THSER101

Cable Extension Kit for Raspberry Pi Camera

General Description

THSER101 is a plug-and-play cable extension kit for Raspberry Pi Camera and Computer system. The kit is compatible with the Raspberry Pi Camera Module V2 (version 2.1), HQ Camera, and defined modes of the 1.3 RPi Camera Module. THSER101 extends the cable length up to 20 meters from the Camera to the RPi Computer with a regular 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 to software set up or coding. THSER101 works as if the Camera were directly connected to the Computer.

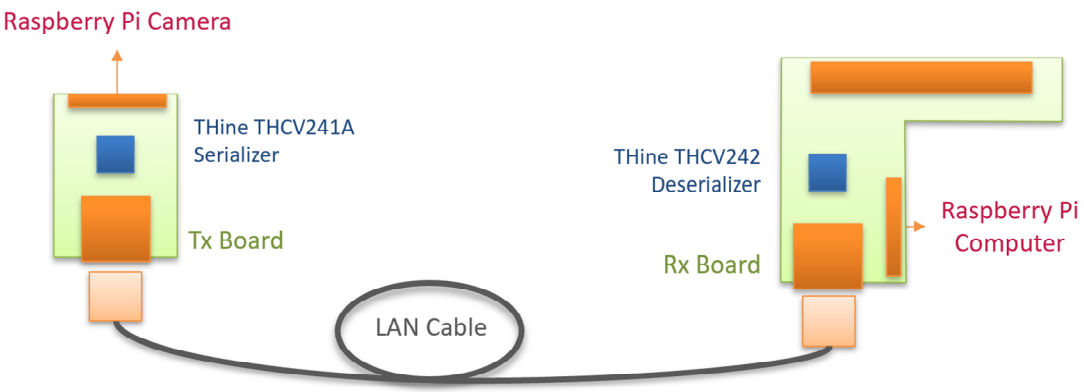
Features

- ✓ Up to 20-meter cable extension
- ✓ Supporting most LAN Cables
- ✓ Plug and Play connection
- ✓ No software configuration needed
- ✓ V-by-One® HS Technology

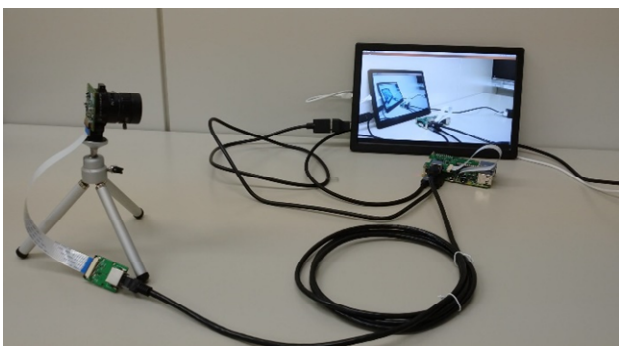
Applications

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

Block Diagram



Use Case



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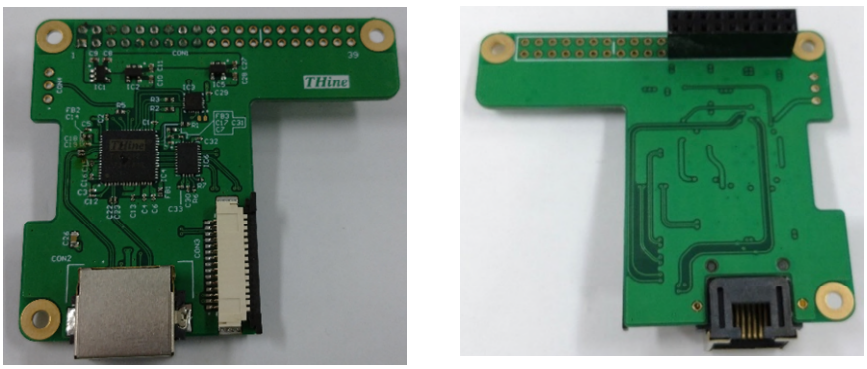
1. Contents of Kit

Item	Description
Tx Board (1pc)	Transmitter Board with THine THCV241A MIPI CSI-2 to V-by-One® HS Serializer
Rx Board (1pc)	Receiver Board with THine THCV242 V-by-One® HS to MIPI CSI-2 Deserializer
2-meter LAN Cable (1pc)	LAN/Ethernet Cable, Cat5e, Straight
Ribbon Flex Cables (2pcs)	AWM 20624, to connect (a) Tx Board and Camera and (b) Rx Board and Computer
Mounting Screws for Rx Board (6pcs)	Hardware to mount Rx Board on Raspberry Pi Computer Board
Longer Spacers for Rx Board (3pcs)	
Mounting screws for Tx Board (for V2 Camera only) (4pcs)	Hardware to mount Raspberry Pi Camera V2 (Version 2.1) on Tx Board
Shorter Spacers for Tx Board (for V2 Camera only) (4pcs)	
Mounting Nuts for Tx Board (for V2 Camera only) (4pcs)	

Left: Tx Board (front) Right: Tx Board (back)



Left: Rx Board (front) Right: Rx Board (back)

From Left to Right: Mounting Hardware, 2-meter LAN Cable, Ribbon Flex Cables

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2. Shipping Package/Box

(85mm x 38mm x 119mm)

3. Quick Start Guide

See user guide and/or quick start guide document located on TSI's website at:
https://www.thinesolutions.com/cable-extension-kit

4. Raspberry Pi Computer

This kit is compatible with the Raspberry Pi 4 Model B and 3 Model B+ (not included in the kit).
This kit will electronically support the full range of Raspberry Pi Computers with a 40pin 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.

5. Raspberry Pi Camera Module (RPi Camera V1.3, RPi Camera V2.1, RPi HQ Camera)

This kit is compatible and tested with the Raspberry Pi Camera Module V2 (version 2.1) and HQ Camera.

This kit supports Raspberry Pi Camera V1.3 for certain modes as defined in the table below:

Mode	Still	Video
0	Not Supported	Supported
1	Supported	Supported
2	Not Supported	Not Supported
3	Not Supported	Not Supported
4	Supported	Supported
5	Supported	Supported
6	Supported	Supported
7	Supported	Supported

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6. Cable Recommendation

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

Cable Type	RPi Camera V1.3	RPi Camera V2.1	RPi HQ Camera
Dizaozhe CAT5E (2m)	OK	OK	OK
Jinghua CAT5E (2m)	OK	OK	OK
rovll CAT5E (2m)	OK	OK	OK
SAMZHE CAT5E (2m)	OK	OK	OK
Shengwei CAT5E (2m)	OK	OK	OK
rovll CAT5E (10m)	OK	OK	OK
Jinghua CAT5E (10m)	OK	OK	OK
Choseal CAT5E (10m)	OK	OK	OK
Philips CAT7 (10m)	OK	OK	OK
Shengwei CAT5E (15m)	OK	OK	OK
Shengwei CAT5E (20m)	OK	OK	Not Supported

This kit has been tested with the following cables at -20degree C.

Cable Type	RPi Camera V1.3	RPi Camera V2.1	RPi HQ Camera *1
Dizaozhe CAT5E (2m)	-	-	-
Jinghua CAT5E (2m)	-	OK	-
rovll CAT5E (2m)	-	-	-
SAMZHE CAT5E (2m)	OK	OK	-
Shengwei CAT5E (2m)	-	-	-
rovll CAT5E (10m)	-	-	-
Jinghua CAT5E (10m)	-	OK	
Choseal CAT5E (10m)	-	-	
Philips CAT7 (10m)	OK	OK	-
Shengwei CAT5E (15m)	-	-	-
Shengwei CAT5E (20m)	-	-	-

*1: The operation temperature of RP HQ Camera is specified 0degree C to 50degree C.

This kit has been tested with the following cables at 60degree C.

Cable Type	RPi Camera V1.3	RPi Camera V2.1	RPi HQ Camera *2
Dizaozhe CAT5E (2m)	-	-	OK
Jinghua CAT5E (2m)	-	OK	OK
rovll CAT5E (2m)	-	-	-
SAMZHE CAT5E (2m)	OK	OK	OK
Shengwei CAT5E (2m)	-	-	OK
rovll CAT5E (10m)	-	-	-
Jinghua CAT5E (10m)	-	OK	OK
Choseal CAT5E (10m)	-	-	OK
Philips CAT7 (10m)	OK	OK	-
Shengwei CAT5E (15m)	-	-	-
Shengwei CAT5E (20m)	-	-	-

*2: The operation temperature of RP HQ Camera is specified 0degree C to 50degree C.

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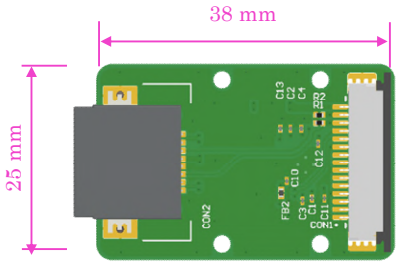
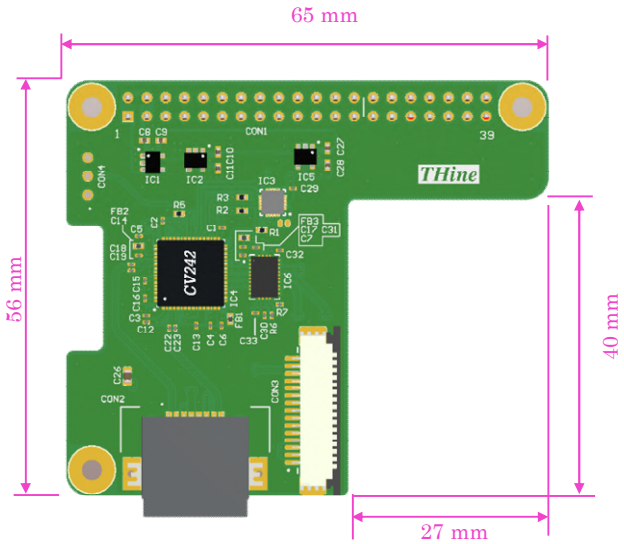
7. Mechanical Drawings

Tx Board



Rx Board



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8. 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.

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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.

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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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