



Desktop Network Appliance with Marvell® ARMADA® 7040 Processor, Five GbE, 2GB DDR4, On-board 4GB eMMC, USB Type-C Console, and RoHS Compliant

# **User Manual**





# Revision

Date	Version	Changes
December 7, 2023	1.00	Initial release



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# **Manual Conventions**



#### **WARNING**

Warnings appear where overlooked details may cause damage to the equipment or result in personal injury. Warnings should be taken seriously.



#### **CAUTION**

Cautionary messages should be heeded to help reduce the chance of losing data or damaging the product.



#### **NOTE**

These messages inform the reader of essential but non-critical information. These messages should be read carefully as any directions or instructions contained therein can help avoid making mistakes.



# **Table of Contents**

1 INTRODUCTION	1
1.1 Overview	2
1.2 Features	
1.3 Front Panel	3
1.4 Rear Panel	3
1.5 TECHNICAL SPECIFICATIONS	4
1.6 Dimensions	6
2 UNPACKING	7
2.1 Anti-static Precautions	8
2.2 Unpacking Precautions	8
2.3 PACKING LIST	9
3 INSTALLATION	10
3.1 Installation Precautions	11
3.2 POWER-ON AND SETUP PROCEDURE	11
3.3 RESOURCE DOWNLOAD	
A REGULATORY COMPLIANCE	14
B SAFETY PRECAUTIONS	18
B.1 Safety Precautions	19
B.1.1 General Safety Precautions	
B.1.2 Anti-static Precautions	20
B.1.3 Product Disposal	21
B.2 MAINTENANCE AND CLEANING PRECAUTIONS	22
B.2.1 Maintenance and Cleaning	22
B.2.2 Cleaning Tools	22
C HAZARDOUS MATERIALS DISCLOSURE	23
C.1 RoHS II DIRECTIVE (2015/863/EU)	24
C.2 CHINA ROHS	25



# **List of Figures**

Figure 1-1: PUZZLE-100 Series	2
Figure 1-2: Front Panel	3
Figure 1-3: Rear Panel	3
Figure 1-4: Physical Dimensions (millimeters)	6
Figure 3-1: System Connection	12
Figure 3-2: IEI Resource Download Center	13



# **List of Tables**

Table 1-	1: Technical	Specifications	.5
			•



Chapter

1

# Introduction



#### 1.1 Overview



Figure 1-1: PUZZLE-100 Series

The PUZZLE-100 is a desktop network appliance powered by Marvell® ARMADA® 7040. The integrated GbE ports are ideally suited for a wide range of applications, such as SOHO and SMB networking infrastructure. The PUZZLE-100 supports five GbE ports for high-speed network applications. The network interfaces can be defined with various combinations to adopt the SMB network environment.

#### 1.2 Features

The PUZZLE-100 features are listed below:

- Compact and fanless design for easy integration
- Powered by Marvell® ARMADA® 7040 (88F7040) quad-core Armv8
   Cortex®-A72 CPU, up to 1.4GHz
- Onboard 2GB DDR4 memory
- Five GbE RJ-45 ports (via Marvell Switch 88E6352)
- 4 GB eMMC 5.1
- One console port (USB Type-C)
- One USB 3.0 Type-A port
- RoHS compliant



### 1.3 Front Panel

The overview of the front panel is shown in Figure 1-2.



Figure 1-2: Front Panel

The default states of the LED indicators located on the front panel are listed below.

**Power:** Power on/off (off: dark; booting: red; ready: blue)

Network: Network (defined by users)

**Information:** Information (defined by users)

#### 1.4 Rear Panel

An overview of the PUZZLE-100 rear panel is shown in **Figure 1-3** below.

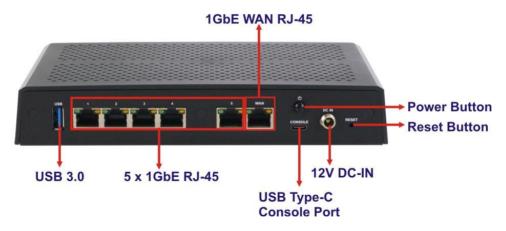


Figure 1-3: Rear Panel



## 1.5 Technical Specifications

The PUZZLE-100 technical specifications are listed in **Table 1-1**.

System				
CPU (SoC)	Marvell® ARMADA® 7040 (88F7040) quad-core Armv8 Cortex®-A72 CPU, up to 1.4GHz			
Memory	On-board 2GB DDR4			
еММС	4 GB eMMC 5.1, enterprise grade MLC			
Ethernet IC	LAN: Marvell Switch 88E6352			
	WAN: Marvell Alaska, 88E1512, 1GbE PHY			
Ethernet Port	LAN: 5 x RJ45 LAN port			
	WAN: 1 x RJ45 port			
I/O and Indicators				
USB	1 x USB 3.0 Type-A port			
Console Port	1 x USB Type-C			
<b>Expansion Slot</b>	1 x PCIe Mini slot (optional)			
Indicators	1 x Power (blue)			
	1 x Network (programmable)			
	1 x Information (programmable)			
Button	Power button			
	Reset button			
Anti-theft Lock Hole	One on the side panel			
Foot Spacer	Yes			
Power				
Power Consumption	Max. 22W			
Power Input	1 x 12V DC-in jack			
	100V ~ 240V AC			
Power Adapter	12VDC, 40W			
Thermal Solution	Fanless			



### **PUZZLE-100**

Environmental and Mechanical				
Mounting	Desktop			
Temperature	Operating: 0°C – 40°C (32°F – 104°F)			
	Storage: -10°C – 50°C (14°F – 122°F)			
Humidity	5% – 90%, non-condensing			
Certification	CE, FCC, VCCI, BSMI			
Operating System	Linux			
Physical Dimensions	209.9 mm x 151.2 mm x 38.1 mm (W x D x H)			
Weight	0.6 kg			

**Table 1-1: Technical Specifications** 



### 1.6 Dimensions

The physical dimensions are shown below:

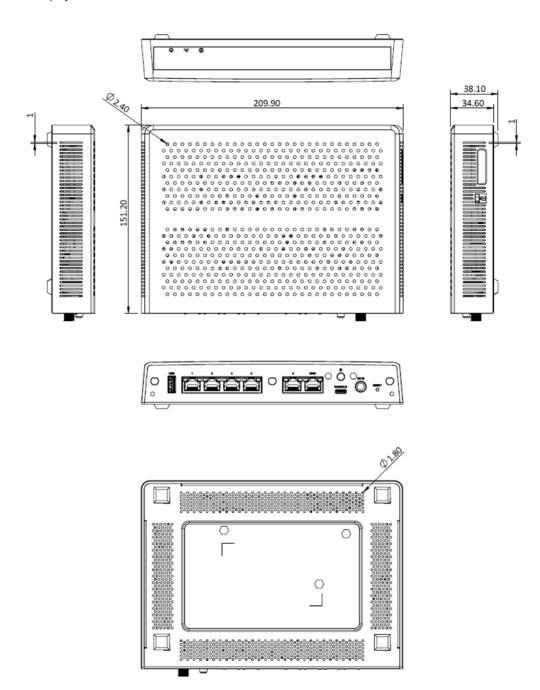


Figure 1-4: Physical Dimensions (millimeters)



Chapter

2

# Unpacking



#### 2.1 Anti-static Precautions



#### WARNING:

Failure to take ESD precautions during installation may result in permanent damage to the PUZZLE-100 and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the PUZZLE-100. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the PUZZLE-100 or any other electrical component is handled, the following anti-static precautions are strictly adhered to.

- Wear an anti-static wristband: Wearing a simple anti-static wristband can help to prevent ESD from damaging the board.
- Self-grounding: Before handling the board, touch any grounded conducting material. During the time the board is handled, frequently touch any conducting materials that are connected to the ground.
- Use an anti-static pad: When configuring the PUZZLE-100, place it on an anti-static pad. This reduces the possibility of ESD damaging the PUZZLE-100.

### 2.2 Unpacking Precautions

When the PUZZLE-100 is unpacked, please do the following:

- Follow the anti-static precautions outlined in Section 2.1.
- Make sure the packing box is facing upwards so the PUZZLE-100 does not fall out of the box.
- Make sure all the components shown in **Section 2.3** are present.



### 2.3 Packing List



### NOTE:

If some of the components listed in the checklist below are missing, please do not proceed with the installation. Contact the IEI reseller or vendor you purchased the PUZZLE-100 from or contact an IEI sales representative directly. To contact an IEI sales representative, please send an email to <a href="mailtosales@ieiworld.com">sales@ieiworld.com</a>.

The PUZZLE-100 is shipped with the following components:

Quantity	Item	Image
1	PUZZLE-100	
1	Power cord	
1	USB Type-A to Type-C console cable	
1	Network cable (CAT5E)	
1	Power adapter (12VDC, 40W) (63040-010040-400-RS)	



Chapter

3

# Installation



#### 3.1 Installation Precautions

During installation, be aware of the precautions below:

- Read the user manual: The user manual provides a complete description of the PUZZLE-100, installation instructions and configuration options.
- DANGER! Disconnect Power: Power to the PUZZLE-100 must be disconnected during the installation process. Failing to disconnect the power may cause severe injury to the body and/or damage to the system.
- Qualified Personnel: The PUZZLE-100 must be installed and operated only by trained and qualified personnel. Maintenance, upgrades, or repairs may only be carried out by qualified personnel who are familiar with the associated dangers.
- Air Circulation: Make sure there is sufficient air circulation when installing the PUZZLE-100. The PUZZLE-100's cooling vents must not be obstructed by any objects. Blocking the vents can cause overheating of the PUZZLE-100. Leave at least 5 cm of clearance around the PUZZLE-100 to prevent overheating.
- Grounding: The PUZZLE-100 should be properly grounded. The voltage feeds must not be overloaded. Adjust the cabling and provide external overcharge protection per the electrical values indicated on the label attached to the back of the PUZZLE-100.

### 3.2 Power-On and Setup Procedure



### WARNING:

Make sure a power supply with the correct input voltage is being fed into the system. Incorrect voltages applied to the system may cause damage to the internal electronic components and may also cause injury to the user.

To power-on and set up the PUZZLE-100 please follow the steps below:



- **Step 1**: Connect the power adapter shipped with the PUZZLE-100 to the power jack on the rear panel.
- Step 2: Use a power cord to connect the power adapter and the power source. Ensure to connect the power cord to a socket-outlet with earthing connection.
- Step 3: Push the power button down. The power LED indicator on the front panel changes from red to blue. Red means the device is booting up, and blue means it is ready to use.
- **Step 4:** Connect the PUZZLE-100 to the network via the WAN port on the rear panel.
- **Step 5:** Connect the PUZZLE-100 to a computer or other network devices.

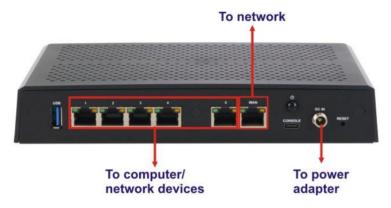


Figure 3-1: System Connection



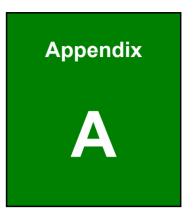
### 3.3 Resource Download

All the resources for the PUZZLE-100 are available on IEI Resource Download Center (<a href="https://download.ieiworld.com">https://download.ieiworld.com</a>). Type PUZZLE-100 and press Enter to find all the relevant software, utilities, and documentation.



Figure 3-2: IEI Resource Download Center





# **Regulatory Compliance**



#### **DECLARATION OF CONFORMITY**

CE

This equipment is in conformity with the following EU directives:

- EMC Directive (2004/108/EC, 2014/30/EU)
- Low-Voltage Directive (2006/95/EC, 2014/35/EU)
- RoHS II Directive (2011/65/EU, 2015/863/EU)
- Medical Device Directive 93/42/EEC: EN 60601-1

If the user modifies and/or install other devices in the equipment, the CE conformity declaration may no longer apply.

If this equipment has telecommunications functionality, it also complies with the requirements of the Radio Equipment Directive 2014/53/EU.

#### **English**

IEI Integration Corp. declares that this equipment is in compliance with the essential requirements and other relevant provisions of Directive 2014/53/EU.

#### Български [Bulgarian]

IEI Integration Corp. декларира, че този оборудване е в съответствие със съществените изисквания и другите приложими правила на Директива 2014/53/EU.

#### Česky [Czech]

IEI Integration Corp. tímto prohlašuje, že tento zařízení je ve shodě se základními požadavky a dalšími příslušnými ustanoveními směrnice 2014/53/EU.

#### Dansk [Danish]

IEI Integration Corp. erklærer herved, at følgende udstyr overholder de væsentlige krav og øvrige relevante krav i direktiv 2014/53/EU.

#### Deutsch [German]

IEI Integration Corp. erklärt dieses Gerät entspricht den grundlegenden Anforderungen und den weiteren entsprechenden Vorgaben der Richtlinie 2014/53/EU.

#### Eesti [Estonian]

IEI Integration Corp. deklareerib seadme seadme vastavust direktiivi 2014/53/EÜ põhinõuetele ja nimetatud direktiivist tulenevatele teistele asjakohastele sätetele.

#### Español [Spanish]

IEI Integration Corp. declara que el equipo cumple con los requisitos esenciales y cualesquiera otras disposiciones aplicables o exigibles de la Directiva 2014/53/EU.

#### Ελληνική [Greek]

IEI Integration Corp. ΔΗΛΩΝΕΙ ΟΤΙ ΕΞΟΠΛΙΣΜΟΣ ΣΥΜΜΟΡΦΩΝΕΤΑΙ ΠΡΟΣ ΤΙΣ ΟΥΣΙΩΔΕΙΣ ΑΠΑΙΤΗΣΕΙΣ ΚΑΙ ΤΙΣ ΛΟΙΠΕΣ ΣΧΕΤΙΚΕΣ ΔΙΑΤΑΞΕΙΣ ΤΗΣ ΟΔΗΓΙΑΣ 2014/53/EU.

#### Français [French]

IEI Integration Corp. déclare que l'appareil est conforme aux exigences essentielles et aux autres dispositions pertinentes de la directive 2014/53/EU.



Italiano [Italian]

IEI Integration Corp. dichiara che questo apparecchio è conforme ai requisiti essenziali ed alle altre disposizioni pertinenti stabilite dalla direttiva 2014/53/EU.

Latviski [Latvian]

IEI Integration Corp. deklarē, ka iekārta atbilst būtiskajām prasībām un citiem ar to saistītajiem noteikumiem Direktīvas 2014/53/EU.

Lietuvių [Lithuanian]

IEI Integration Corp. deklaruoja, kad šis įranga atitinka esminius reikalavimus ir kitas 2014/53/EU Direktyvos nuostatas.

Nederlands [Dutch]

IEI Integration Corp. dat het toestel toestel in overeenstemming is met de essentiële eisen en de andere relevante bepalingen van richtlijn 2014/53/EU.

Malti [Maltese]

IEI Integration Corp. jiddikjara li dan prodott jikkonforma mal-ħtiġijiet essenzjali u ma provvedimenti oħrajn relevanti li hemm fid-Dirrettiva 2014/53/EU.

Magyar [Hungarian]

IEI Integration Corp. nyilatkozom, hogy a berendezés megfelel a vonatkozó alapvető követelményeknek és az 2014/53/EU irányelv egyéb előírásainak.

Polski [Polish]

IEI Integration Corp. oświadcza, że wyrobu jest zgodny z zasadniczymi wymogami oraz pozostałymi stosownymi postanowieniami Dyrektywy 2014/53/EU.

Português [Portuguese]

IEI Integration Corp. declara que este equipamento está conforme com os requisitos essenciais e outras disposições da Directiva 2014/53/EU.

Româna [Romanian]

IEI Integration Corp. declară că acest echipament este in conformitate cu cerințele esențiale și cu celelalte prevederi relevante ale Directivei 2014/53/EU.

Slovensko [Slovenian]

IEI Integration Corp. izjavlja, da je ta opreme v skladu z bistvenimi zahtevami in ostalimi relevantnimi določili direktive 2014/53/EU.

Slovensky [Slovak]

IEI Integration Corp. týmto vyhlasuje, že zariadenia spĺňa základné požiadavky a všetky príslušné ustanovenia Smernice 2014/53/EU.

Suomi [Finnish]

IEI Integration Corp. vakuuttaa täten että laitteet on direktiivin 2014/53/EU oleellisten vaatimusten ja sitä koskevien direktiivin muiden ehtojen mukainen.

Svenska [Swedish]

IEI Integration Corp. förklarar att denna utrustningstyp står I överensstämmelse med de väsentliga egenskapskrav och övriga relevanta bestämmelser som framgår av direktiv 2014/53/EU.



FCC WARNING FC

This equipment complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference, and
- This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

#### **ROHS STATEMENT**



The label on the product indicates this product conforms to European (EU) Restriction of Hazardous Substances (RoHS) that set maximum concentration limits on hazardous materials used in electrical and electronic equipment.

#### **CHINA ROHS**



The label on the product indicates the estimated "Environmentally Friendly Use Period" (EFUP). This is an estimate of the number of years that these substances would "not leak out or undergo abrupt change." This product may contain replaceable sub-assemblies/components which have a shorter EFUP such as batteries and lamps. These components will be separately marked.

#### **VCCI CLASS B WARNING**



この装置は、クラスB情報技術装置です。この装置は、家庭環境で使用することを目的としていますが、この装置がラジオやテレビジョン受信機に近接して使用されると、受信障害を引き起こすことがあります。 取扱説明書に従って正しい取り扱いをして下さい。

VCCI-B



Appendix
B

# **Safety Precautions**



#### **B.1 Safety Precautions**



#### WARNING:

The precautions outlined in this appendix should be strictly followed. Failure to follow these precautions may result in permanent damage to the PUZZLE-100.

Please follow the safety precautions outlined in the sections that follow:

#### **B.1.1 General Safety Precautions**

Please ensure the following safety precautions are adhered to at all times.

- Make sure the power is turned off and the power cord is disconnected when moving, installing or modifying the system.
- Do not apply voltage levels that exceed the specified voltage range.
   Doing so may cause fire and/or an electrical shock.
- Electric shocks can occur if opened while still powered on.
- Do not drop or insert any objects into the ventilation openings.
- If considerable amounts of dust, water, or fluids enter the system, turn
  off the power supply immediately, unplug the power cord, and contact the
  system vendor.
- This equipment is not suitable for use in locations where children are likely to be present.
- DO NOT:
  - O Drop the system against a hard surface.
  - O In a site where the ambient temperature exceeds the rated temperature



#### **B.1.2 Anti-static Precautions**



#### WARNING:

Failure to take ESD precautions during the installation of the PUZZLE-100 may result in permanent damage to the PUZZLE-100 and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the PUZZLE-100. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the PUZZLE-100 is opened and any of the electrical components are handled, the following anti-static precautions are strictly adhered to.

- Wear an anti-static wristband: Wearing a simple anti-static wristband can help to prevent ESD from damaging any electrical component.
- Self-grounding: Before handling any electrical component, touch any
  grounded conducting material. During the time the electrical component is
  handled, frequently touch any conducting materials that are connected to the
  ground.
- Use an anti-static pad: When configuring or working with an electrical component, place it on an anti-static pad. This reduces the possibility of ESD damage.
- Only handle the edges of the electrical component: When handling the electrical component, hold the electrical component by its edges.



#### **B.1.3 Product Disposal**



#### **CAUTION:**

Risk of explosion if the battery is replaced by an incorrect type;

Replacement of a battery with an incorrect type that can defeat a safeguard (for example, in the case of some lithium battery types);

Disposal of a battery into fire or a hot oven, or mechanically crushing or cutting of a battery, that can result in an explosion;

Leaving a battery in an extremely high temperature surrounding environment that can result in an explosion or the leakage of flammable liquid or gas;

A battery subjected to extremely low air pressure that may result in an explosion or the leakage of flammable liquid or gas;

Dispose of used batteries according to instructions and local regulations.

- Outside the European Union If you wish to dispose of used electrical and electronic products outside the European Union, please contact your local authority so as to comply with the correct disposal method.
- Within the European Union:



EU-wide legislation, as implemented in each Member State, requires that waste electrical and electronic products carrying the mark (left) must be disposed of separately from normal household waste. This includes monitors and electrical accessories, such as signal cables or power cords. When you need to dispose of your display products, please follow

the guidance of your local authority, or ask the shop where you purchased the product. The mark on electrical and electronic products only applies to the current European Union Member States.

Please follow the national guidelines for electrical and electronic product disposal.



### **B.2 Maintenance and Cleaning Precautions**

When maintaining or cleaning the PUZZLE-100, please follow the guidelines below.

#### **B.2.1 Maintenance and Cleaning**

Prior to cleaning any part or component of the PUZZLE-100, please read the details below.

- The interior of the device does not require cleaning. Keep fluids away from the device interior.
- Be cautious of all small removable components when vacuuming the device.
- Turn the device off before cleaning the device.
- Never drop any objects or liquids through the openings of the device.
- Be cautious of any possible allergic reactions to solvents or chemicals used when cleaning the device.
- Avoid eating, drinking and smoking within vicinity of the device.

#### **B.2.2 Cleaning Tools**

Some components in the PUZZLE-100 may only be cleaned using a product specifically designed for the purpose. In such case, the product will be explicitly mentioned in the cleaning tips. Below is a list of items to use when cleaning the PUZZLE-100.

- Cloth Although paper towels or tissues can be used, a soft, clean piece of cloth is recommended when cleaning the PUZZLE-100.
- Water or rubbing alcohol A cloth moistened with water or rubbing alcohol
  can be used to clean the PUZZLE-100.
- Using solvents The use of solvents is not recommended when cleaning the PUZZLE-100 as they may damage the plastic parts.
- Vacuum cleaner Using a vacuum specifically designed for computers is
  one of the best methods of cleaning the PUZZLE-100. Dust and dirt can
  restrict the airflow in the PUZZLE-100 and cause its circuitry to corrode.
- Swabs Swaps moistened with rubbing alcohol or water are excellent tools
  for wiping hard to reach areas. Whenever possible, it is best to use lint free
  swabs such as foam swabs for cleaning.



**Appendix** 

C

# Hazardous Materials Disclosure



### C.1 RoHS II Directive (2015/863/EU)

The details provided in this appendix are to ensure that the product is compliant with the RoHS II Directive (2015/863/EU). The table below acknowledges the presences of small quantities of certain substances in the product, and is applicable to RoHS II Directive (2015/863/EU).

Please refer to the following table.

Part Name	Toxic or Hazardous Substances and Elements									
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent Chromium (CR(VI))	Polybrominated Biphenyls (PBB)	Polybrominated Diphenyl Ethers (PBDE)	Bis(2-ethylhexyl) phthalate (DEHP)	Butyl benzyl phthalate (BBP)	Dibutyl phthalate (DBP)	Diisobutyl phthalate (DIBP)
Housing	О	О	О	О	О	О	O	О	О	O
Display	О	О	О	О	О	О	O	О	О	O
Printed Circuit	О	О	О	О	O	O	O	O	О	O
Board										
Metal Fasteners	О	О	О	О	О	О	O	О	О	О
Cable Assembly	О	О	О	О	О	О	O	О	О	О
Fan Assembly	О	О	О	О	О	О	O	О	О	О
Power Supply	О	О	О	О	O	O	O	O	О	О
Assemblies										
Battery	O	O	О	О	О	О	О	О	О	О

O: This toxic or hazardous substance is contained in all of the homogeneous materials for the part is below the limit requirement in Directive (EU) 2015/863.

X: This toxic or hazardous substance is contained in at least one of the homogeneous materials for this part is above the limit requirement in Directive (EU) 2015/863.





#### C.2 China RoHS

此附件旨在确保本产品符合中国 RoHS 标准。以下表格标示此产品中某有毒物质的含量符合中国 RoHS 标准规定的限量要求。

本产品上会附有"环境友好使用期限"的标签,此期限是估算这些物质"不会有泄漏或突变"的年限。本产品可能包含有较短的环境友好使用期限的可替换元件,像是电池或灯管,这些元件将会单独标示出来。

部件名称	有毒有害物质或元素						
	铅 (Pb)	录 (Hg)	镉 (Cd)	六价格 (CR(VI))	多溴联苯 (PBB)	多溴二苯酰 (PBDE)	
壳体	0	0	0	0	0	0	
显示	0	0	0	0	0	0	
印刷电路板	0	0	0	0	0	0	
金属螺帽	0	0	0	0	0	0	
电缆组装	0	0	0	0	0	0	
风扇组装	0	0	0	0	0	0	
电力供应组装	0	0	0	0	0	0	
电池	0	0	0	0	0	0	

O: 表示该有毒有害物质在该部件所有物质材料中的含量均在SJ/T11364-2014與GB/T26572-2011 标准规定的限量要求以下。

X: 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 SJ/T11364-2014 與 GB/T26572-2011 标准规定的限量要求。