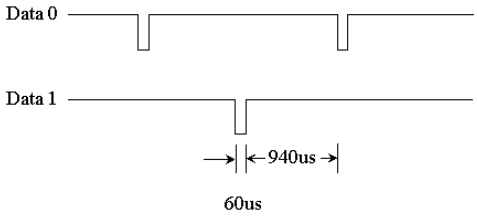
ACCESS 7A, RS232/W26-BIT

Default Output

W26-bit
PE E E E E E E E E E E E E O O O O O O O O O O O O PO
P_E = Even parity
E = Bits counted into even parity
O = Bits counted into odd parity
P_O = Odd parity

Wiegand Timing



DATA0 and DATA1 outputs are used for transmission. DATA0 is used to output 0-bits and DATA1 for 1-bits. Each pulse has active time of 60 us, followed by delay of 940 us. This gives total bit time of 1 ms. Pulse is active when the open collector output is in the conductive state. In case of no communication both pins are normally high.

Byte Coding

Byte length is five (5) bits. First four (4) bits are used for information and the fifth is odd parity calculated from information bits. Bit order is LSB first.
Example: 2 -> 01000b.

Output string format

10 leading Zeros > SS 14DataDigits ES LRC < 10 Trailing Zeros

SS = Start Sentinel, example: 11010

ES = End Sentinel, example: 11111
LRC = Longitudinal Redundancy Check.

To overcome the problem of transmitting data with 'F' characters that would be seen as a terminator (11111) the data is converted into ordinary numerical base 10 string. See example below.

The hexadecimal code of a transponder being 00004567AF will be converted into 00000004548527. Note that this string is always 14 digits long and is calculated as follows, referred to the initial hexadecimal value:

(F* 160 + A* 161 + 7 *162 + 6 * 163 + 5 * 164 + 4*165 + 0 * 166 + 0 * 167 + 0 * 168 + 0 * 169) = 15+160+1792+24576+327680+4194304+0+0+0+0= 00000004548527)

Longitudinal Redundancy Check

LRC is calculated by XORing all data bits (excluding start, stop and CR/LF).

Default Output Communication

RS232
RS-232 connection is in accordance with standards. Communication is done at 9600 bauds, no parity, 8 databits, 1 start bit, 1 stop bit. Both of RxD- and TxD –lines must always be connected.

Output string format

<STX>SSSSSSSSSSCC<CR><LF><ETX>
where

Data	Length	Description
S	10 bytes	Serial number
C	2 bytes	LRC-checksum, explained later. Only 4 information bits are used

Control characters in ASCII:
STX = 02
LF = 10
CR = 13
ETX = 03

Checksum calculation

Checksum is calculated by XOR:ing all bytes of serial number leading the checksum itself. ASCII characters are converted to binary values before calculation
(example 'A'-> 1010b).

Example of string with correct checksum: <STX>01026A72FFE4<CR><LF><ETX>

ACCESS 7C, RS232/W66-BIT

Data String Format

Output string has the format OSSSSSSSS…SSSSSSSSE

Data	Length	Description
O	1 bit	Odd parity calculated from 36 first bits of serial number *)
S	64 bits	Serial number in binary form
E	1 bit	Even parity calculated from 36 last bits of serial number *)

*) 4+4 bits in the middle is used to both parity bits

Data is sent MSB first. First bit sent is Odd parity.

O $D_0D_1…D_{26}D_{27}$ $D_{28}D_{29}D_{30}D_{31}D_{32}D_{33}D_{34}D_{35}$ $D_{36}D_{37}$... $D_{62}D_{63}$ E
|---------- Odd parity ----------|
|---------- Even parity ----------|

D_0 : First data byte bit 7.
D_1 : First data byte bit 6.
…
D_7 : First data byte bit 0
D8 : Second data byte bit 7.
…

Only two parity bits of totally 66 bits is not enough to guarantee reliable error detection. This communication mode is recommended only on 'noise free' environment and short distances, for example inside chassis.

Wiegand timing

WIE0 and WIE1 outputs are used for transmission. WIE0 is used to output 0-bits and WIE1 for 1-bits. Each pulse has active time of 640 us, followed by delay of 640 us. This gives total bit time of 1,3 ms. Pulse is active when the open collector output is in the conductive stage.

RS232 formats

Communication settings: 9600 bauds, no parity, 8 databits, 1 start bit, 1 stop bit.

RS 232 Format 1

Output string has a format:

BSSSSSSSSSSSSSSSS=PPPPMTC<LF><CR>

where

Data	Length	Description
B	1 byte	Start character, constant 'B'
S	16 bytes	Serial number
=	1 byte	Separation character, constant '='
P	4 bytes	constant 0000h
M	1 byte	Tag type 1=Mifare, 2=ICODE, 3=PICO, 4=ISO 15693, 5=FeliCa, 6=Topaz
T	1 byte	End character, constant 'T'
C	1 byte	LRC-checksum, explained in chapter 2.7.1. Only 4 information bits are used.

All transmitted characters are ASCII characters.
Mifare Standard has serial number length of 32 bits, remaining 8 characters are always zeroes.

Checksum calculation

Checksum is calculated by XOR:ing all 4-bit bytes leading the checksum itself. ASCII characters are converted to binary values before calculation (example 'A'-> 1010b). Constants are interpreted to checksum calculation values as follows:

'B' = 0x05
'=' = 0x05
'T' = 0x05
Tag type is converted as follows:
'1' = 0x00
'2' = 0x01
'3' = 0x01
'4' = 0x02
'5' = 0x02
'6' = 0x03

Detailed information on calculation can be requested from Idesco Oy.

RS 232 Format 2

Output string has a format:

BBDDDDDDDDDDCC

, where

Data	Length	Description
BB	2 bytes	Start character
DD	10 bytes	Serial number
CC	2 bytes	LRC checksum

All transmitted characters are ASCII characters.

Output string example:
MIFARE card ID number B5402BA2:
The card's ID number is only 32 bits long, so additional zeroes are added to the original data.

RS 232 message seen by the host:
00016A80574486 <CR><LF>
00 = Start character
86 = Checksum (Please see example below)

Remove the checksum and change the data to binary characters:
0000 0000 000 0 0001 0110 1010 1000 0000 0101 0111 0100 0100
0000 0000 000 p dddd dddd dddd dddd dddd dddd dddd dddd ddd p

First eight bits are zeroes. p = parity bits (first even parity, last odd parity)

Remove the first 11 bits from the left

0 0001 0110 1010 1000 0000 0101 0111 0100 0100

Then drop both parity bits

0001 0110 1010 1000 0000 0101 0111 0100 010

This leaves 35 bits of the card number data.

000 1011 0101 0100 0000 0010 1011 1010 0010 = B5402BA2 hex

Checksum calculation example

Data 00 016A805744 86
Add together the ASCII-coded hex characters (6 bytes, from 00 to 44) and include the last eight bits to the result. The result is the checksum.

ACCESS 8 AH W26-BIT

Wiegand 26-bit

The default 26- bit wiegand output data has a following format. Bits are described as sent:

1: even parity of bits 2..13 (12 bits total)
2-25: 3 least significant bytes of serial number
26: odd parity of bits 14..25 (12 bits total)

Wiegand timings

Reader timings can be changed by using command cards.

Pulse length:
20 s – 100 s (10 s steps)
Default time: 50 s

Pulse delay:
200 s – 20 ms (100 s steps)
Default time: 2 ms

ACCESS 8 CM t RS232/W26-BIT

The reader can be configured to use wiegand or clock and data output format. Wiegand output is used as a default output format. Reader sends card data out also through RS 232 serial communication line.
Different configurable parameters are listed in the chapter 3.

Default wiegand data length

As a default reader is sending out the data in the 26- bit format. Data is read from the sector 15 and from block 0. First three bytes are read out from the block and parity bits are added to this 24- bit data.

The following is an example about the 26-bit wiegand output format structure:

Output string has the format:
ESSSSSSSS...SSSSSSSSO

Data	Length	Description
E	1 bit	Even parity calculated from 12 first bits of data string
S	24 bits	Data in binary form
O	1 bit	Odd parity calculated from 12 last bits of data string

Data is sent MSB first. First bit sent is Even parity.

E D_0D_1.....$D_{10}D_{11}D_{12}D_{13}$.....$D_{22}D_{23}$ O
|-----Even parity-----| ------ Odd parity -------|

D_0 : First data byte bit 7.
D_1 : First data byte bit 6.
...
D_{22} : Last data byte bit 1
D_{23} : Last data byte bit 0

Default wiegand data timings

WIE0 and WIE1 outputs are used for transmission. WIE0 is used to output 0-bits and WIE1 for 1-bits.

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Default parameters

Reader has default parameters where each pulse has active time of 70 us, followed by delay of 930 us. This gives total bit time of 1 ms.

RS232

RS 232 data string can also be configured. User can configure what bytes from the Mifare sector are send out. Note, that only the full bytes are send out.
RS-232 connection is electrically according standard. Communication is done at 9600 baud, no parity, 8 databits, 1 start bit, 1 stop bit.
The complete serial number without parity bits is sent out via RS232.

ACCESS 9 CM RS232

General

The reader is able to support RS 232 output format. Default settings for serial communications are 9600 bauds, no parity, 8 databits, 1 start bit, 1 stop bit.
Baudrate can be changed with baud command.

1.1

RS 232 output format

Output string has a format: Data <CR> <LF>
Data is sent out as it is written to the card.

ACCESS 9 CL RS232 SERVICE/W26-BIT

In the default mode the reader is using 26-bit Wiegand as a default interface. The Service interface is using 9600 baud RS 232 by default. Both Host and Service interfaces can be configured to use different formats and interfaces.

Wiegand 26-bit

The default 26-bit Wiegand output data has the following format. Bits are sent the same way:

1:	even parity of bits 2..13 (12 bits total)
2-25:	3 least significant bytes of serial number
26:	odd parity of bits 14..25 (12 bits total)