Advanced Card Systems Limited
Card & Reader Technologies

ACM1252U-Z2

User Manual

ACM1252U-Z2 User Manual V1.00

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

Version History

Date	By	Changes	Version
2016-09-19	Keith Mo	• Initial Version	1.00
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1.0. Introduction

The ACM1252U-Z2 is a reader (IFD and PCD) module that support contactless (PICC) smart cards.

The ACM1252U-Z2 is an NFC reader module developed based on the 13.56 MHz contactless technology. This NFC Reader Module supports all three NFC modes namely card reader/writer, card emulation, and peer-to-peer communication.

The ACM1252U-Z2 supports ISO 14443 Type A and B cards, MIFARE®, FeliCa, and ISO 18092–compliant NFC tags. It also supports other NFC devices with an access speed of up to 424 Kbps and proximity operating distance of up to 30 mm (depending on tag type used).

It is PC/SC–compliant for interoperability across different applications and platforms and provides high-speed communication ability for contactless cards and NFC tags/devices. Post-deployment firmware upgrade is also supported, eliminating the need for additional hardware modification.

2.0. Features

- ISO 14443 Parts 1-4 Compliant for Contactless Smart Card Interface.
- ISO 18092 Compliant for Contactless Smart Card Interface.
- An external antenna for PICC contactless access applications.
- The ACM1252U-Z2 supports the following Tag Types:
  - MIFARE Classic. E.g. MIFARE 1K, 4K, MINI and Ultralight.
  - ISO14443-4 Type A and B.
  - ISO18092 FeliCa, NFC tag
- T=CL emulation for MIFare 1K/4K PICCs
- High Speed (424 kbps) Communication for PICCs
- Energy saving modes for turning off the antenna field whenever the PICC is inactive, or no PICC is found. It prevents the PICC from exposing to the field all the time.
- User-Controllable Peripherals. E.g. LED.
- PCSC Compliant for Contact and Contactless Interfaces.
- USB V2.0 Interface. (12M bps)
- Device Firmware Upgradeable through the USB Interface.

3.0. Architecture

NXP's LPC11U37 is for main processor for communication with PC, and control the contactless chip and peripherals. PN512 act as a contactless chip to perform the communication between contactless tags and LPC11U37

For communication architecture, the protocol between ACM1252U-Z2 and PC is using CCID protocol. All the communication between PICC is PCSC Compliant

4.0. ACM1252U-Z2 Operating Procedure

4.1. Driver installation Procedure

Hardware requires:

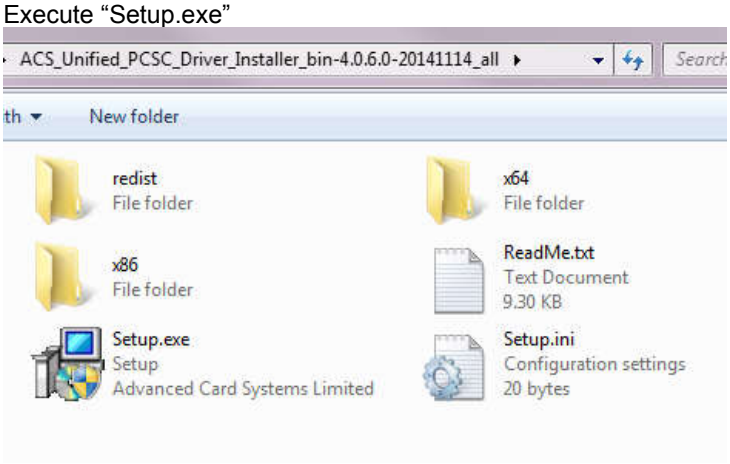
- ACM1252U-Z2
- PC with OS window XP or above

Software requires:

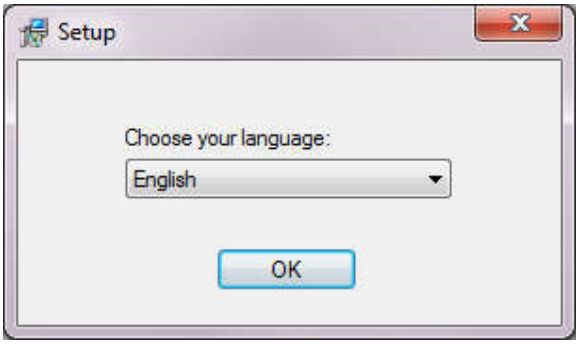
- Driver installer “ACS_Unified_PCSC_Driver_Installer_bin-4.0.6.0-20141114_all.zip”

Steps:

1. Extract the file “ACS_Unified_PCSC_Driver_Installer_bin-4.0.6.0-20141114_all.zip”
2. Execute “Setup.exe”

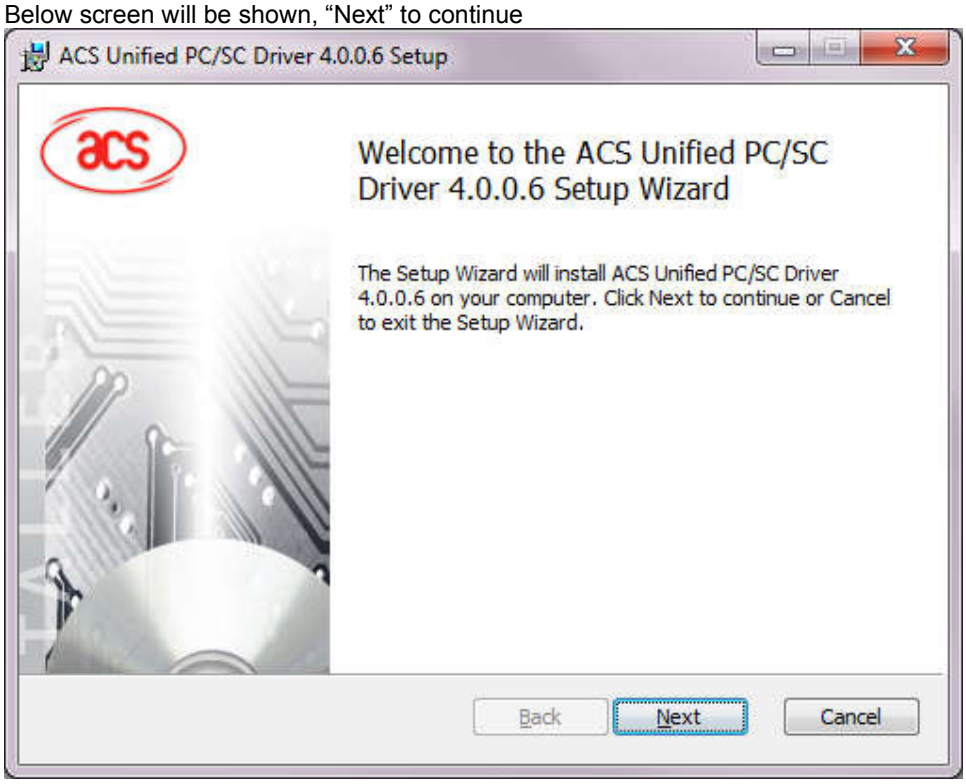


3. Below screen will be shown

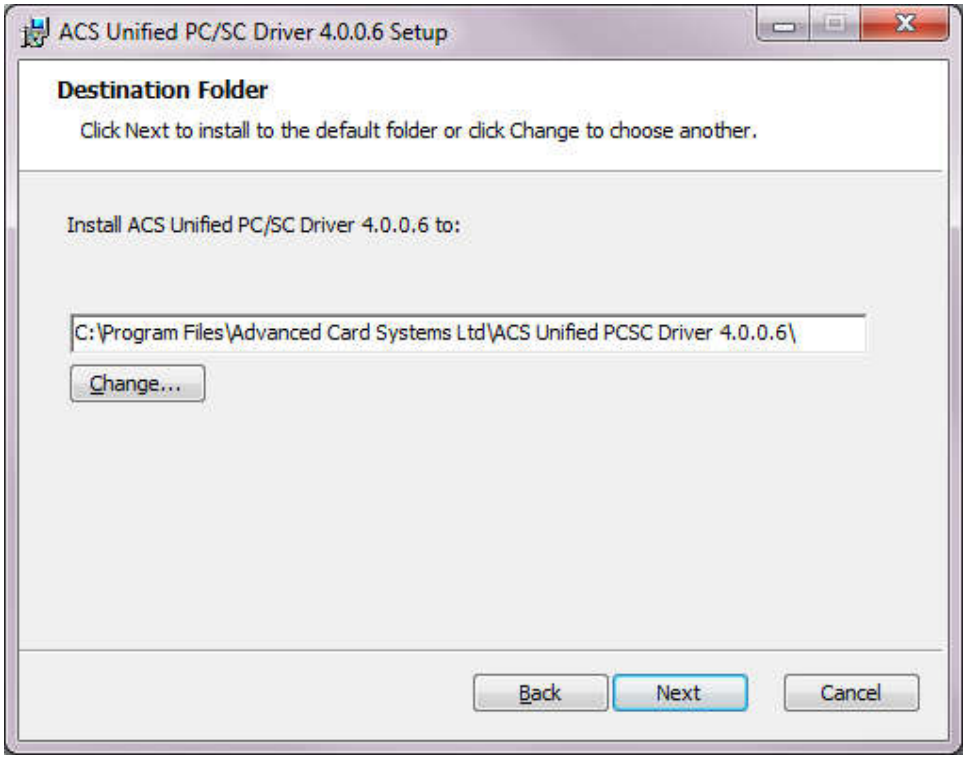


Select the language, then Click “OK”

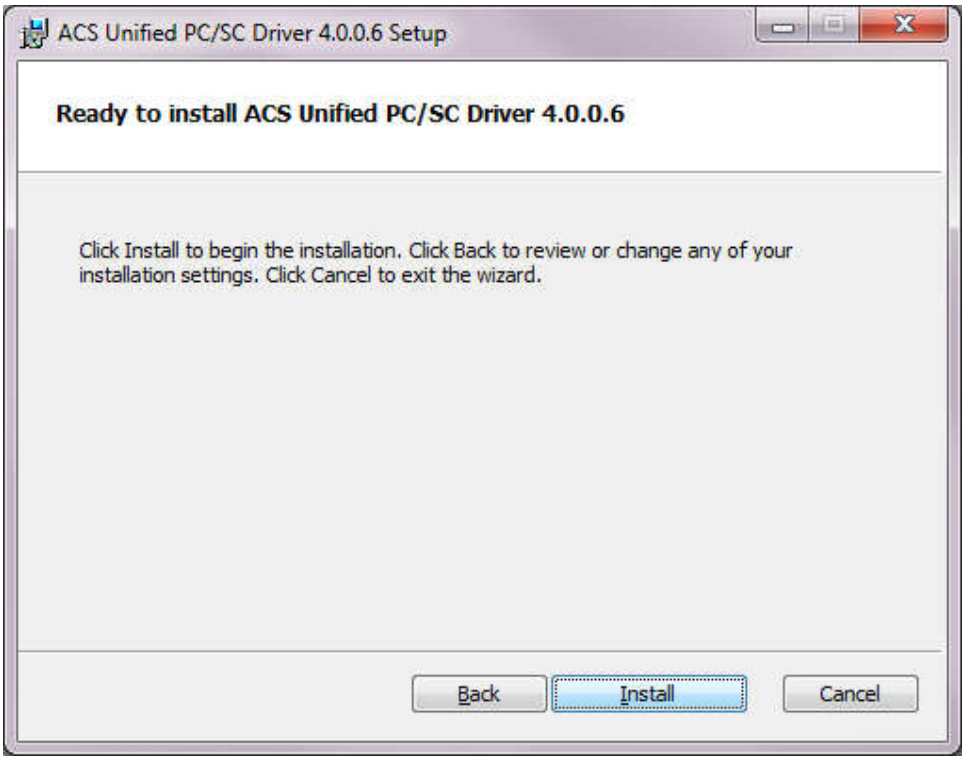
4. Below screen will be shown, “Next” to continue



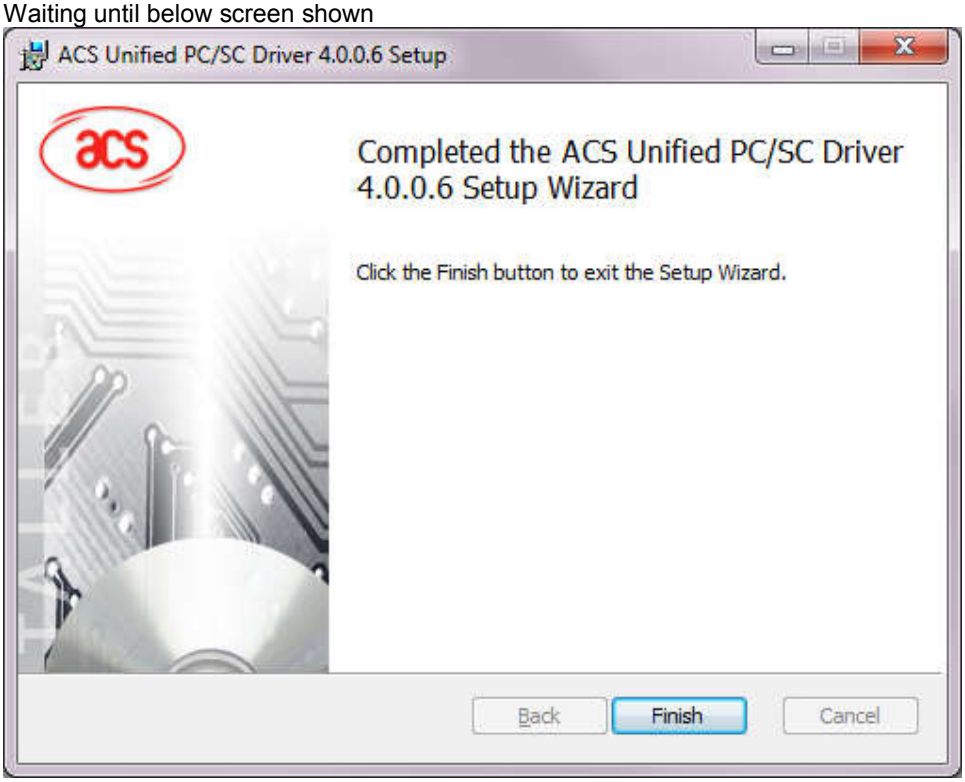
5. Below screen will be shown, configure the installation path, then “Next” to continue



6. Below screen will be shown, “Install” to continue



7. Waiting until below screen shown



Click “Finish”

8. Driver Installation Complete

4.2. Operation Example

Hardware requires:

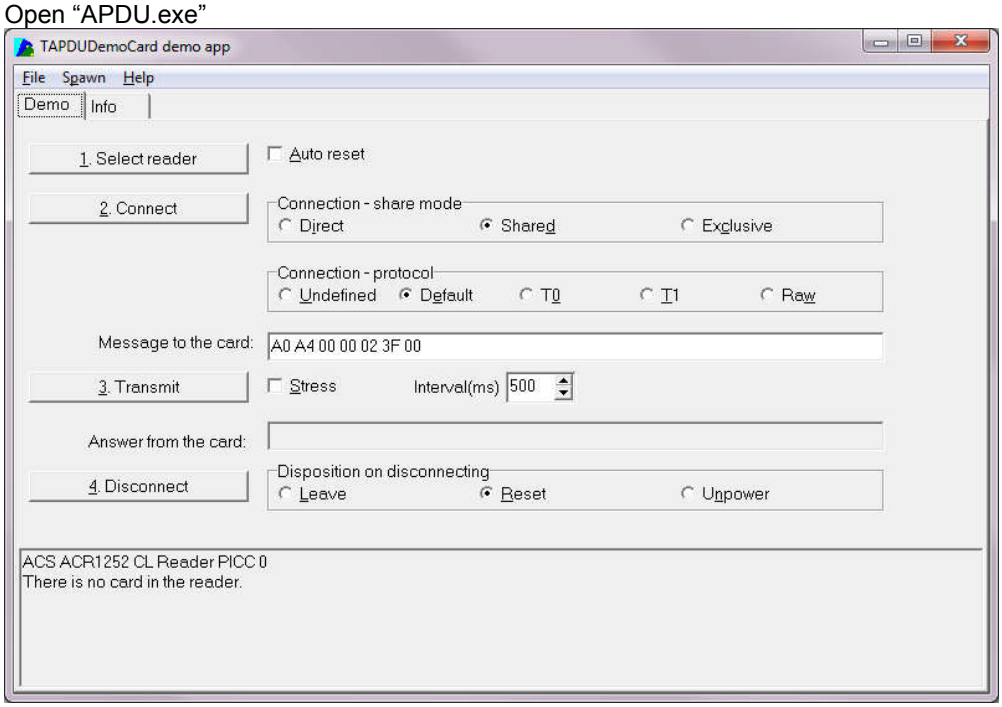
- ACM1252U-Z2
- PC with OS window XP or above
- Test card x 1 (provided by ACS)

Software requires:

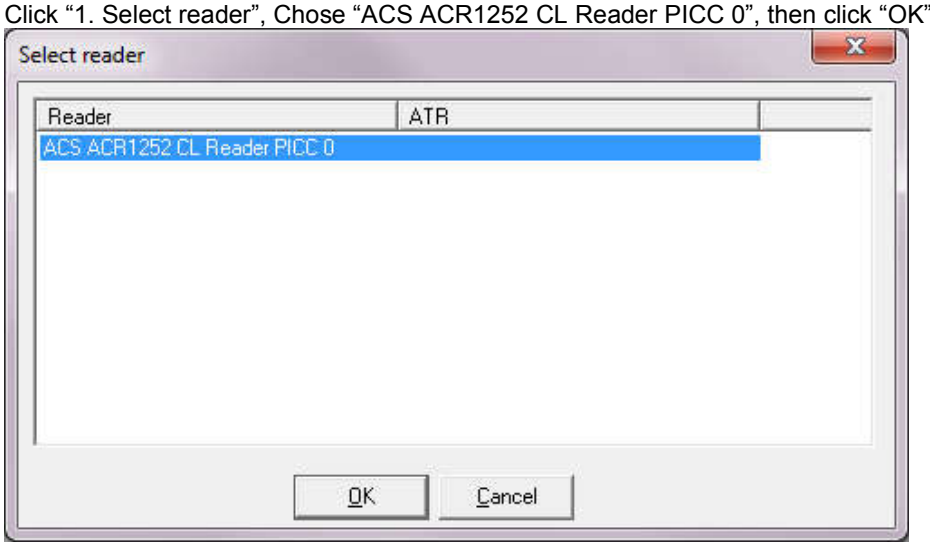
- APDU.exe (for example)

Steps:

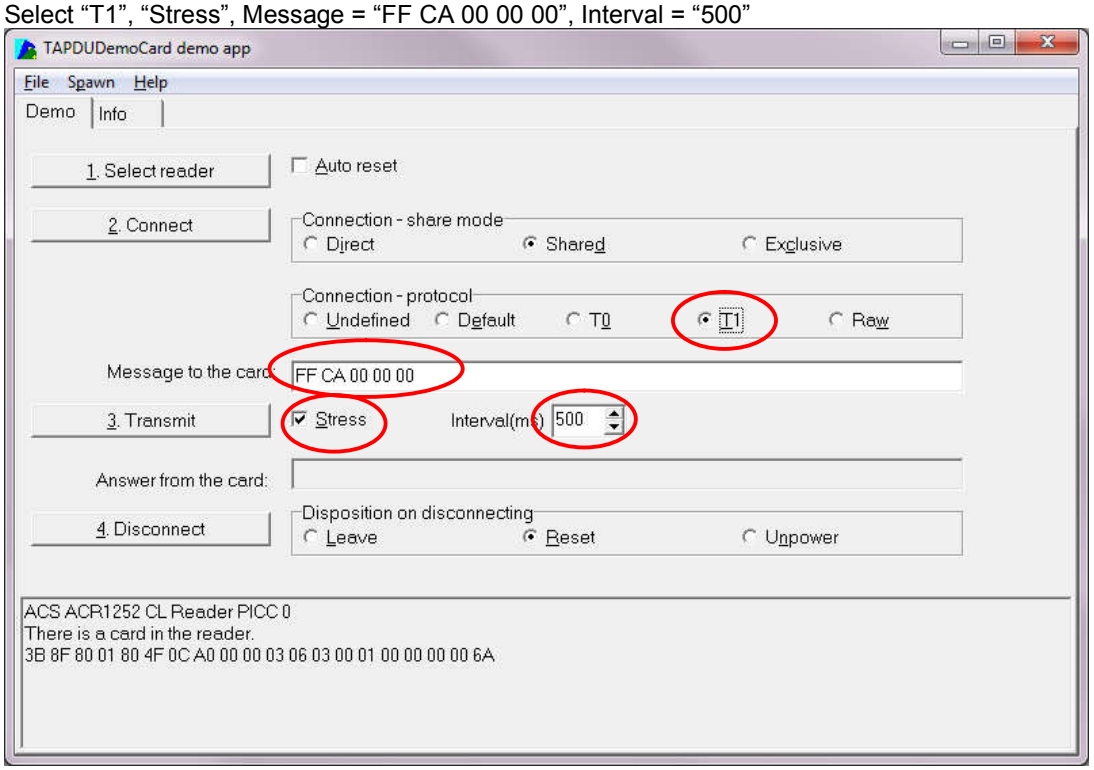
1. Plug in the reader into the PC
2. Place the Test Card on the top of the reader about 5cm
3. Open “APDU.exe”



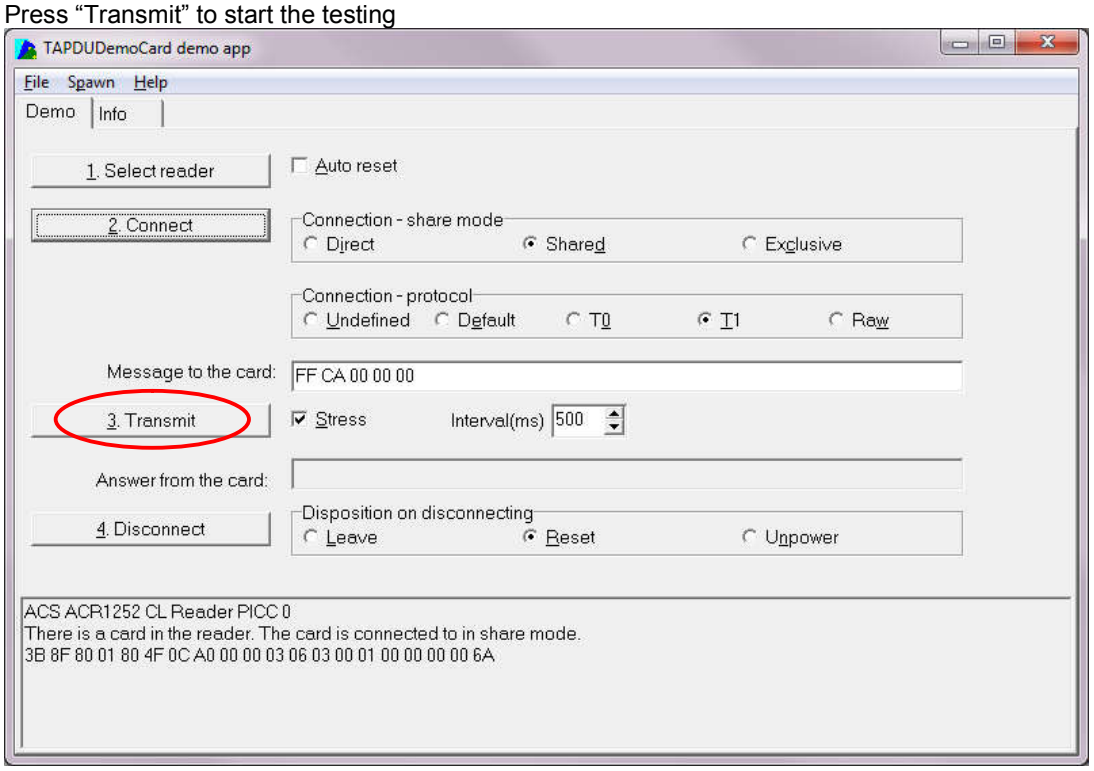
4. Click “1. Select reader”, Chose “ACS ACR1252 CL Reader PICC 0”, then click “OK”



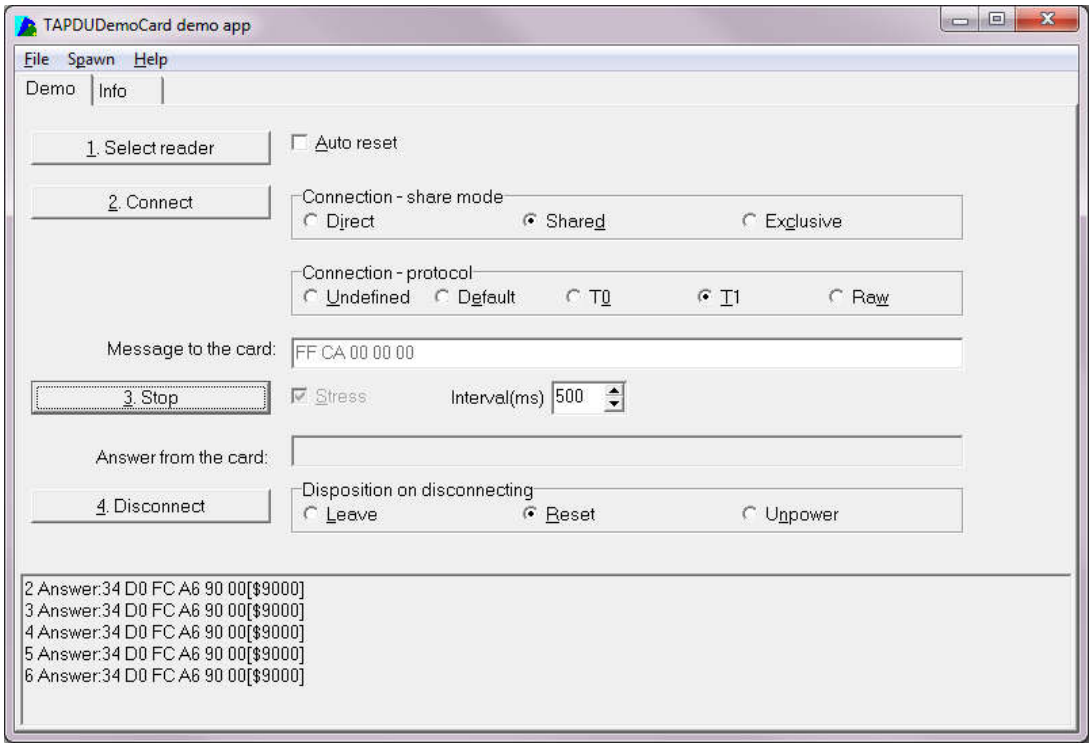
5. Select “T1”, “Stress”, Message = “FF CA 00 00 00”, Interval = “500”



6. Press “Connect”
7. Press “Transmit” to start the testing

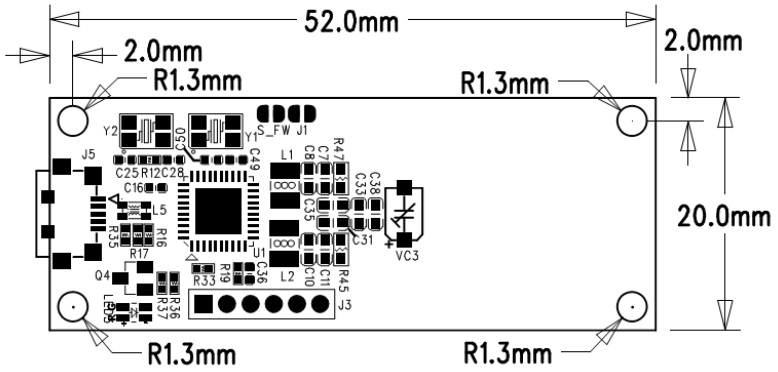


8. Below screen will be shown



9. Can start the Lab Test

Appendix A. Technical Specifications



Universal Serial Bus Interface

Power Source..... From USB
Speed..... 12 Mbps (Full Speed)
Supply Voltage..... Regulated 5 V DC
Supply Current ..... Max. 200 mA

Contactless Smart Card Interface

Standard ..... ISO/IEC 18092 NFC, ISO 14443 Type A & B, MIFARE, FeliCa
Protocol..... ISO 14443 T=CL for ISO 14443-4 compliant cards and T=CL Emulation for MIFARE 1K/4K, ISO 18092, FeliCa and NFC tags
Smart Card Read/Write Speed..... 106 Kbps, 212 Kbps, 424 Kbps
Operating Frequency ..... 13.56 MHz
Operating Distance ..... Up to 30 mm (depending on card type)

SAM Card Interface (Optional)

Standard ..... ISO 7816
Protocol..... T=0 and T=1 protocol

Built-in Peripherals

Bi-Color LED ..... Red and Green

Physical Specifications

Dimensions ..... 52.0 mm (L) × 20.0 mm (W) × 6.0 mm (H)

Operating Conditions

Temperature..... 0 °C – 50 °C
Humidity..... Max. 90% (non-condensing)
MTBF ..... 500,000 hrs

Application Programming Interface

PC/SC
CT-API (through wrapper on top of PC/SC)

Certifications/Compliance

ISO 14443, ISO 18092, ISO 7816 (upon request), CE, PC/SC, CCID, RoHS 2, USB Full Speed
Microsoft® WHQL for Windows® 2000, Windows® XP, Windows Vista®, Windows® 7, Windows® 8, Windows® 8.1, Windows® Server 2003, Windows® Server 2008, Windows® Server 2008 R2, Windows® Server 2012, Windows® Server 2012 R2

Device Driver Operating System Support

Windows® 2000, Windows® XP, Windows Vista®, Windows® 7, Windows® 8, Windows® 8.1, Windows® Server 2003, Windows® Server 2008, Windows® Server 2008 R2, Windows® Server 2012, Windows® Server 2012 R2
Linux®, Mac OS®, Android™ 3.1 and above

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

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.
This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

**End Product Labeling:
The Final end product label must contain the following statement on the product label:
“Contains FCC ID: V5MACM1252U-Z2"

CE 1313

This equipment can be used in member states of the European Union once the corresponding administrative licence is obtained.