



# Open Source Release Documentation

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# I. Introduction

Prime III was created in 2003 as the world's single most accessible electronic voting system in Dr. Juan E. Gilbert's research lab. It offers a secure, multimodal electronic voting that delivers the necessary system security, integrity and user satisfaction safeguards in a user-friendly interface that accommodates all people regardless of ability. Prime III implements a Universal Design. By Universal Design, we mean an approach that was intentional to accommodate all voters on a single machine independent of situation or ability. More specifically, Prime III allows people to vote by voice and/or touch with a user-friendly interface.

Prime III was the basis for a proposal successfully submitted to the U.S. Election Assistance Commission (EAC) to make voting systems more accessible. In June 2011, the EAC announced Dr. Gilbert's team would lead the \$4.5 million project.

Prime III advances the following four areas of voting technologies:

- **Accessibility.** Voters can choose to follow written or spoken instructions. Likewise, they can record their votes either by touching a screen, using a physical switch, or speaking into a microphone.
- **Security and Privacy.** Prime III's self-contained software runs within the web browser offline. This means that the software never has to interface with online/internet systems; therefore, it can be downloaded to a local computer. Additionally, when using the voice-activated ballot, voters are not required to divulge the names of candidates they support. Instead, a series of voice prompts leads voters to say words such as "next" or "vote." After voters complete their ballots, they should confirm their selections on printed ballots (containing no identifiable information) before the ballots are placed into the ballot box. This safeguard mechanism allows election officials to manually audit overall results.
- **Usability.** The software was developed through years of usability testing, which included focus groups consisting of people with a variety of physical disabilities. This research continues in larger public tests.
- **Cost-Efficiency.** Prime III is a cost-savings model for administering elections in comparison to other technologies. The various fiscal needs of organizations interested in using this technology were considered when designing Prime III. The software and hardware models have been designed to reduce the cost of an election significantly by using commercial off-the-shelf (COTS) components.

Prime III enables those who may have difficulty seeing, hearing, speaking, or reading, as well as those who may have other physical disabilities, such as missing limbs, the ability to vote securely, privately, and with dignity. Everyone votes on the same machine independent of their ability or disability.

## II. Setup

Prime III is designed to operate with a mouse, touch or stylus as input. The interface is setup to accept keyboard input for tab, arrow keys and the enter key. If you connect an accessibility switch to Prime III, you can program the buttons accordingly. Speech or sound input is possible by using a headset with a microphone. Prime III works best in Firefox in full screen mode. When using the java applet for the sound detection, you can set the java permissions to bypass the popup box for the microphone. For best results, use Firefox with this version of Prime III. To start Prime III,

1. Make the necessary adjustments to the Settings.js file, see details below.
2. Add the appropriate access codes to the Ballot.js file.
3. Open index.html in Firefox

### Additional Open Source Software

The Prime III system uses additional open source software for the text to speech, speech recognition (or sound detection) and PDF ballot printing. The text to speech is accomplished using meSpeak.js. Prime III also uses SitePal, but this requires a license. The speech recognition uses PocketSphinx from CMU or a sound detection java applet developed in our labs. The PDF ballot printing jsPDF. These open source tools are used to build the Prime III features.

### index.html

The index.html file is the starting point for Prime III. After adjusting the configurations, open the index.html file in your web browser. Currently, Prime III works best in Firefox.

### Settings.js

The configuration file for Prime III is Settings.js. The primary configuration settings are described below.

***var TextToSpeechEngine = "Speakjs"; //Speakjs or SitePal***

The TextToSpeechEngine setting specifies which text to speech engine to use in Prime III. Currently, Speakjs represents the meSpeak.js setting. SitePal requires a SitePal account and it requires you use Prime III online.

***var meSpeakVoice = "voices/en/en-us.json";***

The meSpeakVoice will be used in future releases for multilingual support.

***var PrintThe = "QRCode"; //Ballot or QRCode or BallotAndQRCode or PDFText or PDFImage or Nothing***

PrintThe is a configuration setting describing what to print. The *Ballot* setting, will print a Prime III ballot. The *QRCode* setting prints a qrcode representing the Prime III ballot. *BallotAndQRCode* prints the ballot and the qrcode. The *PDFText* will print the Prime III ballot in PDF. The *PDFImage* is for a future implementation and the *Nothing* doesn't print anything.

***var UserInterface = "LEVI"; //Basic or LEVI***

The UserInterface setting loads the appropriate voting system visual interface. The *Basic* setting will load a simple ballot interface with a dropdown box for the contests. The *LEVI* interface is the Low Error Voting Interface designed by Dr. Ted Selker.

***var AllowVotersToSelectAudio = true;***

Allows the voter to select the audio options.

***var AllowOverVotes = false;***

AllowOverVotes will allow the voters to over vote.

***var UseAudio = false;***

When UseAudio is true, Prime III will use the text to speech engine to speak to the voter. If UseAudio is false, the system will be silent.

***var MicIsOn = false;***

When the MicIsOn is set to true, Prime III will use the corresponding SoundDetector speech engine. If set to false, Prime III doesn't accept speech or sound input.

***var UseAccessCode = true;***

When UseAccessCode is set to true, Prime III will require the user to enter an access code to start Prime III. Otherwise, Prime III opens without an access code.

***var SoundDetector = "PocketSphinx"; //Java or PocketSphinx***

The speech recognizer or sound detector is specified by SoundDetector.

***var SoundDetectorSensitivity = 4.5; //default is 10, we have been using 3.5, the higher the number the less sensitive***

The SoundDetectorSensitivity is used by the sound detector java applet only.

***var SoundDetectorSensitivityMax = 7; //maximum sensitivity level***

The SoundDetectorSensitivityMax is used by the sound detector java applet only.

***var SoundDetectorSensitivityIncrement = 0.5;***

The SoundDetectorSensitivityIncrement is used by the sound detector java applet only.

***var QRCodeBaseURL = "p3v.us/i.htm"; //This is the location for Prime III on the web for QR Code Processing***

The QRCodeBaseURL specifies the base location for Prime III on the web for use when scanning a qrcode that was generated by Prime III. See the Prime III YouTube video for an example.

***var VotedMenuString = " \*\*\*";***

The VotedMenuString specifies the string that designates a candidate or option has been selected by the voter.

***var NumberOfCandidateButtonsColumns = 2; // Set to 1 or 2***

Represents the number of button columns (1 or 2) when using the LEVI interface.

***var NumberOfCandidateButtons = 12; //6 or 12***

Represents the number of buttons on the page. 6 or 12 are typically good numbers.

***var CandidateButtonFontAndSize = "font: bold 18px  
Arial;width:800;height:90";***

Specifies the font for the candidate buttons.

## **Ballot.js**

The Ballot.js file contains all the information about a specific ballot in Prime III.

***var BallotName = "NIST Standard Ballot";***

The BallotName setting represents the title of the ballot.

***var BallotID = "UF2015";***

The BallotID is a unique identifier for the ballot.

***var NumberOfCandidates = 71;***

The NumberOfCandidates is generated by the BallotCreator.html, see below, and represents the number of candidates on the ballot.

***var NumberOfContests = 11;***

The NumberOfContests is generated by the BallotCreator.html, see below, and represents the number of contests on the ballot.

***var NumberOfParties = 11;***

The NumberOfParties is generated by the BallotCreator.html, see below, and represents the number of parties on the ballot.

***var AccessCodes = new Array();***

***AccessCodes[0] = "1853";***

***AccessCodes[1] = "1111";***

***AccessCodes[2] = "0000";***

AccessCodes represents the acceptable access codes for Prime III on the access code screen.

### **BallotCreator.html**

The BallotCreator.html file can be used to generate the JavaScript for the Ballot.js file. Please copy and paste the JavaScript into a Ballot.js file for use in Prime III.

## **III. Prime III Websites**

Prime III primary website: <http://www.PrimeVotingSystem.org>

YouTube Videos:

<https://youtu.be/bM5DKP4c4aw>

<https://youtu.be/YPorhOMzaKk>

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