Ethernet1 Xplained Pro

Part Number: ATETHERNET1-XPRO

The Atmel® Ethernet1 Xplained Pro is an extension board to the Atmel Xplained Pro evaluation platform. The board enables the user to experiment with Ethernet network connectivity applications.

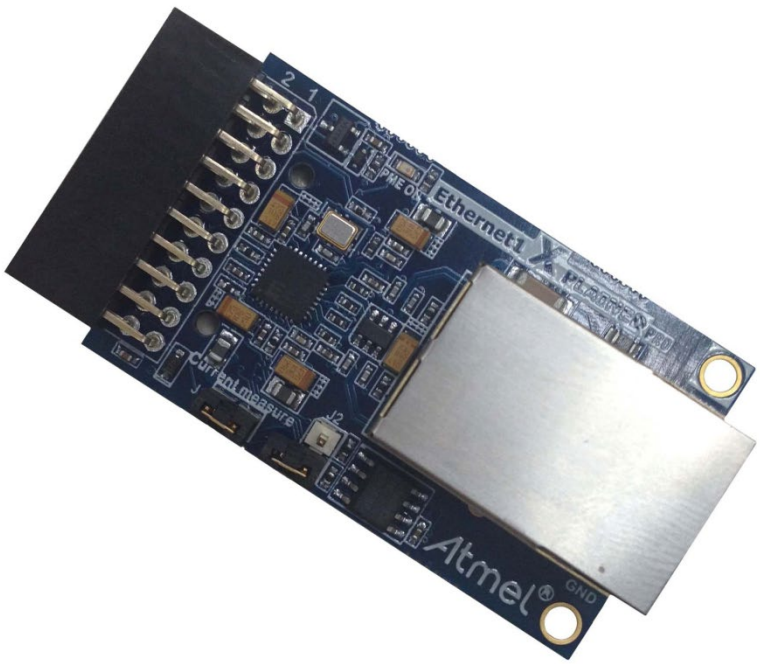
Key Features

- Compatible with the Xplained Pro extension headers
- 10BASE-T and 100BASE-TX physical layer support
- Auto-negotiation: 10/100Mbps full and half duplex
- Two LEDs indicator
- Support external 1KB or 4KB EEPROM
- Xplained Pro hardware identification system
- Supported with application examples in Atmel Software Framework

PLEASE SEE FOLLOWING PAGES FOR THE USER GUIDE

USER GUIDE

Atmel Ethernet1 Xplained Pro



Preface

Atmel® Ethernet1 Xplained Pro is an extension board to the Atmel Xplained Pro evaluation platform. The board enables the user to experiment with Ethernet network connectivity applications.

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Introduction

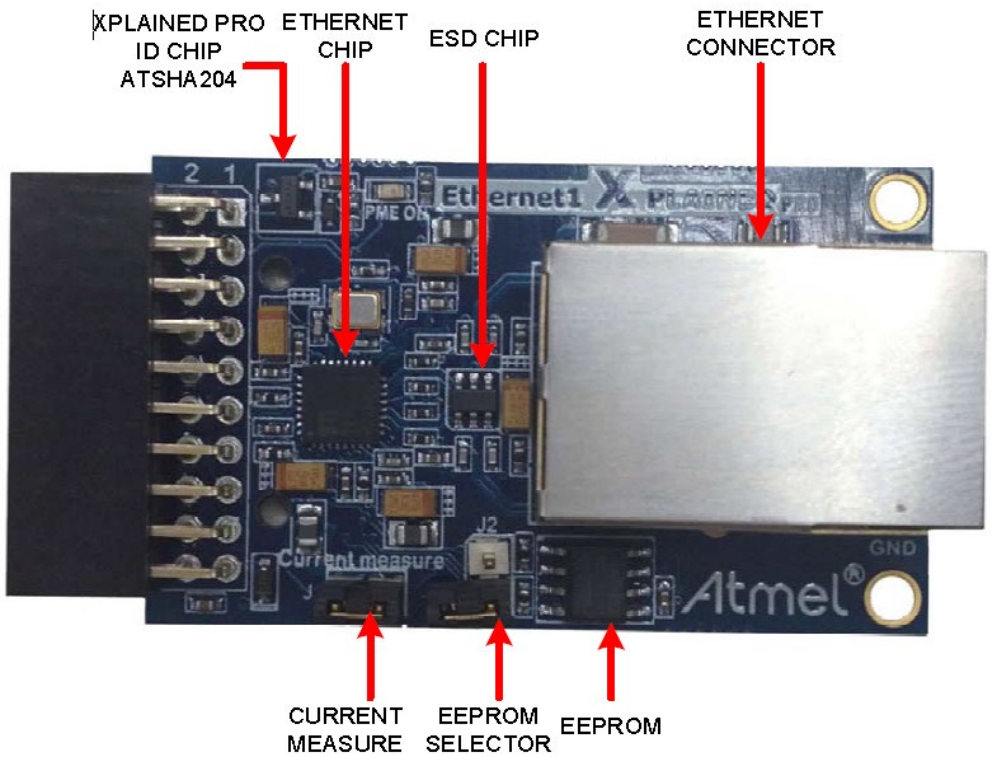
Features

- 10BASE-T and 100BASE-TX physical layer support
- Auto-negotiation: 10/100Mbps full and half duplex
- Two LEDs indicator
- Support external 1KB or 4KB EEPROM
- Xplained Pro hardware identification system

Kit Overview

Ethernet1 Xplained Pro is a basic extension board for the Xplained Pro platform. The Ethernet is controlled via a SPI interface up to 40MHz for high throughput Ethernet applications. Ethernet1 Xplained Pro connects to any Xplained Pro standard extension header on any Xplained Pro MCU board.

Figure 1-1. Ethernet1 Xplained Pro Extension Board



Getting Started

Quick-start

Three steps to start exploring the Atmel Xplained Pro platform:

A. Download and install Atmel Studio.
B. Launch Atmel Studio.
C. Connect Ethernet1 Xplained Pro to an Xplained Pro MCU board and connect a USB cable to DEBUG USB port on the Xplained Pro MCU board.

Connecting Ethernet1 Xplained Pro to the Xplained Pro MCU Board

Atmel Ethernet1 Xplained Pro has been designed to be connected to the Xplained Pro header marked EXT1. However it is compatible with all Xplained Pro EXT headers. Refer to the pin-out of your Xplained Pro MCU board to find out which Xplained Pro EXT headers that can be used.

Once the Xplained Pro MCU board is powered the green power LED will be lit and Atmel Studio will auto detect which Xplained Pro MCU- and extension board(s) that are connected. You will be presented with relevant information like datasheets and kit documentation. You also have the option to launch Atmel Software Framework (ASF) example applications for the combination of Xplained Pro MCU board and extensions connected. The target device is programmed and debugged by the on-board Embedded Debugger. No external programmer or debugger tool is needed.

Design Documentation and Related Links

The following list contains links to the most relevant documents and software for Ethernet1 Xplained Pro:

A. Xplained Pro products - Atmel Xplained Pro is a series of small-sized and easy-to-use evaluation kits for 8- and 32-bit Atmel microcontrollers. It consists of a series of low cost MCU boards for evaluation and demonstration of features and capabilities of different MCU families.
B. Ethernet1 Xplained Pro User Guide - PDF version of this User Guide.
C. Ethernet1 Xplained Pro Design Documentation - Package containing schematics, BOM, assembly drawings, 3D plots, layer plots etc.
D. Atmel Studio - Free Atmel IDE for development of C/C++ and assembler code for Atmel microcontrollers.

Xplained Pro

Xplained Pro is an evaluation platform that provides the full Atmel microcontroller experience. The platform consists of a series of Microcontroller (MCU) boards and extension boards that are integrated with Atmel Studio, have Atmel Software Framework (ASF) drivers and demo code, support data streaming, and more.

Xplained Pro MCU boards support a wide range of Xplained Pro extension boards that are connected through a set of standardized headers and connectors. Each extension board has an identification (ID) chip to uniquely identify which extension boards are attached an Xplained Pro MCU board. This information is used to present relevant user guides, application notes, datasheets, and example code through Atmel Studio. Available Xplained Pro MCU and extension boards can be purchased in the Atmel Web Store.

Hardware Identification System

All Xplained Pro compatible extension boards have an Atmel ATSHA204 CryptoAuthentication™ chip mounted. This chip contains information that identifies the extension with its name and some extra data. When an Xplained Pro extension board is connected to an Xplained Pro MCU board the information is read and sent to Atmel Studio. The Atmel Kits extension, installed with Atmel Studio, will give relevant information, code examples, and links to relevant documents. Table 1-1 Xplained Pro ID Chip Content shows the data fields stored in the ID chip with example content.

Table 1-1. Xplained Pro ID Chip Content

Data field	Data type	Example content
Manufacturer	ASCII string	Atmel'\0'
Product Name	ASCII string	Ethernet1 Xplained Pro'\0'
Product Revision	ASCII string	02'\0'
Product Serial Number	ASCII string	1774020200000010'\0'
Minimum Voltage [mV]	uint16_t	3000
Maximum Voltage [mV]	uint16_t	3600
Maximum Current [mA]	uint16_t	30

Standard Headers and Connectors

Xplained Pro Standard Extension Header

All Xplained Pro kits have one or more dual row, 20-pin, 100mil extension headers. Xplained Pro MCU boards have male headers while Xplained Pro extensions have their female counterparts. Note that all pins are not always connected. However, all the connected pins follow the defined pin-out described in Table 1-2 Standard Layout of Xplained Pro Extension Header. The extension headers can be used to connect a wide variety of Xplained Pro extensions to Xplained Pro MCU boards and to access the pins of the target MCU on Xplained Pro MCU board directly.

Table 1-2. Standard Layout of Xplained Pro Extension Header

Pin numbers	Name	Description
1	ID	Communication line to the ID chip on extension board.
2	GND	Ground.
3	ADC(+)	Analog to digital converter, alternatively positive part of differential ADC.
4	ADC(-)	Analog to digital converter, alternatively negative part of differential ADC.
5	GPIO1	General purpose I/O.
6	GPIO2	General purpose I/O.
7	PWM(+)	Pulse width modulation, alternatively positive part of differential PWM.
8	PWM(-)	Pulse width modulation, alternatively positive part of differential PWM.
9	IRQ/GPIO	Interrupt request line and/or general purpose I/O.
10	SPI_SS_B/GPIO	Slave select for SPI and/or general purpose I/O.
11	TWI_SDA	Data line for two wire interface. Always implemented, bus type.
12	TWI_SCL	Clock line for two wire interface. Always implemented, bus type.
13	USART_RX	Receiver line of Universal Synchronous and Asynchronous serial Receiver and Transmitter.
14	USART_TX	Transmitter line of Universal Synchronous and Asynchronous serial Receiver and Transmitter.
15	SPI_SS_A	Slave select for SPI. Should be unique if possible.
16	SPI_MOSI	Master out slave in line of Serial peripheral interface. Always implemented, bus type.
17	SPI_MISO	Master in slave out line of Serial peripheral interface. Always implemented, bus type.
18	SPI_SCK	Clock for Serial peripheral interface. Always implemented, bus type.
19	GND	Ground.
20	VCC	Power for extension board.

Ethernet1 Xplained Pro Hardware Overview

Headers and Connectors

Ethernet1 Xplained Pro Extension Header

Ethernet1 Xplained Pro implements one Xplained Pro Standard Extension Header marked with EXT in silkscreen. This header makes it possible to connect the board to any Xplained Pro MCU board. The pin-out definition for the extension header can be seen in Table 1-3 Ethernet1 Xplained Pro Specific Extension Header.

Table 1-3. Ethernet1 Xplained Pro Specific Extension Header

Pin numbers	Name	Description
1	ID	Communication line to the ID chip.
2	GND	Ground.
3	NC	
4	NC	
5	PME	Power Management Event, active low.
6	nRST	Reset line for Ethernet, active low.
7	NC	
8	NC	
9	INTRN	Interrupt request from Ethernet, active low.
10	NC	
11	NC	
12	NC	
13	NC	
14	NC	
15	SPI_SS_A	Ethernet chip select signal, connected to CSN pin of Ethernet chip.
16	SPI_MOSI	Master out slave in line of Ethernet, connected to SI pin of Ethernet chip.
17	SPI_MISO	Master in slave out line of Ethernet, connected to SO pin of Ethernet chip.
18	SPI_SCK	Clock line of Ethernet, connected to SCLK pin of Ethernet chip.
19	GND	Ground.
20	VCC	Target supply voltage.

Peripherals

Ethernet Controller

Ethernet1 Xplained Pro features a single-port Ethernet controller which consists of a 10/100 physical layer transceiver (PHY), a MAC, and a Serial Peripheral Interface (SPI). The part number of the Ethernet controller is KSZ8851SNL from Micrel, INC. The connections to Ethernet are shown in Table 1-4 Ethernet Controller Connections.

Table 1-4. Ethernet Controller Connections

Pin on EXT connector	Signal Name	Description
5	PME	Power Management Event, active low. It is asserted when one of the wake-on-LAN events is detected by KSZ8851SNL.
6	nRST	Reset line for Ethernet, active low.
9	INTRN	Interrupt request from Ethernet, active low. An active low signal to host CPU to indicate an interrupt status bit is set.
15	SPI_SS_A	Ethernet chip select signal, connected to CSN pin of Ethernet chip. Active low input pin for SPI interface.
16	SPI_MOSI	Master out slave in line of Ethernet, connected to SI pin of Ethernet chip.
17	SPI_MISO	Master in slave out line of Ethernet, connected to SO pin of Ethernet chip. This SO is tri-stated output when CSN is negated.
18	SPI_SCK	Clock line of Ethernet, connected to SCLK pin of Ethernet chip. This clock speed can run up to 40MHz.

Hardware Revision History and Known Issues

Identifying Product ID and Revision

The revision and product identifier of Xplained Pro boards can be found in two ways, through Atmel Studio or by looking at the sticker on the bottom side of the PCB.

By connecting an Xplained Pro MCU board to a computer with Atmel Studio running, an information window will pop up. The first six digits of the serial number, which is listed under kit details, contain the product identifier and revision. Information about connected Xplained Pro extension boards will also appear in the Atmel Kits window.

The same information can be found on the sticker on the bottom side of the PCB. Most kits will print the identifier and revision in plain text as *A09-nnnn\rr* where *nnnn* is the identifier and *rr* is the revision. Boards with limited space have a sticker with only a QR-code which contains a serial number string.

The serial number string has the following format:

"nnnnrrssssssssss"

n = product identifier

r = revision

s = serial number

The kit identifier for Ethernet1 Xplained Pro is 2258.

Revision 1

Revision 1 of Ethernet1 Xplained Pro is the initial released version. There are no known issues.

Evaluation Board/Kit Important Notice

This evaluation board/kit is intended for use for FURTHER ENGINEERING, DEVELOPMENT, DEMONSTRATION, OR EVALUATION PURPOSES ONLY. It is not a finished product and may not (yet) comply with some or any technical or legal requirements that are applicable to finished products, including, without limitation, directives regarding electromagnetic compatibility, recycling (WEEE), FCC, CE or UL (except as may be otherwise noted on the board/kit). Atmel supplied this board/kit "AS IS," without any warranties, with all faults, at the buyer's and further users' sole risk. The user assumes all responsibility and liability for proper and safe handling of the goods. Further, the user indemnifies Atmel from all claims arising from the handling or use of the goods. Due to the open construction of the product, it is the user's responsibility to take any and all appropriate precautions with regard to electrostatic discharge and any other technical or legal concerns.

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Revision History

Doc Rev.	Date	Comments
42226A	09/2014	Initial document release.

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