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## Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China





## PD-IM-7401 Evaluation Board User Guide

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### Reference Documents

- IEEE 802.3af-2003 standard, DTE Power via MDI
- IEEE802.3at-2009 standard, DTE Power via MDI
- PD69101 Data Sheet, Catalogue Number 06-0076-058
- Application Note 187: Layout Design Guidelines for PoE Systems, Catalogue Number 06-0082-080
- Application Note 184: Designing a 1 Port PoE system, Catalogue Number 06-0079-080

The above documents can be obtained via our Customer Support. To access other documents, go to our web site at <http://www.microsemi.com/> and under Tech Support\Documentation, look up for the documents.



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# 1 About this Guide

This user guide provides both a description and operation procedures for Microsemi's PD-IM-7401 Evaluation Board, which is used to evaluate the performance of the PD69101 PoE 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 organization.
- Chapter 2 **Introduction:** Describes the PoE evaluation board over view 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 PoE evaluation board.
- Chapter 5 **Installation:** Provides description of the installation process.

## 2 Introduction

Microsemi's PD-IM-7401 Evaluation Board (see Figure 1) provides the designer with the needed environment to evaluate the performance and the implementation of PoE applications based on the PD69101 PoE Manager. The evaluation board enables PoE designers to evaluate Microsemi's PoE solution with maximum flexibility and ease in configuration

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

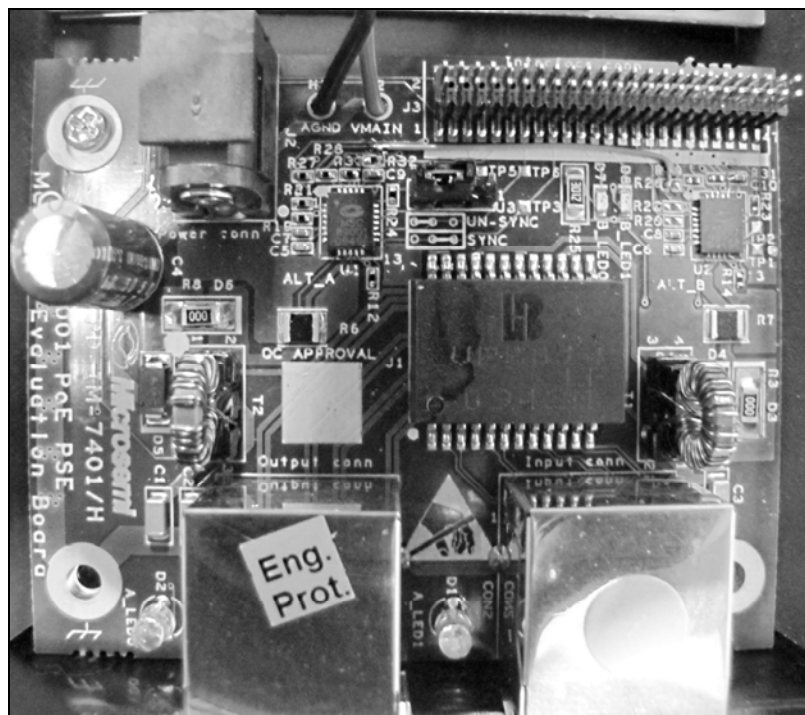


Figure 1: PD-IM-7401 Evaluation Board - General View

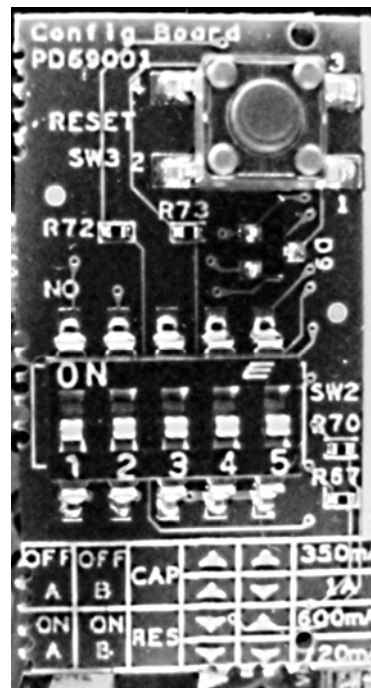


Figure 2: PD-IM-7401 Configuration Board - General View

### 2.1 Evaluation Boards Ordering Information

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

Ordering Number	Description
PD-IM-7401	1 port1 Evaluation Board that simulates a one port switch.

### 2.2 Evaluation Board Features

- Design to support one port PoE application (2-pairs or 4-pairs)
- Two RJ45 connectors (data in, data and power out)
- Vin connectors – DC in connector
- On board LEDs indicators
- Reset button
- Pulse transformers and common mode chocks
- Easy configuration of switch's board
- Evaluation Board working temperature: 0° to +50° C
- RoHS compliant

## 2.3 Evaluation Board Interfaces and Connections

The board has several interfaces:

- **RJ45 interface:** Running from the PD69101 to PD (powered device) (CON1)
- **Vin connectors:** DC in (Vmain) connection (J2)
- **Configuration interface:** Control and configuration signals running between the main board to configuration board (J3)
- **LEDs indication:** Master and Slave on board LED indication
- **Synchronization jumper:** System working configuration 2-pairs or synchronized 4-pairs operation

## 2.4 Physical Characteristics

Table 1 lists the evaluation board's physical characteristics.

**Table 1: Physical Characteristics**

Parameter	Value
Mechanical dimensions	68 x 54 x 17 mm (L x W x H)

### 3 Physical Description

#### 3.1 Package Contents

Upon opening the Evaluation Board package, verify that all parts itemized in the packing list are included. If any part is missing or seems damaged, contact the local representative or Microsemi's Headquarters. Package contents for standard shipments are as follows:

- PD-IM-7401 Evaluation Board
- 54V Desktop Adapter

#### 3.2 Switches and Jumpers

The evaluation board comprises switches and jumpers used to select the desired configuration states of the board. **Note:** Default configurations are indicated as 'default'.

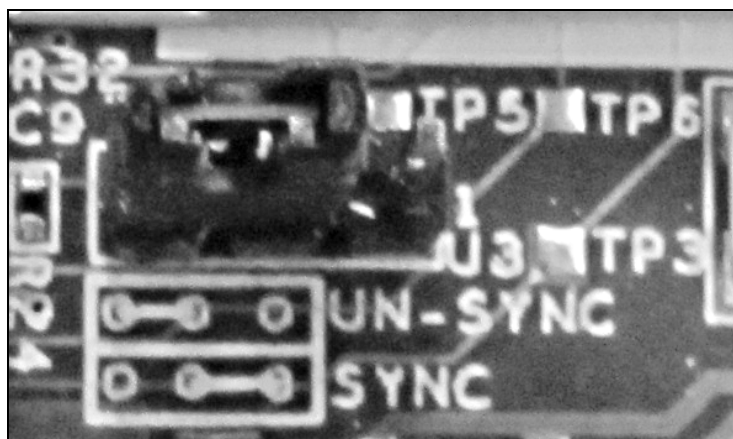
#### 3.3 Synchronization Selection

There is a synchronization jumper option (U3):

- **UN-SYNC:** 2-pairs operation. Only the Master supplies power (set the Slave to **off state** for proper operation).
- **SYNC:** Synchronized 4-pairs operation. The Master and the Slave supply power on the data and spear lines.

**Table 2: Synchronization Selection**

Switch/Jumper	UN-SYNC	SYNC
U3	Short from pin "2" to "3"	Short from pin "1" to "2"



**Figure 3: Synchronization Selection (U3)**



### 3.3.1 Reset Button

The dedicated Reset button SW #1 (see Figure 4) is utilized to reset the PD69101 PoE controllers.

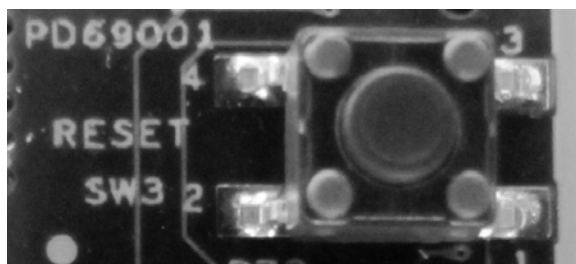


Figure 4: Reset Button (SW #3)

### 3.3.2 Configuration Switches

Five configuration switches are utilized to configure the PD69101 PoE controllers operations:

- Two ON/OFF switches are utilized to enable/disable the Master and the Slave (SW #1 and SW #2) (see Table 3).
- One switch is utilized to select the detection method (SW #3):
  - Resistor detection only: IEEE802.3af and IEEE802.3at compliant
  - Resistor and legacy detection
- Two switches are utilized to select the current capability, as shown in Table 4.
  - 350 mA continual current: IEEE802.3af compliant
  - 600 mA continual current: IEEE802.3at compliant
  - 720 mA continual current: IEEE802.3at high power
  - 1000 mA continual current: Very high power capability for future applications

**Note:** The assembled pulse transformer is not designed to support 1 A of current. To support currents of 1 A, resistors R9, R10, R11, R13, R15, R16, R17, and R18 (0 Ω) must be assembled to bypass the PT. In this setup the data in (CON2) is **not** supported.

Table 3: On/Off and Resistor Detection

Position SW #	ON	OFF
1	Master OFF	Master ON
2	Slave OFF	Slave ON
3	Res + Cap Detection	Res detection only

Table 4: Current Capability

Position SW #	OFF/OFF	OFF/ON	ON/OFF	ON/ON
4/5	AT 720mA	AT 600mA	AT 1A	AF 350mA

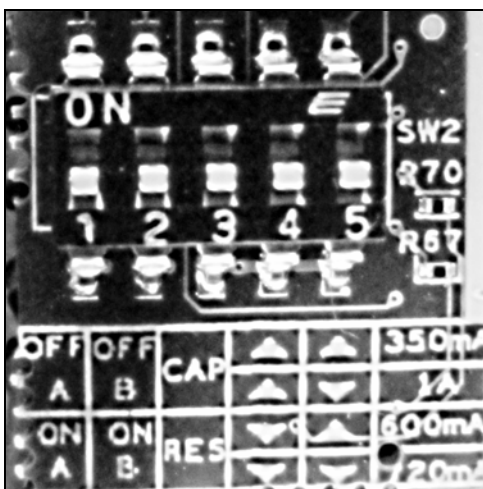


Figure 5: Configuration Switches (SW #2)

### 3.4 Connectors

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

#### 3.4.1 Connectors Table

Table 5 lists the Evaluation Board's connectors.

Table 5: Connectors List

#	Connector	Name	Description
1	CON1 – CON2	RJ45 connectors	Two RJ45 ports for data-in and for connecting to the powered device load
2	J3	Interface configuration connector	Connection to the configuration board
3	J2	Vin connectors	DC in (Vmain) connection used to power the Evaluation Board.

#### 3.4.2 Connectors Detailed Explanation

The numbering is in reference to the numbers listed in Table 5.

##### 1. RJ45 connectors (#1)

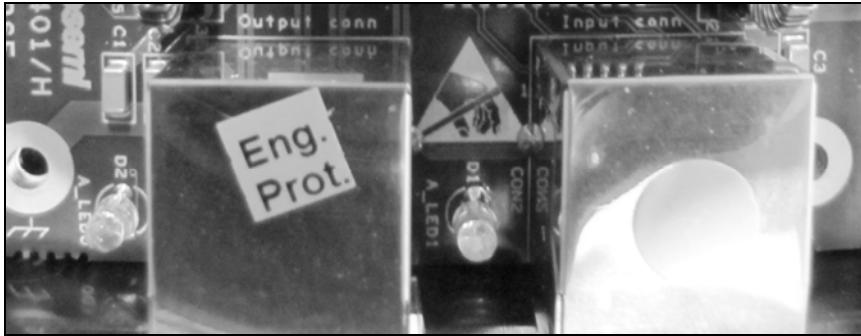
See Figure 6. There are two dedicated RJ45 connectors.

Table 6: RJ45 Connectors

CON2 Pin No	Signal Name	Description
1, 2, 3, 4, 5, 6, 7, 8	Data in	Data input from external switch (1G)
CON1 Pin No	Signal Name	Description
1, 2	Data and power out	Data and power output to powered device (PoE Master Negative data port)
3, 6	Data and power out	Data and power output to powered device (PoE Master Positive data port)
4, 5	Data and power out	Data and power output to powered device (PoE Slave Negative spare port)
7, 8	Data and power out	Data and power output to powered device (PoE Slave Positive spear port)

- Manufacturer: Kinsun

- Manufacture part number: 3060115907



**Figure 6: RJ45 Connectors**

## 2. Vin connectors (J2)

See Figure 7.

DC in (Vmain) connection, used to power the Evaluation Board,  $44\text{ V} > V_{\text{main}} > 57\text{ VDC}$ .

**Table 7: Vin Connectors**

Pin No.	Signal Name	Description
1	Vmain (Vin +)	The positive main voltage (referenced to AGND)

- Manufacturer: Shogyo International Corp.
- Manufacture part number: MJ-179P



**Figure 7: Vin Connector**

### 3. LEDs Indication

See Figure 8.

These are port status indication LEDs. Two dedicated LEDs indicate the port status (for example on/off): **D1** and **D2**

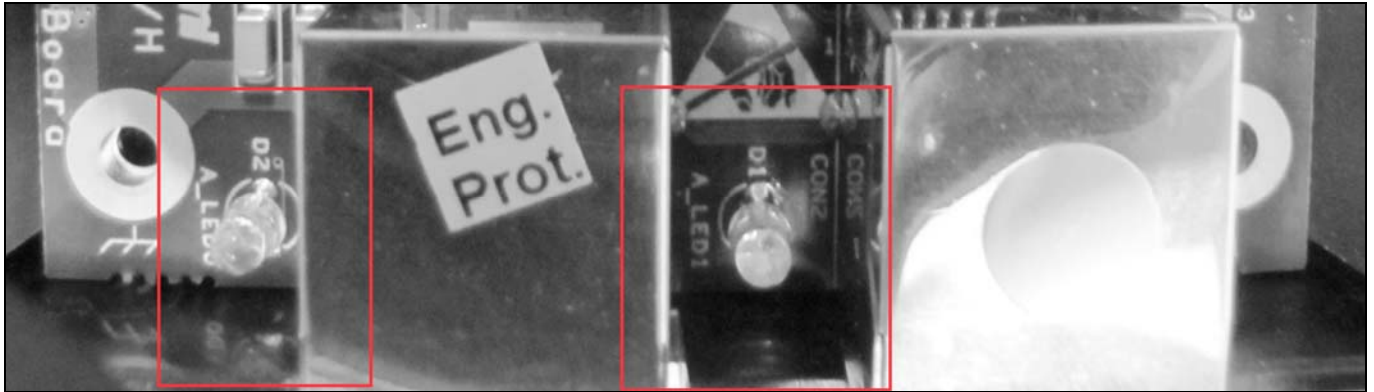


Figure 8: LEDs Indication

## 4 Electrical Characteristics

The evaluation board's electrical characteristics are described below:

**Table 8: Electrical Characteristics**

Parameter	Symbol	Min.	Max.	Units
Main DC supply Vmain		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 the Evaluation Board with any PoE application.

### 5.1 Preliminary Considerations and Safety Precautions

- Verify that the board's power supply is turned on before the peripheral devices are turned on.
- Prior to powering the board, connect all required peripherals.
- Never hot swap units!
- Verify that the board is properly configured prior to turning on the power supply.

### 5.2 Initial Configuration

**Note:** It is important to verify that the Evaluation Board is setup as shown in Figure 9 prior to starting any operation.

1. Connect the configuration board to the main board (J3).
2. Configure the board operation by selecting the required configuration on the configuration board switches (SW#2).
3. Connect the SYNC/UN-SYNC jumper (U3).
4. Connect a power cable from the power supply to the Evaluation Board (J2).

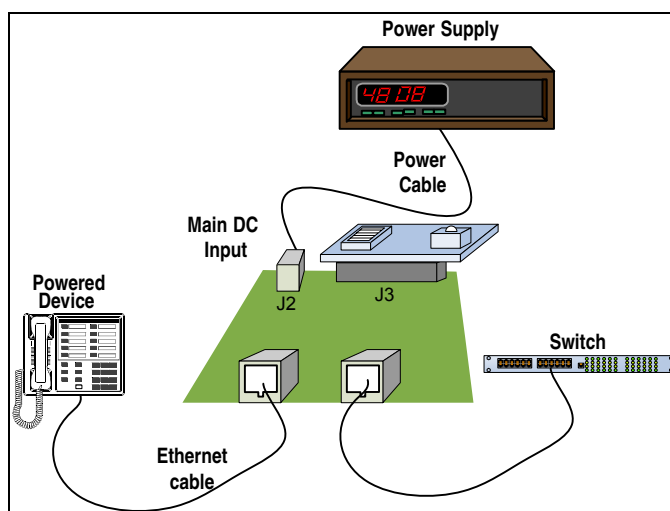


Figure 9: Test Setup



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For support contact: [sales\\_AMSG@microsemi.com](mailto:sales_AMSG@microsemi.com)

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