AW-CU427-USB

IoT Connectivity Evaluation Board for AWS IoT Core

Datasheet

Rev. B

DF

(For Standard)

Features

Wi-Fi

- Single band 2.4 GHz 802.11 b/g/n
- Security–WEP, WPA/WPA2 (personal), AES (HW), TKIP (HW), CKIP (SW), WMM/WMM-PS/WMM-SA
- Dara Rate up to 72.2Mbps

Bluetooth

- Supports extended Synchronous Connections (eSCO), for enhanced voice quality by allowing for retransmission of dropped packets
- Adaptive Frequency Hopping (AFH) for reducing radio frequency interference
- Maximum UART baud rates up to 4 Mbps
- Supports 5.0's LE Secure Connections
- Supports Bluetooth Core Specification version 5.1 + (Enhanced Data Rate) EDR features:
  - Adaptive Frequency Hopping (AFH)
  - Quality of Service (QoS)
  - Extended Synchronous Connections (eSCO) — Voice Connections
  - Fast Connect (interlaced page and inquiry scans)
  - Secure Simple Pairing (SSP)
  - Sniff Subrating (SSR)
  - Encryption Pause Resume (EPR)
  - Extended Inquiry Response (EIR)
  - Link Supervision Timeout (LST)
- Interface support – Host Controller Interface (HCI) using a high-speed UART interface and PCM for audio data

MCU

- 150-MHz Arm Cortex-M4F CPU with single-cycle multiply (Floating Point and Memory Protection Unit)
- 100-MHz Cortex M0+ CPU
- 1 MB Application Flash with 32-KB auxiliary flash (AUXflash), 32-KB Supervisory Flash and 64MB External QSPI NOR Flash
- 288 KB integrated SRAM
- OTP E-Fuse memory for validation and security (To program an eFuse, VDD must be at 2.5 V ±5%).
- 8 MHz Internal Main Oscillator (IMO) with 2% accuracy
- Execute-In-Place (XIP) from external Quad SPI Flash
- Hardware acceleration for Symmetric and Asymmetric cryptographic methods (AES, 3DES, RSA, and ECC) and Hash functions (SHA-512, SHA-256)

Revision History

Document NO: R2-2474-DST-01

Version	Revision Date	DCN NO.	Description	Initials	Approved
A	2020/10/08	DCN018571	● Initial Version	Steven Jian	Chihhao Liao
B	2020/12/21	DCN019630	● Modify product description ● Add “5. Additional Information”	Josh Lin	Patrick Lin

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1. Introduction

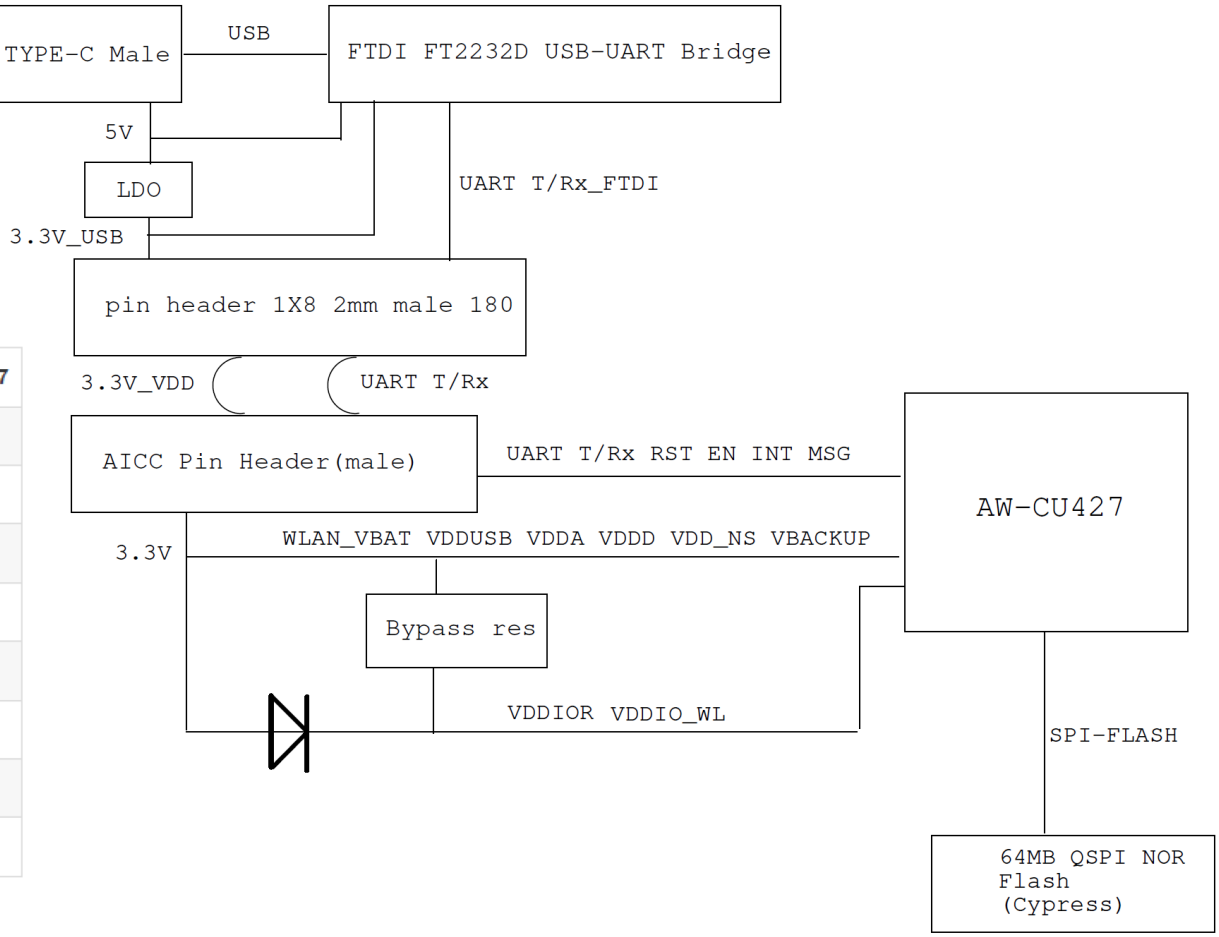
1.1 Product Overview

AzureWave presents AW-CU427-USB Wi-Fi & Bluetooth* with Microcontroller solution which provides a highly cost-effective, flexible and easy to-use hardware/software platform to build a new generation of connected, smart devices. These smart-connected devices enable device to deliver a broad-range of services to consumers including energy-management, demand-response, home automation and remote access. This allows a user to manage comfort and convenience, also run diagnostics and receive alerts and notifications, in addition to managing and controlling the device. Developers can leverage the rich connectivity features of these new smart devices to create a new generation of innovative new applications and services.

The AW-CU427-USB integrates a power amplifier (PA) that meets the output power requirements of most handheld systems, a low-noise amplifier (LNA) for best-in-class receiver sensitivity, an internal transmit/receive (iTR) RF switch and a Printed antenna. The AW-CU427-USB implements the world's most advanced Enhanced Collaborative Coexistence algorithms and hardware mechanisms, allowing for an extremely collaborative WLAN and Bluetooth coexistence. The Microcontroller is a combination of a dual-core microcontroller with low-power Flash technology and digital programmable logic, high-performance analog-to-digital and digital-to-analog conversion, low-power comparators, and standard communication and timing peripherals. In addition to that, an UART to USB converter between the MCU & Host Computer streamline the development process for AICC applications.

Note: Based on the latest AWS IoT Core SDK, the BT feature is disabled.

1.2 Block Diagram



AICC	AW-CU427
RST	XRES_L
TXD	P0_3
RXD	P0_2
EN	P0_5
GND	GND
VCC	3.3V
INT	P1_0
MSG	P1_1

1.3 Specifications Table

1.3.1 General

Features	Description
Product Description	IoT Connectivity Evaluation Board for AWS IoT Core
Major Chipset	Cypress CYW43438, PSoC 62 (1MB Flash:CY8C6247)
Host Interface	UART/USB
Dimension	75.11mm(L) x 20mm(W) x 10.85mm(H)
Package	USB 2.0 dongle with type C connector
Antenna	Internal Printed antenna
Weight	9g

1.3.2 WLAN

Features	Description
WLAN Standard	IEEE 802.11b/g/n, Wi-Fi compliant
Frequency Rage	WLAN: 2.4 GHz Band
Modulation	DSSS DBPSK(1Mbps), DQPSK(2Mbps), CCK(11/5.5Mbps) OFDM BPSK(9/6Mbps), QPSK(18/12Mbps), DBPSK(1Mbps), DQPSK(2Mbps), CCK(11/5.5Mbps), 16-QAM(36/24Mbps), 64-QAM (72.2/54/48Mbps)
Number of Channels	802.11b: ● USA, Canada and Taiwan – 1 ~ 11 ● Most European Countries – 1 ~ 13 ● Japan – 1 ~ 13 802.11g: ● USA and Canada – 1 ~ 11 ● Most European Countries – 1 ~ 13 802.11n: ● USA and Canada – 1 ~ 11

	● Most European Countries – 1 ~ 13
Data Rate	802.11b: 1, 2, 5.5, 11Mbps 802.11g: 6, 9, 12, 18, 24, 36, 48, 54Mbps 802.11n: MCS0~7 HT20
Security	● WPA™- and WPA2™- (Personal) support for powerful encryption and authentication ● AES and TKIP acceleration hardware for faster data encryption and 802.11i compatibility ● Cisco® Compatible Extension- (CCX, CCX 2.0, CCX 3.0, CCX 4.0, CCX5.0) certified ● Wi-Fi Protected Setup (WPS) ● WEP ● WMM / WMM-SA ● CKIP(Software)

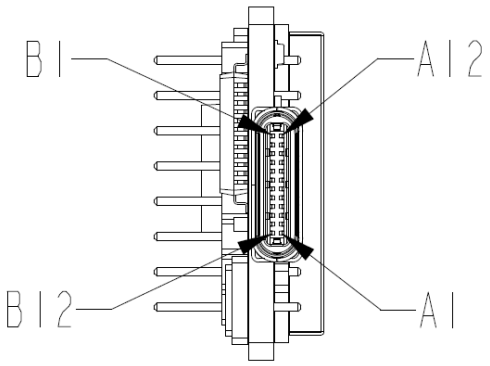
1.3.3 Operating Conditions

Features	Description
Operating Conditions	
Voltage	VDD_33 for AW-CU427:3.3V VBUS from USB:5V
Operating Temperature	0~50 °C
Operating Humidity	less than 85% R.H.
Storage Temperature	-10~60°C
Storage Humidity	less than 60% R.H.
ESD Protection	
Human Body Model	±1KV
Changed Device Model	±300V

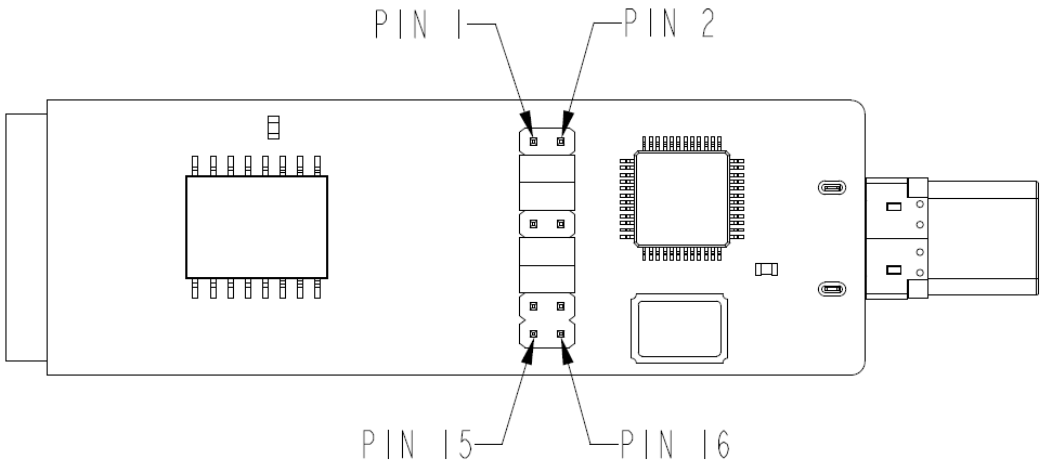
2. Pin Definition

2.1 Pin Map

2.1.1 USB Connector



2.1.2 Pin Header Connector



2.2 Pin Table

2.2.1 USB Connector

Pin No	Definition	Basic Description	Voltage	Type
A1	GND_A1	Ground.		GND
A2	SSTXP1	Floating Pin, No connect to anything.		Floating
A3	SSTXN1	Floating Pin, No connect to anything.		Floating
A4	VBUS1	5V VBUS power input	5V	PWR
A5	CC1	Configuration channel. Pulled low with a 5.1K ohms resistor on the module		I
A6	DP1	USB 2.0 differential pair, position 1, positive. This pin is connected to pin B6 on the module		I/O
A7	DN1	USB 2.0 differential pair, position 1, negative. This pin is connected to pin B7 on the module		I/O
A8	SBU1	Floating Pin, No connect to anything.		Floating
A9	VBUS2	5V VBUS power input	5V	PWR
A10	SSRXN2	Floating Pin, No connect to anything.		Floating
A11	SSRXP2	Floating Pin, No connect to anything.		Floating
A12	GND_A12	Ground.		GND
B1	GND_B1	Ground.		GND
B2	SSTXP2	Floating Pin, No connect to anything.		Floating
B3	SSTXN2	Floating Pin, No connect to anything.		Floating
B4	VBUS4	5V VBUS power input	5V	PWR
B5	CC2	Floating Pin, No connect to anything.		Floating
B6	DP2	USB 2.0 differential pair, position 2, positive. This pin is connected to pin A6 on the module		I/O
B7	DN2	USB 2.0 differential pair, position 2, negative. This pin is connected to pin A7 on the module		I/O

B8	SBU2	Floating Pin, No connect to anything.		Floating
B9	VBUS3	5V VBUS power input	5V	PWR
B10	SSRXN1	Floating Pin, No connect to anything.		Floating
B11	SSRXP1	Floating Pin, No connect to anything.		Floating
B12	GND_B12	Ground.		GND

2.2.2 Pin Header Connector

Pin No	Definition	Basic Description	Voltage	Type
1	XRES_L	External reset I/O pin(pulled up by a 4.7K ohms resistor internally)	VDD_33	I
3	P0_3	PSoC 62 P0.3, programmed as UART TXD for AICC by default	VDD_33	O
5	P0_2	PSoC 62 P0.2, programmed as UART RXD for AICC by default	VDD_33	I
7	P0_5	PSoC 62 P0.5, programmed as EN pin for AICC by default	VDD_33	I
9	GND_9	Ground		GND
11	VDD_33	Power supply input for AW-CU427	3.3V	PWR
13	P1_0	PSoC 62 P1.0, programmed as INT pin for AICC by default	VDD_33	O
15	P1_1	PSoC 62 P1.1, programmed as MSG pin for AICC by default	VDD_33	I
2	NC_2	Floating Pin, No connect to anything.		Floating
4	FT_UART_RXD	FTDI FT2232D UART Rx	3.3V	I
6	FT_UART_TXD	FTDI FT2232D UART Tx	3.3V	O
8	NC_8	Floating Pin, No connect to anything.		Floating

10	GND_10	Ground.		GND
12	VDD_33_USB	Power supply output from the internal LDO	3.3V	PWR
14	NC_14	Floating Pin, No connect to anything.		Floating
16	NC_16	Floating Pin, No connect to anything.		Floating

3. Electrical Characteristics

3.1 Absolute Maximum Ratings

Symbol	Parameter	Minimum	Typical	Maximum	Unit
VDD_33	Power supply for AW-CU427	-0.5		3.9	V
VBUS	Power Supply from USB	-0.3		6	

3.2 Recommended Operating Conditions

Symbol	Parameter	Minimum	Typical	Maximum	Unit
VDD_33	Power Supply for AW-CU427		3.3		V
VBUS	Power Supply from USB		5		V

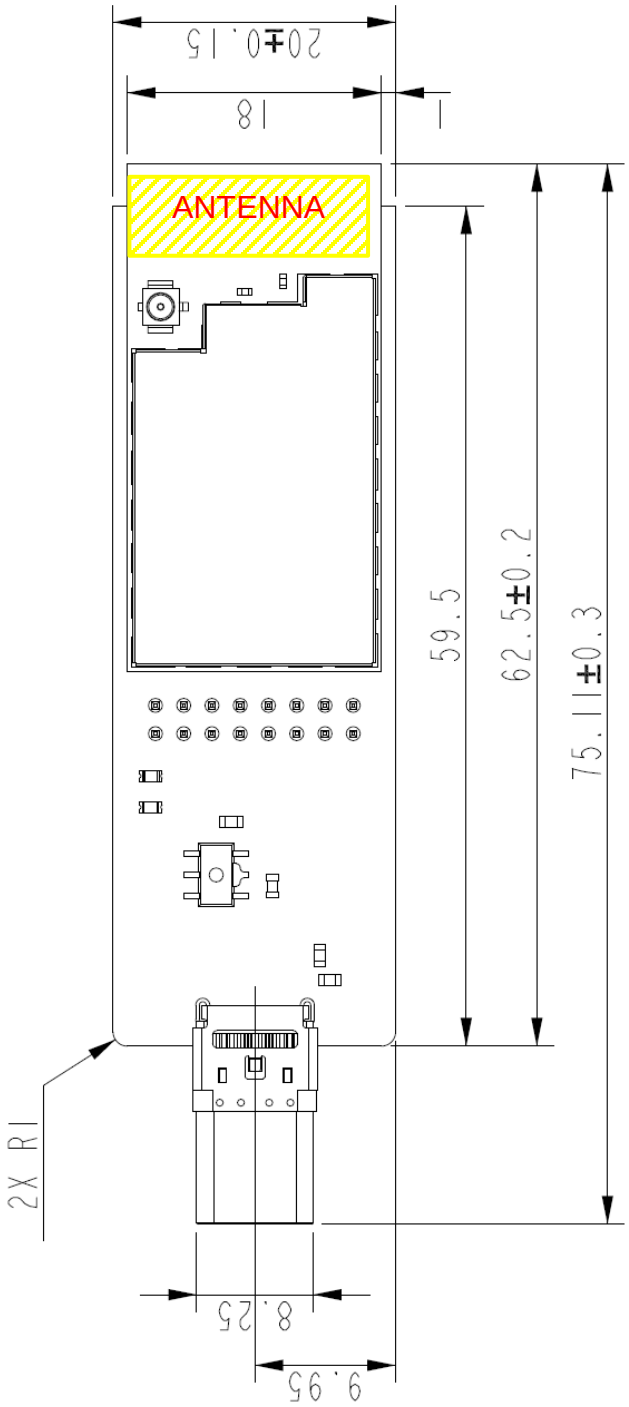
3.3 GPIO DC Characteristics (for AW-CU427)

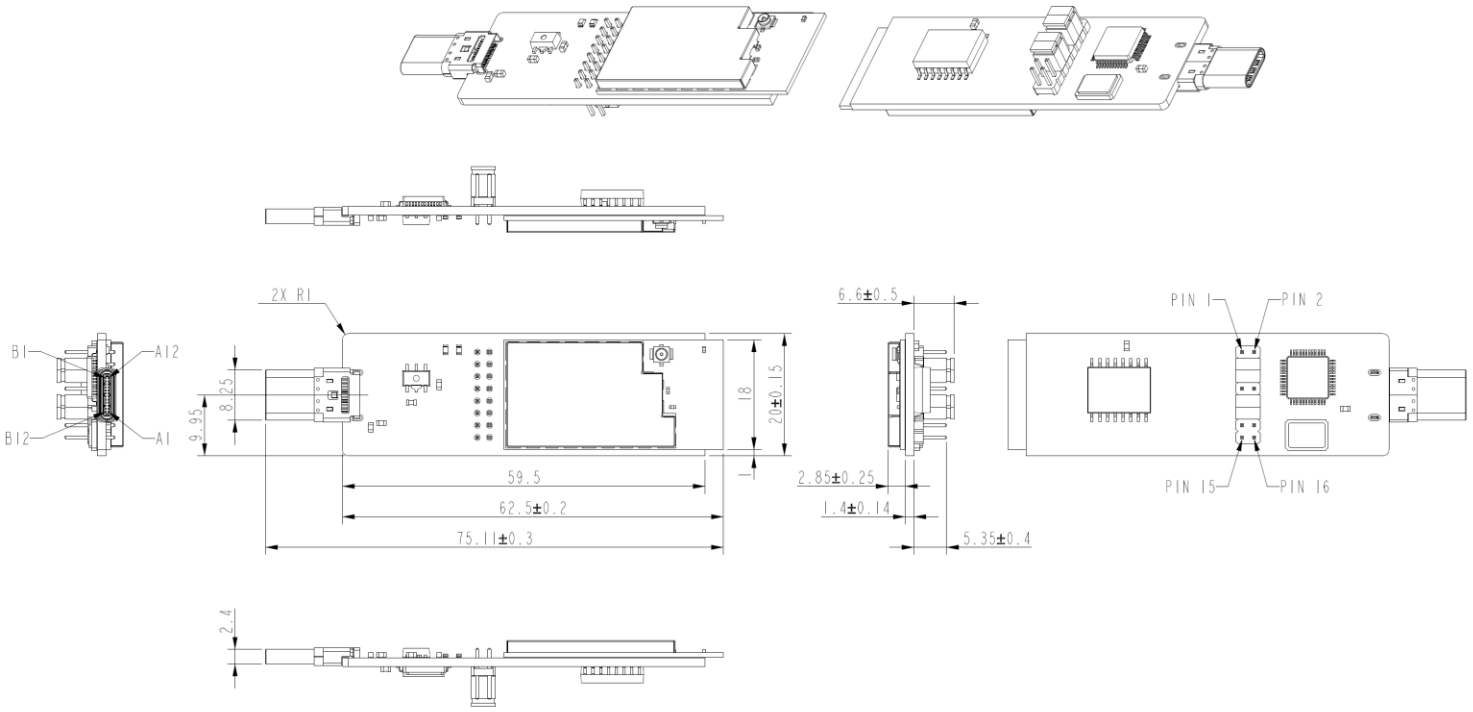
Symbol	Parameter	Condition	Min	Typ	Max	Units
V_{IH}	Input high voltage	CMOS Input	0.7*VDD			V
V_{IL}	Input low voltage	CMOS Input			0.3*VDD	V
V_{IH}	Input high voltage	LVTTL input, VDD < 2.7 V	0.7*VDD			V
V_{IL}	Input low voltage	LVTTL input, VDD < 2.7 V			0.3*VDD	V
V_{IH}	Input high voltage	LVTTL input, VDD >=2.7 V	2			V
V_{IL}	Input low voltage	LVTTL input, VDD >= 2.7 V			0.8	V
V_{OH}	Output High Voltage	IOH = 8 mA	VDD-0.5			V
V_{OL}	Output Low Voltage	IOL = 8 mA			0.4	V
*please find the details @ https://www.cypress.com/products/32-bit-arm-cortex-m4-cortex-m0-psoc-62-performance-line						

4. Mechanical Information

4.1 Mechanical Drawing

**Keep out distance of the antenna is > 10mm for non-conductive materials & 20mm for conductive materials.*





5. Additional Information

The AW-CU427-USB is designed for **Engineering Evaluation Purpose** Only as opposed to an end product. Thus, it may not comply with directives such as WEEE, CE and FCC. The dongle is not completely enclosed with a shielding case. User must take whatever measures to prevent ESD and minimize interference generated by the dongle. **For preventing any damage on this dongle, please plug it into USB female port horizontally**.