



**397 Route 281 – P.O. Box 1175
Tully, New York 13159-1175
Phone: 315 696-6676
Fax: 315 696 9923
Email: sales@acipower.com
www.acipower.com**

DRIVING THE SHARP LQ106K1LA05 LED BACKLIT LCD USING AN ACI LED DRIVER

APPLICATION NOTE

Version 1.0 – 6/18/08

The following is an application note that describes how to use the ACI-A036034-1707 or the ACI-A036034-1781 LED driver to power the SharpLQ106K1LA05 LED backlit LCD.

Please refer to the ACI-036034-1707 or ACI-0360-1781 datasheets for additional information on the LED driver.

Table of Contents

Datasheet symbol definitions.....	3
General circuit operation.....	3
Control and Dimming.....	4
Connection diagrams.....	5,6

Datasheet symbol definitions

<i>V_f</i>	<i>Voltage forward</i>	The total forward voltage drop for a given series string of LEDs.
<i>I_{out}</i>	<i>Current output</i>	The current supplied by the LED driver into a given number of LEDs.
<i>OCV</i>	<i>Open circuit voltage</i>	The voltage that appears at the output of the LED driver with no LEDs connected.
<i>I_{cntl}</i>	<i>Current control</i>	The control voltage supplied by the user to control LED drive current

General circuit operation

All ACI LED drivers operate as a true DC constant current source. The output current will remain constant for a given set-point provided that the total series string forward voltage (***V_f***) is within the recommended range as specified per the driver datasheet. The user has the ability to control the set-point or LED intensity using the ***I_{cntl}*** input.

The ACI-A036034-1707 or the ACI-036034-1781 I-LITE LED drivers, feature a maximum intensity selector switch (S1). This 4 position rotary switch allows the user to set the maximum output current when ***I_{cntl}*** is at full intensity. The output current settings for the 4 positions are as follows:

- A = 34mA
- B = 25.5mA
- **C = 17mA (Specified LED current per the Sharp LQ106K1LA05 datasheet)**
- D = 8.5mA

For example, if setting C was chosen, varying ***I_{cntl}*** throughout its range would vary the output current from 0 to 17mA per channel. When no dimming is required, users should leave the ***I_{cntl}*** pin disconnected or tied to the reference output pin (Pin 5 of CON 1) to allow the driver to operate at full output current (as dictated by the maximum output current setting A-D).

The input voltage range of the I-LITE driver is specified as +12V +/-10% (although in practice a much wider input voltage range can be tolerated). The output drive current is under closed-loop control, and therefore remains stable despite changes of input voltage over the specified range.

The I-LITE family of drivers is open circuit protected. However, shorting the outputs or referencing any of them to ground will potentially damage the unit and/or cause the on-board fuse to open. In most cases replacing the fuse (F1) will allow the unit to function again normally.

The ACI-A036034-1707 and ACI-A036034-1781 are five channel common anode LED drivers that monitor the sum of all the currents flowing through the LED's. Within the LED backlight specification, the nominal LED drive current is typically defined for a single series channel. Similarly, the I-LITE LED drivers are specified the same way, on a per channel basis. The driver is able to maintain the drive current selected provided the user does to exceed the recommended series connected cumulative LED forward-drop voltage. In the case of the ACI-A036034-1707 and ACI-A036034-1781, the recommended range is +18 to +32Vdc.

Control and Dimming

The ACI-A036034-1707 and ACI-A036034-1781 I-LITE LED drivers employ firmware which supports the following control signals:

- Enable on pin 3 on CON1 (Active high, TTL compatible)
- Icntl
0.25V to 3.0V for the ACI-A036034-1707
0V to 5.0V for the ACI-A036034-1781
- +Vref (use for high side of potentiometer or D/A reference)
3.3V for the ACI-A036034-1707
5.0V for the ACI-A036034-1781

The dimming firmware approximates a logarithmic response as shown in Figure 1a (ACI-A036034-1707) or Figure 1b (ACI-A036034-1781).

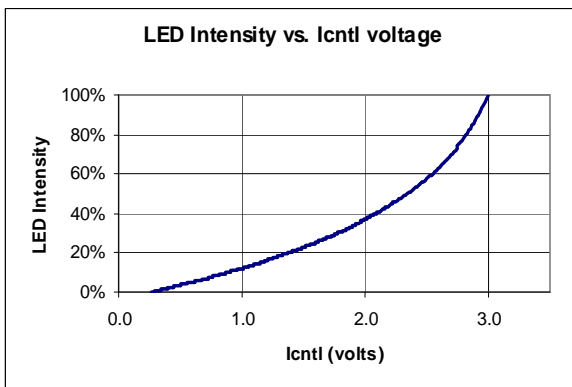


Figure 1a

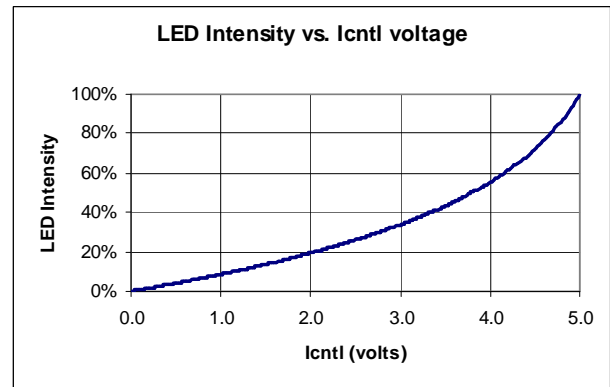
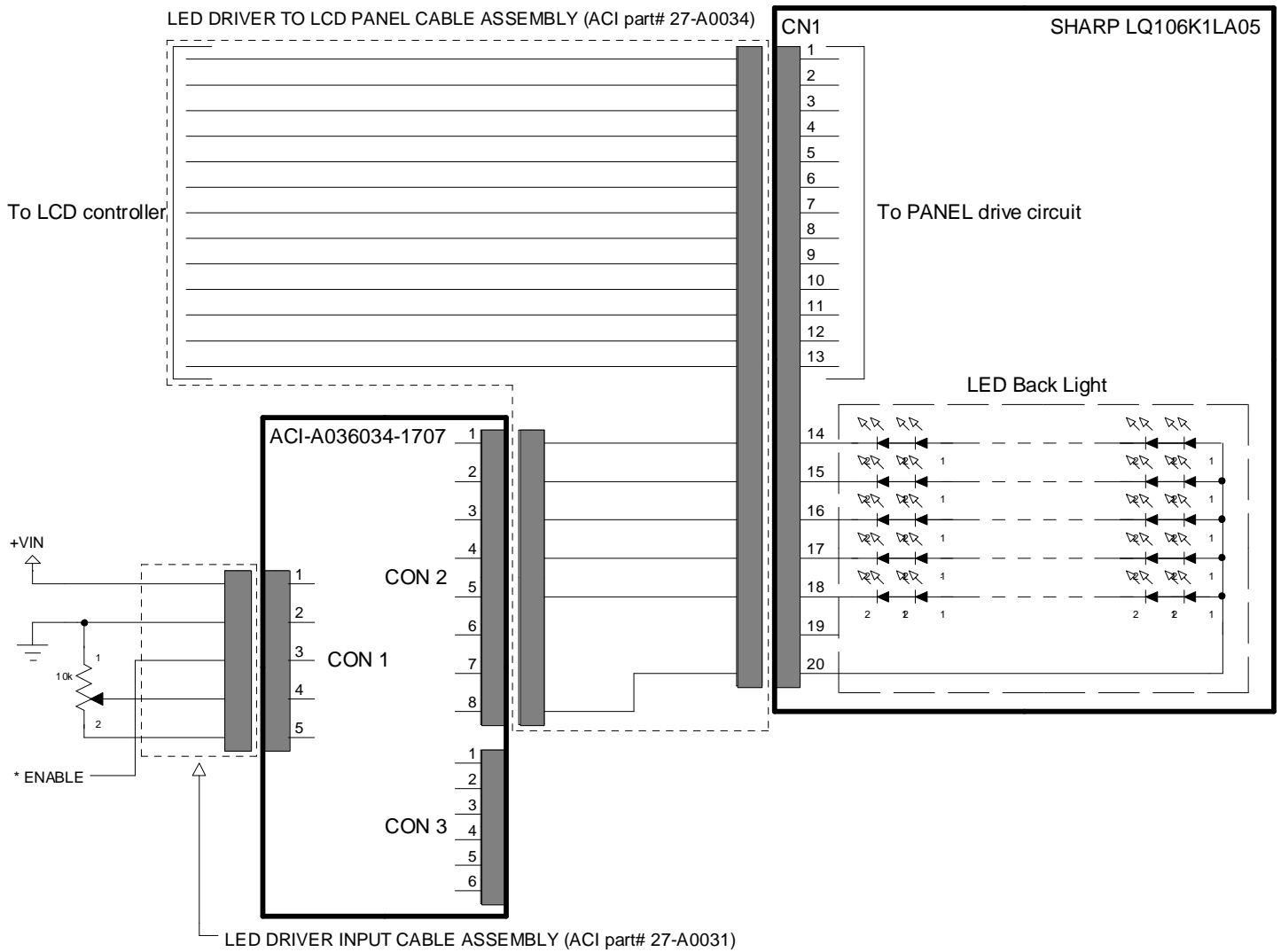


Figure 1b

CONNECTION SCHEME TO DRIVE THE SHARP LQ106K1LA05 USING THE ACI-036034-1707 LED DRIVER



* Tie Enable (Pin 3) to Vref (+3.3V, Pin 5) if not used

CONNECTION SCHEME TO DRIVE THE SHARP LQ106K1LA05 USING THE ACI-036034-1781 LED DRIVER AND DIGITALVIEW TBD

