

Predator Portable ERS



CONFIDENTIAL

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1. Glossary

| | |
|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AES | Advanced Encryption Standard Algorithm selected by NIST (Rijndael) |
| API | Application Programming Interface |
| ARM | Advanced RISC Machines |
| ASIC | Application Specific Integrated Circuit |
| CAPK | Certification Authority Public Key as in the EMV standard |
| CBC | Cipher Block Chaining mode, as defined in ANSI X3.106 |
| COG | Chip on Glass |
| COGS | Cost of Goods Sold |
| COTS | Commercial Off-the-Shelf |
| CTS | Clear to Send |
| DEA/DES | Data Encryption Algorithm/Standard, as defined in ANSI X3.92 |
| DTR | Data Terminal Ready |
| DUKPT | Derived Unique Key Per Transaction Method as defined in the VISA's <i>POS Equipment Requirement: PIN processing and Data Authentication</i> , International Version 1.0, August 1988 |
| ECB | Electronic Code Book mode, as defined in ANSI X3.106 |
| ECR | Electronic Cash Register |
| EMV | Joint Europay, MasterCard and Visa Standard |
| EOL | End of Life |
| ERS | Engineering Requirements Specification |
| GID | Group Identifier - Concept inherited from Verix terminals file system |
| HDLC | High-level Data Link Control |
| ICC | Integrated Chip Card (Smart Card) |
| LCD | Liquid Crystal Display |
| MAC | Message Authentication Code, as defined in ANSI X9.19 |
| MMU | Memory Management Unit |
| MSAM | Multiple Secure Access Module |
| MSR | Magnetic Stripe Reader |
| OS | Operating System |
| PED | PIN Entry Device |
| PIN | Personal Identification Number |
| POS | Point-of-Sale |
| PRD | Product Requirement Document |
| PSCR | Primary Smart Card Reader |
| RTS | Ready to Send |
| SOC | System on Chip |
| SAM | Secure Access Module |
| SC | Smart Card (Integrated Chip Card) |
| SCC | Serial Communication Coprocessor |
| SDK | Software Development Kit |
| SL2 | Security Level 2 |
| SL3 | Security Level 3 and 4 |
| SRAM | Static Random Access Memory |
| STN | Super Twisted Nematic |
| VSS | VeriShield Security Scripts |

2. Introduction

2.1. Purpose

The scope of this Engineering Requirement Specification (ERS) is to address the requirements that are listed in Predator 5/6 PRD (VDN 23191).

2.2. References

VDN 23191 – Omni 5600 Product Requirements Document
VDN 19682 - VeriFone Product Qualification Guide
VDN 14997 - Verifone security requirement
VDN 19390 - Checklist for Hardware Design Quality Testing
VDN 19682 - VeriFone Product Qualification Guide
VDN XXXXX - Omni 5600 Design Validation Test Report

3. Product Overview

Omni 5600, aka Predator Portable or P56, is a portable version of the Omni 5100 terminal, thus an extension of the Omni 5xxx family. As such, the 5600 architecture is based on the COTS ARM SOC and Verix V Operating System. Key objectives of the portable product include

1. **Good wireless performance:** Want customers to be able to connect and maintain a connection any time there is a valid network signal available.
2. **Short Time to Market:** Leveraged IDV, Plastics, and re-use of common circuitry design from 5100 minimize Engineering time.
3. **Low Cost:** Leverage Predator architecture and major components and seek aggressive radio modem partners to minimize material costs while still meeting performance and reliability objectives.
4. **Manufacturing Postponement of radio configuration:** Supply Chain needs the ability to build generic “main” terminals and install wireless comms modules per customer orders at time of shipment. This improves order response time and minimizes risk of inventory exposure.

4. Required Feature List

The PRD (VDN 23191) lists the required features. Below is a summary of what is required of the Hardware.

- ❑ Thermal Printer
 - 12.5 lines per second (LPS). A “line” is defined in plain text, standard character height.
 - Support 57mm wide by 25 meter long paper roll *(35 meter long roll requirement was dropped)*
 - Support for standard Omni 51xx features
 - (Paper out sensor is NOT supported)

- ❑ Smart Card access (For certain models only)
 - Front-entry Primary SC reader
 - 3-SAM configuration standard
 - 7816 asynchronous Smart Cards + EMV1, 4.0 support.
 - Specific Synchronous Smart Cards. No synchronous card is supported on the SAM.
 - T=0, T=1 support
 - (AFNOR chip position on the Smart Card is NOT supported)
 - SC voltages 1.8V, 3.0V, 5.0V
 - SC asynchronous clock frequencies: 12 MHz, 6.0 MHz, 3.0 MHz, 1.5MHz
- ❑ Magnetic Stripe Reader (MSR)
 - Triple Track (1, 2, & 3)
 - Minimum Card Swipe MTBF of 200,000
 - <1% Bi-Directional Read Failures (for standard test cards swiped at 4 IPS to 50 IPS)
- ❑ Display
 - Graphics - 128 × 64 pixels
 - Software controllable contrast
 - Software controllable (on/off) back-light
 - Support for standard Omni 51xx features
- ❑ Keypad
 - 3 X 4 Keypad Matrix
 - Four ATM-style Keys
 - Four Screen-addressable Keys
 - Enter/Yes, Clear/Back, Cancel/No and "Alpha" Keys
 - Keypad colors must comply with current EMV color scheme and positional requirements. (Cancel/red, Clear/yellow, Enter/green)
 - Optional, removable privacy shield for PIN entry and PED certification
 - Audible key-press response (buzzer)
 - Keypad to be backlit similar to Omni 3600 with power time-out
 - Translucent keypad material for backlight illumination
- ❑ Terminal interface
 - 4-Wire RS-232 Serial Port, without Synch support, on MOD10 RJ45 Jack.
 - Telco Modem Port
 - USB Device Port (for Debug Port on SDK version of terminal ONLY)
 - NO support for additional serial port (e.g., for PIN Pad or Bar Code Reader)
 - NO support for RS-485 LAN
 - NO support for Ethernet (other than as might be implemented using the 802.11b module)
- ❑ Communication
 - 14.4Kbps Modem standard
 - 802.11b ("WiFi") module (option)
 - CDMA dual band module (option)
 - GPRS dual band North America module (option)
 - GPRS dual band International module (option)
 - Off Line (no wireless) module (option)
- ❑ Power
 - Supplied by an external universal-input power supply OR by Primary Battery Pack
- ❑ Security
 - PED Compliance, On-Line and Off-Line
 - Level 3 and Level 4 (SL3) Compliance

- ❑ Cryptographic Algorithms
 - Single-DES
 - Triple-DES
 - RSA
- ❑ Key management
 - Master/Session
 - DUKPT (single-DES and triple-DES based)
 - Remote key initialization is not supported
 - Simultaneous multiple key management
 - Multiple DUKPT
 - SecureKIT key injection tool
- ❑ OS
 - Ported Verix V OS for maximum application portability
- ❑ Applications
 - Verix Ported Applications
 - SoftPay
 - EMV 2000 Level 2 certified application
 - Custom developed applications
- ❑ Firmware Upgrades
 - As per current setup in O37xx family.
- ❑ Tools
 - SDK: Compiler, linker, debugger and other application tools

5. Hardware Characteristics

5.1. *Ergonomics*

Figure 1 shows the latest design for the Predator Portable unit. Predator Portable will have an optional privacy shield that can be mounted on the unit.

Figure1. TOP view of Predator Portable.

Predator - Plan View
14th Nov. 2002



5.2. Display

A 128x64-pixel display is intended for use in this payment terminal application. Although the pixel resolution will remain the same as the O37XX family, the overall display size will be reduced to accommodate a smaller final product. With the presence of two SPI bus ports available on the CPU, the interface to the LCD controller chip will be serial instead of parallel. This is primarily for security reasons, since no data bus signals will be brought out to an unsecured area of the PCB. An additional benefit to the usage of a serial interface is the reduced cost of flex connectors to interface to the LCD controller.

It is also intended to use the internal charge pump circuit of the LCD controller to generate the needed LCD bias voltages. This allows removal of the circuitry normally needed to generate multiple supply voltages in the terminal and to reduce the implementation costs. Contrast adjustment will be performed under software control.

□ Graphic Display:

- 128x64 Dots, Graphic, Monochrome, Transflective, STN-type, COG, LCD
- 12 O'clock viewing direction
- Overall glass size: 70mm x 43mm
- Viewing area: 65mm x 33mm
- Active area: 60.14mm x 30.06mm
- Dot pitch: 0.47mm x 0.47mm
- Dot size: 0.45mm x 0.45mm
- Backlighting with power time out

The LCD controller integrated in the SOC is not targeted for use with the smaller LCD type described above, but it is intended for use with higher resolution LCDs, such as a QVGA color display. Such functionality is reserved for future use in a Customer Display Appliance (CDA).

5.3. Keypad Input

The Predator Portable is equipped with two rubber-key keypads as shown in Figure 2. The main keypad contains a 3 X 4 alphanumeric key matrix, an "Alpha" key, 4 screen-addressable keys, and 3 keys for Cancel, Backspace/Clear, and Enter. The keypad should be EMV compliant and support the Telco format, with a dual function Backspace/Clear key and must have oversized customer-entry keys for no less than the Cancel and

Enter keys. The Keypad must also comply with EMV positional requirements and key colors as shown in Figure 2.

The second keypad is an ATM-style keypad with keys marked F1 – F4. Current ATM keys from O3xxx products must be supported vertically and horizontally in order to help maintain the backward-compatibility of software.



Figure 2. Provisional Keypad Layout.

Minimum support for multiple key presses would be the same as required by the current O37XX family. Support for other multiple key presses may be desirable.

5.4. Integrated Communications Ports

One MOD8 serial port will be provided, primarily to facilitate PC and back-to-back SW or FW downloads. The port also supports certain (though as-yet-unnamed) peripherals. Use of a MOD8 connector allows compatibility with peripherals currently used by existing O5XXX and O3XXX products.

□ Port 1

- A 4-Wire RS232 port with TX, RX, RTS, and CTS signals. No support for Synch lines will be needed. Port 1 will not be a “powered port”.
- When AC power pack is driving the terminal, 9V will be available at the serial connector, for purposes of powering an external serial device. Serial Port current is limited to 400 mA.

□ USB SDK Port

- A USB slave port is available as a debugging port for application development.

The pin allocations for the two ports are defined in Table 1 below.

| Pin | Port 1 | USB SDK Port |
|-----|--------|--------------|
| 1 | - | - |
| 2 | - | - |
| 3 | - | - |
| 4 | - | - |
| 5 | GND | - |
| 6 | RXD | - |

| | | |
|-----------|------------|----------|
| 7 | TXD | - |
| 8 | - | - |
| 9 | - | - |
| 10 | - | - |

Table 1: Pin allocations for COM Port 1 and USB Debug Port

5.5. Integrated Modem

A 14.4Kbps PSTN Modem with global support is required. The modem must support 300/1200/2400bps offering CCITT V.21, V.22, V.22bis compatibility. It must also support Bell 103 and 212A modem compatibility for the U. S. and other countries. This modem must support the non-intrusive line-in-use test, so that the phone line can be shared with other terminals. The modem must also be capable of operating with both asynchronous and synchronous protocols. The Hypercom FastConnect protocol must also be supported at 1200bps. While a global modem may result in several PCB variants, for a limited number of countries the use of external protection devices are accepted on the telco lines. The telco connector will be a RJ11 and the wiring will be the same as currently used in O37XX series products.

In this case, since the ARM processor does not have a SCC, the HDLC framing needs to be done in the modem solution. V.80 asynchronous communication protocol is accepted and preferred for communication with the modem chipset. The modem chipset must perform the synchronous communication.

The design should attempt to leave enough support for possible soft-modem solutions in the future.

The need for DTR support on the internal serial port is required.

The internal modem port must support a minimum of 57.6K-baud rate.

5.6. Wireless Communications Modules (Options)

Three optional Wireless Communication Modules will be available. Any one of these may be installed in the Handheld Terminal. These modules support wireless connectivity and TCP/IP-based data transfer for ultra-high-speed transaction processing times and remote point of sale solutions.

WiFi: The WiFi module currently employs the GemTek Compact Flash module with built-in 2400 MHz antenna. It also currently employs the Connect One serial-to-compact flash interface device.

CDMA: The CDMA module consists of a system interface, power control circuitry, and wireless modem. The system interface includes a number of power and GND signals, serial interface for communicating to the wireless modem, USB Host and Device signals (for debug only), wireless modem and module control signals. The power control circuitry provides early detection of high power events (i.e. wireless modem transmission), and maintains wireless modem power requirements while system power resources are allocated to wireless modem module. The wireless modem is a Sierra Wireless EM3420 embedded wireless modem that provides CDMA2000 1X connectivity. It has a dual band radio supporting both the 800MHz cellular and 1900MHz PCS bands.

GPRS North America: The GPRS module consists of a system interface, power control circuitry, and wireless modem. The system interface includes a number of power and GND signals, serial interface for communicating to the wireless modem, USB Host and Device signals (for debug only), wireless modem and module control signals. The power control circuitry provides early detection of high power events (i.e. wireless modem transmission), and maintains wireless modem power requirements while system power resources are allocated to wireless modem module. The wireless modem is a Siemens MC56 embedded wireless modem that provides GSM network connectivity with GPRS support. It has a tri-band radio supporting GSM 850MHz, GSM 1800MHz, and GSM 1900MHz bands.

GPRS International: The GPRS module consists of a system interface, power control circuitry, and wireless modem. The system interface includes a number of power and GND signals, serial interface for communicating to the wireless modem, USB Host and Device signals (for debug only), wireless modem and module control signals. The power control circuitry provides early detection of high power events (i.e. wireless modem transmission), and maintains wireless modem power requirements while system power resources are allocated to wireless modem module. The wireless modem is a Siemens MC55 embedded wireless modem that provides

GSM network connectivity with GPRS support. It has a tri-band radio supporting GSM 900MHz, GSM 1800MHz, and GSM 1900MHz bands.

5.7. Magnetic Card Reader

The terminal will support an integrated magnetic stripe card reader that is compliant with ISO standards, and is capable of supporting the current Card Association requirements for Hi-Coercivity cards. The Hi-Coercivity requirement is Low-Co up to 2750 Oersted, and is based on ISO/IEC 7811-6 "Identification Cards - Recording Technique" Part 6: Magnetic Stripe - High Coercivity."

Although the PRD may indicate a dual-track reader is adequate, a triple-track MSR design is highly advisable.

The reader must have a high reliability and operate successfully over a wide range of swipe speeds. There shall be <1% read failures on good cards at 4ips to 50ips swipe speeds. The MSR must support a variance/tolerance within the ISO standard of +/-1mm. No JIS or CAFIS magnetic card support will be required

The minimum MTBF for the magnetic card reader head should be approximately 200,000 swipes.

The plastic enclosure must have an icon showing the proper card-swipe orientation.

Note: ISO 7810 pertains to overall physical card dimensions. ISO 7811 includes several parts: /1=embossing spec for machine readability, /2=Low-coercivity recording spec, /3=embossed character field locations, /4=Track 1 and 2 locations and sizes, /5=Track 3 location and size, and /6=High-coercivity recording spec. Since we're read-only, parts 1, 2, and 6 don't directly affect us.

5.8. Smart Card Reader & Security Access Module Readers

Predator Portable will include four smart card interfaces, one PSCR and an optional 3-SAM module.

The PSCR is a full-size reader used for the customer's smart card located on the front edge of the Predator Portable (front insertion of the card). The PSCR is oriented so that the contacts on the customer card are facing up when inserted.

The optional plug-in SAM module is installed within the terminal at the factory. Two different options are available: no SAM module or a 3-SAM module. For security reasons, the mechanical design does not allow the upgrade of the SAM module in the field. However, the SAM sockets on the module are accessible through a plastic door allowing the merchant to insert and remove SAM cards in the field.

The PCSR can either be asynchronous or synchronous and all SAMs are asynchronous. No more than 2 smart card interfaces (a smart card is defined as either a SAM or a PSCR) can be powered simultaneously.

Support for synchronous smart cards will be provided either through the libraries from Philips Semiconductors or through smart card drivers developed by VeriFone when not provided by Philips Semiconductors. The drivers will be developed in order of priority since additional development time will be needed. The list of Synchronous Cards are as defined in the PRD (VDN 22974).

5.8.1. Mechanical Characteristics

- The physical characteristics are compliant with ISO 7816-1.
- The position of contacts is compliant with ISO 7816-2, dimensions and position of contact.
- The PSCR is a non-landing reader (friction contacts) with 8 contacts only.

5.8.2. Electrical Characteristics

- The electrical characteristics are compliant with ISO 7816-3, electronic signal and transmission protocol.
- The electrical characteristics are compliant with EMV 4 specifications.
- 5V & 3V volt cards are supported. 1.8V support is also required for future cards while currently there are no cards at this voltage.
- Predator Portable supports all ISO 7816-compliant cards.

- T=0 protocol for asynchronous cards is supported as defined in ISO 7816-3 standard.
- T=1 protocol for asynchronous cards is supported as defined in ISO 7816-3 and EMV 4 standards.
- Up to 2 smart cards can be powered at the same time (if the terminal provides enough power): 1 PSCR + 1 SAM or 2 SAMs only. The limitations will be implemented in the firmware.
- Power to customer card: 65mA max for 5V cards or 50mA max for 3V cards
- Power to SAM cards: SAM1 + SAM2 = 80mA max , SAM3 + SAM4 = 80mA max
- Circuit must be designed to pass EMV1, 4.0.

Table 2 below shows the baud rates for the supported values of the (F, D) parameters. The baud rates are given for a card clock frequency of 3.00MHz at which the smart card operates.

Table 2: Supported Baud Rate for Smart Card.

| | | Di | 1 | 2 | 4 | 8 | 16 | 32 | 12 | 20 |
|------|------|----|-------|--------|--------|--------|--------|---------|--------|--------|
| FI | Fi | | | | | | | | | |
| 0000 | 372 | | 8,065 | 16,129 | 32,258 | 64,516 | | | 96,774 | |
| 0001 | 372 | | 8,065 | 16,129 | 32,258 | 64,516 | | | 96,774 | |
| 0010 | 558 | | 5,376 | 10,753 | 21,505 | 43,011 | | | 64,516 | |
| 0011 | 744 | | 4,032 | 8,065 | 16,129 | 32,258 | 64,516 | 129,032 | 48,387 | |
| 0100 | 1116 | | 2,688 | 5,376 | 10,753 | 21,505 | 43,011 | 86,022 | 32,258 | |
| 0101 | 1488 | | 2,016 | 4,032 | 8,065 | 16,129 | 32,258 | 64,516 | 24,194 | |
| 0110 | 1860 | | 1,613 | 3,226 | 6,452 | 12,903 | 25,806 | 51,613 | 19,355 | 32,258 |
| 1001 | 512 | | 5,859 | 11,719 | 23,438 | 46,875 | 93,750 | | | |
| 1010 | 768 | | 3,906 | 7,813 | 15,625 | 31,250 | 62,500 | 125,000 | 46,875 | |
| 1011 | 1024 | | 2,930 | 5,859 | 11,719 | 23,438 | 46,875 | 93,750 | | |
| 1100 | 1536 | | 1,953 | 3,906 | 7,813 | 15,625 | 31,250 | 62,500 | 23,438 | |
| 1101 | 2048 | | 1,465 | 2,930 | 5,859 | 11,719 | 23,438 | 46,875 | | |

Clock frequency = 3.00 MHz

5.9. *Integrated Printer*

The terminal shall support an integral clam shell thermal printer with the following hardware specifications as defined in VDN 22794:

- Print Speed: 12.5 lines/sec (LPS). "Line" is defined as plain text in default character height
- Print Column Width: Option for printing 24/32/42 characters/line.
- Font Capabilities: Must support existing O3xxx fonts.
- Paper Roll: Must support 57mm x 25meter paper roll as per the O37xx family.
- (Paper-Out Sensor NOT supported)

5.10. *Security Circuit*

The terminal must contain an integrated PINpad. The security level of the internal PINpad shall be capable of meeting **Level 2, 3 & 4** per country requirements specified in VFI Doc No. 14997. The terminal will be fully compliant with the Joint POS PED Security Requirements (a.k.a., VISA/MasterCard PED specification).

Potting is being considered instead of using the PED fence. The keys are to be stored in an external SRAM that is preserved during power off by a battery. The keys will be protected by a MMU from access by other applications. The operational life of the back-up battery must be a minimum of 3 years.

An active tamper detection circuit will destroy the keys on detection of an attack. This will include attempts to open the plastic case. An integral mesh in the PCB and a flexible mesh surrounding the protected circuitry will provide additional security for the key signals within the terminal.

For countries such as Canada and Australia that require Security Level 2, additional components must be populated on the MAIN PCB.

This requirement was later changed. On attack the keys are to be destroyed but the RAM content is not to be destroyed. Hence Keys can not be stored in external SRAM.

5.11. Power Pack

Predator Portable shall use a standard universal-input power pack capable of operating from voltages of 100-240VAC. The power pack must meet the required regulatory certifications and be rated at a minimum of 36W.

The printer head voltage will be supplied directly from the power pack. The power pack voltage must not exceed the absolute maximum voltage level of the printer head as specified by the printer manufacturer.

The power budget for the Predator Portable is shown in Table 3.

Table 3: Predator Portable Power Budget.

| Voltage | 3.300 | 9.000 |
|---------------------------|--------------|---------------|
| Processor | 0.038 | 0.000 |
| Flash | 0.010 | 0.000 |
| SRAM | 0.030 | 0.000 |
| Buzzer | 0.000 | 0.004 |
| Backlight, LCD | 0.002 | 0.050 |
| Backlight, KB | | |
| LCD | 0.001 | 0.000 |
| MSR | 0.003 | 0.000 |
| 3.3V Power Supply | 0.002 | 0.002 |
| 1.8V LDO | 0.154 | 0.000 |
| Battery Charger | | |
| Printer Motor Controller | 0.016 | 0.019 |
| Paper Sensor | 0.006 | 0.000 |
| Printer Motor | 0.000 | 0.600 |
| Printer Logic | 0.054 | 0.000 |
| Printer Head | 0.000 | 2.291 |
| RS-232 | 0.002 | 0.000 |
| WiFi Module | | |
| CDMA Module | | |
| GPRS Module | | |
| PSCR (5V/50mA) | 0.200 | 0.000 |
| SAM (5V/50mA) | 0.250 | 0.000 |
| External PINpad | 0.000 | 0.450 |
| Modem | 0.073 | 0.000 |
| 3.3V SPS | 0.000 | 0.363 |
| Sub Total Amps (A) | 0.841 | 3.779 |
| Conversion Efficiency | 0.850 | 0.990 |
| Total Amps (A) | | 3.817 |
| Total Watts | | 34.352 |

The power pack is to provide enough power for supporting certain VeriFone PIN Pads connected to Serial Port 1 of the Predator Portable.

5.12. *Physical and Environmental Specifications*

This product is not intended for outdoor use. This must be stated because of liability issues that could arise if this product is used outdoors. We are not obtaining the specific certifications that would allow use of this product in an outdoor environment.

- ☐ VeriFone Product Qualification Guide (VDN 19682)
- ☐ Checklist for Hardware Design Quality Testing (VDN 19390)

5.12.1. **Temperature and Humidity Specifications**

- ☐ Operating Environment
 - Temperature: 0°C to +40°C (32°F to 104°F)
 - Relative Humidity: 5% to 90% RH non-condensing
- ☐ Non-Operating Environment:
 - Temperature: -30°C to +60°C (-22°F to 140°F)
 - Relative Humidity: 5% to 90% RH non-condensing

5.13. *Product Certification Guidelines*

Governing Legal Documents for Performance Criteria for EU Countries and US.

- ☐ CISPR 24(1997), (EN55024, 1998)
 - Annex A “Telecommunications Terminal Equipment”
 - Annex G “Point of Sale Terminals”
- ☐ CISPR 22(1997), (EN55022, 1998)
- ☐ CFR 47 parts 2, 15, and 68
- ☐ EN 60950, 4th Amendment

5.13.1. **Radiated Emissions**

- ☐ Legal requirements
 - Per EN 55022 ITE Emission Standard 1998 – CISPR22 Class B
- ☐ Design Requirements
 - Minimum of 1dB of margin below specified limits

5.13.2. **Conducted Emissions**

- ☐ Legal requirements
 - Per EN 55022 ITE Emission Standard 1998 – CISPR22 Class B
- ☐ Design Requirements
 - Minimum of 6dB of margin below specified limits

5.13.3. **Electrical Static Discharge (ESD)**

- ☐ Legal requirements
 - Per EN/IEC 61000-4-2 (1995) Amend 1 (1998) (EN61000-4-2, 1998)
 - 4KV Contact Discharge, 8KV Air Discharge
 - Evaluated results to Performance Criteria B
- ☐ Design Requirements
 - Evaluated results to Performance Criteria A
 - Perform contact discharge as in IEC 61000-4-2 using fast mode rise time tip (Keytek part number DT-21) up to 4KV.
 - Perform air discharges as in IEC 61000-4-2 using standard air discharge tip, extending voltage range up to 10KV.
 - Continue air discharges for 10KV to 15KV, but evaluate results to Performance Criteria C.

- ❑ Note regarding connectors: As stated in the legal standard, bare connector pins will not be chosen as discharge points. However, connectors that will be populated with a typical cable in the connector area will be considered a valid discharge point.

5.13.4. Radiated Immunity

- ❑ Legal requirements
 - Per EN 61000-4-3 (1998) -- 3 Volts/m min.
 - No loss of data and LAN connection maintained, if provided.
 - Test to Performance Criteria A.
- ❑ Design Requirements
 - Per EN 61000-4-3 -- 10 Volts/m min. Add 26-80MHz.
 - No loss of data and LAN connection maintained, if provided.
 - Test to Performance Criteria A.
 - ENV 50204 – 900MHz square wave

5.13.5. Electrical Fast Transients Immunity (EFT/Burst)

- ❑ Legal requirements
 - Per EN/IEC 61000-4-4 (1995) – 0.5kV I/O lines; 1 kV power lines
 - No loss of data and LAN connection maintained, if provided.
 - Test to Performance Criteria B.
- ❑ Design Requirements
 - Per EN /IEC61000-4-4 (1995) – 1kV I/O lines; 2 kV power lines
 - No loss of data and LAN connection maintained, if provided.
 - Test to Performance Criteria B.

5.13.6. Surge

- ❑ Legal requirements
 - Per EN/IEC 61000-4-5 (1995)
 - Test to Performance Criteria B.
 - ITU-T K series
 - No data loss or user intervention.
- ❑ Design Requirements
 - Margin of 1.5KV Differential Mode for EN/IEC 61000 and 2.5KV Common Mode for ITU-T.

5.13.7. Conducted Immunity

- ❑ Legal requirements
 - Per EN/IEC 61000-4-6 (1996)
 - Test to Performance Criteria A.
- ❑ Design Requirements
 - Add 100kHz - 150kHz, add 30 - 400MHz.

5.13.8. Magnetic Field Susceptibility

- ❑ Legal requirements
 - Per EN/IEC 61000-4-8 (1993) – 1 gauss: 47.5-1320Hz and 20-140dBpt: 30-30kHz.
 - Test to Performance Criteria A.
 - No data loss or user intervention.
- ❑ Design Requirements
 - Meet legal requirements

5.13.9. Voltage Dips

- ❑ Legal requirements
 - Per EN/IEC 61000-4-11 (1994)
 - Test to Performance Criteria B & C.
 - Equipment self recovers with no loss of data or application.
- ❑ Design Requirements
 - Meet legal requirements

5.13.10. Harmonic Current Emissions

- ❑ Legal requirements
 - Per EN/IEC 61000-3-2 (1998) Per Table 1
- ❑ Design Requirements
 - Meet legal requirements

5.13.11. Flicker

- ❑ Legal requirements
 - Per EN 61000-3-3 (1994)
 - Generally exempt except for >50 Watts input power
- ❑ Design Requirements
 - Meet legal requirements

5.13.12. PTT Certifications

- ❑ Legal requirements
 - Any EU or national deviations required for meeting legal standards.
- ❑ Design Requirements
 - Meet legal requirements
 - Meet Country -Specific requirements

5.14. Shock and Vibration Specifications

- ❑ Meet VDN 19682

5.15. Mechanical Specifications

- ❑ Dimensions:
 - Length: 209.2 mm (8.2 in)
 - Width: 101.8 mm (4.0 in)
 - Depth: 72 mm (2.8 in)
- ❑ Weight: 480g (1.06 lb.)
- ❑ Connector Specifications:
 - Dual MOD10 for COM ports
 - Single RJ11 for Modem port
 - DC Power Input Jack

5.16. Base Platform Options

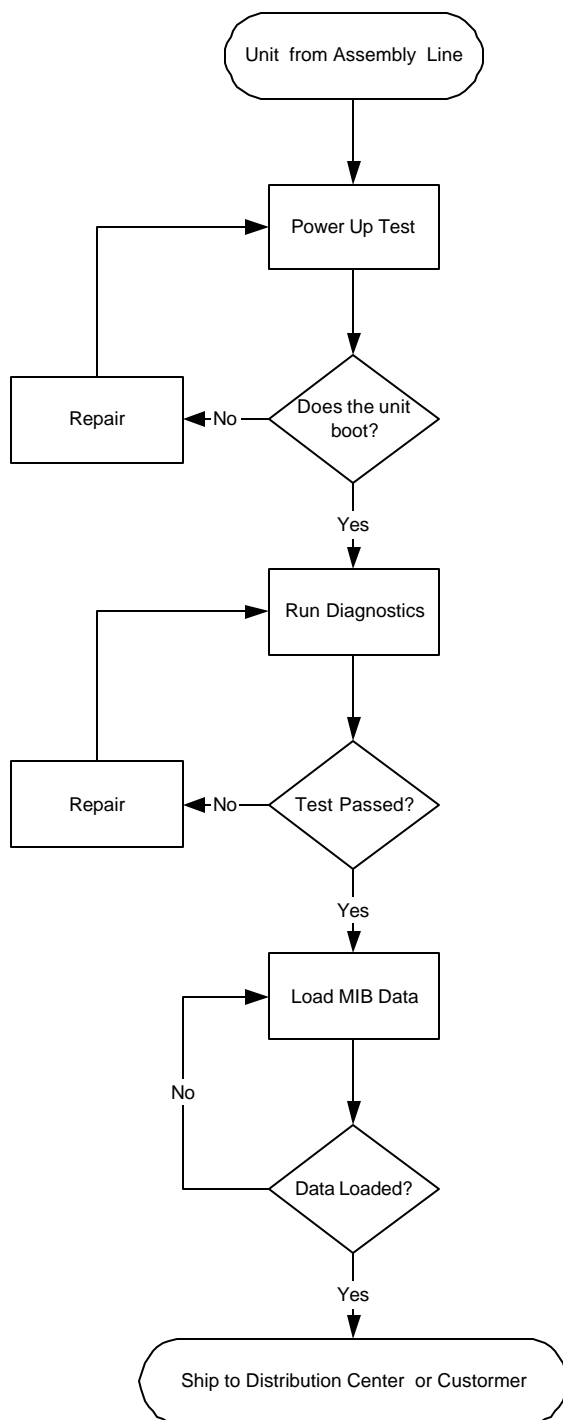
Predator Portable M-Level variants are listed in Table 4 below.

Table 4: Predator Portable Variants.

| Version | PSC R | SAM | MSR | Display Type | Printer | Memory | USB |
|------------|----------|-----|-----|---------------|---------|--------|-----|
| WiFi | Yes | 3 | Yes | Graphical LCD | Yes | 6 | - |
| CDMA | Yes | 3 | Yes | Graphical LCD | Yes | 6 | - |
| GPRS-NA | Yes | 3 | Yes | Graphical LCD | Yes | 6 | - |
| GPRS-Int'l | Yes | 3 | Yes | Graphical LCD | Yes | 6 | - |
| Off-Line | Yes | 3 | Yes | Graphical LCD | Yes | 6 | - |
| SDK | Yes | 3 | Yes | Graphical LCD | Yes | 6 | Yes |

6. Lifecycle

6.1. Manufacturing

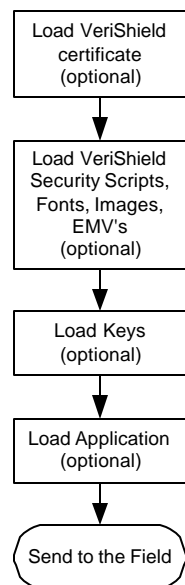


❑ Predator Portable has been designed for localization only; this is regional, and not country specific.

- ❑ Run the standard diagnostic tests.
- ❑ Load MIB Data.
- ❑ The Predator Portable is now ready to be shipped to the Distribution Center or directly to the Customer.

6.2. *Distribution*

Performed by VeriFone, VIP, or Customer



- ❑ Load the firmware. The General Encryption Key (GEK) and security markers are generated at that time.
 - The firmware file along with its signature file will be downloaded using the Direct Load utility (DL.EXE).
- ❑ Run the diagnostic tests again.
- ❑ If the tests fail, the unit needs to be repaired.
- ❑ Load the customer's VeriShield certificates if needed.
 - This is downloaded using the Direct Load utility (DL.EXE).
 - This must be done before loading a Security Script.
- ❑ Load the VeriShield Security Script(s) if needed using the Direct Load utility (DL.EXE).
 - This must be done before injecting the customer's transaction keys.
- ❑ Load customer's keys using VeriShield SecureKIT or a customer's specific key injection tool if needed.
- ❑ Load the application(s) if needed.
- ❑ The unit is ready for the Field.

6.3. Repair

Because the Predator Portable terminal is a device that has a very low COGS value, the engineering team considers the Predator Portable to be a non-serviceable unit.

6.3.1. Repair On-site

- ❑ On-site repair is not possible since the unit will lose the firmware and keys as soon as the plastic case is opened. However, diagnostic software can be run on-site to determine if the terminal needs to be replaced.

6.3.2. Repair Center

- ❑ When a Predator Portable is received, it is first examined externally to determine if the plastic case was opened and if physical tampering has occurred. If physical tampering has occurred, then the Predator Portable is put aside.
- ❑ If possible, switch the Predator Portable into the diagnostic mode. Status is displayed or can be retrieved through the serial port. The HyperTerminal application running on a PC can be used to retrieve the information.
- ❑ Repair/replace the faulty parts if needed.
- ❑ Reload the firmware.
- ❑ The unit should be turned off and on and then the presence of the firmware must be verified to make sure the unit properly retains the RAM data.
- ❑ The unit is sent to the Distribution Center or VIP to be configured with the customer's specific settings (i.e. keys injection and optionally loading of VeriShield & EMV certificates, security scripts, fonts...)

6.4. End of Life

By disposing properly of the units that are no longer in use, we want to prevent someone from:

- Retrieving secret information still present in the terminal such as keys.
- Reusing the Predator Portable case to conduct a substitution attack by replacing the internal hardware.

7. Requirements Traceability Matrix

Not Applicable.