HawkEye PDK SDK

Passport and Thai National ID Card

Developer's Manual

for Windows

R&D Computer System Co., Ltd.

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HawkEye PDK SDK is a software development kit for passport and Thai national ID card reading. It's an important part of R&D Computer System Co., Ltd. PDK product series.

1. Features

1.1 Supports passport's MRZ reading and RFID chip reading.

1.2 Supports Thai national ID card reading.

1.3 Uses for passport and smart card readers that support HawkEye PDK SDK such as PDK3302R2S, a reader manufactured by Elyctis.

1.4 Supports C# programming language.

1.5 For 32-bit application developing.

1.6 Supports Windows 7 and higher versions, 32 and 64 bits.

2. Applications

2.1 Must place the license file, RDNIDLib.DLD into the same folder of executable file (EXE) or the folder that application program have read-write access rights.

2.2 Must place PDK's DLL and XML files into the same folder of executable file (EXE)

2.3 DLL files of PDK SDK are 32-bit library version only, support both 32 and 64 bits Windows.

- Developer have to configure the compiler to support 32-bit Platform or Target CPU as x86. Please don't configure to x64 nor AnyCPU type.

3. Files and Folders inside PDK SDK

Developers can download PDK SDK from our company website in PDK3302R2S product page.

Folders inside SDK are:

- **\Drivers**
- **\Manuals**
- **\PDKSample**: ready to use sample application.
- **\SourceCode**: project source code of PDKSample.
- **\Tools**

4. Drivers installations

Please plug USB cable of PDK3302R2S into a PC's USB port directly. Don't use USB hub and extension cable. Windows will install the drivers of all readers by searching and downloading from the Internet. Readers that should be installed are:

4.1 **Elyctis Virtual COM Port** for MRZ reader

4.2 **Identive Multi-Slot CL Reader** for RFID reader

4.3 **uTrust 2700 R Smart Card Reader** (3 items) for two full size ID card readers and one SAM reader.

5. Information of PDK3302R2S reader

There are 5 sub-readers inside the PDK3302R2S:

5.1 MRZ Reader

- Use Virtual COM Port interfacing, for passport's MRZ data reading.
- Normally shown as COM11 or COM3 or others, but not COM1, COM2.
- Inside PDKSample, it will shown as **COMxx - ID BOX**.

5.2 Contactless Reader or CL Reader

- It's a RFID reader for e-Passport.
- PCSCDiag will display it as **ELYCTIS CL reader xxxxxxxxxxxxxxx 0**.
- Inside PDKSample, it will shown as **MULTISLOT_CTL**.

5.3 The first Contact Smart Card Reader or CNT Reader

- It's the left side Thai ID card reader.
- PCSCDiag will display it as **ELYCTIS CNT reader 0**.
- Inside PDKSample, it will shown as **ELYCTIS CNT reader 0 (Left)**.

5.4 The second Contact Smart Card Reader or CNT Reader

- It's the right side Thai ID card reader.
- PCSCDiag will display it as **ELYCTIS CNT reader 1**.
- Inside PDKSample, it will shown as **ELYCTIS CNT reader 1 (Right)**

5.5 The third Contact Smart Card Reader or CNT Reader

- It's a SAM reader, embedded inside the base of PDK3302R2S.
- PCSCDiag will display it as **ELYCTIS CNT reader 2**.
- PDKSample doesn't use this reader.

We can use PCSCDiag, the testing software, for checking the name of each reader. This software is inside **Tools** folder of PDK SDK package.

The reader names inside PDKSample are mapped by software from original name for easy reader selecting. But sometimes they may be not corrected in case of using two PDK3302R2S at the same time. Please study mapping method from PDKSample source code.

6. Information inside passport

6.1 MRZ

MRZ (Machine Readable Zone) is the zone of two lines at the bottom of passport information page. MRZ reader can use OCR technique to capture characters and text from that zone.

The following information have been provided in MRZ:

- Name
- Surname

- Date of Birth
- Nationality
- Sex
- Valid until/Expiration date
- Document Number
- Document Type
- Issuer
- Optional Data (Personal Number)

6.2 RFID Chip

Inside every e-Passport there is an RFID Chip for keeping information such as MRZ data and face image. Reader software has to do some security checks, which each country is different, before reading the chip. The Basic Access Control (BAC) is a most method used. BAC requires some data to be read by the MRZ reader and uses that data as key values in requesting permission to read out data from the chip.

The information on the chip is divided into the following Data Groups (DG):

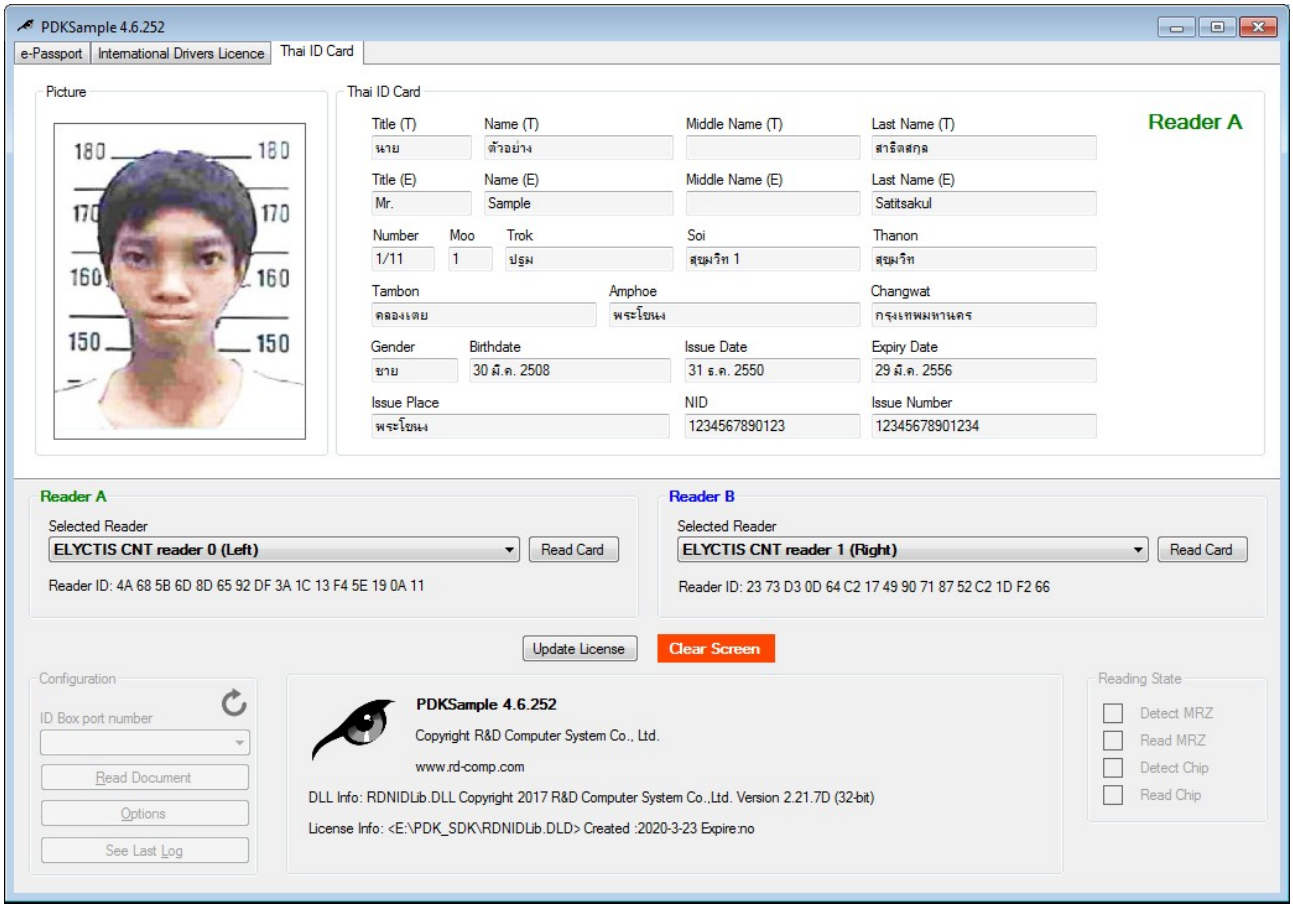
- DG1 Machine Readable Zone (MRZ Data)
- DG2 Biometric data: Encoded Face
- DG3 Biometric data: Encoded Fingerprint(s)
- DG4 Biometric data: Encoded Eye(s)
- DG5 Displayed Portrait (Picture of the holder as printed in the passport)
- DG6 Reserved for future use
- DG7 Signature of the holder as printed in the passport
- DG8 Encoded security features: Data features
- DG9 Encoded security features: Structure features
- DG10 Encoded security features: Substance features
- DG11 Additional personal details (Address, Phone, etc.)
- DG12 Additional document details (Issue date, Issued by, etc.)
- DG13 Optional data
- DG14 Data for securing secondary biometrics (EAC)
- DG15 Active Authentication Public Key info
- DG16 Person(s) to Notify
- and some of security data

Usually the data is read at least DG1 and DG2, while others may or may not, depends on the job. But the more reading, the longer it takes to read.

Further information and reading procedures for passports can be found in the **ICAO Doc 9303 Machine Readable Travel Documents**.

7. PDKSample program and source code

PDKSample is a C# sample program for learning and developing a passport and ID card reading program. Using the ELY TRAVEL DOC Passport Reader source code from Elyctis Development Kit (SDK), previously it has two tabs for e-Passport (eID / ePP) and International Driver License (IDL) reading . The third tab, Thai ID Card, has been added for Thai national ID card reading.



To read Thai national ID card, we use various commands from the RDNIDLibD.DLL. This library took from the **ThaiID/DLL Plus SDK**.

Compiled PDKSample program (EXE file) is inside the **\PDKSample** folder of the SDK package, you can try it immediately.

This software development requires Microsoft Visual Studio, version 2019 is recommended.

7.1 Passport and international driving license reading

- Uses all the original code from ELY TRAVEL DOC source code.
- The options for reading the Data Group (DG) of the program are divided into 2 tabs. The BAC tab (Basic Access Control tab) will affect the e-Passport reading. The BAP tab (Basic Access Protection tab) will affects electronic driving license (eDL) reading.

- For fast e-Passport reading, you should only select the DG1 and DG2 in **Options** page > BAC tab and also uncheck the **Enable Log** and **Save in CSV file** options.
- The program will save some data files in Windows' **Documents\ELYCTIS** folder.
- Caution. If set to enter the MRZ value manually in the PDKSample program (Options> Enter MRZ manually) and enter the wrong MRZ value multiple times, it may cause the RFID chip to break itself. That passport will no longer can be used. Then the release version shouldn't allow users to enter MRZ manually by themselves.

7.2 Reading Thai national ID card

- The third tab that has been added to the original source code at the bottom of the MainForm.cs file. Added lines are commented and marked with "PDKSample".
- Please see commands in **R&D NID Card DLL Plus SDK Developer Manual** (RDNIDLibPlus_Manual_Eng_Rxxxxxx.pdf) located in the **\Manuals** folder of the SDK package.

7.3 Limitations of PDKSample

Since PDKSample is just a simple program for studying the various commands of the SDK, so that the program have some limitations as follows

- It can be used with only one PDK3302R2S reader at a time. If more than one reader are plugged in, the program may not work properly.

8. License file management (.DLD)

License File is the most important for using PDK SDK. This file is a collection of registered and licensed readers. Non-registered reader will not work with the PDK SDK and PDKSample. The reader products that have model names beginning with PDK, such as PDK3302R2S are registered and can use PDK SDK.

For details on how to use the DLD license file, please read the **R&D NID Card DLL Plus SDK Developer Manual** in the SDK package.

9. Questions and problem solving

Question

Why the developed software (EXE) doesn't work?

Answer

Check that all DLL and XML files are in the same folder of the EXE file, please compare with the files in **\PDKSample** folder of PDK SDK package. Then check if there is DLD file in the same folder as the program (EXE). If not, please update license or copy RDNIDLib.DLD file to this folder.

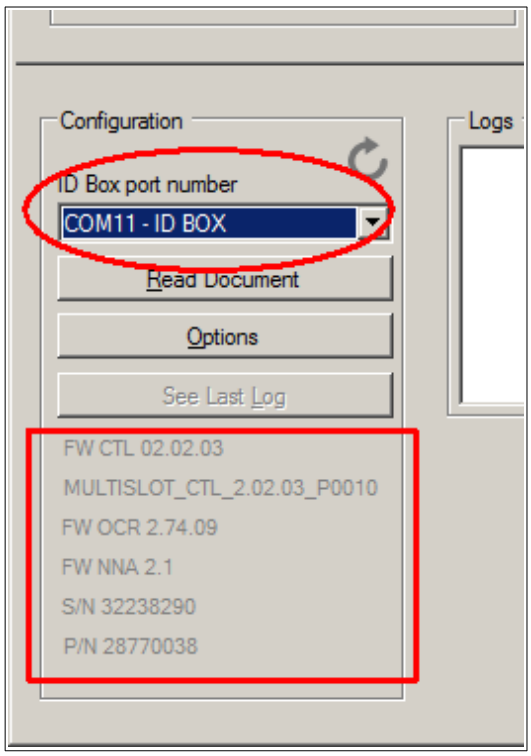
Question

How to solve the drivers installation problems?

Answer

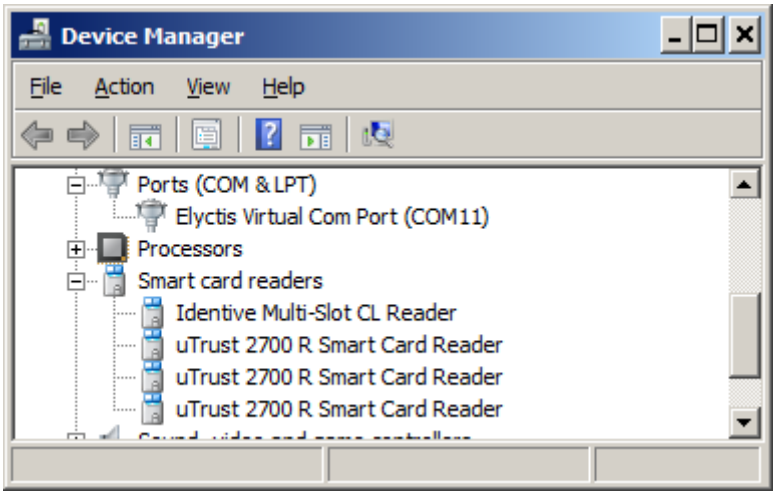
Do these steps:

- Run the PDKSample program select e-Passport tab and click ID Box port number to select **COMxx - ID BOX**. The reader information will be seen in the bottom left red frame as in the below picture.



  - If the COMxx - ID BOX reader is not found, Elyctis Virtual COM Port driver may has some problems. Resolve the issue by unplugging and re-plugging the USB cable. Or move the USB cable to other USB port. Or run the Setup.exe program located in the **\Drivers\ID BOX One Scanner Driver v1.1** folder of the SDK package.
  - If the first 2 lines are not “FW CTL xx.xx.xxx” and “MULTISLOT_CTL” indicate that the Identive Multi-Slot CL Reader driver has a problem, solve the problem by unplugging and re-plugging the reader USB cable. Or move the USB cable to other USB port. Or update driver from Windows Update (Search automatically ...) (requires internet connection)

- Use Device Manager to open and check that the following drivers are installed correctly or not.



- Elyctis Virtual COM Port (COM number can be any number)
- Identive Multi-Slot CL Reader
- uTrust 2700 R Smart Card Reader (3 devices)
- If there are some missing or incorrect, please unplugging and re-plugging the reader USB cable. Or move the USB cable to other USB port. Or right-click on that reader and select the **Update Driver Software…** and click **Search automatically...** The correct drivers will be loaded from Windows Update (requires internet connection).

Question

Found that the e-Passport reading is slow, more than 10 seconds. How to fix it?

Answer

Go to the Options page, on the BAC tab, select only Datagroup 1 and 2. Disable all other groups. And also uncheck the **Enable Log** and **Save in CSV file** options.



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