BIONYM | NYMI DEVELOPER UNIT USER GUIDE

Version 1.1

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DEVELOPER UNIT USER GUIDE

1 CONTENTS

2 DOCUMENT HISTORY

Revision No.	Date	Editor	Notes:
v1.0	19/03/14	Kris Misquitta	Initial Release
v1.1	06/04/14	Lauren Long	Clasp switch now clears provision keys

2.1 CHANGE LOG

3 INTRODUCTION

3.1 PURPOSE AND SCOPE

This document describes how to properly use your Developer Nymi unit. It is applicable for firmware version 0.2.3.

3.2 GETTING STARTED

When you start using the developer Nymi, you need to charge the battery by inserting the micro-USB cable into the side of the Nymi. Your Nymi should then appear to power on. This is confirmed by three LEDs flashing once.

The developer version of the Nymi has two features to make development easier: The clasp switch and the reset button.

- **The clasp switch** is used to mimic and set the state of the Nymi band (Open or Closed), and to clear stored provision keys. You should almost always leave the clasp in the Closed state, as most Nymi functionality is only enabled when the clasp is Closed. Flipping the switch to an Open state and then back to Closed will also clear all the stored provision keys. (A developer Nymi can only hold 4 provision keys at once.) A provision key is used to establish trust between the Nymi and your application.
- **The reset button** can be used to restart the Nymi in a soft reset. Provision keys will not be affected.

The clasp switch and its states can be seen in Figure 2.2-1 below. Figure 2.2-2 shows the hole for the reset button. A paper clip should be used to push the reset button.

Moreover, the developer Nymi is permanently authenticated, as long as the clasp switch is in the Closed state. On the other hand, a consumer Nymi is only authenticated after the wearer has measured their electrocardiogram (ECG) using the Nymi Companion App. This authenticated state is maintained until they take the Nymi off of their wrist.

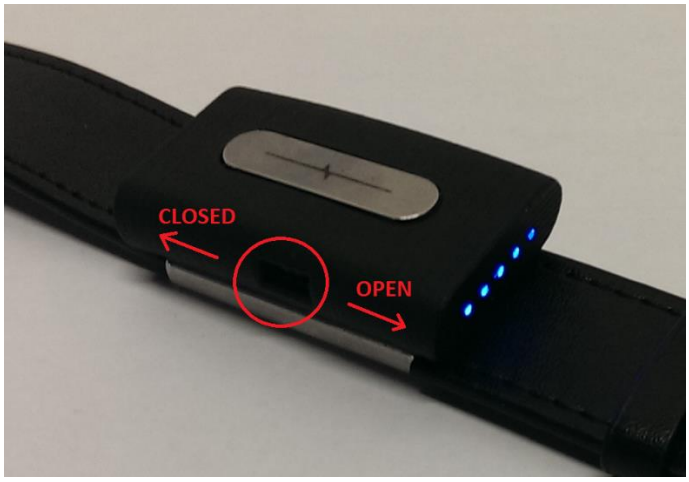

Figure 3.2-1 - The clasp switch

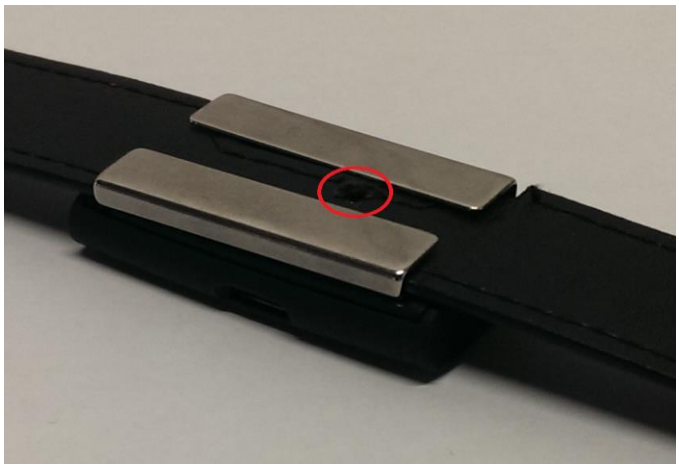

Figure 3.2-2 - The reset button hole

4 FEATURES

4.1 THE BATTERY

The battery is never disconnected from the rest of the Nymi circuitry. This means that the Nymi will always be powered unless the battery is dead. Because the unit is always powered and running at full capacity, a fully charged battery will currently last approximately 4-5 hours only.

The battery can be charged simply by plugging in a micro-USB cable into the unit. Please charge the Nymi only through a computer USB port.

If the User Interface (UI) is enabled, the Nymi will indicate the charge level through the LED display unless the user is navigating the menu. The charge levels are shown below in Figure 3.1-1.

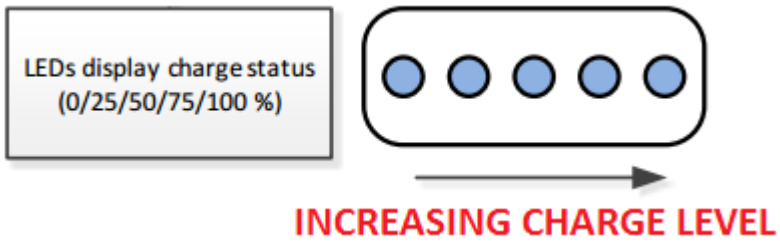

Figure 4.1-1 - Battery charge indicator

4.2 THE USER INTERFACE (UI)

The user interface is made up of two components: Gesture recognition for input, and a five-LED display and vibration motor for feedback. These are described in greater detail in Section 4.

4.3 THE ELECTRODES

The Nymi has stainless steel electrodes that are located on the top and bottom of the unit. These should be kept clean for proper function. To clean them, simply wipe them down with a soft cloth to clear built-up oil and dirt. For more effective cleaning, a damp cloth or an alcohol wipe can be used.

4.4 THE CLASP SWITCH

The clasp switch mimics whether or not the Nymi is on the wrist of the user. The Closed state corresponds to when a Nymi is on the wrist of the user, and the Open state corresponds to when the user has taken off their Nymi. Please see Figure 2.2-1 to see which directions correspond to which state.

Flipping the switch to Open then Closed will also clear all the stored provision keys in the Nymi, since the developer unit can only hold 4 provision keys at once. (Note that a consumer Nymi will be able to store more keys, and only a factory reset will clear the provisions.) A provision key is used to establish trust between the Nymi and your application. Please read the “Overview” section of the SDK documentation to better understand this concept.

When the clasp is Open, the Nymi band is essentially in an “Off” state. This means that:

- The UI is disabled (no input OR feedback can be given/received, including the LED display)*
- The unit moves out of an authenticated state
- Provisioning is disabled
- All streams (ECG, IMU, Gesture) are disabled

*The exception to this is if a reset is done. In this case, the usual LED pulse appears before the display powers down.

Conversely, when the clasp is Closed, the Nymi band is in an “On” state. This means that:

- The UI is enabled
- The unit can be authenticated
- Provisioning is enabled
- The Nymi can stream data
- Any other Nymi functionality is enabled

When going from an Open state to a Closed state, the Nymi should vibrate for 1 second and the display will give a Heartbeat animation (see section 4.4.1 on animations). When going from a Closed state to an Open state, the Nymi should appear to power down.

*Note that the battery can be charged in either state. However, no charge indication is given in the Open state.

4.5 THE RESET BUTTON (SOFT RESET)

The reset button is used to get the Nymi out of any possible bad states. Simply push the button by inserting a paper clip into the reset hole on the bottom of the unit. Provision keys will not be affected by a soft reset.

After a successful reset, the innermost and outermost LEDs (1,3 and 5) should pulse once only. If they continue to pulse, it means that the Nymi was not initialized properly. There is a watchdog timer that will reset the Nymi in this case in order to try and correct for the failure.

4.6 FACTORY RESET (HARD RESET)

A factory reset can be performed on the Nymi by pressing the reset button five times quick succession.

This will remove all provisioning data and device IDs of any applications that were provisioned with the Nymi. This will also restore the factory firmware that was shipped with your Nymi. Therefore a factory reset should be performed as a last resort to restore the Nymi to a known working condition.

5 THE USER INTERFACE (UI) – INTERACTING WITH THE NYMI

5.1 INTRODUCTION

The UI allows the user to interact with the Nymi by using gestures to give input and receive feedback through the vibe motor and the five-LED display.

5.2 ENABLING/DISABLING THE UI

The UI can be disabled or enabled by setting the clasp switch to Open or Closed, respectively.

5.3 GESTURES

Currently there are two gestures that can be used to provide user-input to the Nymi:

- Double Tap – Tap twice in quick succession on the top of the unit only. If a double tap is not registered, it may be necessary to adjust the time in between taps. The Double Tap is used for menu navigation and confirmation.
- Shake – Shake the unit in an up-and-down motion several times. Shake is used to execute a Force Lock.

5.4 VIBE MOTOR AND LED DISPLAY

The vibe motor and LED display are used either independently or together to give feedback. For reference in this document, the LEDs can numbered 1-5 if LED 1 is the leftmost LED when looking at the unit in a right-side-up position.

5.4.1 ANIMATIONS

The LED display has several different lighting animations to communicate to the user:

- Blink: Any combination of the LEDs will quickly blink on and off.
- Sequential: The LEDs will light in sequence from 1-5.
- Outside-in: LEDs 1 and 5 will turn on, followed by 2 and 4 in sequence, and then by 3.
- Heartbeat: The LEDs will quickly glow on and off twice, similar to the “lub-dub” of a heart.

5.4.2 NOTIFICATIONS

Notifications are a specific form of feedback to the user. Currently there are two types:

- Success – The motor will vibrate for 1 second and all five LEDs will be on for 4 seconds.
- Failure – The motor will vibrate for 1 second and all five LEDs will blink for 4 seconds.

These notifications will be given after provisioning and a force lock request, and can also be programmatically triggered through the Nymi Communication Library.

5.5 IDLE UI

When the user is not navigating the menu and no notifications have been received, the UI is idle. While idle, the UI will do one of two things:

1. If the charger is connected, it will display the charge status. See section 3.1 for a description of the charge status.
2. If the charger is not connected and the battery is low, all five LEDs will Blink every 10 seconds. If the battery is not low, nothing will be displayed.

5.6 THE MENU

The Menu can be used to display the authentication status. While navigating the menu, no notifications will be processed by the Nymi.

5.6.1 BRINGING UP THE MENU

The Menu can be brought up by performing a Double Tap gesture at any time, except in the following cases:

- A stream is active (ECG, IMU, Gesture)
- During provisioning

The Menu has successfully been brought up if the display lights up with a Sequential animation.

5.6.2 AUTHENTICATION STATUS

When the menu is brought up, the authentication status will immediately display for 4 seconds. This should be all five LEDs on at once.

5.6.3 PROVISIONING

In order to provision an application with a Nymi, provisioning mode must be entered. This can be done by performing a Double Tap *after* the Menu is brought up. (Essentially, double tapping twice.)

When provisioning mode is entered, the display will repeatedly light up with an Outside-In animation until the mode is exited.

During provisioning mode, applications can be provisioned with your Nymi using the Nymi Communication Library.

After provisioning, either a Success or Failure notification will be given to indicate whether the process passed or not.

Please note that the developer unit can only store 4 provision keys at any one time. (This will be modified in future firmware releases.) Please flip the clasp switch back and forth to clear all provisions.

5.7 FORCE LOCK

A force lock request can be executed by performing a Shake gesture. See section 4.3 for more on the Shake gesture.

This will forcibly disconnect your Nymi from any applications it is currently connected to.

If the disconnection is successful, a Success notification will be given. Otherwise, a Failure notification will be given.

5.8 STREAMING

The Nymi can be engaged in several different types of data streaming, each of which has its own animation:

- ECG streaming: Heartbeat animation
- IMU and/or Gesture Streaming: Blink animation every 5 seconds.

Note that IMU and/or Gesture streaming cannot be performed at the same time as ECG streaming.

6 TROUBLESHOOTING

Table 1 below shows several problems you may encounter, their symptoms and their fixes.

Problem	Symptoms	Solution
The Nymi does not appear to respond	The LED display and motor will not give feedback	Make sure the clasp state is Closed. If it is, the battery may not be charged. Make sure the unit is powered. If there is still no response, first try a few soft resets and then a factory reset if all else fails.
The Nymi was not initialized properly	LEDs 1,3 and 5 are pulsing	Wait for a soft reset or perform a hard reset