PhlatLight LED Development Kit Manual

DK-105T-1

Introduction:

PhlatLight LEDs, from Luminus Devices, have been designed from the ground up to enable a new class of illumination and projection systems. Benefiting from a suite of innovations in chip technology, packaging, and thermal management, PhlatLight LEDs allow designers to achieve efficient light engine designs and deliver high brightness solutions.

The DK-105T series of PhlatLight Development Kits was designed for fast and simple evaluation of PhlatLight products. The included electrical and thermal solutions enable customers to easily breadboard or prototype their system without time consuming and costly development of driver boards and heat sinks.

Designed to work with SSR-90 and SSR-50 parts, delivering up to 5A of current, the DK-105T development kits support various different drive conditions and use scenarios.

This plug and play solution can easily be connected to common laboratory equipment through standard connectors and allows system designers to save weeks in their development cycles.

Table of Contents:

1. Key Features

- Drive a SSR-50 or SSR-90 up to 5A
- Runs off of 12VDC nominal
- Drives at either 1.75, 3.15, or 5A
- Dimmable using 0-10V analog input
- Support for Synjet cooling system - Power and Control

Note that 0 – 10V input is compatible with common 0-10V dimmers like Lutron, Lithonia, etc. Only the dimming portion of the dimmer should be used and not the AC switch as this design is not AC compliant.

2. Development Kit Contents

As seen in Figure 1, the content of each PhlatLight DK-105T-1 Development Kit includes the following components:

- Synjet with heatsink
- Driver Board
- Mounting Hardware (Thermal interface material is NOT provided)
- User manual

This development kit was designed with flexible features to allow for easy evaluation of PhlatLight LEDs. It was not optimized for size or for direct integration in end products. However, the underlying circuit and thermal design can be used as a reference by system designers. To this effect, the complete design files including schematics, mechanical drawings, and bills of materials are available upon request.

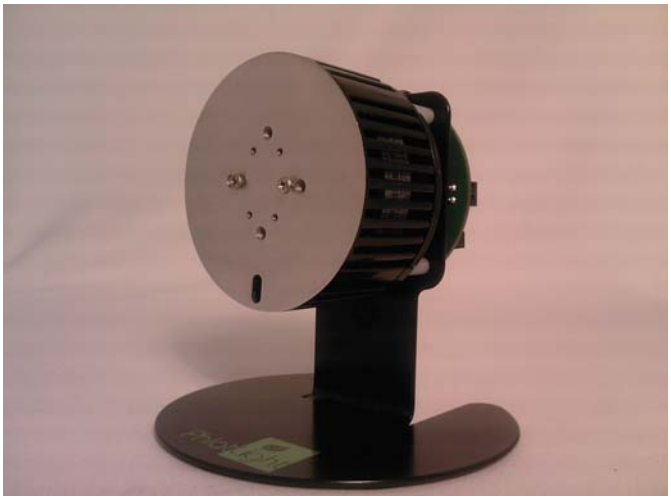

Figure 1: Development Kit Contents

2.1 Driver Board

The driver circuit, designed by Texas Instruments, is designed to provide up to 5A of current to a SSR-90 or SSR-50 PhlatLight LED.

The driver board is fully capable of providing PWM dimming from 0 to 100% with a 0 to 10VDC external signal into an MSP430 microcontroller. The control voltage is divided down using a resistor network, then sampled by the internal Analog to Digital converter. The microcontroller then produces a Pulse Width Modulated signal with duty cycle proportional to the input voltage. The longer the duty cycle, the brighter the LED will be. PWM freq is 400Hz +/-10Hz. Code can be provided upon request.

The driver requires a 12VDC input from an external AC/DC source. The external PWM voltage input range is between 0 – 10V. Care must be taken to not exceed these voltages as it may cause permanent damage to the driver board.

2.2 Mounting Hardware and Thermal Interface Material (TIMs)

This development kit does not contain any thermal interface material. Do not mount the LED module without proper thermal interface material.

Suggested Thermal Interface Materials include:

Vendor	Part	Type	Thermal Conductivity	Thickness	Electrical Isolation
Graf-Tech	eGraf 1205	Foil	10	0.254	No
Indium Corp	InSn foil	Foil		0.125	No
Btechcorp	TP-1-40	Foil	5.0	0.089	No
Arctic Silver	Arctic Silver 5	Grease	8.9	Pressure Dependent	No
Shin-Etsu	7783D	Grease	6.0	Pressure Dependent	No
Bergquist	Hi-Flow 625	PCM	0.5	Pressure Dependent	Yes
Bergquist	Hi-Flow 300P	PCM	1.6	Pressure Dependent	Yes
Bergquist	Pad 3000S30 0.02"	Gap Pad	3.0	0.508	Yes
Bergquist	Pad 3000S30 0.01"	Gap Pad	3.0	0.254	Yes
Fuji Polymer	XR-M 30X-M	Gap Pad	17	0.3	Yes
Fuji Polymer	XR-J 50X-M	Gap Pad	14	0.5	Yes
Fuji Polymer	Y30-a	Gap Pad	N/A	0.5	Yes

M2.5x6 screws are provided for attachment of SSR package types.

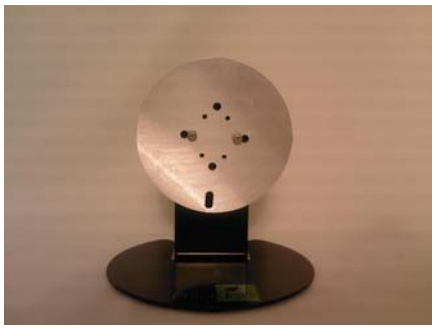

Figure 2: Mounting Hole Pattern

3. User Instructions

The following procedure explains how to setup the PhlatLight Development Kit. It is recommended that the table be equipped with ESD protection.

Equipment Required by User

In order to power and use the development kit, some additional equipment is required. Table 1 lists the type of equipment as well as a suggested part. An additional list of other compatible power supplies is provided in Appendix B.

Lab Equipment	Recommended Part
12V Lab Power Supply	CUI Inc. FSK-S30-12U
Oscilloscope	Tektronix TDS 3024B
Multimeter	Fluke 187
Photodetector	Thorlabs PDA10A

Table 1: Additional Lab Equipment

3.1 Electrical Connections

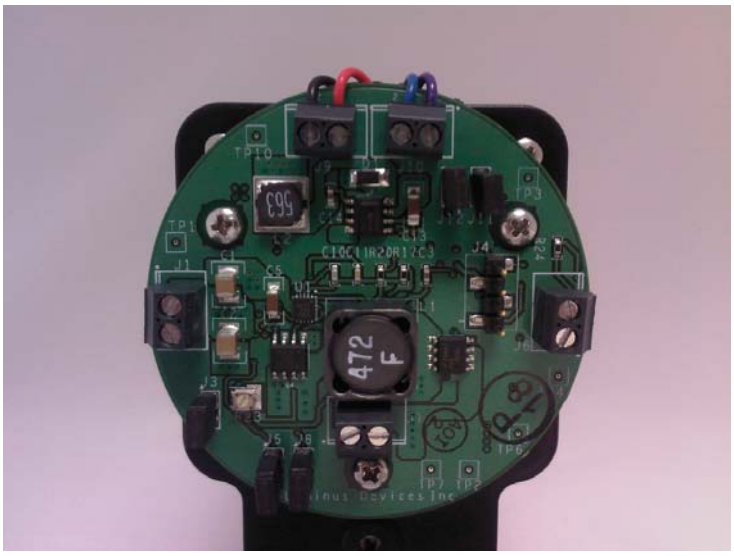

Figure 5: Completed electrical connections on DK-105T-1

4. Operating Instructions

Note: All pin 1 connectors are the positive terminal. All pin 2 connectors are the ground terminal.

To operate, follow the instructions below:

1) Select the jumper settings for desired LED current as shown in Table 1.
2) Select the jumper setting for the ENABLE feature as shown in Table 2.
3) Select the jumper setting for the Synjet Control feature as shown in Table 3.
4) Connect J7 to the SST LED
5) If desired, connect 0-10V signal source to J6
6) If desired, connect J10 to the Synjet control
7) If desired, connect J9 to Synjet Power
8) Connect J1 to 12V power supply and turn on power supply.

Table 1: LED Current Selection

J8	J5	LED Current
Installed	Installed	1.75A
Not installed	Installed	3.15A
Installed	Not installed	5.00A
Not installed	Not installed	Do not use

Table 2: LED Enable Selection

J3	Mode
Not installed	Enable LED
Installed	Disable LED

Table 3: Synjet Control Selection

J11	J12	Mode
Not installed	Not installed	Standard
Not installed	Installed	Silent
Installed	Not Installed	High
Installed	Installed	Off

Refer to the schematic diagram below.

Appendix A: Schematic Diagram

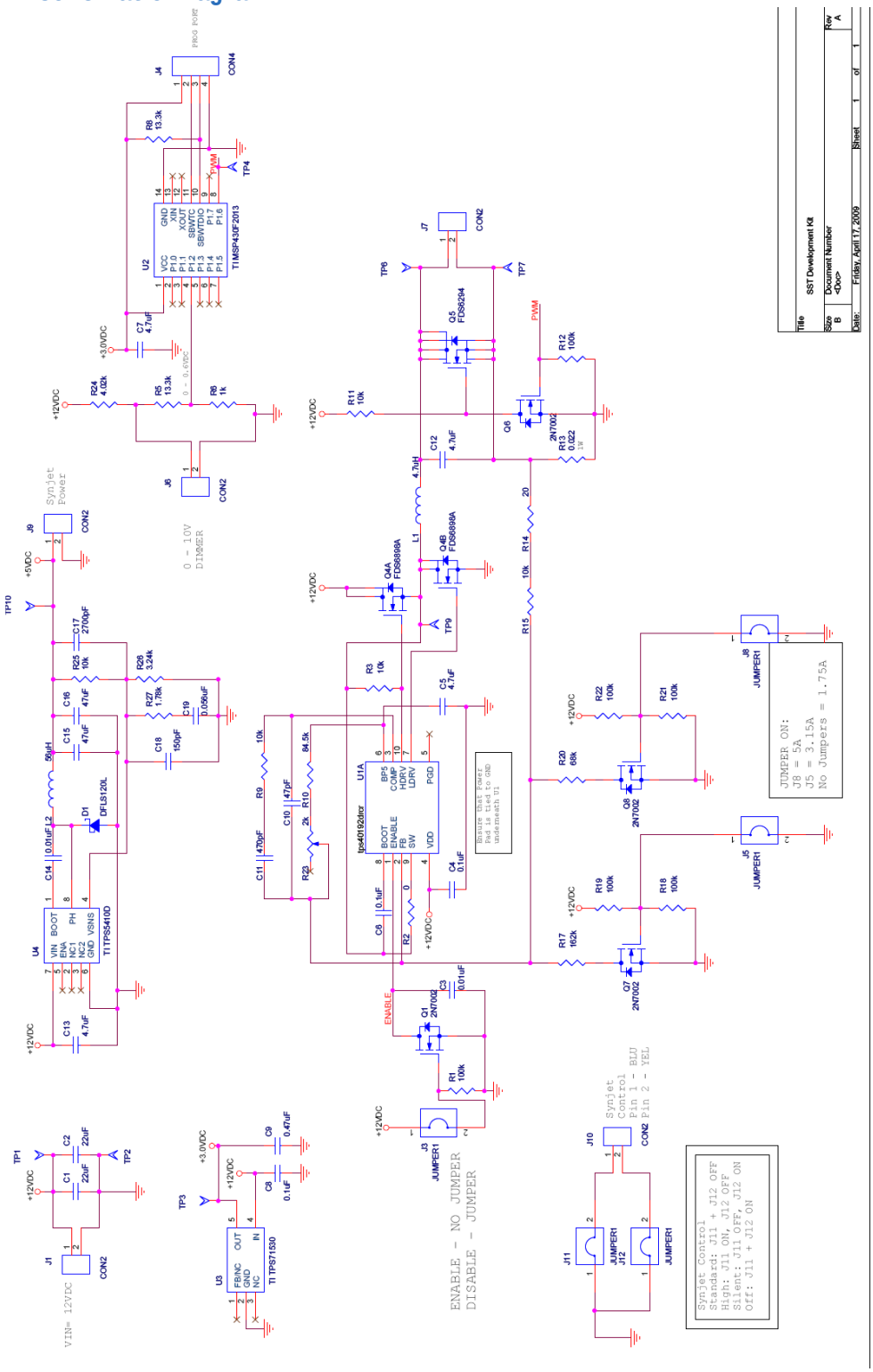

Figure 8: Schematic

Appendix B: IAC-DC Power Supplies

Table 2 shows a list of AC-DC power supplies. Failure to use a similar power supply will result in a malfunctioning board. Various different power supplies are listed in the table. For best efficiency, it is recommended to select a power supply that closely matches the required power.

Power	Manufacturer	Input	Output V/I	Size	Mounting	Part #
30W	CUI Inc.	AC 85-264 VAC (47-400Hz)	12V / 2.5A	3.7" x 2" x 0.85"	Thru-hole/SMT	FSK-S30-12U
50W	Omron	AC 85-264VAC (47-63Hz)	12V / 4.2A	5" x 3.34" x 1.57"	DIN Rail	S8SP-05005
50W	Lambda Power	AC 90-264VAC (47-63Hz)	12V / 3A	3.62" x 1.46" x 6.26"	Enclosed/Chassis mount	SWS Series
60W	Globtek Inc.	AC 90-264VAC (47-440Hz	12V / 5A	5.24" x 2.39" x 1.62"	External/Desktop	DPS50

Table 2: List of AC/DC power supplies with an isolated output

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