NCN26010BMNEVB 10Base-T1S Power Supply and Adapter Board User's Manual

EVBUM2834/D

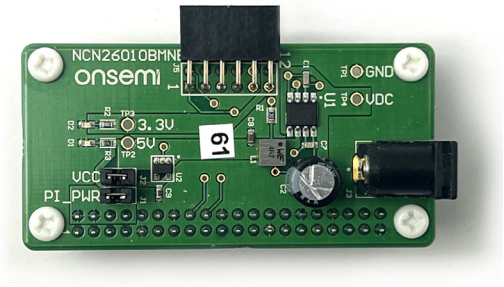

Figure 1. Bridge Board Photograph (Revision 1)

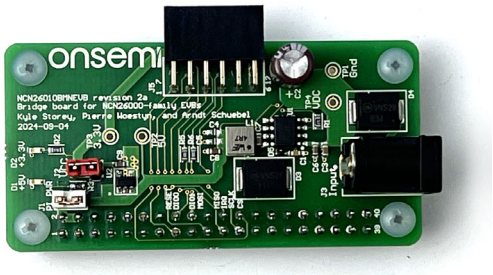

Figure 2. Bridge Board Photograph (Revision 2)

Introduction

NCN26010BMNEVB is a PCB designed to allow customers to connect **onsemi**'s NCN26010XMNEVB to a Raspberry Pi single board computer (SBC). The NCN26010XMNEVB is an evaluation board for the NCN26010, a 10Base-T1S transceiver with SPI interface.

The main purpose of the bridge board is to act as a physical interface adapter, routing the PMOD connector of the NCN26010XMNEVB to the appropriate pins on the 40-pin header on the Raspberry Pi SBC.

Features

The NCN26010BMNEVB bridge board includes all circuitry to power both a Raspberry Pi and an **onsemi** NCN26010XMNEVB. It features a DC/DC buck converter (NCV891330PD50R2G) that accepts an 8—28 V input and generates a regulated 5 V supply, capable of sourcing 3 A of continuous current. This is sufficient to power any Raspberry Pi model available today.

The board also contains a 3.3 V linear voltage regulator (NCP115ASN330T2G) to provide a stable 3.3 V supply to the connected 10Base-T1S MACPHY evaluation board.

The bridge board also establishes a data connection between the MACPHY evaluation board and the Raspberry Pi.

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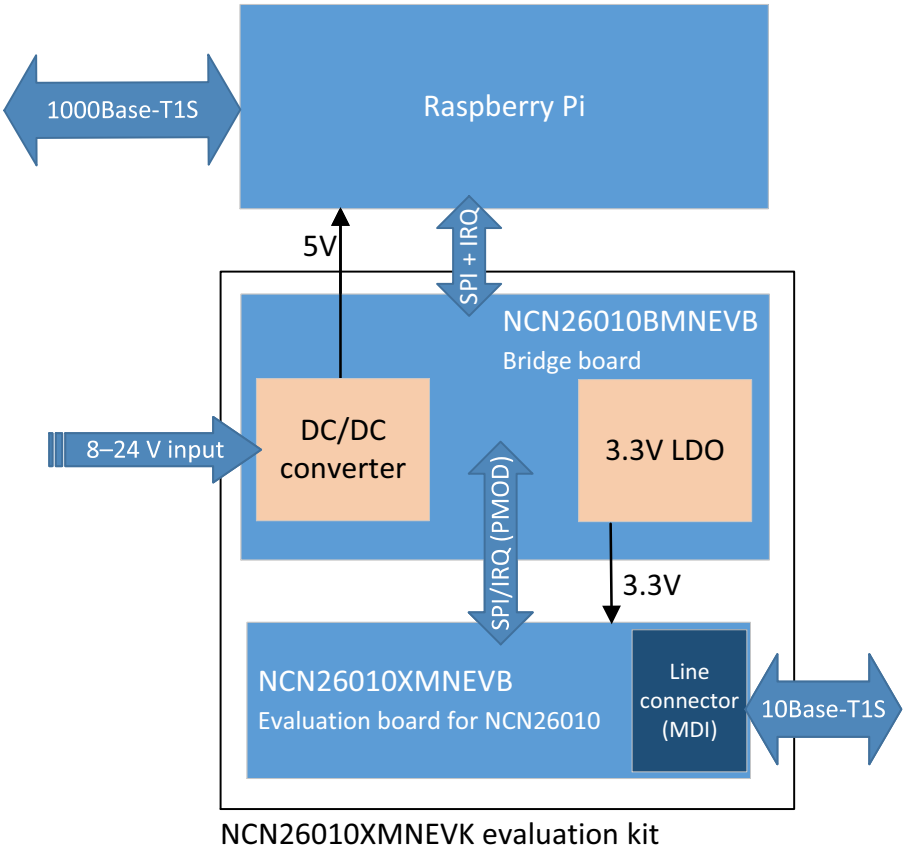

Figure 3. Simplified Block Diagram of the Complete Evaluation Kit

APPLICATIONS INFORMATION

Connectors and Jumper Locations

Figure 4 shows the top view of the EVB with the connectors and jumpers. When connected to a complete node, the setup looks as in Figure 5.

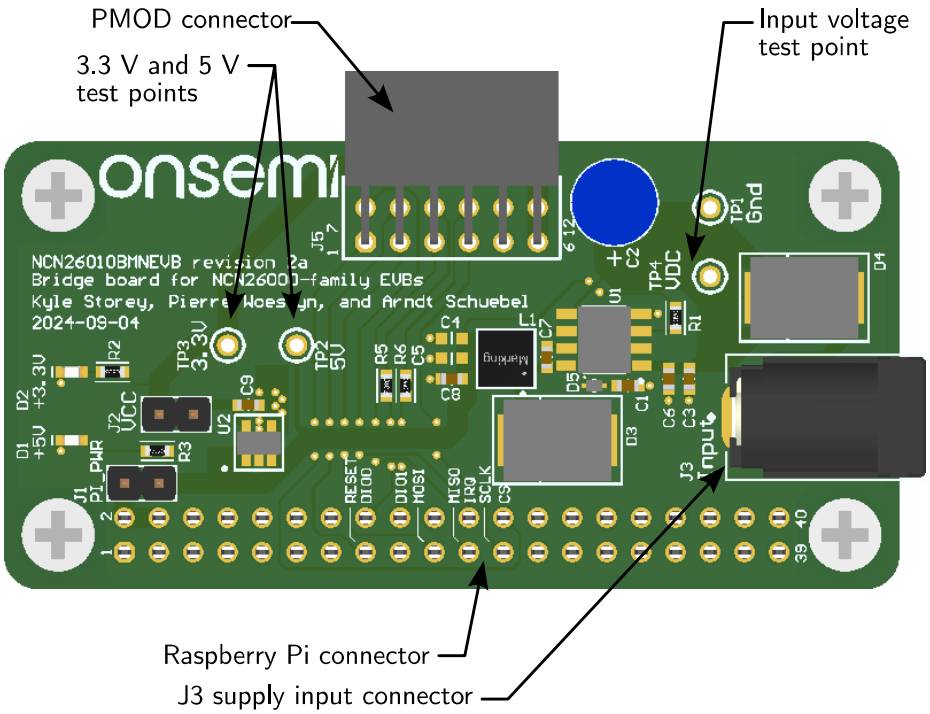

Figure 4. Connectors and Jumpers (Revision 2)

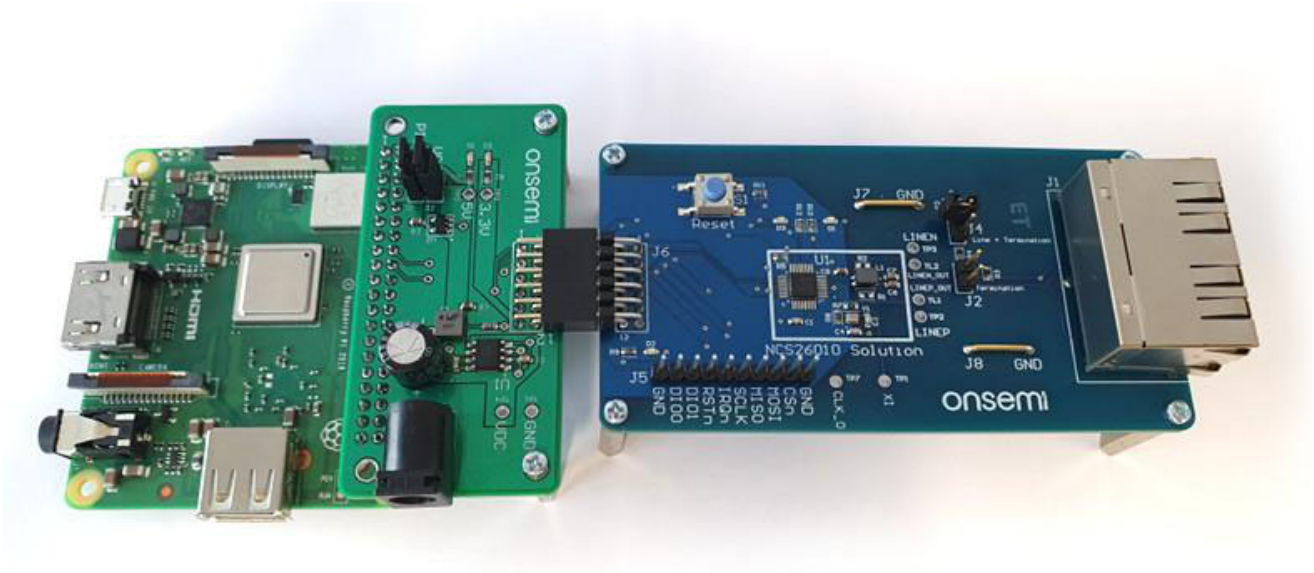

Figure 5. Raspberry Pi 3A+ Connected to the Evaluation Kit. A Kit Consists of an NCN26010BNMEVB and an NCN26010XMNEVB (Revision 1 Boards shown)

Power Supply, Test Points and Connectors

The bridge board can be powered though J3, a barrel connector. The input voltage may be 8—28 V. The pin inside the barrel connector is the supply terminal; the barrel ring is ground. A diode protects against reverse polarization.

Table 1 lists all connectors and test points on the bridge board.

Table 1. TEST POINTS AND JUMPERS

Name on Board	Function	Comment
TP1	GND	Ground connection
TP2	VDC	Can be used to measure the input voltage, VDC (8—28 V). Users could also use this test point for feeding the input voltage to the board if the J3 barrel connector is not used.
TP3	3.3 V	This test point can be used to monitor the 3.3 V VCC rail. This rail is passed to the PMOD connector, and from there to the transceiver board.
TP4	5 V	TP4 can be used to monitor the 5 V output of the DC/DC converter on the bridge board
J1	PI_PWR	When both the NCN26010XMNEVB and the Raspberry Pi are powered by their own external power supplies, this jumper needs to be left open. When the Raspberry Pi is powered from its micro-USB port and should also provide power to the MACPHY evaluation board connected via the J5 PMOD connector, then this jumper needs to be closed. When powering the entire setup with the DC/DC converter of the bridge board, the jumper also needs to be closed.
J2	VCC	To power a MACPHY evaluation board through the PMOD connector, close J2. If the MACPHY evaluation board is powered by an external power supply, it must be left open. J2 can also be used to measure the current consumed by the attached NCN26010XMNEVB: simply connect a current meter instead of closing the jumper.
J5	PMOD	PMOD connector, following the SPI-with-GPIO PMOD standard. The GPIOs connect to the DIO0–1 and IRQ nets of the NCN26010XMNEVB evaluation board.
Pi	Raspberry Pi	40-pin Raspberry PI connector. Connects to a Raspberry Pi SBC.

For the pin-out of the PMOD and the Raspberry Pi connectors, refer to the board schematic and [1] at the end of this document.

Revision Information

Two board revisions have been designed to date. Refer to Figure 1 and Figure 2 for the visual appearance and to Figure 6 and Figure 7 for the schematics.

In revision 2, R3 was changed from 500 Ω to 3.6 kΩ. No other changes were made to the schematic. The layout was improved, particularly around the buck converter.

References

[1] **onsemi**. *NCN26010XMNEVB 10BASE−T1S MACPHY Evaluation Board User's Manual (EVBUM2832/D)*. 2024.

NCN26010BMNEVB Schematic

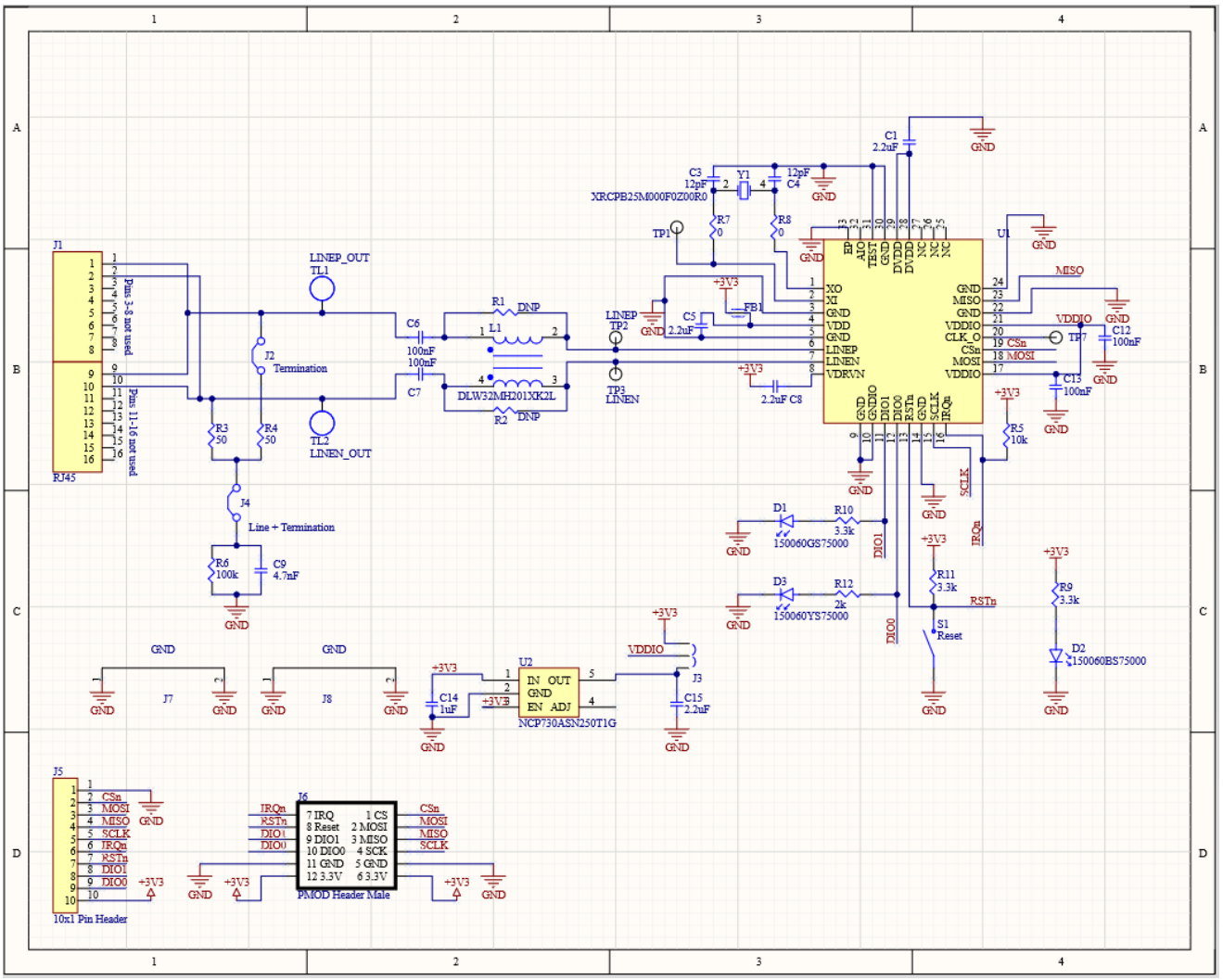

Figure 6. NCN26010BMNEVB Schematic (Revision 1)

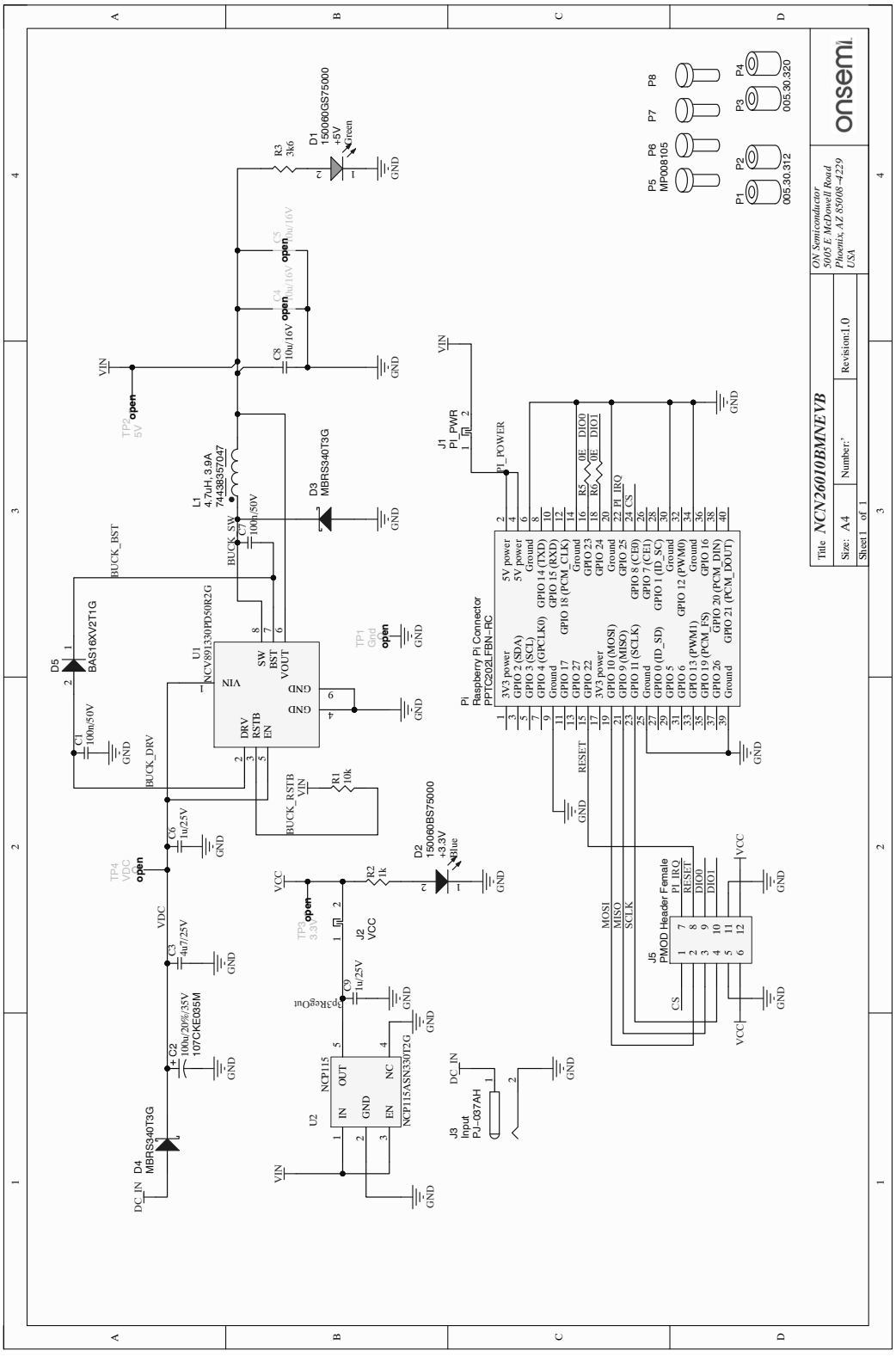

Figure 7. NCN26010BMNEVB Schematic (Revision 2)

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