

SONET - Grafische Übersicht

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Einführung

Dieses Dokument bietet eine Übersicht über das in Bildern dargestellte Synchronous Optical Network (SONET).

Hinweis: *Tabellen und Diagramme mit freundlicher Genehmigung von JDS Uniphase Corporation*

Voraussetzungen

Anforderungen

Für dieses Dokument bestehen keine speziellen Anforderungen.

Verwendete Komponenten

Dieses Dokument ist nicht auf bestimmte Software- und Hardwareversionen beschränkt.

Konventionen

Weitere Informationen zu Dokumentkonventionen finden Sie unter [Cisco Technical Tips Conventions](#) (Technische Tipps zu Konventionen von Cisco).

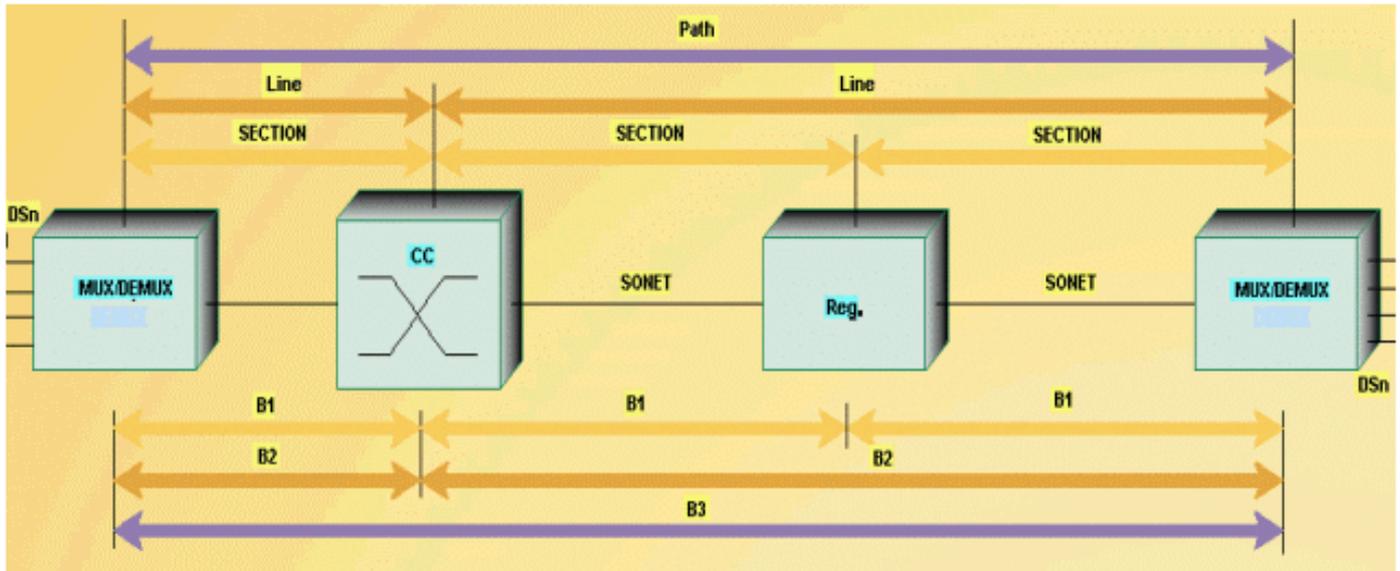
SONET - Übersicht

Dieser Abschnitt bietet eine Übersicht über SONET in grafischem Format.

Der SONET-Link

Abbildung 1 zeigt, wie eine SONET-Verbindung aussieht.

Abbildung 1: SONET-Link

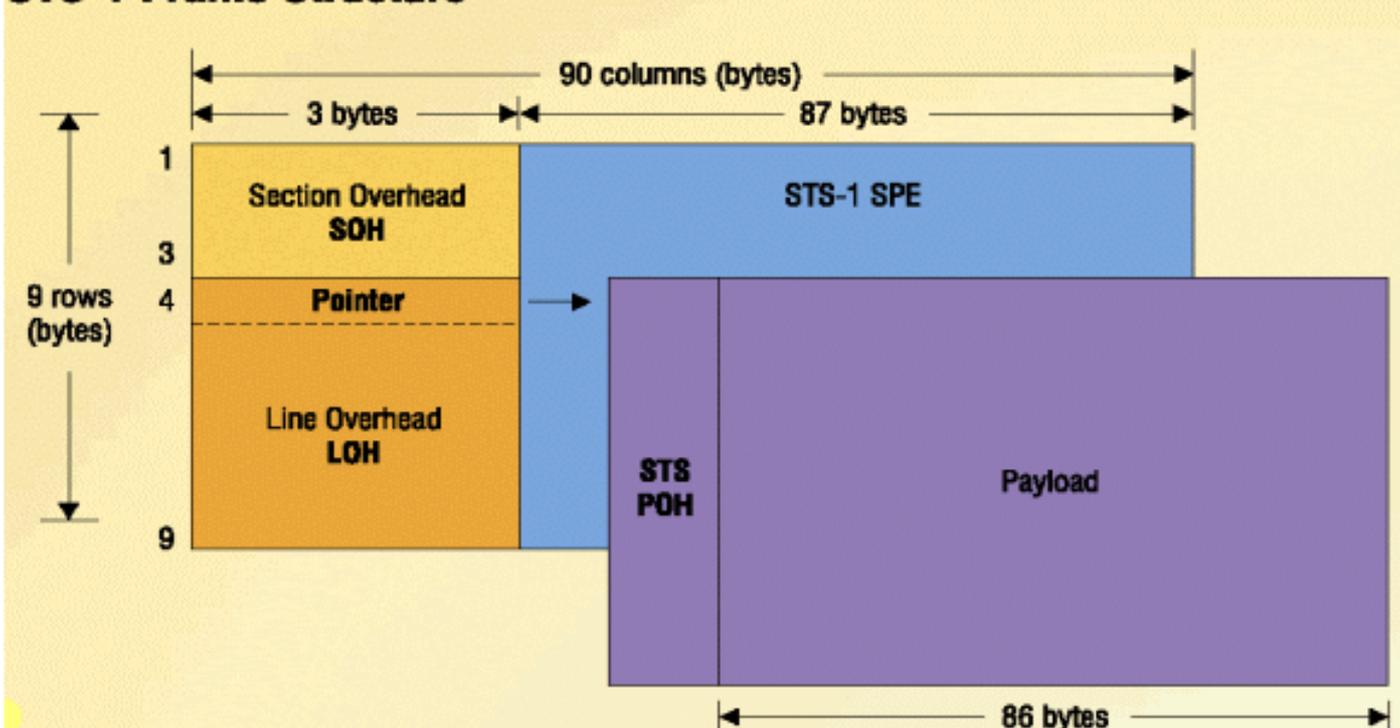


STS-1-Frames

Abbildung 2 zeigt die Rahmenstruktur für das synchrone Übertragungssignal (STS-1).

Abbildung 2: STS-1-Rahmenstruktur

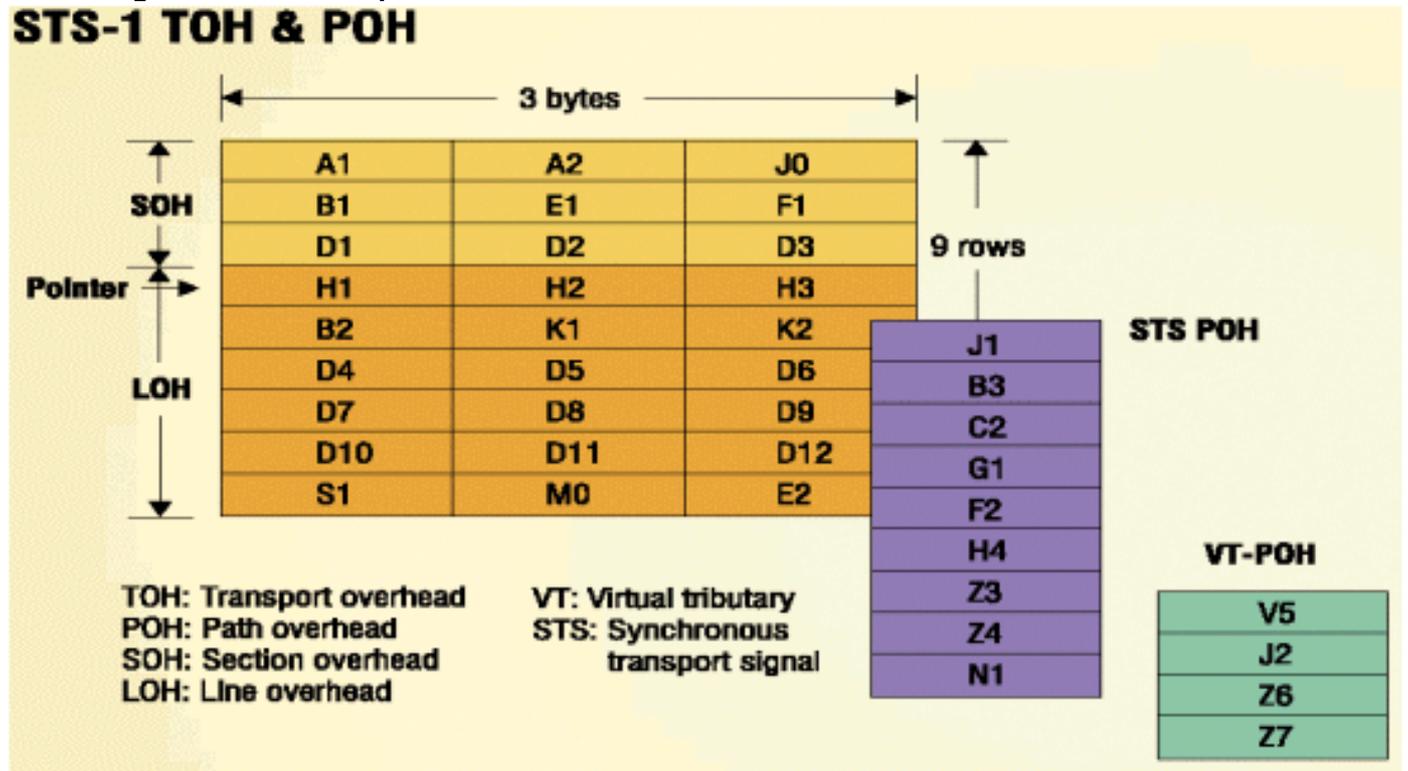
STS-1 Frame Structure



STS-1 SONET-Overhead

Abbildung 3 zeigt den STS-1-Transport und den Pfad-Overhead (SONET Overhead).

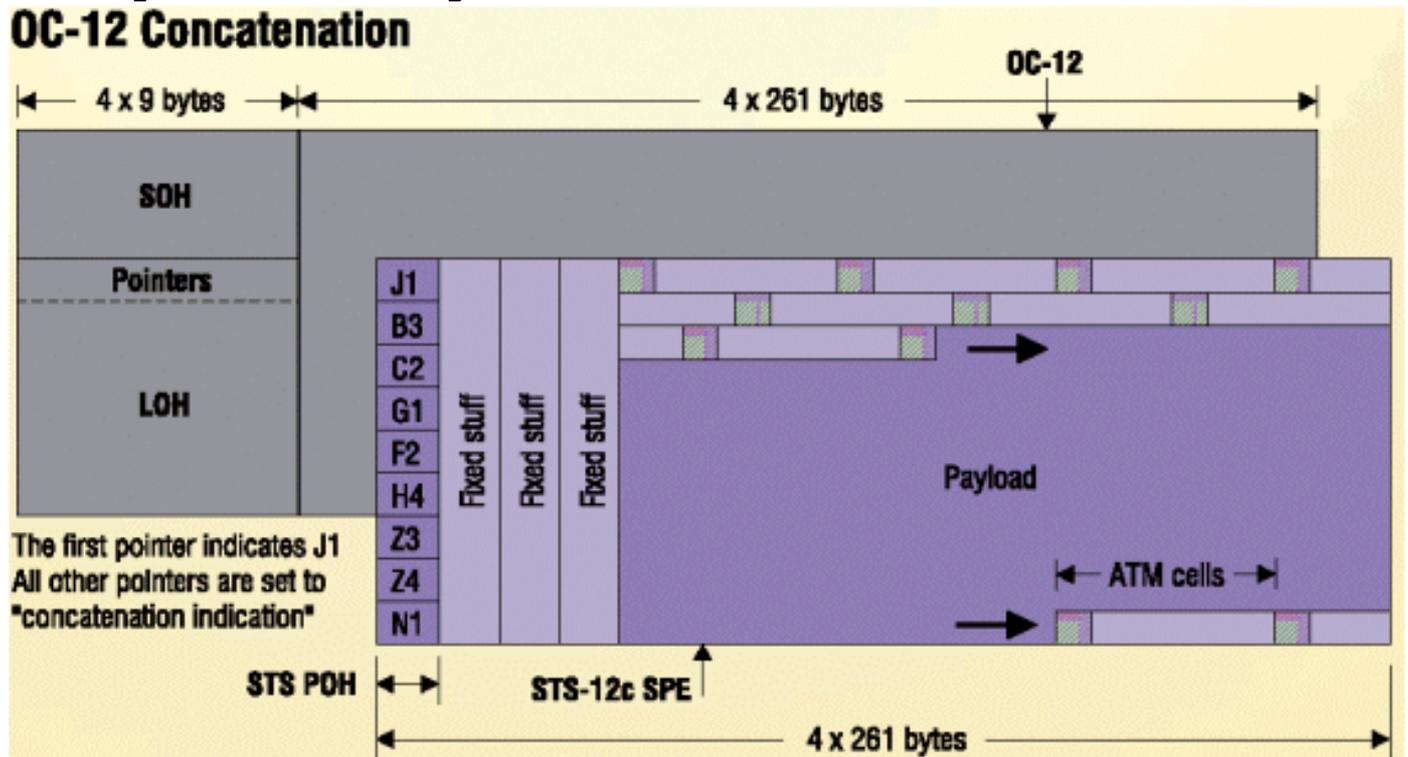
Abbildung 3: STS-1-Transport und Pfad-Overhead



OC-12-Verkettung

Abbildung 4 zeigt die OC-12-Verkettung.

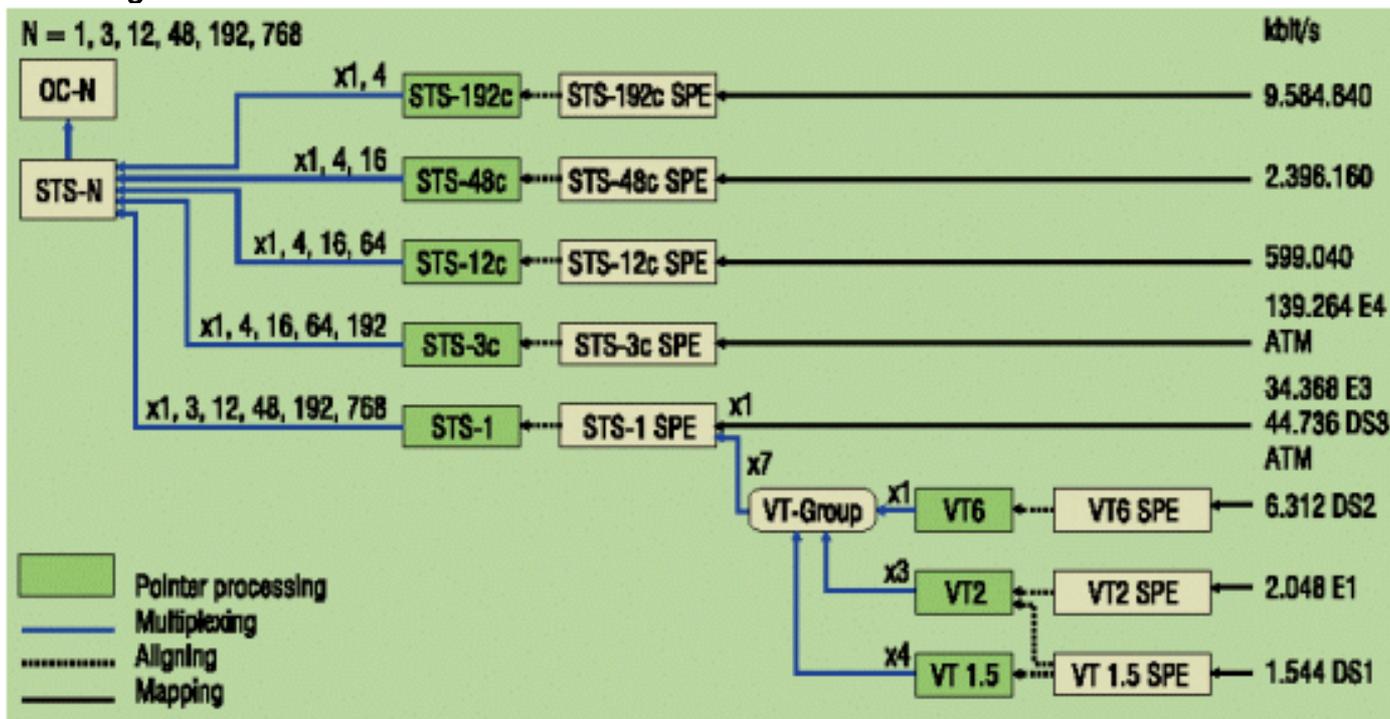
Abbildung 4: OC-12-Verbindung



SONET-Hierarchie

Abbildung 5 zeigt die SONET-Hierarchie.

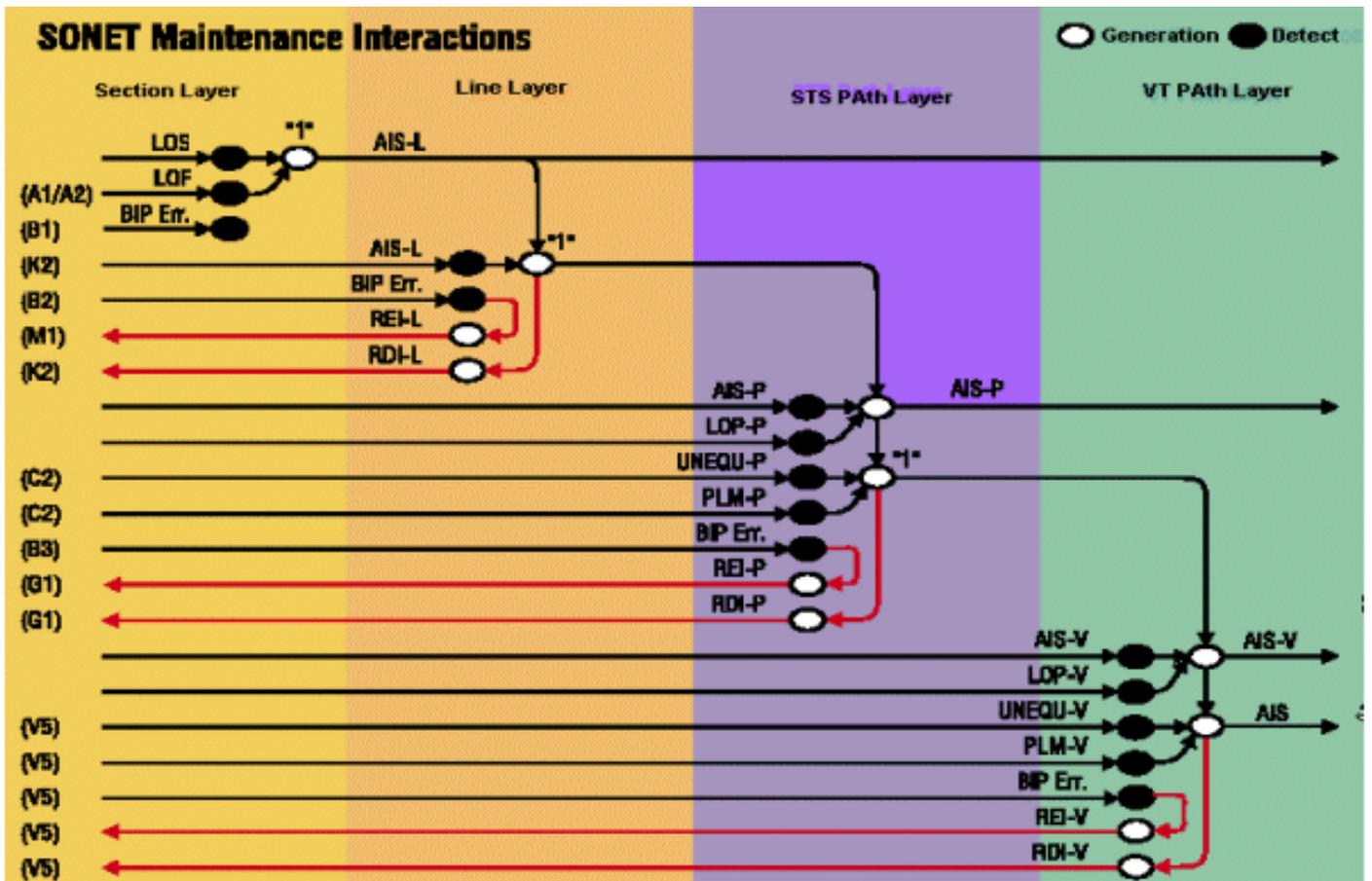
Abbildung 5: SONET-Hierarchie



SONET-Wartungsinteraktionen

Abbildung 6 zeigt, wie SONET-Wartungsinteraktionen angezeigt werden.

Abbildung 6: SONET-Wartungsinteraktionen



Warn- und Erkennungskriterien

In [Tabelle 1](#) sind die Bedeutung der Alarme und ihre Erkennungskriterien aufgeführt.

Tabelle 1: Bedeutung von Alarmen und deren Erkennungskriterien

	Anomalies / Defects	Detection criteria	Bellcore ANSI
LOS	Loss of Signal	All-zero pattern for $2.3 \mu s \leq T \leq 100 \mu s$	GR-253 T1.231
SEF	Severely Error Framing	A1, A2 errored for $\geq 625 \mu s$	GR-253 T1.231
LOF	Loss of Frame	If SEF persists for $\geq 3 ms$	GR-253 T1.231
S-BIP Error	Section BIP Error (B1)	Mismatch of the recovered and computed BIP-8 covers the whole STS-N frame	GR-253 T1.105
L-BIP Error	Line BIP Error (B2)	Mismatch of the recovered and computed N x BIP-8 covers the whole frame, except section overhead	GR-253 T1.105
AIS-L	Line-AIS	K2 (bits 6, 7, 8) = 111 for ≥ 5 frames	GR-253 T1.231
REI-L	Line Remote Error Indication	Number of detected B2 errors in the sink side encoded in byte M0 or M1 of the source side	GR-253 T1.105
RDI-L	Line Remote Defect Indication	K2 (bits 6, 7, 8) = 110 for $\geq z$ frames ($z = 5 - 10$)	GR-253 T1.231
AIS-P	STS Path AIS	All "1" in the STS pointer bytes H1, H2 for ≥ 3 frames	GR-253 T1.231
LOP-P	STS Path Loss of Pointer	8 - 10 NDF enable 8 - 10 invalid pointers	GR-253 T1.231
P-BIP Error	STS Path BIP Error (B3)	Mismatch of the recovered and computed BIP-8 covers entire STS-SPE	GR-253 T1.105
UNEQ-P	STS Path Unequipped	C2 = "0" for ≥ 5 (≥ 3 as per T1.231) frames	GR-253 T1.231
TIM-P	STS Path Trace Identifier Mismatch	Mismatch of the accepted and expected Trace Identifier in byte J1 (64 bytes sequence)	GR-253 T1.105
REI-P	STS Path Remote Error Indication	Number of detected B3 errors in the sink side encoded in byte G1 (bits 1, 2, 3, 4) of the source side	GR-253 T1.105
RDI-P	STS Path Remote Defect Indication	G1 (bit 5) = 1 for ≥ 10 frames	GR-253 T1.231
PLM-P	STS Path Payload Label Mismatch	Mismatch of the accepted and expected Payload Label in byte C2 for ≥ 5 (≥ 3 as per T1.231) frames	GR-253 T1.231
LOM	Loss of Multiframe	Loss of synchronization on H4 (bits 7, 8) superframe sequence	GR-253 T1.105
AIS-V	VT Path AIS	All "1" in the VT pointer bytes V1, V2 for ≥ 3 superframes	GR-253 T1.231
LOP-V	VT Loss of Pointer	8 - 10 NDF enable 8 - 10 invalid pointers	GR-253 T1.231
V-BIP Error	VT Path BIP Error (BIP-2)	Mismatch of the recovered and computed BIP-2 (V5 bits 1, 2) covers entire VT	GR-253 T1.105
UNEQ-P	VT Path Unequipped	V5 (bits 5, 6, 7) = 000 for ≥ 5 (≥ 3 as per T1.231) superframes	GR-253 T1.231
TIM-V	VT Path Trace Identifier Mismatch	Mismatch of the accepted and expected Trace Identifier in byte J2	for further study
REI-V	VT Path Remote Error Indication	If one or more BIP-2 errors detected in the sink side, byte V5 (bits 3) = 1 on the source side	GR-253 T1.105
RDI-V	VT Path Remote Defect Indication	V5 (bit 8) = 1 for ≥ 10 superframes	GR-253 T1.231
PLM-V	VT Path Payload Label Mismatch	Mismatch of the accepted and expected Payload Label in byte V5 (bits 5, 6, 7) for ≥ 5 (≥ 3 as per T1.231) superframes	GR-253 T1.231

[STS-1 SOH, LOH, POH und VT POH Byte](#)

[Abbildung 7](#) und [Abbildung 8](#) enthalten eine Beschreibung aller Bytes von STS-1 SOH, Line OverHead (LOH), Path OverHead (POH) und Virtual Tributary Path OverHead (VT POH).

Abbildung 7: SOH-Abschnitt-Overhead

SOH Section Overhead

A1, A2: Indicates the beginning of each STS-1 within a STS-n frame. The pattern is Hex F628.

J0: Section trace. It is defined only for STS-1 number 1 of an STS-N signal. Used to transmit a one byte fixed length string or a 16 byte message so that a receiving terminal in a section can verify its continued connection to the intended transmitter.

Z0: Section growth. It is defined in each STS-1 for future growth except for STS-1 number 1 (which is defined as J0).

B1: Section error monitoring. The BIP-8 is calculated over all bits of the previous STS-N frame after scrambling and is placed in the B1 byte of STS-1 number 1 before scrambling. Defined only for STS-1 number 1 of an STS-N signal.

E1: Allocated to be used as local orderwire channels for voice communication between section terminating equipments, hubs and remote terminal locations.

F1: Reserved for user purposes (e.g. temporary data/voice channel connections for special maintenance purposes).

D1 - D3: Data communication channels (DCC). A 192 kbit/s message based channel for alarms, maintenance, control, monitoring, administration and other communication needs.

Abbildung 8: LOH Line Overhead

