Advanced Card Systems Limited
Card & Reader Technologies

ACR330
Bus Validator II

User Manual V1.00

Subject to change without prior notice

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1.0. Introduction

The ACR330 Bus Validator is designed specifically for the Automatic Fare Collection (AFC) system, to offer the convenience of cashless payment in buses, ferries, trams, railways and other transportation modes.

ACR330 enables high-speed transaction processing and transaction records collection through 13.56 MHz contactless (RFID) technology. It supports all smart cards/tags compliant to ISO 14443 Type A & B, Felica and MIFARE®. Through GPS, it enables to locate vehicles, manage fleets and set flexible distance-based fares.

An embedded barcode scanner allows transaction through print out or mobile barcodes. It supported various advanced connection modes for data transfer which includes Wi-Fi, 3G/4G and GSM/GPRS.

The mobile validator supported multiple payment transactions as a means of propriertary use that consists of four payment system certifications that caters to both Visa PayWave and MasterCard.

The purpose of this document is to provide a detailed guide on how to use the ACR330.

2.0. ACR330 Overview

2.1. Parts Description

Figure 1: ACR330 Parts

Part Number	Part Name
1a, 1b, 1c,1d	Programmable Button with Backlight (Blue)
2	Blue LED Indicator (For passenger)
3	Yellow LED Indicator (For passenger)
4	Green LED Indicator (For passenger)
5	Red LED Indicator (For passenger)
6	LCD Display with Touch Panel
7	Tapping Area
8	1D/2D Barcode Scanning Area
9	Speaker
10	Green LED Indicator (For Driver)
11	Red LED Indicator (For Driver)
12	Buzzer
13	Power Button
14	SIM and SD Card Cover
15	Back Cover

Table 1: ACR330 Parts Description

2.2. Connection Ports

Figure 2: ACR330 Connection Ports

Port Number	Port Name
1	Power Socket
2	RJ11 Serial Port (RS232, RS485)
3	USB Host
4	Ethernet
5	USB Client (for internal debugging)
6	Socket for External GPS Antenna
7	SAM Cover with 4 ISO7816 SAM Socket inside

Table 2: ACR330 Connection Ports Description

2.3. Input Power, RS232, RS485 Pin Assignment

Power Socket Type: Molex 43045-0400, Micro-Fit 3.0 Right Angle Header, 3.00mm Pitch, Dual Row, 4 Circuits

RS232, RS485 Socket type: RJ11

Pin Assignment is shown as below:

Figure 3: ACR330 Input Power

Pin Number	Pin Name
1	NC
2	RS232-TX
3	RS232-RX
4	RS485-A
5	RS485-B
6	GND

Table 3: ACR330 Input Power Pins Description

***Note**: Below is the application direct access device paths list:*

- *RS232 - /dev/ttyO0*
- *RS485 - /dev/ttyO1*
- *USB disk - /media/udiskp1*

2.4. SAM Slot Arrangement

The SAM Slot Arrangement is shown in the image below.

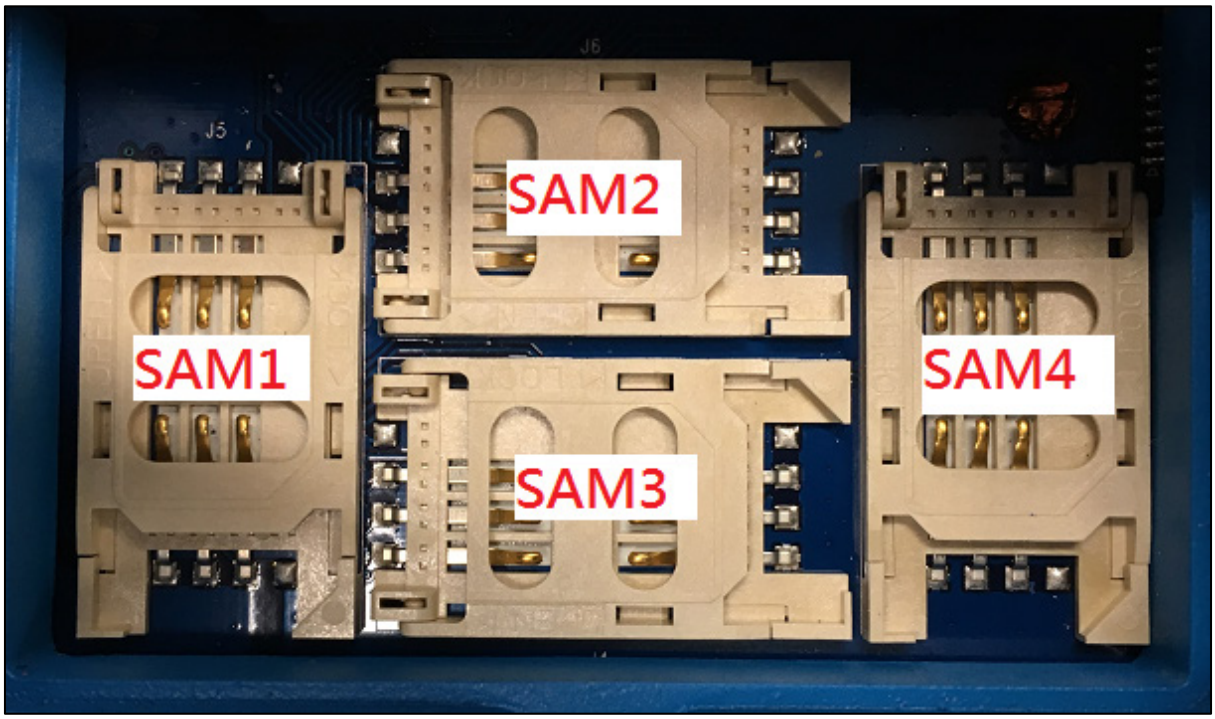
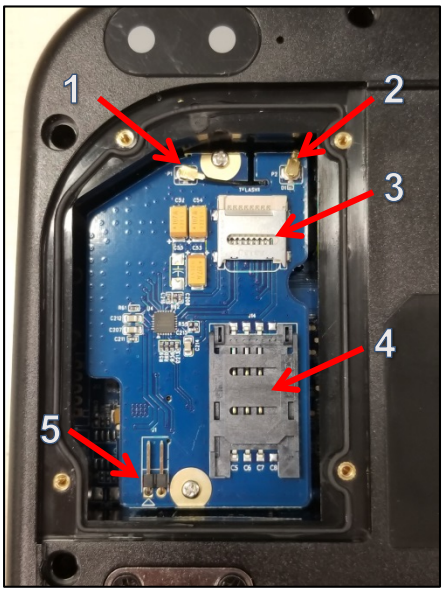


Figure 4: SAM Slot Arrangement

2.5. LTE Board Description



Part Number	Part Name
1	4G Antenna Socket
2	GPS Socket
3	SD Card Slot
4	SIM Card Slot
5	Console Jumper Port (Console mode will be enable when jumper is plugged in.) ***Note**: Jumper is not included in standard product.*

Table 4: ACR330 LTE Board Description

***Note**: Below is the application direct access device paths list:*

- *MicroSD - /media/sdcardp1*

2.6. Replace Real Time Clock Battery

CR2032 coin cell is used for Real Time Clock backup power. The lifetime of the coin cell is around 5 years. If time cannot be stored, it may be caused by low battery.

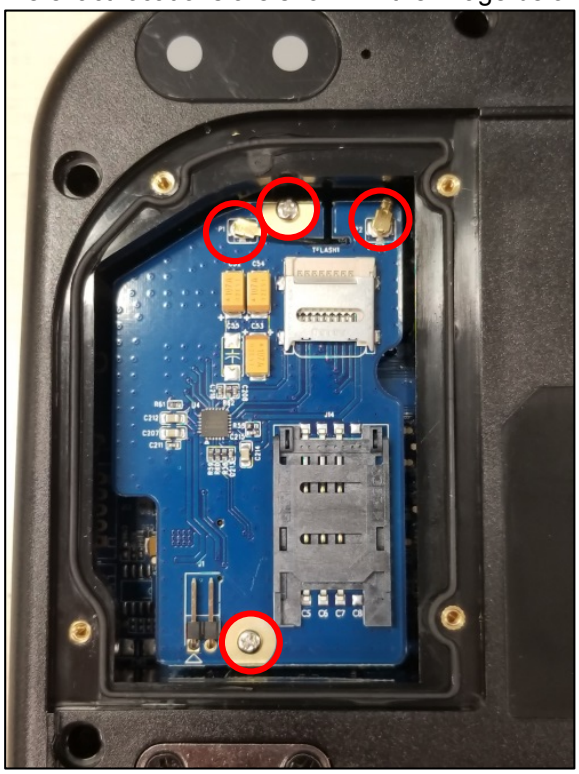
To replace coin cell:

1. Unscrew two pieces screws and take them out. The exact locations are shown in the image below.
   ***Note**: Be careful in handling the screws so they will not drop inside the bus validator.*

2. Using a screw driver, take out the LTE board.

3. The coin cell may now be accessed. Replace the old coin cell with a new one.

4. Return the LTE board. Ensure that the two screws and IPEX connectors are located correctly. The exact locations are shown in the image below.



3.0. ACR330 Device Setup

The following sections detail the procedure in setting up the firmware and application to the ACR330.

3.1. Turn device on/off

To turn device on/off, press **power button**.

To hard power off the device, press and hold **power button** for around 8 seconds.

The location of the power button is shown in the image below.

3.2. Upgrade the firmware

It is important to upgrade the firmware of the ACR330 first before loading the library and the application into the device. Below are the components needed and instructions for firmware upgrade. Some reminders need to be taken note off as well.

***Notes**:*

1. *Only use firmware files officially provided by Advanced Card Systems Ltd.*
2. *Do NOT load the ACR330 firmware file into other ACS readers.*

Failure to follow the above reminders may cause damage to the smart card reader.

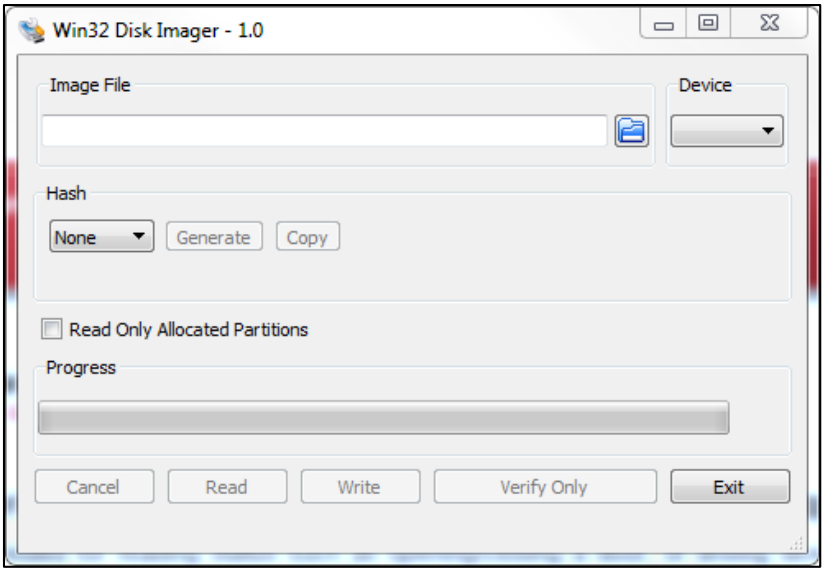
Components needed:

- ACR330
- SD cards (4GB or above)
- Desktop PC (Windows 7 or above)
- Win32 Disk Imager application

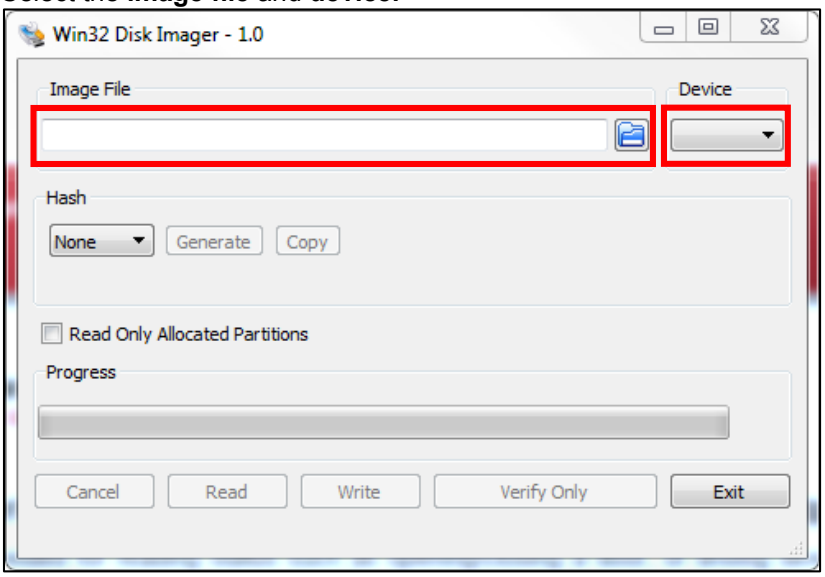
To upgrade the firmware of the ACR330:

1. Plug in an **SD card** (4GB or above) to the PC.

2. Open **Win32 Disk Imager application**.
   ***Note**: The Win32 Disk Imager application may be downloaded online for free.*

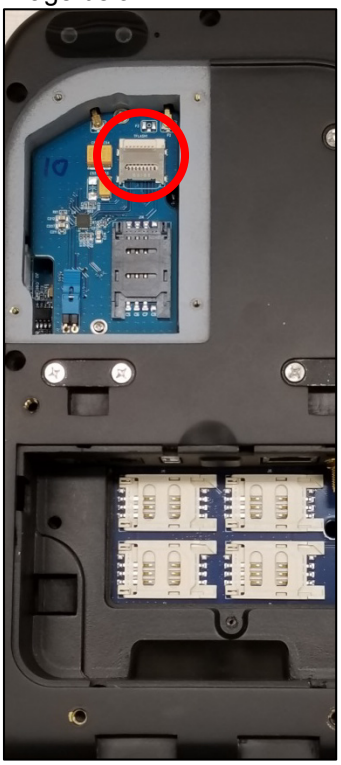


3. Select the **image file** and **device.**



4. Click **Write** and wait for the progress bar to be complete.

5. Plug in the **SD card** into the LTE board of the ACR330. The exact location is shown in the image below.



6. Turn on the **ACR330** by plugging in the power cable.
***Note**: If the LCD does not turn on, press the power button on the top right corner of the bottom casing.*

7. The ACR330 will be upgraded automatically. The LED will keep blinking.

8. After around 8 minutes, the LED will turn off. The upgrade is completed.

9. Remove the **SD card**.

10. Reboot the device for the changes to take effect.

3.3. Access ACR330 through PC using LAN

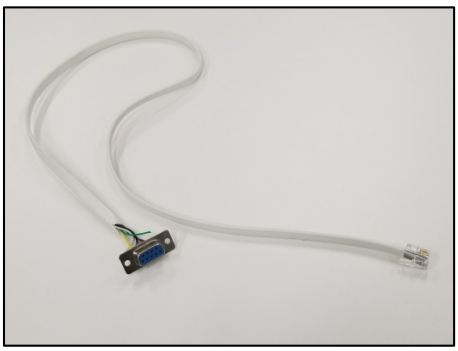
You may access ACR330 through the PC to enable functions which may be needed for operations (e.g. file transfer). Below are the components needed and instructions for accessing ACR330 through PC.

Components needed:

- Jumper (to enable the console mode)

***Note**: Jumper is not included in standard product.*

- RS232 debug console cable



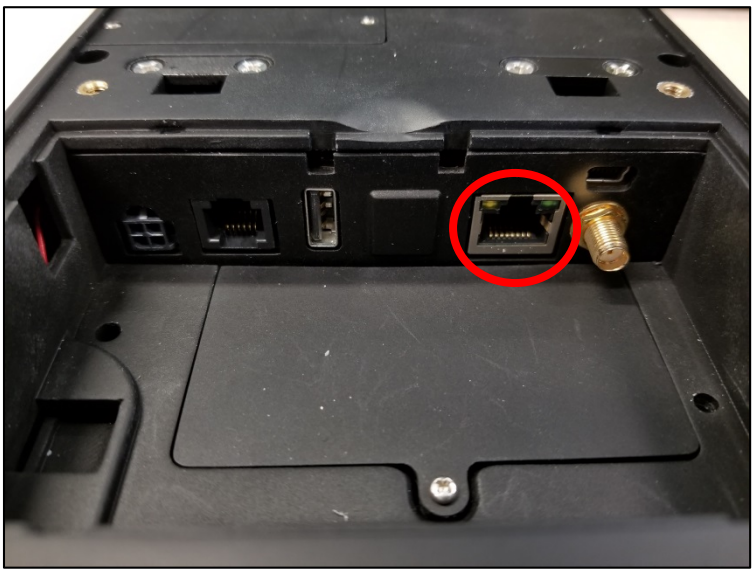
- Bitvise SSH Client (Tunnelier) SFTP Application
- ***Note**: The Bitvise SSH Client (Tunnelier) SFTP Software may be downloaded from https://www.bitvise.com/ssh-client-download.*
- LAN cable

To access ACR330 using LAN:

1. On the LTE board, plug in **jumper** to enable console mode.

***Note**: Jumper is not included in standard product.*

2. Connect ACR330 to the Ethernet using a **LAN cable**. The exact location of the Ethernet port at the back of the ACR330 is shown in the image below.



3. Connect ACR330 to the PC using the **RS232 debug console cable**. The exact location of the RJ11 serial port at the back of the ACR330 is shown in the image below.

   ***Note**: Connect the other end of the cable to the PC serial port or USB-RS232 converter.*

4. Turn on the **ACR330**.
5. Login in to the console.
    a. Login name: root
    b. Password: root

    ***Note**: If [root@Linux/root] # is shown, it means login is successful*
6. Type "**ifconfig eth0**" to get IP address.
7. Open the **Bitvise SSH Client (Tunnelier) SFTP Application** on the PC.
8. Login with the IP address in step 5.
    a. Login name: machinekit
    b. Password: machinekit
9. The ACR330 may now be accessed on the PC.

    ***Note**: For more details, please refer to ACR330 API.chm.*

FCC Caution.

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

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Note: 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.

FCC Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment .This equipment should be installed and operated with minimum distance 20cm between the radiator& your body.