


# RJ45 & Transformer

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The diagram illustrates the electrical connections for an RJ45 module using a transformer (T1, PULSE\_H1197). The RJ45 connector (J1) has pins 1 through 8. The connections are as follows:

- Input Pins (LED2+, LED2-, LED4+, LED4-):** These pins are connected to the +3.3V supply through resistors R21 (569 ohms) and R22 (569 ohms).
- Transformer (T1):** The transformer has two primary windings (pins 1, 2, 3, 4 and pins 5, 6, 7, 8) and two secondary windings (pins 1, 2, 3, 4 and pins 5, 6, 7, 8).
- Output Pins (TPOUT+, TPOUT-, TPIN+, TPIN-):** These pins are connected to the transformer secondary windings through resistors R14 (49.9 ohms), R16 (49.9 ohms), R17 (49.9 ohms), and R26 (49.9 ohms).
- Grounding:** The output pins are connected to GND through capacitors C18 (0.1uF) and C21 (0.1uF).

**BOM DONE**



# Ethernet PHY

Housings\_DFN\_QFN:QFN-28-1EP\_6x6mm\_Pitch0.65mm

ENC28J60-1/ML

QFN-28

GPIO10\_MOSI 3

GPIO9\_MISO 2

GPIO11\_SCLK 4

GPIO8\_CEO# 5

GPIO25 28

PHY\_OSC1 19

PHY\_OSC2 20

RESET 6

VDD 24

VDDPLL 16

LEDA\_K 23

LEDB\_K 22

VDDRX 15

TPIN+ 9

TPIN- 8

VSSRX 7

VDDTX 11

TPOUT+ 13

TPOUT- 12

VSSTX 14

RBIA5 10

VCAP 25

VSS 26

VSSPAD 29

VSSPLL 17

CLKOUT 27

VSSOSC 18

OSC2 20

VDDOSC 21

WOL 19

TINT 28

1k R3

2.2k R8

10uF C11

10uF C10

16pf C2

16pf C3

25Mhz Y1

+3.3V

GND

BOM DONE

# Raspberry Pi Header

TH Female Bottom or SMT Female Top Header  
 SMT: Toby Electronics REF-182665-01/REF-182665-03  
 TH: Digikey 1528-1385-ND  
 Pin #s Match RPI.

P1	P2
RPI_3V3_1	2 RPI_VBUS
GPI01_SDA1	4 RPI_VBUS
GPI03_SCL1	6 GND
GPI04	8 GPI014_TXD0
GND	10 GPI015_RXD0
GPI017	12 GPI018
GPI027	14 GND
GPI022	16 GPI023
RPI_3V3_2	18 GPI024
GPI010_MOSI	20 GND
GPI09_MISO	22 GPI025
GPI011_SCLK	24 GPI08_CE0#
GND	26 GPI07_CE1#
GPI00_ID_SD	28 GPI01_ID_SC
GPI05	30 GND
GPI06	32 GPI012
GPI013	34 GND
GPI019	36 GPI016_CE2#
GPI026	38 GPI020_MOSI
GND	40 GPI021_SCLK

H1 H3  
 hole-metalized-no4 hole-metalized-no4  
 H2 H4  
 hole-metalized-no4 hole-metalized-no4

+3V3

C17  
 dnp-100n  
 W1 TEST\_1P  
 W2 TEST\_1P  
 R18  
 dnp-1k  
 U3  
 A0  
 A1  
 A2  
 WP  
 VCC  
 SDA  
 SCL  
 GND  
 R20  
 dnp-3.9k  
 R23  
 dnp-3.9k  
 GPI00\_ID\_SD  
 GPI01\_ID\_SC  
 dnp-AT24CS32-SSHM  
 Housings\_SSOP:TSSOP-8\_4.4x3mm\_Pitch0.65mm  
 16-bit addressed I2C EEPROM, 32Kb+  
 Stores RPI HAT configuration.  
 GND

[illegible]

# Raspberry Pi Power

The diagram illustrates a power supply circuit for a Raspberry Pi. It starts with a +5V source connected to a green LED (D6) and a 1k resistor (R13) to ground. This source is also connected to a current mirror circuit consisting of two PNP transistors (Q1 and Q2) and a MOSFET (Q3). The current mirror is used to regulate the current through the PNP transistor (Q2) which drives the RPI\_VBUS line. The RPI\_VBUS line is connected to the VIN pin of a linear regulator (U4, AP7365\_SOT-23-5). The regulator's EN pin is connected to a 1uF capacitor (C19) to ground. The regulator's VOUT pin is connected to a +3V3 source, which is also connected to a green LED (D7) and a 220 resistor (R20) to ground. The regulator's GND pin is connected to ground. The +3V3 source is also connected to a 1uF capacitor (C20) to ground.

**Legend:**

- Q1: Low  $R_{ds}$  PFET like DMP3099L. 3A, 99m $\Omega$  @ 4.5V Vgs.
- Q2: Matched PNP pair. Current mirror comparator pulls Q1 gate low (on) when USB\_VBUS\_RVP > USB\_VBUS.
- Q3: Q\_PMOS\_GSD
- U4: AP7365\_SOT-23-5
- C19: 1uF
- C20: 1uF
- R13: 1k
- R15: 10k
- R19: 47k
- R20: 220

**Ideal Diode for RPi 5V Source**

**Extra Linear Reg. for 3.3V**

Power ethernet phy whether we have PoE or not. Phy requires more power than allowed from RPi 3.3V.

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