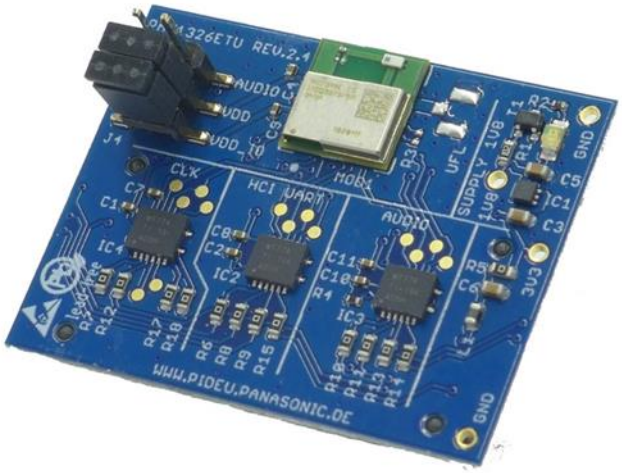
Panasonic
INDUSTRY

PAN1326C2

Bluetooth® Basic Data Rate and Low Energy Module

Design Guide

Rev. 1.1



Wireless Connectivity

Overview

Panasonic's new PAN1326C2 is a Host Controlled Interface (HCI) Bluetooth® Radio Frequency (RF) module that brings Texas Instruments™ seventh generation Bluetooth core integrated circuit, the CC2564C, to an easy to use module format. The PAN1326C2 is Bluetooth 5.1 compliant and it offers best-in-class RF performance with about twice the range of other Bluetooth Low Energy (LE) solutions. Panasonic's tiny footprint technology has produced a module of only 85.5 mm². The module is designed to accommodate PCBs pad pitch of 1.3 mm and as few as two layers for easy implementation and manufacturing. The module has been designed to be 100 percent pin-compatible with previous generations of Texas Instruments based Bluetooth HCI modules.

Bluetooth

- Scatternet and piconets simultaneously
- Synchronous Connection Oriented (SCO) links on the same piconet
- Support for All Voice Air-Coding – Continuously Variable Slope Delta (CVSD), A-law, µ-law, modified Subband Coding (mSBC), and transparent (uncoded)
- Assisted mode for HFP 1.6 Wideband Speech (WBS) profile or A2DP profile to reduce host processing and power
- Support of multiple Bluetooth profiles with enhanced QoS
- Multiple sniff instances tightly coupled to achieve minimum power consumption
- Independent buffering for LE allows large numbers of multiple connections without affecting BR or EDR performance
- Built-in coexistence and prioritization handling for BR, EDR, and LE
- Capabilities of link layer topology Scatternet (can act concurrently as peripheral and central)
- Network support for up to 10 devices
- Time line optimization algorithms to achieve maximum channel utilization

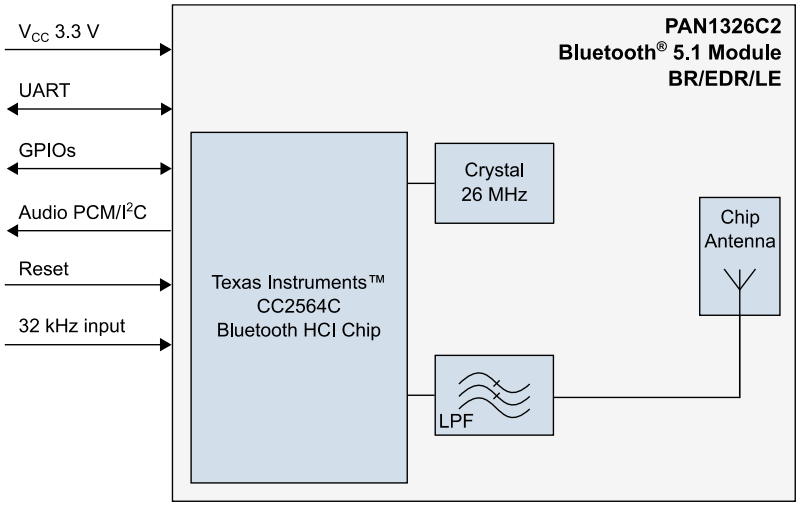
Features

- Bluetooth 5.1 compliant up to the HCI layer
- Best-in-class Bluetooth RF performance (Tx, Rx sensitivity, blocking)
- Dimensions: 9 mm × 9.5 mm × 1.8 mm
- Based upon Texas Instruments CC2564C
- Interfaces: UART, GPIO, PCM

Characteristics

- Bluetooth 5.1
- Receiver sensitivity: -90 dBm
- Output power: 8 dBm
- Power supply: 1.7 V to 4.8 V
- Power consumption: Tx 40 mA
- Power consumption: Rx 20 mA
- Operating temperature range: -40 °C to 85 °C

Block Diagram



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This Design Guide does not lodge the claim to be complete and free of mistakes.

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Engineering Samples are not qualified and they are not to be used for reliability testing or series production.

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Table of Contents

1 About This Document

1.1 Purpose and Audience

This Design Guide is intended to support the easy integration of the PAN1326C2 into a product and to ensure the compliance with regulatory requirements. This guide gives an overview about the hardware design requirements by providing a reference design.

It is intended for hardware design, application, and Original Equipment Manufacturers (OEM) engineers.

The product is referred to as “the PAN1326C2” or “the module” within this document.

1.2 Revision History

Revision	Date	Modifications/Remarks
1.0	2019-11-08	First version
1.1	2020-12-02	Updated chapter “Placement Recommendation”. Updated Bluetooth version (Bluetooth 5.1). Corrected order number. Added chapter “Restricted End Use”. New design, structure, and disclaimer.

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 and software.
⇨ [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.

1.4 Related Documents

For related documents please refer to the Panasonic website ⇨ 6.2.2 Product Information.

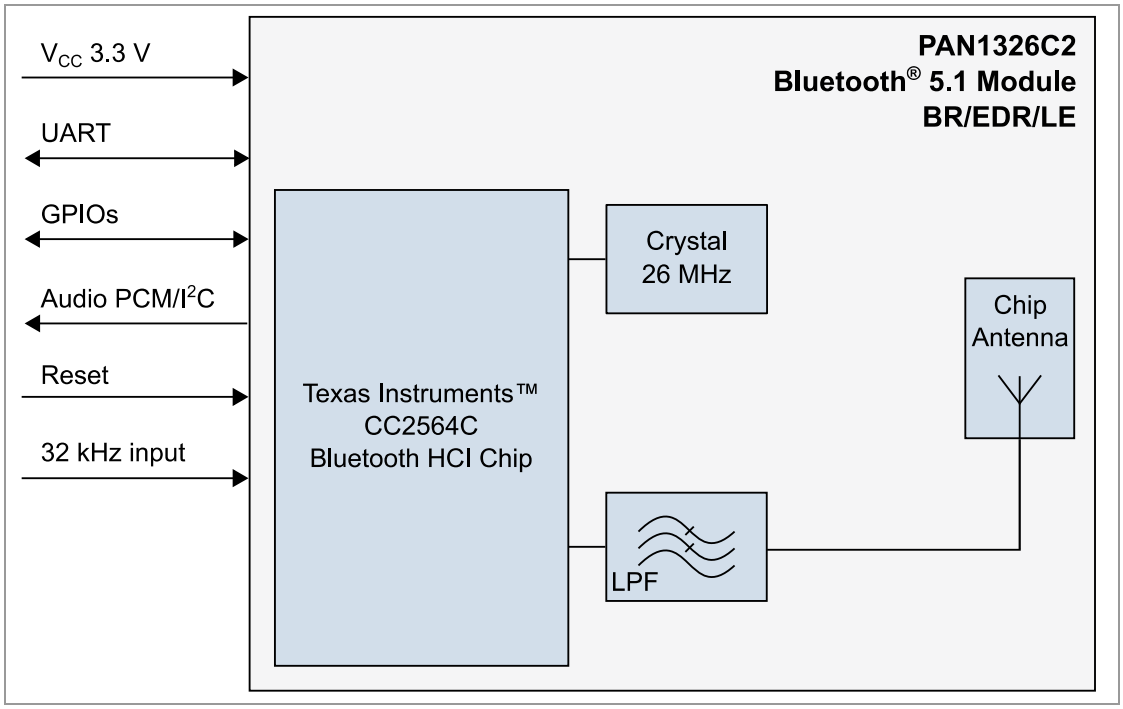
2 Overview

Panasonic's new PAN1326C2 is a Host Controlled Interface (HCI) Bluetooth RF module that brings Texas Instrument's seventh generation Bluetooth core integrated circuit, the CC2564, to an easy to use module format. The PAN1326C2 is Bluetooth 5.1 compliant and it offers best in class RF performance with about twice the range of other Bluetooth LE solutions. Panasonic's tiny footprint technology has produced a module of only 85.5 mm². The module is designed to accommodate PCBs pad pitch of 1.3 mm and as few as two layers for easy implementation and manufacturing. The module has been designed to be 100 percent pin-compatible with previous generations of Texas Instruments based Bluetooth HCI modules.

For related documents please refer to ⇨ 6.2.2 Product Information.

3 PAN1326C2 Module

3.1 Block Diagram



3.2 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.

Impact of Placement on the Antenna Radiation Pattern

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

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

The following requirements must be met:

- ✓ Keep this product away from heat. Heat is the major cause of decreasing the life of these products.
- ✓ Keep this product away from other high frequency circuits.

The antenna requires a cutout area of 5 mm × 3 mm under the PAN1326C2 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 PAN1326C2 evaluation board.

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

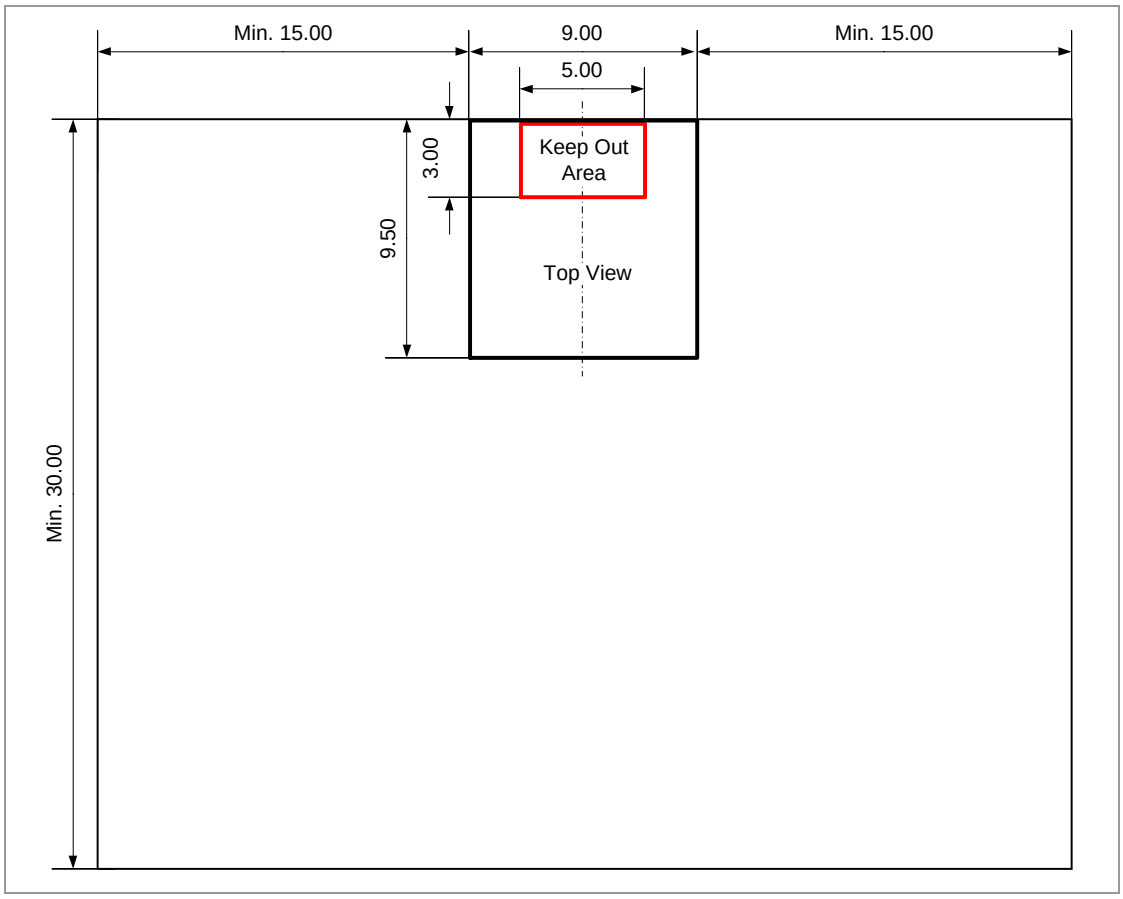
All dimensions are in millimeters.

Use a ground plane in the area surrounding the module wherever possible.

It is recommended to place the module:

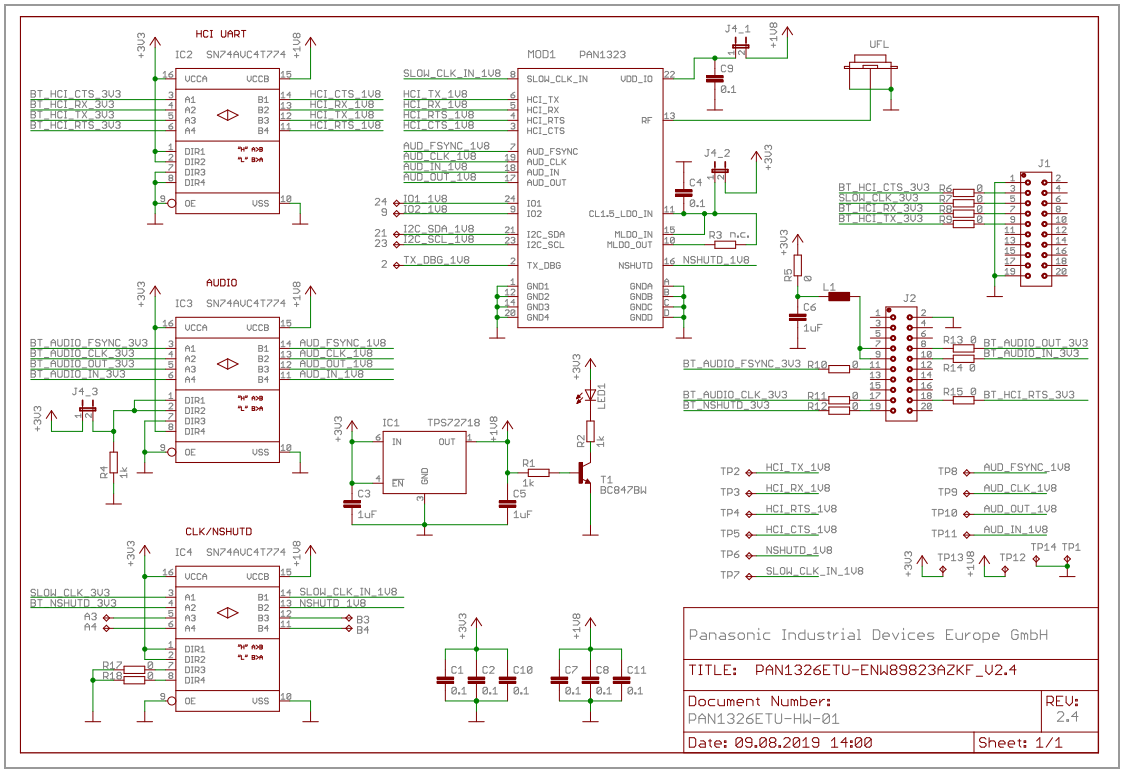
- In the center (horizontal) of mother PCB.
- At the edge (horizontal) of mother PCB.

Antenna Placement Recommendation

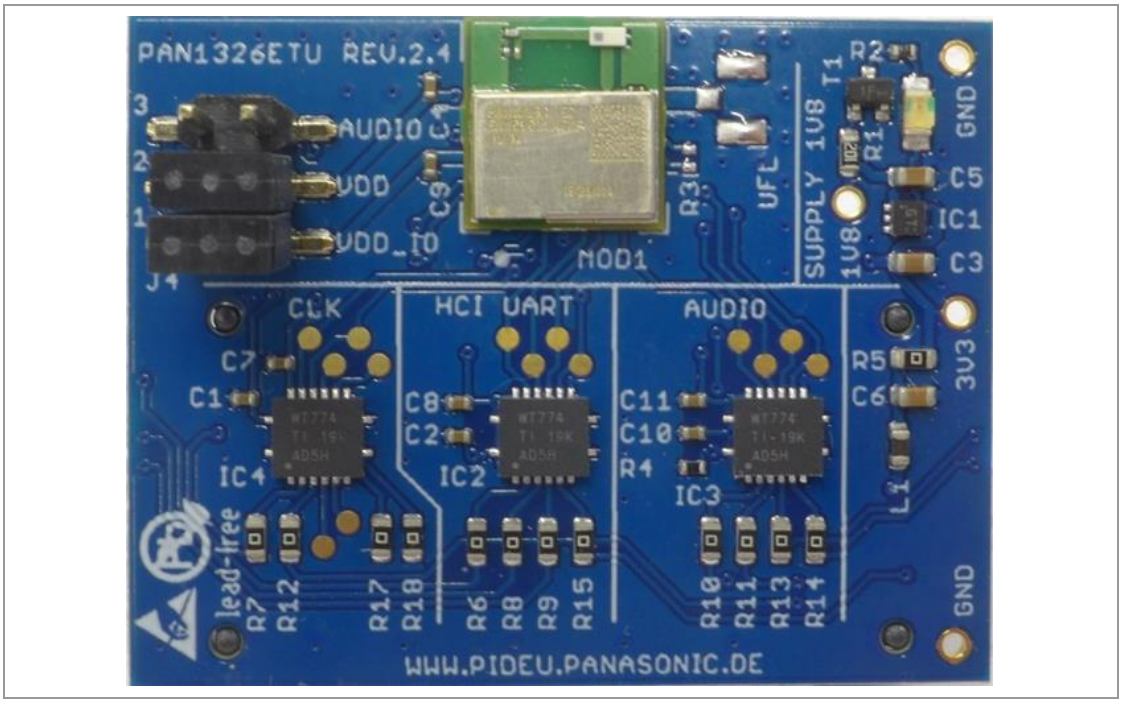


4 Reference Design

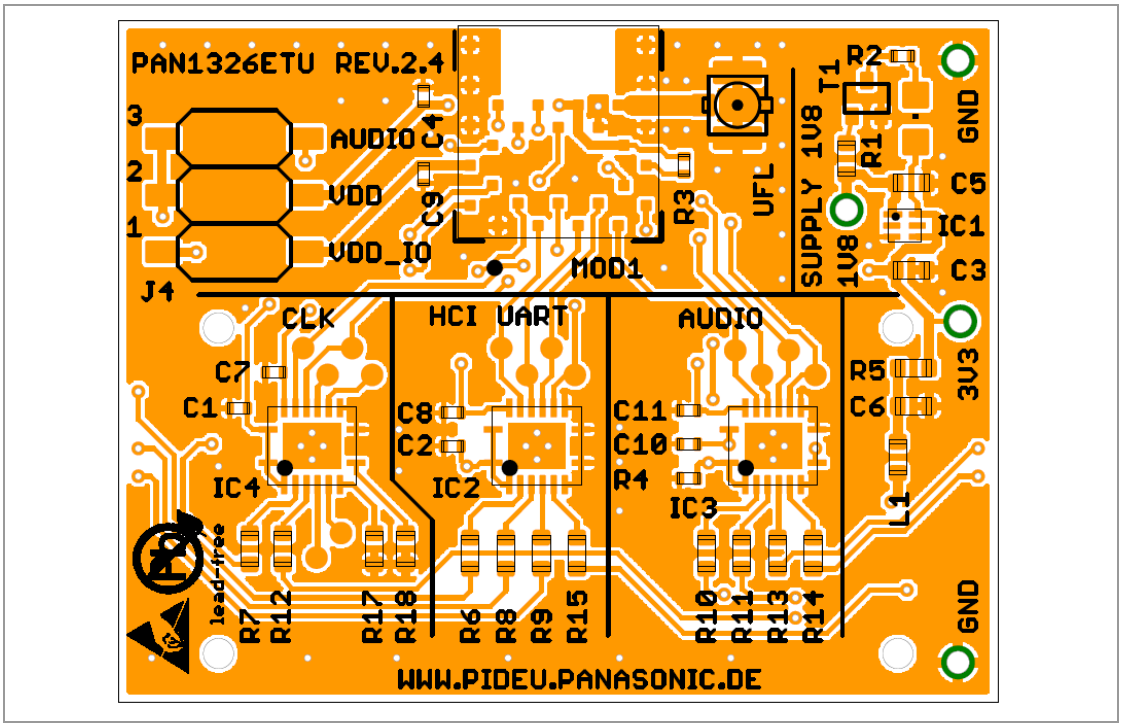
4.1 Schematic



4.2 Breakout Board

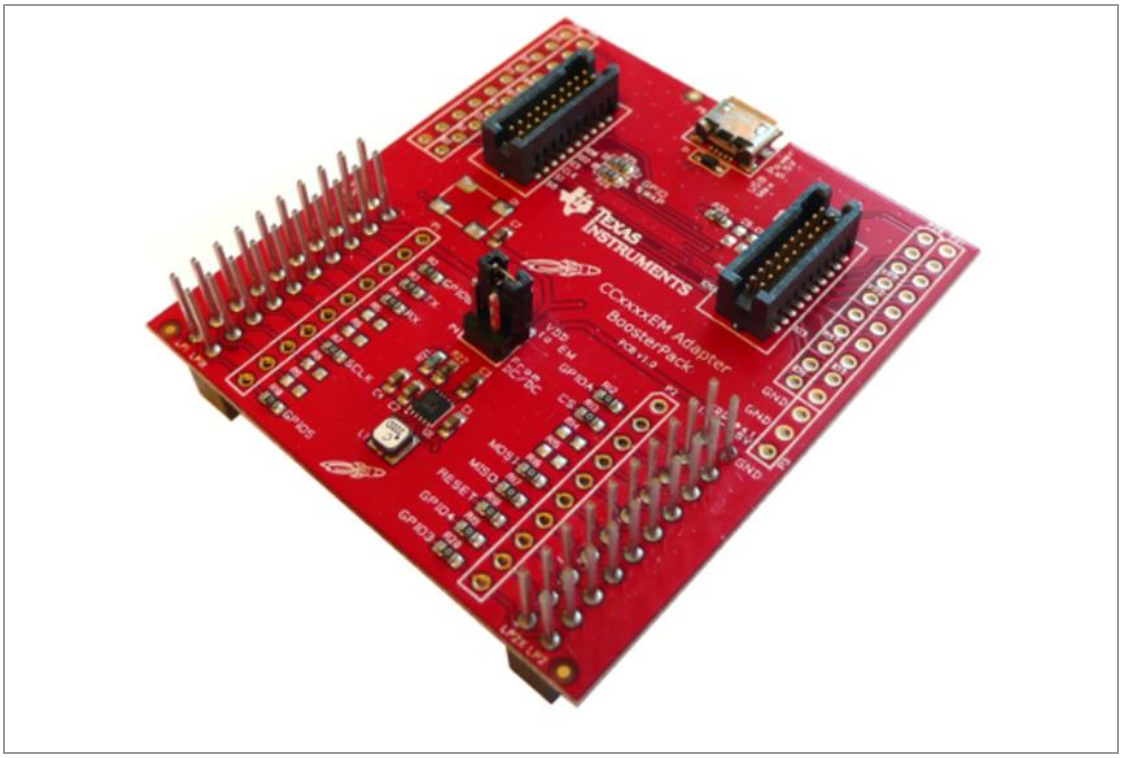


4.3 Component Placement

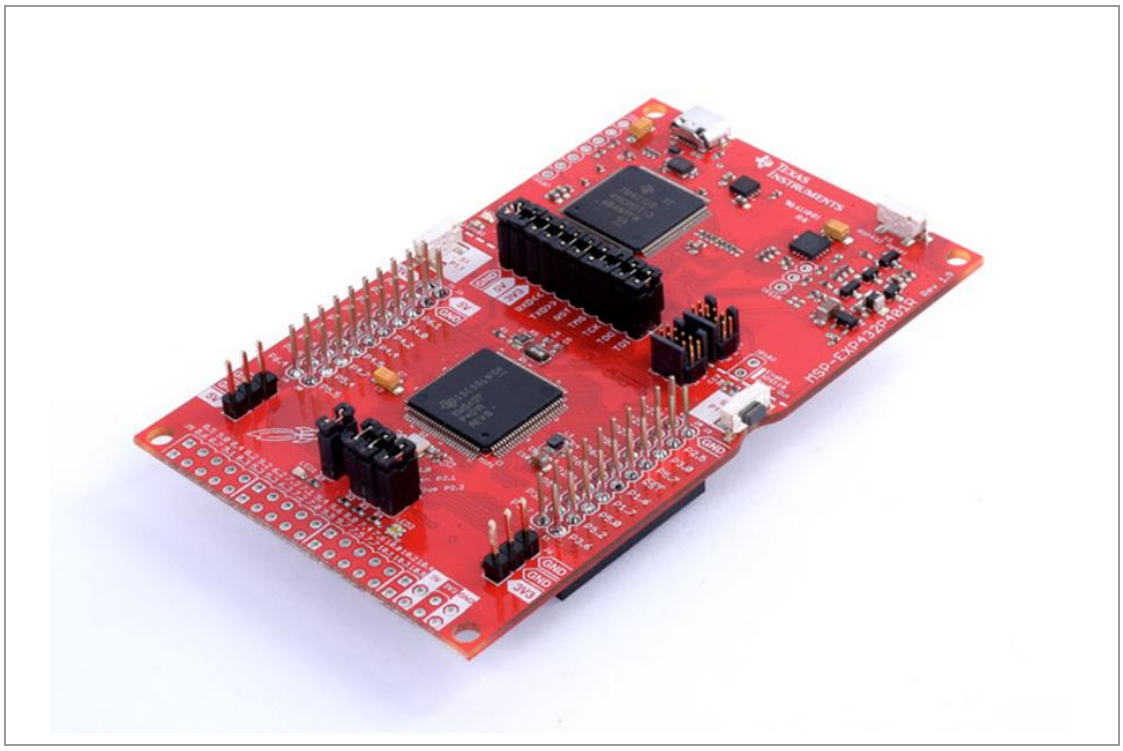


4.4 EM Adapter BoosterPack

If the adapter board is purchased directly via Texas Instruments or a related distributor, the crystal oscillator next to C7 is not equipped. Please be aware, that in this case the 32 kHz slow clock is missing and must solder on the board.



4.5 MSP432 Launchpad



For detailed information about the installation and tools, please refer to the Texas Instruments website http://www.ti.com/.

5 Restricted Use

5.1 Life Support Policy

This Panasonic Industrial Devices Europe GmbH product is not designed for use in life support appliances, devices, or systems where malfunction can reasonably be expected to result in a significant personal injury to the user, or as a critical component in any life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

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Transfer, export, re-export, usage or reselling of this product to any destination, end-user or any end-use prohibited by the European Union, United States or any other applicable law is strictly prohibited.

6 Appendix

6.1 Ordering Information

Variants and Versions

Order Number	Brand Name	Description	MOQ[1]
ENW89819AYKF	Experimenter Kit	1× PAN1326C2 Breakout Board 1× Texas Instruments MSP430 Launchpad 1× Texas Instruments Boost/CCEMAdapter	1
ENW89819AXKF	1326C2 Breakout Board	1× PAN1326C2 Breakout Board	1

[1] Abbreviation for Minimum Order Quantity (MOQ). The default MOQ for mass production is 1 500 pieces, fewer only on customer demand. Samples for evaluation can be delivered at any quantity via the distribution channels.

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 website "Sales & Support" 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