

# THSER102

## Cable Extension Kit for Raspberry Pi Camera Modules V2/HQ/V3

Including LAN Cable, Flexible Flat Cables, 2x20 Pin Header, and Mounting Hardware

### General Description

THSER102 is a plug-and-play cable extension kit for Raspberry Pi Camera Modules. The kit is compatible with Raspberry Pi 5, as well as Pi 4 Model B and Pi 3 Model B+. The kit is compatible with Raspberry Pi Camera Module 3, in addition to V2 Camera (version 2.1) and HQ Camera. The THSER102 extends the cable length for >10 meters between the Raspberry Pi Camera Module and the Computer with a standard LAN Cable.

The extension capability is driven by THine's V-by-One® HS technology whose configuration is pre-tuned for easy plug-and-play installation. There is no need for software setup or coding. THSER102 works as if the Raspberry Pi Camera were directly connected to the computer.

The THSER102 also supports advanced applications. HAT on HAT support allows to use another HAT\* board on top of THSER102 Rx Board. 3ch GPIO Extension allows extending GPIO communication between the

camera and the computer.

### Features

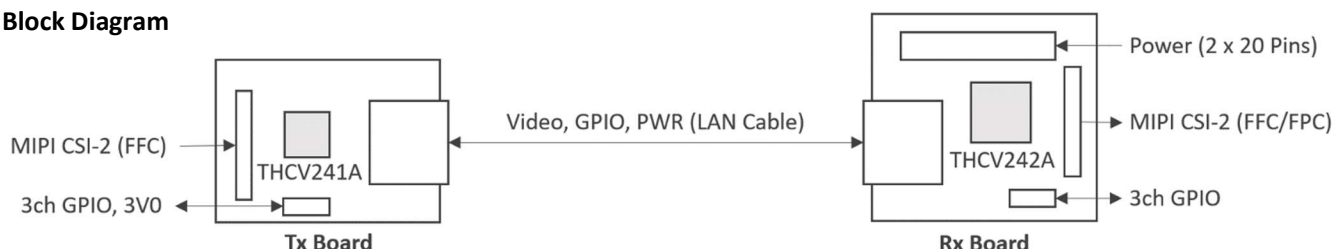
- ✓ Supporting Raspberry Pi 5, Pi 4 Model B, and Pi 3 Model B+
- ✓ Supporting Raspberry Pi Camera Module 3, V2 Camera (v.2.1), and HQ Camera
- ✓ >10-meter Cable Extension
- ✓ Plug and Play
  - ✓ No software configuration is needed.
  - ✓ Camera works as if THSER102 not exists.
- ✓ Advanced Applications Supported
  - ✓ HAT on HAT\*
  - ✓ 3ch GPIO Extension

### Applications

All Raspberry Pi Camera applications where physical separation of the Camera from the Computer is required

\* HAT: Hardware Attached on Top

### Block Diagram

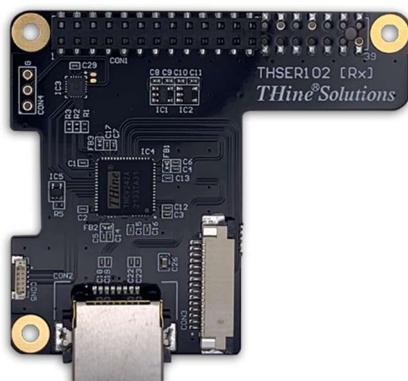


### 1. Kit Contents

Item	Description
<b>Tx Board (1pc)</b>	Transmitter Board with THine THCV241A MIPI CSI-2 to V-by-One® HS Serializer
<b>Rx Board (1pc)</b>	Receiver Board with THine THCV242A V-by-One® HS to MIPI CSI-2 Deserializer
<b>2-meter LAN Cable (1pc)</b>	LAN/Ethernet Cable, Cat5e, Straight
<b>Flexible Flat Cables (2pcs)</b>	AWM 20624 15pin to 15pin, to connect (a) Tx Board and Camera and (b) Rx Board and Computer
<b>Pin Header (1pc)</b>	Hardware to connect Rx Board with Raspberry Pi Computer Board
<b>Mounting Screws for Rx Board (6pcs)</b>	Hardware to mount Rx Board on Raspberry Pi Computer Board
<b>Longer Spacers for Rx Board (3pcs)</b>	
<b>Mounting screws for Tx Board for V2/V3 Camera (4pcs)</b>	Hardware to mount Raspberry Pi Camera V2 (Version 2.1) on Tx Board
<b>Shorter Spacers for Tx Board for V2/V3 Camera (4pcs)</b>	
<b>Mounting Nuts for Tx Board for V2/V3 Camera (4pcs)</b>	



**Tx Board**



**Rx Board**



**THSER102 Kit**

## 2. Start Guide

See Start Guide located in THine Solutions' website at:

<https://www.thinesolutions.com/thser102/start-guide>

## 3. Raspberry Pi Computer

This kit is compatible with:

- ✓ Raspberry Pi 5 (See Note 1)
- ✓ Raspberry Pi 4 Model B
- ✓ Raspberry Pi 3 Model B+

This kit will electronically support the full range of Raspberry Pi Computers with a 40-pin connector (additional hardware/connectors may be required) although it is not production tested with Raspberry Pi Computers other than the Raspberry Pi 4 Model B. **Note:** To use with Raspberry Pi 5, Raspberry Pi Camera Cable (a 15pin to 22pin FFC) instead of the enclosed Flexible Flat Cable is needed.

## 4. Raspberry Pi Camera Module

This kit is compatible with:

- ✓ Raspberry Pi Camera Module 3
- ✓ Raspberry Pi Camera Module V2 (version 2.1)
- ✓ Raspberry Pi HQ Camera

## 5. LAN Cable Recommendation

This kit has been tested with the following cables at ambient room temperatures.

Cable Type	RPi V3 Camera	RPi V2 Camera	RPi HQ Camera
Jinghua CAT5 (2m)	OK	OK	OK
SK-Link CAT5 (2m)	OK	OK	OK
Qiuyeyuan CAT5 (2m)	OK	OK	OK
SAMZHE CAT5 (2m)	OK	OK	OK
Shengwei CAT5 (2m)	OK	OK	OK
Jinghua CAT5 (5m)	OK	OK	OK
SK-Link CAT5 (5m)	OK	OK	OK
Lvlian CAT5 (5m)	OK	OK	OK
Qiuyeyuan CAT5 (5m)	OK	OK	OK
Shengwei CAT5 (5m)	OK	OK	OK
SAMZHE CAT5 (5m)	OK	OK	OK
Qiuyeyuan CAT7 (5m)	OK	OK	OK
Lvlian CAT5 (10m)	OK	OK	OK
Qiuyeyuan CAT5 (10m)	OK	OK	OK
Shengwei CAT5 (10m)	OK	OK	OK
Qiuyeyuan CAT5 (15m)	OK	OK	OK
Shengwei CAT5 (15m)	OK	OK	OK

## 6. 3ch GPIO Extension

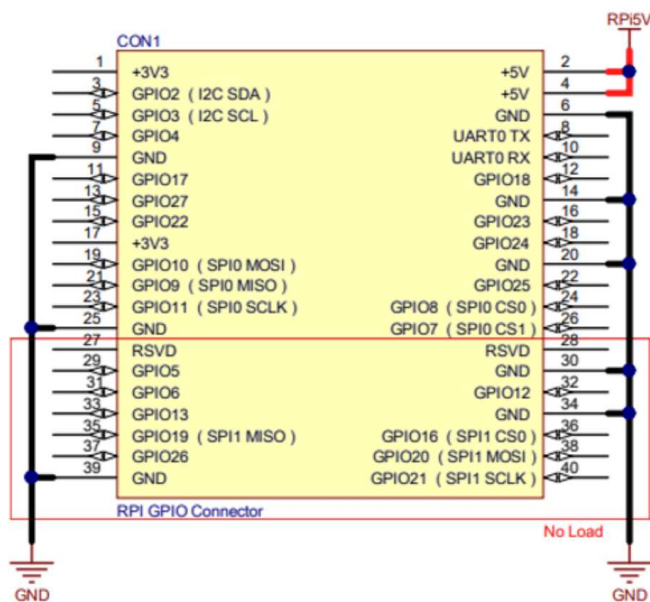
The Pin assignment for the 3ch GPIO Extension connectors (CON3 of Tx Board and CON5 of Rx Board) is as follows:

Pin Number	Pin Title	Description
1	Power	3.3V output
2	GPIO1	GPIO (from Rx Board to Tx Board)
3	GPIO2	GPIO (from Tx Board to Rx Board)
4	GPIO3	GPIO (from Tx Board to Rx Board)
5	GND	Ground

## 7. HAT on HAT Support

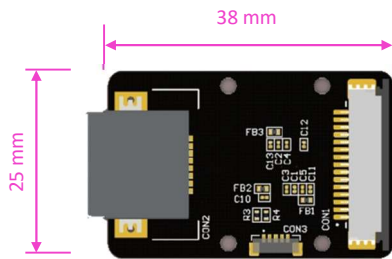
The THSER102 uses the following pins, leaving the other pins open.

- #2 and #4 (+5V)
- #6, #9, #14, #20, and #25 (GND)

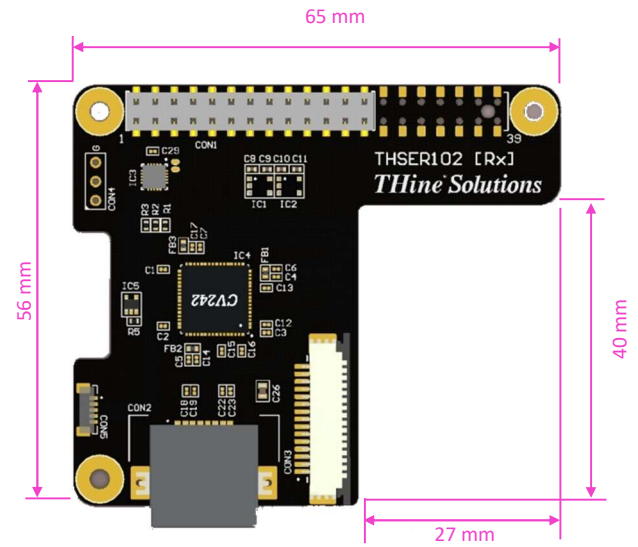


## 8. Mechanical Drawings

**Tx Board**



**Rx Board**



## 9. Regulatory Compliance

EMC testing completed with 2m cable (SAMZHE, SH-1020)

### EU

The Cable Extension Kit conforms with the following applicable community harmonized legislation:

- a. **Electromagnetic Compatibility Directive (EMC) 2014/30/EU,**
- b. **Restriction of Hazardous Substances (RoHS) Directive 2011/65/EU**

The following harmonized standards have been used to demonstrate conformity to these standards:

**EN 55032:2015 Class A**

**EN 55024:2010**

**EN IEC63000:2018**

### WEEE Directive Statement for the European Union



This marking indicates that this product should not be disposed with other household wastes throughout the EU. To prevent possible harm to the environment or human health from uncontrolled waste disposal, recycle it responsibly to promote the sustainable reuse of material resources. To return your used device, please use the return and collection systems or contact the retailer where the product was purchased. They can take this product for environmentally safe recycling.

### FCC

The Cable Extension Kit is in conformity with the requirements of

- a. **FCC 47 CFR Part 15, Subpart B, Class A Digital Device.**

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

NOTE: This equipment has been tested and found to comply with the limits for a Class A 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 may cause harmful interference in which case the user will be required to correct the interference at his own expense.

## **Safety Information**

IMPORTANT: PLEASE RETAIN THIS INFORMATION FOR FUTURE REFERENCE

### **Warnings**

- This product should only be connected to and powered by a Raspberry Pi computer. Any external power supply used with the Raspberry Pi should comply with relevant regulations and standards applicable in the country of intended use.
- This product should be operated in a well-ventilated environment and should not be covered.
- This product should be placed on a stable, flat, non-conductive surface while it is in use, and it should not be contacted by conductive items.
- Ethernet cable used with this product should be kept at a distance as far as possible from the power cables of any devices to avoid the effects of noise impacting the product performance.
- This product generates, uses, and can radiate radio frequency energy. If not installed and used according to this manual the equipment may cause interference with radio and television communications. There is, however, no guarantee that interference will not occur in any particular installation due to site-specific factors.

### **Instruction for Safe Use**

To avoid malfunction of or damage to your Cable Extension Kit, please observe the following:

- Do not expose it to water or moisture or place it on a conductive surface whilst in operation.
- Do not expose it to heat from any source; the Cable Extension Kit is designed for reliable operation at normal ambient room temperatures.
- Take care whilst handling to avoid mechanical or electrical damage to the printed circuit board and exposed connectors. Use a tripod with the device to minimize damage to the electronic components.
- Avoid handling the Cable Extension Kit while it is powered. Handle only by the edges or by the lens mount assembly to minimize the risk of causing damage by electrostatic discharge.
- Take care not to damage any of the exposed electronics components. These are easily damaged if the unit is dropped, and this is especially the case if a large lens is fitted.

## Important Notice

1. The product specifications described in this document are subject to change without prior notice.
2. The circuit diagrams described in this document are examples of the application. THine Solution, Inc. ("THine") assumes no responsibility for any losses incurred by you or third parties from the use of these circuit diagrams.
3. Testing and other quality control techniques are used to this product to the extent THine deems necessary to support warranty for performance of this product. Except where mandated by applicable law or deemed necessary by THine based on the user's request, testing of all functions and performance of the product is not necessarily performed.
4. This product is presumed to be used for general electric device, not for applications which require extremely high reliability/safety.

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