

ATWINC1500 Xplained Pro



Preface

Atmel® ATWINC1500 Xplained Pro is an extension board to the Atmel Xplained Pro evaluation platform. The extension board allows to evaluate the Atmel ATWINC1510/1500 low cost, low power 802.11 b/g/n WiFi network controller module. Supported by the Atmel Studio integrated development platform, the kit provides easy access to the features of the ATWINC1510/1500 and explains how to integrate the device in a custom design.

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1. Introduction

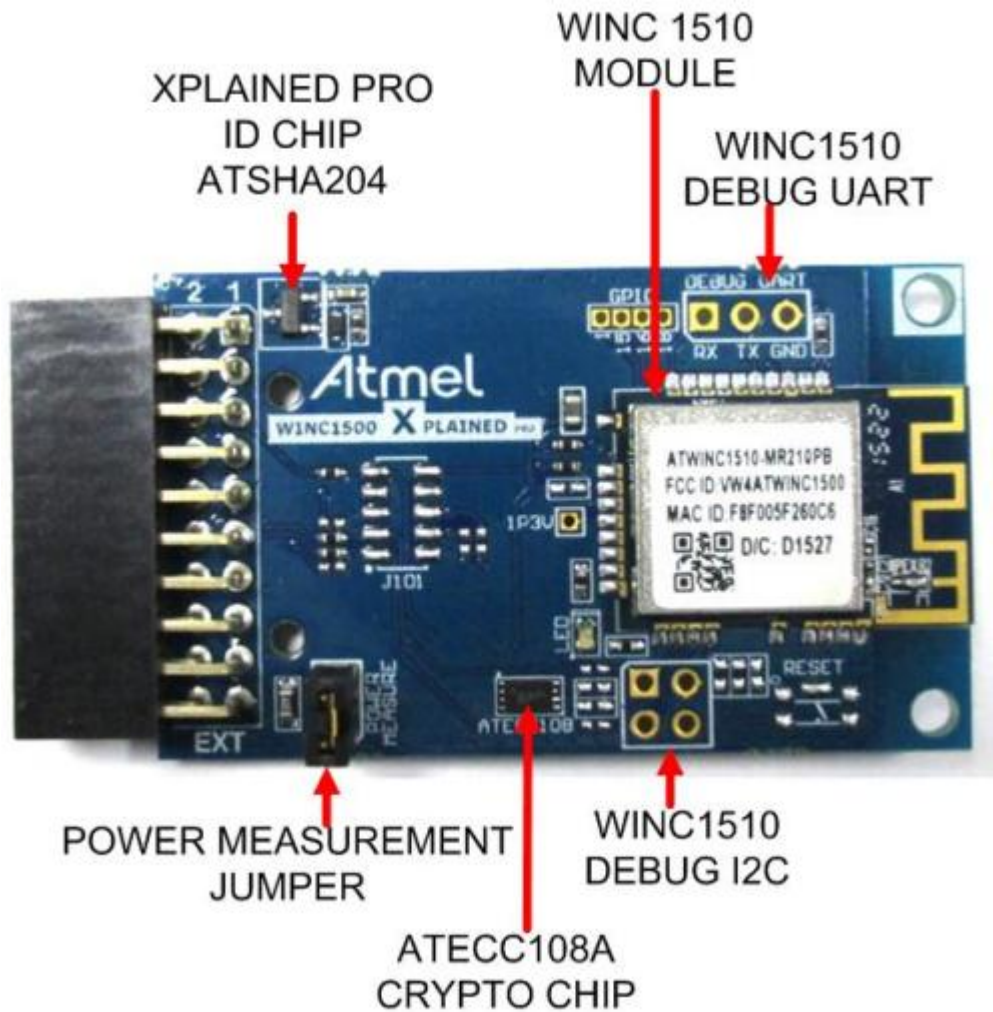
1.1 Features

- ATWINC1510-MR210-PB Wi-Fi[®] module
 - Atmel SmartConnect Wi-Fi module
 - IEEE[®] 802.11 b/g/n network controller SoC
 - FCC ID for ATWINC1500 module is VW4ATWINC1500 and the same for ATWINC1510 is 2ADHKATWINC1510
- ATECC108A/508A Crypto Chip
 - Atmel CryptoAuthentication™
 - ECDSA
 - 256 or 283 bit encryption key
- Xplained Pro hardware identification system

1.2 Kit Overview

Atmel ATWINC1500 Xplained Pro is a carrier board for the SmartConnect-ATWINC1510-MR210PB Wi-Fi module and an extension board for the Atmel Xplained Pro platform. It connects to any Xplained Pro standard extension header on any Xplained Pro MCU board to provide Wi-Fi functionality.

Figure 1-1. ATWINC1500 Xplained Pro Extension Board



2. Getting Started

2.1 Three Steps to Start Exploring the Atmel Xplained Pro Platform

1. Download and install [Atmel Studio](#).
2. Launch Atmel Studio.
3. Connect ATWINC1500 Xplained Pro to the Xplained Pro MCU board and connect a USB cable to the DEBUG USB port on the Xplained Pro MCU board.

2.2 Connecting ATWINC1500 Xplained Pro to the Xplained Pro MCU Board

ATWINC1500 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 evaluation kit 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) connected. Atmel Studio will present relevant information like datasheets and kit documentation. The kit landing page in Atmel Studio also have the option to launch Atmel Software Framework (ASF) example applications for the kit. The target device is programmed and debugged by the on-board Embedded Debugger. No external programmer or debugger tool is needed.

2.3 Design Documentation and Related Links

The following list contains links to the most relevant documents and software for ATWINC1500 Xplained Pro:

1. [Xplained Pro products](#)¹ - Atmel Xplained Pro is a series of small-sized and easy-to-use evaluation kits for Atmel AVR[®] 8- and 32-bit microcontrollers and SoC RF modules. It consists of a series of low-cost MCU and wireless boards for evaluation and demonstration of features and capabilities of different MCU and wireless families.
2. [ATWINC1500 Xplained Pro User Guide](#)² - PDF version of this User Guide.
3. [ATWINC1500 Xplained Pro Design Documentation](#)³ - Package containing schematics, BOM, assembly drawings, 3D plots, layer plots, etc.
4. [Atmel Studio](#)⁴ - Free Atmel IDE for development of C/C++ and assembler code for Atmel microcontrollers.
5. [ATWINC1510-MR210PB](#)⁵ - Product page with information and datasheet.
6. [ATECC108A/508A](#)⁶ - Product page with information and datasheet.

¹ <http://www.atmel.com/XplainedPro>

² http://www.atmel.com/Images/Atmel-42388-ATWINC1500-Xplained-Pro_UserGuide.pdf

³ http://www.atmel.com/Images/Atmel-42388-ATWINC1500-Xplained-Pro_UserGuide.zip

⁴ <http://www.atmel.com/atmelstudio>

⁵ <http://www.atmel.com/devices/atwinc1500.aspx>

⁶ <http://www.atmel.com/devices/ATECC108A.aspx>

3. Xplained Pro

Xplained Pro is an evaluation platform that provides the complete Atmel microcontroller and SoC RF experience. The platform consists of:

- Microcontroller (MCU) and RF evaluation kits
- Support a wide range of extension boards
- Atmel Software Framework (ASF) drivers and demo code integrated with Atmel Studio
- User guides, application notes, datasheets, and example code through Atmel Studio

Xplained Pro MCU and extension boards can be purchased in the [Atmel Web Store](#)¹.

3.1 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 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 3-1, “Xplained Pro ID Chip Content” on page 5](#) shows the data fields stored in the ID chip with example content.

Table 3-1. Xplained Pro ID Chip Content

Data field	Data type	Example content
Manufacturer	ASCII string	Atmel\0'
Product Name	ASCII string	Segment LCD1 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

3.2 Standard Headers and Connectors

3.2.1 Xplained Pro Standard Extension Header

All Xplained Pro evaluation kits have one or more dual row, 20-pin, 100mil extension headers. Xplained Pro boards have male headers while Xplained Pro extension boards 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 3-2, “Xplained Pro Extension Header” on page 5](#). The extension headers can be used to connect a wide variety of Xplained Pro extensions to Xplained Pro boards and to access the pins of the target MCU on Xplained Pro board directly.

Table 3-2. Xplained Pro Extension Header

Pin number	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.

¹ <http://www.atmel.com/tools/atwinc1500-xstk.aspx>

Pin number	Name	Description
7	PWM(+)	Pulse width modulation, alternatively positive part of differential PWM.
8	PWM(-)	Pulse width modulation, alternatively negative 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.

4. Hardware User Guide

4.1 Headers and Connectors

4.1.1 ATWINC1500 Xplained Pro Extension Header

ATWINC1500 Xplained Pro implements one [Xplained Pro Standard Extension Header on page 5](#) 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 4-1, “ATWINC1500 Xplained Pro Extension Header” on page 7](#).

Table 4-1. ATWINC1500 Xplained Pro Extension Header

Pin on EXT	Function	Description
1	ID	Communication line to ID chip.
2	GND	Ground.
3	NC	
4	NC	
5	ATWINC1500 RESET	Active-low hard reset.
6	ATWINC1500 WAKE	Host wake control.
7	NC	
8	NC	
9	ATWINC1500 IRQ	ATWINC1500 interrupt output.
10	ATWINC1500 CHIP ENABLE	Active-high module enable signal.
11	I ² C SDA	Data line of I ² C interface (connected to ATECC108A/508A).
12	I ² C SCL	Clock line of I ² C interface (connected to ATECC108A/508A).
13	UART RX	Receive pin of target MCU UART interface (NC by default).
14	UART TX	Transmit pin of target MCU UART interface (NC by default).
15	ATWINC1500_SS	Chip select signal.
16	SPI_MOSI	Master out, Slave in signal of target MCU SPI interface.
17	SPI_MISO	Master in, Slave out signal of target MCU SPI interface.
18	SPI_SCK	Clock line of SPI interface.
19	GND	Ground.
20	VCC	Target supply voltage.

4.1.2 Power Measurement Header

To measure power going to the ATWINC1510-MR210PB module remove the jumper and connect a voltmeter across these pins.

A 1Ω resistor is connected in parallel with the jumper which gives a 1 to 1 relationship between voltage and current measured across the jumper. The resistor is rated for 1/10W maximum power dissipation, which translates to a maximum of 316mA at 3.3V.

4.1.3 ATWINC1500 Debug Interfaces

ATWINC1500 Xplained Pro has two non-mounted connectors for debug interfaces to the ATWINC1510-MR210PB; one for UART and one for I²C.

Note that the I²C and UART debug signals are disconnected from the Xplained Pro extension header. To connect the I²C solder 0Ω resistors to R107 and R108. To connect the UART solder 0Ω resistors to R118 and R117. To find the location of the resistors, refer to the kit [ATWINC1500 Xplained Pro Design Documentation on page 4](#).

Table 4-2. UART Debug

Pin on UART connector	Pin on ATWINC1510 module	Function
1	19	UART RX.
2	14	UART TX.
3		Ground.

Table 4-3. I²C Debug

Pin on I ² C connector	Function	Function
1	2	I ² C clock.
2		Ground.
3	3	I ² C data.
4		NC

4.2 Peripherals

4.2.1 ATWINC1510-MR210PB

The ATWINC1510-MR210PB main control pins are connected to the Xplained Pro extension header.

Table 4-4. ATWINC1510-MR210PB Connection

Pin on EXT connector	Pin on ATWINC1510 module	Function
5	4	RESET_N.
6	11	WAKE.
9	13	IRQ_N.
10	22	CHIP_EN.
15	16	SPI_SSN.
16	15	SPI_MOSI.
17	17	SPI_MISO.
18	18	SPI_SCK.

4.2.2 LED

There is one dual green/red LED on the ATWINC1500 Xplained Pro extension board that is controlled by the ATWINC1510-MR210PB. These LEDs are used to show application status.

Table 4-5. LED Connection

Pin on ATWINC1510 module	Function
27	Green LED.
1	Red LED.

4.2.3 Crypto Device

ATWINC1500 Xplained Pro features an Atmel ATECC108A/508A CryptoAuthentication device. For more information about the device, refer to [ATECC108A on page 4](#).

Table 4-6. ATECC108A/508A Connections

Pin on EXT connector	Function
11	I ² C data
12	I ² C clock

5. Hardware Revision History and Known Issues

5.1 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 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 ATWINC1500 Xplained Pro is 2442.

5.2 Board Revisions

Revision 6 of ATWINC1500 Xplained Pro is the initial released version. Revision 10 of ATWINC1500 Xplained Pro is the latest released version. There are no known issues.

6. Document Revision History

Document revision	Date	Comment
42388B	17/11/2015	Wireless module part number updated.
42388A	15/04/2015	Initial document release.

7. 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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