Littfinski DatenTechnik (LDT)

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RS 485 Interface-Protocol for the Transponder-Reading System TrainDetect (Train Number Identification) and general RFID-Application

1.   General Information

The Transponder-Reading-System consist of up to 99 Transponder-Readers COL-10 and one Interface INTER-10 for the transmittance of the transponder information via the serial RS 232 interface to the PC.
The interface-protocol of this connection has been described within the document "LDT-RFID-RS232" and can be downloaded from our Web Site.
The communication between the INTER-10 and the Transponder-Readers COL-10 will be provided via a fast (data rate 125 kbaud) bidirectional serial RS 485 reading-bus. The data-protocol for this reading bus will be described within this document.

2.   RS 485 Bus

Explanation of abbreviations:

|			
Ad:	Address		
LG:	Reader COL-10	TP:	Transponder
Modus1:	Request mode	RO-TP:	Read-Only Transponder
Modus2:	Spontaneous mode	RW-TP:	Read/Write Transponder

2.1.   Baud rate

Always 125000 baud.

2.2.   Frame-structure RS 485 Bus

The UART - Frame of the bus protocol between interface and reader unit COL-10 consist of 11 bit.

That are start- and stop-bit as well as 8 data bits and the ninthly special bit („addressing bit": bit TXB8 at the UCR) which has to be set always to "High" during sending the LG-address of the programming unit/interface to the LG with purpose of the LG – selection.
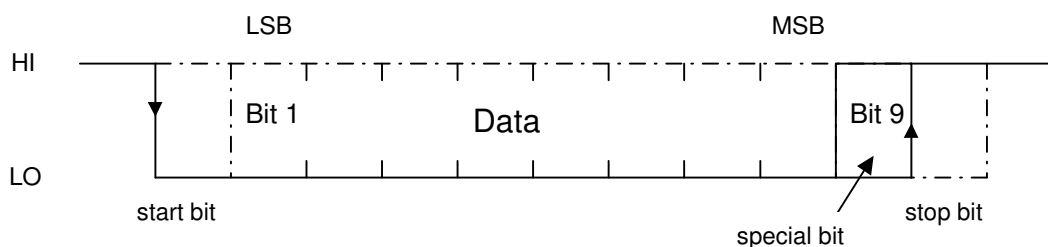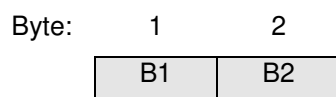

Picture 1: Frame structure RS485 Bus

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2.3. Protocols

2.3.1. Interface to the LG
2.3.1.1. LG-Search (Mode 2)

Byte: 1 2

B1	B2

Explanation:

B1:   LG – Address from 1 – 99

B2:   Control Word 31$_H$

This search is required within the spontaneous mode only because the interface has to search for the connected reader units at a cyclical request. For that it will be send a control word to all available addresses within 1 – 99. A connected LG will answer as explained within 2.3.2.5.

2.3.1.2. Requirement of new TP-Data

Byte: 1 2

B1	B2
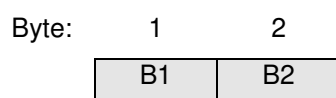
Explanation:

B1:   LG – Address

B2:   Control Word 53$_H$

This requirement is valid for both modes. If a LG contains new transponder data those data will be transmitted after request (2.3.2.1.). The LG will answer even if no TP will be within the area of a LG. If there will be **no** TP inside the reading area of a LG but the TP-data has been already transmitted the control word for "LG vacant" will be transmitted (2.3.2.3.). If there will be a TP inside the reading area of a LG and the TP-data has been transmitted already the control word for "TP occupied and old data" will be transmitted (2.3.2.2.).

2.3.1.3. Requirement of old TP-Data (Mode 1)

Byte: 1 2

B1	B2
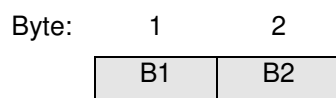
Explanation:

B1:   LG – Address

B2:   Control Word 77$_H$

This request will be carried out within the requirement mode. A LG will send the data of the last read transponder if there is no transponder inside the reading area. If there has been a transponder located at the reading area the data of this transponder will be transmitted (2.3.2.1.). Therefore this request can be used as well for creating a status report in case e.g. if the PC has been temporary switched off and the user software has been re-started.

2.3.1.4.   Interface Restart by the PC (Mode 2)

Byte: 1   2

B1	B2
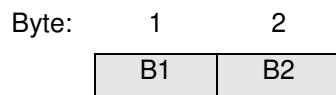
Explanation:

B1:   LG – Address

B2:   Control Word 85$_H$

This control word will be transmitted within the spontaneous mode only. The interface will send this control word if it receives a reset from the PC. Before the interface will carry this out it will send this control word to every connected LG. This assures that within the next data request of the interface there will be as well transponder data transmitted provided that the data has been sent before or no TP will be inside the LG reading area. Therefore this request can be used as well for creating a status report in case e.g. if the PC has been temporary switched off.

2.3.2.   LG to the Interface

2.3.2.1.   TP-Data

Byte: 1   2   3   4   5   6

B1	B2	B3	B4	B5	B6
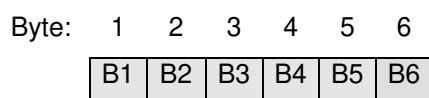
Explanation:

B1:   LG – Address

B2:   TP-Identification B6$_H$
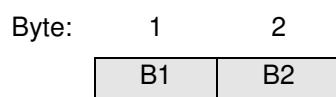
B3:   TP-Data byte 1

B4:   TP-Data byte 2

B5:   TP-Data byte 3

B6:   TP-Data byte 4 (sorting number)

A LG will send this answer if the interface transmits the request for new data (2.3.1.2.) and if it contains new TP-data, which has not been transmitted. The same answer will be carried out after a request for old data (2.3.1.3.).

2.3.2.2.   No new TP-Data, TP still inside reading area of the LG

Byte: 1   2

B1	B2

Explanation:

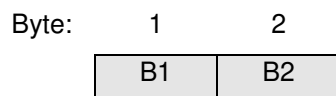B1:   Control Word 70$_H$

B2:   LG – Address

If a LG has sent already the TP – Data to the interface and the TP will be still inside the reading area of the LG this answer will be send after request in accordance to 2.3.1.2.

2.3.2.3. TP not anymore inside the reading area of a LG, LG vacant

Byte: 1   2

B1	B2

Explanation:

B1:   Control Word 80$_H$

B2:   LG – Address

If the LG has sent the TP-Data already to the interface and there is no TP inside the reading area of the LG any more the answer will be transmitted by the first request in accordance to 2.3.1.2. This answer will be send only once. Every following request according 2.3.1.2. will be answered in accordance to 2.3.2.4. until the LG will read new TP-Data.

2.3.2.4. LG still vacant

Byte: 1

B1
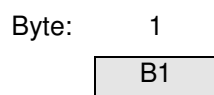
Explanation:

B1:   Control Word CC$_H$

If a LG has sent once the answer in accordance to 2.3.2.3. it will continue to transmit this answer after every request as per 2.3.1.2. With this reason is it possible for the interface to identify the vacancy of the LG independent if this report has been sent already to the PC. Therefore is it not required to report any further vacancy report of the LG from the interface to the PC because the PC received these already. On this way will be the RS 232 bus not excessive loaded if e.g. a LG will be for several minutes vacant.

2.3.2.5. LG available

Byte: 1

B1
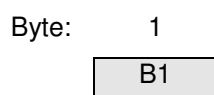
Explanation:

B1:   Control Word 90$_H$

This answer will be transmitted when the interface will be within the spontaneous mode and will search for available LG`s (2.3.1.1.).