

# COPPER-COPPER / COPPER-FIBER REPEATER ZWR2 ELCONNECT®

**SIMPLE** Plug&Play installation

**FIELD-PROVEN** High quality and dependability

**POWERFUL**  
Range extension for SHDSL systems



ZWR2MSKU 1-pair



ZWR2MSKU 2-pair



ZWR2MSKUGF

## THE PRODUCT

The regenerative repeaters of the ZWR2 product family are used if the distance between line terminating unit and network terminating unit exceeds the maximum operating range of the DSL access. When using one ZWR2, the range is doubled, whereas application of two cascaded ZWR2 allows to even triple the SHDSL system transmission range. The repeater for SHDSL transmission ZWR2 regenerates the attenuated and distorted incoming signal for further transfer. It supports net data rates from 192 kbps to 2304 kbps (in one-pair mode) or, resp. up to 1152 kbps (in two-pair operation).

## ZWR2MSKU 1P AND ZWR2MSKU 2P

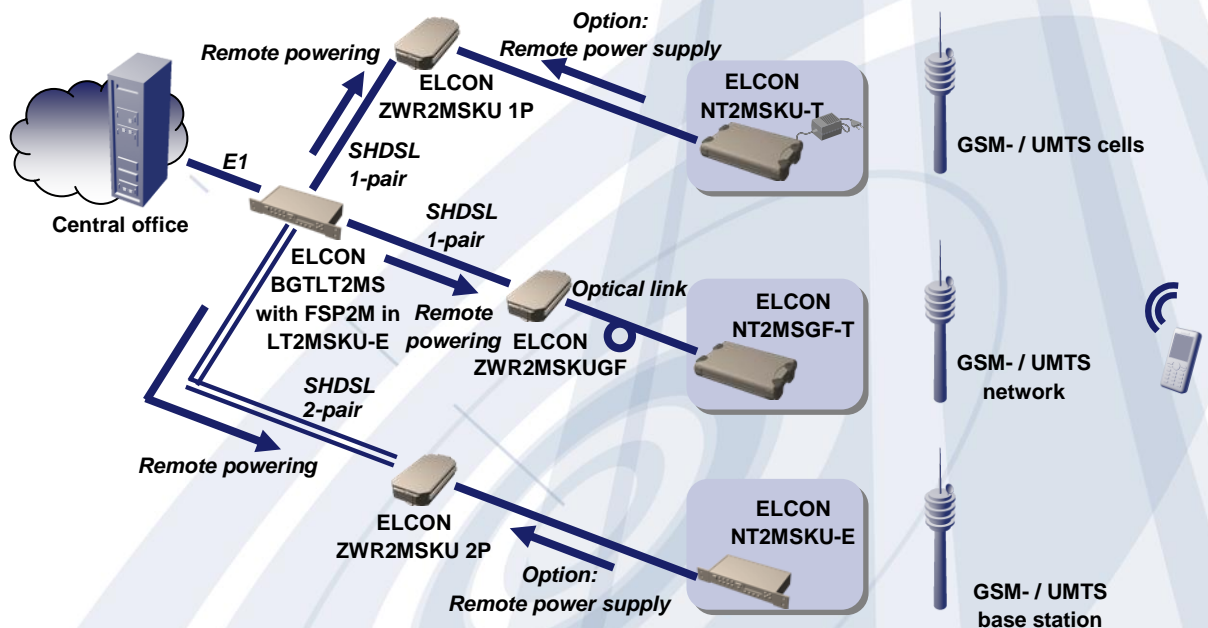
The ZWR2MSKU is available in two versions: While the ZWR2MSKU 1P with one DSL interface has been designed for one-pair mode, the ZWR2MSKU 2P provides two DSL ports and can be optionally operated in one- or two-pair mode. Both the ZWR2MSKU 1P and 2P can either be powered remotely from the exchange (SDH-Mux/LT2) or from subscriber side (NT2) via the FSP2-module, or locally. In addition, the ZWR2MSKU 1P and 2P can transmit the remote power supply to another ZWR2MSKU 1P / 2P or to the NT2 (the latter only in two-pair operation).

## ZWR2MSKUGF

For galvanic isolation of mobile radio stations, a copper-fiber repeater (ZWR2MSKUGF) is used in conjunction with an optical NT2. The regenerative repeater ZWR2MSKUGF converts the one-pair copper interface on LT side into an optical fibre interface for the NT. The line digit rate of the copper wire pair is 2320 kbps. The fibre interface allows transmission of an optical signal which is comparable with the SHDSL one-pair mode, thus efficiently protecting the exchange-side equipment from possible overvoltages in the base stations. The ZWR2MSKUGF can be remotely powered from the exchange (via SDH-Mux/LT2) or locally.

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## APPLICATION



## HARDWARE AND MANAGEMENT

The repeaters ZWR2MSKU 1P and 2P are accommodated in a metal casing (IP 40), whereas the ZWR2MSKUGF is housed in an ABS plastic cassette (protected as per IP 52/54). All ZWR2 can be installed either in a cable fitting or in a repeater rack ZWRE, which is specifically designed for installation in cable junction boxes (KVz). Up to six ZWR2MSKU 1P, three ZWR2MSKU 2P or two ZWR2MSKUGF can be placed in one ZWR subrack or a cable fitting.

The ZWR2 is controlled by the LT2 or the SDH Multiplexer with installed SHDSL Linecards. In conjunction with an LT2, the ZWR2 can be monitored and configured via the ELCON Network Management System (ENMS). If the ZWR2 is operated at a multiplexer, monitoring and configuration of the ZWR2 is effected by the NMS of the Multiplexer vendor.

## ADVANTAGES OF THE ELCON SYSTEM

- Support of different modes of operation (TDM/ATM, EFM-, SHDSL-Mode) in one- and two-pair operation
- Support of bit rates  $n \times 64k$  from 192 kbps to 2304 kbps
- Protection of the office-side equipment thanks to galvanic isolation when using a ZWR2MSKUGF

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## ELCONNECT®

### TECHNICAL DATA

#### DSL interface

- as per ETSI TS 101 524 or ITU-T G.991.2
- Net data rate:
  - 192 kbps ... 2304 kbps (1-pair);
  - 192 kbps ... 1152 kbps per each pair (2-pair)
- Line digit rate:
  - up to 773<sup>1</sup>/<sub>3</sub> kbaud (1-pair);
  - up to 389<sup>1</sup>/<sub>3</sub> kbaud (2-pair)
- Line code: TC-16-PAM
- Line impedance: 135 Ω
- Degree of protection: TNV3

#### Optical fibre interface (UGS)

- Bit rate: 2320 kbps
- Line digit rate: 4640 kbaud
- Line code: CMI-coded binary signal
- Pulse shape: nominally rectangular
- Optical wavelength:
  - ZWR2: 1310 nm (Transmitter),  
1550 nm (Receiver)
  - NT2: 1310 nm (Receiver),  
1550 nm (Transmitter)
- Optical transmitter: Laser
- Spectral bandwidth of laser: < 10 nm
- Average optical transmitting power at UGS<sub>ab</sub>: -10 dBm
- Extinction coefficient: < 0.1
- Sensitivity of the optical receiver at UGS<sub>an</sub> for bit error rate < 10<sup>-9</sup>: -7 dBm > P > -35 dBm
- LWL-connection: SC-APC / 9° untuned connector
- Range: max. 20 dB line attenuation

#### Power supply

- Input voltage:
  - 112 V DC ± 3 V DC (60 mA) (Remote power supply)
  - -40.5 V DC ... -75 V DC (Local power supply)
- Power consumption in case of local power supply:
  - < 2.8 W (1-pair);
  - < 4.5 W (2-pair);
  - < 5 W (ZWR2MSKUGF)
- Power consumption in case of remote power supply:
  - < 2.2 W (1-pair);
  - < 3.5 W (2-pair);
  - < 5 W (ZWR2MSKUGF)
- Output voltage: ~100 V (depending on the distance to the feeding source)
- Feeding range (one repeater ZWR2MSKU 1P and 2P):
  - max. 4000 m (with 1-pair PE-cable 0.4 mm);
  - max. 8000 m (with 2-pair PE-cable 0.4 mm)

#### Physical parameters

##### Dimensions (W × D × H)

- ZWR2MSKU 1P: 109.4 mm × 194 mm × 30 mm
- ZWR2MSKU 2P: 109.4 mm × 194 mm × 67.5 mm
- ZWR2MSKUGF: 109.7 mm × 194.4 mm × 103.7 mm

##### Environmental conditions

- as per ETS 300 019
- Operation:
  - Air temperature: -25 °C ... +55 °C;
  - Rel. air humidity: 5 % ... 95 %
- Storage:
  - Air temperature: -25 °C ... +55 °C;
  - Rel. air humidity: 10 % ... 100 %
- Transport:
  - Air temperature: -25 °C ... +70 °C;
  - Rel. air humidity: 60 % ... 95 %

#### EMC & Safety

- EMC: EN 55022, class B; ITU-T K.21, enhanced level; ETSI EN 300 386; ETSI TS 201 468 OTC-Level2
- Safety: EN 60950-1

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#### PURCHASE ORDER INFORMATION

Product designation	Order number
ZWR2MSKU 1P	900119
ZWR2MSKU 2P	900068
ZWR2MSKUGF	6293