TAIL PROTOCOL

Firmware Ver 2.21 (05Nov2019)

Command List

Commands are all case insensitive

Tail Moves

TAILHM	HoMe position
TAILS1	Slow wag 1
TAILS2	Slow wag 2
TAILS3	Slow wag 3
TAILFA	FAst wag
TAILSH	SHort wag
TAILHA	HAppy wag
TAILER	ERect
TAILEP	Erect Pulse
TAILT1	Tremble 1
TAILT2	Tremble 2
TAILET	Erect Trem
TAILU1	User defined 1
TAILU2	User defined 2
TAILU3	User defined 3
TAILU4	User defined 4

Led Patterns

LEDOFF	LEDs off
LEDREC	Blink 1 second on, 1 second off
LEDTRI	Fade in 1 second – Fade out 1 second
LEDSAW	Fade in 2 seconds – off
LEDSOS	Morse SOS
LEDBEA	Beacon (100ms on every 2 seconds)
LEDFLA	Flame
LEDSTR	Strobo
LEDUS1	User defined 1
LEDUS2	User defined 2
LEDUS3	User defined 3
LEDUS4	User defined 4

Other Commands

PING	Returns 'OK'
VER	Returns the Firmware version number
SHUTDOWN	Switches off the unit (will lose the BT connection!)
USERMOVE	*See below*
USERLEDS	*See below*
AUTOMOVE	*See below*

Send User Defined Tail Moves and LEDs Patterns

Up to 4 user-defined move definitions and 4 LED patterns can be sent over the BT connection and assigned to user presets (callable with the TAILU1 … TAILU4 commands). These presets will be lost once the unit is powered off.

The two instructions used to send a tail move or a LED pattern definition follow the same syntax and consist in a keyword (usermove or userleds) followed by a number of parameters. These are letter-number pairs, where the letter defines the type of parameter (see table).

USERMOVE U_<n>_ **P**_<n>_ **N**_<nnn>_ **A**_<n>_ **A**_<n>_ … **A**_<n>_ **B**_<n>_ **B**_<n>_ **…** **B**_<n>_ **S**_<nnn>_ **S**_<nnn>_ … **S**_<nnn>_

USERLEDS U_<n>_ **P**_<nn>_ **N**_<nnn>_ **A**_<n>_ **A**_<n>_ … **A**_<n>_   **S**_<nnn>_ **S**_<nnn>_ … **S**_<nnn>_

_<n>_   1-digit number
_<nn>_   1- or 2-digit number
<nnn>   1- to 3-digit number

Letter prefix	Parameter type	Range of values for moves	Range of values for LED patterns
U	User preset number	1..4	1..4
P	Number of Points in the move or LED pattern	1..5	1..32
N	Number of cycles (times the pattern will be repeated	0..255	0..255
A	Point for servo 1 or brightness point for the LEDS	0..8 0 -> 0 degrees 1 -> 22.5 degrees 2 -> 45 degrees … 8 -> 180 degrees	0..8 0 -> LEDs off … 4 -> 50% intensity … 8-> LEDs max intensity
B	Point for servo 2	0..8 (same as A)	N/A
S/L	Time between the current point and the next (in 20ms increments) S will wait in the current position, then move to the next when the time has elapsed L will gradually move from the current position to the next, over the time specified	0..127 Time x 20ms	0..127 Time x 20ms

Notes
- Parameters of type A, B, S and L can appear in any order (e.g. AABBSS, ABABSS, ABSABS)
- Parameters can be separated by any character that is not a number or a letter (e.g. space, comma, semicolon). However, the letters themselves act as separators, and it is recommended that no additional characters are used, as the serial buffer has a limited capacity and may not be able to store the whole instruction
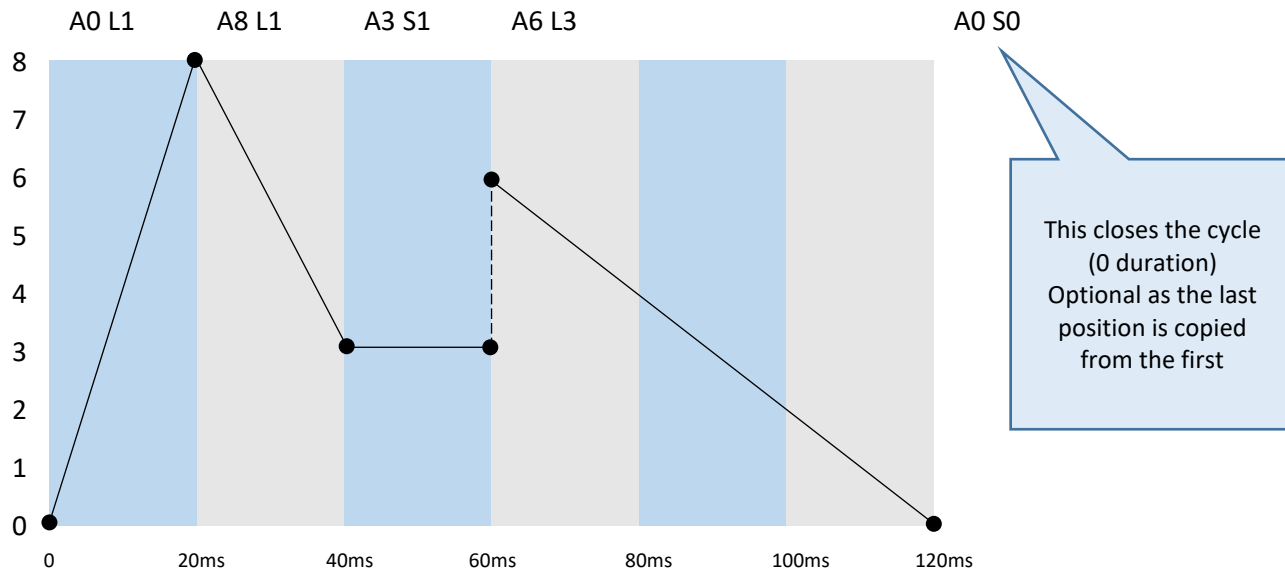
Figure 1 - Graphical Example

USERTAIL Examples

Example 1 – Slow Wag 1 (same as the TAILS1 command)
Both servos move from 22.5° to 157.5° (position 1 to 7) and back, for 3 times; each cycle is (68+68)*20ms = 2.72s long

USERMOVE U1P2N3A1A7B1B7L68L68

U1 -> Store into user preset 1
P2 -> The move consists of 2 points

N3	Repeat the sequence 3 times
A1A7	Servo1 moves from 1 to 7 (157.5° to 22.5°)
B1B7	Servo2 moves exactly as servo1
S68S68	Position 2 is reached in 68*20ms = 1.36s; return to position 1 in the same time

Example 2 – Test Servos
Moves servos in steps of 90° every 2 seconds; servo2 is delayed by 90°

USERMOVE   U2P4N3 A0A4A8A4 B4B8B4B0 S100S100S100S100

U2	Store into user preset 2
P4	The move consists of 4 points
N3	Repeat the sequence 3 times
A0A4A8A4	Move servo1 90° at a time, starting from 0°
B4B8B4B0	Move servo2 90° at a time, starting from 90°
S100S100S100S100	Each position is held for 100*20ms = 2s;

USERLEDS Examples

Example 1 – Beacon (same as the LEDBEA command)
The led strip lights up for 100ms every 2s

USERLEDS U1P2N5A8A0S5S95

U1	Store into user preset 1
P2	The pattern consists of 2 brightness points
N5	Repeat pattern 5 times
A8A0	Start at full brightness, then turn off
S5S95	On for 5*20ms = 100ms; Off for 95*20ms = 1.9s (total time = 2 seconds)

Example 2 – Fade in/out (similar to LEDTRI)

The led strip lights up slowly, then dims until completely off; this is repeated 3 times

USERLEDS U2P2N3 A0A8 L100L100

U2	Store into user preset 2
P2	The pattern consists of 2 brightness points
N3	Repeat pattern 3 times
A0A8	Start off, finish at full brightness
L100L100	Each brightness point is reached in 100*20ms = 2s

Random Moves (Auto)

Defines a sequence of random moves, selected from any of 3 groups as below; interval between moves varies randomly from T1 and T2, while

Move Group	List of moves in the group
Calm and Relaxed	Slow Wag 1, Slow Wag 2, Slow Wag 3
Fast and Excited	Fast Wag, Short Wag, Happy Wag, Erect
Frustrated and Tense	Tremble 1, Tremble 2, Tremble Erect, High Wag?

Commands

AUTOMODE G<n> **G**<n>**G**<n>   **T**<nnn> **T**<nnn>**T**<nnn> **STOPAUTO**

The tail will pause for a random number of seconds between each move (min and max specified by the first and second T parameter, respectively). The tail will stop completely after the time passed by the 3rd T parameter.

Stopauto will abort the current 'auto mode' session after completing any ongoing move.

Letter prefix	Parameter type	Range of values
G	Move Group (see table above)	1..3
T	Time in 1 sec increments	15..240 (15s .. 4min) 1st parameter – min random pause between moves 2nd parameter – max random pause between moves 3rd parameter – total duration

The parameter order is not important, except that the 3 T parameters are interpreted in the above order

Example

AUTOMODE T15 T60 T240 G1 G2