



SPINET

Ethernet to SPI interface module User's Guide

- 10BASE-T physical layer, full duplex or half duplex
- Including RJ45 connector with galvanic insulation and two LED indicators
- Media access controller (MAC)
- 8 KB of buffers for reception and transmission
- Hardware assisted checksum calculation
- Power by 3.3 V or 5 V
- Outputs with both 3.3 V and 5 V levels
- 5 V tolerant inputs
- Easy connection to PVK40 board
- Example program in C



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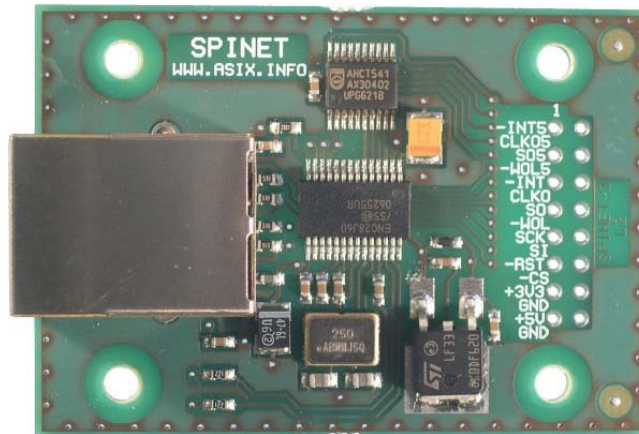
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Note: This document contains hyperlinks pointing to web pages on the Internet. If the links happen to be broken (pointing to a non-existing page), please download recent version of this manual from www.asix-tools.com.

1. SPINET

SPINET is a module based on ENC28J60 Ethernet controller by [Microchip](#) providing easy connection of application circuitry to an Ethernet network without necessity of previous knowledge of physical layer of this interface.



SPINET contains 10BASE-T physical layer (PHY) including RJ45 connector with galvanic insulation and media access control logic (MAC). The module supports half duplex and full duplex operation at 10 Mb/s and it is equipped by 8 kB of dual port SRAM for incoming and outgoing data. Besides of other features it includes hardware engine for copying blocks of memory and checksum calculation in one's complement arithmetics (IP checksum) and CRC.

2. INPUTS AND OUTPUTS

Pin	Label	Type	Description	3.3 V	5 V
1	-INT5	OUT	Interrupt pin		✓
2	CLK05	OUT	User clock output		✓
3	SO5	OUT	Serial data out		✓
4	-WOL5	OUT	Wake On LAN *)		✓
5	-INT	OUT	Interrupt pin	✓	
6	CLK0	OUT	User clock output	✓	
7	SO	OUT	Serial data out	✓	
8	-WOL	OUT	Wake On LAN *)	✓	
9	SCK	IN	Serial clock input	✓	✓
10	SI	IN	Serial data input	✓	✓
11	-RST	IN	Reset	✓	✓
12	-CS	IN	Chip select	✓	✓
13	+3V3	PWR	Power supply of +3.3 V	✓	
14	GND	PWR	Common ground	✓	✓
15	+5V	PWR	Power supply of +5 V		✓
16	GND	PWR	Common ground	✓	✓

*) According to recent datasheet of ENC28J60, this pin shall be left unconnected.

The module is powered by **single power supply**, use either +3.3 V or +5 V on appropriate pin 13 or 15.

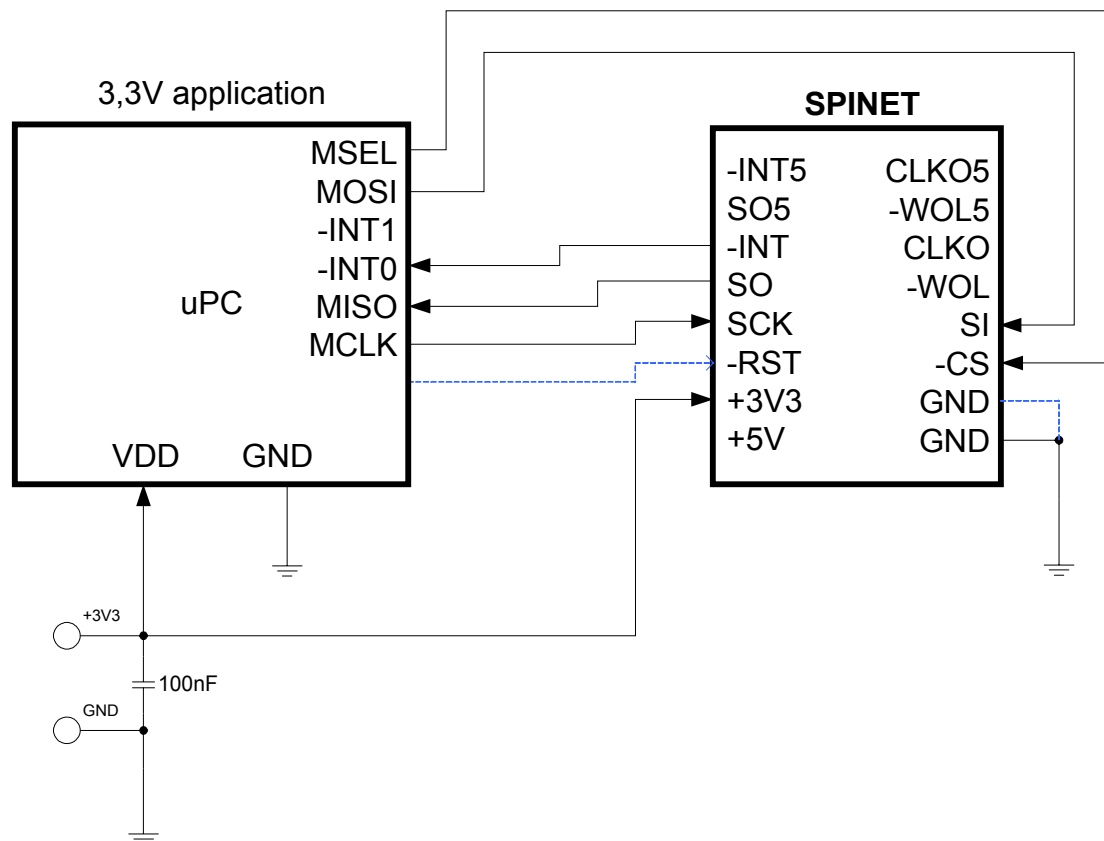
All module inputs are LVTTL and are 5 V tolerant.

Outputs pins with names prefixed by dash character ("-") are active in log. 0, all other signals are active in log. 1.

All outputs are doubled. Outputs on pins 5 to 8 are with 3.3 V levels and connect directly ENC28J60. If 5 V power supply is used, signals with 5 V levels are available on pins 1 to 4. Connect outputs with corresponding voltage level according to applications need, see the table above.

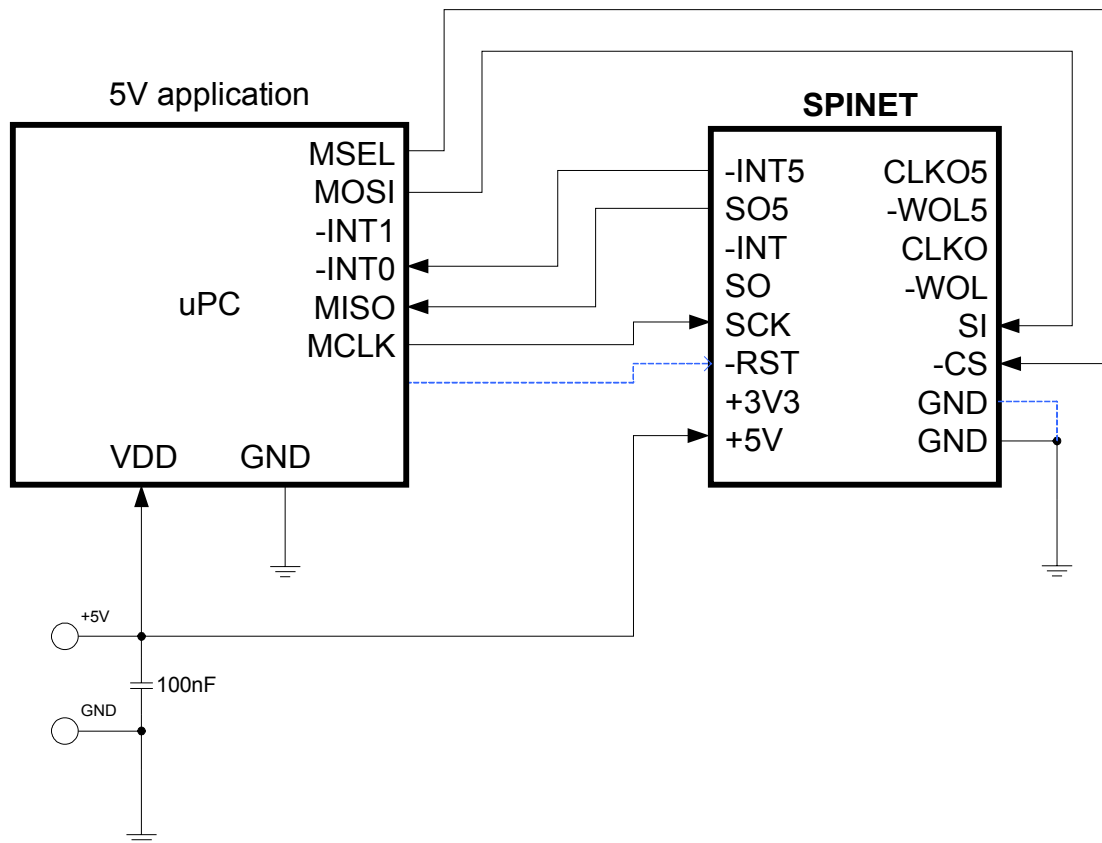
2.1 Connection to 3.3 V application

If the modules is to be used in 3.3 V application input and output signals of ENC28J60 are used directly.



2.2 Connection to 5 V application

In case the module is to be used in 5 V application, the output signals are connected through integrated level converter while input signals are connected directly ENC28J60 (which is 5 V tolerant). A 3.3 V voltage regulator for powering the ENC28J60 is part of the module.



3. SOFTWARE

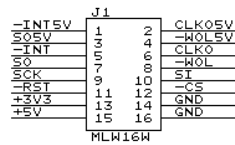
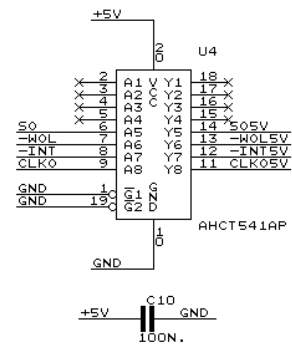
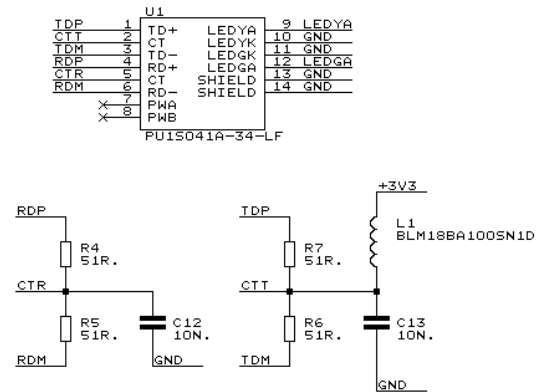
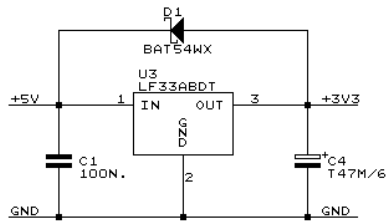
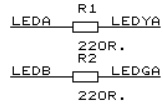
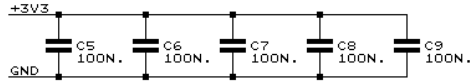
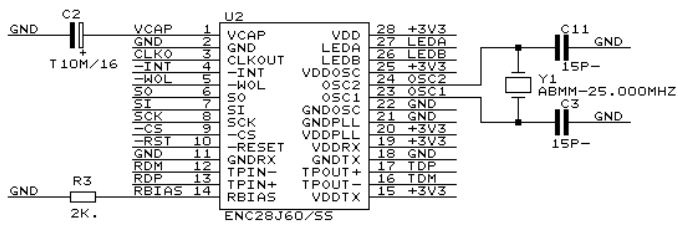
An example program in C is available at www.asix-tools.com royalty free. The module may be purchased as a set for easy connection to PVK40 development board.

Description of communication with ENC28J60 is available in the datasheet and application notes of its manufacturer.

A suitable **MAC address** shall be assigned to the module during startup configuration of ENC28J60. If you are not assigned Organization unique identifier (OUI) by IEEE, it is recommended to use an address from locally administered range, that is, an address with bit 1 (second least significant) in its first byte set, e.g. 02-00-00-00-00-78.

Note: The module provides with solution of communication over Ethernet network up to the MAC layer, that is, it transfers Ethernet frames. Higher level protocols (ARP, IP, ICMP, UDP, TCP, HTTP...) are to be implemented in the application (typically in the firmware of connected microcontroller).

4. ELECTRICAL SCHEMATICS



Top view of the SPINET PCB. Dimensions are indicated: overall width 57, distance from left edge to center of top-left hole 8, distance from left edge to center of top-right hole 48, distance from top edge to center of top-right hole 5, distance from top edge to center of bottom-right hole 11, overall height 35, and distance from right edge to center of bottom-right hole 40. The PCB features four mounting holes (Ø 3), a central microcontroller (SPINET), a USB connector, a 3.3V regulator, a 5V regulator, and various passive components. A label '1' is present on the left side of the board.

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6. TECHNICAL SPECIFICATIONS

6.1 Recommended values for 3.3 V application

Power supply, 3.3 V	VCC3	min. 3.1 V	max. 3.6 V
Power consumption, +3V3	ICC3		max. 180 mA
Input voltage log.1	VIH	min. 2.25 V	max. 5.5 V
Input voltage log.0	VIL		max. 1 V
Output voltage log.1, 3.3 V	VOH3	min. VCC3-0.7	
Output voltage log.0, 3.3 V	VOL3		max. 0.4 V
Output pin current, 3.3 V	Iout3		max. 4 mA

6.2 Recommended values for 5 V application

Power supply, 5 V	VCC5	min. 4,5 V	max. 5,5 V
Power consumption, +5V	ICC5		max. 200 mA
Input voltage log.1	VIH	min. 2,25 V	max. 5.5 V
Input voltage log.0	VIL		max. 1 V
Output voltage log.1, 5 V	VOH5	min. 4,4 V	
Output voltage log.0, 5 V	VOL5		max. 0,1 V
Output pin current, 5 V	Iout5		max. 25 mA

Values for use in other than typical environment are available in datasheets for ENC28J60, 74AHCT541 and LF33.