User Manual

DA14AVDDECTDEVKT Quick Start Guide

UM-D-005

Abstract

This guide helps users evaluate Dialog Semiconductor's DA14AVDDECTDEVKT. It also shows how to set up the boards using different stacks, that is, Audio Data (AD) stacks or Voice Data (VD) stack.

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Table 1: Contents of the DA14AVDDECTDEVKT Box 6

1 Terms and Definitions

AVD	Audio Voice Data
CVM	Cordless Voice Module
WAM	Wireless Audio Module
FP	Fixed Part
PP	Portable Part
PTT	Push to Talk
TG	Tour Guide
PA	Public Address
DUT	Device Under Test
HID	Human Interface Device
COLA	Co-Located Application
HostApp	Hosted Application

2 References

[1] UM-UA-051, Smartbeat™ AVD User Manual, User Manual, Dialog Semiconductor.

[2] UM-D-004, Audio Data Stack Tour Guide Example Application, User Manual, Dialog Semiconductor.

[3] UM-D-003, Audio Data Stack Public Address Example Application, User Manual, Dialog Semiconductor.

[4] UM-D-006, Voice Data Stack Voice Conferencing Example Application, User Manual, Dialog Semiconductor.

3 Introduction

Dialog's DA14AVDDECTDEVKT is a development kit for the DA14AVDDECT module. This module is a member of the wireless module family, operating on the interference free DECT frequency band (1.9 GHz) and it can be used in hosted or embedded Audio, Voice, and Data (AVD) applications. There are three stacks available for the AVD module, falling into two categories, the Audio Data (AD) stacks (Tour Guide stack and Public Address stack) and the Voice Data (VD) stack.

The development kit has the AVD module mounted on carrier boards. The carrier board has an ARM debug interface and a USB-UART interface for programming and debugging the AVD module. The development kit also has some pre-defined push buttons and LEDs tailored for the example applications, Li-Ion battery connectors, and 3.5 mm audio jacks. This development kit targets users who are familiar with application-level software programming and does not require detailed understanding of the DECT protocol.

3.1 Development Kit Content

Figure 1 and Figure 2 show the components of the development kit and Table 1 contains an overview of the parts.

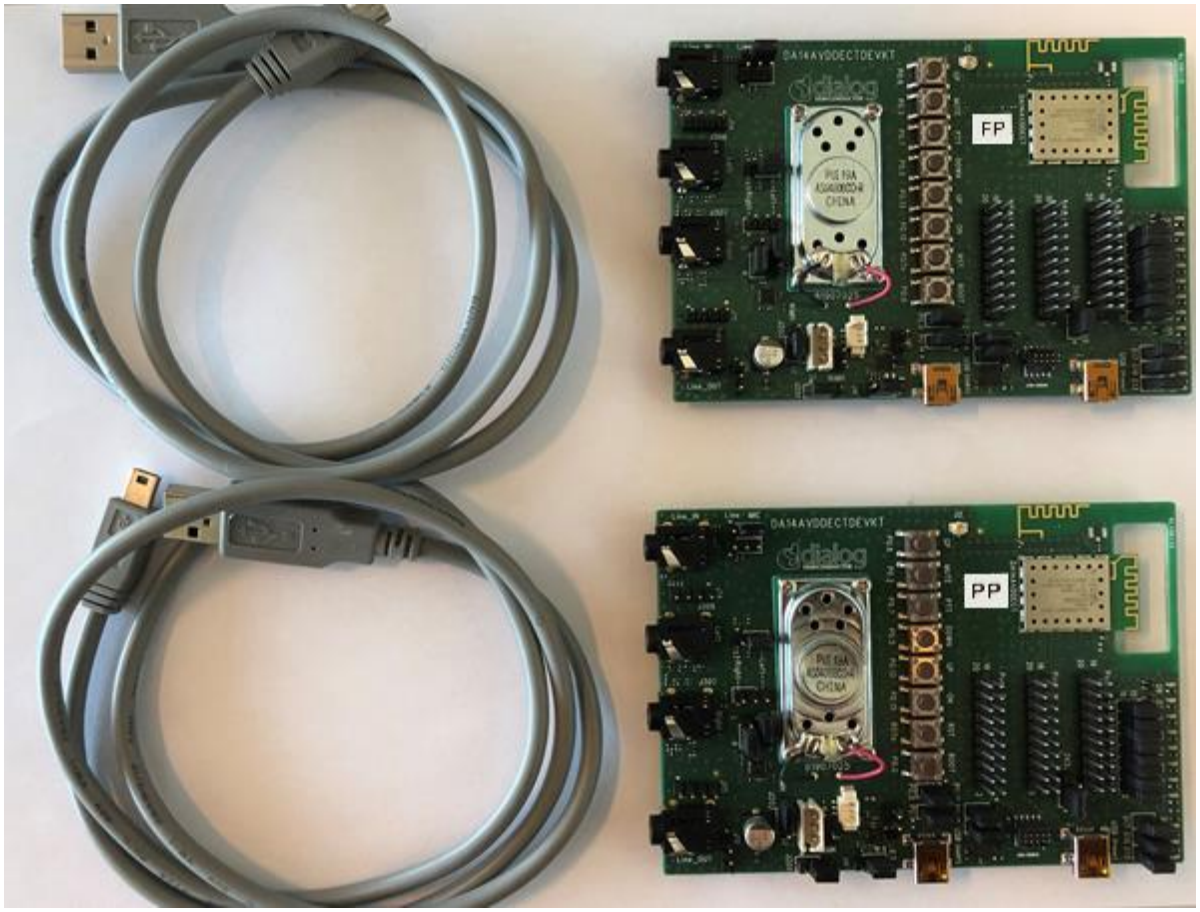

Figure 1: DA14AVDDECTDEVKT HW Overview

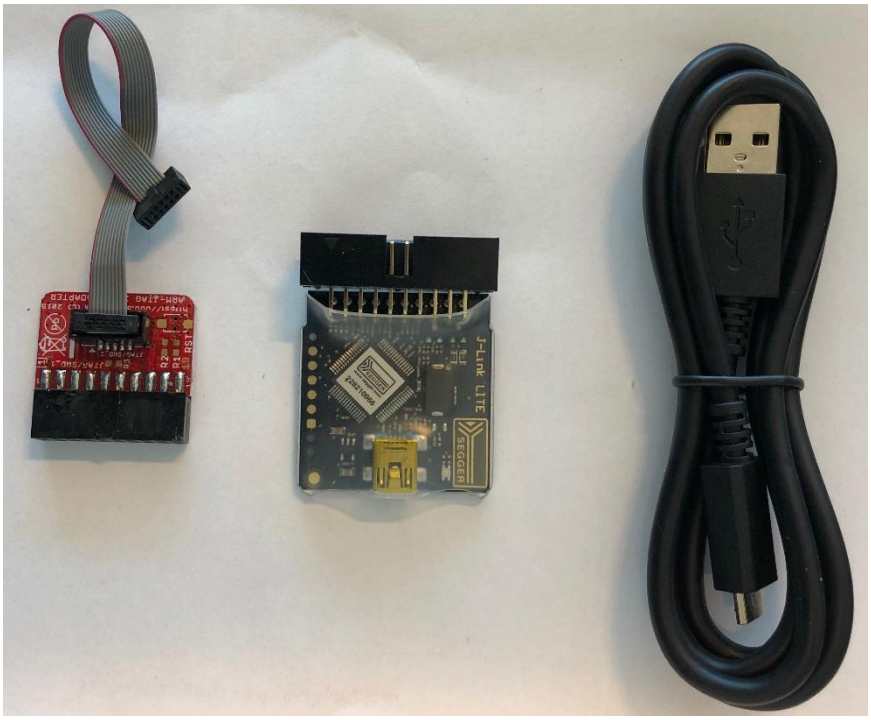

Figure 2: Segger J-Link Lite and 20-to-10 Pin Adapter with Cable

Table 1: Contents of the DA14AVDDECTDEVKT Box

DA14AVDDECTDEVKT	Included in the Box
Carrier Boards	2 ×
MiniUSB Cable	3 ×
ARM debugger (Segger J-Link LITE) with ARM JTAG-20-10 adapter	1 ×
Paper insert (for out-of-the-box use)	1 ×

3.2 Prerequisites

- Experience with the C programming language.
- Experience with development of embedded systems.
- Experience with Eclipse (Dialog's Smartbeat™ AVD Studio) provides an advantage.

3.3 Powering Options

The carrier boards can be powered in two ways:

- Powering via USB
- Power via Battery (Li-Ion or NiMH)

Default jumper settings are marked by white rectangles on the PCB and jumper settings are the same for J203, J201, and J4 (Figure 3) when the board is powered from USB or Li-Ion battery. The carrier boards are shipped with the default jumper settings.

3.3.1 Powering via USB

To power the carrier boards via USB, connect your PC to the miniUSB connector named "USB" on the carrier boards (marked blue in Figure 3). Use the default jumper settings for J203, J201, and J4 (marked with red on Figure 3 and also Figure 4 for zoomed image).

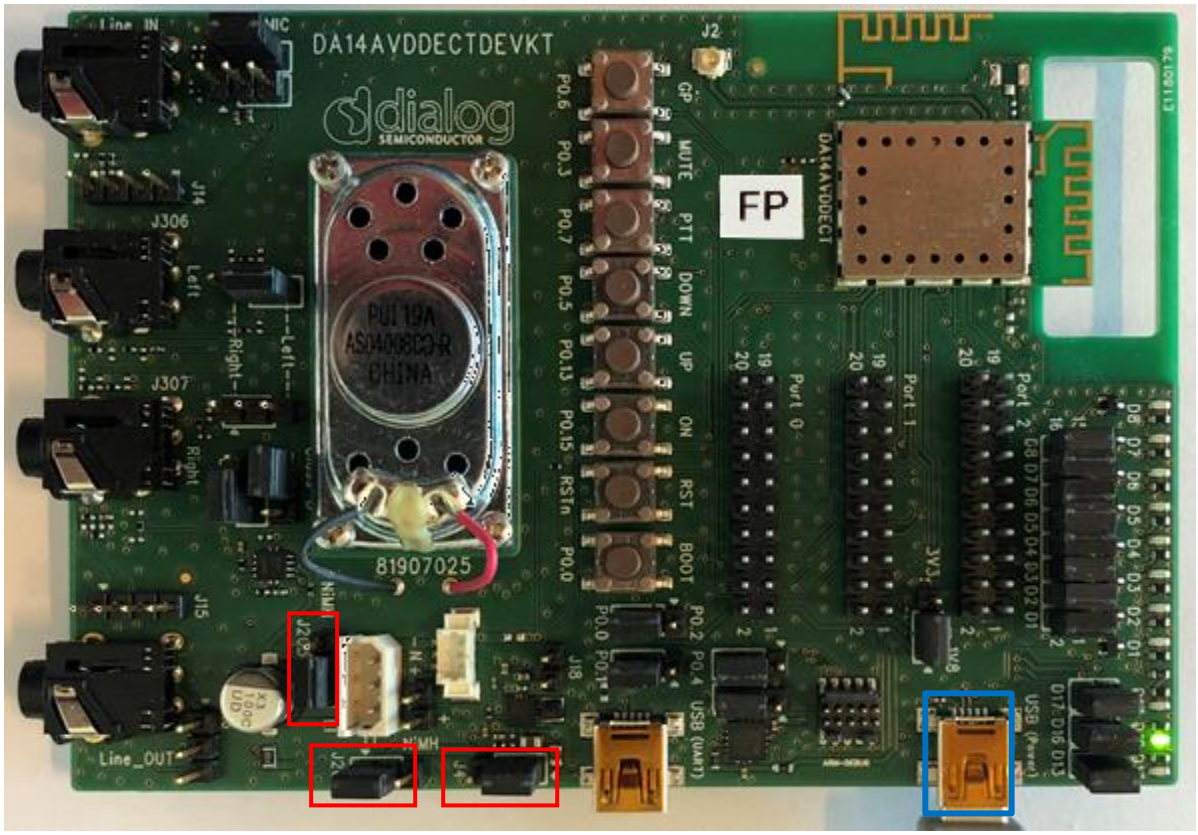

Figure 3: Board Power On

3.3.2 Power via Battery

3.3.2.1 Power from Li-Ion Battery

The carrier boards can also be powered from Li-Ion battery pack. The board has two 3-pin connectors for Li-Ion batteries (marked blue in Figure 4). Use the default jumper settings for J203, J201, and J4 (marked red in Figure 4). The carrier boards are shipped with these jumper settings.

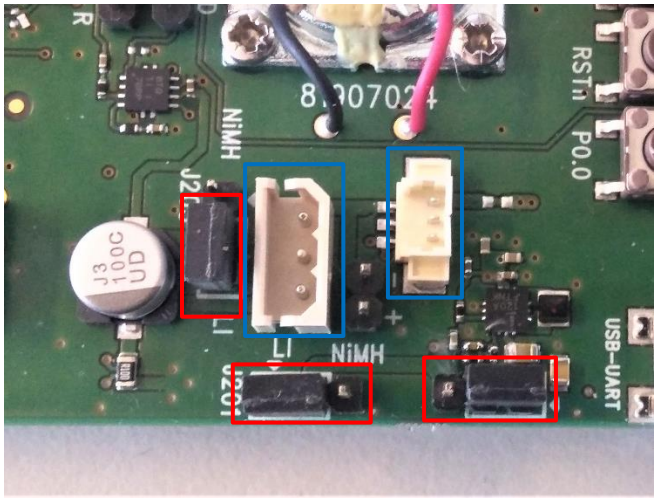

Figure 4: Jumper settings for Li-Ion batteries

3.3.2.2 Powering from NiMH Battery

The carrier boards can also be powered via NiMH battery pack. The board has one standard pin header (J204) marked blue in Figure 5. Pay attention to jumper setting on J203, J201, and J4 (marked red in Figure 5).

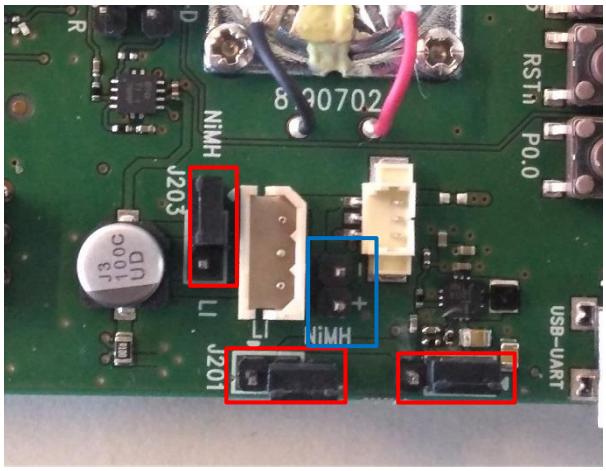

Figure 5: Jumper Settings for NiMH Battery Pack

4 Out of the box Use

The carrier boards are programmed and paired so they can be used directly out of the box. The Audio Data Stack and Tour Guide application are already installed. This section uses the Tour Guide application to explain how to set up the boards.

4.1 Verify DECT Region Setting

The development kit is configured in EU DECT mode. To avoid any violations, the carrier boards may need to be re-configured for the actual region. Follow the steps below to change the DECT region settings.

1. Open HostApp (location is "Workspace_AVD/Tools/") on your PC and connect the PC to the FP or PP board via USB (use WinHID connection).

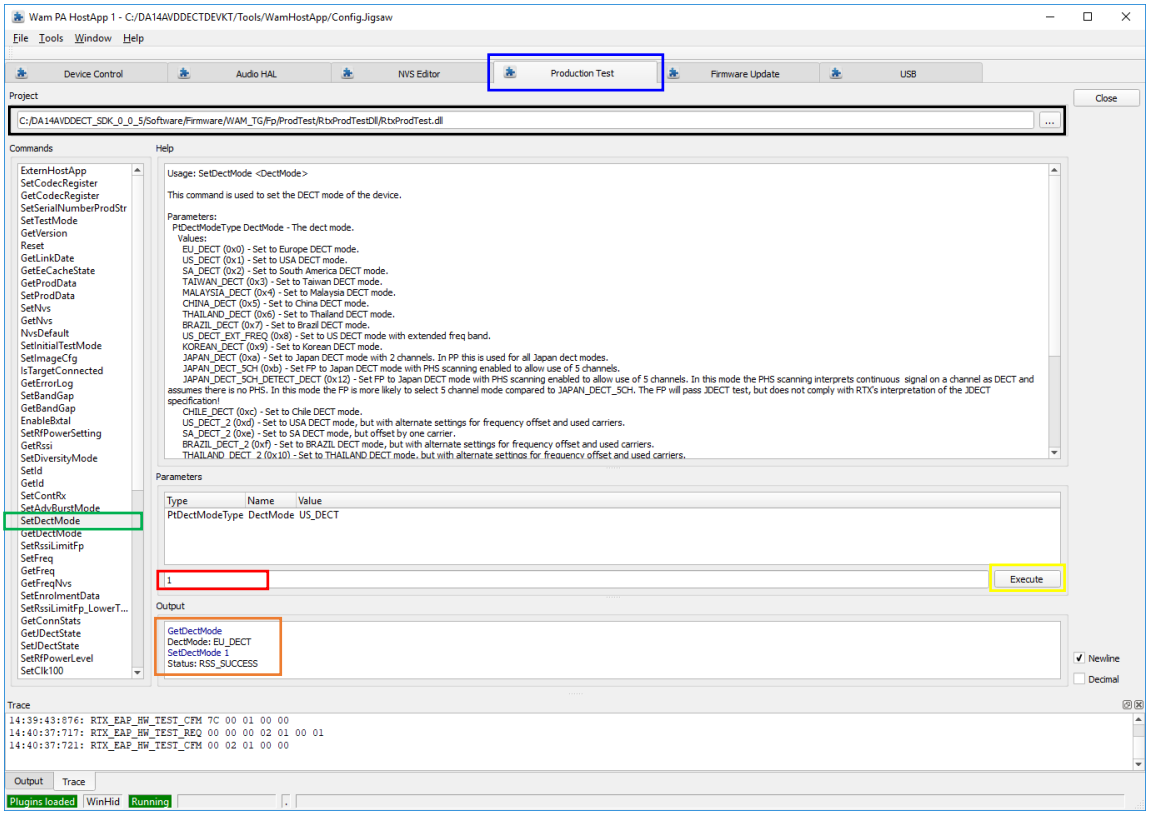

Figure 6: HostApp Screenshot for Changing DECT Mode

2. Figure 6 presents the GUI of HostApp. The DECT mode can be changed by following the details below:
   a. Switch to "**Production Test**" tab (marked blue) and under "**Project**" browse to "RtxProdTest.dll" (marked black).
   b. Click the "**SetDectMode**" command on the left "**Commands**" column (marked green) and enter your DECT region (for example, 0x1 = US_DECT) in the "**Parameters**" field (marked red).
   c. Click the "**Execute**" button (marked yellow), make sure that status in the "**Output**" is "**RSS_SUCCESS**" (marked orange), and then power cycle or reset the module.

4.2 How to Set up

1. Power up the fixed part (FP) carrier board either via miniUSB cable or from a battery. When power is supplied, the LEDs on the FP should light up, D5 red and D16 green, as shown in Figure 3. Power up the PP in the same way.

2. Once the DECT link is established between FP and PP, the green LED (D16) turns OFF on both boards and the red LED (D17 in Figure 7 and Figure 8) remains ON.

Figure 7: Tour Guide FP in Connected Mode

Figure 8: Tour Guide PP in Connected Mode

3. When the Tour Guide FP and PP are connected, FP will automatically start broadcasting audio.
4. Headsets can be connected via a 3.5 mm audio jack (marked red in Figure 9) to the FP carrier board and to the PP carrier board, where the user can listen to broadcasted audio.
5. Optionally, smartphone outputs can be connected to "Line_In" on the FP board (marked blue in Figure 9). Please note that the default analog input gain (+20 dB) is configured for headset use, but it can be easily changed to, for example, 0 dB as described in the Audio Data Stack Tour Guide example application ([2]). Use J9 jumper (marked yellow in Figure 9) to change the audio input from J306 (Headset) to "Line In".

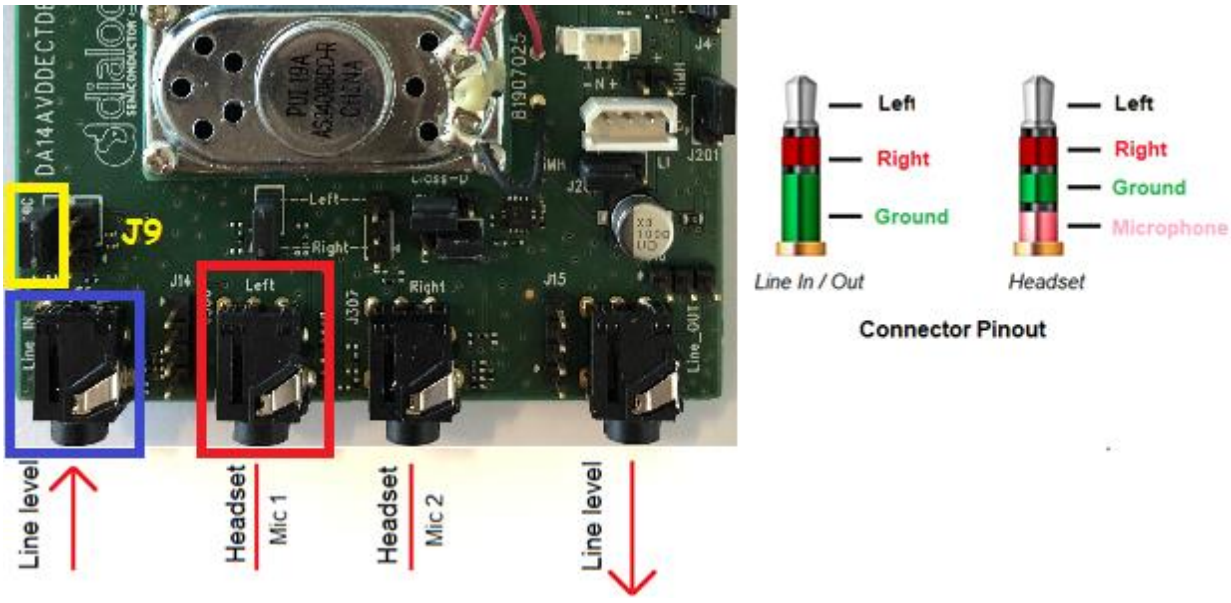

Figure 9: Audio Connector Definition

6. In Dialog's Tour Guide System, group members can ask questions to the tour guide after pressing "PTT" button on the PP carrier board. Once the PTT button is pressed, a "question call" is established automatically and the two parties can talk to each other.
7. Please refer to Audio Data Stack Tour Guide Example Application ([2]) for more details.

5 Embedded Use

This section explains how users can reprogram the AVD module to a Public Address (PA) system or a voice conferencing system using the Smartbeat™ AVD Studio. To see how to install the Smartbeat™ AVD studio, refer to the Smartbeat™ AVD Studio User Manual ([1]).

5.1 Hardware Connections

Connect the carrier board and J-Link Lite debugger to your PC as shown in Figure 10, so the SmartBeat™ AVD Studio can access the target via the Serial Wire Debug (SWD) Interface.

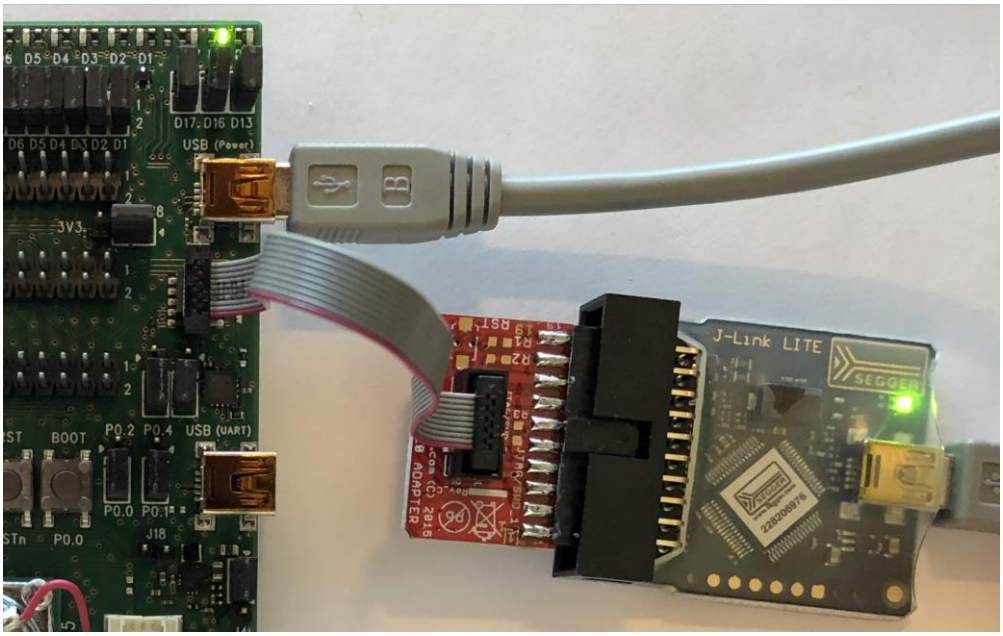

Figure 10: Segger J-Link Debugger Connection to Carrier Board

5.2 Working with Smartbeat™ AVD Studio to Program Public Address System

1. Once the Smartbeat™ AVD Studio is started up, provide the location of the AVD workspace (see Figure 11, the folder to be selected is called "Workspace_AVD").

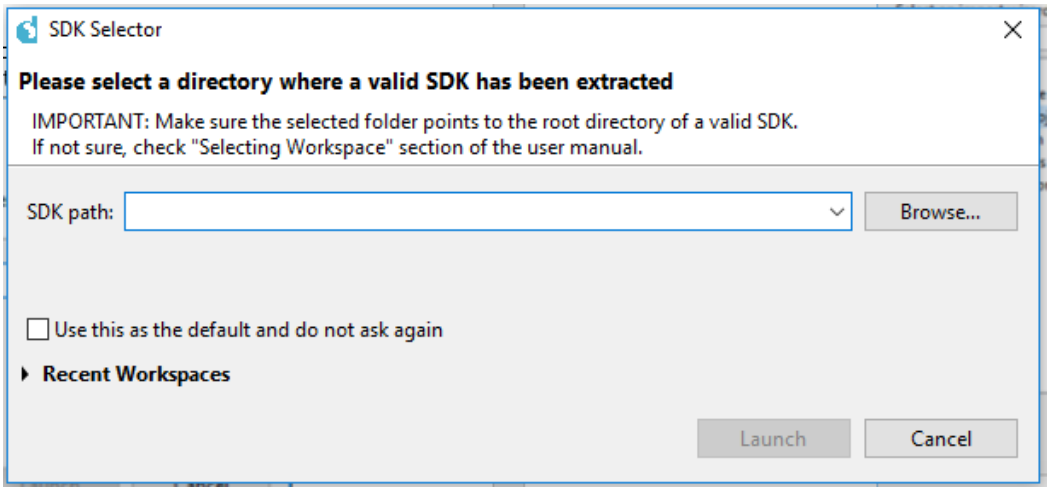

Figure 11: Select Workspace in Smartbeat™ AVD Studio

2. Create a project by clicking **File** > **New** > **Smartbeat WAM Project** (Figure 12).

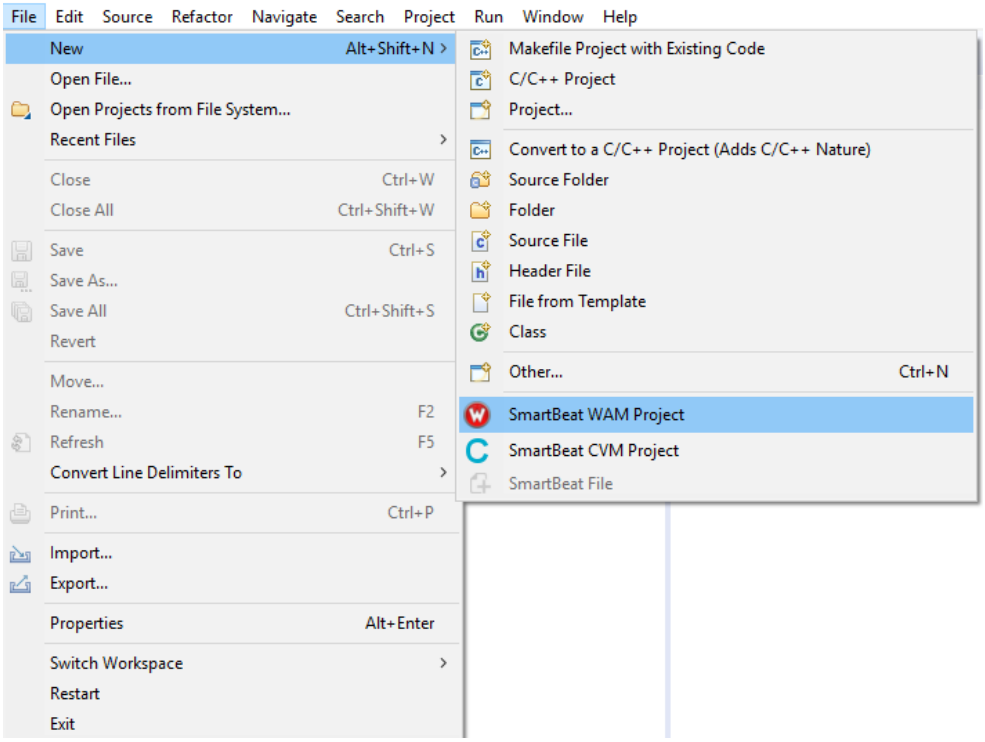

Figure 12: Create a New Project in Smartbeat™ AVD Studio to Program Audio Data Stack

3. Select the "**WAM PA Fp**" template type for Public Address FP configuration and choose a name for the project (Figure 13).

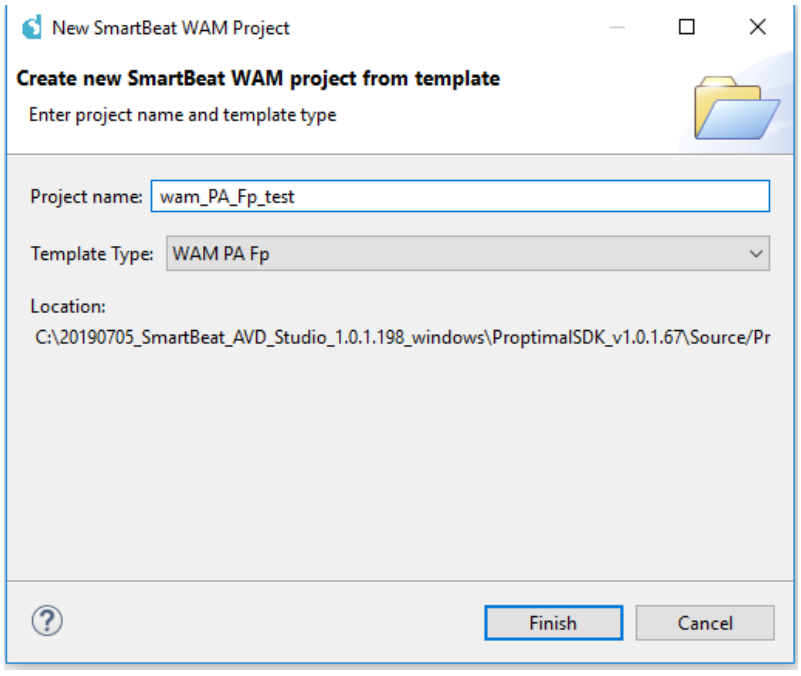

Figure 13: New Project Setup (Audio Data Stack)

4. The project structure should look like Figure 14. Make sure that the **Build** folder has all `.bat` files (bc, be, and bp).

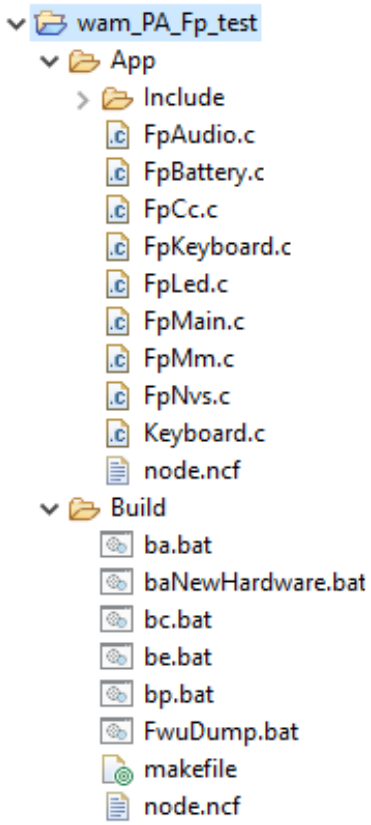

Figure 14: Project Structure (Audio Data Stack)

5. Build the project by clicking on "Build All" (Figure 15).

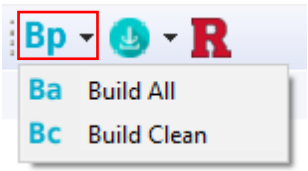

Figure 15: Build Project Options

6. Click on "**DUT Connection Manager**" and click on "SWD" to connect to J-Link Lite debugger:

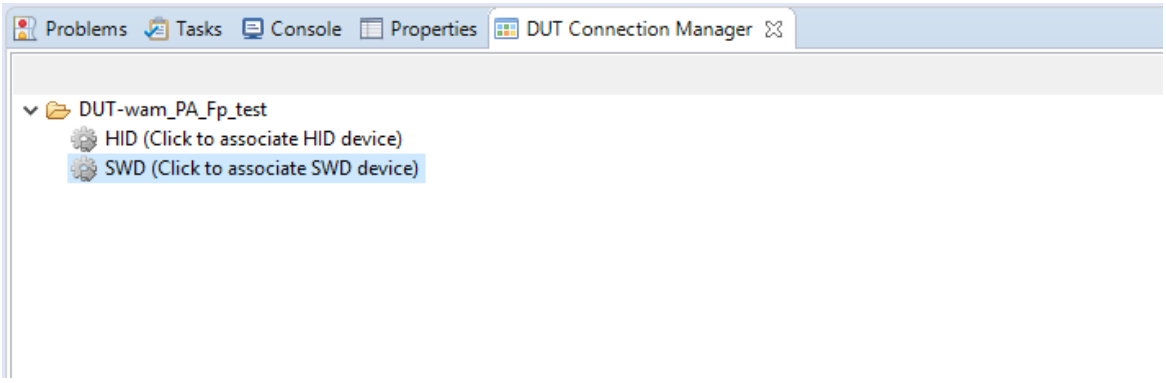

Figure 16: DUT Connection Manager View

7. Now download Stack and COLA application to the target DUT (Figure 17).

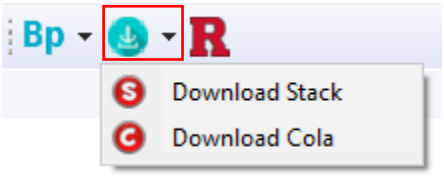

Figure 17: Download Stack/Cola Application

8. If you are using the carrier boards outside of EU region, change the DECT region accordingly by using the HostApp tool (see Figure 29). See section 4.1.

Figure 18: Open HostApp tool (See Toolbar)

9. Now, Cola is disabled by default. In order to enable it, connect to the HID Interface by clicking on "**DUT Connection Manager**" tab and then click on "HID" (see Figure 19).

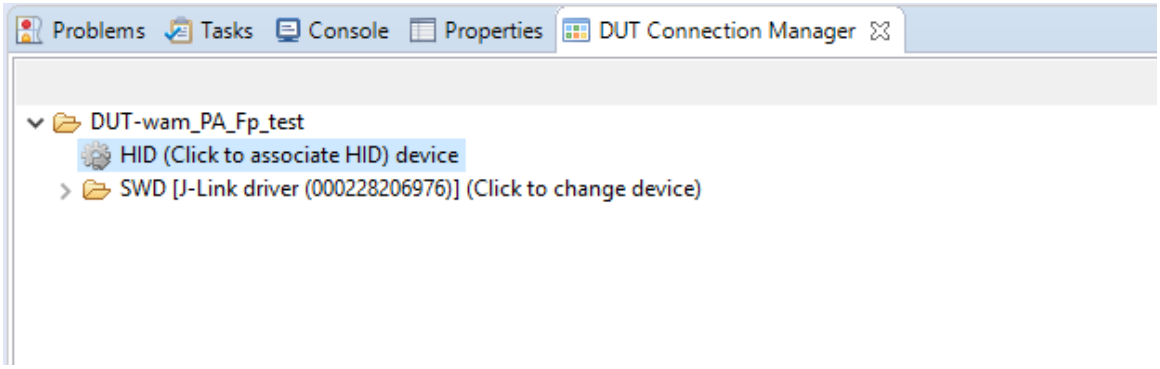

Figure 19: DUT Connection Manager View (for HID)

10. Now enable Cola (marked blue in Figure 20) and then Reset (marked red in Figure 20) the board.

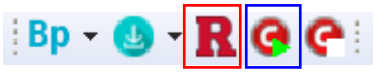

Figure 20: Enable Cola and Reset (See Toolbar)

11. To create a new project for the PP carrier board, follow the same procedure but change the template type to "**WAM PA Pp**" in step 3.
12. Once both the FP and PP carrier boards are programmed, register PP to FP.
13. Long press the MUTE button to initiate the registration mode on FP until the red LED (D17) and the orange LED (D13) start blinking simultaneously (1 sec on/1 sec off). See Figure 21.

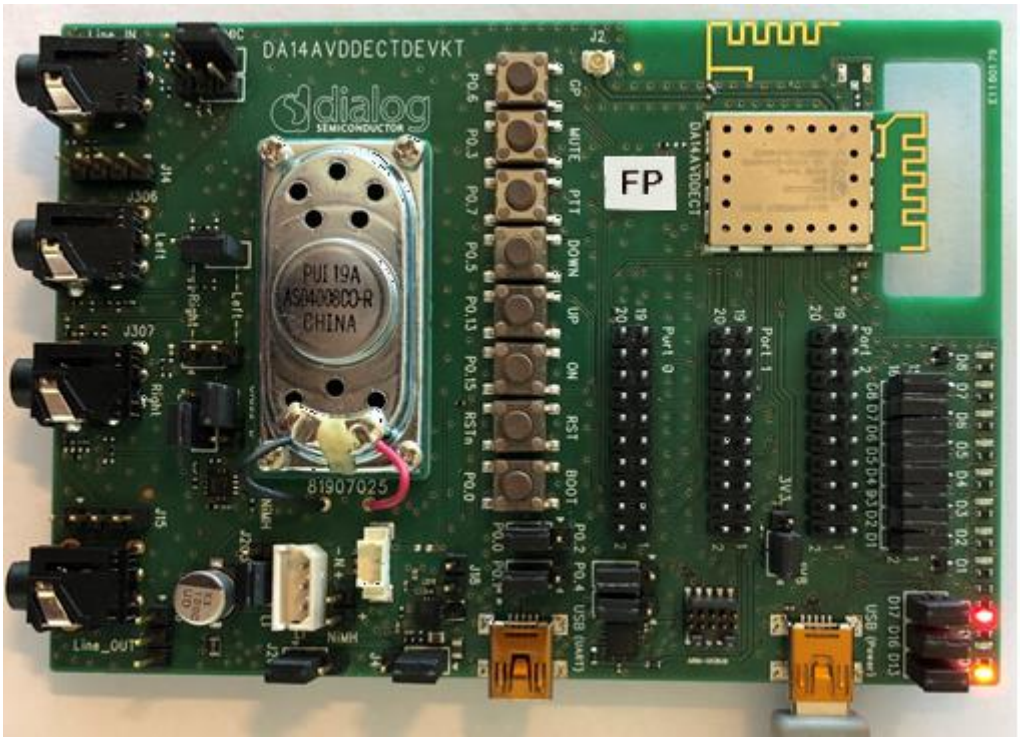

Figure 21: Public Address FP in Registration Mode

14. Press MUTE button during power-up to initiate the registration mode on PP. Wait until red LED (D17) starts blinking (1 sec on/1 sec off) and Green LED (D16) is constantly on. See Figure 22.

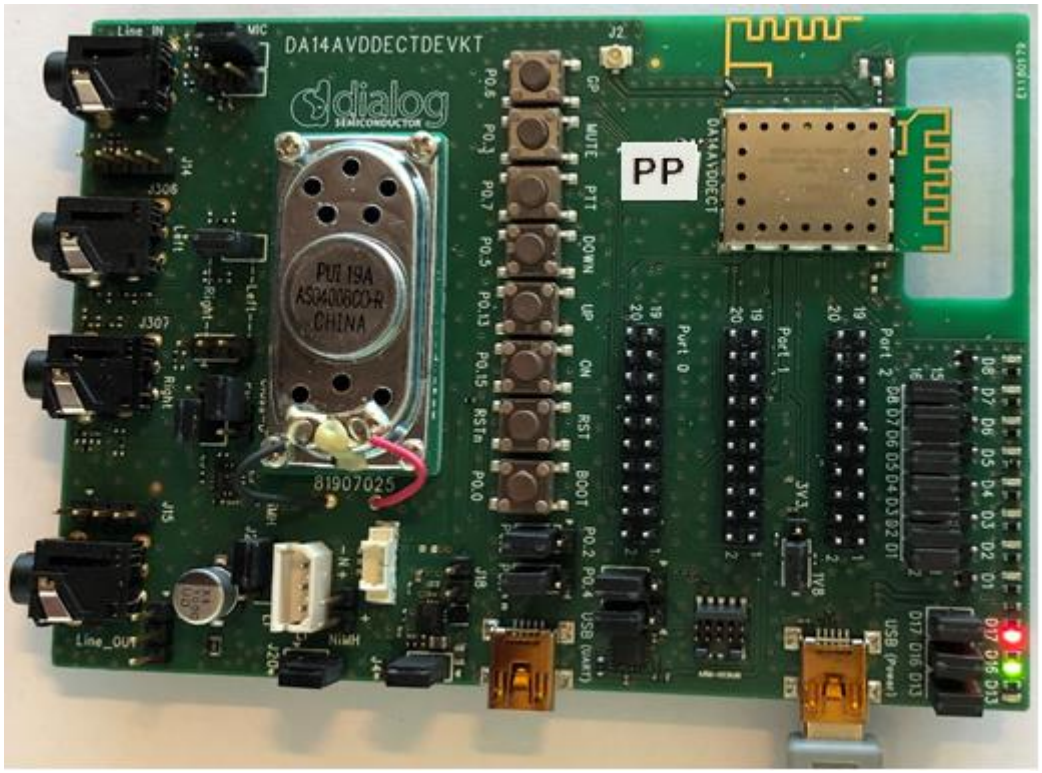

Figure 22: Public Address PP in Registration Mode

15. Registration should be completed within seconds, then audio connection is automatically established by the application. Red LED (D17) remains constantly ON, indicating that both boards are now connected (see Figure 7 and Figure 8).

16. In the Public Address system PP sends audio to FP. Audio connections can be done in a way similar to step 4 in section 4.2.
17. Please refer to Audio Stack Public Address Example Application ([3]) for more details.

5.3 Working with Smartbeat™ AVD Studio to Program Voice Conferencing System

1. Make sure the proper hardware connection is in place (see section 5.1).
2. Select a proper workspace as described in step 1 in section 5.2.
3. Create a project by clicking **File** > **New** > **Smartbeat CVM Project**.

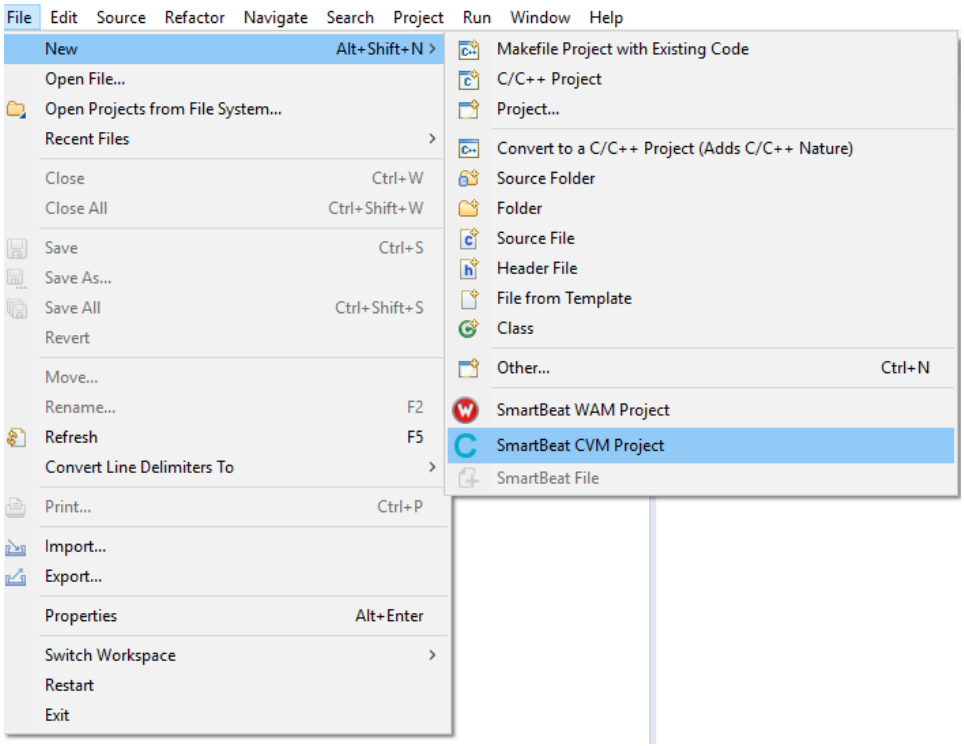

Figure 23: Create a New Project in Smartbeat™ AVD Studio to program Voice Data Stack

4. Select the "**CVM STD Fp**" template, type and choose a name for the project (Figure 24).

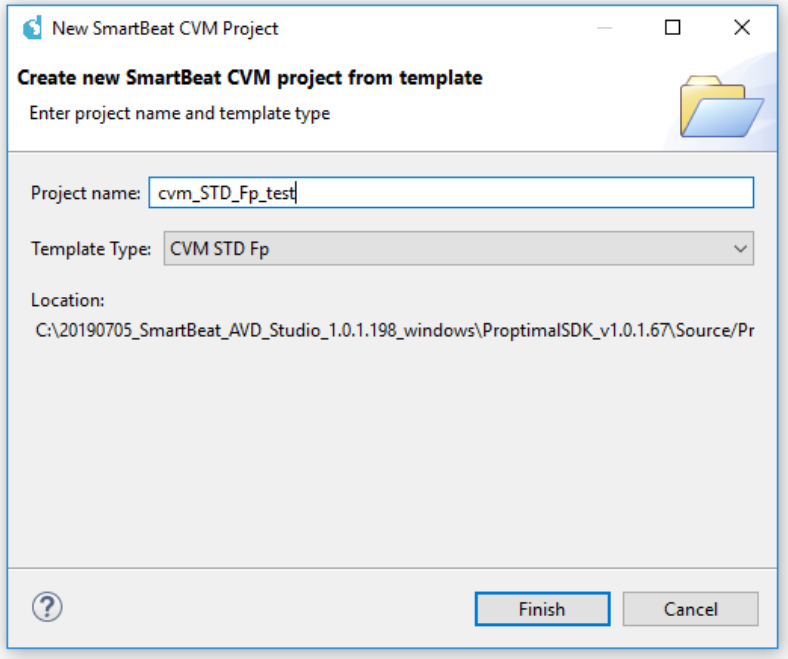

Figure 24: New Project Setup (Voice Conferencing stack)

5. The project structure should look like Figure 25. Make sure that the **Build** folder has all `.bat` files (bc, be, and bp).

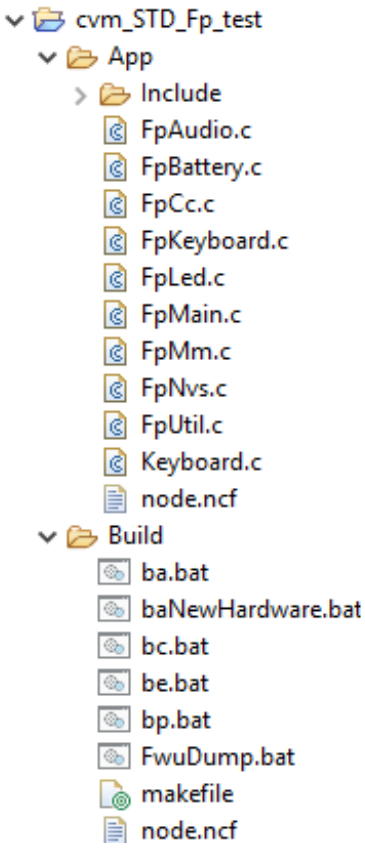

Figure 25: Project Structure (Voice Data Stack)

6. Build the project by clicking on "Build All" (Figure 26).

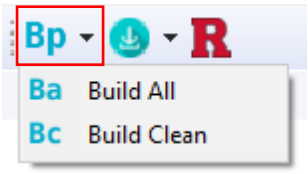

Figure 26: Build Project Options (See Toolbar)

7. Click on "**DUT Connection Manager**" and click on "SWD" to connect to J-Link Lite debugger (Figure 27).

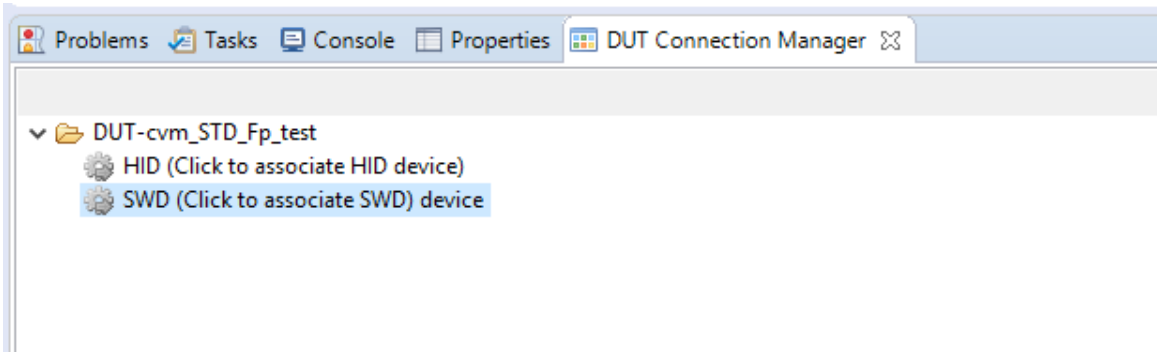

Figure 27: DUT Connection Manager View (for SWD)

8. Now download Stack and COLA application to the target DUT (Figure 28).

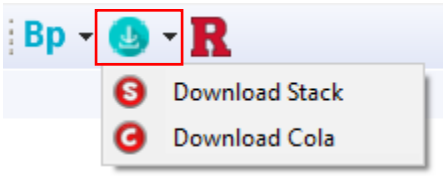

Figure 28: Download Stack/Cola Application (See Toolbar)

9. If you are using the carrier boards outside of EU region, change the DECT region accordingly by using the HostApp tool (see Figure 29). See section 4.1.

Figure 29: Open HostApp Tool (See Toolbar)

10. Now, Cola is disabled by default. In order to enable it, connect to the HID Interface by clicking on "**DUT Connection Manager**" tab and then click on "HID". (See Figure 30).

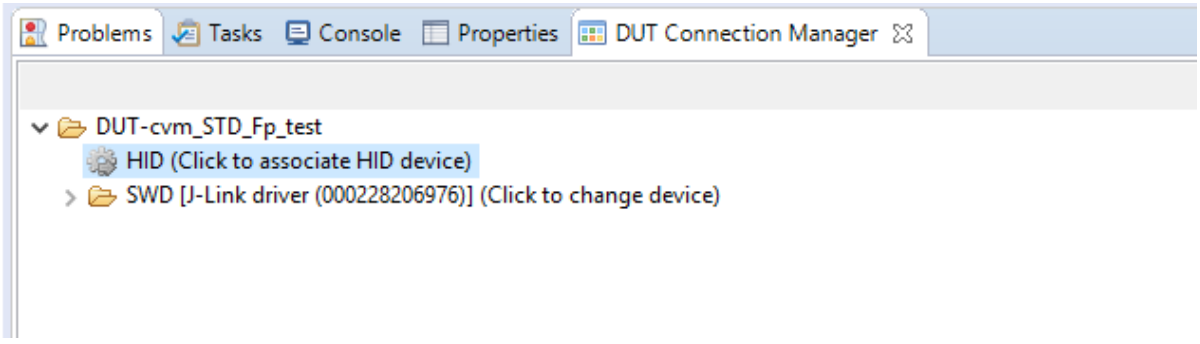

Figure 30: DUT Connection Manager View (for HID)

11. Now enable the Cola (marked blue in Figure 31) and then Reset the board (marked red in Figure 31).

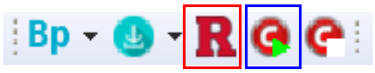

Figure 31: Enable Cola and Reset (See Toolbar)

12. To create a new project for the PP carrier board, follow the same procedure but change the template type to "**CVM STD Pp**" in step 4 follow rhe same procedure.
13. Once both the FP and PP carrier boards are programmed, registration can be done in a way similar to step 13 in section 5.2.
14. Please refer to Voice Data Stack Voice Conferencing Example Application ([4]) for more details.

Revision History

Revision	Date	Description
1.2	18-Jan-2022	Updated logo, disclaimer, copyright.
1.1	11-09-2020	Section 5.2 updated steps
1.0	04-Nov-2019	Initial version.

Status Definitions

Status	Definition
DRAFT	The content of this document is under review and subject to formal approval, which may result in modifications or additions.
APPROVED or unmarked	The content of this document has been approved for publication.

RoHS Compliance

Dialog Semiconductor's suppliers certify that its products are in compliance with the requirements of Directive 2011/65/EU of the European Parliament on the restriction of the use of certain hazardous substances in electrical and electronic equipment. RoHS certificates from our suppliers are available on request.