

EVM User's Guide: ADC3910D125EVM

ADC3910D125 Evaluation Module



Description

The ADC3910D125EVM is an evaluation module (EVM) designed to evaluate the ADC3910D125 family of high speed ADCs. The ADC3910D125EVM is populated with a ADC3910D125, 10-bit ADC, dual-channel, LVCMOS interface, and can operate up to 125MSPS. The ADC3910D125EVM allows for evaluation of all device speed grades, 25MSPS, 65MSPS, and 125MSPS.

Get Started

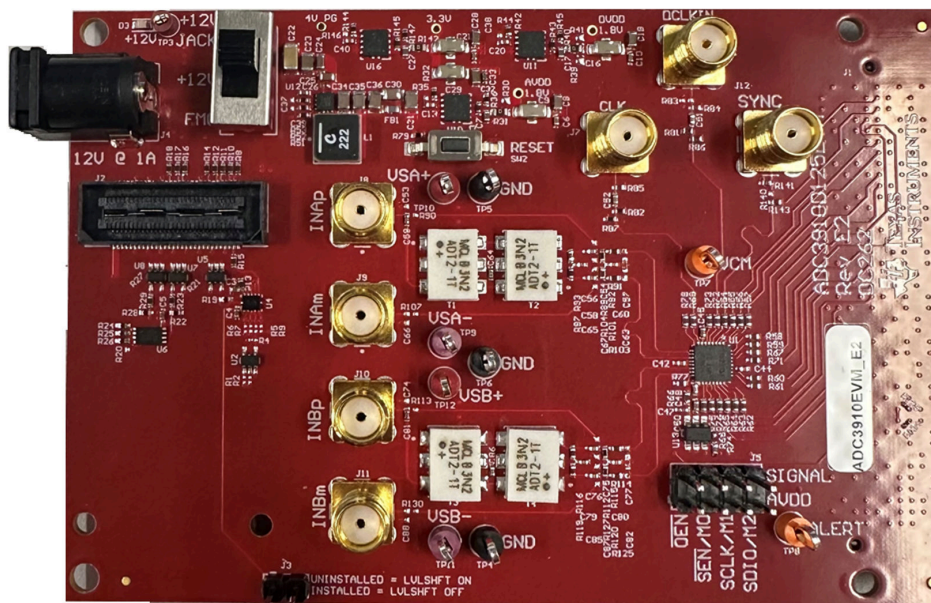
1. Order the EVM on ti.com.
2. Download the latest revision of the data sheet ([SBASAD1](#)).
3. Download the latest [ADC3910D125EVM GUI](#)
4. Download [High Speed Data Converter Pro \(HSDC Pro\)](#).

Features

- 10-bit, 125 MSPS ADC
- Dual-channel
- Ultra-low power
- Latency: 1 clock cycle
- Buffered inputs
- Small footprint: 32-VQFN (4mm × 4mm)

Applications

- Radio receiver
- [LIDAR](#)
- Low latency control loops
- [Laser scanners](#)
- [GPS](#)
- [SMU](#)
- Detection equipment



ADC3910D125EVM

1 Evaluation Module Overview

1.1 Introduction

The ADC3910D125EVM allows for evaluation of all ADC39XX versions as the versions are all P2P compatible. By default, the ADC3910D125EVM, has the ADC3910D125 (10-bit, 125MSPS). The EVM is configured to receive external single-ended analog inputs as the EVM includes baluns for single-ended to differential conversion. The sample clock is also sourced externally and is single-ended LVCMOS.

To capture data from the ADC3910D125EVM, the EVM is connected to a TSWDC155EVM through an FMC connector. The TSWDC155EVM has an AMD Atrix-7 FPGA to capture the ADC3910D125EVM output. The ADC data, captured by the FPGA, is then transferred to the PC and displayed in HSDC Pro.

1.2 Kit Contents

Table 1-1. ADC3910D125EVM Kit Contents

Item	Description	Quantity
ADC3910D125EVM	PCB	1
FTDI board	PCB	1
Mini USB cable		1
EVM barrel power cable		1

2 Hardware

This section details the required tools, both hardware and software, needed to effectively use the ADC3910D125EVM.

2.1 Board Overview

Figure 2-1 and Figure 2-2 highlight the key aspects of the ADC3910D125EVM.

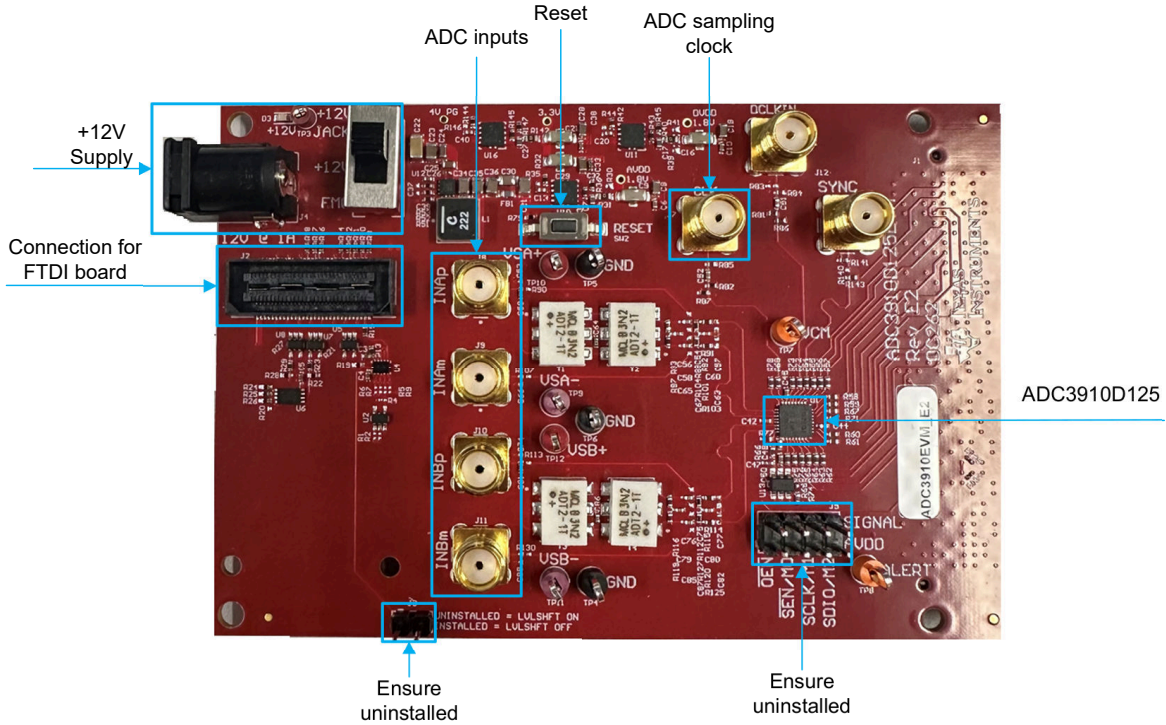


Figure 2-1. ADC3910D125EVM Feature Identification

Make sure that SW1 is set to take power from the +12V jack, the included FTDI board is connected to J2, and jumpers J3 & J5 remain uninstalled.

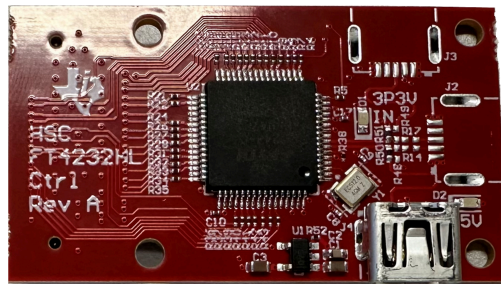


Figure 2-2. FTDI Board Included with ADC3910D125EVM That Connects to J2

2.2 Required Equipment

The following equipment is not included with the EVM kit, but is required for proper evaluation.

1. TSWDC155EVM for capturing the data from the ADC3910D125EVM
2. At least two, low-noise, signal generators for to provide the ADC sampling clock and an analog input. TI recommends either of the following signal generators:
 - Rohde & Schwarz SMA100A
 - Rohde & Schwarz SMA100B
3. Bandpass filters for the sample clock and the analog inputs. The filters has a narrow passband within 5%-15% of the desired bandwidth and minimal insertion loss.
4. SMA cables for signal connections.

2.3 Hardware Modifications

Before setting up the hardware, a few modifications are needed. Make the following modifications to the TSWDC155EVM:

- Remove Resistor R46
- Populate R47 with a 0Ω Resistor
- Remove Resistor R49
- Populate R177 with a 0Ω Resistor

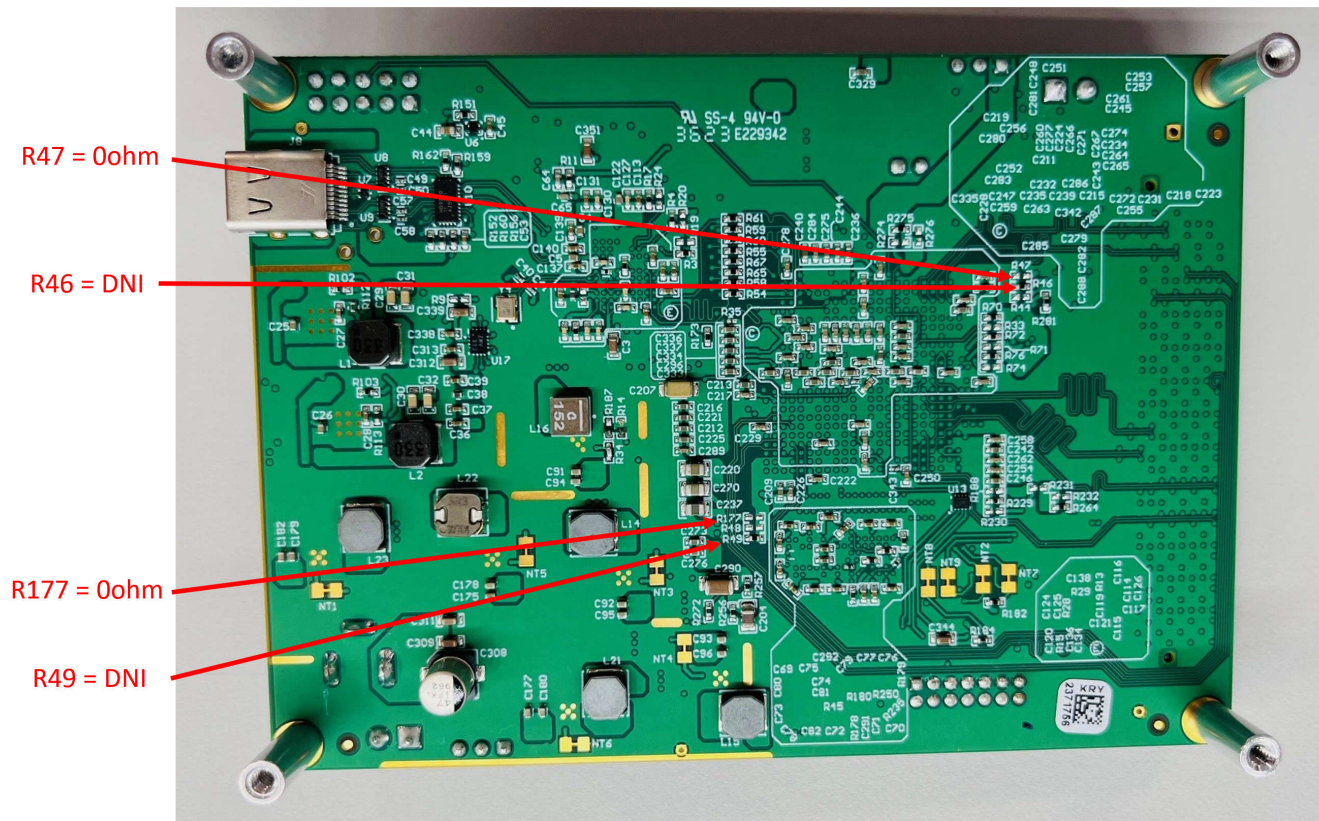


Figure 2-3. TSWDC155EVM Modifications

2.4 Hardware Setup

1. Connect the ADC3910D125EVM to the TSWDC155EVMEVM through the FMC connector.
2. Connect the FTDI dongle to the ADC3910D125EVM via J2 of the ADC3910D125EVM.
3. Connect the JTAG dongle provided with the TSWDC155EVMEVM onto the JTAG Connector of the TSWDC155EVM.
4. Make sure Jumper J2 on TSWDC155EVM is connected between pins one and two.
5. Connect a +12V power supply to the DC Barrel Jack connector of the ADC3910D125EVM using the included power supply cable.
6. Connect a mini USB cable from the PC to the FTDI dongle installed on the ADC3910D125EVM.
7. Connect a USB C cable from the PC to the USB C connector on the TSWDC155EVM.
8. Connect a micro USB cable from the PC to the JTAG dongle connected to the TSWDC155EVM
9. Connect a bandpass filtered clock signal source to J7 labeled CLK of the ADC3910D125EVM.
10. Connect a bandpass filtered analog input source to J8 and/or J10 of the ADC3910D125EVM labeled INAp and INBp, respectively.

If all the steps above were followed correctly, then the final setup looks like the following:

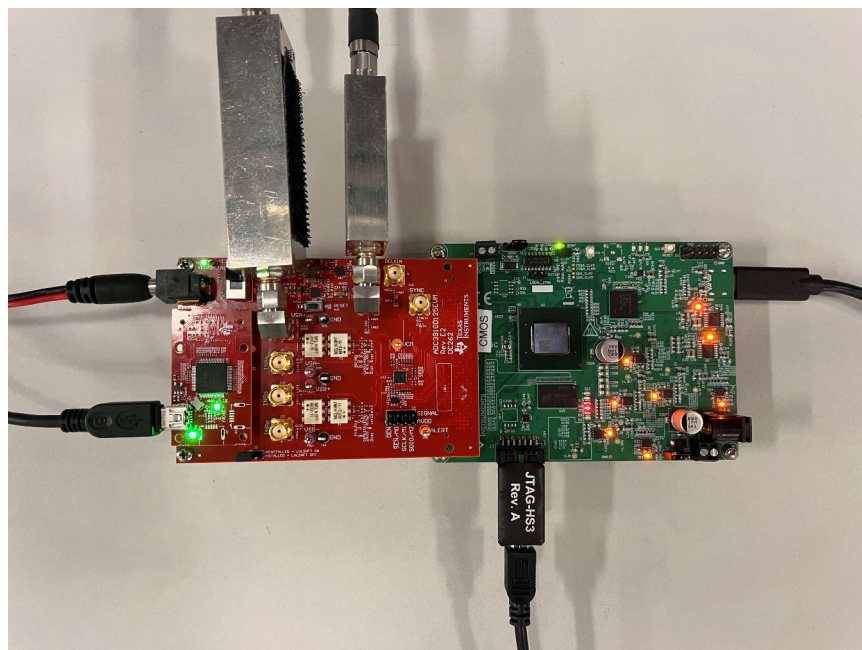


Figure 2-4. Final Setup of ADC3910D125EVM

3 Software

3.1 Software Setup

1. Download and install the latest version of HSDC Pro.
2. Install the ADC39xxEVM GUI.
3. Install Vivado Lab Solutions.
4. Verify that the Vivado Lab bin folder is added to your PATH system environment variable.
 - a. Search for System Environment Variables in the start menu.
 - b. Click on Environment Variable.
 - c. Under System Variables, locate and click on the Path variable.
 - d. Click on Edit.
 - e. Click on New to add a new path.
 - f. Add the path to your Vivado Lab installation, depending on where you installed Vivado Lab and what version you installed. The path to the bin folder typically looks something like this: C:\Xilinx\Vivado_Lab\2023.1.1\bin.

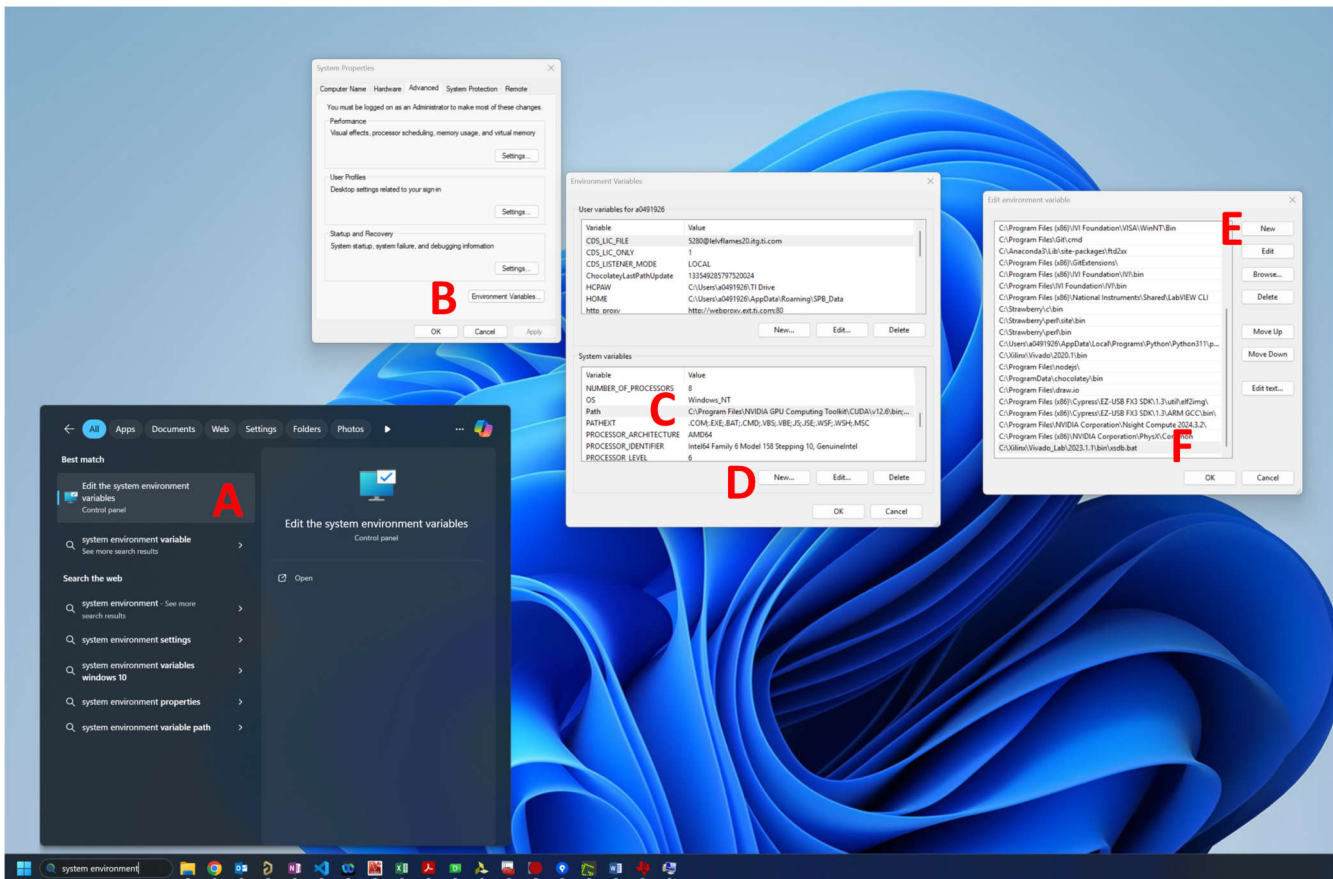


Figure 3-1. Steps to Add the Vivado Bin Folder to System Path Variable

4 Implementation Results

4.1 Bringup

The ADC3910D125EVM GUI currently only supports sample rates up to 90MHz. The GUI will be updated to support the full speed in the future.

1. Connect a Bandpass filtered 65MHz clock signal to the ADC.
2. Connect a bandpass filtered 5MHz analog input signal to either ADC input.
3. Open HDC Pro. Always ensure that HSDC Pro is open before opening the GUI.
4. When prompted to connect to a board, click Cancel.

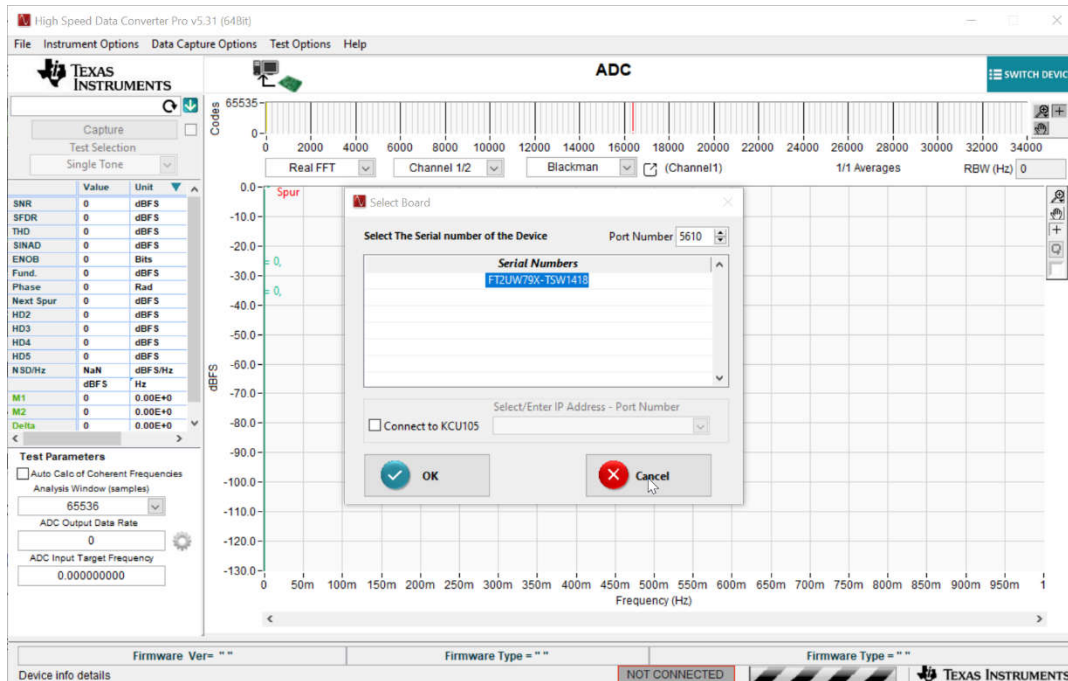


Figure 4-1. Canceling the Board Selection in HSDC Pro

5. Open the ADC39xxEVM GUI and wait for the GUI to connect to the ADC3910D125EVM and the TSWDC155EVM. This may take up to 30 seconds.



Figure 4-2. Opening the ADC39xxEVM GUI

- Once the GUI opens, set the Sample Frequency to 65MHz.

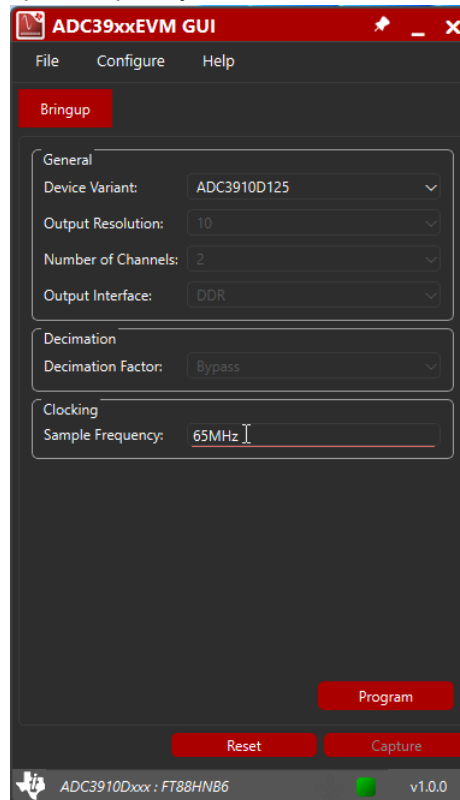


Figure 4-3. Setting Sample Frequency in ADC39xxEVM GUI

- Click Program to program the ADC and FPGA. This may take up to 30 seconds.

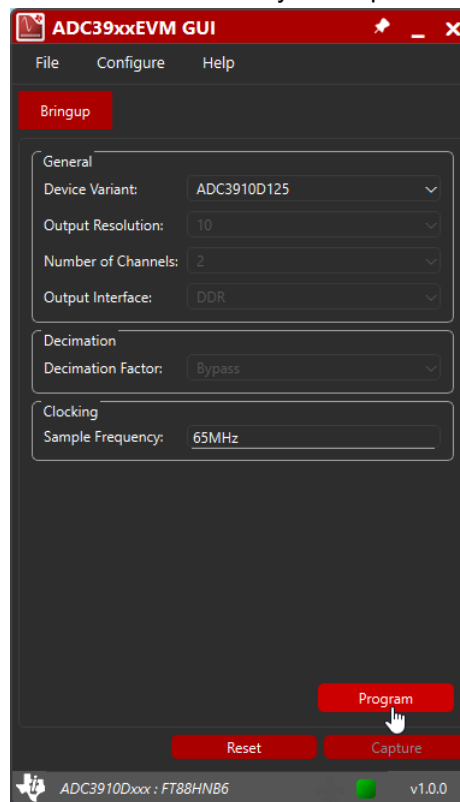


Figure 4-4. Programming the ADC with the ADC39xxEVM GUI

- Once the programming is complete, the Capture button becomes enabled. Click the capture button to capture data in HSDC Pro. This may take a few seconds.

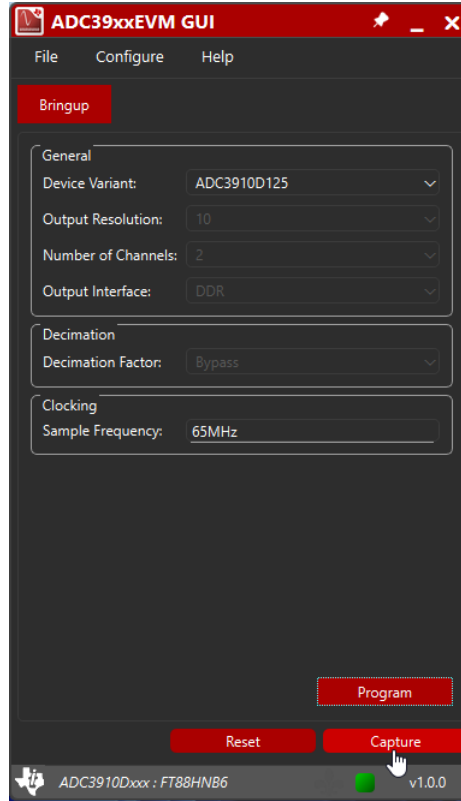


Figure 4-5. Capturing ADC Data With the ADC39xxEVM GUI

- When the data is captured, an FFT appears in HSDC Pro, where you can view the performance of the device. For more functions and features of HSDC Pro, see the HSDC Pro User Guide.

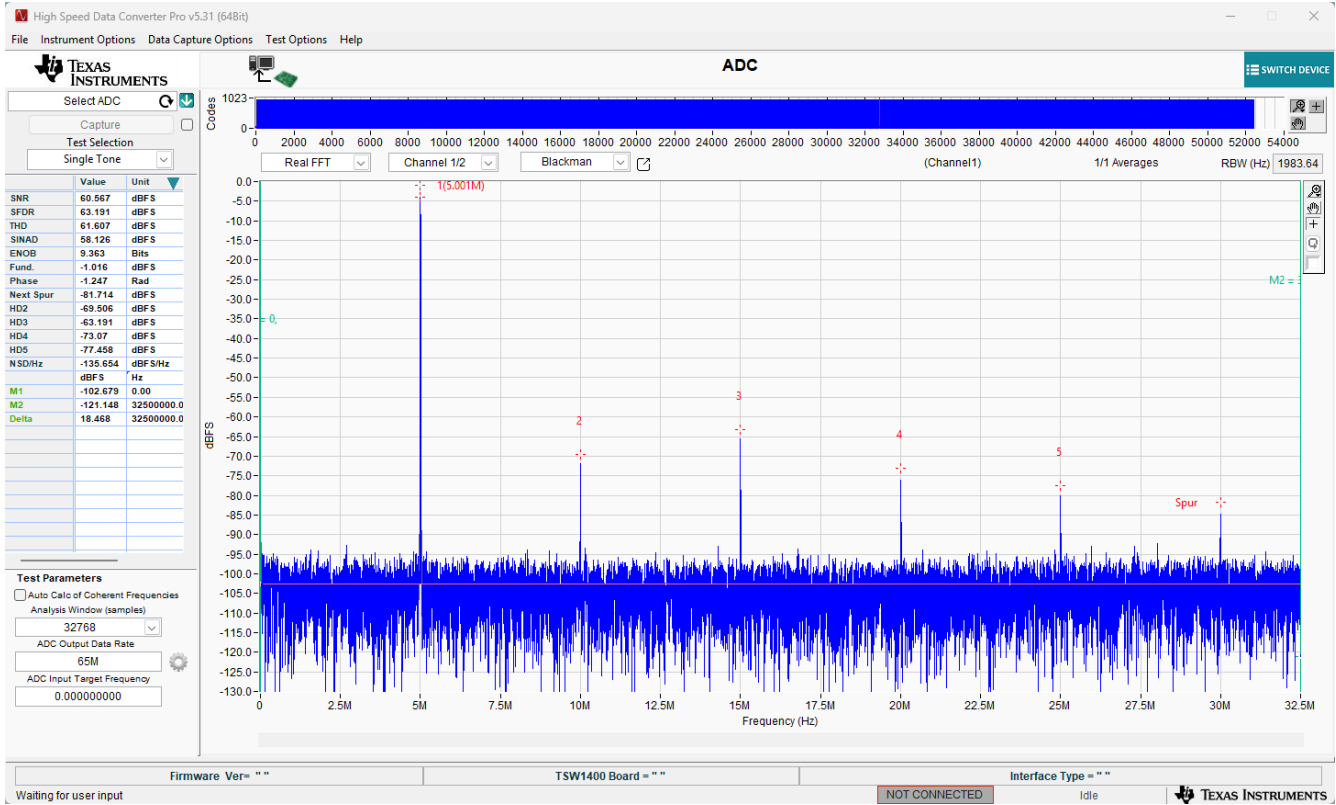


Figure 4-6. Viewing Captured Data in HSDC Pro

5 Additional Information

5.1 Trademarks

All trademarks are the property of their respective owners.

6 References

- [ADC3910D125 Datasheet](#)
- [ADC39xxEVM GUI](#)
- [High-Speed Data Converter Pro GUI User's Guide \(Rev. E\)](#)

7 Revision History

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

Changes from Revision * (December 2023) to Revision A (December 2025)	Page
• Removed references to TSW1418EVM and updated to latest capture card TSWDC155EVM.....	1
• Updated setup procedure to reflect new capture card and GUI.....	5

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WARNING

Evaluation Kits are intended solely for use by technically qualified, professional electronics experts who are familiar with the dangers and application risks associated with handling electrical mechanical components, systems, and subsystems.

User shall operate the Evaluation Kit within TI's recommended guidelines and any applicable legal or environmental requirements as well as reasonable and customary safeguards. Failure to set up and/or operate the Evaluation Kit within TI's recommended guidelines may result in personal injury or death or property damage. Proper set up entails following TI's instructions for electrical ratings of interface circuits such as input, output and electrical loads.

NOTE:

EXPOSURE TO ELECTROSTATIC DISCHARGE (ESD) MAY CAUSE DEGRADATION OR FAILURE OF THE EVALUATION KIT; TI RECOMMENDS STORAGE OF THE EVALUATION KIT IN A PROTECTIVE ESD BAG.

3 Regulatory Notices:

3.1 United States

3.1.1 Notice applicable to EVMs not FCC-Approved:

FCC NOTICE: This kit is designed to allow product developers to evaluate electronic components, circuitry, or software associated with the kit to determine whether to incorporate such items in a finished product and software developers to write software applications for use with the end product. This kit is not a finished product and when assembled may not be resold or otherwise marketed unless all required FCC equipment authorizations are first obtained. Operation is subject to the condition that this product not cause harmful interference to licensed radio stations and that this product accept harmful interference. Unless the assembled kit is designed to operate under part 15, part 18 or part 95 of this chapter, the operator of the kit must operate under the authority of an FCC license holder or must secure an experimental authorization under part 5 of this chapter.

3.1.2 For EVMs annotated as FCC – FEDERAL COMMUNICATIONS COMMISSION Part 15 Compliant:

CAUTION

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

FCC Interference Statement for Class A EVM devices

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

FCC Interference Statement for Class B EVM devices

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- 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.

3.2 Canada

3.2.1 For EVMs issued with an Industry Canada Certificate of Conformance to RSS-210 or RSS-247

Concerning EVMs Including Radio Transmitters:

This device complies with Industry Canada license-exempt RSSs. Operation is subject to the following two conditions:

(1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Concernant les EVMs avec appareils radio:

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Concerning EVMs Including Detachable Antennas:

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication. This radio transmitter has been approved by Industry Canada to operate with the antenna types listed in the user guide with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

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 pour 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 isotrope 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 indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

3.3 Japan

3.3.1 *Notice for EVMs delivered in Japan:* Please see http://www.tij.co.jp/lstds/ti_ja/general/eStore/notice_01.page 日本国内に輸入される評価用キット、ボードについては、次のところをご覧ください。

<https://www.ti.com/ja-jp/legal/notice-for-evaluation-kits-delivered-in-japan.html>

3.3.2 *Notice for Users of EVMs Considered "Radio Frequency Products" in Japan:* EVMs entering Japan may not be certified by TI as conforming to Technical Regulations of Radio Law of Japan.

If User uses EVMs in Japan, not certified to Technical Regulations of Radio Law of Japan, User is required to follow the instructions set forth by Radio Law of Japan, which includes, but is not limited to, the instructions below with respect to EVMs (which for the avoidance of doubt are stated strictly for convenience and should be verified by User):

1. Use EVMs in a shielded room or any other test facility as defined in the notification #173 issued by Ministry of Internal Affairs and Communications on March 28, 2006, based on Sub-section 1.1 of Article 6 of the Ministry's Rule for Enforcement of Radio Law of Japan,
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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This is a class A product intended for use in environments other than domestic environments that are connected to a low-voltage power-supply network that supplies buildings used for domestic purposes. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

-
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