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Model 2710 SuperMITT I3C Test Tool User Manual

Engineering Report 950001672
Rev A
Date: 2025-07-04

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Revision History

Doc Version	Date	Description
Rev A	2025-07-04	Initial Version

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1 Product Introduction

1.1 Overview

The Model 2710 SuperMITT (Multiple Interface Test Tool) is an advanced testing solution designed for validating the hardware and software of I²C (Inter-Integrated Circuit) and I3C (Improved Inter-Integrated Circuit) peripheral buses. Equipped with an onboard FPGA (Field-Programmable Gate Array) and custom firmware, the SuperMITT performs comprehensive end-to-end verification tests, ensuring the reliability and compliance of connected devices.

For users requiring additional PHY (Physical Layer) cards, these can be obtained by purchasing the Model 2712. However, the Model 2710 already includes one Model 2712 PHY card, eliminating the need for a separate purchase.

Figure 1 Model 2710 SuperMITT I3C/I²C Test Tool



1.2 Features

1. **Supports Testing for I3C and I²C Protocols**
   - The Model 2710 is designed to test both I²C (Inter-Integrated Circuit) and I3C (Improved Inter-Integrated Circuit) buses.
   - I²C Support – Ensures compatibility with traditional I²C devices, widely used in embedded systems.
   - I3C Support – Enables testing of I3C HCI implementations, which offer faster speeds, better power efficiency, and backward compatibility with I²C.
   - Allows validation of hardware and software implementations, ensuring correct functionality across different bus configurations.

2. **Configurable Voltage Levels (1.2V / 1.8V / 3.3V Logic)**
   - Supports multiple logic voltage levels to match different system requirements.
   - 1.2V- Suitable for ultra-low-power devices.
   - 1.8V- Common in mobile and battery-operated applications.
   - 3.3V- Standard for many embedded and industrial systems.
   - The ability to select voltage levels makes Model 2710 versatile for a board range of devices and test environments.
3. **Configurable Pull-Up Resistors**
   - I^2C and I3C buses require pull-up resistors to ensure proper signal integrity and reliable communication.
   - Model 2710 allows users to configure pull-up resistor values based on their specific test setup.
   - This flexibility helps in evaluating different device behaviors and optimizing bus performance under varying conditions.

2 Hardware Introduction

2.1 Packing List

Figure 2 Packing list



1x Model 2710 SuperMITT Board
(Fully assembled, configured, and tested)



1x Power Adapter
with interchangeable AC clips



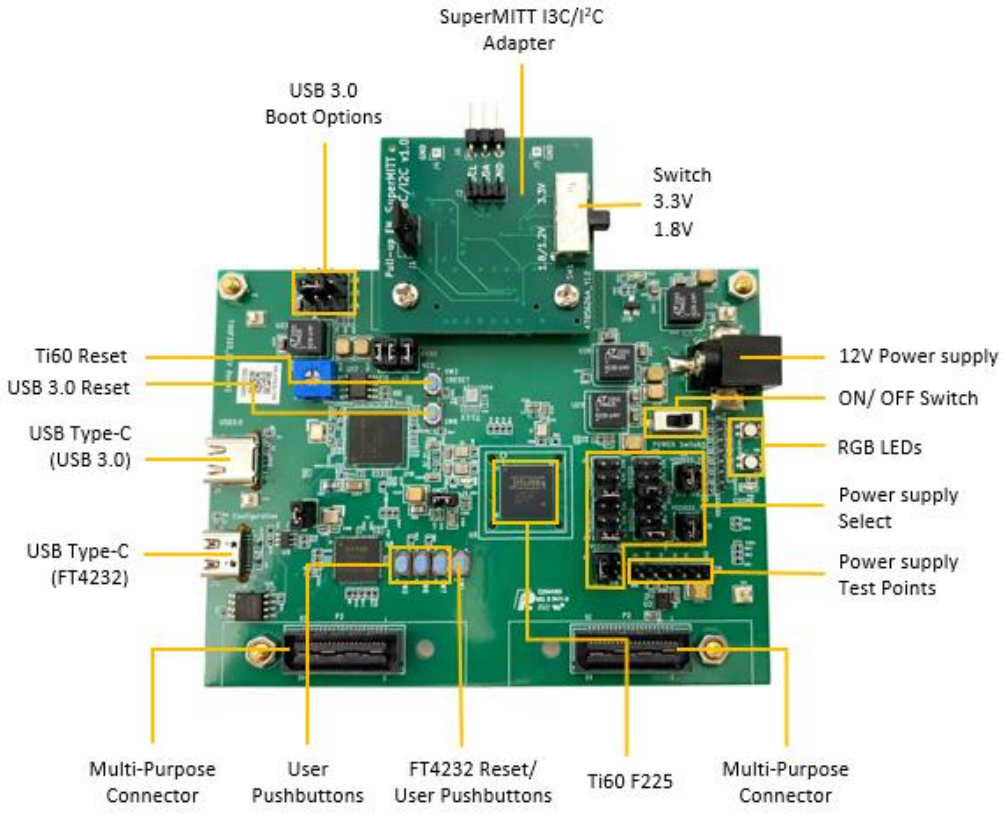
1x USB Type-C to Type-C



1x USB Type A to Type-C

2.2 Hardware Overview

Figure 3 Hardware Overview



2.3 LED and Reset Button

After turning on the board, the board LEDs light up to indicate the following board status.

LED	Light Status	Description
D22	Green on	Power good
D15	Green on	FPGA configuration done
D20	Red on	FPGA configuration error

Power On Sequence:

- **Switch SW4:** Turns on the board.
- **Power Input:** 12V DC input, which is regulated to 3.3V, 2.5V, 1.8V, 1.5V, and 1.2V for board components.
- **Power-Good LED (D22):** Illuminates when all voltages are stable, indicating the board is powered properly.

Board Reset:

- **Reset Signal (CRESET):** Used to reset the Ti60F225C4 FPGA device.

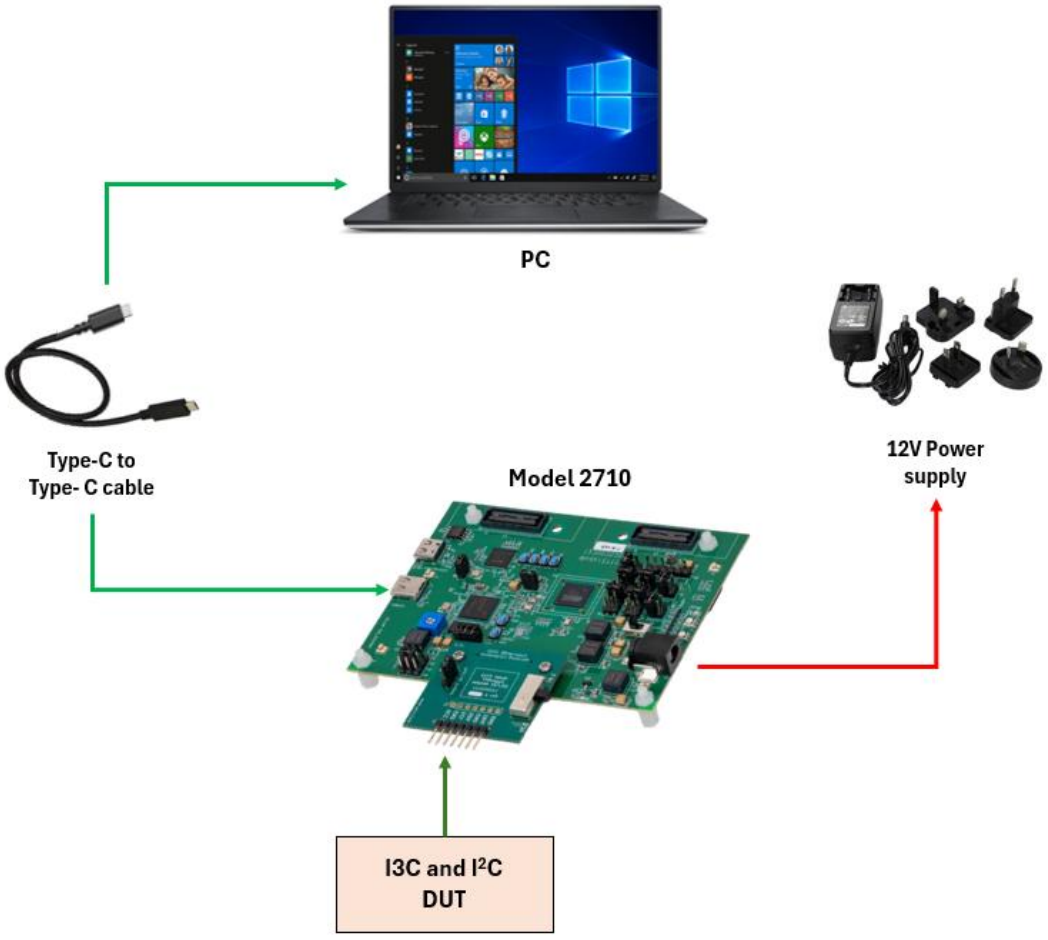
- **Manual Reset (SW3 Pushbutton):**
  - ❖ Pressing SW3 drives CRESET low.
  - ❖ Releasing SW3 drives CRESET high.
  - ❖ This high-low-high transition resets the FPGA.
- **Configuration Mode:** After reset, the device loads its configuration bitstream from flash memory.
- **CDONE LED (D15, Green LED):** Turns ON when the FPGA successfully enters user mode after configuration.

USB 3.0 Reset:

- **SW8 Pushbutton:** Resets the USB 3.0 module manually.

3 Configuration and Setup

Figure 4 User Manual Setup



1. Check what voltage VCC/SCL/SDA is from the DUT and check the following:
   - ❖ If it is 3.3V, change the switch SW1 on Model 2712 to 3.3V mode.

- ❖ If it is 1.8V, change the switch SW1 on Model 2712 to 1.8V/1.2V mode and change the jumper J8 on Model 2710 to 1.8V.
- ❖ If it is 1.2V, change the switch SW1 on the Model 2712 to 1.8V/1.2V mode and change the jumper J8 on the Model 2710 to 1.2V.

2. If external pull-ups are not in use, move the jumper J1 on the Model 2712 to “EN” and connect pins 1 and 2. This will enable a pull-up value of 680 Ohm on SDA and SCL using VCC as the source. If external pull-ups are in use, move the jumper to connect pins 2 and 3 to disable.
3. With the DUT powered off and the Model 2710 with the AC adapter plugged in and SW4 off, plug in the VCC, SCL, SDA, GND lines coming from the DUT into the matching labeled ports on the Model 2712.
   - ❖ NOTE: VCC is strictly used for pull-ups and should be the same voltage level as SCL and SDA
4. Plug in the USB cable into the J1 port labeled “USB3.0” and turn on the SW4.
   - ❖ Two green LEDs, D15 (FPGA Flashed) and D22 (Power Good), should turn on.
   - ❖ In Device Manager under “Universal Serial Bus devices”, a device labeled “SuperMITT” should also show up.
5. Follow the Microsoft HLK guidance for the next steps on running tests.

4 Command Line

1. Plug the USB cable into the Type-C connector labeled "USB3.0" and turn on the power switch. The SuperMITT takes a few seconds to enumerate.
2. Go to aka.ms/supermitt and follow the instructions to download the supporting software. Then, extract the .zip file and access the “**SuperMittCmd.exe**” file from there.
3. On the command line, run "SuperMittCmd.exe -version". A non-zero version should appear for the FX3 and FPGA.
   - SuperMITT Cmd Version: 1.6
   - Firmware Version: 1.3
   - FPGA Boot Version: 0.5
   - FPGA App Version: 1.12
4. On the command line,
   - Run “**SuperMittCmd.exe -i3c-simple-setup 0**” and the **D16** LED should illuminate, and **D17** LED should stay off.
   - Run “**SuperMittCmd.exe -i3c-simple-setup 0 -off**” and **D16** LED should turn off, and **D17** LED should stay off.
5. On the command line,
   - Run “**SuperMITTCmd.exe -adapter-info**” and the information should be:
     Adapter Info - Type: 0, Version: 0, Voltage: 1.8/1.2V Mode (or “3.3V Mode” if the switch on the adapter is set to 3.3V)
   - If the adapter is not well connected / resistors are missing from the adapter etc.,
     Then the Type and Version will be greater than 0 and the Voltage will be 3.3V Mode

4.1 Firmware Update

- On the command line:
  Run "**SuperMittCmd.exe -update"** and the information should be:
  [Note: Do not power off the device until all the following messages have been displayed]

  Payload FX3 FW Ver: 1.3
  Payload FPGA Boot Ver: 0.5
  Payload FPGA App Ver: 1.12
  SuperMittUpdateCommand: Updating FPGA EEPROM.
  SuperMittUpdateCommand: Flashing FPGA boot + app image.
  SuperMittUpdateCommand: Erasing FPGA EEPROM.
  SuperMittUpdateCommand: Successfully erased FPGA EEPROM.
  SuperMittUpdateCommand: Beginning FPGA EEPROM write. May take some time.
  SuperMittUpdateCommand: Finished FPGA EEPROM write.
  SuperMittUpdateCommand: Beginning FPGA EEPROM read. May take some time.
  SuperMittUpdateCommand: Finished FPGA EEPROM read. Will verify contents.
  SuperMittUpdateCommand: FPGA EEPROM successfully flashed. Rebooting FPGA.
  SuperMittUpdateCommand: FPGA rebooted.
  SuperMittUpdateCommand: Beginning FX3 EEPROM write. May take some time.
  SuperMittUpdateCommand: Finished FX3 EEPROM Write.
  SuperMittUpdateCommand: Beginning FX3 EEPROM read. May take some time.
  SuperMittUpdateCommand: Finished FX3 EEPROM read. Will verify contents.
  SuperMittUpdateCommand: FX3 EEPROM successfully flashed. Rebooting FX3.
  SuperMittUpdateCommand: FX3 rebooted.
  SuperMittUpdateCommand: FPGA and FX3 successfully updated!
- In the meantime, ensure that the power-up LEDs, **D17** and **D18**, turn ON for a few seconds during the step: "***SuperMittUpdateCommand: Beginning FX3 EEPROM read. May take some time***".
- If the above step fails, the boot fail LED (D20) will turn red.