

Alpha1 Series Bluetooth Communication Protocol

Version: V20151215

Command format:
 BT->DEV:
 Header + length + command + <parameter> [parameter 2] [parameter 3] > + CHECK + end character
 DEV->BT:
 Header + length + command + <parameter> [parameter 2] [parameter 3] > + CHECK + end character
 Note: [] indicates dispensable fields and can be decided based on specific commands.
 -> indicates mandatory fields.

Field description:
 Header (2B): fixed to 0XFB 0XBF
 Length (1B): total number of bytes of (header + length + command + parameter + CHECK)
 Command (1B): specific command
 Parameter (nB): one parameter at least. If the parameter does not make any sense, the value 0X00 is used by default.
 CHECK (1B): (length + command + parameter). Accumulates by bytes, taking the byte with the lowest results.
 End character (1B): fixed to 0XD0

Notes:
 (1) This protocol is applicable to communication between Alpha1 products and Bluetooth devices only. The embedded firmware version of Alpha1 must be later than 2015121519, earlier versions may result in compatibility issues due to the new commands.
 (2) Current protocol version M = 16

Command Description	Attribute	BT->DEV Transmit										DEV->BT Response									
		Command header 1 (1B)	Command header 2 (1B)	Length (1B)	Command 1 (1B)	Parameter (nB)	CHECK (1B)	End character (1B)	Remark	Command header 1 (1B)	Command header 2 (1B)	Length (1B)	Command 1 (1B)	Parameter (nB)	CHECK (1B)	End character (1B)	Remark				
BT handshake	R	0XFB	0XBF		0X01	0X00				0XFB	0XBF		0X01	Parameter 1 (nB): return the character string of the Bluetooth device name							
Obtaining an action list	R	0XFB	0XBF		0X02	0X00				0XFB	0XBF		0X02	0X00							
Implementing an action list	W	0XFB	0XBF		0X03	Parameter 1 (nB): character string of the action list name				0XFB	0XBF		0X03	0X00: success 0X01: failure-empty file name 0X02: failure-low battery							
Play stop	W	0XFB	0XBF		0X05	0X00				0XFB	0XBF		0X05	0X01							
Sound switch	W	0XFB	0XBF		0X06	Parameter 1 (1B): 0X00-mute				0XFB	0XBF		0X06	0X00							
Play control	W	0XFB	0XBF		0X07	Parameter 1 (1B): 0X00-pause				0XFB	0XBF		0X07	0X00							
Heartbeat packet	W	0XFB	0XBF		0X08	0X00			The robot replies a same command	0XFB	0XBF		0X08	0X00							
Reading robot state	R/A	0XFB	0XBF		0X0A	0X00				0XFB	0XBF		0X0A	: 0X00=sound state (0X01-mute; 0X00-non-mute) : 0X01=play state (0X01-non-pause; 0X00-pause) : 0X02=volume (0-255 (1B)) : 0X03=servo indicate state (0X01-on; 0X00-off) : 0X04-1T card insertion (0X01-inserted; 0X00-removed)							
Volume adjustment	W	0XFB	0XBF		0X0B	Parameter 1 (1B): 0-255				0XFB	0XBF		0X0B	0X00							
Powering off all servos	W	0XFB	0XBF		0X0C	0X00			No limit is placed on servo number. This field is valid when the robot is in idle state.	0XFB	0XBF		0X0C	0X00							
Controlling all servo indicators	W	0XFB	0XBF		0X0D	Parameter 1 (1B): 0X00-off (0X01-on)				0XFB	0XBF		0X0D	0X00							
Clock calibration	W	0XFB	0XBF		0X0E	Parameter 1 (1B): year (last two numbers) Parameter 2 (1B): month Parameter 3 (1B): day Parameter 4 (1B): hour Parameter 5 (1B): minute Parameter 6 (1B): second			As for 1S, the clock function can be enabled in power-on state only. As for 1P, the clock function can be enabled in power-on and power-off states. Convert the decimal number to hexadecimal number before the write/read operation.	0XFB	0XBF		0X0E	0X00: success 0X01: failure							
Reading clock parameters	R	0XFB	0XBF		0X0F	0X00				0XFB	0XBF		0X0F	Parameter 1 (1B): clock switch (0X00-no, 0X01-yes) Parameter 2 (1B): duty (0X00-no, 0X01-yes) Parameter 3 (1B): hour (0-23) Parameter 4 (1B): minute (0-59) Parameter 5 (1B): second (0-59) Parameter 6 (1B): character string length of the action list Parameter 7 (nB): character string of the action list (clock action)							
Setting clock parameters	W	0XFB	0XBF		0X10	Parameter 1 (1B): clock switch (0X00-no, 0X01-yes) Parameter 2 (1B): duty (0X00-no, 0X01-yes) Parameter 3 (1B): hour (0-23) Parameter 4 (1B): minute (0-59) Parameter 5 (1B): second (0-59) Parameter 6 (1B): character string length of the action list Parameter 7 (nB): character string of the action list (clock action)				0XFB	0XBF		0X10	0X00							
Reading the software version	R	0XFB	0XBF		0X11	0X00				0XFB	0XBF		0X11	Version information (10B)							
Reading battery capacity of the robot	R	0XFB	0XBF		0X18	0X00				0XFB	0XBF		0X18	Parameter 1 (2B): voltage (mV) Parameter 2 (1B): charge (0X00-no, 0X01-yes, 0X02-no battery) Parameter 3 (1B): remaining battery capacity (0-100)							
Low voltage alarm	A									0XFB	0XBF		0X19	0X00							
Reading the hardware version	R	0XFB	0XBF		0X20	0X00				0XFB	0XBF		0X20	Character string of the hardware version (nB)							
Controlling the motion of a single servo	W	0XFB	0XBF	Total number of bytes of (header + length + command + parameter + CHECK)	0X22	Parameter 1 (1B): servo ID Parameter 2 (1B): servo angle Parameter 3 (1B): servo running time Parameter 4 (2B): receiving interval of two frames	Accumulates es by bytes, taking the byte with the lowest results.	0XD0	For details about the parameter meanings, refer to Alpha1 Series PC Communication Protocols.	0XFB	0XBF	Total number of bytes of (header + length + command + parameter + CHECK)	0X22	Parameter 1 (1B): servo ID Parameter 2 (1B): servo ID 0X00: success 0X01: wrong servo ID 0X02: allow servo angle excess 0X03: no reply from servo	Parameter (parameter) Accumulates es by bytes, taking the byte with the lowest results.	0XD0					
Controlling the motion of multiple servos	W	0XFB	0XBF		0X23	Parameter 1 (nB): correspond to angle of number 1 to M servos Parameter 2 (1B): servo running time Parameter 3 (1B): receiving interval of two frames				0XFB	0XBF		0X23	Parameter 1 (nB): corresponding to reply of number 1 to M servos respectively 0X00: success 0X01: wrong servo ID 0X02: allow servo angle excess 0X03: no reply from servo							
Reading back angle of a single servo (powered off)	R	0XFB	0XBF		0X24	Parameter 1 (1B): servo ID				0XFB	0XBF		0X24	Parameter 1 (1B): servo ID Parameter 2 (1B): servo angle 0XFF-no reply from servo 0XFE-wrong servo ID							
Reading back angle of multiple servos (powered off)	R	0XFB	0XBF		0X25	0X00				0XFB	0XBF		0X25	Parameter 1 (nB): corresponding to angle value of number 1 to M servos respectively 0XFF-no reply from servo 0XFE-wrong servo ID							
Setting offset value of a single servo	W	0XFB	0XBF		0X26	Parameter 1 (1B): servo ID Parameter 2 (2B): offset value (with minus or plus sign)			The offset value indicates the offset of the servo from the original position.	0XFB	0XBF		0X26	Parameter 1 (1B): servo ID Parameter 2 (2B): 0X00-success 0X01-failure 0X02-no reply from servo							
Setting offset value of multiple servos	W	0XFB	0XBF		0X27	Parameter 1 (M*2B): each two bytes compose an offset value which corresponds to number 1 to M servos respectively				0XFB	0XBF		0X27	Parameter 1 (nB): corresponding to reply of number 1 to M servos respectively 0X00-success 0X01-failure 0X02-no reply from servo							
Reading offset value of a single servo	R	0XFB	0XBF		0X28	Parameter 1 (1B): servo ID				0XFB	0XBF		0X28	Parameter 1 (1B): servo ID Parameter 2 (2B): The value 0X8Bxx indicates no reply from servo (x can be any value). Other values indicate valid offset.							
Reading offset value of multiple servos	R	0XFB	0XBF		0X29	0X00				0XFB	0XBF		0X29	Parameter 1 (M*2B): each two bytes compose an offset value which corresponds to number 1 to M servos respectively. The value 0X8Bxx indicates no reply from servo (x can be any value). Other values indicate valid offset.							
Reading version of a single servo	R	0XFB	0XBF		0X2A	Parameter 1 (1B): servo ID				0XFB	0XBF		0X2A	Parameter 1 (1B): servo ID Parameter 2 (4B): servo version							
Reading version of multiple servos	R	0XFB	0XBF		0X2B	0X00				0XFB	0XBF		0X2B	Parameter 1 (M*4B): each four bytes compose a servo version which corresponds to number 1 to M servos respectively. The value 0xB8xxxx indicates no reply from servo (x can be any value). Other values indicate valid version number.							
Play completion	A									0XFB	0XBF		0X31	Parameter 1 (nB): complete file name of the action list							
Allowing charge during play	W/A	0XFB	0XBF		0X32	Parameter 1 (1B): 0X01-enable charge 0X00-disable charge				0XFB	0XBF		0X32	Parameter 1 (1B): the reply data is consistent with data configured for BT							
Reading the SN of the robot	R	0XFB	0XBF		0X33	0X00				0XFB	0XBF		0X33	Parameter 1 (nB): return character string of the SN							
Reading the UID of the main chip	R	0XFB	0XBF		0X34	0X00				0XFB	0XBF		0X34	Parameter 1 (nB): return character string of the UID of the main chip							
Sending the action list	A									0XFB	0XBF		0X80	Parameter 1 (nB): character string of the action list name							
Completing action list sending	A									0XFB	0XBF		0X81	0X00: success 0X01: failure							

Note: In the Attribute column "W" indicates write, "R" indicates read, and "A" indicates automatic report of BT.