AY-V64

Multi-Reader
Installation and Programming Manual

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Notice and Disclaimer

This manual's sole purpose is to assist installers and/or users in the safe and efficient installation and usage of the system and/or product, and/or software described herein.

BEFORE ATTEMPTING TO INSTALL AND/OR USE THE SYSTEM, THE INSTALLER AND THE USER MUST READ THIS MANUAL AND BECOME FAMILIAR WITH ALL SAFETY REQUIREMENTS AND OPERATING PROCEDURES.

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- The use of the software associated with the system and/or product, if applicable, is subject to the terms of the license provided as part of the purchase documents.
- ROSSLARE exclusive warranty and liability is limited to the warranty and liability statement provided in an appendix at the end of this document.
- This manual describes the maximum configuration of the system with the maximum number of functions, including future options. Therefore, not all functions described in this manual may be available in the specific system and/or product configuration you purchased.
- Incorrect operation or installation, or failure of the user to effectively maintain the system, relieves the manufacturer (and seller) from all or any responsibility for consequent noncompliance, damage, or injury.
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- All graphics in this manual are for reference only, some deviation between the image(s) and the actual product may occur.
- All wiring diagrams are intended for reference only, the photograph or graphic of the PCB(s) are intended for clearer illustration and understanding of the product and may differ from the actual PCB(s).

1.   Introduction

The AY-V64 is a programmable Wiegand and Clock & Data proximity card and keypad reader.

The AY-V64 supports multiple proximity card and keypad formats providing a high level of compatibility and connectivity with host controllers.

The unit is programmable for proximity card data in 26-Bit Wiegand, Clock & Data or Wiegand Card + PIN format.

The keypad can also be programmed to output eight different data formats.

The AY-V64 utilizes flash firmware for easy upgrades.

Figure 1: AY-V64 Multi-Reader

Introduction

This manual contains the following chapters:

- Installation
- Wiring Instructions
- Operation Instructions

The AY-V64 package contains the following items:

- One AY-V64 Access Control Unit
- Installation kit
- Installation and operating manual

Additional non-supplied equipment required:

- Compatible host controller
- Power supply – 5 to 16 VDC (from a regulated power supply)

Other Rosslare accessories can be found at Rosslare's website:

http://www.rosslaresecurity.com

2.   Technical Specifications

Electrical Characteristics

Power Supply Type	Linear type – recommended
Operating Voltage Range	5–16VDC
Absolute Maximum (non-operating)	18 VDC
Input Current	Standby: 150 mA Read: 180 mA
Tamper Output	Open collector, active low, max. sink current 30 mA
Maximum Cable Distance to Controller	500 ft (150 meters)
Card Read Distance*	9 in. (22 cm) maximum read range

Environmental Characteristics

Operating Temp. Range	-4°F to 145°F (-20°C to 63°C)
Operating Humidity Range	0 to 95% (non-condensing) Suitable for outdoor use (meets IP54)

Dimensions

Height x Width x Depth	4.92 x 4.92 x 0.83 in. (125 x 125 x 21 mm)
Weight	0.628 lbs. (285 g)

* Measured using a Rosslare proximity card or equivalent. Range also depends on electrical environment and proximity to metal.

3. Installation

3.1 The Installation Kit

The Installation kit comprises of the following items that are to be used during the installation procedure:

- One Installation Template
- Two pan head screws & wall plugs
- One L shaped security screw tool
- Two Security screws

3.2 Installing the AY-V64 Multi-Reader

Figure 2:Removing the Top Cover
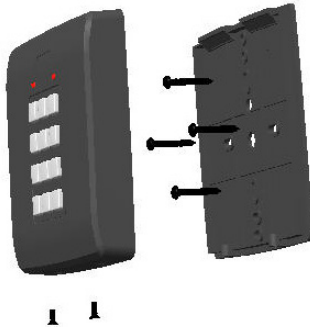
Figure 2 shows the front view of the AY-V64 Multi-Reader.

When installing the reader, you must remove the snap-off cover to access the screw holes.

The Reader must be mounted with the appropriate screws, as described in the template provided.

To install the reader:

1. Determine an approximate location for the installation of the Reader.

2. Peel off the back of the self-adhesive installation label template and locate it at the required location.

3. Using the template as a guide, drill two holes (the size of which are indicated in the template) to install the reader onto the surface,

4. Drill a $^{7}/_{16}$-in (10-mm) hole for the cable. In the event that you are installing the reader on metal, place a grommet or electrical tape around the edge of the hole.

5. Route the interface cable from the reader to the controller. A linear type power supply is recommended.

> **Note**
> The reader can also be mounted using strong epoxy glue. After application, the reader should be firmly held in place until the glue dries.

4.   Wiring Instructions

The AY-V64 Multi-Reader is supplied with a 46-cm (18") pigtail, comprising a 6-conductor cable.

To connect the reader to the controller:

1. Prepare the reader cable by cutting the cable jacket back 3.2 cm (1¼") and stripping the wire 1.3 cm (½").

2. Prepare the controller cable by cutting the cable jacket back 3.2 cm (1¼") and stripping the wire 1.3 cm (½").

3. Splice the reader's pigtail wires to the corresponding controller wires and cover each joint with insulating tape.

    If the tamper output is being utilized, connect the purple wire to the correct input on the controller.

Table 1: Wiring Colors

Reader	Color	Function
5~16 VDC	Red	DC Input
Shield / Ground	Black	Ground
Data 1	White	Data 1
Data 0	Green	Data 0
LEDCTL	Brown	LED Control
Tamper	Purple	Tamper

4. Trim and cover all unused conductors.

> Note
> - The individual wires from the Reader are color-coded according the Wiegand standard.
> - When using a separate power supply for the Reader, this supply and that of the Controller must have a common ground.
> - The Reader's cable shield wire should preferably be attached to an earth ground, or a signal ground connection at the panel, or power supply end of the cable. This configuration is best for shielding the Reader cable from external interference.

5. Operation Instructions

5.1 Transmit Mode

When the AY-V64 is in Transmit mode, it is ready to receive data from a presented proximity card or an entered PIN code.

When the reader is in Transmit mode, the Transmit LED is red and the Program LED is off

Transmit 🔴 ⚪ **Program**
Red
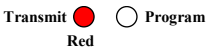
When a proximity card or keyboard entry is being transmitted, the Transmit LED flashes green.

Keyboard data can be sent via one of eight different keypad transmission formats (see Section 5.5).

Proximity cards presented to the reader are always sent in 26-Bit Wiegand, Clock & Data, or Card + PIN Wiegand format (see Section 5.6).

5.2 Programming the AY-V64

Programming the AY-V64 is done solely via the unit's keypad driven programming menu system. To reach the programming menu system, the AY-V64 must first be placed into Programming mode (see Section 5.3).

During the AY-V64's manufacturing process, certain codes and settings are pre-programmed. These settings are the called the default factory settings.

Table 2 shows the names of all the AY-V64 menus.

Default factory settings are marked by an * sign.

Table 2: Programming Menus

Menu Description	Menu Number
Selecting Keypad Transmission Format	1
Single Key, Wiegand 6-Bit (Rosslare Format)	*
Single Key, Wiegand 6-Bit with Nibble + Parity Bits	
Single Key, 8-Bit Wiegand, Nibbles Complemented	
4 Keys Binary + Facility code, Wiegand 26-Bit	
1 to 5 Keys + Facility code, Wiegand 26-Bit	
6 Keys BCD and Parity Bits, Wiegand 26-Bit	
Single Key, 3x4 Matrix Keypad	
1 to 8 Keys BCD, Clock & Data Single Key	
Selecting Proximity Card Transmission Format	2
Wiegand 26-Bit	*
Clock & Data	
Wiegand Card + PIN	
Changing the Programming Code	3
Changing the Facility Code	4
Return to Factory Default Settings	0

5.3 Entering Programming Mode

To enter Programming mode:

1. Press the **#** key 4 times.

   The Transmit LED turns off and the Program LED turns red.

   Transmit ◯   🔴 **Program Red**

2. Enter your 4-digit Programming code.

   1 2 3 4

   If the Programming code is valid, the Program LED turns green and the AY-V64 enters Programming mode.

   Transmit ◯   🟢 **Program Green**

> 🖉 • The factory default Programming code is 1234.
> Note • If a Programming code is not entered within 30 seconds, the AY-V64 returns to Transmit mode.

5.4 Exiting Programming Mode

To exit the Programming mode at any time:

1. Press the **#** key.

   You hear a beep.

   The Program LED turns off and the Transmit LED turns red.

   Transmit 🔴 ⚪ **Program**
   Red

   This indicates that the AY-V64 has returned to Transmit mode.

   Wrong entries may reset the reader back to Transmit mode.

   While in Programming mode, if no key is pressed for 30 seconds, the AY-V64 exits Programming mode and returns to Transmit mode.

5.5 Selecting Keypad Transmission Format

The AY-V64 has eight different keypad transmission selectable formats.

To select a keypad transmission format:

1. Enter Programming mode.

   Transmit ⚪ 🟢 **Program**
   Green

   Press "**1**" to enter Menu 1.

   1

2. The Transmit LED turns red.

   Transmit 🔴 🟢 **Program**
   Red **Green**

   Enter the appropriate option number for the keypad transmission format that you wish to select (see Section 5.5.1).

   ?

   Three beeps are emitted on success.

The system returns to Transmit mode.

The Program LED turns off and the Transmit LED turns red.

Transmit ● ○ **Program**
Red

If an incorrect option number is entered, a long beep is sounded. The reader returns to Transmit mode and the keypad transmission format remains unchanged.

Note	• Only one keypad transmission format can be active at any one time
	• When using the keypad transmission format "1 to 8 keys BCD, Clock & Data" (Option 8), an additional input is required to specify the number of keys in the PIN code.

5.5.1 Keypad Transmission Format Option Number

See Table 3 to determine the option number for the keypad transmission format you wish to select.

Table 3: Keypad Transmission Format

Keypad Transmission Format	Option Number
Single Key, Wiegand 6-Bit (Rosslare Format)	1*
Single Key, Wiegand 6-Bit with Nibble + Parity Bits	2
Single Key, Wiegand 8-Bit, Nibbles Complemented	3
4 Keys Binary + Facility code, Wiegand 26-Bit	4
1 to 5 Keys + Facility code, Wiegand 26-Bit	5
6 Keys BCD and Parity Bits, Wiegand 26-Bit	6
Single Key, 3x4 Matrix Keypad	7
1 to 8 Keys BCD, Clock & Data Single Key	8

* Option 1 is the default factory setting.

More information on each of the different keypad transmission formats is available below and on the following pages.

5.5.1.1 Single Key, 6-Bit Wiegand (Rosslare Format)

Each key press immediately sends 4 bits with 2 parity bits added; even parity for the first 3 bits and odd parity for the last 3 bits.

```
0 = 1 1010 0    6 = 1 0110 0
1 = 0 0001 0    7 = 1 0111 1
2 = 0 0010 0    8 = 1 1000 1
3 = 0 0011 1    9 = 1 1001 0
4 = 1 0100 1    * = 1 1011 1 = "B" in Hexadecimal
5 = 1 0101 0    # = 0 1100 1 = "C" in Hexadecimal
```

5.5.1.2 Single Key, 6-Bit Wiegand, Nibble & Parities

Each key press immediately sends 4 bits with 2 parity bits added; even parity for the first 3 bits and odd parity for the last 3 bits.

```
0 = 0 0000 1    6 = 1 0110 0
1 = 0 0001 0    7 = 1 0111 1
2 = 0 0010 0    8 = 1 1000 1
3 = 0 0011 1    9 = 1 1001 0
4 = 1 0100 1    * = 1 1010 0 = "A" in Hexadecimal
5 = 1 0101 0    # = 1 1011 1 = "B" in Hexadecimal
```

5.5.1.3 Single Key, 8-Bit Wiegand, Nibbles Complemented

This option inverts the most significant bits in the message leaving the least 4 significant bits as Binary Coded Decimal (BCD) representation of the key. The host system receives an 8-bit message.

```
0 = 11110000    6 = 10010110
1 = 11100001    7 = 10000111
2 = 11010010    8 = 01111000
3 = 11000011    9 = 01101001
4 = 10110100    *= 01011010 = "A" in Hexadecimal
5 = 10100101    # = 01001011 = "B" in Hexadecimal
```

5.5.1.4 4 Keys Binary + Facility Code, 26-Bit Wiegand

This option buffers 4 keys and outputs keypad data with a three-digit facility code like a standard 26-Bit card output.

The facility code is set in Programming Menu number four and can be in the range 000 to 255. The factory default setting for the Facility code is 000 (see Section 5.8).

The keypad PIN code must be 4 digits long and can range between 0000 and 9999. On the fourth key press of the 4-digit PIN code, the

data is sent across the Wiegand Data lines as binary data in the same format as a 26-Bit card.

If the "*" key or the "#" key are pressed during PIN code entry, the keypad clears the PIN code entry buffer, generates a beep and is ready to receive a new 4-digit keypad PIN code.

If the entry of the 4-digit keypad PIN code is disrupted and no number key is pressed within 5 seconds, the keypad clears the PIN code entry buffer, generates a beep and is ready to receive a new 4-digit keypad PIN code.

(EP) FFFF FFFF AAAA AAAA AAAA AAAA (OP)

Where: EP = Even parity for first 12 bits.

OP = Odd parity for last 12 bits

F = 8-Bit Facility Code

A = 24-Bit code generated from keyboard

5.5.1.5   1 to 5 Keys + Facility Code, 26-Bit Wiegand

This option buffers up to 5 keys and outputs keypad data with a facility code like a 26-Bit card output.

The facility code is set in Programming Menu number four and can be in the range 000 to 255. The factory default setting for the facility code is 000 (see Section 5.8).

The keypad PIN code can be one to five digits long and can range between 0 and 65,535. When entering a keypad PIN code that is less than 5 digits long, the "#" key must be pressed to signify the end of PIN code entry. For keypad PIN codes that are 5 digits long, on the fifth key press of the 5-digit PIN code, the data is sent across the Wiegand Data lines as binary data in the same format as a 26- Bit Card.

If the "*" key is pressed during PIN code entry or a PIN code greater than 65,535 is entered, the keypad clears the PIN code entry buffer, generates a beep and is ready to receive a new 4-digit keypad PIN code.

If the entry of the 1 to 5 digit keypad PIN code is disrupted and no number key or " " key is pressed within 5 seconds, the keypad will

clear the PIN code entry buffer, generate a medium length beep and is ready to receive a new 1 to 5-digit keypad PIN code.

(EP) FFFF FFFF AAAA AAAA AAAA AAAA (OP)

Where: EP = Even parity for first 12 bits

OP = Odd parity for last 12 bits

F = 8-Bit Facility Code

A = 24-Bit code generated from keyboard

5.5.1.6   6 Keys BCD and parity bits, 26-Bit Wiegand

Sends buffer of 6 keys, adds parity and sends a 26-Bit BCD message. Each key is a four bit equivalent of the decimal number.

The keypad PIN code must be 6 key presses long. On the sixth key press of the 6-digit PIN code, the data is sent across the Wiegand Data lines as a BCD message.

If the entry of the 6-digit keypad PIN code is disrupted and no number key is pressed within 5 seconds, the keypad clears the PIN code entry buffer, generates a medium length beep and is ready to receive a new 6-digit keypad PIN code.

(EP) AAAA BBBB CCCC DDDD EEEE FFFF (OP)

Where:

A = First key entered   D = Fourth key entered

B = Second key entered   E = Fifth key entered

C = Third key entered   F = Sixth key entered

5.5.1.7   Single Key, 3x4 Matrix Keypad (MD-P64)

This unique mode is intended to let the host controller scan the AY-V64 keypad while still keeping the proximity card readers 26-Bit Wiegand or Clock & Data formats active.

An optional interface board must be used between the AY-V64 and the host system. Each key press is immediately sent on DATA0 as an ASCII character at a baud rate of 9600 bits per second.

When a key is pressed, DATA1 is pulled "low" until the key is released at which point DATA1 is set to "high". This allows the controller to detect the duration of the key press.

The MD-P64 interface unit outputs the data received to 7 outputs emulating a keyboard. The interface unit does not affect any data that it receives from the proximity reader whether it is 26-Bit Wiegand or Clock & Data.

Key pressed = ASCII Value

0 = '0' (0x30 hex)	6 = '6' (0x36 hex)
1 = '1' (0x31 hex)	7 = '7' (0x37 hex)
2 = '2' (0x32 hex)	8 = '8' (0x38 hex)
3 = '3' (0x33 hex)	9 = '9' (0x39 hex)
4 = '4' (0x34 hex)	*= '* ' (0x2A hex)
5 = '5' (0x35 hex)	# = '#' (0x23 hex)

5.5.1.8   1 to 8 Keys BCD, Clock & Data

Buffers up to 8 keys and outputs keypad data without a facility code like standard Clock and Data card output.

The keypad PIN code can be one to eight digits long. The PIN code length is selected while programming the reader for Option 8. The reader transmits the data when it receives the last key press of the PIN code. The data is sent across the two data output lines as binary data in Clock & Data format.

If the "*" key or the "#" key is pressed during PIN code entry, the keypad clears the PIN code entry buffer, generates a beep, and is ready to receive a new keypad PIN code.

If the entry of the digit keypad PIN code is disrupted and no number key or "#" key is pressed within 5 seconds, the keypad clears the PIN code entry buffer, generates a medium length beep and is ready to receive a new keypad PIN code.

5.6 Selecting Proximity Card Transmission Format

The AY-V64 has two different selectable proximity card transmission formats. Follow the steps below to select the appropriate proximity card reader transmission format that you wish to use.

To select the proximity card transmission format:

1. Enter Programming mode.

   Transmit ○   ● **Program**
                    Green

2. Press "**2**" to enter Menu 2.

   The Transmit LED turns red.

   Transmit ● **Red**   ● **Program** **Green**

3. Enter the appropriate option number for the proximity card transmission format that you wish to select (see Section 5.6.1).

   Three beeps are emitted on success.

   The system returns to Transmit mode.

   The Program LED turns off and the Transmit LED turns red.

   Transmit ● **Red**   ○ **Program**

   If an incorrect option number is entered, the reader returns to Transmit mode and the keypad transmission format remains unchanged.

5.6.1 Proximity Card Transmission Format Option Number

- 26-Bit Wiegand

  Wiegand 26 bit transmission format select option "1"

- Clock & Data

  Clock & Data transmission format select option "2"

- Wiegand Card + PIN

This unique mode is intended to let host controllers get card and keypad data simultaneously. This option overrules the selected Keypad Transmission Format and sends the keypad data as described below.

The AY-V64 output data turns into virtually 52-bit Wiegand, 26-bit Card data followed by a 26-bit keypad data

After a card is presented to the AY-V64, the Transmit LED starts to flash Red indicating that AY-V64 is waiting for the PIN code.

The entered pin code buffered up to 5 keys and outputs keypad data with a facility code much like option 5 above

5.7 Changing the Programming Code

To change the Programming code:

1. Enter Programming mode.

   Transmit ◯   ● **Program**
                       Green

2. Press "**3**" to enter Menu 3.

   `3`

   The Transmit LED turns red.

   Transmit ●   ● **Program**
          Red   **Green**

3. Enter the new 4-digit code you wish to set as the Programming code.

   `?` `?` `?` `?`

   The system returns to Transmit mode.

   Three beeps are emitted on success.

   The Program LED turns off and the Transmit LED turns red.

   Transmit ●   ◯ **Program**
          Red

> **Note**
> The Programming code cannot be erased; the code 0000 is not valid and does not erase the Programming code.

5.8   Changing the Facility Code

To change the Facility code:

1. Enter Programming mode.

   Transmit ◯   ● **Program**
                             Green

2. Press "**4**" to enter Menu 4.

   `4`

   The Transmit LED turns red.

   Transmit ●   ● **Program**
                 Red   **Green**

3. Enter the new 3-digit code you wish to set as the Facility code.

   `?` `?` `?`

   The system returns to Transmit mode.

   Three beeps are emitted on success.

   Transmit ●   ◯ **Program**
                 Red

   The Program LED turns off and the Transmit LED turns red.

   > Facility codes can be in the range between 000 and 255.
   > Note

5.9   Return to Factory Default Settings

> ⚠ You must be very careful before using this command! Doing so
> Warning erases the entire memory, which includes all user and special
> codes. In addition, all codes are returned to their factory
> default settings.

To return to factory default settings:

1. Enter Programming mode.

   Transmit ◯   ● **Program**
                             Green

2. Press "**0**" to enter Menu 0.

   `0`

   The Transmit LED and the Program LED flash red.

   Transmit ☀   ☀ **Program**
                  Red   **Red**

3. Enter your 4-digit Programming code.

   `?` `?` `?` `?`

If the Programming code is valid, all memory is erased. You hear three beeps and the controller returns to Normal mode.

If the Programming code is invalid, you hear a long beep and the controller returns to Normal mode without erasing the memory of the controller

5.10   Replacing a lost Programming Code

In the event that the Programming code is forgotten, the AY-V64 may be reprogrammed in the field using the following instructions:

1. Remove power from the reader.
2. Activate tamper by removing the reader from the wall or removing the reader's case.
3. Apply power to the reader.
4. You now have 10 seconds to enter Programming mode using the factory default Programming code **1234**.

A.   Limited Warranty

The full ROSSLARE Limited Warranty Statement is available in the Quick Links section on the ROSSLARE website at www.rosslaresecurity.com.

Rosslare considers any use of this product as agreement to the Warranty Terms even if you do not review them.

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