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 Command header 1 (1B)	Command header 2 (1B)	Length (1B)	Command (1B)	Parameter (nB)	CHECK (1B)	End character (1B)	Remark	DEV->BT Response 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); : 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									0XFB	0XBF		0X19	0X00			
Reading the hardware version	R	0XFB	0XBF	Total number of bytes of (header + length + command + parameter + CHECK)	0X20	0X00	CHECK= (length + command + parameter) Accumulates by bytes, taking the byte with the lowest results.	0XED	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)	0X20	Character string of the hardware version (nB)	CHECK= (length + command + parameter) Accumulates by bytes, taking the byte with the lowest results.	0XED	
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				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 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 UDID of the main chip	R	0XFB	0XBF		0X34	0X00				0XFB	0XBF		0X34	Parameter 1 (nB): return character string of the UDID 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.