The RapID Platform Network Interface Is a Complete, Pretested Solution that Manages the Industrial Protocol and Network Traffic for a Host Processor
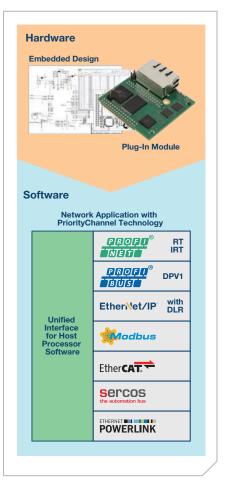
The network interface module or embedded design contains everything needed to participate in star, line, or tree network topologies, including the communications controller, protocol stacks, flash, RAM, Ethernet switch, and PHYs. A host processor connects to the network interface via a UART or 16-bit parallel interface. At the software layer the host connects to a unified interface so other protocols can be used without changing the host software. The network communications is extremely robust and supports ADI's PriorityChannel® technology. This means your field device will operate problem-free with any Modbus TCP controller and will never disconnect from the network.
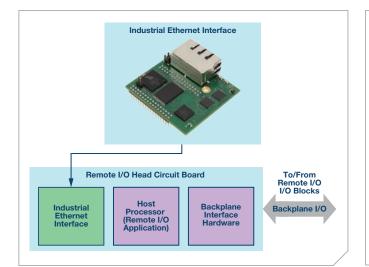
Easy Hardware and Software Integration

The network interface can be integrated into a design as either a module or an embedded design. As a module, the network interface plugs into a board using standard 2.54 mm pitch through-hole pins. When designing-in the module, hardware integration is as easy as connecting power/ground/reset and interfacing the host to the UART or 16-bit parallel interface.

As an embedded design, the network interface hardware design can be integrated directly using the schematics provided. Also provided are the bill of materials and example layouts to minimize the hardware design effort. Software for the embedded design is provided as firmware that is downloaded to the flash. Whether using the network interface as a module or an embedded design, no software development is required and there are no license fees or royalties.

Software integration with a host is also easy. Messages passed between the host and network interface follow a unified interface definition. A simple to use, Analog Devices supplied, PC-based tool configures the network interface so the host only passes parameters between it and the network interface. From this tool, it is also easy to specify how parameters will be passed to the Modbus TCP register map and the associated host parameters. Since the host is only passing parameters, the host software does not have to change if Modbus TCP network parameters change or if another industrial Ethernet protocol is used. There is also a sockets interface that supports direct Ethernet communication. Example C-code is provided to minimize the software effort for the host/network interface communication.
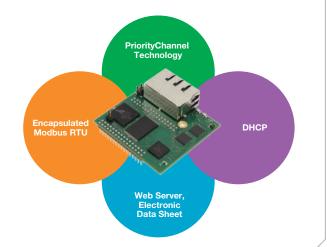
Hardware

Embedded Design

Plug-In Module

Software

Network Application with PriorityChannel Technology

Unified Interface for Host Processor Software

PROFI NET®	RT IRT
PROFI BUS®	DPV1
EtherNet/IP™	with DLR
Modbus	
EtherCAT®	
sercos the automation bus	
ETHERNET POWERLINK	

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Industrial Ethernet Interface

Remote I/O Head Circuit Board

| Industrial Ethernet Interface | Host Processor (Remote I/O Application) | Backplane Interface Hardware |

To/From Remote I/O I/O Blocks
Backplane I/O

PriorityChannel Technology

Encapsulated Modbus RTU

DHCP

Web Server, Electronic Data Sheet

Reliable, Flexible Network Integration

The RapID platform network interface supports Modbus TCP communication with PriorityChannel—a revolutionary technology that eliminates the effects of network traffic and ensures reliable, real-time network performance. It gives your device a significant competitive advantage, extremely low jitter, and a reliable connection that will not disconnect even with >95% network loading.

Modbus TCP is a master/slave protocol with Modbus RTU encapsulated in a TCP frame. The protocol requires slave devices to respond to the master's commands, and these responses should be performed in a timely manner. With PriorityChannel technology's extremely low latency, Modbus TCP commands will not be lost in unrelated network traffic and these commands will be responded to with minimum delay. In addition, the network interface comes with an example electronic data sheet file that can be tailored to describe the features of the field device to a Modbus TCP master. To assist with commissioning, a webserver is provided so the field device's network information can be displayed on a standard browser.

EVALUATION KIT

Fast Evaluation and Development

The RapID platform network interface evaluation kit provides a quick assessment for interfacing a host to the module. An application example is provided in order to demonstrate end-to-end, host-to-network, and interface-to-master communication. Simply connect the host development board to the network interface evaluation board via the UART or 16-bit parallel interface. Once host-side communication is established, Modbus TCP communication can be evaluated using a PLC or master simulator. The communication path between host and Modbus TCP master can be completely verified before integrating the module into your field device hardware.

RapID Platform Modbus TCP Network Interface

Parameter	Details
Part Number	RapID-NI-V2012, RapID-NI-V2112
Host Processor	Any CPU or DSP
Host Processor Interfaces	UART (115.2 kbaud) 16-bit parallel (up to 12.5 Mbps)
Network Interface	Data transport: IEEE 802.3
	Data rate: 10 Mbps/100 Mbps
	Ports: 2
Temperature (°C)	−40 to +85
Power Supply	Voltage: 3.3 V_{DC}
	Power consumption: 1.6 W
TCP/IP	ARP, BSD sockets, DNS, DHCP, TFTP, HTTP server, CGI
Modbus TCP	Cyclic input data: 504 bytes Cyclic output data: 504 bytes
	Cycle time: 1 ms (min)
	Function Codes: 01, 02, 03, 04, 05, 06, 07, 15, 16, and 17
Compliance	RoHS, CE

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