

13.56MHz Reader/Writer

1

D-Think M30

DataSheet

Version 1.0

Augu 2013



Note: Please module and antenna "RX TX1 GND TX2" correspondence connected; attention, cables not too small, too long, otherwise it will affect the reading and writing results.

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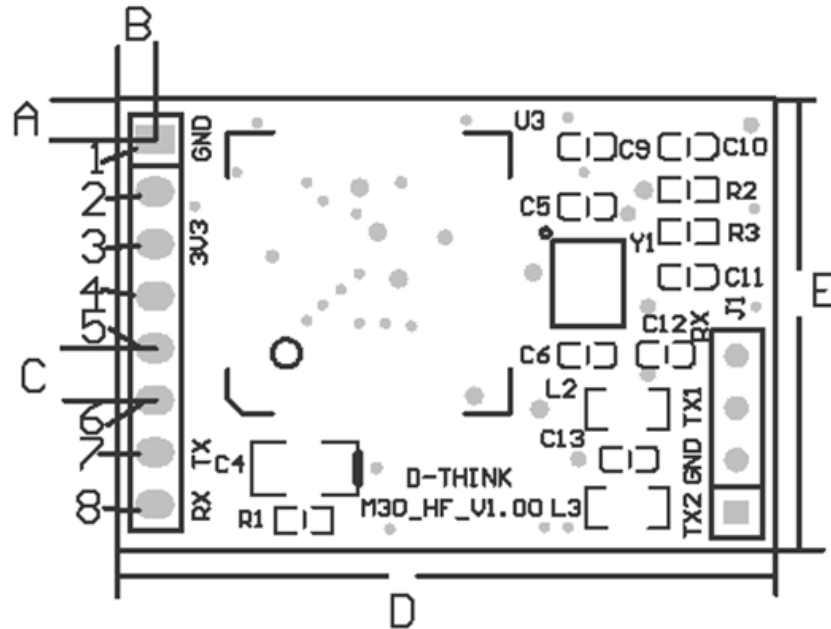
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1. GENERAL INFORMATION

- ◇ Protocols: ISO14443A , ISO15693
- ◇ DC3.3V VDD Operating
- ◇ Maximum 230MA Working Current
- ◇ Size: 50 x 50 x3.6 mm
- ◇ Operating frequency: 13.56MHz
- ◇ Operating distance: Reach 60mm(1443a 50 mm) Depending on the label and different
- ◇ Operating Temperature Range: -20°C ~ +50°C
- ◇ Storage Temperature Range: -25°C ~ +60°C

2. Hardware dimensions and pin Information



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A=2.00mm B=1.86mm C=2.54mm
 D=32.01mm E=22.00mm

1--GND 3--3.3VDC 7--TTL_TX
 8--TTL_RX 2, 4, 5, 6NC

Number	Name	Type	Explanation
1	GND	Power	Power ground
2	NC	NC	NC
3	VCC	Power	Power supply (DC3.3V)
4	NC	NC	NC
5	NC	NC	NC
6	NC	NC	NC
7	UART_TX	I/O	UART TX
8	UART_RX	I/O	UART RX

3. Communication Protocol

3.1 Receives the command format (PC to send)

Header + Length + Device identifier code + Command + Parameters + Checksum

Header: 2BYTE, 0xAABB

Length: 2BYTE, Identification from the device identifier code to check word, The first byte is valid, Second byte is reserved 0

device identifier code:

2BYTE, device identification module responds only consistent with its own device ID or device ID is 0x0000 (Broadcast) command

Command: 2BYTE, Identifies the coding command functions

Parameters: Command packets (can be empty)

Checksum: 1BYTE, Device identification to the parameter byte by byte XOR

Note: In addition to the command header and checksum word outside, if the data in a byte 0xAA, and thereafter shall be followed by a 0x00, length word unchanged.

3.2 Back Command Format (PC receives)

Header + Length + Device identifier code + Command + Status + Parameters + Checksum

Header: 2BYTE,0xAABB

Length: 2BYTE, Identification from the device identifier code to check word, The first byte is valid, Second byte is reserved 0

device identifier code:

2BYTE, Module device identifier code

Command: 2BYTE, Identifies the coding command functions

Status : 1BYTE, 00 = Command OK, Nonzero = Command failure

Parameters: Command packets (can be empty)

Checksum: 1BYTE, Device identification to the parameter byte by byte XOR

Note: In addition to the command header and checksum word outside, if the data in a byte 0xAA, and thereafter shall be followed by a 0x00, length word unchanged.

4. Detailed command

4.1 Command List

Type	No.	Code	Explanation
S Y S T E M	1	0101	Initialize Serial Port
	2	0201	Specify device identifier
	3	0301	Read device identifier
	4	0401	Get RF_READER type and product snr
	5	0801	Manage Protocol
	6	0C01	Manage RF Transmittal
I S O 1 4 4 3 A	1	0102	Request TYPE_A card
	2	0202	MifareStd card Anticoll
	3	0302	MifareStd card Select
	4	0402	Order activated TYPE_A card to enter HALT status
	5	0702	Authenticate Mifare_Std card key
	6	0802	Read a block of data from Mifare_Std card
	7	0902	Write a block of data into Mifare_Std card
	8	0A02	Initialize some block of Mifare_Std card into purse
	9	0B02	Read Mifare_Std card purse value
	10	0C02	Deduction Mifare_Std card purse
	11	0D02	Recharge Mifare_Std card purse
	12	0E02	Mifare_Std card data restore

I S O 1 4 4 3 A	13	0F02	Transfer the block data in M1 card BUFFER into specified block
	14	1002	Request DESFire card in detection range and reset
	15	1102	Send command to DESFire card
	16	1202	Ultralight card Anticoll and activate
	17	1302	Write a page of data into Ultralight(C)
	18	3002	Reset the sensor area DESFire cards
	19	4002	Authenticate Key for Ultralight C Step 1
	20	4102	Authenticate Key for Ultralight C Step 1
	21	4202	Update key of Ultralight C
	22	0303	Command line with ISO14443 protocol exit active CPU card
I S O 1 5 6 9 3	1	0010	ISO15693_Inventory(multiple cards)
	2	0110	ISO15693_Inventory(Single card)
	3	0210	ISO15693_Stay_Quiet
	4	0310	ISO15693_Select
	5	0410	ISO15693_Reset_To_Ready
	6	0510	ISO15693_Read
	7	0610	ISO15693_Write
	8	0710	ISO15693_Lock_Block
	9	0810	ISO15693_Write_AFI
	10	0910	ISO15693_Lock_AFI
	11	0A10	ISO15693_Write_DSFIID
	12	0B10	ISO15693_Lock_DSFIID
	13	0C10	ISO15693_Get_System_Information
	14	0D10	ISO15693_Get_Block_Security

4.2 System command

1. Initialize Serial Port

Command code:0x0101

Parameters:00=4800

01=9600

02=14400

03=19200

04=28800

05=38400

06=57600

07=115200

Remarks: After the initial power-on module default baud rate 19200

Answer data:NONE

2. Specify device identifier

Command code: 0x0201

Parameters: 2 BYTE device identification

Remarks: Module responds only consistent with its own device ID or device ID is 0x0000 (Broadcast) command

Answer data: NONE

3. Read device identifier

Command code: 0x0301

Parameters: NONE

Answer data: 2 BYTE device identification

Remarks: So the command is generally used broadcast mode (0x0000), so use this command should ensure that the system does not have the same two or more device identification modules in parallel, otherwise the reading device identifier may be wrong.

4. Get RF_READER type and product snr

Command code: 0x0401

Parameters: NONE

Answer data: F_READER type and product snr

5. Manage Protocol

Command code: 0x0801

Parameters: 1 BYTE

type = 'A': Set as TYPE_A mode

type = 'B': Set as TYPE_B mode

type = 'r': Set as AT88RF020 card mode

type = 's': Set as ST card mode

type = 'l': Set as ISO15693 mode

Answer data: NONE

6. Manage RF Transmittal

Command code: 0x0C01

Parameters: 00 = off

Nonzero = ON

Remarks: After the antenna module power is off, do the " Manage Protocol " command antenna automatically.

Answer data: NONE

4.3 ISO1443A command

1. Request TYPE_A card

Command code: 0x0102

Parameters: 0x26 = Request not the card into hibernation

0x52 = search all states cards

Answer data: 2BYTE card type code

2. MifareStd card Anticoll

Command code: 0x0202

Parameters: NONE

Answer data: 4BYTE card serial number

3. MifareStd card Select

Command code: 0x0302

Parameters: 4BYTE card serial number

Answer data: 1BYTE card capacity code

4. Order activated TYPE_A card to enter HALT status

Command code: 0x0402

Parameters: NONE

Answer data: NONE

5. Authenticate Mifare_Std card key

Command code: 0x0702

Parameters: 1BYTE password authentication (MODEL) + 1BYTE absolute block number + 6BYTE password

MODEL = 0x60: A key authentication

MODEL = 0x61: B key authentication

Answer data: NONE

6. Read a block of data from Mifare_Std card

Command code: 0x0802

Parameters: 1 BYTE absolute block number

Answer data: 16 BYTE data

7. Write a block of data into Mifare_Std card

Command code: 0x0902

Parameters: 1 BYTE absolute block number + 16 BYTE data

Answer data: NONE

8. Initialize some block of Mifare_Std card into purse

Command code: 0x0A02

Parameters: 1 BYTE absolute block number + 4 BYTE Initial amount (Low byte first)

Answer data: NONE

9. Read Mifare_Std card purse value

Command code: 0x0B02

Parameters: 1 BYTE absolute block number

Answer data: 4 BYTE balance (Low byte first)

10. Deduction Mifare_Std card purse

Command code: 0x0C02

Parameters: 1 BYTE absolute block number + 4 BYTE debit amount (Low byte first)

Answer data: NONE

11. Recharge Mifare_Std card purse

Command code: 0x0D02

Parameters: 1 BYTE absolute block number + 4 BYTE recharge amount (Low byte first)

Answer data: NONE

12. Mifare_Std card data restore

Command code: 0x0E02

Parameters: 1 BYTE absolute block number

Answer data: NONE

13. Transfer the block data in M1 card BUFFER into specified block

Command code: 0x0F02

Parameters: 1 BYTE absolute block number

Answer data: NONE

14. Request DESFire card in detection range and reset

Command code: 0x1002

Parameters: 0x26 = REQ_STD

0x52 = REQ_ALL

Answer data: 4 byte CSN + ATS information

15. Send command to DESFire card

Command code: 0x1102

Parameters: COS command

Answer data: n BYTE the data returned from the label

16. Ultralight card Anticoll and activate

Command code: 0x1202

Parameters: NONE

Answer data: 7 BYTE Ultralight UID

17. Write a page of data into Ultralight(C)

Command code: 0x1302

Parameters: 1 BYTE page address + 4 BYTE write data

Answer data: NONE

18. Reset the sensor area DESFire cards

Command code: 0x3002

Parameters: 0x26 = REQ_STD

0x52 = REQ_ALL

Answer data: 7 BYTE CSN + ATS information

19. Authenticate Key for Ultralight C Step 1

Command code: 0x4002

Parameters: NONE

Answer data: 8 BYTE 3DES encrypted data

20. Authenticate Key for Ultralight C Step 2

Command code: 0x4102

Parameters: 8 BYTE step 1 returns the decrypted data re-encrypted data byte right

Answer data: NONE

21. Update key of Ultralight C

Command code: 0x4202

Parameters: 16 BYTE keys

Answer data: NONE

22. Command line with ISO14443 protocol exit active CPU card

Command code: 0x0303

Parameters:NONE
Answer data:NONE

4.4 ISO15693 command

1. ISO15693_Inventory(multiple cards)

Command: 0x0010

Parameters:NONE

Answer data: 9 Byte as a group, each structure: 1 Byte DSFID + 8 Byte UID

2. ISO15693_Inventory(Single card)

Command: 0x0110

Parameters:NONE

Answer data:9 Byte : 1 Byte DSFID + 8 Byte UID

3.StayQuiet (ISO15693_Stay_Quiet)

Command: 0x0210

Parameters: 8 Byte UID

Answer data: NONE

4.Select (ISO15693_Select)

Command: 0x0310

Parameters: 8 Byte UID

Answer data: NONE

5.ResetToReady (ISO15693_Reset_To_Ready)

Command: 0x0410

Parameters: 1 Byte model + 8 Byte UID

Answer data: NONE

6.Read (ISO15693_Read)

Command: 0x0510

Parameters: 1 Byte model + 8 Byte UID + 1 Byte starting block number + 1 Byte blocks

Answer data: Data read

7.Write (ISO15693_Write)

Command: 0x0610

Parameters: 1 Byte model + 8 Byte UID + 1 Byte block number + 4 Byte write data

Answer data: NONE

8.LockBlock (ISO15693_Lock_Block)

Command: 0x0710

Parameters: 1 Byte model + 8 Byte UID + 1 Byte block number

Answer data: NONE

9.WriteAFI (ISO15693_Write_AFI)

Command: 0x0810

Parameters: 1 Byte model + 8 Byte UID + 1 Byte write data

Answer data: NONE

10.LockAFI (ISO15693_Lock_AFI)

Command: 0x0910

Parameters: 1 Byte model + 8 Byte UID

Answer data: NONE

11.WriteDSFID (ISO15693_Write_DSFID)

Command: 0x0A10

Parameters: 1 Byte model + 8 Byte UID + 1 Byte write data

Answer data: NONE

12.LockDSFID (ISO15693_Lock_DSFID)

Command: 0x0B02

Parameters: 1 Byte model + 8 Byte UID

Answer data: NONE

13.GetSysInfo (ISO15693_Get_System_Information)

Command: 0x0C10

Parameters: 1 Byte model + 8 Byte UID

Answer data: 1 Byte ? (0x0F) + 8 Byte UID + 1 Byte DSFID + 1 Byte AFI + 3
Byte ? (0x1B 0x03 0x01)

14.GetBlockSecurity (ISO15693_Get_Block_Security)

Command: 0x0D10

Parameters: 1 Byte model + 8 Byte UID + 1 Byte starting block number + 1 Byte
blocks

Answer data: N Byte locked state, each corresponding to a 1 byte, zero is not locked,
the lock nonzero

4.5 Command Example

Host send command: Get RF_READER type and product snr

Header	Length	Identifier	Command	Parameters	Checksum
AABB	0500H	0000H	0401H	NONE	05H

Command operation successful return

Header	Length	Identifier	Command	Status	Parameters	Checksum
AABB	1A00H	1112H	0401H	00H	See table below	1D

Parameters

HEX	44 2D 54 68 69 6E 6B 20 4D 33 30 20 52 46 49 44 20 50 44 41
ASCII	“D-Think M30 RFID PDA”

Command fails to return

Header	Length	Identifier	Command	Status	Parameters	Checksum
AABB	0600H	1112H	0401H	0A	NONE	0C

Revision history

Version	Date	Author	Modify description
V1.0	2013-8-6	jin	Create