



Advanced Card Systems Ltd.
Card & Reader Technologies

ACR880 GPRS Portable Smart Card Terminal



Technical Specifications



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1.0. Introduction



The ACR880 GPRS Portable Smart Card Terminal is a secure and portable smart card terminal that secures and streamlines various transactions using smart card technology. This innovative device is capable of facilitating secure mutual authentication between a card and a reader, detailed multi-layered information from the cards based on embedded access rights, and transactions through both private and public network infrastructures. It can offer solutions to different applications including e-healthcare, e-government and e-administration.

ACR880 may function with or without its cradle, thus giving users the option to use it either as a powerful desktop device with other peripherals like magstripe readers and thermal printers, or as a standalone and handheld reader that may be used in field works. It has Secure PIN Entry (SPE) to protect every PIN code entered into the device from security attacks while it is on desktop mode. It also has GPRS connectivity to allow data transmission even with the reader on standalone mode.

Other features of ACR880 include a dual smart card interface, contactless card reader module, USB and RS232 connectivity, integrated TCP/IP networking support, multiple SAM slots, a 128x64 high resolution graphical LCD, a user-friendly 20-button keypad, multiple bi-colored status LEDs, a highly-audible speaker and a real-time onboard clock. It allows addition of features like high speed WiFi access and biometric fingerprint sensor, and enables firmware upgrades to be able to adapt to the changes of future security systems.



2.0. Features

- 32-Bit ARM 9 Processor running on Embedded Linux
- 32MB Flash and 32MB SDRAM Memory
- Dual Operation Modes (PC-Linked/Standalone)
- Long Battery Life for All Day Use
- Charging via Docking Cradle
- Dual Interface Reader (Contact and Contactless)
- USB Host & Client Full Speed/Serial/Ethernet Interface
- GPRS/GSM quad band (850, 900, 1800, 1900 MHz)
- 2 Full-Sized Contact Card Slots (Landing Connector)
- 2 SAM-Sized Card Slots (Contact Connector)
- Firmware Upgradability
- Hand-held Size and Weight
- Easy-to-Read, High Resolution Backlit LCD
- Highly Durable Chemical Resistant 20-Button Keypad
- 4 LED Status Indicators
- Built-in Speaker
- Tamper Detection Switch to Protect Against Unauthorized Intrusion
- Real-Time Clock (RTC) with Independent Backup Battery
- Secure PIN Entry (SPE) Support
- PPS (Protocol And Parameters Selection) Support with 9,600—230,400 Bps In Reading and Writing Smart Cards
- (Optional) Built-in Fingerprint Sensor
- (On Request) WiFi
- (On Request) Colored LCD
- (On Request) Internal Microphone
- (On Request) Cigarette Lighter Adapter
- ISO 7816 Card Support
- ISO 14443 Card Support
- PC/SC Compliance
- CE Compliance
- FCC Compliance
- EMV 2000 v4.0 Level 1 Certification
- RoHS Compliance



3.0. Supported Card Types

3.1. MCU Cards

ACR880 operates with MCU cards that follow:

- T=0 or T=1 protocol
- ISO 7816-Compliant Class A, B, C (5V, 3V, 1.8V)

3.2. Memory-based Smart Cards (Synchronous Interface)

ACR880 supports the following memory cards:

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

3.3. Contactless Cards

ACR880 supports the following memory cards:

1. ISO 14443-Compliant, Type A & B Standard, parts 1 to 4, T=CL protocol
2. MiFare[®] Classic



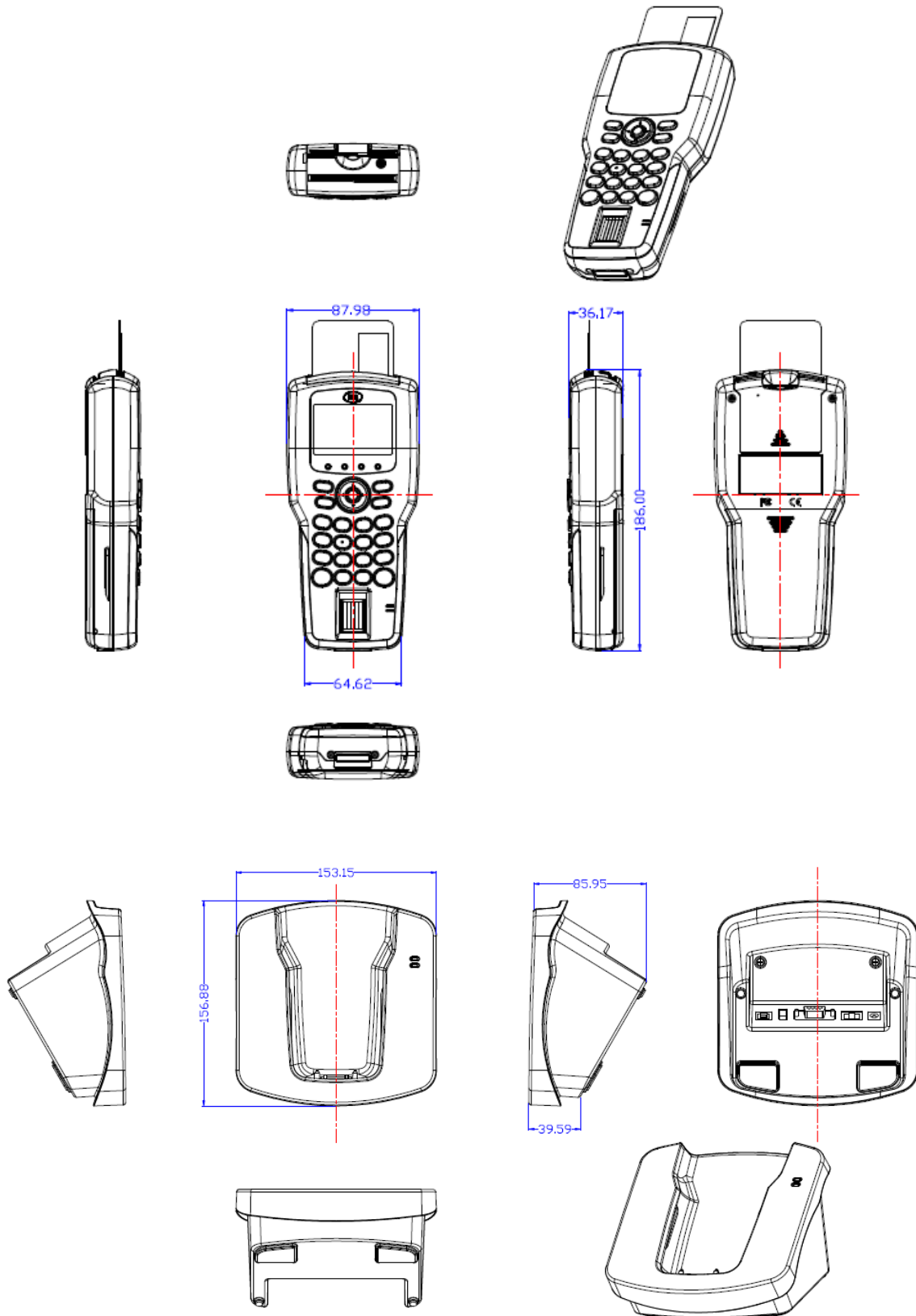
4.0. Typical Applications

- e-Healthcare
 - Medical Identification
 - Digital Signatures
 - Digital Prescriptions
 - Patient Date and History
 - Billing Transactions
- e-Government
- e-Banking and e-Payment
- Transportation
- Loyalty Program
- Time and Attendance Checking





5.0. Technical Specifications





Processor

32-Bit Arm 9 Processor

Operating System

Embedded Linux 2.6

Memory

Memory 32MB flash + 32MB SDRAM

Power

Supply Voltage 12V DC
 Supply Current..... Max. 1A
 Power Source..... External Power Adapter
 Rechargeable and replaceable Lithium Ion Battery Pack (Standby Time: 14 hours,
 Operation Time: 5-7 hours depending on the type of usage)
 Back-up Battery Independent Back-up Battery (1 x CR2032) for Internal Real Time Clock and 240-byte
 Tamper-Protected Storage
 Charging..... Via Cradle

Note: Operation time estimation is based in 6 transactions per minute. Actual results may vary.

Connectivity

USB USB 1.1 Full Speed, 12 Mbps
 RS232 3 lines Rx/D, Tx/D and GND
 Ethernet..... 10/100 Mb Auto-negotiate
 GPRS/GSM Quad Band (850, 900, 1800, 1900 MHz)
 Ethernet..... Through external rear mounted WiFi module

Smart Card Interface

Contact – Standard

Smart Card Slots 2 ID-1 Slots
 Card Connector Type Landing
 Standard..... ISO-7816 Class A, B, C (5V, 3V, 1.8V), T=0 and T=1,
 Supply Current..... Max. 50mA
 Smart Card Read / Write Speed 9,600-230,400 bps
 Card Insertion Cycles 200,000 (minimum)
 Short Circuit Protection +5V / GND on all pins

Contact - SAM

SAM Card Slots Two ID-000 slots
 Card Connector Type Contact
 Smart Card Read /Write Speed 9,600-250,000 bps

Contactless

Standard..... ISO-14443 A & B part 1-4
 Protocol Mifare® Classic Protocols, T=CL
 Smart Card Read /Write Speed 106, 212, 424, 848 kbps
 Operating Distance Up to 60 mm at 106kbps
 Operating Frequency 13.56 MHz

Fingerprint Scanner Interface (Optional)

Active Sensor Size 12.8 x 18 mm
 Array Size 256 x 360 pixels
 Array Pitch 50 microns
 Image Resolution 508 DPI

Firmware Upgrade Interface

Firmware Upgradeable

Human Interfaces

Keypad 20 keys (4 Function keys, 4 Direction keys, 10 Number keys, 1 Clear key, 1 Enter key)
 LCD Display 128 x 64 dot matrix black and white graphic LCD with backlighting
 Window size: 49mm x 29mm; Active area size: 46mm x 28mm
 Number of characters on LCD: User-definable (Max: 21 characters x 8 rows)
 Audio Speaker 20 – 20 kHz audio
 LED Status Indicators 4 LEDs for indicating status (LED1 &2: Red/Green; LED 3: Red; LED4: Green)
 Tamper Switch..... Internal anti-intrusion detection and protection

Physical Specifications

Dimensions..... Device: 88mm (L) x 186mm (W) x 36mm (H) (subject to change)



..... Cradle: 153mm (L) x 157mm (W) x 88mm (H) (subject to change)
Case Color Dark Blue
Weight Device: 348g (with battery); Cradle: 613g (subject to change)

Operating Conditions

Temperature 0°C to 50°C
Humidity 40% to 80%, non-condensing

Certifications/Compliance

EMV2000 v4.0 Level 1, CE, FCC, RoHS, ISO-7816, ISO-14443, PC/SC



Other Features

Real Time Clock

API

PC/SC, CT-API, OCF, ACS API for peripheral monitoring and control



6.0. Software Development Kit Specifications

The ACR880 SDK is a complete package containing all the vital components required for smart card application development. It provides developers with a convenient and effective way to incorporate smart cards into their solutions.



Smart Card Reader	ACR880 GPRS Portable Smart Card Terminal (Device and Cradle)
Smart Cards	5 ACOS3 Microprocessor-based Smart Cards
	5 ACOS6 SAM-sized Microprocessor-based Smart Cards
	5 MiFare 1K Contactless Cards
	5 SLE 5528 Memory-based Smart Cards
	5 SLE 5542 Memory-based Smart Cards
	2 Initialized SLE 5542 Memory-based Smart Cards
Accessories	1 Power Adapter
	Rechargeable and replaceable Lithium Ion Battery
	1 RS232 Serial Cable
	1 USB Cable
	1 RJ-45 Ethernet Cable
SDK CD-ROM	Sample Demo Application <ul style="list-style-type: none"> • Taxation Demo Application
	Sample Codes <ul style="list-style-type: none"> • ACOS 3 • ACOS 6 SAM • MiFare Programming • Memory Card
	Tools & Utilities <ul style="list-style-type: none"> • ACR880 Secure Smart Card Terminal Tool • GCC Compiler • API Source Code
	User Manuals and Reference Materials <ul style="list-style-type: none"> • ACR880 API Manual • ACR880 Application Note • ACR880 SDK User Manual • ACR880 SDE Setup Manual • ACR880 Manual Firmware Update Instructions • ACR880 Technical Specification • ACOS 3 Reference Manual • ACOS 6 SAM Reference Manual