



# Mobile Testing Guide

# **ANDROID & iOS**

Version 2, April 2017

*The details are correct at the time of writing and based on iOS 9+ and Android 4.4+. Note that new releases on both platforms may mean the details change or are adjusted slightly. Additionally Android features can be inconsistent across devices and versions. The document flags issues where known however there may be further issues.*

# CONTENTS



<b>ANDROID</b>	2
Talkback	3
Switch access	10
Auto scanning	11
Magnification gestures	12
Greyscale	13
Browser & Talkback support	14
Testing tools	16
<b>IOS</b>	17
Voiceover	18
The Rotor	19
Basic gestures	22
Screen Curtain	25
Speech Off	25
Pass-through Gesture	25
Zoom	26
Invert colors	28
Grayscale	28
Testing tools	28
<b>RESOURCES</b>	29
Standards & Guidelines	29
Android resources	30
Apple Resources	30
Articles and other resources	31

# ANDROID



## GETTING STARTED

Android accessibility features can be enabled on Android devices through **Settings** → **Accessibility**.



### TalkBack

Pre-installed Android screen reader. When enabled, Android reads everything on the screen. In apps, this includes all buttons, images, form elements, static text, etc. In the mobile browser, this should include all web content (text, alternatives for images, links, form fields, tables, and so on). TalkBack users include blind and low-vision users, as well as users with some cognitive or learning difficulties.



### Switch access

Switch access allows you to control your device using configurable key combinations with an external keyboard. You can move focus to clickable items and select an item.



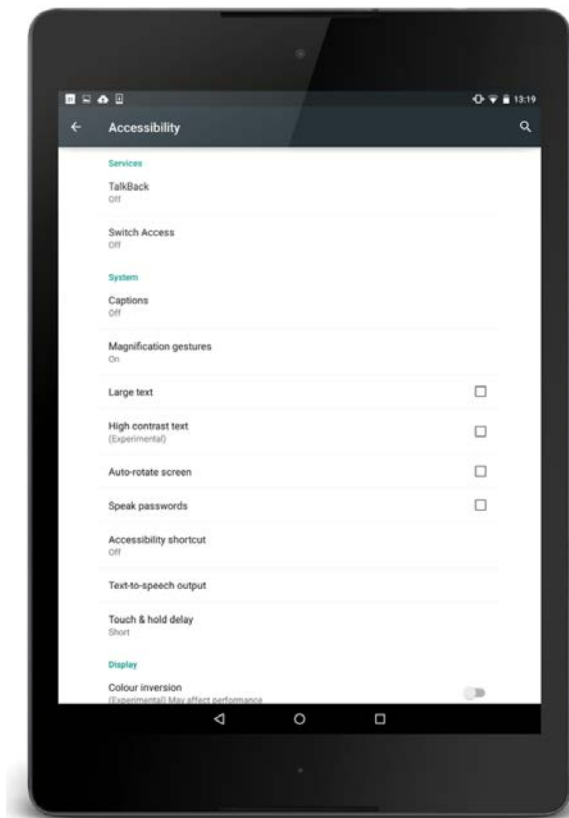
### Magnification gestures

When enabled, magnification allows you to zoom in and out by triple-tapping the screen.



### Grayscale view

When enabled, this setting removes all color from the display, which can make it easier for users with vision disabilities, such as color-blindness, to read the display.



**Figure 1:** *The accessibility settings panel shown on a Nexus Tablet*

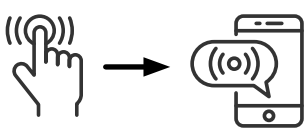
## TALKBACK

To enable TalkBack, navigate to **Settings** → **Accessibility** → **TalkBack** then switch the button to **On**. A 'Use TalkBack' confirmation screen will appear. When used for the first time a tutorial will be launched. Ensure the device volume is turned up as TalkBack doesn't automatically adjust the volume if muted.

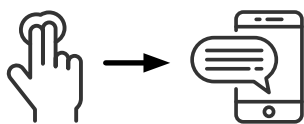
You can customize the TalkBack experience through **Settings** → **Accessibility** → **TalkBack** → **Settings**. Mid-way down the settings screen under the heading "Touch Exploration" ensure that "Explore by touch" is selected, and then launch and complete the "Explore by touch" tutorial. It is recommended you follow the Talkback tutorial accessed mid-way down the settings screen under the heading "Touch Exploration".

## Switching Talkback on and off quickly

You can map the TalkBack on/off button to the Power key by navigating to **Settings** → **Accessibility** → **Accessibility shortcut** and selecting **On**. Then you can then switch TalkBack on and off using these two steps:



1. **Press and hold** the Power button until you hear a sound or feel a vibration.



2. **Touch and hold two fingers** on the screen until you hear spoken confirmation.

If the device has multiple users, using the shortcut on the lock screen temporarily enables accessibility features until the device is unlocked.



**Note:** This feature is not universal across devices. For example it does not appear to work on the Hudl running KitKat 4.4.2.

## Basic gestures on Android

Once you enable TalkBack, the way you interact with the device changes.



All TalkBack gestures use **one finger**.



When you use **two or more fingers**, your touch or gesture goes straight to the application, rather than to TalkBack.

For example, with TalkBack off on most pages you can usually scroll by slowly dragging one finger. With TalkBack on, you can scroll by dragging two fingers.

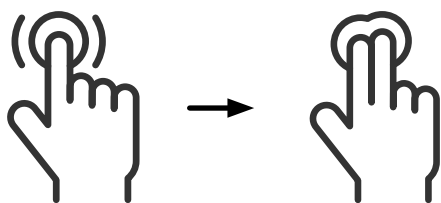
There are two interaction methods:

- ☐ **Explore by touch:** Drag your finger over the screen to have TalkBack describe the items under your finger. You can double tap to open links, press buttons, and so on. When you switch TalkBack on, touch exploration is automatically enabled.
- ☐ **Gesture navigation:** You can swipe right with a single finger to move from one item to the next in sequence. Or you can swipe left to go backward through this sequence. TalkBack describes items as you move focus around the screen. You can double-tap to open links, press buttons, and so on.

In some applications, you can zoom by putting two fingers on the screen and pinching them together or pulling them apart. The chart below shows Android's core touch and gesture commands.

## Core TalkBack commands

### Switch TalkBack on/off



Press and hold the off button, wait for the vibration then hold two fingers down.

Or through **Settings** → **Accessibility** → **TalkBack**



**Note:** This only works if the Accessibility Shortcut has been enabled in the accessibility settings screen

### Speak an element



Single tap

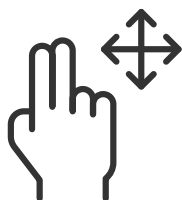
### Scroll forward



Right then left

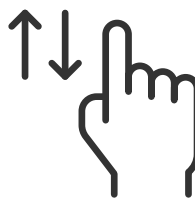
*If you're on a page longer than one screen*

### Scroll



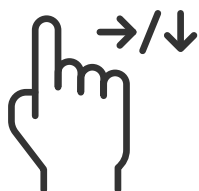
Two-finger slide

### Move to first item on screen



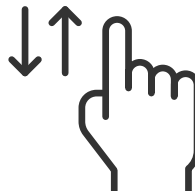
Up then down

### Select next item



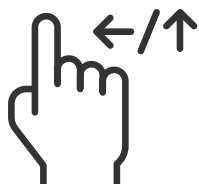
Swipe right / down

### Move to last item on screen



Down then up

### Select previous item



Swipe left / up

### Scroll back



Left then right

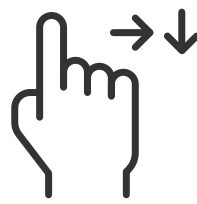
*If you're on a page longer than one screen*

## Move slider down



Left then right  
*Such as volume*

## Notifications



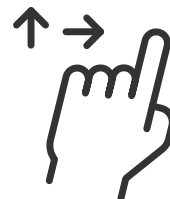
Right then down

## Home button



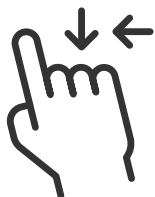
Up then left

## Open local context menu



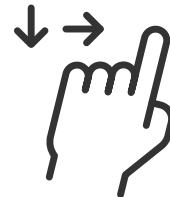
Up then right

## Back button



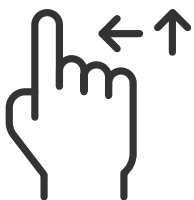
Down then left

## Open global context menu



Down then right

## Recent apps



Left then up

## Zoom



One-finger triple tap  
*Built in screen  
magnification,  
when enabled*

This isn't considered necessary for testing, but you can assign new actions to the gestures through

**Settings → Accessibility → TalkBack → Settings → Manage gestures.**

## Context menus

TalkBack has a global context menu and a local context menu to make it easy to find settings and controls. The global context menu contains commands that work anywhere, and the local context menu varies depending on the focused item. On older versions, the global and local context menus are shaped like circles, so you can drag your finger in a circle to hear the different options. On Android 5+ they are presented as lists.

### TalkBack global context menu features

The following explains features available in the global context menu.

#### Quick navigation

Hear all of the items on the screen as you move your finger in a circle. This option isn't available if you're using the list version of the context menu instead of the circle version (by enabling "Show Context Menu as list" in TalkBack settings).

#### Read from top

Hear a read-out of all items on the screen, starting from the top.

#### Read last utterance

Hear the last verbalization again.

#### Spell last utterance

Hear a letter-by-letter spelling of TalkBack's last verbalization.

#### Read from next item

Hear a read-out of all items on the screen, starting from the last focused item.

### TalkBack settings

This option is outside the circle menu, at the top-right corner of your screen. Selecting this option opens the TalkBack settings screen.

### Using the global context menu



Swipe down then right to open the menu



Drag your finger to hear menu items.



When you hear the item that you'd like to select, release your finger.

### Text to speech settings

This option is outside the circle menu, at the bottom-right corner of your screen. Selecting this option opens your text-to-speech settings. You can disable TalkBack or dim the screen from here.



## Local context menu

The local context menu contains controls that relate to the focused item. The options available in the menu change depending on the item. If there are no relevant options, TalkBack announces 'No menu items'.

### TalkBack local context menu features

The following explains features available in the local context menu.

#### **Default**

Each swipe to the right reads the content of the focused item.

#### **Characters**

Each swipe to the right speaks one character of the currently focused item.

#### **Words**

Each swipe to the right speaks one word of the currently focused item.

#### **Lines**

Each swipe to the right speaks a single line of the currently focused item.

#### **Paragraph**

Each swipe to the right speaks one paragraph of the currently focused item.

#### **Page**

Each swipe to the right speaks all of the items on the current page.

## Using the local context menu



Swipe up then right to open the local context menu.



Drag your finger in a circle to hear menu items.



When you hear the item that you'd like to select, release your finger.

## Alternative TalkBack local context menu features

When you activate the local context menu from screens other than your home screen, you might hear the features in the following table.

### **Page navigation**

Open a new local context menu with options for moving to the next or previous page.

## Cursor control menu

Open a new local context menu with options for moving the cursor and editing text.

Options in the cursor control menu include:

- ❏ Move cursor to beginning and move cursor to end
- ❏ Cut, Copy, Paste, Select all
- ❏ Start selection mode and End selection mode.

To move the cursor while in an edit box, you can tap the volume keys.

## Links menu

When you navigate to text that contains links, you can open the local context menu, and select the Links submenu to select one of the links included in the text.

## Word

Each swipe to the right speaks one word of the currently focused item.

## Change granularity menu

Select this option to open a new local context menu with the navigation granularity options listed above (Default, Page, Paragraph, Line, Word and Character).

In certain apps (such as web browsers), you may also see options to navigate by Headings and Landmarks, Links, Lists, Controls and Special Content, e.g. tables).

## Global Context Menu

Read from top

Repeat last utterance

Spell last utterance

Read from next item

Pause feedback

TalkBack Settings

Text-to-speech Settings

Dim screen

CANCEL

**Figure 2:** *The global context menu displayed on screen when TalkBack is running*

## Label controls

This menu allows you to add, remove, and edit customized labels for unlabeled content. Sometimes applications are missing labels on images. You can use TalkBack to create your own labels for these images, to make it easier to identify them in the future.

## Screen blanking

With TalkBack 4.2 and later, there is an option to dim/undim the screen from the Global Context menu. For older devices you can download the free Android app [Shades](#) to accomplish the same thing. This is a useful technique for testing since it allows the tester to have a similar experience to users who can't see the screen.

- To blank the screen, run Shades and turn down the screen-brightness slider to 0.
- To un-blank the screen and bring it back to full brightness, press the power button rapidly several times—that's the trigger to disable Shades.

## SWITCH ACCESS

To enable switch access, navigate to **Settings** → **Accessibility** → **Switch access** and then switch the button to **On**.

Switch access allows you to control your device using configurable key combinations. This means you can use an external keyboard or switch device to execute core keyboard commands to navigate and interact with websites and native apps. As with the use of TalkBack, this is a useful feature for testing keyboard access and content order.

To use switch access, you'll need a keyboard paired with the tablet or mobile. Then you'll need to assign keys to actions through **Settings** → **Accessibility** → **Switch access** → **Settings**. Select **Actions** under the heading "**Assign Keys to Actions**" to map a keystroke to the action.

## Recommended keystroke mappings

While keystroke mappings depend on user preference, we recommend (for consistency) that test teams use the same keystrokes, as shown in the table below.

Global context menu features	Description
Auto scanning	Space bar (this is already mapped)
Next	Tab
Previous	Shift + Tab
Click	Enter
Long click	Semi colon (;)
Scroll forward	Right arrow
Scroll backwards	Left arrow
Back	Delete
Home	Escape
Notifications	Equals (=)
Quick settings	Down arrow
Recent apps	Up arrow

## AUTO SCANNING

Auto scanning is a feature that moves focus automatically through all visible elements on screen, both focusable and inactive (for example, static text). Once all visible content has been auto scanned, the user is presented with five additional auto scan options:

1. Back
2. Home
3. Recent apps
4. Notifications
5. Quick navigation

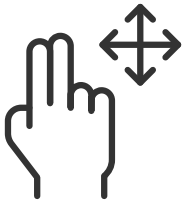
This is a useful tool for testing content and focus order.

# MAGNIFICATION GESTURES

To enable Zoom, navigate to **Settings** → **Accessibility** → **Magnification Gestures** then switch the button to **On**.

When magnification gestures are enabled, you can zoom, pan across the screen and pan content:

1. Zoom in or out by triple-tapping the screen. Then, while zoomed in, you can:



Drag two or more fingers to pan across the screen.



Pinch two or more fingers together or spread them apart to adjust the zoom level.



**Note:** If you enter or exit an app when zoomed in, you automatically zoom out. Simply triple-tap to zoom in again.

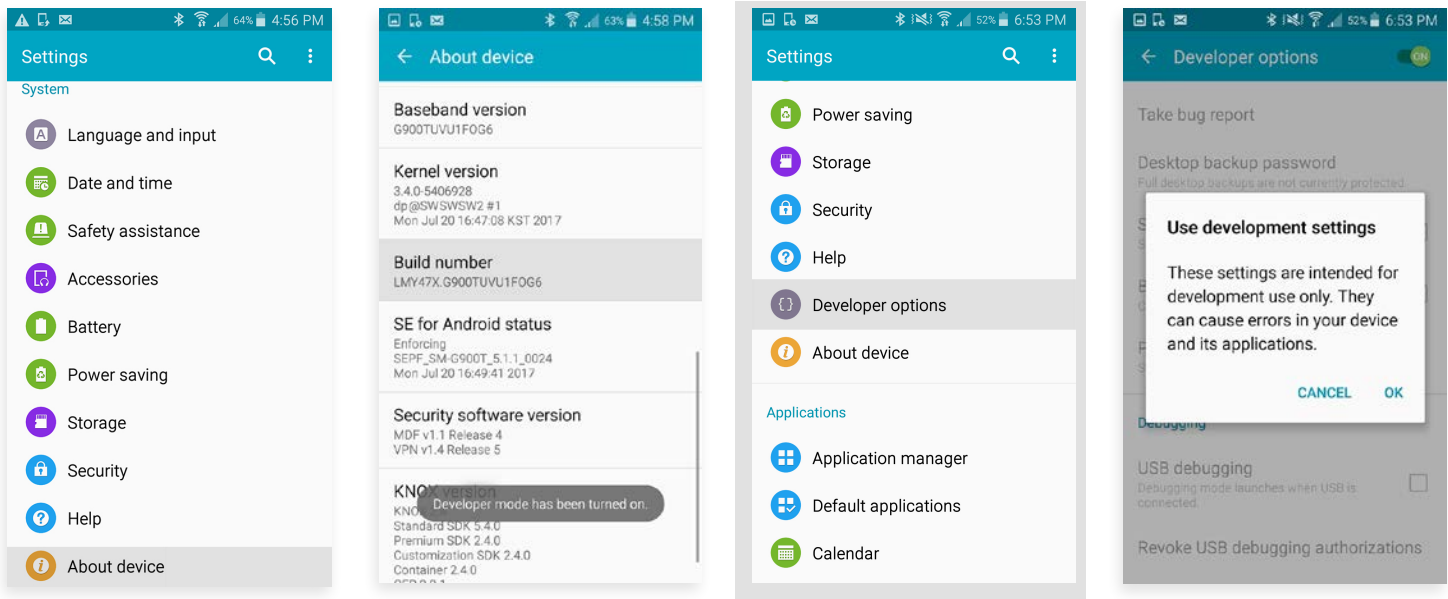
2. You can also temporarily magnify what's under your finger by triple-tapping and holding. In this magnified state, you can drag your finger to explore different parts of the screen. Lift your finger to return to your previous state.



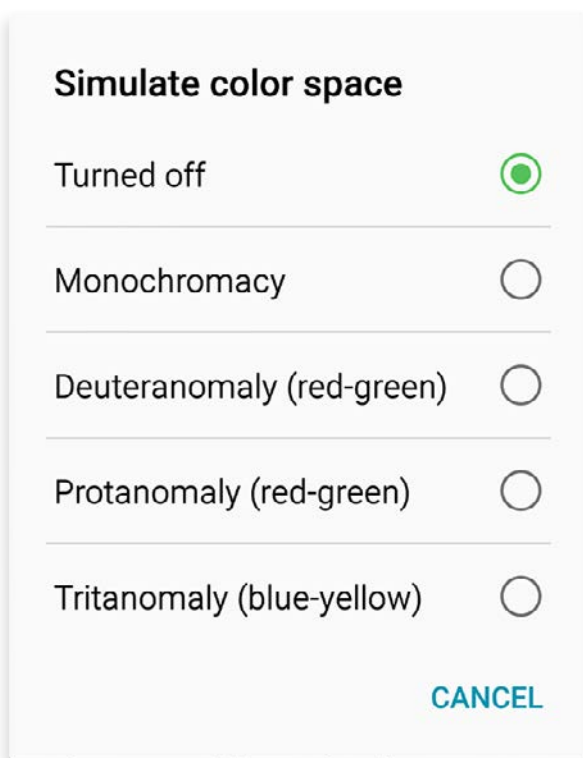
**Note:** Triple-tap for magnification works everywhere except the keyboard and navigation bar.

# GREYSCALE

To enable Android's grayscale view, first [enable Developer Mode](#) on your device. (This is a one-time process for each device.)



1. Go to **Settings** → **About Tablet** (which might also be labeled **About Phone** or **About Device**).
2. Locate the **Build number** section, and tap on the phrase “**Build number**” 7 times.
3. Go back to the main **Settings** page and tap on **Developer Options**.
4. Enable the **Developer Options** switch.



From then on, you can enable [Android's grayscale view](#) (Lollipop 5.0 onwards) by going to **Settings** → **Developer Options** → **Simulate color space** and selecting “**Monochromacy**.” Once you've made that selection, display colors will be replaced by shades of gray.

Grayscale is applied to all screens until you turn off the feature, which you can do by going back to **Settings** → **Developer Options** → **Simulate color space** and selecting “**Disabled**.”

Android's grayscale view can be used alongside any of Android's other modes or applications, including TalkBack and Shade, among others.

# BROWSER AND TALKBACK SUPPORT

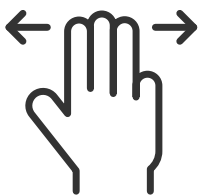
The native Android browser, Chrome, has basic support for web browsing with TalkBack. This means that some of the newer techniques found in WAI ARIA or HTML5 may not be compatible and may not be announced correctly by TalkBack if you were to use it with Chrome. Firefox for Android has better support for WAI ARIA and HTML5 as well as more robust support for core HTML such as headings, WAI ARIA Landmarks, data tables and so on. So we recommend testing on Firefox for Android.

Ideally, the best web development practice is to use core HTML where possible and only use WAI ARIA and HTML5 where functionality can't be achieved though core HTML. Where WAI ARIA and HTML5 must be used, keep in mind that while they may not be fully supported in Chrome with TalkBack, that support may exist elsewhere:

1. Firefox on Android
2. Other platforms such as iOS
3. Future versions of Chrome on Android

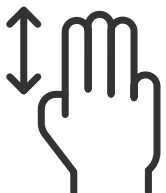
## Navigating Firefox

Firefox uses the three-finger swipe to navigate elements.



A three-finger swipe up or down cycles between the options listed below.

- ☐ List items (not lists)
- ☐ Links
- ☐ Headings
- ☐ Form elements (edit boxes, checkboxes, buttons...)
- ☐ Landmarks



A three-finger swipe left or right moves up or down the page by the selected element:

The consistency of this feature may vary across devices and versions. For example, three-finger gestures do not appear to work on the Hudl running KitKat 4.4.2.

## Firefox quick-navigation keystrokes that work with TalkBack

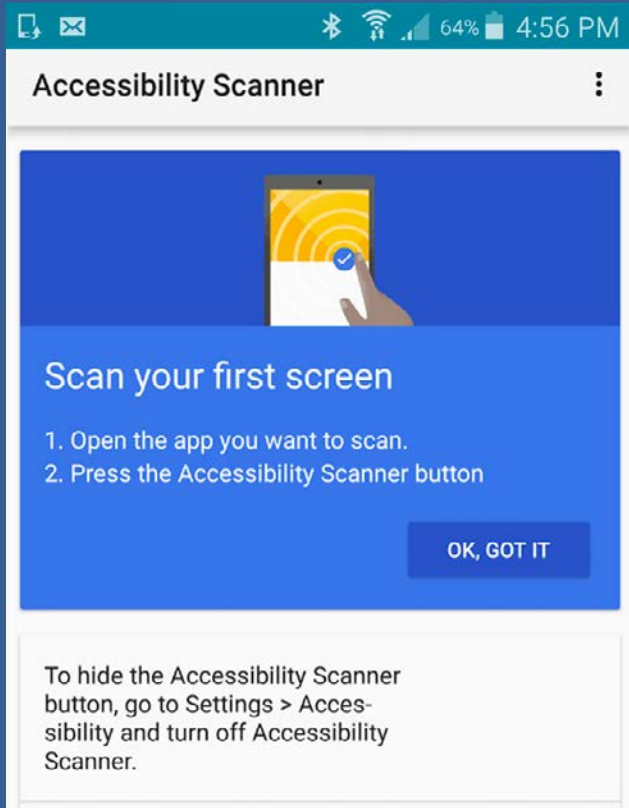
Firefox supports quick navigation keys with TalkBack. These work with a physical keyboard, a Bluetooth keyboard connected to your Android device, or the Eyes-Free keyboard in typing mode.

Keystrokes will only work when focus is in the HTML and not on the browser UI or in a text field.

Key	Description
<b>a</b>	Moves to next named anchor
<b>b</b>	Moves to next button
<b>c</b>	Moves to next combobox or listbox
<b>e</b>	Moves to next text entry or password field
<b>f</b>	Moves to next form field (button, combobox, text entry, radio button, slider, checkbox)
<b>g</b>	Moves to next graphic
<b>h</b>	Moves to next heading of any level
<b>i</b>	Moves to next item in an unordered, ordered or definition list
<b>k</b>	Moves to next hyperlink
<b>l</b>	Moves to next unordered, ordered or definition list
<b>p</b>	Moves to next page tab (in ARIA-enabled web apps)
<b>r</b>	Moves to next radio button
<b>s</b>	Moves to next separator
<b>t</b>	Moves to next data table
<b>x</b>	Moves to next checkbox



# TESTING TOOLS



The **Android Accessibility Scanner** suggests accessibility improvements for Android apps such as enlarging small touch targets, increasing contrast and providing content descriptions.

The Accessibility Scanner is only compatible with later versions of Android and can be accessed via **Settings** → **Accessibility** → **Accessibility Scanner**. To run the scanner open the app and tap the Accessibility Scanner button.



## GETTING STARTED

iOS accessibility features can be enabled on iOS devices through **Settings** → **General** → **Accessibility**.

### VoiceOver:



Pre-installed iOS screen reader. When enabled, VoiceOver reads everything on the screen. In mobile Safari, this includes all web content (text, alternatives for images, links, form fields, tables, and so on). In apps, this includes all buttons, images, form elements, static text, etc.

### Zoom:



A full screen magnifier that scales content by 200 percent when enabled and the screen is double tapped with three fingers. Magnification can then be adjusted between 100 and 500 percent. Zoom works throughout iOS as well as together with VoiceOver when enabled.

### Invert Colors:



A high-contrast mode for users with low vision, color blindness, and sensitivity to brightness. Once enabled settings apply throughout the system including video.

### Grayscale:



This setting removes all color from the display, which can make it easier for users with vision disabilities, such as color-blindness, to read the display.

# VOICEOVER

VoiceOver users include blind and low-vision users, as well as users with some cognitive or learning difficulties. To enable VoiceOver, navigate to

**Settings → General**  
**→ Accessibility → VoiceOver**

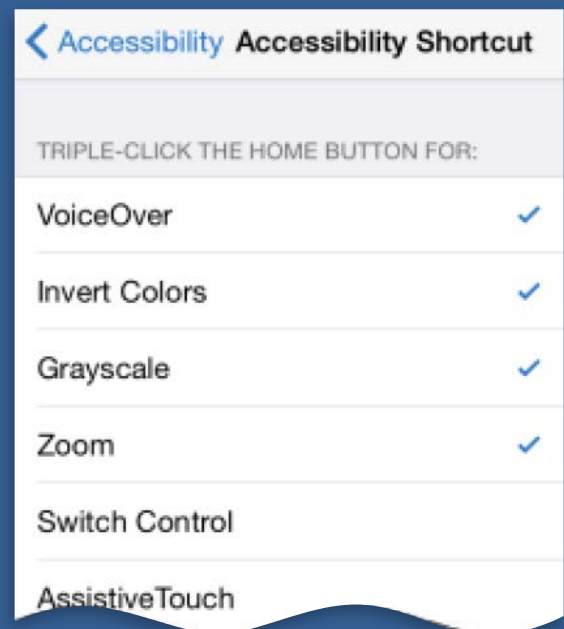
Then, touch and slide the white **Off** button (beside the word *VoiceOver*) to the right to enable VoiceOver. Once in the On position, the button changes color to indicate VoiceOver is enabled.



**Figure 3:** *The accessibility settings panel shown in iOS8*

## ACCESSIBILITY SHORTCUT

You are able to switch the accessibility features on and off using triple click on the home button. To enable this go to **Settings → General → Accessibility → Accessibility Shortcut** and select the features (such as VoiceOver) from the list of options. It is recommended you do this as it makes testing a lot quicker and easier as you don't have to go into settings each time to switch VoiceOver on and off.



**Figure 4:** *Accessibility shortcut menu*

# THE ROTOR

The Rotor is a virtual control built into VoiceOver. It allows you to select how you navigate through a dial format that lists marked-up elements on screen. It works with web content as well as native apps.

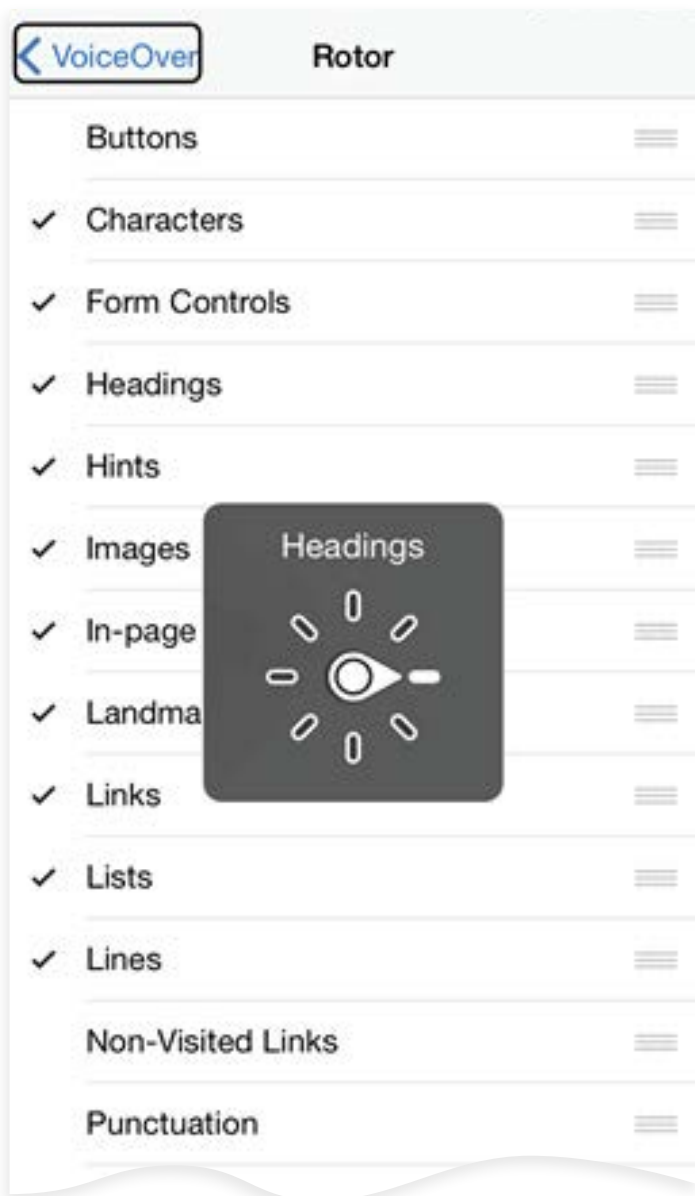
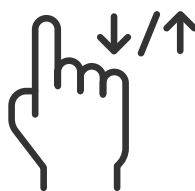


Figure 5: The Rotor displayed on screen when VoiceOver is running, showing the “Headings” options selected

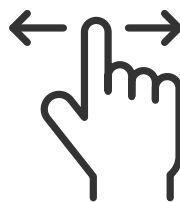
## To use the Rotor:



Place two fingers on the screen and twist them like you’re turning a dial. The arrow points to options for how you wish to navigate (for example, by headings)



Swipe up or down to jump between headings



Swipe left or right to move backward or forward through all content on the page

You can customize which features are included in the Rotor through **Settings** → **Accessibility** → **VoiceOver** → **Rotor**. These features include:

## VoiceOver Rotor features

Rotor features	Description	Availability
Audio ducking	Switch audio ducking (decreasing the volume of background noise when interacting with VoiceOver) on and off	Web and apps
Braille screen support	Shows an on screen Braille keyboard	Web
Buttons	Navigate between buttons	Web
Characters	Navigate one character at a time	Web and apps
Containers	Navigate by containers within a page, such as lists, landmarks, tables, etc.	Web and apps
Form controls	Navigate by form controls	Web
Handwriting	Fill in text fields by writing on screen	Web
Headings	Navigate between headings	Web and apps
Hints	Turn hints on and off	Web and apps
Images	Navigate images	Web
In-page Links	Navigate between in-page links	Web
Landmarks	Navigate between WAI ARIA Landmarks	Web
Language	Switch between supported	Web
Links	Navigate between links	Web
Lists	Navigate between lists	Web
Lines	Navigate line by line	Web
Non-visited Links	Navigate non-visited links	Web
Punctuation	Announces all punctuation, some punctuation, some punctuation	Web and apps

Rotor features	Description	Availability
Same Item	Navigate the previous item	
Search Fields	Navigate search fields	Web
Sounds	Switch sounds on or off	Web and apps
Speech Rate	Increase and decrease the speech rate	Web and apps
Static Text	Navigate between static text	Web
Tables	Navigate between tables	Web
Text Fields	Navigate between text fields	Web
Vertical Navigation	Flicking up or down, left or right is similar to using arrow keys on desktop	Web and apps
Visited links	Navigate between visited links	Web
Volume	Increase and decrease the volume	Web and apps
Words	Navigate between words	Web and apps
Zoom	Switch zoom on and off	Web

For testing purposes we recommend that you select at least these features within the Rotor:

- ❑ Buttons

❑ Containers

❑ Form controls

❑ Headings

❑ Hints
- ❑ Images

❑ Landmarks

❑ Links

❑ Lists

❑ Search fields
- ❑ Static Text

❑ Tables

❑ Zoom

There is also a Language Rotor that allows users to switch VoiceOver to use different languages. This setting is important so that second-language users can select English in the Rotor in order for content to be pronounced correctly.

# BASIC GESTURES

You may get an alert that VoiceOver changes the gestures used to control the device. Select **OK**.

Once you enable VoiceOver, the way you interact with the device changes. There are two interaction methods:

## 1. Explore by touch:



Drag your finger over the screen to have VoiceOver describe the items under your finger.



You can tap with a second finger or double-tap to open links, press buttons, and so on.

## 2. Gesture navigation:



You can swipe right with a single finger to move from one item to the next in sequence.



You can swipe left to go backward through this sequence. VoiceOver describes items as you move focus around the screen.



You can double-tap to open links, press buttons, and navigate using the [Rotor](#).

# Core VoiceOver commands

These are VoiceOver's core touch and gesture commands:

## Switch VoiceOver on/off



Triple-click  
the home key

## Rotor



Turn a dial with two  
fingers

## Speak an element



Single tap

## Zoom



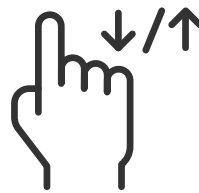
Three-finger double tap

## Activate an element



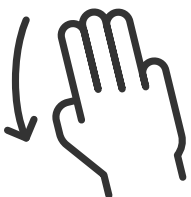
Double tap

## Jump to the previous/next Rotor item



Swipe up / down

## Scroll



Flick three fingers

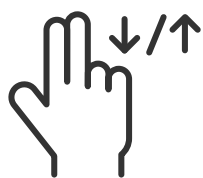
## Select previous / next



Swipe left / right



Read all top to bottom/bottom to top



Two-finger swipe  
down / up

Play / pause media



Two-finger double tap  
*Audio, video, voice  
memos, photos*

Next / previous page



Three-finger swipe  
right / left

Screen curtain on / off



Three-finger quadruple  
tap

Speak additional information



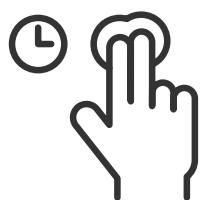
Three-finger tap  
*Such as position on  
screen, pagination,  
position in a table, and  
so on*

Mute / un-mute VoiceOver



Three-finger triple tap

Pass-through gesture



Two-finger tap and  
hold



**Tip:** A good place to practice VoiceOver gestures is in the VoiceOver Practice area found in

**Settings → General → Accessibility → VoiceOver.**

VoiceOver needs to be enabled for the VoiceOver Practice button to appear.

# SCREEN CURTAIN

Sighted developers and testers can turn off the screen to understand how well content is communicated when it can't actually be seen. Turn off the display by triple-tapping the screen with three fingers. This is an essential feature when testing.



**Note:** If you have both VoiceOver and Zoom enabled at the same time, Screen Curtain is enabled with a three-finger quadruple tap. For accessibility testing, we require running the features in isolation. But it could be useful to try running the features together on a few screens.

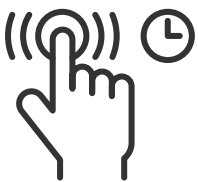
# SPEECH OFF

You can temporarily mute VoiceOver by double-tapping the screen with three fingers.



**Note:** If you have VoiceOver and Zoom enabled at the same time, you can toggle speech output with a three-finger triple tap. For accessibility testing, we require running the features in isolation. But it could be useful to try running the features together on a few screens.

# PASS-THROUGH GESTURE



You can use the pass-through gesture to tell VoiceOver to treat the next gesture as a standard iOS gesture. You can perform the pass-through gesture by double-tapping the screen and holding down your finger on the second tap for one second before performing the standard iOS gesture.



A short audio prompt after you've held the second tap for one second tells you that iOS is ready for you to perform the standard gesture.

For example, to scroll a view, double-tap and hold for one second before swiping left or right. You can also use the pass-through gesture for drag-and-drop functionality, or to adjust a slider with more precision than the usual VoiceOver behavior of giving the slider focus and requiring up and down swipes to adjust the value.

# ZOOM

People with low vision often use Zoom. Users with cognitive impairments, such as autism, may also use Zoom to focus in on key content and reduce the amount of visual clutter on the screen. To enable full screen Zoom, first navigate to the Zoom screen and select **Settings** → **General** → **Accessibility** → **Zoom**

Then, touch and slide the white Off button (beside the word *Zoom*) to the right to enable Zoom. Once in the On position, the button changes color to indicate Zoom is enabled.

Standard iOS gestures—flick, pinch, tap, and rotor—still work when the screen is magnified. Invert Colors and Grayscale also work with Zoom. There are some differences in commands when Zoom is run with VoiceOver: see the [VoiceOver Basic Gestures](#) section.

You can view magnified screens either in either “Full Screen Zoom” or “Window Zoom”.

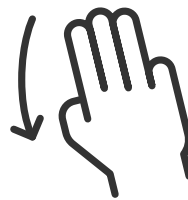
## Zoom Commands

### Toggle Zoom on/off



Double-tap 3 fingers

### Scroll



Flick three fingers

### Speak an element



Single tap

### Rotor



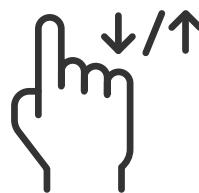
Turn a dial with two fingers

### Activate an element



Double tap

### Jump to the previous/next Rotor item



Swipe up / down

## Select previous / next



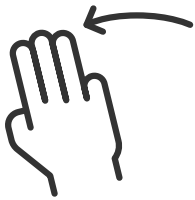
Swipe left / right

## Play / pause media



Two-finger double tap  
*Audio, video, voice  
memos, photos*

## Next / previous page



Three-finger swipe  
right / left

## Screen curtain on / off



Three-finger  
quadruple tap

## Speak additional information



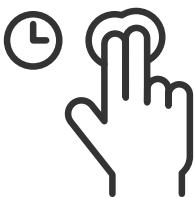
Three-finger tap  
*Such as position on  
screen, pagination,  
position in a table, and  
so on*

## Mute / un-mute VoiceOver



Three-finger triple tap

## Pass-through gesture



Two-finger tap and  
hold

# INVERT COLORS

To enable Invert Colors, first navigate to **Settings** → **General** → **Accessibility** → **Display Accomodations** and find **Invert Colors** in the **Vision** list.

Then, touch and slide the white **Off** button (beside the words *Invert Colors*) to the right to enable Invert Colors. Once in the On position, the button changes color and display colors are inverted to indicate Invert Colors is enabled.

The color inversion is applied to all screens until the feature is disabled by sliding the button to the **Off** position.

Invert Colors can be used with VoiceOver, Zoom, and Grayscale.

# GRAYSCALE

To enable Grayscale, first navigate to **Settings** → **General** → **Accessibility** → **Display Accomodations** → **Color Filters Accomodations** and enable the Color Filters toggle to view greyscale and other filters.

Then, touch and slide the white **Off** button (beside the words *Grayscale*) to the right to enable Grayscale. Once in the **On** position, the button changes to dark gray and display colors are replaced by grayscale colors to indicate Grayscale is enabled.

Grayscale is applied to all screens until the feature is disabled by sliding the button to the **Off** position.

Grayscale can be used with VoiceOver, Zoom, and Invert Colors.

# TESTING TOOLS

The [Accessibility Inspector](#) in Xcode can be used to test for missing or incorrect labels, traits and hints amongst other things. This can be run in the developer environment or using the iOS simulator.

# RESOURCES



## STANDARDS

- [Section 508 of the US Rehabilitation Act](#)
- [W3C: Web Content Accessibility Guidelines \(WCAG\) 2.0](#)
- [Draft Information and Communication Technology \(ICT\) Standards and Guidelines \(2010\)](#)

## GUIDELINES

- [W3C Mobile Accessibility Task Force extension](#)
- [W3C Note: Mobile Accessibility: How WCAG 2.0 and UAAG 2.0 Apply to Mobile Devices](#)
- [W3C: Techniques for WCAG 2.0](#)
- [WCAG 2.0 Techniques Applicable to Mobile without Changes](#)
- [BBC: Mobile Accessibility Guidelines](#)
- [Mobile Accessibility Guidelines for Developers](#)

# ANDROID RESOURCES

- ◉ [Accessibility – Android Developers](#)
- ◉ [Accessibility – Android Design](#)
- ◉ [Android Testing Tools](#)

# APPLE RESOURCES

- ◉ [Apple Accessibility](#)
- ◉ [iOS Human Interface Guidelines](#)
- ◉ [iOS Accessibility: Raising the Bar](#)
- ◉ [Apple Accessibility Mailing List](#)
- ◉ [Accessibility Programming Guide for iOS](#) - A technical introduction to iOS accessibility features, using its accessibility API to implementing accessibility in native apps, and testing apps for accessibility.
- ◉ [Accessibility on iPhone](#) – A technical introduction to iOS accessibility features and API.
- ◉ [Making Your iPhone Application Accessible](#) – A springboard for implementing accessibility in native iOS apps.
- ◉ [Testing the Accessibility of Your iPhone Application](#)
- ◉ [UIAccessibility Protocol Reference](#) – A full reference for iOS's main accessibility API methods and properties, a great place to start when you need to find a way to handle special use cases.
- ◉ [UIAccessibilityContainer Protocol](#) – Useful for understanding how to contain and group interface elements, especially when creating custom views.
- ◉ [UIAccessibilityFocus Protocol](#) – Useful when handling focus, listening to changes in VoiceOver focus, and so on.
- ◉ [Xcode toolset](#)
- ◉ [iOS Simulator User Guide](#)

# ARTICLES AND OTHER RESOURCES

- [WebAIM Articles](#)
- [Georgia Tech Research Institute: Accessibility Assistant: Accessibility Information](#)
- [Native, HTML5, or Hybrid: Understanding Your Mobile Application Development Options](#)
- [What's 'large text' in WCAG 2.0 parlance?](#) - Helpful for deciding the color contrast requirements for text of different sizes.
- [Google I/O 2013 Enabling blind and low-vision accessibility on Android \(video\)](#)
- [Google I/O 2012 - Making android apps accessible \(video\)](#)
- [Testing with Android](#)
- [Accessibility Testing Criteria for Android](#)
- [Browsing the Web with Chrome and TalkBack](#)
- [Browsing the Web with Firefox and TalkBack](#)
- [Learning iOS VoiceOver gestures \(PDF\)](#) - A cheat sheet that will help you to remember the gestures used to control VoiceOver.
- [Accessibility for iPhone and iPad apps](#)