LJCV Electronics

nic424

ENC424J600 10/100-BaseT Network Interface Card

Features

- On board 10/100Mbps Ethernet controller, and RJ45 jack for network connection
- Small 1.3x2.5" circuit board footprint
- 3.3V DC supply
- Microchip's TCP/IP protocol stack, with IPv4, UDP, TCP, DHCP, ICMP, FTP, and HTTP support
- IEEE 802.3 10/100BaseT compliant
- Unique preprogrammed MAC address
- Integrated cryptographic security engines
- Fully assembled and tested

Description

The nic424 is a small network interface card implemented with Microchip Technology new Stand-Alone ENC424J600 Ethernet Network Controller.

The circuit board includes all required components for the ethernet controller and a RJ-45 jack with integrated magnetics and built-in Link and Activity LEDs for connection to an Ethernet Local Area Network.

The nic424 can be used with any processor supporting the industry standard SPI™ interface or via a parallel interface.
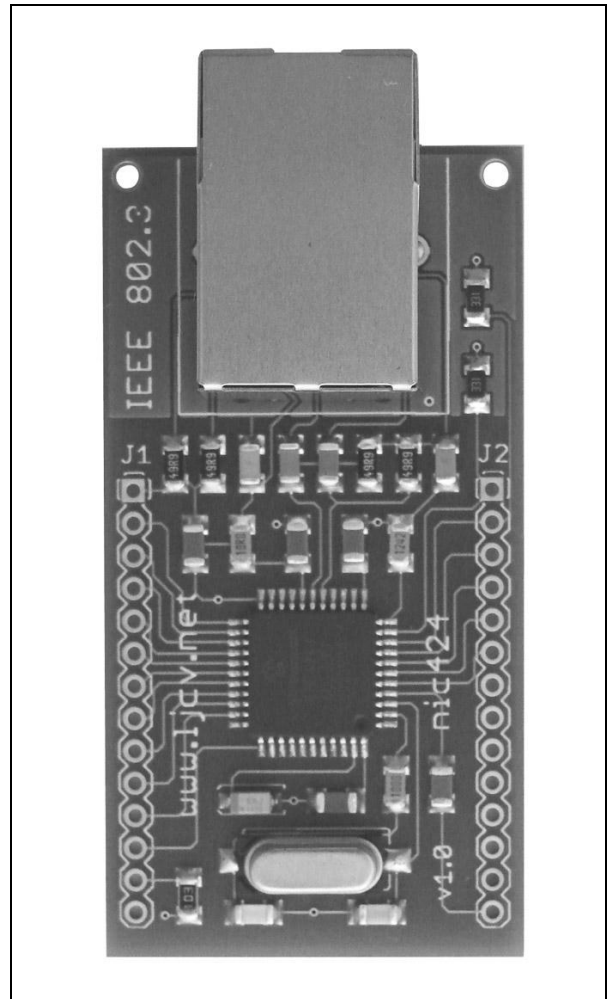
Applications

- Remote control and monitoring
- Data capture and logging
- Industrial Automation
- Building Automation
- Appliance remote management
- Robotics
- Microcontroller Research and Development
- TCP/IP Research and Development

General Description

The nic424 is a small Network Interface Card based on Microchip Technology new ENC424J600[B1] IEEE 802.3 Stand-Alone Ethernet controller with integrated SPI and PSP interface, MAC and 10/100BASE-T PHY.

The board includes all support components for the Ethernet controller.

Communication with the ENC424J600 is implemented using the standard SPI (Serial Peripheral Interface) signals SCK (clock), SI (serial input), SO (serial output) and CS (chip select) or via an 8-bit PSP (Parallel Slave Port modes 5 and 6) interface using the AD0-AD14, AL, CS, RD, WR, EN, R/W signals.

To select the interface mode, the INT pin from the ENC424J600 pin is shared with the SPISEL signal that is sensed and latched during the initial power-on. The nic424 board already includes a pull-up/pull-down resistor to enable either the SPI or PSP interface.

For SPI the nic424 SPISEL (J1-13) pin must be connected to Vdd, for PSP the nic424 SPISEL pin must be connected to Vss, and the PSP mode selected with the PSPCFG0 pin.

The board interface is completed with other signals from the ENC424J600 such as CLKOUT, INT, LEDA and LEDB.

The board requires a stable +3.3V DC supply with at least 150mA.

All digital inputs and I/O pins operating as inputs are 5V tolerant, but the digital output pins drive only up to the Vdd voltage (3.3V), this voltage may be not enough to interface the nic424 with 5V systems. In this case level translation may be required. Consult the ENC424J600[B1] datasheet section 2.8

(Digital I/O Levels) for additional information.

When the SPI interface is used for best ESD performance Microchip recommends to tie the unused PSP pins to either Vss or Vdd.

Complete schematics of the nic424 are included in Appendix A.

Ethernet Controller

Microchip's ENC424J600 is an IEEE 802.3 Stand Alone Ethernet controller with integrated MAC and 10/100BASE-T PHY modules. It has an 24KBytes dual port static RAM buffer with hardware assisted circular receive FIFO, CRC generation a security engines module.

It supports Unicast, Multicast and Broadcast packets, and programmable receive packet filtering.

The hardware CRC calculation module facilitates the in-buffer checksum generation for various network protocols.

For applications where SSL, TLS or other related protocols are used, the ENC424J600 includes a block of security engines that perform RSA, Diffie-Hellman, AES, MD5, and SHA-1 algorithm computations.

Consult the ENC424J600[B1] datasheet for additional information.

The ENC424J600 also includes two programmable LED outputs for LINK, Rx/Tx activity and collision status. These two outputs drive the LEDs present in the nic424 RJ-45 jack. By default the yellow LED indicates LINK status and the green LED Rx/Tx activity.

For a detailed feature description and complete documentation of the Ethernet Controller, please refer to Microchip's ENC424J600 Data Sheet[B1].

Software Drivers

A complete TCP/IP protocol stack[B2] with drivers supporting the ENC424J600 is available from Microchip Technology.

Board Interface (J1, J2)

Connections to the board are performed via the J1 and J2 connectors interface; they accommodate any standard 14 pin header with .100" pitch.

J1 and J2 Pin Outs

	J1		J2	
Vdd	1		1	LEDA
CLKOUT	2		2	LEDB
$\overline{INT}$	3		3	AD7
AD8	4		4	AD6
AD9	5		5	AD5
AD10	6		6	AD4
AD11	7		7	AD3
AD12	8		8	AD2
AD13	9		9	AD1
AD14	10		10	AD0
PSPCFG0	11		11	SCK/AL
$\overline{CS}$	12		12	SI/RD/$\overline{RW}$
SPISEL	13		13	SO/WR/EN
Vss	14		14	Vss

Physical Dimensions
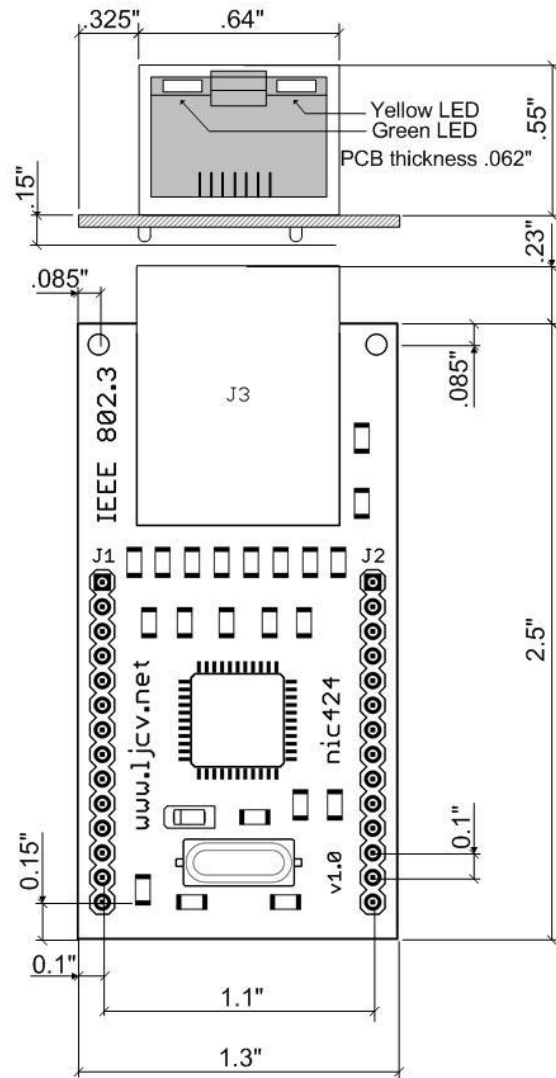
Note: Drawing not to scale

All dimensions are in inches.

## Electrical Characteristics

Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
V_{DD}	Supply Voltage	-0.3 to +4.0	V
I_{SUP}	Supply Current (@ V_{DD}=3.30V)	150	mA
T_{OP}	Operating Temperature	0 to +85	°C
T_{STO}	Storage Temperature	-50 to +150	°C

DC Normal Operating Characteristics

Symbol	Parameter	Value			Unit
		Min	Typ	Max	
V_{DD}	Supply Voltage	3.0	3.3	3.6	V
I_{SUP}	Supply Current (@V_{DD}=3.30V)	70	130	150	mA
V_{IL}	Input Low Voltage (Digital Input Pins)	Vss	-	0.2 Vdd	V
V_{IH}	Input High Voltage (Digital Input Pins)	0.6 Vdd	-	5.5	V
V_{OL}	Output Low Voltage (All digital output pins)	Vss	-	0.4	V
V_{OH}	Output High Voltage (All digital output pins)	2.4	-	Vdd	V

For complete AC and DC operating characteristics please refer to Microchip's ENC424J600 Data Sheet[B1].

Appendix A – nic424 Schematics
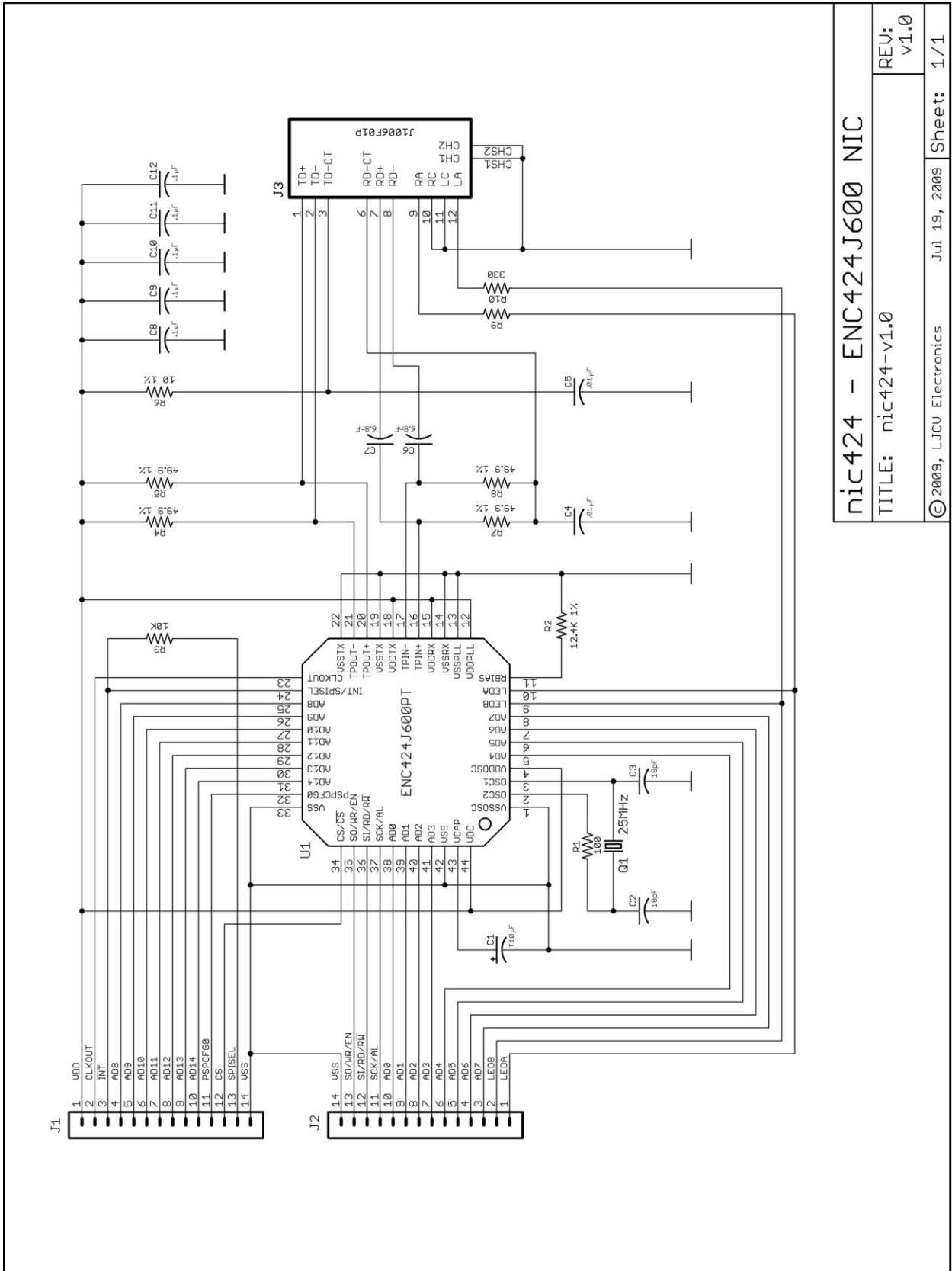
Appendix B – Technical References

[B1] ENC424J600/624J600 Stand-Alone Ethernet Controller Data Sheet, Microchip Technology Inc., 2009, Document Number DS39935B.

[B2] Microchip TCP/IP Protocol Stack, available at *www.microchip.com/tcpip*.

Revision History:

October 2009, Original data sheet document for nic424.

November 2009,
- Page 2, corrected reference for SPISEL J1 pin.
- Page 3, corrected legends on J1 Pin Outs.

Notes: