of the uplink port to be reconfigured, scroll to the "Src Prt" column and type the number of the channeled port (n=1 to 4 for the 4-port version or 1 to 8 for the 8-port version) to connect this timeslot to the corresponding channeled port.
  3. Press <Tab> to scroll to the source timeslot column ("Src Ts") and type the number of the timeslot on the selected channeled port (m=1 to 31 for **E1**; m=1 to 24 for **T1**) you want to connect to the desired uplink timeslot.
  4. Press <Tab> to scroll to the Type column and type **D** or **V** to select Data or Voice to be transferred through the selected timeslot.
  5. Repeat steps 2 to 4 for all timeslots that you want to assign to carry data/voice.
  
- **To disconnect an uplink timeslot:**
  1. From the Port Parameters menu, select **Timeslots Matrix**.
  2. Scroll to the corresponding channeled port ("Src Prt" column) and choose **NC**.
  
- **To assign an uplink timeslot for management:**
  1. From the Port Parameters menu, select **Time Slot Matrix**.
  2. If management is already assigned to a certain uplink timeslot, scroll to this timeslot and choose **NC** to disconnect.
  3. Scroll to the uplink timeslot that you want to set as dedicated management timeslot ("Src Prt" column) and choose **MNG**.

The desired uplink timeslot is now dedicated to management.
  4. After assigning timeslots, press <Esc> to return to the Port Parameters menu. The changes are saved automatically.



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# Chapter 1

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## Introduction

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### 1.1 Overview

DXC-4 is a standalone unit, used for the grooming of E1/T1 digital transmission lines.

DXC-4 allows the user to select the DS0 timeslots with their signaling information, groom them together and send them over a single E1/T1 link towards a central location. This allows a telecom carrier to groom the fractional traffic from up to 8 fractional E1/T1s into a single E1/T1 uplink, instead of connecting each base transceiver station (BTS) directly to the base station controller (BSC).

The signal bit rate is 2048 kbps for an E1 link or 1544 kbps a T1 link.

DXC-4 performs E1-to-T1 or T1-to-E1 signaling conversion between the groomed channels to the uplink. The conversion is done on the signaling only. Data signals are passed transparently. A-law/ $\mu$ -law conversion is not supported.

### Product Options

DXC-4 can be ordered with 4 or 8 link channels and one or two power supplies for power supply redundancy.

**Note**

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*In this manual, the generic term DXC-4 is used when the information is applicable to all the versions. The complete designation is used only for information applicable to a specific version.*

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### Applications

*Figure 1-1* shows the 4-channel DXC-4 device in a cellular base application.

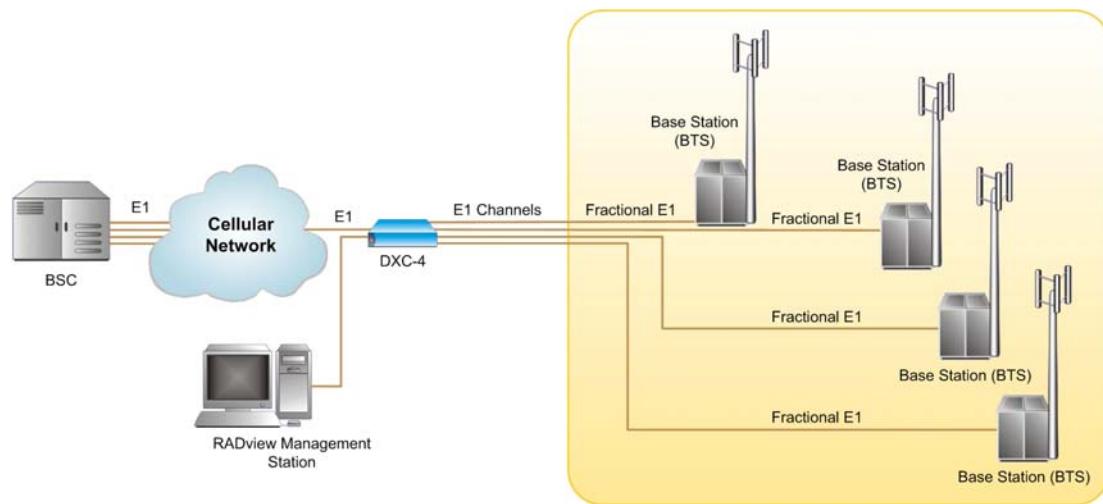


Figure 1-1. DXC-4 Base Application

## Features

### E1/T1 Grooming

DXC-4 is a standalone unit used for grooming E1/T1 digital transmission lines. It can groom DS0 timeslots including the signaling information, into a single E1/T1 link towards a central location. It can also groom traffic from up to 8 fractional E1/T1 links into a single E1/T1 uplink.

### E1/T1 Interfaces

The E1 interface meets ITU recommendations G.703, G.704, G.706, and G.732. It supports either 2 or 16 frames per multiframe, with or without CRC-4. Line coding is HDB3 or AMI. The user-selectable integral LTU ensures a range of up to 2 km (1.2 miles).

The T1 interface complies with AT&T TR-62411, ANSI T1.403 and AT&T Pub. 54016. The T1 interface supports D4 and ESF framing formats. Zero suppression over the line is selectable for either transparent, B7ZS or B8ZS. The user-selectable integral CSU ensures a range of up to 2.1 km (1.3 miles).

### Ethernet Interface

DXC-4 includes a 10/100BaseT Ethernet LAN port intended for direct connection to an Ethernet hub port, using a UTP cable wired point-to-point. The interface supports auto-negotiation.

### Timing Modes

DXC-4 can operate in the following timing modes:

- Internal: An internal oscillator provides clocking for the E1/T1 uplink and link channels.
- Station: A Station clock attached to the station input becomes the transmit clock for the uplink and link channels. It can also transmit the station clock to another DXC-4 device. The station clock rate is 2.048 Mbps for E1 links and 1.544 Mbps for T1 links.

- External (LBT): DXC-4 can take one of the received clocks from the uplink or from any of the link channels
- Automatic: Link channels are checked for synchronization and the receive clock of the first synchronized channel is used.

### Management:

Status and diagnostic information is defined, configured, and monitored using one of the following methods:

- Serial connection using a local terminal
- Ethernet connection using SNMP and RADview, RAD's client-server, or CORBA-based Network Management System
- Telnet
- Web browser
- A remote unit can also be managed inband, using a dedicated timeslot over the E1/T1 uplink.

### Diagnostics

Diagnostic capabilities include local and remote loopbacks on the E1/T1 uplink and link channels.

### Optional redundant power supply

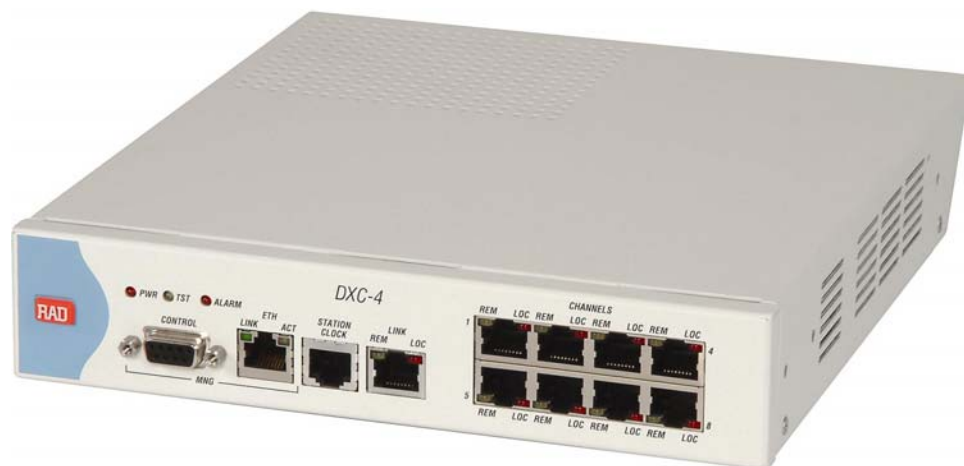
DXC-4 has a combined AC/DC power supply with an optional second power supply for redundancy.

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## 1.2 Physical Description

*Figure 1-2* shows a 3D view of the 8-channel DXC-4 unit. The 4-channel unit features only the upper row of link channels.



*Figure 1-2. DXC-4, 3D View*

All the user controls of the DXC-4 are located on the front panel. The LEDs display the status of the power, data flow for the uplink and per link channel and provide diagnostics. For a detailed description of the LED indicators, see [Chapter 3](#).

All the ports of the DXC-4 are also located on the front panel. The ports include the uplink, the link channel ports, the station clock port and two management ports. The connectors are described in detail in [Chapter 2](#).

The rear panel includes one or two power supply connectors.

The bottom part of the unit includes the DIP switch controlling the use of unbalanced E1 uplink interface. The use of this switch is described in [Chapter 2](#).

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## 1.3 Functional Description

### Functional Block Diagram

[Figure 1-3](#) shows a functional block diagram of the DXC-4.

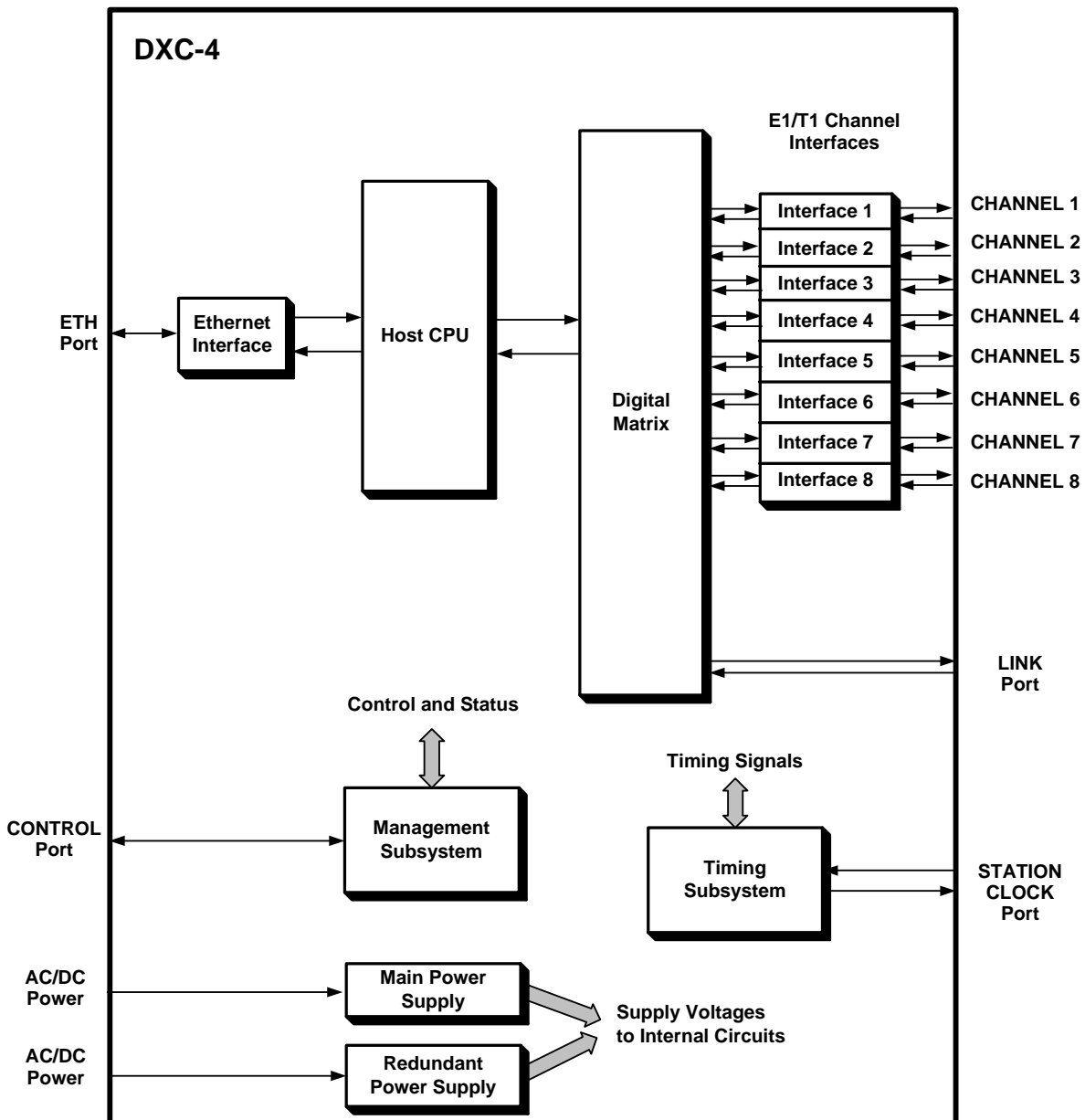


Figure 1-3. DXC-4 Functional Block Diagram

DXC-4 comprises the following main subsystems:

- Host CPU
- Digital Matrix
- E1/T1 uplink interface
- E1/T1 link channel interfaces
- Timing subsystem
- Management subsystem
- Power supply.

## Host CPU

The host CPU processes the data on the hardware configuration set by the user and configures the device in accordance. It also transmits the management via the ETH port, either to the IP network or toward the E1/T1 uplink (when operating with inband management).

## Digital Matrix

The digital matrix takes the payload from the link channels and transfers it to the E1/T1 uplink port interface.

## Uplink and Link Channels

DXC-4 can be configured to operate with the following types of uplink and link channels interfaces:

- E1 (balanced or unbalanced)
- T1

The E1/T1 operation is software-controlled via the menus. E1 unbalanced operation is controlled by the bottom-accessed DIP switch and software.

### E1 Port Interface Characteristics

The E1 interfaces, both of the uplink and the link channels, are compatible with virtually all carrier-provided E1 services and meet ITU recommendations G.703, G.704, and G.732. The E1 interface supports either 2 or 16 frames per multiframe, with or without CRC-4. Line coding is HDB3 or AMI. The user-selectable integral LTU ensures a range of up to 2 km. You can also select the frame synchronization algorithm: standard (in accordance with ITU-T Rec. G.704), in accordance with AT&T TR-62411, or a proprietary fast algorithm. The framing mode and CRC-4 are user-programmable, separately for the uplink and the link channels. Jitter performance complies with the requirements of ITU-T Rec. G.823, ETSI TBR-12 and TBR-13.

The E1 port interfaces have integral LTUs for long-haul operation, covering line attenuations up to 36 dB. For short-haul operation, you can configure the port interface to emulate a DSU (in this case, the maximum line attenuation is 10 dB).

The E1 line interface is software-selectable between the 120 $\Omega$  balanced interface and 75 $\Omega$  unbalanced interface. Setting the uplink unbalanced interface requires also DIP switch selection. Both interfaces terminate in a shielded RJ-45 connector. To convert the RJ-45 connector into a pair of BNC coax connectors, the unbalanced interface requires, in addition, an adaptor cable CBL-RJ-45/2BNC/E1 (to be ordered from RAD).

### T1 Port Interface Characteristics

The T1 interface is compatible with virtually all carrier-provided T1 services, including ASDS from AT&T, and complies with AT&T TR-62411, AT&T Pub. 54016, and ANSI T1.403.

The T1 interface supports the D4 framing formats. The uplink interface also supports the ESF format. Zero suppression over the line is selectable for either



transparent, B7ZS or B8ZS. Line coding is AMI. The nominal transmit level for the uplink is  $\pm 3V \pm 10\%$ , and the line signal is software-adjustable for the line lengths of 0 through 655 ft in accordance with AT&T CB-119. The maximum line attenuation with DSU is 10 dB; when the integral CSU option is used, the maximum line attenuation is 36 dB. The DSU operating range can be set to 0-133 ft, 134-266 ft, 267-399 ft, 400-533 ft, 534-655 ft, or FCC-68A. The CSU transmit level can be set to 0, -7.5, -15, or -22.5 dB.

The T1 links have a 100 $\Omega$  balanced interface terminated in an RJ-45 shielded connector. Jitter performance complies with the requirements of AT&T TR-62411.

## Timing Subsystem

The DXC-4 timing subsystem is based on an internal clock oscillator with  $\pm 32$  ppm accuracy.

DXC-4 can operate in the following timing modes:

**Internal:** DXC-4 local oscillator provides clock to the E1/T1 uplink, groomed channels, and the cross-connect switch.

**Station:** DXC-4 uses a station clock from its station input as a clock source for the E1/T1 uplink, groomed channels, and the cross-connect switch. It can also transmit the station clock to any other device. The station clock rate is 2.048 Mbps for E1 links and 1.544 Mbps for T1 links.

**External (LBT):** DXC-4 uses one of the received clocks from the uplink or any of the groomed channels as its system clock.

**Automatic:** DXC-4 checks the groomed channels for synchronization and uses the receive clock of the first synchronized channel as its system clock. When the selected system clock drops, DXC-4 will search for the next available source.

## Management Functions

DXC-4 has a local management subsystem that controls the operation of all of its circuits. The local management subsystem can communicate through the following ports:

- Serial asynchronous RS-232 port with DCE interface, for direct connection to a local ASCII terminal with DTE interface. This provides access to all the available configuration, diagnostics, performance and alarm monitoring functions.

The serial port rate can be set to the following data rates: 9600 bps, 19,200 bps, 38,400 bps, 57,600 bps, or 115,200 bps.

The word format is 1 start bit, 8 data bits, no parity, and one stop bit. The handshaking with the terminal is configured for full-duplex, echo off and no flow control.

You can select the codes sent for controlling the display on the terminal screen (clear screen, move cursor to screen home position, and move cursor one position to the right) in accordance with the type of terminal. The

supported terminal type is VT-100 or any terminal compatible with it. However, the user can also enter manually any required codes.

- Via the ETH port, using the SNMP protocol or Telnet
- Through a dedicated timeslot on the E1/T1 uplink.

When this option is enabled, DXC-4 can be managed by a RADview management station connected through an E1/T1 link passing through RAD equipment (for example, Megaplex or DXC units). DXC-4 supports the RAD proprietary Frame Relay management protocol only.

The supported management traffic rate for this type of connection is 64 kbps. The dedicated inband management channel uses IP communication, and the user must specify the IP address of the desired management station. The management IP packets are encapsulated in accordance with RFC 1490.

- *ConfiguRAD*, a user-friendly Web-based terminal management system serving for remote device configuration and maintenance. It is embedded into DXC-4 and provided at no extra cost. ConfiguRAD can be run from any standard Web browser.

The DXC-4 SNMP agent supports all the relevant standard MIBs, as well as the private MIBs of RAD.

## Software Updating

The DXC-4 operating software version is stored in the flash memory, and can be updated using the standard TFTP protocol. This enables remote software updating from a central location.

For additional flexibility, the flash memory can store two different software versions. The user can select, by means of the supervision terminal, which software will actually be used by DXC-4. This capability provides additional security during remote program downloading, as the previous version can still be used in case of a failure.

DXC-4 supports both cold and warm software downloading procedures.

Cold installation is done via the Boot Manager program and supports downloading via either XMODEM or TFTP protocols.

Warm installation supports both server mode and client mode installations.

- In the server mode, the software upgrade is done using a PC or a workstation with a TFTP Client application.
- In the client mode, the software upgrade is done via the TFTP Handler menu.

## Diagnostics

Diagnostic capabilities include local and remote loopbacks on both the E1/T1 uplink and channel ports:

**Local loopback:** the output signal of the port is looped back internally, within the DXC-4 framer.

**Remote loopback:** the signal received by the port is regenerated and looped back to the transmit path of the port, and then returned toward the remote equipment.

## Power Supply

DXC-4 has either single or dual combined AC/DC power supply. The nominal rating is 100–240 VAC, 50 to 60 Hz or -48 VDC. The dual power supply provides power redundancy to the unit.

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## 1.4 Technical Specifications

<b>General</b>	<i>Function</i>	E1/T1 grooming device
	<i>Maximum Number of Groomed Links</i>	4 or 8, according to order
<b>E1 Uplink</b>	<i>Line Data Rate</i>	2.048 Mbps
	<i>Framing Options</i>	<ul style="list-style-type: none"> <li>• G.732N with or without CRC-4 protection</li> <li>• G.732S with or without CRC-4 protection</li> </ul>
	<i>Applicable Standards</i>	ITU-T Rec. G.703, G.704
	<i>Line Impedance</i>	Selectable by switch and software: <ul style="list-style-type: none"> <li>• 120Ω, balanced</li> <li>• 75Ω, unbalanced</li> </ul>
	<i>Interface Modes</i>	Software-selectable: <ul style="list-style-type: none"> <li>• Short Haul (DSU)</li> <li>• Long Haul (LTU)</li> </ul>
	<i>Signal Level</i>	
	<i>Receive</i>	See <a href="#">Table 1-1</a>
	<i>Transmit</i>	±3V (±10%), balanced ±2.37V (±10%), unbalanced
	<i>Line Code</i>	HDB3, AMI
	<i>Jitter Performance</i>	As per ITU-T G.823
	<i>Connector</i>	
<i>Balanced</i>	RJ-45, 8-pin, female	
<i>Unbalanced</i>	Using external cable adaptor (RJ-45 to BNC)	
<i>Surge protection</i>	Secondary	

*Timing* Internal accuracy:  $\pm 30$ ppm  
 Loopback timing:  $\pm 130$ ppm  
 Station timing:  $\pm 130$ ppm

Table 1-1. Receive Signal Level, E1 Uplink

Interface Mode	Balanced Interface	Unbalanced Interface
LTU mode	0 to -36 db	Disabled
DSU mode	0 to -10 db	0 to -6 db

## T1 Uplink

*Data Rate* 1.544 Mbps

*Framing Options* D4 (SF), ESF

*Applicable Standards* AT&T TR-62411, AT&T Pub. 54016, ANSI T1.403

*Line Impedance* Balanced, 100  $\Omega$

*Zero Suppression*

- Transparent (no zero suppression)
- B7ZS (AMI)
- B8ZS

*Jitter Performance* Per AT&T TR-62411

*Interface Modes* Software-selectable:

- Short Haul (DSU)
- Long Haul (CSU)

*Signal Level*

*Receive* 0 to -10 dB in DSU mode  
 0 to -36 dB in CSU mode

*Transmit* 0, -7.5, -15, -22.5 dB in CSU mode  
 $\pm 3V \pm 10\%$  soft adjustable at 0 to 655 ft in DSU mode

*Line Code* AMI

*Connector* RJ-45, 8-pin

*Surge protection* FCC 68.302

**E1 Link Channels**

<i>Nominal Line Data Rate</i>	2.048 Mbps $\pm$ 50 ppm
<i>Number of Groomed Timeslots</i>	Up to 31
<i>Framing Options</i>	G.732N, G.732S with or without CRC-4 protection in accordance with ITU-T Rec. G.704
<i>Applicable Standards</i>	ITU-T Rec. G.703, G.704, G.732
<i>Line Impedance</i>	Software-selectable: <ul style="list-style-type: none"> <li>• 120<math>\Omega</math>, balanced</li> <li>• 75<math>\Omega</math>, unbalanced</li> </ul>
<i>Interface Modes</i>	Software-selectable: <ul style="list-style-type: none"> <li>• Short Haul (DSU)</li> <li>• Long Haul (LTU)</li> </ul>
<i>Signal Level</i>	
<i>Receive</i>	0 to -15 dB in DSU mode 0 to -36 dB in LTU mode
<i>Transmit</i>	$\pm$ 3V ( $\pm$ 10%), balanced $\pm$ 2.37V ( $\pm$ 10%), unbalanced
<i>Line Code</i>	HDB3, AMI
<i>Connector</i>	RJ-45, 8-pin per channel

**T1 Link Channels**

<i>Nominal Line Data Rate</i>	1.544 Mbps
<i>Number of Groomed Timeslots</i>	Up to 24
<i>Framing</i>	D4 (SF), ESF
<i>Applicable Standards</i>	AT&T TR-62411, AT&T Pub. 54016, ANSI T1.403
<i>Line Impedance</i>	Balanced, 100 $\Omega$
<i>Interface Modes</i>	Software-selectable: Short Haul (DSU) Long Haul (CSU)

	<i>Signal Level</i>	
	<i>Receive</i>	0 to -15 dB in DSU mode 0 to -36 dB in CSU mode
	<i>Transmit</i>	0, -7.5, -15, -22.5 dB in CSU mode $\pm 3V \pm 10\%$ soft adjustable at 0 to 655 ft in DSU mode
	<i>Line Code</i>	<ul style="list-style-type: none"> <li>• Transparent (no zero suppression)</li> <li>• B7ZS (AMI)</li> <li>• B8ZS</li> </ul>
	<i>Connector</i>	RJ-45, 8-pin per channel
<b>CONTROL Serial Port for Terminal</b>	<i>Interface</i>	V.24/RS-232, asynchronous, DTE
	<i>Connector</i>	9-pin D-type female connector
	<i>Data Rate</i>	9600, 19200, 38400, 57600 or 115200 bps
	<i>Character</i>	no parity, odd or even parity
	<i>Stop Bits</i>	1, 1.5 or 2
<b>ETH Management Port</b>	<i>Interface</i>	10/100BaseT
	<i>Connector</i>	RJ-45 connector
	<i>Layer II Protocol</i>	MAC
<b>Station Clock Port</b>	<i>Format</i>	Framed/Unframed 1s G.703 compatible
	<i>Bit Rate</i>	E1: 2.048 Mbps T1: 1.544 Mbps
	<i>Line Code</i>	E1: HDB3 T1: B8ZS
	<i>Connector</i>	RJ-45, 8-pin, female
<b>Timing</b>		
	<i>Internal</i>	$\pm 30$ ppm
	<i>Loopback</i>	$\pm 130$ ppm
	<i>Station</i>	$\pm 130$ ppm
<b>Diagnostics</b>	<i>Loopbacks</i>	User-activated local and remote loopback on the E1/T1 uplink and channel ports

<b>Indicators</b>	<i>General</i>	PWR (green)
		TEST (yellow)
		ALARM (red)
	<i>E1/T1 Uplink</i>	LOC (red)
		REM (yellow)
	<i>E1/T1 Channels (per channel)</i>	LOC (red)
		REM (yellow)
	<i>ETH Management Port</i>	LINK (green)
		ACT (yellow)
	<b>Physical</b>	<i>Height</i>
<i>Width</i>		21.5 cm (8.5 in)
<i>Depth</i>		21.3 cm (8.4 in)
<i>Weight</i>		0.9 kg (2.0 lb)
<b>Power</b>	Combined AC/DC power supply with optional redundancy	
	<i>AC Voltage</i>	100 to 240 VAC ( $\pm 10\%$ ), 50 to 60 Hz, 7W
	<i>DC Voltage</i>	-48 VDC (-36 to -72 VDC), 7W
<b>Environment</b>	<i>Operating Temperature</i>	0°–50°C (32°–122°F)
	<i>Storage Temperature</i>	-20° to 70°C (-4° to 158°F)
	<i>Humidity</i>	Up to 90%, non-condensing





# Chapter 2

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## Installation and Setup

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### 2.1 Introduction

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**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.

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**Note**

*Before installing the product, review [Handling Energized Products](#) at the beginning of the manual.*

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### 2.2 Site Requirements and Prerequisites

AC-powered DXC-4 units should be installed within 1.5m (5 ft) of an easily-accessible grounded AC outlet capable of furnishing the voltage in accordance with DXC-4 nominal supply voltage.

DC-powered DXC-4 units require a -48 VDC power source, which must be adequately isolated from the main supply.

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 front of the unit for signal lines and interface cables.

The ambient operating temperature of DXC-4 is 0° to 50°C (32° to 122°F), at a relative humidity of up to 90%, non-condensing. The storage temperature is -20° to 70°C (-4° to 158°F).

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### 2.3 Package Contents

The DXC-4 package includes the following items:

- One DXC-4 unit
- Technical documentation CD-ROM
- One or two power cables with open ends
- CBL-RJ-45/2BNC/E1 adaptor cable, if unbalanced uplink interface is needed

- RM-35 rack adaptor kit (if ordered).

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## 2.4 Equipment Needed

The DXC-4 unit is designed for desktop or bench installation and is delivered as a fully assembled unit. No provisions are made for bolting the unit to a tabletop.

The following cables are needed for the DXC-4 connections:

<b>Network or user ports</b>	Standard copper cable for LAN connection
<b>Control port</b>	Straight flat cable with DB-9 connectors for the supervisory terminal connection
<b>Power inlet</b>	AC or DC cable for the power connections

*Appendix A* details pinouts of the relevant DXC-4 ports.

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## 2.5 Setting the Bottom DIP Switch

When working with the E1 interface, set the DIP switch to match the E1 connection type: balanced or unbalanced. The unit is factory set to BAL.

- To set the interface to unbalanced:
  - Set both sections of the bottom switch to UNBAL.

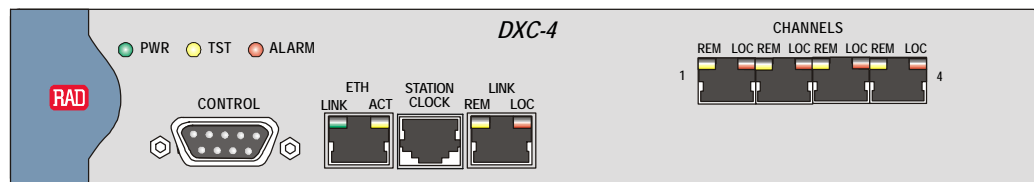
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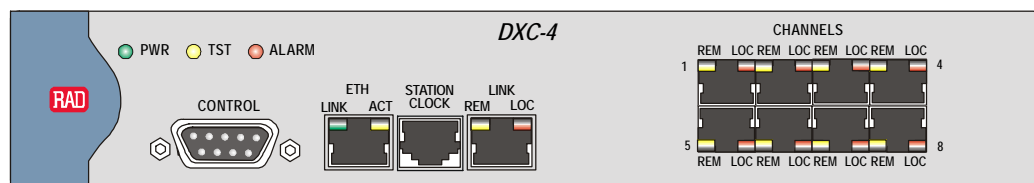
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## 2.6 Connecting the Interface Cables

*Figure 2-1* and *Figure 2-2* show the front panel of a 4-channel and 8-channel DXC-4 versions, respectively.



*Figure 2-1. DXC-4 Front Panel, 4-Channel Version*



*Figure 2-2. DXC-4 Front Panel, 8-Channel Version*

## Connecting the Uplink Port

The E1/T1 uplink port terminates in an RJ-45 balanced connector. [Appendix A](#) specifies the pinout of the E1/T1 connector. To connect an unbalanced uplink interface, RAD offers a 15-cm long adapter cable, CBL-RJ45/2BNC/E1, which has one RJ-45 plug for connection to the DXC-4 LINK connector and two BNC female connectors at the other end. The cable wiring diagram is given in [Appendix A](#).

- **To connect the E1 balanced or T1 uplink port interface:**
  - Connect the uplink to the RJ-45 connector on the DXC-4 front panel, designated LINK.
  
- **To connect the E1 unbalanced uplink port interface:**
  1. Connect the RJ-45 plug of the CBL-RJ45/2BNC/E1 adaptor cable to the DXC-4 LINK connector.
  2. Connect the coaxial cables from the user's equipment to the two BNC connectors at the other end of the adapter cable. Pay attention to correct connection:
    - Connect the cable from the user's equipment transmit output to the green (DXC-4 receive input) BNC connector
    - Connect the cable from the user's equipment receive input to the red (DXC-4 transmit out) BNC connector.

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**Note**

*To avoid possible disturbance effects, **do not leave** the remote (BNC) end of the CBL-RJ45/2BNC/E1 cable open (not connected to the remote equipment).*

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## Connecting the Link Channel Ports

The link channels terminate in RJ-45 connectors. [Appendix A](#) specifies their pinout.

- **To connect the link channel port:**
  - Connect the external channel to the RJ-45 connector of the appropriate port on the DXC-4 front panel.

## Connecting the Station Clock Port

The station clock port terminates in an RJ-45 balanced connector. [Appendix A](#) specifies the pinout of the station clock connector.

- **To connect the station clock port interface:**
  - Connect the clock source device to the RJ-45 connector on the DXC-4 front panel, designated STATION CLOCK.

## Connecting the ETH Management Port

DXC-4 can be managed by a network management station, which is located on the LAN connected to the unit's ETH port. [Appendix A](#) specifies the pinout of the ETH port connector.

- **To connect the ETH management port:**
  - Use a standard (station) cable wired point-to-point for direct connection to an Ethernet hub port.
  - Use a crossed cable for connection to another station port, such as a PC.

## Connecting the ASCII Terminal

The front panel CONTROL DCE supervisory port has a 9-pin D-type female connector with RS-232 interface. The DCE interface enables direct connection to terminals and management stations.

The DXC-4 control port terminates in an RS-232 connector. [Appendix A](#) specifies its pinout.

- **To connect the ASCII terminal directly to the CONTROL port:**
  1. Connect the cable to the RS-232 connector, designated CONTROL.
  2. Connect the other side of the cable to the ASCII terminal, or PC running a terminal emulation software.

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## 2.7 Connecting the Power

**Note** *Before installing the product, review [Handling Energized Products at the beginning of the manual](#).*

The DXC-4 power inlet can accept either 100 to 240 VAC or -36 to -72 VDC without changing any settings.

**Note** *DXC-4 is supplied with either a straight or 90° angled power connector that is used for AC or DC power sources. For connection details, see also the DC power supply connection supplement.*

- **To connect DXC-4 to an AC power source:**
  1. Connect an appropriate approved 3-prong AC power connector to the open-end cable provided with the unit in the following manner:
    - Brown wire – Phase
    - Blue wire – Neutral
    - Yellow/Green wire – Protective earth.
  2. Connect the resulting power cable to the power inlet on the DXC-4 rear panel.

3. Connect the other end of the cable to the power source.

The unit turns on automatically upon connection to the mains.

► **To connect DXC-4 to a DC power source:**

1. Locate and turn off the circuit breaker that supplies the DC branch circuit.
2. Connect the power cable to the power inlet on the DXC-4 rear panel.
3. Connect the wires to the DC power source in the following order:
  - Connect the yellow/green wire to the protective earth bus.
  - Connect the brown wire to the positive (usually earthed) pole.
  - Connect the blue wire to the negative pole.
4. Switch on the DC power to the branch circuit.



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**Before switching on this unit and connecting or disconnecting any other cable, the protective earth terminals of this unit must be connected to the protective ground conductor of the mains (AC or DC) power cord. If you are using an extension cord (power cable) make sure it is grounded as well.**

**Any interruption of the protective (grounding) conductor (inside or outside the instrument) or disconnecting of the protective earth terminal can make this unit dangerous. Intentional interruption is prohibited.**

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# Chapter 3

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## Operation

This chapter:

- Explains power-on and power-off procedures
- Provides a detailed description of the front panel controls and indicators and their functions
- Lists alternative methods of the product configuration, explaining ASCII terminal and Web browser management applications and illustrating management menus.

Installation procedures given in [Chapter 2](#) must be completed and checked before attempting to operate DXC-4.

For a detailed explanation of parameters on the menus, see [Chapter 4](#).

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### 3.1 Turning the DXC-4 On

► To turn DXC-4 on:

- Connect the power cord to the mains.

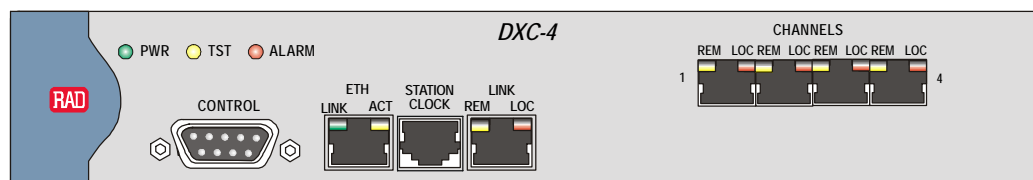
The PWR indicator lights up and remains lit as long as DXC-4 receives power.

DXC-4 requires no operator attention once installed, with the exception of occasional monitoring of front panel indicators. Intervention is only required when DXC-4 must be configured to its operational requirements, or diagnostic tests are performed.

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### 3.2 Controls and Indicators

The front panel of DXC-4 includes a series of LED indicators that show the current operating status of the unit. [Figure 3-1](#) and [Figure 3-2](#) show the front panel of a 4-channel and 8-channel DXC-4 versions, respectively. [Table 3-2](#) lists and describes the indicators.



*Figure 3-1. DXC-4 Front Panel, 4-Channel Version*

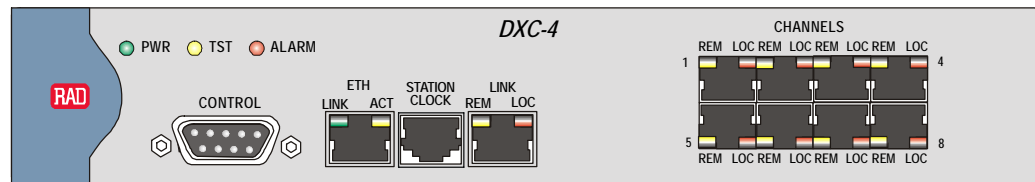


Figure 3-2. DXC-4 Front Panel, 8-Channel Version

When DXC-4 is powered on the PWR LED in the front panel lights to indicate that DXC-4 is on. [Table 3-1](#) shows the correct status of the indicators a few seconds after power-up.

Table 3-1. DXC-4 Indicator Status

Indicator	Status
PWR	On
TST	Off
ALARM	Off
LINK – LOC, LINK – REM	Off
CHANNELS – LOC, CHANNELS – REM	Off

**Note**

A blinking PWR indicator in a DXC-4 with dual power supply indicates that the main power supply is faulty, and the device is operating from the redundant one.

If the above LED indications do not appear following the initial power turn-on, refer to [Chapter 5](#) for the diagnostic test instructions.

Table 3-2. DXC-4 LEDs

Name	Function
PWR (green)	ON – Power supply is ON Blinking – One of the power supplies is out of order
TST (yellow)	ON – A local or remote loopback test is active on one of the DXC-4 ports
ALARM (red)	ON – An alarm enters the buffer of DXC-4
LINK – LOC (red)	ON – Local uplink is not synchronized
LINK – REM (yellow)	ON – Remote uplink is not synchronized
ETH – LINK (green)	ON – 10/100BaseT link is established
ETH – ACT (yellow)	ON – Activity is present on the management link
CHANNELS – LOC (red)	ON – Local uplink is not synchronized
CHANNELS – REM (yellow)	ON – Remote uplink is not synchronized



### 3.3 Default Settings

*Table 3-3* lists the default settings of the DXC-4 configuration parameters.

*Table 3-3. DXC-4 Default Settings*

Parameter	Parameter	Default Value
Source Clock		LBT from Uplink
Control Port	Set Baud Rate	115200 bps
	Stop Bits	1
	Parity	None
	Timeout (minutes)	10
Uplink Port Type		E1
E1 Uplink Parameters	Frame	G.732S
	Restoration Time	1 SECOND (FAST)
	Interface Type	DSU
	Idle Code	7F
	Line Code	HDB3
	Balanced	Yes
	Out of service code	7F
	Time slot Matrix for Uplink E1	See <i>Default E1 Timeslot Matrix</i> figures under <i>Mapping E1 Uplink Timeslots</i> in <i>Chapter 4</i>
T1 Uplink Parameters	Frame	SF (D4)
	Code	B8ZS
	Interface Type	CSU
	Idle Code	7F
	Mask	0 dB
	Sync	1 Second (Fast)
	Out of service code	7F
	Time slot Matrix for Uplink T1	See <i>Default T1 Timeslot Matrix</i> figures under <i>Mapping T1 Uplink Timeslots</i> in <i>Chapter 4</i>
Link Channel Type		E1

Parameter	Parameter	Default Value
<b>E1 Link Channel Parameters</b>	Update channel number	Port 1
	Frame	G.732S
	Restoration Time	1 SECOND (FAST)
	Interface Type	DSU
	Line Code	HDB3
	Balanced	Yes
	Idle Code	7F
	Out of service code	7F
<b>T1 Link Channel Parameters</b>	Update channel number	Port 1
	Frame	SF (D4)
	Code	B8ZS
	Interface Type	CSU
	Mask	0 dB
	Sync	1 Second (Fast)
	Idle Code	7F
	Out of service code	7F

### 3.4 Configuration Alternatives

After installation, there are no special operating procedures for DXC-4. Once it is powered up, the unit operates automatically. The unit operational status can be monitored constantly.

If required, DXC-4 can be reconfigured. Both the DXC-4 configuration and monitoring operations are performed locally from an ASCII terminal connected to the control port or from a PC running a Web browser.

The following functions are supported by the DXC-4 management software:

- Viewing system information
- Modifying configuration and mode of operation, including setting system default values and resetting the unit
- Monitoring DXC-4 performance
- Initiating connectivity tests
- Upgrading software.

## Working with a Terminal

DXC-4 includes a V.24/RS-232 asynchronous DTE 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.

The DXC-4 control port can be configured to communicate at the following rates: 9.6, 19.2, 38.4, 57.6 or 115.2 kbps.

The word format consists of 1, 1.5, or 2 stop bits and 8 data bits; parity can be odd, even or disabled.

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

1. Make sure all DXC-4 cables and connectors are properly connected.
2. Connect DXC-4 to a PC equipped with an ASCII terminal emulation application (for example, Windows Hyper Terminal or Procomm).
3. Turn on the control terminal PC and set its port parameters to 115,200 baud, 8 bits/character, 1 stop bit, no parity.
4. Set the terminal emulator to ANSI VT100 emulation (for an optimal view of system menus).
5. When the initialization and self-test are over, user name and password entry fields are displayed.

### Login

To prevent unauthorized modification of the operating parameters, DXC-4 supports two access levels: .

- A **superuser** can perform all the activities supported by the DXC-4 management facility, including defining new users.
- A **user** has access rights (**full control** or **read only**) defined by the superuser. Users are not allowed to create new users.

---

**Note** *It is recommended to change default passwords to prevent unauthorized access to the unit.*

---

► **To enter as a superuser:**

1. Enter **su** for user name.
2. Enter **1234** for password.

This allows you to configure all the parameters of DXC-4, and to change the *su* and *user* passwords.

► **To enter as a user:**

1. Enter **user** for user name.
2. Enter **1234** for password.

## Choosing Options

► To choose an option:

- Type the number corresponding to the option, and press **<Enter>**.  
DXC-4 updates its database with a new value or displays a new menu for the selected option.

---

**Notes**

- *All the changes are updated automatically except for the IP parameters.*
  - *When a menu option has only two values, typing the option number and pressing **<Enter>** will toggle between the available values.*
- 

## Navigating Data Forms

Some of the DXC-4 management software screens are data forms, which are bigger than regular menus and require scrolling to navigate between parameters. For example, the Inventory screen or Manager List menu are considered data forms.

Use the following keys (case-sensitive) for the data form navigation:

- **L** – scroll left, **Left Arrow** – move left
- **R** – scroll right, **Right Arrow** – move right
- **U** – move up
- **D** – move down
- **<Tab>** – select next changeable cell
- **S<row number>, <col number>** - select cell.

---

**Note**

*You can display these navigation keys by typing **<?>** from a data form.*

---

## Exiting the Control Session

Type **⌘** to exit the terminal control session at any time from any management menu.

## 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 diagnostic tests on the DXC-4 units.

### Web Browser Requirements

The following Web browsers can be used to access the DXC-4 supervision utility from any location that enables access to the DXC-4 using Internet protocols.

- Internet Explorer 6.0, running on Windows™ 98, Windows™ 2000, Windows™ XP
- Netscape Communicator 7.1, running on Windows™ NT or Unix.

## Login

► To login via Web browser:

1. Connect one of the DXC-4 Ethernet ports to the LAN.
2. Open the Web browser.
3. Enter the IP address of the DXC-4 in the address field of the browser in the following format: **http://IP address'** and then press **<Enter>** to command the browser to connect ('IP address' stands for the actual DXC-4 IP address which has to be assigned via an ASCII terminal). The login window is displayed:

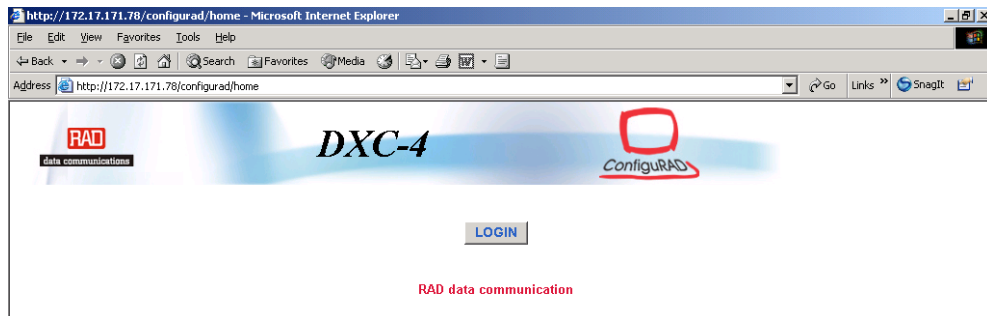


Figure 3-3. Web Browser Access, Typical Log-in Window

4. After the opening window is displayed click **LOGIN**. The user name and password window is displayed:

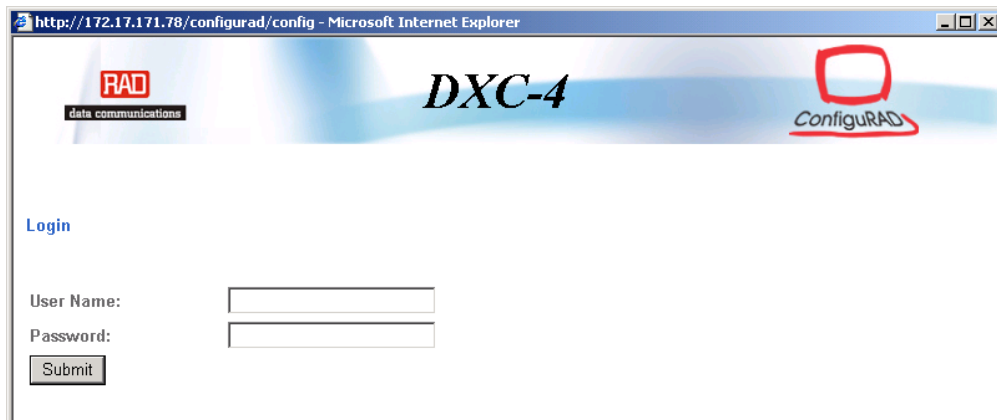


Figure 3-4. Username and Password Entry Window

5. In the Password Entry window (Figure 3-4), enter your user name (**su**) and password (**1234**). The Main menu is displayed:

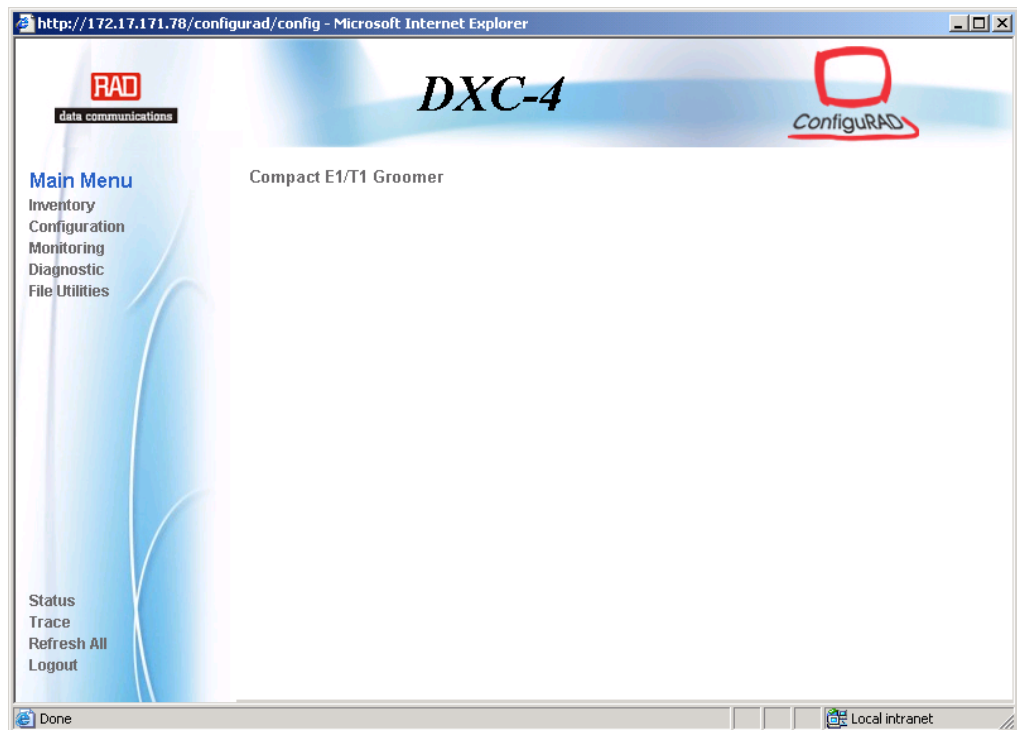


Figure 3-5. Main Menu Window

### Notes

- It is recommended to change default passwords to prevent unauthorized access to the unit.
- DXC-4 allows up to six management sessions to be active at a time. This includes up to five network sessions (Telnet or ConfiguRAD) and one ASCII terminal session.
- If no user input is detected for 5 minutes during ConfiguRAD session, DXC-4 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 DXC-4 units.

At the left-hand bottom corner ConfiguRAD provides some auxiliary management tools:

- Status – shows the number of users currently managing the DXC-4 device
- Trace – opens an additional pane for system messages, progress indicators (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 is displayed, select a value from the drop-down box or enter it in a text box.

## Working with RADview

To manage DXC-4 using RADview, refer to the *RADview/TDM DXC-4 User's Manual*.

---

---

### 3.5 Turning the DXC-4 Off

- To power off the DXC-4:
  - Remove the power cord from the power source.





# Chapter 4

---

## Configuration

This chapter illustrates the configuration DXC-4 screens and explains their parameters. The menu tree of the DXC-4 management software is shown in the following *Figure 4-1*.

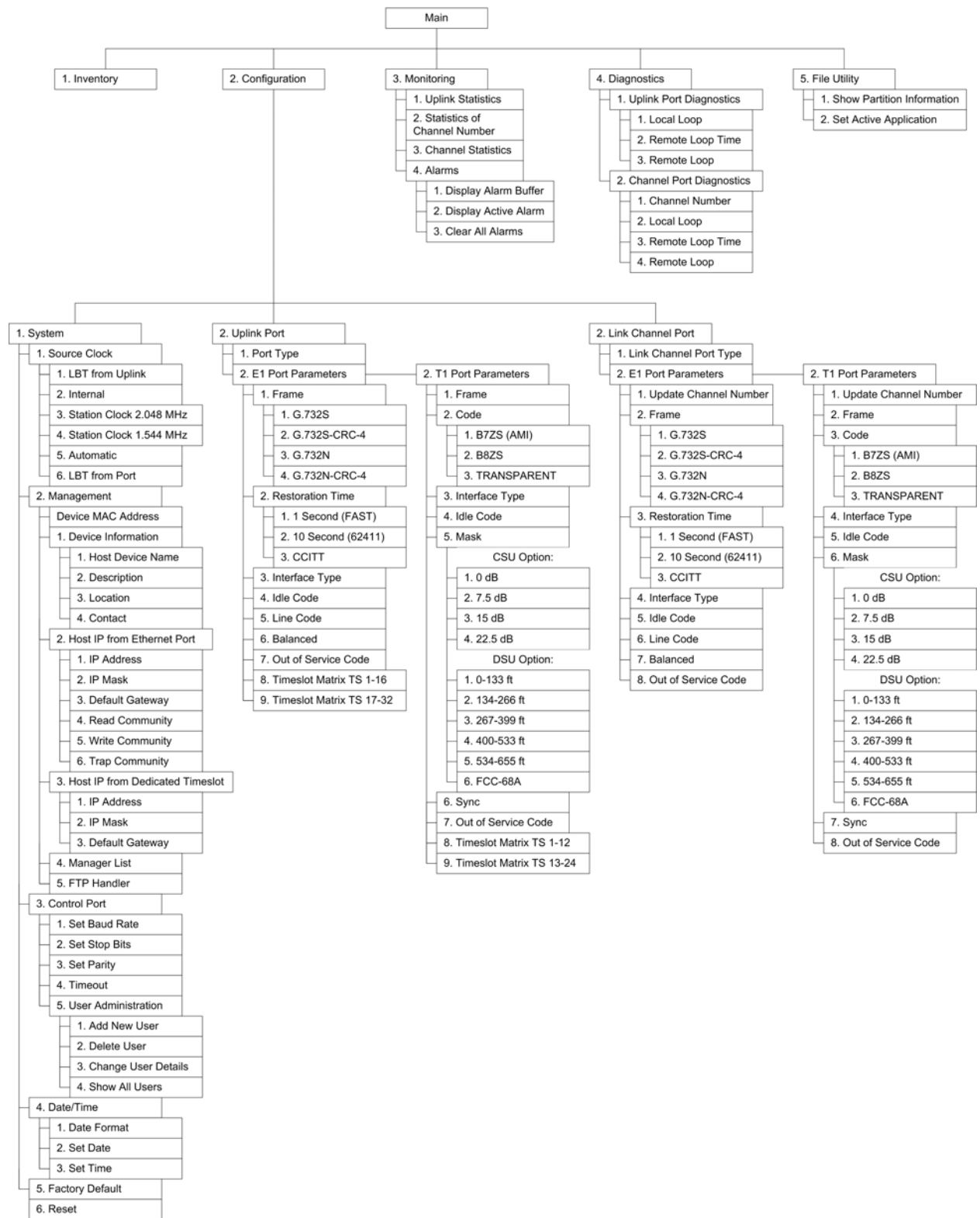


Figure 4-1. DXC-4 Menu Tree

## 4.1 Configuring DXC-4 for Management

In order to enable SNMP, Telnet or Web-based management, you must define the DXC-4 internal SNMP agent parameters. Also you can enter additional information about your DXC-4, such as contact person, unit location etc.

**Note**

*The new SNMP parameters of DXC-4 agent take effect only after the unit is reset.*

### Configuring Control Port Parameters

DXC-4 embedded software enables you to configure the CONTROL port parameters.

➤ **To access the Control Port menu:**

- From the Main > Configuration > System menu, select **Control Port**.

The Control Port menu appears (see *Figure 4-2*).

```

                                DXC-4 ( 4 PORTS )
Control Port

1. Set Baud Rate (bps)           > (115200 bps)
2. Stop Bits                     > (1 Stop Bit)
3. Parity                        > (None parity)
4. Timeout (minutes) [3 - 10]   ... (10)
5. User Administration           >

>

Configure the Serial Port parameters

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

```

*Figure 4-2. Control Port Menu*

### Changing the Control Port Data Rate

➤ **To configure the control port data rate:**

1. From the Control Port menu, select **Set Baud Rate**.

The Set Baud Rate menu appears.

2. Select the DXC-4 serial control port rate by typing the number corresponding to the desired value, and press **<Enter>**.

**Note**

*It is also necessary to change the rate on the HyperTerminal accordingly.*

The display returns to the Control Port menu. The changes are saved automatically.

## Changing the Number of Stop Bits

- To select the number of stop bits:
  - From the Control Port menu, select **Stop Bits** to set the number of stop bits to **1**, **1.5** or **2**.

The display is refreshed and a new value appears.

## Selecting the Parity

- To select the parity:
  1. From the Control Port menu, choose **Parity**.

The Parity menu appears.

2. Select appropriate parity by choosing **No Parity**, **Odd parity**, or **Even Parity**.

The Control Port menu appears. The changes are saved automatically.

## Selecting the Timeout

- To configure the security timeout:
  - From the Control Port menu, select **Timeout** to configure the timeout (idle disconnect time): **3** to **10 MIN**. Type the selected value and press Enter.

The display is refreshed and a new value appears. The change is saved automatically.

## Configuring Management Parameters

- To access the Management menu:

From the Main > Configuration > System menu, select **Management**.

The Management menu appears:

```

                                DXC-4 (4 PORTS)
Management
Device Mac Address                ... (00.20.D2.21.42.2A)
Device Information                 >
Host IP from Ethernet Port        >
Host IP from Dedicated Timeslot >
Manager List                       [ ]>
TFTP Handler                       >

Configure all parameters required for the product management via SNMP

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

```

Figure 4-3. Management Menu

## Entering Device Information

The Device Information menu allows you to assign a name to DXC-4, give description to the unit, define its location and contact person. These entries may include up to 20 characters.

► **To enter device information:**

1. From the Management menu, select **Device Information**.

The Device Information menu appears (see [Figure 4-4](#)). The screen also displays the MAC address of the DXC-4 device.

2. From the Device Information menu, select **Host Device Name** and enter a name of the unit; select **Description** and enter a description of the unit; select **Location** and enter description of the DXC-4 location; select **Contact** and enter the name of a contact person.

```

                                DXC-4 (4 ports)
Device Information
Host Device Name          ... (DXC-4)
Description               ... (DXC-4)
Location                  ... (Location of this device)
Contact                   ... (Name of contact person)

>

Standard device information

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

```

*Figure 4-4. Device Information Menu*

## Configuring the Host Parameters

DXC-4 can be managed by a network management station, which is located on the LAN connected to the unit's ETH port. In order to establish a proper connection, it is necessary to configure the following: host IP address, IP mask, default gateway, the unit's trap, read and write communities.

► **To define the IP parameters:**

1. From the Management menu, select **Host IP from Ethernet Port**.

The Host IP from Ethernet Port menu appears (see [Figure 4-5](#)).

2. From the Host IP menu, perform the following:
  - Select **IP Address** to define the host IP address.
  - Select **IP Mask** to define the IP mask.
  - Select **Default Gateway** to set the default gateway IP address.
  - 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 DXC-4 will send traps.
3. Reset the DXC-4 by turning it off and on, or by selecting **Reset** from the System Configuration menu.

```

                                DXC-4 (4 ports)
Host IP from Ethernet Port
TEST

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)

>
Management interface parameters

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

Figure 4-5. Host IP from Ethernet Port Menu

A remote DXC-4 without ETH management port can be also managed via a dedicated timeslot from the E1 link connecting the two DXC-4 devices. The dedicated timeslot for management is selected as described in [Mapping E1 Uplink Timeslots](#) on page 4-14. In order to establish this type of management connection, it is necessary to configure the host IP address, IP mask, and the default gateway.

- **To define the IP parameters for dedicated timeslot management:**
  1. From the Management menu, select **Host IP from Dedicated Timeslot**.
    - The Host IP from Dedicated Timeslot menu appears (see [Figure 4-6](#)).
  2. From this menu, perform the following:
    - Select **IP Address** to define the host IP address.
    - Select **IP Mask** to define the IP mask.
    - Select **Host Default Gateway** to set the default gateway IP address.
  3. Reset the DXC-4 by turning it off and on or by selecting **Reset** from the System Configuration menu.

```

                                DXC-4 (4 ports)
Host IP from Dedicated Timeslot

    Remote IP
1. IP Address                    ... (0.0.0.0)
2. IP Mask                      ... (0.0.0.0)
3. Default Gateway              ... (0.0.0.0)

>

Dedicate TS Management interfaces available on the system

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

```

Figure 4-6. Host IP from Dedicated Timeslot Menu

## Configuring the Network Managers

You can define or modify the network management stations to which the SNMP agent of DXC-4 will send traps. Up to ten managers can be defined.

► **To configure the network managers:**

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

The Manager List menu appears:

```

                                DXC-4 (4 ports)
Manager List
TEST

    Managers ID      IP Address
1                   0.0.0.0
2                   0.0.0.0
3                   0.0.0.0
4                   0.0.0.0
5                   0.0.0.0
6                   0.0.0.0

1. Change cell      ... (0.0.0.0)

>

10 managers may be defined
ESC-prev.menu; !-main menu; &-exit;  ?-help                                1 user(s)

```

Figure 4-7. Manager List Menu

2. From the Manager List menu, select a management station. Press **u** to scroll up and **d** to scroll down.
3. Press **1** followed by **<Enter>** to change the address if needed and enter a new IP address for the selected management station.
4. Repeat step 2 and step 3 to define additional management stations.
5. Reset the DXC-4.

## 4.2 Configuring DXC-4 for Operation

The recommended configuration procedure for DXC-4 includes the following stages:

1. Configuring the clock source
2. Configuring the E1 Uplink Port Interface
3. Configuring the T1 Uplink Port Interface
4. Configuring the Link Channels.

### Main Menu

All configuration screens of the DXC-4 management software are accessed via the Main menu. The Main menu includes the following options:

**Inventory** – displays information on the functional blocks of the unit

**Configuration** – defines configuration parameters for the DXC-4 system.

**Monitoring** – monitors system performance

**Diagnostics** – initiates diagnostic tests

**File Utilities** – manages new software transfers.

For the user's convenience, parameters that are mandatory for configuration, such as IP settings of the DXC-4 host or forwarding mode, are given in the Quick Start menu (Main menu > Configuration > Quick Setup). This menu is explained in the Quick Start Guide at the beginning of the manual, and the menu parameters are explained in the relevant sections of the configuration chapter.

► **To display the System Configuration menu:**

- From the Main > Configuration menu, select **System**.

The System Configuration menu appears:

```

                                DXC-4 ( 4 PORTS )
System
Source Clock  >(LBT from Uplink)
Management    >
Control Port  >
Date/Time     >
Factory Default
Reset

>
Configuration of the System Objects

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

```

Figure 4-8. System Configuration Menu



## Configuring the Clock Source

The DXC-4 device supports manual and automatic clock modes. For an explanation of clock modes, see [Chapter 1](#).

► **To configure the system clock source:**

1. From the Main > Configuration > System menu, select **Source Clock**.

The Clock Source menu appears:

```

                                     DXC-4
Source Clock                         (Internal)
-----
1. LBT from Uplink
2. Internal
3. Station Clock 2.048Mhz
4. Station Clock 1.544Mhz
5. Automatic
6. LBT from port - 1
7. LBT from port - 2
8. LBT from port - 3
9. LBT from port - 4
>
Configure the system/subsystem source clock
ESC-prev.menu; !-main menu; &-exit;                               1 user(s)

```

*Figure 4-9. Source Clock Menu*

2. From the Clock Source menu, select the appropriate clock source by choosing **LBT from Uplink**, **Internal**, **Station Clock**, **LBT from port**, or **Automatic**.

The System Configuration menu appears. The changes are saved automatically.

## Configuring the E1 Uplink Port Interface

When DXC-4 is working with the E1 data flows, you can configure the following parameters:

- Selecting framing mode
  - G732N – Timeslot 0 contains sync word
  - G732S transparent – 16 frames per multiframe, timeslot 16 is passed transparently.
- Enabling generation and checking of check bits for the frames transmitted on the E1 port (as per CRC-4 polynomial specified by ITU G.704).
- Selecting time required for the E1 port to return to normal operation after sync loss:
  - CCITT – As per requirements of ITU-T Rec.G.732
  - Fast – After 1 sec
  - 62411 – As per requirements of AT&T TR-62411 (after 10 sec).

- Selecting the out-of-service code and a code transmitted to fill unused timeslots in the E1 frames
- Selecting the interface type
- Selecting the line code
- Selecting the line impedance
- Mapping E1 timeslots – Assigning each timeslot to carry user’s data, voice, idle code or management bits

The E1 port configuration is performed via the Port Parameters menu.

► **To configure the E1 port type and parameters:**

1. From the Main > Configuration menu select **Uplink Port**.

The following screen appears:

```

                                DXC-4 ( 4 ports )
Uplink port

1. Port type [E1,T1]                (E1)
2. Port parameters                    >

>
Configuration of the Uplink port
ESC-prev.menu; !-main menu; &-exit;                1 user(s)

```

*Figure 4-10. Uplink Port Menu*

2. Choose **Port type [E1,T1]** and the following screen appears:

```

                                DXC-4 ( 4 PORTS )
Port type[E1,T1] (T1)

1. E1
2. T1

Configuration of the Uplink port
ESC-prev.menu; !-main menu; &-exit;                1 user(s)

```

*Figure 4-11. Uplink Port Type Menu*

3. Select **E1** to return to the Uplink Port menu.

► **To access the Port Parameters menu:**

- From the Uplink Port menu (*Figure 4-10*), select **Port Parameters**.

The Port Parameters menu appears:

```

                                DXC-4 (4 ports)
Port Parameters

1. Frame                        > (G.732S)
2. Restoration Time            > (1 Second (Fast))
3. Interface Type [LTU, DSU]   > (DSU)
4. Idle Code                   ... (7F)
5. Line Code [AMI, HDB3]       > (HDB3)
6. Balanced [Yes, No]          > (Yes)
7. Out of Service Code        ... (7F)
8. Time slot Matrix for Uplink E1 TS 1 - 16 [] >
9. Time slot Matrix for Uplink E1 TS 17 - 31 [] >
>
ESC-prev.menu; !-main menu; &-exit;                                1 user(s)

```

Figure 4-12. E1 Port Parameters Menu

## Configuring the E1 Port Parameters

### Selecting E1 Framing Mode

► To select E1 framing mode:

1. From the Port Parameters menu, select **Frame**.

The Frame menu appears:

```

                                DXC-4 (4 ports)
Frame                            (G.732N)

1. G.732S
2. G.732S-CRC4
3. G.732N
4. G.732N-CRC4

>
Select item <1 to 4>
ESC-prev.menu; !-main menu; &-exit;                                1 user(s)

```

Figure 4-13. E1 Framing Menu

2. From the Frame menu, type 1 to 4 to select G.732N or G.732S framing mode, with or without CRC-4 option.

The display returns to the Port Parameters menu. The changes are saved automatically.

### Selecting Resynchronization Time

You can define time required for the E1 port operating in the framed mode to normal operation after loss of synchronization:

- CCITT – As per requirements of ITU-T Rec.G.732
- Fast – After 1 sec
- 62411 – As per requirements of AT&T TR-62411 (after 10 sec).

➤ **To select resynchronization time:**

1. From the Port Parameters menu, select **Restoration Time**.

The Restoration Time menu appears:

```

                                DXC-4 (4 ports)
Restoration Time (1 Second (Fast))

1. 1 Second (Fast)
2. 10 Seconds (62411)
3. CCITT
>
Select item <1 to 3>
ESC-prev.menu; !-main menu; &-exit;                                1 user(s)

```

*Figure 4-14. E1 Restoration Time Menu*

2. From the Restoration Time menu, select **CCITT** to choose CCITT mode, select **1 Second** to choose FAST mode, or select **10 Seconds** to choose 62411 mode.

The display returns to the Port Parameters menu. The changes are saved automatically.

## Selecting Interface Type

➤ **To select the interface type:**

1. From the Port Parameters menu (see [Figure 4-12](#)), select **Interface Type**. The following screen appears:

```

                                DXC-4 (4 ports)
Interface Type [LTU, DSU](LTU)

1. LTU
2. DSU
>
Select item <1 to 2>
ESC-prev.menu; !-main menu; &-exit;                                1 user(s)

```

*Figure 4-15. E1 Interface Type Menu*

2. Choose **LTU** or **DSU**.

The display returns to the Port Parameters menu. The changes are saved automatically.

## Selecting Line Code

➤ **To select the line code:**

1. From the Port Parameters menu (see [Figure 4-12](#)), select **Line Code**. The following screen appears:

```

                                DXC-4 (4 ports)
Line Code [AMI, HDB3](HDB3)

1. AMI
2. HDB3
>
Select item <1 to 2>
ESC-prev.menu; !-main menu; &-exit;                                1 user(s)

```

Figure 4-16. E1 Line Code Menu

2. Choose **HDB3** or **AMI**.

The display returns to the Port Parameters menu. The changes are saved automatically.

## Selecting Line Impedance

- To select the line impedance:

1. From the Port Parameters menu (see [Figure 4-12](#)), select **Balanced**. The following screen appears:

```

                                DXC-4 (4 ports)
Balanced [YES, NO](Yes)

1. YES
2. NO
>
Select item <1 to 2>
ESC-prev.menu; !-main menu; &-exit;                                1 user(s)

```

Figure 4-17. E1 Line Impedance Menu

2. Choose **Yes** for a balanced line or **No** for an unbalanced line.

The display returns to the Port Parameters menu. The changes are saved automatically.

### Note

*The LTU operation mode is possible only with balanced E1 interface. If you try to set the LTU mode together with unbalanced interface, DXC-4 sends an error message.*

## Selecting Idle Code and OOS Code

- To select the idle code or OOS code:

From the Port Parameters menu (see [Figure 4-12](#)), type the corresponding number and then the two characters of the code.

- Type **4** to change the Idle Code from 7F to any value from 00 to FF.
- Type **7** to change the OOS code from 7F to any value from 00 to FF.

## Mapping E1 Uplink Timeslots

When working with E1 data flows, you can assign each timeslot to carry data, voice, idle code, or management bits.

*Figure 4-18* shows a default timeslot matrix for E1 uplink timeslots 1 to 16. The matrix for timeslots 17 to 31 looks similar. The matrix column names correspond to the following:

- Lnk Ts – the uplink timeslots (1 to 16/17 to 31)
- Src Prt – the number of link channel port (1 to 4) or (1 to 8)
- Src Ts – the number of timeslot (1 to 31) on the selected link channel port. TS values range from 1 to 31 for E1 channeled links and from 1 to 24 for T1 channeled links.
- Type – Voice or Data

### Note

*Conversion between E1 uplink and T1 link channels or vice versa is possible for data only.*

```

                                DXC-4 (4 PORTS)
Time slot Matrix for Uplink E1 TS 1 - 16

  Lnk Ts   Src Prt   Src Ts   Type   Lnk Ts   Src Prt   Src Ts   Type
    1       1         1         V      9        NC        -        -
    2       1         2         V     10        NC        -        -
    3       1         3         V     11        NC        -        -
    4       1         4         V     12        NC        -        -
    5       1         5         V     13        NC        -        -
    6       1         6         V     14        NC        -        -
    7       1         7         D     15        NC        -        -
    8       NC        -         -     16        NC        -        -

  1. 1          3. 3          5. NC
  2. 2          4. 4          6. CLR T
>
Select item <1 to 6>
ESC-prev.menu; !-main menu; &-exit; ?-help                                1 user(s)

```

*Figure 4-18. Default E1 Timeslot Matrix*

➤ **To clear all the existing timeslot assignments in the matrix:**

- From the Time Slot Matrix menu, select **CLR T**.

All the existing timeslot connections, except for MNG, are cleared and set to NC.

➤ **To assign E1 Uplink timeslots to carry data from the link channels:**

1. From the Port Parameters menu, select **Time Slot Matrix**.

The Time Slot Matrix appears.

2. Place the cursor to the first timeslot of the uplink port to be configured
3. In the "Src Prt" column (type <?> to obtain help on how to scroll the screen)

- Type the number of the link channel (n=1 to 4 for the 4-port version or 1 to 8 for the 8-port version) to connect this timeslot to the corresponding link channel.

The number in the "Src Prt" (Source Port) column changes to n.

- Press <Tab> to scroll to the source timeslot column ("Src Ts").
- Type the number of the timeslot on the selected link channel (m=1 to 31) you want to connect to the desired uplink timeslot.
- Press **N** or **P** to scroll between screens displaying timeslots 1 to 8, 9 to 16, 17 to 24, and 25 to 31.

*Figure 4-19* shows the Timeslot matrix after configuring timeslot #1 of the uplink to carry data from the timeslot #21 on the link channel #2.

- Repeat steps 2 to 7 for all timeslots that you want to assign to carry data.

DXC-4 (4 PORTS)							
Time slot Matrix for Uplink E1 TS 17 - 31							
Lnk Ts	Src Prt	Src Ts	Type	Lnk Ts	Src Prt	Src Ts	Type
17	2	21	D	25	NC	-	-
18	NC	-	D	26	NC	-	-
19	NC	-	-	27	NC	-	-
20	NC	-	-	28	NC	-	-
21	NC	-	-	29	NC	-	-
22	NC	-	-	30	NC	-	-
23	NC	-	-	31	MNG	-	-
24	NC	-	-				

1. 1                    3. 3                    5. NC  
 2. 2                    4. 4                    6. CLR T

>  
 Select item <1 to 6>  
 ESC-prev.menu; !-main menu; &-exit;                    ; ?-help                    2 user(s)

*Figure 4-19. E1 Timeslot Matrix with Configured Uplink Timeslot (#1)*

➤ **To disconnect an uplink timeslot:**

- From the Port Parameters menu, select **Time Slot Matrix**.
- Scroll to the corresponding link channel ("Src Prt" column) and choose **NC**.

➤ **To assign an uplink timeslot for management:**

- From the Port Parameters menu, select **Time Slot Matrix**.
- If management is already assigned to a certain uplink timeslot, scroll to this timeslot and choose **NC** to disconnect.

Now neither of the uplink timeslots is assigned to management.

- Scroll to the uplink timeslot that you want to set as dedicated management timeslot ("Src Prt" column) and choose **MNG**.

The desired uplink timeslot is now dedicated to management.

- Once you finish assigning timeslots, press <Esc> return to the Port Parameters menu. The changes are saved automatically.

## Configuring the T1 Uplink Port Interface

When DXC-4 is working with the T1 data flows, you can configure the following parameters:

- Selecting framing mode: SF (D4) or ESF
- Selecting time required for the T1 port to return to normal operation after sync loss:
  - Fast – After 1 sec
  - 62411 – As per requirements of AT&T TR-62411 (after 10 sec).
- Selecting the out-of-service code and a code transmitted to fill unused timeslots in the T1 frames
- Selecting the interface type (CSU or DSU)
- Selecting the line attenuation (CSU) or operating range (DSU)
- Mapping T1 timeslots – Assigning each timeslot to carry user's data, voice, idle code or management bits

The T1 port configuration is performed via the Port Parameters menu.

► **To configure the T1 port type and parameters:**

1. From the Main > Configuration menu select **Uplink Port**.

The following screen appears:

```

                                DXC-4 ( 4 ports )
Uplink port
1. Port type [E1,T1]                (T1)
2. Port parameters                   >
>
Configuration of the Uplink port
ESC-prev.menu; !-main menu; &-exit;          1 user(s)
  
```

*Figure 4-20. Uplink Port Menu*

2. Choose **Port type [E1,T1]**

The following screen appears:

```

                                DXC-4 ( 4 PORTS )
Port type[E1,T1] (T1 )
1. E1
2. T1
Configuration of the Uplink port
ESC-prev.menu; !-main menu; &-exit;          11 user(s)
  
```

3. Select **T1** to return to the Uplink Port menu.



- To access the Port Parameters menu:
  - From the Uplink Port menu (*Figure 4-10*), select **Port Parameters**.

The Port Parameters menu appears:

```

                                DXC-4 (4 PORTS)
Port parameters
1. Frame [ESF, SF(D4)]           > (ESF  )
2. Code                          > (B8ZS)
3. Interface type [CSU, DSU]     > (CSU)
4. Idle Code [0 - ff]           ... (7F)
5. Mask                          > (0 - 133 ft)
6. Sync [1 Second (Fast), 10 Seconds (62411)] > (1 Second (Fast))
7. Out of Service Code          ... (7F)
8. Time slot Matrix for Uplink T1 1 - 12 [] >
9. Time slot Matrix for Uplink T1 13 - 24 [] >
>
Uplink port parameters
ESC-prev.menu; !-main menu; &-exit;                                1 user(s)
```

Figure 4-21. T1 Port Parameters Menu

## Configuring the T1 Port Parameters

### Selecting the T1 Framing Mode

- To select the T1 framing:
  1. From the Port Parameters menu, select **Frame**.

The following screen appears:

```

                                DXC-4 (4 ports)
Frame [[ESF, SF(D4)] (ESF  )
1. SF(D4)
2. ESF
>
Select item <1 to 2>
ESC-prev.menu; !-main menu; &-exit;                                1 user(s)
```

Figure 4-22. T1 Framing Menu

2. From the Frame menu, select **ESF** or **SF(D4)** to select the framing mode.

The display returns to the Port Parameters menu. The changes are saved automatically.

- To select the T1 line code:
  1. From the Port Parameters menu, select **Code**.

The following screen appears:

```

                                DXC-4 (4 ports)
Code (B8ZS)
 1. B7ZS (AMI)
 2. B8ZS
 3. TRANSPARENT

>
Select item <1 to 3>
ESC-prev.menu; !-main menu; &-exit;                                1 user(s)

```

Figure 4-23. T1 Code Menu

- From the Code menu, select **B8ZS**, **B7ZS (AMI)**, or **TRANSPARENT** code.

The display returns to the Port Parameters menu. The changes are saved automatically.

### Selecting Resynchronization Time

You can define time required for the T1 port operating in the framed mode to normal operation after loss of synchronization:

- Fast – After 1 sec
- 62411 – As per requirements of AT&T TR-62411 (after 10 sec).

#### ► To select resynchronization time:

- From the Port Parameters menu, select **Restoration Time**.

The Restoration Time menu appears:

```

                                DXC-4 (4 ports)
Restoration Time (1 Second (Fast))

 1. 1 Second (Fast)
 2. 10 Seconds (62411)

>
Select item <1 to 3>
ESC-prev.menu; !-main menu; &-exit;                                1 user(s)

```

Figure 4-24. T1 Restoration Time Menu

- From the Restoration Time menu, select **1 Second** to choose FAST mode, or select **10 Seconds** to choose 62411 mode.

The display returns to the Port Parameters menu. The changes are saved automatically.

### Selecting Interface Type

#### ► To select the interface type:

- From the Port Parameters menu ([Figure 4-21](#)), select **Interface Type**.

The following screen appears:

```

                                DXC-4 (4 ports)
Interface Type [CSU, DSU](CSU)

1. CSU
2. DSU
>
Select item <1 to 2>
ESC-prev.menu; !-main menu; &-exit;                                1 user(s)

```

Figure 4-25. T1 Interface Type Menu

2. Choose **CSU** or **DSU**.

The display returns to the Port Parameters menu. The changes are saved automatically.

### Selecting Idle Code and OOS Code

► To select the idle code or OOS code:

Type the corresponding number and then the two characters of the code.

- Type **4** to change the Idle Code from 7F to any value from 00 to FF.
- Type **7** to change the OOS code from 7F to any value from 00 to FF.

### Selecting the Mask

The T1 output transmit level must be adjusted to ensure reliable operation of the network, and for compliance with FCC Rules Part 68A. This adjustment is used to minimize the interference caused by your transmit signal to other users that transmit their signals on other pairs of the same cable. The required setting depends mainly on the length of the cable that connects between the T1 port and the first repeater down the line and is defined by your system administrator or data carrier.

► To select the nominal cable attenuation:

- From the port parameters menu ([Figure 4-21](#)), select **Mask**.

The Mask menu appears ([Figure 4-26](#)). The Mask menu depends on the interface type option selected in the Port Parameters configuration screen.

- If you are using the CSU option, select **0 db** for no attenuation, or **7.5 dB**, **15 dB**, or **22.5 dB** for the corresponding attenuation relative to the nominal transmit level.
- If you are using the DSU option, select **0-133 ft**, **134-266 ft**, **267-399 ft**, **400-533 ft**, **534-655 ft**, or **FCC-68A** for the corresponding operating range.

```

                                DXC-4 (4 ports)
Mask (0 -133 ft)

1. 0 -133 ft
2. 134-266 ft
3. 267-399 ft
4. 400-533 ft
5. 534-655 ft
6. FCC-68A

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

```

Figure 4-26. T1 Mask Menu

## Mapping T1 Uplink Timeslots

When working with T1 data flows, you can assign each timeslot to carry data, voice, idle code, or management bits.

```

                                DXC-4 (4 PORTS)
Time slot Matrix for Uplink T1 1 - 12

  Lnk Ts   Src Prt   Src Ts   Type   Lnk Ts   Src Prt   Src Ts   Type
  1         1         1         D       7         NC        -         -
  2         2         1         D       8         NC        -         -
  3         3         1         D       9         NC        -         -
  4         4         1         D      10         NC        -         -
  5         NC        -         -      11         NC        -         -
  6         NC        -         -      12         NC        -         -

1. 1
2. 2
3. 3
4. 4
5. NC
6. CLR T

>
Select item <1 to 6>
ESC-prev.menu; !-main menu; &-exit; ?-help                                1 user(s)

```

Figure 4-27. Default T1 Timeslot Matrix for Timeslots 1 to 12

Figure 4-18 shows a default timeslot matrix for T1 uplink timeslots 1 to 12. The matrix for timeslots 13 to 24 looks similar. The matrix column names correspond to the following:

- Lnk Ts – the uplink timeslots (1 to 12/13 to 24)
- Src Prt – the number of link channel (1 to 8)
- Src Ts – the number of timeslot on the selected link channel. TS values range from 1 to 31 for E1 channeled links and from 1 to 24 for T1 channeled links.
- Type – Voice or Data

**Note**

*Conversion between E1 uplink and T1 link channels or vice versa is possible for data only.*

➤ **To clear all the existing timeslot assignments in the matrix:**

- From the Time Slot Matrix menu, select **CLR T**.

All the existing timeslot connections, except for MNG, are cleared and set to NC.

➤ **To assign T1 Uplink timeslots to carry data from the link channels:**

1. From the Port Parameters menu, select **Time Slot Matrix**.

The Time Slot Matrix appears.

2. Place the cursor to the first timeslot of the uplink port to be configured, in the "Src Prt" column (type <?> to obtain help on how to scroll the screen).
3. Type the number of the link channel (n=1 to 4 for the 4-port version or 1 to 8 for the 8-port version) to connect this timeslot to the corresponding link channel.

The number in the "Src Prt" (Source Port) column changes to n.

4. Press <Tab> to scroll to the source timeslot column ("Src Ts") T
5. Type the number of the timeslot on the selected link channel (m=1 to 24) you want to connect to the desired uplink timeslot.
6. Press **N** or **P** to scroll between screens displaying timeslots 1 to 8, 9 to 16, and 17 to 24.
7. Press <Tab> to scroll to the Type column and type **D** or **V** to select Data or Voice to be transferred through the selected timeslot.

*Figure 4-28* shows the Timeslot matrix after configuring timeslot #1 of the uplink to carry data from the timeslot #21 on the link channel #2.

```

                                DXC-4 ( 4 PORTS )
Time slot Matrix for Uplink T1 13 - 24

  Lnk Ts   Src Prt   Src Ts   Type   Lnk Ts   Src Prt   Src Ts   Type
    13      1        -        D     19      NC        -        -
    14      2       21        D     20      NC        -        -
    15      3        -        D     21      NC        -        -
    16      4        -        D     22      NC        -        -
    17      NC        -        -     23      NC        -        -
    18      NC        -        -     24      MNG       -        -

1. 1          5. NC
2. 2          6. CLR T
3. 3
4. 4
>
Select item <1 to 6>
ESC-prev.menu; !-main menu; &-exit; ?-help                                1 user(s)
    
```

*Figure 4-28. T1 Timeslot Matrix with Configured Uplink Timeslot (#2)*

8. Repeat steps 2 to 3 for all timeslots that you want to assign to carry data.
- **To disconnect an uplink timeslot:**
    1. From the Port Parameters menu, select **Timeslots Matrix**.
    2. Scroll to the corresponding link channel ("Src Prt" column) and choose **NC**.
  - **To assign an uplink timeslot for management:**
    1. From the Port Parameters menu, select **Time Slot Matrix**.
    2. If management is already assigned to a certain uplink timeslot, scroll to this timeslot and choose **NC** to disconnect.

Now neither of the uplink timeslots is assigned to management.
    3. Scroll to the uplink timeslot that you want to set as dedicated management timeslot ("Src Prt" column) and choose **MNG**.

The desired uplink timeslot is now dedicated to management.
    4. Once you finish assigning timeslots, press **<Esc>** return to the Port Parameters menu. The changes are saved automatically.

## Configuring the Link Channels

- **To configure the link channel port type:**
  1. From the Main > Configuration menu select **Link Channel Port**.

The following screen appears:

```

                                DXC-4 ( 4 ports )
Link channel port

1. Link Channel Port type[E1,T1]      >  (T1)
2. Port parameters                      >

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

*Figure 4-29. Link Channel Port Menu*

2. Choose **Port type [E1,T1]**

The following screen appears:

```

                                DXC-4 ( 4 PORTS )
Link Channel Port type [E1,T1] (T1 )

1. E1
2. T1
>
Configuration of the Uplink port
ESC-prev.menu; !-main menu; &-exit;                                     1 user(s)
```

3. Select **E1** or **T1** and return to the Link Channel Port menu.

## Configuring Link Channel Port Parameters

► To configure link channel port parameters:

1. From the Link Channel Port menu Select **Port Parameters**.

The Port Parameter screens that appear for E1 and T1 channels are shown in *Figure 4-30* and *Figure 4-31*, respectively.

```

                                DXC-4 ( 4 PORTS )
Port parameters

1. Update channel number          > (Port 1)
2. Frame                          > (G.732S)
3. Restoration time               > (1 Second (Fast))
4. Interface type[L,TU,DSU]      (DSU)
5. Idle code                      ... (7F)
6. Line code[AMI,HDB3]           (HDB3)
7. Balanced[Yes,No]              (Yes)
8. Out of service code           ... (7F)
>
Link channel port parameters
ESC-prev.menu; !-main menu; &-exit;                                1 user(s)

```

*Figure 4-30. Port Parameters, E1 Link Channels*

```

                                DXC-4 ( 4 PORTS )
Port parameters

1. Update channel number          > (Port 1)
2. Frame                          > (SF (D4))
3. Code                          > (B8ZS      )
4. Interface type[CSU,DSU]      (CSU)
5. Idle code                      ... (7F)
6. Mask                          > (0 db)
7. Sync                          > (1 Second (Fast))
8. Out of service code           ... (7F)

Link channel port parameters
>
ESC-prev.menu; !-main menu; &-exit;                                1 user(s)

```

*Figure 4-31. Port Parameters, T1 Link Channels*

2. To update one or all of the link channels, select **Update Channel Number**.

The following screen appears:

```

                                DXC-4 (4 PORTS)
Update channel number          (Port 1)

1. Port 1
2. Port 2
3. Port 3
4. Port 4
5. All Ports

>
Select item <1 to 5>

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

```

Figure 4-32. Update Channel Screen

3. Choose a port (or all ports) to return to the Port Parameters menu.

► **To configure the link channels:**

- Configuring the E1 or T1 link channel is the same as configuring the E1 or T1 uplink port. Refer to the uplink port configuration procedures in the previous sections of this chapter.

---

## 4.3 Additional Tasks

This section describes additional operations available supported by the DXC-4 management software, including the following:

- Managing the user database
- Displaying the DXC-4 inventory
- Setting the system date and time
- Resetting to the default values
- Resetting the device
- Warm installing of software releases via TFTP protocol
- Exiting the control session.

### Managing the User Database

DXC-4 has an access control mechanism that allows users to operate the device at various levels.

A maximum of eight users are defined in DXC-4: four named permanent users (SUPERUSER, USER, DEBUG, AND TECH) that cannot be removed from the system, and four dynamic users that can be added or removed as necessary.

Four access locations are defined (TERMINAL, TELNET, WEB, and ALL) to allow access from specific locations as needed.



Four access levels are defined (FULL CONTROL, USER, DEBUG, AND TECH) to grant the user permission to use all or part of the unit's resources. Depending on the user's access level, various options on the screen may be enabled or disabled.

The default permanent user definitions are described in the following table:

*Table 4-1. Default Permanent User Definitions*

User Name	Password	Access Level	Access Location	Description
su (superuser)	1234	FULL CONTROL	Terminal, Telnet, Web	Can monitor, operate, and change all resources, full access to everything
user	1234	USER	Terminal, Telnet, Web	All resources monitor only, can change own password only
debug	1234	DEBUG	Terminal, Telnet, Web	For RAD technical use only
tech	1234	TECH	Terminal, Telnet, Web	All resources monitor only, can operate diagnostic loops and change own password only

A superuser administrator manages the database of the users who are allowed to operate or monitor the DXC-4 system. This allows the administrator to:

- Add a new user
- Delete an existing user
- Change a user's password
- Display the list of users.

### **Adding a New User to the Database**

DXC-4 allows you to define up to 4 dynamic users.

#### **► To add a new user:**

1. From the Main > Configuration > System > Control Port menu (see [Figure 4-2](#)), choose **User Administration**.

The User Administration menu appears:

```

                                DXC-4 (4 PORTS)
User Administration

1. Add New User
2. Enter User Name           ... ( )
3. Enter Password           ...
4. Confirm Password and Save ...

Select item <1 to 4>

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

```

Figure 4-33. User Administration Menu

- From the User Administration menu, choose **Add New User**.

The Add New User menu appears:

```

                                DXC-4 (4 PORTS)
Add New User

1. Enter User Name           ... <>
2. Permission>               <USER>
3. Access>                   <ALL>
4. Enter Password           ... <>
5. Confirm Password and Save ...

Select item <1 to 5>

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

```

Figure 4-34. Add New User Menu

- From the Add New User menu, choose **Enter User Name**, and enter a new user name.

The new user name appears.

**Note**

*User names are case-sensitive.*

- Choose **Permission** and enter the access level to be granted to the user: **FULL CONTROL, USER, DEBUG, TECH**.
- Choose **Access** and enter the access location from which the user will enter the system: **TERMINAL, TELNET, WEB, ALL**.
- Choose **Enter Password**, and enter a password for the user name.
- Choose **Confirm Password and Save**, and enter the same password again.

The new user name and password are saved.

### Deleting an Existing User from the Database

➤ To delete an existing user:

1. From the Main > Configuration > System > Control Port > User Administration menu, choose **Delete User**.

The Delete User menu appears:

```

                                DXC-4 ( 4 PORTS )
Delete User
1. Enter UserName (to delete)      ... ( )
2. Enter User Password             ...
3. Confirm Password and Delete     ...

Select item <1 to 3>

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

Figure 4-35. Delete User Menu

2. From the Delete User menu, choose **Enter User Name**, and then enter the name of the user that you intend to delete.
3. Choose **Enter User Password**, and then enter that user’s password.
4. Choose **Confirm Password and Delete**, and enter the same password again.

### Changing the User Details

The administrator is allowed to change a user’s password and access level.

➤ To change a user’s details:

1. From the User Administration menu, choose **Change User Details**.

The Change User Details menu appears:

```

                                DXC-4 ( 4 PORTS )
Change User Details
1. Enter User Name (to change)    ... ( )
2. Enter Old Password             ...
3. Change Password                ...
4. Confirm and Save Password      ...

Select item <1 to 4>

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

Figure 4-36. Change User Details Menu

2. From the Change User Details menu, choose **Enter User Name**, and then enter the name of the user whose password you intend to change
3. Choose **Enter Old Password**, and then enter the user’s old password.

4. Choose **Change Password**, and then enter a new password for the user.
5. Choose **Confirm and Save Password**, and enter the new password again.

## Displaying the User List

- To display a list of registered users:
  - From the User Administration menu, choose **Show All Users**.

The Show All Users screen appears (see [Figure 4-37](#)).

```

DXC-4 (4 PORTS)
Show All Users

User ID  UserName
  1      su
  2      badas
  3      user 1
  4      user 2
  5      user 3
  6      user 4

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

```

*Figure 4-37. Show All Users Screen*

## Displaying the DXC-4 Inventory

The DXC-4 inventory displays the HW and SW revision of the DXC-4 functional blocks.

- To display the DXC-4 inventory:
  - From the Main menu, select **Inventory**.

The Inventory screen appears:

```

DXC-4 (4 PORTS)
Inventory

Name                HW Revision  SW Revision
Main board          0.0          1.00A1
Altera -1           0.0          0.0

>

Inventory Info

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

```

*Figure 4-38. Inventory Screen*

## Setting the System Date and Time

DXC-4 embedded software enables you to update the current date and time.

► **To access the Date & Time menu:**

- From the Main > Configuration > System menu, select **Date/Time**.

The **Date & Time** menu appears (see [Figure 4-2](#)).

```

                                DXC-4 ( 4 PORTS )
Date & Time
1. Date Format          >  (Europe  dd-mm-yyyy)
2. Set Date            ... (18-05-2003)
3. Set Time           ... (15:09:00)

>

Set product date/time

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

```

*Figure 4-39. Date & Time Menu*

Select the date format and then type the date and the time of the day in the format set on the screen.

## Resetting to the Default Values

You can reset DXC-4 to its default settings. The reset to the defaults does not affect the clock source, IP address, mask, or gateway settings.

► **To reset DXC-4 to the defaults:**

1. From the Main > Configuration > System menu ([Figure 4-8](#)), select **Factory Default**.

DXC-4 displays the following message:

```
Are you sure you want to initialize
to default configuration (Y/N)?
```

2. Type **Y** to confirm the reset.

DXC-4 resets all configuration parameters, except for the clock source and Host IP from Ethernet port, to their default settings.

## Resetting the Device

You can reset the DXC-4 either by turning it off and on or by using the System Configuration menu.

► **To reset the DXC-4 device:**

1. From the Main > Configuration > System menu ([Figure 4-8](#)), select **Reset**.

DXC-4 displays the following message:

```
Are you sure you want to reset(Y/N)?
```

2. Type **Y** to confirm the reset.

The reset is performed.

## Warm Installing of Software Releases via TFTP Protocol

You can install a new software release via the File Utilities menu (see [Appendix B](#)). However, this is not suitable when you do not want to reset a DXC-4 unit. In this case you can perform hot software installation with the help of TFTP Handler menu.

### ► To install a new software release:

1. From the Main > Configuration > System > Management menu, select **TFTP Handler**.

The TFTP Handler menu appears (see [Figure 4-40](#)).

2. Select **Server IP** and type in the Server IP address.
3. Change the Retry and Total Timeout values, if necessary.

```

                                DXC-4 (4 ports)
TFTP Handler

  File Name                      ... (dxc4.img)
  Transfer Status                 ... (No Operation )
  Transfer Error                  ... (NO ERROR)
1. Command                       > (No Operation)
2. Server IP                      ... (0.0.0.0)
3. Retry Timeout(sec)[1 - 2000]  ... (1)
4. Total Timeout(sec)[1 - 2000]  ... (15)
>
SW download via TFTP protocol
ESC-prev.menu; !-main menu; &-exit;                               2 user(s)
```

*Figure 4-40. TFTP Handler Menu*

4. From the TFTP Handler menu, select **Command**. The Command menu appears (see [Figure 4-41](#)).
5. Select the type of the software download operation: without or with reset, by typing 1 or 2.

DXC-4 starts downloading the new software. The downloading progress is displayed on the TFTP Handler screen.

```
DXC-4 (4 ports)
Command
1. Software Download
2. Software Download with Reset
3. No Operation
>
Select item <1 to 3>
ESC-prev.menu; !-main menu; &-exit;                2 user(s)
```

Figure 4-41. Command Menu

**Note** Warm software upgrade can be also done from a PC or a workstation with a TFTP Client application. To do this, follow the TFTP Client application instructions.





# Chapter 5

---

## Configuring a Typical Application

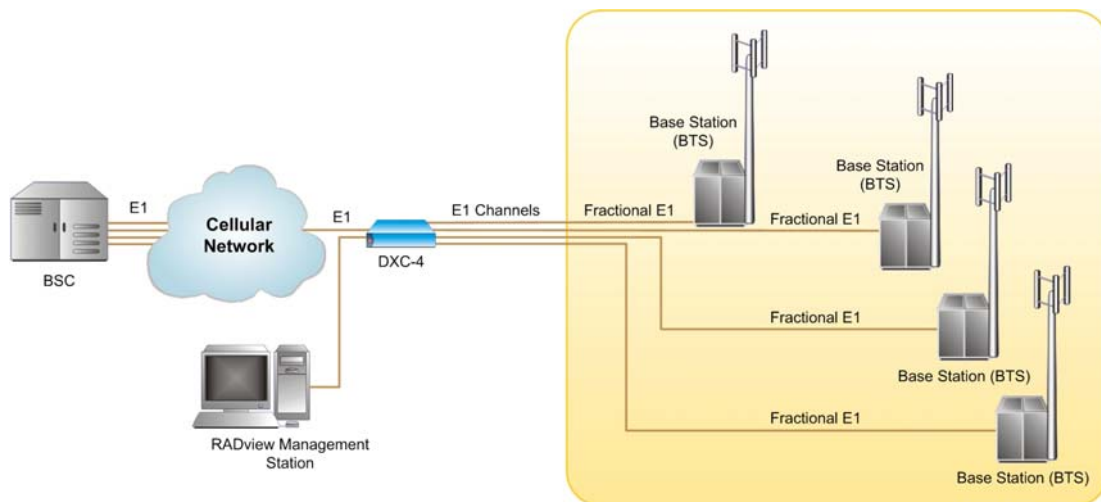
This chapter gives detailed instructions for setting up a typical application using DXC-4.

---

### 5.1 Overview

In the following application, cellular traffic on several fractional E1 channels is groomed into a single full E1 channel as shown in [Figure 5-1](#).

#### Application



*Figure 5-1. Aggregating Fractional Traffic to Fuller Trunks*

#### Configuration Sequence

To configure this application, perform the following steps:

1. Configure management parameters
2. Configure the clock source
3. Configure the E1 uplink port interface.

## 5.2 Configuring the Management Parameters

► To define the IP parameters:

1. From the Management menu, select **Host IP from Ethernet Port**.

The Host IP from Ethernet Port menu appears (see *Figure 5-2*).

From the Host IP menu, perform the following:

- Select **IP Address** to define the host IP address.
- Select **IP Mask** to define the IP mask.
- Select **Default Gateway** to set the default gateway IP address.
- 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 DXC-4 will send traps.

Reset the DXC-4 by turning it off and on, or by selecting **Reset** from the System Configuration menu.

```

                                DXC-4 (4 ports)
Host IP from Ethernet Port
TEST

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)

>
Management interface parameters

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

```

*Figure 5-2. Host IP from Ethernet Port Menu*

## 5.3 Configuring the Clock Source

► To configure the system clock source:

1. From the System Configuration menu, select **Source Clock**.

The Clock Source menu appears:

```

                                     DXC-4
Source Clock                          (Internal)
1. LBT from Uplink
2. Internal
3. Station Clock 2.048Mhz
4. Station Clock 1.544Mhz
5. Automatic
6. LBT from port - 1
7. LBT from port - 2
8. LBT from port - 3
9. LBT from port - 4
>
Configure the system/subsystem source clock
ESC-prev.menu; !-main menu; &-exit;                1 user(s)

```

Figure 5-3. Source Clock Menu

2. From the Clock Source menu, select the appropriate clock source by choosing **LBT from Uplink**, **Internal**, **Station Clock**, **LBT from port** or **Automatic**.

The System Configuration menu appears. The changes are saved automatically.

## 5.4 Mapping the Uplink Timeslots

### Configuring the E1 Uplink Port Interface

1. From the Configuration screen (Main Menu), select **Uplink Port**.

The following screen appears.

```

                                     DXC-4 (4 ports)
Uplink port
1. Port type [E1,T1]                      (E1)
2. Port parameters                          >
>
Configuration of the Uplink port
ESC-prev.menu; !-main menu; &-exit;
1 user(s)

```

2. Choose **Port type E1**
3. Access the Port Parameters menu and define:
  - E1 Framing Mode
  - Resynchronization Time
  - Interface Type, Line Impedance and Line Code
  - Idle Code and OOS Code

## Mapping E1 Uplink Timeslots

Assign each timeslot to carry data, voice, idle code, or management bits.

► **To assign E1 Uplink timeslots to carry data from the link channels:**

1. From the Port Parameters menu, select **Time Slot Matrix**.

The Time Slot Matrix appears.

2. Place the cursor to the first timeslot of the uplink port to be configured.
3. Type the number of the link channel (n=1 to 4 for the 4-port version or 1 to 8 for the 8-port version) to connect this timeslot to the corresponding link channel.

The number in the "Src Prt" (Source Port) column changes to n.

4. Press <Tab> to scroll to the source timeslot column ("Src Ts").
5. Type the number of the timeslot on the selected link channel (m=1 to 31 for E1; m=1 to 24 for T1) you want to connect to the desired uplink timeslot.
6. Press **N** or **P** to scroll between screens displaying timeslots 1 to 8, 9 to 16, 17 to 24, and 25 to 31.
7. Repeat steps 2 to 7 for all timeslots that you want to assign to carry data.

DXC-4 (4 PORTS)								STAT
Time slot Matrix for Uplink E1 TS 1 - 16								
Lnk Ts	Src Prt	Src Ts	Type	Lnk Ts	Src Prt	Src Ts	Type	
1	1	1	V	9	NC	-	-	
2	1	2	V	10	NC	-	-	
3	1	3	V	11	NC	-	-	
4	1	4	V	12	NC	-	-	
5	1	5	V	13	NC	-	-	
6	1	6	V	14	NC	-	-	
7	1	7	D	15	NC	-	-	
8	NC	-	-	16	NC	-	-	
1. 1	3. 3	5. NC						
2. 2	4. 4	6. CLR T						
>								
Select item <1 to 6>								
ESC-prev.menu; !-main menu; &-exit; ?-help								1 user(s)

Figure 5-4. E1 Timeslot Matrix 1-16

DXC-4 (4 PORTS)								STAT
Time slot Matrix for Uplink E1 TS 17 - 31								
Lnk Ts	Src Prt	Src Ts	Type	Lnk Ts	Src Prt	Src Ts	Type	
17	2	21	D	25	NC	-	-	
18	2	22	D	26	NC	-	-	
19	3	1	V	27	NC	-	-	
20	4	6	D	28	NC	-	-	
21	NC	-	-	29	NC	-	-	
22	NC	-	-	30	NC	-	-	
23	NC	-	-	31	MNG	-	-	
24	NC	-	-					
1. 1	3. 3	5. NC						
2. 2	4. 4	6. CLR T						
>								
Select item <1 to 6>								
ESC-prev.menu; !-main menu; &-exit; ; ?-help								
								2 user(s)

Figure 5-5. E1 Timeslot Matrix 17-31



# Chapter 6

---

## Monitoring and Diagnostics

This chapter describes the DXC-4 monitoring and diagnostic functions, which include:

- Statistics
- Alarms
- Diagnostic loopbacks on the E1/T1 uplink and link channels.

---

### 6.1 Monitoring Performance

DXC-4 reports statistics on E1/T1 uplink and the channels every 15 minutes up to 24 hours.

The **Monitoring** menu is shown below.

```

                                DXC-4 (4 PORTS)                                STAT
Monitoring
1. Uplink Statistics                []
2. Statistics of channel number    >  (1)
3. Channel statistics              []
4. Alarms                          >
>
All alarms statuses and statistics of the product
ESC-prev.menu; !-main menu; &-exit;                                2 user(s)
-----
```

*Figure 6-1. Monitoring Menu*

---

### 6.2 Detecting Errors

- To view the uplink statistics:
  - From the Monitoring menu, choose **Uplink Statistics** to display the uplink statistics (see [Figure 6-2](#)).

DXC-4 (4 PORTS)						STAT
Uplink Statistics						
	ES	UAS	SES	BES	LOFC	CSS
CURRENT	0	659	0	0	0	147
24 HOUR	0	8100	0	0	1	255
INTERVAL 01	0	900	0	0	1	132
v INTERVAL 02	0	900	0	0	0	132
INTERVAL 03	0	900	0	0	0	132
INTERVAL 04	0	900	0	0	0	132
INTERVAL 05	0	900	0	0	0	132
INTERVAL 06	0	900	0	0	0	132
INTERVAL 07	0	900	0	0	0	132
INTERVAL 08	0	900	0	0	0	132
>						
ESC-prev.menu; !-main menu; &-exit; ; ?-help						2 user(s)

Figure 6-2. Uplink Statistics

► To view the channel statistics:

1. From the Monitoring menu, choose **2** to display the list of channels.
2. Type the channel number.
3. From the Monitoring menu, choose **Channel Statistics**. The Channel Statistics menu appears (see [Figure 6-3](#)).

DXC-4 (4 PORTS)						STAT
Channel Statistics						
	ES	UAS	SES	BES	LOFC	CSS
CURRENT	360	0	0	0	0	0
24 HOUR	15300	0	0	0	0	1
INTERVAL 01	900	0	0	0	0	0
v INTERVAL 02	900	0	0	0	0	0
INTERVAL 03	900	0	0	0	0	0
INTERVAL 04	900	0	0	0	0	0
INTERVAL 05	900	0	0	0	0	0
INTERVAL 06	900	0	0	0	0	0
INTERVAL 07	900	0	0	0	0	0
INTERVAL 08	900	0	0	0	0	1
>						
ESC-prev.menu; !-main menu; &-exit; ; ?-help						2 user(s)

Figure 6-3. Channel Statistics



## 6.3 Handling Alarms

DXC-4 maintains an alarm buffer that can store up to 100 alarm messages.

### Alarm Messages

DXC-4 displays alarm messages on the supervision terminal. Most of the alarms are **ON/OFF**-type, meaning that the alarm is displayed on the active alarms screen only when the alarm condition is present, and is automatically removed when the condition is cleared (if the alarm is being displayed, it will disappear only when the display is refreshed by scrolling). The BPV alarm is of the **ON** type, meaning that the alarm is always displayed on the active alarms screen, and will disappear only when the display is refreshed by scrolling). An example of the Active Alarms screen is shown in *Figure 6-5*.

When an ON/OFF-type alarm changes its state from ON to OFF, it is not removed from the alarm buffer. Moreover, a new entry of this alarm is added to the alarm buffer. An example of the Alarm Buffer screen is shown in *Figure 6-6*.

*Table 6-1* lists the alarm messages displayed on the DXC-4 control terminal.

*Table 6-1. DXC-4 Alarm Messages*

Number	Terminal Message	Description	Type
1	RED ALARM	T1 port lost synchronization to incoming data stream.	ON/OFF
2	LOCAL SYNC LOSS	E1 port lost synchronization to incoming data stream.	ON/OFF
3	YELLOW ALARM	Remote equipment lost synchronization to incoming data stream to T1 port.	ON/OFF
4	REMOTE SYNC LOSS	Remote equipment lost synchronization to incoming data stream to E1 port.	ON/OFF
5	FRAME SLIP	Slip has occurred in E1/T1 port.	ON/OFF
6	AIS ALARM	AIS alarm has occurred in E1/T1 port	ON/OFF
7	AIS RED ALARM	AIS RED alarm has occurred in E1/T1 port.	ON/OFF
8	SIGNAL LOSS	Signal loss has occurred in E1/T1 port	ON/OFF
9	CRC ALARM	CRC alarm has occurred in E1 port.	ON/OFF
10	BPV ALARM	Number of coding error detected in the E1/T1 received line.	ON

## Displaying the Alarms

DXC-4 allows you to display the active alarms or the alarm buffer.

► **To access the Alarms menu:**

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

The Monitoring menu appears (see [Figure 6-1](#)).

2. From the Monitoring menu, select **Alarms**.

The Alarms Screen appears (see [Figure 6-4](#)).

```

                                DXC-4                                STAT
Alarms
1. Display alarm buffer []
2. Display active alarm []
3. Clear all alarms
>
System alarms, statuses
ESC-prev.menu; !-main menu; &-exit;                                2 user(s)

```

*Figure 6-4. Alarms Menu*

## Displaying Active Alarms

The log file specifies alarm or event name, severity (major or minor), status (ON or OFF), and time elapsed since the last DXC-4 reset.

► **To display the active alarms:**

- From the Monitoring menu, select **Alarms** and then type **2**.

The Active Alarms screen appears (see [Figure 6-5](#)).

The display of the alarms screen includes the time the alarm entered the buffer, the alarm number and name, the port on which the alarm occurred, and status (always ON).

Once the event that caused the alarm is cleared, the ALM indicator turns off. You have to exit the alarms screen and access the screen again to refresh the display and assure that the alarm was removed from it.

DXC-4 ( 4 PORTS )						STAT
Display active alarm						
	TIME	DATE	ERROR NUM	ALARM TYPE	PORT	STATE
1	14:23:01	12-02-2004	08	SIGNAL LOSS	Chnl 4	ON
2	14:23:01	12-02-2004	08	SIGNAL LOSS	Chnl 3	ON
3	14:23:01	12-02-2004	08	SIGNAL LOSS	Chnl 2	ON
4	14:23:01	12-02-2004	01	RED ALARM	UpLink	ON
5	12:46:20	12-02-2004	08	SIGNAL LOSS	Chnl 1	ON
6	12:46:20	12-02-2004	05	FRAME SLIP	UpLink	ON
7	12:46:20	12-02-2004	02	LOC SYNC LOSS	UpLink	ON
8	12:46:20	12-02-2004	08	SIGNAL LOSS	UpLink	ON
>						
ESC-prev.menu; !-main menu; &-exit; ; ?-help						2 user(s)

Figure 6-5. Active Alarm Screen

## Working With Alarm Buffer

DXC-4 maintains an alarm buffer, which can store up to 100 alarm messages.

### ► To display the alarm buffer:

- From the Monitoring menu, select **Alarms** and then type **1**.

The Alarm Buffer screen appears (see [Figure 6-5](#)).

The display includes the same entries as the Active Alarms screen, with the only difference that the status in the last column can be ON or OFF.

DXC-4 ( 4 PORTS )						STAT
Display alarm buffer						
	TIME	DATE	ERROR NUM	ALARM TYPE	PORT	STATE
1	14:23:01	12-02-2004	08	SIGNAL LOSS	Chnl 4	ON
2	14:23:01	12-02-2004	08	SIGNAL LOSS	Chnl 3	ON
3	14:23:01	12-02-2004	08	SIGNAL LOSS	Chnl 2	ON
4	14:23:01	12-02-2004	01	RED ALARM	UpLink	ON
5	12:46:20	12-02-2004	08	SIGNAL LOSS	Chnl 1	ON
6	12:46:20	12-02-2004	05	FRAME SLIP	UpLink	ON
7	12:46:20	12-02-2004	02	LOC SYNC LOSS	UpLink	ON
8	12:46:20	12-02-2004	08	SIGNAL LOSS	UpLink	ON
>						
ESC-prev.menu; !-main menu; &-exit; ; ?-help						1 user(s)

Figure 6-6. Alarm Buffer Screen

### ► To clear the alarm buffer:

- From the Alarms menu, select **Clear all alarms**.

All the log file entries are deleted from the log file.

## 6.4 Testing DXC-4

The user-controlled test functions of DXC-4 consist of the local and remote digital loopbacks on the E1/T1 uplink port and the channels. The purpose of these tests is to determine the source of a break in the data flow. The main diagnostic screen is shown below.

```

Diagnostic                                     DXC-4 (4 PORTS)                               STAT
1. Uplink Port Diagnostics                     >
2. Channels Port Diagnostics                   >
>
All self-tests
ESC-prev.menu; !-main menu; &-exit;           2 user(s)
-----

```

Figure 6-7. Diagnostics Menu

### Running the Local Loopback

The local digital loopback checks the performance of the local DXC-4 unit circuits. DXC-4 allows local loopbacks on both the uplink (see [Figure 6-8](#)) and any of the link channels (see [Figure 6-9](#)).

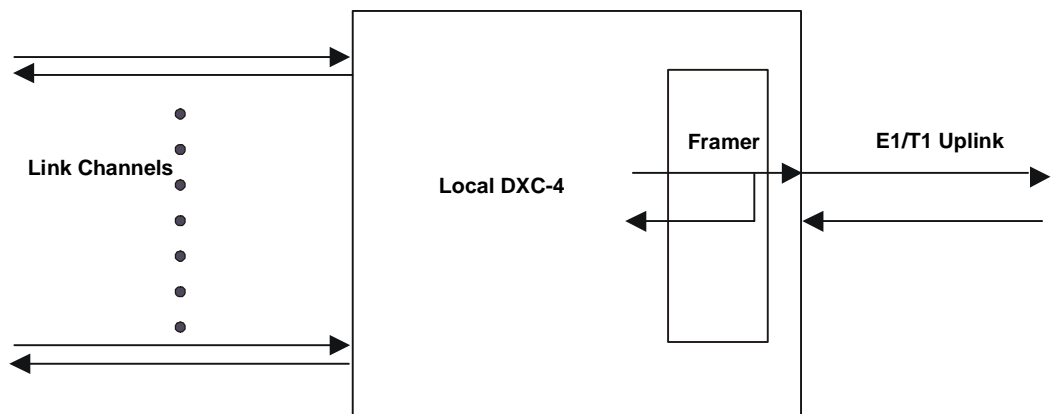


Figure 6-8. Local Loopback on the Uplink

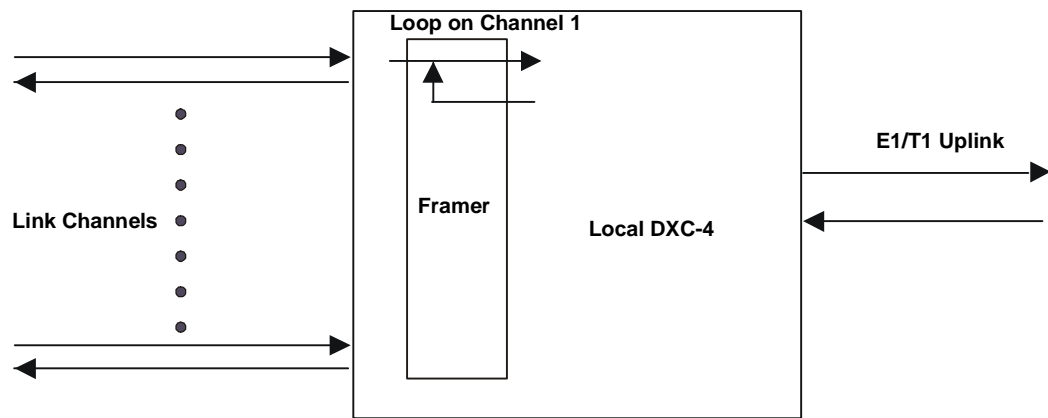


Figure 6-9. Local Loopback on Link Channel 1

► To run the local loopback on the DXC-4 Uplink:

1. From the Main menu, select Diagnostics > Uplink Diagnostics.  
The Uplink Diagnostics menu is displayed (see [Figure 6-10](#)).
2. Type **1** to activate the LLB.  
The local loopback is initiated. The TST indicator lights up.

```

                                DXC-4 ( 4 PORTS )
Uplink Port Diagnostics
Local Loop [ON,OFF]
Remote loop time [10-600 sec]
Remote Loop [ON,OFF]
>
ESC - previous menu ; ! - main menu ; & - exit terminal

```

Figure 6-10. Uplink Diagnostics Menu

► To run the local loopback on a DXC-4 Link Channel:

1. From the Main menu, select Diagnostics > Channel Port Diagnostics.  
The Channel Port Diagnostics menu is displayed (see [Figure 6-10](#)).
2. From the Channel Port Diagnostics menu, choose **1** to display the list of channels.
3. Type the channel number.
4. Type **2** to activate the LLB.  
The local loopback is initiated. The TST indicator lights up.

```

                                DXC-4 ( 4 PORTS)                                STAT
Channels Port Diagnostics
1. Channel number                >   (1)
2. Local Loop[ON,OFF]            (OFF)
3. Remote loop time(Sec)[10 - 600]  ... (10)
4. Remote loop[ON,OFF]            (OFF)

>

Channels Port Diagnostics

ESC-prev.menu; !-main menu; &-exit;                                2 user(s)
-----

```

Figure 6-11. Channel Port Diagnostics Menu

## Running the Remote Loopback

The remote loopback (RLB) checks the performance of the LIU block and the line connecting the DXC-4 uplink (see [Figure 6-12](#)) or link channel (see [Figure 6-13](#)) with the remote unit.

DXC-4 allows you to set the loopback timeout causing the RLB to deactivate automatically after the desired period of time.

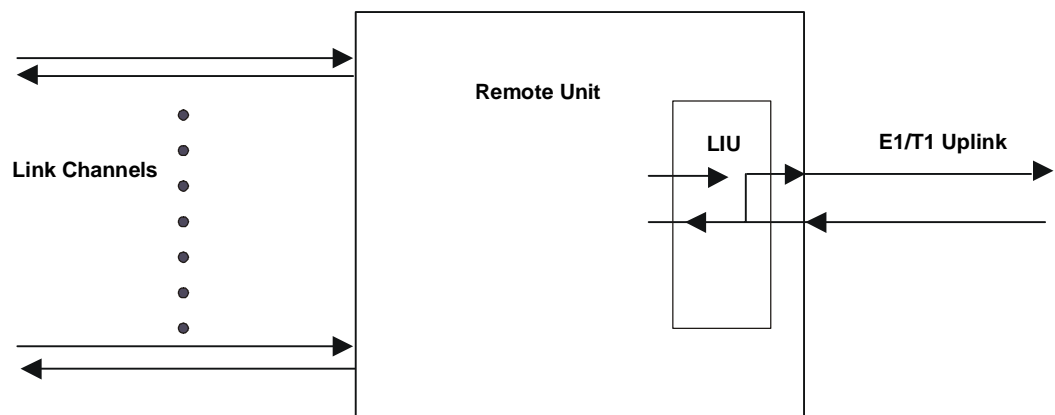


Figure 6-12. Remote Digital Loopback on the Uplink

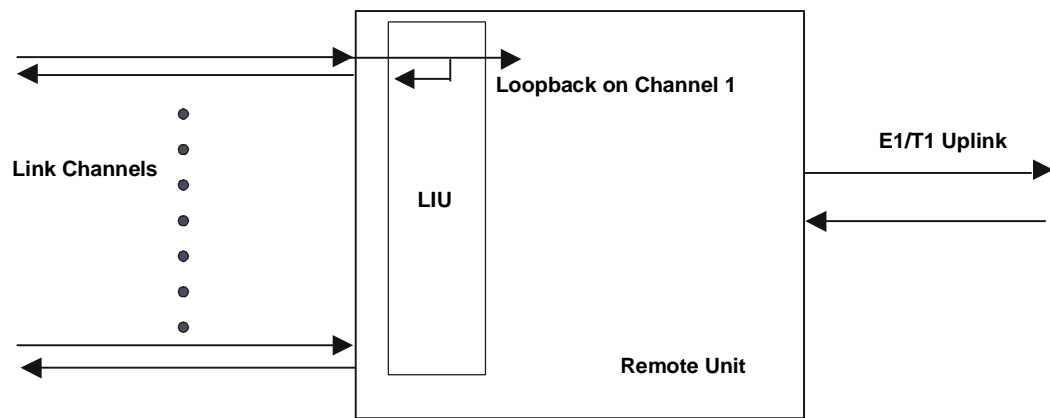


Figure 6-13. Remote Digital Loopback on Link Channel 1

- ▶ **To run the remote loopback from DXC-4 Link Channel:**
  1. From the Main menu, select **Diagnostics > Uplink Diagnostics**.  
The Uplink Diagnostics menu is displayed (see [Figure 6-10](#)).
  2. Select **Loop Timing**, if you want to change the loopback timeout settings.  
Type the Loop Timeout value in the range from 10 to 600 sec.
  3. Once you selected the loopback timeout, type **3** to activate the RLB.  
The loopback is initiated. The TST indicator lights up.
  
- ▶ **To run the remote loopback from the DXC-4 Link Channel:**
  1. From the Main menu, select **Diagnostics > Channel Port Diagnostics**.  
The Channel Port Diagnostics menu is displayed (see [Figure 6-11](#)).
  2. From the Channel Port Diagnostics menu, choose **1** to display the list of channels.
  3. Type the channel number.
  4. Select **Loop Timing**, if you want to change the loopback timeout settings.  
Type the Loop Timeout value in the range from 10 to 600 sec.
  5. Once you selected the loopback timeout, type **4** to activate the RLB.  
The loopback is initiated. The TST indicator lights up.

**Note**

*The local and remote loopbacks cannot be run simultaneously. If you try to run the local loopback while the remote one is activated, DXC-4 will send the following error message: REMOVE REMOTE LOOPBACK BEFORE RUNNING LOCAL LOOPBACK. Similarly, if you try to run the remote loopback while the local one is activated, DXC-4 will send the following error message: REMOVE LOCAL LOOPBACK BEFORE RUNNING REMOTE LOOPBACK.*

## Deactivating the Loopbacks

- To deactivate a running loopback:
    - Choose **Local Loop** to deactivate the LLB
    - Choose **Remote Loop** to deactivate the RLB.The TST indicator turns off.
- 
- 

## 6.5 Frequently Asked Questions

**Question:** Is it possible to configure the DXC-4 Uplink or Link Channels as Unframed?

**Answer:** No. The DXC-4 Uplink and Link Channels support either 2 or 16 frames per multiframe, with or without CRC-4.

**Question:** What is the User Name and Password for DXC-4?

**Answer:** For version 1.00: User Name = admin, Password = 1234. For version 1.01 and higher: User Name = su, Password = 1234

---

---

## 6.6 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](http://www.rad.com) (offices – About RAD > Worldwide Offices; distributors – Where to Buy > End Users).



# Appendix A

## Pinouts

### A.1 Ethernet, Station Clock and E1/T1 Uplink and Channel Interface Connectors

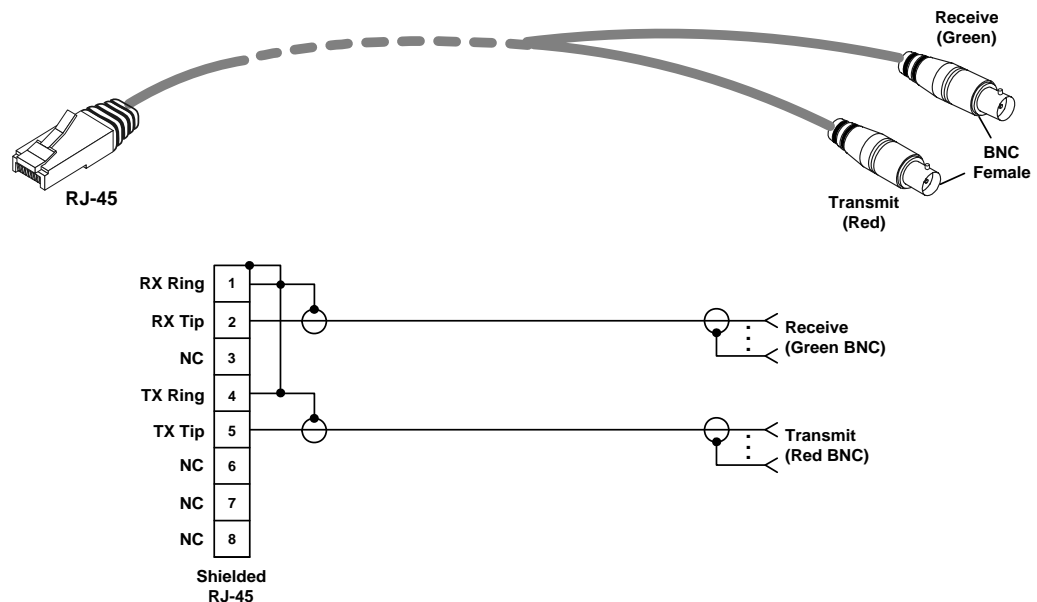
All the above interfaces terminate in an RJ-45 connector. [Table A-1](#) lists the connector pin assignment.

*Table A-1. E1/T1 Connector Pinout*

Pin	Function
4, 5	Receive (input)
1, 2	Transmit (output)

When DXC-4 is configured to operate with unbalanced E1 interfaces, it is necessary to convert each DXC-4 RJ-45 connector to the standard pair of BNC female connectors used by unbalanced E1 interfaces.

For this purpose, RAD offers a 15-cm long adapter cable, CBL-RJ45/2BNC/E1, which has one RJ-45 plug for connection to the DXC-4 LINK connector and two BNC female connectors at the other end. Cable wiring is given in [Figure A-1](#).



*Figure A-1. E1 Adapter Cable, CBL-RJ45/2BNC/E1, Wiring Diagram*

## A.2 CONTROL Connector

The control terminal interface terminates in a V.24/RS-232 9-pin D-type female connector configured as DCE. [Table A-2](#) lists the CONTROL connector pin assignments. [Table A-3](#) describes the control signal direction.

*Table A-2. CONTROL Connector Pinout*

Pin	Function
1	-
2	Receive Data (RD)
3	Transmit Data (TD)
4	-
5	Ground (GND)
6	Data Set Ready (DSR)
7	Request To Send (RTS)
8	Clear To Send (CTS)
9	-

*Table A-3. CONTROL Connector Signal Direction*

Signal	Direction
CTS	Out
DSR	Out
RTS	In
RD	Out
TD	In

# Appendix B

---

## Boot Manager and Software Downloading

---

---

### B.1 Introduction

This chapter describes the DXC-4 boot software and provides instructions for software downloading via TFTP applications.

The DXC-4 software is stored in Flash memory in two sections: boot and file system. The boot sector holds a boot program that calls up the rest of the program from the files system.

The file system has two partitions (0 and 1), each of which can hold a compressed copy of the DXC-4 application software. One copy is referred to as **active partition**, the other as **backup partition**. The active partition is decompressed and loaded into the DXC-4 RAM upon power-up. The backup file is used whenever there is a need to reload the previous software version.

---

---

### B.2 Booting DXC-4

DXC-4 boots up automatically. After power-up, no user intervention is required, except when the user wants to access the file system to modify or update the DXC-4 application software.

#### Boot Sequence

The following is a description of the boot sequence. If the system is working normally, the entire process is completed within two minutes.

1. The boot program searches for the active partition in the file system. If the file exists, the program continues.

If the file does not exist, the boot program searches for the backup file. If the backup is found, it is used instead of the active partition, and the boot process continues.

If there is no backup file, the boot waits for you to download a file via the XMODEM protocol or TFTP protocol. The received file is saved in the active partition of the file system.

2. Active and backup partitions are compressed and automatically decompressed into the RAM before execution begins.

3. After decompression, the DXC-4 software starts to execute and you can begin working.

## Boot Menu

The boot menu can be accessed by pressing <Enter> during the boot. The boot menu is shown in *Figure B-1*.

```
0 - Exit Boot-Manager
1 - Show partitions information
2 - Set the Active Application
3 - Erase a partition
4 - Download an Application by XMODEM
5 - Select an Application to run temporarily
6 - Erase all partitions
7 - Show basic hardware information
8 - Change the baud rate of the terminal.
9 - System Configuration.
a - Download an Application by TFTP
b - Reset Data-base.
Press the ESC key to go back to the Main Menu.
```

*Figure B-1. Boot Menu*

**Exit Boot Manager** exits the Boot menu and continues to boot from the current active partition.

**Show Partition Information** displays which partition is active and whether the partitions are empty or full.

**Set the Active Application** will, if both partitions are full, make the backup partition the active partition.

**Erase a Partition** will erase a partition that you select.

**Download an Application by XMODEM** will download an application to the unit via this protocol. The procedure is as follows:

1. Select the Destination Partition.

If the partition is full, you will be asked if you want to erase the previous application version.

2. Select **Y** to confirm.

3. In the terminal, enter the **Filename (prbm20.img)** of the application to download.

4. Choose **XMODEM** in the **PROTOCOL** window.

5. Select **Send**.

6. After the download is complete, the unit makes destination partition the active partition and boots from the new application.

- **Select an Application to Run Temporarily** will boot from the application on the backup partition – but only for this boot. Subsequent boots revert to the active partition.
- **Erase All Partitions** will erase both partitions.

- **Show Basic Hardware Information** will display the RAM size, flash memory size, and flash memory type.
- **Change the Baud Rate of the Terminal** will change the boot manager baud rate. You will also need to change the terminal's baud rate accordingly.
- **System Configuration** prepares the unit to receive an application download via the TFTP protocol. The procedure is as follows:
  1. Enter an **IP Address**.
  2. Enter an **IP Mask**.
  3. Enter a **Default Gateway Address**.
- **Download an Application by TFTP** downloads an application to the unit via this protocol. The procedure is as follows:
  1. Open the TFTP server.
  2. Verify that the TFTP software on the sending device is configured correctly.
  3. Press 'a' in the boot menu to start the procedure.
  4. Enter the target **Filename**.
  5. Enter the **Server IP Address**, which is the IP address of the sending device.
  6. **Select the partition for download:** the backup partition is displayed.

If the partition is full, the following message appears: **The partition is full. Do you want to erase it? (y/n)**
  7. After selecting 'y', the partition will be erased & the download process starts.

The downloaded application will be written to the backup partition. After the download is complete, the unit makes the backup partition the active partition and runs the new application.
- **Reset Database** clears the device database and reloads the factory default parameter values (see [Chapter 3](#)).

**Note**

---

*Menu items starting with hex digits (for example, a or b) are case sensitive.*

---

## Accessing the File System

The file system menu is an option that allows the user to perform basic file transfer operations. These operations are all optional. When working with the File Utility menu, configure the ASCII terminal rate to 115.2 kbps.

➤ **To access the File System menu:**

- From the Configuration menu, select **File Utility**.

The File Utility menu appears.

```

                                DXC-4 (4 PORTS)                                STAT
File Utilities

1. Show partition information []
2. Set the active application [Partition 0,Partition 1]>

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

```

Figure B-2. File Utility Menu

From the File System menu, you can:

- Display the partition information.
- Set the active partition.

➤ To display the partition information:

- From the File Utility menu, select **Show Partition Information**.

The Partition Information menu appears (see [Figure B-3](#)).

```

                                DXC-4 (4 PORTS)
Show partition information

Partition number      0                                1
Type                  Active                            Empty
File name             prbm20.img                            Empty
Version               1.00A1                                Empty
date                  15.05.2003                             Empty

>
Please select item <1 to 0>
ESC-prev.menu; !-main menu; &-exit; ?-help
1 user(s)

```

Figure B-3. Partition Information Menu

➤ To select the active partition:

1. From the File Utility menu, select **Set the Active Application**.

The Set the Active Application menu appears (see [Figure B-3](#)).

2. Select the active partition.

**Note**

*The change will be activated only after reset.*

```
DXC-4 (4 PORTS)
Set the active application [Partition 0,Partition 1]

1. Partition 0
2. Partition 1

>

Please select item <1 to 2>
ESC-prev.menu; !-main menu; &-exit;
1 user(s)
```

Figure B-4. Set the Active Application Menu

---

## B.3 Downloading the Application Software

New application software releases are distributed as **\*.img** files, which you can download via TFTP protocol, when the DXC-4 management software is already running.

### Note

*Before using TFTP, verify that the Host IP Address, Subnet Mask, and Default Gateway have been configured (Main > Configuration > System > Management > Host IP from Ethernet Port menu). If you want to change any of these parameters, you need to reset the device in order to activate the changes.*

---

## Downloading Application Files via TFTP

The application software is downloaded when DXC-4 has already completed the boot-up procedure and the management software is running.

### ► To download application file via TFTP:

1. Start a TFTP application.
2. Configure the 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
  - Type – octet.
3. Select a local **dxc4.img** file to download.

4. Enter the DXC-4 IP address.
5. Start downloading.

DXC-4 automatically erases the backup partition (it takes about 25 seconds). Once the downloading is completed, DXC-4 saves the new release in the backup partition and makes it the active partition, while the former active partition becomes the backup partition.

DXC-4 restarts automatically.





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Thank you for your assistance!

**Manual Name:** DXC-4 Ver. 1.0

**Publication Number:** 379-200-05/07

Please grade the manual according to the following factors:

	<i>Excellent</i>	<i>Good</i>	<i>Fair</i>	<i>Poor</i>	<i>Very Poor</i>
Installation instructions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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What did you like about the manual?

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## 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.

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Please add any comments or suggestions you may have.

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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:

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Publication No. 379-200-05/07

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