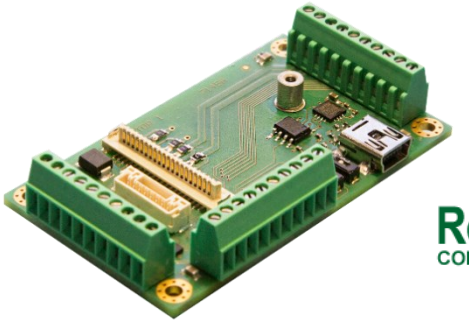
Evaluation Board for TEC Controller



RoHS COMPLIANT

General Description:

The EVL-1093 is an evaluation board for the TEC-1092 TEC Controller and provides easy connectivity for it.

The TEC-1092 is not included with the EVL-1093.

It has the same size and pinout as the TEC-1091. (Except the additional connector X5)

Please refer to the datasheet of the TEC-1092 (document 5208) for more information.

Features

Input Characteristics:

- DC Input Voltage: 5 to 12 V

Main Features:

- USB connector to interface the TEC-1092
- RS232 and RS485 (Half-Duplex) connectors
- Interface for TEC-1092
- ESD protection
- Screw connectors

Special Requirements / More Information:

- Please contact us for additional information or customization.

Absolute Maximum Ratings

Supply voltage (DC)	14 V

Operating Characteristics for Firmware >= v4.00

Temperature	-40°C to 90°C
Humidity	5 – 95%, non-condensing

Electrical Characteristics

Unless otherwise noted: T_A = 25 °C, V_{IN} = 12 V

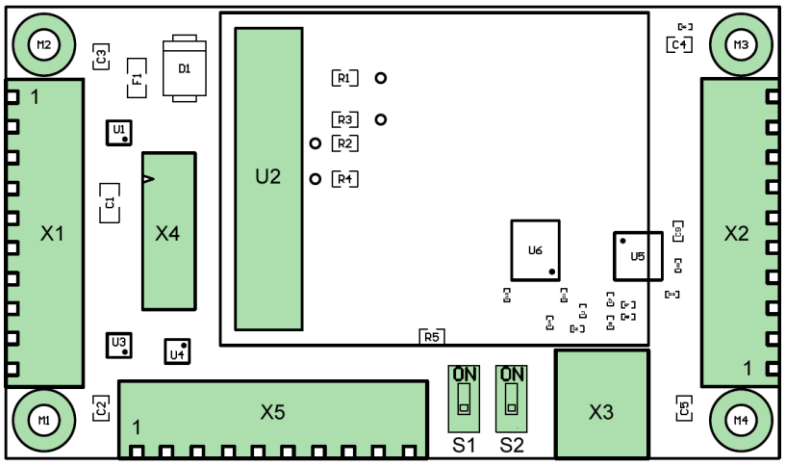
Symbol	Parameter	Test Conditions / Hints	Min	Typ	Max	Units
DC Power Supply Input:						
V_{IN}	Supply voltage		4.9		12	V
USB:						
V_{PP}	Electrical isolation				1	kV

RS232 TTL and General Purpose Digital I/O Characteristics (GPIO1 … GPIO8, RX, TX)

Unless otherwise noted: T_A = 25°C, U_{IN} = 12 V

Symbol	Parameter	Test Conditions / Hints	Min	Typ	Max	Units
ESD Protection: (Between TEC-1092 and Connector)						
V_{PP}	ESD discharge	IEC61000−4−2			100	kV
R_A	Series resistance		170	200	230	Ω

Pin Configuration and Mechanical Data



Top view

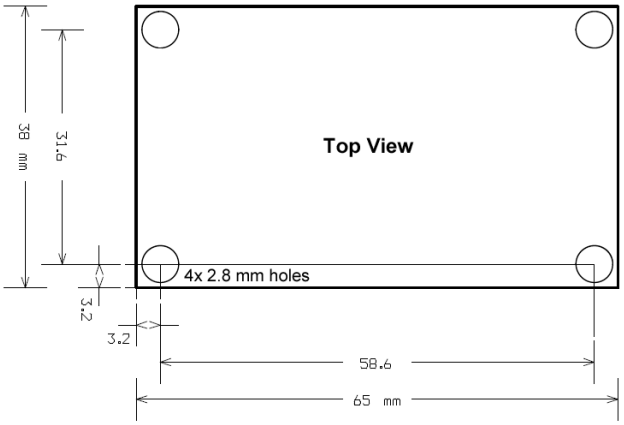
Pin Description:

X1	1	Power VIN
	2	Power GND
	3	GPIO1
	4	GPIO2
	5	GPIO3
	6	GPIO4
	7	RS232 TTL TX
	8	RS232 TTL RX
	9	RS485 A2 (D+)
	10	RS485 B2 (D-)
X2	1	HR temperature sensor IA
	2	HR temperature sensor IB
	3	HR temperature sensor UA
	4	HR temperature sensor UB
	5	Shield
	6	LR temperature sensor A
	7	LR temperature sensor B
	8	GND
	9	Out- (Peltier element minus)
	10	Out+ (Peltier element plus)
X5	1	GPIO5
	2	GPIO6
	3	GPIO7
	4	GPIO8
	5	NC
	6	NC
	7	NC
	8	NC
	9	3.3 V
	10	5 V
X3	USB mini B	
X4	Status Display Kit DPY-111x connector	
U2	TEC-1092 connector	

U2	TEC-1092 connector
S1	On: 120 Ω RS485 termination enabled
S2	On: USB connectivity enabled Off: RS232 TTL connectivity enabled

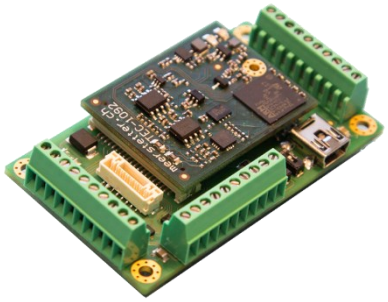
Dimensions:

65 mm × 38 mm × 14 mm

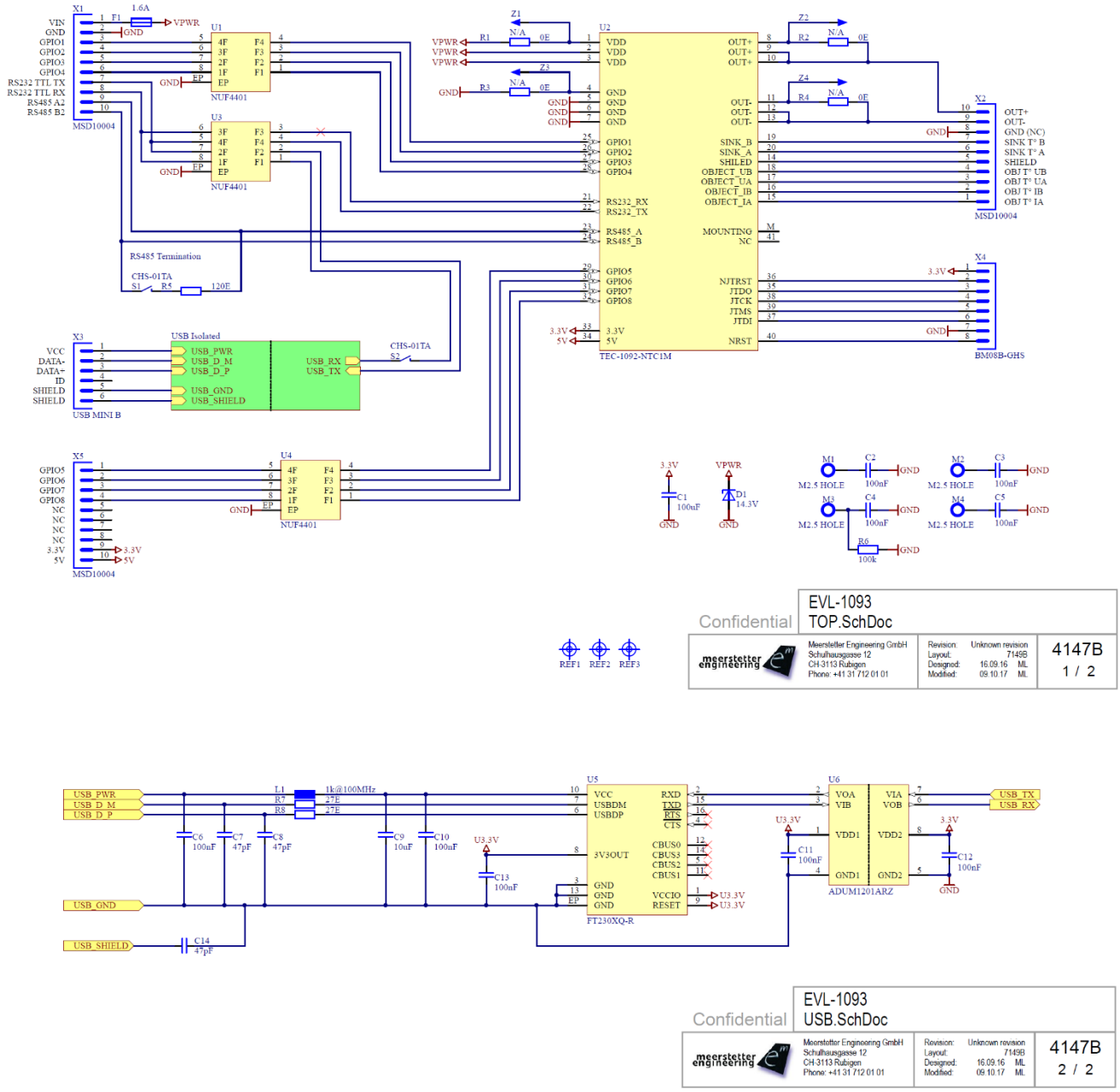


Operation Modes / Theory of Operation

The EVL-1093 allows the evaluation and simple connection of a TEC-1092 to a host system using USB. Further, a DPY-111x TEC Status Display Kit can be connected.



Schematic



Please contact Meerstetter Engineering if you need the whole Altium Project inclusive layout.

Parts List

Quantity	Referenze	Component	Value	Manufacturer	Manufacturer Part No.
1	PCB	PCB 7149B	EVL-1093	MEERSTETTER ENGINEERING	ME7149B
3	C7, C8, C14	CAPACITOR CERAMIC	47pF / 50V	TDK	C1005C0G1H470J
5	C6, C10, C11, C12, C13	CAPACITOR CERAMIC	100nF / 25V	TDK	C1005X7R1E104K050BB
4	C2, C3, C4, C5	CAPACITOR CERAMIC X7R	100nF / 50VDC	AVX	08055C104KAT2A
1	C9	CAPACITOR CERAMIC	10uF / 10V	MURATA	GRM188R61A106KE69D
1	C1	CAPACITOR CERAMIC X5R	100uF / 10V	TDK	C3216X5R1A107M160AC
4	R1, R2, R3, R4	RESISTOR-0.1W-1% SMD	0E	MULTICOMP	MC 0.1W 0805 0R
2	R7, R8	RESISTOR-63mW-1% SMD	27E	VISHAY DRALORIC	CRCW040227R0FKED
1	R5	RESISTOR ANTI-PULSE SMD	120E / 0.25W	PANASONIC	ERJT06J121V
1	R6	RESISTOR-125mW-1% SMD	100k	VISHAY DRALORIC	CRCW0402100KFKEAHP
1	L1	FERRITE BEAD	1k@100MHz	TAIYO YUDEN	BK1005HS102-T
1	F1	FUSE SMD FAST	1.6A / 63VDC	SCHURTER INC	3413.0218.22
1	D1	DIODE TRANSIL UNIDIR SMD	VBR MIN = 14.3V	ST MICROELECTRONICS	SM6T15A
2	S1, S2	SWITCH DIP 1POS SMD	CHS-01TA	COPAL ELECTRONICS	CHS-01TA
3	U1, U3, U4	FILTER EMI / ESD	NUF4401	ON SEMICONDUCTOR	NUF4401MNT1G

Quantity	Referenze	Component	Value	Manufacturer	Manufacturer Part No.
1	U6	DIGITAL ISOLATOR 2CH 1MB	ADUM1201ARZ	ANALOG DEVICE	ADUM1201ARZ
1	U5	USB TO SERIAL CONVERTER	FT230XQ-R	FTDI CHIPS	FT230XQ-R
1	X3	CONNECTOR USB SMD	USB TYP B MINI HORIZONTAL	WÜRTH ELECTRONICS	65100516121
1	X4	CONNECTOR 8POL SMD	BM08B-GHS	JST	BM08B-GHS-TBT
3	X1, X2, X5	SCHRAUBKLEMME 10POL	MSD10004	SAURO	MSD10004
1	U2	CONNECTOR 41POL SMD	91911-31341LF	AMPHENOL FCI	91911-31341LF
1	U2	EINLÖT DISTANZBOLZEN	M2X5	WÜRTH ELEKTRONIK	9774050243

EVL-1093 Ordering Information, Hardware Configuration

Example Configuration: **EVL-1093-SCREW**

Display Unit:
It is possible to connect a small or big OLED 2x16 / 4x20 character display directly to the X4 connector of the device. Please visit the DPY-111x product pages on our website for further information.

Customization:
Many hardware and software features of the TEC-1092 are customizable upon request. Please contact Meerstetter Engineering with your enquiry.

Meerstetter Engineering GmbH
Schulhausgasse 12
3113 Rubigen, Switzerland

meerstetter engineering
Member of Berndorf Group

Phone: +41 31 529 21 00
Email: contact@meerstetter.ch
Website: www.meerstetter.ch

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Change History

Date of change	Version	Changed/ Approved	HW-Version	Change / Reason
14 October 2024	F	XF / ML	v1.01	• Add: Change History • Mod: Specified that the RS485 Data Interface only supports Half-Duplex communication • Mod: Change naming of "Object" to "HR" (High Resolution" and "Sink" to "LR" (Low Resolution) • Fix: RS232 RX and TX pins were inversed • Fix: The absolute maximum supply voltage (DC) is rated at 14 V instead of 20 V