

US159-DA16200MEVZ

DA16200 Pmod™ Board

The US159-DA16200MEVZ ultra-low power Wi-Fi Pmod module enables you to add Wi-Fi capability to any evaluation kit or MCU board equipped with a Pmod expansion capability. The board provides a standard Pmod Type 3A (expanded UART) connection for the on-board Wi-Fi module.

The US159-DA16200MEVZ features a Type 3A Pmod connector and incorporates the DA16200MOD Module, which is based on the DA16200 SoC. With a standard connector and software support, the US159-DA16200MEVZ is ideal for the Renesas Quick-Connect IoT to rapidly create an IoT system.

Kit Contents

- US159-DA16200MEVZ Pmod Board

Features

- DA16200MOD module
 - Integrated chip antenna
 - Cortex-M4F+ at 30MHz to 160MHz
 - 802.11b/g/n radio PHY, 2.4GHz
 - SoC runs full OS and TCP/IP stack
 - Memory: 256kB ROM, 512kB RAM, 8kB OTP, 48B retention memory and 32Mb SPI Flash
 - RF regulatory certifications: FCC, IC, CE, KC, TELEC, SRRC
 - Wi-Fi Alliance certifications: Wi-Fi CERTIFIED b/g/n, WPA, WPA2, and WPA3
 - 3.3V supply voltage
 - +20dBm range booster mode
 - 100dBm Rx sensitivity
 - Ultra-low power with 3 sleep modes: (1) unconnected (nA), (2) connected ultra-low (μ A), and (3) connected ultra-fast (μ A)
- Standardized Type 3A Pmod connector supports an expanded UART interface
- Optional battery operation with on-board CR1220 coin cell
- LED (D1) to aid in user software debug
- 10-pin 1.27mm pitch Arm Cortex-Debug connector (J2) for software development and debug support

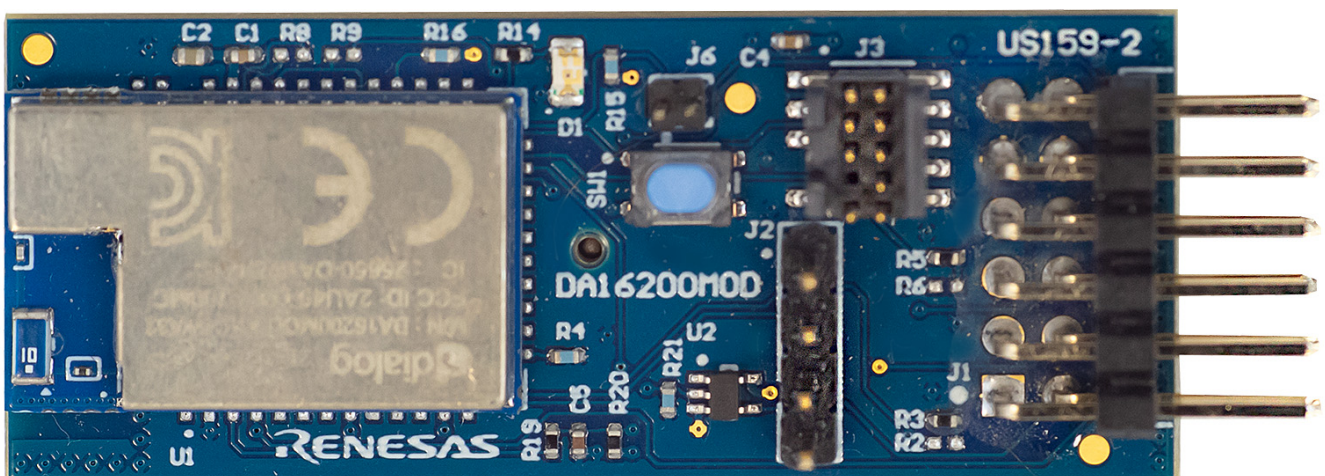


Figure 1. US159-DA16200MEVZ Pmod Board (XE Evaluation Board)

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1. Functional Description

The US159-DA16200MEVZ functions as a Wi-Fi wireless building block to create a custom IoT system solution. This module adds Wi-Fi 802.11b/g/n 2.4GHz connectivity capability to any IoT system that supports Pmod expansion modules. Visit the Renesas [website](#) for more details on the DA16200 Wi-Fi SoC Module.

2. Setup

2.1 Required or Recommended User Equipment

The following additional lab equipment is recommended for using the board (and is sold separately):

- Any MCU board that supports Type 3A Pmod.

2.2 Software Installation and Usage

For the latest version of the e2 studio, use the Renesas [website](#), and for the latest connectivity support and details on creating customized IoT system solutions, visit the Quick-Connect IoT [site](#).

The Renesas Flexible Software Package ([FSP](#)) is an enhanced software package that provides easy-to-use, scalable, high-quality software for embedded system designs using the Renesas RA family of Arm Microcontrollers. With the support of a new Arm TrustZone and other advanced security features, FSP provides a quick and versatile way to build secure, connected IoT devices using production-ready drivers, Azure RTOS, FreeRTOS, and other middleware stacks.

The firmware for operating the module with a Renesas EK-RA6M4 evaluation kit is pre-loaded on the US159-DA16200MEVZ Pmod module.

Firmware	
DA16200_v3.2.2.1	Standard DA16200 SDK

For more details on the application, see the [guide](#), *Wi-Fi Enabled Cloud IoT Solution Kit Quick Start Guide*.

2.3 Kit Hardware Connections

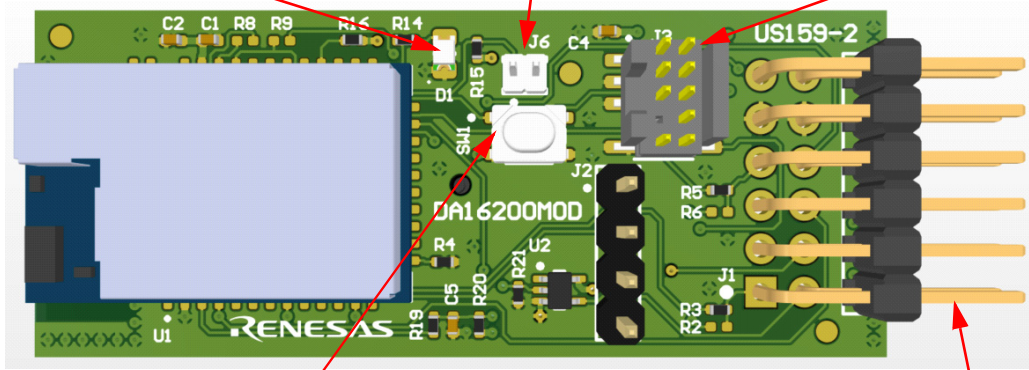
Follow these procedures to set up the kit as shown on [Figure 2](#).

1. Ensure the MCU evaluation kit being used has a Pmod connector set to Type 3A. (For help, refer to the kit hardware manual.)
2. Plug in the US159-DA16200MEVZ to the Pmod connector on the MCU evaluation kit, and be careful to align Pin 1 on the module to Pin 1 on the MCU kit.
3. The US159-DA16200MEVZ is now ready to be used in the system. Follow the MCU kit instructions for connecting and powering up the evaluation kit.

D1 – LED to aid in user software debug

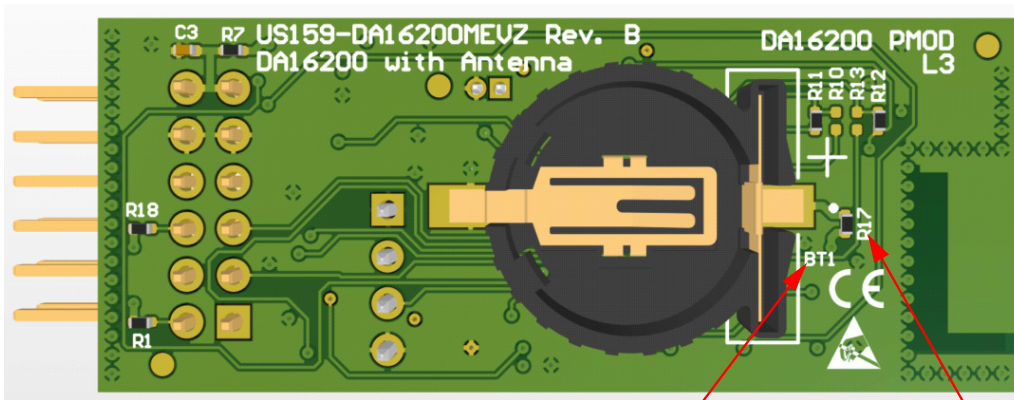
J6 – Install jumper to initiate factory reset

J3 – Arm Cortex-Debug connector



SW1 – Momentary pushbutton switch to initiate WPS

J1 – Pmod Connector to MCU Board



BT1 – Remove R17 before installing the CR1220 coin cell, and be careful to observe polarity (+ on cell facing upwards)

R17 – Be sure to remove before installing the coin cell

Figure 2. Evaluation Kit Details

3. Alternate Hardware Configurations

Referring to the schematic in the following section, there are a number of Do Not Fit (DNF) components that allow for alternate hardware configurations as detailed in [Table 1](#):

Table 1. Alternate Hardware Configurations

DA16200MOD Pin	Default Function	Alt Function	Alt Signal Name	Read Modifications for Alt Function
GPIOA0	GPIO	UART1 TXD	UART1_TXD	Install R8 & R9 and remove R11 & R12
GPIOA1	GPIO	UART1 RXD	UART1_RXD	
GPIOA2	GPIO	-	-	-
GPIOA3	NC	-	-	-
GPIOA4/UART1_TXD	UART1_TXD	UART1 RTS	CTS_HOST_GPIOA4	Install R2, R6, R8, R9, R10 & R13 and remove R3, R5, R11 & R12
GPIOA5/UART1_RXD	UART1_RXD	UART1 CTS	RTS_HOST_GPIOA5	
GPIOA6/WPS	WPS	-	-	-
GPIOA7	Factory Reset	-	-	-
GPIOA8	GPIO	-	-	-
GPIOA9	GPIO	-	-	-
GPIOA10	NC	-	-	-
GPIOA11	GPIO	INTn	-	-
JTAG_TCLK	SWCLK_TCLK	JTAG	TCLK	-
JTAG_TMS	SWDIO_TMS	JTAG	TMS	-
UART0_TXD	UART0_TXD	-	-	-
UART0_RXD	UART0_RXD	-	-	-
GPIOC6/nTRST	GPIO	JTAG	nTRST	-
GPIOC7/TDO	GPIO	JTAG	TDO	-
GPIOC8/TDI	GPIO	JTAG	TDI	-

4. Schematic Diagram

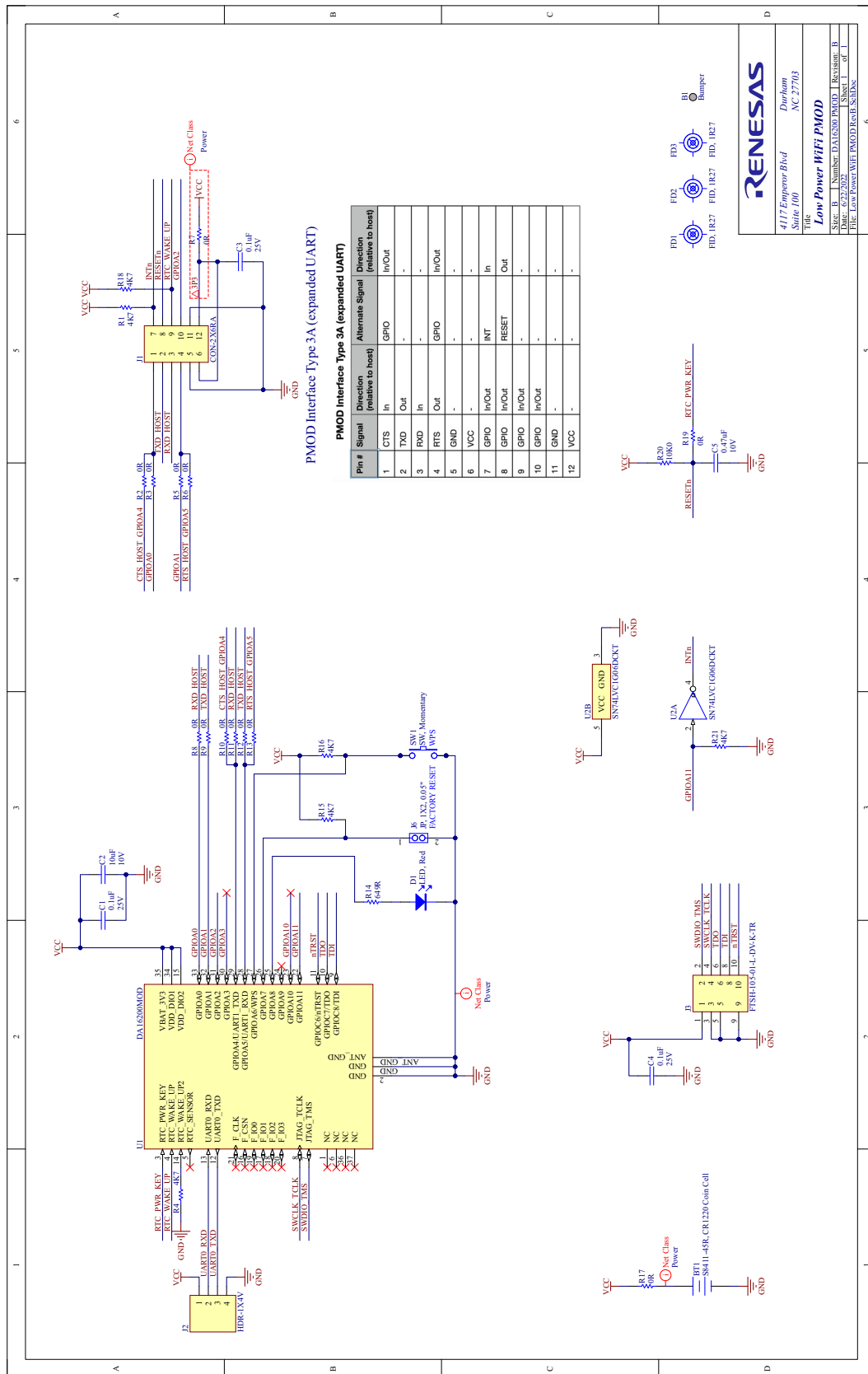


Figure 3. US159-DA16200MEVZ Application Schematic Diagram

5. Bill of Materials

Qty	Reference Designator	Description	Manufacturer	Manufacturer Part Number
1	B1	Bumper, Cylindrical, 0.375" D, 0.19" HSM	Bumper Specialties	BS35CL01X02RP
1	BT1	Battery Holder, 12mm Coin Cell, CR1220, SM, RoHS	Harwin	S8411-45R
3	C1, C3, C4	Capacitor, 0.1 μ F, 25V, SM 0402, Multilayer Ceramic, X7R, RoHS	Taiyo Yuden	TMK105B7104KVHF
1	C2	Capacitor, 10 μ F, 10V, SM 0603, Multilayer Ceramic, X5R, RoHS	Samsung Electro-Mechanics	CL05A106MP5NUNC
1	C5	Capacitor, 0.47 μ F, 10V, SM 0402, Multilayer Ceramic, X7R, RoHS	Kemet	C0402C474K8RACTU
1	D1	LED, Red, Clear, 0805, SM, RoHS	Würth Elektronik	150080RS75000
1	J1	Connector, 2x6, 0.1", Pmod, Right Angle, Unshrouded, RoHS	Harwin	M20-9950645
1	J2	4 Pin, 0.1", Single Row, Vertical, Header, RoHS	Sullins	PBC04SAAN
1	J3	Connector, 2x5 Header, Vertical, 1.27mm Pitch, Pin 7, SM, RoHS	Samtec	FTSH-105-01-L-DV-007-K
1	J6	1X2 Pin, 0.05", Single Row, Vertical, Header, RoHS	Sullins	GRPB021VWVN-RC
6	R1, R4, R15, R16, R18, R21	Resistor, 4.7k Ω , 1/10W, 1%, 100ppm, SM, 50WV, 100OV, Thick Film, 0402, RoHS	KOA Speer	RK73H1ETTP4701F
7	R3, R5, R7, R11, R12, R17, R19	Resistor, 0 Ω , 1/10W, 1%, 100ppm, SM, 50WV, 100OV, Thick Film, 0402, RoHS	KOA Speer	RK73Z1ETTP
1	R14	Resistor, 649 Ω , 1/10W, 1%, 100ppm, SM, 50WV, 100OV, Thick Film, 0402, RoHS	KOA Speer	RK73H1ETTP6490F
1	R20	Resistor, 10k Ω , 1/10W, 1%, 100ppm, SM, 50WV, 100OV, Thick Film, 0402, RoHS	KOA Speer	RK73H1ETTP1002F
1	SW1	Switch, Pushbutton, Top Actuated, SM, RoHS	C&K Components	PTS810 SJG 250 SMTR LFS
1	U1	DA16200MOD, WiFi, 802.11b/g/n, Transceiver, 256kB ROM, 512kB RAM, 8 kB OTP, 48 kB NV Memory, 37-SMD Module, SM, RoHS	Dialog Semiconductor	DA16200MOD-AAC4WA32
1	U2	IC, Digital, Buffer, Inverting, Open Drain, SM, SC-70-5, RoHS	Diodes Inc.	74LVC1G06SE-7

5.1 Board Layout

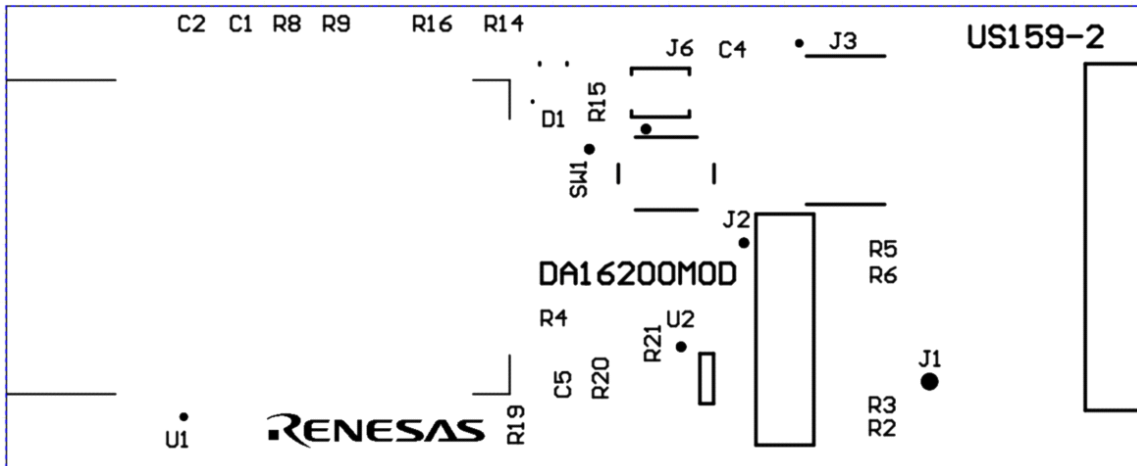


Figure 4. Silkscreen Top

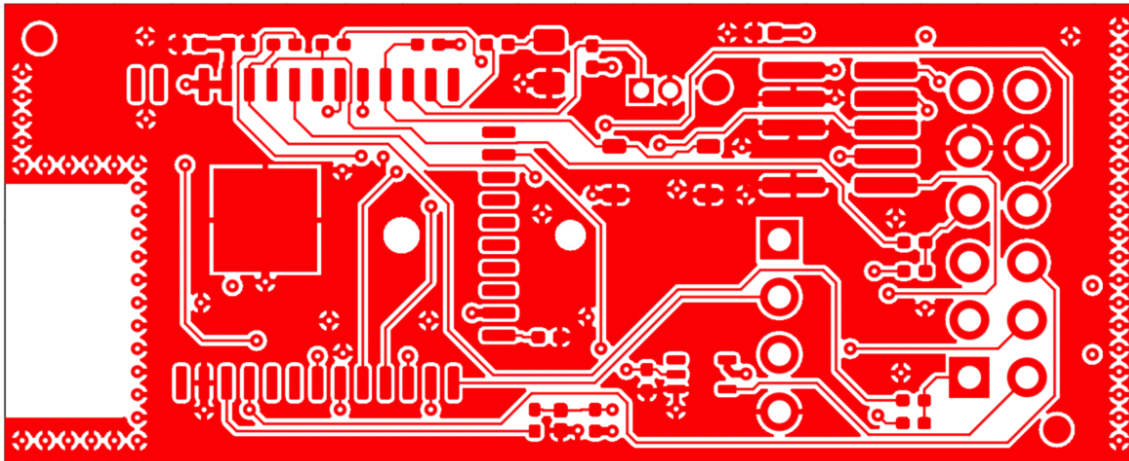


Figure 5. Copper Top

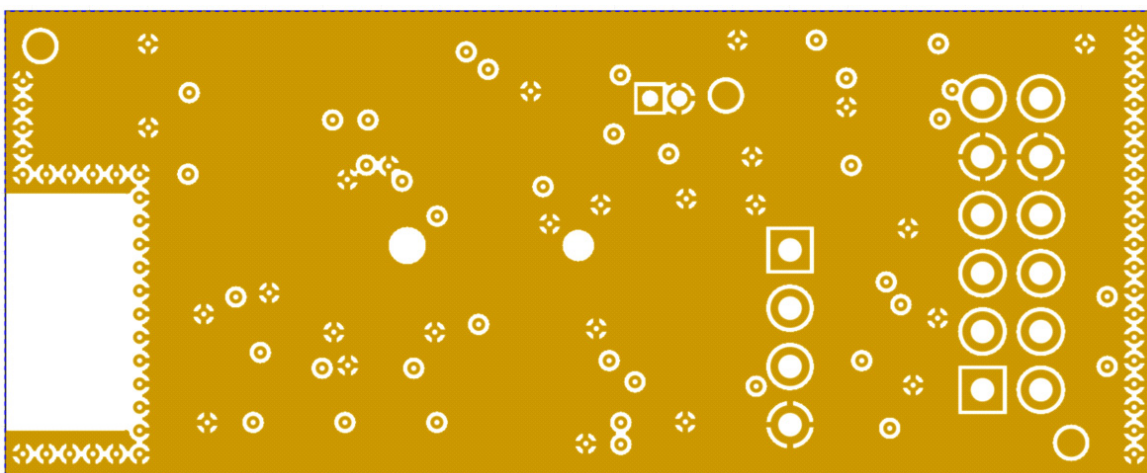


Figure 6. Copper L1 Layer

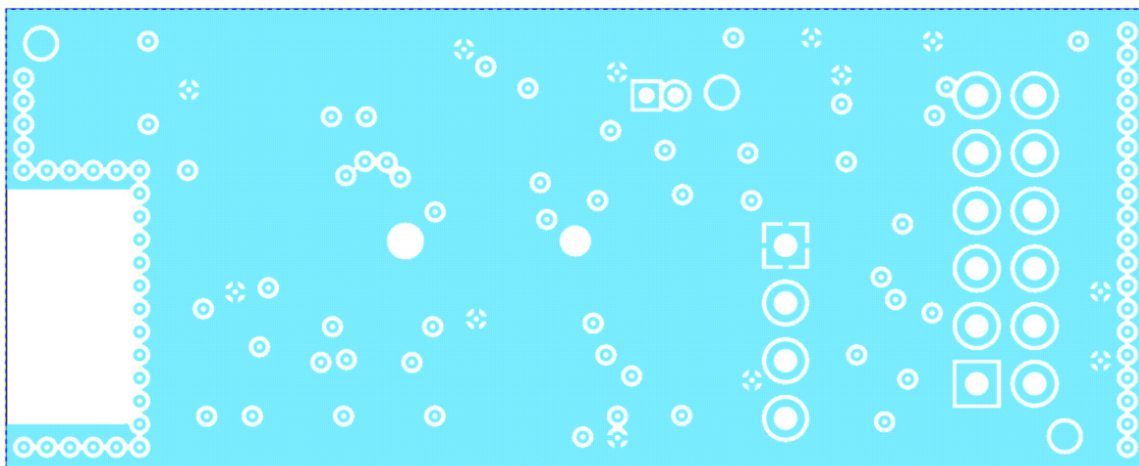


Figure 7. Copper L2 Layer

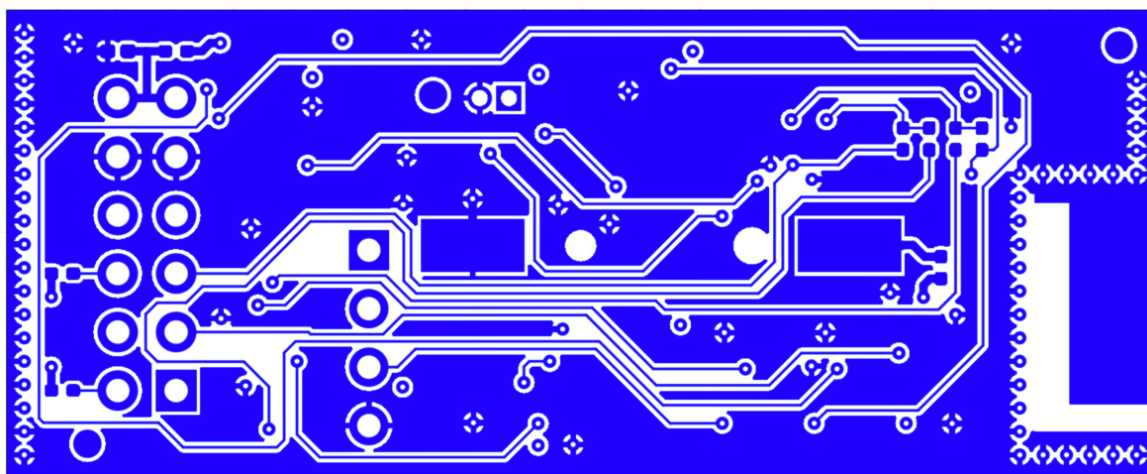


Figure 8. Copper Bottom

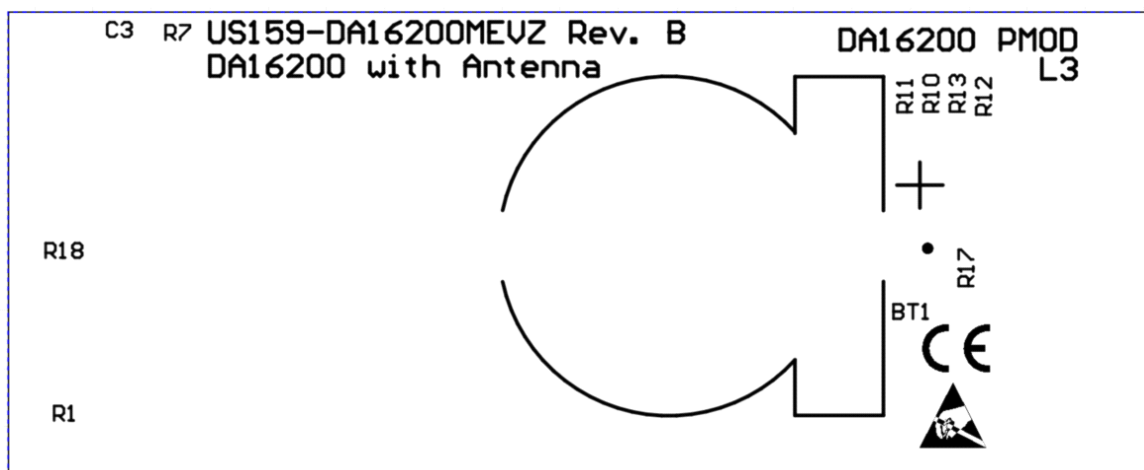


Figure 9. Silkscreen Bottom

6. Ordering Information

Part Number	Description
US159-DA16200MEVZ	DA16200 Pmod Board

7. Revision History

Revision	Date	Description
1.01	Sep 8, 2023	Replaced Figure 1 with an updated image.
1.00	Jun 27, 2022	Initial release

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