



eRIC Development Kit

The eRIC Development Kit provides a platform for the test and evaluation of eRIC radio transceivers and allows demonstration of the transfer of serial data over the RF link and simple manual/auto transmit/receive modes.

The kit comprises:

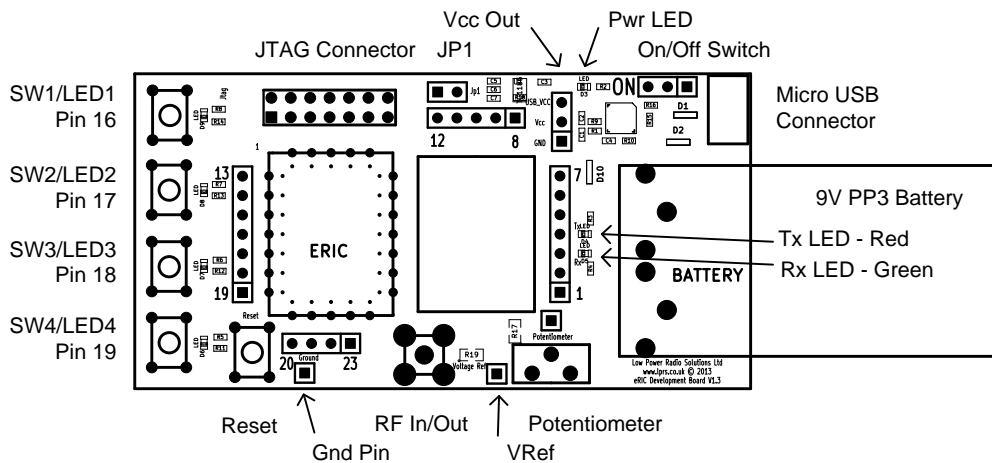


- Two eRIC400 (400MHz) or eRIC900 (900MHz) RF Transceiver modules
- Two eRIC Development boards
- Two matching antenna (400/900MHz) with SMA (Male) connectors
- Two 9V Alkaline PP3 Batteries
- Two USB Type A to Micro-B USB connector jump leads for connection to PC
- One 'Wireless Mike' 4GB USB memory stick containing data sheets and software

Using this kit together with the supplied 'easyRadio Companion' software, connection can be made to the eRIC modules allowing the default operating frequency (channels), RF power output, 'Over Air' and Host serial communication rates to be configured and changed.

Development Board Description

N.B. Board supplied may differ slightly from illustration



Feature	Description
SW1/LED1 to SW4/LED4	Momentary push button switch and LED indicator connected to eRIC I/O pins
JTAG Connector	TI compatible JTAG programming connector
JP1	Bootloader enable jumper. Jumper in place to enable bootloader mode
Vcc Out	5V or 3V3 (20mA max) outputs and Gnd Ref for powering external circuitry
Pwr LED	Indicates that board is powered
On/Off Switch	Board power On/Off
Micro USB Connector	USB Serial Data and 5V USB power
Battery	9V PP3 battery for board power
Tx LED (Red)	Indicates serial USB data activity
Rx LED (Green)	Indicates eRIC receive data activity
Potentiometer	Provides variable voltage output on adjacent pin for testing A-D etc.
VRef	'Top' of potentiometer. Connect to Vcc Out pin 5V/3V3 or other voltage
RF In/Out	50R SMA Female RF connector for antenna or test equipment connection
Gnd Pin	0V Gnd reference for 'scope or other test equipment.
Reset Switch	Momentary push button eRIC reset switch



Notes

The eRIC development board is provided with both a 'spring pinned socket' and an area/pads for the alternative and permanent SMD mounting of eRIC. All eRIC pins (1–23) are brought out to Single In Line (SIL) turned pin sockets allowing easy interconnection to external prototype/development circuitry via jumper wires.

The board can be powered either by the PC USB connection (5V) or for portable/remote range testing by the supplied 9V PP3 battery.

An onboard FT230 device provides a USB to serial connection to a host PC or other device and is used both for sending and receiving serial data to eRIC, sending configuration commands and at a later stage for programming the 'flash' memory of the device using the embedded bootloader software.

Status LEDs are used to indicate presence of board power and both transmitted and received serial data activity. Four of the I/O pins are connected to pushbutton switches/LEDs to provide useful user input/outputs for test and demonstration during later application development.

Users in the United States using eRIC9 modules should permanently connect eRIC pin 14 (Frequency Select Pin) to 0V (Gnd). This action will change the default operating frequency from 869.75 MHz to 915.00 MHz and reduce the default transmit power output from +7dBm to -3dBm.

Check and Set Up the Development Boards

- Inspect the boards and familiarise yourself with the layout.
- Insert the eRIC modules into the spring clips and carefully press down until the module 'snaps' in place. Note the orientation of the eRIC module – Pin 1 is adjacent to the UFL RF connector. After multiple insertions and removals the spring clips may need to be carefully re-tensioned by bending them gently inwards to maintain contact with the castellated half pads.
- Check that the Bootloader jumper (JPI) is **not** in place. (Pins not bridged)
- Screw the supplied whip antennas into the SMA RF connectors.
- Note that in operation the boards should be separated by a minimum distance of about 30cm (12 inches) to prevent RF front end overload (swamping).

Demonstration Modes

To allow stand-alone (portable) operation for range testing etc. without the need for a host PC, the built in demos are accessed as follows:

- Power the eRIC Development boards by either connecting the supplied 9V PP3 batteries or connecting the boards to a PC USB port via the supplied USB adapter leads.
- Ensure that the miniature power slide switch is 'On' and check that the Red power LEDs light.
- To enter demonstration mode(s) press and hold down Switch 1. Whilst holding down Switch 1, momentarily press and release the red reset button, now release Switch 1. The blue LEDs 3 & 4 will flash twice indicating demonstration mode is now active.
- Decide which board is to be the 'receiver', then press and release Switch 3 to select 'Receive' mode for this board.
- To select 'Manual Transmit' mode on the other (transmitter) board repeat the initial procedure then press and release Switch 2. Any button now pressed on this transmitter board will be remotely 'echoed' on the receiving board by a corresponding LED indication.
- To select 'Automatic Transmit' mode on the other (transmitter) board repeat the initial procedure then press and release Switch 4. The transmitting board will then display an incrementing binary pattern on the local LEDs that will be 'echoed' on the receiving board by a corresponding LED indication. This mode is useful for performing battery powered 'walkabout' range tests.

To return the boards back to the default easyRadio mode, simply press and release the red reset button.

easyRadio Mode

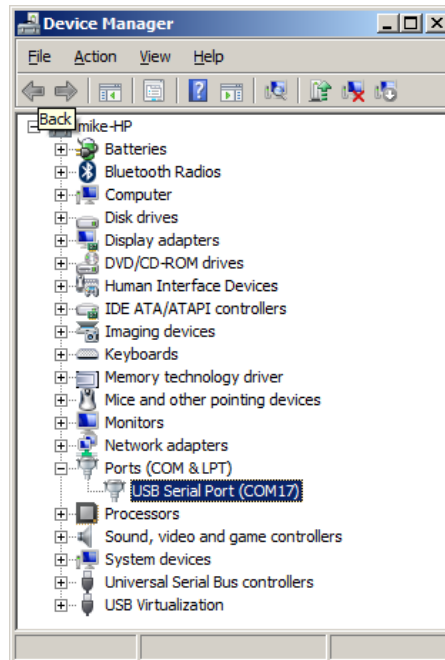
The modules supplied with the eRIC development kit are embedded with a subset of the LPRS easyRadio Operating System (eROS). This provides a serial connection to 'easyRadio Companion' software running on a Windows PC or any application software running on any device that generates and processes serial data.

The PC software should be installed and configured as detailed below:

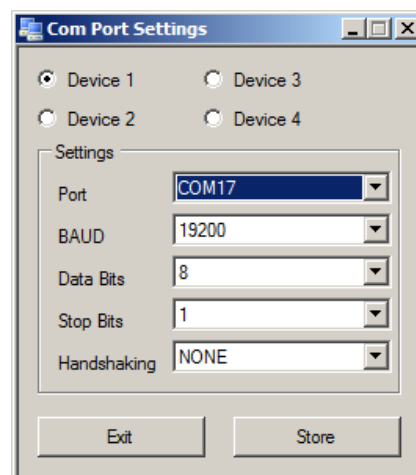
- If running Windows XP on your PC download the FTDI Virtual Com Port Drivers from: <http://www.ftdichip.com/Drivers/VCP.htm> and install as instructed. The drivers are already provided within Windows Vista, Windows 7 & 8 Operating Systems.



- Download the 'easyRadio Companion Software' from: <http://www.lprs.co.uk/easy-radio/downloads.html> or copy the file from the supplied 'Wireless Mike' USB stick and double click to install. Follow the prompts.
- Using the supplied USB jumper cables, connect the Development boards to the PC (or PCs). Switch the board On.
- After initial connection the PC may report that it is 'Installing Drivers'. Wait until this has completed and then check Windows Device Manager and note the allocation of the (USB) Com port. Com17 is shown in the screen shot below:



- The second development board can be connected to another spare USB port on the same PC in a similar manner and it will be allocated another unique Com port. Note that, as before, the two boards should be separated by a minimum distance of 30cm (12 inches) to prevent RF overload.
- Now run the 'easyRadio Companion Software'. Configure the serial ports in 'Settings/RS232 Settings' to match those previously noted in Device Manager. Select 'Device 1' button, press Store (to save) and then Exit. Repeat this procedure if a second board is connected, but in this case select 'Device 2'.



Then:

- Momentarily press and release the Reset button on both Dev Boards.
- Sending any command from 'easyRadio Companion Software' will confirm communication with the module.

Experiment with the various available commands but always ensure that both modules are set to either the same or compatible settings.

Further general information on the use of 'easyRadio Companion' software can be found in 'easyRadio Advanced RF Modules – Your Quick Start Guide' that is available from:

<http://www.lprs.co.uk/easy-radio/downloads.html>



Programming eRIC

Advanced users can write user application programs for eRIC that can be compiled, downloaded and run using the Texas Instruments TI Code Composer Studio (CCStudio) Integrated Development Environment (IDE). This can be downloaded from:

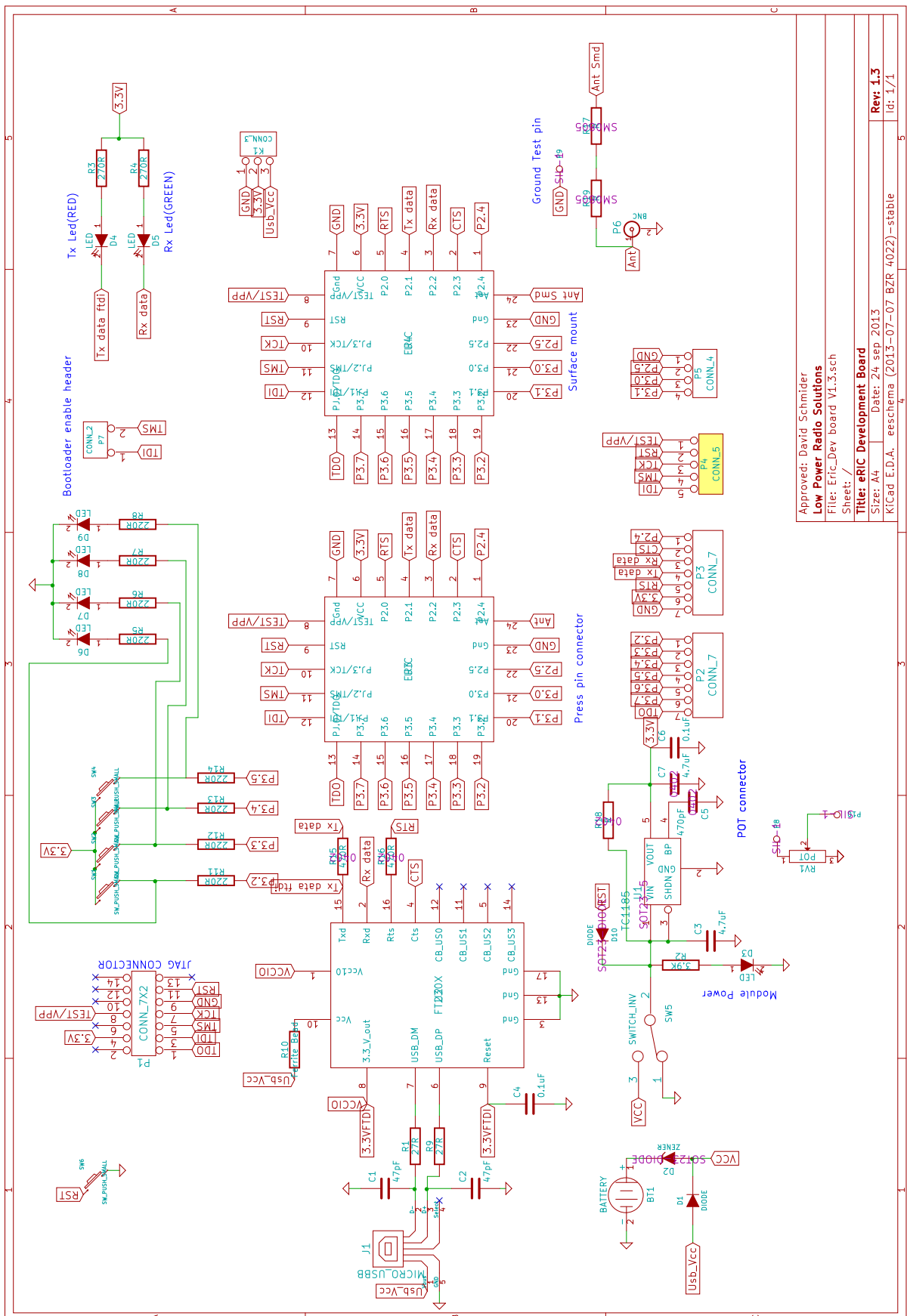
<http://www.ti.com/tool/ccstudio>

Please read the eRIC Tutorials 1, 2 & 3 for help on the installation and the use of CCStudio with eRIC.

<http://www.lprs.co.uk/easy-radio/downloads.html>



Schematic



Approved: David, Schmitter
Low Power Radio Solutions
File: Eric_Dev board V1.3.sch
Sheet: /
Title: eRIC Development Board
Size: A4 Date: 24. sep. 2013
KICad E.D.A. eschema (2015-07-07 BZR 4022) -stable
Rev: 1.3
Id: 1/1



eRIC Development Kit

Product Order Codes

Name	Description	Frequency	Order Code
eRIC Dev Kit	eRIC Development Kit including two eRIC400 modules*	433MHz	eRIC4-DK
eRIC Dev Kit	eRIC Development Kit including two eRIC900 modules*	868/915MHz	eRIC9-DK

Document History

Issue	Date	Notes/Comments
Preliminary 0.1	July 2013	Preliminary Draft
VI.0	February 2014	Release
VI.1	February 2014	Minor additions and clarifications.
VI.2	May 2014	Simplified access to Demo modes

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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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