User Manual
SOT-EVA-S1

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1. Introduction

SOT-EVA-S1 is an adapter used for converting a computer's USB interface to the parallel interface, or to a serial parallel interface (SPI). This board is based on the FPGA chip. There are three connectors on board: a USB female connector to the host computer, a micro-D connector to the device with SPI, and a D-Sub Micro-D connector to the device with a parallel interface. The adapter is offered with a specific GUI as an evaluation kit for digitally controlling the ERAVANT low-phase-noise frequency synthesizer modules, e.g., SOT-02215300200-SF-E6 with SPI, SOT01210313003-SF-B6, SOT-02220313003-SF-B6, and SOT01320313001-SF-B6 with parallel interface.

2. Instrument Setup and Control

When using the evaluation kit SOT-EVA-S1 for synthesizer control, Eravant's provided graphical user interface (GUI) is required. This GUI enables various functionalities, including single-frequency output, frequency hopping, and frequency sweeping. The steps for using the SOT-EVA-S1 and the GUI are summarized below, and the connection of the coaxial and millimeter-wave synthesizers, as shown in the sample, is demonstrated in Figures 1 and 2.
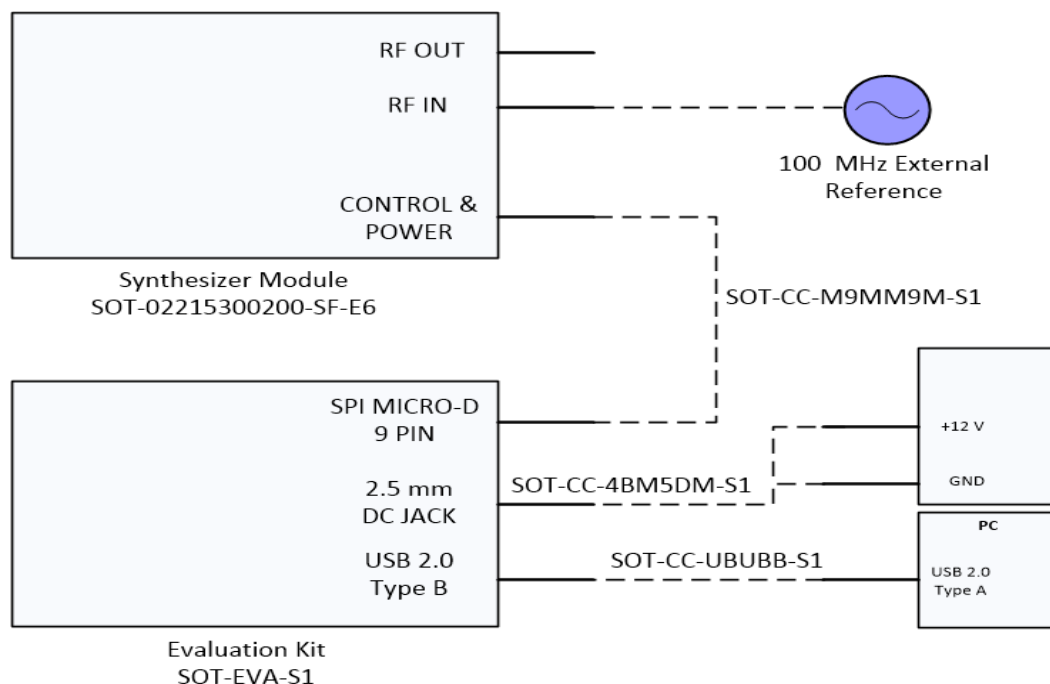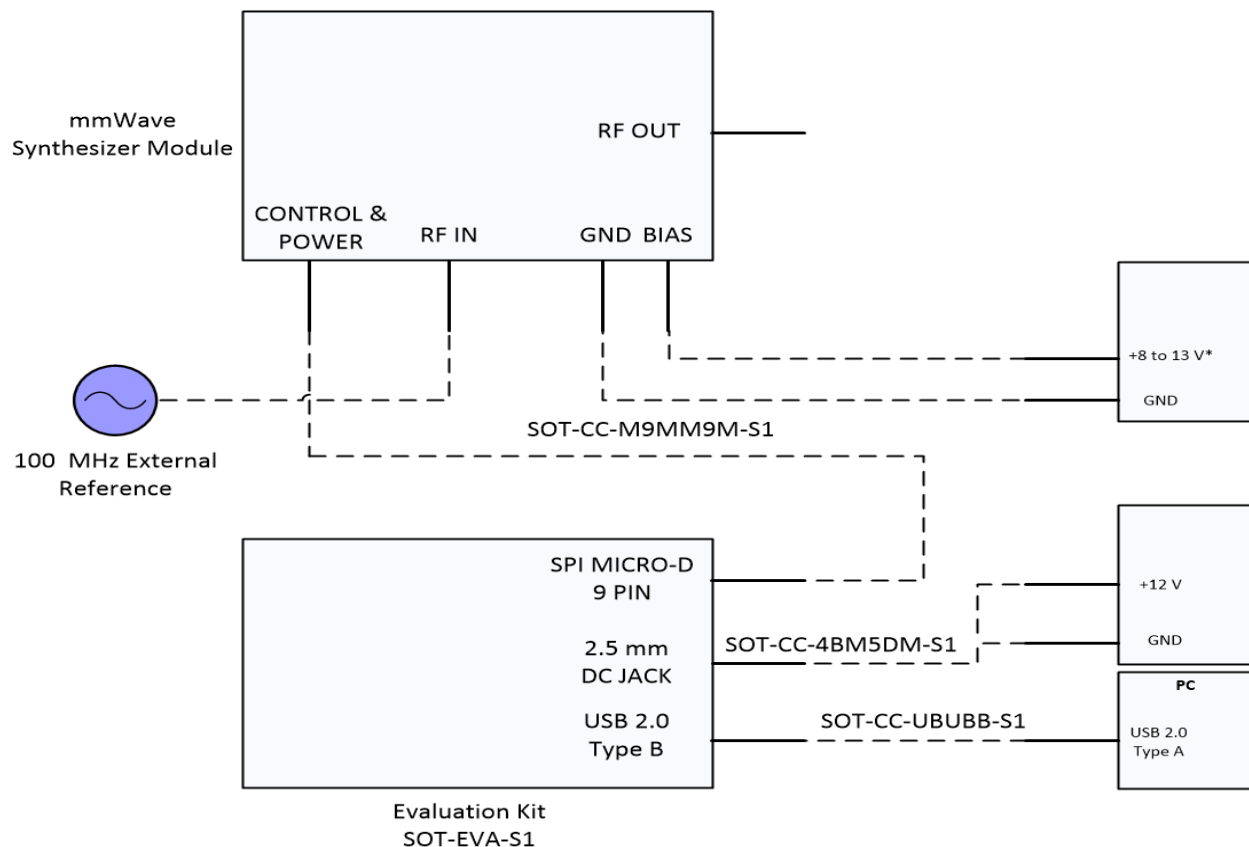

Figure 1. Coaxial Synthesizer Setup using SOT-EVA-S1 and External Reference Source

Figure showing mmWave Synthesizer Module setup with labels:

- mmWave Synthesizer Module
- RF OUT
- CONTROL & POWER
- RF IN
- GND BIAS
- +8 to 13 V*
- GND
- 100 MHz External Reference
- SOT-CC-M9MM9M-S1
- SPI MICRO-D 9 PIN
- 2.5 mm DC JACK
- USB 2.0 Type B
- SOT-CC-4BM5DM-S1
- +12 V
- GND
- PC
- USB 2.0 Type A
- SOT-CC-UBUBB-S1
- Evaluation Kit SOT-EVA-S1

*The Synthesizer DC bias depends on the multiplier. Please check the datasheet for the corresponding synthesizer to confirm the correct DC bias.

Figure 2. Millimeter Wave Synthesizer Setup using SOT-EVA-S1 and External Reference Source

1. Connect the control port of the synthesizer module with the Micro-D connector of the adapter board SOT-EVA-S1 using standard Micro-D9 male to Micro-D9 male cable **SOT-CC-M9MM9M-S1**. A standard Micro-D9 male to Micro-D9 cable should be included in the synthesizer package.

2. Connect a power supply capable of delivering 12 VDC / 2 A using a DC Plug to a 4 mm Banana plug cable (SOT-CC-4BM5DM-S1) to SOT-EVA-S1 as shown in Figure 1. The millimeter-wave synthesizer module will require one additional power-supply cable (not included in the package) to connect the feedthrough pins to the user-provided DC power supply, as shown in Figure 2. Refer to the bias requirement provided in the product datasheet.

3. Connect the PC and the SOT-EVA-S1 with the USB 2.0, Type A to Type B Cable (SOT-CC-UBUB-S1) as shown in Figure 1 or Figure 2.

4. To synchronize output frequency with external reference, connect a 100 MHz high-performance crystal oscillator to the 'RF IN' port of the synthesizer module using an appropriate cable with an

SMA Male connector on one end. Ensure the output power of the external reference source falls within the specified range.

5. Connect the RF output to the desired components in the RF chain using an appropriate SMA cable. If the RF port is not connected to any components, use a matched SMA termination load to prevent reflected power from causing damage.
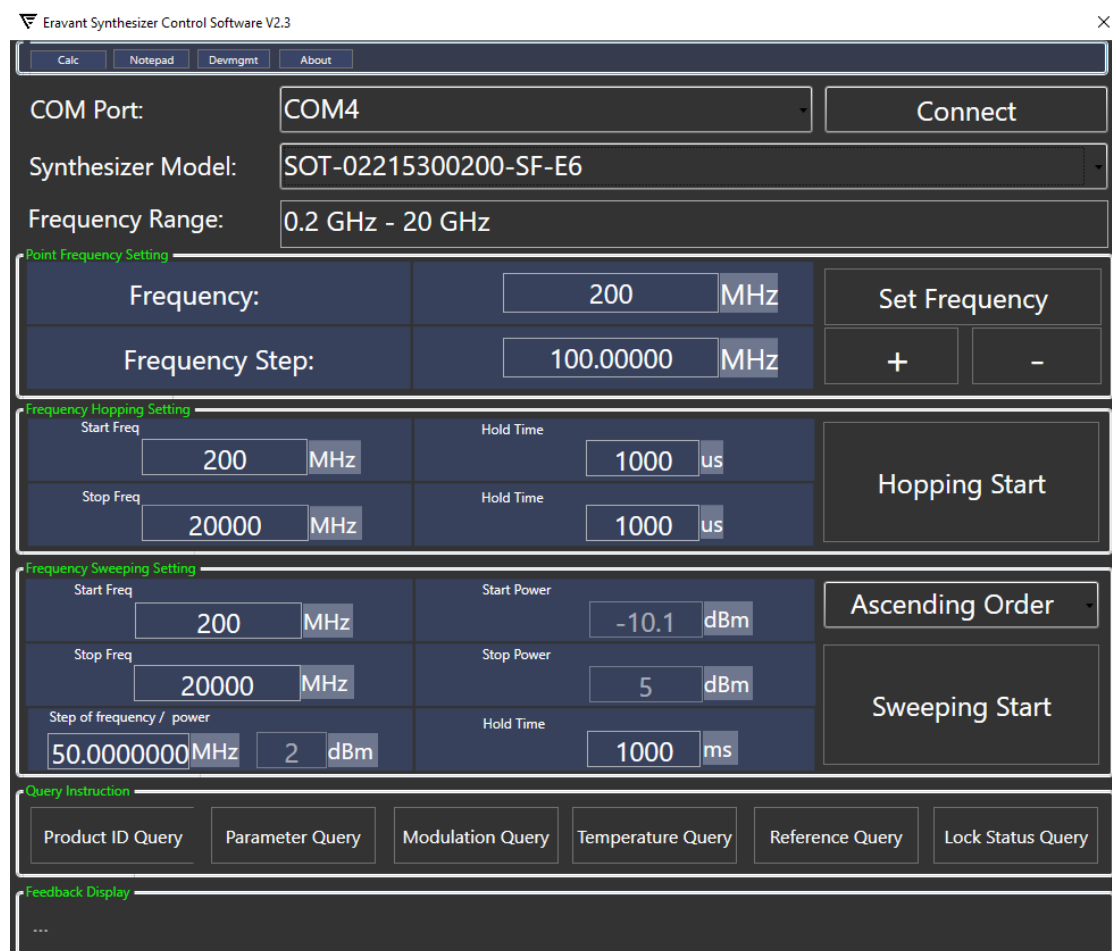

Figure 3. GUI Window

6. After completing the connections as shown in Figure 1 or Figure 2, launch the GUI, and select the correct synthesizer model as well as the communication port (COM3 or others, depending on the PC devices). Initiate the connection by clicking the 'Connect' button to establish a connection between the SOT-EVA-S1 and the PC. The sample GUI window is shown in Figure 3.

7. The 'Point Frequency Setting' section serves the purpose of generating a single-frequency output. Input the desired frequency in the 'Frequency' field and click 'Set Frequency' to apply the change. Additionally, for manual frequency sweeping at a specified step, input the 'Frequency Step,' and use the '+' or '-' buttons accordingly.

8. The 'Frequency Hopping Setting' section facilitates frequency hopping between two frequencies. To configure this, input the 'Start Freq' and 'Hold Time' for the first frequency, and then input the 'Stop Frequency' and 'Hold Time' for the second frequency. Activate the frequency hopping function by clicking 'Hopping Start'. Once the hopping function is activated, the "Hopping Stop" must be clicked before performing any other operations.

9. The 'Frequency Sweeping Setting' section is designed to enable the frequency sweeping function. Since the synthesizer modules have a fixed output power level, the power control settings in the GUI will be non-functional. To set up frequency sweeping, enter the 'Start Frequency', 'Stop Frequency', and 'Step of Frequency' in their respective fields. Choose one of the four sweeping options from the drop-down list, which includes 'continuous ascending order', 'continuous descending order', 'single ascending sweep', and 'single descending sweep'. After selecting your preferred sweeping option, initiate the frequency sweeping by clicking 'Sweeping Start'. Once the sweeping function is activated, the "Sweeping Stop" must be clicked before performing any other operations.