



PS00017990A00

GE21-TF-RTC Memory Expansion Card (with Integrated RTC)

User Guide

Suzhou Inovance Technology Co., Ltd.

Add.: No. 52, Tian E Dang Road, Wuzhong District, 215104,

Suzhou City, Jiangsu Province, P.R. China

Tel: (0512) 6637 6666 Fax: (0512) 6285 6720

www.inovance.com



Preface

■ Introduction

This guide introduces the full-scene task information for using this product, including product introduction, installation, configuration, and commissioning. Before using this product, read this guide carefully to ensure safe use.

■ Standards Compliance

The following table lists the certifications, directives, and standards that the product may comply with. For details about the acquired certificates, see the certification marks on the product nameplate.

Certification Name	Instruction		Standards Compliance
CE certification	EMC	2014/30/EU	24 VDC products: EN 61131-2 220 VAC products: EN 61131-2 EN 61000-3-2 EN 61000-3-3
	LVD	2014/35/EU	EN 61010-1 EN 61010-2-201
	RoHS directive	2011/65/EU amended by (EU) 2015/863	EN IEC 63000
UL/cUL certification	-		UL 61010-1 UL 61010-2-201 CAN/CSA-C22.2 No. 61010-1 CSA C22.2 NO. 610102201
KCC certification	-		-
EAC certification	-		-

Certification Name	Instruction		Standards Compliance
UKCA certification	Safety regulations	Electrical Equipment (Safety) Regulations 2016	EN 61010-1 EN 61010-2-201
	EMC regulations	Electromagnetic Compatibility Regulations 2016	24 VDC products: EN 61131-2 220 VAC products: EN 61131-2 EN 61000-3-2 EN 61000-3-3
	RoHS regulations	Directive (RoHS) Regulations 2012	EN IEC 63000

■ More Data

Data Name	Code	Description
Easy321&Easy511 Programmable Logic Controller User Guide	PS00017976	Introduces comprehensive task information for using Easy321 and Easy511 products, including product introduction, installation, wiring, configuration and commissioning, product features, fault diagnosis, maintenance, and more.
H5U and Easy Series Programmable Logic Controller Programming Guide	19011157	Introduces the basics of PLC programming, quick start guide, communication, motion control, and high-speed counter usage.
H5U and Easy Series Programmable Logic Controller Instruction Guide	19011156	Introduces the basic and complex instructions used for programming applications, as well as examples of these instructions.
GE21-TF-RTC Memory Expansion Card (with Integrated RTC) User Guide (this guide)	PS00017990	Introduces the full-scene task information for using this product, including product introduction, installation, configuration, and commissioning.

■ Revision History

Date	Version	Revision
May 2025	A00	Initial release.

■ Access to the Guide

This guide is not delivered with the product. You can obtain the PDF version in the following ways

- Do keyword search under Service and Support at <http://www.inovance.com>.
- Scan the QR code on the product with your smart phone.
- Scan the QR code below to install My Inovance app, where you can search for and download user guides.



■ Warranty Disclaimer

Inovance provides warranty service within the warranty period (as specified in your order) for any fault or damage that is not caused by improper operation of the user. Maintenance will be charged after the warranty period expires.

Within the warranty period, maintenance will be charged for the following damage:

- Damage caused by operations not following the instructions in the user guide
- Damage caused by fire, flood, or unusual voltage
- Damage caused by unintended use of the product
- Damage caused by use beyond the specified scope of application of the product
- Damage or secondary damage caused by force majeure (natural disaster, earthquake, and lightning strike)

The maintenance is charged according to the latest Price List of Inovance. If otherwise agreed upon, the terms and conditions in the agreement shall prevail.

For details, see Product Warranty Card.

Fundamental Safety Instructions

■ Safety Precautions

- This chapter presents essential safety instructions for a proper use of the equipment. Before operating the equipment, read through the guide and comprehend all the safety instructions. Failure to observe the safety precautions may result in serious injuries or death of personnel or device damage.
- "DANGER", "WARNING", and "CAUTION" in this guide only indicate some of the precautions that need to be followed; they just supplement the safety precautions.
- Use this product according to designated environment requirements. Damage caused by improper use is not covered by warranty.
- Inovance shall take no responsibility for any personal injuries or property damage caused by improper usage.

■ Safety Levels and Definitions



DANGER

Indicates that failure to comply with the notice will result in severe personal injuries or even death.



WARNING

Indicates that failure to comply with the notice may result in death or severe personal injury.



CAUTION

Indicates that failure to comply with the notice may result in minor or moderate personal injuries or equipment damage.

■ Fundamental safety instructions

- Drawings in the guide are sometimes shown without covers or protective guards. Remember to install the covers or protective guards as specified first, and then perform operations in accordance with the instructions.
- The drawings in the guide are shown for illustration only and may be different from the product you purchased.
- Operators must take mechanical precautions to protect personal safety and wear protective equipment, such as anti-smashing shoes, safety clothing, safety glasses, protective gloves, and protective sleeves.

Unpacking



WARNING

- Do not install the equipment if you find damage, rust, or signs of use on the equipment or accessories upon unpacking.
- Do not install the equipment if you find water seepage or missing or damaged components upon unpacking.
- Do not install the equipment if you find the packing list does not conform to the equipment you received.



CAUTION

- Check whether the packing is intact and whether there is damage, water seepage, dampness, and deformation before unpacking.
- Unpack the package in accordance with the package sequence. Do not hit the package with force.
- Check whether there is damage, rust, or signs of bumping on the surface of the equipment and equipment accessories before unpacking.
- Check whether the package contents are consistent with the packing list before unpacking.

Storage and Transportation



WARNING

- Large-scale or heavy equipment must be handled by qualified professionals using specialized hoisting equipment. Failure to comply may result in personal injuries or equipment damage.
- Before hoisting the equipment, ensure that components such as the front cover and terminal blocks are secured firmly with screws. Loosely-connected components may fall off and result in personal injuries or equipment damage.
- Do not stand or stay below the equipment when it is being hoisted.
- When hoisting the equipment with a steel rope, ensure the equipment is hoisted at a constant speed without suffering from vibration or shock. Do not turn the equipment over or let the equipment stay hanging in the air. Failure to comply may result in personal injuries or equipment damage.



CAUTION

- Handle the equipment with care during transportation and mind your steps to prevent personal injuries or equipment damage.
- When carrying the equipment with bare hands, hold the equipment casing firmly with care to prevent parts from falling. Failure to comply may result in personal injuries.
- Store and transport the equipment strictly based on the requirements. Failure to comply may result in equipment damage.
- Do not store or transport the equipment in environments with water splash, rain, direct sunlight, strong electric field, strong magnetic field, and strong vibration.
- Avoid storing the product for more than 3 months. When the product needs to be stored for an extended period, take more strict protection and necessary inspection.
- Pack the equipment strictly before transportation. Use a sealed box for long-distance transportation.
- Do not transport the equipment with other devices or materials that may harm or have negative impacts on the equipment.

Installation



DANGER

- Installation must be carried out by skilled personnel who have undergone specialized electrical training and possess comprehensive electrical expertise. Non-professionals are not allowed to install the equipment.



WARNING

- Read through the guide and safety precautions before installation.
- Do not install the equipment in places with strong electric or magnetic fields.
- Before installation, check that the mechanical strength of the installation site can bear the weight of the equipment. Failure to comply will result in mechanical hazards.
- Do not wear loose clothes or accessories during installation. Failure to comply may result in electric shock.
- When installing the equipment in a closed environment (such as a cabinet or casing), use a cooling device (such as a fan or air conditioner) to cool the environment down to the required temperature. Failure to comply may result in equipment over-temperature or a fire.
- Do not retrofit the equipment.
- Do not fiddle with the bolts used to fix equipment components or the bolts marked in red.
- When the equipment is installed in a cabinet or final assembly, a fireproof enclosure providing both electrical and mechanical protections must be provided. The IP rating must meet IEC standards and local laws and regulations.
- Before installing devices with strong electromagnetic interference, such as a transformer, install a shielding device for the equipment to prevent malfunction.
- Install the product on an incombustible object such as metal and do not touch or attach the product to combustibles. Failure to comply can result in fire accident.



CAUTION

- Cover the top of the equipment with a piece of cloth or paper during installation. This is to prevent unwanted objects such as metal chippings, oil, and water from falling into the equipment and causing faults. After installation, remove the cloth or paper to prevent over-temperature caused by poor ventilation due to blocked ventilation holes.
- Resonance may occur when the equipment operating at a constant speed switches to variable speed operations. In this case, install the vibration-proof rubber under the motor frame or use the vibration suppression function to reduce resonance.

Wiring



DANGER

- Equipment installation, wiring, maintenance, inspection, or component replacement must be performed only by professionals.
- Before wiring, disconnect all the power supplies of the equipment. Wait for at least the time designated on the equipment warning label before further operations because residual voltage still exists after power-off. Measure the DC voltage of the main circuit and make sure that it is below the safety voltage. Failure to comply can result in electric shock.
- Do not perform wiring, remove the equipment cover, or touch the circuit board with power ON. Failure to comply will result in an electric shock.
- Ensure the equipment is grounded properly. Failure to comply can result in electric shock.



WARNING

- Do not connect the input power supply to the output end of the equipment. Failure to comply will result in equipment damage or even a fire.
- When connecting a drive to the motor, check that the phase sequences of the drive and motor terminals are consistent to prevent reverse motor rotation.
- Cables used for wiring must meet cross sectional area and shielding requirements. The shield of the cable must be reliably grounded at one end.
- Tighten the terminal screws with the tightening torque specified in the guide. Failure to comply may result in overheat, damage to the connection parts, or fire.
- After wiring, check that all cables are connected properly and no screws, washers or exposed cables are left inside the equipment. Failure to comply may result in electric shock or equipment damage.



CAUTION

- During wiring, follow the proper electrostatic discharge (ESD) procedures, and wear an antistatic wrist strap. Failure to comply will result in damage to internal equipment circuits.
- Use shielded twisted pairs for the control circuit. Connect the shield to the grounding terminal of the equipment for grounding purpose. Failure to comply can result in equipment malfunction.

Power-On



DANGER

- Before power-on, check that the equipment is installed properly with reliable wiring and the motor can be restarted.
- Check that the power supply meets equipment requirements before powering on to prevent equipment damage or a fire.
- When the equipment is powered on, do not open the cabinet door or protective cover, touch any wiring terminal, or disassemble any component of the equipment. Failure to comply can result in electric shock.



WARNING

- Perform a trial run after wiring and parameter setting to ensure the equipment operates safely. Failure to comply may result in personal injuries or equipment damage.
- Before power-on, check that the rated voltage of the equipment is consistent with that of the power supply. Failure to comply may result in fire accident.
- Before powering on, check that no one is near the equipment, motor, or machine. Failure to comply may result in death or personal injuries.

Operation



DANGER

- The equipment must be operated only by professionals. Failure to comply can result in death or personal injuries.
- During operation, do not touch any connecting terminals or disassemble any component of the equipment. Failure to comply can result in electric shock.



WARNING

- Do not touch the equipment enclosure, fan, or resistor with bare hands. Failure to comply may result in burns.
- During operation, prevent metal or other objects from falling into the equipment. Failure to comply may result in fire or equipment damage.

Maintenance



DANGER

- Equipment installation, wiring, maintenance, inspection, or component replacement must be performed only by professionals.
- Do not maintain the equipment with power ON. Failure to comply can result in electric shock.
- Before maintenance, disconnect all the power supplies of the equipment and wait for at least the time designated on the equipment warning label.
- When a permanent magnet motor is used, do not touch the motor terminals immediately after power-off because the motor terminals can generate induced voltage during rotation even after the equipment is powered off. Failure to comply can result in electric shock.



WARNING

- Perform routine and periodic inspection and maintenance on the equipment in accordance with maintenance requirements and keep a record.

Repair



DANGER

- Equipment installation, wiring, maintenance, inspection, or component replacement must be performed only by professionals.
- Do not perform maintenance on the equipment with power on. Failure to comply can result in electric shock.
- Before inspection and maintenance, disconnect all the power supplies of the equipment and wait for at least the time designated on the equipment warning label.



WARNING

- Submit a request for repair services in accordance with the product warranty agreement.
- When the fuse is blown or the circuit breaker or earth leakage current breaker (ELCB) trips, wait for at least the time designated on the equipment warning label before power-on or further operations. Failure to comply may result in death, personal injuries, or equipment damage.
- When the equipment is faulty or damaged, require professionals to perform troubleshooting and repair by following repair instructions and keep a repair record.
- Replace quick-wear parts of the equipment in accordance with the replacement instructions.
- Do not operate on damaged equipment. Failure to comply may result in death, personal injuries, or equipment damage.
- After the equipment is replaced, check the wiring and set parameters again.

Disposal



WARNING

- Dispose of retired equipment in accordance with local regulations and standards. Failure to comply may result in death, personal injuries, or property damage.
- Recycle retired equipment by observing industry waste disposal standards to avoid environmental pollution.

■ Safety Labels

For safe operation and maintenance, comply with the safety labels on the equipment. Do not damage or remove the safety labels. See the following table for descriptions of the safety labels.

To ensure safe operation, comply with equipment-related safety labels. See the following table for description of the safety labels.

Safety Label	Description
	• Read through the safety instructions before operating the equipment. Failure to comply may result equipment damage, personal injuries, or even death. • Do not touch the terminals or remove the cover with power ON or within 10 min after power-off. Failure to comply will result in an electric shock.

1 Product Introduction

1.1 Product Overview

The GE21-TF-RTC expansion card is the GE21 series storage (with integrated RTC) expansion card independently developed by Inovance. This card can be used with Easy321 and Easy511 series PLCs and supports upgrading user programs and firmware. During the upgrade, the RTC clock remains running normally.

1.2 Model and Nameplate

■ Model description

GE21 - TF - RTC

①

②

③

① **Product Information**

GE21 series general-purpose expansion card

③ **Product Code**

RTC clock card

② **Product Code**

TF card

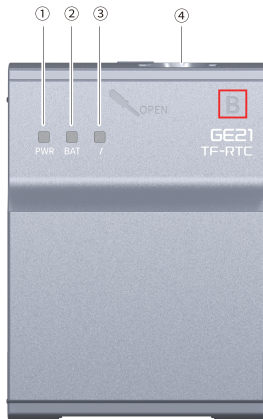
-

■ Nameplate description



Model	Description	Code
GE21-TF-RTC	PLC controller option-GE21-TF-RTC-GE21 series TF card (with integrated RTC)	01480074

1.3 Components



No.	Component	Mark	Definition	Indicator Color	Description
①	Power supply status indicator	PWR	Power supply state	Yellow-green	● ON: The power supply is normal ● OFF: The power supply is abnormal.
②	Battery alarm indicator	BAT	RTC battery low	Red	● ON: Indicates low battery. Replace the battery in time to prevent RTC clock loss. ● OFF: Indicates normal battery level

No.	Component	Mark	Definition	Indicator Color	Description
③	-	/	-	-	Reserved
④	Card slot	SD	-	-	-

Note

The letter "B" on the product indicates that only the card slot B of the PLC is supported.

1.4 Product Specifications

1.4.1 General Specifications

No.	Specification
IP rating	IP20
Dimensions (W x H x D)	58 mm × 42 mm × 21.4 mm
Weight	About 27 g

1.4.2 Power Supply Specifications

Item	Specification
Short circuit protection	Supported
Hot swap	Not supported

1.4.3 TF Card Specifications

No.	Specification
Communication interface	SDIO
Capacity	Max. 32 GB
Specification	TransFlash (Micro SD)
File format	FAT32
Mounting method	Self-eject

1.4.4 Clock Specifications

No.	Specification
Communication interface	I ² C
Clock accuracy	120 seconds/month
Time format	YYYY-MM-DD hh-mm-s
Battery specifications	Coin cell battery, 3-year service life, replaceable
Battery replacement time	≤ 60 seconds (power-off time does not exceed 15 seconds) Notes: If the power-off time exceeds 15 seconds, the RTC clock time needs to be reset after the battery is replaced.

1.5 Environmental Specifications

Take the operability, serviceability, and adaptability to environment into account when installing the expansion card to the PLC.

Item	Specification
Installation/Ambient environment	Free from conductive dust, conductive fibers, explosive dust, flammable gases, water mist/greasy dirt, corrosive dust/gases, strong vibration, and repetitive shock.
Max. altitude	≤ 2000 m
Pollution degree	Level 2
Interference immunity	2 kV on DC power supply line (IEC61000-4-4)
Overvoltage category	I
EMC immunity level	Zone B, IEC61131-2
ESD protection level	Contact discharge +/-6 kV, air discharge +/-8 kV
Vibration resistance	● Application scenario: Tested according to IEC60068-2-6. 3.5 mm amplitude at 5 Hz to 8.4 Hz; 1 g acceleration at 8.4 Hz to 200 Hz; in ten cycles/axes ● Transportation scenario: Tested according to IEC60068-2-64, 0.01 g²/Hz power spectral density at 5 Hz to 100 Hz; 0.001 g²/Hz power spectral density at 200 Hz; 1.14 g Grms

Item	Specification
Shock resistance	Application/Transportation scenario: Tested according to IEC60068-2-27; 15 g peak acceleration, 11 ms pulse width, 18 cycles in total in X, Y and Z axial directions
Ambient temperature/humidity	● Temperature: -20°C to +55°C ● Humidity: < 95% RH (30°C), without condensation
Storage temperature/humidity	● Temperature: -20°C to +60°C ● Humidity: < 95% RH (30°C), without condensation
Transportation temperature/humidity	● Temperature: -40°C to +70°C ● Humidity: < 95% RH (40°C), without condensation

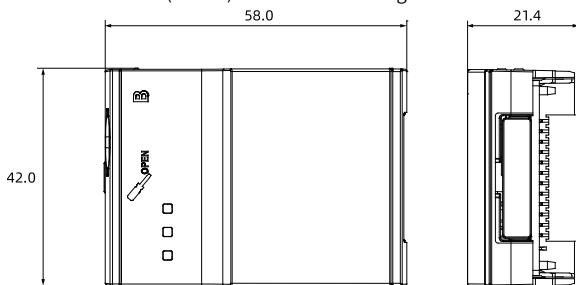
2 Installation

2.1 Installation Precautions

- Make sure the PLC is powered off before installing or removing the expansion card.
- Do not connect/disconnect the expansion card with power ON. This may lead to master restart or user data loss or damage.
- Do not drop or shock the housing or terminals of the expansion card to avoid damage.

2.2 Installation Dimensions

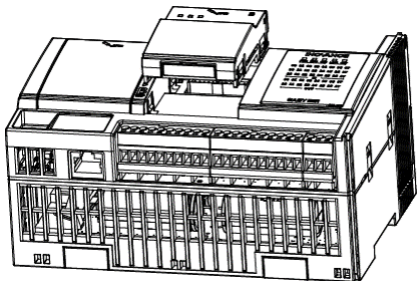
The installation dimensions (in mm) are shown in the figure below.



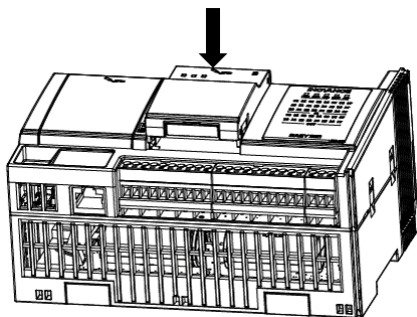
2.3 Installation Method

■ Installing the expansion card

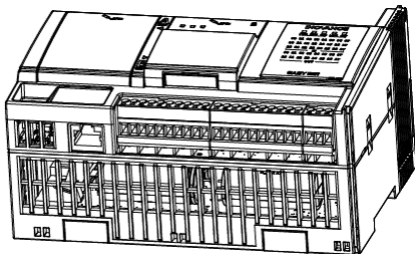
1. Place the PLC and the expansion card horizontally.



2. Insert the expansion card into the card slot B vertically along the guide ribs, and press the expansion card.

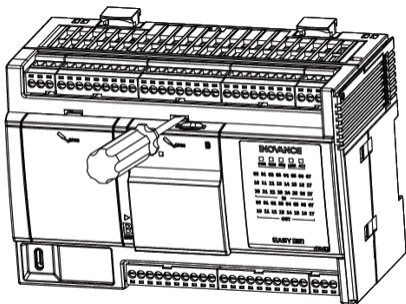


3. The installation is complete when you hear a click and the surface of the expansion card is flush with the surface of the PLC.

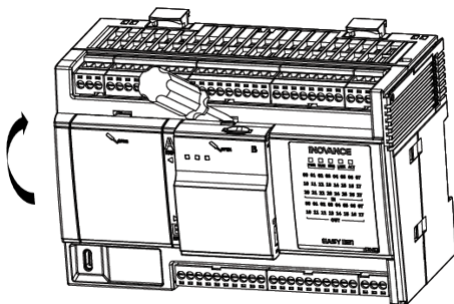


■ Removing the expansion card

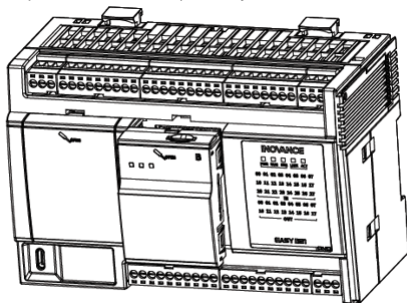
1. Place the PLC horizontally and insert a slotted screwdriver into the inner snap-fit position.



2. Pry the expansion card module in the direction of the arrow.



3. Remove the expansion card module vertically when you hear a distinct sound indicating that the expansion card has partially detached from the PLC.



3 Configuration and Commissioning



Caution

- The GE21-TF-RTC expansion card only supports EXP-B.
- The type ID of the GE21-TF-RTC expansion card is 17. The configured expansion card type must be consistent with the actually installed expansion card type.

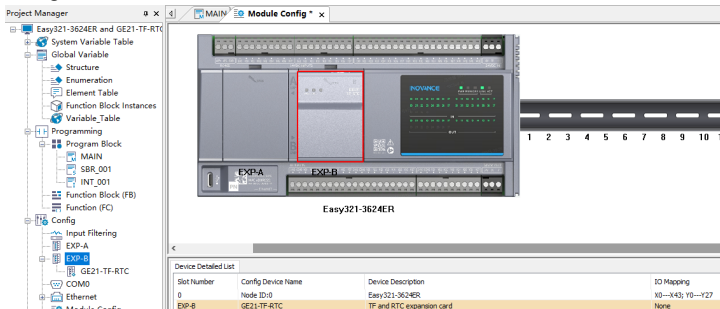
Operating procedure

1. Create a project.

- a. Double-click the AutoShop shortcut icon on the PC desktop to open the AutoShop programming software.
- b. Select **File > New Project** in the menu bar to open the **New Project** dialog box.

- c. Set **Project name**, **Save path**, **Editor**, **Project description**, and **Series and models**. Click **OK**.

2. In the **Project Manager** pane, go to **Config > EXP-B**. Right-click **EXP-B** and select **GE21-TF-RTC**. Alternatively, go to **Config > Module Config**. Right-click **Module Config** and select **Auto Scan** to add the GE21-TF-RTC expansion card, as shown in the figure below.



3. After successful compiling, download the project and run it.
 - a. Click the download button  in the toolbar to download the program to the PLC.
 - b. After the download is complete, click the run button  in the toolbar to run the program.

4 Appendix: Replacing the Backup Battery

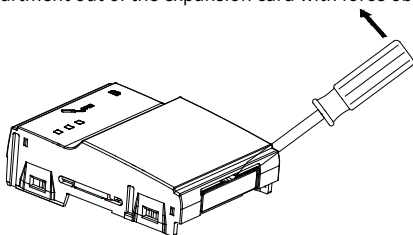
The backup battery supplies power to the product when the PLC is out of power, with a maximum battery life of 3 years, depending on the use environment. When the backup battery runs out of power, replace it promptly.



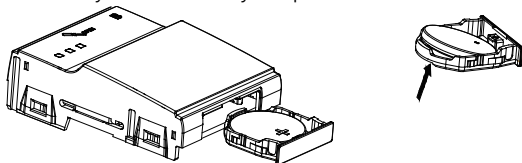
Caution

The replacement of the backup battery must be completed within 15 seconds (excluding the time for removing the expansion card); otherwise, the RTC clock will be lost.

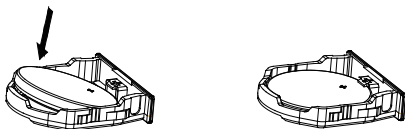
1. Remove the expansion card as described in "Removing the Expansion Card" in ["2.3 Installation Method" on page 19](#).
2. Insert a pointed tool, such as a screwdriver, into the notch in the housing and lever the battery compartment out of the expansion card with force obliquely upward.



3. Remove the old battery from the battery compartment.



4. Place a new battery in the battery compartment according to the polarity markings on the battery and make sure the battery is secured.



5. Push the battery compartment into the expansion card until you hear a click (Note that the positive polarity of the battery faces the notch in the housing).

