EV-126
AAT3143 EVAL: High Efficiency 1X/1.5X/2X Charge Pump for White LED Applications

Introduction

The AAT3143 EVAL board demonstrates the functionality of the AAT3143 and its application as a white LED backlight driver. The AAT3143 is a low-noise, constant frequency charge pump DC/DC converter with tri-mode load switch (1X), fractional (1.5X), and doubling (2X) conversion to maximize efficiency and operate over a wide input voltage range.

The AAT3143 can provide dimming control by driving the EN/PWM pin with a PWM signal. The EVAL board is equipped to offer this through its user-interface. The user-interface has three brightness settings available. The brightness levels are achieved by varying the duty-cycle of a PWM signal with a frequency of approximately 1kHz.

This document describes the evaluation board and its accompanying user interface. In addition, a brief "Getting Started" section is included to help the user begin operating the evaluation board. A schematic of the complete circuit is shown in Figure 1. The actual board layout is also provided. For additional information, please consult the AAT3143 product datasheet.

Schematic

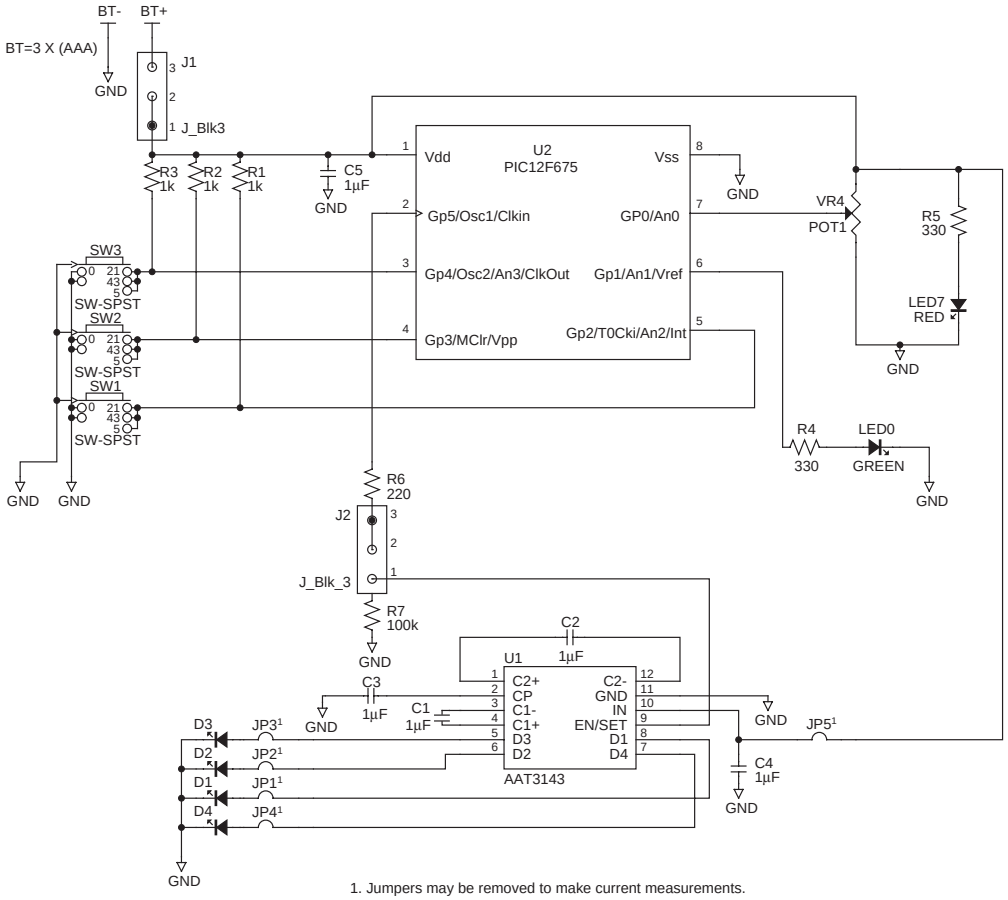


Figure 1: Evaluation Board Schematic.

Getting Started

In most cases, the board ships mounted onto a battery pack. The battery pack holds three AAA size, conventional alkaline batteries. A jumper is inline with the battery supply for connecting/disconnecting power. There is an additional jumper labeled ON SRL OFF. It provides access to EN/SET. For operation, ensure that it is in the ON SRL position. To apply power to the board, connect the supply by jumpering ON, MCU. The red LED7 should illuminate, indicating that power has been connected.

The user interface is provided by three buttons: CYCLE, UP, and DOWN. The modes of operation are detailed in Table 1. Each button controls a particular function. The CYCLE button toggles on/off auto-cycling. The UP button increments to the next number of EN/SET edges. When the UP button is held down, the MCU will auto-increment through all of the settings after a short delay. Pressing the DOWN button decrements the number of EN/SET edges. When the DOWN button is held, the MCU will auto-decrement through all of the settings.

User Interface Functionality

Button(s) Pushed	Description
CYCLE[1]	Toggle on/off auto-cycling. Cycles through the available brightness level settings.
UP	Increment the brightness setting. If held down, auto-cycle through the settings.
DOWN	Decrement the brightness setting. If held down, auto-cycle through the settings.
CYCLE + UP + DOWN[2]	Reset. Enable line is pulled low.

Table 1: User Interface Functionality.

1. The auto-cycling speed is adjusted with the 10K POT, VR4. Turn clockwise to speed up and counter-clockwise to slow down.
2. The '+' sign indicates that these buttons are all pressed and released together.

Printed Circuit Board

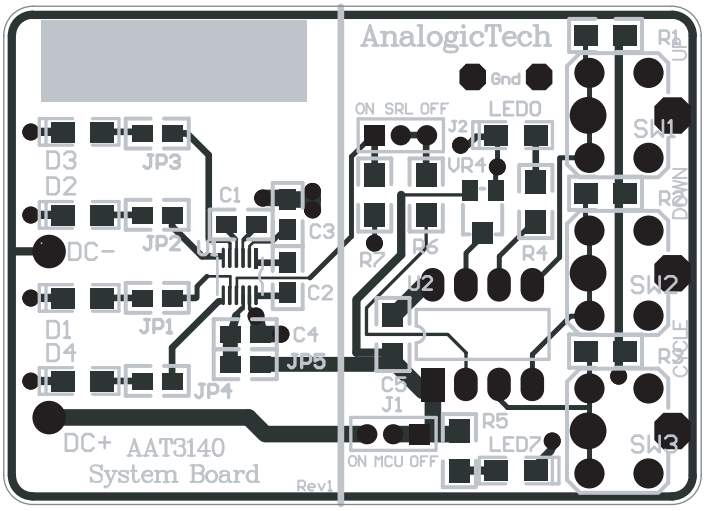


Figure 2: Top Layer (not to scale).

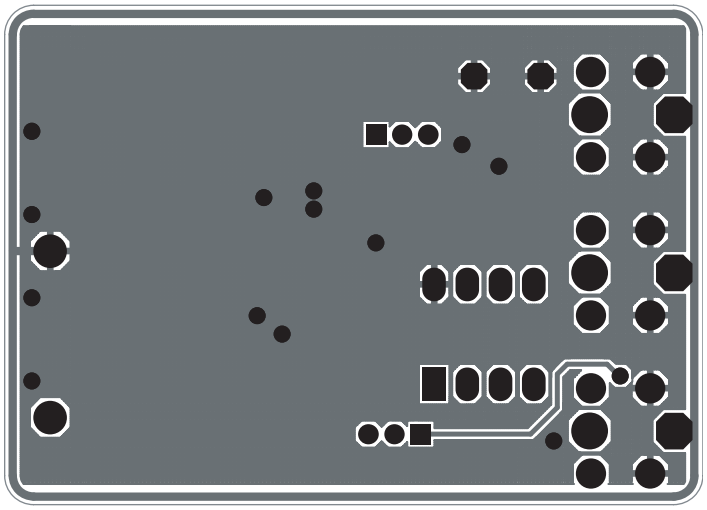


Figure 3: Bottom Layer (not to scale).

AAT3143 EVAL Component Listing

Component	Part#	Description	Manufacturer
U1	AAT3143	High Efficiency 1X/1.5X/2X Charge Pump for White LED; TSOPJW-12 Package	AnalogicTech
U2	PIC12F675	8-Bit CMOS, FLASH-Based µC; 8-Pin PDIP Package	Microchip
D1 - D4	LW M673	Mini TOPLED White LED; SMT Package	OSRAM
JP1 - JP5	Chip Resistor	0Ω, 5%, 1/8W; 0805	Vishay
C1 - C4	ECJ-2FB1E105K	1µF, 25V, X5R, 10%; 0805	Panasonic-ECG
J1, J2	PRPN401PAEN	Con. Header, 2mm Zip	Sullins Electronics
LED0	CMD15-21UGC/TR8	Green LED; 1206	Chicago Miniature Lamp
LED7	CMD15-21SRC/TR8	Red LED; 1206	Chicago Miniature Lamp
R1 - R3	Chip Resistor	1K, 5%, 1/4W; 1206	Vishay
R4, R5	Chip Resistor	330, 5%, 1/4W; 1206	Vishay
R6	Chip Resistor	220, 5%, 1/4W; 1206	Vishay
R7	Chip Resistor	100K, 5%, 1/4W; 1206	Vishay
C5	ECJ-3YB1E105K	1µF, 25V, X7R, 10%; 1206	Panasonic-ECG
VR4	EVN-5ESX50B14	10K POT; 3mm Squared SMD	Panasonic-ECG
SW1 - SW5	PTS645TL50	Switch Tact, SPST, 5mm	ITT Industries

Table 2: Component Listing.

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