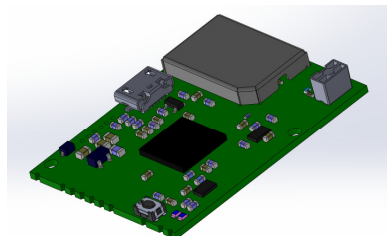
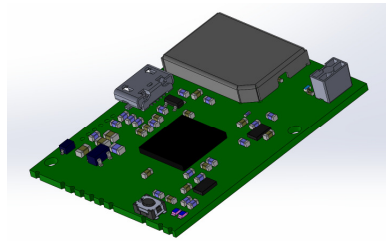


Piri 2096 Manual



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1.0 General Information

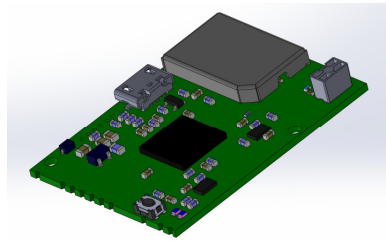
This document is intended as a manual to describe how to integrate the Piri 2096 radio module in end products.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation

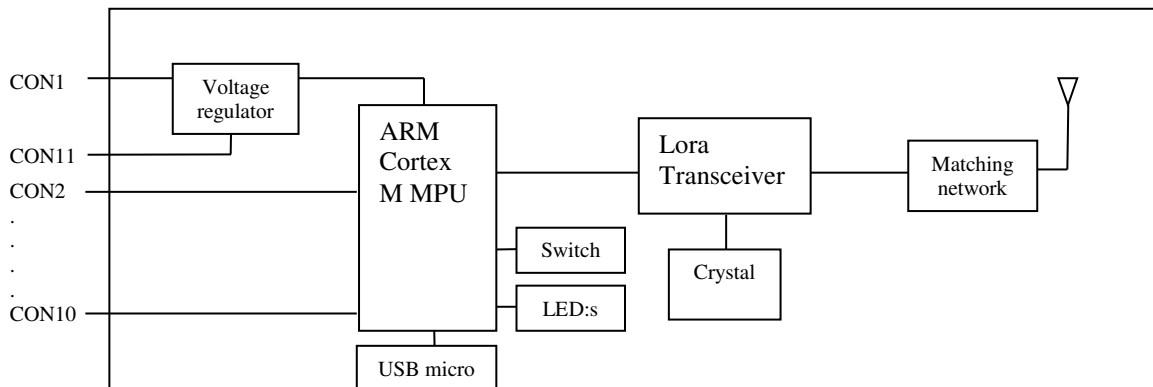
1.1 Reference

- [1] 2096-100 Schematic
- [2] 2096-103 PCB layout



2.0 Description of module

The module utilize Lora modulation that uses Chirp Spread Spectrum modulation (CSS) for RF communication at 2.4 GHz and ARM Cortex M MPU as the controller for the RF circuit.



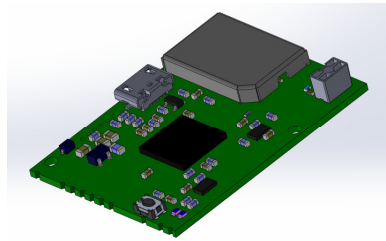
Block diagram

The module is preprogrammed with Piri proprietary communication stack with API for easy implementations of function based module design and general GPIO:s along with external/integrated reset/factory restore function and indication LED:s for communication status. The connection can be either by PCB edge connectors or through the optional flex strip connector (J1).

The system is over air upgradable without loss of functionality during process on both stack and user module.

The module can be used for different control applications that needs secure communication channels. Automatic provisioning of module at installation site for minimum work effort on site.

The module has integrated antenna. Other antenna solutions are not allowed.



2.1 Communication Frequency and Settings

The communication frequency spans over the 2402->2480 MHz band.

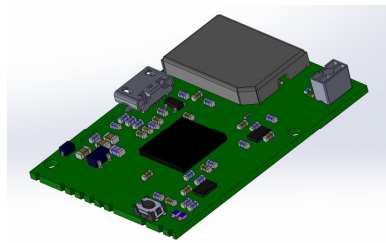
All Piri systems are geo positioned before RF communication can start as it automatically selects the regional settings required for compliance with RF communication in different regions.

2.2 Transmission

The module utilize LBT/FHM time slot based protocol to handle the transmission between devices.

2.3 Master->slave

The Piri system uses Master->Slave communication protocol to reduce re-transmission and structure the communication into predefined transmission slots so it can handle large amount of radio devices simultaneously.



3.0 Specification

3.1 Electrical

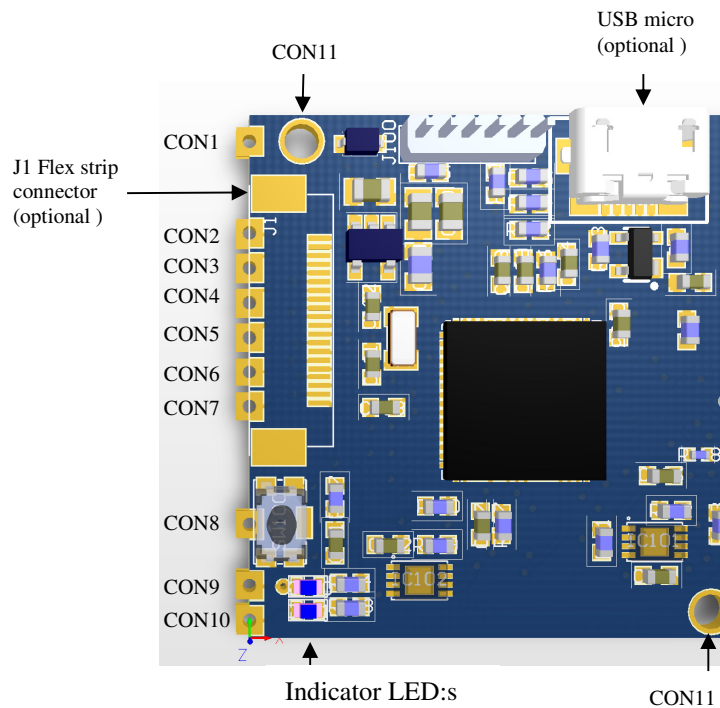
Voltage input range of 4.5->12VDC.

Current consumption: <30 mA

Communication signals: 3.3V

3.2 Electrical connections

Connection	Function
CON1	VCC
CON2	GPIO
CON3	GPIO
CON4	GPIO
CON5	GPIO
CON6	GPIO
CON7	GPIO
CON8	GPIO
CON9	GPIO
CON10	GPIO
CON11	GND

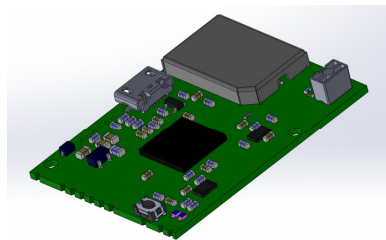


3.3 Environment

The module is intended for indoor usage:

Operational temperature: 0 ->60 degrees

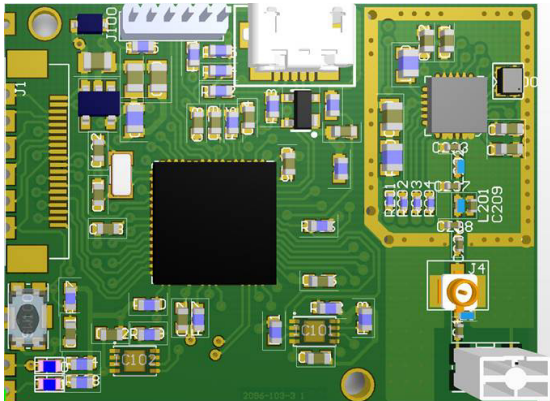
Humidity: 20->80 % (non-condensing)



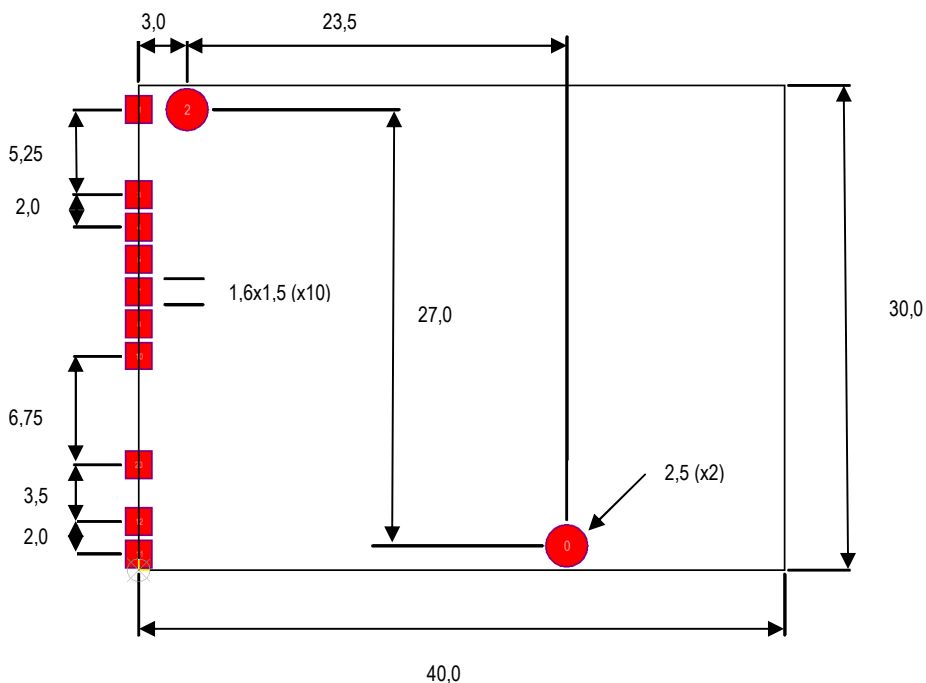
3.4 Mechanical and installation

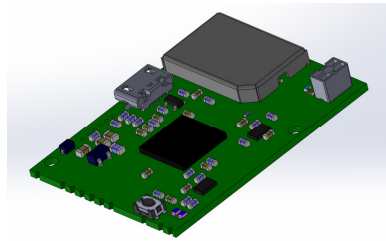
As the module is intended for different solutions the mechanical structure is done so it can be both mounted as a SMT mountable component, as a remote positioned part within the system with flex strip or by USB micro connection.

Size (Width x Length x Height): 30 x 40 x 5.5 mm

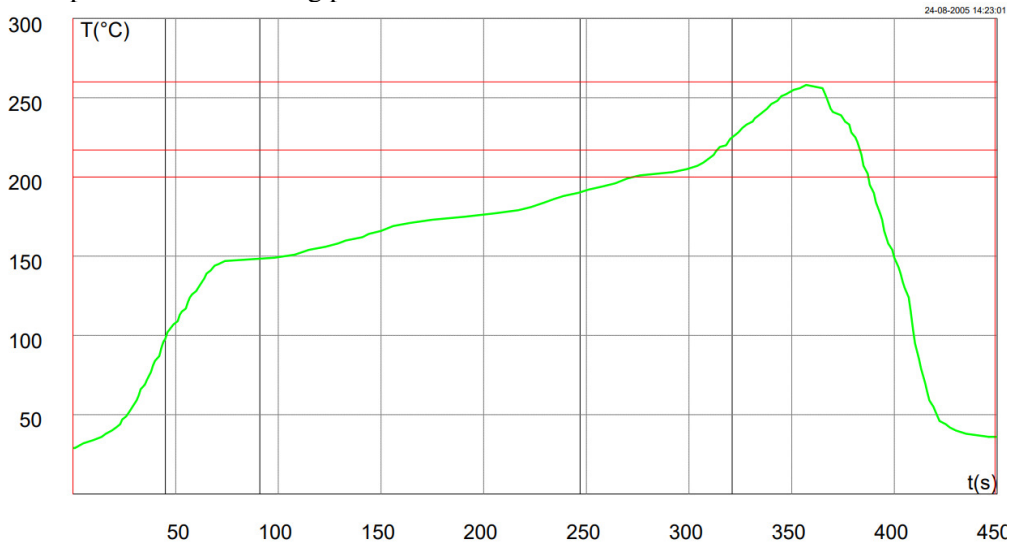


For SMT mounting the following PCB footprint can be used (mm):





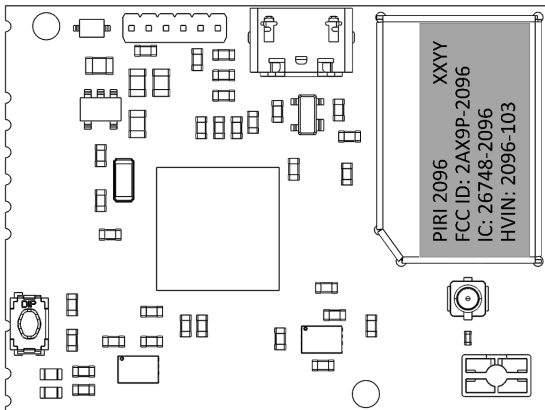
Example of SMT soldering profile is shown below



Do not exceed peak temperature and slope time between preheat and peak solder zone.

3.5 Label

The module is fitted with an identifying label on the RF shield box as shown on picture below.



Label information contains following:

PIRI 2096: Product Marketing Name

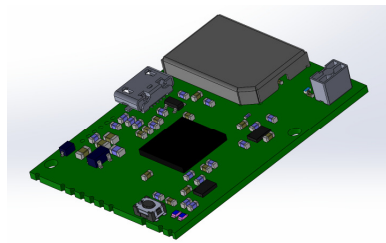
XX: Production year

YY: Production week

2AX9P-2096: FCC ID

26748-2096: ISED Certification number

2096-103: HVIN



3.6 Pictures

Picture of radio module.



4.0 Module features

4.1 Connectors

The module has a number of communication I/O:s that can be used in order to communicate with the controller through the flex strip connector J1 [1] or the castellated connection points on the PCB [2].

A connector pad J4 [1] is on the PCB for evaluation of environmental introduced RF properties.

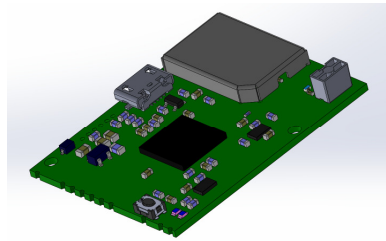
The USB connector and J1 is an option. The J100 and J4 connector is only used for development purpose and not mounted on the production units.

4.2 Reset button

The module is optionally fitted with a reset or factory restore button SW100 [1]. To factory reset the device press the button while turning on the power to the device. Indicator LED:s will toggle when factory reset has been performed.

4.3 Indication LED:s

The module is fitted with 2 LED indicating status of unit and communication D100, D101 [1].



5.0 Compliance Information

5.1 Federal Communication Commission (FCC) Statement



Compliance statement

This device complies with part 15 of the FCC Rules. Operations is subjected to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) This device must accept any interference received, including interference that may cause undesired operation.

Warning

Changes or modifications not expressly approved by Nordic Light AB could void the user's authority to operate the equipment.

FCC Interference statement

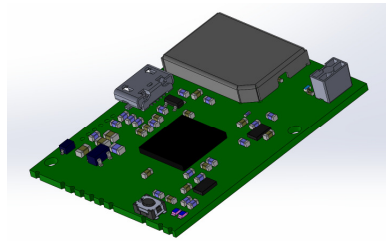
This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

Reorient or relocate the receiving antenna.
Increase the separation between the equipment and the receiver.
Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
Consult the dealer or an experienced radio/TV technician for help.

It is the host manufacturer's responsibility to ensure continued compliance with FCC requirements once the module has been installed in to the host product.



5.2 Innovation, Scientific and Economic Development Canada (ISED) Statement

Radiation Exposure Statement for Canada

This device complies with the Industry Canada's licence-exempt RSSs. Operation is subjected to the following two conditions:

- (1) This device must not cause interference.
- (2) This device must accept any interference, including interference that may cause undesired operation of the device.

This equipment is exempt from the routine RF exposure evaluation requirement of RSS-102. This equipment should be installed and operated with a minimum distance of 20 cm between the antenna and the user or bystanders.

Le present appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:

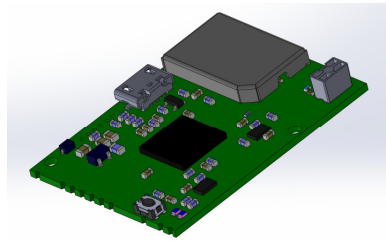
- (1) L'appareil ne doit pas produire de brouillage.
- (2) L'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Ce matériel n'est pas sujet à l'évaluation habituelle d'exposition RF selon RSS102. Ce matériel devrait être installé et exploité en gardant une distance minimale de 20 cm entre l'antenne et l'utilisateur ou les spectateurs.

Antenna warning

PIRI 2096 has been approved by ISED to operate with the on board antenna. Any modifications on the antenna on this device are strictly prohibited.

Le PIRI 2096 a été approuvé par ISDE pour fonctionner avec l'antenne embarquée. Toute modification de l'antenne de cet appareil est strictement interdite.



5.2 End Product Labeling

PIRI 2096 has been labeled with its own FCC ID and IC Certification number. The end product manufacturer must ensure that FCC and ISED labeling requirements are met. If the FCC ID and IC Certification number of PIRI 2096 are not visible when the module is installed in another device, then the device must have a clearly visible label containing the following information.

PIRI 2096 a été étiqueté avec son propre ID FCC et son numéro de certification IC. Le fabricant du produit final doit s'assurer que les exigences d'étiquetage FCC et ISDE sont respectées. Si l'ID FCC et le numéro de certification IC du PIRI 2096 ne sont pas visibles lorsque le module est installé dans un autre appareil, alors l'appareil doit avoir une étiquette clairement visible contenant les informations suivantes.

Contains FCC ID: 2AX9P-2096 Contains IC: 26748-2096
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It is the host manufacturer's responsibility to ensure continued compliance with ISED Canada requirements once the module has been installed to the host product.

Il incombe au fabricant de l'hôte assurer la conformité continue aux exigences d'ISED Canada une fois que le module a été installé sur le produit hôte.