TAHOE®

Tahoe 289

E3/T3/Ethernet Bridge

User Manual

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Firmware version 1.0.3
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Safety Instructions

Read the following safety notices before installing or operating the device:

This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents.

Read the installation instructions before you connect the device to its power source.

Reliable earthing of this equipment must be maintained.

This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that a fuse no larger than 240 VAC, 16A is used.

Check nameplate ratings to ensure there is no overloading of supply circuits that could have an effect on overcurrent protection and supply wiring.

There is no physical circuit separation if the outlet is disabled. Always disconnect the power cord before removing the cover of any powered device.

Immediately disconnect the unit from the outlet and contact qualified service personnel if any of the following events are noted:

1. *The power cord has become frayed or damaged.*
2. *Liquid has been spilled on to the device or the device has been exposed to rain or water.*

No serviceable parts inside! Do not attempt to repair or service this device yourself. Internal components must be serviced by authorized personnel only.

Do not work on the system, or connect or disconnect cables during periods of lightning activity.

Contents

Preface

About this Manual

This manual contains following chapters:

Chapter 1, Introduction	An overview of Tahoe 289
Chapter 2, Management	The ways to access and manage the device
Chapter 3, Control and Settings	The device settings available for the user
Chapter 4, Statistics	Statistics displayed by the device
Appendix A, Troubleshooting	Description of typical problems that may occur during use of the device
Appendix B, Technical Specification	Technical parameters of the device
Appendix C, Declaration of Conformity	Information about compliance with European standards

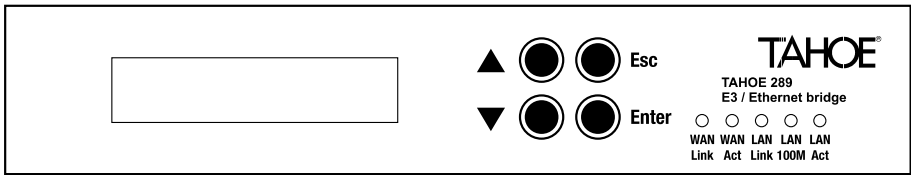
Document Conventions

This manual uses following conventions:

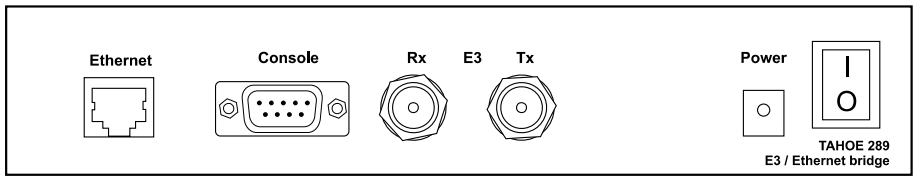
boldface font	Commands and keywords
< >	Required arguments
[ ]	Optional arguments
{ a | b | c }	Alternative arguments
[a | b | c]	Alternative optional arguments
`typewriter font`	Information displayed during a serial or remote connection
`boldface typewriter font`	Information to be entered during a management session
LCD font.	Information displayed on the LCD
Note	Notes contain helpful suggestions that may be worth remembering
Caution	This symbol means a situation that requires you to be careful. Otherwise equipment damage or loss of data may occur.
Warning	This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment be aware of the hazards involved with electrical circuitry and be familiar with standard practices in preventing accidents.

Introduction

Tahoe® 289 bridges allow connecting two LANs over an E3 / T3 (DS3) line. They are a cost-effective alternative to expensive E3 / T3 routers.
Bridges are transparent, that is both interconnected networks appear as a single LAN, as if both were plugged into the same Ethernet switch.



front panel



back panel

Tahoe 289 has two network interfaces, the serial WAN G.703 interface and the FastEthernet interface for Local Area Network (LAN) connection.

G.703 interface

The G.703 (WAN) interface consists of two coaxial BNC connectors. One of them is a transmit output (Tx), while the other one is a receive input (Rx). The Tx and Rx connectors should be connected to the corresponding line terminating the equipment's Rx and Tx ports.
The WAN interface type – E3 or T3 depends on the device variant and should be specified during ordering. The data transmission rates are 34.368 Mbps and 44.736 Mbps respectively.

Ethernet interface

The Ethernet interface used for local network (LAN) connection. It may work at speeds of 10 Mbps (10Base-T) or 100 Mbps (100Base-Tx), in full-duplex or half-duplex mode. The mode of operation is selected automatically, although a specific setting can be forced. An Automatic flow control is supported while in full-duplex mode.

LED indicators

Besides the LCD display, the following status LEDs are placed on the front panel:

WAN	Rx	G.703 receiver activity
	Tx	G.703 transmitter activity
LAN	Link	lit when the device is connected to a LAN
	100M	LAN connection throughput – lit when 100 Mbps connection speed is negotiated
	Act	LAN activity, blinks when data is sent or received

Management

The Tahoe 289 bridge is equipped with an LCD display/keypad and a serial console (RS232) connector. Both give equivalent access to device settings and statistics.
All setting adjustments take immediate effect. Settings have to be saved before restart with the "Save setting" option, otherwise previously stored values will be loaded during startup. Factory default settings may be loaded with the "Factory defaults" option in the "Advanced options" submenu.

LCD Menu

The LCD display with keypad is used to adjust device settings and display statistics. The main LCD screen is shown below:

The CIR indicator is shown when the Committed Information Rate is set.
An asterisk (*) is shown when there are unsaved settings.
In the second line the current total data rate is displayed.

When the main screen is shown use the Up and Down keys to view other statistics, and press the Enter key to enter device settings. Options may be shown or adjusted with the keypad as follows:

Up	previous option/setting
Down	next option/setting
Enter	enter a submenu, change a setting, accept a change, perform an action
Esc	leave a submenu, cancel a change

Serial Console

The serial console gives access to all device settings and statistics via the interactive terminal screen. Any VT100 compatible terminal may be used to access the device. To connect use a DB9 null-modem cable at 9600bps, 8 data bits, no parity, 1 stop bit without flow-control.
The main terminal screen is shown below. It is divided into three distinct sections. The interactive menu is displayed on the left side of screen, the statistics are displayed on the right side. The bottom half of the screen is reserved for log messages. The status line below the log shows a quick key map to assist the operator.

```
   Tahoe 289                    Statistics

>  G.703 settings               Total data rate                0kbps
   Ethernet settings            Tx data rate                   0kbps
   Advanced options             Rx data rate                   0kbps
   Reset counters               Tx frames                          0
   Restore settings             Rx frames                          0
   Save settings                Frame errors                       0
   Reboot                       Ethernet state     100BaseT-FD MDIX
                                Uptime                 0d 00h07m48s
                                Version                HW:B FW:1.0.3

   Log
   0d 00:00:00 Tahoe 289 Rev:B Ver:1.0.3
   0d 00:00:00 built Jan 14 2008 15:02:38
   0d 00:00:00 Factory defaults loaded.
   0d 00:00:01 G703 link up
   0d 00:00:03 Ethernet link up

arrows Navigate  +/- Change  Enter Accept  D Default  R Refresh screen
```

Use the arrow keys to navigate through the menu. Settings can also be adjusted with the plus and minus keys. Press D for the default setting. Press Enter (or Return) to accept a change.

Control and settings

Device settings are available from the LCD menu and through the serial console.

G.703 settings

Serial E3 / T3 (DS3) interface settings.

CIR

Committed Information Rate. Limits the transmit data rate to a specified value from 512kbps up to full link throughput in 512kbps steps.

Transmit clock

Choses the source of the transmitter clock. A local oscillator or a remote clock recovered from the serial line receiver may be selected. Available settings:

- Local Osc. use local reference oscillator
- Received clock use recovered clock

Invert clock

Determines on which clock edge data is updated and sampled respectively.

- Normal update and sample on rising clock edge
- Inverted update and sample on falling clock edge
- Inverted Tx update on falling and sample on rising clock edge

Cable length

Indicates cable length for waveform shaping in T3 (DS3) mode. Ignored for E3 converters.

- below 70m cable no longer than 70m (225ft)
- above 70m cable longer than 70m (225ft)

Loopback

Enables serial loop back (for testing purposes). The following modes are available:

- Local — local loop back
- Remote (line) — remote loop back (not using framer)
- Remote (frame) — remote loop back (using framer)

This setting is not saved.

Ethernet settings

Ethernet interface settings.

Ethernet mode

Selects the speed and duplex mode of the Ethernet interface. Available modes are:

- Auto — use auto-negotiation, recommended setting
- 10BaseT-HD — force 10Mbps, half-duplex
- 10BaseT-FD — force 10Mbps, full-duplex
- 100BaseT-HD — force 100Mbps, half-duplex
- 100BaseT-FD — force 100Mbps. full-duplex

The auto mode is the recommended setting, but forced modes are also available. When selecting a forced Ethernet mode, make sure the link partner has the same mode selected as duplex cannot be detected in such circumstances.

Flow control

Select a flow control to be used on the Ethernet interface, as follows:

- Auto — flow-control, depends on advertised link partner abilities (recommended setting)
- Enabled — force flow control
- Disabled — don't use flow control

The recommended setting is Auto. When flow-control is enabled and Ethernet is in full-duplex mode, the device will send and accept pause frames to prevent network congestion.

Receive queue

Changes the size of the Ethernet receive queue in 64kB (32 frames) steps. May be used to adjust latency in a heavily-loaded network.

Transmit queue

Changes the size of the Ethernet transmit queue with 64kB (32 frames) step. May be used to adjust latency in a heavily-loaded network.

Reset connection

Resets the Ethernet interface and reinitializes auto-negotiation if enabled.

Advanced options

Advanced user options.

POST

Power On Self Test,

- Enabled self test will be performed on every boot
- Disabled self test will not be performed

Disabling POST may shorten startup time. The recommended setting is Enabled.

Factory defaults

Loads the factory default settings.

Upgrade

Enters the firmware upgrade mode. Check Tahoe web site for updates.

Reset counters

Resets frame and error counters.

Restore settings

Restores previously saved settings.

Save settings

Stores settings to nonvolatile memory.

Reboot

Reboots the device.

Statistics

The following bridge statistics are available from the LCD menu and through the serial console.

Name	Description
Total data rate	Total data rate used in kbps.
Tx data rate	Transmit data rate used in kbps.
Rx data rate	Receive data rate used in kbps.
Tx frames	Count of transmitted frames.
Rx frames	Count of received frames.
Frame errors	Count of frames received with errors.
Ethernet state	State of Ethernet link: speed, duplex and cable crossover is displayed.
Uptime	Time from device startup in days, hours, minutes and seconds.
Version	The hardware revision and firmware version.

Appendix A, Troubleshooting

Problem	Possible solutions
Serial interface is connected but there is no link	▪ Make sure Rx and Tx connectors are not swapped. Make sure a link partner is connected and properly configured
WAN link is detected at only one end	▪ Make sure both Tx and Rx connectors are properly connected at both ends
There is a WAN link, but no data flows	▪ Check G.703 settings at both ends
LCD shows “Tx fail”	▪ Transmit line is shorted at local end, remove the short circuit

Appendix B, Technical Specification

throughput	**E3**	34.368 Mbps
	T3 (DS3)	44.736 Mbps
memory	16MB, SDRAM @100MHz	
connectors	G.703 (Rx, Tx)	2x BNC, unbalanced 75 Ohm
	Ethernet	RJ45
	Console	DB-9/M
network protocols	HDLC	
Ethernet interface	10/100Base-T, RJ45 connector	
serial console	RS-232, DB-9/M connector, 9600bps, 8N1	
power consumption	6W	
power input	15V DC, 400mA	
power supply	100-240V AC, 50/60Hz, 1A	
dimensions	200 mm (width) x 45 mm (height) x 130 mm (depth)	
environmental conditions	storage: temperature -20°C to 65°C, humidity 5% to 95% operation: temperature 0°C to 50°C, humidity 0% to 85%	

Appendix C, Declaration of Conformity

CE

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We declare that the product Tahoe 289 complies with the regulations of the following European Directives:

- **73/23/EEC** low voltage safety requirements
- **89/336/EEC** EMC requirements
- **99/5/EEC** radio & telecommunication terminal equipment requirements

The compliance of Tahoe 289 with the requirements of the above-mentioned directives is ensured by complete application of the following harmonized European Standards:

- **EN 60950:2000**
- **EN 55022:1998**
- **EN 61000-6-1:2002**
- **EN 61000-6-3:2002**

The products also comply with the directive 2002/95/EC on the restriction of the use of certain hazardous substances in electrical and electronic equipment ("RoHS Directive") with the exemptions applicable for network infrastructure equipment for switching, signalling, transmission and network management (according to clause 7 of the Annex to the directive).

Signed: Piotr Kaczmarzyk
Position: Director

Signature: 

Date: 20 January 2008
Place: Wrocław, Poland

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