

# iDynamo 6

## Secure Card Reader Authenticator Installation and Operation Manual



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**Table 0-1 - Revisions**

<b>Rev Number</b>	<b>Date</b>	<b>Notes</b>
10	Jul 19, 2019	Initial Release
20	Aug 1, 2019	Update 450 mAh to 400 mAh
21	Sep 4, 2019	Re-publish to fix publication error
22	Nov 3, 2021	Update RoHS statement; Add software license agreement; <b>1.1, 1.2</b> general update; <b>1.6</b> update “Made for” list and refresh list of available models; <b>3.4.3, Appendix A</b> , update battery pack charge time; Add information about USB-C connector and connection type selection in <b>1.5, 2.5.2, 2.6, 2.7</b> and remove redundant “how to connect” sections; Throughout, refresh lists of / mention of available models; Throughout, clarify USB 3.0 handheld hosts can provide enough power without battery; Throughout, clarify battery pack is now included; Misc. clarifications and corrections.

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- Consult the dealer or an experienced radio/TV technician for help.

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## 1 Introduction

### 1.1 About iDynamo 6

Cafés and restaurants, boutiques and large retailers will benefit from iDynamo 6, the next generation of MagTek secure card reader authenticators (SCRAs). iDynamo 6 reads magnetic stripe cards, EMV chip cards (contact and contactless), and NFC enabled mobile wallets including Samsung Pay, Google Pay, Apple VAS, and Apple Pay. iDynamo 6 delivers a smart solution for companies that need the most flexibility in the smallest form-factor at a great price. The versatile mounting bracket enhances mechanical stability with many types of deployment scenarios, including desktop computers, mobile handsets, and tablets, regardless of size and form factor. iDynamo 6 is made from molded black plastic with a rubberized coating to keep the durability up and fingerprints down.

### 1.2 Product Features

#### Payment Methods

- Secure card reader authenticator for:
  - Magnetic stripe cards
  - EMV chip cards
- Optionally:
  - EMV contactless cards
  - NFC-capable devices

#### General

- Multiple connection/interface options including, iOS Lightning, USB-C plug, or USB-C receptacle
- Select models Made for iPad, iPhone

#### Security

- Triple DEA encryption/DUKPT key management
- AES 128 encryption/DUKPT key management
- MagneSafe Security Architecture
- MagnePrint card authentication

### 1.2.1 Stable Performance

The universal mounting bracket attaches to the host-of your choice and provides for a stable swipe, dip, or tap experience. Contactless and NFC reading requires connection to and power from a fully-powered USB 3.0 port, or from the rechargeable battery pack. The battery pack gives users the reliability they need in mobile payment scenarios.

### 1.2.2 Compatible with Multiple Operating Systems

iDynamo 6 is flexible and is the perfect choice for solutions that run on Windows, Android, or iOS hosts, with Lightning or USB connectors depending on the host and operating system. iDynamo 6 has two connector configurations to select from:

- Lightning and USB-C receptacle
- USB-C plug and USB-C receptacle

### 1.2.3 The Power of Flexibility

iDynamo 6 is ideal for mobile solutions. It allows for pass-through charging for convenient mounting to portable host devices, and easily conforms to holsters and cases for custom solutions. Custom colors are available with minimum order size. For environments where weight or battery requirements are critical, such as in-flight airline solutions, iDynamo 6 can be used without the battery pack to read magnetic stripe and contact EMV chip cards. With the rechargeable battery pack installed, or when connected to a host that implements USB 3.0, there is enough power to also read contactless EMV cards and NFC wallets. iDynamo 6 connects to Android, iOS, and Windows operating systems, making it one of the most flexible SCRAAs offered by MagTek.

### 1.2.4 MagneSafe Security Architecture

iDynamo 6 adheres to MagTek's MagneSafe Security Architecture based on dynamic encryption, authentication, and tokenization, which protects cardholder data from the moment of swipe, dip, or tap.

### 1.2.5 Magensa Services

Couple iDynamo 6 with Magensa Services to make your certification cycle easier and remove unencrypted data from your environment. A service representative will work with you to determine whether Magensa Decrypt, Magensa Decrypt and Forward, or the Magensa Payment Protection Gateway is best for you. And as always, MagTek's developer tools including our royalty-free software development kits with APIs that are readily available 365/24/7 on our web site. For faster development, use our MagneFlex browser and middleware, where your code can be written once and deployed on multiple operating systems. The data is unpacked, parsed, and sent to its destination faster and easier.

### 1.3 About iDynamo 6 Components

The major components of iDynamo 6 with Lightning connector are shown in the figures below. Other models of iDynamo 6 are substantially similar with the exception of the host connector plug.

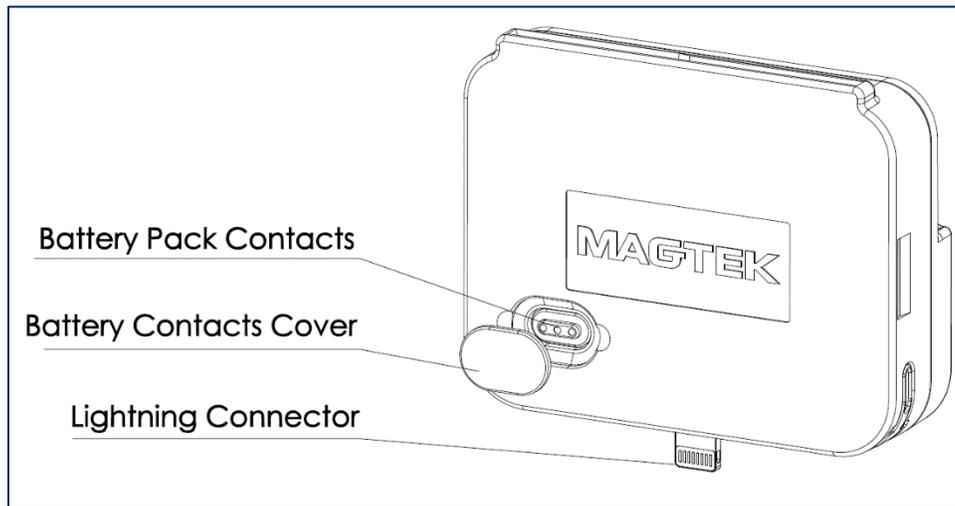
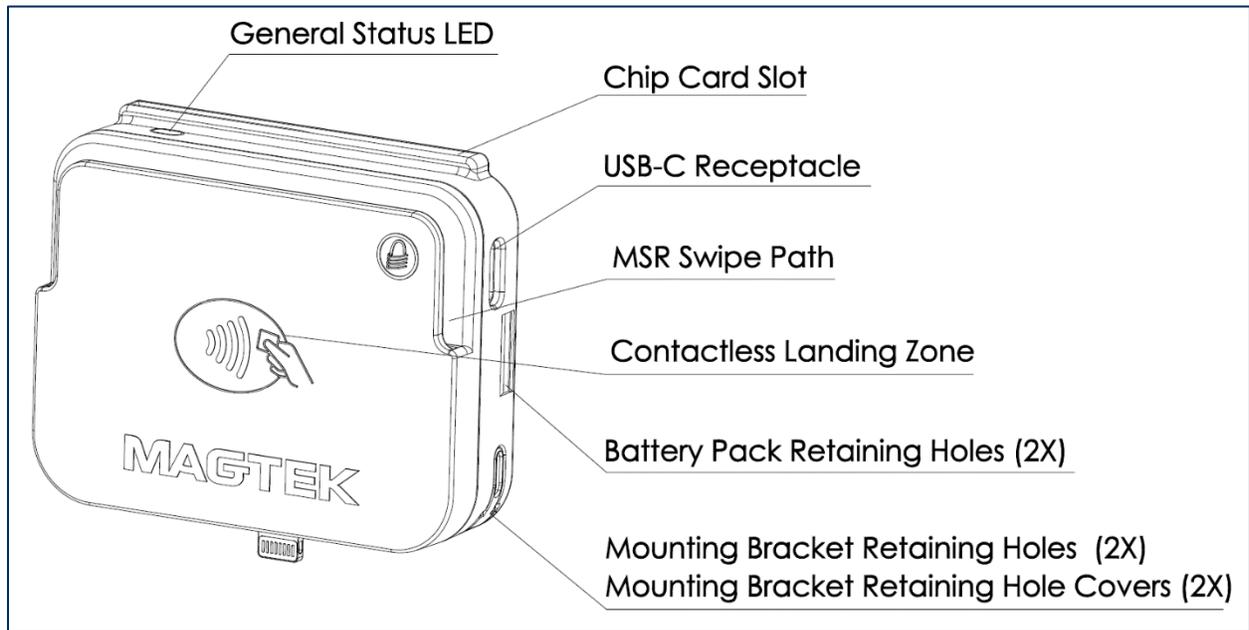
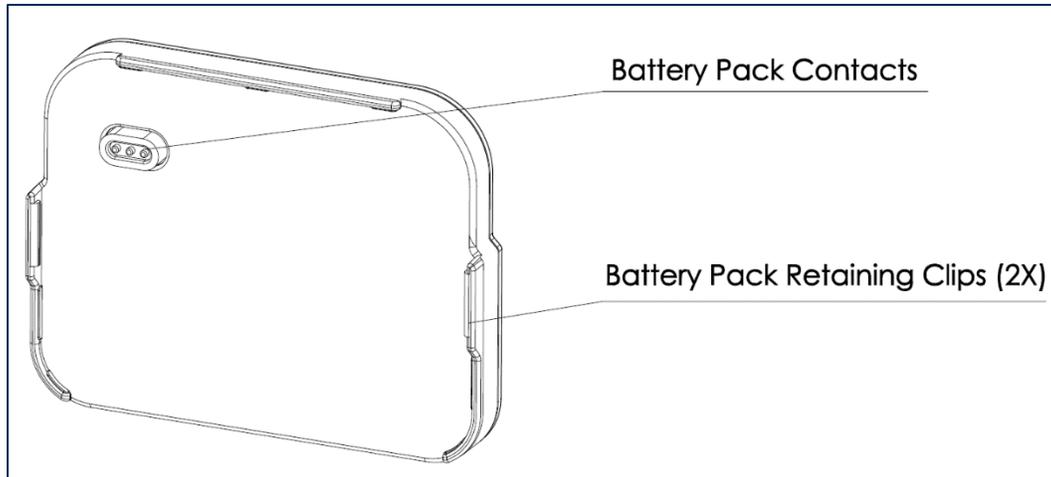
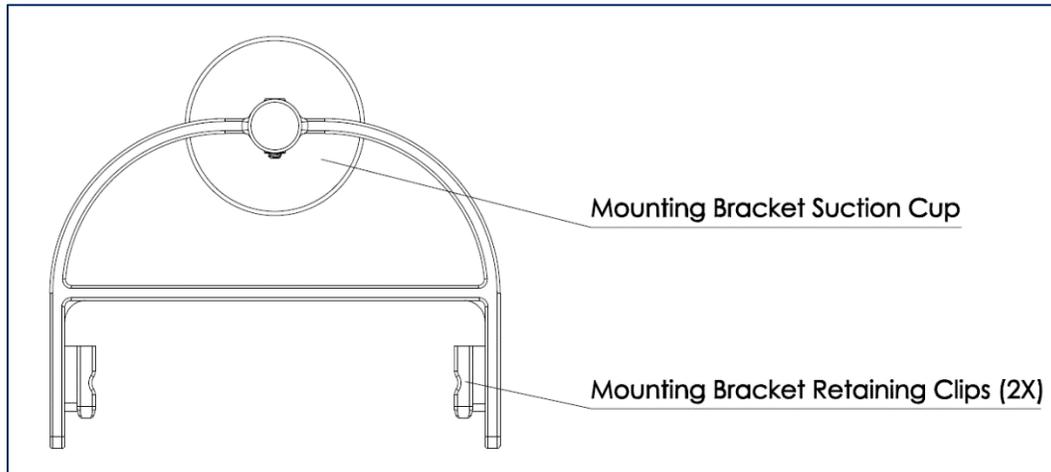


Figure 1-1 - iDynamo 6 Major Components



**Figure 1-2 - iDynamo 6 Battery Pack Major Components**



**Figure 1-3 - iDynamo 6 Mounting Bracket Major Components**

## 1.4 About Terminology

In this document, iDynamo 6 is referred to as the **device**. It is designed to be connected to a **host**, which is a piece of general-purpose electronic equipment which can send commands and data to, and receive data from, the device. Host types include PC computers/laptops, tablets, and smartphones. Generally, the host must have **software** installed that communicates with the device and is capable of processing transactions. During a transaction, the host and its software interact with the **operator**, such as a cashier or bank teller, while the device interacts with the **cardholder**.

## 1.5 About Solution Planning

Smooth deployment of an iDynamo 6 solution requires some up-front planning and decision-making:

- Determine the overall **functional requirements** and desired **user experience** of the solution iDynamo 6 will be integrated into. For example, how iDynamo 6 and its host will be physically **presented** to the cardholder. This includes whether the solution will be handheld or permanently mounted in a stand or enclosure, and whether the solution is intended to be used in portrait or landscape orientation (iDynamo 6 can be used in either orientation). When planning placement, be sure to consider:
  - a) **Power source availability.** For example, permanently mounted solutions should be within reasonable cabling distance from the power source; handheld solutions need a designated secure location with charging power available.
  - b) **Ergonomics.** For example, make sure there is adequate clearance for operators or cardholders to easily find the critical components of the device, and to insert, swipe, or tap a card, or to tap a contactless payment device.
- Determine what **documentation** and **training** will be required from solution design through testing and field deployment. For example, it may be necessary to develop a solution-specific installation procedure for technicians, and training materials for operators.
- Determine what type of **host** iDynamo 6 will connect to. Host types include iOS smartphones and tablets, Android smartphones and tablets, and Windows tablets and PCs. See **Table 1-1** for a list of available models and their intended hosts.
- Determine what iDynamo 6 will use as its **primary connection** and specify that when ordering. Models with **USB-C plug** and **USB receptacle** can be configured to use either of those as the primary connection, and both connections can be configured to use **connection type USB HID** for Android and Windows hosts, **iAP** for iOS hosts, or **One-time Automatic**, which allows the device to determine what host type it is connected to when connected for the first time after leaving the factory, and automatically change its configuration to match.
- Determine what the solution will use as a **primary power source**. Depending on the model, iDynamo 6 can be powered by the USB-C receptacle or by the handheld host connection (Lightning or USB-C plug). If you want to use contactless functions when the solution is powered by a handheld host that does not implement USB 3.0, the device's removable battery pack must be installed.
- If using the battery pack, determine the **battery recharge schedule(s)** and order spares. In high-traffic mission-critical solutions, it may be wise to keep spare batteries and spare devices configured and charged for fast swap-out.
- Determine how iDynamo 6 will be **branded**. In large quantities, MagTek can accommodate custom branding colors and trade dress. Contact a representative for details.
- Determine what **software** will be installed on the host and how it will be configured. Software can include operating system, transaction processing software, security software, and so on. Include any additional support required by the software, such as network connections.
- Determine how iDynamo 6 should be **configured**, and specify that configuration when you order. MagTek or your reseller can advise. For deep detail about configuration options and how they affect device behavior, see **D998200324 IDYNAMO 6 PROGRAMMER'S MANUAL (COMMANDS)**.
- Determine how the solution will be **tested** and, if appropriate, how it will be **certified**.
- Determine how the solution will be **maintained**. See section **4 Maintenance** for guidance on maintaining the iDynamo 6 portion of the solution.

- Determine how the solution will be **regularly inspected** for tampering, unauthorized added components such as eavesdropping or skimming devices, and so on. Proper inspection requires additional solution-specific training, instructions, and visual references.

## 1.6 Available Models and Accessories

Table 1-1 - iDynamo Models

Model	Part #	Connections	Host / Solution Design Types
iDynamo 6 with Lightning	21087016	<p>Lightning plug for:</p> <ul style="list-style-type: none"> <li>• Host communication</li> <li>• Handheld power input from host</li> <li>• Charging power output to host</li> </ul> <p>USB-C receptacle for:</p> <ul style="list-style-type: none"> <li>• Charging power input</li> <li>• Contactless reader power input</li> <li>• Limited host communication</li> </ul> <p>Battery pack contacts for:</p> <ul style="list-style-type: none"> <li>• Charging power output to battery pack</li> <li>• Handheld power input from battery pack for contactless reader</li> </ul>	Made for iPhone 12 Pro Max, iPhone 12 Pro, iPhone 12, iPhone 12 mini, iPhone 11 Pro Max, iPhone 11 Pro, iPhone 11, iPhone XS Max, iPhone XS, iPhone XR, iPhone X, iPhone 8 Plus, iPhone 8, iPhone 7 Plus, iPhone 7, iPhone 6s Plus, iPhone 6s, iPhone 6 Plus, iPhone 6, iPad Pro 10.5-inch, iPad Pro 12.9-inch (2nd generation), iPad Pro 9.7-inch, iPad Pro 12.9-inch (1st generation), iPad Air 2, iPad Air, iPad mini 4, iPad mini 3, iPad (5th and 6th generation)
iDynamo 6 with USB-C Plug	21087023	<p>USB-C plug for:</p> <ul style="list-style-type: none"> <li>• Host communication</li> <li>• Handheld power input from host</li> <li>• Charging power output to host</li> </ul> <p>USB-C receptacle for:</p> <ul style="list-style-type: none"> <li>• Charging power input</li> <li>• Contactless reader power input</li> <li>• Host communication / operating power input if plug disabled</li> </ul> <p>Battery pack contacts for:</p> <ul style="list-style-type: none"> <li>• Charging power output to battery pack</li> <li>• Handheld power input from battery for contactless reader</li> </ul>	Direct mount or cabled connection to Android hosts with USB-C port and USB On-The-Go (OTG), to iOS hosts with USB-C connector, and to Windows hosts with USB-C connector.

Table 1-2 - iDynamo 6 Accessories

Accessory	Part #	Notes
Battery Pack	1000005550	Included with device. Spares available for order.
Universal Mounting Bracket	1000005552	Included with device. Spares available for order.
USB-C to USB Type A Cable	1000005076	Included with device. Spares available for order.

## 2 Installation

Installing iDynamo 6 is a straightforward process: The acquirer configures the encryption keys and EMV terminal / payment brand application settings before deployment. End users need only set up a host with appropriate software, configure the software, and connect the device to the host. This section provides general information about setting up solutions that incorporate iDynamo 6, including host software, connecting the device, and mounting the device.



### 2.1 About Host Software

In any solution, iDynamo 6 is connected to a **host**, which must have software installed that knows how to communicate with the device, and which is capable of performing actions intended to be carried out when a cardholder swipes, inserts, or taps a card or contactless payment device. To set up the host software to work with iDynamo 6, follow the installation and configuration instructions provided by the vendor of the host or the host software. For details about developing host software, see section **5 Developing Custom Software**.

Some connection types may also require installation of device drivers on the host. To set up any necessary drivers, see the connection-specific “How To” sections in section **2.5 Connecting to an iOS Host**.

## 2.2 How to Use the USB-C Receptacle for Pass-Through Charging

### NOTICE

**iDynamo 6's USB-C receptacle only supports *charging* the host while iDynamo 6 is connected. It does not support *synchronizing data*. To synchronize the host with a computer, you must disconnect iDynamo 6 and connect the host directly to the computer.**

**Unlike iDynamo 6 with USB host plugs, iDynamo 6 with Lightning can receive a limited set of commands via the USB-C receptacle in addition to the Lightning connector, even when the device is set to use the Lightning connector as its primary host interface.**

iDynamo 6 models that include a plug are also equipped with a USB-C receptacle, which allows the host to continue charging while iDynamo 6 is connected to the host's power and data port. This is called pass-through charging.

To set up pass-through charging, follow these steps:

- 1) Disconnect iDynamo 6 from the host.
- 2) Verify the charging power source works properly without iDynamo 6 by connecting the host directly to the power source using the host's original cable: The power source must be a USB charger sold or approved by the host's manufacturer.
- 3) Make sure the host charges correctly.
- 4) Disconnect the charging cable from the host and charger and set it aside.
- 5) Connect iDynamo 6 to the host. See section **2 Installation** for details.
- 6) Connect the charging cable included with iDynamo 6 to the charger.
- 7) Connect the other end of the cable to iDynamo 6's USB-C receptacle.

For deeper details about the device's power systems, see section **3.4 Power Management**.

## 2.3 How to Install the Battery Pack

### NOTICE

**If the solution design includes accepting contactless payments while iDynamo 6 is powered by a handheld host (that is, not powered through the USB-C receptacle from a high-powered USB source), the host must implement USB 3.0, or the device must have the battery pack installed. iDynamo 6 only uses the battery pack to power its on-board contactless reader, and receives all other operating power from the connected host.**

To install the battery pack, follow these steps:

- 1) Remove the battery pack contacts cover from the rear of iDynamo 6 (see **Figure 1-1**).
- 2) Make sure the electrical contacts on iDynamo 6 and the battery pack are clean (see **Figure 1-1**).
- 3) Rotate the battery pack so the contacts line up with the contacts on iDynamo 6.
- 4) Press the battery pack onto iDynamo 6 until you feel it click into place.
- 5) iDynamo 6 does not power on when only the battery pack is connected. The device only powers on when it is connected to a host via the host connector, or to a USB-C power source via the USB-C receptacle. In some cases, the device remains powered off until the host establishes a logical connection, in addition to being physically connected.
- 6) Although the battery pack ships with a partial charge, MagTek recommends fully charging it before use. For details, see section **3.4.3 How to Charge the Connected Host and Battery Pack**.

To remove the battery pack, use your thumb to apply pressure to the iDynamo 6 housing above one of the battery pack retaining clips, and use your finger to pull out on the retaining clip to release it.

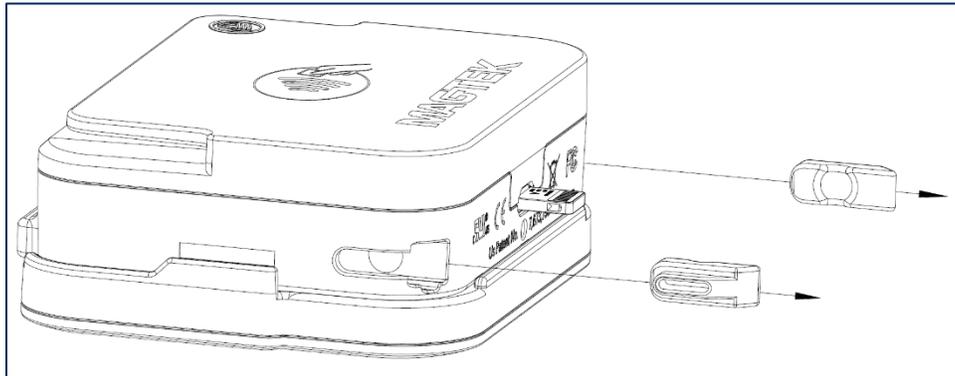


## 2.4 How to Install the Mounting Bracket

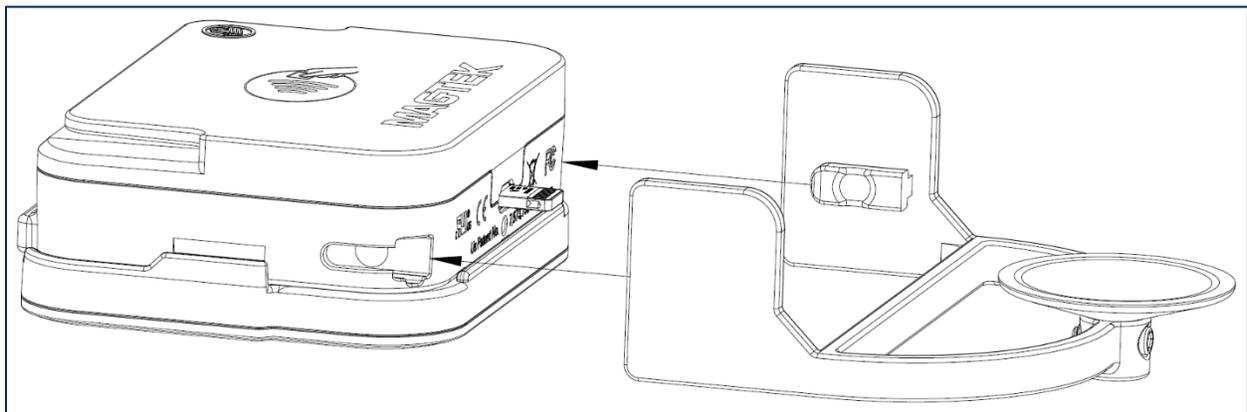
iDynamo 6 provides a universal mounting bracket that can be used to mechanically stabilize its connection with the host and provide a more secure, integrated feel for cardholders to interact with.

To install the optional mounting bracket, follow these steps:

- 1) Use a paperclip to slide the small covers out of the mounting bracket retaining holes on each side of iDynamo 6's housing. Set them aside for possible future use.



- 2) Slide the mounting bracket's retaining clips into iDynamo 6's retaining holes until you feel them seat firmly in place.



- 3) Make sure the mounting bracket suction cup is clean.
- 4) Make sure the rear surface of the host is clean and smooth.
- 5) After connecting iDynamo 6 to the host (see section **2.5 Connecting to an iOS Host** or section **2.6 Connecting to an Android Host**), press the mounting bracket's suction cup onto the rear surface of the host.

To uninstall the mounting bracket, reverse the steps above, including re-inserting the retaining hole covers. The mounting bracket resists slightly when being pulled out of the retaining holes, but is designed to be removable without damage.

## 2.5 Connecting to an iOS Host

### 2.5.1 About Connecting to an iOS Host

iDynamo 6 connects to an iOS-based host via the Lightning plug or USB-C plug, depending on which connector the chosen host provides.

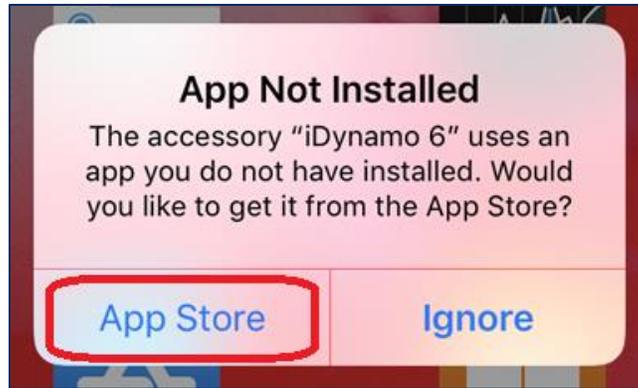
### 2.5.2 How to Connect to an iOS Host

#### NOTICE

**Before connecting models of iDynamo 6 that provide a USB-C host plug, be sure the device is configured to use the correct USB connection (USB-C plug or USB-C receptacle) as the primary host interface. This may be specified on a sales order, or configured using sample tools, sample code, or custom software (see section 5 Developing Custom Software).**

To connect iDynamo 6 to an iOS host for the first time, follow these steps:

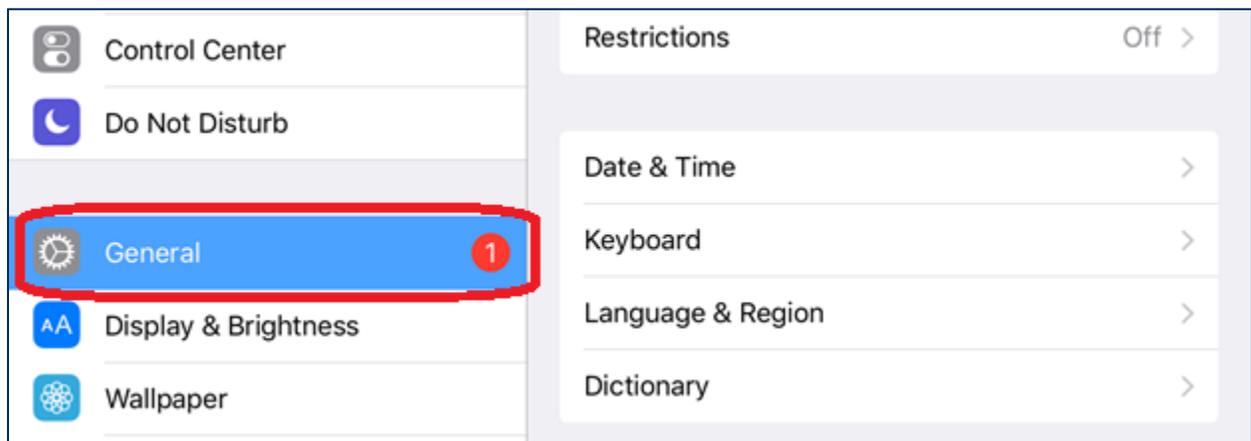
- 1) If you are connecting to the host using the USB-C receptacle, make sure you are using a model of iDynamo 6 that supports communication and power through that connection. Models with Lightning connector are not designed for this mode of use, and can not draw operating power from the USB-C receptacle; it is for battery pack / host charging only. See **Table 1-1** for details about connection capabilities of each model.
- 2) If you are using a model of iDynamo 6 that provides a USB-C host plug, make sure iDynamo 6 is configured to use the desired connector (USB-C plug or USB-C receptacle) as its primary host interface. If it is configured to use another connection, use that connection first to change the configuration. This may be specified on a sales order, or configured using sample tools, sample code, or custom software (see section **5 Developing Custom Software**).
- 3) Make sure iDynamo 6 is configured to use the correct connection type. For iOS hosts, it must be set to either **iAP** or **One-time Automatic**. If the connection type is set to **One-time Automatic**, the device automatically detects whether it is connected to an iAP host or to a USB HID host the first time it is connected to a host, and changes its connection type from One-time Automatic to the detected type. This setting may be specified on a sales order, or configured using sample tools, sample code, or custom software (see section **5 Developing Custom Software**). If the device is accidentally configured to use the **USB HID** connection type, use a Windows or Android host first to change the setting to **iAP**.
- 4) If you will be using iDynamo 6 to receive contactless payments in handheld mode (not connected to a USB-C cable) and the host does not implement USB 3.0, install the battery pack. See section **2.3 How to Install the Battery Pack** and make sure the battery pack is adequately charged.
- 5) If you will be using the mounting bracket, install it. See section **2.4 How to Install the Mounting Bracket**.
- 6) Power on the host.
- 7) Plug iDynamo 6 into the host's Lightning or USB-C connector. Make sure all components are seated firmly. If you are using the mounting bracket, press the suction cup onto the rear of the host.
- 8) After a few seconds, the iOS host pops up an **App Not Installed** window. Press the **App Store** button to open the App Store and browse through the list of all compatible apps.



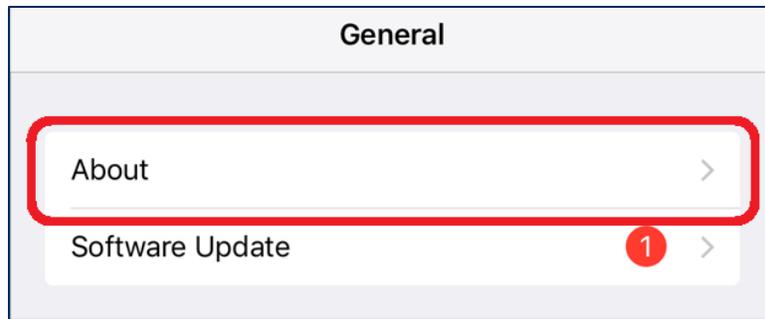
- 9) If the **App Not Installed** window does not pop up, it is likely an iDynamo 6 or other MagTek device has been connected to the host in the past and the host already has a compatible app installed. Follow these steps to install a compatible app manually:
- a) On the iOS host, select **Settings** to open the **Settings** page.



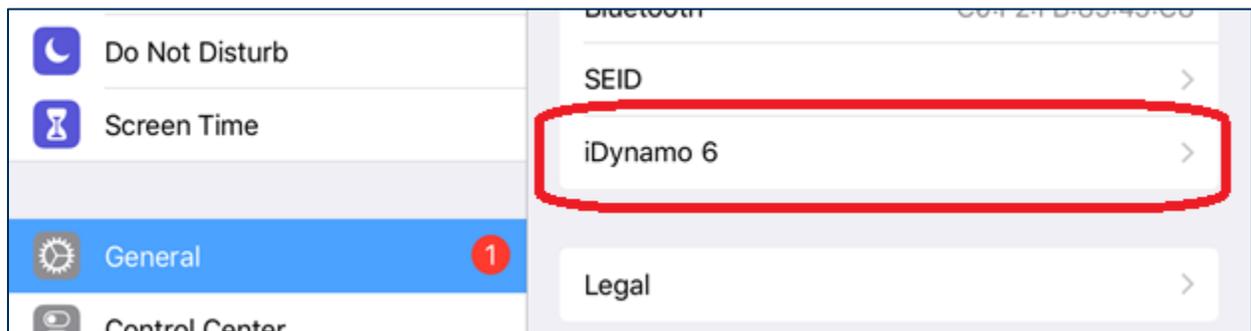
- b) Select **General** to open the **General** page.



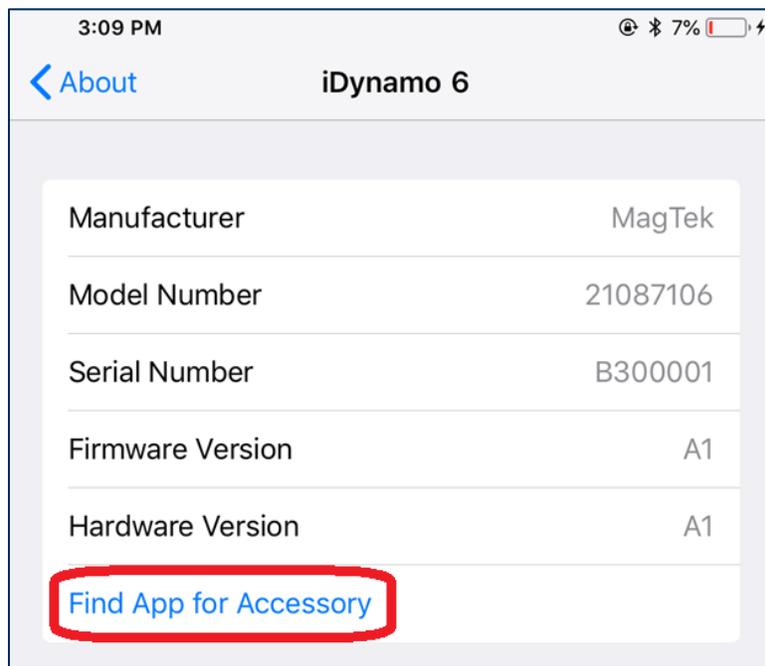
- c) Select **About** to open the **About** page.



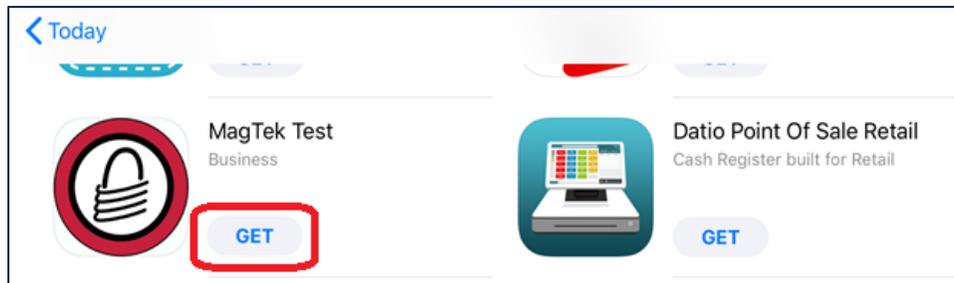
d) Select the entry for **iDynamo 6** to show the device's **About** page.



e) In the device's **About** page, select **Find App for Accessory**.



10) Install and configure the host software you intend to use with iDynamo 6. If you do not yet have host software, you can download a test tool from the App Store called **MagTek Test**, published by **MagTek, Inc.**, to perform simple tests.



- 11) Make sure the host software is configured to look for the device on the proper connection type.
- 12) Make sure the host software is configured to look for the correct device.
- 13) Make sure the host software is configured to properly interpret incoming data from the device.
- 14) Use the host software or the **MagTek Test** app to test swiping, inserting, and tapping a card or contactless payment device. For details about reading each payment type, see section **3.5 Card Reading**. If you are using the **MagTek Test** app, follow these steps:
  - a) Launch the **MagTek Test** app on the host.
  - b) At the bottom of the app, select **Lightning EMV**, even if the device is connected via the USB-C plug.
  - c) Press the **Connect** button. If the host successfully connects, the main reporting area of the app will say **Connected...**
  - d) EMV transactions require the device's clock to be set before processing. The device does not have a battery-backed clock, so it must be set by the host software. If you are using the **MagTek Test** app, push the host's date and time to the device by pressing the **Options** button and pressing the **Set Date Time** button.
  - e) Before testing a swipe, use the app to **Send** command **580101** to the device and receive response **0000** to enable the magnetic stripe read head. For convenience, the **MagTek Test** app provides an **MSR On** button that sends this command to the device with a single press.
  - f) After swipe testing, **Send** command **580100** to disable the magnetic stripe read head and conserve power.
- 15) Optionally set up iDynamo 6 for pass-through charging as described in section **2.2 How to Use the USB-C Receptacle for Pass-Through Charging**. Specifically in the case of iDynamo 6 with Lightning connector, if the USB-C receptacle is connected via cable to a host computer, that host may also have limited command / response communication with the device.

To disconnect iDynamo 6 from an iOS host, follow these steps:

- 1) Make sure all installed apps that use iDynamo 6 are either closed or disconnected.
- 2) Turn off the host's display to avoid accidentally launching or interacting with apps.
- 3) Disconnect the cable from the USB-C receptacle, if one is connected.
- 4) Carefully disconnect iDynamo 6 by pulling it straight out from the host's Lightning or USB-C connector.

## 2.6 Connecting to an Android Host

### 2.6.1 About Connecting to an Android Host

iDynamo 6 can connect to Android hosts via the USB-C plug or USB-C receptacle. For details about connection capabilities of each model of iDynamo 6, see **Table 1-1**.

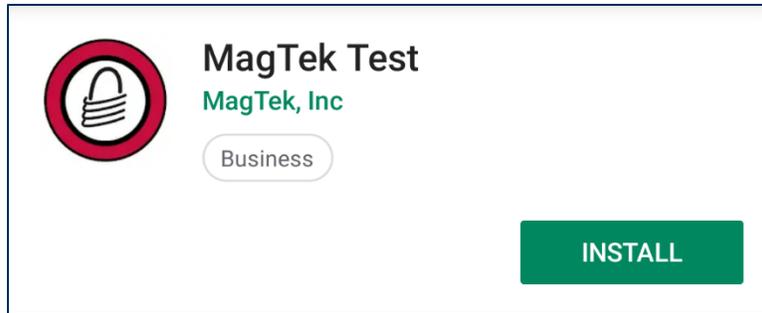
### 2.6.2 How to Connect to an Android Host

#### NOTICE

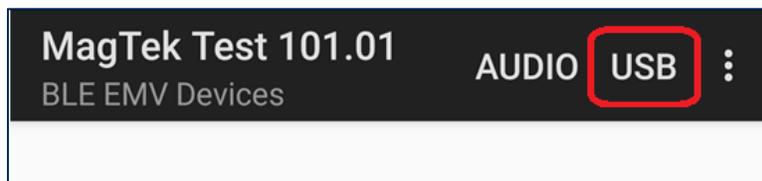
**Before connecting models of iDynamo 6 that provide a USB-C host plug, be sure the device is configured to use the correct USB connection (USB-C plug or USB-C receptacle) as the primary host interface. This may be specified on a sales order, or configured using sample tools, sample code, or custom software (see section 5 Developing Custom Software).**

To connect iDynamo 6 to an Android host that supports USB On-The-Go, follow these steps:

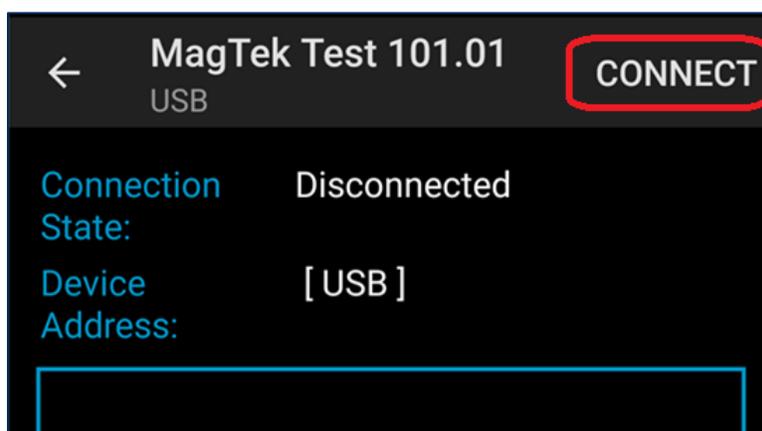
- 1) If you are connecting to the host using the USB-C receptacle, make sure you are using a model of iDynamo 6 that supports communication and power through that connection. Models with Lightning connector are not designed for this mode of use, and can not draw operating power from the USB-C receptacle; it is for battery pack / host charging only. See **Table 1-1** for details about connection capabilities of each model.
- 2) Make sure iDynamo 6 is configured to use the desired connector (USB-C plug or USB-C receptacle) as its primary host interface. If it is configured to use another connection, use that connection first to change the configuration. This may be specified on a sales order, or configured using sample tools, sample code, or custom software (see section **5 Developing Custom Software**).
- 3) Make sure iDynamo 6 is configured to use the correct connection type. For Android hosts, it must be set to either **USB HID** or **One-time Automatic**. If the connection type is set to **One-time Automatic**, the device automatically detects whether it is connected to an iAP host or to a USB HID host the first time it is connected to a host, and changes its connection type from One-time Automatic to the detected type. This setting may be specified on a sales order, or configured using sample tools, sample code, or custom software (see section **5 Developing Custom Software**). If the device is accidentally configured to use the **iAP** connection type, use an iOS host first to change the setting to **USB HID**.
- 4) If you will be using iDynamo 6 to receive contactless payments in handheld mode (not connected to a USB-C cable) and the host does not implement USB 3.0, install the battery pack. See section **2.3 How to Install the Battery Pack** and make sure the battery pack is adequately charged.
- 5) If you will be using the mounting bracket, install it. See section **2.4 How to Install the Mounting Bracket**.
- 6) Power on the host.
- 7) On the host, install and configure the host software you intend to use with iDynamo 6. If you do not yet have that software, you can download a test tool from the Google Play store called **MagTek Test**, published by **MagTek, Inc** to perform simple tests:



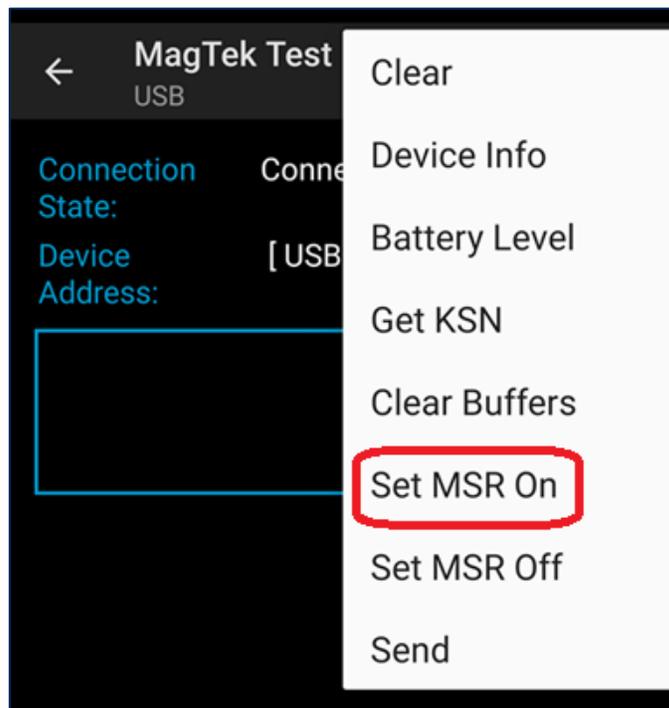
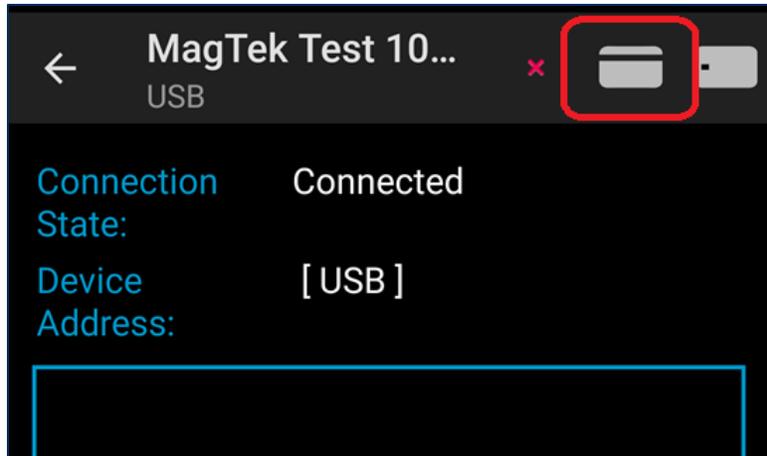
- a) Make sure the host software is configured to look for the device on the right connection.
- b) Make sure the host software knows which device(s) it should interface with.
- c) Make sure the host software is configured to properly interpret incoming data from the device. For direct USB connections, iDynamo 6 transmits data as a vendor-defined HID device.
- 8) Connect iDynamo 6 to the host. Make sure all components are seated firmly. If you are using the mounting bracket, press the suction cup onto the rear of the host.
- 9) Use the host software or the **MagTek Test** app to connect to the device and to test swiping, inserting, and tapping a card. For details about reading each payment type, see section **3.5 Card Reading**.
  - a) Open the **MagTek Test** app on the Android host.
  - b) Press the **USB** button in the top menu bar. The app should report the **USB Connection State** is **Disconnected**.



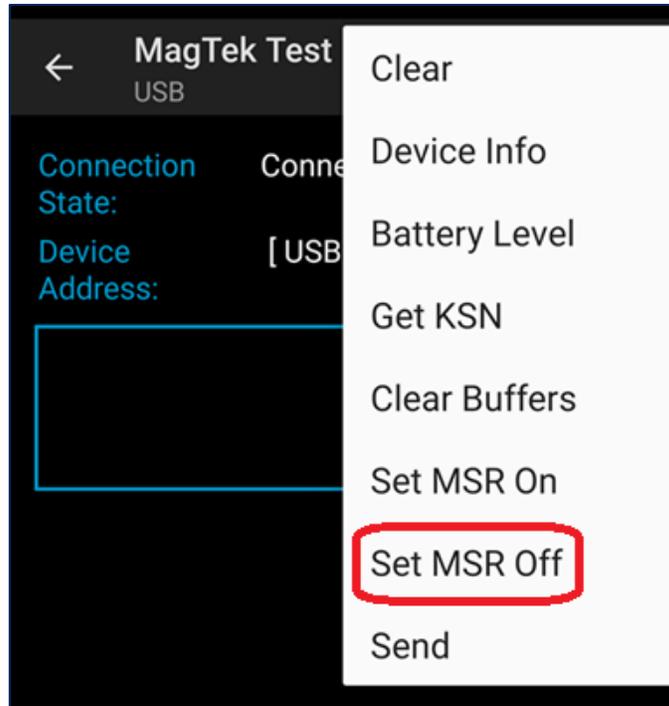
- c) Press the **Connect** button in the top menu bar. **Connection State** should report **Connected**.



- d) Before testing a swipe, press the magnetic stripe card button in the top menu bar to open a menu, and select **Set MSR On** to enable the magnetic stripe read head.



- e) After testing a swipe, press the magnetic stripe card button in the top menu bar to open a menu, and select **Set MSR Off** to disable the magnetic stripe read head and conserve power.



- 10) To disconnect from the host and power down iDynamo 6, unplug the cable from the device's USB-C receptacle.

## 2.7 Connecting to a Windows Host

### 2.7.1 About Connecting to a Windows Host

iDynamo 6 can connect to Windows hosts via the USB-C plug or USB-C receptacle. For details about connection capabilities of each model of iDynamo 6, see **Table 1-1**.

### 2.7.2 How to Connect to a Windows Host

#### NOTICE

**Before connecting models of iDynamo 6 that provide a USB-C host plug, be sure the device is configured to use the correct USB connection (USB-C plug or USB-C receptacle) as the primary host interface. This may be specified on a sales order, or configured using sample tools, sample code, or custom software (see section 5 Developing Custom Software).**

To connect iDynamo 6 to a Windows host, follow these steps:

- 1) If you are connecting to the host using the USB-C receptacle, make sure you are using a model of iDynamo 6 that supports communication and power through that connection. Models with Lightning connector are not designed for this mode of use, and can not draw operating power from the USB-C receptacle (it is for battery pack / host charging only). See **Table 1-1** for details about connection capabilities of each model.
- 2) Make sure iDynamo 6 is configured to use the desired connector (USB-C plug or USB-C receptacle) as its primary host interface. If it is configured to use another connection, use that connection first to change the configuration. This may be specified on a sales order, or configured using sample tools, sample code, or custom software (see section **5 Developing Custom Software**).
- 3) Make sure iDynamo 6 is configured to use the correct connection type. For Windows hosts, it must be set to either **USB HID** or **One-time Automatic**. If the connection type is set to **One-time Automatic**, the device automatically detects whether it is connected to an iAP host or to a USB HID host the first time it is connected to a host, and changes its connection type from One-time Automatic to the detected type. This setting may be specified on a sales order, or configured using sample tools, sample code, or custom software (see section **5 Developing Custom Software**). If the device is accidentally configured to use the **iAP** connection type, use an iOS host first to change the setting to **USB HID**.
- 4) If you will be using iDynamo 6 to receive contactless payments in handheld mode (not connected to a USB-C cable) and the host does not implement USB 3.0, install the battery pack. See section **2.3 How to Install the Battery Pack** and make sure the battery pack is adequately charged.
- 5) If you will be using the mounting bracket, install it. See section **2.4 How to Install the Mounting Bracket**.
- 6) Power on the host.
- 7) On the host, install and configure the host software you intend to use with iDynamo 6 (if you do not yet have that software, you can use *MTNETDemo.exe* included in **99510132 SOFTWARE, SDK, DYNAMAG / DYNAMAX / EDYNAMO / UDYNAMO / ADYNAMO / MDYNAMO / TDYNAMO / DYNAWAVE (WINDOWS .NET)**, available from MagTek.com, to perform simple tests):
  - a) Make sure the host software is configured to look for the device on the right connection.
  - b) Make sure the host software knows which device(s) it should interface with.
  - c) Make sure the host software is configured to properly interpret incoming data from the device. For direct USB connections, iDynamo 6 transmits data as a vendor-defined HID device.

- 8) Connect iDynamo 6 to the host. Make sure all components are seated firmly. If you are using the mounting bracket, press the suction cup onto the rear of the host.
- 9) Use the host software to connect to the device and to test swiping, inserting, and tapping a card (see section **3.5 Card Reading**).

## 3 Operation

### 3.1 About Operating Modes

During operation, iDynamo 6 transitions between distinct modes, each of which behaves differently:

- **Powered Off Mode** is the shipping mode of the device. The device enters this mode when it is not receiving power from a host or from the USB-C receptacle, even if the battery pack is connected. When powered off, the device consumes no power, even if the battery pack is connected. To move the device from Powered Off Mode to Standby Mode, connect the device's USB-C receptacle to a fully-powered USB charger. To move the device from Powered Off Mode to Connected Mode, use the host software to establish a connection through the primary host interface.
- **Standby Mode** is an intermediate state the device enters when it is receiving power (such as when it is physically connected to a USB charger via the USB-C receptacle, but is not logically connected to a host). In this mode, the device can not communicate with the host, but recharges any attached battery pack or host. To progress from Standby Mode to Connected Mode, the operating system or host software must establish a logical connection with the device (for example, opening a USB HID connection from an Android or Windows host).
- **Connected Mode** occurs when the host is providing power to iDynamo 6 and has established a logical connection. In this mode, the host and the device can both initiate communication.

### 3.2 About the General Status LED

iDynamo 6's **General Status LED** (see section 1.3 **About iDynamo 6 Components**), provides feedback to the operator and cardholder about the internal state of the device. **Table 3-1** shows how to interpret the flashing patterns of the General Status LED.

**Table 3-1 - iDynamo 6 General Status LED Meanings**

Color	Flashing Pattern	Meaning
Off	Off 	The device is not connected to a host and is not receiving power.
Green	Solid 	If the device has no battery pack connected, it is receiving power from the host, and is ready for the host software to connect.
Green	Solid 	If a battery pack is connected, the battery pack is not charging and its charge level is good.
Amber	Solid 	The battery pack is not charging and its charge level is fair. Charge when possible.
Red	Solid 	The battery pack is not charging and its charge level is low. Charge immediately.
Red	Slow blink 	The battery pack is charging and its charge level is low. Continue charging.
Amber	Slow blink 	The battery pack is charging and its charge level is fair. Continue charging if possible.
Green	Slow blink 	The battery pack is charging and its charge level is high. Continue charging if desired. Transitions to "not charging" indicator when full.
Green	Fast flash 	A cardholder's card is currently swiping in the card path, or has just exited the card path but has not yet been completely decoded by the device.
Green	Solid on 2 seconds 	Device has successfully read a swiped card.
Red	Solid on 2 seconds 	Device could not read a swiped card.
Blue	Solid 	Host is loading firmware onto the device.

### 3.3 About Sounds

iDynamo 6's beeper provides feedback to operators and cardholders about the internal state of the device:

- The device sounds one short beep after it has successfully read a contactless tap, and the cardholder can safely remove the card or device from the contactless landing zone.
- The device sounds two short beeps if it can not read a contactless tap. The operator should restart the transaction.
- The device sounds two beeps when an operator cancels a pending EMV transaction. The host may override this behavior so the cancelation is silent.

## 3.4 Power Management

### NOTICE

**iDynamo 6 with Lightning connector does NOT use power from the USB-C receptacle for operating power; the USB-C receptacle only provides power to charge the iOS host and the battery pack. Operating power for iDynamo 6 MUST come from the Lightning plug. iDynamo 6 does not power on if it is only receiving power from the USB-C receptacle.**

### 3.4.1 About Power

iDynamo 6's optional battery pack incorporates a Lithium-ion rechargeable battery, which requires very little maintenance. It is not subject to "charge memory" and therefore does not require deep discharge cycles to restore its charge capacity like many other battery technologies.

When properly powered through the USB-C receptacle, iDynamo 6 recharges the battery pack, powers any connected host through the Lightning or USB-C plug, and waits for the host to make a logical connection before powering on (see section **3.4.3 How to Charge the Connected Host and Battery Pack**). While charging the battery pack and/or the host, the device consumes more power from the USB power source than when the battery pack and host are fully charged. The device stops charging the battery pack when it determines it is optimally full, to prevent overcharging.

The device draws power from the host plug to power all operations except the integrated contactless reader. To save power, the host must logically disconnect from the device. The methods for the host to stop powering the device vary between operating systems and connection types, and are outside the scope of this manual. The host software may also send commands to control some device features directly to save power, such as turning off the magnetic stripe reader when it is not in use (see section **5 Developing Custom Software**).

For details about the device's behavior in its various power modes, see section **3.1 About Operating Modes**. For information about checking battery levels, recharging the battery pack and connected host, powering the device on and off, and forcing the device to reset, see the following sections.

The removable battery pack is designed to last hundreds of charging cycles, but with time and / or with use, its charge capacity will naturally degrade. To maintain the battery pack's charge capacity as much as possible, follow these guidelines:

- Do not discharge the battery pack to 0%. Full discharge shortens the battery life.
- When possible, plan to recharge the battery pack well before it is fully depleted.
- Store the battery pack at the lowest reasonable temperatures within the device's specified storage temperature range (see **Appendix A Technical Specifications**; below 77°F / 25°C is optimal). Temperature is the most critical factor in extending battery life.
- Store the battery pack charged to less than 100% (40% is optimal).

### 3.4.2 How to Check Battery Level

To check the charge level of the battery pack, make sure the device is connected to the host and look at the General Status LED (see section **3.2 About the General Status LED**).

Custom host software may also query the device and show its current charge level on the host display at all times for convenience. For details, see section **5 Developing Custom Software**.

### 3.4.3 How to Charge the Connected Host and Battery Pack

#### CAUTION

**To avoid possible damage to the host or the device, only use a USB power adapter designed for the host you are using, and the cable included with iDynamo 6. For example, for iOS devices, use only chargers sold by or approved by Apple.**

Recharge the connected host and the iDynamo 6 battery pack (if it is installed for handheld contactless transactions) when either the host or the battery pack reports it is low on charge. Use the included USB-C cable to connect iDynamo 6 to a charger that is sold by or approved by the manufacturer of the host you are using. See section **2.2 How to Use the USB-C Receptacle for Pass-Through Charging**. A full recharge cycle for a completely drained battery pack, regardless of whether iDynamo 6 is also charging a connected host, takes approximately 5 hours.

### 3.4.4 How to Power On / Power Off

In Powered Off mode (General Status LED is off) power on the device by connecting it to a host and establishing a logical connection using the host software. In response, the device lights the General Status LED and transitions to Connected Mode. For details, see section **3.1 About Operating Modes** and section **3.2 About the General Status LED**.

To power off the device, close the logical connection using the host software, or physically disconnect iDynamo 6 from the host following the uninstall steps described in section **2 Installation**.

### 3.4.5 How to Force Reset

To force the device to reset, power it off by completely disconnecting it from the host and USB power. Even if the battery pack is connected, the device powers off completely when disconnected.

## 3.5 Card Reading

### NOTICE

**If the solution design includes accepting contactless payments while iDynamo 6 is powered by a handheld host (that is, not powered through the USB-C receptacle from a high-powered USB-C power source) and the host does not implement USB 3.0, the device must have the battery pack installed. iDynamo 6 only uses the battery pack to power its on-board contactless reader, and receives all other operating power from the connected host.**

### 3.5.1 About Reading Cards

The steps for starting a transaction and reading a card or contactless payment device are different depending on iDynamo 6's configuration and on the design of the host software. Host software developers should see section **5 Developing Custom Software** for implementation references. The solution developer should provide solution-specific instructions for operators to follow. A transaction generally follows this essential flow:

- 1) If the device will be used to accept contactless transactions while handheld, and the host does not implement USB 3.0, the operator makes sure the battery pack is installed and charged.
- 2) The operator makes sure iDynamo 6 is configured properly and is connected to the host (see section **2 Installation**).
- 3) The operator uses the host user interface to finalize a transaction amount, then initiates a transaction.
- 4) The host communicates with the device, and reports to the operator when the device is ready.
- 5) The operator makes sure iDynamo 6 is receiving power from the host and has powered itself on. When the device is not powered via the USB-C receptacle, the host generally opens a session with the device to process a transaction, then closes the session after the transaction is complete to power off the device and conserve power.
- 6) The operator guides the cardholder in presenting payment.
- 7) The cardholder interacts with the device to present payment. The following sections provide additional details about presenting each of the available payment methods.
- 8) Because the device does not have its own display, the device may send messages to the host prompting the cardholder to perform certain actions; the host software should process these requests by displaying the requested messages, and depending on the placement of the host display(s), the operator may need to relay the messages to the cardholder. For example:
  - a) If the device can not read the card, it may prompt the cardholder to swipe, insert, or tap again.
  - b) If the device repeatedly can not read a chip card, it may prompt the cardholder to use the magnetic stripe reader instead of the chip card slot. This is known as **EMV fallback**.
- 9) The device reports the success or failure of the transaction to the host, which should report the results to the operator.

### 3.5.2 How to Swipe Magnetic Stripe Cards

Cardholders should swipe magnetic stripe cards in the MSR swipe path with the magnetic stripe facing away from the cardholder and into the device, as shown in **Figure 3-1**. Cardholders may swipe in either direction along the path.



**Figure 3-1 - Swiping a Card Through iDynamo 6**

### 3.5.3 How to Insert Contact Chip Cards

Cardholders should insert chip cards into the chip card slot with the chip facing the cardholder and toward the slot, as shown in **Figure 3-2**.



**Figure 3-2 - Inserting a Chip Card Into iDynamo 6**

### 3.5.4 How to Tap Contactless Cards / Devices

## NOTICE

**If the solution design includes accepting contactless payments while iDynamo 6 is powered by a handheld host (that is, not powered through the USB-C receptacle from a high-powered USB-C power source) and the host does not implement USB 3.0, the device must have the battery pack installed. iDynamo 6 only uses the battery pack to power its on-board contactless reader, and receives all other operating power from the connected host.**

To tap a contactless card or electronic payment device, cardholders should do the following:

- 1) If the cardholder is using an electronic payment device, such as a smartphone, make sure the payment device has **NFC** turned **On** and has a payment app configured to process transactions. For details, see the documentation provided by the smartphone manufacturer and payment app publisher.
- 2) Wait until the host software indicates it is ready for a tap.
- 3) Tap the card or electronic payment device on the contactless landing zone, indicated by the EMVCo Contactless Indicator on the device's face (see **Figure 3-3**). The antenna of the card or device must be centered over the contactless landing zone. Because each smartphone model may have its NFC antenna placed differently, the ideal tap position may vary by make and model. For example, Samsung users may need to tap the center of the phone on the contactless landing zone, while iPhone users may need to tap the top of the phone on the contactless landing zone.
- 4) Wait for the device to beep. The host software may also display progress showing whether the tap succeeded or failed.
- 5) Remove the card or electronic payment device from the contactless landing zone.



Figure 3-3 - Tapping a Contactless Card On iDynamo 6

## 4 Maintenance



**To avoid damaging the read head, only clean the card path with approved cleaning cards. DO NOT use liquid cleaning products or insert any other objects into the device.**

Periodic cleaning of iDynamo 6's exterior may be required. To clean the outside of iDynamo 6, wipe it down with a soft, damp, lint-free cloth and then wipe it dry.

MagTek's double-sided cleaning card **96700004** is designed to clean the magnetic read head in the MSR swipe path and the contact pins inside all chip card contact readers. Keeping both of these components clean is essential to the device's functioning. MagTek recommends swiping and inserting a cleaning card once per week to avoid credit card misreads.

## 5 Developing Custom Software

Custom host software uses the same underlying device command set for all iDynamo 6 connection types (Lightning and USB). The device commands are wrapped differently depending on the physical connection type and the device's configuration. The following sections provide high-level information about communicating with the device via the various physical connection types in various software development frameworks, and provide pointers to available SDKs, which include sample code. All product documentation and SDKs are available for download by searching for the product name on [www.magtek.com](http://www.magtek.com) and navigating to the **Support** tab.

Developers of custom host software that implements contactless transactions should refer to *EMV Contactless Specifications for Payment Systems, Book A, Architecture and General Requirements* for user interface requirements that may need to be met by the host software. For example, because iDynamo 6 has a single General Status LED and does not have a display, the **MagTek Demo** app demonstrates using the host's display to emulate the standard four-LED contactless tap sequence.

### 5.1 iOS Custom Software

MagTek produces software development kits (SDKs) with API libraries that provide higher-level functions wrapped around **iAP2** communication protocols. These libraries simplify the development of custom host software that interfaces with iDynamo 6. See *99510111 SOFTWARE, SDK, ADYNAMO, DYNAMAX, EDYNAMO, IDYNAMO, IDYNAMO 6, KDYNAMO, SDYNAMO, TDYNAMO, UDYNAMO (IOS)*.

In addition to MagTek's SDKs, custom host software can communicate directly with the device using Apple's *ExternalAccessory* Framework, with sample code available in the form of Apple's *EADemo* app. For details, see *Apple Developer Documentation* and *D998200324 IDYNAMO 6 PROGRAMMER'S MANUAL (COMMANDS)*.

### 5.2 Android and Windows Custom Software

MagTek produces software development kits (SDKs) with API libraries that provide higher-level functions wrapped around **USB HID** communication protocols. These libraries simplify the development of custom host software that interfaces with iDynamo 6. See:

- *99510133 SOFTWARE, SDK, DYNAMAG, DYNAMAX, DYNAWAVE, EDYNAMO, IDYNAMO 6, MDYNAMO, TDYNAMO (WINDOWS C++ / JAVA)*
- *99510132 SOFTWARE, SDK, ADYNAMO, DYNAMAG, DYNAMAX, DYNAWAVE, EDYNAMO, IDYNAMO 6, MDYNAMO, TDYNAMO, UDYNAMO (WINDOWS .NET)*
- *99510109 SOFTWARE, SDK, ADYNAMO, BULLET, DYNAMAG, DYNAMAX, DYNAWAVE, EDYNAMO, IDYNAMO 6, MDYNAMO, TDYNAMO, UDYNAMO (ANDROID)*

In addition to MagTek's SDKs, custom software on any operating system can communicate directly with the device using the operating system's native USB libraries and protocols. For details, see *D998200324 IDYNAMO 6 PROGRAMMER'S MANUAL (COMMANDS)*.

### 5.3 For More Information

For more information about developing custom host software that integrates with iDynamo 6, see the MagTek website or contact your reseller or MagTek Support Services.

## Appendix A Technical Specifications

iDynamo 6 Technical Specifications	
Reference Standards and Certifications	
Identification Cards Financial Transaction Cards (ISO 7813) AAMVA ISO/IEC 14443 Type A and Type B EMV ICC Specifications for Payment Systems Ver 4.3, L1 Contact and L2 Contact Encryption: TDEA (3DES)-CBC using DUKPT MFi certification requirements MasterCard TQM Label Certified FCC Title 47 Part 15 Class B CE Level B EMC UR/CUR UL Recognized California Proposition 65 (California) EU Directive Waste Electrical and Electronic Equipment (WEEE) EU Directive Restriction of Hazardous Substances (RoHS) Universal Serial Bus Specification 2.0, compatible with 1.1	
Physical Characteristics	
Dimensions (H x W x T)	iDynamo 6: 2.75 in. (70 mm) x 2.1 in. (53.9 mm) x 0.73 in. (18.75 mm)  iDynamo 6 with battery pack: 2.8 in. (72.72 mm) x 2.24 in. (57.8 mm) x 1.3 in. (33.0 mm)
Weight	iDynamo 6: 0.90 oz. (25.4g) Battery pack: 1.68 oz. (47.6g)
Supported Mounting Options	Direct to handheld host
Card Read Characteristics	
Magnetic Stripe Reader	Bidirectional 3 track encrypting IntelliHead magnetic stripe reader (MSR) with MagnePrint
Magnetic Stripe Decoding	Financial (ISO Type B), AAMVA, or Other ISO 7810, 7811
Acceptable Swipe Speeds	4 inches per second to 60 inches per second
Chip Card Reader	EMVCo L1 and L2 Contact Reader Terminal type 21 and 24 with ODA Terminal type 21 and 24 without ODA
Contactless Reader	EMVCo L1 and L2 Contactless Reader D-PAS, MCL, payWave, Expresspay, Apple Pay, RFID
User Interface Characteristics	
Status Indicators	General Status LED (Red/Green/Blue/Amber)
Display Type	Not Applicable

<b>iDynamo 6 Technical Specifications</b>	
Display Size (viewable area)	Not Applicable
Display Resolution	Not Applicable
Keypad	Not Applicable
<b>Security Characteristics</b>	
Ingress Protection	Not Applicable
Tamper Protection	Tamper Evident Enclosure
Code Protection	Signed firmware. The device will not allow a host to install firmware that is not properly signed by an authorized source.
Eavesdrop Protection	Not Applicable
<b>Electrical Characteristics</b>	
Power Inputs	USB-C receptacle Plus select from Lightning plug or USB-C plug
Battery Type	Optional battery pack: Rechargeable Lithium Polymer (LiPo)
Battery Capacity	Optional battery pack: 400 mAh nominal, used for contactless reader power only
Battery Charge Time	Optional battery pack: Approximately 5 hours to full charge
Battery Time, Powered Off	Up to 2 years (time from 60% charge to 0% charge)
Battery Time, Idle	Not Applicable
Battery Time, Sleep Mode	Not Applicable
Battery Time, Transactions	Overall battery time depends on host battery capacity. Contactless reader ~250 contactless reads per battery pack charge
Voltage Requirements	USB-C: 5V Lightning: 3.3V
Maximum Current Draw	From USB-C receptacle: 550mA for short periods during contactless transactions with battery pack not installed Additional draw (~2A, depends on host) when charging battery pack and/or host's battery  From connected handheld host: 86mA when magnetic read head is on; <5mA otherwise 550mA for short periods during contactless transactions with battery pack not installed
Data Storage	Not Applicable

<b>iDynamo 6 Technical Specifications</b>	
<b>Host Connection Characteristics</b>	
Wired Connection Types	USB-C Receptacle (all models) Plus select from: Lightning plug or USB-C plug
Wireless Connection Types	Not Applicable
Wireless Connection Frequency	Not Applicable
<b>Software Characteristics</b>	
Tested Operating System(s)	iOS 9 and above, Windows 7, Windows 8.1, Windows 10, Android 4.4.2 and above on devices with USB On-The-Go (OTG) support
<b>Environmental Tolerance</b>	
Operating Temperature	32°F to 113°F (0°C to 45°C)
Operating Relative Humidity	5% to 90% without condensation
Storage Temperature	32°F to 113°F (0°C to 45°C)
Storage Relative Humidity	5% to 90% without condensation
Vibration Resistance	Not Applicable
Shock Resistance	No separation of covers, damage to internal components, or damage to connectors after six surface drops and four corner drops 3 feet onto carpeted surface. Battery pack may separate from device.
<b>Reliability</b>	
Shelf Life	Minimum 4 years
Magnetic Read Head Life	200,000 card swipes
ICC Read Head Life	200,000 card insertions
Battery Shelf Life	Minimum 4 years for external battery pack
Battery Cycle Life	500 full discharge / recharge cycles for external battery pack