

## Product Guide





**Features**

- Electrical-to-optical converter for the SPA bus
- Connects the substation secondary devices to the fibre-optic SPA bus
- High immunity to electrical and electromagnetic interference
- Easy mounting and installation
- Complete range of bus connection modules for different applications
- Products of the SPACOM product family and ABB's Substation Automation system

**Application**

The SPA bus interconnects the substation protection relays, annunciator systems and other devices by means of a fibre-optic loop based on a glass or plastic fibre cable. The devices are connected to the bus over bus connection modules type SPA-ZC\_ which convert the electrical signals of the devices to optical signals for the bus and, vice versa, the optical signals of the bus to electrical signals

of the devices. All the standard secondary devices of a substation are equipped with a serial interface for receiving and transmitting information.

The serial ports of the devices are TTL, RS 485 or RS 232 C signal level interfaces. Bus connection modules are available for these interface types.

**Design**

The SPA bus connection modules are used in both ends of the SPA bus, i.e. on the substation level for connection of the bus to the communication units and on the feeder level for connection of the bus to the substation secondary devices.

fibre optic signals for the bus and vice versa. The unit comprises one 9-pin D type connector for the host device and one pair of optical transceivers for the SPA bus. The module can be powered from the host device or from a separate power source. In the latter case the bus connection module and the fibre-optic bus remain operative, should the power supply from the host device be interrupted.

**Bus connection module SPA-ZC 17**

The bus connection module SPA-ZC 17 is used for connecting substation secondary devices to the SPA bus. It converts the TTL or RS 485 level signals of the host device to

The bus connection module SPA-ZC 17 can be used in both master and slave mode.

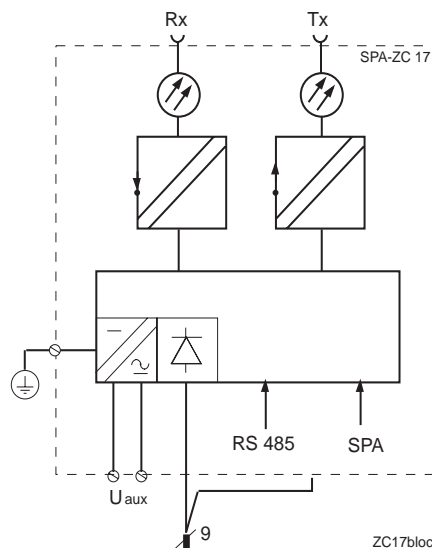


Fig. 1 Block diagram of SPA-ZC 17

**Bus connection module  
SPA-ZC 20**

The bus connection module SPA-ZC 20 is used for multiplying the number of available fibre-optic loops in a substation. The module is provided with 15 transceiver pairs, that is it can form 15 fibre-optic loops. All of the loops formed by the module carry the same information. In certain applications, where operational reliability is of primary concern it can

be recommended to limit the number of substation secondary devices connected to one single loop. In these applications the bus connection module SPA-ZC 20 is applied.

The SPA-ZC 20 is only used in master mode and it is powered from the device to which it is connected. The input interface of the device is of the RS 485 type.

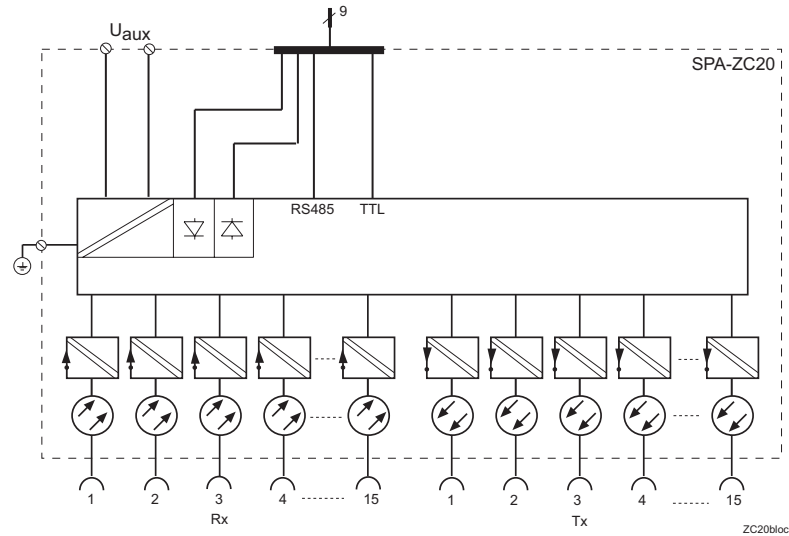


Fig. 2 Block diagram of SPA-ZC 20

### Bus connection module SPA-ZC 21

The bus connection module SPA-ZC 21 is used for connecting substation secondary devices to the SPA bus. It converts the TTL or RS 485 level signals of the host device to fibre optic signals for the bus and vice versa. The unit comprises one 9-pin D type connec-

tor for the host device and one pair of optical transceivers for the SPA bus. The module is powered from the host device.

The bus connection module SPA-ZC 21 can be used in both master and slave mode.

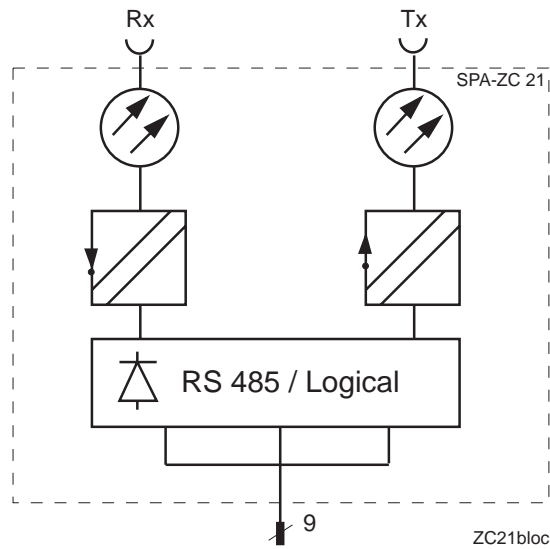


Fig. 3 Block diagram of SPA-ZC 21

**Bus connection module  
SPA-ZC 22**

The bus connection module SPA-ZC 22 is used for dividing the system into several fibre-optic loops. The SPA-ZC 22 module is available in two versions, one with five fibre-optic transceiver pairs and one with two pairs. The SPA-ZC 22 module is connected to the communicator units of the SPA loop. The bus connection module features a built in RS 232 C interface for direct connection to a PC, a modem, etc. and one RS 485 interface for connection to e.g. a SRIO unit. The bus connection module can also be used in slave

mode if a double connection to one substation secondary device is needed. The third mode of operation for the SPA-ZC 22 module is the optical repeater mode. In the optical repeater mode a fibre pair from the communicator unit's optical module is connected to the first transceiver pair of the SPA-ZC 22 module. The data is then retransmitted over the other transceiver pair(s) in the module.

The bus connection module SPA-ZC 22 is powered from the device to which it is connected or from an external power source.

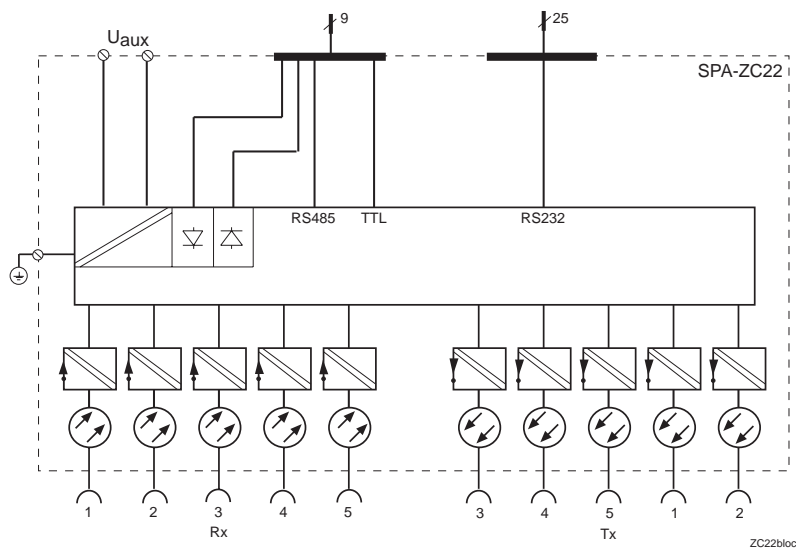


Fig. 4 Block diagram of SPA-ZC 22

## Technical data

Table 1: Power supply

|   |                                     |
|---|-------------------------------------|
| From host device                                  | SPA-ZC 20<br>SPA-ZC 21              |
| From host device and external supply              | SPA-ZC 17<br>SPA-ZC 22              |
| Supply voltage when supplied from external source | 80...265 V ac or dc<br>18...80 V dc |

## Ordering

## When ordering, please specify:

|  |                         |
|--|-------------------------|
| Ordering information                           | Ordering example        |
| 1. Type designation and quantity               | SPA-ZC 17BB2A, 5 pieces |
| 2. Order number                                | RS 951 014-AA           |
| 3. Auxiliary voltage $U_{aux}$ , if applicable | 110 V dc                |

## Order numbers of bus connection module SPA-ZC 17

| Type designation | Auxiliary supply  | Transmitter | Receiver | Order No.     |
|------------------|-------------------|-------------|----------|---------------|
| SPA-ZC 17BB2A    | 80...265 V ac, dc | Plastic     | Plastic  | RS 951 014-AA |
| SPA-ZC 17BB2C    | 18...80 V dc      | Plastic     | Plastic  | RS 951 014-BA |
| SPA-ZC 17BM2A    | 80...265 V ac, dc | Plastic     | Glass    | RS 951 014-CA |
| SPA-ZC 17BM2C    | 18...80 V dc      | Plastic     | Glass    | RS 951 014-DA |
| SPA-ZC 17MB2A    | 80...265 V ac, dc | Glass       | Plastic  | RS 951 014-EA |
| SPA-ZC 17MB2C    | 18...80 V dc      | Glass       | Plastic  | RS 951 014-FA |
| SPA-ZC 17MM2A    | 80...265 V ac, dc | Glass       | Glass    | RS 951 014-GA |
| SPA-ZC 17MM2C    | 18...80 V dc      | Glass       | Glass    | RS 951 014-HA |

## Order numbers of bus connection module SPA-ZC 17 for SACO units

| Type designation | Auxiliary supply  | Transmitter | Receiver | Order No.     |
|------------------|-------------------|-------------|----------|---------------|
| SPA-ZC 17BB2A/S  | 80...265 V ac, dc | Plastic     | Plastic  | RS 951 014-AB |
| SPA-ZC 17BB2C/S  | 18...80 V dc      | Plastic     | Plastic  | RS 951 014-BB |
| SPA-ZC 17BM2A/S  | 80...265 V ac, dc | Plastic     | Glass    | RS 951 014-CB |
| SPA-ZC 17BM2C/S  | 18...80 V dc      | Plastic     | Glass    | RS 951 014-DB |
| SPA-ZC 17MB2A/S  | 80...265 V ac, dc | Glass       | Plastic  | RS 951 014-EB |
| SPA-ZC 17MB2C/S  | 18...80 V dc      | Glass       | Plastic  | RS 951 014-FB |
| SPA-ZC 17MM2A/S  | 80...265 V ac, dc | Glass       | Glass    | RS 951 014-GB |
| SPA-ZC 17MM2C/S  | 18...80 V dc      | Glass       | Glass    | RS 951 014-HB |

## Order numbers of bus connection module SPA-ZC 20

| Type designation | Transmitter |       | Receiver |       | Order No.     |
|------------------|-------------|-------|----------|-------|---------------|
|                  | Plastic     | Glass | Plastic  | Glass |               |
| SPA-ZC 20 15B0M  | 15          | 0     | 15       | 0     | RS 951 020-AA |
| SPA-ZC 20 10B5M  | 15          | 0     | 15       | 1     | RS 951 020-BB |
| SPA-ZC 20 5B10M  | 15          | 0     | 15       | 2     | RS 951 020-CB |
| SPA-ZC 20 0B15M  | 15          | 0     | 15       | 3     | RS 951 020-DB |

**Order numbers of bus connection module SPA-ZC 21**

| Type designation | Transmitter | Receiver | Order No.     |
|------------------|-------------|----------|---------------|
| SPA-ZC 21BB      | Plastic     | Plastic  | RS 951 021-AA |
| SPA-ZC 21BM      | Plastic     | Glass    | RS 951 021-BA |
| SPA-ZC 21MB      | Glass       | Plastic  | RS 951 021-CA |
| SPA-ZC 21MM      | Glass       | Glass    | RS 951 021-DA |

**Order numbers of bus connection modules SPA-ZC 21 for SACO units**

| Type designation | Transmitter | Receiver | Order No.     |
|------------------|-------------|----------|---------------|
| SPA-ZC 21BB/S    | Plastic     | Plastic  | RS 951 021-AB |
| SPA-ZC 21BM/S    | Plastic     | Glass    | RS 951 021-BB |
| SPA-ZC 21MB/S    | Glass       | Plastic  | RS 951 021-CB |
| SPA-ZC 21MM/S    | Glass       | Glass    | RS 951 021-DB |

**Order numbers of bus connection module SPA-ZC 22, version with two bus loops**

| Type designation  | TX1/TX2         | TX2/RX2         | Order No.     |
|-------------------|-----------------|-----------------|---------------|
| SPA-ZC 22C 2B0M   | Plastic/Plastic | Plastic/Plastic | RS 951 027-EA |
| SPA-ZC 22C 1B1M   | Plastic/Plastic | Glass/Glass     | RS 951 027-CA |
| SPA-ZC 22C 1B1M/B | Plastic/Glass   | Plastic/Glass   | RS 951 027-CB |
| SPA-ZC 22C 1B1M/M | Glass/Plastic   | Glass/Plastic   | RS 951 027-CC |
| SPA-ZC 22C 0B2M   | Glass/Glass     | Glass/Glass     | RS 951 027-AA |
| SPA-ZC 22A 2B0M   | Plastic/Plastic | Plastic/Plastic | RS 951 027-FA |
| SPA-ZC 22A 1B1M   | Plastic/Plastic | Glass/Glass     | RS 951 027-DA |
| SPA-ZC 22A 1B1M/B | Plastic/Glass   | Plastic/Glass   | RS 951 027-DB |
| SPA-ZC 22A 1B1M/M | Glass/Plastic   | Glass/Plastic   | RS 951 027-DC |
| SPA-ZC 22A 0B2M   | Glass/Glass     | Glass/Glass     | RS 951 027-BA |

**Order numbers of bus connection module SPA-ZC 22, version with five bus loops**

| Type designation  | Transmitter/receiver pairs |       | Order No.     |
|-------------------|----------------------------|-------|---------------|
|                   | Plastic                    | Glass |               |
| SPA-ZC 22C 5B0M   | 5                          | 0     | RS 951 027-UA |
| SPA-ZC 22C 4B1M   | 4                          | 1     | RS 951 027-SA |
| SPA-ZC 22C 3B2M/B | 3                          | 2     | RS 951 027-PA |
| SPA-ZC 22C 2B3M   | 2                          | 3     | RS 951 027-MA |
| SPA-ZC 22C 1B4M   | 1                          | 4     | RS 951 027-KA |
| SPA-ZC 22C 0B5M   | 0                          | 5     | RS 951 027-GA |
| SPA-ZC 22A 5B0M   | 5                          | 0     | RS 951 027-VA |
| SPA-ZC 22A 4B1M   | 4                          | 1     | RS 951 027-TA |
| SPA-ZC 22A 3B2M   | 3                          | 2     | RS 951 027-RA |
| SPA-ZC 22A 2B3M   | 2                          | 3     | RS 951 027-NA |
| SPA-ZC 22A 1B4M   | 1                          | 4     | RS 951 027-LA |
| SPA-ZC 22A 0B5M   | 0                          | 5     | RS 951 027-HA |

The letters A or C following the code string SPA-ZC 22 of the type designation indicates the auxiliary voltage and the rated frequency of the bus connection module as follows:

A = 50 Hz or 60 Hz, 80...265 V ac or 80...265 V dc, C = 18...80 V dc

**References****Additional information**

|  |                 |
|--|-----------------|
| Manual "Bus connection module SPA-ZC 17" | 1MRS 751230-MUM |
| Manual "Bus connection module SPA-ZC 21" | 1MRS 751340-MUM |
| Manual "Bus connection module SPA-ZC 22" | 1MRS 751288-MUM |







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