ATWILC1000-SD

ATWILC1000-SD User Guide

Introduction

The ATWILC1000-SD is a Secure Digital (SD) card interface board designed to demonstrate the features of the low power consumption ATWILC1000-MR110PB IoT (Internet of Things) module, that supports an IEEE® 802.11 b/g/n standard. This module is specifically optimized for low power IoT applications.

Figure 1. ATWILC1000-SD Board

Features

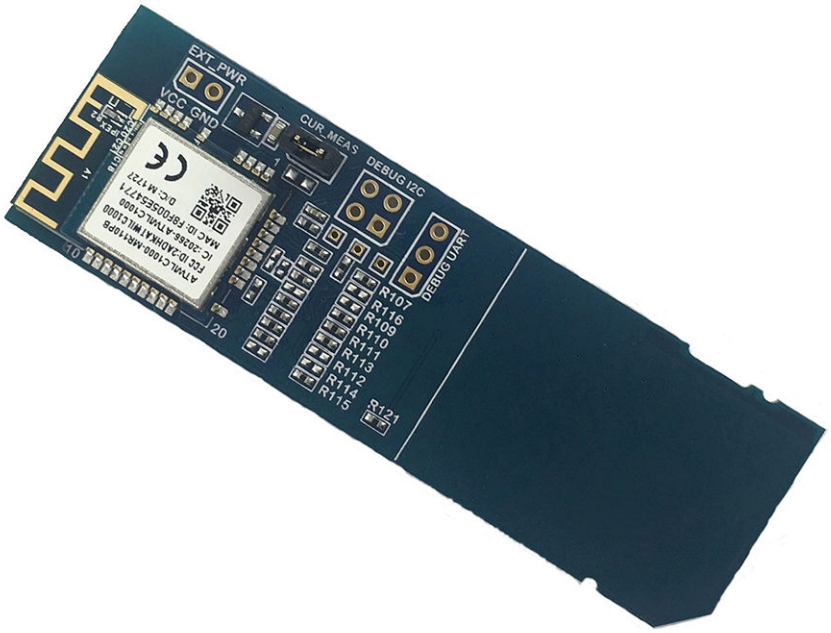
- ATWILC1000-MR110PB, a low power consumption IoT module compliant with IEEE 802.11 b/g/n standard specifications
  - Supports 20MHz single spatial stream (1x1) solution
  - Cortus APS3 32-bit processor
  - PCB Antenna
- Debug I^2C and UART header footprints
- External power supply header footprint
- Current measurement header

Table of Contents

1. Kit Overview

The ATWILC1000-SD is an extension board containing the ultra-low power ATWILC1000-MR110PB IoT module. This board connects to any MCU board with Secure Digital Input/Output (SDIO) or MultiMedia Card plus (MMCplus) card via on board MMCplus card connector, however, it supports only the SD interface.

Figure 1-1. ATWILC1000-SD Board Overview



The ATWILC1000-SD can be used with any MCU board with SD or MMCplus connectors.

1.1 Standard MMCplus Connector

The following table provides the pin descriptions for the standard MMCplus connector.

Table 1-1. Standard MMCplus Connector

Pin	Function	Description
1	DATA3	Data bit 3
2	CMD	Command
3	VSS	Ground
4	VDD	3.3 V Power supply
5	CLK	SDIO clock
6	VSS	Ground
7	DATA0	Data bit 0
8	DATA1	Data bit 1
9	DATA2	Data bit 2

Pin	Function	Description
10	DATA4	Data bit 4
11	DATA5	Data bit 5
12	DATA6	Data bit 6
13	DATA7	Data bit 7

2. Design Documentation and Relevant Links

The following list contains links to the documentation and software available for the ATWILC1000-SD board:

- **Xplained Pro products** is a series of small-sized and easy-to-use evaluation kits for microcontrollers and other products. It consists of a series of low-cost MCU boards for evaluation and demonstration of features and capabilities of different MCU families.
- **Atmel Studio** provides a free Atmel IDE for development of C/C++ and assembler code for microcontrollers.
- **Atmel Data Visualizer** is a program used for processing and visualizing data. Data Visualizer can receive data from various sources such as, the Embedded debugger data gateway interface found on Xplained Pro boards and COM ports.
- **ATWILC1000-SD** - Product page.
- **ATWILC1000-SD Design Documentation**, this package contains schematics, BOM, assembly drawings, 3D plots, layer plots, and so on.
- **ATWILC1000-MR110PB Datasheet** details the ATWILC1000-MR110PB, which is a low power consumption 802.11 b/g/n IoT (Internet of Things) module.
- **ATWILC1000B-MUT Datasheet** provides information about the ATWILC1000B, a single chip IEEE 802.11b/g/n Radio/Baseband/MAC link controller optimized for low power mobile applications.
- **ATWILC1000 Getting Started with SAMA5D3 Xplained Board** provides a summary of SmartConnect ATWILC1000 on SAMA5D3 Xplained board.
- **SAMA5 ARM® Cortex® Based MPUs** page is an online directory to access the tools and software of SMART SAMA5 Cortex-A5-Based Embedded MPUs.

3. Hardware Specifications

This chapter provides information about the ATWILC1000-SD SD connector, debug connectors, and current measurement header of the ATWILC1000-SD.

3.1 ATWILC1000-SD MMCplus Connector

The ATWILC1000-SD has a PCB-implemented SD card interface (J103) via the MMCplus connector. This board supports only the SDIO interface; it does not support the MMCplus interface. The pin connections other than SD connections such as, CHIP_EN, RESET_N, IRQ, and Host_Wake can be optionally used to configure the module in sleep/low power mode. The connector is used to connect the ATWILC1000-SD board to an MCU board with an SD/MMCplus connector. The following table provides pin descriptions for the MMCplus/SD connector.

Table 3-1. ATWILC1000-SD MMCplus Connector

Pin on SD/MMC Connector	Pin on ATWILC1000-MR110xB Module	Function	Description
1	14	SD DATA 3	SDIO Data 3
2	18	SD CMD	SDIO command
3	9, 12 and 28	GND	Ground
4	23	VDD	3.3V Power supply
5	19	SD CLK	SDIO clock
6	9, 12 and 28	GND	Ground
7	17	SD DATA 0	SDIO Data 0
8	16	SD DATA 1	SDIO Data 1
9	15	SD DATA 2	SDIO Data 2
10	22	CHIP_EN	Data 4 is used for CHIP_EN
11	4	RESET_N	Data 5 line is used for RESET_N
12	13	IRQ	Data 6 line is used for Host interrupt
13	11	Host_Wake	Data 7 line is used for Host_Wake

3.2 Current Measurement Header

The current measurement header (J102) can be used to measure the current consumed by the ATWILC1000-SD module using an ammeter. Two 0 Ohm resistors, R104 and R105, can be removed and Ammeter can be connected across the pads of a Resistor to measure the current consumed by individual power rails VBAT and VDDIO, respectively.

3.3 Debug Connectors

The Debug I²C (J105) and Debug UART (J104) connectors are not mounted on the board. The following tables provide pin descriptions of the debug I²C connector and debug UART connector.

Table 3-2. Debug I²C Connector

Pin on I²C Connector	Pin on ATWILC1000 Module	Function
1	2	I²C SCL
2	9, 12 and 28	Ground
3	3	I²C SDA
4	-	Not connected

Table 3-3. Debug UART Connector

Pin on UART Connector	Pin on ATWILC1000 Module	Function
1	25	UART RX
2	27	UART TX
3	9, 12 and 28	Ground

3.4 Test Points

There are three Through-hole test points for CHIP_EN (TP103), IRQN (TP104) and RESET_N (TP102). These test points can be used to place the module into low power mode while connecting it to an MCU board with a SD connector by making wire jumpers rework. This rework is not required when connecting the board to an MCU board with MMCplus connector.

4. Using SPI Interface

The following section describes how to use the SPI interface via MMC/SD connector and wire jumpers of the ATWILC1000-SD board.

4.1 Using SPI Interface via MMC/SD Connector

The following hardware rework must be done in the ATWILC1000-SD board to use the SPI interface rather than SDIO interface through the same MMC/SD connector.

- To select the SPI interface, pull the pin 10 of wireless module (SDIO_CFG) high. To achieve this, remove R103 and mount R102 with a 1MOhm pull up resistor.
- Remove R110 and R113 from the board and mount R109 with a 0 Ohm resistor on the board for SPI_CLK.
- Replace a 75 Ohm resistor mounted in R108 with a 0 Ohm resistor for SPI_TXD.
- Remove R115 and R107 from the board and mount R114 with a 0 Ohm resistor for SPI_SS.
- Remove R106 from the board and mount R112 with a 0 Ohm resistor for SPI_RXD.

Table 4-1. SPI Connections in ATWILC1000-SD MMCplus Connector

Pin on SD/MMC Connector	SD Connection	SPI Connection
1	SD DATA 3	SPI_SS
2	SD CMD	SPI_RXD
3	GND	Ground
4	VDD	3.3 V Power supply
5	SD CLK	SPI_CLK
6	GND	Ground
7	SD DATA 0	SPI_TXD
8	SD DATA 1	-
9	SD DATA 2	-
10	CHIP_EN	Data 4 is used for CHIP_EN
11	RESET_N	Data 5 line is used for RESET_N
12	IRQ	Data 6 line is used for Host interrupt
13	Host_Wake	Data 7 line is used for Host_Wake

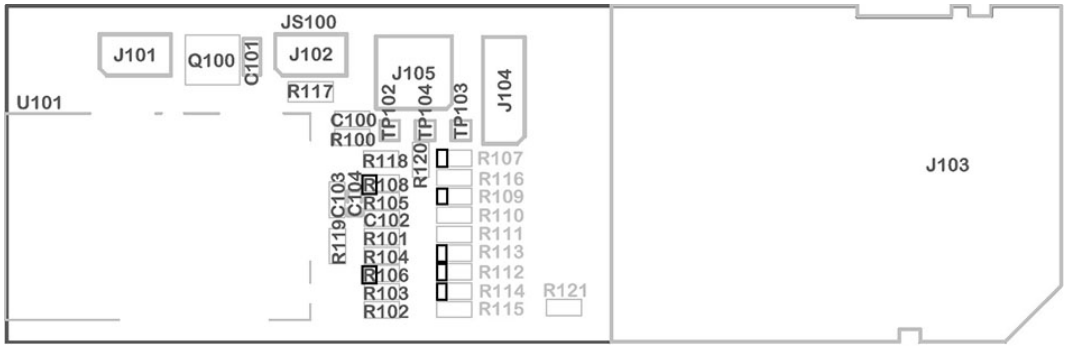
4.2 Using SPI Interface via Wire Jumpers

The following hardware (wire jumpers of equal length) rework must be done in the ATWILC1000-SD board to use the SPI interface rather than SDIO interface.

- Solder two wire jumpers from TP102 and TP103 for RESET_N and CHIP_EN to the host board GPIOs/VCC.

- Solder a wire jumper from TP104 for IRQN to the host board interrupt pin.
- To select the SPI interface, pull the pin 10 of wireless module (SDIO_CFG) high. To achieve this, remove R103 and mount R102 with a 1 MOhm pull up resistor.
- Remove R113 from the board and solder a wire jumper from a pad of R109 or R113 (marked in black as shown in the following figure) to the host board for SPI_CLK.
- Remove R108 from the board and solder a wire jumper from a pad of R108 (marked in black as shown in the following figure) for SPI_TXD, to SPI_RXD of the host board.
- Remove R107 from the board and solder a wire jumper from a pad of R107 or R114 (marked in black as shown in the following figure) for SPI_SS, to SPI_SS/GPIO of the host board.
- Remove R106 from the board and solder a wire jumper from a pad of R106 or R112 (marked in black as shown in the following figure) for SPI_RXD, to SPI_TXD of the host board.

Figure 4-1. Accessing SPI Interface via Wire Jumpers



5. Hardware Revision History and Known Issues

5.1 Identifying Product ID and Revision

The revision and product identifier of the ATWILC1000-SD can be found by looking at the sticker on the bottom side of the PCB. The identifier and revision are printed in plain text as A09-nnnn\rr, where nnnn is the identifier and rr is the revision. Also the label contains a 10-digit serial number unique to each board.

The product identifier for ATWILC1000-SD is A09-2610.

5.2 Revision

Revision 4 of the ATWILC1000-SD is the initially released revision and Revision 6 is the latest revision. The differences between Revision 4 and 6 are as follows:

1. The on board SD PCB connector in Rev 4 was updated with MMCplus PCB connector. In Rev 6, the on board SD PCB connector is updated to accommodate pin connections for RESET_N, IRQN and CHIP_EN in the module. This allows the user to configure the module to enter low power mode. This is helpful while connecting the board with an MCU board having MMCplus card slot without any hardware rework.
2. Test points are provided in Rev 6 for RESET_N, IRQN and CHIP_EN signal lines for making wire jumper with the MCU board to place the module into low power mode. This is helpful while connecting the board with an MCU board having only SD card slot. These three signals are required only for low power mode and are not required for normal operating mode.

6. Document Revision History

Rev A - 11/2017

Section	Changes
Document	• Replaced SD connector with MMCplus connector. • Introduced three through-hole test points. • Introduced the SPI interface. • Updated the pin details of debug connectors. • Changed document style. • New Microchip document number which replaces the previous Atmel document number 42620. • Various editorial changes.

Previously Released Atmel Revisions

Doc. rev.	Date	Comment
42620A	11/2015	Initial document release.

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