DT100104

ATECC608A Trust Development Board User's Guide

Introduction

The ATECC608A Trust Development Board is an add-on board for the CryptoAuth Trust Platform and other Microchip development platforms that contain a MikroElektronika mikroBUS™ header. The board connects to any board that has a host mikroBUS connection. This board provides an alternative to the sample units that require a socket board to perform initial development and testing.

The ATECC608A Trust Development Board contains the ATECC608A-TNGTLS (Trust&GO), ATECC608A-TFLXTLS (TrustFLEX) and ATECC608A-MAHDA (TrustCUSTOM) secure elements. This provides a user the ability to develop solutions with any of these devices based on the requirements of the application. The user's guide provides a physical overview of the connections and switch settings implemented on the board.

Figure 1. Front View

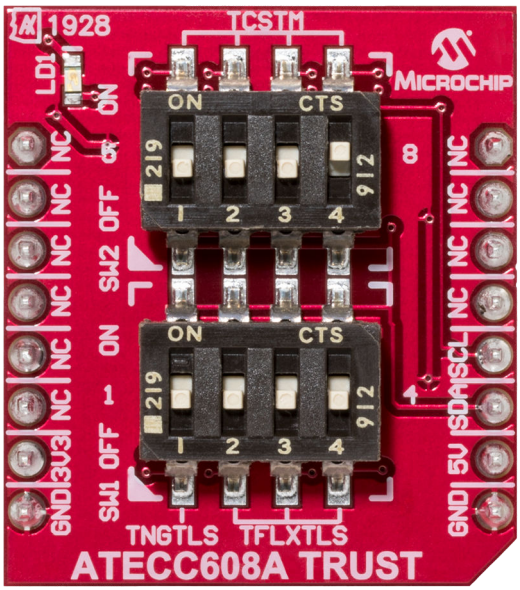
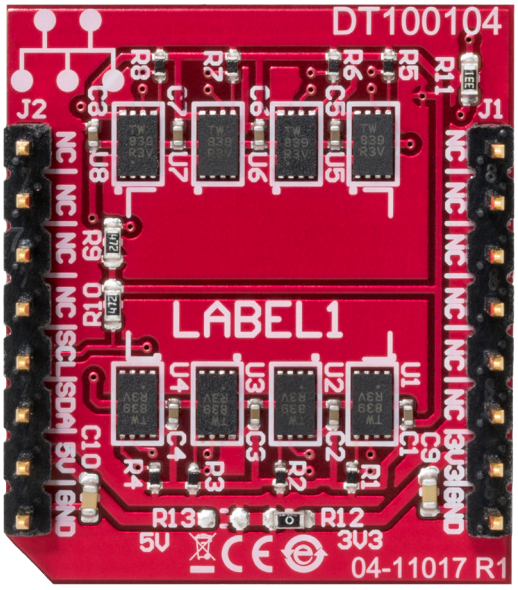


Figure 2. Back View



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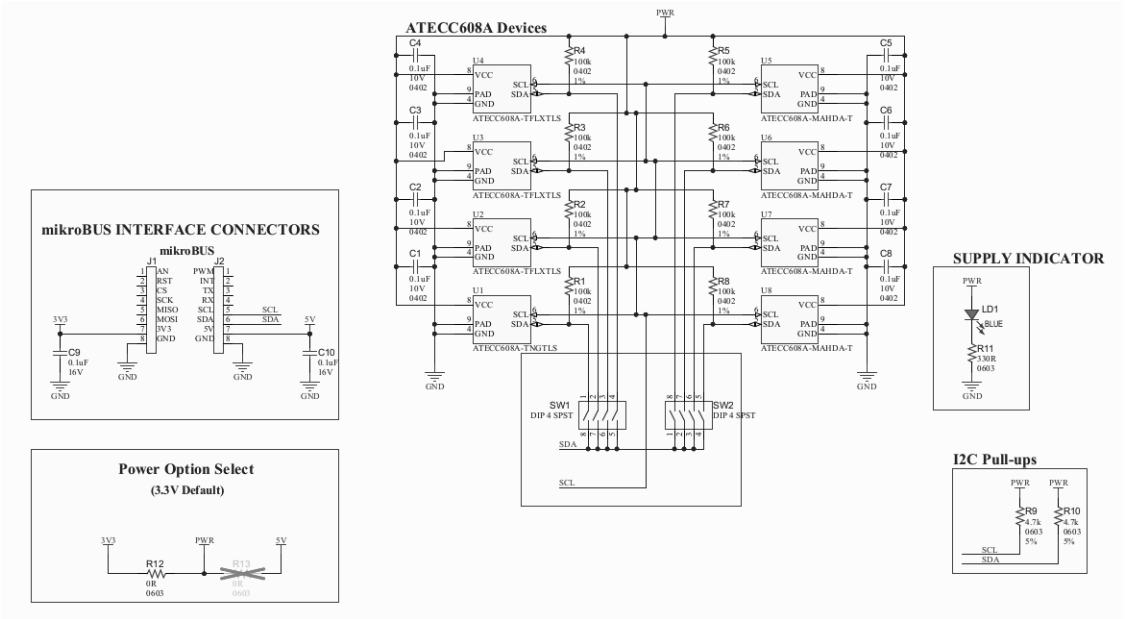
1. Hardware Description

1.1 Schematic and Key Features

- One ATECC608A-TNGTLS Trust&GO Device (U1)
- Three ATECC608A-TFLXTLS Prototype TrustFLEX Devices (U2, U3, U4)
- Four ATECC608A-MAHDA TrustCUSTOM Devices (U5, U6, U7, U8)
- Two 4-Position SPST DIP Switches for Device Selection (SW1, SW2)
- One mikroBUS Connector (J1, J2)
- On-Board 4.7k I^2C Pull-Up Resistors (R9, R10)
- On-Board LED Power Indicator (LD1)
- Zero-Ohm Resistor Jumpers to Select a 3.3V or 5V Power (3.3V Enabled by Default via R12)
  Note: To enable a 5V power, remove R12 and solder a zero-ohm resistor into R11.

Figure 1-1. ATECC608A Trust Development Board Schematic



1.2 Device Selection

Devices Hardware Selection

Each secure element has a switch connection that enables the user to select a given device. Slide the DIP switch to the ON state to enable the device selection. Selecting the device connects the corresponding SDA line through the DIP switch. The SCL signals of all eight devices are connected together. A large value pull-up resistor on each SDA line of each device keeps the device in a low-current state when not selected. Note that the switch number shown on the top of the board (***not the number on the switch***) corresponds to the device identifier U# on the back of the board.

Figure 1-2. Device Selection

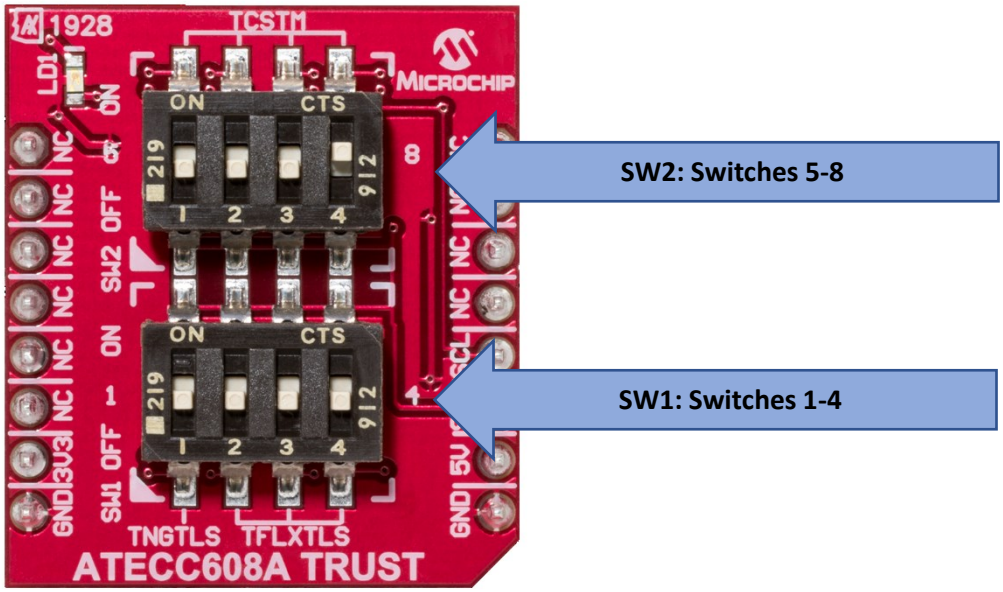


Table 1-1. Device Selection Switches

Switch #	DIP Switch	Secure Element	Trust Element Type
SW1	1	ATECC608A-TNGTLS	Trust&GO
	2, 3, 4	ATECC608A-TFLXTLS	TrustFLEX
SW2	5, 6, 7, 8	ATECC608A-MAHDA	TrustCUSTOM

Devices Software Selection

Once a specific device is selected, a specific I^2C address must be used to address the given device type. While each device is initially programmed with a default I^2C address, it is possible to overwrite this address. See the specific device data sheets for more information.

Table 1-2. Default I^2C Addresses

Device	Default 7-bit I^2C Address	8-bit Programmed I^2C Address Value(1)
ATECC608A-TNGTLS	0x35	0x6A
ATECC608A-TFLXTLS	0x36	0x6C
ATECC608A-MAHDA	0x60	0xC0

Note:

1. This is the I2C_Address byte value programmed into the ATECC608A device.

Note that multiple devices can be enabled provided they have different I^2C addresses. If multiple devices with the same address are selected, a failure occurs due to a conflict on the I^2C bus.

1.3 Hardware Documentation

Additional documentation for the kit can be found on the Microchip website for the ATECC608A Trust (DT100104) development kit.

This includes:

1. Board design documentation including schematics/3D views.
2. Gerber files.
3. ATECC608A Trust Development Board User's Guide.

2. Connecting the Board

The form factor of the ATECC608A Trust Development Board was chosen because Microchip has heavily adopted the use of the mikroBUS connector on host boards. Many of Microchip's development platforms will support one or more mikroBus interfaces. These include:

- Microchip Explorer 16/32 Development Board
- MPLAB® Xpress Evaluation Board
- Automotive Networking Development Board
- PIC® Curiosity Boards
- PIC Curiosity Nano Boards
- AVR® Curiosity Nano Boards

2.1 CryptoAuth Trust Platform Connections

The ATECC608A Trust Development Board has an I^2C connection through the mikroBUS header that enables it to connect to the mikroBUS host header present on the Trust Platform, or any of the PIC/AVR/SAM MCU host development boards that have a mikroBUS header.

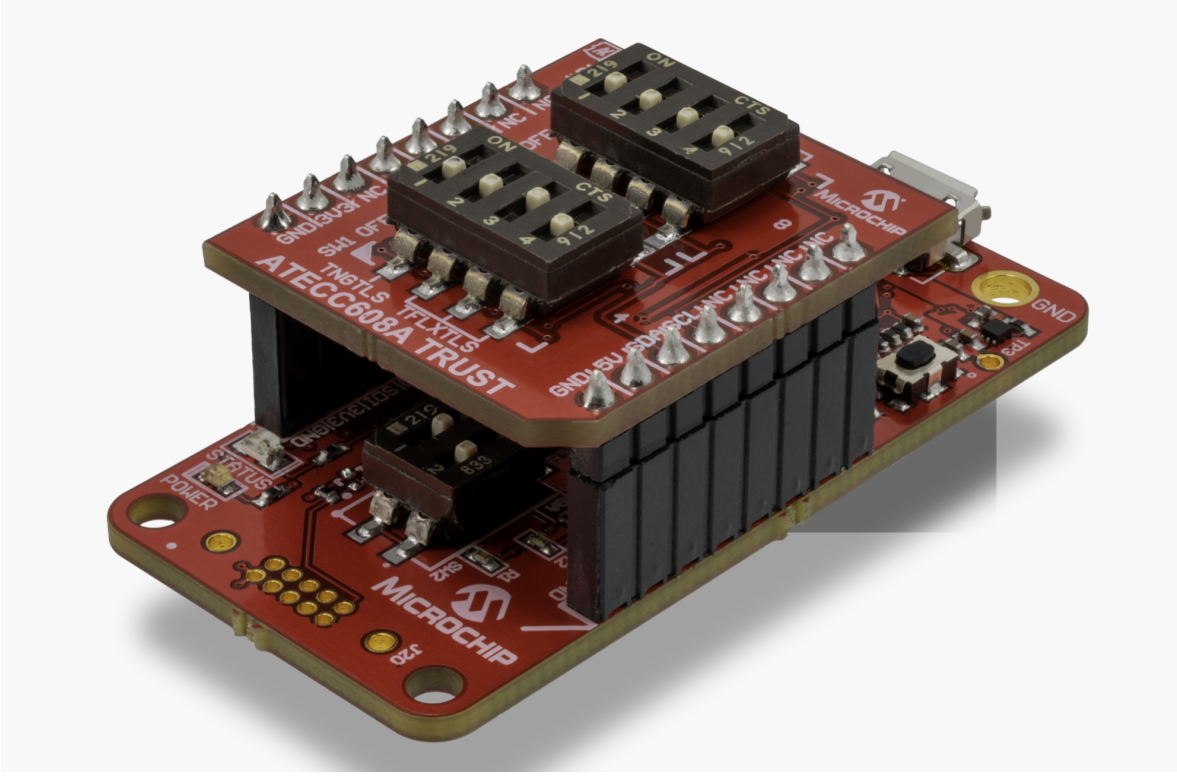
Connecting the ATECC608A Trust Development Board to the CryptoAuth Trust Platform

1. Set the switches on the CryptoAuth Trust Platform to enable the mikroBUS header and disable the on-board devices. This setting is highlighted in Bold and Italic below:

Switch Settings		What is Enabled	
SW2_1	**SW2_2**	**mikroBUS™ Header**	**On-Board Devices**
ON	ON	Yes	Yes
OFF	ON	No	Yes
ON	***OFF***	***Yes***	***No***
OFF	OFF	No	No

2. Connect the two boards as shown in Figure 2-1.

Figure 2-1. ATECC608A Trust Connected to a CryptoAuth Trust Platform Development Board



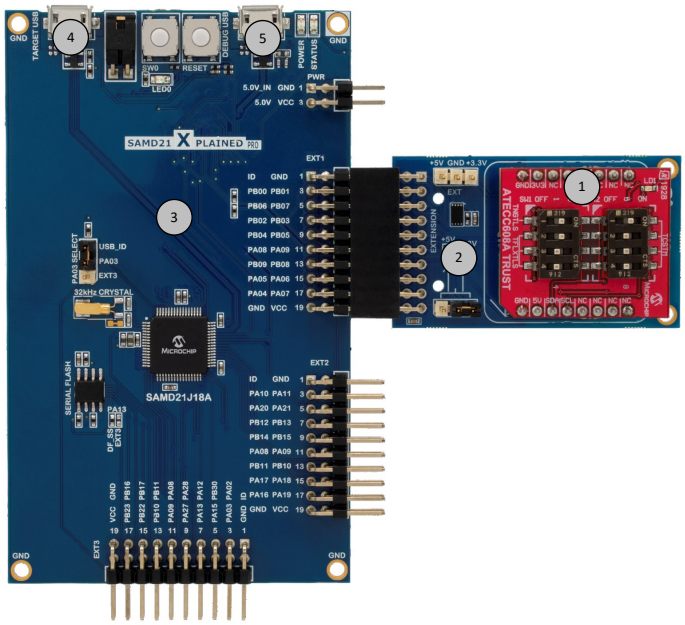
Attention: The angled notch on the ATECC608A Trust Development Board must be aligned with the angled line on the silk screen near the mikroBUS connector.

3. Select the device that you want to connect to the host via the DIP switches shown on the ATECC608A Trust Development Board. Switch 3 is on and all others are off. This selects an ATECC608A-TFLXTLS device.
4. Connect a USB cable between the CryptoAuth Trust Platform on the host system where the software is developed.
5. Invoke the software tools for the given application or the use case that is being developed.

2.2 Xplained Pro Connections

Some Microchip development boards support only the Xplained Pro extension headers. Through use of an adapter board, the ATECC608A Trust Development Board can still be used. Figure 2-2 shows the full assembly of the ATECC608A Trust Development Board, the ATMBUSADAPTER-XPRO and an ATSAMD21-XPRO Development Board.

Figure 2-2. Connections to an Xplained Pro Development Platform



1. ATECC608A Trust Development Board
2. ATMBUSADAPTER-XPRO
3. ATSAMD21-XPRO Development Board
4. TARGET USB Port
5. DEBUG USB Port

How to Connect the ATECC608A Trust Development Board to an Xplained Pro Host Board

1. Connect the ATMBUSADAPTER to the ATECC608A Trust Development Board as shown in Figure 2-2.
2. Connect the combined ATMBUSADAPTER and ATECC608A Trust Development Board to one of the XPRO extension connectors on the host board. EXT1 has been used in Figure 2-2.
3. Set the switch or switches on the ATECC608A Trust Development Board to enable the device you want to connect to.
   Note: The switch settings, as shown, enable one each of the ATECC608A-TNGTLS, ATECC608A-TFLXTLS and ATECC608A-MAHDA TrustCUSTOM devices. This is legal because all the I^2C addresses for the selected devices are unique. In general, only one device will be selected.
4. Connect the USB cables to the TARGET USB Port and the DEBUG USB Port and the host system.
5. Invoke the appropriate software development tools for the application.

3. Document Revision History

Revision A (September 2019)

- Initial release of this document

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