

WISA X-Mikrobus Adapter User Manual

Version 1.0

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1. Introduction

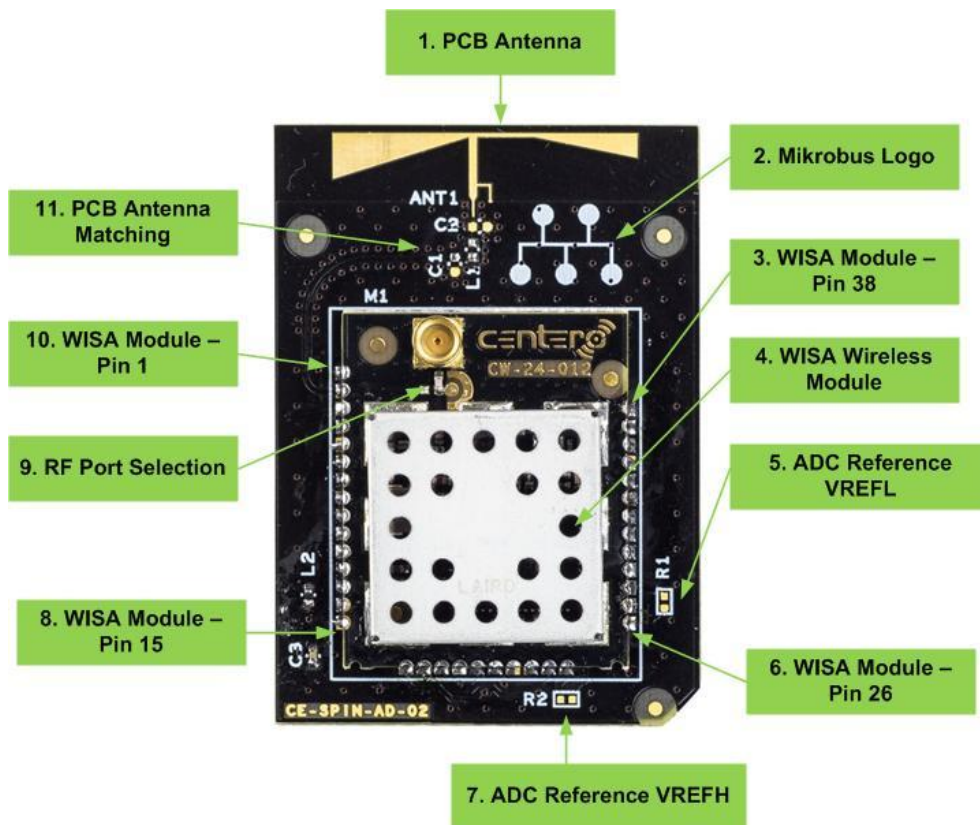
The WISA X-Mikrobus board is an adapter that allows users to incorporate the WISA module in their products using headers. This is for products where users require or desire that the WISA module can be easily removed or replaced since the WISA module is a surface mount module.

Highlighted Features

- It exposes all the communication ports and pins of the WISA module via various headers.
- Hosts high-performance PCB Bow-tie antenna
- RF port can be routed to either PCB Bow-tie or to the on-module MMCX connector (external antenna)

2. Functional Description

The picture below identifies the various components present on the top layer of the adapter and describes their functionality.



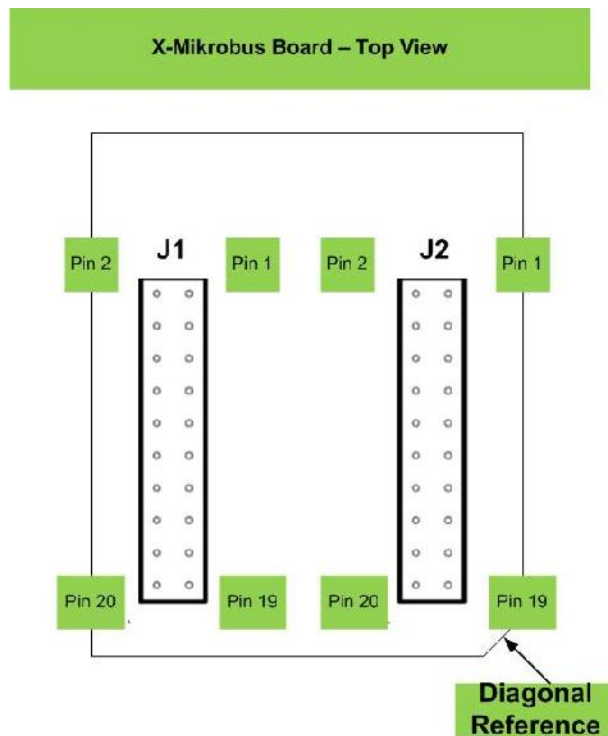
#	Functionality	Designator	Description of Functionality
1	PCB Antenna	ANT1	PCB antenna.
2	Mikrobus Logo	Logo	Adapter is Mikrobus compliant. In addition to the minimum signals exposed as required by the Mikrobus specification is also exposes all other WISA interface pins.
3	WISA Module – pin 38	NA	Pin 38 of the WISA Module – for reference purposes.
4	WISA Module	M1	WISA wireless module. Part number CW-24-012.
5	ADC Reference VREFL	R1	Populate with 0 Ohm resistor if ADC present in the WISA module is used, an no external voltage reference is used. Populating with 0 Ohms ties VREFL to GND.
6	WISA Module – pin 26	NA	Pin 26 of the WISA Module – for reference purposes.
7	ADC Reference VREFH	R2	Populate with 0 Ohm resistor if ADC present in the WISA module is used, an no external voltage reference is used. Populating with 0 Ohms ties ADC reference pin VREH to the V_LDO_OUT (pin 29 of the WISA module) which is the output of the internal 3.0 V LDO regulator.
8	WISA Module – pin 15	NA	Pin 15 of the WISA Module – for reference purposes.
9	RF Port Selection	NA	Capacitor present on the WISA module. Populating it perpendicular to the MMCX connector connects RF port to MMCX connector. Populating it parallel to the MMCX connector connects RF port to the external PCB antenna.
10	WISA Module – pin 1	NA	Pin 1 of the WISA Module – for reference purposes.
11	PCB Antenna Matching	NA	Impedance matching circuitry for the PCB antenna.

3. X-Mikrobus Adapter Pinout

The X-Mikrobus adapter exposes all pins available on the WISA module via two 20 position dual-row headers with .100 spacing.

The designators for the headers are J1 and J2. The manufacturer part number for the J1 and J2 headers is TSM-110-01-L-DV-P and they are manufactured by Samtec.

The table below lists and describes the functionality of the WISA X-Mikrobus pins. The table follows the convention depicted in the image below with the view being from the top and through the board. Please note that header J1 and J2 and not visible from the top, as they are surface mount connectors and are installed on the bottom side of the board.



Note: For additional details related to the functionality of the WISA pins, please consult the document entitled *“WISA Radio Module - Hardware Integration Manual 1.6.”*

Pin Designator	WISA PIN #	WISA Pin Name	Functionality	ISA100 Functionality
J1 - 1	24	GPIO1	GPIO	Optional

J1 – 2	31	JTAG-TDI	JTAG TDI	Optional
J1 – 3	28	VREFL	ADC Voltage Reference	Connect to GND.
J1 – 4	30	JTAG-TCLK	JTAG CLK	Optional
J1 – 5	NC	Not connected	Not connected	Not connected
J1 – 6	21	ADC-BATT	Analog Input for Battery	Optional
J1 – 7	23	GPIO/ADC2	GPIO/ADC Input	Optional
J1 – 8	37	nReset	WISA Module Reset	Connect to GPIO.
J1 – 9	25	VREFH	ADC Voltage Reference	Connect to pin J1-11 V-LDO-OUT.
J1 – 10	4	SPI-CS	SPI Chip Select	Optional
J1 – 11	29	V—LDO-OUT	Voltage output of the internal LDO at 3.0 VDC. Limit current draw on this pin to <25 mA.	Connect to pin J1-9 – VREFH.
J1 – 12	5	SPI-SCK	SPI Clock	Optional
J1 – 13	35	GPIO3	GPIO	Optional
J1 – 14	6	SPI-SOUT	SPI Data Out	Optional
J1 – 15	36	GPIO4	GPIO	Optional
J1 – 16	7	SPI-SIN	SPI Data In	Optional
J1 – 17	8	GPIO5	GPIO	Optional
J1 – 18	11	VCC-IN	WISA Module supply voltage.	Supply voltage – provide external 3.3 VDC.
J1 – 19	20	WISA STATUS		ISA100 wakeup/status/provisioning

				signal. Connect to a push-button. Holding this signal low for > 30 seconds will cause the WISA module ISA100 stack to erase its provisioning information to the factory default state and unjoin the ISA100 network.
J1 - 20	27 and 38	GND	Ground	Connect to ground.

Pin Designator	WISA PIN #	WISA Pin Name	Functionality	ISA100 Functionality
J2 - 1	33	JTAG-TDO	JTAG TDO	Optional
J2 - 2	NC	Not connected	Not connected	Not connected
J2 - 3	34	JTAG-TMS	JTAG TMS	Optional
J2 - 4	13	RDY-RADIO	Ready Radio	Ready signal for external application processor. Digital line used by WISA module to wake up the external application processor. Connect to external application processor GPIO.
J2 - 5	32	BOOT-SWITCH	BOOT-SWITCH signal read by the bootloader at start-up.	The status of this pin dictates the firmware image that will be loaded. Optional.
J2 - 6	6	WKU-RADIO		Wake-up signal for external connected to application processor. Digital line used by the application processor to wake up WISA module from sleep mode.

				Connect to external application processor GPIO.
J2 – 7	22	GPIO/ADC1	GPIO/ADC Input	Optional
J2 – 8	19	EXTCTS	UART1 Request to Send	UART communication with external application processor. Connect to CTS (INPUT) signal of the application processor UART.
J2 – 9	15	UART0-TX	UART0 Transmit Data	UART used for bootloader and HW test app. Optional.
J2 – 10	16	UART1-TX/ API	UART1 Transmit Data	UART communication with the external application processor. Connect to RX line of the application processor UART.
J2 – 11	14	UART0-RX	UART0 Receive Data	UART used for bootloader and HW test app. Optional.
J2 – 12	17	UART1-RX/ API	UART1 Receive Data	UART communication with the external application processor. Connect to TX line of the application processor UART.
J2 – 13	9	I2C-SCL	I2C Clock	Optional.
J2 – 14	18	EXTRTS	UART1 Clear to Send	UART communication with external application processor. Connect to RTS (OUTPUT) signal of the application processor UART.
J2 – 15	10	I2C-SDA	I2C Serial Data Line	Optional.
J2 – 16	26	TAMPER/RTC- WAKEUP	Tamper detect.	Do not connect.

J2 – 17	NC	Not connected	Not connected	Not connected
J2 – 18	NC	Not connected	Not connected	Not connected
J2 – 19	27 and 38	GND	Ground	Connect to ground.
J2 - 20	NC	Not connected	Not connected	Not connected

4. PCB Antenna Performance Specification

The X-Mikrobus adapter includes an on-board PCB Bow-tie antenna tuned for the 2.4 GHz band. The impedance and reflection of the Bow-tie antenna PCB antenna are shown in the figure below. The reflection is better than -10 dB for the entire 2.4 GHz band.



