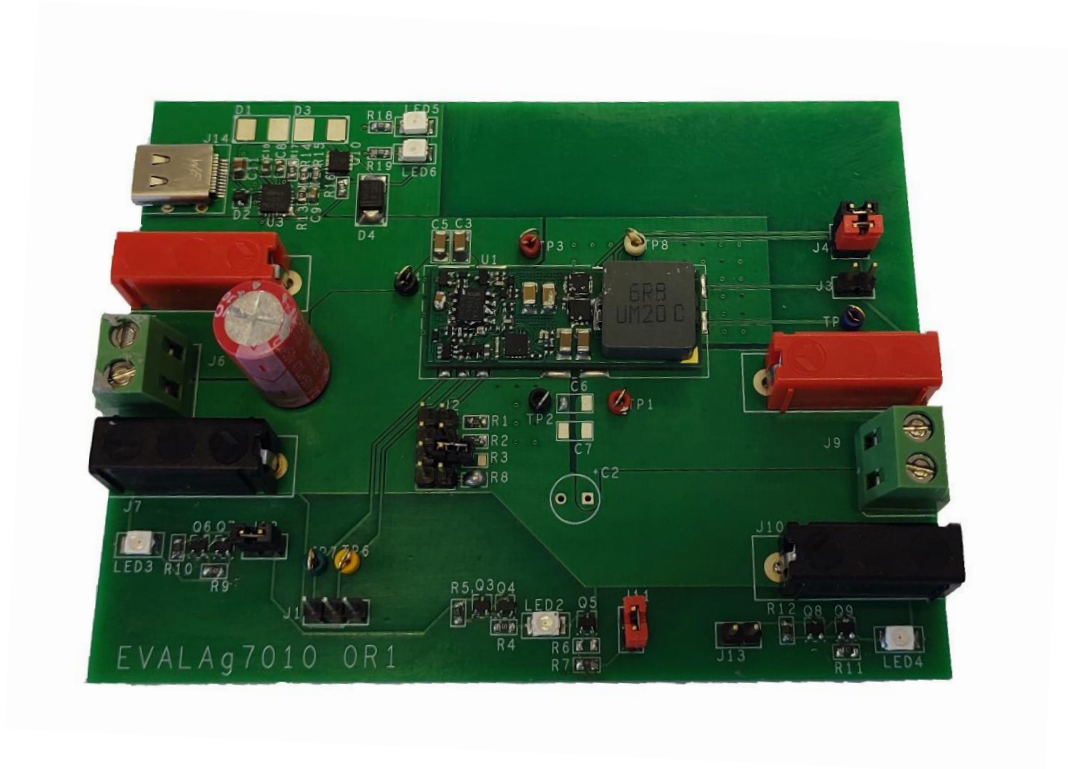




Evaluation Board User Manual



EvalAg7010 Evaluation Board User Manual

Version 1.0 – February 2022

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1 Kit Contents

- EvalAg7010 Evaluation Board
- Ag7010 Soldered to Evaluation Board

2 Additional Components

- I²C controller

3 Board Layout

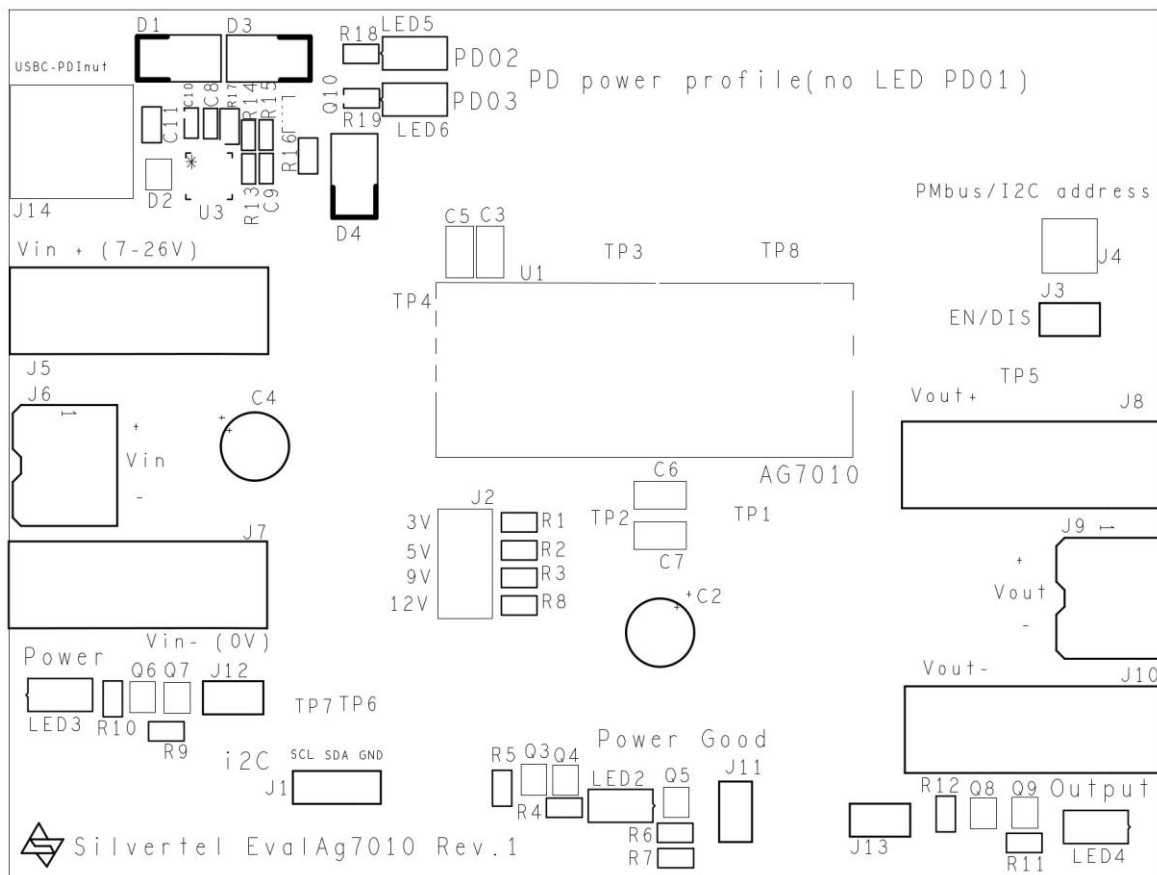


Figure 1: EvalAg7010 Board Layout

3.1 Link Settings

- J2 – Output voltage Select
- J3 – CONTROL Set
- J4 – I²C Address Set
- J11 – PWR good LED Enable
- J12 – Input Power LED Enable
- J13 – Output Power LED Enable

3.2 Input Output Connections

- J1 – I²C Interface
- J5, J6 & J7 – Input Power
- J8, J9 & J10 – Load Output
- J14 – USB-C Connector

4 Introduction

This Manual is a guide to using the EvalAg7010 evaluation board fitted with a Silvertel Ag7010 High Efficiency Buck Converter module for use in a wide variety of point of load (PoL) and DC-DC converter applications, including USB Powered Device (PD), Apple Lightning and Intel Thunderbolt.

5 Input

5.1 Supply

The EvalAg7010 evaluation board can be powered using a DC Power supply connected to either J5 and J7 via banana connectors, J6 with bare wire or J14 via USB-C.

This supply should deliver between 8-24V, a lower voltage will not cause damage to the module. The DCDC converter will be enabled when its supply exceeds the configured VIN_ON setting, by default this is 6.75V.

The Ag7010 can output up to 120W with 10A of continuous output current. At this output current the Ag7010 will dissipate up to 5.1W. Any power source should be suitably rated for the desired output power, the power dissipation of the Ag7010 and any transmission power losses.

5.2 Output Voltage Adjust

The output voltage of the Ag7010 module can be adjusted by changing the location of the jumper J2. There are four jumper locations on J2 for configuring the output voltage of the Ag7010 to either 3V, 5V, 9V, or 12V.

For configuring the output voltage to a user specific value, fit a resistor to location R1 to change the first jumper position, please refer to the Ag7010 datasheet for details on resistor value calculation.

With no jumper present on J2, the module will output 3V.

5.3 CONTROL

The Ag7010 DCDC converter can be enabled or disabled by pulling the CONTROL pin LOW, which can be performed by connecting a jumper link to J3, EN/DIS. This pin function can be inverted or negated using the PMBus configuration.

6 I²C

The Ag7010's I²C interface supports PMBus commands and is designed to the PMBus rev 1.3 specification. This allows for the configuration, control and monitoring of the DC/DC converter by a system controller. For the full command list of the I²C interface, see the Ag7010 Datasheet

The Pin arrangement for the I2C interface is as below:

Serial Clock - Serial Data Analogue – Ground

6.1 I²C Address

Up to four Ag7010 modules can operate on the same I²C bus by configuring them to operate on different addresses. Bits 0 and 1 of the I²C address can be pulled LOW from their default HIGH state by connecting one or two jumpers to J4. Bit 0 is set by the lower row of J4, bit 1 is set by the upper row of J4.

7 Output

The Ag7010 will output 3-12.7V and can deliver a continuous output current of 10A, for up to 120W of continuous power, the peak output power may be reduced as a result of the operating conditions the module is operating in.

7.1 PWR good LED

The power good LED will illuminate when the output voltage has reached a regulated output.

8 Test Setup

Figure 2 shows a typical test set up using the EvalAg7010 evaluation board.

The equipment required: -

- Up to 130W USB PSE or 24V bench power supply
- Application Device
- USB-C cable

Optional equipment: -

- Data source e.g. PC

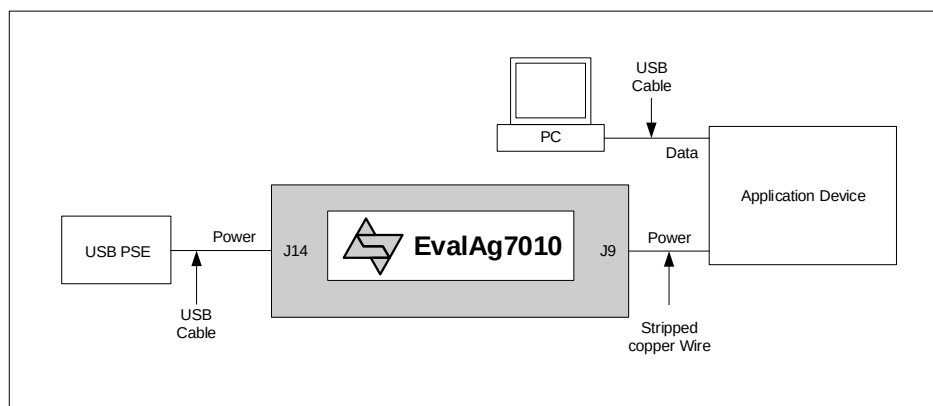


Figure 2: Basic Test Setup

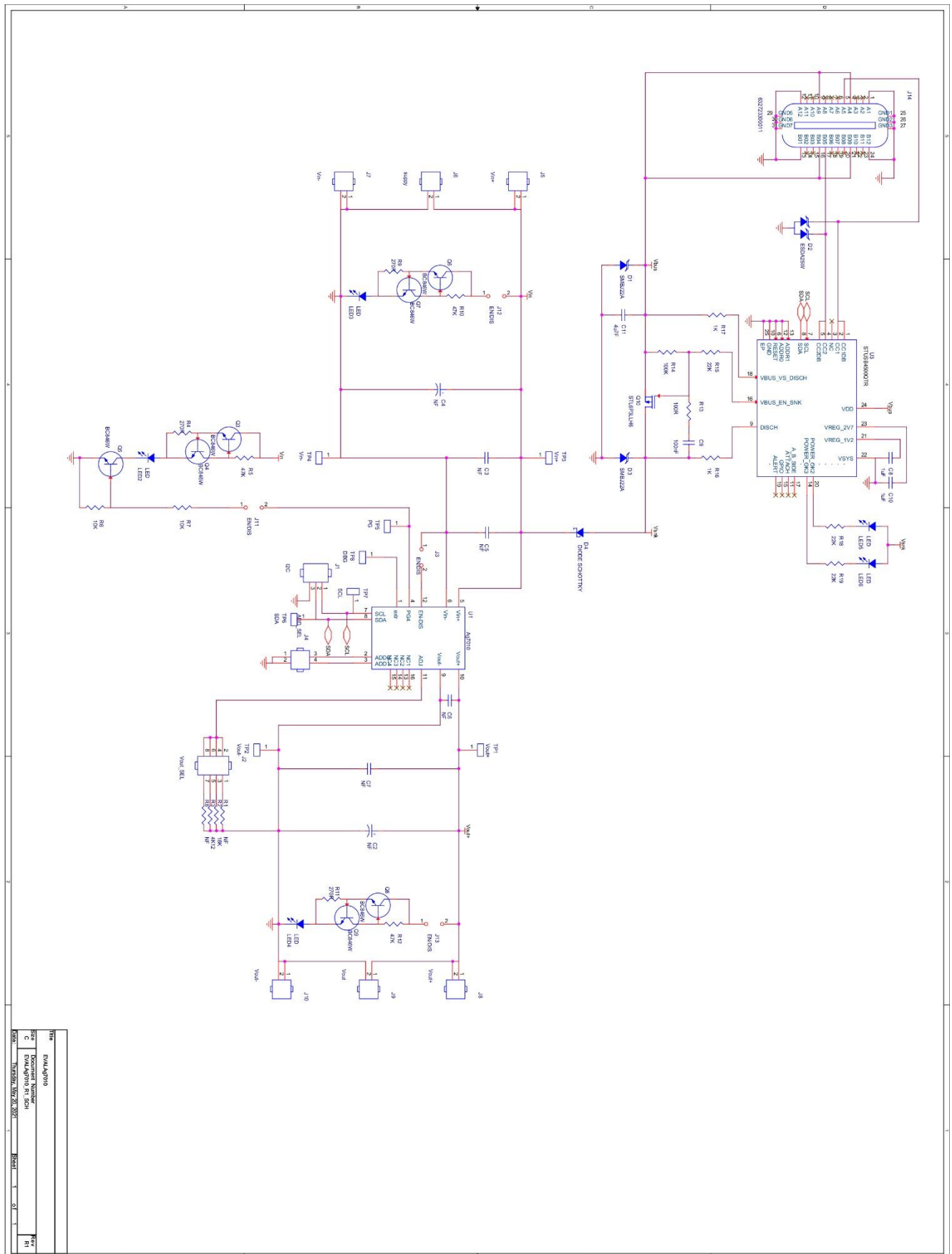
9 USB Data

The EvalAg7010 contains a USB PD controller negotiating power delivery from a USB PSE for the purpose of evaluating the module for USB powered applications. There is no data Throughput for the USB-C connection.

10 Additional information

Full operating conditions and feature set can be found in the Ag7010 product datasheet, available from www.silvertel.com.

11 Schematic



12 Bill of Materials

EvalAg7010 Eval Board - Rev.1										24th Feb 2022		Date
Strictly Private and Company Confidential												
Silver Part No.	Description	Value	Location:	Qty:	Package:	Rating:	Tol:	Supplier Pt. NO:	Comments:			
	Buck Converter Module	Ag7010	U1	1	Custom	-	-	Silver Telecom Part				
	USB PD Sink Controller	STUSB4500CTR	U3	1	QFN-24	-	-	ST Micro				
	Transistor NPN 60V Single	BC946B5V	Q3-Q9	7	SOT1323	-	-	Infineon or NXP Only				
	MOSFET P-Channel	STL6P3LH6	Q10	1	PowerPA7-5x6-8	-	-	ST Micro				
	Protection Diode	SMBJ22A	D1, D3	2	SMB	-	-	Wurth- 824 500 581 Vishay, ST Micro, Diodes Inc				
	Protection Diode	ESD425W	D2	1	SOT323	-	-	ST Micro				
	Schottky Diode	SK54B	D4	1	SMB	5A	-	Taiwan Semi				
	SMD LED	RED LED	LED2,LED6	5	SMT	-	-	Wurth - 150 141 RS7 310 0				
	Capacitor Electrolytic	NF	C2	0	Through Hole	35V	20%	Panasonic, Samsung, NIC, TDK, Murata, Kemet, AVX, Wurth	Pitch: 3.5mm			
	Capacitor Electrolytic	470uF	C4	1	Through Hole	35V	20%	Panasonic, Samsung, NIC, TDK, Murata, Kemet, AVX, Wurth	Pitch: 3.5mm			
	Ceramic multi-layer	22uF	C3	1	1206	35V	20%	Samsung, NIC, TDK, Murata, Kemet, AVX, Wurth				
	Ceramic multi-layer	NF	C5-C7	0	1206	35V	20%	Samsung, NIC, TDK, Murata, Kemet, AVX, Wurth				
	Ceramic multi-layer	1uF	C8, C10	2	0603	25V	20%	Samsung, NIC, TDK, Murata, Kemet, AVX, Wurth				
	Ceramic multi-layer	100nF	C9	1	0603	100V	20%	Samsung, NIC, TDK, Murata, Kemet, AVX, Wurth				
	Ceramic multi-layer	4.7uF	C11	1	0805	250V	20%	Samsung, NIC, TDK, Murata, Kemet, AVX, Wurth				
	Resistor - 0805	Not fitted	R1	0	0805	125mW	1%	Royal Ohm, Eurohm & Yageo				
	Resistor - 0805	19.1K	R2	1	0805	125mW	1%	Royal Ohm, Eurohm & Yageo				
	Resistor - 0805	6.2K	R3	1	0805	125mW	1%	Royal Ohm, Eurohm & Yageo				
	Resistor - 0805	270R	R4, R9, R11	3	0805	125mW	1%	Royal Ohm, Eurohm & Yageo				
	Resistor - 0805	47K	R5, R10, R12	3	0805	125mW	1%	Royal Ohm, Eurohm & Yageo				
	Resistor - 0805	10K	R6, R7	2	0805	125mW	1%	Royal Ohm, Eurohm & Yageo				
	Resistor - 0805	4.7K	R8	1	0805	125mW	1%	Royal Ohm, Eurohm & Yageo				
	Resistor - 0805	100K	R13	1	0603	100mW	1%	Royal Ohm, Eurohm & Yageo				
	Resistor - 0603	100K	R14	1	0603	100mW	1%	Royal Ohm, Eurohm & Yageo				
	Resistor - 0603	22K	R15	1	0603	100mW	1%	Royal Ohm, Eurohm & Yageo				
	Resistor - 0805	1K	R16, R17	2	0805	125mW	1%	Royal Ohm, Eurohm & Yageo				
	Resistor - 0805	22K	R18	1	0805	125mW	1%	Royal Ohm, Eurohm & Yageo				
	Red Connector	4mm PCB Socket	J5, J8	2	Through Hole	-	-	Hirschmann 973682101				
	Black Connector	4mm PCB Socket	J7, J10	2	Through Hole	-	-	Hirschmann 973682100				
	DC Power Connector	2 Way Screw Terminal	J6, J9	2	Through Hole	-	-	Multicomp, Amphenol				
	USB-C Connector	632723300011	J14	1	Through Hole	-	-	Wurth				
	Link	2 Way	J3, J11, J12, J13	4	Through Hole	-	-	Valcon LHCS-02S-R-060-034, Wurth 61300211121				
	Link	3 Way	J1	1	Through Hole	-	-	Valcon LHCS-03S-R-060-034, Wurth 61300311121				
	Link	4x2 Way	J2	1	Through Hole	-	-	Valcon THD-04-R				
	Link	2x2 Way	J4	1	Through Hole	-	-	Valcon THD-02-R				
	Test point	1 Way	TP1-5, TP8	6	Through Hole	-	-	Valcon, Multicomp, Keystone				
	Test point	1 Way	TP6, TP7	0	Through Hole	-	-	Valcon, Multicomp, Keystone				
	PCB	Rev.1 - 106.7mm x 80.3mm	-	1	-	-	-					
	Jumper Links	Links	-	5	-	-	-					
	Feet	Sticky Feet	-	4	-	-	-	Affix RF-022, SL5003				
			Total	71								