ViVOpay ™ VP5300M User Manual

80171500-001 Rev. A

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1. Overview

ID TECH's ViVOpay VP5300M is a motorized, compact SRED credit card reader designed to support MSR (magstripe) and contact EMV, plus contactless EMV (when the device is mated with the VP5300M's NFC antenna).

The ViVOpay VP5300M is designed to deliver MSR, EMV, and optional NFC (contactless) payment acceptance with SRED security and reliability in unattended payment scenarios, such as Parking, Fueling, ATM, Ticketing, and Payment Kiosks (among others).

The VP5300M leads the industry in low power consumption and ruggedness, with its plastic bezel and IK07 and IP42 ratings to ensure long life in demanding conditions. The VP5300M is certified to the latest payment standards of EMV (Level 1 and Level 2) and PCI (5.x) and offers easy integration of payments into self-serve kiosk and unattended environments.

The VP5300M

VP5300-NFC Antenna

1.1. VP5300M PCI/EMV Certified Insert Reader

Model Number	Description
IDM-181	VP5300M; Ethernet, 8 SAM, JIS; No conformal coating; Production Unit; No custom features.
IDM-081	VP5300M; No Ethernet, 8 SAM, JIS; Production Unit; No custom features.
IDM-101	VP5300M; Ethernet, No SAM, JIS; Production Unit; No conformal coating; No custom features.
IDM-180	VP5300M; Ethernet, 8 SAM, No JIS; Production Unit; No conformal coating; No custom features.

1.2. Optional Accessories

Model Number	Description
80171201-001	USB cable
80171203-001	RS-232 cable
80171204-001	Power cable, with Molex coupling
AC0005R-12	Power supply, USA plug, 12VDC, 4.25A; 90-264 VAC input (60Hz US, 50Hz Europe), Molex plug
80141220-001	L100 cable

1.3. NFC Antenna

Model Number	Description
ID-80152002-003 Antenna	NFC Antenna, silver overlay, with RJ-45 (male) coupling.

The ViVOpay VP5300M supports USB and serial (RS-232) host communication using the command protocol defined in the *NEO 2 Interface Developers Guide*. This comprehensive guide describes all the firmware commands and other features available in ID TECH's NEO-series devices; it is the authoritative source for technical information of interest to systems integrators. Contact your ID TECH representative to obtain a copy of this guide, which is available under NDA. Note, also, that a feature-rich, Windows-based Universal SDK is available to aid in rapid development of applications that talk to the VP5300M.

Be sure to check the Downloads page on the ID TECH Knowledge Base for the latest VP5300M demos, utilities, SDK updates, white papers, and other downloads, all of which are freely available without registration.

NOTE: The VP5300M requires the use of an external 12V DC power supply; it cannot run on USB port power alone. When other peripherals are connected to it, such as an NFC antenna, the VP5300M powers those peripherals.

1.4. Features

The ViVOpay VP5300M supports the following features:

- Contactless: ISO/IEC 14443 Type A and B
- ISO 18092 (peer-to-peer communication)
- PCI-PTS 5.x certification with SRED
- Tamper responsive (with automatic zeroization of keys in the event of tamper)
- MSR reads up to 3 tracks of data (Bi-Directional), with JIS-1 and JIS-II support
- ICC reader with landing contact
- Contact and Contactless EMV Level 1 certified
    - Contact EMV Level 2 certified, using ID TECH's proven Common Kernel
    - All major Contactless kernels supported
- State-of-the-art encryption support
    - Triple DES
    - AES
    - TransArmor RSA
- Support for DUKPT key management (with 15 DUKPT slots) of data and/or MAC keys
- NGA Key Injection Protocol
- TR34 Remote Key Injection Protocol
- 15 DUKPT key slots supported
- Optional contactless (NFC/RFID) antenna
- Mechanical or optical front switch
- Plastic bezel with a gate
- Dedicated USB and Ethernet ports (for data communication)
- Dedicated DC 12 to 24V power input
- LAN with network function 2 colored LEDs for link state and speed indication
- Audio feedback for MSR, contact EMV, and contactless transactions
- RoHS 2, and REACH compliance
- 1-year manufacturer's warranty

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

1.5. Applicable Documents

- ISO 7810 Identification cards: Physical characteristics
- ISO 7811 1 - 6 Identification Cards: Track 1 - 3
- ISO 7816 Identification cards: Integrated circuit cards
- ISO 4909 Magnetic stripe content for track 3
- 801714XX Product Requirement Document: Motorized PCI SRED / EMV Insert Reader
- 80000403-001 Enhanced Encrypted MSR Data Output Format
- 80000404-001 ID-Tech Encrypt Data Format in Command Response Specification
- 80000405-001 IDTECH NGA Key Injection Protocol

1.6. ViVOpay VP5300M: Approvals

Item	Regulation & Class
CE	EN55032/EN55035, Class- B
FCC	Part 15, Class-B
RoHS	Compliant
UL	Compliance with UL regulation
REACH	Compliance with REACH regulation
USB IF	Compliance with USB IF regulation
EMV	Contact L1 & L2 / Contactless L1
PCI	PCI PTS 5.X Certified
Contactless Technology	**Specification Compliance**
American Express	American Express® ExpressPay 3.1
Discover	Discover® DPAS 1.0 Zip 3.1.2
MasterCard	MasterCard® MChip 3.1.1
Visa	Visa VCPS 2.2
Interac	Interac 1.5d
CUP	qPBOC 3.0 (pending)
JCB	JCB (pending)
Mobile wallets	Apple Pay Apple VAS (pending) Android Pay Google Smart Tap 2.1 (pending)

2. ViVOpay VP5300M: Electrical

Voltage requirement: 12V DC (minimum) is recommended, to 24V maximum.

Battery: The unit contains a small lithium battery to power the Real Time Clock and certain anti-tamper features. This battery has a shelf life of five years. The battery is not user replaceable. Do not attempt to open the VP5300M for any reason; this will trigger the anti-tamper features, causing the unit to become inoperable. If battery replacement is required, return the VP5300M to ID TECH. Contact support@idtechproducts.com for more information.

2.1. ViVOpay VP5300M: Firmware

Feature	Support Function
Magnetic stripe	• Meets ISO 7810/ISO 7811 specification Supports AAMVA format • Supports JIS I/II card format • Supports single, dual and triple tracks. Bi-directional reading
Contactless	• EMVCo Contactless Level 1/2 • ISO 14443 Type A&B, MIFARE, ISO 18092 (including P2P) Visa: VCPS 2.2 • IRWIN listed MasterCard: M/Chip 3.1 • American Express: ExpressPay 3.1 Discover: DPAS 1.0 • Interac: Flash version 1.5d PBOC: level 1 • MIFARE: Classic, Ultralight C, DESFire, DESFire EV1 supported via passthrough mode
Contact	• EMVCo Contact Level 1 & 2 (L2 Common Kernel)
Key injection	• Compatible with FutureX and Geobridge HSMs for Data Key Injection • Can communicate with HSM via USB or RS232 port • Support for RSA keys generation and certificates loading Support for Asymmetric TR-34 Remote Key Injection

Security	• PCI PTS SRED Certified (5.x or higher)
	• Supports ID TECH Encrypted Data Output Format – 80000502-001
	• Support multiple types of encryption formats:
	  ○ TDES
	  ○ AES
	  ○ RSA-based TransArmor
	• Supports Multiple Key management techniques: DUKPT
	• Master Session Key

Feature	Support Function
	• Secure firmware. Remote key injection, and application download using PKI • Secure commands (PKI) for configuring device (RTC, whitelist, reset device, etc.)
Command Set	• Reference the NEO Interface Developers Guide - 800139403-001
Host Interfaces	• RS232, USB-HID
Firmware/Application Download	• Use host interfaces to download firmware/application
Application	• Future development to supports payment applications hosted by the VP5300M to send payment packets to different gateways/processors/acquirers • QSPI Flash for code storage and SDRAM for memory
LEDs	• LEDs – Green NFC Certification LED on antenna • diagnostic LED • 1 tri-color LED indicator for MSR
Audio	• Beep for contactless transaction and other functions
Logs	• Keep logs for firmware/application download, secure events
Ethernet	• Can connect to internet

3. ViVOpay VP5300M: Physical/Mechanical Characteristics

Item	
Physical Dimensions: VP5300M Reader	163mm from back of mounting surface x 65mm flange width x 27.5 mm flange height (LxWxH)
Physical Dimensions: VP5300 NFC Antenna Bezel	65mm x 54mm x 14.5mm (LxWxH), not counting 15.5mm-deep M4 studs that protrude from the back of the unit
Structure Material	Plastic bezel, PC UL 94V-0
Housing Color	Black
Weight	0.51 kg without SAM board
Bezel	Plastic bezel with texture

3.1. ViVOpay VP5300M: Environmental Characteristics

Category	Support	
Operating Temperature	-0° C to 50° C (32° F to 122° F), max change of 10° C per hour	
Storage Temperature	-20° C to 70° C (-4° F to 158° F)	
Operating Humidity	10% to 95% non-condensing	
Storage Humidity	10% to 95% non-condensing, duration 3 months	
Transit Humidity	5% to 95% non-condensing, duration 1 week	
Operating Environment	Water resistant for indoor use	
IK Rating	IK07	
IP Rating	IP42	
ESD (Device)	Air discharge	±15kV

Note: Cables/connectors must be fully isolated with insulating material to prevent ESD discharge.

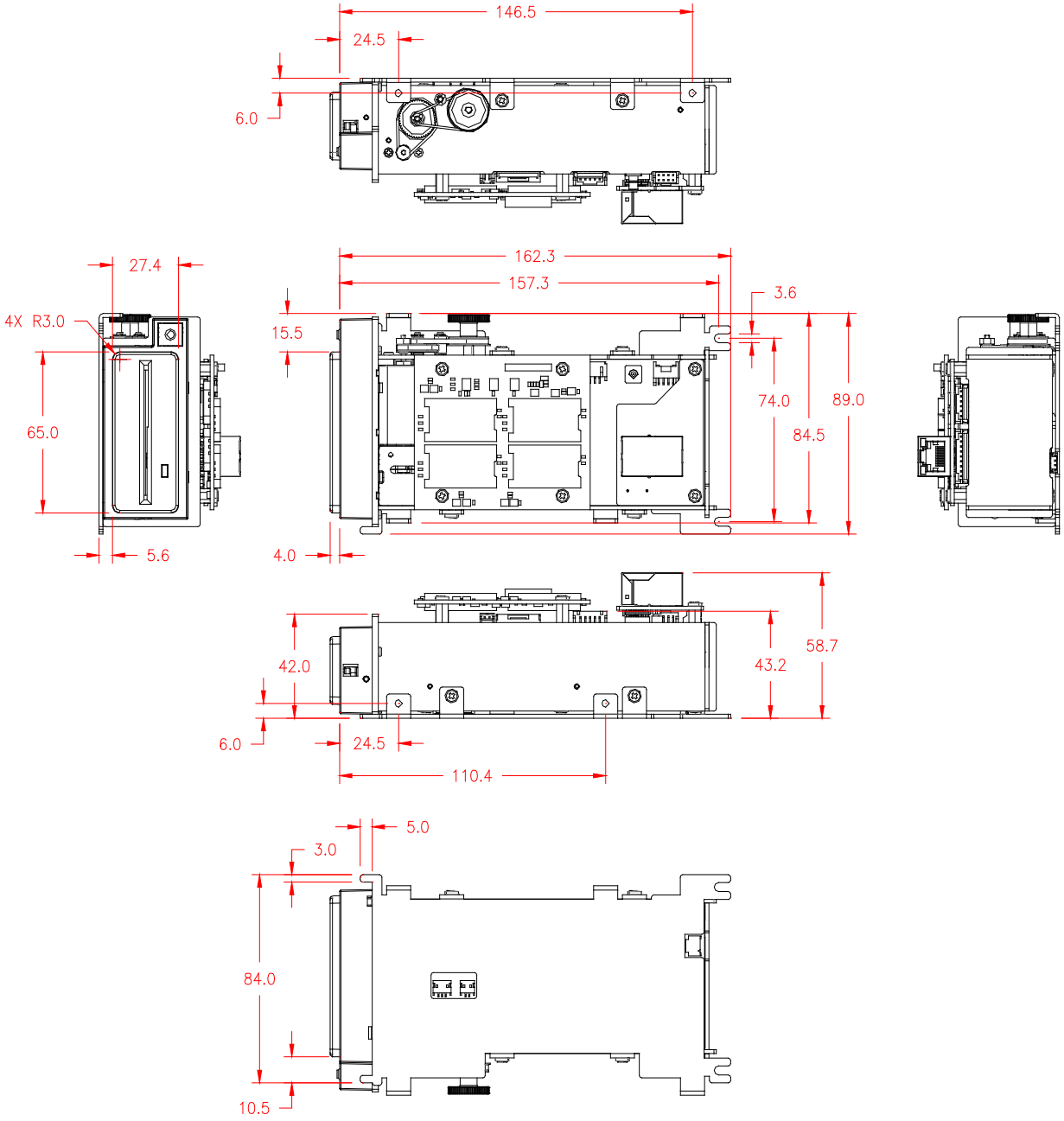
3.2. ViVOpay VP5300M: Durability and Reliability Specs

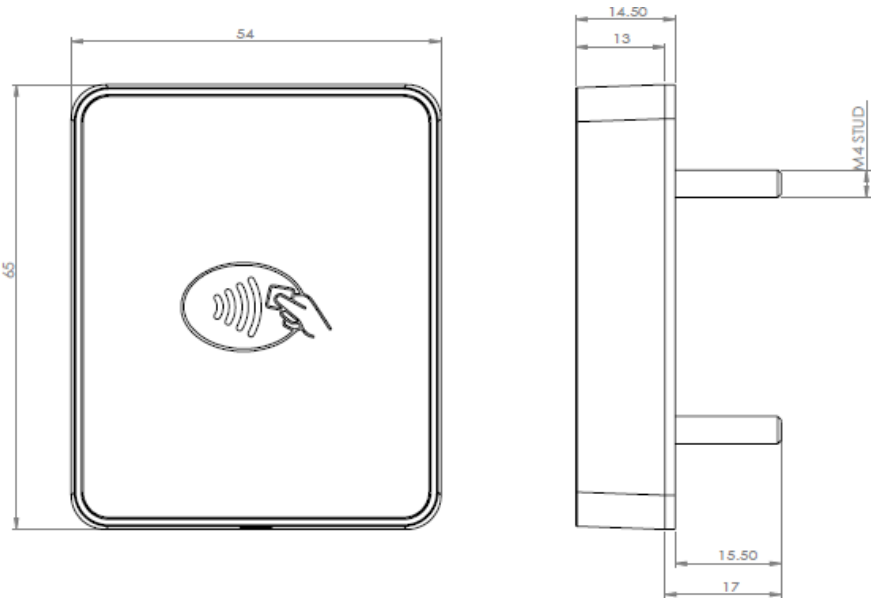
Item	Specification
Magnetic Head	600,000 cycles minimum
Chassis, card slot	600,000 cycles minimum
Smartcard contact block	600,000 cycles minimum
Bezel and gate	600,000 cycles minimum
Motorized mechanism	600,000 cycles minimum
Impact Resistance	The front face is impact resistant to IK07 rating
Ingress Resistance	The front face meets IP42 rating

3.3. ViVOpay VP5300M Contactless Specifications

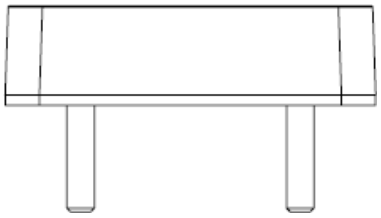
Hardware	
MTBF	Over 100,000 hours
Receiver Subcarrier Data	ISO 14443-2 Type A: Modified Manchester ISO 14443-2 Type B: NRZ-L, BPSK ISO 18092 ISO 21481 (PCD & NFC)
Typical Read Range	0~4cm(0~1.5 inches)
Electrical	
Working power	Greater than 6.0W

4. VP5300M 3-View Drawing

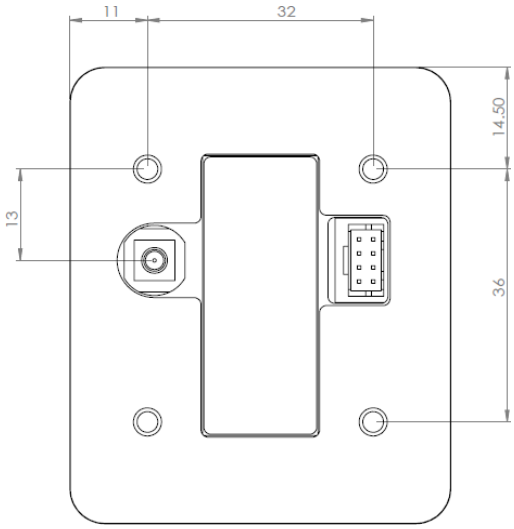




5. VP5300M NFC Antenna 3-View



Antenna mounting details:



6. VP5300M Installation

This section provides information on how to install the ViVOpay VP5300M in an enclosure.

Note that the unit may be installed edgewise (vertically), or in a horizontal manner. It can also be bolted to or custom-mounted flush with a surface. In the latter case, be sure to allow a 3mm (minimum) cutout clearance around the edge of the metal face flange (assuming the enclosure is metallic), to maintain good NFC performance. **Do not tightly flush-mount the unit to a metal enclosure**. Test NFC performance thoroughly to be sure no interference or signal attenuation occurs.

6.1. Parts List

Verify that you have the following hardware for the installation of the ViVOpay VP5300M:

- IDM-101: VP5300M; Ethernet, No SAM, JIS; No conformal coating; Production Unit; No custom features.
- (Optional) ViVOpay 5300M NFC Antenna P/N ID-80152002-003. You will need this item and its cable (P/N 80152235-001 or 80152336-001) to use VP5300M's contactless (NFC) capabilities.
- USB cable P/N 80171201-001, or RS-232 cable P/N 80171203-001.
- Power supply P/N **AC0005R-12** with cable 80171204-001.

6.2. Installing the Reader

Refer to the VP5300M 3-view drawing. Verify that power cords can physically reach the unit. Then proceed to:

- Locate, mark, and drill holes for the mounting points of the unit.
- Secure the unit to the enclosure with bolts or screws of appropriate depth. Note that the anti-tamper nubs, located on the unit's left side, must be depressed when the unit is mounted.

6.3. Mounting the ViVOpay VP5300M External NFC Antenna

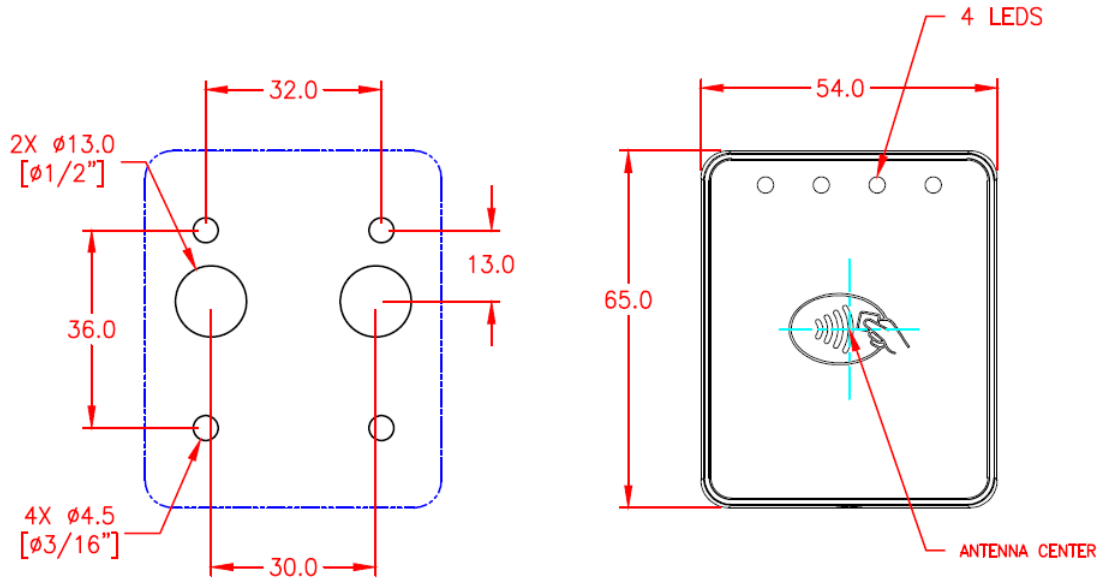
Refer to the VP5300M Antenna 3-view drawing. If you are using the VP5300M's contactless capability, you will need to install the optional NFC antenna and its cabling.

Use the following instructions to mount the antenna on the exterior of a kiosk.

Note: It is recommended that you experiment with and verify the orientation of the ViVOpay VP5300M NFC Antenna before marking and drilling mounting holes, ensuring that the antenna is far enough away from the main body of the VP5300M so that insertion of a "tap card" in the unit's contact-EMV slot doesn't trigger an unwanted NFC interaction.

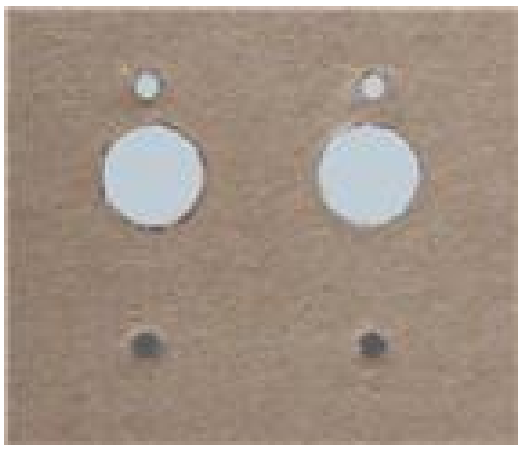
Important: Mark holes in such a way as to ensure that the ViVOpay VP5300M NFC Antenna is oriented with the LEDs at the top.

1. Locate and mark the four 4.5 mm (3/16 inch) mounting holes.



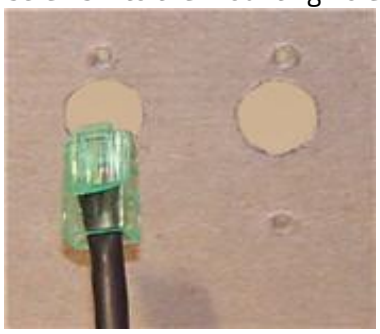
RECOMMENDED CUTOUT
FOR MOUNTING

2. Locate and mark two 14.0 mm (0.551 inches) access holes (used for connecting the antenna barrel connector and the LED power and data cable to the unit. Notice that these holes are located off-center toward the top of the unit.
3. Drill the four 4.5 mm (3/16 inch) mounting holes.
4. Drill the two access holes (14.0 mm, 0.551 inch) holes using a 35/64 drill bit.



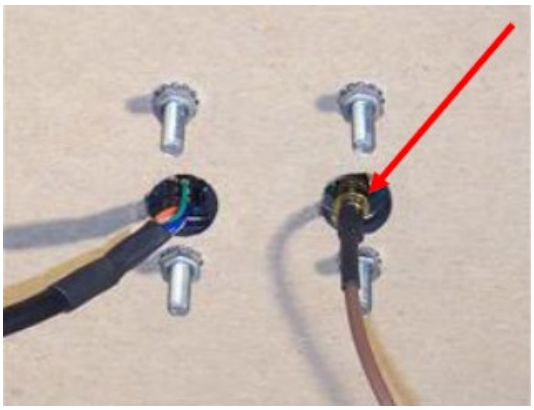
5. Use the nuts that are supplied with the unit (in plastic bag).

6. Route the end of the cable (80152235-001) with the RJ-45 connector through the matching 14.0 mm (0.551 inch) hole into the kiosk. Make sure that the front of the antenna will be properly oriented (not upside down) on the kiosk before inserting the four screws into the mounting holes.



7. Align the four threaded posts with their mounting holes and attach the ViVOpay VP5300M NFC Antenna to the mounting surface. Make sure that the cable is not pinched, rubbing, or binding.

8. Use the four nuts to secure the ViVOpay VP5300M NFC Antenna to the surface of the kiosk. Make sure to tighten the nuts securely so that the antenna does not move freely on the outside surface of the kiosk.



Note: Tighten the nuts to 5-7 in/lbs. for a good weather-tight seal.

9. Attach the end of the cable with the SMB barrel connector through the right 14.0 mm (0.551 inch) hole and secure it to its socket on the back of the antenna. The SMB connector pushes onto the socket.

10. Attach the RJ-45 connector (male) coming from the ViVOpay VP5300M NFC Antenna to the RJ-45 receptacle (female) on the 80152236-001 cable.

6.3.1. Flush-Mounting the Antenna

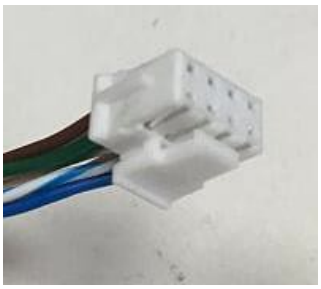
The antenna's RF field is sensitive to the proximity of metal. There are three options when flush-mounting the antenna in a metal surface or bezel:

1. Mount with the RF emitting surface of the antenna at least 1cm forward of any metal.
2. Mount with the RF emitting surface of the antenna at least 1cm behind any metal. **Note:** this reduces the antenna's effective range.
3. Mount flush with the metal but allow a minimum of 1cm spacing between the antenna and the metal.

In all three cases, **make sure to test the antenna** mounting before engaging in a production-ready installation.

6.4. Attaching the Cables from the Antenna to the VP5300M

1. Attach the SMB barrel end of the cable (80152336-001) from the antenna to the SMB post of the VP5300M. The connector slides on.
2. Attach the 8-pin end of the cable (80152336-001) from the antenna to the ViVOpay VP5300M, where the receptacle sits next to the RJ-45 (Ethernet) receptacle.



6.5. Connecting to Power

The VP5300M is powered through the power input connector.

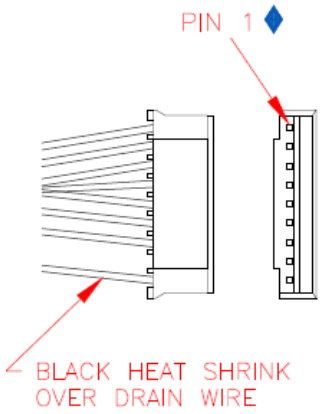
1. Connect the 12V DC power supply (P/N AC0005R-12) with cable 80171204-001 to the receptacle on the bottom side of unit.
2. Plug the unit in to an AC outlet and verify that the VP5300M lights up.

6.6. Connecting to the Data Port

Use 9-pin JST P/N PHR-9 (or equivalent) for the RS232 connector or 5-pin JST P/N PHR-5 (or equivalent) for the USB connector. See diagrams below for RS-232 or USB, as appropriate.

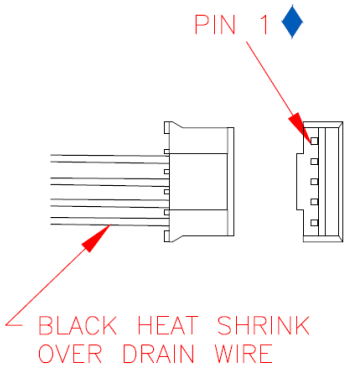
6.7. VP5300M External Cable Pin Assignments: RS-232

WIRE CONNECTIONS				
P1	COLOR	GAUGE	SIGNAL	J1
2		26	RXD	3
3		26	TXD	5
4		26	DTR	6
5		26	GND	7
6		26	DSR	1
7		26	RTS	2
8		26	CTS	4
SHELL	DRAIN	26	CASE GND	9



6.8. VP5300M External Cable Pin Assignments: USB

WIRE CONNECTIONS				
P1	COLOR	GAUGE	SIGNAL	J1
1	--	--	N/C	--
2	WHITE	28	DATA-	3
3	GREEN	28	DATA+	2
4	BLACK	26	GND	4
SHELL	DRAIN	26	CASE GND	5



7. LED Management

There are two LEDs. One is the user-interface LED on the front bezel of the reader; the other (diagnostic) LED is on the back.

Front LED Status

- The LED turns green in idle waiting.
- LED handling for Magstripe card operation:
    - The LED will turn red to indicate that the recent magstripe card read was bad.
- LED handling for smart card operation:
    - The Green LED will flash after powering on the smart card.
    - The solid Green LED indicates smart card processing is complete and the ICC powered off. The user can remove the smart card.

State	LED	Indicating
0	Off	No external power.
1	Flashing Green	Powering on the smart card and starting smart card operation.
2	Solid Green	Idle waiting (Smart card processing is complete and the ICC powered off. User can remove the smart card. If the transaction mode was MSR, magstripe card data is sent out.)
3	Solid Red	The recent magstripe card read was bad. Red lasts 1 second.

7.1. Diagnostic LED Status

The LED on the *back* of the VP5300M is intended to be used for diagnostic purposes. LED status:

1. Off
2. Solid: No communication with its host.
3. Flashing (1 sec on, 1 sec off): Communicating with its host. LED Colors:
    - Amber: Reader requires on-site service actions.
    - Green: Reader is ready to read cards.
    - Red: Reader needs to be sent back to the manufacturer.

State	Green LED	Amber LED	Red LED	Indicating	Service action
1	Off	Off	Off	No external power.	Check the power cable and power supply.
2			Solid Red	Power is on, but firmware doesn't run.	Dismount the device and send it back to the manufacture.
3		Solid Amber	Off	Solid amber normally means the front removal-detection buttons (left side of front bezel) are not depressed. If this possibility is ruled out, check host connectivity.	Check that the removal detection button is fully depressed. Check the communication cable and if host is running.
4	Solid Green	Solid Amber		Power on. First restart and no command sent. In not ready state and waiting for host to communicate.	No action required.
5	N/A	N/A		N/A	N/A
6	Flashing Green	Flashing Amber		Firmware downloading and programming in progress.	Wait for download to finish.
7	Solid Green	Off		In ready state but no communication with its host.	Check connections.
8	N/A			N/A	N/A
9		Flashing Amber		Removal flag is on and communicating with its host.	Check removal switch (under the gasket on the unit's front flange, on the right) to see if it is fully engaged; if necessary, call service center to reactivate the reader.
10		Solid Amber	Solid Red	Reader has no communication with its host, and the crypto driver is not functioning: Crypto MCU is lost or certificates are invalid (unit may be tampered).	Dismount the reader and send it back to the manufacturer.
11		Flashing Amber		Reader is communicating with its host, and the crypto driver is not functioning: Crypto MCU is lost or certificates are invalid (unit may be tampered).	Dismount the reader and send it back to the manufacturer.

8. Using the ViVOpay VP5300M to Make a Contactless Purchase

8.1. Presenting Proximity Cards or NFC Phones

The ViVOpay VP5300M allows for credit/debit card purchases using Contactless technology when the optional NFC antenna is installed.

Present the card or phone in close proximity to the front portion of the antenna module. Present the card or phone so that maximum surface area is parallel to the antenna module as shown below. The antenna should beep and all four green LEDs should illuminate briefly to indicate a successful test.

This tests the antenna's ability to read the Contactless test card. An unsuccessful test produces no reaction from the reader. If you use a test card and the antenna is attached to the VP5300M, a dummy transaction can be tested. The transaction will not be authorized and return a response but will at least test for end-to-end connectivity.

9. Installation

- The VP5300M is designed to be mounted on a metal surface and in reasonably close proximity to any internal motors and electrical devices that may be operating inside the kiosk. However, the unit (like all NFC/RFID devices) is susceptible to RF and electromagnetic interference**.**

  It is important that the unit not be mounted near (within 3 or 4 feet of) large electric motors, computer UPS systems, microwave transmitters, anti-theft devices, radio transmitters, routers, and so on.

- Close proximity of metal to antenna's the RF-emitting end can greatly reduce the antenna's range.
- Tie all cables neatly with nylon cable-ties and route them so that they are inaccessible and invisible to customers. Label the cable ends as "host," "ViVOpay," and "power" to simplify connection testing or component replacement, particularly when untrained individuals might be involved.
- Test the installation using a test card to perform an end-to-end transaction (the same as an actual purchase). The NFC antenna front panel's light should illuminate. Even if the transaction is declined (as it should be with a test card), it will prove connectivity all the way through the system. If possible, the store manager or some other responsible party should test each VP5300M on a regular basis (perhaps at the start of each day or at least once per week) with a test card to ensure continued operation and functionality. If the unit is manually rebooted, it is important to test the contactless reader portion as soon as possible afterwards to verify continued communication. Note that the reader automatically reboots once every 24 hours on its own, and performs a firmware self-check at that time, to meet PCI requirements.

10. Maintenance

Clean the VP5300M on a weekly basis with a card reader cleaning card to clean the device's magnetic heads and rollers. Clean the surface of the card insertion bezel with a lint-free cloth.

11. RF Interference

Q. Why do I need to know about RF interference?
A. Contactless payment devices use radio frequency technology to send card data to a contactless terminal reader.

Q. How can RF interference affect contactless payment?
A. Radio frequency interference can cause data errors. If RF interference is present, contactless payment devices may operate intermittently or inconsistently.

Q. Where does RF interference come from?
A. Radio frequency interference (RFI) can originate from a wide number of sources at the point-of-sale (POS). Some examples of sources of RF energy and RF interference include:

- AM/FM radio and TV transmitters
- 2-way radios and pagers
- Mobile telephones
- Power lines and transformers
- Large electric motors
- Medical equipment
- Microwaves
- Electromechanical switches
- Wireless routers

Q. What should I do if I suspect RF interference exists in my environment?
A. Begin by inspecting your environment for possible sources of RF interference.

Q. Do equipment manufacturers test their devices for RF interference?
A. Yes. Electronic equipment is tested for RFI sensitivity by the manufacturers. These tests are performed in a controlled laboratory environment and will often not replicate the types of situations that would be encountered in your own point-of-sale (POS) environment.

Q. What RF levels will impact RF operations?
A. Factors that can cause RF interference vary case-by-case. There are no set rules defining a single RF level that will cause RFI. RFI depends on the sensitivity of the equipment under consideration, or how low an interpreting signal can be in the presence of the equipment and cause problems.

Equipment can be particularly sensitive to very low signal levels of one frequency and yet be quite immune to high signal levels of another frequency; frequency is an important factor. Some electronic system components are internally shielded and have a very high immunity to interference; but generally, most equipment has not been so engineered.

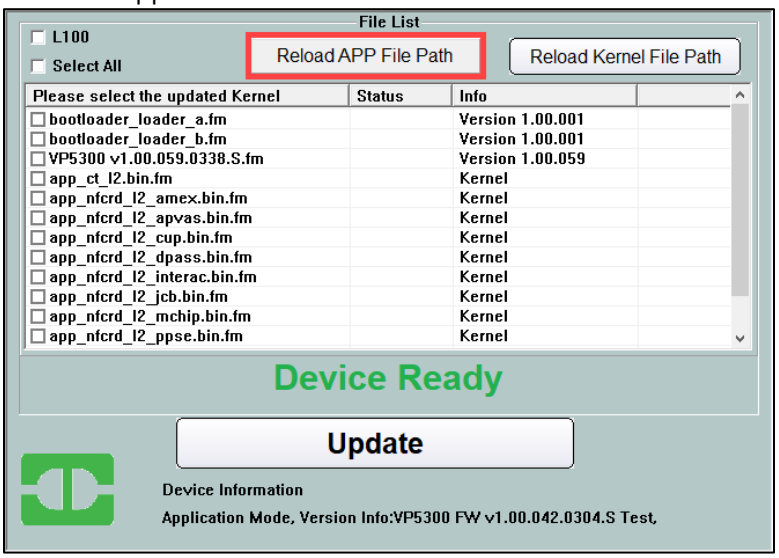
12. Updating VP5300M Firmware

Users can update VP5300M firmware with a Windows computer via either serial or USB interfaces.

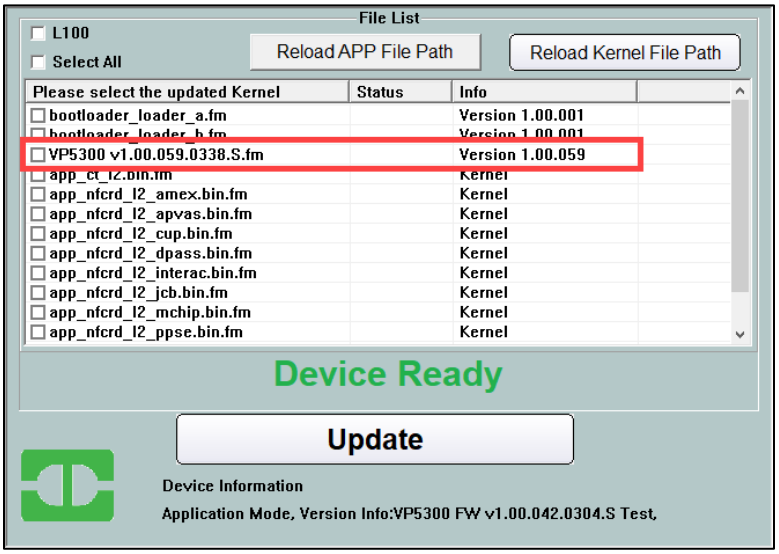
Note: Before you begin, contact your ID TECH representative to receive the most recent VP5300M firmware; download the ZIP file and extract it to your computer.

Follow the steps below to update VP5300M firmware:

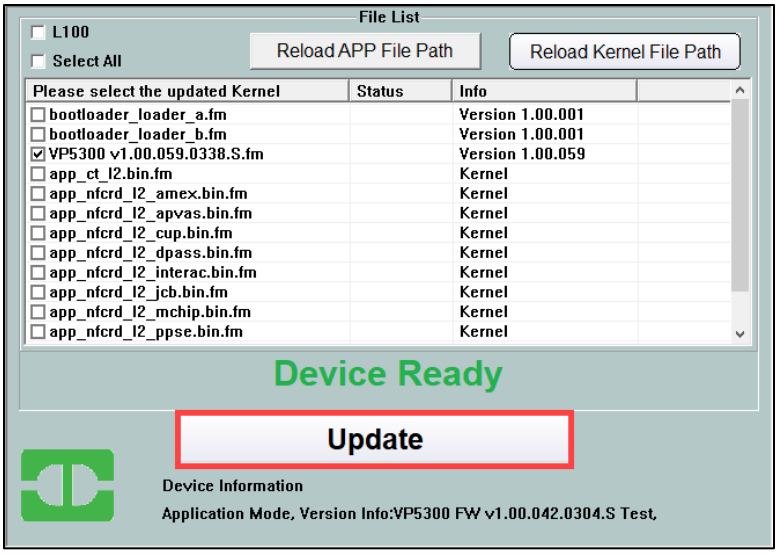
1. Navigate to the directory where you extracted the VP5300M firmware files and run **IDTechBootload.EXE.**
2. Click **Reload APP File Path** to change the directory from with the ID TECH Reader Bootload Software app loads firmware files.



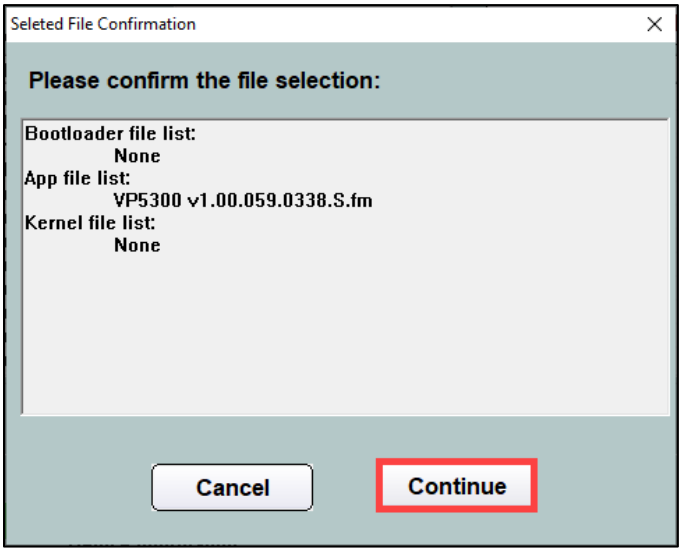
3. Navigate to the directory where you downloaded the VP5300M firmware and click **OK**.
4. Select the firmware to load onto the VP5300M.



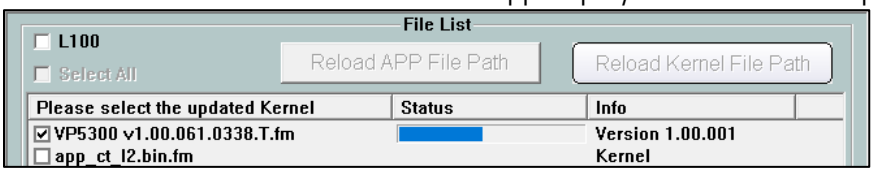
5. Click the **Update** button. The ID TECH Reader Bootload Software app will update the VP5300M with the selected firmware.



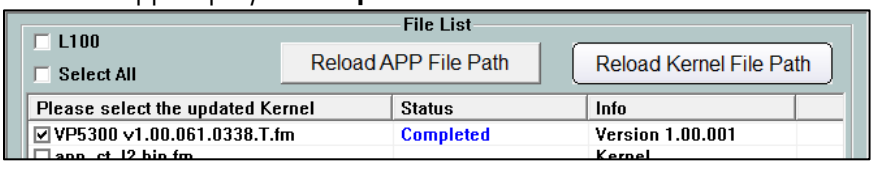
6. Click **Continue** to verify the desired firmware update.



7. The ID TECH Reader Bootload Software app displays a status bar for update progress.



8. When the update completes, the VP5300M reboots and the ID TECH Reader Bootload Software app displays a **Completed** status the LED on the reader should be solid green.



13. Troubleshooting

The ViVOpay VP5300M reader is designed to be reliable and easy to troubleshoot. The components that may require troubleshooting include the power module (if applicable), the reader, and the serial cable.

If you are unable to resolve the problem, please contact support@idtechproducts.com (sending an e-mail to this address will automatically open a support ticket).

Symptom	Possible Cause	Remedy
General Issues		
Reader does not appear to be powered on (no LEDs are lit).	• Reader not powered on or incorrect voltage. • Improper use of internal power supply provided by the kiosk.	• Check cable connections. • Verify that power is on and correct voltage and current are present. • Make sure that the correct pins are utilized. • Make sure that the power provided is within the specified range of the reader. • Make sure that the correct polarity is observed. • For more information, refer to the Input Voltage under the Electrical specification section. • Replace the device with a known-good device to verify that the power supply and wiring in the installation are sound.
Reading Cards/Phones		
LED is lit, but beeper is not audible when card/fob presented.	• Card/fob/phone not properly presented. • RF interference. • Unsupported card used. • Wrong firmware (contact your local support representative).	• Present card/fob/phone closer to the antenna, and ensure it is parallel to the face of the reader. • Verify that the card/fob/phone is valid/current. • Verify that metal is not interfering with the antenna. • Test with "ViVOcard Contactless Test Card" part number 241-0015-03 Rev A. • Try a different card/fob. • Check to see if card/fob is damaged. • Verify that correct firmware is loaded on reader (local support representative only). • Power cable plug is fully inserted. • Replace the unit.

Symptom	Possible Cause	Remedy
Some cards/fobs read, but not all.	• Possible bad card/fob. • Unsupported card used. • Wrong firmware (contact your local support representative).	• Check to see if card/fob is damaged. • Verify that correct firmware is loaded on reader (local support representative only). • Card readers must contain the latest versions of card-brand public certificates (CAPKs). If a CAPK is out of date, one particular kind of card may no longer be usable. Update the CAPK.
Communication to Kiosk		
No data is received, or data is garbled.	• Faulty or incorrect cable connections.	• Check that the cable connection is secure and in the correct port on the unit.
Load Firmware		
Firmware loading software indicates "open RS-232 failed"	Device is not completely connected to PC, or other software is using the serial interface.	• Check the cable connection • Close other software which might be using the same serial interface.
Firmware loading software indicates "Load firmware failed."	Device is not well connected to PCs.	• Check the cable connections.
Firmware loading software indicates "Send Command failed."	Bootloader firmware in device is destroyed.	• Contact your support representative to reload manufacture's firmware.

14. FCC warning 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.

The user 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.

Note: The grantee is not responsible for any changes or modifications not expressly approved by the party responsible for compliance. Such modifications could void the user's authority to operate the equipment.

Note: 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 the 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.

This device complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. The antenna(s) used for this transmitter must not be co-located or operating in conjunction with any other antenna or transmitter and must be installed to provide a separation distance of at least 20cm from all persons.

15. IC Compliance Warning

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

1. This device may not cause interference, and
2. This device must accept any interference, including interference that may cause undesired operation of the device.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

1. l'appareil ne doit pas produire de brouillage, et, and
2. l'utilisateur de l'appareil doit accepter tout brouillage radioelectrique subi, meme si le brouillage est susceptible d'en compromettre le fonctionnement.

16. Cautions and Warnings

	**Warning**: Avoid close proximity to radio transmitters which may reduce the capability of the reader. **Avertissement :** Évitez la proximité d'émetteurs radio, ce qui peut réduire la performance du lecteur.
	**Caution:** Do not drop the device. **Attention :** Ne pas laisser tomber le lecteur.
	**Caution:** Electrostatic sensitive device. Use caution in handling, in high ESD conditions. **Attention :** Le lecteur est sensible aux décharges électrostatiques. Manipulez le lecteur avec précaution dans une situation d'électricité statique élevée.