Advanced Card Systems Ltd.
Card & Reader Technologies

ACR880 GPRS Portable Smart Card Terminal

Technical Specifications

Table of Contents

1.0. Introduction

The new ACR880 is a secure and feature-rich handheld portable smart card terminal that leverages on the characteristics and mechanisms of smart card technology. This innovative device is capable of facilitating secure mutual authentication, detailed multi-layered information from the cards based on the embedded access rights, and transactions through both private and public network infrastructures. It can offer solution to different applications such as: Healthcare, e-Government, and e-Administration.

The industry defining ACR880 specifications include a dual smart card interface, contactless card reader module, GPRS/GSM quad band, USB and RS232 connectivity, integrated TCP/IP networking support, multiple SAM slots, a 128x64 high resolution 2. 3 inch black and white graphical LCD, a durable user friendly 20-button keypad, multiple bi-colored status LEDs, a highly effective audible speaker, and a real-time onboard clock.

It supports Secure PIN Entry (SPE) so that every PIN code is entered securely on the PIN pad of the device. This successfully eliminates the possibility of a Virus/Trojan or USB Sniffer getting hold of the PIN, since PIN codes are never exposed to the vulnerable PC or workstation.

This highly efficient tool can also host additional features like high speed WiFi access and optional biometric fingerprint sensor simultaneously. Most importantly, the eH880 firmware can easily be updated through different options. The eH880 terminal therefore, provides unmatched usability and compatibility within any future systems.

2.0. Features

- 32-Bit ARM 9 Processor running 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-Size Contact Card Slots (Landing Connector)
- 2 SAM-Size Card Slots (Contact Connector)
- Firmware Upgradeable
- 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
- Supports Secure PIN Entry (SPE)
- Supports PPS (Protocol And Parameters Selection) with 9,600—230,400 Bps In Reading and Writing Smart Cards
- (Optional) Built-in Fingerprint Sensor
- (On Request) Wifi
- (On Request) Color LCD
- (On Request) Internal Microphone
- (On Request) Cigarette Lighter Adapter
- ISO 7816
- ISO 14443
- PC/SC
- USB Full Speed
- CE
- FCC
- EMV 2000 v4.0 Level 1
- RoHS

3.0. Supported Card Types

3.1. MCU Cards

The eH880 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)

The eH880 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

The eH880 supports the following memory cards:

1. ISO 14443 Compliant, Type A & B Standard, parts 1 to 4, T=CL protocol
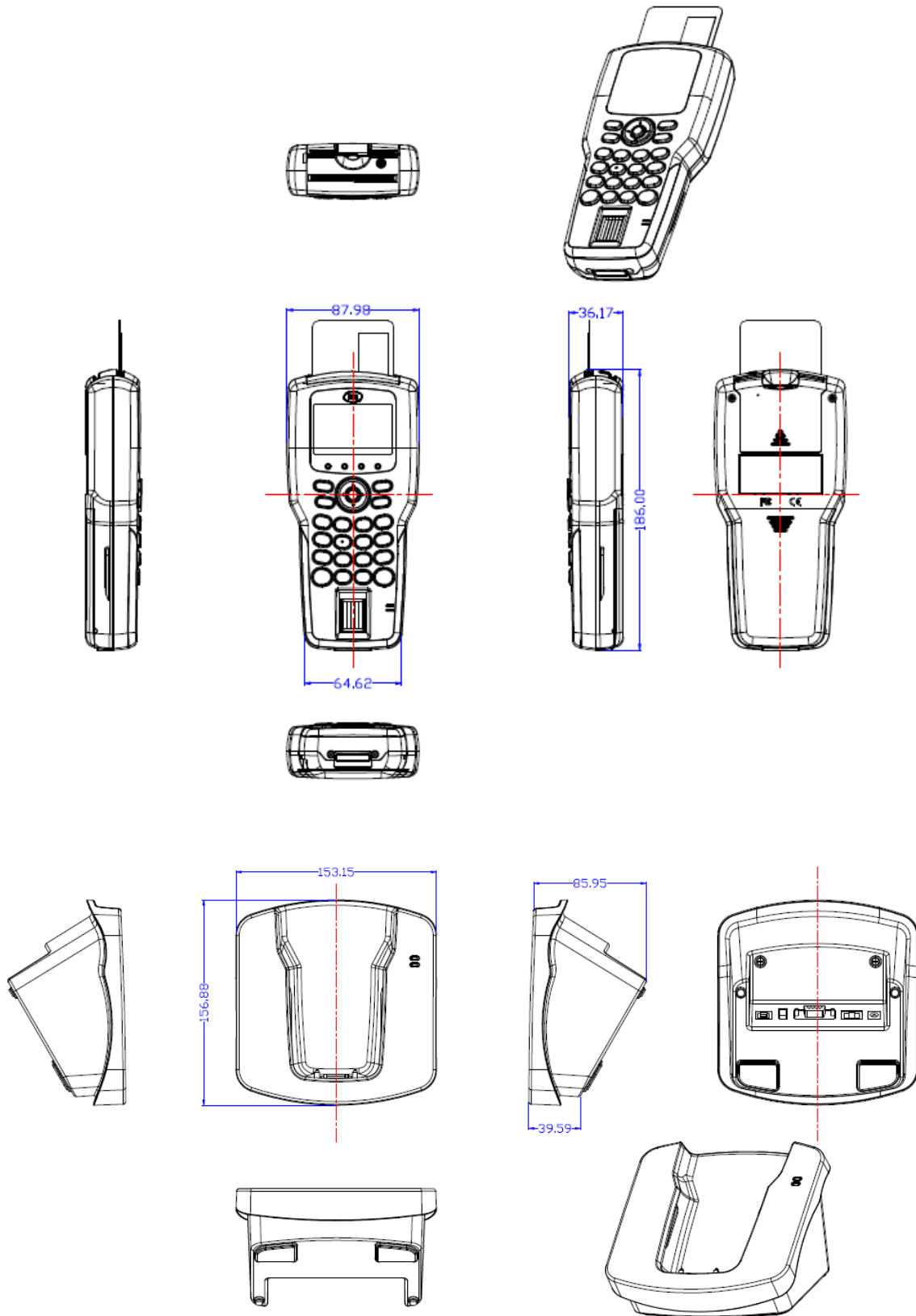2. Mifare® Classics

4.0. Typical Applications

- Electronic Healthcare
    - Medical Identification
    - Digital Signatures
    - Digital Prescriptions
    - Patient Date and History
    - Billing Transactions
- Electronic Government
- Secure Electronic Payment
- Customer Loyalty
- Secure Home-banking
- Time and Attendance

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)
Backup battery ....Independent backup 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 RxD, TxD 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$^{®}$ Classics protocols, T=CL
Smart card read / write speed...............106, 212, 424, 848 kbps
Operating distance................................up to 40 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

Certifcations/Compliances
EMV2000 v4.0 Level 1, CE, FCC, RoHS Compliant, 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 Card Terminal (Device and Cradle)
Smart Cards	5 ACOS3 Microprocessor-based Smart Cards
	5 ACOS6 SIM-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 Codes • ACOS 3 • ACOS 6 SAM • Mifare Programming • Memory Card
	Tools & Utilities • eH880 Secure SmartCard Terminal Tool • GCC Compiler • API Source Code
	User Manuals and Reference Materials • 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