E20 Class, Evaluation Kit

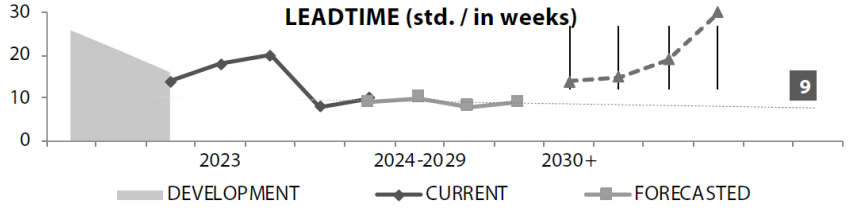
MPN:

AES-VOXE20FXW

E20 Class Evaluation Board Kit for the modules E20B (Series B), E20W (Series W), E20F (Series F) and E20X (Series X).

A	A	C	4	4	8 weeks
TECHPOINT	LIFESPOT	VAROD	VERTICALS	DCO	ELT

* Page 2 for key legend. Commercial data refresh: January 2023



Based on Qualcomm's Verona Reference Design

PRE-APROVED MODULES:

OPTIONAL	INTERFACE	FORM FACTOR	COMPLIANT CUSTOMIZATION
E20B (Series B)	LGA CoB	N/A	Bluetooth 5.2 via HCI UART or USB 1.1, labelling, material grade, fine tuning.
E20W (Series W)	M.2 E-Key	3030	Bluetooth 5.2 via HCI UART or USB 1.1, labelling, material grade, fine tuning.
E20F (Series F)	M.2 B-Key	3042	Bluetooth 5.2 via HCI UART or USB 1.1, labelling, material grade, fine tuning.
E20X (Series X)	Mini PCIe	Full Size	Bluetooth 5.2 via HCI UART or USB 1.1, labelling, material grade, fine tuning.

Revision History

RELEASES	DATE	NOTES	PREPARED	APPROVED
Version 1.0	2023-02-22	Based on completed EVT test schedule	N Manoukian	L Tu

* Commercial Key Legend

Indicators that assess the specific product for its position in the technology curve and the supply chain responsiveness it enjoys. They combine an inner-outer view: both from outside factors and from internal corporate and production support.

MOI [Market Orientation Index]	A value calculated from the grading of the factors below. Used as a rule-of-thumb to aid design-in and procurement evaluation. MOI depicts the present product affinity to Innovation (I), Customer Empathy (C) and Price Focus (P).
TECHNOLOGY	High to Low: Advanced (A), Barring (B), Common (C), Dissolving (D)
AGE	Life cycle spot. Early to Late: Agonist (A), Bold (B), Current (C), Distressed (D)
VAROD [Variants On-Demand]	Flexibility in creating variants (Rigid to Flexible): Auxiliary (A), Basic (B), Core (C), Deep (D).
VERTICALS	Applicability in vertical markets: Specialized to a single market (1), to application in multiple verticals (4).
DCO [Design Cost Orientation]	Commodity index related to the cost point for the product's design conception. VALUES: 1 to 4; the higher the number the more cost aware is the core design.
ELT [Effective Lead Time]	Adjusted lead-time in weeks. This is a compound value based on the timeframe for the fulfilment of the 90% of unscheduled orders received accounting also for the industrial lead-time and internal inventory buffering. VALUE: number of ELT weeks.

E20 CLASS, EVALUATION KIT 1

AES-VOXE20FXW 1

E20 CLASS EVALUATION BOARD KIT FOR THE MODULES E20B (SERIES B), E20W (SERIES W), E20F (SERIES F) AND E20X (SERIES X). 1

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1. Description

The AES-VOXE20FXW is a powerful evaluation board kit which is designed to support hardware integration, performance validation, software development and the evaluation of the E20 class family modules. Specifically, the E20B LGA CoB (Series B), the E20W M.2 E-Key (Series W), the E20F M.2 B-Key (Series F) and E20X miniPCIe (Series X).

The Evaluation Kit comprises the Development Board, two coaxial cables SMA to IPEX MHF1 100mm length, two external dipole antennas and three jumper caps that all the configuration of the various pin headers on the module.

2. Top Features

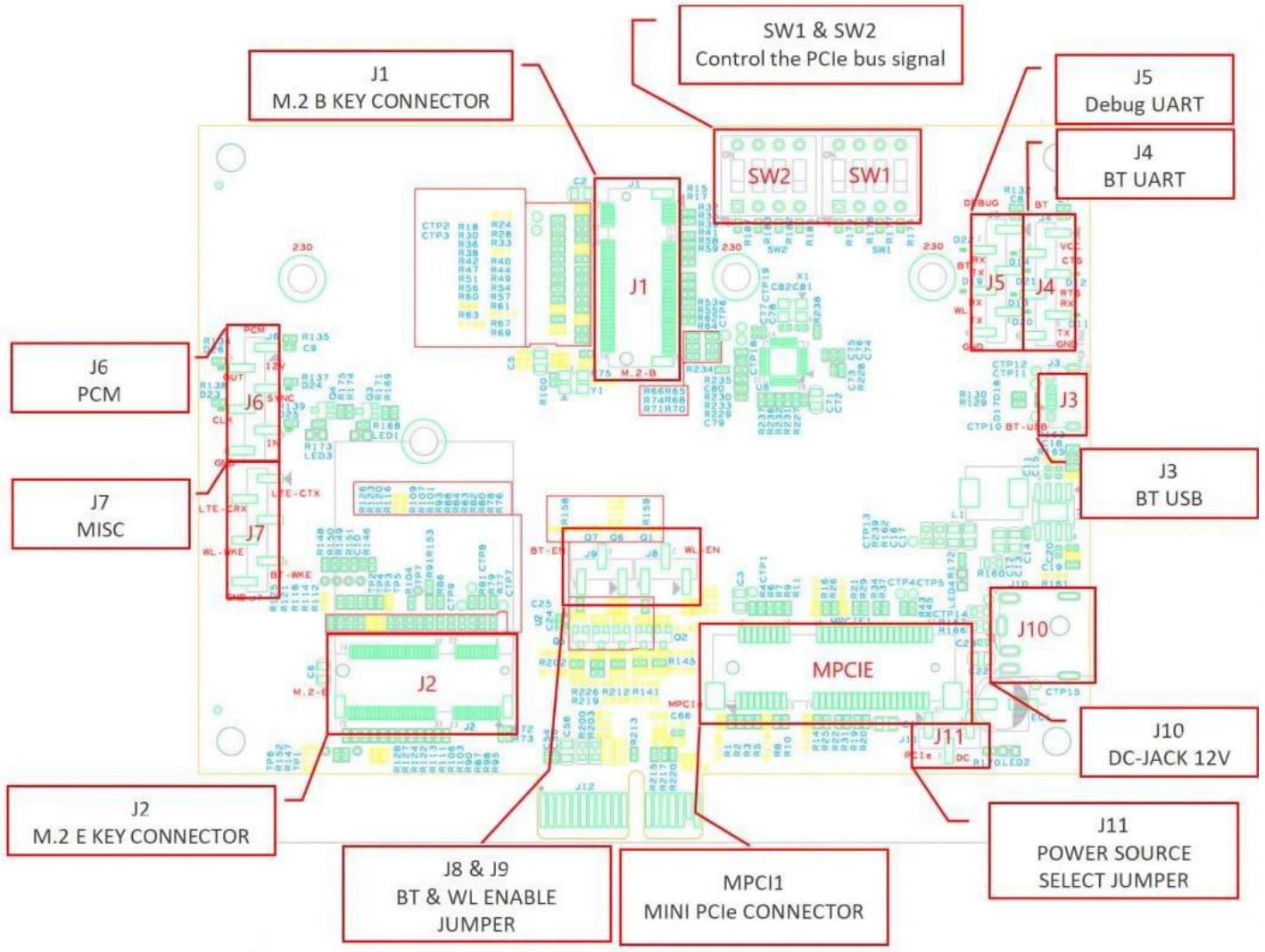
- Facilitates up to three different E20 Class Modules M.2 E-Key (Series W), M.2 B-Key (Series F) and miniPCIe (Series X).
- PCIE interface exposed on mPCIe socket and M.2 socket via standard PCIEx1 edge-finger (to PC)
- UART interface exposed on micro USB connector(USB1) via USB/UART bridge (UART for BT) or Pin Header
- USB interface exposed on micro USB connector(USB2) (USB for BT)
- Can be powered by PC - PCIE interface (12Vdc) or DC Adaptor (12Vdc)
- Ability to hold either Wi-Fi or Bluetooth radio in reset via WL-EN and BT-EN signals
- Ability to select the M.2 or mPCIe module cards (PCIE interface) using both Switch1 & 2
- IO break-out 2.54 mm pitch pin header connector that brings out all interfaces PCM , Debug UART
- Bi-directional 8-bit voltage level shifter (3v3 <-> 1v8) for application/prototyping use

3. Specifications

INTERFACE	**PCIE**	Wi-Fi, when using E20 M.2 & mPCIe module)
	UART	(Bluetooth) – Pin Header
	USB	(Bluetooth) – Micro USB
	PCM	(Bluetooth audio) – Pin Header
	JTAG,MISC	Test point
	WL/BT Debug	(UART) – Pin Header
POWER SUPPLY	**PCIEx1**	12Vdc ,1A
	DC Jack	12Vdc , 2A
ENVIRONMENTAL	**Operating Temperature**	0° ~ +45° Celsius
	Storage Temperature	-20° ~ +65° Celsius
	Operating Humidity	10% ~ 90% non-condensing
	Storage Humidity	5% ~ 90% non-condensing
	Moisture Sensitivity Level	MSL3 based on IPC/JEDEC J-STD-020D. Standard for handling see IPC/JEDEC J-STD-033C
MECHANICAL	**Dimensions**	110.0mm x 88.0mm x 25mm
	Weight	3.6 g
PACKAGING	**Packing style**	Brown Box, stored sealed under vacuum
	Package Contents	EVK contains RF Cable x2, RF Antenna x2 and Jumper cap x3

4. What's on Board

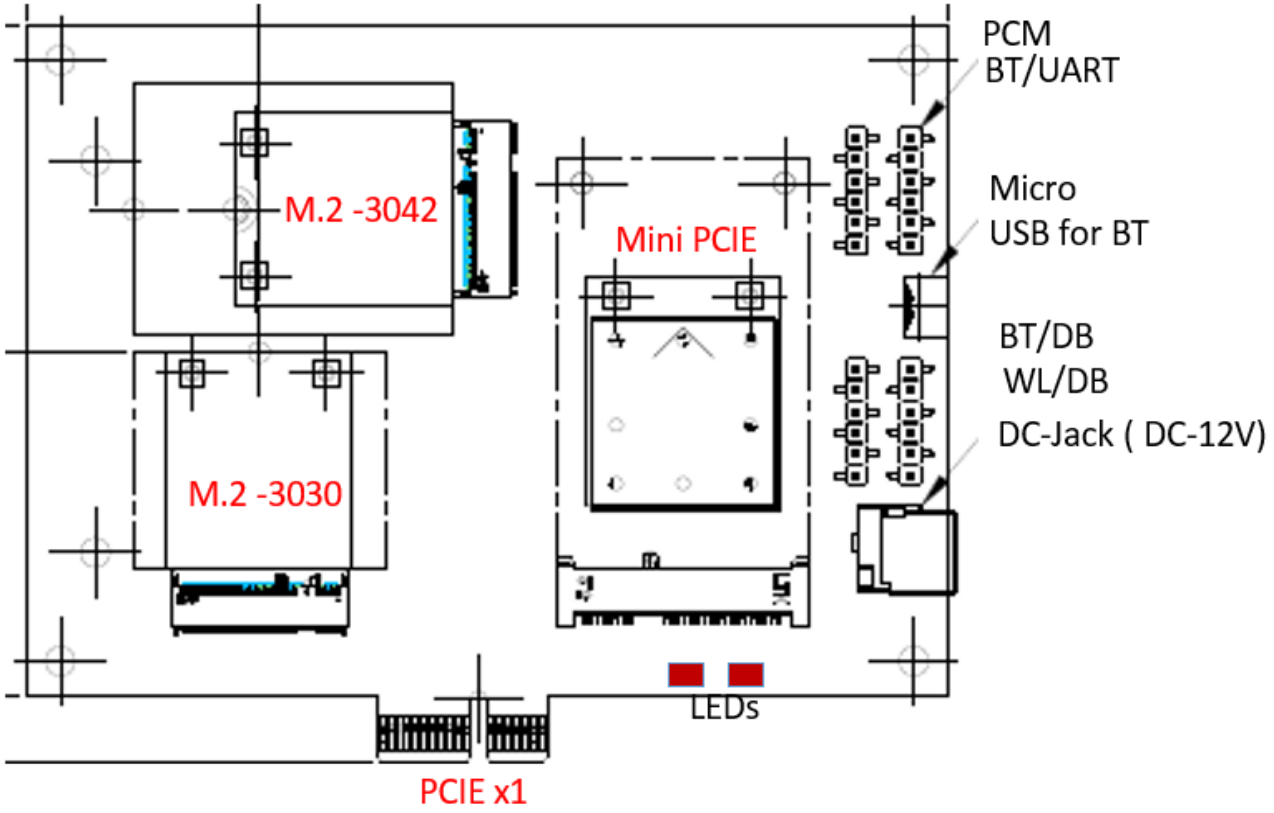
This section illustrates the main elements of the Evaluation Board along with their respective description.



Component	Description
J1, J2, J11	M.2 & mPCIe connectors for module carrier
J3	Micro USB connector for BT-USB function
J4	Pin-header-6P for BT-UART function
J5	Pin-header-6P for Debug (UART)
J6, J7	Pin-header -6P for PCM & MISC function test(option)
J8, J9	Pin-header -3P for BT-EN and WL-EN function
J10	DC Jack for 12V Adapter
J11	Mechanical switch for power source selection
SW1, SW2	DIP-switch for PCIe bus signal selection

5. Module Topology

The following diagram illustrates the position of the E20 class modules on the Evaluation Board. The PCIe, USB and UART host interfaces are easily accessible by standard I/O connectors. The EVB has three slots to accommodate the E20 Series F M.2 B-key of 3042 Form Factor, the E20 Series W M.2 E-Key of 3030 Form Factor and the E20 Series X Mini PCI Express Full Card Form Factor.



Notes:

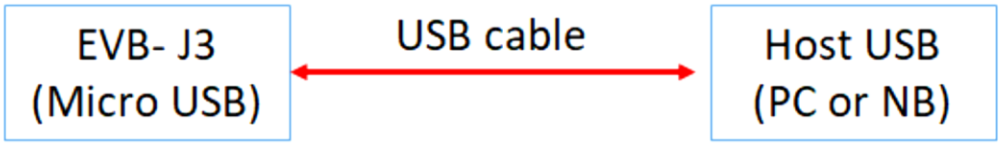
- The two on board LED's located at the bottom of the illustration above are used for 3V3 & 12V power source indication.
- There are on board two Pin Headers located at the top-right that are used for UART Bluetooth function along with UART debugging.

6. Bluetooth Selection

This section outlines how to select the Bluetooth to be either via USB 1.1 or UART. If the plugged in module supports BT via USB, please see section 7.1. On the other hand, if the module supports BT via UATY see 7.2.

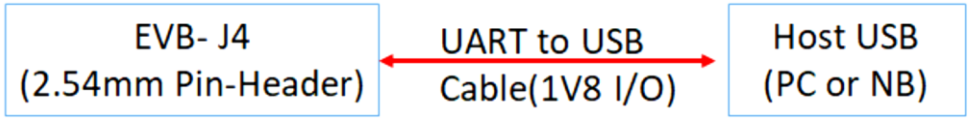
6.1 Bluetooth via USB

If the onboard E20 module that is connected to the Evaluation Board supports Bluetooth via USB, connect the micro USB B cable to the Micro USB connector (J3 component) and the other end to the desired host system:

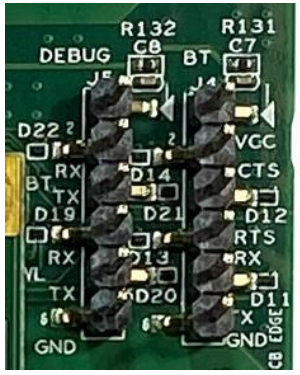


6.2 Bluetooth via UART

On the other hand, if the connected E20 module supports Bluetooth via UART instead, use the 6P pin header (Component J4).



The 6P pin header (Component J4) designated for UART is located at the top right corner of the EV. Below is a preview of the pin header:



7. Evaluation Board Kit Contents

This EVB optionally contains up to three E20 module carriers:

1. E20 Series W E20 M.2 E-key (3030 FF)
2. E20 Series F M.2 B-key (3042 FF)
3. E20 Series X Mini PCIe (Full Size FF)

Mini PCIe (30x50mm)

M.2 B Key (30x42mm)

M.2 E-Key (30x30mm)

Additionally, the EVK contains an adaptor (UK, US or EU upon request) and optionally the following items:

- SMA antenna
- USB A to USB B micro and a
- SMA to MHF1 coaxial cable.
- PCIe extender cable

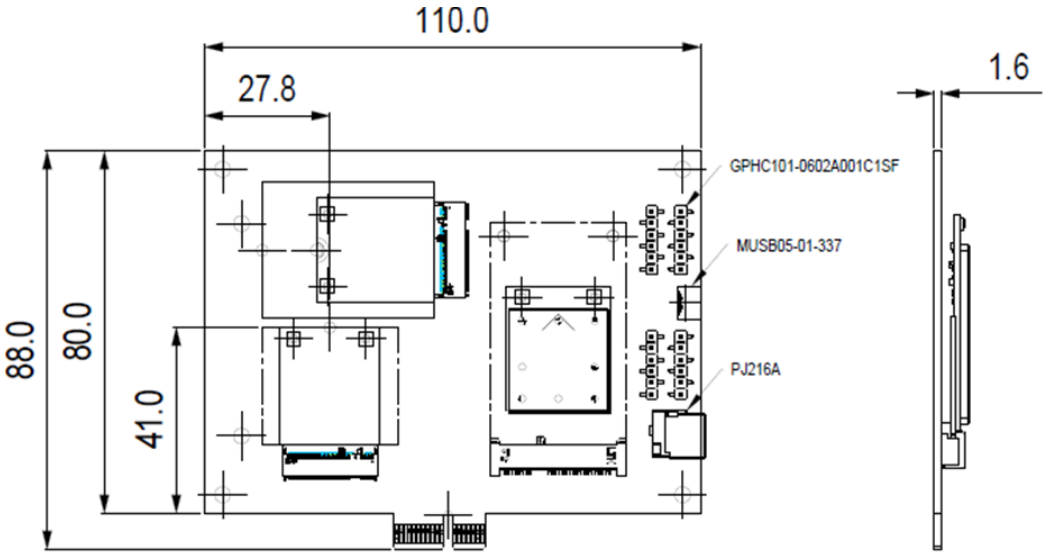
8. Configuring the Interface

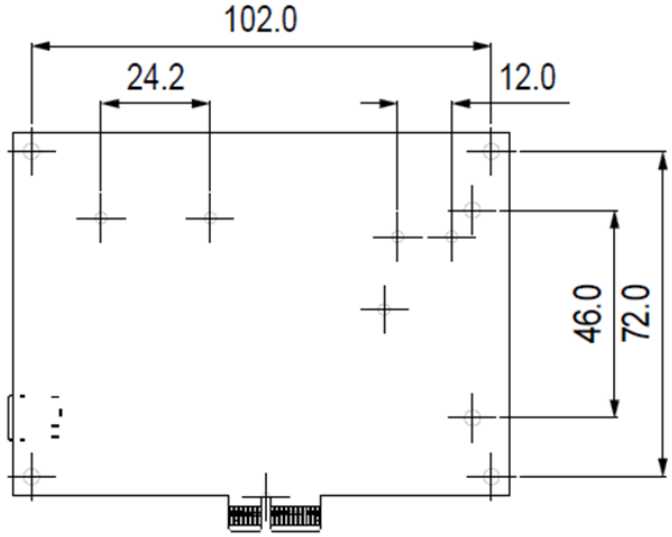
The table below indicates the state at which the two switches (SW1 and SW2) have to be in order to switch to the desired interface. The states of both switches dictate the desired module to be used. The Mini PCIe state refers to the type of E20 module connected to the Evaluation Board. E20 Series X, the M.2 E-key to the E20 Series W and the M.2 B-key to the E20 Series F.

	SW2	SW1
	ON 1 2 3 4	ON 1 2 3 4
mPCIe		
M.2 E key		
M.2 B key		

9. Mechanical Drawing

Mechanical drawings in millimeters (mm), showing the module's top, profile and bottom side:

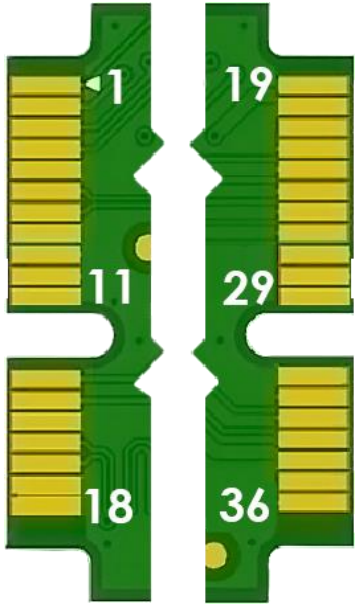




10. PCIE PINOUT

A PCIe x1 slot has 36 pins in total. The pins are arranged in two rows of 18 pins each. The pins on the front row are numbered from 1 to 18, while the pins on the back row are numbered from 19 to 36. A visual representation of the PCIe x1 edge of the module can be seen below:

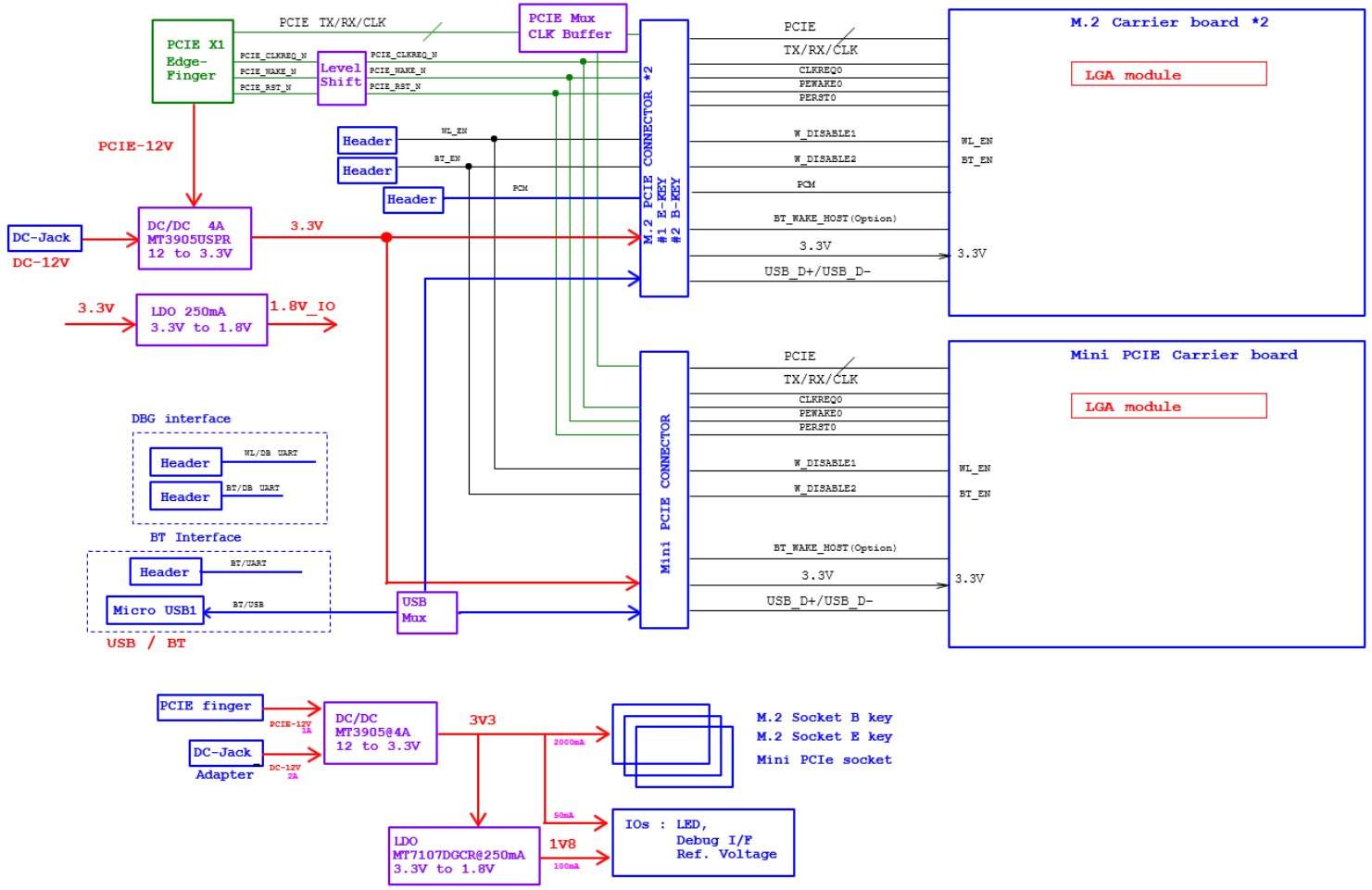
PIN NO.	SIDE A PAD NAME	SIDE B PAD NAME	PIN NO.
1	+12V	PRSNT_N	**19**
2	+12V	N/C	20
3	+12V	N/C	21
4	GND	GND	22
5	N/C	N/C	23
6	N/C	N/C	24
7	GND	N/C	25
8	+3.3V	N/C	26
9	N/C	+3.3V	27
10	+3.3V AUX	+3.3V	28
11	WAKE_N	PERST0_L	29
12	CLKREQ_N	GND	30
13	GND	PCIE_REFCLK_P	31
14	PCIE_RXP	PCIE_REFCLK_N	32
15	PCIE_RXN	GND	33
16	GND	PCIE_TXP	34
17	PRSNT_N	PCIE_TXN	35
18	GND	GND	36



Overall, the PCIe x1 pin map is designed to provide a high-speed, reliable, and flexible interface for connecting various types of PCIe devices to a motherboard.

11. Block Diagram

The following image shows the block diagram of the Evaluation Board:



12. Environmental Performance Qualification

At the time of writing this document, throughput test at controlled thermal conditions are to be scheduled. Any related enquiries can be addressed to VOXMICRO Sales.

13. Product Identification

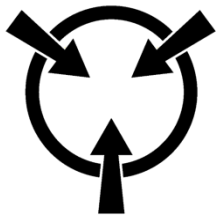
Packaging presents applicable marking, including major regulatory domain identifiers:

- FCC (USA), ISED (Canada), CE RED (Europe).
- Serial number barcode.

14. ESD Processes

The AES-VOXE20FXW constitutes a sensitive electronic device and caution is required when handling it. ESD handling, shipment and storage notices apply. Also see the general Notices Section included in this document.

DO NOT OPEN OR HANDLE EXCEPT AT A STATIC-FREE WORKSTATION



DO NOT SHIP OR STORE NEAR STRONG ELECTROSTATIC, ELECTROMAGNETIC OR RADIOACTIVE FIELDS

15. Packaging, Storage and Handling

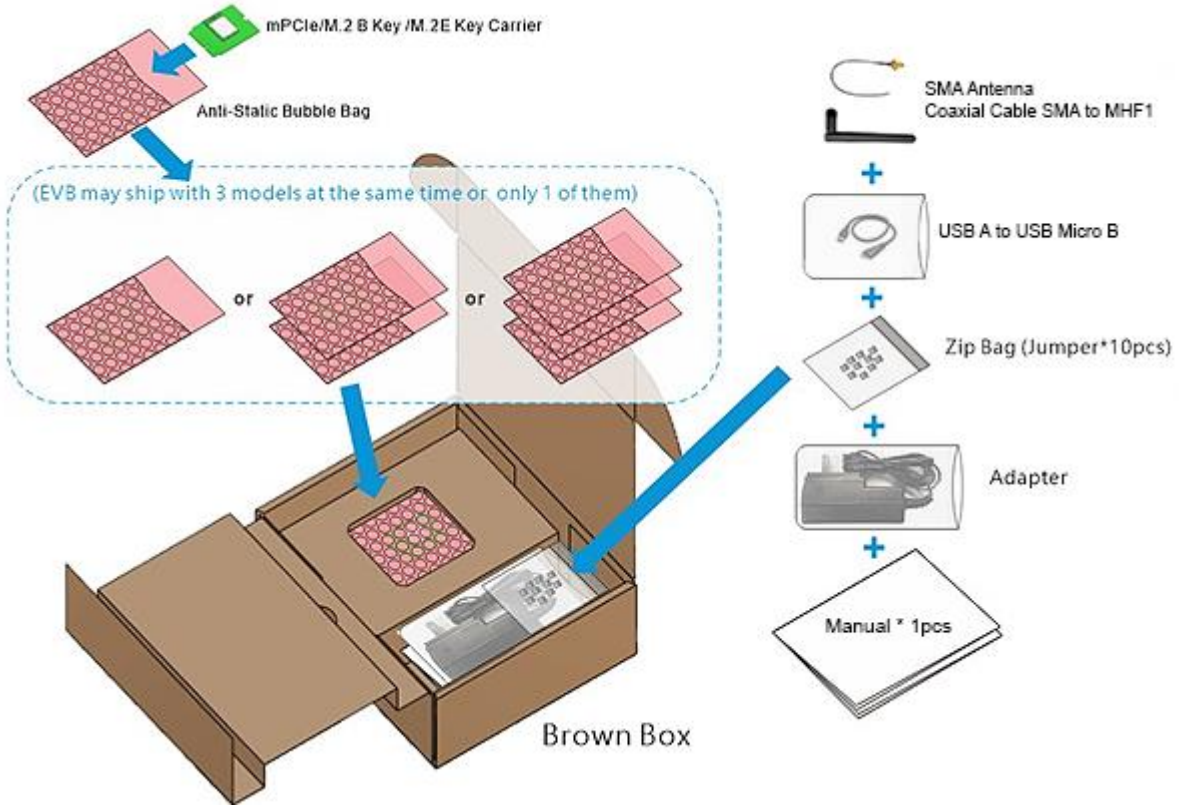
15.1 Boxed Packing specifications:

Standard packing method*, follows. Samples and less-than-reel quantities ship as cut-tape portions.

* Packaging modality and artwork can flexibly follow OEM/ODM customer requirements.
** The Packaging modality and the selection of its materials is made with environmental responsibility and commitment to resource preservation. Please reuse and recycle where possible.

	MODULE IN BOX
CONTENT (UNITS)	1
INVENTORY SKU	AES-VOXE20FXW
OUTER DIMENSIONS	44 x 32 x 3.0 mm
GROSS WEIGHT	3.9 gr
PICK & PACK METHOD	Padded envelope or carton box depending on quantity. Padded & separated.
PACKAGING COMPLIANCE **	ANSI/ESD S20.20, IEC 61340-5-1, RoHS3
HTS CODE (HS)	8517.62
COUNTRY OF ORIGIN (COO)	764 - Thailand
NAFTA / ECCN	5A992c

15.2 Packaging Methodology



Notes:

Brown Box Dimensions: L175xW145xH60mm

16. Notices

STORAGE: The product shall be stored, and the package shall remain closed according to storage environmental conditions noted within this datasheet. - The product shall be stored in non-corrosive gas (Cl2, NH3, SO2, Nox, etc.). - No excess mechanical shock shall be applied including, but not limited to, sticking the packing materials by sharp object and dropping the product, in order to avoid damaging the packing materials.
SHELVE LIFE: Products left more than two years after reception need to have their specifications confirmed prior to use.
HANDLING: Care in handling or transporting products is required as excessive stress or mechanical shock may break products. – Cracks or damages on products' terminals may lead to changes in their characteristics. Products are not to be touched with bare hands as this may result in electrostatic damage. - Application of static electricity or overvoltage may cause defect in the product or deterioration of its reliability, and caution must be taken against exposure to any static electricity generated by electrified items such as workbenches, soldering irons, tools, carrying containers, etc.
LAND PATTERN & DIMENSIONS: All ground terminals should be connected to the ground patterns. Furthermore, the ground pattern should be provided between IN and OUT terminals. Please refer to the specifications for standard land dimensions.
MECCHANICAL PLACEMENT: When mounting products connected to other components, products may be stressed and broken by uneven forces. To prevent such damages, compliance with specifications for the tools and interfaces being used is required.
CLEANING: As this Product is Moisture Sensitive, no cleaning is permitted.
OPERATIONAL EVNIRONMENTAL CONDITIONS: Products are designed to work as part of electronic compositions under normal environmental conditions (ambient temperature, humidity and pressure). Operation under the following circumstances may damage the products and leakage of electricity and abnormal temperature may occur:
In an atmosphere containing corrosive gasses (Cl2, NH3, SOx, NOx) or combustible / volatile gases - Dusty places – Places of direct sunlight - Water splashing zones - Humid places where water condenses - Freezing places
In the instance of potential operation in such environments, consult with AIRETOS before actual use. Application of static electricity or excessive voltage while assembling and measuring is discouraged as it might be a cause of degradation or destruction.
INPUT POWER CAPACITY: Products shall be used in the input power capacity specified in this datasheet. If components are to be used beyond the documented input power capacity range, prior consultation with VOXMICRO is advised.
LIMITATION OF APPLICATIONS: The product is designed and manufactured for consumer application only and is not available for any application listed below which requires significantly high reliability for the prevention of defects that may directly cause damage to the third party's life, body or property.
- Aircraft equipment - Aerospace equipment - Undersea equipment - Power plant control equipment - Medical equipment - Transportation equipment (vehicles, trains, ships, etc.) - Traffic signal equipment - Disaster prevention / crime prevention equipment - Data-processing equipment - Application of similar complexity and/ or reliability requirements to the applications listed in the above.
If the product is to be used in equipment or electric circuit that requires high safety or reliability function / performances, sufficient reliability evaluation check for safety shall be performed prior to commercial shipment and consideration for the installation of a protective circuit at customer's design stage is strongly recommended. Please provide and appropriate fail-safe function on the customer's product to prevent any damages that may be caused by the abnormal function or the failure of our product.
QUALITY CONTROL: Testing and quality control is applied to the extent VOXMICRO deems necessary. Unless mandated by government requirements, VOXMICRO does not necessarily test all parameters of each product.
LIFECYCLE: Please note that VOXMICRO may discontinue the manufacture of products, due to reasons such as end of supply of materials and/or components from our suppliers.
CONFORMITY: Please make sure that your product has been evaluated and confirmed against your specifications when the AIRETOS product is mounted to your product. Please conduct validation and verification of the products in actual condition of mounting and operating environment before commercial shipment of the equipment. All the items and parameters in this product specification have been prescribed on the premise that our product is used for the purpose, under the condition and in the environment agreed upon between you and us. You are requested not to use our product deviating from such agreement. We consider it not appropriate to include other terms and conditions for transaction warranty in product specifications, drawings or other technical documents. Therefore, even if your original part of this product specification includes such terms and conditions as warranty clause, product liability clause, or intellectual property infringement liability clause, we are not able to accept such terms and conditions in this product specification unless they are based on the governmental regulation or what we have agreed otherwise in a separate contact. We would like to suggest that you propose to discuss them under negotiation of contract.

DISCLAIMER: Please note that the only warranty that provides regarding the products is its conformance to the specifications provided herein. Accordingly, VOXMICRO shall not be responsible for any defects in products or equipment incorporating such products, which are caused under the conditions other than those specified in this specification.
VOXMICRO HEREBY DISCLAIMS ALL OTHER WARRANTIES REGARDING THE PRODUCTS, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE, THAT THEY ARE DEFECT-FREE, OR AGAINST INFRINGEMENT OF INTELLECTUAL PROPERTY RIGHTS. YOU AGREE TO INDEMNIFY AND DEFEND VOXMICRO AND ITS AFFILIATES AGAINST ALL CLAIMS, DAMAGES, COSTS, AND EXPENSES THAT MAY BE INCURRED, INCLUDING WITHOUT LIMITATION, ATTORNEY FEES AND COSTS, DUE TO THE USE OF PRODUCTS.
VOXMICRO's liability under this warranty shall be limited to products that are returned during the warranty period to the address designated by VOXMICRO and that are determined by VOXMICRO not to conform to such warranty. If VOXMICRO elects to repair or replace such products, AIRETOS shall have reasonable time to repair such products or provide replacements. Repaired products shall be warranted for the remainder of the original warranty period. Replaced products shall be warranted for a new full warranty period.
For avoidance of doubt, VOXMICRO shall not be liable for any defects that are caused by neglect, misuse or mistreatment by an entity other than VOXMICRO including improper installation or testing, or for any products that have been altered or modified in any way by an entity other than VOXMICRO. Moreover, VOXMICRO shall not be liable for any defects that result from your or third party's design, specifications or instructions for such products.

VOXMICRO PROFILE

Distributed Locations & Customer-Centric Operations

Quality processes at all stages

Sourcing Assurance

Application / Custom / ODM

Materials Management

Supply Chain

FAE

R&D → **DESIGN** → **PRODUCTION** → **DISTRIBUTION** → **TQM**

5% OF REVENUE
- **INVESTED IN INNOVATION R&D**

12 YEARS HANDS-ON IN
- **OEM/ODM WIRELESS MODULE MARKET**

DECADES OF
- **CUMMILATIVE ENGINEERING EXPERIENCE**

HUNDREDS OF
- **ROUTINE INDUSTRIAL CUSTOMERS**

THOUSANDS OF
- **TUNING HOURS YEARLY**

MILLIONS OF
- **INTERNAL AND EXTERNAL INVESTMENTS**