



ViVOpay[®] 8850

Technical Specifications



ViVOtech, Inc. 451 El Camino Real, Santa Clara, CA 95050 Ph: (408) 248-7001
Email: info@vivotech.com URL: www.vivotech.com

Copyright© 2011, ViVOtech® Inc. All rights reserved.

ViVOtech, Inc.
451 El Camino Real
Santa Clara, CA 95050

This document, as well as the hardware and software it describes, is furnished under license and may only be used in accordance with the terms of such license. The content of this paper is furnished for informational use, subject to change without notice, and not to be construed as a commitment by ViVOtech, Inc. ViVOtech, Inc. assumes no responsibility or liability for any errors or inaccuracies that may appear in this document.

Except as permitted by such license, no part of this publication may be reproduced or transmitted by electronic, mechanical, recorded, or any other method, or translated into another language or language form without the express written consent of ViVOtech, Inc. ViVOtech, ViVOwallet, ViVOnfc, ViVOcard, ViVOpay, ViVOpersona, and ViVOgiftcard are trademarks or registered trademarks of ViVOtech®, Inc.

Warranty Disclaimer: The services and hardware are provided "as is" and "as-available," and the use of these services and hardware is at the user's own risk. ViVOtech does not make, and hereby disclaims, any and all other express or implied warranties, including, but not limited to warranties of merchantability, title, fitness for a particular purpose, and any warranties arising from any course of dealing, usage, or trade practice. ViVOtech does not warrant that the services or hardware will be uninterrupted, error-free, or completely secure.

December 2011



Table of Contents

Chapter 1	
Introduction	1
About This Document	1
ViVOpay 8850 Overview	1
Features	1
Payment Applications	1
Related Documentation	2
Chapter 2	
Hardware Specifications	3
Main Components	3
User Interface Components	3
Contactless Reader/Writer	3
Magnetic Stripe Reader (MSR)	3
EMV Contact Card Reader	3
Keypad	3
Touch Screen LCD	3
Stylus	3
Electrical Interface	3
Data	3
Data Cables	4
Power	5
Stylus	5
SAM Card	5
Mechanical	6
Dimensions	6
Mounting	6
Environmental	7
Chapter 3	
Application Development and Interfaces	8
Overview	8
Application Development	8
Serial API	8
Key Injection	8
Device Emulation	8
Firmware Upgrades	9
Interfaces	9
Fixed prompts	9

Soft Buttons	10
Onboard Diagnostics	10
Signature Capture	10
Chapter 4	
Certifications	11
Safety Standard	11
EMI and RFID Compliance	11
RoHS Compliance	11
WEEE Compliance	11
Card Association Certifications	11
PCI 2.1 Certification	11
Chapter 5	
Testing	12
Overview	12
Environmental	12
Durability	12
HALT Testing	13



Chapter 1 Introduction

About This Document

This technical specification provides details on the ViVOpay 8850 to ViVOtech partners and POS system integrators requiring complete functional specifications. Information on certifications and test results is also included.

ViVOpay 8850 Overview

The ViVOpay 8850 is a PCI 2.1 certified counter-top contactless reader with integrated display, MSR, signature capture, and PIN pad. This device features serial RS-232 and USB 2.0 communications to POS systems. The ViVOpay 8850 seamlessly integrates with existing POS systems and requires minimal counter space at checkout stands. The ViVOpay 8850 is one in a series of multi-function payment devices using the same basic components for consistent programming interface and performance over the product line.

Features

The following features are supported:

- Support for NFC devices
- ISO 18092 support for peer-to-peer NFC devices and smartphones
- Support for contactless cards
- ADA-compliant keypad for PIN entry
- Three-track, bidirectional magnetic-stripe reader
- Electronic signature capture
- 24-bit color touch screen (480 x 272)
- Buzzer
- Industry standard LED indicators
- SAM card controller and two connectors
- EMV contact card reader
- Serial communications
- USB 2.0 slave interface
- Real time clock
- PCI PED 2.1 compliance
- Environmental compliance
- Field-upgradeable firmware
- Full application programming interface and software development kit over serial port with any Windows XP-based development tool

Payment Applications

ViVOpay 8850 supports the following contactless payment applications with AR 2.1.X firmware:

- MasterCard PayPass Magstripe v3.3
- Visa payWave MSD v2.0.2
- American Express ExpressPay v1.0
- Discover Zip v1.0
- Google Wallet

- ViVOCARD 1, 2, and 3

Other payment applications may be offered with future versions of the Advanced Reader firmware.

Related Documentation

The following documents also provide information on the ViVOPay 8850:

- *ViVOPay 8850 User Guide*
- *ViVOPay 8000-Series Serial Interface Developers Guide*
- *ViVOPay 8000-Series SDK Reference Manual*



Chapter 2

Hardware Specifications

Main Components

User Interface Components

Contactless Reader/Writer

The radio frequency antenna used for contactless communications surrounds the touch screen. The typical reading range is 4 cm depending on conditions where the ViVOpay 8850 is located.

Magnetic Stripe Reader (MSR)

The enclosure incorporates a 3-track magnetic stripe card reader head conforming to ISO/IEC 7811-2 specifications. The analog signals from this MSR are protected in a flat ribbon cable that connects to the Controller Main Board.

EMV Contact Card Reader

The contact card reader is PCI- and ISO 7816-compliant contact interface supporting EMV 4.2 for contact card transactions.

Keypad

The 13-button keypad is ADA compliant and withstands more than one million pushes on each button. The keypad membrane snap domes provide approximately 220 gms of tactile feedback when pressed.

Touch Screen LCD

The capacitive touch screen is a 24-bit color LCD with a 480 x 272 pixel resolution. The touch screen withstands more than one million signatures.

Stylus

The stylus is an active capacitance device with a straight cord and connector. Only the stylus can be used to write on the touch screen. Replacement styluses are available.

Electrical Interface

The ViVOpay 8850 has four connectors: data, power, stylus, and SAM card.

Data

The ViVOpay 8850 data connector supports serial and USB communications on a single 10-pin RJ-45/RJ50 connector. Data cables with power are available. The pinouts for the data connector are given below.

Pin Number	Description
1	+9-12VDC, 500mA
2	RS-232 Tx
3	RS-232 Rx

Pin Number	Description
4	+9-12VDC, 500mA
5	Data + (DP USB)
6	Data - (DM USB)
7	PWR GND
8	N/C
9	PWR GND
10	VBUS (USB)

Data Cables

Data cables are available in 1, 2, and 3 meter lengths (part numbers ending in -00, -01, -02 respectively). The pinouts for the POS side of the data cables are given in the tables below.

RS-232 (220-2463-0X)

DB9 Pin Number	Description
1	No connect
2	RS-232 Tx
3	RS-232 Rx
4	No connect
5	GND
6	No connect
7	No connect
8	No connect
9	No connect

RS-232 with power (220-2467-0X)

DB9 Pin Number	Description
1	No connect
2	RS-232 Tx
3	RS-232 Rx
4	No connect
5	PWR GND
6	No connect
7	No connect
8	No connect
9	+12VDC, 500mA

USB (220-2462-0X)

USB Pin Number	Description
1	VBus
2	Data - (DM)
3	Data + (DP)
4	GND

USB with power (220-2466-0X)

USB Pin Number	Description
1	VBus
2	Data - (DM)
3	Data + (DP)
4	GND
5	GND
6	+12 VDC, 500mA

Power

Power to the ViVOPay 8850 is supplied through a 5.5 mm barrel connector (socket). The following table gives the pinouts.

Contact	Description
Outer	PWR GND
Inner	+9 to 12VDC, 500mA

Maximum power consumption is 13.5 Watts.

Maximum voltage input is 24 VDC, not recommended for sustained usage.

The ViVOPay 8850 also includes a lithium-ion battery with a shelf life of 5 years.

Stylus

The 4-pin stylus connector has a lock tab for added security. Use only styluses available from ViVOTech for this connector.

SAM Card

The ViVOPay 8850 has one SAM card slot standard with a second optional SAM slot.

Mechanical

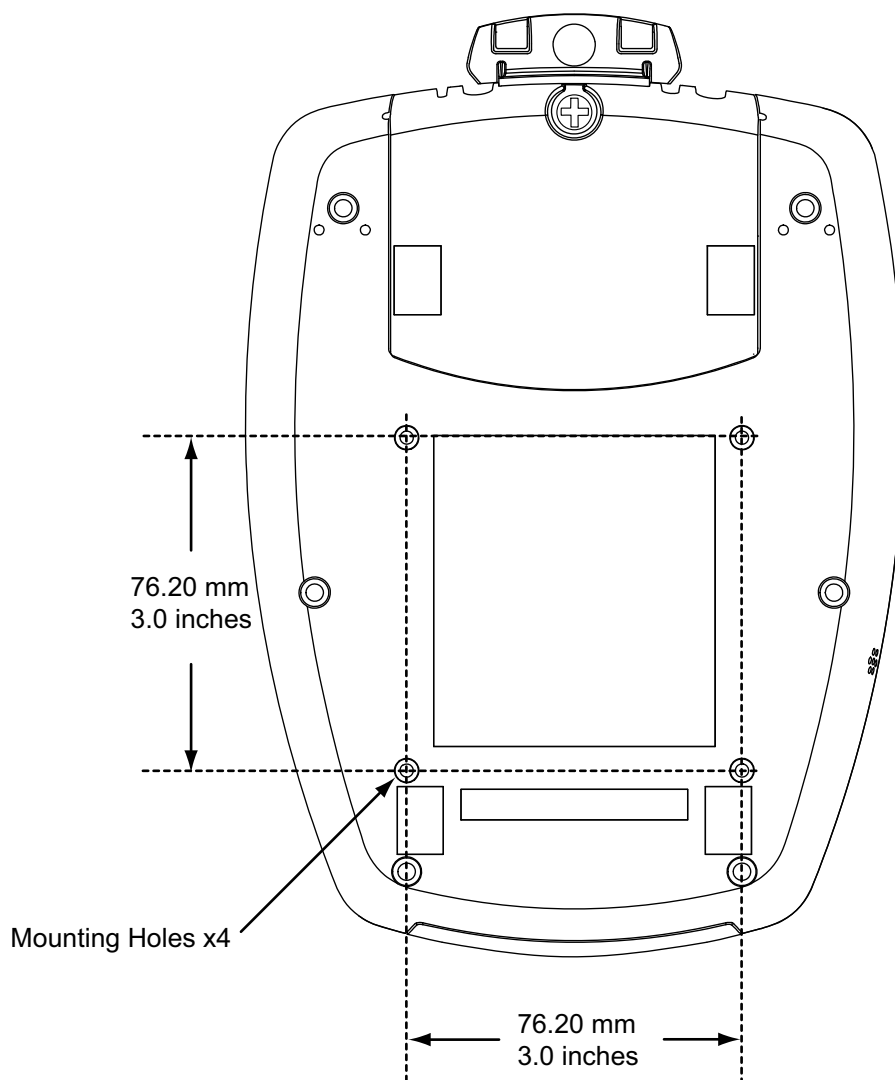
Dimensions

The ViVOpay 8850 has the following overall dimensions.

Dimensions	
Length	215.4 mm (8.48 in)
Width	149.2 mm (5.87 in) maximum
Depth	51.1 mm (2.01 in)
Weight	0.57 Kg (1.25 lbs)

Mounting

The ViVOpay 8850 can be mounted to bracket or other surface using four M3 blind-tapped mounting holes.



Environmental

The following table lists the environmental specifications for the ViVOpay 8850.

Specification	Details	Notes
Storage Temperature	-10 to +60°C 14 to 140°F	Based on Bellcore GR-63-CORE.
Operating Temperature	0 to 40°C 32 to 104°F	
Relative Humidity	10 to 85% non-condensing	



Chapter 3

Application Development and Interfaces

Overview

The ViVOPay 8850 employs an operating system and advanced software features based on our next generation firmware design. This modular architecture supports efficient certification and maintenance across the entire product line.

The ViVOPay Runtime Environment (VRE) provides the architecture for writing new card and general applications, communications protocols, and user interface experiences.

Application Development

The ViVOPay 8850 development environment is based on an extensive library of commands and responses passed between the ViVOPay 8850 and POS device. The serial API and SDK functions allow easy development of Windows applications to interact with the ViVOPay 8850 over its serial interface.

Developers can use the serial protocol API, the C++/C SDK, or both to develop applications for the ViVOPay 8850.

Serial API

The ViVOPay 8000-Series Serial Command API consists of over 60 commands for controlling the ViVOPay 8850 via the serial data port as part of your POS application. For complete information, see the *ViVOPay 8000-Series Interface Developer's Guide*.

Key Injection

Key injection will be performed at the customer facility or at their contract manufacturer's facility. The manufacturer must log the serial number at the time the keys are injected. The *ViVOPay 8000-Series Interface Developer's Guide* contains information on how to retrieve the serial number from the ViVOPay 8850.

Device Emulation

The ViVOPay 8850 is capable of emulating third-party payment devices. Contact ViVOTech for more information on payment device emulation with the ViVOPay 8850.

Firmware Upgrades

The ViVOPay 8850 firmware can be easily upgraded using a USB data cable and a Windows utility. ViVOPay 8850 has a secure boot loader to verify the authenticity of the ViVOPay firmware before it can be loaded. If authentication fails, the firmware is deleted and unit is disabled. The authenticity of the firmware is verified using 2048-bit RSA public keys that are embedded into the microprocessor.

For more information, see the ViVOPay 8850 *User Guide*.

Interfaces

Fixed prompts

The ViVOPay 8850 includes a set of pre-defined screen prompts to help customers through the payment process. Downloading custom or localized prompts is not supported in the ViVOPay 8850 firmware.

The following list of PCI 2.1-compliant prompts are pre-defined for firmware release AR 2.1.0.

amount	insert or swipe card	please tap or swipe card
amount ok?	international card	please use chip reader
approved	international card please insert	please use keypad to confirm
approved avail	international card please swipe	please use keypad to confirm or
approved available	invalid entry	cancel
authorized	is amount ok?	please use keypad to select account
authorizing please wait	keys not found	please use keypad to select option
available	no card	please use other visa card
balance	not accepted	please wait
call your bank	not authorized	please wait...
cancel	not connected	present card
cancelled	offline	present one card only
cancel to reject	offline available fund	press cancel to reject
card read ok	other	press enter to accept
card read ok remove card	other amount	processing
cash	out of order	processing...
cash back?	payment	push enter
choose transaction type	pin try limit exceeded	receipt?
clear	please enter amount	remove card please wait
confirm amount	please enter cash back amount	signature required
connecting online	please enter phone	signature required transaction not
convert to credit?	please enter tip	completed
copyright	please enter tip amount using	subtotal
credit	keypad	swipe again
debit	please enter tip option using keypad	swipe card
declined	please enter zip code	tap again
done	please insert card	tap card
end of key life	please insert or swipe card	tap or swipe card
enter configuration id	please present card	thank you
enter date and time	please present one card only	timeout
enter force transaction online	please press enter on keypad to	tip
fail	continue	tip amount
fare	please press enter to continue	total
fatal error	please push enter	total charged to card
fee	please re-enter phone number	transaction complete
initializing	please re-enter zip code	transaction completed
input date of birth and press enter	please remove card	transaction not completed
input joint applicant date of birth and	please select 1 card	unit disabled
press enter	please select option	vivotech, inc.
input joint applicant social security	please sign on the screen	voucher
number and press enter	please sign the receipt	welcome
input social security number and	please swipe card	would you like a receipt?
press enter	please tap card	

Soft Buttons

A fixed set of soft buttons are available for display and use on the touch screen. The size and location of the buttons is controlled through the communication interface using the appropriate commands. However the appearance and the text is fixed. The following button texts are available:

DONE	CLEAR	LOYALTY
CREDIT	OK	EBT
DEBIT	YES	GIFT CARD
CANCEL	NO	CASH

The TOUCH button is used exclusively by the onboard diagnostics and not available for application programming. The button text is fixed to upper case.

Onboard Diagnostics

Onboard diagnostics allow the user to boot up in a diagnostic mode to carry out various system components tests. These tests include:

- Touch Screen
- Keypad
- LCD
- LEDs
- Buzzer
- Magstripe
- RFID
- PIN keys status

For more information, see the *ViVOpay 8850 User Guide*.

Signature Capture

The ViVOpay 8850 returns signature captures as either a PNG or BMP formatted graphic file. For more information, see the *ViVOpay 8000-Series Interface Developer's Guide*.



Chapter 4 Certifications

Safety Standard

This product meets the basic Safety requirement as defined by IEC 60950-1: 2005 Second Edition and EN 60950-1: 2006 Second Edition + A11:200.

EMI and RFID Compliance

The product meets FCC and Industry Canada electromagnetic interference (EMI) and radio frequency interference device (RFID) compliance requirement.

- US - 47CFR15J/FCC Part 15, Subpart J Class A (EMI)
- FCC 15.225 (RFID)

RoHS Compliance

This product complies with European Union Directive 2002/95/EC (RoHS Directive) of the European Parliament and of the Council of 27 January 2003.

WEEE Compliance

This product complies with European Union Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE).

Card Association Certifications

This product is tested and certified by the card associations - Master Card Global, Visa International, American Express, Discover.

- MasterCard PayPass ISO/IEC 14443 v1.1
- MasterCard M/Stripe v3.3
- Visa - MSD v2.0.2
- AmEx - ExpressPay 1.0
- Discover - v1.0

PCI 2.1 Certification

The ViVOpay 8850 is PCI 2.1 certified for online PIN transactions. Security design elements include:

- PIN entry shield
- Secure area on Main Board
- Secure data protected from enclosure penetration



Overview

The ViVOPay 8850 has been subjected to performance, durability, and environmental testing.

Environmental

The following table lists the environmental specifications for the ViVOPay 8850.

Specification	Details	Notes
Static Contact Discharge	Withstands $\pm 2\text{kV}$ to $\pm 4\text{kV}$	EN 301 489-1, clause 9.3.2 and EN 61000-4-2, 1995, ESD (Electrostatic Discharge)
Static Air Discharge	Withstands $\pm 2\text{kV}$ to $\pm 8\text{kV}$	
Ultraviolet Exposure	Colorfast to less than 5% variation after 3 years, no visible cracking or mechanical deterioration after 3 years.	
Spill resistant	Survives minor spills	Tested by ViVOtech

Durability

The following table lists the durability specifications for the ViVOPay 8850.

Component	Specification	Comments
ViVOPay 8850	Greater than 6 years Mean Time Before Failure (MTBF)	This is a calculated value based on Telcordia Technologies SR-332 modeled at 40°C.
ViVOPay 8850	Drop test	Dropped on six points from three feet on carpet covered concrete.
MSR	Greater than 1 million reads	Manufacturer specification verified by ViVOtech
Touch Screen	Shatter resistance	Survives a 1" diameter steel ball (2.4 ounces) dropped from 3 feet
Keypad	1 million button pushes	
Lithium-ion Battery	5 year shelf life	Includes dissipation while the ViVOPay 8850 is unpowered

HALT Testing

The ViVOpay 8850 underwent and passed thermal and vibration stress testing at an independent HALT lab.

Test	Comments
Cold Temperature Operating Limit	Passed
Hot Temperature Operating Limit	Passed
Cold Temperature Destructive Limit	Passed
Hot Temperature Destructive Limit	Passed
Vibration Operating Limit	Passed
Vibration Destructive Limit	Passed