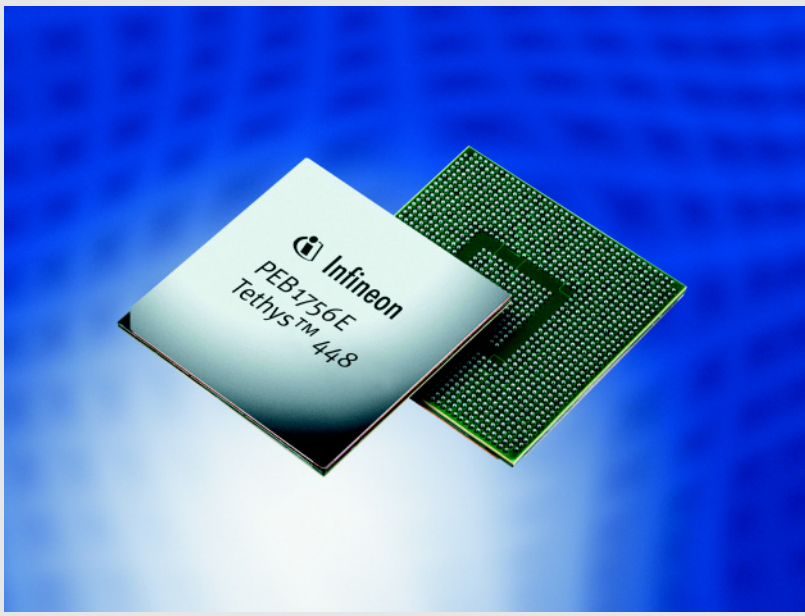
Semiconductor Solutions for High Speed Communications and Fiber Optic Applications



Tethys™ 448 is optimized for SONET/SDH applications as a full-duplex sixteen STS-48/STM-16 or a mix of sixteen STS-12/STM-4 and STS-3/STM-1 MUX/DEMUX with full framer functionality including pointer processing, and overhead termination; ideal for aggregation, ADM and DWDM applications. In the demultiplex ingress direction, Tethys™ 448 accepts either sixteen STS-48/STM-16, or a mix of sixteen STS-12/STM-4 and STS-3/STM-1 signals in serial 2.5 Gbit/s or serial 622 Mbit/s or serial 155 Mbit/s format. Tethys™ 448 locates the incoming SONET/SDH frame, optionally de scrambles the data, monitors the TOH and POH, and provides STS-1 level pointer processing. In addition, Tethys™ 448 supports TOH and POH overhead transparency.

In the multiplex direction, Tethys™ 448 accepts sixteen STS-48/STM-16 signals in serial 2.5 Gbit/s format. Tethys™ 448 further provides corresponding functionality in the DEMUX direction.

Tethys™ 448

Applications

- ADM
- Metro Aggregation
- Digital Cross connects
- Repeaters
- DWDM Equipment
- Test Equipment

Features

- Provides serial STS-48/STM-16, STS-12/STM-4 or STS-3/STM-1 links
- Differential CML 2.5 Gbit/s I/O interface to optics
- Differential CML 2.5 Gbit/s I/O interface to system/backplane
- TFI-5 Support
- Processes SONET/SDH sixteen STS-48/STM-16 or a mix of sixteen STM-12/STM-4 and STS-3/STM-1 on the line side interface
- Processes SONET/SDH sixteen STS-48/STM-16 on the system/client side serial 2.5 Gbit/s interface
- Provides line timing of all line and system side interfaces
- Processes SONET/SDH flexible concatenation streams of STS-2c, 3c, 4c, … to 48c
- Supports auto-detection of concatenation streams STS-3c/STM-1, STS-12c/STM-4 and STS-48c/STM-16
- Supports STS-1 level pointer processing of STS-48/STM-16 or STM-12/STM-4 or STS-3/STM-1 streams
- Provides interfaces for dropping alarm and status information, and for forcing alarm conditions
- Power dissipation of 15 W, depending on mode of operation
- Terminates and generates SONET section, line, and path layers
- Provides TOH and POH transparency
- Provides monitoring of POH bytes B3 and N1/Z5
- Provides B2 SF/SD capability for Poisson and bursty error distribution
- Pro Provides full TOH/POH add/drop
- Provides STS-1 level POH add/drop
- Supports more than ±746 UI programmable output skew on STS48/STM-16 output links to external cross-connects
- For diagnostic purposes, Tethys provides PRBS generator/checker and loop backs

Tethys™ 448
PEB1756E
Sixteen STS-48/STM-16 MUX/DEMUX

Infineon technologies

Never stop thinking.

Features (cont'd)

- Provides B1, B2, H1 and H2 bit error generation for both receive and transmit direction diagnostics
- Provides 1 second performance monitors
- 0.13 µm process, 1.2 V core, 3.3 V I/O
- P-FCHBGA-1397 CBGA
- Motorola 32-bit synchronous microprocessor interface for configuration, control, and status monitoring
- Complies with GR-253, GR-1377, ITU-T G.707, and ANSI T1.105
- Provides a standard 5 signal IEEE 1149.1 JTAG test port for boundary scan board test purposes

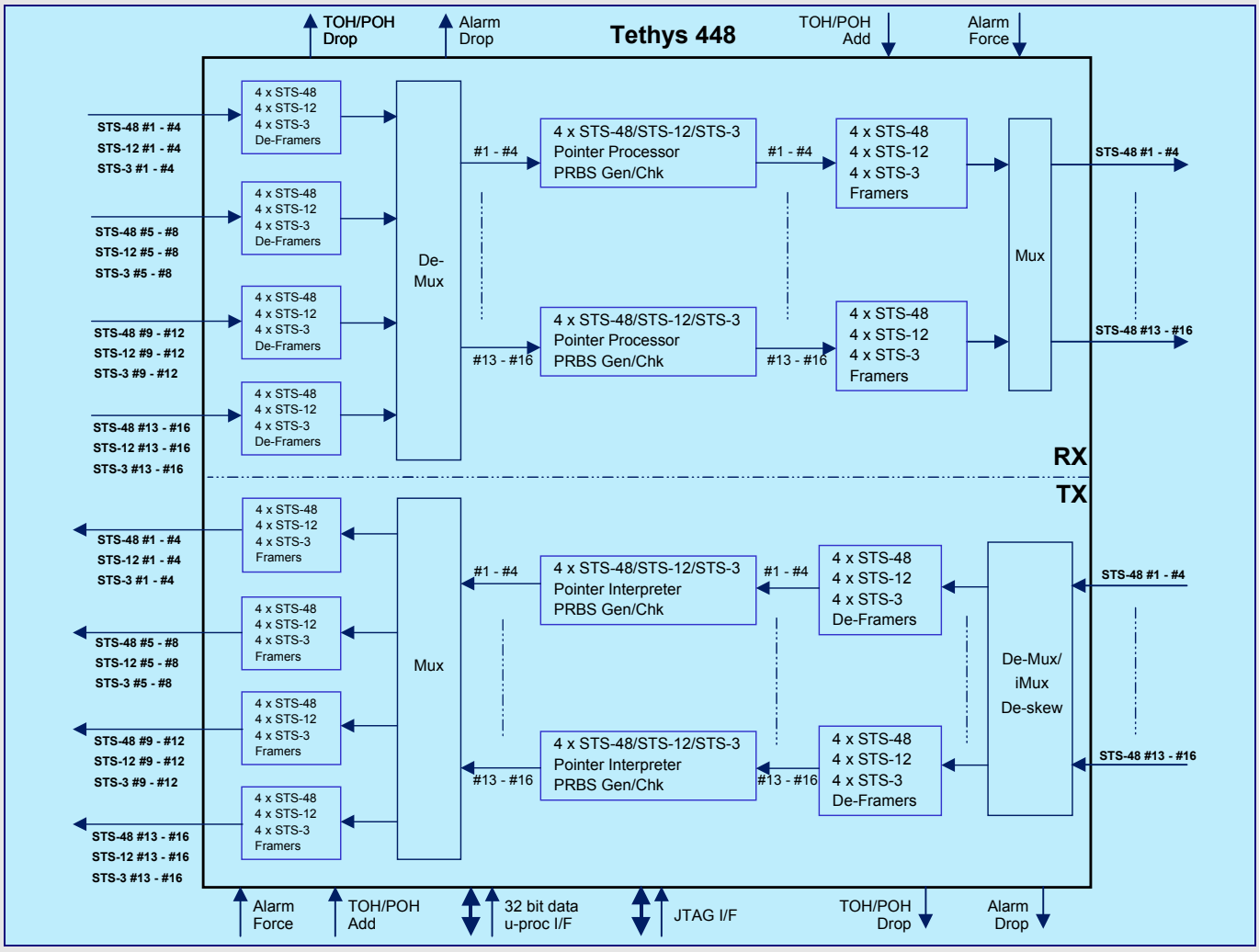
Specifications

- OIF TFI-5

Standards

- ANSI T1.105-2000-193R2 (DRAFT)
- ANSI T1.105.05-1994
- T1X1.3/93-005RI -1993 - preliminary
- GR-253-CORE Sept. 2000

Type	Sales Code	Description	Package
1397 ball BGA	–	–	P-FCHBGA-1397



Tethys™ 448 PEB1756E Block Diagram

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Overview

Tethys™ 448 is a highly integrated device that implements full duplex SONET/SDH processing at STS-48/STM-16, STS-12/ STM-4 or STS-3/ STM-1 rates. In the rest of this document, only SONET terminology will be stated. However, SDH terminology applies equally well unless otherwise written.

Tethys™ 448 supports up to 40 Gbit/s bandwidth or 80 Gbit/s full-duplex. It provides section, line, and path overhead processing and supports framing, scrambling/de scrambling, alarm signal insertion/detection, bit interleaved parity (B1/B2/B3) processing, path overhead processing, pointer processing and TOH and POH transparency. It also provides substantial performance monitoring of TOH/POH overhead for receive direction with 1 second count accumulation.

On the line side, sixteen STS-48's, or a mix of sixteen STS-12's and STS-3's are supported. The interface utilizes serial independent 2.5 Gbit/s links, serial independent 622 Mbit/s links or serial independent 155 Mbit/s respectively for each interface. The STS-48, STS-12 and STS-3 interfaces can be received at differing clock frequencies, depending on the SONET line clock variation of ± 20 ppm. Similarly, the STS-48, STS-12 or STS-3 outputs can be line timed to the STS-48 inputs.

On the system/client side, sixteen STS-48 can be interfaced. In this case, serial 2.5 Gbit/s is utilized for the respective interfaces.

The System side can support 16 independent STS-48 links. The selection/configuration of the system and line side interfaces is completely independent.

All TOH (A1… E2) bytes can be added/dropped onto the parallel TOH/POH interfaces. This applies in both receive and transmit directions.

All POH passing through the device can be added or dropped onto the TOH/POH ports. The TOH and POH ports are physically shared.

Detected alarms like LOS, LOF, SEF, AIS-L can be dropped onto the parallel Alarm Drop Interfaces. This applies in both the receive and transmit directions. In addition, Tethys™ 448 can drop the payload concatenation configuration onto the same interface.

In TOH Transparency mode, J0, B1, E1, F1, K1, K2, D1-D12, S1, M0/M1 and E2 bytes are transparent through the device. In POH Transparency mode, all POH bytes, including the B3 bytes, are transparent as is. TOH/POH transparency can be implemented through the TOH/POH ADD/DROP ports using the dropped overhead and bit error masks on these interfaces. This applies to both the receive and transmit directions.

Tethys™ 448 can process any legal mix of flexible concatenated signals ranging from STS-1, STS-2c, STS-3c … up to STS-48c. Each set of concatenated signals must fit inside an STS-3, STS-12 or STS-48 boundary (depending on whether the pointer processor is configured as an STS-3, STS-12 or STS-48) and must be formatted as an STS-Nc frame as defined in GR-253-CORE.

Tethys™ 448 provides the ability for certain frame structures to be automatically detected and configured into the device. This feature allows the user to interface to systems with unknown standard payload concatenation configurations.

Various diagnostic features are provided. Framed PRBS-32 can be generated and checked on any channel via loopbacks. Errors can be inserted into B1, B2, H1 and H2 bytes on a bit-by-bit basis.

To support asynchronous timing between different physical ports, Tethys™ 448 provides STS-1 level pointer processing for sixteen STS-48 or a mix of sixteen STS-12 and STS-3 interfaces in the receive direction. On the line side receive interface, all inputs can be asynchronous with frequency differences of ±20 ppm.

The pointer processor on the receive side adjusts for these differences and outputs the STS-48, STS-12 or STS-3 streams based on the line timed or system frequencies selected on the system side. In the transmit direction, the system side ingress ports and line side egress ports must be locked to the same frequency.

Tethys™ 448 aggregates all STS-48 ports from the system side to the line side in the transmit/multiplex direction. STS-3 and STS-12 rate streams received from the line side are always multiplexed into the STS-48 rate streams on the system side. In the receive direction, the de-aggregation of physical ports is the reverse of the transmit direction aggregation.

To select the best timing available in the system, the S1 bytes are processed and the system has the option to select either timing from the line or timing from the local reference source. On the system side, the receive outputs can be line timed to their respective system side transmit inputs.

Tethys™ 448 generates and detects all SONET/SDH relevant alarms and defects, including LOS, LOF, RDI-L, REI-L, AIS-P, AIS-L and LOC on each line side and system side interface

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Applications

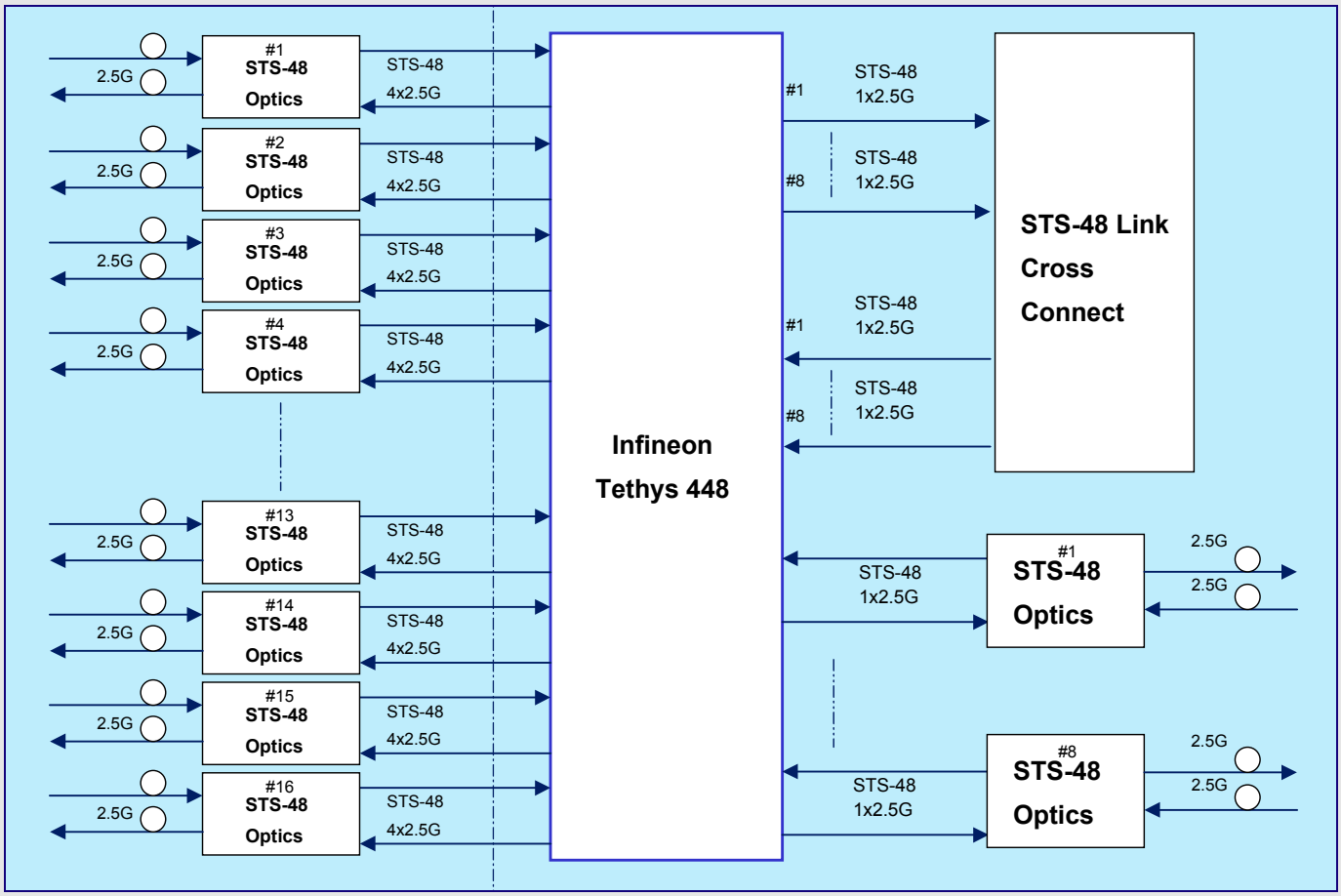
The application below shows how sixteen STS-48 signals can be connected to a Tethys™ 448 device.

Tethys™ 448 receives a serial independent 2.5 Gbit/s format STS-48 frame from the optical device. It then performs framing, performance monitoring, and rate adaptation in the receive direction, and finally outputs a single STS-48 2.5 Gbit/s differential pair to the STS-48 link cross connect or the STS-48 optic transceivers.

In the transmit direction, Tethys™ 448 performs the reverse operation.

TOH and POH interfaces may be added and dropped as required through the respective Tethys™ 448 ports (not shown).

Many other configuration options are possible that cannot be shown in this diagram. Please refer to the data sheet for more detailed information.



40G - STS-48 Cross Connect and Aggregation

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