KAMAMI

KAmod USB-RJ45 Extender

Rev. 20251017115121
Źródło: https://wiki.kamamilabs.com/index.php?title=KAmod_USB-RJ45_Extender

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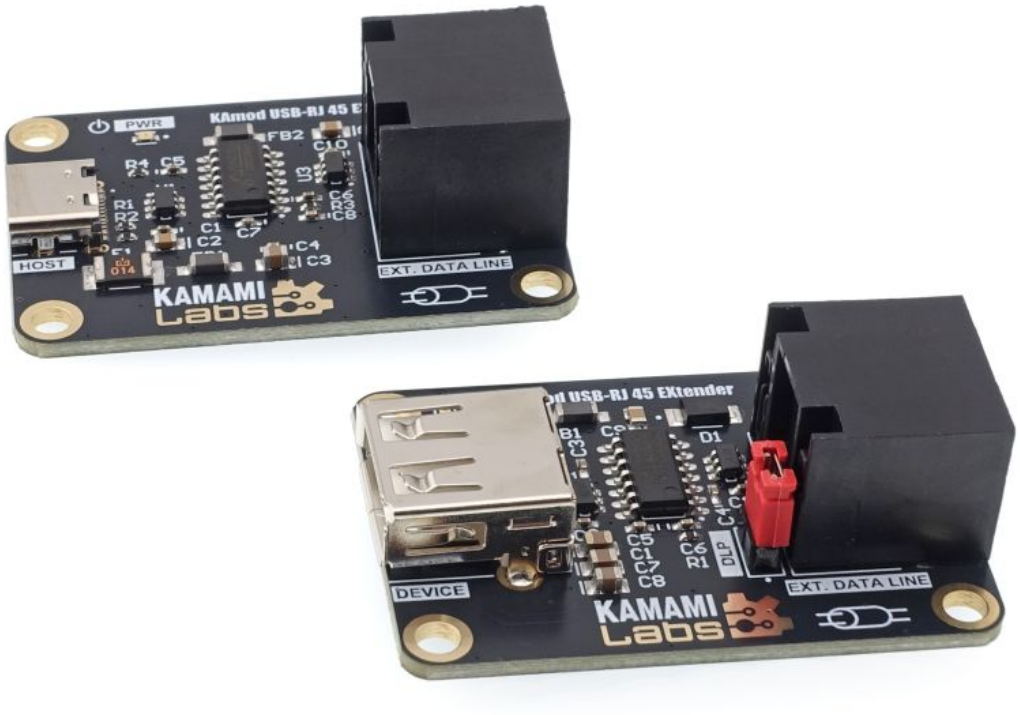
Description

KAmod USB-RJ45 Extender - USB Extension over Ethernet Cable
The KAmod USB-RJ45 Extender kit is designed to transmit data between a computer (with an UPPER module connected) and a USB device (connected to a LOWER module) over distances many times greater than standard USB cable lengths. A pair of differential signals is used for transmission. Thanks to the RJ45 connectors, a traditional patch cord (twisted pair Ethernet) can be used as a connecting cable between the modules.

The complete kit, consisting of two modules, is useful in industrial installations, audiovisual systems (e.g., lecture halls and conference rooms), larger computer installations with KVM switches, as well as in various service and consumer applications.



Basic Parameters

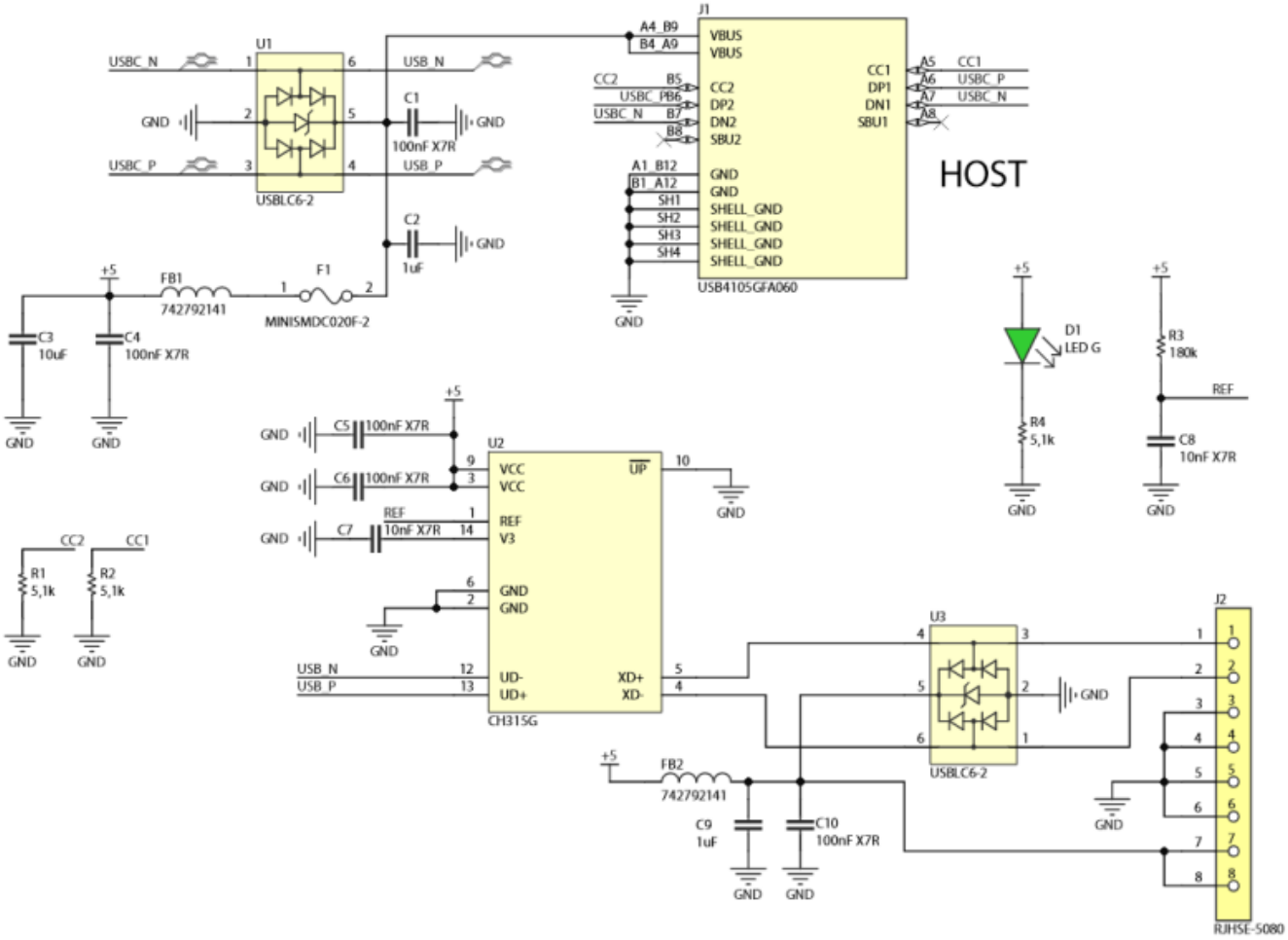
- 1x USB port (UPPER module: USB Type-C, LOWER module: USB Type-A)
- 1x RJ45 socket for connection to a compatible module
- Power supply: 5 V DC from the USB Type-C port on the UPPER module
- LEDs indicate the presence of power supply voltage to the modules
- Built-in ESD protection on all USB and RJ45 ports
- The maximum length of cables connecting the modules is approximately 20 m, but depends on the quality of the cables and the operating conditions of the modules
- PCB dimensions: 2x 45 x 30.8 mm
- Mounting holes: diameter 3.2 mm, spacing: 39 x 25 mm
- Additionally in the LOWER module:
    - 1x2 goldpin connector *E5V*' (for connecting an external 5 V DC power supply)
    - 1x2 goldpin connector *DLP*' (for connecting the module's power rail to the line) powering the RJ45 socket)

Standard Equipment

Code	Description
KAmod USB RJ45 Extender (UPPER)	• Assembled and powered-up module
KAmod USB RJ45 Extender (LOWER)	• Assembled and running module

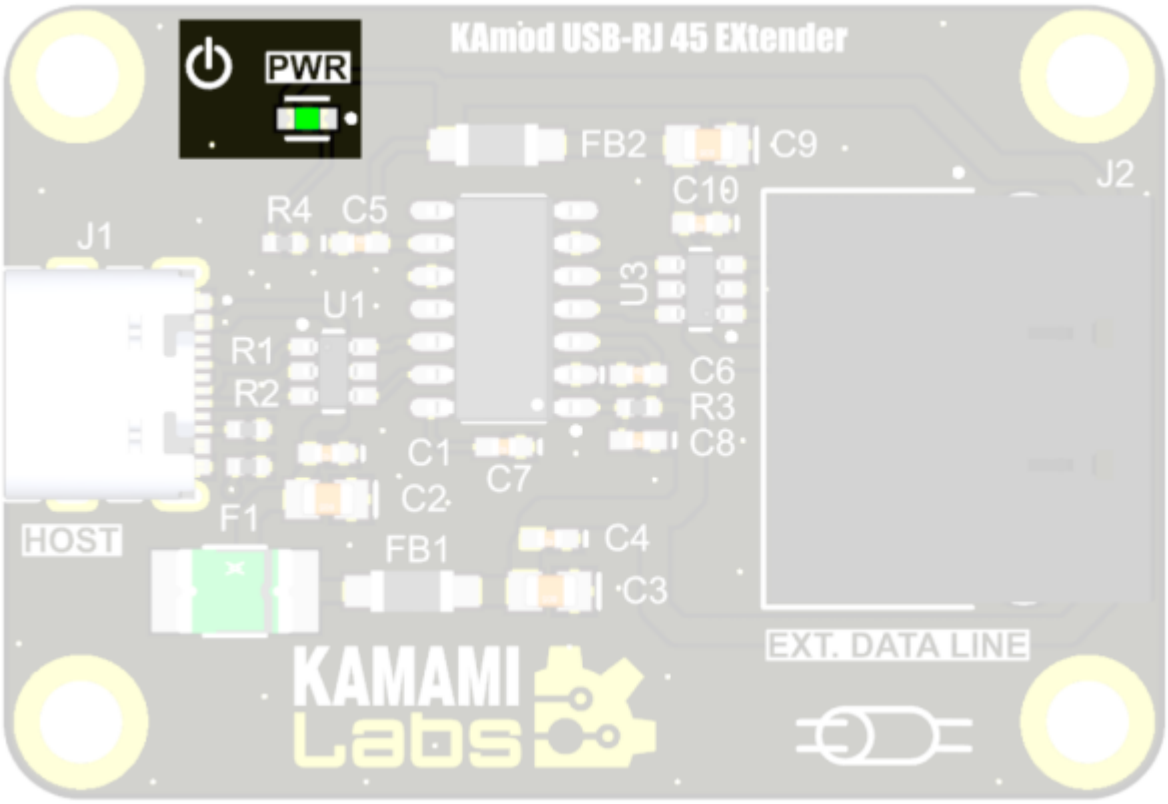
UPPER Module

Electrical diagram


HOST
USB4105GFA060
USBLC6-2
MINISMDC020F-2
742792141
CH315G
RJHSE-5080
100nF X7R
10uF
1uF
5,1k
180k
LED G

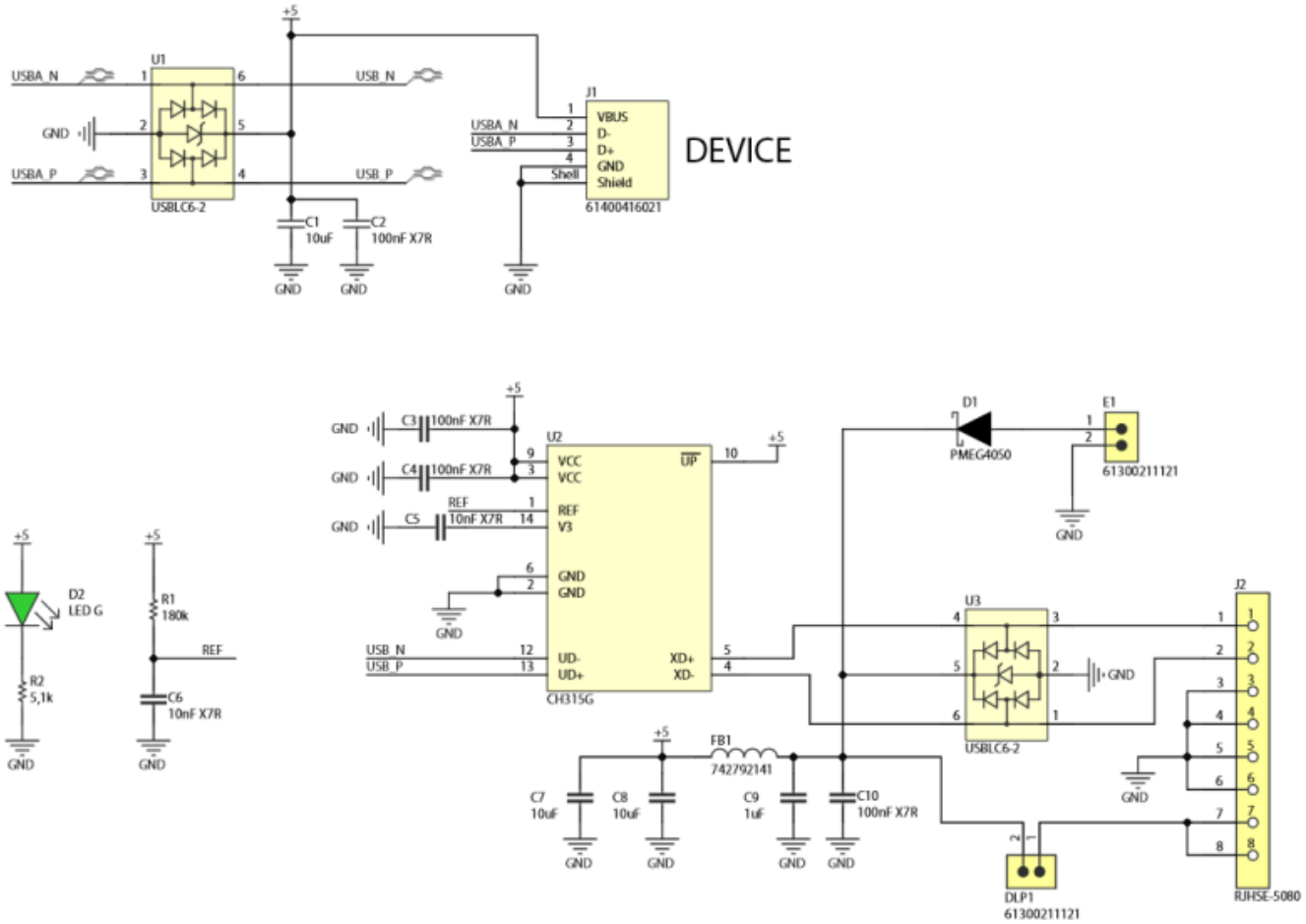
Operating elements

LED



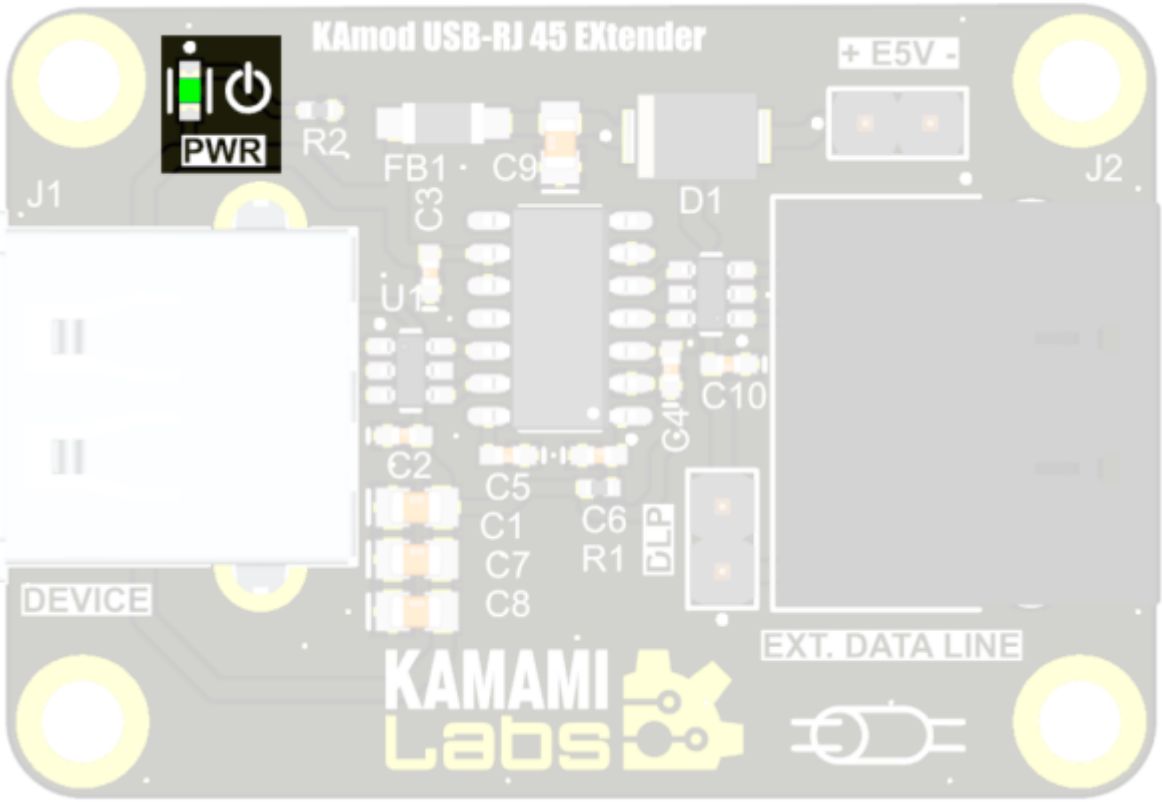
LOWER Module

Wiring Diagram



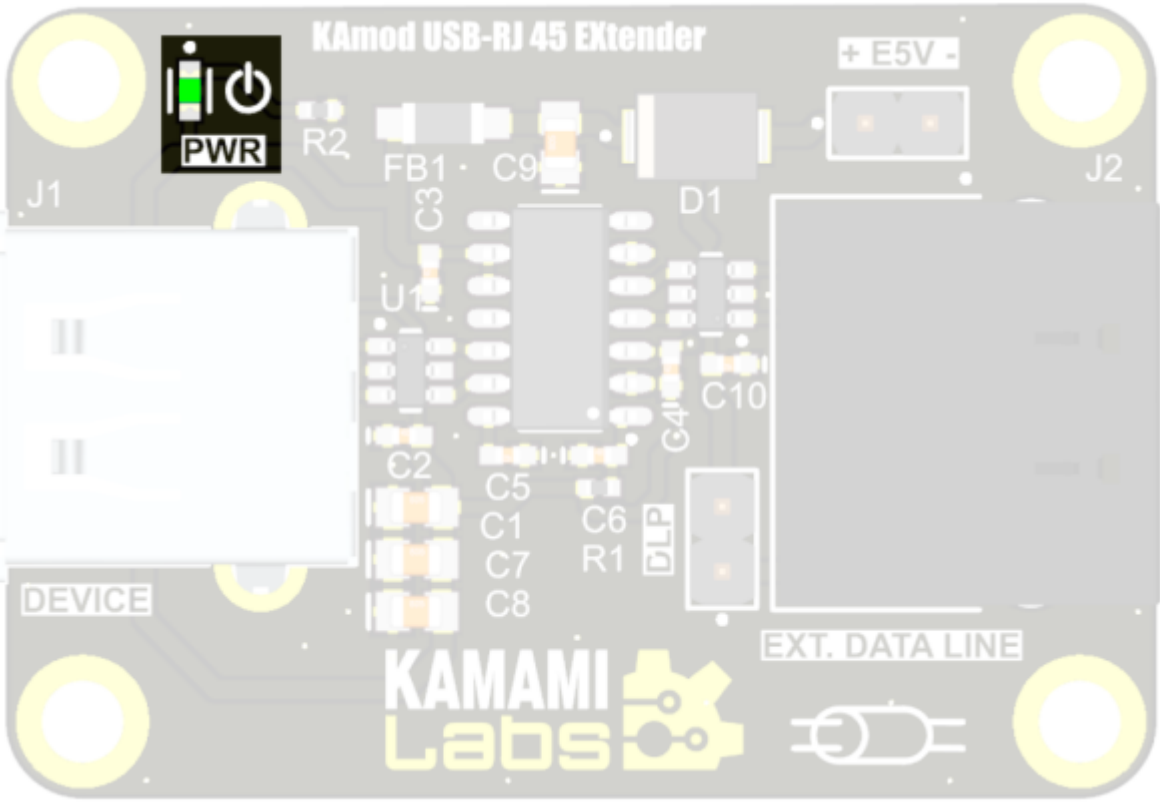
Operating elements

LED


KAmod USB-RJ 45 EXtender
PWR
R2
FB1
C9
C3
D1
+ E5V -
J1
J2
U1
C10
G4
C2
C5
C1
C6
R1
C7
C8
DLP
DEVICE
EXT. DATA LINE
KAMAMI
Labs

Operating elements

LED


KAmod USB-RJ 45 EXtender
PWR
R2
FB1
C9
C3
D1
+ E5V -
J1
J2
U1
C10
G4
C2
C5
C1
C6
R1
C7
C8
DLP
DEVICE
EXT. DATA LINE
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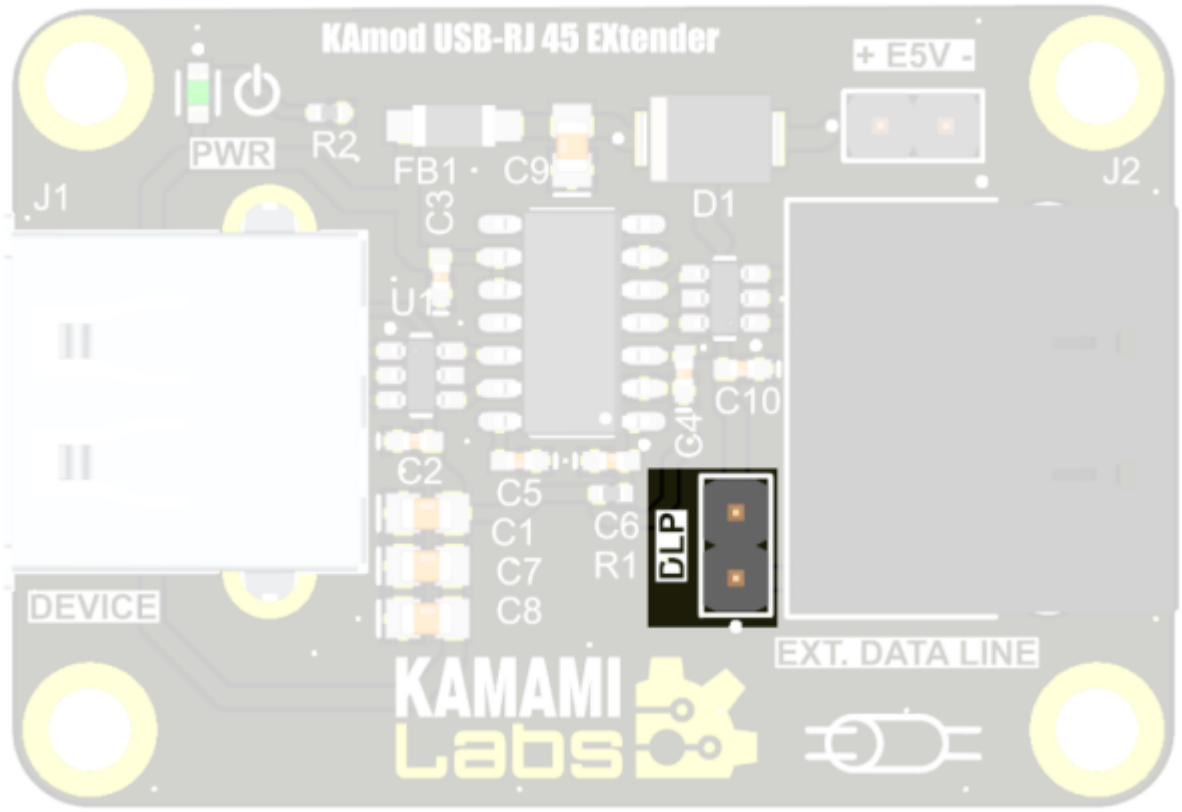
Labs

Jumper for connecting the power supply from the UPPER module



Power

Power for the HOST module is supplied via a USB-C cable connected to the host device (e.g., a computer).

There are two power supply methods for the LOWER module.

1. Power supplied by the voltage applied to the J2 (RJ45) connector from the UPPER module.
   This method is the simplest to apply, as it does not require an additional voltage source. To supply power to the system, first disconnect any external voltage source from the E5V connector, and then place a jumper on the goldpin connector marked DLP (DLP1 in the diagram).

Caution!Do not power the LOWER module simultaneously with external voltage (E5V) and voltage supplied via twisted-pair cable!

2. Power supplied by external voltage applied to the E5V connector (E1 in the diagram).

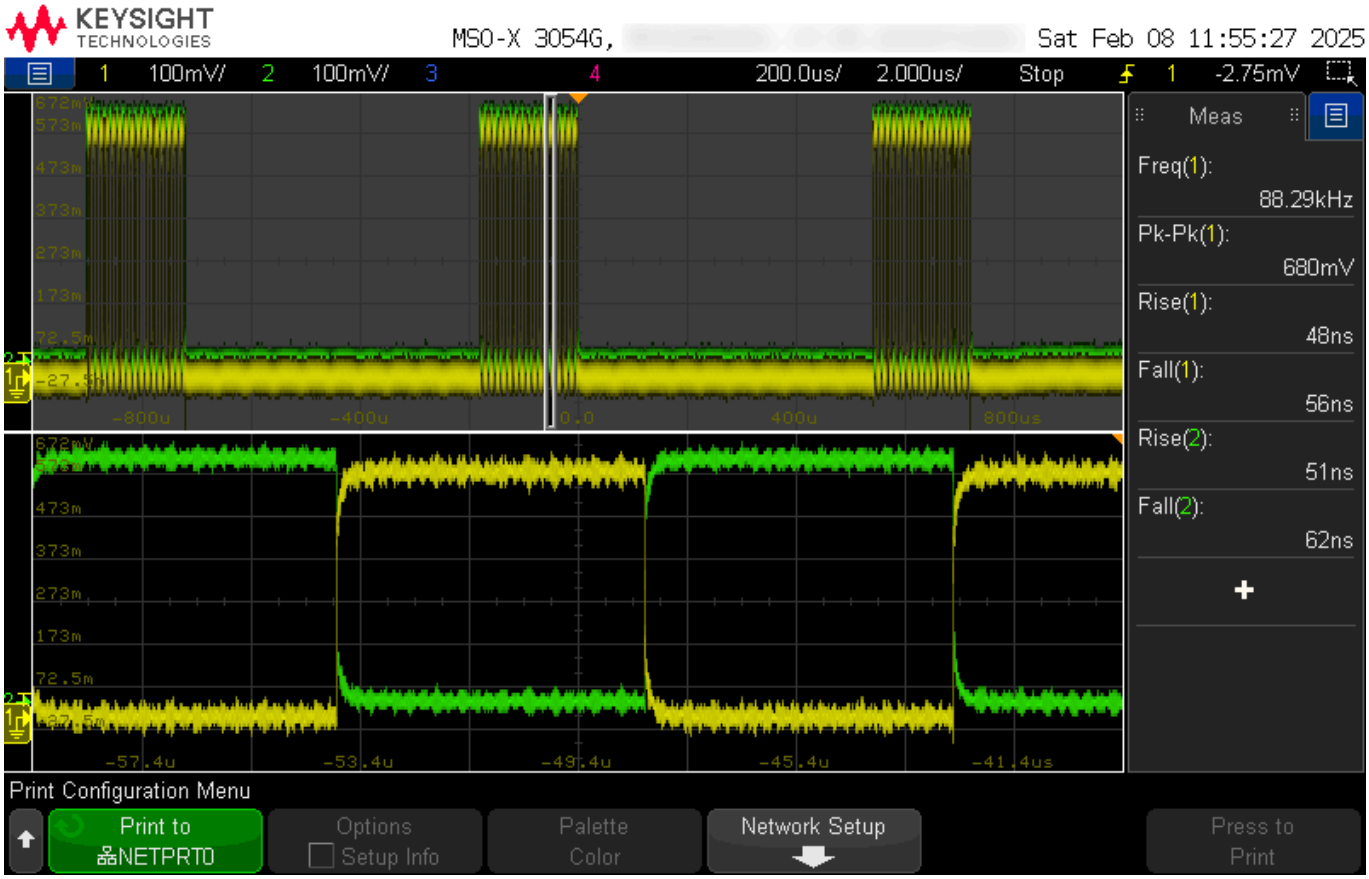
   This method is preferred for long-distance communication, as well as for use with high-current USB devices, as excessively high power cable resistance can lead to interference on the LOWER module's power supply line. In this configuration, before applying external voltage, remove the jumper from the goldpin connector marked DLP (DLP1 in the diagram).

Caution!When using the second configuration described, avoid a potential difference between the ground of the master device (on the UPPER module side) and the ground of the power supply supplying 5V to the LOWER module. It is

recommended to use a voltage source isolated from the power grid (or other infrastructure shared by both modules), as otherwise, equalizing currents in the ground loop can damage the module(s), the master device, the end device, and/or the power supply.

Data Transmission

An example waveform on a differential data line, recorded on the LOWER module side using a 20m twisted-pair Ethernet cable, is shown in the figure below.



Links

[CH315G datasheet]

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