

COM-5401 4-PORT 10/100/1000MBPS ETHERNET TRANSCEIVERS

Key Features

- Plug-in Ethernet transceivers provides FPGA-based ComBlock modules with high-speed parallel network access.
- Network Interface:
 - 4 RJ-45 ports
 - 4 Gbits/s maximum combined throughput on standard CAT-5 unshielded twisted pair cables
 - Triple-speed (10Base-T/100Base-Tx/1000Base-T)
 - Autonegotiation to automatically select the highest link up speed (10/100/1000 Mbps) and duplex (full/half)
- FPGA Interface: standard RGMII 1.3
- Includes tri-mode 10/100/1000 Mbps Ethernet MAC binary code for use with Spartan-6 FPGAs.
- Single 5V supply. Standard 98-pin PCIe left connector.

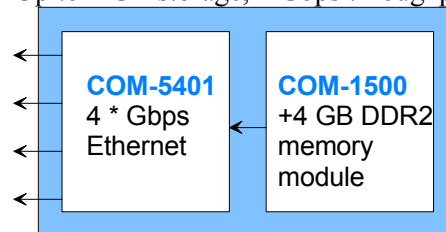
For the latest data sheet, please refer to the **ComBlock** web site: comblock.com/com5401.html.
These specifications are subject to change without notice.

For an up-to-date list of **ComBlock** modules, please refer to www.comblock.com/product_list.html.

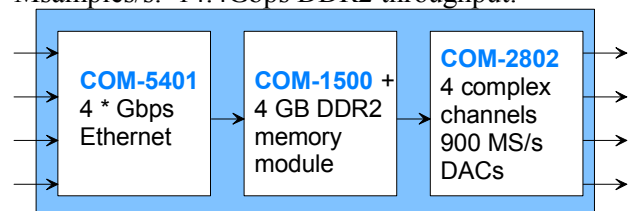


Typical Application

High-throughput IP data server:
Up to 4 GB storage, 4 Gbps throughput.



Arbitrary waveform generator
Up to 4GB storage, 4-complex channels, 900 Msamples/s. 14.4Gbps DDR2 throughput.



Interfaces

The 98-pin connector connects an external FPGA directly to the four KSZ9021RN Ethernet PHYs.

Each PHY comprises two distinct interfaces:

- a bi-directional MII interface for monitoring and control, and
- a RGMII interface for transferring transmit and receive data at high-speed.

The signals definition is best described in the Micrel KSZ9021RN specifications.

Nominal Operation

Supply voltage	+4.9 to +5.5 VDC
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Absolute Maximum Ratings

Supply voltage	-16V min, +16V max
98-pin connector inputs	-0.5V min, +3.6V max

Reference Documents

- [1] [Micrel KSZ9021-RL/RN data sheet](#)
- [2] RGMII 1.3 specifications
- [3] [COM-5401 schematics](#)
- [4] [COM-5401SOFT driver specifications](#)

LEDs

2 LEDs within each LAN RJ-45 jack provide summary information as to the LAN: Link, activity and negotiated speed.

Link/Activity	LED2 (left) Green	LED1 (right) Yellow
Link off	Off	Off
1000 Link / no activity	Off	On
1000 Link / activity	Off	Blinking
100 Link / no activity	On	Off
100 Link / activity	Blinking	Off
10 Link / no activity	On	On
10.Link / activity	Blinking	Blinking

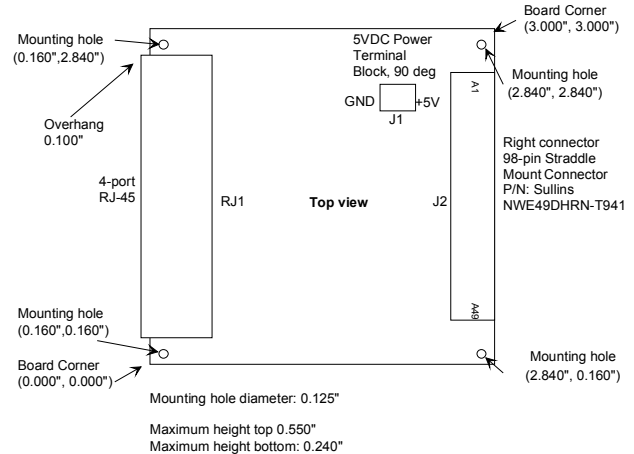
FPGA Driver

A driver is available for a Xilinx Spartan-6 FPGA acting as MAC and driving one or multiple Ethernet PHYs on the COM-5401. Synthesized (.ngc) component, instantiation template and use example

are included in the COM-1600 code template:

<http://comblock.com/download.html#COM1600template>

Mechanical Interface



Schematics

The adapter schematics are provided on the ComBlock CDRom and are also available online at comblock.com/download/com_5401schematics.pdf

Pinout

LAN Connector RJ1

The RJ-45 Jack is wired as a standard PC network interface card. Connection to a LAN switch is over a straight-through cable. Use a crossover cable to connect directly to a PC.

