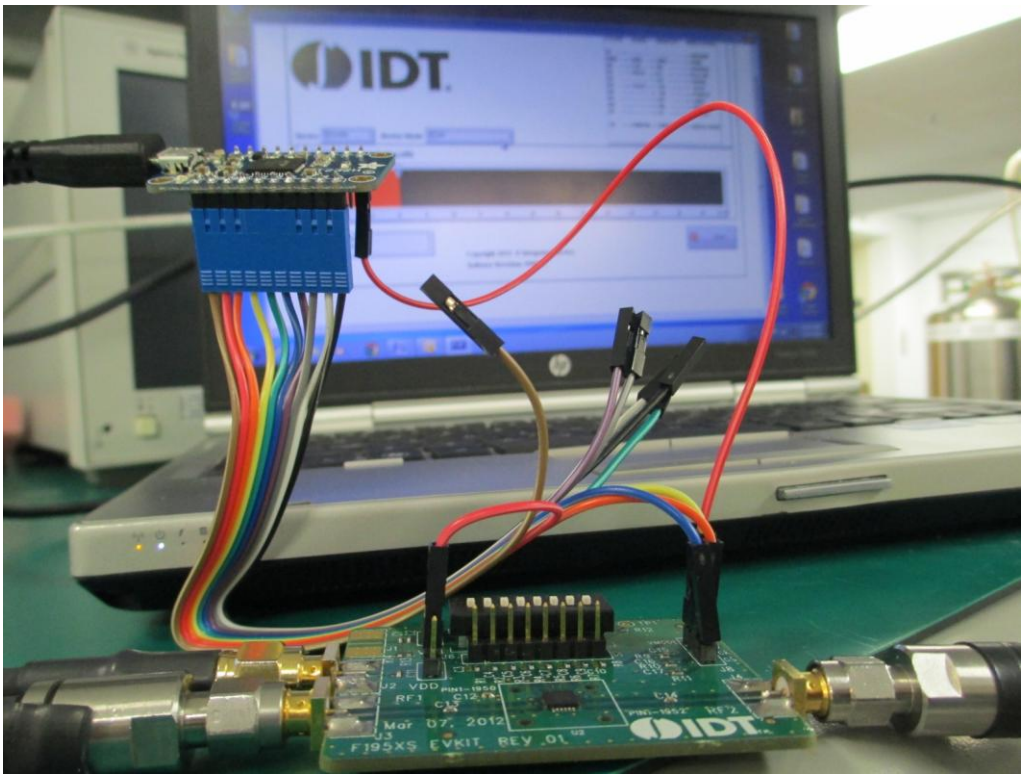
INTEGRATED DEVICE TECHNOLOGY

RF Products Evaluation Solution Digital Control Software Guide

8/14/2015



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1. Introduction

IDT offers a wide range of high performance RF products, many of which can be controlled with serial and/or parallel interfaces.

To aid its customers in testing these devices, IDT has developed a Product Evaluation Solution (EVS). IDT's EVS kit consists of:

- A standard Product Evaluation Kit, EV_{KIT} (the product mounted on an evaluation board)
- The RF Digital Control Board
- All necessary cabling
- The RF Digital Control Software downloaded from IDT's website

The purpose of this application note is to assist customers to properly set-up the EVS hardware and software to control the Product on an evaluation board or EV_{KIT}.

2. Requirements

Customer-supplied hardware:

Computer or laptop:

- Must run the Microsoft Windows™ Operating Systems.
- Customer must use powered USB port on the computer or laptop to the RF Digital Control Board.

Power supply:

- Customer must provide a separate regulated 3 to 5 V input to the Product EV_{KIT} Vdd connection.

IDT supplied hardware:

- RF Digital Control Board (USB-based)
- Micro-B to USB cable (similar to the USB cable used for cell phones)
- Ribbon Cable (connects RF Digital Control Board to Product EV_{KIT})
- IDT's Product EV_{KIT}

IDT supplied software:

- RF Digital Control Software downloaded from www.idt.com website.

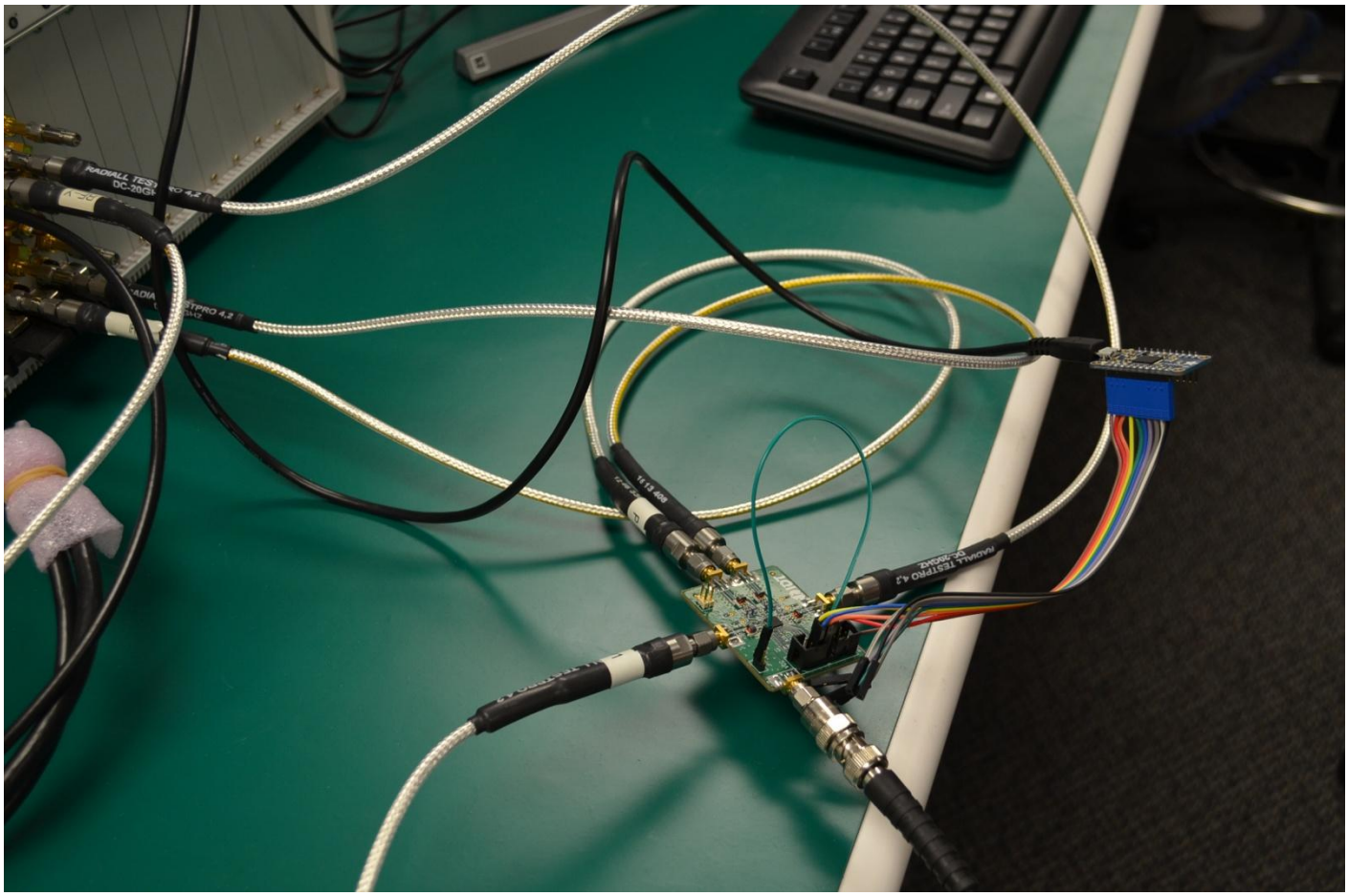

Figure 1 - EVS hardware configuration

3. RF Digital Control Software Overview

The RF Digital Control Software is a complied LabVIEW application that controls IDT's Product EV_{KIT} using the RF Digital Control Board. The RF Digital Control Board utilizes FTDI's USB to serial/parallel converter chip, which has been assembled by AdaFruit. The RF Digital Control Software does not require users to have LabVIEW software installed. The installation application, will install all the drivers and runtime engines needed.

4. Customer Tools and Resources

IDT provides customers the following tools and support of the EVS solution

- This Application Note
- EVS Configuration & Installation Video available at: www.idt.com.
- RF Digital Control Software available at: www.idt.com.
- RF Product Datasheets provide detailed information on the EV_{KIT}. Available at: www.idt.com.

5. Installation Overview

The following installation procedure provides a quick view of the overall installation process. Please visit each section of this application note for a detailed description of each installation step.

1) Obtain the EVS hardware solution for the specific product you plan on evaluating from your IDT Sales Representative.
    i) **NOTE: Always follow proper ESD handling procedures when handling electronic components to avoid damage.**
2) Download the RF Digital Control Software from www.idt.com .
3) Follow the Software Installation procedure in this Application Note or video.
4) Using your own cables and regulated power supply, make the proper connections to V_{dd} (or V_{cc}) and ground on the EV_{KIT} for the product you are evaluating.
    i) **NOTE: Check the Product Datasheet for the correct Vdd supply voltage range before applying Vdd. Datasheets can be found at www.idt.com**
5) Connect the RF Digital Control Board to a powered USB port on your laptop using the USB cable provided.
6) Connect the RF Digital Control Board to the Product EV_{KIT} using the cable provided. This Application Note provides instructions for each Product EV_{KIT}.
7) Launch the RF Digital Control Software on your laptop and select the specific part number for the EV_{KIT} you are testing.
8) Using your own cables and test equipment, connect the RF signal to the Product EV_{KIT}. Use the RF Digital Control Software to digitally control the part during your evaluation.
    i) **NOTE: Do not apply the RF signal to the Product EV_{KIT} until after Vdd and Logic Voltages are applied to the EV_{KIT} (in that order).**
    ii) The product may start in an unknown state. Command product to any state upon startup.
9) When your evaluation is complete:
    i) Turn off and disconnect the RF signal applied to the EV_{KIT}.
    ii) Turn off and disconnect the Logic voltage and Vdd voltage applied to the EVKIT.

6. Software Installation Procedure

After downloading the RF Digital Control Software from www.idt.com the file needs to be uncompressed. Windows should do this automatically. From this folder right-click on the file **Setup** (Figure 2) then select **Run as administrator**. The installation wizard will install the LabVIEW runtime engine, the drivers for the RF Digital Control Board, and the user interface to control the products.

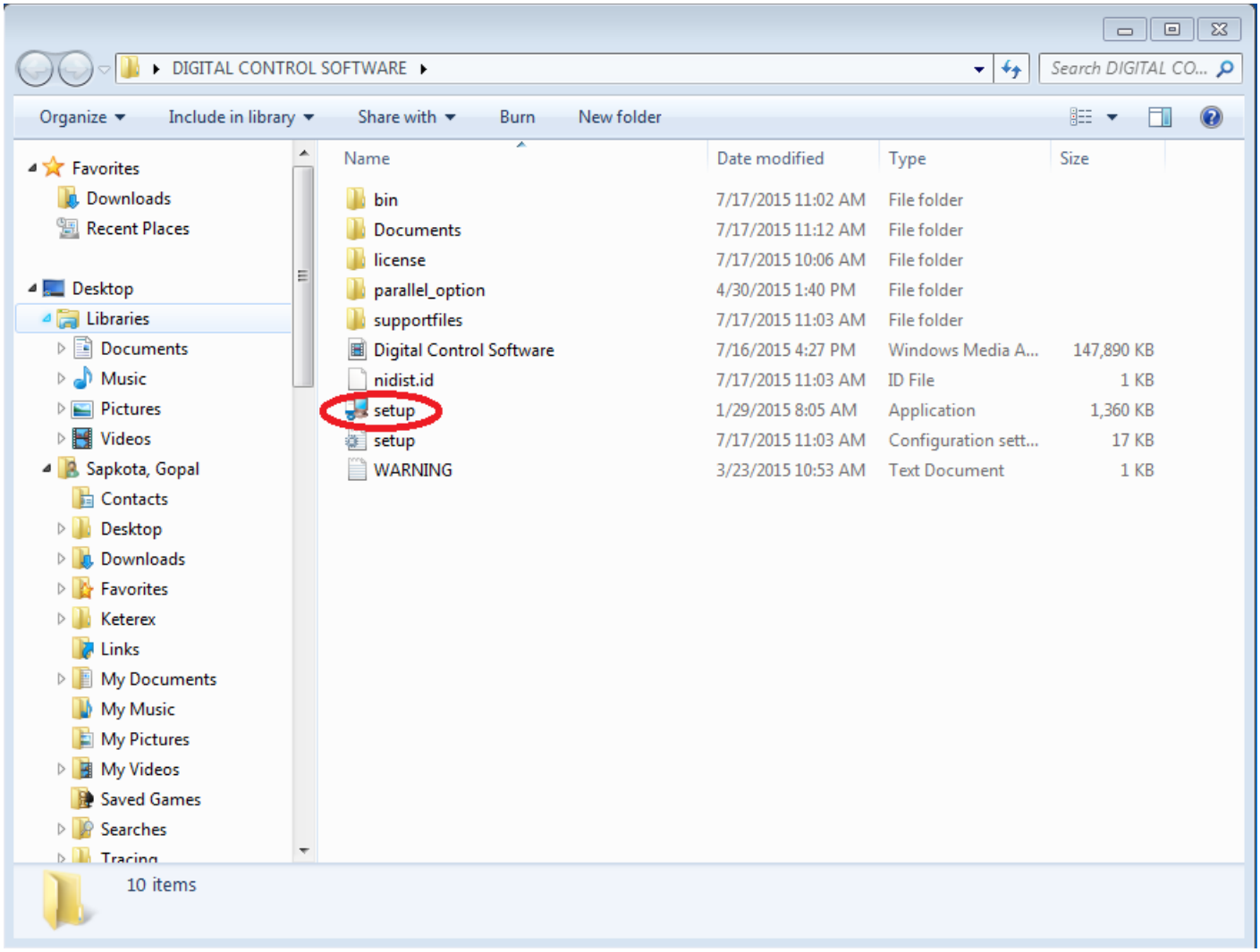

Figure 2 - Software Installer zip folder

Once the installation wizard starts, you can choose the destination directory (folder) to place the application file. Click **next** once you have chosen the destination directory.

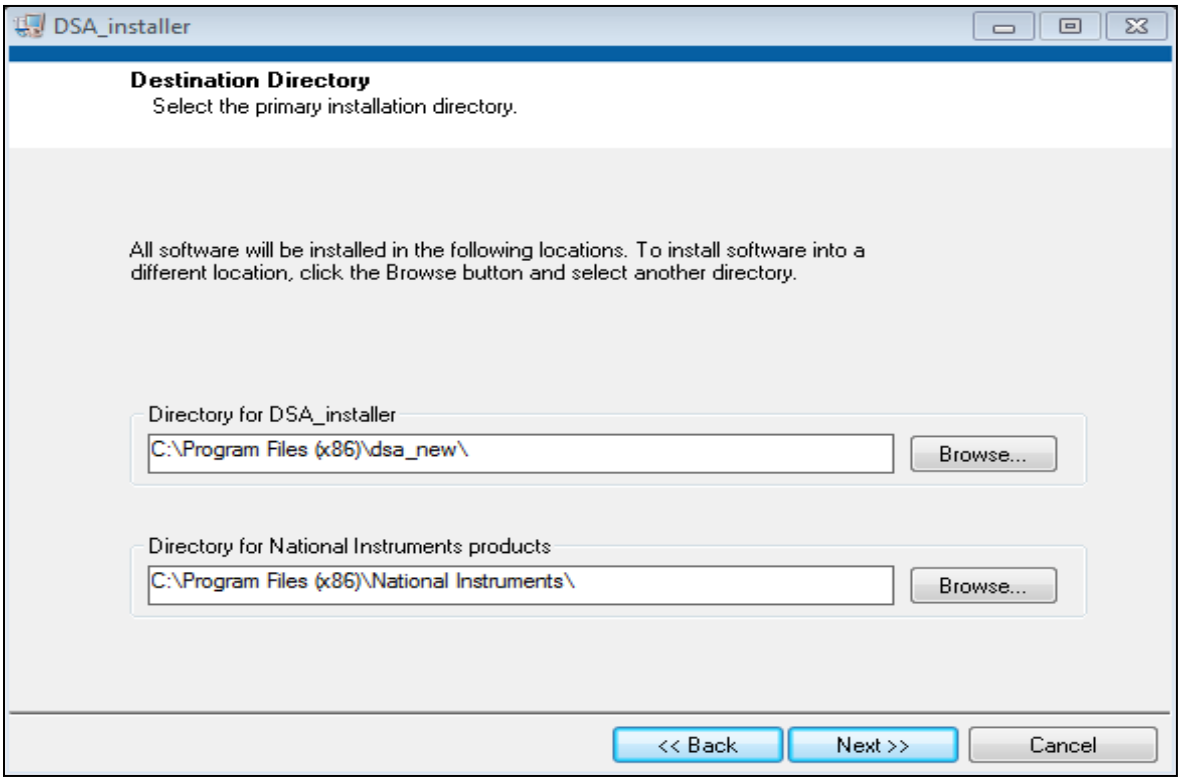

Figure 3 - Directory locations for software installer file folder

The next step is to accept the software license agreement. Please read the license terms and conditions carefully and accept the license agreement. *The software will not be installed without accepting the software license agreement*.

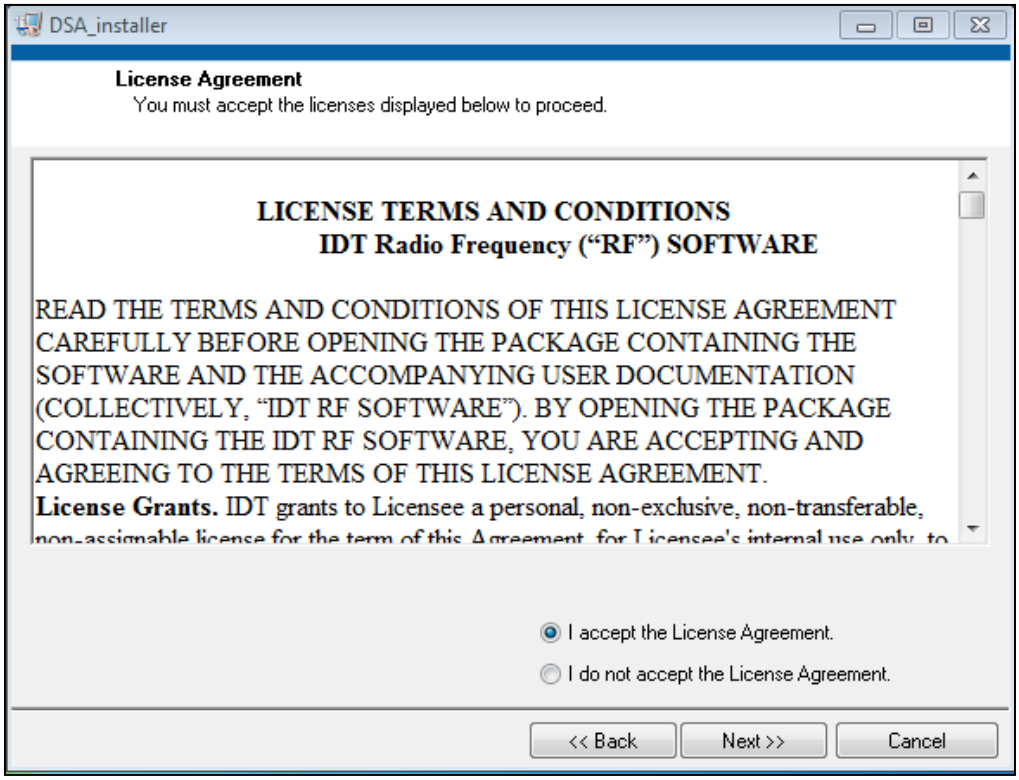

Figure 4 - License Terms and Conditions

Once the installation is complete, a shortcut for the application is automatically stored in the User's desktop.

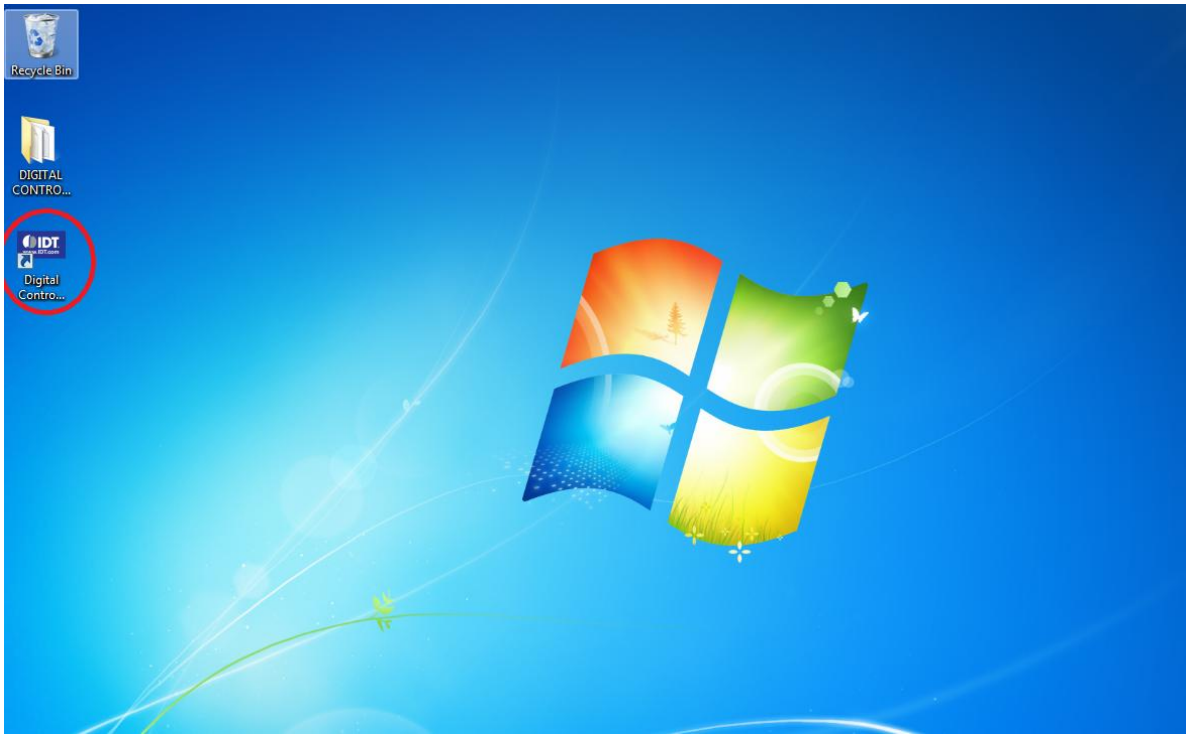

Figure 5 - RF Digital Control Software stored in users desktop

After the Digital Software Control application installation is complete, the software will load the necessary drivers for the RF Digital Control Board which utilizes the FTDI chip. The device driver installation wizard will automatically start running. Click the **Extract** button to continue the installation of FTDI's device driver.

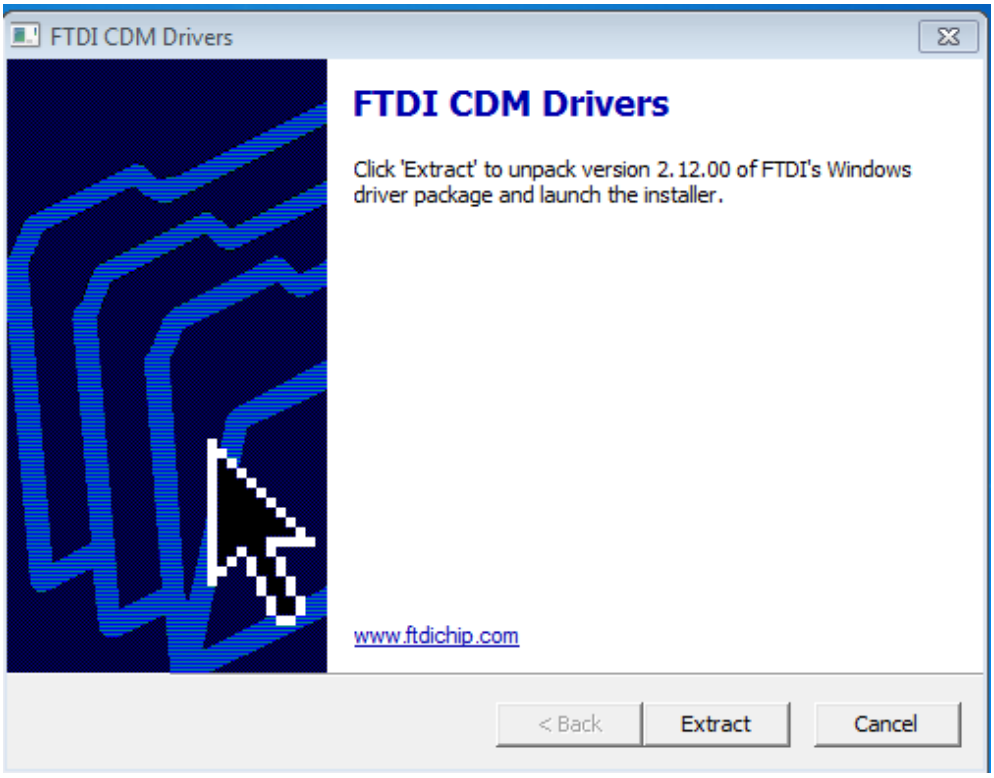

Figure 6 - FTDI's device driver installation

Please accept the license agreement and click **Next** to finish the installation of FTDI's device driver. Once the installation is complete, users will be able to run the RF Digital Control Software Application.

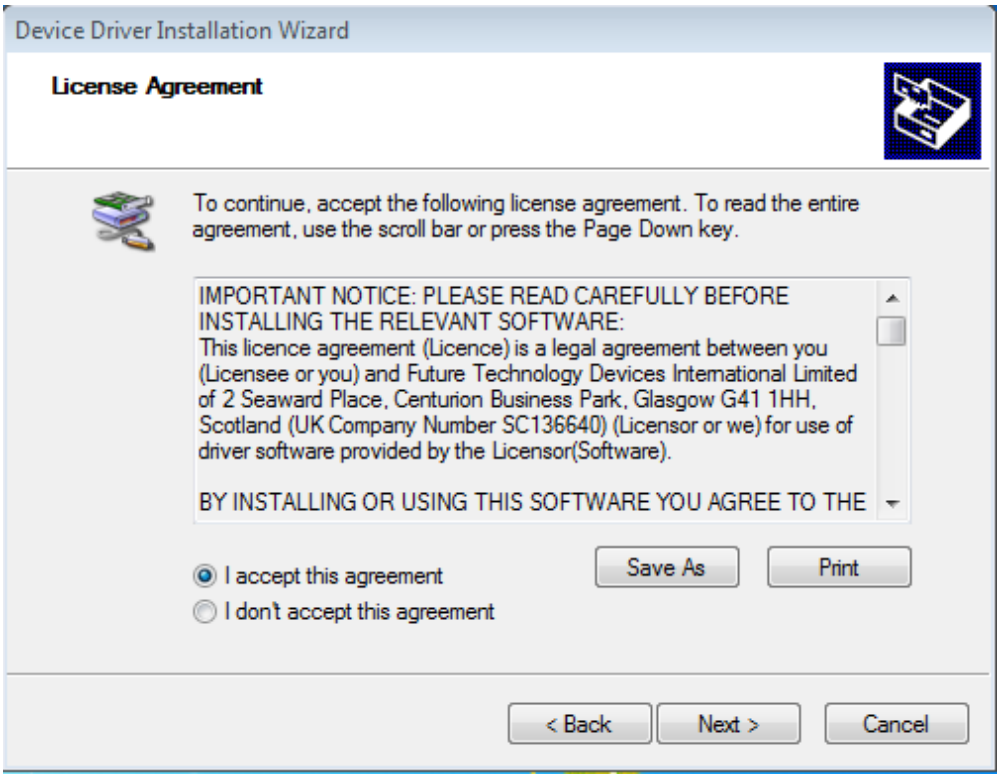

Figure 7 - FTDI's device driver license agreement

7. RF Digital Control Board

7.1. RF Digital Control Board Information

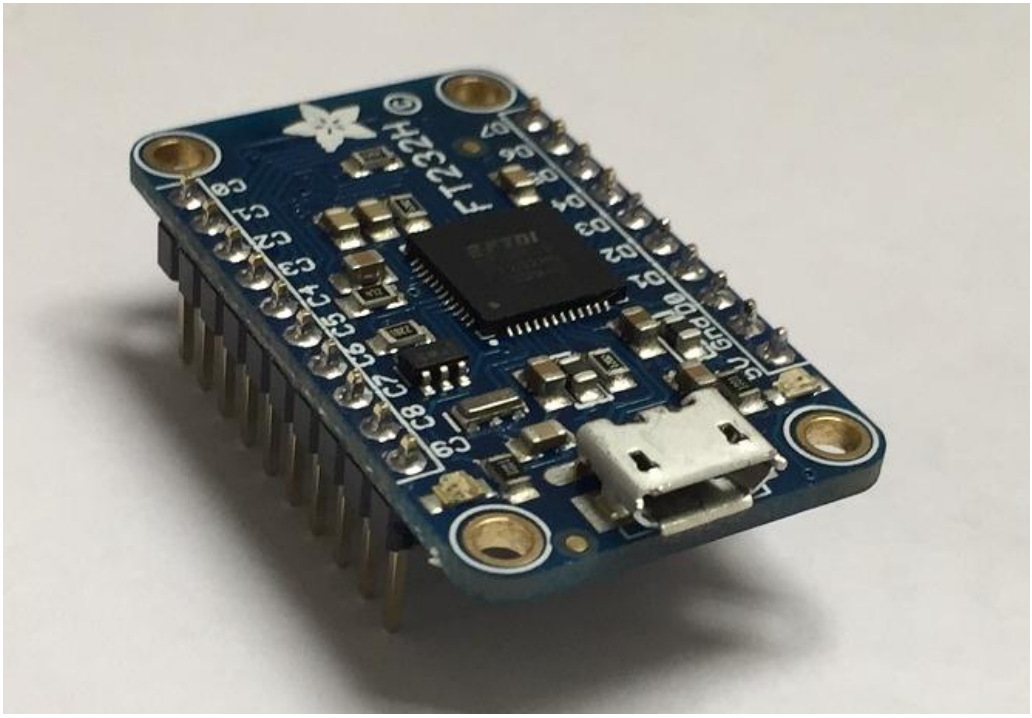

Figure 8 - RF Digital Control Board

The RF Digital Control Board is built by a company called AdaFruit which utilizes FTDI's FT232H chip. There are 2 headers with 10-pins used for making digital connection. The header uses standard 100 mil spacing between the pins.

Datasheets for IDT's Product EVKIT and RF Digital Control Board datasheet can be found in the links provided below:

RF Digital Control Board : http://www.ftdichip.com/Support/Documents/DataSheets/ICs/DS_FT232H.pdf
DSA: http://www.idt.com/products/rf-products

8. Cable Connection

Cables are provided to make the connection between the RF Digital Control Board and the Product EV_{KIT}. Please refer to each figure and table below for correct pin connection using the cable.

NOTE: The Product EVKIT may get damaged if proper procedures are not used.

8.1. RF Digital Control Board

The USB to micro-B cable (similar to cell phone USB cables) is connected from the computer to the RF Digital Control Board. Please refer to the pin configuration tables for each product below for correct connection from the RF Digital Control Board to the Product EV_{KIT}.

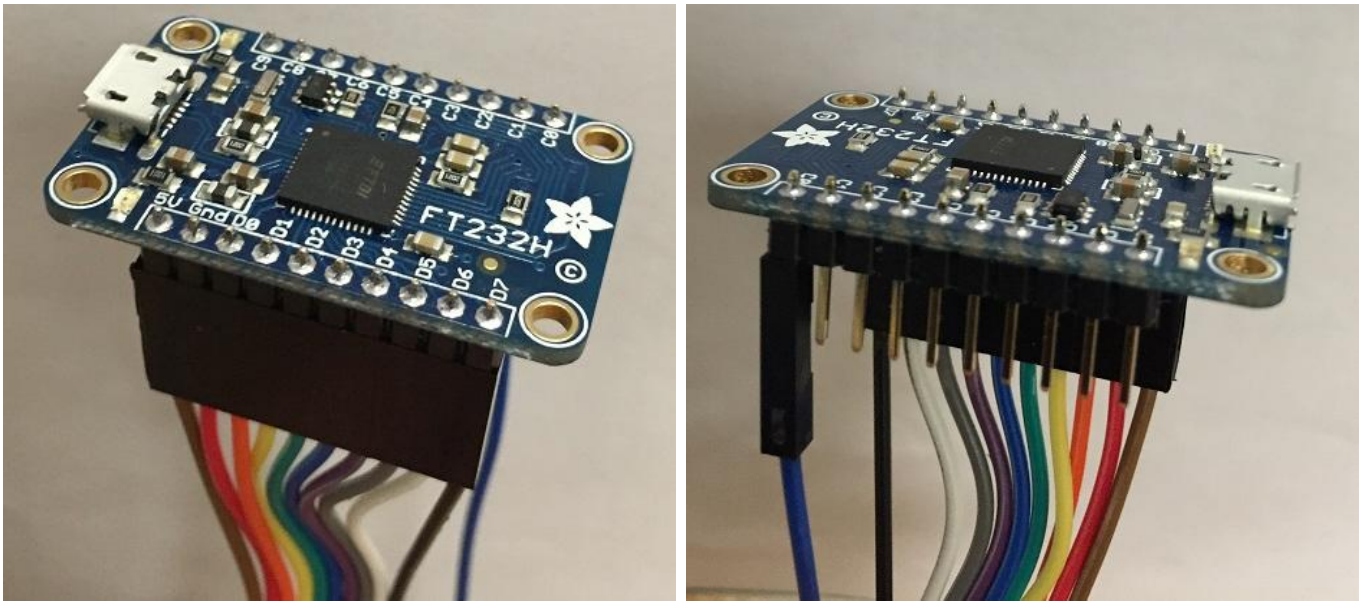

Figure 9 - Top and side views of cable connections of RF Digital Control Board

Figure 9 shows the pin connection on the RF Digital Control Board. The ribbon cable is connector to the right side header (when looking into the USB connector). Make the brown cable align with the 5 V pin and the black cable with pin D7. A single wire is used to make a connection from the C0 pin of the RF Digital Control Board to the VMODE pin of the Product $EV_{KIT.}$

8.2. F1950EVB

8.2.1. **Serial Control Mode**

Users should connect a supply voltage between 3 V to 5 V to VDD of the F1950EVB (Product EV_{KIT}). Refer to Table 1 and Figure 10 for correct serial pin connection between the RF Digital Control Board and the F1950EVB.

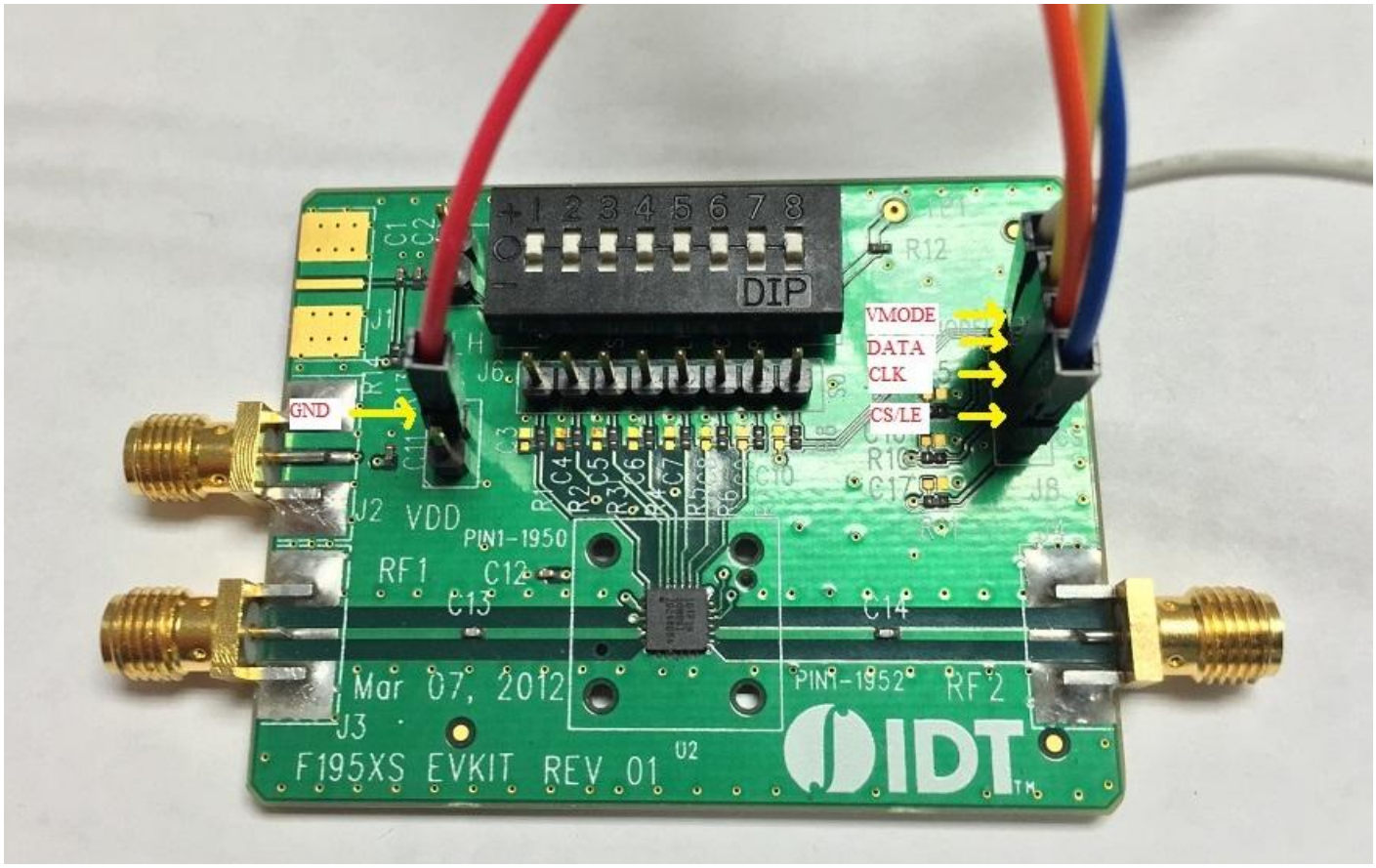

Figure 10 - Serial Mode pin connection for F1950EVB

Table 1 - Serial Mode pin connection for F1950 EVB

RF Digital Control Board	Wire Color	F1950EVB Board Pin
C9		
C8		
C7		
C6		
C5		
C4		
C3		
C2		
C1		
C0	Single Wire	VMODE

RF Digital Control Board	Wire Color	F1950EVB Board Pin
5V	BROWN	
GND	RED	GND
D0	ORANGE	CK
D1	YELLOW	DATA
D2	GREEN	
D3	BLUE	CS/LE
D4	PURPLE	
D5	GREY	
D6	WHITE	
D7	BLACK	

8.2.2. **Parallel Control Mode**

For parallel control mode, users need to run the “EEPROG” application to program the CBUS pin of the RF Digital Control Board. The supply voltage for the VDD should be between 3V to 5V. Please refer to Table 2 and Figure 11 for the correct direct/latched parallel pin connection between the RF Digital Control Board and the F1950EVB.

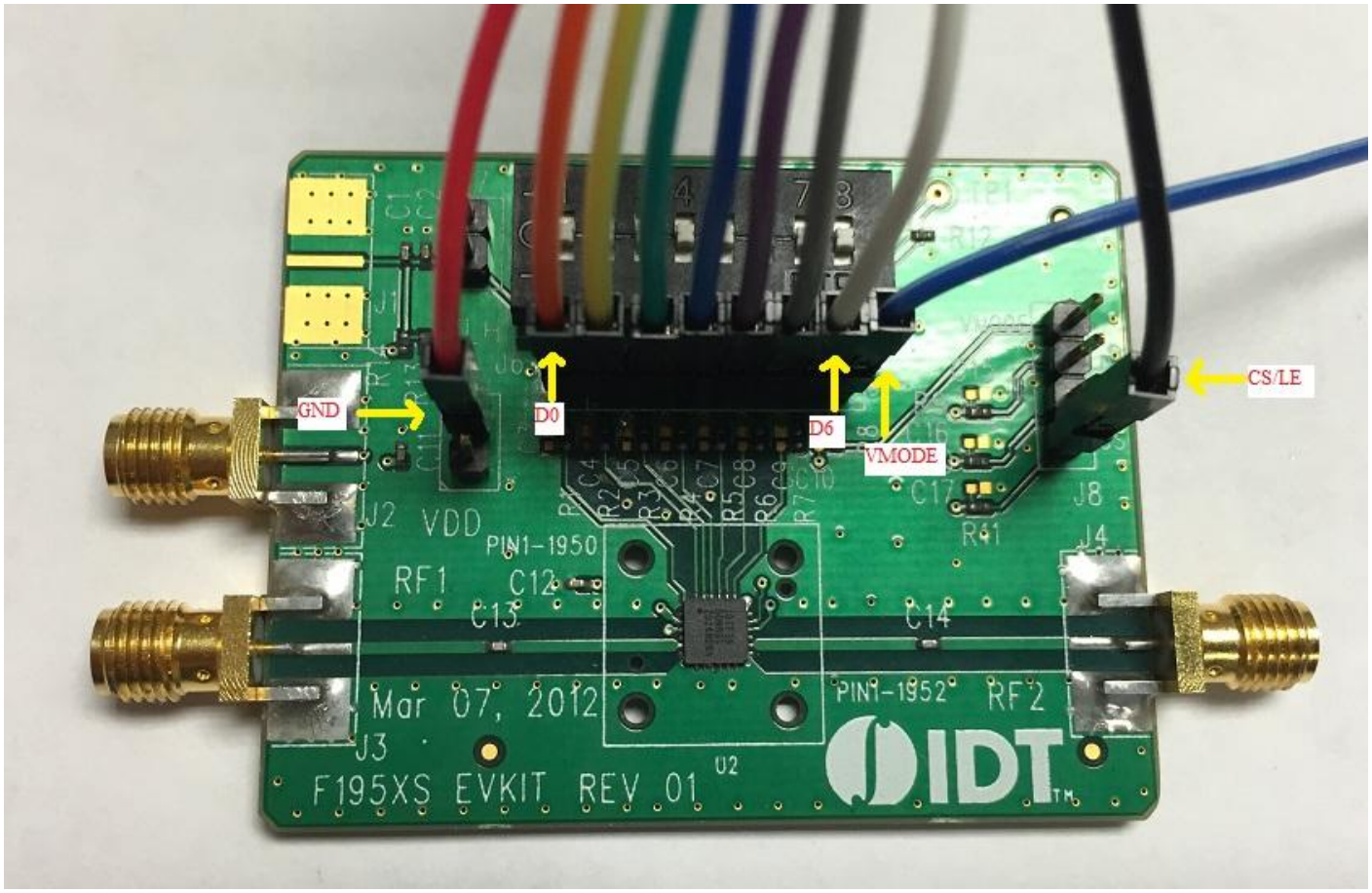

Figure 11 - Parallel mode pin connection for F1950EVB

Table 2 - Parallel Mode pin connection for F1950EVB

RF Digital Control Board	Wire Color	F1950EVB Board Pin
C9		
C8		
C7		
C6		
C5		
C4		
C3		
C2		
C1		
C0	Single Wire	VMODE

RF Digital Control Board	Wire Color	F1950EVB Board Pin
5V	BROWN	
GND	RED	GND
D0	ORANGE	D0
D1	YELLOW	D1
D2	GREEN	D2
D3	BLUE	D3
D4	PURPLE	D4
D5	GREY	D5
D6	WHITE	D6
D7	BLACK	CS/LE

8.3. F1951EVB

8.3.1. **Serial Control Mode**

Users should connect a supply voltage between 3V to 5V to VDD of the F1951EVB. Refer to the Table 3 and the Figure 12 for correct serial pin connection between the RF Digital Control Board and the F1951EVB.

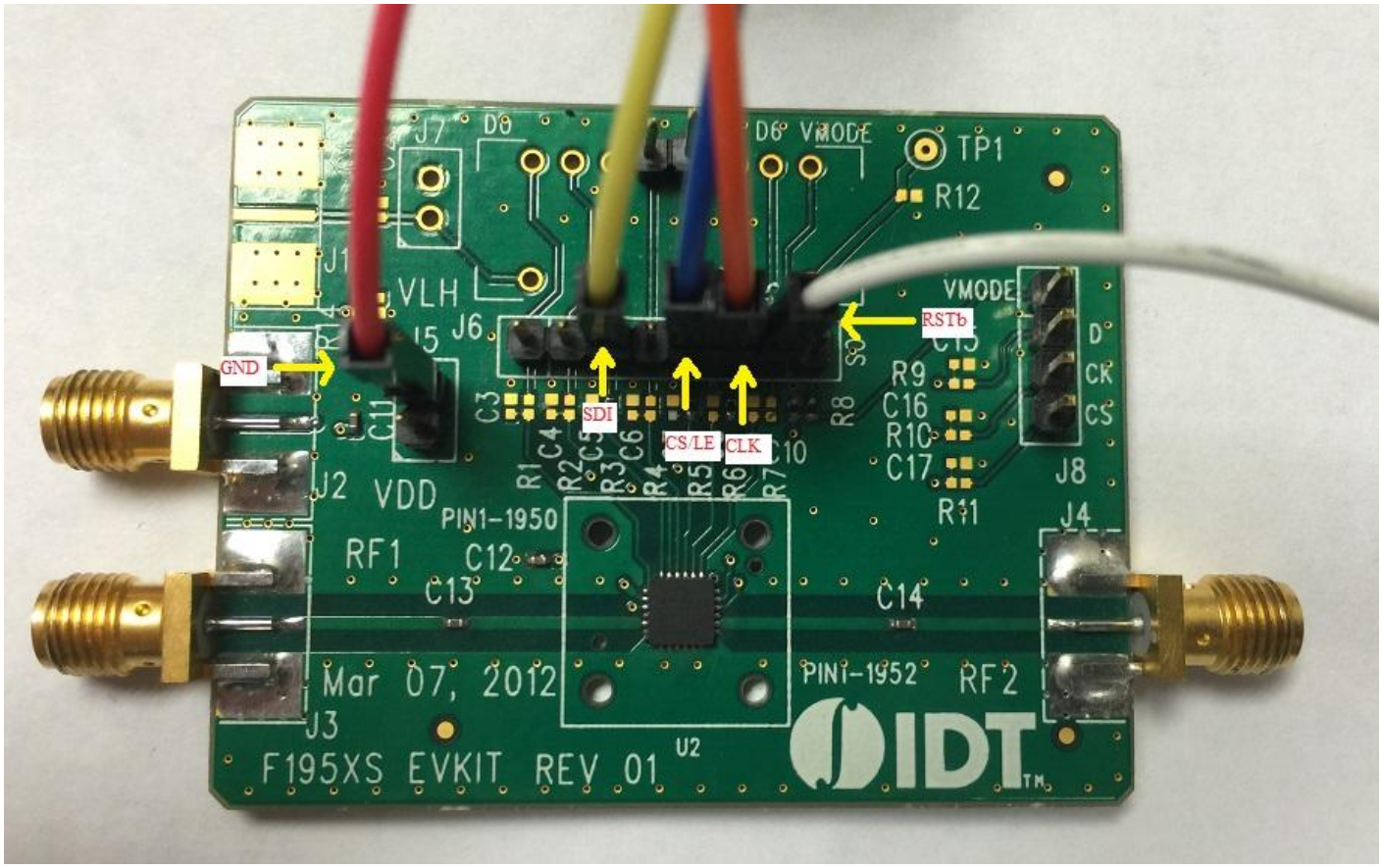

Figure 12 - Serial Mode pin connection for F1951EVB

Table 3 - Serial mode pin connection for F1951EVB

RF Digital Control Board	Wire Color	F1951EVBBoard Pin
C9		
C8		
C7		
C6		
C5		
C4		
C3		
C2		
C1		
C0	Single Wire	RSTb

RF Digital Control Board	Wire Color	F1951EVB Board Pin
5V	BROWN	
GND	RED	GND
D0	ORANGE	CLK
D1	YELLOW	SDI
D2	GREEN	
D3	BLUE	CS/LE
D4	PURPLE	
D5	GREY	
D6	WHITE	
D7	BLACK	

8.4. F1953EVB

8.4.1. **Serial Control Mode**

Users should connect a supply the voltage between 2.7V to 3.3V to VDD of the F1953EVB. Refer to Table 4 and Figure 13 for correct serial pin connection between the RF Digital Control Board and the F1953EVB.

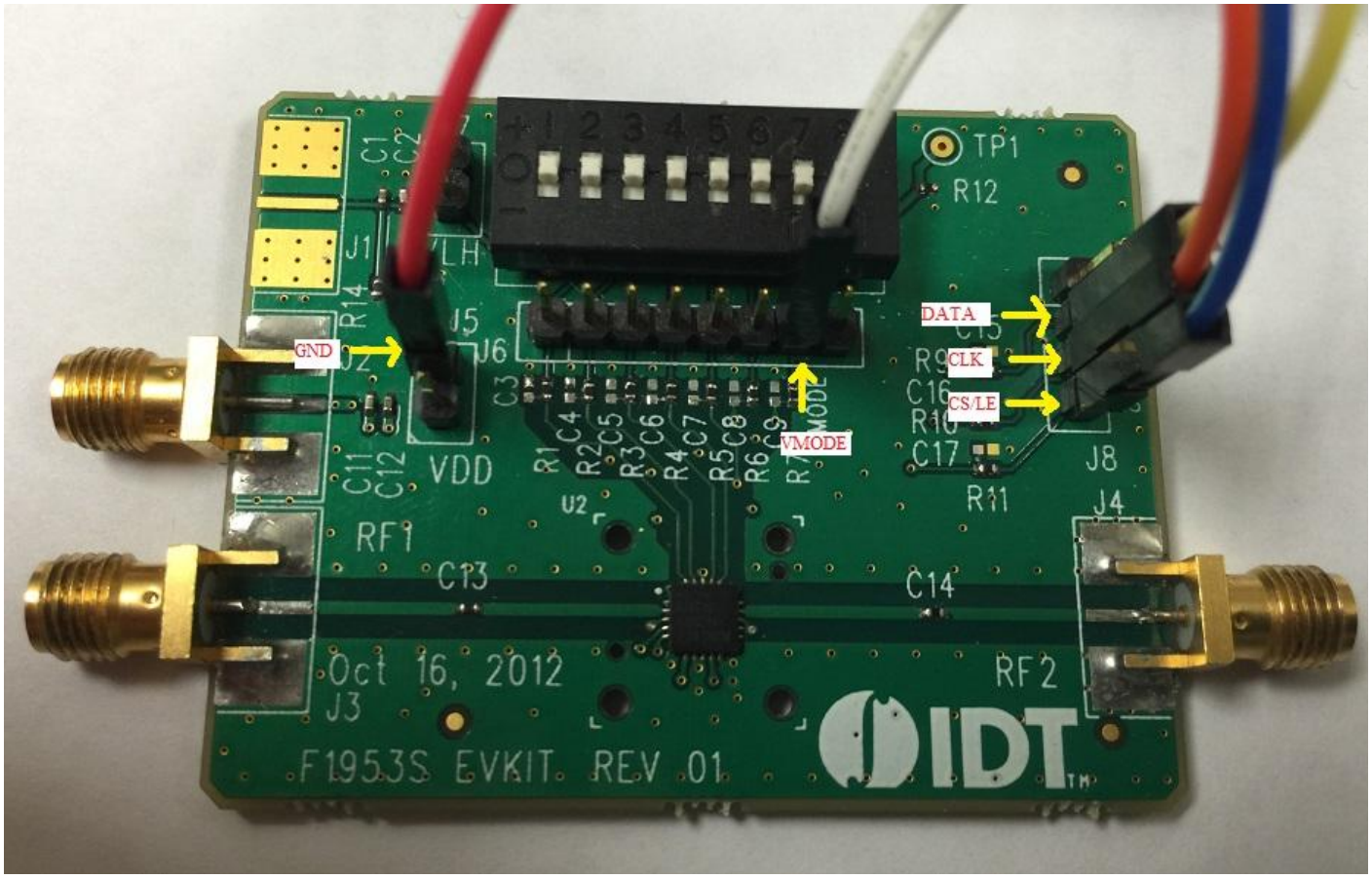

Figure 13 - Serial Mode pin connection for F1953EVB

Table 4 - Serial mode pin connection for F1953EVB

RF Digital Control Board	Wire Color	F1953EVB Board Pin
C9		
C8		
C7		
C6		
C5		
C4		
C3		
C2		
C1		
C0	Single Wire	VMODE

RF Digital Control Board	Wire Color	F1953EVB Board Pin
5V	BROWN	
GND	RED	GND
D0	ORANGE	CLK
D1	YELLOW	DATA
D2	GREEN	
D3	BLUE	CS/LE
D4	PURPLE	
D5	GREY	
D6	WHITE	
D7	BLACK	

8.4.2. **Parallel Control Mode**

For parallel control mode users need to run the “EEPROG” application to program the CBUS pin of the RF Digital Control Board. The supply voltage for the VDD should be between 2.7V to 3.3V. Please refer to Figure 14 and Table 5 for the correct direct/latched parallel pin connection between the RF Digital Control Board and the F1953EVB.

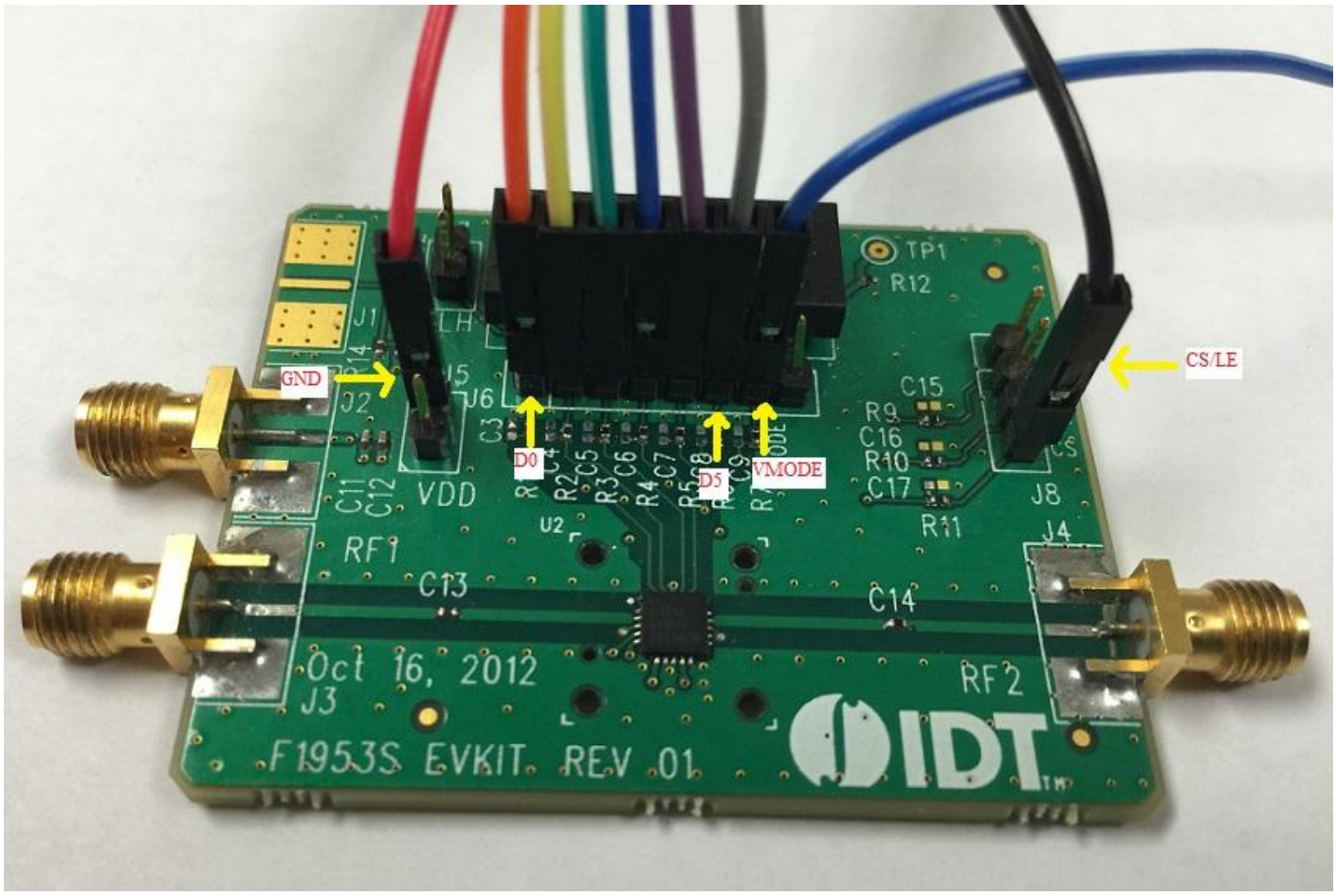

Figure 14 - Parallel mode pin connection for F1953EVB

Table 5 - Parallel mode pin connection for F1953EVB

RF Digital Control Board	Wire Color	F1953EVB Board Pin
C9		
C8		
C7		
C6		
C5		
C4		
C3		
C2		
C1		
C0	Single Wire	VMODE

RF Digital Control Board	Wire Color	F1953EVB Board Pin
5V	BROWN	
GND	RED	GND
D0	ORANGE	D0
D1	YELLOW	D1
D2	GREEN	D2
D3	BLUE	D3
D4	PURPLE	D4
D5	GREY	D5
D6	WHITE	
D7	BLACK	CS/LE

8.5. F1956EVB

8.5.1. **Serial Control Mode**

Users should connect a supply the voltage between 3.0V to 5.0V to VDD of the F1956EVB. Also supply 5V to VDD (J10 on the F1956EVB) to provide voltage to 10 pin DIP Switches for serial address word control. Refer to Table 6 and Figure 15 for correct serial pin connection between the RF Digital Control Board and the F1956EVB.

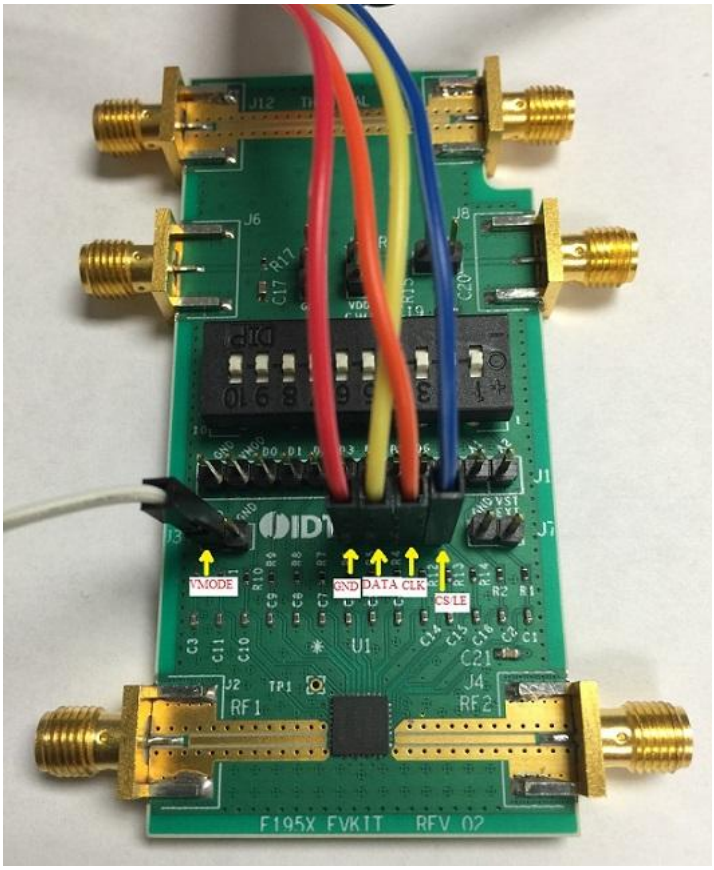

Figure 15 - Serial mode pin connection for F1956EVB

Table 6 - Serial mode pin connection for F1956EVB

RF Digital Control Board	Wire Color	F1956EVB Board Pin
C9		
C8		
C7		
C6		
C5		
C4		
C3		
C2		
C1		
C0	Single Wire	VMODE

RF Digital Control Board	Wire Color	F1956EVB Board Pin
5V	BROWN	
GND	RED	GND
D0	ORANGE	CLK
D1	YELLOW	DATA
D2	GREEN	
D3	BLUE	CS/LE
D4	PURPLE	
D5	GREY	
D6	WHITE	
D7	BLACK	

8.5.2. **Parallel Control Mode**

For parallel control mode users need to run the “EEPROG” application to program the CBUS pin of the RF Digital Control Board. The supply for the VDD should be between 3.0 V to 5.0 V Refer to Figure 16 and Table 7 for correct direct/latched parallel pin connection between the RF Digital Control Board and the F1956EVB.

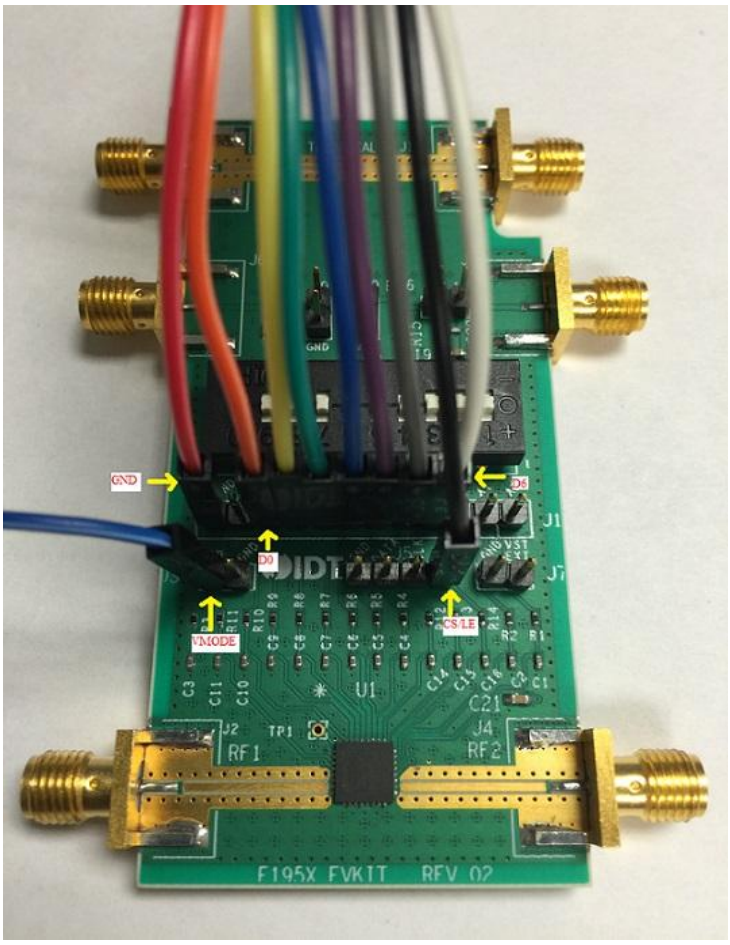

Figure 16 - Parallel Mode pin connection for F1956EVB

Table 7 - Parallel Mode pin connection for F1956EVB

RF Digital Control Board	Wire Color	F1956EVB Board Pin
C9		
C8		
C7		
C6		
C5		
C4		
C3		
C2		
C1		
C0	Single Wire	VMODE

RF Digital Control Board	Wire Color	F1956EVB Board Pin
5V	BROWN	
GND	RED	GND
D0	ORANGE	D0
D1	YELLOW	D1
D2	GREEN	D2
D3	BLUE	D3
D4	PURPLE	D4
D5	GREY	D5
D6	WHITE	D6
D7	BLACK	CS/LE

8.6. F1912EVB

8.6.1. **Serial Control Mode**

Users should connect a supply voltage between 3.0 V to 5.25 V to VDD of the F1912EVB. Refer to Table 8 and Figure 17 for correct serial pin connection between the RF Digital Control Board and the F1912EVB.

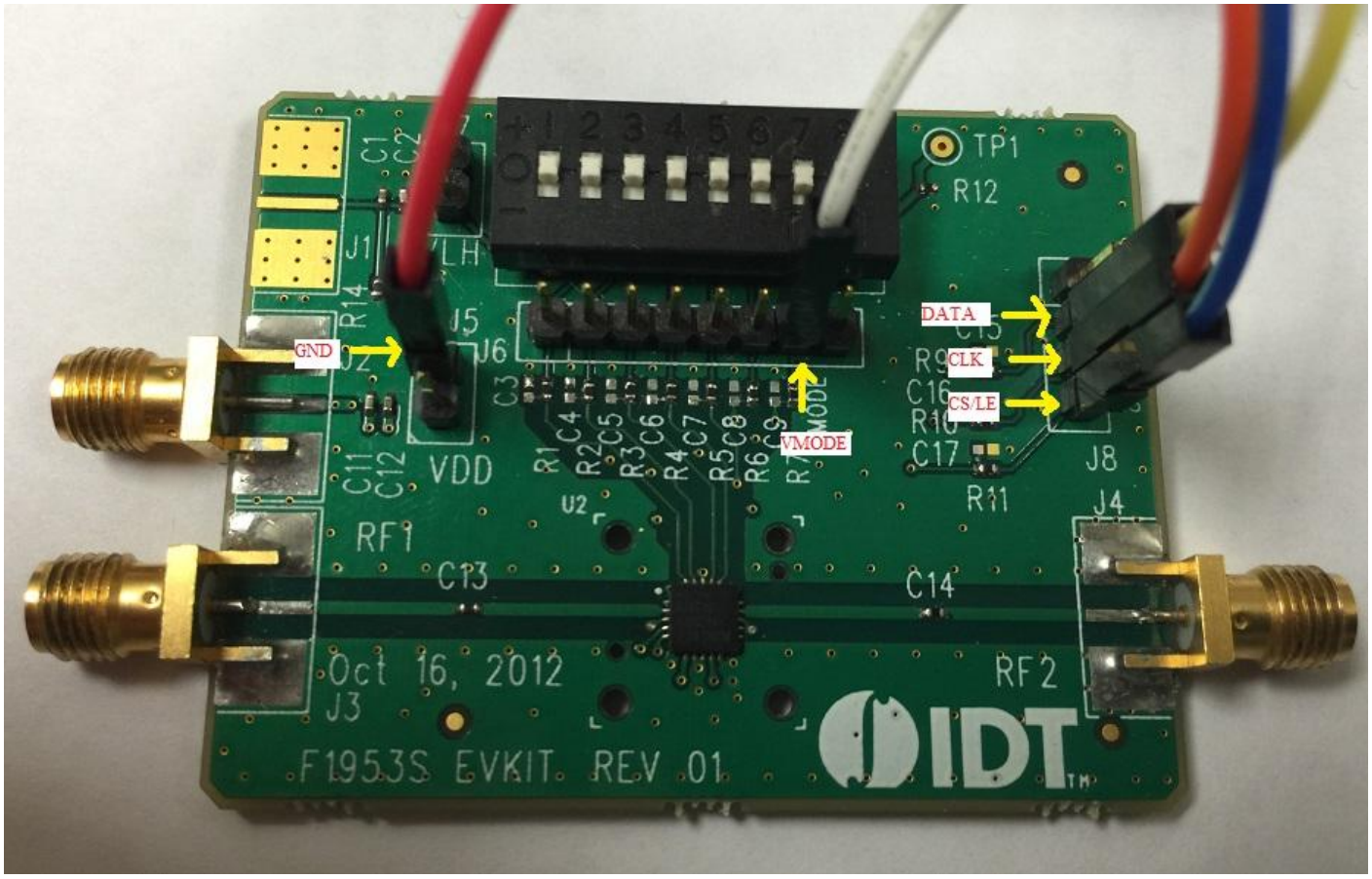

Figure 17 - Serial mode pin connection for F1912EVB

Table 8 - Serial mode pin connection for F1912EVB

RF Digital Control Board	Wire Color	F1912EVB Board Pin
C9		
C8		
C7		
C6		
C5		
C4		
C3		
C2		
C1		
C0	Single Wire	VMODE

RF Digital Control Board	Wire Color	F1912EVB Board Pin
5V	BROWN	
GND	RED	GND
D0	ORANGE	CLK
D1	YELLOW	DATA
D2	GREEN	
D3	BLUE	CS/LE
D4	PURPLE	
D5	GREY	
D6	WHITE	
D7	BLACK	

8.6.2. **Parallel Control Mode**

For parallel control mode users need to run the “EEPROG” application to program the CBUS pin of the RF Digital Control Board. The supply voltage for the VDD should be between 3.0 V to 5.25 V. Please refer to Figure 18 and Table 9 for correct direct/latched parallel pin connection between the RF Digital Control Board and theF1912EVB.

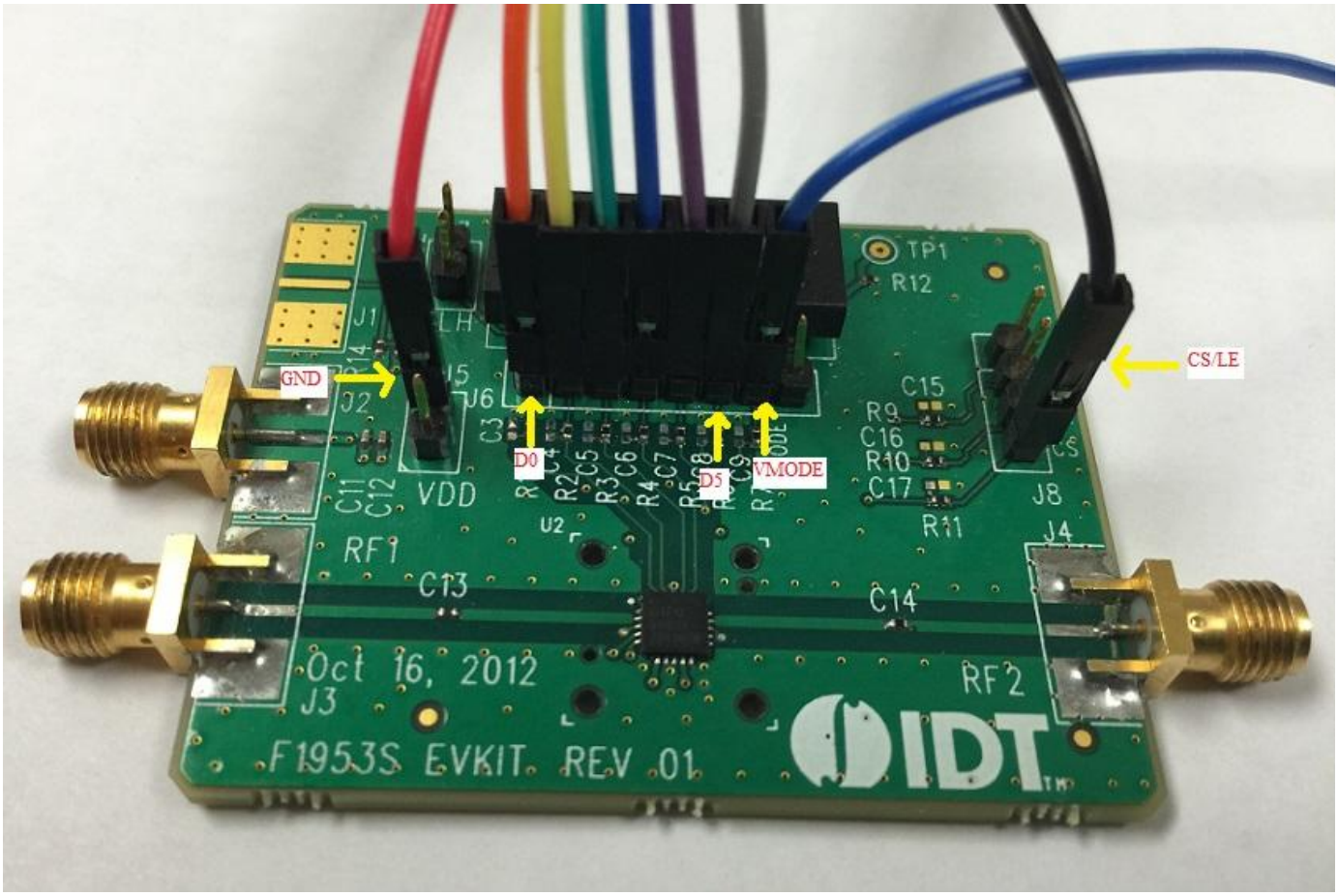

Figure 18 - Parallel mode pin connection for F1912EVB

Table 9 - Parallel mode pin connection for F1912EVB

RF Digital Control Board	Wire Color	F1912EVB Board Pin
C9		
C8		
C7		
C6		
C5		
C4		
C3		
C2		
C1		
C0	Single Wire	VMODE

RF Digital Control Board	Wire Color	F1912EVB Board Pin
5V	BROWN	
GND	RED	GND
D0	ORANGE	D0
D1	YELLOW	D1
D2	GREEN	D2
D3	BLUE	D3
D4	PURPLE	D4
D5	GREY	D5
D6	WHITE	
D7	BLACK	CS/LE

8.7. F1975EVB

8.7.1. **Serial Mode**

Users should connect a supply the voltage between 3.0V to 5.25V to VDD of the F1975EVB. Refer to Table 10 and Figure 19 for correct serial pin connection between the RF Digital Control Board and the F1975EVB.

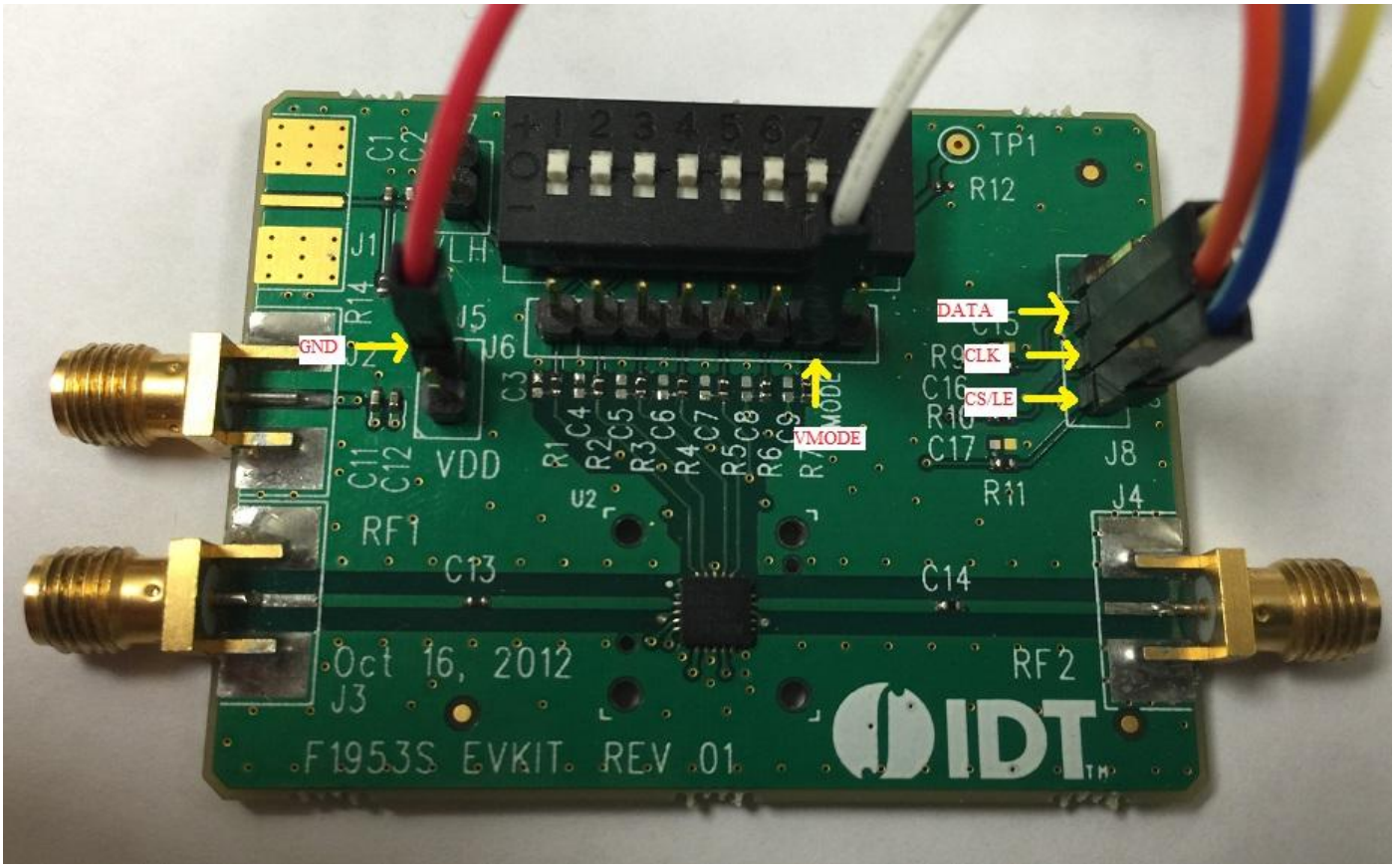

Figure 19 - Serial Mode pin connection for F1975EVB

Table 10 - Serial Mode pin connection for F1975EVB

RF Digital Control Board	Wire Color	F1975EVB Board Pin
C9		
C8		
C7		
C6		
C5		
C4		
C3		
C2		
C1		
C0	Single Wire	VMODE

RF Digital Control Board	Wire Color	F1975EVB Board Pin
5V	BROWN	
GND	RED	GND
D0	ORANGE	CLK
D1	YELLOW	DATA
D2	GREEN	
D3	BLUE	CS/LE
D4	PURPLE	
D5	GREY	
D6	WHITE	
D7	BLACK	

8.7.2. **Parallel Mode**

For parallel control mode users need to run the “EEPROG” application to program the CBUS pin of the RF Digital Control Board. The supply voltage for the VDD should be between 3.0 V to 5.25 V. Please refer to Figure 20 and Table 11 for correct direct/latched parallel pin connection between the RF Digital Control Board and the F1975EVB.

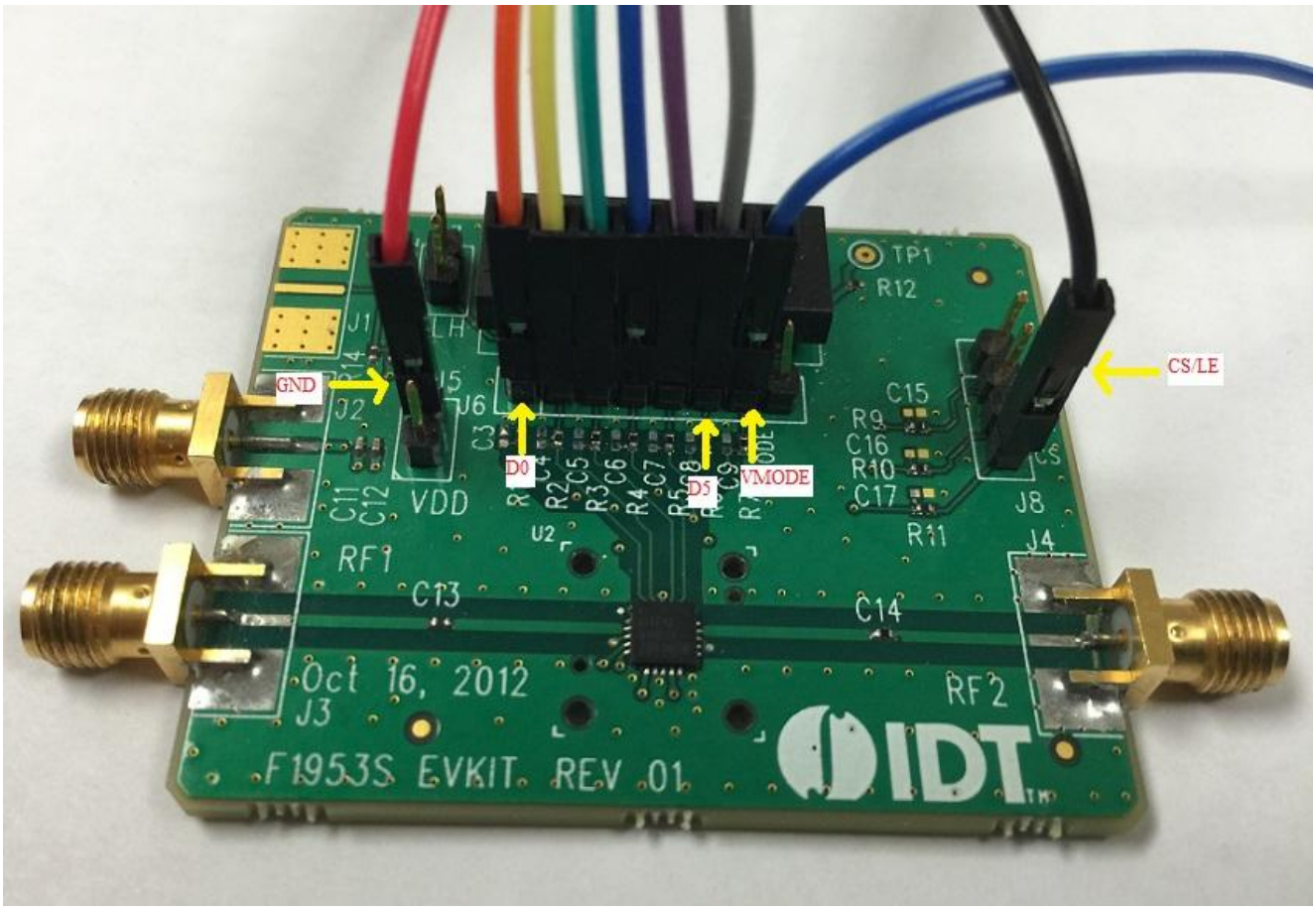

Figure 20 - Parallel Mode pin connection for F1975EVB

Table 11 - Parallel Mode pin connection for F1975EVB

RF Digital Control Board	Wire Color	F1975EVB Board Pin
C9		
C8		
C7		
C6		
C5		
C4		
C3		
C2		
C1		
C0	Single Wire	VMODE

RF Digital Control Board	Wire Color	F1975EVB Board Pin
5V	BROWN	
GND	RED	GND
D0	ORANGE	D0
D1	YELLOW	D1
D2	GREEN	D2
D3	BLUE	D3
D4	PURPLE	D4
D5	GREY	D5
D6	WHITE	
D7	BLACK	CS/LE

8.8. F1977EVB

8.8.1. **Serial Mode**

Users should connect a supply the voltage between 3 V to 5 V to VDD of the F1977EVB. Also supply 5V to VDD (J10 on F1977EVB) to provide the voltage to 10 pin DIP Switches for serial address word control. Refer to Table 12 and Figure 21 for correct serial pin connection between the RF Digital Control Board and the F1977EVB.

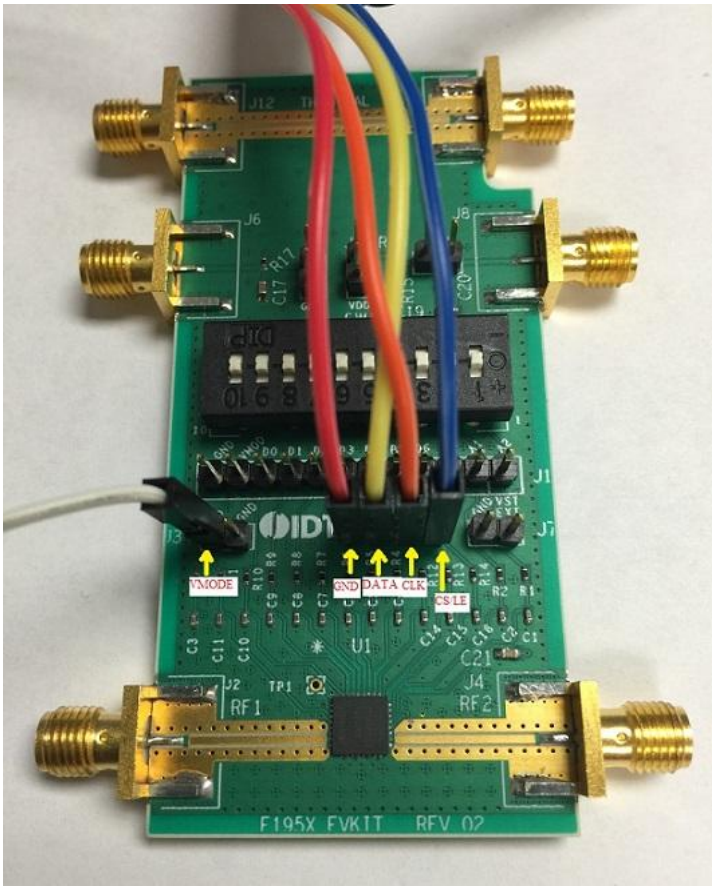

Figure 21 - Serial Mode pin connection for F1977EVB

Table 12 - Serial Mode pin connection for F1977EVB

RF Digital Control Board	Wire Color	F1977EVB Board Pin
C9		
C8		
C7		
C6		
C5		
C4		
C3		
C2		
C1		
C0	Single Wire	VMODE

RF Digital Control Board	Wire Color	F1977EVB Board Pin
5V	BROWN	
GND	RED	GND
D0	ORANGE	CLK
D1	YELLOW	DATA
D2	GREEN	
D3	BLUE	CS/LE
D4	PURPLE	
D5	GREY	
D6	WHITE	
D7	BLACK	

8.8.2. **Parallel Control Mode**

For parallel control mode users need to run the “EEPROG” application to program the CBUS pin of the RF Digital Control Board. The supply voltage for the VDD should be between 3.0to 5.0 V. Please refer to Figure 22 and Table 13 for correct direct/latched parallel pin connection between the RF Digital Control Board and the F1977EVB.

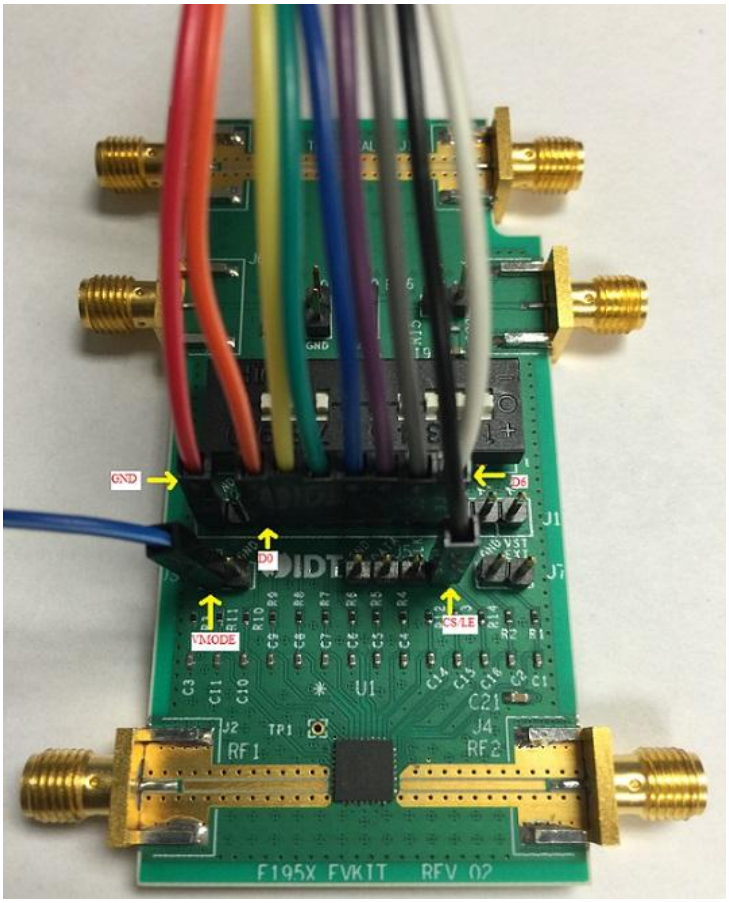

Figure 22 - Parallel Mode pin connection for F1977EVB

Table 13 - Parallel Mode pin connection for F1977EVB

RF Digital Control Board	Wire Color	F1977EVB Board Pin
C9		
C8		
C7		
C6		
C5		
C4		
C3		
C2		
C1		
C0	Single Wire	VMODE

RF Digital Control Board	Wire Color	F1977EVB Board Pin
5V	BROWN	
GND	RED	GND
D0	ORANGE	D0
D1	YELLOW	D1
D2	GREEN	D2
D3	BLUE	D3
D4	PURPLE	D4
D5	GREY	D5
D6	WHITE	D6
D7	BLACK	CS/LE

8.9. F1200EVB

8.9.1. **Serial Mode**

Users should connect a supply voltage between 4.75 V to 5.25 V to VDD of the F1200EVB. Refer to Table 14 and Figure 23 for correct serial pin connection between the RF Digital Control Board and the F1200EVB. Make sure VMODE pin is left open for serial mode.

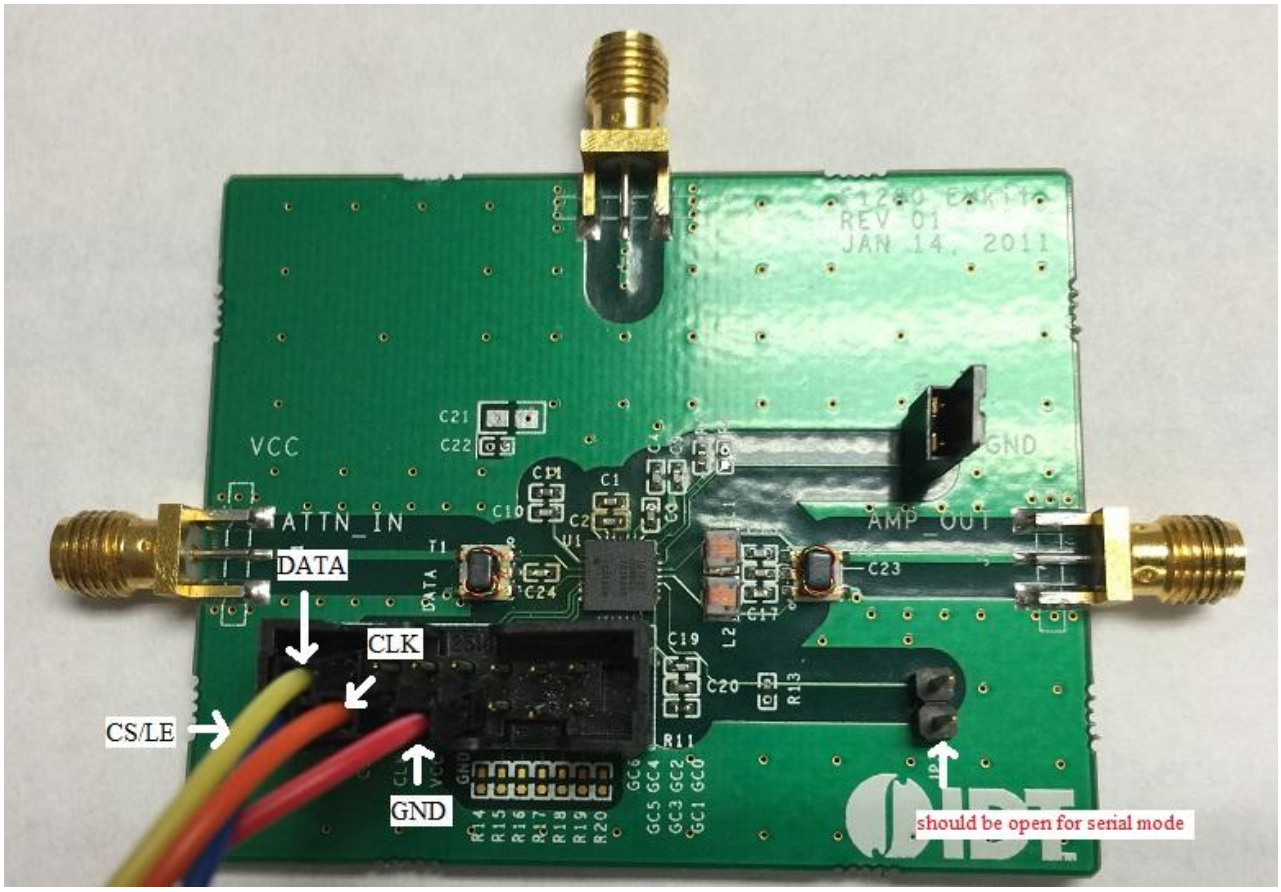

Figure 23 - Serial mode pin connection for F1200EVB

Table 14 - Serial mode pin connection for F1200EVB

RF Digital Control Board	Wire Color	F1200EVB Board Pin
C9		
C8		
C7		
C6		
C5		
C4		
C3		
C2		
C1		
C0		

RF Digital Control Board	Wire Color	F1200EVB Board Pin
5V	BROWN	
GND	RED	GND
D0	ORANGE	CLK
D1	YELLOW	DATA
D2	GREEN	
D3	BLUE	CS/LE
D4	PURPLE	
D5	GREY	
D6	WHITE	
D7	BLACK	

8.9.2. **Parallel Mode**

Users should connect a supply voltage between 4.75 V to 5.25 V to VDD of the F1200EVB. Refer to Table 15 and Figure 24 for correct parallel pin connection between the RF Digital Control Board and the F1200EVB. VMODE pin should be closed for parallel mode.

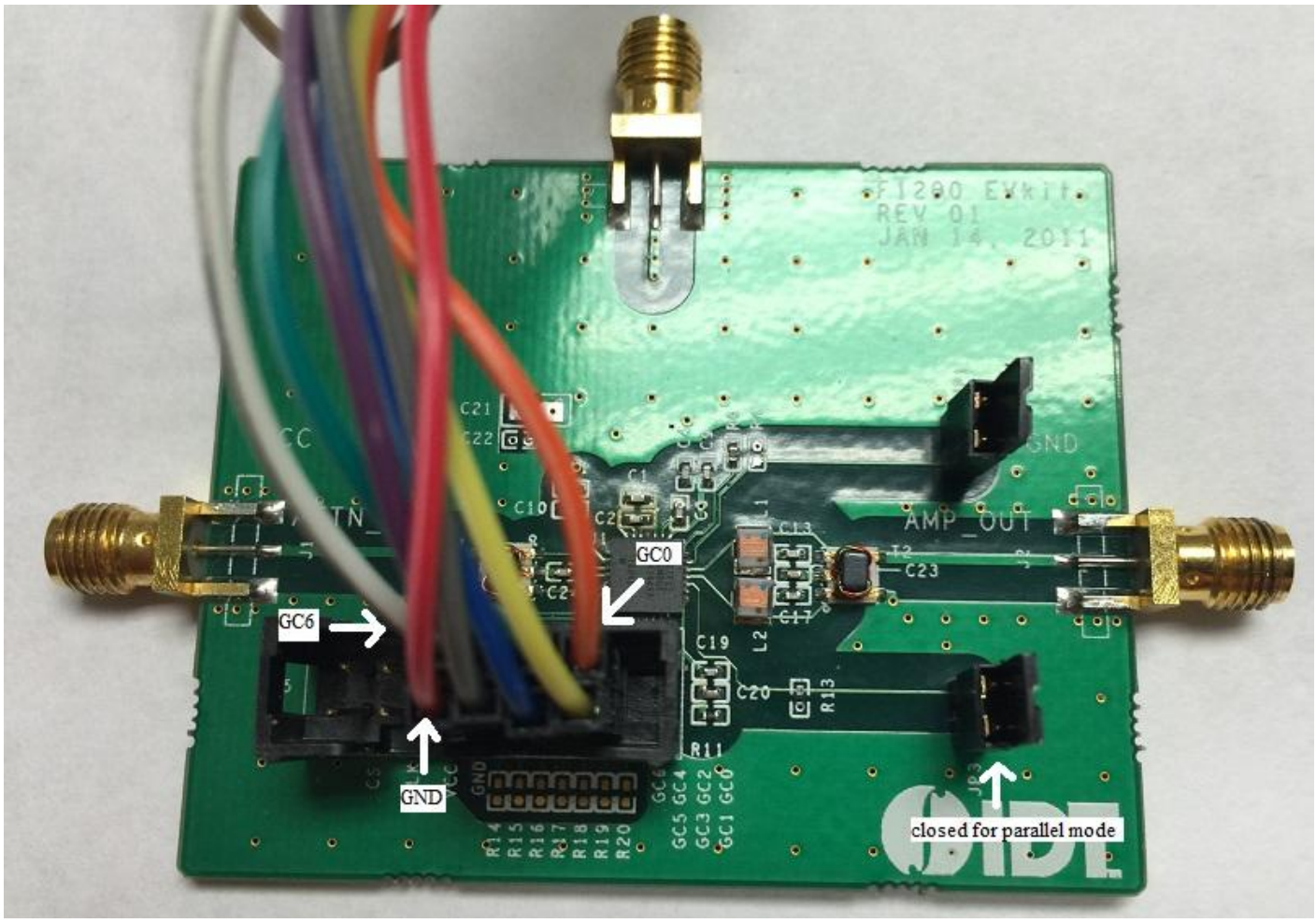

Figure 24 - Parallel mode pin connection for F1200EVB

Table 15 - Parallel mode pin connection for F1200EVB

RF Digital Control Board	Wire Color	F1200EVB Board Pin
C9		
C8		
C7		
C6		
C5		
C4		
C3		
C2		
C1		
C0		

RF Digital Control Board	Wire Color	F1200EVB Board Pin
5V	BROWN	
GND	RED	GND
D0	ORANGE	GC0
D1	YELLOW	GC1
D2	GREEN	GC2
D3	BLUE	GC3
D4	PURPLE	GC4
D5	GREY	GC5
D6	WHITE	GC6
D7	BLACK	

8.10. F1240EVB

8.10.1. **Serial Mode**

Users should connect a supply voltage between 4.75 V to 5.25 V to VDD of the F1240EVB. Refer to Table 16 and Figure 25 for correct serial pin connection between the RF Digital Control Board and the F1240EVB. Connect VMODE to ground for serial mode.

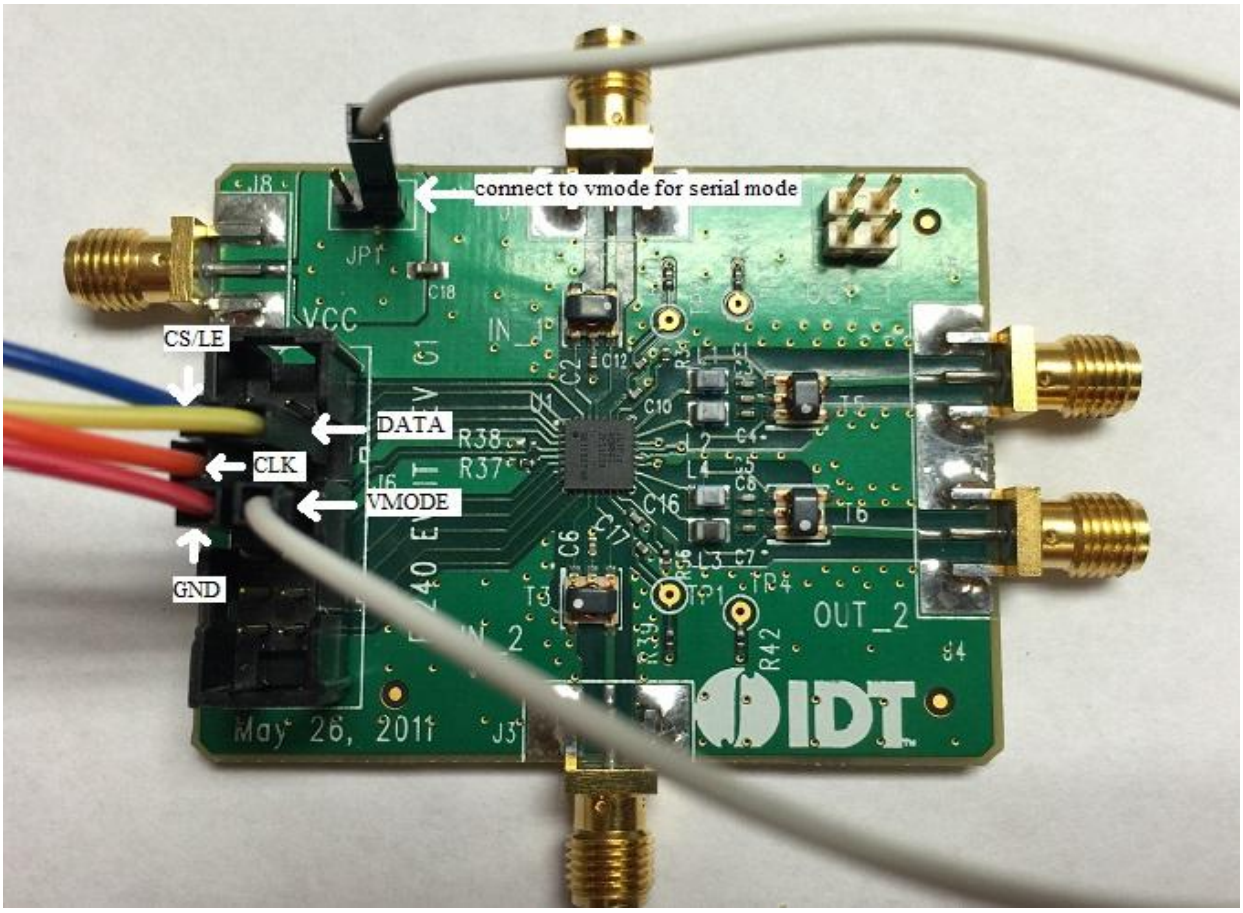

Figure 25 - Serial mode pin connection for F1240EVB

Table 16 - Serial mode pin connection for F1240EVB

RF Digital Control Board	Wire Color	F1240EVB Board Pin
C9		
C8		
C7		
C6		
C5		
C4		
C3		
C2		
C1		
C0		

RF Digital Control Board	Wire Color	F1240EVB Board Pin
5V	BROWN	
GND	RED	GND
D0	ORANGE	CLK
D1	YELLOW	DATA
D2	GREEN	
D3	BLUE	CS/LE
D4	PURPLE	
D5	GREY	
D6	WHITE	
D7	BLACK	

8.10.2. **Parallel Mode**

Users should connect a supply voltage between 4.75 V to 5.25 V to VDD of the F1240EVB. Refer to Table 17 and Figure 26 and 27 for correct parallel pin connection between the RF Digital Control Board and the F1240EVB.

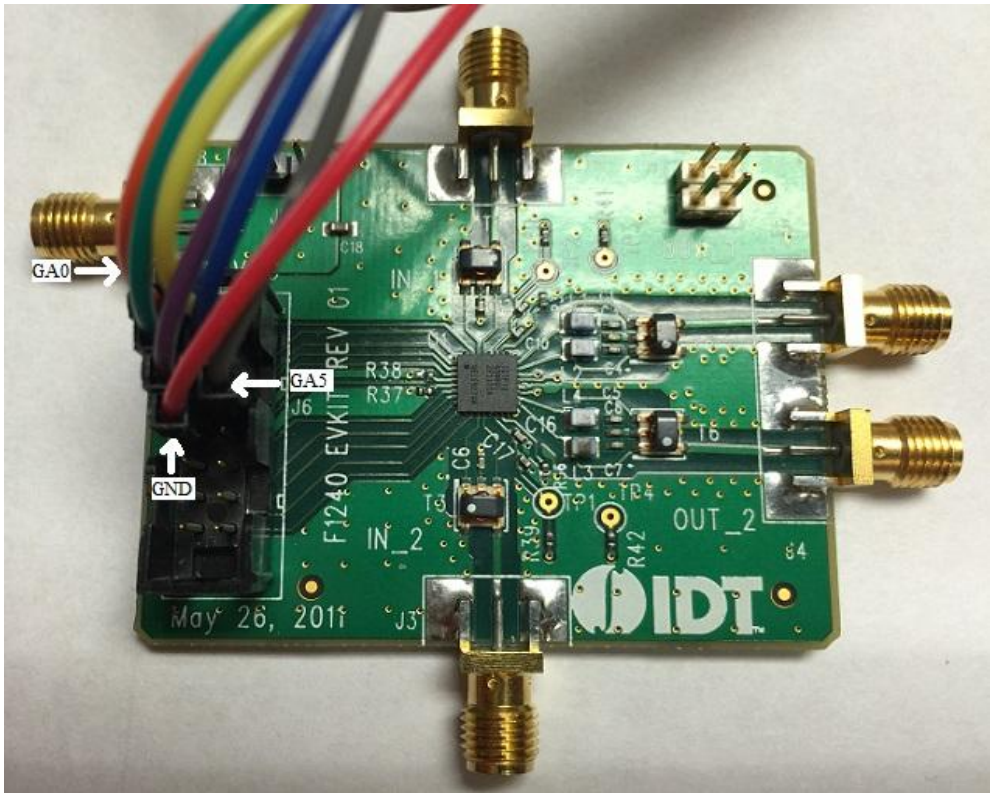

Figure 26 - Parallel Mode Channel A pin connection for F1240EVB

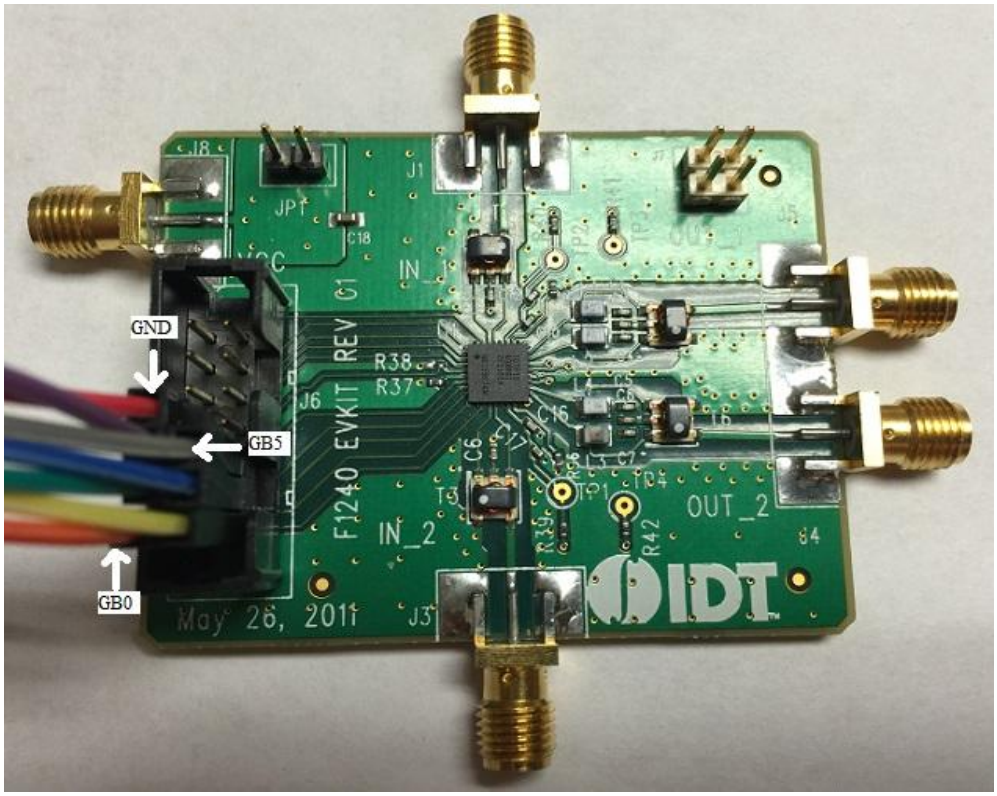

Figure 27 - Parallel mode Channel B pin connection for F1240EVB

Table 17 - Parallel mode pin connection for F1240EVB

RF Digital Control Board	Wire Color	F1240EVB Board Pin
C9		
C8		
C7		
C6		
C5		
C4		
C3		
C2		
C1		
C0		

RF Digital Control Board	Wire Color	F1240EVB Board Pin
5V	BROWN	
GND	RED	GND
D0	ORANGE	GA0/GB0
D1	YELLOW	GA1/GB1
D2	GREEN	GA2/GB2
D3	BLUE	GA3/GB3
D4	PURPLE	GA4/GB4
D5	GREY	GA5/GB5
D6	WHITE	
D7	BLACK	

8.11. F1241EVB

8.11.1. **Parallel Mode**

Users should connect a supply voltage between 4.75 V to 5.25 V to VDD of the F1241EVB. Refer to Table 18 and Figure 28 and 29 for correct parallel pin connection between the RF Digital Control Board and the F1241EVB.

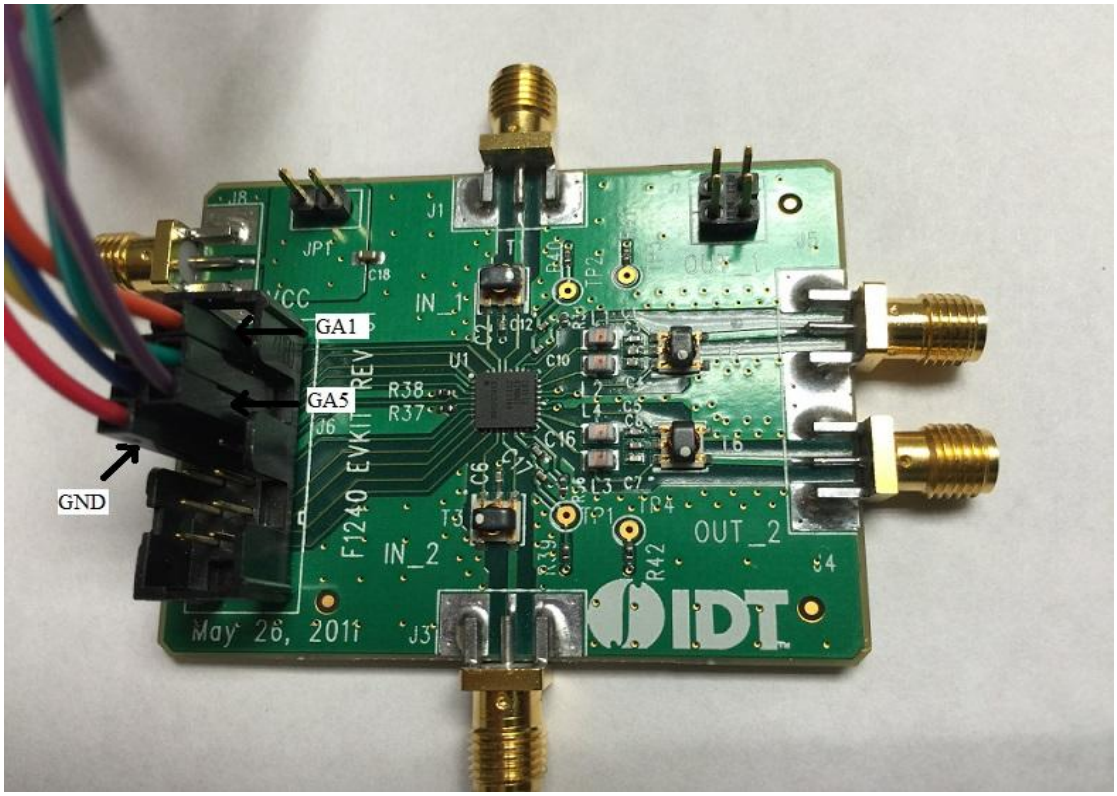

Figure 28 - Parallel mode Channel A pin connection for F1241EVB

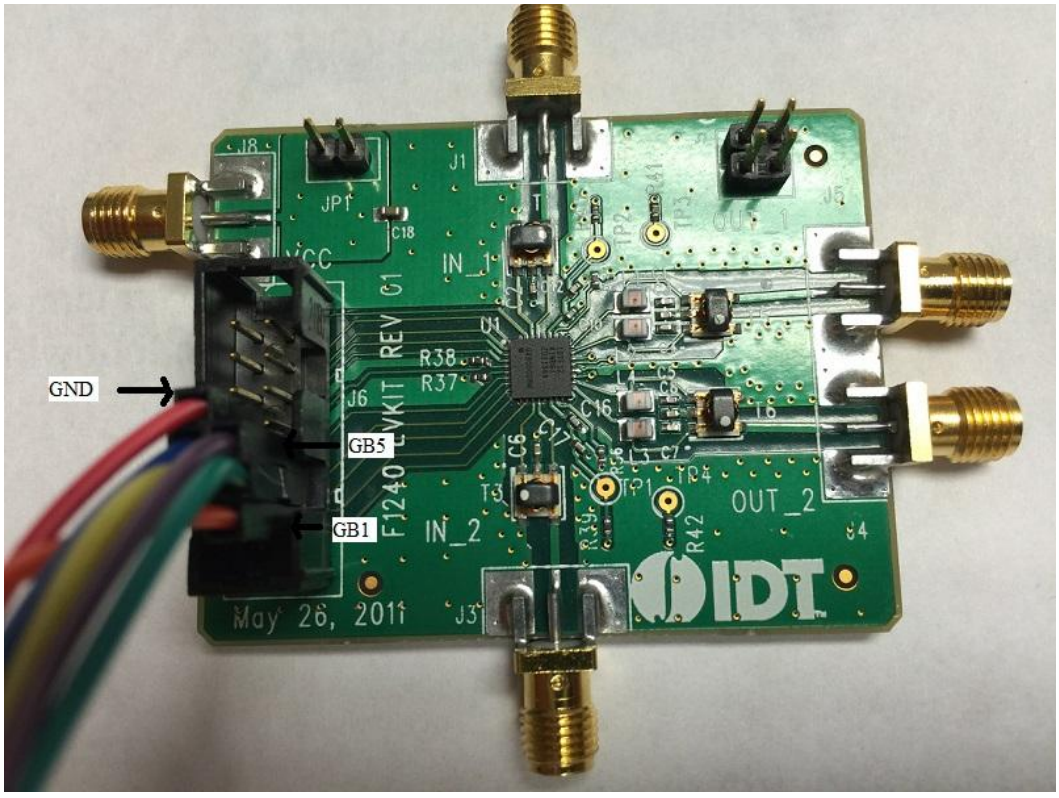

Figure 29 - Parallel mode Channel B pin connection for F1241EVB

Table 18 - Parallel mode pin connection for F1241EVB

RF Digital Control Board	Wire Color	F1241EVB Board Pin
C9		
C8		
C7		
C6		
C5		
C4		
C3		
C2		
C1		
C0		

RF Digital Control Board	Wire Color	F1241EVB Board Pin
5V	BROWN	
GND	RED	GND
D0	ORANGE	GA1/GB1
D1	YELLOW	GA2/GB2
D2	GREEN	GA3/GB3
D3	BLUE	GA4/GB4
D4	PURPLE	GA5/GB5
D5	GREY	
D6	WHITE	
D7	BLACK	

8.12. F0480EVB

8.12.1. **Serial Mode**

Users should connect a supply voltage between 4.75 V to 5.25 V to VDD of the F0480EVB. Refer to Table 19 and Figure 30 for correct serial pin connection between the RF Digital Control Board and the F0480EVB.

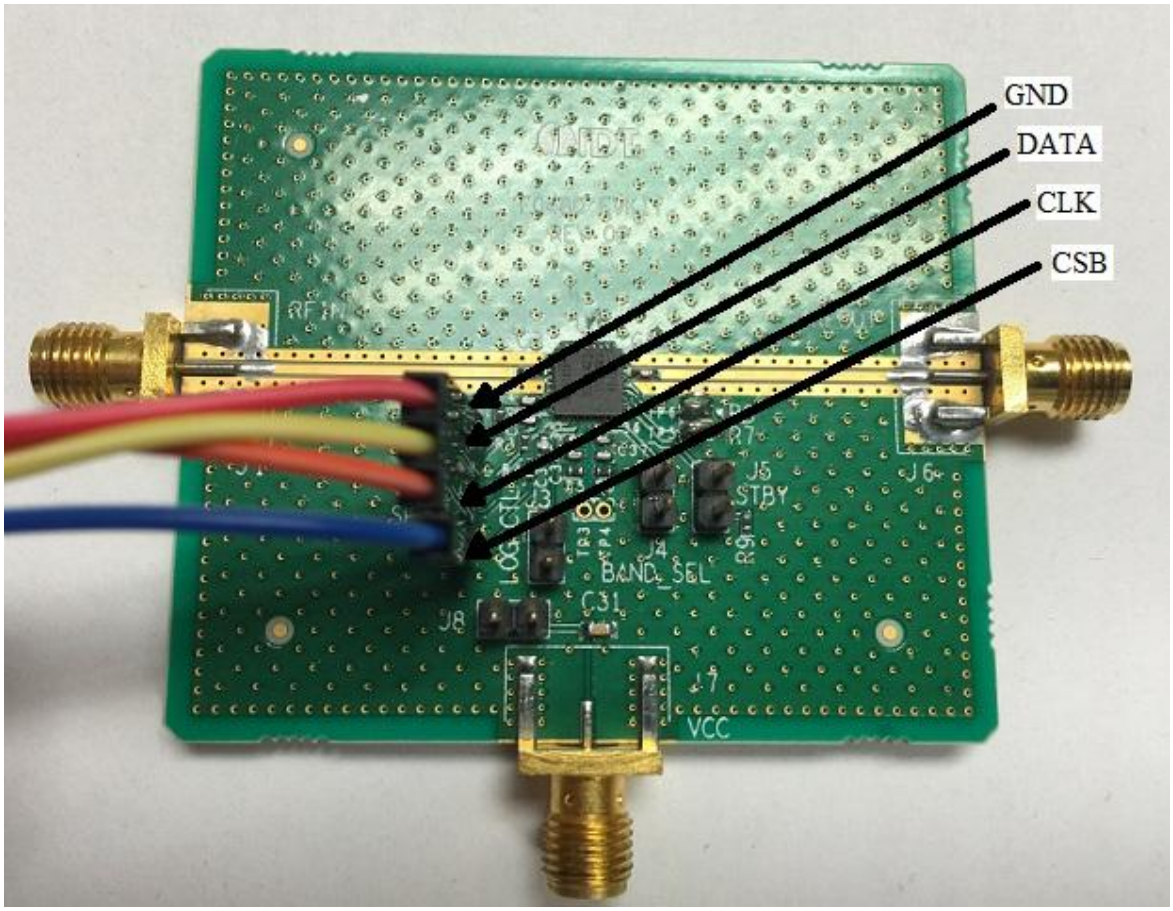

Figure 30 - Serial Mode pin Connection for F0480EVB

Table 19 - Serial mode pin connection for F0480EVB

RF Digital Control Board	Wire Color	F0480EVB Board Pin
C9		
C8		
C7		
C6		
C5		
C4		
C3		
C2		
C1		
C0		

RF Digital Control Board	Wire Color	F0480EVB Board Pin
5V	BROWN	
GND	RED	GND
D0	ORANGE	CLK
D1	YELLOW	DATA
D2	GREEN	
D3	BLUE	CSb
D4	PURPLE	
D5	GREY	
D6	WHITE	
D7	BLACK	

8.13. Device Configuration

Once the installation is complete and the cable connection is made, plug your Adafruit's RF Digital Control Board to your computer via the USB cable. Open **Device Manager**, via the Control Panel, to check that the USB serial port is correctly installed. Figure 31 shows the Device Manager window.

NOTE: If the RF Digital Control Board is not connected and the user tries to run the RF Digital Control Software, a pop-up box will be displayed asking to find the library for the device driver.

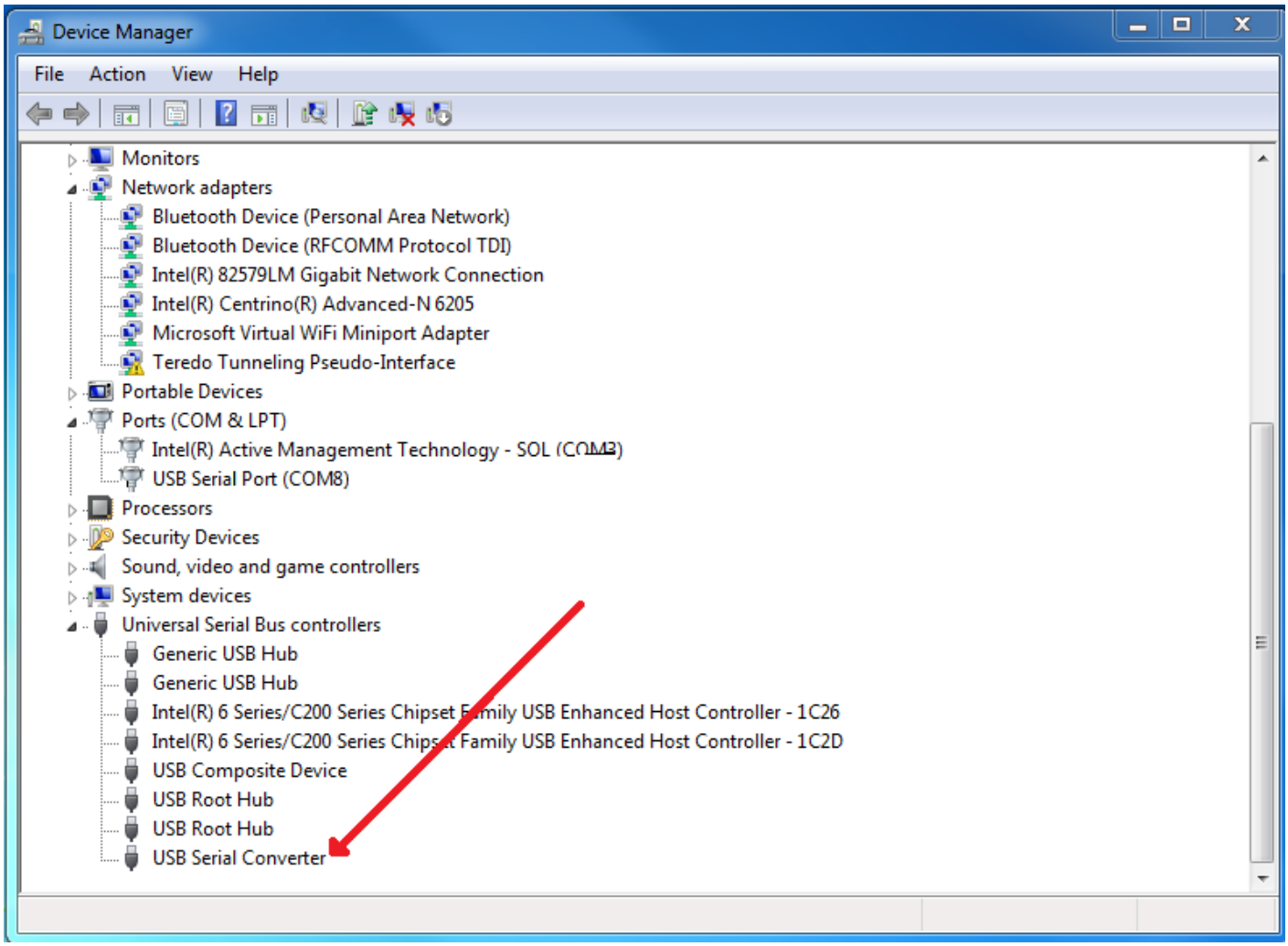

Figure 31 - USB Serial Device Correctly Installed

9. Software Application

9.1. Software Installation

Once the installation is complete, the Software application shortcut will be placed on the user's desktop.

9.2. Software Interface

The RF Digital Control Software controls the Product EV_{KIT} in both serial, direct parallel, and parallel latched mode.

NOTE: The pop-up box appears notifying that "RF Digital Control Board not found" if user tries to run the RF Digital Control Software without connecting the RF Digital Control Board.

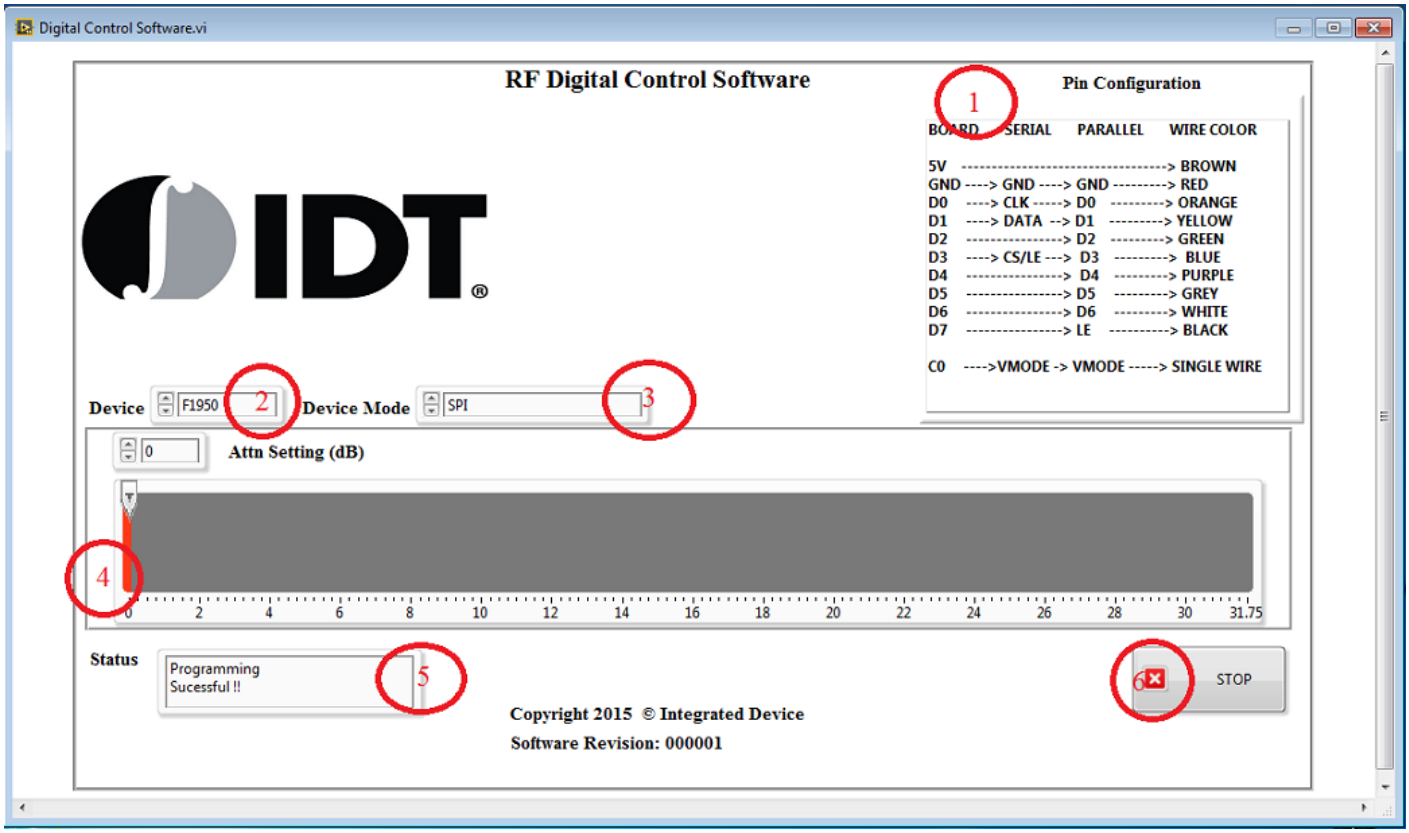

Figure 32 - Software Application

9.2.1. Pin Configuration

This application works for both serial and parallel interfaces. Please refer to the pin configuration in Figure 32 (Number 1) for the correct connection from the RF Digital Control Board to IDT's Product EV_{KIT}. Latch Enable pins are different for different modes of communication.

9.2.2. Device

Choose the device you would like to test using the RF Digital Control Software Application.

9.2.3. Device Mode

Users can choose one of the three modes of communication for the device (Figure 32, Number 3). Please refer to the device datasheet for supported modes of communication. Modes of operation that are not supported by Digital Control Application/device are automatically disabled.

9.2.4. Attenuation Setting

Users can set the desired attenuation using this control. The attenuation step and maximum attenuation are different for each device.

9.2.5. Status

Any status or error messages are displayed in this box (Figure 32, Number 5).

9.2.6. Stop

Users can stop the application using the STOP button (Figure 32, Number 6).

9.2.7. Address

The Address control button is not present in Figure 32. It is only visible when the F1956EVB and F1977EVB are selected.

9.2.8. Channel B

The Channel B control is not present in Figure 32. It is only visible when the F1240EVB is selected. The light on this indicator indicates that channel B is selected.

9.3. Parallel Control Option

Please note that the RF Digital Control Software application won't support parallel mode without running executable "EEPROG" which is located in the folder named "parallel_option".

9.4. EEPROG

The executable application "EEPROG" programs the CBUS pin of the RF Digital Control Board chip for direct/latched parallel mode. Please note that the user needs to run this application only one time. Once the application programs the RF Digital Control Board chip, product EVB or EV_{KIT} can be controlled using direct parallel and parallel latched mode. The steps for opening the EEPROG application are provided below.

Right click on the "parallel_option" folder then click open. Figure 36 shows the location of the "parallel_option" folder.

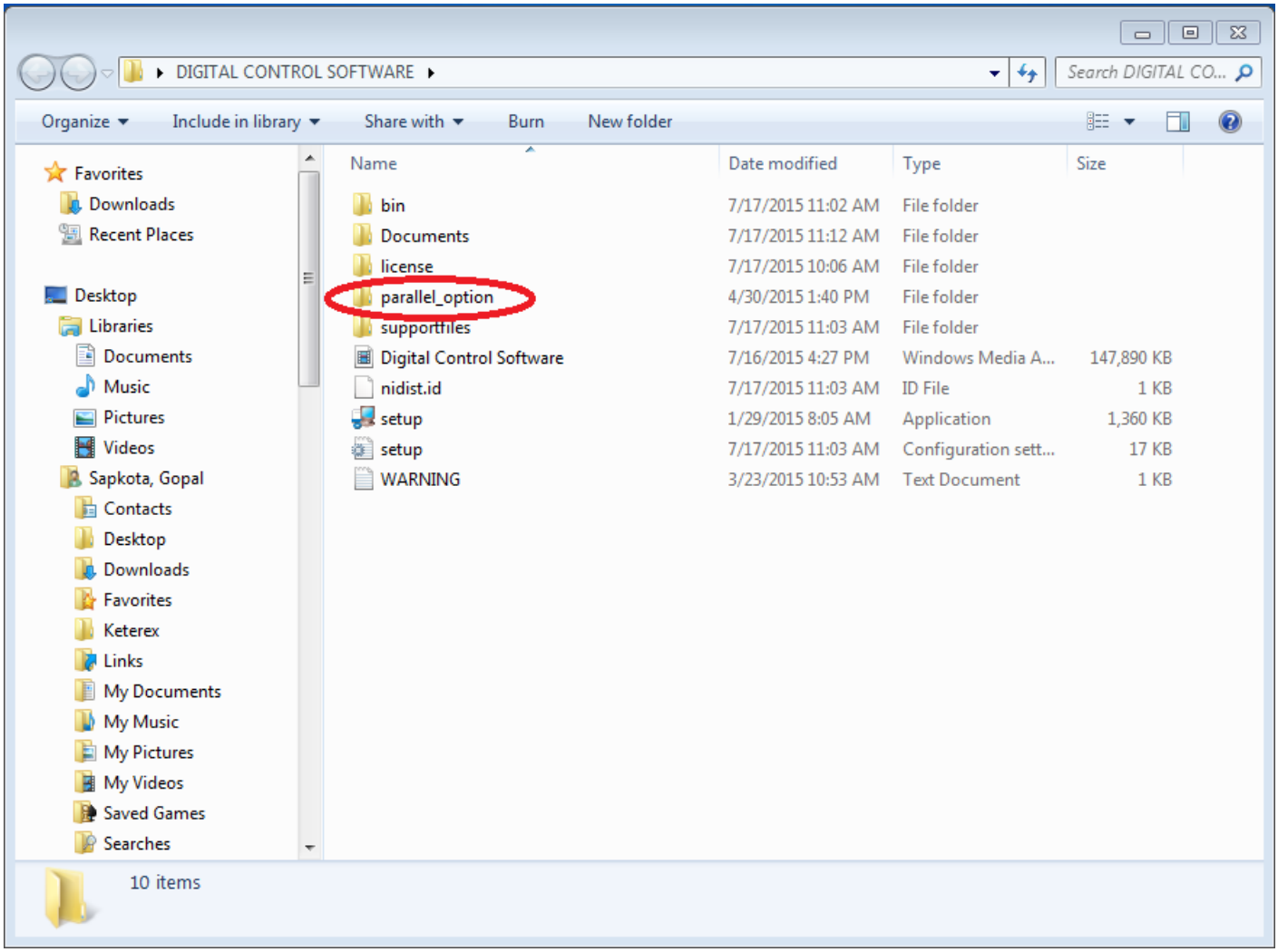

Figure 33 - location of the “parallel_option” folder

Right click on the “EEPROG.exe” file then click open. The Figure 33 shows the location of the “EEPROG.exe” file.

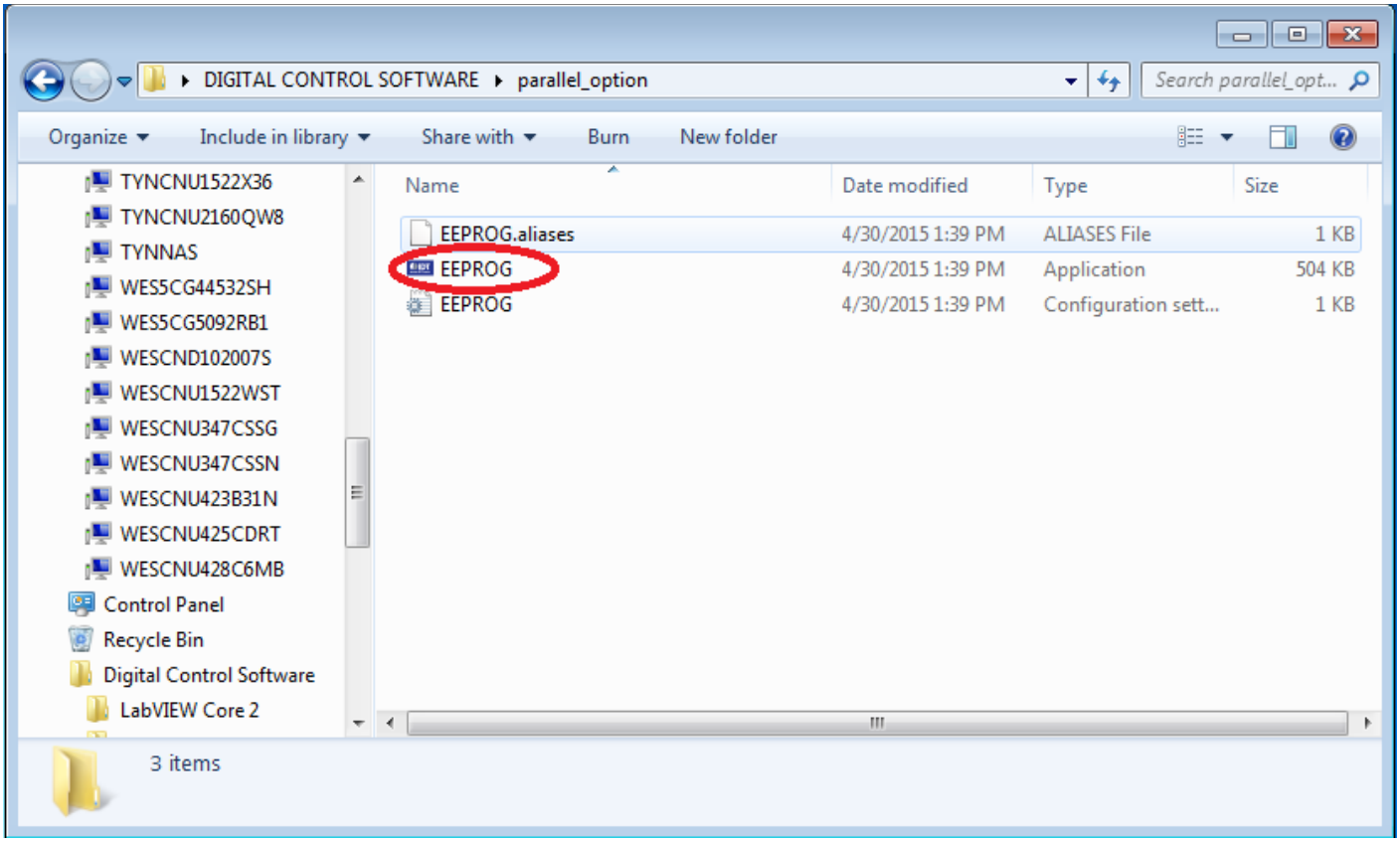

Figure 34 - EEPROG Application Location

Figure 35 shows the EEPROG application interface that needs to be run so that parallel mode can be used.

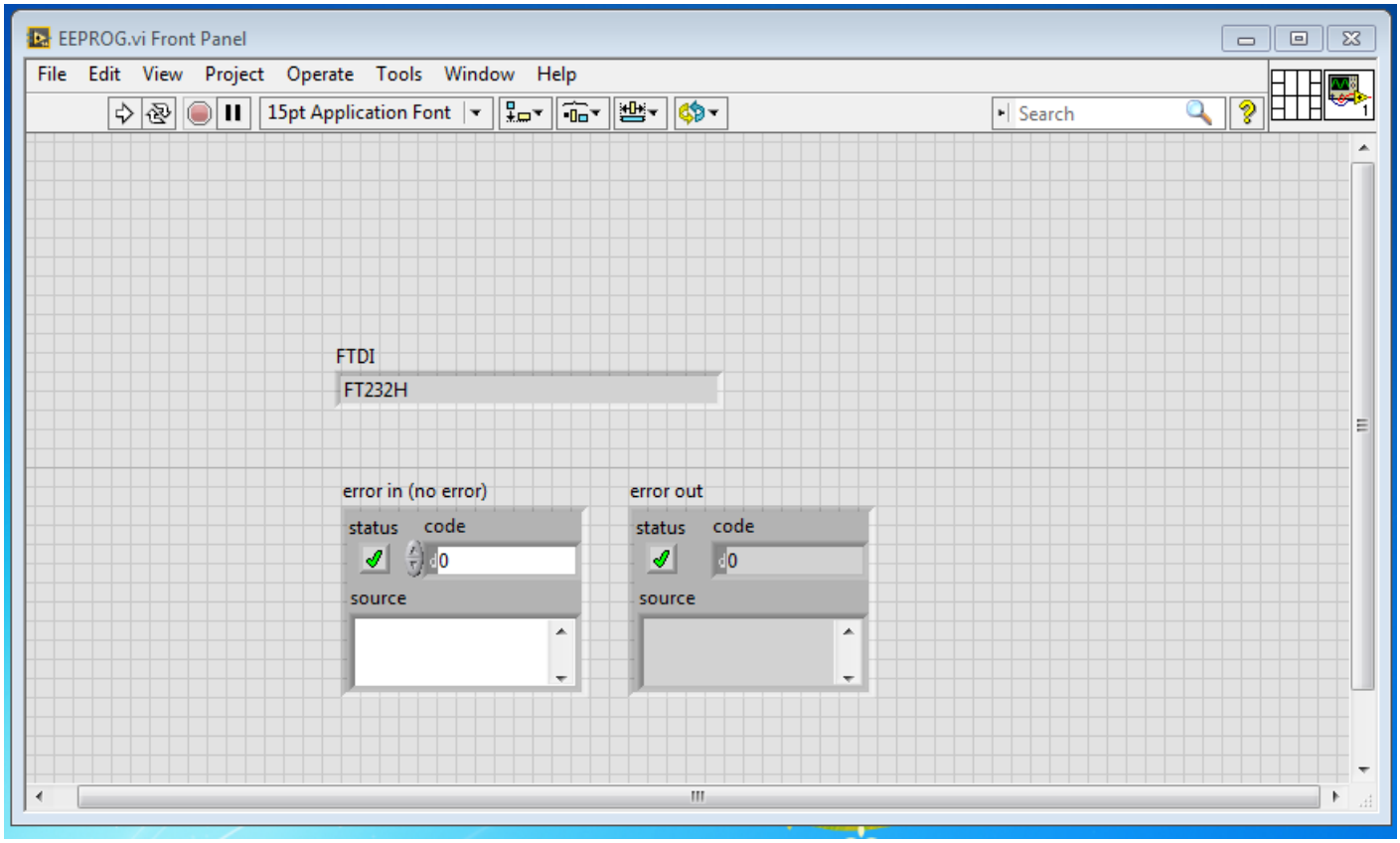

Figure 35 - EEPROG application for direct/latched parallel mode

10. Test Environment

The application has been known to work on a "HP EliteBook 2560p" running "Windows 7 Professional".

11. Supported Devices

Table 20 - Supported devices

Product	Product Family	Comment	Support Date
F1950EVB	Digital Step Attenuator	Requires cable for connection	August 2015
F1951EVB	Digital Step Attenuator	Requires cable for connection	August 2015
F1953EVB	Digital Step Attenuator	Requires cable for connection	August 2015
F1956EVB	Digital Step Attenuator	Requires cable for connection	August 2015
F1912EVB	Digital Step Attenuator	Requires cable for connection	August 2015
F1975EVB	Digital Step Attenuator	Requires cable for connection	August 2015
F1977EVB	Digital Step Attenuator	Requires cable for connection	August 2015
F1200EVB	Variable Gain Amplifier	Requires cable for connection	August 2015
F1240EVB	Variable Gain Amplifier	Requires cable for connection	August 2015
F1241EVB	Variable Gain Amplifier	Requires cable for connection	August 2015
F0480EVB	Variable Gain Amplifier	Requires cable for connection	August 2015