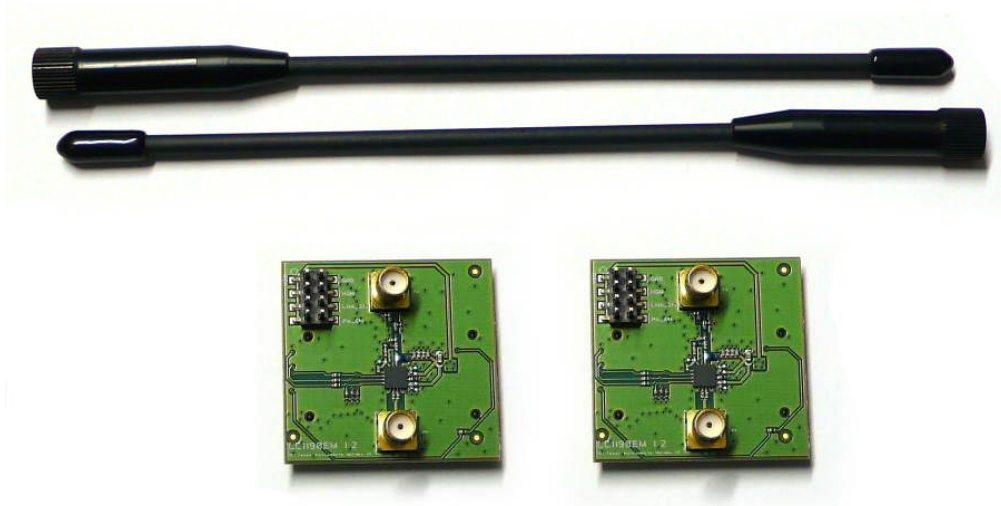


# **CC1190**

## ***Evaluation Module Kit***

[www.ti.com/cc1190emk](http://www.ti.com/cc1190emk)

### ***Quick Start Guide***



## 1 Introduction

Thank you for purchasing a CC1190 Evaluation Module Kit.

The CC1190 is an integrated RF front-end comprising a Power Amplifier (PA) for increased RF output power and a Low Noise Amplifier (LNA) for improved receive sensitivity. CC1190 is designed for operation in the 850-950 MHz frequency band.

This Quick Start Guide will show you how to connect the CC1190EM to an existing system and how to perform simple RX and TX tests using a signal generator and spectrum analyzer.

## 2 Connecting to an Existing System

### 2.1 RF Connection

Use a 50 Ohm coaxial cable with SMA connectors to connect the RF signal from the radio to the CC1190EM connector P4 on the bottom of the image below. Connect the antenna to the connector P3 on the top of the image below.

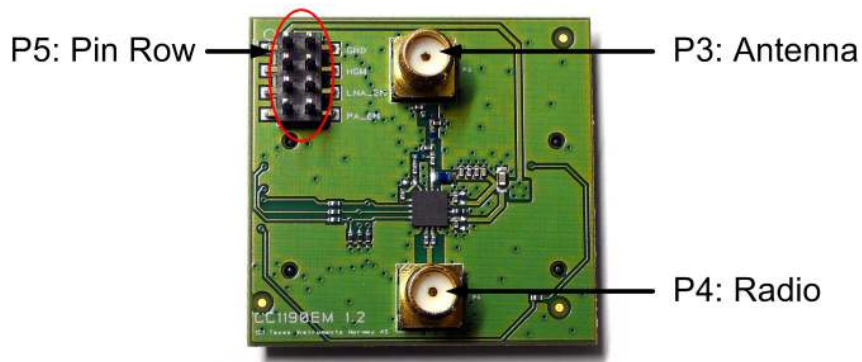


Figure 1 - CC1190EM

Figure 2 shows one possible set up where the output of a radio is connected to the radio input of the CC1190. The CC1190 is controlled by the jumper settings in this example.

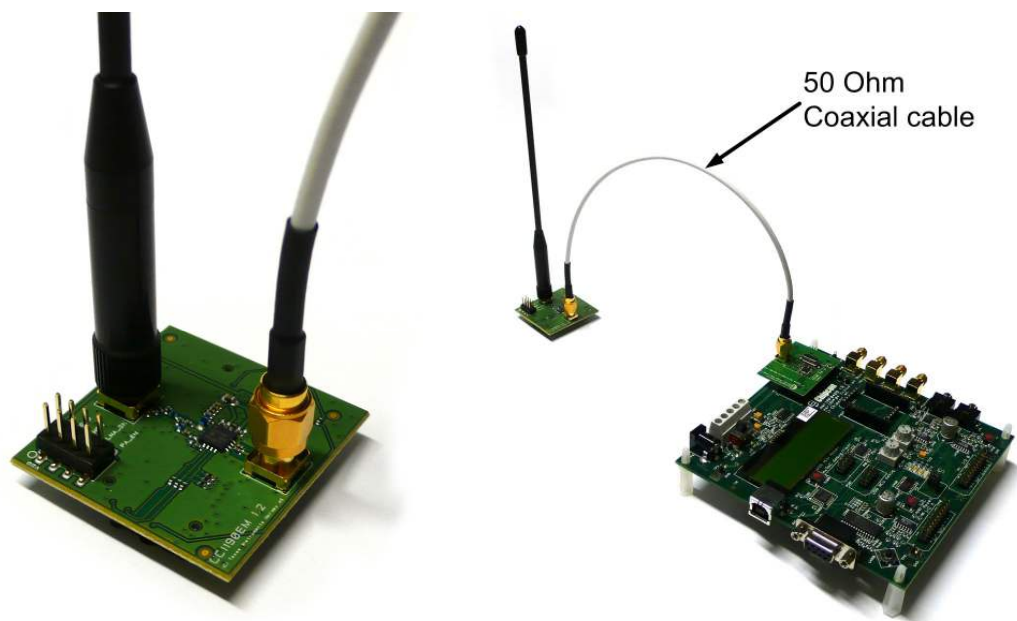
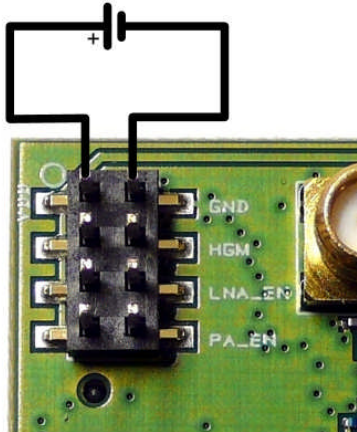


Figure 2 - Possible set up of CC1190 + radio (no control signals or power supply are shown)

## 2.2 Power Supply

### Using the Pin Row Header (P5) 2.0 V – 3.7 V



**WARNING: Do not connect a jumper between P5 pins 1-2, as this will short-circuit the power supply!**

Make sure your power supply can provide sufficient current for the CC1190. See the CC1190 datasheet for details.

### Using the Sockets

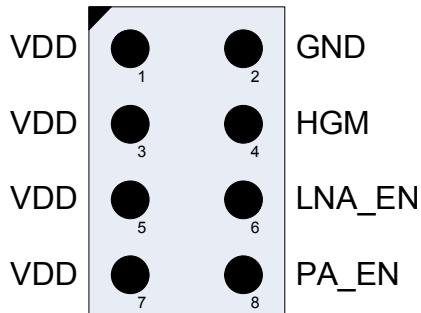
Power can also be supplied through the P1 and P2 sockets on the backside of the CC1190EM. Connecting the CC1190EM to a SoC Battery Board or a SmartRF05EB (version 1.8 or newer) will provide power to the CC1190EM.

**Note:** SmartRF04EB and SmartRF05EB (older than version 1.8) are not compatible with the CC1190EMs due to limitations in the power supply.

## 2.3 Digital Control Signals

### Using the Pin Row Header (P5)

Controlling the modes of the CC1190 can be done manually by placing jumpers on this header, or by connecting wires to the header pins and using an external micro controller to set the appropriate signal levels.



Pin	Signal
1	VDD (used for power connection)
2	GND (used for power connection)
3	VDD (used for pull-up jumper)
4	HGM (High Gain Mode), both for RX and TX 1 = High gain (with jumper in place) 0 = Low gain (no jumper)
5	VDD (used for pull-up jumper)
6	LNA_EN 1 = LNA enabled (with jumper in place) 0 = LNA in power down (no jumper)
7	VDD (used for pull-up jumper)
8	PA_EN 1 = PA enabled (with jumper in place) 0 = PA in power down (no jumper)

The three control signals have pull-down resistors, giving a default value of 0. To force any of the signals to 1, connect a jumper between pins 3-4, 5-6 or 7-8.

See the CC1190 datasheet for detailed description on the usage of the three control signals.

**Note:** The CC1190EM cannot be controlled directly from SmartRF Studio.

### Using the P1 and P2 Sockets

The CC1190 control signals are routed to the P1 and P2 sockets according to the table below.

Signal	EM Connector
VDD	P2.7, P2.9
GND	P1.1, P1.19, P2.2
HGM	P1.9
LNA_EN	P1.7
PA_EN	P1.3

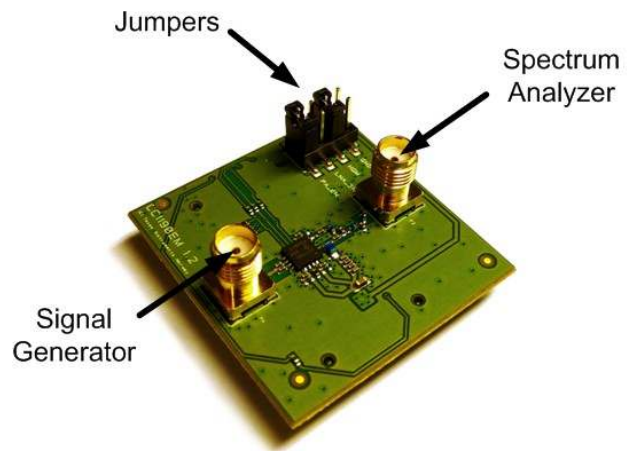
**Note (if using SmartRF05EB to power the CC1190EM):** P1.3, P1.7 and P1.9 are sharing the UART signals on SmartRF05EB. Please disconnect the jumpers in position 5-6 and 7-8 on header P1 on the SmartRF05EB. It is also recommended to disable the UART level converter (P10 in position 1-2) on the SmartRF05EB.

### 3 Test Setup

#### 3.1 TX Testing

To test the CC1190 PA:

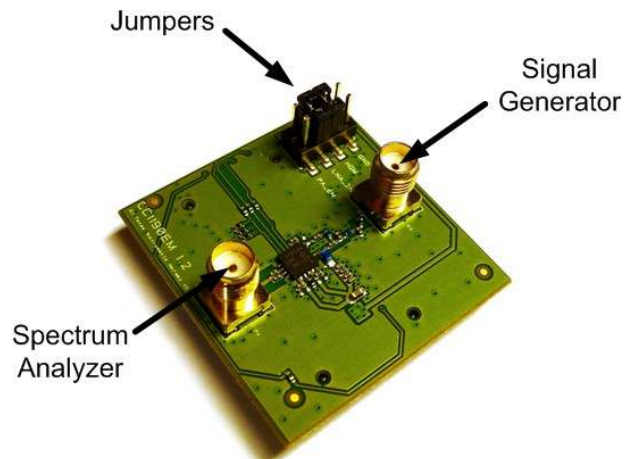
- Connect a signal generator to P4 (radio side).
- Connect a spectrum analyzer to P3 (antenna side). Make sure it is capable of handling the high output power from CC1190.
- Set the control signal jumpers as shown in the picture on the right.
- Connect power and ground to the CC1190EM.



#### 3.2 RX Testing

To test the CC1190 LNA:

- Connect a spectrum analyzer to P4 (radio side).
- Connect a signal generator to P3 (antenna side).
- Set the control signal jumpers as shown in the picture on the right.
- Connect power and ground to the CC1190EM.



### 4 Document History

Revision	Date	Description/Changes
-	2009-12-03	Initial version

## IMPORTANT NOTICE

Texas Instruments Incorporated and its subsidiaries (TI) reserve the right to make corrections, modifications, enhancements, improvements, and other changes to its products and services at any time and to discontinue any product or service without notice. Customers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All products are sold subject to TI's terms and conditions of sale supplied at the time of order acknowledgment.

TI warrants performance of its hardware products to the specifications applicable at the time of sale in accordance with TI's standard warranty. Testing and other quality control techniques are used to the extent TI deems necessary to support this warranty. Except where mandated by government requirements, testing of all parameters of each product is not necessarily performed.

TI assumes no liability for applications assistance or customer product design. Customers are responsible for their products and applications using TI components. To minimize the risks associated with customer products and applications, customers should provide adequate design and operating safeguards.

TI does not warrant or represent that any license, either express or implied, is granted under any TI patent right, copyright, mask work right, or other TI intellectual property right relating to any combination, machine, or process in which TI products or services are used. Information published by TI regarding third-party products or services does not constitute a license from TI to use such products or services or a warranty or endorsement thereof. Use of such information may require a license from a third party under the patents or other intellectual property of the third party, or a license from TI under the patents or other intellectual property of TI.

Reproduction of TI information in TI data books or data sheets is permissible only if reproduction is without alteration and is accompanied by all associated warranties, conditions, limitations, and notices. Reproduction of this information with alteration is an unfair and deceptive business practice. TI is not responsible or liable for such altered documentation. Information of third parties may be subject to additional restrictions.

Resale of TI products or services with statements different from or beyond the parameters stated by TI for that product or service voids all express and any implied warranties for the associated TI product or service and is an unfair and deceptive business practice. TI is not responsible or liable for any such statements.

TI products are not authorized for use in safety-critical applications (such as life support) where a failure of the TI product would reasonably be expected to cause severe personal injury or death, unless officers of the parties have executed an agreement specifically governing such use. Buyers represent that they have all necessary expertise in the safety and regulatory ramifications of their applications, and acknowledge and agree that they are solely responsible for all legal, regulatory and safety-related requirements concerning their products and any use of TI products in such safety-critical applications, notwithstanding any applications-related information or support that may be provided by TI. Further, Buyers must fully indemnify TI and its representatives against any damages arising out of the use of TI products in such safety-critical applications.

TI products are neither designed nor intended for use in military/aerospace applications or environments unless the TI products are specifically designated by TI as military-grade or "enhanced plastic." Only products designated by TI as military-grade meet military specifications. Buyers acknowledge and agree that any such use of TI products which TI has not designated as military-grade is solely at the Buyer's risk, and that they are solely responsible for compliance with all legal and regulatory requirements in connection with such use.

TI products are neither designed nor intended for use in automotive applications or environments unless the specific TI products are designated by TI as compliant with ISO/TS 16949 requirements. Buyers acknowledge and agree that, if they use any non-designated products in automotive applications, TI will not be responsible for any failure to meet such requirements.

Following are URLs where you can obtain information on other Texas Instruments products and application solutions:

### Products

Amplifiers	<a href="http://amplifier.ti.com">amplifier.ti.com</a>
Data Converters	<a href="http://dataconverter.ti.com">dataconverter.ti.com</a>
DLP® Products	<a href="http://www.dlp.com">www.dlp.com</a>
DSP	<a href="http://dsp.ti.com">dsp.ti.com</a>
Clocks and Timers	<a href="http://www.ti.com/clocks">www.ti.com/clocks</a>
Interface	<a href="http://interface.ti.com">interface.ti.com</a>
Logic	<a href="http://logic.ti.com">logic.ti.com</a>
Power Mgmt	<a href="http://power.ti.com">power.ti.com</a>
Microcontrollers	<a href="http://microcontroller.ti.com">microcontroller.ti.com</a>
RFID	<a href="http://www.ti-rfid.com">www.ti-rfid.com</a>
RF/IF and ZigBee® Solutions	<a href="http://www.ti.com/lprf">www.ti.com/lprf</a>

### Applications

Audio	<a href="http://www.ti.com/audio">www.ti.com/audio</a>
Automotive	<a href="http://www.ti.com/automotive">www.ti.com/automotive</a>
Broadband	<a href="http://www.ti.com/broadband">www.ti.com/broadband</a>
Digital Control	<a href="http://www.ti.com/digitalcontrol">www.ti.com/digitalcontrol</a>
Medical	<a href="http://www.ti.com/medical">www.ti.com/medical</a>
Military	<a href="http://www.ti.com/military">www.ti.com/military</a>
Optical Networking	<a href="http://www.ti.com/opticalnetwork">www.ti.com/opticalnetwork</a>
Security	<a href="http://www.ti.com/security">www.ti.com/security</a>
Telephony	<a href="http://www.ti.com/telephony">www.ti.com/telephony</a>
Video & Imaging	<a href="http://www.ti.com/video">www.ti.com/video</a>
Wireless	<a href="http://www.ti.com/wireless">www.ti.com/wireless</a>

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265  
Copyright © 2009, Texas Instruments Incorporated