



Value through Innovation

## VP3300 OEM User Manual



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### **Warranty Disclaimer**

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## FCC Regulatory Compliance

This device complies with Part 15 of the FCC Rules:

- This device may not cause harmful interference, and
- This device must accept any interference received, including interference that may cause undesired operation of the device.

## Notices: 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.

This device complies with part 15 of the FCC rules. Operation is subject to two conditions: This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

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.

Changes or modifications to the VP3300 OEM not expressly approved by ID TECH could void the user's authority to operate the device.

## Cautions and Warnings



Warning: Avoid close proximity to radio transmitters, which may reduce the capabilities of the reader.

**Revision History**

Date	Rev	Changes	Author
04/08/2021	J	Implemented Revision History Added VP3300BT Mounting and EMV Contactless Logo Requirements	CB
05/04/2021	K	Added note about ECP 2.0 support in Major Features and Contactless NFC Features sections	CB

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## 1. Introduction

VP3300 OEM is ID TECH's ultra-compact, EMV L1/L2-certified 3-way (MSR, contact EMV, and contactless) card reader, based on the VP3300-series design, but with card-reader componentry externalized to allow custom placement of the chip card slot and the magnetic stripe read head within a customer-designed chassis.

The VP3300 OEM is built to optimize cost, high reliability, and maximum compatibility with existing contactless payment technologies (including Apple Pay, Android Pay, and Samsung Pay).

The VP3300 OEM incorporates the proven ID TECH Common Contact EMV L2 kernel that is also found in ID TECH's popular UniPay III card reader. Developers can integrate VP3300 OEM into terminal systems with minimal effort using ID TECH's Universal SDK, available for Windows, Android, or iOS.

### 1.1. Major VP3300 OEM Features

- Micro-USB port for communications and power
- Magnetic stripe support: ISO 7810/ISO 7811, Hi-Co+Lo-Co Magnetic, JIS1/JIS2
- MSR is bidirectional, reading up to 3 tracks of data at once
- ICC support: EMV Level 1 and EMV L2 approvals. All L1 & L2 on the device
- Contactless transaction support via Near Field Communication (NFC)
- LED status indicator
- Audio feedback
- Field upgradable firmware
- Standby mode for low power consumption
- Compact and ergonomic design to integrate with a variety of devices
- Available with a sturdy stand, for tabletop use
- TDES and AES 128 encryption support
- DUKPT key management
- Software Development Kits for Windows, Android, and iOS
- One-year manufacturer's warranty
- Supports 16 contact and 16 contactless AIDs, for a total of 32 AIDs
- ECP 2.0 Support<sup>1</sup>

### 1.2. Magnetic Stripe Features

- ISO 7810 / ISO 7811
- AAMVA format
- JIS I / II
- Single / Dual / Triple Track Support
- Bi-directional reading
- Samsung Pay MST

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<sup>1</sup> Supported in NEO 1.10.035 and above. Not supported in NEO 1.01 firmware.

### **1.3. ICC Contact Card Features**

- EMVCo Contact Level 1 & 2 compliant

### **1.4. Contactless (NFC) Features**

- ISO 14443 Type A&B
- ISO 18092 (P2P)
- MasterCard® MCL (Formerly PayPass)
- Visa payWave/VCPS
- Visa IRWIN
- Discover® DPAS
- American Express® ExpressPay
- MIFARE
- Apple Pay
- Apple VAS Loyalty
- Samsung Pay NFC and MST
- Android Pay
- Google Pay Smart Tap Loyalty
- ECP 2.0 Support<sup>2</sup>

### **1.5. Other Agency Approvals and Compliances**

- CE (EN55022/EN55024, Class- B)
- FCC (Part 15, Class-B)
- RoHS (DIRECTIVE 2011/65/EU)
- REACH
- EMV Contact L1&L2
- EMV Contactless L1
- TQM

### **1.6. Supported USB Interfaces**

- USB-HID or USB-KB

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<sup>2</sup> Supported in NEO 1.10.035 and above. Not supported in NEO 1.01 firmware.

## 2. Physical Specifications

Item	Specification
Physical Dimensions	64mm x 49mm x 15mm (LxWxH)
Structure Material	Plastic, PC UL 94V-0
Texture	MT11010
Weight	50g
Operation and Storage Environment	
Operating Temperature	0° C to 55° C Non-condensing
Storage Temperature	-20° C to 60° C Non-condensing
Operating Humidity	5% to 95% Non-condensing
Storage Humidity	5% to 95% Non-condensing

### 2.1. Electrical Power

	State	Typical Current Draw	Current Draw with Buzzer On
	Idle (Poll on Demand, Contactless OFF)	80 mA	Maximum 230 mA
	Idle (Poll on Demand, Contactless ON)	400 mA	Maximum 530 mA
	Autopoll Mode	400 mA	Maximum 530 mA

#### Transactions per battery charge:

250 MSR + 125 EMV + 125 EMV CTLS transactions (Total 500 transactions) per charge.<sup>3</sup>

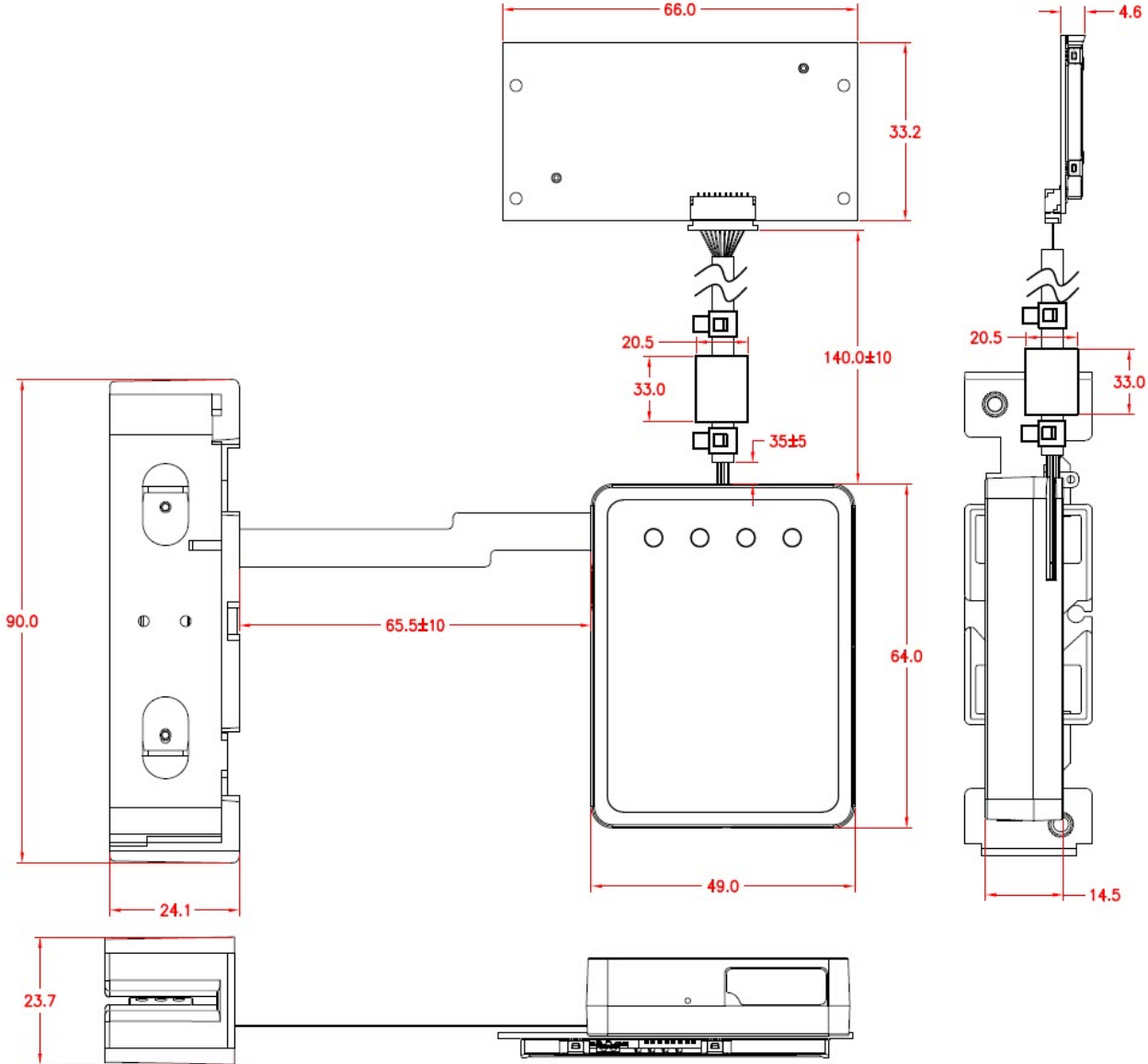
### 2.2. Available Interfaces

Although ID TECH recommends using a USB connection to communicate with the VP3300 OEM, a VP3300 OEM Bluetooth version is also available.

<sup>3</sup> Transactions per battery charge only applicable to OEM Bluetooth.



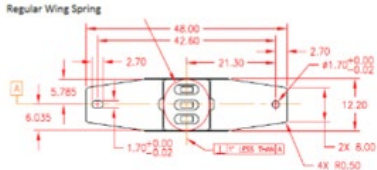
### 2.3. VP3300 OEM 3-View Drawing



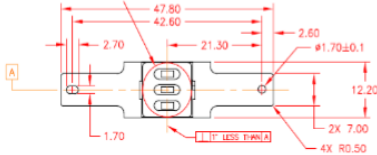
### 3. Design Guidelines

When integrating the VP3300 OEM into a project, make sure to follow the guidelines below.

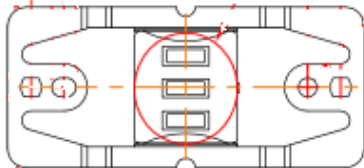
- MSR Head: VP3300 OEM device supports multiple MSR head types including:
  - Wing Spring



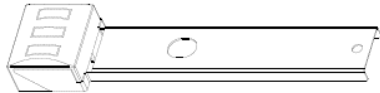
- Leaf Spring



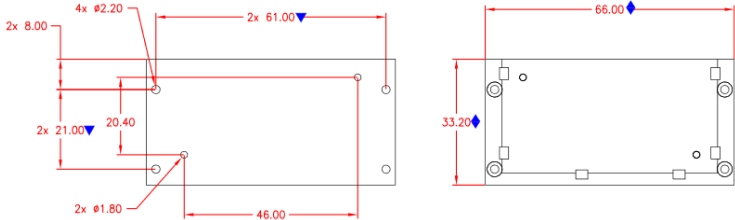
- Frame Spring



- Cantilever



- **MSR Connection:** The MSR connection must be flexible printed circuit.
- **MSR Connector Length:** The recommended FPC maximum length is 30cm.
- **Contactless Mounting:** Note that the antenna’s RF field antenna is sensitive to the proximity of metal. There are three options for mounting the VP3300 OEM components in a metal surface:
  - Mount with the RF emitting surface of the antenna at least 1cm *forward* of any metal.
  - Mount with the RF emitting surface of the antenna at least 1cm *behind* any metal. This will reduce the effective range of the antenna.
  - Mount flush with the metal but allow a minimum of 1cm distance from the metal.
- **EMV Mounting:** The EMV cable comes with a ferrite shield<sup>4</sup> to protect from EMF interference; see mounting guidelines below:



<sup>4</sup> Contact your ID TECH representative for a CAD model for design purposes.

### 3.1. VP3300 OEM Mounting and EMV Contactless Logo Requirements

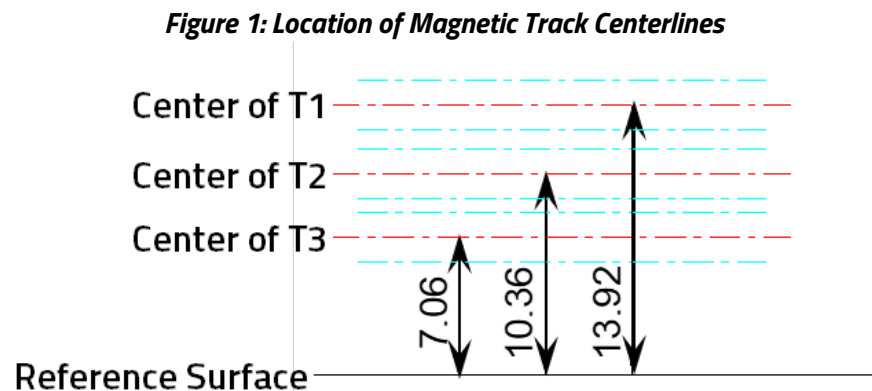
Note that if the VP3300 OEM is mounted behind any kind of casing or cover, that assembly **MUST** follow EMV requirements regarding contactless logo size and position. See [EMVco Contactless Symbol Reproduction Requirements](#) for details.

## 4. Installation and Use Guide for Magnetic Heads

This section defines the design specifications ID TECH customers require to install magnetic readers and heads to the correct dimensions and other specific requirements that ensure maximum life and reading reliability. ID TECH has spent years testing magnetic heads with our electronics to determine the best dimensions and characteristics. These factors, combined with the specified reference surface, provide for ID TECH's industry-leading reading reliability. It is extremely important to follow these instructions to achieve the best performance for ID TECH magnetic reading components that are designed into your product(s).

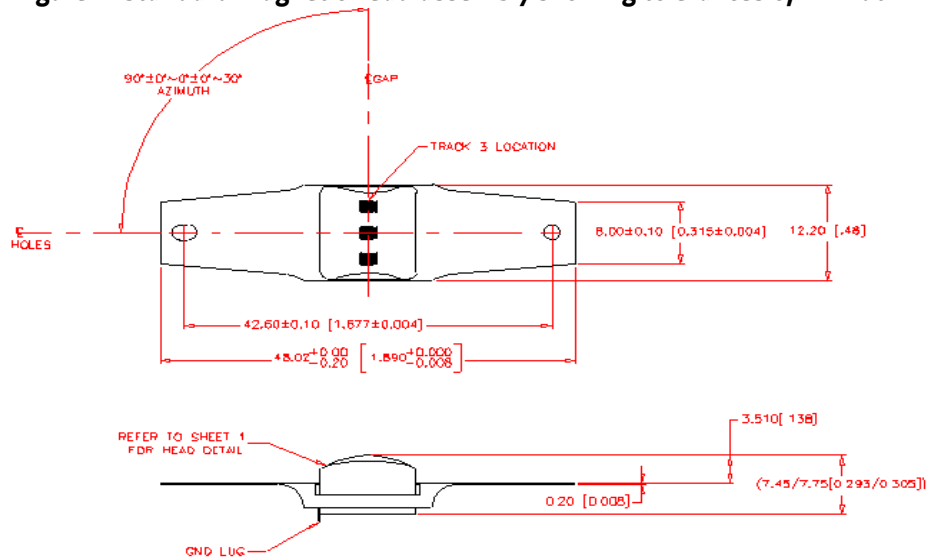
### 4.1. Track Locations

ISO 7810 and ISO 7811 standards define the specification for all "standard" magnetic stripe cards. The location of each magnetic head's track's centerline is shown below in **Figure 1**<sup>5</sup>. ID TECH's heads are installed in spring mounts that have mounting holes located on the centerline of Track 2; refer to **Figure 2** for the 3-track standard magnetic head and (wing) spring mount. The pivot pins must be precisely located to the dimensions shown below in **Figure 1** for the Track 2 centerline, ensuring the read head will be to the proper dimensions for all tracks.



<sup>5</sup> Note: Magnetic heads can contain one, two, or three tracks, but a three-track head is the most common.

**Figure 2: Standard Magnetic head assembly showing tolerances of Azimuth**



## 4.2. Reference Surface/Wear-Plate

The reference surface is an important element for the proper design of all credit card readers because all dimensions for installing magnetic heads are measured from that surface. There are important considerations to understand when designing the reference surface/wear-plate:

1. ID TECH uses stainless steel for the reference surface/wear-plate in most of our credit readers to prevent any measurable wear from the pressure exerted by card edges, assuring negligible wear. Integrators should remember that the magnetic head's installation dimensions are taken from the reference surface and that any variation from those dimensions could have a negative effect on reading reliability.

Note that electrostatic discharge can be an issue for MagStripe readers. When using metal for the reference surface/wear-plate, integrators should either ground the plate or use conductive plastic to help minimize ESD.

2. ID TECH uses wear-resistant 30% glass-filled plastics in applications where stainless steel is impractical, such as insert readers. In this type of reader, the force from the card's edges is small while inserting and withdrawing cards compared to the force exerted on the wear plate in a conventional swipe reader. ID TECH's insert readers use a 30% glass-filled polycarbonate plastic in the insert reader's rails.
3. It is extremely important that the reference surface not have any bumps or abrupt changes on the surface for *one card length* (3 and 3/8 inches) from the centerline of the read head's gap; any irregularities will cause reading failures. The critical design requirement is that the reference surface/wear-plate must be at minimum flush to above any surface within a card length of the read head's center line. Any surface that is in-line with the card swipe, if

plastic, should at a minimum be of 30% glass-filled plastic because the card's edge will inevitably scrape that surface upon entering and exiting the card swipe. We recommend having stainless steel surfaces on both the entrance and exit area surfaces or have them substantially below the rail's reference surface.

### 4.3. Card Reader Rails/Slot and Magnetic Head Protrusion

When designing a card reader, engineers must consider the thickness of the media used. Magnetic media comes in various thicknesses, but most readers use cards that are nominally 0.030 inches thick +/- 10%<sup>6</sup>. Some applications do occur where the media is thinner, normally in specialized applications where the media can be as thin as 0.010 inches thick (such as the paper cards used for many parking lot paper tickets).

To accommodate media with minimum and maximum thicknesses, the slot needs to be a between 0.040 and 0.050 inches wide in an area a minimum of 0.5 inches on either side of the centerline of the magnetic head's gap (this gap is located at the apex of the head's radius). The remaining portion of the rails (slot width) can be wider, but never smaller; also remember that it is best to have the reference surface/wear-plate extend for a minimum of 1.5 inches from the magnetic head's gap.

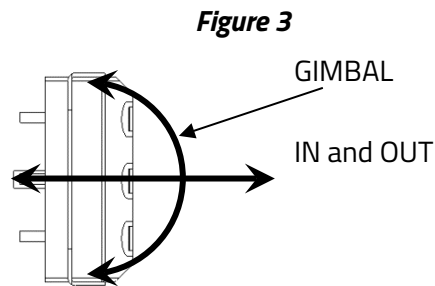
1. Magnetic heads need to be able to rotate on a gimbal (refer to **Figure 3** for an example) to compensate for tilting cards, and therefore must have a minimum deflection. For credit/debit cards used in financial transactions or other applications using standard thickness cards (0.030 inches +/- 10%), the magnetic head's gap (the apex of the protruding radius) should be spaced within 0.010 +/- 0.003 inches from the opposing rail/wall.

To ensure reliable read rates on thinner cards, the head must contact the media and be deflected by a minimum of 0.007 inches (0.18mm); this is regardless of the media thickness, or head configuration. For example, if the media is 0.010 inches (0.25mm) thick, the head face must be positioned a maximum of 0.003 inches (0.08mm) from the opposite wall. To avoid damaging the gap material the head should not contact the opposing rail/surface in the card slot.

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<sup>6</sup> Note: 0.030-inch thickness is the dimension for all credit and debit cards, and is common for other cards as well.

2. If the rails are designed without using an ID TECH rail, the minimum slot width should be 0.040 inches wide, at a minimum of 0.5 inches on both sides of the magnetic head's gap. There must also be a smooth transition leading up to the 0.040-inch-wide area of the slot both entering and exiting the magnetic head.



3. When designing insert style readers, make sure the magnetic media on cards can be inserted completely, past the read head, so the reader registers the stop sentinel on the magnetic stripe.

## 5. Before Using the VP3300 OEM

The VP3300 OEM is designed to operate in conjunction with certified third-party payment software and compatible hosts, such as USB-equipped tablets, PCs, and smartphones.

Before you connect VP3300 to a host, install and activate the host software application according to the instructions provided by your payment application service or software provider, then connect the VP3300 OEM (or device containing the VP3300 OEM) to the host through a micro-USB cable (not included).

## 6. LED Status and Audible Beeper Indicators

Device Status	4 LEDs	Audible Beeper
Run Mode	Left LED flashes 300ms on/5s off	
Contactless Read Successful	All 4 LEDs flash one time	1 longer beep
Contactless Read Failed		2 short beeps
ICC Processing	Left LED flashes: 500ms on/off, DO NOT remove card	
Magnetic Stripe Read Successful	All 4 LEDs flash one time	1 longer beep
Magnetic Stripe Read Failed		2 short beeps

## 7. What Kind of USB Cable to Use with a VP3300

The table below provides scenarios for using a VP300 with a USB cable and the type of cable required.

Scenario	Device Communication	Cable Required
I want to connect the VP3300 OEM to a computer to power the device and use the computer as a host device.	USB-HID	Standard micro USB cable*
I want to connect the VP3300 OEM to a mobile device to power the VP3300 OEM and connect to the host device via Bluetooth.	Bluetooth	Standard micro USB cable
I want to connect the VP3300 OEM to a mobile device to power the VP3300 OEM, use the mobile device as a host device, and power both the VP3300 OEM and mobile device via power injection.	USB-HID	Powered OTG micro USB cable*

\* Also supports updating firmware.

## 8. For Software Developers: Software Development Support

VP3300 devices, including the VP3300 OEM, are designed to be compatible with a wide range of third-party payment applications. ID TECH offers a [Universal SDK](#) (available for iOS, Android, or Windows) to enable rapid application development with any model of VP3300 as the target device. The supported languages include Objective C (on iOS), Java (on Android), and C# (on Windows). The Universal SDK includes rich, powerful libraries that make communication with VP3300 OEM comparatively easy while greatly facilitating debugging.

Normally, application development that takes advantage of VP3300 OEM capabilities can be done in a high-level language like Java or C# (using convenience objects and data structures), obviating the need to send hex-code commands directly via USB-HID.

Nevertheless, it is possible to communicate with the device via audio jack or via USB-HID. For a command reference for VP3300-series products, consult the *NEO Interface Developers Guide* (IDG), P/N 80139403-001.

### 8.1. Best Practices for VP3300 OEM Developers

When developing payment applications for Android and iOS, make sure to consult the *ID TECH Universal SDK Guide* for your respective platform for best practices to follow. Download the *Universal SDK Guide* from the [VP3300 OEM product page](#) as part of the ZIP file for your development platform.

**ID TECH strongly recommends that integrators include a way for users to update their passwords.**



## 9. USDK Demo App

The Universal SDK comes with a rich, fully featured demo app, including complete source code for the demo app.

To use the demo app, plug a VP3300 OEM into a Windows PC using a USB-to-micro-USB cable (not included), then open **UniversalSDKDemo.exe** file to launch the USDK Demo app.



The USDK Demo app displays available commands in a command tree, as shown above.

Single-click on a command to populate the center panel of the window with optional settings relevant to the command. In some cases, text fields appear for users to enter custom values. Execute commands by double-clicking it in the command tree or clicking **Execute Command**. Commands execute in real time and a data trace appears automatically in the center and right-hand panels.

**Note:** For instructions on updating device firmware, see the VP3300 Bluetooth User Manual, available on the [ID TECH Knowledge Base](#).

## 10. For More Information

- To learn more about the VP3300 OEM and other ID TECH products, visit the [ID TECH Knowledge Base](#).
- Visit us online at <http://idtechproducts.com>.
- Find more Tech Support resources at the [ID TECH Tech Support home page](#) or send an email describing any issues to [support@idtechproducts.com](mailto:support@idtechproducts.com).