



**Navigate safely in
tight and crowded
spaces**

Obstacle Detection Systems
that can be installed on *any*
wheelchair.

SETTINGS MANUAL

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May 2018

Serial Terminal Instructions

The Braze blind spot sensor system settings can be modified using a Serial terminal. These instructions will show you how to use this terminal to change the settings on your Braze Sentina. If you have any questions, please don't hesitate to contact us at info@brazemobility.com

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Computer Instructions

Computer Instructions

1. Download Arduino from the website (free software) at <https://www.arduino.cc/en/Main/Software>
2. Leave the Braze system set up for use (including all cords plugged in), remove USB plug from battery pack. Plug your Braze System into the USB port in your computer.
3. Open Arduino on your computer.
4. Click tools (in the menu bar on a macbook), ensure that you have the right port selected (see figure 1)
5. Click the button on the top right-hand corner of the Arduino window (small magnifying glass-figure 2)
6. If unit has customized settings already in place, copy them to the log page on the last page of this booklet, view settings by entering "print".
7. Enter commands (listed on p.11&12) into the text bar of the pop-up window and press enter or the "send" button to change settings (use exact punctuation and spelling).
8. Once a setting is entered, you can immediately test that it has been successfully sent on your Sentina unit, without unplugging
9. If you are satisfied with the settings, use command "save" to ensure all settings are saved. You can unplug the USB cord from your computer, and place in the battery pack. Test that all settings saved.

Note: Sending multiple commands may freeze the Braze System. If the system freezes at any time, unplugging and replugging the USB power source will reset the system.

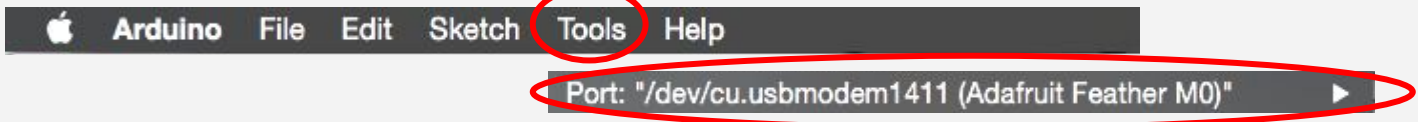


Figure 1- ensure that the correct port is selected!



Figure 2

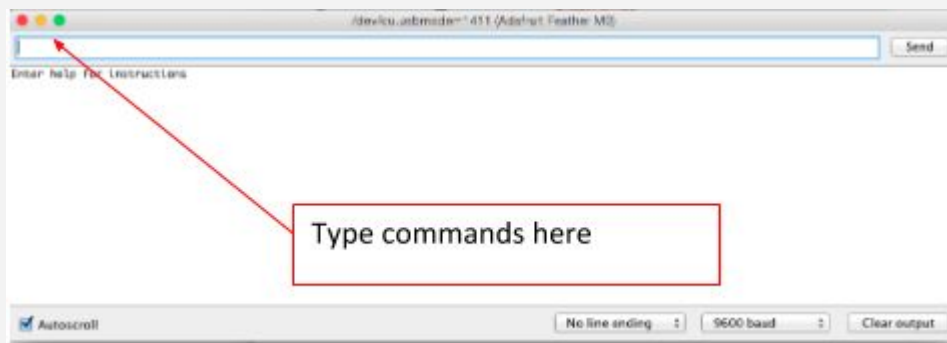


Figure 3

Using Bluetooth App (Android)

1. Ensure your phone's Bluetooth is switched to "on" (can be done in the settings window of most phones)
2. Download serial terminal app from the Playstore, or wherever you get your apps from. There may be multiple Serial Terminal apps, the one we have used and succeeded with can be seen in figure 4.
3. Open the app- click the options button (figure 5) and select settings (figure 6).
4. Scroll down to the "send" line and find the "newline" field (figure 7), and switch Newline to NUL (figure 8).
5. Click options (figure 5), then devices (figure 6)
6. Ensure you are in Bluetooth LE, and connect to Adafruit Bluefruit LE (figure 9)
7. Click "options" (figure 5), then "terminal" (figure 6)
8. Click connect button- will say "connected" when ready (figure 10)
9. Enter Serial commands (figure 11). Full list of available commands on p.11&12 Ensure all spelling and punctuation is exactly as shown in instructions.
10. If you are satisfied with the settings, use command "save" to ensure all settings are saved. You can unplug the USB cord from your computer, and place in the battery pack. Test that all settings saved.

Note: Sending multiple commands may freeze the Braze System. If the system freezes at any time, unplugging and replugging the USB power source will reset the system.

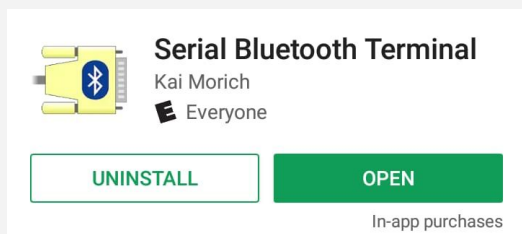


Figure 4

This is the app that we have used, and the one which all of the screenshots are from. It is free, and available on the Android play store.

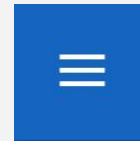


Figure 5

Options button on the top left hand corner of the app screen.

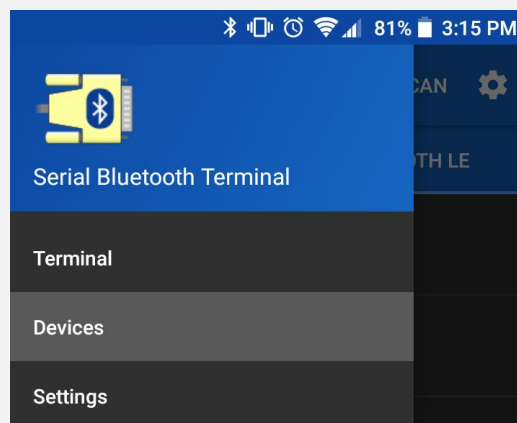


Figure 6

The options screen. You will need to select each of these throughout the set up process.

Using Bluetooth App (Android)

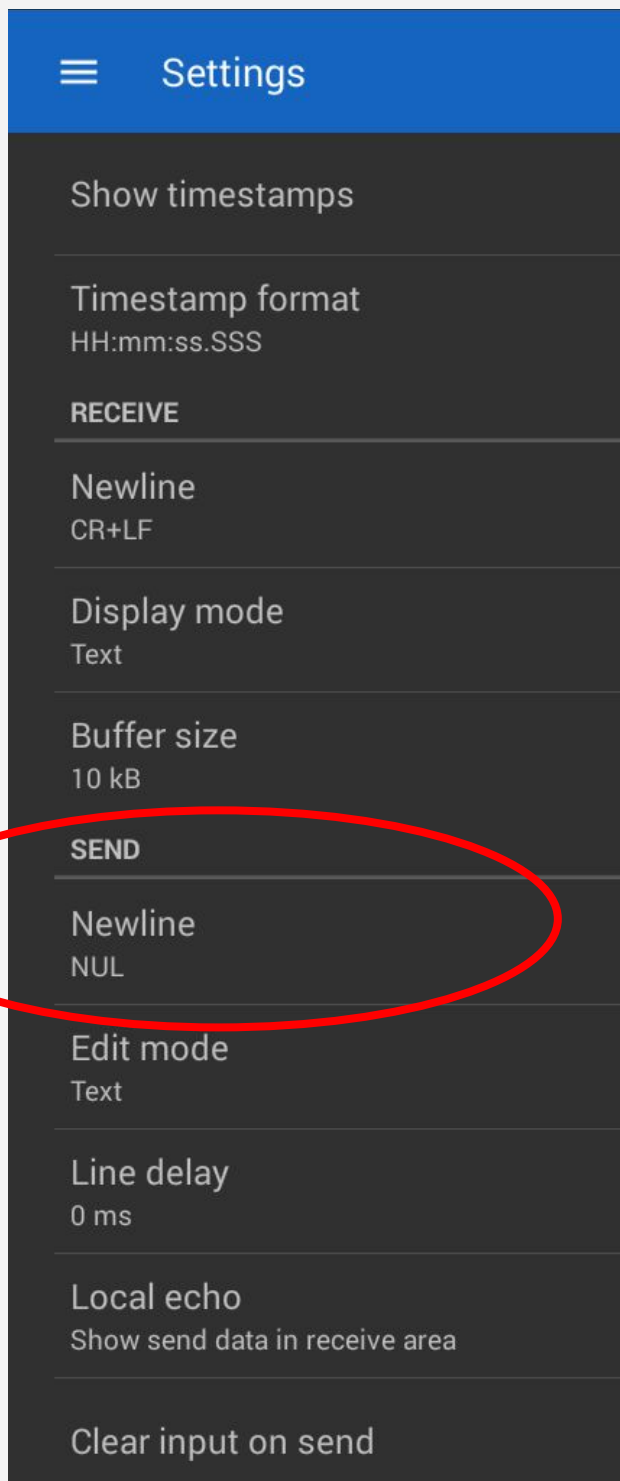


Figure 7
Scroll down to the “send” section. Newline should be set to NUL, if not press on Newline, and select NUL on the menu in figure 8.

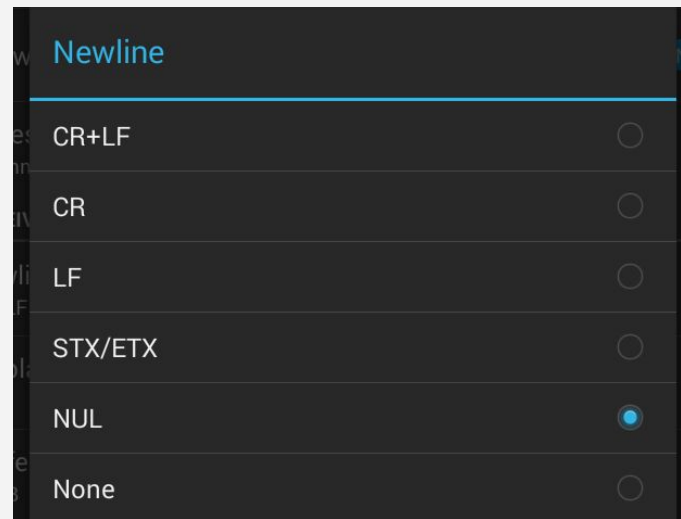


Figure 8
Ensure that the Newline selected for “send” is set to NUL.

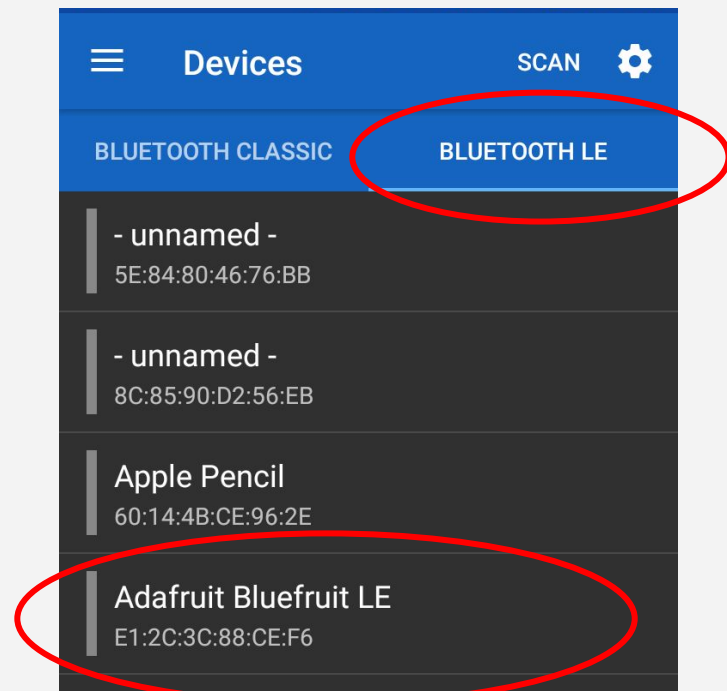


Figure 9
Ensure that the tab selected at the top is Bluetooth LE. Once you have this selected, Adafruit Bluefruit LE is the name of the Sentina on Bluetooth. Select this device.

Using Bluetooth App (Android)

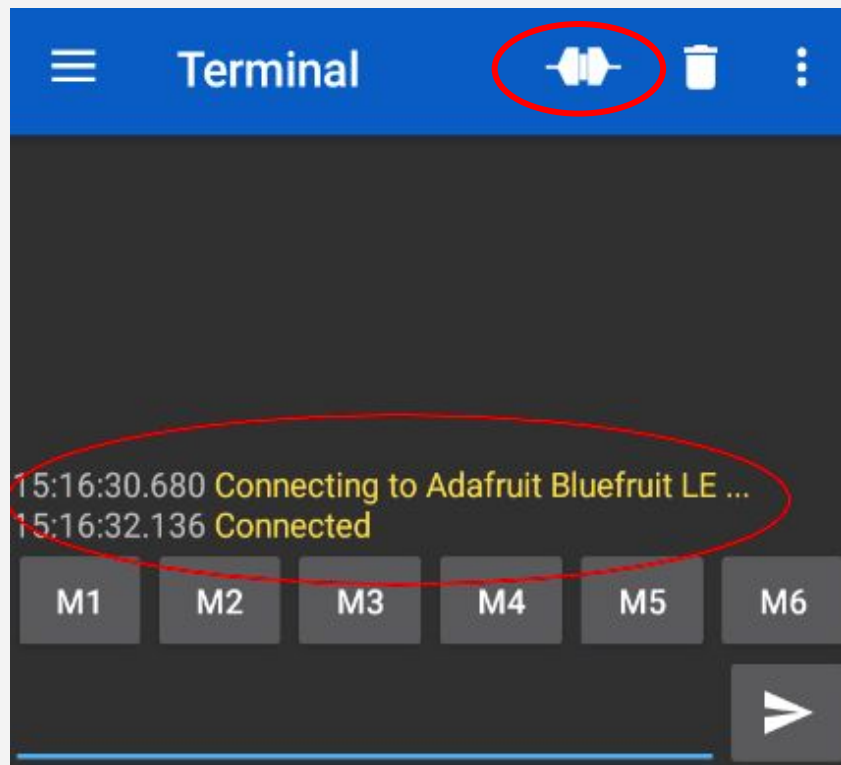


Figure 10

This image shows the app displaying that the Bluetooth connection has been established between the phone and the Sentina. You are now ready to enter commands into the system. If it is disconnected for any reason, click the connect button in the top right corner.

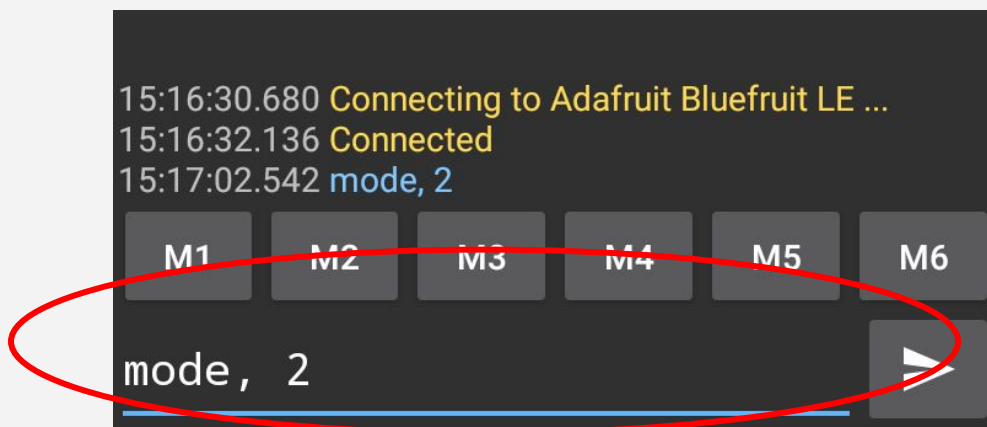


Figure 11

Once you have connected your device to your phone via Bluetooth, you can enter any of the commands (listed on p. 11&12) into the text box at the bottom of your screen, and press the send button. This will change the settings on your device. See list below for all available setting changes.

Using Bluetooth App (iOS)

Using Bluetooth App (iOS):

iPhones may have difficulty reading from the device, This means settings such as print and help will not work. Settings should still update as normal.

1. Ensure your phone's Bluetooth is switched to "on" (can be done in the settings window of most phones)
2. Search and download a "BLE terminal" app from the App Store. There are multiple BLE Terminal apps, the one we have used and succeeded with can be seen in figure 10.
3. Open the app- a list of available devices will appear (figure 11).
4. Find and connect to Adafruit Bluefruit LE (figure 11)
5. Ensure device is connected (figure 12).
6. Enter commands into the text bar- use mode,2 to ensure connection is working your mode lights should toggle to mode 2 if connection is working. Ensure you follow test by resetting to mode 1.
7. Enter Serial commands (figure 9). Full list of available commands listed on p.11&12. Ensure all spelling and punctuation is exactly as shown in instructions. Changes are automatically saved.
8. If you are satisfied with the settings, use command "save" to ensure all settings are saved. You can unplug the USB cord from your computer, and place in the battery pack. Test that all settings saved.

Note: Sending multiple commands may freeze the Braze System. If the system freezes at any time, unplugging and replugging the USB power source will reset the system.

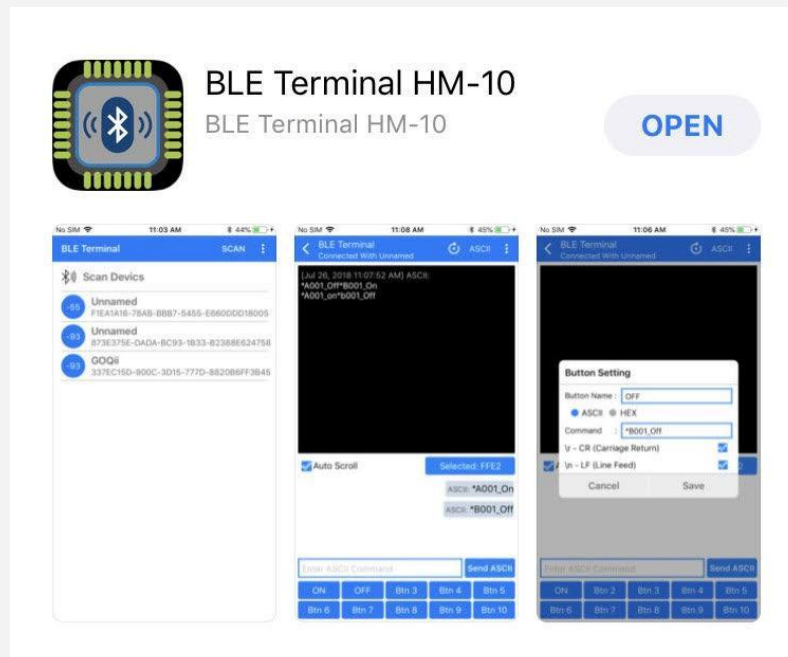


Figure 10 - This app is the one which we used- all screenshots will be using this app. There are alternative BLE Terminal apps available, however some were unable to connect with the Braze Sentina when trialed.

Using Bluetooth App (iOS)

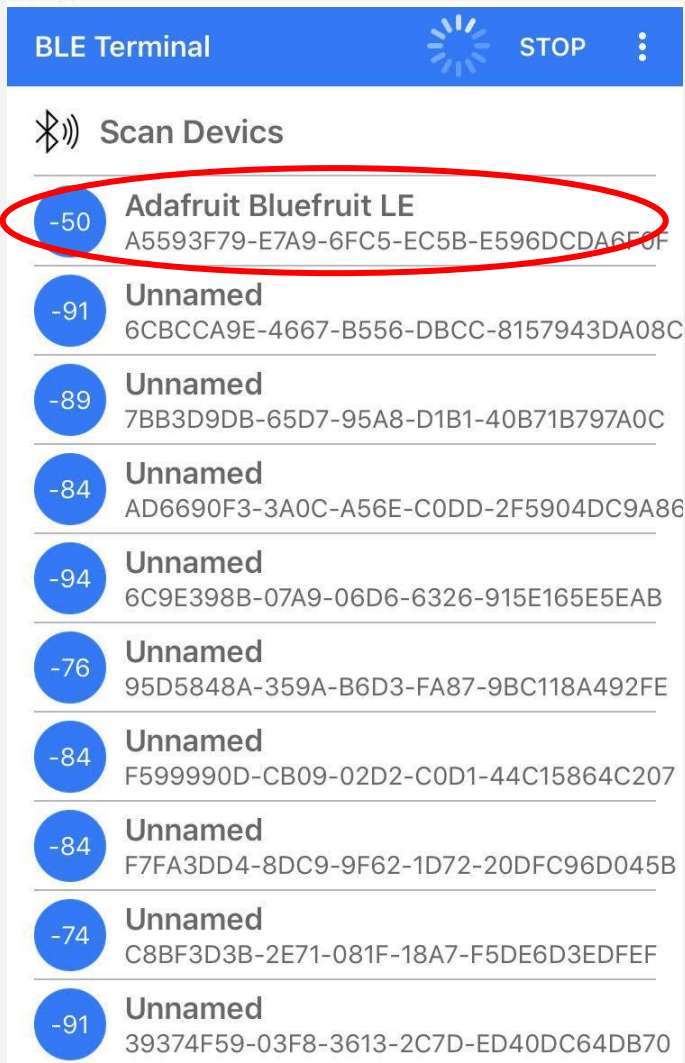


Figure 11 - All available Bluetooth devices will show up on the app. Find the device called Adafruit Bluefruit LE- that is the Braze Sentina. If a newer version of the system is used, the device will be called Braze Sentina



Figure 12- Once you click the device from the list, this screen will pop up. It will say connecting to Adafruit. Wait until the screen says connected to Adafruit. Press and hold the "Send ASCII" button until a pop-up occurs.

Using Bluetooth App (iOS)



Figure 13 - Make sure that "ASCII" is selected (has a blue dot) and both "\r" and "\n" are not selected (have grey boxes). Press "Save" when finished.

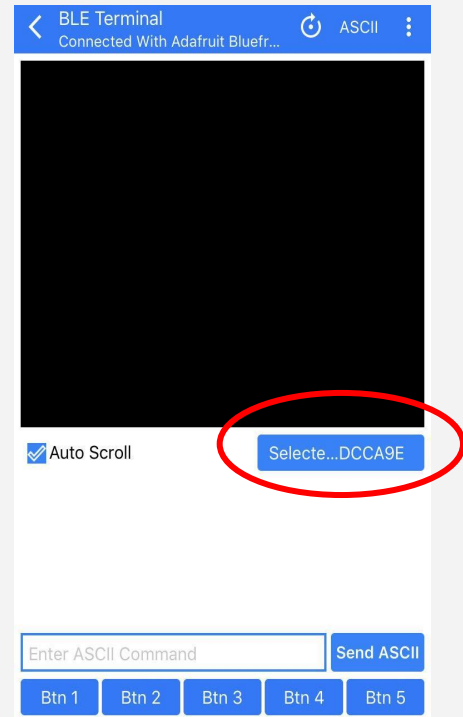


Figure 14 - Press the blue button circled in red in the above picture, a new popup should appear.

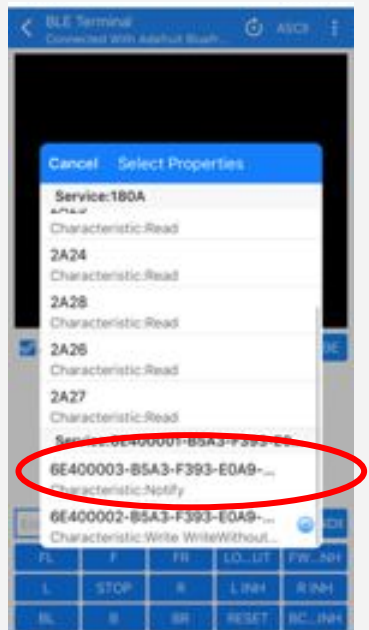


Figure 15 - Scroll to the bottom of the list and select the service with "Characteristic:Notify", a new pop-up should appear that says "Successfully". Press "OK" to close the dialog box

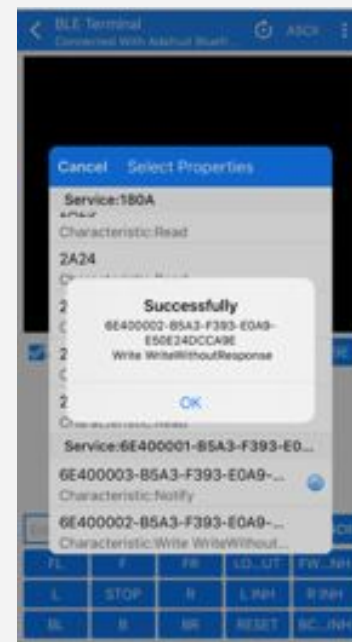


Figure 16 - Repeat the steps outlined in figures 14 and 15 except this time select "Characteristic:Write WriteWithout..."

Using Bluetooth App (iOS)



Figure 17- The app is now configured for the Braze Sentina system. The commands can now be typed in to the terminal and should display feedback on the black portion of the screen

Settings

Help

View all settings and commands

Input Values	Outcome
help	All commands and settings display

Reset

To reset your unit to factory settings.

Input Values	Outcome
reset	All settings will return to factory settings.

Factory

Shows the factory settings that will be applied on reset

Input Values	Outcome
factory	Shows all factory settings

Print

Shows the current saved device settings

Input Values	Outcome
print	Shows all saved settings

Save

This command will commit the settings currently on the system to memory. When changing settings, they will be applied only until the system is re-plugged into power. If you use the save command, the settings will remain on the unit when it is re-booted.

Input Values	Outcome
save	All current settings sent to permanent memory

Unit of Measurement

Switching units of measurements from cm to in. Default setting is metric, eh? But for our friends to the South you can easily change it!

Input Values	Outcome
imp,0	Change to metric measurement (cm)
imp,1	Change to imperial measurement (in)

Settings

Changing feedback configuration

This will change the number of vibration modules that can be used with the unit. If one vibration module is being used, feedback from all three coverage zones are merged into one signal. If 3 vibration pads are used, feedback for each feedback zone is provided separately through each vibration module.

Input Values	Outcome
fc,0	Use with 1 vibration pad &/or audio. All three feedback zones merged.
fc,1	Use with 3 vibration modules, each feedback zone is relayed to individual vibration modules.

Hiding Feedback

The factory settings for the Braze devices are that the alerts are the same for both rear sensors and Echo Heads (all both sets of Echo Head ports in a Hydra). You are able to turn off feedback for either the front or Echo Head feedback zone. For example if you would like to use audio/vibrations to alert for the rear blind spots of the wheelchair but not the front, use the hide commands.

Hide Lights

Turn off light feedback for a certain zone

Input Values	Outcome
hidelights,0	No lights hidden
hidelights,1	Light feedback hidden for rear only
hidelights,2	Light feedback hidden for Echo Head sensors

Hide Vibration

Turn off vibration feedback for a certain zone

Input Values	Outcome
hidevibe,0	Vibration on for both rear and Echo Head sensors
hidevibe,1	Vibration feedback hidden for rear only
hidevibe,2	Vibration feedback hidden for Echo Head sensors

Hide Audio

Turn off light feedback for a certain zone

Input Values	Outcome
hideaudio,0	Audio on for both rear and Echo Head sensors
hideaudio,1	Audio feedback hidden for rear only
hideaudio,2	Audio feedback hidden for Echo Head sensors

Settings

Mirror

This command will swap the lights that the sensors are mapped to for the Braze Sentina (ie sensors on the right hand side will track to the lights on the left hand side. This allows the unit to be installed on the front of the wheelchair, or for left-handed drivers. Both top and bottom rows of lights are changed.

Input Values	Outcome
mirror,0	No mirroring. All lights map to the sensors shown in factory settings
mirror,1	Left-right swap. The sensors on the left hand side will map to the right hand side light. The sensors on the right hand side will map to the left light (for both top and bottom row of lights)
mirror,2	Top-bottom mirror. The top bank of lights will now map to the Sentina, and the Echo Heads will map to the bottom row of lights.

Light Intensity

To set the brightness of the LED lights

Input Values	Outcome
li,#	Change light brightness (0=lights off, 500=

Changing mode

This will change the default mode activated when the unit starts. Mode is indicated by the number of blue lights appearing on the controller. Consult Sentina manual for more information on modes. You should change this if you find that you most commonly use the long-range mode.

Input Values	Outcome
mode,0	Default mode will switch to off
mode,1	Default mode will switch to mode one
mode,2	Default mode will switch to mode two

Threshold Changes

The commands for threshold changes are based upon the lights which they correspond to on the controller. The first part of the command is based on the direction of the lights (right, middle or left). The next part is the location of the light (bottom bar=1, top bar=2). The next part consists of whether you are changing the warning distance/yellow light, (w) or the danger distance/red light (d). The last part of the command is the mode you wish to change it in (1 or 2). The serial command diagrams on the following pages illustrates this in more detail.

Change mode 1 thresholds

Changing the mode 1 threshold will change the distance from an object at which feedback will activate in mode 1. Danger means the red light is activated, warning means yellow light is activated. Audio feedback occurs at red light only.

Values must fall in the range of 5-255 cm or 2-100". Measurement is selected using imp command (page 11)

Bottom row of lights (row 1)

Input Values	Outcome
left1w1,# right1w1,#	The warning feedback in mode 1 will occur at #cm of distance from the rear sensor on the left/right side.
left1d1,# right1d1,#	The danger feedback will occur at #cm from the left/ right rear sensor in mode 1.
middle1w1,#	The warning feedback in mode 1 will occur at #cm of distance from the middle rear sensor.
middle1d1,#	The danger feedback will occur at #cm from the sensor in mode 1 for the middle.

Top row of lights (row 2)

Input Values	Outcome
left2w1,# right2w1,#	The warning feedback in mode 1 will occur at #cm of distance from the rear sensor on the left/right side.
left2d1,# right2d1,#	The danger feedback will occur at #cm from the left/ right rear sensor in mode 1.
middle2w1,#	The warning feedback in mode 1 will occur at #cm of distance from the middle rear sensor.
middle2d1,#	The danger feedback will occur at #cm from the sensor in mode 1 for the middle.
left2w1,# right2w1,#	The warning feedback in mode 1 will occur at #cm of distance from the rear sensor on the left/right side.
left2d1,# right2d1,#	The danger feedback will occur at #cm from the left/ right rear sensor in mode 1.

*Warning thresholds must always be longer than danger thresholds

Threshold Changes

The commands for threshold changes are based upon the lights which they correspond to on the controller. The first part of the command is based on the direction of the lights (right, middle or left). The next part is the location of the light (bottom bar=1, top bar=2). The next part consists of whether you are changing the warning distance/yellow light, (w) or the danger distance/red light (d). The last part of the command is the mode you wish to change it in (1 or 2). The serial command diagrams on the following pages illustrates this in more detail.

Change mode 2 thresholds

Changing the mode 2 threshold will change the distance from an object at which feedback will activate in mode 2. Danger means the red light is activated, warning means yellow light is activated. Audio feedback occurs at red light only.

Values must fall in the range of 5-255 cm or 2-100". Measurement is selected using imp command (page 11)

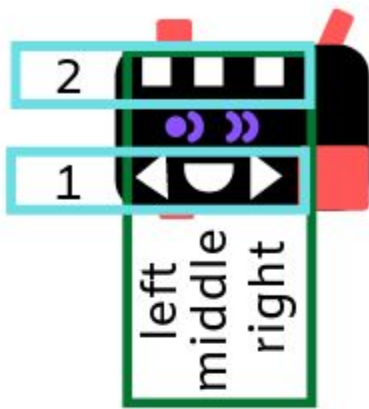
Bottom row of lights (row 1)

Input Values	Outcome
left1w2,# right1w2,#	The warning feedback in mode 1 will occur at #cm of distance from the rear sensor on the left/right side.
left1d2,# right1d2,#	The danger feedback will occur at #cm from the left/ right rear sensor in mode 1.
middle1w2,#	The warning feedback in mode 1 will occur at #cm of distance from the middle rear sensor.
middle1d2,#	The danger feedback will occur at #cm from the sensor in mode 1 for the middle.

Top row of lights (row 2)

Input Values	Outcome
left2w2,# right2w2,#	The warning feedback in mode 1 will occur at #cm of distance from the rear sensor on the left/right side.
left2d2,# right2d2,#	The danger feedback will occur at #cm from the left/ right rear sensor in mode 1.
middle2w2,#	The warning feedback in mode 1 will occur at #cm of distance from the middle rear sensor.
middle2d2,#	The danger feedback will occur at #cm from the sensor in mode 1 for the middle.
left2w2,# right2w2,#	The warning feedback in mode 1 will occur at #cm of distance from the rear sensor on the left/right side.
left2d2,# right2d2,#	The danger feedback will occur at #cm from the left/ right rear sensor in mode 1.

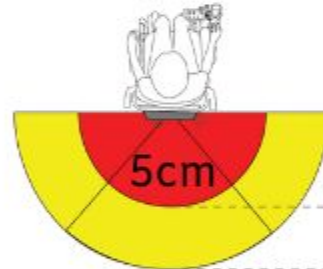
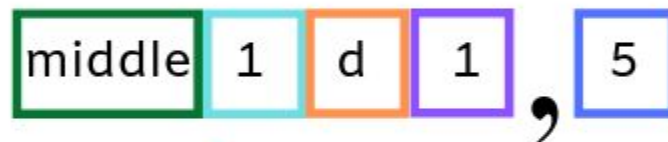
*Warning thresholds must always be longer than danger thresholds



Each light on the controller module represents a certain feedback zone. Use the diagram to the left to create the serial command to modify the feedback for a given zone. Use the color coded boxes to fill in the below

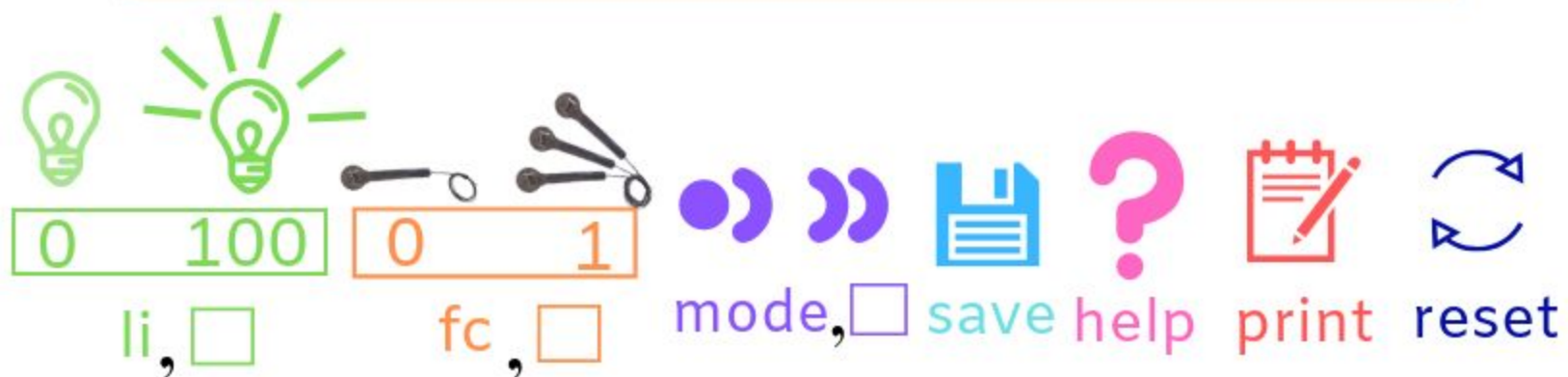


Type the exact command into the serial terminal to change the distance threshold. Do not add any spaces.

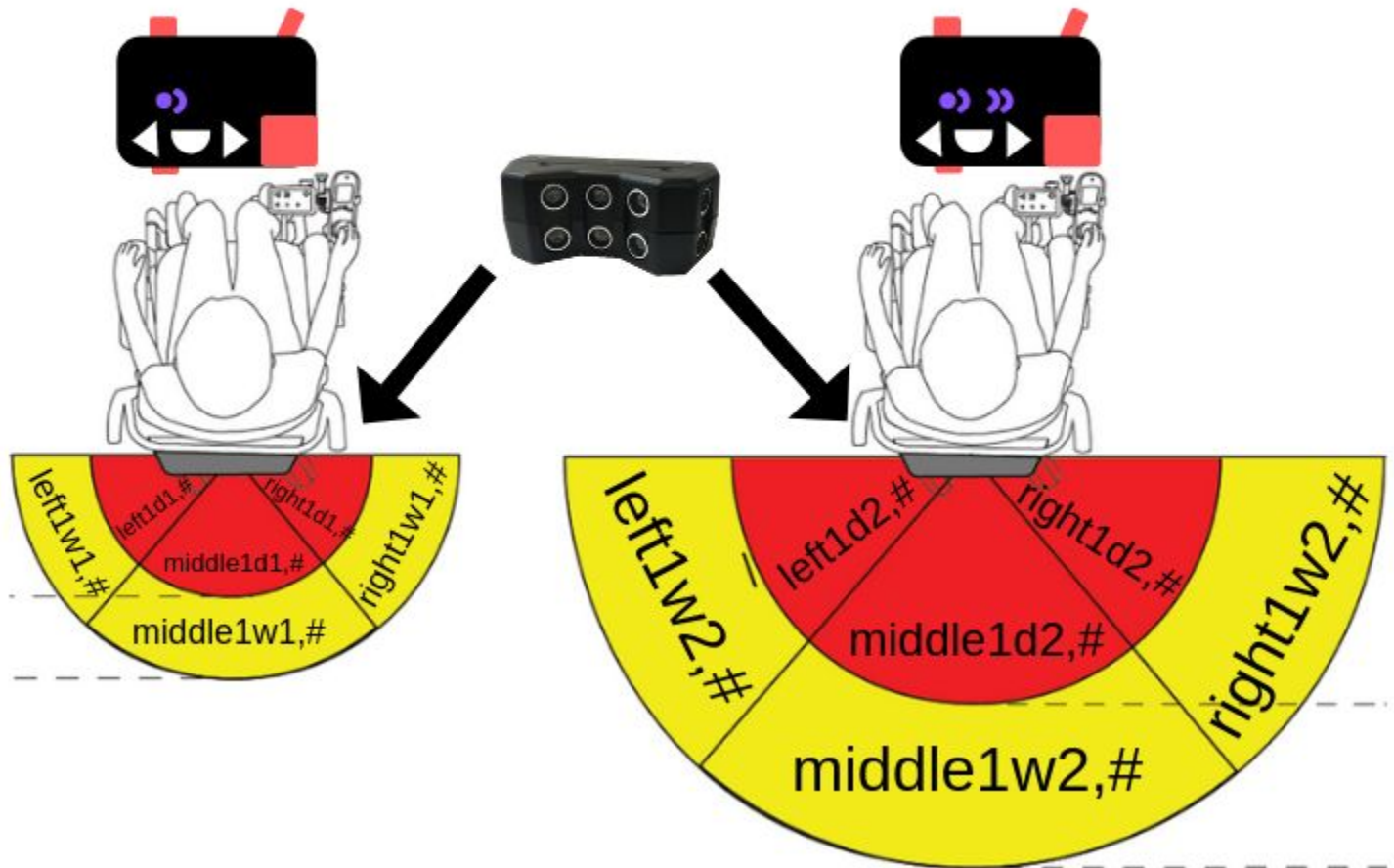


For example, the command middle1d1,5 changes the danger threshold for the middle sensor to 5cm in mode 1.

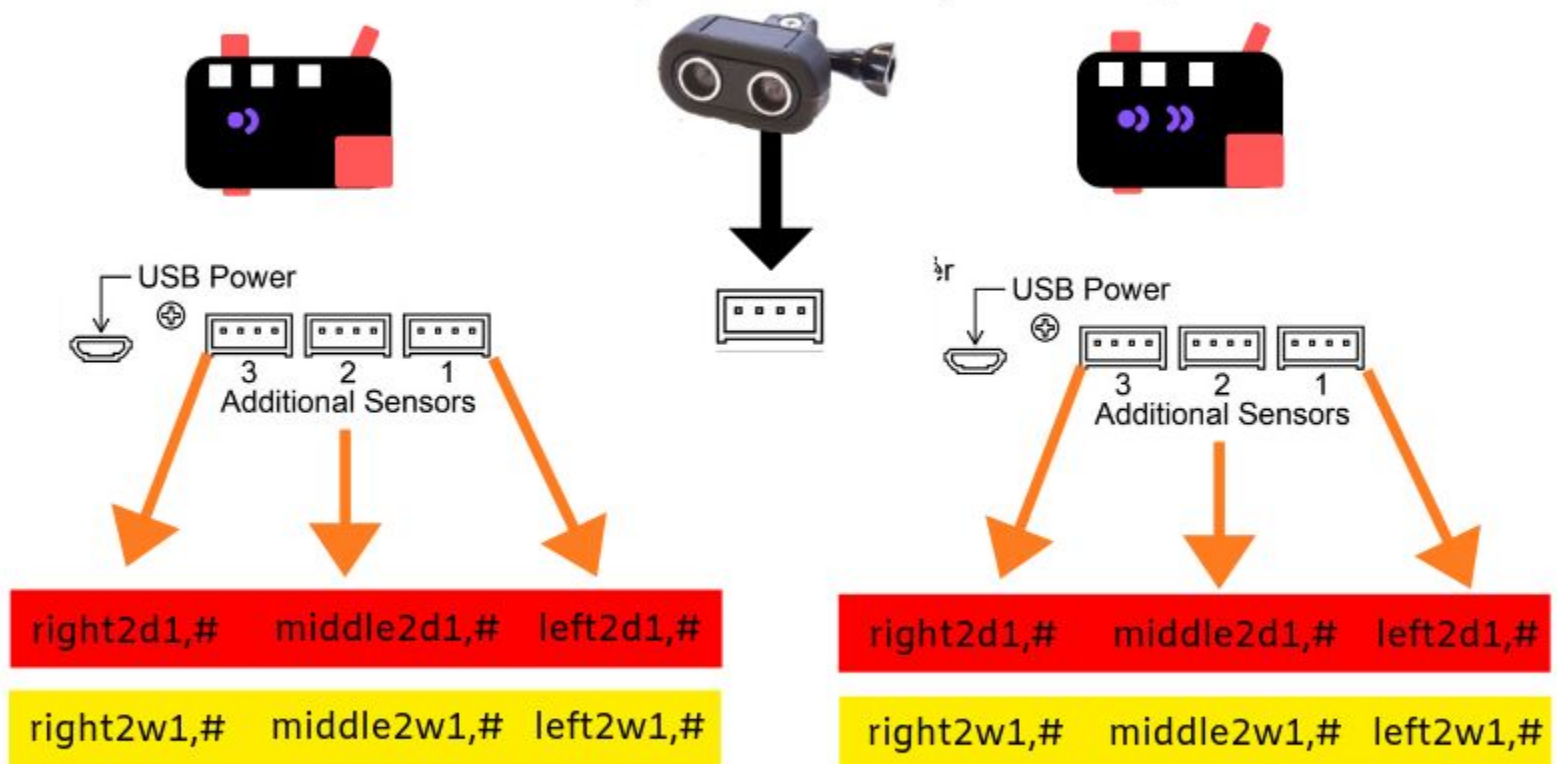
Enter commands below into serial terminal to change Braze Hydra parameters. The coloured boxes should be filled with the corresponding colour coded values.



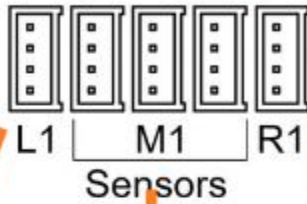
The Sentina device corresponds to the bottom row of lights, row 1



The Echo Heads correspond to the top row of lights, row 2



Mode 1

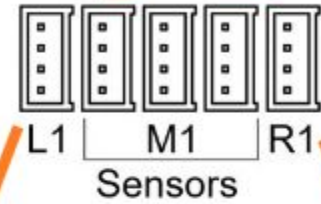


left1d1,# middle1d1,# right1d1,#

left1w1,# middle1w1,# right1w1,#

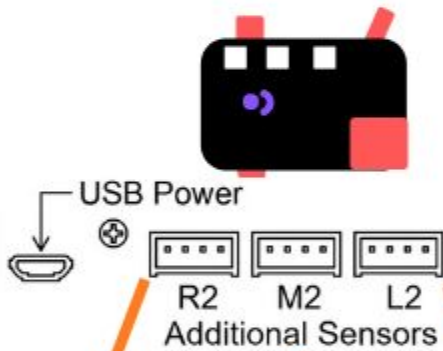


Mode 2



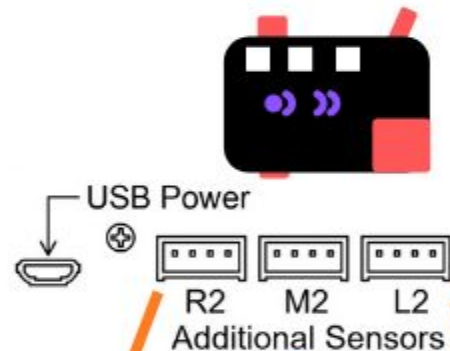
left1d1,# middle1d1,# right1d1,#

left1w1,# middle1w1,# right1w1,#



right2d1,# middle2d1,# left2d1,#

right2w1,# middle2w1,# left2w1,#



right2d1,# middle2d1,# left2d1,#

right2w1,# middle2w1,# left2w1,#

Troubleshooting

1. I can't find the Adafruit Feather M0 to connect to via Bluetooth

Ensure that the device is turned on, and search for devices again. Ensure that the device is not connected to any other device (via bluetooth or serial terminal). If you still can't find it, restart the Braze unit by unplugging and replugging the USB power source. Scan for devices again.

2. The system seems to be frozen

Sending multiple commands may freeze the Braze System. If the system freezes at any time, unplugging and replugging the USB power source will reset the system. You will need to re-connect the system following restart. If the system freezes during a reset, ensure that you reset the system again to ensure all commands were sent. You will see a "reset complete" at the end of the line if the reset was successful.

3. When I type a command nothing happens and the typing disappears

There are two potential problems that can cause this:

a. The system is frozen

If the system freezes, none of the lights will respond. Try pressing the mode button. If the device does not respond, unplug and replug the system and reconnect it (see below)

b. The system has been disconnected

If the system becomes disconnected for any reason, you will need to reset it. To do this, follow from step 4 on computer instructions, step 6 of the Andriod instructions, or step 4 of iOS instructions.

4. I am using a Braze Hydra, which commands should I use?

The commands for the Braze Hydra are the same as for the Braze Sentina. The left, right and middle tracks to the lights on the controller, and the corresponding ports are indicated by the sticker attached to the box. If you have any confusion about which port tracks to which light, plug in Echo Heads and see which corresponding light turns on.

5. I use the imperial system, is there any way I can program in inches rather than cm?

Yes! Our friends to the South can change to imperial measurement by entering the command `imp,1`. This will change all distance values to inches.

6. I am experiencing a problem that is not listed here

Braze Mobility customer support would be happy to help! Email info@brazemobility.com with a brief description of the problem and the best time to call/video conference with you is and the best contact to reach you at.

7. The commands are not working for my unit

The settings listed in this manual were active as of January 2019. Older units may have an alternate version of the commands. You can check which commands will work for your unit by typing "help" into the serial terminal. If you have any further questions please contact us.

Settings Log

Setting	Value
hidelights	
hideaudio	
hidevibe	
mirror	
imp	
fc	
li	
left1w1	
left1d1	
left1w2	
left1d2	
middle1w1	
middle1d1	
middle1w2	
middle1d2	
right1w1	

Setting	Value
right1d1	
right1w2	
right1d2	
left2w1	
left2d1	
left2w2	
left2d2	
middle2w1	
middle2d1	
middle2w2	
middle2d2	
right2w1	
right2d1	
right2w2	
right2d2	
mode	