

# CHRONOS

## Smart Access Network Device



### Introduction

**CHRONOS** is a smart and versatile access network device for TDM and Ethernet access links and expanded services, such as reducing operating expenses and improving margins.

Its functions cover current and future access network requirements of today and enable efficient solutions through easy configuration, test and monitoring interfaces.

**CHRONOS** implements a fully managed demarcation function between customer network and service provider network. It monitors end-to-end connectivity and SLAs via its integrated test functionality.

**CHRONOS** offers independent interface and service control with integrated throughput test functions according to RFC 2544 (benchmark for network interconnect devices).

It incorporates Ethernet operations management according to Y.1731 (OAM functions), 802.1ag and 802.3ah (Ethernet in the first mile), configuration management via HTML browser or via SNMP.

### Features

- **CHRONOS** adapts easily to evolving networks via its highly modular architecture and flexibility
- functions cover current and future access network requirements today!
- Implements a fully managed demarcation function between customer network and service provider network
- Various interface modules:
  - Ethernet and E1 Service Interfaces:
  - Ethernet, SFP, G.SHDSL.bis or E1 Port Interfaces
- Jumbo Frames supported
- fibre and copper access
- Offers built-in independent interface and service control with integrated throughput test functions according to RFC 2544 for trouble shooting
- Connectivity Fault Management
- Network management: Built-in SNMP-agent, capable to monitor and manage, HTML based WEB -OPI
- Inband management capability
- Fan less solution at Desktop Units

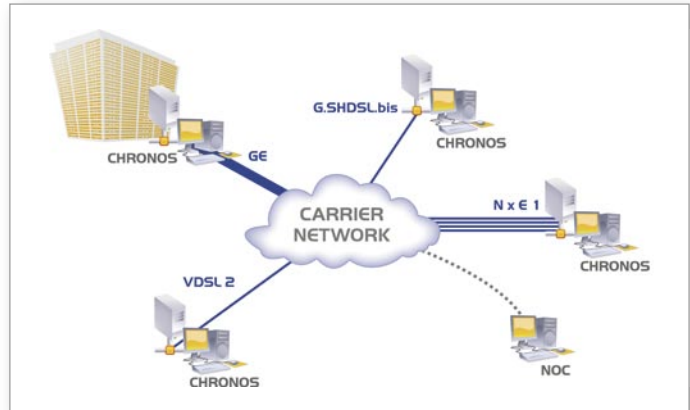
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## Smart Access Network Device Applications Examples

### Application Example I

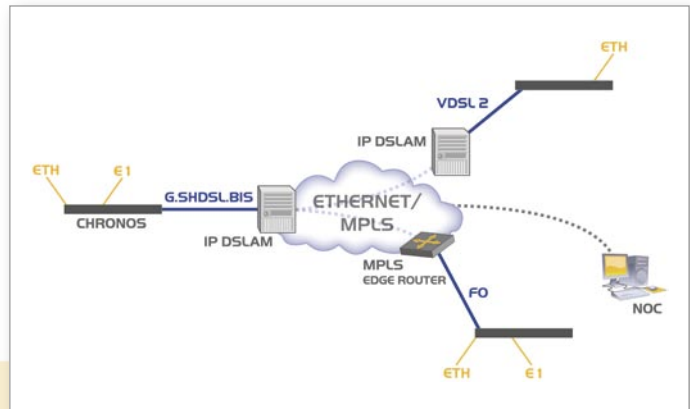
Realisation of logically separated client networks with various access technologies

The integrated Ethernet OAM test functions monitors single hops or end-to-end connections



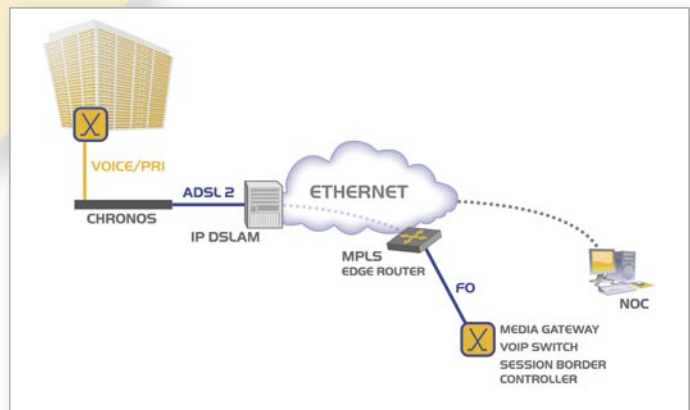
### Application Example II

Transport of traditional leasedline services and IP/Ethernet by using a single access link to a remote location



### Application Example III

Integration of a PBX with a PRI link interface into a VoIP network



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Modules	Devices	CHRONOS pro 3 modular Interfaces	CHRONOS flex 1 modular Interface	CHRONOS lite
<b>10 / 100 / 1000 BT</b>		2 x onboard	2 x onboard	2 x onboard
<b>CHRONOS ETH-S</b> SFP 10 / 100 / 1000 BT 100 FX / 1000 Base-SX/LX Bandwidth ≤ 1Gbit/s		pluggable	onboard	onboard
<b>CHRONOS VDSL</b> VDSL2 (G.993.2); ADSL2+(G.992.5) Bandplan 998 profiles: 8b, 17a, 30a, Bandwidth ≤ 100 Mbit/s		pluggable	onboard	onboard
<b>CHRONOS G.SHDSL.bis</b> 4 x G.SHDSL.bis; copper bonding TC-PAM16/32, NT/TE Mode Bandwidth ≤ 22,4 Mbit/s		pluggable	pluggable	n/a
<b>CHRONOS TDM</b> G.703/704 (E1) over Ethernet CESoPSN, SAToP		pluggable	pluggable	n/a
<b>CHRONOS VOICE</b> Converts ISDN (2Mbit PRI) into VoIP PRI: 30 Channels / SIP: 16 Ch. T38 or 48 Ch. G.729		pluggable	pluggable	n/a
<b>CHRONOS 8E1</b> Ethernet over 8 x E1/T1 (120 / 100 ) GFP-F, Vcat, LCAS Bandwidth ≤ 16 Mbit/s		pluggable	pluggable	n/a

## CHRONOS

### Smart Access Network Device Specifications

#### Network Interface (optical)

- 2 x 10/100/1000BT
- SFP
  - 10/100/1000BT IEEE 802.3 compliant
  - 100Base FX (125 MHz operation)
  - 1000Base – X
- xDSL
  - VDSL2 (G.993.2)
  - ADSL2+(G.992.5)
- 8 x E1
  - GFP-F
  - LCAS
  - VCAT
- G:SHDSL.bis

#### Service Interface ports

- 2 x 10/100/1000BT Bit rate: 155 Mbit/s
- SFP
  - 10/100/1000BT IEEE 802.3 compliant
  - 100Base FX (125 MHz operation)
  - 1000Base – X
- E1
  - SAToP
  - CESoPSN
  - 120 Ω, RJ-45 Connector / short haul

#### Features

- QoS 802.1 P,Q
- Q-in-Q
- Mac-in-Mac
- RMON
- RFC2544
- Jumbo frames supported

#### Management

- Network Management port (front access):
  - 10/100BaseTx (RJ45)
  - HTML based WEB-OPI
- SNMP V1 + V2c
- 802.1x
- CFM Management
  - 802.3 ah
  - Y.1731
- Link Layer Management
  - 802.3 ah

#### Environmental

- Operating: 0 to +50°C
- Storage: -10 to +70°C
- Humidity: < 85% (30°C), non-condensing

#### Power

- consumption: <40W
  - Input Voltage: 230 V AC (165...265 V AC)
- Protection class II

#### Physical

- Desktop
  - Dimension: 266 (W)×44 (H)×210 (D) mm
- Standalone (19"), Form Factor: EIA 19", 1RU
  - Dimension: 482,5 (W)×44 (H)×316,6 (D) mm

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### Smart Access Network Device

#### CHRONOS 8E1

The CHRONOS 8E1 module realises the transport of the Ethernet Traffic via up to 8 E1 Channels. The E1 Interfaces are bundled to one logical Link via LCAS and VCAT.

The ethernet traffic is encapsulated with GFP-F, HDLC, or cHDLC to be transmitted via the WAN Interfaces.

#### Specification

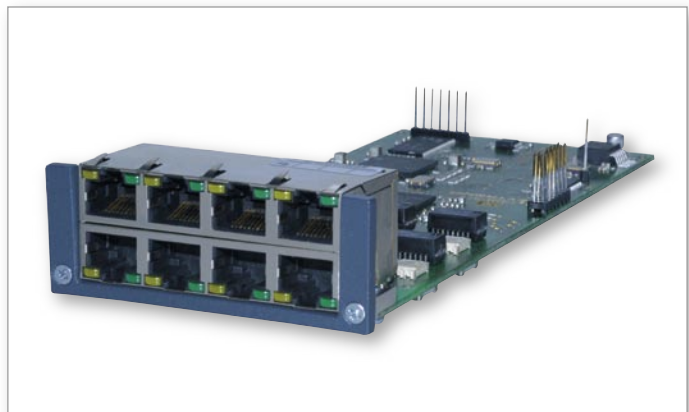
8 x E1 /120  $\Omega$  Interfaces according to G703/704  
Jitter Attenuator according ITU-T G.736, G.742, G.823

VCAT/LCAS Link Aggregation (Inverse Multiplexing)

- Link aggregation for up to 8 links per ITU-T G.7043/G.7042
- Differential delay compensation for up to 200ms
- Receive and Transmit Data are independent (asymmetry support)
- Supports Virtual Concatenation of up to 8 E1s

GFP-F

- GFP Frame mode per ITU-T G.7041
- GFP idle frame insertion and extraction



#### CHRONOS G.SHDSL SHDSL.bis

The CHRONOS G.SHDSL.bis module realises the transport of Ethernet Traffic over up to 4 copper pairs. The line pairs are bundled to one logical Link via m-pair bonding.

#### Specification

Coding

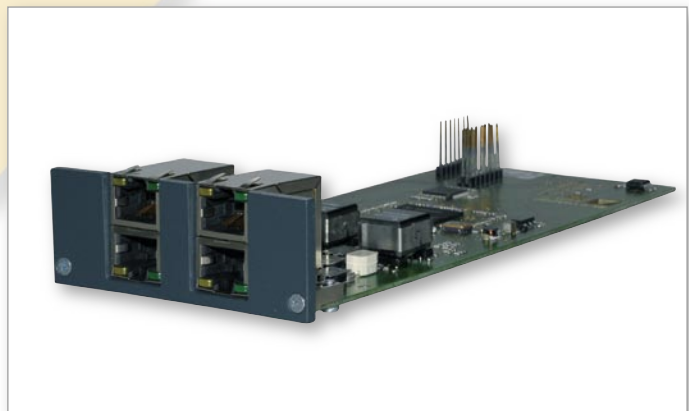
- TC-PAM 32

Bandwidth

- $\leq 22.4$  Mbit/s

Connectors

- 4 x RJ45



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#### CHRONOS TDM

The CHRONOS TDM module realises the transport of TDM traffic over Ethernet.

It converts framed or unframed E1 data flows into packets and vice versa, and ensures that jitter and wander levels of the recovered clock are conform to ITU-T G.823/824 and G.8261/Y.1361

##### Specification

- 1 E1/T1 Interfaces
  - 120  $\Omega$ , RJ-45 Connector
  - short haul
- 1 clock input
  - 50  $\Omega$ , SMB connector
- Supports
  - SAToP
  - CESoPSN



#### CHRONOS ETH-S

The CHRONOS ETH-S module realises the transport of Ethernet Traffic over one SFP Port. This port can be used as USR or LINK/NET Interface

##### Specification

- Connector:SFP
- supported plug in SFP's:
  - 10/100/1000BT IEEE 802.3 compliant
  - 100Base FX (125 MHz operation)
  - 1000Base – X

