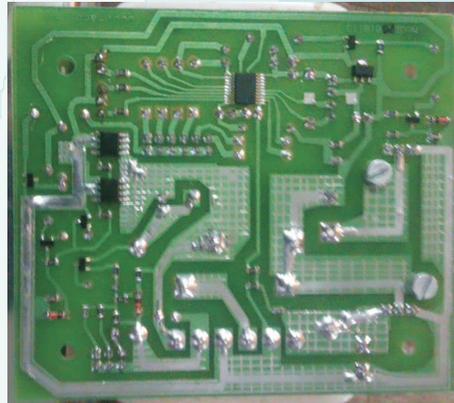
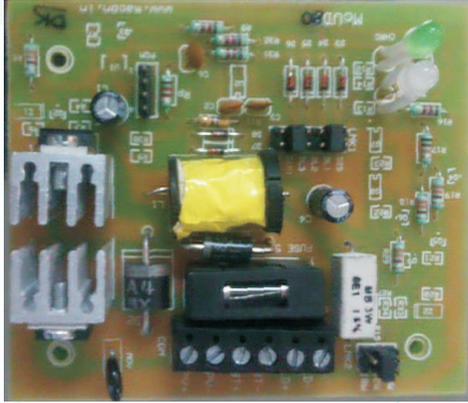


PROPRIETARY DESIGN



AN ISO 9001-2008 CERTIFIED COMPANY

McUD80 MICROCONTROLLER BASED Solar Dusk To Dawn PWM Charge Controller with Built-in Multi load LED Driver and Programmable Auto Dimming / Shut-down after programmable Delay

McUD80 is a controller designed with the latest state-of-art microcontroller based technology for providing highly accurate, easy and economical solution to the OEMs making Solar LED street lights. It is unique to be able to drive any load right from 6W to 18W with simple links provided. If you have different types of solar street lights requirement like 6W, 9W, 12W or 18W, the same controller can be used by simple link provided on board. Also, it can be configured by OEM to make it operate in any of the options-

1. Plain dusk to dawn operation with constant illumination throughout the night.
2. Selectable automatic switch over to dimming mode after programmable (factory set) delay timings of 4 hours, 5 hours or 6 hours
3. Selectable automatic shut down after programmable (factory set) delay timings of 4 hours, 5 hours or 6 hours
4. Selectable dimming percentage programmable (factory set) to 50% or 25% of full illumination after the selected delay time.

Any other delay or dimming can be set as per user needs subject to MOQ.

Since the single kit can be used for normal dusk to dawn operation or with delayed off or with delayed dimming to drive not only one type of load but 4 different ones, you save on the inventory. It is truly universal kit of its kind available.

The controller comes with built-in LED driver in smps mode to save power and give constant illumination over entire operating range of a 12V battery. The current limit is selectable on board anywhere upto 2.10A in 4 different steps to drive upto 18W of power LEDs in fixture. No need to have any LED driver separately! The dusk to dawn operation is done by charge controller which has full protections against over charge, deep discharge, reverse polarity, over load/short circuit at output and reverse current passage from battery to panel during night. On board replaceable glass fuse is provided on the kit. Kit comes in modular version with connector on pcb to make direct connections to panel, battery and LEDs in fixture.

Multifunction LED indicators are provided on board to indicate various statuses of battery and panel.

The controller can be fitted inside the Aluminium/Polycarbonate housings by any technician simply by making connections to the terminals provided on the board.

Salient Specifications:

SYSTEM: 12V Nominal
 CAPACITY: Panel 80 Wp Max, Load 2.1Amax smps for led load
 REGULATION: LOW LOSS, SHUNT TYPE
 OVD: Output Voltage Drop < 200 mV at 2.1A load
 IVD: Input Voltage Drop < 330mV at 5 A charge
 LVD: Low Voltage Disconnect, 10.8V
 HVD: High Voltage Disconnect, 14.2 V
 LVR: Low Voltage Reconnect, 12.5 V
 HVR: High Voltage Reconnect, 14.15V
 (Battery Charging is PWM type by default)
HVP: Battery high voltage protection. If battery voltage > 15V, Load is disconnected, charging control disabled

PROTECTIONS: Short circuit and overload at load
 Reverse polarity of Battery and Panel
 Reverse current flow from battery to panel
 Lightening protection in panel circuit
 HVP

ON BOARD FUSE: 5A, glass type. To protect from over size panel and reverse connections of battery

APPLICATION: IN - FIXTURE USE ONLY.

AMBIENCE: Operating Temp 0 to 50 Deg C, 90% RH

DIMENSIONS: 92 L x 80 W x 30 H (all dim in mm)

Indicators and Controls:

CHARGING: **Green LED**. Turns on when panel voltage is more than 12V to indicate positive charging, It starts flickering when battery is charged and goes in PWM mode of absorption.

BAT STATUS : **BICOLOUR LED**.

1. Turns Red when battery reaches LVD and disconnects the load. (**BAT LOW**)
 2. RED turns on and off if battery voltage is between 11V and 12.5 V. (**BAT RESERVE**)
 2. Turns Green when battery is **HEALTHY** (between 12.5V and 14.2V)
 3. Alternates **Red** and **Green** when battery > 15V. Load is disconnected. Charging is disabled.
- Dusk to Dawn operation: Load turns on at dusk and shuts down at dawn automatically.

6-WAY TERMINAL "CON": On board connector marked PV+, PV-, BT+, BT-, LD+ and LD- to make connections to respective inputs and outputs.

Note: LD+ and LD- are load terminals which here are to be connected to power LED cluster in fixture directly. The output is SMPS suitable to drive with constant current upto 2.1 Amax drive irrespective of battery voltage between HVD and LVD thereby maintaining the constant illumination from fixture. The LED drive current is set to desired value as per requirement with links provided on kit.

USER ACCESSIBLE SETTINGS:

6WAY 2PIN "LNK1": Short D2D for normal dusk to dawn operation. Short DL1 (6 hours delay), DL2 (5 hours delay), DL3 (4 hours delay).

Short DIM1 (50% light), DIM2 (25% light) or **unique profile (see next page)**.

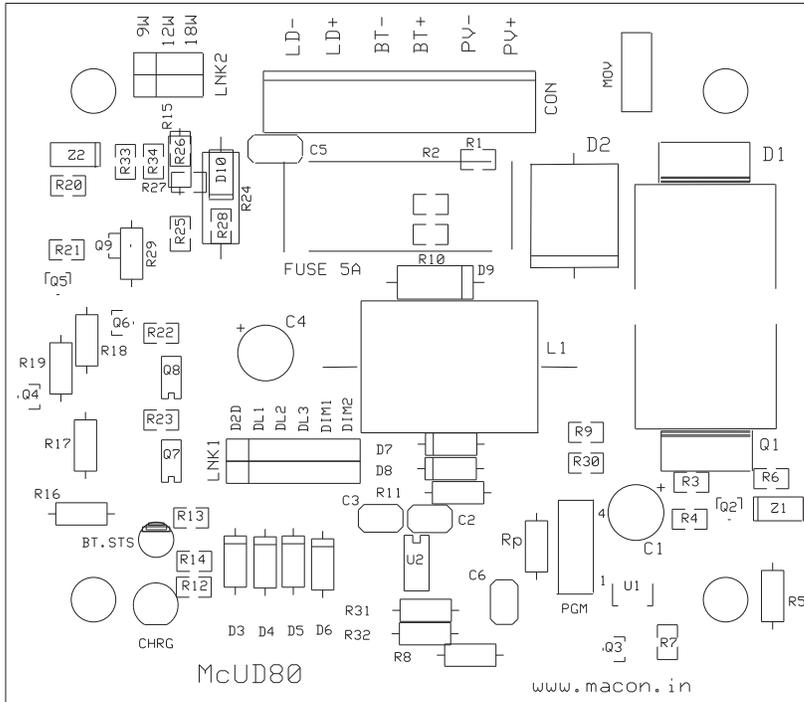
3-WAY 2-PIN "LNK2": 6W operation when no link used. For 9/12/18W operation, use respective link. Short links are provided with every controller.

Please refer to operating instructions for setting desired operation.

OPERATING INSTRUCTIONS: McUD80



IMPORTANT: READ THESE INSTRUCTIONS BEFORE USE.



1. A 6-way connector 'CON' is meant to make connections to Load (LD+ and LD-), Battery (BT+ and BT-) and Panel (PV+ and PV-). Load should be normally parallel combination of 3-LED series links as per desired wattage. Battery should be of 12V nominal voltage. Panel should be 12V nominal upto 80Wp. Ensure that panel current under STC should be not more than C/10 of battery.
2. On board glass fuse should not be changed to any other value than factory default.
3. This kit can be used for 6W/9W/12W/18W load (i.e. 2 /3/4 or 6 links of 3-LED series).
4. 'LNK2' is meant to select the load as marked on it. By default, when no short link is used, it works as 6W driver. When link is placed on 9W, load current is set to the said wattage. Similarly for other wattages mentioned. Ensure proper link as per the load. Only one of the 3 links should be used.
5. 'LNK1' is another set of links for selection of different mode of operation.
'D2D' link is used for normal dusk to dawn operation of the load with the constant illumination of full load. No other links are to be used for this operation.
'DL1' is used to switch of load after 6 hours.
'DL2' is used to switch of load after 5 hours.
'DL3' is used to switch of load after 4 hours.
When DL1, DL2 or DL3 is used, D2D is open.
DL1, DL2, DL3 can be used in conjunction with other any one of two links marked 'DIM1' or 'DIM2'.

While any one of DL1/DL2/DL3 are used, either 'DIM1' or 'DIM2' can be used to have dimming of the load instead of totally switching off the load after respective delay times. 'DIM1' results in 50% intensity after delay while 'DIM2' will give 25% of full intensity /or a unique profile (see next page). Thus, for example, if you use 'DL2' link and 'DIM1' link, the load will be 50% after 5 hours. Notice that two links are needed for dimming operation, while for switching off the load after desired delay, dimming links are not to be used at all. Also, note D2D link is not used when delay operation is used.

Delay timings and dimmings are factory set as mentioned above. These can be programmed to any other values only at our end and you cannot alter these preset values.

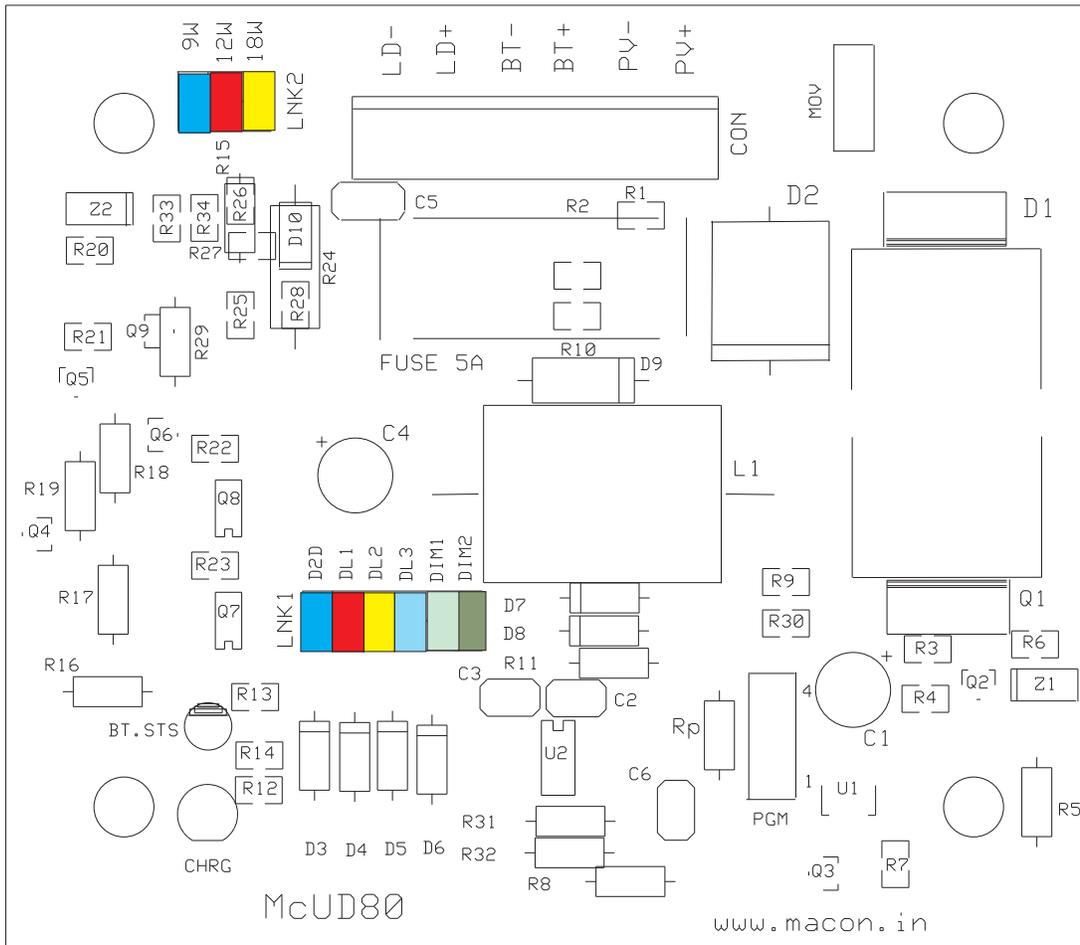
To check the actual light intensity after delay timings set by you, you need not wait for the actual delays selected. Connect the battery and proper load as per load setting link. With all other links in 'LNK1' open, simply use the link for 'DIM1' or 'DIM2'. You will see the resulted intensity (which will happen after actual delay).

GENERAL PRECAUTIONS:

Utmost care is taken while designing the kit with view to having full protections against commonly encountered eventualities. You should, however, give proper attention to the following points.

1. Always connect battery first with proper polarity. (If battery is connected in reverse direction, the on-board fuse will blow). The 'BT.STS' LED should turn green which indicates battery is in healthy state (>12.5V). When making connections for the first time, load will not be on unless, BT.STS is Green.
2. Connect the load to the terminals of CON as described above. Load should be on.
3. Connect panel in the last. For reasons beyond control, if panel is first connected without battery, 'CHRG' GREEN LED will turn on and off alternately and also 'BT.STS' Bicolour LED will turn Red and Green alternately. Under such conditions load is always disconnected and charging control is disabled. (Uncontrolled equalisation mode). When battery is connected, it will come to normal mode immediately.
4. Do not connect panel of more than 80Wp capacity. If higher wattage panel is used, on-board fuse will blow. For 80Wp panel, connected battery must be of at least 60Ah capacity. The higher the capacity, the better. Charging current to the battery should never be more than C/10 capacity of battery.

DO NOT EVER FIDDLE WITH PGM CONNECTOR



EXAMPLES OF SELECTION OF LINK 1 PINS (FOR VERSION V3):

FOR 6W Load and dusk to dawn operation: No link at LNK2, and LNK 1 

For 12W load and dimming after 5hours to 50%: LNK2 
LNK1  

For 18W load and load switched off after 6 hours: LNK2 

LNK1 

For 9W load and dimming 75% (25% light) after 4 hours: LNK2 

LNK1  

UNIQUE PROFILE ON PIN DIM2:

Pin DIM2 can be configured in a unique profile,

<i>From Dusk to 5 hours</i>	<i>100% light</i>
<i>Next 5 hours</i>	<i>30% light</i>
<i>Approx 2 hours before dawn</i>	<i>100% light</i>

McUD80 is thus available in two different versions-

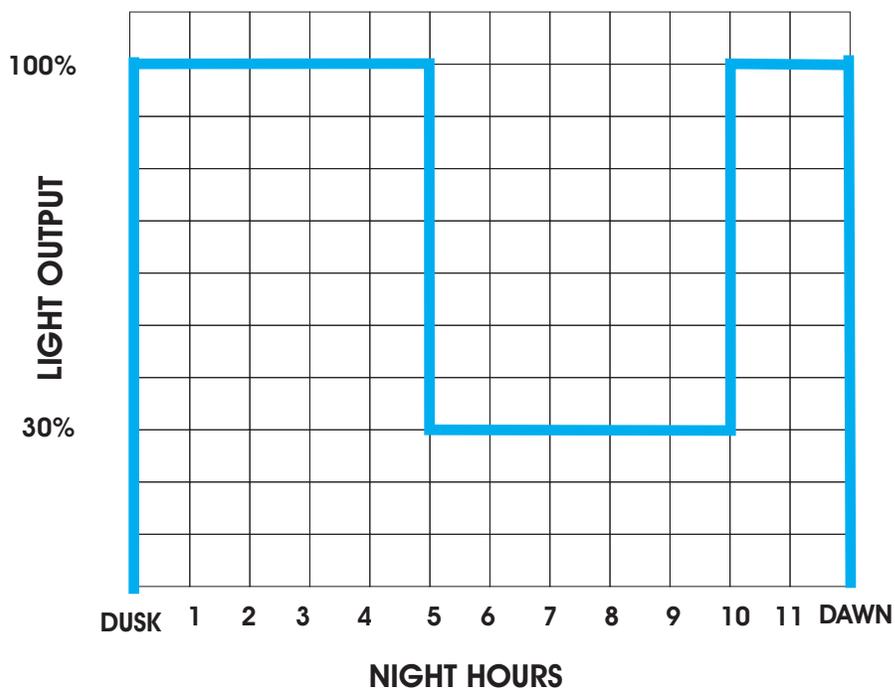
Version 3 D2D, DL1, DL2, DL3, DIM1, DIM2 as described in earlier pages where you have options of two different settings for dimming 50% light and 25% light after set delay timings.

Version 4 D2D, DL1, DL2, DL3, DIM1. These settings are unaltered as in Version 3.
DIM2 in this version is made independent pin. It should be used alone without any pins at LINK1.
Full light is available for first 5 hours, followed by 5 hours of dim light of 30% intensity and then followed by about 2 hours of again full light till dawn.

This is very useful feature for street lights as the people get full light in the wee hours of the day when they start out for work. Please note even in Version 4, you still have automatic shut down of load after provided time delays or 50% light till dawn. Only Pin DIM2 has been assigned a different job.

Version 3 and Version 4 are our standard versions. You need to specify the version before placing order.

DIM2 MODE OF OPERATION ON VERSION V4:



NOTE: FOR SIMPLICITY, NIGHT AND DAY TIMES ARE ASSUMED TO BE EQUAL TO 12 HOURS. THESE WILL CHANGE AS PER SEASON.

EASY WAY TO SELECT THE PINS AT LINK 1

VERSION V4

SR NO	D2D	DL1	DL2	DL3	DIM1	DIM2	RESULT
1							100 % LIGHT FROM DUSK TO DAWN
2	NC				NC	NC	FIRST 6 HOURS FULL LIGHT THEN OFF
3	NC					NC	FIRST 6 HOURS FULL LIGHT THEN 50% LIGHT TILL DAWN
4	NC	NC			NC	NC	FIRST 5 HOURS FULL LIGHT THEN OFF
5	NC	NC				NC	FIRST 5 HOURS FULL LIGHT THEN 50% LIGHT TILL DAWN
6	NC	NC	NC		NC	NC	FIRST 4 HOURS FULL LIGHT THEN OFF
7	NC	NC	NC			NC	FIRST 4 HOURS FULL LIGHT THEN 50% LIGHT TILL DAWN
8	NC	NC	NC	NC	NC		FIRST 5 HOURS FULL LIGHT, NEXT 5 HOURS 30% LIGHT, THEN FULL LIGHT TILL DAWN

VERSION V3

SR NO	D2D	DL1	DL2	DL3	DIM1	DIM2	RESULT
1							100 % LIGHT FROM DUSK TO DAWN
2	NC				NC	NC	FIRST 6 HOURS FULL LIGHT THEN OFF
3	NC					NC	FIRST 6 HOURS FULL LIGHT THEN 50% LIGHT TILL DAWN
4	NC	NC			NC	NC	FIRST 5 HOURS FULL LIGHT THEN OFF
5	NC	NC				NC	FIRST 5 HOURS FULL LIGHT THEN 50% LIGHT TILL DAWN
6	NC	NC	NC		NC	NC	FIRST 4 HOURS FULL LIGHT THEN OFF
7	NC	NC	NC			NC	FIRST 4 HOURS FULL LIGHT THEN 50% LIGHT TILL DAWN
8	NC				NC		FIRST 6 HOURS FULL LIGHT THEN 25% LIGHT TILL DAWN
9	NC	NC			NC		FIRST 5 HOURS FULL LIGHT THEN 25% LIGHT TILL DAWN
10	NC	NC	NC		NC		FIRST 4 HOURS FULL LIGHT THEN 25% LIGHT TILL DAWN

LEGENDS

			DON'T CARE	
			PIN CONNECTED	
		NC	NO CONNECTION	