

Using a Refreshable Braille Display with the iPad

Chapter 2: Navigating Apps with the RBD

Objectives

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Refreshable Braille Display Overview

Refreshable Braille Displays provide access to information that is on a screen – such as the iPad’s screen – by electronically raising and lowering different combinations of pins in braille cells. The RBD is refreshable – it changes continuously as the user moves the cursor around the screen.

For beginning braille readers, producing braille on the RBD is physically easier than producing braille on the traditional Perkins Braille Writer. Electronic braille tends to be “crisper” than

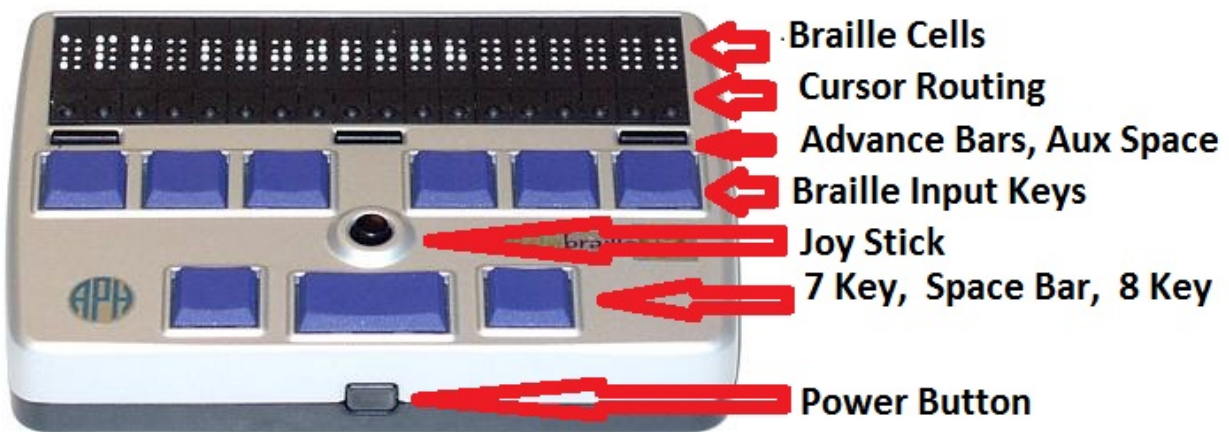
paper braille and electronic braille is never “mushy”. The RBD paired with the iPad also has the option of auditory output (VoiceOver); VoiceOver can be muted allowing the student to read the electronic braille without hearing VoiceOver.

Refreshable Braille Displays come in different sizes; options include 14 cells, 18 cells, 40 cells, 80 cells, etc. The smaller RBD is good for young students who have little hands and are reading smaller passages; older students/adults often prefer the larger RBD which will display larger passages at one time. RBDs are wireless – they are connected by Bluetooth. RBDs have additional features such as the routing buttons to allow easier navigation.

The Refreshable Braille Display uses a variety of commands for additional navigation and editings. These commands are called “Chords” and are a combination of braille dots and the space key pressed simultaneously.

The refreshable braille commands in this guide were tested using the Refreshabraille 18 from the American Printing House.

Figure 1 Image of APH 18 Refreshabraille - labeled



Refreshable Braille 18

This RBD manual is the fourth manual in a series of iPad training manuals. In the second manual, “Intro to Reading, Writing and Research on the iPad”, Chapter 7 is an introduction to the RBD with basic activities that are broken down into small chunks. The activities in the second manual are performed first using the VoiceOver gestures and then are repeated using the RBD commands.

The “Using a Refreshable Braille Display with the iPad” manual will discuss using the RBD in detail.

2.1 Basic RBD Navigating Commands

This section will introduce the basic RBD commands used for navigating. Turn on the RBD before you turn on VoiceOver. If you leave VoiceOver on all the time, turn on the RBD before you wake up the iPad.

The RBD will briefly display announcements that VoiceOver verbalizes on the braille display. Example: When the VoiceOver focus is moved to the Address button in Safari, VoiceOver will say “Address button, edits the URL” and “Address button, edits the URL” will briefly appear on the braille display. This feature is particularly helpful for deaf-blind users or blind users that have muted the VoiceOver speech.

Help Mode

The iPad has a VoiceOver RBD Help mode that allows you to practice various RBD commands. While in this mode, VoiceOver will verbally state what RBD command you pressed and what that command does. Example: When you press the “R Chord”, VoiceOver will say, “Dot 1, dot 2, dot 3, dot 5, space bar. Read page starting at the selected item.”

Note: Not all the RBDs will have a joystick; there are RBD chord commands that correspond with the joystick commands.

VoiceOver must be on in order to use the RBD Help Mode.

To access the RBD Help mode, press K Chord (1 + 3 + space). To exit the RBD Help, use a *two finger scrub*, *4 finger double tap*, or *B Chord*.

TEACHER HINT: SHOW YOUR STUDENTS THE HELP MODE – THEY WILL TEACH THEMSELVES THE COMMANDS!

Commonly used RBD Navigation Commands

“Chord” means braille input keys and space bar are pressed simultaneously.

TEACHER HINT: THE “RIGHT SIDE” OF THE RBD (DOTS 4,5,6) ARE TYPICALLY COMMANDS TO MOVE FORWARD. THE “LEFT SIDE” OF THE RBD (DOTS 1,2,3) ARE TYPICALLY COMMANDS TO MOVE BACKWARD.

TEACHER HINT: THE JOYSTICK ON THE APH 18 IS CHALLENGING FOR MANY STUDENTS. WE SUGGEST THAT STUDENTS ARE TAUGHT TO USE THE CORRESPONDING RBD COMMANDS INSTEAD OF THE JOYSTICK.

- Go to Home Screen; 1 + 2 + 5 + space (H Chord) H = Home
- Move VoiceOver cursor to next item; joystick right or 4 + space
- Move VoiceOver cursor to previous item; joystick left or 1 + space
- Move VoiceOver cursor to first item on the page: 1 + 2 + 3 + space (L Chord)
- Move VoiceOver cursor to last item on the page; 4 + 5 + 6 + space
- Move VoiceOver cursor to next container; 4 + 7 + space
- Move VoiceOver cursor to previous container; 1 + 7 + space
- Activate selected item; push joystick in or 3 + 6 + space
- Read the “whole” page starting at the top of the screen; 2 + 4 + 5 + 6 + space (W Chord)
W = Whole
- Pause/resume reading; 1 + 2 + 3 + 4 + space (P Chord) P = Pause
- Read all from current position; 1 + 2 + 3 + 5 + space (R Chord) R = Read All
- Scroll page up or down; 3 + 4 + 5 + 6 + space; 1 + 4 + 5 + 6 + space
- Scroll left or right; 2 + 4 + 6 + space (O Chord); 1 + 3 + 5 + space
- Cancel or go back to previous screen; 1 + 2 + space (B Chord) B= Back
- Toggle contractions On/Off (Grade I/Grade II Braille); 1 + 2 + 3 + 4 + Chord (G Chord) G = Grade
- Launch Control Center; 2 + 3 + 4 + space (S Chord) then 1 + 4 + 5 + 6 + space; (S = Status Bar)
 - Dismiss Control Center with 1 + 2 + space (B Chord) B = Back
- Launch Notification Center; 4 + 6 + space or S Chord then 3 + 4 + 5 + 6 + space (S = Status Bar)
 - Dismiss Notification Center with 1 + 2 + space (B Chord) B = Back
- Search Field; from Home Screen, 3 + 4 + 5 + 6 + space
- App Switcher; H Chord two times fast (H = Home)
- Access Rotor; 5 + 6 + space or 2 + 3 + space
- Perform Rotor action or adjust value defined by Rotor; 3 + space or 6 + space
- Jump to next or previous container; 4 + 7 + space or 1 + 7 + space
- Jump to Status bar; 2 + 3 + 4 + space (S Chord) S = Status bar
- Tab; 2 + 3 + 4 + 5 + space (T Chord) T = Tab
- Hide Keyboard; 1 + 4 + 6 + space
- @ symbol (used in email addresses); 4 + 7

Activity 2.1a Practice Navigating the Home Screen Using RBD Commands

In order for students to develop good muscle memory, repeat these commands and activities multiple times. Encourage the student to quickly initiate the commands. If possible, participants are encouraged to practice these familiar keyboarding skills with the **Screen Curtain ON** (iPad screen is dark). Turn the Screen Curtain On/Off with the RBD command: 1 + 2 + 3 + 4 + 5 + 6 + space (FOR Chord)

1. Turn screen curtain on; (1 + 2 + 3 + 4 + 5 + 6 + space) or FOR Chord.
2. Go to the Home screen; (1 + 2 + 5 + space) or H Chord.
3. Navigate item-by-item; (joystick right or 4 + space; joystick left or 1 + space to move forward or backwards across the screen).
4. Read the entire page starting at the top; (2 + 4 + 5 + 6 + space) or W Chord.
5. Pause VoiceOver; (1 + 2 + 3 + 4 + space) or P chord.
6. Resume all; (1 + 2 + 3 + 5 + space) or R Chord.
7. Move cursor directly to Calendar (top left); (1 + 2 + 3 + space) or L Chord.
8. Move cursor directly to Safari (bottom right); (4 + 5 + 6 + space).
9. Move cursor directly to Calendar (top left); (1 + 2 + 3 + space) or L Chord.
10. Move cursor directly to Pages (next container); (4 + 7 + space).
11. Move to second Home screen; (1 + 3 + 5 + space) or O chord.
12. Move back to first Home screen; (2 + 4 + 6 + space).
13. Find and Open Dropbox;
 - Move to Safari; (4 + 5 + 6 + space)
 - Move to Dropbox; (joystick left or 1 + space)
 - Activate Dropbox; (Joystick in or 3 + 6 + space)
14. Close Dropbox; (H Chord).
15. Set the Rotor to Speech Rate; (5 + 6 + space or 2 + 3 + space).
16. Increase Speech Rate to 100%; (3 + space multiple times).
17. Read All command; (1 + 2 + 3 + 5 + space) or R Chord.
18. Set the Speech Rate to 45%; (6 + space multiple times).
19. Turn Screen Curtain Off; (1 + 2 + 3 + 4 + 5 + 6 + space) or FOR Chord.

Activity 2.1b Practice Navigating a Pages Document

For this activity, we will use the homework assignment called “A Fright on Carpenter’s Peak.” (Any document that is several pages long and that has multiple choice questions at the end will work.)

TEACHER HINT: YOU MUST HAVE THE I-BEAM (FLASHING CURSOR IN TEXT) OR FLASHING BRAILLE PINS (ON RBD) IN ORDER TO EDIT THE DOCUMENT. 3 + 6 + SPACE WILL OPEN THE TEXT FIELD.

1. Go to the Home screen; (H Chord).
2. Open Pages;
 - Move to Pages (next container); (4 + 7 + space)
 - Activate Pages; (joystick in or 3 + 6 space)
3. Open “A Fright on Carpenter’s Peak”;
 - Joystick right or 4 + space or drag finger stopping on “A Fright on Carpenter’s Peak”
 - Activate document; (joystick in or 3 + 6 + space) VoiceOver should begin reading document
4. Pause Reading; (P chord).
5. Navigate to beginning of document; (joystick in or 3 + 6 + space).
 - **Note that the “textfield is editing”; the I-beam and VoiceOver cursor are now displayed.**
6. Navigate to end of document; (joystick in or 3 + 6 + space).
7. Navigate to second then third page; (1 + 4 + 5 + 6 + space, then repeat).
8. Navigate back to the second page; (3 + 4 + 5 + 6 + space).
9. Read by Lines;
 - Set the Rotor to Lines; (5 + 6 + space or 2 + 3 + space stoping on Lines)
 - Joystick down or 6 + space
10. Move cursor to beginning of document; (joystick in or 3 + 6 + space).
11. Go to Pages home screen;
 - Move to Documents button; (1 + 2 + 3 + space) or L Chord
 - Activate Documents button; (joystick in or 3 + 6 + space)

TEACHER HINT: CURRENTLY THE I-BEAM ON THE IPAD SCREEN IS ONE LINE BELOW WHAT VOICEOVER IS READING; THIS MAKES THE BRAILLE ON THE RBD DIFFERENT THAN WHAT IS BEING READ OUTLOUD. MOVE THE I-BEAM UP ONE LINE (JOYSTICK UP) TO DISPLAY THE CORRECT BRAILLE ON THE RBD.

2.2 Panning Keys

RBDs have a limited amount of braille characters that can be displayed at one time. The APH Refresh Braille 18 can display 18 characters at one time; however, most sentences contain more than 18 characters. To display the next 18 characters, press the right panning button. To display the last 18 characters, press the left panning button.

2.3 Flashing RBD Cursor

In an editable app such as Pages, Notes, or Mail, you must initially open the text field by double tapping, pushing the joystick in or 3 + 6 + space. The I-beam will appear on the screen and the flashing cursor will appear on the RBD. The RBD cursor is split between two braille cells as Dot 8 and Dot 7. This enables you to insert a character between the two flashing dots.

There are four quick ways to move the the VoiceOver cursor to a new location – which will make the corresponding braille appear on the display.

1. Insertion Point at Start/End
2. Dragging finger
3. Routing button
4. Use the Rotor to move line by line

TEACHER HINT: WHEN USING THE READ ALL COMMAND (R CHORD), VOICEOVER WILL READ THE TEXT; HOWEVER, THE VOICEOVER CURSOR DOES NOT MOVE AND THE RBD DOES NOT CHANGE TO DISPLAY THE NEW CORRESPONDING BRAILLE TEXT.

*Moving the RBD by lines, words and characters will be addressed in section 2.8.

2.4 Insertion Point at Start/Insertion Point at End

When editing a document, pushing the joystick in (3 + 6 + space) will move the I-beam *and the RBD cursor* to the beginning of the document. Pushing the joystick in again (3 + 6 + space) will move the I-beam *and the RBD cursor* to the end of the document. The RBD will display the corresponding braille text.

2.5 Move VoiceOver Cursor by Dragging One Finger

When the textfield is editing (after you initially activate the textfield by pressing 3 + 6 + space), you can simply drag one finger down or around the screen. VoiceOver will read the line that your finger is on and the braille will follow along. The I-beam *and the RBD cursor* will both move to the beginning of the line that VoiceOver is reading. The RBD will display the corresponding braille text.

Activity 2.5 Open Textfield to Navigate the Document

1. Open “Superhero Joey”;
 - Joystick right or 4 + space stopping on “Superhero Joey”
 - Activate Superhero Joey; (joystick in or 3 + 6 + space)
2. Pause VoiceOver; (P Chord).
3. Activate the Text field; (joystick in or 3 + 6 + space.) Cursor will appear at beginning of document; if the cursor moved to the end of the document, press the joystick in or 3 + 6 + space again to move cursor to beginning.
4. Move cursor to end of document; (joystick in or 3 + 6 + space).
5. Move cursor to beginning of document; (joystick in or 3 + 6 + space).
6. Drag finger to “Joey skipped downstairs.”
7. Read the full braille sentence; (press right Panning Key).

Leave “Superhero Joey” open as we will use this document in the next activity.

2.6 Routing Button to Move the Cursor

When editing, you can quickly move the RBD cursor to the desired location by pressing the Routing button. Locate the desired braille letter on the RBD, then find the Routing button directly below and move one Routing button to the right. Example if you brailled the word “Appile” instead of “Apple”, you would find the Routing button directly below the “i” and then move one Routing button to the right (under the “l”). The RBD cursor will now flash Dot 8 under the “i” and Dot 7 to the right of the “i”. You can now use the delete command (1 + 4 + 5 + space or D Chord) to delete the “i”.

Activity 2.6 Move Cursor using Routing Button

Use the Pages document “Superhero Joey” for this activity.

1. Move cursor to beginning of document; (joystick in or 3 + 6 + space).
2. Read line by line;
 - Set Rotor to Lines; (5 + 6 + space or 2 + 3 + space) stopping on Lines)
 - Joystick down or 6 + space; joystick up or 3 + space stopping on the line, “I’m sure to win the contest.”

Notice that the VoiceOver cursor is on “I’m sure to win the contest.” But the I-Beam is on the print text one line below. To move the I-beam back to the VoiceOver cursor, press the joystick up or 3 + space. This will make the braille match the VoiceOver sentence.

3. Read the braille line; pan stopping on “Joey skipped downstairs.”

Notice that when panning, the VoiceOver cursor does not move and VoiceOver does not verbalize.

4. Edit the sentence to “Joey skipped happily downstairs.”
 - Located the braille “ed” in the word “skipped”
 - Press the Routing button one below and one routing button to the right of the letter “ed”. (This will move the flashing cursor: dot 8 will be directly below the “d” and dot 7 will be in the cell to the right of the “d”.)

Notice that only the Grade II braille contraction “ed” became Grade I.

- Type a space then the word “happily” then space. (The braille word “happily” will not appear until the space is typed.)

Notice that the Grade I “skipped” reverted back to Grade II when the cursor was moved off of the word.

Commonly Used RBD Commands for Editing

- Delete; D Chord or 7 + space
- Toggle Contracted/Uncontracted Braille; G Chord
- Return/Enter; 8 + space (E Chord)
- Toggle between 6 dot braille and 8 dot braille; 2 + 3 + 6 + space
- Select Text; 2 + 5 + 6 + space (selects one character, word or line depending on rotor setting); 2 + 5 + 6 + space multiple times (selects multiple characters, words, or lines depending on the rotor setting)
- Deselect Text; 2 + 3 + 5 + space (dropped F Chord)
- Select All; 2 + 3 + 5 + 6 (dropped G Chord)
- Cut; 1 + 3 + 4 + 6 + space (X Chord)
- Copy; 1 + 4 + space (C Chord)
- Paste; 1 + 2 + 3 + 6 + space (V Chord)
- Undo; 1 + 3 + 5 + 6 + space (Z Chord)
 - If in Pages, you can Undo by moving to Documents (L Chord) then right to Undo button (6 + space) and activate (3 + 6 + space).
- Redo; 2 + 3 + 4 + 6 + space (THE Chord)
- Toggle Hide Keyboard; 1 + 4 + 6 + space
- Toggle Mute VoiceOver; 1 + 3 + 4 + space (M Chord)
- Toggle Screen Curtain; 1 + 2 + 3 + 4 + 5 + 6 + space (FOR Chord)
- Tab; 2 + 3 + 4 + 5 + space (T Chord)
- Enter or New Line; 1 + 5 + space (E chord) or 8 + space

2.7 Routing Button Converts One Word to Uncontracted Braille

The Routing button has another function. When you are using Contracted braille and you press a Routing button under a word that is contracted, just that word – only that word – will convert to Uncontracted Braille. This enables a beginning braille reader to independently check and/or learn the unfamiliar braille contraction.

In the activity above, when you pressed the Routing button below the word “skipped” the contracted “ed” was changed to the individual letters “e” and “d”.

Activity 2.7 Use the Routing button to Convert Contracted Word to Uncontracted Word

1. Continue to read the braille; pan one time stopping on the sentence “I come.”
2. Changed the contracted word to uncontracted word; press Routing button below the contracted word “come”. (Only this word will convert to uncontracted braille; when you use the G Chord, the entire document converts to uncontracted braille.)
3. Press the Routing button below the letter “l”. Now the word “come” reverts back to Contracted braille.

2.8 Toggle between Uncontracted/Contracted Braille

You can quickly toggle the entire document between Uncontracted/Contracted braille by using the G Chord. In order to insert a character or a word into an existing document, you **must** be in Uncontracted Braille mode.

TEACHER HINT: YOU MUST SWITCH TO UNCONTRACTED BRAILLE (G CHORD) IN ORDER TO EDIT.

Remember: When using Contracted braille, if you have set Automatic Braille Translation On, then you must type quickly or the individual letters will automatically convert to Whole Word contraction. When Automatic Braille Translation is Off, then the letter does not automatically convert to a Whole Word contraction – no matter how much time passes. The braille letter/word does not appear on the RBD until the space bar is pressed. *However, if adding a character within a word, you will then have to delete the space.* When using Uncontracted braille, the braille letters never convert to Whole Word contractions.

TEACHER HINT: TRY SETTING AUTOMATIC BRAILLE TRANSLATION ON – THEN ENCOURAGE THE STUDENT TO THINK HOW THE WHOLE WORD IS SPELLED BEFORE STARTING TO BRAILLE THE WORD. THIS OFTEN ENCOURAGES A BRAILLE STUDENT TO PRODUCE BRAILLE FASTER!

Activity 2.8 Use the Routing button to Convert Contracted Word to Uncontracted Word

1. Continue to read the braille; (pan one time stopping on the contracted word stopping on the line “I’m a superhero,. . .”).
2. Change the entire document to uncontracted braille; (G chord).
3. Continue to read the braille; (pan stopping on “Joey looked . . .”)
4. Change the entire document to contracted braille; (G Chord).

2.9 Navigating a Document while Editing by Words or Characters

Set the Rotor (5 + 6 + space or 2 + 3 + space) to Lines, Words or Characters. Once on the desired option, joystick up or down (3 + space or 6 + space) to move backwards or forwards by the selected amount. Example: Set the Rotor to Words. Press 6 + space to move forwards one word at a time. This allows you to hear VoiceOver say each word individually. If the Rotor is set to Characters, VoiceOver will say each letter. Reading by characters is useful to when checking spelling, such as how a name is spelled or to determine an email address. When moving by character, VoiceOver will say all punctuation such as “period”.

Navigating by lines is usually available; however, in some apps, using the rotor to navigate by lines is not an option.

Activity 2.9 Navigating by Words or Characters

Continue to use the Pages document “Superhero Joey” for this activity.

1. Move the cursor to the beginning of the document; (joystick in or 3 + 6 + space).
2. Read by words;
 - Change Rotor setting to Words; (5 + 6 + space or 2 + 3 + space, stopping on Words)
 - Move word by word; (6 + space to move forwards or 3 + space to move backwards stopping on the word “Katherine”)
3. Read by characters;
 - Change Rotor setting to Characters: (5 + 6 + space or 2 + 3 + space stopping on Characters)
 - Move Character by character; (6 + space to move forwards or 3 + space to move backwards). Check the spelling of the word “Katherine”.

2.10 Punctuation Rotor Options

The Rotor now has a punctuation option. When the Rotor is set to Punctuation, the choices are All Punctuation, Some Punctuation or No Punctuation

- All Punctuation When All Punctuation is selected, VoiceOver will say everything including: Hyphen, quotes, semi-colon, etc. The RBD will spell out all these words. This option is commonly used when proofreading a document.
- Some Punctuation When Some Punctuation is selected, VoiceOver will not say the punctuation; punctuation will show up correctly in braille on the RBD. This is the most commonly used Punctuation option.
- No Punctuation When No Punctuation is selected, VoiceOver will not say the punctuation AND no punctuation will show up in braille on the RBD. That means that not even the “.” (period) symbol will appear on the RBD.

TEACHER HINT: SOME PUNCTUATION IS THE MOST COMMONLY USED PUNCTUATION OPTION. ALL PUNCTUATION CAN BE USED WHEN PROOFREADING A DOCUMENT.

- Capitalization is not a Punctuation Option in the Rotor. VoiceOver will ONLY say capitalization when you are navigating character by character.

2.11 Mute: Braille Only Mode

VoiceOver must be On in order for the RBD to work; however, you can choose to Mute VoiceOver (1 + 3 + 4 = space or M Chord). Muting VoiceOver enables the braille reader to practice his/her braille skills. Muting also provides privacy so that nearby students donot hear voiceOver talking.

When in class, the student can also opt to hear VoiceOver but to use earbuds so that other students donot hear VoiceOver.

To toggle between Mute/Unmute (speech on/off), use the M Chord.

2.12 Screen Curtain

Another option is to turn the iPad's screen blank by turning the Screen Curtain On (1 + 2 + 3 + 4 + 5 + 6 + space or FOR Chord). This is a good option when the user would like privacy.

Example: When the braille student is taking a test, turning on the Screen Curtain keeps the student's work private.

To toggle between the Screen Curtain On/Off, use the For Chord.

2.11 Activity Screen Curtain & Mute

Continue to use the Pages document "Superhero Joey" for this activity.

1. Turn speech Off; (M Chord) mute.
2. Read braille; (read and pan to next line).
3. Turn speech On; (M Chord) unmute.
4. Make screen dark; (For Chord) Screen Curtain On.
5. Read with VoiceOver; (R Chord).
6. Pause reading; (P Chord).
7. Make screen visible; (For Chord) Screen Curtain Off.

TEACHER HINT: THE RBD COMMANDS TO MAKE APPS JIGGLE, TO MOVE BETWEEN OPEN APPS AND TO REMOVE A DOCUMENT OR APP FROM A FOLDER HAVE YET TO BE DETERMINED. USE VOICEOVER GESTURES FOR THESE ACTIVITIES.

2.13 Enter/Exit Announcement Mode

The RBD will display the previous announcements on the braille display. To toggle between entering/exiting the Announcement mode, press 1 + 3 + 4 + 5 + space or N Chord. To view the previous announcement press 1 + space. To view the next announcement, press 4 + space.

When in announcement mode, the first and last braille cell on the braille display will show 1 + 2 + 3 + 4 + 5 + 6 + 7 + 8. VoiceOver will not say the announcements when you are in the Announcement mode. (VoiceOver will say the announcements as they appear when you are NOT in the Announcement mode.)

2.13 Enter/Exit Announcement Mode

1. Activate Announcement mode; (1 + 3 + 4 + 5 + space) N Chord.
2. Read previous announcements; (1 + space multiple times).
3. Read next announcement; (4 + space).
4. Exit Announcement mode: (1 + 3 + 4 + 5 + space) N Chord.