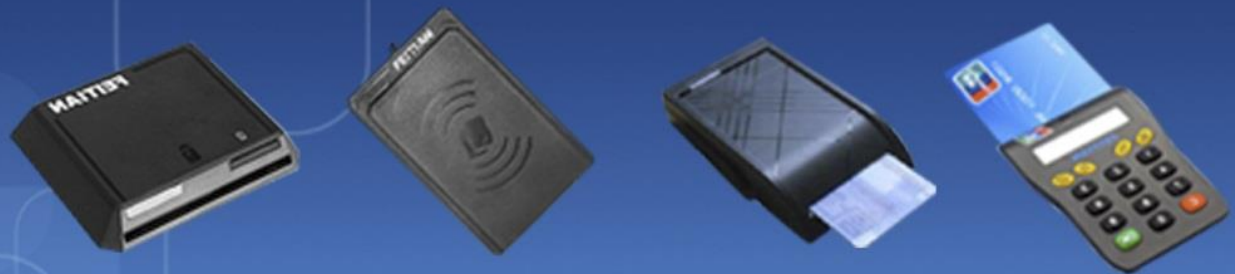


FEITIAN



R502 User manual

Feitian Technologies Co., Ltd.

Website: www.FTsafes.com

Revision History:

Date	Revision	Description
Feb, 2013	V1.0	Release the first version
May, 2013	V1.1	Add description when insert card, the USB port need provided at least 120mA current
October 17, 2016	V1.2	Publish new R502(R502B), update user manual

Software Developer's Agreement

All Products of Feitian Technologies Co., Ltd. (Feitian) including, but not limited to, evaluation copies, diskettes, CD-ROMs, hardware and documentation, and all future orders, are subject to the terms of this Agreement. If you do not agree with the terms herein, please return the evaluation package to us, postage and insurance prepaid, within seven days of their receipt, and we will reimburse you the cost of the Product, less freight and reasonable handling charges.

1. Allowable Use – You may merge and link the Software with other programs for the sole purpose of protecting those programs in accordance with the usage described in the Developer's Guide. You may make archival copies of the Software.
2. Prohibited Use – The Software or hardware or any other part of the Product may not be copied, reengineered, disassembled, decompiled, revised, enhanced or otherwise modified, except as specifically allowed in item 1. You may not reverse engineer the Software or any part of the product or attempt to discover the Software's source code. You may not use the magnetic or optical media included with the Product for the purposes of transferring or storing data that was not either an original part of the Product, or a Feitian provided enhancement or upgrade to the Product.
3. Warranty – Feitian warrants that the hardware and Software storage media are substantially free from significant defects of workmanship or materials for a time period of twelve (12) months from the date of delivery of the Product to you.
4. Breach of Warranty – In the event of breach of this warranty, Feitian's sole obligation is to replace or repair, at the discretion of Feitian, any Product free of charge. Any replaced Product becomes the property of Feitian.

Warranty claims must be made in writing to Feitian during the warranty period and within fourteen (14) days after the observation of the defect. All warranty claims must be accompanied by evidence of the defect that is deemed satisfactory by Feitian. Any Products that you return to Feitian, or a Feitian authorized distributor, must be sent with freight and insurance prepaid.

EXCEPT AS STATED ABOVE, THERE IS NO OTHER WARRANTY OR REPRESENTATION OF THE PRODUCT, EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

5. Limitation of Feitian's Liability – Feitian's entire liability to you or any other party for any cause whatsoever, whether in contract or in tort, including negligence, shall not exceed the price you paid for the unit of the Product that caused the damages or are the subject of, or indirectly related to the cause of action. In no event shall Feitian be liable for any damages caused by your failure to meet your obligations, nor for any loss of data, profit or savings, or any other consequential and incidental damages, even if Feitian has been advised of the possibility of damages, or for any claim by you based on any third-party claim.

6. Termination – This Agreement shall terminate if you fail to comply with the terms herein. Items 2, 3, 4 and 5 shall survive any termination of this Agreement.

Chapter

Chapter 1 R502 Introduce	i
Product introduce	i
Key words.....	i
Certification	ii
Applications	ii
Chapter 2 Specification	iii
2.1 Features	iii
2.2 Parameters.....	iv
Chapter 3 Usage guide	v
3.1 Hardware configuration	v
3.1.1 Status of reader	v
3.2 Running environment	vi
3.3 Hardware running environment	vi
3.4 Software running environment.....	vi
Chapter 4 Software running environment.....	vii
Driver install	vii
4.1 Install driver on Windows	vii
4.2 Install driver on Linux and Mac OS X Platform.....	vii
Chapter 5 Demo Application	viii
Chapter 6 UID Software	ix
Chapter 7 Firmware upgrade tool.....	x

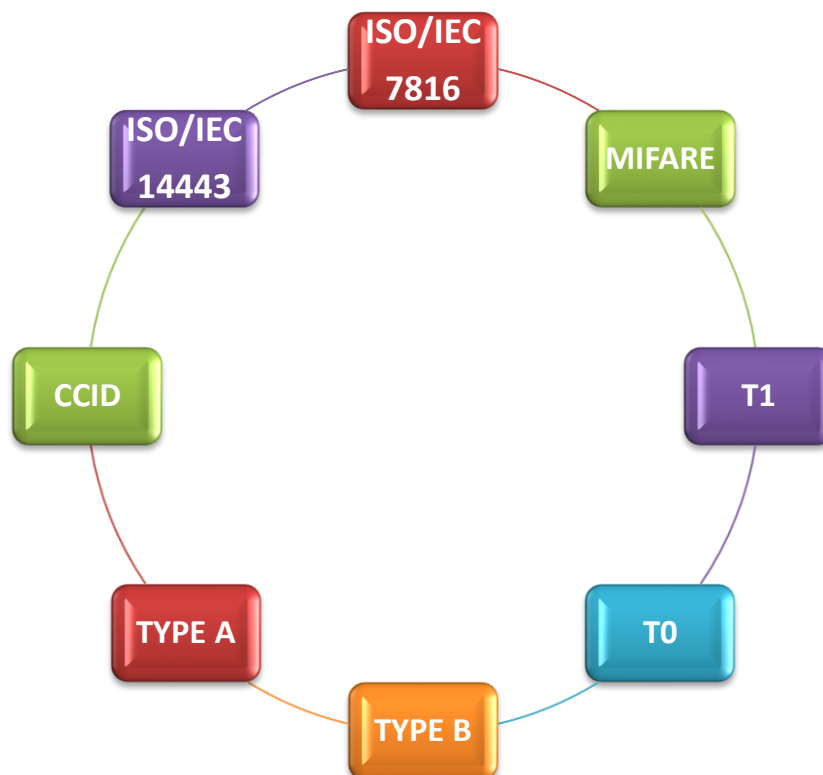
Chapter 1 R502 Introduce

Product introduce


R502 is a dual-interface smart card reader developed by Feitian Technologies. It is based on CCID driver. It supports not only contact cards compliant with ISO 7816 but also contactless cards compliant with ISO 14443 and contactless cards following Mifare standard. It also provides SIM card slots for many kinds of smart card applications. Moreover R502 comes with the SAM slot suitable for GSM 11.11 cards.

R502 is a terminal interface device for smart card applications and system integrations. With support for smart cards using different interfaces, R502 can be widely used in industries or applications requiring electronic payment and authentication, especially suitable for the high security fields. It is an optimal solution for authentication, e-commerce, financial organizations, access control etc.

Key words



Certification

1	CE	YES
2	FCC	YES
3	EMV Level 1	Compatible with EMV Level 1
4	RoHS	YES
5	WEEE 	YES

Applications

R502 is high speed smartcard reader product, it can using financial systems, e-commerce, e-government, e-banking, digital signatures, authentication, network access control, online games, recharge payment, ticketing system, parking and access control, public transportation system.

Chapter 2 Specification

2.1 Features

- Full speed USB 2.0 standard
- Power supply by USB, the usb interface must be provided 120mA current when insert card
- The maximum current less than 100mA (no smartcard insert)
- Accordance with CCID standard to do develop
- Contact card:
 - ◆ Support 1x full size card
 - ◆ Support T0 and T1, in accordance with ISO 7816
 - ◆ The card clock frequency 4MHz
 - ◆ Support Class A, B, C, AB, BC, ABC
 - ◆ Smart card communication speed: 10753bps – 344086bps
 - ◆ Card slot: ISO/IEC standard using 8 contacts, 100,000 plug time
 - ◆ Support 1x GSM11.11 standard SIM card
- Contactless card:
 - ◆ Build-in antenna
 - ◆ Accordance with ISO/IEC 14443 (A and B) standard
 - ◆ Support Mifare S50/S70/Ultralight C cards
 - ◆ Operating distance (0-30mm), Mifare card(0-45mm), it depends on cards
 - ◆ Card clock Frequency: 13.56MHz
 - ◆ Smart card communication speed: 106kbps
- Open UID(User ID) function
- Support upgrade firmware (encrypted)
- OS:
 - Windows 2000/XP/2003/Vista/2008/7/8
 - Linux Kernel 2.6+ (FC14 X64, ubuntu9.10, ubuntu10.04, ubuntu11.10, openSUSE11.3 X64)
 - Mac OS X

2.2 Parameters

Communication protocol		CCID 1.1
Interface		USB Type A
Power supply		USB port on PC
Working current		<100mA (no card insert)
Working temperature		0~+60℃
Storage temperature		- 20℃~85℃
Humidity		≤90 %(No condensation)
Card slot		100,000 plug times
Contactless communication distance		Type A/B card(0-30mm), Mifare card(0-45mm), it depends on card
Physical Security		Card circuit protection
Card parameters	Contact card	Under-pressure deck
		1x full size card support
		Support T0/T1/Class A,B,C card
		Support GSM11.11 standard SAM slot
		Card communication rate: 10753~344086bps
		The card clock frequency 4MHz
	Contactless	Build-in antenna
		Support ISO 14443 standard (Type A and B)
		Support Mifare contactless card
		Card communication rate: 106kbps
Certificate		CE FCC RoHS EMV 2000 level 1
Cases		C9,C10,C5,C8
Standard		ISO/IEC 14443 TYPE A/B, ISO/IEC 7816 T0 and T1 ISO/IEC 7816 CLASSA、CLASSB and CLASSAB MIFARE standard MIFARE S50、MIFARE S70、MIFARE Ultralight C GSM 11.11
OS		Windows 2000/XP/2003/Vista/2008/7/8 Linux(FC14x64,ubuntu9.10,ubuntu10.04,ubuntu11.10,openSUSE11.3 X64) MAC OS X

Chapter 3 Usage guide

Notice: The SAM card doesn't support hot-swappable

3.1 Hardware configuration

To help users have better experience for using R502, we provided lights for R502 product. The light will help customer to understand the reader status and to save time to easy use.

We provided three indicators (Red/Blue/Green) to inform the status of reader. It included below status of reader (USB data transfer/contact card/contactless card working status)

*The R502 doesn't support using contactless and contact at same time, since dual interface card (contact and contactless) will had issue. The design is when insert contact card, then the contactless will block.

3.1.1 Status of reader

✧ USB data transfer – red color

No	explanation	Status
1	USB enumerating	1Hz flashing
2	USB enumerated	Turn on
3	Firmware checksum failure	4Hz flashing

✧ Contact card – Blue color

No	explanation	Status
1	No card	Turn off
2	Card inserted	Turn on
3	Data transfer	flashing

✧ Contactless card – Green color

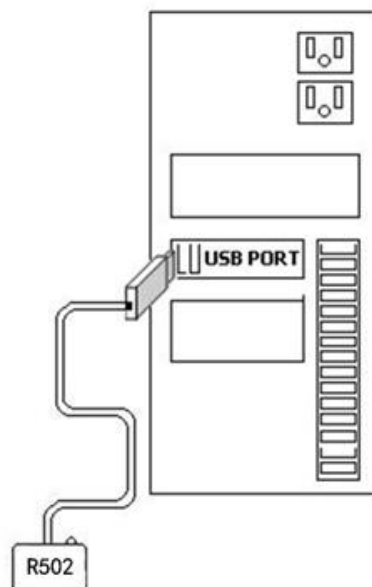
No	explanation	Status
1	No card	Turn off
2	Card putted on reader	Turn on
3	Data transfer	flashing

3.2 Running environment

R502 is dual interface smart card reader, which support contact and contactless card, Also it integrated with one SAM card inside, can be using financial industry. The default running environment is normal PC platform. But R502 is not only can using on PC, it also can using it for the embedded device, Feitian can provide OEM for the different platform, like ARM or MIPS and so on.

3.3 Hardware running environment

Connect to your PC through USB port, the requirement is your PC at least have one USB port.



3.4 Software running environment

R502 support below system by default:

Windows: Windows 2000/xp/2003/Vista/2008/Windows 7/Windows 8

Linux: (FC 14, Ubuntu, Opensuse, redhat, cent OS)

Mac OS X: 10.6.8+

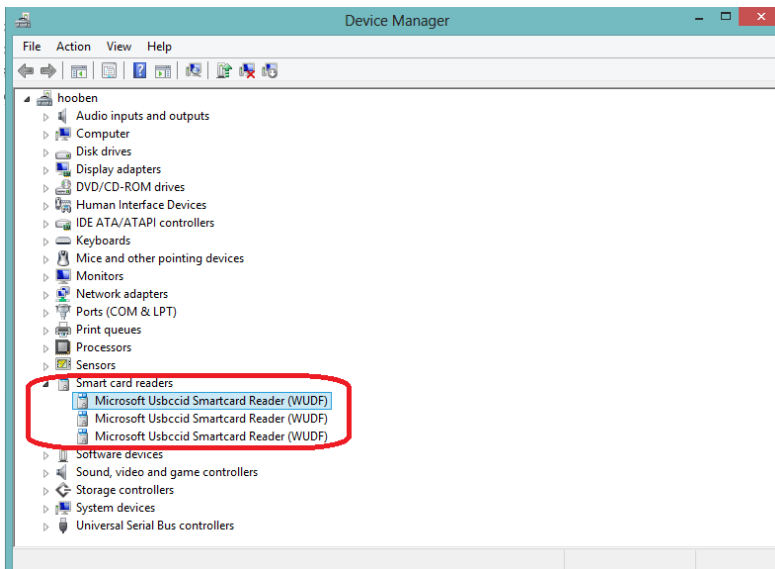
Chapter 4 Software running environment

Driver install

4.1 Install driver on Windows

R502 is accordance CCID standard to do design, so don't need install driver on Vista+, the driver already integrated into system. Customer don't need install any driver.

PS: When insert reader, the system will automatically install it. Here is a review after driver installed.



4.2 Install driver on Linux and Mac OS X Platform

Please confirm that you have install CCID Driver and PCSC Lite at first (Some linux system already integrated it in system). For the special system, please refer below website to do install through source code way (<http://pcsc-lite.alieth.debian.org/ccid.html>)

The driver was integrated into CCID latest driver after **1.4.21**, please go CCID official website to download and using it. More questions, please contact world.support@ftsafes.com

Chapter 5 Demo Application

We provided demo application to customer, which showed how to connect and disconnect to customer, also, it showed how to communication with reader.

More information, please go to SDK, find demo application and operation manual.

Chapter 6 UID Software

UID (User ID) function is authentication function, it means the distributor can do authentication with reader. The distributor can write own flag into reader, like key pair. And then the reader will through the data to generator a UID. When customer bought reader from distributor, if they want to read and write firmware, it must be contact distributor to using UID to do encryption with firmware and give to customer. More information, please find UID application and operation user manual in SDK.

Chapter 7 Firmware upgrade tool

The firmware upgrade tool using to do upgrade. To consider customer will have OEM Feitian R502, then after firmware oemed. Customer can through this tool to do upgrade.

This tool need to work with UID tool, the default UID is FFFFFFFFFFFFFFFF, if customer change them UID, then will need Feitian to using that UID do encryption firmware and send to customer to do upgrade.