

Radio Tool User's Guide

Overview

Radio Tool is a tool for RF evaluation and testing of CC33xx designs during development and certification. The tool enables low-level radio testing capabilities by manually setting the radio into transmit or receive modes. Usage of the tool requires familiarity and knowledge of radio circuit theory and radio test methods.

CC3301 BoosterPack™ Hardware Setup

RF Connections

As seen on the figure below, the BP-CC3301 has an onboard SMA connector and PCB antenna. The SMA connector on J1 provides a way for testing conducted measurements (see [Figure 1.](#)). Alternately, a trackpad for an U.F.L connector (J2) is provided onboard to replace the SMA connector and provide a way to test in the lab using a compatible cable (see [Figure 2.](#)). The PCB antenna pointed out on the figure below uses an "Inverted F Antenna Design", for more information on this antenna design see <https://www.ti.com/lit/pdf/SWRU120>.

A rework may be need to be performed before using the connector on J1 or the PCB antenna. This involves swapping the position of the existing 10pF capacitor to lead the transmission line to the desired connection.

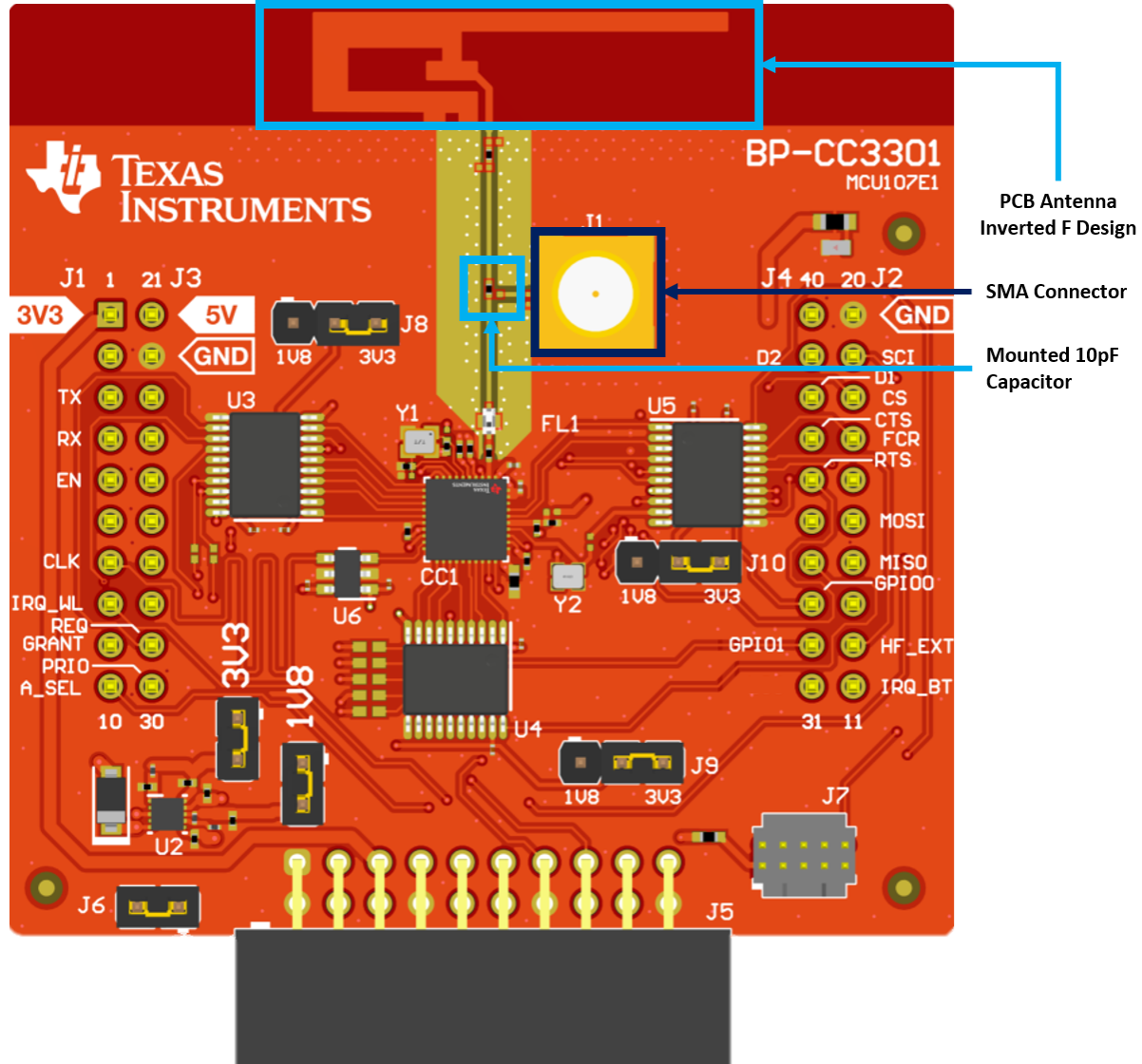


Figure 1. BP-CC3301 transmitting to PCB Antenna instead of SMA connector (J1)

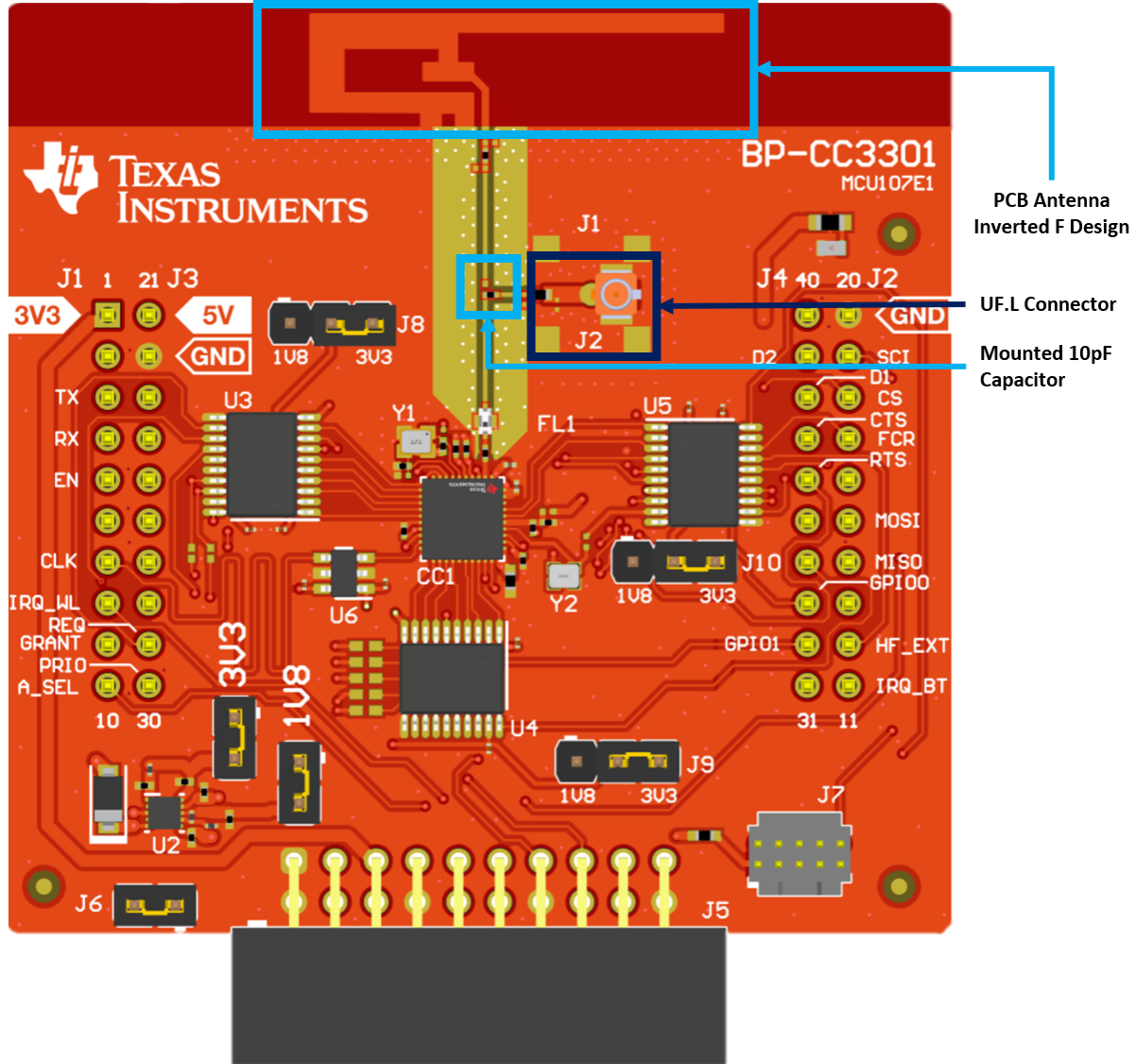


Figure 2. BP-CC3301 transmitting to U.F.L connector (J2)

HW Prerequisites

- Windows 10 64Bit / Ubuntu 18 (or higher) 64bit operation system
- Latest Chrome Web Browser
- Installation of SimpleLink Wi-Fi Toolbox
- CC3301 BoosterPack™
- Breadboard Jumper Wires
- An XDS110 debugger for SWD communication

The XDS110 enables direct communication to the CC3301 device via the SWD interface. This allows external tools, such as the Radio Tool, to send commands directly to the device without the use of an embedded host. Three different options currently exist for enabling the XDS110 connection:

- **Option 1** : XDS110 JTAG Debug Probe Kit
- **Option 2** : Simplelink LaunchPad with onboard XDS110 (i.e. LAUNCHXL-CC3235SF), and JTAG SWD 10pin IDC Cable
- **Option 3** : LP-XDS110 (ET) and JTAG SWD 10pin IDC Cable

Note

There are different options to power the board from the host JTAG debugger, but for peak RF performance it is recommended to use a separate supply.

Option 1: XDS110 JTAG Debug Probe

For this hardware connection grab the XDS110 JTAG Debug Pod, 20-pin debug cable, and the TI 20-pin to ARM Cortex 10-pin converter adapter (it may be labeled as “CTI20MALE to ARM20-ETM FEMALE 516980-0001”) from the kit. Plus, some female to male jumper cables.

Note

If you are having problems with your computer recognizing the XDS110 DebugProbe you may download and install the “XDS110 Support Utilities package” currently on release 7.0.100.1 from https://software-dl.ti.com/ccs/esd/documents/xdsdebugprobes/emu_xds_software_package_download.html.

The [Figure 3](#). below shows the contents included when buying the [XDS110 JTAG Debug Probe Kit](#), and highlights the accessories used for this hardware configuration.

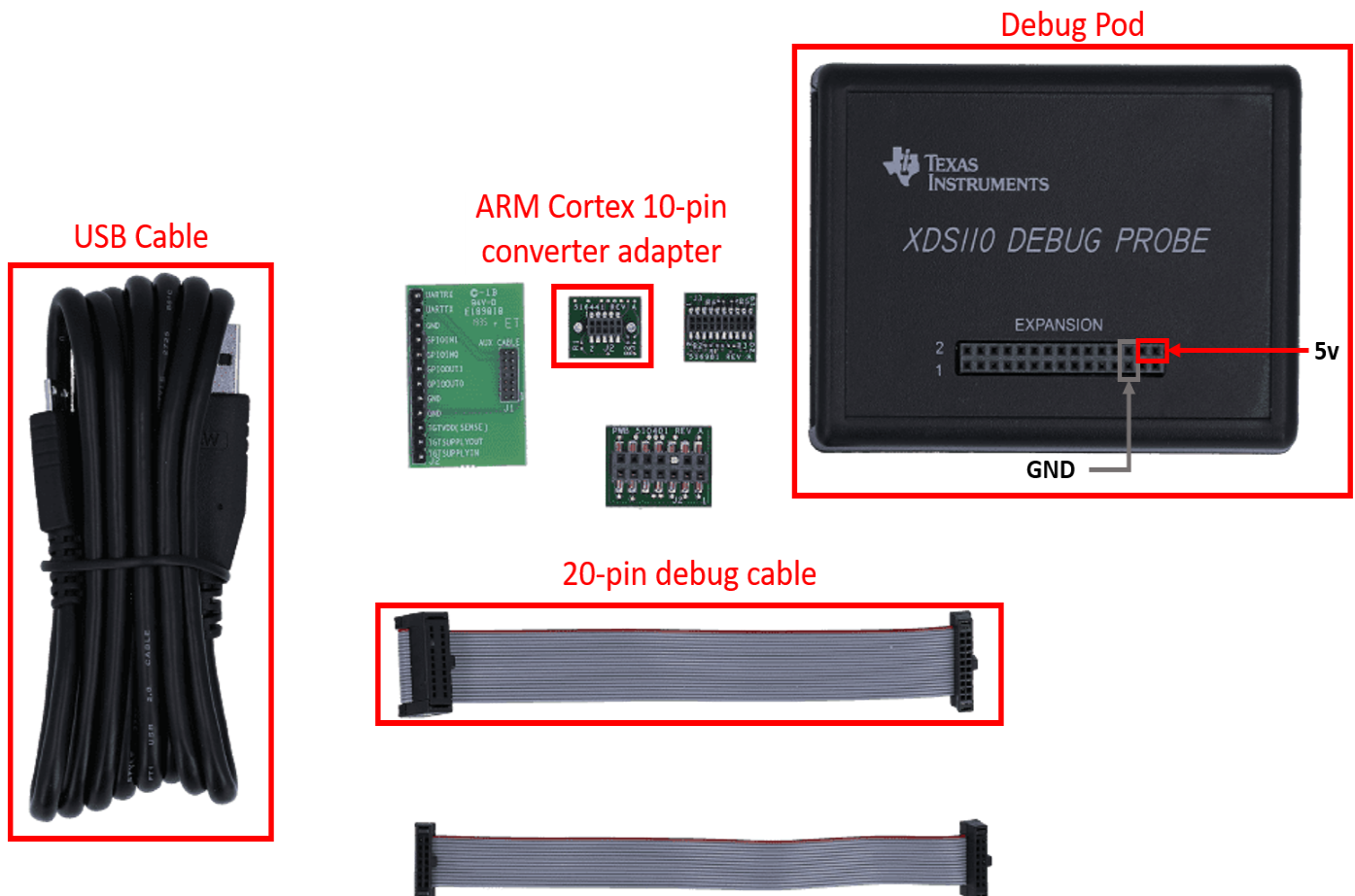


Figure 3. Image of XDS110 JTAG Debug Probe Kit

Grab the 20-pin debug cable then attach it to the “Debug” port of the Debug Pod, on the other side of the cable connect the 10-pin converter adapter. The end of the cable with the 10-pin adapter should be connected to the “ARM 10pin JTAG Connector” (J7) , see Figure below.

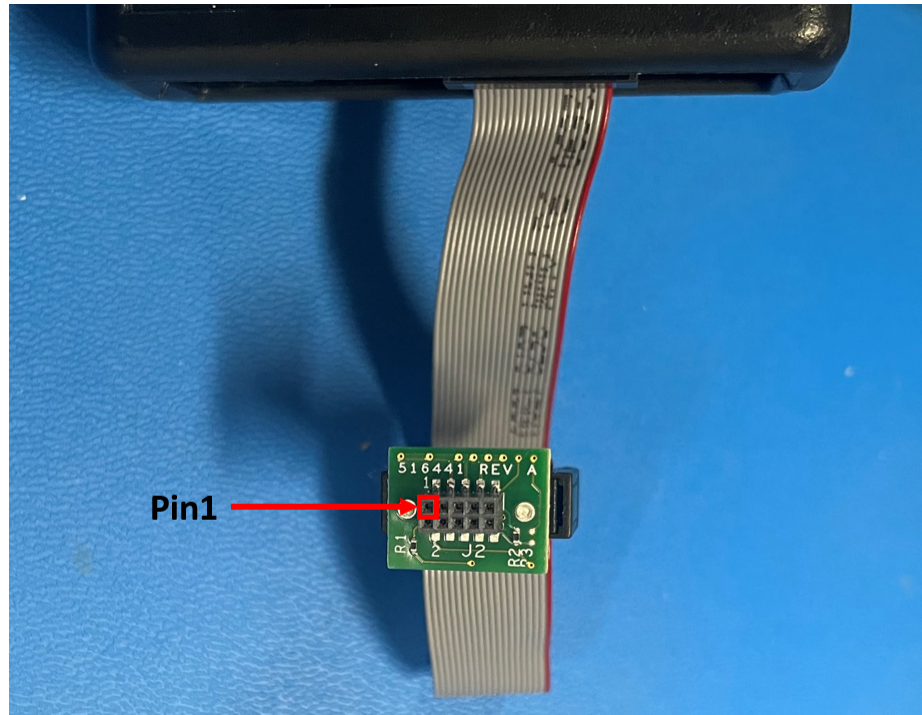


Figure 4. 20-pin to ARM Cortex 10-pin converter adapter

The TI 20-pin to ARM Cortex 10-pin converter adapter is not keyed, as such be careful not to attach it incorrectly. To attach them correctly Pin1 from the 10-pin adapter and Pin1 of the BP-CC3301 ARM 10pin JTAG Connector (J7) must be aligned. As such the top left Pin of the 10-pin adapter connector shown on Figure 4. must connect to the Pin1 of the ARM 10pin JTAG Connector (J7) shown in Figure 5. below.

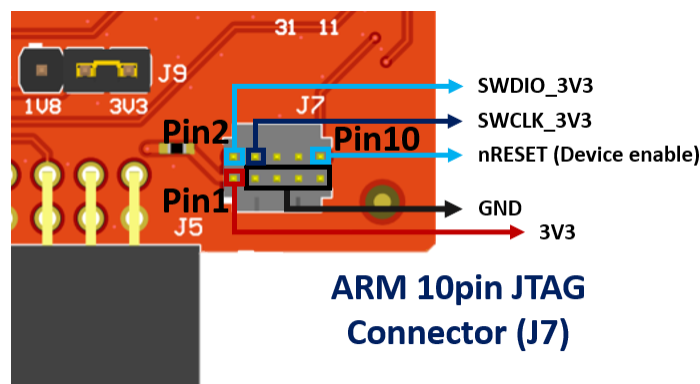


Figure 5. Pinout for BP-CC3301 XDS110 ARM 10pin JTAG Connector

Lastly the debug cable does not provide power to the BP-CC3301, as such connect the 5v and GND pins on the “Expansion port” of the Debug Pod (see Figure 6. highlighting the 5V and GND pins), and to the 5v and GND pins of the BP-CC3301 (P1.1, and P1.2, or refer to the BP-CC3301 Hardware User Guide for more information).

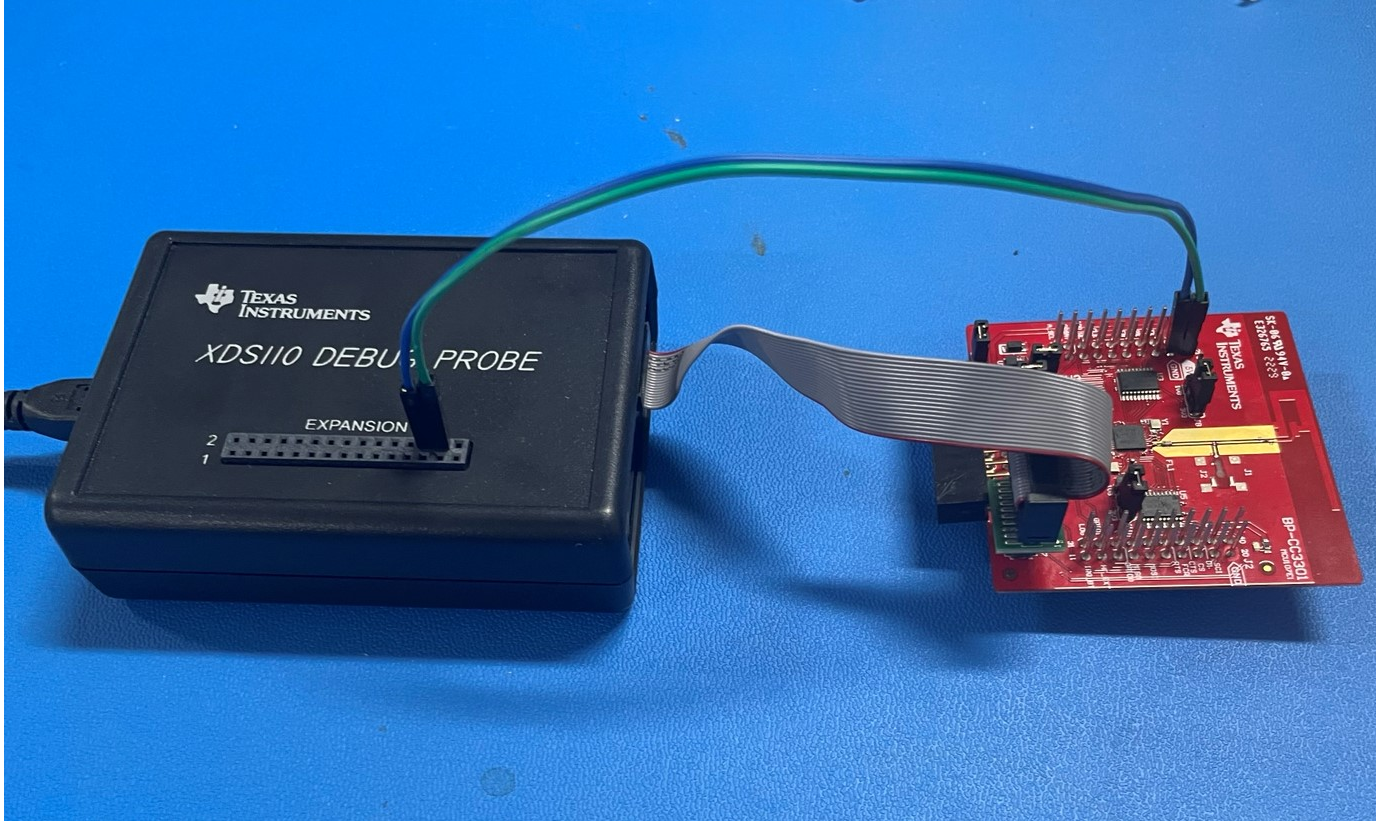


Figure 6. BP-CC3301 connected to XDS110 Debug Pod

ⓘ Warning

Be careful when using the ARM Cortex 10-pin converter adapter. The adapter is not keyed and it can get damaged when too much pressure is applied.

Option 2: SimpleLink Launchpads and 10-pin cable

Most SimpleLink Launchpads have an onboard XDS110 Debugger. The boards often include an XDS110 OUT connection which allows the debugger to be connected to other target devices or boards. This connection can be used to connect to the BP-CC3301 for use with Radio Tool.

To make use of the onboard XDS110 Debugger remove all jumpers to disconnect the onboard emulator from the onboard device (in this example the CC3235SF on the [LAUNCHXL-CC3235SF](#)). Attach the JTAG SWD 10pin IDC Cable to the BoosterPack ARM 10pin JTAG Connector (J7) and the “XDS110 OUT” connector on the SimpleLink LaunchPad (do not use the “JTAG IN”). Then use two jumper wires to provide 5v and GND from the SimpleLink Launchpads to the Booster Pack.

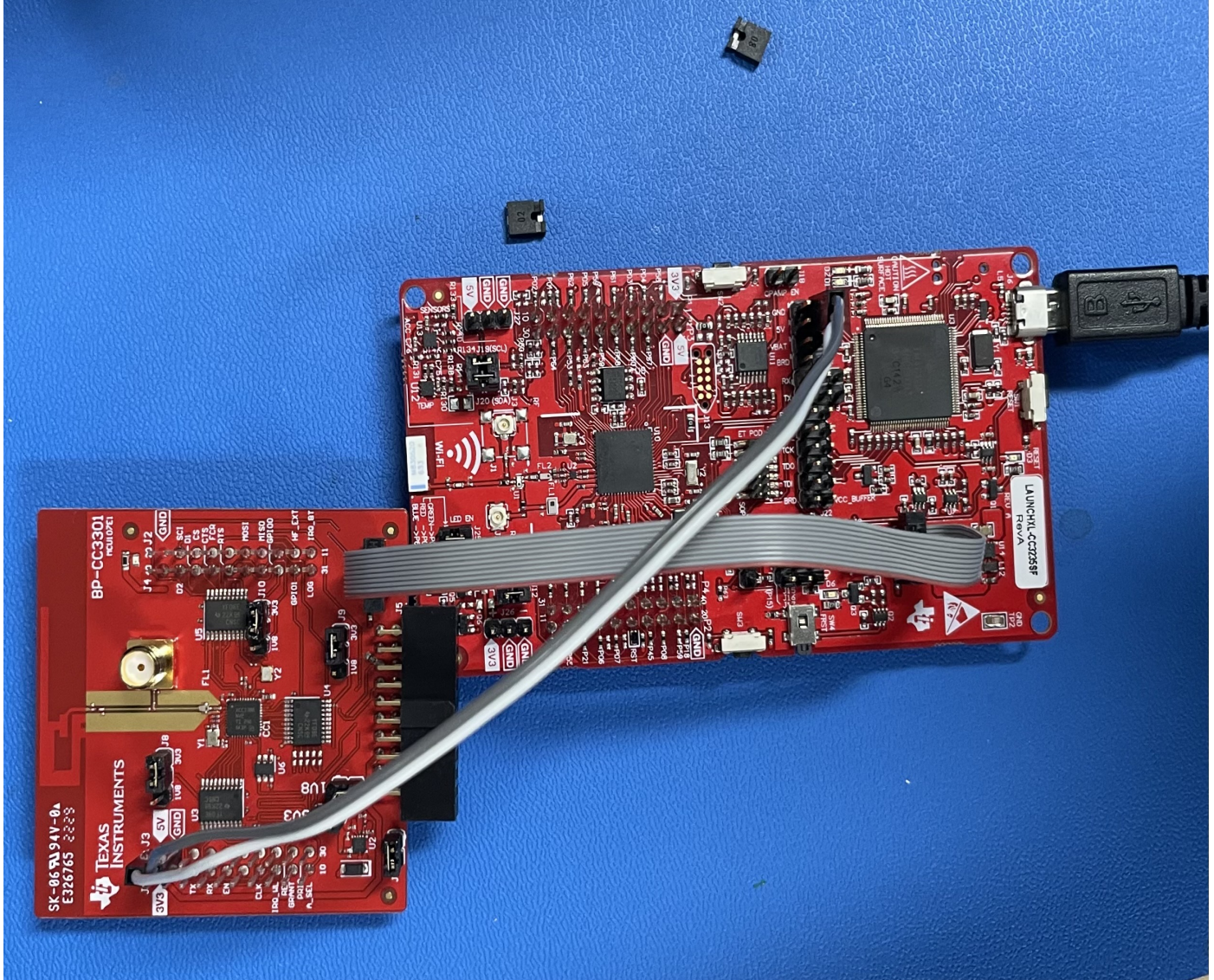


Figure 7. BP-CC3301 connected to LAUNCHXL-CC3235SF

Note

Figure above shows the LAUNCHXL-CC3235SF being used as an example, but many of our SimpleLink LaunchPad will have an onboard XDS110 with a 10pin XDS110 connector for it.

Option 3: LP-XDS110 and 10-pin cable

To use the LP-XDS110 (or LP-XDS110 (ET)) connect the [JTAG SWD 10pin IDC Cable](#) from the BoosterPack ARM 10pin JTAG Connector (J7) to the XDS110 connector on the LP-XDS110. Then use two jumper wires to provide 5v and GND to the BP-CC3301 from the LP-XDS110 (see [Figure 8](#). below).

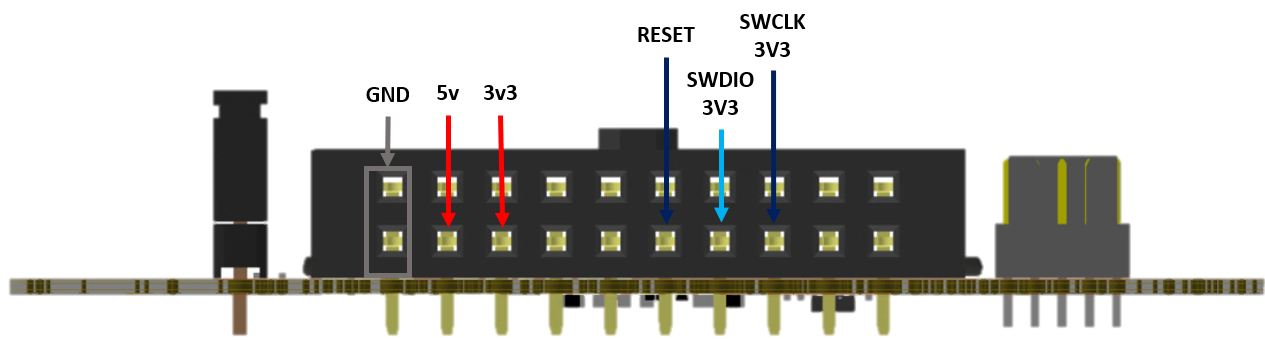


Figure 8. LP-XDS110 Header Pinout

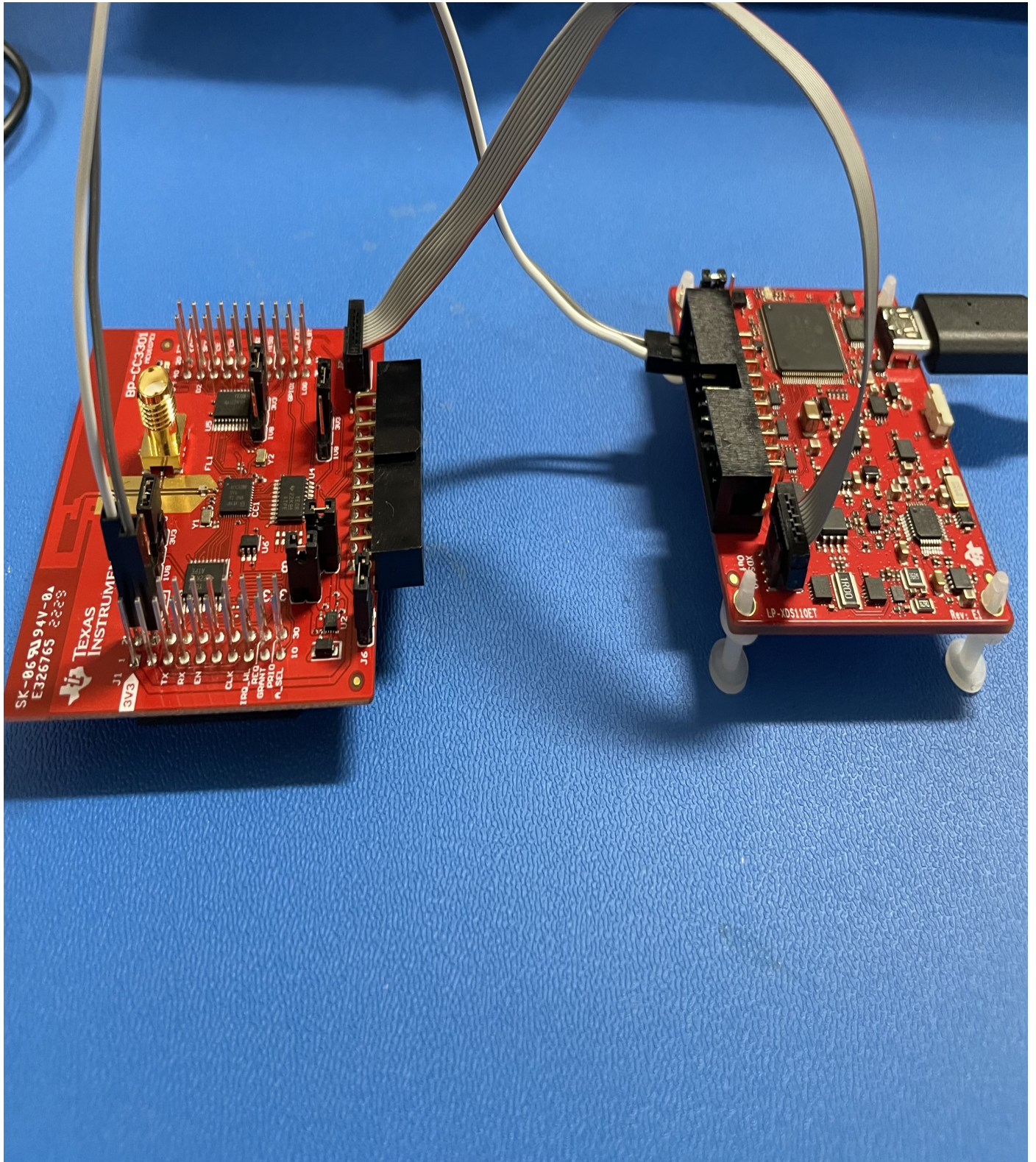


Figure 9. BP-CC3301 connected to LP-XDS110