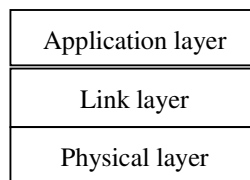# UHF Reader Communication Protocol

Brief Instruction

Communication protocol means that PC machine operates the stipulations of communication protocol of the reader through the communication interface.

RS485 interface supports RS232 communication protocol in the data link layer, but it has protocol extend.

Communication protocol adopts data format of asynchronism communication protocol which is face to byte,. It stipulates that the data frames the PC machine issues to reader must be command, and the data frames from the reader must be response. The command or response data frames must become long bytes and adopt group package and check sum methods to check out afterward.

The longest command or response data frames is 128bytes.

1 communication protocol configuration

| Application layer |
| Link layer |
| Physical layer |

Picture one：communication protocol configuration

Communication protocol adopts administrative levels configuration like the following picture indicated, including physical layer, data link layer and application layer.

1．1 1Physicle layer

The physical layer completes the sending and receiving of bit, and needs to meet the criterion of RS232,the special design demand is like the following:

- one stat bie, eight data bits, one stop bit and no even and odd.
- Communication band rate is designed to

9600bps,19200bps,38400bps,37600bps and 115200bps.After the line on reader repositions, the star band rate is 9600bps,.The communication band rate of the reader can be changed through the PC machine to send command. .When the PC machine and the reader transmission makes mmistakes, the ban rate of reader will revert to 9600bps.

1．2 Data link layer

Data link layer stipulates the types and data format of command and response frames in speciality

The types of frames includes command frame, ,response frame and r response frame. That reader commands   to complete

1．2．1 the format definition of command frame

Command frame is the data frame when mainframe operate reader,the format is like the following table indicated"

Head	Addr	Len	Cmd	Parameter	…	Parameter	Check
0x0A	1 byte	n+2	1 byte	Byte 1		Byte n	cc

- Head is the frame symbol,defines 0x0A
- Addr is the address of reader,generally from 20 to 240,225(OXFF)is communal address,254(OXFE)is broadcasting address. Reader receives the command of iits own assress, communal address and broadcasting address, but never reverts the command of broadcasting   address
- Len is length area ,means the middle byte NO.after lengthe area
- Cmd is command NO. area.。
- Parameter is the area of the command frame.
- Check is the araa of check sum ,it stipulates the checkout range is the check sum of all the bytes from star frame to parameter.Reader needs to calculate the check sum to check mistake after receiving the command frame.

1．2．2 format definition of response frame

Response frame is the data frame that reader returns to mainframe.Response frame includes the data that reader needs to collect,the format definition is like the following table indicated"

Head	Addr	Len	Status	Response	…	Response	Check
0x0A	1 byte	n+2	1 byte	Byte 1		Byte n	cc

- Head is head type,,response frame itype is fixed to be OXED

- Addr is the own address of reader

- Len is length, means the middle bytes after the length

- Status means   the result by the operation stipulated by command,0means right carrying-off. While other indicate abnormity.

- Response is the data from the response frame.

- Check is the check sum area,it stipulates the checkout range is the check sum of all bytes from head to parameter,PC machine needs to calculate the check sum to check mistake after receiving the command frame.

- The check sum of bytes, PC machine needs to calculate the check sum to check mistake after receiving the command frame.

The stipulation to get the data is like the following table indicated:Status

Sequence number	value	Name	Narration interposed
1	0x00	ERR_NONE	Successful completion the command
	0x01	ERR_ GENERAL_ERR	General mistake
	0x02	ERR_PAR_SET_FAILED	Fail to sset parameter
	0x03	ERR_PAR_GET_FAILED	Fail to read parameter
	0x04	ERR_NO_TAG	No tag
	0x05	ERR_READ_FAILED	Fail to read tag
	0x06	ERR_WRITE_FAILED	Fail to read-in tag
	0x07	ERR_LOCK_FAILED	Fail to stipulate tag
	0x08	ERR_ERASE_FAILED	fail to erase tag
	0x09		

	0x0A		
	0xFE	ERR_CMD_ERR	Nonsupport by command or parameter exceed the rang
	0xFF	ERR_UNDEFINED	Undefinition mistake

2 command frame definition

2.1 system to set command

2.1.1 Set Baud Rate

Set the communication band rate of reader RS232

Head	Addr	Len	Cmd	Parameter	Check
0x0A		0x03	0x20	baudrate	cc

bandrate parameter is needed to set. The special parameter meanings are : 0x00，9600bps；0x01，19200bps；0x02，38400bps；0x03，57600bps；0x04，115200bps。

After reader receives command frame,,it will return to the response frame of no data with the primary bandrate,then amend the reader parameter to communicate with the new bandrate.

2.1.2 Reset Reader

Command frame of reset reader

Head	Addr	Len	Cmd	Check
0x0A		0x02	0x21	cc

After reader receives this command,it will returns to the response frame of no data first, then the reader resets

2.1.3 Get Firmware Version

The command frame to read the software edition of the reader

Head	Addr	Len	Cmd	Check
0x0A		0x02	0x22	cc

When reader receives this command frame, it will return to the response frame,, the command data in the response frame is BootLoader or the firmware version,.The format of the response frame I is like the following table indicated.

Head	Addr	Len	Status	Response	Response	Check
0x0B		0x04	0x00	Major	Minor	cc

Major is the major vertion of firmware program

Mainor   is the minor version of the firmware program

2.1.4 Set_RF

Set command frame of reader frequency parameter.

Head	Addr	Len	Cmd	Parameter1	Parameter2	Check
0x0A		0x04	0x25			cc

Parameter1 is RF：canclespan is 0～30；

Parameter2 is frequency sype：cancle span is（00 is ISM920—905MHz, 01 is ISM902—928MHz, 02 is ISM865—868MHz,）

After reader receives this command frame, it will amend the magnitude of power of the RF and

returns to the response frame with no data.

2.1.5 Get_RF

Query reader RF parameter。

Head	Addr	Len	Cmd	Check
0x0A		0x02	0x26	cc

After the reader receives thiscommand frame of reader，**it will return to the response frame，**

the format of the responseframe is like following table indicated：

Head	Addr	Len	Status	POWER	Freq	Check
0x0B		0x04	0x00			cc

POWER is the present RF value of reader。

Freq is the present frequency type of reader（00 is ISM920—905MHz, 01 is ISM902—928MHz, 02 is ISM865—868MHz,）

2.1.6 Get Work Antenna

Query the command frame of work antenna of the reader。

Head	Addr	Len	Cmd	Check
0x0A		0x02	0x28	cc

After the reader receives this command frame，it will return to the response frame，the format of

the response frame is like following table indicated：

Head	Addr	Len	Status	**Antenna**	Check
0x0B		0x03	0x00		cc

2.1.7 Set Work Antenna

Set command frame of FR work antenna.

Head	Addr	Len	Cmd	Parameter	Check

		0x0A			0x03	0x27	antenna	cc

Antenna is the work antenna parameter needs to set.,adopted digital mask off code design.,when the   DD-D7 is or 1 ,,meaning that the corresponding antenna isi on or off working.

After reader receives this command frame,it will return to the response frame with no data,and amend the FR work parameter.

2.2 ISO18000-6B tag operation command

2.2.1 Iso Multi Tag Identify

ISO18000 multi tag identify.

Head	Addr	Len	Cmd	Check
0x0A		0x02	0x60	cc

After reader receives this command frame,it will make multi-tag identify,then return the tag number.,the tag data will be saved in the FR storage..The response frame r format is like the fo;;owing table indicated.

Head	Addr	Len	Status	Response	Check
0x0B		0x03	0x00	TagCount	cc

Tag count i

2.2.2 Iso Multi Tag Read

ISO18000 multi taf users datas   read

Head	Addr	Len	Cmd	Parameter	Check
0x0A		0x02	0x61	Start Addr	cc

Star addr is for the users datas need to read.

After readers receive the command frame,it will make multi tag users datas reading,and read the 8 bytes data from the star address of every tag .After indentification,,it will return the tag number of this time ,and the tag data will be saved in the FR storage.the response frame format is like the following table indicated:

Head	Addr	Len	Status	Response	Check
0x0B		0x03	0x00	TagCount	cc

2.2.3 Iso Write

ISO18000 ttag single byte write

Head	Addr	Len	Cmd	Parameter	Parameter	Check
0x0A		0x04	0x62	Addr	Value	cc

Addr is the tag address needs to write

Value is the data needs to write

The reader will return to the response frame with on data.

2.2.4 Iso Read With UID

Read the data in the condition of knowing UID

Head	Addr	Len	Cmd	Parameter	Parameter	Check
0x0A		0x0B	0x63	UID(8byte)	Addr	cc

Addr is the star address,UID is the ID NO.of the known tag.The reader will return 9 bytes data.

Head	Addr	Len	Status	Response	Check
0x0B		0x0B	0x00	9byte	cc

In the returning datas ,the first byte is antenna number and the latter 8 bytes are data.

2.2.5 Iso Write With UID

In the condition of knowing UID,write tag data

Head	Addr	Len	Cmd	Parameter	Parameter	Parameter	Check
0x0A		0x0B	0x64	UID(8byte)	Addr	Value	cc

Address is the tag address f needs to write

Value is   the data needs to write

UID is the ID number of the knowing tag

The reader returns to the response rame with no data.

2.2.6 Iso Lock

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ISO18000 tag lock

Head	Addr	Len	Cmd	Parameter	Check
0x0A		0x02	0x65	Addr	cc

Address is the address for the tag needs to lock

2.2.7 Iso Query Lock

Iso18000lB locking inquiry。

ISO18000 query lock

Head	Addr	Len	Cmd	Parameter	Check
0x0A		0x02	0x66	Addr	cc

Address is the tag address needs to query.

The response frame format format is like the following table indicated:

Head	Addr	Len	Status	Response	Check
0x0B		0x03	0x00	Lock Status	cc

Lock status,0 means unlocked,1 means locked

2.2.8 Iso Block Write

ISO18000 tag block (four bytes)write

Head	Addr	Len	Cmd	Parameter	Parameter	Check
0x0A		0x02	0x67	Addr	Value （4bytes）	cc

Addr is the tag address needs to write,it must be

Value is the data needs to write

The reader returns to the response frame with no data

2.2.9 Iso Single Tag Read

ISO18000 single tag read

Head	Addr	Len	Cmd	Parameter	Check
0x0A		0x03	0x68	Addr	cc

Addr is the star address,,when the address is 0,ithe reader reads UID.The reader returns 9 bytes data

Head	Addr	Len	Status	Response	Check
0x0B		0x0B	0x00	9byte	cc

In the returning datas,the first byte is antenna number,the latter 8bytes are data.

2.3 EPC GEN2 tag work command

2.3.1 Gen2 Multi Tag Identify

EPC Gen2multi tag identify

Head	Addr	Len	Cmd	Check
0x0A		0x02	0x80	cc

After the reader rexeives the command frame,it makes EPC,GEN2 multi tag operate,then return the tag number of this time after identification.The tag data will be saved in the storage .The response frame format   is like the following table indicated.

Head	Addr	Len	Status	Response	Check
0x0B		0x03	0x00	TagCount	cc

TagCount

2.3.2 Gen2 EPC Write

EPC Gen2 EPC write

Head	Addr	Len	Cmd	Parameter	Parameter	Check
0x0A		0x02	0x81	World Addr	Value（2bytes）	cc

World addr is thewoed address needs to write(0~5)

Value is the byte data needs to write

After the reader receives the command,it will write   the EPC coding with a word(two bytes)

Generally , now he EPC tag and EPC coding are six bytes(96 digit)

Reader returns to the response frame with no data.

2.3.3 Gen2 Lock

EPC Gen2 taqg data lock

Head	Addr	Len	Cmd	Parameter	Check
0x0A		0x02	0x82	MemBank	cc

Mem Band is the tag area needs to lock,,it must be 2 when lock the EPC

The reader will return to the response frame with no data.

2.3.4 Gen2 Kill

EPC Gen2tag kill

Head	Addr	Len	Cmd	Parameter	Check
0x0A		0x02	0x83	Password	cc

Password means kill the code

The reader returns to the response frame with no data.

2.3.5 Gen2 Init

EPC Gen2 tag specification initialization。

EPC Gen2 tag specification initialization

Head	Addr	Len	Cmd	Parameter	Check
0x0A		0x03	0x84	BitCount	cc

BitCount is the EPC digit　need s to initialize

The reader returns to the response frame with no data

2.3.6 Gen2 Read

Head	Addr	Len	Cmd	Parameter	Parameter	Parameter	Check
0x0A		0x05	0x85	Membank	Word Addr	WordCnt	cc

2.3.7 Gen2 Write

EPC Gen2 discretional area write

Head	Addr	Len	Cmd	Parameter	Parameter	Parameter	Check
0x0A		0x06	0x86	Membank	World Addr	Value（2bytes）	cc

Word Addr is the word address needs to write in(0~5)

Value is the two bytes datas need to write in.

After the reader receives the command, it will write a word(two bytes)in the appointed address.The reader returns to the response frame with no data,.

2.3.8 Gen2 Block Write

Head	Addr	Len	Cmd	Parameter	Parameter	Parameter	Check
0x0A		0x02	0x87	Membank	World Addr	Value（2bytes）	cc

2.4 Buffer management command

2.4.1 Get ID And Delete

Get the tag data from the buffer ,then delete the data.

Head	Addr	Len	Cmd	Parameter	Check
0x0A		0x03	0x40	Count	cc

Count is the data number that wants to get,the largest is 18.The response frame is like the following table indicated:

Head	Addr	Len	Status	Response	Response	Check

| 0x0B | | 14*n+3 | 0x40 | Count | Data(14*n) | cc |

Count is the uploading number,of this time,data means tag data.14 bytes make a group fo tag data,the first byte of the group means tag type,the second means antenna number,and the llatter 12 bytes mean tag data.

2.4.2 Get ID

Get the tag data from the buffer,the keep the data.

Head	Addr	Len	Cmd	Check
0x0A		0x03	0x41	cc

Count is the tag number needs to get.The response frame is like the following table indicated:

Head	Addr	Len	Status	Response	Check
0x0B		17	0x00	Data(14)	cc

2.4.3 Get ID ACK

After the reader receives the command of Feedback of successful data getting,delete the data that transimited before

Head	Addr	Len	Cmd	Check
0x0A		0x03	0x42	cc

The reader deletes one group of ID that transmited,and transmits another group data of ID.

If no data in the determent storage,the reader will returns to the response frame with no data

2.4.4 Query ID Count

Query ID count

Head	Addr	Len	Cmd	Check
0x0A		0x03	0x43	cc

The response frame format is like the following table indicated:

Head	Addr	Len	Status	Response	Check
0x0B		0x03	0x00	Count	cc

Count is the tag number in the buffer

2.4.5 Clear ID Buffer

Clean the buffer

Head	Addr	Len	Cmd	Check
0x0A		0x03	0x44	cc

The reader returns the response frame with no data.

3 Technical Support

Welcome to contact with us when there is any question in using it,we will do our best to service you.。

4   Addenda command index table

Sequence	Command	Name	Narration interposed

number	code		
System setting command (0x60 ~ 0x7F)			
	0x20	Set Baudrate	Set communication bandrate
	0x21	Reset Reader	Reset reader
	0x22	Get Firmware Version	Read the software version OF readers
	0x23	Set Parameter	Set the single work parameter of readers
	0x24	Get Parameter	Read the single parameter of readers
	0x25	Set_RF	Set the FR poeder of readers
	0x26	Get RF	Get RF poeder of readers
	0x27	Set Work Antenna	Set the work antenna of readers
	0x28	Query Battery	Query buttery quantity（handset）
Tag operation command (0x68~0x9F)			
	0x60	Iso Multi Tag Identify	ISO18000 multi tag ID NO. searching
	0x61	Iso Multi Tag Read	ISO18000 multi tag 8 bytes data reading
	0x62	Iso Write	ISO18000 single tag single byte writing
	0x63	Iso Read With UID	ISO18000 reads according the ID NO.
	0x64	Iso Write With UID	ISO18000 wtites according the ID NO.
	0x65	Iso Lock	ISO18000single tag lock
	0x66	Iso Query Lock	ISO18000single tag query lock
	0x67	Iso Block Write	ISO18000 single teag read and write

	0x68	Iso Single Tag Read	ISO18000single tag read
	0x80	Gen2 Multi Tag Identify	EPC GEN2 multi tag EPC read
	0x81	Gen2 EPC Write	EPC GEN2 single tag EPC single byte
	0x82	Gen2 Lock	EPC GEN2 single tag lock
	0x83	Gen2 Kill	EPC GEN2 single tag kill
	0x84	Gen2 Init	EPC GEN2 single tag EPC digit lock
	0x85	Gen2 Read	EPC GEN2 single tag read
	0x86	Gen2 Write	EPC GEN2 single tag write
	0x87	Gen2 BlockWrite	EPC GEN2 single tag block write
Buffer management command 0x40~0x4F）			
	0x40	Get ID And Delete	Distill tag data and kill buffer pickup
	0x41	Get ID	Distill tag data and keep buffer pickup
	0x42	Get ID ACK	feedback of right distilling tag data
	0x43	Query ID Count	Query tag data NO.in the buffer
	0x44	Clear ID Buffer	Clean the buffer