The CC2592 is a combined PA and LNA, operating in the 2.4 GHz frequency band. Rx/Tx switches, as well as a balun, are integrated on the chip. This allows it to operate as a drop-in range extender for radio transceivers and wireless MCUs with a differential combined Rx/Tx RF port.

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1 Using the CC2592EM

Caution: Do not leave the EVM powered when unattended.

The CC2592 standalone evaluation module (EM) can be used as a simple add-on to your existing system to improve output power and sensitivity. Use a 50 Ω coaxial cable with SMA connectors to connect the RF signal from the radio to the CC2592EM connector J1 (marked “Transceiver port”). Connect the antenna to connector J2 (marked “Antenna port”). To locate the connectors, see Figure 1.
Figure 2 shows one possible setup where the output of a radio EM, in this case a CC2530, is connected to the transceiver port of the CC2592EM. In the example below, there are no discrete control lines between the radio node and CC2592, so control of the LNA and PA enable signals has to be done manually by placing jumpers on header P3. This setup provides a quick way to test the CC2592 with your chosen radio, but may not deliver the same performance as integrating both devices on one board would. This is due to the added losses through two baluns, and the cable and connectors.

![Figure 2. Possible SetUp of CC2592 + Radio (no control signals)](image)

In order to measure the performance of the CC2592 PA, connect a signal generator to J1 (radio side) and a spectrum analyzer to J2 (antenna side). To test the LNA, reverse the connections.
The CC2592EM contains a 2×5 pin row header (P3). This can be used both to power and control the CC2592. Controlling the modes of the CC2592 can be done manually by using jumpers on the board, or by using an external controller to set the appropriate signal levels on the pins on P3.

<table>
<thead>
<tr>
<th>Pin</th>
<th>Signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>VDD (used for pull-up jumper)</td>
</tr>
<tr>
<td>2</td>
<td>HGM (connect to pin 1 with jumper to set high)</td>
</tr>
<tr>
<td>3</td>
<td>VDD</td>
</tr>
<tr>
<td>4</td>
<td>Not used</td>
</tr>
<tr>
<td>5</td>
<td>VDD (used for pull-up jumper)</td>
</tr>
<tr>
<td>6</td>
<td>PA_EN (connect to pin 5 with jumper to set high)</td>
</tr>
<tr>
<td>7</td>
<td>VDD</td>
</tr>
<tr>
<td>8</td>
<td>Not used</td>
</tr>
<tr>
<td>9</td>
<td>VDD (used for pull-up jumper)</td>
</tr>
<tr>
<td>10</td>
<td>LNA_EN (connect to pin 9 with jumper to set high)</td>
</tr>
</tbody>
</table>

The three control signals have pull-down resistors, giving a default value of 0. They also have series resistors to avoid shorting the power in case the signals are forced to ground through the EM connector. To force any of the signals to 1, connect a jumper between pins 1-2, 5-6 or 9-10.

For detailed description on the usage of the three control signals, see the CC2592 2.4-GHz Range Extender Data Manual (SWRS159).

The sockets P1 and P2 can also be used to power and control the device, as seen in the schematic drawing. The EM can be connected to a SoC Battery Board, a SmartRF06EB or a SmartRF05EB to power the device. The EM cannot be controlled directly from SmartRF™ Studio.

The CC2592 control signals are routed to the EM connector according to Table 1.

<table>
<thead>
<tr>
<th>Signal</th>
<th>EM Connector</th>
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</thead>
<tbody>
<tr>
<td>VDD</td>
<td>P2.7, P2.9</td>
</tr>
<tr>
<td>GND</td>
<td>P1.1, P1.19</td>
</tr>
<tr>
<td>HGM</td>
<td>P1.9</td>
</tr>
<tr>
<td>LNA_EN</td>
<td>P1.7</td>
</tr>
<tr>
<td>PA_EN</td>
<td>P1.3</td>
</tr>
</tbody>
</table>

P1.3, P1.7 and P1.9 are sharing the UART signals on SmartRF05EB. On SmartRF05EB, please disconnect the jumpers in position 5-6 and 7-8 on header P1. It is also recommended to disable the UART level converter (P10 in position 1-2). For more details, see the schematics diagrams in the SmartRF05 Evaluation Board User’s Guide (SWRU210).
2 References

- CC2592 2.4-GHz Range Extender Data Manual (SWRS159)
- System-on-Chip Battery Board User's Guide (SWRU241)
- SmartRF05 Evaluation Board User's Guide (SWRU210)
- SmartRF06 Evaluation Board User's Guide (SWRU321)
A.1 CC2592EM Schematic Diagram

Figure 3. CC2592EM Schematic Diagram
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CAUTION

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STANDARD TERMS AND CONDITIONS FOR EVALUATION MODULES (continued)

FCC Interference Statement for Class B EVM devices
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• 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.

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3.2.1 For EVMs issued with an Industry Canada Certificate of Conformance to RSS-210

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Concernant les EVMs avec antennes détachables
Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé par l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotope rayonnée équivalente (p.i.r.e) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante. Le présent émetteur radio a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés dans le manuel d'usage et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indexé, sont strictement interdits pour l'exploitation de l'émetteur.

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http://www.tij.co.jp/lsds/ti_ja/general/eStore/notice_01.page

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2. Use EVMs only after User obtains the license of Test Radio Station as provided in Radio Law of Japan with respect to EVMs, or
3. Use of EVMs only after User obtains the Technical Regulations Conformity Certification as provided in Radio Law of Japan with respect to EVMs. Also, do not transfer EVMs, unless User gives the same notice above to the transferee. Please note that if User does not follow the instructions above, User will be subject to penalties of Radio Law of Japan.
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### Applications

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