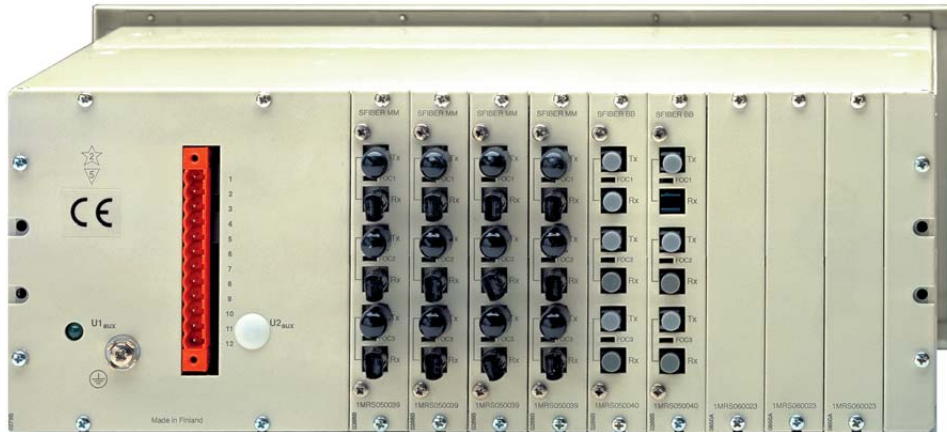


# Lon Bus Connection Devices

RER\_  
SPA-ZC\_

## Product Guide



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## Features

- The LonWorks Network is an open system adapted for various application areas
- Peer-to-peer protocol which allows all the networked devices to communicate with each other
- Powerful LonTalk protocol for substation information interchange in LonWorks networks
- Nodes identified by their own subnet and node number
- Max. 255 subnets and 127 nodes per subnet
- High immunity to electric and electromagnetic interference due to fibre-optic transfer media
- The protocol complies with the reference model for open system interconnection (OSI) by ISO
- Maximum network speed 1.25 Mbit/s in ABB substations with fibre-optic media
- Member of the ABB's Distribution Automation System

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## Application

Due to the increasing amount of data transferred within and from modern substations the communication feature of the protection and control equipment is being utilized more and more. This requires fast and reliable operation of the information transfer media to be used for communication.

The LON protocol provides the ultimate solution for the increased demand on transferring information within and from modern substations.

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## Design

The LonTalk protocol used in LonWorks networks, is designed to fulfill the requirements of a great variety of industrial applications.

The protocol complies with the reference model for open systems interconnection (OSI) developed by the International Standard Organization (ISO).

The speed of the network depends on the medium used and the transceiver design. The fibre-optic media used with our protection and control devices allow the maximum speed of 1.25 Mbit/s to be used.

The protocol is a peer-to-peer protocol which allows all the devices connected to the network to communicate with each other. The nodes are identified by their own subnet and node number (max. 255 subnets and 127 nodes per subnet).

The LON bus is used in a similar way as ABB's original SPA bus, i.e. to link the different parts of the substation protection and control system to each other. Measured values, status data and event information are spontaneously sent to the higher-level

devices. When required, these higher-level devices are able to read and write memorized values, setting values and other parameter data. In addition, the LON bus allows the bay level devices to communicate with each other and, thus, provide interlocking information between the bay controllers and blocking signals between the protection relays.

The LonTalk protocol supports two types of application layer objects: network variables and explicit messages. The network variables are used to deliver short messages such as measured values, status information and interlocking/blocking signals, whereas explicit messages are used for longer messages, for instance, events and explicit read and write messages, to access device data. SPA-bus messages can also be sent transparently in the form of explicit messages, for the purpose of transferring parameter data to devices communicating over the SPA bus. Our protective relays and control units which are equipped with a SPA-bus interface can be connected to the LON bus using the LON/SPA gateway module SPA-ZC 100 or SPA-102. The RE\_ 500 series devices have built-in LON support.

## Lon Star-Coupler RER 111



The Lon Star-Coupler RER 111 is used to interconnect the nodes in a LonWorks network. It offers a variety of configuration options. As standard the RER 111 unit provides the following:

- Single or double auxiliary power supply units with input voltage ranges 80...265 V ac/dc or 18...80 V dc
- Input/Output (I/O) Card
- Mother Board
- 9 slot placements for option cards

The following five option cards are available:

- The Fibre-Optic Option Card SFIBER provides three fibre-optic transceiver pairs for the interconnection of bay level devices, connection between two RER 111 modules equipped with Fibre-Optic Option Cards or between a RER 111 module and higher level devices e.g. MicroSCADA.
- The RS-485 Option Card SRS485 provides a means of connecting LON bus devices using the RS-485 interface to the LonWorks network. The card also comprises a fibre-optic transceiver pair.
- The SLTA Option Card SSLTA provides the interconnection between higher level devices (e.g. monitoring terminals, PC, etc.) and the LonWorks network. It can also provide the interconnection between RER 111 modules by using the fibre-optic transceiver pair.
- The Router Option Card, SROUT, provides connection to devices using twisted pair (TP/XF-78 or TP/XF-1250) transceivers and / or using fibre-optic transceiver pairs. It also provides a means by which an overall system can be divided into multiple subsystems.

- The Double Connection Option Card SREDU provides a means for connecting devices together by using double connections. This method enables the use of two fibre-optic transceiver pairs to connect to any device supporting double connection. In the event of a fault in one fibre-optic connection, this connection is still able to receive and transmit data to devices.
- The LON Clock Master option card SLCM provides means for connection to a clock reference device and performs time synchronization on LON. There are five separate time synchronization methods for different types of bay level devices and for different accuracy requirements. The SLCM option card includes an internal clock to generate various synchronization messages and signals in order to synchronize other devices on the LON network.

## Bus connection module RER 103



The bus connection module RER 103 acts as an interfacing unit between an RE\_500 device and the fibre-optic SPA, LON<sup>™</sup> and IEC 60870-5-103 bus. The bus connection module converts incoming optical signals from the SPA, LON<sup>™</sup> and IEC\_103 bus to electrical RS-485 signals for the RE\_500 devices and vice versa. The module is plugged into the RS-485 D-type subminiature connector on the rear plate of the RE\_500 device. It can be used together with any RE\_500 device provided with a 9-pin D-type connector. The bus connection module is powered from the D-type connector of the RE\_500 device.

## Fibre-optic SMX transceiver RER 107

The RER 107 is a fibre-optic SMX transceiver used together with the PCLTA card, as fibre-optic LonWorks interface for a PC, e.g. a MicroSCADA system. The RER 107 is mounted on the PCLTA card and provides the card with one or two (two RER 107 required) fibre-optic channels to the LonWorks Network. The fibre-optic connection is made for plastic or glass fibre cables.

Please, note that the PCLTA-20 adapter is not available from the ABB. The adapter can be purchased from Echelon Corporation. More information is available from: <http://www.echelon.com>.

Features of the PCLTA option card:

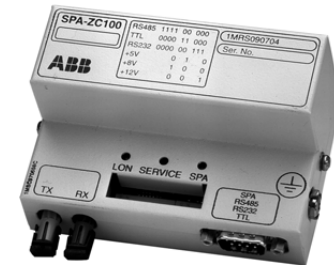
- 32 bit PCI, SMX card for LONWORKS networks (made by Echelon)

## LON bus connection module RER 117



The bus connection module RER 117 connects a PC directly to the LON network. It acts as an interface unit between Echelon's PC card (type PCC-10 Network Adapter) and a fibre optic LONWORKS® bus. The bus connection module RER 117 converts incoming optical signals to electrical signals for the PCC-10 card and vice versa. RER 117 is connected to the PCC-10 card using a cable and a D type sub-miniature connector. LONWORKS® networks can be installed, maintained and monitored with a laptop, RER 117, PCC-10 card and a network management program, e.g. Lon Network Tool.

## Connection module SPA-ZC 100 and SPA-ZC 102



The connection modules SPA-ZC 100 and SPA-ZC 102 are used to connect SPACOM products, or other devices provided with the SPA bus interface, to the LON bus.

The module polls the SPA-bus device for data and if data have changed the module spontaneously sends new information on the LON bus. Transparent SPA-bus messages received by the module from the LON network are forwarded as standard SPA-bus messages to the SPA-bus device.

The module connects to the SPA-bus device by means of a TTL (SPA), RS 485 or RS 232 interface and to the LON network is by means of glass or plastic fibre-optic cables.

The SPA-ZC 100 Gateway is powered from the host device to which it is connected, while the SPA-ZC 102 is powered from an external power supply.

## SPA-ZC\_



The SPA-ZC 17, 21 and 22 are used for connecting SPACOM devices to the SPA bus. The opto-modules are available with (SPA-ZC 17) or without (SPA-ZC 21) external power supply. Version SPA-ZC 22 with five outputs/inputs is also available.

## Technical data

## RER 111

<b>Supply voltage</b>	
Power supply module voltage range: SPGU 240 A1 - Rated voltage	$U_n = 110/120/230/240$ VAC $U_n = 110/125/220$ VDC $U = 80...265$ VAC/DC
- Operative range SPGU 48 B2 - Rated voltage - Operative range	$U_n = 24/48/60$ VDC $U = 18...80$ VDC
Power consumption when all option cards installed	<16 W
<b>Fault Relays:</b>	
Terminal numbers	X2/1-2, 3-2, 4-2, 5-2
- Nominal voltage	250 VAC/DC
- Continuous current carrying capacity	5 A
- Make and carry for 0.5 s	10 A
- Make and carry for 3 s	8 A
- Breaking capacity for dc, when the control circuit time constant L/R < 40 ms, at 48/110/220 V dc control circuit voltage	1 A/0.25 A/0.15 A
- Contact material	AgCdO <sub>2</sub>
<b>Disturbance tests</b>	
High frequency interference test according to IEC 60255-22-1 - common mode - differential mode	2.5 kV, 1 MHz 1.0 kV, 1 MHz
Fast transient test according to IEC 61000-4-4 and IEC 60255-22-4, class IV	4 kV
Electrostatic discharge test according to IEC 61000-4-2 and IEC 60255-22-2, class III - contact discharge - air discharge	6 kV 8 kV
<b>Environmental conditions</b>	
Specified ambient service temperature range	-10...+55°C
Transport and storage temperature range	-40...+70°C
<b>Climatic environmental tests</b>	
Dry heat test according to IEC 60068-2-2	+55°C
Dry cold test according to IEC 60068-2-1	-10°C
Damp heat test according to IEC 60068-2-30	RH = 93%, 55°C, 6 cycles
Degree of protection by enclosure of the device case according to IEC 60529	IP 20

## Ordering

## Order numbers for RER 103

Type designation	Transmitter	Receiver	Order No.
RER 103	Plastic	Plastic	RER103-BB
RER 103	Plastic	Glass	RER103-BM
RER 103	Glass	Plastic	RER103-MB
RER 103	Glass	Glass	RER103-MM

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Ordering (cont'd)

**Order numbers for RER 107**

Type designation	Item	Order No.
RER 107-MM	Fibre-optic SMX transceiver, glass	1MRS 090702-MM
RER 107-BB	Fibre-optic SMX transceiver, plastic Snap-in type connectors	1MRS 090702-BB

**Order numbers for RER 111**

The basic version of the RER 111 unit includes the case, the I/O card and two power supply cards (The voltage ratings of the power supply cards are selected by the purchaser).  
The wall mounting bracket is delivered with the RER 111 unit. The basic type designation for the RER 111 is:

**RER111C-** - - |  
 | | |  
 | | | A = U<sub>aux</sub> = 110..240 VAC/DC, SPGU 240 A1  
 | | | C = U<sub>aux</sub> = 24...60 VDC, SPGU 48 B2  
 | | | 0 = Only one power supply included  
 | | |  
 | | | A = U<sub>aux</sub> = 110..240 VAC/DC, SPGU 240 A1  
 | | | C = U<sub>aux</sub> = 24...60 VDC, SPGU 48 B2  
 | | |  
 | | | C = Device revision

**Examples:**

RER111C-AC *RER 111 unit including two power supplies, power supply 1 of type 110..240 VAC/DC, power supply 2 of type 24...60 VDC.*  
 RER111C-C0 *RER 111 unit including one power supply of type 24...60 VDC.*

**Mounting accessories:**

The brackets required for panel or rack (19") mounting must be ordered separately.  
NOTE: The brackets are delivered in pairs.

Mounting set	Type designation
Panel mounting set	1MRS050200
19" rack mounting set	1MRS050201

**Option cards:**

All option cards must be ordered separately. A maximum of 9 option cards can be installed in one RER 111 unit. By default, empty slots are covered with blank plates.

**Type designation for the option cards:**

**Router option card:**

Router option card with ST-type glass fibre-optic transceivers	SROUT-C-MM
Router option card with snap-in-type plastic fibre-optic transceivers	SROUT-C-BB

**Serial LonTalk Adapter option card:**

SLTA with ST-type glass fibre-optic transceivers	SSLTA-C-MM
SLTA with snap-in-type plastic fibre-optic transceivers	SSLTA-C-BB

**Double connection option card:**

Double connection option card with ST-type glass fibre-optic transceivers	SREDU-C-MM
Double connection option card with snap-in-type plastic fibre-optic transceivers	SREDU-C-BB

**RS485 option card:**

RS485 option card with ST-type glass fibre-optic transceivers	SRS485-C-MM
RS485 option card with snap-in-type plastic fibre-optic transceivers	SRS485-C-BB

## Product Guide

## Order numbers for RER 111 (cont.)

**Fibre-optic option card:**

Fibre-optic option card with ST-type glass fibre-optic transceivers	SFIBER-C-MM
Fibre-optic option card with snap-in-type plastic fibre-optic transceivers	SFIBER-C-BB

**LON Clock Master option card:**

SLCM with ST-type glass fibre-optic transceivers	SLCM-C-MM
SLCM with snap-in-type plastic fibre-optic transceivers	SLCM-C-BB
SLCMFO with ST-type glass fibre-optic transceivers	SLCMFO-C-MM

**Blank plate:**

Blank plates can be ordered separately by using the following type designation:	
Blank plate	1MRS060023

## Order numbers for SPA-ZC 100 and SPA-ZC 102

Type designation	Transmitter	Receiver	Order No.
SPA-ZC 100 BB	Plastic	Plastic	1MRS 090704-AA
SPA-ZC 100 MM	Plastic	Glass	1MRS 090704-DA
SPA-ZC 102 BB	Plastic	Plastic	1MRS 090705-AA
SPA-ZC 102 MM	Plastic	Glass	1MRS 090705-DA

## Order numbers for SPA-ZC 100 for voltage regulator SPAU 341 C

Type designation	Transmitter	Receiver	Order No.
SPA-ZC 100 BB for SPAU 341 C, no. 1	Plastic	Plastic	1MRS 090704-AB
SPA-ZC 100 BB for SPAU 341 C, no. 2	Plastic	Plastic	1MRS 090704-AC
SPA-ZC 100 BB for SPAU 341 C, no. 3	Plastic	Plastic	1MRS 090704-AD
SPA-ZC 100 MM for SPAU 341 C, no. 1	Glass	Glass	1MRS 090704-DB
SPA-ZC 100 MM for SPAU 341 C, no. 2	Glass	Glass	1MRS 090704-DC
SPA-ZC 100 MM for SPAU 341 C, no. 3	Glass	Glass	1MRS 090704-DD

## References

## Additional information

RER103 Bus Connection Module, Manual	1MRS750532-MUM
RER107 Transceiver Module, Manual	1MRS 750610-MUM
RER111 LON Star Coupler, Manual	1MRS750104-MUM
RER117 LON Bus Connection Module, Manual	1MRS750846-MUN
SPA-ZC100 LON/SPA Gateway, Manual	1MRS750741-MUM
SPA-ZC102 LON/SPA Gateway, Manual	1MRS750742-MUM
SPA-ZC100/102 Programming Manual	1MRS750743-MUM
SPA-ZC17 Bus Connection Module, Manual	1MRS751230-MUM
SPA-ZC21 Bus Connection Module, Manual	1MRS751340-MUM
SPA-ZC22 Bus Connection Module, Manual	1MRS751288-MUM

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