

AYC-B7661

**MIFARE Full-Finger Capacitive
Biometric Reader/Controller**
Installation Manual



ROSSLARE
SECURITY PRODUCTS

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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 described herein.

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- 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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1. Introduction

Rosslare's AYC-B7661 MIFARE® Smart Card Fingerprint Capacitive Reader/Controller is a biometric fingerprint reader that is used with access control systems.

The AYC-B7661 reader uses a full-finger capacitive type biometric sensor to verify between fingerprint data and a biometric template stored in the unit (1:1 and 1:N modes). It accepts up to 107 users.

When used as a reader, the AYC-B7661 unit is compatible with most access controllers. These include the following Rosslare units: AC-015, AC-115, AC-020, AC-215, AC-225, AC-425, AC-525, and ExpansE™.

1.1 Reader Features

When using the AYC-B7661 as a reader, it has the following features:

- MIFARE card reading followed by fingerprint (in 1:1 mode)
- Rosslare's algorithm for ID code derived from the fingerprint template (in 1:N mode)
- Supports a back tamper sensor and a tamper output signal
- Supports a Lockout feature for increased security
- Compatible with MIFARE (ISO 14443A) 1K and 4K cards
- Programmable data transmission formats
- Programmable LED control and buzzer control inputs
- Configuration cards created using Rosslare's CP-R26 desktop fingerprint reader and card programmer
- No PC is required for fingerprint enrollment. The unit uses cards to configure fingerprint templates.

1.2 Controller Features

If you connect the unit to a Rosslare PS-x25 secured power supply, it automatically functions as a controller.

When using the AYC-B7661 as a controller, it includes the following features:

- MIFARE card reading followed by fingerprint reading (in 1:1 mode)
- Rosslare's algorithm for ID code derived from the fingerprint template (in 1:N mode)
- The tamper output signal triggers the siren
- Request to exit (REX) signal comes from the PS-x25 secured power supply

Pressing the REX unlocks the door that connects to output (PS-x25). The duration that the door is unlocked is configurable using the configuration card (1 to 99 seconds).

- Bell feature is available with the PS-x25 secured power supply – Depends on the AUX input
- Programmable door lock timer
- Ability to enable or disable auxiliary input, output, and bell
- No PC is required for fingerprint enrollment (unit uses cards to configure fingerprint templates)
- REX input
- Lock output
- Aux input – This is the brown wire (LED control in Reader mode). The AUX input can either activate the AUX output for the time configured according to the Configuration card (1 to 99 sec) or activate the AUX output to toggle for every AUX input event. In addition, user can select the AUX input to activate the bell. The user can enable or disable all the AUX input features using the Configuration card.
- Aux output – Depends on the AUX input

2. Technical Specifications

General Characteristics

Output Formats	<ul style="list-style-type: none">• Wiegand 26 (default)• Wiegand 26 with Facility code• Wiegand 32 Reversed• Clock & Data• Wiegand 32• Wiegand 34• Wiegand 40
Max. Read Range*	4 cm (1.6 in.)

Electrical Characteristics

Power Supply Type	Linear type (recommended)
Input Voltage	5 to 16 VDC
Absolute Maximum (non-operating)	18 VDC
Maximum Input Current (1:1)	Standby: 60 mA @ 12 VDC Read: 100 mA @ 12 VDC
Maximum Input Current (1:N)	Standby: 95 mA @ 12 VDC Read: 100 mA @ 12 VDC
Tamper Output	Open collector, active low Max. sink current 32 mA
Maximum Controller Cable Distance	150 m (500 ft.) (using 18-AWG shielded cable)
Frequency	13.56 MHz
Card Compatibility	MIFARE ISO14443A-3 standard

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

Environmental Characteristics

Operating Temperature Range	-25°C to 60°C (-13°F to 140°F)
------------------------------------	--------------------------------

Operating Humidity Range	30% to 85% (non-condensing)
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Physical Characteristics

Dimensions (H x W x D)	100 x 54 x 42 mm (3.9 x 2.1 x 1.7 in.)
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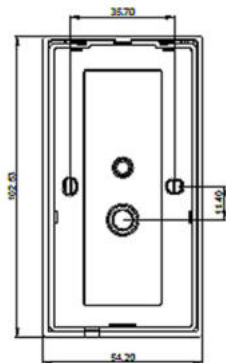
Weight	156 g (5.5 oz)
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3. Installation

3.1 Mounting Instructions

Use the supplied drilling template for finding and drilling the correct holes (Figure 1).

Figure 1: AYC-B7661 – Mounting Orientations



Be sure to protect the fingerprint sensor when the reader is mounted outside.

To mount the unit:

1. Determine an approximate surface location for the reader.
2. Peel off the back of the self-adhesive mounting label template and place it on the required mounting location.
3. Using the template as a guide, drill two holes (of the size indicated on the template) on the surface to mount the unit.
4. Insert the wall plugs into both mounting holes.
5. Drill a 10-mm (7/16") hole for the cable. If the surface is metal, place a grommet or electrical tape around the edge of the hole.

- At the bottom of the unit's case, unscrew and remove the security screw (see Figure 2), using the supplied security hex-key screwdriver.

Figure 2: AYC-B7661 – Removing the Top Cover



- Carefully remove the snap-off front cover of the unit to reveal two screw holes.
- Insert the unit's cable wire into the cable hole and move the unit flush with the wall.
- Using the two mounting screws, screw the unit to the wall through the two wall plugs.
- Route the cable from the unit to the:
 - Controller – when configuring as a reader (Section 3.2.1)
 - PS-x25 power supply – when configuring as a controller (Section 3.2.2)



The unit can also be mounted using strong epoxy glue. After application, firmly hold the unit in place until the glue dries.

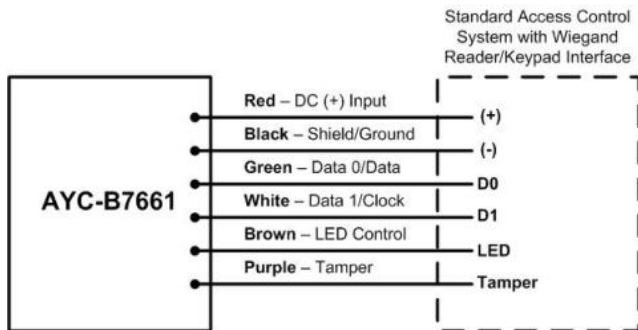
11. Carefully re-attach the snap-off front cover of the unit and secure the case security screw at the bottom using the security hex key.

3.2 Wiring Instructions

3.2.1 Wiring the Unit as a Reader

If you connect the unit to a standard access control unit, it automatically functions as a reader.

Figure 3: Wiring Layout for Reader Configuration



The AYC-B7661 unit is connected with an 8-wire, 46-cm (18") cable.

To connect the unit as a reader (to a controller):

1. Prepare the unit's cable by cutting the cable jacket back 3.2 cm (1¼") and strip the wire 1.3 cm (½").
2. Prepare the controller cable by cutting the cable jacket back 3.2 cm (1¼") and strip the wire 1.3 cm (½").
3. Splice the unit's pigtail wires to the corresponding controller wires (Table 1) and cover each connection.

Table 1: Wiring the Reader to the Controller

Color	Wiring
Black/Shield	Ground
Red	Vin
Green	Data 0
White	Data 1
Brown	LED control
Purple	Tamper

- If the tamper output is being utilized, connect the purple wire to the correct input on the controller.
- Trim and cover all conductors that are not used.



Note

- The individual wires extending from the reader are color-coded according to the required Wiegand standard.
- When using a separate power supply for the reader, this supply and the controller's power supply must have a common ground. A linear power supply is recommended.
- Attach the cable shield wire on the reader to an earth ground (best), or to 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.

3.2.2 Wiring the Unit as a Controller

If you connect the unit to a Rosslare PS-x25 secured power supply, it automatically functions as a controller.

The AYC-B7661 unit is connected with an 8-wire, 46-cm (18") cable.

To connect the unit as a controller:

- Prepare the unit's cable by cutting the cable jacket back 3.2 cm (1¼") and strip the wire 1.3 cm (½").
- Prepare the PS-x25 secured power supply's cable by cutting the cable jacket back 3.2 cm (1¼") and strip the wire 1.3 cm (½").

Installation

3. Splice the controller pigtail wires to the corresponding PS-x25 secured power supply's wires (see Table 2) and cover each connection.

Table 2: Wiring the Unit as a Controller

Controller	Color	Functionality	Note
5~16 VDC	Red	+DC Input	Wired to the PS-x25
Shield/ Ground	Black	Ground	Wired to the PS-x25
C 1	White	Communication	Wired to the PS-x25
C 2	Green	Communication	Wired to the PS-x25
AUX. IN	Brown	Auxiliary Input	Wired to input



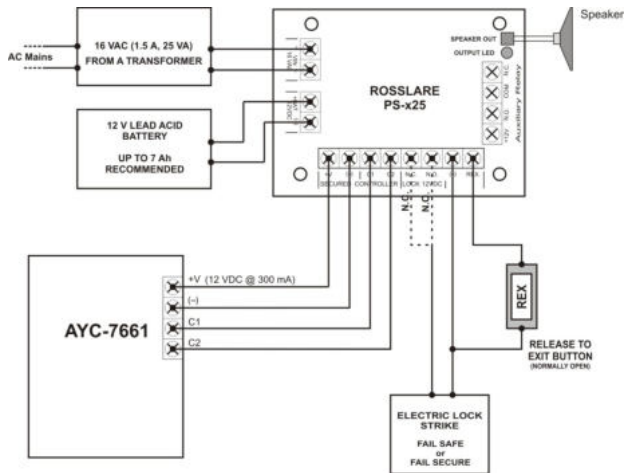
Note

Attach the cable shield wire on the unit to an earth ground (best). You can also attach it to a signal ground connection at the panel or power supply end of the cable. This configuration is best for shielding the controller cable from external interference.

4. Trim and cover all conductors not used.
5. To connect the unit to the desired power supply option, refer to the relevant wiring diagrams that follow.

Figure 4 shows the wiring for the controller application using a dual-relay secure application appurtenance.

Figure 4: Controller Wiring – Using a Dual-Relay Secure Application Appurtenance



Installation

Figure 5 shows the auxiliary output connection using the internal power.

Figure 5: Controller Wiring – Using the Internal Power

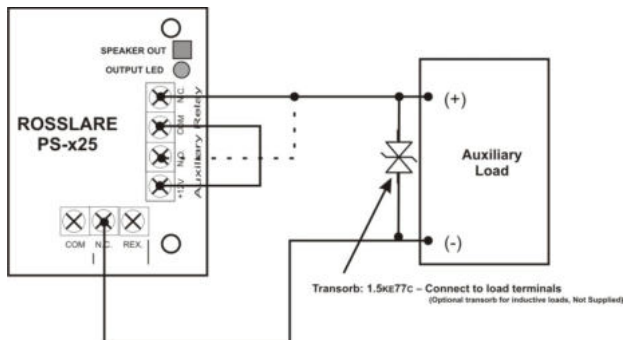
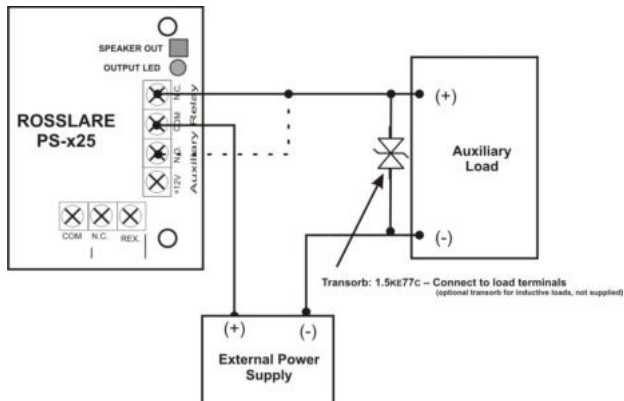


Figure 6 shows the auxiliary output connection using the external power.

Figure 6: Controller Wiring – Using the External Power



4. Reader/Controller Configuration

4.1 Configuring the Unit

To provide the highest level of security, the reader is programmed to validate only MIFARE cards whose settings correspond to the Master card that is used to bring the reader into Configuration mode, where the following settings can be configured:

- Card transfer format
- MIFARE card Key A value
- LED and buzzer control enable
- Lock-out settings
- Transmission of Card Serial Number (CSN) or card ID from dedicated sector

In addition, it is possible to browse between 1:1 and 1:N modes.



The Master and Configuration cards are configured using the Desktop Programmer (CP-R26). Refer to the *CP-R26 Hardware and AS-B01 Software Manual* for more details.

4.2 Configuration Procedure

The reader does not work until it is configured upon initial use. It is recommended to configure the reader one time only, following installation and its initial use. However, if needed, configuring the reader can be done anytime using the same procedure described below.

To configure the unit:

1. Present the Master card.

A short beep is generated and the two LEDs begin to blink in orange, as the reader goes into Configuration mode.

2. Within 30 seconds (while the reader is still in Configuration mode), present a valid Configuration card to the reader.

Reader/Controller Configuration

If the configuration is valid, 3 short beeps are emitted, and both LEDs flash in green 3 times quickly together.

If the configuration is not valid, an error beep is generated. If the reader is being configured for the first time, the reader will not work until a successful configuration is performed.

If the reader is already in use, then following a failed configuration, the reader returns to Standby mode and continues to work with its previous configuration settings.

5. Fingerprint Enrollment

After configuring the unit, either as a reader or as a controller, you need to enroll fingerprints (1:N) or fingerprints and cards (1:1) into the unit.

For configuration and fingerprint enrollment, you need to use the following pre-configured cards:

- Enroll
- Add card
- Delete
- +1
- +10



You need Rosslare's CP-R26 unit to generate these cards.

Note

5.1 Enrollment in 1:N Mode

In 1:N mode, the unit identifies users according to their fingerprints only.

Before enrolling users, it is recommended to create a list of all users and their record number (see Appendix A). The unit accepts up to 107 users.

To enroll fingerprints:

1. For first time use, configure the reader as explained in Chapter 4.
2. When the reader is in Standby mode, present the Enroll card to the reader. Both LEDs flash orange.



The 'enroll', '+1', '+10', 'add card', and 'delete' are the same for both the 1:1 and 1:N modes.

Note

Fingerprint Enrollment

3. Present the record number (+10 and +1) cards the number of times required to reach the desired record number, each time a card is presented the reader emits 1 beep.



For example, to enroll a fingerprint to record number 32, present the +10 card three times followed by the +1 card twice.

4. Present the Enroll card. The right LED flashes green and the left LED is off.
5. Ask users to place their finger on the capacitive sensor.
When it successfully identifies the fingerprint, the unit emits one short beep.
6. Ask users to place their finger on the unit's sensor once more.
 - If valid, the unit emits three short beeps and the LEDs blink green. The user's fingerprint template is then stored in the defined record within the unit.
 - If an enrollment error occurs, the unit emits an error tone and the LEDs turn red for about one second.



For people who cannot enroll their finger:

- In Reader mode, there is an option to use the reader with card only CSN or sector.
- In Controller mode, you can enroll a user card with the Add Card process (Section 5.3).

To delete enrolled fingerprints in 1:N mode:

1. When the reader is in Standby mode, present the Delete card to the reader.
Both LEDs flash orange.
2. Present the record number (+10 and +1) cards the number of times required to reach the desired record number.
Each time a card is presented the reader emits one beep.



For example, to enroll a fingerprint to record number 32 present the +10 card three times followed by the +1 card twice.

3. Present the Delete card.

If valid, the unit emits three short beeps and the LEDs blink green. The users do not need to place their finger on the unit's sensor.

If an error occurs, the unit emits an error tone and the LEDs turn red for about one second.

5.2 Enrollment in 1:1 Mode

In 1:1 mode, the unit identifies users according to their fingerprints and their user MIFARE smart cards.

Before enrolling users, it is recommended to create a list of all users and their record number (see Appendix A). The unit accepts up to 107 users.

To enroll cards and fingerprints:

1. For first time use, configure the reader as explained in Chapter 4.
2. When the reader is in standby mode, present the Enroll card to the unit.

Both LEDs flash orange.

3. Present the record number (+10 and +1) cards the number of times required to reach the desired record number.

Each time a card is presented the reader emits one beep.



For example, to enroll a fingerprint to record number 32 present the +10 card three times followed by the +1 card twice.

4. Present the Enroll card, and then present the user's card.
The right LED flashes green and the left LED turns off. The unit emits a long beep.
5. Ask users to place their finger on the unit's sensor once for first identification.
When it successfully identifies the fingerprint, the unit emits one short beep.
6. Ask users to place their finger on the unit's sensor once more.

Fingerprint Enrollment

- If valid, the unit emits three short beeps and the LEDs blink green. The user's fingerprint template is then stored in the defined record within the unit.
- If an enrollment error occurs, the unit emits an error tone and the LEDs turn red for about one second.

To delete enrolled users (fingerprint and user card) in 1:1 mode:

1. When the reader is in Standby mode, present the Delete card to the reader.

Both LEDs flash orange.

2. Present the record number (+10 and +1) cards the number of times required to reach the desired record number.

Each time a card is presented the reader emits one beep.



For example, to enroll a fingerprint to record number 32 present the +10 card three times followed by the +1 card twice.

3. Present the Delete card.

If valid, the unit emits three short beeps and the LEDs blink green. The users do not need to place their finger on the unit's sensor.

If an error occurs, the unit emits an error tone and the LEDs turn red for about one second.

To add a user card to an existing fingerprint record:

1. When the reader is in Standby mode, present the Add card configuration card to the reader.

Both LEDs flash orange.

2. Present the record number (+10 and +1) cards the number of times required to reach the desired record number.

Each time a card is presented the reader emits one beep.



For example, to enroll a fingerprint to record number 32 present the +10 card three times followed by the +1 card twice.

3. Present the Add card configuration card followed by the user's card.
 - If valid, the unit emits three short beeps and the LEDs blink green. The user's fingerprint template is then stored in the defined record within the unit.
 - If an enrollment error occurs, the unit emits an error tone and the LEDs turn red for about one second.



In 1:1 mode, up to two cards can be enrolled per user in each slot.

5.3 Adding ID from a Card (Reader 1:N Mode)

After normal enrollment, the ID code sent to the controller is based on the Rosslare's algorithm. However, you can link the user card's ID to the template. In this case, the user's ID is sent to the controller instead of the previous ID.

To add an ID from a user card:

1. Present the Add Card card.

Both LEDs flash orange.
2. To get to the desired record number, do one of the following:
 - Ask the users whose ID cards you wish to add to place the finger linked to each record number.
 - Present the record number (+10 and +1) cards the number of times required to reach the desired record number.
3. Present the Add card card.
4. Present the user's card.
 - If valid, the unit emits three short beeps and the LEDs blink green. The user's fingerprint template is then stored in the defined record within the unit.
 - If an error occurs because the ID from the user's card already exists inside the unit's database, the unit emits an error tone and the LEDs turn red for about one second.

6. Modes of Operation

The AYC-B7661 has the following modes of operation:

- Boot Mode (reset)
- Configuration Mode
- Standby Mode
- Read Mode
- Lockout Mode
- Factory Defaults

6.1 Boot Mode

The reader enters Boot mode upon power up or upon restoration of power after a power failure where the loader runs separately from the main application. The Boot mode lasts for approximately three seconds, during which the red LEDs flash simultaneously.

6.2 Configuration Mode

Refer to Section 4.2 on how set the reader to Configuration mode.



The Configuration card is configured using the Desktop Reader (CP-R26) and the Card programmer and Fingerprint enrollment. Refer to the *CP-R26 Hardware and AS-B01 Software Manual* for more details.

6.3 Standby Mode

The reader enters Standby mode:

- After the Boot (reset) and Configuration modes
- After the Lockout mode period
- After a successful card or fingerprint read

During Standby mode, the left red LED remains lit to indicate Standby mode and the reader is ready for normal use.

6.4 Read Mode

Depending on the mode of operation configured, the unit behaves as follows:

- 1:N Mode
The unit recognizes user fingerprints enrolled in Standby mode. On a valid verification of the fingerprint template reading, it transfers the user ID to the controller.
- 1:1 Mode
The unit enters Read mode when users present a MIFARE card, followed by placing their finger. The card or fingerprint can have a valid or invalid value or match.

Following a validated card read, the right LED blinks green, indicating to users to place their finger on the unit's sensor.



In either mode, for people who cannot enroll their finger, there is an option to use the reader with card only CSN or sector.

6.4.1 Valid Card or Fingerprint Read

When card and/or fingerprint reads are valid, the following sequence occurs:

6.4.1.1 In 1:N Mode

1. While the unit is in Standby mode, users place their finger on the unit's sensor.
When the unit finds a template match, it emits three short beeps and the two LEDs flash green.
2. The unit sends the data to the access controller, according to its configured transmission format.
The unit then re-enters Standby mode.

6.4.1.2 In 1:1 Mode

1. While the unit is in Standby mode, users present their MIFARE smart card to the unit.

2. The unit emits a short beep and the right green LED flashes. This shows that the unit is waiting a user to place a finger on the sensor.
3. The users place their finger on the fingerprint sensor. When the unit finds a match, it emits three short beeps and the two green LEDs to indicate success.



If the user does not place a finger within 10 seconds, the unit returns to Standby mode and the user must restart the identification procedure.

4. The unit sends the data to the access controller, according to its configured transmission format. The unit then re-enters Standby mode.

6.4.2 Invalid Card or Fingerprint Read

An invalid card or fingerprint read can occur when:

- There is an error in fingerprint presentation (for example, a user places the finger incorrectly)
- There is a mismatch between the fingerprint and the template (for example, a user presents the wrong finger)

An invalid card read can occur when the card is not verified. When a card or fingerprint read is invalid, the following sequence occurs:

1. If the fingerprint is wrong or the card (in 1:1 mode) is invalid, the two LEDs turn red and the buzzer emits a long, low beep. The user can then re-attempt finger presentation.
2. Based on the Lockout mode configuration (Section 6.5), several invalid reads within 30 seconds puts the unit into Lockout mode. If there are fewer than the preconfigured number of invalid card or fingerprint reads within 30 seconds, the unit enters Standby mode.



In Reader mode, when using Rosslare's controllers and AxTrax™ software, the unit sends specific messages when failures occur. The AxTrax™ software can handle the following messages:

- Fingerprint data reading from card failed
- Fingerprint reading failed
- Fingerprint capacitive sensor / card verification failed

6.5 Lockout Mode

The reader enters Lockout mode when there are a number of invalid card and/or finger reads within a 30-second period. During Lockout mode, the two LEDs flash red simultaneously for 1 minute. After 1 minute, the reader enters Standby mode.



The default number of invalid reads before the reader enters Lockout mode is 5. The number of invalid reads can be programmed to be 1-10.

The default duration of Lockout mode is 1 minute. The duration can be programmed to be 1-5 minutes.

6.6 Factory Defaults

Upon initial power up, the unit remains in Factory Default mode until valid Master and Configuration cards are presented.

A. User Spreadsheet

User #	User Name	User #	User Name
1.		55.	
2.		56.	
3.		57.	
4.		58.	
5.		59.	
6.		60.	
7.		61.	
8.		62.	
9.		63.	
10.		64.	
11.		65.	
12.		66.	
13.		67.	
14.		68.	
15.		69.	
16.		70.	
17.		71.	
18.		72.	
19.		73.	

20.		74.	
21.		75.	
22.		76.	
23.		77.	
24.		78.	
25.		79.	
26.		80.	

B. 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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