

A5931xES Evaluation Board User Guide

DESCRIPTION

This evaluation board is used to demonstrate the Allegro A5931GES three-phase sensorless fan driver IC.

FEATURES

- USB communications to allow a GUI to control the device via I²C
- Switch to program devices that have been embedded into a fan

EVALUATION BOARD CONTENTS

- APEK5931xES-01-T evaluation board

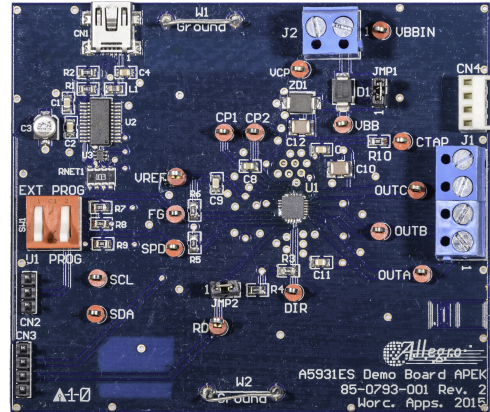


Figure 1: A5931xES Evaluation Board

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Table 1: A5931GES Evaluation Board Configurations

Configuration Name	Part Number
APEK5931GES-01-T	A5931GES-T
APEK5931KES-01-T	A5931KES-T

Table 2: General Specifications

Specification	Min.	Nom.	Max.	Units
Motor Supply Voltage (V_{BB})	5	–	16	V
VREF Output Voltage ($V_{BB} = 5$ to 16 V)	2.75	2.85	2.95	V
Input Logic Low Level	0	–	0.8	V
Input Logic High Level	2	–	–	V

USING THE EVALUATION BOARD

EQUIPMENT REQUIRED

- Fan
- Voltage supply to power the fan
- Standard A Male to Mini B Male USB cable (not included)
- Personal computer for USB control

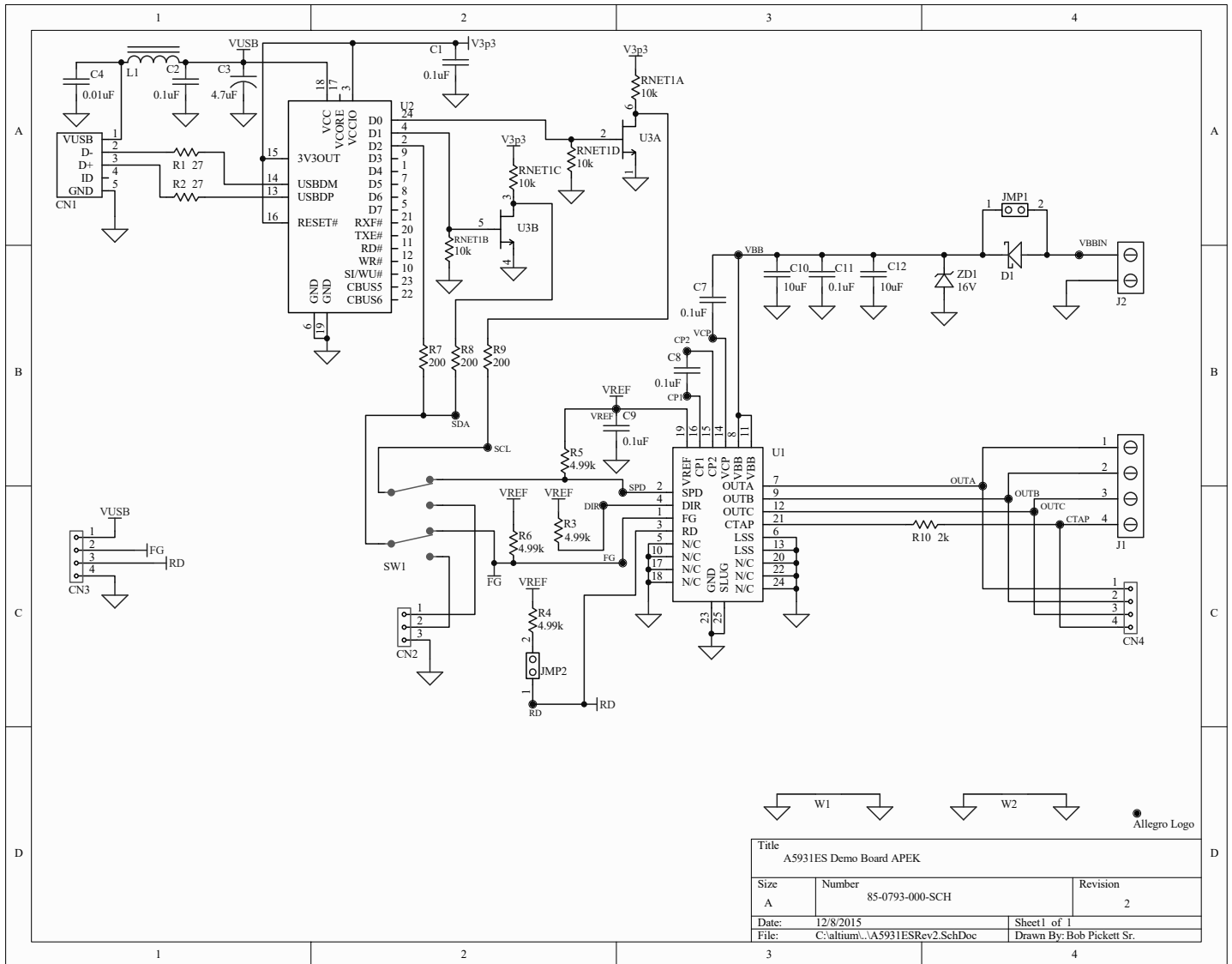
SETUP

1. Set the motor voltage supply to the intended voltage.
2. Turn off motor voltage supply.
3. Connect motor voltage supply to J2.
4. Connect the fan to either J1 (screw-down terminals) or CN4 (Molex 0022022035; Digikey WM3201-ND).

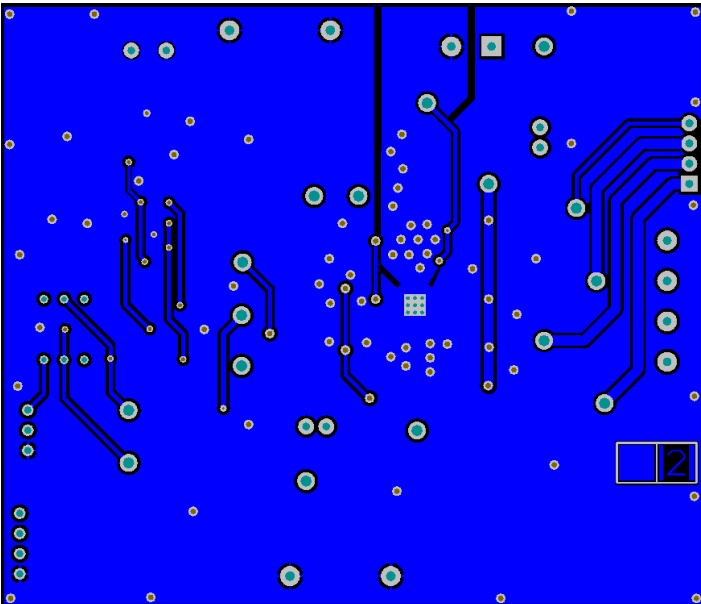
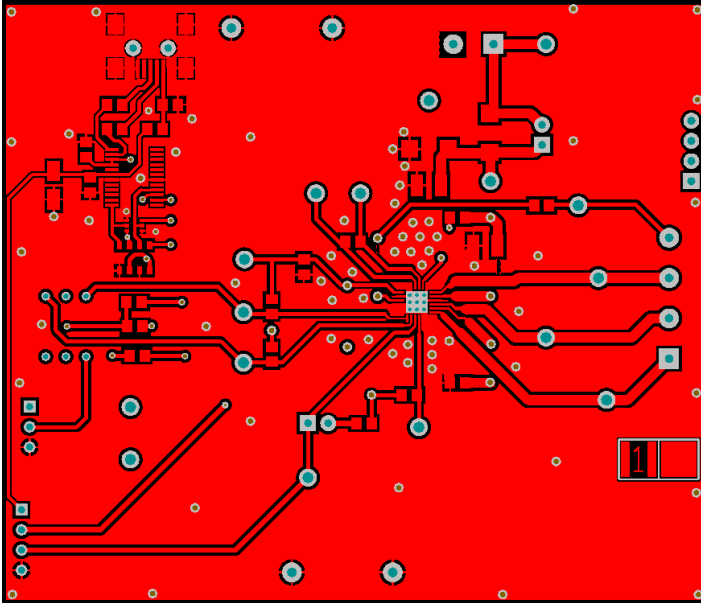
Note: Do not connect or disconnect the fan unless the outputs are either disabled or the VBB voltage is off.

5. If using the GUI, connect the USB cable to CN1 and a personal computer.
6. Turn the voltage supply on.

SCHEMATIC



LAYOUT



BILL OF MATERIALS

Table 3: APEK5931xES-01-T Evaluation Board Bill of Materials

ELECTRICAL COMPONENTS					
Designator	Quantity	Value	Description	Part Type	Footprint
C1, C2	2	0.1 μ F	16 V Capacitor	Murata GRM219R71C104KA01D; Digikey 490-1683-1-ND	0805
C3	1	4.7 μ F	35 V Capacitor	Chemi-Con EMZA350ADA4R7MD61G; Digikey 565-2553-1-ND	UCC D61 Cap
C4	1	0.01 μ F	50 V Capacitor	Murata GRM216R71H103KA01D; Digikey 490-1664-1-ND	0805
C7, C8, C9, C11	4	0.1 μ F	25 V Capacitor	Kemet C0805C104K3RACTU; Digikey 399-1168-1-ND	0805
C10, C12	2	10 μ F	25 V Capacitor	TDK C3225X7R1E106M; Digikey 445-1434-1-ND	1210
CN1	1		USB Mini B Recepticle	JAE Electronics DX2R005HN2E700; Digikey 670-1190-1-ND	DX2R005HN2E700
CN2, CN3, JMP1, JMP2	11 Pins		Cut from 50-Pin Strip	Samtec TSW-150-07-T-S; Digikey SAM1035-50-ND	2-pos. shunt, 3-Pin 0.1" Connector, 4-Pin 0.1" Connector
CN4	1		Molex 4-Pin Verticle Recepticle	Molex 22-02-2045; Digikey WM3202-ND	Molex 4-Pin 4455-N Vertical2
CP1, CP2, CTAP, DIR, FG, OUTA, OUTB, OUTC, RD, SCL, SDA, SPD, VBB, VBBIN, VCP, VREF	16		Large Test Point	Keystone Electronics 5010; Digikey 5010K-ND	PAD 57 125 TP HB
D1	1		Schottky Diode	Diodes Inc. B240-13-F; Digikey B240- FDICT-ND	DO-214AA
	4		Bumpon Foot	3M SJ-5303 (CLEAR); Digikey SJ5303-7-ND	Bumpon Foot
J1	1		4-Pin Screw Down Terminal Block	On Shore ED120/4DS; Digikey ED2227-ND	4-pin screw down connector2
J2	1		2-Pin Screw Down Connector	On Shore Technology ED120/2DS; Digikey ED1609-ND	2-pin screw down connector2
L1	1		Ferrite Bead	Laird MI0805K400R-10; Digikey 240-2389-1-ND	0805
			PCB	85-0793-001 Rev. 2	
R1, R2	2	27 Ω	1/8 W Resistor	Vishay/Dale CRCW080527R0FKEA; Digikey 541-27.0CCT-ND	0805
R3, R4, R5, R6	4	4.99 k Ω	1/8 W Resistor	Panasonic ERJ-6ENF4991V; Digikey P4.99KCCT-ND	0805
R7, R8, R9	3	200 Ω	1/8 W Resistor	Panasonic ERJ-6GEYJ201V; Digikey P200ACT-ND	0805
R10	1	2 k Ω	1/8 W Resistor	Panasonic ERJ-6GEYJ202V; Digikey P2.0KACT-ND	0805
RNET1	1	10 k Ω	4 Isolated Resistors	CTS 744C083103JP; Digikey 744C083103JPCT-ND	CTS 744 Series
SW1	1		Dual SPDT Switch	Grayhill 76STC02T; Digikey 76STC02T-ND	76STC02T
U1	1		Fan Driver	A5931xES-T	ES 24-Pin 4x4 QFN
U2	1		USB 8-Bit FIFO IC	FTDI FT240XS-R; Digikey 768-1127-1-ND	SSOP-24 (150 mil)
U3	1		Dual N-Channel FETs	Rohm UM6K1NTN; Digikey UM6K1NTNCT-ND	SOT-363
W1, W2	2		22 Gauge Buss Wire (300 mils above PCB)		Scope Ground
ZD1	1	16 V	TVS Zener	Littelfuse SMBJ16A; Digikey SMBJ16ALFCT-ND	DO-214AA

RELATED LINKS

A5931 Product Page: <https://www.allegromicro.com/en/products/motor-drivers/bldc-drivers/a5931>

Allegro Software Registration Site: <https://registration.allegromicro.com/#/>

APPLICATION SUPPORT

For applications support contact, go to <https://www.allegromicro.com/en/about-allegro/contact-us/technical-assistance> and navigate to the appropriate region.

Revision History

Number	Date	Description
-	July 5, 2023	Initial release

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