Advanced Card Systems Ltd.
Card & Reader Technologies

ACR320 Ticket Validator

For Automatic Fare Collection

User Manual

Version 0.10.01

Document Name:
03-USR-ACR320

info@acs.com.hk
www.acs.com.hk

Version History

Date	By	Changes	Version
2011-11-30	Jack Tse	Initiator	0.10.00
2012-05-10	Jack Tse	Update the technical spec	0.10.01

Table of Contents

1.0. Introduction

ACR320 – Intelligent Bus Validator is designed specifically for the use in Automatic Fare Collection (AFC) systems for public transport, e.g. for buses, ferries, trams, railway and other transportation means.

ACR320 supports all smart cards/tags compliant to ISO14443 Type A & B, Mifare, and Near Field Communication (NFC) standard. By virtue of the embedded powerful 32bit ARM 11 processor, ACR320 enables a high speed transaction processing and transaction records collection. ACR320 supports varies advance connection modes for data transfer, including Wi-Fi, HSPA/WCDMA, Quad-band GSM/GPRS, HSPA and USB thumb drive data collection. It also equips with GPS enabling you to locate the vehicle, fleet management and set fare flexibly with reference to distance.

There are four SAM card slots for holding Purchase SAM cards to ensure the security and integrity of the transactions. Furthermore, the reader module has the feasibility to be detachable such that customers could replace their own one with unique secret encryption algorithm.

With its compact, light and trendy design, ACR320 allows users to operate it by mounting on the pole or as a handheld ticket validator powered by rechargeable lithium-ion battery.

ACR320 is furthermore integrated with a 640 x 480 high resolution VGA 5.7” LCD, speaker, 4 LED indicators with different colors, 4 backlit buttons. Adding to a strict shocking, vibration, water and dust Ingress protection and reliability testing, ACR320 is the best choice of your AFC projects application.

Touch Screen could be an option to further enhance the features of ACR320 that enables it suitable to be a Driver console and POS terminal.

2.0. Specifications

- 32-Bit ARM11 Processor running embedded Linux
- Flash 512 MB and RAM 256 MB
- 5.7 inches TFT-LCD Color Screen (Optional : Touch Screen)
- 4 LED for transaction Indicators (1 Blue, 1 Yellow, 1 Green and 1 Red)
- 4 Buttons with Backlight
- Speaker with loud around 70dB in 1-meter distance
- Tamper Detection Switch to Protect Against Unauthorized Intrusion
- Supports Micro-SD memory card expansion slot
- Vehicle-mounted power (10V to 36V)
- With Rechargeable Lithium-ion Battery
- Operating temperature -20 to 60 degree C
- Humidity 15% to 95% non-condensing

- Communications
  - Quad-band GSM/GPRS: 850/900/1800/1900 MHz
  - WCDMA (3G)
  - Wifi: IEEE 802.11 b/g
  - Built-in 10/100-base-T Ethernet
  - USB Host and Client
  - Serial – RS232/RS485

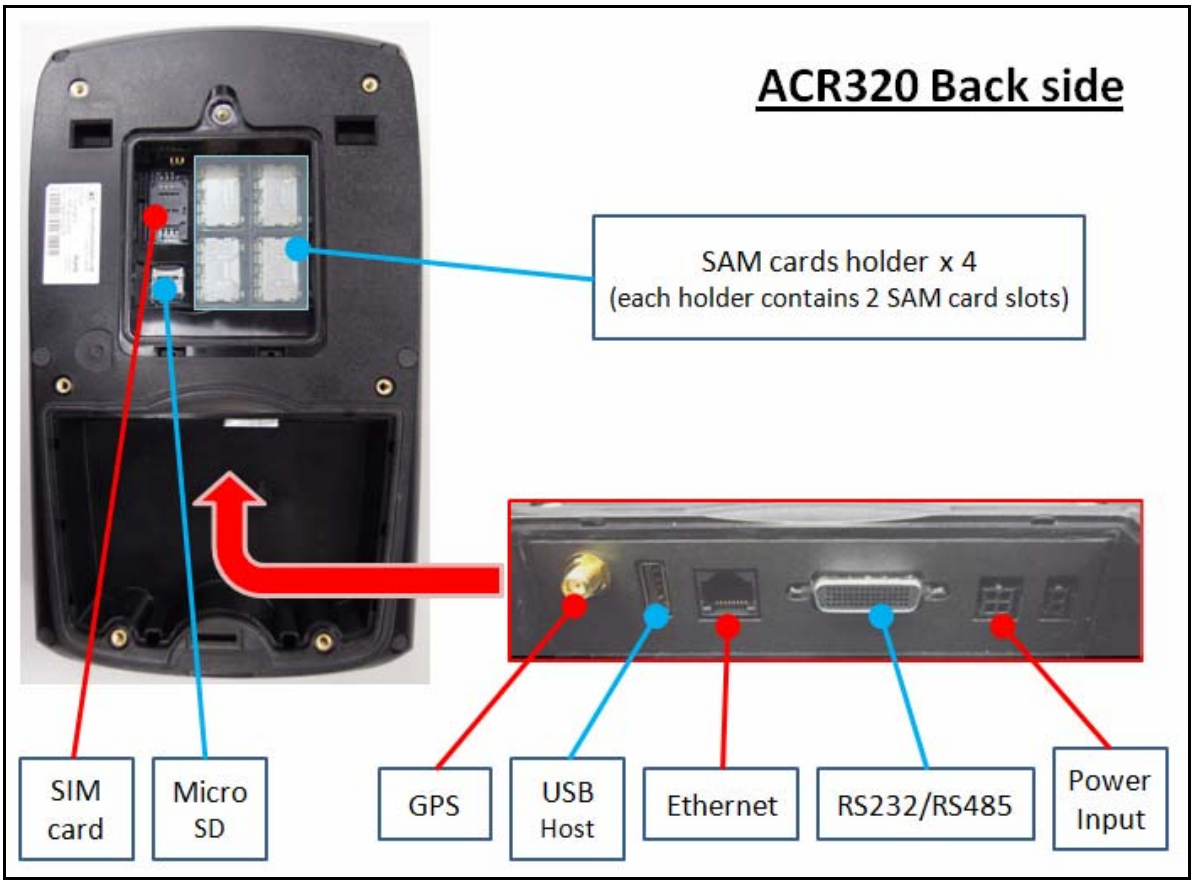
- Supported Card Types
  - Contactless cards
    - ISO 14443 Compliant Type A & B standard
    - Mifare classics, Ultralight, Ultralight C, Mifare Plus, Mifare Desfire
  - 8 SAM cards and 1 SIM card
    - Support T=0,1 and ISO 7816 Parts 1-3

- Certification / Compliance
  - CE
  - FCC
  - Shock: Procedure I of MIL-STD 810D
  - Vibration: MIL-STD 810D, Method 514.3, Category 8
  - RoHS

3.0. Illustration

3.1. ACR320 device and parts

The main components on the front side of the ACR320 are shown below:



3.2. Battery

A rechargeable Li-ion battery (3.7V, 1800mAh) supplies energy to the device once the external power source cannot supply power to the device. So, transactions can still be processed even the power supply of the bus is out of order. The battery locates at back of the device. In order to change the battery, turn the screw in the circle in the figure below to left to remove the battery cover. Follow the direction of the red arrow to take away the cover.

Then, unplug the battery and a new battery can be replaced in the carrier.

The battery is recharged once the external power source resumes supplying power to the device.

3.3. SAM card slots

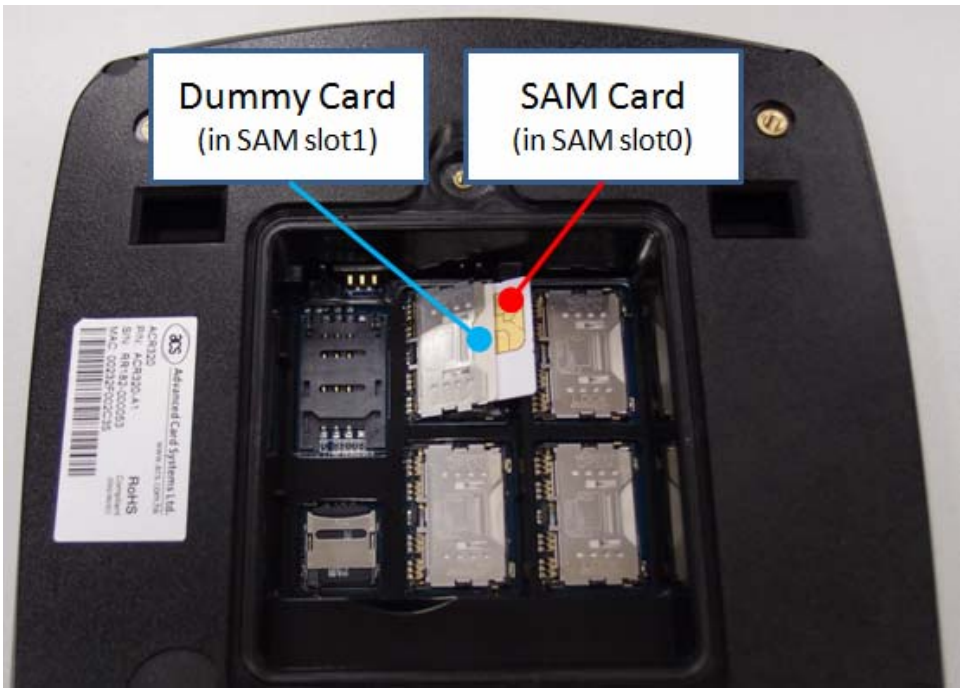
There are 4 SAM card holders on ACR320. Each holder can contain at most 2 SAM cards, so ACR320 has 8 SAM card slots in total. They are located behind the battery. In order to insert or change SAM cards, please follow some simple steps below.

1. Follow the instruction in chapter 3.2 to remove the battery cover
2. Remove the Li-ion battery and the SAM card slots will be seen

Slot no of the SAM readers

SIM2 : Slot 0 SIM1 : Slot 1	SIM2 : Slot 4 SIM1 : Slot 5
SIM2 : Slot 2 SIM1 : Slot 3	SIM2 : Slot 6 SIM1 : Slot 7

SIM2 is the upper slot while SIM1 is the lower slot. For each card holder, if only 1 slot would be inserted with a SAM card, please remember to insert a dummy card to another slot of the holder. If no SAM cards are inserted on a card holder (both 2 SAM slots on the card holder), insert a dummy card on one of the card slot of the holder is all right.



3.4. Smartcard reader

The Ticket Validator is built-in with a 13.56MHz smartcard reader. The demo application software running at startup read cards continuously. When we present a card in front of the antenna, the demo application software will show a corresponding message.

3.5. USB Host

The USB host port is compliant with USB 1.1 full speed. USB devices (e.g. mouse, keyboard, USB hub, etc) can be connected to the Ticket validator via this port. For standard HID device (e.g. mouse) or mass storage device (e.g. USB drive), no driver is needed.

3.6. USB Client

The USB client port is compliant with USB 2.0 high speed.

3.7. Ethernet

An Ethernet port is provided for connecting to network via RJ45 cable. By default, it uses dynamic IP address. So, when you connect the mobile validator to a network with DHCP server, it should be able to get the IP address automatically.

Cable can be plugged to the mobile validator before or after booting up.

3.8. 3G / GPRS

Before using the 3G/GPRS feature, a SIM card should be installed in the SIM slot before powering up the device. The application will use the API to gain access to the 3G/GPRS.

3.9. RS232/485

The RS232/485 signals can be accessed via the 60 pin connector.

4.0. FCC Caution

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.

(2) This device must accept any interference received, including interference that may cause undesired operation.

Note: This transmitter must be installed to provide a separation distance of at least 20 cm from all persons. 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.