.en

Eval-Kit Qi-Wireless Power

■ **free up your energy**

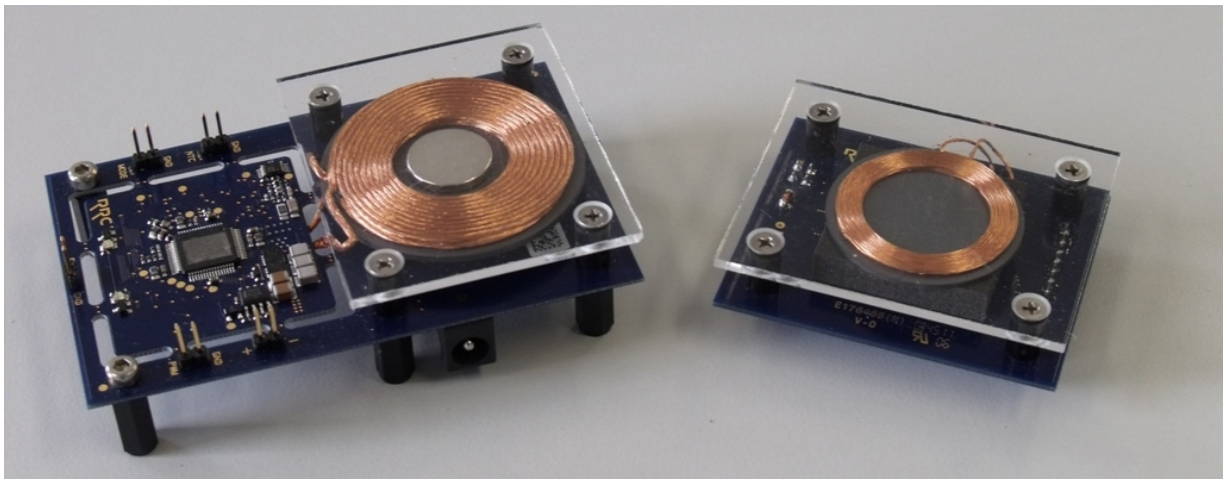
IMPORTANT NOTICE

RRC Power Solutions (RRC) provides the enclosed product(s) under the following conditions:
This evaluation board/kit is intended for use for **ENGINEERING DEVELOPMENT, DEMONSTRATION, OR EVALUATION PURPOSES ONLY** and is not considered by RRC to be a finished end-product fit for general consumer use. Persons handling the product(s) must have electronics training and observe good engineering practice standards. As such, the goods being provided are not intended to be complete in terms of required design, marketing, and/or manufacturing related protective considerations, including product safety and environmental measures typically found in end products that incorporate such semiconductor components or circuit boards. This evaluation board/kit does not fall within the scope of the European Union directives regarding electromagnetic compatibility, FCC or UL, and therefore may not meet the technical requirements of these directives or other related directives.

Qi (pronounced "chee" and choosen by the Wireless Power Consortium) is the sign of interoperability between power transmitters and power receivers.

Content Eval-Kit Qi-Wireless Power

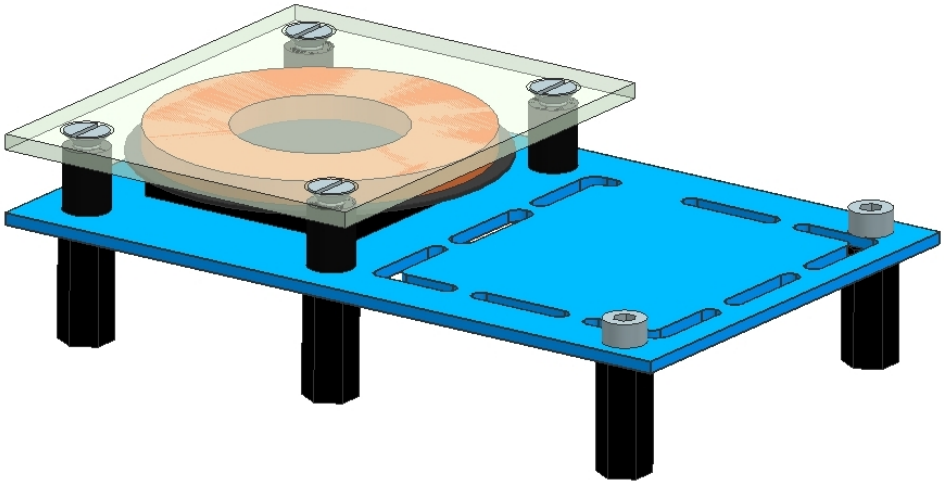
- 1 power transmitter
- 1 5V/1A* power receiver
- 1 universal AC adapter (19VDC output voltage)
- 1 SMT pin header 2.54mm (10pin / 7pin)
- 1 SMT pin socket 2.54mm (10pin)
- 1 brief instruction sheet in German, English and Japanese



Transmitter (left) and Receiver (right) of the eval-kit

* 0.84A as stand alone demonstration kit with active LED's

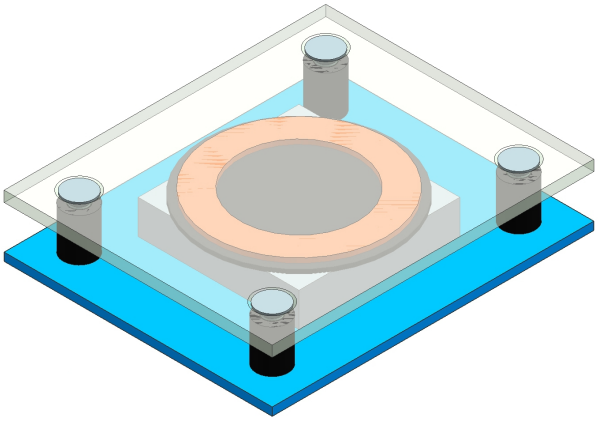
Power Transmitter



Features:

- Plug and play power transmitter
- Separable PCB to modify the eval-kit to an embedded power transmitter in a customer application
- I²C Interface
- Integrated safety functions
    - Automatically identification of a power receiver
    - Continuous receiving of status information from the power receiver
    - Foreign object detection
    - Monitoring of input voltage and input current

Power Receiver



Features:

- Qi certified plug and play power receiver
- Ultra bright high power LEDs indicate the power reception
- Controlled 5V output voltage
- 5W output power
- I²C Interface
- Integrated safety functions
    - Continuous transmitting of status information to the power transmitter
    - Over and under voltage protection

Directions for use

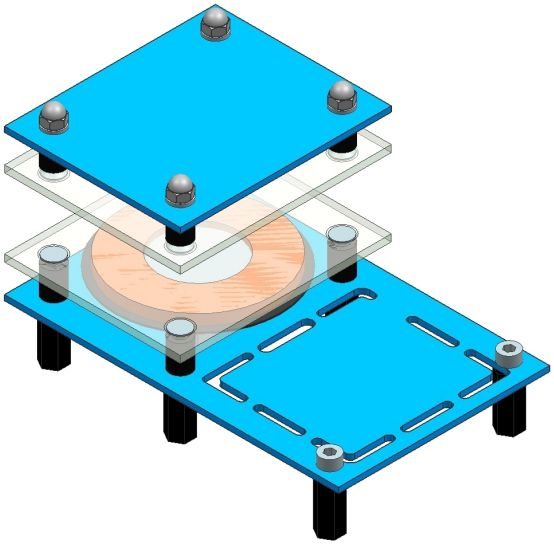
How to use as stand alone plug and play demonstration kit

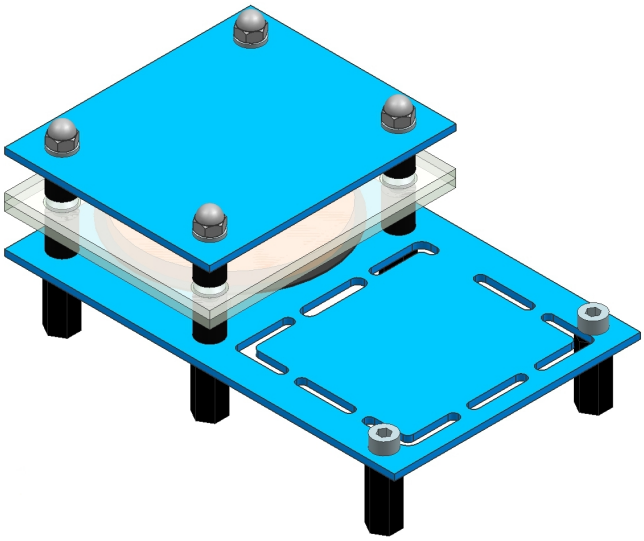
1. Choose the right wall plug for the enclosed universal AC adapter.

2. Connect the universal AC adapter to the power transmitter and the wall socket. The device is in stand by mode. The power transmitter waits for the positioning of a receiver. The power consumption is minimized.

3. The acrylic glass surface covers the transmitter coil. Put the coil of the power receiver, also covered by an acrylic glass surface, on it.

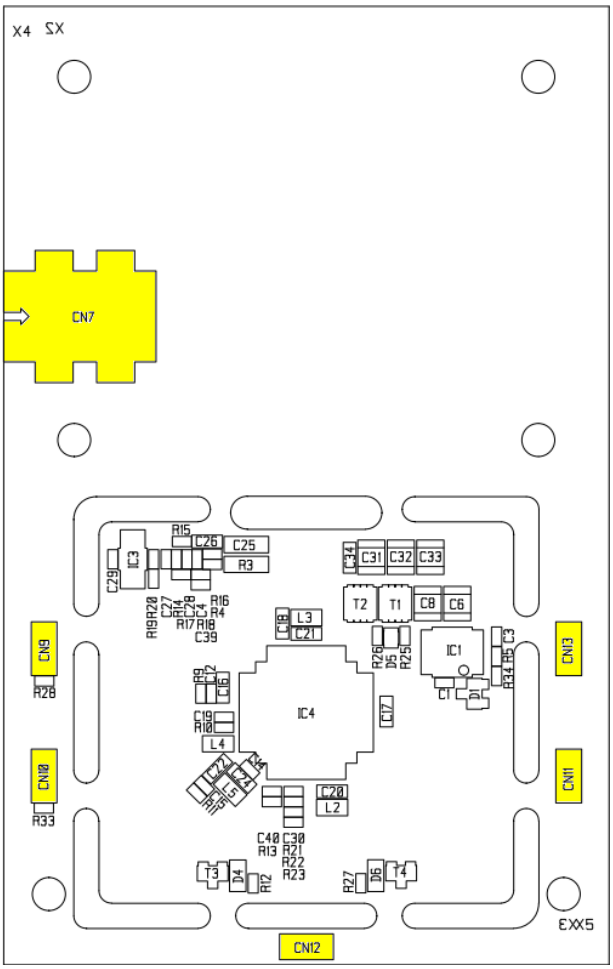
4. After the correct identification of the receiver, the power transmitter powers the ultra bright LEDs. The power consumption of these LEDs is approximately 800mW.



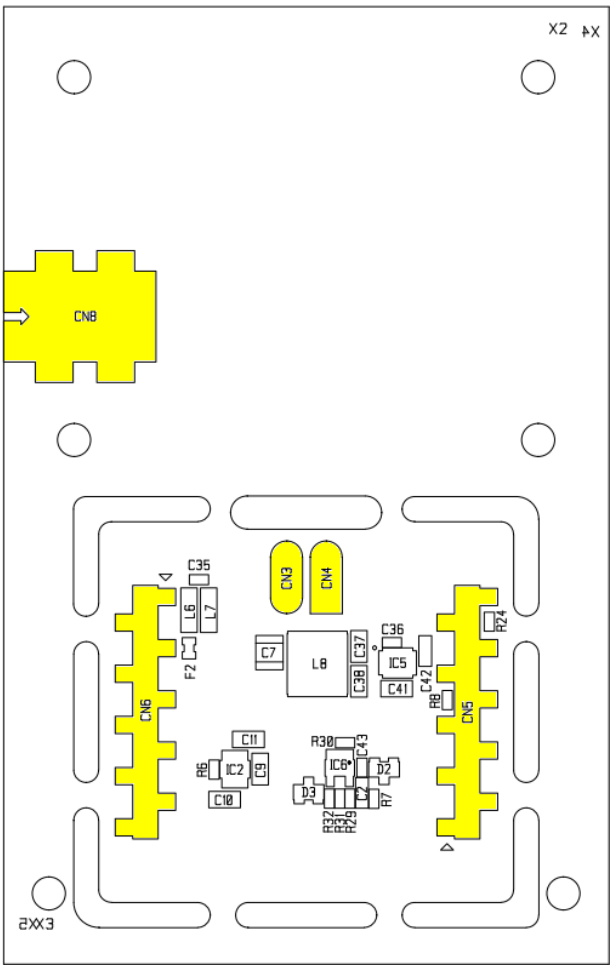


How to embed the power transmitter in a customer application

Caution: Do not extend the wires between the coil and the PCB. The voltage at the resonant circuit may exceed 75Vrms.



Top Placement



Bottom Placement

Description of steps

Remark: Use proper tools!

1. Disconnect the power transmitter from the universal AC adapter.

2. If necessary, solder the enclosed SMT Pins to the board (CN5/CN6). You can find a detailed description of all connections below.

3. Unscrew and remove the four screws and the acrylic glass surface.

4. Cut through the eight small bonds of the detachable PCB with a small side-cutter or a cutting rotary tool.

5. Mount the Transmitter in your application. For proper power transfer, the distance between the transmitter coil and the receiver coil should not exceed 5mm.

Power Transmitter PCB Connections

CN3/CN4

Coil - D47x1-24µH

CN5

Pin 1	TMS - JTAG interface
Pin 2	TDO - JTAG interface
Pin 3	TDI - JTAG interface
Pin 4	TCK - JTAG interface
Pin 5	TRST - JTAG interface
Pin 6	GND
Pin 7	Vcc - internal 3.3V DSC supply
Pin 8	SCL - I^2C communication clock
Pin 9	SDA - I^2C communication data
Pin 10	ADC - analog input and/or external voltage reference

CN6

Pin 1	19VDC - supply voltage
Pin 2	GND
Pin 3	19VDC - supply voltage
Pin 4	GND
Pin 5	SCI_RX – serial communication interface
Pin 6	SCI_TX - serial communication interface
Pin 7	Vcc - internal 3.3V DSC supply
Pin 8	GND
Pin 9	Digital GPIO
Pin 10	Digital GPIO

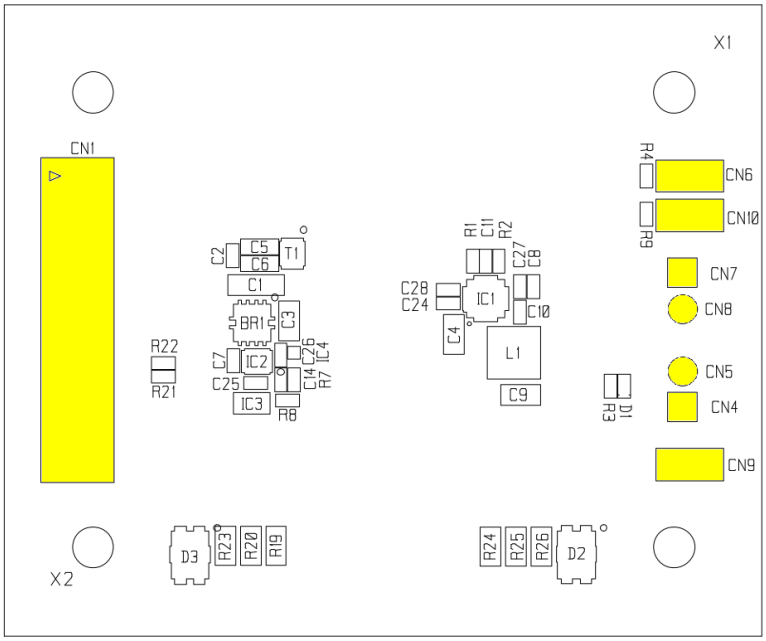
CN7/CN8

Center Pin:	19VDC - supply voltage
Spring Contact:	GND

	= not active

How to embed the power receiver in a customer application

Caution: Do not extend the wires between the coil and the PCB.



Top Placement

Description of steps

Remark: use proper tools!

1. Unscrew and remove the four screws and the acrylic glass surface.

2. Connect your load to CN4 (5V/5W) and CN5 (GND).

3. Mount the Receiver in your application. For proper power transfer, the distance between the transmitter coil and the receiver coil should not exceed 5mm.

Power Receiver PCB Connections

CN1

Pin 1	Vcc - internal 3.3V supply
Pin 2	SWIM - Single Wire Interface Module
Pin 3	Reset - MCU reset
Pin 4	GND
Pin 5	RxD – serial communication interface
Pin 6	TxD – serial communication interface
Pin 7	SDA - I^2C communication data
Pin 8	SCL - I^2C communication clock
Pin 9	GND
Pin 10	5VDC/1A - output voltage

	= not active

CN2/CN3

Coil – D35x08-24µH

CN7

Intermediate bus voltage

CN8

GND

CN4

5VDC/1A -output voltage

CN5

GND

CN6

Mode

CN10

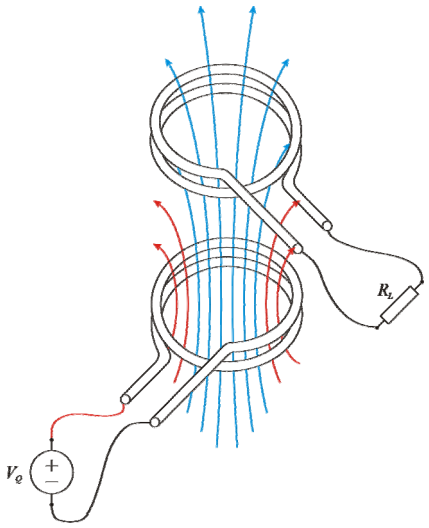
NTC

CN9

OBL
Deactivation of the LEDs

How it works and coil shapes

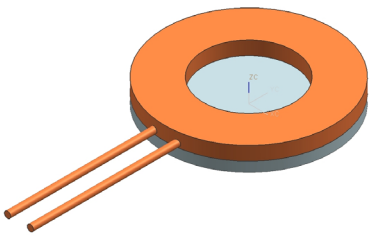
The wireless low power transfer is based upon magnetic near field coupling. Electrical alternating current conduction in a transmitter coil causes a magnetic alternating field around it. With this magnetic field it is possible to induce a voltage at a second receiver coil. If so, the two coils are magnetically coupled. This coupling is used to transfer power from the power transmitter to the power receiver and also to transfer digital data from the power receiver to the power transmitter. This data stream is necessary to control the load-dependence of the uncontrolled output voltage.

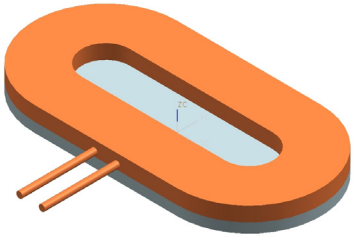


The output power in the power receiver is limited to 5W. The frequency of the alternating current is in the range of 110 to 205kHz.

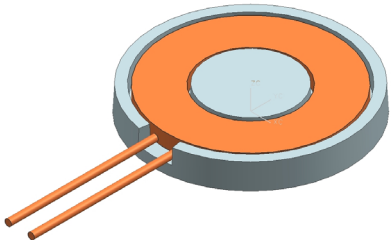
Coil shape possibilities

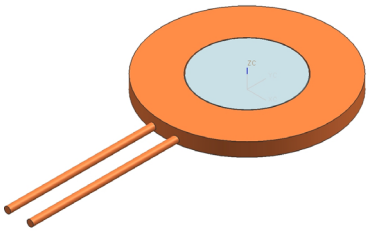
The transmitter coil consists of a circular wire-wound inductor with a diameter of 43mm and a ferromagnetic shield. The circular shape of the inductor has benefits due to the rotation symmetry of it. In cases where this rotation symmetry is not practical and/or a mechanical structure arranges the alignment of the transmitter and the receiver, other shapes may generate similar performance and fit better to the application.



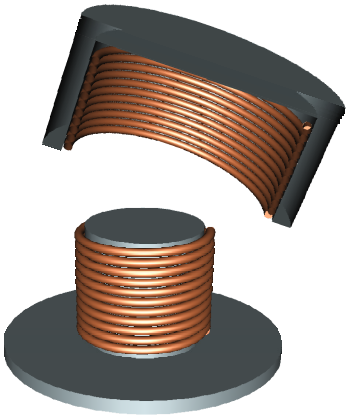


Furthermore, an extension of the planar ferrite shield to a pot core may generate a smaller leakage field. This becomes noticeable at the total system efficiency, the electromagnetic compatibility and the ability of transmitting power. In other cases, where a very thin construction height is necessary, a shrinking of the shield to a simple bolt shape in the middle of the coil may benefit.





If it is mechanically and esthetically possible to arrange the transmitter and the receiver coil to nest into each other, the leakage field is minimized.



In the above case, the efficiency and the electromagnetic compatibility are maximized and a transmission of very high power is possible.

Generally, the shape and the size can adapt to nearly every customer requirement.

RRC power solutions GmbH
Technologiepark 1
D-66424 Homburg/Saar
Deutschland

TEL: +49 6841 9809-0
FAX: +49 6841 9809-280

E-Mail: sales@rrc-ps.de

Internet: http://www.rrc-ps.de
http://www.rrc-wireless-power.de

RRC power solutions Inc.
18340 Yorba Linda Blvd., Ste. 107-437
Yorba Linda, CA 92886-4104
USA

TEL: +1-714-777-3604
FAX: +1-714-777-3658

Email: usa@rrc-ps.com

Internet: http://www.rrc-ps.com
http://www.rrc-wireless-power.com