



Manual

biosim™

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1.0 Introduction

The biosim™ mobile application enables quick and easy set up the i-limb® hand or i-digits™ device. biosim™ can also be used for new user myo-testing and training using the virtu-limb. biosim™ is available for Apple devices only, and is compatible with iOS 8.1 or newer. Full functionality is offered when downloaded onto an iPad.

The features which are applicable to the device you connect to will be available within biosim™. For example, gesture control set up will only be available in i-limb® quantum and i-digits™ quantum devices.

2.0 Getting Started

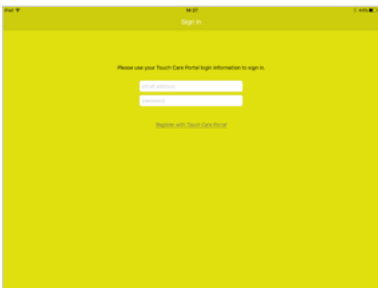


Prior to installing the app you should register as a new user by selecting login/register at the top right of touch bionics website www.touchbionics.com.

Follow the registration steps. To enable access to biosim™ clinicians should identify themselves as 'Clinical Professional'. An activation email will be sent to the email account used when registering. Click the link in the email to activate the account.

Once an account is set up with touch bionics, biosim™ can be downloaded from the Apple Store.

Clinicians may also download the user version of the app, my i-limb™, using the same registration details.



The first time you connect to biosim™ you will see the 'sign in' screen. Insert the email address and password used to register your Touch Bionics account.



If asked for a 5 digit code, this is your security number which was included in your registration email. Alternatively, this can be found on the biosim™ home screen by selecting the 'information' icon.

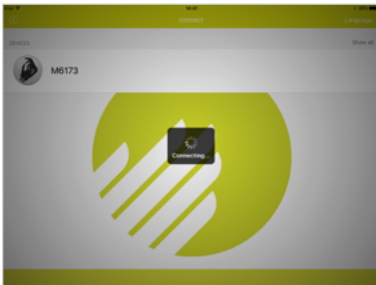


A Wi-Fi or cellular connection is needed to download the app and received updates.



Your Apple device connects to the i-limb®, i-digits™ or virtu-limb device via Bluetooth. Therefore, when connecting ensure the Bluetooth of your Apple device is switched on.

3.0 Connecting to a device



Upon opening the biosim™ app, all available devices will be displayed. Choose the device which you wish to connect to by tapping on the device number. The device must be switched on to be shown on the list.

The device will be shown by its device number.

For i-limb® devices: a letter followed by four numbers.

For i-digits™ and virtu-limb devices: two letters followed by four numbers.

NOTE: If connection isn't established, close biosim™ app and power cycle i-limb®, i-digits™, virtu-limb device.

4.0 App control



When biosim™ connects to the device, it will open on the app control tab.

All available grips are displayed on the app control screen and by swiping left.

Quick grips are entered by tapping on the desired grip icon, the i-limb® or i-digits™ will adopt the chosen grip. The grip can be exited by tapping the same icon again, or by choosing another grip.

5.0 Gesture control

Gesture control screen displays the grips currently programmed on the device. Additionally, the method of accessing gesture control is identified by the letters in the red circle beside the hand image e.g. either hold open or co-contraction.

5.1 Programming grips

To change the programmed grip, choose the grip currently assigned to the direction. This will open the grips screen, to program a new grip tap on the desired grip icon.

5.2 Access method

The default setting for accessing gesture control is hold open. This can be changed to co-contraction by tapping on the image of the hand in the middle of the gesture control screen.

The hold open and co-contraction timings can be altered within the same menu.

5.3 Reset default grips



The grips programmed on the device can be returned to the default grips by choosing the hand icon to open the menu and tapping the 'reset to default grips'.

6.0 Muscle control



The muscle control screen shows which grips are programmed onto which muscle triggers. The grips programmed on each trigger can be modified and the timings of each muscle trigger adjusted within the muscle control screen.

6.1 Programming grips



Choosing the muscle trigger or grip icon will open the grips screen, to program a new grip tap on the desired grip icon. The muscle control screen will now show the new grip assigned to that muscle trigger.

6.2 Muscle trigger timings



The timings associated with the muscle triggers are adjusted by tapping on the clock icon beside the muscle trigger. The available timings will be displayed and are adjusted by selecting the current timing and using the scroll menu to select the new desired timing. Tap 'save' to apply the change.

6.3 Favorites



Favorite sets of muscle triggers can be set up, allowing different grips to be accessed using the muscle triggers depending on the favorite set applied. For example; a different set of grips may be required at work from home, therefore a home and a work favorite could be set up.

Favorites are set up using the app, and can be applied to the i-limb® or i-digits™ device using the app or grip chips.

To set up a new favorite, tap on the plus sign icon. 'Tap here to edit me' will be displayed. By choosing it, the grips assigned to each muscle trigger can be set, and the favorite can also be given a name and an icon.

Choose 'send' at the top right of the screen to apply it to the i-limb® or i-digits™ device.

To delete a set of favorites, swipe left.

7.0 Proximity control



Grip chips™ are programmed on the proximity control screen. The available grip chips™ in the area are displayed, with their name, number and the grip programmed on the grip chip™.

The use of grip chips™ can be turned on/off using the global toggle switch at the top of the list. Each individual grip chip™ can be turned on/off using the toggle switch beside each grip chip™.

NOTE: When grip chips™ are first received they are switched off. Sharply tapping on the grip chip™ wakes it up, it will then be displayed on the list.



Choose the grip chip™ to be programmed.

Three options are available to program onto the grip chip™: a quick grip™, favorite or my grip™.

To program; choose the desired menu, the available grips of favorites will be displayed, choose the required one from the menu. The grip chip™ info screen will now show the grip or favorite programmed on the grip chip™.

Tap 'save' at the top right of the screen. The program will be saved to the grip chip™ and will automatically disconnect from the app.

NOTE: For grip chips™ to function the i-limb® or i-digits™ must not be connected to biosim™ or my i-limb™ app.

NOTE: The grip chip™ can be reprogrammed at any time.

8.0 Myo-graph



The myo-graph icon is displayed on the top left of the screen. The myo-graph enables you to view the users muscle signals in real time. This allows myo-testing and site selection to be carried out. It also enables the muscle activity to be monitored while the user is wearing their prosthesis and completing training tasks.



On the graph, the red signal is open and the blue is close.

The graph shows 10 seconds of activity. It can be paused by swiping right. Continuing to swipe right allows the myo-graph history to be reviewed.

A screenshot can be taken of the graph, using the camera icon at the top right of the screen.

The grip which the device is currently in is displayed above the graph. This shows if the user has entered an automatic grip using gesture or muscle control.

8.1 Gain setting

The gain can be adjusted for each of the inputs using the slider bar at the top of the graph. For i-limb[®] and virtu-limb electrodes this should be adjusted to fine tune the set up, with the main setting adjusted on the electrode itself.

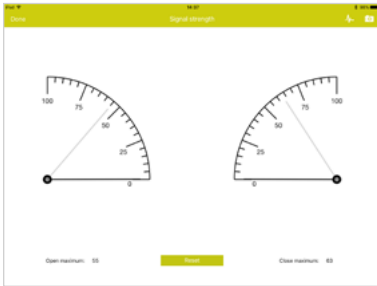
For optimal control of the prosthesis, the user should have signals which range in strength between 30%-80% height on the graph. 30% for gentle signals, 80% for strong effort signals.

If the signals are at the top of the graph, the user will not have proportional control of their device.

8.2 Threshold setting

The threshold is displayed by the thick black horizontal line near the bottom of the myo-graph. The threshold is the level above which a signal is recognised by the device. The i-limb[®]/i-digits[™] will not respond to any signals below the threshold line. The threshold can be adjusted individually for open and close using the slider bars at the top of the screen.

8.3 Analog gauges

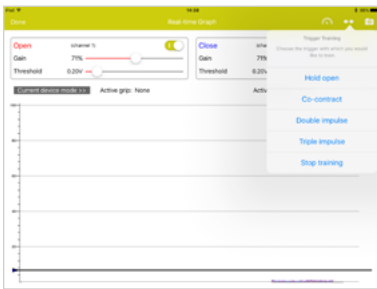


Analog gauges can be selected as an alternative to view the signal strength. Choose the icon at the top right of the screen.

The maximum signal strength is noted for each of the channels at the bottom of the screen. The maximums can be reset using the 'reset' icon.

NOTE: a muscle trigger must be assigned to a grip on the muscle control screen prior to training of that trigger.

8.4 Trigger training



Trigger training enables the user to practise their muscle actions with prompts shown on screen to help guide their training of the muscle actions. The muscle trigger to be trained is chosen from the drop down menu.

8.5 Calibration



Within the training, calibration can be conducted. This allows automated set up of the timings required for the individual user. Upon selecting 'calibrate' instructions will appear on screen asking the user to generate the muscle trigger four times.

At the end of the calibration the trigger timings will be automatically set. If you wish to adjust these settings manually this can be done in the muscle control screen, by tapping the clock icon beside the required muscle trigger.

9.0 Speed boost



Speed boost feature enables the movement of the digits to be increased or decreased using a simple slider bar. The slider bar is found by selecting the speed boost icon at the top left of the screen.

10.0 Settings

The settings icon is found at the top right of the screen. Within settings the core set up of the device is completed, health check can be carried out and training and games utilised.

10.1 Set up



Name: Displays device number. Allows device to be re-named.

Swap input channels: Switch which input opens the hand and which closes without the need to rewire the physical prosthesis.

Battery type: The size of the battery used within the prosthesis should be selected from the menu. This enables greater accuracy of low battery warning. If using an electronic elbow, 'powered by elbow' should be selected.

Using wrist rotator: If an electronic wrist rotator is fitted within the prosthesis the method of accessing wrist rotation should be selected to avoid conflicting with triggers used for the i-limb® hand. If using fast access or a fast rising signal to access the wrist, select 'impulse'.

Input channel filters: Signal filters enable regulation of excessively strong inputs, particularly useful when using force sensor resistors (FSRs). The filter can be applied to each channel independently.

Setup hand using settings from another hand: Use this option to apply settings to the currently connected device from a device that has previously been connected to biosim™ on the same iPad. The available devices to choose from will be displayed. This feature is particularly useful to apply settings from loan to definitive devices.

Reset factory defaults: To return a device to factory settings choose this option.

10.2 Grip settings

The icons of the available grips of the connected device are displayed. Any grips programmed with gesture or muscle control will be highlighted and a small red circle beside the grip icon will identify the method of accessing it.

10.2.1 Grip timings

Choosing a grip icon will display any changable digit timings.

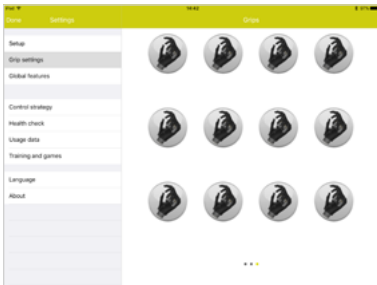
NOTE: Some grips have no changable options.

The grip timings may require to be adjusted to improve alignment of digits in relation to each other. For example to improve tip to tip grip in pinch grip.

Digit timing may need to be adjusted if the type of covering is changed. This is due to the resistance offered by different covering types.

The number displayed in the grip timing is the run time of the digit, therefore increasing the number will make it move further before it stops.

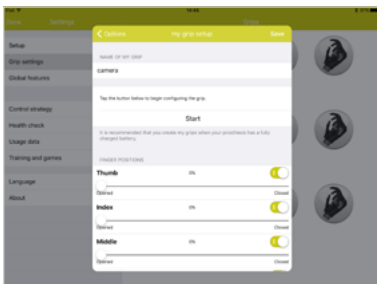
10.2.2 my grips™



Customized my grips™ are setup in the grip settings menu by swiping left to the my grips™ icons and choosing any my grip™ icon. There are two options to setup a my grip™:

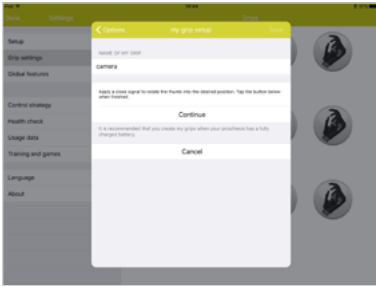
1. Configure my grip™
2. Scan QR to import my grip™

Configure my grip™ provides the option to fully customize the grip to the individuals' requirements. Choosing this option enables the grip name to be set and then a configuration process is followed. Firstly the user gives a signal to rotate the thumb to the desired position. Secondly, the user closes the digits to the desired position. If the my grip™ is to be utilised for a particular object, the object can be positioned in the i-limb® or i-digits™ during the configuration to enable the optimum my grip™ position to be set.



The position can be tested by choosing 'test my grip' prior to saving. If fine tuning is required, this can be completed after the my grip™ has been saved by selecting configure my grip™.

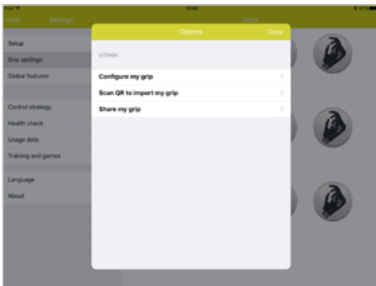
Slider bars are displayed allowing the percentage of open/close of each digit to be adjusted. Also the option for each digit to be active or inactive during the my grip™ can be set.



The my grip™ can be assigned to any control option (gesture, app, muscle or proximity control).

Upon entering a my grip™, a close signal must be given for the device to adopt the my grip™ position. This allows the user the opportunity to position the object which the my grip™ was designed for into their prosthesis.

10.2.3 QR codes



A wide selection of my grips™ are available on touch bionics website (downloads > QR codes). These are customized grips which have been shared by other i-limb® hand users which can be applied onto any other i-limb® hand.

After choosing a my grip™ icon the option to 'Scan QR to import my grip' is displayed. Choosing this option accesses the camera of the Apple device. The Apple device camera window should then be positioned over the QR code where it will scan the QR code and load it onto the my grip™.

Additionally, a my grip™ can be shared by choosing 'Share my grip'. This is automatically submitted to touch bionics for potential addition to the QR code grip library.

NOTE: QR codes are only available for i-limb® hands.

NOTE: Some fine tuning of the QR code my grip™ may be required, as the size/side of the i-limb® hand differs between individuals.

10.3 Global features



Use pulsing: Pulsing is the increase grip force applied by all digits at the same time. This feature can be turned on/off. The delay is the period of time which the close signal must be sustained by the user before the pulsing feature activates.

Use vari-grip™: vari-grip™ is the increase grip force applied by each digit in turn. This feature can be turned on/off. The delay is the period of time which the close signal must be sustained by the user before the vari-grip™ feature activates.

Use natural hand: If the i-limb® hand is fully open, after a period of no muscle activity the hand will adopt a natural position. This feature can be turned on/off. The time period of no activity can be set by choosing 'delay'. The position which the hand adopts is set using the slider bars on the menu opened when choosing 'Finger positions'.

Use auto-grasp™: When the digits are closed if a quick open signal is given the i-limb® or i-digits™ device identifies this as an accident and recloses the digits, to prevent dropping objects. auto-grasp™ can be turned on/off. High activation mode requires the digits to be stalled for auto-grasp™ to be active. Low activation mode only requires the digits to be closed but not to be stalled closed for auto-grasp™ to be active.

Low battery warning: When the battery level is low the i-limb® or i-digits™ will emit a low battery warning noise. The pitch of this noise can be adjusted to suit the individual user using the slider bar. Choose 'test' to hear the pitch of the noise.

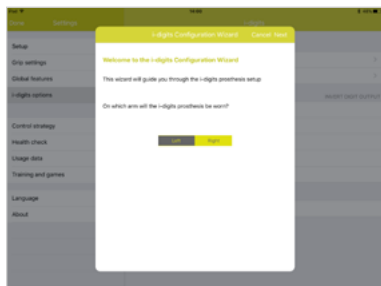
Rotate thumb on exit: When exiting a grip the thumb will stay rotated in the position of that grip if this feature is turned off. If turned on, the thumb will rotate to opposition position when any grip is exited.

NOTE: Rotate thumb on exit is only applicable for devices with powered thumb rotation.

10.4 i-digits™ configuration

When connected to an i-digits™ device, the i-digits™ options menu will be shown in the settings screen.

10.4.1 Set up wizard



Set up wizard enables configuration of the i-digits™ device to the specific users' presentation. This must be completed prior to fitting the user with the prosthesis.

The set up wizard is a four step process, including device side, setting which prosthetic digits are present, the digit size fitted and the input type.

10.4.2 Throw off delays

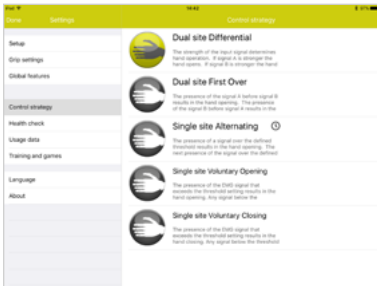


Throw off delays can be applied after the i-digits™ device is fully fabricated. The throw off delays are applied to each digit individually and are used to fine tune alignment of the digits. The delay is in the initial movement of the digits and is only applied when the digit closes from the fully open position.

10.4.3 Digit manipulation

The digits can be individually moved to assist in prosthesis assembly and as a diagnostic tool. If the digit is incorrectly set up during the configuration, the toggle switch can be used to invert the movement of the digit.

10.5 Control strategy



There are 5 control strategies available for i-limb® or i-digits™ devices. It is possible to control the device using one or two inputs. A description of each of the control strategies is included within biosim™.

The control strategy can be changed by tapping the icon beside the desired control strategy.

For single site alternating control strategy there are some additional timing parameters which are selecting by tapping the clock icon.

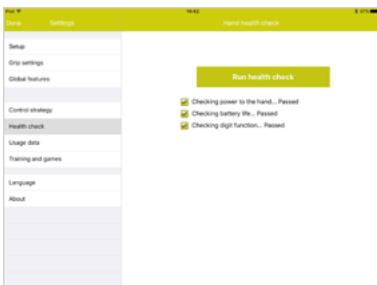
10.5.1 Single site alternating timings



Regrip: A window of time after which a signal is given that another signal can be given and the same action of the digits occurs. For example; a signal is given to close the digits, another signal is given within the regrip time, the digits will close again.

Auto-revert: After this time of no signal activity the next signal given will result in the digits closing. This is a safety setting to prevent the user accidentally dropping an object which they may have been holding for a period of time.

10.6 Health check



A health check of the i-limb® or i-digits™ can be completed to check the function of the device. Each digit will be moved individually. A message will be displayed on screen if there are any faults noted with the i-limb® or i-digits™ device.

10.7 Usage data

System totals		Since last reset		Feature counts		
Power cycles	773	Power cycles	1	Feature name	Open	Close
Thumb	20000	Thumb	0	Standard precision pinch closed	0	0
Open thumb 1	20000	Index	0	Standard precision pinch opened	0	0
Index	20000	Middle	0	Thumb precision pinch closed	0	0
Middle	20000	Ring	0	Thumb precision pinch opened	0	0
Ring	20000	Little	0	Thumb 2 jaw chuck closed	0	0
Little	20000	Power button	0	Standard 3 jaw chuck closed	0	0
Power button	1000	Power button	0	Thumb 3 jaw chuck closed	0	0
				Thumb 3 jaw chuck opened	0	0
				Thumb park continuous	0	0
				Thumb park open	0	0
				Water park	0	0
				Water park close	0	0
				Water park open	0	0
				Custom gesture	0	0
				Custom grip	0	0
				Relax thumb	0	0
				Open palm	0	0
				Controlled	0	0
				Relax	0	0

Excessive signal activity	
Reset counter	0
Open count 1	0
Close count 1	0
Total runtime	0
30/12 hours	0

The activity of the i-limb® or i-digits™ device is displayed on the usage data screen.

The total number of movements of each digit, the number of movements since last reset and the number within each grip are displayed.

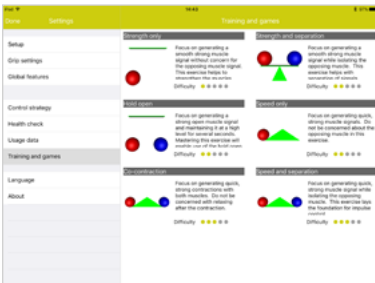
Refresh counts: The data displayed was recorded when connecting to the i-limb® or i-digits™ device. Tapping the 'refresh counts' icon updates the counts to include all additional movements since connection.

Rest counts: The data can be reset, using the 'reset counts' icon, between each clinical visit to track the users progress.

Excessive activity counts: Any signal held for longer than 3 seconds is recorded. This enables identification of the user holding signals unnecessarily, and may be useful to note if the battery isn't lasting as long as expected or the user is experiencing excessive fatigue.

Total runtime: The total number of hours of use of the i-limb® or i-digits™ device.

10.8 Training and games



Training and games supports the users' muscle development by providing alternative ways to visualise the muscle action. Various games are available, to concentrate on particular aspects of the muscle action. A description of each game is provided. The aim is described at the top of the chosen game screen, once the user starts playing the game this description is replaced with their score.

NOTE: The colour of the ball represents the muscle being worked. red: open, blue: close.

Within each game:

Choose start/stop, at the top right of the screen, to begin and end the game.

Choose open/close, at the bottom right of the screen, to work on the development of one particular muscle group.

Disable digit motion, top right of screen, enables the user to focus on the game without movement of the i-limb® or i-digits™ device also occurring.

Active feature/active trigger, at the bottom of the screen, displays the grip the i-limb® or i-digits™ device is currently in and how the feature was entered.

Two vertical bars on the right of the screen display the muscle strength as the user completes the game.

10.9 Language

The language of the biosim™ app can be changed. Choose the desired language. The change will be applied the next time the biosim™ app is opened. The language can also be changed at the top right of the initial launch screen of biosim™, prior to connecting to a i-limb®, i-digits™ or virtu-limb device.

10.10 About

App information and information about the connected i-limb®, i-digits™ or virtu-limb device are displayed. App information can also be found at the top left of the launch screen of biosim™, prior to connecting to a device.

The user specific security code, a 5 digit number, is displayed within the about screen.

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