Wireless relay control instruction set V1.03

Version	Update Date	Updated content	operator
V1.0	2018-12-1	Instruction set creation	Eric
V1.01	2019-4-20	Add "example of instruction"	Ben
V1.02	2019-4-24	Increase the query relay status command Increase version number query	Eric
V1.03	2019-5-6	Increase PWM control protocol Add general parameter storage protocol	Eric

1. Instruction structure description

1.1 Mobile to terminal command

Start Flag + Password + Instruction number + Instruction content + Check code + End Flag

Start Flag	Password	Instruction Code	Instruction content	Check code	End Flag
0xA1	0x04D2	0x01			AA
1 byte	2 byte	1 byte	Uncertain length	1 byte	1byte

Start Flag: Instructions always start at 0xA1

Password: The length is 2 bytes. For example: 0x04D2 is converted to decimal as 04*0x0100 + D2 = 1234, which means the password is 1234.
When the terminal receives the operation instruction, it needs to compare the password with the saved password. If the matching is consistent, the operation is performed, otherwise the execution will be refused.

Instruction Code: The length is 1 byte, indicating different instructions. See details (Table 2.1)
Instruction content: Different instructions have different instruction lengths, see (Table 2.1).

Check code: The length is 1 byte. The XOR operation is performed from the start flag to the instruction content to check the completeness of the instruction. If the check code is not correct, the instruction is not executed.

End Flag: The instruction always ends with 0xAA

1.2 Terminal to mobile phone command

In order to ensure that the instruction can be executed correctly, the terminal needs to return the execution result after receiving the instruction and executing the instruction.

If the execution result is not returned within 3 seconds, then the instruction is not executed correctly.

The format of the instruction is as follows:

Start Flag	Instruction Code	Instruction execution result	Check Code	End Flag
0xA1	0x01			AA
1 byte	1 byte	Uncertain length	1 byte	1byte

Instruction execution result:

Instruction execution result	length	Instruction execution result
00	1 byte	Indicates execution failure
01	1 byte	Indicates successful execution
Other	Uncertain length	Determined by the instruction code

1.3 Terminal notification instruction

The terminal notification instruction refers to an instruction that the terminal actively reports. The difference with 1.2 is that it is not a response to the issued command, but an instruction to actively notify the mobile phone according to the change of the terminal status. The command format notified by the terminal to the mobile phone is as follows:

Start Flag	Instruction Code	Content of the notice	Check Code	End Flag
0xA1	0x81			AA
1 byte	1 byte	Uncertain length	1 byte	1byte

The main types of notifications are as follows：

No	Instruction Code	Instruction description:	Instruction length	Comment
1	0x81	Upload terminal working status (including relay status)	5 Byte	Please refer to the section 4.1

1.4 Security Mechanism

To ensure secure access to the terminal. We have defined the following security verification mechanisms to ensure legitimate access to the terminal.

1, security code mechanism: all instructions must contain a 2-byte password. When the password is inconsistent, the terminal will refuse to execute the instruction.

2. Mobile to terminal command type

The following instructions are sent from the mobile phone to the terminal. The format of the command is as follows:

NO	Command Code	Command Description	Instruction content length	Comment
1	01	Turn relay on	1 byte	
2	02	Turn Relay off	1 byte	
3	03	Timing to turn on the relay	4 byte	
4	04	Timing to turn off the relay	4 byte	
5	05	Query relay status	1 byte	
6	06	PWM Setting	2 byte	Only for terminals with PWM function
7	07	General parameter saving	5 byte	
8	08	General parameter Reading	5 byte	
11	11	Change Password	2 byte	
19	19	Query version number	1byte	

3. Instruction description

3.1 Turn on relay

Start Flag	Password	Instruction Code	Instruction content	Check Code	End Flag
0xA1	0x04D2	0x01	<PR>		AA
1 byte	2 byte	1 byte	1 byte	1 byte	1byte

Description of the parameters of the instruction content:
<PR> : Relay channel number. Ranges:01-08; Length : 1 byte

Example: Turn on the first channel of the relay
Command::A1 04 D2 01 01 77 AA
Response:A1 01 01 A1 AA

3.2 Turn off Relay

Start Flag	Password	Instruction Code	Instruction content	Check Code	End Flag
0xA1	0x04D2	0x02	<PR>		AA
1 byte	2 byte	1 byte	1 byte	1 byte	1byte

Description of the parameters of the instruction content:
<PR> : Relay channel number. Ranges:01-08. Length : 1 byte
Example: Turn off the first relay
Command::A1 04 D2 02 01 74 AA
Response:A1 02 01 A2 AA

3.3 Timing open relay

Start Flag	Password	Instruction Code	Instruction content	Check Code	End Flag
0xA1	0x04D2	0x03	<PR><OT>		AA
1 byte	2 byte	1 byte	4 byte	1 byte	1byte

Parameters:
<PR> : Relay channel number. Ranges:01-08 ; Length : 1 byte
<OT> Set the time to turn on the relay.
Range: 0~2^24. Number of bytes: 3byte.
Unit: second
Example: Set the first channel relay to turn on after 3 seconds
Command::A1 04 D2 03 01 00 00 03 76 AA
Response:A1 03 01 A3 AA

3.4 Timing off relay

Start Flag	Password	Instruction Code	Instruction content	Check Code	End Flag
0xA1	0x04D2	0x04	<PR><CT>		AA
1 byte	2 byte	1 byte	4 byte	1 byte	1byte

Parameters:
<PR>: Relay channel number. Ranges:01-08 ; Length : 1 byte
<CT> Set the time to turn off the relay.
Range: 0~2^24. Number of bytes: 3byte.
Unit: seconds
Example: Turn off 1 relay after setting the time for 3 seconds
Command::A1 04 D2 04 01 00 00 03 71 AA
Response:A1 04 01 A4 AA

3.5 Query relay status command

Start Flag	Password	Instruction Code	Instruction content	Check Code	End Flag
0xA1	0x04D2	0x05	<QR>		AA
1 byte	2 byte	1 byte	1 byte	1 byte	1byte

Parameters:
<QR> Reserved parameter, default is 0x00
After sending the query instruction, the Terminal returns the following command.

Start Flag	Instruction Code	Instruction execution result	Check Code	End Flag
0xA1	0x05	<PR><ST>		AA
1 byte	1 byte	Uncertain length	1 byte	1byte

<PR>: Numbers of channel; Ranges :01-08 ; Length : 1 byte
<ST>: Relay Open/Close status. Length depends on <PR>,
Examples are as follows:
<ST> : 0x0001
It means that the first channel is open and the second channel is off.
<ST> : 0x01010100:
It means that the first channel is off, and the second, third, and fourth channel are open.

Example: Query the status of the current relay (assuming the relay is a 2-channel relay)

Command::A1 04 D2 05 00 72 AA

Response:A1 05 02 00 01 A7 AA
Indicates that the first relay is on and the second relay is off.

3.6 PWM parameter settings(Just for PWM Version)

Start Flag	Password	Instruction Code	Instruction content	Check Code	End Flag
0xA1	0x04D2	0x06	<CHN><PWMValue>		AA
1 byte	2 byte	1 byte	2 byte	1 byte	1byte

Parameters:
<CHN>:the number of PWM channels; Range: 01-08. Number of bytes: 1byte.
<PWMValue>: PWM parameter value, the duty ratio is 0x00 to 0x64 . Number of bytes: 1byte
Example: The first PWM setting duty cycle is 5%.

Command:A1 04 D2 06 01 05 75 AA

Response:A1 06 01 A6 AA (indicating successful execution)

3.7 General data storage
This command allows you to save some data in this relay. Such as device ID and so on.

Start Flag	Password	Instruction Code	Instruction content	Check Code	End Flag
0xA1	0x04D2	0x07	<Index><Data>		AA
1 byte	2 byte	1 byte	5 byte	1 byte	1byte

Parameters:
<Index>: Access index ; Index value range: 0x01 to 0x32 ; Length: 1byte.
<Data>: data ;Length: 4byte
Example: Store the 4 bytes data(0x01020304) to the location of index 2.
Command::A1 04 D2 07 02 01 02 03 04 77 AA

Response format is as follows:

Start Flag	Instruction Code	Instruction execution result	Check Code	End Flag
0xA1	0x07	<RESULT>		AA
1 byte	1 byte	1 byte	1 byte	1byte

<RESULT>:Execution result 01 means success, 00 means failure
例: A1 07 01 A7 AA

Indicates successful execution.

3.8 General parameter reading

This command allows you to read the saved data based on the index number.

Start Flag	Password	Instruction Code	Instruction content	Check Code	End Flag
0xA1	0x04D2	0x08	<Index>		AA
1 byte	2 byte	1 byte	1 byte	1 byte	1byte

Parameters:

<Index>: Access index ; Index value range: 0x01 to 0x32 ; Length: 1byte.

Example: Read the data at index 2.

Command:A1 04 D2 08 02 7D AA

Response format is as follows:

Start Flag	Instruction Code	Instruction execution result	Check Code	End Flag
0xA1	0x08	<Index><Data>		AA
1 byte	1 byte	5 byte	1 byte	1byte

<Index> Access index ; Index value range: 0x01 to 0x32 ; Length: 1byte.

<Data> : Saved data ; Length: 4byte

Response:A1 08 02 01 02 03 04 A0 AA

3.11 Change the Password command

Start Flag	Password	Instruction Code	Instruction content	Check Code	End Flag
0xA1	0x04D2	0x11	<pwd>		AA
1 byte	2 byte	1 byte	2 byte	1 byte	1byte

Parameters:

<pwd>: The hexadecimal number of Password. Length: 2byte.

Example: Change the password to 1111 from 1234, the hexadecimal of 1111 is 0x0457.

Command::A1 04 D2 11 04 57 35 AA

Response:A1 11 01 B1 AA

3.19 Query the version number (this function does not need to be reflected in the app)

Start Flag	Password	Instruction Code	Instruction content	Check Code	End Flag
0xA1	0x04D2	0x05	<QR>		AA
1 byte	2 byte	1 byte	1 byte	1 byte	1byte

Parameters:

<QR> Reserved parameter, default is 0x00

After sending the query instruction, the device returns the following command.

Start Flag	Instruction Code	Instruction execution result	Check Code	End Flag
0xA1	0x05	<HV><SV>		AA
1 byte	1 byte	4byte	1 byte	1byte

<HV> : Hardware version number: 2 byte , The current version number is 0x0001 Indicates the first version

<SV>: Software version number: 2 byte , The current version number is 0x0002 Indicates the second version