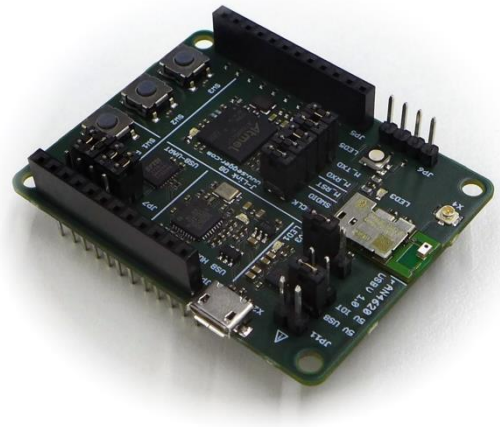
Panasonic

PAN4620

IEEE® 802.15.4 and Bluetooth® Low Energy Module

Design Guide

Rev.0.1



Wireless Modules

Overview

The PAN4620 is Panasonic's Internet of Things dual mode module comprising NXP®'s Kinetis MKW41Z512CAT4 SoC - a 2.4 GHz 802.15.4 and Bluetooth® Low Energy wireless radio microcontroller based on an ARM® Cortex-M0+ core.

Features

- UART, SPI, I²C, TSI, ADC & DAC
- Same form factor and compatible pinout for VCC, GND, Reset, UART, I²C, and SWD as PAN1026, PAN1760, PAN1760A, and PAN1761
- Single and concurrent operation of IEEE® 802.15.4 and BLE
- Open to various known application layers or proprietary solutions
- Surface Mount Type dimensions: 15.6 mm x 8.7 mm x 1.9 mm
- On module 32 MHz and 32 kHz crystal
- SoC: NXP® Kinetis® KW41Z – 2.4 GHz 802.15.4 and BLE 4.2 Wireless Radio Microcontroller
- Core: Up to 48 MHz 32 bit ARM® Cortex-M0+
- Memory: 512 kB of flash and 128 kB of SRAM
- Voltage range: 1.8 V to 4.2 V
- Temperature range: -40 °C to 85 °C

Characteristics

- Transceiver frequency range 2360 MHz to 2483.5 MHz
- Programmable transmitter output power: -30 dBm to 3 dBm
- Receiver sensitivity (BLE): -93 dBm
- Receiver sensitivity typical for IEEE® Standard 802.15.4: -98 dBm
- Typical receiver current consumption (3.6 V supply): 8.5 mA
- Transmitter current consumption (3.6 V supply, 0 dBm): 7.6 mA

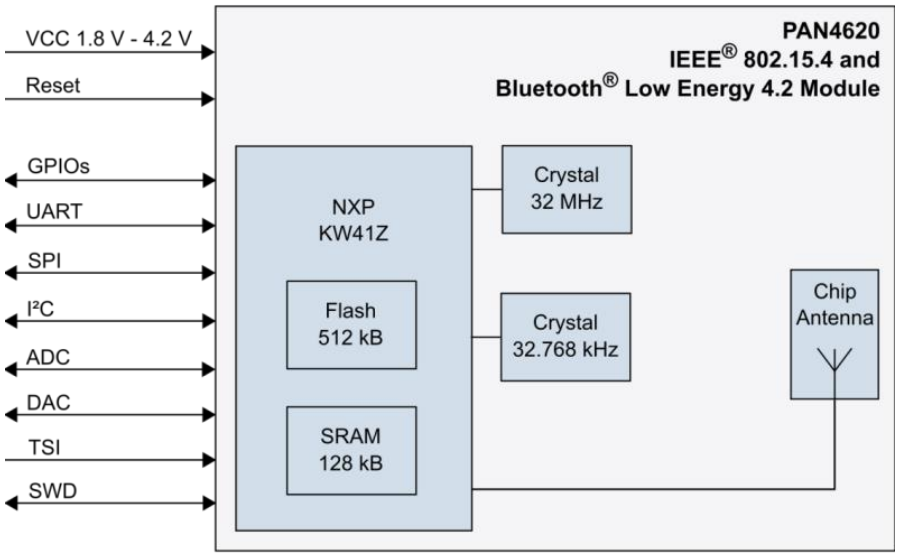
Bluetooth®

- Bluetooth® LE 4.2 compliant implementation certified by BT SIG
- Supporting software consisting of BLE host stack and profiles and IPv6 6LoBLE
- Bluetooth® Developer Studio Plug-In

IEEE® 802.15.4

- IEEE® standard 802.15.4 compliant
- Supporting software consisting of 802.15.4 MAC/PHY implementation, Simple Media Access Controller (SMAC), and NXP®'s certified Thread® and ZigBee® stacks are available.

Block Diagram



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1 About This Document

1.1 Purpose and Audience

This Design Guide applies to the IEEE® 802.15.4 and Bluetooth® Low Energy development platform PAN4620 USB. The intention is to enable our customers to easily integrate our module PAN4620 in their product.

This guide describes the hardware and gives useful hints.

1.2 Revision History

Revision	Date	Modifications/Remarks
0.1	06.06.2018	1st version.

1.3 Use of Symbols

Symbol	Description
	Note Indicates important information for the proper use of the product. Non-observance can lead to errors.
	Attention Indicates important notes that, if not observed, can put the product's functionality at risk.
	Tip Indicates useful information designed to facilitate working with the Module.
⇨ [chapter number] [chapter title]	**Cross reference** Indicates cross references within the document. **Example:** Description of the symbols used in this document ⇨ 1.3 Use of Symbols.
✓	**Requirement** Indicates a requirement that must be met before the corresponding tasks can be completed.
➔	**Result** Indicates the result of a task or the result of a series of tasks.

1.4 Related Documents

Please refer to the Panasonic website for more information as well as related documents ⇨ 6.2.2 Product Information.

2 Overview

The PAN4620 USB is a development platform for the PAN4620 IEEE® 802.15.4 and Bluetooth® Low Energy module to implement Bluetooth and IEEE® 802.15.4 functionality into various electronic devices.

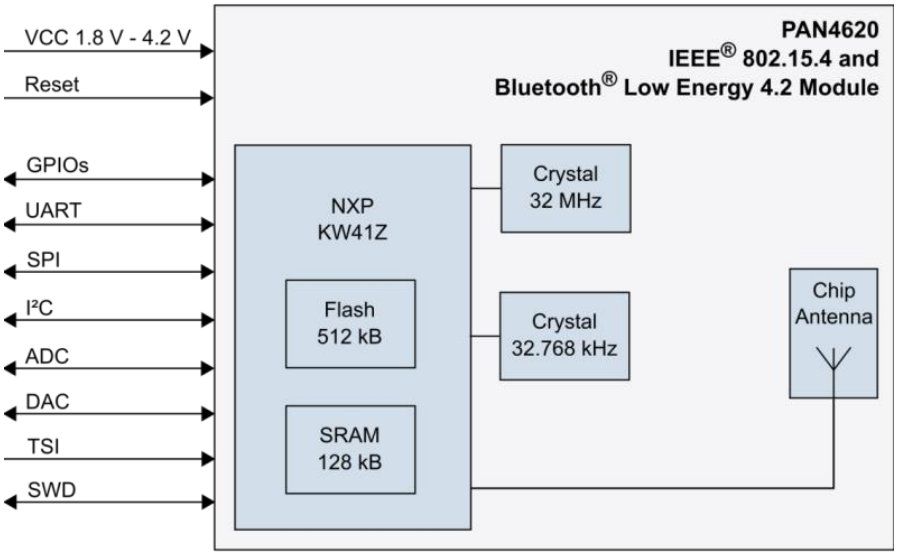
This guide describes the hardware.

Please refer to the Panasonic website for related documents ⇨ 6.2.2 Product Information.

Further information on the variants and versions ⇨ 6.1 Ordering Information.

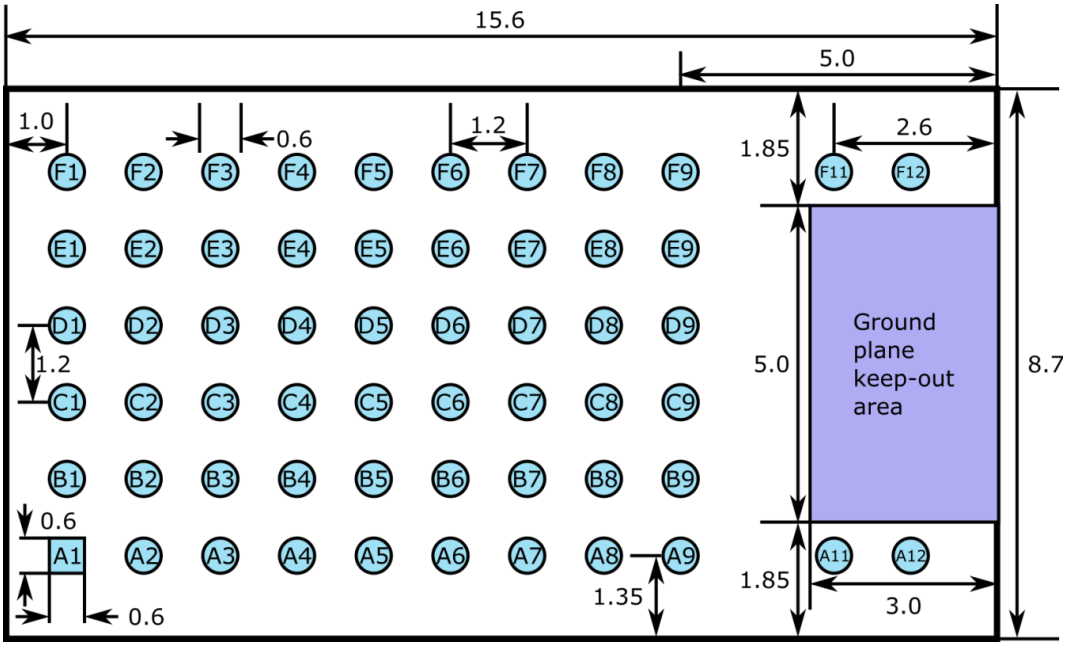
3 PAN4620 Module

3.1 Block diagram



3.2 Footprint

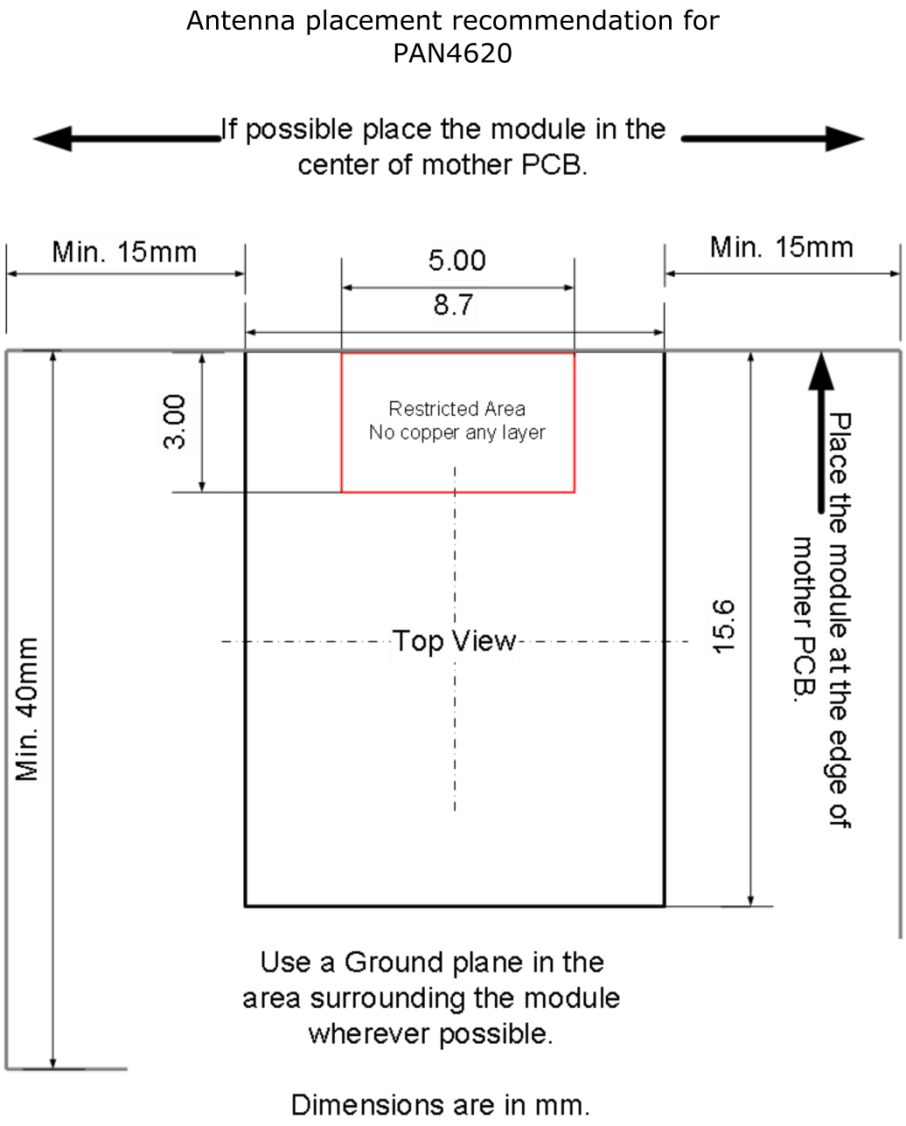
Top view (dimensions are in mm)



3.3 Placement

Antenna Keep-out Area

Do not place any ground plane under the marked restricted antenna area in any layer! This would be affecting the performance of the chip antenna in a critical manner.



Note: The above recommendation for the ground plane is based on a FR4 4-Layer PCB.

Antenna Keep-out Area

The antenna requires a cutout area of 5 mm x 3 mm under the PAN4620 module. This keep-out area shall be located in every layer under the module antenna. Note for example the keep-out area in all four layers of the PAN4620 USB Adapter.

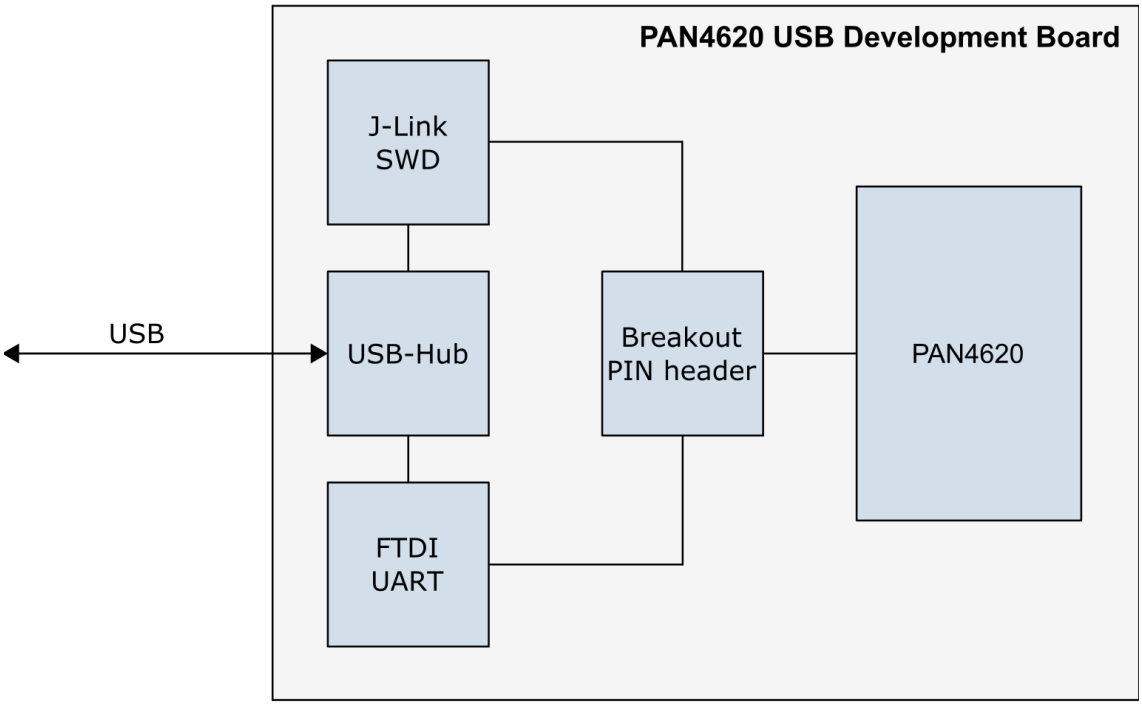
Impact of Placement on the Antenna Radiation Pattern

The placement of the module, surrounding material, and customer components have an impact on the radiation pattern of the antenna.

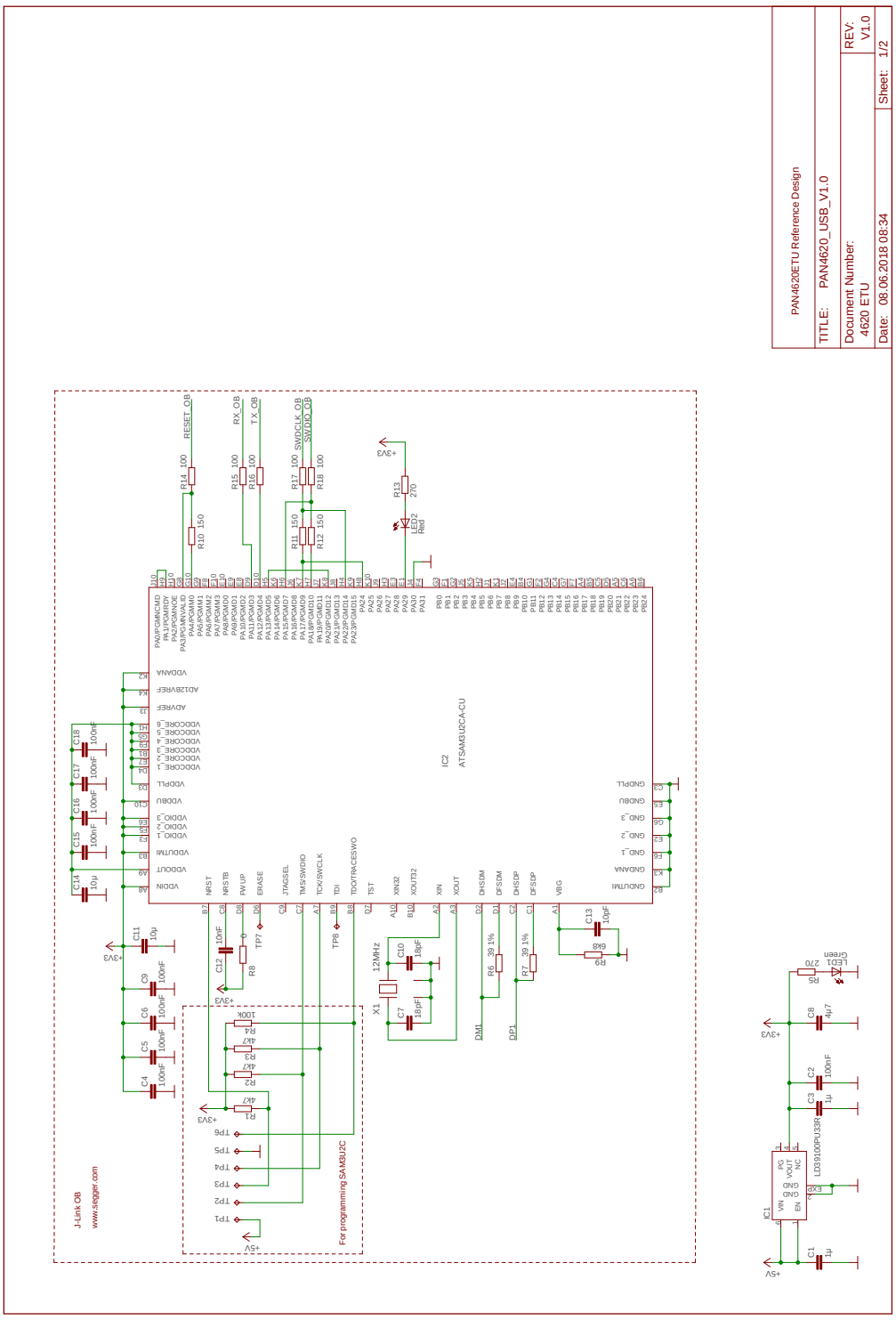
It is recommended to verify the perfect position of the module in the target application before fixing the design.

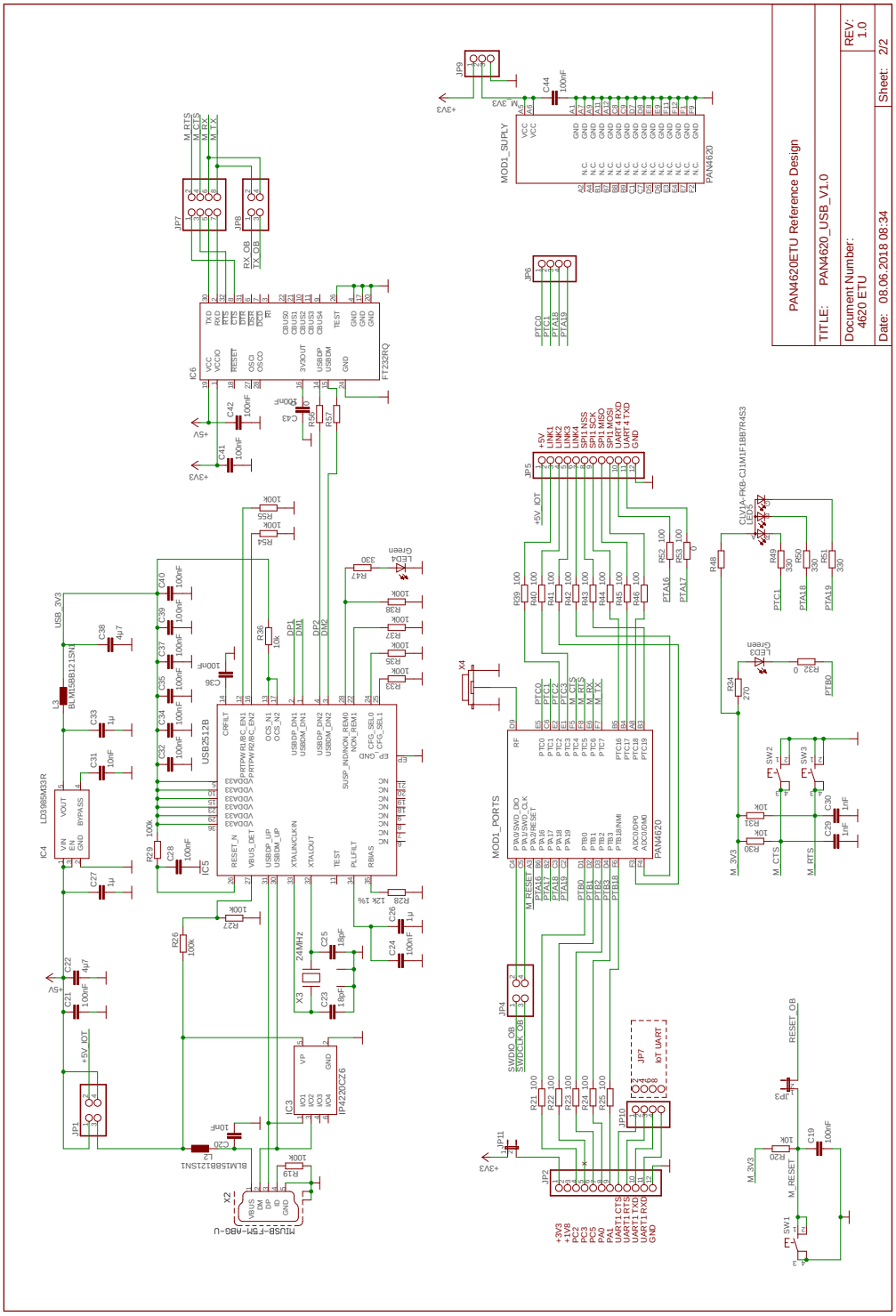
4 Reference Design

Block diagram:

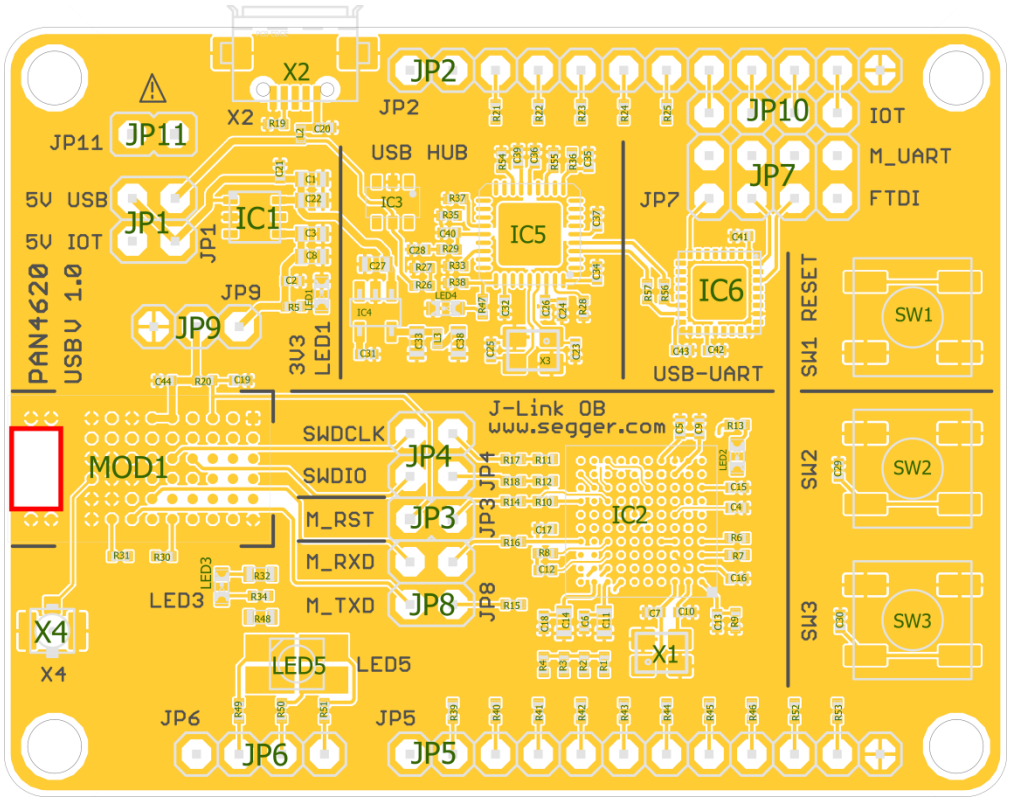


4.1 Schematic




PAN4620ETU Reference Design
TITLE: PAN4620_USB_V1.0
Document Number: 4620 ETU
REV: 1.0
Date: 08.06.2018 08:34
Sheet: 2/2
MOD1_SUPLY
MOD1_PORTS
PAN4620
USB2512B
FT232RQ
IP4220CZ6
LD3985M33R
BLM15BB121SN1
MUSB-FSH-A8G-U

4.2 Placement Recommendations



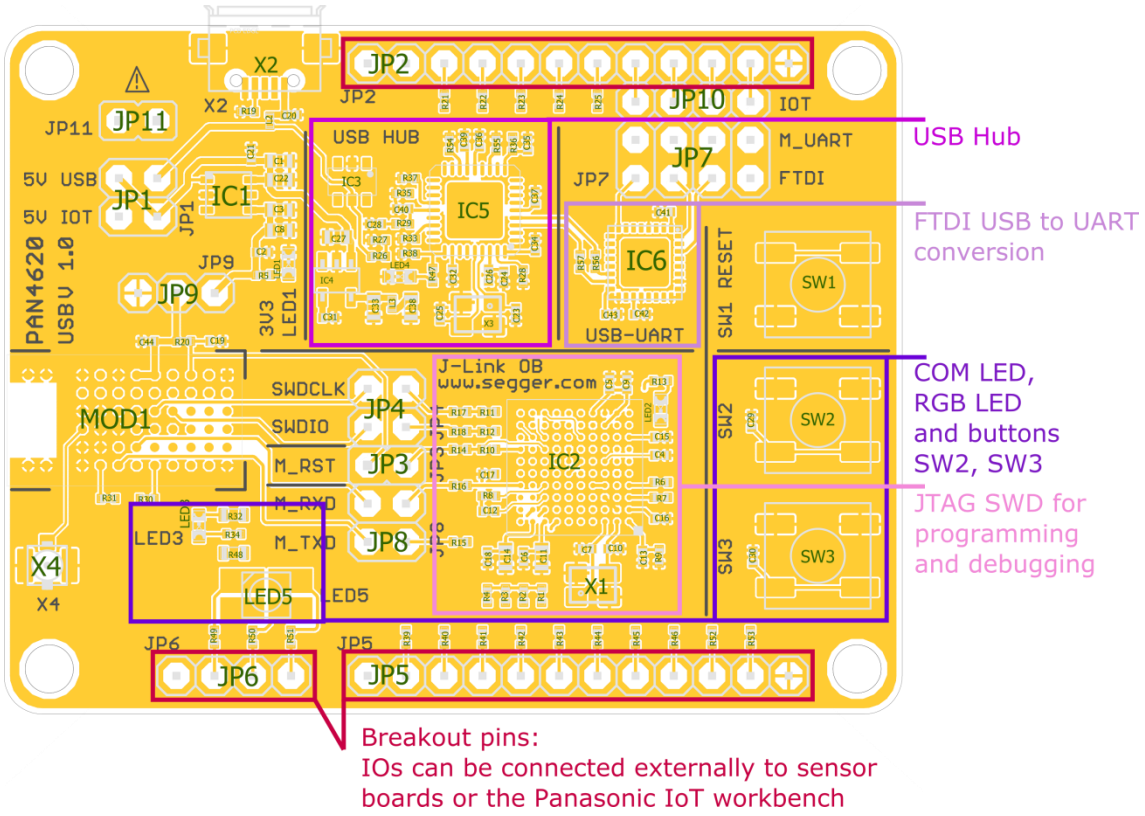
The module shall be placed as close as possible to the edge of the application.

It is important to have the keep out area below the antenna. Keep out area

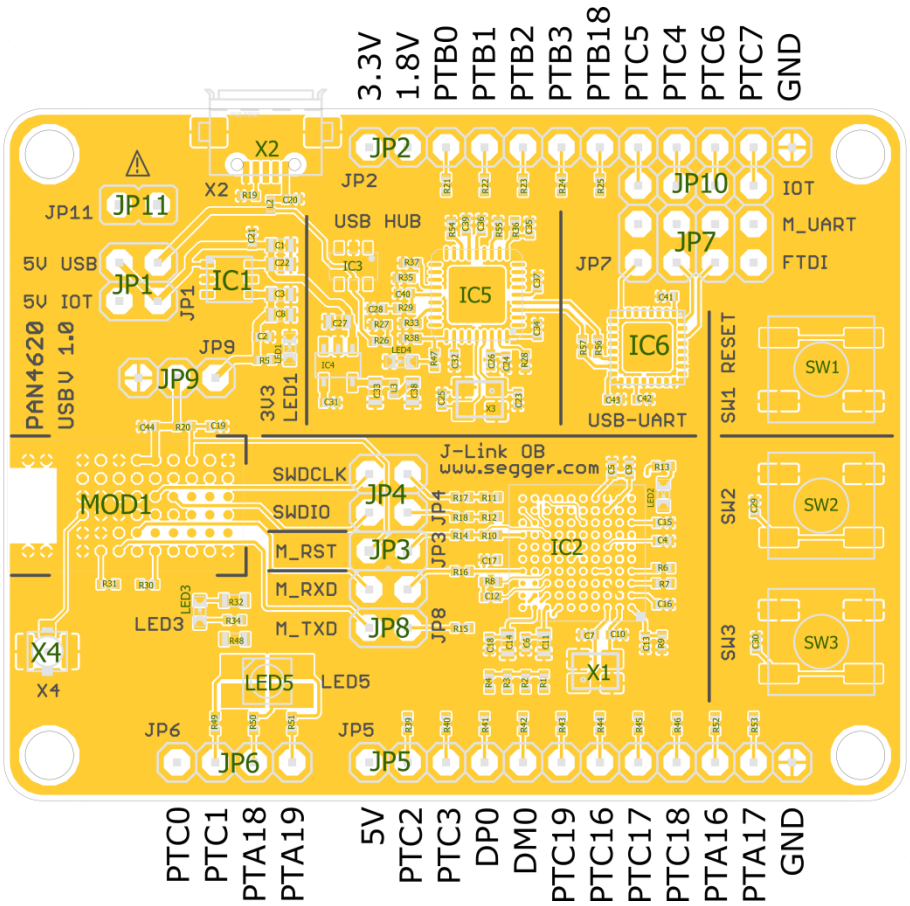
To download the design files go to the download area on the product website.

⇨ 6.2.2 Product Information.

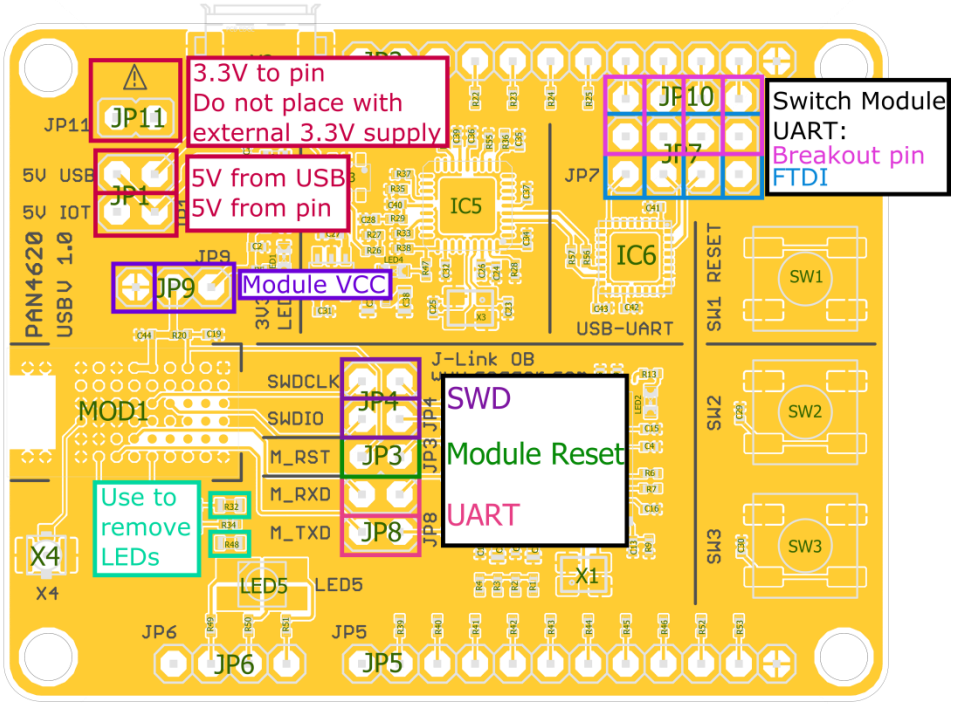
4.3 Building Blocks



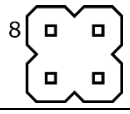
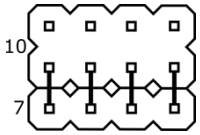
4.4 Breakout pins



4.5 Configuration Settings



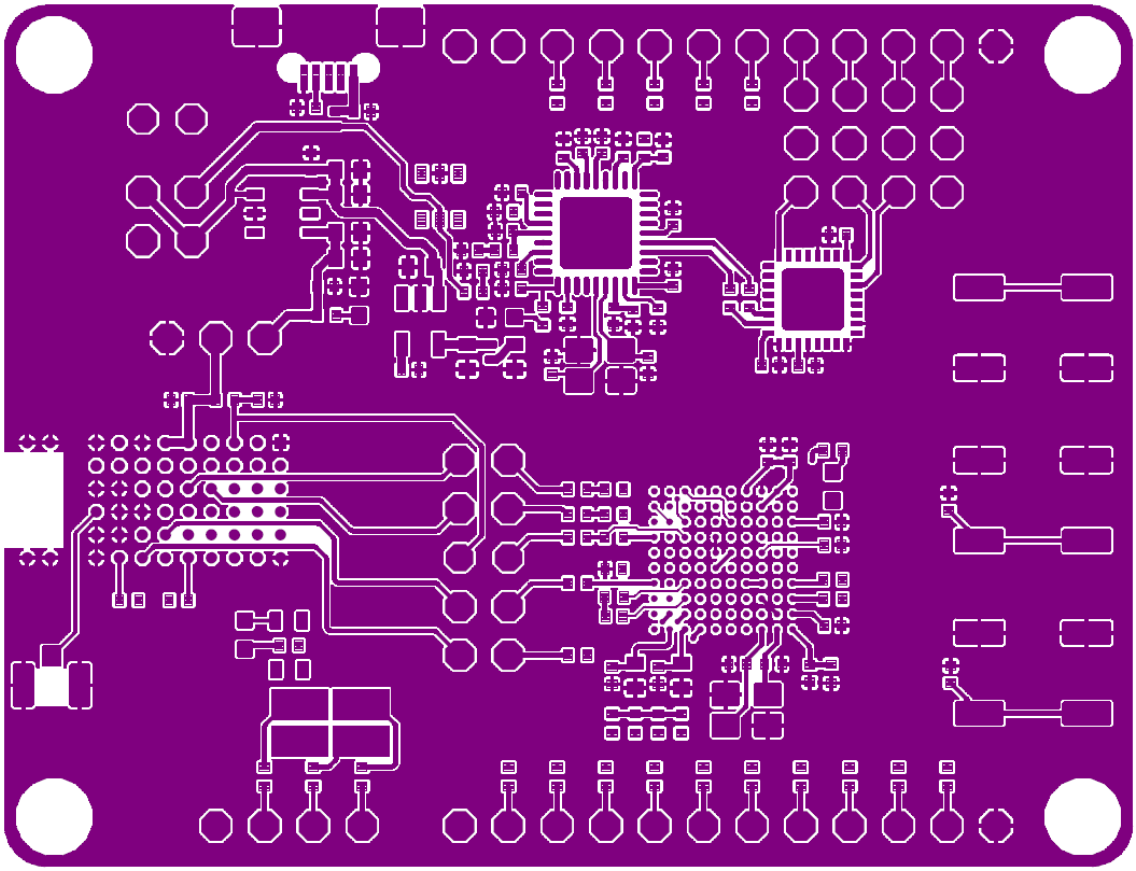
Jumper	Description		
J1	1	5 V from USB connected	5 V power option, to power the board from USB or the 5 V pin. The 5 V from USB can also be used to power the sensor board.
	1	5 V from or to breakout pin connected	
J3	3	Module reset connected	If there is no firmware on the module, the reset will be pulled low. This has to be considered when the module is sharing a common reset with other components.
	3	Module reset disconnected	
J4	4	SWD connected	Access to module and programmer SWD
	4	SWD disconnected	
J8	8	Module UART connected	Access to module UART RX and TX.

		Module UART disconnected	
J9		Module VCC connected.	Module VCC connection and GND pin. The module VCC jumper can be removed for current measurements.
J7, J10		FTDI connected to module UART.	Option for module UART to breakout pin or FTDI. Place jumpers either on J7 or J10.
		Breakout pin connected to module UART.	
J11 ⚠		3.3 V are supplied to the breakout pin.	Option to power an external sensor board sensors with 3.3 V. Do not place this jumper, if an external 3.3 V source is present.
		3.3 V are not supplied to the breakout pin.	
R32, R48	These 0 Ω resistors can be removed, to disconnect the LEDs in case the IOs PTB0, PTC1, PTA18, and PTA19 shall be used for other purposes.		
SW2, SW3	If you want to use PTC4 and PTC5 for other purposes, do not push the buttons.		

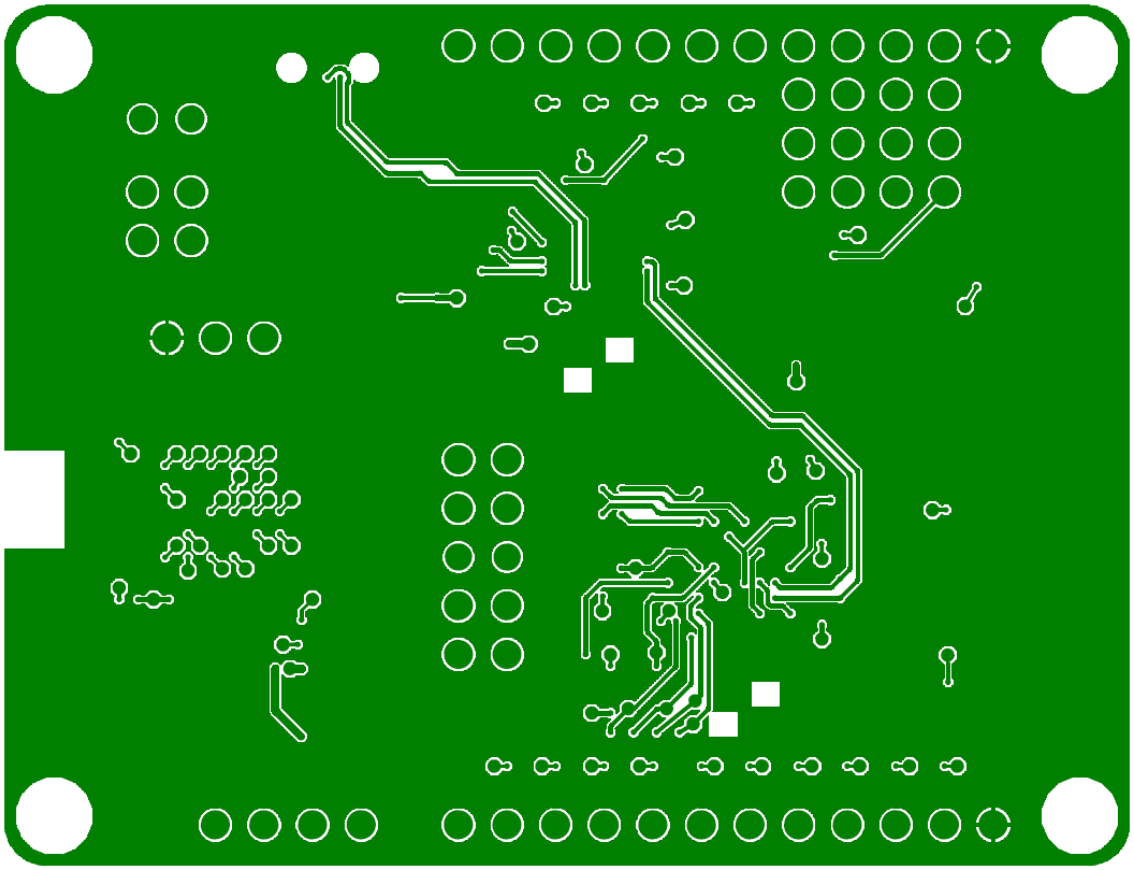
After each different configuration the reset button needs to be pressed.

4.6 PCB Layout

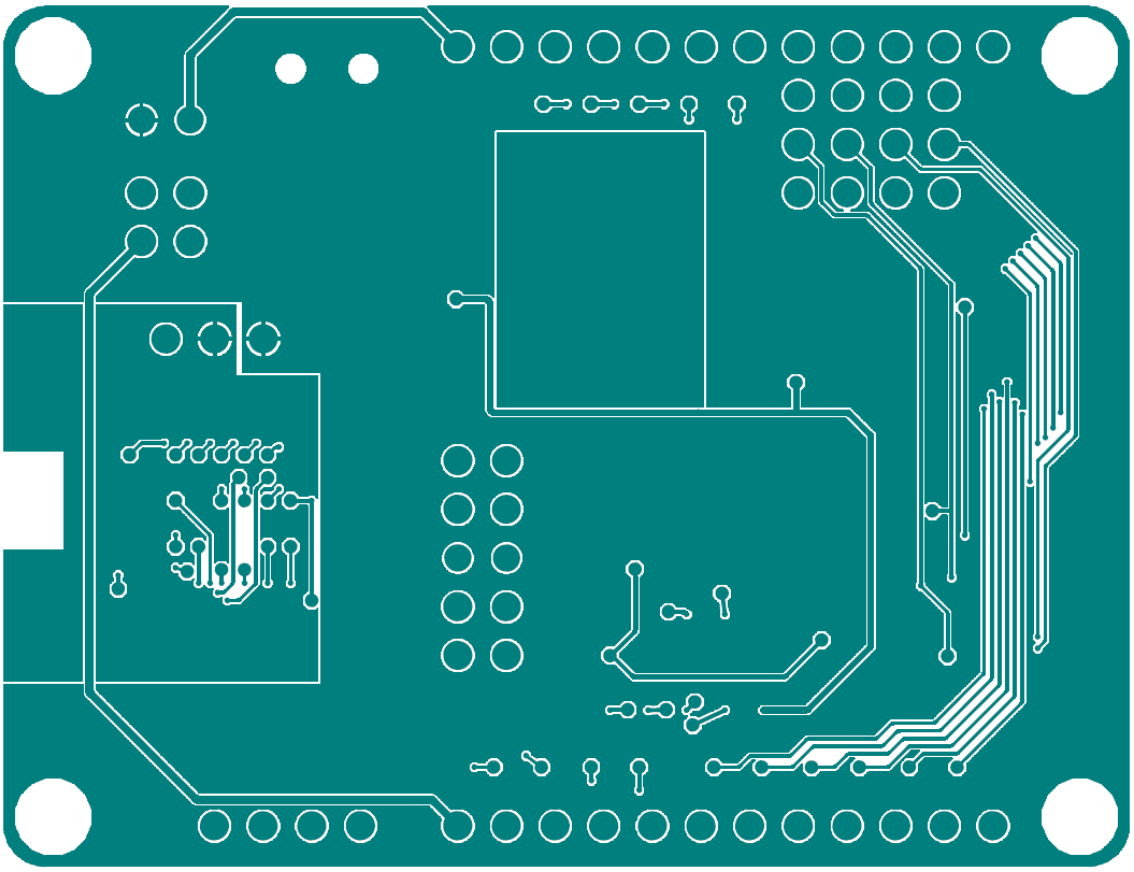
4.6.1 Top Layer



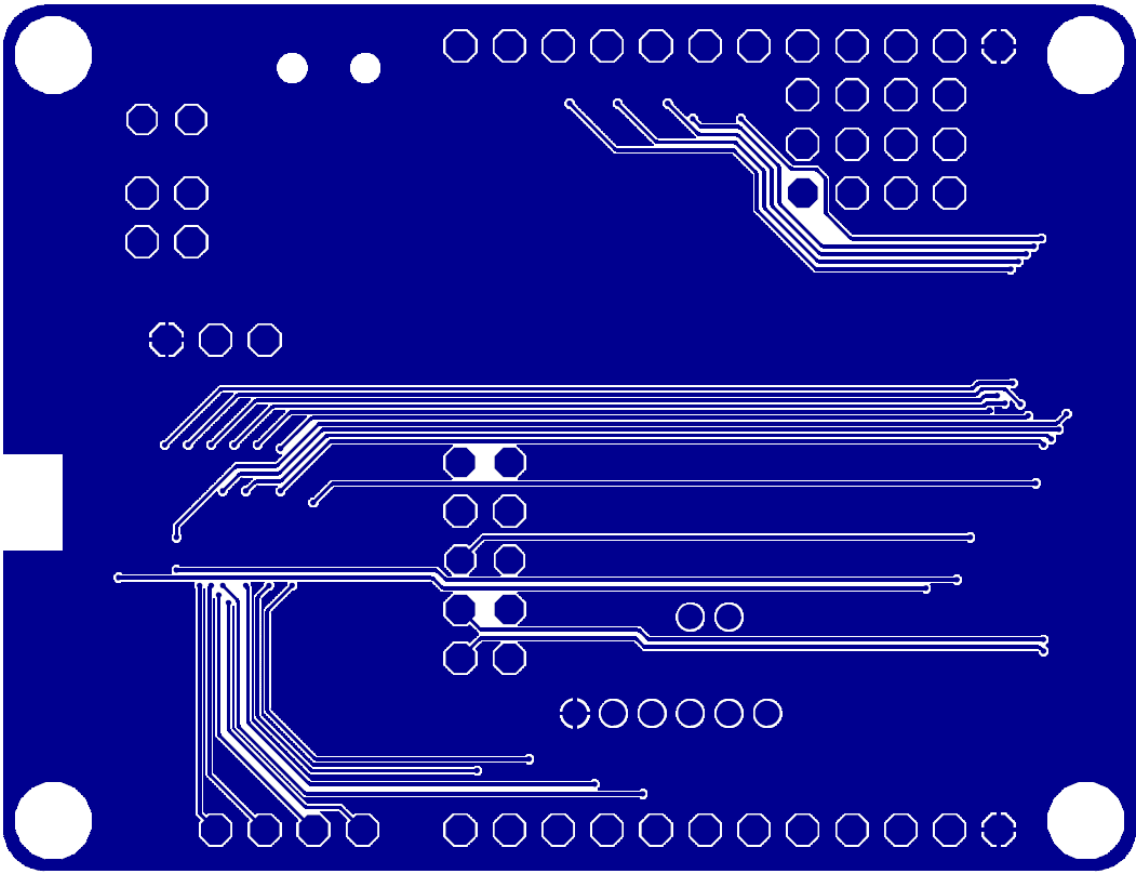
4.6.2 Second Layer



4.6.3 Third Layer



4.6.4 Bottom Layer



5 Cautions

5.1 Restricted Use

5.1.1 Life Support Policy

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6 Appendix

6.1 Ordering Information

Variants and Versions

Order Number	Brand Name	Description	MOQ
ENWC9B01AQEF	PAN4620-ETU	USB Evaluation Board	1
ENWC9B01A1EF	PAN4620	PAN4620 Module	1 500

6.2 Contact Details

6.2.1 Contact Us

Please contact your local Panasonic Sales office for details on additional product options and services:

For Panasonic Sales assistance in the **EU**, visit

https://eu.industrial.panasonic.com/about-us/contact-us

Email: wireless@eu.panasonic.com

For Panasonic Sales assistance in **North America**, visit the Panasonic Sales & Support Tool to find assistance near you at

https://na.industrial.panasonic.com/distributors

Please visit the **Panasonic Wireless Technical Forum** to submit a question at

https://forum.na.industrial.panasonic.com

6.2.2 Product Information

Please refer to the Panasonic Wireless Connectivity website for further information on our products and related documents:

For complete Panasonic product details in the **EU**, visit

http://pideu.panasonic.de/products/wireless-modules.html

For complete Panasonic product details in **North America**, visit

http://www.panasonic.com/rfmodules