

US159-DA16600EVZ

DA16600 Pmod™ Board

The US159-DA16600EVZ is an ultra-low power Wi-Fi + Bluetooth™ low energy combo Pmod module that provides both low power Wi-Fi and low power BLE functionality to your device. The DA16600 integrates the low power Wi-Fi DA16200 SoC and the low power Bluetooth LE DA14531 SoC on a single module. Together they deliver long battery life and low power consumption in a convenient form factor. As a single integrated system, standard functions are available such as provisioning Wi-Fi through the BLE connection and Wi-Fi/BLE coexistence.

The US159-DA16600EVZ features a Type 3A Pmod connector, incorporates the DA16600 module, and combines low power Wi-Fi with low power Bluetooth capability in a single module. With its standard connector and software support, the US159-DA16600EVZ is ideal for the Renesas Quick-Connect IoT to rapidly create an IoT system.

**Kit Contents**

- US159-DA16600EVZ Pmod Board

**Features**

- DA16600MOD-AAC4WA32 module
  - 3.3V supply voltage
  - Integrated chip antenna
  - Cortex-M4F+ at 30MHz to 160MHz and Cortex M0+ at 16MHz
  - 802.11b/g/n radio PHY, 2.4GHz
  - Bluetooth 5.1 core qualified
  - SoC runs full OS and TCP/IP stack
  - Memory: 256 kB ROM, 512kB RAM, 8kB OTP, 48B retention memory and 32Mb SPI Flash
  - RF regulatory certifications: FCC, IC, CE, KC, TELEC, and SRRC
  - Wi-Fi Alliance certifications: Wi-Fi CERTIFIED b/g/n, WPA, WPA2, and WPA3
- Standardized Type 3A Pmod connector supports an expanded UART interface
- LED (D1) to aid in user software debug
- 10-pin 1.27mm pitch Arm Cortex-Debug connector (J2) for software development and debug support

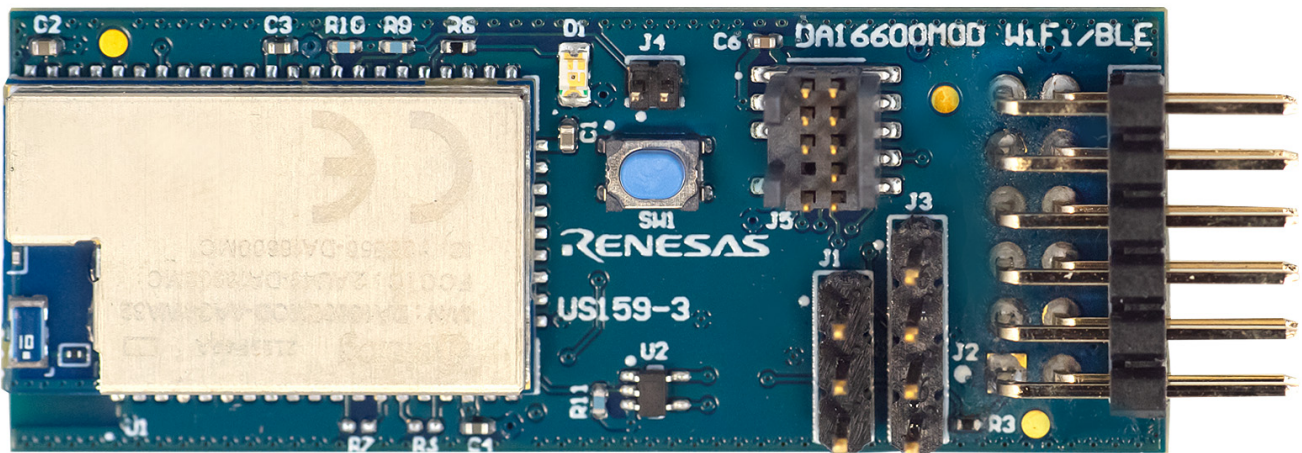


Figure 1. US159-DA16600EVZ Pmod Board (XE Evaluation Board)

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# 1. Functional Description

The US159-DA16600EVZ functions as a Wi-Fi and Bluetooth wireless building block to create a custom IoT system solution. This module adds Wi-Fi and Bluetooth connectivity capability to any IoT system that supports Pmod expansion modules. For a full list of available sensor Pmod boards, visit the Quick-Connect IoT web page on the Renesas [website](#).

## 2. Setup

### 2.1 Required or Recommended User Equipment

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

- An 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 designed to provide easy-to-use, scalable, high-quality software for embedded system designs using 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 is pre-loaded on the US159-DA16600EVZ Pmod module.

Firmware	
DA16600 v3.2.2.0	Standard DA16600 SDK

For more details on the application, see the [documentation](#), *Quick-Connect IoT DA16600 Provisioning Demo*.

### 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-DA16600EVZ 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-DA16600EVZ is now ready to be used in the system. Follow the MCU kit instructions for connecting and powering up the evaluation kit.

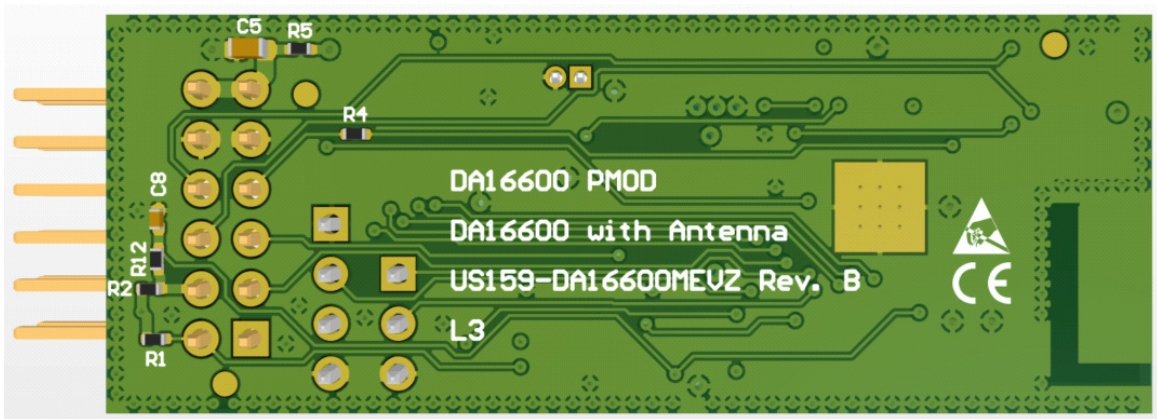
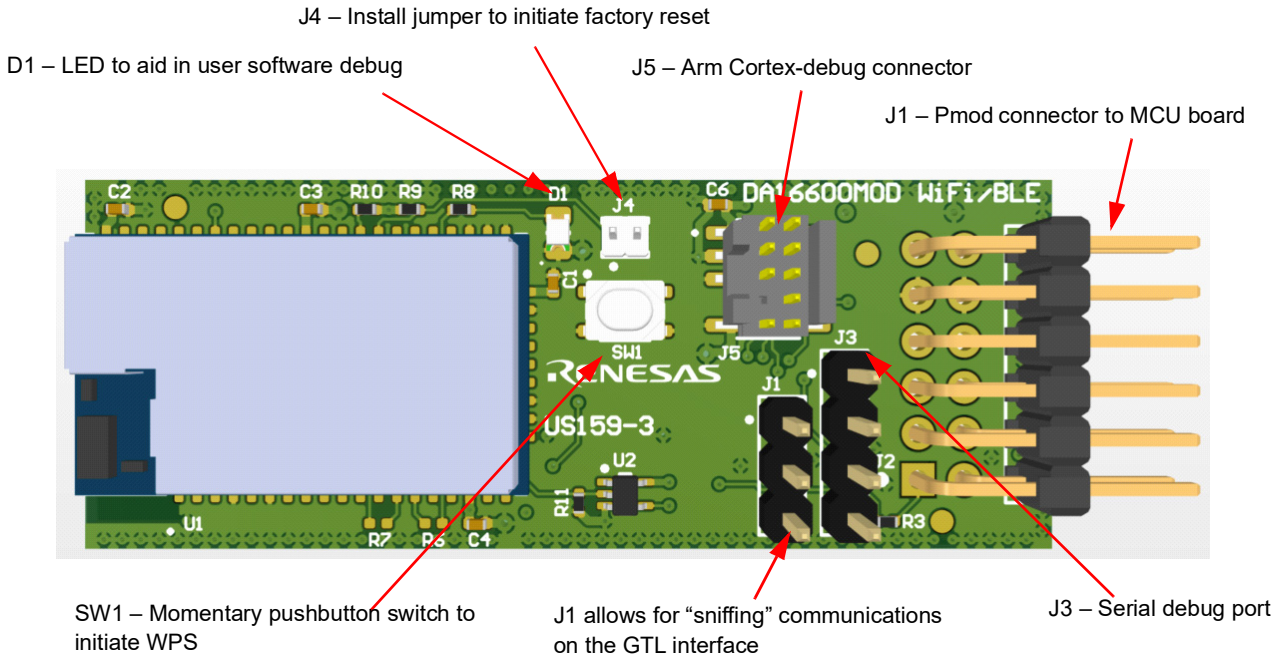


Figure 2. Evaluation Kit Details

### 3. Schematic Diagram

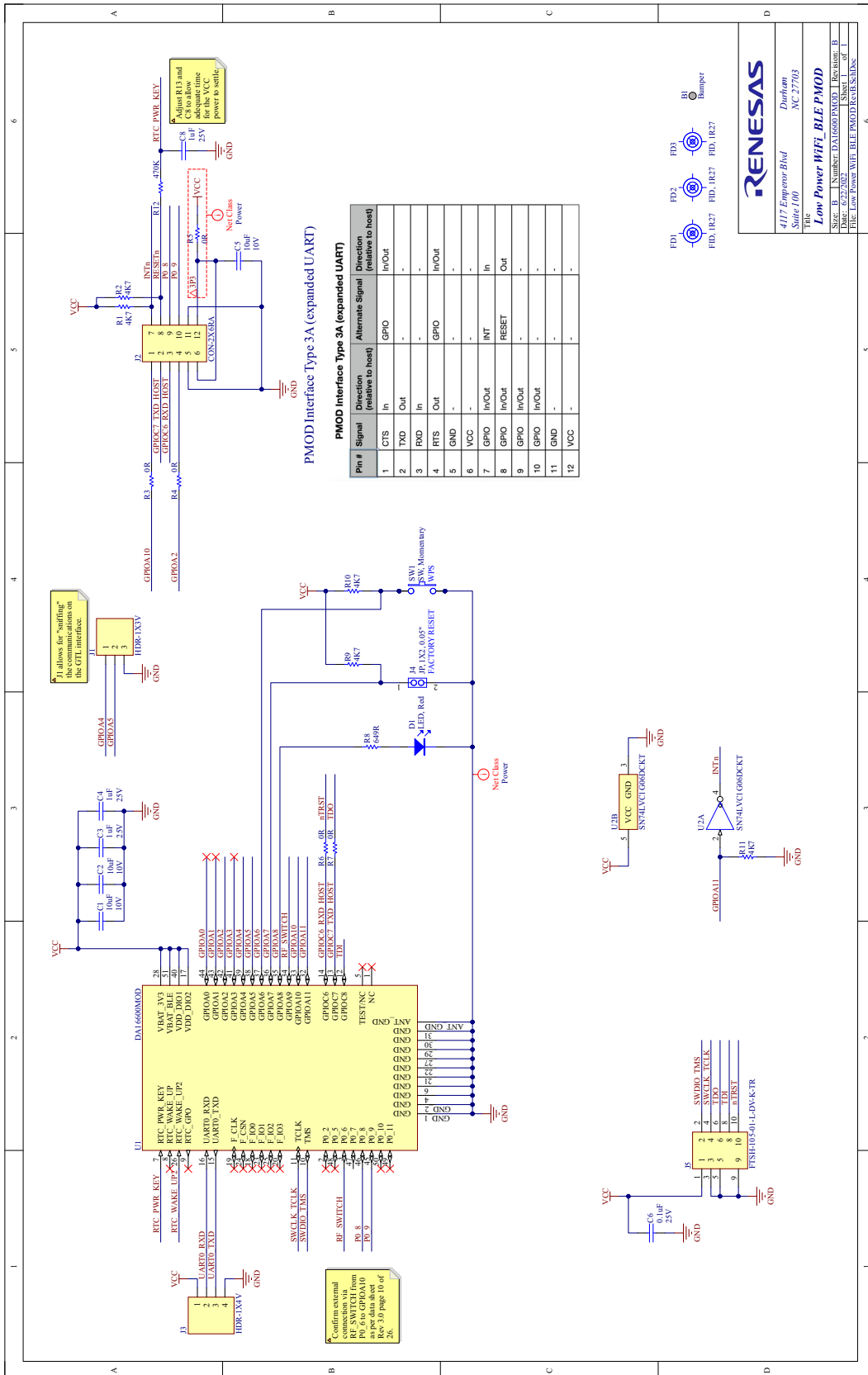


Figure 3. US159-DA16600EVZ Schematic Diagram

## 4. Bill of Materials

Qty	Reference Designator	Description	Manufacturer	Manufacturer Part Number
1	B1	Bumper, Cylindrical, 0.375" D, 0.19" HSM	Bumper Specialities	BS35CL01X02RP
2	C1, C2	Capacitor, 10 $\mu$ F, 10V, SM 0603, Multilayer Ceramic, X5R, RoHS	Samsung Electro-Mechanics	CL05A106MP5NUNC
3	C3, C4, C8	Capacitor, 1 $\mu$ F, 25V, SM 0402, Multilayer Ceramic, X5R, RoHS	Taiyo Yuden	TMK105BJ105KV-F
1	C5	Capacitor, 10 $\mu$ F, 10V, SM 0603, Multilayer Ceramic, X5R, RoHS	Murata	GRM188R61A106KE69D
1	C6	Capacitor, 0.1 $\mu$ F, 25V, SM 0402, Multilayer Ceramic, X7R, RoHS	Taiyo Yuden	TMK105B7104KVHF
1	D1	LED, Red, Clear, 0805, SM, RoHS	Würth Elektronik	150080RS75000
1	J1	3 Pin, 0.1", Single Row, Vertical, Header, RoHS	Sullins	PBC03SAAN
1	J2	Connector, 2 $\times$ 6, 0.1", PMOD, Right Angle, Unshrouded, RoHS	Harwin	M20-9950645
1	J3	4 Pin, 0.1", Single Row, Vertical, Header, RoHS	Sullins	PBC04SAAN
1	J4	1X2 Pin, 0.05", Single Row, Vertical, Header, RoHS	Sullins	GRPB021VWVN-RC
1	J5	Connector, 2 $\times$ 5 Header, Vertical, 1.27mm Pitch, Pin 7, SM, RoHS	Samtec	FTSH-105-01-L-DV-007-K
5	R1, R2, R9, R10, R11	Resistor, 4.7k $\Omega$ , 1/10W, 1%, 100ppm, SM, 50 WV, 100 OV, Thick Film, 0402, RoHS	KOA Speer	RK73H1ETTP4701F
3	R3, R4, R5	Resistor, 0 $\Omega$ , 1/10W, 1%, 100ppm, SM, 50 WV, 100 OV, Thick Film, 0402, RoHS	KOA Speer	RK73Z1ETTP
1	R8	Resistor, 649 $\Omega$ , 1/10W, 1%, 100ppm, SM, 50 WV, 100 OV, Thick Film, 0402, RoHS	KOA Speer	RK73H1ETTP6490F
1	R12	Resistor, 470k $\Omega$ , 1/10W, 1%, 100ppm, SM, 50 WV, 100 OV, Thick Film, 0402, RoHS	KOA Speer	RK73H1ETTP4703F
1	SW1	Switch, Pushbutton, Top Actuated, SM, RoHS	C&K Components	PTS810 SJG 250 SMTR LFS
1	U1	DA16600MOD, WiFi, 802.11b/g/n, Bluetooth LE, Transceiver, WiFi CPU - 256kB ROM, 512kB RAM, 8 kB OTP, 48 kB NV Memory, BLE CPU - 48 kB RAM, 144 kB ROM, 32 kB OTP, 51-SMD Module, SM, RoHS	Dialog Semiconductor	DA16600MOD-AAC4WA32
1	U2	IC, Digital, Buffer, Inverting, Open Drain, SM, SC-70-5, RoHS	Texas Instruments	SN74LVC1G06DCKT



## 4.1 Board Layout

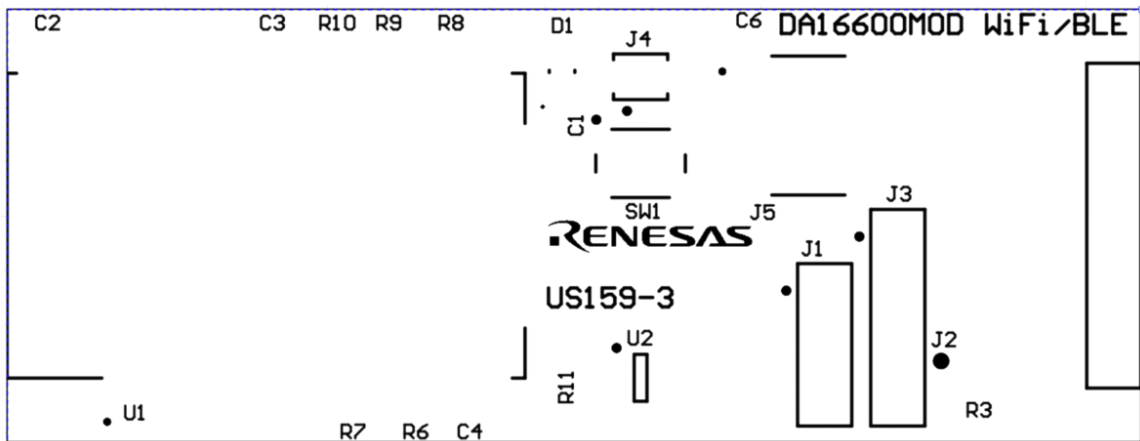


Figure 4. Silkscreen Top

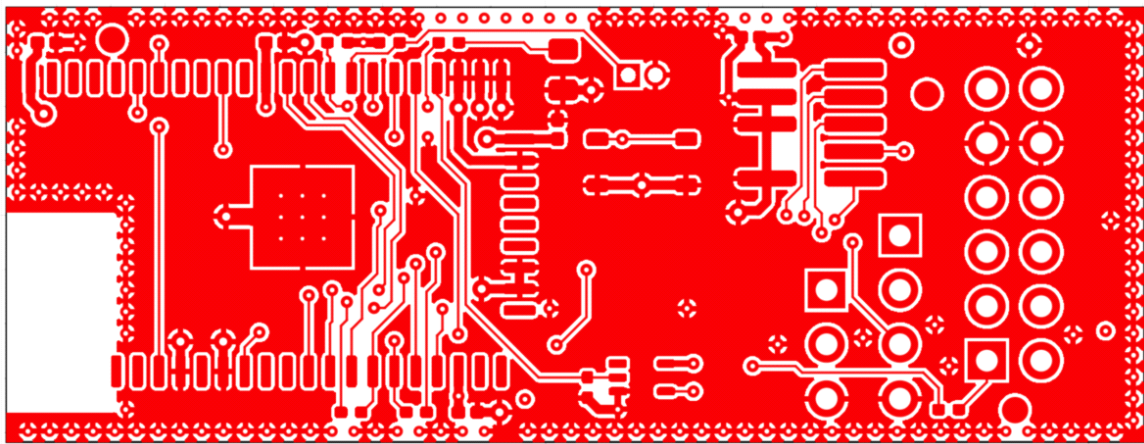


Figure 5. Copper Top

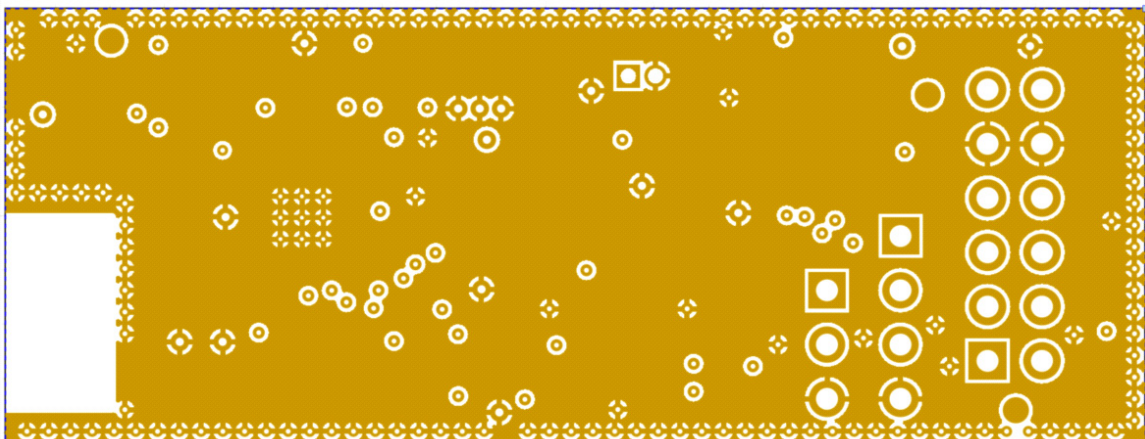


Figure 6. Copper L1 Layer

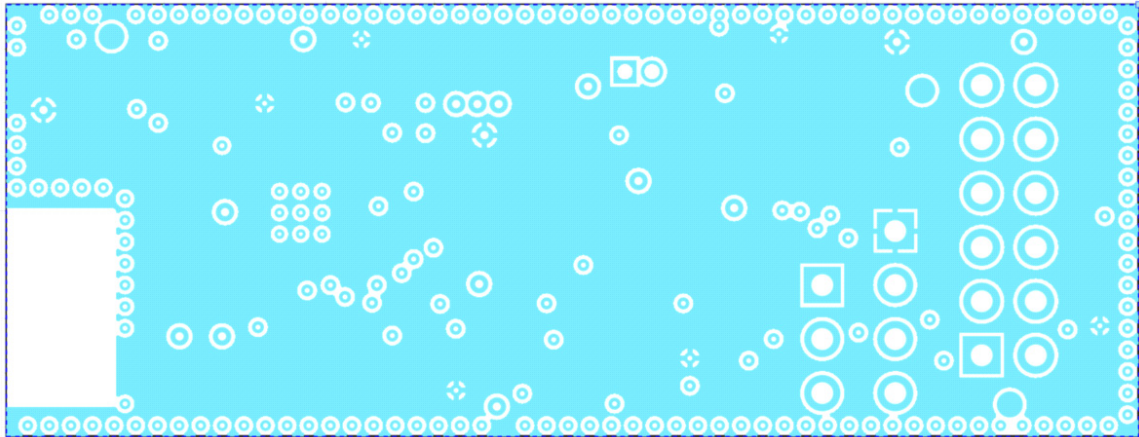


Figure 7. Copper L2 Layer

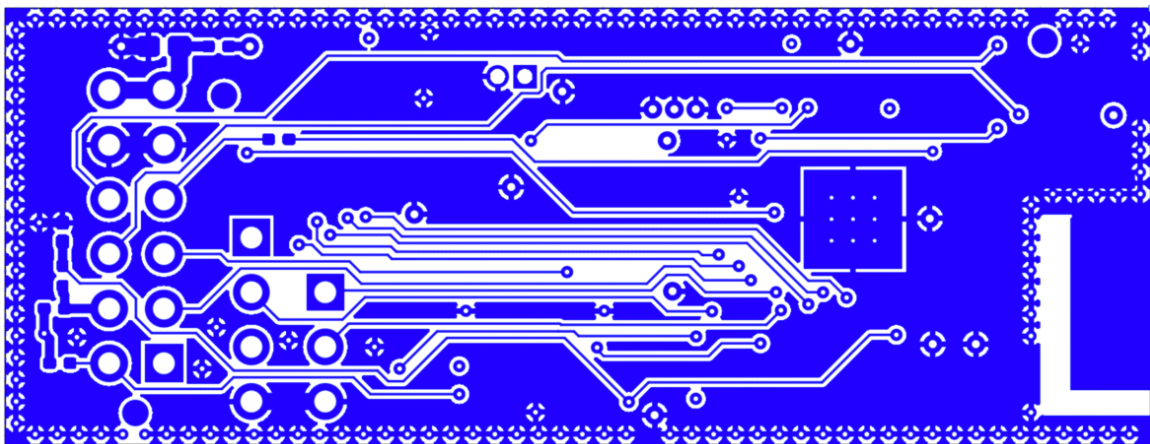


Figure 8. Copper Bottom

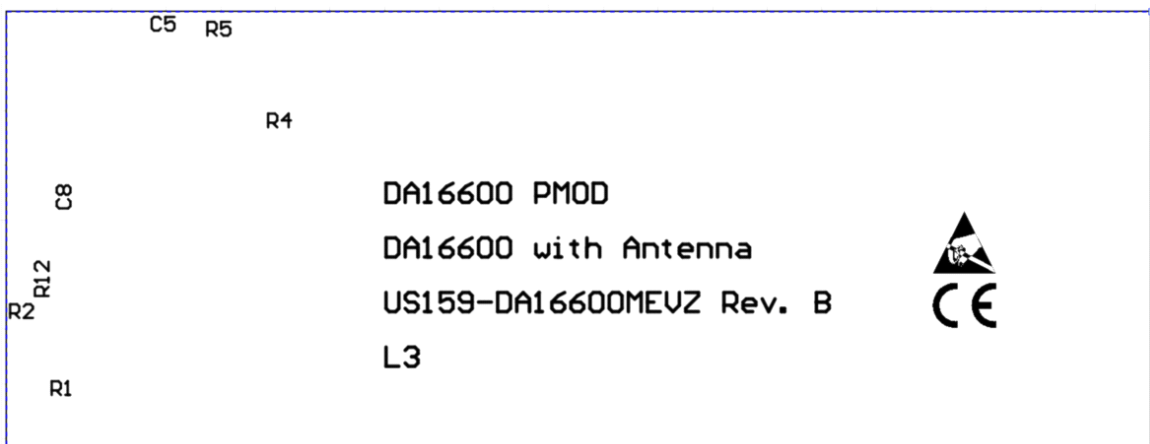


Figure 9. Silkscreen Bottom



## 5. Ordering Information

Part Number	Description
US159-DA16600EVZ	DA16600 Pmod Board

## 6. Revision History

Revision	Date	Description
1.01	Sep 8, 2023	Replaced <a href="#">Figure 1</a> with updated image
1.00	Jun 27, 2022	Initial release

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