

MX5 Series

Magnetic Stripe Card Reader
RFID/SC Reader/Writer

Manual



Revision F

2012-05-27

Table of Content

| | |
|---|-----------|
| INTRODUCTION | 3 |
| Accessories of MX5 | 3 |
| Warranty | 3 |
| Disclaimer | 3 |
| GENERAL FEATURES | 4 |
| Technical Specifications | 5 |
| Dimension Views: | 8 |
| Connection Views: | 8 |
| MX5-CBL (Add-on Cable for MX5) | 9 |
| Typical MX5 Device Setup | 10 |
| MX5 UTILITY SOFTWARE | 11 |
| System Requirements | 11 |
| MX5 Utility Installation | 11 |
| MX5 Utility General Information | 13 |
| Definitions of Settings..... | 13 |
| MX Device Firmware Upgrade Menu..... | 21 |
| Creating a Setup Card | 23 |
| Hardware Mounting | 24 |
| Hardware Maintenance | 24 |
| Reading / Writing RFID | 24 |
| Reading/ Writing SC Smart IC Cards..... | 24 |
| APPENDICES | 25 |
| HID Software Developer Notes on Mag-Tek Compatible Format: | 25 |
| OPOS/POS.NET Information..... | 26 |
| Sample of the TestApp screen: | 29 |
| Basic steps to see the MX5-HID device work with POS.NET | 30 |
| Troubleshooting and FAQ..... | 31 |
| Firmware Listing | 37 |

Introduction

Thank you for purchasing the MX5 Magnetic Swipe Card Reader and RFID/SC Reader/Writer. It is a product ideally suited for access control, time keeping, banking, ID recognition & credit verification and related applications. In fact, wherever a RFID/SC/Magnetic stripe ID or transaction card is used, one can find a related use for the versatile, user-friendly MX5 device.

The MX5 is designed to offer a versatile and expandable solution that will attractively complement an existing system for years to come. The MX5 units are the product of choice for versatility, expandability and productivity.

Accessories of MX5

The accessories content will vary based on the type of device purchased:

1. MX5 Unit
2. Velcro adhesive strip.
3. Quick Set Default Setup Card. (only with MX53 series)
4. CD ROM: Utility, Firmware, SDK, Manual(s) and Product specifications.

Warranty

All the MX5 products are backed by a two year parts and labour limited warranty. Should you have problems with your MX5 device please contact the dealer from whom you purchased the product. Any alteration and/or erasure or modification of the MX5 will void the warranty.

Disclaimer

The Manufacturer makes no claims or warranties with respect to the contents or accuracy of this publication or the product it describes, including warranties of fitness or merchantability for a particular purpose. The Manufacturer shall not be liable for any special, incidental or consequential damages, nor damages due to use or misuse born from Integration into any mechanical, electrical or computer system. The Manufacturer is not responsible for the accuracy of any device connected to the MX5. The Manufacturer reserves the right to make any changes to this manual or product(s) without the obligation to notify any person of such changes. Any alteration and/or erasure or modification of the MX5 will void the warranty.

General Features

The MX5 series of devices communicates with a host computer or other terminal type using a USB interface. Unlike any other reader on the market today, you will not need to stock different models to support USB Serial, Keyboard, HID or Custom applications. Just plug it in, download the desired firmware and your MX5 is ready to meet your needs.

The MX5 series product offering is based on the core of MX5 Magnetic Card Readers which utilizes an Arms 7 (32 Bit Processor) CPU. By simply removing the side cover of the MX5 Magnetic card reader, you now can add a variety of snap on modules designed to add combo Reading/Writing for RFID or IC Smart Cards. If you do not require a Magnetic Card Reader, the Compact version - MX5C is also available for all the MX5 add on modules. For the RFID power user, we have created our MX5T table top model which supports both Low Frequency 125 KHz and High Frequency 13.56 MHz cards/tags; all in one Reader. All of our MX5 product line is fully flash upgradeable, customizable and a wide range of firmware is available, making the MX5 product the most versatile product currently on the market. The MX5 product is the One and only Card Device you will ever need for many years to come.



The MX53 products currently supports all the ISO, ABA, ANSI, ISO magnetic card standards and AAMVA, CADMV drivers license standards. We can also provide support for non standard magnetic decoding methods and Cut & Paste of Magnetic data on the fly. Data encryption can also be performed inside the reader and various data encryption standards are available for data output. Currently Triple DES, Advanced Security Features, Masked Data is available and AES-128 encryption will also be available soon for your custom application requirements. These features are specifically designed to meet PCI DSS Requirements.

Custom firmware applications can be provided exclusively upon request. A unique feature built into all our MX5 products will protect your custom firmware and guaranty exclusive hardware to all your clients.

Another exclusive feature only available on the MX53 magnetic card reader or MX53 Combo reader is the **QuickSet** setup card. This feature is great when deploying large installations or if you just wish your client to have a default card customized to their application. All your custom parameters and options for the MX53 can be programmed in a simple swipe of this card. Custom **QuickSet** setup cards are available from your supplier. This great little feature will save you technical support time, increase productivity and help improve hardware deployment time. System Development Kits (SDK) are available for all our MX5 series products. Our kits include a DLL, Demo software, sample code, code description manual and protocol manual. Contact your MX5 device provider for a listing and pricing.

Technical
Specifications

Technical
Specifications
continued:

| | |
|--|--|
| MX53-USB | |
| Built-in Magnetic Card Decoder | Yes |
| Supported Standard | ABA, ANSI, ISO, AAMVA, CADMV |
| Communications | USB port (RS232 – DB9, PS2 KB Wedge using MX5-CBL) |
| Power | 5V Via USB port |
| Current mA | 35 mA |
| Connectors | USB Type A |
| Cable Length | 6 Ft (180 cm)(Default) also Available in 2 Ft (60 cm) and 15 Ft (450 cm) |
| Dimensions (LxWxH) | 100 x 32 x 32 mm |
| Total Weight | 130 g |
| Operating Temp. | - 20 C to 55 C |
| Humidity | 10% - 90% relative humidity |
| Quick Set® Factory Default Card | Yes One step Default setup card, Customizable |
| Boot Load Flash Upgradable Memory | Yes |
| Selectable Tracks | Yes (Separate Track selection for both ISO & AAMVA) |
| Selectable Available Tracks | 1, 2, 3 |
| Track Swipe Rates | 2 : 125 ips at 75 bpi 1, 3: 60 ips at 210 bpi |
| Head Life | Over 1,000,000 passes |
| Programmable Sound On/Off | Yes |
| Programmable Carriage Return | Yes |
| Programmable Inter character Delay | Yes |
| Programmable SS/ES Selectable Char. | Yes |
| Parity and LRC Data Checking | Built-in, audible and LED good read and error indicator |
| Certifications | CE, FCC, UL, RoHS |
| Add-on Modules | Smart IC Chip Card, EM RFID, Mifare RFID options |
| Support Operating Systems | Win 7, Win 2008 ,Vista, Win 2003, Win 2000, XP, Win Ce, Unix |
| Warranty | 2 years |

| | |
|---|--|
| MX53-RFID | |
| Built-in Magnetic Card Decoder | Yes |
| Supported Card types (Module Specific) | EM, TI, AT, Mifare, I Code |
| Communications | USB port (RS232 – DB9, PS2 KB Wedge using MX5-CBL) |
| Power | 5V Via USB port |
| Current mA | 45 - 65 mA |
| Connectors | USB Type A |
| Cable Length | 6 Ft (180 cm)(Default) also Available in 2 Ft (60 cm) and 15 Ft (460 cm) |
| Dimensions (LxWxH) | 100 x 48 x 35 mm (RFID add on) |
| Total Weight | 150 g |
| Operating Temp. | - 20 C to 55 C |
| Humidity | 10% - 90% relative humidity |

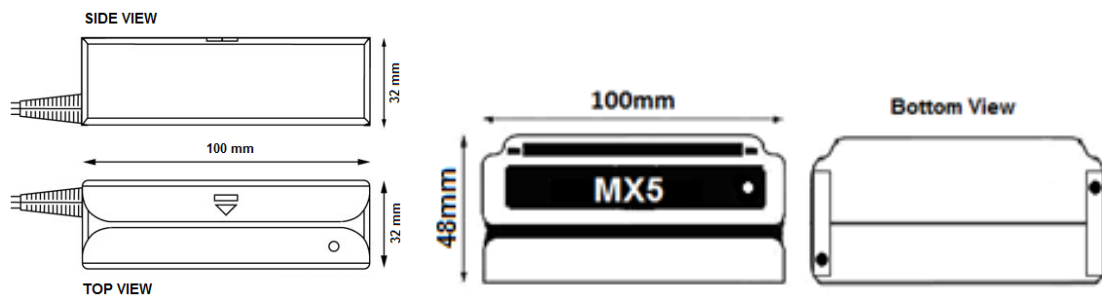
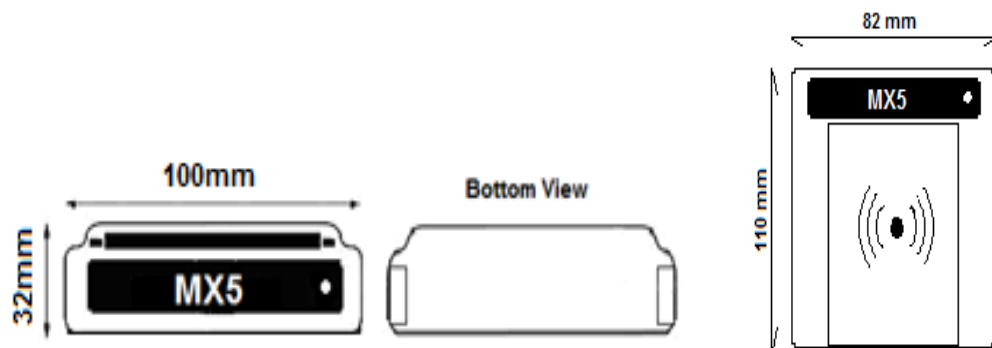
Technical Specifications continued:

| | |
|--|--|
| MX5C | |
| Communications | USB port (RS232 – DB9, PS2 KB Wedge using MX5-CBL) |
| Power | 5V Via USB port |
| Current mA | 45 - 65 mA |
| Connectors | USB Type A |
| Cable Length | 6 Ft (180 cm)(Default) also Available in 2 Ft (60 cm) and 15 Ft (460 cm) |
| Dimensions (LxWxH) | 100 x 32 x 35 mm (RFID add on) |
| Total Weight | 130 g |
| Operating Temp. | - 20 C to 55 C |
| Humidity | 10% - 90% relative humidity |
| Set-up Utility | Yes |
| Flash Memory Upgrade | Yes |
| Programmable Sound On/Off | Yes |
| Programmable Carriage Return | Yes |
| Programmable Inter character Delay | Yes |
| Programmable SS/ES Selectable Character | Yes |
| IC Card Supported (MX5C-SC ONLY) | ISO7816-(1-4) (T=1, T=0), SLE4418-4428, SLE4432/4442, SLE4436/5536, I2C Memory cards |
| Classifications Supported (Module Specific) | ISO14443A, ISO14443B, ISO15693, Mifare Classic, DESFire, Ultra |
| Certifications | CE, FCC, UL, RoHS |
| Support Operating Systems | Win 7, Win 2008 ,Vista, Win 2003, Win 2000, XP, Win Ce, Unix |
| Warranty | 2 years |

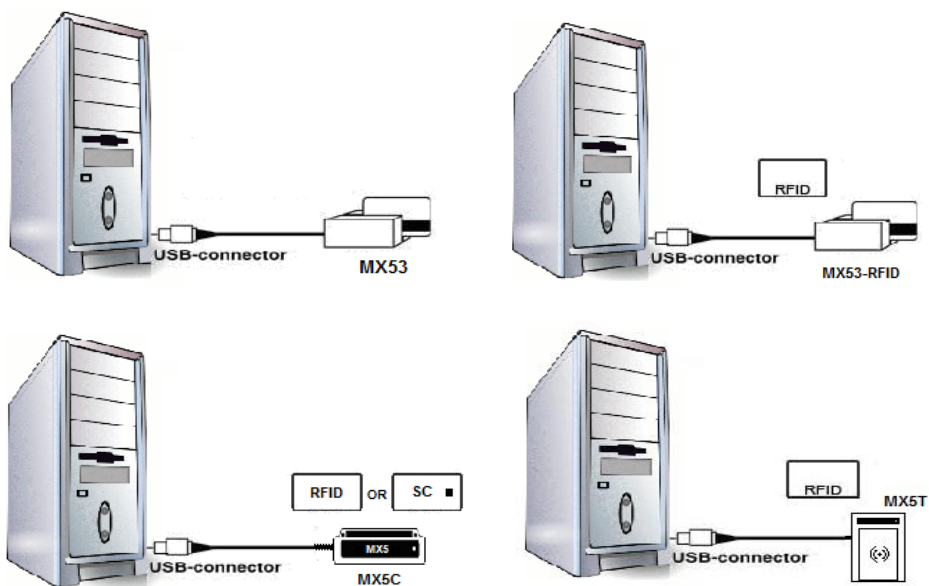
Technical Specifications continued:

| | |
|------------------------------------|---|
| MX5T-Tabletop | |
| Communications | USB port (RS232 – DB9, PS2 KB Wedge using MX5-CBL) |
| Power | 5V Via USB port |
| Current mA | 65- 100 mA |
| Connectors | USB Type A |
| Cable Length | 6 Ft (180 cm)(Default) also Available in 2 Ft (60 cm) and 15 Ft (450 cm) |
| Dimensions (LxWxH) | 110 x 82 x 27 mm |
| Total Weight | 120 g |
| Operating Temp. | - 20 C to 55 C |
| Humidity | 10% - 90% relative humidity |
| Set-up Utility | Yes |
| Frequency RFID | LF - 125 KHz and HF - 13.56 MHz |
| Prog. Sound On/Off | Yes |
| Prog. Carriage Return | Yes |
| Prog. Inter character Delay | Yes |
| Data Checking | Built-in, audible good read and error responses |
| Classifications Supported | ISO14443A, ISO14443B, ISO15693, EM, TK, AT |
| Certifications | CE, FCC, UL, RoHS, |
| Support Operating Systems | Win 7, Win 2008 ,Vista, Win 2003, Win 2000, XP, Win Ce, Unix |
| Warranty | 2 years |

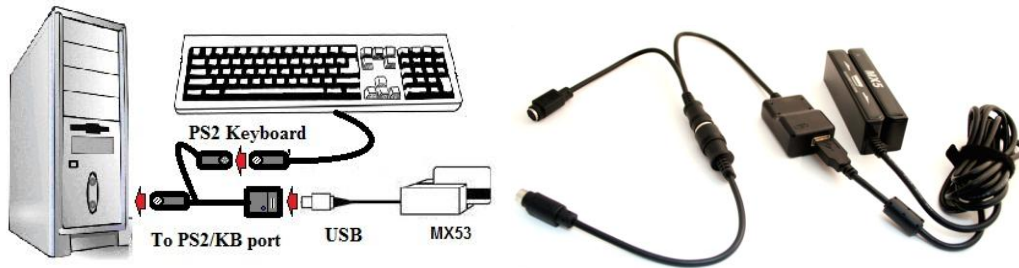
Dimension Views:

**MX53-USB****MX53-COMBO-USB****MX5C-USB****MX5T-USB**

Connection Views:

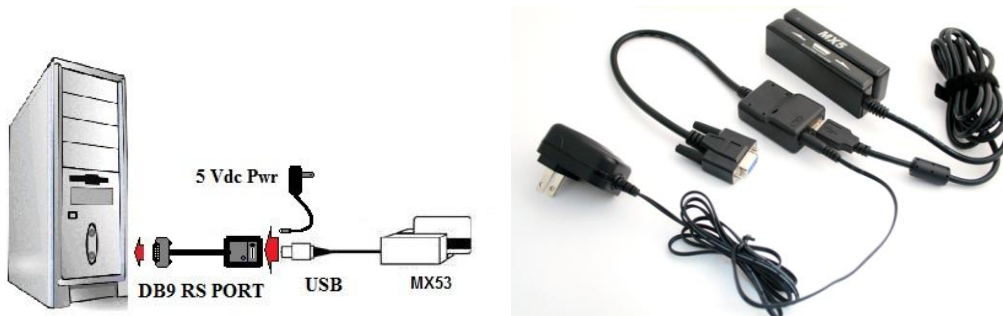


MX5-CBL (Add-on Cable for MX5)



Typical connection of the MX5-CBL-KB to a MX53-USB reader

Note that the device connected could be an MX53 (Shown above), MX5C or MX5T device. All devices connected to this keyboard wedge cable (MX5-CBL-KB) must have a keyboard firmware installed using the latest version 2.8.0 Utility or higher. This cable is designed to utilize the existing keyboard port on your PC (Mini DIN6 or DIN5) concurrently with your keyboard. The card information is transferred to your computer as if someone had manually typed the information. In order to change any settings of the device, you must connect the device directly to a USB port and use the Utility. Power is provided by the keyboard port.



Typical connection of the MX5-CBL-RS to a MX53-USB reader

When utilizing the MX5-CBL-RS cable, the device must have the latest VRS firmware from Utility version 2.8.0 or higher. Power is provided by a power adapter. In order to change any settings of the device, you must connect the device directly to a USB port and use the Utility.



MX5-CBL-KB



MX5-CBL-RS

Typical MX5 Device Setup

1. Power on your system (PC).
2. Insert the MX-5 Utility CD into your system and install the MX5 Setup Utility.
3. Connect the USB cable of the MX5 to a free USB port .(See **Connection Views**)
4. Windows will automatically install the appropriate driver for the device. INF files for VRS firmware versions maybe needed by Windows. These files are installed by the MX5 Utility and located in the default programs directory MX5 Device. Select this directory when requested by Windows device manager auto installer.
5. You maybe requested to REBOOT your system.
6. You are now ready to configure your MX5 device using the MX5 Device Utility. Note that the MX53 magnetic card reader or Combo reader can be configured using the **QuickSet** setup card. All your custom parameters can be programmed with a simple swipe of this card thru the MX53 reader. Custom **QuickSet** setup card settings are available from your supplier. This feature is great when deploying large installations or if you just wish your client to have a default card customized to their application. This will save you technical support time and increase productivity.
7. If you require to Upgrade or Change the device characteristic eg: USB serial or HID or custom USB. You will need to use the MX5 Device Utility to enable the Flash upgrade function of the device. See the **MX5 Device utility software** section for more details.
8. Once you have placed the MX5 Device in upgrade mode, you can select from an extensive list of various firmware upgrades located on your CD. Select the upgrade based on the device type you are using. Each device has specific firmware upgrades. See the Firmware list section for descriptions of the available firmware. Do not worry should you install the wrong firmware, the Utility and MX5 hardware is intuitively designed to prevent any damage or Lock up of your device. The Flash function of the MX5 Device is designed to be upgraded as many times as desired to help keep your hardware up to date. All the MX5 Device settings and options are also saved into the MX5 Device Flash memory. This allows you to move the hardware to any computer without losing your custom settings.
9. Note that when the MX5 Device is upgraded, the MX5 Device will automatically restart. You do not need to unplug the Device from the USB port to restart the Device. Windows will automatically install the new drivers for the Device if required. Also note that each time you plug the MX5 Device into a new USB port on your computer, Windows will install the drivers for that device for that port. Special care should be noted when using VRS (USB Virtual Serial Port). Refer to the VRS section for hints on configuring your MX5 Device on all your computer's USB ports.
10. System Development Kit (SDK) Utility located on the CD is designed for software developers who wish to integrate the MX5 Device to their own application using our DLL and sample code. The SDK Utility is available to demonstrate proper operation of the device using the DLL with the Hardware.

MX5 Utility Software

Every MX5 comes with a utilities setup and test program that is included on the CD. This program is designed to configure selectable functions for each MX5 Device and to demonstrate the functionality of various MX5 devices. The MX5 Utility can also be used to demonstrate Smart Card reading and writing functions using the SC Module.

System Requirements

1. AT compatible PC or later model with display.
2. Any of the following operating systems: Windows 2000, XP, VISTA, and Windows 7
3. 256K available conventional memory.
4. A free USB port.

MX5 Utility Installation

Use the following steps below in order to install the MX5 Utility program.

- Execute the self installing application program from the CD or download the Utility from:
http://www.poshmfg.ca/GeneralInfoFiles/Downloads_MX5.html.
- The application will be installed in your “All Programs Directory” in a directory called “MX5 Device”
- Connect your MX5 Device to a free USB port.
- Select the application **MX5Utility** to start the program. Your desktop may also contain the MX5Utility Icon.



MX Device Setup Menu 2.8.0

Device Info

Devices: MX53-VRS (COM3)

Device Name: 53-VRS-M2-UID Ser #: 34FFFFFF5739333856622343

Device Revision: 3.9

General Settings

☒ Sound On ☐ Upper-case Character Delay (KB/RS): Hardware Function:
☐ Enable (KB/RS) Add-On Cable No Delay

Magnetic Card Reader Settings

☒ ISO Track 1 ☒ AAMVA Track 1 Trk1 SS: 0
☒ ISO Track 2 ☒ AAMVA Track 2 Trk2 SS: 0
☐ ISO Track 3 ☐ AAMVA Track 3 Trk3 SS: 0
Track Output Order: 1-2-3

RFID UID Reader Settings

RFID SS: 0
RFID ES: 0
☐ Send CR

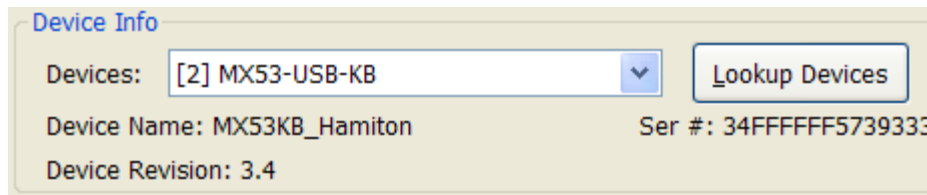
UID Output Options

☒ Decimal ☒ No Padding ☒ Reverse UID
☐ Hex ☐ Fixed 10 Byte Leading 0 Padding/Truncation
☐ Fixed 13/17 Byte Leading 0 Padding

- E. The MX5 Utility program will auto-detect the MX5 Device. If the MX5 is connected and no device is listed, press the **Lookup Device** dialog box.
- F. If NO device appears in the information dialog box after pressing **Lookup Device**, check to see that the Device is plugged into the USB port and the power LED of the MX5 device is **ON**. Exit the Utility and Repeat from step C.
- G. If you are still unable to see the device in the dialog box, Exit the Utility and go to the [Troubleshooting Section](#).

MX5 Utility General Information

The MX5 Utility is intuitive to the hardware configuration and will automatically read the MX5 Device settings and display the settings in its appropriate dialog boxes. Dialog boxes which are not related to this firmware version will be grayed out and disabled.



Device Info

Devices: [2] MX53-USB-KB ▼ Lookup Devices

Device Name: MX53KB_Hamiton Ser #: 34FFFFFF5739333

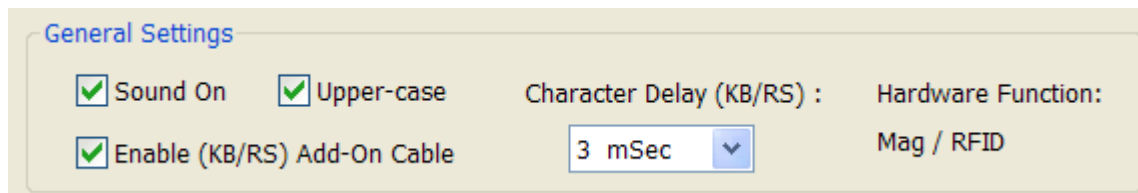
Device Revision: 3.4

Should you have more than one MX5 Device connected to your system, you can select a different MX5 Device by using your mouse and selecting the pull down draw bar in the **Devices:** window. The Device Name and device number will be listed in the pull down draw bar dialog box. After selecting a device, the screen will automatically update and the dialog boxes will be updated with the selected device settings. The **Device Info Section** will display the internal device serial number, the device name and the version installed in the device selected.

You may choose to enable or disable any available options which are not grayed out.

Definitions of Settings

General Settings



General Settings

☒ Sound On ☒ Upper-case Character Delay (KB/RS) : Hardware Function:

☒ Enable (KB/RS) Add-On Cable 3 mSec ▼ Mag / RFID

"Sound On" Selecting this option will enable sound. A single beep is heard when a good read is made, two beeps are heard when an error is detected in a selected track. No data is sent out by the device when an error is detected on any of the selected tracks.

"Upper-case Selector" By Selecting this option all the card data will be output in "**CAPITAL**" letters. This option overrides the Caps lock status. By un-checking this option, all the data output will be in "**lower case**" only and this mode is not affected by the Caps lock status.

"Character Delay (KB/RS) Selector" option is used to add a delay between each character sent out by the device. Delay maybe needed if your computer is busy or slow at accepting data entry. Increase the delay if data loss is noticed when reading your data Card.

"Hardware Function" You can see the function(s) of the Device. Multiple functions only apply to devices which have more than one Module attached. (Eg: Mag card / RFID / Chip Card) This display is for your information only.

Magnetic Card Reader Settings

Magnetic Card Reader Settings

| | | | |
|---|---|--|---|
| <input checked="" type="checkbox"/> ISO Track 1 | <input checked="" type="checkbox"/> AAMVA Track 1 | Trk1 SS: <input checked="" type="checkbox"/> % | <input checked="" type="checkbox"/> Send CR Track 1 |
| <input type="checkbox"/> ISO Track 2 | <input checked="" type="checkbox"/> AAMVA Track 2 | Trk2 SS: <input checked="" type="checkbox"/> ; | <input checked="" type="checkbox"/> Send CR Track 2 |
| <input type="checkbox"/> ISO Track 3 | <input type="checkbox"/> AAMVA Track 3 | Trk3 SS: <input checked="" type="checkbox"/> ; | <input checked="" type="checkbox"/> Send CR Track 3 |
| Track Output Order: 1-2-3 | | Trk123 ES: <input checked="" type="checkbox"/> ? | <input type="checkbox"/> Send Any Valid Selected Tracks |

"ISO Track Selectors" Select which Credit Card or Data Card tracks you would like the reader to read. See your application notes to determine which track should be selected.

"AAMVA Track Selectors" Select which Driver License data tracks you would like the reader to read. This option only applies to driver licenses and has no effect on ISO cards.

"Track SS Selectors" Enable or Disable the Track Start Character (Start Sentinel). You can also select your own SS by using the pull down Draw bar. Use default settings unless notified otherwise by your application vendor. Each track can have a unique SS.

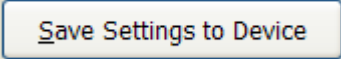
"Track ES Selector" Enable or Disable the Track End Character (End Sentinel). You can also select your own ES by using the pull down Draw bar. Use default settings unless otherwise notified by your application vendor. All the tracks will share the same ES. You may also add a unique ES to the data string read from the RFID data card.

"Send CR Track Selectors" Select a Carriage Return "CR" at the end of the selected track of magnetic strip data.

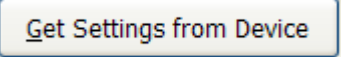
"Track Output Order" This option allows you to change the output order of the selected tracks. Default order is (1,2,3).

"Send Any Valid Selected Tracks Selector" Enabling this option will tell the device to send out ANY VALID data of the tracks "that have been selected" only (Track Error "OFF"). Not selecting this option will tell the reader to only send ALL the selected valid tracks only (Default) Any track data error on any selected tracks will flash the LED twice and sound two beeps. NO DATA will be sent out. This option is handy for trouble shooting.

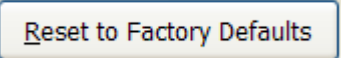
Function Buttons

A rectangular button with a thin blue border and a light beige background. The text "Save Settings to Device" is centered in a blue, sans-serif font.

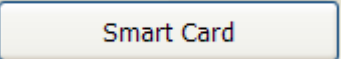
All changes will be saved to the MX-Device once you have selected this option. All saved settings are automatically updated and implemented inside the MX-Device flash Memory.

A rectangular button with a thin blue border and a light beige background. The text "Get Settings from Device" is centered in a blue, sans-serif font.

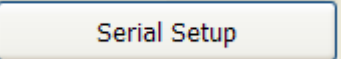
Your screen settings will be updated to reflect the current device settings when you click on this button.

A rectangular button with a thin blue border and a light beige background. The text "Reset to Factory Defaults" is centered in a blue, sans-serif font.

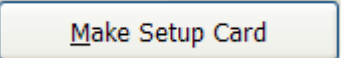
Selecting this option will force all the MENU settings and the device to be reset to the factory defaults based on the hardware.

A rectangular button with a thin blue border and a light beige background. The text "Smart Card" is centered in a blue, sans-serif font.

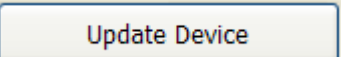
Select this option to test the Smart Card modules with SLE4428 cards. Refer to the section following on the functions that can be tested with the utility.

A rectangular button with a thin blue border and a light beige background. The text "Serial Setup" is centered in a blue, sans-serif font.

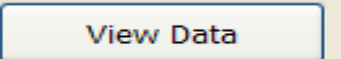
This option brings up a settings dialog that allows for changing the settings of the Serial communications between the MX Device and the computer.

A rectangular button with a thin blue border and a light beige background. The text "Make Setup Card" is centered in a blue, sans-serif font.

Select this option if you need to generate the Setup Card Data String of the current settings. The string will be copied to the clipboard buffer. Paste this data into track 1 of your magnetic card encoder to produce your new Custom "Default Setup Card".

A rectangular button with a thin blue border and a light beige background. The text "Update Device" is centered in a blue, sans-serif font.

Select this option if you need to update or change the Firmware inside the Device. The Device will automatically start to beep and Flash the LED every second to indicate the device is in Update Mode. You may need to press the "Lookup Devices" button in order to change to the Update Menu.

A rectangular button with a thin blue border and a light beige background. The text "View Data" is centered in a blue, sans-serif font.

Select this option to see the results of a card swipe (such as a credit card or a driver's license card). This will open an output window below the settings area. Once the Output window is opened, you will see the various commands and responses from the MX5 device. *This option is only available when you are using a VRS or HID version firmware for a reader. VRS means "Virtual Serial Port" via a USB port.*

RFID UID Reader Settings

RFID UID Reader Settings

RFID SS: ☒ %
RFID ES: ☒ ?
☐ Send CR

UID Output Options

☒ Decimal ☒ No Padding ☒ Reverse UID
☐ Hex ☐ Fixed 10 Byte Leading 0 Padding/Truncation
☐ Fixed 13/17 Byte Leading 0 Padding

“**RFID SS & ES**” Enable or Disable the RFID Start & End Character (Start Sentinel). You can also select your own SS/ES by using the pull down Draw bar. Use the default settings unless notified otherwise by your application vendor.

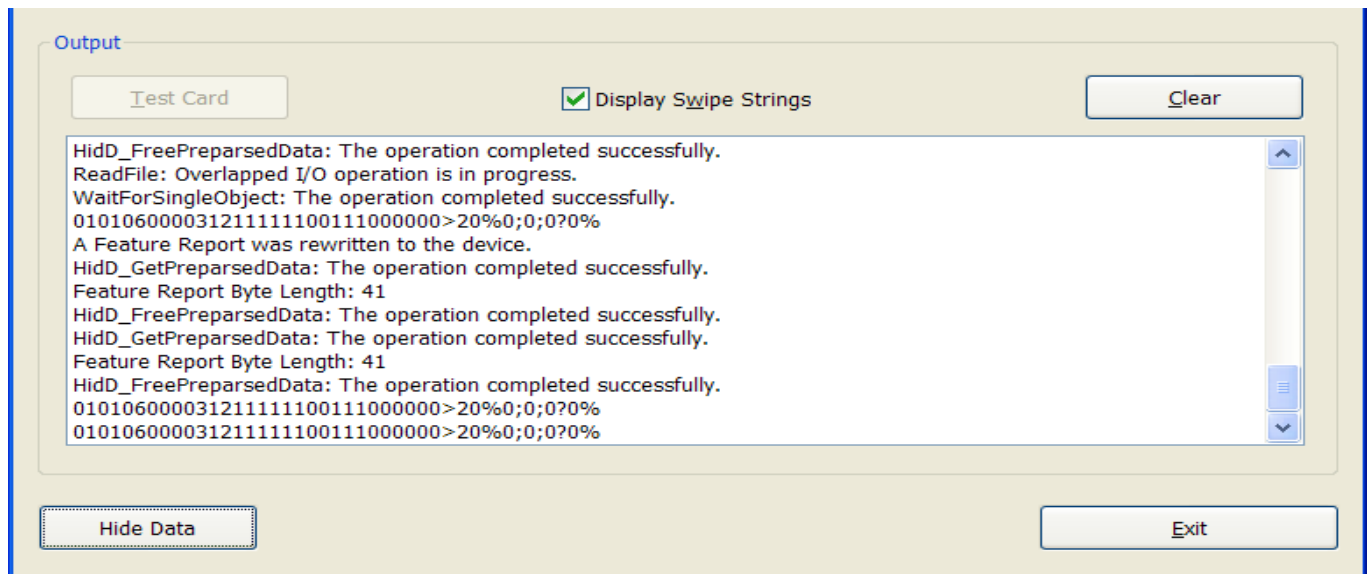
“**Send CR**” You may add a CR to the UID read from the RFID data card.

UID Output Options

“**Decimal/Hex**” The UID can optionally be output to any waiting software or screen in either Decimal or Hexadecimal format.

“**Padding**” Sending the UID in Decimal output without any padding of zero characters is the default. Optionally, the UID can be padded with leading zeroes to a length of 10 characters or to a maximum length of 17 characters (13 characters for EM Cards).

Card Testing Options



"Test Card" Selecting this option will put the program into read mode. The utility will wait until a valid card is read with the MX-HID device. Note that none of the controls will work while the application is in read mode until a card is read or the system times out at which point the controls will return. The **"Test Card"** option will put the application in 'wait for input from the MX-HID reader' mode. If you have read a card before the **"Test Card"** button is pressed, the report on the last card read will be sent to the application. *This option is only available when you are using a HID version firmware for a reader.*

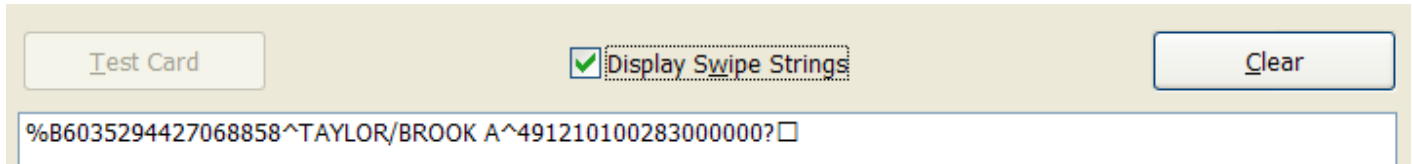
"Display Swipe Strings" If you Check this box, then the card swipe tracks data will be displayed one line at a time in printable characters. If this box is left unchecked, the card swipe is reported character by character from 0 - 336. *This option is only available when you are using a HID version firmware for a reader*

"Hide Data" Select this option to close the Output window.

This option is only available when you are using a VRS or HID version firmware for a reader. VRS means "Virtual Serial Port" via a USB port.

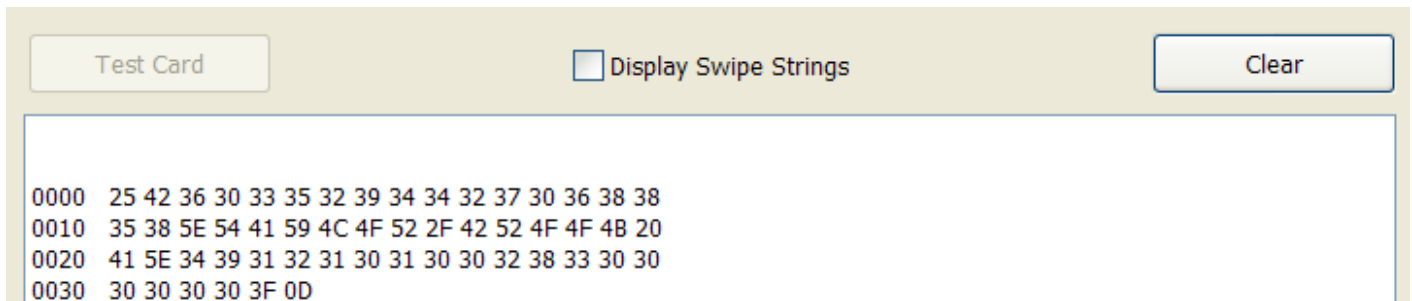
Hex Data output for VRS Firmware

When the reader has a VRS type firmware installed, there is an option to output the data being read by the reader in a hexadecimal format. Setting the 'Display Swipe Strings' will output the data in regular character format.



The screenshot shows a software interface for VRS Firmware. At the top, there are three buttons: 'Test Card', 'Display Swipe Strings' (which is checked with a green icon), and 'Clear'. Below these buttons is a text area containing the string: %B6035294427068858^TAYLOR/BROOK A^491210100283000000?□

Un-checking that feature will display the data in hexadecimal format in columns with line numbers.



The screenshot shows the same software interface for VRS Firmware, but the 'Display Swipe Strings' checkbox is now unchecked. The text area displays data in hexadecimal format, organized in columns with line numbers:

0000 25 42 36 30 33 35 32 39 34 34 32 37 30 36 38 38

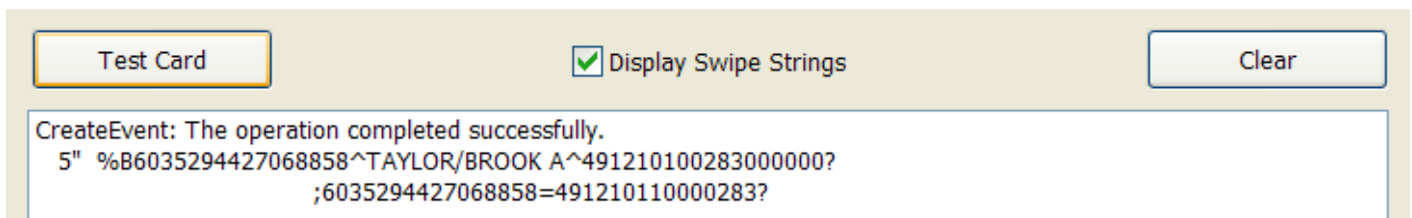
0010 35 38 5E 54 41 59 4C 4F 52 2F 42 52 4F 4F 4B 20

0020 41 5E 34 39 31 32 31 30 31 30 30 32 38 33 30 30

0030 30 30 30 30 3F 0D

Hex Data output for HID Firmware

When the reader has a HID type firmware installed, there is an option to output the data being read by the reader in a hexadecimal format. Setting the 'Display Swipe Strings' will output all the data along with the first 7 HID report bytes. Refer to the Appendix for a definition of the 7 report bytes.



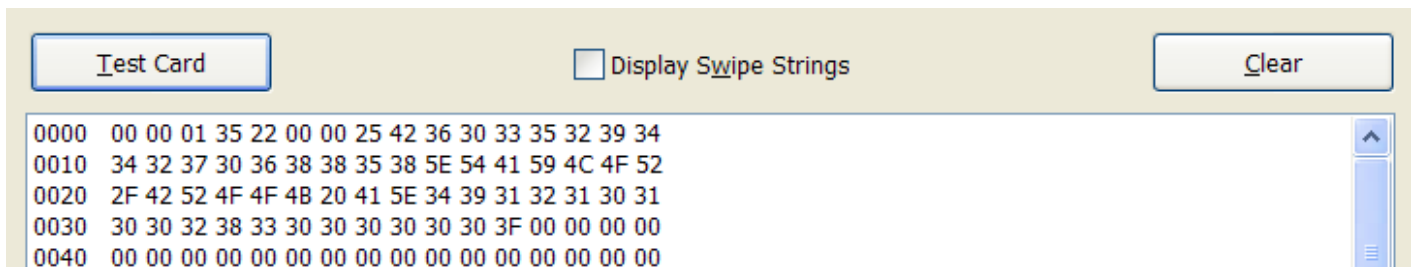
The screenshot shows a software interface for HID Firmware. At the top, there are three buttons: 'Test Card', 'Display Swipe Strings' (which is checked with a green icon), and 'Clear'. Below these buttons is a text area containing the following text:

CreateEvent: The operation completed successfully.

5" %B6035294427068858^TAYLOR/BROOK A^491210100283000000?

;6035294427068858=491210110000283?

Un-checking the 'Display Swipe Strings' feature will display the data in hexadecimal format in 16 columns with line numbers.



The screenshot shows the same software interface for HID Firmware, but the 'Display Swipe Strings' checkbox is now unchecked. The text area displays data in hexadecimal format, organized in columns with line numbers:

0000 00 00 01 35 22 00 00 25 42 36 30 33 35 32 39 34

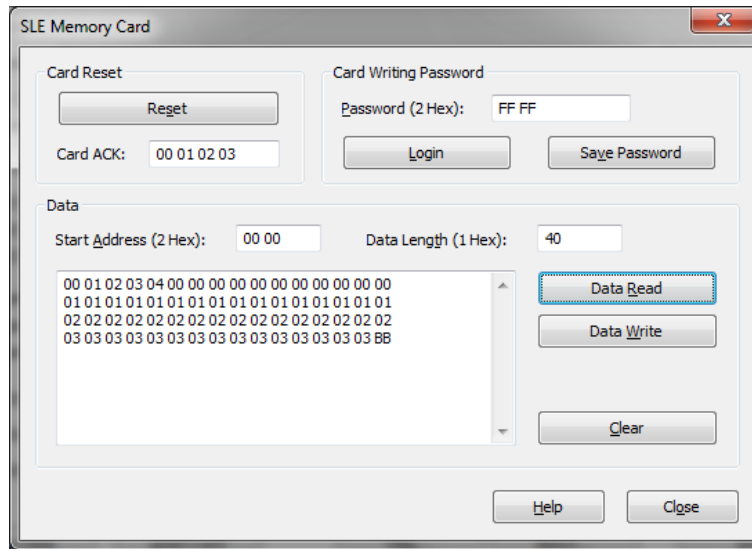
0010 34 32 37 30 36 38 38 35 38 5E 54 41 59 4C 4F 52

0020 2F 42 52 4F 4F 4B 20 41 5E 34 39 31 32 31 30 31

0030 30 30 32 38 33 30 30 30 30 30 30 3F 00 00 00 00

0040 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

Smart Card Testing



"Smart Card" Selecting this option will open a new window to test the Contact Smart Card Module using an SLE memory card. The SLE 4428 is a 1 kilobyte memory card which is a recommended or equivalent memory card from SLE. The Smart Card utility is very basic and only supports the basic commands for the purpose of TESTING the device only. Once the window is open the following options become available:

“Card Reset” This option is the first command which needs to be selected once the SLE card has been inserted into the contact card slot. Press the card down firmly until the Led changes color. If the card contacts are inserted the wrong way, the Device will sound two short Beeps to indicate an ERROR and the LED will not change color. Remove the SLE card and rotate the card so that the gold contacts on the card face the opposite direction and then insert the card by pressing the card down firmly. Once the Card is inserted properly the Led will change color and other options will be un-grayed.

“Login” Once you have entered the two byte HEX password (Default is FF FF) press the Login button. If the password is successful, the “Save Password” and “Data Write” option will be Un-grayed. If the wrong password is entered then an error screen will pop up.

“Save Password” Once this option is un-grayed, the card is unlocked and the value of the “Password (2 Hex)” can be changed to a new password. Pressing the Save Password will save the new value of the password onto the card. This can be repeated many times until you log out. Removing the card performs an Auto Log out. The new password will need to be entered in order to Login once the card is inserted back into the SC module.

“Data Read” and “Data Write” Before pressing these options, you should select the start address and the data length. The start address is a two hex byte “FF FF” and should not exceed the memory size of the memory card. A 1 KB card has an address range off “00 00” hex to “04 00” hex. A data length of “40” hex will fetch 64 bytes of data to be displayed. Using the default values is recommended for first time users. The card data will be displayed in HEX on the screen. Each data byte is comprise of two hex characters - “00” to “FF” Hex. You can edit the value of each character by typing over the data bytes displayed. Care should be taken not to change the data length or use invalid characters. An error screen will pop up should the data length or data format be invalid once the Data Write option is pressed. The data

written to the card is not verified by this command and a Data Read should be performed to verify the data was written to the card properly. If you did not login then the **Data Write** button will be grayed out and you will be unable to save any data to the card. You can read any data from the card without logging in.

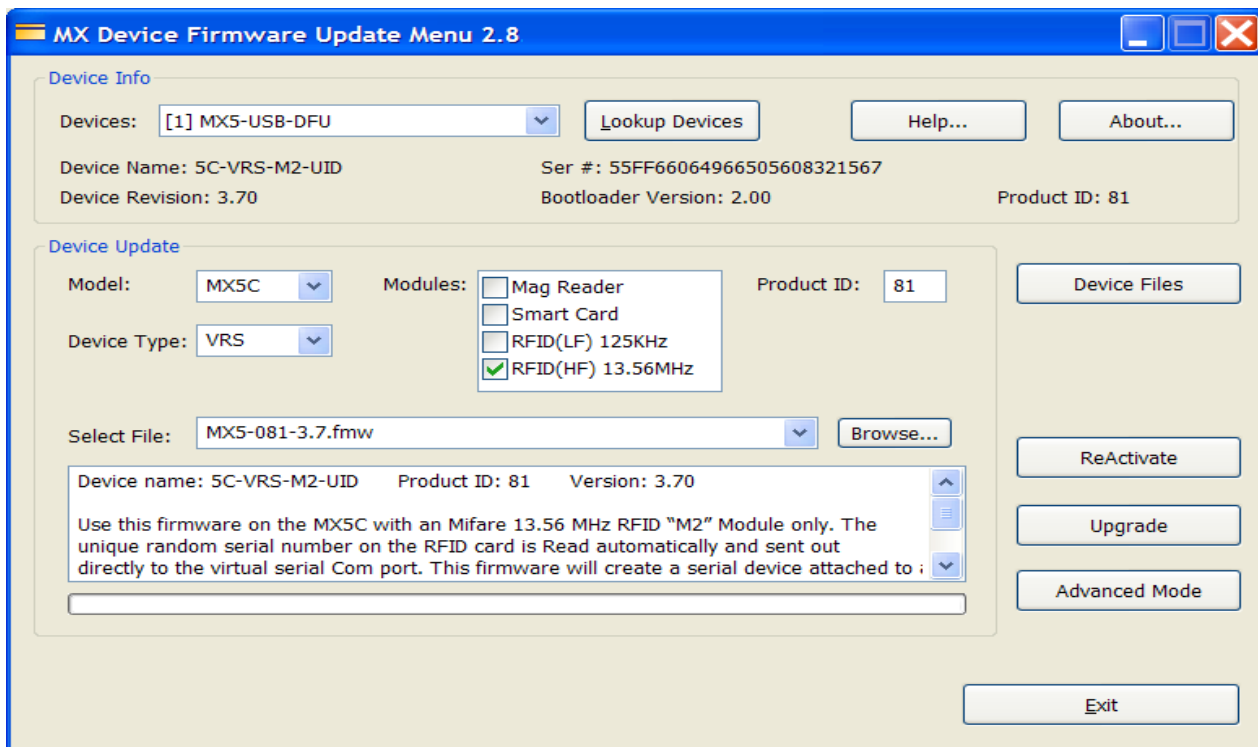
“**Clear**” This option will clear all the data in the data window. This will not affect or change the information on the memory card. If you have not saved the data before pressing **Clear**, the data will be lost.

Special Note: All the Device settings are stored inside the individual device flash memory. This utility is not required to be running or installed in order to operate the MX-Device. A special QuickSet "Default Card" is provided with our entire MX5 Magnetic card device line, to setup the device to a known factory default settings.

MX Device Firmware Upgrade Menu

The MX Device Firmware Update menu is automatically opened when the utility recognizes that the selected device has been turned "ON" to update mode. In upgrade mode the MX-Device will be sounding a beep and flashing the LED every second.

If no device is found, press the "**Lookup Devices**" button and the first device found will be listed. If you have more than one device connected, use the draw down bar to list all the available devices on your system. Select the appropriate MX-Device to be upgraded. Note that the MX-Device selected must be in Upgrade mode in order for this Menu to be shown. Selecting a MX-Device which is not in Upgrade mode will automatically change the menu selection according to the selected MX-Device current settings.



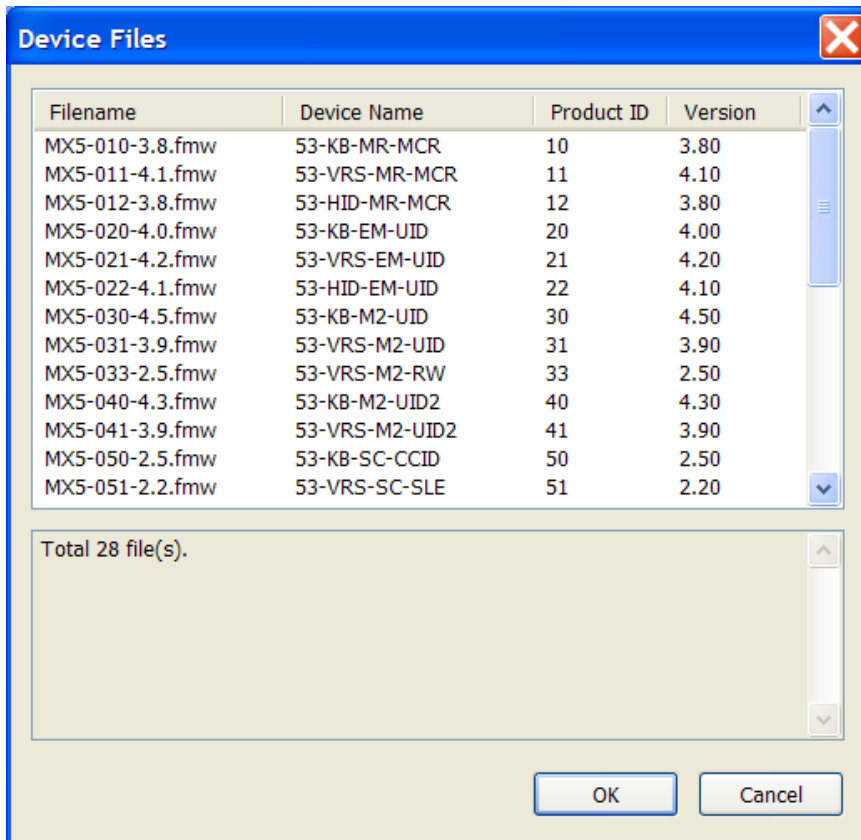
The **Device Info** area will display the MX5 Device's current information stored in its flash memory. If you do not wish to change the firmware, press the **ReActivate** button and the MX5 Device will restart with the current firmware.

The "**Device Update**" area lists all the features of each Firmware File that can be flashed into the MX5 Device. The Model, Device Type, Module(s) and Product ID are listed in the various dropdown/selection boxes.

"Reactivate" This button will Re-Activate the current firmware inside the MX-Device. The Device will automatically restart once you have completed the "Upgrade" or "ReActivate" action to the MX-Device and return to the Device Settings screen.

"Upgrade" You may choose to install New Firmware using the "Upgrade" button into the MX-Device. You must select a valid MX-Device firmware file before the "Upgrade" Button can be selected. The "Upgrade" button will be grayed out until you have chosen a valid file. A valid file type will have an **.FMW** file name extension.

“Device Files” This feature provides quick access to all firmware files. If it is known what file is needing to be loaded into the Device by either Device Name or Product ID. Picking a firmware file from the list will select it for loading automatically.



Advanced Mode

If the Product ID number of the file selected is for a different module than what was initially installed on the Device and the Update button is clicked, a warning message will be displayed. ***An override option is available. Clicking on the Advanced Mode button displays a password entry dialog. The password required for changing a MX5 Device to a new Product ID within the Model's possible modules is 'MASTER'. This is Advanced Mode 1.***

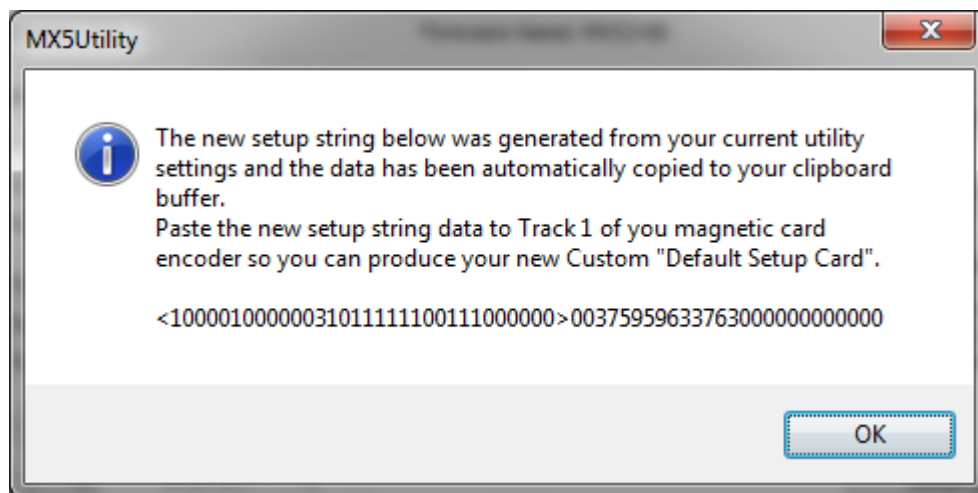
If for some reason there is a need to change the Model to be something other than what it was designated to be from the factory, there is a password that provides the option to load any firmware file. This can render the product non-functional after an incorrect firmware file is loaded. Using this mode will lock up an MX5 device and will void the warranty. The override password to load any firmware into a unit is 'SUPER'. This is Advanced Mode 2.

Creating a Setup Card

In order to create a setup card you will require a magnetic card encoder and a blank track 1 magnetic card. Using the MX5 Utility you will need to install the desired firmware into the MX5 device. You will also need to configure all the desired settings to meet your application requirements. Save the settings to the device by pressing the **Save Settings to Device** Button. Now you can press the **Make Setup Card** Button to generate a special data string which represents your current configuration on the screen. The Data string is automatically copied to your clipboard memory. Now using your Magnetic card encoder and the encoder application, paste the data string into the data field for track 1. Encode the data to a blank magnetic card. Your new setup card is now done. Mark the card using a permanent marker to identify it as your special setup card. Now you are ready to test your new card.

With the MX5 Utility running, scan the setup card through your MX5 Device. Your MX5 Device should respond with one long beep (No Data will be seen when using a setup card). The MX5 Device has now accepted the settings stored on the setup card and saved the settings into its flash memory. Open the MX5 Utility, if you have not done so already, and press the **Get Settings from Device** Button. The screen will update with the device's current saved settings. Verify your settings and you are done. You do not need to use the MX5 Utility to configure your MX53 Device.

If the desired firmware is installed you simply need to read the setup card and all your settings are automatically flashed into your MX53 device. This function is Ideal for hardware deployment or returning your hardware to a known state. The window below shows the dialog box which is opened once you press the **Make Setup Card** Button.



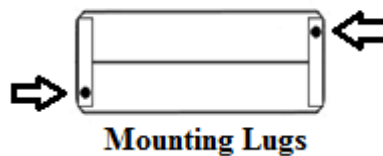
A factory default card is included with your MX53 Device. Use this card to restore your device back to factory default. The settings will automatically be saved to the Flash memory of the MX53 device. Should you not have a default card then using the MX5 Utility you can select press the Reset To Factory Defaults Button and the screen will be set to the factory default. Note that each firmware has a different factory default. Make sure you have selected the desired firmware before you save your defaults. Once the defaults are shown you will need to save the settings to the MX53 device by pressing Save Settings to Device Button. This will save your current settings to your MX53 device Flash Memory. A long beep will be heard from your device indicating the settings were saved successfully.

Hardware Mounting

The MX5 compact, MX5 combo and MX5 stand alone unit can all be easily installed to any existing computer system with the use of the double sided Velcro adhesive strip which is included with your unit. Various configurations are possible for mounting your MX5 to your computer, see the illustrations below.



Bottom View of MX5



The MX5 can also be mounted to your table top or wall using the Velcro adhesive strip. Mounting lugs included on the bottom of each MX5 reader makes it easy to mount and secure to your Kiosk or work area.

Hardware Maintenance

You can increase the life and maintain the performance of your MX5 magnetic head reader by periodically cleaning the read head with a pre-saturated cleaning card. It is recommended to clean the head once a week for heavy use and once a month for light use. Cleaning the head will improve successful read rates and ensure long life of the reading head. The same cleaning card can also be used to clean the chip card contacts of your Smart Card (SC) module. Cleaning cards should be available from your MX5 vendor.

Reading / Writing RFID

To Read/Write RFID cards on the MX5 Combo or Compact RFID device, Place the card onto the side of the case indicated by the RFID symbol (((o))). The card can be read from up to 3 cm from the device. For writing cards, it is best to have the card closest to the device as possible. For table top models place the card directly over the RFID symbol (((o))).

Reading/ Writing SC Smart IC Cards

To Read/Write SC smart cards on the MX5-SC module, insert the card such that the chip on the card is facing the device. Once inserted correctly, the Red LED will be turned on. If the card is incorrectly inserted, The Device will beep and flash twice.

Appendices

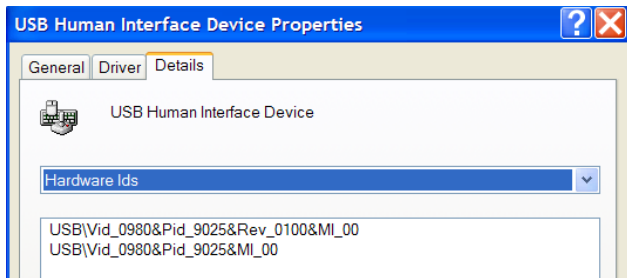
HID Software Developer Notes on Mag-Tek Compatible Format:

The MX-HID USB device decimal ID numbers are:

Vendor ID: 0x0980

Product ID: 0x9025

Revision ID: 0x0100



Data Definition:

<Count> runs from 0 to 336 in rows of 16 bytes.

<ASCII number> values range from 0 to 255 (displayed in decimal base).

Example:

5" %B6035294427068858

```
0000  00 00 01 35 22 00 00 25 42 36 30 33 35 32 39 34
0010  34 32 37 30 36 38 38 35 38 5E 54 41 59 4C 4F 52
0020  2F 42 52 4F 4F 4B 20 41 5E 34 39 31 32 31 30 31
```

The values represented:

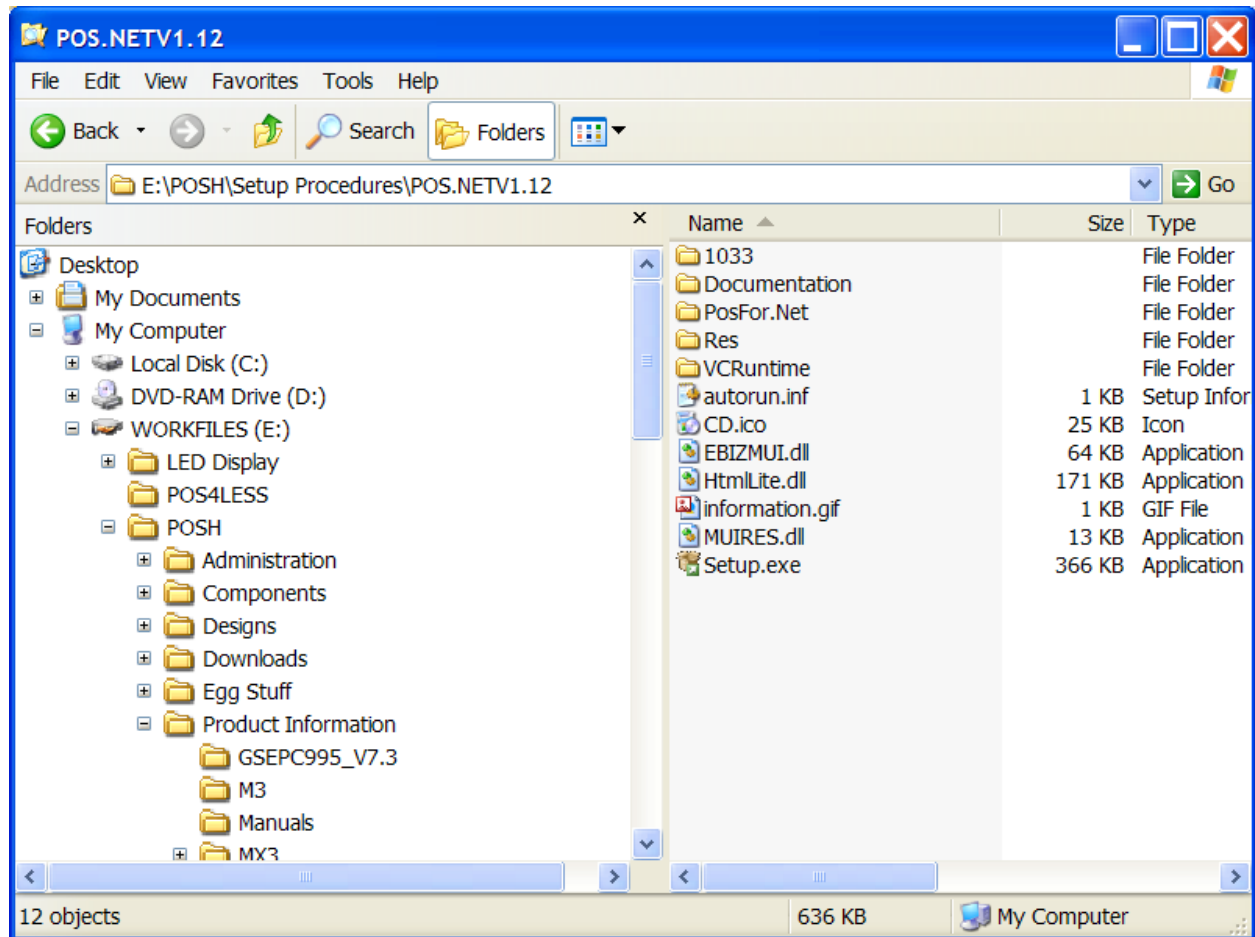
Byte Offset --- Usage Name

- 0 --- Track 1 decode status ('0' = Good Read, '1' = Read Error)
- 1 --- Track 2 decode status ('0' = Good Read, '1' = Read Error)
- 2 --- Track 3 decode status ('0' = Good Read, '1' = Read Error)
- 3 --- Track 1 data length (Up to 110 Characters)
- 4 --- Track 2 data length (Up to 110 Characters)
- 5 --- Track 3 data length (Up to 110 Characters)
- 6 --- Card encoding type (Type 00 = ISO/ABA card Type 01 = AAMVA card Type 02 = CADL Type 04=RFID)
- 7 - 116 --- Track 1 ASCII data (Mag card data or RFID UID number)
- 117 - 226 --- Track 2 ASCII data
- 227 - 336 --- Track 3 ASCII data

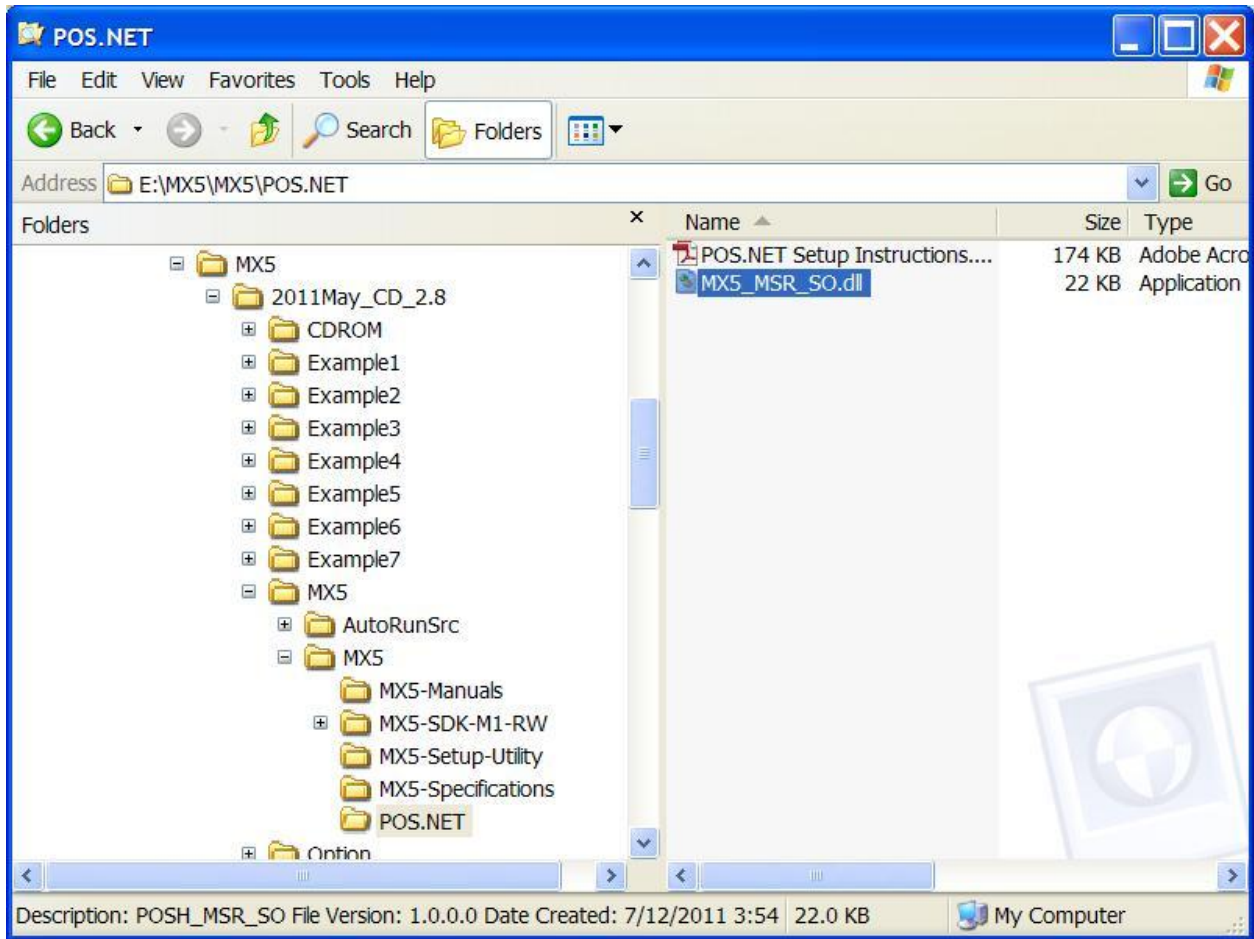
For a more detailed explanation of HID and coding examples, refer to the MX5 HID Programmers Manual on the CD. That document can be found in the MX5-Manuals folder.

OPOS/POS.NET Information

1. Download the "Microsoft Point of Service for .NET v1.12" (POS for .NET) library from the following link
<http://www.microsoft.com/downloads/en/details.aspx?FamilyID=EAAE202A-0FCC-406A-8FDE-35713D7841CA&displaylang=en>
2. Install POS for .NET by clicking on the setup.exe in the extracted folder. **Insure install location is:** C:\Program Files\Microsoft Point Of Service\

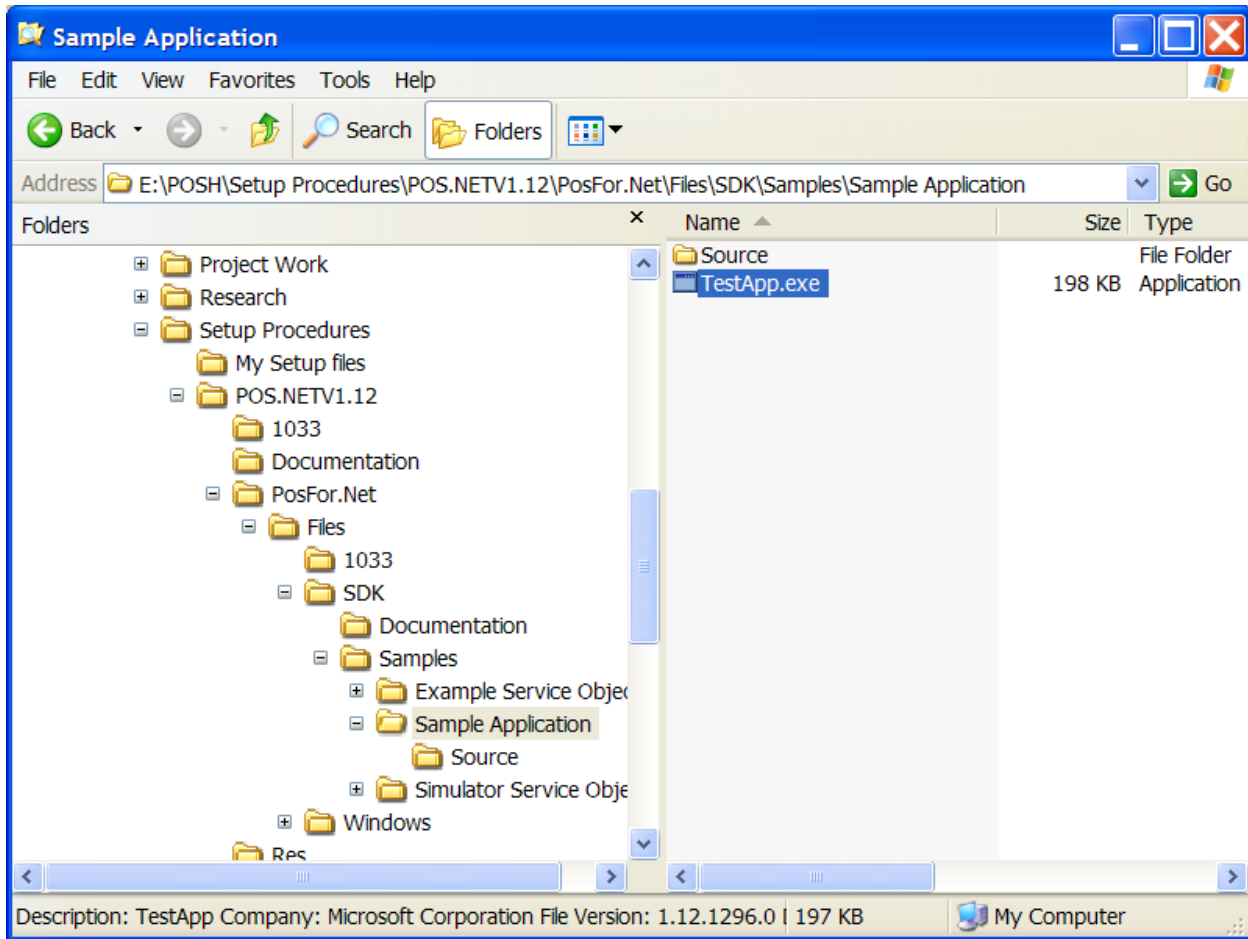


3. Copy MX5_MSR_SO.dll from the CDROM in this location: 'CDdrive:/MX5/POS.NET' to the Microsoft UPOS folder "C:\Program Files\Common Files\Microsoft Shared\Point Of Service\Control Assemblies"

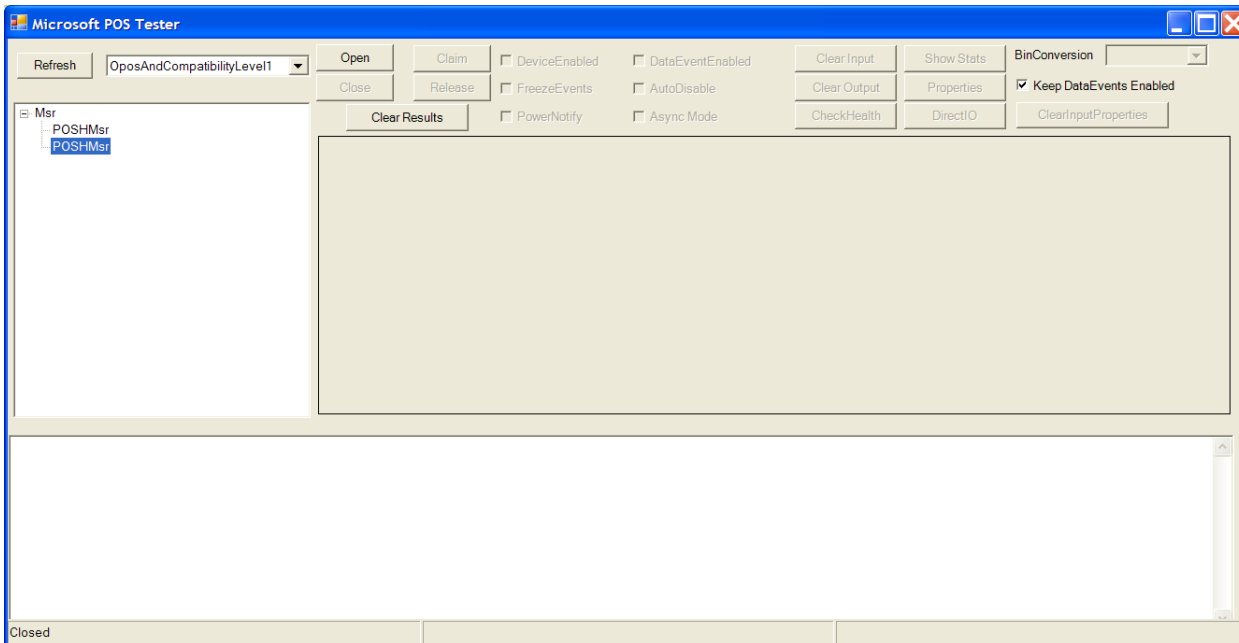


4. Run the test application to test POS on MX5-HID devices:

"CDDrive:\pos for.net install folder\PosFor.Net\Files\SDK\Samples\Sample Application\TestApp.exe"



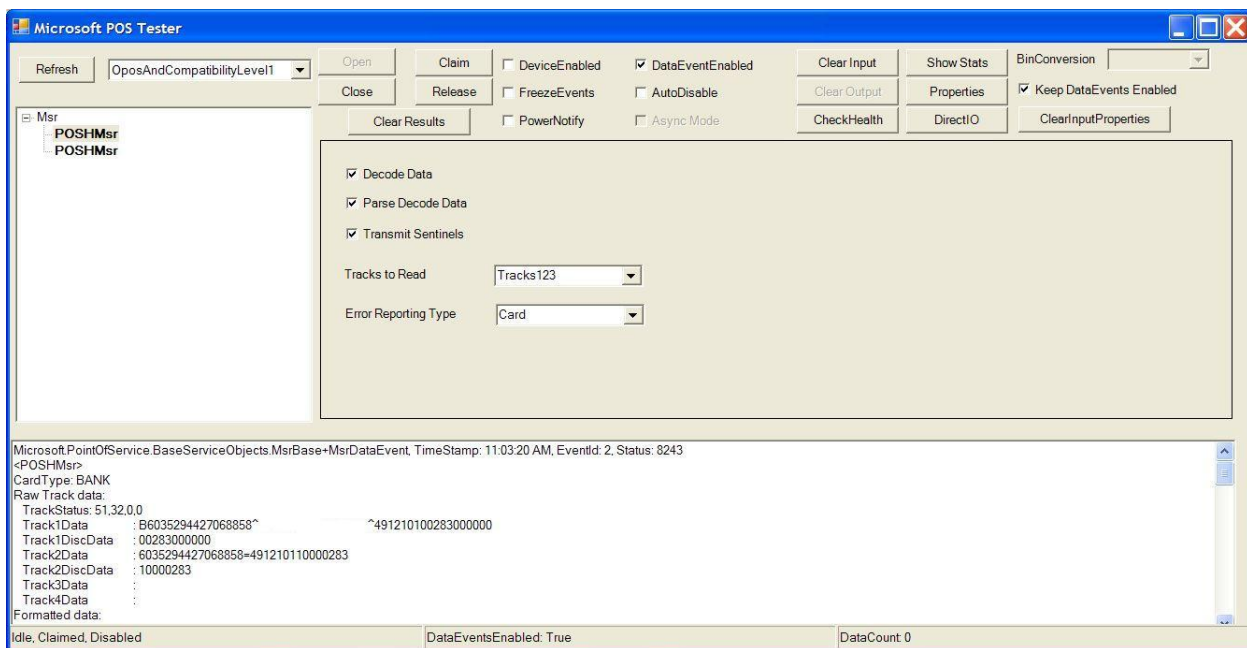
Sample of the TestApp screen:



You will notice that there are two entries of the Magnetic reader. This is due to there being two logical devices in the MX5. Always pick the first one to test with otherwise you will receive an 'UNABLE TO ENABLE DEVICE' error if you try to enable it. The Hardware Id of the right device will end in '00'.

Basic steps to see the MX5-HID device work with POS.NET

1. Click on 'Open'.
2. Click on 'Claim'.
3. Click on the checkbox of 'DeviceEnabled'.
4. To see the report on a card, click on the 'DataEventEnabled' checkbox and swipe a card through the reader.



5. Click on 'Release' when finished with the testing.

Troubleshooting and FAQ

In most instances, your MX5 product is a plug and play device and should operate trouble free. The drivers for most of the MX5 firmware applications are included with your Windows operating system (OS). It is highly recommended that your OS have all the latest service packs installed in order to insure proper operation of your MX5 device. Depending on the version of your OS, additional installation files (.INF) maybe required with the use of the Virtual Serial firmware (VRS). These files are included as part of the installation for the MX5 Utility and can be found in the MX5 Device subdirectory of your All Programs directory.

Below you will find a list of various Frequently Asked Questions (FAQ) and solutions which maybe helpful in resolving your issue with your MX5 product.

❖ My MX5 is not recognized by my Windows Operating System (OS)?

Solution: Unplug your MX5 from your computer and confirm you have installed the latest service pack and updates for your OS. You may need to restart your computer to complete the updates. Try installing the MX5 after your system has restarted. Windows should automatically install the appropriate drivers for your MX5. Your system may request driver information when using certain Firmware applications of the MX5. If this is the case, you can find these files in the MX5 Device directory which is created when you install the MX5 Utility.

❖ My System reports a Device error when I install my MX5?

Solution: Do Not unplug your MX5 from your computer. Open your device manager of your OS and list the device in question. Right click on the device in question and select properties of the device. Select the option to remove the device and click OK. Now unplug your MX5 from your computer and wait a few seconds before you plug your MX5 back. Some older versions of OS need to reboot after removing the device. You may want to try this option if you are still getting this error after removing the device.

❖ My MX5 LED flashes and beeps every second?

Solution: Your MX5 is set in upgrade mode. Use the MX5 Utility to reactivate your existing firmware or install a different Version of firmware into the MX5. By upgrading your firmware, your system may install different drivers for your MX5 device. This is normal and you should let the process complete normally.

Troubleshooting Continued

- ❖ When using my MX5 as a Virtual Serial (VRS) device, my software application cannot see the MX5 when I changed USB ports?

Solution: The MX5 is assigned a different COM port for each USB port. This is Normal and you will need to adjust the COM port to be the same on each USB port for the MX5 device. You can adjust the COM port for each USB by using your device manager and going to properties of the MX5 device. You will need to access the Advanced settings to change the COM port number. Make sure that your application software matches the selected COM port number. You will need to change this option for every USB port you wish to connect the MX5 device to.

- ❖ After mounting my MX5 Device to my monitor, two beeps are randomly heard from the MX5?

Solution: Older CRT monitors emit electromagnetic fields and mounting the MX5 to this type of monitor is not recommended. The CRT will interfere with the MX5 Magnetic Head and RFID device. Two beeps from the MX5 indicate an error state was detected which was caused by the CRT electromagnetic fields.

- ❖ After I upgraded my firmware on the MX5, I cannot see any data from the MX5 Device?

Solution: The default firmware installed into the MX5 device is commonly a keyboard device. When you read a card using the MX5, data is automatically typed to your computer as if someone has entered the data manually. If you have installed a new firmware application which is a Virtual Serial port (VRS) or HID Report device, the card data will no longer be sent to your keyboard port. Your software application will determine which interface you are required to use for your MX5 device. The MX5 Utility is designed to be used to upgrade, configure and test your MX5 device. You may need to open the View Data window in the MX5 Utility in order to see card data from your MX5 device if you have selected a VRS or HID firmware. If your MX5 is a Keyboard device, you can view card data in any word processing or note pad document.

- ❖ I have updated my firmware on my MX5 combo device and my RFID stopped working?

Solution: Check the hardware configuration setting using the MX5 Utility. You can enable or disable any portion of your combo reader. You can turn off the Magnetic card option of the MX5 and only use the RFID or SC option of the firmware. By doing so, you will not be able to read any magnetic cards. Reversely you can also turn off the RFID or SC of your MX5 device and only enable the Magnetic card option. The factory default setting for this option is the Magnetic card option is enabled only. You need to change this setting to enable both options and save your changes.

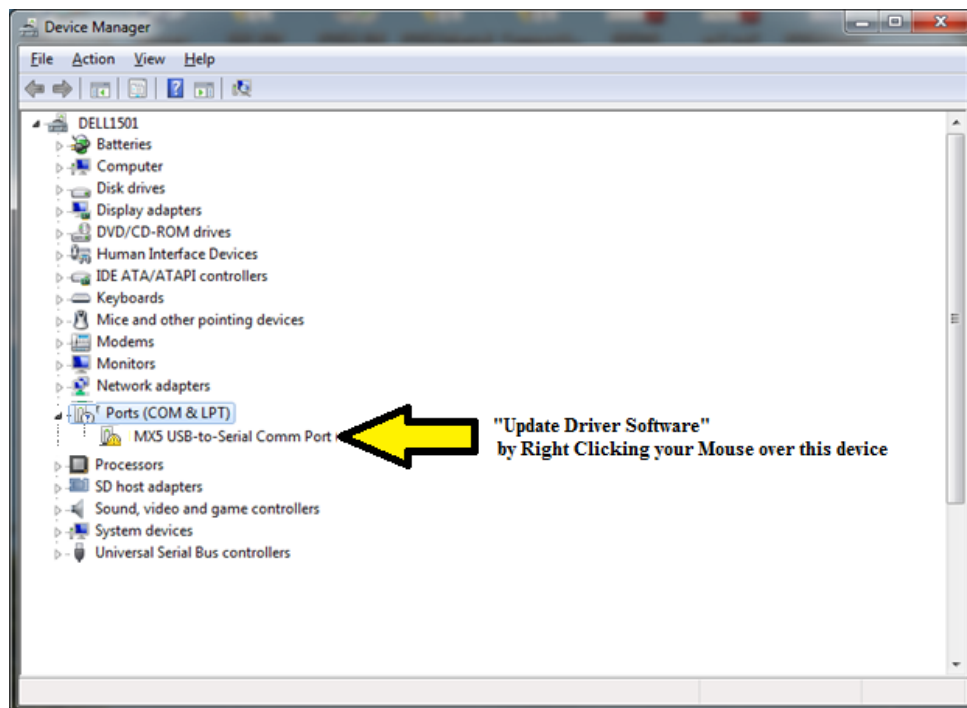
- ❖ I am using the MX5 and after I upgraded the firmware, the utility does not see any device?

Solution: As new firmware applications are created and released for the MX5 Series, upgrades are also done to the MX Utility and the Configuration. If you download new firmware files from the Internet, also make sure that you are using the latest MX Utility available. By downloading the latest MX Utility and installing it on your system, all the required updated files are automatically installed and updated.

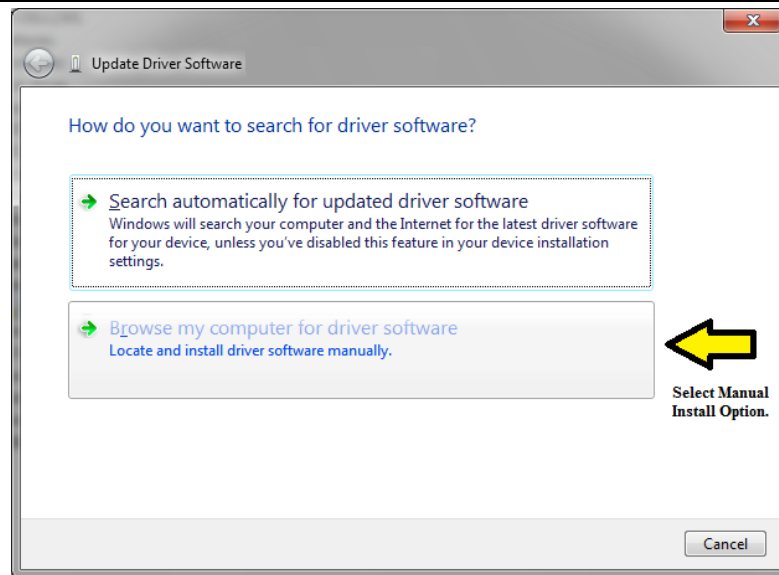
- ❖ After I upgraded my MX5 firmware with a VRS (Virtual Serial Port) version, my computer failed to install the device and returned an error message that the hardware did not install properly?

Solution: The MX5 only uses generic drivers which are included as part of your Microsoft Operating System(OS). We recommend that you keep your OS up to date with the latest upgrades and service packs available for your system. Also make sure that you are using the latest MX Utility available. By downloading the latest MX Utility and installing it on your system, all the required updated files are automatically installed and updated. The USB Virtual serial Port (VRS) makes use of a driver called usbser.sys which is included with your OS. You will find an Installation file located in the directory that you have selected during the install of the MX Utility. The default location is "C:/Program Files/MX5 Device/". The file is a setup information file called MX5_EN.inf.

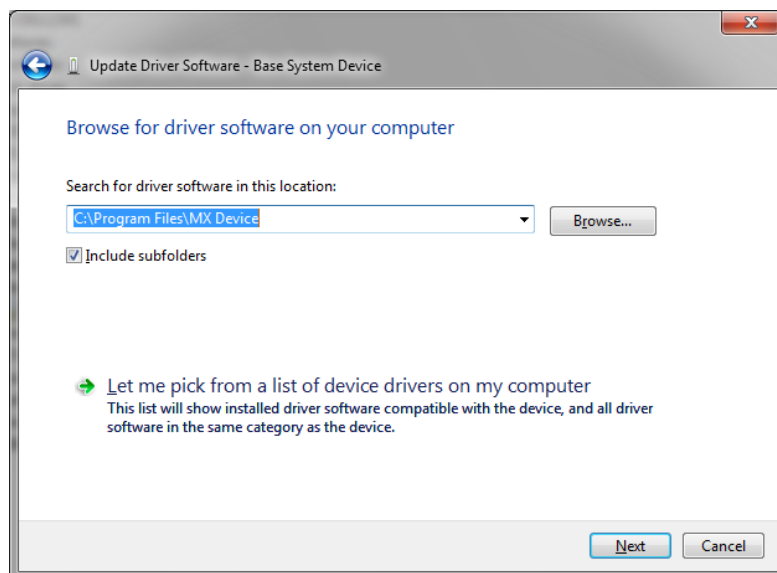
Use this file to update the drivers listing for the MX5 device. See the illustrations below on how to use this file. Open your device Manager for your OS and locate the device which did not install properly. You will see an "!" or "?" beside the device in question. Right Click your mouse cursor over the device and select "Update Driver Software" option. See illustration below.



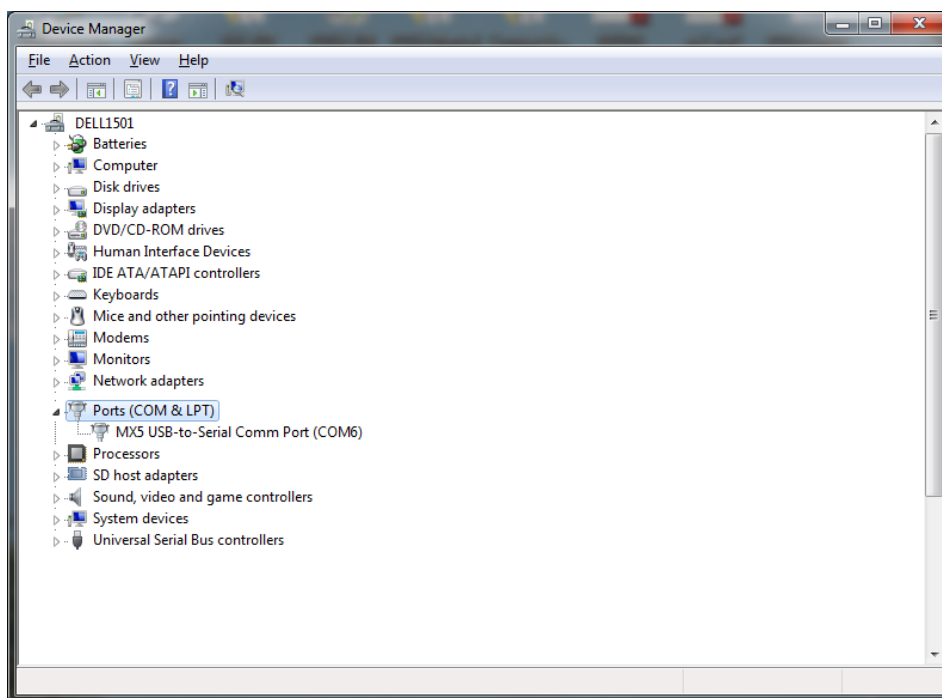
Once you have selected Update Driver Software, You will need to Select "Locate and install driver software manually" option. See illustration below.



You will then be asked to provide a search directory which contains the INF files for the MX5 Device. For this illustration the files are saved in the “C:\Program Files\MX5 Device” by default when you install the MX5 Utility. Use the Browse... option to select the location. See illustration below. Click “Next” once you have selected the location.



The system will then install the INF file for the MX5 Device. The system may ask you if you want to install this device driver, if so, select Install. When the installation completes, your device will be automatically configured and a COM port will be assigned to this device. (You can change this port number by going into Properties of the Device and selecting advance options) See illustration below.



You may need to close and re-open the MX5 Utility in order for the new device to appear in the selection pull down menu. It is recommended to always keep your operating system updated with the latest service pack and updated. The MX5 Device only uses the drivers which are supplied with your operating system. The INF file only contains the information of which files the operating system will need to install for the selected MX5 Device.

Other Considerations

- All the Device settings are stored inside each individual MX5 device flash memory. Moving the MX5 device to another computer will not affect the MX5 settings.
- All the configurable settings available through the MX5 utility can be configured by using a special QuickSet "Default Card". A factory default QuickSet card is provided with all our MX5 Magnetic card devices to setup the device to a known factory default mode. You can have your own Custom versions of the QuickSet setup card to meet your system and software requirements. This feature is ideal for hardware deployment and setting up your hardware. You do not need to use the MX5 Utility to setup your MX5 magnetic device when you use the QuickSet setup card. Just read the QuickSet card and all your settings are automatically saved into the flash memory of the MX5 device.
- Your MX53 magnetic card readers are all designed to be easily upgraded with an RFID or SC solution. Just remove the side cover from the MX53 card reader and attach one cable to your RFID or SC module. The module is designed to snap on the MX53 reader. The MX53 combo unit is now ready to be flashed with the appropriate supporting firmware.
- Custom firmware applications installed on your MX5 device may be designed to disable utility and upgrade functions. Contact your Device vendor for more details.
- Data Encryption features are only available on Custom firmware applications. Contact your Device vendor for more details.

Firmware Listing

The following is a list of the various firmware versions available to be upgraded into the MX5 Devices. Each firmware may require a specific hardware type in order to function properly. Some upgrades are hardware specific and can only be installed on specific hardware of the MX5 Devices. Accidental loading of the wrong firmware is prevented by the MX Device utility Version 2.8.0 or higher. Caution should be taken when using an older version of the utility. It is recommended to always use the latest version of the MX Device Utility.

MX53 List:

| | |
|--|---|
| 53-KB-MR-MCR Ver. 4.1 Product ID:10 Magnetic card reader, Keyboard output | Use this firmware on any MX53 with a three track magnetic card reader. Magnetic card data is typed out when a magnetic card is swiped on the reader. This firmware creates a second HID keyboard attached to the system. No special driver is required. |
| 53-VRS-MR-MCR Ver. 4.5 Product ID:11 Magnetic card reader, Virtual USB Serial output, ASCII Data | Use this firmware on any MX53 with a three track Magnetic card reader. Magnetic card data is sent out to the virtual serial Com port when a magnetic card is swiped on the reader. This firmware will create a Virtual serial device attached to a Com port. Use the MX5_EN.INF install file to automatically install the appropriate Microsoft Drivers provided with the OS. The MX5 setup utility when installed will provide this INF file. No additional drivers are required. |
| 53-HID-MR-MCR Ver. 4.5 Product ID:12 Magnetic card reader, HID report format output | Use this firmware on any MX53 with a three track Magnetic card reader. The three track Magnetic card data is sent out to a HID report when a magnetic card is swiped on the reader. This reader will send an interrupt to the system and then send a fixed report of characters from 0 - 336. This Report also includes Error status of each track, data length and type of card read. The MX5 setup utility Help File has more details on this report. No additional drivers are required. (ISO7810) Product ID: 0x9025 HEX |
| 53-KB-2D-MCR Ver. 4.1 Product ID:14 Magnetic card reader, 2D Barcode reader, Keyboard output | Use this firmware on any MX53 with a three track Magnetic card reader with an attached 2D Barcode reader. Magnetic card data or 2D Barcode data is typed out when a magnetic card is swiped or a barcode is read by the reader. This firmware creates a second HID keyboard attached to the system. No additional drivers are required. |
| 53-VRS-2D-MCR Ver. 4.5 Product ID:15 Magnetic card reader, 2D Barcode reader, Virtual USB Serial output, ASCII Data, | Use this firmware on any MX53 with a three track Magnetic card reader with an attached 2D Barcode reader. Magnetic card data or 2D Barcode data is sent out to the virtual serial Com port when a magnetic card is swiped or a barcode is read by the reader. This firmware will create a Virtual serial device attached to a Com port. Use the MX5_EN.INF install file to automatically install the appropriate Microsoft Drivers provided with the OS. The MX5 setup utility when installed will provide this INF file. No additional drivers are required. |
| 53-HID-2D-MCR Ver. 4.4 Product ID:16 Magnetic card reader, HID report format output, 2D Barcode reader | Use this firmware on any MX53 with a three track Magnetic card reader with an attached 2D Barcode reader. Magnetic card data or 2D Barcode data is sent out to a HID report when a magnetic card is swiped or a barcode is read by the reader. This reader will send an interrupt to the system and then send a fixed report of characters from 0 - 336. This Report also includes Error status of each track, data length and type of card read. The |

| | |
|--|--|
| | <p>MX5 setup utility Help File has more details on this report. No additional drivers are required.</p> <p>(ISO7810) Product ID: 0x9025 HEX</p> |
|--|--|

MX53-EM List:

| | |
|---|---|
| <p>53-KB-EM-UID Ver. 4.3 Product ID:20 Magnetic card reader with EM UID# reader, Keyboard output</p> | <p>Use this firmware on the MX5C or MX53 with an EM 125 KHz RFID “EM” Module only. The three track magnetic card reader option can be turned off if desired using the setup utility. The unique random serial number on the EM RFID card is Read automatically and typed out as if someone manually typed the number. Magnetic card data is also typed out when a magnetic card is swiped on the reader. This firmware creates a second HID keyboard attached to the system. No special driver is required. (EM4100, EM4102, TK4100, ISO7810)</p> |
| <p>53-VRS-EM-UID Ver. 4.5 Product ID:21 Magnetic card reader with EM UID# reader, Virtual USB Serial output, ASCII Data</p> | <p>Use this firmware on the MX5C or MX53 with an EM 125 KHz RFID “EM” Module only. The three track magnetic card reader option can be turned off if desired using the setup utility. The unique random serial number on the EM RFID card is Read automatically and sent out directly to the virtual serial Com port. Magnetic card data is also sent out to the virtual serial Com port when a magnetic card is swiped on the reader. This firmware will create a Virtual serial device attached to a Com Port. Use the MX5_EN.INF install file to automatically install the appropriate Microsoft Drivers provided with the OS. The MX5 setup utility when installed will provide this INF file. No additional drivers are required. (EM4100, EM4102, TK4100, ISO7810)</p> |
| <p>53-HID-EM-UID Ver. 4.4 Product ID:22 Magnetic card reader with EM UID# reader, HID report format output</p> | <p>Use this firmware on the MX53 with a 125 KHz RFID "EM" Module only. The UID on the EM RFID card is Read automatically and sent to Track 1 of the HID Device in Mag-Tek report format. This Report also includes Error status of each track, data length and type of card read. The MX5 setup utility Help File has more details on this report. Magnetic card data is also sent out to the HID device when a magnetic card is swiped on the reader. An event flag is set by the HID device when data is available in the buffer. No additional driver is required. (EM4100, EM4102, TK4100,ISO7810)</p> |

MX53-M2 List:

| | |
|---|--|
| <p>53-KB-M2-UID Ver. 4.8 Product ID:30 Magnetic card reader with Mifare S50 ID# reader, Keyboard output</p> | <p>Use this firmware on the MX53 with a Mifare 13.56 MHz RFID “M2” add on Module only. The three track magnetic card reader option can be turned off if desired using the setup utility. The unique random serial number on the RFID card is Read automatically and typed out as if someone manually typed the number. Magnetic card data is also typed out when a magnetic card is swiped on the reader. This firmware creates a second HID keyboard attached to the system. No special driver is required. (Mifare M50, M70, ISO-14443A)</p> |
| <p>53-VRS-M2-UID Ver. 4.3 Product ID:31</p> | <p>Use this firmware on the MX53 with a Mifare 13.56 MHz RFID “M2” add on Module only. The three track magnetic card reader option can be turned off if desired using the</p> |

| | |
|--|---|
| <p>Magnetic card reader with Mifare S50 ID# reader, Virtual USB Serial output, ASCII Data</p> | <p>setup utility. The unique random serial number on the RFID card is Read automatically and sent out directly to the virtual serial Com port. Magnetic card data is also sent out to the virtual serial Com port when a magnetic card is swiped on the reader. This firmware will create a serial device attached to a Com port. Use the MX5_EN.INF install file to automatically install the appropriate Microsoft Drivers provided with the OS. The MX5 setup utility when installed will provide this INF file. No additional drivers are required. (Mifare M50, M70, ISO-14443A)</p> |
| <p>53-HID-M2-UID Ver. 1.2 Product ID:32 Magnetic card reader with Mifare S50 ID# reader, HID report format output</p> | <p>Use this firmware on the MX53 with a 13.56 Mhz RFID "M2" Module only. The UID on the RFID card is Read automatically and sent to Track 1 of the HID Device in Mag-Tek report format. This Report also includes Error status of each track, data length and type of card read. The MX5 setup utility Help File has more details on this report. Magnetic card data is also sent out to the HID device when a magnetic card is swiped on the reader. An event flag is set by the HID device when data is available in the buffer. No special driver is required. (Mifare M50, M70, ISO-14443A)</p> |
| <p>53-VRS-M2-RW Ver. 2.9 Product ID:33 Magnetic card reader with Mifare S50/S70 Data Reader / Writer, Virtual USB Serial output, Format ASCII Data, SDK</p> | <p>Use this firmware Read / Write Mifare S50 Cards using the MX53 with a Mifare, 13.56 MHz RFID "M2" add on Module only. The three track magnetic card reader option can be turned off if desired using the setup utility. This firmware is designed to be used with the RFID SDK (System Development Kit) and the MX5-RFID Utility. Using a DLL or a serial Protocol to Read and Write data to the S50 Mifare Memory Card. Magnetic card data is also sent out to the virtual serial Com port when a magnetic card is swiped on the reader. This firmware will create a serial device attached to a Com port. Use the MX5_EN.INF install file to automatically install the appropriate Microsoft Drivers provided with the OS. The MX5 setup utility when installed will provide this INF file. No additional drivers are required. (Mifare M50, ISO-14443A) Use Libs50.DLL or VRS Protocol Ver. 2.0-RFID</p> |
| <p>53-VRS-M2-CCID Ver. 1.0 Product ID:34 Magnetic card reader with Mifare S50/S70 Data Reader / Writer, CCID Smart Card Reader, Virtual USB Serial output, Format ASCII Data</p> | <p>Use this firmware Read / Write Mifare S50 Cards using the MX53 with a Mifare, 13.56 MHz RFID "M2-SC" add on Module only. The three track magnetic card reader option can be turned off if desired using the setup utility. Using a DLL or a serial Protocol to Read and Write data to the S50 Mifare Memory Card. Magnetic card data is also sent out to the virtual serial Com port when a magnetic card is swiped on the reader. This firmware will create a serial device attached to a Com port. This Firmware also creates a composite USB Smart Card class-device using (Usbccid.sys) that is compliant with the USB Chip/Smart Card Interface Devices (CCID) Specification. Use the MX5_EN.INF install file to automatically install the appropriate Microsoft Drivers provided with the OS. The MX5 setup utility will provide this INF file when it is installed. No additional drivers are required. (Mifare M50, ISO-14443A) Use Libs50.DLL or VRS Protocol Ver. 2.0-RFID</p> |
| <p>53-KB-M2-UID2 Ver. 4.6 Product ID:40 Magnetic card reader with I-</p> | <p>Use this firmware on the MX53 with an I-Code 2 (Mifare II) 13.56 MHz RFID "M2" Module only. The three track magnetic card reader option can be turned off if desired using the setup utility. The unique random serial number on the I-Code2 RFID card is</p> |

| | |
|--|---|
| Code2 ID# reader, Keyboard output | Read automatically and typed out as if someone manually typed the number. Magnetic card data is also typed out when a magnetic card is swiped on the reader. This firmware creates a second HID keyboard attached to the system. No special driver is required. I-CODE2 (ISO-15693) |
| 53-VRS-M2-UID2 Ver. 4.2 Product ID:41 Magnetic card reader with I-Code2 ID# reader, Virtual USB Serial output, ASCII Data | Use this firmware on the MX53 with an I-Code 2 (Mifare II) 13.56 MHz RFID “M2” Module only. The three track magnetic card reader option can be turned off if desired using the setup utility. The unique random serial number (UID) on the I-Code2 RFID card is Read automatically and sent out directly to the virtual serial Com port. Magnetic card data is also sent out to the virtual serial Com port when a magnetic card is swiped on the reader. This firmware will create a serial device attached to a Com port. Use the MX5_EN.INF install file to automatically install the appropriate Microsoft Drivers provided with the OS. The MX5 setup utility when installed will provide this INF file. No additional drivers are required. I-CODE2 (ISO-15693) |
| 53-VRS-M2-UID-RW2 Ver. 1.7 Product ID:43 Magnetic card reader with I-Code2 Data Reader / Writer, Virtual USB Serial output, Format ASCII Data, SDK | Use this firmware to Read / Write I-Code 2 Cards using the MX53 with a 13.56 MHz RFID “M2” add on Module only. This firmware is designed to be used with the RFID SDK (System Development Kit) and the MX5-RFID Utility. Using a DLL or a serial Protocol to Read and Write data to the I-Code2 Memory Card. Magnetic card data is also sent out to the virtual serial Com port when a magnetic card is swiped on the reader. This firmware will create a serial device attached to a Com port. Use the MX5_EN.INF install file to automatically install the appropriate Windows Drivers provided with the OS. The MX5 setup utility when installed will provide this INF file. No additional drivers are required. I-CODE2 (ISO-15693) Use Libs50.DLL or VRS Protocol Ver. 2.0-RFID |

MX53-SC List:

| | |
|--|--|
| 53-KB-SC-CCID Ver. 2.8 Product ID:50 Magnetic card reader Keyboard output with CCID Microsoft Class Driver for Smart Cards | Use this firmware on the MX53 with an IC Smart Card (SC) add on Module. The three track magnetic card reader option can be turned off if desired using the setup utility. Magnetic card data is typed out when a magnetic card is swiped on the reader. This firmware creates a second HID keyboard attached to the system. This Firmware also creates a composite USB smart card class-device using (Usbccid.sys) that is compliant with the USB Chip/Smart Card Interface Devices (CCID) Specification. |
| 53-VRS- SC-SLE Ver. 2.5 Product ID:51 Magnetic card reader with SLE 4428/5528 Reader / Writer, Virtual USB Serial output/input, ASCII Data | Use this firmware on the MX53 with an IC Smart Card (SC) add on Module for the SLE 4428/5528 Memory Cards. The three track magnetic card reader option can be turned off if desired using the setup utility. The SLE 4428/5528 Smart Card can be written or read thru the Com port using the POSH command Set 1.0. Magnetic card data is also sent out to the virtual serial Com port when a magnetic card is swiped on the reader. This firmware will create a serial device attached to a USB Com port. Use the MX5_EN.INF install file to automatically install the appropriate Microsoft Drivers provided with the OS. The MX5 setup utility when installed will provide this INF file. No additional drivers are required. (SLE-4428) Use VRS Protocol Ver. 1.0-SLE |

| | |
|---|--|
| 53-HID-SC-CCID Ver. 1.0 Product ID:52 Magnetic card reader HID output with CCID Microsoft Class Driver for Smart Cards | Use this firmware on the MX53 with an IC Smart Card (SC) add on Module. The Smart Card or Magnetic Card is Read and data is sent to the HID Device in Mag-Tek report format. This firmware creates a second HID keyboard attached to the system. This Firmware also creates a composite USB smart card class-device using (Usbccid.sys) that is compliant with the USB Chip/Smart Card Interface Devices (CCID) Specification. |
| 53-VRS-M2-CCID Ver. 1.0 Product ID:55 Magnetic card reader Serial output with CCID Microsoft Class Driver for Smart Cards | Use this firmware on the MX53 with a 13.56 MHz RFID/IC Smart Card "M2SC" Module. The unique random number on the RFID card is Read automatically and sent out directly to the virtual serial Com port. A Smart Card can be written or read thru the Com port using the POSH command Set 1.0. Magnetic card data is also sent out to the virtual serial Com port when a magnetic card is swiped on the reader. This firmware will create a serial device attached to a Com port. Firmware also uses a composite USB smart card class-device (Usbccid.sys) that is compliant with the USB Chip/Smart Card Interface Devices (CCID) Specification. Use the MX5_EN.INF install file to automatically install the appropriate Microsoft Drivers provided with the OS. The installation of the MX5 utility will provide this INF file. No additional drivers are required. |
| 53-HID-M2-CCID Ver. 1.0 Product ID:56 Magnetic card reader HID output with CCID Microsoft Class Driver for Smart Cards | Use this firmware on the MX53 with an 13.56 MHz RFID/IC Smart Card "M2SC" Module. The Smart Card, RFID(UID) or Magnetic Card is Read and data is sent to the HID Device in report format. This firmware creates a second HID keyboard attached to the system. This Firmware also creates a composite USB smart card class-device using System driver Usbccid.sys that is compliant with the USB Chip/Smart Card Interface Devices (CCID) Specification. |

MX5C-EM List:

| | |
|---|---|
| 5C- KB -EM-UID Ver. 4.3 Product ID:60 EM ID# reader, Keyboard output | Use this firmware on the MX5C with an EM 125 KHz RFID "EM" Module only. The unique random serial number (UID) on the EM RFID card is Read automatically and typed out as if someone manually typed the number. This firmware creates a second HID keyboard attached to the system. No special driver is required. (EM4100, EM4102, TK4100, ISO7810) |
| 5C-VRS-EM-UID Ver. 4.5 Product ID:61 EM ID# reader, Virtual USB Serial output, ASCII Data | Use this firmware on the MX5C with an EM 125 KHz RFID "EM" Module only. The unique random serial number (UID) on the EM RFID card is Read automatically and sent out directly to the virtual serial Com port. This firmware will create a Virtual serial device attached to a Com Port. Use the MX5_EN.INF install file to automatically install the appropriate Microsoft Drivers provided with the OS. The MX5 setup utility when installed will provide this INF file. No additional drivers are required. (EM4100, EM4102, TK4100, ISO7810) |
| 5C- HID-EM-UID Ver. 4.4 Product ID:62 EM ID# reader, HID report format output | Use this firmware on the MX5C with a 125 KHz RFID "EM" Module only. The UID on the EM RFID card is Read automatically and sent to Track 1 of the HID Device in Mag-Tek report format. This Report also includes Error status of each track, data length and type of card read. The MX5 setup utility Help File has more details on this report. An event flag is set by the HID device when data is available in the buffer. No additional |

| | |
|--|--|
| | <p>driver is required. se this firmware on the MX5C with an EM 125 KHz RFID “EM” Module only. The unique random serial number (UID) on the EM RFID card is Read automatically and sent out as track 1 data to the HID report. This reader will send an interrupt to the system and then send a fixed report of characters from 0 - 336. This Report also includes Error status of each track, data length and type of card read. The MX5 setup utility Help File has more details on this report. No additional drivers are required.</p> <p>(EM4100, EM4102, TK4100, ISO7810)</p> |
|--|--|

MX5C-SC List:

| | |
|---|--|
| 5C-KB -SC-CCID Ver. 2.8 Product ID:70 Keyboard output with CCID Microsoft Class Driver for Smart Cards | Use this firmware on the MX5C with an IC Smart Card (SC) add on Module. This firmware creates a second HID keyboard attached to the system. This Firmware also creates a composite USB smart card class-device using (Usbccid.sys) that is compliant with the USB Chip/Smart Card Interface Devices (CCID) Specification. |
| 5C-VRS-SC- SLE Ver. 2.5 Product ID:71 SLE 4428/5528 Reader / Writer, Virtual USB Serial output/input, ASCII Data | Use this firmware on the MX5C with an IC Smart Card (SC) add on Module for the SLE 4428/5528 Memory Cards. The SLE 4428/5528 Smart Card can be written or read thru the Com port using the POSH command Set 1.0. This firmware will create a serial device attached to a USB Com port. Use the MX5_EN.INF install file to automatically install the appropriate Microsoft Drivers provided with the OS. The MX5 setup utility when installed will provide this INF file. No additional drivers are required. (SLE-4428) Use VRS Protocol Ver. 1.0-SLE |
| 5C-HID-SC-CCID Ver. 1.0 Product ID:72 Smart card reader, HID output with CCID Microsoft Class Driver for Smart Cards | Use this firmware on the MX5C with an IC Smart Card (SC) add on Module. The Smart Card is Read and data is sent to the HID Device in Mag-Tek report format. This firmware creates a second HID keyboard attached to the system. This Firmware also creates a composite USB smart card class-device using (Usbccid.sys) that is compliant with the USB Chip/Smart Card Interface Devices (CCID) Specification. |
| 5C-VRS-M2-CCID Ver. 1.0 Product ID:75 Magnetic card reader Serial output with CCID Microsoft Class Driver for Smart Cards | Use this firmware on the MX5C with a 13.56 MHz RFID/IC Smart Card "M2SC" Module. The unique random number on the RFID card is Read automatically and sent out directly to the virtual serial Com port. A Smart Card can be written or read thru the Com port using the POSH command Set 1.0. This firmware will create a serial device attached to a Com port. Firmware also uses a composite USB smart card class-device driver (Usbccid.sys) that is compliant with the USB Chip/Smart Card Interface Devices (CCID) Specification. Use the MX5_EN.INF install file to automatically install the appropriate Microsoft Drivers provided with the OS. The installation of the MX5 utility will provide this INF file. No additional drivers are required. |
| 5C-HID-M2-CCID Ver. 1.0 Product ID:76 Magnetic card reader HID output with CCID Microsoft Class Driver for Smart Cards | Use this firmware on the MX5C with an 13.56 MHz RFID/IC Smart Card "M2SC" Module. The Smart Card and RFID(UID) is Read and data is sent to the HID Device in report format. This firmware creates a second HID keyboard attached to the system. This Firmware also creates a composite USB smart card class-device using (Usbccid.sys) that is compliant with the USB Chip/Smart Card Interface Devices (CCID) Specification. |

MX5C-M2-List:

| | |
|--|---|
| 5C-KB -M2-UID Ver. 4.8 Product ID:80 Mifare S50 ID# reader, Keyboard output | Use this firmware on the MX5C with a Mifare 13.56 MHz RFID “M2” add on Module only. The unique random serial number (UID) on the RFID card is Read automatically and typed out as if someone manually typed the number. This firmware creates a second HID keyboard attached to the system. No special driver is required. (Mifare M50, M70, ISO-14443A) |
| 5C-VRS -M2-UID Ver. 4.3 Product ID:81 Mifare S50 ID# reader, Virtual USB Serial output, ASCII Data | Use this firmware on the MX5C with a Mifare 13.56 MHz RFID “M2” add on Module only. The unique random serial number (UID) on the RFID card is Read automatically and sent out directly to the virtual serial Com port. This firmware will create a serial device attached to a Com port. Use the MX5_EN.INF install file to automatically install the appropriate Microsoft Drivers provided with the OS. The MX5 setup utility when installed will provide this INF file. No additional drivers are required. (Mifare M50, M70, ISO-14443A) |
| 5C- HID-M2-UID Ver. 1.2 Product ID:82 Mifare ID# reader, HID report format output | Use this firmware on the MX5C with a 13.56 Mhz RFID "M2" Module only. The UID on the RFID card is Read automatically and sent to Track 1 of the HID Device in Mag-Tek report format. This Report also includes Error status of each track, data length and type of card read. The MX5 setup utility Help File has more details on this report. An event flag is set by the HID device when data is available in the buffer. No special driver is required. (Mifare M50, M70, ISO-14443A) |
| 5C-VRS -M2-RW Ver. 2.9 Product ID:83 Mifare S50/S70 Data Reader / Writer, Virtual USB Serial output, Format ASCII Data, SDK | Use this firmware to Read/Write Mifare S50 Cards using the MX5C with a Mifare, 13.56 MHz RFID “M2” add on Module only. This firmware is designed to be used with the RFID SDK (System Development Kit) and setup on the MX5-RFID Utility. It uses a DLL or the serial Protocol to Read and Write data to the S50 Mifare Memory Card. This firmware will create a serial device attached to a Com port. Use the MX5_EN.INF install file to automatically install the appropriate Microsoft Drivers provided with the OS. The MX5 setup utility when installed will provide this INF file. No additional drivers are required. (Mifare S50, ISO-14443A) Use Libs50.DLL or VRS Protocol Ver. 2.0-RFID |
| 5C-KB-M2-UID2 Ver. 4.6 Product ID:90 I-Code ID# reader, Keyboard output | Use this firmware on the MX5C with an I-Code 2 13.56 MHz RFID “M2” Module only. The unique random serial number (UID) on the I-Code2 RFID card is Read automatically and typed out as if someone manually typed the number. This firmware creates a second HID keyboard attached to the system. No special driver is required. I-CODE2 (ISO-15693) |
| 5C-VRS-M2-UID2 Ver. 4.2 Product ID:91 I-Code ID# reader, Virtual USB Serial output, ASCII Data | Use this firmware on the MX5C with an I-Code 13.56 MHz RFID “M2” Module only. The unique random serial number (UID) on the I-Code2 RFID card is Read automatically and sent out directly to the virtual serial Com port. This firmware will create a serial device attached to a Com port. Use the MX5_EN.INF install file to automatically install the appropriate Microsoft Drivers provided with the OS. The MX5 setup utility when installed will provide this INF file. No additional drivers are required. I-CODE2 (ISO-15693) |

| | |
|--|---|
| 5C-VRS-M2-RW2 Ver. 1.7 Product ID:93 I-Code ID# reader/writer, Virtual USB Serial output, ASCII Data | Use this firmware Read / Write ICode Cards using the MX5C with a 13.56 MHz RFID “M2” add on Module only. This firmware is designed to be used with the RFID SDK (System Development Kit) and the MX5-RFID Utility. Using a DLL or a serial Protocol to Read and Write data to the ICode Card. This firmware will create a serial device attached to a Com port. Use the MX5_EN.INF install file to automatically install the appropriate Microsoft Drivers provided with the OS. The MX5 setup utility when installed will provide this INF file. No additional drivers are required. (ICode, ISO-15693) Use Libs50.DLL or VRS Protocol Ver. 2.0-RFID |
|--|---|

MX5T List:

| | |
|---|---|
| 5T-KB -EM-UID Ver. 4.0 Product ID:100 EM ID# reader, Keyboard output | Use this firmware on the MX5T EM 125 KHz RFID Reader ONLY. The unique random serial number (UID) on the EM RFID card is Read automatically and typed out as if someone manually typed the number. This firmware creates a second HID keyboard attached to the system. No special driver is required. (EM4100, EM4102, TK4100, ISO7810) |
| 5T-KB -M2-UID Ver. 4.2 Product ID:110 Mifare S50/S70 ID# reader, Keyboard output | Use this firmware on the MX5T Mifare 13.56 MHz RFID Reader ONLY. The unique random serial number (UID) on the M1 RFID card is Read automatically and typed out as if someone manually typed the number. This firmware creates a second HID keyboard attached to the system. No special driver is required. (Mifare M50, M70, ISO-14443A) |
| 5T-VRS-M2-RW Ver. 2.3 Product ID:113 Mifare S50 Data Reader / Writer, Virtual USB Serial output, Format ASCII Data, SDK | Use this firmware on the MX5T ONLY to Read / Write Mifare S50 Cards. Mifare 13.56 MHz RFID Reader/Writer. The unique random serial number (UID) of the Mifare RFID card can also be Read automatically. This firmware is designed to be used with the RFID SDK (System Development Kit) and the MX5-RFID Utility. Using a DLL or a serial Protocol to Read and Write data to the S50 Mifare Memory Card. This firmware will create a serial device attached to a Com port. Use the MX5_EN.INF install file to automatically install the appropriate Microsoft Drivers provided with the OS. The MX5 setup utility when installed will provide this INF file. No additional drivers are required. (Mifare M50, ISO-14443A) Use Libs50.DLL or VRS Protocol Ver. 2.0-RFID |
| 5T-KB-M2-UID2 Ver. 4.2 Product ID:120 I-CODE2 Reader, Keyboard output | Use this firmware on the MX5T ONLY. Mifare 13.56 MHz RFID Reader. The unique random serial number (UID) on the I-CODE2 RFID card is Read automatically and typed out as if someone manually typed the number. This firmware creates a second HID keyboard attached to the system. No special driver is required. I-CODE2 (ISO-15693) |
| 5T-VRS-M2-RW2 Ver. 1.0 Product ID:123 I-CODE2 Reader / Writer, Virtual USB Serial output, Format ASCII Data, SDK | Use this firmware on the MX5T ONLY to Read / Write I-CODE2 Reader/Writer. This firmware is designed to be used with the MX5-RFID SDK Utility. Using a DLL or a serial Protocol to Read and Write data to the I-CODE2 Card/Tag. This firmware will create a serial device attached to a Com port. Use the MX5_EN.INF install file to automatically install the appropriate Microsoft Drivers provided with the OS. The MX5 setup utility when installed will provide this INF file. No additional drivers are required. (I-CODE2 (ISO-15693) Use VRS Protocol Ver. 2.0-RFID |
| 5T-KB-EI-UID Ver. 4.0 Product ID:130 EM ID# & Mifare S50/S70 ID# reader, Keyboard output | Use this firmware on the MX5T ONLY. EM 125 KHz and Mifare 13.56 MHz RFID Reader. The unique random serial number (UID) of the EM and Mifare RFID cards are Read automatically and typed out as if someone manually typed the number. This firmware creates a second HID keyboard attached to the system. No special driver is required. (Mifare M50, M70, ISO-14443A) (EM4100, EM4102, TK4100, ISO7810) |

New firmware applications and updates are available off the manufacturer's website. Custom applications, SDK (System Development Kits) are available for all the MX5 series products. Contact your MX5 device supplier for more details.