

Read module communication protocol programming

## Version summary

DATE	Version	author	Note
2021.12.06	1.0		

## brief

Through protocol programming, it is used to realize function configuration, information reading, control and other operations of the host computer on the reading module. Protocol can be virtual via RS-232, USB The interface such as serial port realizes the interaction between the host computer and the reading module. This document contains protocol format specifications and protocol instruction tables.

## Protocol Format

The host sending command consists of four parts:

Command Type	PID	FID	Parameter Values
1Byte	1Byte	1Byte	Elongate

Part description

Field	Length	description
TYPE	1Byte	The type of command sent by the host or identification module
PID	1Byte	A number that contains a specific set of functions
FID	1Byte	7bit 6bit Parameter bytes 0 0 NONE 0 1 1Byte 1 0 2Byte 1 1 >2Byte
PARAM	Elongate	The length of the parameter is determined by the FID high two digits. if Greater than two bytes, the first two bytes of the parameter part Determines the number of bytes remaining in the parameter.

## Protocol package type

Communication programming protocols encompass several types of commands: configuration commands, control commands, status commands, and image commands. Each command class includes multiple specific communication commands for the host to send requests and for the module to respond to host requests.

### Configuration Commands:

- Configuration Write (21): Host requests the modification of one or more configuration parameter values. After a successful configuration write, the parameters are directly saved to the storage medium.
- Configuration Write Reply (22): Module responds to the host with the configuration result.
- Configuration Read (23): Host requests the retrieval of one or more configuration parameter values.
- Configuration Read Reply (24): Module sends the requested configuration parameter values to the host in response to the request.

### Control Commands:

- Control Instruction (32): Host sends one or more control instructions to make the module perform a specific action.
- Control Reply (33): Module responds to the control instructions sent by the host.

### Status Query:

- Status Read (43): Host requests the retrieval of module status information.
- Status Reply (44): Module sends status information in response to the host's request.

### Image Commands:

- Image Read (60): Host requests the retrieval of image data.
- Image Reply (61): Module sends image data to the host in response to the request.

Please note that these commands play specific roles in configuring, controlling, querying status, and handling image data between the host and the recognition module.

## Protocol command description

### • configuration commands

These commands are used to configure the identification module or receive the configuration information of the identification module.

#### Configure write 0x21

The configuration write command is sent by the host to send the configuration command to the identification module. The command parameter values are applied to the corresponding functions of the current read module and saved to the storage medium.

##### protocol format

<21><PID><FID><PARAM>

#### Configure write reply 0x22

Sent by the recognition module to the host as a response to the configuration write command. This parameter describes the configuration write execution result. Supported configuration write commands are executed correctly. Invalid commands return incorrect results.

##### protocol format

<22><PID><FID><PAR><RID>

The format description is as follows:

PID/FID	Configure the identity contained in the write
PAR	If the write value is 1 byte, enter the original parameter value If the write parameter value is two or more bytes, enter 00
RID	Configure write result <ul style="list-style-type: none"> <li>• 0x00 portswellconfigured</li> <li>• 0x01 Invalid PID/FID</li> </ul>

#### Example 1

Master 21614100

Module 2261410000

Set the reading mode to **key triggering mode**

Example 2

**Master** 2151C200020D0A

**Module** 2251C20000

Configuration suffix /r/n

### **Configure read 0x23**

The configuration read command is sent by the host to receive the configuration information parameter value of the identification module

#### **protocol format**

<23><PID><FID>

### **Configure the read reply 0x24**

Sent by the recognition module to the host as a response to the configuration read command. The value of the configuration parameter used to send the host request. If an unsupported configuration parameter is requested, then no error is generated. Unsupported PID/FID is ignored.

#### **Protocol Format**

<24><PID><FID><PARAM> The module ignores unsupported requests for setting parameters and produces no errors.

### **Example 1**

**Host** 236141

**Module** 24614105

**Read module read mode**

## control command

Control commands are used to perform operations on the operation identification module, such as decoding and factory restoration.

### Control instruction 0x32

The control command is sent by the host to control the identification module to complete a certain operation.

#### Protocol Format

<32><PID><FID><PARAM>

### Control returns 0x33

The identification module is used to respond to the control instruction (0x32) sent by the host. When the control command is executed correctly, the recognition module sends a "result command" in response. Some control instructions are not returned. If the control command contains an illegal instruction, the illegal instruction will be included in the result command returned to the host.

#### Protocol Format

<33><PID><FID><PAR><RID>

The format description is as follows:

PID/FID	PID FID included in the control command
PAR	If the control command is a 1-byte parameter, enter the original parameter value If the control command has no parameter, or 2 or more byte parameter values, enter 00
RID	Control command result 0x00 The command succeeded 0x01 PID,FID, the parameter is incorrect

#### Example 1

Host 327501

Module Nothing

Send the start decode command

#### Example 2

Host 327501

Module 3375020000

Send the stop decoding command

## Status query command

These commands are used to send and receive status parameters. The status query includes the module software version, firmware version, and serial number.

### The status reads 0x43

The status read command is sent by the host to receive information about a status parameter of the identification module.

#### Protocol Format

<43><PID><FID>

### The status returned to 0x44

The value of the status parameter sent by the recognition module to the host as a response to the status read for sending the host request. Unsupported or invalid status query commands are ignored with no error. If none of the queries is supported, an empty status reply is returned.

#### Protocol Format

<44><PID><FID><PARAM>

Unsupported or invalid status query commands are ignored with no error. If all queries are not supported, an empty status reply is returned <44><00>

**Example 1** Get the read module firmware version:

The host sends a status read:



Command Type	PID/FID
43	02C1
Status Read	Firmware Version

Identification module status reply:

Command Type	PID/FID	Parameter
44	02C1	00 09 42 46 35 33 31 5F 31 2E 30
Status	Firmware Version	Length BF531_1.0
Reply		

## Image command

This part of the command is used for image data transmission.

### The image reads 0x60

The image reading command is issued by the host to request the identification module to send the current (last) acquired image data.

#### Protocol Format

<60><Request image head>

<Request image head>The condition information that contains the requested image, such as image size, format, etc., is defined as follows

Parameter	Byte	State
width	2	image width (MSB first) Width If the maximum image width that can be supported is small, the image will be scaled
height	2	Image height (MSB first) height If the maximum image width that can be supported is small, the image will be scaled
image type	1	BBit[7:4] Bit[3:0]=3 is Jpeg format Represents the percentage of compression: 01 – 0A 10%-100% 00 50%(default) Bit[3:0] 0 Raw data 3 Jpeg format
retain	1	

#### Recognition module response

When the recognition module correctly receives the image data reading command, it will send an "image reply" command as a response. If the host request contains an invalid parameter value, or the recognition module returns an empty "image reply".

### The image returns to 0x61

The image reply is sent by the recognition module to the host in response to the image read command.

#### Protocol Format

61><Return image head><image data>

<Return image head>as defined below:

Parameter	Byte	State
width	2	image width (MSB first) Width If the maximum image width that can be supported is small, the image will be scaled
height	2	Image height (MSB first) height If the maximum image width that can be supported is small, the image will be scaled
compress	1	0 Raw data 3 Jpeg
retain	1	Reserved use
Image data length	4	Total bytes of image data area ((MSB first))

If the image read command has an invalid parameter, the reply returns empty data.

< 61 > <00 >

**Example**

The host requests the identification module to upload the image, the size is 640x480, the original data, and the identification module returns the current collected image:

The host sends the image data read command

CommandType	Request image head			
60	02 80	01 E0	00	00

Picture reading width height raw data remain

The identification module sends a reply command

CommandType	Return image head				image data	
61	02 80	01 E0	00	00	00 1C 20 00	7A 76 7B 7A 7C 76 76 76 79 79 78 79 76 .....

Picture reading reply width height raw data remain Image data length Image data

## Protocol command table

### Configuration parameter table

This list describes the definition of PID/FID and parameter values for each configuration function of the read module.

The configuration parameters are written or read. For details, see "Configuration Commands".

#### communication interface

Communication interface selection		
Description	PID/FID	Value
RS232 (serial port)	4240	00
USB analog keyboard		01
USB virtual serial port		02
USB HID POS		03
RS485		04

#### RS232 parameters

RS232 parameters			
Description		PID/FID	Value
<b>Baud rate</b>	1200	4141	04
	2400		05
	4800		06
	9600		07
	19200		08
	38400		09
	57600		0A
	115200		0B
	128000		0C
<b>Data bits</b>	7 bits	4142	00
	8 bits		01
<b>Check bit</b>	8 bits	4143	01
	None		00
	Even		01
<b>Stop bit</b>	Odd	4144	02
	1		00
	2		01

## USB Keyboard

USB keyboard parameters			
Description		PID/FID	Value
<b>Keyboard country type</b>	US	<b>4340</b>	<b>00</b>
	Spain		<b>01</b>
	Germany		<b>02</b>
	France251		<b>03</b>
	France189		<b>04</b>
	Italy		<b>05</b>
	Sweden153		<b>06</b>
	Sweden285		<b>07</b>
	UK166		<b>08</b>
	UK168		<b>09</b>
	Brazil		<b>0A</b>
	Latin America		<b>0B</b>
	India		<b>0C</b>
	Korea		<b>0D</b>
	Russia		<b>0E</b>
	Turkey Q		<b>0F</b>
	Turkey F		<b>10</b>
	Hungary		<b>11</b>
<b>Bar code type</b>	Croatia	<b>4341</b>	<b>12</b>
	ASCII		<b>00</b>
	GBK		<b>01</b>
<b>Input velocity mode</b>	UTF-8	<b>4342</b>	<b>02</b>
	Speed default		<b>00</b>
	fast		<b>01</b>

## Reading parameter

Description	key	PID/FID	Value
<b>Burst mode</b>	continuous	<b>6141</b>	<b>00</b>
	automatic		<b>01</b>
	pulse		<b>02</b>
	Motion induction		<b>04</b>
			<b>05</b>
		<b>6182</b>	
<b>Pulse trigger timeout</b>	Stop decoding timeout duration (unit: 1ms) XXYY = hex values 00 to FFFF		<b>XXYY</b>
<b>Inductive mode sensitivity</b>	1		
	2		

	3		
	4		
<b>Inductive mode is continuously decoded</b>	5	<b>614B</b>	<b>00</b>
	off		<b>01</b>
<b>Code interval</b>	on	<b>6482</b>	<b>0000</b>
	off		<b>XXYY</b>
	Interval time (unit 1ms) XXYY = hex value 0001 to FFFF		
<b>Same code without delay</b>	off	<b>6443</b>	<b>00</b>
	non-deferred		<b>01</b>

## Fill light

Fill light setting			
Description		PID/FID	Value
<b>Working mode</b>	Decode steady on	<b>6241</b>	<b>02</b>
	anxiety of influence		<b>00</b>
	Powered on		<b>03</b>
<b>Working brightness</b>	Percentage 0 to 100 XX = hex The value ranges from 0 to 64	<b>6248</b>	<b>XX</b>
<b>Sensor detection is enabled</b>	off	<b>6244</b>	<b>00</b>
	Lighting Form		<b>01</b>
<b>Induction detection brightness</b>	Percentage 0 to 100 XX = hex The value ranges from 0 to 64	<b>624C</b>	<b>XX</b>

## CROSS LASER LIGHT

Positioning light setting			
Description		PID/FID	Value
<b>Working mode</b>	blink	<b>6242</b>	<b>01</b>
	Steady on		<b>02</b>
	off state		<b>00</b>
<b>Sensor detection is enabled</b>	off	<b>6245</b>	<b>00</b>
	Steady on		<b>01</b>

## Buzzer

Buzzer Settings			
Description		PID/FID	Value
<b>Read success tone</b>	on	<b>6346</b>	<b>01</b>
	off		<b>00</b>
<b>Number of successful read</b>	0	<b>6342</b>	<b>00</b>
	1		<b>01</b>

	2		02
Recognize success types	default	6341	01
	briefness		00
Start tone	prolonged sound		02
	four-tone	6345	01
	Second-tones		02
	off		00

### Voice setting

voice setting			
Description		PID/FID	Value
Working mode	off	6540	00
	on		01
Read successfully	off	6542	00
	Combination broadcast		01
	Only the default voice is played		02
	Allow to broadcast wechat pay voice		03
volume	Allow to broadcast Alipay payment voice	6541	04
	0 to 100 XX = hex The value ranges from 0 to 64		XX

### data edition

data edition			
Description		PID/FID	Value
Suffix enable	on	514C	01
	off		00
Bar code suffix content	The data length is 0 to 40 bytes LD = Length (2 bytes) + Data (0-40 bytes)	51C2	LD
Prefix enable	on	51CB	01
	off		00
Barcode prefix content	The data length is 0 to 40 bytes LD = Length (2 bytes) + Data (0-40 bytes)	51C1	LD
protocol format	off	5143	00
	Format 1		01
	Format 2		02
toggle case	Format 2		03
	off	5148	00
	uppercase		01
	lowercase		02

## One-dimensional code setup

One-dimensional code setup			
Description		PID/FID	Value
<b>Code 39</b>			
<b>Code 39</b>	Forbidden to read	2340	00
	Permissive reading		01
<b>verification mode</b>	uncheck	2341	00
	Code 32 Check		01
	Mod 43 Check		02
<b>Full ASCII</b>	forbid	2342	00
	permit		01
<b>Output start and end characters</b>	forbid	2343	00
	permit		01
<b>Output check</b>	forbid	2333	00
	permit		01
<b>Code 93</b>			
<b>Code 93</b>	Forbidden to read	2240	00
	Permissive reading		01
<b>Full ASCII</b>	forbid	2241	00
	permit		01
<b>Code 128</b>			
<b>Code 128</b>	Forbidden to read	2140	00
	Permissive reading		01
<b>UPC-A</b>			
<b>UPC-A</b>	Forbidden to read	2441	00
	Permissive reading\		01
<b>data logger checker</b>	forbid	2451	00
	permit		01
<b>UPC-E</b>			
<b>UPC-E</b>	Forbidden to read	2442	00
	Permissive reading\		01
<b>data logger checker</b>	forbid	2452	00
	permit		01
<b>EAN 13</b>			
<b>EAN 13</b>	Forbidden to read	2443	00
	Permissive reading\		01
<b>data logger checker</b>	forbid	2453	00
	permit		01
<b>EAN 8</b>			
<b>EAN 8</b>	Forbidden to read	2444	00
	Permissive reading\		01
<b>data logger checker</b>	forbid	2454	00



	permit		01
<b>odabar</b>			
<b>odabar</b>	Forbidden to read	2540	00
	Permissive reading		01
<b>verification mode</b>	uncheck	2541	00
	check		01
<b>data logger checker</b>	forbid	2542	00
	permit		01
<b>Output start and end characters</b>	forbid	2543	00
	Output the start and end character ABCD		01
	Output the start and end character abcd		02
<b>Standard 2 of 5</b>			
<b>Standard 2 of 5</b>	Forbidden to read	2640	00
	Permissive reading		01
<b>verification mode</b>	uncheck	2641	00
	Find the residual 10 check		01
<b>data logger checker</b>	forbid	2642	00
	permit		01
<b>Matrix 2 of 5</b>			
<b>Matrix 2 of 5</b>	Forbidden to read	2740	00
	Permissive reading		01
<b>verification mode</b>	uncheck	2741	00
	Find the residual 10 check		01
<b>data logger checker</b>	forbid	2742	00
	permit		01
<b>Interleaved 2 of 5</b>			
<b>Interleaved 2 of 5</b>	Forbidden to read	2840	00
	Permissive reading		01
<b>verification mode</b>	uncheck	2841	00
	Find the residual 10 check		01
<b>data logger checker</b>	forbid	2842	00
	permit		01
<b>MSI</b>			
<b>MSI</b>	Forbidden to read	2A40	00
	Permissive reading		01
<b>verification mode</b>	uncheck	2A41	00
	Find the residual 10 check		01
	Find the rest 11 check		02
	2 quadrate-10 check		03
	Find the rest 11 Find the rest 10 check		04
<b>data logger checker</b>	forbid	2A42	00
	permit		01
<b>Code 11</b>			
<b>Code 11</b>	Forbidden to read	2940	00

	Permissive reading		01
<b>verification mode</b>	1 check	2941	00
	2 check		01
	automatic check		02
	forbid		03
<b>data logger checker</b>	permit	2942	00
	forbid		01
<b>GS1 Databar( Omnidirectional)</b>			
<b>GS1 Databar ( Omnidirectional)</b>	Forbidden to read	2B40	00
	Permissive reading		01
<b>GS1 Databar (Limited)</b>			
<b>GS1 Databar (Limited)</b>	Forbidden to read	2B41	00
	Permissive reading		01
<b>GS1 Databar (Expanded)</b>			
<b>GS1 Databar Expanded)</b>	Forbidden to read	2B42	00
	Permissive reading		01
<b>China Post</b>			
<b>China Post</b>	Forbidden to read	2D40	00
	Permissive reading		01
<b>Plessey</b>			
<b>Plessey</b>	Forbidden to read	2C40	00
	Permissive reading		01
<b>data logger checker</b>	forbid	2C41	00
	permit		01
<b>Plessey</b>			
<b>Plessey</b>	Forbidden to read	2E40	00
	Permissive reading		01
<b>encoding type</b>	ASCII	2E41	00
	Numeric		01

## Qr code setting

Qr code setting			
Description		PID/FID	value
<b>QR Code</b>			
<b>QR Code</b>	Forbidden to read	1040	00
	Permissive reading		01
<b>Mirror image reading</b>	on	1042	00
	off		01
<b>Micro QR</b>			

Micro QR	Forbidden to read	1540	00
	Permissive reading		01
<b>PDF417</b>			
PDF417	Forbidden to read	1140	00
	Permissive reading		01
<b>Chinese sensible code</b>			
Chinese sensible code	Forbidden to read	1240	00
	Permissive reading		01
<b>Data Matrix</b>			
Data Matrix	Forbidden to read	1340	00
	Permissive reading		01
<b>Aztec</b>			
Aztec	Forbidden to read	1440	00
	Permissive reading		01
<b>Micro PDF417</b>			
Micro PDF417	Forbidden to read	1640	00
	Permissive reading		01
<b>Grid Matrix</b>			
Grid Matrix	Forbidden to read	1740	00
	Permissive reading		01

## Control command table

To complete the corresponding control command functions, complete protocol commands need to be organized according to the Control Commands section.

Control command table			
Description		PID/FID	value
<b>Decoding command</b>	Start decoding	7501	none
	Stop decoding	7502	none
	Start delay decoding	7504	none
<b>Setting command</b>	factory reset	7601	
<b>Code reading Settings</b>	Close All	7642	00
	Only all one-dimensional codes are allowed to be read		01
	Only all QR codes can be read		02
	Allow all bar codes		03

## Status query command table

To complete the status information query function, you need to compose a complete protocol command according to the Status Command section.

equipment information			
Description		PID/FID	
<b>version</b>	Read the software version	02C2	
	firmware version	02C1	
<b>product message</b>	serial number	02C5	
	date of manufacture	02C6	
	Hardware model (Device type)	02C7	
	Hardware Specifications	02C8	
	hardware version	02C4	