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**Power over Ethernet**  
**Software GUI**  
**User Guide**  
**Enhanced Mode**  
**PoE+ Mode**

**Revision 1.6**  
**Catalog Number 06-0027-056**

**Reference Documents**

- 06-0012-080 Layout Design Guidelines for PoE Systems, AN-128
- PD63000\_UG - PD63000/G,PD69000,PD69100 Serial Communication Protocol
- 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 the documents.



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Table of Contents

- 1 About this Guide..... 5
  - 1.1 Audience..... 5
  - 1.2 Organization..... 5
  - 1.3 Evaluation Board Kit..... 5
- 2 Introduction..... 6
  - 2.1 Enhanced Mode ..... 6
    - 2.1.1 PoE Manager ICs Types..... 7
    - 2.1.2 Enhanced Mode Feature Support..... 7
  - 2.2 PoE+ Mode..... 8
- 3 Installation ..... 10
  - 3.1 Application Requirements ..... 10
    - 3.1.1 Required Hardware..... 10
    - 3.1.2 Required Software ..... 10
  - 3.2 Setting up the Hardware..... 10
  - 3.3 Installing Software ..... 11
  - 3.4 Windows Settings ..... 11
- 4 GUI Common Features ..... 12
  - 4.1 Initializing the GUI ..... 12
  - 4.2 GUI Common Elements ..... 13
  - 4.3 Connecting to the Board..... 13
  - 4.4 Modifying the Communication Parameters ..... 13
  - 4.5 Main Screen Indicators..... 13
  - 4.6 Menu Options ..... 13
    - 4.6.1 Exiting the Program..... 13
    - 4.6.2 Developer Status..... 13
    - 4.6.3 Showing the Status Number ..... 14
    - 4.6.4 Viewing the Demo Mode..... 14
    - 4.6.5 Viewing the Application Version..... 14
- 5 Enhanced Mode Operation (EMO) ..... 15
  - 5.1 The Ports Tab (EMO) ..... 17
    - 5.1.1 Enhanced Mode Port Status Indicators ..... 17
    - 5.1.2 Enabling/Disabling Ports ..... 19
    - 5.1.3 Enabling AT Mode..... 19
    - 5.1.4 Setting the Power Budget ..... 19
    - 5.1.5 Setting the Line Detection Method..... 19
    - 5.1.6 Setting the Backoff Time..... 19
    - 5.1.7 Setting System Parameters ..... 19
  - 5.2 The Power Management Tab (EMO) ..... 20
    - 5.2.1 Setting the Power parameters ..... 20
    - 5.2.2 Real Time Measurements Field ..... 21
    - 5.2.3 Providing Extra Power..... 21
    - 5.2.4 Setting the Power Mode..... 21
  - 5.3 The Interrupt Tab (EMO) ..... 22
    - 5.3.1 Displaying an Event ..... 22
  - 5.4 The IC Status Tab (EMO)..... 23
    - 5.4.1 IC Status Display..... 24
    - 5.4.2 Setting the Temperature Limit..... 25
    - 5.4.3 Displaying the Current Temperature Limits ..... 25
  - 5.5 The Matrix Tab (EMO)..... 25
    - 5.5.1 Viewing the Current Physical – Logical Port Matrix ..... 26
    - 5.5.2 Defining the Physical – Logical Port Matrix..... 26
    - 5.5.3 Setting the Default Matrix..... 27
  - 5.6 The PPL (Port Power Limit) Tab (EMO)..... 27
    - 5.6.1 Viewing the Current Power Limits ..... 27
    - 5.6.2 Setting the Port Power Limit ..... 28

Company Confidential

- 5.6.3 Setting a Uniform Power Limit ..... 28
- 5.7 The TPPL (Temporary Port Power Limit) Tab (EMO)..... 28
  - 5.7.1 Viewing the Current Power Limits..... 29
  - 5.7.2 Setting the Port Power Limit ..... 29
  - 5.7.3 Setting a Uniform Power Limit ..... 29
- 5.8 The Priority Tab (EMO) ..... 29
  - 5.8.1 Viewing the Current Power Limits..... 30
  - 5.8.2 Setting the Port Power Limit ..... 30
  - 5.8.3 Setting a Uniform Power Limit ..... 30
- 6 PoE+ Mode Operation ..... 31
  - 6.1 The Ports Tab (PoE+) ..... 32
    - 6.1.1 PoE+ Mode Port Status Indicators..... 32
    - 6.1.2 Enabling/Disabling Ports..... 33
    - 6.1.3 Resetting the PoE Controller ..... 33
    - 6.1.4 Setting the Power Budget ..... 33
    - 6.1.5 Selecting the Line Detection Method ..... 33
  - 6.2 The Power Management Tab (PoE+) ..... 33
    - 6.2.1 Viewing the Current Parameters..... 34
    - 6.2.2 Setting the Limits Definition ..... 34
    - 6.2.3 Setting the Power Mode..... 34
    - 6.2.4 Setting the Board LED Blink Rate..... 35
    - 6.2.5 Real Time Measurements Field ..... 35
    - 6.2.6 Calculated Power Field ..... 35
  - 6.3 The Interrupt Tab (PoE+) ..... 35
    - 6.3.1 Displaying Events ..... 36
  - 6.4 The IC Status Tab (PoE+)..... 37
    - 6.4.1 IC Status Display ..... 37
    - 6.4.2 Setting the Temperature Limit ..... 38
    - 6.4.3 Displaying the Current Temperature Limit..... 38
  - 6.5 The PPL (Port Power Limit) Tab (PoE+)..... 38
    - 6.5.1 Viewing the Current Power Limits..... 38
    - 6.5.2 Setting the Port Power Limit ..... 39
    - 6.5.3 Setting a Uniform Power Limit ..... 39
  - 6.6 The Priority Tab (PoE+) ..... 39
    - 6.6.1 Viewing the Current Power Limits..... 40
    - 6.6.2 Setting the Port Power Limit ..... 40
    - 6.6.3 Setting a Uniform Power Limit ..... 40
- 7 Troubleshooting ..... 41

**List of Figures**

- Figure 2-1: Enhanced Mode Block Diagram – Utilizing PD69000..... 6
- Figure 2-2: Enhanced Mode Block Diagram – Utilizing the PD63000..... 6
- Figure 2-3: PoE+ Mode Block Diagram ..... 8
- Figure 3-1: Hardware Setup ..... 11
- Figure 3-2: Setup Wizard..... 11
- Figure 4-1: Startup Screen ..... 12
- Figure 4-2: Communication Dialog Box..... 12
- Figure 4-3: Developer Login Dialogue Box ..... 13
- Figure 4-4: About Dialogue Box ..... 14
- Figure 5-1: PoE Manager Enhanced Mode Window, Ports Tab (EMO)..... 15
- Figure 5-2: PoE Manager Enhanced Mode Window, Power Management Tab (EMO)..... 20
- Figure 5-3: PoE Manager Enhanced Mode Window, Interrupt Tab (EMO)..... 22
- Figure 5-4: PoE Manager Enhanced Mode Window, IC Status Tab (EMO) ..... 24
- Figure 5-5: PoE Manager Enhanced Mode Window, Matrix Tab (EMO) ..... 26



Company Confidential

Figure 5-6: PoE Manager Enhanced Mode Window, PPL Tab (EMO) .....27  
Figure 5-7: PoE Manager Enhanced Mode Window, TPPL Tab (EMO) .....29  
Figure 5-8: PoE Manager Enhanced Mode Window, Priority Tab (EMO) .....30  
Figure 6-1: PoE Manager Enhanced Mode Window, Ports Tab (PoE+) .....31  
Figure 6-2: PoE Manager Enhanced Mode Window, Power Management Tab (PoE+) .....34  
Figure 6-3: PoE+ PoE Manager Enhanced Mode Window, Interrupt Tab (PoE+) .....36  
Figure 6-4: PoE Manager Enhanced Mode Window, IC Status Tab (PoE+).....37  
Figure 6-5: PoE Manager Enhanced Mode Window, PPL Tab (PoE+).....38  
Figure 6-6: PoE Manager Enhanced Mode Window, Priority Tab (PoE+) .....39



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## 1 About this Guide

This user guide provides both a description and operation procedures of the Microsemi's software GUI (Graphical User Interface) utilized to demonstrate the Enhanced mode and Power over Ethernet+ (PoE+) mode.

### 1.1 Audience

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

### 1.2 Organization

This Guide is divided into several sections:

- Chapter 1 About this Guide** describes the objectives audience organization and related documentation
- Chapter 2 Introduction** describes the GUI's main functions and the operation modes
- Chapter 3 Installation** provides safety precautions, software requirements, hardware requirements and hardware setup
- Chapter 4 GUI Common Features** describes how to Initialize the GUI and GUI's screen elements
- Chapter 5 Enhanced Mode Operation (EMO)** describes the GUI's Enhanced mode Operation, its various screens and the meaning of each screen's button/indicator
- Chapter 6 PoE+ Mode Operation** describes the GUI's PoE+ mode operation, its various screens and the meaning of each screen's button/indicator
- Chapter 7 Troubleshooting** provides a useful troubleshooting guide and Program Download procedure

### 1.3 Evaluation Board Kit

The Evaluation Board Kit comes with the following items:

- PoE Manager Enhanced mode installation CD
- Aardvark-Evaluation board I<sup>2</sup>C adapter cable

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## 2 Introduction

Microsemi’s demonstration boards provide the designer with the environment needed to evaluate the performance and the implementation of the Enhanced and PoE+ modes.

There are two operating modes:

- Enhanced Mode, page 6
- PoE+ Mode, page 8

### 2.1 Enhanced Mode

The Enhanced Mode configuration for PoE systems is divided into three main different systems:

- PoE system based on PD69000 PoE controller and four PoE managers ICs (PD69012 or PD69008), as shown in Figure 2-1. PoE managers function as slaves to a PoE Controller.

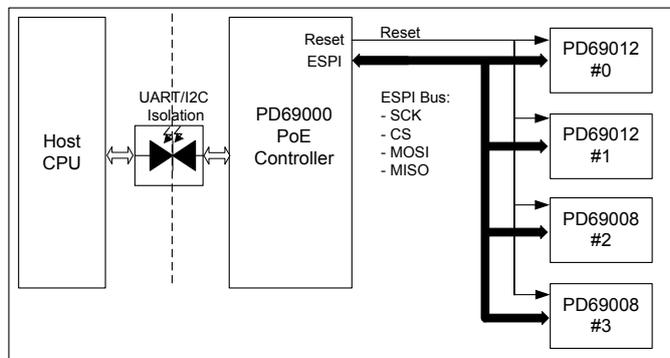


Figure 2-1: Enhanced Mode Block Diagram – Utilizing PD69000

- PoE system based on the PD63000 PoE controller and two PoE managers ICs (PD64012G/H or PD64004A/H), as shown in Figure 2-2. PoE managers function as slaves to a PoE Controller.

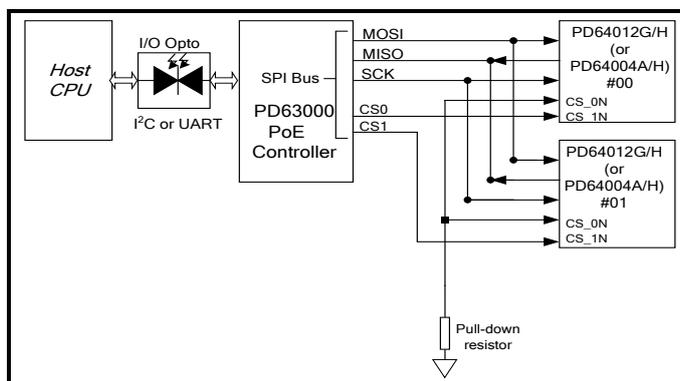


Figure 2-2: Enhanced Mode Block Diagram – Utilizing the PD63000

- PoE system based on the PD69100 PoE controller and PoE managers IC (PD69108 or PD69104).

PoE manager ICs automatically perform PoE operations, while PoE Controller performs power management and other tasks.

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Host CPU communicates with PoE Controller via an isolated UART interface or I<sup>2</sup>C interface. PoE Controller is used to initialize, control and monitor each of the PoE managers ICs via an internal ESPI (69000 and 69100 systems) / SPI (63000 system) bus.

In Enhanced mode, PoE Controller performs additional Power over Ethernet tasks, such as:

- Legacy PDs detection
- Enhanced power management algorithms
- Port matrix control
  - Communication protocol translator

### 2.1.1 PoE Manager ICs Types

- **IEEE802.3af standard ICs (AF ICs):** PD64012/G/GH, PD64004A/AH, PD69012, PD69008, PD69104, and PD69108
- **IEEE802.3at standard (AT ICs):** PD64012GH, PD64004AH, PD69012, PD69008, PD69104, and PD69108

### 2.1.2 Enhanced Mode Feature Support

The Enhanced Mode software supports the following features:

- Supports up to 96 ports.
- Real-time refresh rate (less than two-seconds intervals) of system and port measurements, including:
  - General power, voltage, and current measurements
  - Status (on, off, power management, overload) per port
  - Power consumption [W] per port
  - Current [mA] per port
  - Class per port (0-4)
  - Enable / disable per port
- Automatic detection of connected devices
- Supports 600mA current in AT mode
- Displays GUI version and PoE Controller's software version
- Line Detection Algorithms
  - IEEE 802.3af
  - IEEE 802.3af + Pre Standard
- System resetting (by a pushbutton)
- Restoring default values (by a pushbutton)
- Saving system settings (by a pushbutton)
- Graphic display of port status from PoE Devices (port on, port off due to AC disconnect or due to overload)
- Power budget
- AF: Banks 1 to 7
- AT: Banks 0 to 15
- Advanced power management

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- Setting  $V_{main}$  limits
- Defining maximum power per port
- Defining interrupt Mask parameters and viewing interrupt statuses
- Thermal emulation of the PD64012 and PD64004A and setting thermal limits
- Enabling setting priority for all ports
- Establishing logical/physical port relationship

## 2.2 PoE+ Mode

The switch host CPU communicates with PD33000B via an isolated I<sup>2</sup>C or UART bus (see Figure 2-3).

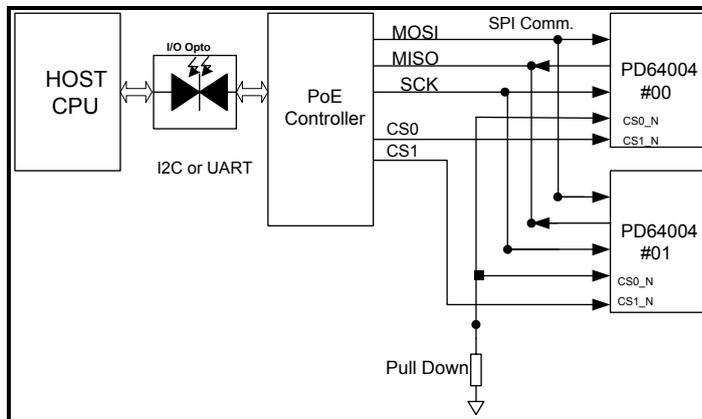


Figure 2-3: PoE+ Mode Block Diagram

In this mode of operation, PD64004s communicate with PD33000B PoE Controller via an SPI bus and are directly slaved to PD33000B. PoE Controller has additional Power over Ethernet features, such as:

- Legacy PDs detection
- PoE+ power management algorithms
  - Communication protocol translator

The PoE+ mode software supports the following features:

- Supports up to 8 ports (2 x PD64004A PoE Devices)
- Automatic detection of devices connected (number of ports)
- Display GUI version and firmware (PoE Controller) version
- Real-time refresh rate (less than two-seconds intervals) of system and port measurements, including:
  - Current [mA]
  - Power consumption [W]
  - Class of PD (0-4)
  - Per port status (on, off, power management, overload)
- Graphic display of port status from PoE devices (port on, port off due to AC disconnection mode or due to overload)
- Thermal emulation of the two PD64004As; two temperature meters taking readings within the devices, with less than two seconds intervals



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- System power management
  - System interrupt view and mask

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## 3 Installation

The following sections detail the installation process.

- Application Requirements, page 10
- Setting up the Hardware, page 10
- Installing Software, page 11
- Windows Settings, page 11

### 3.1 Application Requirements

To evaluate the board's capabilities fully, Microsemi recommends using the software package provided with the Evaluation Board. The software enables communication from the PC to the Evaluation Board via RS-232 communication channel or I<sup>2</sup>C. For programming instructions, refer to *Serial Communication Protocol User Guide, catalog number 06-0032-056*.

#### 3.1.1 Required Hardware

The minimum requirements for the PC are:

- Pentium 166MHz (running on a Windows 98 or 2000 or XP platform)
- 64MB of RAM
- 16-bit color display (1024x768)
- CD-ROM drive
- 40MB of free hard disk space

#### 3.1.2 Required Software

Microsoft .NET Framework Version 2.0 Redistributable Package must be installed on the PC.

- For Microsoft .NET Framework Version 2.0 Redistributable Package (x86):  
<http://www.microsoft.com/downloads/details.aspx?FamilyID=0856EACB-4362-4B0D-8EDD-AAB15C5E04F5&displaylang=en>
- For Microsoft .NET Framework Version 2.0 Redistributable Package (x64):  
<http://www.microsoft.com/downloads/details.aspx?familyid=B44A0000-ACF8-4FA1-AFFB-40E78D788B00&displaylang=en>

### 3.2 Setting up the Hardware

1. Turn off power supply.
2. Interconnect equipment as shown in Figure 3-1.

Power supply should deliver 48 volts (nominal) / 20 amps (maximum). PC -Evaluation board I<sup>2</sup>C adapter cable comes with the kit.

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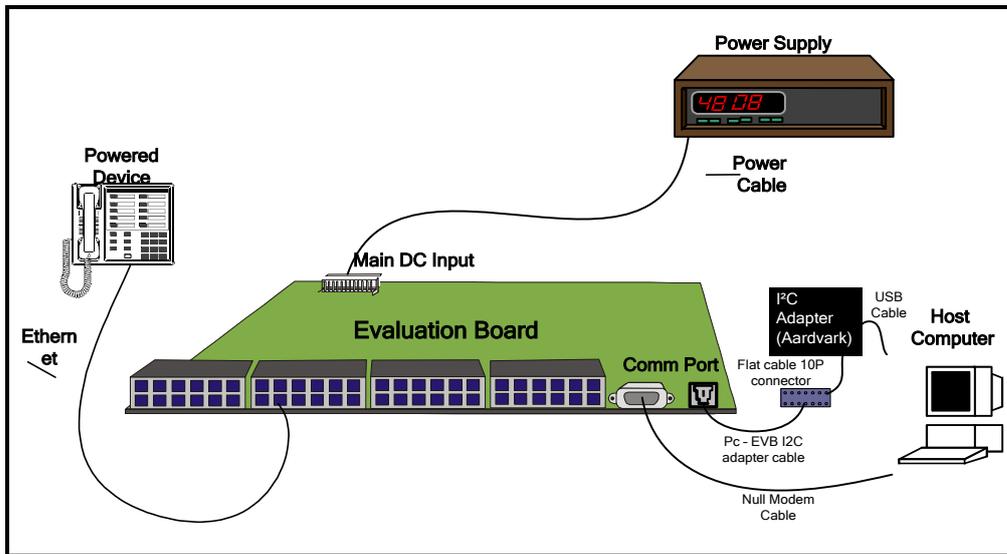


Figure 3-1: Hardware Setup

### 3.3 Installing Software

Refer to Figure 3-2.

1. Insert CD provided with the kit into CD drive.
2. Uninstall the previous GUI version (if exists).
3. Run **Setup.exe**.

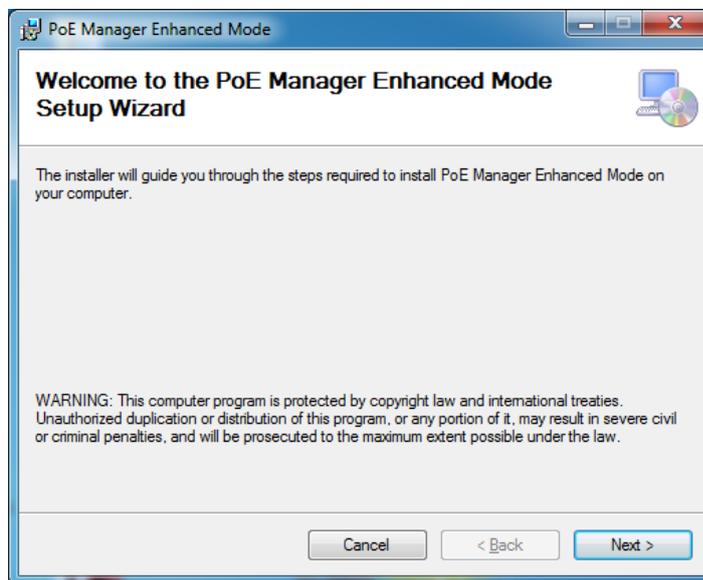


Figure 3-2: Setup Wizard

4. Click **Next**, **Install**, and **Finish** sequentially.

The installation procedure is complete and the GUI is installed.

### 3.4 Windows Settings

View the GUI by setting DPI to normal resolution (96 DPI).

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## 4 GUI Common Features

The following sections describe:

- Initializing the GUI
- GUI screen elements

### 4.1 Initializing the GUI

1. Adjust the power supply for 48 volts and apply power to the connected Evaluation Board.



2. On the desktop, click

The Parameters Initialization screen appears, followed by the main screen, with the status bar displaying "**I<sup>2</sup>C** + Rate or **UART** + Com number' and **'Online'** at the bottom of the screen. Kind of main screen that appears depends on the mode being used.



Figure 4-1: Startup Screen

If communication port operation fails, or the user wishes to modify the Communication link parameters manually, (refer to Modifying the Communication Parameters, page 13) the Communication dialog box appears (Figure 4-2). In this dialogue box, you can set the connected COM port and I<sup>2</sup>C parameters.

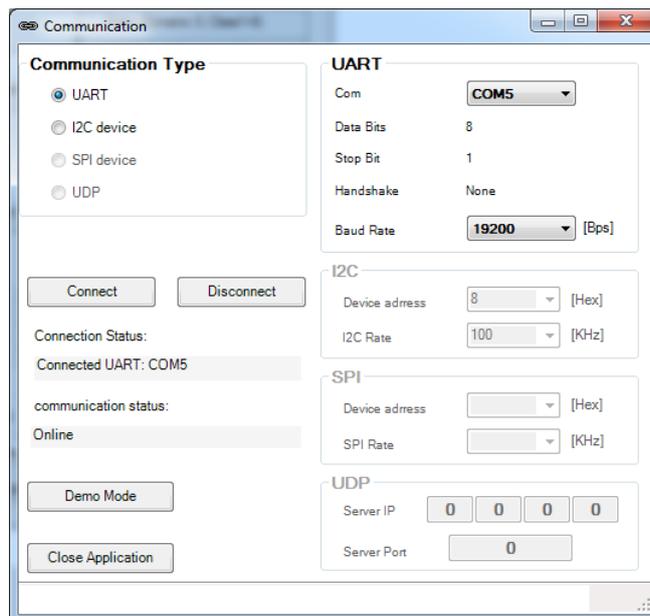


Figure 4-2: Communication Dialog Box

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## 4.2 GUI Common Elements

There are a series of buttons and indicators on each screen. The following sections detail their functions.

## 4.3 Connecting to the Board

- Click  to connect Host computer to evaluation board. GUI software is now active.
- Click  to disconnect Host computer from evaluation board. GUI software is disabled.

## 4.4 Modifying the Communication Parameters

The Communication dialog box (Figure 4-2) enables modifying the default communication parameters.

1. Click .

The dialog box opens.

2. Edit the parameters as required.
3. Click **Connect**.

The changes are automatically saved and the dialog box closes.

## 4.5 Main Screen Indicators

- **Number of Ports:** This indicator displays the total number of ports detected by the GUI software.
- **Communication Indicator** : This indicator blinks when the PC communicates properly in both directions (Tx and Rx). The refresh rate is between 1 to 2 seconds.

## 4.6 Menu Options

The GUI contains the following menu options.

### 4.6.1 Exiting the Program

- Select **File > Exit**.

### 4.6.2 Developer Status

Figure 4-3 displays the Developer View dialogue box for logging in the developer mode.

**Note:**

Only authorized Microsemi personnel can access this mode.



Figure 4-3: Developer Login Dialogue Box

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### 4.6.3 Showing the Status Number

The status number provides detailed information regarding the port status. For more information regarding the port status, refer to *PD63000 & PD69000/G Serial Communication Protocol User Guide 06-0032-056*.

- Select **Setup > Show status number**.

An additional field appears, showing a number representing the status description.

12	13	14	15	16	17	18	19	20	21	22	23
											
INIT 27											
<input checked="" type="checkbox"/>											

### 4.6.4 Viewing the Demo Mode

If you do not have the required hardware to test the evaluation board, the Demo mode enables you to view GUI screens. All functions are disabled.

- To enter the Demo mode, select **Help > Demo Mode**.
- To exit the Demo mode, select **Help > Demo Mode**.

### 4.6.5 Viewing the Application Version

To view the application version, select **Help > About**.

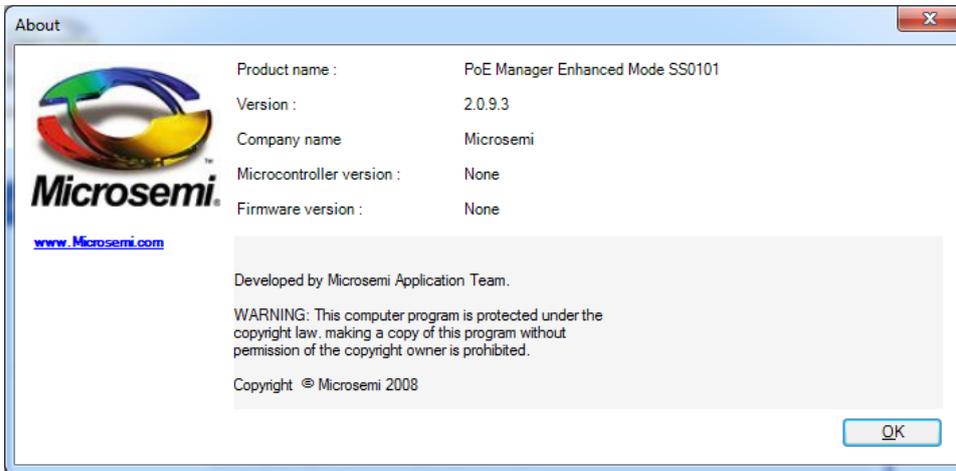


Figure 4-4: About Dialogue Box

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## 5 Enhanced Mode Operation (EMO)

This chapter provides a detailed description of the Enhanced Mode software features.

The Enhanced Mode software contains the following products: PD63000, PD33000, PD63000\_HighPower, PD62000, PD69000, PoE\_API, PD69000\_HighPower, PD69002, CPSS\_PoE\_API, PD69100.

Each product is automatically identified during GUI startup according to the Product number field.

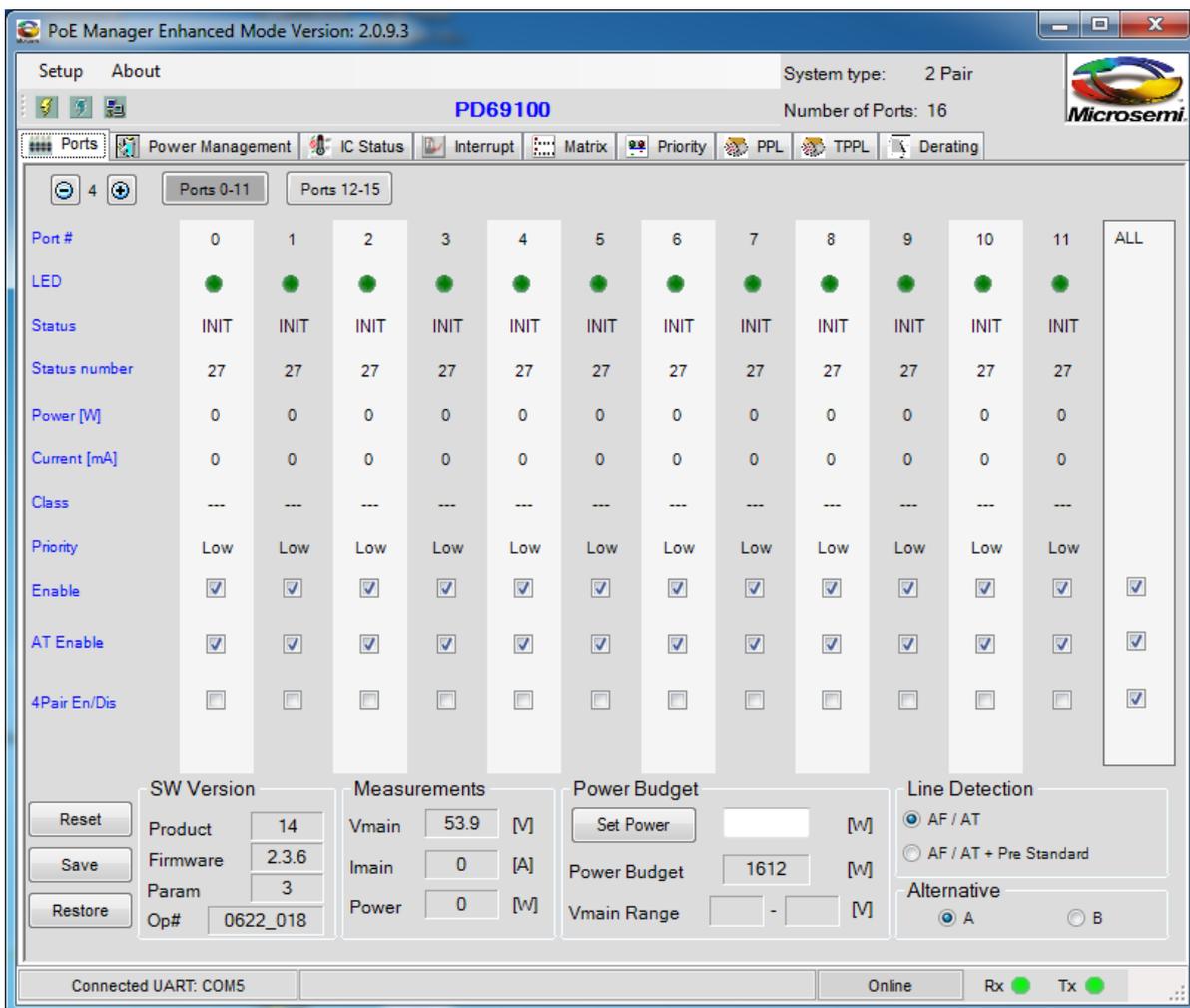


Figure 5-1: PoE Manager Enhanced Mode Window, Ports Tab (EMO)

The Ports tab (of the PoE Manager Enhanced Mode window) includes the following elements:

- **Main Menu Tabs:** Used to select the following functions:
  - Ports: Displays ports' real-time monitoring, product number, GUI version, allows setting of the detection method (AF/AT or AF/AT +Pre Standard) and selection of the alternative option ('A' or 'B'). Refer to The Ports Tab (EMO), page 17.
  - Power Management: Sets power budget, power banks, valid input voltage and presents real time measurements. Refer to The Power Management Tab (EMO), page 20.



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- Interrupt: Displays interrupt related information and masks. Refer to

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The Interrupt Tab (EMO), page 21.

- IC Status: Displays the current PD devices temperature, enables temperature alarm limit setting and selection of AT mode. Current HW version is also displayed. Refer to The IC Status Tab (EMO), page 23.
  - Matrix: Displays Logical to Physical port associations. Refer to The Matrix Tab (EMO), page 25
  - PPL: Used for setting port power limit for all ports. Refer to The PPL (Port Power Limit) Tab (EMO), page 27.
  - TPPL: Used for setting the Temporary Port Power Limit for all ports. Refer to The TPPL (Temporary Port Power Limit) Tab (EMO), page 28
  - Priority: Used for priority setting for all ports. Refer to The Priority Tab (EMO), page 29.
- **LEDs:** Indicates the ports status
  - **Enable Checkboxes** Used for enabling port/s
    - **Power, Current, Class Measurements Fields:** Displays measurements taken on the input power line such as voltage, current and calculated power

For detailed information on the Enhanced Mode's buttons, indicators, and combo-boxes, refer to GUI Common Features on page 12.

## 5.1 The Ports Tab (EMO)

The Ports tab (Figure 5-1) has several functions:

- Displays:
  - Port number
  - Status information of each port
  - Power and current information
  - Port class
  - The software version
  - System power statistics
- Enables/disables the port
- Enables each device's AT operation mode
- Sets the power budget
- Sets the line detection method
- Resets the system, saves system parameters or restores the default parameters
- Sets the backoff time

### 5.1.1 Enhanced Mode Port Status Indicators

The following buttons display information on each port:

- : Used to navigate between ports 0-12, 13-24, 25-36, and 37-48.
- : Enables you to display the status of the next four ports (+4) / previous four ports (-4).

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- **Ports:** Ports number: The ports are physically defined from 1 to 12, but their logical designation is from '0' to '11', depending on the number of PoE Managers in the system.
- **LED:** This multi-color indicator indicates port status:
  - Dark green: Port off
  - Light green: Port on
  - Yellow : Port overloaded or shorted
  - Yellow blinking : Port under power management
- **Status:** Indicates actual port status number and its description. Statuses are:
  - UnDef: Port is off, non-existing port number
  - ON: Port is on, valid resistor/capacitor detected
  - ON-Hi: High power port is ON
  - OFF: Port is off, user setting
  - INIT- Port is off, detection is in process
  - UDL: Port is off, Underload state
  - OVL: Port is off, Overload state
  - P.M.: Power Management function shuts down port due to lack of power. Port shuts down or remains off.
  - SHORT: Port is off, short condition
  - ERR: Port is off, internal hardware fault
  - VOUT: Port is off, main supply voltage is high/low
  - TEMP: Port is off, over temperature at the port.
  - OVPWR: PoE IC Over Power
  - OTHER: Unknown status

For more information, refer to *User Guide-PD33000B Serial Communication Protocol*, catalog number 06-0031-056, table 1: Actual Port Status

- **Power:** Power consumed by each port.
- **Current:** Current consumed by each port.
- **Class:** The PSE (PoE device) determines the PD class during the interrogation stage. The class is displayed as a number from 0 to 4.

Versions	
GUI Ver.	1.1.6
Product	7
Firmware	200
Param	1

- **Versions:** Displays the GUI version, product version, PoE controller's software version, and parameters version.

Measurements	
Vmain	50.7 [V]
Imain	0 [A]
Power	0 [W]

- **Measurements:** Displays the system power statistics (refer to 5.1.4Setting the Power Budget on page 19):
  - Vmain: Main input voltage

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- I<sub>main</sub>: Total input current
- Power: Total power consumption

### 5.1.2 Enabling/Disabling Ports

To enable/disable a port:

- Check/uncheck the required checkbox, either individually or all at once by checking the **All** checkbox.

### 5.1.3 Enabling AT Mode

To set the AT or AF operation mode:

- Check the **AT Enable** box to enable AT operation.
- Leave the **AT Enable** box unchecked to enable AF operation.

### 5.1.4 Setting the Power Budget

In this text box, you can set the system power limit. Power limit must be between 37 and 2000 watts.

To set the power limit:

1. In the Power Budget text box, type the required number of watts.
2. Click **Set Power**.

**Note:**

The GUI enables setting the power budget from 0 to 65535 watts. In cases where the power is out of range, the PoE CPU will reply with an error message.

In addition, the GUI displays the following specifications:

- **Power Budget:** Displays the system power budget.
- **V<sub>main</sub> Range:** Displays the main input voltage ranges. The values are determined in the Power Management tab, page 20.

### 5.1.5 Setting the Line Detection Method

You can set the Line Detection Method to one of the following:

- AF/AT (this method does not detect legacy devices).
- AF/AT + Pre Standard (Capacitor Detection) (detects legacy devices)

### 5.1.6 Setting the Backoff Time

Power is carried over the cabling using two techniques: Alternative A and Alternative B

Alternative A implements a simplex method for delivering power to the end device. Power is carried on the same conductors as data.

Alternative B carries power over spare wire pairs in the cable.

Select one of two valid four-wire connections to power the PSE:

- Alternative A: Power the PSE over data lines (1, 2 and 3, 6)
- Alternative B: Power the PSE over spare lines (4, 5 and 7, 8)

### 5.1.7 Setting System Parameters

The GUI Software provides three options for setting the system parameters:

- **Save:** Saves the current configuration parameters to the PoE Controller's non-volatile memory.
- **Restore:** Restores the factory defaults parameters and restarts the GUI operation.

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- **Reset:** Resets the PoE Controller and the PoE devices and restarts the GUI operation.

### 5.2 The Power Management Tab (EMO)

The Power Management tab enables:

- Setting the required output power and parameters
- Viewing Real Time Measurements and online consumed power
- Setting of the Power management Mode

To access the Power Management tab:

- On the PoE Manager Enhanced Mode window, click the **Power Management tab**. The following screen appears (Figure 5-2):

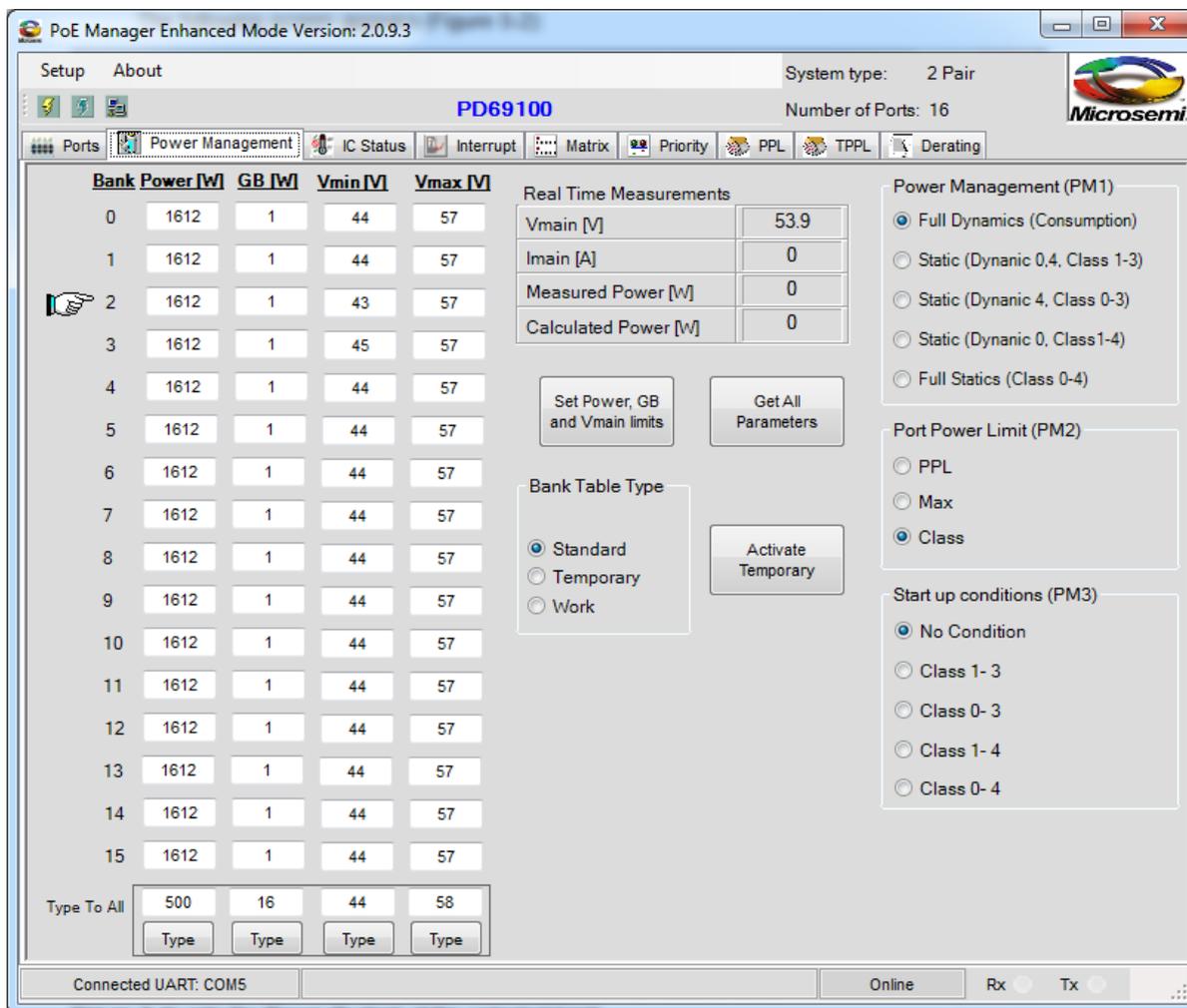


Figure 5-2: PoE Manager Enhanced Mode Window, Power Management Tab (EMO)

#### 5.2.1 Setting the Power parameters

The above table sets each bank's:

- Power budget
- Guard Band (The Guard Band is the range in which the evaluation board will not connect to additional ports)

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- Vmax (upper input voltage limit)
- Vmin (lower input voltage limit).

To set power banks parameters click the "**Set Power, GB and Vmain limits**" button.

To get power banks parameters click the "**Get All Parameters**" button.

### 5.2.2 Real Time Measurements Field

These read only fields display the real-time current, voltage, and power.

- **Vmain:** Actual input line voltage
- **Imain:** Total current consumption
- **Mesured Power:** Total measured used power (Vmain x Imain)
- **Calculated Power:** This read only field displays the sum power of all ports, allocated by the IEEE standard 802.3af-2003, or actually consumed according to Calculated Power Management mode

### 5.2.3 Providing Extra Power

The PoE IC can provide extra power to the ports (Available in advanced mode).

To provide extra power mark the **AT extra power** checkbox.

### 5.2.4 Setting the Power Mode

Setting the power mode for the ports consists of 3 steps:

1. PM-1: How system power is being calculated (Summed).
  - 0 - Full Dynamics (Consumption)
  - 1 - Classes 1 to 3 = Class power, classes 0,4 = Dynamic
  - 2 - Classes 0 to 3 = Class power, class 4 = Dynamic
  - 3 - Classes 1 to 4 = Class power, class 0 = Dynamic
  - 4 - Classes 0 to 4 = Class power.
2. PM-2: Port Power Limit.
  - 0 - Table set by the user (PPL)
  - 1 - Class Limit
  - 2 - Max (AT/AF flag)
3. PM-3: Start up conditions: The port will not start up in case that detected class power is higher than the predefined.
  - 0 - No Condition
  - 1 - Condition on Classes 1 to 3
  - 2 - Condition on Classes 0 to 3
  - 3 - Condition on Classes 1 to 4
  - 4 - Condition on Classes 0 to 4

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### 5.3 The Interrupt Tab (EMO)

The Interrupt tab enables definition of interrupt masks and viewing of interrupt statuses.

To access the Interrupt tab:

- On the PoE Manager Enhanced Mode window, click the **Interrupt tab**. The following screen appears (Figure 5-3):

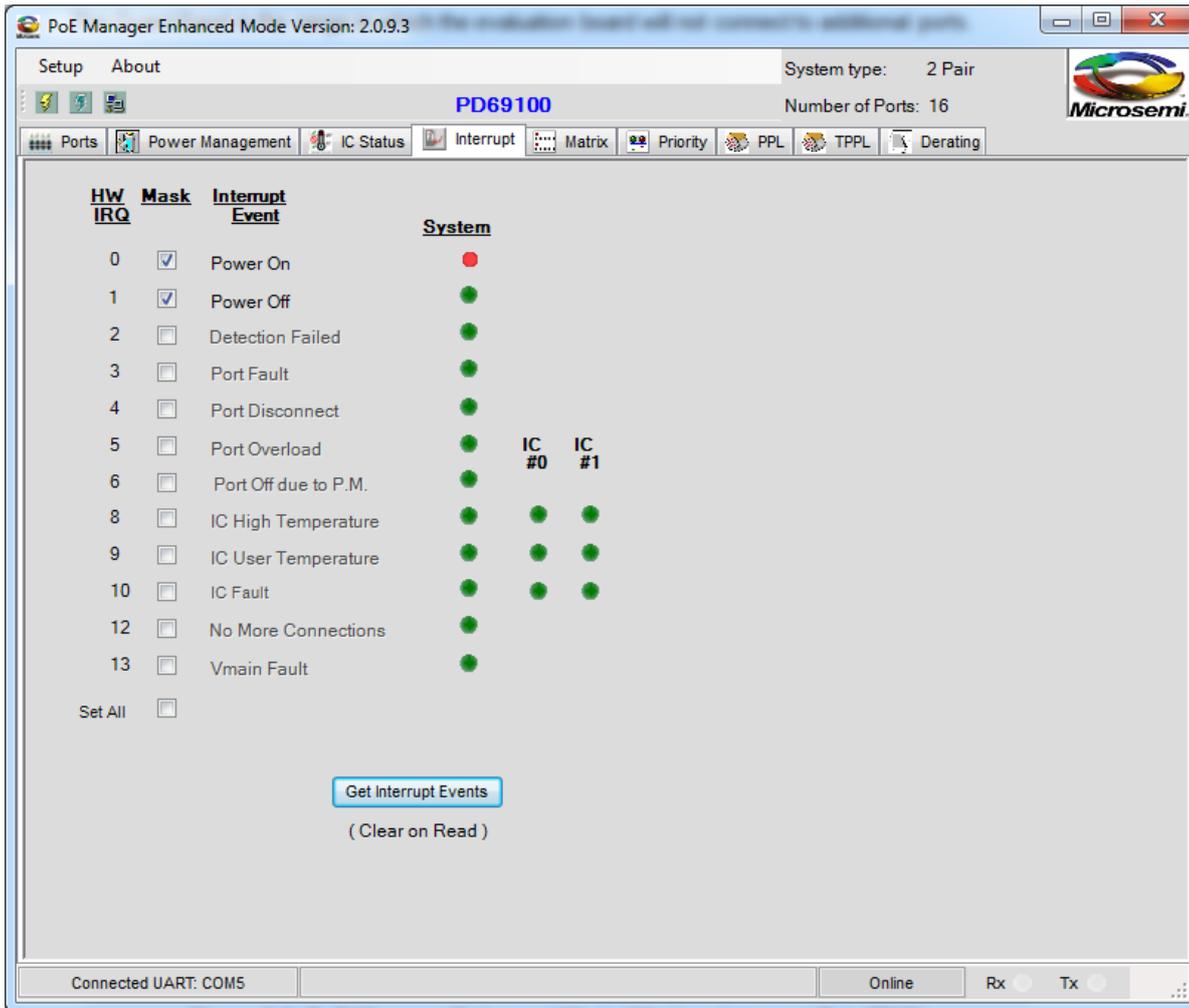


Figure 5-3: PoE Manager Enhanced Mode Window, Interrupt Tab (EMO)

The Interrupt tab displays the following information:

- HW IRQ:** This number indicates the event bid.
- Interrupt Reg:** This field describes each Interrupt event.
- System:** A green LED indicates that an interrupt event has occurred.
- ICs Interrupt Indication LEDs:** Indicates the specific PoE device that caused the event (bits 8 to 10). A red LED means IC fault, while a green LED means a valid IC.

#### 5.3.1 Displaying an Event

To display the events:

- Click **Get Interrupt**.

To mask events:

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1. Click the **Mask checkbox** of the required event.
2. Click **Get Interrupt Events**.

The tab displays the interrupt status.

- Green LED: No event occurred
- Red LED: An event occurred

Upon LEDs refreshment, the CPU zeros the event register.

### 5.4 The IC Status Tab (EMO)

The IC Status tab displays the Integrated Circuit (IC) temperature. Each PoE device incorporates two or four temperature sensors, measuring the IC's temperature. In addition, the PoE devices have an over-temperature limit setting, which enables the Host CPU to receive relevant over-temperature feedback (refer to Setting the Temperature Limit, page 25).

The tab presents AT mode checkboxes allowing the user to set the chip mode to AT when checked, or to AF mode when unchecked. In cases where the hardware is not an AT compliant, the program refuses any attempt to set the chip to AT.

To access the IC Status tab:

On the PoE Manager Enhanced Mode window, click the **IC Status tab**. The following screen appears (Figure 5-4):

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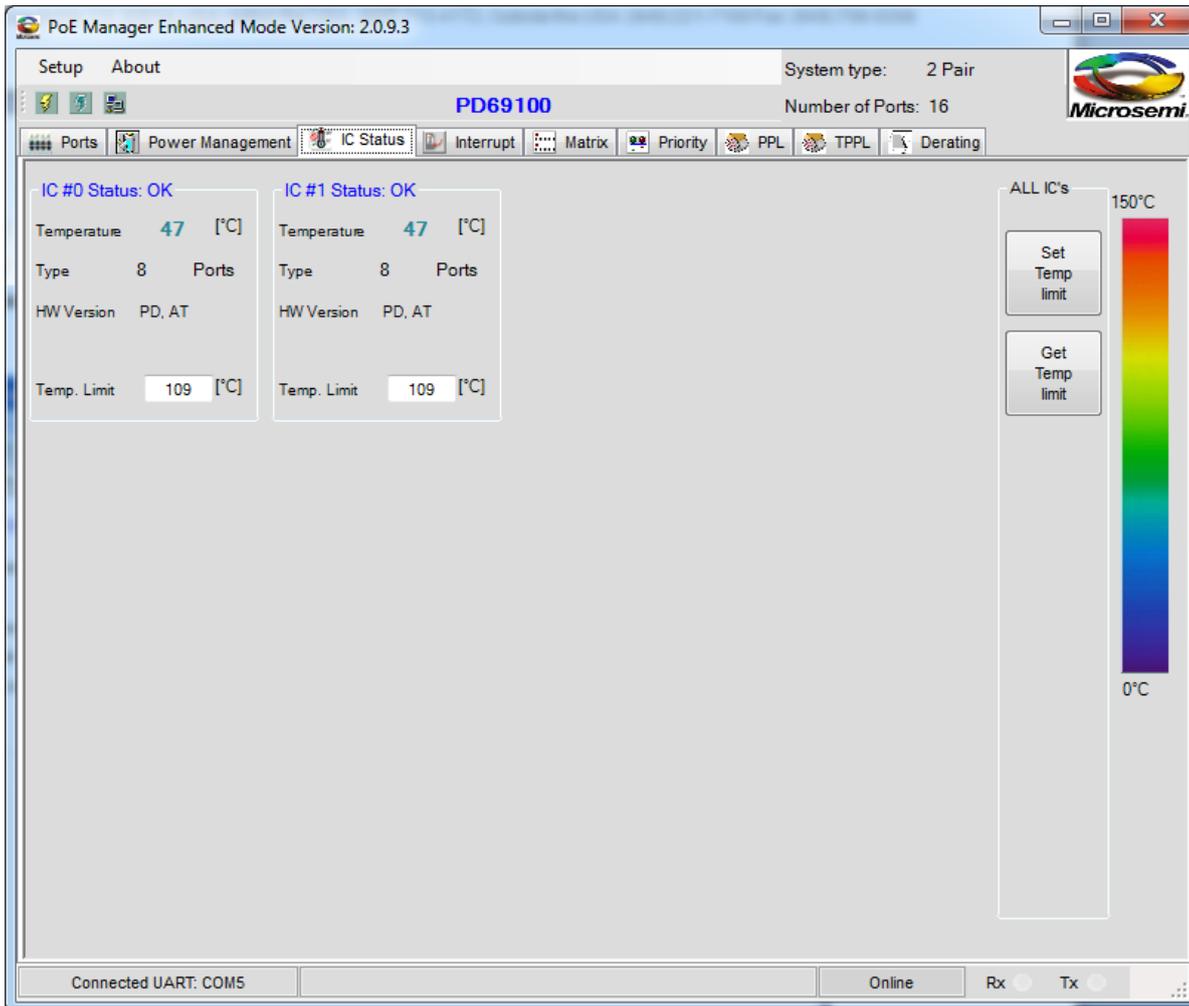


Figure 5-4: PoE Manager Enhanced Mode Window, IC Status Tab (EMO)

### 5.4.1 IC Status Display

The IC Status tab displays the following information:

- **IC number and status:** Status Display displays the PoE device number and current status:
  - None: No PoE device detected
  - OK: Expected PoE device detection
  - Volatile: Unexpected PoE detection
  - New: Unexpected PoE detection (1)
  - Error: Fail/Missing PoE device
  - Different: Different PoE device was detected
- **Temperature telemetry:** Per IC temperature sensors display the relevant IC temperature (average of the two or four sensors). The temperature font color corresponds to the color of the temperature bar.
- **Type:** PoE device's number of ports
- **HW version:** PoE device current hardware version
- **AT mode:** Device AT operation request and status:

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- Checked: AT operation
- Unchecked: AF operation
- **Temperature bar:** A color legend that represents the temperature value corresponding to the temperature font color.

#### 5.4.2 Setting the Temperature Limit

To set the temperature limit of an individual IC device, in the **Temp. Limit** field type the required temperature (in Celsius).

To set the temperature limit of all IC devices:

1. Under All IC's, click **Set Temperature Limit**.
2. Click **Save & Reset**.

#### 5.4.3 Displaying the Current Temperature Limits

This button retrieves the temperature limit settings from the CPU.

### 5.5 The Matrix Tab (EMO)

The Matrix tab displays the system's logical ports configuration

To access the Matrix tab:

- On the PoE Manager Enhanced Mode window, click the **Matrix tab**. The following screen appears (Figure 5-5):

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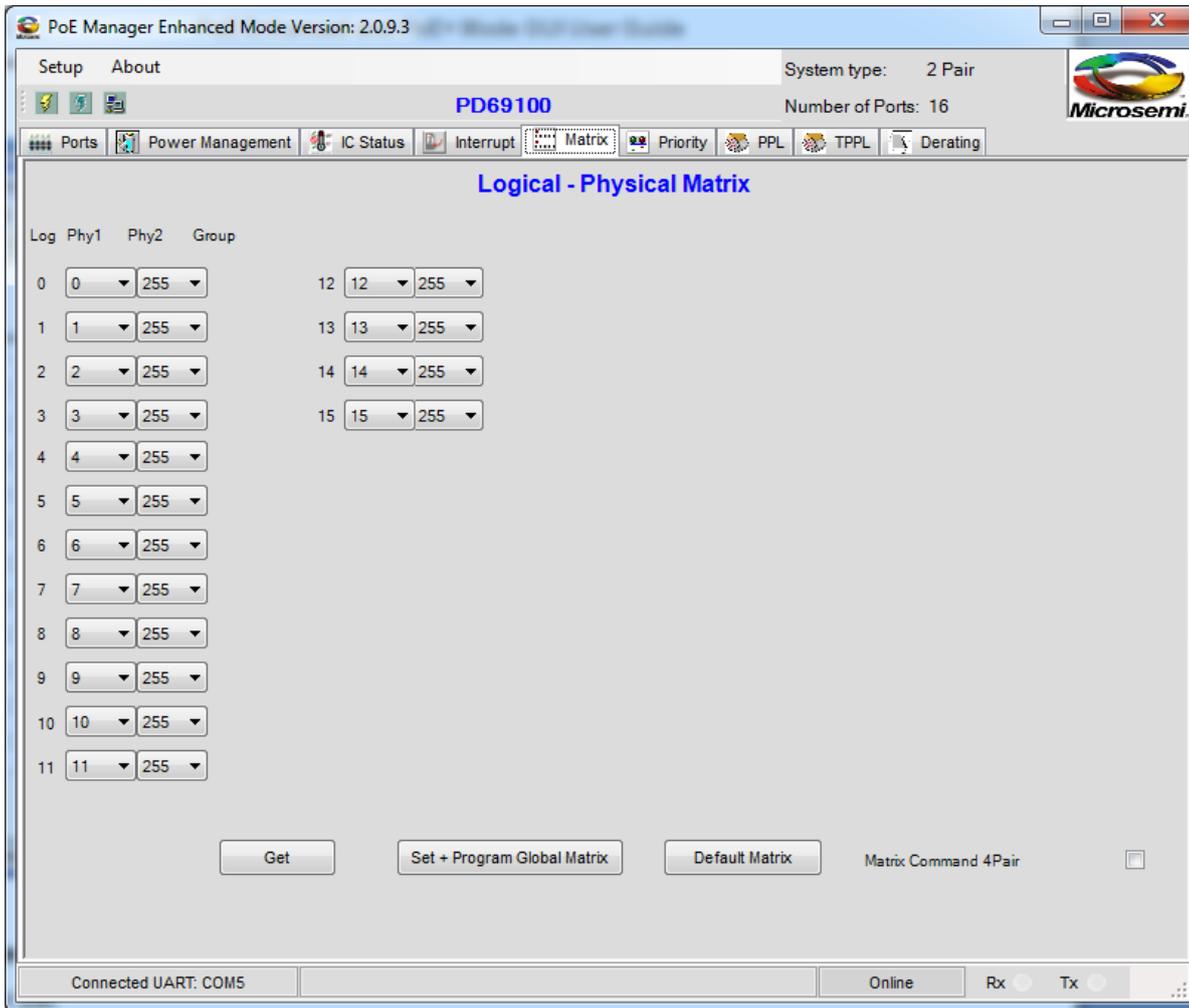


Figure 5-5: PoE Manager Enhanced Mode Window, Matrix Tab (EMO)

### 5.5.1 Viewing the Current Physical – Logical Port Matrix

Click **Get**. The physical matrix appears.

### 5.5.2 Defining the Physical – Logical Port Matrix

In cases where the physical definition of a port (or ports) does not correspond with the logical definition, you can manually map the correspondence.

To define the correspondence between a physical port and any logical port:

1. In the physical port's drop down menu, select the port number corresponding to the logical port.
2. Repeat for any port that requires definition.
3. Click **Set**.

The physical port is defined.

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### 5.5.3 Setting the Default Matrix

You can define the physical/logical port correspondence as 1:1. For example, Logical port 1 corresponds to Physical port 1; Logical port 12 corresponds to Physical Port 12 and so on.

1. Click **Default Matrix**.
2. Click **Save**.

Physical ports are defined.

### 5.6 The PPL (Port Power Limit) Tab (EMO)

The PPL (Port Power Limit) tab enables to set the power limit of each port. PPL is the maximum power per single port. If a port exceeds its power limit, the PoE system shuts that port down.

To access the PPL tab:

- On the PoE Manager Enhanced Mode window, click the **PPL tab**. The following screen appears (Figure 5-6):

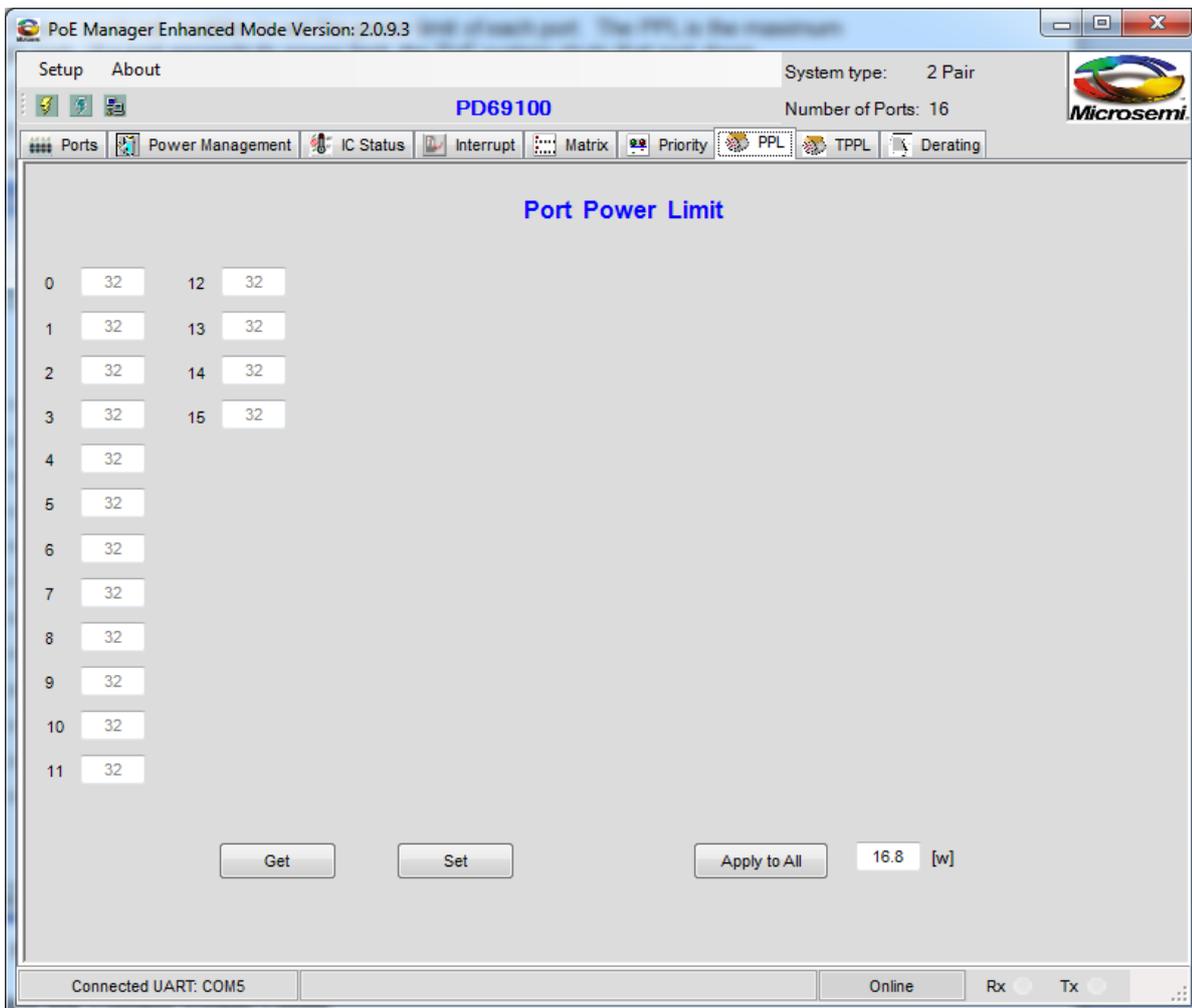


Figure 5-6: PoE Manager Enhanced Mode Window, PPL Tab (EMO)

#### 5.6.1 Viewing the Current Power Limits

Click **Get**. The tab displays the current power limits as set by the PoE Controller.

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### 5.6.2 Setting the Port Power Limit

1. In the required field(s), type the power limit.
2. Click **Set**.

The power limits are set.

### 5.6.3 Setting a Uniform Power Limit

You can set a uniform port power limit.

1. In the Apply to All field, type in the required power limit.
2. Click **Apply to All**.

The power limit is set.

## 5.7 The TPPL (Temporary Port Power Limit) Tab (EMO)

The TPPL (Temporary Port Power Limit ) tab enables to set a temporary power limit for each port. The TPPL is the maximum power value per one single active port. This value will be the port's new power limit only when the port is still 'on'. When port is turned off, the maximum power for a specific port returns to PPL. If a port exceeds its power limit, the PoE system shuts down the appropriate port.

To access the TPPL tab:

On the PoE Manager Enhanced Mode window, click the **TPPL tab**. The following screen appears (Figure 5-7):

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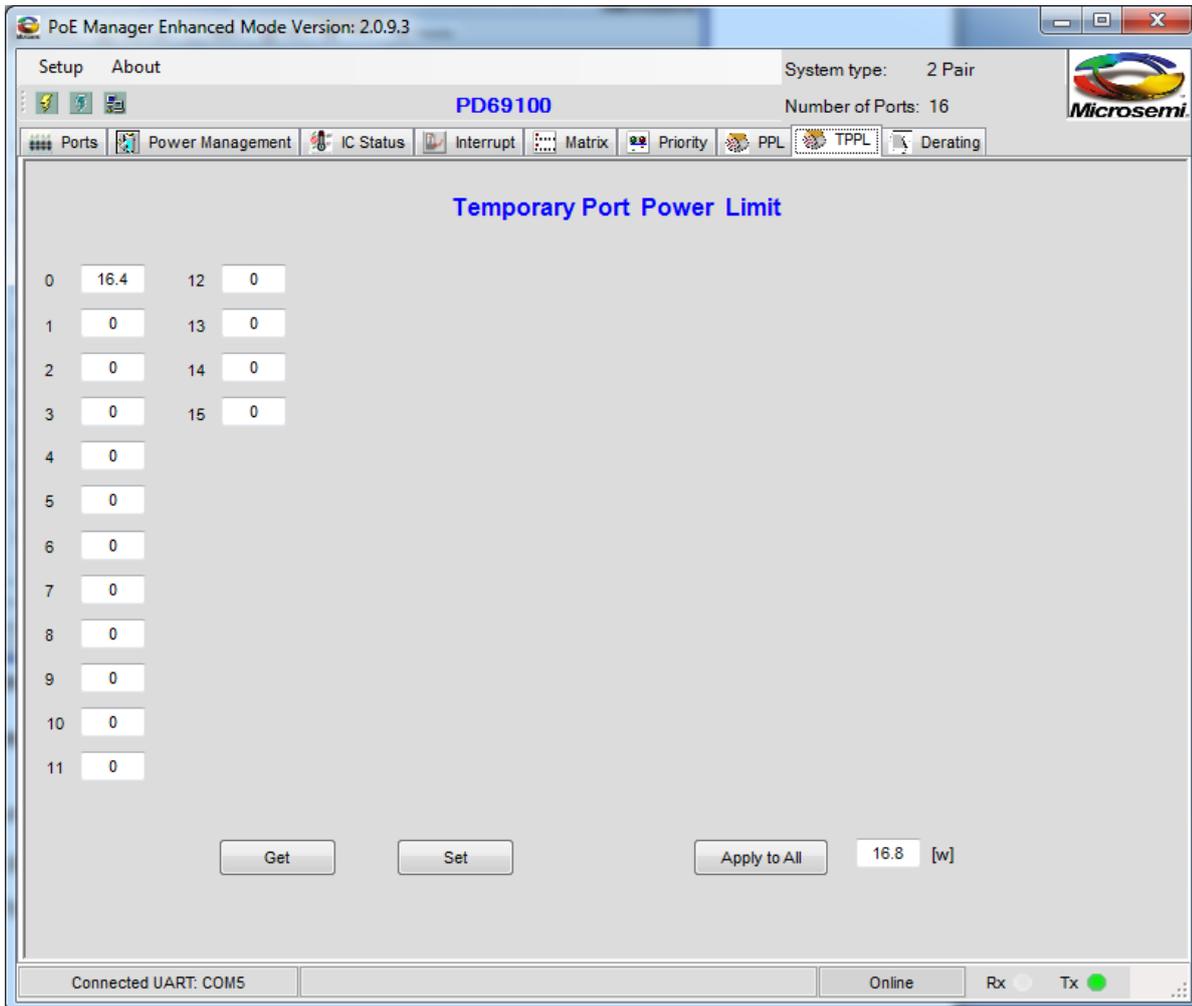


Figure 5-7: PoE Manager Enhanced Mode Window, TPPL Tab (EMO)

### 5.7.1 Viewing the Current Power Limits

Click **Get**. The tab displays the current power limits as set by the PoE Controller.

### 5.7.2 Setting the Port Power Limit

1. In the required field(s), type the power limit.
2. Click **Set**.

The power limits are set.

### 5.7.3 Setting a Uniform Power Limit

You can set a uniform port power limit.

1. In the Apply to All field, type in the required power limit.
2. Click **Apply to All**.

The power limit is set.

## 5.8 The Priority Tab (EMO)

The Priority tab enables setting or displaying the ports' priorities. The priority levels determine which ports receive power in case the demand is greater than the supply. There are three priority levels: Critical, High, and Low.

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To access the Enhanced Mode Port Priority tab:

- On the PoE Manager Enhanced Mode window click the **Priority tab**. The following screen appears (Figure 5-8):

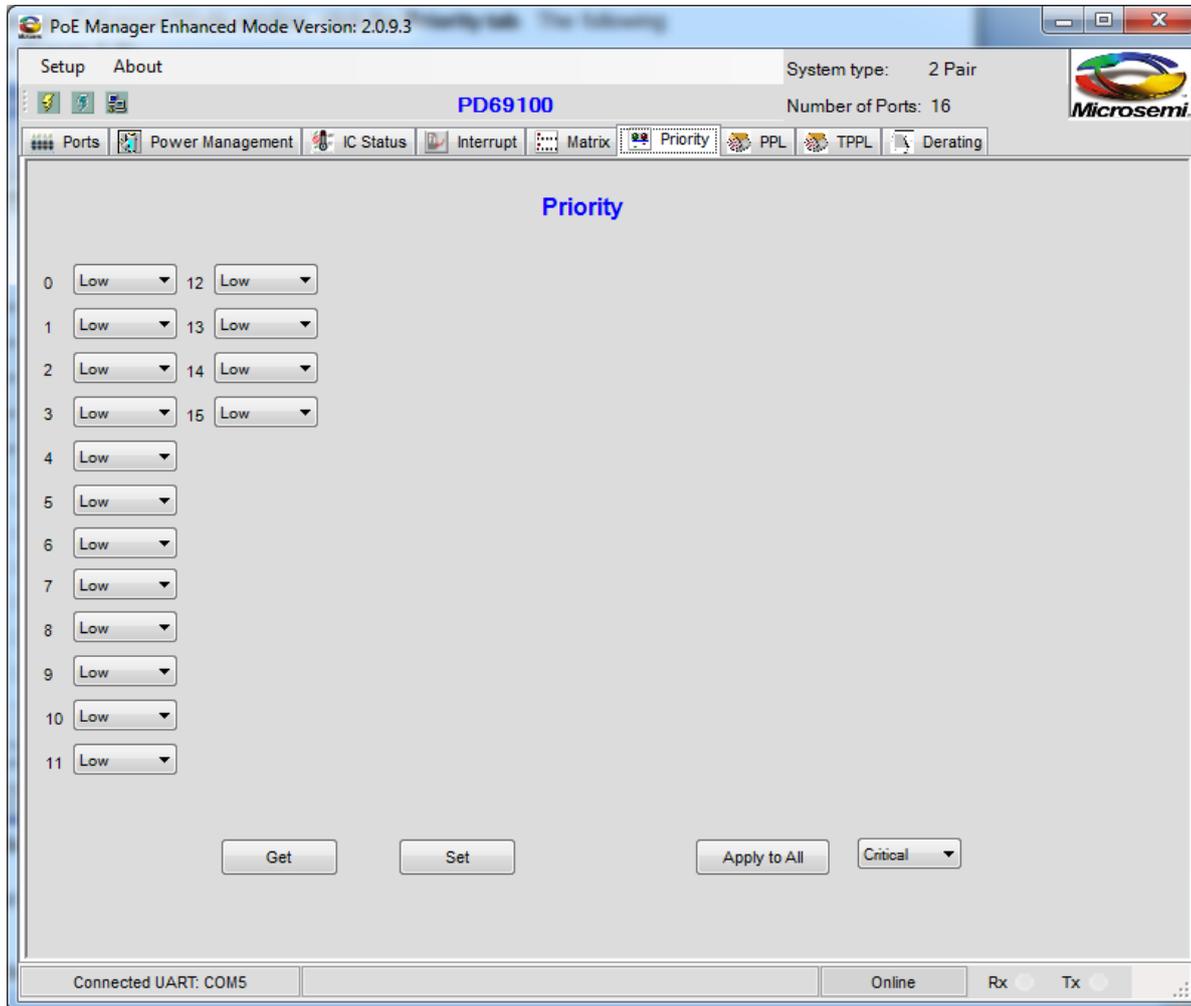


Figure 5-8: PoE Manager Enhanced Mode Window, Priority Tab (EMO)

### 5.8.1 Viewing the Current Power Limits

Click **Get**. The tab displays the current priority level as set by the PoE Controller.

### 5.8.2 Setting the Port Power Limit

- From the drop down list, select the priority level for each port.
- Click **Set**.

The priority levels are set.

### 5.8.3 Setting a Uniform Power Limit

You can set a uniform priority level.

- From the Apply to All list, select the required level.
- Click **Apply to All**.

The uniform priority level is set.

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## 6 PoE+ Mode Operation

This chapter provides a detailed description of the PoE+ mode.

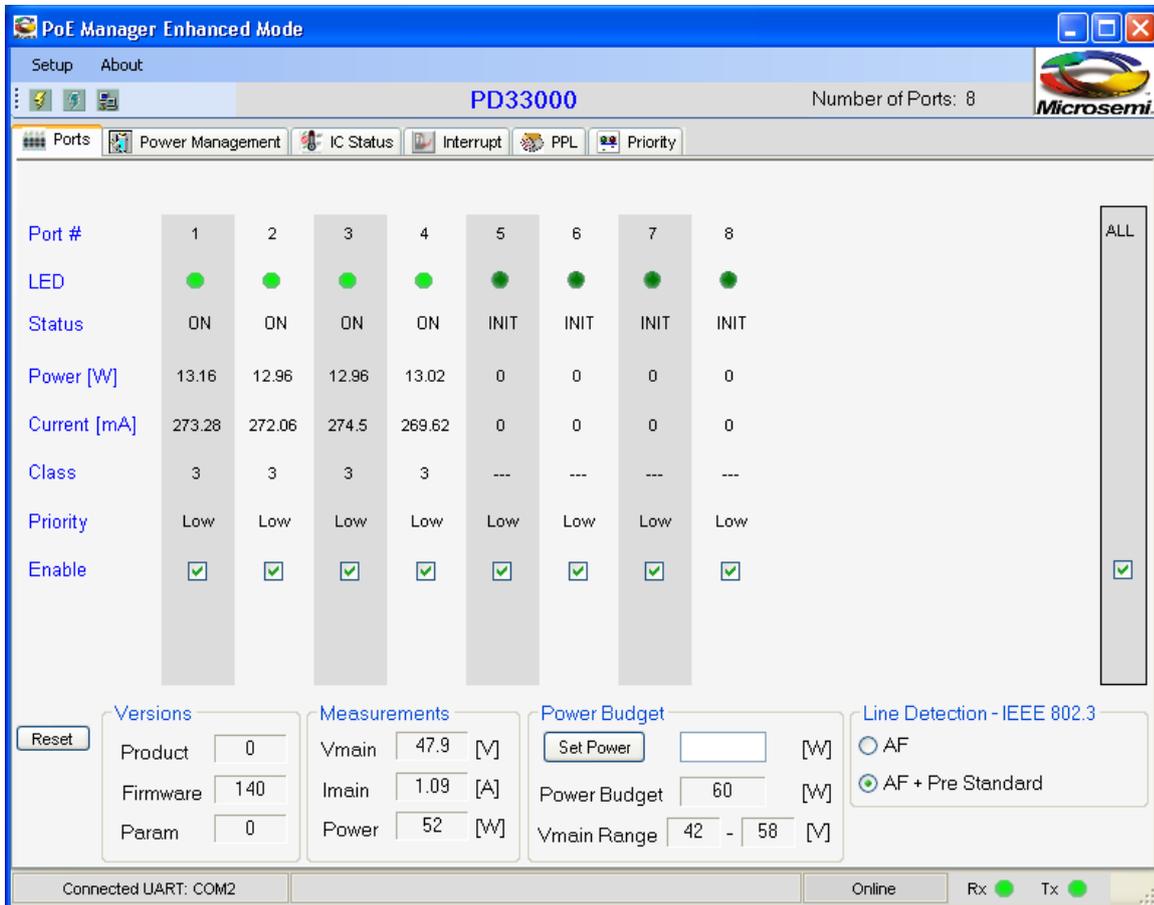


Figure 6-1: PoE Manager Enhanced Mode Window, Ports Tab (PoE+)

Figure 6-1 includes the following elements:

- **Main menu tabs:** Used for selecting the following screens:
  - Ports: Displays real-time monitoring of the system and ports. Refer to The Ports Tab, page 32.
  - Power Management: Sets power budget, power banks, valid input voltage and presents real time measurements. Refer to The Power Management Tab, page 33.
  - Interrupt: Displays interrupt related information and mask. Refer to The Interrupt Tab, page 35.
  - IC Status: Displays the current PD64012 devices temperature and enables the temperature alarm limit setting. Refer to The IC Status Tab, page 37.
  - Port Power Limit: Maximum output power per port. Refer to The PPL (Port Power Limit) Tab, page 38.
  - Priority: Enables priority setting for all ports, individually or all-at-once. Refer to The Priority Tab, page 39.
- **Port status indicators:** Indicates ports' status.

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- **Port enable checkboxes:** Used for enabling port/s,
- **Power, current, class measurements field:** Displays measurements taken on the input power line, such as voltage, current and calculated power.

For detailed information regarding PoE+ Mode's main screen buttons, indicators and combo-boxes, refer to GUI Common Features, page 12.

### 6.1 The Ports Tab (PoE+)

The Port tab (Figure 6-1):

- Displays system information
- Enables setting the power budget.

#### 6.1.1 PoE+ Mode Port Status Indicators

The following buttons display information on each port:

- **Ports:** The port number, 1 to 8.
- **LED:** Graphical LED, displaying the actual status of the relevant port:
  - Dark green: Port off
  - Light green: Port on
  - Yellow : Port overloaded or shorted
  - Yellow blinking : Port under power management
- **Status:** Indicates the actual port status. Statuses are:
  - UnDef: Port is off; non-existing port number
  - ON: Port is on; valid resistor/capacitor detected
  - ON-Hi: High power port is ON
  - OFF: Port is off; user setting
  - INIT- Port is off; detection is in process
  - UDL: Port is off; Underload state
  - OVL: Port is off; Overload state
  - P.M.: Power Management function shuts down port, due to lack of power. Port shuts down or remains off.
  - SHORT: Port is off; short condition
  - ERR: Port is off; internal hardware fault
  - VOUT: Port is off; main supply voltage is high/low
  - TEMP: Port is off; over temperature at the port.
  - OVPWR: PoE IC Over Power
  - OTHER: Unknown status

For more information, refer to *User Guide-PD33000B Serial Communication Protocol*, catalog number 06-0031-056, table 1: Actual Port Status

- **Power [W]:** Power consumed by each port.
- **Current [mA]:** Current consumed by each port.
- **Class:** Displays each port's class, in accordance with IEEE 802.3af standard.

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### 6.1.2 Enabling/Disabling Ports

To enable/disable a port:

- Check/uncheck the required checkbox(es) individually, or all at once by checking the **All** checkbox.

### 6.1.3 Resetting the PoE Controller

Click **Reset**. The PoE Controller is reset. All parameters are set to their defaults.

### 6.1.4 Setting the Power Budget

In this text box, you can set system power limit. Power limit must be between 22 and 160 watts.

1. In the Set Power field, type the required number of watts.
2. Click **Set Power**.

The system power budget is set. In addition, the screen displays the following specifications:

- **Power Budget:** Displays the current power budget.
- **Vmain Range:** Displays the main input voltage ranges.

### 6.1.5 Selecting the Line Detection Method

You can set the line detection method to:

- AF
- AF + Pre Standard

## 6.2 The Power Management Tab (PoE+)

The Power Management tab enables:

- Setting the required output power
- Viewing Real Time Measurements and online consumed power
- Setting off the Calculated Power Mode

To access the Power Management tab:

On the PoE Manager Enhanced Mode window, click **Power Management tab**. The following screen appears (Figure 6-2):

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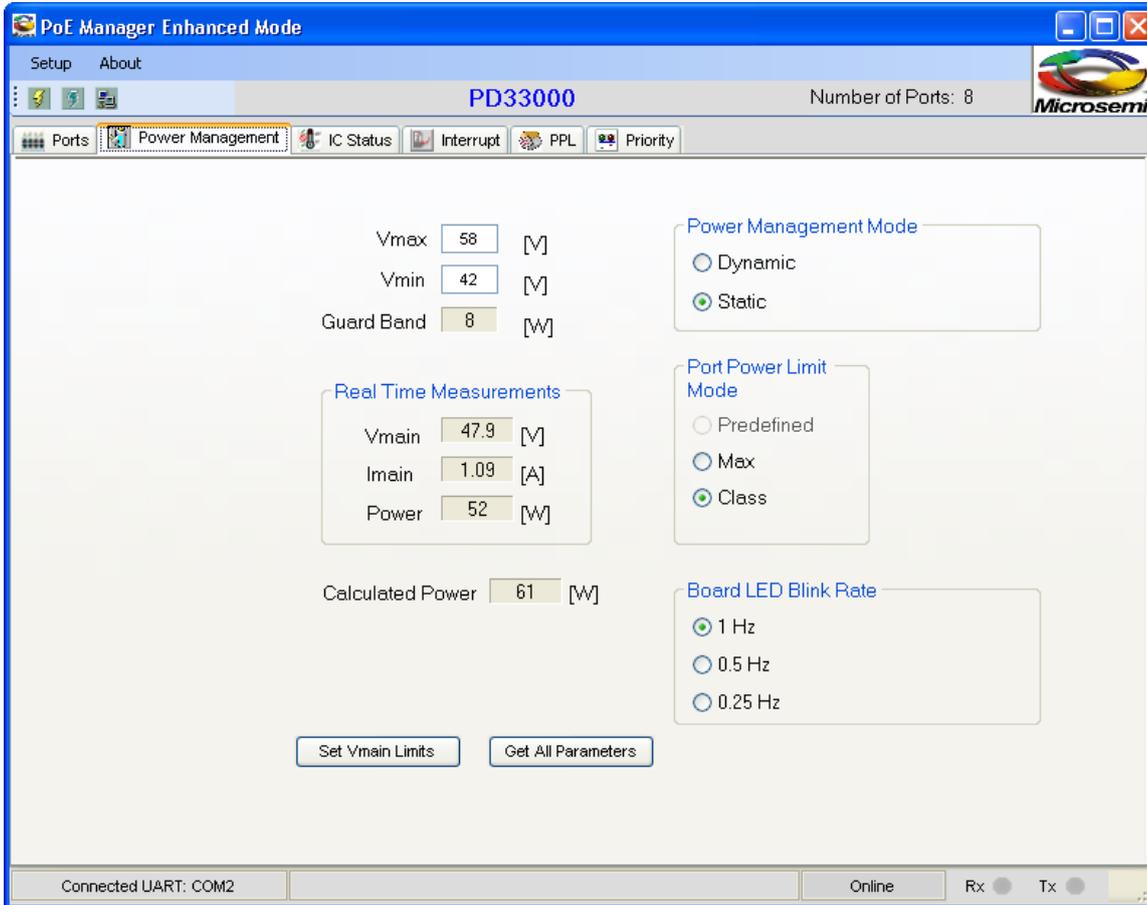


Figure 6-2: PoE Manager Enhanced Mode Window, Power Management Tab (PoE+)

### 6.2.1 Viewing the Current Parameters

To view the current parameters, click **Get All Parameters**. The parameters appear on the screen.

### 6.2.2 Setting the Limits Definition

These fields determine the minimum and maximum voltage settings shown in Figure 6-1.

To set the voltage limits:

1. In the Vmax field, type the upper input voltage limit.
2. In the Vmin field, type the lower input voltage limit.
3. Click **Set Vmain Limits**.

The Guard Band is a 19-watt constant limit. Within this range no additional ports are connected.

### 6.2.3 Setting the Power Mode

Setting the power mode for the ports consists of two steps:

- Selecting the Power Management Mode
  - Selecting the Port Power Limit Mode
1. Under Power Management Mode, select:
    - **Dynamic Power Management:** Based on actual used power (enables Predefined or Max mode) **or**

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- **Static Management:** Set by the PD classification and according to the IEEE 802.3af standard (enables Max or Class modes)
2. Under the Port Power Management Limit Mode, select the required mode.
- **Predefined:** A user defined limit
  - **Max:** If a PD's consumed power exceeds full power it is disconnected
  - **Class:** If a PD's consumed power exceeds its class predefined power, it is disconnected

The configuration is saved to the PoE Controller's non-volatile memory.

### 6.2.4 Setting the Board LED Blink Rate

The board blink rate sets the required LED-blinking rate in the power management state.

Click the required radio box. The setting is saved.

### 6.2.5 Real Time Measurements Field

These read only fields display the real-time current, voltage, and power.

- **Vmain:** Actual input line voltage
- **Imain:** Total current consumption
- **Power:** Total power used ( $V_{main} \times I_{main}$ )

### 6.2.6 Calculated Power Field

This read only field displays the sum power of all ports allocated by the IEEE standard 802.3af-2003, or actually consumed according to Calculated Power Management Mode.

## 6.3 The Interrupt Tab (PoE+)

The Interrupt tab enables definition of interrupt masks and viewing of interrupt statuses.

To access the Interrupt tab:

- On the PoE Manager Enhanced Mode window, click the **Interrupt tab**. The following screen appears (Figure 6-3):

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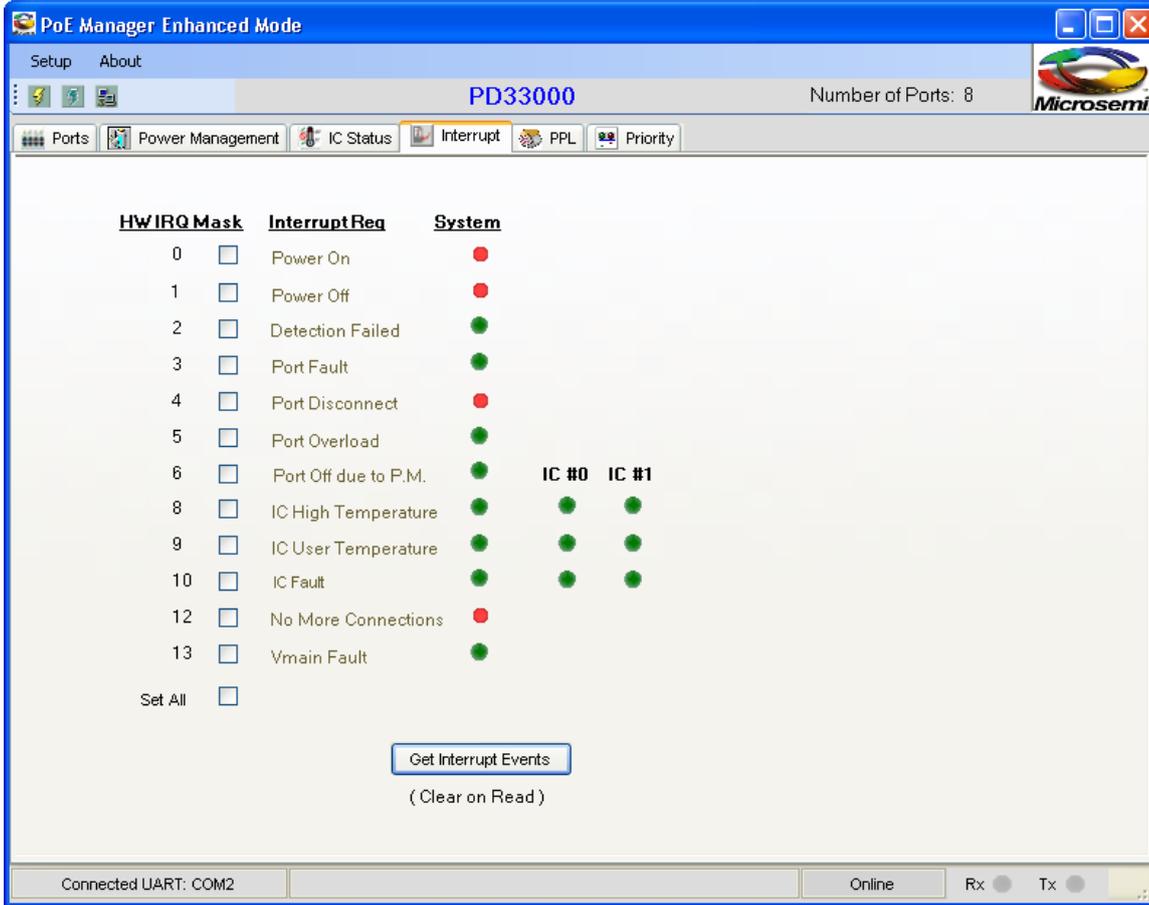


Figure 6-3: PoE+ PoE Manager Enhanced Mode Window, Interrupt Tab (PoE+)

The Interrupt tab displays the following information:

- HW IRQ: This number indicates the event bid.
- Interrupt Reg: This field describes each Interrupt event.
- System: A green LED indicates that an interrupt event has occurred.
- ICs Interrupt Indication LEDs: Indicates the specific PoE device that caused the event (bits 8 to 10). A red LED means IC fault, while a green LED means a valid IC.

### 6.3.1 Displaying Events

To display the events, click **Get Interrupt**.

To mask events:

1. Click the **Mask checkbox** of the required event.
2. Click **Get Interrupt Events**.

The screen displays the interrupt status.

- Green LED: No event occurred
- Red LED: An event occurred

Upon LEDs refreshment, the CPU zeros the event register.

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## 6.4 The IC Status Tab (PoE+)

The IC Status tab displays the chip's temperature. Each PoE device incorporates two sensors, measuring the junction temperature. In addition, the PoE devices include an over-temperature limit setting to allow the Host CPU to receive a relevant over-temperature indication.

To access the IC Status tab:

- On the PoE Manager Enhanced Mode window, click **IC Status tab**. The followingscreen appears (Figure 6-4):

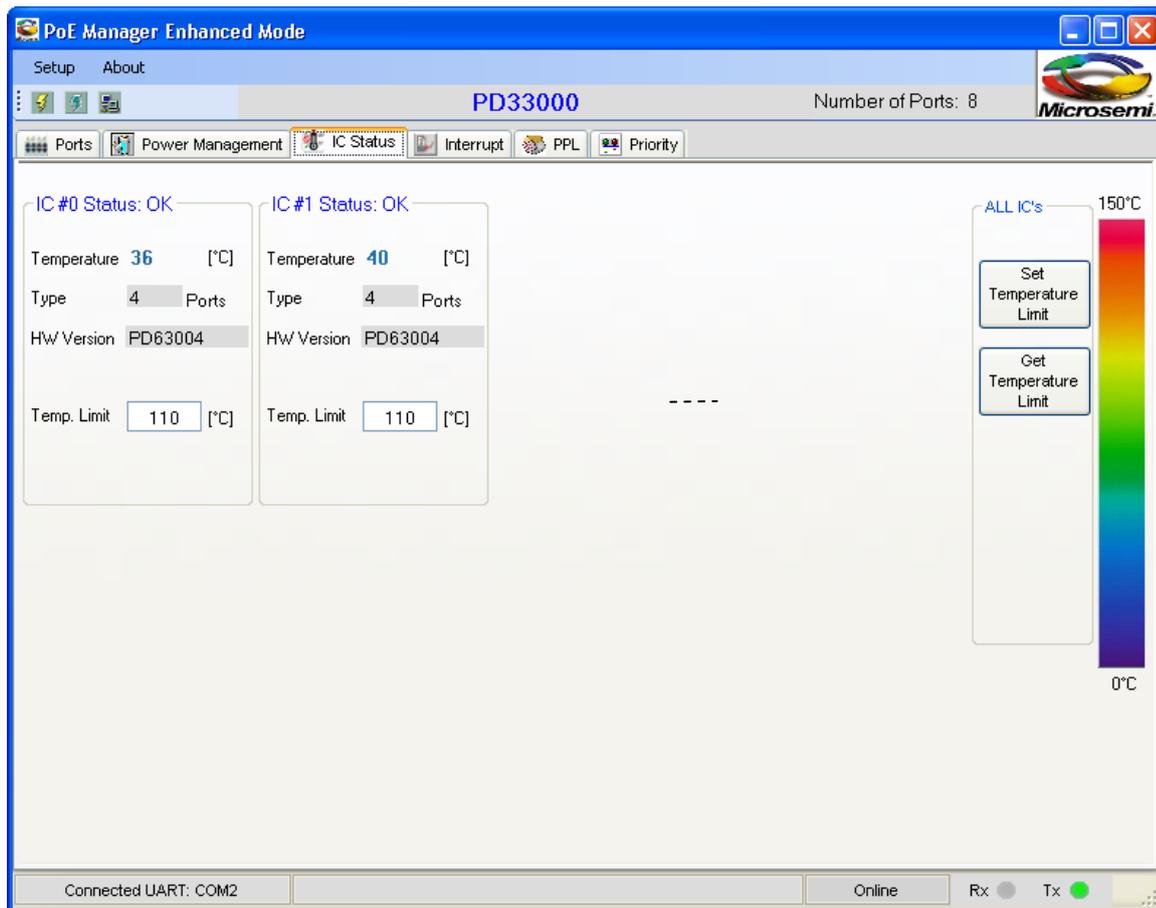


Figure 6-4: PoE Manager Enhanced Mode Window, IC Status Tab (PoE+)

### 6.4.1 IC Status Display

The IC Status tab displays the following information:

- **IC Number and Status:** Status display displaying the PoE device number and current status:
  - OK: Expected PoE device detection
  - ERR: Fail/missing PoE device
- **Temperature Telemetry:** Per IC temperature sensors display the relevant IC average temperature (average of the two or four sensors). The temperature font changes its color in accordance with the actual temperature.
- **Type:** PoE device's number of ports
- **HW version:** PoE device current hardware version

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- **Temperature Bar:** A color legend that represents the temperature value in correspondence with the temperature font color.

### 6.4.2 Setting the Temperature Limit

To set the temperature limit of an individual IC device, in the **Temp. Limit** field, type the required temperature (in Celsius).

To set the temperature limit of all IC devices, under All IC's, click **Set Temperature Limit**.

### 6.4.3 Displaying the Current Temperature Limit

You can retrieve the current temperature limits from memory.

Click **Get Temperature Limit**. The temperature limits appears in the Temp. Limit fields

## 6.5 The PPL (Port Power Limit) Tab (PoE+)

The PPL (Port Power Limit) tab enables to set the power limit of each port.

To access the PPL tab:

- On the PoE Manager Enhanced Mode window I, click the **PPL tab**. The following screen appears (Figure 6-5):

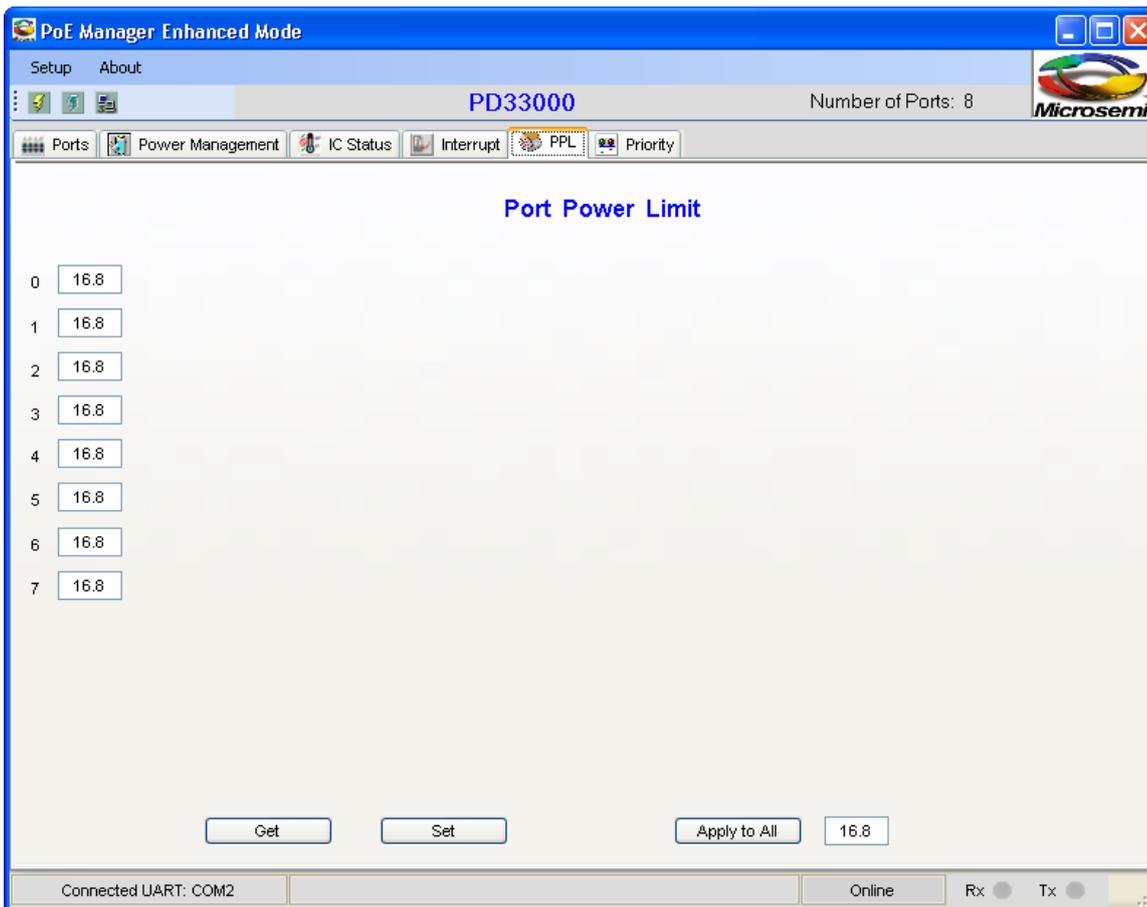


Figure 6-5: PoE Manager Enhanced Mode Window, PPL Tab (PoE+)

### 6.5.1 Viewing the Current Power Limits

Click **Get**. The tab displays the current power limits as set by the PoE Controller.

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### 6.5.2 Setting the Port Power Limit

1. In the required field(s), type the power limit.
2. Click **Set**.

The power limits are set.

### 6.5.3 Setting a Uniform Power Limit

You can set a uniform port power limit.

1. In the Apply to All field, type in the required power limit.
2. Click **Apply to All**.

A uniform power limit is set.

## 6.6 The Priority Tab (PoE+)

The Priority tab enables setting or displaying the ports' priorities. The priority levels determine which ports receive power in case the demand is greater than the supply. There are three priority levels: Critical, High, and Low.

To access the Priority Tab:

- On the PoE Manager Enhanced Mode window, click the **Priority tab**. The following screen appears (Figure 6-6):

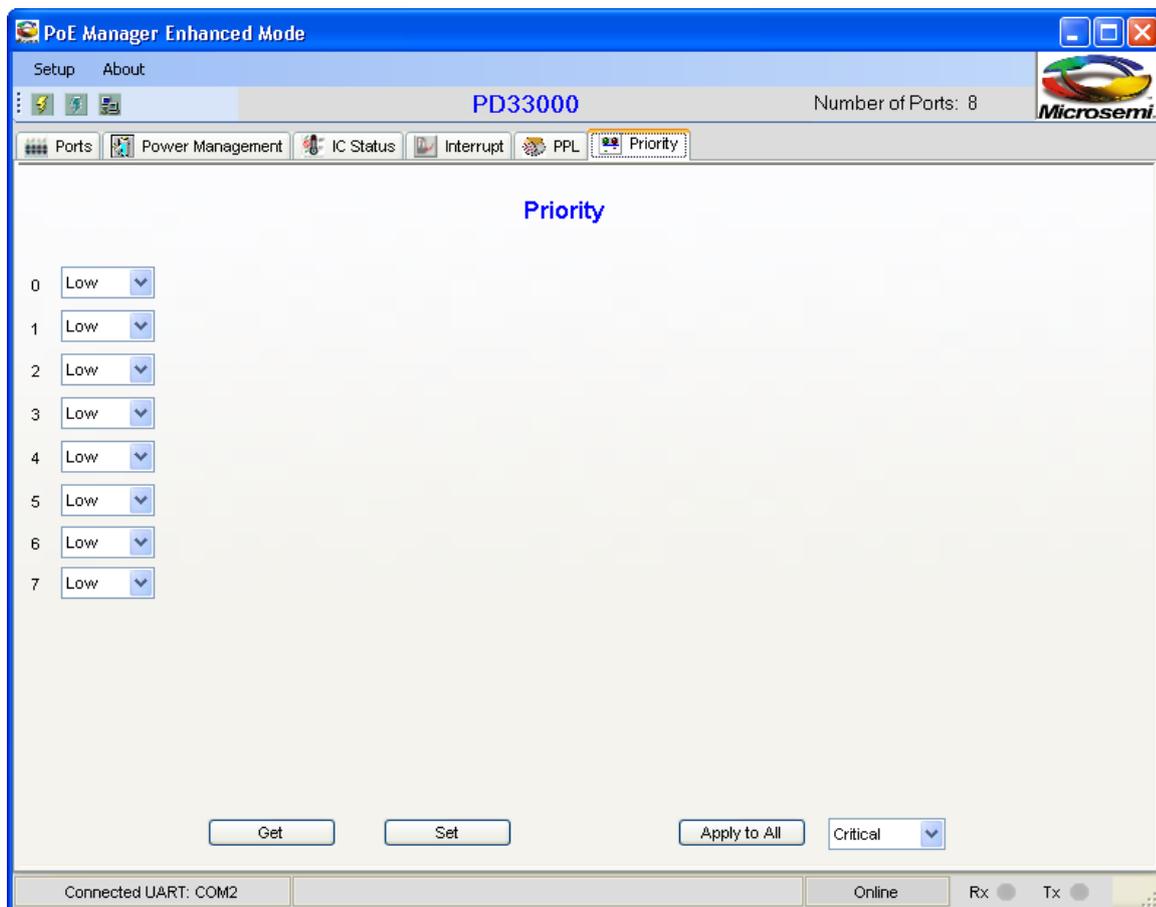


Figure 6-6: PoE Manager Enhanced Mode Window, Priority Tab (PoE+)



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### 6.6.1 Viewing the Current Power Limits

Click **Get**. The tab displays the current priority level as set by the PoE Controller.

### 6.6.2 Setting the Port Power Limit

1. From the drop down list, select the priority level for each port.
2. Click **Set**.

The priority levels are set.

### 6.6.3 Setting a Uniform Power Limit

You can set a uniform priority level.

1. From the Apply to All list, select the required level.
2. Click **Apply to All**.

The uniform priority level is set.

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## 7 Troubleshooting

Table 7-1 provides a troubleshooting guide.

The scenarios described in the table are simple and do not take into account human errors or multiple failures. Carry out corrective actions in a sequential manner.

For problems that are not resolved, refer to your nearest Microsemi Customer Support, as indicated on this User's Manual rear cover.

**Table 7-1: Evaluation Boards Troubleshooting Guide**

Symptom	Corrective Action
Evaluation Board does not power up; D4 indicator (Vmain On) does not illuminate.	<ol style="list-style-type: none"> <li>1. Verify that power is applied to the 48 VDC cable.</li> <li>2. Verify that correct polarity is supplied to the Board.</li> <li>3. Verify that the power cable at J1 is well secured.</li> </ol>
UART communication with the Board fails to start	<ol style="list-style-type: none"> <li>1. Ensure that there is a proper cable connection to J26 and to the other cable end.</li> <li>2. Verify that a standard null modem RS-232 cable is used.</li> <li>3. Verify that J14 is in position '3'.</li> <li>4. Verify that jumpers J12 and J13 are set to position '1'.</li> <li>5. Verify that the Board is set to Enhanced mode (switches SW2 thru SW5).</li> <li>6. Depress Reset switch – SW1.</li> </ol>
I <sup>2</sup> C communication with the Board fails to start	<ol style="list-style-type: none"> <li>1. Ensure that Aardvark-Evaluation board I2C Adapting cable is properly connected.</li> <li>2. Verify AARDvark driver is properly connected to PC's USB cable.</li> <li>3. Verify board is set to Auto mode.</li> <li>4. Depress Reset switch – SW1.</li> </ol>
A PD connected to the Board fails to operate	<ol style="list-style-type: none"> <li>1. Verify PD is IEEE 802.3af-compliant and designed for PoE via the spare pair.</li> <li>2. Replace the Ethernet cable.</li> <li>3. Try to reconnect the PD to another port. If it is powered, then there is probably a faulty port or the RJ-45 connector in the gang assembly is defective.</li> </ol>
PD powers up, but there is no data link	This is normal behavior since Evaluation Board is designed for demonstration purposes and does not support data.



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Revision History

Revision Level / Date	Para. Affected	Description
1.0/ 31.07.07		Initial release
1.1/ 20.12.07	Whole document	Adding the I2C feature
1.2/ 05.05.09	Enhanced Mode	Added text supporting Microsemi™ Enhanced mode controller - PD69000 containing AT mode capabilities.
1.3/09.12.09	Whole document	General formatting and editing, new screen shots
1.4 / 17-Mar-10		PD83000 removed from text and graphics remove all the mentions to the 4-pairs PD64012G mode using the PD83000 and replace them with the PD69000.
1.5 / 10-10-10	Chapter 2 and 5	Adding PD69100 product
1.6 / 17-06-12	Enhanced Mode	Modify PM tab

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