



PD70100EVB15B
Evaluation Board User Guide
Revision 0.1

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1 About this Guide

This user guide provides both description and operation procedures for Microsemi's PD70100EVB15B Evaluation Board, used for evaluating the performance of PD70100 PD applications.

1.1 Audience

This user guide is intended for qualified personnel, meaning operators and technicians who have a background in basic concepts of electronics.

1.2 Organization

This guide is divided into several sections as follows:

• Chapter 1	About this Guide: Describes the objectives, audience, and organization.
• Chapter 2	Introduction: Provides an overview about evaluation board's main functions, features, physical characteristics and ordering information.
• Chapter 3	Physical Description: Provides explanation related to the physical description (switches, jumpers, connectors).
• Chapter 4	Electrical Characteristics: Provides electrical characteristics of the evaluation board.
• Chapter 5	Installation: Provides description of the installation process.
• Chapter 6	Schematic: Provides board schematic diagram
• Chapter 7	List of Materials: Provides board's list of materials.

1.3 Reference documents

PD70100 datasheet, catalogue number DS_PD70100_70200

2 Introduction

Microsemi's PD70100EVB15B Evaluation Board (see

Figure 2) provides designers with the needed environment to evaluate the performance and implementation of PD applications based on PD70100 PDchip. The evaluation board enables PD designers to evaluate Microsemi's PDchip solution.

All necessary steps and connection instructions required to install and operate this board are provided within this document.

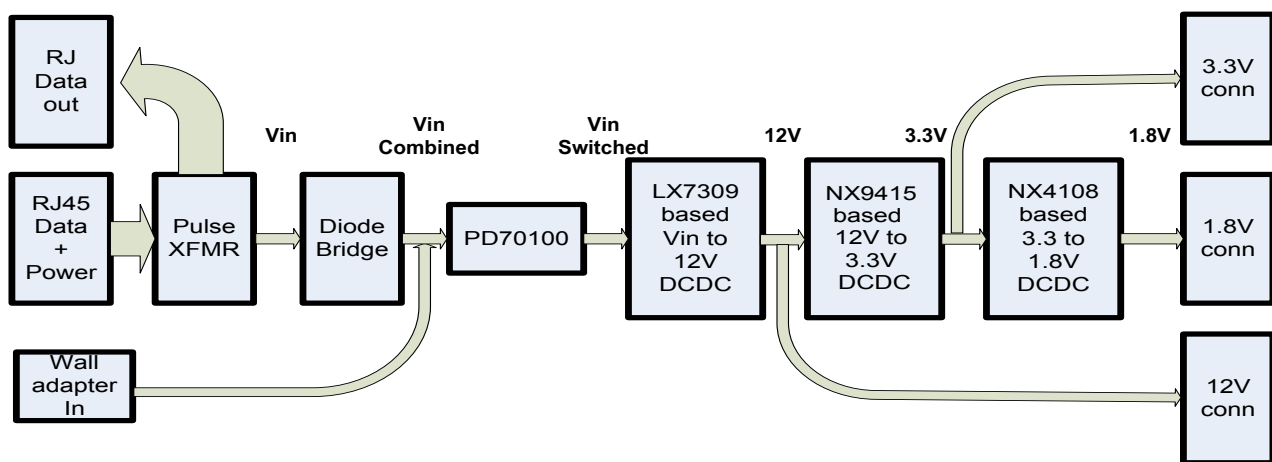


Figure 1: PD70100EVB15B Block Diagram

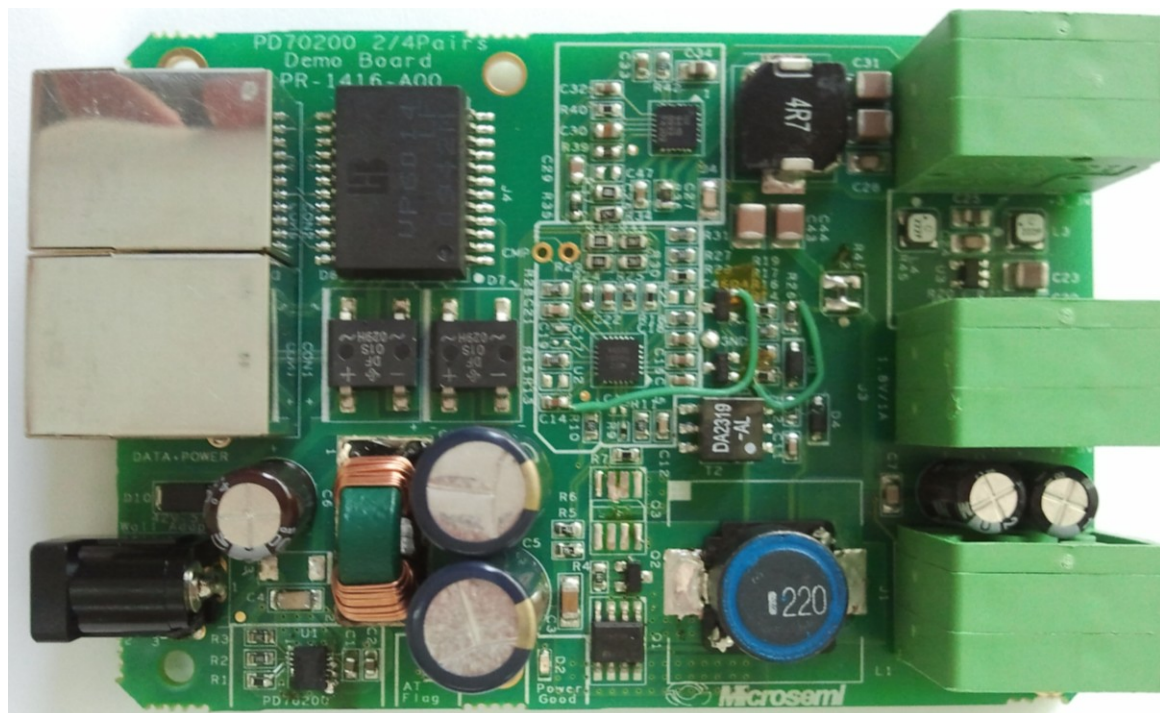


Figure 2: PD70100EVB15B Evaluation Board – General View



2.1 Evaluation Boards Ordering Information

Microsemi's supplies the following Evaluation Boards as shown below:

Ordering Number	Description
PD70100EVB15B	PD70100 based application supporting 15 Watt application using three voltage output signals: 1. 12V 0.6A. 2. 3.3V 2A. 3. 1.8V 0.5A.

2.2 Evaluation Board Features

- Designed to support one PDchip application (2-pairs)
- Two RJ45 connectors (Data and Power In, Data Out)
- Optional Wall adapter – DC in connector
- Output voltage connectors.
- On board LED indicator
- Pulse transformers and common mode chocks
- Evaluation Board working temperature: 0° to +70°C
- RoHS compliant.

Notice:

Although the board supplies AF power of 15 Watt, All DCDC sections are designed for a total power delivery of 25Watt. The board is subset of AT levels 25Watt board, based on the PD70200 device.

2.3 Evaluation Board Interfaces and Connections

Board has several interfaces:

- **RJ45 Interface:** Running from PSE side to PD (powered device), based on PD70100 (CON1)
- **Vin Connectors:** DC in, alternative wall adapter connection (J2)
- **LEDs Indication:** Power good LED indication
- **Output Voltage Connectors:**
 1. 12V
 2. 3.3V
 3. 1.8V

2.4 Physical Characteristics

Table 1 lists evaluation board's physical characteristics.

Table 1: Physical Characteristics

Parameter	Value
Mechanical dimensionsin mm	95 x 65 x 17 mm (L x W x H)

3 Physical Description

3.1 Package Contents

Upon opening the Evaluation Board package, verify the following part is included. If it is missing or seems damaged, contact local representative or Microsemi's headquarters. Package content for standard shipments is:

- PD70100EVB15B Evaluation Board

3.2 Connectors

The following sections provide both general and detailed information regarding unit's connectors.

3.2.1 Connectors Table

Table 2 lists the Evaluation Board's connectors.

Table 2: Connectors List

#	Connector	Name	Description
1	CON1	RJ45 Connector	RJ45 port for Data and Power In for PSE connection
2	CON2	RJ45 Connectors	RJ45 port for Data Out for PD data connection
3	J2	Optional Wall Adapter	Optional DC in connection for powering the board instead of CON1. Insertion of wall adapter connector disconnects CON1.
4	J1	12V Output	A terminal block for connecting a load to 12V output regulator
5	J5	3.3V Output	A terminal block for connecting a load to 3.3V output regulator
6	J3	1.8V Output	A terminal block for connecting a load to 1.8V output regulator

3.2.2 Connectors Detailed Explanation

The numbering is in reference to the numbers listed in Table 2.

1. RJ45 Connectors (#1)

See Figure 3. There are two dedicated RJ45 connectors.

Table 3: RJ45 Connectors

CON2 Pin No	Signal Name	Description
1, 2, 3, 4, 5, 6, 7, 8	Data Out	Data output to PD
CON1 Pin No	Signal Name	Description
1, 2	Data and Power In	Data and power input to powered device (PoE Master Negative data port)
3, 6	Data and Power In	Data and power input to powered device (PoE Master Positive data port)
4, 5	Data and Power In	Data and power input to powered device (PoE Master Negative data port)
7, 8	Data and Power In	Data and power input to powered device (PoE Master Positive data port)

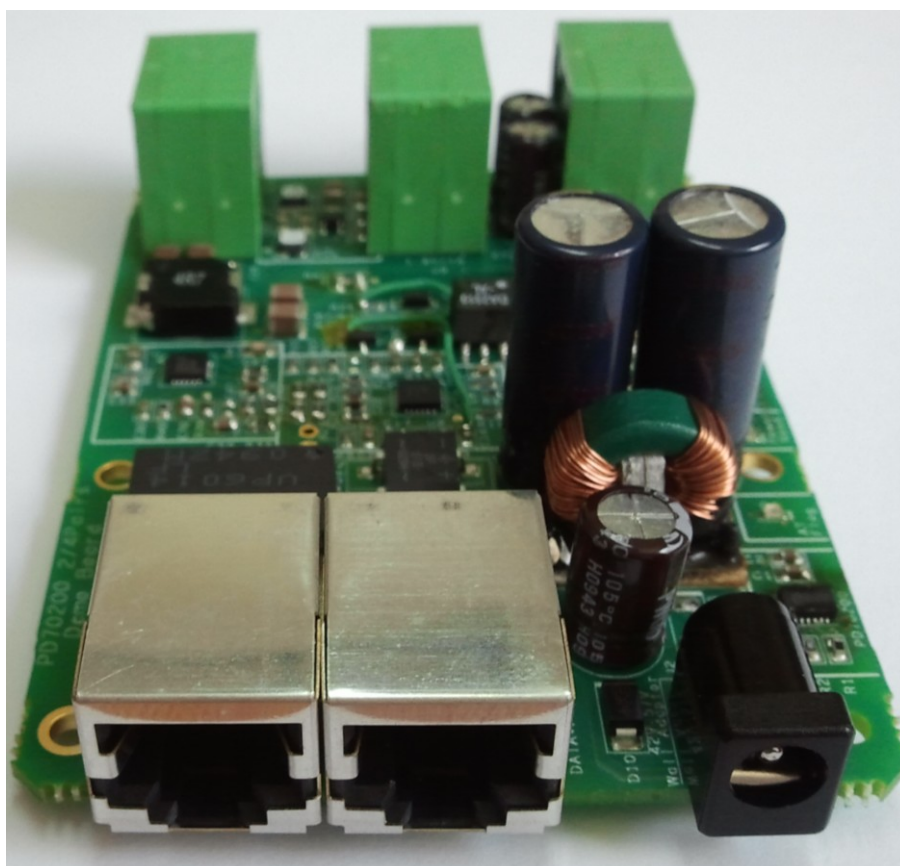


Figure 3: Front RJ45 and Wall Adapter Connectors

2. Vin Connectors (J2)

DC in connection can be used to power Evaluation Board instead of RJ45 PSE connection

42V > Vin > 57VDC.

Table 4: Vin Connectors

Pin No.	Signal Name	Description
External ring	Vmain (Vin -)	Negative input voltage
Internal pin	Vmain (Vin +)	Positive input voltage

- Manufacturer: **TAI CHUNG ELECTRONIC COMPONENT PARTS CO., LTD.**
- Manufacture part number: **TC18-013-02**

3. Vout Connectors

See Figure 4.

J1 – 12VDC out connection, used for connecting to external load.

Table 5: J1 Connectors

Pin No.	Signal Name	Description
1 – Left	12V Positive	Positive 12V voltage
2 – Right	12V GND	Return of 12V voltage

J3 – 1.8VDC out connection, used for connecting to external load.

Table 6: J3 Connectors

Pin No.	Signal Name	Description
1 – Left	1.8V Positive	Positive 1.8V voltage
2 – Right	1.8V GND	Return of 1.8V voltage

J1 – 3.3VDC out connection, used for connecting to external load.

Table 7: J5 Connectors

Pin No.	Signal Name	Description
1 – Left	3.3V Positive	Positive 3.3V voltage
2 – Right	3.3V GND	Return of 3.3V voltage

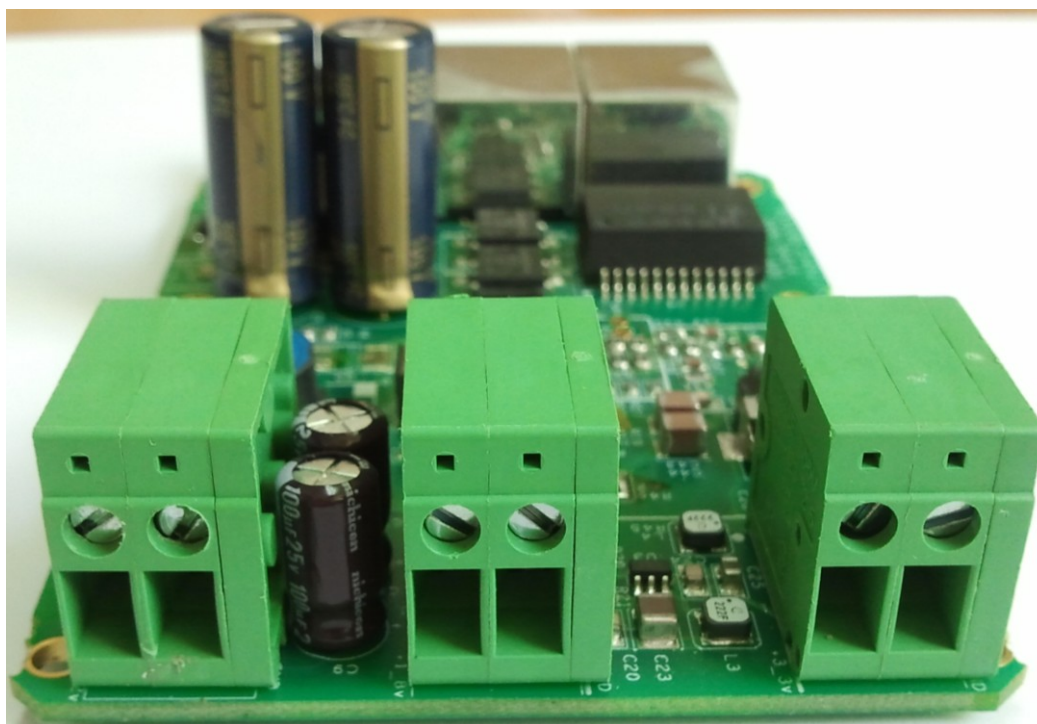


Figure 4: Vout Connectors

4. LED Indication

See Figure 5.

D2 is the Power_GOOD indication LED, an PD70100 device output signal indicating device's isolation switch is operated.

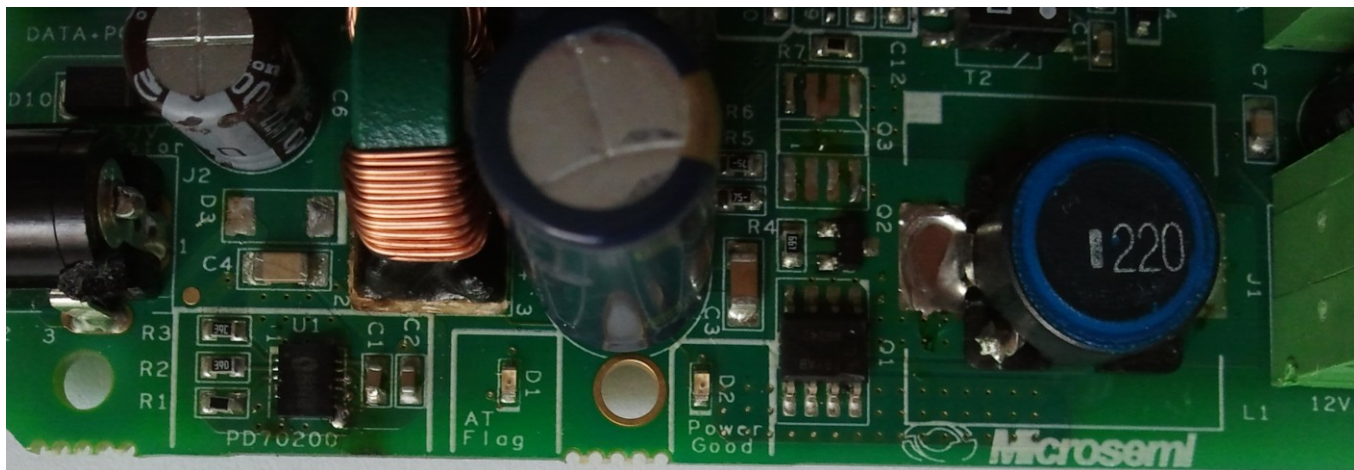


Figure 5: Powr_Good LED Indication



4 Electrical Characteristics

Evaluation board's electrical characteristics are described below:

Table 8: Electrical Characteristics

Parameter	Symbol	Min.	Max.	Units
Main DC Supply – V_{main}		44	57	V
Port Isolation to Chassis		-	1.5	kVrms
All Communication's Isolation to Chassis		-	1.5	kVrms

5 Installation

This chapter describes the steps required to install and operate Evaluation Board with any PoE application.

5.1 Preliminary Considerations and Safety Precautions

- Verify board's power supply is turned on before peripheral devices are turned on.

5.2 Initial Configuration

Note: It is important to verify Evaluation Board is setup as shown in Figure 6 prior to starting any operation.

1. Connect configuration board to main board (J1, J2, J3).
2. Connect a power cable from power supply to Evaluation Board (CON1).
3. Connect Ethernet Cable from Evaluation Board (CON2) to Ethernet Host.

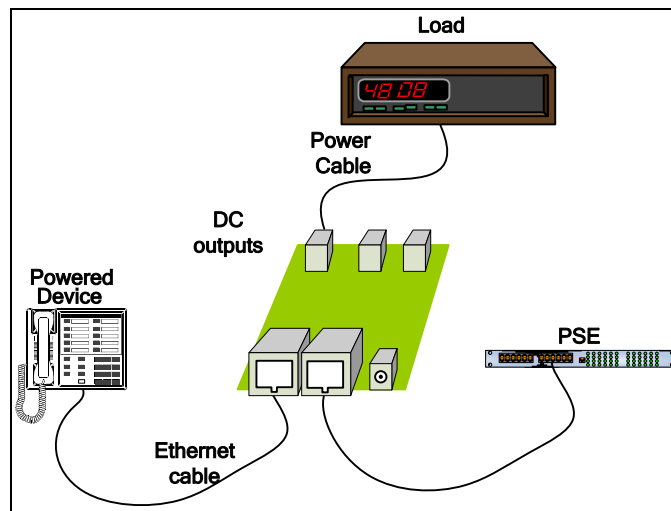
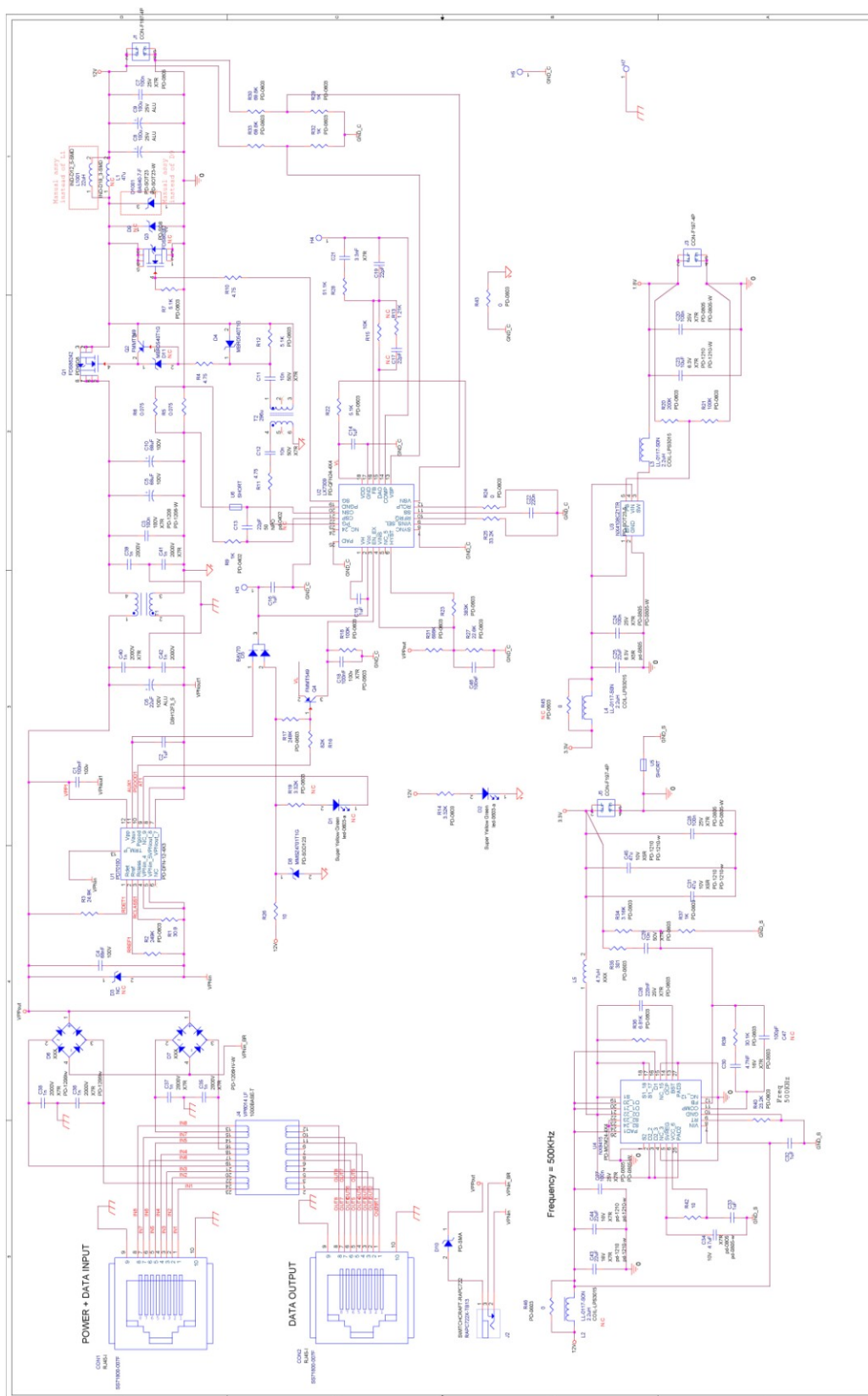


Figure 6: Test Setup

6 Schematic



7 List of Materials

Item #	Description	Reference Des	MFR part Number	Manufacturer
1	CAP CRM 4.7 μ F 10V 10% X7R 0805 SMT	C34	GRM21BR71A475KA73K	Murata
2	Cap X5R 22 μ F 6.3V 10% 0805	C25	08056D226KAT2A	AVX
3	CAP CRM 100nF 25V 5% X7R 0805 SMT	C7,C20,C24,C27,C28	08053C104JAT2A	AVX
4	CAP CRM 68nF 100V 10% X7R 1206 SMT	C4	12061C683KAT2A	AVX
5	CAP CRM 1nF/2000V 10%++X7R 1206 SMT	C35-C42	1206GC102KAT1A	AVX
6	CAP CRM 100nF 100V 10% X7R 1206 SMT	C3	12061C104KAT2A	AVX
7	CAP CER 22pF 50V 5% NPO 0402 SMT	C19	C0402C220J5GAC	Kemet
8	Capacitor, X7R, 10 μ F, 10V, 10% 1210	C23	1210ZC106KAT2A	AVX
9	CAP CRM 22 μ F 16V 20% X7R 1210 SMT	C43,C44	210YC226MAT2A	AVX
10	CAP CRM X5R 47 μ F 10V 20% 1210 SMT	C31,C45	C1210C476M8PAC	Kemet
11	CAP CRM 4.7nF 16V 10% X7R 0603 SMT	C30	GRM188R71H472KA01	Murata
12	Capacitor, X7R, 3.3nF, 16V, 10% 0603	C21	GRM188R71H332KA01	Murata
13	Capacitor, X7R, 220nF, 16V, 10% 0603	C22	C0603C224K4RAC	Kemet
14	CAP 220NF 25V X7R 10% 0603	C26	GRM188R71E224KA88D	Murata
15	Capacitor,X7R, 1 μ F, 25V, 10% 0603	C2,C14-C16,C32,C33	GRM188R71E105KA12D	Murata
16	Capacitor, X7R, 100nF,100v, 10% 0603	C1,C18,C46	GRM188R72A104KA35D	Murata
17	CAP CRM 10nF 50v 10% X7R 0603 SMT	C11,C12,C29	GRM188R71H103KA01	Murata
18	CAP ALU 68 μ F 100V 20% 10X25 105C P=5mm T/H	C5,C10	UPM2A680MPD	Nichicon
19	CAP ALU 22 μ F 100V 20% 8X11.5 105C P=3.5mm T/H	C6	UPS2A220MPD1TD	Nichicon
20	CAP ALU 100 μ F 25V 20% 6.3*11 105C Low Imp P2.5	C8,C9	UPW1E101MED	Nichicon
21	CON RJ45 SINGLE 8 POS. SHILDED after vibration	CON1,CON2	SS71800-007F	Bel Stewart
22	CON DC POWER JACK RA 2.0X6.3 T/H	J2	MJ-179P	Shogyo International Corp.
23	Terminal block 2 pole interlocking 5mm pitch PBC insert	J1,J3,J5	DT-123RA-02P	DINKLE
24	DIO DUAL 70V 200mA 250mW Trr=6nS COM. CAT SOT23	D5	BAV70	Infineon
25	DIO BRIDGE 100V 1A SMT	D6,D7	DF01S-E3/45	Vishay



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Item #	Description	Reference Des	MFR part Number	Manufacturer
26	Diode, Schottky 40V SOT23,BAS40	D1001	BAS40-7-F	Diodes Inc.
27	DIO SCHOTTKY 90V 1A SMA REC SMT	D10	SS1H10-E3	Vishay
28	DIO SCHOTTKY 40V 500mA SOD123 REC. SMT	D4	MBR0540T1G	ON Semiconductor
29	DIO ZNR 14V 500mW 5% SOD-123 SMT	D8	MMSZ4701T1G	ON Semiconductor
30	Ofek AF PD chip front end PD70100	U1	PD70100	Microsemi
31	Synchronous Flyback DC/DC Controller LX7309	U2	LX7309	Microsemi
32	5A SYNCHRONOUS BUCK SWITCHING REGULATOR	U4	NX9415CMTR	Microsemi
33	1A SYNCHRONOUS BUCK SWITCHING REGULATOR W. FET	U3	NX4108CZ1TR	Microsemi
34	IC, N-CH POWER MOSFET 150v 4.1A SO8	Q1	FDS86242	Fairchild
35	1000 BASE T SINGLE PORT VOICE OVER IP MAGNETICS MODULE SMT	J4	VP6014 HF	BOTHHAND
36	Inductor,22μH 20% SMT	L1001	SLF12575T-220M4R0	TDK
37	Power Inductors 2.2μHy 1.5A 110mOhm SMT Shilded	L3,L4	LPS3015-222ML	Coilcraft
38	Inductor 4.7μHy DCR=12.5mohm shielded SMD11.2x10	L5	SEP1004EC-4R7M-LF	Coilmaster
39	Transformer, Gate driver SMT 269μH 0.795 DCR	T2	DA2319-AL	Coilcraft
40	Common Mode Choke 10mHy 0.5R Hip Split T/H RoHS	T1	LT-6960-I2G	ICE Components Asia Co. Ltd.
41	LED SuperYelGrn 100-130o 20-40mcd h=1 0603 SMD	D2	19-21-SYGCS530E3TR8	Everlight
42	RES TCK FLM 1K 1% 62.5mW 0402 SMT 100 PPM	R9	CR0402-FX-1001GLF	Bourns
43	RES TCK FLM 0R 62.5mW 5% 0603 SMT	R24,R43,R46	CR16-000ZL	ASJ
44	Resistor, 82K, 5%, 1/16W 0603	R16	CR16-823JL	ASJ
45	RES TCK FLM 22.6K 0.1W 1% 0603 SMT 100ppm	R27	CR16-2262FL	ASJ
46	RES TCK FLM 24.9K 62.5mW 1% 0603 SMT	R3	CR16-2492FL	ASJ
47	RES TCK FLM 249K 62.5mW 1% 0603 SMT	R2,R17	CR16-2493FL	ASJ
48	RES 383K 100mW 1% 0603SMT MTL FLM	R23	CR16-3833FL	ASJ
49	Resistor, 3.32K, 1%, 1/16W 0603	R14	CR16-3321FL	ASJ
50	Resistor, 30.9R 1%, 1/10W 0603	R1	RK73H1JTTD30R9F	KOA
51	Resistor, 3.16K, 1%, 1/16W 0603	R34	CR16-3161FL	ASJ
52	Resistor, 69.8K, 1%, 1/16W 0603	R30,R33	CR16-6982FL	ASJ

Item	Description	Reference Des	MFR part Number	Manufacturer
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#				
53	RES TCK FLM 5.1K 62.5mW 1% 0603 SMT	R7,R12,R22	CR16-5101FL	ASJ
54	Resistor, 0.075 Ohm, 1%, 1/10W 0603	R5,R6	UR73D1JTTD75LF	KOA
55	Resistor, 698K, 1%, 1/16W 0603	R31	CR16-6983FL	ASJ
56	RES TCK FLM 23.2K 0.1W 1% 0603 SMT	R40	RK73H1JTTD2322F	KOA
57	RES 4.75R 0.1W 1% 0603 SMT MTL FLM	R4,R10,R11	RC1608F4R75CS	Samsung
58	RES TCK FLM 10R 62.5mW 1% 0603 SMT	R26,R42	MCR03EZPFX10R0	Rohm
59	RES SMT 301R 100mW 1% 0603 MTL FLM	R35	CR0603-FX-3010ELF	Bourns
60	RES 1K 62.5mW 1% 0603 SMT MTL FLM	R29,R32,R37	CR16-1001FL	ASJ
61	RES TCK FLM 6.81K 62.5mW 1% 0603 SMT	R36	CR16-6811FL	ASJ
62	RES 10K 62.5mW 1% 0603 SMT MTL FLM	R15	CR16-1002FL	ASJ
63	RES 30.1K 62.5mW 1% 0603 SMT MTL FLM	R39	CR16-3012FL	ASJ
64	RES 33.2K 62.5mW 1% 0603 SMT MTL FLM	R25	RC1608F3322CS	Samsung
65	RES 51.1K 62.5mW 1% 0603 SMT MTL FLM	R28	CR16-5112FL	ASJ
66	RES 100K 62.5mW 1% 0603 SMT MTL FLM	R18,R21	CR16-1003FL	ASJ
67	RES MTL FLM 200K 62.5mW 1% 0603 SMT	R20	CR16-2003FL	ASJ
68	TRN PNP -30V -1A SOT23	Q2,Q4	FMMT549	Zetex



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