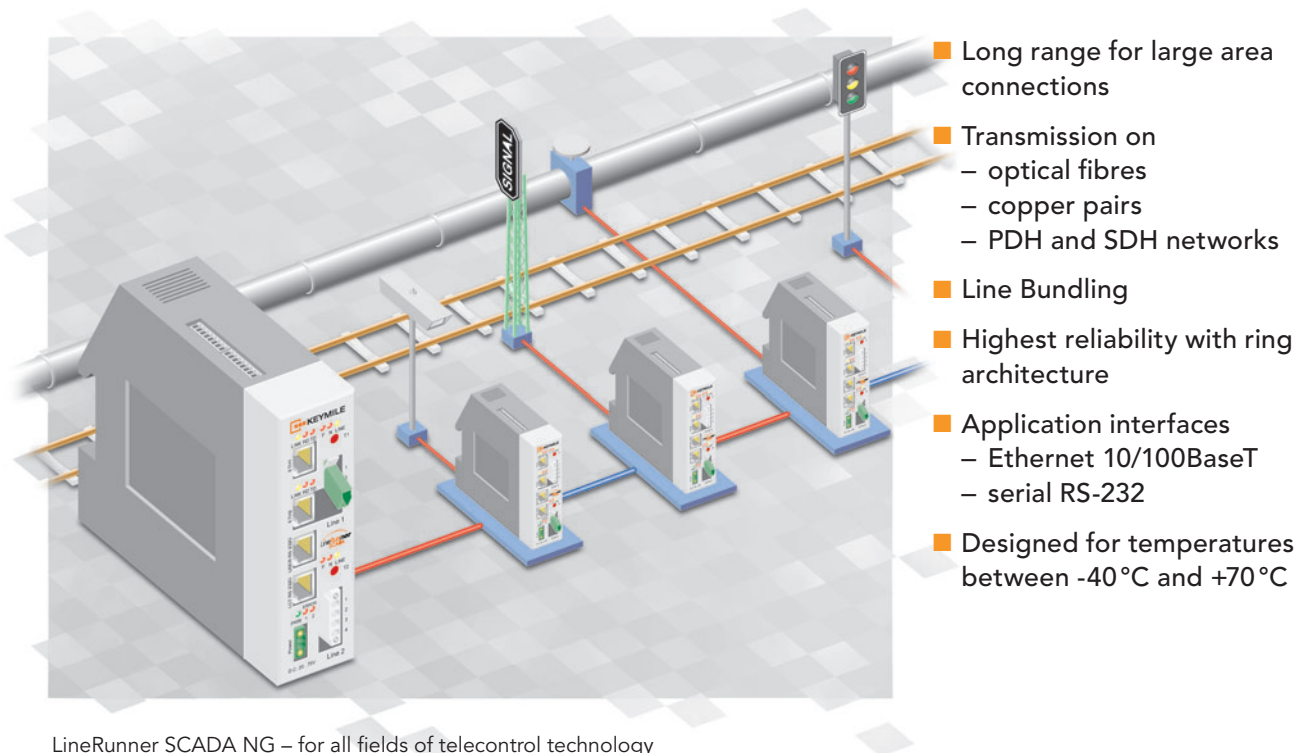# LineRunner SCADA NG

Broadband transmission system for Ethernet telecontrol/SCADA applications

■ Long range for large area connections

■ Transmission on
  – optical fibres
  – copper pairs
  – PDH and SDH networks

■ Line Bundling

■ Highest reliability with ring architecture

■ Application interfaces
  – Ethernet 10/100BaseT
  – serial RS-232

■ Designed for temperatures between -40 °C and +70 °C

LineRunner SCADA NG – for all fields of telecontrol technology

■ LineRunner SCADA NG

LineRunner SCADA NG (SCADA = Supervisory Control and Data Acquisition) is the broadband transmission system for reliable and cost-optimised data transmission with up to 8 Mbps in telecontrol systems of:

□ Railway and transport companies

□ Utilities

□ Motorways

□ Waterways

□ Airports

□ Pipeline facilities

LineRunner SCADA NG comes with a modular design. It enables the data transmission on copper pairs, optical fibres or in SDH/PDH networks with a single system. On optical routes ranges of up to 35 km can be achieved. Radio relay equipment and leased lines can also be integrated into the system.

Exchangeable line interfaces enable the media conversion between the different transmission media at each LineRunner SCADA NG.

■ SCADA network

LineRunner SCADA NG is a multidrop system of the latest generation. Multidrop means that data of up to 63 LineRunner SCADA NGs is exchanged via one transmission path.

This SCADA network can be arranged in various topologies, e.g. linear or ring topology. So LineRunner SCADA NG supports variable network architectures using almost any infrastructure.

Future safety

LineRunner SCADA NG provides two Ethernet interfaces for the transport of Ethernet traffic transparently over any established transmission media.

To support already existing applications with serial interfaces, the LineRunner SCADA NG additionally has a serial interface (via the RJ45 jack), which can be used in parallel.

For serial data, a guaranteed bandwidth of up to 128 kbps is available.

Line interfaces (LI)

Basis module (BMD) or BM2
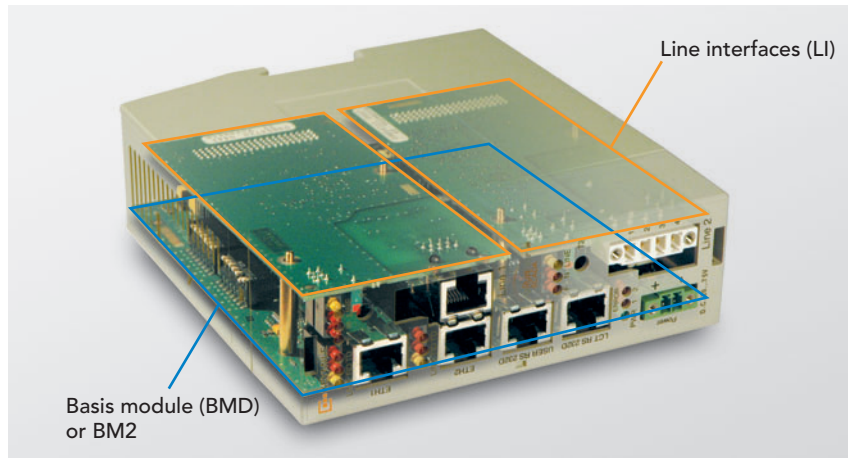
Design of a LineRunner SCADA NG

Operation

The LineRunner SCADA NG comes in a robust plastic housing. It is designed for DIN rail installation as well as for desktop deployment.

All interfaces and indicator lamps on the LineRunner SCADA NG are arranged at the front panel and are easily accessible for local services.

Due to the low supply voltage and power consumption the LinneRunner SCADA NG system can be operated also with solar panels. Apart from the user interface each LineRunner SCADA NG comes with two line interfaces. In addition, it can be operated as repeater or media converter.

Robustness

LineRunner SCADA NG is designed for operation in harsh climatic conditions.

It can operate in the temperature range of -40 °C to +70 °C. It is also shock resistant and works in environments with high level of electromagnetic interferences.

Variety of interfaces

The LineRunner SCADA NG can be quickly and easily adapted to the transmission medium used by plugging the corresponding line interfaces.

The table on page 2 gives an overview on the interfaces available and the typical transmission ranges between two LineRunner SCADA NG.

Protocols

Computers can be connected via Ethernet (TCP/IP) or serially via master/slave (asynchronous to the computer) to the LineRunner SCADA NG.

Technical data of the line interfaces			
Designation	Features	Typical range per route	
LI NG OF1S	1 fibre monomode optical fibre, connector F-3000	at 0,625 dB/km:	20.0 km
LI NG OF1L-6 LT, LI NG OF1L-6 NT	1 fibre monomode optical fibre, connector F-3000	at 0,625 dB/km	35.0 km
LI NG OF-SFP	SFP module	at 0,625 dB/km	10,0 km (depending on SFP module)
LI NG SHDSL	2 wire SHDSL transmission with connector Mini Combicon (range with low noise)	2.3 Mbps; ø 0,4 mm	3.2 km
		2.3 Mbps; ø 0,8 mm	6.0 km
		512 kbps; ø 0,4 mm	5.2 km
		512 kbps; ø 0,8 mm	10.3 km
LI NG SHDSL-2	4 wire SHDSL transmission with connector Mini Combicon	like LI NG SHDSL	
LI NG 2M	G.703, 2 Mbps witch connector RJ45	max. 6 dB attenuation	
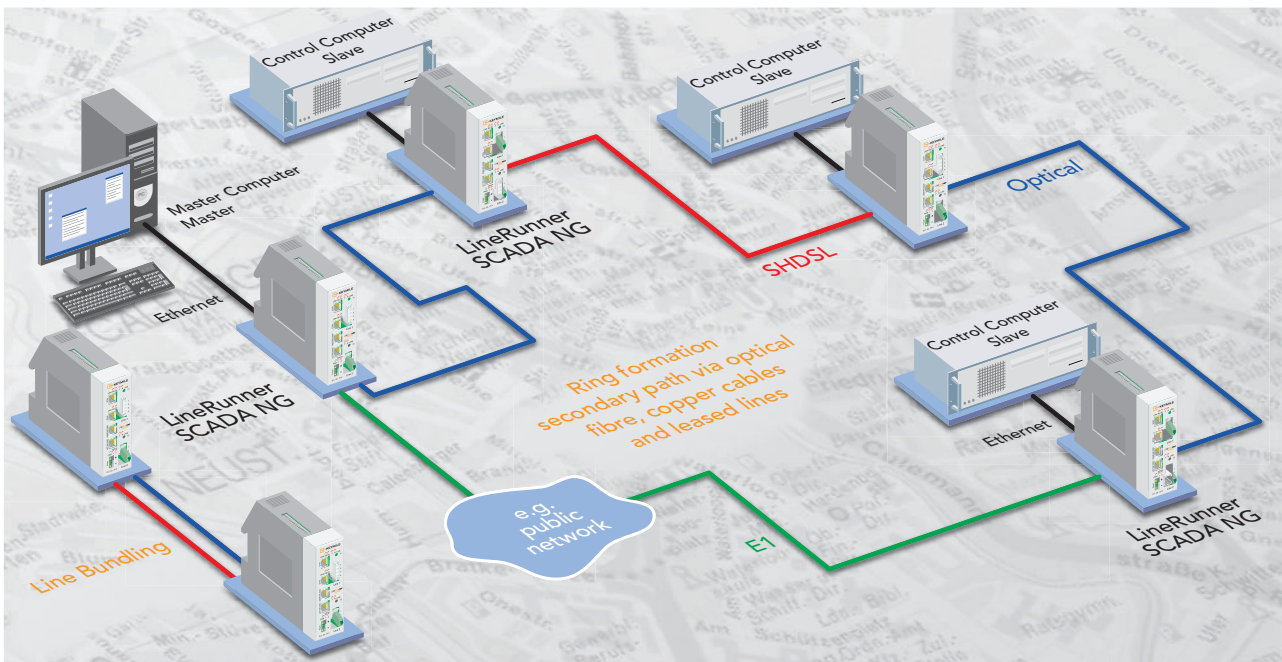
Typical construction of a LineRunner SCADA NG point-to-point and ring installation

■ Ring formation

Any SCADA network can be connected as a ring. The advantage of a ring architecture is an improved transmission fail safety. Whenever a transmission route is broken at one place due to external influences (e.g. excavations) data can continue to be exchanged between LineRunner SCADA NGs. There are no downtimes.

■ Line Bundling

Two lines can be bundled to achive a maximum transmission rate in point-to-point application.

You can even interconnect different transmission media via interface modules.

If one of the interconnected line fails the data is being transmitted via the remaining line.

■ Remote power supply

For the LineRunner SCADA NG two basic modules are available (BMD for SHDSL and BM2 for SHDSL-2). The BMD module can be powered remotely at remote locations via the RFS / RPS modules. The remote supply voltage is transmitted via the same copper pair that is employed for the SHDSL route.

Hence you can realise very long SHDSL transmission routes if you employ a LineRunner SCADA NG as regenerator – even at installation sites without local power supply.

Remote powering can also be used for units of 3rd party suppliers.

■ ABU

LineRunner ABU (Alarm and Bypass Unit) was developed for three applications.

▫ Alarm output: The ABU provides two alarm outputs. Configured alarms can be forwarded to an external alarm concentrator unit.

▫ Bypass function: If a LineRunner SCADA NG assembled with LI NG SHDSL fails, the ABU bridges the wires. Thus data transmission via the network is still ongoing.

▫ DC/DC converter: The unit provides a power supply (5 V) for units of 3rd party suppliers.

■ Management

All LineRunner SCADA NG functions are managed centrally via the management system ASMOS. Alarms and inventory data can be received via SNMP in parallel.

Technical Data

User Interfaces	
RS-232D	Asynchronous, max. 230.4 kbps
Ethernet	10BaseT, 10/100BaseT (Layer 2 Bridge)

Basic Module	
BMD	2x LI 2M, LI SHDSL, LI OF-1S/L 1x LI SHDSL-2, OF-SFP
BM2	2x all LIs

Line Interfaces	
Laser	Safety class 1
	OF1S wavelength: 1310 nm
	OF1L-6 wavelength: 1310/1550 nm
	OF1S data rate: 2 Mbps (with Line Bundling x 2)
	OF1L-6 data rate: 6 Mbps (with Line Bundling x 2)
	OF-SFP data rate: 12.5 Mbps *
SHDSL	2 wire, According to ITU-T 991.2, 16/32 TCPAM
	Data rates: various between 256 kbps and 5696 kbps (with Line Bundling x 2), max. 11 Mbps
SHDSL-2	4 wire, According to ITU-T 991.2, 16/32 TCPAM
	Data rates: various between 256 kbps and 4096 kbps (with Line Bundling x 2)
2M	G.703/G.704, 120 ohm (symmetrical)
	Data rate 2 Mbps
Topologys	Point-to-point, point-to-point with Line Bundling, chain, Ring, ring with branch line, meshed networks

Configuration and Monitoring	
Management	LineRunner ASMOS (serial or Ethernet)
	Monitoring and alarming SNMP (Ethernet)

Operation Modes	
RS-232D	Serial asynchronous to the computer
Ethernet, MAC (Layer 2)	IEEE Std 802.1
	IEEE Std 802.3ab - 1000BASE-T
	IEEE Std 802.3i - 10BASE-T
	IEEE Std 802.1Q - VLAN

Power Supply	
Operating voltage	20 ... 75 V DC
Power consumption	<6 W BMD / <12 W, BM2
Remote Power feeding	Via LineRunner SCADA NG RFS/RPS (only with LI NG SHDSL)

Environmental Conditions	
EMV	ETSI EN 300 386
	ETSI ES 201 468 (Test Level 2)
	EN 50121-4
Device safety	EN 60950-1
CE label	Yes
GS label	Yes
Temperature range operation	-40 ... +70 °C (+55 °C in case of horizontal mounting)
Temperature range transport	-40 ... +70 °C
Temperature range storage	-40 ... +85 °C
Mechanical robustness	ETSI EN 300 019-2-3 (Class 3M5)

Dimensions (h x w x d) and Weight	
LineRunner SCADA NG	135 x 43 x 150 mm, approx. 400 g

Other Features	
MTBF	>70 years