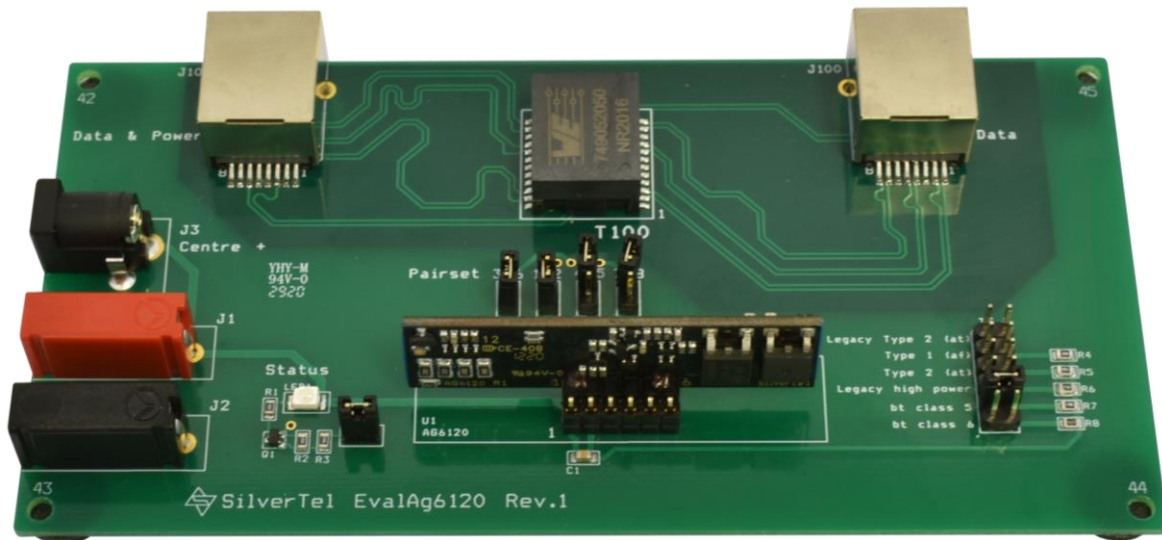




# Evaluation Board User Manual



## EvalAg6120 Evaluation Board User Manual

Version 1.0 – September 2020

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## 1 Kit Contents

- EvalAg6120 Evaluation Board
- Ag6120 PSE Module

## 2 Introduction

This Manual is a guide to using the EvalAg6120 evaluation board fitted with a Silvertel Ag6120 Single Channel Power Sourcing Equipment (PSE) Module.

This board is designed to assist with evaluating the use of Silvertel's Ag6120 in an application; as such it has been design to pass through 10/100/1000/10GBASE-T Ethernet data signals from any source connected to J100 onto the powered device connected to J101

This Evaluation board can also be used with the Ag6100 or Ag6110 Modules; however the output power settings are not a feature of those modules.

## 3 Board Layout

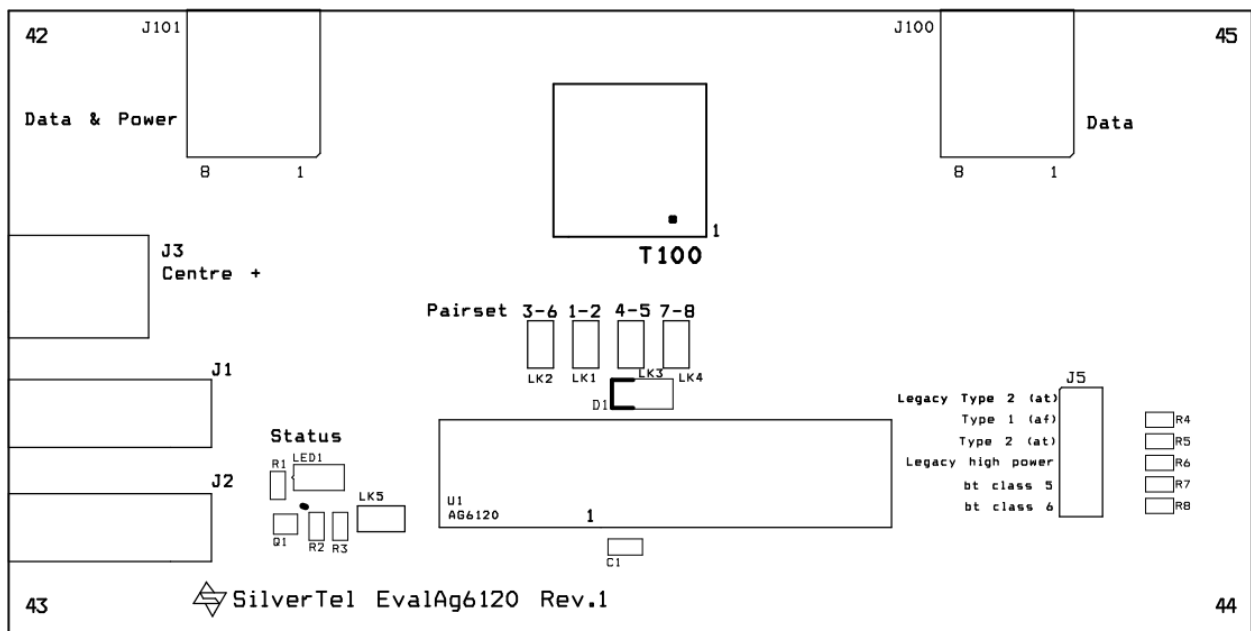


Figure 1: EvalAg6120 Board Layout

### 3.1 Link Settings

- LK1-4 – Output Pairset Enable
- LK5 – Status LED Enable
- J5 – Output Power Select

## 4 Input

### 4.1 Power

The EvalAg6120 evaluation board is powered using a DC Power supply delivering between +44V to +57V. The positive supply is connected to either J1 or the centre pin of J3 and 0V to either the outer ring of J3 or J2.

### 4.2 Data

A data source can be connected to the Data port J100 via RJ45 connector. This data will be transposed onto the Data and Power output port J101 via the data transformer. The data traces on the evaluation board have been designed to pass through 10/100/1000/10GBASE-T Ethernet data signals. No processing or amplification of this signal will be performed on the evaluation board

## 5 Power option select

The Ag6120 has an option to select its output power and class. These can be chosen by placing a jumper on the appropriate pins of J5. The power option select should be set while the Ag6120 is powered off, if the power option is changed while the device is powered, the change will not occur until after the Ag6120 output has been power cycled.

Mode	Classification type <sup>*2</sup>	Max output power <sup>*3</sup>	Connected pair sets <sup>*4</sup>
Legacy Type 2 (at) <sup>*1</sup>	IEEE802.3at	38W	Either 2
Type 1 (af)	IEEE802.3bt	20W	Either 2
Type 2 (at)	IEEE802.3bt	38W	Either 2
Legacy high power	at + legacy class 5	75W	All 4
BT 1 pair (bt class 5) <sup>*5</sup>	IEEE802.3bt	46W	Either 2/all 4
BT Type 3 (bt class 6) <sup>*5</sup>	IEEE802.3bt	75W	All 4

**Table 1: option selections and limits**

<sup>\*1</sup> Not recommend for new designs only for use as drop in replacement of the Ag6100

<sup>\*2</sup> See section 5.5.2: Classification of the Ag6120 Datasheet for details

<sup>\*3</sup> See sections 5.7: Output Current Limits & 5.8: Output Power of the Ag6120 Datasheet for details

<sup>\*4</sup> See section 5.4: Port Output of the Ag6120 Datasheet for details

<sup>\*5</sup> Compatible with IEEE802.3bt single signature PDs

## 6 Pairset Select

The EvalAg6120 contains four links LK1-4 that connect the pairsets to the outputs of the Ag6120. In order to enable power transfer down a given pairset a jumper should be inserted onto the relevant link or removed if power is not desired down that given pairset.

Pairsets 1-2 and 4-5 are connected to the positive output of the Ag6120. While pairsets 3-6 and 7-8 are connected to the negative output of the Ag6120. In high power modes all four jumpers should be fitted.

When only two pairsets are to be connected, in order to guarantee operation either pairsets 1-2 & 3-6 should be connected or pairsets 4-5 & 7-8 should be connected.

## 7 Operation

To ensure that the Ag6120 does not apply power to a non-PoE enabled device the output port first checks for a valid PoE signature. If the Ag6120 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 Ag6120 will then perform classification to determine the power requirement of the PD, only after this has occurred will the Ag6120 supply power to the powered device.

## 8 Status Output

The Status LED will illuminate if the Ag6120 is providing power to the output port. It will also flash as per the table below when an error has occurred. If this functionality is not desired, it can be disabled by removing the jumper on link LK5.

<b>Fault Condition</b>	<b>Status Pulses (200ms)</b>
Short Circuit	1 x Flash
Over Current	2 x Flashes
Signature/Class Error	3 x Flashes
Input Voltage < UVLO limit	4 x Flashes

**Table 2: Status Output**

## 9 Test Setup

Figure 2 shows the basic set up using the EvalAg6120 evaluation board powered by a DC power supply with an output between 44V and 57V. The power option select should already be set before supplying power to the module. The powered device and data source need not be connected before power is applied.

The equipment required: -

- Power supply unit, +44-57V output e.g. 60V bench power supply
- Powered device
- CAT5e/CAT6a cables

Optional equipment: -

- Data source e.g. PC

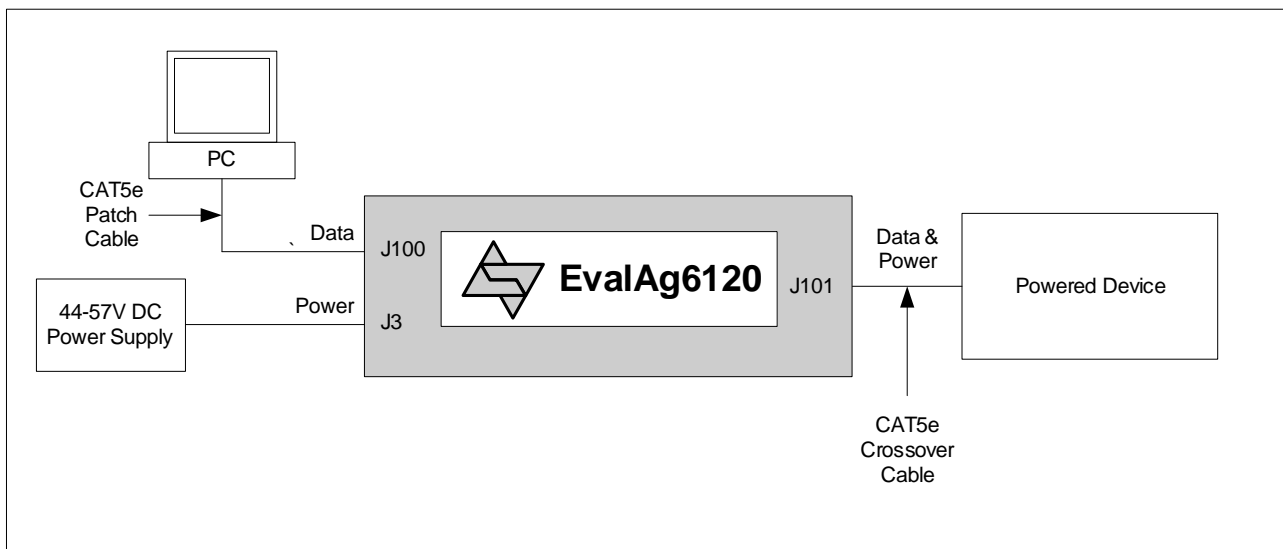
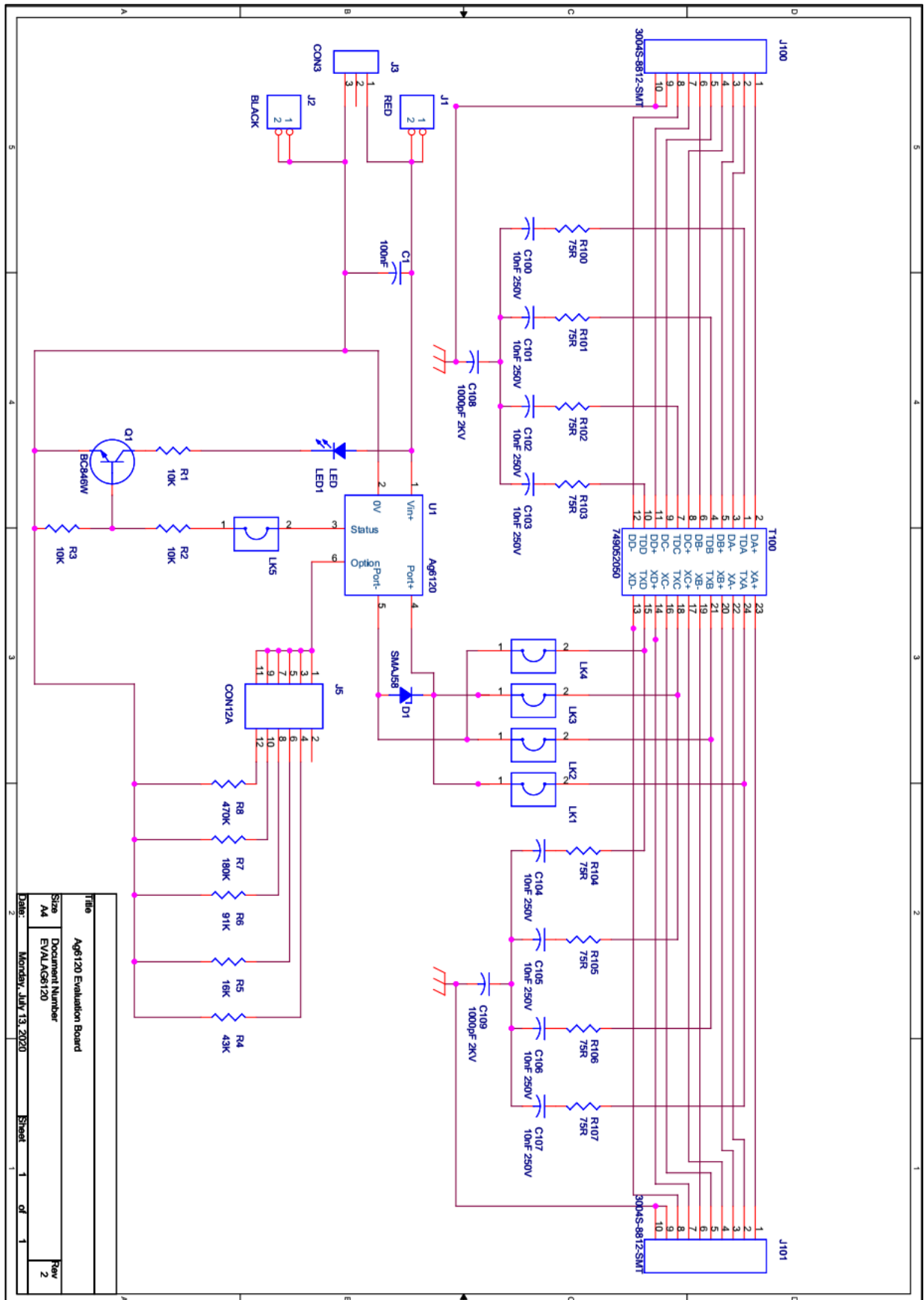


Figure 2 Basic Test Setup

## 10 Additional information

Full operating conditions and feature set can be found in the Ag6120 product datasheet, available from [www.silvertel.com](http://www.silvertel.com).

### 11 Schematic



### 12 Bill of Materials

EVALAg6120 Eval Board - Rev.1										13th July 2020	Date
***Strictly Private and Company Confidential***											
Silver Part No.	Description	Value	Location:	Qty:	Package:	Rating:	Tol:	Supplier Pt.No:	Comments:		
	POE+ PSE Module	Ag6120	U1	1	Custom	-	-	Silver Telecom Part			
	Transistor NPN 60V Single	BC846Bw	Q1	1	SOT323	-	-	Infratec or NXP Only			
	Protection Diode	SMAJ15BA	D1	1	SMA	-	-	Würth- 824 500 581 Vishay, ST Micro, Diodes Inc			
	Transformer - Data	10G BaseT POE+	T100	1	SMT	-	-	Würth - 749052050			
	SM LED	RED LED	LED1	1	SMT	-	-	Würth - 150 141 RST 310 0			
	Ceramic multi-layer	100nF	C1	1	0805	100V	20%	Samsung, NTC, TDK, Murata, Kennel & AVX			
	Ceramic multi-layer	10nF	C100 - C107	8	0805	250V	20%	Samsung, NTC, TDK, Murata, Kennel & AVX			
	Ceramic multi-layer	1000µF 2KV	C108, C109	2	1206	2KV	20%	Samsung, NTC, TDK, Murata, Kennel & AVX, Würth-885342208024			
	Resistor - 0803	10K	R1, R2, R3	3	0603	63mW	1%	Royal Ohm, Eurohm & Yageo			
	Resistor - 0805	75R	R100 - R107	8	0805	125mW	1%	Royal Ohm, Eurohm & Yageo			
	Resistor - 0805	43K	R4	1	0805	125mW	1%	Royal Ohm, Eurohm & Yageo			
	Resistor - 0805	16K	R5	1	0805	125mW	1%	Royal Ohm, Eurohm & Yageo			
	Resistor - 0805	91K	R6	1	0805	125mW	1%	Royal Ohm, Eurohm & Yageo			
	Resistor - 0805	180K	R7	1	0805	125mW	1%	Royal Ohm, Eurohm & Yageo			
	Resistor - 0805	470K	R8	1	0805	125mW	1%	Royal Ohm, Eurohm & Yageo			
	Red Connector	4mm PCB Socket	J1	1	Through Hole	-	-	Hirschmann 973582100			
	Black Connector	4mm PCB Socket	J3	1	Through Hole	-	-	Hirschmann 973582101			
	Ethernet Connector	RJ45	J100, J101	2	SMT	-	-	Toby, DC-001-B-2-5MM-R, Würth 694108301002			
	DC Power Connector	DC-001	J3	1	Through Hole	-	-	Toby, DC-001-B-2-5MM-R, Würth 694108301002			
	Link	2x6 Way	J5	1	Through Hole	-	-	Toby/ETHD-08R-110-055-030, Würth: 61301221121			
	Link	2 Way	LK1-LK5	5	Through Hole	-	-	Toby LHCS-02S-R-060-034, Würth 6130021121			
	Module Socket	6 Way	U1	1	Through Hole	-	-	Toby SLW-106-01-G-S			
	PCB	Rev 2R - 127mm x 102mm		1		-	-				
	Jumper/Links	Links	LK1 - LK5, J5	6		-	-				
	Feet	Sticky Feet		4		-	-	Athy RF-022			
				45		Total					