uDynamo

Technical Reference Manual

PART NUMBER 99875587-50

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MAGTEK®

REVISIONS

Rev Number	Date	Notes
1.01	7/25/2012	Initial release
2.01	9/18/2012	Changed document format to reflect MagTek style and updated tables
3.01	10/17/2012	Updated section 3 to expand the description of the LED operation; updated section 4 noting communication problems due to iPhone4 Wi-Fi connection
4.01	11/1/2012	Added note to show that the volume will automatically be adjust to the maximum if App is already running.
50	10/31/2014	Update LED information

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FCC WARNING STATEMENT

This equipment has been tested and was found to comply with the limits for a Class B digital device pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference with radio communications. However, there is no guarantee that interference will not occur in a particular installation.

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.

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 numériqué 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 (Ⓟⓑ).

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SECTION 1:   DESCRIPTION OF THE SYSTEM

The uDynamo is a magnetic stripe secure card reader authenticator (SCRA) designed to allow all three tracks of financial and other cards such as AAMVA to be read using the multimedia audio connector of a mobile devices such as iOS and Android devices. The uDynamo interfaces to mobile devices through the audio head set jack and communicates with the host device through the microphone input and the audio output signals.

In addition to the audio interface, a USB interface is provided to allow the uDynamo to charge its internal, rechargeable battery, and to allow the uDynamo to interface with Windows or OS X based computers which provide a host USB interface.

The uDynamo is powered by rechargeable internal Lithium-ion batteries that are not replaceable. The reader is designed to draw extremely low current in when operating with the audio interface allowing the device to operate on batteries for extended periods. When operating from USB, the device is powered from the USB bus and will charge the battery at the rate allowed by the host USB interface.

Card data are encrypted within the reader prior to being sent to the host. The host has no knowledge of the decryption key ensuring that cardholder data are protected. This also provides the merchant the confidence that their customer data cannot be compromised by malicious software on their systems.   To allow verification of the transaction, a partly obfuscated account number, cardholder name and card expiration date are sent to the host as clear text where they may be displayed, retained, or become part of a receipt.

The uDynamo is a MagneSafe reader that is fully compliant with MagTek's V5 protocol and includes MagnePrint®, a powerful anti-skimming technology that can detect whether a card is the original card, or is a fraudulent copy.

The uDynamo is capable of reading all three tracks of ISO 7813 Magnetic cards containing financial and AAMVA data found on driver's licenses.

Figure 1 uDynamo

FEATURES

Major features of the uDynamo are as follows:

- The uDynamo is designed to interface with iOS and Android devices using the multimedia audio connector of mobile devices
- The uDynamo includes a micro USB interface to allow charging and to provide USB communications to a USB host computer
- Bi-directional card reading
- Reads encoded data that meets ANSI/ISO/AAMVA/JIS Type 2 standards
- Reads up to three tracks of card data
- Supplies 54 byte MagnePrint™ value
- Contains a unique, non-changeable serial number which allows tracking each reader
- Encrypts all track data and the MagnePrint value
- Provides clear text confirmation data including card holder's name, expiration date, and a portion of the PAN as part of the Masked Track Data
- Mutual Authentication Mode for use with Magensa

SPECIFICATIONS

The table below shows the specifications for the uDynamo.

GENERAL

Reference Standards	ISO 7810 and ISO 7811/ AAMVA*
Message Format	ASCII
Card Speed	6 to 60 ips (15 to 152 cm/s)
Dimensions	2.50 in. X 1.55 in. X 0.62 in. (63.5 mm X 39.4 mm X 15.7 mm)

ELECTRICAL

Power Input	USB port or 5 VDC for battery charging
Current	100mA max

ENVIRONMENTAL

Temperature	
Operating	0 °C to 45 °C (32 °F to 113 °F)
Storage	-10 °C to 60 °C (14 °F to 140 °F)
Humidity	
Operating	10% to 90% noncondensing
Storage	10% to 90% noncondensing
Operating Altitude	3000m (10,000 ft)

* ISO (International Standards Organization) and AAMVA (American Association of Motor Vehicle Administrators).

SECTION 2:   CONTROLS

The uDynamo has no user controls. Control, status and data functions are provided by the host interface. The system requires software on the host device to direct the operation of the card reader through the application programming interface (API).

SECTION 3:   INDICATORS AND ANNUNCIATORS

The uDynamo has a single tri-color LED to provide user feedback. Other user prompts and feedback may be provided via the host's user interface under the control of the software on that host. The LED is sufficiently bright that it may be seen outdoors in bright, diffuse (slightly overcast) lighting conditions.

The LED indicator reflects the status of the uDynamo. When the uDynamo is off, the LED will be off. When the device is first powered on, the LED will reflect the startup sequence while the device is initializing.

POWER ON WITH AUDIO INTERFACE

When powering on the device while connected to the Audio interface, the LED will very quickly flash Red once after a device self check. If the battery voltage is low but still operational, the LED will light up Red for an additional 2 seconds. After this startup sequence, the LED will change to reflect the current state/status of the reader. Refer to the table below for more detail.

POWER ON WITH USB INTERFACE

When powering on the device while connected to the USB interface, the LED will very quickly flash Red once after a device self check. After this startup sequence, the LED will change to reflect the current state/status of the reader. Refer to the table below for more detail.

CARD SWIPES

After swiping a card, the LED will temporarily shut off while the reader is processing data. Once the processing is complete, the LED will either turn Green for 2 seconds to indicate a good card read or turn Red for 2 seconds to indicate a bad card read. Afterwards, the LED will change to the appropriate state. Refer to the table below for more detail.

Charging and Battery Level LED Indicators

Color	Flashing Pattern		Meaning
Off	Off	———	**Active Mode**: A card has just been swiped. The device will then show whether the read was successful, then return to showing device status. If a card has not just been swiped, the device is powered off or the battery is fully discharged.
Red	Short Flash	⊓	**Startup Mode**: The device has just been powered on and is performing a self-test.
Green	Steady On	———	**Idle Mode**: If configured to require authentication, the device is waiting for authentication. Otherwise, the device is in the Fully Charged state and is ready to read a card.
Green	Rapid Flash	⊓⊓⊓⊓	**Idle Mode**: Authentication has been established and the device is ready to read a card. In this mode, the LED does not indicate the battery state.
Amber/Green	Flash/Blink		**Idle Mode**: The device is charging and is in the Healthy Battery state (between the Fully Charged state and the Low Battery state).
Red/Green	Flash/Blink		**Idle Mode**: The device is charging OR not charging, and is in the Low Battery state. Card swipes and commands are available. Charge the device to the Healthy Battery state.
Amber	Steady On	———	**Idle Mode**: The device is charging and is in the Critically Low Battery state. Card swipes and most commands are unavailable. Charge the device to at least the Low Battery state before using.
Red	Rapid Flash	⊓⊓⊓⊓	**Idle Mode**: The device is not charging and is in the Critically Low Battery state. Card swipes are not available. Stop using the device, disconnect it from the mobile device, and charge it until it reaches the Healthy Battery state.
Red	Steady On	———	**Startup Mode**: If the device has just been powered on, it has failed the self-test. Card swipes and commands are unavailable. **Idle Mode**: If Authentication has been attempted, it has failed. In this mode, the LED does not indicate the battery state. Attempt to re-authenticate, or power off the device, check authentication configuration, and power the device back on.
Green	Two Seconds On	⊓	**Active Mode**: Device has successfully read a swiped card. After this, the LED shows the device status.

Red	Two Seconds On		**Active Mode**: If the device was previously in authenticated mode, that mode has timed out. Re-establish authentication. **Active Mode**: If a card has just been swiped, the device has failed to decode card data. After this, the LED shows the device status. Swipe again. **Startup Mode**: If the device has just been powered on, the device is not charging, and self-test has detected the Low Battery state. After this, the LED shows the device status.

SECTION 4:   CONNECTING THE SYSTEM

GETTING STARTED (USB)

The uDynamo works with hosts that support USB HID including Windows, Mac OS X and Linux.

1. Install the appropriate MagTek demo application for your system. (Windows and OS/X only).
2. Using the included Micro-USB cable (Micro-B), connect the uDynamo to a host USB port on your system.
3. Run the MagTek demo application.

You are now ready to swipe credit cards using your new uDynamo.

GETTING STARTED (MOBILE DEVICE)

The uDynamo connects to the host by plugging the integral audio connector into the host's audio connection. The uDynamo works with iOS* and many Android devices.

1. Install the appropriate MagTek demo or custom application.

2. Disconnect any headsets or devices that may be connected to the audio jack of your mobile device.

3. Connect the uDynamo to the audio jack of your mobile device.

4. Run the MagTek demo or custom application.

You are now ready to swipe credit cards using your uDynamo.

Note

When the uDynamo is plugged into a Mobile device while the mobile App is already launched, volume will automatically be adjust to the maximum.

* Some communication problems with the iPhone 4 have been discovered when using a WiFi connection. It may require a few retries to complete a transaction.

SECTION 5:   USE OF THE DEMONSTRATION APPLICATIONS

USB READER MODE

MagTek has created a demonstration program for Windows and Mac OS X that can be used to demonstrate the features of the uDynamo, and to verify its proper operation. Once the program is launched, it continually checks for the existence of a USB HID reader. The user interface provides the connection status in the display.

MOBILE DEVICE MODE

MagTek has created a demonstration program for iOS devices that can be used to demonstrate the features of the uDynamo, and to verify its proper operation. Once the program is launched, it continually checks for the existence of an audio reader. The user interface provides the connection status in the display.
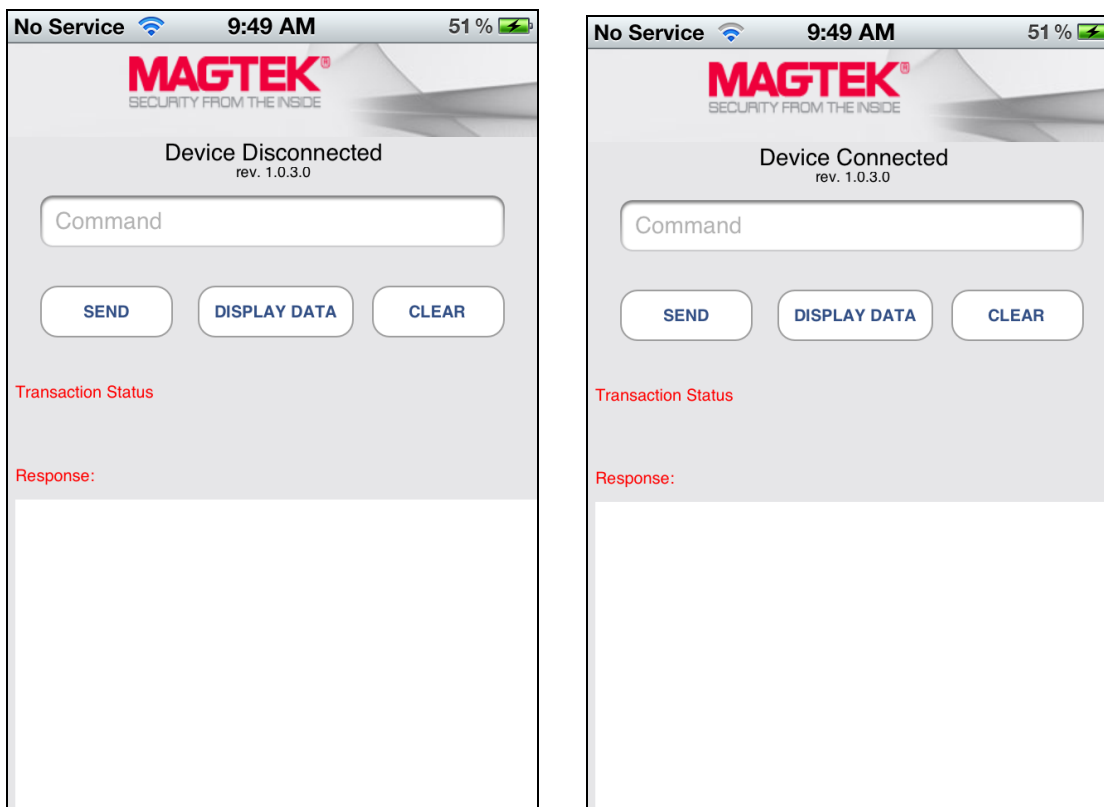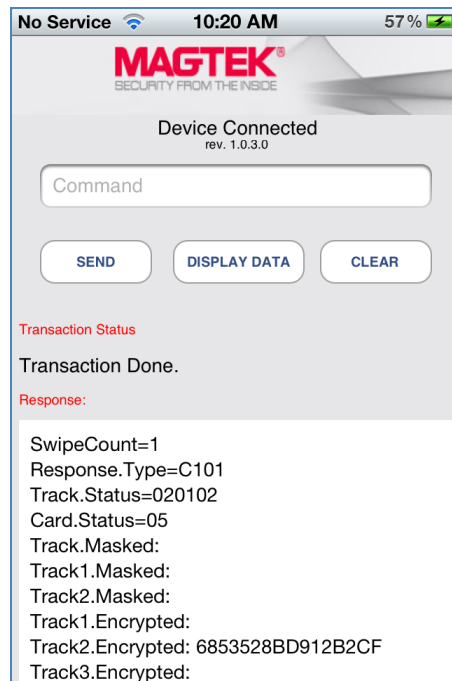

Figure 2 Demonstration GUI showing the connection status of the reader.

If a reader is attached and the demonstration software reflects "Device Connected", but there is no response from the reader after a card swipe, it is possible that the media volume for the phone is turned down or is muted. Using the phone or tablet controls, turn the media volume to maximum.

When the reader is attached and is detected, swiping a card through the reader will cause the data from that card to be read. When the card swipe is detected, the GUI will indicate that the card

has been swiped while the data are transferred to the host. Once the data have been transferred, the display is updated with the card data. The data include the encrypted track data from all available tracks, a partially obfuscated account number, Card holder name, the service code and the card expiration date.

Figure 3 Indication that a card has been swiped, followed by the display of the card data

If an error occurs during the card read, the display will indicate a non-zero card status and will display those data which it can.

Figure 4 Demonstration GUI program display after a card read error

SECTION 6: MAINTENANCE

Aside from the folding audio jack, the uDynamo contains no moving parts and requires no regular maintenance. The outside of the unit may be cleaned using a damp cloth and ammonia, detergent, or isopropanol.

The read heads may be cleaned using a MagTek head cleaning card, part number 96700004.