

# ICT and Elections

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## **THEMATIC WORKSHOP**

**Information Technology and Elections Management**  
**Informed Decisions for Sustainable Outcomes**



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# E Voting in INDIA

## EVMs in Indian Elections



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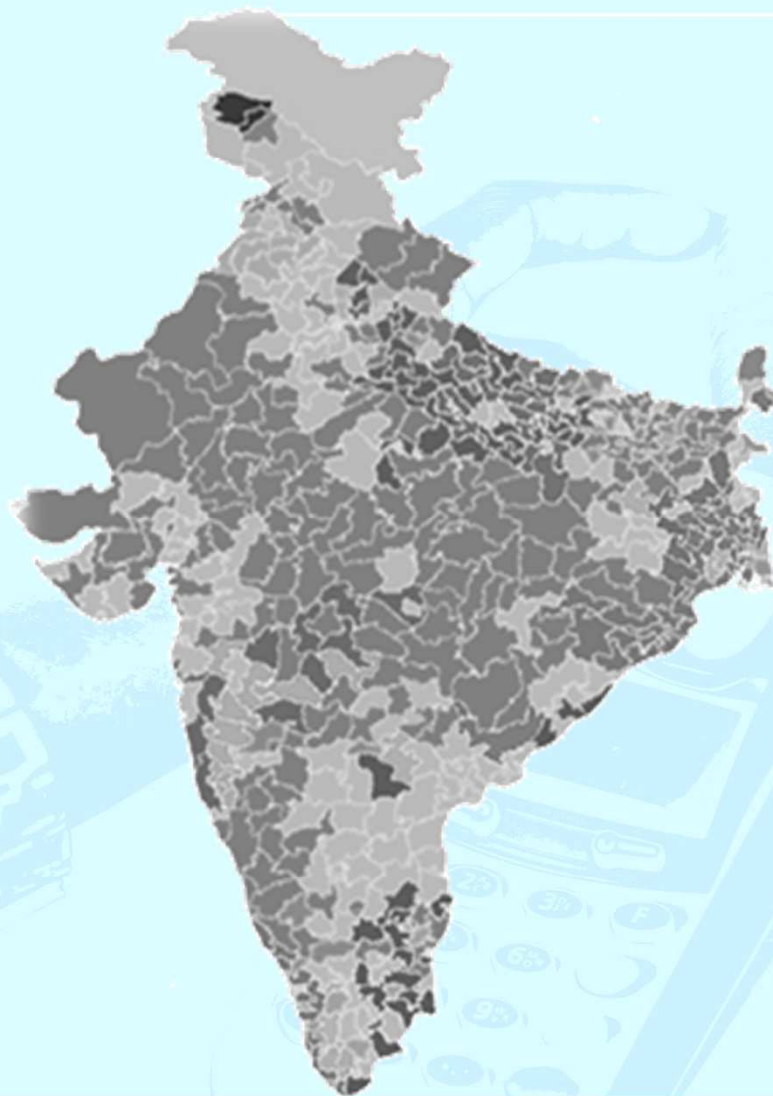
# What's Ahead

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- Introduction to Indian Electoral Dynamics
- History of EVMs in India
- E voting Features
  - Technical
  - Administrative
- E voting at polling station
- Counting
- Advantages
- Photo walk thru



# India Electoral Dynamics



**World's most populous democracy**

**753 million voters**

**0.83 million polling stations**

**5 million polling staff in GE 2009**

**Over 1 million EVMs used during GE 2009**

**Constituencies: 544 PCs and 4120 ACs**

**28 States and 7 Union Territories**

**1365 registered Political parties**



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# Indian Electoral system ; complex factors



# History of EVMs in India

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## **Separate Ballot Boxes:**

- first two General Elections in India in 1952 and 1957,
- unmarked ballot paper in the ballot box

## **Single Ballot Box:**

- Marking the ballot paper in 1960-1961.
- till the General Elections to Lok Sabha 1999



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# EVM Emergence:

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- Election process continued to remain cumbersome, with long drawn schedules and logistics.
  - **Printing of the ballot paper**, bundling serious challenges
  - **Distribution of the ballot paper** to the polling personnel of individual polling station was a laborious process,
  - **Counting process** involved a huge manpower and time
  - **Post counting scenario** was long drawn
- **Invalid votes** were in large number
- **Environmental impact**– the country had used over 8000 metric tons of paper



# History of EVMs in India

## EVM Emergence:

- The need to modernize the electoral process (In an error free manner and removing the possibilities of invalid votes was therefore acutely felt)
  - **1977** : Initial consideration for introduction
  - **1982** : 50 polling stations on an experimental measure
  - **1989** : The law was amended.
  - **1990** : Referred to the Electoral Reforms Committee (Dinesh Goswami). Technical Expert Committee for the evaluation of EVMs constituted by ERC.
  - **1990** : The Expert Committee unanimously recommended use of EVMs concluding it is a secure system.
  - **1992** : Necessary amendments in the Conduct of Elections Rules, 1961





# The Journey of EVMs

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- **1992 to 1998:** EVMs awareness by demo & mass media campaigns
- **1998 :** EVMs have been being used in every General /bye elections
- **2004 & 2009:** Exclusive use of EVMs in General Elections to Lok Sabha
- **2006 :** Further improvement in technology was brought about
  - Features like date and time stamping of all keys pressed and dynamic key coding were added

New model of EVMs was again evaluated by Expert Committee. They unanimously recommended the use of modified EVMs



# First Questions on E voting

Does it Fit into the existing Election Procedure?

Will it appear familiar to the voter?

Electorate acceptability?

How does it address the skepticism of the Political Parties, Civil society and media?

What are the transparent administrative safeguards, involving candidates and political parties?

Is it secure? what are the advantages & disadvantages?



# E Voting

## Basic Questions

How secure is the data ?

Adequate

- mechanical,
- electrical and
- software security features are provided

Can the data be tampered with ?

It incorporates a microprocessor that has 'burnt-in' software code which cannot be altered or retrieved

How does the machine operate in remote areas without electric power ?

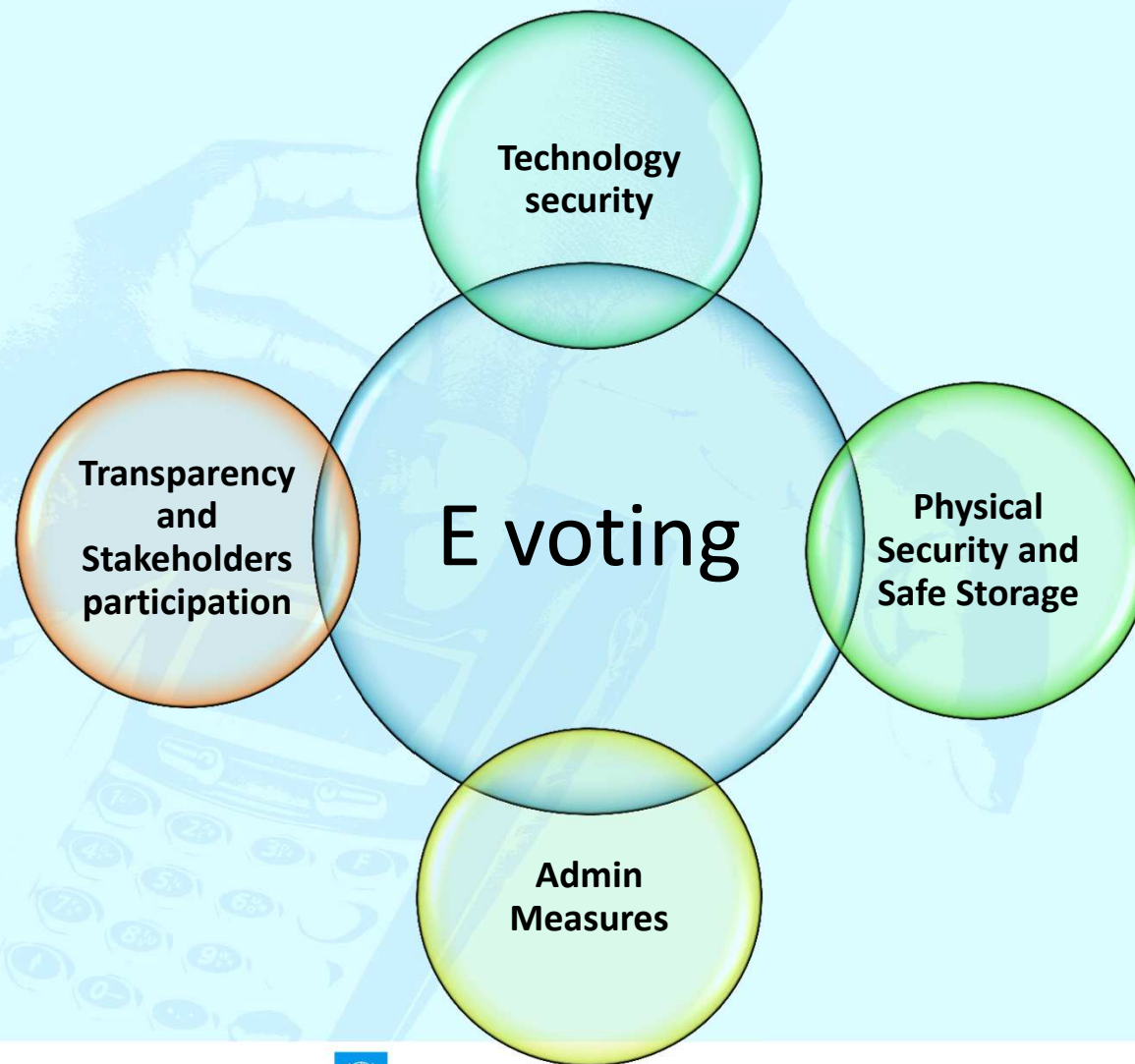
It is independent of main power and operates on a special power pack

Can the data be stored long enough ?

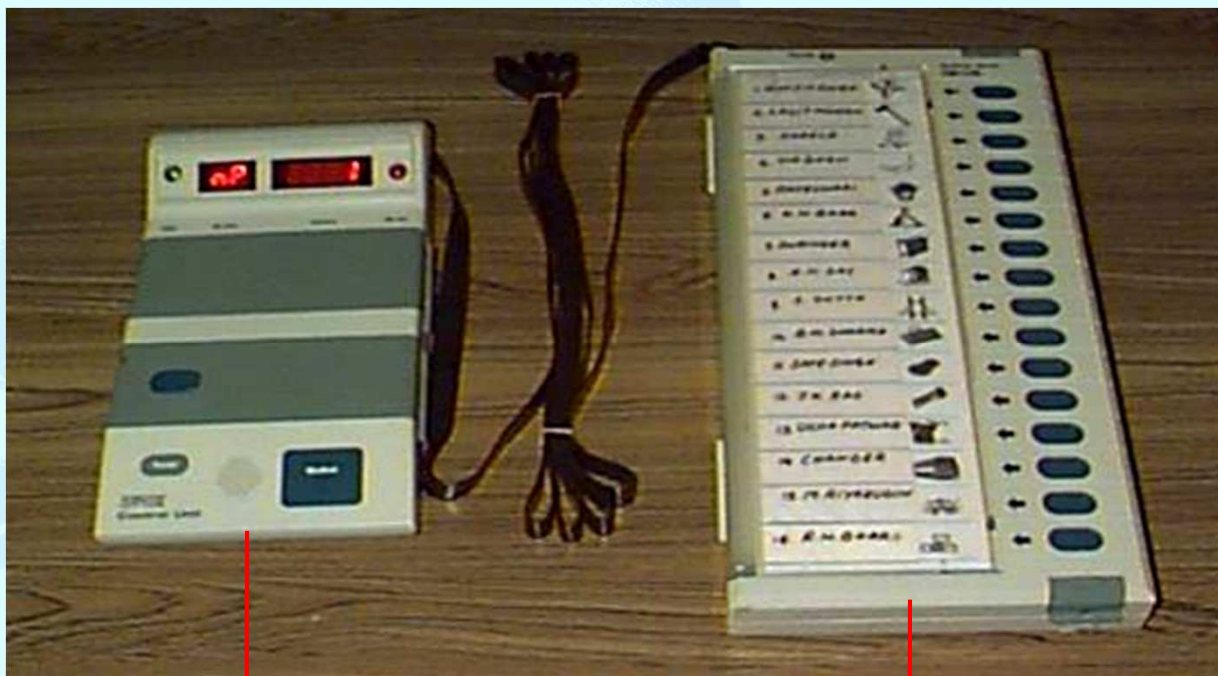
Data recorded on non-volatile dual redundant memory chips. Retained for years even when the power pack is removed



# E voting: Corner stones



# Technology features



Control Unit

Ballot Unit



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# Technology features

## Micro-controller:

1. One Time Programmable Read Only Memory (OTPROM)
2. Program codes are fused permanently
3. Program codes once written and fused , cannot be read back or altered by anyone including the manufacturer
4. Does not accept data from any other external device other than the Ballot Unit
5. Stand-alone system and does not have any operating system



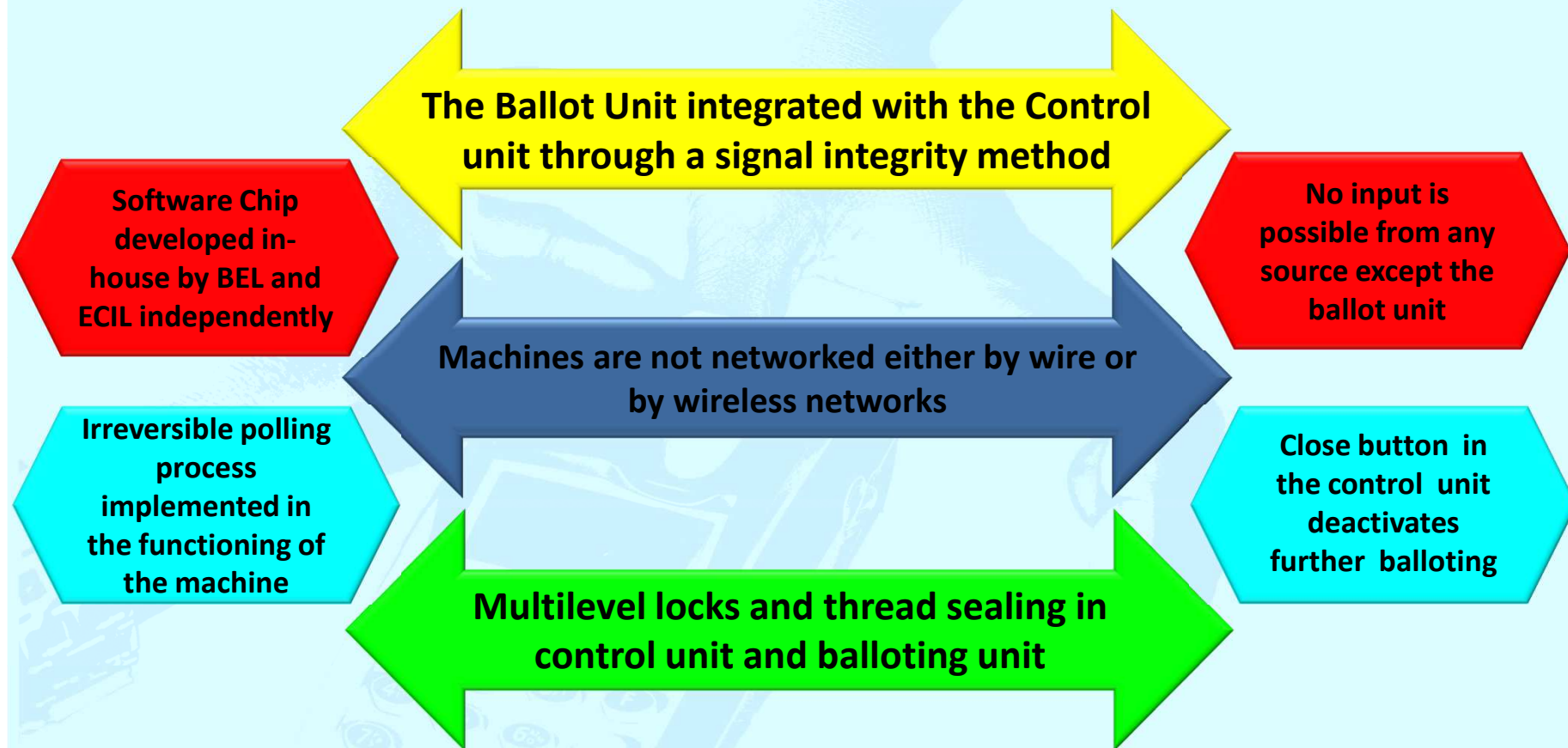
## Non-Volatile Memory:

1. Data can be written only through the command signal from the Micro-controller only
2. Non-Volatile Memory and Micro-controller are tightly integrated
3. Memory device does not require a battery backup and can store data safely
4. Data recorded on the memory chips can be retained for many years even when the power pack is removed

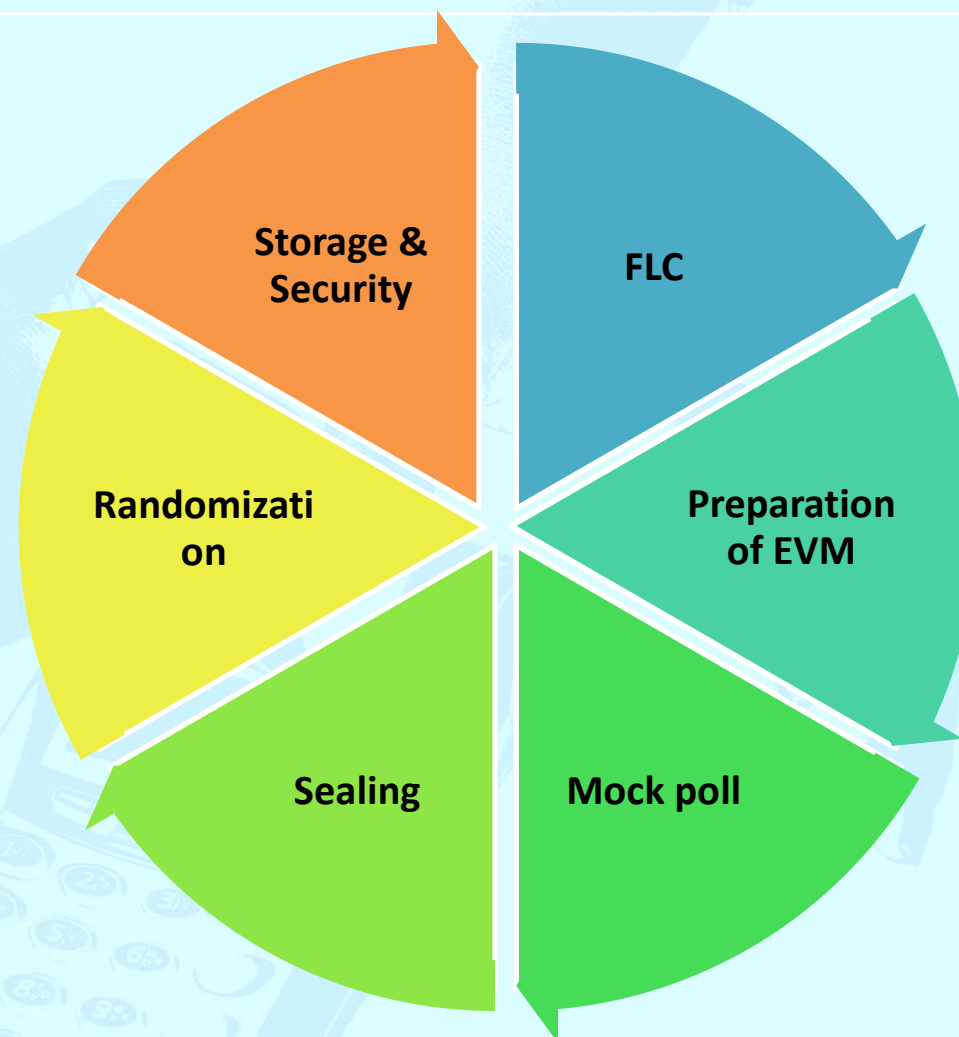




# Technology features



# Administrative Measures



Involvement of stake holders for building Trust and Confidence

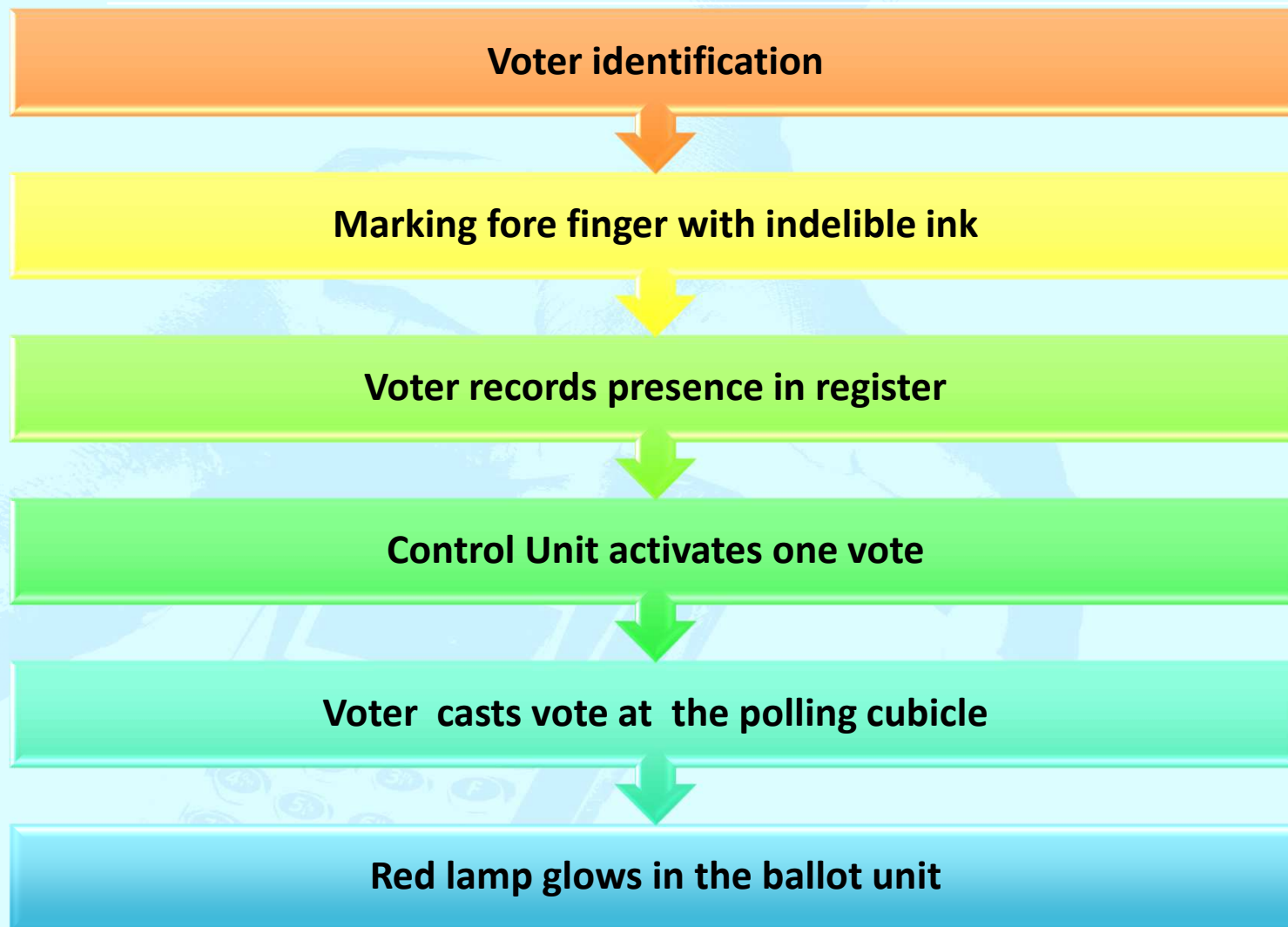


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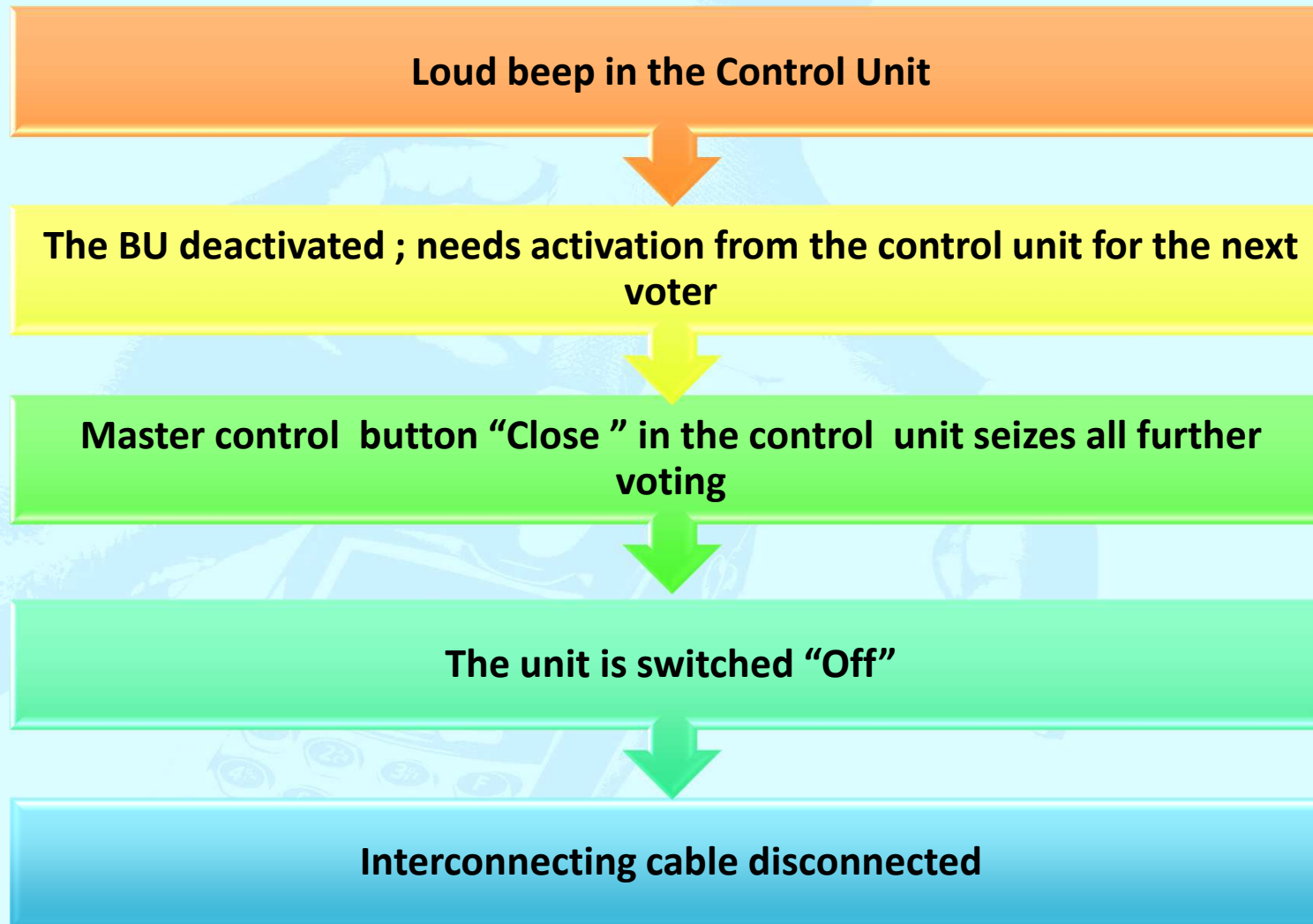


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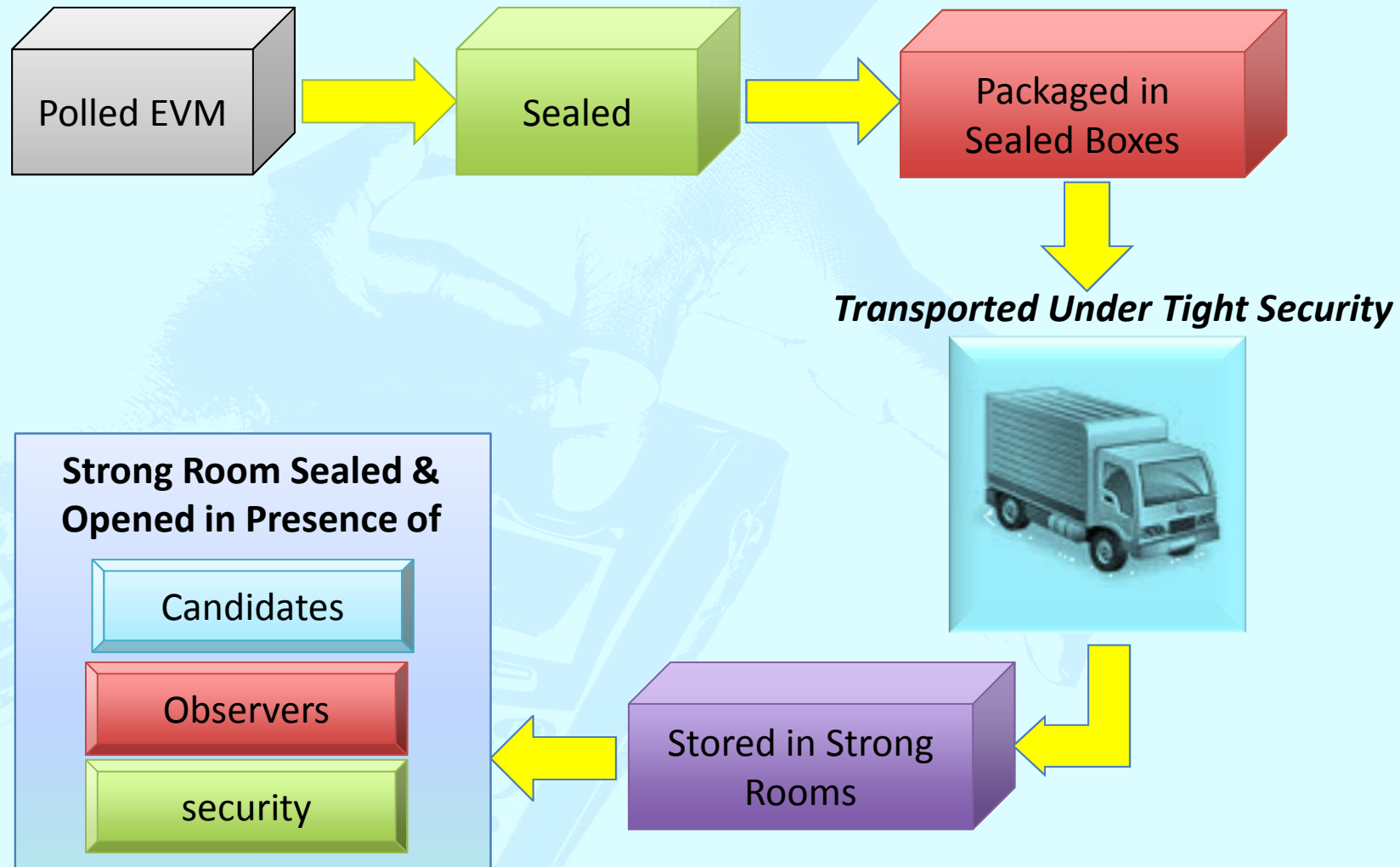
# E-Voting at the Polling station



# E-Voting at the Polling station



# Storage of Polled EVMs:



# Counting Process in EVM

- Video recording of the display on the CU is being done at all time
- Only authorized personnel ( Election official, Media and candidates /counting agents)
- Strict frisking by security personnel.
- 100 meter periphery sanitized
- Result of round wise counting of votes are immediately displayed prominently
- After completing all rounds, final tabulation is done and only then the results are declared.





# Advantages of E Voting

- **No Scope for Invalid Votes**
- **Reduced Logistical Arrangements**
  - Transportation easier
  - Counting easier and faster
  - Simple to operate
  - Easy to manage
  - Less Manpower
- Stores result in its memory for 10 years and more
- Elector friendly as illiterate people find EVMs easier than the ballot paper



# Advantages of E Voting

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- Increased Speed of Voting
- Low operating cost
- Ballot stuffing better handled
- Preserves voting secrecy
- Re-usable: EVMs can be reused
- Braille stickers enabling Blind voters to vote on their own
- Impartiality of Electronic voting and counting technologies



# To end with....

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- Trust and confidence in the system very essential
- Transparency in operations
- Involvement of Political parties at every stage
- Demos to citizens and media
- Modernizing essential





# Photo Walk thru



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# Ballot Paper printing/ verification in process



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**THEN :- BALLOT BOX WAY** 5 - 9 March 2012, Mombasa, Kenya

# Ballot papers being carried from Press



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**THEN :- BALLOT BOX WAY** 5 - 9 March 2012, Mombasa, Kenya



# Ballot papers being verified and dispatched for polling stations



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**THEN :- BALLOT BOX WAY** 5 - 9 March 2012, Mombasa, Kenya

# Ballot Paper Vs. E Voting

**Then**

**Ballot box way**



Ballot box ready for dispatch

**Now**

**Electronic Voting Machine (EVM) way**



EVM ready for dispatch



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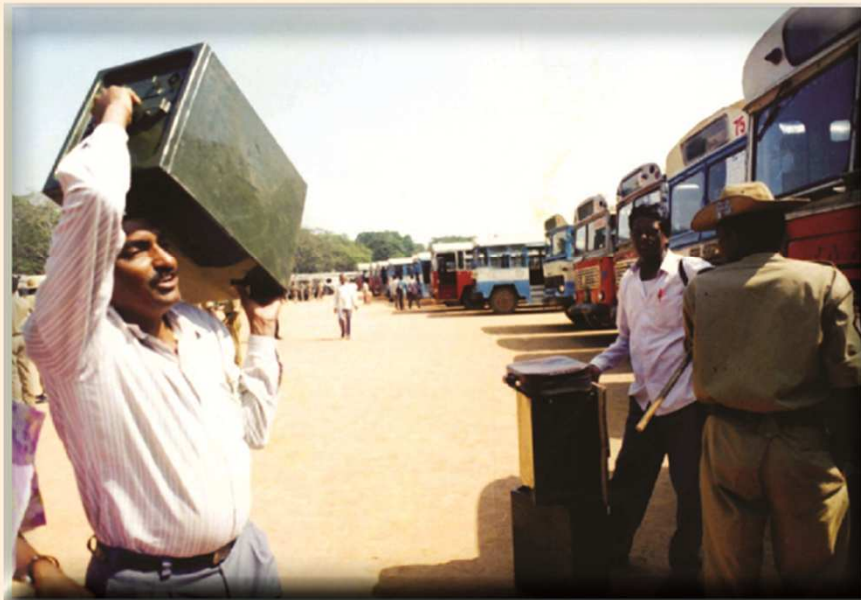
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# Ballot Paper Vs. E Voting

**Then**

**Ballot box way**



Ballot Box being carried to Polling stations

**Now**

**Electronic Voting Machine (EVM) way**



EVMs being carried by Polling Staff



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# Ballot Paper Vs. E Voting

**Then**

**Ballot box way**



Voting Ballot paper way

**Now**

**Electronic Voting Machine (EVM) way**



Voting EVM way



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# Ballot Paper Vs. E Voting

**Then**

**Ballot box way**



Voter inserting ballot paper in the ballot box

**Now**

**Electronic Voting Machine (EVM) way**



Voter casting her vote in the ballot unit



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# Ballot Paper Vs. E Voting

**Then**

**Ballot box way**



Counting Ballot box/ Paper way

**Now**

**Electronic Voting Machine (EVM) way**



Counting EVM way



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# Ballot Paper Vs. E Voting

**Then**

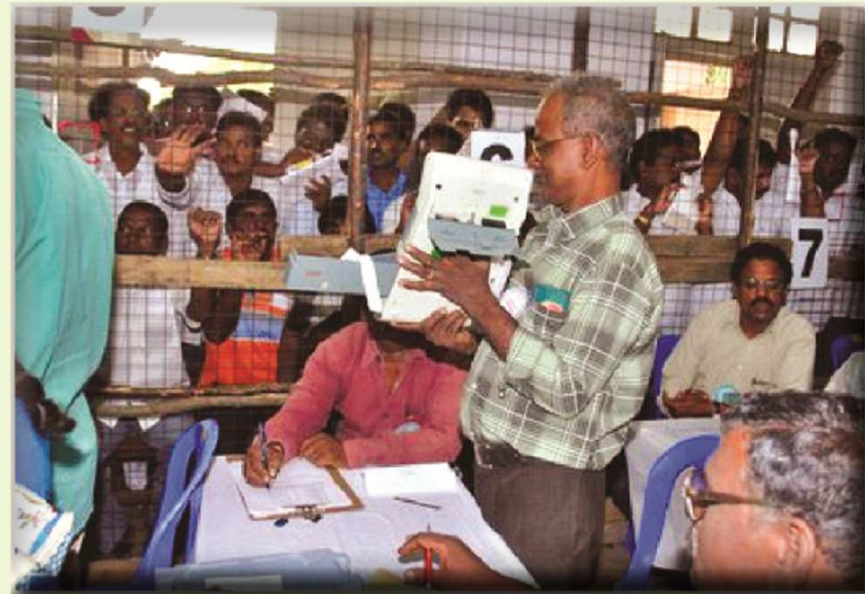
**Ballot box way**



Counting Ballot box/ Paper way

**Now**

**Electronic Voting Machine (EVM) way**



Counting EVM way



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# EVM Photos



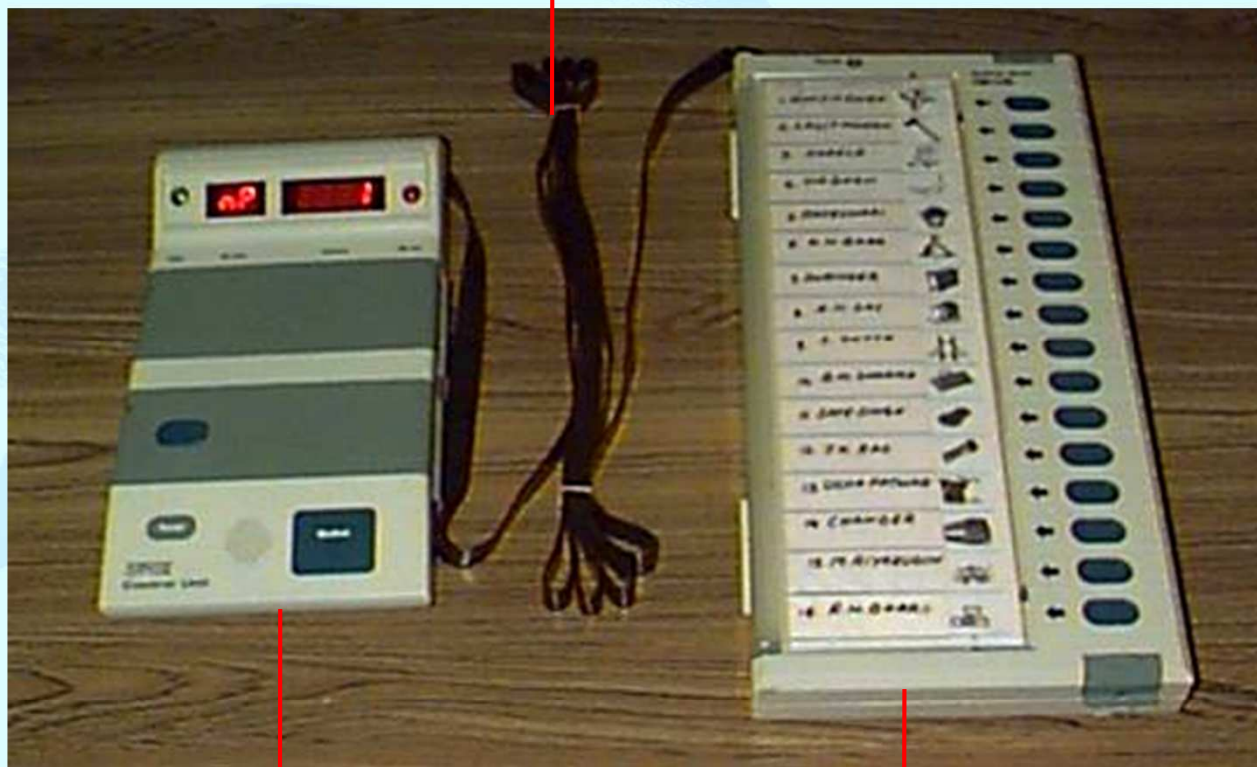
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# Sub-Units of EVM

Interconnecting Cable



Control Unit

Ballot Unit

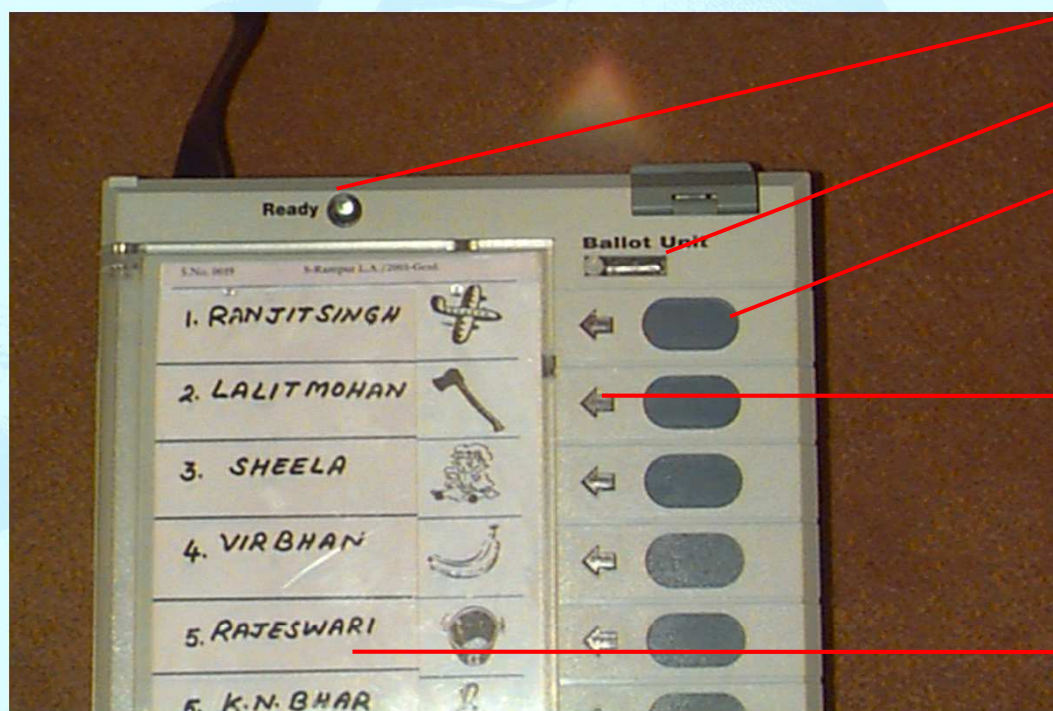


# Control Unit - Display Section





# Ballot Unit - Details



Ready Lamp  
Slide Switch Window  
Candidate's Button

Candidate's Lamp

Ballot Paper Screen



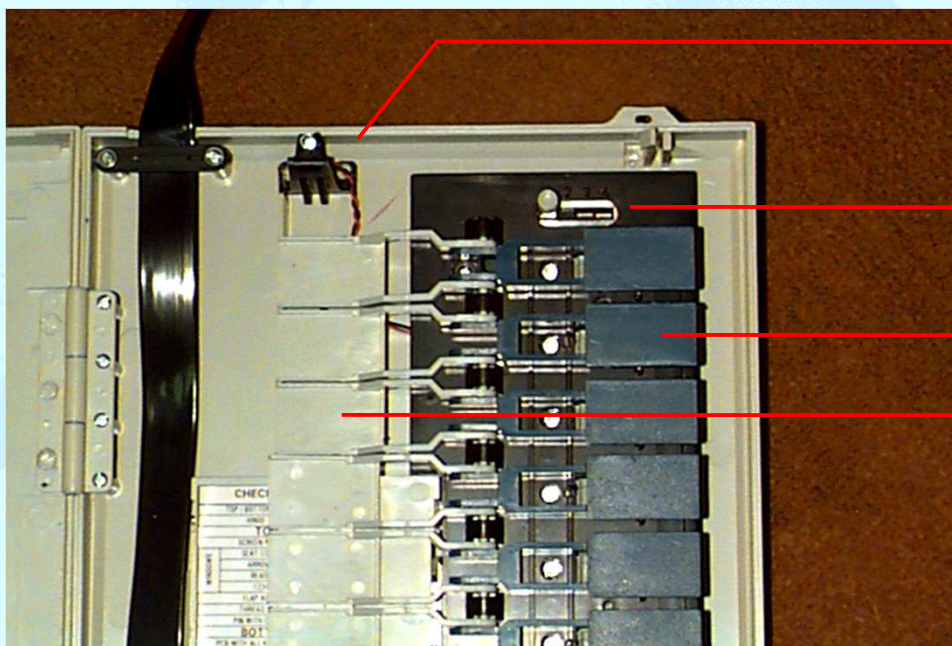
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# Ballot Unit - Internal parts



Ready Lamp

Slide Switch

Candidate's Button

Masking Tab

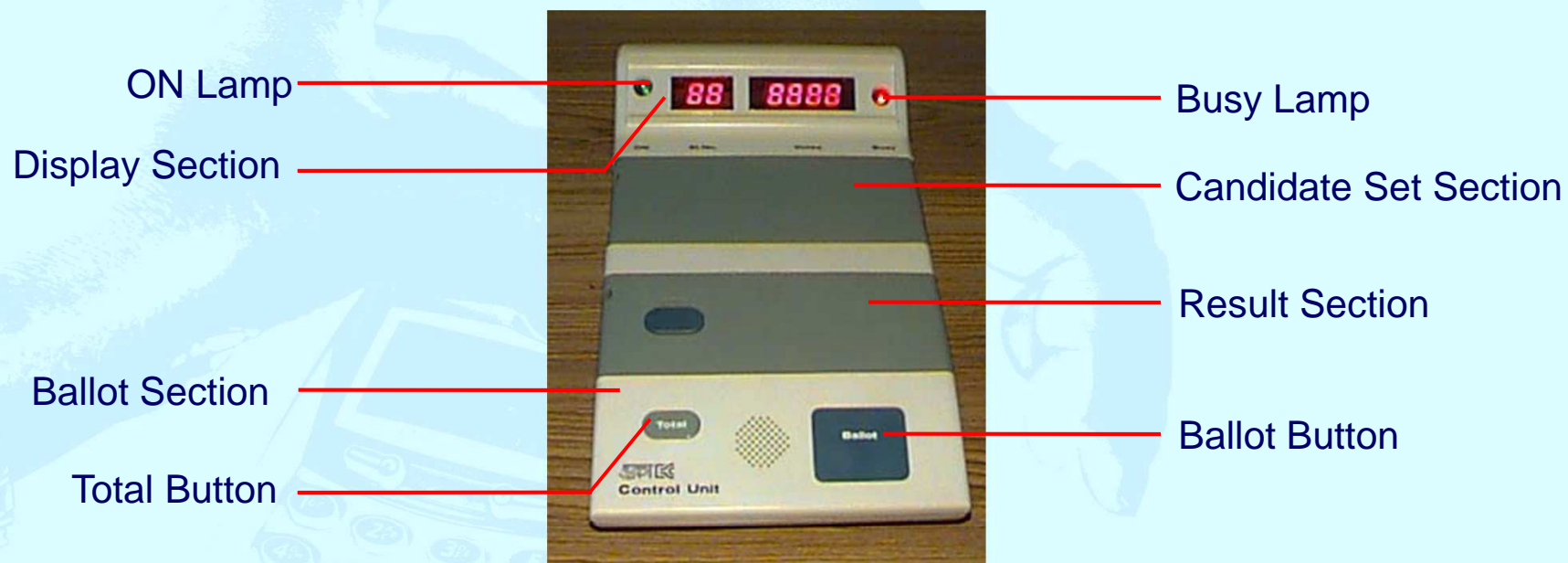


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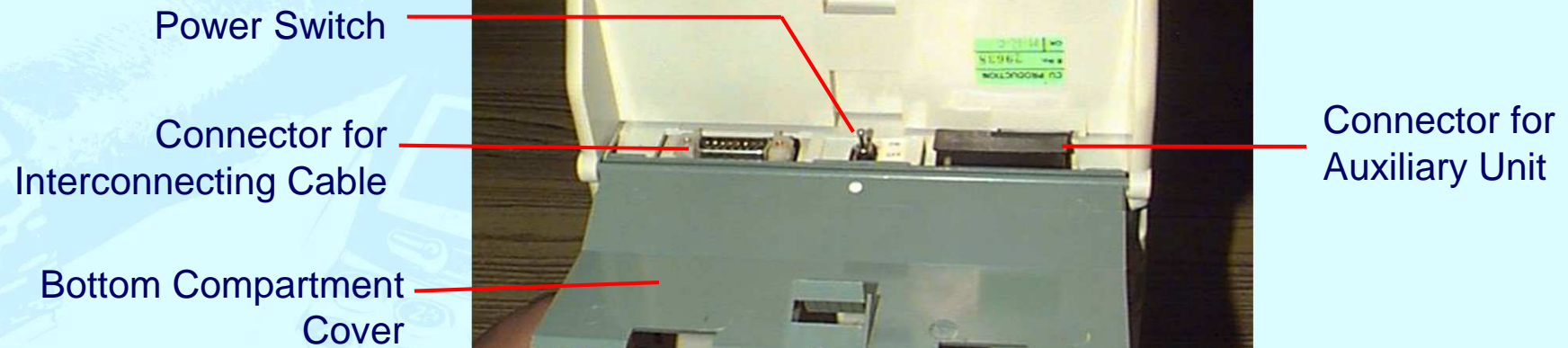


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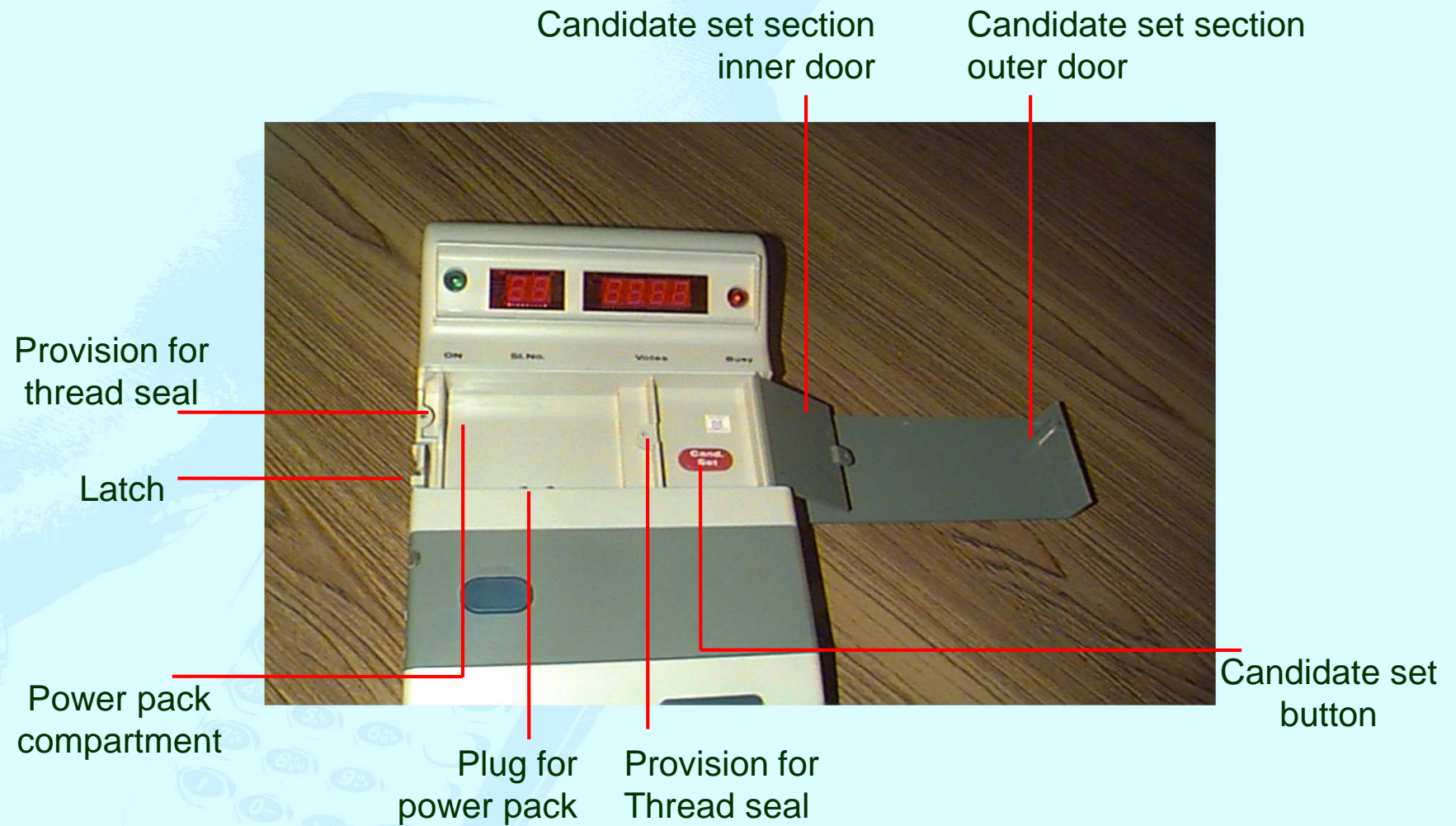
# Control Unit



# Control Unit - View of Bottom Compartment

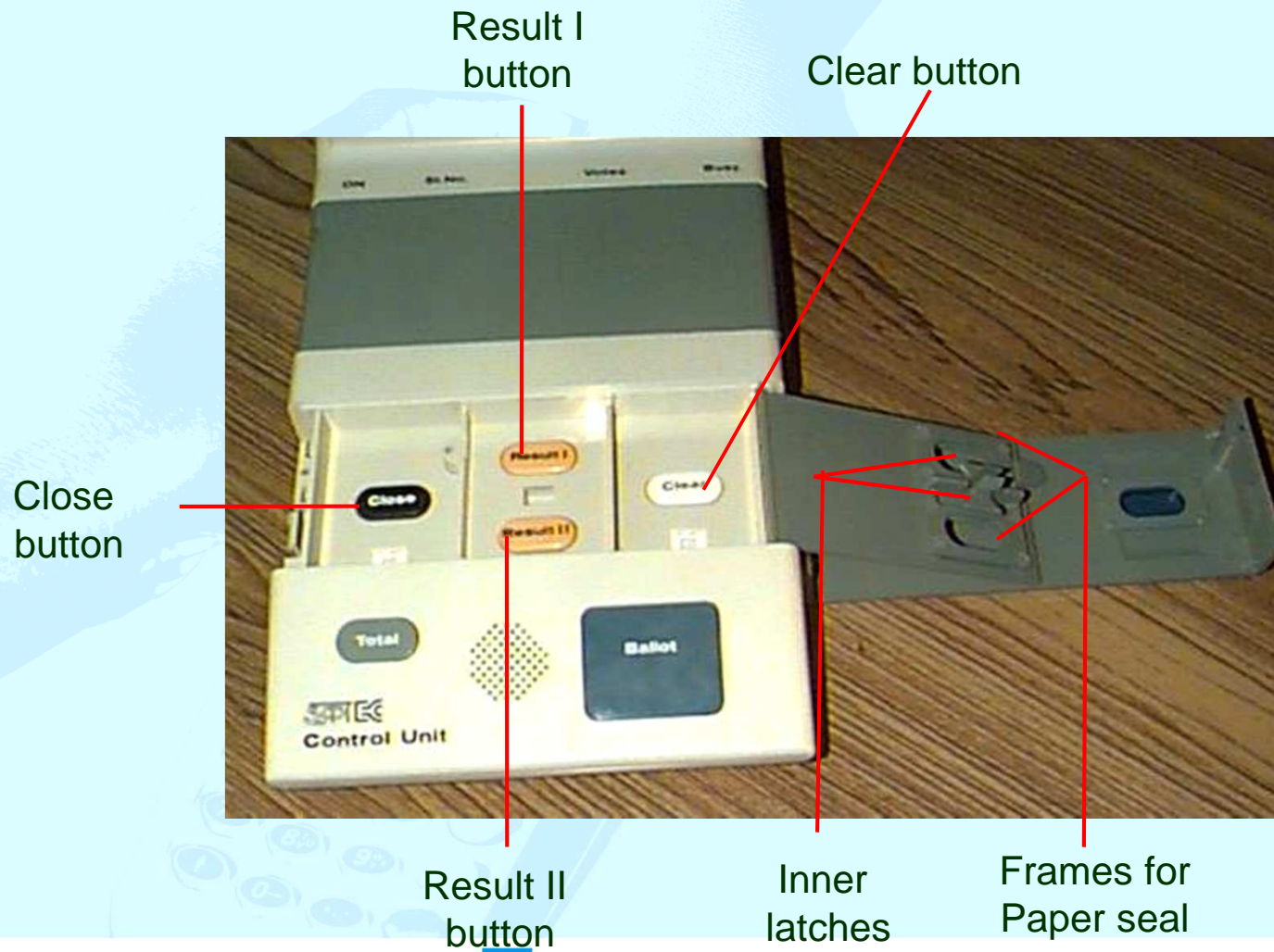


# Control Unit - Candidate Set Section





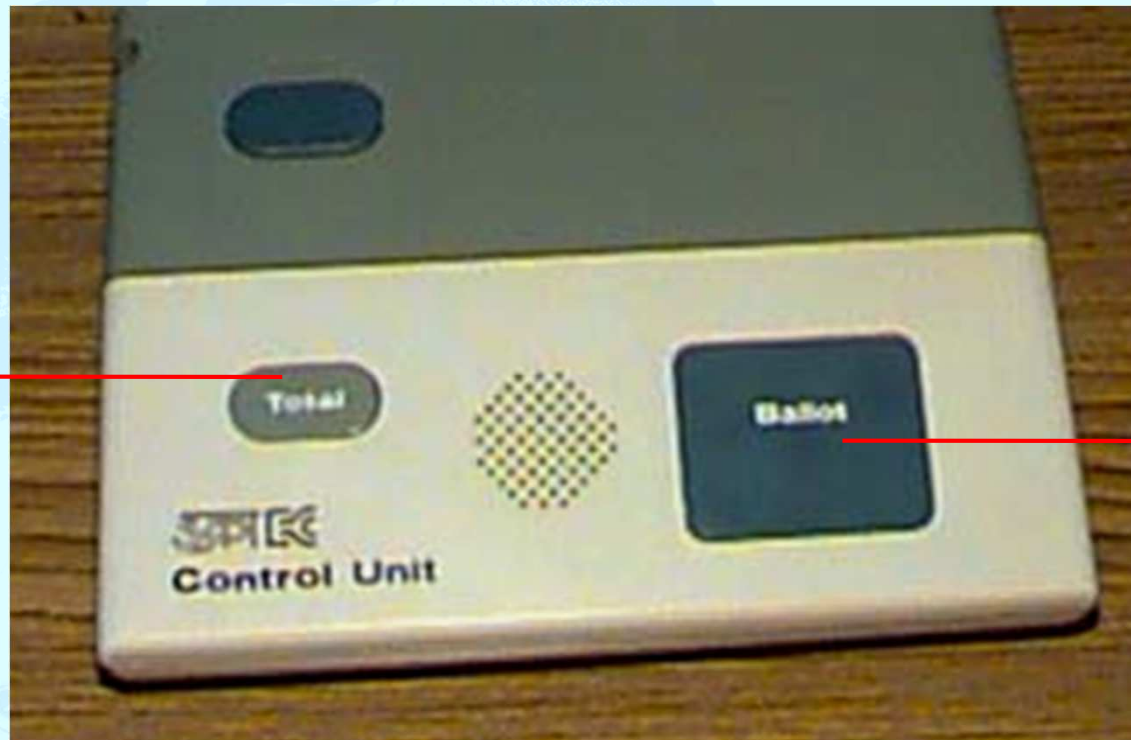
# Control Unit - Result Section





# Control Unit - Ballot Section

Total button



Ballot button



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# Thank You



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# The Indian elections size of the operations

- For instance, in the General Elections -2009 there were
  - 8,34,944 polling stations,
  - 2046 election observer
  - 1,39,284 micro observers,
  - 46,90,575 polling staff deployed.
  - 74,729 videographers,
  - 40,599 digital cameras deployed,
  - 119 special trains comprising 3060 coaches used for transporting police personnel
  - 55 helicopters 600 sorties,
  - 86,782 villages were identified under vulnerability mapping.

