project VOX

L.A. COUNTY + IDEO

Deliverable 3.1.4
In-process BMD Prototypes (Audio UI v.2)

Los Angeles County + IDEO | May 5, 2015

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VOTING PRINCIPLES

Relevant for the Audio User Experience

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4

*The voting system must instill **public trust** by having the ability to produce a physical and tangible record of a voter's ballot to verify the ballot was marked as intended before it is cast and to ensure audit ability of the system.*

The role of the paper ballot should be understood by the voter.

6

*The voting system must offer a **variety of options** to cast a vote to ensure that a single/ fixed method of voting does not prove to be a barrier and source of disenfranchisement for any group of voters.*

Voters with visual impairments should have an option to vote on the BMD in a way that doesn't require the touchscreen.

7

*The voting system must guarantee a **private and independent** voting experience for all voters, including voters with a full range of types of disabilities and voters with limited English proficiency.*

Voters who use the BMD should be able to discover and use the audio interface privately and independently.

Voters should be able to cast their ballots and verify their selections privately and independently.

8

*The voting system must be **easy** for all voters to use, in particular, for voters with a full range of types of disabilities and voters with limited English proficiency.*

The audio UI and the interaction with the hardware inputs and outputs should be easy to use.

GOALS

Goals for Software Prototype 3.1.4 in User Evaluation Session

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1. Understand the **relationship between the audio output and keypad input**.
2. Solicit guidance on what **types of settings** are desired.
3. Iterate on the **flow and language** of the audio + keypad user interface based on user input.
4. Observe how users navigate through a **'vote for multiple' contest**.
5. Get feedback on synthetic **voice** versus human voice.
6. Compare the two different **keypad layouts.**

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RESEARCH SETUP

Prototype setup for 3.1.4 User Evaluation Session

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RESEARCH SETUP

Changes from 3.1.3 Prototype to 3.1.4 Prototype

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3.1.3 Prototype	3.1.4 Prototype
User driven, where the voter controls the pace of the experience	User driven, where the voter controls the pace of the experience
Voice actor reading script from a UI map, reacting to voter interaction with tactile controller	User interacting with the controller which navigates through the programmed audio version of the BMD
Cursor cross (up, down, left, right & select) plus volume and speed controls. Also presented different button styles, sizes and keypad layouts.	Cursor cross (up, down, left, right & select) plus volume, speed controls and help. Had one controller with the Trace Center layout.
Headphones for voter + bluetooth speaker for observers	Headphones for voter + bluetooth speaker for observers
Voice actor, mirror app, diagram	Code, built upon the existing touchscreen prototype
Automatically looped and repeat if no action taken; after 3 secs	No automatic repeating/looping of audio
Male human voice	Female synthetic voice (text to speech)
No directional information on how to hold controller	Directional information on how to hold controller
3 contests (no vote for many contest)	4 contests, including a vote for many contest
Audio begins with prompts for starting the “audio + controller” experience	Audio begins with prompts for starting the “audio + controller” or the option to begin the touchscreen experience with the audio guide (“touch + audio”)

AUDIO UI DESIGN

THE AUDIO UI DESIGN

Overview

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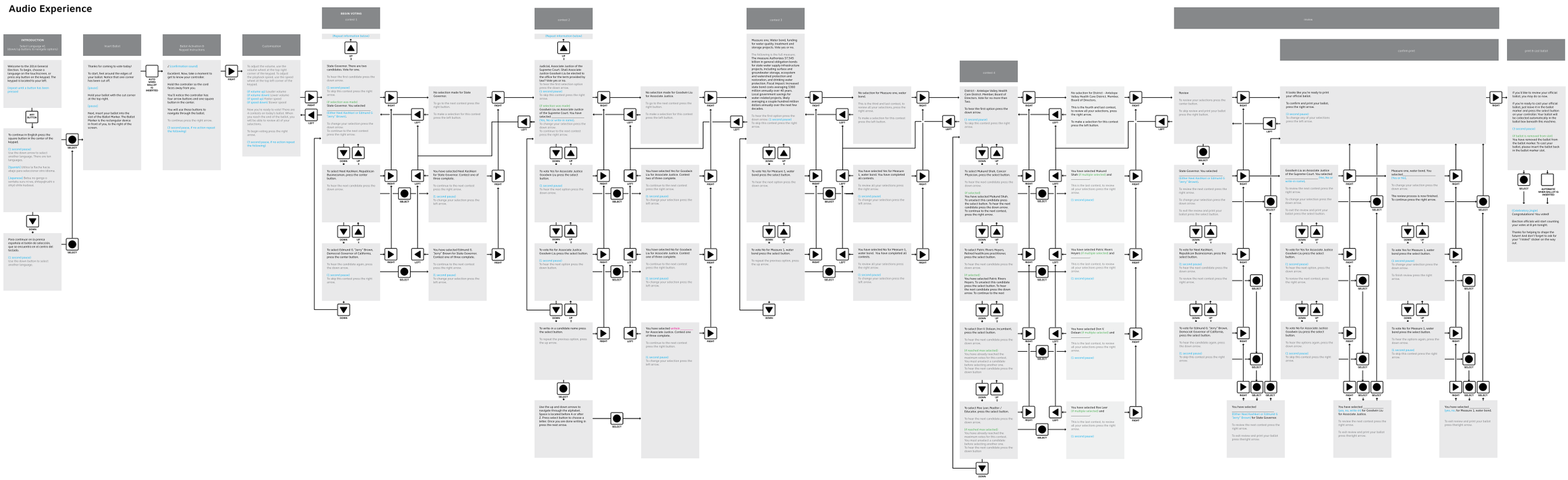
Audio Experience



THE AUDIO UI DESIGN

Start-up flow

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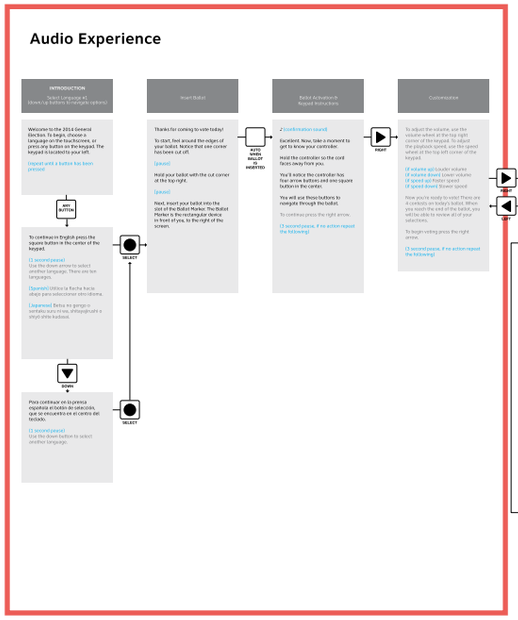
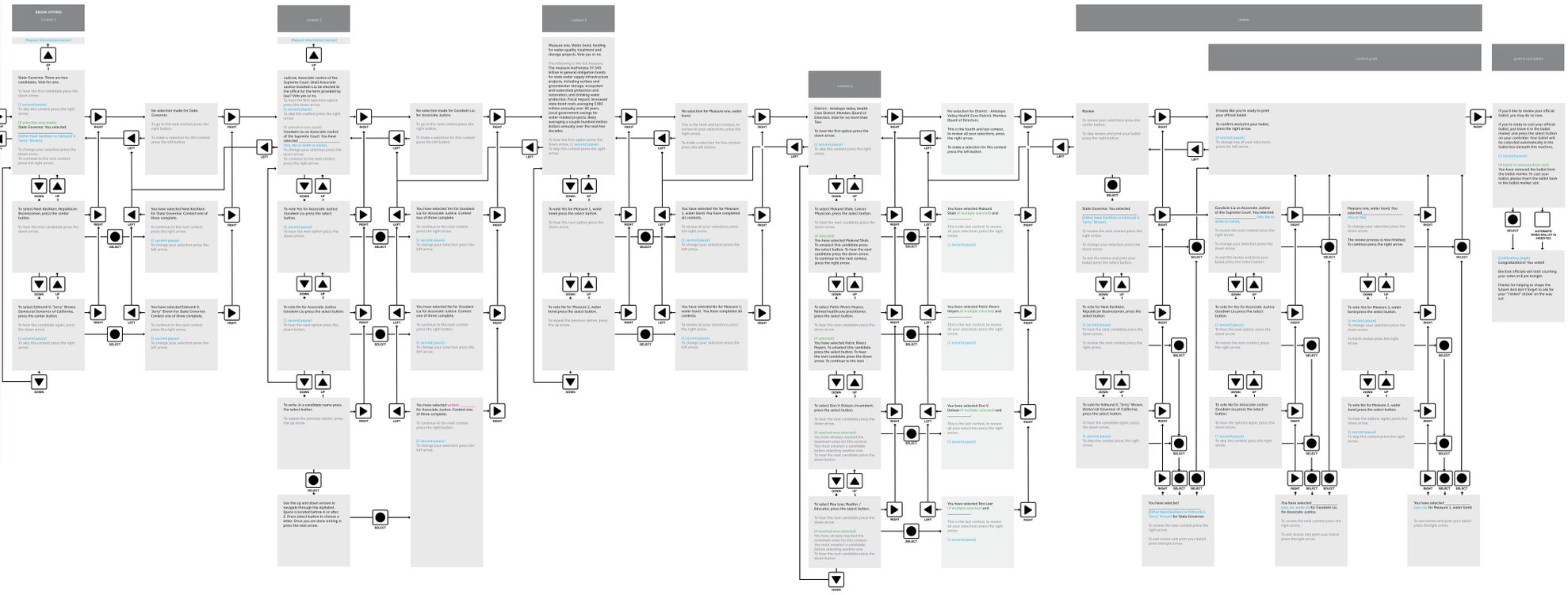


START-UP FLOW



THE AUDIO UI DESIGN

Start-up flow

INTRODUCTION

Select Language #1
(down/up buttons to navigate options)

Welcome to the 2014 General Election. To begin, choose a language on the touchscreen, or press any button on the keypad. The keypad is located to your left.

(repeat until a button has been pressed

ANY BUTTON

To continue in English press the square button in the center of the keypad.

(1 second pause)
Use the down arrow to select another language. There are ten languages.

[Spanish] Utilice la flecha hacia abajo para seleccionar otro idioma.

[Japanese] Betsu no gengo o sentaku suru ni wa, shitayajirushi o shiyō shite kudasai.

SELECT

DOWN

"Para continuar en Español, presione el botón cuadrado en elcentro del teclado"

(1 second pause)
Use the down button to select another language.

SELECT

Insert Ballot

Thanks for coming to vote today!

To start, feel around the edges of your ballot. Notice that one corner has been cut off.

[pause]

Hold your ballot with the cut corner at the top right.

[pause]

Next, insert your ballot into the slot of the Ballot Marker. The Ballot Marker is the rectangular device in front of you, to the right of the screen.

AUTO WHEN BALLOT IS INSERTED

Ballot Activation & Keypad Instructions

♪ (confirmation sound)

Excellent. Now, take a moment to get to know your controller.

Hold the controller so the cord faces away from you.

You'll notice the controller has four arrow buttons and one square button in the center.

You will use these buttons to navigate through the ballot.

To continue press the right arrow.

(3 second pause, if no action repeat the following)

RIGHT

Customization

To adjust the volume, use the volume wheel at the top right corner of the keypad. To adjust the playback speed, use the speed wheel at the top left corner of the keypad.

(if volume up) Louder volume
(if volume down) Lower volume
(if speed up) Faster speed
(if speed down) Slower speed

Now you're ready to vote! There are 4 contests on today's ballot. When you reach the end of the ballot, you will be able to review all of your selections.

To begin voting press the right arrow.

(3 second pause, if no action repeat the following)

RIGHT

LEFT

BEGIN VOTING

contest 1

(Repeat information below)

UP

State Governor. There are two candidates. Vote for one.

To hear the first candidate press the down arrow.

(1 second pause)
To skip this contest press the right arrow.

(if selection was made)
State Governor. You selected

(Either Neel Kashkari or Edmund G "Jerry" Brown).

To change your selection press the down arrow.
To continue to the next contest press the right arrow.

RIGHT

LEFT

DOWN

UP

To select Neel Kashkari, Republican Businessman, press the center button.

To hear the next candidate press the down arrow.

RIGHT

LEFT

SELECT

DOWN

UP

To select Edmund G. "Jerry" Brown, Democrat Governor of California, press the center button.

To hear the candidate again, press the down arrow.

(1 second pause)
To skip this contest press the right arrow.

RIGHT

LEFT

SELECT

DOWN

THE AUDIO UI DESIGN

Contest selection flow

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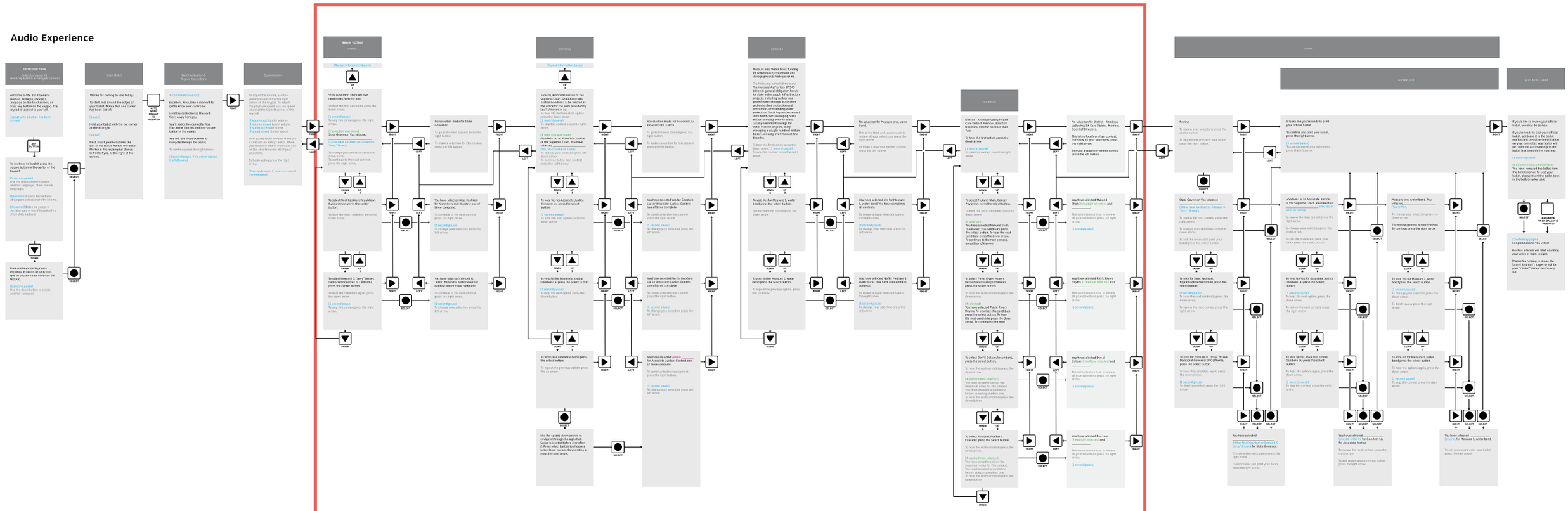
Audio Experience



CONTEST SELECTIONS FLOW

THE AUDIO UI DESIGN

Contest selection flow

State Governor. There are two candidates. Vote for one.

To hear the first candidate press the down arrow.

(1 second pause)
To skip this contest press the right arrow.

(if selection was made)
State Governor. You selected _____ (Either Neel Kashkari or Edmund G "Jerry" Brown).

To change your selection press the down arrow.
To continue to the next contest press the right arrow.

DOWN UP

To select Neel Kashkari, Republican Businessman, press the center button.

To hear the next candidate press the down arrow.

DOWN UP

To select Edmund G. "Jerry" Brown, Democrat Governor of California, press the center button.

To hear the candidate again, press the down arrow.

(1 second pause)
To skip this contest press the right arrow.

RIGHT

LEFT

SELECT

No selection made for State Governor.

To go to the next contest press the right button.

To make a selection for this contest press the left button.

You have selected Neel Kashkari for State Governor. Contest one of three complete.

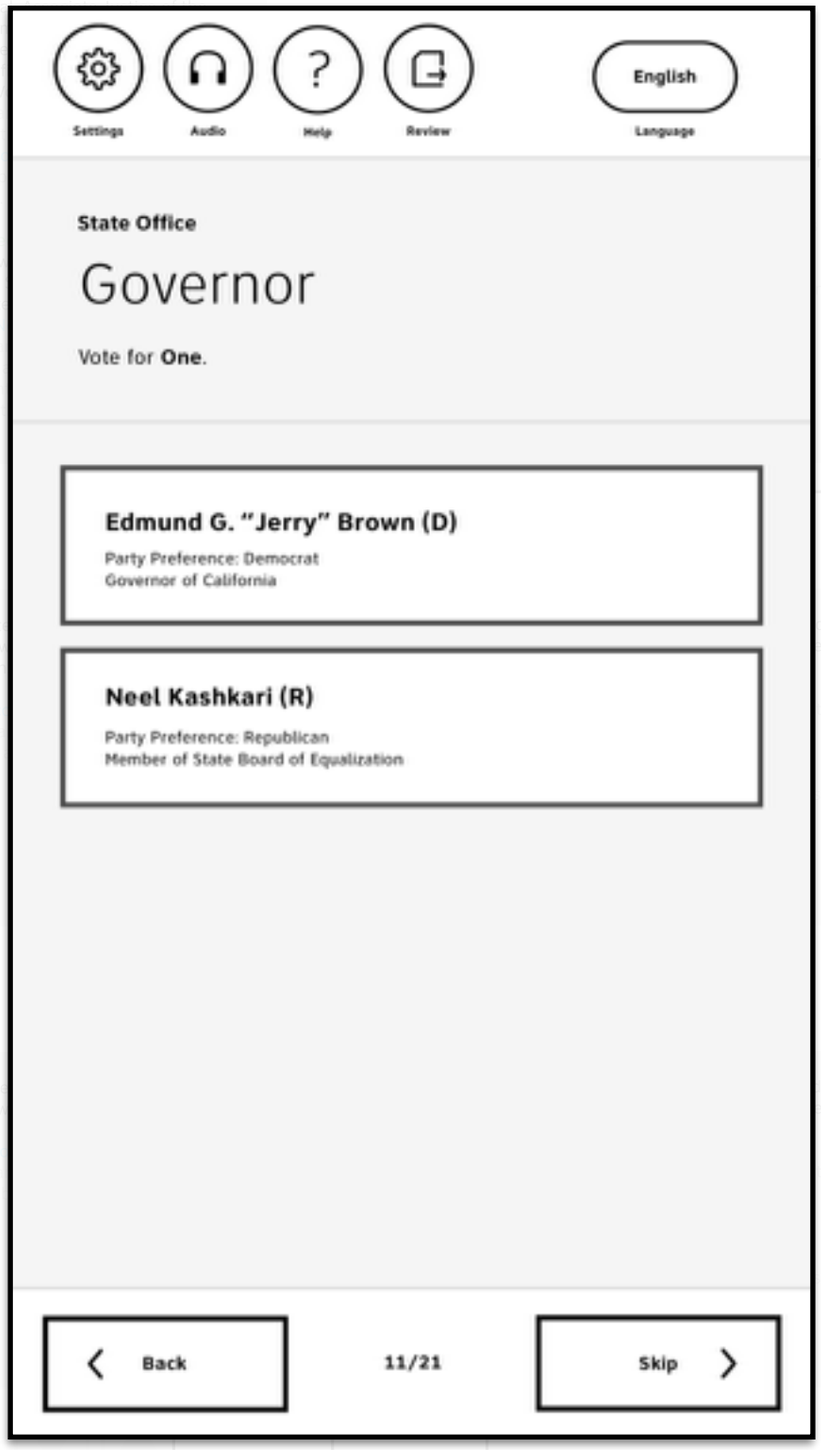
To continue to the next contest press the right arrow.

(1 second pause)
To change your selection press the left arrow.

You have selected Edmund G. "Jerry" Brown for State Governor. Contest one of three complete.

To continue to the next contest press the right arrow.

(1 second pause)
To change your selection press the left arrow.



Corresponding touchscreen visuals for contest selections

THE AUDIO UI DESIGN

Vote for up to Two Contest

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contest 4

District - Antelope Valley Health Care District. Member, Board of Directors. Vote for no more than Two.

To hear the first option press the down arrow.

(1 second pause)
To skip this contest press the right arrow.

RIGHT

No selection for District - Antelope Valley Health Care District. Member, Board of Directors.

This is the fourth and last contest, to review all your selections, press the right arrow.

To make a selection for this contest press the left button.

LEFT

DOWN

UP

To select Mukund Shah, Cancer Physician, press the select button.

To hear the next candidate press the down arrow.

(if selected)
You have selected Mukund Shah. To unselect this candidate press the select button. To hear the next candidate press the down arrow. To continue to the next contest, press the right arrow.

RIGHT

LEFT

SELECT

You have selected Mukund Shah (if multiple selected) and _____.

This is the last contest, to review all your selections press the right arrow.

(1 second pause)

DOWN

UP

To select Patric Rivers Heyers, Retired healthcare practitioner, press the select button.

To hear the next candidate press the down arrow.

(if selected)
You have selected Patric Rivers Heyers. To unselect this candidate press the select button. To hear the next candidate press the down arrow. To continue to the next

RIGHT

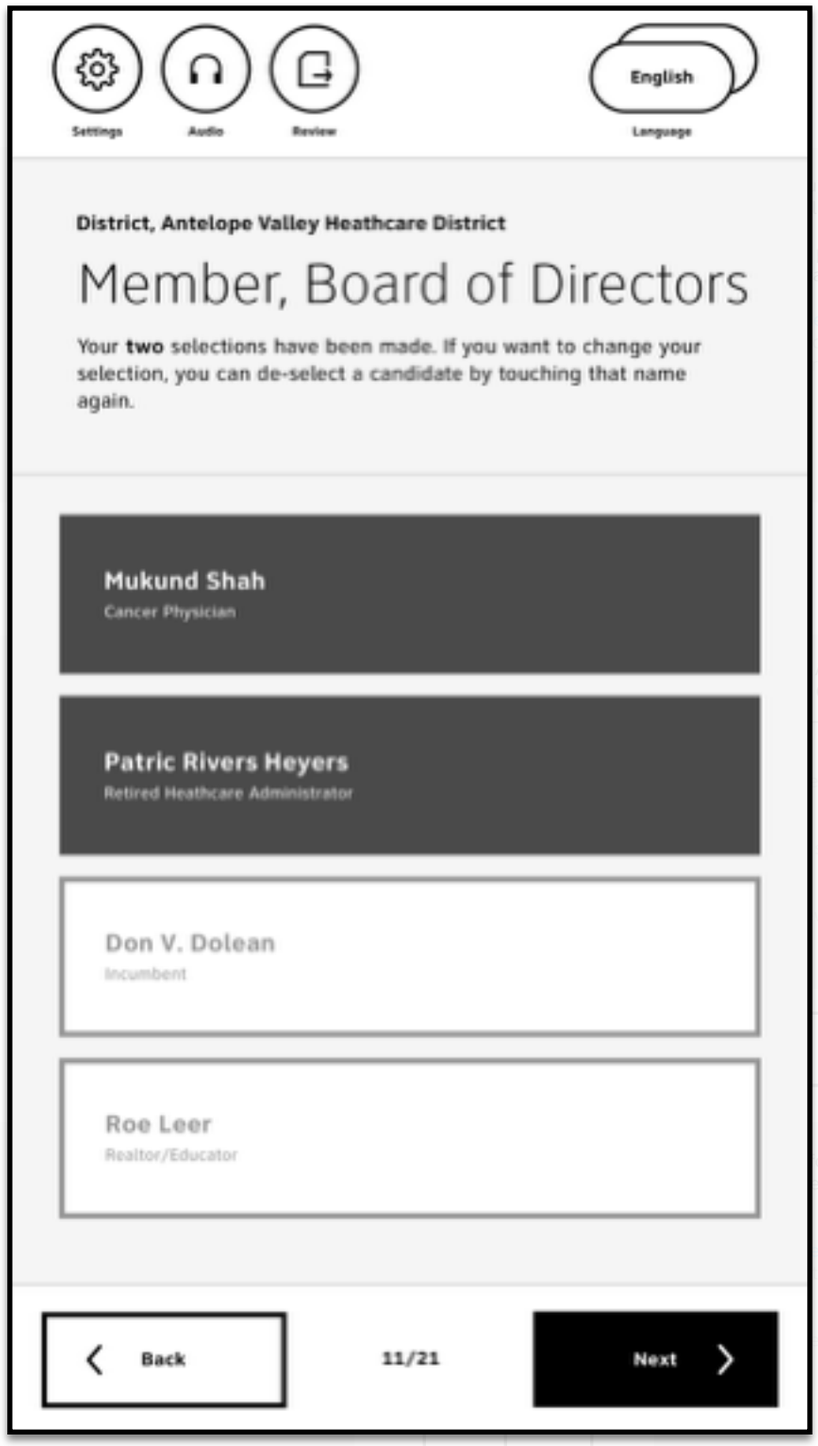
LEFT

SELECT

You have selected Patric Rivers Heyers (if multiple selected) and _____.

This is the last contest, to review all your selections press the right arrow.

(1 second pause)



Corresponding touchscreen visuals for Vote for Two

THE AUDIO UI DESIGN

Review flow

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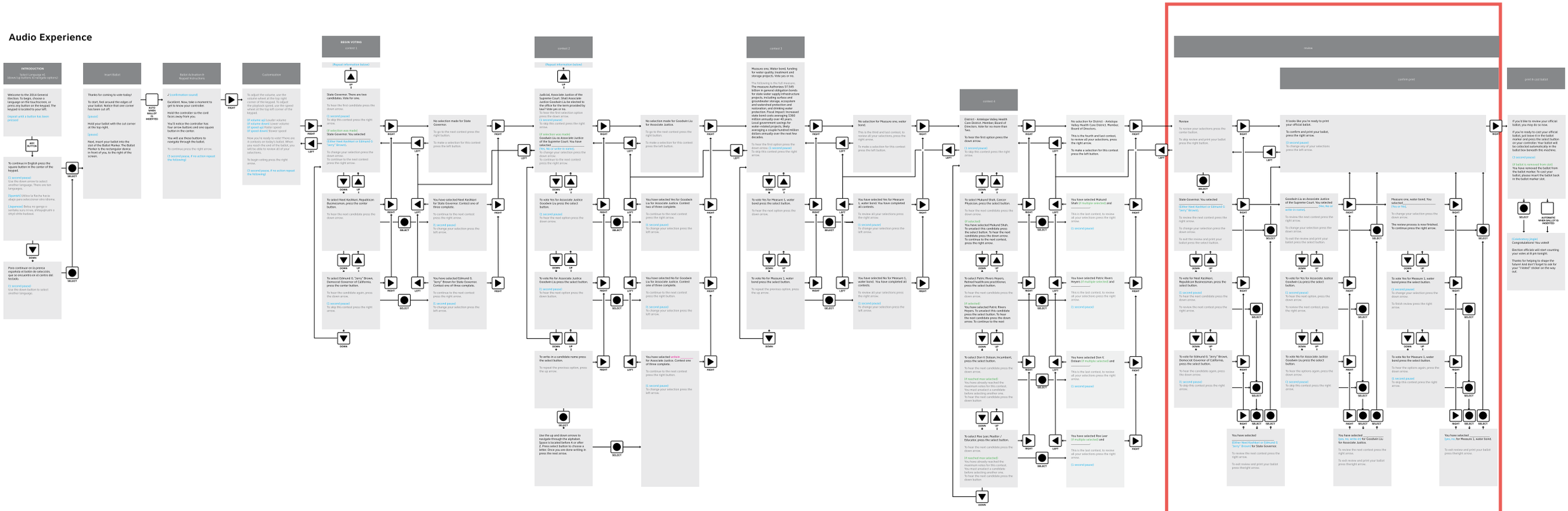
Audio Experience



REVIEW SELECTIONS FLOW

THE AUDIO UI DESIGN

Review flow

project VOX

Review

To review your selections press the center button.

To skip review and print your ballot press the right button.

RIGHT

LEFT

SELECT

State Governor. You selected _____ (Either Neel Kashkari or Edmund G “Jerry” Brown).

To review the next contest press the right arrow.

To change your selection press the down arrow.

To exit the review and print your ballot press the select button.

DOWN UP

To vote for Neel Kashkari, Republican Businessman, press the select button.

(1 second pause)
To hear the next candidate press the down arrow.

To review the next contest press the right arrow.

To vote for Edmund G. “Jerry” Brown, Democrat Governor of California, press the select button.

To hear the candidate again, press

Goodwin Liu as Associate Justice of the Supreme Court. You selected _____ (Yes, No or write-in name).

To review the next contest press the right arrow.

To change your selection press the down arrow.

To exit the review and print your ballot press the select button.

To vote for Yes for Associate Justice Goodwin Liu press the select button.

(1 second pause)
To hear the next option, press the down arrow.

To review the next contest, press the right arrow.

To vote No for Associate Justice Goodwin Liu press the select button.

To hear the options again, press the

Measure one, water bond. You selected_____ (Yes or No).

To change your selection press the down arrow.

The review process is now finished. To continue press the right arrow.

To vote Yes for Measure 1, water bond press the select button.

(1 second pause)
To change your selection press the down arrow.

To finish review press the right arrow.

To vote No for Measure 1, water bond press the select button.

To hear the options again, press the down arrow.

It looks like you’re ready to print your official ballot.

To confirm and print your ballot, press the right arrow.

(3 second pause)
To change any of your selections press the left arrow.

AUTOMATIC WHEN BALLOT IS INSERTED

(Celebratory jingle)
Congratulations! You voted!

Election officials will start counting your votes at 8 pm tonight.

Thanks for helping to shape the future! And don’t forget to ask for your “I Voted” sticker on the way out.

THE AUDIO UI DESIGN

Print, verify & cast

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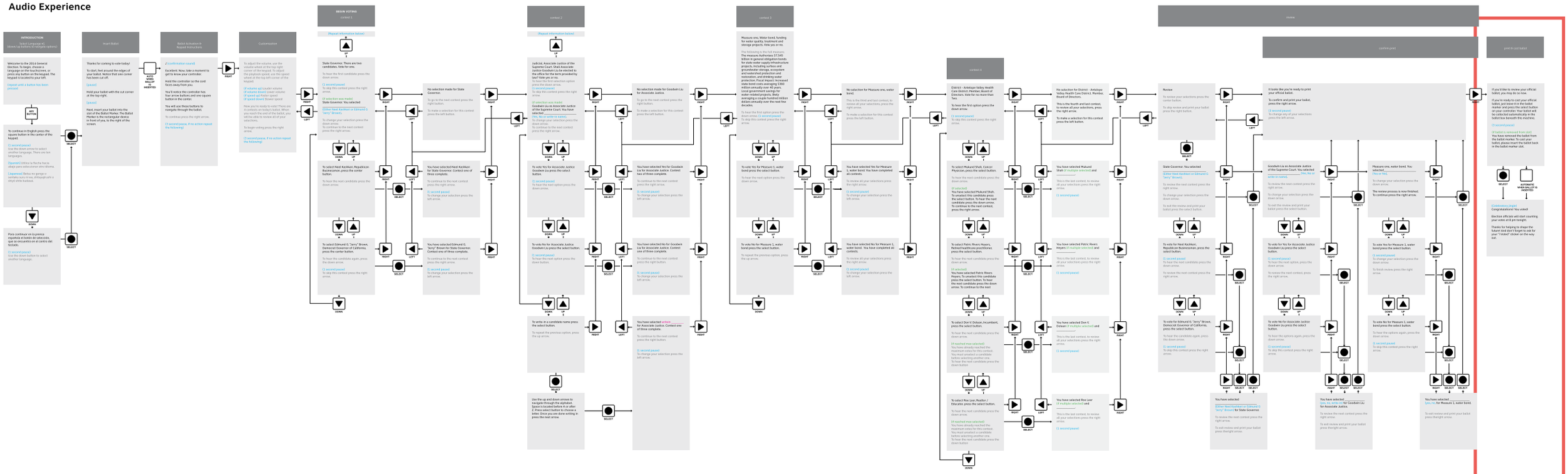
Audio Experience



PRINT & CAST FLOW

THE AUDIO UI DESIGN

Print, verify & cast

project VOX

confirm print

print & cast ballot

It looks like you're ready to print your official ballot.

To confirm and print your ballot, press the right arrow.

(3 second pause)
To change any of your selections press the left arrow.

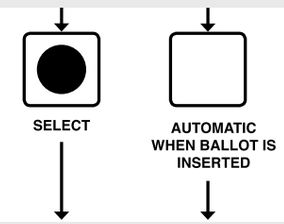
RIGHT

If you'd like to review your official ballot, you may do so now.

If you're ready to cast your official ballot, just leave it in the ballot marker and press the select button on your controller. Your ballot will be collected automatically in the ballot box beneath this machine.

(3 second pause)

(if ballot is removed from slot)
You have removed the ballot from the ballot marker. To cast your ballot, please insert the ballot back in the ballot marker slot.



(Celebratory jingle)
Congratulations! You voted!

Election officials will start counting your votes at 8 pm tonight.

Thanks for helping to shape the future! And don't forget to ask for your "I Voted" sticker on the way out.

LEARNING

LEARNING

From the user evaluation

1

Need a consistent repeat function. **Repeat is more important than pause**, especially since the system waits for input from the voter before moving forward.

2

When asked, participants confirmed that screen curtain functionality, which blocks visibility of the display on demand, would be beneficial, although most did not think it was necessary to toggle the screen curtain on and off during the session.

3

The cursor-cross controller layout makes it significantly easier for users to identify the buttons, compared to the TRACE layout.

4

Casting flow was confusing. None of the users were able to successfully cast their ballot. Since the printing mechanism was not working in the prototype, users were handed the ballot, and assumed they were done.

We also recognized that the audio text could be more clear and more informative.

5

Many users didn't notice that the voice was synthetic. A high- quality synthetic voice is on par with a human recorded voice, for most users.

CONSISTENT REPEAT

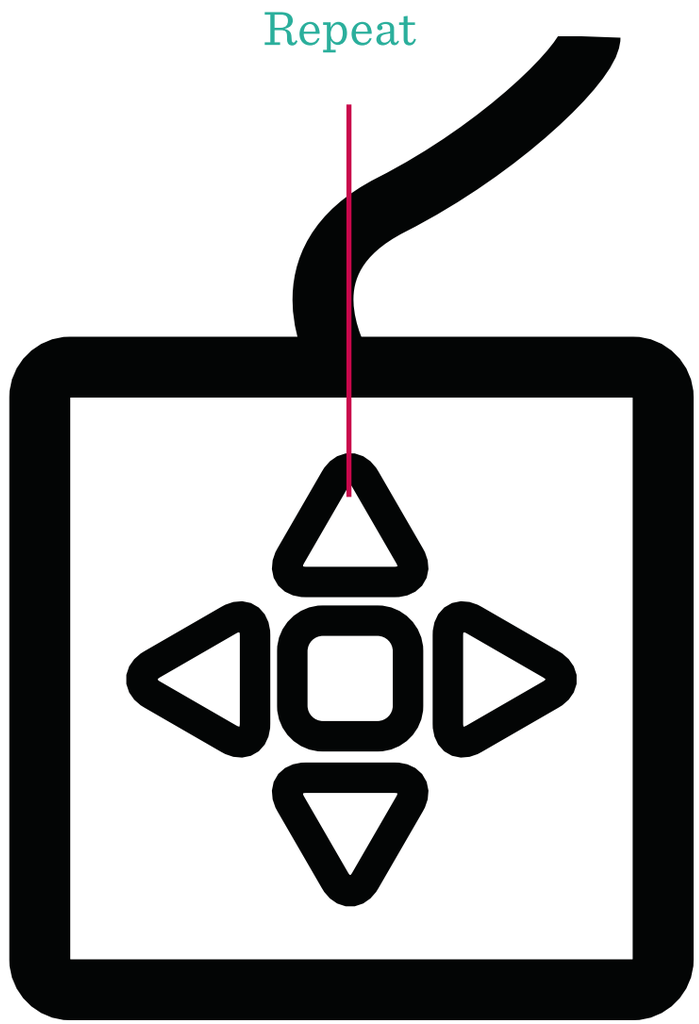
From learning to action

project VOX

Learning
Need a consistent repeat function. **Repeat is more important than pause**.

New Design (May prototype)
The up button was repurposed as the consistent repeat function.

Previously the up button was used to navigate up in the list of candidates/ options, but we found that function was rarely used. We also believe that repeating is an important function, but that adding a separate button would be a cognitive overload. Since the arrow buttons are directional it is easier to describe the location.



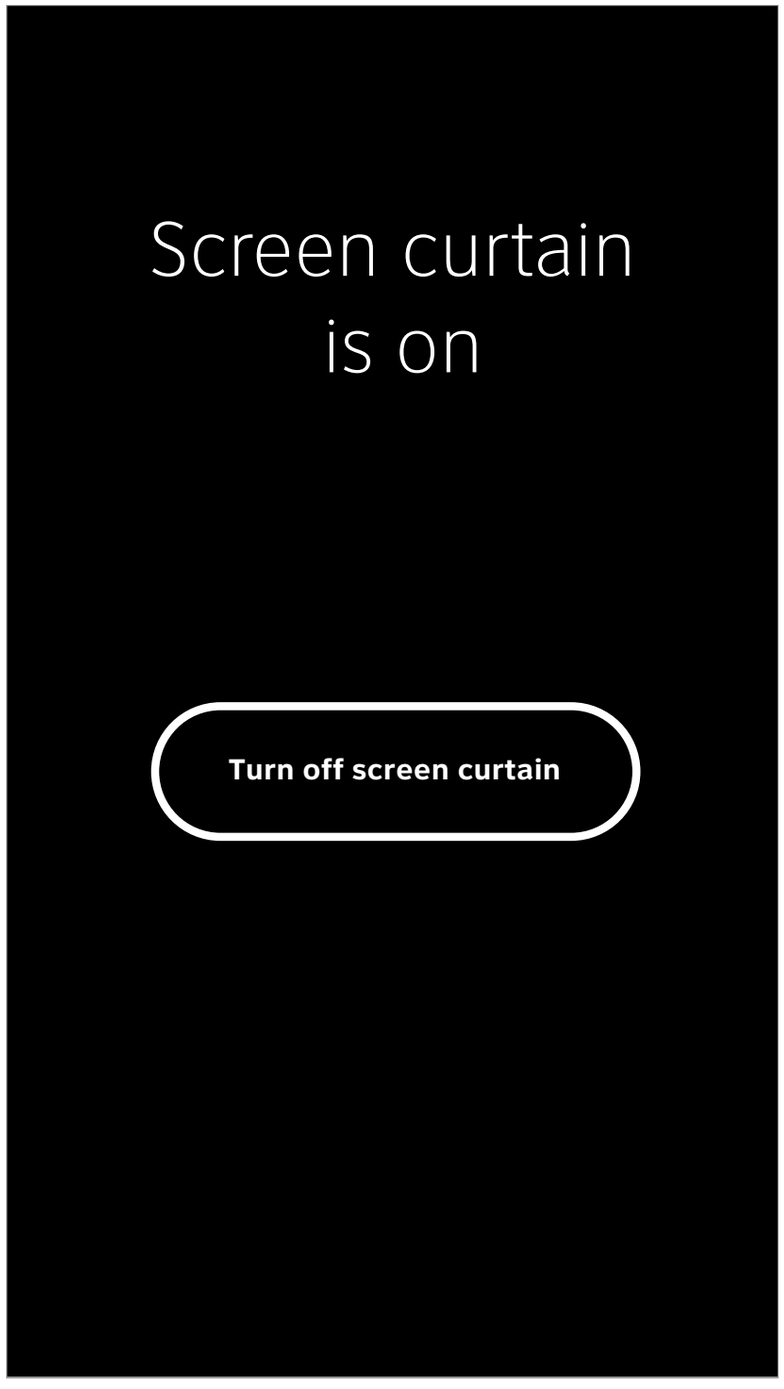
SCREEN CURTAIN

From learning to action

project VOX

Learning
The screen curtain (screen mute) function was requested upon prompting. When prompted some users would like to be able to toggle the screen curtain on/off during the session, but most users did not expect it to be necessary.

New Design (May prototype)
We added an instructional step. The user can press the select button to turn on the screen curtain. Although the use case for non-sighted users turning on the screen is minimal, the need for the poll worker (or a voter's assistant), to access screen functionality is a possibility, and we wanted to make sure we accommodate that case.



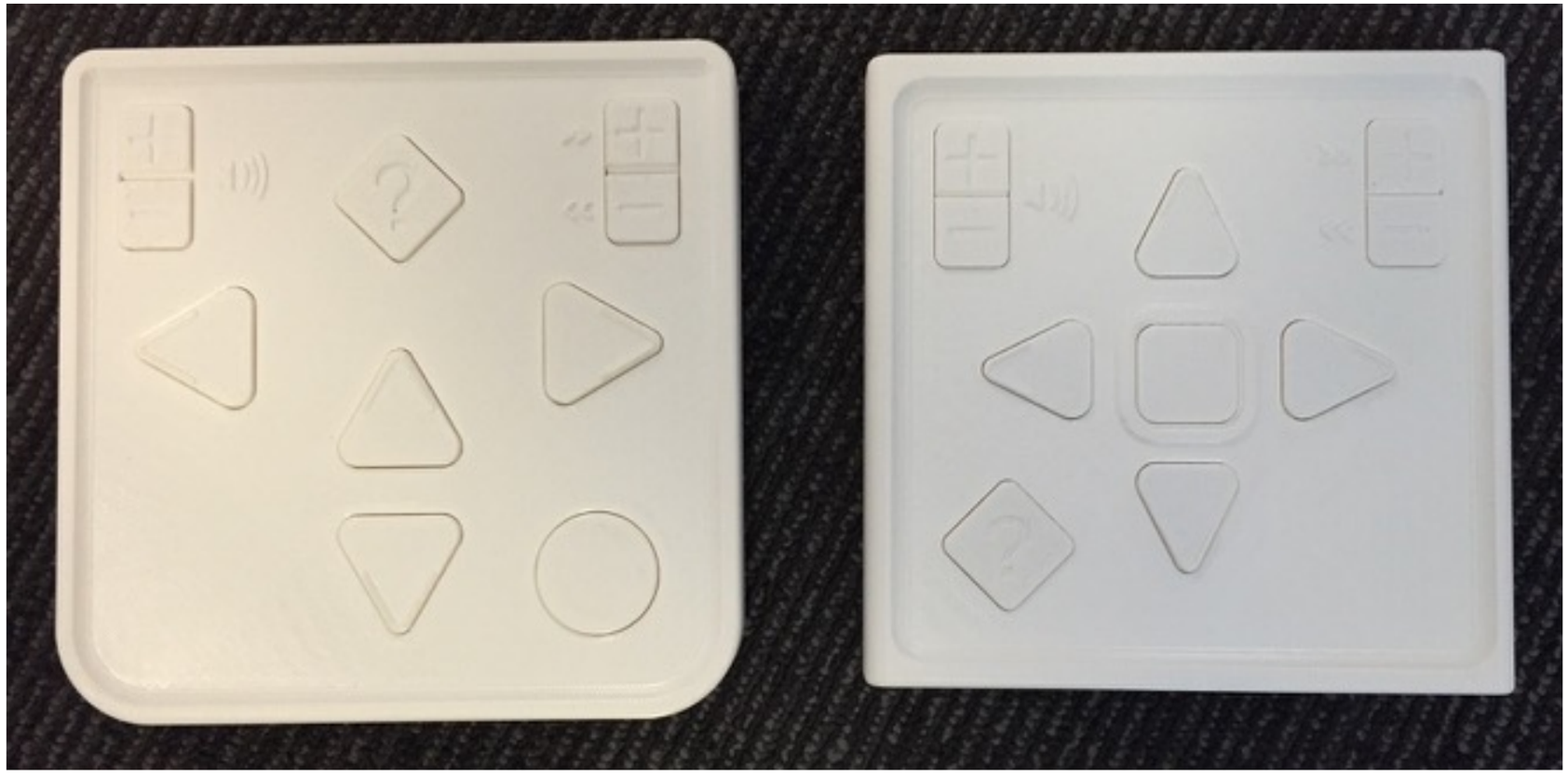
CONTROLLER LAYOUT

From learning to action

project VOX

Learning
The cursor-cross controller layout makes it significantly easier for users to identify the buttons, compared to the TRACE layout.

New Design (May prototype)
Based on this we have continued to develop our cursor-cross controller with a center select layout. The help button, speed control and volume control have evolved, in addition to spreading out the cursor buttons.



Controller with Trace Center layout

Controller and center select layout

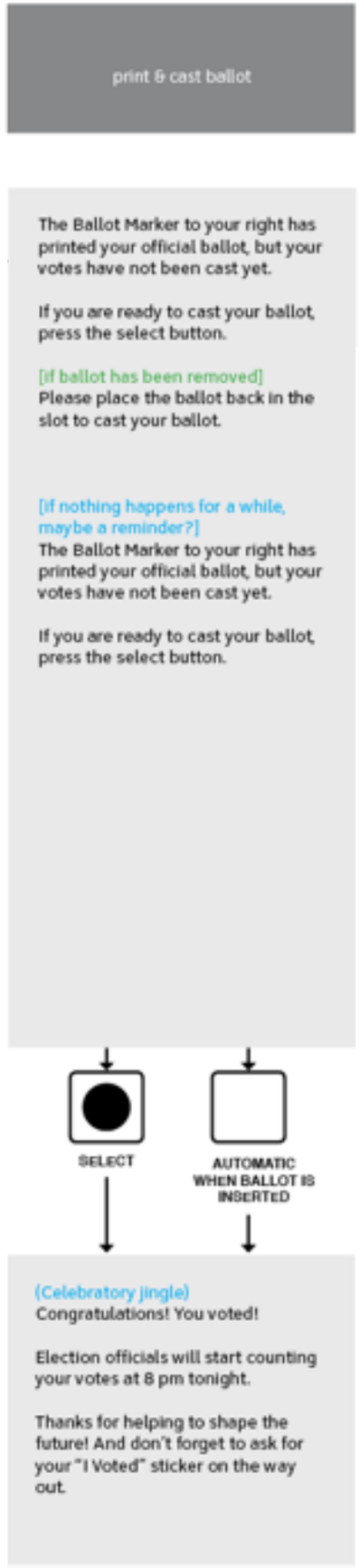
CASTING FLOW

From learning to action

Learning
Casting flow was confusing. None of the users were able to successfully cast their ballots. Since the printing mechanism was not working in the prototype, users were handed the ballot, and assumed they were done.

We also recognized that the audio text could be more clear and more informative.

New Design (May prototype)
The casting flow instructions were re-written to provide more context of where the printing is happening and provide clear direction of what action to take.



VOICE QUALITY

From learning to action

project VOX

Learning
Many users didn't notice that the voice was synthetic. A synthetic voice is on par with a human recorded voice, for most users.

Additionally, a synthetic voice recorded voice clips. This is something to consider during the RFP process.

UPDATED AUDIO INTERFACE GUIDELINES

AUDIO INTERFACE GUIDELINES

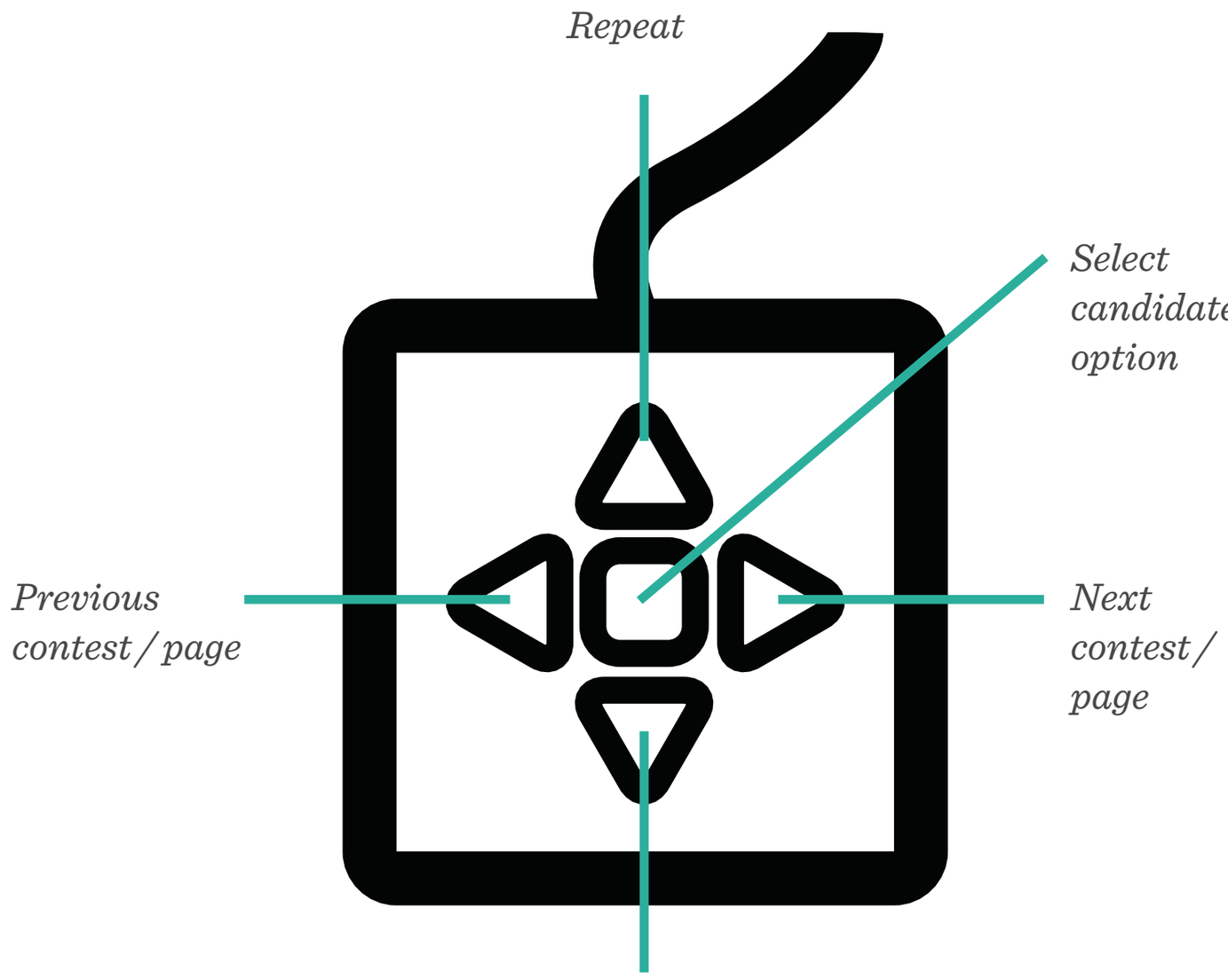
1. *Be consistent*
2. *Let the user dictate the pace*
3. *Minimize demands on user's memory*
4. *Provide easy exits*
5. *Allow for error correction*
6. *Use simple and natural dialogue*

BE CONSISTENT

Audio interface guidelines

***Being consistent** makes it easier for users to quickly learn the audio interface patterns.*

Users told us they understood the cursor-cross controller layout and how the button layout corresponds to navigating through the contests. Because they felt comfortable navigating through the system.



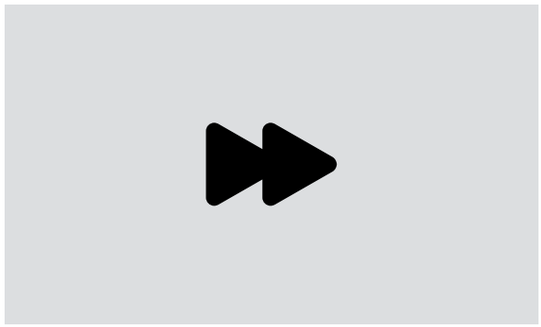
LET THE USER DICTATE THE PACE - USER DRIVEN

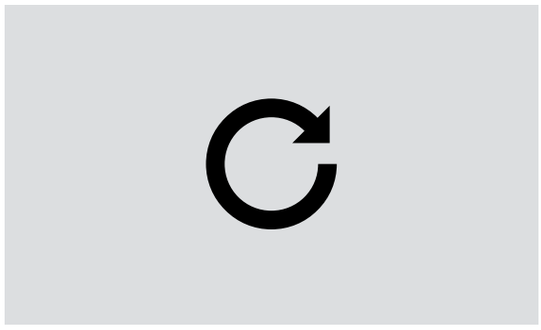
Audio interface guidelines

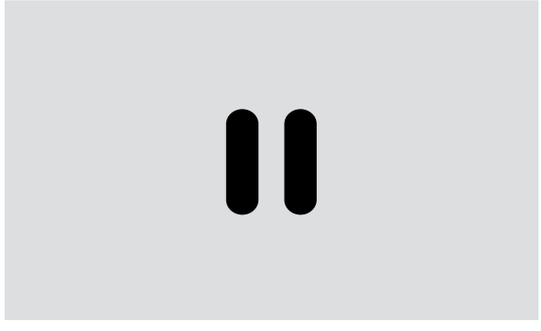
Being able to interrupt
Allowing the user to press the button at anytime and interrupt the current audio allows the user to navigate at their own pace.

Being able to repeat
Providing a way for users to repeat is just as important as allowing users to navigate at their own pace.

Having time to think
We heard several times that the main reason for letting users dictate their own pace was to allow them time to think. This is why the system does not loop the audio. Actions happen when a user initiates.







MINIMIZE DEMANDS ON USER'S MEMORY

Audio interface guidelines

Sentence structure

1. *First part of sentence is the action*
2. *Second part of sentence is what you need to do to activate.*

Hierarchy of actions

The most commonly used action is listed first, followed by the less used actions.

Example of sentence structure:

State Governor. There are two candidates. Vote for one.

1 2

To hear the first candidate, press the down arrow.

(1 second pause)
To skip this contest, press the right arrow.

To select Neel Kashkari, Republican Businessman, press the center button.

To hear the next candidate, press the down arrow.

To repeat this, press the up arrow.

Example of hierarchy:

You have selected Neel Kashkari for State Governor. Contest one of three complete.

To continue to the next contest press the right arrow.

(1 second pause)
To change your selection press the left arrow.

To repeat this, press the up arrow.

PROVIDE EASY EXITS

Audio interface guidelines

Skipping

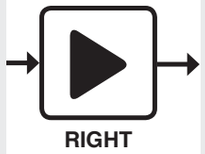
Knowing that users will want to skip contests or review, we've provided an easy way for them to skip forward. Skipping is always the secondary action in the hierarchy.

Example: Skipping contests

State Governor. There are two candidates. Vote for one.

To hear the first candidate, press the down arrow.

(1 second pause)
To skip this contest, press the right arrow.



No selection made for State Governor.

To go to the next contest press the right button.

To make a selection for this contest press the left button.

Example: Review

Review

To review your selections press the center button.

To skip review and print your ballot press the right button.

ALLOW FOR ERROR CORRECTION

Audio interface guidelines

We have designed two primary moments for users to correct errors.

Immediate correction
After having made a selection, a user can correct it by pressing the left arrow.

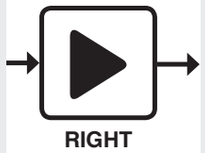
Edit selections in Review
Review makes it easy for users to make changes to their selections.

Example: Skipping contests

State Governor. There are two candidates. Vote for one.

To hear the first candidate, press the down arrow.

(1 second pause)
To skip this contest, press the right arrow.



No selection made for State Governor.

To go to the next contest press the right button.

To make a selection for this contest press the left button.

Example: Review

State Governor. You selected

_____
(Either Neel Kashkari or Edmund G “Jerry” Brown).

To review the next contest press the right arrow.

To change your selection press the down arrow.

To exit the review and print your ballot press the select button.

SIMPLE AND NATURAL DIALOGUE

Audio interface guidelines

We have done many revisions and iterations on the text to make it as simple and natural as possible.

Some tips for simplifying the language:

Use the most common words.

Use shapes that users are familiar with such indicators as arrow, diamond, circle, square. (Question mark outlines are not universal indicators for help, nor are they easy to identify)

Use short sentences. No run-on sentences.

Users should feel like they are having a dialogue with the system.

We will provide a tone specification in the final deliverable.

NEXT STEPS

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- *Design a screen curtain experience.*

- *Refine the design of the casting flow and add the verification step. This step will also influence the user flow of the touchscreen experience, which is why we carefully considered the design direction of the verification process for people who have a vision impairment.*