RDM530 SERIAL Desktop Reader: ISO14443A/B, ISO15693 DEVELOPMENT KIT

FCC NOTE: THE MANUFACTURER IS NOT RESPONSIBLE FOR ANY RADIO OR TV INTERFERENCE CAUSED BY UNAUTHORIZED MODIFICATIONS TO THIS EQUIPMENT. SUCH MODIFICATIONS 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.

1 PS2 or RS232 or USB or TCP/IP OPERATIONS

The RDM530 Desktop Reader which support ISO14443-A-B, ISO15693, can operate with a terminal such as computer or other controller, which can supply PS2 orRS232 or USB or TCP/IP interface and only supplied by computer or other controller.

1.1 Electrical Interface

Basically, this communication protocol does not need to be bound with any electrical interface characteristic. Typically the following types of physical link could be used:

- PS2 (Point to point only)
- RS232 (Point to point only)
- USB (Slave only)
- TCP/IP(Slave only)

1.2 RS232 Data Format:

1.2.1 PC/SC Smart Card Reader with RS232 connection .Compliant with PC/SC V2.0 specifications.

1.2.2 RDM TAG MASTER DATA FORMAT:The data format (Start Bit, Data Bits, parity, Stop Bit) is software configurable, and can be set to match the special requirement of data transmission between two communication devices. The general data format is defined as:

Parameter	Description
Baud Rate	Selective: 9600, 19200, 38400, 57600, 1152000 (It can be changed by command Send from the Host)
Data Bits	Fixed: 8 bits
Start Bit	Fixed: 1 Bits
Stop Bit	Selective: 1 bit.
Parity	None

The following is the default setting (RS232):

Baud Rate	Data Bits	Start Bit	Stop Bit	Parity
9600	8	1	1	None

1.3 USB Data Format:

PC/SC Smart Card Reader with USB connection .Compliant with PC/SC V2.0 specifications.

2 Link Layer

The communication protocol is a packet-oriented protocol - all the data exchanged between two communication devices will be based on packet format. The protocol is designed for multi-drop mode and where point-to-point mode could be treated as a special case of multi-drop mode.

The data packet starts with the control character 'STX' and ends with 'ETX', which follows the 8-bit BCC checksum. Besides the checksum is used for error checking, character (byte) time-out and packet (command) time-out are used to re-synchronous the communication.

2.1 Packet Format

There are two types of data packets. Command Message is the packet Send from the Host to the reader device. The Reply Message is the packet Send from the reader to the Host.

Packet format for Command Message (Host to Reader)

STX	STATION ID	DATA LENGTH	CMD	DATA[0..N]	BCC	ETX

Packet format for Reply Message (Reader to Host)

STX	STATION ID	DATA LENGTH	STATUS	DATA[0..N]	BCC	ETX

3 Available Commands

Name	Description
SYSTEM COMMANDS	
SetAddress	Program the Device Address to the reader
SetBaudrate	Set the reader's communication baud rate
SetSerlNum	Set the reader's Serial Number
GetSerNum	Get the reader's Serial Number
SetUserInfo	Set the Usr Information
GetUserInfo	Get the User Information
GetVerNum	Get the reader's firmware version number.
SetPort	Control status of the I/O ports.
SetLED	Turn On/Off the LEDs
SetBuzzer	Turn On/Off the Buzzer
Control-workmode	Control the reader to stay in active state or idle state
ISO14443-A-B COMMANDS	
REQA	ISO14443A REQUEST
Anticoll	ISO14443A Anti-collision
Select	ISO14443A Select
Halt	ISO14443A Halt
Request_B	ISO14443B REQB command
Attrib_B	ISO14443B ATTRIB command
RDM_Rst_ Typeb	Integrate the request and attrib command
RDM__Typeb_Transfer_Command	ISO14443-4 transparent command Type B Card
MF_Read	The Read command integrates the low level commands (request, anti-collision, select, authentication, read) to achieve the reading operation with a one-step single command.
MF_Write	The Write command integrates the low level commands (request, anti-collision, select, authentication, write) to achieve the writing operation

	with a one-step single command.
MF_InitVal	The Initialization command integrates the low level commands (request, anti-collision, select, authentication) to achieve the value block initialization with a one-step single command.
MF_Decrement	The Decrement command integrates the low level commands (request, anti-collision, select, authentication) to achieve the Decrement with a one-step single command.
MF_HLIncrement	The Increment command integrates the low level commands (request, anti-collision, select, authentication) to achieve the Increment with a one-step single command.
MF_GetSnr	The GetSnr command integrates the low level commands (request,anticoll,select) to achieve the select card with a one-step single command,and output the card's Snr
ISO15693 COMMANDS	
RDM_Inventory	ISO15693 Inventory Command
RDM_Read	ISO15693 Read Command
RDM_Write	ISO15693 Write Command
RDM_Lockblock	ISO15693 Lock_Block Command
RDM_StayQuiet	ISO15693 Stay_Quiet Command
RDM_Select	ISO15693_Select Command
RDM_Resetready	ISO15693_Reset_To_Ready Command
RDM_Write_Afi	ISO15693_Write_AFI Command
RDM_Lock_Afi	ISO15693_Lock_AFI Command
RDM_Write_Dsfid	ISO15693_Write_DSFID Command
RDM_Lock_Dsfid	ISO15693_Lock_DSFID Command
RDM_Get_Information	ISO15693_Get_System_Information Command
RDM_Get_Multiple_Block_Security	ISO15693_Get_Multiple_Block_Security Command

RDM_15693_Transfer_Command	Using this command may transparent ISO15693 command to The Card that it meet the ISO15693 protocol

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

3.1 Sequence Example

3.1.1 SetBaudrate (0x81)

Data Field

DATA[0] Communication speed

0x00 – 9600 bps
0x01 – 19200 bps
0x02 – 38400 bps
0x03 – 57600 bps
0x04 – 115200 bps

Response:

STATUS: 0x00 - OK

Data Field

DATA[0] Return the new communication speed Code.

0x00 – 9600 bps
0x01 – 19200 bps
0x02 – 38400 bps
0x03 – 57600 bps
0x04 – 115200 bps

Description

Set the reader's baud rate for host communication. The baud rate will be stored in the reader's EEPROM and used as the new default baud rate.The new baud rate will not take effect until the reader is reset.

EXAMPLE:

Send Data： AA 02 02 81 01 80 BB

Response Data：： AA 02 02 00 01 01 BB (19200,N,8,1)

Example: Read from Block 10 reading 3 blocks, and output in ASCII

3.1.2 RDM_SET_PS2 (0x8F)

Send data：

DATA [0]: Mode Control

Bit0 : Request Mode. 0=Request Idle, 1 = Request All

Bit1 : Key Select. Select use KeyA or Key B for Authenticaiton

0=KeyA, 1=KeyB

Bit2 : Output format 0=Hex, 1=ASCII

Bit3 : Read Mode, 0 = Block, 1 = Byte

Bit4 : CR\LF Mode, 0 = ON, 1 = OFF (if on the send a newline when the data has been read, if off then just send the data and no newline)

Example: Read from Block 10 reading 3 blocks, and output in ASCII

SET:

Send Data ：AA 00 0A 8F 05 03 10 ff ff ff ff ff ff 93 BB（ CR\LF =0）

Response Data：AA 00 02 00 80 82 BB

READ DATA:

WHEN CONNECT TO PS2 CONNECTOR GET DATA:

!"#$%&'()*+,-./0123456789:;<=>?abcdefghijklmno

3.1.3 CMD_MF_Request (0x25)

Data Field

DATA[0]: Request mode

0x00 – Request Idle

0x01 – Request All

DATA[1]: 00 don't need to execute the halt command

01 need to execute the halt command

Response:

Data Field

STATUS: 0x00 – OK

DATA[0-3]: Card Serial Number

Description:

The High Level Value Increment Command integrates the low level commands (Request, AntiColl1, Select) and get the SNR of selected card.

EXAMPLE:

Send Data： aa 02 03 25 26 00 02 bb

Response Data：AA 02 06 00 00 16 0F F4 7F 96 BB

3.2 ISO15693 Commands Example

3.2.1 RDM_Inventory (0x10)

Data Field

DATA[0]: Flags

Bit0: Sub_carrier_flag
Bit1: Date_rate_flag
Bit2: Inventory_flag
Bit3: Protocol Extension_flag
Bit4: Afi_flag
Bit5: nb_slots_flag
Bit6: Option_flag
Bit7: RFU

DATA[1]: Afi

DATA[2]: Masklengh

DATA[3..10]: Maskvalue

Response:

STATUS: 0x00 - OK

Data[0] : The card's number that exist in the reading area

Data[1..n] : UID

Description:

Run the anticollison loop. through this command you can get the UID of all the VICC in the readable zone.(usually it may get 3 to 6 card's snr,it base on the strength of the RF power)

Example:

Send Data： aa 00 04 10 06 00 00 12 bb

When only one card in the reading area： AA 00 0B 00 01 00 01 4A 80 E9 11 00 00 07 3E BB

Two card in the reading area： AA 00 15 00 02 00 01 4A 80 E9 11 00 00 07 E0 00 00 3B 80 E9 11 00 00 07 87 BB

Three card in the reading area： AA 00 1F 00 03 00 01 4A 80 E9 11 00 00 07 E0 00 00 3B 80 E9 11 00 00 07 E0 00 00 3F 80 E9 11 00 00 07 2C BB

Four card： AA 00 29 00 04 00 01 4A 80 E9 11 00 00 07 E0 00 00 3B 80 E9 11 00 00 07 E0 00 00 3E 80 E9 11 00 00 07 E0 00 00 3F 80 E9 11 00 00 07 BC BB

Have no card in the reading area： AA 00 02 01 83 80 BB

4 RDM530 Type Description

RDM530 X---- X

Contactless Interface option

A: ISO14443-TYPEA

B: ISO14443-TYPEA+B

C: ISO15693

D: ISO14443-TYPEA+TYPEB

E: ISO14443-TYPEA+TYPEB+IS015693

F: ISO11784/ISO11785

Communication Interface Option

T = TCP/IP

S = RS232

P = PS2

U = USB