Alpha1 Series Bluetooth Communication Protocol

Version: V20151215

Command format:

BT->DEV:
Header + length + command + <parameter 1[parameter 2][parameter 3] > + CHECK + end character
DEV->BT:
Header + length + command + <parameter 1[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 0XED

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 (1B)	Parameter (nB)	CHECK (1B)	End character (1B)	Remark	Command header 1 (1B)	Command header 2 (1B)	Length (1B)	Command (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+TF 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): daily (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): daily (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			Total number of bytes of (header + length + command + parameter + CHECK)			CHECK= (length + command + parameter) Accumulates by bytes, taking the byte with the lowest results.	0XED		0XFB	0XBF	Total number of bytes of (header + length + command + parameter + CHECK)	0X19	0X00	CHECK= (length + command + parameter) Accumulates by bytes, taking the byte with the lowest results.	0XED	
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		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			For details about the parameter meanings, refer to Alpha1 Series PC Communication Protocols.	0XFB	0XBF		0X22	Parameter 1 (1B): servo ID Parameter 2 (1B): 0X00-success 0X01-wrong servo ID 0X02-allow servo angle excess 0X03-no reply from servo			
Controlling the motion of multiple servos	W	0XFB	0XBF		0X23	Parameter 1 (MB): 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 (MB): 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 (MB): 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 (1B): 0X00-success 0X01-failure 0X02-no reply from servo			
Setting offset value of multiple servos	W	0XFB	0XBF		0X27	Parameter 1((M*2)B): each two bytes compose an offset value which corresponds to number 1 to M servos respectively				0XFB	0XBF		0X27	Parameter 1 (MB): 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 0X88xx 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*2)B): each two bytes compose an offset value which corresponds to number 1 to M servos respectively. The value 0X88xx 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*4)B): each four bytes compose a servo version which corresponds to number 1 to M servos respectively. The value 0x88xxxxxx indicates no reply from servo (x can be any value). Other values indicate valid version number.			
Play completion	A									0XFB	0XBF		0X31	Parameter (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 (nB): return character string of the SN			
Reading the UDID of the main chip	R	0XFB	0XBF		0X34	0X00				0XFB	0XBF		0X34	Parameter (nB): return character string of the UDID of the main chip			
Sending the action list	A									0XFB	0XBF		0X80	Parameter (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.