Instruction Sets V1.5RC-20220615

Contents

Update Description

Version number	Update date	Prepared by	Reviewed by	Firmware version	Update description
V1.5RC	2022-06-15			V2.2.16.220615RC	Add chart_view axis related instructions
V1.3RC	2022-04-08			V2.2.13.220329RC	Add description of button related instruction set
V1.2RC	2022-04-05			V2.2.12.220324RC	Perfect instruction set example description
V1.1RC	2022-03-25			V2.2.12.220324RC	Instruction set description optimization
V1.0RC	2022-03-25			V2.2.11.220323RC	Summary of the instruction set

1. Instruction Description

1.1 MCU→HMI Module

The instructions sent by the main widget device MCU to the HMI module are in the form of JSON plain text, with good self-description, hierarchical structure, high readability and scalability; In addition, the frame header and frame tail are added to improve the security and anti-collision of the instruction.

The format is as follows:

```
Frame header            +                     data                  +               frame tail
ST<      {"cmd_code":"set_text","type":"label","widget":"label","text":"Hello"}        >ET
```

Category	Content	Description	Remarks
Frame header	ST<	Data frame header	Data start identifier
cmd_code	Instruction code	Used to distinguish different instructions	The instruction code is functionally unique and is the unique identifier to distinguish the instruction
Type	Type	Widget type	Used to distinguish widget type
Widget	Widget name	Widget name	Used to distinguish different widgets, the unique identifier of the widget is unique;
Text	Text	Function field	Data content part, different for different instructions
….	Same as above	Other functional fields	Data content part, different widgets may be different
Frame tail	>ET	Date frame tail	End of data identification

1. The data format adopts the format of frame header + data + frame tail, and the intermediate data part adopts JSON format and verification, and the maximum length of a single data does not exceed 1,024 bytes.
2. The intermediate JSON text part includes cmd_code, type, widget, etc. For details, see the above table; each JSON instruction is different, and you can choose the instruction according to your own needs.
3. The "instruction sending" described below refers to the instruction sent by the MCU to the HMI module;

1.2 HMI Module → MCU

The data protocol sent by the HMI module adopts the form of hexadecimal format, which can effectively reduce the analysis difficulty and processing burden of the main widget device MCU; increase the CRC16 verification to effectively improve the data security;

The format is as follows:

Frame header +	CMD	+	LEN	+	DATA	+	Frame tail	+	Verification
ST<	0x1068		0x0004		0x01 0x02 0x03 0x04		>ET		CRC16

Category	Content	Length (bytes)	Remarks
Frame header	ST<	3	Data frame header
CMD	See below for details	2	The unique identifier of the MCU to distinguish the instruction
LEN	Length	2	The length of the data part, excluding the frame header, frame tail, CMD, LEN and verification
DATA	See below for details	=LEN	The data part is generally composed of widget name + data
Frame tail	>ET	3	Date frame tail
Verification	CRC16	2	Adopt CRC16/MODBUS verification; high order in front, low order in back

1. The "instruction return" described below refers to the instruction issued by the HMI module to the MCU;

2. System Instruction

2.1 boot_cmd

Instruction return:

Return instruction	Description	Delivery type	Remarks
0x0000	System operating status	Initiative	The startup program is automatically sent three times at an interval of 100ms

Data description:

Category	Data	Delivery type	Remarks
CMD	0x0000	Initiative	The startup program is automatically sent three times at an interval of 100ms
LEN	0x0001		
DATA	0x01: System running 0x02: System standby (screen backlight off) 0xFF: System operation error		Last byte of data part

For example:
System running
Response: ST<0x00 0x00 0x00 0x01 0x01>ET
HEX:53 54 3C 00 00 00 01 01 3E 45 54 AB 25

2.2 sys_reboot

Instruction sending:

Instruction	Instruction description	Remarks
sys_reboot	System restart	Used for MCU to restart HMI module

For example:
Send: ST<{"cmd_code":"sys_reboot","type":"system"}>ET

2.3 sys_hello

Instruction sending:

Instruction	Instruction description	Remarks
sys_hello	Communication detection is used to detect whether the communication is normal	Device returns 0x0001 instruction

Instruction return:

Instruction	Instruction description	Delivery type	Remarks
0x0001	System communication probe return instruction	Passive	

Data description:

Category	Data	Delivery type	Remarks
CMD	0x0001	Passive	System communication probe return instruction
LEN	0x0001		
DATA	0x01: System running		Last byte of data part

For example:
Send: ST<{"cmd_code":"sys_hello","type":"system"}>ET
Response: ST<0x00 0x01 0x00 0x01 0x01>ET
HEX:53 54 3C 00 01 00 01 01 3E 45 54 6B 35

2.4 sys_version

Instruction sending:

Instruction	Instruction description	Remarks
sys_version	Get gui software version	Device returned 0x0002 instruction

Instruction return:

Return instruction	Return description	Delivery type	Remarks
0x0002	GUI software version number distribution (get_version)	Passive	

Data description:

Category	Data	Delivery type	Remarks
CMD	0x0002	Passive	GUI software version number distribution
LEN	Version number length		
DATA	Software version		

For example:
a) Obtain the software version, version number: v2 2.13.220329RC
Send: ST<{"cmd_code":"sys_version","type":"system"}>ET
Response: ST<0x00 0x02 0x00 0x10 V2.2.13.220329RC>ET
HEX:53 54 3C 00 02 00 10 56 32 2E 32 2E 31 33 2E 32 32 30 33 32 39 52 43 3E 45 54 1C 58

2.5 set_sleep

Instruction sending:

Instruction	Instruction description	Remarks
set_sleep	Set the device to sleep	Turn off the backlight, the program runs in the background

Send data description:

Category	Description	Type	Remarks
Sleep	Whether to sleep	Bool	Whether to sleep

For example:
a) Set the device to sleep:
Send: ST<{"cmd_code":"set_sleep","type":"system","sleep":true}>ET

b) Turn off device sleep:
Send: ST<{"cmd_code":"set_sleep","type":"system","sleep":false}>ET

2.6 set_buzzer

Instruction sending:

Instruction	Instruction description	Remarks
set_buzzer	Set the buzzer to sound	Since the message queue is used for instruction sending and receiving, if the interval of the instruction message to widget the buzzer is less than the duration of the buzzer sound, the sound will continue after the instruction stops when the message accumulates.

Send data description:

Category	Description	Type	Remarks
Time	Time	Uint	Unit ms, sound duration

For example:
Send: ST<{"cmd_code":"set_buzzer","type":"system","time":100}>ET

2.7 set_brightness

Instruction sending:

Instruction	Instruction description	Remarks
set_brightness	Set backlight brightness	LCD backlight brightness percentage

Send data description:

Category	Description	Type	Remarks
brightness	LCD backlight brightness	Uint	1. The value range is 0-100. 2. The backlight adjustment level of the old version is 0-7;

For example:
Send: ST<{"cmd_code":"set_brightness","type":"system","brightness":100}>ET

2.8 set_touch_cal

Instruction sending:

Instruction	Instruction description	Remarks
set_touch_cal	Set touchscreen calibration (for resistive screens)	Automatic restart after calibration is complete

For example:
Send: ST<{"cmd_code":"set_brightness","type":"system","brightness":100}>ET

2.9 clear_touch_cal

Instruction sending:

Instruction	Instruction description	Remarks
clear_touch_cal	Clear touchscreen calibration data	for resistive screens

For example:
Send: ST<{"cmd_code":"set_touch_cal","type":"system"}>ET

2.10 set_touch_test

Instruction sending:

Instruction	Instruction description	Remarks
set_touch_test	Touchscreen test	A manual restart is required to run the user GUI

For example:
Send: ST<{"cmd_code":"set_touch_test","type":"system"}>ET

2.11 set_vol

Instruction sending:

Instruction	Instruction description	Remarks
set_vol	Volume adjustment	
set_vol_inc	Volume up	
set_vol_dec	Volume down	
set_mute	Set mute	

Send data description:

Category	Description	Type	Remarks
Vol	Volume	Uint	Value: 0-100, volume percentage
Step	Step Value	Uint	Volume percentage
Mute	Mute	Bool	Mute or not

For example:
a) Set volume to 50%:
Send: ST<{"cmd_code":"set_vol","type":"system","vol":50}>ET

b) Volume up by 5%:
Send: ST<{"cmd_code":"set_vol_inc","type":"system","step":5}>ET

c) Volume down by 5%:
Send: ST<{"cmd_code":"set_vol_dec","type":"system","step":5}>ET

d) Set mute:
Send: ST<{"cmd_code":"set_mute","type":"system","mute":true}>ET

e) Unmute:
Send: ST<{"cmd_code":"set_mute","type":"system","mute":false}>ET

2.12 set_audio

Instruction sending:

Instruction	Instruction description	Remarks
set_audio_play	Play audio start	
set_audio_pause	Play audio pause	After the playback ends, no need to replay the audio through this instruction
set_audio_stop	Play audio stop	

Send data description:

Category	Description	Type	Remarks
Audio	Audio name	Text	Played audio name, supports wav and mp3
Pause	Audio pause	Bool	Whether to pause audio playback

For example:

a) Play audio 01.wav:

Send: ST<{"cmd_code":"set_audio_play","type":"system","audio":"01.wav"}>ET

b) Pause:

Send: ST<{"cmd_code":"set_audio_pause","type":"system","pause":true}>ET

c) Continue playing:

Send: ST<{"cmd_code":"set_audio_pause","type":"system","pause":false}>ET

d) Stop playing:

Send: ST<{"cmd_code":"set_audio_stop","type":"system"}>ET

3. General Instruction

3.1 set_enable

Instruction sending:

Instruction	Instruction description	Remarks
set_enable	Set widget enabled state	

Send data description:

Category	Description	Type	Remarks
enable	Whether to enable	Bool	Set the enabled state of the widget, the value is true/false

For example:

a) Set the button1 widget available:

Send: ST<{"cmd_code":"set_enable","type":"widget","widget":"button1","enable":true}>ET

b) Set the button1 widget unavailable:

Send: ST<{"cmd_code":"set_enable","type":"widget","widget":"button1","enable":false}>ET

3.2 set_visible

Instruction sending:

Instruction	Instruction description	Remarks
set_visible	Set the visible state of the widget	

Send data description:

Category	Description	Type	Remarks
Visible	Visible or not	Bool	Set whether the widget is visible, the value is true/false

For example:

a) Set the button1 widget visible:

Send: ST<{"cmd_code":"set_visible","type":"widget","widget":"button1","visible":true}>ET

b) Set the button1 widget invisible:

Send: ST<{"cmd_code":"set_visible","type":"widget","widget":"button1","visible":false}>ET

3.3 set_xy

Instruction sending:

Instruction	Instruction description	Remarks
set_xy	Set widget coordinates	x y is of type int and can be negative.

Send data description:

Category	Description	Type	Remarks
x	x-axis coordinate	int	x-axis coordinate value
y	y-axis coordinate	int	y-axis coordinate value

For example:
a) Set slider1 xy coordinates to (0,0):
Send: ST<{"cmd_code":"set_xy","type":"widget","widget":"slider1","x":0,"y":0}>ET

b) Set slider1 xy coordinates to (-40,240):
Send: ST<{"cmd_code":"set_xy","type":"widget","widget":"slider1","x":-40,"y":240}>ET

c) Set slider1 xy coordinates to (400,240):
Send: ST<{"cmd_code":"set_xy","type":"widget","widget":"slider1","x":400,"y":240}>ET

3.4 set_state

Instruction sending:

Instruction	Instruction description	Remarks
set_state	Set widget state	The values can be "normal", "pressed", "disable"; see the widget state property for details

Send data description:

Category	Description	Type	Remarks
State	Widget state	Text	Widget state, see the state property of each widget for details

For example:
a) Set the button1 widget to the pressed state:
Send: ST<{"cmd_code":"set_state","type":"widget","widget":"button1","state":"pressed"}>ET

3.5 set_border_type

Instruction sending:

Instruction	Instruction description	Remarks
set_border_type	Set the widget border type	

Send data description:

Category	Description	Type	Remarks
State	Widget state	Text	For the value, see the state property of the current widget. If the state is not specified, modify the border type in the normal state.
Value	Border type	Uint	The values are as follows: 0: No border 1: Left border 2: Right border 4: Top border 8: Bottom border 15: All borders

For example:

a) Set the border type in the normal state of the b widget to full border:

Send:

ST<{"cmd_code":"set_border_type","type":"widget","widget":"b","state":"normal","value":15}>ET

b) Set the border type in the normal state of the b widget to left and right borders:

Send: ST<{"cmd_code":"set_border_type","type":"widget","widget":"b","state":"normal","value":3}>ET

c) Set the border type in the pressed state of the b widget to the top and bottom borders:

Send:

ST<{"cmd_code":"set_border_type","type":"widget","widget":"b","state":"pressed","value":12}>ET

d) Set the border type in the pressed state of the b widget to no border:

Send:

ST<{"cmd_code":"set_border_type","type":"widget","widget":"b","state":"pressed","value":0}>ET

e) Set the border type in the normal state of the b widget to full border:

Send: ST<{"cmd_code":"set_border_type","type":"widget","widget":"b","value":15}>ET

3.6 set_border_width

Instruction sending:

Instruction	Instruction description	Remarks
set_border_width	Set widget border line width	

Send data description:

Category	Description	Type	Remarks
State	Widget state	Text	For the value, see the state property of the current widget. If the state is not specified, modify the border type in the normal state.
Width	Border width	Uint	Border line width

For example:
a) Set the line width to 1 in the normal state of the b widget:
Send: ST<{"cmd_code":"set_border_width","type":"widget","widget":"b","state":"normal","width":1}>ET

b) Set the line width to 2 in the pressed state of the b widget
Send: ST<{"cmd_code":"set_border_width","type":"widget","widget":"b",
"state":"pressed","width":2}>ET

c) Set the line width to 5 in the normal state of the b widget:
Send: ST<{"cmd_code":"set_border_width","type":"widget","widget":"b","width":5}>ET

3.7 set_fg_image

Instruction sending:

Instruction	Instruction description	Remarks
set_fg_image	Set the widget foreground image	If no state is specified, modify the foreground image in the normal state

Send data description:

Category	Description	Type	Remarks
State	Widget state	Text	For the value, see the state property of the current widget, if
fg_image	Front image	Text	Front image name, no need to specify suffix name, support png/jpg/bmp format

For example:
a) Set the front image in the pressed state of the pg1 widget to n0:
Send:
ST<{"cmd_code":"set_fg_image","type":"widget","widget":"pg1","state":"pressed","fg_image":"n0"}>E
T

b) Set the front image in the normal state of the pg1 widget to n1:
Send: ST<{"cmd_code":"set_fg_image","type":"widget","widget":"pg1","fg_image":"n1"}>ET

3.8 set_bg_image

Instruction sending:

Instruction	Instruction description	Remarks
set_bg_image	Set the widget background image	

Send data description:

Category	Description	Type	Remarks
State	Widget state	Text	For the value, see the state property of the current widget. If the state is not specified, the image in the normal state will be modified.
bg_image	Front image	Text	Background image name, no need to specify suffix name, support png/jpg/bmp

For example:
a) Set the background image in the pressed state of the i1 widget to n0:
Send:
ST<{"cmd_code":"set_bg_image","type":"widget","widget":"i1","state":"pressed","bg_image":"n0"}>ET

b) Set the background image in the normal state of the i1 widget to n1:
Send: ST<{"cmd_code":"set_bg_image","type":"widget","widget":"i1","bg_image":"n1"}>ET

3.9 set_font

Instruction sending:

Instruction	Instruction description	Remarks
set_font	Set font name (replace font)	If no state is specified, modify the font in the normal state

Send data description:

Category	Description	Type	Remarks
State	Widget state	Text	For the value, see the state property of the current widget. If the state is not specified, the font in the normal state will be modified.
Font	Font name	Text	Font name, no suffix required, only ttf vector fonts are supported

For example:
a) Set the font in the normal state of the b1 widget to msyh:
Send: ST<{"cmd_code":"set_font","type":"widget","widget":"b1","state":"normal","font":"msyh"}>ET

b) Set the font in the pressed state of the b1 widget to default:
Send: ST<{"cmd_code":"set_font","type":"widget","widget":"b1","state":"pressed","font":"default"}>ET

c) Set the font in the normal state of the b1 widget to default:
Send: ST<{"cmd_code":"set_font","type":"widget","widget":"b1","font":"default"}>ET

3.10 set_font_size

Instruction sending:

Instruction	Instruction description	Remarks
set_font_size	Set font size	If no state is specified, modify the font size in the normal state

Send data description:

Category	Description	Type	Remarks
State	Widget state	Text	For the value, see the state property of the current widget. If the state is not specified, the font size in the normal state will be modified.
Size	Font size	Uint	Font size

For example:

a) Set the font size to 18 in the normal state of the b1 widget:

Send: ST<{"cmd_code":"set_font_size","type":"widget","widget":"b1","state":"normal","size":18}>ET

b) Set the font size to 24 in the pressed state of the b1 widget:

Send: ST<{"cmd_code":"set_font_size","type":"widget","widget":"b1","state":"pressed","size":24}>ET

c) Set the font size to 18 in the normal state of the b1 widget:

Send: ST<{"cmd_code":"set_font_size","type":"widget","widget":"b1","size":18}>ET

3.11 set_text_align_h

Instruction sending:

Instruction	Instruction description	Remarks
set_text_align_h	Set the horizontal alignment of the font	If no state is specified, modify the horizontal alignment of the font in the normal state

Send data description:

Category	Description	Type	Remarks
State	Widget state	Text	For the value, see the state property of the current widget. If the state is not specified, modify the font alignment in the normal state.
align_h	Font horizontal alignment	Uint	The values are as follows: 0: no alignment 1: center alignment 2: text-align: left 3: text-align: right

For example:

a) Set the font to center alignment in the normal state of the b1 widget:

Send:
ST<{"cmd_code":"set_text_align_h","type":"widget","widget":"b1","state":"normal","align_h":1}>ET

b) Set the font to the text-align: left in the normal state of the b1 widget:
Send:
ST<{"cmd_code":"set_text_align_h","type":"widget","widget":"b1","state":"normal","align_h":2}>ET

c) Set the font to the text-align: right in the normal state of the b1 widget:
Send:
ST<{"cmd_code":"set_text_align_h","type":"widget","widget":"b1","align_h":3}>ET

3.12 set_text_align_v

Instruction sending:

Instruction	Instruction description	Remarks
set_text_align_v	Sets the vertical alignment of the font	If no state is specified, modify the vertical alignment of the font in the normal state

Send data description:

Category	Description	Type	Remarks
State	Widget state	Text	For the value, see the state property of the current widget. If the state is not specified, the vertical alignment of the font in the normal state is modified.
align_v	Font vertical alignment	Uint	The values are as follows: 0: no alignment 1: center alignment 2: top alignment 3: bottom alignment

For example:
a) Set the font to center alignment in the normal state of the b1 widget:
Send:
ST<{"cmd_code":"set_text_align_v","type":"widget","widget":"b1","state":"normal","align_v":1}>ET
b) Set the font to top-align in the normal state of the b1 widget:
Send:
ST<{"cmd_code":"set_text_align_v","type":"widget","widget":"b1","state":"normal","align_v":2}>ET

c) Set the font to bottom alignment in the normal state of the b1 widget:
Send: ST<{"cmd_code":"set_text_align_v","type":"widget","widget":"b1","align_v":3}>ET

3.13 set_color

Instruction sending:

Instruction	Instruction description	Remarks
set_color	Set the showcolor relative to the widget color.	The color value is in ABGR format from high to low, R=0x11 G=0x22 B=0x33 A=0xFF, 0xFF332211 after combination, 4281541137 in decimal system, and it supports translucent effect.

Send data description:

Category	Description	Type	Remarks
color_object	Color target object	Text	The value is the color-related attributes contained in the current widget, such as text_color/fg_color/bg_color, etc.; you can add the widget state before the color attribute, and set the color in different states, such as normal:bg_color. If no state is specified, modify the color value in the normal state;
Color	Color	Uint	The color value is in ARGB format from high to low, for example: A=0xFF R=0x11 G=0x22 B=0x33, 0xFF112233 after the combination, 4279312947 in decimal system, and the transparent effect is supported;

For example:

a) Set the normal state bg_color of the switch widget to black:

Send: ST<{"cmd_code":"set_color","type":"widget","widget":"switch","color_object":"bg_color", "color":4278190080}>ET

b) Set the normal state text_color of the edit widget to blue:

Send: ST<{"cmd_code":"set_color","type":"widget","widget":"edit","color_object":"text_color", "color":4278190335}>ET

c) Set the dialog widget normal state bg_color to red:

Send: ST<{"cmd_code":"set_color","type":"widget","widget":"dialog","color_object":"bg_color", "color":4294901760}>ET

d) Set the switch widget dialog state bg_color to yellow:

Send: ST<{"cmd_code":"set_color","type":"widget","widget":"dialog","color_object":"normal:bg_color", "color":4294967040}>ET

e) Set the dialog widget pressed state bg_color to green:

Send:

ST<{"cmd_code":"set_color","type":"widget","widget":"dialog","color_object":"pressed:bg_color", "color":4278255360}>ET

3.14 take_snapshot

Instruction sending:

Instruction	Instruction description	Remarks
take_snapshot	Screenshots/Snapshots	1. The screenshot function can only screenshot the window, not the widgets under the window. 2. The screenshot is saved in the resource folder snapshot;

For example:

a) Screenshot home_page page:

Send: ST<{"cmd_code":"take_snapshot","type":"widget","widget":"home_page"}>ET

b) Screenshot led_demo interface:

Send: ST<{"cmd_code":"take_snapshot","type":"widget","widget":"led_demo"}>ET

4. Widget Instruction

4.1 window

1. Instruction sending:

Instruction	Instruction description	Remarks
open_win	Open any window	Windows running in the background can also be opened with this instruction
close_win	Close any window	The data of the current window is not cached, it is not recommended to use it, and it should be used with caution
back_win	Return to upper window	Close the current window without caching the data of the current window
back_win_to	Return to any upper-level window	Other opened windows run in the background
back_home	Return to the main window	Do not close previously opened windows, other windows run in the background

2. For example:

a) Open the label_value window:

```
ST<{"cmd_code":"open_win","type":"window","widget":"label_value"}>ET
```

b) Close the label_value window:

```
ST<{"cmd_code":"close_win","type":"window","widget":"label_value"}>ET
```

c) Return to the upper window:

```
ST<{"cmd_code":"back_win","type":"window"}>ET
```

d) Return to the upper window named label_value/home_page, close all windows above this window, generally applicable to multi-level windows:

```
ST<{"cmd_code":"back_win_to","type":"window","widget":"label_value"}>ET
ST<{"cmd_code":"back_win_to","type":"window","widget":"home_page"}>ET
```

e) Return to the main window:

```
ST<{"cmd_code":"back_home","type":"window"}>ET
```

Special instructions: the main window home_page cannot be closed;

4.2 label

1. Instruction sending:

Instruction	Instruction description	Remarks
set_text	Set the text showed by the label	
set_value	Set the value showed by the label	
get_text	Get the text showed by the label	
get_value	Get the value showed by the label (float)	

Send data description:

Category	Description	Type	Remarks
Text	Text	Text	Set the text to show
Value	Value	int/float	Set the value to show
Format	Number format	Text	Value:%d,%02d,%03d,%04d,%05d,%06d,%f,%.1f,%.2f,%.3f,%.4f,%.5f,%.6f

2. Instruction returns:

Return instruction	Description	Return type	Remarks
0x1060	The label text is sent passively	Passive	The MCU will send it only after it is obtained through the get_text instruction, and the lable will not send the data actively.
0x1062	Label value delivery (float type)	Active/passive	After the set_value event is bound to the button, the value is sent actively after the value changes or the get_value instruction is used to obtain the value

Return data description:

Category	Data	Description	Remarks
CMD	0x1060	Label text delivery	The MCU obtains the text content through the get_text instruction
LEN	"Widget name" + length of text	Data length	
DATA	"widget name": text	Data content	The data length does not exceed 1,024 bytes

Category	Data	Description	Remarks
CMD	0x1062	Label value delivery	After the set_value event is bound to the button, it will be actively issued after the value changes or use the get_value instruction to obtain the value
LEN	"Widget name" + the length of the value	Data length	
DATA	Widget name + value	Data content	The value is the last four bytes of the data part, float conforms to the IEEE 754 specification

3. For example:
Set text:

Hello Stone

1234567890

```
ST<{"cmd_code":"set_text","type":"label","widget":"label","text":"Hello Stone"}>ET
ST<{"cmd_code":"set_text","type":"label","widget":"label","text":"1234567890"}>ET
```

Set value:

1.23

```
ST<{"cmd_code":"set_value","type":"label","widget":"label2","value":5}>ET
ST<{"cmd_code":"set_value","type":"label","widget":"label2","value":5,"format":"%02d"}>ET
ST<{"cmd_code":"set_value","type":"label","widget":"label2","value":1.23}>ET
ST<{"cmd_code":"set_value","type":"label","widget":"label2","value":1.23,"format":"%.3f"}>ET
```

Get text:
a) Get the text content of the label widget as Stone:
Send: ST<{"cmd_code":"get_text","type":"label","widget":"label"}>ET
Response: ST<0x10 0x60 0x00 0x0D "label":Stone>ET
HEX: 53 54 3C 10 60 00 0D 22 6C 61 62 65 6C 22 3A 53 74 6F 6E 65 3E 45 54 00 CE

b) Get the text content of the label widget as 12345:
Send: ST<{"cmd_code":"get_text","type":"label","widget":"label"}>ET
Response: ST<0x10 0x60 0x00 0x0D "label":12345>ET
HEX:53 54 3C 10 60 00 0D 22 6C 61 62 65 6C 22 3A 31 32 33 34 35 3E 45 54 A4 2B

Get value:
a) Get the value of the lable widget as 1.26:
Send: ST<{"cmd_code":"get_value","type":"label","widget":"label"}>ET
Response: ST<0x10 0x62 0x00 0x09 label 0x3F 0xA1 0x47 0xAE>ET
HEX:53 54 3C 10 62 00 09 6C 61 62 65 6C 3F A1 47 AE 3E 45 54 6C 8B

b) Get the value of the lable widget as 8:
Send: ST<{"cmd_code":"get_value","type":"label","widget":"label"}>ET
Response: ST<0x10 0x62 0x00 0x0A label 0x41 0x00 0x00 0x00>ET
HEX:53 54 3C 10 62 00 0A 6C 61 62 65 6C 32 41 00 00 00 3E 45 54 C2 99

4.3 edit

1. Instruction sending:

Instruction	Instruction description	Remarks
set_text	Set the content showed by edit	
set_value	Set the value showed by edit	
get_text	Get the content showed by edit	
get_value	Get the value showed by edit (int/float)	

Send data description:

Category	Description	Type	Remarks
Text	Text	Text	Set the text to show
Value	Value	int/float	Set the value to show
Format	Number format	Text	Value:%d,%02d,%03d,%04d,%05d,%06d,%f,%.1f,%.2f,%.3f,%.4f,%.5f,%.6f

2. Instruction return:

Return instruction	Return description	Data return type	Remarks
0x1070	Edit text delivery	Active/passive	Active and passive distribution, it can be actively distributed after the edit data is changed, or it can be actively obtained using get_text
0x1071	Edit value delivery	Passive	Int type
0x1072	Edit value delivery	Passive	Float type

Return data description:

Category	Data	Description	Remarks
CMD	0x1070	Edit text delivery	Active and passive distribution can be actively distributed after the edit data is changed, or it can be actively obtained using get_text
LEN	"Widget name" + length of text	Data length	
DATA	"widget name": text	Data content	The data length does not exceed 1,024 bytes

Category	Data	Description	Remarks
CMD	0x1071	Edit value delivery	After the set_value event is bound to the button, it will be actively issued after the value changes or use the get_value instruction to obtain the value
LEN	"Widget name" + the length of the value	Data length	
DATA	Widget name + value	Data content	The value is the last four bytes of the data part, int type

Category	Data	Description	Remarks
CMD	0x1072	Edit value delivery	After the set_value event is bound to the button, it will be actively issued after the value changes or use the get_value instruction to obtain the value
LEN	"Widget name" + the length of the value	Data length	
DATA	Widget name + value	Data content	The value is the last four bytes of the data part, float type, IEEE 754 specification

3. For example:
Set text:
ST<{"cmd_code":"set_text","type":"edit","widget":"edit","text":"Hello Stone"}>ET
ST<{"cmd_code":"set_text","type":"edit","widget":"edit","text":"1234567890"}>ET

Set value:
a) The edit data type is int and it is showed as 3:
ST<{"cmd_code":"set_value","type":"edit","widget":"edit","value":3}>ET

b) The edit data type is int and it is showed as 03:
ST<{"cmd_code":"set_value","type":"edit","widget":"edit","value":3,"format":"%02d"}>ET

c) The edit data type is float and it is showed as 2.500000:
ST<{"cmd_code":"set_value","type":"edit","widget":"edit1","value":2.5}>ET

d) The edit data type is float, which shows 2.50:
ST<{"cmd_code":"set_value","type":"edit","widget":"edit1","value":2.5,"format":"%.2f"}>ET

Get text:
a) Get edit text data: abcdefg:
Send: ST<{"cmd_code":"get_text","type":"edit","widget":"edit"}>ET
Response: ST<0x10 0x70 0x00 0x0E "edit":abcdefg>ET
HEX:53 54 3C 10 70 00 0E 22 65 64 69 74 22 3A 61 62 63 64 65 66 67 3E 45 54 CA EB

b) Get edit text data: StoneDesigner:
Send: ST<{"cmd_code":"get_text","type":"edit","widget":"edit"}>ET
Response: ST<0x10 0x70 0x00 0x15 "edit":StoneDesigner>ET
HEX: 53 54 3C 10 70 00 15 22 65 64 69 74 22 3A 53 74 6F 6E 65 44 65 73 69 67 6E 65 72 3E 45 54 04 32

Get value:
a) edit int type data delivery, data: 123:
Send: ST<{"cmd_code":"get_value","type":"edit","widget":"edit"}>ET
Response: ST<0x10 0x71 0x00 0x08 edit 0x00 0x00 0x00 0x7B>ET
HEX: 53 54 3C 10 71 00 08 65 64 69 74 00 00 00 7B 3E 45 54 B6 5C

b) Edit int type data delivery, data: -123:
Send: ST<{"cmd_code":"get_value","type":"edit","widget":"edit"}>ET
Response: ST<0x10 0x71 0x00 0x08 edit 0xFF 0xFF 0xFF 0x85>ET
HEX:53 54 3C 10 71 00 08 65 64 69 74 FF FF FF 85 3E 45 54 4A 62

c) edit float type data delivery, data: 123.456:
Send: ST<{"cmd_code":"get_value","type":"edit","widget":"edit"}>ET
Response: ST<0x10 0x72 0x00 0x08 edit 0x42 0xF6 0xE9 0x79>ET
HEX:53 54 3C 10 72 00 08 65 64 69 74 42 F6 E9 79 3E 45 54 48 75

d) Edit float type data delivery, data: -123.456:
Send: ST<{"cmd_code":"get_value","type":"edit","widget":"edit"}>ET
Response: ST<0x10 0x72 0x00 0x08 edit 0xC2 0xF6 0xE9 0x79>ET
HEX:53 54 3C 10 72 00 08 65 64 69 74 C2 F6 E9 79 3E 45 54 80 F4

4.4 spin_box

1. Instruction sending:

Instruction	Instruction description	Remarks
set_text	Set the showed text content	
set_value	Set the showed value	
get_text	Get the showed text content	
get_value	Get the showed value (int/float)	

Send data description:

Category	Description	Type	Remarks
Text	Text	Text	Set the text to show
Value	Value	int/float	Set the value to show
Format	Number format	Text	Value:%d,%02d,%03d,%04d,%05d,%06d,%f,%.1f,%.2f,%.3f,%.4f,%.5f,%.6f

2. Instruction return:

Return instruction	Return description	Data return type	Remarks
0x10A0	Spin_box text delivery	Active/passive	It can be actively issued after the spin_box data is changed, or it can be actively obtained using get_text (generally not used)
0x10A1	Spin_box value delivery	Passive	Int type
0x10A2	Spin_box value delivery	Passive	Float type

Return data description:

Category	Data	Description	Remarks
CMD	0x10A0	Spin_box text delivery	It can be actively issued after the spin_box data is changed, and can be obtained actively using get_text (generally not used)
LEN	"Widget name" + length of text	Text length	
DATA	"widget name": text	Text content	The data length does not exceed 1,024 bytes

Category	Data	Description	Remarks
CMD	0x10A1	Spin_box value delivery	It can be actively issued after the spin_box data is changed, and can be obtained actively using get_text (generally not used)
LEN	"Widget name" + the length of the value	Data length	
DATA	Widget name + value	Data content	The value is the last four bytes of the data part, int type

Category	Data	Description	Remarks
CMD	0x10A2	Spin_box value delivery	It can be actively issued after the spin_box data is changed, and can be obtained actively using get_text (generally not used)
LEN	"Widget name" + the length of the value	Data length	
DATA	Widget name + value	Data content	The value is the last four bytes of the data part, float type, in line with the IEEE 754 specification

3. For example:

Set text:

```
ST<{"cmd_code":"set_text","type":"spin_box","widget":"spin_box1","text":"Stone"}>ET
```

Set value:

a) The data type is int and it shows 08:

```
ST<{"cmd_code":"set_value","type":"spin_box","widget":"spin_box1","value":8,"format":"%02d"}>ET
```

b) The data type is floa and it shows 7.30:
ST<{"cmd_code":"set_value","type":"spin_box","widget":"spin_box1","value":7.3,"format":"%.2f"}>ET

c) The data type is int, which is showed as 6:
ST<{"cmd_code":"set_value","type":"spin_box","widget":"spin_box1","value":6}>ET

Get text:
a) Text data delivery, text content: Stone:
Send: ST<{"cmd_code":"get_text","type":"spin_box","widget":"spin_box"}>ET
Response: ST<0x10 0xA0 0x00 0x10 "spin_box":Stone>ET
HEX:53 54 3C 10 A0 00 10 22 73 70 69 6E 5F 62 6F 78 22 3A 53 74 6F 6E 65 3E 45 54 19 3C

Get value:
a) Int type data delivery, and the data is 3:
Send: ST<{"cmd_code":"get_value","type":"spin_box","widget":"spin_box"}>ET
Response: ST<0x10 0xA1 0x00 0x0C spin_box 0x00 0x00 0x00 0x03>ET
HEX:53 54 3C 10 A1 00 0C 73 70 69 6E 5F 62 6F 78 00 00 00 03 3E 45 54 8A 1A

b) Int type data delivery, and the data is 9:
Send: ST<{"cmd_code":"get_value","type":"spin_box","widget":"spin_box"}>ET
Response: ST<0x10 0xA1 0x00 0x0C spin_box 0x00 0x00 0x00 0x09>ET
HEX:53 54 3C 10 A1 00 0C 73 70 69 6E 5F 62 6F 78 00 00 00 09 3E 45 54 52 19

c) Float type data delivery, and the data is 1.6:
Send: ST<{"cmd_code":"get_value","type":"spin_box","widget":"spin_box"}>ET
Response: ST<0x10 0xA2 0x00 0x0C spin_box 0x3F 0xCC 0xCC 0xCD>ET
HEX:53 54 3C 10 A2 00 0C 73 70 69 6E 5F 62 6F 78 3F CC CC CD 3E 45 54 F9 1A

d) Float type data delivery, and the data is 1.23:
Send: ST<{"cmd_code":"get_value","type":"spin_box","widget":"spin_box"}>ET
Response: ST<0x10 0xA2 0x00 0x0C spin_box 0x3F 0x9D 0x70 0xA4>ET
HEX:53 54 3C 10 A2 00 0C 73 70 69 6E 5F 62 6F 78 3F 9D 70 A4 3E 45 54 3F 5B

4.5 combo_box_ex

1. Instruction sending:

Instruction	Instruction description	Remarks
set_text	Set the showed text content	
set_value	Set the showed value	
set_selected	Set current option	
get_text	Get the showed text content	
get_value	Get the showed value (int/float)	
get_selected	Get current option	

Send data description:

Category	Description	Type	Remarks
Text	Text	Text	Set/get the text to show
Value	Value	int/float	Set/get the value to show
Selected	Selective	Uint	Set/get current option
Format	Number format	Text	Value:%d,%02d,%03d,%04d,%05d,%06d,%f,%.1f,%.2f,%.3f,%.4f,%.5f,%.6f

2. Instruction return:

Return instruction	Return description	Data return type	Remarks
0x10B0	Combo_box_ex text delivery	Active/passive	It can be actively delivered after the combo_box_ex data is changed, or it can be actively obtained using get_text
0x10B1	Combo_box_ex value delivery	Passive	Int type
0x10B2	Combo_box_ex value delivery	Passive	Float type
0x10B8	Combo_box_ex serial number delivery	Passive	Int type MCU uses the get_selected instruction to get from 0

Return data description:

Category	Data	Description	Remarks
CMD	0x10B0	Combo_box_ex text delivery	It can be issued automatically after the combo_box_ex data is changed, and can be obtained actively using get_text
LEN	"Widget name" + length of text	Text length	
DATA	Widget name: Text	Text content	

Category	Data	Description	Remarks
CMD	0x10B1	Combo_box_ex value delivery	
LEN	"Widget name" + the length of the value	Data length	
DATA	Widget name + value	Data content	The value is the last four bytes of the data part, int type

Category	Data	Description	Remarks
CMD	0x10B2	Combo_box_ex value delivery	
LEN	"Widget name" + the length of the value	Data length	
DATA	Widget name + value	Data content	The value is the last four bytes of the data part, float type, in line with the IEEE 754 specification

Category	Data	Description	Remarks
CMD	0x10B8	Combo_box_ex serial number delivery	
LEN	"Widget name" + the length of the value	Data length	
DATA	Widget name + serial number value	Data content	Int type MCU uses the get_selected instruction to obtain, starting from 0

3. For example:
Set text:
ST<{"cmd_code":"set_text","type":"combo_box_ex","widget":"cbx1","text":"Stone"}>ET

Set value:
a) The data type is int and it shows 08:
ST<{"cmd_code":"set_value","type":"combo_box_ex","widget":"cbx1","value":8,"format":"%02d"}>ET

b) The data type is float and it shows 7.30:
ST<{"cmd_code":"set_value","type":"combo_box_ex","widget":"cbx1","value":7.3,"format":"%.2f"}>ET

c) The data type is int, which is showed as 6:
ST<{"cmd_code":"set_value","type":"combo_box_ex","widget":"cbx1","value":6}>ET

Set the current option:
ST<{"cmd_code":"set_selected","type":"combo_box_ex","widget":"cbx1","selected_index":2}>ET

Get text:
a) The text data is red:
Send: ST<{"cmd_code":"get_text","type":"combo_box_ex","widget":"combo_box_ex"}>ET
Response: ST<0x10 0xB0 0x00 0x02 "combo_box_ex":red>ET
HEX:53 54 3C 10 B0 00 12 22 63 6F 6D 62 6F 5F 62 6F 78 5F 65 78 22 3A 72 65 64 3E 45 54 D2 96

Get value:
a) The int type data is 123:
Send: ST<{"cmd_code":"get_value","type":"combo_box_ex","widget":"combo_box_ex"}>ET
Response: ST<0x10 0xB1 0x00 0x10 combo_box_ex 0x00 0x00 0x00 0x7B>ET
HEX:53 54 3C 10 B1 00 10 63 6F 6D 62 6F 5F 62 6F 78 5F 65 78 00 00 00 7B 3E 45 54 2C B2

b) The float type data is 1.23:
Send: ST<{"cmd_code":"get_value","type":"combo_box_ex","widget":"combo_box_ex"}>ET
Response: ST<0x10 0xB2 0x00 0x10 combo_box_ex 0x3F 0x9D 0x70 0xA4>ET
HEX:53 54 3C 10 B2 00 10 63 6F 6D 62 6F 5F 62 6F 78 5F 65 78 3F 9D 70 A4 3E 45 54 68 68

Get the current option:
a) The current option number of combo_box_ex is 4, which is the fifth selected item:
Send: ST<{"cmd_code":"get_selected","type":"combo_box_ex","widget":"combo_box_ex1"}>ET
Response: ST<0x10 0xB8 0x00 0x12 combo_box_ex 0x00 0x00 0x00 0x04>ET
HEX:53 54 3C 10 B8 00 10 63 6F 6D 62 6F 5F 62 6F 78 5F 65 78 00 00 00 04 3E 45 54 92 F2

4.6 mledit

1. Instruction sending:

Instruction	Instruction description	Remarks
set_text	Set the showed text content	
get_text	Get the showed text content	

Send data description:

Category	Description	Type	Remarks
Text	Text	Text	Set/get the text to show

2. Instruction return:

Return instruction	Return description	Data return type	Remarks
0x10C0	Mledit text delivery	Active/passive	It can be actively issued after the data is changed, and can be obtained actively using get_text

Return data description:

Category	Data	Description	Remarks
CMD	0x10C0	Mledit text delivery	It can be actively issued after the data is changed, or it can be obtained actively using get_text
LEN	"Widget name" + text	Data length	
DATA	Widget name: Text	Text content	The data length cannot exceed 1,024 bytes (the text content after the widget name: number)

3. For example:
Set text:
ST<{"cmd_code":"set_text","type":"mledit","widget":"mledit","text":"Stone"}>ET

Get text:
a) Get text data: Stone
Send: ST<{"cmd_code":"get_text","type":"mledit","widget":"mledit"}>ET
Response: ST<0x10 0xC0 0x00 0x02 "mledit":Stone>ET
HEX:53 54 3C 10 C0 00 0E 22 6D 6C 65 64 69 74 22 3A 53 74 6F 6E 65 3E 45 54 6F 92

4.7 progress_bar

1. Instruction sending:

Instruction	Instruction description	Remarks
set_max	Set the progress bar maximum value	
show_text	Set whether the progress bar shows text	
set_value	Set the progress bar value	
get_value	Get the progress bar value	
get_percent	Get progress bar percentage	

Send data description:

Category	Description	Type	Remarks
Text	Text	Text	Set whether the progress bar shows text
Max	Maximum value	Uint	Set the progress bar maximum value
Value	Value	Uint	Set the progress bar value/get the progress bar value
Percent	Percentage	Uint	Get progress bar percentage

2. Instruction return:

Return instruction	Return description	Data return type	Remarks
0x1050	Progress bar value delivery	Active/passive	MCU uses the get_value instruction to obtain
0x1051	Progress bar percentage	Passive	The MCU uses the get_percent instruction to obtain

Return data description:

Category	Data	Description	Remarks
CMD	0x1050	Progress_bar value delivery	Active/passive delivery, MCU uses the get_value instruction to obtain
LEN	"Widget name" + the length of the value	Data length	
DATA	Widget name + value	Text content	Float type, in line with IEEE 754 specification

Category	Data	Description	Remarks
CMD	0x1051	Progress bar percentage	Passive delivery, the MCU uses the get_percent instruction to obtain
LEN	"Widget name" + length in percentage	Data length	
DATA	Widget name + percentage	Text content	Int type

3. For example:
Set the progress bar maximum value:
ST<{"cmd_code":"set_max","type":"progress_bar","widget":"progress_bar","max":100}>ET

Set whether the progress bar shows text:
ST<{"cmd_code":"set_show_text","type":"progress_bar","widget":"progress_bar","show_text":true}>E
T
ST<{"cmd_code":"set_show_text","type":"progress_bar","widget":"progress_bar","show_text":false}>E
T

Set the progress bar value:
ST<{"cmd_code":"set_value","type":"progress_bar","widget":"progress_bar","value":40}>ET

Get the progress bar value:
a) Progress bar data changed, data 54.978615:
Send: ST<{"cmd_code":"get_value","type":"progress_bar","widget":"progress_bar"}>ET
Response: ST<0x10 0x50 0x00 0x10 progress_bar 0x42 0x5B 0xEA 0x1A>ET
HEX:53 54 3C 10 50 00 10 70 72 6F 67 72 65 73 73 5F 62 61 72 42 5B EA 1A 3E 45 54 BF 09

b) Progress bar data changed, data: 54.999928:
Send: ST<{"cmd_code":"get_value","type":"progress_bar","widget":"progress_bar"}>ET
Response: ST<0x10 0x50 0x00 0x10 progress_bar 0x42 0x5B 0xFF 0xED>ET
HEX:53 54 3C 10 50 00 10 70 72 6F 67 72 65 73 73 5F 62 61 72 42 5B FF ED 3E 45 54 08 36

c) Progress bar data changed, data: 55.000000:
Send: ST<{"cmd_code":"get_value","type":"progress_bar","widget":"progress_bar"}>ET
Response: ST<0x10 0x50 0x00 0x10 progress_bar 0x42 0x5C 0x00 0x00>ET
HEX:53 54 3C 10 50 00 10 70 72 6F 67 72 65 73 73 5F 62 61 72 42 5C 00 00 3E 45 54 C7 16

Get the progress bar percentage:
a) Progress bar percentage: 40%:
Send: ST<{"cmd_code":"get_percent","type":"progress_bar","widget":"progress_bar"}>ET
Response: ST<0x10 0x51 0x00 0x10 progress_bar 0x00 0x00 0x00 0x28>ET
HEX:53 54 3C 10 51 00 10 70 72 6F 67 72 65 73 73 5F 62 61 72 00 00 00 28 3E 45 54 33 A1

4.8 progress_circle

1. Instruction sending:

Instruction	Instruction description	Remarks
set_max	Set the progress bar maximum value	
show_text	Set whether the progress bar shows text	
set_value	Set the progress bar value	
get_value	Get the progress bar value	
get_percent	Get progress bar percentage	

Send data description:

Category	Description	Type	Remarks
Text	Text	Text	Set whether the progress bar shows text
Max	Maximum value	Uint	Set the progress bar maximum value
Value	Value	Uint	Set the progress bar value/get the progress bar value
Percent	Percentage	Uint	Get progress bar percentage

2. Instruction return:

Return instruction	Return description	Data return type	Remarks
0x10E0	Progress circle value	Passive	Key (last four bytes of data part): value: 0x42400000 The current progress bar value is 48.000000 (type float, in line with IEEE 754 specification)
0x10E1	Progress circle percentage	Passive	Key (the last four bytes of the data part): percent: 0x00000028, the current progress bar percentage is 40% (type int)

Return data description:

Category	Data	Description	Remarks
CMD	0x10E0	Progress circle value	
LEN	"Widget name" + the length of the value	Data length	
DATA	Widget name + value	Value content	Float type, in line with IEEE 754 specification

Category	Data	Description	Remarks
CMD	0x10E1	Progress_circle percentage	Passive delivery
LEN	"Widget name" + length in percentage	"Widget name" + percentage	
DATA	Widget name + percentage	Percentage value	Int type

3. For example

Set the progress bar maximum value:

ST<{"cmd_code":"set_max","type":"progress_circle","widget":"pg_circle1","max":100}>ET

Set whether the progress bar shows text:

ST<{"cmd_code":"set_show_text","type":"progress_circle","widget":"pg_circle1","show_text":true}>ET

ST<{"cmd_code":"set_show_text","type":"progress_circle","widget":"pg_circle1","show_text":false}>ET

Set the progress bar value to 40%:

ST<{"cmd_code":"set_value","type":"progress_circle","widget":"progress_circle1","value":40}>ET

Get the progress bar value:

a) Get the value of progress_circle1 as 54.978615:

Send: ST<{"cmd_code":"get_value","type":"progress_circle","widget":"progress_circle"}>ET

Response: ST<0x10 0x50 0x00 0x10 progress_circle 0x42 0x5B 0xEA 0x1A>ET

HEX:53 54 3C 10 50 00 10 70 72 6F 67 72 65 73 73 5F 62 61 72 42 5B EA 1A 3E 45 54 BF 09

b) Get the value of progress_circle1 as 54.999928:

Send: ST<{"cmd_code":"get_value","type":"progress_circle","widget":"progress_circle"}>ET

Response: ST<0x10 0x50 0x00 0x10 progress_bar 0x42 0x5B 0xFF 0xED>ET

HEX:53 54 3C 10 50 00 10 70 72 6F 67 72 65 73 73 5F 62 61 72 42 5B FF ED 3E 45 54 08 36

c) Get the value of progress_circle1 as 55.000000:

Send: ST<{"cmd_code":"get_value","type":"progress_circle","widget":"progress_circle"}>ET

Response: ST<0x10 0x50 0x00 0x10 progress_bar 0x42 0x5C 0x00 0x00>ET

HEX:53 54 3C 10 50 00 10 70 72 6F 67 72 65 73 73 5F 62 61 72 42 5C 00 00 3E 45 54 C7 16

Get the progress bar percentage:

a) Actively get the percentage of progress_circle is 40%:

Send: ST<{"cmd_code":"get_percent","type":"progress_circle","widget":"progress_circle"}>ET

Response: ST<0x10 0x51 0x00 0x10 progress_bar 0x00 0x00 0x00 0x28>ET

HEX:53 54 3C 10 51 00 10 70 72 6F 67 72 65 73 73 5F 62 61 72 00 00 00 28 3E 45 54 33 A1

4.9 hscroll_label

1. Instruction sending:

Instruction	Instruction description	Remarks
set_text	Set the text showed by hscroll_label	
set_loop	Set whether the hscroll_label to loop playback	
set_yoyo	Set whether the hscroll_label to yoyo	
set_direction	Set the direction of hscroll_label scrolling	
set_lull	Set hscroll_label lull	
set_duration	Set the duration for hscroll_label to scroll once	
get_text	Get the text showed by hscroll_label	

Send data description:

Category	Description	Type	Remarks
Text	Text	Text	Set the text showed by hscroll_label
Loop	Loop	Bool	Set whether the hscroll_label to loop playback
Yoyo	Yoyo	Bool	Set whether the hscroll_label to yoyo
Direction	Direction	Bool	Set the direction of hscroll_label scrolling
Lull	Lull	Uint	Set hscroll_label lull
Duration	Duration	Uint	Set the duration for hscroll_label to scroll once

2. Instruction return:

Return instruction	Return description	Data return type	Remarks
0x1100	Text returns	Passive	

Return data description:

Category	Data	Description	Remarks
CMD	0x1100	Text returns	
LEN	"Widget name" + length of text	Data length	
DATA	Widget name + text	Text content	Data format: text: "widget name": text content

3. For example:

Set text:

ST<{"cmd_code":"set_text","type":"hscroll_label","widget":"hscroll_label1","text":"Hello Stone"}>ET
ST<{"cmd_code":"set_text","type":"hscroll_label","widget":"hscroll_label1","text":"1234567890"}>ET
ST<{"cmd_code":"set_text","type":"hscroll_label","widget":"hscroll_label",
"text":"http://www.stoneitech.com http://www.stoneitech.com"}>ET

Set whether to loop playback:

ST<{"cmd_code":"set_loop","type":"hscroll_label","widget":"hscroll_label1","loop":true}>ET
ST<{"cmd_code":"set_loop","type":"hscroll_label","widget":"hscroll_label1","loop":false}>ET

Set whether to yoyo:
ST<{"cmd_code":"set_yoyo","type":"hscroll_label","widget":"hscroll_label1","yoyo":true}>ET
ST<{"cmd_code":"set_yoyo","type":"hscroll_label","widget":"hscroll_label1","yoyo":false}>ET

Set the direction:
a) Set hscroll_lable1 to scroll from left to right:
ST<{"cmd_code":"set_direction","type":"hscroll_label","widget":"hscroll_label1","direction":true}>ET

b) Set hscroll_lable1 to scroll from right to left:
ST<{"cmd_code":"set_direction","type":"hscroll_label","widget":"hscroll_label1","direction":false}>ET

Set the scroll lull:
ST<{"cmd_code":"set_lull","type":"hscroll_label","widget":"hscroll_label1","lull":2000}>ET
ST<{"cmd_code":"set_lull","type":"hscroll_label","widget":"hscroll_label1","lull":5000}>ET

Set the duration required to scroll once:
ST<{"cmd_code":"set_duration","type":"hscroll_label","widget":"hscroll_label1","duration":2000}>ET
ST<{"cmd_code":"set_duration","type":"hscroll_label","widget":"hscroll_label1","duration":5000}>ET

Get text:
a) Get the text of hscroll_lable1: http://www.stoneitech.com http://www.stoneitech.com:
Send: ST<{"cmd_code":"get_text","type":"hscroll_label","widget":"hscroll_label"}>ET
Response: ST<0x11 0x00 0x00 0x43 "hscroll_label":http://www.stoneitech.com http://www.stoneitech.com>ET
HEX:53 54 3C 11 00 00 43 22 68 73 63 72 6F 6C 6C 5F 6C 61 62 65 6C 22 3A 68 74 74 70 3A 2F 2F 77 77 77 2E 73 74 6F 6E 65 69 74 65 63 68 2E 63 6F 6D 20 68 74 74 70 3A 2F 2F 77 77 77 2E 73 74 6F 6E 65 69 74 65 63 68 2E 63 6F 6D 3E 45 54 B7 71

4.10 text_selector

1. Instruction sending:
2.

Instruction	Instruction description	Remarks
set_text	Set the text of the text selector	The set text needs to be the text already contained in the text selector, that is, jump to the position of the text;
set_value	Set the value of the text selector	The set value needs to be the value already contained in the text selector, that is, jump to the position of the value;
set_selected	Set the current option of the text selector	Jump to the option location;
get_text	Get the text of the text selector	Get the text of the current option;
get_value	Get the value of the text selector	Get the value of the current option;
get_selected	Get the current option of the text selector	Get the serial number of the current option;

Send data description:

Category	Description	Type	Remarks
Text	Text	Text	Set/get showed text
Value	Value	Uint	Set/get the value of the text selector
selected_index	Options	Uint	Set/get the current option of the text selector

2. Instruction return:

Return instruction	Return description	Data return type	Remarks
0x1080	Text selector text delivery	Passive	
0x1081	Text selector value delivery	Active/passive	Int type
0x1082	Text selector serial number delivery	Passive	Int type

Return data description:

Category	Data	Description	Remarks
CMD	0x1080	Text delivery	
LEN	"Widget name" + length of text	Data length	
DATA	Widget name + text	Text content	The data length cannot exceed 1,024 bytes (the text after the widget name: number)

Category	Data	Description	Remarks
CMD	0x1081	Value delivery	
LEN	"Widget name" + the length of the value	Data length	
DATA	Widget name + value	Value content	Int type, the last four bytes of the data part

Category	Data	Description	Remarks
CMD	0x1082	Serial number delivery	
LEN	"Widget name" + the length of the value	Data length	
DATA	Widget name + value	Value content	Int type, the last four bytes of the data part

3. For example

Set jumping to option location containing this text:

ST<{"cmd_code":"set_text","type":"text_selector","widget":"text_selector1","text":"stone"}>ET

ST<{"cmd_code":"set_text","type":"text_selector","widget":"text_selector1","text":"designer"}>ET

Set jumping to option location containing this value:

ST<{"cmd_code":"set_value","type":"text_selector","widget":"text_selector1","value":2021}>ET

Set the option position to jump to this sequence number:

ST<{"cmd_code":"set_selected","type":"text_selector","widget":"text_selector1",
"selected_index":5}>ET

Get the text of the current option:
a) Get text_selector1 text data as 2020:
Send: ST<{"cmd_code":"get_text","type":"text_selector","widget":"text_selector1"}>ET
Response: ST<0x10 0x80 0x00 0x15 "text_selector1":2020>ET
HEX:53 54 3C 10 80 00 15 22 74 65 78 74 5F 73 65 6C 65 63 74 6F 72 31 22 3A 32 30 32 30 3E 45 54 63
40

b) Get text_selector1 text data as yellow:
Send: ST<{"cmd_code":"get_text","type":"text_selector","widget":"text_selector1"}>ET
Response: ST<0x10 0x80 0x00 0x17 "text_selector2":yellow>ET
HEX:53 54 3C 10 80 00 17 22 74 65 78 74 5F 73 65 6C 65 63 74 6F 72 32 22 3A 79 65 6C 6C 6F 77 3E
45 54 06 5E

Get the value of the current option:
a) Get the value data of text_selector1 as 2021:
Send: ST<{"cmd_code":"get_value","type":"text_selector","widget":"text_selector1"}>ET
Response: ST<0x10 0x81 0x00 0x12 text_selector1 0x00 0x00 0x07 0xE5>ET
HEX:53 54 3C 10 81 00 12 74 65 78 74 5F 73 65 6C 65 63 74 6F 72 31 00 00 07 E5 3E 45 54 FE 5A

b) Get the value data of text_selector2 as 4:
Send: ST<{"cmd_code":"get_value","type":"text_selector","widget":"text_selector1"}>ET
Response: ST<0x10 0x81 0x00 0x12 text_selector2 0x00 0x00 0x00 0x04>ET
HEX:53 54 3C 10 81 00 12 74 65 78 74 5F 73 65 6C 65 63 74 6F 72 32 00 00 00 04 3E 45 54 17 99

Special note: If the content of the text selector is text, the number of the current option is returned instead of the serial number;
For example: 1:red;2:blue;3:green;4:yellow;5:grey; At this time, the corresponding text is yellow.

Get the serial number of the current option:
a) The current option number of text_selector1: 50, that is, the 51st is selected:
Send: ST<{"cmd_code":"get_selected","type":"text_selector","widget":"text_selector1"}>ET
Response: ST<0x10 0x82 0x00 0x12 text_selector1 0x00 0x00 0x00 0x32>ET
HEX:53 54 3C 10 82 00 12 74 65 78 74 5F 73 65 6C 65 63 74 6F 72 31 00 00 00 32 3E 45 54 75 32

b) The current option number of text_selector1: 5, that is, the 6th is selected:
Send: ST<{"cmd_code":"get_selected","type":"text_selector2","widget":"text_selector1"}>ET
Response: ST<0x10 0x82 0x00 0x12 text_selector2 0x00 0x00 0x00 0x05>ET
HEX:53 54 3C 10 82 00 12 74 65 78 74 5F 73 65 6C 65 63 74 6F 72 32 00 00 00 05 3E 45 54 14 7C

Special instructions: When the content of the text selector is text, for example, the format is: 1:red; 2:blue;3:green; 4:yellow; 5:grey; Use get_value to get the number in the format; use get_select instruction to get What is the serial number of the current option (the serial number is the system order and cannot be changed), the two need to be distinguished.

4.11 slider

1. Instruction sending:

Instruction	Instruction description	Remarks
set_max	Set the slider maximum value	
set_min	Set the slider minimum value	
set_step	Set the slider step value	
set_value	Set the slider value	
get_value	Get slider value	

Send data description:

Category	Description	Type	Remarks
Max	Text	Text	Set the slider maximum value
Min	Value	Uint	Set the slider minimum value
Step	Step Value	Uint	Set the slider step value
Value	Value	Uint	Set/get slider value

2. Instruction return:

Return instruction	Return description	Data return type	Remarks
0x1040	Slider value is changing	Initiative	
0x1041	After the slider value is changed	Initiative	

Return data description:

Category	Data	Description	Remarks
CMD	0x1040	Slider value change	Actively deliver when the slider value changes
LEN	"Widget name" + the length of the value	Data length	
DATA	Widget name + value	Value content	The last four bytes of the data part, type float, in line with the IEEE 754 specification

Category	Data	Description	Remarks
CMD	0x1041	Value delivery	The value after the slider value has been changed
LEN	"Widget name" + the length of the value	Data length	
DATA	Widget name + value	Value content	The last four bytes of the data part, type float, in line with the IEEE 754 specification

3. For example
Set slider parameters:
a) Set the slider1 widget maximum value to 200:

```
ST<{"cmd_code":"set_max","type":"slider","widget":"slider1","max":200}>ET
```

b) Set the slider1 widget minimum value to 0:

```
ST<{"cmd_code":"set_min","type":"slider","widget":"slider1","min":0}>ET
```

c) Set the current value of the slider1 widget to 10:

```
ST<{"cmd_code":"set_value","type":"slider","widget":"slider1","value":10}>ET
```

d) Set slider1 widget step value 1:

```
ST<{"cmd_code":"set_step","type":"slider","widget":"slider1","step":1}>ET
```

Get slider parameters:
a) The slider1 data is changing, which is 48.000000:

```
Response: ST<0x10 0x40 0x00 0x0B slider1 0x42 0x40 0x00 0x00>ET
HEX:53 54 3C 10 40 00 0B 73 6C 69 64 65 72 31 42 40 00 00 3E 45 54 27 6D
```

b) The slider1 data is changing, which is 49.000000:

```
Response: ST<0x10 0x40 0x00 0x0B slider1 0x42 0x44 0x00 0x00>ET
HEX:53 54 3C 10 40 00 0B 73 6C 69 64 65 72 31 42 44 00 00 3E 45 54 A3 6C
```

c) Get slider1 data (change completed), the data is 49.000000:

```
Send: ST<{"cmd_code":"get_value","type":"slider","widget":"slider1"}>ET
Response: ST<0x10 0x41 0x00 0x0B slider1 0x42 0x44 0x00 0x00>ET
HEX:53 54 3C 10 41 00 0B 73 6C 69 64 65 72 31 42 44 00 00 3E 45 54 33 3D
```

4.12 image

1. Instruction sending:

Instruction	Instruction description	Remarks
set_image	Set the image name to show	
set_draw_type	Set the drawing type of image	
set_scale	Set the scale ratio of the image	
set_rotation	Set the rotation of the image	

Send data description:

Category	Description	Type	Remarks
Image	Image name	Text	
draw_type	Drawing type	Uint	The value of draw_type is as follows: 0: Default show. Shows the image at its original size in the upper left corner of the destination rectangle. 1: center show. Shows the image at its original size in the center of the destination rectangle. 2: icon show. As the center show, but resize based on screen density. 3: scale show. Scale the image to the size of the target rectangle (width and height are not guaranteed to be proportional). 4: Automatic scale show. Scale the image to the width or height of the target rectangle (select the smallest ratio), and center show. 5: If the image is larger than the target rectangle, it will be automatically reduced and showed, otherwise it will be showed in the center. 6: Width scale show. Scale the image to the width of the target rectangle, and the height is scaled by this ratio, exceeded parts are not showed. 7: Height scale show. Scale the image to the height of the target rectangle, and the width is scaled by this ratio, exceeded parts are not showed. 8: Tile show. 9: Tile show in the horizontal direction and scale in the vertical direction. 10: Tile show vertically and scale horizontally. 11: Tile show vertically and scale horizontally (bottom to top).
scale_x	x-axis scaling	Float	Image scaling
scale_y	y-axis scaling	Float	Image scaling
Rotation	Rotation angle	Uint	Unit: angle

2. Instruction return:

Return instruction	Return description	Return type	Remarks
0x1090	Image system key delivery	Initiative	System key (last two bytes of data part): 0x0001: Press down press key 0x0002: press click press and release (trigger click event) 0x0004: the press up button is released (the button is completed)
0x1091	Image user-defined key delivery	Initiative	User key (last two bytes of data part): User-defined key

Return data description:

Category	Data	Description	Remarks
CMD	0x1090	Key delivery	Image key system key delivery
LEN	"Widget name" + the length of the value	Data length	
DATA	Widget name + value	Value content	Last two bytes of the data section

Category	Data	Description	Remarks
CMD	0x1091	Value delivery	Image button user-defined key delivery
LEN	"Widget name" + the length of the value	Data length	
DATA	Widget name + value	Value content	Last two bytes of the data section

3. For example
Set image parameters:
a) Set the image widget name to guage_bg/vgus01:
ST<{"cmd_code":"set_image","type":"image","widget":"image","image":"guage_bg"}>ET
ST<{"cmd_code":"set_image","type":"image","widget":"image","image":"vgus01"}>ET

b) Set the image widget drawing type to 2 (center show):
ST<{"cmd_code":"set_draw_type","type":"image","widget":"image","draw_type":2}>ET

c) Set the scaling of the image widget:
ST<{"cmd_code":"set_scale","type":"image","widget":"image","scale_x":0.5,"scale_y":0.5}>ET
ST<{"cmd_code":"set_scale","type":"image","widget":"image","scale_x":1,"scale_y":1}>ET

d) Set the rotation angle of the image widget to 90/180:
ST<{"cmd_code":"set_rotation","type":"image","widget":"image","rotation":90}>ET
ST<{"cmd_code":"set_rotation","type":"image","widget":"image","rotation":180}>ET

Image system key delivery:
a) Image1 widget pressed:
Response: ST<0x10 0x90 0x00 0x08 image1 0x00 0x01>ET
HEX:53 54 3C 10 90 00 08 69 6D 61 67 65 31 00 01 3E 45 54 CE 5C

b) The image1 widget is released (click event):
Response: ST<0x10 0x90 0x00 0x08 image1 0x00 0x02>ET
HEX:53 54 3C 10 90 00 08 69 6D 61 67 65 31 00 02 3E 45 54 8A 5C

c) The image1 widget is released:
Response: ST<0x10 0x90 0x00 0x08 image1 0x00 0x04>ET
HEX:53 54 3C 10 90 00 08 69 6D 61 67 65 31 00 04 3E 45 54 02 5C

Image user-defined key delivery:
a) Image1 widget is customized pressed:

Response: ST<0x10 0x91 0x00 0x08 image1 0x04 0xD2>ET
HEX:53 54 3C 10 91 00 08 69 6D 61 67 65 31 04 D2 3E 45 54 4B 95

b) Image1 widget is customized released (click event):
Response: ST<0x10 0x91 0x00 0x08 image1 0x16 0x2E>ET
HEX:53 54 3C 10 91 00 08 69 6D 61 67 65 31 16 2E 3E 45 54 18 1D

c) Image1 widget is customized released:
Response: ST<0x10 0x91 0x00 0x08 image1 0x22 0xCE>ET
HEX:53 54 3C 10 91 00 08 69 6D 61 67 65 31 22 CE 3E 45 54 1C 9B

Special instruction: The button function of image can only be used after checking the clickable attribute and setting the corresponding key-value attribute.
By default, no key will be delivered;

4.13 image_value

1. Instruction sending:

Instruction	Instruction description	Remarks
set_image	Set the name prefix of the image value	The number is composed of a series of images, this instruction is used to set the image name prefix
set_format	Set format of image value	
set_max	Set the maximum value of the image value	
set_min	Set the minimum value of the image value	
set_value	Set the value of the image value	
get_value	Get the value of the image value	

Send data description:

Category	Description	Type	Remarks
Image	Image name	Text	Set the name prefix of the image value, such as num0-num9 prefixed with num
Format	Number format	Text	Set the format of the image value, Value: %d,%02d,%03d,%04d,%05d,%06d,%f,%.1f,%.2f,%.3f,%.4f,%.5f,%.6f
Max	Maximum value	Uint	Set the maximum value of the image value
Min	Minimum value	Uint	Set the minimum value of the image value
Value	Image value	Float	Set/get the value of the image value

2. Instruction return:

Return instruction	Return description	Data return type	Remarks
0x1092	Image_value value delivery	Initiative	Float type

Return data description:

Category	Data	Description	Remarks
CMD	0x1092	Value delivery	Image_value value delivery
LEN	"Widget name" + the length of the value	Data length	
DATA	Widget name + value	Value content	Float type, the last four bytes of the data part, in line with the IEEE 754 specification

3. For example

Set the image value parameters:

a) Set the image_value widget image name prefix:

ST<{"cmd_code":"set_image","type":"image_value","widget":"image_value","image":"num"}>ET

b) Set the image_value widget format:

ST<{"cmd_code":"set_format","type":"image_value","widget":"image_value","format":"%02.2f"}>ET

c) Set the maximum value of the image_value widget:

ST<{"cmd_code":"set_max","type":"image_value","widget":"image_value","max":200}>ET

d) Set the minimum value of the image_value widget:

ST<{"cmd_code":"set_min","type":"image_value","widget":"image_value","min":0}>ET

e) Set the current value of the image_value widget:

ST<{"cmd_code":"set_value","type":"image_value","widget":"image_value","value":6.66}>ET

Get image value parameters:

a) Get the value of image_value as 4.23:

Send: ST<{"cmd_code":"get_value","type":"image_value","widget":"image_value"}>ET

Response: ST<0x10 0x92 0x00 0x0F image_value 0x40 0x87 0x5C 0x29>ET

HEX:53 54 3C 10 92 00 0F 69 6D 61 67 65 5F 76 61 6C 75 65 40 87 5C 29 3E 45 54 F6 DB

4.14 image_animation

1. Instruction sending:

Instruction	Instruction description	Remarks
set_play	Set image animation play	
set_pause	Set image animation pause	
set_stop	Set image animation stop	
set_format	Set the image name prefix of the image animation	
set_image	Set the image name prefix of the image animation	
set_interval	Set image animation interval	
set_loop	Set whether the image animation to loop playback	
set_range	Set image animation range	

Send data description:

Category	Description	Type	Remarks
Format	The composition format of image animation	Text	Set the image composition format of the image animation, such as num0-num9 composition, then the format is %s%d
Image	Image name prefix	Text	Set the image name prefix of the image animation
Interval	Interval	Uint	Image animation playback interval, unit: ms
Loop	Whether to loop image animation	Bool	Set whether to loop playback
start_index	Image starting ordinal	Uint	Image starting sequence number
end_index	Image ending ordinal	Uint	Image starting sequence number

2. For example:
Set image animation parameters:
a) Set image_animation to start playback:
ST<{"cmd_code":"set_play","type":"image_animation","widget":"image_ani1"}>ET

b) Set image_animation to pause playback:
ST<{"cmd_code":"set_pause","type":"image_animation","widget":"image_ani1"}>ET

c) Set image_animation to stop playback:
ST<{"cmd_code":"set_stop","type":"image_animation","widget":"image_ani1"}>ET

d) Set the image composition format of image_animation:
ST<{"cmd_code":"set_format","type":"image_animation","widget":"image_ani1","format":"%s%d"}>ET

e) Set the image animation name prefix of image_animation :
ST<{"cmd_code":"set_image","type":"image_animation","widget":"image_ani1","image":"num"}>ET

f) Set the image_animation playback interval:
ST<{"cmd_code":"set_interval","type":"image_animation","widget":"image_ani1","interval":200}>ET

g) Set image_animation whether to loop playback:
ST<{"cmd_code":"set_loop","type":"image_animation","widget":"image_ani1","loop":true}>ET

h) Set the start and end sequence of image_animation:
ST<{"cmd_code":"set_range","type":"image_animation","widget":"image_ani1","start_index":1,
"end_index":9}>ET

4.15 gif

1. Instruction delivery

Instruction	Instruction description	Remarks
set_image	Set the image name to show	
set_play	Set gif image play	
set_pause	Set gif image pause	
set_stop	Set gif image stop	
set_loop	Set the number of frames to loop playback	Stop after how many frames are played
set_frame	Set which frame of the gif to show	gif is valid in pause/stop state
set_scale	Set the scale ratio of the image	
set_rotation	Set the rotation of the image	

Send data description:

Category	Description	Type	Remarks
Image	Image name	Text	Set the image name to show
Loop	Number of frames played	Uint	Set the number of frames for loop playback (stop after how many frames are played)
Frame	Image frame	Uint	Set which frame of gif to show (gif is valid in pause/stop state)
scale_x	x-axis scaling	Float	Set the scale ratio of the image
scale_y	x-axis scaling	Float	Set the scale ratio of the image
Rotation	Start and end images	Float	Set the rotation angle and unit angle of the image

2. For example:
Set gif image parameters:
a) Set the showed gif image:
ST<{"cmd_code":"set_image","type":"gif","widget":"gif0","image":"bear"}>ET
ST<{"cmd_code":"set_image","type":"gif","widget":"gif0","image":"monkey"}>ET

b) Set gif image play:
ST<{"cmd_code":"set_play","type":"gif","widget":"gif0"}>ET

c) Set gif image pause:
ST<{"cmd_code":"set_pause","type":"gif","widget":"gif0"}>ET

d) Set gif image stop:
ST<{"cmd_code":"set_stop","type":"gif","widget":"gif0"}>ET

e) Set the number of frames to loop playback:
ST<{"cmd_code":"set_loop","type":"gif","widget":"gif0","loop":123}>ET

f) Set which frame of the gif to show:
ST<{"cmd_code":"set_frame","type":"gif","widget":"gif0","frame":0}>ET
ST<{"cmd_code":"set_frame","type":"gif","widget":"gif0","frame":1}>ET
ST<{"cmd_code":"set_frame","type":"gif","widget":"gif0","frame":10}>ET

g) Set the scaling of the image:
ST<{"cmd_code":"set_scale","type":"gif","widget":"gif0","scale_x":0.5,"scale_y":0.5}>ET

h) Set the rotation angle of the image:
ST<{"cmd_code":"set_rotation","type":"gif","widget":"gif0","rotation":90}>ET

4.16 svg

1. Instruction delivery

Instruction	Instruction description	Remarks
set_image	Set the image name to show	
set_scale	Set the scale ratio of the image	
set_rotation	Set the rotation of the image	

Send data description:

Category	Description	Type	Remarks
Image	Image name	Text	Set the image name to show
scale_x	x-axis scaling	Float	Set the scale ratio of the image
scale_y	x-axis scaling	Float	Set the scale ratio of the image
Rotation	Rotation	Float	Set the rotation of the image

2. For example:
Set svg image parameters:
a) Set the image showed by svg0:
ST<{"cmd_code":"set_image","type":"svg","widget":"svg0","image":"1"}>ET
ST<{"cmd_code":"set_image","type":"svg","widget":"svg0","image":"login"}>ET

b) Set the scaling of the svg0 image:
ST<{"cmd_code":"set_scale","type":"svg","widget":"svg0","scale_x":0.5,"scale_y":0.5}>ET
ST<{"cmd_code":"set_scale","type":"svg","widget":"svg0","scale_x":1,"scale_y":1}>ET

c) Set the rotation angle of the svg0 image:
ST<{"cmd_code":"set_rotation","type":"svg","widget":"svg0","rotation":90}>ET
ST<{"cmd_code":"set_rotation","type":"svg","widget":"svg0","rotation":180}>ET

4.17 button

1. Instruction returns:

Return instruction	Description	Data return type	Remarks
0x1001	System key delivery	Initiative	System key (last byte of data part): 0x01: press down 0x02:press click and up (trigger the click event) 0x03:long pressed (if repeat is not 0, the click event will be triggered continuously) 0x04: press up (button finished)
0x1002	User-defined key delivery	Initiative	User key (last two bytes of data part): Two bytes of data, the meaning of the key is user-defined

Return data description:

Category	Data	Description	Remarks
CMD	0x1001	System key	Click the button to automatically deliver, the user does not set a custom key value to deliver the system key value by default
LEN	"Widget name" + the length of the key value	Data length	
DATA	"Widget name" + key value	Data content	Last byte of data part

Category	Data	Description	Remarks
CMD	0x1002	User key	Click the button to automatically deliver, if the user does not set a custom key value, the system key value is delivered by default, if the user key value is set, the user-defined key value is delivered
LEN	"Widget name" + length of user key value	Data length	
DATA	Widget name + user key value	Data content	The last two bytes of the data part; high-order first, low-order last

2. For example:

System key value:

a) Button press instruction:

Response: ST<0x10 0x01 0x00 0x08 button9 0x01>ET

HEX:53 54 3C 10 01 00 08 62 75 74 74 6F 6E 39 01 3E 45 54 E7 E0

b) Click button and release (complete button click action) instruction:

Response: ST<0x10 0x01 0x00 0x08 button9 0x02>ET

HEX:53 54 3C 10 01 00 08 62 75 74 74 6F 6E 39 02 3E 45 54 A3 E0

c) Button release instruction:

Response: ST<0x10 0x01 0x00 0x08 button1 0x04>ET

HEX:53 54 3C 10 01 00 08 62 75 74 74 6F 6E 31 04 3E 45 54 EA 01

d) Button long press instruction:

Response: ST<0x10 0x01 0x00 0x08 button9 0x03>ET

HEX:53 54 3C 10 01 00 08 62 75 74 74 6F 6E 39 03 3E 45 54 5F E1

User-defined key:

a) Button press customized instruction 0x04D2:

Response: ST<0x10 0x02 0x00 0x09 button1 0x04 0xD2>ET

HEX:53 54 3C 10 02 00 09 62 75 74 74 6F 6E 31 04 D2 3E 45 54 66 23

b) Button release (complete button click action) customized instruction 0x162E:

Response: ST<0x10 0x02 0x00 0x09 button1 0x16 0x2E>ET

HEX:53 54 3C 10 02 00 09 62 75 74 74 6F 6E 31 16 2E 3E 45 54 35 AB

c) Button release customized instruction 0x0315:

Response: ST<0x10 0x02 0x00 0x09 button1 0x03 0x15>ET

HEX:53 54 3C 10 02 00 09 62 75 74 74 6F 6E 31 03 15 3E 45 54 D2 AB

d) Button long press customized instruction 0x0064:

Response: ST<0x10 0x02 0x00 0x09 button1 0x00 0x64>ET

HEX:53 54 3C 10 02 00 09 62 75 74 74 6F 6E 31 00 64 3E 45 54 EE F4

4.18 ☑ check button

1. Instruction sending:

Instruction	Instruction description	Remarks
set_value	Set check value	

Send data description:

Category	Description	Type	Remarks
Value	Check value	Bool	Set check value, which is true/false

2. Instruction return:

Return instruction	Return description	Data return type	Remarks
0x1020	Check button value	Initiative	Key: 0x00: unchecked state; 0x01: checked state

Return data description:

Category	Data	Description	Remarks
CMD	0x1020	Check button value	
LEN	"Widget name" + the length of the value	Data length	
DATA	Widget name + value	Value content	Last byte of data part

3. For example:
Set parameters:
ST<{"cmd_code":"set_value","type":"check_button","widget":"check_button","value":true}>ET
ST<{"cmd_code":"set_value","type":"check_button","widget":"check_button","value":false}>ET

Get parameters:
a) The value of the check button is changed and the instruction is delivered actively - unchecked:
Response: ST<0x10 0x20 0x00 0x0D check_button 0x00>ET
HEX:53 54 3C 10 20 00 0D 63 68 65 63 6B 5F 62 75 74 74 6F 6E 00 3E 45 54 AF 1E

b) The value of the check button is changed and the instruction is delivered actively - selected
Response: ST<0x10 0x20 0x00 0x0D check_button 0x01>ET
HEX:53 54 3C 10 20 00 0D 63 68 65 63 6B 5F 62 75 74 74 6F 6E 01 3E 45 54 53 1F

4.19 ◉ radio_button

1. Instruction sending:

Instruction	Instruction description	Remarks
set_value	Set check value	Set check value, which is true/false
get_checked	Get the currently checked radio button	Key: 0x00: unchecked state; 0x01: checked state

Send data description:

Category	Description	Type	Remarks
Value	Check value	Bool	Set check value, which is true/false

2. Instruction return:

Return instruction	Return description	Data return type	Remarks
0x1030	Radio_button value change	Initiative	
0x1031	Radio_button value change	Passive	The MCU uses the get_checked instruction to obtain

Return data description:

Category	Data	Description	Remarks
CMD	0x1030	Check button value	Active delivery
LEN	"Widget name" + the length of the value	Data length	
DATA	Widget name + value	Value content	Last byte of data part

Category	Data	Description	Remarks
CMD	0x1031	Check button value	Passive delivery, use the get_checked instruction to obtain
LEN	"Widget name" + the length of the value	Data length	
DATA	Widget name + value	Value content	Last byte of data part

3. For example:
Set parameters:
ST<{"cmd_code":"set_value","type":"radio_button","widget":"radio_button","value":true}>ET
ST<{"cmd_code":"set_value","type":"radio_button","widget":"radio_button","value":false}>ET

Actively deliver instruction:
a) Manually select radio_button1, radio_button is automatically closed and selected:
Response: ST<0x10 0x30 0x00 0x0E radio_button1 0x01>ET
HEX:53 54 3C 10 30 00 0E 72 61 64 69 6F 5F 62 75 74 74 6F 6E 31 01 3E 45 54 34 4E
Response: ST<0x10 0x30 0x00 0x0D radio_button 0x00>ET
HEX:53 54 3C 10 30 00 0D 72 61 64 69 6F 5F 62 75 74 74 6F 6E 00 3E 45 54 32 36

b) Manually select radio_button2, radio_button1 is automatically closed and selected:
Response: ST<0x10 0x30 0x00 0x0E radio_button2 0x01>ET
HEX:53 54 3C 10 30 00 0E 72 61 64 69 6F 5F 62 75 74 74 6F 6E 32 01 3E 45 54 34 0A
Response: ST<0x10 0x30 0x00 0x0E radio_button1 0x00>ET
HEX:53 54 3C 10 30 00 0E 72 61 64 69 6F 5F 62 75 74 74 6F 6E 31 00 3E 45 54 C8 4F

MCU actively obtains the current option:
a) Actively get the current option: radio_button1
Send: ST<{"cmd_code":"get_checked","type":"radio_button","widget":"radio_button1"}>ET
Response: ST<0x10 0x31 0x00 0x0E radio_button1 0x01>ET
HEX:53 54 3C 10 31 00 0E 72 61 64 69 6F 5F 62 75 74 74 6F 6E 31 01 3E 45 54 E5 73

b) Actively get the current option: radio_button2
Send: ST<{"cmd_code":"get_checked","type":"radio_button","widget":"radio_button2"}>E
Response: ST<0x10 0x31 0x00 0x0E radio_button2 0x01>ET
HEX:53 54 3C 10 31 00 0E 72 61 64 69 6F 5F 62 75 74 74 6F 6E 32 01 3E 45 54 E5 37

4.20 switch

1. Instruction sending:

Instruction	Instruction description	Remarks
set_value	Set switch value	

Send data description:

Category	Description	Type	Remarks
Value	Check value	Bool	Set check value, which is true/false

2. Instruction return:

Return instruction	Return description	Data return type	Remarks
0x1010	After the switch value is changed	Initiative	Key (last byte of data part): 0x00: switch off 0x01: switch on

Return data description:

Category	Data	Description	Remarks
CMD	0x1010	Switch value	Click the button to automatically deliver
LEN	"Widget name" + value	"Widget name" + value content length	
DATA	Widget name + value	Value content	Key (last byte of data part)

3. For example:
Set switch parameters:
ST<{"cmd_code":"set_value","type":"switch","widget":"switch","value":true}>ET
ST<{"cmd_code":"set_value","type":"switch","widget":"switch","value":false}>ET

Instruction actively returns:
a) The switch value is changed and the instruction is delivered actively - the switch switch is turned off:
Response: ST<0x10 0x10 0x00 0x07 switch 0x00>ET
HEX:53 54 3C 10 10 00 07 73 77 69 74 63 68 00 3E 45 54 21 F2

b) The switch value is changed and the instruction is delivered actively - the switch switch is turned on:
Response: ST<0x10 0x10 0x00 0x07 switch 0x01>ET
HEX:53 54 3C 10 10 00 07 73 77 69 74 63 68 01 3E 45 54 DD F3

4.21 digit_clock/ time_clock

1. Instruction sending:

Instruction	Instruction description	Remarks
set_date	Set RTC time	
set_format	Set the format of the clock	Only for digit clock
get_date	Get RTC time	

Send data description:

Category	Description	Type	Remarks
Date	Time	Text	Set/get RTC time
Format	Time format	Text	See the table below for values

Format value	Description
Y	Represent year (shown in full)
M	Represent month (1-12)
D	Represent day (1-31)
h	Represent hour (0-23)
m	Represent minute (0-59)
s	Represent second (0-59)
w	Represent week (0-6)
W	Abbreviation for the week
YY	Represents the year (only the last two digits are showed)
MM	Represent month (01-12)
DD	Represent day (01-31)
hh	Represent hour (00-23)
mm	Represent minute (00-59)
ss	Represent second (00-59)
MMM	Abbreviation for month

2. Instruction return:

Return instruction	Return description	Data return type	Remarks
0x10F0	Date+time return	Passive	

Return data description:

Category	Data	Description	Remarks
CMD	0x10F0	Date+time return	
LEN	"Widget name": the length of the datetime	Data length	
DATA	"Widget name" + datetime	Data content	

3. For example:
Set digital clock parameters:
a) Set the clock time:

```
ST<{"cmd_code":"set_date","type":"digit_clock","widget":"digit_clock","date":"12:23"}>ET
ST<{"cmd_code":"set_date","type":"digit_clock","widget":"digit_clock","date":"12:23:46"}>ET
ST<{"cmd_code":"set_date","type":"digit_clock","widget":"digit_clock","date":"2021-02-26 12:23"}>ET
ST<{"cmd_code":"set_date","type":"digit_clock","widget":"digit_clock",
"date":"2021-02-26 12:23:46"}>ET
ST<{"cmd_code":"set_date","type":"time_clock","widget":"time_clock1",
"date":"2021-02-26 12:23:46"}>ET
```

b) Set the clock show format:
ST<{"cmd_code":"set_format","type":"digit_clock","widget":"digit_clock","format":"hh:mm"}>ET
ST<{"cmd_code":"set_format","type":"digit_clock","widget":"digit_clock","format":"hh:mm:ss"}>ET
ST<{"cmd_code":"set_format","type":"digit_clock","widget":"digit_clock",
"format":"YYYY-MM-DD hh:mm"}>ET
ST<{"cmd_code":"set_format","type":"digit_clock","widget":"digit_clock",
"format":"YYYY-MM-DD hh:mm:ss"}>ET
ST<{"cmd_code":"set_format","type":"digit_clock","widget":"digit_clock",
"format":"YYYY-MM-DD hh:mm:ss w"}>ET
ST<{"cmd_code":"set_format","type":"digit_clock","widget":"digit_clock",
"format":"YYYY-MM-DD hh:mm:ss W"}>ET
ST<{"cmd_code":"set_format","type":"digit_clock","widget":"digit_clock",
"format":"YYYY-MM-DD hh:mm:ss MMM"}>ET
ST<{"cmd_code":"set_format","type":"digit_clock","widget":"digit_clock",
"format":"YYYY-M-D h:m:s"}>ET
ST<{"cmd_code":"set_format","type":"digit_clock","widget":"digit_clock",
"format":"YYYY/MM/DD hh:mm:ss"}>ET

Get the date and time data delivery:
a) Get the date and time of digit_clock1: 2021-02-26 12:31:35
Send: ST<{"cmd_code":"get_date","type":"digit_clock","widget":"digit_clock1"}>ET
Response: ST<0x10 0xF0 0x00 0x22 "digit_clock1":2021-02-26 12:31:35>ET
HEX:53 54 3C 10 F0 00 22 22 64 69 67 69 74 5F 63 6C 6F 63 6B 31 22 3A 32 30 32 31 2D 30 32 2D 32
36 20 31 32 3A 33 31 3A 33 35 3E 45 54 30 BB

b) Get the date and time of time_clock1: 2021-02-26 12:34:57
Send: ST<{"cmd_code":"get_date","type":"time_clock","widget":"time_clock1"}>ET
Response: ST<0x10 0xF0 0x00 0x21 "time_clock1":2021-02-26 12:34:57>ET
HEX:53 54 3C 10 F0 00 21 22 74 69 6D 65 5F 63 6C 6F 63 6B 31 22 3A 32 30 32 31 2D 30 32 2D 32
36
20 31 32 3A 33 34 3A 35 37 3E 45 54 D7 35

4.22 gauge

1. Instruction sending:

Instruction	Instruction description	Remarks
set_image	Set the image name to show	
set_draw_type	Set the drawing type of the image (same as image)	

Send data description:

Category	Description	Type	Remarks
Image	Image	Text	Set the image name to show
draw_type	Drawing type	Uint	Set the drawing type of the image, the value is the same as the image widget

2. For example:
Set image parameters:
a) Set gauge1 background image:
```
ST<{"cmd_code":"set_image","type":"gauge","widget":"gauge1","image":"gauge_bg"}>ET
ST<{"cmd_code":"set_image","type":"gauge","widget":"gauge1","image":"gauge_bg1"}>ET
```

b) Set gauge1 image drawing type:
```
ST<{"cmd_code":"set_draw_type","type":"gauge","widget":"gauge1","draw_type":2}>ET
```

4.23 gauge_pointer

1. Instruction sending:

Instruction	Instruction description	Remarks
set_image	Set the image name to show	
set_angle	Sets the rotation angle of the pointer	

Send data description:

Category	Description	Type	Remarks
Image	Image	Text	Set the name of the image to be showed (same as image)
Angle	Angle	int	Sets the rotation angle of the pointer

2. For example:
Set image parameters:
a) Set gp1 gauge pointer image:
```
ST<{"cmd_code":"set_image","type":"gauge_pointer","widget":"gp1","image":"guage_pointer"}>ET
ST<{"cmd_code":"set_image","type":"gauge_pointer","widget":"gp1","image":"guage_pointer1"}>ET
ST<{"cmd_code":"set_image","type":"gauge_pointer","widget":"gp1","image":"guage_pointer2"}>ET
```

b) Set gp1 gauge pointer rotation angle:
```
ST<{"cmd_code":"set_angle","type":"gauge_pointer","widget":"gp1","angle":0}>ET
ST<{"cmd_code":"set_angle","type":"gauge_pointer","widget":"gp1","angle":30}>ET
ST<{"cmd_code":"set_angle","type":"gauge_pointer","widget":"gp1","angle":60}>ET
ST<{"cmd_code":"set_angle","type":"gauge_pointer","widget":"gp1","angle":90}>ET
ST<{"cmd_code":"set_angle","type":"gauge_pointer","widget":"gp1","angle":-90}>ET
ST<{"cmd_code":"set_angle","type":"gauge_pointer","widget":"gp1","angle":180}>ET
ST<{"cmd_code":"set_angle","type":"gauge_pointer","widget":"gp1","angle":270}>ET
```

4.24 chart_view

4.24.1 x_axis / y_axis

1. Instruction sending：

Instruction	Instruction description	Remarks
set_min	Set the minimum value of the curve axis	
set_max	Set the maximum value of the curve axis	
set_range	Set the value range of the curve axis	to set the minimum and maximum values, the same function as set_min and set_max
set_data	Set the date of the curve sequence point	

Sending data instructions:

Category	Description	Type	Remarks
min	minimum	float	Set the minimum of the curve axis
max	maximum	float	Set the maximum of the curve axis
data	The scale value of the coordinate axis	text	Set the scale value of the curve axis, Use the symbol "[]" to contain the data, Use the symbol "," split;

2. Instruction return：

Return instruction	Return description	Data return type	Remarks
0x1160	Minimum delivery	Passive	Minimum format: widget name +float value
0x1161	Maximum delivery	Passive	Maximum format: widget name +float value

Return data description:

Category	Data	Description	Remarks
CMD	0x1160	Value delivery	
LEN	widget name +float value length	Data length	
DATA	widget name +float value	Data content	float type

Category	Data	Description	Remarks
CMD	0x1161	capacity delivery	
LEN	widget name +float value length	Data length	
DATA	widget name +float value	Data content	float type

3. For example:：

Set the minimum value of the coordinate axis:

a) Set the minimum value of x_axis to 0:

```
ST<{"cmd_code":"set_min","type":"x_axis","widget":"x_axis1","min":0}>ET
```

b) Set the minimum value of y_axis to 0:

ST<{"cmd_code":"set_min","type":"y_axis","widget":"y_axis1","min":0}>ET

c) Set the maximum value of the x_axis to 19:

ST<{"cmd_code":"set_max","type":"x_axis","widget":"x_axis1","max":19}>ET

d) Set the minimum value of y_axis to 210:

ST<{"cmd_code":"set_max","type":"y_axis","widget":"y_axis1","max":210}>ET

Set the maximum and minimum values of the x_axis and y_axis:

ST<{"cmd_code":"set_range","type":"x_axis","widget":"x_axis1","min":0,"max":19}>ET
ST<{"cmd_code":"set_range","type":"y_axis","widget":"y_axis1","min":0,"max":210}>ET

Set the scale display value of the x_axis:

ST<{"cmd_code":"set_data","type":"x_axis","widget":"x_axis1","data":"[1,2,3,4,5,6,7,8,9,10]"}>ET
ST<{"cmd_code":"set_data","type":"x_axis","widget":"x_axis1",
"data":"[1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20]"}>ET

Set the scale display value of the y_axis:

ST<{"cmd_code":"set_data","type":"y_axis","widget":"y_axis1",
"data":"[0,20,40,60,80,100,120,140]"}>ET

ST<{"cmd_code":"set_data","type":"y_axis","widget":"y_axis1",
"data":"[0,30,60,90,120,150,180,210]"}>ET

Get the maximum and minimum values of the coordinate axes:

a) Get the minimum value of the x_axis is 0:
Send: ST<{"cmd_code":"get_min","type":"x_axis","widget":"x_axis1"}>ET
Response: ST<0x11 0x60 0x00 0x0B x_axis1 0x00 0x00 0x00 0x00>ET
HEX:53 54 3C 11 60 00 0B 78 5F 61 78 69 73 31 00 00 00 00 3E 45 54 CD 40

b) Get the maximum value of the x_axis is 9:
Send: ST<{"cmd_code":"get_max","type":"x_axis","widget":"x_axis1"}>ET
Response: ST<0x11 0x61 0x00 0x0B x_axis1 0x41 0x10 0x00 0x00>ET
HEX:53 54 3C 11 61 00 0B 78 5F 61 78 69 73 31 41 10 00 00 3E 45 54 C9 42

c) The minimum value of the y_axis is -10:
Send: ST<{"cmd_code":"get_min","type":"y_axis","widget":"y_axis1"}>ET
Response: ST<0x11 0x60 0x00 0x0B y_axis1 0xC1 0x20 0x00 0x00>ET
HEX:53 54 3C 11 60 00 0B 79 5F 61 78 69 73 31 C1 20 00 00 3E 45 54 A0 97

d) The maximum value of the y_axis is 210:
Send: ST<{"cmd_code":"get_max","type":"y_axis","widget":"y_axis1"}>ET

Response: ST<0x11 0x61 0x00 0x0B y_axis1 0x43 0x52 0x00 0x00>ET
HEX:53 54 3C 11 61 00 0B 79 5F 61 78 69 73 31 43 52 00 00 3E 45 54 EA 6E

4.24.2 line_series / bar_series

1. Instruction sending:

Line_series/bar_series related:

Instruction	Instruction description	Remarks
set_line	Set the boundary line of the curve sequence whether is showed, whether it is smooth or not	Only for line_series
set_area	Set whether the curve sequence area is showed	Only for line_series
set_symbol	Set whether curve index markers are showed	Only for line_series
set_value	Set curve index data	
set_capacity	Set the curve index FIFO capacity	The curve sequence data will be reset after setting the volume
get_value	Get curve index data	
get_capacity	Get cancel index FIFO capacity	

Send data description:

Category	Description	Type	Remarks
Show	Whether to show	Bool	Used to set whether the curve/image is showed
Smooth	Whether to smooth	Bool	Used to set whether the curve is showed smoothly
Symbol	Symbol	Bool	Set whether curve series point markers are showed (only for line_series)
Index	index	Uint	index number, starting from 0
Mode	Mode	Text	index set value mode, value: push, set the value in an additional way
Value	Value	Float	index value, which can be a single float or an array of floats
Capacity	Capacity	Uint	Curve/histogram FIFO Capacity

2. Instruction return:

Return instruction	Return description	Data return type	Remarks
0x10D1	Value delivery	Passive	index value format: widget name + index value + float value
0x10D2	Capacity delivery	Passive	index capacity format: widget name + capacity value (int type)

Return data description:

Category	Data	Description	Remarks
CMD	0x10D1	Value delivery	
LEN	index value format: widget name + index value + float value	Data length	
DATA	Widget name + index value + float value	Data content	Index type: int, value type: float type

Category	Data	Description	Remarks
CMD	0x10D2	Capacity delivery	
LEN	index capacity format: widget name + capacity value	Data length	
DATA	Widget name + capacity value	Data content	Int type

3. For example:

Set whether curve boundary lines are showed:

a) Set line_series1 boundary line smooth show

ST<{"cmd_code":"set_line","type":"line_series","widget":"line_series1","show":true,"smooth":true}>ET

b) Set line_series1 boundary line polyline show

ST<{"cmd_code":"set_line","type":"line_series","widget":"line_series1",
"show":true,"smooth":false}>ET

c) Set line_series1 boundary line smooth not to show

ST<{"cmd_code":"set_line","type":"line_series","widget":"line_series1",
"show":false,"smooth":true}>ET

d) Set line_series1 boundary line polyline not to show

ST<{"cmd_code":"set_line","type":"line_series","widget":"line_series1",
"show":false,"smooth":false}>ET

Set whether the curve area is showed:

e) Set line_series1 to set the curve area show

ST<{"cmd_code":"set_area","type":"line_series","widget":"line_series1","show":true}>ET

f) Set line_series1 to set the curve area to not show

ST<{"cmd_code":"set_area","type":"line_series","widget":"line_series1","show":false}>ET

Set whether curve point markers are showed:

g) Set line_series1 to set the curve point marker show

ST<{"cmd_code":"set_symbol","type":"line_series","widget":"line_series1","show":true}>ET

h) Set line_series1 to set curve point markers not to show

ST<{"cmd_code":"set_symbol","type":"line_series","widget":"line_series1","show":false}>ET

Set the curve/histogram data:

a) Set the value of line_series1 index 4 to 10:

ST<{"cmd_code":"set_value","type":"line_series","widget":"line_series1","index":4,"value":10}>ET

b) Set the value after line_series1 index 4 to:

ST<{"cmd_code":"set_value","type":"line_series","widget":"line_series1","index":4, "value":[10,29,69,45,67,34]}>ET

c) Set the line_series1 index value in push mode, that is, append data at the end, and move the previous data forward:

ST<{"cmd_code":"set_value","type":"line_series","widget":"line_series1",
"mode":"push","value":23}>ET

d) Set multiple values of line_series1 indexes in push mode, that is, append data at the end, and move the previous data forward:

ST<{"cmd_code":"set_value","type":"line_series","widget":"line_series1","mode":"push",
"value":[10,29,69,45,67,34]}>ET

e) Set the value of bar_series1 index 4 to 10:

ST<{"cmd_code":"set_value","type":"bar_series","widget":"bar_series1","index":4,"value":10}>ET

f) Set the value after bar_series1 index 4 to:

ST<{"cmd_code":"set_value","type":"bar_series","widget":"bar_series1","index":4,
"value":[10,29,69,45,67,34]}>ET

g) Set the bar_series1 index value in push mode, that is, append data at the end, and move the previous data forward:

ST<{"cmd_code":"set_value","type":"bar_series","widget":"bar_series1",
"mode":"push","value":23}>ET

h) Set multiple values of bar_series1 indexes in push mode, that is, append data at the end, and move the previous data forward:

ST<{"cmd_code":"set_value","type":"bar_series","widget":"bar_series1","mode":"push",
"value":[10,29,69,45,67,34]}>ET

Set index FIFO capacity:

ST<{"cmd_code":"set_capacity","type":"line_series","widget":"line_series1","capacity":15}>ET
ST<{"cmd_code":"set_capacity","type":"bar_series","widget":"bar_series1","capacity":15}>ET

Get index values:

ST<{"cmd_code":"get_value","type":"line_series","widget":"line_series1","index":4}>ET
ST<{"cmd_code":"get_value","type":"bar_series","widget":"bar_series1","index":4}>ET

Get index FIFO capacity:

ST<{"cmd_code":"get_capacity","type":"line_series","widget":"line_series1"}>ET
ST<{"cmd_code":"get_capacity","type":"bar_series","widget":"bar_series1"}>ET

Get index values:

a) Get the value of line_series1 index 4 as 140, of which 0x0004 is the index 4, and 0x430C0000 is the floating point number 140:

Send: ST<{"cmd_code":"get_value","type":"line_series","widget":"line_series1","index":4}>ET
Response: ST<0x10 0xD1 0x00 0x12 line_series1 0x00 0x04 0x43 0x0C 0x00 0x00 >ET
HEX:53 54 3C 10 D1 00 12 6C 69 6E 65 5F 73 65 72 69 65 73 31 00 04 43 0C 00 00 3E 45 54 8D 07

b) Get line_series1 index 9 with a value of 90:
Send: ST<{"cmd_code":"get_value","type":"line_series","widget":"line_series1","index":9}>ET
Response: ST<0x10 0xD1 0x00 0x12 line_series1 0x00 0x09 0x42 0xB4 0x00 0x00 >ET
HEX:53 54 3C 10 D1 00 12 6C 69 6E 65 5F 73 65 72 69 65 73 31 00 09 42 B4 00 00 3E 45 54 AC CD

Get the index capacity value:
a) Get the line_series1 index capacity value of 10:
Send: ST<{"cmd_code":"get_capacity","type":"line_series","widget":"line_series1"}>ET
Response: ST<0x10 0xD2 0x00 0x10 line_series1 0x00 0x00 0x00 0x0A >ET
HEX:53 54 3C 10 D2 00 10 6C 69 6E 65 5F 73 65 72 69 65 73 31 00 00 00 0A 3E 45 54 3F D1

b) Get the line_series1 index capacity value of 19:
Send: ST<{"cmd_code":"get_capacity","type":"line_series","widget":"line_series1"}>ET
Response: ST<0x10 0xD2 0x00 0x10 line_series1 0x00 0x00 0x00 0x13 >ET
HEX:53 54 3C 10 D2 00 10 6C 69 6E 65 5F 73 65 72 69 65 73 31 00 00 00 13 3E 45 54 63 D6

4.25 qr_code

1. Instruction sending:

Instruction	Instruction description	Remarks
set_text	Set QR code text content	

Send data description:

Category	Description	Type	Remarks
Text	Text	Text	Set QR code text content

2. For example:
Set QR code text content:
ST<{"cmd_code":"set_text","type":"qr","widget":"qr1","text":"http://www.stoneitech.com"}>ET

4.26 pie_slice

1. Instruction sending:

Instruction	Instruction description	Remarks
set_value	Set the current value of the pie chart	
set_max	Set the maximum value of the pie chart	
set_start_angle	Set the starting angle of the pie chart	
set_radius	Set the ring thickness radius of the pie chart	
set_show_text	Sets whether the pie chart shows text	

Send data description:

Category	Description	Type	Remarks
Value	Value	Uint	Set the current value of the pie chart
Max	Maximum value	Uint	Set the maximum value of the pie chart
start_angle	Starting angle	int	Set the starting angle of the pie chart
Radius	Thickness radius	Uint	Set the ring thickness radius of the pie chart
show_text	Text	Bool	Sets whether the pie chart shows text

2. For example:
Set the widget pie_slice3 value to 60:
```
ST<{"cmd_code":"set_value","type":"pie_slice","widget":"pie_slice3","value":60}>ET
```

Set the widget pie_slice3 maximum value to 60:
```
ST<{"cmd_code":"set_max","type":"pie_slice","widget":"pie_slice3","max":60}>ET
```

Set the starting angle of the widget pie_slice3 to 60:
```
ST<{"cmd_code":"set_start_angle","type":"pie_slice","widget":"pie_slice3","angle":60}>ET
```

Set the widget pie_slice3 loop thickness radius to 60:
```
ST<{"cmd_code":"set_radius","type":"pie_slice","widget":"pie_slice3","radius":60}>ET
```

Set whether the widget pie_slice3 shows text:
```
ST<{"cmd_code":"set_show_text","type":"pie_slice","widget":"pie_slice3","show_text":true}>ET
ST<{"cmd_code":"set_show_text","type":"pie_slice","widget":"pie_slice3","show_text":false}>ET
```

4.27 slide_indicator/ slide_indicator_arc

1. Instruction sending:

Instruction	Instruction description	Remarks
set_max	Set indicator maximum value	
set_size	Set indicator size	
set_value	Set indicator options	With slide_view to switch the interface
set_spacing	Set indicator spacing	
get_value	Get the current value of the indicator (option)	

Send data description:

Category	Description	Type	Remarks
Max	Maximum value	Uint	Set indicator maximum value
Size	Indicator size	Uint	Set indicator size
Value	Options	Uint	Get the current value of the indicator (option), value: 0-(max-1)
Spacing	Spacing	Float	Set the indicator spacing, the value must be greater than 0

2. Instruction return:

Return instruction	Return description	Data return type	Remarks
0x1110	Value delivery	Passive	Use get_value to get the current value (option)

Return data description:

Category	Data	Description	Remarks
CMD	0x1110	Value delivery	
LEN	Format: widget name + value	Data length	
DATA	Widget name + value	Data content	Int type, the last four bytes of the data part

3. For example:

Set the maximum value of the indicator slide_indicator1

ST<{"cmd_code":"set_max","type":"slide_indicator","widget":"slide_indicator1","max":5}>ET
ST<{"cmd_code":"set_max","type":"slide_indicator","widget":"slide_indicator1","max":7}>ET

Set the size of the indicator slide_indicator1

ST<{"cmd_code":"set_size","type":"slide_indicator","widget":"slide_indicator1","size":5}>ET
ST<{"cmd_code":"set_size","type":"slide_indicator","widget":"slide_indicator1","size":7}>ET

Set the options of the indicator slide_indicator1 (with slide_view to switch the interface)

ST<{"cmd_code":"set_value","type":"slide_indicator","widget":"slide_indicator1","value":0}>ET
ST<{"cmd_code":"set_value","type":"slide_indicator","widget":"slide_indicator1","value":1}>ET

Set the spacing of the indicator slide_indicator1

ST<{"cmd_code":"set_spacing","type":"slide_indicator","widget":"slide_indicator1","spacing":15}>ET
ST<{"cmd_code":"set_spacing","type":"slide_indicator_arc","widget":"slide_ind_arc1","spacing":5}>ET
ST<{"cmd_code":"set_spacing","type":"slide_indicator_arc","widget":"slide_ind_arc1",
"spacing":10}>ET

Get the current value of the indicator (option)

a) The current option of the indicator slide_indicator1 is 0, which is the first:

Send: ST<{"cmd_code":"get_value","type":"slide_indicator","widget":"slide_indicator1"}>ET
Response: ST<0x11 0x10 0x00 0x14 slide_indicator1 0x00 0x00 0x00 0x00>ET
HEX:53 54 3C 11 10 00 14 73 6C 69 64 65 5F 69 6E 64 69 63 61 74 6F 72 31 00 00 00 00 3E 45 54
EB 75

b) The current option of the indicator slide_indicator1 is 5, which is the sixth:

Send: ST<{"cmd_code":"get_value","type":"slide_indicator","widget":"slide_indicator1"}>ET
Response: ST<0x11 0x10 0x00 0x14 slide_indicator1 0x00 0x00 0x00 0x05>ET
HEX:53 54 3C 11 10 00 14 73 6C 69 64 65 5F 69 6E 64 69 63 61 74 6F 72 31 00 00 00 05 3E 45 54
27 75

4.28 slide_view

1. Instruction sending:

Instruction	Instruction description	Remarks
set_view	Set the serial number of the current view interface (switch to a specific interface)	
set_auto_play	Set the current view autoplay (automatically switch the interface)	
get_view	Get the current view number	

Send data description:

Category	Description	Type	Remarks
Index	Serial number	Uint	Set the serial number of the current view interface (switch to a specific interface)
auto_play	Autoplay	Uint	Sliding view autoplay interval length, 0 cancels autoplay; unit: ms

2. Instruction return:

Return instruction	Return description	Data return type	Remarks
0x1120	Current view serial number	Passive	The MCU uses the get_view instruction to obtain

Return data description:

Category	Data	Description	Remarks
CMD	0x1120	Current view serial number	
LEN	Format: widget name + length of serial number value	Data length	
DATA	Widget name + serial number value	Data content	Int type, the last four bytes of the data part

3. For example:

Set the current view interface serial number:

```
ST<{"cmd_code":"set_view","type":"slide_view","widget":"slide_view0","index":0}>ET
ST<{"cmd_code":"set_view","type":"slide_view","widget":"slide_view0","index":2}>ET
```

Set the automatic switching interface interval:

```
ST<{"cmd_code":"set_auto_play","type":"slide_view","widget":"slide_view0","auto_play":0}>ET
ST<{"cmd_code":"set_auto_play","type":"slide_view","widget":"slide_view0","auto_play":1000}>ET
ST<{"cmd_code":"set_auto_play","type":"slide_view","widget":"slide_view0","auto_play":3000}>ET
```

Get the current view number:

a) The current page of slide_view0 is 0, which is the first:

Send: ST<{"cmd_code":"get_view","type":"slide_view","widget":"slide_view0"}>ET

Response: ST<0x11 0x20 0x00 0x0F slide_view0 0x00 0x00 0x00 0x00>ET

HEX:53 54 3C 11 20 00 0F 73 6C 69 64 65 5F 76 69 65 77 30 00 00 00 00 3E 45 54 65 11

b) The current page of slide_view0 is 1, which is the second:
Send: ST<{"cmd_code":"get_view","type":"slide_view","widget":"slide_view0"}>ET
Response: ST<0x11 0x20 0x00 0x0F slide_view0 0x00 0x00 0x00 0x01>ET
HEX:53 54 3C 11 20 00 0F 73 6C 69 64 65 5F 76 69 65 77 30 00 00 00 01 3E 45 54 99 10

c) The current page of slide_view0 is 6, which is the 7th:
Send: ST<{"cmd_code":"get_view","type":"slide_view","widget":"slide_view0"}>ET
Response: ST<0x11 0x20 0x00 0x0F slide_view0 0x00 0x00 0x00 0x06>ET
HEX:53 54 3C 11 20 00 0F 73 6C 69 64 65 5F 76 69 65 77 30 00 00 00 06 3E 45 54 ED 11

4.29 slide_menu

1. Instruction sending:

Instruction	Instruction description	Remarks
set_value	Set the current menu option	Switch to a specific menu
set_scale	Set the current menu scale	Value 0.5-1.0
set_align_v	Set the current menu alignment	
get_value	Get the current menu option	

Send data description:

Category	Description	Type	Remarks
Value	Value	Uint	Current menu option (specific menu)
Scale	Scale	Float	Set the current menu scale (value 0.5-1.0)
align_v	Alignment	Uint	Set the current menu alignment, value 0-3 0: no alignment 1: center alignment 2: top alignment 3: bottom alignment

2. Instruction return:

Return instruction	Return description	Data return type	Remarks
0x1130	Deliver the current menu option	Passive	Use get_value to get the current menu option

Return data description:

Category	Data	Description	Remarks
CMD	0x1130	Deliver the current menu option	
LEN	Format: widget name + length of serial number value	Data length	
DATA	Widget name + serial number value	Data content	Int type, the last four bytes of the data part

3. For example:
Set the current menu option for the widget slide_menu0:
ST<{"cmd_code":"set_value","type":"slide_menu","widget":"slide_menu0","value":0}>ET
ST<{"cmd_code":"set_value","type":"slide_menu","widget":"slide_menu0","value":2}>ET

Set the current menu scale of the widget slide_menu0:
ST<{"cmd_code":"set_scale","type":"slide_menu","widget":"slide_menu0","scale":0.5}>ET
ST<{"cmd_code":"set_scale","type":"slide_menu","widget":"slide_menu0","scale":0.8}>ET
ST<{"cmd_code":"set_scale","type":"slide_menu","widget":"slide_menu0","scale":1.0}>ET

Set the current menu alignment of the widget slide_menu0:
ST<{"cmd_code":"set_align_v","type":"slide_menu","widget":"slide_menu0","align_v":1}>ET
ST<{"cmd_code":"set_align_v","type":"slide_menu","widget":"slide_menu0","align_v":2}>ET
ST<{"cmd_code":"set_align_v","type":"slide_menu","widget":"slide_menu0","align_v":3}>ET

Get the current option (serial number) of the sliding menu:
a) The current menu option of the widget slide_menu0 is 0, which is the first menu option:
Send: ST<{"cmd_code":"get_value","type":"slide_menu","widget":"slide_menu0"}>ET
Response: ST<0x11 0x30 0x00 0x0F slide_menu0 0x00 0x00 0x00 0x00>ET
HEX:53 54 3C 11 30 00 0F 73 6C 69 64 65 5F 6D 65 6E 75 30 00 00 00 00 3E 45 54 05 70

b) When the front menu option of the widget slide_menu0 is 8, that is, the ninth menu option:
Send: ST<{"cmd_code":"get_value","type":"slide_menu","widget":"slide_menu1"}>ET
Response: ST<0x11 0x30 0x00 0x0F slide_menu1 0x00 0x00 0x00 0x08>ET
HEX:53 54 3C 11 30 00 0F 73 6C 69 64 65 5F 6D 65 6E 75 31 00 00 00 08 3E 45 54 A9 B3

4.30 tab_button

1. Instruction delivery

Instruction	Instruction description	Remarks
set_value	Set current label button value	Switch to a specific tab view
get_value	Get current menu button value	Get current tab view options

Send data description:

Category	Description	Type	Remarks
Value	Whether to be selected	Bool	The value is true: select, false: deselect

2. Data returns:

Return instruction	Return description	Data return type	Remarks
0x1140	Get the current label view number	Passive	

Return data description:

Category	Data	Description	Remarks
CMD	0x1140	Get the current label view number	
LEN	Format: widget name + length of value	Data length	
DATA	Widget name + serial number value	Data content	Last byte of data part

3. For example:
Set current label button value
ST<{"cmd_code":"set_value","type":"tab_button","widget":"tab_button4","value":true}>ET
ST<{"cmd_code":"set_value","type":"tab_button","widget":"tab_button4","value":false}>ET

Get current menu button value
a) The current tab button value of the widget tab_button1 is 0, that is, it is not selected:
Send: ST<{"cmd_code":"get_value","type":"tab_button","widget":"tab_button1"}>ET
Response: ST<0x11 0x40 0x00 0x0C tab_button1 0x00>ET
HEX: 53 54 3C 11 40 00 0C 74 61 62 5F 62 75 74 74 6F 6E 31 00 3E 45 54 29 90

b) The current tab button value of the widget tab_button1 is 1, that is, it is selected:
Send: ST<{"cmd_code":"get_value","type":"tab_button","widget":"tab_button1"}>ET
Response: ST<0x11 0x40 0x00 0x0C tab_button1 0x01>ET
HEX: 53 54 3C 11 40 00 0C 74 61 62 5F 62 75 74 74 6F 6E 31 01 3E 45 54 D5 91

4.31 tab_view

1. Instruction delivery

Instruction	Instruction description	Remarks
get_view	Get the current label view number	

Send data description:

Category	Description	Type	Remarks
View	Serial number	Uint	Get the current label view number

2. Instruction return:

Return instruction	Return description	Data return type	Remarks
0x1150	Get the current label view number	Passive	Get with get_view

Return data description:

Category	Data	Description	Remarks
CMD	0x1150	Get the current label view number	
LEN	Format: widget name + length of value	Data length	
DATA	Widget name + serial number value	Data content	The last four bytes of the data part

3. For example:
Get the current label view number:
a) The current option number of the tab view tab_view0 is 0, which is the first view
Send: ST<{"cmd_code":"get_view","type":"tab_view","widget":"tab_view0"}>ET
Response: ST<0x11 0x50 0x00 0x0D tab_view0 0x00 0x00 0x00 0x00>ET
HEX:53 54 3C 11 50 00 0D 74 61 62 5F 76 69 65 77 30 00 00 00 00 3E 45 54 FA 1D

b) The current option number 2 of the tab view tab_view0, which is the third view
Send: ST<{"cmd_code":"get_view","type":"tab_view","widget":"tab_view1"}>ET
Response: ST<0x11 0x50 0x00 0x0D tab_view1 0x00 0x00 0x00 0x02>ET
HEX: 53 54 3C 11 50 00 0D 74 61 62 5F 76 69 65 77 31 00 00 00 02 3E 45 54 8E DD

4.32 scroll_view

1. Instruction sending:

Instruction	Instruction description	Remarks
set_xslidable	Set whether to allow x-direction sliding	
set_yslidable	Set whether to allow y-direction sliding	
set_snap_to_page	Set whether to align by page when scrolling	
set_move_to_page	Set whether to turn one page at a time when scrolling	
set_scroll_to	Set scroll to the specified offset	
set_scroll_delta_to	Set the scroll specified offset	

Send data description:

Category	Description	Type	Remarks
Value	Value	Bool	Whether to enable
xoffset	x-axis scroll offset	int	Negative values indicate scrolling in the opposite direction
yoffset	y-axis scroll offset	int	Negative values indicate scrolling in the opposite direction

2. For example:
Set whether to allow sliding in the x direction:
ST<{"cmd_code":"set_xslidable","type":"scroll_view","widget":"scroll_view2","value":true}>ET
ST<{"cmd_code":"set_xslidable","type":"scroll_view","widget":"scroll_view2","value":false}>ET

Set whether to allow sliding in the y direction:
ST<{"cmd_code":"set_yslidable","type":"scroll_view","widget":"scroll_view2","value":true}>ET
ST<{"cmd_code":"set_yslidable","type":"scroll_view","widget":"scroll_view2","value":false}>ET

Set whether to align by page when scrolling:
ST<{"cmd_code":"set_snap_to_page","type":"scroll_view","widget":"scroll_view1","value":true}>ET
ST<{"cmd_code":"set_snap_to_page","type":"scroll_view","widget":"scroll_view1","value":false}>ET

Set whether to turn one page at a time when scrolling:
ST<{"cmd_code":"set_move_to_page","type":"scroll_view","widget":"scroll_view1","value":true}>ET
ST<{"cmd_code":"set_move_to_page","type":"scroll_view","widget":"scroll_view1","value":false}>ET

Set scroll to the specified offset:
a) Set the x-axis of the widget scroll_view2 to scroll to a coordinate of 50 pixels:
ST<{"cmd_code":"set_scroll_to","type":"scroll_view","widget":"scroll_view2","xoffset":50}>ET

b) Set the y-axis of the widget scroll_view2 to scroll to a coordinate of 50 pixels:
ST<{"cmd_code":"set_scroll_to","type":"scroll_view","widget":"scroll_view2","yoffset":50}>ET

c) Set the x-axis and y-axis of the widget scroll_view2 to scroll to the coordinates (50,50) pixels:
ST<{"cmd_code":"set_scroll_to","type":"scroll_view","widget":"scroll_view2",
"xoffset":50,"yoffset":50}>ET

Set the specified offset for scrolling (send instructions to scroll continuously):
a) Set the x-axis scroll offset of widget scroll_view2 to 50 pixels:
ST<{"cmd_code":"set_scroll_delta_to","type":"scroll_view","widget":"scroll_view2","xoffset":50}>ET

b) Set the y-axis scroll offset of widget scroll_view2 to 50 pixels:
ST<{"cmd_code":"set_scroll_delta_to","type":"scroll_view","widget":"scroll_view2","yoffset":50}>ET

c) Set the x-axis and y-axis of the widget scroll_view2 to scroll with an offset of 50 pixels each:
ST<{"cmd_code":"set_scroll_delta_to","type":"scroll_view","widget":"scroll_view2","xoffset":50,
"yoffset":50}>ET

d) Set the x-axis and y-axis of the widget scroll_view2 to scroll -50 pixels offset (reverse scrolling):
ST<{"cmd_code":"set_scroll_delta_to","type":"scroll_view","widget":"scroll_view2","xoffset":-50,
"yoffset":-50}>ET

4.33 list_view

1. Instruction sending:

Instruction	Instruction description	Remarks
set_height	Set the height of the list item	

Send data description:

Category	Description	Type	Remarks
Height	Height	Uint	Set the height of the list item

2. For example:

Set the height of the list item:

```
ST<{"cmd_code":"set_height","type":"list_view","widget":"list_view0","height":40}>ET
ST<{"cmd_code":"set_height","type":"list_view","widget":"list_view0","height":60}>ET
```

4.34 list_view_h

1. Instruction sending:

Instruction	Instruction description	Remarks
set_width	Set the width of the list item	
set_spacing	Set the spacing of list item	

Send data description:

Category	Description	Type	Remarks
Width	Height of the list item	Uint	Set the height of the list item
Spacing	Spacing of list item	Uint	Set the spacing of list item

2. For example:

Set the width of the list item:

```
ST<{"cmd_code":"set_width","type":"list_view_h","widget":"list_view_h3","width":60}>ET
ST<{"cmd_code":"set_width","type":"list_view_h","widget":"list_view_h3","width":120}>ET
```

Set the spacing of list items:

```
ST<{"cmd_code":"set_spacing","type":"list_view_h","widget":"list_view_h3","spacing":5}>ET
ST<{"cmd_code":"set_spacing","type":"list_view_h","widget":"list_view_h3","spacing":15}>ET
```