MAGTEK®
SECURITY FROM THE INSIDE

eDynamo

Secure Card Reader Authenticator
Installation and Operation Manual

July 2017

Manual Part Number:
D998200110-22

REGISTERED TO ISO 9001:2008

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Table 0-1 - Revisions

Rev Number	Date	Notes
10	Oct 23, 2015	Initial Release
11	Oct 26, 2015	Minor fix to **Appendix A**
12	Nov 04, 2015	Add to **Appendix A**, other minor cleanup
13	Jan 15, 2016	Add firmware update status to **Table 3-1**
20	Jun 15, 2016	Update LED and pairing behavior; general cleanup and clarification
21	Jun 12, 2017	Update section **2.3** BLE pairing instructions for iOS, Android, Windows 10 v1703 and above; misc. clarifications and corrections
22	Jul 6, 2017	Add supporting information about tamper; Update third-party copyrights; Misc. clarifications and corrections

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This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment to an outlet on a different circuit than the receiver.
- Consult the dealer or an experienced radio/TV technician for help.

FCC COMPLIANCE STATEMENT

This device complies with Part 15 of the FCC Rules. Operation of this device is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.

CUR/UR

This product is recognized per Underwriter Laboratories and Canadian Underwriter Laboratories 1950.

CANADIAN DOC STATEMENT

This digital apparatus does not exceed the Class B limits for radio noise from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe B prescrites dans le Réglement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe B est conformé à la norme NMB-003 du Canada.

CE STANDARDS

Testing for compliance with CE requirements was performed by an independent laboratory. The unit under test was found compliant with standards established for Class B devices.

UL/CSA

This product is recognized per Underwriter Laboratories and Canadian Underwriter Laboratories 1950.

ROHS STATEMENT

When ordered as RoHS compliant, this product meets the Electrical and Electronic Equipment (EEE) Reduction of Hazardous Substances (RoHS) European Directive 2002/95/EC. The marking is clearly recognizable, either as written words like "Pb-free," "lead-free," or as another clear symbol ().

Table of Contents

1 Introduction

1.1 About eDynamo

eDynamo, MagTek's newest secure card reader authenticator (SCRA), gives users the flexibility needed to securely accept a variety of payment card technologies. Whether accepting a traditional magnetic stripe card or a contact EMV card, eDynamo gives merchants the ability to connect via USB or Bluetooth® Smart (BLE), delivering one reader for mobile or stationary needs. This design leads to saving the user money on a single, low-cost, yet highly secure device.

The dual interface delivers compatibility for traditional Microsoft Windows computers in addition to Bluetooth Smart (BLE) compatible tablets and smartphones. The low energy consumption extends the life of its rechargeable battery when interfacing via BLE, and the USB wired connection keeps eDynamo up and running without worrying about battery life. eDynamo is a flexible, reliable, and secure card reading solution.

Ideal for merchants and financial institutions, eDynamo offers the MagneSafe™ Security Architecture with the convenience of a Bluetooth interface. This powerful combination assures card data protection, transaction security and convenience needed to secure mobile applications with strong encryption and proven card authentication.

eDynamo product features include:

- EMV L1 and L2 (contact only)
- Rechargeable battery with 5-year life
- Red/Green/Amber General Status LED
- Blue Bluetooth Status LED
- Built-in lanyard attachment
- Open standards-based encryption 3DES (TDEA)
- DUKPT Key Management
- MagnePrint® Card Authentication
- Unique non-changeable device serial number
- Immediate card data tokenization
- Device/host authentication
- Time bound session IDs
- Ergonomic design simplifies card swiping
- No cable to interfere with reader grip
- Convenient battery charging via industry standard USB cables
- Allows over 1000 card swipes or insertions between charges

1.2 About eDynamo Components

The major components of eDynamo are shown in **Figure 1-1**.

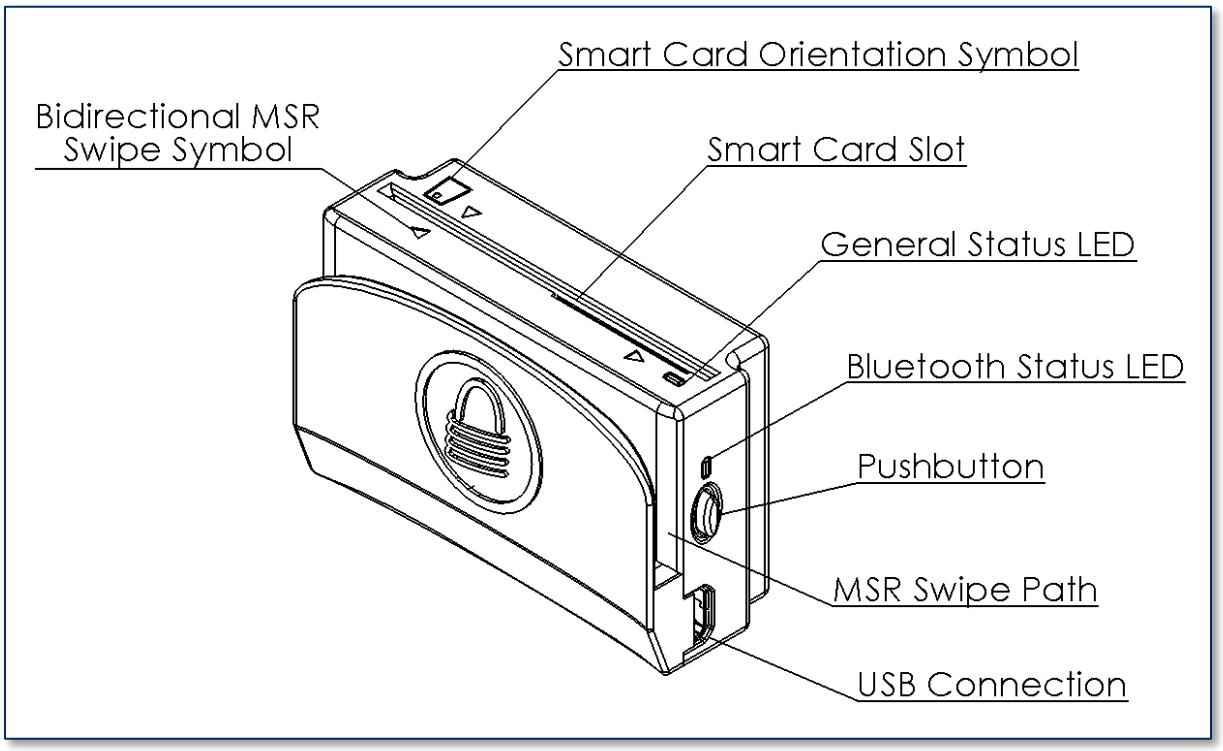


Figure 1-1 – eDynamo Major Components

1.3 About Terminology

In this document, eDynamo 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**.

1.4 About Solution Planning

A smooth deployment of an eDynamo solution requires some up-front planning and decision-making:

- Determine what type of **host** eDynamo will connect to. This can be a computer with a USB port or a host with Bluetooth 4.0 hardware that supports BLE. When planning, include any additional support or devices required by the host, such as physical locations, mounting, and power connections.
- 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.
- Select which **connection type** the solution will use. eDynamo can connect physically via USB or via BLE, and logically as a vendor-defined HID device or GATT device, respectively.
- Determine how eDynamo should be **configured**, and specify that when you order devices. For example, although eDynamo comes with factory default passwords, it is a good idea to choose and set non-default passwords early in the planning process, or request non-default passwords when ordering devices.
- Determine what the solution will use as a **primary power source**. eDynamo can be powered by a USB host through the USB port, or can be powered by its internal rechargeable battery.
- Determine the **battery recharge schedule(s)**. For example, in high-traffic mission-critical solutions, it may be appropriate to keep a spare device configured and charged for fast swap-out.
- Determine how eDynamo will be physically **presented** to the cardholder. This includes whether the device will be handheld or mounted to a countertop. When planning placement, be sure to consider the connection type and power source. For example, if the primary data connection is USB, the mounting location should be within reasonable USB cabling distance from the USB host.
- Determine how eDynamo will be **branded**. The optional docking station offers a recessed location for adding custom-branded labels. For details, see MagTek document ***D998200109 eDynamo Docking Station Custom Label Artwork Specifications***.

2 Installation

Installing eDynamo is a straightforward process: The acquirer configures the Certificate Authority, public keys, terminal and payment brand 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 solutions that incorporate eDynamo, including host software, connecting the device, and using the device.

2.1 About Host Software

In any solution, eDynamo 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 or inserts a card. Some connection types also require installation of device drivers.

To set up the necessary drivers, see the connection-specific "How To" sections below. To set up the host software to work with eDynamo, follow the installation and configuration instructions provided by the vendor of the host or the host software.

2.2 About Power

eDynamo can be powered by one of two power sources:

- When the device is connected to a host via USB, it receives power from the host's USB port. In this mode, the device is always on and consumes full power.
- When the device is not connected to a computer via USB, it uses an internal rechargeable battery as its primary power source.

When the battery needs to be recharged, the General Status LED will rapidly flash red after a card is swiped. When the battery is too discharged to power the device, the device will not respond to swipes. In either case, recharge the battery as follows:

1) Connect the device to a fully-powered USB port. While the device is charging, the General Status LED will be green most of the time and will periodically blink off. When the device is fully charged and still connected to USB power, the General Status LED will be continuously green.
2) Disconnect the device from USB power for BLE operation. The General Status LED will turn off. The device will be ready for pairing or connecting.

2.3 About Connecting eDynamo to a Host

The following sections provide steps for connecting eDynamo to a host via the various available physical connection types. For details about connecting eDynamo via USB when it is installed in the optional docking station, see section **2.4 How to Mount eDynamo**.

2.3.1 How to Connect eDynamo to a Host Computer via USB

To connect eDynamo to a host computer using the Micro USB port, follow these steps:

1) Connect the small end of the USB cable to eDynamo as shown in **Figure 2-1**.
2) Connect the large end of the USB cable to the host computer's USB port.
3) Power on the host computer.
4) On the host, install and configure the host software you intend to use with eDynamo (if you do not yet have that software, you can use ***MTNETDemo.exe*** included in ***99510132 Dynamag / DynaMAX / eDynamo / uDynamo / aDynamo / mDynamo .NET SDK for Windows***, available from MagTek.com, to perform simple tests):
   a) Make sure the host software is configured to look for the device on the proper connection type.
   b) Make sure the host software knows which device(s) it should interface with.
   c) Make sure the host software sends eDynamo a configuration command to transmit card data over USB. The factory default is to transmit data over BLE only.
   d) Make sure the host software is configured to properly interpret incoming data from the device. For direct USB connections, eDynamo will transmit data as a vendor-defined HID device.
5) Use the host software to test swiping a card.

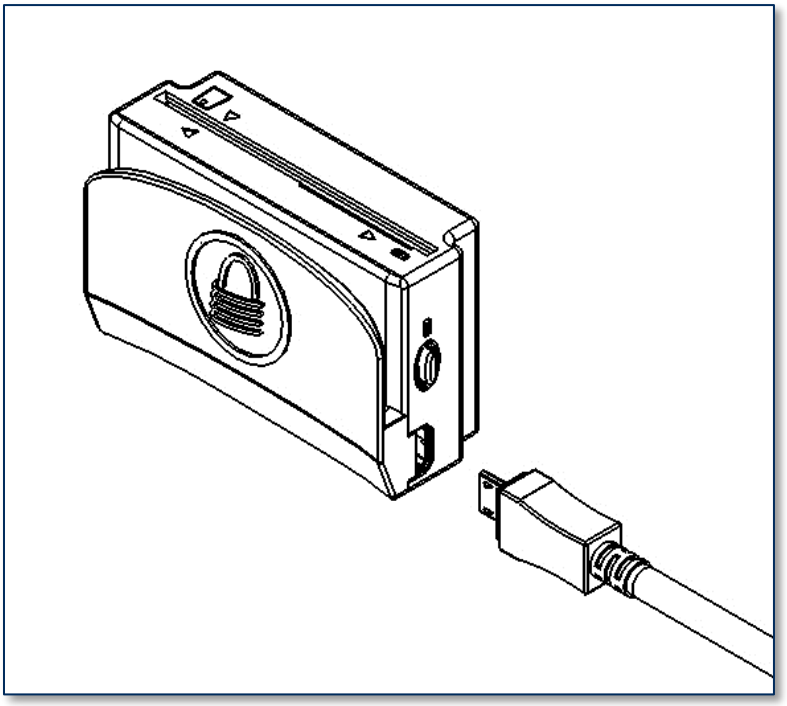
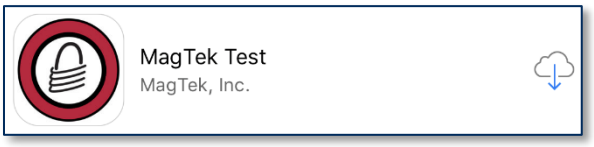


Figure 2-1 - Connecting eDynamo to a Computer

2.3.2 How to Connect eDynamo to an iOS Host via BLE

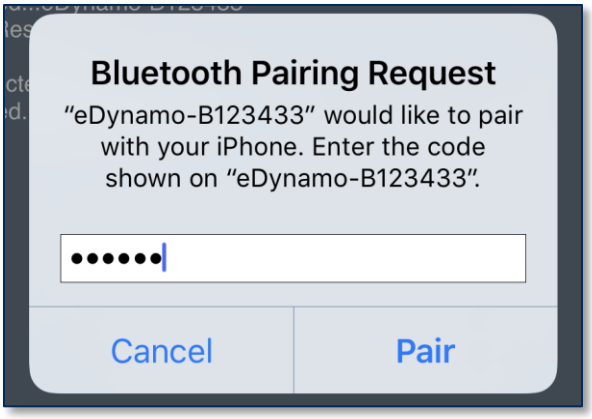
To connect eDynamo to an iOS host that supports BLE, follow these steps:

1) If any BLE host software has an active data connection to the device, close the connection.
2) On the host, install and configure the host software you intend to use with eDynamo. If you do not yet have that software, you can download a test tool from the App Store called **MagTek Test**, published by **MagTek, Inc.**.



3) Make sure eDynamo's battery is adequately charged (see section **2.2 About Power** for instructions).
4) Make sure the eDynamo output connection is configured to transmit card data over BLE. This is the factory default.
5) Press the pushbutton for 2 seconds until the Bluetooth Status LED starts flashing. The Bluetooth Status LED will flash blue once a second for up to 60 seconds, or until a host pairs or connects.
6) On the iOS host, launch the **Settings** app, select **Bluetooth**, and make sure the host's Bluetooth radio is turned **On**.
7) Use the host application or the **MagTek Test** app (not the device's **Settings** app) to pair with the device. If you are using the **MagTek Test** app, the steps will be as follows. Other host software may be similar:
   a) Launch the host software app.
   b) Select **eDynamo** as the device type.
   c) Press the **Connect** button.
   d) Locate the seven-digit serial number on the label on the bottom of the device.
   e) In the list of pairable devices, select **eDynamo-xxxxxxx**, where **xxxxxxx** is the device's serial number.

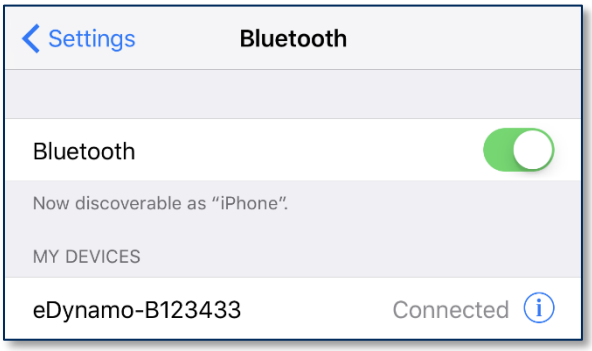
8) When the host pops up a **Bluetooth Pairing Request** message asking for a code, enter the configured passkey (or one of the defaults, **999999** or **000000**). The app should report the device is now **Connected**.



9) Use the host software or **MagTek Test** to test swiping a card.
10) Remember to change the default passkey. See the ***eDynamo Programmer's Reference*** documentation for details.

To unpair from the device, follow these steps:

1) On the iOS host, launch the **Settings** app and select **Bluetooth**.
2) Press the "i" information icon next to the device's name in the **MY DEVICES** list.



3) Select **Forget This Device** and make sure the device disappears from **MY DEVICES**.

2.3.3 How to Connect eDynamo to an Android Host via BLE

To connect eDynamo to an Android host that supports BLE:

1) If any BLE host software has an active data connection to the device, close the connection.
2) On the Android host, install and configure the host software you intend to use with eDynamo. 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.**.
3) Make sure eDynamo's battery is adequately charged (see section **2.2 About Power** for instructions).
4) Make sure the eDynamo output connection is configured to transmit card data over BLE. This is the factory default.
5) Press the pushbutton for 2 seconds until the Bluetooth Status LED starts flashing. The Bluetooth Status LED will flash blue once a second for up to 60 seconds, or until a host pairs or connects.
6) On the Android host, launch the **Settings** application and open the **Bluetooth** menu.
7) Press the **SEARCH FOR DEVICES** or **Scan** button to show an **AVAILABLE DEVICES** list.
8) Locate the seven-digit serial number on the label on the bottom of the device.
9) In the list of pairable devices, select the device called **eDynamo-xxxxxxx**, where **xxxxxxx** is the device's serial number.
10) When the host pops up a **Bluetooth Pairing Request** message asking for a code, enter the configured passkey (or one of the defaults, **999999** or **000000**) to return to the **Bluetooth** configuration page. The device appears in the **PAIRED DEVICES** list.
11) Use the host software or the **MagTek Test** app to test swiping a card.
12) Remember to change the default password. See the ***eDynamo Programmer's Reference*** documentation for details.

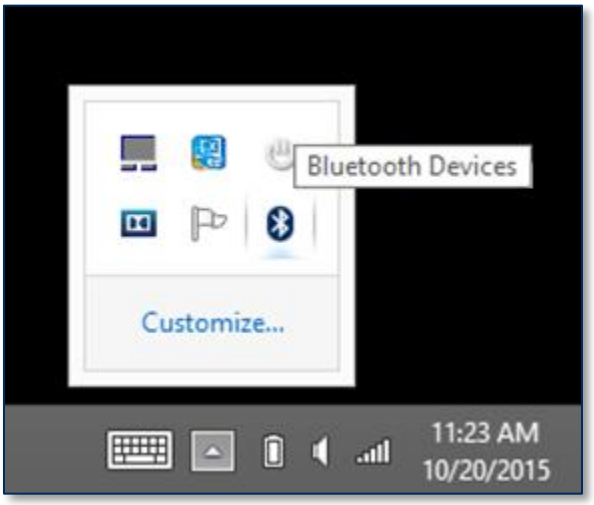
To unpair from the device, follow these steps:

1) Locate the device in the **Bluetooth** configuration page.
2) Press the settings (gear) icon.
3) Press the **Unpair** button and make sure the device disappears from the **Paired devices** list.

2.3.4 How to Connect eDynamo to a Windows 8.1 or Windows 10 Host [Version 1607 or Below] via BLE (Windows Drivers)

To connect eDynamo to a host with Windows 8.1 or Windows 10 version 1607 or below, with Bluetooth 4.0 or higher hardware that supports BLE, follow these steps:

1) If you are using an external Bluetooth adapter, install any required drivers and connect it to the host.
2) If any BLE host software has an active data connection to the device, close the connection.
3) On the host, install and configure the software you intend to use with eDynamo (if you do not yet have that software, you can use ***MTNETDemo.exe*** included in ***99510132 Dynamag / DynaMAX / eDynamo / uDynamo / aDynamo / mDynamo .NET SDK for Windows***, available from MagTek.com, to perform simple tests):
   a) Make sure the host software is configured to look for the device on the proper connection type.
   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. When using BLE, the device will transmit data in GATT format.
4) Make sure eDynamo's battery is adequately charged (see section **2.2 About Power** for instructions).
5) Make sure the eDynamo output connection is configured to transmit card data over BLE. This is the factory default.
6) Press the pushbutton for 2 seconds until the Bluetooth Status LED starts flashing. The Bluetooth Status LED will flash blue once a second for up to 60 seconds, or until a host pairs or connects.
7) Enter desktop mode and double click the **Bluetooth Devices** icon in the taskbar to launch the **Manage Bluetooth Devices** window.



8) Locate the seven-digit serial number on the label on the bottom of the device.
9) Read through the list of pairable devices and locate the device called **eDynamo-xxxxxxx**, where **xxxxxxx** is the device's serial number. Below the device name you should see the text **Ready to pair**. If the device does not show in the list, make sure the battery is charged (see section **2.2 About Power**) and press the pushbutton once to make sure the device is not in Airplane Mode.

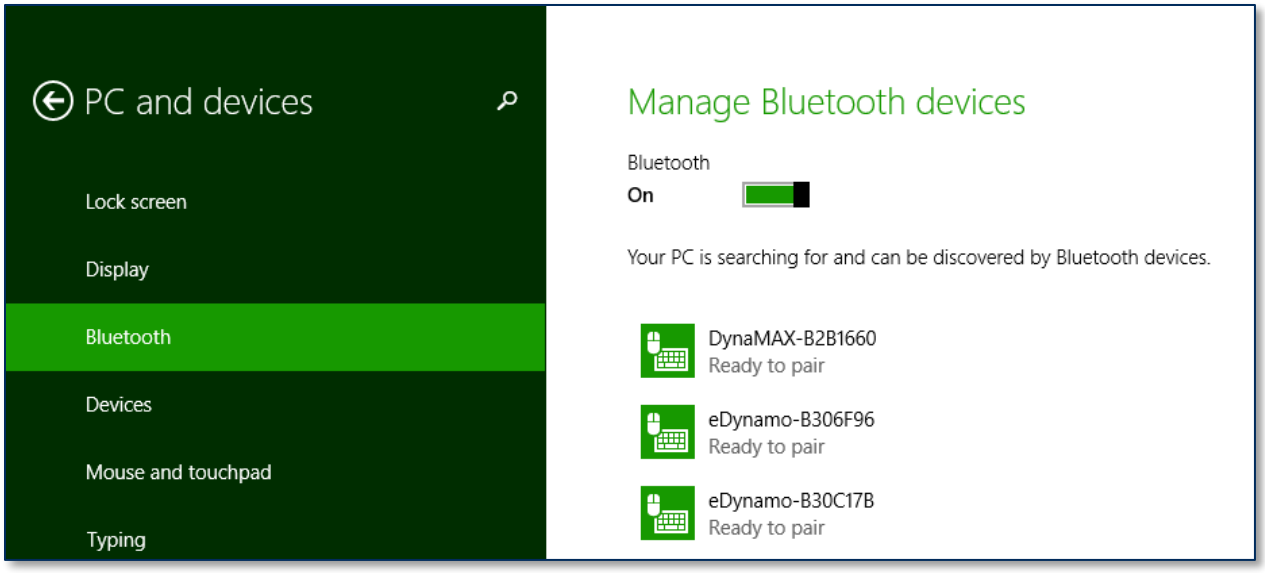
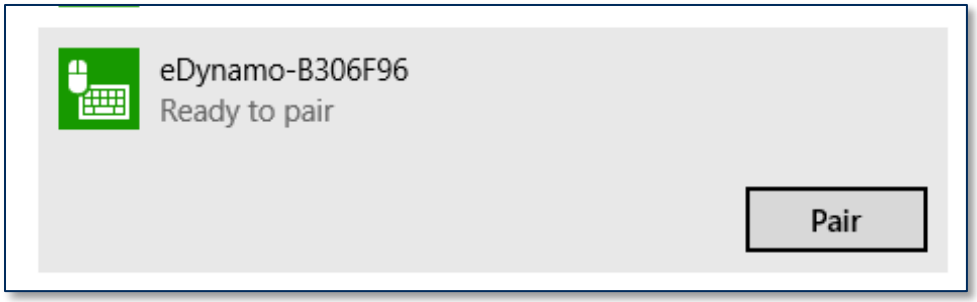
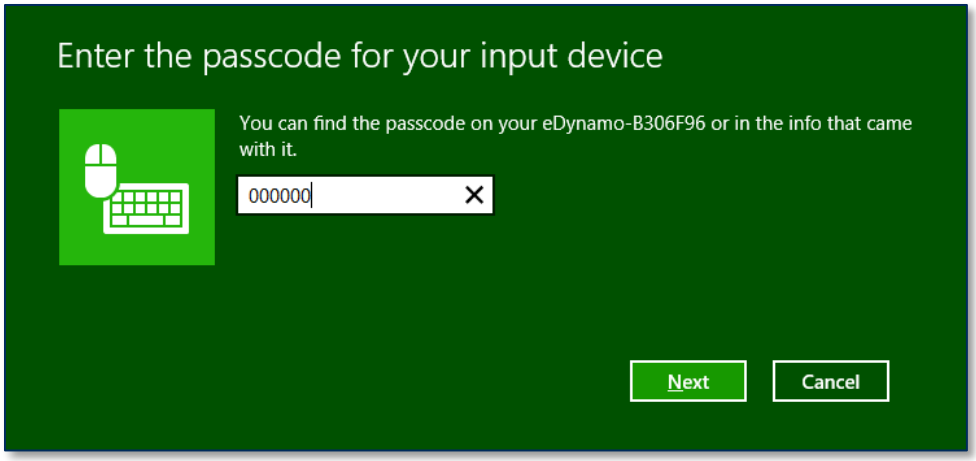


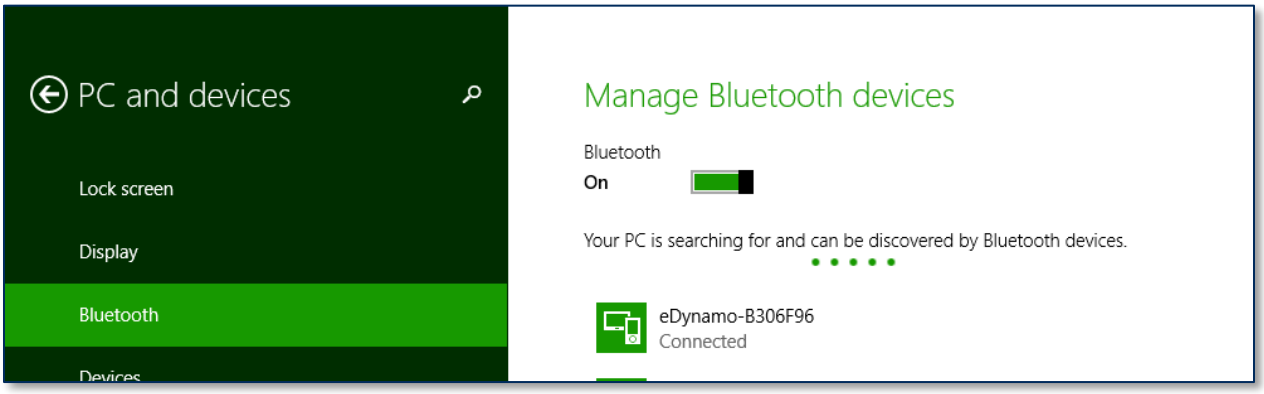
Figure 2-2 – Windows 8.1 Manage Bluetooth Devices Window

10) Select the device and press the **Pair** button.



11) Enter default passcode **000000** (or the device's actual password if it has been configured differently), then press the **Next** button. Windows will return you to the **Manage Bluetooth devices** page. After a short period of time, you will see the text **Connected** below the device you are pairing with. Note that in this case, "Connected" means the device is paired, but the host does not have an active data connection until the host software initiates one.





12) Use the host software to test swiping a card. To save power, the host software should disconnect from the device when data is not being transferred.
13) Remember to change the default password. See the ***eDynamo Programmer's Reference*** documents for details.

To unpair from the device:

1) Locate the device in the **Manage Bluetooth devices** window.
2) Press the **Remove device** button.

2.3.5 How to Connect eDynamo to a Windows 10 Host [Version 1703 or Above] via BLE (Windows Drivers)

To connect eDynamo to a host with Windows 10 version 1703 or above, and Bluetooth 4.0 or higher hardware that supports BLE, follow these steps:

1) Make sure the host's Bluetooth interface is turned on and working correctly.
2) If any BLE host software has an active data connection to the device, close the connection.
3) On the host, install and configure the software you intend to use with eDynamo (if you do not yet have that software, you can use ***MTNETDemo.exe*** included in ***99510132 Dynamag / DynaMAX / eDynamo / uDynamo / aDynamo / mDynamo .NET SDK for Windows***, available from MagTek.com, to perform simple tests):
   a) Make sure the host software is configured to look for the device on the proper connection type.
   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. When using BLE, the device will transmit data in GATT format.
4) Make sure eDynamo's battery is adequately charged (see section **2.2 About Power** for instructions).
5) Make sure the eDynamo output connection is configured to transmit card data over BLE. This is the factory default.
6) In the **Start** menu type **Bluetooth** and select **Bluetooth and other devices settings**, or double-click the **Bluetooth Devices** icon in the taskbar to launch the **Bluetooth & other devices** window.
7) Locate the seven-digit serial number on the label on the bottom of the device.
8) Press the pushbutton for 2 seconds until the Bluetooth Status LED starts flashing. The Bluetooth Status LED will flash blue once a second for up to 60 seconds, or until a host pairs or connects.
9) Press the **Add Bluetooth or other device** button to launch an **Add a device** window.
10) Under **Choose the kind of device you want to add**, select **Bluetooth**.
11) Read through the list of pairable devices and locate the device called **eDynamo-xxxxxxx**, where **xxxxxxx** is the device's serial number. Select the device. Enter the configured passkey (or one of the defaults, **999999** or **000000**) and press the **Connect** button.
12) After a short period of time, you will see the text **Connected** below the device you are pairing with. Note that in this case, "Connected" means the device is paired, but the host does not have an active data connection until the host software initiates one.
13) Press the **Done** button to close the **Add a device** window.
14) Use the host software to test swiping a card.
15) Remember to change the default password. See the ***eDynamo Programmer's Reference*** documents for details.

To unpair from the device:

1) Select the device in the **Bluetooth and other devices settings** window.
2) Press the **Remove device** button.

2.4 How to Mount eDynamo

eDynamo is designed and tested to operate as a handheld device or surface-mounted device. For solutions that require mounting, eDynamo can be installed in the optional docking station (shown in **Figure 2-3**), which incorporates micro-suction mounting feet with considerable holding power.

Figure 2-3 - eDynamo Installed In Optional Docking Station

The docking station is mostly suitable for solutions where eDynamo will operate permanently on USB power, because the USB cable can not be disconnected for handheld use when the device is docked.

To install the device in the optional docking station, follow these steps (see **Figure 2-4**):

1) Remove the protective tape from the micro-suction pads on the docking station base, and stick it to a clean, smooth surface.
2) Connect the USB cable to the device.
3) Place the device in the docking station base, with the USB cable facing the docking station's USB cable clamp.
4) Snap the cover onto the docking station base, capturing the USB cable.
5) Press the device onto a clean, smooth surface to stick it in place.
6) Twist the device's base to unstick it from the surface.

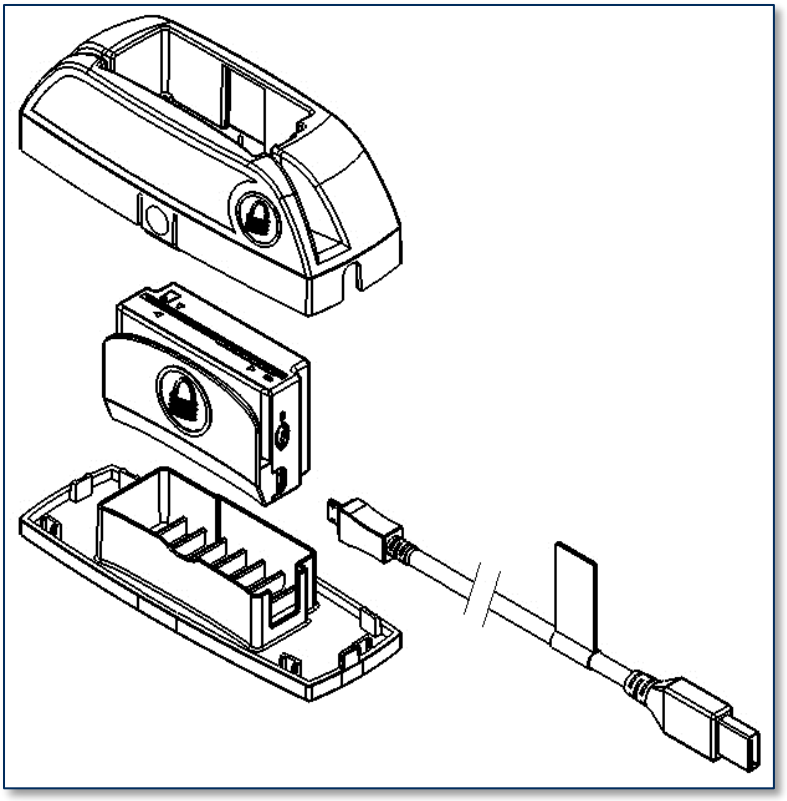


Figure 2-4 - Optional Docking Station Assembly

3 Operation

3.1 About Operating Modes

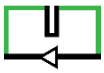
During operation, eDynamo transitions between six distinct modes, each of which behaves differently:

- **Reset Mode** occurs when the user presses and holds the pushbutton for 5 to 10 seconds. After resetting, the device progresses to Airplane Mode. If the device is connected to USB power, it will immediately progress to Discoverable Mode.
- **Airplane Mode** is the shipping mode of the device. In Airplane mode, the device consumes very little power. The device may or may not be paired with one or more BLE hosts, but it will not advertise or communicate over BLE. To move the device from Airplane Mode to Discoverable Mode, press the pushbutton briefly or connect the device to USB power. To move the device from Airplane Mode to Pairing Mode, press and hold the pushbutton for two seconds. Connecting to a USB host will automatically move the device to Connected Mode.
- **Discoverable Mode** is the device's normal low-power waiting state. The user activates this mode when the device is not connected to USB by briefly pressing the pushbutton once while in Airplane Mode. In this mode, the device remains paired with any previously paired BLE hosts but is not connected to transmit data. Upon entering Discoverable Mode, the device advertises itself over BLE, and any paired BLE host may initiate a connection. If the device is configured to transmit data over USB and is connected to a USB host, it will immediately progress from Discoverable Mode to Connected Mode.
- **Pairing Mode** is activated by pressing the pushbutton for two seconds, waiting for the Bluetooth Status LED to flash off three times, and releasing the pushbutton. In this mode, an unpaired BLE host may initiate pairing. Upon entering Pairing Mode, the device advertises itself over BLE, and the Bluetooth Status LED flashes once every two seconds. The device will continue to be pairable until it pairs with a BLE host or until the optional pairing timeout period expires. If the pairing timeout period is 0 (no timeout), the Bluetooth Status LED will stop flashing after one minute to conserve power, but the device will continue advertising. Upon successful pairing, the device enters Discoverable Mode.
- **Connected Mode** occurs when the device is connected to a USB host, or when a paired BLE host initiates a connection (generally in response to the host software's graphical user interface). In this mode the host and the device can both initiate communication, and it is the host's responsibility to terminate the connection and return the device to Discoverable Mode to save power when an active data connection is no longer needed for the current transaction. In this mode, the device does not advertise and is not discoverable by other paired BLE hosts.
- **Tamper Mode** means a self-test has failed or a tamper has been detected. Upon entering this mode, the device must be returned to the manufacturer for physical inspection and a factory reset. The following can cause the device to enter this mode:
    - The device has been opened.
    - The coin cell battery inside the device has discharged below its minimum operating voltage. If the coin cell is completely discharged, the device will not respond to commands.

3.2 About the Status LEDs

eDynamo's **General Status LED** and **Bluetooth Status LED** provide feedback to the operator and cardholder about the internal state of the device (see **Figure 1-1**). **Table 3-2** shows how to interpret the colors and flashing patterns of the General Status LED, and **Table 3-2** shows how to interpret the colors and flashing patterns of the Bluetooth Status LED.

Table 3-1 – General Status LED Meaning

Color	Flashing Pattern		Meaning
Off	Off		If powered by the battery, the device is waiting for a swipe or host command, or the battery is completely drained of power and needs to be recharged.
Green	Steady On		If the device is powered by USB and configured to require authentication, the device is waiting for the host to authenticate. After authentication is established it will slowly blink green, or will turn steady red if authentication fails. If the device is powered by USB and not configured to require authentication, the device battery is fully charged and the device is ready to read a card.
Green	Mostly Solid		If powered by USB, the device is waiting for a swipe or host command, and the battery is charging.
Green	One Second On		The device has successfully decoded a swiped or inserted card.
Green	Slow Blinking		If configured to require authentication, the host has successfully authenticated and the device is ready to read a card.
Green	Rapid Flashing		If operating in BLE mode, the device has card data to send to the host, but the host has not yet established a connection. Flashing will stop when the host establishes a connection or after timeout waiting for connection (15-30 seconds).
Amber	One Second On		If operating in BLE mode, the device has card data to send to the host, but sending has failed.
Amber	Steady On		The device is in tamper mode. See section **3.1 About Operating Modes**.

Color	Flashing Pattern		Meaning
Red	Steady On		If powered by USB and the device is configured to require authentication, the host has failed to authenticate. Make sure you are connecting to the correct host, and check the authentication configuration on the host. The device also uses this status when a user is updating the firmware. On completion, the device will reset and the LED will turn off briefly.
Red	Rapid Flashing		When operating on battery power, a card has just been swiped but the battery must be recharged. If there is enough battery power to transmit card data, expect the LEDs to display standard card data statuses after one second. If followed by no other status, the battery is too low to send data.
Red	One Second On		Device has failed to decode data on a swiped card. Try the swipe again.

Table 3-2 – Bluetooth Status LED Meaning

Color	Flashing Pattern		Meaning
Off	Off		If powered by the battery, the device is in Airplane Mode, Discoverable Mode, or Connected Mode, or has completed one minute of BLE advertising in Pairing Mode, or the battery is completely drained of power and needs to be recharged.
Blue	Three Flashes		The user has just pressed the pushbutton for 2 seconds, and the device will transition to Pairing Mode when the button is released.
Blue	Short Flashing		The device is in Pairing Mode, is advertising and ready for a BLE host to initiate pairing.
Blue	Solid On		The Bluetooth Status LED is lit when the pushbutton is pressed, to provide user feedback that the pushbutton is working correctly.
Blue	Solid On		The device can optionally be configured to light the Bluetooth Status LED whenever a BLE connection is active.

3.3 Card Reading

Before use, make sure eDynamo is connected to a power source (see section **2.2 About Power**) and is connected to a host (see section **2.3 About Connecting eDynamo to a Host**).

When the device connected to the host via USB and powered by the USB port, generally the host will always keep a connection open to the device, and the device indicates it is ready for a swipe or host command by keeping the General Status LED green.

When connected to the host via BLE and powered by the internal rechargeable battery, the host must initiate a BLE connection to process a transaction, then disconnect after the transaction is complete to conserve power. In this mode, the device saves power by not keeping any LEDs turned on, but will use the LEDs to report success or failure of the swipe and data transmission after a cardholder swipes a card (see section **3.2 About the Status LEDs** for details).

Cardholders should swipe magnetic stripe cards with the magnetic stripe facing away from the device's lock logo and toward the larger side of the device, as shown in **Figure 3-1**, or insert smart cards oriented according to the smart card symbol on the top of the device, as shown in **Figure 3-2**.

After a swipe or insertion, the operator may then monitor the device's response by using the host software or by watching the status LEDs. See section **3.2 About the Status LEDs** for assistance interpreting the device's LED patterns in response to a swipe.

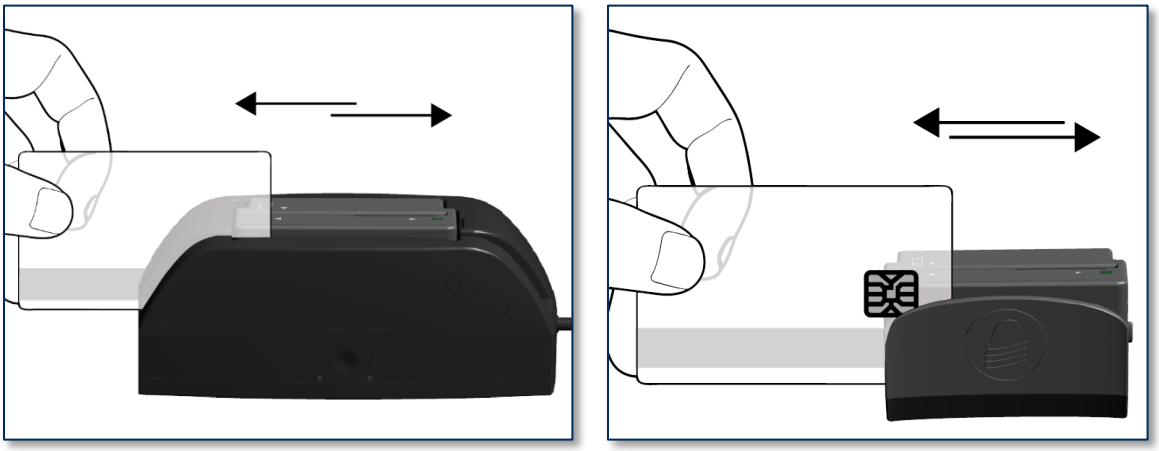


Figure 3-1 - Swiping a Card Through eDynamo

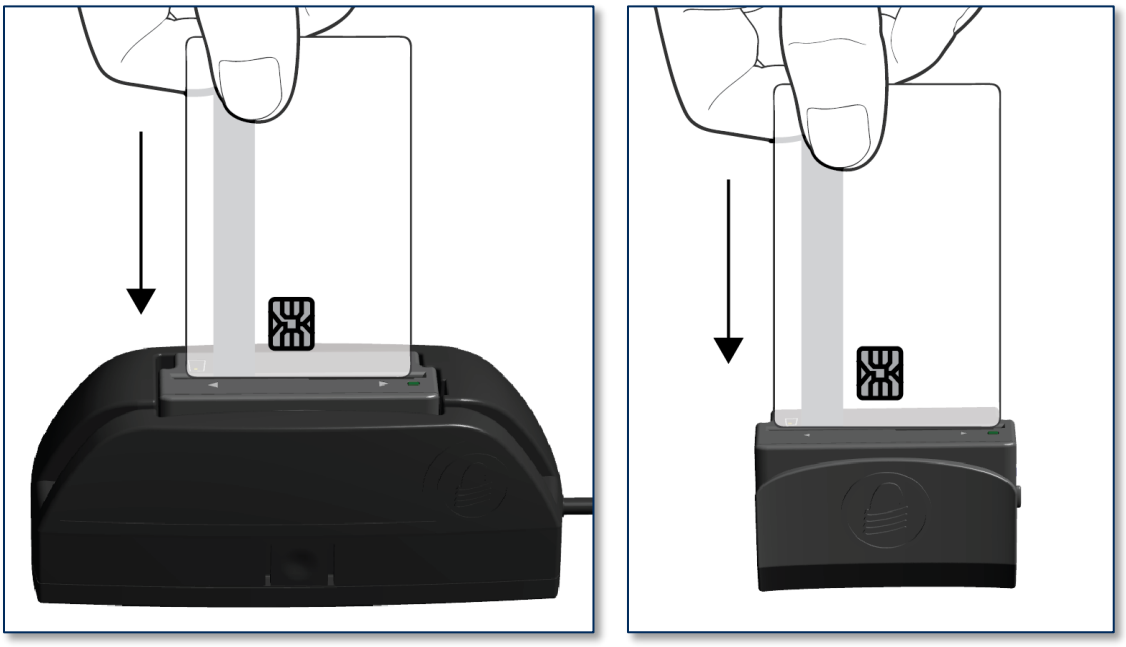


Figure 3-2 - Inserting a Smart Card Into eDynamo

4 Maintenance

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

⚠ CAUTION

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.

If the optional docking station's micro-suction mounting feet lose their holding power over time, use a clean, damp, lint-free cloth to wipe the mounting feet and the mounting surface clean, then let both surfaces air dry. This should restore the mounting feet's holding power.

5 Developing Custom Software

Custom software uses the same underlying device command set for all eDynamo connection types (USB or BLE). The device commands are wrapped differently depending on the physical connection type and the device's configuration. The following sections give high-level information about communicating with the device via the various physical connection types in various software development frameworks, and provide pointers to select API references and sample code.

5.1 USB-Based Custom Software

MagTek produces software development kits (SDKs) with API libraries that provide higher-level functions wrapped around **HID USB** communication protocols. These libraries simplify the development of custom applications that use eDynamo, and include an SDK for the Microsoft .NET Framework, and an SDK for non-managed Windows executable images, such as.exe or DLL files.

In addition to the SDK API libraries, custom software on any operating system can communicate directly with the device using native USB libraries and protocols.

If you are developing a point-of-sale (POS) application for Windows, you might also consider using the service objects for .NET POS (UPOS 1.12), available from Microsoft.

5.2 BLE-based Custom Software and Apps

When eDynamo is connected via **BLE** to a host with Bluetooth 4.0 hardware that supports BLE, the device will act as a server/peripheral, and the host will act as a client/central. The custom software wraps commands in simple Get/Set wrappers, and should use whatever BLE library is appropriate for the chosen software development framework. For example, iOS custom apps use Apple's `CoreBluetooth` Framework, for which sample code is available in the form of Apple's Temperature Sensor app; see https://developer.apple.com/library/IOS/samplecode/TemperatureSensor/Introduction/Intro.html.

5.3 For More Information

For more information about developing custom applications that integrate with eDynamo, see the MagTek web site or contact your reseller or MagTek Support Services.

Appendix A Technical Specifications

eDynamo Technical Specifications	
Reference Standards and Certifications	
Magnetic stripe: 3 Track Read Data Identification Cards Financial Transaction Cards (ISO 7813) AAMVA Identification Cards Integrated Circuits with Contacts (ISO 7816) EMV ICC Specifications for Payment Systems Ver 4.3, L1 Contact and L2 Contact Encryption: TDEA (3DES)-CBC using DUKPT IPC-A-610 Class II Assembly Ingress Protection: IP-30 per ANSI/IEC 60529-2004 FCC Title 47 Part 15 Class B CE Level B EMC CE Safety 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 TQM Label Certified	
Physical Characteristics	
Dimensions (L x W x H):	2.45 in. x 1.52 in. x 0.97 in. (62.2 mm x 38.7 mm x 24.7 mm)
Weight	Handheld: 2.2 oz. (60 g) With docking station: 4.3 oz. (120 g)
Supported Mounting Options:	Handheld Countertop with optional docking station micro-suction pads
Card Read Characteristics	
Magnetic Stripe Reader:	Bidirectional 3 track non-encrypting IntelliHead magnetic stripe reader (MSR) with MagnePrint
Magnetic Stripe Decoding:	Financial (ISO Type B), AAMVA, or Other
Acceptable Swipe Speeds:	6 inches per second to 60 inches per second
Smart Card Reader:	EMVCo L1 and L2 Contact Reader
User Interface Characteristics	
Status Indicators:	General Status LED (Red/Green/Amber) Bluetooth Status LED (Blue)
Display Type:	Not Applicable
Display Size (viewable area):	Not Applicable
Display Resolution:	Not Applicable

eDynamo Technical Specifications	
Keypad:	Not Applicable
Security Characteristics	
Ingress Protection:	ANSI/ISO 60529 ingress protection rating 30
Tamper Protection:	Secure Cryptographic Device (SCD) with Tamper Resistant Security Module (TRSM).
Code Protection:	Signed firmware. Any attempt to install unsigned firmware on the device will render it unusable.
Eavesdrop Protection:	Main processor encryption Tamper-evident enclosure around data signals
Electrical Characteristics	
Power Inputs:	USB powered via Micro-USB B jack
Battery Type:	Rechargeable Li-ion (main device power) Coin cell backup battery
Battery Capacity:	800 mAH nominal
Battery Charge Time:	Approximately 3 hours to full charge
Battery Time, Airplane Mode:	2 years
Battery Time, Transactions:	1900 swipes over 8 hours 1300 insertions over 5.5 hours
Voltage Requirements:	5 VDC on USB power 3.7 VDC on battery power
Maximum Current Draw:	< 100 mA battery discharge rate when not charging ~500 mA battery charge rate when connected to USB charger
Data Storage:	Not Applicable
Connection Characteristics	
Wired Connection Types:	Micro-USB B, compatible with USB 1.1, USB 2.0 Vendor-defined USB Human Interface Device (HID) data format
Wireless Connection Types:	Bluetooth Low Energy (BLE) wireless GATT device / data format
Wireless Range:	Minimum 30 ft. or 10 m in line-of-sight conditions
Wireless Frequency:	2.4 GHz
Software Characteristics	
Tested Operating System(s):	USB: Windows 7, Windows 8.1, Windows 10 BLE: iOS 7.1 and above, Android 4.4.2 and above, Windows 8.1, Windows 10 on hosts with Bluetooth 4.0 hardware

eDynamo Technical Specifications	
Environmental Tolerance	
Operating Temperature:	32°F to 113°F (0°C to 45°C)
Operating Relative Humidity:	5% to 90% without condensation at 23°C
Storage Temperature:	14°F to 131°F (-10°C to 55°C)
Storage Relative Humidity:	5% to 90% without condensation at 23°C
Vibration Resistance:	Not Applicable
Shock Resistance:	No substantial damage or loss of cryptographic keys after four unconstrained 1-meter drops to a concrete surface
Reliability	
Shelf Life:	Minimum 4 years
Magnetic Read Head Life:	250,000 card swipes
ICC Read Head Life:	100,000 card insertions
Battery Shelf Life:	Minimum 1 year for main battery
Battery Cycle Life:	300 cycles at 80% of maximum capacity