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LED Lighting

LightBar SERIES MODULE

Installation Application Note

Part No: ECM-Txx

Version: 072303-1

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Brief Note

The objective of this Application Note is to provide one with technical resources necessary to set up the ECM series light bar module in a variety of applications, such as cove lighting, retail, architectural illumination, casino, PUB, a well as many other LED lighting designs. The LED light bar module is a linear array of LEDs mounted on a measure-and-cut printed circuit board (PCB). Its versatility and flexibility can provide customers to meet a wide range of indoor and outdoor lighting configurations. The LED light module offers a low-voltage, new alternative to skillful installation and replacement, yet significantly reduces energy. In these cases, the ECM light bar module may be easily assembled by the customer. We hereby provides you an instruction of how to choose an appropriate power supply, how to set up an electrical connection in either parallel or serial, and the technical requirements of using light bar module, and accessories.

Structural Work

Structural systems are made of a variety of materials that have very different coefficients of thermal expansion and, especially when the LED lighting is mounted as a system, all of the light builders should manage this expansion/contraction phenomena and work collaboratively between the lighting system and the structural materials. The failure in the LED lighting would be most apparent of all of the structural materials, such as losing end caps, very wide dark spots, etc. So, all of the light builders should allow at least one inch (1”) while structuring the tube system. By following all the light builders at different ambient temperatures, the total system is allowed to operate together as a unit and the LED lighting provides the maximum possible line of illuminated light.

General Information before Installation

The semiconductor light source, though the LED technology offers many benefits, has different technical values from conventional incandescent or halogen light source. For customers planning to set up the LED technology to various applications, this Installation Application Note will assist in completing the unique LED light characteristics.

- First of all, read this Installation Application Note carefully before setup.
- Be aware of whether the input voltage requirement is at DC24V or DC12V.
- Make a site plan to understand where and what is the total volume of the product will be used.
- Do not place the heavy shock or stress on the module.
- Always protect the unpacked light bar from the weather.

ECM Light Bar Specification

Dimension

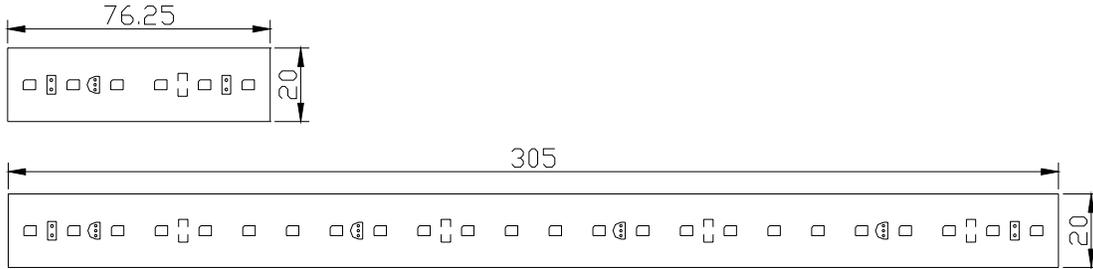
Part Number	Dimension (LXW)	LED Color	LED No.
ECM-S24 (30520) Series	305 X 20 mm	R/Y/B/G/W	24
ECM-S24 (30510) Series	305 X10 mm	R/Y/B/G/W	24
ECM-S06 (07620) Series	76 X 20 mm	R/Y/B/G/W	6
ECM-S06 (07610) Series	76 X 10 mm	R/Y/B/G/W	6
ECM-S48M3 Series	305 X 35 mm	R.G.B.	48
ECM-S96 Series	1200 X 25mm	R/Y/B/G/W	96
ECM-308	409 X 8.5mm	R/Y/B/G/W	

Mechanical Characteristics

Unit: mm

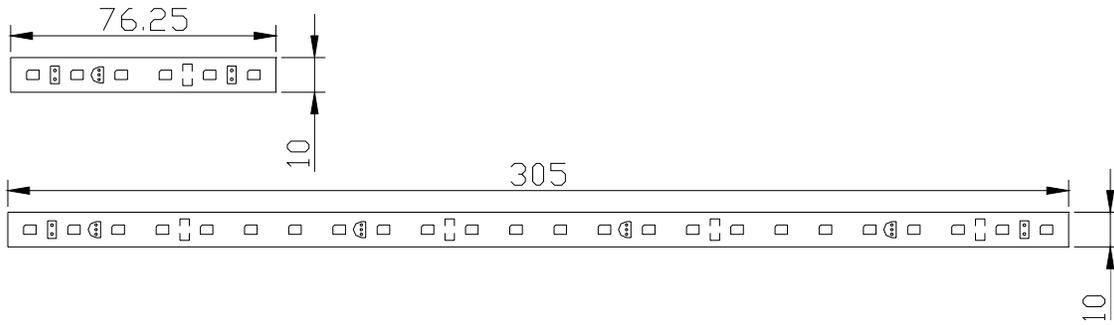
S06-76.25 * 20

S24-305 * 20

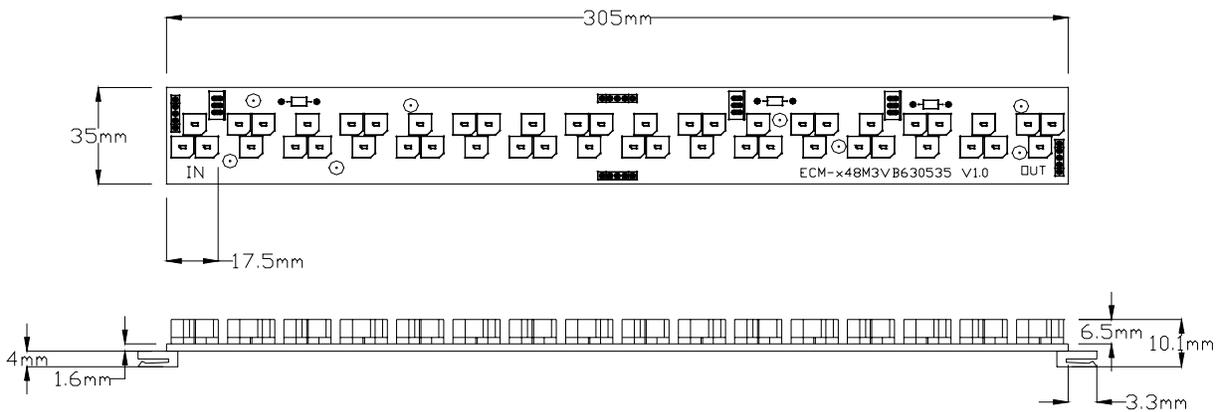


S06-76.25 * 10

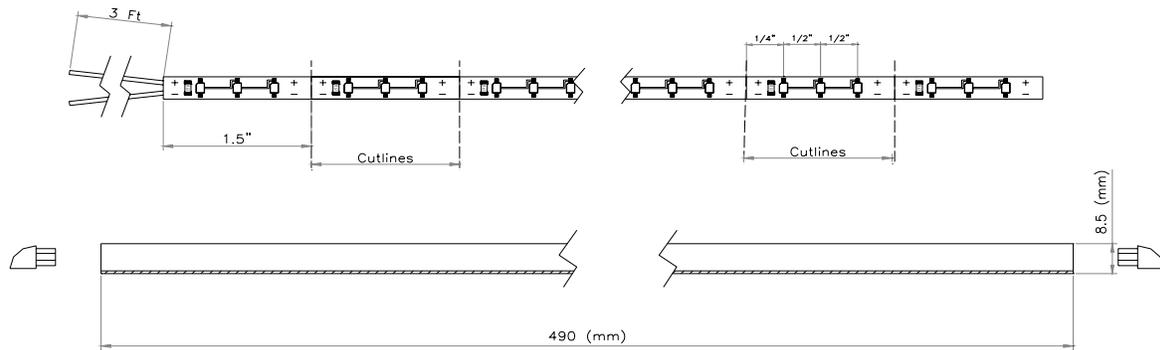
S24-305 * 10



S48 - 305 * 35



ECM-308



Electrical Characteristics

The section will highlight the parameters of electrical design so that you can connect to an appropriate power supply.

Figure 1.

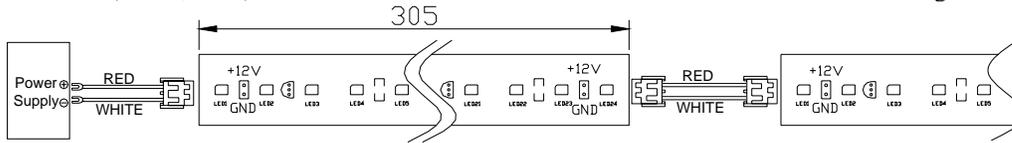
Model No.	Working Voltage (typ.)	Working Current (max.)		
		Red/Yellow	Blue/Green/White	R.G.B.
ECM-S24 (30520)	12VDC	320mA	360mA	-
ECM-S24 (30510)	12VDC	320mA	360mA	-
ECM-S06 (7620)	12VDC	80mA	90mA	-
ECM-S06 (7610)	12VDC	80mA	90mA	-
ECM-S48 (30535)	24VDC	-	-	320mA
ECM-S96 (120025)	12VDC	320mA*4	360mA*4	-
ECM-308	12VDC	-	120mA	-

Light Bar Connection Requirements

There is a connection wire to be used to interlock the adjacent light bar modules. Make sure the wire has the same orientation, i.e. Red wire to anode (+) and White wire to cathode (-) of the adjacent board. (Figure 2.)

ECM-S24 (30520; 7620)

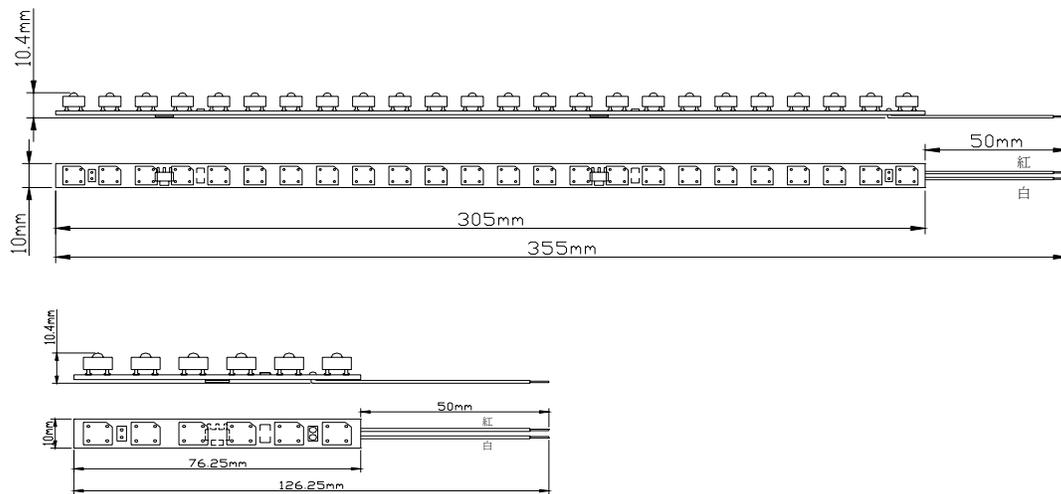
Figure 2.



When interlocking the 20mm wide light bar module, measure how many pieces of the product you will use and make sure the light bar is securely connected. In general, one ECM-S96 is a 1.2meter white linear light tube in which there are four pieces of ECM-S24 light bars interlocked.

ECM-S24 (30510; 7610)

Figure 3.

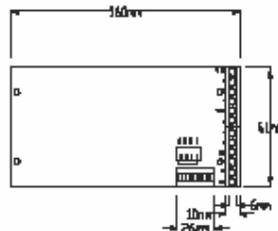


Limited to the 10mm PCB width, two wires are available to allow soldering to the adjacent board. Additional 3M butt connector, model 1410, can also be applied to a filled cable with wire gauges 24AWG. The 3M butt connector is filled with a sealant to provide moisture resistance. It provides a quick and reliable splice to a dependable electrical connection.

The appendix shows simple connection of ECM-S48 R.G.B. light bar module to the R.G.B. controller for a small lighting application.

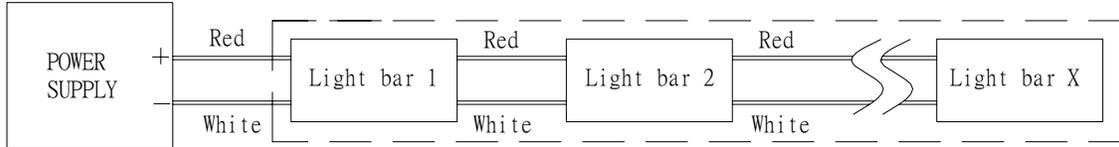
(Under construction)

DMX-303 Decoder

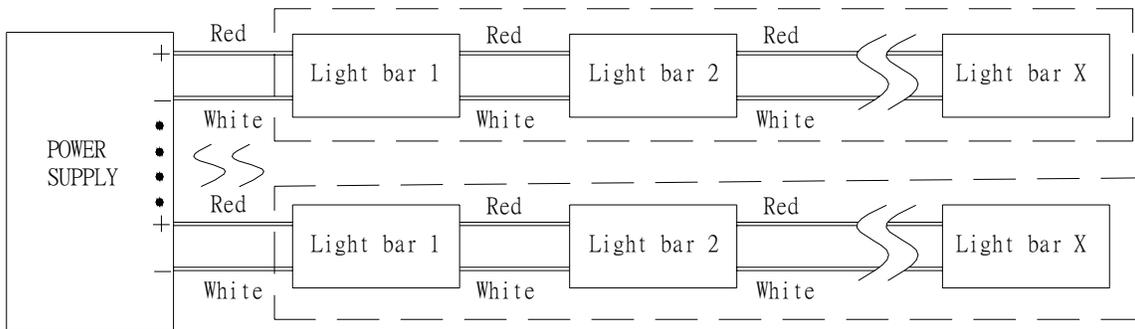


Serial & Parallel Connection Definition

In serial string



In parallel string



LED Quantity in Series Connection

To assess how many pieces of light bar module can be string connected in serial port, we tested and summarized the typical and maximum quantity on the light bar connection to share current with one parallel port of power supply. Remember the light bar connector itself must not exceed 3A of current. (Refer to Figure 4).

Figure 4.

Module No.	Quantity per Serial String (PCS)	
	Typ.	Max.
ECM-S24 (30520)	4	6
ECM-S24 (30510)	4	6
ECM-S06 (7620)	16	24
ECM-S06 (7610)	16	24
ECM-S48 (30535)	6	8
ECM-308	6	8

Power Setup Precaution

Installation power supplies at different locations is a realistic problem for many LED applications. Here is to illustrate the setup precautions.

- Mount the power supply to a wall or stud in a dry location inside a building or inside a dry location rated raceway.
- Make sure whether the power supply is for AC input or DC input; and is aware of the input range.
- Remove cover of the power supply and carefully remove knockout for the AC line input wires.

- Route the wires from the power supply and protect them from any mechanical damage.
- Keep a proper distance between each power supply when multiple power supplies operate together, and the environment in good air convection. Add cooling fans if necessary.
- The power supply must be **OFF** while installing LED light bar

Power Consumption Definition

LEDs are current dependant devices. As such, current limiting devices are required in each power supply setting. For customers not familiar with LED connection, this section will assist in figuring out an appropriate power supply by which the light bar can be driven.

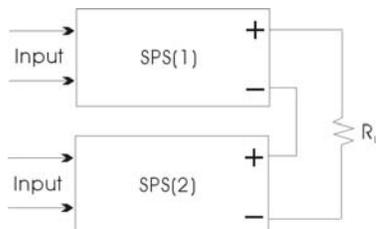
The simplest calculation is to define the required power supply with the following equation.

$$Power\ Wattage = Voltage * Current$$

A required power wattage is the light bar voltage (DC12V) multiplied by the forward current through the total light bars. If the application, for example, requires total 10Amp of forward current, you will need minimum 120 wattage of power output. (=12*10) Bear in mind, there is a linear relationship between the forward current and the forward voltage. For serial strings of light bars, the fewer the LEDs in the string the better the current control. Consequently, this means an increase of power consumption, and ensuing heat generation of the resistor. Without proper heat sinking or thermal devices, the efficiency of the lighting would suffer.

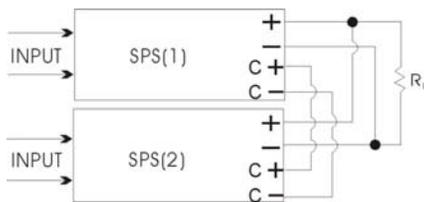
Power Supply Serial & Parallel Definition

In serial port

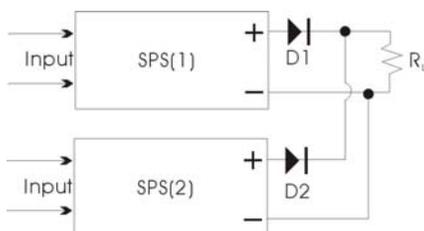


In parallel port

Option A: To parallel modes with current share function.
(Caution: The voltage difference should not exceed 0.2V)



Option B: To parallel modes without current share function.



Power Connection Requirement

In general DC operation is the most simple and efficient way of driving LEDs. When operating a LED device, the current to a serial string of the light bar should be no more than **1.5Amp** from a parallel port of power supply. The current value is dependent on the wire connector current rating.

Application Example

To ensure a thorough understanding on this Application Note, here illustrates an example of a LED construction in 100-meter, or 100,000mm. Said, if the customer wants to design his project by using red LED in a string configuration, here is the summary of products required and the connection layout.

LED Project - 100-meter:

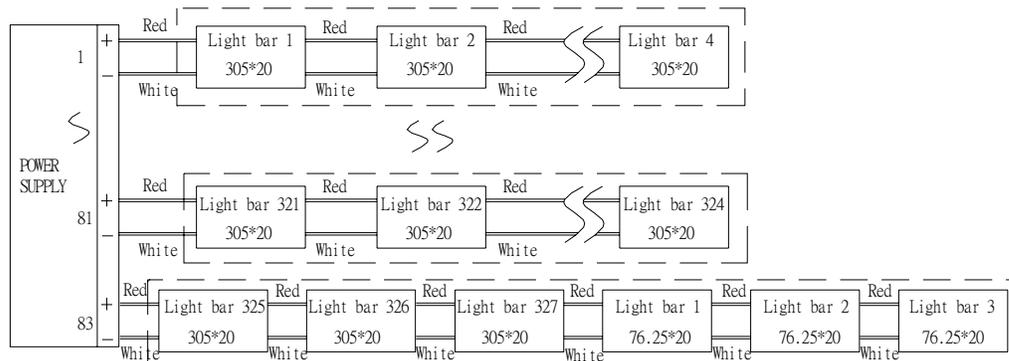
Light Source	Item Requirement	Model	Dim. & Spec.	Quantity
Option A	Light Bar Module	ECM-S24 (30520)	305X20mm	327PCS
		ECM-S06 (7620)	76X20mm	3PCS
	Connecting Wire	W2502A1-05	50mm	330PCS
	Y-Jack Wire	W2502B2-12	100mm	83PCS
	Power Consumption		DC12V, 1260Watt Power Parallel Port * 83	-

All the light bars operate at DC12V input voltage. As shown in Figure 1, the current of red/yellow ECM-S24 (30520) requires 320mA and blue/green/white ECM-S24 (30520) 360mA. As a matter, the serial string current of red/yellow is typ. 1.28A (=0.32*4) and blue/green/white is typ. 1.44A (=0.36*4) Driving 327PCS of ECM-S24 and 3PCS of ECM-T06 would require minimum 105A, i.e. 1260 watts of power. To drive a serial string, remember a parallel port of power consumption must not exceed 1.5A as mentioned and also the quantity of serial string is outlined in Figure 1. Refer to the connection layout. The max. 83 power ports are required to share the power current. (=327/4 + 1)

Light Source	Item Requirement	Model	Dim.	Quantity
Option B	Light Tube	ECM-S96 (120025)	1200X25mm	83PCS
	Y-Jack Wire	W2502B2-12	100mm	83PCS
	Power Consumption		DC12V, 1275Watt Power Parallel Port * 83	-

Another option is to use the ECM-S96 light tube as a lighting construction. The current parameter is also detailed in Figure 1. The required power port to share current is 83 here.

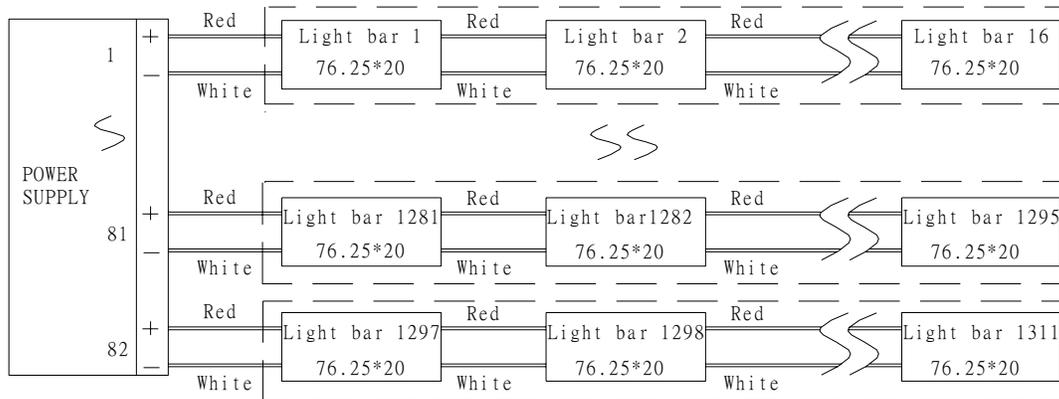
Connection Layout:



Light Source	Item Requirement	Model	Dim. & Spec.	Quantity
Option C	Light Bar Module	ECM-S06 (7620)	76.25X20mm	1311PCS
	Connecting Wire	W2502A1-05	50mm	1311PCS
	Y-Jack Wire	W2502B2-12	100mm	82PCS
	Power Consumption		DC12V, 1260Watt Power Parallel Model * 82	-

All the light bars operate at DC12V input voltage. As shown in Figure 1, the current of red/yellow ECM-S06 (7620) requires 80mA and blue/green/white ECM-S06 (7620) 90mA. As a matter, the serial string current of red/yellow is typ. 0.32A (=0.08*4) and blue/green/white is typ. 0.36A (=0.09*4) Driving 1311PCS of ECM-S06 would require minimum 105A, i.e. 1260 watts of power. To drive a serial string, remember a parallel port of power consumption must not exceed 1.5A as mentioned and also the quantity of serial string is outlined in Figure 1. So total 82 ports are required to share the power current. (=1311/16)

Connection Layout:



Testing

To insure proper electrical connections, light up testing on one serial string should be engaged before the final assembly. More LED serial strings can be attached to the specific power port that conducts the shared current.

Accessory Specification

If necessary, we provide light bar connection wires and mounting accessories with the following specification. (Figure 5)

Figure 5

Model No.	Item Description	Dim.
W2502A4-05	S24 Lightbar Connection Wire	Pitch 2.5mmx2pin (L)50mm Red-White wire
W2505B1-05	S48 Lightbar Connection Wire	Pitch 2.5mmx5pin (L) 50mm Red-Red-Green-Blue-Black wire
W2505B5-50	Interlocking Decoder DX303 & Lightbar S48 Connection Wire	Pitch 2.5mmx5pin (L) 500mm R-R-G-B-B wire
W2505B5-90	Interlocking Decoder DX303 & Lightbar S48 Connection Wire	Pitch 2.5mmx5pin (L) 900mm R-R-G-B-B wire
W2503B6-150	Signal Wire from Decoder DX303 to Controller DMX103	2.5mmx3pin (L) 1500mm R-B-G wire
W2503B7-50	Signal Wire from Controller DMX103 to Decoder DX303	2.5mmx3pin (L) 500mm R-B-G wire
AC1210	Saddle Tie Mount	7(H)x15(L)x10(W)mm Mounting hole dia. 3mm
AC1410	3M 24AWG Butt Connector	Insulator dia. 1.52mm

Company Information~

Service Support

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