

# MX 900 Series

## Installation Guide

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# **MX 900 Series Installation Guide**

## **Part Number SPC132-022-01-A, Revision A**

March 1, 2012

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DRAFT

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## Contents

<b>1. Introduction</b> . . . . .	<b>1</b>
Intended Audience . . . . .	1
Document Organization . . . . .	1
Modifications to this document . . . . .	1
Acronyms, Abbreviations, and Definitions . . . . .	2
<b>2. Hardware Installation</b> . . . . .	<b>3</b>
Installing the Device . . . . .	3
To unpack the shipping carton . . . . .	3
Selecting a Location . . . . .	4
Stand Mount . . . . .	5
Wall Mount . . . . .	6
PIN Protection Measures . . . . .	7
Installing Optional Components . . . . .	8
Installing Countertop Wedge . . . . .	8
Removing or Installing the I/O Module . . . . .	9
Installing MSAM or SD Cards . . . . .	10
Installing the Stylus and Holster . . . . .	14
Removing the Privacy Shield . . . . .	16
Connecting the Device . . . . .	17
I/O Module . . . . .	17
Multiport Cable . . . . .	18
Connecting ECR in Tailgate Mode . . . . .	20
Connecting to a Host PC . . . . .	21
Connecting to the Ethernet LAN . . . . .	21
Connecting to USB Host or Hub . . . . .	21
Powering up . . . . .	22
Using the I/O Module . . . . .	22
Using the Multiport Cable . . . . .	23
Calibrate Touch Screen . . . . .	24
<b>3. Maintenance</b> . . . . .	<b>25</b>

Cleaning the Terminal . . . . . 25  
Cleaning the Display Screen . . . . . 25  
Magnetic Stripe Cleaner . . . . . 25  
Smart Card Reader . . . . . 25

**4. Terminal Specifications . . . . . 27**  
Terminal Specifications . . . . . 27

DRAFT

# 1 INTRODUCTION

This installation guide is your primary source of information for setting up and installing the MX 900 Series terminals, the MX 915™ and MX 925™.

## Intended Audience

This guide is useful for anyone installing and configuring the MX 900 Series terminals. A basic description of terminal features is also provided.

## Document Organization

The following chapters are included:

Chapter 1, Introduction, explains the Intended Audience, Document Organization, and common acronyms, abbreviations, and definitions used.

Chapter 2, Installation, explains how to install the MX 900 Series terminals.

Chapter 3, Maintenance, explains how to maintain your MX 900 Series terminals.

Chapter 4, Specifications, provides information on power, environment, and dimensions of the hardware.

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## Modifications to this document

This document may be changed or extended to include new product requirements.

## Acronyms, Abbreviations, and Definitions

The following table describes the common acronyms, abbreviations, and definitions used:

Convention	Meaning
BFI	Buffer Flush Interval
bps	bits per second
CRC	Cyclic Redundancy Check
FA	File Authentication
Firmware	Software in FLASH/ROM
FTP	File Transfer Protocol
GISKE	Global Interoperable Secure Key Exchange
iPKG	The Itsy Package Management System
IPP	Internal PIN Pad
ISR	Interrupt Service Routine
JFFS2	Journaling Flash File System
KLK	VSS Key Loading Key
KSN	Key Serial Number
KVC	Key Verification Code
LED	Light Emitting Diode
MS	Master Session
MSR	Magnetic Stripe Reader
NFS	Network File System
OSS	Open Sound System
PED	PIN Entry Device
PEK	PIN Encryption Key
RFCR	RF Card Reader
RRT	Receive Record Threshold
RTC	Real-time Clock
SAM	Security Access Module
VRK	VeriShield Remote Key
VSS	VeriShield Security Scripts



# 2 HARDWARE INSTALLATION

This chapter describes the MX 900 Series installation procedures and includes connection examples.

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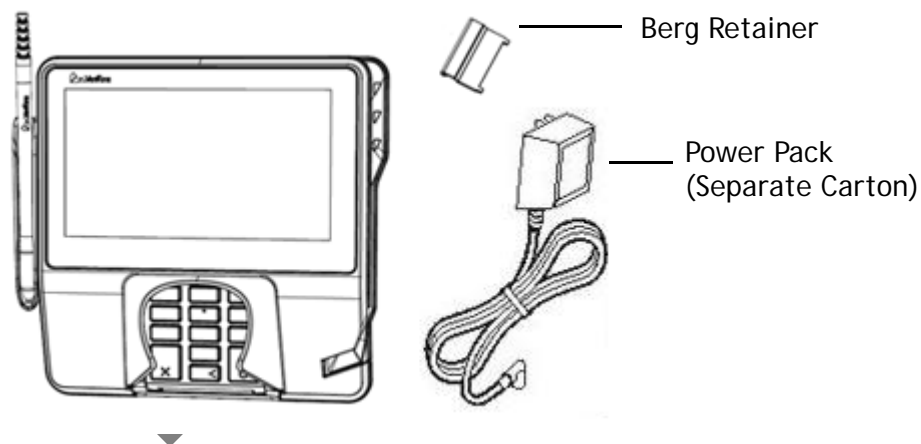
## Installing the Device

This section presents installation guidelines for the MX 900 Series terminal.

### Unpacking

Open the shipping carton and carefully inspect the contents for possible tampering or shipping damage.

**Warning:** Do not use a damaged terminal.



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## To unpack the shipping carton

1. With the shipping carton right side up, open the top and remove all items from the carton:
  - Terminal unit
  - Power pack (Separate Packaging)
  - Berg retainer
2. Remove the protective plastic wrap from the display and other components.

3. Place the components on a table or countertop.
4. Save the shipping cartons and packing material for repacking or moving in the future.

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## Selecting a Location

**Warning:** The MX 900 Series terminal is designed for indoor use only.

Use the following guidelines to select a location for the MX 900 Series terminal.

1. Select a location for the terminal that offers adequate ventilation and protection and is convenient for the user and merchant.
2. Place the MX 900 Series terminal on a flat surface, such as a table or countertop, or mount it on a mounting stand supplied by VeriFone. Avoid areas with:
  - Excessive heat or dust
  - Oil or moisture
  - Devices that cause excessive voltage fluctuations or electrical noise, such as air conditioners, fans, electric motors, neon signs, or high-frequency security devices must be no closer than 24 inches
  - Direct sunlight or objects that radiate heat

**Note: Interference Sources:**

Special care is required when mounting the MX 900 Series terminal in sites that utilize anti-theft devices positioned at doorways or surface mounted deactivator pads. Devices of this type, such as Sensormatic brand devices, generate strong electromagnetic fields which may interfere with MX 900 Series terminals. Always select mounting locations at least 6 feet from doorway units and at least 18 inches from surface mounted deactivator pads.

**Note: Mounting Considerations:**

VeriFone recommends the use of an approved stand for all mounting situations. Position the terminal conveniently in relation to power, ECR and LAN connections. Ensure the MX 900 Series terminal is located in a manner that allows customers to swipe their magnetic cards or insert their Smart Cards in a smooth and comfortable motion without encountering obstructions. If the unit will be swiveled during normal operation, VeriFone requires the use of an approved swivel stand. The stand must limit the swivel to 180 degrees to prevent twisting and damage to the MX 900 Series cable. After mounting, verify all cables move freely and do not twist when the unit is rotated throughout its range of motion.

**Warning:** Do not use the MX 900 Series terminal near water, including a bathtub, wash bowl, kitchen sink, or laundry tub. Do not use in a wet basement or near a swimming pool.

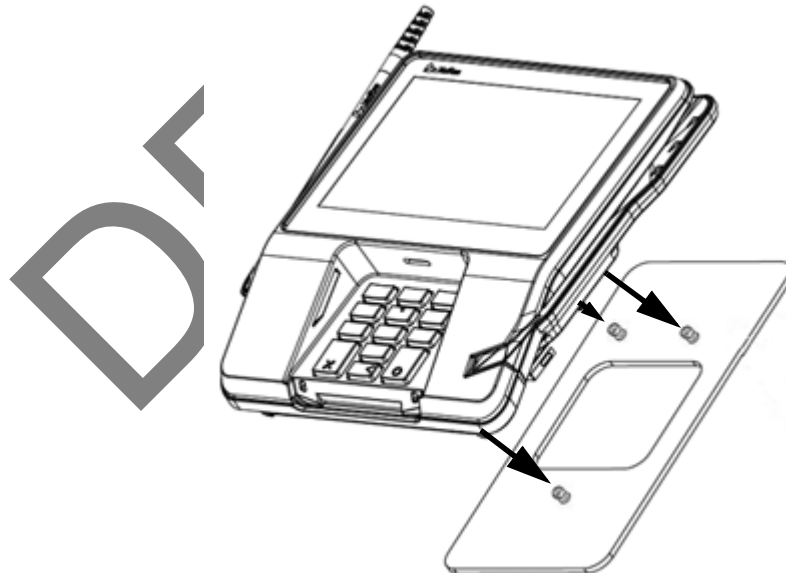
3. Before connecting the terminal to the power pack, complete the installation by connecting all the cables (see Connecting the Device and Power Up with the Multiport Cable).

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## Stand Mount

In most retail spaces, the terminal is positioned on a stand mount. To install the terminal on the stand mount:

1. Install the stand mount on the countertop in the desired lane over an appropriate hole through which the wiring connections can be threaded.
2. Thread all wiring connections through the center of the stand mount.
3. Make all wiring connections.
4. Align and seat the three pins on the top plate of the stand mount platform with the three key-hole slots on the bottom of the terminal.
5. Slide the terminal down until the unit seats securely.

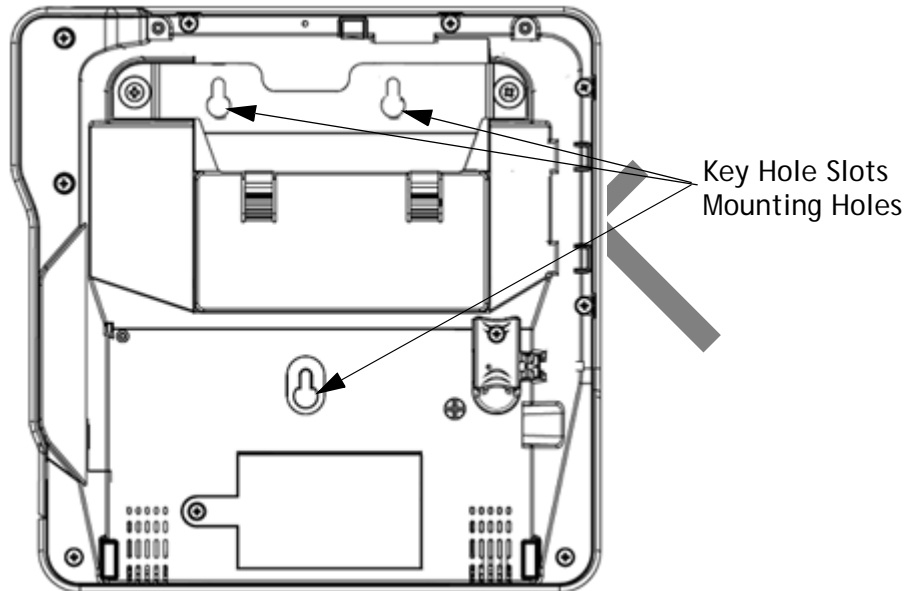


6. Position the stand so that it is protected from being bumped by shopping carts or other items. Being bumped and potentially trigger the system into "thinking" a breach attempt has occurred, causing the encryption keys to be cleared.

## Wall Mount

The MX 900 Series terminal can be mounted on a wall. To wall mount the MX 900 Series terminal:

1. Create a template of the three key hole slots on the bottom of the MX 900 Series terminal.



2. Locate a wall stud to base center placement of the MX 900 Series terminal unit.
3. Mark the hole placement on the desired wall location.
4. Prepare holes for screw placement. For mounting into drywall use 1/8" Hollow Wall Anchors. Other stud mountings use #6 trim screws. After installation apply 30 pounds force downward to ensure proper mounting.
  - a. Create a small hole in which to screw in self-tapping wood screws, or
  - b. Insert molly screws into prepared holes in sheet rock wall.
5. Insert screws into prepared holes, leaving approximately 6.35mm (1/4") of the screw above the level of the wall.

**Note:** Adjust the screw depth till the unit is firmly mounted.

6. Align and seat screws in the key hole slots.
7. Slide the MX 900 Series terminal down until the unit seats securely.

## PIN Protection Measures

The following techniques can be employed to provide for effective screening of the PIN-entry keypad during the PIN-entry process. These methods would typically be used in combination, though in some cases a method might be used singly.

- Positioning of terminal on the check-stand in such a way as to make visual observation of the PIN-entry process infeasible. Examples include:
  - Visual shields designed into the check-stand. The shields may be solely for shielding purposes, or may be part of the general check-stand design.
  - Position the PIN Entry Device (PED) so that it is angled in such a way that PIN spying is difficult.
- Installing PED on an adjustable stand that allows consumers to swivel the terminal sideways and/or tilt it forwards/backwards to a position that makes visual observation of the PIN-entry process difficult.
- Positioning of in-store security cameras so that the PIN-entry keypad is not visible.

The following table describes the two preferred mounting methods and the recommended measure to protect from PIN capture in four observation corridors:

Mounting Methods and Protection Measures		
Method	Cashier	Customer Queue
Countertop without stand	Use signage behind the PED	Install so that customer is between PED and next in queue
Countertop with Stand	No Action Needed	Install so that customer is between PED and next in queue

VeriFone also recommends instruction of the cardholder regarding safe PIN-entry. This can be done with a combination of:

- Signage on the PED
- Prompts on the display, possibly with a “click-through” screen
- Literature at the point of sale
- A logo for safe PIN-entry process

**Note:** For a detailed discussion of PINpad Security Best Practices, see the MX 900 Reference Manual.

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## Installing Optional Components

This section discusses the installation procedures for the optional components available for the MX 900 Series terminal. Your terminal may already have some of these options, as modules can be installed at the factory or in the field.

### Installing Countertop Wedge

The countertop wedge raises the rear section of the MX 900 Series terminal by an angle of 10 degrees to facilitate use of the screen. See the Stand Mount section for aligning the pins.

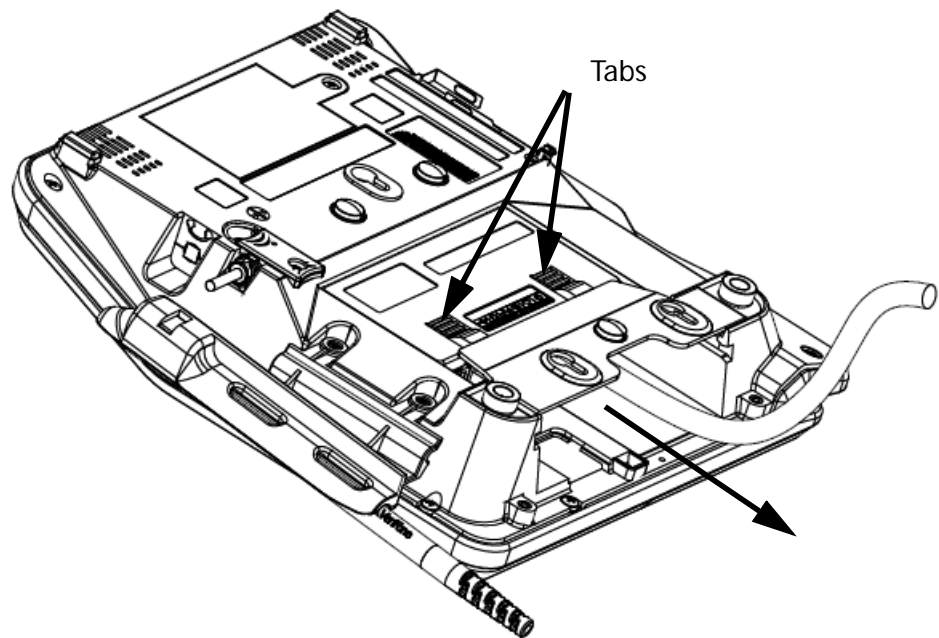
#### To install the countertop wedge

1. Align the pins in the countertop wedge with the two key holes on the bottom of the MX 900 Series terminal.
2. Slide the countertop wedge firmly into position.

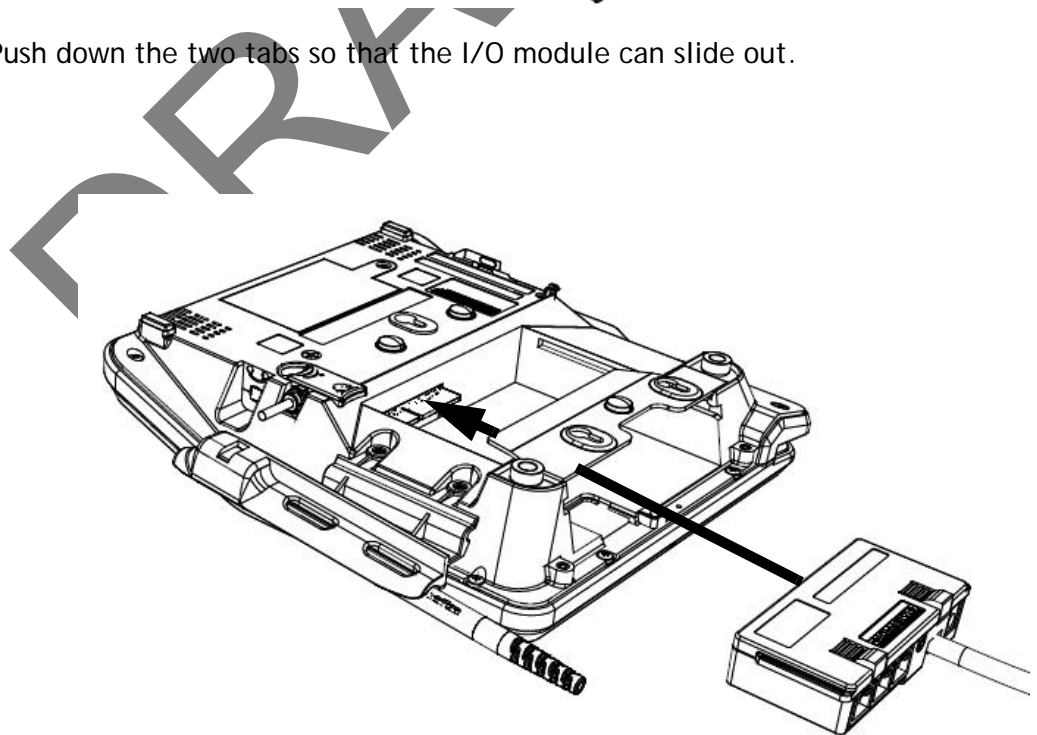
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## Removing or Installing the I/O Module

Use the following steps to remove and install I/O modules.



Push down the two tabs so that the I/O module can slide out.



Slide the module in until it locks into place.

I/O Modules			
Terminal	Description	Terminal P/N	I/O Module P/N
MX 915	AUD, BERG ONLY, NO TAILGATE	P132-601-00-R	MX900-01
	PWR, AUD, BERG W/ TAILGATE, ETH, USB OTG, COM 2	P132-602-00-R	MX900-02
	PWR, AUD, POE, USB OTG, USB HOST, COM 1, COM 2	P132-603-00-R	MX900-03
	PWR, AUD, ETH, USB OTG, COM 1, WIFI/BT	P132-604-00-R	MX900-04
MX 925	AUD, BERG ONLY, NO TAILGATE	P132-601-00-R	MX900-01
	PWR, AUD, BERG W/ TAILGATE, ETH, USB OTG, COM 2	P132-602-00-R	MX900-02
	PWR, AUD, POE, USB OTG, USB HOST, COM 1, COM 2	P132-603-00-R	MX900-03
	PWR, AUD, ETH, USB OTG, COM 1, WIFI/BT	P132-604-00-R	MX900-04

## Installing MSAM or SD Cards

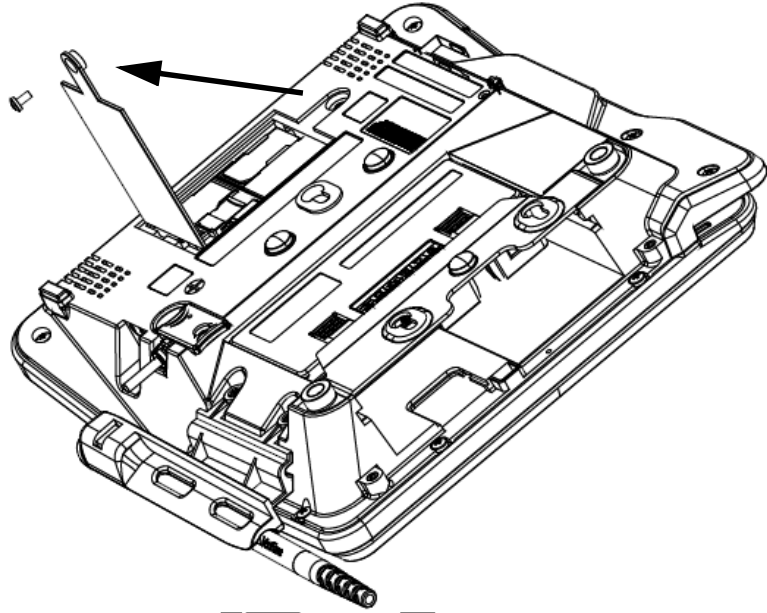
Follow the steps below to install smart cards (MSAM or SD cards).

Often merchants are issued MSAM or SD cards to run small applications, such as loyalty programs. MSAM and SD cards are used only with MX 900 Series terminal smart card configurations.

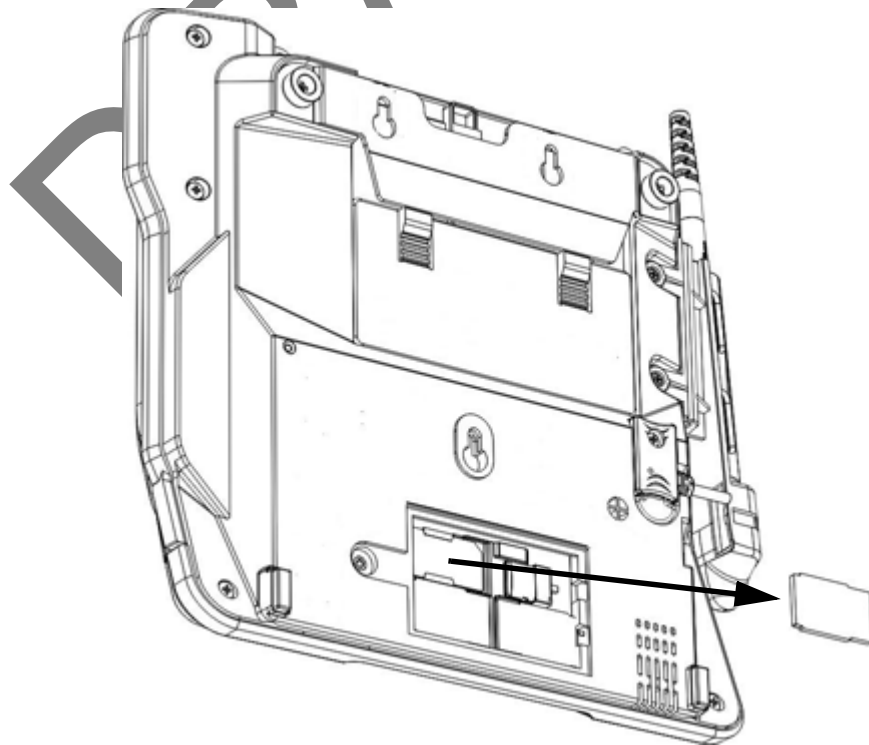
1. Unplug the power pack from the multiport cable or unplug from the I/O module if no multiport cable is present.
2. Place the terminal upside down on a soft, clean surface to protect the glass cover from scratches.



3. Remove the card compartment door screw and rotate the door up and back to access the SD and MSAM cardholders.

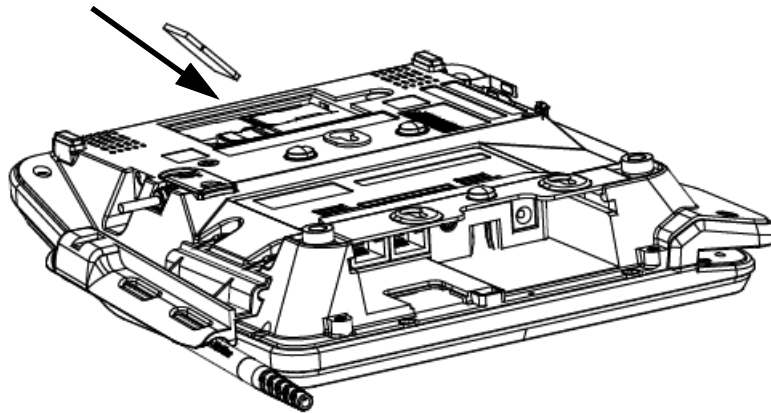


4. Remove any previously installed MSAM or SD card by sliding the card from the cardholder.



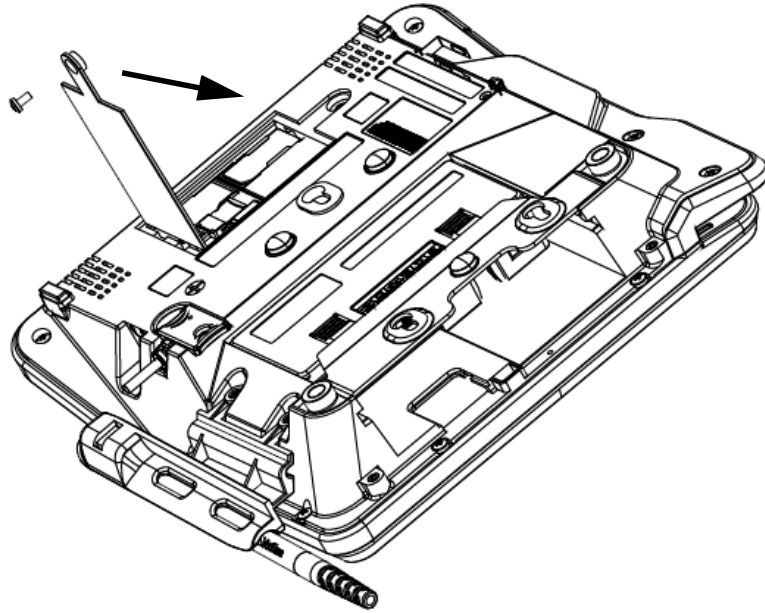
**Note:** Before inserting the SD or MSAM card, position it with the card's gold contacts facing the smart card reader end of the terminal. The cardholder connector base has a set of contacts and a notch on one corner to ensure the card is positioned correctly. The card has a notch on one corner to ensure that it fits into the connector base in only one way. The card compartment door will not close properly if the cards are installed incorrectly.

5. Install an MSAM or SD card by aligning the card and carefully sliding it within the guides on the cover until it is fully inserted.



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6. Reinstall the compartment cover and door screw.

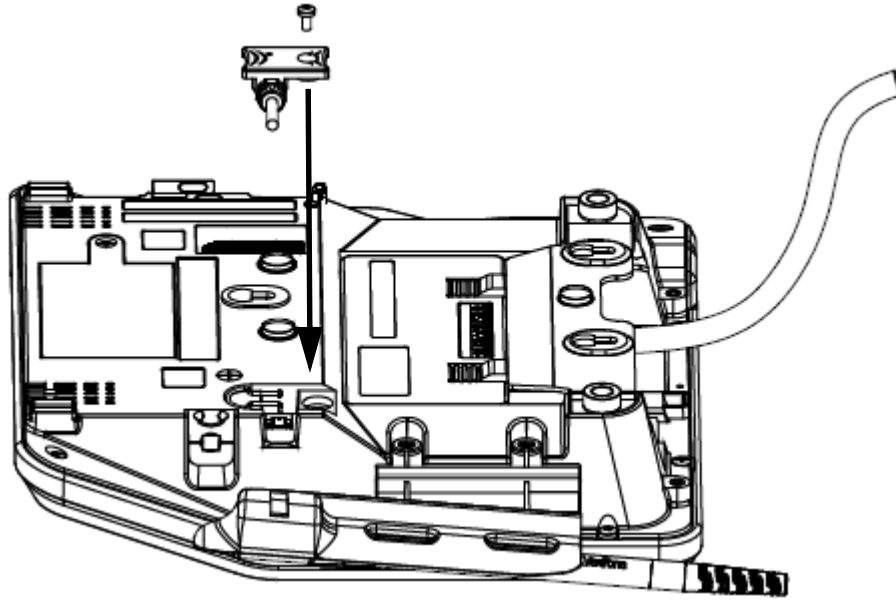


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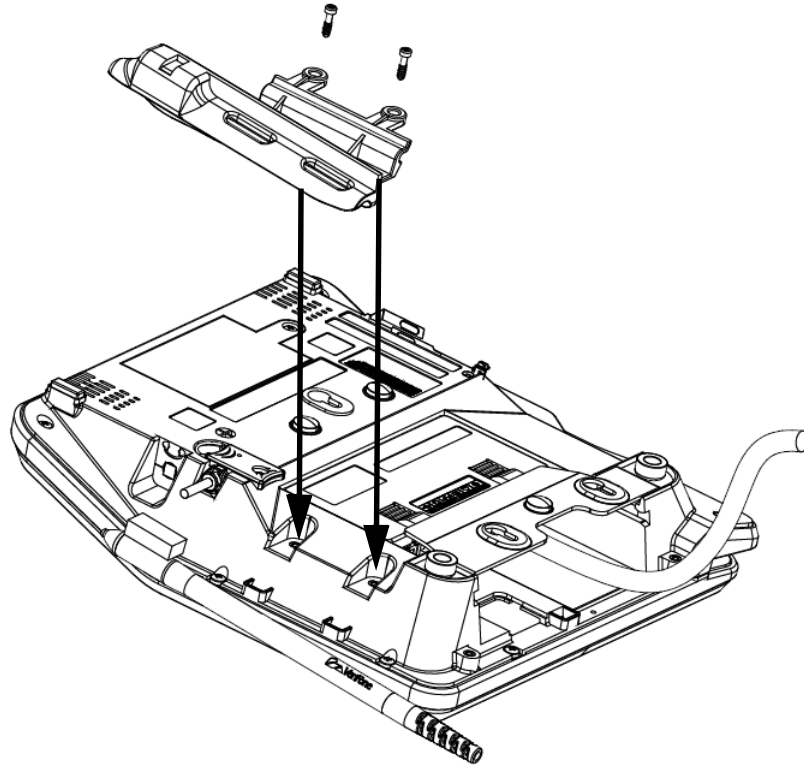
## Installing the Stylus and Holster

Use the following steps to install the stylus and its holster.

1. Turn the MX 900 Series terminal over and plug the stylus cable into the top of the terminal and insert and tighten screw.



2. Locate the two screw holes for attaching the holster. Route the stylus cable through a channel in the holster and then attach the holster using the two screws. The cable should be in the channel between the holster and the terminal.

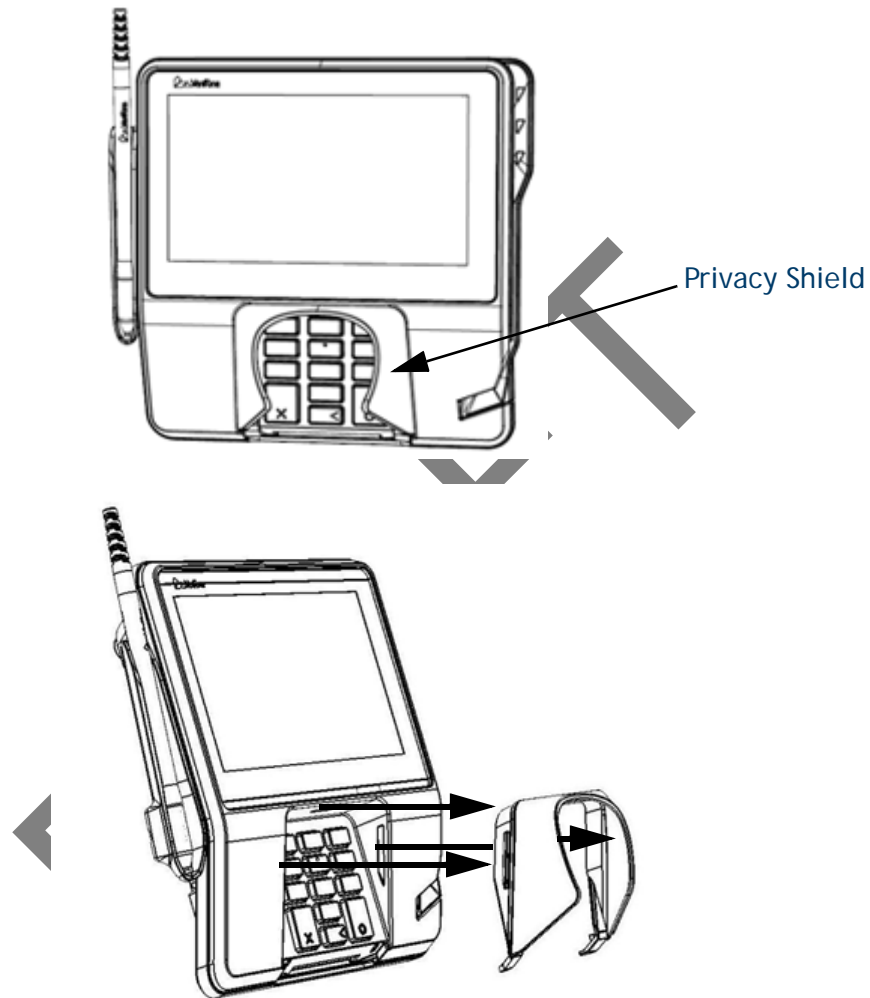


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## Removing the Privacy Shield

To remove the privacy shield, pull on each side of the privacy shield until it disconnects from each of the three connection points.

**Warning:** Once the privacy shield is removed, it cannot be re-installed.



## Connecting the Device

This section provides brief descriptions of possible MX 900 Series terminal device connections and the power pack connection. For complete information about installing and using an optional device, see the user documentation supplied with that device.

Ensure that the multiport cable or I/O module is not connected to a power pack before attaching to the MX 900 Series terminal.

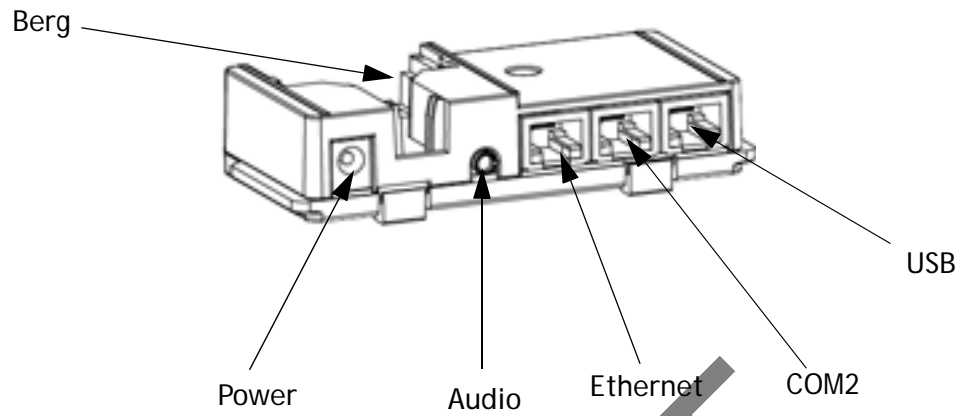
### I/O Module

The MX 900 Series terminals use one of four I/O Modules without the multiport cable to make the following connections:

**Note:** Use the Ethernet port on the I/O module only if the multiport cable is not attached. Otherwise, use the Ethernet port on the multiport cable.

Connection	I/O Module 1	I/O Module 2	I/O Module 3	I/O Module 4
Power Jack	X	X	X	X
Audio Jack	X	X	X	X
Berg	X	X		
Tailgate / Com3		X		
Ethernet		X		
Power Over Ethernet			X	X
USB 2.0 Device		X	X	X
USB 1.1 Host			X	X
COM1			X	X
COM2		X	X	X

Example of connections to the I/O Module (I/O Module 2 shown below)



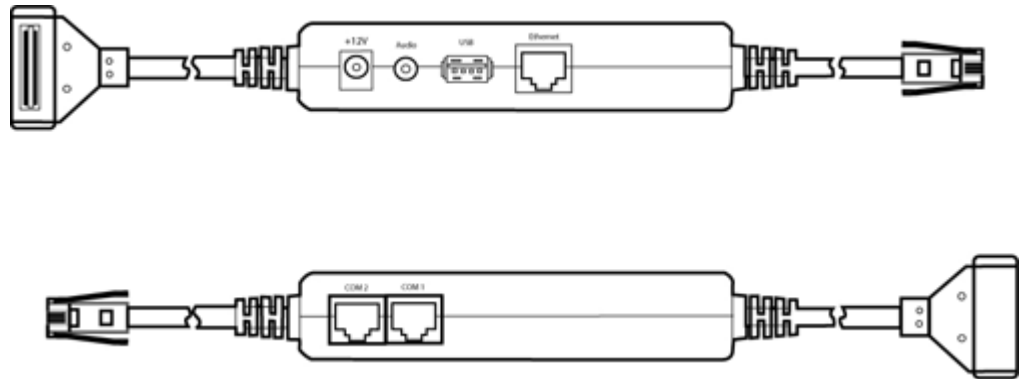
## Multiport Cable

The MX 900 Series terminals use a multiport cable to make the following connections:

- ECR
- Ethernet LAN
- Development/host PC
- Serial cable
- USB
- USB device
- Power input
- Audio output

**Note:** Some multiport cables require additional cabling to work; for example a pigtail for certain ports or Ethernet cable.





**Caution:** Improper installation or removal of the terminal connector may permanently damage the MX 900 Series terminal.

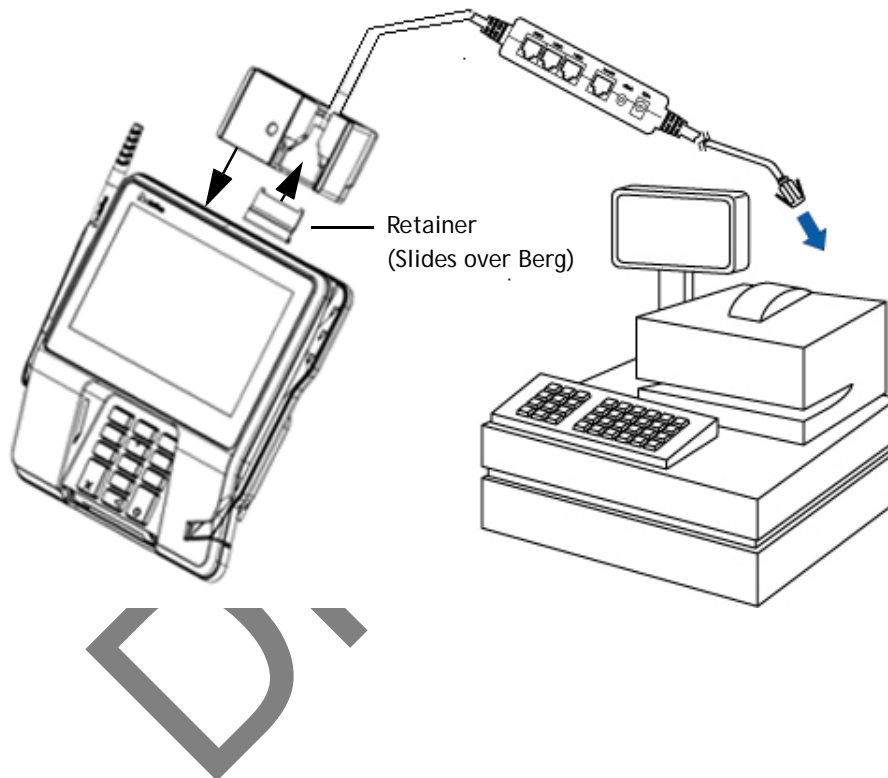
The following precautions must be taken with multiport cables:

- Use the Ethernet port on the IO module only if the multiport cable is not attached. Otherwise, use the Ethernet port on the multiport cable.
- Do not force the terminal connector into place.
- Always make sure that all of the pins are lined up in correct parallel fashion before applying light pressure to snap the terminal connector into place.
- Do not attempt to remove the terminal connector by pulling directly on the cable. Instead, firmly grasp the sides of the terminal connector with thumb and forefinger, then pull out at the same angle the connector on the terminal is facing.
- Disconnecting the power source during transaction processing may cause loss of transaction data.

## Connecting ECR in Tailgate Mode

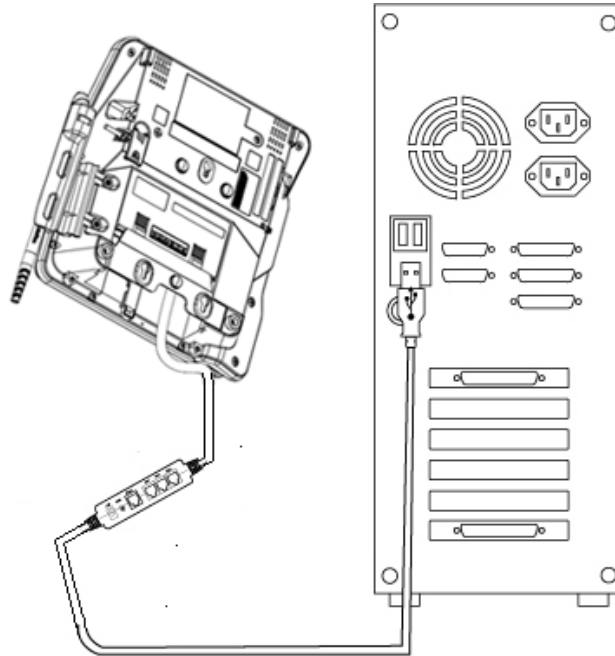
To connect an ECR to the MX 900 Series terminal, insert the multiport cable plug into the bottom socket on the terminal and install the retainer. Then connect the RS485 tailgate connector to the desired 12-volt port on the back of the IBM register, such as 9A or 9B.

**Caution:** Use caution because the various ports on the back of the register have different voltages. Plugging into the wrong port may damage the register or the MX 900 Series terminal.



## Connecting to a Host PC

To connect the MX 900 Series terminal to a development PC, which shows a USB connection with the 23741-02-R multiport cable. Note that USB drivers are required to support this configuration.



## Connecting to the Ethernet LAN

To connect the MX 900 Series terminal to an Ethernet LAN through the Ethernet port using a standard Ethernet cable, insert the LAN cable from the LAN router or hub into the Ethernet port on the multiport cable.

## Connecting to USB Host or Hub

Connecting to a USB host or hub requires VeriFone USB cable (P/N 23741-02-R). To connect to a USB host or hub:

1. Insert the multiport cable plug into the bottom socket on the terminal, secure with the tie-down strap, and route the cable through the slots to the desired exit side.
2. Plug the USB connector of the multiport cable into the USB host or hub.

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## Powering up

This section describes how to connect the MX 900 Series terminal to a power source using the multiport cable or I/O Module.

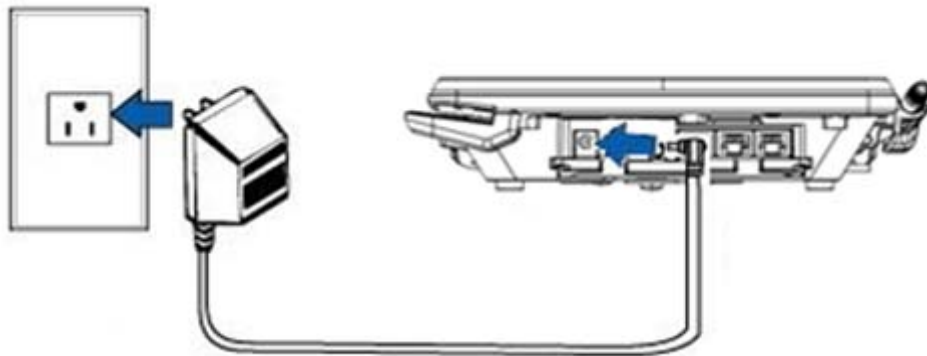
**Note:** If connected to an ECR, the MX 900 Series terminal can receive power from the ECR.

**Warning:** Do not plug the power pack into an outdoor outlet or operate the terminal outdoors.

**Note:** The power outlet should be on a dedicated circuit or on an uninterruptible power supply (UPS). If other devices are plugged into the same circuit, the MX 900 Series device can potentially experience power fluctuations that might cause it to malfunction.

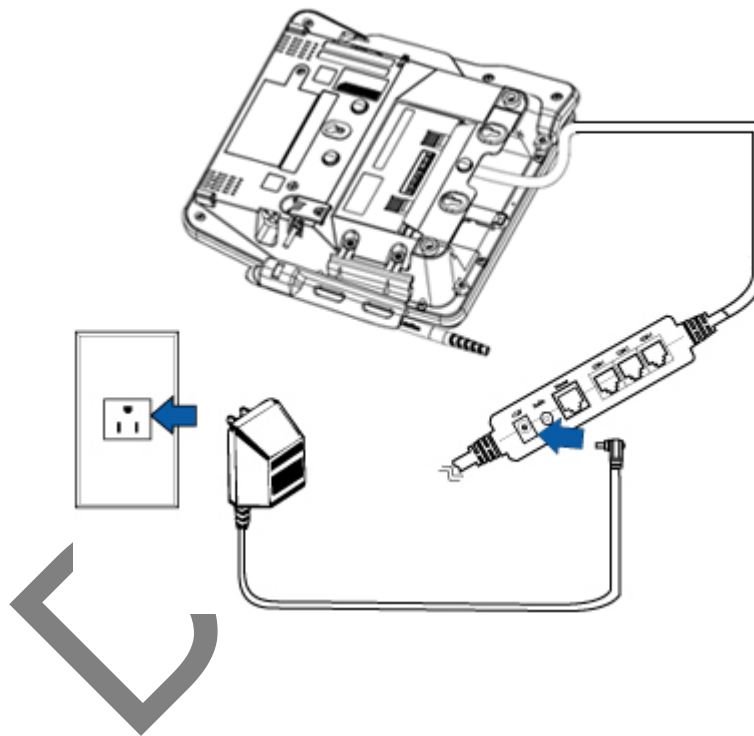
### Using the I/O Module

1. Make all other connections before connecting the power pack.
2. Insert the plug from the power pack into the +12V receptacle on the I/O module.
3. Plug the power pack into an indoor electrical power outlet.



## Using the Multiport Cable

1. Make all other connections before connecting the power pack.
2. Insert the multiport cable connector into the port on the back of the terminal and secure with the Berg retainer.
3. Route the cable through the slots to the desired exit side.
4. Insert the plug from the power pack into the +12V receptacle on the multiport cable.
5. Plug the power pack into an indoor electrical power outlet.



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## Calibrate Touch Screen

The MX 900 Series terminal requires a touch screen calibration at the time of installation. The terminal should be powered on and allowed to stabilize at normal operating temperature; usually this takes no longer than 30 minutes, even if the terminal was previously in a cooler or warmer location. The touch screen calibration procedure (below) should then be performed. Also, while in System Mode, verify the time on the unit is correct.

To perform a touch screen (panel) calibration, follow these procedures:

### Primary Method:

1. Press the 1, 5, and 9 keys at the same time to enter System Mode. Keep hands away from the display until the prompt appears for password entry.
2. Enter the System Mode password.
3. In System Mode, perform a manual touch screen compensation. Tap Administration > Touch Panel > Go. Follow the directions on the display.

**Note:** if the touch panel is completely unresponsive after logging in, press '1' and 'enter' to perform the calibration.

### Alternate Method:

This method does not require knowledge of system password.

1. Press 'Red X' (clear) key prior to entering any digits on password screen. The menu screen displays the following options.
  - 1 - Run Application
  - 2 - Perform Calibration
  - X - Return to Login Screen
2. Press '2' key to perform screen calibration.
3. After calibration is complete, press '1' to run customer application or 'X' to return to password menu screen. If no keys are pressed within a few seconds, the terminal will automatically return to the password menu screen.

# 3 MAINTENANCE

The MX 900 Series terminal has no user-maintainable parts. The smart card implementation is a proprietary hardware solution that has no serviceable parts.

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## Cleaning the Terminal

To clean the terminal, use a clean cloth slightly dampened with water and a drop or two of mild soap. For stubborn stains, use alcohol or an alcohol-based cleaner. For best results, use the VeriFone Cleaning Kit (P/N 02746-01).

**Note:** Never use thinner, trichloroethylene, or ketone-based solvents as they may deteriorate plastic or rubber parts. Do not spray cleaners or other solutions directly onto the display.

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## Cleaning the Display Screen

Spray a non-scrubbing cleaner onto a cloth or paper towel and then clean the screen with it. Do not spray cleaners or other solutions directly onto the display.

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## Magnetic Stripe Cleaner

Dirt can lead to magnetic stripe card reading problems. The magnetic stripe reader (MSR) should be cleaned on a regular basis using commercially available card cleaning cards. VeriFone cleaning card P/N 02746-01 is recommended. Cleaning the MSR should be done anywhere from daily, to once a week depending on the volume of terminal usage.

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## Smart Card Reader

Do not attempt to clean the smart card reader. Doing so may void the warranty. For smart card reader service, contact your VeriFone distributor or service provider.

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# 4 TERMINAL SPECIFICATIONS

## Terminal Specifications

This chapter discusses power requirements, dimensions, and other specifications of the MX 900 Series terminals.

Power	<ul style="list-style-type: none"><li>• Power pack output requirements: 12W, 12-24VDC.</li><li>• Power pack input requirements: 100-240VAC, 50/60Hz.</li></ul>
Environmental	<ul style="list-style-type: none"><li>• Operating temperature: 0° to 40° C (32° to 104° F)</li><li>• Storage temperature: – 18° to + 66° C (0° to 150° F)</li><li>• Humidity: 15% to 95% relative humidity; no condensation</li></ul>
Dimensions	<b>MX 915</b> <ul style="list-style-type: none"><li>• Height: 56 mm (2.2 inches)</li><li>• Width: 182 mm (7.2 inches)</li><li>• Depth: 225 mm (8.9 inches)</li></ul> <b>MX 925</b> <ul style="list-style-type: none"><li>• Height: 56 mm (2.2 inches)</li><li>• Width: 218 mm (8.6 inches)</li><li>• Depth: 230 mm (9.1 inches)</li></ul>
Weight	<b>MX 915:</b> 1.3 lbs. (0.6 kg) <b>MX 925:</b> 2.0 lbs. (0.9 kg)

DRAFT

# INDEX

## A

---

acronyms, Installation Guide 2  
audience, Installation Guide 1

## C

---

connecting  
  ECR Tailgate 20  
  Ethernet LAN 21  
  I/O module 17  
  multiport cables 18  
  to Host PC 21  
  to USB host or hub 21  
countertop wedge, installing 8

## E

---

ECR connection, tailgate mode 20  
Ethernet LAN connection 21

## H

---

Host PC 21

## I

---

I/O module  
  connecting 17

  disconnecting 17  
  power up with 22  
I/O modules 9  
installation  
  I/O modules 9  
  MSAM cards 10  
  MX 900 Series 3  
  optional components 8  
  SD cards 10  
  selecting a location 4  
  stand mount 5  
  wall mount 6

## L

---

location for MX 900 Series 4

## M

---

maintenance  
  cleaning a terminal 25  
  smart card reader 25  
MSAM cards, installing 10  
multiport cables  
  connecting 18  
  disconnecting 18  
  power up with 22  
MX 900 Series  
  hardware installation 3  
  specifications 27

## O

---

optional components

  countertop wedge 8  
  I/O modules 9  
  installation 8  
  MSAM cards 10  
  SD cards 10

## P

---

PIN protection measures 7  
power up  
  with I/O module 22  
  with multiport cable 22

## S

---

SD cards, installing 10  
specifications, MX 900 Series 27  
stand mount for MX 900 Series 5

## U

---

USB  
  connection 21

## W

---

wall mount for MX 900 Series 6

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### **Federal Communication Commission Interference Statement**

This device complies with Part 15 of the FCC Rules. Operation 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.

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

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

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

**Note:** The country code selection is for non-US model only and is not available to all US model. Per FCC regulation, all WiFi product marketed in US must fixed to US operation channels only.

### **Radiation Exposure Statement:**

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

**This device is intended only for OEM integrators under the following conditions:**

- 1) The antenna must be installed such that 20 cm is maintained between the antenna and users, and
- 2) The transmitter module may not be co-located with any other transmitter or antenna.

As long as 2 conditions above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed

**IMPORTANT NOTE:** In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

**End Product Labeling**

This transmitter module is authorized only for use in device where the antenna may be installed such that 20 cm may be maintained between the antenna and users. The final end product must be labeled in a visible area with the following: “Contains FCC ID: **B32MX900-04BTWIFI**”. The grantee's FCC ID can be used only when all FCC compliance requirements are met.

**Manual Information to the End User**

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user’s manual of the end product which integrates this module.

The end user manual shall include all required regulatory information/warning as show in this manual.