TMS LITE SDN. BHD. (Co. No. 671971V)
LED ILLUMINATION SOLUTION PARTNER

LC-18-OD-4CH-X2-48V

Lighting Controller Unit

(Overdrive)

USER MANUAL

Table of Contents

Revision Notes

Rev	Date/Author	Comment
1.0	July2020/KW	First Revision
1.1	Aug2020/KW	Update X2 Version
1.2	Aug2020/KW	Added Communication Protocol Documentation
1.3	Dec2020/KW	Minor Correction
1.4	Jan2022/KW	Minor Correction

General Description

The LC-18-OD-4CH-X2-48V controller provides high current short interval strobing for applications that require high intensity and high precision. The controller consists of 4 channels with individual settings for each channel. Only Strobe mode is available for this controller.

Specification

Parameter	Value
Controller Supply Voltage	48 VDC
Lighting Supply Voltage	48 VDC
No. of Channel	4
Channel Mode	Strobe mode only
Output Current	Maximum current per channel = 2A
Strobe Delay, Output Delay, Output Width	Adjustable 0 – 99.99ms (10us/step)
Strobe Width	Adjustable 0 – 10.00ms (10us/step)
Input Trigger Signal	3.3-24V, >5mA rising/falling edge trigger
Output Trigger Signal	Support rising/falling edge output trigger
Trigger Delay	≤ 25us
Software Control	RS232 / TCPIP

Connectors Description

Terminal	Function
VS (48V)	Controller Power Supply +
GND (0V)	Controller Power Supply –
COMM	Communication Port (between master and slave boards)
ADDR	4 Way DIP Switch (for slave address selection)

Terminal	Function
LIGHT INPUT +	Power Supply for Lighting + (48V)
LIGHT INPUT –	Power Supply for Lighting –
CH +	Lighting Channel Output +
CH –	Lighting Channel Output –

Terminal	Function
IN +	External Input +
IN –	External Input –
OUT +	External Output +
OUT –	External Output –

Operation Mode

Strobe Mode

Strobe mode provides short interval triggering for applications that require high intensity and high precision. An input trigger signal will turn on the lighting output based on pre-set delay and duration parameters.

There are 4 adjustable strobe parameters available:

Strobe Delay = Delay time between the external input signal and the lighting output
Strobe Width = Duration of the lighting's turn on time
Output Delay = Delay time between the external input signal and the external output signal
Output Width = Duration of the external output signal's turn on time

Parameter timings are in the range of 0-9999 which is equivalent to 0-99.99ms (in step of 10us)

** REMARK:
Strobe Width is fixed at 10ms maximum, adjustable in the range of 0-1000
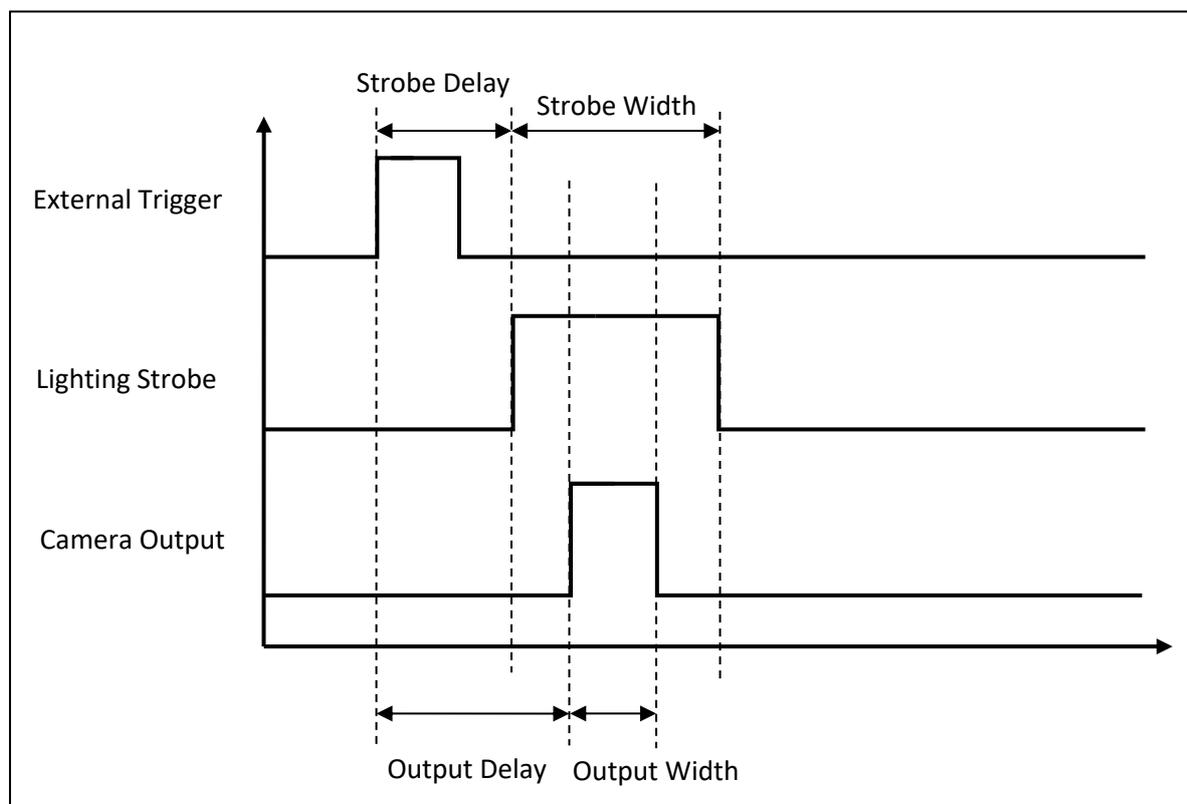
Current Multiplier

Current Multiplier setting provides more precise control of lighting intensity for lightings with different current ratings.

Ex:
Maximum current = 2000mA/2A
Current Multiplier setting range = 1-10
1 = 10% of max output current (200mA)
2 = 20% of max output current (400mA)
3 = 30% of max output current (600mA)
4 = 40% of max output current (800mA)
5 = 50% of max output current (1000mA)
6 = 60% of max output current (1200mA)
7 = 70% of max output current (1400mA)
8 = 80% of max output current (1600mA)
9 = 90% of max output current (1800mA)
10 = 100% of max output current (2000mA/2A)

For example: if the lighting's overdrive current rating is 520mA, current multiplier can be set to 3, setting the maximum output current to 600mA. So the lighting's intensity can be adjusted from low to high within the range of 0-255.

If multiplier is set too high, for example 10 (100% of max output = 2A), the adjustable intensity range for the lighting is only about 0-67. Setting the intensity value to 68 or higher will not have any effect towards the lighting output brightness.

Slave Board Address Setting

The address of the slave boards must be set manually before power on the controller by using the 4-way DIP switch.

Address value is calculated in binary code

Settable address number = 0-15

SWITCH NO.	0	1	2	3
BINARY VALUE	2^0	2^1	2^2	2^3
ADDRESS 0	0	0	0	0
ADDRESS 1	1	0	0	0
ADDRESS 2	0	1	0	0
ADDRESS 3	1	1	0	0
ADDRESS 4	0	0	1	0
ADDRESS 5	1	0	1	0
ADDRESS 6	0	1	1	0
ADDRESS 7	1	1	1	0
ADDRESS 8	0	0	0	1
ADDRESS 9	1	0	0	1
ADDRESS 10	0	1	0	1
ADDRESS 11	1	1	0	1
ADDRESS 12	0	0	1	1
ADDRESS 13	1	0	1	1
ADDRESS 14	0	1	1	1
ADDRESS 15	1	1	1	1

** REMARK:

Each slave board must have different address number, else the controller may malfunction

Communication Connection

All the COMM connector must be looped together for the communication between slave boards

All COMM1 and COMM2 must be looped together as shown below:

Input Signal

Input signal is used to turn on the lighting under Strobe/Trigger mode.

The lighting output is turned on after a delay time defined by Strobe Delay, while the turn on duration is defined by Strobe Width.

Acceptable voltage for external input signal is from 3.3-24VDC.

The external trigger signal can be configured as rising edge or falling edge trigger.
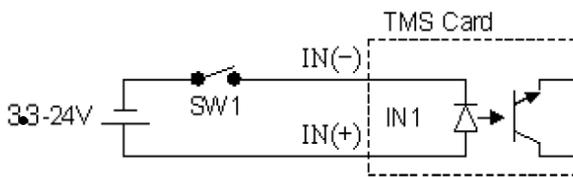
Output Signal

The output signal is optional and is used to trigger external devices such as smart camera. The output signal is only available in Strobe Mode.

The output pulse is triggered after a delay time defined by Output Delay, while the turn on duration is defined by Output Width.
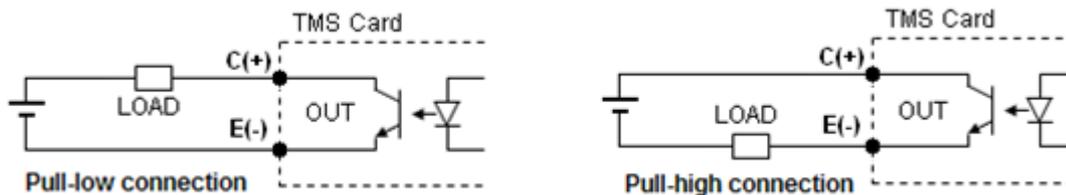
Drawing Dimension
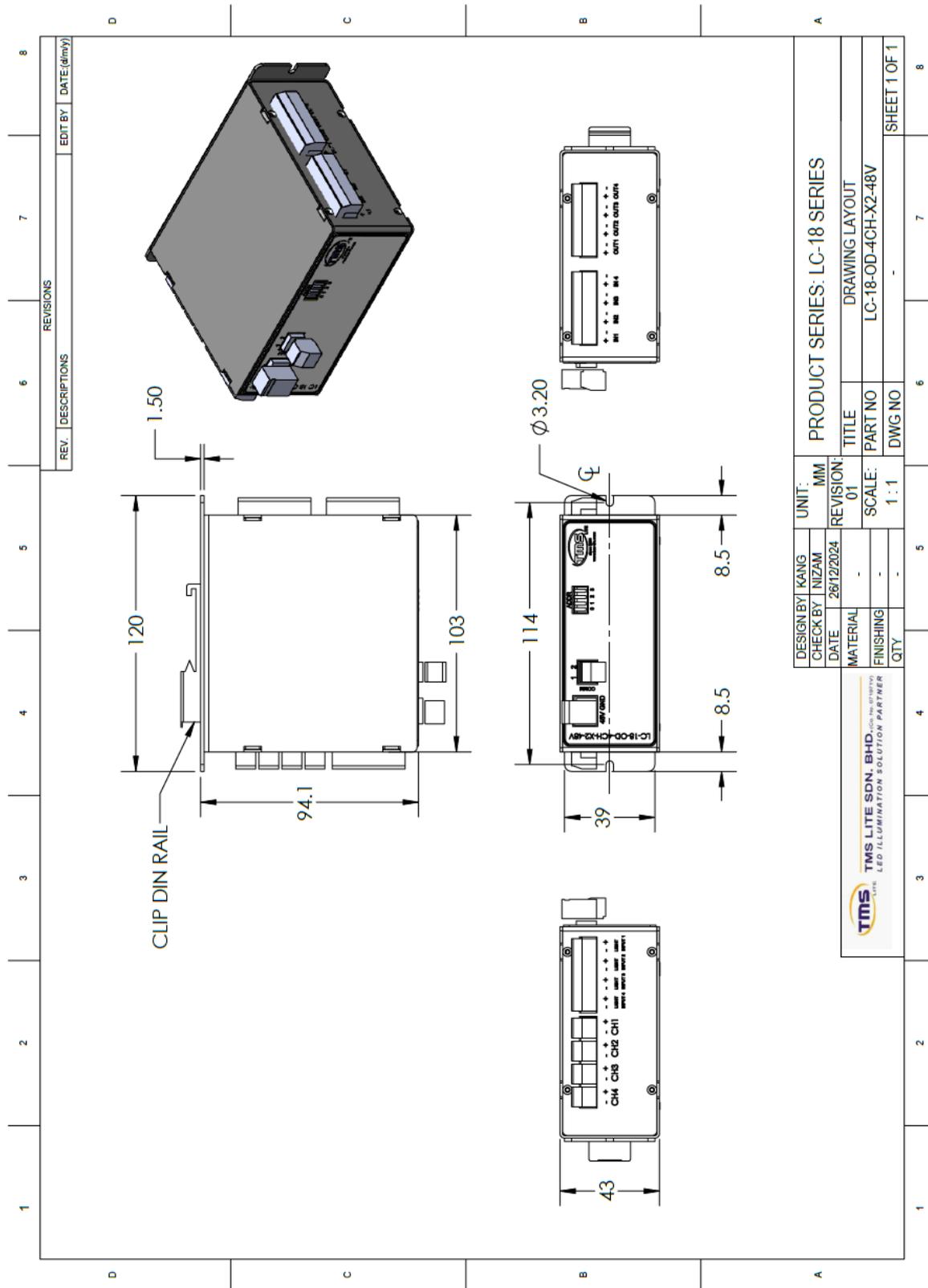
Communication Protocol

1. Communication Setting

COMPORT
Baud Rate = 115200
Data Bits = 8
Parity = None
Stop Bits = 1

TCPIP
Default IP: 192.168.0.100
Default Subnet Mask: 255.255.255.0
Default Gateway: 192.168.0.1

2. Master Command.

Message Format (ASCII)

Write

@	YY	{	ZZZZ	}
Starting Byte	Command Code	Open Bracket	Data	Close Bracket (End Byte)

Read

@	YY	{	}
Starting Byte	Command Code	Open Bracket	Close Bracket (End Byte)

Return Message

@	YY	{	ZZZZ	}
Starting Byte	Command Code	Open Bracket	Data	Close Bracket (End Byte)

2.1 Write to Master

Command List

Command Code (YY)	Command Description	Data	No. of Byte
MSI	Set IP Address	WWW.XXX.YYY.ZZZ	15
MSS	Set Subnet Mask	WWW.XXX.YYY.ZZZ	15
MSG	Set Gateway	WWW.XXX.YYY.ZZZ	15
MSU	Update IP	NONE	0

Send Update IP command after done setting IP/Submask/Gateway

**REMARK:
Do a power restart on the Master Unit for the new IP Address to come into effect

Example
Set IP Address = 192.168.0.123
Tx > @MSI{192.168.000.123}
Rx < @MSI{192.168.000.123}

Update IP on Master
Tx > @MSU{}
Rx < @MSU{}

2.2 Read from Master

Command Code (YY)	Command Description	Return	
		Data	No. of Byte
MRI	Read IP Address	WWW.XXX.YYY.ZZZ	15
MRS	Read Subnet Mask	WWW.XXX.YYY.ZZZ	15
MRG	Read Gateway	WWW.XXX.YYY.ZZZ	15
MRV	Read Firmware Version	WXYZ (W.X.Y.Z)	0

Example
Read IP Address = 192.168.0.123
Tx > @MRI{}
Rx < @MRI{192.168.000.123}

3. Slave Command

Message Format (ASCII)

Write

@	W	X	YY	{	ZZZZ	}
Starting Byte	Board Address	Channel No.	Command Code	Open Bracket	Data	Close Bracket (End Byte)

Read

@	W	X	YY	{		}
Starting Byte	Board Address	Channel No.	Command Code	Open Bracket	Close Bracket (End Byte)	

Return Message

@	W	X	YY	{	ZZZZ	}
Starting Byte	Board Address	Channel No.	Command Code	Open Bracket	Data	Close Bracket (End Byte)

Starting Byte
Symbol "@" is used as starting byte

Board Address
W = 0 ~ F (0-15)

Channel No.
Channel number
X = 1 ~ 4;

Data
Data is set inside a set of Bracket
Max data length = 4 digits

Refer table Command List for No. of byte of data for each command

4. Write to Slave

Command List

Command Code (YY)	Command Description	Data	No. of Byte
SM	Set Channel Mode	0 = Constant 1 = Strobe 2 = Trigger	1
SR	Set Current Multiplier	1-10	2
SI	Set Intensity	0 - 255	3
SD	Set Strobe Delay	0 – 9999 (99.99ms)	4
SW	Set Strobe Width	0 – 9999 (99.99ms)	4
SY	Set Output Delay	0 – 9999 (99.99ms)	4
SH	Set Output Width	0 – 9999 (99.99ms)	4
ST	Strobe	NONE	0
EE	Save EEPROM	NONE	0

**REMARK:
For Save EEPROM function, use any channel no. for x value, all channels' parameters will be saved

Return Message
Controller will send a return message same as the command sent to the controller to indicate successful sending.

If wrong command or data are sent, a message of {ERR} in the bracket will be returned.

5. Read from Slave

Command List

Command Code (YY)	Command Description	Return	
		Data (ZZZZ)	No. of Byte
RM	Read Channel Mode	0 = Constant 1 = Strobe 2 = Trigger	1
RR	Read Current Multiplier	1-10	2
RI	Read Intensity	0 – 255	3
RD	Read Strobe Delay	0 – 9999 (99.99ms)	4
RW	Read Strobe Width	0 – 9999 (99.99ms)	4
RY	Read Output Delay	0 – 9999 (99.99ms)	4
RH	Read Output Width	0 – 9999 (99.99ms)	4
RV	Read Version	WXYZ (W.X.Y.Z)	0

**REMARK:
For Read Version function, use any channel no. for x value

Example

Write

Board Address = 0

1) Set CH1 to constant mode
Tx > @01SM{0}
Rx < @01SM{0}   (Success)

2) Set CH1 to strobe mode
Tx > @01SM{1}
Rx < @01SM{1}   (Success)

3) Set CH1 Intensity = 90
Tx > @01SI{90}
Rx < @01SI{90}   (Success)

4) Set CH1 Strobe Width = 500 (5.00ms)
Tx > @01SW{500}
Rx < @01SW{500}   (Success)

5) Strobe CH1
Tx > @01ST{}
Rx < @01ST{}   (Success)

6) Save EEPROM parameter
Tx > @01EE{}
Rx < @01EE{}   (Success)

Board Address = 1

1) Set CH1 to constant mode
Tx > @11SM{0}
Rx < @11SM{0}   (Success)

2) Set CH2 Intensity =200
Tx > @12S2{200}
Rx < @12S2{200}   (Success)

3) Set CH1 Strobe Width = 1000 (10.00ms)
Tx > @11SW{1000}
Rx < @11SW{1000} (Success)

Read

1) Read CH1 mode = Constant
Tx > @01RM{}
Rx < @01RM{0}   (Success)

2) Read CH1 Current Multiplier = 2
Tx > @01RR{}
Rx < @01RR{02}   (Success)

4) Read CH1 Intensity = 150
Tx > @01RI{}
Rx < @01RI{150}   (Success)

5) Read CH2 Strobe Delay = 500 (5.00ms)
Tx > @02RD{}
Rx < @02RD{0500} (Success)

6) Read CH2 Strobe Width = 2000 (20.00ms)
Tx > @02RW{}
Rx < @02RW{2000} (Success)

7) Read Board Version
Tx > @01RV{}
Rx < @01RV{1000} (Success)

Wrong Command or Data Sending

Tx > @01SI{500}
Rx < @01SI{ERR}

Tx > @08SC{3}
Rx < @08SC{ERR}

Tx > @1SH{1}
Rx < @1SH{ ERR }

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