

Universal SDK Version 7

ReadMe File for rf IDEAS SOFTWARE and HARDWARE - rf IDEAS' pcProx® USB Software Developer's Kit, and Proximity Reader.

The default SDK installation directory is — **C:\Program Files\rf IDEAS\pcProxSDK**

Version 7.1.1 now supports the pcProx® Plus dual frequency card reader, as well as TCP/IP and UDP Ethernet connections. Since February 2010 the Universal SDK DLL version 7.x now supports four products; pcProx®, pcProx Plus, pcSwipe™, and pcProx Sonar. Version 7.1.2 supports pcProx Plus. Version 7.1.3 added serial pcProx Plus support. Version 7.2.6 supports pcProx Plus readers with extended functionality. Version 7.2.8 includes the changes for backward compatibility of pcProx Plus extended features. Version 7.2.9 includes the HID API implementation instead of libusb on the Linux to communicate with the USB device. Version 7.2.11 includes bug fixes on Linux with HID API implementation. Version 7.2.12 includes the resolution of slow connectivity issues with serial devices on Linux Platforms. Version 7.2.13 includes the resolution of bug fixes with connection issues. Version 7.2.14 includes addition of volume control feature of pcProx Plus. Version 7.2.15 includes key writing & configuration bit mechanism for EV1 key programming feature, Bluetooth® low energy technology (BTLE) Support. Version 7.2.16 includes sending current configuration to the reader before writing EV1 data. Introducing error codes for EV1 and BTLE API. Version 7.2.17 includes removal of name mangling for java escalation. Version 7.2.18 includes default vid pid list. Version 7.2.19 includes change of hidapi libs in linux. Version 7.2.20 includes the issue fix for performing clean installation by installer. Version 7.2.21 includes GetFWFilename API, new sample applications, the issue fix for the pcProxAPI document containing the incorrect definition of the setBTLEConfiguration API. Version 7.2.22 includes reducing sleep time in WriteCfg api for readers based on loon platform. Version 7.2.23 includes bug fixing in SDK examples. Version 7.2.24 includes new EULA document and fixed issues related to serial loon reader. 7.2.25 includes improved API reference and ReadMe documents. Version 7.2.26 includes some more improvements in API reference document. Version 7.2.27 includes adding BLE example in SDK and providing support for Mac OS X in pcProxAPI SDK. Version 7.2.28Beta includes changes for proxAdv reader. Version 7.2.28 includes SDK release for RedHat by fixing limitations of SDK on Linux, adding some FAQs in ReadMe related to compatibility issues in Linux and fixing bugs in SDK examples. Version 7.2.29 includes fixing crash for proxAdv readers and incorporating feedbacks for BLE Example. Version 7.3.0 includes updating documents for new release. Version 7.3.2 includes GetFullFWVersion API and making SDK thread-safe. Version 7.3.3 includes Increase the baud rate of serial readers from 9600 to 115200. Version 7.3.4 includes bug fix for connecting low baud rate serial loon reader. Version 7.3.5Beta includes issue fix: buffer overflow on calling GetDevName. Version 7.3.5 includes addition of multiple baud rates functionality for serial loon readers with firmware v16.8. Version 7.3.6 includes static library for Windows. Version 7.3.7Beta includes logging functionality in SDK. Version 7.3.7Beta2 changes the location of Log file to C:/pcProxLogs/ProxApiSdk. Version 7.3.7Beta3 adds Firmware: CPU0 and CPU1 Application and pcProx Library version to logs. Also fixes bug in connecting pcSwipe readers. Version 7.3.7 add support for proxAdvance readers on Linux. Version 7.3.8 includes bug fixes for: i) Serial readers not getting connected on Linux platform, and ii) USB readers getting connected by passing connection type as SERIAL. Version 7.3.9 includes bug fixes for: i) Memory Leak in C# example. ii) Fixing hash keys in configuration other than 1st, and iii) NTWare Canon reader listing all cards. It also includes the updated card list in pcProxAPI.h. Version 7.4.0 includes isASCIIPresent Flag implementation to check support for ASCII-Conversion-Type in the reader and improvement in document for getActiveId32 API. Version 7.4.1 includes bug fixes for enable Extended / Hashing functionality for RDR- 80x81AKE, AKB, E-P, or B-P with F/W LNC160800SPX700. Version 7.4.2 includes: i) change in getFWFilename API documentation. ii) added step to set device rules for rf IDEAS readers in Linux in ReadMe.pdf file. iii) improved API document for LED structure. iv) added FAQ for ethernet reader. v) added signature validation process for libusb0.dll. vi) implemented JM3 reader requirement. vii) Bug fixes for AKE readers and find next IP functionality. viii) updated card list in pcProxAPI.h file. Version 7.4.3Beta includes: i) changed product id of JM3 reader. ii) added vendor and product id for KPIT. iii) added get Electronic Serial Number functionality for loon USB reader. Version 7.4.3 includes: i) Added /GUARD:CF compiler option in SDK. ii) Updated SDK and C++, C#, VB-Net, and BLE example project files to support Visual Studio 2019 toolset. Version 7.4.4Beta includes: i) Adding new readers' information in vid-pid list. Version 7.4.4 includes: i) Exposing some of the APIs of the SDK for Linux and Mac Platforms. Version 7.4.5 includes: i) Implementing CRC Process for HWG File ii) Adding two new APIs WriteDevCfgToCRCFile and ReadDevCfgFromCRCFile iii) Adding the getESN option in the readme

of the Examples. Version 7.4.6 includes: i) Bug Fix of HWG File CRC Implementation. Version 7.4.7 includes: i) Changing the name CRC to iEndOfHwgFile in the SDK for secure hwg+ files. ii) Updating new window's server IP. iii) Bug Fix related to secure hwg+ files when value is appended at the end of security key. iv) Bug Fix related to loading the secure hwg+ files with security key starting with 0. Version 7.4.8Beta includes: i) Adding two APIs for some special reader configuration. Version 7.4.8 includes i) Latest cardtypes ii) Some APIs exposure restricted. Version 7.4.9 includes i) Bug fix for API documentation. Version 7.5.0Beta includes: i) Adding exposure for two APIs ReadSecureData and WriteSecureData. Version 7.5.0Beta2 includes i) Bug fix for SetComSrchrng for AK0 readers ii) Adding latest card types. Version 7.5.0Beta3 includes i) Bug fix for Com port for serial readers on Linux. Version 7.5.0 includes i) Removing Beta3 from version. Version 7.5.1 includes i) Bug fix to remove Beta3 from API documentation. Version 7.5.2Beta includes i) Bug fix for card data buffer ii) Adding API for vSDK beta information. Version 7.6.0 includes i) Exposing WriteDevCfgToSecureFile and ReadDevCfgFromSecureFile for Linux and Mac. iii) Adding the error code for Tampered Files. iv) Exposing WriteSecureData and ReadSecureData for Linux and Mac. v) Making the Secure hwg file compatible for all three platforms. vi) Adding the API for parsing the .ini File. vii) Bug Fixes. viii) Implementing the Progress Bar at the SDK. ix) Adding API for generating and checking Secure Firmware Files. Version 7.6.1 includes i) Bug fix for loadini and document. ii) Enabling debugging feature for debug mode. Version 7.6.2 includes: i) Bug fix for documentation and loon reader taking long time to load hwg file. ii) Adding support of Linux-Arm64 and Mac-M series. iii) Adding GetActiveID API in loop for readercomm example. iv) Updating Copyright information. v) Adding support of BLE version information. viii) Adding Updated EULA document. Version 7.6.3 includes: i) Updating API doc. Version 7.6.4 includes: i) Bug fix for getting segmentation error for SecureHwg API on Ubuntu22. ii) Bug fix for IOCTL error on console. iii) Changing the folder location for EULA pdf. Version 7.7.0 includes: i) Adding new API's to get additional information of reader: GetCopyrightInfo, GetBuildDate, GetCPUInfo, GetPlatformType, GetSerialNumber. iii) Adding new API for BLE readers: WriteBLEDataToFile, WriteBLEKeyToFile, WriteBLEDataToReader WriteBLEKeyToReader. iv) Adding support of GetFWFilename and GetFullFWVersion for Wren Serial Reader. v) Adding new API SendGetFWVersion to populate firmware version for serial reader. 7.7.1 includes: i) Bug fix for loading BLE HWG files on Wren Mobile reader. ii) Adding Updated EULA document. iii) Updating Readme. Version 7.7.2 includes: i) Bug fix for writeDevCfgToFile_char() and readDevCfgFmFile_char() APIs not working ii) Bug fix for ReadDevCfgFromSecureFile API not working on Mac Monterey. iii) Adding readDevCfgFmFile_char and writeDevCfgToFile_char in C# example. iv) Bug fix for BLE HWG API's WriteBLEKeyToReader not working as expected. v) Updated api documentation for GetLEDCtrl and SetLEDCtrl.

Version 6.x of the DLL Library supported a maximum of 16 devices, version 7 supports up to 127 USB devices and has been ported to Linux and Mac OS X.

For your convenience both version 6 and version 7 are included. We recommend new users use version 7 which is downward compatible with version 6.x. Version 7 will scan for all three products (pcProx, pcSwipe, pcProx Sonar) by default, version 6 will only connect with pcProx devices.

This installation file contains following examples:

1. C/C++
2. C#
3. Java
4. Python
5. VB.NET
6. Autolt.
7. BLE_Example

Directory tree for examples

```
|-- AutoIt
|   |-- readercomm.au3
|   `-- ReadMe.txt
|-- BLE_Example
|   |-- Beacon
|   |-- BLE_Example.sln
|   |-- Bluegiga SDK
|   |-- README.md
|   |-- Scanner
|   `-- Serial Driver
|-- C#
|   |-- App.config
|   |-- pcproxlib.cs
|   |-- Program.cs
|   |-- Properties
|   |-- readercomm.csproj
|   |-- readercomm.sln
|   `-- ReadMe.txt
|-- C++
|   |-- Makefile
|   |-- readercomm.cpp
|   |-- readercomm.sln
|   |-- readercomm.vcxproj
|   `-- ReadMe.txt
|-- Java
|   |-- readercomm.java
|   `-- ReadMe.txt
|-- Python
|   |-- readercomm.py
|   `-- ReadMe.txt
`-- VB.net
    |-- App.config
    |-- Module1.vb
    |-- My Project
    |-- PcProxAPIWrapper.vb
    |-- readercomm.sln
    |-- readercomm.vbproj
    `-- ReadMe.txt
```

Note: This is the structure of examples folder for windows. For Linux and Mac OS X, the examples folder contain the examples for following language: C/C++, Java and Python only.

Note: GetActiveID() can be called every 250ms (4 times per second) to sample for cards in the reader. Typically the card data will be present for one second as this is the factory default setting.

Note: The 32 bit and 64 bit DLL's are the same name but can be distinguished from one another by the Property Detail as seen when right clicking on the DLL file.

The functions within this DLL are not "name managed" and are compatible with all languages capable of loading a DLL and calling it's functions. This include VB .Net, C#, C++, Java, Python, Autolt and more. The Linux shared library is compiled under Ubuntu 20.04 (32 & 64-bit) with g++ 9.4.0 on a 5.4.0 kernel for x86 platform. For ARM boards shared library compiled under Raspberry Pi 3B+ with g++ 9.4.0 on a 5.4.0 kernel. The Mac dynamic library is compiled under Monterey 12.6.2 using Xcode with Apple clang version 14.0.0.

Cavities :

1. Why pcproxAPI SDK does not work on Linux kernel below then 2.6.39?

Solution: HIDRAW driver which comes by default with Linux kernel does not support feature report communication before version 2.6.39 which rfIDEAS used to communicate with the readers.

2. Why the following errors : `ioctl(SFEATURE) : Broken Pipe Error` `ioctl(SFEATURE) : Protocol Error` comes in linux while developing console application?

Solution: These are the messages that are coming from 3rd party library HIDAPI on failure of device communication and there is no way to silent these messages. Do not treat them as errors.

3. Why we receive an error message “ error while loading shared libraries: libudev.so.0: cannot open shared object file: No such file or directory“ on linux?

Solution: This error will come because libudev.so.0 is not supported in some newer kernel versions. They support libudev.so.1.

To fix this error : link libudev.so.1 to libudev.so.0 using the command :

```
sudo ln -sf <location of libudev>/libudev.so.1 <location of libudev>/libudev.so.0
```

Note : Creating a softlink is one of the solution that we tried and worked. However, user can choose any other method.

4. Why we receive a message “ Reader not Connected“ even when the device is attached physically on linux?

Solution: Whenever rfIDEAS readers are connected on Linux machine, User have to give appropriate permission to readers to communicate with them. However giving permission manually is not a hard task but when user have to connect and disconnect various readers frequently, this becomes a quite frustrating thing to do.

To handle such situations, there is another approach to give permission to readers, which is a one time setup. After this process the user will never have to give permission to any rfIDEAS reader on that Linux machine.

This step requires creating a rules on Linux systems (works with any Linux based machines like Raspberry Pi machines too).

Steps:

- Open the terminal and type the following command:
sudo vi /etc/udev/rules.d/rfideas.rules
- Type the following lines in the rfideas.rules file and save it.

```
KERNEL=="hidraw*", ATTRS{idVendor}=="<vendor_id>", MODE="0666"  
KERNEL=="hidraw*", ATTRS{idVendor}=="<vendor_id>", ATTRS{idProduct}=="<product_id >",  
MODE="0666"  
SUBSYSTEM=="tty", ATTRS{idVendor}=="<vendor_id>", MODE="0666"  
SUBSYSTEM=="tty", ATTRS{idVendor}=="<vendor_id>", ATTRS{idProduct}=="<product_id>",  
MODE="0666"
```

Note:

Replace <vendor_id> and <product_id> with the actual value of vendor id and product id respectively. For standard pcProx reader, vendor_id = 0c27 and product_id = 3bfa.

- Type the following command to activate the newly created rules for rfIDEAS devices:
sudo udevadm trigger

AFTER FOLLOWING STEPS, WHENEVER rfIDEAS READERS ARE CONNECTED, THEY WILL HAVE APPROPRIATE PERMISSIONS FOR COMMUNICATION.

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