



# ESPL-G401

PCIe to Four

GbE LAN Module

**Customer:**  

---

**Customer**  

---

**Part Number:**  

---

**Innodisk**  

---

**Part Number:**  

---

**Innodisk**  

---

**Model Name:**  

---

**Date:**  

---

|                                    |                                    |
|------------------------------------|------------------------------------|
| <b>Innodisk</b><br><b>Approver</b> | <b>Customer</b><br><b>Approver</b> |
|                                    |                                    |

Total Solution For  
Embedded Peripherals

## Table of Contents

|                                         |           |
|-----------------------------------------|-----------|
| <b>TABLE OF CONTENTS</b>                | <b>I</b>  |
| <b>REVISION HISTORY</b>                 | <b>II</b> |
| <b>LIST OF TABLES</b>                   | <b>1</b>  |
| <b>LIST OF FIGURES</b>                  | <b>2</b>  |
| <b>1. PRODUCT INTRODUCTION</b>          | <b>3</b>  |
| 1.1. OVERVIEW                           | 3         |
| 1.2. FEATURES                           | 3         |
| <b>2. PRODUCT SPECIFICATIONS</b>        | <b>4</b>  |
| 2.1. DEVICE PARAMETERS                  | 4         |
| 2.2. ELECTRICAL SPECIFICATIONS          | 4         |
| 2.2.1. POWER REQUIREMENT                | 4         |
| 2.2.2. POWER CONSUMPTION                | 4         |
| 2.3. ENVIRONMENTAL SPECIFICATIONS       | 4         |
| 2.3.1. TEMPERATURE RANGES               | 4         |
| 2.3.2. HUMIDITY                         | 5         |
| 2.3.3. SHOCK AND VIBRATION              | 5         |
| 2.3.4. MEAN TIME BETWEEN FAILURE (MTBF) | 5         |
| 2.4. CE AND FCC COMPATIBILITY           | 5         |
| 2.5. ROHS COMPLIANCE                    | 5         |
| 2.6. HARDWARE                           | 5         |
| 2.6.1. LAYOUT                           | 5         |
| 2.6.2. PIN DEFINE                       | 6         |
| 2.6.3. ESPL-G401 MECHANICAL DRAWING     | 7         |
| 2.6.4. PACKING LIST                     | 8         |
| 2.7. SOFTWARE SUPPORT                   | 8         |
| <b>3. INSTALLATION GUIDE</b>            | <b>8</b>  |
| <b>4. APPEDIX</b>                       | <b>9</b>  |
| <b>CONTACT US</b>                       | <b>12</b> |

## REVISION HISTORY

| Revision | Description    | Date      |
|----------|----------------|-----------|
| 1.0      | First Released | Nov, 2022 |

List of Tables

**TABLE 1: DEVICE PARAMETERS ..... 4**

**TABLE 2: POWER REQUIREMENT..... 4**

**TABLE 3: POWER CONSUMPTION ..... 4**

**TABLE 4: TEMPERATURE RANGES..... 4**

**TABLE 5: SHOCK AND VIBRATION ..... 5**

**TABLE 6: MEAN TIME BETWEEN FAILURE (MTBF)..... 5**

**TABLE 7: PCIe x 4 GOLDEN FINGER PIN DEFINE ..... 6**

**List of Figures**

**FIGURE 1: BLOCK DIAGRAM ..... 3**

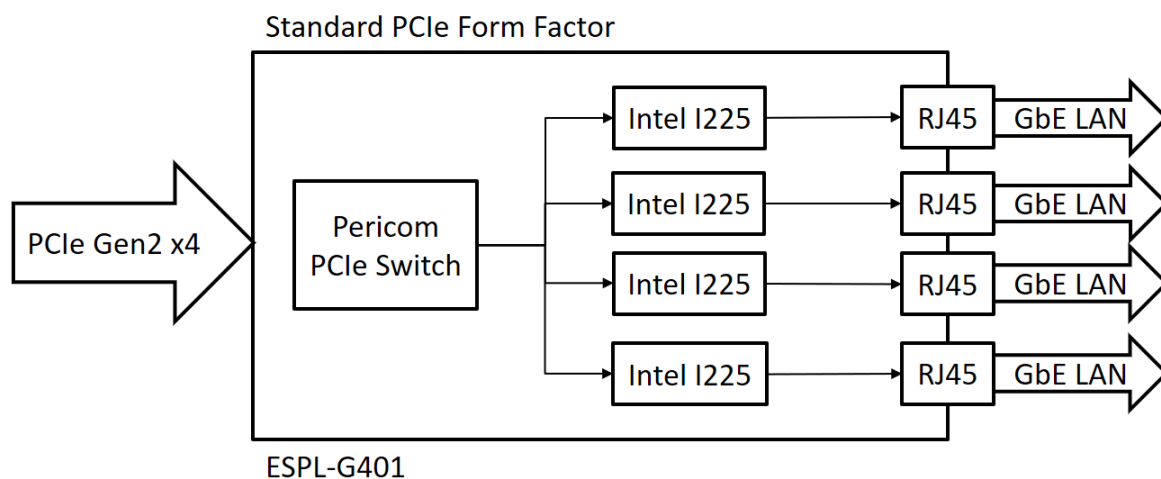
**FIGURE 2: PCIe BOARD PICTURE ..... 3**

**FIGURE 3: ESPL-G401 PCIe BOARD DRAWING ..... 8**

# 1. Product Introduction

## 1.1. Overview

Innodisk ESPL-G401 is designed with Standard PCIe form factor, ESPL-G401 supports PCIe Gen 2.1 with a single lane to four GbE LAN ports, optimized for higher performance and lower power, which brings you a flexible expansion solution for embedded systems.



**Figure 1: Block Diagram**

## 1.2. Features

- Supports four GbE LAN ports
- Complies with EN61000-4-5 2kV Surge protection
- Optional Industrial Temperature (-40°C to +85°C) support
- 30μ" golden finger, 3-year warranty
- Industrial design, manufactured in innodisk Taiwan



**Figure 2: PCIe Board Picture**

## 2. Product Specifications

### 2.1. Device Parameters

**Table 1: Device Parameters**

|                          |                            |
|--------------------------|----------------------------|
| <b>Form Factor</b>       | Standard PCIe              |
| <b>Input I/F</b>         | PCI Express 2.1 x 4        |
| <b>Output I/F</b>        | GbE LAN x 1                |
| <b>Output Connector</b>  | RJ45 x 4                   |
| <b>Dimension (WxLxH)</b> | 169.55 x 111.15 x 17.52 mm |

### 2.2. Electrical Specifications

#### 2.2.1. Power Requirement

**Table 2: Power Requirement**

| <b>Item</b>   | <b>Connector</b>    | <b>Rating</b> |
|---------------|---------------------|---------------|
| Input voltage | mPCIe Golden Finger | +3.3 DC +-5%  |

#### 2.2.2. Power Consumption

**Table 3: Power Consumption**

| <b>Max (W)</b> | <b>Voltage(V)</b> | <b>Max (mA)</b> |
|----------------|-------------------|-----------------|
| 7.42           | 3.3               | 636             |
|                | 12                | 443             |

### 2.3. Environmental Specifications

#### 2.3.1. Temperature Ranges

**Table 4: Temperature Ranges**

| <b>Temperature</b> | <b>Range</b>                                                    |
|--------------------|-----------------------------------------------------------------|
| Operating          | Standard Grade: 0°C to +70°C<br>Industrial Grade: -40°C to +85° |
| Storage            | -55°C to +95°                                                   |

### 2.3.2. Humidity

Relative Humidity: 10-95%, non-condensing

### 2.3.3. Shock and Vibration

**Table 5: Shock and Vibration**

| Reliability      | Test Conditions                 | Reference Standards |
|------------------|---------------------------------|---------------------|
| Vibration        | 7 Hz to 2K Hz, 20G, 3 axes      | IEC 68-2-6          |
| Mechanical Shock | Duration: 0.5ms, 1500 G, 3 axes | IEC 68-2-27         |

### 2.3.4. Mean Time between Failure (MTBF)

Reliability prediction methodology provides the basis for reliability evaluation and analysis. The purpose of the prediction is to predict the life time of the product in units of failure rate and MTBF.

**Table 6: Mean Time between Failure (MTBF)**

| Product         | Condition                                                                                                                                                     | MTBF (Hours) |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| ESPL-G401-C1/W1 | The analysis is at 25°C ambient temperature by Telcordia SR-332, Issues 4, Method I, Case 3 under Ground Benign, Controlled environment, 50% operation stress | 3,689,288    |

### 2.4. CE and FCC Compatibility

ESPL-G401 conforms to CE and FCC requirements.

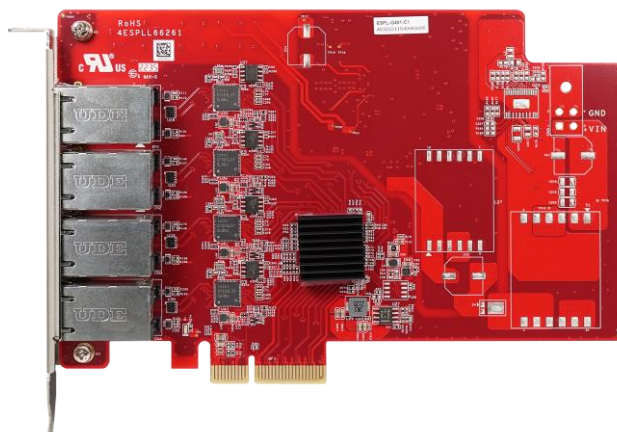
### 2.5. RoHS Compliance

ESPL-G401 is fully compliant with RoHS directive.

### 2.6. Hardware

#### 2.6.1. Layout





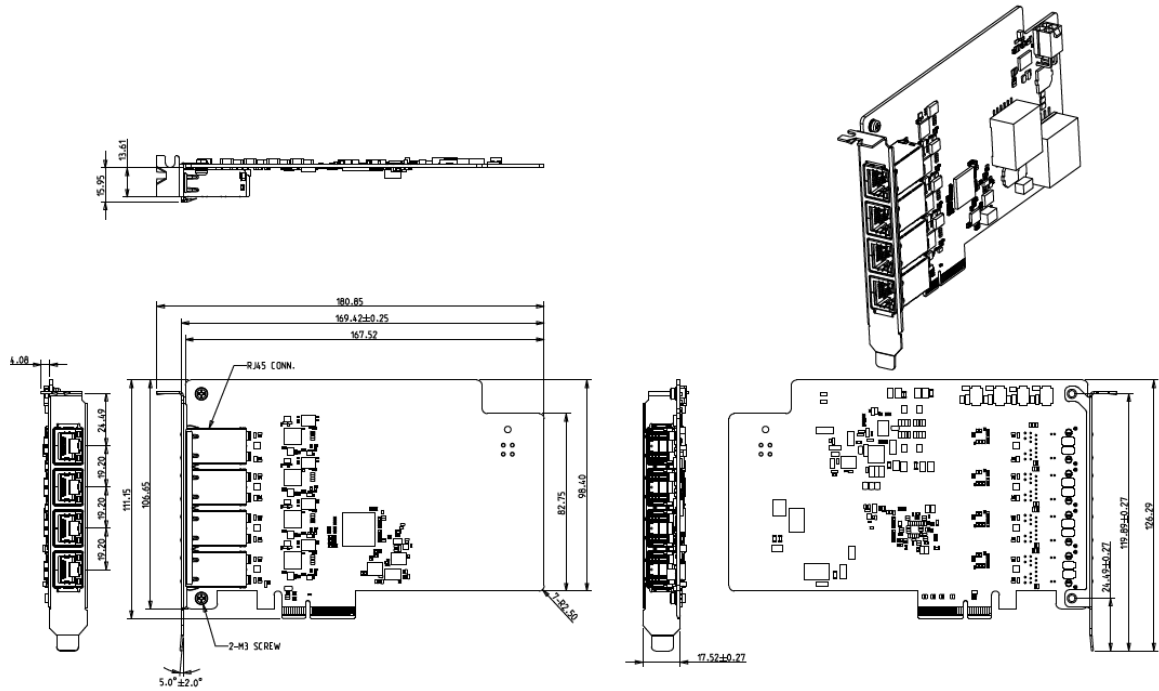
### 2.6.2. Pin Define

**Table 7: PCIe x 4 Golden Finger Pin Define**

| Signal Name           | Pin #      | Pin #      | Signal Name |
|-----------------------|------------|------------|-------------|
| +12V                  | <b>B1</b>  | <b>A1</b>  | PRSNT       |
| +12V                  | <b>B2</b>  | <b>A2</b>  | +12V        |
| +12V                  | <b>B3</b>  | <b>A3</b>  | +12V        |
| GND                   | <b>B4</b>  | <b>A4</b>  | GND         |
| SMCLK                 | <b>B5</b>  | <b>A5</b>  | NC          |
| SMDAT                 | <b>B6</b>  | <b>A6</b>  | NC          |
| GND                   | <b>B7</b>  | <b>A7</b>  | NC          |
| +3.3V                 | <b>B8</b>  | <b>A8</b>  | NC          |
| NC                    | <b>B9</b>  | <b>A9</b>  | +3.3V       |
| NC                    | <b>B10</b> | <b>A10</b> | +3.3V       |
| WAKE                  | <b>B11</b> | <b>A11</b> | PERST       |
| <b>Mechanical Key</b> |            |            |             |
| NC                    | <b>B12</b> | <b>A12</b> | GND         |
| GND                   | <b>B13</b> | <b>A13</b> | REFCLK+     |
| RX0+                  | <b>B14</b> | <b>A14</b> | REFCLK-     |
| RX0-                  | <b>B15</b> | <b>A15</b> | GND         |
| GND                   | <b>B16</b> | <b>A16</b> | TX0+        |

|       |            |            |      |
|-------|------------|------------|------|
| PRSNT | <b>B17</b> | <b>A17</b> | TX0- |
| GND   | <b>B18</b> | <b>A18</b> | GND  |
| RX1+  | <b>B19</b> | <b>A19</b> | NC   |
| RX1-  | <b>B20</b> | <b>A20</b> | GND  |
| GND   | <b>B21</b> | <b>A21</b> | TX1+ |
| GND   | <b>B22</b> | <b>A22</b> | TX1- |
| RX2+  | <b>B23</b> | <b>A23</b> | GND  |
| RX2-  | <b>B24</b> | <b>A24</b> | GND  |
| GND   | <b>B25</b> | <b>A25</b> | TX2+ |
| GND   | <b>B26</b> | <b>A26</b> | TX2- |
| RX3+  | <b>B27</b> | <b>A27</b> | GND  |
| RX3-  | <b>B28</b> | <b>A28</b> | GND  |
| GND   | <b>B29</b> | <b>A29</b> | TX3+ |
| NC    | <b>B30</b> | <b>A30</b> | TX3- |
| PRSNT | <b>B31</b> | <b>A31</b> | GND  |
| GND   | <b>B32</b> | <b>A32</b> | NC   |

### 2.6.3. ESPL-G401 Mechanical Drawing



### Figure 3: ESPL-G401 PCIe Board Drawing

#### 2.6.4. Packing List

- ESPL-G401 PCIe Board x 1

## 2.7. Software Support

- Windows: 10(64bit)
- Linux (igc): kernel 5.x version

## 3. Installation Guide

Please download driver from Intel official website.

Or you can download Intel i225 chip driver from Intel official web site directly.

<https://www.intel.com/content/www/us/en/products/details/ethernet/gigabit-controllers/i225-controllers/downloads.html>

## 4. Appedix

innodisk

### 宜鼎國際股份有限公司 Innodisk Corporation REACH Declaration

Tel: (02) 7703-3000 Fax: (02) 7703-3555 Internet: <https://www.innodisk.com/>

Innodisk Corporation pursues its social responsibility for global environmental preservation by committing to be compliant with REACH regulation (REGULATION (EC) No 1907/2006).

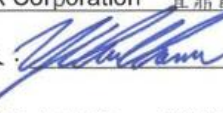
We hereby confirm that the product(s),

**Scope: Flash Memory, DRAM Module and Embedded Peripherals Products.**

- The standard products of **not listed** in the Appendix2 meet the requirements of REACH SVHC regulations (SVHCs < 0.1% in Article), as described in the candidate list table currently including 224 substances and shown on the ECHA website. (<http://echa.europa.eu/de/candidate-list-table>).
- The standard products listed in the Appendix2 contain(s) one or more hazardous substances or constituents exceeding 0.1 % by weight in article if not otherwise specified in candidate list table.  
Where the threshold value is exceeded, the substances in question are to be declared in accompanying. (SVHCs > 0.1% in Article).
- Comply with REACH Annex XVII.

#### Guarantor

Company name 公司名稱: Innodisk Corporation 宜鼎國際股份有限公司

Company Representative 公司代表人:  陳怡全

Company Representative Title 公司代表人職稱: QA Manager 品保經理

Date 日期: 2022 / 06 / 14



## RoHS 自我宣告書 (RoHS Declaration of Conformity)

**Manufacturer Products: All Innodisk EM FLASH, DRAM and EP products**

- 一、 宜鼎國際股份有限公司（以下稱本公司）特此保證售予貴公司之所有產品，皆符合歐盟 2011/65/EU 及 (EU) 2015/863 關於 RoHS 之規範要求。

Innodisk Corporation declares that all products sold to the company, are complied with European Union RoHS Directive (2011/65/EU) and (EU) 2015/863 requirement.

- 二、 本公司同意因本保證書或與本保證書相關事宜有所爭議時，雙方宜友好協商，達成協議。

Innodisk Corporation agrees that both parties shall settle any dispute arising from or in connection with this Declaration of Conformity by friendly negotiations.

- 三、 本公司聲明我們的產品符合 RoHS 指令的附件中 7(a)、7(c)-I、6(c) 允許豁免。

We declare, our products permitted by the following exemptions specified in the Annex of the RoHS directive.

※ 7(a) Lead in high melting temperature type solders (i.e. lead-based alloys containing 85% by weight or more lead).

※ 7(c)-I Electrical and electronic components containing lead in a glass or ceramic other than dielectric ceramic in capacitors, e.g. piezoelectric devices, or in a glass or ceramic matrix compound.

※ 6(c) Copper alloy containing up to 4% lead by weight.  
(This exemption applies to products that use antennas)

| Name of hazardous substance | Limited of RoHS ppm (mg/kg) |
|-----------------------------|-----------------------------|
| 鉛 (Pb)                      | < 1000 ppm                  |
| 汞 (Hg)                      | < 1000 ppm                  |
| 鎘 (Cd)                      | < 100 ppm                   |
| 六價鉻 (Cr 6+)                 | < 1000 ppm                  |
| 多溴聯苯 (PBBs)                 | < 1000 ppm                  |
| 多溴二苯醚 (PBDEs)               | < 1000 ppm                  |
| 鄰苯二甲酸二(2-乙基己基)酯 (DEHP)      | < 1000 ppm                  |
| 鄰苯二甲酸丁酯苯甲酯 (BBP)            | < 1000 ppm                  |
| 鄰苯二甲酸二丁酯 (DBP)              | < 1000 ppm                  |

宜鼎國際股份有限公司  
Innodisk Corporation

鄰苯二甲酸二異丁酯 (DIBP)

&lt; 1000 ppm

立 保 證 書 人 (Guarantor)

Company name 公司名稱: Innodisk Corporation 宜鼎國際股份有限公司Company Representative 公司代表人: Randy Chien 簡川勝Company Representative Title 公司代表人職稱: Chairman 董事長Date 日期: 2021 / 06 / 09

# Contact us

## Headquarters (Taiwan)

5F., No. 237, Sec. 1, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan

Tel: +886-2-77033000

Email: sales@innodisk.com

## Branch Offices:

### USA

usasales@innodisk.com

+1-510-770-9421

### Europe

eusales@innodisk.com

+31-40-3045-400

### Japan

jpsales@innodisk.com

+81-3-6667-0161

### China

sales\_cn@innodisk.com

+86-755-2167-3689

**[www.innodisk.com](http://www.innodisk.com)**

© 2018 Innodisk Corporation.

All right reserved. Specifications are subject to change without prior notice.

January 12, 2024