



ViVOpay[®]

8100 User Guide

Revision 1.0



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Chapter 1

Getting Started

Overview

The ViVOPay 8100 seamlessly integrates with existing POS systems and requires minimal counter space at checkout stands. The ViVOPay 8100 is a PCI 2.1 certified counter-top contactless reader with integrated display, MSR, function keys, and PIN pad. This device features serial RS-232 and USB 2.0 communications to POS systems.

ViVOPay 8100 supports the following contactless payment applications:

- PayPass ISO/IEC 144443
- MasterCard M/Stripe
- Visa MSD
- American Express – ExpressPay
- Discover Zip
- Mifare ePurse (Passthrough)
- ViVOCARD 1 & 2

ViVOPay 8100 also supports debit and credit magnetic stripe applications.

This document assumes that users are familiar with their host POS systems and all related functions.




Features

The following features are supported:

- PCI 2.1 certified
- ISO14443 type A/B Mifare based contactless payment transactions
- Support for NFC devices
- PIN entry for PIN debit transactions
- Magnetic stripe card transactions

Unpacking the ViVOpay 8100

The ViVOpay 8100 requires a data cable and a power supply if you are not powering the reader through the data cable. Verify that you have all the required components for the installation.

ViVOpay 8100 (P/N 540-0703-01)	
<p>Data cable (varies by POS and length)</p> <ul style="list-style-type: none"> • Serial Data Cable (P/N 220-2463-0X), requires separate power supply • USB Data with Power Cable (P/N 220-2466-0X) <p>These cables are recommended and approved by ViVOTech to comply with FCC rules and regulations.</p>	
<p>Power supply, if required</p> <ul style="list-style-type: none"> • US/North America (P/N 220-2476-00) <p>This power supply recommended and approved by ViVOTech to comply with FCC rules and regulations.</p>	

You may also need the following:

- Four M3 screws
If you want to secure the reader to a surface, you need four M3 screws of the appropriate length (not supplied).
- Contactless test card (ViVOCARD Contactless Test Card P/N 241-0015-03)
- Magnetic stripe test card

The ViVOTech data cables and power supply are specifically designed to meet FCC requirements. If you are using other cables or power supply, you must install ferrites available from ViVOTech. For your free ferrite core kit with installation instructions, please contact ViVOTech support.

Accessories

The following accessories are available for the ViVOpay 8100.

Part Number	Description
520-2370-00	Wedge Bracket Kit



Chapter 2

Installing the ViVOPay 8100

Overview

Before you connect and mount the ViVOPay 8100, you should plan the installation to conform to PCI 2.1 requirements and minimize radio frequency interference. Once you have determined the location and mounting of the ViVOPay 8100, you can connect it to power and the POS terminal. Finally, you should test the ViVOPay 8100 to make sure the installation is successful.

Site Planning

Two environmental considerations affect how you install the ViVOPay 8100. PCI certification has specific restrictions on how the reader is positioned to prevent PIN theft. You should also consider objects and devices near the reader that may affect the performance of the contactless radio frequency antenna.

PCI PED Compliance

The ViVOPay 8100 is a PCI 2.1 certified PIN/Debit payment device. PCI 2.1 certification requires that sufficient protection be provided to ensure that entering a PIN number CANNOT be viewed by a third party (such as another customer standing nearby, the cashier, or a security camera).

The ViVOPay 8100 has design elements, such as a recessed keypad, that meet some of these requirements. However, to fully implement PCI 2.1 make sure you consider the following.

1. The ViVOPay 8100 must be in a location that will NOT force a customer to enter a PIN that can be viewed by a third party (for example, a customer must tilt or rotate the device for better accessibility due to objects blocking a card swipe).
2. If the ViVOPay 8100 is elevated on a mounting stand, shielding must be provided on the mount to prevent a PIN being viewed by a third party.
3. If the ViVOPay 8100 is mounted on a counter top, additional shielding (which can include other devices such as a cash register as long as conditions in (1) above are met) must be provided to ensure that the PIN cannot be viewed by a third party (including cashier and security camera).

WARNING: PCI requires that the device be mounted so that the PIN entry cannot be observed by a third party (such as another customer standing in line, the cashier at the counter, or a security camera mounted in the ceiling to observe the cash register area). If the PIN entry can be observed, the store owner may be responsible for any losses incurred by the customer if it can be determined that the customer's PIN was stolen at that location.

Hardware Viewing Angles

The information in this section will help you position the ViVOPay 8100 so that it conforms with PCI 2.1 requirements.

The angles in the figures below describing the line of sight to the keypad are defined as follows:

α	Angle between the horizontal plane through the 5 key and the virtual line which connects the 5 key and an observer's eye
β	Horizontal position of an observer relative to the user's position
γ	Horizontal range which is to be covered by the privacy screen
δ	Angle between the keypad plane and the horizontal plane (tilt angle)

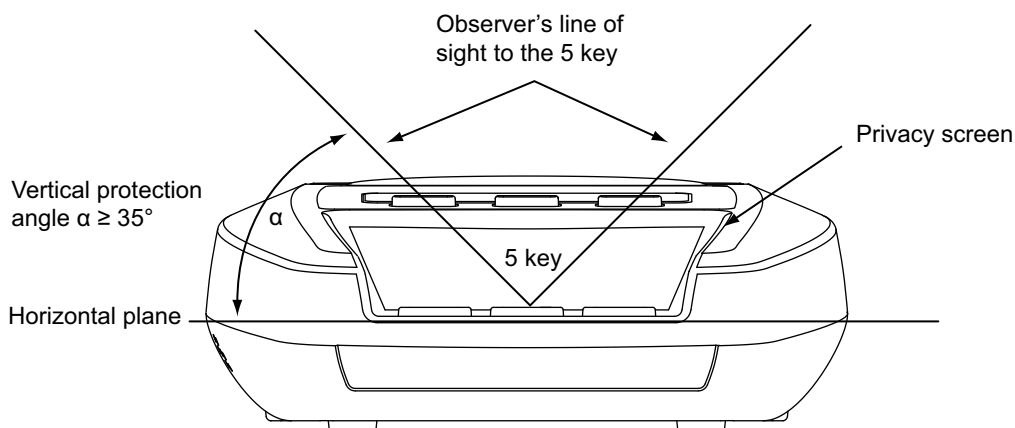


Figure 1. Vertical protection angle, sides

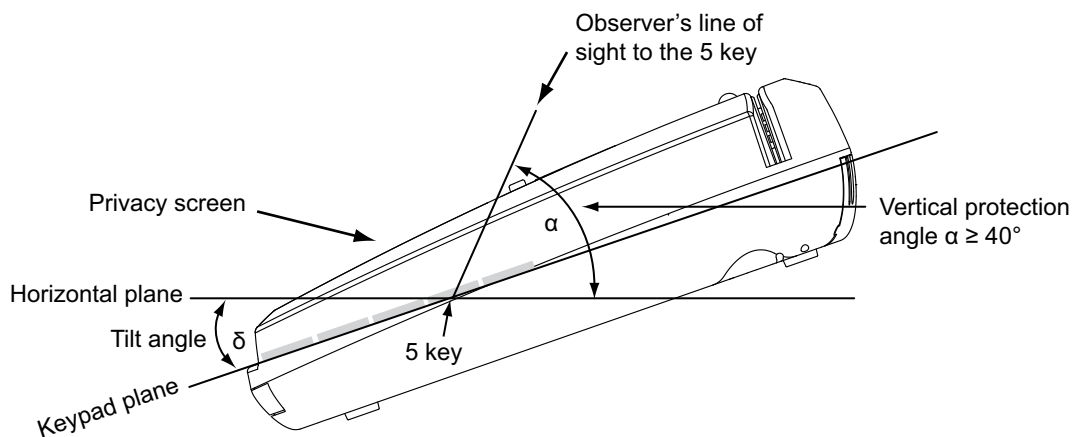


Figure 2. Vertical protection angle, top

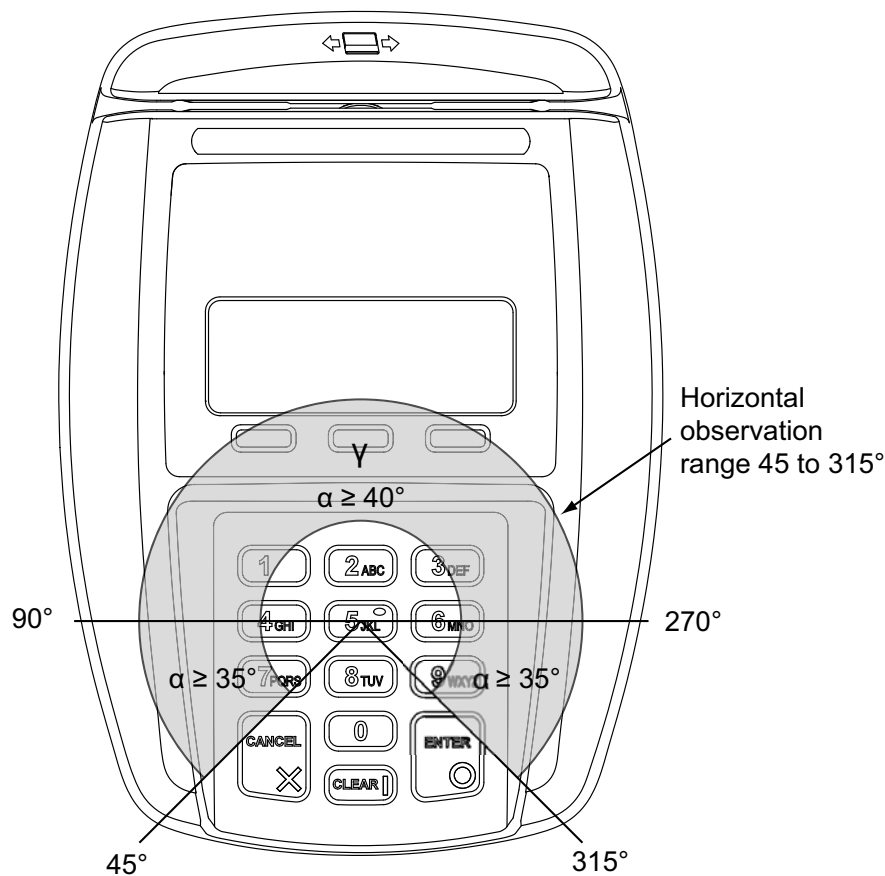


Figure 3. Horizontal protection angles

Horizontal Angle β	Remarks	Vertical Angle α
$315^\circ \leq \beta \leq 45^\circ$	Within this range of β the cardholder deters an observer with his/her body.	N/A
$45^\circ \leq \beta \leq 90^\circ$ $270^\circ \leq \beta \leq 315^\circ$	Within these ranges visual observation of the keypad is partially blocked by the cardholder. The protection angle α shall be at least 35° . Please note that the front end of the privacy screen must be higher if the ViVOpay 8100 is tilted.	$\alpha \geq 35^\circ$
$90^\circ \leq \beta \leq 270^\circ$	The protection angle shall be at least 40° . The display side of the privacy screen may be lowered as the PED is tilted against the horizontal plane.	$\alpha \geq 40^\circ$

Additional Shielding

At times it may be impossible to position the ViVOpay 8100 so that viewing PIN entry is blocked from all positions—especially from overhead cameras. In these instances, the cashier should advise the customer to use their other hand to block observation of PIN entry.



Verifying PCI Compliance

Before completing the installation, you must verify the ViVOpay 8100 is positioned so that the PIN entry is not visible to other customers, the cashier behind the counter, or video surveillance cameras. If PIN entry is visible, the ViVOpay 8100 must be repositioned or shielding added until PIN entry cannot be observed.

These tests usually require at least two people—one to simulate entering the PIN while the other attempts to view the keypad.

Can Another Customer View the PIN?

While one person stands at the ViVOpay 8100 with their hand positioned to enter the PIN, the other tester should try to observe the keypad from behind and beside the first person.

Can the Cashier View the PIN?

While one person stands at the ViVOpay 8100 with their hand positioned to enter the PIN, the other tester should stand behind the counter and try to observe the PIN keypad. The second tester should move around a little to see if there is a position where they can observe PIN entry.

Can the Video Camera View the PIN?

While one person stands at the ViVOpay 8100 with their hand positioned to enter the PIN, the other tester should observe what is being recorded by any video camera with a view of the ViVOpay 8100. This may require playing back a recording to see if PIN entry is visible. If the video camera is moveable, the second person should move the video camera to determine if there is a position where PIN entry can be observed.

Retesting Requirements

If PIN entry on the ViVOPay 8100 is observable in any of the above tests, you must reposition the ViVOPay 8100 and completely retest all locations to verify that PIN entry is not visible. Consider placing a display to block observation from that position.

Repositioning the ViVOPay 8100 to block observance of PIN entry at one location may expose PIN entry to observation at another location. PCI requires that you reposition the ViVOPay 8100 and retest until PIN entry is secure from observation.

Radio Frequency Interference

To perform contactless transactions, the ViVOPay 8100 uses a radio frequency antenna. The range (reading distance) and performance of the reader can be affected by other radio frequency emitters and proximity to metal.

For best performance, adhere to the following guidelines:

- Do not position the ViVOPay 8100 closer than 1 foot (30 cm) to ViVOPay 8100s or other RF-emitting devices. Some environments may require greater distances.
- Do not position the ViVOPay 8100 near radio transmitters.
- Avoid placing the ViVOPay 8100 on or near large metal objects.

Installing the ViVOPay 8100

This section describes how to install the ViVOPay 8100. The basic steps are:

- Connect to power and POS
- Mount if required
- Test the installation

Connecting the ViVOPay 8100

Accessing the Connectors

The ViVOPay 8100 connectors are beneath a cover on the bottom of the reader.

To access the connectors

1. Turn over the ViVOPay 8100 so that the connector cover is visible.
2. Use a Phillips #1 screwdriver to remove the captive screw that holds the connector cover in place.



- Slide the connector cover away from the ViVOpay 8100.



If the captive screw catches, invert the ViVOpay 8100 to remove the connector cover.

Installing a SAM Card

The ViVOpay 8100 has a single SAM card slot for an optional SAM card. If you are using a SAM card in your application, insert the SAM card as shown by the SAM card icon.

Warning: Do not insert or remove a SAM card while the ViVOpay 8100 is powered. This will cause permanent damage to the SAM card.

Connecting Power and Data

There are connectors for data and power inside the connector cover. There is also access to the SAM card slot if you are using this option.

To connect the ViVOpay 8100

- Position the ViVOpay 8100 so that you can access the data and power connectors.



2. Insert the power cable into the power connector.



3. Insert the data cable into the 10-pin RJ45 connector directly beside the power socket.



4. Pass the cables through the slots in the connector cover. Use the narrow slot for the power cable to provide strain relief.



5. Replace the cover and secure it with the retaining screw.
6. Turn the ViVOpay 8100 keypad side up.
7. Attach the data cable from the ViVOpay 8100 to the appropriate port on the POS.
8. Plug in the power supply if required or make sure the POS is powered on. The ViVOpay 8100 beeps twice and the left LED illuminates. The ViVOpay 8100 may take up to 30 seconds to finish booting.

The ViVOpay 8100 displays the opening set of screens before it displays the **Welcome** screen. The opening screens include:

- ViVOtech screen
- Copyright screen
- Firmware version screen

The reader should then display **Welcome** or **Please present card** or similar wording, depending upon the POS application.

If the reader fails to power up, try reseating the power connector (or change to a different power outlet).

If the reader still fails to power up, try replacing the power supply. If the reader still fails to power up, and the power supply is definitely good, contact your local support representative. For more troubleshooting information, see [“Troubleshooting” on page 16](#).

Mounting the ViVOpay 8100 to a Surface

The ViVOpay 8100 can be mounted to a surface to prevent it from being accidentally dislodged or repositioned.

To mount the ViVOpay 8100

1. Drill four 3.5mm (9/64 inch) holes in the surface where the ViVOpay 8100 will be mounted. Use the hole spacing shown in [Figure 4](#).

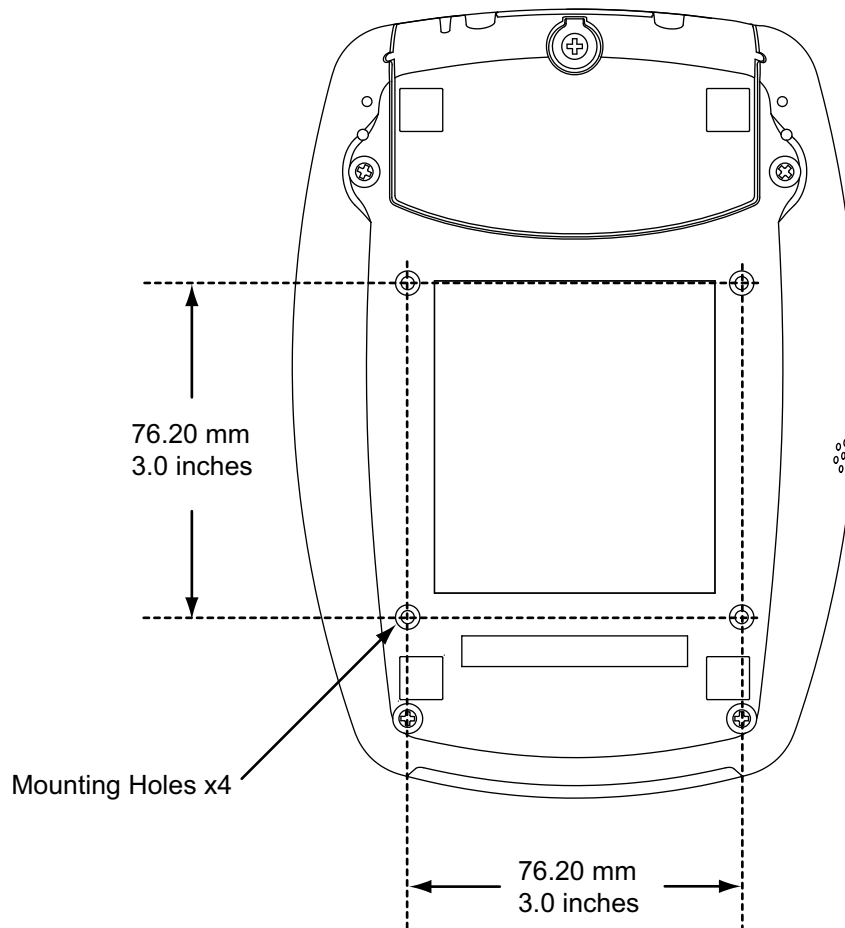


Figure 4. Mounting hole locations

2. Position the ViVOpay 8100 over the mounting holes and use four M3 screws (not supplied) long enough to secure the ViVOpay 8100 to the mounting surface.

Mounting the Wedge Bracket

The optional wedge bracket tilts the ViVOPay another 11° for greater privacy. The wedge bracket is fastened to the ViVOPay 8100 with the four mounting holes.

To mount the wedge bracket

1. Align the mounting bracket over the mounting holes with the thickest end over the connector cover.
2. Fasten in place with four M3 screws as shown in [Figure 5](#).



Figure 5. Attaching the wedge bracket

Testing the Installation

After you have completed the installation and have checked for PCI 2.1 conformance, check that the ViVOPay 8100 and the POS are communicating correctly by performing a sample transaction.

Testing a Contactless Read

Present the contactless card/fob/phone flat against the touch screen and so that maximum surface area is parallel to the screen.



When a card/fob/phone has been successfully read, the ViVOPay 8100 beeps and illuminates all four green LEDs. For an alternate test, see [“RFID and Antenna Test” on page 21](#).

Testing a Magnetic Stripe Card Read

To test the magnetic stripe reader, pass a test magnetic stripe card through the reader slot. Orient the card with the magnetic stripe at the bottom facing you as shown below.



When a magnetic stripe card has been read successfully, the ViVOpay 8100 beeps and illuminates all four green LEDs. For an alternate test, see [“Magstripe Test” on page 20](#).

Testing a Transaction

The exact wording that appears on the ViVOpay 8100 depends on the POS application.

To test a transaction

1. Ring up a transaction on the POS. The ViVOpay 8100 may show **Welcome** or similar wording.
2. Present a card/fob/phone in close proximity to the reader or swipe a magnetic stripe card.
3. A single beep and LED flash indicates that the card has been validated. The ViVOpay 8100 may display **Processing** or similar wording while the transaction is being processed.
4. If the POS software requires a PIN entry, you will see **Please enter PIN**. Use the keypad to enter the PIN.
5. A receipt is printed by the POS with the purchase amount. The ViVOpay 8100 may show **Thank You** or similar wording for a successful transaction.



Chapter 3

Troubleshooting and Maintenance

Troubleshooting

The ViVOpay 8100 readers are reliable and easy to troubleshoot. The components that may require troubleshooting include the power supply, the reader, and the data cable.

Symptom	Possible Cause	Remedy
General Issues		
Reader does not appear to be powered on—no LEDs lit, no LCD display.	<ul style="list-style-type: none"> • Reader not powered on. • Incorrect power supply used. 	<ul style="list-style-type: none"> • Check cable connections. • Verify that power is on and correct voltage and current are present. • Replace the power supply. • Verify that power cable plug is fully inserted. • Replace the reader.
Reading Cards/Fobs/Phones		
LEDs do not light and beeper is not audible when card/fob/phone is presented.	<ul style="list-style-type: none"> • Card/fob/phone not properly presented. • Metal or RF interference. • Firmware issue (contact your local support representative). • Reader not powered on or incorrect voltage. • Incorrect power supply used. • Unsupported card/fob/phone used. 	<ul style="list-style-type: none"> • Present card/fob/phone closer to the reader and ensure it's parallel to the reader's display. • Verify that the card/fob/phone is valid/current. • Test with "ViVOcard Contactless Test Card" part number 241-0015-03. • Try a different card/fob/phone. • Verify that the unit is not near any large metal objects. • Verify that correct firmware is loaded (local support representative only). • Verify that power is on and correct voltage and current are present. • Verify that power cable plug is fully inserted. • Replace the reader.
Some cards/fobs/phones read, but not all.	<ul style="list-style-type: none"> • Wrong firmware (contact your local support representative). • Possible bad card/fob/phone. • Unsupported card used. 	<ul style="list-style-type: none"> • Verify that correct firmware is loaded on reader (local support representative only). • Check to see if card/fob/phone is damaged. • Try a different card/fob/phone.
Communication to POS/ECR		
No data is received, or data is garbled.	<ul style="list-style-type: none"> • Faulty or incorrect cable connections. • Unsupported card used. • Contactless application is not installed on terminal (for serial connections only). • Magstripe card not swiped correctly. • Magstripe card not level during card swipe. • The POS application is not using the correct communications parameters. 	<ul style="list-style-type: none"> • Check that the cable connection is secure and in the correct port on the POS/ECR. • Check that the POS/ECR has the correct software application to accept data from the contactless reader (may need assistance from the POS vendor). • Try a different card/fob/phone or magstripe card if testing the magstripe reader. • If testing with the magstripe card, try turning the card around; make sure that the card is level during the card swipe. • Contact the payment processor for an application upgrade. • Check that the cable is correctly attached to the back of the ViVOpay 8100 • Check the POS application.

Onboard Diagnostics

The ViVOpay 8100 has a built-in diagnostics program accessible through the RS-232 interface. If you did not purchase an RS-232 data cable with your ViVOpay 8100, you will need one to access the diagnostic tests. The Onboard Diagnostics (OBD) tests the following components of the ViVOpay 8100.

Test	Possible Results
LCD Test	Pass/Fail
Touch Screen Test	Pass/Fail. This test is not valid for the ViVOpay 8100.
Key Test	Pass/Fail 1234567890<cancel><backspace><enter>
LED Test	Pass/Fail
Buzzer Test	Pass/Fail
Magstripe Test	Pass Tracks 1 or 2 or 3/Fail
RFID Test	Pass Type A or B/Fail
Security Keys Test	KPK, DUKPT, Master 1234567890

Accessing the OBD Tests

To connect the ViVOpay 8100 to a terminal emulator

1. Connected the RS-232 data cable to the ViVOpay 8100 as described in [“Connecting Power and Data” on page 9](#).
2. Launch the terminal emulation program and set the serial communication parameter of the terminal emulation program to the following:

Baud rate: 11500

Parity: none

Stop bit: 8

Flow control: none

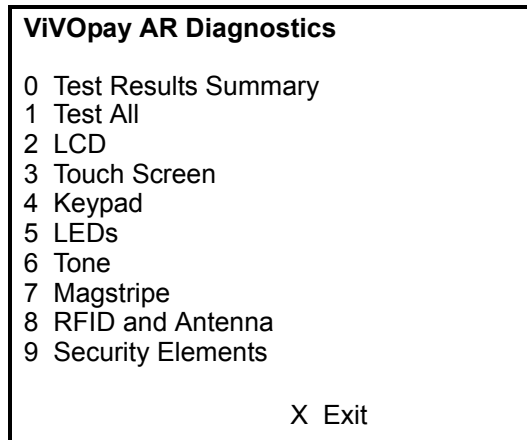
3. Connect the BD-9 end of the data cable to the COM port of a computer running a terminal emulation program.

To enter the Onboard Diagnostics

1. Power off the ViVOpay 8100 by removing the power supply from the power receptacle.
2. Plug the power supply back into the power receptacle.
3. Press the **3** key and hold it down until the the main **ViVOpay AR Diagnostics** screen appears. This is approximately 40 seconds after power is first applied.

ViVOpay AR Diagnostics	
1	Onboard Diagnostic
2	
3	Application Tests
4	Get Version
5	Boot
X	Exit

- Press the 1 key to enter the OBD. The **ViVOpay AR Diagnostics** menu displays.

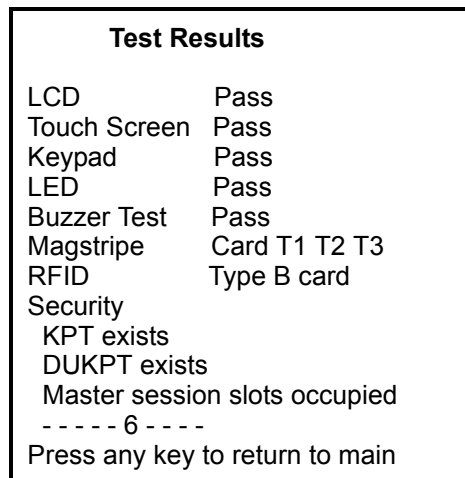


The **ViVOpay AR Diagnostics** screen is the main menu.

Test Results Summary

The **Test Results Summary** displays the results of all tests performed. Once the ViVOpay 8100 is returned to normal mode, all results are cleared. If you reenter the **ViVOpay AR Diagnostics**, all test are marked as not performed.

- Press **0** on the **ViVOpay AR Diagnostics** screen. The **Test Results** screen is displayed with the results of all the tests run.



Test All

Test All runs the entire test sequence and displays the results.

- Press **1** when the **ViVOpay AR Diagnostics** screen is displayed. All of the tests are run in sequence and the results are displayed. See each individual test for information.

LCD Test

The LCD test turns the pixels on/off and checks screen clarity to verify that the LCD screen is working properly. The results will be displayed on the LCD.

1. Press **2** from the **ViVOpay AR Diagnostics** screen. The **AR LCD Test** screen is displayed.

AR LCD Test

1 Test all pixels ON (not run)
2 Test all pixels OFF (not run)
3 Test clarity of display (not run)
CANCEL(X) Exit to main menu

Select Test with 1, 2, or 3 and:
Press ENTER (O) to pass test
Press CANCEL (X) to fail test

2. Press **1**. All pixels should be turned on and the screen should be a gray color.
3. Press **ENTER** if the correct screen is displayed otherwise press **CANCEL** to fail the test. The AR LCD Test screen is displayed.
4. Press **2**. All pixels should be turned off and the screen should be bright.
5. Press **ENTER** if the correct screen is displayed otherwise press **CANCEL** to fail the test. The AR LCD Test screen is displayed.
6. Press **3**. A checkerboard pattern is displayed.
7. Press **ENTER** if the correct screen is displayed otherwise press **CANCEL** to fail the test. The AR LCD Test screen is displayed.
8. Press **CANCEL** to exit back to the main menu.

Touch Screen Test

The Touch Screen test does not apply to the ViVOpay 8100. If you are running **Test All**, press **CANCEL** to abort this test.

Keypad Test

This test asks you to enter each of the keys in sequence to verify that the keypad is working correctly. The results will be displayed on the LCD.

1. Press **4** on the **ViVOpay AR Diagnostics** screen. The **Keypad Test** screen is displayed.

Keypad Test

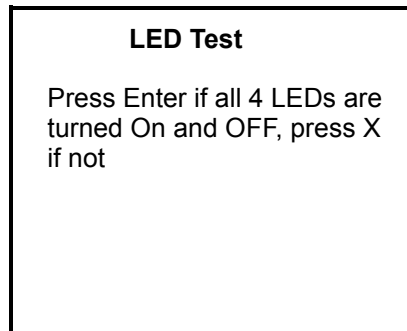
Press key 1

2. Press key **1**. The screen then asks for the next key in sequence.
3. Continue pressing each key as requested.

LED Test

This test asks you to verify that all of the LEDs are working correctly. The results will be displayed on the LCD.

1. Press **5** on the **ViVOpay AR Diagnostics** screen. The **LED Test** screen is displayed.

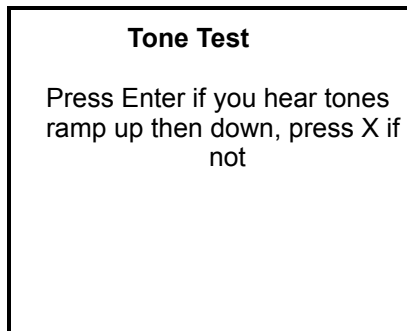


2. Press **ENTER** if all four LEDs flash on and off in sequence otherwise, press **CANCEL** to indicate that the LEDs did not flash. The ViVOpay AR Diagnostics screen appears.

Tone Test

This test asks you to verify that the buzzer is audible. The results will be displayed on the LCD.

1. Press **6** on the **ViVOpay AR Diagnostics** screen. The **Tone Test** screen is displayed.

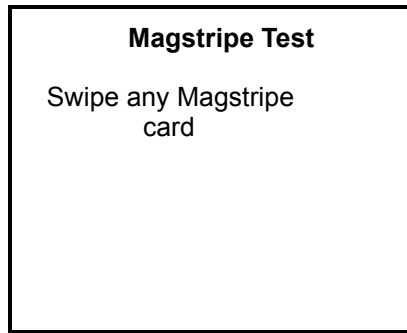


2. Listen for the tones and make sure they ramp up and then down.
3. Press **ENTER** if you hear the tones otherwise press **CANCEL** to indicate that the tones did not ramp up and down.

Magstripe Test

This test asks you to swipe a magstripe card through the slot at the top of the ViVOpay 8100 and displays the tracks read correctly. The results will be displayed on the LCD.

1. Press **7** on the **ViVOpay AR Diagnostics** screen. The **Magstripe Test** screen is displayed.

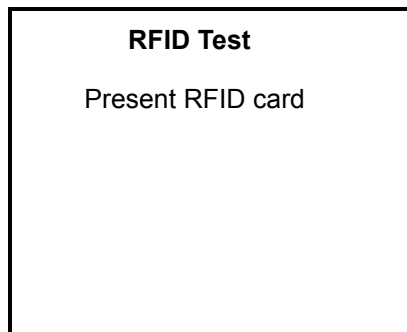


1. Swipe a card with a magnetic stripe through the slot on the top of the ViVOpay 8100.
2. The panel displays the results of the swipe; either the card has been successfully read or an error is indicated.
3. Press any key to return to the **ViVOpay AR Diagnostics** screen.

RFID and Antenna Test

This test asks you to present a contactless card/phone/fob close to the touch screen to verify that the antenna is able to detect a contactless card. The results will be displayed on the LCD.

1. Press **8** on the **ViVOpay AR Diagnostics** screen. The **RFID Test** screen is displayed.

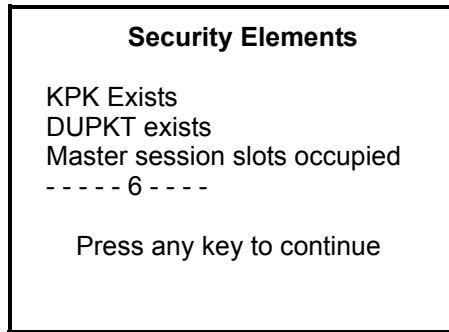


2. Present the card/fob/phone in close proximity to the reader and so that maximum surface area is parallel to the touch screen. The screen indicates if a card/phone/fob has been detected.
3. Press any key to return to the ViVOpay AR Diagnostics main menu.

Security Elements Test

This test verifies that the KPT and DUPKT keys are loaded into the ViVOpay 8100. It also verifies which slot contains the master Key. The results will be displayed on the LCD.

1. Press **9** on the **ViVOPay AR Diagnostics** screen. The **Security Elements Test** screen is displayed.



2. Press any key to return to the **ViVOPay AR Diagnostics** main menu.

Maintenance

The ViVOPay 8100 contains no user-serviceable parts within its enclosure. Do not open the ViVOPay 8100 enclosure.

WARNING: Attempting to open the ViVOPay 8100 enclosure will trigger PCI 2.1 security measures and it will stop functioning even after reassembly!

You can upgrade the ViVOPay 8100's firmware if required.

Upgrading the Firmware

You can upgrade the firmware of the ViVOPay 8100 if required for your application. You will need the following from your ViVOPay 8100 distributor:

- New ViVOPay firmware
- ViVOPay download utility
- USB data cable

You also need a PC with a USB port. The PC should have the required USB driver USBSER.SYS and HID.DLL files. If not, they are available for download from Microsoft's website.

To upgrade the firmware

1. Make sure you have the USBSER.SYS and HID.DLL files installed on the PC.
2. Copy the firmware image and ViVO download utility to the PC you are using for the upgrade.
3. Copy the vivopay.inf file to the Windows\inf directory.
4. Connect the USB data cable to the ViVOPay 8100 and PC (see ["Connecting Power and Data" on page 9](#)).

5. Double click the ViVO download utility icon or .exe to start the utility.



6. Power on the ViVOpay 8100. The bootloader version appears under the ViVOtech logo.
7. Click **Download Image**.
8. When prompted, locate and select the firmware (.hex file) to download and click **OK**.
A progress bar indicates the status of the download. It will take approximately eight minutes to complete the download.
9. When the download is complete disconnect the ViVOpay 8100 from the PC and power.
The new firmware will be active next time you apply power to the ViVOpay 8100.
10. Connect the ViVOpay 8100 to the POS with the appropriate data cable.
11. Reconnect power.



ViVOpay 8100 Specifications

RF Interface	
Frequency	13.56 MHz
Standard	ISO 14443 Type A/B
Physical	
Length	190.5 mm (7.5 in)
Width	129.45 mm (5.1 in) maximum
Depth	47.63 mm (1.875 in)
Weight	0.4 Kg (0.9 lbs)
Environmental	
Operating Temp.	0 to 40° C (32 to 104° F)
Storage Temp.	-10 to 70° C (-14 to 158° F)
Operating Humidity	10 to 85% non-condensing
Operating Environment	Indoor only
Power	
Voltage	9-12 Vdc regulated, +/- 10%
Consumption	13.5 W maximum

Regulatory Compliance

FCC Part 15 Class B Equipment

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

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment 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 Information for User

The users manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. In cases where the manual is provided only in a form other than paper, such as on a computer disk or over the Internet, the information required by this section may be included in the manual in that alternative form, provided the user can reasonably be expected to have the capability to access information in that form.

Industry Canada Class B Equipment

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

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

Industry Canada Information for User

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

**Electronic Cash Register (ECR)**

The combination of a traditional cash register and a POS terminal, often PC-based.

ExpressPay from American Express

American Express contactless payment product that utilizes contactless technology.

Firmware

Software that is embedded in a hardware device that allows reading and executing the software, but does not allow modification, e.g., writing or deleting data by an end user.

Example: Firmware is a computer program in a read-only memory (ROM) integrated circuit chip. A hardware configuration is usually used to represent the software.

Example: Firmware is a program embedded in an erasable programmable read-only memory (EPROM) chip, which program may be modified by special external hardware, but not by an application program.

Fob

A key chain device or other non-standard credit card sized form factor that has an embedded radio frequency (RF) chip.

MasterCard PayPass

MasterCard's contactless payment product that utilizes contactless technology.

NFC

Near Field Communications.

NFC Phone

Near Field Communications (NFC) phone. A technology that enables communication between a secure element in a mobile device and a contactless reader to make credit/debit payments. Also see UICC.

PCI 2.0

The Payment Card Industry Security Standards Council (PCI SSC) mission is to enhance payment account data security. PCI 2.0 is a set of standards created by PCI SSC to increase the security of card data.

Point of Sale (POS)

Refers to terminals used in retail stores with a magnetic stripe reader, keyboard, display and autodialer modem or IP connection, connected to the telephone/internet network and used for on-line credit/debit authorization. Can also be connected to a host computer, which handles all transaction processing including item price look-up, data collection, and credit/debit authorization.

Proximity Payments

Payment method utilizing contactless technology such as RF, Infrared (IrDA) or Near Field Communications (NFC).

Radio Frequency (RF)

Any frequency that corresponds to radio signals, including those used by cellular telephones and wireless networks.

RF Reader

The Point of Sale device that receives the RF transmission from a card, fob or NFC phone.

Visa Contactless

Visa's contactless payment product that utilizes contactless technology.