

UG10439

AFCI 8CH Demo Quick Start Guide

Rev. 1.0 — 15 July 2026

User guide

Document information

Information	Content
Keywords	UG10439, MCXN547, AFCI, ARC, current sensor
Abstract	This document provides quick start guide to DC AFCI Solution with MCXN547-AFCI board.



1 Introduction

This quick start guide describes the implementation of the MCXN547-AFCI board. This board is based on the MCXN547VNLT MCU with a high-performance NPU and a PowerQuad DSP. The board can connect to up to eight Current Transformer (CT) sensors.

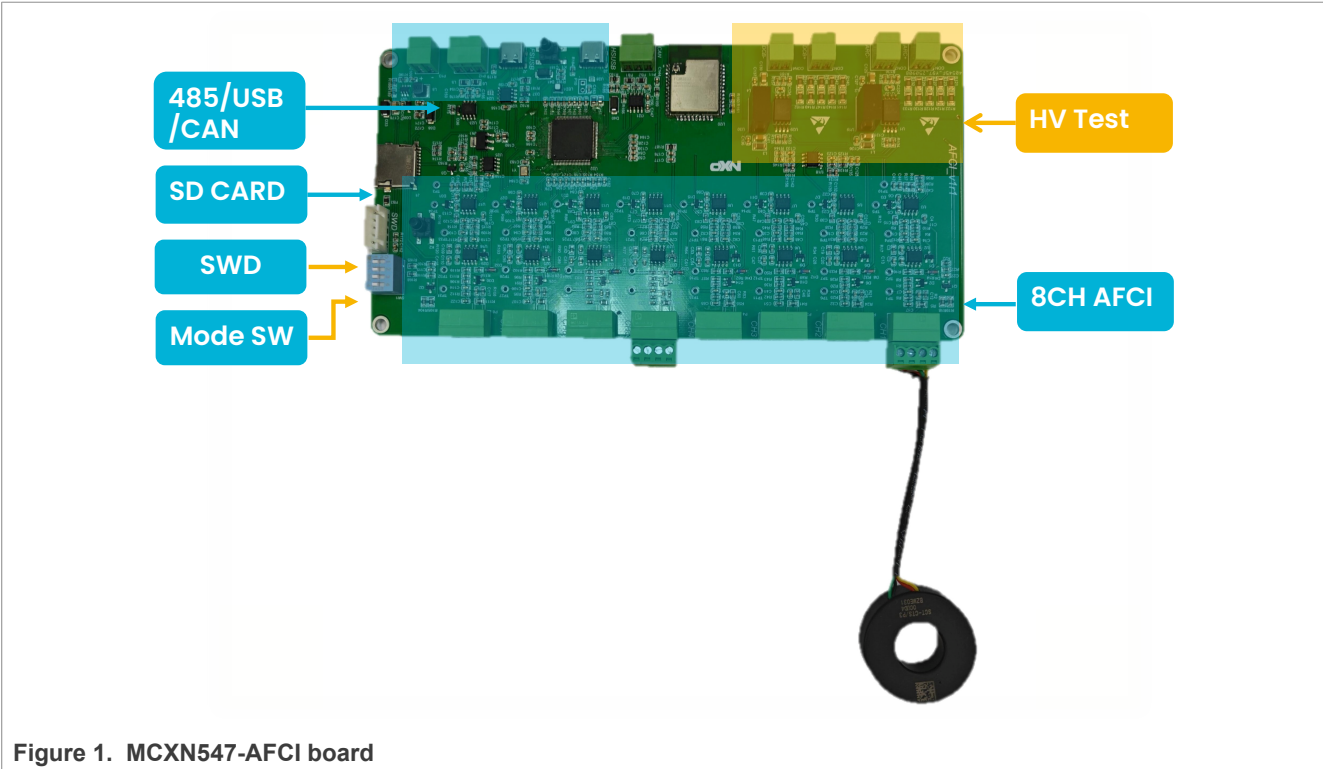


Figure 1. MCXN547-AFCI board

The MCXN547-AFCI board with the DC AFCI solution can detect ARC faults within 10 ms on each CT sensor input channel. The hardware consists of several modules and supports the RS485, CAN, SD card, and Wi-Fi interfaces. It also includes a mode switch for selecting the firmware operating mode.

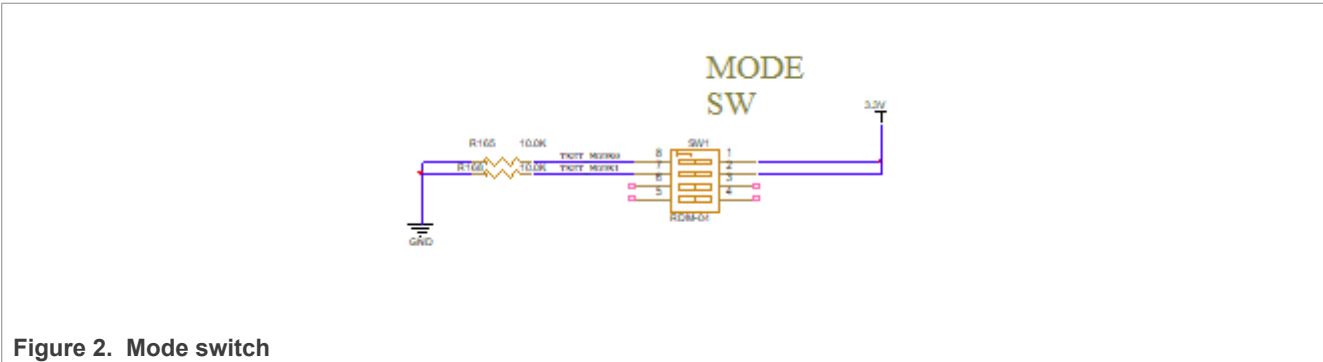


Figure 2. Mode switch

The MCXN547-AFCI board can operate in either the Normal Working Mode for a normal eight-channel AFCI ARC detection or the HV-Test Mode for sampling data sets and labeling them for training. When using the board for the first time, leave switch SW1 in the OFF position to select the Normal Working Mode.

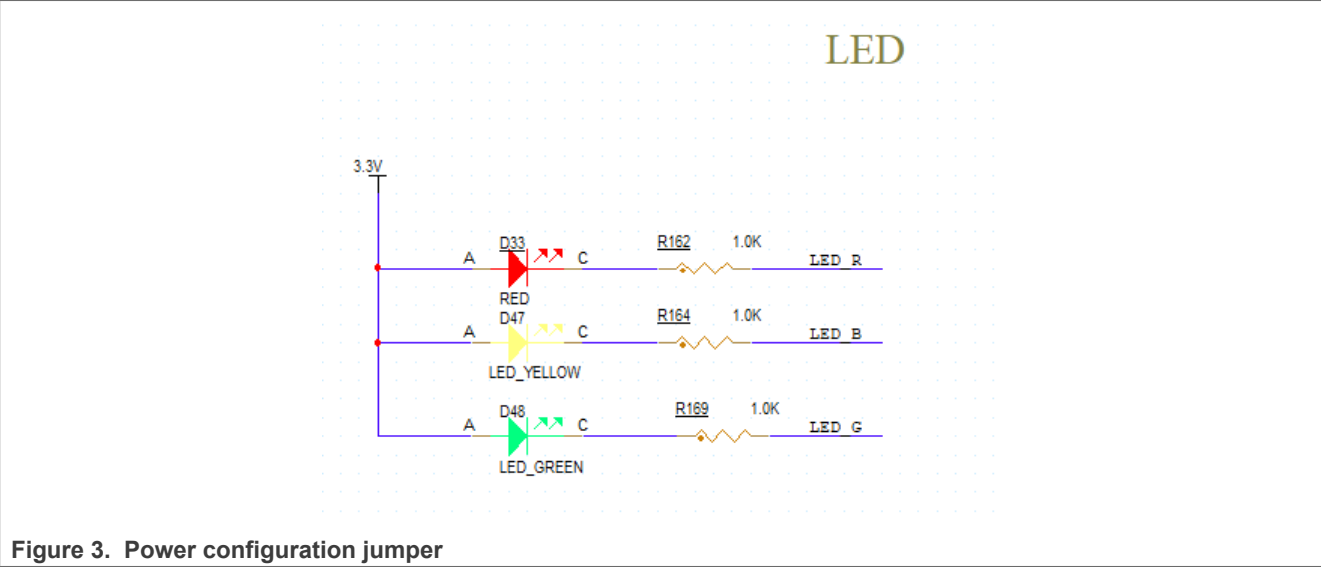


Figure 3. Power configuration jumper

The red LED turns on when the software starts to run. After the self-test is complete, the green LED turns on in the Normal Working Mode so both the red and green LEDs remain on. In the HV-Test Mode, the blue LED turns on, so both the red and blue LEDs remain on. In the Normal Working Mode, the blue LED blinks when an ARC fault is detected on any channel.

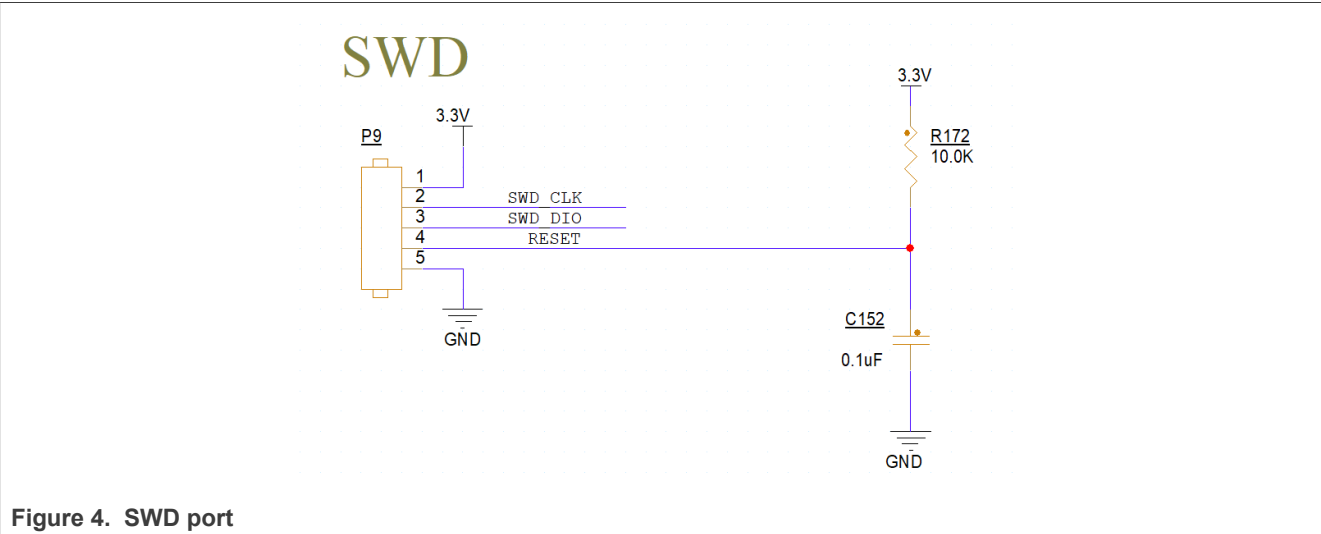
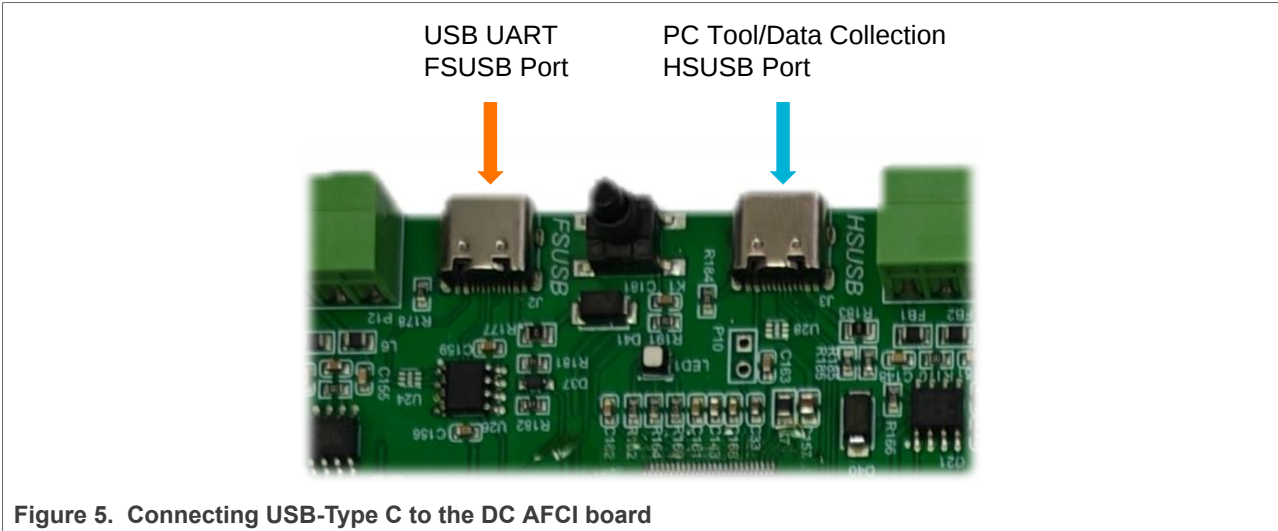


Figure 4. SWD port

The SWD port (P9) is used for firmware programming and debugging. Both the MCU-Link and J-Link debuggers are supported.

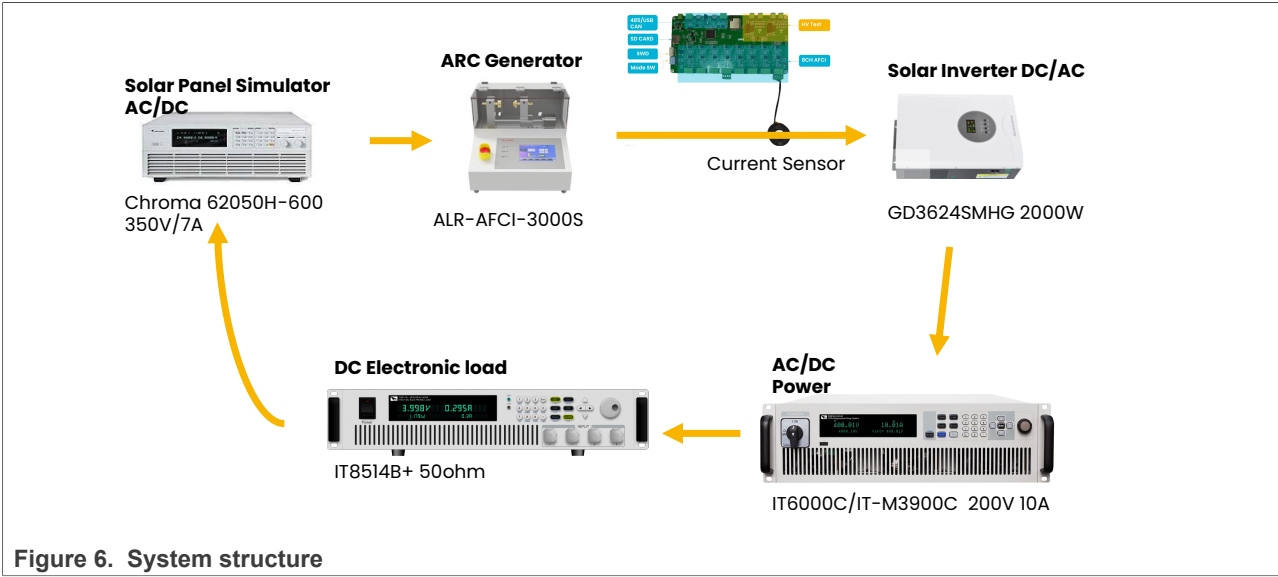
2 Step-by-step guide

1. Connect the MCXN547-AFCI board to the PC.



Connect the MCXN547-AFCI board by the USB-Type C cable to the FSUSB port. Connect the SWD interface (P9) on the MCXN547-AFCI board to an MCU-Link or J-Link debugger and connect the debugger USB port to the PC.

- 2. Set up the DC AFCI test system and connect the CT sensor to the MCXN547-AFCI board, as shown in [Figure 6](#).



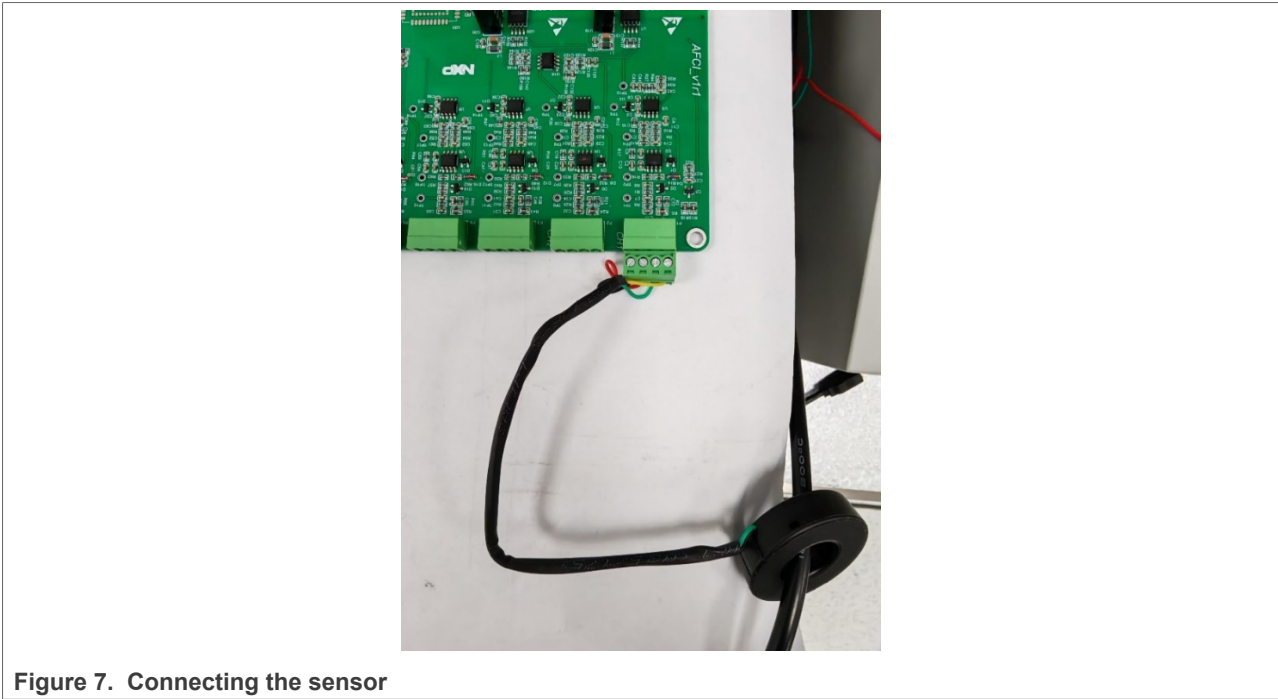


Figure 7. Connecting the sensor

Keep the **MODE SW** in the Normal Working Mode.

- 3. Open the MCUXpresso IDE, choose a workspace, and import the DC AFCI Solution firmware.

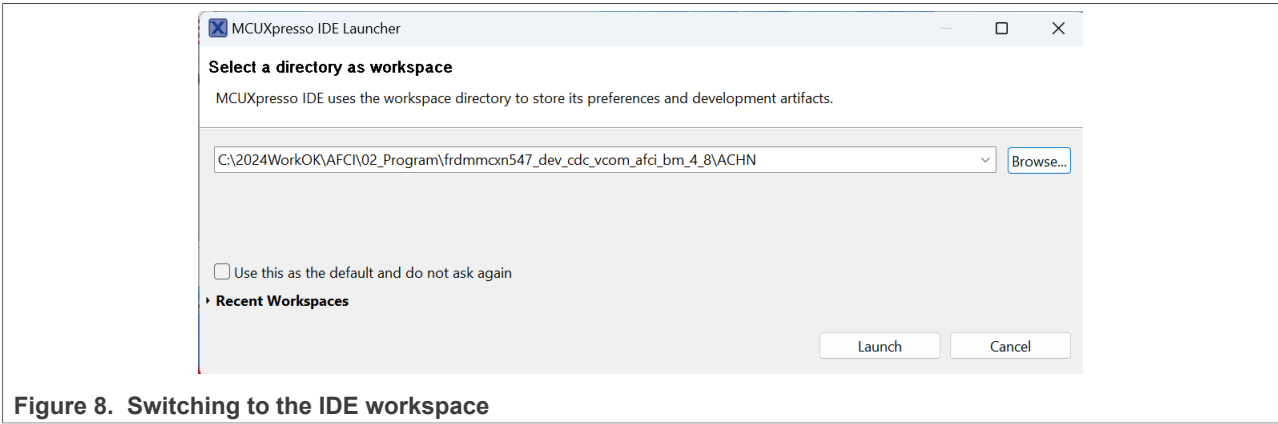


Figure 8. Switching to the IDE workspace

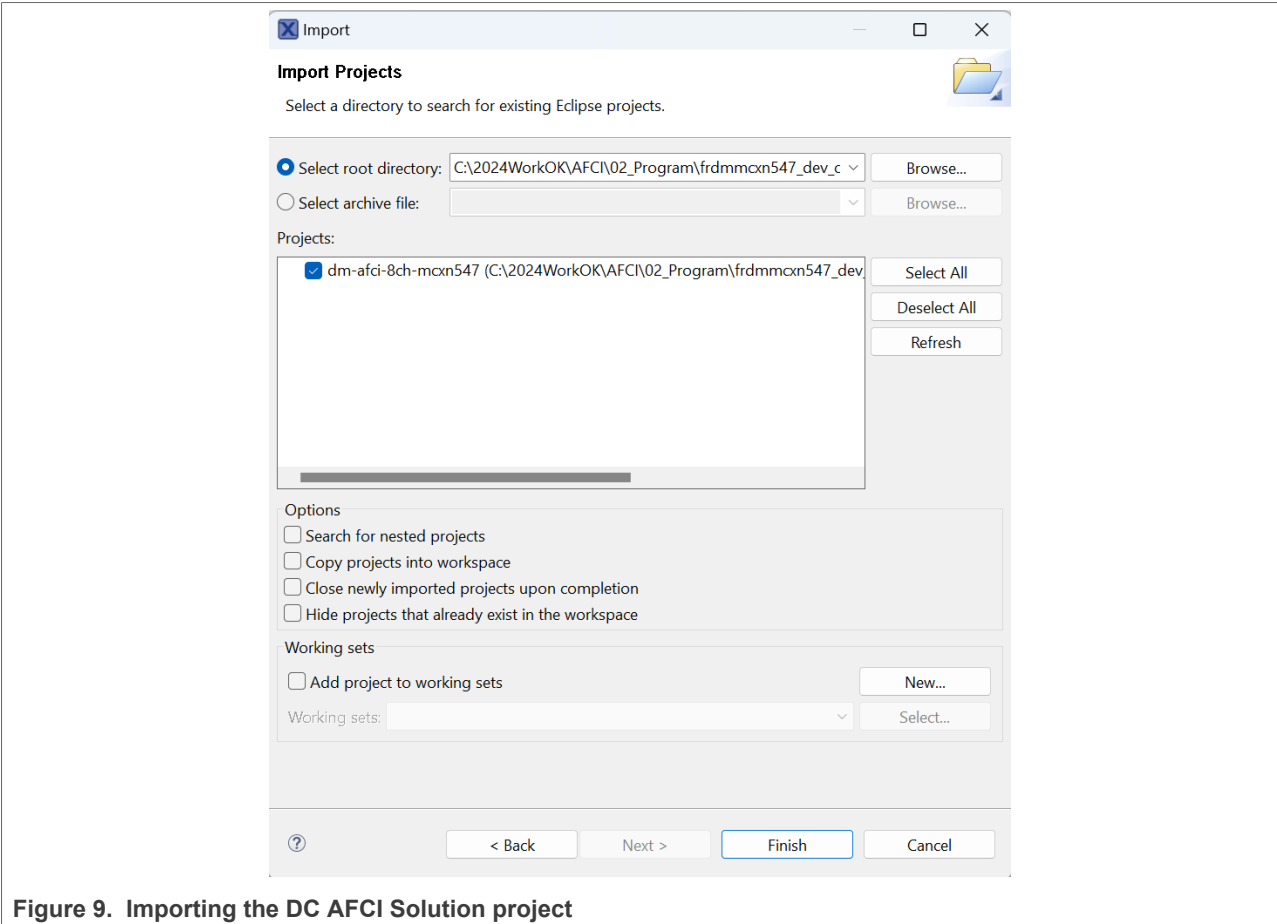


Figure 9. Importing the DC AFCI Solution project

4. Compile the project and download the code, as shown in [Figure 10](#).

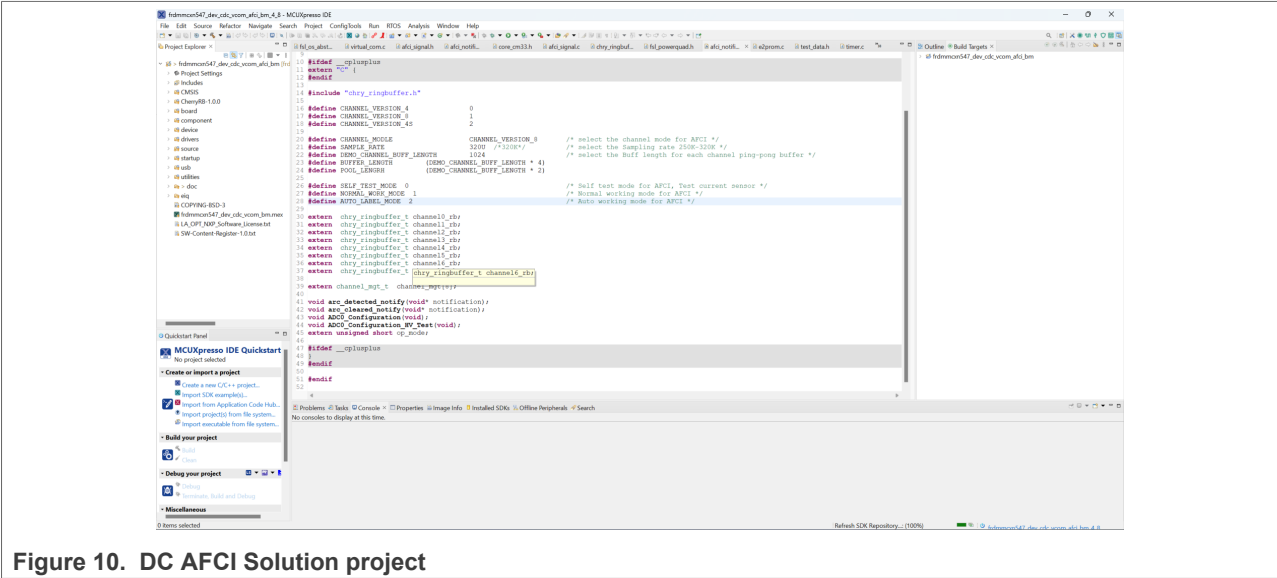


Figure 10. DC AFCI Solution project

5. Run the demo.

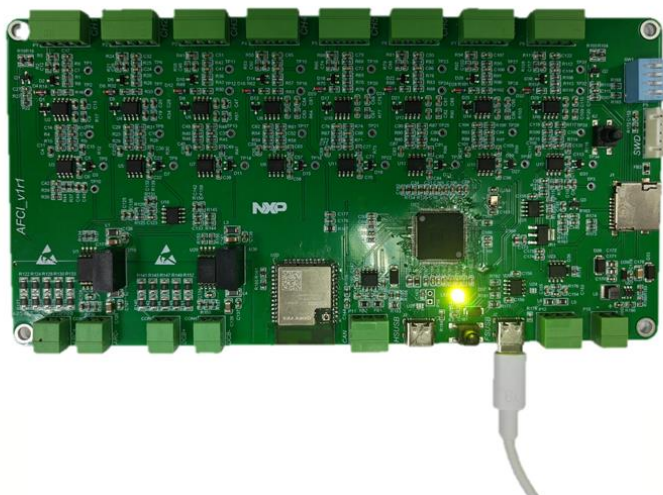


Figure 11. Board running in the Normal Working Mode

6. Open a serial COM tool and press the reset button (U36). If a sensor is connected correctly, the tool prints the number of the connected channel, as shown in [Figure 12](#), where Channel 1 is connected. The MCXN547-AFCI board supports a self-test feature to detect which channel is connected.

```
USB device CDC virtual com demo

LPADC EDMA Example
Configuring LPADC0...
ADC Full Range: 65536
Configuring LPADC EDMA...
Package Header Information:
Magic: 0xA55A
Sample Quantity: 2048
Package Index: 0
Device Quantity: 2
Header Checksum: 0x 0
Sample Checksum: 0x 0
Static library model is using...

[INFO] Initialize the PowerQuad accelerator for the library generated by the eIQ Time Series Studio.
ch0, abundant cnt:2
ch1, abundant cnt:3
ch0, abundant cnt:3
ch1, abundant cnt:4
ch0, abundant cnt:3
loop: 14598, ch: 0
Channel 1 Connected
```

Figure 12. Sensor self detection

Use the ARC generator to produce a DC ARC fault. The MCXN547-AFCI board can detect the ARC and print the result, as shown in [Figure 13](#).

It is recommended to use an AI model trained on your own system. Otherwise, the DC AFCI Solution may fail to detect ARC faults reliably. You can use the eIQ TSS to train your own ARC fault-detection model based on common machine learning or deep learning. The instructions for collecting data, training, and deploying a new model to the board are described in the eIQ TSS user manual.



Figure 13. ARC fault detected

3 Abbreviations

Table 1. Abbreviations

Abbreviation	Description
ARC	Angular Rate Channel
CAN	Controller Area Network
CT	Current Transformer
DSP	Digital Signal Processor
HV	High Voltage
IDE	Integrated Development Environment
NPU	Neural Processing Unit
SW	Software
SWD	Serial Wire Debug
TSS	Time Series Studio

4 Revision history

Table 2. Revision history

Document ID	Release date	Description
UG10439 v.1.0	15 July 2026	Initial release

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