

DimNIT – LED dimming controller

GENERAL DESCRIPTION

The ACA-DN002-2340 is a LED dimming control board (DimNIT) that provides a PWM dimming control signal from a variety of input sources. The on-board 6 position dip switch allows for a variety of operational modes that include:

1. Analog dimming input control
2. 1 or 2 pushbutton input dimming control
3. Ambient light-sensing dimming control with on-board photo-diode conditioning circuitry
4. Linear or Logarithmic dimming response
5. Straight or Inverted PWM dimming logic
6. Active Hi or Lo Enable control

DimNIT can be used to control the power input of an existing LED driver, or the LEDs directly. Many low cost LED backlit displays use simple resistive current limiting, requiring only +12V for the LEDs. DimNIT extends the performance of these displays.

Small in size, DimNIT can fit just about anywhere. For very cost sensitive applications, factory programmed versions can be made available that eliminate all but the specific components required for the application.

MECHANICAL/ENVIRONMENTAL

Weight = 5.25 grams

Size (L x W x H) = 2.25 IN x 0.7 IN x 0.215 IN

PCB thickness = 0.062 IN

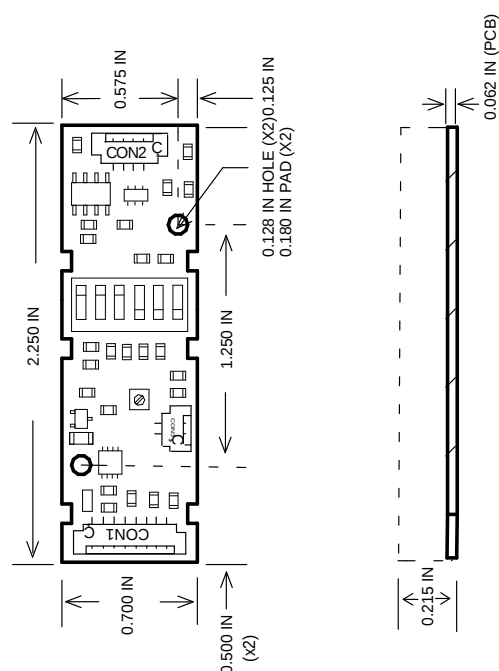
Mounting Holes = 0.120 IN diameter (X2)

Input Power & Control Connector = CON1

PWM switch Output Connector = CON2

Photodiode Input Connector = CON3

RoHS Compliant



INPUT CONNECTOR
CON1
MOLEX 53261-0871

PIN # FUNCTION

- | | |
|---|---------------------|
| 1 | +VIN(PWR) |
| 2 | GND(PWR) |
| 3 | ENABLE (IN) |
| 4 | ENABLE (IN) |
| 5 | INTENSITY CNTL (IN) |
| 6 | PWM (IN) |
| 7 | +3.3V REF (OUT) |
| 8 | GND(SIG) |

OUTPUT CONNECTOR
CON2
MOLEX 53261-0471

PIN # FUNCTION

- | | |
|---|----------------------|
| 1 | LED ANODE |
| 2 | PWMOUT |
| 3 | NC |
| 4 | LED CATHODE (COMMON) |

OUTPUT CONNECTOR
CON3
MOLEX 53261-0271

PIN # FUNCTION

- | | |
|---|----------------------|
| 1 | PHOTODIODE (ANODE) |
| 2 | PHOTODIODE (CATHODE) |

MAXIMUM RATINGS*

Symbol	Parameter	Value	Unit
Vin	Supply Voltage (Referenced to Ground)	-0.3 to 30	Vdc
Vip	Voltage applied to any Input Pin (Referenced to Ground)	-0.3 to 3.6	Vdc
Iop	Current sourced or sinked from any Output Control Pin	+/- 10	mAdc
Isw	Maximum PWM switch current	3.0	Adc
Top	Operating Temperature (Still air ambient around Dimmer)	-30 to +85	°C
Tstg	Storage Temperature	-40 to +105	°C

*Maximum Ratings are those values beyond which damage to the DimNIT dimmer may occur.

ELECTRICAL CHARACTERISTICS

Vin = +4.5V to +28V unless otherwise specified.

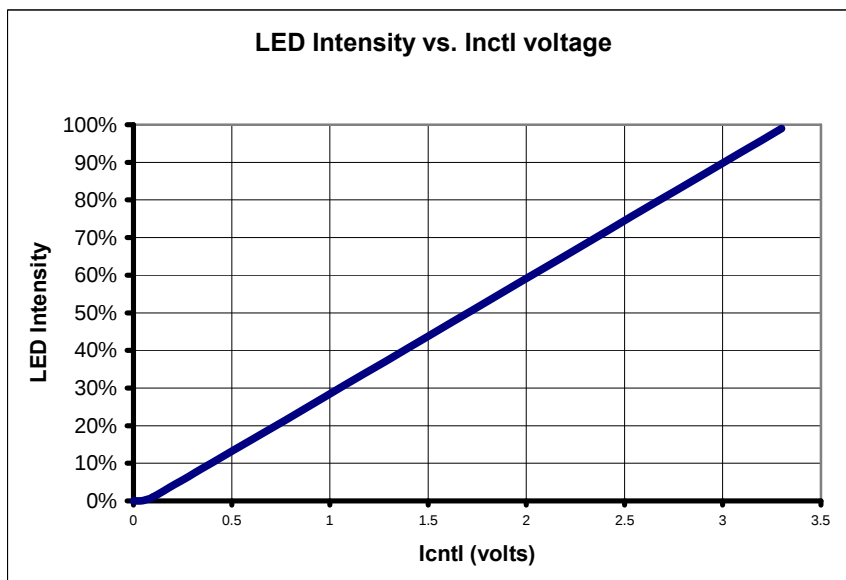
Symbol	Parameter	Test Conditions	Min	Nom	Max	Unit
Vcntl	Control voltage input to obtain 0 to 100% brightness range	S1 = X00X00 S1 = X10X00	0 3.3		3.3 0	Vdc Vdc
PWMcntl	PWM duty-cycle input to obtain 0 to 100% brightness range	CON1, pin 5 open: S1 = X00X10 S1 = X10X10	0 100		100 0	% %
PWMhi	PWM input "Logic 1" threshold		1.6			
PWMlo	PWM input "Logic 0" threshold				0.5	Vdc
PWMin	PWM input frequency		0.1		10	kHz
PWMout	PWM output frequency		309	325	341	Hz
PWMVoh	PWM out high logic level		2.6			Vdc
PWMVol	PWM out low logic level				0.6	Vdc
Btn_up	Active "Up button" voltage window	S1 = X01000	1.00		1.11	Vdc
Btn_dwn	Active "Down button" voltage window		1.57		1.74	Vdc
ENoff	Enable Control, Unit Off	Enable (Pin 3)			0.8	Vdc
ENon	Enable Control, Unit ON	Enable (Pin 3)	1.6			Vdc
EN\off	Enable Control, Unit Off	Enable (Pin 4)	1.6			Vdc
EN\on	Enable Control, Unit ON	Enable (Pin 4)			0.8	Vdc
+3.3Vref	+3.3V Reference Output Voltage		3.14	3.3	3.46	Vdc
+3.3Vref-I	+3.3V Reference Output Current Draw				50	mAdc

ELECTRICAL CHARACTERISTICS

Vin = +6.5V to +28V unless otherwise specified.

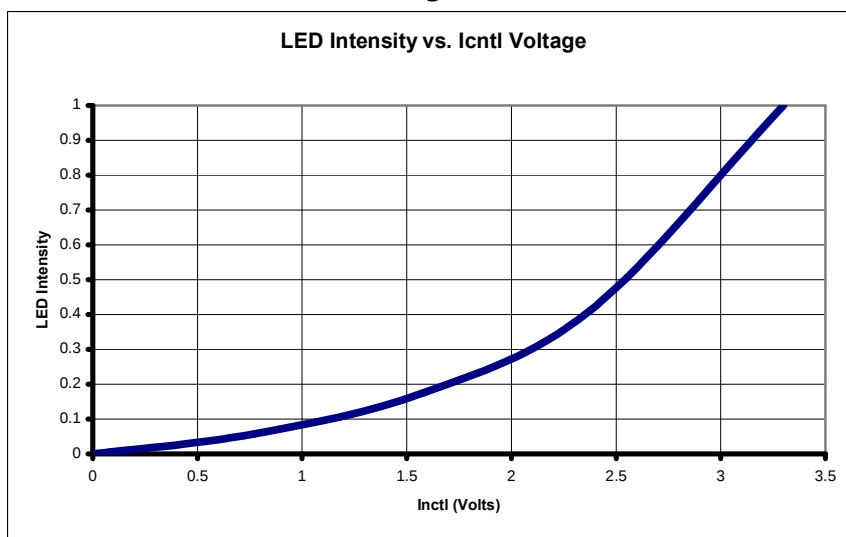
Iinq	Vin quiescent current draw	Vin = +12V CON1, pin 7 open CON2 open		4.3		mAdc
ALS	Ambient light sensing brightness control range	CON1, pin 5 open: S1(1-6) = XX0101 Photodiode covered Photodiode direct sun		20 100		% %

Linear Mode



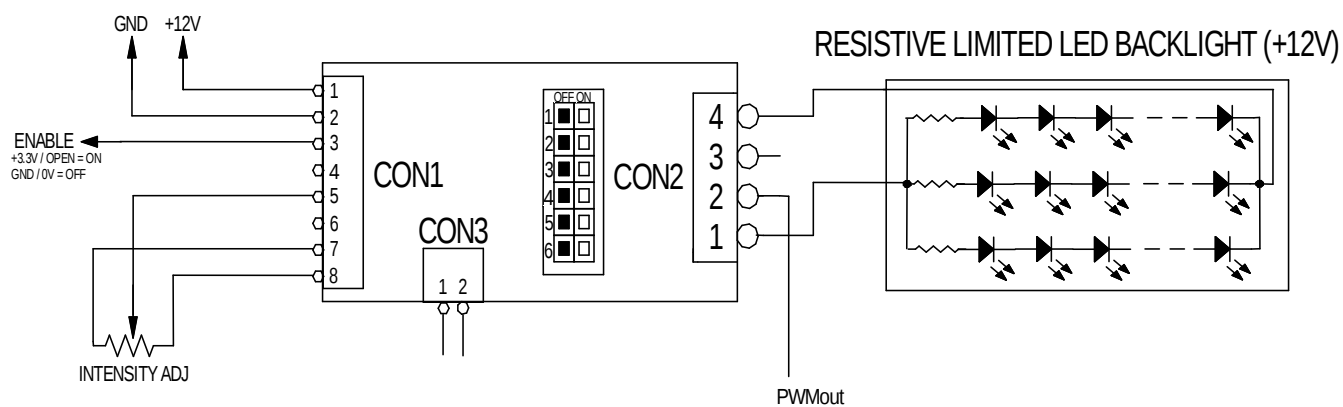
S1(1) = 0

Log Mode

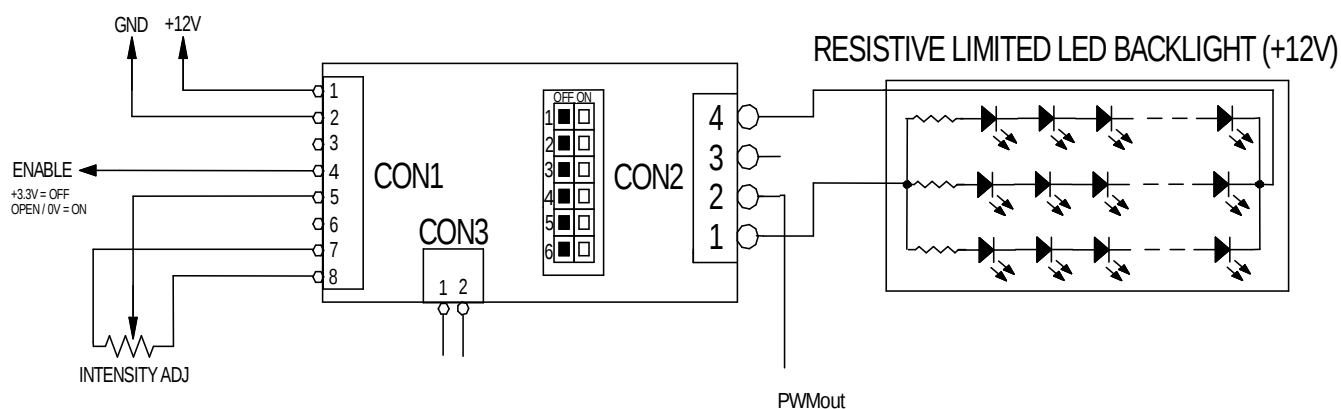


S1(1) = 1

ACTIVE HIGH ENABLE, POT DIMMING



ACTIVE LOW ENABLE, POT DIMMING



PRODUCT DATA SHEET

06/11/13

The diagram illustrates the electrical connections for the LED backlight control system. It features three main components: a microcontroller (CON1), a status indicator (CON2), and a backlight driver (CON3). The microcontroller (CON1) has 8 pins, with pins 1 and 2 connected to GND and +12V respectively. Pins 3 and 4 are connected to the ENABLE pin, which is controlled by +3.3V (ON) or GND (OFF). Pins 5 and 6 are connected to the OPEN pin, which is controlled by GND (OFF). Pins 7 and 8 are connected to the PWMhi and PWMlo pins, which are controlled by the PWM in signal. The status indicator (CON2) has 6 pins, with pins 1 and 2 connected to the microcontroller's PWMout pin. The backlight driver (CON3) has 2 pins, with pin 1 connected to the microcontroller's PWMout pin and pin 2 connected to the backlight. The backlight is a resistive limited LED array (+12V) consisting of a 3x3 grid of LEDs. The PWMout signal from the microcontroller is connected to the PWM in input of the backlight driver.

The schematic diagram illustrates the electrical connections for the sensor module. It features three main connection points: CON1, CON2, and CON3.

- CON1:** An 8-pin connector. Pins 1 and 2 are for GND and +12V. Pins 3, 4, 5, 6, 7, and 8 are for the ENABLE signal, which can be +3.3V (OPEN = ON) or GND (0V = OFF). The OPEN signal is connected to pin 5.
- CON2:** A 4-pin connector. Pins 4, 3, 2, and 1 are for the RESISTIVE LIMITED LED BACKLIGHT (+12V). The PWMout signal is connected to pin 1.
- CON3:** A 2-pin connector. Pins 1 and 2 are for the PHOTODIODE.

Additional components and labels include:

- RESISTIVE LIMITED LED BACKLIGHT (+12V):** A circuit diagram showing a grid of LEDs connected to a +12V supply and a PWMout signal.
- PHOTODIODE:** A component connected to the PHOTODIODE pins (1 and 2) of CON3.
- ADJUST ON-BOARD TRIMPOT FOR DESIRED SENSITIVITY:** A note indicating the location of a trimmer potentiometer on the board.

6	5	4	3	2	1	
1	0	1	0	X	0	= <i>ALS Linear</i>
1	0	1	0	X	1	= <i>ALS Log</i>

PRODUCT DATA SHEET

06/11/13

[illegible]

The schematic diagram illustrates the connection of the LED driver IC to the backlight and the brightness control interface. The IC has three connectors: CON1 (8 pins), CON2 (4 pins), and CON3 (2 pins). The backlight is a 3x4 grid of LEDs connected in a resistive matrix. The brightness control interface includes a 1-button brightness response section with two graphs: 'LO TO HI' and 'HI TO LO'. Below these graphs are two DIP switch configurations: 'DIP2 = OFF' (switch open) and 'DIP2 = ON' (switch closed). The IC is also connected to a 3.3V supply and a 10K resistor, which is connected to the DIM CNTL pin. The IC is labeled 'ENABLE' and 'GND / 0V = OFF'.

USING DIMNIT TO CONTROL INTERNAL LED DRIVER

FACTORY LED BACKLIT PANEL WITH INTERNAL LED DRIVER

