

# NLink V1.4

NLink LinkTrack Anchor Frame(Length:896Bytes) --- RO				
Data	Type	Length (Bytes)	Description	Index
Frame Header	uint8	1	Value = 0x55	0
Function Mark	uint8	1	Value = 0x00	1
id	uint8	1	ID corresponding to this block (Invalid when the value equals "0xFF")	
role	uint8	1	Role corresponding to this block, value = TAG, refer to the <b>Role Table</b> for more information	Block0
[pos.x, pos.y, pos.z] * 1000	int24	9	Position of the tag, unit: m	
[dis0, dis1, dis2, dis3, dis4, dis5, dis6, dis7] * 100	uint16	16	Distance from the tag to the corresponding anchor, unit: m	
id	uint8	1	ID corresponding to this block (Invalid when the value equals "0xFF")	
role	uint8	1	Role corresponding to this block, value = TAG, refer to the <b>Role Table</b> for more information	Block1
[pos.x, pos.y, pos.z] * 1000	int24	9	Position of the tag, unit: m	
[dis0, dis1, dis2, dis3, dis4, dis5, dis6, dis7] * 100	uint16	16	Distance from the tag to the corresponding anchor, unit: m	
id	uint8	1	..... ID corresponding to this block (Invalid when the value equals "0xFF")	Block2-Block28
role	uint8	1	Role corresponding to this block, value = TAG, refer to the <b>Role Table</b> for more information	
[pos.x, pos.y, pos.z] * 1000	int24	9	Position of the tag, unit: m	Block29
[dis0, dis1, dis2, dis3, dis4, dis5, dis6, dis7] * 100	uint16	16	Distance from the tag to the corresponding anchor, unit: m	
reserved	*	67	Reserved	812
local time	uint32	4	Time of local node, unit: ms	879
reserved	*	4	Reserved	883
voltage * 1000	uint16	2	Interface supply voltage of the local node, unit: V	887
system time	uint32	4	Time of system, unit: ms	889
id	uint8	1	Local node ID	893
role	uint8	1	Local node role, refer to the <b>Role Table</b> for more information	894
Checksum	uint8	1	Value = 0xE	895

NLink LinkTrack Tag Frame(Length:128Bytes) --- RO				
Data	Type	Length (Bytes)	Description	Index
Frame Header	uint8	1	Value = 0x55	0
Function Mark	uint8	1	Value = 0x01	1
id	uint8	1	ID	2
role	uint8	1	Local node role, refer to the <b>Role Table</b> for more information	3
[pos.x, pos.y, pos.z] * 1000	int24	9	Position of the tag, unit: m	4
[vel.x, vel.y, vel.z] * 10000	int24	9	Velocity of the tag, unit: m/s	13
[dis0, dis1, dis2, dis3, dis4, dis5, dis6, dis7] * 1000	int24	24	Distance from the tag to the corresponding anchor, unit: m	22
[g.x, g.y, g.z]	float	12	IMU angular velocity, unit: rad/s	46
[a.x, a.y, a.z]	float	12	IMU acceleration, unit: m/s <sup>2</sup>	58
reserved	*	70	Reserved	70
[angle.x, angle.y, angle.z] * 100	int16	6	Euler angle of the tag, unit: deg	82
[q0, q1, q2, q3]	float	16	Quaternion	88
reserved	*	4	Reserved	104
local time	uint32	4	Time of local node, unit: ms	108
system time	uint32	4	Time of system, unit: ms	112
reserved	*	116	Reserved	116
[cop.x, cop.y, cop.z] * 100	uint8	3	Estimation of the tag position's precision, unit: m	117
voltage * 1000	uint16	2	Interface supply voltage of the local node, unit: V	120
reserved	*	5	Reserved	122
Checksum	uint8	1	The Checksum is equal to all previous bytes added	127

NLink LinkTrack Node Frame(Length:Frame LengthBytes) --- RO				
Data	Type	Length (Bytes)	Description	Index
Frame Header	uint8	1	Value = 0x55	0
Function Mark	uint8	1	Value = 0x02	1
Frame Length	uint16	2	Frame length	2
role	uint8	1	Local node role, refer to the <b>Role Table</b> for more information	4
id	uint8	1	Current node ID	5
reserved	*	4	Reserved	6
valid node quantity	uint8	1	Total valid nodes	10
role	uint8	1	Role corresponding to this block, refer to the <b>Role Table</b> for more information	11
id	uint8	1	ID corresponding to this block	12
data length	uint16	2	Transparent data length	13
data[length]	uint8	1*length	Transparent data	15
role	uint8	1	Role corresponding to this block, refer to the <b>Role Table</b> for more information	16
id	uint8	1	ID corresponding to this block	17
data length	uint16	2	Transparent data length	18
data[length]	uint8	1*length	Transparent data	20
Checksum	uint8	1	..... The Checksum is equal to all previous bytes added	Block... Frame Length - 1

NLink LinkTrack Node Frame(Length:Frame LengthBytes) --- RO				
Data	Type	Length (Bytes)	Description	Index
Frame Header	uint8	1	Value = 0x55	0
Function Mark	uint8	1	Value = 0x03	1
Frame Length	uint16	2	Frame length	2
role	uint8	1	Local node role, refer to the <b>Role Table</b> for more information	4
id	uint8	1	Current node ID	5
system time	uint32	4	Time of system, unit: ms	6
local time	uint32	4	Time of local node, unit: ms	10
reserved	*	10	Reserved	14
voltage * 1000	uint16	2	Interface supply voltage of the local node, unit: V	24
valid node quantity	uint8	1	Total valid nodes	26
role	uint8	1	Role corresponding to this block, refer to the <b>Role Table</b> for more information	
id	uint8	1	ID corresponding to this block	
[pos.x, pos.y, pos.z] * 1000	int24	9	Position of the tag, unit: m	Block0
reserved	*	9	Reserved	
role	uint8	1	Role corresponding to this block, refer to the <b>Role Table</b> for more information	
id	uint8	1	ID corresponding to this block	
[pos.x, pos.y, pos.z] * 1000	int24	9	Position of the tag, unit: m	Block1
reserved	*	9	Reserved	
Checksum	uint8	1	..... The Checksum is equal to all previous bytes added	Block... Frame Length - 1

NLink LinkTrack Node Frame(Length:Frame LengthBytes) --- RO				
Data	Type	Length (Bytes)	Description	Index
Frame Header	uint8	1	Value = 0x55	0
Function Mark	uint8	1	Value = 0x04	1
Frame Length	uint16	2	Frame length	2
role	uint8	1	Local node role, refer to the <b>Role Table</b> for more information	4
id	uint8	1	Local node ID	5
system time	uint32	4	Time of system, unit: ms	6
[cop.x, cop.y, cop.z] * 100	uint8	3	Estimation of the tag position's precision, unit: m	10
[pos.x, pos.y, pos.z] * 1000	int24	9	Position of the tag, unit: m	13
[vel.x, vel.y, vel.z] * 10000	int24	9	Velocity of the tag, unit: m/s	22
reserved	*	9	Reserved	31
[g.x, g.y, g.z]	float	12	IMU angular velocity, unit: rad/s	40
[a.x, a.y, a.z]	float	12	IMU acceleration, unit: m/s <sup>2</sup>	52
reserved	*	64	Reserved	64
[angle.x, angle.y, angle.z] * 100	int16	6	Euler angle of the tag, unit: deg	76
[q0, q1, q2, q3]	float	16	Quaternion	82
reserved	*	4	Reserved	98
local time	uint32	4	Time of local node, unit: ms	102
reserved	*	10	Reserved	106
voltage * 1000	uint16	2	Interface supply voltage of the local node, unit: V	116
valid node quantity	uint8	1	Total valid nodes	118
role	uint8	1	Role corresponding to this block, refer to the <b>Role Table</b> for more information	
id	uint8	1	ID corresponding to this block	
dis * 1000	int24	3	Distance from the tag to the corresponding anchor, unit: m	Block0
fp_rssi * (-2)	uint8	1	First path power level, unit: dB	
rx_rssi * (-2)	uint8	1	Received power level, unit: dB	
reserved	*	6	Reserved	
role	uint8	1	Role corresponding to this block, refer to the <b>Role Table</b> for more information	
id	uint8	1	ID corresponding to this block	
dis * 1000	int24	3	Distance from the tag to the corresponding anchor, unit: m	Block1
fp_rssi * (-2)	uint8	1	First path power level, unit: dB	
rx_rssi * (-2)	uint8	1	Received power level, unit: dB	
reserved	*	6	Reserved	
Checksum	uint8	1	..... The Checksum is equal to all previous bytes added	Block... Frame Length - 1

NLink LinkTrack Node Frame(Length:Frame LengthBytes) --- RO				
Data	Type	Length (Bytes)	Description	Index
Frame Header	uint8	1	Value = 0x55	0
Function Mark	uint8	1	Value = 0x05	1
Frame Length	uint16	2	Frame length	2
role	uint8	1	Local node role, refer to the <b>Role Table</b> for more information	4
id	uint8	1	Local node ID	5

Data	Type	Length (Bytes)	Description	Index
local time	uint32	4	Time of local node, unit:ms	6
system time	uint32	4	Time of system, unit:ms	10
reserved	*	4	Reserved	14
voltage * 1000	uint16	2	Interface supply voltage of the local node, unit: V	18
valid node quantity	uint8	1	Total valid nodes	20
role	uint8	1	Role corresponding to this block, refer to the Role Table for more information	
id	uint8	1	ID corresponding to this block	
dis * 1000	int24	3	Distance from the tag to the corresponding anchor, unit: m	Block0
fp_rssi * (-2)	uint8	1	First path power level, unit: dB	
rx_rssi * (-2)	uint8	1	Received power level, unit: dB	
role	uint8	1	Role corresponding to this block, refer to the Role Table for more information	
id	uint8	1	ID corresponding to this block	
dis * 1000	int24	3	Distance from the tag to the corresponding anchor, unit: m	Block1
fp_rssi * (-2)	uint8	1	First path power level, unit: dB	
rx_rssi * (-2)	uint8	1	Received power level, unit: dB	
Checksum	uint8	1	The Checksum is equal to all previous bytes added	Block... Frame Length-1

NLink_LinkTrack_Node_Frame4(Length: Frame_LengthBytes) --- RO				
Data	Type	Length (Bytes)	Description	Index
Frame Header	uint8	1	Value = 0x55	0
Function Mark	uint8	1	Value = 0x06	1
Frame Length	uint16	2	Frame length	2
role	uint8	1	Local node role, refer to the Role Table for more information	4
id	uint8	1	Local node ID	5
local time	uint32	4	Time of local node, unit:ms	6
system time	uint32	4	Time of system, unit:ms	10
reserved	*	4	Reserved	14
voltage * 1000	uint16	2	Interface supply voltage of the local node, unit: V	18
valid tag quantity	uint8	1	Total valid tags	20
tag_id	uint8	1	TAG ID	
reserved	*	2	Reserved	
tag_voltage * 20	uint8	1	Interface supply voltage of the TAG, unit: V	
anchor_quantity	uint8	1	Total valid anchors, the value doesn't exceed 8	
anchor_id	uint8	1	ANCHOR ID	
dis * 1000	int24	3	Distance from the tag to the corresponding anchor, unit: m	Block0
anchor_id	uint8	1	ANCHOR ID	
dis * 1000	int24	3	Distance from the tag to the corresponding anchor, unit: m	
tag_id	uint8	1	TAG ID	
reserved	*	2	Reserved	
tag_voltage * 20	uint8	1	Interface supply voltage of the TAG, unit: V	
anchor_quantity	uint8	1	Total valid anchors	
anchor_id	uint8	1	ANCHOR ID	
dis * 1000	int24	3	Distance from the tag to the corresponding anchor, unit: m	Block1
anchor_id	uint8	1	ANCHOR ID	
dis * 1000	int24	3	Distance from the tag to the corresponding anchor, unit: m	
Checksum	uint8	1	The Checksum is equal to all previous bytes added	Block... Frame Length-1

NLink_LinkTrack_Node_Frame5(Length: Frame_LengthBytes) --- RO				
Data	Type	Length (Bytes)	Description	Index
Frame Header	uint8	1	Value = 0x55	0
Function Mark	uint8	1	Value = 0x08	1
Frame Length	uint16	2	Frame length	2
role	uint8	1	Local node role, refer to the Role Table for more information	4
id[4]	uint8	4	Local node ID	5
local time	uint32	4	Time of local node, unit:ms	9
system time	uint32	4	Time of system, unit:ms	13
reserved	*	4	Reserved	17
voltage * 1000	uint16	2	Interface supply voltage of the local node, unit: V	21
valid node quantity	uint8	1	Total valid nodes	23
role	uint8	1	Role corresponding to this block, refer to the Role Table for more information	
id [4]	uint8	4	ID corresponding to this block	
dis * 1000	int24	3	Distance from the tag to the corresponding anchor, unit: m	Block0
fp_rssi * (-2)	uint8	1	First path power level, unit: dB	
rx_rssi * (-2)	uint8	1	Received power level, unit: dB	
role	uint8	1	Role corresponding to this block, refer to the Role Table for more information	
id [4]	uint8	4	ID corresponding to this block	
dis * 1000	int24	3	Distance from the tag to the corresponding anchor, unit: m	Block1
fp_rssi * (-2)	uint8	1	First path power level, unit: dB	
rx_rssi * (-2)	uint8	1	Received power level, unit: dB	
Checksum	uint8	1	The Checksum is equal to all previous bytes added	Block... Frame Length-1

NLink_LinkTrack_Node_Frame6(Length: Frame_LengthBytes) --- RO				
Data	Type	Length (Bytes)	Description	Index
Frame Header	uint8	1	Value = 0x55	0
Function Mark	uint8	1	Value = 0x09	1
Frame Length	uint16	2	Frame length	2
role	uint8	1	Local node role, refer to the Role Table for more information	4
id[4]	uint8	4	Current node ID	5
reserved	*	4	Reserved	9
valid node quantity	uint8	1	Total valid nodes	13
role	uint8	1	Role corresponding to this block, refer to the Role Table for more information	
id[4]	uint8	4	ID corresponding to this block	
data_length	uint16	2	Transparent data length	
data[length]	uint8	1*length	Transparent data	
role	uint8	1	Role corresponding to this block, refer to the Role Table for more information	
id[4]	uint8	4	ID corresponding to this block	
data_length	uint16	2	Transparent data length	
data[length]	uint8	1*length	Transparent data	
Checksum	uint8	1	The Checksum is equal to all previous bytes added	Block... Frame Length-1

NLink_LinkTrack_User_Frame(Length: (11+ data_length)Bytes) --- WO				
Data	Type	Length (Bytes)	Description	Index
Frame Header	uint8	1	Value = 0x54	0
Function Mark	uint8	1	Value = 0xF1	1
reserved	*	4	Reserved. The byte written must be 0xFF	2
remote_role	uint8	1	Value = NODE/SLAVE, refer to the Role Table for more information	6
remote_id	uint8	1	Remote ID, Range: [0,254]	7
data_length	uint16	2	Transparent data length	8
data[length]	uint8	1*length	Transparent data	10
Checksum	uint8	1	The Checksum is equal to all previous bytes added	10 + data length

NLink_LinkTrack_Setting_Frame0(Length: 128 Bytes) --- RW				
Data	Type	Length (Bytes)	Description	Index
Frame Header	uint8	1	Value = 0x54 --- RW	0
Function Mark	uint8	1	Value = 0x00 --- RW	1
mix	uint8	1	bit0: [0: none],[1: read] --- WO bit1: [0: none],[1: remote switch setting] --- WO bit2: [0: none],[1: restart current node after setting] --- WO bit3: [0: none],[1: restart current node] --- WO bit4: [0: none],[1: restore factory] --- WO bit5: [0: none],[1: read cm mode param] --- WO	2
role	uint8	1	enum(NODE,ANCHOR,TAG,CONSOLE,MASTER,SLAVE) --- RW	3
math_model	uint8	1	role = TAG; enum(MATH_MODEL0,MATH_MODEL1,MATH_MODEL2) --- RW role = other; Value = 0xFF --- RW	4
uart_baudrate	uint24	3	enum([115200,230400,460800,921600,1000000,1200000,1500000,2000000,3000000]) --- RW	5
system_ch	uint8	1	Range: [0,11] --- RW	8
id	uint8	1	Refer to LP Mode Table --- RW	9
update_rate	uint16	2	Refer to LP Mode Table --- RW	10
system_id	uint8	1	Range: [0,255] --- RW	12
reserved	uint8	1	Reserved. The byte written must be 0xFF	13
on_off	uint8	1	bit0: [0: uart led off],[1: uart led on] --- RW bit7-4: Reserved	14
reserved	uint8	1	Reserved. The byte written must be 0xFF	15
filter_property	uint8	1	Range: [0,255] --- RW	16
mode	uint8	1	bit3-0: mode run --- enum(LP_MODE0,LP_MODE1,Reserved,DT_MODE0,DT_MODE1,DT_MODE2,DR_MODE1,Reserved,CM_MODE,Reserved,DR_MODE0,Reserved,LP_MODE4,LP_MODE5,LP_MODE6,MEM_MODE), "Blue Mark: mix=remote switch setting" is effective --- RW bit7-4: mode mem	17
reserved	*	1	Reserved	18
protocol	uint8	1	Reference Role Rule --- RW	19

tx_gain	uint8	1	Range: [0,33.5]dB--> [0,67] -- RW	20
reserved	uint8	3	Reserved	21
node_capacity	uint8	1	DR_MODE:node_capacity,Others:invalid -- RW	24
reserved	uint8	2	Reserved	25
local_time	uint32	4	terminal system time:uint.ms -- WO local time:uint.ms -- RO	27
reserved	uint8	5	Reserved	31
anchor_group_index	uint8	1	anchor_group_index=0:A0-A9 -- RW anchor_group_index=1:A10-A19 -- RW anchor_group_index=2:A20-A29 -- RW	36
[a0_coordinate.x,a0_coordinate.y,a0_coordinate.z]*1000	int24	9	Unit: m -- RW	37
[a1_coordinate.x,a1_coordinate.y,a1_coordinate.z]*1000	int24	9	Unit: m -- RW	46
[a2_coordinate.x,a2_coordinate.y,a2_coordinate.z]*1000	int24	9	Unit: m -- RW	55
[a3_coordinate.x,a3_coordinate.y,a3_coordinate.z]*1000	int24	9	Unit: m -- RW	64
[a4_coordinate.x,a4_coordinate.y,a4_coordinate.z]*1000	int24	9	Unit: m -- RW	73
[a5_coordinate.x,a5_coordinate.y,a5_coordinate.z]*1000	int24	9	Unit: m -- RW	82
[a6_coordinate.x,a6_coordinate.y,a6_coordinate.z]*1000	int24	9	Unit: m -- RW	91
[a7_coordinate.x,a7_coordinate.y,a7_coordinate.z]*1000	int24	9	Unit: m -- RW	100
[a8_coordinate.x,a8_coordinate.y,a8_coordinate.z]*1000	int24	9	Unit: m -- RW	109
[a9_coordinate.x,a9_coordinate.y,a9_coordinate.z]*1000	int24	9	Unit: m -- RW	118
Checksum	uint8	1	The Checksum is equal to all previous bytes added. -- RW	127

NLink System Common Frame0(Length:32 Bytes) -- RO				
Data	Type	Length (Bytes)	Description	Index
Frame Header	uint8	1	Value = 0x52 -- RW	0
Function Mark	uint8	1	Value = 0x00 -- RW	1
mix	uint8	1	bit0: [0: write][1: read] -- WO	2
product_version	uint8	1	product version l:decimal fraction -- RO	3
	uint8	1	product version h:integer -- RO	4
hardware_version	uint8	1	hardware version l:decimal fraction -- RO	5
	uint8	1	hardware version h:integer -- RO	6
firmware_version	uint8	1	firmware version b -- RO	7
	uint8	1	firmware version l -- RO	8
	uint8	1	firmware version m -- RO	9
	uint8	1	firmware version h -- RO	10
reserved			Reserved. The byte written must be 0xFF	11
uart_baudrate	uint24	3	reference lps setting: frame uart baudrate -- RO	19
role	uint8	1	enum{NODE,ANCHOR,TAG,CONSOLE,MASTER,SLAVE} -- RW	22
id	uint8	1	Refer to Mode Table -- RW	23
reserved	*	7	Reserved. The byte written must be 0xFF	24
Checksum	uint8	1	The Checksum is equal to all previous bytes added. -- RW	31

NLink LinkTrack Error Frame0(Length: 32 Bytes) -- RO				
Data	Type	Length (Bytes)	Description	Index
Frame Header	uint8	1	Value = 0x54	0
Function Mark	uint8	1	Value = 0xFA	1
Frame Length	uint16	2	Value = 32	2
role	uint8	1	Reference Role Table -- RO	4
id	uint8	1	Local node ID -- RO	5
local_time	uint32	4	Time of local node, unit:ms -- RO	6
reserved	*	4	Reserved. The bytes written must be 0xFF	10
error_type	uint8	1	bit0: [0: none][1: node repeat] -- RO bit1: [0: none][1: lps setting frame error] -- RO bit2: [0: none][1: anchor coordinate error] -- RO bit3: [0: none][1: restart] -- RO bit4: [0: none][1: hard fault] -- RO bit5: [0: none][1: uwb tx error] -- RO bit6: [0: none][1: pos abnormal zero] -- RO bit7: [0: none][1: dt length exceed] -- RO	14
reserved	*	2	Reserved.	15
error_type mark0	uint8	1	range[0,255]	17
error_type mark1	uint8	1	range[0,255]	18
error_type mark2	uint8	1	range[0,255]	19
reserved	*	11	Reserved.	20
Checksum	uint8	1	The Checksum is equal to all previous bytes added. -- WO	Frame Length - 1

LP Mode Table			
mode	update_rate	id	
LP_MODE0	1,2,5,10,25,50	ANCHOR: 8, TAG: 40, CONSOLE: 1	
LP_MODE1	1,2,5,10,20	ANCHOR: 30, TAG: 40, CONSOLE: 1	
LP_MODE2	1,2,5,10	ANCHOR: 8, TAG: 200, CONSOLE: 1	
LP_MODE3	1,5,25	ANCHOR: 13, TAG: 100, CONSOLE: 1	
LP_MODE4	1,2,5,10	ANCHOR: 120, TAG: 40, CONSOLE: 1	
LP_MODE5	1,2,5,10,25,50,100,200	ANCHOR: 4, TAG: 4, CONSOLE: 0	
LP_MODE6	1,2,5,10,25,50,100,200	ANCHOR: 6, TAG: 16, CONSOLE: 1	

Role Table(In DR\_MODE0 and DR\_MODE1 the role is NODE, the default value is 0, but it can be set to 0 to 254)  
enum{NODE, ANCHOR, TAG, CONSOLE, MASTER, SLAVE}

LinkTrack Protocol Table  
enum{ANCHOR\_FRAME0,TAG\_FRAME0,NODE\_FRAME0,NODE\_FRAME1,NODE\_FRAME2,NODE\_FRAME3,NODE\_FRAME4,NODE\_FRAME5,NODE\_FRAME6}  
NMEA-0183 = 0x80. Used for tag only.

Protocol Rule			
mode	role	protocol	
LP_MODE0/1/2/3/4/5	ANCHOR/CONSOLE	LINKTRACK ANCHOR_FRAME0 LINKTRACK_NODE_FRAME1 LINKTRACK_NODE_FRAME4	
	TAG	LINKTRACK_TAG_FRAME0 LINKTRACK_NODE_FRAME2 LINKTRACK_NODE_FRAME3 NMEA-0183	
DR_MODE0	NODE	LINKTRACK_NODE_FRAME2 LINKTRACK_NODE_FRAME3	
DR_MODE1	NODE	LINKTRACK_NODE_FRAME5	
DT_MODE0	MASTER	*	
	SLAVE	*	

Typedef	
Byte's Quantities	Type
1	uint8, int8
2	uint16, int16
3	uint24, int24
4	uint32, int32, float
8	uint64, int64

Typedef		
Abbreviation	Full Title	Type
RW	Read Write	Terminal can read data from node & write data to node
RO	Read Only	Terminal can only read data from node
WO	Write Only	Terminal can only write data to node