



Advanced Card Systems Ltd.
Card & Reader Technologies

ACR88



Technical Specifications



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1.0. Introduction



With the increasingly wide acceptance of smart card in the market in the recent years, smart card applications have gained maturity in terms of its level of sophistication and coverage in the market. With this, a versatile smart card reader becomes an emergent need.

ACR88 is a versatile handheld portable smart card reader, with built-in keypad, LCD, bi-color LED and buzzer features. It can also host the feature of non-volatile memory to give better support to your system. In addition, its onboard memory enables future firmware and application enhancements that guarantee against obsolescence.

ACR88 is a line of secured electronic devices of pocket size designed primarily for multi-application (e.g.: loyalty, healthcare). It is capable of performing secure authentication, displaying rich information from the card, and conducting both online or offline transaction.

1.1. User programmability

ACR88 is user-programmable through the ACR88 ScriptBuilder. Users can now quickly build their own standalone applications according to easy-to-use and well-defined script commands provided by ACS. These eliminate both the need to program the device in lower level languages, and the need to deal with development and other hardware platform dependent issues! With ACR88, you can have full rein on realizing the limitless possibilities that your application would bring.



2.0. Features

- Dual operation modes:
 - PC-linked: powered through USB
 - Standalone: powered through 3x AAA batteries
- Accepts 3 V and 5V cards: two full-size cards and 3 SAM cards
- Supports PPS (Protocol and Parameters Selection) up to 115,200 bps in reading and writing smart cards
- Ergonomic and highly durable keypad
- Easy-to-read, graphical LCD with backlight
- Monotone buzzer with software controlled ON/OFF
- 3 bi-color LEDs
- Real-time clock (RTC) with independent backup battery
- Field upgradeable for firmware (requires a firmware upgrade cable)
- User Programmable for standalone mode by using easy-to-use script commands
- Supports Secure PIN Entry (SPE)
- Tamper detection switch that acts as an indicator if there are any unauthorized intrusions
- Hand-held size and weight
- (Optional) Additional non-volatile memory for multilingual font storage
- CCID compatible
- EMV 2000 v4.0 Level 1
- CE and FCC
- RoHS Compliant
- ISO 7816
- PC/SC
- Microsoft ® WHQL



3.0. Supported Card Types

3.1. MCU Cards

The ACR88 operates with an MCU card following either the T=0 and T=1 protocol.

3.2. Memory-based Smart Cards (Synchronous Interface)

The ACR88 supports the following memory cards:

- Cards following the I2C bus protocol (free memory cards) such as:
 - Atmel: AT24C01 / 02 / 04 / 08 / 16
- SLE4432/4442/5542 intelligent 256 bytes EEPROM with write protect function:
 - SLE4432, SLE5542
- SLE4418/4428/5528 intelligent 1K bytes EEPROM with write-protect function:
 - SLE4418, SLE5528



4.0. Typical Applications

- Customer Loyalty
- E-Purse/ E-Commerce
- One-time password generator
- Secure Home-banking
- Computer System Logon
- Healthcare application – medical identification
- E-government applications
- Time and attendance applications
- Computer /Network access control
- Digital Signature & Identification
- Online Gaming

5.0. Technical Specifications



Power

Operating voltage.....	3.3V
Operation mode	PC-Linked and Standalone
PC-Linked mode	automatically switch to USB bus power, always ON
Standalone mode.....	automatically switch to 3 x AAA-size battery power, soft ON/OFF switch
Power consumption	Less than 100mA (excluding card power) in standalone mode
Backup battery	Independent backup battery (1 x CR2032) for RTC

Smart Card Interface

Standard	ISO-7816 Class A, B (5V, 3V), T=0 and T=1
Supply current.....	max. 60mA
Smart card read / write speed.....	9,600-115,200 bps (primary/secondary slot)
CLK frequency	3.58 MHz
Card connector type.....	Landing/ Contact ((primary/secondary slot)
Card insertion cycles.....	min. 300,000 / min 100,000 (primary/secondary slot)
Short circuit protection	+5V / GND on all pins

SAM Card Interface

Card connector type.....	Contact
Smart card read / write speed.....	9,600 bps
Location	Under the removable grey lid, please refer to the photo on the last page

Universal Serial Bus Interface

USB Cable	USB 1.1 Full Speed, 12 Mbps, detachable
Power Source	from USB



Firmware Upgrade Interface

Firmware Upgrade Cable6-pin serial cable, 115,200 bps, detachable
Power Sourcefrom USB

Human Interfaces

Keypad20 keys (4 Function keys, 4 Direction keys, 10 Number keys, 1 Clear key, 1 Enter key)
LCD128 x 64 dot-matrix LCD with backlight
BuzzerMonotone buzzer with software controlled ON/OFF
Dual color LED power indicators.....(LED 1) GREEN indicates device power on; RED indicates low battery
(LED 2) GREEN indicates primary card slot power on; ORANGE indicates primary card slot I/O activity
(LED 3) GREEN indicates secondary card slot power on; ORANGE indicates secondary card slot I/O activity
Tamper switch.....Built inside the case which protect fraudulent intrusion

Device and User Programmable Memory

Firmware version A175 (default)
FLASH64KB (for firmware storage, not user programmable)
EEPROM for data storage60KB
EEPROM for script binary storage4KB
RAM300B

Firmware version A177 (on request)
FLASH64KB (for firmware storage, not user programmable)
EEPROM for data storage56KB
EEPROM for script binary storage8KB
RAM300B

Physical Specifications

DimensionsDevice: 175mm (L) x 76mm (W) x 31mm (H)
CablesUSB cable length: 1.5m; Serial firmware upgrade cable : 1.5m
Case ColorSilver and Grey
Weight.....Device: 190g; USB cable: 60g; Serial firmware upgrade cable : 45g

Operating Conditions

Temperature0°C to 50°C
Humidity40% to 80%, non-condensing

Other Features

Reset ButtonObscure small hole just above SAM door for hardware reset
Privacy Cover (Optional)Removable privacy cover for keypad
Real Time Clock

Certifications/Compliance

EMV Level 1, CE, FCC, RoHS Compliant, PC/SC
Microsoft © WHQL 2000, XP, Vista, 7

Device Driver Operating System Support

Windows © 2000, Server 2003, XP, Vista, Server 2008, Server 2008 R2, 7
Linux, MAC





6.0. Software Development Kit Specifications

The ACR88 Software Development Kit (ACR88 SDK) enables effective development of customized applications and systems by using smart cards, card readers, and PCs. It can serve as an ideal training and development tool for those who are interested in knowing smart card technologies.



Smart Card Reader	ACR88 Handheld Portable Smart Card Reader
Test Cards	5 ACOS3 Microprocessor-based Smart Cards
	5 ACOS6 SIM-sized Microprocessor-based SAM Smart Cards
Accessories	1 Serial firmware upgrade cable (For firmware upgrade only)
	1 Detachable USB cable
	1 Leather case for ACR88
SDK CD-ROM	<p>Sample Applications - These demo programs showcases the wide range of applications where ACR88, e.g. e-purse, healthcare card</p> <ul style="list-style-type: none"> • Functional Demo • Multi-Application Demo • Taxi Stand-alone Demo • Traffic Violation Stand-alone Demo
	<p>Sample Codes</p> <ul style="list-style-type: none"> • Borland Delphi 7 • MS Visual Basic 6.0 • MS Visual Basic .NET • MS Visual C# • MS Visual C++ 6.0
	<p>Tools & Utilities</p> <ul style="list-style-type: none"> • Card Tool • PC/SC Learning Tool • Quick View • ACR88 ScriptBuilder • Smartflash
	<p>User Manuals and Reference Materials</p> <ul style="list-style-type: none"> • ACR88 SDK User Manual • ACR88 Reference Manual • ACR88 API Reference Manual • ACR88 CCID Memory Card Access • ACR88 Scripting Language Manual • ACR88 Technical Specification • ACOS3 Reference Manual • ACOS6 SAM Reference Manual
SDK OS Support	Windows © 98, ME, 2000, XP



ACR88U



ACR88U



ACR88U back side showing the 3 AAA battery slots



ACR88U showing the 3 SAM slots



Side shot of ACR88,
showing the USB connector and 2 full-size card slots



ACR88U and its optional privacy cover