



DS34T108DK Evaluation Kit
for 1- to 8-Port TDM-over-Packet ICs

General Description

The DS34T108DK is an easy-to-use evaluation kit for the DS34T108 octal TDM-over-Packet IC and for the DS34T101, T102, T104, S101, S102, S104, and S108 TDMoP ICs. This demo kit is a stand-alone system with TDMoP chip, local oscillator, local control processor, memory, E1/T1 LIUs and framers, power supply, and user interface software all included in a 1 RU enclosure. The demo kit is controlled over an RS-232 serial link from an external ASCII terminal (typically using terminal emulation software running on a PC). The ASCII user interface is menu driven and hierarchical for ease of use. The behavior and performance of the TDMoP IC can be evaluated with a single demo kit where the Ethernet signal is looped back to the kit or with two demo kits configured as separate end points.

Demo Kit Contents

DS34T108DK System
TDMoP IC Daughter Card (Factory Installed)
User Interface Software (Factory Installed)

Ordering Information

PART	TYPE
DS34T108DK	Demo Kit for DS34T101/2/4/8 and DS34S101/2/4/8 TDM over Packet ICs

Features

- ◆ Complete System: Motherboard and Daughter Card in a Convenient 1 RU Enclosure
- ◆ Menu-Driven ASCII Text User Interface Software
- ◆ TDMoP IC, Local Oscillator and IC Configuration Jumpers on Daughter Card
- ◆ System Processor, Memory, Ethernet PHYs, I/O Jacks, and Optional E1/T1 LIUs and Framers on Motherboard
- ◆ Built-In AC Power-Supply Module
- ◆ Land Patterns on Daughter Card for Several Common TCXO and OCXO Package Styles Plus Connector to Use a Lab Reference
- ◆ 9-Pin Serial Jack to Connect an ASCII Terminal for Configuration and Status
- ◆ System TCP/IP Stack for Configuration and Status Over IP/Ethernet
- ◆ One RJ-45 Ethernet Jack for Connection to the Ethernet Network
- ◆ One RJ-45 Jack for Each E1/T1 Port
- ◆ RJ-45 External Clock Input Jack
- ◆ BNC Common Clock Input Jack
- ◆ SPI™, 16-Bit, or 32-Bit Interface to TDMoP IC
- ◆ Full JTAG Boundary Scan Support Throughout



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1 Introduction

1.1 Overview

The DS34T108DK is a complete evaluation platform. The system consists of:

- Two quad E1/T1 transceivers (a transceiver is a framer plus an LIU)
- One TDMoP IC daughter card
- Motorola MPC870 CPU
- One uplink port for the 10/100M Ethernet (supports auto negotiation)
- One 10Mbps Ethernet management port connected to the MPC870 FEC for debugging
- Peripheral memory and glue logic
- RS-232 interface for control and configuration using an ASCII terminal

1.2 Features

Three operating modes for E1/T1 are supported: unframed, framed, and framed-with-CAS. Bundles consisting of carrying entire TDM data streams or selected TDM timeslots are transported over the network based on IP/MPLS/MEF addressing.

VLAN tagging and priority labeling are supported, according to 802.1p and Q. The Type of Service (ToS) of outgoing IP packets is user-configurable.

Synchronization between TDM interfaces is maintained by deploying advanced clock distribution mechanisms. The clocking options are: internal, loopback, recovered clock (either adaptive or common clock), and an externally provided E1 station clock.

When the TDMoP IC on the daughter card is a DS34S101/2/4/8, which does not have on-chip E1/T1 framers and LIUs, the TDMoP IC can be connected to the E1/T1 framers and LIUs on the motherboard to complete the TDM-to-packet path. When the TDMoP IC on the daughter card is a DS34T101/2/4/8, which does have on-chip E1/T1 framers and LIUs, the system can be configured to use either the TDMoP IC's framers and LIUs or the motherboard's framers and LIUs. A DS34T101/2/4/8 IC can behave like a DS34S101/2/4/8 IC by configuring the system to use the motherboard's framers and LIUs.

1.3 Physical Description

Figure 1-1. DS34T108DK Photo



1.3.1 Front Panel

The front panel contains:

- ETH uplink port with indicator LEDs for ETH LINK and ETH ACT.
- TDM ports – eight E1/T1 with indicator LEDs for SYNC LOS (left) and TST (right)
- E3/T3/STS-1 port (not currently supported by the user interface software)
- Control port (RS-232 for connection of an ASCII terminal)
- E1 external station clock
- ETH management port with indicator LEDs for ETH LINK and ETH ACT
- Common clock reference port.

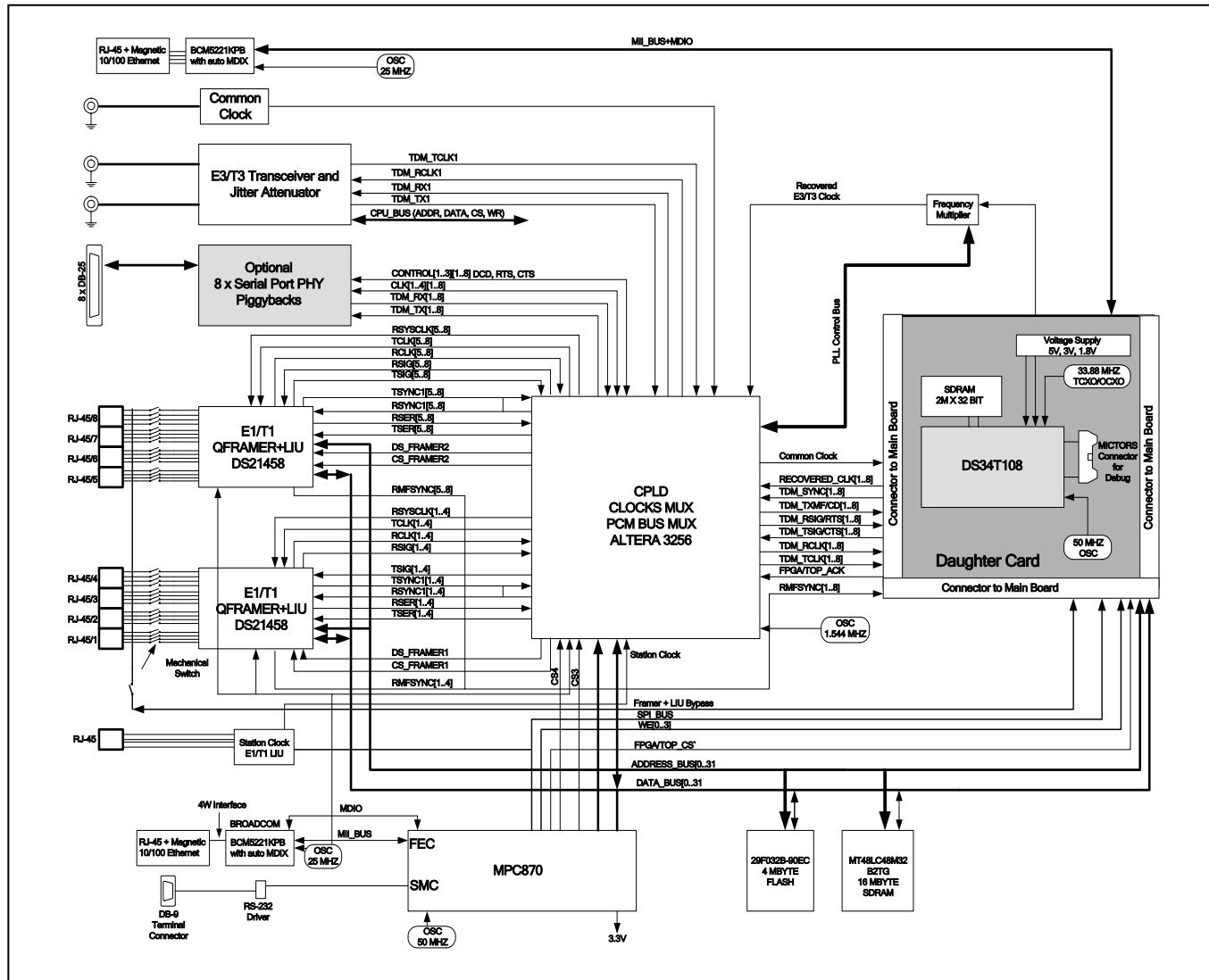
For additional information, see section 2.

1.3.2 Rear Panel

The rear panel contains the POWER switch (which lights up when in the ON state) and eight optional serial interface connections.

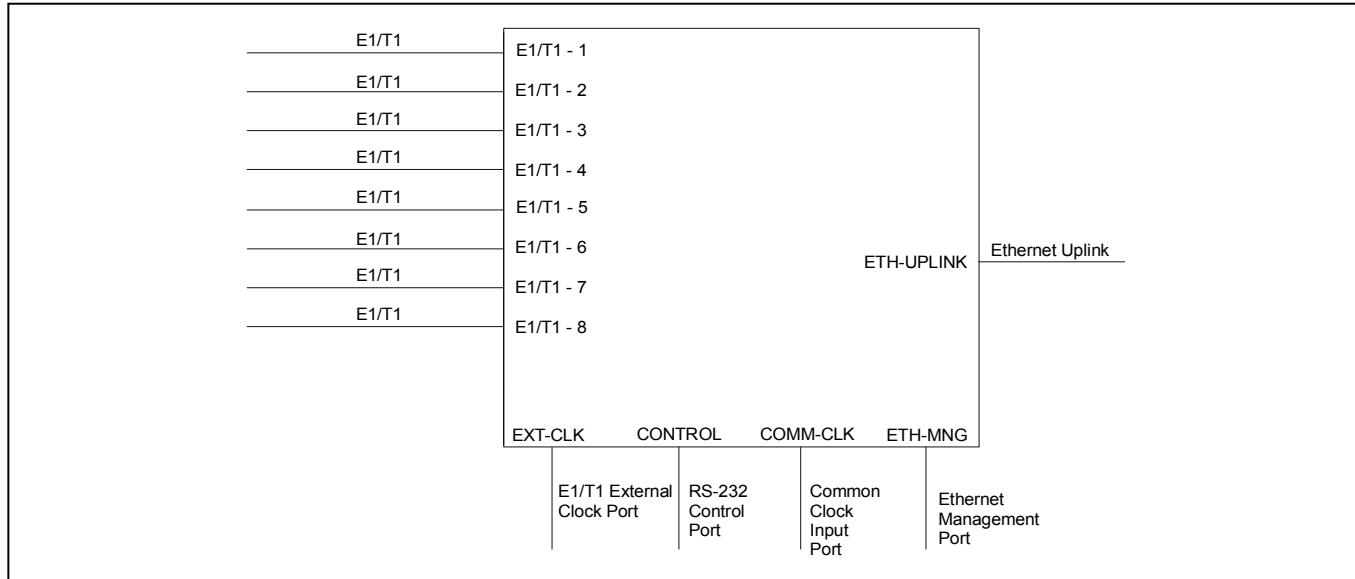
1.4 Functional Description

Figure 1-2. DS34T108DK Block Diagram



1.4.1 Ports

Figure 1-3. Representation of DS34T108DK Ports



E1. The E1 interface complies with the following standards: ITU-T Rec. G.703, G.704, G.706, G.732, and G.823. The E1 framers support unframed (pass-through), framed, and framed-with-CAS. Long haul/short haul options can be selected by configuration.

T1. The T1 interface complies with the following standards: AT&T TR-62411, ITU-T Rec. G.703, G.704, ANSI T1.403, and G.824. The T1 framers support unframed (pass-through), SF, and ESF.

Ethernet Uplink. The Ethernet uplink interface complies with the following standards: IEEE 802.3, 802.3u, 802.1p and Q. This interface is a standard 10/100BaseT half/full duplex Ethernet port with auto-negotiation support. DS34T108DK supports VLAN tagging and priority. A different VLAN can be configured for each bundle. The data stream coming from the E1/T1 interfaces is encapsulated into IP/MPLS/MEF packets and transferred over the Ethernet port, and vice versa. When using IP, a destination IP address should be configured for each bundle. When using MPLS, a bundle should be configured with an MPLS label.

Ethernet Management. The local Ethernet management port enables the connection of a software debugger to the DS34T108DK CPU. The interface is a standard 10Base-T half-duplex Ethernet port that complies with IEEE 802.3 standard.

E1/T1 External Clock. The E1 External Clock port enables connection of an external clock source to support station clock.

Common Clock. The Common Clock port enables connection of a common clock source, via LVTTL input. It supports frequencies of up to 25 MHz. The common clock is used as a reference clock when common (differential) mode is used for clock recovery.

RS-232 Control. The RS-232 Control port enables connection an ASCII terminal for configuring DS34T108DK.

1.4.2 Modes of Operation

DS34T108DK modes of operation for E1/T1 are:

- Unframed
- Framed

- Framed-with-CAS.

In unframed mode, the entire incoming bit stream from each interface is encapsulated into IP/MPLS/MEF-over-Ethernet packets without regard for frame alignment. This option provides clear channel end-to-end service.

In Framed and Framed-with-CAS modes, the incoming bit stream is regarded as a sequence of $n \times 64$ kbps channel groups. This mode allows fractional or full E1/T1 transmission.

1.4.3 Timing Modes

The E1/T1 Transmit (Tx) clock operates in several timing modes, to provide maximum flexibility for the DS34T108DK TDM interface. The available timing modes are:

- **Loopback Timing** – the clock is derived from the received TDM clock.
- **Recovered Clock Timing** – the clock is regenerated from the ETH network using the clock recovery mechanism.
- **Internal Clock Timing** – the clock is provided by an internal oscillator.
- **E1/T1 Station Clock Timing** – the clock is provided by the external E1/T1 clock source.

Each of the clocks must be configured correctly for both the local and remote TDM interfaces to ensure proper operation.

The clock distribution system is implemented in an Altera EPLD, assembled on the main board. [Figure 1-4](#) and [Figure 1-5](#) show the clock distribution for one E1/T1 port of the system (there are eight E1/T1 TDM ports total). The clock source for each TDM port is selected by an internal multiplexer in the EPLD.

Figure 1-4. E1/T1 Clock Distribution (One Clock Mode)

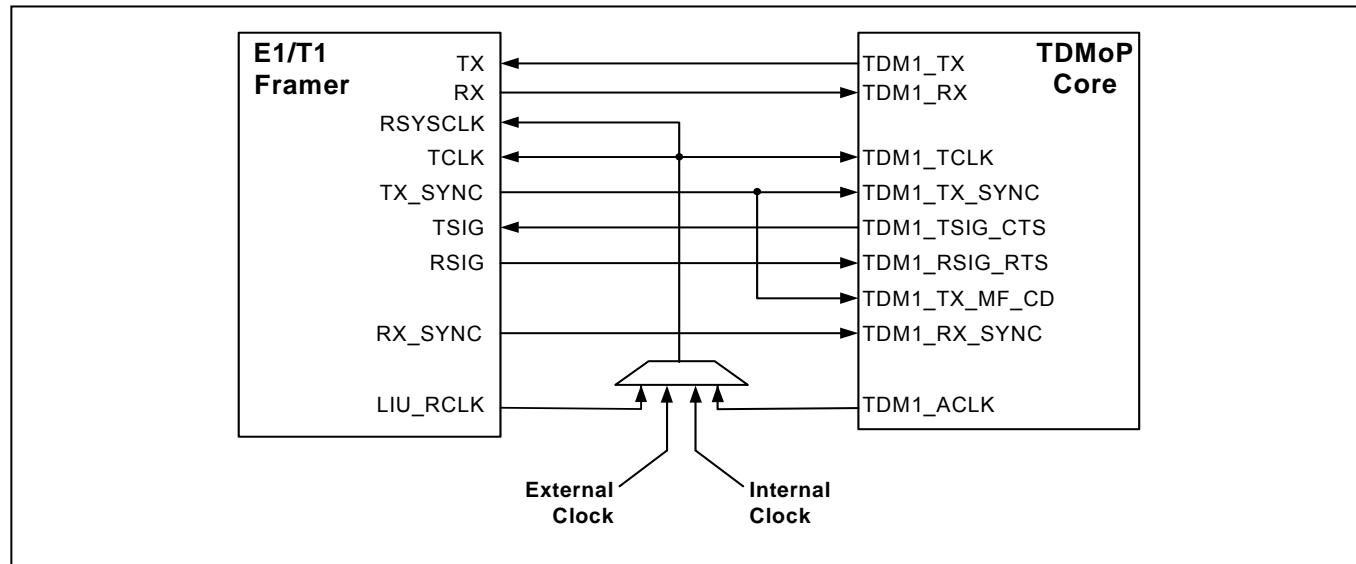
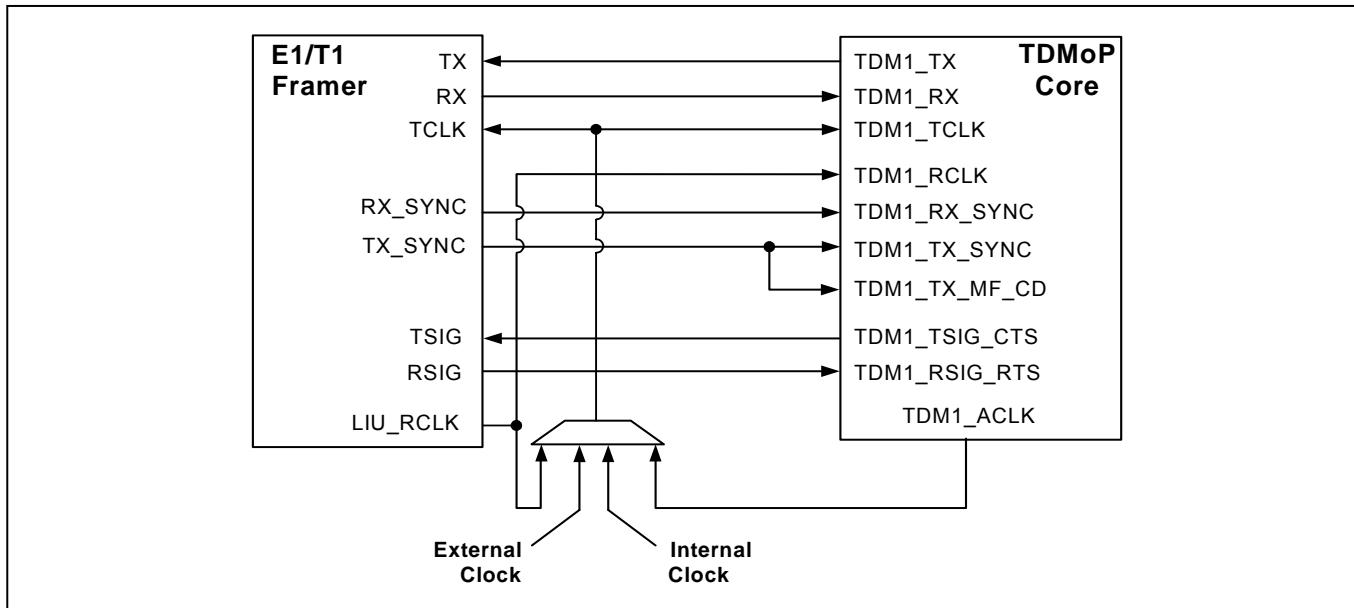


Figure 1-5. E1/T1 Clock Distribution (Two Clock Mode)



1.4.4 CPU Board

Figure 1-6 shows the CPU and Peripherals block diagram. The CPU clock (50.00 MHz) is obtained from an on-board local crystal oscillator.

The flash device has memory capacity of 8 MB. The flash is used for storage of software and configuration data that should not be lost when system power is off.

The RAM memory contains SDRAM devices with capacity of 16 MB. The MPC870 CPU supports all SDRAM control signals, including CAS and RAS refresh signals, enabling a direct connection between CPU and RAM.

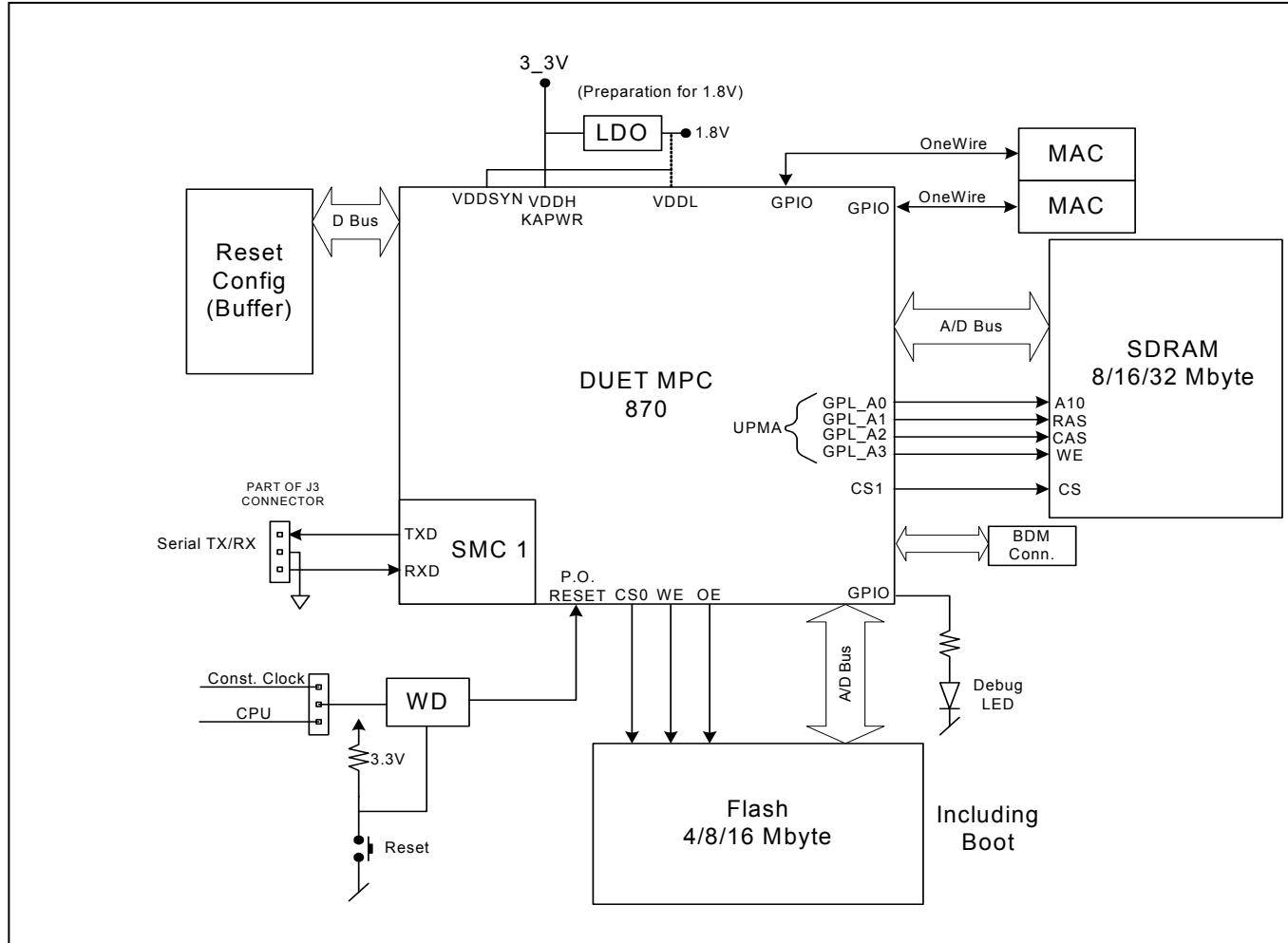
The CPU supports a 16- or 32-bit data bus, selected by the JP6–JP10 jumpers on the daughter card. The CPU data and address buses are asynchronous.

The CPU can accept and prioritize up to seven external interrupts. Only IRQ-1 is in use, and it is connected to the E1/T1 framers, the uplink PHY, the management PHY and the TDMoP IC daughter card.

MPC870's SMC1 communication port, used as a UART, is connected through an RS-232 transceiver to the Control port on the front panel of the system. An ASCII terminal connected to the Control port can be used to configure the system.

The MPC870's Fast Ethernet communication controller is connected through an Ethernet PHY to the Ethernet Management port (ETH-MNG) on the front panel of the system.

Figure 1-6. CPU and Peripherals Block Diagram



1.4.5 TDMoP IC Daughter Card

The daughter card contains a Maxim TDMoP IC, such as a DS34T108, and a Xilinx Spartan XC2S200E FPGA.

The core voltage is 1.8V for the TDMoP IC and the FPGA. I/Os are supplied with 3.3V. In addition, 1.5V is made from the 3.3V power supply through an onboard linear regulator.

Three oscillators are assembled on the daughter:

- 50MHz – for the system clock of the TDMoP IC (CLK_SYS pin).
- 38.88MHz – for the clock recovery block (TCXO/OCXO) of the TDMoP IC (CLK_HIGH, CLK_CMN pins).
- 2.048MHz – for the LIUs and Framers (MCLK pin) built into the TDMoP IC.

1.4.6 Bundles

A bundle is defined as a stream of bits originating from one TDM interface that are transmitted from a TDMoP source device to a TDMoP destination device. For example, a bundle may comprise any number of 64 kbps timeslots originating from a single E1 or T1 interface. Bundles are single-direction streams, frequently coupled with bundles in the opposite direction to enable full duplex communications. More than one bundle can be transmitted between two TDMoP edge devices.

Each bundle transmitted or received by the DS34T108DK uses one of the following payload type methods:

- TDMoIP using AAL1, CESoPSN or SAToP payload type method
- TDMoMPLS using AAL1, CESoPSN or SAToP payload type method
- TDMoMEF using AAL1, CESoPSN or SAToP payload type method
- HDLCoIP
- HDLCoMPLS

Up to 64 bundles are supported. Each TDMoP bundle/connection may be assigned to one of the payload type machines or to the CPU.

1.4.7 Packet Formats

Figure 1-7. TDMoIP Packet with VLAN Tag

DA MAC_addr/ Broadcast/ Multicast	SA	VLAN Tag up to 2 tags	Eth Type IP	IP Header Dest. IP = IP_Add1/ IP_Add2	UDP* or L2TPv3 Header Bundle no. = Bundle_Identifier/ OAM_bundle_num	Control Word	Payload Type AAL1/HDLC/ OAM/SAToP/ CESoPSN	CRC32
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Figure 1-8. TDMoMPLS Packet with VLAN Tag

DA MAC_addr/ Broadcast/ Multicast	SA	VLAN Tag up to 2 tags	Eth Type MPLS	Up to 2 MPLS Labels Optional	MPLS Label** Bundle no. = Bundle_Identifier/ OAM_bundle_num	Control Word	Payload Type AAL1/HDLC/ OAM/SAToP/ CESoPSN	CRC32
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Figure 1-9. TDMoMEF Packet with VLAN Tag

DA MAC_addr/ Broadcast/ Multicast	SA	VLAN Tag up to 2 tags	Eth Type MEF	ECID = Bundle_Identifier	Control Word	Payload Type AAL1/HDLC/OAM/ SAToP/CESoPSN	CRC32	
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Notes:

* The UDP source port number is used as the bundle number designator, while UDP destination port number is set to 0x085E (2142), the user port number assigned by IANA to TDMoIP.

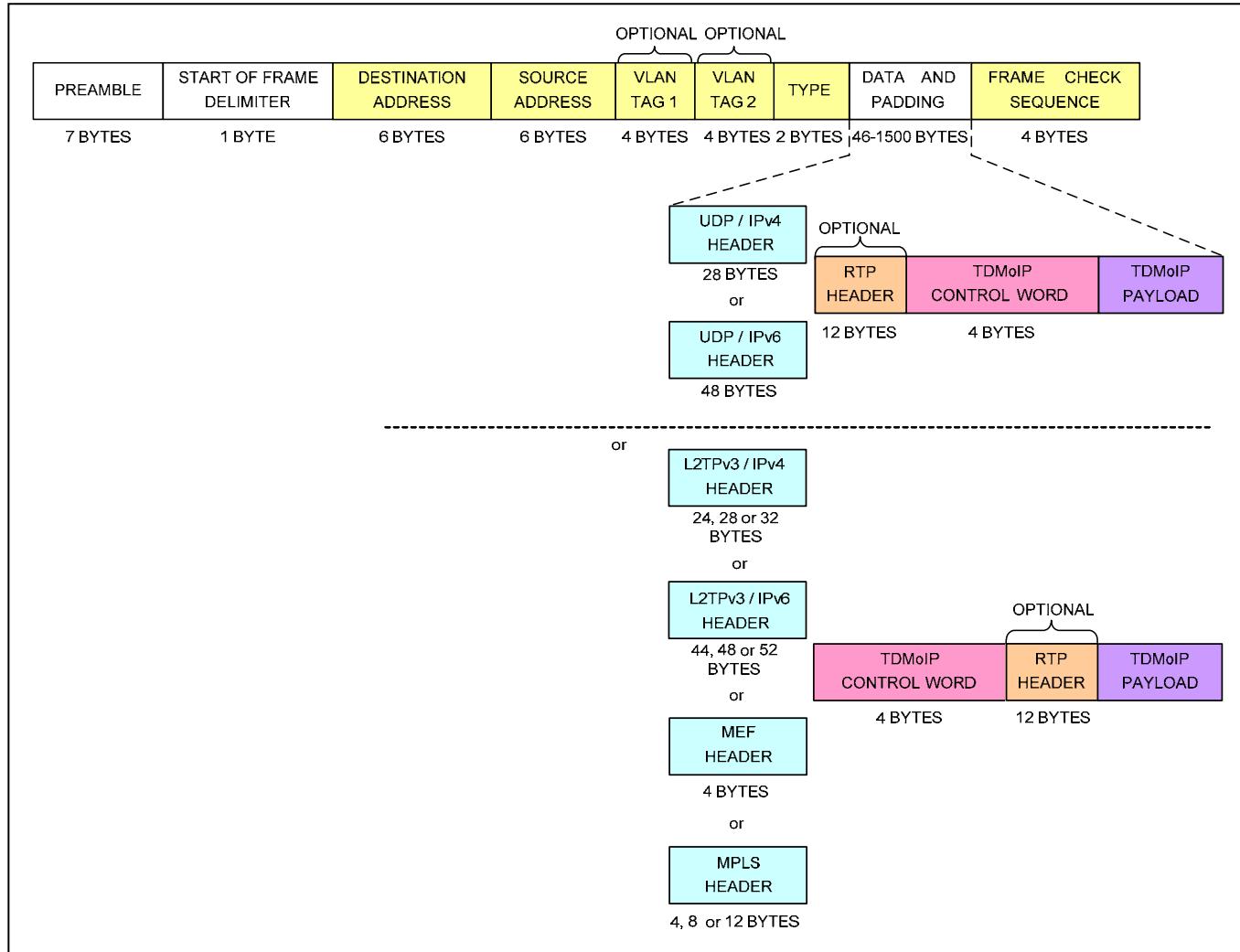
** A stack of up to three MPLS labels is supported, where the inner label is used as the bundle number designator.

1.4.8 TDMoP Mappings

To transport TDM data through packet switched networks, the DS34T108DK encapsulates it into Ethernet packets, as depicted in [Figure 1-10](#).

The UDP/IP, L2TPv3/IP, MEF and MPLS headers, as well as the TDMoIP control word are detailed in the Packet Formats section of the TDMoIP IC data sheets.

Figure 1-10. TDMoIP Encapsulation in an Ethernet Frame



1.4.9 Payload Type Machines

SAToP. The SAToP payload type machine converts unframed E1/T1 or serial data flows into IP, MPLS or Ethernet packets and vice versa according to ITU-T Y.1413, MEF 8, MFA 8.0.0 and IETF RFC 4553.

CESoPSN. The CESoPSN payload type machine converts structured E1/T1 data flows into IP, MPLS or Ethernet packets and vice versa with static assignment of timeslots inside a bundle according to ITU-T Y.1413, MEF 8, MFA 8.0.0 and IETF RFC 5086.

AAL1. The AAL1 payload type machine converts E1/T1 or serial data flows into IP, MPLS or Ethernet packets, and vice versa, according to ITU-T Y.1413, Y.1453, MEF 8, MFA 4.1 and IETF RFC 5087. For E1/T1 it supports structured mode with/without CAS using 8-bit timeslot resolution, while implementing static timeslot allocation. For E1/T1 or serial interfaces it also supports unstructured mode.

HDLC. The HDLC payload type machine, for efficient transfer or termination of frame-based traffic, provides an HDLC controller for each bundle assigned to it. It supports 2, 7 and 8-bit timeslot resolution (i.e. 16, 56, and 64 kbps respectively), as well as $N \times 64$ kbps bundles ($N=1$ to 32). This is useful in applications where HDLC-based signaling interpretation is required (such as ISDN D channel signaling termination, V.51/2, or GR-303), or for trunking packet-based applications (such as Frame Relay), according to IETF RFC 4618.

1.4.10 OAM

This mechanism is used to detect a valid connection. It can be set to Enable or Disable.

When a bundle in DS34T108DK is assigned with OAM, TDMoIP traffic is not sent immediately. First, a TDMoIP echo request packet is sent once every five seconds. This continues until a valid echo reply arrives. The remote TDMoP system receives the echo request packet and sends a valid echo reply only if all parameters in the echo request match its local configuration. When a valid echo reply arrives, the transmitting echo request message stops, and TDMoP traffic flow begins at full rate for that bundle. If there is a break in the connection, the initialization process begins again.

See the VCCV OAM and UDP/IP-Specific OAM sections of the DS34T101/2/4/8 data sheet for details of the OAM payload types.

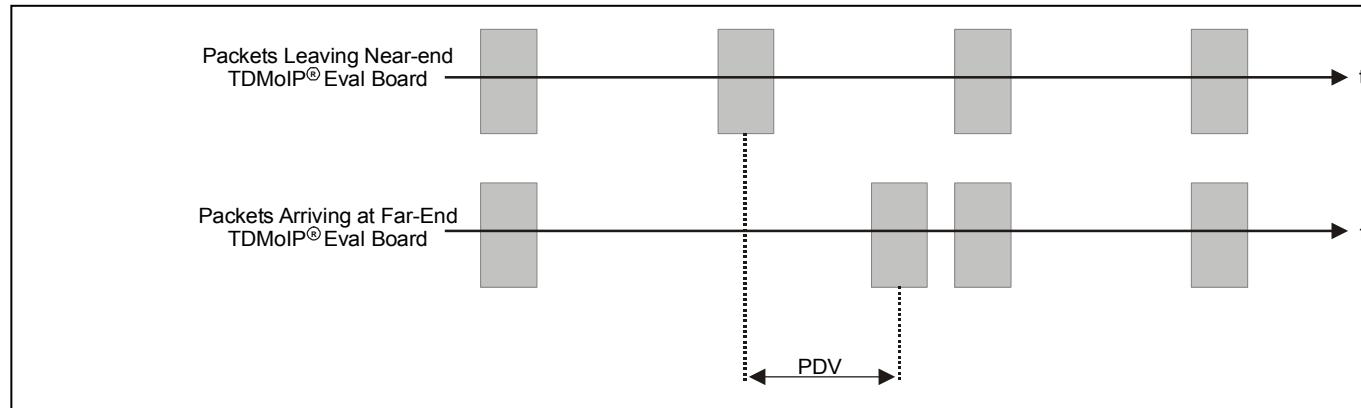
1.4.11 Packet Delay Variation

Packets are transmitted at set intervals. Packet Delay Variation is the maximum deviation from the nominal time the packets are expected to arrive at the receiving device. The TDMoP IC controls a buffer that compensates for the deviation from the expected packet arrival time to prevent buffer overflow or underflow.

Packet Delay Variation is an important network parameter. Large PDV (exceeding the jitter buffer configuration) causes receive buffer overflow or underflow and errors in the recovered E1/T1 signal.

To compensate for large PDV, the PDVT (jitter) buffer should be configured to a higher value.

Figure 1-11. Packet Delay Variation



1.4.11.1 Differential Time

The TDMoP IC is equipped with a Packet Delay Variation Tolerance (PDVT) buffer. The PDVT buffer is filled by the payload of incoming packets and emptied to fill the outgoing E1/T1 or serial data stream.

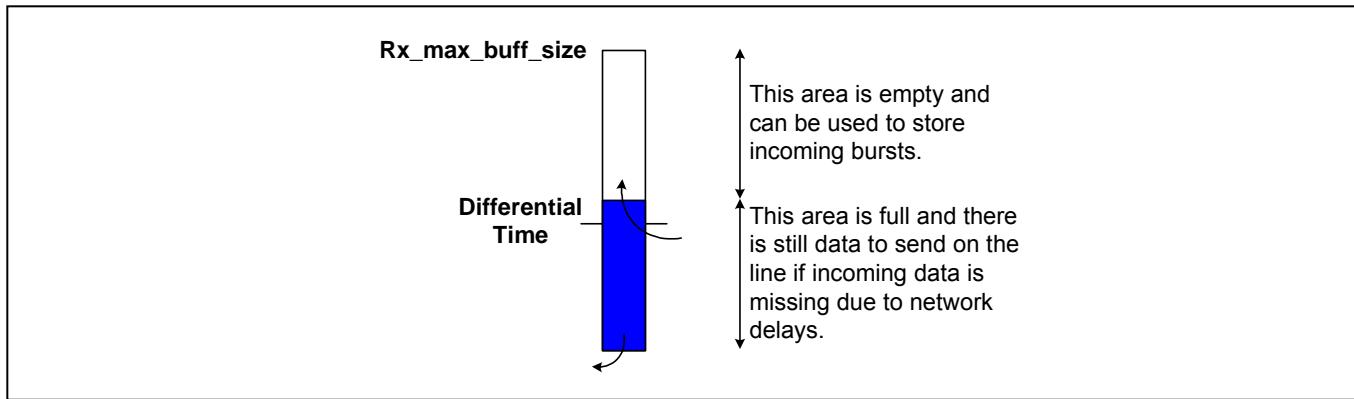
The jitter buffer depth is defined by the Rx_max_buff_size parameter. When the jitter buffer level reaches the value of Rx_max_buff_size, an overrun situation is declared.

The Differential Time parameter defines the amount of data to be stored in the jitter buffer to compensate for network delay variation. This parameter has two implications:

- Differential Time defines the IC's immunity to network packet delay variation.
- The data arriving from the network is delayed by Differential Time before it is sent to the TDM interface.

Differential Time should be smaller than Rx_max_buff_size. Also, the difference between Rx_max_buff_size and Differential Time should be larger than the time required to reconstruct a packet (otherwise an overrun may occur). Configuring the jitter buffer parameters correctly avoids underrun and overrun situations. Underrun occurs when the jitter buffer becomes empty (data is being written to the buffer more slowly than data is being read out of the buffer). Overrun occurs when the jitter buffer is full and there is no room for new data (data is being read out of the buffer more slowly than data is being written to the buffer).

Figure 1-12. Jitter Buffer Parameters



The maximum configurable value for Differential Time is shown in [Table 1-1](#).

Table 1-1. Maximum PDVT for E1/T1

TDM Frame Type	E1	T1
Unframed	256 msec	340 msec
Framed without CAS	256 msec	256 msec
Framed-with-CAS	256 msec	192 msec

1.4.11.2 End-to-End Delay

The data path end-to-end delay, which is a function of all connections and network parameters, is calculated as follows:

$$\text{End-to-End Delay} = \text{PDVT} + \text{Packet Creation Time} + \text{Fixed Network Delay}$$

Where:

Packet Creation Time is measured in seconds

PDVT is measured in seconds

$$\text{Time of 1 Timeslot} = \frac{1}{8kHz}$$

1.4.11.2.1 AAL1 Packets

There are 47 bytes in a regular AAL1 cell.

There are 46 bytes in an AAL1 cell with a pointer.

Unstructured

For E1/T1 unstructured and structured (only for 1 Timeslot)

$$\text{Packet Creation Time} = \frac{47(\text{NC})}{8\text{K}(\text{NTS})}$$

Where:

NC = number of cells per packet

NTS = number of timeslots

In E1 structured, 1 Timeslot: NTS = 1

In E1 unstructured: NTS = 32

In T1: NTS = 24

E1/T1 Structured

$$\text{Packet Creation Time} = \frac{(\text{NC})(\text{NA})}{8\text{K}(\text{NT})}$$

Where:

NC = number of cells per packet

NA = $(47*7 + 46)/8$

NT = number of assigned Timeslots (Note: for 1 timeslot, see Unstructured)

E1/T1 Structured with CAS

$$\text{Fill Packet Time} = \frac{(\text{NC})(\text{NA})}{8\text{K}(\text{NT})} * \frac{(\text{NT})(\text{MZ})}{(\text{NT} * \text{MZ} + [\text{NT} + 1]\text{div}2)}$$

Where:

NC = number of cells per packet

NA = $(47*7 + 46)/8$

NT = number of assigned Timeslots

MZ = Multi frame size (E1 = 16, T1 = 24)

1.4.11.2.2 SAToP (Unstructured) Packets

$$\text{Packet Creation Time} = \left(\frac{1}{(\text{NTS} \times 64\text{K})/8\text{bit}} \right) \times \text{SB}$$

SB = Size of packet in bytes

1.4.11.2.3 CESoPSN Packets (Structured or Structured with CAS)

$$\text{Packet Creation Time} = 0.125 \text{ msec} \times \text{NF}$$

NF = Number of TDM frames per packet

1.4.12 End-to-End Alarm Generation

An end-to-end alarm generation mechanism exists in DS34T108DK to facilitate the following alarms:

- Unframed – OOS is transmitted towards the near-end TDM interface in the event of:
 - Far-end LOS, AIS
 - PDVT underflow/overflow.

- Fractional – Timeslot/CAS configurable alarm pattern is transmitted towards the near-end TDM interface in the event of:
 - Far-end LOS, LOF, AIS
 - PDVT underflow/overflow.

1.4.13 Default Gateway Configuration

The DS34T108DK supports a Default Gateway configuration. In addition, a different Next Hop can be configured for each bundle.

1.5 Technical Specifications

E1	Standards	ITU-T Rec. G.703, G.704, G.706, G.732, G.823
	Framing	Unframed, structured
	Data Rate	2.048 Mbps
	Line Code	HDB3
	Receive Level	0 to -28 dB with LTU, 0 to -9 dB without LTU
	Transmit Level	$\pm 3V \pm 10\%$, balanced
	Line Impedance	120 Ω
	Jitter Performance	Per ITU-T G.823
	Connector	RJ-45, 8-pin
	Standards	AT&T TR-62411, ITU-T Rec. G.703, G.704, ANSI T1.403, G.824
T1	Data Rate	1.544 Mbps
	Line Code	B8ZS, B7ZS
	Framing	Unframed, SF, ESF
	Receive Level	0 dB to -30 dB
	Transmit Level	$\pm 2.75V \pm 10\%$ at 0 to 655 ft with DSU 0 dB, -7.5 dB, -15 dB, -22.5 dB with CSU
	Line Impedance	100 Ω
	Jitter Performance	Per AT&T TR-62411, ITU-T G.824
	Connector	RJ-45, 8-pin
	Standards	IEEE 802.3, 802.3u, 802.1p and Q
	Data Rate	10 or 100 Mbps, half/full-duplex
Ethernet Uplink	Range	Up to 100m on UTP Cat.5
	Type	10/100BaseTx half/full-duplex port with auto-negotiation support
	Connector	RJ-45, 8-pin
	Standards	IEEE 802.3, Ethernet, 802.1p and Q
	Data Rate	10 Mbps, half-duplex
	Range	Up to 100m on UTP Cat.5
	Type	10BaseTx half-duplex
	Connector	RJ-45, 8-pin
	Type	Standard DB-9 connector
	Interface	RS-232/V.24 (DCE) interface
Ethernet Management	Data Rate	115.2 kbps
	Data Bits	8
	Stop Bit	1
	Flow Control	None
	Clock Rate	2.048 Mbps
	Connector	RJ-45, 8-pin
	Line Impedance	120 Ω
	Standard	LVTTL input (square-wave 0/3.3V)
	Connector	BNC
	Loopbacks	LLB and RLB
CONTROL	LINK	OFF when line is not connected ON when line is connected
	ACT	OFF when no activity ON when a frame is being transmitted or received on the line
	LOS	ON when there is no data in Rx
	TST	ON when RDI is detected (remote alarm)
	Power	100–240 VAC, 50–60 Hz
	Physical	Height Width Depth Weight
		4.405 cm (1.734 in) 31.48 cm (12.4 in) 43.75 cm (17.25 in) 2.4 kg (5.3 lb)

2 Installation

2.1 Introduction

The DS34T108DK is delivered completely assembled and ready to use.

Configure the DS34T108DK using an ASCII terminal connected to the DS34T108DK control port as described in section 3 of this manual. If problems are encountered, refer to section 5 for test and diagnostics instructions.

2.2 Making Internal Settings

The DS34T108DK contains jumpers and switches that provide preliminary configuration of the device. To set internal jumpers and switches:

1. Open the DS34T108DK enclosure.
2. Set jumpers located on the motherboard.
3. Set jumpers located on the daughter card.
4. Close the DS34T108DK enclosure.

2.2.1 Opening the DS34T108DK Case

In order to gain access inside the DS34T108DK, you must open its case.

Caution

DS34T108DK contains components sensitive to electrostatic discharge (ESD). To prevent ESD damage, avoid touching the internal components. Before moving the jumpers, touch the DS34T108DK frame.

To open the unit's case:

1. Disconnect all cables from DS34T108DK.
2. Unscrew the 14 cover screws on the top and side panels of the unit.
3. Remove the top cover by pulling it straight up.

2.2.2 Setting the Internal Jumpers

Internal jumpers are located on the motherboard and the daughter card. To set the motherboard jumpers:

1. Refer to [Figure 2-1](#) to locate internal jumpers on the motherboard PCB.
2. Set the motherboard jumpers while referring to [Table 2-1](#).

Figure 2-1. Motherboard Jumper Locations

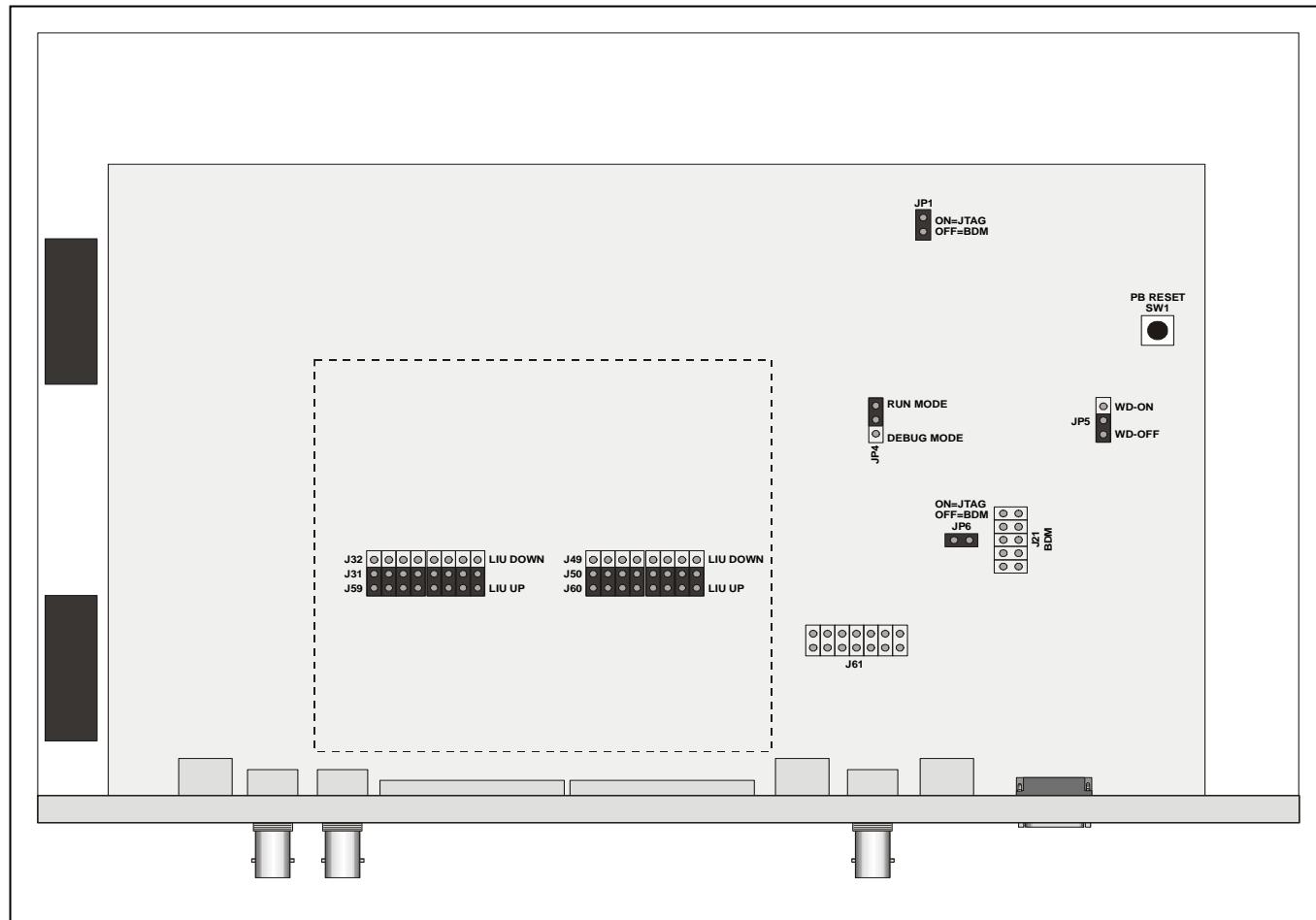


Table 2-1. Motherboard Jumper and Switch Settings

Jumper	Function	Possible Settings	Factory Setting
J23–J30, J33–J40	Connects the system's E1/T1 ports #1–4 to either the LIUs in the TDMoP IC on the daughter card or the LIUs on the motherboard	LIU UP – Ports #1–4 connected to the LIUs and framers in the TDMoP IC on the daughter card LIU DOWN – Ports #1–4 connected to the LIUs and framers on the motherboard	LIU UP
J41–J48, J51–J58	Connects the system's E1/T1 ports #5–8 to either the LIUs in the TDMoP IC on the daughter card or the LIUs on the motherboard	LIU UP – E1/T1 ports #5–8 connected to the LIUs and framers in the TDMoP IC on the daughter card LIU DOWN – E1/T1 ports #5–8 connected to the LIUs and framers on the motherboard	LIU UP
J61	Controls JTAG connection	Connected – JTAG is connected Disconnected – JTAG is disconnected	Disconnected
JP4	Controls debug mode	RUN MODE – Run mode is enabled DEBUG MODE – Debug mode is enabled	RUN MODE
JP1, JP6	Controls BDM/JTAG connection.	Connected (ON) – JTAG is enabled. Use J61 to enable JTAG connection. Disconnected (OFF) – BDM is enabled. Use J21 to enable BDM connection.	Connected (ON)
J21	Controls BDM connection	Connected – BDM is connected Disconnected – BDM is disconnected	Disconnected
JP5	Controls the watchdog mode	WD-ON – Watchdog mode is enabled WD-OFF – Watchdog mode is disabled	WD-OFF
SW1	Resets DS34T108DK		

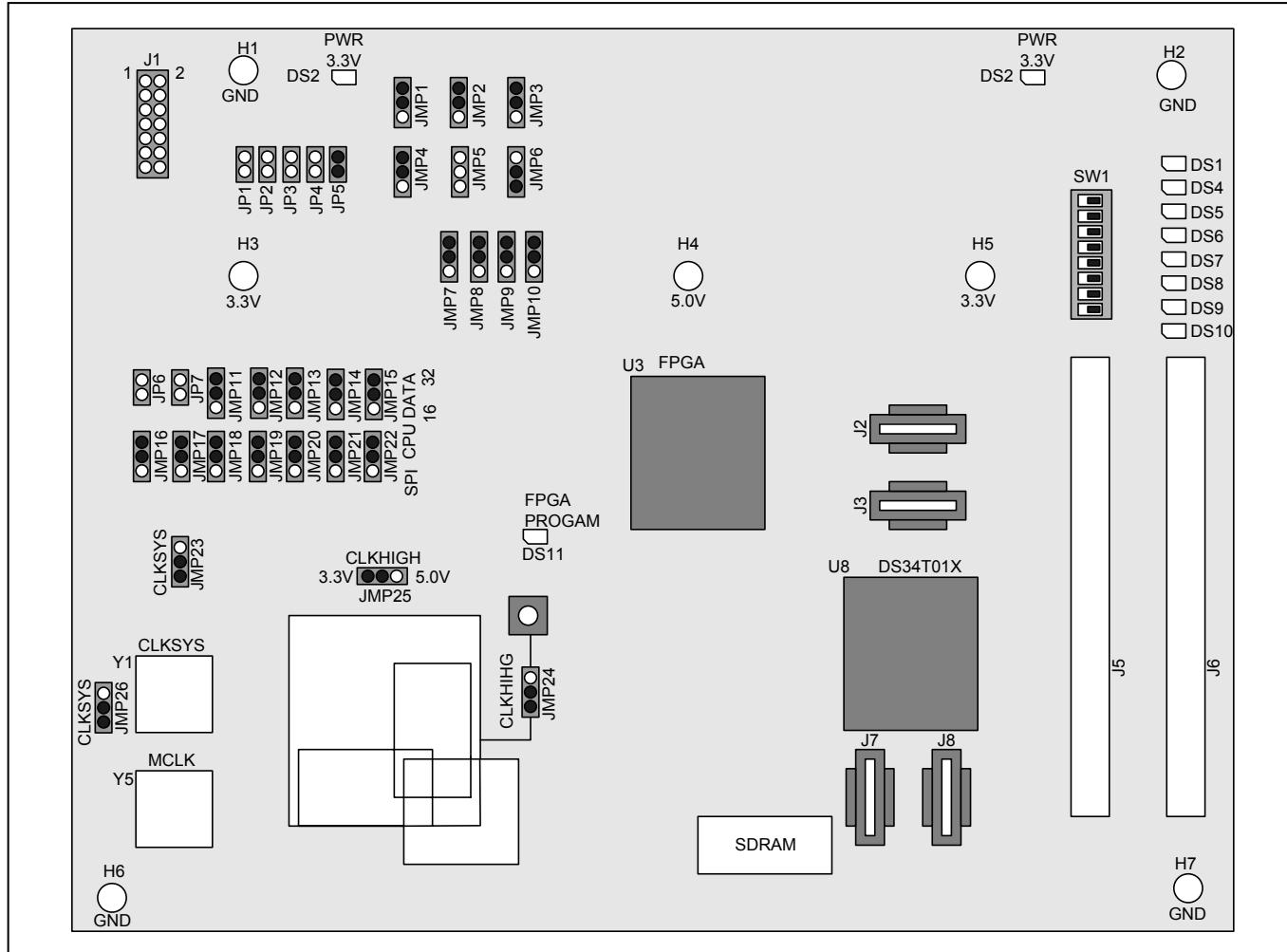
Notes

1. J23–J30, J33–J40, J41–J48, J51–J58 are located under the daughter card. Remove the daughter card to gain access to the jumpers.
2. The motherboard includes additional jumpers and switches which are factory-set and must not be changed by the user.

To set the daughter card jumpers:

1. Refer to [Figure 2-2](#) to locate internal jumpers on the daughter card.
2. Set the daughter card jumpers referring to [Table 2-2](#).

Figure 2-2. Daughter Card Jumper Locations



Note: As-shipped-from-the-factory jumper settings are shown in black.

Table 2-2. Daughter Card Jumper Settings

Jumper	Function	Possible Settings	Factory Setting
JMP16-JMP22	Control CPU/SPI mode operation	SPI – SPI interface mode is enabled CPU – CPU interface mode is enabled.	CPU
JMP11-JMP15	Select the CPU data bus width	32 – CPU data bus width is 32 bits 16 – CPU data bus width is 16 bits	32
JMP23	Controls the source of the clock applied to the TDMoP IC <u>CLK_SYS</u> pin	OSC – Local oscillator on the daughter card (component position Y1, Y2, Y3, Y4, Y6 or U11). The TDMoP IC is therefore asynchronously clocked w.r.t. the CPU on the motherboard. CON – Connector bringing CPU clock up from the motherboard. The TDMoP IC is therefore synchronously clocked w.r.t. the CPU.	OSC
JP6	TDMoP IC SPI_CI Pin Control	Connected – SPI_CI=0. Disconnected – SPI_CI=1.	Disconnected

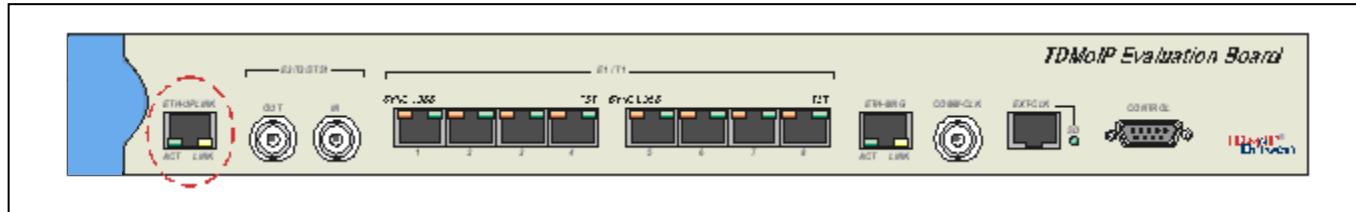
Jumper	Function	Possible Settings	Factory Setting
JP7	TDMoP IC SPI_CP Pin Control	See the TDMoP IC data sheet for pin description. For proper operation do not connect this jumper when the board is configured for CPU bus mode.	Disconnected
JMP7-JMP10	On Board FPGA Program Control	Connected – SPI_CP=0. Disconnected – SPI_CP=1. See the TDMoP IC data sheet for pin description. For proper operation do not connect this jumper when the board is configured for CPU bus mode.	PROM_PROG
JP1-JP5	JTAG Chain Isolation	Connected – Add the JTAG chain of the daughter card to the JTAG chain of the motherboard. Disconnected – Isolate the JTAG chain of the daughter card from the JTAG chain of the motherboard.	Disconnected
JMP1	TDMoP IC RXTSEL Pin Control	Down – RXTSEL=0 Up – RXTSEL=1 See the TDMoP IC data sheet for pin description.	Up
JMP4	TDMoP IC TXENABLE Pin Control	Down – TXENABLE=0 Up – TXENABLE =1 See the TDMoP IC data sheet for pin description.	Up
JMP2	TDMoP IC STMD Pin Control	Down – STMD=0 Up – STMD =1 See the TDMoP IC data sheet for pin description. Must have STMD=0 for proper operation. STMD=1 is only used for factory test of the TDMoP IC.	Down
JMP6	TDMoP IC SCEN Pin Control	Down – SCEN=0 Up – SCEN =1 See the TDMoP IC data sheet for pin description. Must have SCEN=0 for proper operation. SCEN=1 is only used for factory test of the TDMoP IC.	Down
JMP5	TDMoP IC CLK_SYS_S Pin Control	Down – CLK_SYS_S=0 Disconnected – CLK_SYS_S=0 Up – CLK_SYS_S=1 See the TDMoP IC data sheet for pin description.	Disconnected
JMP3	TDMoP IC HIZ_N Pin Control	Down – HIZ_N=0 Up – HIZ_N =1 See the TDMoP IC data sheet for pin description. Must have HIZ_N=1 for proper operation.	Up
JMP24	CLK_HIGH Source	Down – Local Oscillator (component position Y1, Y2, Y3, Y4 or Y6 or U11). Up – SMB Connector (J4)	Down
JMP25	Power Supply for CLK_HIGH local oscillator.	3.3V – 3.3V Supply 5V – 5V Supply	3.3V

Note: The terms "Up" and "Down" in the table above assume the board is oriented as shown in [Figure 2-2](#).

2.3 Connecting to the Ethernet Network Equipment

DS34T108DK is connected to Ethernet network equipment via the 8-pin RJ-45 port designated ETH-UPLINK. Refer to [Appendix A](#) for the connector pin arrangement.

Figure 2-3. ETH-UPLINK Connector

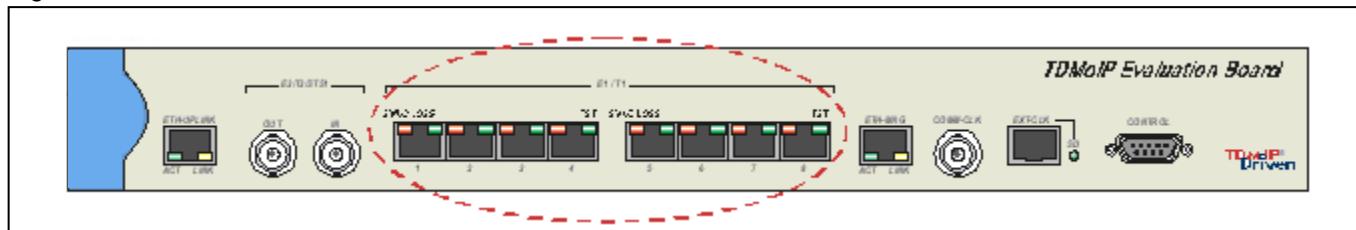


Connect DS34T108DK to the Ethernet network equipment using a standard straight UTP cable.

2.4 Connecting to the TDM Equipment

DS34T108DK is connected to the TDM equipment via E1/T1 balanced RJ-45 ports. Refer to [Appendix A](#) for the connector pin arrangement. Connect DS34T108DK to the TDM equipment using standard straight E1/T1 cables.

Figure 2-4. E1/T1 Connectors

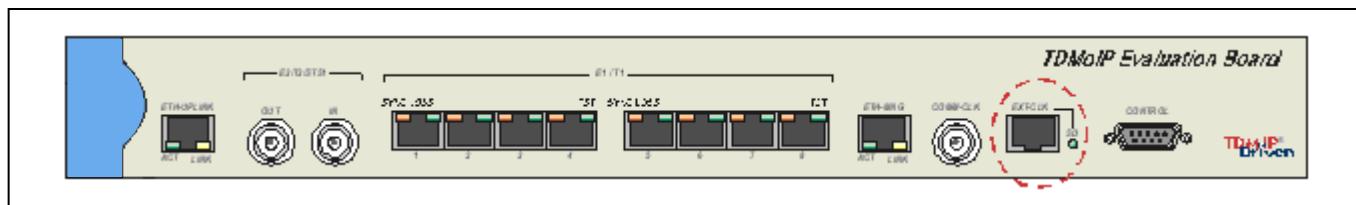


2.5 Connecting to the Clock Sources

2.5.1 Connecting to the External Clock Source

DS34T108DK is connected to an external clock source via a balanced RJ-45 connector designated EXT-CLK. Refer to [Appendix A](#) for the connector pin arrangement.

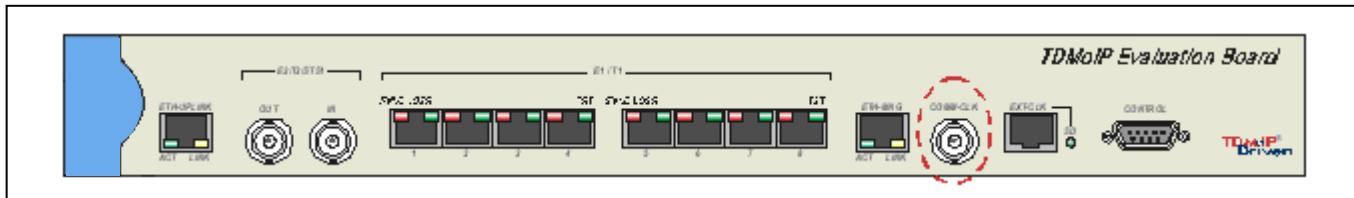
Figure 2-5. EXT-CLK Connector



2.5.2 Connecting to the Common Clock Source

DS34T108DK is connected to a common clock source via an unbalanced BNC connector designated COMM-CLK. Connect DS34T108DK to the common clock source using a using a 75Ω coaxial cable. The input signal must be LVTTL (square-wave with 0/3.3V levels).

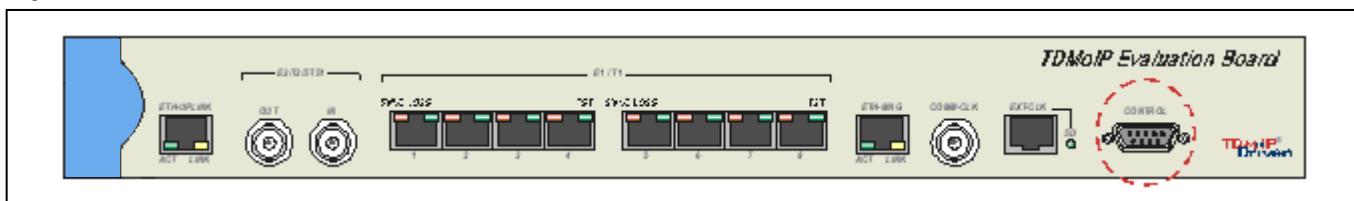
Figure 2-6. COMM-CLK Connector



2.6 Connecting to an ASCII Terminal

DS34T108DK is connected to an ASCII terminal via a 9-pin D-type female connector designated CONTROL. Refer to [Appendix A](#) for the connector pin arrangement.

Figure 2-7. CONTROL Connector



To connect to an ASCII terminal:

1. Connect a serial cable with male 9-pin D-type connector to the CONTROL connector.
2. Connect the other end of the serial cable to an ASCII terminal.

3 Operation

This section:

- Provides a detailed description of the front panel indicators and their functions
- Explains DS34T108DK configuration using an ASCII terminal.

For detailed explanations of parameters on the menus, see section 4.

3.1 Front Panel Indicators

The unit's LEDs are located on the front panel (see [Figure 3-1](#)). [Table 3-1](#) lists the functions of the DS34T108DK LED indicators.

Figure 3-1. DS34T108DK Front Panel

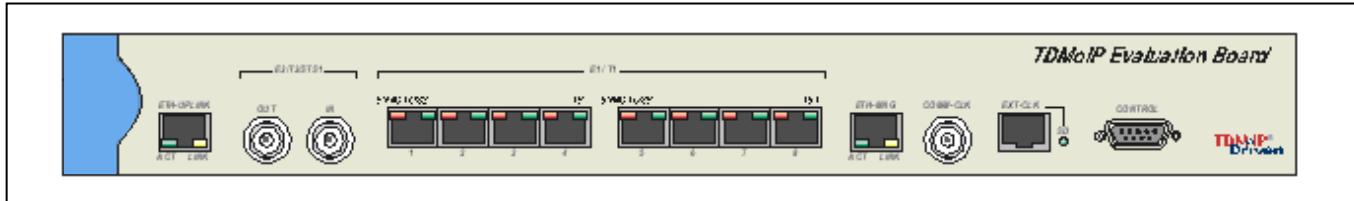


Table 3-1. DS34T108DK LEDs and Controls

Name	Type	Function
SYNC LOSS	Red LED	ON – Loss of E1/T1 synchronization has been detected
TST	Red LED	ON – RDI has been detected
ACT	Green LED	ON – Ethernet link is connected OFF – Ethernet link is disconnected
LINK	Yellow LED	ON – Data is being transmitted/received at the Ethernet interface OFF – No data is being transmitted/received at the Ethernet interface
SD	Green LED	ON – Valid signal is detected at the external clock interface OFF – No valid signal is detected at the external clock interface

3.2 User Interface Software

3.2.1 Using the Control Port and an ASCII Terminal

The DS34T108DK can be configured and monitored using an ASCII terminal connected to the Control port on the DS34T108DK front panel. The Control port is a V.24/RS-232 asynchronous DCE port terminated in a 9-pin D-type female connector. The DS34T108DK continuously monitors Control port signals from the ASCII terminal and immediately responds to any input string received through this port.

To access the user interface software using an ASCII terminal:

1. Make sure all DS34T108DK cables and connectors are properly connected.
2. Connect DS34T108DK to a PC equipped with ASCII terminal emulation software (for example, Windows Hyper Terminal or Procomm).
3. Set the port parameters of the control terminal PC to 115.2 kbps, 8 bits/character, 1 stop bit, no parity. If available, set the terminal emulator to ANSI VT100 emulation (for optimal view of system menus).
4. Turn on the DS34T108DK using the rear panel POWER switch.

5. At the end of the initialization and self-test, system software detects the part number of the TDMoP IC on the internal daughter card and displays it on the terminal screen (e.g. **This is a T108 board**). If the daughter card has a DS34T10x, (x = 1, 2, 4 or 8) IC installed, system software asks **Use External Framer? (y/n)**. To use the T10x series IC's on-chip E1/T1 framers and LIUs, press **n**. To bypass the on-chip framers and LIUs and instead use the E1/T1 framers and LIUs on the motherboard, press **y**.

If the daughter card has a DS34S10x (x = 1, 2, 4 or 8) IC installed (these do not have on-chip E1/T1 framers and LIUs) software automatically configures the system to use the E1/T1 framers and LIUs on the motherboard and does not display the **Use External Framer? (y/n)** prompt.

6. For systems running the Linux operating system, the configuration application is automatically started, and the main configuration menu ([Figure 3-2](#)) is automatically displayed.

For systems running the VxWorks operating system, after the text **INIT HAL DONE !!!!** appears, press **Enter** to get the arrow prompt. At the prompt, type **configTop** (case-sensitive) and press **Enter** to run the configuration application.

3.2.2 Using Telnet through the Ethernet Management Port

The DS34T108DK can be configured and monitored remotely over an IP/Ethernet network if its Ethernet client and therefore can be assigned and IP address automatically by the network's DHCP server.

To access the user interface software using a telnet session:

1. Turn on the DS34T108DK using the rear panel POWER switch.
2. Connect the ETH-MNG port of the DS34T108DK to the local IP/Ethernet network.
3. Using an ASCII terminal connected as described in section above, determine the IP address of the DS34T108DK by selecting **Utilities** from the main configuration menu and then selecting **Management network info**.
4. On a PC connected to the IP/Ethernet network, run "cmd" to get a DOS-like text interface window.
5. At the command prompt, type **telnet** followed by the IP address determined in step 3 above.
6. At the **login:** prompt, type **target**. At the **password:** prompt, type **password**.
7. At the arrow prompt, type **configTop** and press **Enter** to run the configuration application.

Important: The user DS34T108DK will only allow one telnet session at a time. When you are done with the telnet session, you must type **bye** followed by the **Enter** key to close the telnet session. If this closing step is not done before the telnet window is closed on the remote PC, the telnet session will remain open on the DS34T108DK, and you will not be able to telnet in again until the DS34T108DK is rebooted.

Figure 3-2. Main Configuration Menu

```

SW Version          1.2.0

Main Configuration (T108, Internal Framer)

1. Preconfig Configuration
2. General Configuration
3. Interface Configuration
4. Bundle Configuration
5. Bundle Management
6. Restore Default Configurations
7. Alarms
8. Performance (PM)
9. Utilities

Please select item <1 to 9>
q: exit, s: save, ESC: previous menu, r or Enter: reprint screen

Please enter your choice:

```

3.2.3 Choosing Options

To select a menu item, type the corresponding item number and then press **Enter**. If the selected item leads to another menu, the DK software displays the menu. If the selected item is a configurable parameter, the software displays descriptive text about the parameter and then, for parameters with only a few possible settings, displays a numbered list of possible values (e.g. “1: Enable, 2: Disable”) and a prompt such as “Please enter your choice: “. For parameters with many possible values, the software displays descriptive text followed by a prompt at which a value can be entered (e.g. “Please enter your clock rate: “).

The selection or value entered for each parameter is checked after pressing **Enter**, and only valid entries are accepted. If an entry is invalid, the software displays a prompt such as “Please enter a valid choice: “ and gives another opportunity to enter a valid selection number or value.

To navigate upward in the menu hierarchy toward the main menu, press **Esc**.

3.2.4 Redisplaying the Current Menu

To redisplay the current menu, type **r** and press **Enter** or simply press **Enter**.

3.2.5 Saving Changes

After changing the values of one or more parameters in a configuration menu, type **s** then **Enter** to save the changes and write them to the TDMoP IC. If changes are not saved in each menu, attempts to change parameters in other menus may not behave as expected. For example, changes in the Interface Configuration menu must be saved before activities in the Bundle Configuration menu behave correctly, (especially saving a bundle configuration).

4 Configuration

This section discusses the DS34T108DK configuration menus and explains their parameters.

- [Preliminary Configuration](#)
- [Configuring General Parameters](#)
- [Configuring TDM Interfaces](#)
 - [Configuring E1 Interface](#)
 - [Configuring T1 Interfaces](#)
- [Configuring Bundles](#)
 - [Configuring AAL1 Bundles](#)
 - [Configuring HDLC Bundles](#)
 - [Configuring SAToP Bundles](#)
 - [Configuring CESoPSN Bundles](#)
- [Deleting Bundles](#)
- [Displaying Active Bundles](#)
- [Restoring Default Configurations](#)

4.1 Preliminary Configuration

For the convenience of the user, parameters that must be configured, such as link type, TDMoIP and IP versions and clock recovery statistics, are given in the Preliminary Configuration menu. See [Figure 4-1](#) below.

Figure 4-1. Preliminary Configuration Menu

```

PreConfig Configuration

1. Link Type E1
2. Bundle Number ID Location Port in DST, Bundle in SRC UDP Port
3. UDP Mask 1FFF
4. VCCV OAM Mask [0 - 4] 0
5. VCCV OAM Value 1FFF
6. MEF Ethernet Type 88D8
7. MEF OAM Type 0
8. TDMoIP Port Number 1 85E
9. Oscillator Type OCXO (Stratum 3E)
10. RTP Clock Source ABSOLUTE
11. Common clock Rate 25000000
12. IP Version IPv4
13. Clock Recovery Smart Statistics Enable
14. One or Two Clock Mode One
15. CLK_HIGH Frequency Selection 38.88 MHZ

Please select item <1 to 15>
q: exit, s: save, ESC: previous menu, r or Enter: reprint screen

Please enter your choice:

```

Table 4-1. Preliminary Configuration Parameter Descriptions

Parameter	Description	Possible Values
Link Type	Specifies the type of TDM interface (link). All TDM interfaces on a TDMoP IC must be the same type.	E1, T1, E3, T3, STS-1, Nx64 E3, T3 and STS-1 are not yet supported by the user interface software. Default: T1
Bundle Number ID Location	Defines location of the bundle identification number	Ignore Port & Bundle in SRC UDP PORT Port in SRC & Bundle in DST UDP PORT Port in DST & Bundle in SRC UDP PORT Ignore Port & Bundle in DST UDP PORT Default: Port in DST & Bundle in SRC UDP PORT
UDP Mask	This mask can be used to Indicate the width of the bundle identifier. For example, if the desired width is 8 bits, the following should be written to this field: 00000001111111b.	0-0xFFFF Default: 1FFF
VCCV OAM Mask	Indicates which of the 16 MSbits of the control word are used to identify VCCV OAM packets. The mask is active when one of the bits is set to '0'.	0-0xFFFF Default: 0xF000
VCCV OAM Value	Indicates the value of the 16 MSbits of the control word that identifies VCCV OAM packets.	0-0xFFFF Default: 0x1000
MEF Ethernet Type	Ethertype for MEF packets. Must be set to a value greater than 0x5DC.	0-0xFFFF Default: 88D8
MEF OAM Type	Ethertype for MEF OAM packets. Must be set to a value greater than 0x5DC.	0-0xFFFF Default: 0800
TDMoIP Port Number 1	Used to identify UDP/IP TDMoIP packets. Its value is compared to either UDP_SRC_PORT_NUM or UDP_DST_PORT_NUM, according to Bundle Number ID Location (above)	0-0xFFFF Default: 85E
Oscillator Type	The oscillator used as the clock recovery reference clock	TCXO (Stratum 3) OCXO (Stratum 3E) Default: OCXO (Stratum 3E)
RTP Clock Source	Indicates the RTP timestamp generation mode	ABSOLUTE – Absolute mode DIFFERENTIAL – Differential (common clock) mode Default: ABSOLUTE
Common Clock Rate	Defines common clock rate	Default: 25000000
IP Version	IP version number	IPv4 – IP version number 4 Ipv6 – IP version number 6 Default: IPv4
Clock Recovery Smart Statistics	Controls Smart Statistics mode. Smart Statistics must be enabled when the switch-based network type mode is used for the clock recovery scheme for one of the interfaces.	Enable – Smart Statistics are enabled Disable – Smart Statistics are disabled Default: Enable
One Clock or Two Clock mode	Select One Clock or Two Clock Mode. In One Clock mode the TDM-to-Ethernet direction is clocked by the same clock as the Ethernet-to-TDM direction. In Two Clock mode the TDM-to-Ethernet direction is clocked by the TDM clock.	One – One Clock mode Two – Two Clock mode Default: One
CLK_HIGH Frequency Selection	Selects one of the four options for CLK_HIGH frequency	38.88 MHz 19.44 MHz 10 MHz 77.76 MHz Default: 38.88MHz

4.2 Configuring General Parameters

Figure 4-2. General Configuration

Main Menu
↓
General Configuration

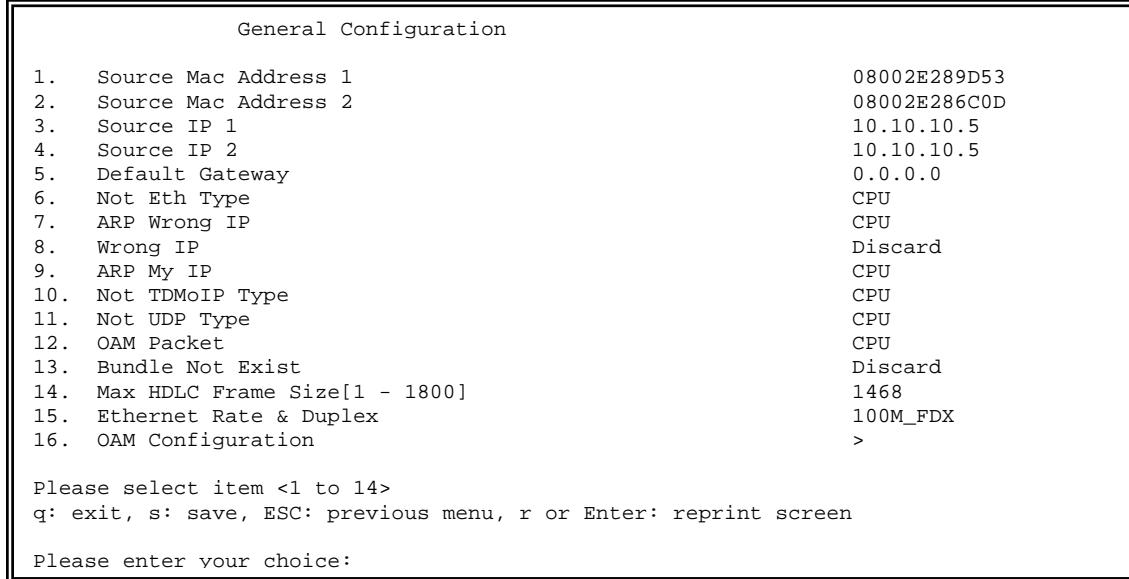


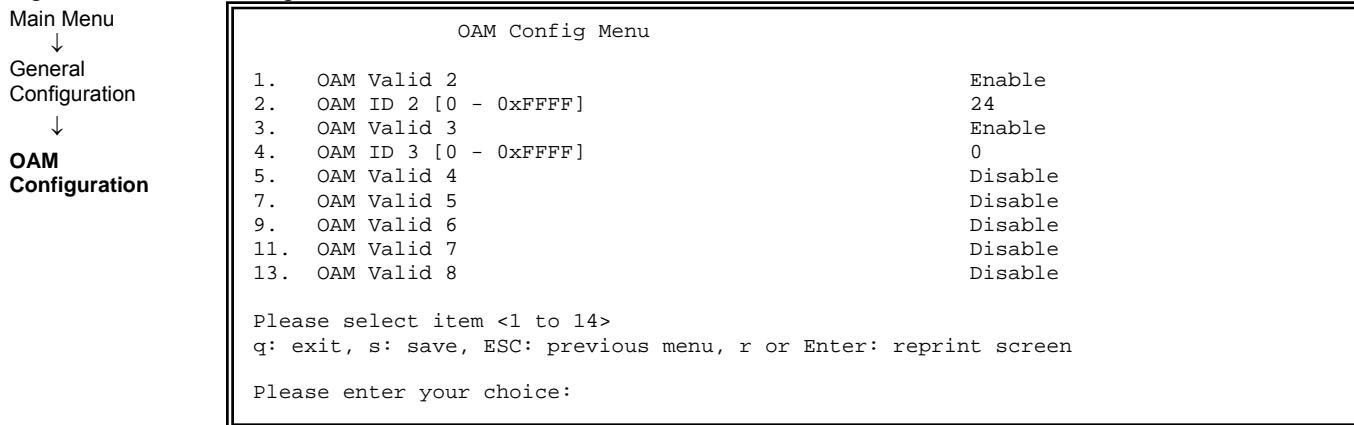
Table 4-2. General Configuration Parameter Descriptions

Parameter	Description	Possible Values
Source MAC address 1	Port local MAC address	Up to 12 alphanumeric characters Default: 08002E289D53
Source MAC address 2	Second host MAC address	Up to 12 alphanumeric characters Default: 08002E289D53
Source IP 1	Host IP address (Note 1)	0.0.0.0 to 255.255.255.255 Default: 10.10.10.4
Source IP 2	Second host IP address (Note 1)	0.0.0.0 to 255.255.255.255 Default: 10.10.10.4
Default Gateway	IP address of default gateway	0.0.0.0 to 255.255.255.255 Default: 0.0.0.0
Not Eth Type	Specifies what to do with packets received from ETH uplink port, where Ethertype does not match one of the following: IP, MPLS, ARP, MEF, MEF OAM or CPU	Discard – Drops these packets CPU – Passes these packets to the CPU Default: CPU
ARP wrong IP	Specifies what to do with ARP packets received from ETH uplink port, where IP is different from source IP	Discard – Drops these packets CPU – Passes these packets to the CPU Default: CPU
Wrong IP	Specifies what to do with packets received from ETH uplink port with IP different from all source IPs	Discard – Drops these packets CPU – Passes these packets to the CPU Default: CPU
ARP My IP	Specifies what to do with ARP packets received from ETH uplink port, where IP is identical to source IP.	Discard – Drops these packets CPU – Passes these packets to the CPU Default: CPU
Not TDMoIP Type	Specifies what to do with packets received from ETH uplink port, where UDP destination/source port is not TDMoIP	Discard – Drops these packets CPU – Passes these packets to the CPU Default: CPU
Not UDP Type	Specifies what to do with packets received from ETH uplink port, where protocol is not UDP	Discard – Drops these packets CPU – Passes these packets to the CPU Default: CPU

Parameter	Description	Possible Values
OAM Packet	Specifies what to do with TDMoIP OAM packets	Discard – Drops these packets CPU – Passes these packets to the CPU Default: CPU
Bundle Not Exist	Specifies what to do with packets received from ETH uplink port, where bundle identifier is not one of the identifiers assigned in the TDMoP IC	Discard – Drops these packets CPU – Passes these packets to the CPU Default: Discard
Max HDLC Frame Size	Maximum size of HDLC packet in bytes (header and FCS are not included)	1-1800 for IP 1-1800 for MPLS Default: 1800
Ethernet Rate & Duplex	If autonegotiation is enabled, rate and duplex must be configured to a value equal or greater than the rate and duplex mode of the network. If autonegotiation is disabled, the rate and duplex must be configured equal to the rate and duplex of the network.	10M Half-duplex, 10M Full duplex, 100M Half-duplex, 100M Full duplex Default: 100M Full duplex
OAM Configuration	Selecting this option causes the OAM Configuration submenu to be displayed.	n/a

Notes:

1. Source IP 1 and Source IP 2 can reside in different subnets. However, the IP mask is used for both source IPs. Either Source IP 1 or Source IP 2 can be selected in the Bundle Configuration Menu (see Configuring Bundles).

Figure 4-3. OAM Configuration**Table 4-3. OAM Configuration Parameter Descriptions**

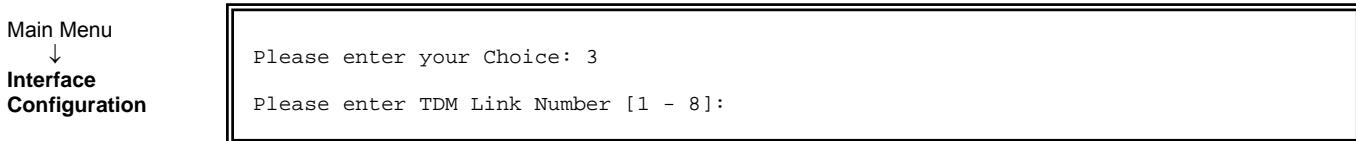
Parameter	Description	Possible Values
OAM Valid n	Enables/disables OAM ID n ($2 \leq n \leq 8$).	Enable Disable Default: Disable
OAM ID n	Specifies OAM ID n ($2 \leq n \leq 8$). These IDs are bundle IDs for UDP/IP-specific OAM. If the bundle ID of an incoming packet matches an enabled OAM ID then the packet classifier in the TDMoP IC considers the packet to be an OAM packet and discards or forwards it to the CPU as specified by the OAM Packet field described above.	0 – 0xFFFF Default: 0

4.3 Configuring TDM Interfaces

The number of TDM interfaces available depends on the TDMoP IC on the daughter card. A DS34T10x or DS34S10x IC has x TDM interfaces (x = 1, 2, 4 or 8). The user interface software only allows configuration of the number of TDM interfaces actually supported by the installed IC.

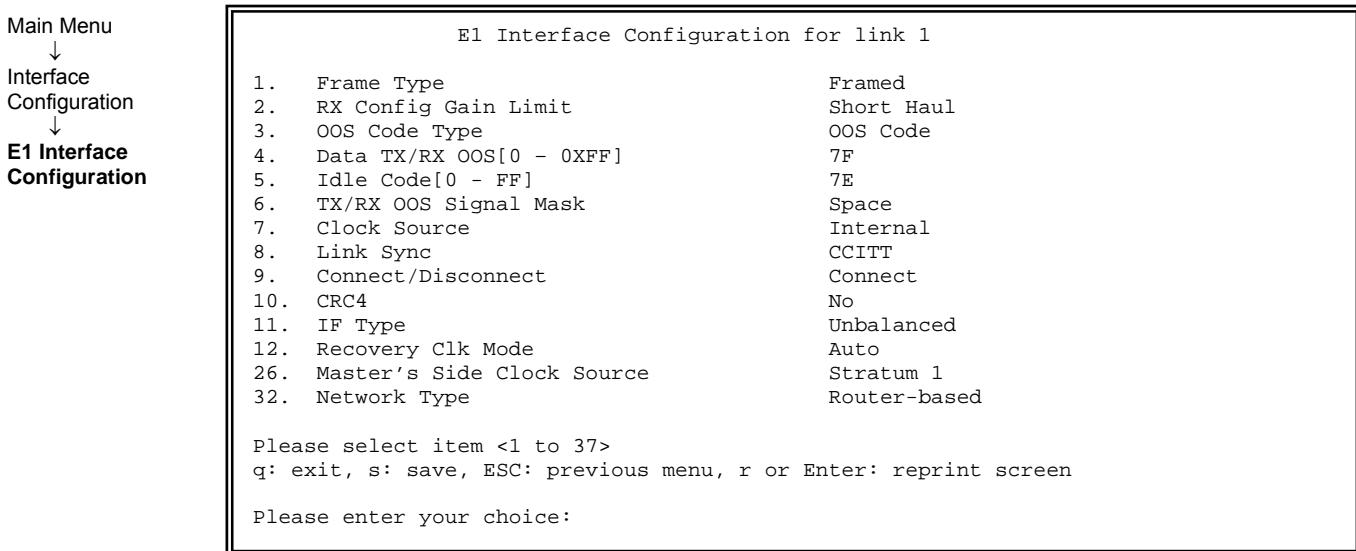
To configure a TDM interface, select **Interface Configuration** from the main configuration menu. Then at the prompt (Figure 4-4) enter the interface number. The Interface Configuration menu is then displayed, either Figure 4-5 (E1) or Figure 4-6 (T1), depending on the setting of the **Link Type** parameter in the Preliminary Configuration menu.

Figure 4-4. TDM Interface Selection



4.3.1 Configuring E1 Interfaces

Figure 4-5. E1 Interface Configuration



Note: The settings for some parameters in this configuration menu determine whether other parameters in the menu are displayed or not. For example, if **Recovery Clk Mode** is set to **Auto** then items 13-25 and 27-31 are not displayed because their values are ignored in that mode. The parameter descriptions in the table below have notes indicating the necessary conditions for a parameter to be displayed. See, for example, the **Acquisition Switch** parameter.

Table 4-4. E1 Interface Configuration Parameter Descriptions

Parameter	Description	Possible Values
Frame Type	Framing mode and operation mode for each configuration Note: Before changing the E1 frame type, you must close all bundles assigned to the link.	Unframed – Framer is configured to pass through mode and the operation mode will be set to Unframed. Framed – The E1 framer is set for simple FAS/NFAS framing and the TDMoP block is set to fractional. Multi-Frame – The E1 framer is set to MF mode and the TDMoP block is set to fractional with CAS. Default: Framed
Rx Config Gain Limit	Determines the maximum attenuation of the receive signal that can be compensated for by the E1 link receive path, to obtain the BER performance required by the standards.	Long Haul – Maximum attenuation of 36 dB Short Haul – Maximum attenuation of 10 dB. This configuration may actually improve the performance when operating over relatively short line sections, especially when operating over multi-pair cables. In such cables, significant interference is generated by the signals carried by other pairs, and therefore a weak desired signal may be masked by the interference. Default: Short Haul
OOS Code Type	Defines what to send if an OOS state occurred	Last Byte Received – Last received byte is sent OOS Code – OOS code is sent Default: OOS Code
Data TX/RX OOS	Can be applied to timeslots transmitted towards the ETH network when loss of signal, loss of frame or AIS is detected at the E1 line. Can also be applied to timeslots transmitted toward the E1 line when Packet Receive Buffer overrun or underrun occurs. In Unframed mode, OOS state will result in AIS transmission. This will be applied when a LOS is detected at the E1 line, or when Packet Receive Buffer overrun or underrun occurs.	0-FF Default: 7E
Idle Code	Determines the idle code inserted into unassigned timeslots by DS34T108DK in the transmit path towards E1 equipment.	0-FF Default: 7E
Tx/Rx OOS Signal Mask	Out-of-service signaling method. OOS signal is sent in the Ethernet direction when loss of signal, loss of frame, or AIS is detected at the E1 line. The OOS signal is also sent toward the E1 line when packet receive buffer overrun or underrun occur	Space – Transmit CAS All 0s, when the Ethernet or TDM link is down Mark – Transmit CAS all 1s, when the Ethernet or TDM link is down Space + Mark – Transmit All 0s in CAS for the first 2.5 seconds, then switch to All 1s Mark + Space – Transmit All 1s in CAS for the first 2.5 seconds, then switch to All 0s. Default: Space
Clock Source	Defines transmit clock source used by the interface	Recovery – Clock recovery regeneration from the ETH uplink Loopback – E1 recovered receive clock is used as the transmit clock Internal – A local clock source is used Station/System – The station/system clock input is used as the transmit clock Default: Internal
Link Sync	Selects the E1 Local Sync Loss Alarm recovery time	CCITT – Complies with ITU-Rec.G.732 62411 – 10 sec Sync Fast – 1 sec Default: CCITT
Connect/Disconnect	Defines if link is connected	Connect – Link is connected Disconnect – Link is disconnected Default: Disconnect

Parameter	Description	Possible Values
CRC4	Enables the generation of CRC bits (in accordance with the CRC-4 polynomial specified by ITU-T Rec. G.704) for the frames transmitted on the E1 link, and the checking of the CRC bits carried by the received E1 link frames	No – CRC-4 option is disabled Yes – CRC-4 option is enabled Default: No
IF Type	Defines E1 interface type	Balanced, Unbalanced Default: Balanced
Recovery Clk Mode	Defines recovery clock mode	Auto – Extended clock recovery parameters are set automatically Manual – Extended clock recovery parameters are set manually. Default: Auto
Acquisition Switch	Determines whether the acquisition phase is enabled during the first clock recovery operation phase. (Note 1)	ON – Acquisition switch is enabled OFF – Acquisition switch is disabled Default: ON
Smart Delta Switch	Controls Smart Delta Switch. This parameter must be enabled when the switch-based network type mode is used for this interface clock recovery scheme. (Note 1)	ON – Smart Delta Switch is enabled OFF – Smart Delta Switch is disabled Default: ON
Smart Delta Timeout	Controls Smart Delta timeout. This parameter must be enabled when the switch-based network type mode is used for this interface clock recovery scheme. (Note 1)	ON – Smart Delta timeout is enabled OFF – Smart Delta timeout is disabled Default: ON
BW Adaptation Switch	Controls the bandwidth adaptation function. (Note 1)	ON – Bandwidth adaptation is enabled OFF – Bandwidth adaptation is disabled Default: ON
Const Delay Change	Controls the Constant Delay change detection function. (Note 1)	ON – Constant Delay change detection enabled OFF – Constant Delay change detection disabled Default: ON
Freeze System	Controls the state of the recovered clock frequency. (Note 1)	ON – Recovered clock frequency is frozen (holdover) OFF – Recovered clock frequency is not frozen Default: OFF
BW Adapter Lower Level	Defines the narrowest bandwidth to be used when BW Adaptation Switch is ON. (Note 1)	0–7 Default: 0
BW Adapter Upper Level	Defines the widest bandwidth to be used when BW Adaptation Switch is ON. (Note 1)	0–7 Default: 0
Adaptive JB Reset Enable	Determines whether to reset the bundle upon detection of wrong jitter buffer level after bundle reopening or upon jitter buffer underrun. (Note 1)	Enable Disable Default: Disable
Adaptive SW Reset Enable	Determines whether to reset the clock recovery state machine upon detection of clock recovery failure. (Note 1)	Enable Disable Default: Enable
CDC Threshold Track 1	Minimum Constant Delay Change threshold in tracking1. (Note 1)	Default: 2000
CDC Threshold Track 2	Minimum Constant Delay Change threshold in tracking2. (Note 1)	Default: 1000
Frequency Deflection	Determines the number of consecutive CDCs detections causing the software to reset the clock recovery state machine. When set to 0, the software monitoring is disabled. (Note 1)	Default: 0
Master's Side Clock Source	The type of the master's side source clock.	Stratum 1 Stratum 2 Stratum 3 Stratum 3E Stratum 4 Default: Stratum 1
SDT Threshold	Defines Smart Delta T threshold. (Note 1)	Default: 6

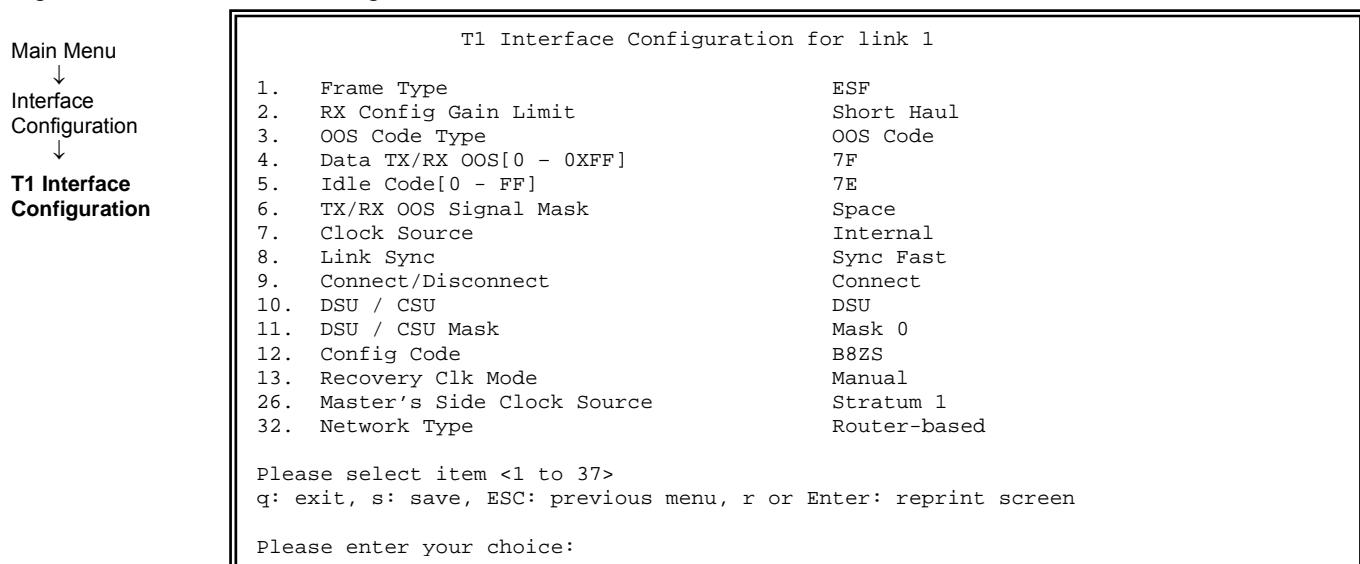
Parameter	Description	Possible Values
SDT Threshold Hysteresis	Defines Smart Delta T threshold hysteresis. (Note 1)	Default: 2
Sliding Window	Defines Smart Delta T sliding window size. (Note 1)	Default: 10
pdV Adev Target	Defines pdv adev target. (Note 1)	Default: 800
pdV Adev Tgt Indf Zone	Defines pdv adev trg indf zone. (Note 1)	Default: 200
Network Type	Model used for simulating distribution of the packet delay variation in the network	Router-based Switch-based Default: Router-based

Notes:

- These fields only available when **Recovery Clock Mode** is set to **Manual**.

4.3.2 Configuring T1 Interfaces

Figure 4-6. T1 Interface Configuration



Note: The settings for some parameters in this configuration menu determine whether other parameters in the menu are displayed or not. For example, if **Recovery Clock Mode** is set to **Auto** then items 13-25, and 27-31 are not displayed because their values are ignored in that mode. The parameter descriptions in the table below have notes indicating the necessary conditions for a parameter to be displayed. See, for example, the **Acquisition Switch** parameter.

Table 4-5. T1 Interface Configuration Parameter Descriptions

Parameter	Description	Possible Values
Frame Type	Framing mode and operation mode for each configuration Note: Before changing the T1 frame type, you must close all bundles assigned to the link.	UnFramed – Framer is configured to pass through mode and the operation mode will be set to unframed. ESF – Framer is configured to T1-ESF mode. Operation mode is set by the Robbed Bit field to either Fractional or Fractional with CAS. SF – Framer is configured to T1-SF mode. Operation mode is set by the Robbed Bit field to either Fractional or Fractional with CAS. Default: ESF

Parameter	Description	Possible Values
Rx Config Gain Limit	Determines the maximum attenuation of the receive signal that can be compensated for by the T1 link receive path, to obtain the BER performance required by the standards.	Long Haul – Maximum attenuation of 36 dB Short Haul – Maximum attenuation of 10 dB. This configuration may actually improve the performance when operating over relatively short line sections, especially when operating over multi-pair cables. In such cables, significant interference is generated by the signals carried by other pairs, and therefore a weak desired signal may be masked by the interference. Default: Short Haul
OOS Code Type	Inserted into unassigned timeslots by the system at the transmit path towards the T1 equipment. This parameter is not displayed when the frame type is set to unframed.	Last Byte Received – Last received byte is sent OOS Code – OOS code is sent Default: OOS Code
Data TX/RX OOS	Can be applied to timeslots transmitted towards the ETH network when loss of signal, loss of frame or AIS is detected at the T1 line. Can also be applied to timeslots transmitted towards the T1 line when a Packet Receive Buffer overrun or underrun occurs. In Unframed mode, Voice/Data OOS state will result in AIS transmission. This will be applied when a LOS is detected at T1 line, or when a Packet Receive Buffer overrun or underrun occurs.	00-FF Default: 7F
Idle Code	Determines the idle code inserted into unassigned timeslots by DS34T108DK in the transmit path towards E1 equipment.	0-FF Default: 7E
Tx/Rx OOS Signal Mask	Out-of-service signaling method. OOS signal is sent in the Ethernet direction when loss of signal, loss of frame, or AIS is detected at the T1 line. The OOS signal is also sent toward the T1 line when packet receive buffer overrun or underrun occur	Space – Transmitting CAS All 0s, when the Ethernet or TDM link is down Mark – Transmitting CAS all 1s, when the Ethernet or TDM link is down Space + Mark – Transmitting All 0s in CAS for the first 2.5 seconds, then switching to All 1s Mark + Space – Transmitting All 1s in CAS for the first 2.5 seconds, then switching to All 0s. Default: Space
Clock Source	Defines transmit clock source used by the interface	Recovery – Clock Recovery regeneration from ETH uplink Loopback – T1 recovered receive clock is used as the transmit clock Internal – Local clock source is used Station/System – The station/system clock input is used as the transmit clock Default: Internal
Link Sync	Selects the T1 Red Alarm recovery time	Sync Fast – 1 sec 62411 – 10 sec Default: 62411
Connect/Disconnect	Defines if link is connected	Connect – Link is connected Disconnect – Link is disconnected Default: Connect

Parameter	Description	Possible Values
DSU/CSU		<p>CSU – If the port interface operates as a CSU, it is necessary to adjust the T1 output transmit level, for reliable operation of the network, and for compliance with FCC Rules Part 68A. This adjustment is used to minimize the interference caused by a local transmit signal to other users that transmit their signals on other pairs of the same cable.</p> <p>The required setting depends mainly on the length of the cable that connects between the T1 port and the first repeater down the link. Repeaters are usually located every mile, and therefore, they are designed to optimally handle signals attenuated by one-mile length of cable. If the T1 port is closer, the repeater will receive a T1 signal at a higher level. This will not significantly improve handling of the T1 signal, but will certainly increase the interference coupled from the T1 pair to repeaters that serve other pairs in the cable.</p> <p>To prevent this, an attenuation value can be selected that brings the T1 signal level closer to the expected repeater signal level. This is achieved by enabling circuitry in the T1 transmitter that pre-attenuates the signal by 7.5dB, 15dB or 22.5dB, effectively emulating 1000, 2000 or 3000 feet of cable.</p>
DSU/CSU Mask		<p>DSU – In this case, the transmit signal mask can be selected in accordance with the transmit line length, to meet DSX-1 requirements, as specified by AT&T CB-119, or operation in accordance with FCC Rules Part 68.</p> <p>For compliance with DSX-1 specifications per AT&T CB-119 and ANSI T1.102-1987, select the value corresponding to the length of the cable (in feet) connected between the T1 port connector and network entry point.</p> <p>Default: DSU</p>
Config Code	Specifies the line coding	<p>CSU:</p> <p>Mask 0 – No attenuation</p> <p>Mask 1 – Attenuation of 7.5 dB relative to nominal</p> <p>Mask 2 – Attenuation of 15 dB relative to nominal</p> <p>Mask 3 – Attenuation of 22.5 dB relative to nominal</p> <p>DSU:</p> <p>Mask 0 – 000 to 133 ft</p> <p>Mask 1 – 133 to 266 ft</p> <p>Mask 2 – 266 to 399 ft</p> <p>Mask 3 – 399 to 533 ft</p> <p>Mask 4 – 533 to 655 ft</p> <p>Default: Mask 0</p>
Recovery Clk Mode	Defines recovery clock mode	<p>B8ZS</p> <p>AMI</p> <p>Default: B8ZS</p> <p>Auto – Extended clock recovery parameters are set automatically</p> <p>Manual – Extended clock recovery parameters are set manually.</p> <p>Default: Auto</p>
Acquisition Switch	Determines whether the acquisition phase is enabled during the first clock recovery operation phase. (Note 1)	<p>ON – Acquisition switch is enabled</p> <p>OFF – Acquisition switch is disabled</p> <p>Default: ON</p>

Parameter	Description	Possible Values
Smart Delta Switch	Controls Smart Delta Switch. This parameter must be enabled when the switch-based network type mode is used for this interface clock recovery scheme. (Note 1)	ON – Smart Delta Switch is enabled OFF – Smart Delta Switch is disabled Default: ON
Smart Delta Self Test	Controls Smart Delta Test. (Note 1)	ON OFF Default: OFF
Smart Delta Timeout	Controls Smart Delta timeout. This parameter must be enabled when the switch-based network type mode is used for this interface clock recovery scheme. (Note 1)	ON – Smart Delta timeout is enabled OFF – Smart Delta timeout is disabled Default: ON
BW Adaptation Switch	Controls the bandwidth adaptation function. (Note 1)	ON – Bandwidth adaptation is enabled OFF – Bandwidth adaptation is disabled Default: ON
Const Delay Change	Controls the Constant Delay change detection function. (Note 1)	ON – Constant Delay change detection is enabled OFF – Constant Delay change detection is disabled Default: ON
Freeze System	Controls the state of the recovered clock frequency. (Note 1)	ON – Recovered clock frequency is frozen (holdover) OFF – Recovered clock frequency is not frozen Default: OFF
BW Adapter Lower level	Defines the narrowest bandwidth to be used when BW Adaptation Switch is ON. (Note 1)	0–7 Default: 0
BW Adapter Upper level	Defines the widest bandwidth to be used when BW Adaptation Switch is ON. (Note 1)	0–7 Default: 0
CDC Threshold Track 1	Minimum Constant Delay change threshold in tracking1. (Note 1)	Default: 2000
CDC Threshold Track 2	Minimum Constant Delay change threshold in tracking2. (Note 1)	Default: 1000
Frequency Deflection	Determines the number of consecutive CDCs detections causing the software to reset the clock recovery state machine. When set to 0, the software monitoring is disabled. (Note 1)	Default: 0
Master's Side Clock Source	The type of the master's side source clock	Stratum 1 Stratum 2 Stratum 3 Stratum 3E Stratum 4 Default: Stratum 1
SDT Threshold	Defines Smart Delta T threshold. (Note 1)	Default: 6
SDT Threshold Hysteresis	Defines Smart Delta T threshold hysteresis. (Note 1)	Default: 2
Sliding Window	Defines Smart Delta T sliding window size. (Note 1)	Default: 10
pDV Adev Target	Defines pdv adev target. (Note 1)	Default: 800
pDV Adev Tgt Indf Zone	Defines pdv adev trg indf zone. (Note 1)	Default: 200
Network Type	Model used for simulating distribution of the packet delay variation in the network	Router-based Switch-based Default: Router-based

Notes:

1. These fields only available when **Recovery Clk Mode** is set to **Manual**.

4.4 Configuring Bundles

To configure a bundle:

1. Configure general parameters (see section [4.2](#)).
2. Configure TDM interface (see section [4.3](#)).
3. From the main configuration menu ([Figure 3-2](#)) select **4. Bundle Configuration**.
4. Enter a bundle number at the prompt. Bundle number can be any number from 0 to 4095.
5. In the Bundle Configuration menu, select **1. Bundle Type** to specify the bundle type: AAL1, HDLC, SAToP, or CES.
6. Proceed with bundle configuration according to the bundle type (see sections [4.4.1](#) through [4.4.4](#) below).

Up to 64 bundles can be assigned in the TDMoP IC in E1 or T1 mode.

4.4.1 Configuring AAL1 Bundles

Figure 4-7. AAL1 Bundle Configuration

Main Menu		Bundle Configuration for ID 2	
↓		1. Bundle Type	AAL1
Bundle Configuration		2. Assign this Bundle to PCM port	1
↓		3. Timeslot Assignment [1-31]	1-31
AAL1 Bundle Configuration		4. TX Bundle Destination	Ethernet
		5. RX Bundle Destination	PCM
		6. TX Bundle Number[0 - 65535]	2
		7. RX Bundle Number[0 - 65535]	2
		8. Source IP Address	IP 1
		9. Destination Main MAC Address	08002E28F2E6
		10. Destination IP Address	10.10.10.6
		11. Next Hop IP	0.0.0.0
		12. IP ToS[0 - 255]	0
		13. IP TTL[0 - 255]	128
		14. Number of VLAN Tags[0 - 2]	0
		20. PSN Type	IP
		21. Switches Sanity Check	Discard
		22. Clock Recovery	No
		23. Differential Time (usec)[1 - 512000]	5000
		24. Max Buffer Size (usec)[0 - 512000]	0
		25. L Bit & OOS	OOS Mode Conditioning
		26. Redundant	Disable
		27. RTP Mode	Disable
		28. Next Hop Type	IP
		29. Enable JB Reset	On N Times
		30. Window Size[2 - 127]	83
		35. Payload Type	Data
		36. Frame size in Cell[1 - 30]	8
		37. Eth Cond Octet Type	Octet A
		38. TDM Cond Octet Type	Octet A
Please select item <1 to 43>			
q: exit, s: save, ESC: previous menu, r or Enter: reprint screen			
Please enter your choice:			

Note: The settings for some parameters in this configuration menu (for example **Bundle Type** and **PSN Type**) determine whether other parameters in the menu are displayed or not. Therefore, it is normal to have gaps in the item numbering, such as having nothing listed between items 14 and 20 in the figure above. The parameter descriptions in the table below have notes indicating the necessary conditions for a parameter to be displayed. See, for example, the **IP TOS** parameter.

Table 4-6. AAL1 Bundle Parameter Descriptions

Parameter	Description	Possible Values
Bundle Type	Select the bundle type.	AAL1 HDLC SAToP CES.
Assign this Bundle to PCM port	Number of the TDM interface to which the bundle is assigned	1–8
Timeslot Assignment	Assigns timeslots to the previously selected bundle, for example: 1–5, 7, 8, 9, 12–15	T1: 1 – 24 E1: 1 – 31
Tx Bundle Destination	Destination of the Tx data flow toward the ETH port Note: The Tx bundle destination cannot be changed after the bundle configuration has been saved.	Ethernet – TDM to Ethernet CPU – TDM to CPU Cross connect – TDM to TDM Default: Ethernet
Rx Bundle Destination	Destination of the Rx data flow from the ETH port Note: The Rx bundle destination cannot be changed after the bundle configuration has been saved.	CPU – CPU PCM – TDM (PCM bus) Discard – Discarded Default: PCM
Tx Bundle Number	Number of the desired Tx bundle	Default: 2
Rx Bundle Number	Number of the desired Rx bundle Note: Must be unique for each bundle ID.	Default: 2
Source IP Address	Assign the bundle one of the source IP addresses configured in General Configuration (see section 4.2)	IP 1, IP 2 Default: IP 1
Destination Main MAC address	MAC address of destination device Note: If the destination Main MAC address is different from the default value, the MAC will not be learned in the ARP process.	Default: 000000000000
Destination IP Address	IP address of the destination device	0.0.0.0 – 255.255.255.255
Next Hop IP	The Next Hop parameter should be used when the Destination IP Address is not in the device subnet. In such cases the Ethernet packet will be sent to the Next Hop IP. The default value of the Next Hop field is the default gateway. Note: The Next Hop must be in the same subnet as the Source IP address of the bundle ID.	0.0.0.0 – 255.255.255.255
IP ToS	Sets the IP ToS field in the IP ETH packets leaving DS34T108DK. ToS setting defines the whole byte , since different vendors may use different bits to tag packets for traffic prioritization. ToS assignment applies to all ETH packets leaving DS34T108DK for this bundle. Note: This parameter is displayed only if PSN Type is set to IP.	0–255 Default: 0
IP TTL	Sets the IP TTL field in the IP packets transmitted by the device. TTL assignment applies to all ETH packets leaving DS34T108DK for this bundle. Note: This parameter is displayed only if PSN Type is set to IP.	0–255 Default: 128

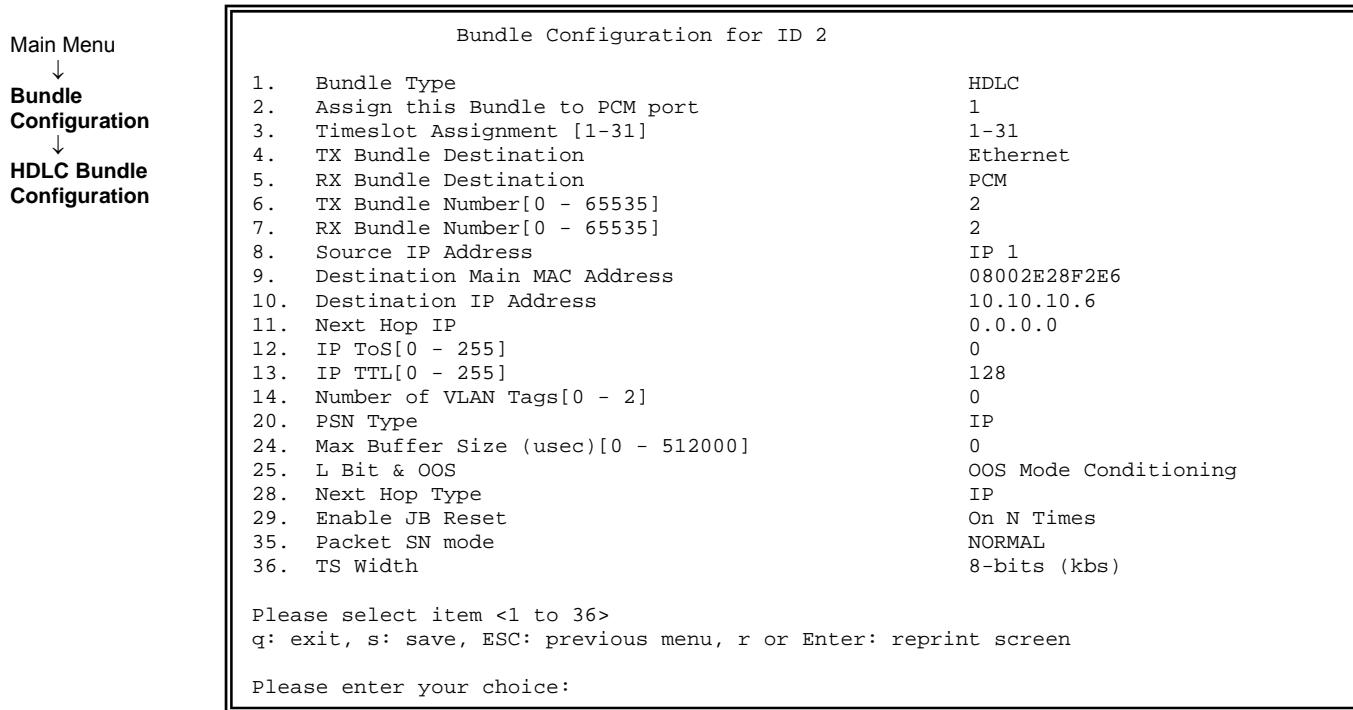
Parameter	Description	Possible Values
MPLS TTL	Sets the MPLS TTL field in the packets transmitted by the device. TTL assignment applies to all MPLS packets leaving DS34T108DK for this bundle. Note: This parameter is displayed only if PSN Type is set to MPLS .	0–255 Default: 128
Number Of VLAN Tags	Defines if VLAN tagging is enabled, and how many VLAN tags are used.	0– No VLAN Tag 1 – One VLAN tag 2 – Two VLAN tags (stacked) Default: 0
VLAN Protocol	Defines the tag protocol identifier (TPID) to use when using VLAN tags. Note: This parameter is displayed only if Number of VLAN tags is set to 1 or 2.	Standard (0x8100) Proprietary Default: Standard (0x8100)
VLAN ID 1	VLAN identifier, uniquely identifying the VLAN to which the Ethernet packet belongs. Note: This parameter is displayed only if Number of VLAN tags is set to 1 or 2.	1–4095 Default: 1
VLAN ID 2	VLAN identifier, uniquely identifying the VLAN to which the Ethernet packet belongs. Note: This parameter is displayed only if the Number of VLAN tags is set to 2.	1–4095 Default: 1
VLAN 1 Priority	Sets the priority of the packet in the virtual LAN. Note: This parameter is displayed only if the Number of VLAN tags is set to 1 or 2.	0–7 Default: 0
VLAN 2 Priority	Sets the priority of the packet in the virtual LAN. Note: This parameter is displayed only if the Number of VLAN tags is set to 2.	0–7 Default: 0
PSN Type	Defines the header encapsulated in the packets leaving DS34T108DK	IP – UDP/IP header MPLS – MPLS header L2TPV3 – L2TPV3/IP header Ethernet – MEF header Default: IP
Switches Sanity Check	Sanity check between the received packet length and the length according to bundle configuration (length mismatch)	CPU – Sends the packets that fail the Sanity Check to the CPU Discard – Drops the packets that fail the Sanity Check Default: Discard
Clock Recovery	Determines whether this bundle is used by the clock recovery mechanism	Yes – Bundle is used by clock recovery mechanism No – Bundle is not used by clock recovery mechanism Default: No
Differential Time	Desired depth of the jitter buffer	1–512000 µs Default: 5000
Max Buffer Size	Defines the maximum size of the jitter buffer. When this parameter is set to zero, the maximum jitter buffer size equals $(2 \times \text{PDVT}) + (2 \times \text{packet fill time})$.	0–512000 µs Default: 0
L Bit & OOS	Defines how the OOS condition at the TDM interface is transmitted towards the Ethernet side.	OOS Mode Conditioning – OOS condition is reported by the OOS code and L-bit of the TDMoIP frame OOS Disable – OOS condition is not reported, but user data continues to be sent towards the Ethernet interface OOS Mode Tx Off – OOS condition is not reported and faulty user data is not transmitted towards the Ethernet interface Default: OOS Mode Conditioning

Parameter	Description	Possible Values
Redundant	Defines whether this bundle is a redundant bundle. Note: The bundle redundancy cannot be changed after the bundle configuration has been saved.	Enable – Current bundle is redundant Disable – Current bundle is not redundant Default: Disable
RTP Mode	Determines if an RTP header is used for the bundle. Must be used for common clock mode.	Enable – RTP header is used Disable – RTP header is not used Default: Disable
Next Hop Type	Must be set to MAC for next hops that do not reply to ARP requests	IP MAC Default: IP
Enable JB Reset	A mechanism that enables setting an optimum level for the jitter buffer working level. It enables the reset of a bundle until a satisfactory jitter buffer level is reached to minimize the delay.	Off – Bundle reset is disabled and the working level of the jitter buffer is determined by the timing the bundle was first opened On N Times – Up to N times of bundle reset is allowed Endless – Bundle reset is allowed with unlimited number of resets Default: On N Times
Window Size	The maximum number of conditioning Ethernet packets that can be inserted upon a loss of received Ethernet packets. If the difference in packet SN is greater than the configured window, there will be no insertion of conditioning packets.	2-127 Default: 83
Number Of Outer Cookies	Determines if L2TPV3 cookies are used, and how many. Note: This parameter is displayed only when PSN Type = L2TPV3 .	0 – L2TPV3 cookies are not used 1 – One L2TPV3 cookie is used 2 – Two L2TPV3 cookies are used Default: 0
Cookie 1	Optional field that contains a randomly selected value used to validate association of the packet with the expected bundle identifier. Note: This parameter is displayed only when PSN Type = L2TPV3 and Number of Outer Cookies is 1 or 2.	0-4294967295 Default: 0
Cookie 2	Optional field that contains a randomly selected value used to validate association of the packet with the expected bundle identifier. Note: This parameter is displayed only when PSN Type = L2TPV3 and Number of Outer Cookies is 2.	0-4294967295 Default: 0
Number Of Outer Labels	Determines if MPLS outer labels are used, and how many. Note: This parameter is displayed only when PSN Type = MPLS .	0 – MPLS outer labels not used 1 – One MPLS outer label is used 2 – Two MPLS outer labels are used Default: 0
MPLS Outer Label 1	MPLS Outer Label (only when not equal to 0) identifies the MPLS LSP which is used to tunnel the TDM packets through the MPLS network. Note: When equal to 0, only the Inner Label exists. Note: This parameter is displayed only when PSN Type = MPLS and Number of Outer Labels is 1 or 2.	0-1048575 Default: 0
MPLS Outer Label 2	MPLS Outer Label (only when not equal to 0) identifies the MPLS LSP which is used to tunnel the TDM packets through the MPLS network. Note: When equal to 0, only the Inner Label exists. Note: This parameter is displayed only when PSN Type = MPLS and Number of Outer Labels is 2.	0-1048575 Default: 0

Parameter	Description	Possible Values
Experimental Bits	Sets the value of the MPLS experimental bits. Note: This parameter is displayed only when PSN Type = MPLS .	0-7 Default: 0
Payload Type	Determines the bundle structure.	Data If the port to which this bundled is assigned has Frame Type = Unframed , then the bundle is configured as Unstructured. Otherwise the bundled is configured as Structured. Voice CAS The bundle is configured as Structured with CAS. For units with T1 interface the payload type can be set to voice with CAS, if the interface type of the far-end unit is set to T1 SF or T1 ESF. Notes: For redundant or cross-connect bundles, both bundles must be the same payload type. <i>The payload type cannot be changed after the bundle configuration has been saved.</i>
Frame Size in Cell	Defines the ETH packet payload length by determining the number of AAL1 cells transmitted over a single ETH packet (efficiency vs. delay tradeoff).	1-30 cells Default: 1
Eth Cond Octet Type	Condition octet used in the Ethernet direction when no data is available.	Octet A Octet B Octet C Octet D Default: Octet A
TDM Cond Octet Type	Condition octet used in the TDM direction when no data is available.	Octet A Octet B Octet C Octet D Default: Octet A
RTP Source Identifier	The RTP header Source Identifier value for transmitted packet. Note: This parameter is displayed only when RTP Mode is Enabled.	0-4294967295 Default: 11111111
RTP Payload	The RTP header Payload value for transmitted packet. Note: This parameter is displayed only when RTP Mode is Enabled.	0-255 Default: 96
Redundant Type	Note: This parameter is displayed only when Redundant is Enabled.	None – Redundancy disabled (no bundles are transmitted) 1 and 1 1 plus 1 1 and 1 HW Only one of the redundant bundles (primary or secondary) is transmitted 1 plus 1 HW – Both redundant bundles (primary and secondary) are transmitted Default: 1 plus 1 HW
Redundant/Cross Bundle Num	Defines the associated redundant bundle. Note: This parameter is displayed only when Redundant is Enabled.	0-4095 Default: 0
Redundant Bundle Active	Defines whether this bundle is a Primary or a Secondary bundle Note: This parameter is displayed only when Redundant is Enabled.	Primary Secondary Default: Primary

4.4.2 Configuring HDLC Bundles

Figure 4-8. HDLC Bundle Configuration



Note: The settings for some parameters in this configuration menu (for example **Bundle Type** and **PSN Type**) determine whether other parameters in the menu are displayed or not. Therefore, it is normal to have gaps in the item numbering, such as having nothing listed between items 14 and 20 in the figure above. The parameter descriptions in the table below have notes indicating the necessary conditions for a parameter to be displayed. See, for example, the **IP TOS** parameter.

Table 4-7. HDLC Bundle Parameter Descriptions

Parameter	Description	Possible Values
Bundle Type	Select the bundle type.	AAL1 HDLC SAToP CES.
Assign this Bundle to PCM port	Number of the TDM port to which the bundle is assigned	1-8
Timeslot Assignment	Assigns timeslots to the previously selected bundle, for example: 1-5, 7, 8, 9, 12-15	T1: 1 - 24 E1: 1 - 31
Tx Bundle Destination	Destination of the Tx data flow toward the ETH port Note: The Tx bundle destination cannot be changed after the bundle configuration has been saved.	Ethernet – TDM to Ethernet CPU – TDM to CPU Cross connect – TDM to TDM Default: Ethernet
Rx Bundle Destination	Destination of the Rx data flow from the ETH port Note: The Rx bundle destination cannot be changed after the bundle configuration has been saved.	CPU – CPU PCM – TDM (PCM bus) Discard – Discarded Default: PCM
Tx Bundle Number	Number of the desired Tx bundle	Default: 2
Rx Bundle Number	Number of the desired Rx bundle Note: Must be unique for each bundle ID.	Default: 2

Parameter	Description	Possible Values
Source IP Address	Assign the bundle one of the source IP addresses configured in General Configuration (see section 4.2)	IP 1, IP 2 Default: IP 1
Destination Main MAC address	MAC address of destination device Note: If the destination Main MAC address is different from the default value, the MAC will not be learned in the ARP process.	Default: 000000000000
Destination IP Address	IP address of the destination device	0.0.0.0 – 255.255.255.255
Next Hop IP	The Next Hop parameter should be used when the Destination IP Address is not in the device subnet. In such cases the Ethernet packet will be sent to the Next Hop IP. The default value of the Next Hop field is the default gateway. Note: The Next Hop must be in the same subset as the Source IP address of the bundle ID.	0.0.0.0 – 255.255.255.255
IP ToS	Sets the IP ToS field in the IP ETH packets leaving DS34T108DK. ToS setting defines the whole byte , since different vendors may use different bits to tag packets for traffic prioritization. ToS assignment applies to all ETH packets leaving DS34T108DK for this bundle. Note: This parameter is displayed only if PSN Type is set to IP.	0–255 Default: 0
IP TTL	Sets the IP TTL field in the IP packets transmitted by the device. TTL assignment applies to all ETH packets leaving DS34T108DK for this bundle. Note: This parameter is displayed only if PSN Type is set to IP.	0–255 Default: 128
MPLS TTL	Sets the MPLS TTL field in the packets transmitted by the device. TTL assignment applies to all MPLS packets leaving DS34T108DK for this bundle. Note: This parameter is displayed only if PSN Type is set to MPLS.	0–255 Default: 128
Number Of VLAN Tags	Defines if VLAN tagging is enabled, and how many VLAN tags are used.	0– No VLAN Tag 1 – One VLAN tag 2 – Two VLAN tags (stacked) Default: 0
VLAN Protocol	Defines the tag protocol identifier (TPID) to use when using VLAN tags. Note: This parameter is displayed only if Number of VLAN tags is set to 1 or 2.	Standard (0x8100) Proprietary Default: Standard (0x8100)
VLAN ID 1	VLAN identifier, uniquely identifying the VLAN to which the Ethernet packet belongs. Note: This parameter is displayed only if Number of VLAN tags is set to 1 or 2.	1–4095 Default: 1
VLAN ID 2	VLAN identifier, uniquely identifying the VLAN to which the Ethernet packet belongs. Note: This parameter is displayed only if the Number of VLAN tags is set to 2.	1–4095 Default: 1
VLAN 1 Priority	Sets the priority of the packet in the virtual LAN. Note: This parameter is displayed only if the Number of VLAN tags is set to 1 or 2.	0–7 Default: 0
VLAN 2 Priority	Sets the priority of the packet in the virtual LAN. Note: This parameter is displayed only if the Number of VLAN tags is set to 2.	0–7 Default: 0

Parameter	Description	Possible Values
PSN Type	Defines the header encapsulated in the packets leaving DS34T108DK	IP – UDP/IP header MPLS – MPLS header L2TPV3 – L2TPV3/IP header Ethernet – MEF header Default: IP
Max Buffer Size	Defines the maximum size of the jitter buffer. When this parameter is set to zero, the maximum jitter buffer size equals $(2 \times \text{PDVT}) + (2 \times \text{packet fill time})$.	0–512000 µs Default: 0
L Bit & OOS	Defines how the OOS condition at the TDM interface is transmitted towards the Ethernet side.	OOS Mode Conditioning – OOS condition is reported by the OOS code and L-bit of the TDMoIP frame OOS Disable – OOS condition is not reported, but user data continues to be sent towards the Ethernet interface OOS Mode Tx Off – OOS condition is not reported and faulty user data is not transmitted towards the Ethernet interface Default: OOS Mode Conditioning
Next Hop Type	Must be set to MAC for next hops that do not reply to ARP requests	IP MAC Default: IP
Enable JB Reset	A mechanism that enables setting an optimum level for the jitter buffer working level. It enables the reset of a bundle until a satisfactory jitter buffer level is reached to minimize the delay.	Off – Bundle reset is disabled and the working level of the jitter buffer is determined by the timing the bundle was first opened On N Times – Up to N times of bundle reset is allowed Endless – Bundle reset is allowed with unlimited number of resets Default: On N Times
Number Of Outer Cookies	Determines if L2TPV3 cookies are used, and how many. Note: This parameter is displayed only when PSN Type = L2TPV3 .	0 – L2TPV3 cookies are not used 1 – One L2TPV3 cookie is used 2 – Two L2TPV3 cookies are used Default: 0
Cookie 1	Optional field that contains a randomly selected value used to validate association of the packet with the expected bundle identifier. Note: This parameter is displayed only when PSN Type = L2TPV3 and Number of Outer Cookies is 1 or 2.	0–4294967295 Default: 0
Cookie 2	Optional field that contains a randomly selected value used to validate association of the packet with the expected bundle identifier. Note: This parameter is displayed only when PSN Type = L2TPV3 and Number of Outer Cookies is 2.	0–4294967295 Default: 0
Number Of Outer Labels	Determines if MPLS outer labels are used, and how many. Note: This parameter is displayed only when PSN Type = MPLS .	0 – MPLS outer labels not used 1 – One MPLS outer label is used 2 – Two MPLS outer labels are used Default: 0
MPLS Outer Label 1	MPLS Outer Label (only when not equal to 0) identifies the MPLS LSP which is used to tunnel the TDM packets through the MPLS network. Note: When equal to 0, only the Inner Label exists. Note: This parameter is displayed only when PSN Type = MPLS and Number of Outer Labels is 1 or 2.	0–1048575 Default: 0

Parameter	Description	Possible Values
MPLS Outer Label 2	MPLS Outer Label (only when not equal to 0) identifies the MPLS LSP which is used to tunnel the TDM packets through the MPLS network. Note: When equal to 0, only the Inner Label exists. Note: This parameter is displayed only when PSN Type = MPLS and Number of Outer Labels is 2.	0-1048575 Default: 0
Experimental Bits	Sets the value of the MPLS experimental bits. Note: This parameter is displayed only when PSN Type = MPLS.	0-7 Default: 0
Packet SN mode	The control word packet sequence number mode	ALWAYS 0 NORMAL – 0- 2^{16} SKIP 0 – 1- 2^{16} Default: NORMAL
TS Width	Defines number of valid bits per timeslot	8-bits – 8 bits (64 kbps) 7 + 1 – 7 + 1 bit (56 kbps) 2 + 6 – 2 + 6 bits (16 kbps) Default: 8-bits

4.4.3 Configuring SAToP Bundles

Figure 4-9. SAToP Bundle Configuration

Main Menu
↓
Bundle Configuration
↓
SAToP Bundle Configuration

Bundle Configuration for ID 2		
1. Bundle Type	SAToP	
2. Assign this Bundle to PCM port	1	
4. TX Bundle Destination	Ethernet	
5. RX Bundle Destination	PCM	
6. TX Bundle Number[0 - 65535]	2	
7. RX Bundle Number[0 - 65535]	2	
8. Source IP Address	IP 1	
9. Destination Main MAC Address	08002E28F2E6	
10. Destination IP Address	10.10.10.6	
11. Next Hop IP	0.0.0.0	
12. IP ToS[0 - 255]	0	
13. IP TTL[0 - 255]	128	
14. Number of VLAN Tags[0 - 2]	0	
20. PSN Type	IP	
21. Switches Sanity Check	Discard	
22. Clock Recovery	No	
23. Differential Time (usec)[1 - 512000]	5000	
24. Max Buffer Size (usec)[0 - 512000]	0	
25. L Bit & OOS	OOS Mode Conditioning	
26. Redundant	Disable	
27. RTP Mode	Disable	
28. Next Hop Type	IP	
29. Enable JB Reset	On N Times	
30. Window Size[2 - 127]	83	
35. Reordering	Yes	
36. Size in Bytes[24 - 1600]	965	
37. Eth Cond Octet Type	Octet A	
38. TDM Cond Octet Type	Octet A	
Please select item <1 to 43>		
q: exit, s: save, ESC: previous menu, r or Enter: reprint screen		
Please enter your choice:		

Note: The settings for some parameters in this configuration menu (for example **Bundle Type** and **PSN Type**) determine whether other parameters in the menu are displayed or not. Therefore, it is normal to have gaps in the item numbering, such as having nothing listed between items 14 and 20 in the figure above. The parameter descriptions in the table below have notes indicating the necessary conditions for a parameter to be displayed. See, for example, the **IP TOS** parameter.

Table 4-8. SAToP Bundle Parameter Descriptions

Parameter	Description	Possible Values
Bundle Type	Select the bundle type.	AAL1 HDLC SAToP CES.
Assign this Bundle to PCM port	Number of the TDM port to which the bundle is assigned	1-8
Tx Bundle Destination	Destination of the Tx data flow toward the ETH port Note: The Tx bundle destination cannot be changed after the bundle configuration has been saved.	Ethernet – TDM to Ethernet CPU – TDM to CPU Cross connect – TDM to TDM Default: Ethernet
Rx Bundle Destination	Destination of the Rx data flow from the ETH port Note: The Rx bundle destination cannot be changed after the bundle configuration has been saved.	CPU – CPU PCM – TDM (PCM bus) Discard – Discarded Default: PCM

Parameter	Description	Possible Values
Tx Bundle Number	Number of the desired Tx bundle	Default: 2
Rx Bundle Number	Number of the desired Rx bundle Note: Must be unique for each bundle ID.	Default: 2
Source IP Address	Assign the bundle one of the source IP addresses configured in General Configuration (see section 4.2)	IP 1, IP 2 Default: IP 1
Destination Main MAC address	MAC address of destination device Note: If the destination Main MAC address is different from the default value, the MAC will not be learned in the ARP process.	Default: 000000000000
Destination IP Address	IP address of the destination device	0.0.0.0 – 255.255.255.255
Next Hop IP	The Next Hop parameter should be used when the Destination IP Address is not in the device subnet. In such cases the Ethernet packet will be sent to the Next Hop IP. The default value of the Next Hop field is the default gateway. Note: The Next Hop must be in the same subset as the Source IP address of the bundle ID.	0.0.0.0 – 255.255.255.255
IP ToS	Sets the IP ToS field in the IP ETH packets leaving DS34T108DK. ToS setting defines the whole byte , since different vendors may use different bits to tag packets for traffic prioritization. ToS assignment applies to all ETH packets leaving DS34T108DK for this bundle. Note: This parameter is displayed only if PSN Type is set to IP .	0–255 Default: 0
IP TTL	Sets the IP TTL field in the IP packets transmitted by the device. TTL assignment applies to all ETH packets leaving DS34T108DK for this bundle. Note: This parameter is displayed only if PSN Type is set to IP .	0–255 Default: 128
MPLS TTL	Sets the MPLS TTL field in the packets transmitted by the device. TTL assignment applies to all MPLS packets leaving DS34T108DK for this bundle. Note: This parameter is displayed only if PSN Type is set to MPLS .	0–255 Default: 128
Number Of VLAN Tags	Defines if VLAN tagging is enabled, and how many VLAN tags are used.	0– No VLAN Tag 1 – One VLAN tag 2 – Two VLAN tags (stacked) Default: 0
VLAN Protocol	Defines the tag protocol identifier (TPID) to use when using VLAN tags. Note: This parameter is displayed only if Number of VLAN tags is set to 1 or 2.	Standard (0x8100) Proprietary Default: Standard (0x8100)
VLAN ID 1	VLAN identifier, uniquely identifying the VLAN to which the Ethernet packet belongs. Note: This parameter is displayed only if Number of VLAN tags is set to 1 or 2.	1–4095 Default: 1
VLAN ID 2	VLAN identifier, uniquely identifying the VLAN to which the Ethernet packet belongs. Note: This parameter is displayed only if the Number of VLAN tags is set to 2.	1–4095 Default: 1

Parameter	Description	Possible Values
VLAN 1 Priority	Sets the priority of the packet in the virtual LAN. Note: This parameter is displayed only if the Number of VLAN tags is set to 1 or 2.	0–7 Default: 0
VLAN 2 Priority	Sets the priority of the packet in the virtual LAN. Note: This parameter is displayed only if the Number of VLAN tags is set to 2.	0–7 Default: 0
PSN Type	Defines the header encapsulated in the packets leaving DS34T108DK	IP – UDP/IP header MPLS – MPLS header L2TPV3 – L2TPV3/IP header Ethernet – MEF header Default: IP
Switches Sanity Check	Sanity check between the received packet length and the length according to bundle configuration (length mismatch)	CPU – Sends the packets that fail the Sanity Check to the CPU Discard – Drops the packets that fail the Sanity Check Default: Discard
Clock Recovery	Determines whether this bundle is used by the clock recovery mechanism	Yes – Bundle is used by clock recovery mechanism No – Bundle is not used by clock recovery mechanism Default: No
Differential Time	Desired depth of the jitter buffer	1–512000 µs Default: 5000
Max Buffer Size	Defines the maximum size of the jitter buffer. When this parameter is set to zero, the maximum jitter buffer size equals $(2 \times \text{PDVT}) + (2 \times \text{packet fill})$.	0–512000 µs Default: 0
L Bit & OOS	Defines how the OOS condition at the TDM interface is transmitted towards the Ethernet side.	OOS Mode Conditioning – OOS condition is reported by the OOS code and L-bit of the TDMoIP frame OOS Disable – OOS condition is not reported, but user data continues to be sent towards the Ethernet interface OOS Mode Tx Off – OOS condition is not reported and faulty user data is not transmitted towards the Ethernet interface Default: OOS Mode Conditioning
Redundant	Defines whether this bundle is a redundant bundle. Note: The bundle redundancy cannot be changed after the bundle configuration has been saved.	Enable – Current bundle is redundant Disable – Current bundle is not redundant Default: Disable
RTP Mode	Determines if an RTP header is used for the bundle. Must be used for common clock mode.	Enable – RTP header is used Disable – RTP header is not used Default: Disable
Next Hop Type	Must be set to MAC for next hops that do not reply to ARP requests	IP MAC Default: IP
Enable JB Reset	A mechanism that enables setting an optimum level for the jitter buffer working level. It enables the reset of a bundle, until a satisfactory jitter buffer level is reached, to minimize the delay.	Off – Bundle reset is disabled and the working level of the jitter buffer is determined by the timing the bundle was first opened On N Times – Up to N times of bundle reset is allowed Endless – Bundle reset is allowed with unlimited number of resets Default: On N Times
Window Size	The maximum number of conditioning Ethernet packets that can be inserted upon a loss of received Ethernet packets. If the difference in packet SN is greater than the configured window, there will be no insertion of conditioning packets.	2–127 Default: 83

Parameter	Description	Possible Values
Number Of Outer Cookies	Determines if L2TPV3 cookies are used, and how many. Note: This parameter is displayed only when PSN Type = L2TPV3 .	0 – L2TPV3 cookies are not used 1 – One L2TPV3 cookie is used 2 – Two L2TPV3 cookies are used Default: 0
Cookie 1	Optional field that contains a randomly selected value used to validate association of the packet with the expected bundle identifier. Note: This parameter is displayed only when PSN Type = L2TPV3 and Number of Outer Cookies is 1 or 2.	0-4294967295 Default: 0
Cookie 2	Optional field that contains a randomly selected value used to validate association of the packet with the expected bundle identifier. Note: This parameter is displayed only when PSN Type = L2TPV3 and Number of Outer Cookies is 2.	0-4294967295 Default: 0
Number Of Outer Labels	Determines if MPLS outer labels are used, and how many. Note: This parameter is displayed only when PSN Type = MPLS .	0 – MPLS outer labels not used 1 – One MPLS outer label is used 2 – Two MPLS outer labels are used Default: 0
MPLS Outer Label 1	MPLS Outer Label (only when not equal to 0) identifies the MPLS LSP which is used to tunnel the TDM packets through the MPLS network. Note: When equal to 0, only the Inner Label exists. Note: This parameter is displayed only when PSN Type = MPLS and Number of Outer Labels is 1 or 2.	0-1048575 Default: 0
MPLS Outer Label 2	MPLS Outer Label (only when not equal to 0) identifies the MPLS LSP which is used to tunnel the TDM packets through the MPLS network. Note: When equal to 0, only the Inner Label exists. Note: This parameter is displayed only when PSN Type = MPLS and Number of Outer Labels is 2.	0-1048575 Default: 0
Experimental Bits	Sets the value of the MPLS experimental bits. Note: This parameter is displayed only when PSN Type = MPLS .	0-7 Default: 0
Reordering	Determines whether to reorder received misordered packets.	Yes – Received misordered packets are reordered No – Received misordered packets are not reordered Default: Yes
Size in Bytes	SAToP payload size in bytes	24-1600 Default: 965
Eth Cond Octet Type	Conditioning octet used in the Ethernet direction when no data is available.	Octet A Octet B Octet C Octet D Default: Octet A
TDM Cond Octet Type	Conditioning octet used in the TDM direction when no data is available.	Octet A Octet B Octet C Octet D Default: Octet A
RTP Source Identifier	The RTP header Source Identifier value for transmitted packet. Note: This parameter is displayed only when RTP Mode is Enabled.	0-4294967295 Default: 111111111
RTP Payload	The RTP header Payload value for transmitted packet. Note: This parameter is displayed only when	0-255 Default: 96

Parameter	Description	Possible Values
	RTP Mode is Enabled.	
Redundant Type	Note: This parameter is displayed only when Redundant is Enabled.	None – Redundancy disabled (no bundles are transmitted) 1 and 1 1 plus 1 1 and 1 HW Only one of the redundant bundles (primary or secondary) is transmitted 1 plus 1 HW – Both redundant bundles (primary and secondary) are transmitted Default: 1 plus 1 HW
Redundant/Cross Bundle Num	Defines the associated redundant bundle. Note: This parameter is displayed only when Redundant is Enabled.	0–4095 Default: 0
Redundant Bundle Active	Defines whether this bundle is a Primary or a Secondary bundle Note: This parameter is displayed only when Redundant is Enabled.	Primary Secondary Default: Primary

4.4.4 Configuring CESoPSN Bundles

Figure 4-10. CESoPSN Bundle Configuration

Main Menu ↓ Bundle Configuration ↓ CES Bundle Configuration	Bundle Configuration for ID 2	
	1. Bundle Type	CES
	2. Assign this Bundle to PCM port	1
	3. Timeslot Assignment [1-31]	1-31
	4. TX Bundle Destination	Ethernet
	5. RX Bundle Destination	PCM
	6. TX Bundle Number[0 - 65535]	2
	7. RX Bundle Number[0 - 65535]	2
	8. Source IP Address	IP 1
	9. Destination Main MAC Address	08002E28F2E6
	10. Destination IP Address	10.10.10.6
	11. Next Hop IP	0.0.0.0
	12. IP ToS[0 - 255]	0
	13. IP TTL[0 - 255]	128
	14. Number of VLAN Tags[0 - 2]	0
	20. PSN Type	IP
	21. Switches Sanity Check	Discard
	22. Clock Recovery	No
	23. Differential Time (usec)[1 - 512000]	5000
	24. Max Buffer Size (usec)[0 - 512000]	0
	25. L Bit & OOS	OOS Mode Conditioning
	26. Redundant	Disable
	27. RTP Mode	Disable
	28. Next Hop Type	IP
	29. Enable JB Reset	On N Times
	30. Window Size[2 - 127]	83
	35. Payload Type	Data
	36. Reordering	Yes
	37. Number of Frames[1 - 1500]	40
	38. Eth Cond Octet Type	Octet A
	39. TDM Cond Octet Type	Octet A
	Please select item <1 to 44>	
	q: exit, s: save, ESC: previous menu, r or Enter: reprint screen	
	Please enter your choice:	

Note: The settings for some parameters in this configuration menu (for example **Bundle Type** and **PSN Type**) determine whether other parameters in the menu are displayed or not. Therefore, it is normal to have gaps in the item numbering, such as having nothing listed between items 14 and 20 in the figure above. The parameter descriptions in the table below have notes indicating the necessary conditions for a parameter to be displayed. See, for example, the **IP TOS** parameter.

Table 4-9. CESoPSN Bundle Parameter Descriptions

Parameter	Description	Possible Values
Bundle Type	Select the bundle type.	AAL1 HDLC SAToP CES.
Assign this Bundle to PCM port	Number of the TDM port to which the bundle is assigned	1-8
Timeslot Assignment	Assigns timeslots to the previously selected bundle, for example: 1-5, 7, 8, 9, 12-15	T1: 1 - 24 E1: 1 - 31
Tx Bundle Destination	Destination of the Tx data flow toward the ETH port <i>Note: The Tx bundle destination cannot be changed after the bundle configuration has been saved.</i>	Ethernet – TDM to Ethernet CPU – TDM to CPU Cross connect – TDM to TDM Default: Ethernet

Parameter	Description	Possible Values
Rx Bundle Destination	Destination of the Rx data flow from the ETH port Note: The Rx bundle destination cannot be changed after the bundle configuration has been saved.	CPU – CPU PCM – TDM (PCM bus) Discard – Discarded Default: PCM
Tx Bundle Number	Number of the desired Tx bundle	Default: 2
Rx Bundle Number	Number of the desired Rx bundle Note: Must be unique for each bundle ID.	Default: 2
Source IP Address	Assign the bundle one of the source IP addresses configured in General Configuration (see section 4.2)	IP 1, IP 2 Default: IP 1
Destination Main MAC address	MAC address of destination device Note: If the destination Main MAC address is different from the default value, the MAC will not be learned in the ARP process.	Default: 000000000000
Destination IP Address	IP address of the destination device	0.0.0.0 – 255.255.255.255
Next Hop IP	The Next Hop parameter should be used when the Destination IP Address is not in the device subnet. In such cases the Ethernet packet will be sent to the Next Hop IP. The default value of the Next Hop field is the default gateway. Note: The Next Hop must be in the same subset as the Source IP address of the bundle ID.	0.0.0.0 – 255.255.255.255
IP ToS	Sets the IP ToS field in the IP ETH packets leaving DS34T108DK. ToS setting defines the whole byte , since different vendors may use different bits to tag packets for traffic prioritization. ToS assignment applies to all ETH packets leaving DS34T108DK for this bundle. Note: This parameter is displayed only if PSN Type is set to IP .	0–255 Default: 0
IP TTL	Sets the IP TTL field in the IP packets transmitted by the device. TTL assignment applies to all ETH packets leaving DS34T108DK for this bundle. Note: This parameter is displayed only if PSN Type is set to IP .	0–255 Default: 128
MPLS TTL	Sets the MPLS TTL field in the packets transmitted by the device. TTL assignment applies to all MPLS packets leaving DS34T108DK for this bundle. Note: This parameter is displayed only if PSN Type is set to MPLS .	0–255 Default: 128
Number Of VLAN Tags	Defines if VLAN tagging is enabled, and how many VLAN tags are used.	0 – No VLAN Tag 1 – One VLAN tag 2 – Two VLAN tags (stacked) Default: 0
VLAN Protocol	Defines the tag protocol identifier (TPID) to use when using VLAN tags. Note: This parameter is displayed only if Number of VLAN tags is set to 1 or 2.	Standard (0x8100) Proprietary Default: Standard (0x8100)
VLAN ID 1	VLAN identifier, uniquely identifying the VLAN to which the Ethernet packet belongs. Note: This parameter is displayed only if Number of VLAN tags is set to 1 or 2.	1–4095 Default: 1

Parameter	Description	Possible Values
VLAN ID 2	VLAN identifier, uniquely identifying the VLAN to which the Ethernet packet belongs. Note: This parameter is displayed only if the Number of VLAN tags is set to 2.	1-4095 Default: 1
VLAN 1 Priority	Sets the priority of the packet in the virtual LAN. Note: This parameter is displayed only if the Number of VLAN tags is set to 1 or 2.	0-7 Default: 0
VLAN 2 Priority	Sets the priority of the packet in the virtual LAN. Note: This parameter is displayed only if the Number of VLAN tags is set to 2.	0-7 Default: 0
PSN Type	Defines the header encapsulated in the packets leaving DS34T108DK	IP – UDP/IP header MPLS – MPLS header L2TPV3 – L2TPV3/IP header Ethernet – MEF header Default: IP
Switches Sanity Check	Sanity check between the received packet length and the length according to bundle configuration (length mismatch)	CPU – Sends the packets that fail the Sanity Check to the CPU Discard – Drops the packets that fail the Sanity Check Default: Discard
Clock Recovery	Determines whether this bundle is used by the clock recovery mechanism	Yes – Bundle is used by clock recovery mechanism No – Bundle is not used by clock recovery mechanism Default: No
Differential Time	Desired depth of the jitter buffer	1-512000 µs Default: 5000
Max Buffer Size	Defines the maximum size of the jitter buffer. When this parameter is set to zero, the maximum jitter buffer size equals $(2 \times \text{PDVT}) + (2 \times \text{packet fill time})$.	0-512000 µs Default: 0
L Bit & OOS	Defines how the OOS condition at the TDM interface is transmitted towards the Ethernet side.	OOS Mode Conditioning – OOS condition is reported by the OOS code and L-bit of the TDMoIP frame OOS Disable – OOS condition is not reported, but user data continues to be sent towards the Ethernet interface OOS Mode Tx Off – OOS condition is not reported and faulty user data is not transmitted towards the Ethernet interface Default: OOS Mode Conditioning
Redundant	Defines whether this bundle is a redundant bundle. Note: The bundle redundancy cannot be changed after the bundle configuration has been saved.	Enable – Current bundle is redundant Disable – Current bundle is not redundant Default: Disable
RTP Mode	Determines if an RTP header is used for the bundle. Must be used for common clock mode.	Enable – RTP header is used Disable – RTP header is not used Default: Disable
Next Hop Type	Must be set to MAC for next hops that do not reply to ARP requests	IP MAC Default: IP
Enable JB Reset	A mechanism that enables setting an optimum level for the jitter buffer working level. It enables the reset of a bundle until a satisfactory jitter buffer level is reached to minimize the delay.	Off – Bundle reset is disabled and the working level of the jitter buffer is determined by the timing the bundle was first opened On N Times – Up to N times of bundle reset is allowed Endless – Bundle reset is allowed with unlimited number of resets Default: On N Times
Window Size	The maximum number of conditioning Ethernet packets that can be inserted upon a loss of received Ethernet packets. If the difference in	2-127 Default: 83

Parameter	Description	Possible Values
	packet SN is greater than the configured window, there will be no insertion of conditioning packets.	
Number Of Outer Cookies	Determines if L2TPV3 cookies are used, and how many. Note: This parameter is displayed only when PSN Type = L2TPV3 .	0 – L2TPV3 cookies are not used 1 – One L2TPV3 cookie is used 2 – Two L2TPV3 cookies are used Default: 0
Cookie 1	Optional field that contains a randomly selected value used to validate association of the packet with the expected bundle identifier. Note: This parameter is displayed only when PSN Type = L2TPV3 and Number of Outer Cookies is 1 or 2.	0-4294967295 Default: 0
Cookie 2	Optional field that contains a randomly selected value used to validate association of the packet with the expected bundle identifier. Note: This parameter is displayed only when PSN Type = L2TPV3 and Number of Outer Cookies is 2.	0-4294967295 Default: 0
Number Of Outer Labels	Determines if MPLS outer labels are used, and how many. Note: This parameter is displayed only when PSN Type = MPLS .	0 – MPLS outer labels not used 1 – One MPLS outer label is used 2 – Two MPLS outer labels are used Default: 0
MPLS Outer Label 1	MPLS Outer Label (only when not equal to 0) identifies the MPLS LSP which is used to tunnel the TDM packets through the MPLS network. Note: When equal to 0, only the Inner Label exists. Note: This parameter is displayed only when PSN Type = MPLS and Number of Outer Labels is 1 or 2.	0-1048575 Default: 0
MPLS Outer Label 2	MPLS Outer Label (only when not equal to 0) identifies the MPLS LSP which is used to tunnel the TDM packets through the MPLS network. Note: When equal to 0, only the Inner Label exists. Note: This parameter is displayed only when PSN Type = MPLS and Number of Outer Labels is 2.	0-1048575 Default: 0
Experimental Bits	Sets the value of the MPLS experimental bits. Note: This parameter is displayed only when PSN Type = MPLS .	0-7 Default: 0
Payload Type	Determines the bundle structure.	<p>Data The bundle is configured as Structured (without CAS).</p> <p>Voice CAS The bundle is configured as Structured with CAS. For units with T1 interface the payload type can be set to voice with CAS, if the interface type of the far-end unit is set to T1 SF or T1 ESF.</p> <p>Notes: For redundant or cross-connect bundles, both bundles must be the same payload type. The payload type cannot be changed after the bundle configuration has been saved.</p>
Reordering	Determines whether to reorder received misordered packets	Yes – Received misordered packets are reordered No – Received misordered packets are not reordered Default: Yes
Number of Frames	The number of TDM frames included in the CESoPSN payload	1-1500 Default: 24
Eth Cond Octet Type	Condition octet used in the Ethernet direction when no data is available.	Octet A Octet B

Parameter	Description	Possible Values
		Octet C Octet D Default: Octet A
TDM Cond Octet Type	Condition octet used in the TDM direction when no data is available.	Octet A Octet B Octet C Octet D Default: Octet A
RTP Source Identifier	The RTP header Source Identifier value for transmitted packet. <i>Note: This parameter is displayed only when RTP Mode is Enabled.</i>	0-4294967295 Default: 11111111
RTP Payload	The RTP header Payload value for transmitted packet. <i>Note: This parameter is displayed only when RTP Mode is Enabled.</i>	0-255 Default: 96
Redundant Type	<i>Note: This parameter is displayed only when Redundant is Enabled.</i>	None – Redundancy disabled (no bundles are transmitted) 1 and 1 1 plus 1 1 and 1 HW Only one of the redundant bundles (primary or secondary) is transmitted 1 plus 1 HW – Both redundant bundles (primary and secondary) are transmitted Default: 1 plus 1 HW
Redundant/Cross Bundle Num	Defines the associated redundant bundle. <i>Note: This parameter is displayed only when Redundant is Enabled.</i>	0-4095 Default: 0
Redundant Bundle Active	Defines whether this bundle is a Primary or a Secondary bundle <i>Note: This parameter is displayed only when Redundant is Enabled.</i>	Primary Secondary Default: Primary

4.5 Deleting Bundles

To delete a bundle:

1. From the Main Menu, select **Bundle Management**.
2. In the Bundle Management Menu select **Delete Existing Bundle(s)**.
3. Type in the bundle ID that you want to delete and press **Enter**.

When you delete a bundle, the Bundle ID in Bundle Configuration is deleted. Any assignments made to that bundle are deleted.

4.6 Displaying Active Bundles

To display a table of active bundles:

1. From the Main Menu, select **Bundle Management**.
2. In the Bundle Management Menu select **Display Existing Bundle(s)**.

4.7 Restoring Default Configurations

To erase all configuration and restore factory-default configuration, select **Restore Default Configurations** from the main configuration menu.

5 Troubleshooting and Diagnostics

You can troubleshoot DS34T108DK by viewing: [Alarms](#), [Performance Monitoring Counters](#), or the [Troubleshooting Chart](#).

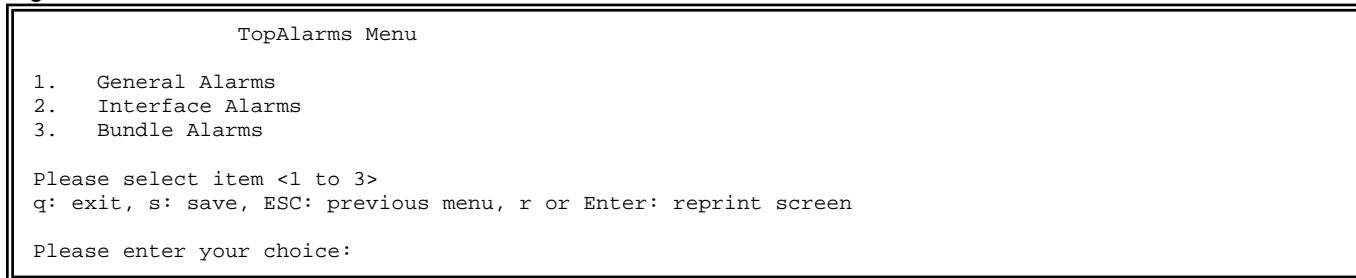
5.1 Displaying Alarms

Alarms menus display the following types of alarms:

- [General Alarms](#)
- [Interface Alarms](#)
- [Bundle Alarms](#).

To view alarms, from the main configuration menu select **Alarms**. The following menu appears:

Figure 5-1. Alarms Menu



5.1.1 Displaying General Alarms

To display general alarms, from the Alarm menu (Figure 5-1) select **General Alarms**. The General Alarms menu appears (Figure 5-2).

Figure 5-2. General Alarms Menu

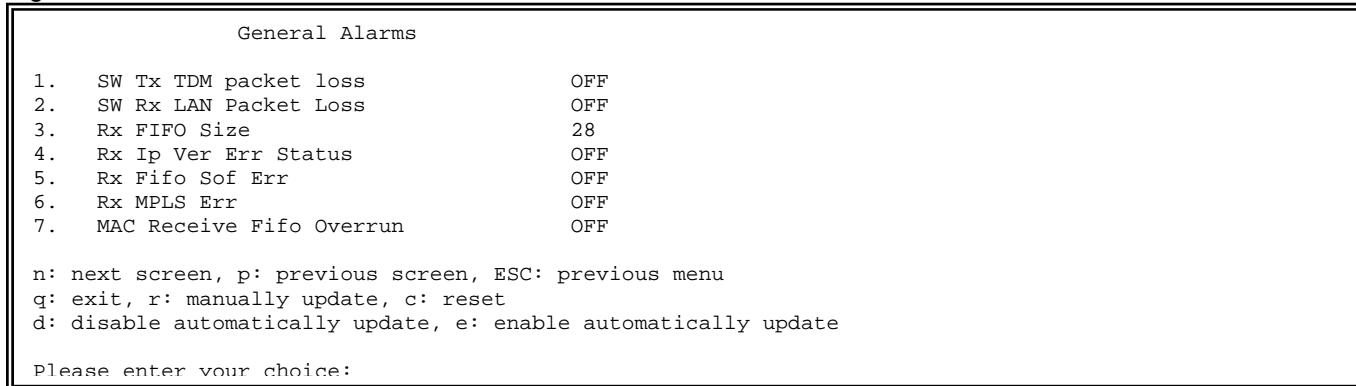


Table 5-1. General Alarm Parameter Descriptions

Parameter	Description	Possible Values
SW Tx TDM packet loss	Packets received from TDM to CPU were discarded due to lack of buffers in the TDMOp IC.	On, Off
SW Rx LAN packet loss	Packets received from LAN to CPU were discarded due to lack of buffers in the TDMOp IC.	On, Off
Rx FIFO size	Indicates the current Rx FIFO level given in dwords (32 bits)	0-3FF
Rx Ip Ver Err Status	Received packet IP version does not match the configured IP version	On, Off
Rx Fifo Sof Err	Start of packet indication mismatch in Rx FIFO (indicates a bundle configuration error). Results in flushing the Rx FIFO's contents	On, Off
Rx Mpls Err	MPLS packet received with more than three labels (packet is discarded)	On, Off
MAC receive FIFO overrun	MAC receive FIFO has overflowed	On, Off

5.1.2 Displaying Interface Alarms

To display E1/T1 interface alarms:

1. From the Alarm menu (Figure 5-1) select **Interface Alarms**.
2. Enter the TDM link (port) number.
3. From the Interface Alarm menu, select **TDM Alarms**.

The TDM Alarms menu is displayed (Figure 5-3).

Figure 5-3. TDM Alarms Menu

```

E1 TDM Alarms for Port 1

1. Loss of Signal           ON
2. Loss of Frame           ON
3. AIS                      OFF
4. RAI                      OFF
5. RX FRAME SLIP           OFF
6. TX FRAME SLIP           OFF
7. BPV/CV ERRORS           0

n: next screen, p: previous screen, ESC: previous menu
q: exit, r: manually update, c: reset
d: disable automatically update, e: enable automatically update

Please enter your choice:

```

Table 5-2. TDM Alarm Descriptions

Message	Description	Possible Values	Corrective Actions
Loss of Signal	Loss of receive signal. Also indicated by the front panel SYNC LOS LED being lit.	On, Off	Check cable connection to the E1 link connector. Check line and/or other communication equipment connected to the link of the remote unit.
Loss of Frame	Loss of frame synchronization.	On, Off	Check the remote equipment. Perform the following: Check cable connection to the E1 connector of the remote device. Check line and/or other communication equipment providing the E1 link to the remote equipment. Replace the remote equipment.
AIS	AIS is detected on the link	On, Off	Check equipment connected to the remote end of the E1 link.
RAI	RAI is detected on the link	On, Off	Check equipment connected to the remote end of the E1 link.
FRAME SLIP	E1 frame slips are detected (not displayed during local loss of frame synchronization). Updated once per second	On, Off	Verify the clock settings. Check the far end (unstable clock source). Replace the DS34T108DK only if previous steps do not correct the problem.
BPV/CV ERROR	Bipolar violations or code violations on the link receive signal. Updated once per second	On, Off	Check the TDM equipment and cable connecting it to the E1 port. Replace the DS34T108DK.

To display adaptive alarms:

1. From the Alarm menu (Figure 5-1), select **Interface Alarms**.
2. Enter the TDM link (port) number.
3. From the Interface Alarm menu, select **Adaptive Alarms**.
4. The Adaptive Alarms menu is displayed (Figure 5-4).

Figure 5-4. Adaptive Alarms Menu

```
Adaptive Alarms for Port 1

1. Current State           Not Active
2. Current Loop Bandwidth  0
3. Min Loop Bandwidth     0
4. Max Loop Bandwidth     0
5. Current PDV_STD        0
6. Min PDV_STD            0
7. Max PDV_STD            0
8. Tracking 1 Convergence Counter 0
9. Dpll Current Level    2147483647
10. Dpll Min Level       2147483647
11. Dpll Max Level       -2147483648
12. Dpll Overflow Occurred OFF
13. Jaf Overflow Occurred OFF
14. Constant Delay Change Detect OFF
15. Smart_Delta_T Timeout Expired OFF
16. Virtual J.B O.R/U.R Occurred OFF
17. System Freeze          OFF
18. Reacquisition Alarm   OFF

n: next screen, p: previous screen, ESC: previous menu
q: exit, r: manually update, c: reset
d: disable automatically update, e: enable automatically update

Please enter your choice:
```

Table 5-3. Adaptive Alarm Descriptions

Message	Description	Possible Values	Corrective Actions
Current State	Current state of the clock recovery mechanism	No recovery – Clock recovery mechanism is disabled Idle – Clock recovery mechanism is in its idle state Acquisition – Frequency acquisition state Tracking1, Tracking2 – In these phases, the Clock Recovery mechanism performs slow and precise phase tracking	Verify that the bundle is configured as Clock Recovery enabled, and that the link clock is configured to be Recovered.
Current Loop bandwidth	The loop filter bandwidth	0–7	
MIN Loop bandwidth	Minimum loop filter bandwidth		
MAX Loop bandwidth	Maximum loop filter bandwidth		
Current PDV_STD	Current power of the network delay variation		
MIN PDV_STD	Minimum power of the network delay variation		
MAX PDV_STD	Maximum power of the network delay variation		

Message	Description	Possible Values	Corrective Actions
Tracking 1 convergence counter	Parameter for internal debug purposes		
Dpll Current Level	Current DPLL input level		
Dpll Min Level	Minimum DPLL input level		
Dpll Max Level	Maximum DPLL input level		
Dpll Overflow Occurred	An extreme high/low DPLL input level was detected.	On, Off	
Jaf Overflow Occurred	Jitter attenuator filter overflow has occurred	On, Off	
Constant Delay Change Detect	A constant network delay change was detected.	On, Off	
SmartDelta_T Timeout Expired	Parameter for internal debug purposes	On, Off	
Virtual J.B O.R/U.R Occurred	Virtual jitter buffer overrun or underrun occurred	On, Off	
System Freeze	The DPLL input level was frozen	On, Off	
Reacquisition Alarm	Parameter for internal debug purposes	On, Off	

If a problem cannot be corrected by carrying out the actions listed in [Table 5-2](#) or [Table 5-3](#), perform the actions corresponding to the problem symptoms in accordance with [Table 5-11](#).

5.1.3 Displaying Bundle Alarms

DS34T108DK displays various per-bundle alarms.

To display bundle alarms:

1. From the Alarms Menu (Figure 5-1), select **Bundle Alarms**.
2. Enter the bundle ID.

Depending on the bundle type, one of the alarm menus shown in Figure 5-5 through Figure 5-7 is displayed.

5.1.3.1 AAL1 Bundle Alarms

Figure 5-5. AAL1 Bundle Alarms Menu

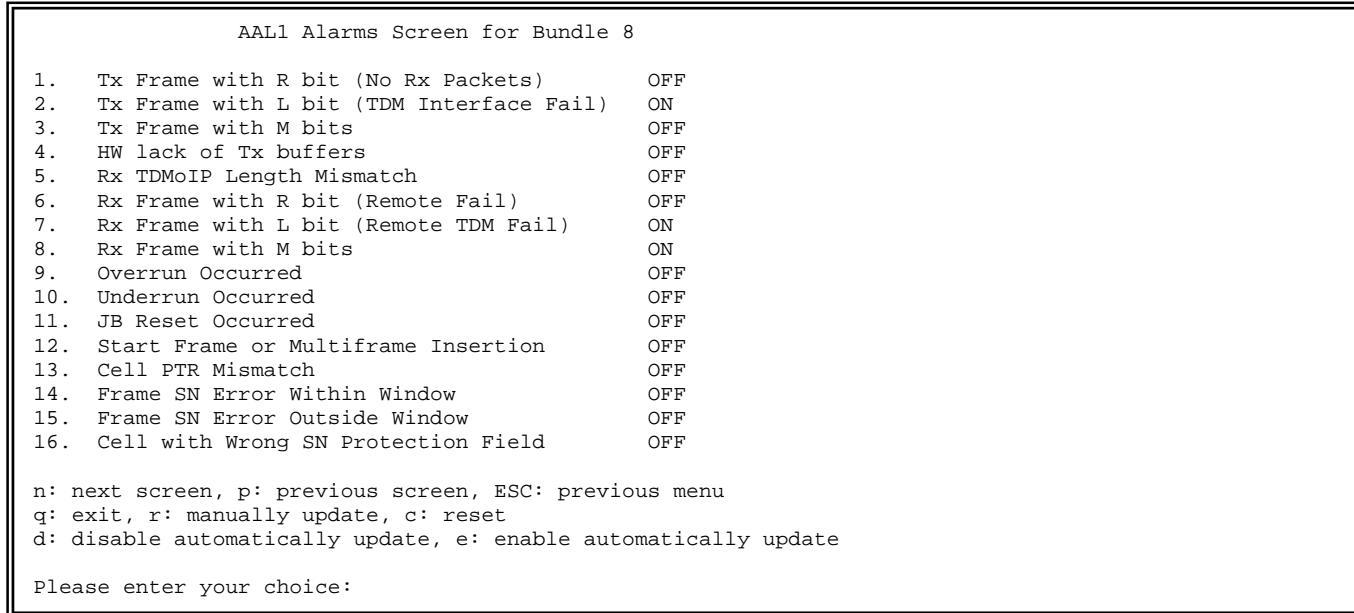


Table 5-4. AAL1 Bundle Alarm Descriptions

Parameter	Description	Possible Values
Tx Frame with R Bits	Transmit packets with Remote Fail indication (R-bit) set	On, Off
Tx Frame with L Bits	Transmit packets with Local Fail indication (L-bit) set	On, Off
Tx Frame with M Bits	Transmit packets with Modifier bits (M-bits) set	On, Off
HW lack of Tx buffers	Packet received from TDM was discarded due to lack of buffers associated with this bundle	On, Off
Rx TDMoIP Length Mismatch	The length of an incoming packet did not match the length expected for the bundle configuration	On, Off
Rx Frame with R Bits	Received packets with Remote Fail indication (R-bit) set	On, Off
Rx Frame with L Bits	Received packets with Local Fail indication (L-bit) set	On, Off
Rx Frame with M Bits	Received packets with Modifier bits (M-bits) set	On, Off
Overrun Occurred	Overrun has occurred in jitter buffer	On, Off
Underrun Occurred	Underrun has occurred in jitter buffer	On, Off
JB Reset Occurred	The jitter buffer was reset	On, Off
Start Frame or Multiframe Insertion	Start frame or multiframe mismatch	On, Off
Cell PTR Mismatch	Cell received with pointer mismatch	On, Off
Frame SN Error Within Window	TDMoIP/MPLS packet sequence number error within window	On, Off
Frame SN Error Outside Window	TDMoIP/MPLS packet sequence number error outside window	On, Off
Cell with wrong SN Protection Field	Cell received with incorrect sequence number protection field (CRC/parity)	On, Off

5.1.3.2 HDLC Bundle Alarms

Figure 5-6. HDLC Bundle Alarms Menu

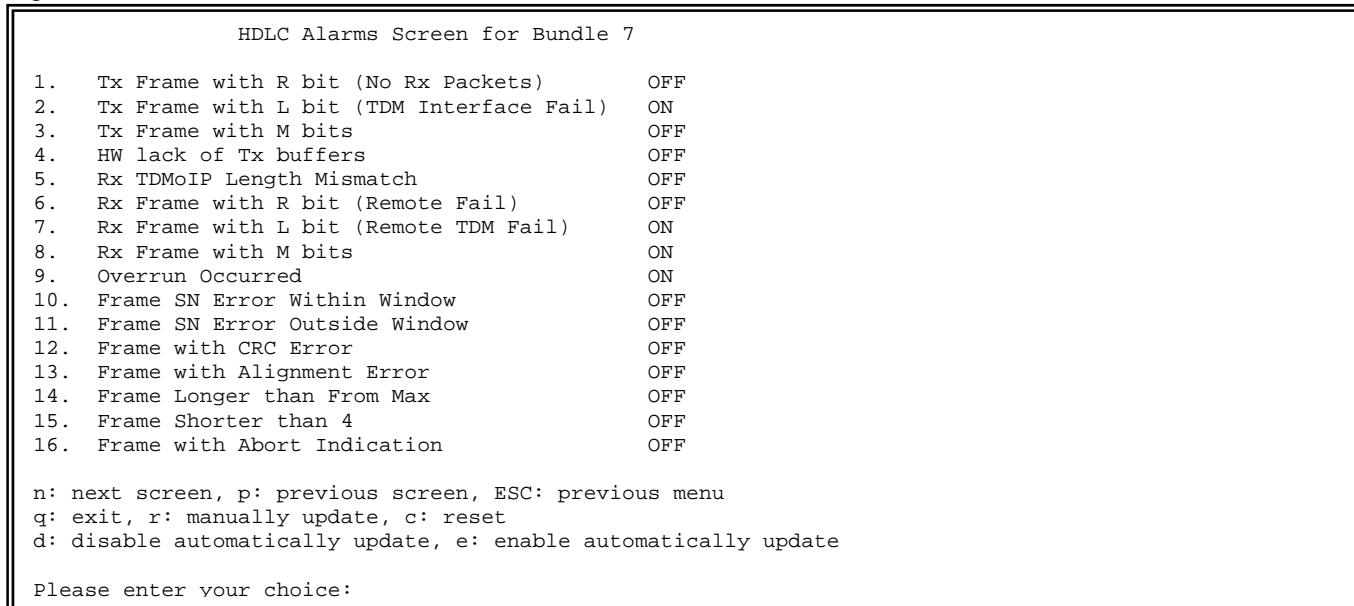


Table 5-5. HDLC Bundle Alarm Descriptions

Parameter	Description	Possible Values
Tx Frame with R Bits	Transmit packets with Remote Fail indication (R-bit) set	On, Off
Tx Frame with L Bits	Transmit packets with Local Fail indication (L-bit) set	On, Off
Tx Frame with M Bits	Transmit packets with Modifier bits (M-bits) set	On, Off
HW lack of Tx buffers	Packet received from TDM was discarded due to lack of buffers associated with this bundle	On, Off
Rx TDMoIP Length Mismatch	The length of an incoming packet did not match the length expected for the bundle configuration	On, Off
Rx Frame with R Bits	Received packets with Remote Fail indication (R-bit) set	On, Off
Rx Frame with L Bits	Received packets with Local Fail indication (L-bit) set	On, Off
Rx Frame with M Bits	Received packets with Modifier bits (M-bits) set	On, Off
Overrun occurred	Overrun has occurred in jitter buffer	On, Off
Frame SN Error Within Window	ETH packet sequence number error within window (window size is 32768)	On, Off
Frame SN Error Outside Window	ETH packet sequence number error outside window (window size is 32768)	On, Off
Frame with CRC Error	HDLC frame with CRC error received from TDM	On, Off
Frame with Alignment Error	HDLC frame with alignment error received from TDM	On, Off
Frame Longer than From Max	HDLC frame longer than maximum configured allowed length received from TDM	On, Off
Frame Shorter than 4	HDLC frame shorter than 4 bytes (including CRC) received from TDM	On, Off
Frame with Abort Indication	HDLC frame with abort indication received from TDM	On, Off

5.1.3.3 SAToP/CES Bundle Alarms

Figure 5-7. SAToP/CES Bundle Alarms Menu

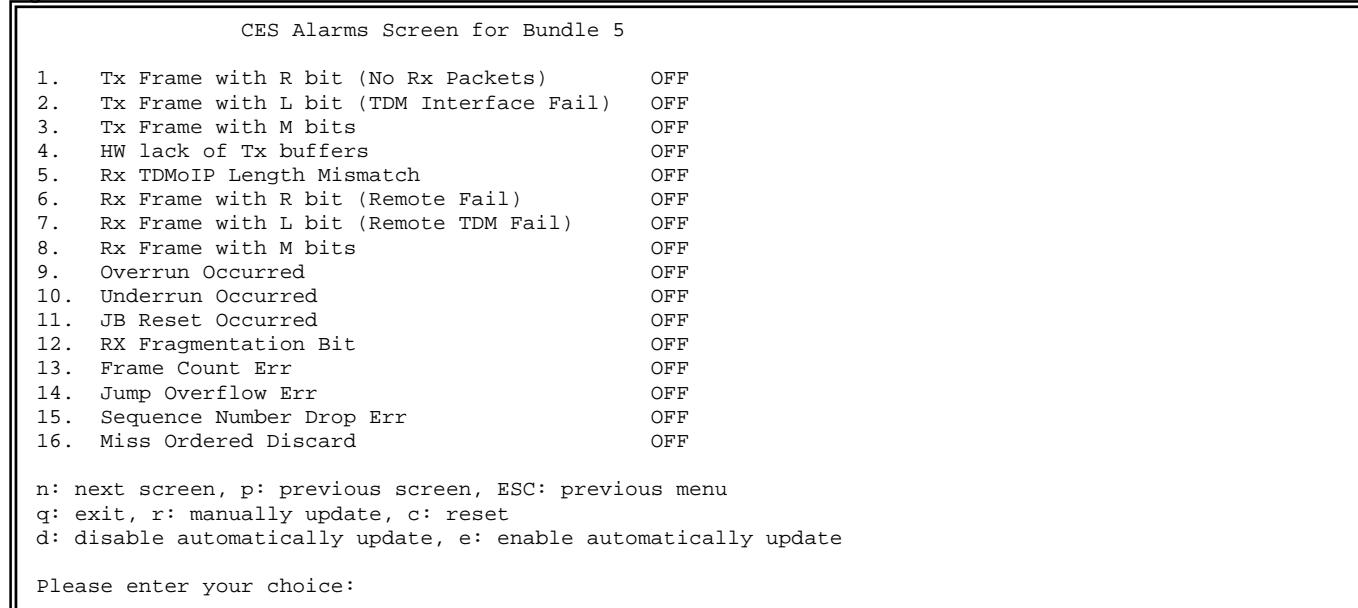


Table 5-6. SAToP or CES Bundle Alarm Descriptions

Parameter	Description	Possible Values
Tx Frame with R Bits	Transmit packets with Remote Fail indication (R-bit) set	On, Off
Tx Frame with L Bits	Transmit packets with Local Fail indication (L-bit) set	On, Off
Tx Frame with M Bits	Transmit packets with Modifier bits (M-bits) set	On, Off
HW lack of Tx buffers	Packet received from TDM was discarded due to lack of buffers associated with this bundle	On, Off
Rx TDMoIP Length Mismatch	The length of an incoming packet did not match the length expected for the bundle configuration	On, Off
Rx Frame with R Bits	Received packets with Remote Fail indication (R-bit) set	On, Off
Rx Frame with L Bits	Received packets with Local Fail indication (L-bit) set	On, Off
Rx Frame with M Bits	Received packets with Modifier bits (M-bits) set	On, Off
Overrun occurred	Overrun has occurred in jitter buffer	On, Off
Underrun occurred	Underrun has occurred in jitter buffer	On, Off
JB Reset Occurred	The jitter buffer was reset	On, Off
Rx Fragmentation Bit	Packet fragmentation status	On – Packet is fragmented Off – Entire (unfragmented) multi-frame structure is carried in a single packet
Start frame or multiframe insertion (CES bundles only)	Start frame or multiframe mismatch	On, Off
Frame Count Err	Packets that belong to structured with CAS bundles were received with incorrect number of frames	On, Off
Jump Overflow Err	Packets received with incorrect sequence number (higher than the expected sequence number and within the window allowed by the configured Rx_max_lost_packets value) and could not be inserted into the jitter buffer due to insufficient space	On, Off
Sequence Number Drop Err	Packets discarded due to incorrect Sequence Number (SN equal to the former or gap between them exceeds limit determined by 'Rx_max_lost_packets' parameter)	On, Off
Miss Ordered Discard	Packets discarded because they were considered duplicated, or because they were received too late to be inserted into the jitter buffer	On, Off

5.2 Displaying Performance Monitoring Counters

DS34T108DK provides statistics collection for the Ethernet interface and bundles.

5.2.1 Displaying Ethernet Counters

To display the Ethernet counters:

1. From the main configuration menu (Figure 3-2), select **Performance (PM)**.

The TopPMs (performance monitoring) menu is displayed (Figure 5-8).

2. Select **Ethernet Performance**.

The Ethernet Performance Data menu is displayed (Figure 5-9). This menu is automatically re-displayed every few seconds. To disable automatic updates, select **d** from the menu. To reset the Ethernet performance monitoring counters, select **c**.

Figure 5-8. Performance Monitoring Menu

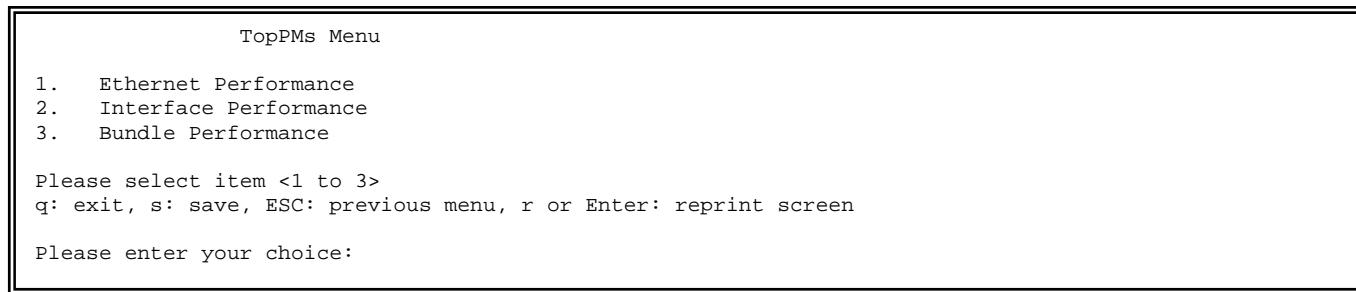


Figure 5-9. Ethernet Performance Data Menu

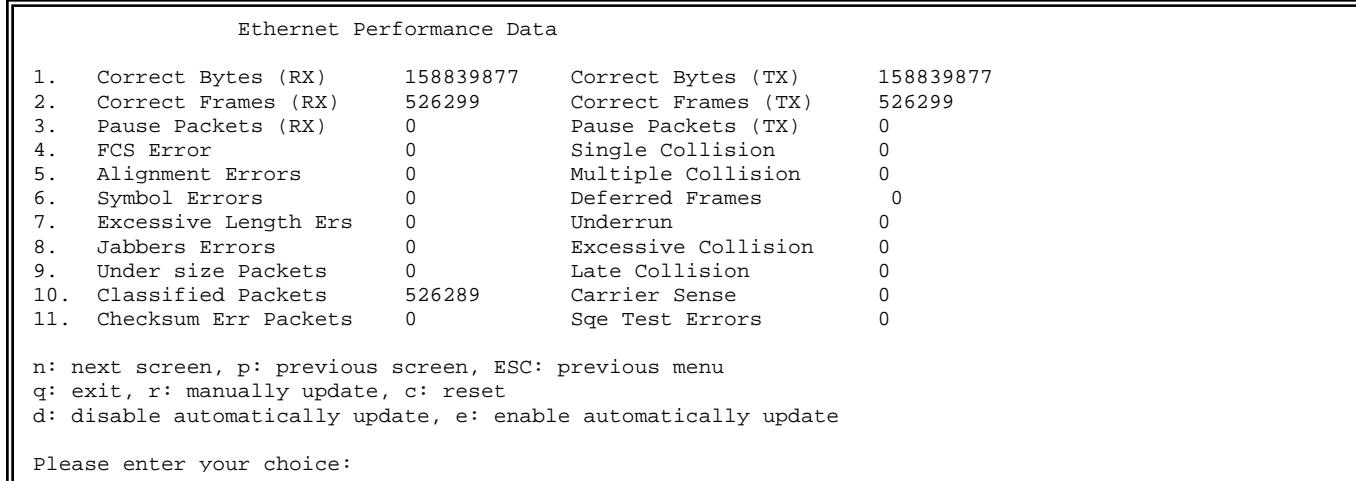


Table 5-7. Ethernet PM Counter Descriptions

Parameter	Description	Possible Values
Correct Bytes (Rx)	The number of ETH packet octets successfully received (not including CRC). When a valid connection is established the number increases steadily. This counter wraps around to 0 after reaching the maximum value.	32 bit number
Correct Frames (Rx)	The number of ETH packets successfully received. When a valid connection is established the number increases steadily. This counter wraps around to 0 after reaching the maximum value.	32 bit number

Parameter	Description	Possible Values
Pause Packet s(Rx)	The number of good ETH pause packets received. A good packet has a length of 64 to 1518 (1536 if bit 8 set in network configuration register) and has no FCS, alignment or receive symbol errors	0-511
FCS Error	Counts the number of packets received that do not pass the FCS check (RFC 1643). An FCS check is a mathematical way to ensure that all the frame bits are correct without the system having to examine each bit and compare it against the original. <u>Recommendation:</u> Check for physical problem such as hardware problem, or a bad line, or noisy environment.	
Alignment Errors	The number of packets received that are not an integral number of octets in length (RFC 1643). All frames should end on an 8-bit boundary, but physical problems on the network could cause the number of bits to deviate from the multiple of eight. <u>Recommendation:</u> Check physical connections, devices and configuration.	0-255
Symbol Errors	The number of packets from PHY that had Rx_err during reception.	0-255
Excessive Length Errs	The number of received packets where the length exceeds 1518 bytes, and without CRC error, alignment error or symbol error.	0-255
Jabbers Error	The number of received packets exceeding 1518 bytes (1536 if bit 8 set in network configuration register) in length and have either a CRC error, an alignment error or a receive symbol error.	0-255
Undersize Packets	The number of received packets where the length is less than 64 bytes, without CRC error or alignment error	0-255
Classified Packets	The number of packets that passed packet classifier.	32 bit number
Checksum Err Packet	The number of packets with IP checksum errors	
Correct Bytes (Tx)	The number of octets successfully transmitted (not including CRC). When a valid connection is established the number increases steadily.	
Correct Frames (Tx)	The number of packets successfully transmitted. When a valid connection is established the number increases steadily.	
Pause Packets (Tx)	The number of pause packets transmitted	
Single Collision	Counter of successfully transmitted packets for which transmission is inhibited by exactly one collision. <u>Recommendation:</u> Use a full-duplex mode if possible.	Valid only in half-duplex mode (RFC 1643)
Multiple Collision	Counter of successfully transmitted packets for which transmission is inhibited by 2 to 15 collisions <u>Recommendation:</u> Use a full-duplex mode if possible.	Valid only in half-duplex mode (RFC 1643)
Deferred Frames	The number of packets experiencing deferral due to carrier sense being active on the first attempt at transmission. Packets involved in any collision are not counted nor are packets that experienced a transmit underrun.	0-511
Underrun	The number of packets that were not transmitted due to transmit FIFO underrun	
Excessive Collision	The number of packets that were not transmitted due to 16 collisions	0-255
Late Collision	In order to allow collision detection to work properly, the period in which collisions are detected is restricted (512 bit-times). For 10BaseT Ethernet (10 Mbps), it is 51.2us (microseconds), and for Fast Ethernet (100 Mbps), 5.12us. For Ethernet stations, collisions can be detected up to 51.2 microseconds after the	Valid only in half-duplex mode (RFC 1643) 0-255

Parameter	Description	Possible Values
	<p>beginning of the transmission, or in other words: up to the 512th bit of the frame. When a station detects a collision after it has sent the 512th bit of its frame, this is counted as a late collision.</p> <p>Note: A late collision is counted twice: as a collision and as a late collision.</p> <p><u>Recommendation:</u> Check if there is incorrect cabling or a non-compliant number of hubs in the network. Bad Network Interface Cards (NICs) can also cause late collisions.</p>	
Carrier Sense	<p>The number of packets transmitted where carrier sense was not seen during transmission or where it was deasserted after being asserted in the transmit packet without collision.</p> <p><u>Recommendation:</u> Check connection between the ETH uplink interface and its Ethernet transceiver.</p>	Valid only in half-duplex mode (RFC 1643) 0–255
Sqe Tst Errors	The number of packets where COL was not asserted within 96 bit times (an interpacket gap) of TX_EN being deasserted in half duplex mode	0–255

5.2.2 Displaying Bundle Counters

DS34T108DK displays counters for AAL1, HDLC, SAToP and CES bundles.

To display bundle counters:

1. From the main configuration menu ([Figure 3-2](#)), select **Performance (PM)**.

The TopPMs (performance monitoring) menu is displayed ([Figure 5-8](#)).

2. Select **Bundle Performance**.

3. A list of open bundles is displayed. Enter the ID number of the bundle for which you want to display the performance monitoring counters.

The Bundle PMs menu is displayed (AAL1: [Figure 5-10](#), HDLC: [Figure 5-11](#), SAToP/CESoPSN: [Figure 5-12](#)). This menu is automatically re-displayed every few seconds. To disable automatic updates, select **d** from the menu. To reset the Ethernet performance monitoring counters, select **c**.

5.2.2.1 Displaying AAL1 Bundle Counters

Figure 5-10. AAL1 Bundle Counter Menu

AAL1 Bundle PMs for Bundle 8	
1. Correct Frames Tx to LAN	1186351
2. Correct Frames Rx from LAN	1186351
3. Lost Frames in Rx	0
4. Minimum JB Level [Usec]	10000
5. Maximum JB Level [Usec]	12000
6. Lost Cells in Rx	0
7. Underrun occurred	0
n: next screen, p: previous screen, ESC: previous menu	
q: exit, r: manually update, c: reset	
d: disable automatically update, e: enable automatically update	
Please enter your choice:	

Table 5-8. AAL1 Bundle Counter Descriptions

Parameter	Description
Correct Frames Tx to LAN	The number of packets successfully transmitted for the bundle. When a valid connection is established the number increases steadily.
Correct Frames Rx from LAN	The number of packets successfully received for a bundle. When a valid connection is established the number increases steadily.
Lost Frames in Rx	<p>There are two possible reasons for lost frames:</p> <ul style="list-style-type: none"> • Packet or packets are dropped or lost somewhere along the network. • Re-ordering of packets by network. Packet re-ordering may occur due to queuing mechanisms, re-routing by the network, or when the router updates very large routing tables and therefore is overloaded. <p><u>Recommendations:</u></p> <ul style="list-style-type: none"> • Make sure DS34T108DK traffic has sufficient bandwidth. • Make sure Ethernet connection is functioning properly. • Make sure Ethernet/IP network provides priority (Quality Of Service) to the DS34T108DK traffic. Priority may be achieved by two means: VLAN tagging and IP ToS marking. • Verify that the IP network devices (switches/routers/modems/etc.) are capable of handling the DS34T108DK PPS rate (Packets Per Second). • Make sure the network devices do not drop/lose/ignore packets by checking their statistics.
Minimum JB Level (Usec)	The minimum jitter buffer level for the current bundle
Maximum JB Level (Usec)	The maximum jitter buffer level for the current bundle
Lost Cells in Rx	Each AAL1 cell header contains a 4-bit sequence number field. This counter counts the cells that were lost.
Underrun Occurred	<p>An underrun situation can be caused by:</p> <ul style="list-style-type: none"> • Buffer starvation: Packets delay variation causes the buffer to empty out gradually until it underflows. • Continuous Sequence Errors. The sequence error means a halt in the valid stream of packet arrival into the Jitter Buffer. • Packets are stopped/lost/dropped. • Differential Timing (PDVT) configuration that is not large enough to compensate for the network delay variation • In a TDM network, all system elements must be locked to one master clock. If not, it leads to a situation in which data is clocked out of the Jitter Buffer at a rate different from the one that is clocked in. This will gradually result in either an Overflow or Underflow event, depending on which rate is higher. The event will repeat itself periodically as long as the system clock is not locked. <p><u>Recommendations:</u></p> <ul style="list-style-type: none"> • Try increasing the Differential Timing (PDVT) in a bundle configuration. Check reasons for sequence errors or lost/dropped packets (if present), system clocking configuration, Ethernet environment (full duplex) and connection, packets drop/loss/ignore by Routers/Switches or non-uniform packets output by Routers/Switches due to queuing mechanisms. • Make sure the same number of timeslots for bundle is configured on each end, and that the "Frame Size in Cells" parameter (Bundle Configuration menu) is identical at both ends. • Make sure the Ethernet/IP network provides priority (Quality Of Service) to the TDMoP traffic. Priority may be achieved by two means: VLAN tagging and IP TOS marking.

5.2.2.2 Displaying HDLC Bundle Counters

Figure 5-11. HDLC Bundle Counter Menu

```

HDLC Bundle PMs for Bundle 7

1. Correct Frames Tx to LAN          0
2. Correct Frames Rx from LAN        0
3. Lost Frames in Rx                0
4. Frames with Any Error           0
5. Good Frames from TDM            0
6. Overrun occurred                0
7. Sn Error Outside Window         0

n: next screen, p: previous screen, ESC: previous menu
q: exit, r: manually update, c: reset
d: disable automatically update, e: enable automatically update

Please enter your choice:

```

Table 5-9. HDLC Bundle Counter Descriptions

Parameter	Description
Correct Frames Tx to LAN	The number of packets successfully transmitted for the bundle. When a valid connection is established the number increases steadily.
Correct Frames Rx from LAN	The number of packets successfully received for a bundle. When a valid connection is established the number increases steadily.
Lost Frames in Rx	There are two possible reasons for lost frames: <ul style="list-style-type: none"> • Packet or packets are dropped or lost somewhere along the network. • Re-ordering of packets by network. Packet re-ordering may occur due to queuing mechanisms, re-routing by the network, or when the router updates very large routing tables and therefore is overloaded. <u>Recommendations:</u> <ul style="list-style-type: none"> • Make sure DS34T108DK traffic has sufficient bandwidth. • Make sure Ethernet connection is functioning properly. • Make sure Ethernet/IP network provides priority (Quality Of Service) to the DS34T108DK traffic. Priority may be achieved by two means: VLAN tagging and IP ToS marking. • Verify that the IP network devices (switches/routers/modems/etc.) are capable of handling the DS34T108DK PPS rate (Packets Per Second). • Make sure the network devices do not drop/lose/ignore packets by checking their statistics.
Frames with Any Error	The number of HDLC frames with any error received from TDM, i.e. CRC Error, HDLC Frame Too Short, HDLC Frame Too Long, Abort Error
Good Frames from TDM	The number of good HDLC frames received from TDM
Overrun Occurred	Overrun has occurred in jitter buffer
Sn Error Outside Window	Counts number of SN error outside window occurrences. The window size is 32768.

5.2.2.3 Displaying SAToP/CES Bundle Counters

Figure 5-12. SAToP/CES Bundle Counter Menu

```

SAToP Bundle PMs for Bundle 5

1. Correct Frames Tx to LAN      569369
2. Correct Frames Rx from LAN   569369
3. Lost Frames in Rx           0
4. Minimum JB Level [Usec]     9968
5. Maximum JB Level [Usec]     14942
6. Discarded Packets in Rx     0
7. Reordered Packets in Rx     0
8. Underrun occurred           0
9. Jump Packets in Rx          0

n: next screen, p: previous screen, ESC: previous menu
q: exit, r: manually update, c: reset
d: disable automatically update, e: enable automatically update

Please enter your choice:

```

Table 5-10. SAToP/CES Bundle Counter Descriptions

Parameter	Description
Correct Frames Tx to LAN	The number of packets successfully transmitted for the bundle. When a valid connection is established the number increases steadily.
Correct Frames Rx from LAN	The number of packets successfully received for a bundle. When a valid connection is established the number increases steadily.
Lost Frames in Rx	<p>There are two possible reasons for lost frames:</p> <ul style="list-style-type: none"> • Packet or packets are dropped or lost somewhere along the network. • Re-ordering of packets by network. Packet re-ordering may occur due to queuing mechanisms, re-routing by the network, or when the router updates very large routing tables and therefore is overloaded. <p><u>Recommendations:</u></p> <ul style="list-style-type: none"> • Make sure DS34T108DK traffic has sufficient bandwidth. • Make sure Ethernet connection is functioning properly. • Make sure Ethernet/IP network provides priority (Quality Of Service) to the DS34T108DK traffic. Priority may be achieved by two means: VLAN tagging and IP ToS marking. • Verify that the IP network devices (switches/routers/modems/etc.) are capable of handling the DS34T108DK PPS rate (Packets Per Second). • Make sure the network devices do not drop/lose/ignore packets by checking their statistics.
Minimum JB Level (Usec)	The minimum jitter buffer level for the current bundle
Maximum JB Level (Usec)	The maximum jitter buffer level for the current bundle
Discarded Packets	Number of received packets that were discarded by SAToP/CESoPSN payload type machine
Reordered Packets	Number of received misordered packets that were successfully reordered by SAToP/CESoPSN payload type machine
Underrun Occurred	<p>An underrun situation can be caused by:</p> <ul style="list-style-type: none"> • Buffer starvation: Packets delay variation causes the buffer to empty out gradually until it underflows. • Continuous Sequence Errors. The sequence error means a halt in the valid stream of packet arrival into the Jitter Buffer. • Packets are stopped/lost/dropped. • Differential Timing (PDVT) configuration that is not large enough to compensate for the network delay variation • In a TDM network, all system elements must be locked to one master clock. If not, it leads to a situation in which data is clocked out of the Jitter Buffer at a rate different from the one that is clocked in. This will gradually result in either an Overflow or Underflow event, depending on which rate is higher. The event will repeat itself periodically as long as the system clock is not locked. <p><u>Recommendations:</u></p>

Parameter	Description
	<ul style="list-style-type: none"> Try increasing the Differential Timing (PDVT) in a bundle configuration. Check reasons for sequence errors or lost/dropped packets (if present), system clocking configuration, Ethernet environment (full duplex) and connection, packets drop/loss/ignore by Routers/Switches or non-uniform packets output by Routers/Switches due to queuing mechanisms. Make sure the same number of timeslots for bundle is configured on each end. Make sure the Ethernet/IP network provides priority (Quality Of Service) to the TDMoP traffic. Priority may be achieved by two means: VLAN tagging and IP TOS marking.
Jump Packets in Rx	Number of jumped packets encountered by SAToP/CESoPSN payload type machine. System software can calculate the number of lost packets using the following equation: Lost Packets = (Jumped Packets – Reordered Packets)

5.2.3 Displaying TDM Interface Counters

This is not yet implemented in the DS34T108DK user interface software.

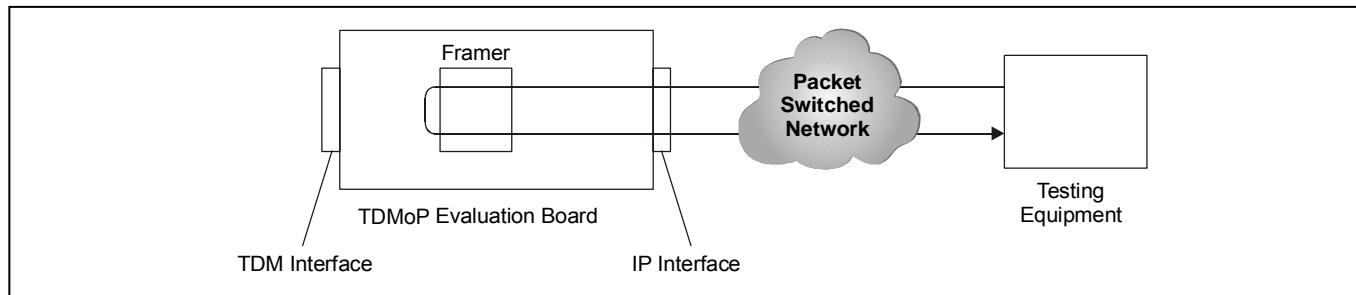
5.3 Diagnostic Loopbacks

DS34T108DK supports local and remote loopbacks that can be run on the physical interfaces and bundles. The loopbacks can be used to check internal circuitry of the unit and its physical network and bundle connections.

5.3.1 Local Loopback

Local loopback returns packets received through the IP interface towards the network. [Figure 5-13](#) shows the signal path for a typical local loopback.

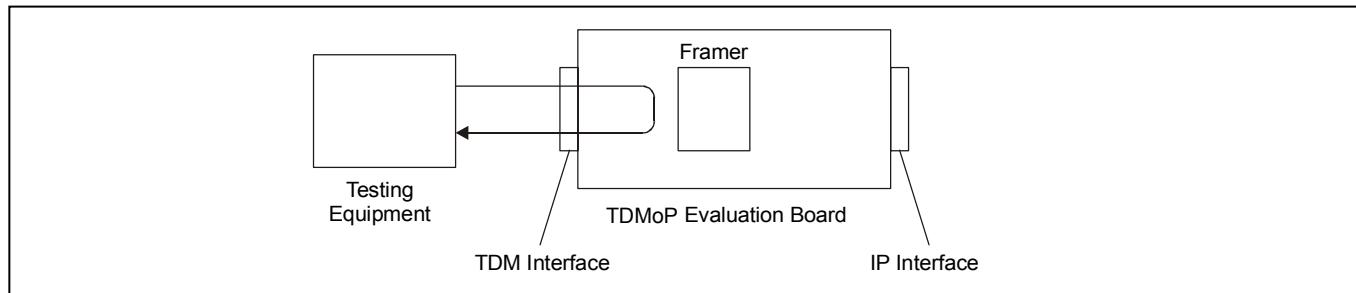
Figure 5-13. Local Loopback Diagram



5.3.2 Remote Loopback

Remote loopback returns the data received on the TDM receive port to the test equipment connected to the TDM transmit port.

Figure 5-14. Remote Loopback Diagram

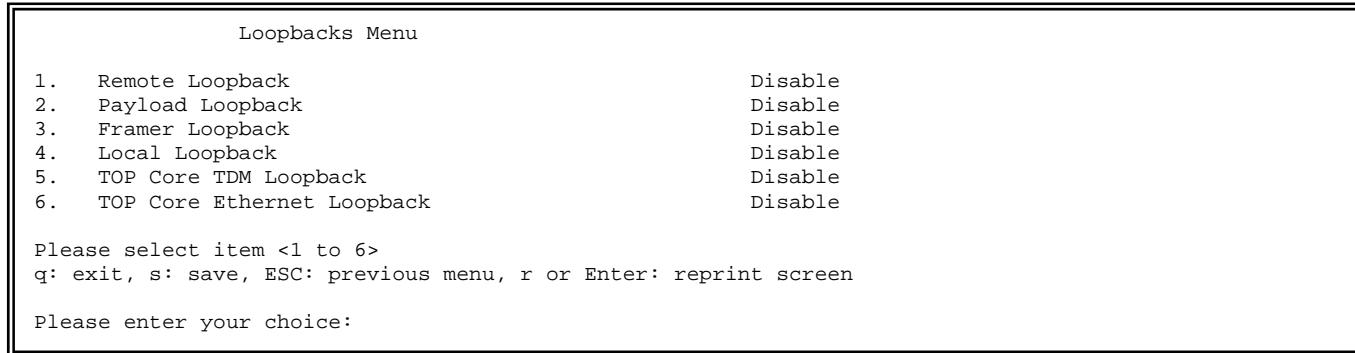


5.3.3 Enabling Loopbacks

To run a loopback on a physical port:

1. From the main configuration menu, select **Utilities**.
The Utility Menu is displayed.
2. From the Utility Menu, select **Loopbacks**.
3. Specify the TDM interface number.
The Loopbacks Menu is displayed (Figure 5-15).
4. Select **Local Loopback**, **Remote Loopback** or any of several other loopback types.
5. Select **Enable**.

Figure 5-15. Loopbacks Menu



5.4 Reading and Writing TDMoP IC Registers and SDRAM Memory

System software has menu options to read and write the registers of the TDMoP IC or its external SDRAM. From the main configuration menu, select **Utilities** and then select either **Read Memory** or **Write Memory** and follow the prompts.

5.5 Troubleshooting Chart

Table 5-11 lists possible DS34T108DK faults, probable causes, and the actions necessary to correct the situation.

Table 5-11. DS34T108DK Troubleshooting Chart

Fault	Probable Cause	Corrective Actions
The E1/T1 equipment connected to DS34T108DK is not synchronized (E1/T1 level) with DS34T108DK	Configuration problems	Check DS34T108DK port configuration.
Slips and errors in E1/T1 equipment		Check E1/T1 alarms to indicate the exact cause.
	Ethernet port is set to work in half-duplex mode (may cause extreme PDV because of collisions and backoffs) Ethernet ports of the local and remote devices are not set to the autonegotiation mode or set to different rates	Check DS34T108DK port configuration (auto negotiation, rate, duplex mode) and check Ethernet PM
	Timing configuration is not properly set (periodic buffer under/overflows – bundle connection status menu)	Check the timing settings.
	Network PDV or Lost Frames	Check PDV introduced by the network, and, if necessary, increase Differential Time (PDVT) setting.
Echo in voice	End-to-end delay is too large	Check network delay and try to decrease it. Try to decrease Differential Time (PDVT). Decrease Ethernet packet size by changing bundle configuration.
Ethernet interface LINK indicator is not lit	No active station on the LAN	Check that at least one station is active on the LAN.
	Cable problem	Check and replace, if necessary, the cable that connects the DS34T108DK ETH uplink connector to the LAN.
	Problem on the LAN	Check LAN media.
	Defective DS34T108DK	Replace DS34T108DK if a failure is detected.

Appendix A. Connector Wiring

A.1 E1/T1 and External Clock Connectors

The E1/T1 and external clock interfaces of DS34T108DK terminate in 8-pin RJ-45 connectors, wired in accordance with [Table A-1](#).

Table A-1. E1/T1 and External Clock Interface Connector Pin-out

Pin	Designation	Direction	Function
1	RD (R)	Input	Receive data (ring)
2	RD (T)	Input	Receive data (tip)
3, 6	—	—	FGND
4	TD (R)	Output	Transmit data (ring)
5	TD (T)	Output	Transmit data (tip)
7, 8	—	N/A	Not connected

A.2 Ethernet Connectors

The Ethernet uplink and Ethernet management electrical interfaces terminate in 8-pin RJ-45 connectors, wired in accordance with [Table A-2](#).

Table A-2. Ethernet Connector Pin-out

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

A.3 ASCII Terminal Connector

The control terminal interface terminates in a V.24/RS-232 9-pin D-type female DCE connector, wired in accordance with [Table A-3](#).

Table A-3. Control Interface Pin-out

Pin	Function
1	—
2	Tx
3	Rx
4	—
5	GND
6-8	—

User Manual Revision History

REVISION DATE	DESCRIPTION	PAGES CHANGED
101308	Initial release.	—

Rev: 101308

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Maxim cannot assume responsibility for use of any circuitry other than circuitry entirely embodied in a Maxim product. No circuit patent licenses are implied. Maxim reserves the right to change the circuitry and specifications without notice at any time.

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