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# **Network Keyboard and DVR communication protocol**

IceWuBoard

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IceWubing

Network Keyboard normally communicates with DVR by Serial port, network or IR.

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## 1. Serial port protocol

The communication mode of serial port is classified to RS232 and RS485, the detail of description is as follow:

Default serial port parameter:

Baud rate: 9600

Data bit: 8

Start bit: 1

Stop bit: 1

Checksum: No

*note: User can set serial port parameter if needed.*

### Serial Packet Format

A serial port packet is 8 bytes and it contains several type of information, as illustrated in Table1.

Byte1	Byte2	Byte3	Byte4	Byte5 B	yte6 B	yte7	Byte8
0x90	Address Code	Key Value	Flag Reserved wird	Reserved word	Keyboard Number		Checksum

Table1. Pa cket format

The following discussion describes the Serial packet fields illustrated in Table 1:

Byte1: First Address, constant is 0x90.

Byte2: Address code (0x01-0xFE 0x00-Keyboard address, for DVR front panel, 0Xff – Broadcast address, is the physical address for DVR..

Byte3: Key value, is referred to Table 2 and 3

Byte4: Flag , 0-key is pressed, 1- key is released

Byte5: reserved word, represents speed in 3-D stick control and default value is 0; it represents control authority in login, 0—PTZ control, 1—system setting, 2—file back up, 3—advanced setting; i.e.: 0x02 only control system setting; 0x0f-control all operations

Byte6: login authority flag when communicates with DVR; 0—guest, 1—user, 2—administrator, 3—local menu user (only used for response)

Byte7: Ke yboard N umber , default value is 0 , represents control authority in multilevel activation, 0 is the highest priority.

Byte8: C hecksum (Byte1+Byte2+Byte3+Byte4+Byte5+Byte6+Byte7) %256

**Login:** value is 0xfe , flag is 1; reserved 1 represents function control authority, 0—PTZ control, 1—system setting, 2—file back up, 3—advanced setting; reserved 2 is Flag of login authority: 0—guest, 1—user, 2—administrator; 0xff is logoff; All login operations need response except logoff.

**Login response: (reserved 2)**

Login successfully: key value is 0xfe, flag is 1, reserved 2 is current login user;

Login failed: key value is 0xfe, flag is 0, reserved 2 is the highest authority user in current login users; 0—guest, 1—user, 2—administrator, 3—local menu user;

<b>Key value</b>	<b>Meaning</b>	<b>Key value</b>	<b>Meaning Ke</b>	<b>y value</b>	<b>Meaning</b>
0x00 0		0x0E	Cancel	0x1C	1/4 window
0x01 1		0x0F	Confirm	0x1D	1/9 window
0x02 2		0x10	Playback	0x1E	1/16 window
0x03 3		0x11	Stop	0x1F	Function 1
0x04 4		0x12	Forward	0x20	Function 2
0x05 5		0x13	Slow forward	0x21 PTZ	
0x06	6	0x14 Previous	0x22		Zoom out
0x07 7		0x15	Next	0x23	Zoom in
0x08 8		0x16	Reverse play	0x24 Aperture close	
0x09 9		0x17	Step through	0x25	Aperture open
0xA Up		0x18	Rewind	0x26	Near Focus
0xB	Down	0x19 Recode	0x27		Far focus
0xC Left	t	0x1A	Auto-switch	0x28	wiper
0xD Right		0x1B	1 window	0x29	Light
0x2A Auto-cruise		0X2B	Cruise	0X2C	Mode
0x2D Set	pre-set point	0X2E Modify	pre-set point	0X2F Delete	pre-set point
0x30	Dome meny	0x31	Page up	0x32	Page down
0x33 Switch	channel				

Table2 Key value table

<b>Key value</b>	<b>meaning</b>	<b>Ke</b>	<b>y value</b>	<b>meaning</b>	<b>Key value</b>	<b>meaning</b>	<b>Key value</b>	<b>meaning</b>
0x41 Up	0x42			Down	0x43	Left	0x44	Right
0x45 T	op left	0x46		Bottom left	0x47 T	op right	0x48	Bottom right

Table3 3-D stick key value table

NOTE: The time between key is pressed and release is captured by DVR, ie. Switch between TV and VGA output signal is recognized by DVR when shift key is pressed for 3 seconds.

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**Sample:**

Use DVR address:1 as an example DVR address is DVR No., you can set in DVR menu:  
Main menu——SETTING——GENERAL——DVR No.

Login: 90 01 FE 01 0F 02 00 A1      DVR answer: 90 FE FE 01 00 02 00 90

Enter: 90 01 1D 00 0F 02 00 A1

90 01 FE 01 0F 02 00 A1

90 01 00 00 00 02 00 93 90 01 0F 00 00 02 00 A2

90 01 0F 01 00 02 00 A3 90 01 0F 00 00 02 00 A2    Enter

90 01 0A 01 00 02 00 9E 90 01 0A 00 00 02 00 9D    Up

90 01 0B 01 00 02 00 9F 90 01 0B 00 00 02 00 9E    Down

90 01 2E 01 00 02 00 C2 90 01 2E 00 00 02 00 C1    Goto

90 01 01 01 00 02 00 95 90 01 01 00 00 02 00 94    1

90 01 33 01 00 00 00 C5                                    CAM

90 01 21 01 01 02 00 B6 90 01 21 00 01 02 00 B5    P/T

90 01 0A 01 1B 00 00 B7 90 01 0A 00 00 00 00 9B    UP

90 01 21 01 00 02 00 B5 90 01 21 00 00 02 00 B4    P/T

## 2. Network communication protocol

The network communication protocol takes the specific format from “Communication protocol”.

“Communication Protocol” defines: Communication protocol takes un-fixed length packet, the head format is fixed and length is 32 bytes, the format is as follow:

Byte1: command (0x98)  
Byte2: reserved  
Byte3: , channel No. .  
Byte4: reserved  
Byte 5---Byte 8: length of expanding data. No expanding data if value is 0;  
Byte 9---Byte 32: Non-expanding data block.  
Byte 33--the end of packet: expanding data.

Note: The reserved bytes and bytes undefined by command must be filled by 0.

According to “Communication Protocol”, the first byte of network keyboard is 0x98  
Byte16 —Byte23 is the content of key value.

Byte16	Byte 17	Byte 18	Byte 19	Byte 20	Byte 21	Byte 22	Byte 23
0x90	Address code	Key value	Key value	Key value	Key value	Keyboard number	Checksum

Table4 protocol format

说明:

- Byte16: First Address, constant 0x90
- Byte17: Address code 0xFF
- Byte18: Key value, is referred to Table 2 and 3
- Byte19: Flag , 0-key is pressed, 1- key is released
- Byte20: reserved word, represents speed in 3 -D stick control and default value is 0x00; it represents control authority in login , 0—PTZ control, 1—system setting, 2—file back up, 3—advanced setting; i.e.: 0x02 only control system setting; 0x0f-control all operations
- Byte21: login authority flag when communicates with DVR; 0—guest, 1—user, 2—administrator, 3—local menu user (only used for response)
- Byte22: Keyboard Number , default value is 0 , represents control authority in multilevel activation, 0 is the highest priority.
- Byte23: Checksum (Byte1+Byte2+Byte3+Byte4+Byte5+Byte6+Byte7) %256

**Login:** value is 0xfe, flag is 1; reserved 1 represents function control authority, 0—PTZ control, 1—system setting, 2—file back up, 3—advanced setting; reserved 2 is Flag of login authority: 0—guest, 1—user, 2—administrator; 0xff is logoff;

All login operations need response except logoff.

#### **Login response: (reserved 2)**

Login successfully: key value is 0xfe, flag is 1, reserved 2 is current login user;

Login failed: key value is 0xfe, flag is 0, reserved 2 is the highest authority user in current login users; 0—guest, 1—user, 2—administrator, 3—local menu user;

Key value	meaning	Key value	meaning Ke	y value	meaning
0x00 0		0x0E	Cancel	0x1C	1/4 window
0x01 1		0x0F	Confirm	0x1D	1/9 window
0x02	2	0x10	Play back	0x1E	1/16 window
0x03 3		0x11	Stop	0x1F	Function 1
0x04 4		0x12	Forward	0x20	Function 2
0x05 5		0x13	Slow forward	0x21 PTZ	
0x06	6	0x14 Previous		0x22	Zoom out
0x07 7		0x15	Next	0x23	Zoom in
0x08 8		0x16	Reverse play	0x24 Aperture close	
0x09 9		0x17	Step through	0x25	Aperture open
0x0A Up		0x18	Rewind	0x26	Near focus
0x0B Down		0x19	Record	0x27	Far focus
0x0C Left	t	0x1A	Auto-switch	0x28	Wiper
0x0D Right		0x1B	1 window	0x29	Light
0x2A Auto-cruise		0X2B	Cruise	0X2C	Mode
0x2D Set	pre-set point	0X2E Modify		0X2F Delete	pre-set point
0x30	Dome menu	0x31	Page up	0x32	Page down
0x33 Switch	channel				

Table 4 key value table

Key value	meaning	Ke	y value	meaning	Key value	meaning	Key value	meaning
0x41 Up			0x42	Down	0x43	Left	0x44	Right
0x45 T	op left		0x46	Bottom left	0x47 T	op right	0x48	Bottom right

Table 5 3-D stick key value table

### 3. Infrared Remote Control communication protocol

Infrared remote control communication is simulated to DVR remote controller for transmitting, taking advantage of existing infrared receipt function on the front panel of DVR. The communication protocol is same as remote controller to serve for fixed 4 bytes.

Byte1 B	Byte2 B	Byte3	Byte4
*	*	Key value	~Key value

Table 6 communication format

Key value	meaning	Key value	meaning	Key value	meaning
0x92 Num0		0x87 Num1		0x86	Num2
0x85	Num3	0x8B Num4		0x8A	Num5
0x89 Num6		0x8F	Num7	0x8E	Num8
0x8D	Num9 0x95		Up	0x9A	Down
0x9B	Left	0x99 Right		0x96	Cancel
0x9E Ok		0x82	Playback	0x81	Stop
0x9C Fast		0x8C Fast	forward	0x90	Previous
0x83 Next		0xA2	Reverse playback	0xA3 S	Step through
0xA5 Rewind		0x93	Record	0xA7	Auto-switch
0xA1	1 window	0xA4 1/4window		0xA9	1/9 window
0xAF 1/16	window	0x91	Function 1	0x94	Function 2
0xA8	PTZ	0xAA	Zoom Out	0xAB	Zoom In
0xAC Aperture		0xAD Aperture		0xB1 Near	Focus
	close		open		
0xB2	Far focus	0xB3 Wiper	0xB4		Light
0xB5 Auto-cruise		0xB6	Cruise	0xB7	Mode
0xB8 Set	pre-set point	0xB9 Modify		0xBA Delete	
			pre-set point		pre-set point
0xBB	Dome Menu	0xBC	Page up	0xBD	Page down

Table 7 key value table

Key value	meaning	Key value	meaning	Key value	meaning	Key value	meaning
0x95 Up		0x9A	Down	0x9B	Left	0x99	Right
0xC1 Top	op left	0xC2	Bottom left	0xC3 Top	op right	0xC4	Bottom right

Table 8 3-D stick key value table

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note:

1. The protocol for login should be appended.
2. The user of front panel has the supreme authority.(Any user can control front panel at any time.)
3. The network keyboard must be controlled by log-in, otherwise can't receive any command.
4. The time between key is pressed and release is captured by DVR, i.e. Switch between TV and VGA output signal is recognized by DVR when shift key is pressed for 3 seconds.

#### 4. Enclosed Keyboard Communication Protocol

Serial parameter:

Baud rate: 9600

Data bit: 8

Start bit: 1

Stop bit: 1

Checksum: no checksum

Protocol format

Byte1	Byte2	Byte3	Byte4
0x80	Address code	Key value	Flag

description:

Byte1: constant 0x80

Byte2: address code, range 0x00-0xff

Byte3: key value, range 0x00-0xff

Byte4: Flag 0x00 —released, 1—pressed.

Key value	description	Key value	description	Key value	description	Key value	description
0x00	0	0x01	1	0x02	2	0x03	3
0x04	4	0x05	5	0x06	6	0x07	7
0x08	8	0x09	9	0xA	Up	0xB	Down
0xC	Left	0xD	Right	0xE	Exit	0xF	Confirm
0x10	Record	0x11	Multi-window	0x12	Play back	0x13	accessorial
0x14	Previous	0x15	Next	0x16	Slow forward	0x17	Forward
0x18	Information	0x19	1/4 window	0x1A	1/4 window	0x1B	1/4 window
0x1C	1/4 window	0x1D	1/8 window	0x1E	1/8 window	0x1F	1/16 window
4		1		2		3	

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	0x20 Aperture open	0x21 Aperture close	0x22	Far focus	0x23	Near focus
0x24	telephoto	0x25	Wide-angle			
				0x2A	PTZ up	0x2B
0x2C	PTZ left	0x2D	PTZ right	0x40	Lock	0x41
						exchange

Table 9 Key value table

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