



# DE-ABCM-DC User Manual

## DUALi Inc.

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We have our development center in South Korea to provide technical support. For any technical assistance can contact our technical support team as below;

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## Revision History

- 2009.04.09 : Issued first
- 2011.07.18 : Add PCB dimension
- 2011.08.08 : Add SAM card connectors' specification
- 2011.12.22 : Add metal shield cover (change product photo)
- 2013.10.21 : Add capacitor(C41, 100nF) on nRESET line to improve stability.
- 2015.01.28 : Add 5V, 3V, 1.8V smart card supply

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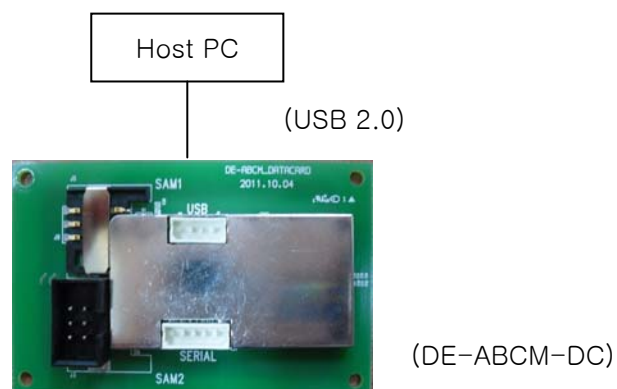
## 1 Summary

Smart Card Interface	Contactless Smart Card (ISO 14443 A/B) 2 SAM CARD (ISO7816, T=0,T=1, 5 V, 3 V, 1.8 V)
Host Interface	USB 2.0 Full Speed (12Mbps), also support USB 1.1
Host Communication	PC/SC or Proprietary
CPU	ARM 32-bit Cortex-M3(72MHz), 64Kbytes Flash, 20Kbytes SRAM
Power Voltage	5V, USB Bus powered
Current	MAX 300mA depend on antenna size
Connection	4pin * 2mm for USB 5pin * 2mm for RS-232
Size	70(W) * 45(L) * 8(H)mm
Antenna Matching	Direct matching
Certification	CE, FCC, IC Certified RoHS compliance
Operating Temperature	-20~60°C

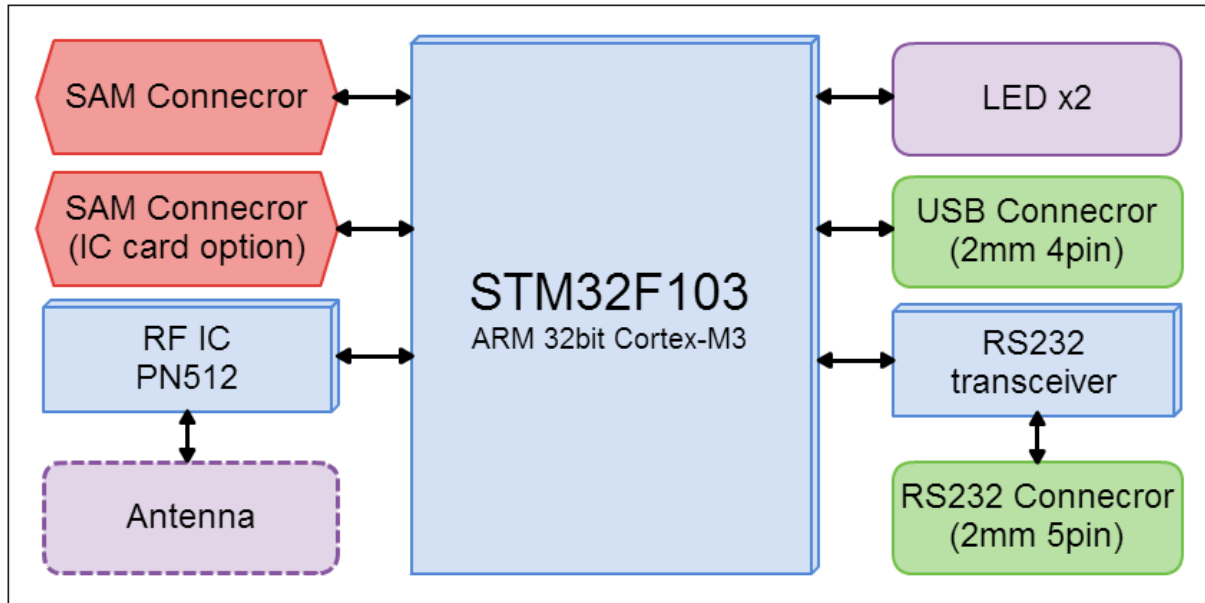
## 2 Structure

### 2.1 The Structure of equipment

- DE-ABCM-DC(RF module) itself contains all circuits include antenna, SAMs and connectors.



## 2.2 The block diagram of main Module



## 2.3 Description of main Module

- CPU : 32bit RISC CPU, It is STM32F103 which is ARM-based 32-bit MCU with Flash, USB, CAN, seven 16-bit timers. This CPU has 64Kbyte Flash memory, 20Kbyte SRAM, 2 UART, USB 2.0 interface.
- PN512 RF IC : This Philips IC can control RF card like MIFARE card, type A/B card and FeliCa card simultaneously.
- USB Connector : It's a Communication part for USB communication.
- SAM card control part: It can control 2 SAMs. And each slot can be operated independently. Contact card connector option.
- Status LED : It has 2 LEDs to display status of communication and RF card status.

### 3 Description of Surface

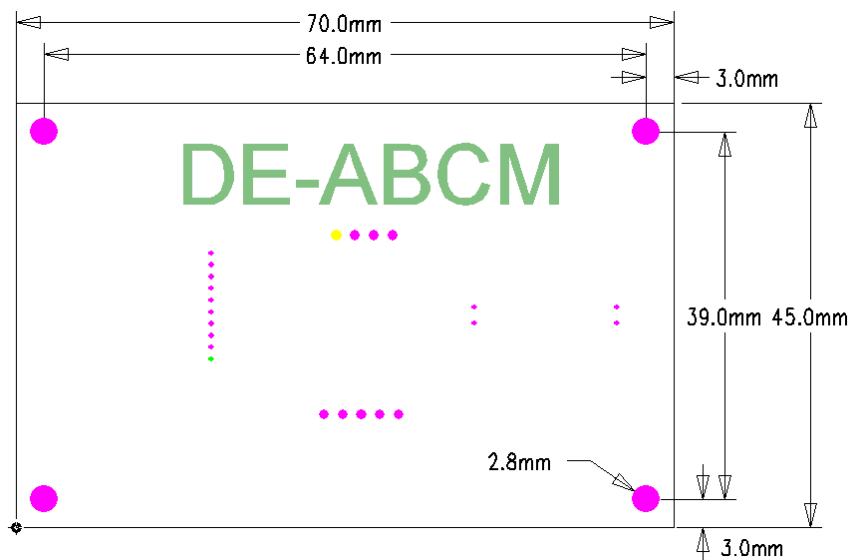
#### 3.1 The picture of device surface



There are no parts at bottom. But there is a space for optional LEDs.

#### 3.2 The size of equipment surface

- DE-ABCM : 70(W) \* 45(L) \* 8(H)mm
- Thickness (PCB) : 1.6T



## 4 Connector pin assignment

### 4.1 USB Connector

[J2] (4Pin 2.0mm) -> PC USB Port

Pin No.	Description
1	VCC(DC5V)
2	USB D+
3	USB D-
4	GND

### 4.2 SAM1 Connector

[J9] (SAM Socket, TM6090-06-G) -> SAM

Pin No.	Description
1	VCC
2	RESET
3	CLOCK
4	GND
5	NC
6	IO

It is for ISO-7816 IC Card(SAM) Communication.

### 4.3 Header for IC CARD Connector and IC CARD Detection

[J8] (6Pin 2.54mm, Box Header 2\*3) -> IC CARD Connector

Pin No.	Description	Pin No.	Description
1	VCC	4	GND
2	RESET	5	NC
3	CLOCK	6	IO

[J4] (5Pin 2.0mm) -> SAM2 Detection (Optional for DataCard Version)

Pin No.	Description
1	VCC(DC5V)
2	TxD(RS-232 or TTL)



3	RxD(RS-232 or TTL)
4	GND
5	SAM2 Detection

## 5 Description of electricity

### 5.1 The Description of power

- Input power : 5V (USB Bus Powered)

### 5.2 The using electric current

- Normal 5V, 150 mA under
- MAX 5V, 200 mA under

### 5.3 The Description of USB communication

- USB V2.0 FULL SPEED (12Mbps)

## 6 Description of Function

### 6.1 Protocol Specification

Refer to protocol specification for detail function.(provide on request)

### 6.2 Control Code Specification

Refer to control code specification for detail function.(provide on request)

### 6.3 Download

Refer download manual.(provide on request)

## 7 Property

### 7.1 Environment to use

- Temperature to use : -20 ~ 60 °C
- Humidity to use : 30 ~ 90 % (relative humidity)

### 7.2 Environment to keep

- Temperature to keep : -20 ~ 80 °C
- Humidity to use : 30 ~ 90 % (relative humidity)

## 8 Warning and Notice

- For indoor use only.
- This product is affected by an element like metal or Magnetism. So one has to take precautions.
- This device is not waterproof.

## **Warranty & Service**

▸ Warranty and Repair service

- DUALi Inc. warrants to the original consumer or other end user that this product, DE-ABCM-DC, is free from defects in materials and workmanship for a period of 1 year from the date of purchase.

※ **Note** Warranty/non-warranty repair fees do not include any shipping charges.

▸ The damages(defaults) prescribed below are NOT to be covered by warranty.

- User's misuse of part/component.
- Fault by the unqualified user's own intention of repairs.
- Product's inspection requirement.
- Adding certain functions or extension of system.
- Fault by User's misuse against the product's manual.

**\*Please contact our service team for the technical/ sales supports.**

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## **Federal Communication Commission Interference Statement**

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 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 Caution:** Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

**FCC Compliance Information :** 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

### **This device is intended only for OEM integrators under the following conditions:**

- 1) The antenna must be installed such that 20 cm is maintained between the antenna and users, and
- 2) The transmitter module may not be co-located with any other transmitter or antenna, As long as 2 conditions above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed.
- 3) The DE-ABCM-DE is limited to installation in mobile or fixed applications.

## **OEM Installation Instructions**

In order to maintain compliance with FCC, Industry Canada, and any other applicable regulations, it is required of the OEM or module level customer to adhere to the guidelines listed in this manual.

### **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.

Separate approval is required for all other operating configuration, including portable configurations with respect to Part 2.1093 and different antenna configurations.

### **End Product Labeling**

This transmitter module is authorized only for use in device where the antenna may be installed such that 20 cm may be maintained between the antenna and users. The final end product must be labeled in a visible area with the following: “Contains FCC ID: SWUDEABCMDE”.

### **FCC Modular approval configuration control**

Control of the end product into which the module will be installed must be maintained such that full compliance of the end product is always ensured. The modular transmitter must comply with any specific rule or operating requirements applicable to the transmitter and the manufacturer must provide adequate instructions along with the module to explain any such requirements.

It is the responsibility of the OEM or module level customer to install the master device in accordance with the guidelines of this manual. In order to maintain compliance with FCC regulations, the module installer must adhere to the guidelines listed in the installation section of this manual.

### **Radiation Exposure Statement:**

This equipment complies with IC 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 device is intended only for OEM integrators under the following conditions:**

1) The antenna must be installed such that 20 cm is maintained between the antenna and users, and

2) The transmitter module may not be co-located with any other transmitter or antenna.

As long as 2 conditions above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed.

**Users manual of the end product:**

In the users manual of the end product, the end user has to be informed to keep at least 20cm separation with the antenna while this end product is installed and operated. The end user has to be informed that the IC radio-frequency exposure guidelines for an uncontrolled environment can be satisfied. The end user has to also be informed that any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment. IC statement is required to be available in the users manual: This Class B digital apparatus complies with Canadian ICES-003.

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.

To ensure compliance with all non-transmitter functions the host manufacturer is responsible for ensuring compliance with the module(s) installed and fully operational. For example, if a host was previously authorized as an unintentional radiator under the Declaration of Conformity procedure without a transmitter certified module and a module is added, the host manufacturer is responsible for ensuring that after the module is installed and operational the host continues to be compliant with the Part 15B unintentional radiator requirements. Since this may depend on the details of how the module is integrated with the host, the grantee (the party responsible for the module grant) shall provide guidance to the host manufacturer for compliance with the Part 15B requirements.

**Requirements for the Host Device:**

The host device and all the separately certified modules it contains shall jointly meet the RF exposure compliance requirements of RSS-102, if applicable.

The host device shall be properly labeled to identify the modules within the host device.

The Industry Canada certification label of a module shall be clearly visible at all times when installed in the host device; otherwise, the host device must be labeled to display the Industry Canada certification number for the module, preceded by the words "Contains transmitter

module”, or the word “Contains”, or similar wording expressing the same meaning, as follows:

Contains transmitter module IC: 9445A-DEABCMDC is the module’s certification number.

The applicant for equipment certification of the module shall provide with each unit of the module either a label such as described above, or an explanation and instructions to the user as to the host device labelling requirements.

### **Industry Canada statement**

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions:

- (1) this device may not cause interference, and
- (2) this device must accept any interference, including interference that may cause undesired operation of the device.

*Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :*

- (1) l'appareil ne doit pas produire de brouillage, et*
- (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.*

## CAUTION

To reduce the risk of electric shock, do not remove the top cover (or the rear section).  
No user serviceable parts inside, refer servicing to qualified personnel.



This symbol, wherever it appears, alerts you to the presence of uninsulated dangerous voltage inside the enclosure-voltage that may be sufficient to constitute a risk of shock.



This symbol, wherever it appears, alerts you to the important operating and maintenance instructions in the accompanying literature. Please read the manual.

- 1) Read these instructions.
- 2) Keep these instructions.
- 3) Heed all warnings.
- 4) Follow all instructions.
- 5) Do not use this equipment near water.
- 6) Do not use near any heat sources such as radiators, heat resistors, stove, or other equipment that produce heat.

**CAUTION**  
**RISK OF EXPLOSION IF BATTERY IS REPLACED**  
**BY AN INCORRECT TYPE.**  
**DISPOSE OF USED BATTERIES ACCORDING**  
**TO THE INSTRUCTIONS**

### **European CE notice to users and product statements**

This product is CE marked according to the provisions of the R&TTE Directive(99/5/EC). Hereby, DUALi Inc. declares that this product is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.

For further information, please contact [http:// www.duali.com](http://www.duali.com)

# CE1177

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**EUROPEAN UNION “DECLARATION OF CONFORMITY”**

**DECLARATION OF CONFORMITY**

**DUALi Inc.**

1-309 Innoplex, 306 Sinwon-ro, Yeongtong-gu, Suwon, Gyeonggi-do, Korea

declare under our sole responsibility that the product(s)

**Smart Card Reader**

to which this declaration relate(s) is in conformance with the following standards:

EN 301 489-1 V1.9.2 :2011

EN 301 489-3 V1.6.1 :2013

EN60950-1 :2006

EN 300 330-1 V1.8.1 :2014

EN 300 330-2 V1.6.1 :2014

following the provisions of the 1999/5/EC Directives.