

Unit / Module Description:	LED Back light controller
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Original Author:	T. White

User Manual for AV141



Advanced Vision Technology Ltd, Thames House, Mere Park,
Dedmere Road, Marlow, SL7 1PB.

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Revision History

Issue	Changes Made	Date	Initials
1.0	Initial Draft	08/03/10	TJW

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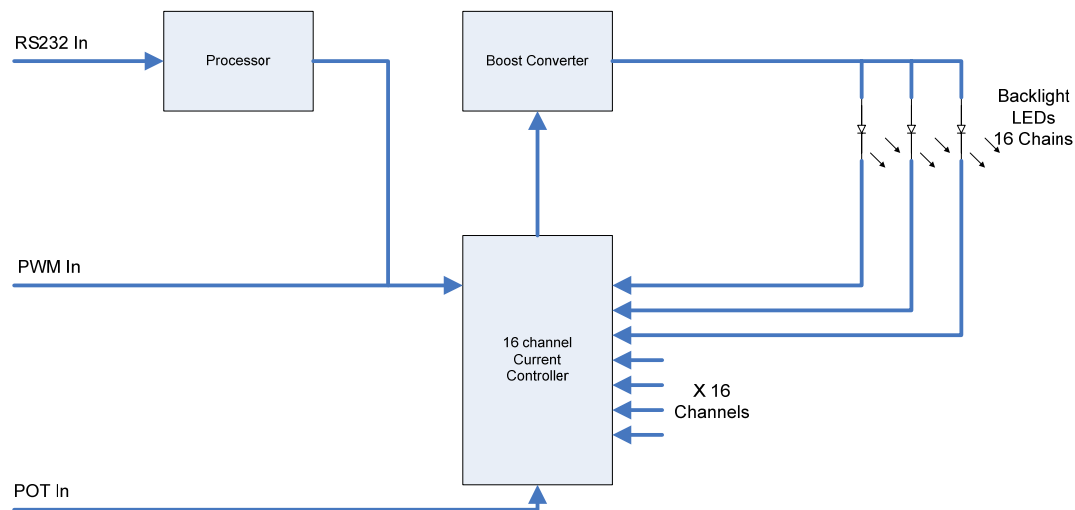
1 Introduction

The AV141 is a highly versatile and efficient current controlled LED backlight inverter. It is capable of driving and regulating backlight LED current of up to 50mA in 16 independent channels. The LED chains can have a maximum forward voltage of 45v.

Backlight intensity can be controlled in a number of ways. The method chosen for control is stored in non-volatile memory, along with the backlight intensity when the unit was last switched off. LED intensity can be controlled using a POT, an RS232 serial interface, external PWM or LED intensity can be fixed

2 Functional Description

2.1 Block Diagram



2.2 Module Description

The AV141 is a highly versatile supply driver for LED backlights. The unit employs a high efficiency boost converter to generate a voltage limited high side supply which is controlled to allow the required current to flow in the LEDs. Maximum output voltage is limited to guard against open circuit conditions. The maximum output voltage can be set up to 60v

With a stable high side supply set, the current controller then regulates the currents independently in the 16 LED chains at a preset value up to 50mA. LED intensity is then controlled by “low frequency” PWM of the current control.

Both maximum high side voltage and maximum output chain current are set in hardware and must be specified when ordering.

Supply voltage is nominally 12v, but can range from 6v (speak to supplier before running from less than 12v) to 14v.

2.3 Interface Description

2.3.1 Mechanical Interface

The Av141 has two FFC type ribbon cable connectors designed to interface with the AUO panel model M240HW01, although other backlights may be driven. Each FFC connector has two power connections for the high side voltage and 8 current regulated sink pins. The FFC connectors on the AV141 are TOP contact, such that the FFC cable needs only one fold. The FFC connectors to connect to the screen backlight have referenced J4 and J5.

Power is supplied to the AV141 with a 4 way PH type connector manufactured by JST. There are two connections for 0v and two connections for +12v. Only one set need be used. The power connector is J2

The data interface connector is a six way PH type connector also by JST. This allows serial data to be sent to the AV141 to control the mode and brightness. There is also a connection on this connector to drive the AV141 with an external PWM source if required. The serial connector is J1

A potentiometer can be connected to the AV141 to allow simple control of the brightness. The pot should be of linear type and have a value of 47K ohms. The pot connector is J3

2.3.2 Electrical Interface

J1 – Serial communications

The AV141 can be controlled and is set up using a serial interface. This can be connected directly to the serial port of a PC. The PC serial port must be set as the following.

Baud rate : 9600, 8 data, 1 stop, no parity, no flow control.

The commands are sent in the format of a capital letter, then a value. The letter M indicates a Mode command and the letter B indicates a brightness value command. There are 3 modes as follows.

M1 – internal PWM mode

M2 – External PWM mode

M3 – Full on.

Internal PWM brightness is set as follows.

B0 – off

B255 – $\frac{1}{4}$ brightness

B511 – $\frac{1}{2}$ brightness

B1023 – Full brightness

Any value from 0 to 1023 can be used to set the desired brightness.

J2 – Power supply connector.

Supply range 6v to 14v, nominal and recommended 12v.

At 12v in, and running LED backlight at full brightness – the unit should take about 1.3A

J3 – Potentiometer input.

Used to connect to a 3 pin pot. The pot value should be 47K in order to achieve the full brightness range. With a 47K pot, current flow is about 25uA. With the pot disconnected – brightness is set controlled by internal PWM, external PWM or set to a specific value. With the pot connected, the brightness set by the other methods is then also moderated by the pot position. The pot will have the range from the intensity set by the other methods down to zero.

J4 & J5 – Screen LED backlight connector.

These connectors connect to the backlight LED chains. The maximum voltage in open circuit on these connectors is 50v. The AV141 should NOT be connected to a supply without BOTH of these connectors connected to the screen LED backlight.

3 Pinout

J1 – Serial Comms and PWM

AV141 Connector Part No. JST B-6B-PH-K-S

Mating Part No. JST PHR-6

Crimp Part No. JST SPH-002T-P0.5S

Pin #	Function
1	GND
2	External PWM in
3	RS232 TX
4	IIC SCL
5	RS232 RX
6	IIC SDA

J2 – Serial Power connector

AV141 Connector Part No. JST B-4B-PH-K-S

Mating Part No. JST PHR-4

Crimp Part No. JST SPH-002T-P0.5S

Pin #	Function
1	+12v
2	+12v
3	GND
4	GND

J3 – Serial Power connector

AV141 Connector Part No. JST B-3B-PH-K-S

Mating Part No. JST PHR-3

Crimp Part No. JST SPH-002T-P0.5S

Pin #	Function
1	Pot hi end
2	Pot wiper
3	Pot low end

J4 & J5 - LED backlight connector

AV141 Connector Part No. Molex : 52745-1096

Mating Cable No. Molex : 98266-0105

Pin #	Function
1	LED chain 1
2	LED chain 2
3	LED chain 3
4	LED chain 4
5	High side +v
6	High side +v
7	LED chain 5
8	LED chain 6
9	LED chain 7
10	LED chain 8

4 EMC

This module is designed to operate from within an enclosed host system, which is build to provide EMC shielding. Operation within the EU EMC guidelines is not guaranteed unless it is installed within an adequate host system.

This module is protected from damage by fast voltage transients originating from outside the host system which may be introduced through the output cables.

Short circuiting any output to ground does not cause the host PC system to lock up or reboot.