

# LIN Gateway User Guide

## V0.1

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# 1 REVISION HISTORY

Table 1 Revision History

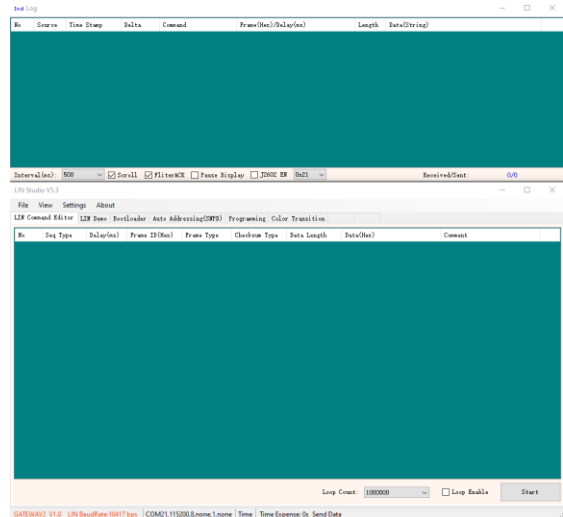
Rev #	Date	Action	By
0.1	11/05/2021	First draft	JackPan

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### 3 SYSTEM OVERVIEW

LIN gateway is designed to speed up indiemicro interior light and LIN bus-based production development, it integrates general LIN command editor, interior light color control and color configuration, bootloader, chip programming, and general color transition formula etc.



#### 3.1 HARDWARE CONNECTION



LIN gateway is a LIN master, it transfers the data from PC software command to LIN slave and send back the LIN slave data to PC software.

## 4 PC SOFTWARE GUI DESCRIPTION

- 1) **LOG and Debug Window:** used to log all of the command and data which operated through Command Operation Window.
- 2) **Command Operation Window:** all of the commands are defined in this window.

The screenshot displays two windows from the LIN Studio V5.3 software. The top window, titled "1. LOG and Debug Window", shows a log of LIN messages. The bottom window, titled "2. Command Operation Window", shows a table of command sequences.

**1. LOG and Debug Window**

No	Source	Time Stamp	Delta	Command	Frame(Hex)/Delay(ms)	Length	Data(String)
14009	OUT	04:10:19:071	0.004	LIN_CMD	21	03	!
14010	IN	04:10:19:088	0.017	LIN_CMD	21 12 61 00 00 00 00 00 00	27	SM: Err:0 Sofg:0 FID:0x21 bitErr:0 chkErr:...
14011	OUT	04:10:19:091	0.003	LIN_CMD	21	03	!
14012	IN	04:10:19:108	0.017	LIN_CMD	21 12 61 00 00 00 00 00 00	27	SM: Err:0 Sofg:0 FID:0x21 bitErr:0 chkErr:...
14013	OUT	04:10:19:112	0.004	LIN_CMD	21	03	!
14014	IN	04:10:19:129	0.017	LIN_CMD	21 12 61 00 00 00 00 00 00	27	SM: Err:0 Sofg:0 FID:0x21 bitErr:0 chkErr:...
14015	OUT	04:10:19:132	0.003	LIN_CMD	21	03	!
14016	IN	04:10:19:150	0.018	LIN_CMD	21 12 61 00 00 00 00 00 00	27	SM: Err:0 Sofg:0 FID:0x21 bitErr:0 chkErr:...
14017	OUT	04:10:19:153	0.003	LIN_CMD	21	03	!
14018	IN	04:10:19:170	0.017	LIN_CMD	21 12 61 00 00 00 00 00 00	27	SM: Err:0 Sofg:0 FID:0x21 bitErr:0 chkErr:...
14019	OUT	04:10:19:174	0.004	LIN_CMD	21	03	!
14020	IN	04:10:19:192	0.018	LIN_CMD	21 12 61 00 00 00 00 00 00	27	SM: Err:0 Sofg:0 FID:0x21 bitErr:0 chkErr:...
14021	OUT	04:10:19:195	0.003	LIN_CMD	21	03	!
14022	IN	04:10:19:213	0.018	LIN_CMD	21 12 61 00 00 00 00 00 00	27	SM: Err:0 Sofg:0 FID:0x21 bitErr:0 chkErr:...
14023	OUT	04:10:19:216	0.003	LIN_CMD	21	03	!

Interval(ms): 500  Scroll  FliterACK  Pause Display  J2802 EN 0x21 Received/Sent: 7011/7012

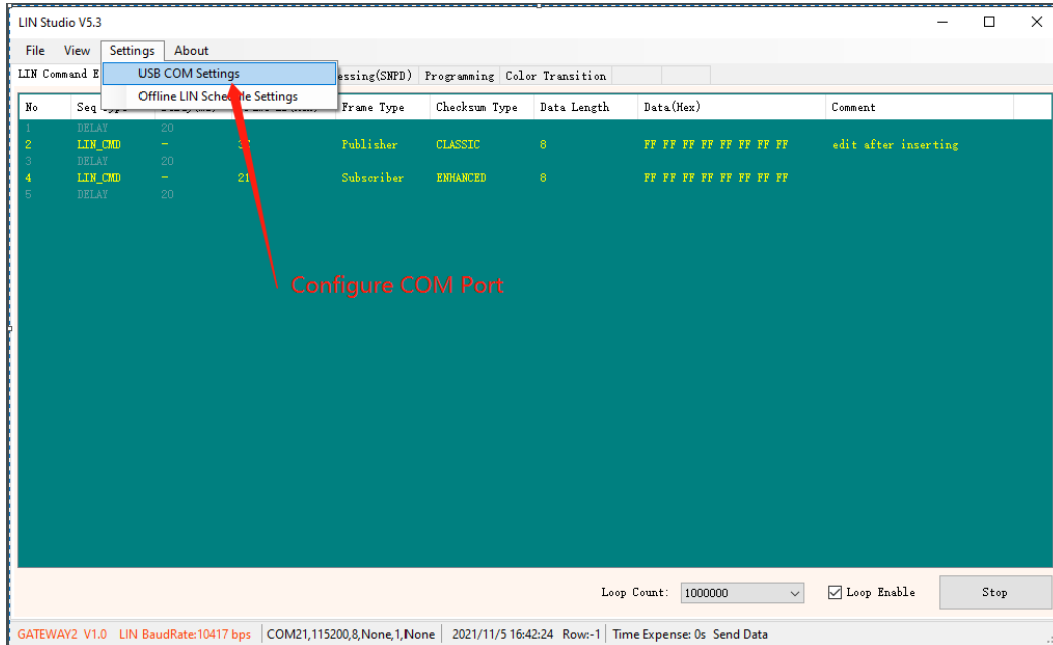
**2. Command Operation Window**

No	Seq Type	Delay(ms)	Frame ID(Hex)	Frame Type	Checksum Type	Data Length	Data(Hex)	Comment
1	LIN_CMD	-	21	Subscriber	ENHANCED	8	FF FF FF FF FF FF FF FF	
2	DELAY	20						

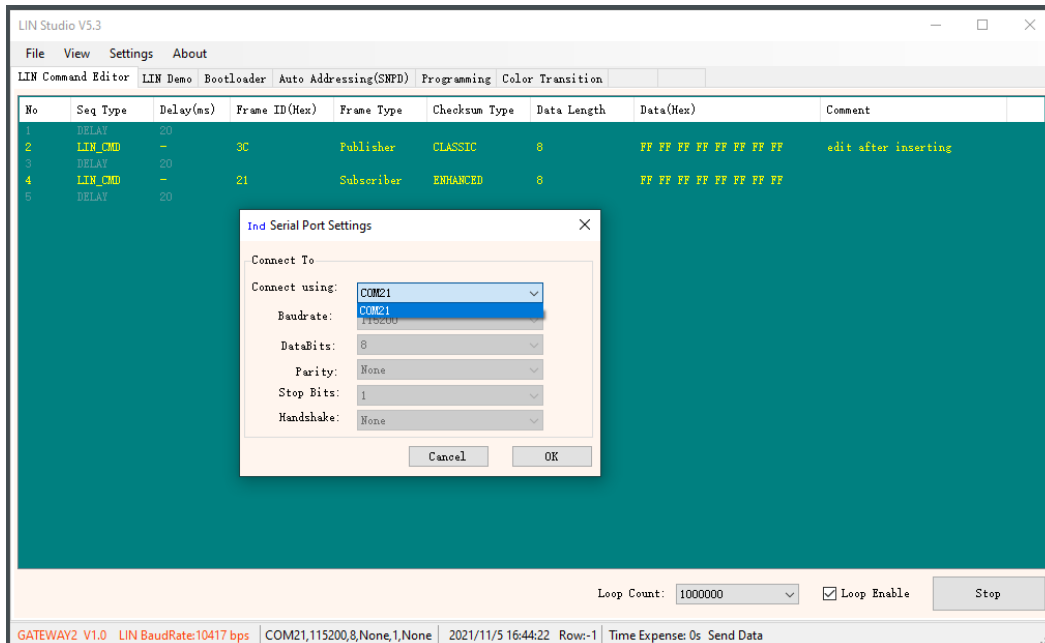
Loop Count: 1000000  Loop Enable

GATEWAY2 V1.0 LIN BaudRate:10417 bps | COM21,115200,8,None,1,None | 2021/11/5 16:10:19 Row:-1 | Time Expense: 0s Send Data

Communication Port need to be set before communicating with LIN gateway:



Select the gateway COM port and press OK button:



## 4.1 LOG AND DEBUG

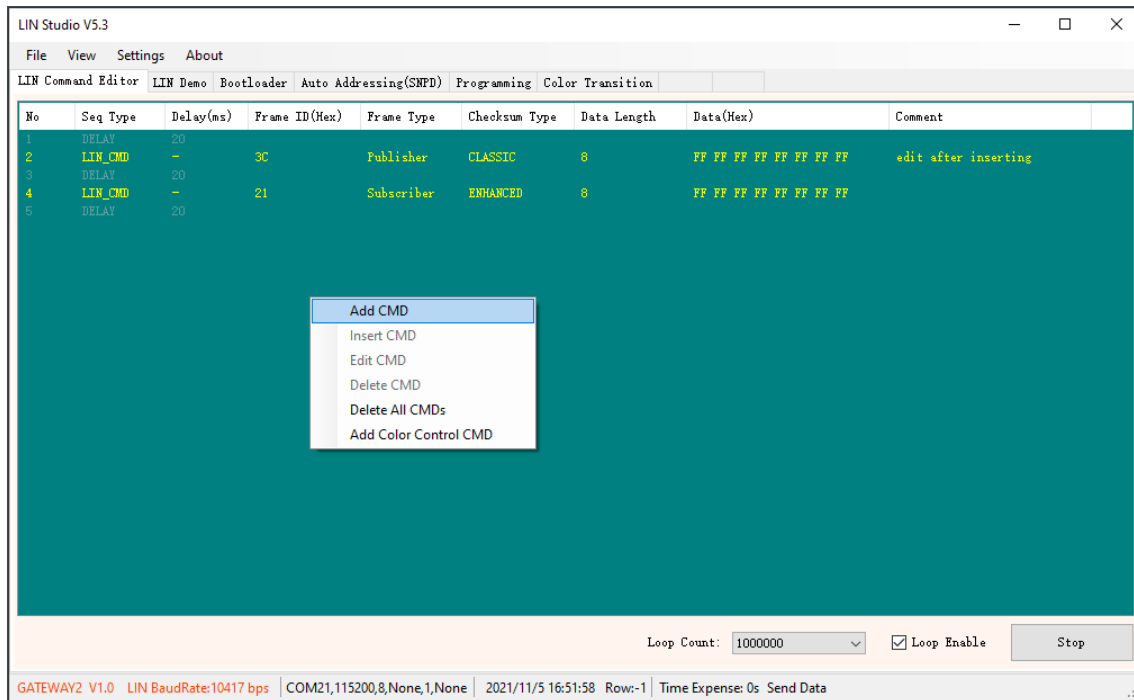
No	Source	Time Stamp	Delta	Command	Frame(Hex)/Delay(ms)	Length	Data(String)
16...	OUT	04:36:04:590	0.003	LIN_CMD	21	03	!.....
16...	IN	04:36:04:607	0.017	LIN_CMD	21 12 61 00 00 00 00 00 00	27	SM: Err:0 Sofg:0 FID:0x21 bitErr:0 chkErr:...
16...	OUT	04:36:04:610	0.003	LIN_CMD	21	03	!.....
16...	IN	04:36:04:628	0.018	LIN_CMD	21 12 61 00 00 00 00 00 00	27	SM: Err:0 Sofg:0 FID:0x21 bitErr:0 chkErr:...
16...	OUT	04:36:04:631	0.003	LIN_CMD	21	03	!.....
16...	IN	04:36:04:649	0.018	LIN_CMD	21 12 61 00 00 00 00 00 00	27	SM: Err:0 Sofg:0 FID:0x21 bitErr:0 chkErr:...
16...	OUT	04:36:04:652	0.003	LIN_CMD	21	03	!.....
16...	IN	04:36:04:669	0.017	LIN_CMD	21 12 61 00 00 00 00 00 00	27	SM: Err:0 Sofg:0 FID:0x21 bitErr:0 chkErr:...
16...	OUT	04:36:04:672	0.003	LIN_CMD	21	03	!.....
16...	IN	04:36:04:690	0.017	LIN_CMD	21 12 61 00 00 00 00 00 00	27	SM: Err:0 Sofg:0 FID:0x21 bitErr:0 chkErr:...
16...	OUT	04:36:04:693	0.003	LIN_CMD	21	03	!.....
16...	IN	04:36:04:710	0.017	LIN_CMD	21 12 61 00 00 00 00 00 00	27	SM: Err:0 Sofg:0 FID:0x21 bitErr:0 chkErr:...
16...	OUT	04:36:04:714	0.004	LIN_CMD	21	03	!.....
16...	IN	04:36:04:731	0.017	LIN_CMD	21 12 61 00 00 00 00 00 00	27	SM: Err:0 Sofg:0 FID:0x21 bitErr:0 chkErr:...
16...	OUT	04:36:04:734	0.003	LIN_CMD	21	03	!.....

Interval(ms): 500  Scroll  FliterACK  Pause Display  J2602 EN 0x21 Received/Sent: 81173/81173

- 1) **Interval(ms)**: data display refresh rate.
- 2) **Scroll**: always display the latest information when enabled.
- 3) **FilterACK**: there is handshake command between PC software and LIN gateway, disabled to check whether the communication is okay or not.
- 4) **Pause Display**: pause display to help browse the log data
- 5) **J2602 EN**: enabled to interpret J2602 command, if disabled, the developer can pick up the LIN2.2 state report command FID through the dropdown list (FID= 0x21 by default)
- 6) **Received/Sent**: Sent data and got data statistics.

Right click to save the data log or clear the log window.

## 4.2 COMMAND EDITOR



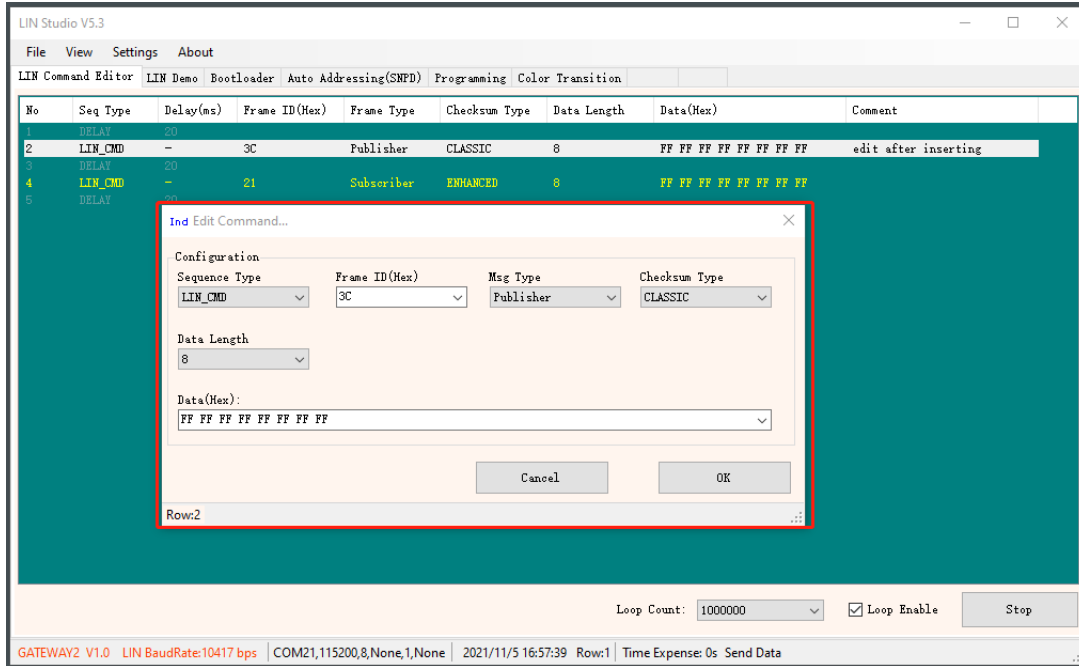
Edit LIN command by right clicking LIN command Editor page

- 1) **Add CMD** : Add LIN command or Add a delay time between LIN commands
- 2) **Insert CMD**: Insert command between exist commands.
- 3) **Edit CMD**: Edit exist command
- 4) **Delete all CMDs**: Clear all of the command in the command editor.
- 5) **Add Color Control CMD**: Add the color control command which is defined in SDK.

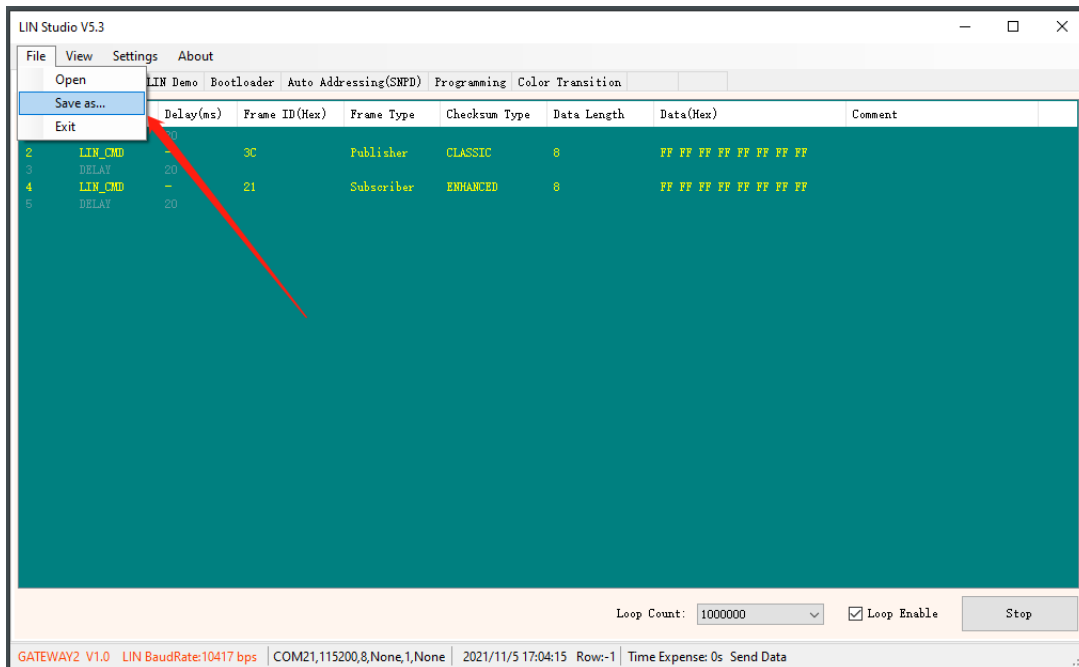


### 4.2.1 Command Content Edit

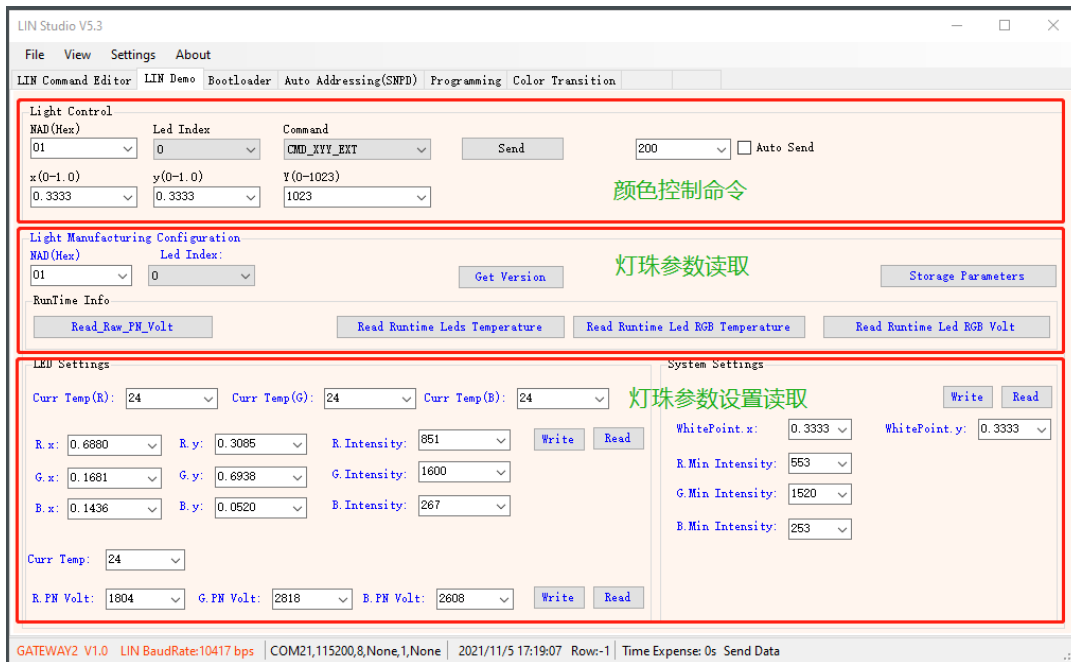
Click one of the commands to enter command configuration window:



### 4.2.2 Save/Load commands to/from File

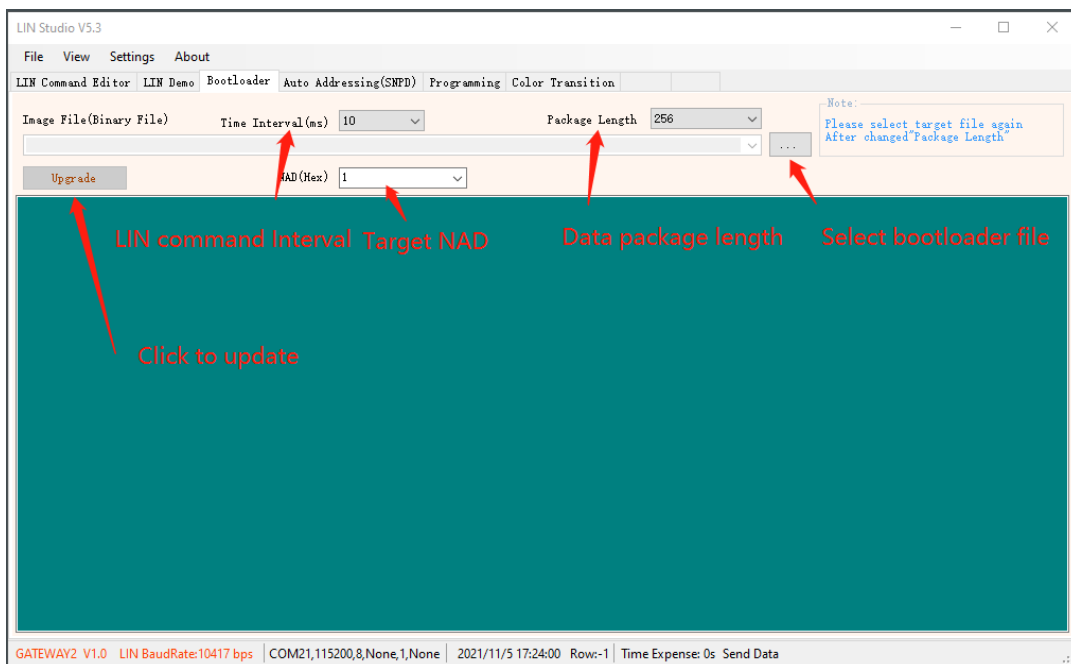


### 4.3 LIN DEMO

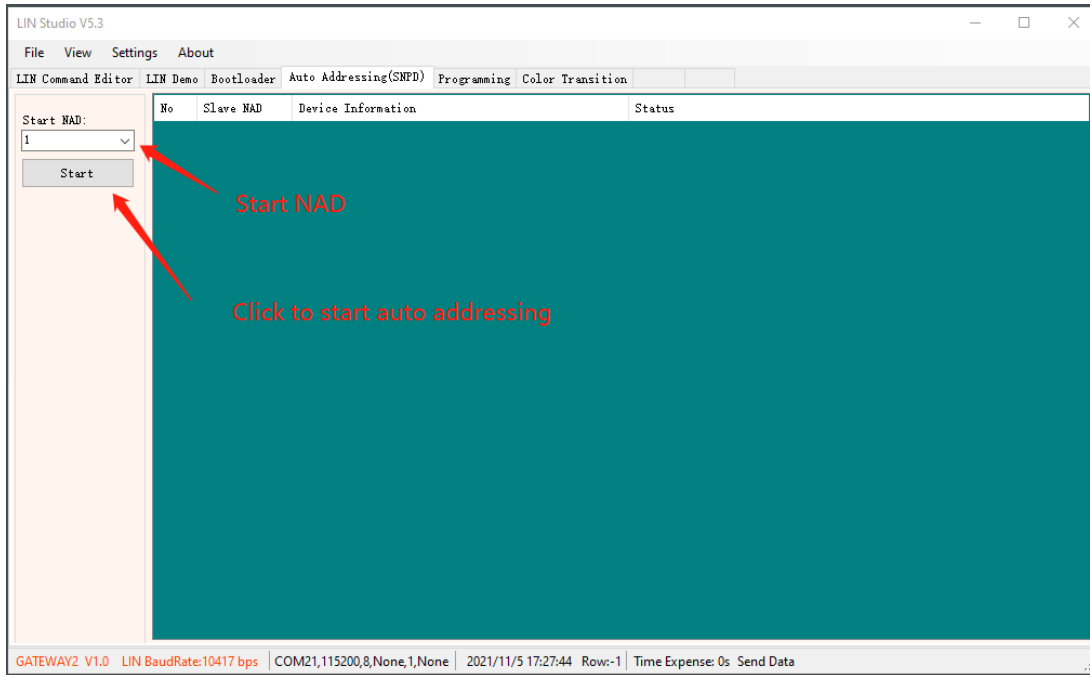


Refers to Color calibration user guide for specific information.

### 4.4 BOOTLOADER

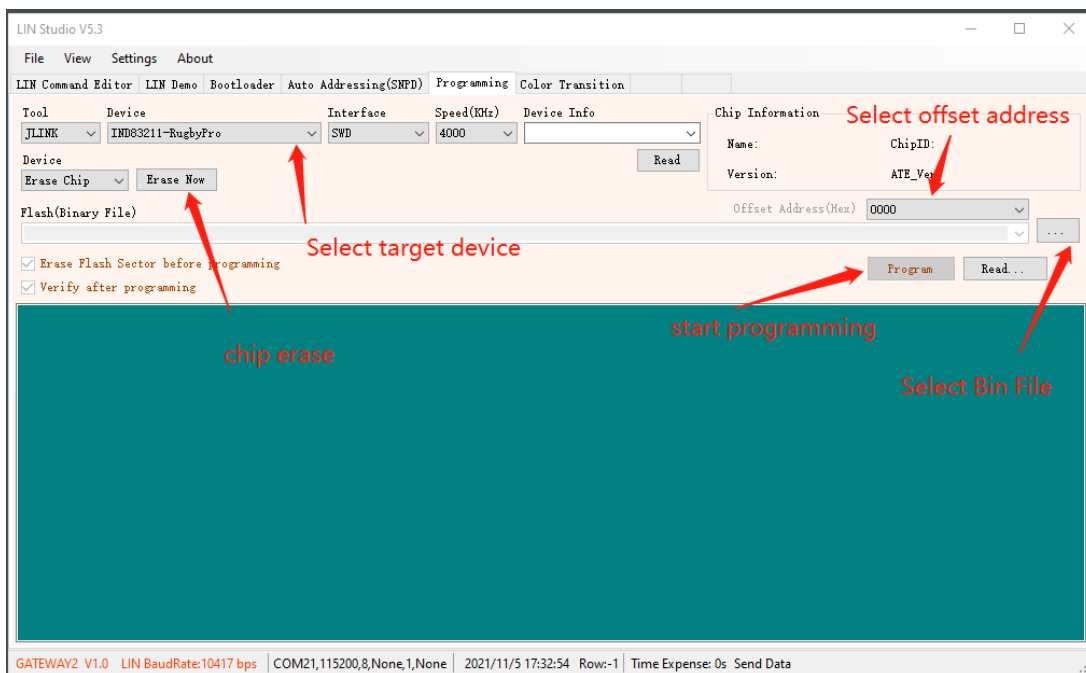


## 4.5 AUTO ADDRESSING

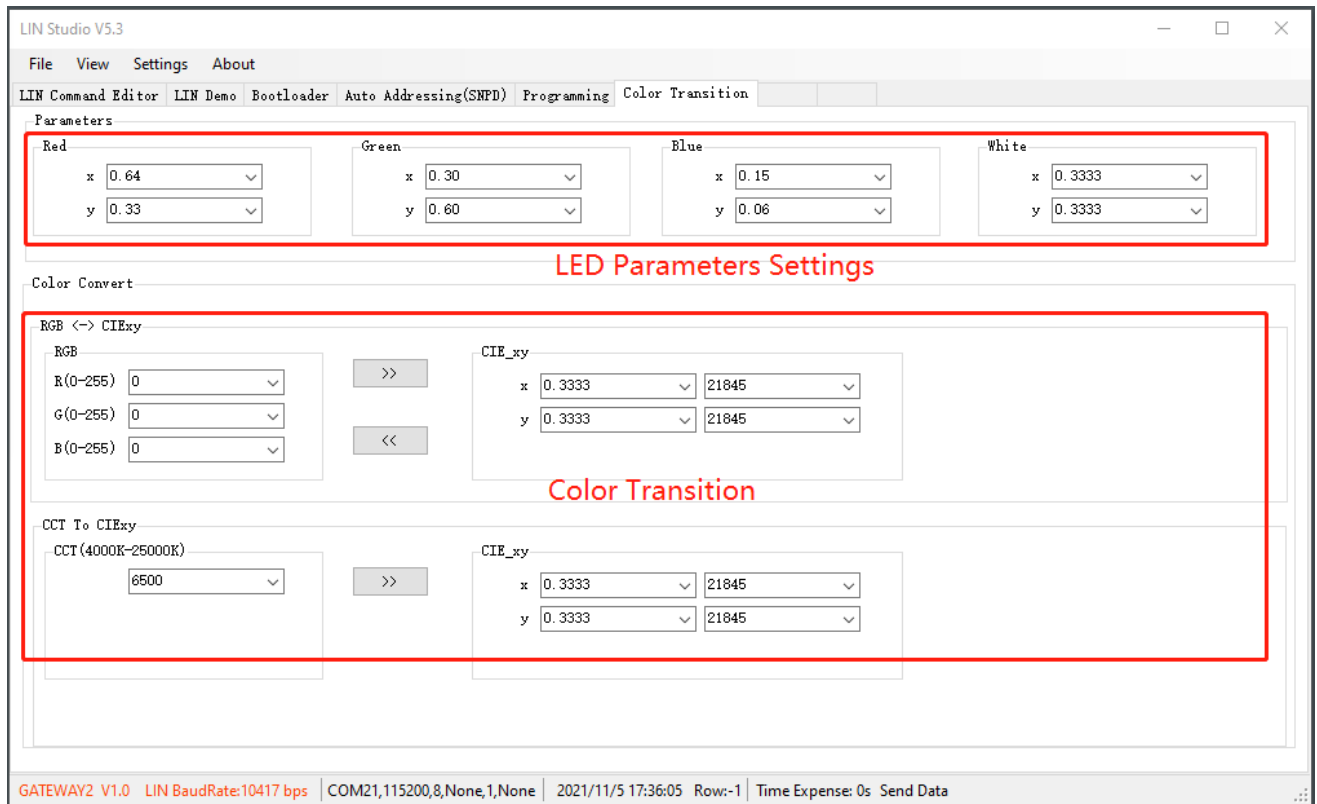


## 4.6 PROGRAMMING

Current PC tool supports programming the target device together with Jlink tool.

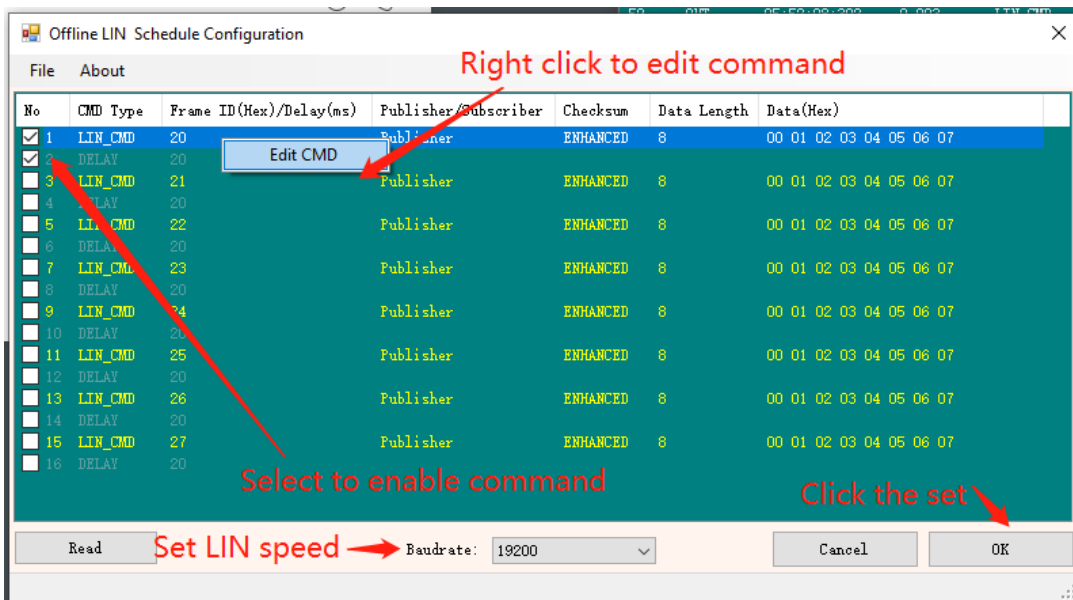
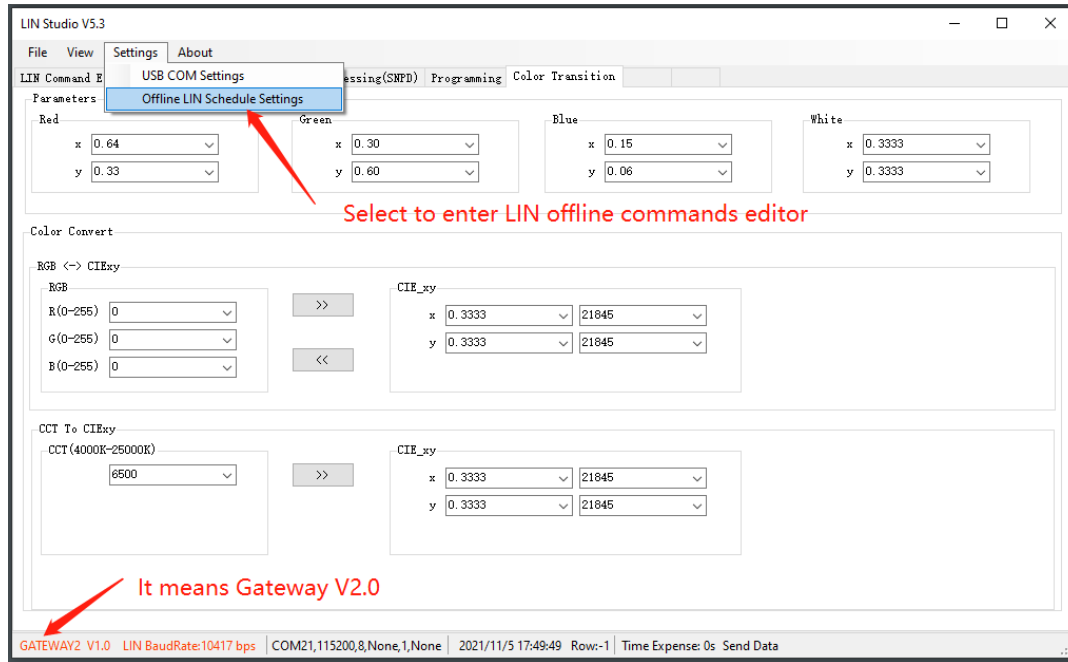


## 4.7 COLOR TRANSITION



## 5 OFFLINE LIN COMMAND

There is an offline command editor in PC software which can run in gateway without PC tool, this function is only supported by LIN gateway V2.0.





Press "START" button to run offline command periodically, Press "STOP" button to stop offline command.

## 6 COMMUNICATION PROTOCOL BETWEEN PC TOOL AND LIN GATEWAY

COM Settings:							
BaudRate:	115200						
DataBits:	8						
Parity:	None						
Stop Bits:	1						

Data Frame Description							
Head(1byte)	FrameID(1byte)	PEC(1byte)	Control Byte(1byte)			Data(Data Lengthbyte)	
			Data Length:bit7:4	Frame Type:bit3:1	Checksum Type: bit0	Data[0:Data Length-1 ]	
<b>Head:</b>	0x55: SEND	<b>Frame ID</b>	0x00-0x3F	LIN Frame ID without Parity			
	0xA5: ACK/RSP						
<b>PEC</b>	Sum of Control Byte + Data		<b>Control Byte</b>				
			<i>Data Length</i>	0-8	Data size		
			<i>Frame Type</i>	0x00:	Request Data		
				0x01:	Send data		
			<i>Checksum Type</i>	0x00:	Classic		
				0x01:	Enhanced		

Send Data To Target							
	Head(1byte)	FrameID(1byte)	PEC(1byte)	Control Byte(1byte)			Data(Data Lengthbyte)
				Data Length:bit7:4	Frame Type:bit3:1	Checksum Type: bit0	Data[0:Data Length-1 ]
<b>SEND</b>	0x55	FID		Len	1	Checksum	Data[0:Len-1 ]
<b>ACK</b>	0xA5	FID		0	1	Checksum	

Request Data From Target							
	Head(1byte)	FrameID(1byte)	PEC(1byte)	Control Byte(1byte)			Data(Data Lengthbyte)
				Data Length:bit7:4	Frame Type:bit3:1	Checksum Type: bit0	Data[0:Data Length-1 ]
<b>Request</b>	0x55	FID		Len	0	Checksum	Data[0:Len-1 ]=0xFF
<b>ACK</b>	0xA5	FID		0	0	Checksum	
<b>RSP</b>	0xA5	FID		Len	0	Checksum	Data[0:Len-1 ]