

ASCII-H Communication Protocol Description for LF-Reader-134-110-H

Provide for:
all customer

Created by:
XEDION AG
Otto-Hahn-Straße 12
95447 Bayreuth

Document ID:
PROTOCOL DESCRIPTION ACSII-H_ENG

Document state:
RELEASED

Date:
01.07.2015



[illegible]

Content

1	Structure of the Communication Protocol	4
1.1	General Remarks	4
1.2	Package Contents.....	4
1.2.1	Package Header	4
1.2.2	Message Structure	4
1.2.3	End of Package.....	5
2	Commands.....	6
2.1	Commands Terminal to Reader	6
2.2	Commands Reader to Terminal	6
2.3	Hardware Reset	7
2.4	Externally Triggered Reading (Read Request from Terminal)	7
2.5	Write Tag.....	8
2.6	Parameter Settings	9
2.7	Check the Current Parameter Settings	11
2.8	Heartbeat	13
2.9	Reset for Device.....	14
2.10	Transponder Mode	14
2.11	Locking of a Page	15
2.12	Interrogate Version & Serial number	16
2.13	Interrogate Version.....	17
3	Failure Codes	18
4	Examples for Package.....	19
5	Other examples:	20

1 Structure of the Communication Protocol

1.1 General Remarks

The communication will be done with ASCII - packages. After each command to the reader a defined response is sent. It is necessary to wait for this response before sending a new command.

1.2 Package Contents

Each package includes a package header (three signs), a message (two or more signs) and the end of package (five signs).

package header	Message	end of package
----------------	---------	----------------

1.2.1 Package Header

The header includes the start sign (one sign) and the package length (two signs).

start	length 1	length 2
-------	----------	----------

start:	start sign (ASCII-sign 'S')
length 1: '0' - 'F'	high byte package length (hexadecimal) - ASCII-sign
length 2: '0' - 'F'	low byte package length (hexadecimal) - ASCII-sign

The message length describes the number of characters of a message.

1.2.2 Message Structure

The message includes a command, a target address and a source address as well as information.

command	Address	information
---------	---------	-------------

Command: ASCII-sign (refer to the 'Command' chapter)

Address: target/ source address; ASCII sign '0' for ID reader and 'F' for the gateway

Information: depends on the command (includes none, one or more ASCII signs '0'...'F')

1.2.3 End of Package

The end of package includes an end sign (one sign) and a checksum (four signs).

End	Checksum 1	checksum 2	checksum 3	checksum 4
-----	------------	------------	------------	------------

End:	end sign ASCII sign no. 13 (hexadecimal 0D)
Checksum 1: ASCII '0'...'F'	high byte - XOR logic of all data (package header, message and end sign);
Checksum 2: ASCII '0'...'F'	low byte - logic of all data (package header, message and end sign);
Checksum 3: ASCII '0'...'F'	high byte - addition of all data (package header, message and end sign);
Checksum 4: ASCII '0'...'F'	low byte - addition of all data (package header, message and end sign);

2 Commands

2.1 Commands Terminal to Reader

Command	Description
'X'	start an externally triggered read
'W'	write tag
'G'	request parameter
'P'	change parameter
'H'	start heartbeat
'N'	start software reset
'M'	set/read TransponderMode (single/mpt)
'L'	lock one page
'I'	version & serial number query
'S'	write serial number (require password)
'V'	version query

2.2 Commands Reader to Terminal

Command	Description
'x'	data from a page (externally triggered read)
'w'	response after write to tag
'p'	response during parameter setting
'g'	response to read parameters
'h'	response after heartbeat
'n'	response after software or hardware reset
'e'	failure message
'm'	response/ack after TransponderMode-Settings
'l'	feedback at locking of one page
'I'	response to version & serial number query
'v'	response to version query

2.3 Hardware Reset

Terminal	Direction	Reader
	←	package head
	←	'n' command
	←	'0' source address
	←	package end

See also section: Reset for Device.

2.4 Externally Triggered Reading (Read Request from Terminal)

The reading is initiated externally through the command 'X'. The command is configurable with the following parameters:

Value	Description
'01' to '17' ¹⁾	read page #
'98'	read all pages until end sign or empty sign in ID bit 0..3
'99'	read whole tag

Terminal	Direction	Reader
package header	→ ... →	
Command 'X'	→	
target address '0'	→	
value i.e. '05'	→	
package end	→ ... →	

	← ... ←	Package Header
	←	'x' command
	←	'0' source address
	←	i.e. '05' page
	←	'0'...'F' ID bit 60..63
	←	'0'...'F' ID bit 56..59
	←	'0'...'F' ID bit 52..55
	←	'0'...'F' ID bit 48..51
	←	'0'...'F' ID bit 44..47
	←	'0'...'F' ID bit 40..43
	←	'0'...'F' ID bit 36..39

	←	'0...'F'	ID bit 32..35
	←	'0...'F'	ID bit 28..31
	←	'0...'F'	ID bit 24..27
	←	'0...'F'	ID bit 20..23
	←	'0...'F'	ID bit 16.. 19
	←	'0...'F'	ID bit 12.. 15
	←	'0...'F'	ID bit 8..11
	←	'0...'F'	ID bit 4..7
	←	'0...'F'	ID bit 0..3
	← ... ←	package End	

There is no acknowledging from the terminal.

In case of read request for more than one page (value 98 or 99) the protocol will be repeated. For the end sign the Reader sends an additional package; the message includes the command 'x' and the source address '0'). If the reading fails the reading will be repeated (parameter 3: *r/w delay time*; parameter 4: *r/w maxrepeat*). If it fails again the Reader sends a failure message 'no tag(4)' to the terminal.

1) Decimal value.

2.5 Write Tag

The terminal will send the following information to the Reader: target, page and data.

Terminal	Direction	Reader
package header	→ ... →	
command 'W'	→	
target address '0'..'E'	→	
page '01'..'17' ¹⁾	→	
'0...'F' ID bit 60..63	→	
'0...'F' ID bit 56..59	→	
'0...'F' ID bit 52..55	→	
'0...'F' ID bit 48..51	→	
'0...'F' ID bit 44..47	→	
'0...'F' ID bit 40..43	→	
'0...'F' ID bit 36..39	→	
'0...'F' ID bit 32..35	→	
'0...'F' ID bit 28..31	→	
'0...'F' ID bit 24..27	→	
'0...'F' ID bit 20..23	→	

'0'...'F'	ID bit 16..19	→	
'0'...'F'	ID bit 12..15	→	
'0'...'F'	ID bit 8....11	→	
'0'...'F'	ID bit 4....7	→	
'0'...'F'	ID bit 0....3	→	
package end		→ ... →	

	← ... ←	package header
	←	'w' command
	←	'0'..'E' source address
	← ... ←	package end

If 'write tag' fails writing will be repeated in the defined time frame (parameter 3: *r/w delay time*; parameter 4: *r/w maxrepeat*). If it fails again, but Transponder is in range, the Reader sends a failure message 'write fail (3)' to the terminal. If there is no transponder in range the Reader sends a failure message 'no tag(4)'.

1) Decimal value.

2.6 Parameter Settings

The following reader parameters can be changed:

Parameter #	Name	Description	Valid Values
0	Sensor delay	operation delay for the presence sensor	'00'..' '99' (0.1s)
1	readmode	automatic readmode	'00' only one page read '01' read to end sign or empty sign '02' all pages '10' read only one page check sensor first '11' up to end/empty sign check sensor first '12' all pages check sensor first
2	readpage	page for readmode '00'	'01'..' '17'
3	r/w repeattime	time between two readings or writings	'00'..' '99' (0.1s)
4	r/w maxrepeat	max. number of tries to read or write	'00'..' '99'
5	RS232 re-peattime	waiting period ¹⁾ for a confirmation; if no confirmation has been received, the message	'01'..' '99' (0.1s)

		will be repeated (see RS232 maxrepeat)	
6	RS232 maxrepeat	max. numbers of tries to send data to the terminal (RS232)	'00' (never ending) '01' '99'
7	watchport	message to the terminal that the carrier has been rejected from I/O	'00' not activated '01' activated
8	baudrate	bitrate for serial interface (will be resumed after reset!)	'01' 4800 '02' 9600 '03' 19200 '04' 28800 '05' 57600
9	parity	parity bit for serial interface (will be resumed after reset!)	'00' none '01' even '02' odd

1) during the waiting period no new actions (for example reading or writing) can be started

Terminal	Direction	Reader
package header	→ ... →	
command 'P'	→	
target address '0'..'5'	→	
parameter* '0'..'9'	→	
value '00'..'99'	→	
package end	→ ... →	

	← ... ←	package header
	←	'p' command
	←	'0' source address
	← ... ←	package end

NOTE: Only parameter 3 (r/w repeattime) ,4 (r/w maxrepeat) ,8 (baudrate) and 9 (parity) takes effect on reader. All other parameters are only for compatibility.

Parameter 7 (watchport) always contains '00'

2.7 Check the Current Parameter Settings

Terminal	Direction	Reader
package header	→ ... →	
command 'G'	→	
target address '0'	→	
package end	→ ... →	

	← ... ←	package header
	←	'g' command
	←	'0' source
	←	'0' value number
	←	'01'..'99' value
	← ... ←	package end

	← ... ←	package header
	←	'g' command
	←	'0' source
	←	'1' value number
	←	'00'..'02' value
	← ... ←	package end

	← ... ←	package header
	←	'g' command
	←	'0' source
	←	'2' value number
	←	'01'..'17' value
	← ... ←	package end

	← ... ←	package header
	←	'g' command
	←	'0' source
	←	'3' value number
	←	'00'..'99' value
	← ... ←	package end

	← ... ←	package header
	←	'g' command
	←	'0' source
	←	'5' value number
	←	'00'..'99' value
	← ... ←	package end

	← ... ←	package header
	←	'g' command
	←	'0' source
	←	'5' value number
	←	'01'..'99' value
	← ... ←	package end

	← ... ←	package header
	←	'g' command
	←	'0' source
	←	'6' value number
	←	'00'..'99' value
	← ... ←	package end

	← ... ←	package header
	←	'g' command
	←	'0' source
	←	'7' value number
	←	'00'..'01' value
	← ... ←	package end

	← ... ←	package header
	←	'g' ¹⁾ command
	←	'0' source
	← ... ←	'8' value number
		'01'..'05' value
	← ... ←	package end

	← ... ←	package header
	←	'g' ¹⁾ command
	←	'0' source
	← ... ←	'9' value number
		'00'..'02' value
	← ... ←	package end

	← ... ←	Package header
	←	'g' ¹⁾ command
	←	'0' source
	← ... ←	package end

end package includes the command 'g' and the source address

2.8 Heartbeat

This command is used to check the connection between the terminal and the ID reader.

Terminal	Direction	Reader
package header	→ ... →	
command 'H'	→	
target address '0' ¹⁾	→	
package end	→ ... →	

	← ... ←	package header
	←	'h' command
	←	'F' source ad-
	←	'0000'...'FFFF' reader ID
	←	'0000' return code
	← ... ←	package end

Meaning of the reader ID:

Every reader has a unique 16 bit reader ID after installation. Every ID may only be used once.

¹⁾ Because of compatibility to separated systems the heartbeat is also allowed with the address 'F'.

2.9 Reset for Device

This command can be used to reset the ID reader (device '0').

During the software reset the reader additionally initiates a self-test.

Terminal	Direction	Reader
package header	→ ... →	
command 'N'	→	
target address '0'	→	
package end	→...→	

	←...←	package header
	←	'n' command
	←	'0' source address
	←...←	package end

2.10 Transponder Mode

This command is used to request actual mode or switch between single – and multipage-transponders. This command is only possible for Reader ('0')

Terminal	Direction	Reader
package header	→ ... →	
command 'M'	→	
target address '0'	→	
mode '0'...'1'	→	
package end	→ ... →	

	← ... ←	package header
	←	'm' command
	←	'F' source address
	←	'0'...'1' mode ¹⁾
	← ... ←	package end

To request the current settings, the Reader needs Command without new mode-settings (see examples). If new mode is given, the Reader only sends acknowledge without current settings.

Available modes:

0 - SinglePage-Transponder

1 - MultiPage-Transponder

NOTE: The Transponder-Mode is only necessary for writing. On reading page '01' will be always read in SinglePage-Mode.

2.11 Locking of a Page

The terminal hands over the Reader its address and the page number which shall be locked.

Terminal	Direction	Reader
package header	→ ... →	
Command 'L'	→	
target address '0'	→	
page '01'.. '17'	→	
package end	→ ... →	

	← ... ←	Package Header
	←	'l' command
	←	'0' source address
	← ... ←	Package End

If 'write tag' fails writing will be repeated in the defined time frame (parameter 3: *r/w delay time*; parameter 4: *r/w maxrepeat*). If it fails again the Reader sends a failure message 'no tag (4)' to the terminal.

Note: Locking is only possible on a MultiPage-Transponder!

2.12 Interrogate Version & Serial number

With this function the Version & Serial Number of the reader can be queried. The Version consists of 8 sign, the Serial consists of 20 sign. As delimiter there is a 5 sign string „S/N:”.

The Data is sending in ClearType-ASCII!

Terminal	Direction	Reader
package header	→ ... →	
Command 'I'	→	
target address 'F'	→	
package end	→ ... →	

	← ... ←	Package Header
	←	'I' command
	←	'F' source address
	←	ASCII(8) 8 sign version
	←	ASCII(5) 5 sign delimiter
	←	ASCII(20) 20 sign serial
	← ... ←	Package End

Example: S23iFASC0.9.9,S/N:1505BY0005

2.13 Interrogate Version

With this function the Version-Number can be queried. The Version-Number consists of 8 signs which are stored in ASCII-code.

Terminal	Direction	Reader
package header	→ ... →	
Command 'V'	→	
target address 'F' '0'	→	
package end	→ ... →	

	← ... ←	Package Header
	←	'v' command
	←	'F' '0' source ad-
	←	'00'...'FF' 1. ASCII
	←	'00'...'FF' 2. ASCII
	←	'00'...'FF' 3. ASCII
	←	'00'...'FF' 4. ASCII
	←	'00'...'FF' 5. ASCII
	←	'00'...'FF' 6. ASCII
	←	'00'...'FF' 7. ASCII
	←	'00'...'FF' 8. ASCII
	← ... ←	Package End

Example: S12v0415443302E392E39.1CC6

command	values 1 to 8							
v0	41	53	43	30	2E	39	2E	39
answer	A	S	C	1	.	0	.	0

3 Failure Codes

The failure codes have the following meanings:

Failure Code	Name	Description
0	none	without failure
1	auto fail	Automatic reading is not possible ^{1,2)}
2	ex fail	External triggered reading is not possible ^{1,2)}
3	write fail	data transfer to the tag not possible ^{1,2,3)}
4	no tag	no tag or antenna installed
5	invalid	invalid parameter or command
6	unknown	unknown failure
7	unconfig	the device is not configured
8	check	parity or/ and checksum failure
9	void ackn	no valid acknowledge
A	locked	<i>Locked Page</i> cannot be written
:	msg len	Message too long
;	invalid	invalid parameter or command
B	no ackn	the message which has to be confirmed had been sent maximally (rs232) maxrepeat) and had not been confirmed by the terminal within the defined time frame (see parameter 5)

- 1) because the device is still busy
- 2) or because a message has not been confirmed by the previous read up to now
- 3) or incorrect page number given

Terminal	Direction	Reader
	← ... ←	package header
	←	'e' command
	←	'0'..'E','F' source address
	←	'0'..'B' failure code
	←...←	package end

4 Examples for Package

ASCII	HEX	Description
'S'	53	start sign
'0'	30	highbyte message length
'2'	32	lowbyte message length
'H'	48	first sign message: value
'F'	46	second sign message: target address
CR	0D	end sign
'5'	35	highbyte checksum XOR
'2'	32	lowbyte checksum XOR
'5'	35	highbyte checksum addition
'0'	30	lowbyte checksum addition

Calculation for the XOR checksum:

$53 \text{ XOR } 30 \text{ XOR } 32 \text{ XOR } 48 \text{ XOR } 46 \text{ XOR } 0D = 52 \rightarrow '5' '2'$

Calculation for the addition checksum:

$53 + 30 + 32 + 48 + 46 + 0D = 150$

Only low significant byte will be used: $\rightarrow 50 \rightarrow '5' '0'$

5 Other examples:

ASCII ('.' = CR)	Description
S05P0101.0BD7	setting readmode reader0 on <i>tag</i>
S04X001.33AD	explicit read reader0 page 1
S04X098.33BD	explicit read reader0 <i>tag</i>
S04X099.32BE	explicit read reader0 <i>whole</i>
S02G0.2B39	question about parameter of reader0
S05P0304.0CDC	setting parameter reader0 <i>repeat_timet</i> to 4
S02N0.2240	reset reader0
S02M0	question about mode-settings of Reader
S03M00	set mode to singlepage
S03M01	set mode to multipage

Contact Person:

Sebastian Weiß
Key Account Manager
Otto-Hahn-Str. 12
95447 Bayreuth
GERMANY
Tel.: +49 (0) 921 507 5242
Fax: +49 (0) 921 507 5241
Cell.: +49 (0) 176 657 85 999
Email: weiss@xedion.de