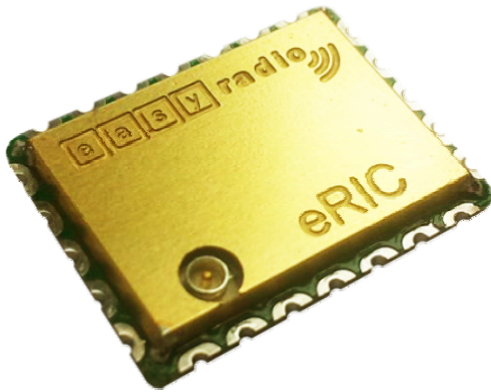




eRIC9 Radio Transceiver

The easy Radio Intelligent Controller (eRIC) radio transceiver module is based on the Texas Instruments CC430F5137 System-on-Chip device to provide an intelligent radio sub-system that combines a high performance RF transceiver, RF band pass filters (BPF), an MSP430 microcontroller, 32Kb flash memory, non-volatile flash storage, temperature sensor, and a low drop voltage regulator. The device operates on the International licence exempt Industrial, Scientific and Medical (ISM) radio bands.



eRIC thus extends the proven easyRadio product line by offering a low cost RF transceiver intended for high volume applications. The compact form factor, surface mount packaging and external antenna connector simplify product design and manufacture and provide for flexible placement of the module within an end product.

Features

- Default 'easyRadio' Protocol Embedded
- ISM Frequency Bands
- Radio Compliance FCC/IC/CE
- Small 15x20x2.2mm Surface Mount Device (SMD)
- Low power operation modes
- eROS Operating System & Application partitions
- Configurable & programmable User I/O
- AES 128 bit data encryption
- Built in Temperature Sensor

Benefits

- Simple serial data in/data out user interface and configuration
- 868MHz (UK & Europe), 908-922MHz (USA)
- Meets ETSI (Europe) & FCC Certified (USA) requirements
- Simplifies product design and manufacture
- Battery powered applications
- Can eliminate need for external application processor
- Minimises external hardware requirements for custom applications
- Secure communications
- Environment monitor

easyRadio Operating System (eROS)

eRIC's processor memory is partitioned and embedded with a protected version of the easyRadio Operating System (eROS) that handles all the complex radio functions and thus eliminates the need for the user to program multiple control registers and understand their interaction. The other partition provides an optional user accessible application code area.

Radio parameters such as frequency, channel, output power and data rate are passed by the application code and radio data is sent and received in the background by simply calling predefined functions.

Also provided is a simple to use API that replaces low level chip specific code with intuitive pin commands that allow the multiple general purpose I/O pins and internal function blocks to be configured and interfaced to external hardware. These built in functions make customisation easy for the novice and powerful for advanced programmers. This architecture can eliminate the need for a separate application microcontroller and thus minimises cost and power consumption for simple 'sense and control' RF nodes such as might be employed within the 'Internet of Things'.

By default (factory settings) the application code area is pre-programmed with a subset of the familiar easyRadio command and communication software that allows key operating parameters such as operating frequency, RF power output and host communication settings to be (optionally) pre-configured using the 'easyRadio Companion' software or to be dynamically changed using simple serial commands sent from the host processor. This allows multiple eRIC devices to communicate free from interference with each other and other local RF devices.

In the default application mode, data is sent to and received from host processors or devices using 3.3V logic level serial data (inverted) with packet sizes up to 250 bytes.



When power is first applied to the module the processor retrieves 'calibration' data for the RF section that compensates for temperature and power supply voltage variations. The transceiver will then be ready to transmit or receive (default) and would normally be left in this state, ready to receive data.

The internal Vreg is not brought out to a specific pin/pad. Should there be need to connect external pull up resistors then connection should be made to a spare GPIO pin/pad configured as a 'High' Output.

Power Supply

The supply used to power the transceiver should be 'clean' and free from ripple and noise (<20mV p-p total). It is suggested that 100nF ceramic capacitors be used to de-couple the supply close to the power pins of the transceiver. The use of 'switch mode' power supplies should generally be avoided as they can generate both conducted and radiated high frequency noise that can be very difficult to eliminate. This noise may considerably reduce the performance of any radio device that is connected or adjacent to such a supply.

FCC INFORMATION (USA) FCC STATEMENT

1. 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.

(2) This device must accept any interference received, including interference that may cause undesired operation.

CAUTION: Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: 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 or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and 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.

OEM INTEGRATION INSTRUCTIONS:

The module was tested under the FCC rules for a Modular Approval and therefore the following shall apply:

- Provided that the antenna, antenna to module cable and tuning network have not been changed in any way, If the antenna used does not meet the restrictions, additional testing is required. The final end product must be labeled in a visible area with the following:

"Contains FCC ID: SLW-ERIC9".

- The End User/ Manufacturer, will not need to repeat the intentional emissions testing (actual radio certification), however the un-intentional emissions testing will need to meet the FCC requirements with the module installed into the final assembly or product.

- However, in many cases, the module may need to be retuned, due to the affects of the product enclosure and assemblies within this enclosure, and the de-tuning affect that this may have on the radio circuitry. In this case and if other radio exist, C2PC is required.

- In the event that the OEM modules Kit is modified in any way, the radio transmitter is integrated into the OEM's final product, Radio Certification is required for the final product.

- The software provided for firmware upgrade will not be capable to affect any RF parameters as certified for the FCC for this module, in order to prevent compliance issues.



Disclaimer

Low Power Radio Solutions Ltd has an on-going policy to improve the performance and reliability of their products; we therefore reserve the right to make changes without notice. The information contained in this data sheet is believed to be accurate however we do not assume any responsibility for errors or any liability arising from the application or use of any product or circuit described herein. This data sheet neither states nor implies warranty of any kind, including fitness for any particular application.

easyRadio modules are a component part of an end system product and should be treated as such. Testing to fitness and field testing is the sole responsibility of the manufacturer of the device into which easyRadio products are fitted. Any liability from defect or malfunction is limited to the replacement of product ONLY, and does not include labour or other incurred corrective expenses. Using or continuing to use these devices hereby binds the user to these terms.



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