Shanghai Naxing Electronics Co., Ltd.

Status-Link

USB Panel Control Protocol Specification

Rev. 1.3

Contents

List of Tables

1. Overview

Status-Link is an USB communication protocol to get device status and set hardware parameters to NXElec BeadaPanel Media Display.
Status-Link is a bi-direction protocol so it will occupy 2 dedicated USB bulk endpoints. In current BeadaPanel firmware(V5.00 and above), the endpoint addresses are 0x82(input) and 0x2(output).

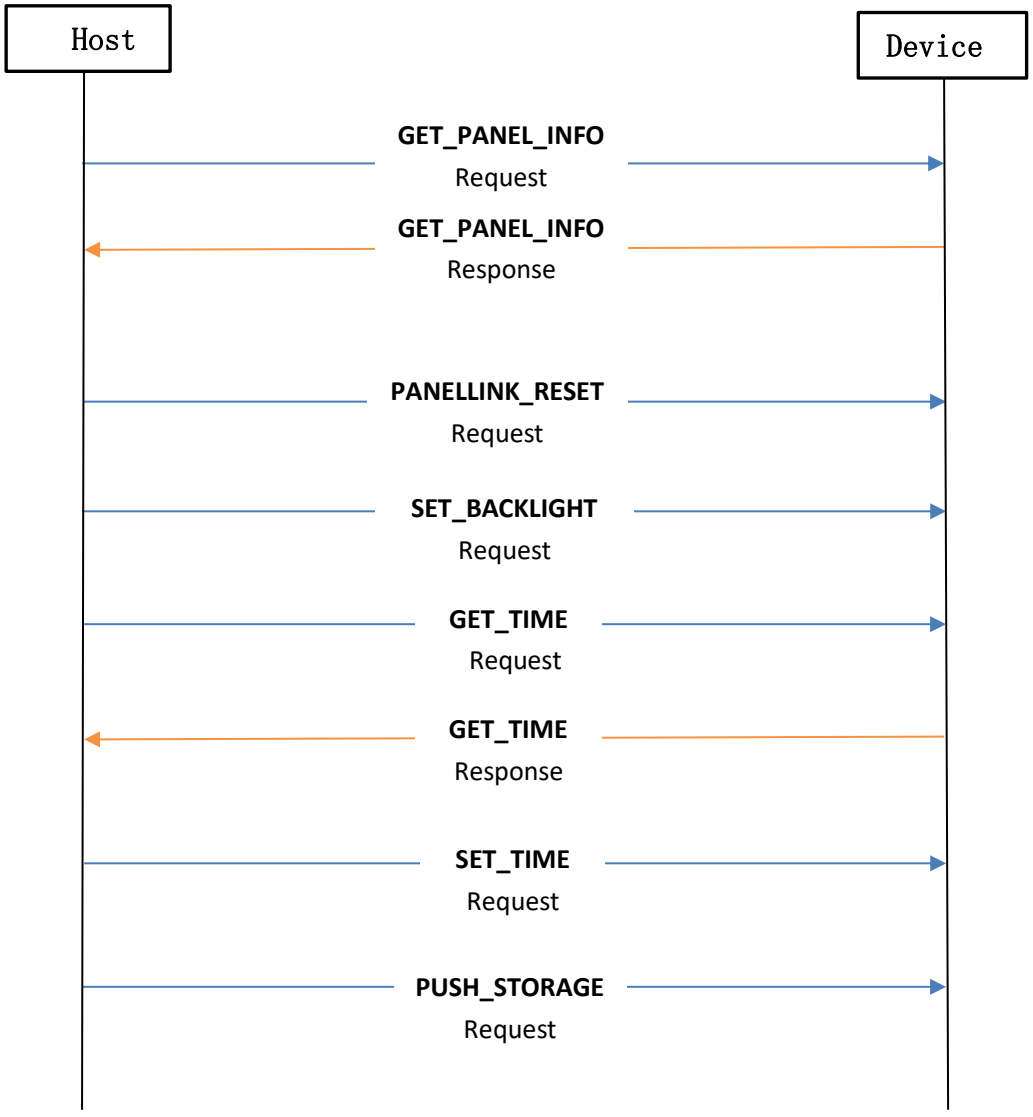
There are 2 ways to identify if current BeadaPanel device support Status-Link protocol or not:

1. BeadaPanel device supports Status-Link since firmware V5.00 and above. So host programmer can check USB device descriptor of current device and if value in field bcdDevice equal to 0x500 then means the device is running on firmware V5.00.
2. For devices which running on firmware version V4.09, the bulk endpoints number is 2. And for version V5.00 or above, this number is 4. Host programmer may query endpoints number in interface descriptor and then know whether the current device can support Status-Link or not.

2.Status-Link Protocol

Status-Link Primitives

Status-Link protocol communicates between USB Host and Device peers on two dedicated USB bulk endpoints.



Status-Link Header

A Status-Link package(request package and response package) consists of a fixed-length header and a variable-length payload. Some Status-Link request or response package may not have payload field so the package will only carry a Status-Link header. In Status-Link version 2, the length of Status-Link header is 20 bytes. Format of a Status-Link header is as below:

Byte Sequence	Field Name	Description
0-10	Protocol String	Constant ASCII String “STATUS-LINK”
11	Version	2 – Current version
12	Type	1 – GET_PANEL_INFO 2 – PANELLINK_RESET 3 – SET_BACKLIGHT 4 – PUSH_STORAGE 5 – GET_TIME 6 – SET_TIME 18 – SET_EVENT_REPORT_CONFIGURATION 19 – GET_EVENT_REPORT_INFO
13	reserved	For future purpose
14-15	Sequence number	Sequence number for future use
16-17	length	Length of header + payload
18-19	16 Bits Checksum	16Bits Checksum of all header fields[1]

2-1 Status-Link Header Format

Note 1: Refer to Section 4 for detail of 16Bits Checksum Algorithm

Status-Link Package

Message Type	Request Package		Response Package	
	Header	Payload	Header	Payload
GET_PANEL_INFO	20	-	20	80
PANEL-LINK_RESET	20	-	-	-
SET_BACKLIGHT	20	1	-	-
PUSH_STORAGE	20	-	-	-
GET_TIME	20	-	20	16
SET_TIME	20	16	-	-
SET_EVENT_REPORT_CONFIGURATION	20	8		
GET_EVENT_REPORT_INFO	20		20	44

2-2 Status-Link Package Length(in bytes)

Payload format of a GET_PANEL_INFO response package is as below:

Byte Sequence	Field Name	Description
0-1	firmware_version	Firmware version in BCD code format.
2-2	Panel-Link_version	
3-3	Status-Link_version	3 – Current Version
4-4	platform	1 – i.mx6ul 2 -- i.mx6ull 4 – V3S 5 – T113
5-5	model	0 – Mode 7 1 – Model 5 2 – Model 6 3 – Model 3 4 – Model 4 10 – Model 5C 17 – Model 2 18 – Model 2W 20 – Model 5S 21 – Model 8 22 – Model 11 23 – Model 9 24 – Model Y 25 – Model X 26 – Model Z
6-69	sn	ASCII string, serial number of BeadaPanel device
70-71	screen_resolution_x	Screen resolution of x
72-73	screen_resolution_y	Screen resolution of y
74-77	storage_size	Available volume of on board eMMC, in KBytes
78-78	max_brightness	Maximum value of screen backlight
79-79	current_brightness	Current value of screen backlight

2-3 GET_PANEL_INFO Response Payload Format

Payload format of SET_BACKLIGHT package is as below:

Byte Sequence	Field Name	Description
0-0	brightness	Backlight value set to device

2-4 SET_BACKLIGHT Payload Format

Payload format of GET_TIME response package is as below:

Byte Sequence	Field Name	Description
0-1	wYear	The year. The valid values for this member are 1601 through 30827.
2-3	wMonth	The month. The valid values for this member are 1 through 12.
4-5	wDayOfWeek	The day of the week. The valid values for this member are 0 through 6.
6-7	wDay	The day of the month. The valid values for this member are 1 through 31.
8-9	wHour	The hour. The valid values for this member are 0 through 23.
10-11	wMinute	The minute. The valid values for this member are 0 through 59.
12-13	wSecond	The second. The valid values for this member are 0 through 59.
14-15	wMilliseconds	The millisecond. The valid values for this member are 0 through 999.

2-5 GET_TIME Response Payload Format

Payload format of SET_TIME package is as below:

Byte Sequence	Field Name	Description
0-1	wYear	The year. The valid values for this member are 1601 through 30827.
2-3	wMonth	The month. The valid values for this member are 1 through 12.
4-5	wDayOfWeek	The day of the week. The valid values for this member are 0 through 6.
6-7	wDay	The day of the month. The valid values for this member are 1 through 31.
8-9	wHour	The hour. The valid values for this member are 0 through 23.
10-11	wMinute	The minute. The valid values for this member are 0 through 59.
12-13	wSecond	The second. The valid values for this member are 0 through 59.
14-15	wMilliseconds	The millisecond. The valid values for this member are 0 through 999.

2-6 SET_TIME Payload Format

Payload format of SET_EVENT_REPORT_CONFIGURATION package is as below:

Byte Sequence	Field Name	Description
0-1	Type	Type of sub commands. 1- ER_CONFIG_SET_GESTURE_TYPE 2- ER_CONFIG_ADD_GESTURE_TYPE 3- ER_CONFIG_CLEAR_GESTURE_TYPE 4- ER_CONFIG_SET_EVENT_GROUPING_DIST_MAX 5- ER_CONFIG_SET_TAP_TIME_MAX 6- ER_CONFIG_SET_DOUBLE_GROUP_TIME_DIFF 7- ER_CONFIG_SET_DOUBLE_GROUP_DIST_DIFF 8- ER_CONFIG_SET_DOUBLE_DIST 9- ER_CONFIG_SET_DOUBLE_TIME_DIFF 10- ER_CONFIG_SET_TAP_DIST_MAX 11- ER_CONFIG_SET_ZOOM_SCALE_MIN 12- ER_CONFIG_SET_ROTATE_ANGLE_MIN
2-3	Length	Length of sub command(header + value) can be variant on different sub command type.
4-7	Value	Value field of configuration command

2-7 SET_EVENT_REPORT_CONFIGURATION Payload Format

Value format of SET_GESTURE_TYPE sub command is as below:

Byte Sequence	Field Name	Description
0-3	Value	Set gesture bits which in non-zero to current gesture configuration word Bit 0: ER_BIT_TAP Bit 1: ER_BIT_DOUBLE_TAP Bit 2: ER_BIT_HOLD Bit 3: ER_BIT_DRAG Bit 4: ER_BIT_HOLD_DRAG Bit 6: ER_BIT_ZOOM Bit 7: ER_BIT_ROTATE Bit 31: ER_BIT_RAWINPUT

2-8 SET_GESTURE_TYPE Sub Command

Value format of ADD_GESTURE_TYPE sub command is as below:

Byte Sequence	Field Name	Description
0-3	Value	Set gesture bits which in non-zero to current gesture configuration word accumulatively. Bit 0: ER_BIT_TAP Bit 1: ER_BIT_DOUBLE_TAP Bit 2: ER_BIT_HOLD Bit 3: ER_BIT_DRAG Bit 4: ER_BIT_HOLD_DRAG Bit 6: ER_BIT_ZOOM Bit 7: ER_BIT_ROTATE Bit 31: ER_BIT_RAWINPUT

2-9 ADD_GESTURE_TYPE Sub Command

Value format of CLEAR_GESTURE_TYPE sub command is as below:

Byte Sequence	Field Name	Description
0-3	Value	Clear gesture bits which in non-zero to current gesture configuration word Bit 0: ER_BIT_TAP Bit 1: ER_BIT_DOUBLE_TAP Bit 2: ER_BIT_HOLD Bit 3: ER_BIT_DRAG Bit 4: ER_BIT_HOLD_DRAG Bit 6: ER_BIT_ZOOM Bit 7: ER_BIT_ROTATE Bit 31: ER_BIT_RAWINPUT

2-10 CLEAR_GESTURE_TYPE Sub Command

Value format of SET_EVENT_GROUPING_DIST_MAX sub command is as below:

Byte Sequence	Field Name	Description
0-3	Value	Constant parameter EVENT_GROUPING_DIST_MAX, in single precision float format. Default value is 150

2-11 SET_EVENT_GROUPING_DIST_MAX Sub Command

Value format of SET_TAP_TIME_MAX sub command is as below:

Byte Sequence	Field Name	Description
0-3	Value	Constant parameter TAP_TIME_MAX, in single precision float format, for gesture TAP recognizer. Default value is 0.5

2-12 SET_TAP_TIME_MAX Sub Command

Value format of SET_DOUBLE_GROUP_TIME_DIFF sub command is as below:

Byte Sequence	Field Name	Description
0-3	Value	Constant parameter DOUBLE_GROUP_TIME_DIFF, in single precision float format, for gesture Double Tap recognizer. Default value is 0.02.

2-13 SET_DOUBLE_GROUP_TIME_DIFF Sub Command

Value format of SET_DOUBLE_GROUP_DIST_DIFF sub command is as below:

Byte Sequence	Field Name	Description
0-3	Value	Constant parameter DOUBLE_GROUP_DIST_DIFF, in single precision float format, for gesture Double Tap recognizer. Default value is 25000.

2-14 SET_DOUBLE_GROUP_DIST_DIFF Sub Command

Value format of SET_DOUBLE_DIST sub command is as below:

Byte Sequence	Field Name	Description
0-3	Value	Constant parameter DOUBLE_DIST, in single precision float format, for gesture Double Tap recognizer. Default value is 362.

2-15 SET_DOUBLE_DIST Sub Command

Value format of SET_DOUBLE_TIME_DIFF sub command is as below:

Byte Sequence	Field Name	Description
0-3	Value	Constant parameter DOUBLE_TIME_DIFF, in single precision float format, for gesture Double Tap recognizer. Default value is 0.5

2-16 SET_DOUBLE_TIME_DIFF Sub Command

Value format of SET_TAP_DIST_MAX sub command is as below:

Byte Sequence	Field Name	Description
0-3	Value	Constant parameter TAP_DIST_MAX, in single precision float format, for gesture TAP recognizer. Default value is 10.

2-17 SET_TAP_DIST_MAX Sub Command

Value format of SET_ZOOM_SCALE_MIN sub command is as below:

Byte Sequence	Field Name	Description
0-3	Value	Constant parameter ZOOM_SCALE_MIN, in single precision float format, for gesture Zoom recognizer. Default value is 0.15.

2-18 SET_ZOOM_SCALE_MIN Sub Command

Value format of SET_ROTATE_ANGLE_MIN sub command is as below:

Byte Sequence	Field Name	Description
0-3	Value	Constant parameter ROTATE_ANGLE_MIN, in single precision float format, for gesture Roate recognizer.

2-19 SET_ROTATE_ANGLE_MIN Sub Command

Payload format of a GET_EVENT_REPORT_INFO response package is as below:

Byte Sequence	Field Name	Description
0-1	firmware_version	Firmware version.
2-3	reserved1	
4-7	ER_GESTURE_CONFIG	Bitmap of gesture event configuration word. Bit 0: ER_BIT_TAP Bit 1: ER_BIT_DOUBLE_TAP Bit 2: ER_BIT_HOLD Bit 3: ER_BIT_DRAG Bit 4: ER_BIT_HOLD_DRAG Bit 6: ER_BIT_ZOOM Bit 7: ER_BIT_ROTATE Bit 31: ER_BIT_RAWINPUT
8-11	EVENT_GROUPING_DIST_MAX	Parameter EVENT_GROUPING_DIST_MAX, in single precision float format.
12-15	TAP_TIME_MAX	Parameter TAP_TIME_MAX, in single precision float format.
16-19	DOUBLE_GROUP_TIME_DIFF	Parameter DOUBLE_GROUP_TIME_DIFF, in single precision float format.
20-23	DOUBLE_GROUP_DIST_DIFF	Parameter DOUBLE_GROUP_DIST_DIFF, in single precision float format.
24-27	DOUBLE_DIST	Parameter DOUBLE_DIST, in single precision float format.
28-31	DOUBLE_TIME_DIFF	Parameter DOUBLE_TIME_DIFF, in single precision float format.
32-35	TAP_DIST_MAX	Parameter TAP_DIST_MAX, in single precision float format.
36-39	ZOOM_SCALE_MIN	Parameter ZOOM_SCALE_MIN, in single precision float format.
40-43	ROTATE_ANGLE_MIN	Parameter ROTATE_ANGLE_MIN, in single precision float format.

2-20 GET_PANEL_INFO Response Payload Format

1 Endianness Declaration

All data structures listed in this document should be transferred and/or stored in little-endian format, or USB peer may receive corrupted data.

2 16Bits Checksum Algorithm

```
unsigned short checkSum16(unsigned short *buf, int nword)
{
	unsigned long sum;

	for (sum = 0; nword > 0; nword--)
		sum += *buf++;
	sum = (sum >> 16) + (sum & 0xffff);
	sum += (sum >> 16);

	return ~sum;
}
```

3 Contact Information

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4 Revision History

Rev.	Date	Description	Author
0.1	20-May-2020	Initial release	wdzhou
0.2	10-June-2020	Add time sync commands	wdzhou
0.3	16-June-2020	Revise time format in to breakdown format	wdzhou
0.4	25-Feb-2023	Correct endpoint description in section 1	wdzhou
1.0	6-Aug-2023	Correct platform and model field description in table 2-3	wdzhou
1.1	13-May-2025	Revise platform and model field for new models in table 2-3	wdzhou
1.2	26-July-2025	Add Event-Report commands	wdzhou
1.3	17-Oct-2025	Add new models in table 2-3	wdzhou