SLTA Option Card
Serial LonTalk™ Adapter

Technical Reference Manual

ABB Automation

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Technical Reference Manual

Contents:

1. Introduction

The Serial LonTalk™ Adapter (SLTA) option card is designed to be used in the LON® Star Coupler RER 111. This device is not a "stand-alone" device.

The SLTA option card is a network interface that enables any host with an RS232 interface to be connected to the LONWORKS® network. Physically, the RS232 interface is a 9-pin D-type female connector.

The SLTA option card can be connected to a remote host via the telephone network and a pair of modems.

The SLTA option card also contains a fibre-optic transceiver pair of one of the following types:

- ST-type glass fibre-optic transceiver
- snap-in-type plastic fibre-optic transceiver

The transceiver types are not interchangeable and have to be specified in the order. For ordering information, see chapter 9.

2. Applications

When integrated into the RER 111 unit, the SLTA option card provides an RS232 connection from the host to the LONWORKS network. The RS232 connection can be used by any host. A network management program running in a personal computer (PC), for example, can control the network through an SLTA.

A SRIO 1000M unit can also be connected to the SLTA option card and have a connection to the LONWORKS network

A host device can be connected either directly to the SLTA option card or via the telephone network using a pair of modems.

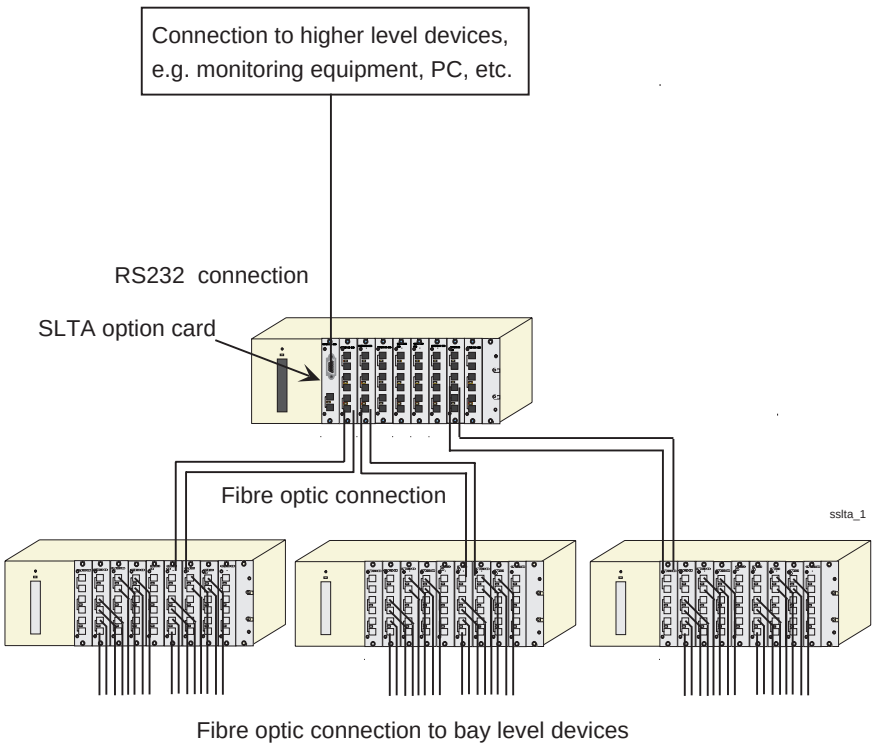

Fig. 2.-1 System structure when the interface to the host is implemented with an SLTA.

3. Functions

3.1. General

The SLTA option card contains one fibre-optic transmitter/receiver pair and one RS232 interface. Both of these communication interfaces are connected to the SLTA core module, LTS-20. In addition to this, the fibre-optic pair is connected to the open collector bus on the mother board of the RER 111 unit. A message received from the RS232 interface is sent to the fibre-optic channel on the option card and the open collector bus on the mother board. A message received from the mother board is sent to both the fibre-optic transmitter and the RS232 interface.

The SLTA option card also contains a service switch. Pressing this switch generates a service pin message. This service pin message is used by the network management device (e.g. higher-level processors, PC. etc.) to install and configure the SLTA option card. The service pin message is only sent to the LONWORKS network. It is NOT sent to the RS232 interface.

The SLTA option card also contains a service LED. This LED is blinking when the SLTA is in the unconfigured state. After configuration of the SLTA option card, the LED is off.

The configuration and the use of the SLTA option card requires a host device, for example, a PC or a SRIO 1000M. From the host device it is possible to send network management commands via the SLTA option card to the LONWORKS network.

When a PC is used as the host device a network management program and a driver have to be installed in the PC. The driver makes enables the network management program to send data to the SLTA option card via the RS232 connection with the correct protocol (Alert/Ack or buffered link protocol).

The SLTA option card has a self-supervision feature for continuous light reception. If the fibre-optic channel receives continuous light, the reception on the channel is cut off. The error is notified to the I/O module of the RER 111 LON Star Coupler via the error line. Error reset is also notified. For information regarding the error line of the RER 111 Star Coupler, refer to the RER 111 manual 1MRS750104-MUM, chapter 4.1.

The indication LED of the fibre-optic channel is continuously lit if continuous light is received.

3.2. RS232 interface

The RS232 interface is a 9-pin D-type female connector.

The RS232 interface can be configured to operate as Data Communication Equipment (DCE) or Data Terminal Equipment (DTE). This DTE function allows a pair of modems to be used and a telephone line to be connected, enabling the LONWORKS network to be controlled from a remote source.

Other user definable parameters are:

- automatic communication speed detection
- user definable communication speeds are 1200, 2400, 9600, 14400, 19200, 38400, 57600 and 115200 bits per second.

There is also a LED for the RS232 receiver. This LED flashes when a message is received.

3.3. Fibre-optic interface

The SLTA option card is equipped with a single fibre-optic transceiver pair. This fibre-optic pair can be from a choice of two different types of fibre-optic interfaces. These are not interchangeable and are defined by the user in the order. For ordering information, please see chapter 9.

The SLTA option card also contains a LED for the fibre-optic receiver. This LED flashes when a message is received.

The fibre-optic interface in the SLTA option card has a built-in support for collision detection.

The speed of the fibre-optic channel is 1.25 Mbit/s only.

3.4. LTS-20 core module

The Echelon LTS-20 core module contains the core electronics and firmware required to implement an SLTA.

In addition, the LTS-20 core module contains parameters required for the communication to the LONWORKS network (address information, etc.).

4. Mechanical and electrical design

4.1. Block diagram

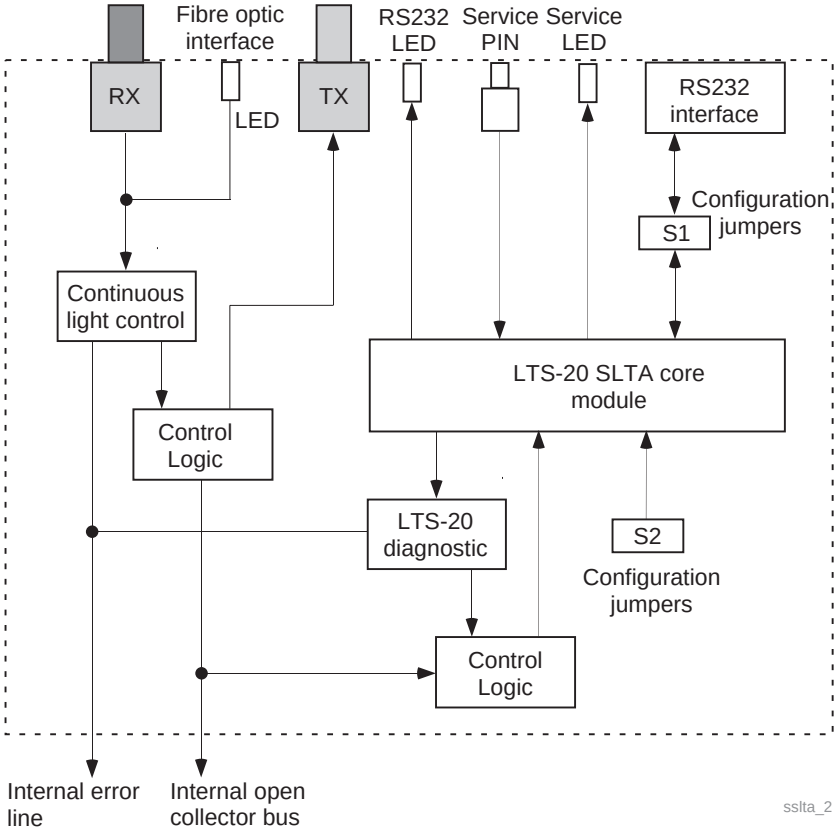

Fig. 4.1.-1 Block Diagram of the SLTA option card.

4.2. Mechanical structure

The SLTA option card is built on a printed circuit board (PCB) of size 100 mm x 160 mm. The size of the front plate is 116.4 mm x 19.8 mm.

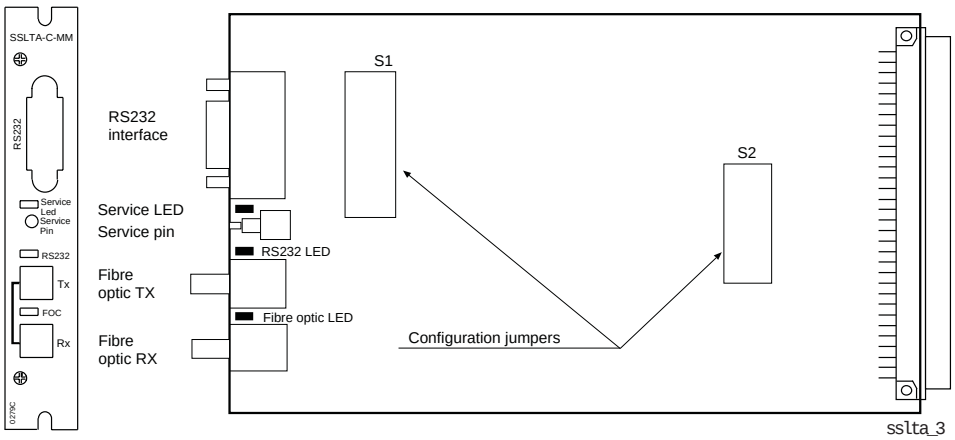

Fig. 4.2.-1 Mechanical structure of the SLTA option card.

5. Interfaces

5.1. General

The SLTA option card has 5 separate interfaces:

- a 64-pin E1 card connector for connection to the mother board of the RER 111 unit
- a fibre-optic transceiver pair
- a 9-pin D-type female connector for the RS232 interface
- a service switch
- a 40-position SIMM connector for the LTS-20 core module.

5.2. RS232 interface

5.2.1. Specification

The RS232 interface is a 9-pin D-type female connector. This connector can be wired as a 3-wire interface for the connection to a host or as an 8-wire interface when it is used in conjunction with a modem.

Table 5.2.1-1 The pin designations for the RS232 interface

Pin	Signal in DCE mode	Signal in DTE mode	Description
1	DCD OUT	DCD IN	Data Carrier detect
2	TXD	RXD	Data I/O
3	RXD	TXD	Data I/O
4	DTR IN	DTR OUT	Data Terminal Ready
5	GND	GND	Signal Ground
6	DSR OUT	DSR IN	Data Set Ready
7	RTS IN	RTS OUT	Request To Send
8	CTS OUT	CTS IN	Clear To Send
9	RIOUT	RIIN	Ring Indicator

Communication cables for use with SLTA option card can be ordered separately. For ordering information, see chapter 9.

The RS232 communication cable has to be shielded. The length of the serial communication cable is limited to max. 12 m.

It is recommended to connect the shield to ground in one end of the cable. However, depending on the specific case and the surroundings, the cable may need more than one earth connection. In such a case the other earth connections should be made through a capacitor.

To connect the protective shield, note the following instruction. The protective shield is designed to be connected to the casing of the D-type connector, which has to be made of conductive material. The connector of the option card is earthed to the case of the RER 111 unit.

The figure 5.2.1.-1 illustrates the connection of the protective shield to the cable connector.

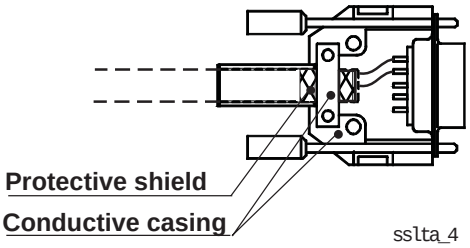

Fig. 5.2.1.-1 Cable protective shield connection.

5.2.2. 3-Wire connection to a host

The diagram below illustrates the cable requirements for 3-wire connection to a host.

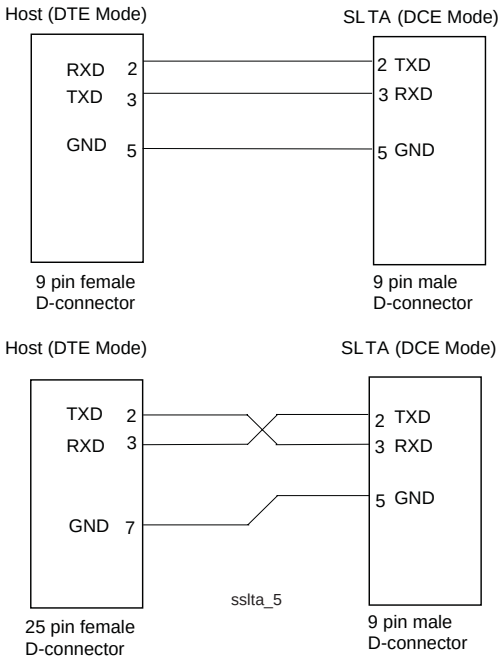

Fig. 5.2.2.-1 Diagram for a 3-wire connection.

5.2.3. 8-Wire connection to a modem

The diagram below illustrates the cable requirements for an 8-wire connection to a modem.

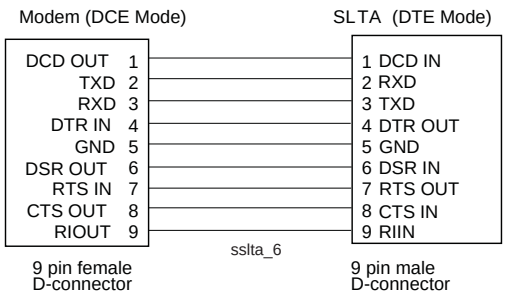

Fig. 5.2.3.-1 Diagram for an 8-wire connection.

5.3. Fibre-optic interface

For more information regarding the fibre-optic connection of option cards, refer to the RER 111 manual 1MRS750104-MUM, chapter 6.2.

5.4. Service switch

The service switch is used to produce a service-pin message. This message can then be used by the network management device (e.g. higher level processors, PC, etc.) to install and configure the SLTA option card. When the switch is pressed and released, the SLTA generates a service pin message. The service pin message is sent to the LONWORKS network, NOT to the RS232 interface.

6. Installation, configuration and programming

6.1. Installation

As the SLTA option card is not intended for "stand-alone" use, it has to be installed in the RER 111 unit. It can be placed in any of the 9 slots available.

The maximum number of SLTA option cards in one RER 111 unit is limited to 3.

To install the SLTA option card to RER 111 unit:

1 **Remove the strain screws on the blank plate or the front plate of the option card installed.**

2 **Lift off the blank plate or pull the required option card out of the casing.**

3 **Replace the old option card with a new one (circuit board component side facing away from the power supply).**

4 **Push the option card into the unit until the front plate is flush with the rack.**

5 **Tighten the option card or the blank plate to the case with the strain screws.**

Notice! Do not touch the fibre-optic transceiver.
Do not remove dust shields from transceivers not in use.

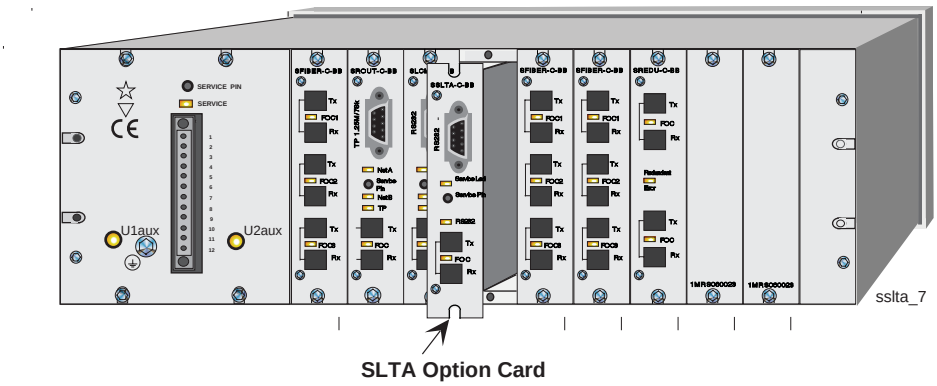

Fig. 6.1.-1 Installation of SLTA option card in the RER 111 unit.

6.2. Configuration

6.2.1. Configuration of the DCE/DTE attribute

The SLTA option card contains two groups of configuration jumpers, S1 and S2, for programming the RS232 interface.

Jumper group S1 is used to configure the SLTA option card as Data Communicating Equipment (DCE) or as Data Terminal Equipment (DTE).

If a modem is to be used in conjunction with the SLTA option card, the jumpers must be set for DTE mode. In any other case, the jumpers must be set for DCE.

Factory default setting: DCE mode.

6.2.2. Configuration of autobaud, baud rate and other communication parameters

The S2 jumper group consists of 9 individual jumpers.

Jumper J1

Is not used.

Jumper J2

J2 defines the network interface link protocol to be used between the SLTA option card and the host. There are two protocols available:

- Alert/Ack link protocol
- buffered link protocol.

The Alert/Ack link protocol is used with host devices that cannot accept asynchronous streams of serial data at high speed, for example PC running DOS or Windows. The buffered link protocol is used with devices accepting and buffering back-to-back serial data without losing characters, for example, most real-time operating systems, Unix, etc.

Factory default setting: Alert/Ack link protocol.

Jumper J3

J3 determines whether the SLTA option card is to be used with a remote host or a local host. If the card is connected to a host via a modem link remote state should be selected. If no modem is used the jumper should be set for local host state.

Factory default setting: local state.

Jumper J4

J4 specifies whether network communication is enabled or disabled after a reset. If network communication is disabled then the SLTA option card enters into the FLUSH state after reset. This means that the SLTA will not be able to communicate on the network after reset. This will allow the host processor to get started without receiving any messages from the network. To enable communication, the host must send a niFLUSH_CANCEL network management message. If network communication is enabled the SLTA is able to start communication on the network immediately after reset.

Factory default setting: disabled

Jumper J5

J5 specifies the type of interface, i.e.3-wire or 8-wire, to be used with the RS232 connection. The 3-wire interface uses the TXD, RXD and GND signals of the RS232 serial interface. The 8-wire interface is used with a modem.

Factory default setting: 3-wire interface.

Jumper J6

J6 is used to select whether the SLTA option card is to use automatic bit rate detection. When this function is used the autobaud SLTA matches the serial bit rate of the SLTA with the serial bit rate of the host. This facility cannot be used in conjunction with a modem.

Factory default setting: autobaud disabled.

Jumpers J7, J8 and J9

J7, J8 and J9 are used to determine the serial communication rate of the SLTA option card. This facility cannot be used in conjunction with autobaud. There are eight available bit rates.

Table 6.2.2-1 The selection table for jumpers J7, J8 and J9.

Serial bit rate	Jumpers		
(Bits per second)	J7	J8	J9
14 400	0	0	0
1200	0	0	1
2400	0	1	0
9600	0	1	1
19 200	1	0	0
38 400	1	0	1
57 600	1	1	0
115 200	1	1	1

Factory default: 9600 bit/s.

6.2.3. Factory default settings

Factory default settings for jumper groups S1 and S2 are as follows:

Jumper group S1:

- DCE mode

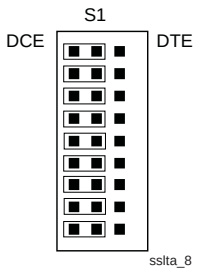

Fig. 6.2.3.-1 Factory default settings for jumper group S1 on the SLTA option card.

Jumper group S2:

- Alert/Ack protocol
- Local host (state)
- Network communication disabled

- 3-wire interface
- Autobaud disabled
- Communication speed of 9600 bit/s

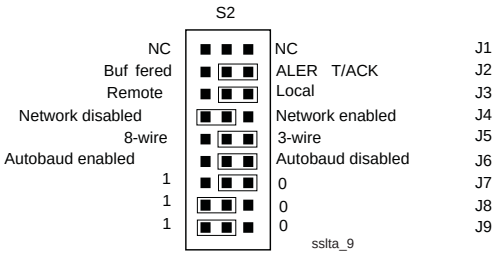

Fig. 6.2.3.-2 Factory default setting for jumper group S2 on the SLTA option card.

6.3. Programming of the SLTA option card

Before the SLTA option card is ready for use in the LONWORKS network it has to be configured by the user. The SLTA option card is configured from the host device via the RS232 interface by the use of a network management program e.g. LON Network Tool (LNT). All configuration information is stored in the EEPROM memory of the Neuron chip located in LTS-20 core module.

To facilitate the easy implementation of the system, the SLTA option card is programmed by the manufacturer. However, the option card has a network address which should be programmed by the user before the card is used in the LONWORKS network.

The network address consists of a node number and a subnet number. A new address will take effect immediately after a change.

By default the node number is 127 and the subnet number is 1.

Note! If any other parameter value is to be changed extreme care should be taken account, because all parameters are stored in EEPROM memory in LTS-20 core module and incorrect settings may cause severe damage to the LTS-20 core module or even destroy it completely.

Note! Refer to Echelon for more information.

LTS-20 LonTalk® Serial Adapter User's Guide.
Manual No: 078-0181-01A

7. Technical data

Interfaces

RS232 interface	9-pin D-type female connector
Max cable length	12 m
Max number of SLTA option cards in one RER 111 unit	3
fibre-optic interface	glass fibre with ST-type connectors
	plastic fibre with snap-in-type connectors
Communication speed	1.25 Mbit/s
Option card to mother board	64-pin E1 connector

Power source

From the mother board interconnection	+8 VDC

Power consumption

SSLTA-C-MM option card	<1.4 W
SSLTA-C-BB option card	<1.4 W

Size

E1 Card	100 mm x 160 mm
Front plate	116.4 mm x 19.8 mm

Disturbance tests

High frequency interference test according to IEC 60255-22-1	
- common mode	2.5 kV, 1 Mhz
- differential mode	1.0 kV, 1 Mhz
Fast transient test according to IEC 61000-4-4 and IEC 60255-22-4, cl. 4	4 kV
Electrostatic discharge test according to IEC 61000-4-2 and IEC 60255-22-2, class III	
- contact discharge	6 kV
- air discharge	8 kV

Environmental conditions

Specified ambient service temperature range	-10...+55°C
Transport and storage temperature range	-40...+70°C

Climatic environmental tests

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

8. Maintenance and service

8.1. Self diagnostics

8.1.1. Fibre-optic receiver LED

The receiver LED flashes when a message is being received from the fibre-optic channel.

If the LED is continuously lit, the channel is heavily loaded or there is a malfunctioning device sending continuous light.

8.1.2. RS232 LED

The RS232 LED flashes when a message is being received from the RS232 interface, i.e. from the host device.

8.1.3. Service LED

If the service LED is off, the Neuron Chip is in the configured state.

If the service LED is flashing, the Neuron Chip is in the unconfigured state.

If the service LED is continuously on, then the network interface has detected a hardware failure.

8.1.4. Service and spare parts

If a fault occurs in the SLTA option card, the faulty option card should be replaced with a new one. For ordering information see chapter 9.

9. Ordering information

Please state the following information in your order:

1. Quantity
2. Type of fibre-optic transceivers
3. RS232 cable (if required).

Type designation of the SLTA option card

Serial LonTalk Adapter option card	Type Designation
SLTA option card with ST-type glass fibre-optic transceivers	SSLTA-C-MM
SLTA option card with snap-in-type plastic fibre-optic transceivers	SSLTA-C-BB

Example:

2 pcs SSLTA-C-MM *Two SLTA option cards with ST type glass fibre-optic transceiver pair.*

2 pcs: Number of cards
SSLTA-C-MM: Card identification

The RS232 cable to be used between a PC and the SLTA option card can be ordered separately. The type designation of the cable is:

1 pc 1MRS120513-xxx *One serial communication cable between PC and SLTA option card.*

1 pc: Number of cables
1MRS120513-xxx: Cable length: 001 = 1 metre, 003 = 3 metre

The RS232 cable to be used between a modem and the SLTA option card can be ordered separately. The type designation of the cable is:

1 pc 1MRS120514-xxx *One serial communication cable between modem and SLTA option card.*

1 pc: Number of cables
1MRS120514-xxx: Cable length: 001 = 1 metre, 003 = 3 metre

The RS232 cable to be used between a SRIO 1000M and the SLTA option card can be ordered separately. The type designation of the cable is:

1 pcSPA-ZP 23A3 *One serial communication cable between SRIO 1000M and SLTA option card. The length of the cable is 3 metres.*

1 pc: Number of cables

Appendix A

Default values of communication parameters and buffers for the SLTA option card.

These values are set during manufacturing and they are stored in the EEPROM memory of the Neuron chip. The values may be read and written over the LONWORKS network using Read Memory and Write Memory network management messages addressed to the SLTA option card (for more details see LONWORKS Technology Device Data chapter A6: The configuration structure).

Table 1: Configuration structure fields and values programmed during manufacturing

Field of a structure	Value	Offset / # of bits		Remarks
channel_id	0x0000	0x0016	/ 16	
location	0	0x02	/ 6*8	set during installation
comm_clock	0	0x08	/ 5	= input_clock / 8: 1,25 Mbit/s
input_clock	5		/ 3	= 10 Mhz
comm_type	1	0x09	/ 3	= single_ended
comm_pin_dir	0x0E		/ 5	= dir.mode - single_ended
preamble_length	6	0x0A	/ 8	= 240 µs
packet_cycle	4	0x0B	/ 8	= 4 ms
beta2_control	0	0x0C	/ 8	
xmit_interpacket	0	0x0D	/ 8	
recv_interpacket	0	0x0E	/ 8	
node_priority	0	0x0F	/ 8	= no priority slot allocated
channel_priorities	30	0x10	/ 8	number of priority slots
collision_detect	1	0x11	/ 1	= enabled
bit_sync_threshold	0		/ 2	= number of bits: 4
filter	0		/ 2	
hysteresis	0		/ 3	
cd_to_end_packet	1	0x12	/ 6	
cd_tail	1		/ 1	
cd_preamble	0		/ 1	
non_group_timer	0	0x18	/ 4	= 128 ms
nm_auth	0		/ 1	= no authentication
preemption timeout	5		/ 3	= 10 sec

Table 2: Buffer settings

Rcv transaction count	7
App buf out size App buf in size	66 66
Net buf out size Net buf in size	66 66
Net buf priority count App buf priority count	5 5
App buf out count App buf in count	15 191
Net buf out count Net buf in count	15 127

Revision history

Date	Versio/Revision	Author	Description
05.01.1998	A	T. Peltoniemi	Original version
29.12.1999	B1	M. Kiikkala	Update version (Q4/99)
01.03.2000	B2	M. Kiikkala	References to SMA-transceiver option removed

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