TagMaster

North America, Inc.

MANUAL

PassMan Software Manual v1.6.1

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GEN4
LONG-RANGE RFID

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1 Introduction

This section introduces PassMan, which is application software for the LR-series Reader.

The PassMan software is suited for a Reader which is being integrated with an existing access control system or for a Reader connected to a host computer and used in an identification system. The Reader communicates with an access control system or a host computer via standard communication interfaces.

The Reader has two main software layers. Every Reader is installed with system software, which constitutes the software foundation of the Reader. The Reader system software can be compared to the operating system of a host computer.

Different Reader application software can reside on top of the system software. The Reader application software defines the behaviour of the Reader.

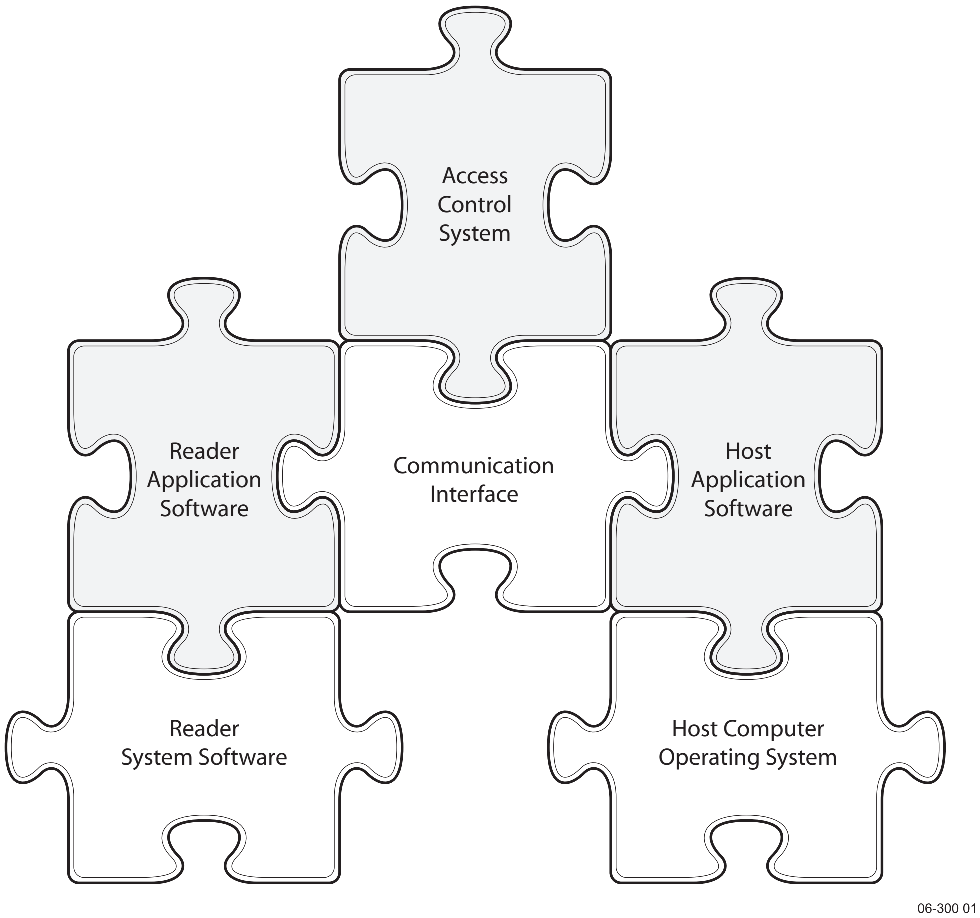

Figure 1 Application and system software overview

The main focus of this manual is the Reader application software. This manual is regarded as a complement to the GEN4 Reader User’s Manual [1]. For a more comprehensive coverage of the Reader hardware and software, see the GEN4 Reader User’s Manual.

2 General Information

This section describes the purpose and the basic tasks of the PassMan software.

The PassMan software makes it possible to incorporate the Reader in an existing access control system using Wiegand or Mag-stripe communication protocols. The PassMan software also makes it possible to connect the Reader to a host computer using the RS485 serial communication interface.

The main function of the PassMan software is to detect an ID-tag and automatically forward ID-tag data to the access control system or to the host computer.

The Reader installed with PassMan has only limited decision-making capabilities on its own. The Reader application software cannot store any information about read ID-tags. Functionality is primarily placed in the access control system or the host computer.

A typical application for an LR-series Reader installed with PassMan is an extension of an existing access control system lacking long-range reading capabilities, for instance in an industrial area protected by a gate.

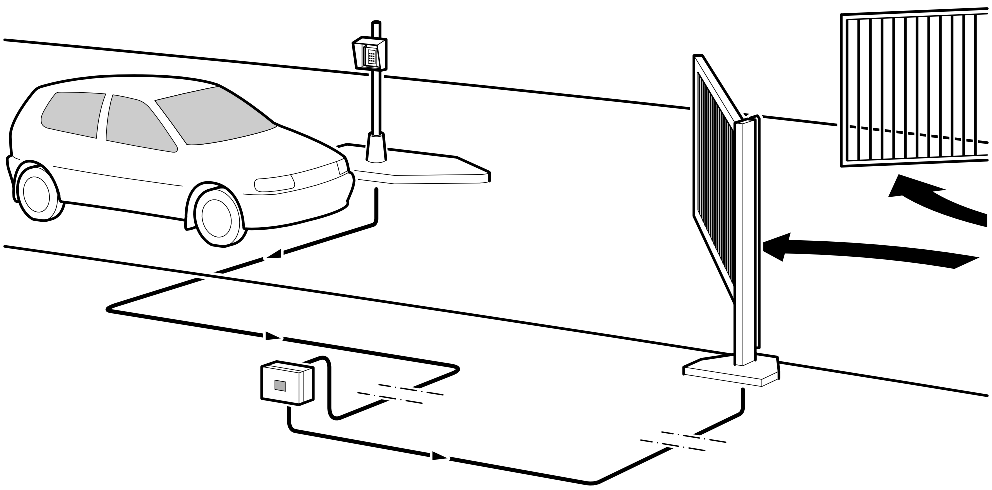

Figure 2 Existing access control system lacking long-range reading capabilities

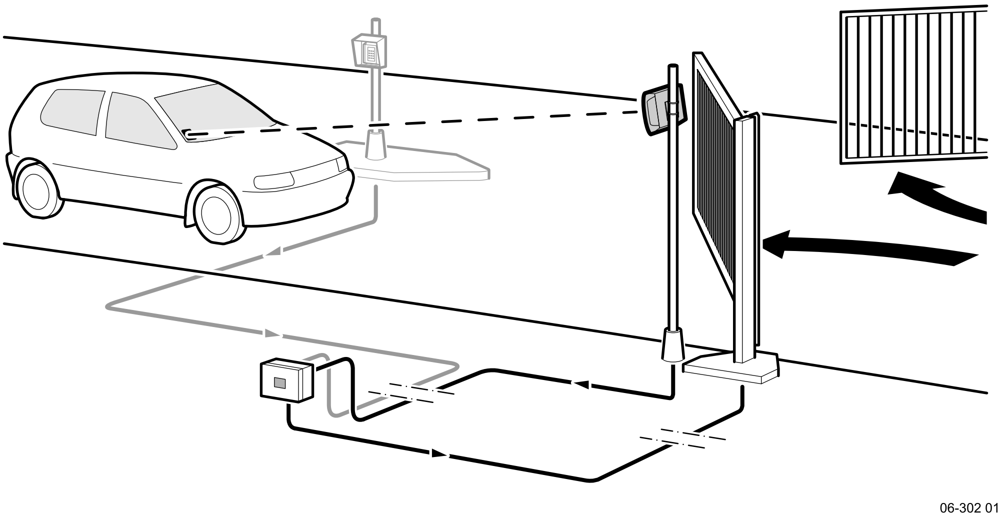

Figure 3 A typical installation using PassMan is an extension of an existing access control system

The ID-tag mounted in the windshield is detected when the vehicle approaches the Reader. The ID-tag data is transmitted to the existing access control system that sends an opening signal to the gate if the reported ID-tag is to be granted access. The Reader is also capable of detecting moving objects without ID-tags.

2.1 Basic Tasks

Described at the most basic level, the PassMan software receives input and produces output. The access control system or the host computer stores information and makes necessary decisions.

Input includes events generated by readings of ID-tags and detection of moving objects. Input can also be information received from an access control system or from a host computer, or both.

Output includes causing the relay to be pulled, sounding the buzzer, and turning on the externally-visible indicator. Output can also be information about events which is sent to an access control system or to a host computer, or both.

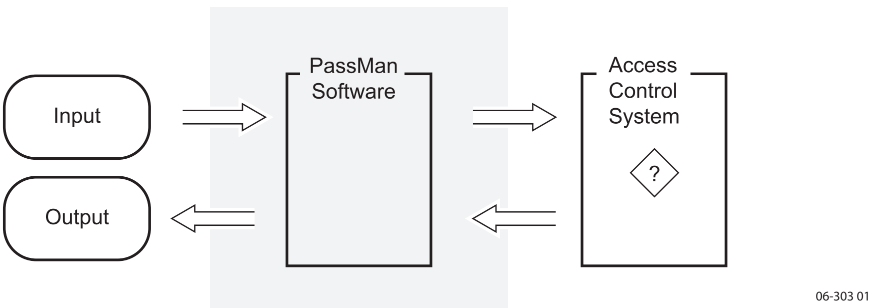

Figure 4 Basic tasks of the PassMan software when the Reader is connected to an access control system

When the Reader is connected to an access control system, output includes information about read ID-tags that is sent to the access control system over the Wiegand/Mag-stripe interface. The Wiegand/Mag-stripe interface sends information one-way, from the Reader to the access control system. When the Reader is connected to an access control system, input includes signals received from the access control system to the input connection.

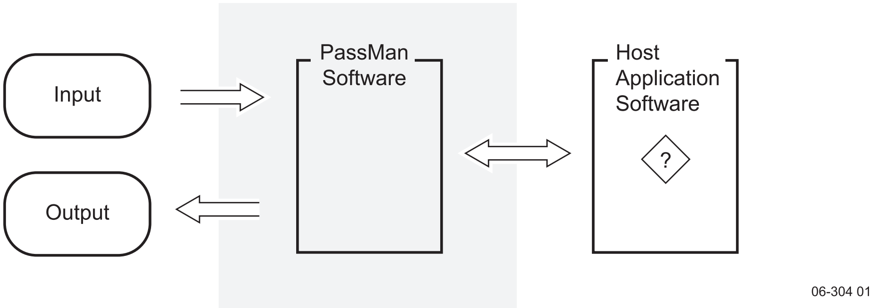

Figure 5 Basic tasks of the PassMan software when the Reader is connected to a host computer

When a Reader is connected to a host computer, output includes information about read ID-tags and motion detections that is sent to the host computer over a serial communication interface. When a Reader is connected to a host computer, input includes information received from the host computer over a serial communication interface.

Output generated by the Reader is based on the configuration settings of the PassMan software. Application settings are stored in Flash memory and are unaffected when the Reader is reset.

2.2 Communication Interfaces

The PassMan software uses three main communication interfaces, which are an RS485 serial interface, a Wiegand/Mag-stripe interface, and an RS232 serial interface.

Table 1 Communication interfaces overview

Communication Interface	**Controller Board Connection**	**Description**
RS485	J41	Used for communication between the Reader and a host computer or for configuration of the Reader from a temporarily connected PC. PassMan supports 2-wire RS485.
RS232	J42	Used for communication between the Reader and a host computer or for configuration of the Reader from a temporarily connected PC.
Wiegand/Mag-stripe	J2	Used for one-way communication from the Reader to an access control system.

For a chart of the controller board with the external connections mentioned above, see the LR-series Installation Manual [2].

The two protocols Wiegand and Mag-stripe share the same physical interface on the controller board of the Reader and therefore cannot be used simultaneously.

If the Reader is connected to a host computer, host application software is needed for establishing a communication link between the Reader and the host.

2.3 ID-tag Data

There are two types of ID-tags used in a TagMaster identification system, called ScriptTags and MarkTags. ScriptTags can both be read from and written to, while MarkTags only can be read.

Every ID-tag has a unique and permanent identification number called ID-tag mark. The data stored in a MarkTag includes the ID-tag mark. The data stored in a ScriptTag includes the ID-tag mark and a writable data field called ID-tag user data.

Table 2 ID-tags overview

ID-tag Type	**ID-tag Data**
MarkTag	Readable ID-tag mark
ScriptTag	Readable ID-tag mark and readable and writable ID-tag user data

The term *ID-tag data* is used to describe the collective data stored in an ID-tag (the ID-tag mark or the ID-tag user data, or both). For MarkTags, ID-tag data also include an optional site code stored in the Reader.

The ID-tag data is sent to the access control system or the host computer in different formats, which correspond to the available communication interfaces as shown in the table below.

Table 3 ID-tag data format overview

Data Format Descriptor	**ID-tag Data format**
WI	Wiegand data
MC	Mag-stripe data
OL	Special type data (previous Mag-stripe format)
FU	Serial data full size (574 bits)
QU	Serial data quarter size (154 bits)
MI	Serial data mini size (14 bits)

3 Message Formats

This section describes the different formats used in the messages sent from the Reader to an access control system and to a host computer.

Messages transmitted from the Reader consist of separate fields and differ in format, depending on the communication interface and type of ID-tag.

Settings regarding the different communication interfaces, ID-tag marks and ID-tag user data can be combined in a variety of ways.

All configuration settings are listed and explained briefly in section 5 Configuration. However, some settings and terminology regarding the message formats require clarification and will be described in more detail in the subsections below.

3.1 Site Code

Information about the site code applies to the PassMan settings described in the following sections:

- 5.3.2 ID-tag Mark and Site Code Send To
- 5.3.5 Serial Data: Site Code Field Length
- 5.3.6 Serial Data: Site Code Value
- 5.3.10 Mag-stripe: Site Code Field Length
- 5.3.11 Mag-stripe: Site Code Value
- 5.3.16 Wiegand: Site Code Field Length
- 5.3.17 Wiegand: Site Code Value

A Site code is used in some access control systems for separating different sites or facilities. The site code is an arbitrary number that is set in the Reader application software. The site code is optional and sent together with the ID-tag mark to an access control system or to a host computer.

The field that the site code occupies in a sent message is of fixed length. The field length is configured in the Reader application software and is set so that it is large enough to hold the actual site code.

If the field length is larger than the space occupied by the site code, the site code will be preceded by zeros. If the field length is smaller than the space occupied by the site code, the site code will be truncated and the most significant digits will be omitted.

Note that the field size sets an upper limit for the value of the site code. To omit the site code from the message, set the field length to 0.

Site code size and field length are expressed as number of digits when using Mag-stripe and serial data formats, as exemplified in the table below.

Table 4 Site code example using Mag-stripe and serial data formats.

Site Code value	Site Code Size	Site Code Field length	Site Code as Sent by PassMan
3381	4 digits (3381)	4 digits	3381
		6 digits	003381

Site code size and field length are expressed as number of bits when using Wiegand data format, as exemplified in the table below.

Table 5 Site code example using Wiegand data format

Site Code value	Site Code Size	Site Code Field Length	Site Code as Sent by PassMan
3381	12 bits (110100110101)	12 bits	110100110101
		14 bits	00110100110101

3.2 ID-tag Mark

The ID-tag mark is applicable to the PassMan settings described in the following sections:

- 5.3.2 ID-tag Mark and Site Code Send To
- 5.3.3 Serial Data: ID-tag Mark Field Length
- 5.3.4 Serial Data: ID-tag Mark Used Number of
- 5.3.9 Mag-stripe: ID-tag Mark Used Number of
- 5.3.10 Mag-stripe: Site Code Field Length
- 5.3.14 Wiegand: ID-tag Mark Field Length
- 5.3.15 Wiegand: ID-tag Mark Used Number of Bits

The ID-tag mark is the unique identification number stored in every ID-tag, typically consisting of eight digits. The ID-tag mark is transmitted to the Reader when the ID-tag is read. The ID-tag mark is formatted by the PassMan software before being forwarded to the access control system or the host computer.

The field that the ID-tag mark occupies in a sent message is of fixed length. The whole ID-tag mark stored in the ID-tag is not necessarily used in the message sent to the host computer or the access control system. The field length is configured in the Reader application software and is set so that it is large enough to hold the desired size of the ID-tag mark. The size of the ID-tag mark forwarded from the Reader is configured in the Reader application software and can be smaller than the original ID-tag mark.

If the field length is larger than the space occupied by the ID-tag mark, the ID-tag mark will be preceded by zeros. If the field length is smaller than the space occupied by the ID-tag mark, the ID-tag mark will be truncated and the most significant digits will be omitted.

The field length is expressed as number of digits when using Mag-stripe and serial data formats, as exemplified in the table below.

Table 6   ID-tag mark example using Mag-stripe and serial data formats

Original ID-tag Mark Expressed with Digits	Used Number of Digits	Field Length	ID-tag Mark as Sent by the Reader
12343985	8 digits	8 digits	12343985
	5 digits	5 digits	43985
	5 digits	7 digits	0043985

The field length is expressed as number of bits when using the Wiegand data format, as exemplified in the table below.

Table 7   ID-tag mark example using Wiegand data format

Original ID-tag Mark Expressed with Bits	Used Number of Bits	Field Length	ID-tag Mark as Sent by the Reader
101111000101101010110001	24 bits	24 bits	101111000101101010110001
	16 bits	16 bits	0101101010110001
	16 bits	20 bits	00000101101010110001

Note that the ID-tag mark represented by bits will result in entirely different decimal values depending on the used number of bits. For instance, the bit sequence 101111000101101010110001 has the decimal value 12343985 and the truncated bit sequence 0101101010110001 has the decimal value 23217.

3.3 Mag-stripe Message Format

The PassMan system supports the following Mag-stripe formats:

- Read-only MarkTag: 5-26 digits. Site code in Reader.
- Read-write ScriptTag: 2-18 digits. Site code in tag.

The Mag-stripe message format is applicable to the PassMan settings described in the following sections:

- 5.3.12 Mag-stripe: Leading Zero Bits
- 5.3.13 Mag-stripe: Trailing Zero Bits

The messages sent over the Mag-stripe interface is enclosed by leading and trailing zero bits, which are used by the access control system for synchronisation. The number of leading zero bits and the number of trailing zero bits are configured in the Reader application software.

The Mag-stripe protocol format organises the data in groups of five bits called sentinels, four data bits and one parity bit. A sentinel is transmitted with the least significant bit first and the parity bit last.

Each sentinel represents a digit of the ID-tag data or a control character, which can have values in the range 0_{Hex}–F_{Hex}.

Sentinels with special meaning in the Mag-stripe message format are:

- B_{Hex} represents start
- D_{Hex} represents field separator
- F_{Hex} represents stop

If PassMan is configured to send the optional site code and ID-tag mark to the access control system, then the message is structured as shown in the figure below.

Leading zero bits	Optional site code	ID-tag mark	Trailing zero bits

Figure 6 Mag-stripe message format sending site code and ID-tag mark

The ID-tag user data consists of two fields when using the Mag-stripe data format, an optional constant field and a number field. If PassMan is configured to send ID-tag user data to the access control system, then the message is structured as shown in the figure below.

Leading zero bits	Optional constant field	Number field	Trailing zero bits

Figure 7 Mag-stripe message format sending ID-tag user data

3.4 Wiegand Message Format

The PassMan system supports the following Wiegand formats:

- Read-only MarkTag: 18-50 bits. Site code in Reader.
- Read-write ScriptTag: 26-50 bits. Site code in tag.

The Wiegand message format is applicable to the PassMan settings described in the following sections:

- 5.3.18 Wiegand: First Parity Bit Type
- 5.3.19 Wiegand: Last Parity Bit Type
- 5.3.20 Wiegand: First Parity Bit Range
- 5.3.21 Wiegand: Last Parity Bit Range

The ID-tag data is enclosed by a first and a last parity bit when using the Wiegand data format. The two parity bits are calculated over two separate bit ranges of the message, which are defined when configuring the PassMan software.

The first parity bit is calculated over a range from the second bit to a defined position in the message. The last parity bit is calculated over a range from a defined position in the message to the second-last bit of the message.

Note that the total length of the message is the sum of the ID-tag mark field length and the site code field length plus two bits (the first and the last parity bits).

If PassMan is configured to send the optional site code and ID-tag mark to the access control system, then the message is structured as shown in the figure below.

First parity bit	Optional site code	ID-tag mark	Last parity bit

Figure 8 Wiegand message format sending site code and ID-tag mark

The ID-tag user data consists of three number fields when using Wiegand data format. The first and last parity bits can be omitted when sending the ID-tag user data.

If PassMan is configured to send ID-tag user data to the access control system, then the message is structured as shown in the figure below.

First parity bit	First number	Second number	Third number	Last parity bit

Figure 9 Wiegand message format sending ID-tag user data

3.5 Serial Message Format

The serial message format is applicable to the PassMan settings described in the following sections:

- 5.2.13 Serial Interface Message Terminator
- 5.2.14 Serial Interface Message Frame
- 5.3.1 ID-tag User Data Send To
- 5.3.7 Serial Data: ID-tag User Data Format

The message sent over the RS485 serial communication interface consists in its most rudimentary form of the site code and ID-tag mark or data format descriptor and ID-tag user data.

If PassMan is configured to send the site code and ID-tag mark to the host computer, then the message is structured as shown in the figure below.

Optional site code	ID-tag mark

Figure 10 Serial message format sending site code and ID-tag mark

A data format descriptor is included when sending the ID-tag user data over RS485 interface. The data format descriptor is two ASCII characters that indicate the format of the ID-tag user data. (See Table 3 in section 2.3 ID-tag Data for a complete listing of the available data formats.)

If PassMan is configured to send ID-tag user data to the host computer, then the message is structured as shown in the figure below.

Data format descriptor	ID-tag user data

Figure 11 Serial message format sending ID-tag user data

3.5.1 Optional Message Frame

An optional message frame containing the ASCII characters Start of Text (STX), ASCII character End of Text (ETX), and a checksum can be used to enclose the basic message as shown in Figure 12 and Figure 13.

To ensure integrity of the sent data a checksum is calculated and included in the message frame before the ETX control character. The checksum is an XOR-calculation of all bytes from STX to the last byte in the ID-tag data. A hexadecimal value 00–FF is used to represent the checksum, which is sent as two ASCII characters over the RS485 interface. The first character in the checksum is referred to as CS1 and the second character in the checksum is referred to as CS2.

STX	Optional site code	ID-tag mark	CS1	CS2	ETX

Figure 12 Serial message format sending site code and ID-tag mark with the message frame highlighted in grey

STX	Data format descriptor	ID-tag user data	CS1	CS2	ETX

Figure 13 Serial message format sending ID-tag user data with the message frame highlighted in grey

3.5.2 Optional Message Terminator

An optional message terminator containing the ASCII character Carriage Return (CR) followed by the ASCII character Line Feed (LF) can be put at the end of the message. The message terminator or the message frame, or both, can be used.

STX	Site code	ID-tag mark	CS1	CS2	ETX	Message terminator

Figure 14 Serial message format sending site code and ID-tag data mark with message frame and message terminator highlighted in grey

STX	Format descriptor	ID-tag user data	CS1	CS2	ETX	Message terminator

Figure 15 Serial message format sending site code and ID-tag data mark with message frame and message terminator highlighted in grey

3.5.3 ID-tag User Data in Bytes or Nibbles

The ID-tag user data can include bytes that do not generate printable characters when displayed in a terminal emulator connected to the RS485 interface.

It is possible to inspect the ID-tag user data by transmitting the information as 4-bit nibbles converted to ASCII instead of standard 8-bit ASCII.

The bit sequence 00001000 (decimal value 8), for instance, represents the ASCII character backspace, which will corrupt the output in the terminal emulator if sent as 8-bit ASCII. The same bit sequence represented by two 4-bit nibbles generates the bit sequences 0000 (decimal value 0) and 1000 (decimal value 8), which will be converted and sent as the ASCII characters “0” followed by “8”.

4 Serial Communication Commands

This section describes general commands, which are used for communication between a host computer and a Reader over the serial communication interface.

In addition to the transmitted ID-tag data, a host computer can communicate with a Reader installed with PassMan software by sending and receiving commands over the RS485 interface.

The message terminator is enabled or disabled as described in section 5.2.13. The message frame described in section 5.2.14 is always present in the serial communication commands, regardless of the current configuration settings.

The sections below describe the commands, their structure, and the responses to the commands.

The convention used to specify the syntax of the commands and the responses are as follows:

- Printable characters are written as they appear in the messages.
- Non-printable characters and user-defined values are written with a short description enclosed by angle brackets.
- Optional characters and optional parts of a message are enclosed in square brackets.

4.1 Commands Sent from the Host to the Reader

Commands can be sent from the host to the Reader. The Reader responds with a control character depending on weather or not the command sent from the host is accepted.

An Acknowledgement (ACK) ASCII character is returned if the reader accepts the sent command, and an Negative Acknowledgement (NAK) ASCII character is returned if the reader does not accept the sent command.

4.1.1 Repeat Last ID-tag Command

This command will cause the Reader to repeat the last ID-tag related message.

To distinguish a repeated message from an original ID-tag related message, the repeated message is preceded by the ASCII character Data Link Escape (DLE). The Reader sends a Cancel (CAN) ASCII character if there is no message to repeat.

Table 8 Repeat last ID-tag command

Description	**Syntax**
Command structure	`<STX>RL1C<ETX>[<CR><LF>]`
Normal response	`<DLE>[ID-tag data>] or` `<DLE><STX>[<ID-tag data>]<Checksum><ETX>[<CR><LF>]`
No message to repeat response	`<STX><CAN>1A<ETX>[<CR><LF>]`

NAK response	<STX><NAK>17<ETX>[<CR><LF>]

4.1.2 Activate Function Set 1 Command

This command will result in the same function as when the Reader input 1 is activated according to the setting described in section 5.2.18 Function on Input 1.

Table 9 Active function set 1 command

Description	Syntax
Command structure	<STX>B171<ETX>[<CR><LF>]
ACK response	<STX><ACK>04<ETX>[<CR><LF>]
NAK response	<STX><NAK>17<ETX>[<CR><LF>]

4.1.3 Close Function Set 1 Command

This command will result in the same function as when the Reader input 1 is made passive.

Table 10 Close function set 1 command

Description	Syntax
Command structure	<STX>E176<ETX>[<CR><LF>]
ACK response	<STX><ACK>04<ETX>[<CR><LF>]
NAK response	<STX><NAK>17<ETX>[<CR><LF>]

4.1.4 Activate Function Set 2 Command

This command will result in the same function as when the Reader input 2 is activated according to the setting described in section 5.2.19 Function on Input 2.

Table 11 Active function set 2 command

Description	Syntax
Command structure	<STX>B272<ETX>[<CR><LF>]
ACK response	<STX><ACK>04<ETX>[<CR><LF>]
NAK response	<STX><NAK>17<ETX>[<CR><LF>]

4.1.5 Close Function Set 2 Command

This command will result in the same function as when the Reader input 2 is made passive.

Table 12 Close function set 2 command

Description	Syntax
Command structure	<STX>E275<ETX>[<CR><LF>]
ACK response	<STX><ACK>04<ETX>[<CR><LF>]
NAK response	<STX><NAK>17<ETX>[<CR><LF>]

4.1.6 Motion Detection Start Command

This command activates the motion detection function in the Reader.

Table 13 Motion detection start command

Description	Syntax
Command structure	<STX>MA0E<ETX>[<CR><LF>]
ACK response	<STX><ACK>04<ETX>[<CR><LF>]
NAK response	<STX><NAK>17<ETX>[<CR><LF>]

4.1.7 Motion Detection Stop Command

This command deactivates the motion detection function in the Reader.

Table 14 Motion detection stop command

Description	Syntax
Command structure	<STX>MS1C<ETX>[<CR><LF>]
ACK response	<STX><ACK>04<ETX>[<CR><LF>]
NAK response	<STX><NAK>17<ETX>[<CR><LF>]

4.2 Messages sent from the Reader to the Host

Messages are sent from the Reader to the Host when events occur.

4.2.1 Motion Detection Message

A motion detection message is sent to the host computer when the Reader detects a moving object and the motion detection is activated.

Table 15 Motion detection message

Description	Syntax
Message structure	<STX>MO00<ETX>[<CR>LF>]

4.2.2 Loop Trigger Input Is Activated Message

This message is sent to the host computer when the isolated input 3 is activated and the loop trigger is enabled according to section 5.2.20 Loop Trigger Duration on Input 3.

Table 16 Loop Trigger Input Is Activated Message

Description	Syntax
Message structure	<STX>LA0F<ETX>[<CR><LF>]

4.2.3 Loop Trigger Input Becomes Inactive Message

This message is sent to the host computer when input 3 becomes inactive and the loop trigger is enabled according to section 5.2.20 Loop Trigger Duration on Input 3.

Table 17 Loop trigger input becomes inactive message

Description	**Syntax**
Message structure	`<STX>LP1E<ETX>[<CR><LF>]`

5 Configuration

This section describes the available configuration settings in the PassMan software and how to change them.

The configuration settings are divided into two general groups. The “System Settings” group covers reading performance, operating logic, and communication interfaces. The “ID-tag Settings” group covers how the Reader formats information transmitted from the ID-tags before it is forwarded to an access control system or a host computer.

The Reader can be configured using a temporarily connected PC via the web interface or the terminal interface. For backwards compatibility it is also possible to configure the Reader via the RS232 interface.

5.1 Configuration Interfaces

5.1.1 Web/Terminal Interfaces

Connect to the web interface or terminal interface as described in “GEN4 Reader User’s Manual”. PassMan settings are available under Settings…/Applications…/PassMan.

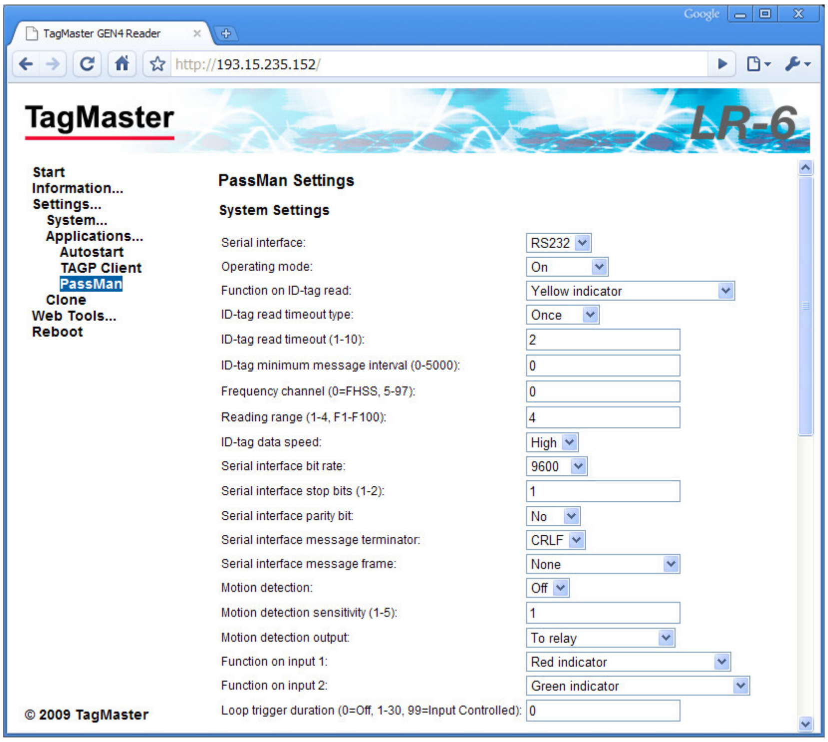

Figure 16 Web interface with PassMan settings

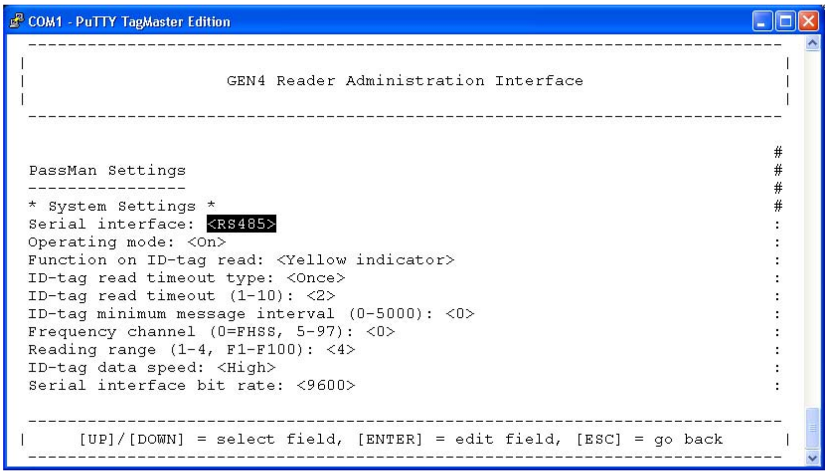

Figure 17 Terminal interface with PassMan settings

5.1.2 PassMan's Terminal Interface

For backwards compatibility reasons the PassMan application is provided with a custom text-based interface for configuration. This interface can be used in parallel to the web interface and the terminal interface.

Perform the configuration as follows:

1. Connect the RS232 interface of the Reader to the serial port of the PC with a RS232 cable.
2. Configure the terminal emulator so that the communication settings are as follows:
    a. 9600 baud
    b. 8 data bits
    c. No parity
    d. 1 stop bit
    e. No flow control
3. Open a connection from the terminal emulator to the Reader. The main menu will be displayed.

```
PassMan v1.6.0
A. System settings menu
B. ID-tag settings menu

Your choice (A or B): A
```

4. Type "A" to display the system settings menu.

```
PassMan v1.6.0 - System settings menu:
 A. Serial interface (RS485)
 B. Operating mode (On)
 C. Function on ID-tag read (Yellow indicator)
 D. ID-tag read timeout type (Once)
 E. ID-tag read timeout (2)
 F. ID-tag minimum message interval (0)
 G. Frequency channel (0)
 H. Reading range (4)
 I. ID-tag data speed (High)
 J. Serial interface bit rate (9600)
 K. Serial interface stop bits (1)
 L. Serial interface parity bit (No)
 M. Serial interface message terminator (CRLF)
 N. Serial interface message frame (None)
 O. Motion detection (Off)
 P. Motion detection sensitivity (1)
 Q. Motion detection output (To relay)
 R. Function on input 1 (Red indicator)
 S. Function on input 2 (Green indicator)
 T. Loop trigger duration (0)

Your choice (A-T):
```

5. Each setting in the system settings menu is represented by a character and a short description. The current value is displayed at the end of the row enclosed in parentheses. Type a character to configure the corresponding setting. A submenu will be displayed.

   Tip: In case of a type error, press backspace or enter to return to the main menu.

6. Depending on the setting, the options in the submenus are set in two different ways:
   a. Options of character type are set by typing a character as seen in the example below:

      ```
      Possible values for ID-tag data speed:
      A. High
      B. Low
      Your choice: B
      ```

   b. Options of numeric types are set by typing a numeric value followed by enter as seen in the example below:

      ```
      Possible values for Frequency channel: 0=FHSS, 5 - 97
      Your choice: 75
      ```

7. Return to the main menu by pressing enter.

```
PassMan v1.6.0
A. System settings menu
B. ID-tag settings menu

Your choice (A or B): B
```

8. Type “B” to display the ID-tag settings menu.

```
PassMan v1.6.0 - Tag settings menu:
 A. ID-tag user data send to (Disable)
 B. ID-tag mark and site code send to (Wiegand and serial interfaces)
 C. Serial data: ID-tag mark field length (8)
 D. Serial data: ID-tag mark number of digits (8)
 E. Serial data: Site code field length (0)
 F. Serial data: Site code value (0)
 G. Serial data: ID-tag user data format (As 8-bit ASCII bytes)
 H. Mag-stripe: ID-tag mark field length (9)
 I. Mag-stripe: ID-tag mark number of digits (9)
 J. Mag-stripe: Site code field length (6)
 K. Mag-stripe: Site code value (0)
 L. Mag-stripe: Leading zero bits (25)
 M. Mag-stripe: Trailing zero bits (25)
 N. Wiegand: ID-tag mark field length (24)
 O. Wiegand: ID-tag mark used number of bits (24)
 P. Wiegand: Site code field length (0)
 Q. Wiegand: Site code value (0)
 R. Wiegand: First parity bit type (Even)
 S. Wiegand: Last parity bit type (Odd)
 T. Wiegand: First parity bit range (13)
 U. Wiegand: Last parity bit range (14)

Your choice (A-U):
```

9. Type a character to change the options for the corresponding setting in the same manner as in the system settings menu described above.
10. A setting is automatically sent to the Reader when an option is configured. A short beep indicates that a valid setting has been saved.

5.2 System Settings

The subsections below describe the different settings that can be configured in the system settings group. The default value for each setting is written within parentheses.

For a chart of the controller board with input and output connections mentioned below, see the LR-series Installation Manual [2].

5.2.1 Serial Interface

PassMan uses either RS485 (default) or RS232 as serial interface to a host computer. The other interface is used for the text-based configuration interface that is described in section 5.1.2.

Table 18 Serial interface setting

Setting	Option	Description
A. Serial Interface (RS485)	A. RS232	RS232 is used as serial interface to host computer. RS485 is used as

		configuration interface.
	B. RS485	RS485 is used as serial interface to host computer. RS232 is used as configuration interface.

5.2.2 Operating Mode

The PassMan software has two operating modes. Beside normal operation, there is an operating mode used for testing purposes.

Table 19 Operating mode setting

Setting	Option	Description
B. Operating mode (On)	A. On	The Reader is ready to read ID-tags and to automatically send ID-tag data over the communication interfaces.
	B. Read test	The Reader beeps and the externally-visible indicator flashes every time an ID-tag is read. This mode is used for testing the reading capabilities.

5.2.3 Function on ID-tag Read

The Reader can perform different functions when an ID-tag is read.

Table 20 Function on ID-tag read setting

Setting	Option	Description
C. Function on ID-tag read (Yellow indicator)	A. Buzzer	The buzzer beeps when an ID-tag is read.
	B. Yellow indicator	The externally-visible indicator flashes yellow when an ID-tag is read.
	C. Relay	The relay is pulled when an ID-tag is read.
	D. Yellow indicator & relay	The externally-visible indicator flashes yellow and the relay is pulled when an ID-tag is read.
	E. Buzzer & relay	The buzzer beeps and the relay is pulled when an ID-tag is read.
	F. Buzzer & yellow indicator	The buzzer beeps and the externally-visible indicator flashes yellow when an ID-tag is read.
	G. Buzzer, yellow indicator, & relay	The buzzer beeps, the externally-visible indicator flashes yellow, and the relay is pulled when an ID-tag is read.
	H. None	The Reader does nothing when an ID-tag is read.

5.2.4 ID-tag Read Timeout Type

A read timeout type is set in order not to flood the access control system or host computer with reported ID-tag readings. The reporting of ID-tags is also affected by the time interval set according to section 5.2.5 ID-tag Read Timeout.

Table 21 ID-tag read timeout type setting

Setting	Option	Description
`D. ID-tag read timeout type (Once)`	`A. Once`	The Reader automatically sends the ID-tag data once over the communication interfaces.
	`B. Periodic`	The Reader automatically sends the ID-tag data periodically over the communication interfaces.

5.2.5 ID-tag Read Timeout

If the Reader is set to forward ID-tag data *once*, the timeout specifies for how long the ID-tag has to be withdrawn from the reading lobe to achieve an additional report. If the Reader is set to forward ID-tag data *periodically*, the timeout specifies the time between recurring reports.

Table 22 ID-tag read timeout setting

Setting	Option	Description
`E. ID-tag read timeout (2)`	`1–10`	Timeout time in 1–10 seconds is used.

5.2.6 ID-tag Minimum Message Interval

If multiple ID-tags are read simultaneously the ID-tag message rate may be too high for some host systems. This parameter sets the minimum time between the start of two adjacent ID-tag messages sent by the PassMan software. The parameter is valid for all interfaces.

Table 23 ID-tag minimum message interval setting

Setting	Option	Description
`F. ID-tag minimum message interval (0)`	`0–5000`	Minimum time in milliseconds between the start of two adjacent ID-tag messages send by PassMan.

5.2.7 Frequency Channel

Set Readers in close proximity to each other to different frequency channels to reduce the risk of interference, or use Frequency-Hopping Spread Spectrum (FHSS).

Frequency hopping in PassMan is limited to sub-bands G-L (2.4320GHz -2.4618GHz).

Table 24 Frequency channel setting

Setting	Option	Description
`G. Frequency`	`0`	FHSS is used.

channel (0)	5–97	Frequency channel 5–97 is used.

5.2.8 Reading Range

The reading range can be controlled to avoid unwanted readings of remote ID-tags.

Table 25 Reading range setting

Setting	Option	Description
H. Reading range (4)	1	The reading range is set to approximately 25% of the maximum reading range (equivalent to F1).
	2	The reading range is set to approximately 50% of the maximum reading range (equivalent to F33).
	3	The reading range is set to approximately 75% of the maximum reading range (equivalent to F66).
	4	The reading range is set to maximum (equivalent to F100).
	F1–F100	Fine tuning of reading range (F1 = min, F100 = max).

5.2.9 ID-tag Data Speed

ID-tags send information to the Reader in high or low data speed. Set the Reader to the data speed supported by the ID-tag.

Note: Never mix ID-tag data speeds by using high for the Reader and low for the ID-tag or vice versa; in such cases the ID-tag will not be read.

Table 26 Reading ID-tag data speed setting

Setting	Option	Description
I. ID-tag data speed (High)	A. High	High data speed
	B. Low	Low data speed

5.2.10 Serial Interface Bit Rate

The RS485 serial interface supports several bit rates.

Table 27 RS485 Interface bit rate setting

Setting	Option	Description
J. Serial interface bit rate (9600)	A. 1200	1200 bps
	B. 2400	2400 bps
	C. 4800	4800 bps
	D. 9600	9600 bps
	E. 19200	19200 bps

	F. 38400	38400 bps

5.2.11 Serial Interface Stop Bits

The number of stop bits can be either one or two.

Table 28 RS485 interface stop bits setting

Setting	Option	Description
K. Serial interface stop bits (1)	1	One stop bit
	2	Two stop bits

5.2.12 Serial Interface Parity Bit

A parity bit is used as a simple error detecting code in the serial communication.

Table 29 RS485 interface parity setting

Setting	Option	Description
L. Serial interface parity bit (No)	A. No	No parity bit is used.
	B. Odd	The parity bit is set to 1 if the number of ones in a given set of bits is even (making the number of ones odd).
	C. Even	The parity bit is set to 1 if the number of ones in a given set of bits is odd (making the number of ones even).

5.2.13 Serial Interface Message Terminator

Messages sent over the RS485 interface can, as an option be terminated with the ASCII character Carriage Return (CR) followed by the ASCII character Line Feed (LF).

Table 30 RS485 interface message terminator setting

Setting	Option	Description
M. Serial interface terminator (CRLF)	A. CRLF	Messages from the Reader to the host are terminated with CR followed by LF.
	B. None	Message terminator is disabled.

5.2.14 Serial Interface Message Frame

ID-tag data sent over the RS485 interface can, as an option be enclosed by a message frame consisting of the ASCII character Start of Text (STX) and a checksums consisting of two characters (CS1 and CS2) followed by the ASCII character End of Text (ETX).

Table 31 RS485 interface message frame

Setting	Option	Description
N. Serial interface message frame (None)	A. STX ... CS1 CS2 ETX	Message frame consisting of STX, CS1, and CS2 followed by ETX is used.
	B. None	Message frame is not used.

5.2.15 Motion Detection

The Reader makes use of the Doppler effect to discover moving objects.

If motion detection is enabled, the sensitivity level is set according to the section 5.2.16 and an output can be activated according to the setting described in section 5.2.17.

Table 32 Motion detection setting

Setting	Option	Description
`O. Motion detection (Off)`	`A. On`	Motion detection is enabled.
	`B. Off`	Motion detection is disabled.

5.2.16 Motion Detection Sensitivity

The sensitivity level of the motion detection is valid when motion detection functionality is enabled.

Table 33 Motion detection sensitivity setting

Setting	Option	Description
`P. Motion detection sensitivity (1)`	`1–5`	Sensitivity level 1–5.

5.2.17 Motion Detection Output

Several outputs can be activated if the Reader detects a moving object. Motion detection output is only valid when motion detection functionality is enabled according to section 5.2.15.

Table 34 Motion detection output setting

Setting	Option	Description
`Q. Motion detection output (To relay)`	`A. To relay`	The relay is pulled.
	`B. To output 1`	The isolated output 1 is activated.
	`C. To output 2`	The isolated output 2 is activated.
	`D. No output connection`	No output is generated.

5.2.18 Function on Input 1

The Reader can generate different outputs when the isolated input 1 is activated.

Table 35 Function on Input 1 setting

Setting	Option	Description
R. Function on input 1 (Red indicator)	A. Buzzer	The buzzer beeps.
	B. Green indicator	The externally-visible indicator is green.
	C. Red indicator	The externally-visible indicator is red.
	D. Relay	The relay is pulled.
	E. Green indicator & relay	The externally-visible indicator is green and the relay is pulled.
	F. Red indicator & relay	The externally-visible indicator is red and the relay is pulled.
	G. Buzzer & relay	The buzzer beeps and the relay is pulled.
	H. Buzzer & green indicator	The buzzer beeps and the externally-visible indicator is green.
	I. Buzzer & red indicator	The buzzer beeps and the externally-visible indicator shows red.
	J. Buzzer, green indicator, & relay	The buzzer beeps, the externally-visible indicator is green, and the relay is pulled.
	K. Buzzer, red indicator, & relay	The buzzer beeps, the externally-visible indicator is red, and the relay is pulled.
	L. None	No output is generated.

5.2.19 Function on Input 2

The Reader can generate different outputs when the isolated input 2 is activated.

Table 36 Function on input 2 setting

Setting	Option	Description
`S. Function on input 2 (Green indicator)`	`A. Buzzer`	The buzzer beeps.
	`B. Green indicator`	The externally-visible indicator is green.
	`C. Red indicator`	The externally-visible indicator is red.
	`D. Output 1`	The isolated output 1 is activated.
	`E. Green indicator & output 1`	The externally-visible indicator is green and isolated output 1 is activated.
	`F. Red indicator & output 1`	The externally-visible indicator is red and isolated output 1 is activated.
	`G. Buzzer & output 1`	The buzzer beeps and the isolated output 1 is activated.
	`H. Buzzer & green indicator`	The buzzer beeps and the externally-visible indicator is green.
	`I. Buzzer & red indicator`	The buzzer beeps and the externally-visible indicator is red.
	`J. Buzzer, green indicator, & relay`	The buzzer beeps, the externally-visible indicator is green, and the relay is pulled.
	`K. Buzzer, red indicator, & relay`	The buzzer beeps, the externally-visible indicator is red, and the relay is pulled.
	`L. None`	No output is generated.

5.2.20 Loop Trigger Duration on Input 3

In situations when the reading function should be active only if a vehicle is approaching, a loop trigger is used. A loop detector can be connected to the isolated input 3 and used to trigger the reading of ID-tags.

Table 37 Loop trigger duration on input 3 setting

Setting	Option	Description
`T. Loop trigger duration on input 3 (0)`	`0`	Isolated input 3 is disabled.
	`1-30`	When the loop detector triggers the Reader on input 3, the externally-visible indicator shows a yellow light and the reading of ID-tags is activated for 1–30 seconds. The reading of ID-tags becomes inactive when the time has elapsed or an ID-tag has been read.
	`99`	Input controlled. When the loop detector triggers the Reader on input 3, the externally-visible indicator shows a yellow light and the reading of ID-tags is activated. The reading of ID-tags becomes inactive when input 3 is deactivated or an ID-tag has been read.

5.3 ID-tag Settings

The subsections below describe the separate settings that can be configured in the ID-tag settings menu. The corresponding tables include the options as they are displayed in the terminal emulation software.

5.3.1 ID-tag User Data Send To

Different formats of ID-tag user data can be sent to separate communication interfaces.

Table 38 ID-tag user data send to setting

Setting	Option	Description
`A. ID-tag user data send to (Disable)`	`A. All data to serial interface and WI/MC/OL data to Wiegand/Mag-stripe interface`	All ID-tag user data is sent to the RS485 interface. Wiegand, Mag-stripe, and previous Mag-stripe format data is sent to the Wiegand/Mag-stripe interface.
	`B. All data to serial interface`	All ID-tag user data is sent to the RS485 interface.
	`C. FU/QU/MI data to serial`	Full size, quarter size and mini size serial data is sent to the RS485 interface. Wiegand, Mag-stripe, and

	interface and WI/MC/OL data to Wiegand/Mag-stripe interface	previous Mag-stripe format data is sent to the Wiegand/Mag-stripe interface.
	D. FU/QU/MI data to serial interface	Full size, quarter size and mini size serial data is sent to the RS485 interface.
	E. WI/MC/OL data to serial interface and to Wiegand/Mag-stripe interface	Wiegand, Mag-stripe, and previous Mag-stripe format data is sent to RS485 interface and the Wiegand/Mag-stripe interface.
	F. WI/MC/OL data to Wiegand/Mag-stripe interface	Wiegand, Mag-stripe, and previous Mag-stripe format data is sent to the Wiegand/Mag-stripe interface.
	G. WI/MC/OL data to serial interface	Wiegand, Mag-stripe, and previous Mag-stripe format data is sent to the RS485 interface.
	H. Disable	ID-tag user data is not sent.

5.3.2 ID-tag Mark and Site Code Send To

The ID-tag data can be sent using separate communication interfaces and data formats.

Table 39 ID-tag mark and site code send to setting

Setting	Option	Description
B. ID-tag mark and site code send to (Wiegand and serial interfaces)	A. Mag-stripe and serial interface	ID-tag data is sent to the Wiegand/Mag-stripe interface and RS485 interface as Mag-stripe data.
	B. Wiegand and serial interface	ID-tag data is sent to the Wiegand/Mag-stripe interface and RS485 interface as Wiegand data.
	C. Mag-stripe interface	ID-tag data is sent to the Wiegand/Mag-stripe interface as Mag-stripe data.
	D Wiegand interface	ID-tag data is sent to the Wiegand/Mag-stripe interface as Wiegand data.
	E Serial interface	ID-tag data is sent to RS485 interface.

	F Disable	ID-tag data is not sent.

5.3.3 Serial Data: ID-tag Mark Field Length

The ID-tag mark field length is expressed as number of digits when using serial data. Configure the used number of digits of the ID-tag mark according to section 5.3.4, so that the field length is large enough to hold the number of used digits.

Table 40 ID-tag mark and site code as serial data: ID-tag mark field setting

Setting	Option	Description
C. Serial data: ID-tag mark field length (8)	5-20	The ID-tag mark field length is 5–20 digits.

5.3.4 Serial Data: ID-tag Mark Used Number of Digits

The used number of digits from the original ID-tag mark is set.

Table 41 Serial data: ID-tag mark used number of digits setting

Setting	Option	Description
D. Serial data: ID-tag mark used number of digits (8)	5-20	The ID-tag mark occupies 5–20 digits.

5.3.5 Serial Data: Site Code Field Length

The site code field length is expressed as number of digits when using serial data. Set the site code value according to section 5.3.6, so that the field length is large enough to hold the site code value.

Set the site code field length to zero to omit the site code from the sent message.

Table 42 Serial data: site code field length setting

Setting	Option	Description
E. Serial data: Site code field length (0)	0-6	The site code field length is 0–6 digits.

5.3.6 Serial Data: Site Code Value

The site code value is expressed in digits when using serial data.

Table 43 Serial data: site code value setting

Setting	Option	Description
F. Serial data: Site code value (0)	0-65535	The site code value is 0–65535.

5.3.7 Serial Data: ID-tag User Data Format

The ID-tag user data in ScriptTags is normally sent as 8-bit ASCII. The ID-tag user data can also be sent in groups of four bits with their hexadecimal value converted to 8-bit ASCII. The latter is used for debugging.

Table 44 Serial data: ID-tag user data format

Setting	Option	Description
`G. Serial data: ID-tag user data format (As 8-bit ASCII bytes)`	`A. As 8-bit ASCII bytes`	The ID-tag user data is sent as 8-bit ASCII over the RS485 interface.
	`B. AS 4-bit ASCII nibbles`	The ID-tag used data is sent over the RS485 interface in groups of four bits and converted to 8-bit ASCII.

5.3.8 Mag-stripe: ID-tag Mark Field Length

The ID-tag mark field length is expressed as number of digits when using Mag-stripe data. Configure the used number of digits of the ID-tag mark according to section 5.3.9, so that the field length is large enough to hold the used number of digits.

Table 45 Mag-stripe: ID-tag mark field length setting

Setting	Option	Description
`H. Mag-stripe: ID-tag mark field length (9)`	`5-20`	The ID-tag mark field length is 5–20 digits.

5.3.9 Mag-stripe: ID-tag Mark Used Number of Digits

The used number of digits from the original ID-tag mark is expressed as number of digits when using Mag-stripe data.

Table 46 Mag-stripe: ID-tag mark used number of digits setting

Setting	Option	Description
`I. Mag-stripe: ID-tag mark used number of digits (9)`	`5-20`	The ID-tag mark occupies 5–20 digits.

5.3.10 Mag-stripe: Site Code Field Length

The site code field length is expressed as number of digits when using Mag-stripe data. Set the site code value according to section 5.3.11, so that the field length is large enough to hold the site code value.

Set the site code field length to zero to omit the site code from the sent message.

Table 47 Mag-stripe data: Site code field length setting

Setting	Option	Description
`J. Mag-stripe: Site code length (6)`	`0-6`	The site code field length is 0–6 digits.

5.3.11 Mag-stripe: Site Code Value

The site code value is expressed in digits when using serial data.

Table 48 Mag-stripe: Site code value setting

Setting	Option	Description
`K. Mag-stripe: Site code value (0)`	`0-65535`	The site code value is 0–65535.

5.3.12 Mag-stripe: Leading Zero Bits

Leading zero bits precede the ID-tag mark and the site code when using Mag-stripe data format.

Table 49 Mag-stripe: Leading zero bits setting

Setting	Option	Description
`L. Mag-stripe: Leading zero bits (25)`	`0-100`	0–100 zero bits precede the ID-tag data.

5.3.13 Mag-stripe: Trailing Zero Bits

Trailing zero bits follow the ID-tag mark and the site code when using Mag-stripe data format.

Table 50 Mag-stripe: Trailing zero bits setting

Setting	Option	Description
`M. Mag-stripe: Trailing zero bits (25)`	`0-100`	0–100 zero bits follow the ID-tag data.

5.3.14 Wiegand: ID-tag Mark Field Length

The ID-tag mark field length is expressed as number of bits when using Wiegand data. Configure the used number of bits of the ID-tag mark according to section 5.3.15, so that the field length is large enough to hold the used number of bits.

Table 51 Wiegand: ID-tag mark field length setting

Setting	Option	Description
`N. Wiegand: ID-tag mark field length (24)`	`16-32`	The ID-tag mark field length is 16–32 bits.

5.3.15 Wiegand: ID-tag Mark Used Number of Bits

The used number of bits from the original ID-tag mark is set.

Table 52 ID-tag mark and site code as Wiegand data: ID-tag mark used number of bits setting

Setting	Option	Description
`O. Wiegand: ID-`	`16-32`	The ID-tag mark occupies 16–32 bits.

tag mark used number of bits (24)		

5.3.16 Wiegand: Site Code Field Length

The site code field length is expressed as number of bits when using Wiegand data. Set the site code value according to section 5.3.17, so that the field length is large enough to hold the site code value.

Set the site code field length to zero to omit the site code from the sent message.

Table 53 Wiegand: Site code field length setting

Setting	Option	Description
P. Wiegand: Site code field length (0)	0-16	The site code field length is 0–16 bits.

5.3.17 Wiegand: Site Code Value

The site code value is entered as digits when using Wiegand data, but the site code is treated as a binary value when defining the field length according to section 5.3.16.

Table 54 Wiegand: Site code value setting

Setting	Option	Description
Q. Wiegand: Site code value (0)	0-65535	The site code value is 0–65535.

5.3.18 Wiegand: First Parity Bit Type

The first parity bit precedes the ID-tag mark and the site code when using Wiegand data format. The first parity bit is calculated from the second bit of the message to the position defined according to section 5.3.20.

Table 55 Wiegand: First parity bit type setting

Setting	Option	Description
R. Wiegand: First parity bit type (Even)	A. Odd	Odd parity is calculated on the first parity bit range.
	B. Even	Even parity is calculated on the first parity bit range.
	C. Bit=1	First parity bit is set to one.
	D. Bit=0	First parity bit is set to zero.

5.3.19 Wiegand: Last Parity Bit Type

The last parity bit follows the ID-tag mark and the site code when using Wiegand data format. The last parity bit is calculated from the position defined according to 5.3.21 to the second last bit of the message.

Table 56 Wiegand: Last parity bit type setting

Setting	Option	Description
`S. Wiegand: Last parity bit type (Odd)`	`A. Odd`	Odd parity is calculated on the last parity bit range.
	`B. Even`	Even parity is calculated on the last parity bit range.
	`C. Bit=1`	Last parity bit is set to one.
	`D. Bit=0`	Last parity bit is set to zero.

5.3.20 Wiegand: First Parity Bit Range

The position of the bit that delimits the first parity bit range is set.

Table 57 ID-tag mark and site code as Wiegand data: First parity bit range setting

Setting	Option	Description
`T. Wiegand: First parity bit range (13)`	`2-49`	The bit range for the first parity bit is 2–49.

5.3.21 Wiegand: Last Parity Bit Range

The position of the bit that delimits the last parity bit range is set.

Table 58 Wiegand: last parity bit range setting

Setting	Option	Description
`U. Wiegand: Last parity bit range (14)`	`2-49`	The bit range for the last parity bit is 2–49.

6 Testing

This section describes how to carry out performance tests using the Reader application software.

After completing the configuration as described in the previous sections, carry out a basic reading test.

The guidelines in section 6.2 Trouble Shooting may be valuable if an error occurs.

6.1 Testing the Reading Lobe

The testing of the reading lobe is as follows:

1. Switch on power to the Reader. The externally-visible indicator will flash green to show that the Reader has been initiated.
2. Set the Reader to operating mode “Read test”.
3. Place an ID-tag in front of the Reader having the ID-tag on the object where it normally will be mounted. Perform repeated readings while simultaneously moving the ID-tag along the expected movement path and check that the ID-tag can be read in all expected positions. Each reported reading will be indicated by a beep and a flash by the externally-visible indicator.

6.2 Trouble Shooting

The following tables describe the most frequently-encountered problems during tests of the reading lobe and the serial communication interface.

Table 59 Common problems when testing the reading lobe

Problem	**Solution**
The externally-visible indicator is constantly off.	Check the Reader installation according to the LR-series Installation Manual [2].
The Reader does not beep when an ID-tag is presented during read test mode.	If several Readers are used in close proximity to each other, set them to different frequency channels.
	Verify that the tag speed setting of the Reader corresponds to the tag speed of the ID-tag.

7 Contact

For any further inquiries, please contact TagMaster North America, Inc.

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8 Glossary

The following abbreviations and acronyms are used in this manual:

access control system	Technical system restricting entrance to a property, a building, or a room to authorized persons.
external application software	*See* host application software.
host	The external intelligence, for instance workstation or server, which acts as master of a Reader or a set of Readers.
host application software	The application software installed in the host used for communicating with the Reader.
ID-tag	ID-carrier in the TagMaster system, which is readable and writable via microwaves.
ID-tag data	The collective stored information in an ID-tag including the optional site code stored in the Reader.
ID-tag mark	The unique and permanent identification number found in every ID-tag.
ID-tag user data	Programmable data field in ScriptTags carrying user data.
Mag-stripe	Mag-stripe is a technology used in card readers and sensors, particularly for access control applications.
MarkTag	Type of ID-tag which hold an identification number called ID-tag mark.
Reader	TagMaster LR-series ID-tag reader.
Reader application software	The application software installed in the Reader, defining the behaviour of the Reader.
reading lobe	The space in front of the Reader in which ID-tags are being read.
ScriptTag	Type of ID-tag which hold an identification number called ID-tag mark and programmable data called ID-tag user data.
site code	A number used in some access control systems for separating different sites or facilities.
system software	The fundamental software and operating system installed in the Reader.
terminal emulation software	A serial computer interface for text entry and display.
terminal emulator	*See* terminal emulation software.
Wiegand	Wiegand is a technology used in card readers and sensors, particularly for access control applications.

9 References

[1] *GEN4 Reader User's Manual*
Doc no. 06-118

[2] *LR-series Installation Manual*
Doc no. 06-136