

# 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<br>0X01: failure-empty file name<br>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)<br>: 0X01=play state (0X01-non-pause; 0X00-pause)<br>: 0X02=volume (0-255 (1B))<br>: 0X03=servo indicate state (0X01-on; 0X00-off)<br>: 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)<br>Parameter 2 (1B): month<br>Parameter 3 (1B): day<br>Parameter 4 (1B): hour<br>Parameter 5 (1B): minute<br>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<br>0X01: failure  |  |                    |        |  |  |  |  |
| Reading clock parameters                            | R         | 0XFB                  | 0XBF                  |  | 0X0F           | 0X00  |            |  |   | 0XFB   | 0XBF                  |                  | 0X0F           | Parameter 1 (1B): clock switch (0X00-no, 0X01-yes)<br>Parameter 2 (1B): duty (0X00-no, 0X01-yes)<br>Parameter 3 (1B): hour (0-23)<br>Parameter 4 (1B): minute (0-59)<br>Parameter 5 (1B): second (0-59)<br>Parameter 6 (1B): character string length of the action list<br>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)<br>Parameter 2 (1B): duty (0X00-no, 0X01-yes)<br>Parameter 3 (1B): hour (0-23)<br>Parameter 4 (1B): minute (0-59)<br>Parameter 5 (1B): second (0-59)<br>Parameter 6 (1B): character string length of the action list<br>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)<br>Parameter 2 (1B): charge (0X00-no, 0X01-yes, 0X02-no battery)<br>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<br>Parameter 2 (1B): servo angle<br>Parameter 3 (1B): servo running time<br>Parameter 4 (2B): receiving interval of two frames   |            | Accumulates by bytes, taking the byte with the lowest results. | 0XE0  | For details about the parameter meanings, refer to Alpha1 Series PC Communication Protocols. | 0XFB                  | 0XBF             | 0X22           | Parameter 1 (1B): servo ID<br>Parameter 2 (1B): servo ID<br>0X00: success<br>0X01: wrong servo ID<br>0X02: allow servo angle excess<br>0X03: no reply from servo  | Parameter (parameter) Accumulates by bytes, taking the byte with the lowest results. |                    |        |  |  |  |  |
| Controlling the motion of multiple servos           | W         | 0XFB                  | 0XBF                  |  | 0X23           | Parameter 1 (nB): correspond to angle of number 1 to M servos<br>Parameter 2 (1B): servo running time<br>Parameter 3 (1B): receiving interval of two frames   |            |  |   | 0XFB   | 0XBF                  |                  | 0X23           | Parameter 1 (nB): corresponding to reply of number 1 to M servos respectively<br>0X00: success<br>0X01: wrong servo ID<br>0X02: allow servo angle excess<br>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<br>Parameter 2 (1B): servo angle<br>0XFF-no reply from servo<br>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<br>0XFF-no reply from servo<br>0XFE-wrong servo ID  |  |                    |        |  |  |  |  |
| Setting offset value of a single servo              | W         | 0XFB                  | 0XBF                  |  | 0X26           | Parameter 1 (1B): servo ID<br>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<br>Parameter 2 (1B): 0X00-success<br>0X01-failure<br>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<br>0X00: success<br>0X01: failure<br>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<br>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<br>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<br>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<br>0X01: failure  |  |                    |        |  |  |  |  |

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