



Advanced Card Systems Ltd.
Card & Reader Technologies



ACR1581U-C1 DualBoost III Smart Card Reader

User Manual V1.00



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1.0. Introduction

Continuing the success of the ACR1281U-C1 and ACR1281S-C1, ACR1581U DualBoost III is the third generation of ACS's DualBoost Reader. It is a dual interface reader that can access any contact and contactless smart cards following the ISO 7816, ISO 14443 and ISO 15693 standards. It has a SAM (Secure Access Module) slot which can be used together with a SAM card for key diversification and mutual authentication, providing high-level security in contact and contactless applications.

1.1. Dual Interface Reader

ACR1581U-C1 not only supports ISO 7816 contact smart card, CAC (Common Access Card), PIV (Personal Identity Verification Card) and microprocessor card but also various kind of contactless cards and tags, including ISO 14443 Type A & B, ISO 15693, MIFARE®, FeliCa, SRI/SRIX, CTS, Innovatron, Picopass, Topaz card and NFC tags. This makes it the ideal device for a broad range of solutions, such as hands-free verification for physical and logical access control, and inventory tracking. ACR1581U-C1 has USB 2.0 full speed for PC-linked operation. Additionally, it can read/write card at speed of up to 848 kbps for contactless smart card and NFC device access.



1.2. Compact Design

With a compact design and powered by USB port, ACR1581U-C1 is extremely portable and convenient for use anytime, anywhere.

1.3. Firmware Upgradeable Feature

To save valuable cost and time, the firmware of ACR1581U-C1 could conveniently be upgraded in-field to allow users to cope with the fast-changing technology for their applications in order to suit different scenarios.

1.4. Multi-Platform Support

ACR1581U-C1 is PC/SC and CCID compliant. With driver support on different platform, ACR1581U-C1 can be operate in Windows®, Linux®, macOS and Android™ operating systems.



2.0. Features

- Dual Interface Smart Card Reader (Contact and Contactless)
- USB 2.0 Full Speed Interface
- Plug and Play – CCID support brings utmost mobility¹
- USB Firmware Upgradeability²
- Contact Smart Card Reader:
 - Supports ISO 7816 Class A, B and C (5V, 3V and 1.8V)
 - CAC (Common Access Card)
 - PIV (Personal Identity Verification Card)
 - Microprocessor Card (T=0 or 1)
- Contactless Smart Card Reader:
 - Supports ISO 14443 Type A and B cards
 - Supports ISO 15693 cards
 - Supports MIFARE® (T=CL), FeliCa, NFC Tags
 - Supports SRI/SRIX, CTS, Innovatron, Picopass, Topaz Card
 - Built-in antenna for contactless tag access, with reading distance of up to 70 mm (depending on tag type)
 - Built-in anti-collision feature (only one tag is accessed at any time)
 - NFC Support:
 - Card reader/writer mode
 - Card emulation mode
 - Supports AES-128 encryption algorithm
- Application Programming Interface:
 - Supports PC/SC³
 - Supports CT-API (through wrapper on top of PC/SC)
- Supports Windows®, Linux®, macOS and Android™ operating systems.
- Built-in Peripherals:
 - Two user-controllable bi-color LEDs
 - User-controllable buzzer
- Compliant with the following certification and standards:
 - EN/IEC 62368
 - CE
 - UKCA
 - FCC
 - RoHS

¹ Applicable under PC-linked mode

² Same as above

³ Same as above



- REACH
- WEEE
- Microsoft® WHQL
- ISO 7816
- ISO 14443
- ISO 15693
- PC/SC
- CCID



3.0. Typical Applications

- e-Government
- e-Banking and e-Payment
- e-Healthcare
- Transportation
- Network Security
- Access Control
- e-Purse & Loyalty

4.0. Driver installation Procedure

The installation procedure is the same for Unified PC/SC Driver version 4.0.0.2 and above. The latest device drivers of the ACS Smart Card Readers may be downloaded from the ACS Driver Download Webpage:

<http://acs.com.hk/en/drivers/>

To install the ACS Driver:

1. In the **ACS Unified Driver** folder, run the file **Setup.exe**.
2. Select the language of your choice, and then click **OK**.

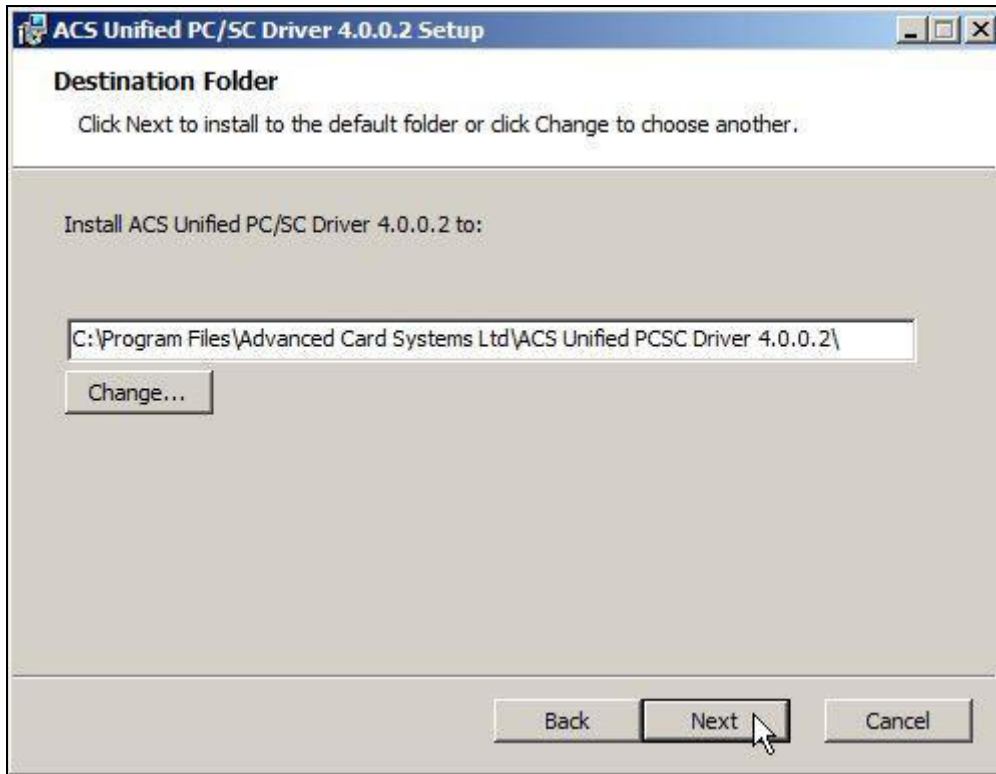


3. The Setup Wizard will be displayed. Click **Next** to proceed with the installation.

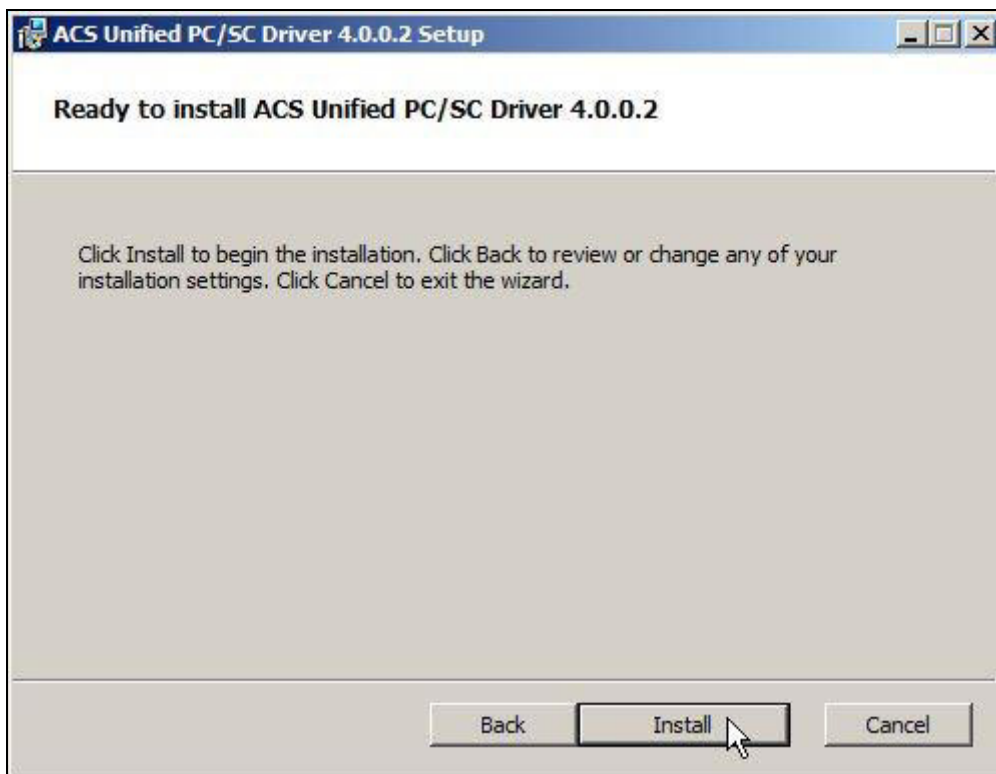




- Click **Next** to install the driver to the default folder located at **X:\Program Files\Advanced Card Systems Ltd\ACS Unified PCSC Driver 4.0.0.2**, with **X** as the drive letter of you local drive. Otherwise, click **Change** to choose another destination folder.

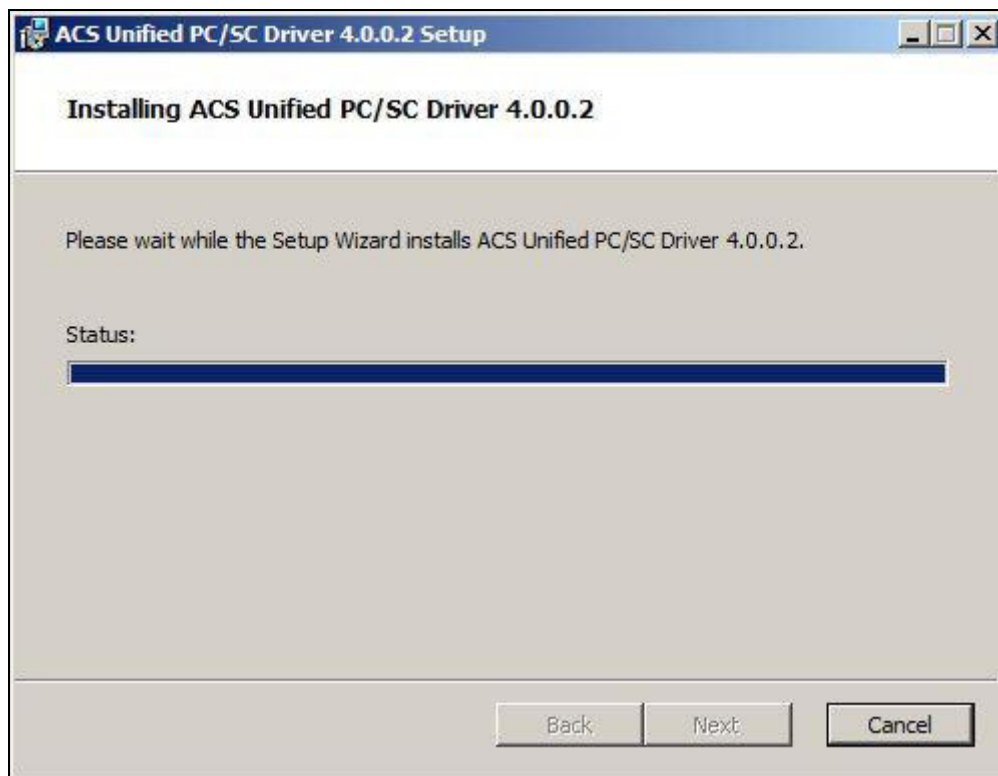


- Click **Install** to begin the installation.

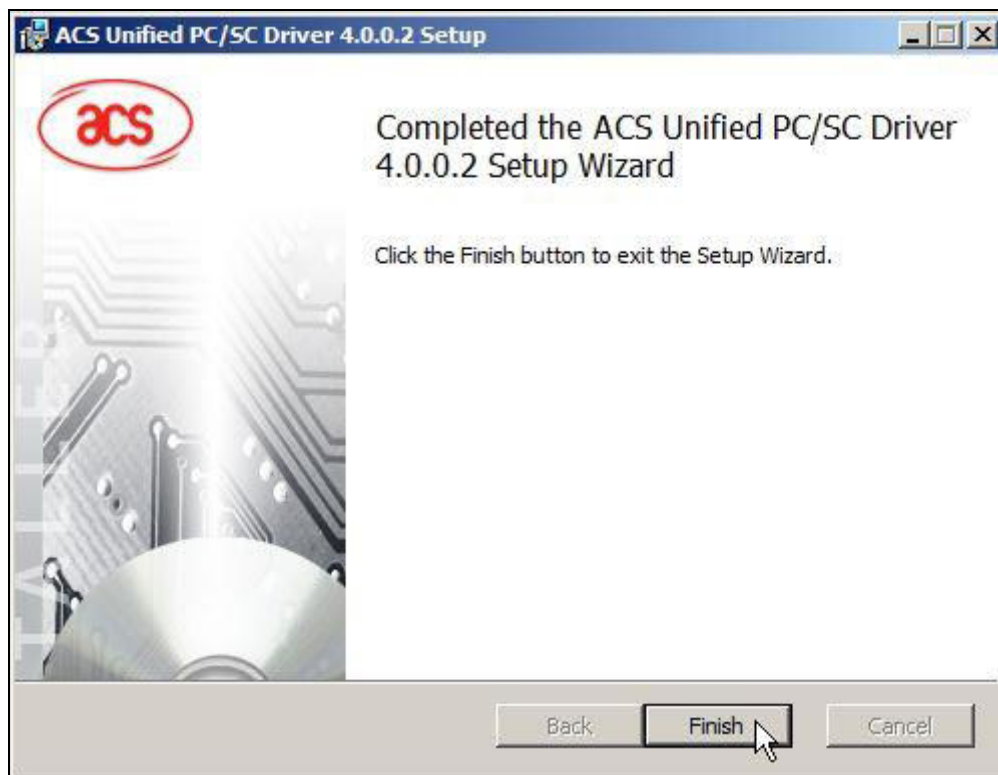




- Wait for the installation process to finish.



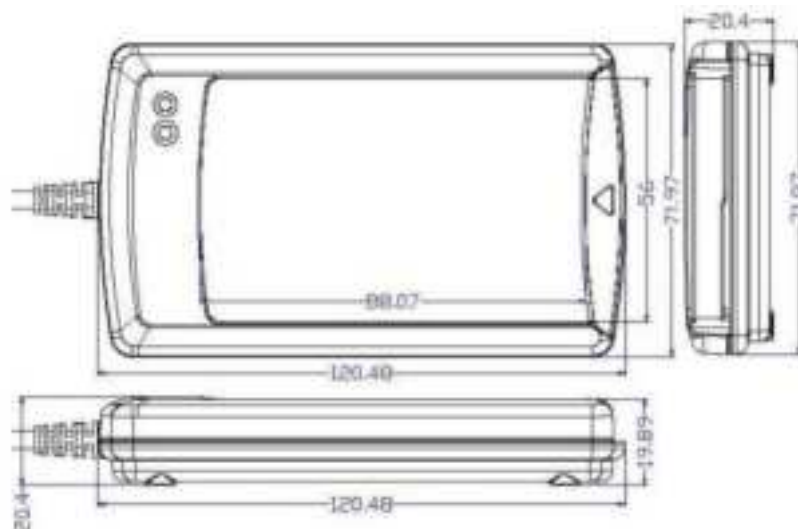
- Once the driver installation is finished, click **Finish** to exit the setup wizard.



5.0. Technical Specifications

| Contact Smart Card Interface | |
|----------------------------------|---|
| Number of Slot(s) | 1 Full-sized Card Slot |
| Supported Card Types | ISO 7816 Class A, B, C (5V, 3V, 1.8V), Microprocessor Card (T=0, T=1) |
| Supply Current | Max. 60 mA |
| Read/Write Speed | 13.4 – 1,250 kbps |
| Clock Frequency | 5 MHz |
| Card Connector | ICC Slot: Landing |
| Card Insertion Cycles | Min. 200,000 |
| Short Circuit Protection | Yes |
| Contactless Smart Card Interface | |
| Supported Card Types | ISO 14443 Type A & B Parts 1-4, ISO 15693, MIFARE®, FeliCa, NFC Tags, SRI/SRIX, CTS, Innovatron, Picopass, Topaz Card |
| Operating Frequency | 13.56 MHz |
| Reading Distance | Up to 70 mm (Depending on tag type) |
| Read/Write Speed | 106/212/424/848 kbps (ISO14443) 26 kbps (ISO15693) |
| Anti-Collision | Yes |
| SAM Card Interface | |
| Standard | 1 x ISO 7816 Class A (5V) Standard SIM size slot |
| Read/Write Speed | 13.4 kbps – 1,250 kbps |
| Clock Frequency | 5 MHz |
| Protocol | T=0, T=1 |
| Host Interface | |
| Protocol | USB CCID |
| Connector Type | USB Type-A |
| Speed | USB 2.0 Full Speed (12Mbps) |
| Supply Voltage | 5VDC |
| Current Consumption | Max. 350mA |
| USB Firmware Upgrade | Supported |

| Physical Characteristics | |
|------------------------------|---|
| Dimension (L x W x H) | Main Body: 120.5 x 72.0 x 20.4 mm Antenna size: 65 x 60 mm |
| Weight | 143 g |
| Available Colour | Matte White |
| USB Cable Length | 2 m (Non-detachable) |
| Peripherals | |
| Buzzer | 1 x Programmable Buzzer (Mono-tone) |
| LED | 2 x Programmable LED (Blue & Green) |
| Operating Condition | |
| Temperature | 0 - 60°C |
| Humidity | 90% (Non-condensing) |
| MTBF | 500,000 Hours |
| Certifications & Compliances | |
| Certifications | EN 62368, CE, UKCA, FCC, RoHS, REACH, WEEE, Microsoft® WHQL |
| Compliances | USB CCID, PC/SC |
| Libraries & Tools | |
| Libraries | CT-API |
| Tools | Software Development Kit |
| Drivers & Support | |
| Driver Supported OS | Windows®, Linux®, macOS, Android™ |
| Warranty | 1 Year |
| Model/Part Number | |
| USB Type-A | ACR1581U-C1 |



Unit: mm

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Windows® is a trademark of Microsoft Corporation in the United States and/or other countries.
Android™ is trademarks of Google LLC.
Linux® is the registered trademark of Linus Torvalds in the U.S. and other countries.

FCC Caution:

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

IMPORTANT NOTE:

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

—Reorient or relocate the receiving antenna.

—Increase the separation between the equipment and receiver.

—Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

—Consult the dealer or an experienced radio/TV technician for help.

FCC Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.