User Manual & Work Instruction:

SmartEVM-Electronic Voting Machine

2025

Version 1.2

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INTRODUCTION

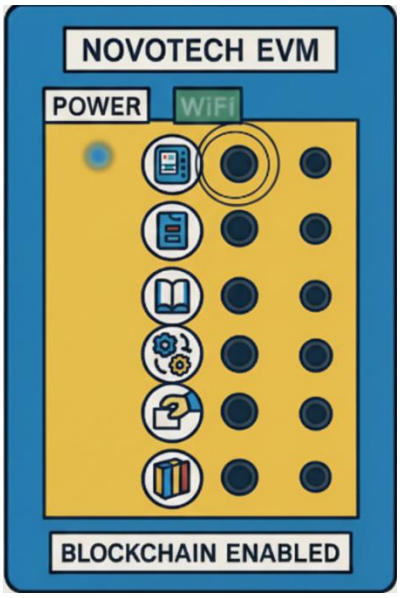
Welcome to the SmartEVM User Manual!

This manual is designed to provide you with clear instructions and guidance on the setup and use of the **SMART EVM**. Our aim is to ensure that you can take full advantage of all the features and benefits of this blockchain-enabled voting system, enabling secure, transparent, and efficient election processes.

The SMART EVM is an advanced electronic voting machine that integrates blockchain technology for tamper-proof vote recording. It offers features such as device registration, secure voter authentication, election creation, real-time vote monitoring, and reset functionalities. With its user-friendly interface and robust backend powered by **Ganache**, **Ethereum**, **Express.js**, **Next.js**, and **Flutter**, this system provides a reliable solution for digital voting.

Throughout this manual, you will find detailed information to help you register your device, log in, create and manage elections, view vote counts, and reset your system when needed. Step-by-step instructions are included for each feature, along with guidelines to ensure smooth operation and integration with your election process.
We at SMART EVM Innovations are committed to providing a secure and trustworthy voting experience. Should you have any questions or require support, our team is always available to assist. Thank you for choosing SMART EVM, and we trust this system will help you conduct elections with confidence, transparency, and integrity.

PRODUCT OVERVIEW



The SMART EVM is an advanced electronic voting solution that combines secure blockchain technology with a simple, user-friendly design. Built with an ESP32 microcontroller, integrated buttons, and status LEDs, the system ensures accurate vote recording and real-time monitoring. The device is enclosed in a durable acrylic-fabricated case, making it both lightweight and robust for field use.

Key Features and Specifications

- **Blockchain-Enabled Voting**: All votes are securely recorded on the Ethereum blockchain (via Ganache) to ensure transparency and immutability.
- **ESP32 Integration**: Provides Wi-Fi connectivity, processing, and secure communication between the device and backend systems.
- **Buttons and LEDs**: Each candidate is assigned a button with an indicator LED that confirms when a vote has been successfully cast.
- **Customization**: The machine includes 8 buttons in total, and the administrator can customize how many are active (e.g., 3, 4, 5, or all 8) depending on the number of candidates in an election.
- **Acrylic Fabricated Enclosure**: Custom-designed box made of acrylic material for durability, portability, and professional finish.
- **Reset Functionality**: Supports secure vote reset from the control panel, with reset events also stored on the blockchain for accountability.
- **Device Registration**: Each device has a unique ID printed on its casing, required during registration to link the EVM to the blockchain system.

- **Connectivity**: Real-time synchronization with the backend via Wi-Fi, ensuring vote counts and resets are updated instantly.
- **Dimensions**: Compact acrylic box designed for easy handling and secure deployment at polling stations.

1 - SAFETY INFORMATION

1.1. Safety Warnings

● Installation should only be performed by authorized personnel or trained technicians. Do not attempt to connect or modify the device if you are unfamiliar with electronics or IoT hardware.
● Use only the recommended power adapter for the ESP32-based system. Incorrect power supply may cause overheating, fire hazards, or permanent damage to the device.
● Do not open, disassemble, or alter the internal wiring of the EVM. Unauthorized modifications can lead to malfunction, electric shock, or compromise voting security.
● Keep the device away from liquids, direct sunlight, and high-temperature sources to prevent short circuits, physical damage, or operational failure.

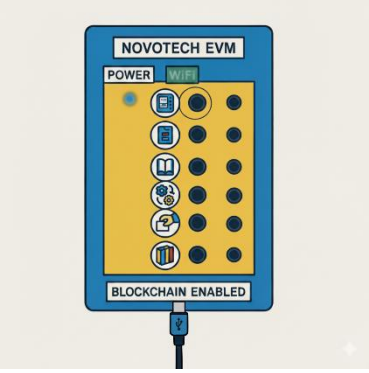
1.2. Guidelines for Safe Usage

1. Place the EVM in a stable, dry, and secure location such as a table or podium during elections. Avoid unstable surfaces or areas prone to spills or dust accumulation.
2. Periodically clean the acrylic enclosure with a soft dry cloth. Do not use water, alcohol, or chemical solvents.
3. Ensure the ESP32 firmware and backend software are updated regularly to maintain security, reliability, and compatibility with blockchain services.
4. In case of a malfunction or device error, disconnect the power immediately and contact the system administrator or SMART EVM support team for assistance.

2 - SET-UP INSTRUCTIONS

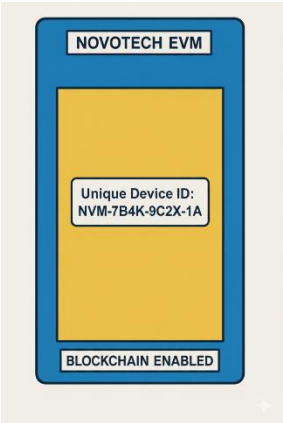
1. **Power Off**: Disconnect the power supply to the ESP32 device before beginning installation to prevent short circuits or accidental damage.
2. **Prepare the Device**: If replacing an older unit, disconnect any existing wiring. Inspect the acrylic enclosure to ensure it is intact and ready for use.
3. **Mount the EVM**: Place the SMART EVM on a stable surface such as a desk or podium. If wall mounting is required, mark screw positions, drill if necessary, and secure the device using the provided screws or brackets.

4. **Connect Power Supply**: Plug the ESP32 device into the supplied power adapter. Confirm the connection is secure and stable.



5. **Check Buttons and LEDs**: Verify that the 8 buttons and their indicator LEDs are operational. The administrator may configure how many are active depending on the election setup.

6. **Initial Setup**: Power on the device, connect it to Wi-Fi, and proceed with **device registration** by entering the unique Device ID and setting a secure password. Once complete, the unit will be ready for election configuration.



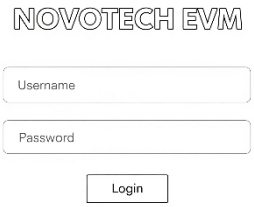
3 - OPERATING PROCEDURES

3.1 View Your Device

Prerequisites: Device must be registered using the Device ID (printed on the back) and a secure password.

Steps:

1. Open the View Votes page.
2. Enter your Device ID and Password, then click Login.
3. On success, you will land on the Dashboard, showing two options:
   - View Past Elections
   - Create New Election.



3.2 Creating a New Election

Purpose: Configure and register a new election linked to the logged-in ESP32 device. All data is stored on the blockchain.

Steps:

1. From View Votes, select Create New Election.
2. Complete the form:
    - Election Name: Required, 3–40 characters.
    - Number of Candidates: Choose 1–8 (activates that number of physical buttons).
    - Candidate Names: Provide unique names for each active button.
    - Maximum Votes: Set the maximum allowed votes (must be a positive integer).
3. Click Submit.
4. On success, the election is recorded on the blockchain, and the device becomes ready for voting.

3.3 Casting Votes (On-Device)

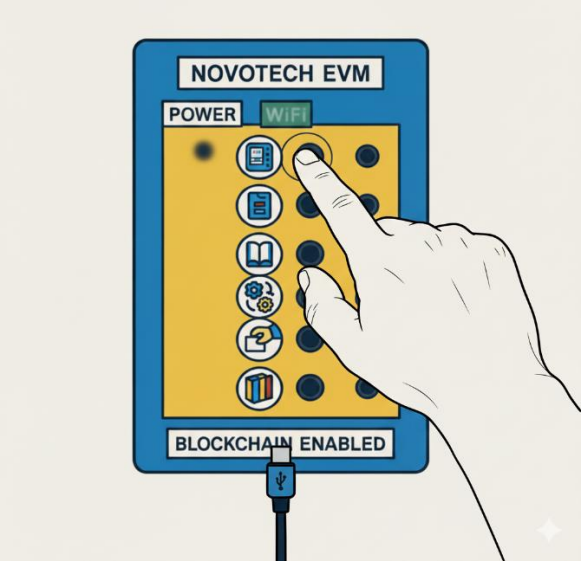
Purpose: Allow voters to vote using the physical buttons on the EVM.

Pre-Vote Checks:

- Confirm correct election is active.
- Verify device is connected to Wi-Fi.
- Check LEDs of active buttons are ready.

Steps:

1. Voter presses the button for their chosen candidate.
2. The paired LED lights briefly to acknowledge the vote.
3. The vote is sent to the backend and written to the blockchain.
4. If the maximum vote limit is reached, further presses are ignored, and a notice appears on the dashboard.



3.4 Viewing Past Elections

Purpose: Access election history stored on the blockchain.

Steps:

1. From View Votes, select View Past Elections.

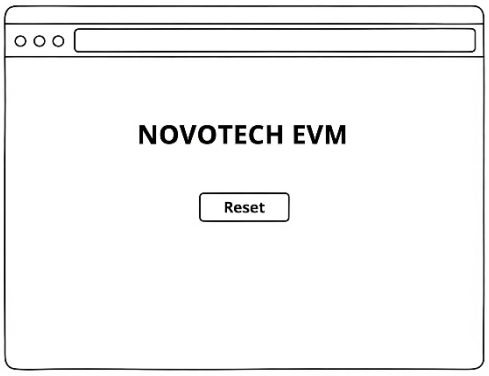
2. Browse the list of elections for the device.
3. Select an election to view details:
    - Name
    - Candidate list
    - Total votes per candidate
    - Maximum votes
    - Graph

3.5 Resetting Votes

Purpose: Clear current votes and prepare device for a new election. Reset events are logged on the blockchain.

Steps:

1. Open the Reset Page.
2. Enter Device ID and Password.
3. If a button is active, the Reset option becomes available.
4. Click Reset to clear votes.
5. A reset transaction is stored in the blockchain ledger.



3.6 Button Customization (Admin Option)

During election creation, select the number of candidates (1–8). The device will enable the corresponding number of buttons.

- Each active button requires a unique candidate name.
- Inactive buttons remain disabled for that election.

THANK YOU!