Advanced Card Systems Ltd.
Card & Reader Technologies

ACR3901T-W1
Secure Bluetooth®
Contact Card Reader

Technical Specifications V1.01

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1.0. Introduction

ACR3901T-W1 Secure Bluetooth® SIM-sized Contact Card Reader combines the latest technology in the world of smart card readers with Bluetooth® connectivity. This compact and wireless smart card reader brings together sophisticated technology with fresh design to meet different requirements in various smart card–based applications using Bluetooth-enabled devices such as smart phones and tablets.

1.1. Smart Card Reader

ACR3901T-W1 supports ISO 7816 Class A, B, and C SIM-sized smart cards (5 V, 3 V, and 1.8 V) in the market including microprocessor cards with T=0 and T=1 protocol. ACR3901T-W1 has both USB Full Speed and Bluetooth 4.0 interface for smart card with read/write speed of up to 600 Kbps.

1.2. Compact Design

With a compact design and a rechargeable Lithium-ion battery for power, ACR3901T-W1 is extremely portable and convenient for use anytime, anywhere with most Bluetooth-enabled devices in the market.

1.3. Firmware Upgradeable Feature

ACR3901T-W1 offers in-field firmware upgrade that lets the user cope with the fast changing technology used by different applications on various scenarios. With this feature, the stakeholders can save valuable cost and time, and provide utmost convenience to its users.

1.4. Secure Bluetooth Connectivity

Along with AES-128 encryption algorithm, ACR3901T-W1 uses Bluetooth technology that provides easy and secured integration without employing any physical connection to any terminal running Android™ 4.3 and later, iOS 5.0 and later, Windows®, and Mac OS®.

1.5. Ease of Integration

ACR3901T-W1 is PC/SC and CCID-compliant, making it easy to install and use with any computer-based environment. Its drivers are compatible with operating systems such as Windows®, Linux®, and Mac OS®.

With its numerous features, the ACR3901T-W1 is the perfect smart card reader for your smart card solution.

2.0. Features

- USB Full Speed Interface
- Bluetooth Interface
- Plug and Play – CCID support brings utmost mobility
- Smart Card Reader:
  - Contact Interface:
    - Supports ISO 7816 Class A, B, and C (5 V, 3 V, 1.8 V) SIM-sized cards
    - Supports microprocessor cards with T=0 or T=1 protocol
    - Supports memory cards
    - Supports PPS (Protocol and Parameters Selection)
    - Features Short Circuit Protection
    - Supports AES-128 encryption algorithm
- Application Programming Interface:
  - Supports PC/SC
  - Supports CT-API (through wrapper on top of PC/SC)
- Built-in Peripherals:
  - LEDs
  - Button
- USB Firmware Upgradeability[1]
- Supports Android™ 4.3 and later[2]
- Supports iOS 5.0 and later[3]
- Compliant with the following standards:
  - EN 60950/IEC 60950
  - ISO 7816
  - Bluetooth
  - PC/SC
  - CCID
  - CE
  - FCC
  - RoHS 2
  - REACH
  - Microsoft® WHQL

[1] *Applicable under PC-linked mode*
[2] *Uses an ACS-defined Android Library*
[3] *Uses an ACS-defined iOS Library*

3.0. Supported Card Types

3.1. MCU Cards

ACR3901T-W1 operates with MCU cards following either T=0 or T=1 protocol.

3.2. Memory-based Smart Cards

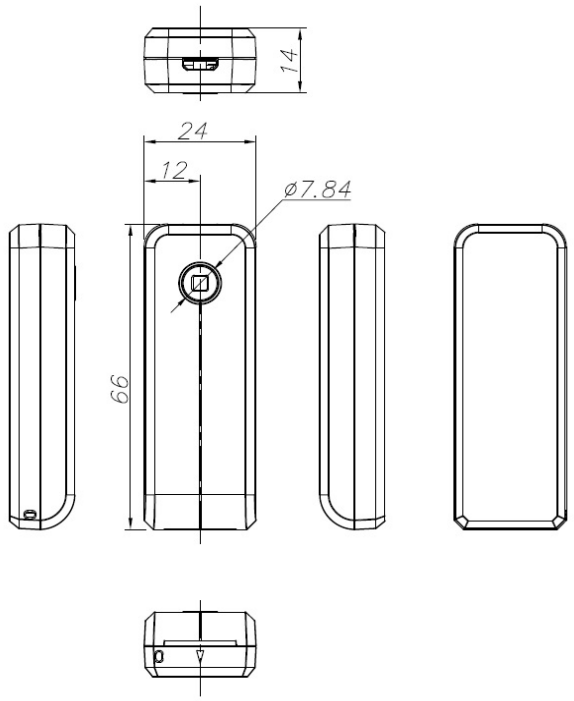
ACR3901T-W1 works with several memory-based smart cards such as:

- Cards following the I2C bus protocol (free memory cards) with maximum 128 bytes page with capability, including:
  - Atmel®: AT24C01/02/04/08/16/32/64/128/256/512/1024
  - SGS-Thomson: ST14C02C, ST14C04C
  - Gemplus: GFM1K, GFM2K, GFM4K, GFM8K
- Cards with secure memory IC with password and authentication, including:
  - Atmel®: AT88SC153 and AT88SC1608
- Cards with intelligent 1 KB EEPROM with write-protect function, including:
  - Infineon®: SLE4418, SLE4428, SLE5518 and SLE5528
- Cards with intelligent 256-byte EEPROM with write-protect function, including:
  - Infineon®: SLE4432, SLE4442, SLE5532 and SLE5542
- Cards with '104' type EEPROM non-reloadable token counter cards, including:
  - Infineon®: SLE4406, SLE4436, SLE5536 and SLE6636
- Cards with intelligent 416-bit EEPROM with internal PIN check, including:
  - Infineon®: SLE4404
- Cards with Security Logic with Application Zone(s), including:
  - Atmel®: AT88SC101, AT88SC102 and AT88SC1003

4.0. Typical Applications

- e-Government
- e-Healthcare
- e-Purse and Loyalty
- Mobile Banking and Payment
- Network Security
- Access Control
- Public Key Infrastructure

5.0. Technical Specifications



Physical Characteristics	
Dimensions	66 mm (L) × 24 mm (W) × 14 mm (H)
Weight	17 g
Color	White
Bluetooth Interface	
Protocol	Bluetooth (Bluetooth Low Energy/Bluetooth 4.0)
Power Source	Rechargeable Lithium-ion Battery (charging through USB)
Speed	1 Mbps
USB Host Interface	
Protocol	USB CCID
Connector Type	Micro-USB
Power Source	From USB port
Speed	USB Full Speed (12 Mbps)
Supply Voltage	5 V
Cable Length	20 cm, Detachable
Contact Smart Card Interface	
Number of Slot	1 SIM-sized Card Slot
Standard	ISO 7816 Parts 1-3, Class A, B, C (5 V, 3 V, 1.8 V)
Protocol	T=0; T=1; Memory Card Support
Supply Current	Max. 50 mA
Smart Card Read/Write Speed	9.6 Kbps – 600 Kbps
Short Circuit Protection	(+5) V/GND on all pins
Clock Frequency	4.80 MHz
Card Connector Type	ICC Slot 0: Contact
Card Insertion Cycles	Min. 10,000
Built-in Peripheral	
LED	1 bi-color: Green and Blue
	1 single-color: Red
Button	For Device ON/OFF; Transaction Approval (depending on software support)
Other Features	
Encryption	In-device AES-128 Encryption Algorithm
Firmware Upgrade	Supported (upgradeable through USB interface)
Application Programming Interface	
PC-linked Mode	PC/SC
	CT-API (through wrapper on top of PC/SC)

Operating Conditions

Temperature ..... 0 °C – 50 °C
Humidity ..... Max. 90% (non-condensing)

Certifications/Compliance

EN 60950/IEC 60950, ISO 7816, USB Full Speed, Bluetooth, PC/SC, CCID, CE, FCC, RoHS 2, REACH, Microsoft® WHQL

Device Driver Operating System Support

Windows® XP, Windows Vista®, Windows® 7, Windows® 8, Windows® 8.1, Windows® 10
Windows® Server 2003, Windows® Server 2008, Windows® Server 2008 R2, Windows® Server 2012, Windows® Server 2012 R2, Windows® Server 2016
Linux®, Mac OS®, Android™[4], iOS[5]

[4] *4.3 and later Android versions is required for Bluetooth 4.0*
[5] *5.0 and later iOS versions is required*

Appendix A. LED Status

ACR3901T-W1 has three LEDs to show the various operation status:

- **Red LED -** Battery status
- **Blue LED -** Card and reader status under Bluetooth mode
- **Green LED -** Card and reader status under USB mode

Color	LED Activity	Status
Red	On	Battery is charging (will OFF after battery is fully charged)
	Slow flash (1 second/flash)	Battery needs to be charged
Blue	Fast–Slow flash (Fast: 250 ms/flash; Slow: 500 ms/flash)	Ready for Bluetooth device connection
	Slow flash (2 seconds/flash)	Bluetooth device connected
	Fast blink	Data transferring between ACR3901T-W1 and Bluetooth device
	On	Card is connected and powered on
Green	Slow flash (2 seconds/flash)	No card operation and ACR3901T-W1 is waiting for PC instruction
	Fast blink	Data transferring between ACR3901T-W1 and PC
	On	Card is connected and powered on

Table 1: LED Status

Note: *When red, blue and green LEDs are both OFF, the ACR3901T-W1 is powered off.*