# IDTECH™
## Value through Innovation

# 80140502-001

# User Manual

# Spectrum Pro

## PCI PTS 4.X Hybrid Insert Reader

## USB / RS232 Interface

CE  FC

80140502-001
Rev. C   7/8/2019

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### Revision History

| Revision | Date | Description of Changes | By |
|---|---|---|---|
| 50 | 2/23/2015 | Preliminary Version | CH |
| 51 | 3/10/2015 | Revise low power mode | CH |
| 52 | 10/27/2015 | Expanded description of Features and Benefits Default sleep timeout value is 120 seconds | KT |
| A | 5/17/2017 | Update status LED table, add low-power mode details, correct various items. | KT |
| B | 7/18/2018 | Updated installation and 3-view drawings. | KT |
| C | 7/9/2019 | Added SRED Decommissioning text | CB |

# Table of Contents

# 1. Introduction

Spectrum Pro is a PCI PTS 4.X and SRED certified outdoor hybrid insert reader which can read both magstripe cards and chip cards using a single slot. Meeting the latest requirements of the payment industry, the Spectrum Pro is EMV Level 1 and Level 2 approved, and features DUKPT key management with Triple DES (TDES) encryption to ensure MagStripe and Smart card data will always be protected.

The Spectrum Pro integrates directly with ID TECH's SmartPIN L100 keypad for a complete Chip & PIN solution. It can also use an optional contactless antenna from Kiosk III for outdoor and unattended applications such as parking, vending machines, kiosks, ATMs, and other POS systems.

Integrators and application developers can create apps that communicate with Spectrum Pro using ID Tech's Universal SDK, which provides a comprehensive Windows-based development environment for programmatic control of the unit. Developers can also communicate with Spectrum Pro directly using UART and/or USB-HID. For details, see the P/N 80132402-002 *Spectrum Pro Low Level API Manual*. This manual contains the complete firmware-level API guide for controlling Spectrum Pro directly, through serial commands. The low-level API manual can be downloaded from:
https://atlassian.idtechproducts.com/confluence/display/KB/Spectrum+Pro+-+downloads

# 2. Features and Benefits
- EMV Level 1 and Level 2 certified
- PCI 4.X certification with SRED support
- MasterCard M/Chip 3.0
- PBOC level 1 and 2
- Supports TDES encryption with DUKPT key management
- Reads up to 3 tracks of card data
- Two SAM modules
- Front switch, card seated switch, and latch
- IP 65 rating and IK 10
- Low power sleep mode and stop mode

# 3. Abbreviations

| | |
|---|---|
| AAMVA | American Association of Motor Vehicle Administrators |
| DES | Data Encryption Standard |
| MSR | Magnetic Swipe Reader |
| TDES | Triple Data Encryption Standard |
| PCI | Payment Card Industry |
| POS | Point of Sale |
| USB | Universal Serial Bus |

PCI                                 Payment Card Industry
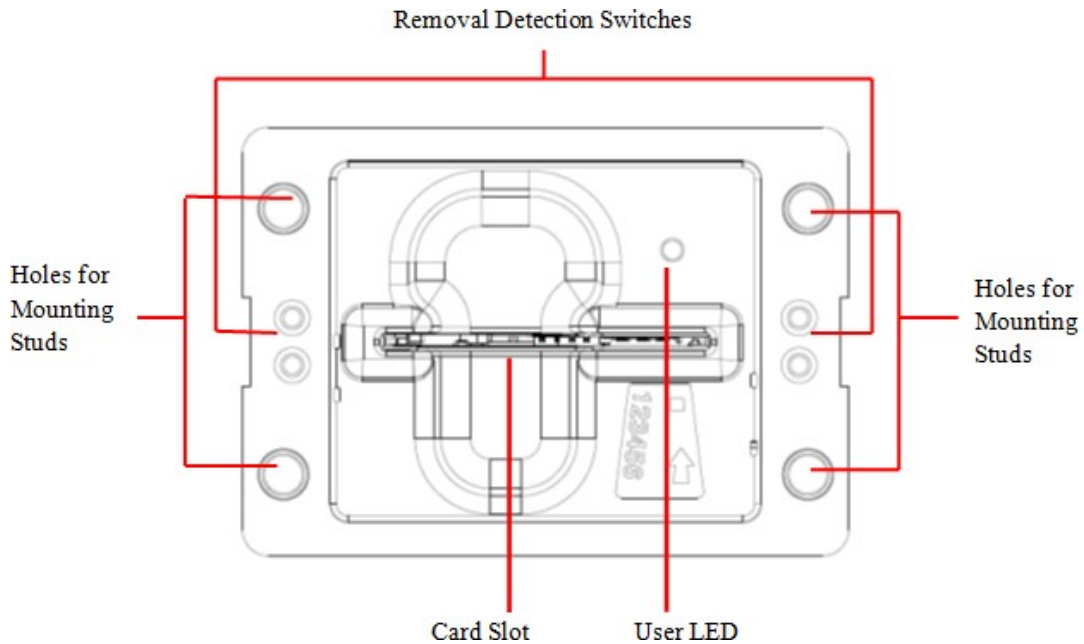SRED                                Secure Reading and Exchange of Data
EMV                                 Europay, MasterCard, and Visa

## 4. Applicable Documents

ISO/IEC 7813 – Identification cards, Physical Characteristic
ISO/IEC 7811 – Identification cards, Recording Techniques, Magnetic Stripe
80132401-002 – ID Tech Spectrum Pro Low Level API Manual

## 5. Front and Back View
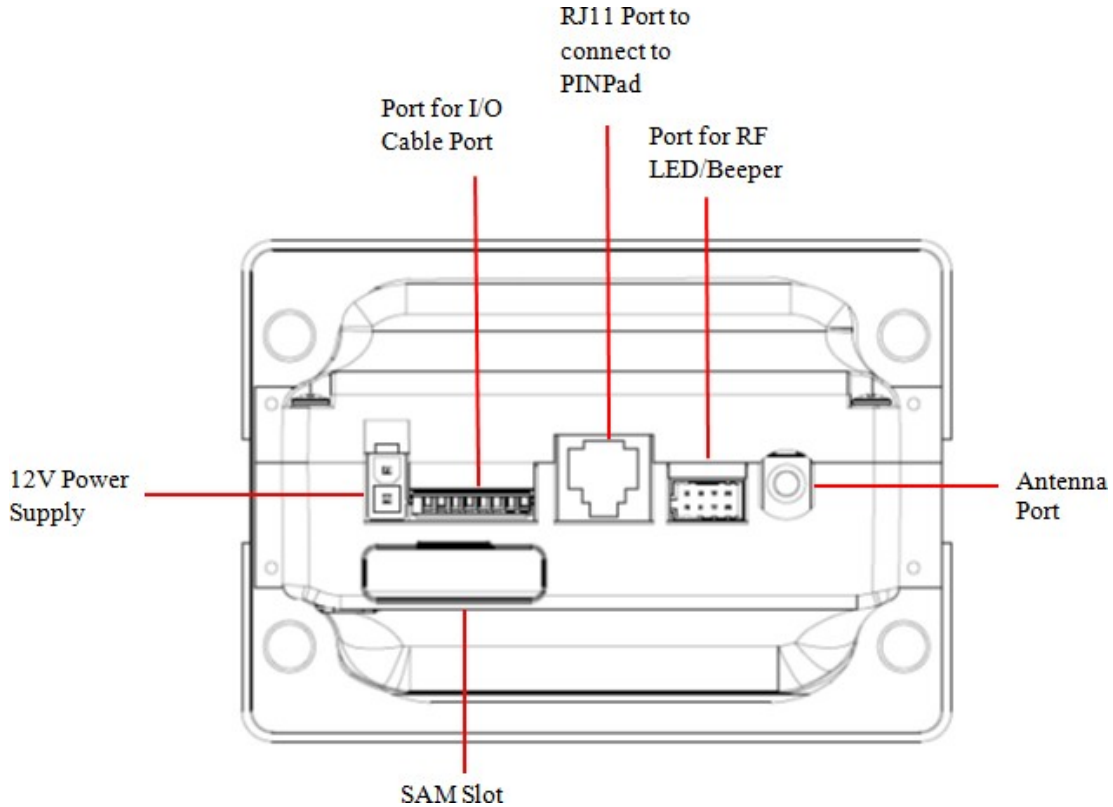
RS232 Communication Settings

| Parameter | Specification |
|---|---|
| Transmission protocol | Asynchronous |
| Communication method | Full Duplex |
| Start bit | 1 bit |
| Data length | 8 bits (Bit7: MSB, Bit0: LSB) |
| Parity | None |
| Stop bit | 1 bit |
| Transmission speed (Baud rate) | 115200 bps (default) |

# 6. Specifications

## 6.1 Supply power

- Supply voltage:
  - DC 5V without supporting latch
  - Additional DC 12V to support latch if latch is needed

- Operating current
  - o Idle – 100mA
  - o Max – 120mA
- USB suspend current: 200 uA
- Sleep mode current: 20 uA
- Stop mode current:
  - with UART wakeup, 16 uA
  - with no UART wakeup, 10 uA
- Reader falls into sleep mode after it is idle for specified time duration. The default time duration is 120 seconds. (This can be adjusted, or even disabled.)
- Reader can be commanded to go to Stop mode (which is a special very-low-power consumption mode).
- Reader can wake up from Sleep mode by card insertion or via UART command. Response time: < 100 ms.
- Reader can wake up from Stop mode by card insertion.
- Power-Off to Power-On time: < 500 ms


## 6.2 Reliability and Environment

- Reliability
  - Magnetic Head Life: 1,000,000 passes minimum
  - Rail and Cover Life: 1,000,000 passes minimum

- Environmental Temperature range:
  Operating:
  -13º F to 158º F ( -25º C to 70º C) non-condensing
  Storage:
  -40º F to 176º F ( -40º C to 80º C) non-condensing
- Relative humidity
  10% to 95% non-condensing

- ESD
  - 6kV contact, and 12 kV air discharge, per ID TECH ESD testing procedure, without permanent damage

## 6.3 Envelope Drawing
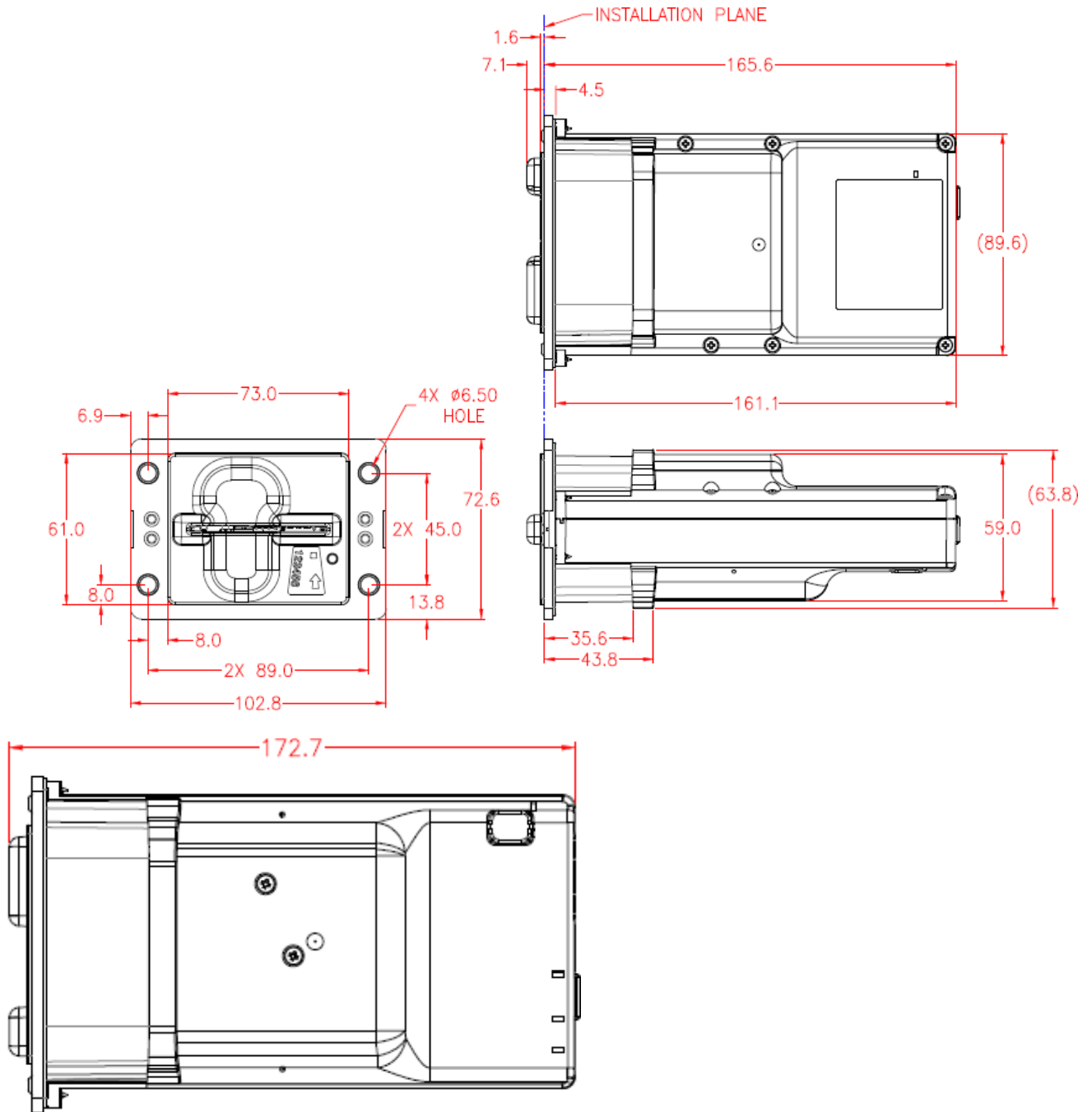
## 7. Mounting Instructions

The reader can be mounted in either a horizontal or vertical orientation. The removal detection points must be pressed down when the unit is mounted. Please refer to the mounting drawing below.



RECOMMENDED CUTOUT
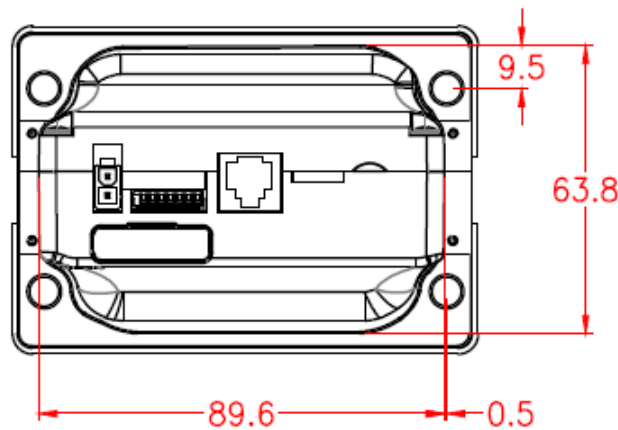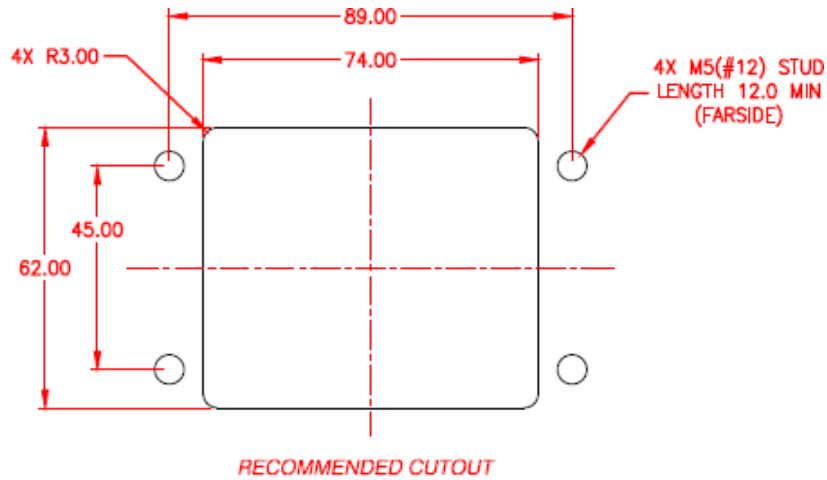


## 8. LED Management

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.

## 8.1 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 LED will turn *off* after powering on the smart card.
  - ➢ The 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 | Flashing Red | Reader start-up |
| 4 | Solid Red | The recent magstripe card read was bad. Red lasts 1 second. |
| | | |
| | | |

## 8.2 Diagnostic LED Status

The LED on the *back* of Spectrum Pro can 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 | LED | Indicating | Service action |
|-------|-----|------------|----------------|

| | Green | Amber | Red | | |
|---|---|---|---|---|---|
| 1 | Off | Off | Off | No external power | Check the power cable and power supply |
| 2 | | | Solid Red | Power is on, but firmware(either K21 or MaxQ) 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. | State will go to either state 3 or 5 in 30 seconds. |
| 5 | RFU | RFU | | RFU | RFU |
| 6 | Flashing Green | Flashing Amber | | Firmware downloading and programming | Will go to state 4 in 30 seconds |
| 7 | Solid Green | Off | | In ready state but no communication with its host | State will go to state 8 in 30 seconds |
| 8 | Flashing Green | | | Command sent to reader; reader waiting for response. | |
| | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| 9 | | Flashing Amber | | Removal flag on and communicating with its host | Check removal switch if they are fully engaged and 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 (may be tampered) | Dismount the reader and send it back to its manufactory |
| 11 | | Flashing Amber | | Reader is communicating with its host, and the crypto driver is not functioning: Crypto MCU is lost or certificates are invalid (may be tampered) | Dismount the reader and send it back to the manufacturer |

## 9. Operation Procedure

A chip card should be inserted with chip side facing up (as shown below). A magstripe card should be inserted with magstripe facing *down* and to the *right* side of the reader. Please see pictures below.





## 10. Decommissioning SRED Devices

All PCI devices require proper decommissioning prior to device disposal in order to ensure the protection of all sensitive financial card data. For instructions on decommissioning your device, see Decommissioning of SRED Devices on the ID TECH Knowledge Base.