



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



LC-18-1CH-X10

LC-18-2CH-X5

High Current Series Lighting Controller Unit

USER MANUAL

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Revision Notes

Rev	Date/Author	Comment
1.0	Sept2020/KW	First Revision
1.1	Dec2020/KW	Minor Correction

General Description

The LC-18-1CH-X10 / LC-18-2CH-X5 high current controller provides intensity control of high current LED lightings for machine vision applications. The controller consists of 1 / 2 channels with individual settings for each channel. There are 3 modes of operation provided to support different types of application.

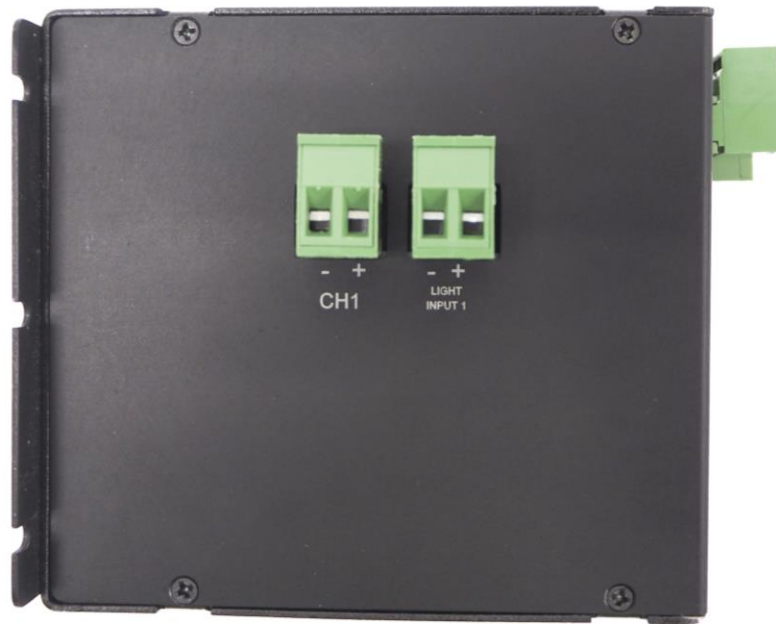
Specification

Parameter	Value	
Controller Supply Voltage	24 VDC	
Lighting Supply Voltage	5/12/24/48 VDC (According to Lighting Voltage Rating)	
No. of Channel	LC-18-1CH-X10	1 Channel
	LC-18-2CH-X5	2 Channels
Channel Mode	Constant, Strobe, Trigger	
Output Current	Maximum current per channel	
	LC-18-1CH-X10	10A
	LC-18-2CH-X5	5A
Strobe Delay, Strobe Width, Output Delay, Output Width	Adjustable 0 – 99.99ms (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	

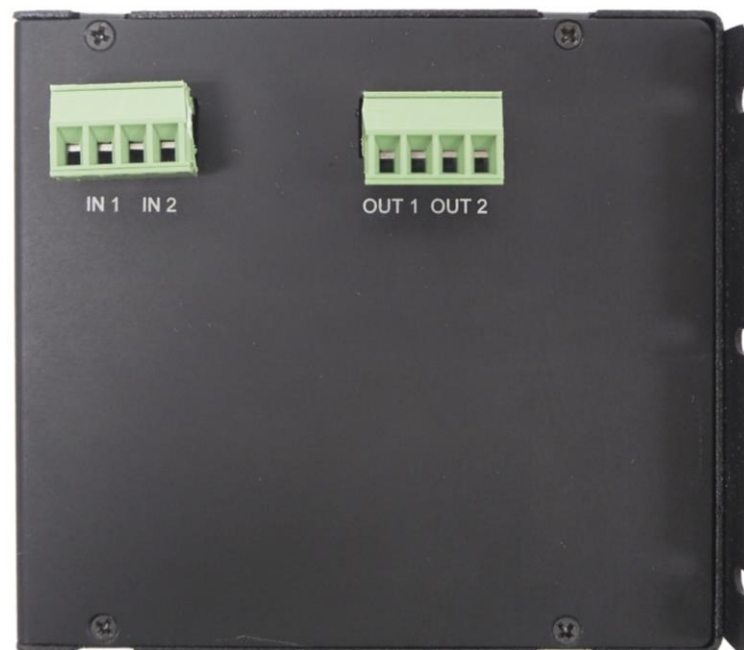
Connectors Description



Terminal	Function
VS (24V)	Controller Power Supply +
GND (0V)	Controller Power Supply –
COMM	Communication Port (between master and slave boards)
RS232	RS232 Communication
TCPIP	TCPIP Communication
ADDR	4 Way DIP Switch (for slave address selection)



Terminal	Function
LIGHT INPUT +	Power Supply for Lighting +
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

Constant Mode

Constant mode offers continuous lighting intensity control. Lighting intensity is controlled using constant current technique. Brightness can be adjusted from fully off to fully on in the range of 0 – 255.

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:

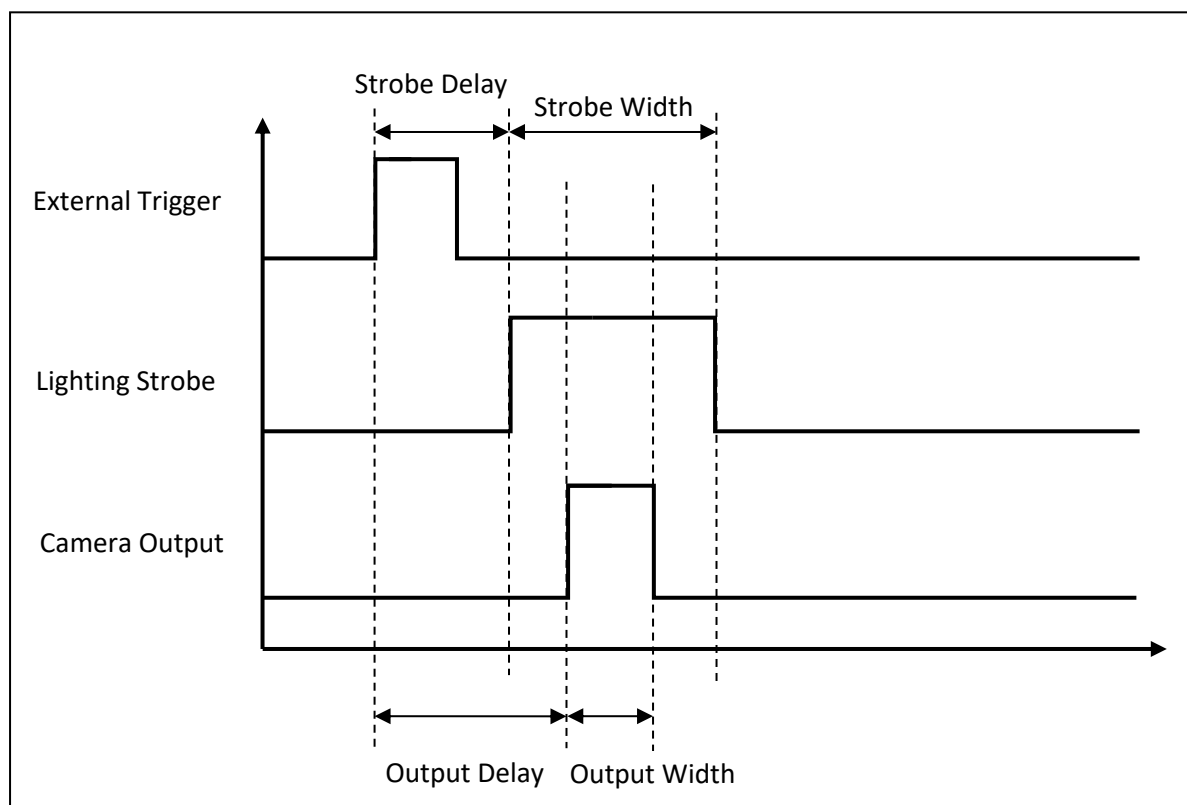
Strobe Delay = Delay time between the external input signal and the lighting output

Strobe Width = Duration of the lighting's turn on time

Output Delay = Delay time between the external input signal and the external output signal

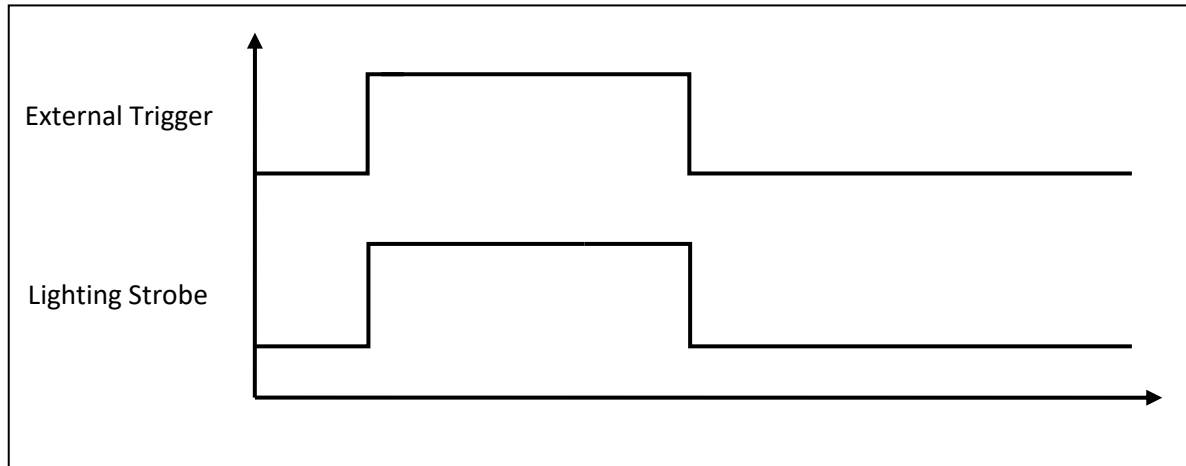
Output Width = Duration of the external output signal's turn on time

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



Trigger Mode

Trigger mode provides most flexibility for variable timing light output. The light output ON when input trigger signal received and OFF when no input signal.



Current Multiplier

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

Ex:

Maximum Current = 5A

Current Multiplier setting range = 1-10

1 = 10% of max output current (500mA)

2 = 20% of max output current (1000mA)

3 = 30% of max output current (1500mA)

4 = 40% of max output current (2000mA)

5 = 50% of max output current (2500mA)

6 = 60% of max output current (3000mA)

7 = 70% of max output current (3500mA)

8 = 80% of max output current (4000mA)

9 = 90% of max output current (4500mA)

10 = 100% of max output current (5000mA/5A)

For example: if the lighting's current rating is 1450mA, current multiplier can be set to 3, setting the maximum output current to 1500mA. 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 = 5A), the adjustable intensity range for the lighting is only about 0-74. Setting the intensity value to 75 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:



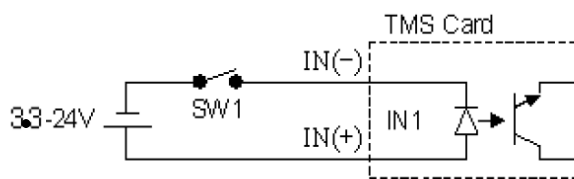
Input Signal

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.

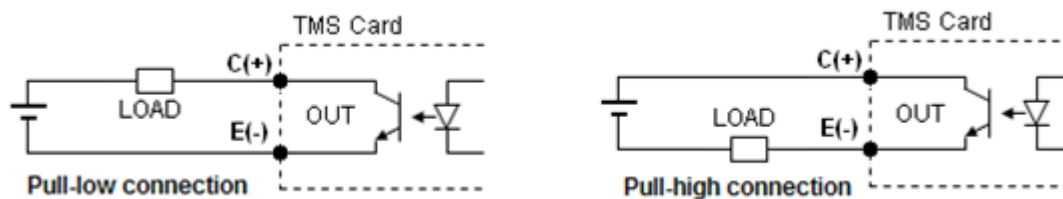
The external trigger signal can be configured as rising edge or falling edge trigger.



Output Signal

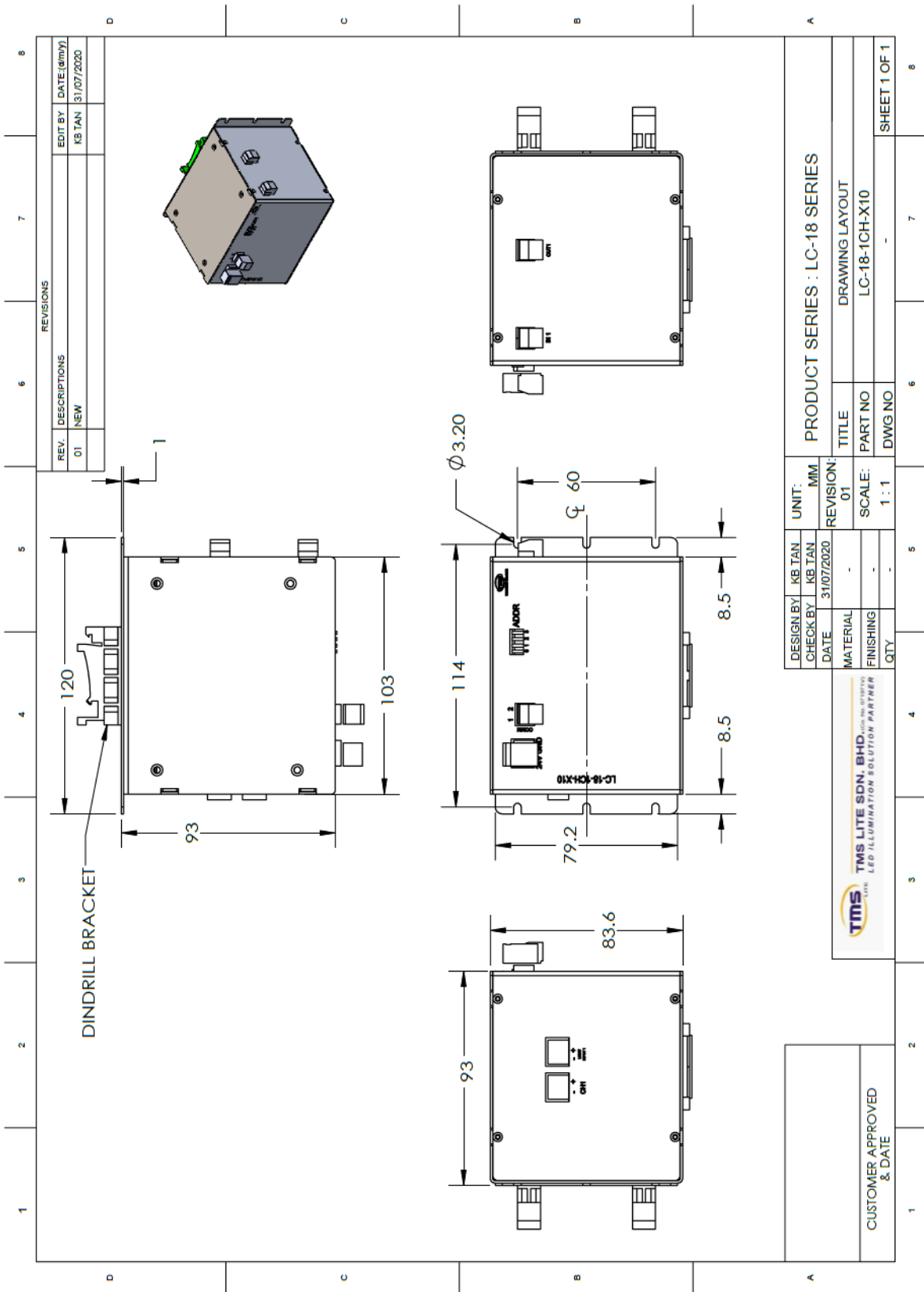
The output signal is optional and is used to trigger external devices such as smart camera. The output signal is only available in Strobe Mode.

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

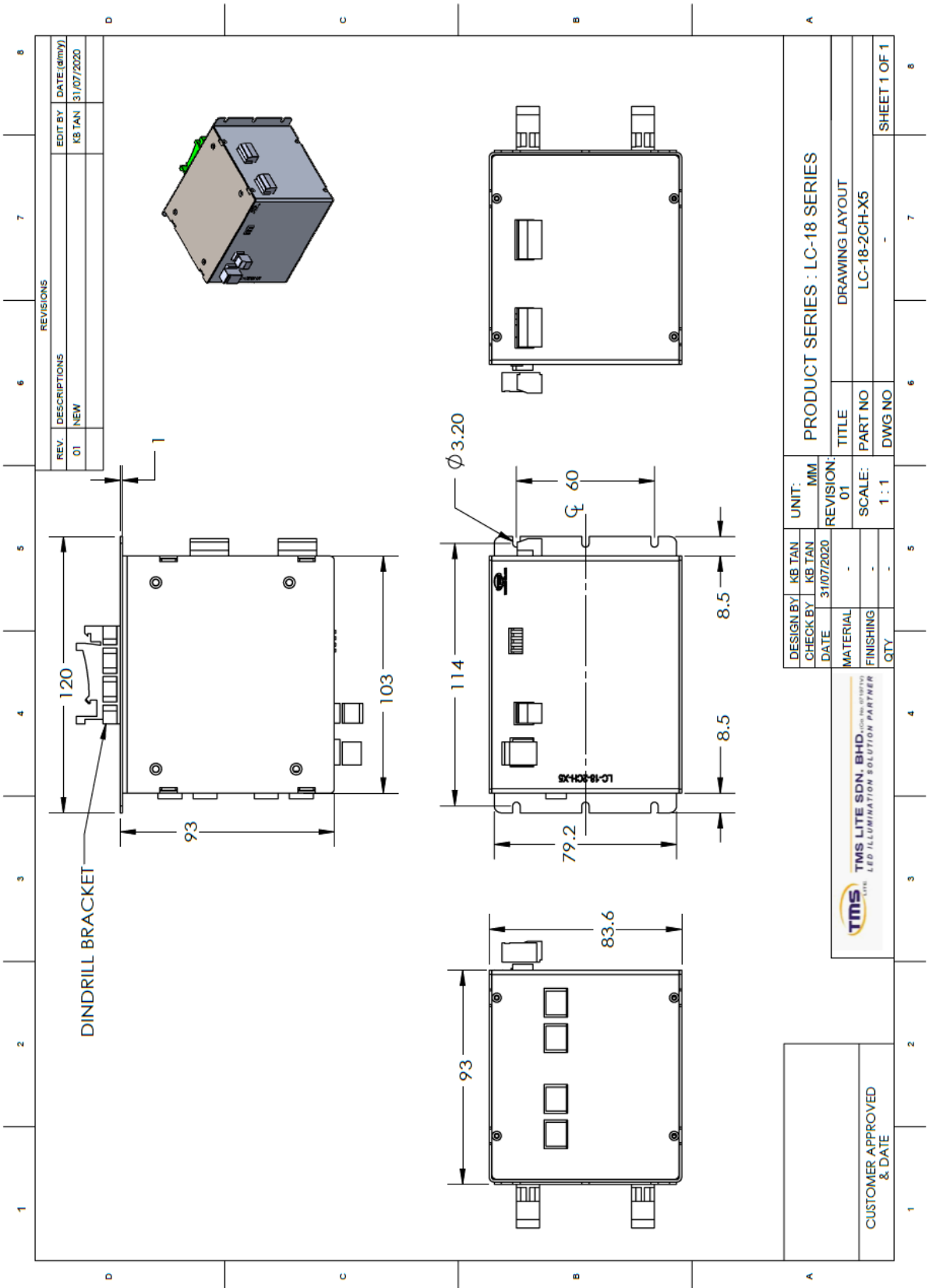


Drawing Dimension

LC-18-1CH-X10



LC-18-2CH-X5



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 (YY)	Code	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 SlaveCommand 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 SlaveCommand 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

ExampleWrite

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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