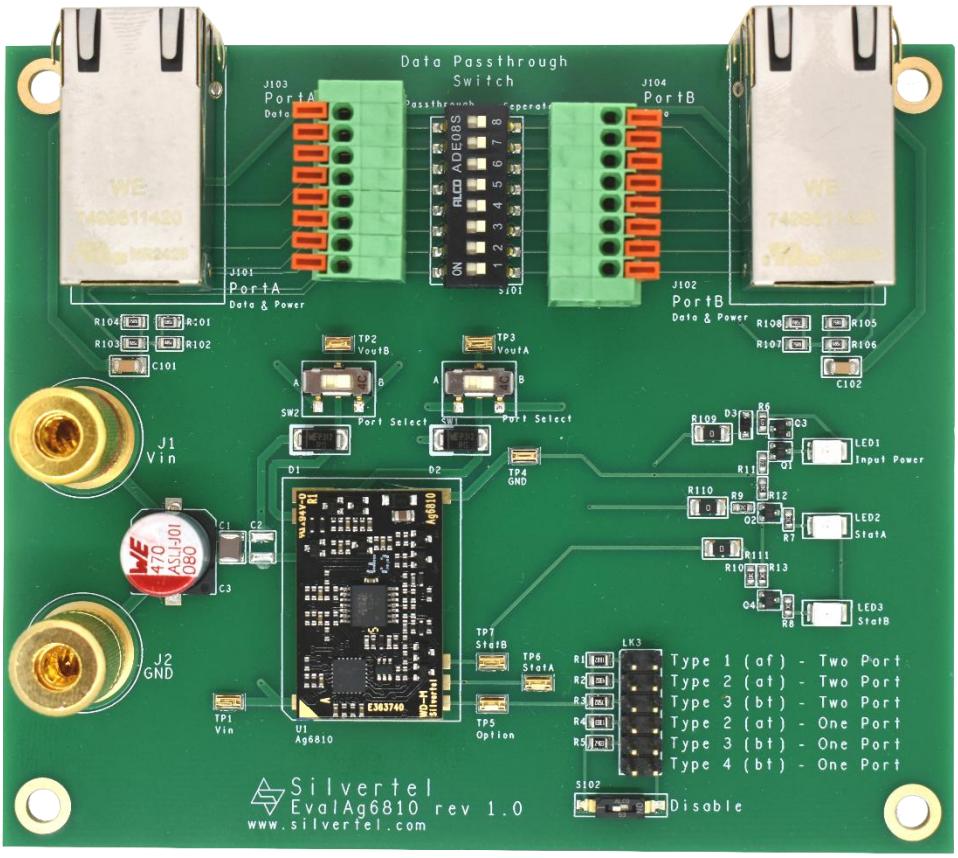
Silvertel

Evaluation Board User Manual



EvalAg6810
Evaluation Board
User Manual

Version 1.0 – March 2025

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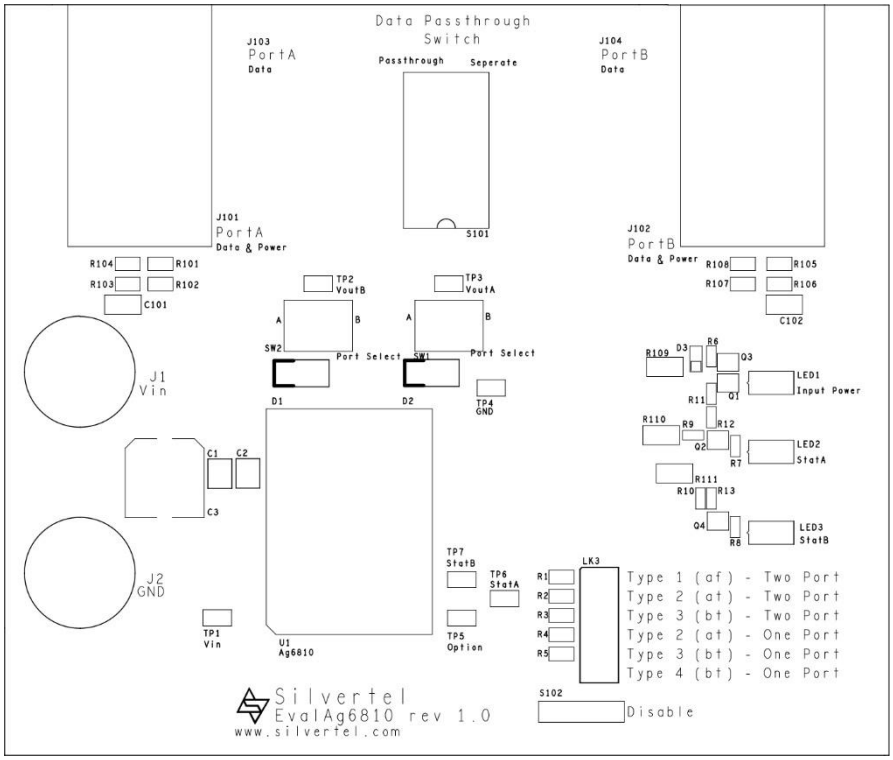

Figure 1: EvalAg6810 Board Layout

2.1 Link Settings

SW1 & SW2 – Output Port Select

S101 – Data Passthrough Select

S102 – Output Disable

LK3 – Option Select

2.2 Input Output Connections

J1 & J2 – Supply Binding Posts

J101 & J102 – RJ45 for Powered Device

J103 & J104 – RJ45 for Data passthrough

3 Introduction

This Manual is a guide to using the EvalAg6810 evaluation board fitted with a Silvertel Ag6810 Power Sourcing Equipment (PSE) Module.

This board is designed to assist with evaluating the use of Silvertel's Ag6810 in an application; as such it has been designed to pass through 10/100/1000BASE-T Ethernet data signals from a source onto any powered device connected to the output ports.

4 Input

4.1 Power

The EvalAg6810 evaluation board is powered using a DC Power supply. The positive supply is connected to binding post J1 and 0V to binding post J2 using 4mm Banana connectors, bare wire, or fork connectors.

The supply should be between 52V and 57V for normal operation in either the Type 3 or Type 4 modes, 50V to 57V for one of the Type 2 modes, or, if the Ag6810 is set to Type 1 Mode, the Supply can be as low as 45V.

5 Operation

To ensure that the Ag6810 does not apply power to a non-PoE enabled device the output port first checks for a valid PoE signature. If the Ag6810 does not see a valid signature then it will disconnect, wait approximately 2 seconds then try again. Once a valid signature has been detected the Ag6810 will then perform the classification checks to determine the power requirement of the PD, only after this has occurred will the Ag6810 supply power to the connected powered device.

6 Mode of Operation select

The Ag6810 has an option to select one of multiple modes of operation. These can be chosen by placing a jumper on the appropriate pins of LK7. If the power option is changed while either of the Ag6810's outputs are powering a device, the change will not take effect until after both outputs of the Ag6810 have ceased power transmission.

Mode	Option resistance	Application IEEE802.3 Compliance	Output		Connected Ports
			Typical power	Highest Class Request	
Dual Type 1	16K	Compliant	2 x 20W	3	Both
Dual Type 2	43KΩ	Compliant	2 x 36W	4	Both
Dual Type 3	75KΩ	Proprietary	2 x 75W	6	Both
Single Type 2 (at)	130KΩ	Compliant	36W	4	Either
Single Type 3 (bt)	240KΩ	Compliant	75W	6	Either
Single Type 4 (bt)	Open Circuit	Compliant	95W	8	Either

Table 1: Option selection

6.1 Data passthrough

There are several methods of data passthrough on the EvalAg6810. The Data can either pass from one of the RJ45 connectors to the other, with all the switches of S101 slid to the "Passthrough" position (Port A side). Alternatively, by having the 8 slide switches on the "Separate" position (Port B side) the data can be passed form source device via the termination block J103 or J104 to the relevant port.

7 Pairset Select

The Ag6810 has the option to power a single port or two ports, to facilitate this the EvalAg6810 contains two slide switches SW1 and SW2. The slide switches change the connection of each of the Ag6810's outputs from the to the cable pairs on Port A to the cable pairs on Port B.

The connections are made such that the evaluation board can supply power in Alt A (data pair) or Alt B (spare pair) configuration when in one of the two port modes. With V_{outA} connected to Port A, and V_{outB} connected Port B, the evaluation board will be providing power in the Alt A configuration. With V_{outA} connected to Port B, and V_{outB} connected Port A, the evaluation board will be providing power in the Alt B configuration.

The Ag6810 switches power on the return path for each pairset, as such the positive input is directly connected to the two of the pairs on both of the RJ45 ports fitted to the evaluation board to facilitate operation in any of the output configurations.

8 Input Power LED

The EvalAg6810 features an input LED, LED1 that will illuminate to indicate that the evaluation board is receiving power. This LED begins to illuminate when the supply voltage exceeds 30V, as a result this LED may be illuminated while the supply voltage is still lower than the under-voltage lockout for the selected mode.

9 Status Output LED

The EvalAg6810 has two Status LEDs that will illuminate if the Ag6810's outputs are providing power to a powered device.

LED2 (STATA) will indicate the status of the port or pairset connected to VOUTA, LED3 (STATB) will indicate the status of the port or pairset connected to VOUTB. The exception to this is when the module is in a single port mode and a single signature PD is connected, in this configuration LED2 will indicate the status for both VOUTA and VOUTB Outputs.

In the event of a fault being detected, the relevant LED will flash as per the table below.

Fault Condition	Status Pulses (200ms)
Device Identification Error	1 x Logic 1 Pulse
Input Voltage < UVLO limit	2 x Logic 1 Pulses
Short Circuit	3 x Logic 1 Pulses
Overload Current	4 or 5 x Logic 1 Pulses

Table 2: Status Output

10 Test Setup

Figure 2 shows the basic set up using the EvalAg6810 evaluation board powered by a DC power supply with an output between 52V and 57V. The powered device and data source need not be connected before power is applied.

The equipment required: -

- Power supply unit, +52V to +57V output e.g. from a 60V bench power supply
- Powered device
- CAT5e/CAT6a cables

Optional equipment: -

- Data source e.g. PC

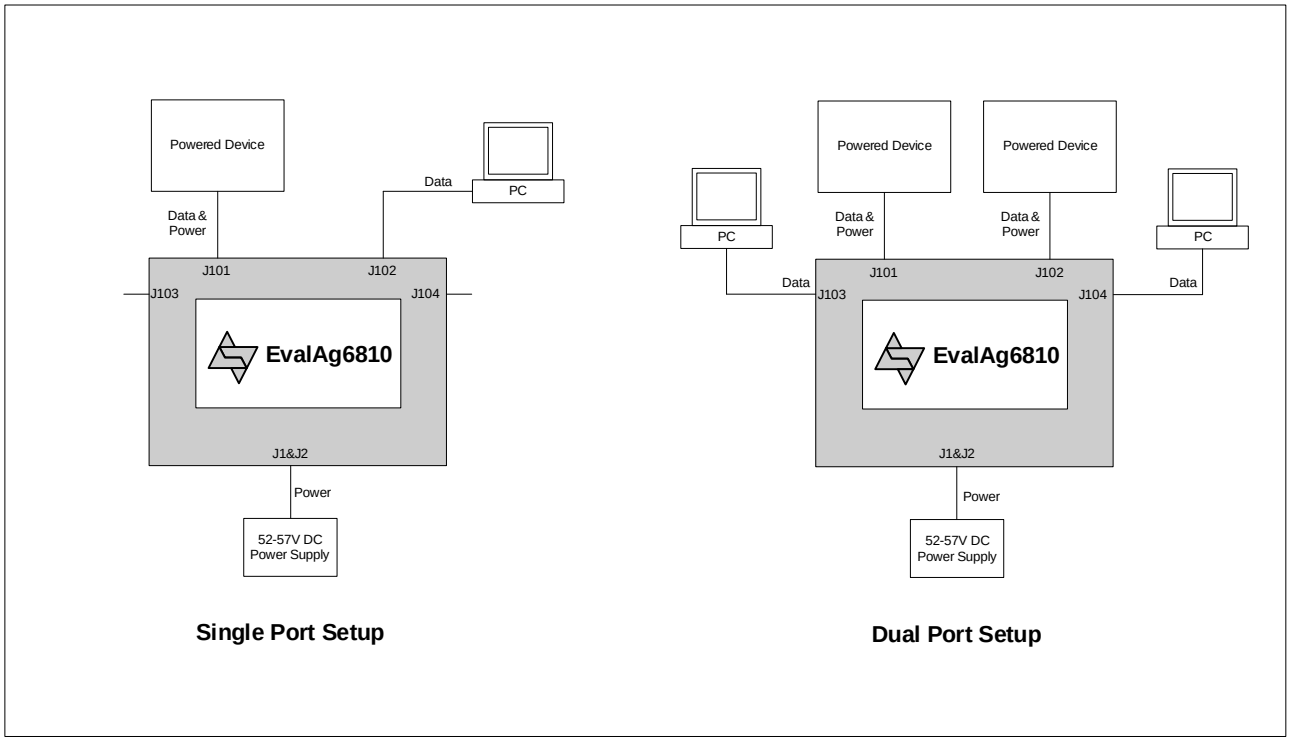

Figure 2 Basic Test Setup

11 Additional information

Full operating conditions and feature set can be found in the Ag6810 product datasheet, available from www.silvertel.com.

12 Schematic

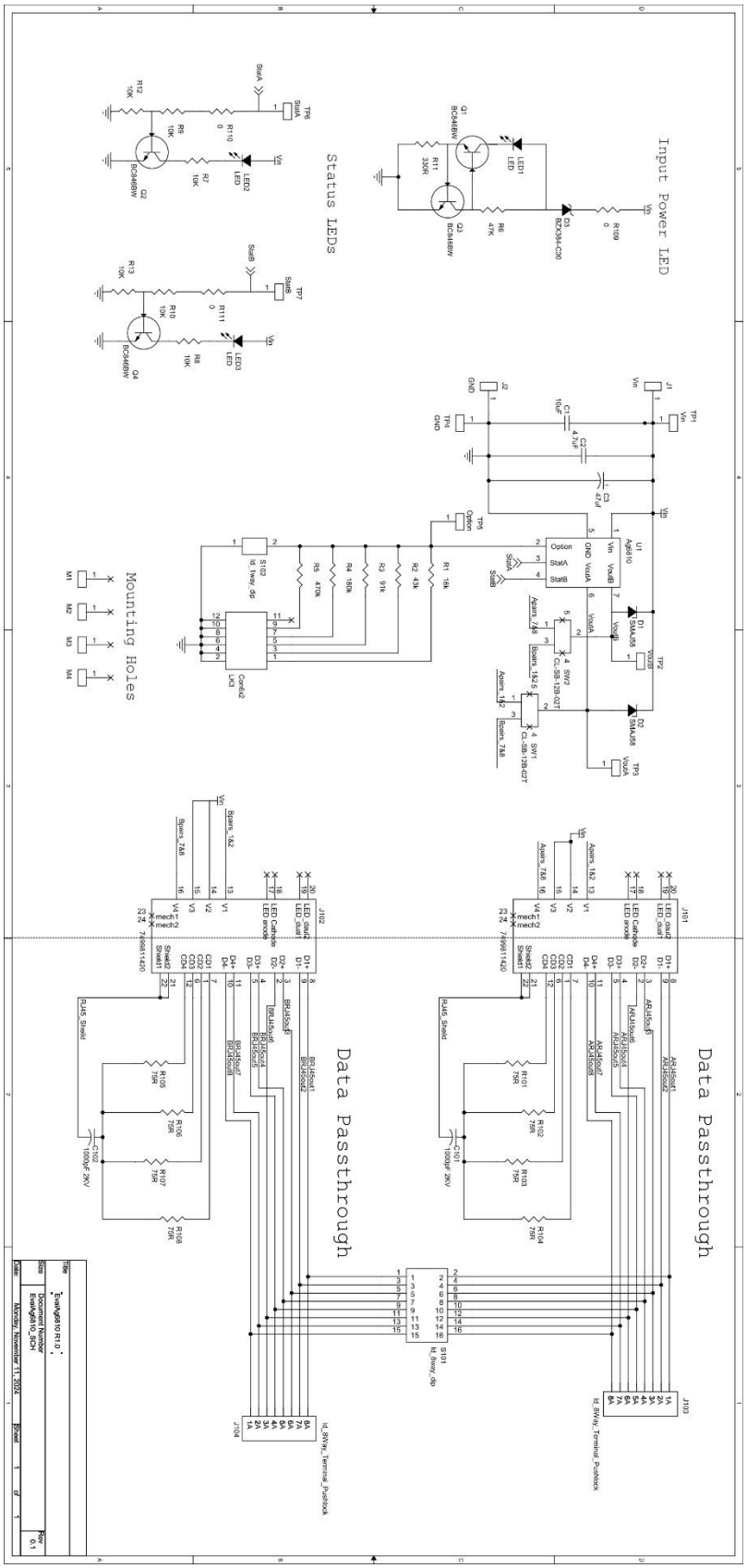

Figure 3: Schematic

13 Bill of Materials

EvalAg6810 Eval Board - Rev.1.0								Date: 5th March, 2025	
Strictly Private and Company Confidential									
Silver Part No.	Description	Value	Location:	Qty:	Package:	Rating:	Tol:	Supplier Pt NO:	Comments:
	PD Module	Ag6810	U1	1	Custom	-	-	Silver Telecom Part	
	Transistor NPN 60v Single	BC846BW	Q1,Q2,Q3,Q4	4	SOT323	-	-	Infineon or NXP Only	
	Protection Diode	SMAJ58A	D1, D2	2	SMA	-	-	Wurth- 824 500 581,Vishay, ST Micro, Diodes Inc	
	Zener Diode - 30v	BZX384-C30	D3	1	SOD323	-	-	Vishay	
	SM LED	RED LED	LED1, LED2, LED3	3	SMT	-	-	Wurth - 150 141 RS7 310 0	
	Electrolytic Capacitor	47uF - 10mm diam	C3	1	SMT	63V	20%	Samsung, NIC, TDK, Murata, Kemet, AVX, Wurth	
	Ceramic multi-layer	10uF	C1	1	1210	100V	20%	Samsung, NIC, TDK, Murata, Kemet, AVX, Wurth	
	Ceramic multi-layer	4.7uF	C2	1	1210	100V	20%	Samsung, NIC, TDK, Murata, Kemet, AVX, Wurth	
	Ceramic multi-layer	1nF	C101,C102	2	1206	1500V	20%	Samsung, NIC, TDK, Murata, Kemet, AVX, Wurth : 885342208024	
	Resistor - 0603	330R	R11	1	0603	64mW	1%	Royal Ohm, Eurohm & Yageo	
	Resistor - 0603	47K	R6	1	0603	64mW	1%	Royal Ohm, Eurohm & Yageo	
	Resistor - 0603	10K	R7-R10,R12,R13	6	0603	64mW	1%	Royal Ohm, Eurohm & Yageo	
	Resistor - 0805	16K	R1	1	0805	125mW	1%	Royal Ohm, Eurohm & Yageo	
	Resistor - 0805	43K	R2	1	0805	125mW	1%	Royal Ohm, Eurohm & Yageo	
	Resistor - 0805	75K	R3	1	0805	125mW	1%	Royal Ohm, Eurohm & Yageo	
	Resistor - 0805	130K	R4	1	0805	125mW	1%	Royal Ohm, Eurohm & Yageo	
	Resistor - 0805	240K	R5	1	0805	125mW	1%	Royal Ohm, Eurohm & Yageo	
	Resistor - 0805	75R	R101-R108	8	0805	125mW	1%	Royal Ohm, Eurohm & Yageo	
	Resistor - 1206	0R	R109-111	3	1206	125mW	1%	Royal Ohm, Eurohm & Yageo	
	Red Connecor	Binding Post	J1	1	Screw Mount	-	-	Switch Electronics 354147	
	Black Connector	Binding Post	J2	1	Screw Mount	-	-	Switch Electronics 354146	
	8 way push lock Connector	691403900008, 234-508	J103,J104	2	Through Hole	-	-	Wurth, Wago	
	Ethernet Connector With Magnetics	7499811420	J101, J102	2	Through Hole	-	-	Wurth - 7499811420	
	Switch DIP - 2 Way - 1 Pole	CL-SB-12B-02T	SW1, SW2	2	SMT	-	-	NIDEC COMPONENTS	
	Switch DIP - 2 Way - 8 Pole	1-1825058-9	S101	1		-	-	ALCOSWITCH - TE CONNECTIVITY	
	Switch DIP - 1 Way - 1 Pole	CFS-01011TB,, EDS01SGNNTR04Q	S102	1		-	-	NIDEC COMPONENTS, ALCOSWITCH - TE CONNECTIVITY	
	Link	2x6 Way	LK3	1	Through Hole	-	-	Toby:FTHD-06R-110-055-030, Wurth: 61301221121	
	Test point	HK-1-G	TP1-7	7	SMT	-	-	Mac 8	
	PCB	Rev.1.0 - 116.8mm x 99.1mm		1		-	-		
	Stud Screw	M4 10mm Flush Stud	M1, M2	0	-	-	-	TR FASTENINGS M4HCS10STZ50	
	Stud Screw	M4 10mm Flush Stud	M3, M4	2	-	-	-	TR FASTENINGS M4HCS10STZ50	
	M4 Nut	M4 Nut	M3,M4	2	-	-	-		
	Jumper Links	Links	LK3	1		-	-		
	Feet	GRF24006A	-	4	-	-	-	Essentra	
			Total	68					

Figure 4: Bill of Materials

14Layer Routing

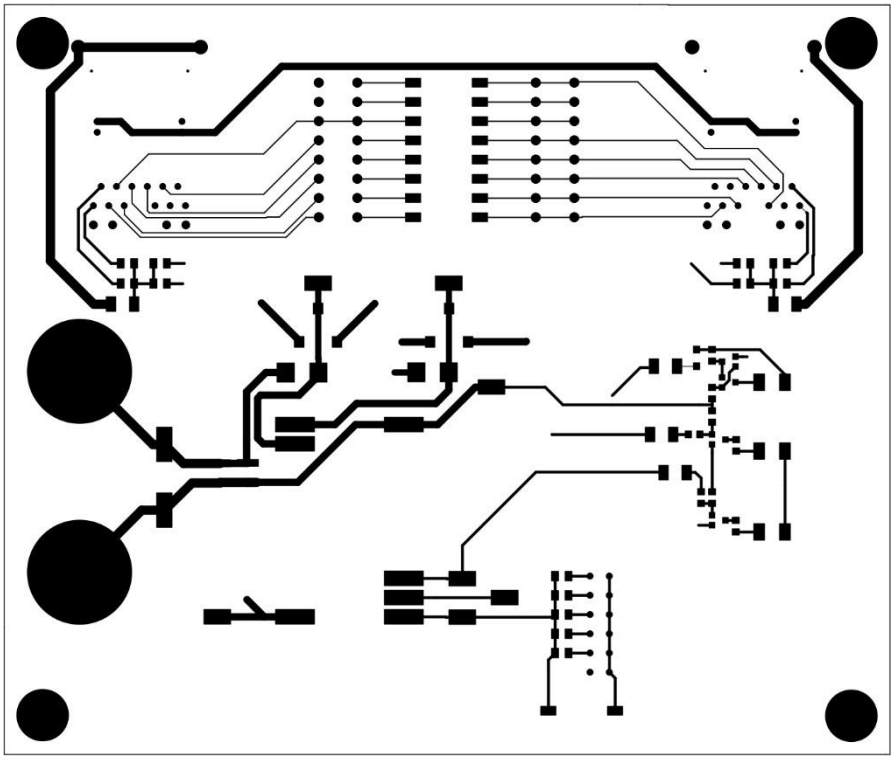

Figure 5: Top Layer Routing

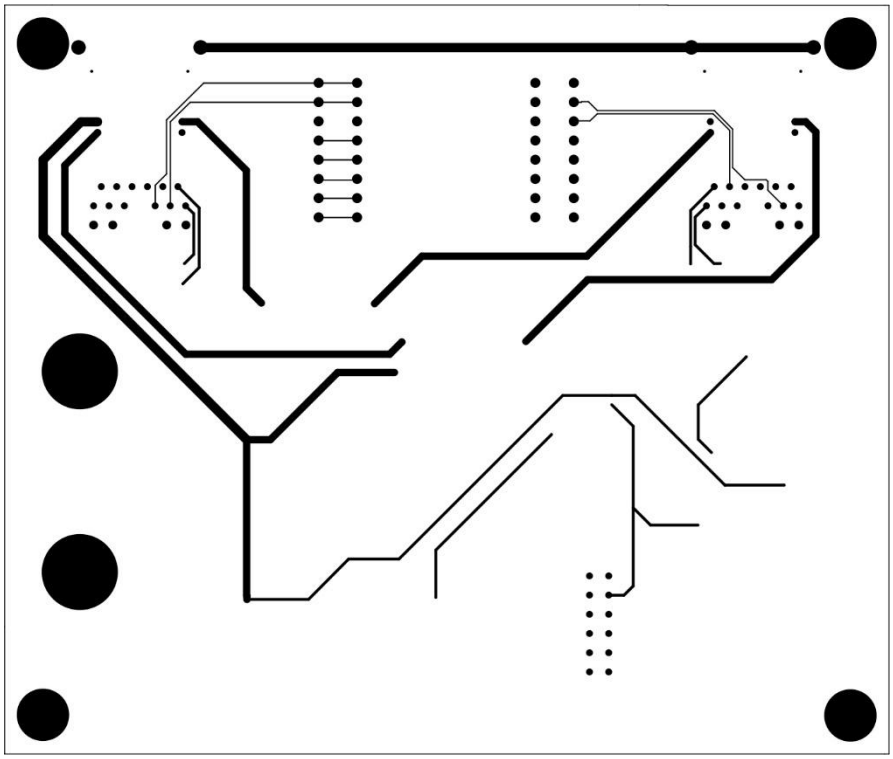

Figure 6: Bottom Layer Routing