LineRunner SHDSL LCM/DTM
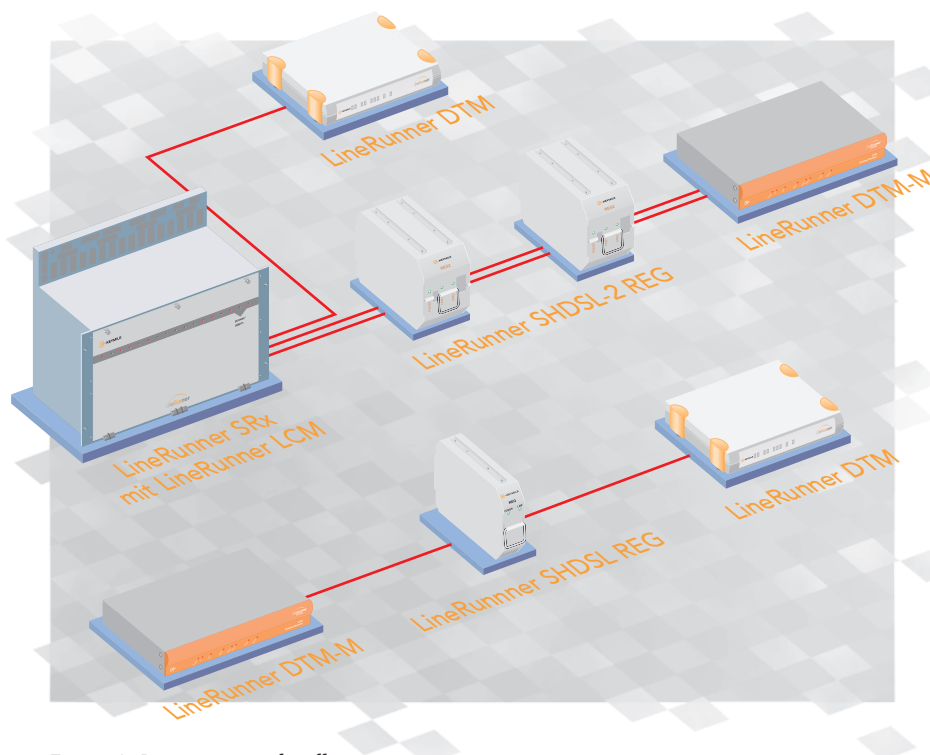
The modular SHDSL transmission system for effective provisioning of TDM data services

Figure 1: Presentation of traffic routing

- **Wide range of interfaces**
  - G.703/G.704
  - X.21/V.11
  - V.35
  - V.36
  - V.24/V.28
  - 10/100BaseT

- **SHDSL transmission with up to 4.6 Mbps via Ethernet**

- **Subrates are supported**

- **Optional 1-pair and 2-pair transmission system**

- **Regenerators for increased reach**

- **Remote power feeding**

LineRunner SHDSL LCM/DTM offers a professional solution for the delivery of business data services, with bandwidths of up to 4.6 Mbps. With a modular design and a wide range of interfaces it is a cost effective and flexible solution that can be used to meet specific customer requirements.

Introduction

The main application of LineRunner SHDSL LCM/DTM is the delivery of symmetrical data services over copper lines.

SHDSL (Single-Pair High-Speed Digital Subscriber Line) transmission technology according to ITU-T G.991.2 is used.

The following components make up the SHDSL solution:

- SHDSL LCM: Line cards
- SHDSL DTM: Desktops
- SHDSL REG: Regenerators

LineRunner SHDSL LCM/DTM offers a variety of interfaces and transmission capacities from subrates <64 kbps to n x 64 kbps with rates up to 4,608 kbps.

It therefore allows simple and fast provisioning of any kind of data service for business customers and network operators, e.g.:

- Symmetrical broadband Internet access
- VPN and LAN-LAN services
- ISDN PRA
- Transparent 2 Mbps leased lines
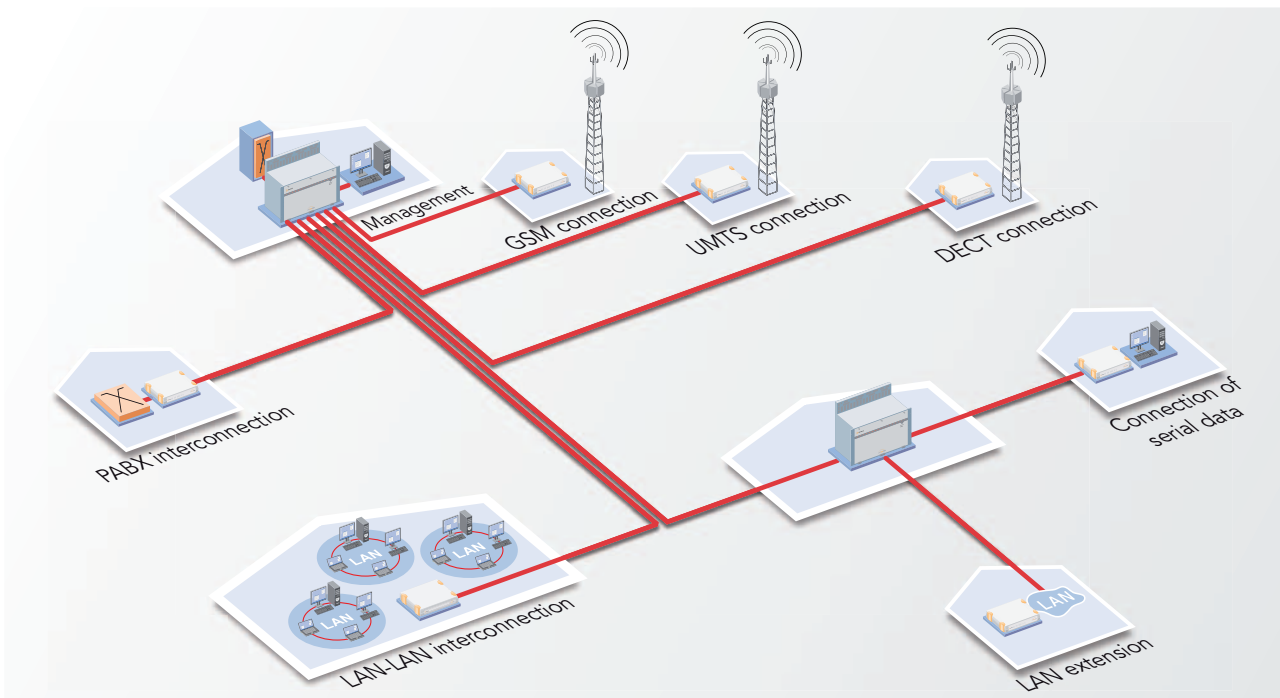- Connection of GSM/UMTS base stations

Figure 2: Applications

With the availability of regenerators, remote power feeding and the option of 1-pair or 2-pair transmission it is possible to deliver services in environments with difficult connection conditions and over an extended range.

■ Line Card SHDSL LCM

LineRunner SHDSL LCM is the transmission unit for LineRunner subracks. The following subracks are supported:

❑ LineRunner SRS2: Application interfaces G.703/120 ohms and X.21/V.11

❑ LineRunner SRA2: Application interface G.703/75 ohms

❑ LineRunner SRV: Application interface V.36 and X.21/V.11

The LineRunner LCM provides Ethernet connections with a data rate of up to 4.6 Mbps on the SHDSL route when it is equipped with the optional Ethernet interface. Mixed equipment with already installed LineRunner DSL modules in one subrack is possible. Integrated remote power feeding allows the remote supply of LineRunner SHDSL DTM desktop units or regenerators via the transmission line.

■ Desktop SHDSL DTM

LineRunner SHDSL DTM desktops can be deployed as network termination (NT) units in customer premises. The LineRunner SHDSL DTM configuration can be changed from NT to LT using a switch. This allows the LineRunner SHDSL DTM to act as an LT module for individual desktop-desktop routes.

LineRunner SHDSL DTM provides a G.703/G.704 application interface (120 ohms). Using optional plug-in modules the unit can easily be equipped with any other application interface.

As a variant, LineRunner SHDSL DTM can be equipped with a remote power feeding module that supplies a NT or regenerator via the transmission line.

A robust plastic housing (DTM) or a metal housing (DTM-M) are available as housing versions. Using optional mounting angles you can mount the DTM-M in 19" or ETSI racks.

■ Rate adaptive

Capacity and transmission rates between the LT and NT can be adjusted via the management software. The SHDSL transmission rate can be configured as n x 64 kbps where n = 3 to 72. Transmit power is reduced (power backoff) for operation over short distances between the central office and the customer premises – this guarantees maximum spectral compatibility.

■ 1-pair/2-pair operation

LineRunner LCM is available as 2-pair, LineRunner DTMs are available as 1-pair or 2-pair versions. 2-pair systems have a larger transmission range in comparison to 1-pair systems. All 2-pair systems can be switched to 1-pair operation via the network management.

■ Remote power feeding

LineRunner LCM features an integrated remote supply module – as an variant LineRunner DTM can be equipped with it in the factory. Each remote supply module can remotely power one unit (REG or NT).

Moreover the remote supply module is able to generate a wetting current. A wetting current is a constant low current that protects the contacts on a transmission route from corrosion. This reduces service costs und augments reliability.

■ Application interfaces

LineRunner SHDSL desktops offer a variety of application interfaces. These are:

- ❑ G.703, 120 or 75 ohms
- ❑ X.21
- ❑ V.35
- ❑ V.36
- ❑ V.24/V.28 (RS-232)
- ❑ Ethernet 10/100BaseT: 1-port bridge or 4-port switch

Moreover application interfaces are available that support besides standard data rates (n x 64 kbps) so-called subrates (<64 kbps) additionally. They allow to simply realise applications that demand

Figure 3: Units of the SHDSL transmission system: DTM, LCM and subracks

for a mandatory subrate with LineRunner SHDSL.

You can easiliy interconnect networks with 4.6 Mbps via the Ethernet interface. The Ethernet interface is an optional application interface where you can insert the DTM or attach it to the SHDSL LCM.

This way you can offer Ethernet in all installed LineRunner DTM desktops or subracks without exchanging any hardware.

■ Regenerators

Regenerators are available to increase the normal range of SHDSL systems. Up to two regenerators can be deployed per transmission line.

Regenerators can be remotely supplied by the LineRunner SHDSL LCM or the SHDSL DTM.

A number of housings for indoor, pole, wall and underground installation are available.

■ Performance monitoring

LineRunner SHDSL LCM/DTM provides extensive control of transmission quality based on performance data according to ITU-T G.826. Performance data is collected at the LT, NT and even at the regenerators.

■ MileGate and UMUX

LineRunner DTM is the subscriber side termination of the SHDSL TDM line cards in den multi-service access platforms MileGate and UMUX.

■ Management

All modules can be managed via LineRunner ASMOS. NTs connected to a STIC are managed via UNEM/UCST

Don't hesitate to contact us for further infomation on the LineRunner SHDSL system.

Technical data

General	
Line code	16 TC-PAM according to ITU-T G.991.2 Annex B
Transmission rate on the SHDSL route	n x 64 kbps duplex on 1 or 2 copper pairs, n = 3 ... 72 (2-pair mode), n = 3 ... 36 (1-pair mode)
Configurable payload data rate at the application interface	G.703 and X/V interfaces: n x 64 kbps, n = 1 ... 32 Ethernet interface: 384 kbps up to 4608 kbps
Supported regenerators	1-pair- or 2-pair regenerators (up to 2 per route)
Remote supply (optional for LineRunner SHDSL DTM)	<115 V DC (according to EN 60950), 75 mA
Wetting current	typical 2 mA, max. 10 mA (according to ITU 991.2)
Storage of performance data (LT side)	96 x 15 minutes and 7 x 24 hours

LineRunner SHDSL LCM (Line Card)	
Transmission interface	SHDSL, 1-pair or 2-pair operation
Remote supply of NT or REG	via 1 or 2 copper pairs
Supported subracks	LineRunner SRA2, LineRunner SRS2, LineRunner SRV
Application interfaces (connector type)	Ethernet (RJ45), G.703/G.704-120 ohms (DSub-15) or G.703/G.704-75 ohms (BNC), X.21/V.11 (DSub-15), V.36 (DSub-37)
Power consumption	<5.0 W (<15 W with remote power feeding)

LineRunner SHDSL DTM (Desktop)	
Transmission interface	SHDSL, 1-pair or 2-pair variant (2-pair variant can be switched in 1-pair operation)
Fixed application interfaces (connector type)	G.703/704-120 ohms (RJ 45)
Optional application interfaces (connector type)	G.703/704-75 ohms (BNC), X.21/V.11 (DSub-15), V.35 (MF-34), V.36 (DSub-37), V.24/V.28 (DSub-25), Ethernet (RJ 45)
Payload data rate	n x 64 kbps, n = 1 ... 32 (1 ... 2 via V.24/V.28)
Payload data rate (subrates, according to ITU-T V.110)	600, 1.200, 2.400, 4.800, 9.600, 19.200, 38.400, 48.000, 56.000 bps
Power supply	88 ... 264 V AC (47 ... 63 Hz), 38 ... 60 V DC, remotely supplied
Power consumption	2.7 W to 10.5 W (according to configuration and application interface)
Dimensions (H x W x D) and weight	DTM: 50 x 295 x 225 mm, ca. 500 g DTM-M: 44 x 265 x 190 mm, ca. 2600 g

Ethernet specifications	
Modes	10FX, 10HX, 100FX, 100HX
Configuration	Auto-negotiation
Data rate	384 kbps ... 4608 kbps
Design	1-port bridge or 4-port switch (4-port only for DTM)

Transmission ranges (1-pair/2-pair without noise)	Ø 0.4 mm	Ø 0.8 mm
n=3	7.5 km/-	19.8 km/-
n=6	5.8 km/7.5 km	16.5 km/19.8 km
n=16	4.9 km/5.7 km	12.0 km/15.4 km
n=32	4.1 km/4.9 km	9.4 km/12.0 km

Remote supply range	Ø 0.4 mm	Ø 0.8 mm
LineRunner DTM without MOD/with MOD G.703A NT	5.5 km	22.1 km
LineRunner DTM without MOD/with MOD G.703A NT	4.5 km	17.9 km
LineRunner DTM with MOD V.35	4.1 km	16.3 km

Environmental conditions	
Temperature range operation	-25 °C to +55 °C, according to ETS 300019-1-3, Class 3.3
Rel. humidity operation (non condensing)	5 % to 95 %, according to ETS 300019-1-3, Class 3.3
Temperature range storage	-25 °C to +55 °C, according to ETS 300019-1-3, Class 1.2
Rel. humidity storage (non condensing)	10 % to 100 %, according to ETS 300019-1-3, Class 1.2
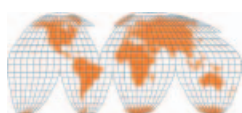
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