

Modular Field Transmitter Evaluation Platform for Industrial Applications



Introduction

Field transmitter designs must support multiple sensor types, output protocols, and power constraints simultaneously. This complexity makes selecting devices and evaluating the design a time-consuming challenge. The field transmitter evaluation platform provides a modular hardware and software platform that lets engineers evaluate TI's latest devices in configurations that closely match real industrial applications. This document covers the platform's scope, available hardware, software design, and where to find more information on each board.

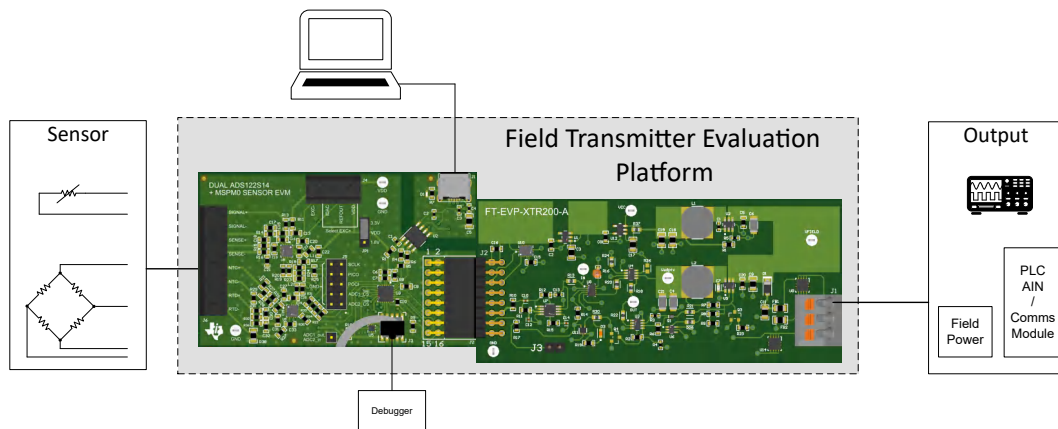


Figure 1. Platform Block Diagram

Table 1. Modules and Software Available

Item type	Item	Link
Hardware—sensor module	SNSR-DUAL-ADC-EVM. ADS122S14 and MSP430G1507 evaluation module	Test out the EVM
Hardware—output module	- AFE88X transmitter board - Reference design: TIDA-010982 - Orderable: AFE88XH1-FELC-EVM	Access hardware files Test out the EVM
	- XTR200 transmitter board - Reference design: TIDA-011026 - Orderable: XTREVM-TRANSMITTER	Access hardware files Test out the EVM
Software	SNSR-DUAL-ADC-EVM-FW. 1-firmware design	Download the firmware and evaluate the design
	Python-based GUI (data visualization)	

Scope of the Field Transmitter Evaluation Platform

The field transmitter evaluation platform is a combination of hardware and software designs for industrial field sensors and transmitters that enables users to evaluate TI hardware in a way that closely resembles a real application.

The goals of the field transmitter platform are:

- Enable users to evaluate TI's latest designs for field sensor and transmitter applications in a modular design implementation
- Provide a user-friendly interface to use and evaluate the hardware's performance
- Maintain minimal reconfiguration from end users is needed by providing a single firmware design

The platform hardware designs are split into two types of modules: sensing modules and output modules. The sensing modules include the front-end circuitry to drive and sample the electrical signal from a sensor including:

- Temperature: thermistors (NTC and PTC), RTD (2-, 3-, and 4-wire), and thermocouple
- Pressure (resistive bridge)
- General purpose sensing: current or voltage

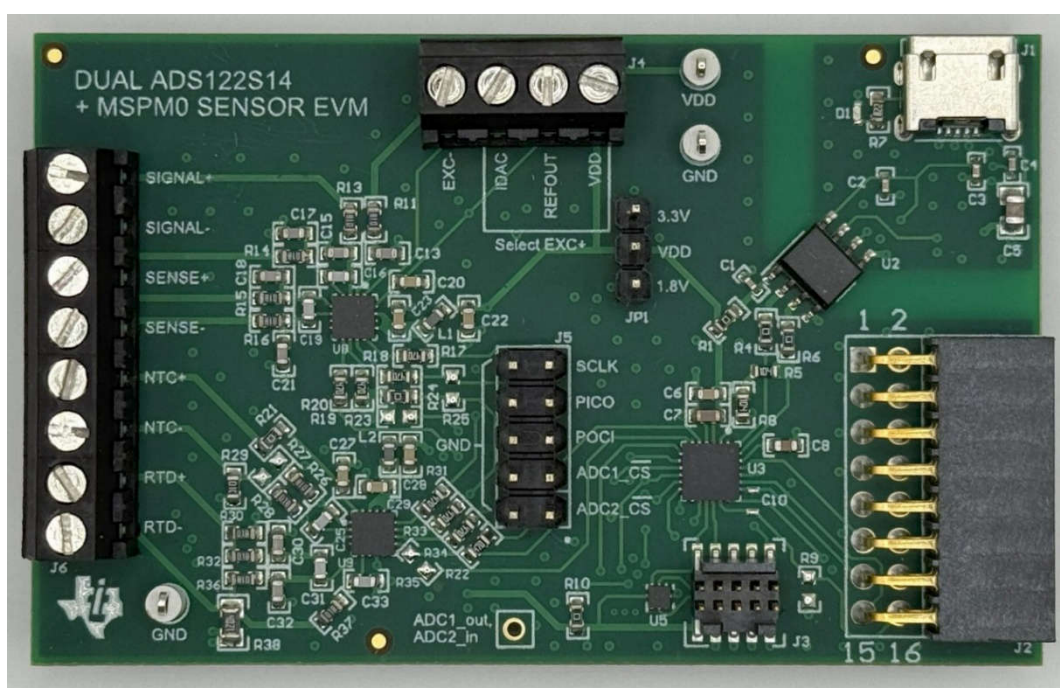


Figure 2. Sensor Module: Dual Channel

The sensing modules also implement an MCU that drives the system. The MCU processes the sensor data and scales the data to drive the transmitter modules accordingly.

The output modules implement circuitry to drive a field transmitter output including:

- 4-20mA industrial interfaces: 2- and 3-wire, including HART
- 0-10V industrial interface
- IO-Link

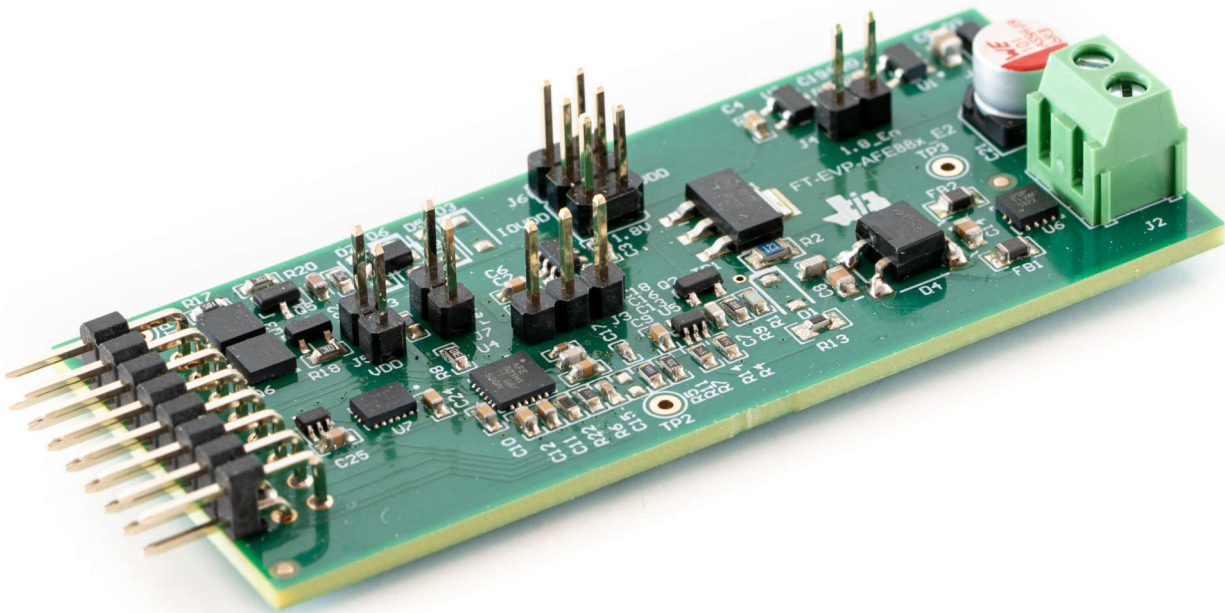


Figure 3. Output Module: 2-wire, 4-20mA

All modules include a level shifter that allows the MCU to identify each board by a unique ID and load the correct software drivers automatically.

Hardware available

A more detailed overview of the available hardware is shown in [Table 2](#) and [Table 3](#).

Table 2. Sensing Modules

Board ID	EVM	ADC interface	Supported Sensor Types	Channels Available
0x01	SNSR-MUX-ADC-EVM	Single channel	• RTD • TC • Thermistor • Resistive bridge • V/I sensing	1 ADS122S14
0x02	SNSR-DUAL-ADC-EVM	Daisy-chained		2 ADS122S14

Table 3. Output Modules

Board ID	EVM	TIDA number	Supported Output Interface	Key Features
0x01	AFE88XH1-FELC-EVM	TIDA-010982	Two-wire 4-20mA	• Resolution: 16 bits • Power supply: 1.8V or 3.3V • SPI input • Loop-powered
0x03	XTREVM-TRANSMITTER	TIDA-011026	Three-wire 4-20mA, 0-10V	• Resolution: 12 bits • Power supply: 3.3V • PWM input • Adaptive power

Software Design

The platform software is a 1-firmware design approach which enables users to easily interface with any combination of sensing and output modules without needing to reflash or reconfigure the MCU.

Figure 4 shows the 1-firmware design flowchart. The firmware is structured in different modules so that the internal configuration and UART handler interface are adjusted according to the hardware that is connected.

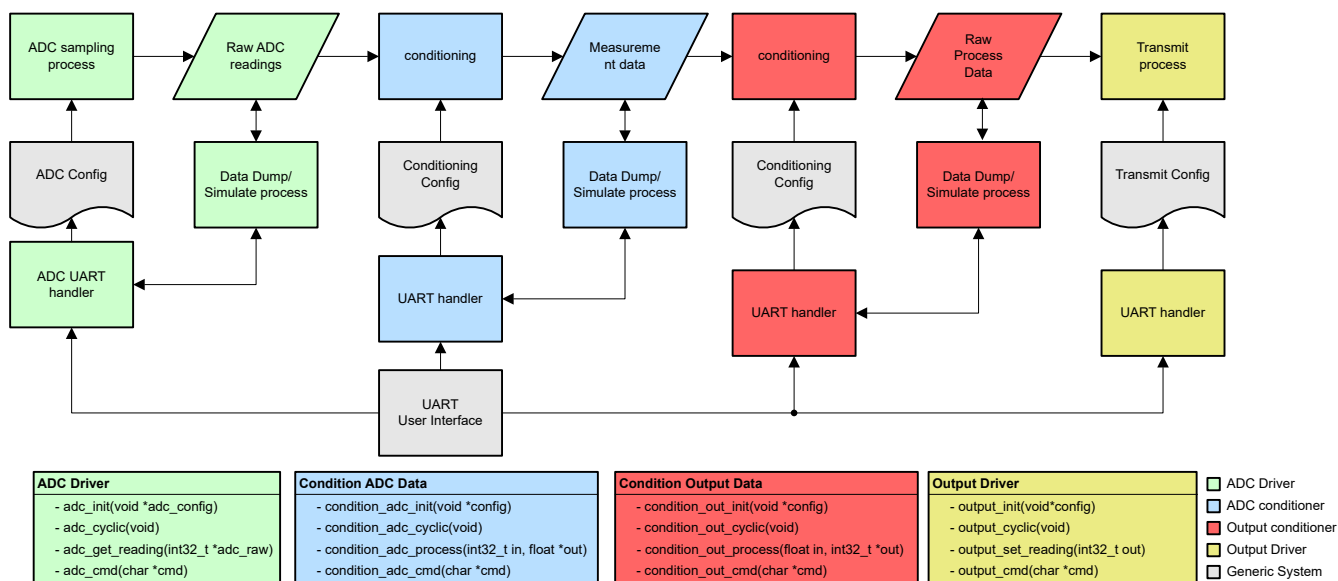


Figure 4. Software Flowchart

The 1-firmware design of the platform is publicly available on GitHub and supports identification and drivers for all released boards.

Users can interface with the platform over USB through a terminal program or a GUI.

The terminal interface allows users to view live data from the system, change programmable configurations of specific devices in the modules, maintain proper functionality, and evaluate the performance of the hardware.

The settings required for communication are:

- Baud rate: 115200
- Serial connection type
- Serial line number

Figure 5 shows an example of a successful connection to the platform HW over the terminal interface where the help command is used to show all of the UART commands available for the specific modules that are connected.

```
FT Platform Oct 31 2025 07:38:59
Running at 32 MHz
Using ADS122S14 in daisy chain for pressure sensing
initialized...
help
help
sys - 0x4ae1 - configure system
adc - 0x545d - configure adc subsystem
out - 0x5fed - configure output subsystem
cin - 0x5f6d - configure adc data conditioning system
cout - 0x6da9 - configure output data conditioning system
help - 0x6659 - show this message
version - 0x45f5 - show information about software and hardware version
ret: 0
```

Figure 5. Terminal Interface

The GUI program is also available on GitHub, and helps to visualize the data. An example of the GUI interface is shown in Figure 6.



Figure 6. GUI Interface

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