Click here to ask an associate for production status of specific part numbers.

Evaluates: MAX30210

MAX30210 Evaluation Kit

General Description

The MAX30210 evaluation kit (EV kit) provides a single platform to evaluate the MAX30210, a ±0.1°C accurate temperature sensor. The EV kit consists of two boards which are connected through headers, a MAX32630FTHR microcontroller board, and the MAX30210 interface board. It also included with the EV kit is a flex PCB which holds the MAX30210 IC. The MAX32630FTHR contains the firmware necessary to use the PC GUI program and provides power to the MAX30210 interface board. The MAX30210 interface board ships with jumpers preinstalled to allow quick evaluation of the MAX30210.

Features

- Flexible PCB Design
  - Low Thermal Mass for Fast Response Time
  - Sense Temperature away from Extra Circuitry
- Easy to Reach Test Points
- Fully Assembled and Tested
- Windows® 7, 8, and 10-Compatible Software

MAX30210 EV Kit Files

FILE	DESCRIPTION
MAX30210EVKitTool.exe	PC GUI Program

Quick Start

Required Equipment

Note: In the following sections, software-related items are identified by bolding. Text in **bold** refers to items directly from the EV kit software. Text in **bold and underlined** refers to items from the Windows operating system.

- MAX30210_INTERFACE_EVKIT_A
- MAX30210_SENSOR_FLEX_EVKIT_A
- MAX32630FTHR
- Micro-USB cable
- Windows PC with USB port

Note: MAX30210_INTERFACE_EVKIT_A and MAX30210_SENSOR_FLEX_EVKIT_A design files are attached at the end of this document.

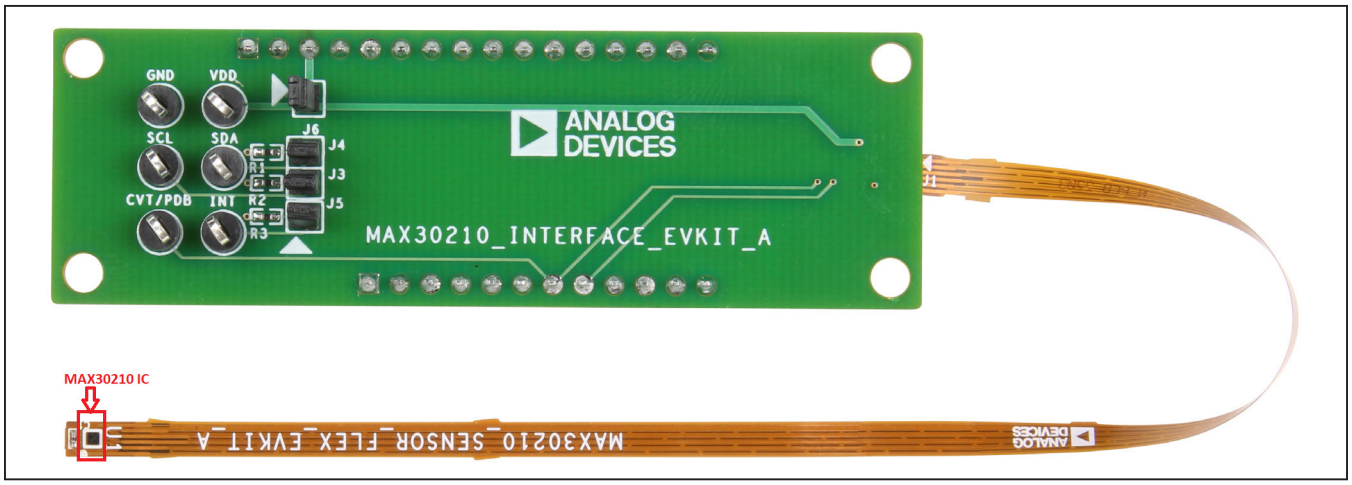
Procedure

The EV kit is tested and shipped in three pieces. Follow the steps below to verify board operation:

1) Plug the MAX32630FTHR into the MAX30210_INTERFACE_EVKIT_A.
2) Connect the MAX30210_SENSOR_FLEX_EVKIT_A to J9 on the interface board, ensuring the contact pads are on the bottom.

***Ordering Information* appears at end of data sheet.**

MAX30210 EV Kit Photo



Windows is a registered trademark and registered service mark of Microsoft Corporation.

319-100941; Rev 1; 4/24

3) Set the EV kit hardware on a non-conductive surface to ensure nothing on the PCBs short together.
4) Connect the EV kit hardware to a PC with the provided USB cable. Attach the micro-USB end to the MAX32630FTHR and the other end to the PC. LED D1 on the MAX32630FTHR begins blinking blue.
5) Microsoft Windows automatically begins installing the necessary device driver. Once the driver installation is complete, a Windows message appears near the system icon menu, indicating the hardware is ready to use. Do not attempt to run the GUI prior to this message. To do so, close the application and restart it once the driver installation is complete. On some versions of Windows, administrator privileges are required to install the USB device.
6) Once the device drivers are installed, download the EV kit software from **www.analog.com/evkit-software** (MAX30210EVKitSoftwareInstall.ZIP) and extract it to a temporary folder.
7) Open the extracted ZIP folder and double-click the .EXE file to run the installer. If a message box stating 'The publisher could not be verified. Are you sure you want to run this software?' appears, select **Yes**.
8) When the installer GUI appears, click **Next**. Select the installation paths and if a shortcut should be created on the desktop. When prompted, press **Install**. Once complete, click **Close**.
9) If a shortcut is created, double-click on the created shortcut to start the GUI. Alternatively, go to **Start** | **All Programs**. Find the MAX30210EVKitTool folder and click on the MAX30210EVKitTool.EXE file inside the folder.
10) When the GUI appears, the text in the right field of the bottom status bar displays **Connected**. If the GUI displays **Not Connected**, ensure the flex PCB is properly connected and power-cycle the MAX30210 EV kit.

Detailed Description of Software

Software Startup

If the EV kit is connected when the software is opened, the software first initializes the hardware to communicate. The software then reads the device registers and updates all the associated control fields displayed on the GUI.

If the EV kit is not connected on start-up, the GUI starts and displays no devices in the **Devices** section of the GUI and no temperature reading in the **Selected Device** section. The status bar at the bottom of the GUI states **Not Connected**.

Once an EV kit is connected, the GUI automatically sets the device registers and begins taking temperature measurements.

ToolStrip Menu Bar

The **ToolStrip** menu bar (Figure 1) is located at the top of the GUI window. This bar comprises the **File**, **Device**, **Logging**, and **Help** menus, the functions of which are detailed in the following sections.

File Menu

The **File** menu contains the option to exit the GUI program.

Device Menu

The **Device** menu connects or disconnects an EV kit to the GUI. If a board is disconnected while the GUI is open, the GUI displays **Hardware Not Connected** in the lower right corner. If the device is then plugged back in, navigate to the **Device** menu and select **Connect**. If successful, the bottom right corner of the GUI reads **Device Connected**.

Figure 1. ToolStrip Menu Bar

Logging Menu

The **Logging** menu provides a way to export each data sample that is being measured by the device. The first logging option is **File Logging**. Selecting either log option opens a prompt asking to select a device to log data from. Next a prompt appears to allow to choose a name for the comma-separated value (CSV) log file, as well as the location to save the generated file. Figure 2 and Figure 3 show the GUI when creating a log file. The GUI disables file logging after one monitoring session and a new file must be generated through the **Logging** menu to log another dataset.

The second logging option is **MicroSD Logging**. MicroSD logging operates the EV kit without a connection to a host PC or power supply. First, insert a microSD card into the connector on the underside of the MAX32630. After selecting the logging interval and writing the selection to the microSD card as shown in Figure 4, connect a 3.7V lithium-ion battery with a JST PH connector to the MAX32630FTHR and then disconnect the board from the host PC. Refer to the MAX32630FTHR documentation for details on connecting a Li+ battery. Press **SW2** to start saving measurements to the SD card. Pressing SW2 again stops measurements. To transfer the logged data from the MicroSD card to a file on a PC, reconnect the MAX30210 EV Kit to the PC and select microSD card logging from the **Logging** menu. Select the 'Save to File' option and a prompt appears to name the log file, see Figure 3. For subsequent logging sessions, press 'Clear Log' on the 'Setup MicroSD Logging' screen to prevent multiple data sets being recorded to the same log file.

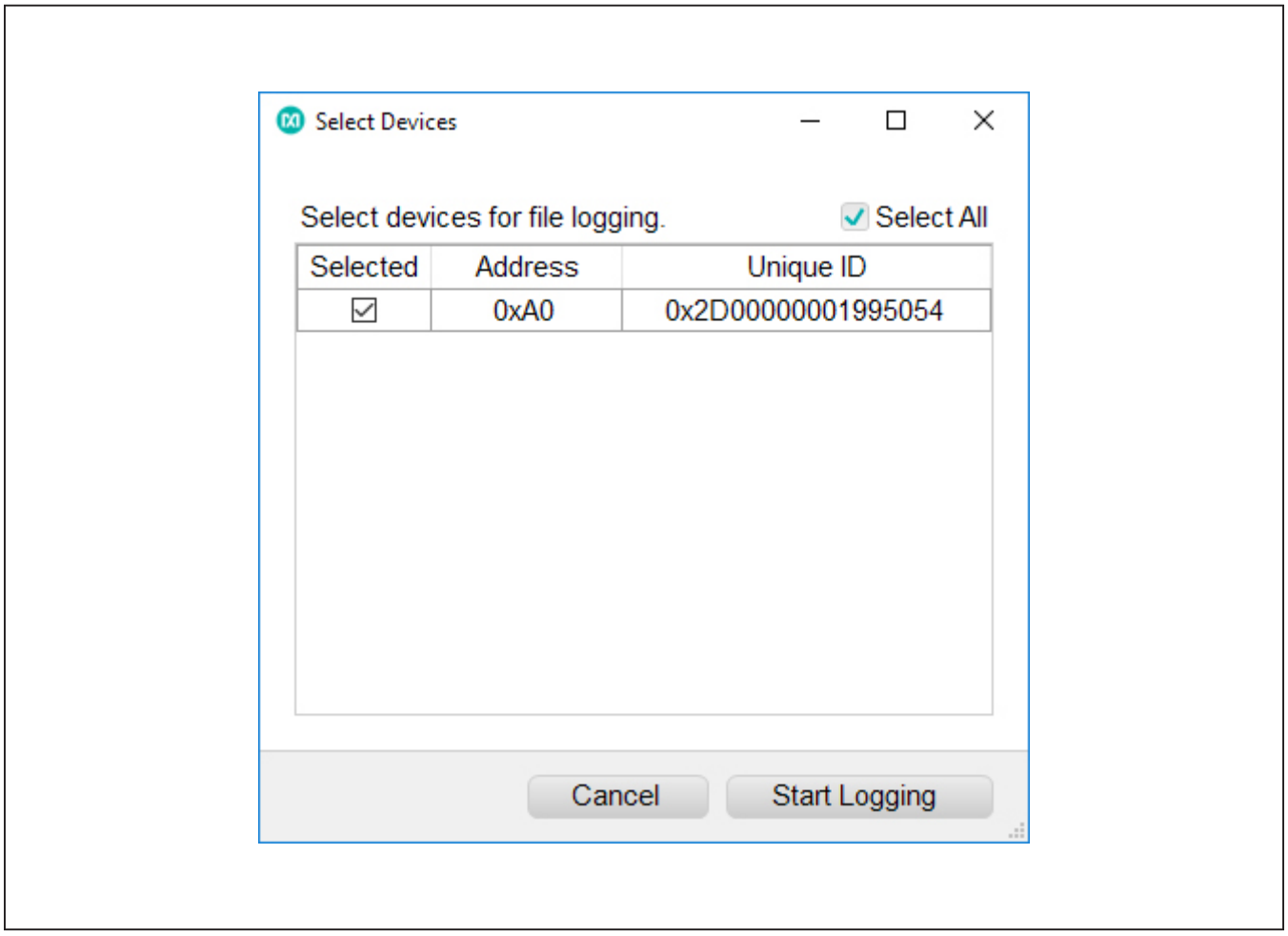


Figure 2: Device Select Screen for Logging

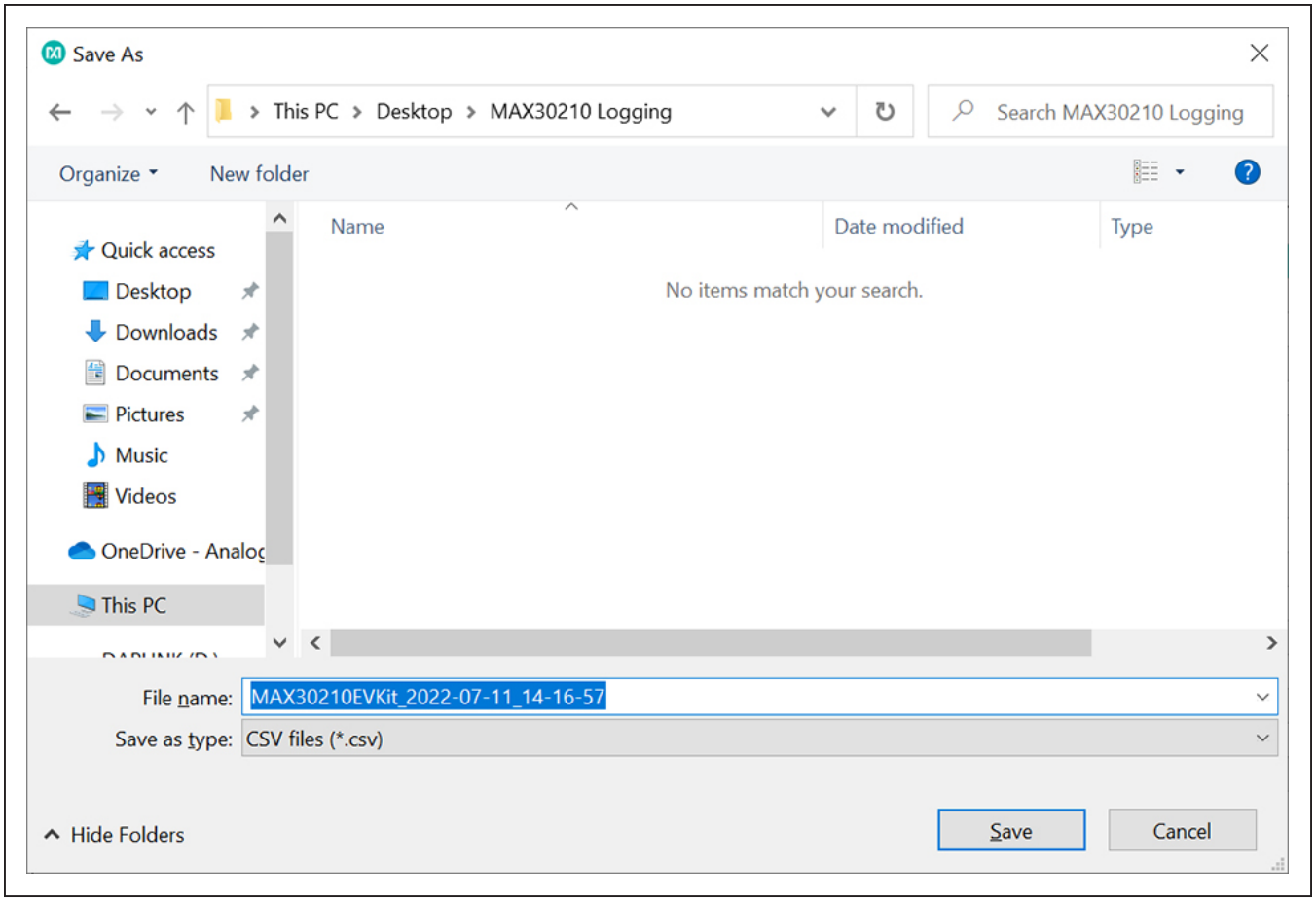


Figure 3: File Naming Screen for Logging

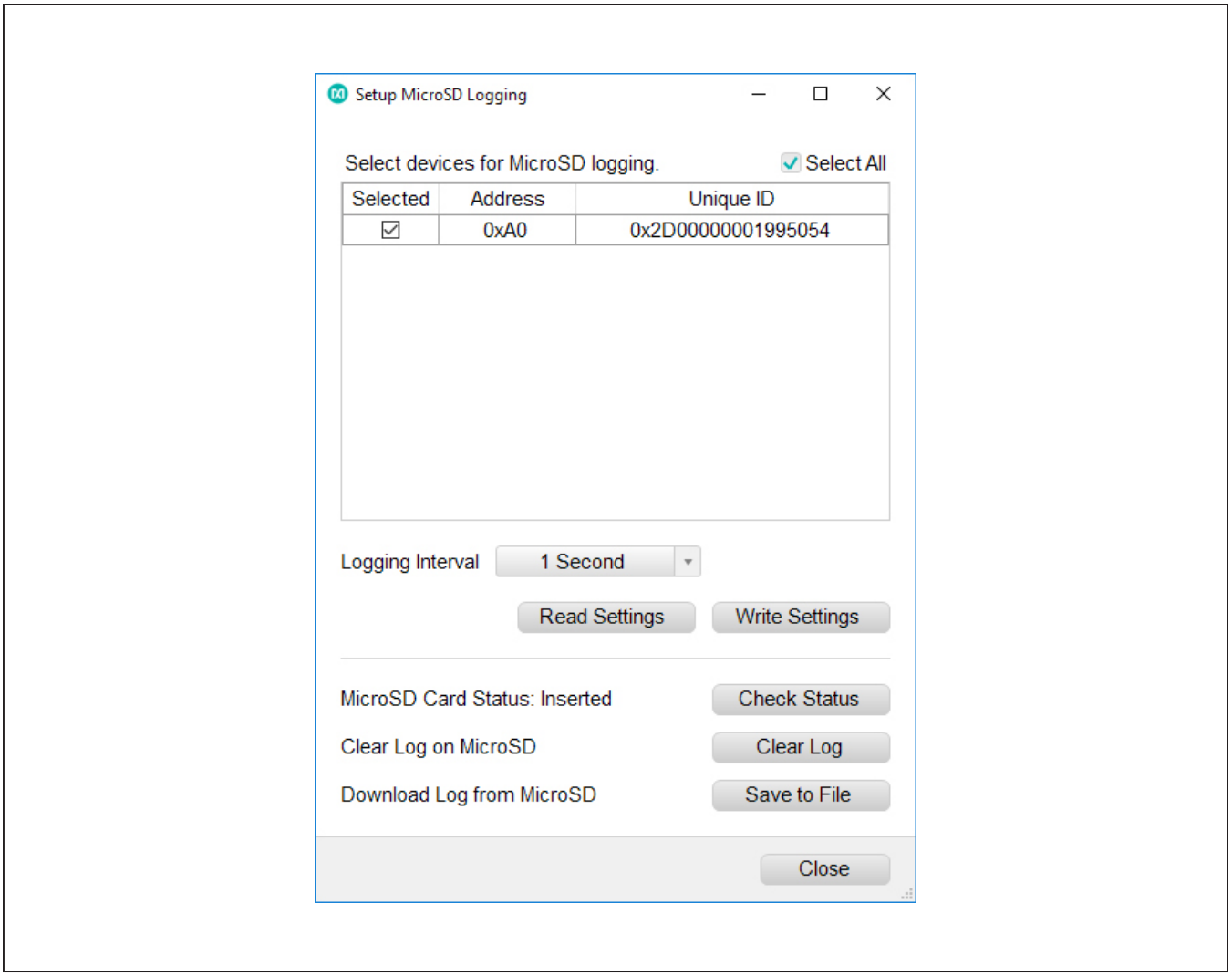


Figure 4: MicroSD Logging Prompt

Help Menu

The **Help** menu contains information to aid with any problems in the use of the GUI. The **About** option displays the GUI splash screen indicating the GUI version being used.

Tab Control

The main interface structure of the GUI consists of a tab control, where each tab controls various blocks of the device. A Change in these interactive controls triggers a write operation to the MAX30210 to update the contents of the registers. These controls are refreshed when reading from the device. The **Register Map** tab allows the user to read and write to individual registers.

General Tab

The **General** tab (Figure 5) displays a general overview of the MAX30210. The tab provides a list of devices connected, temperature data for a selected device, as well as controls for select registers.

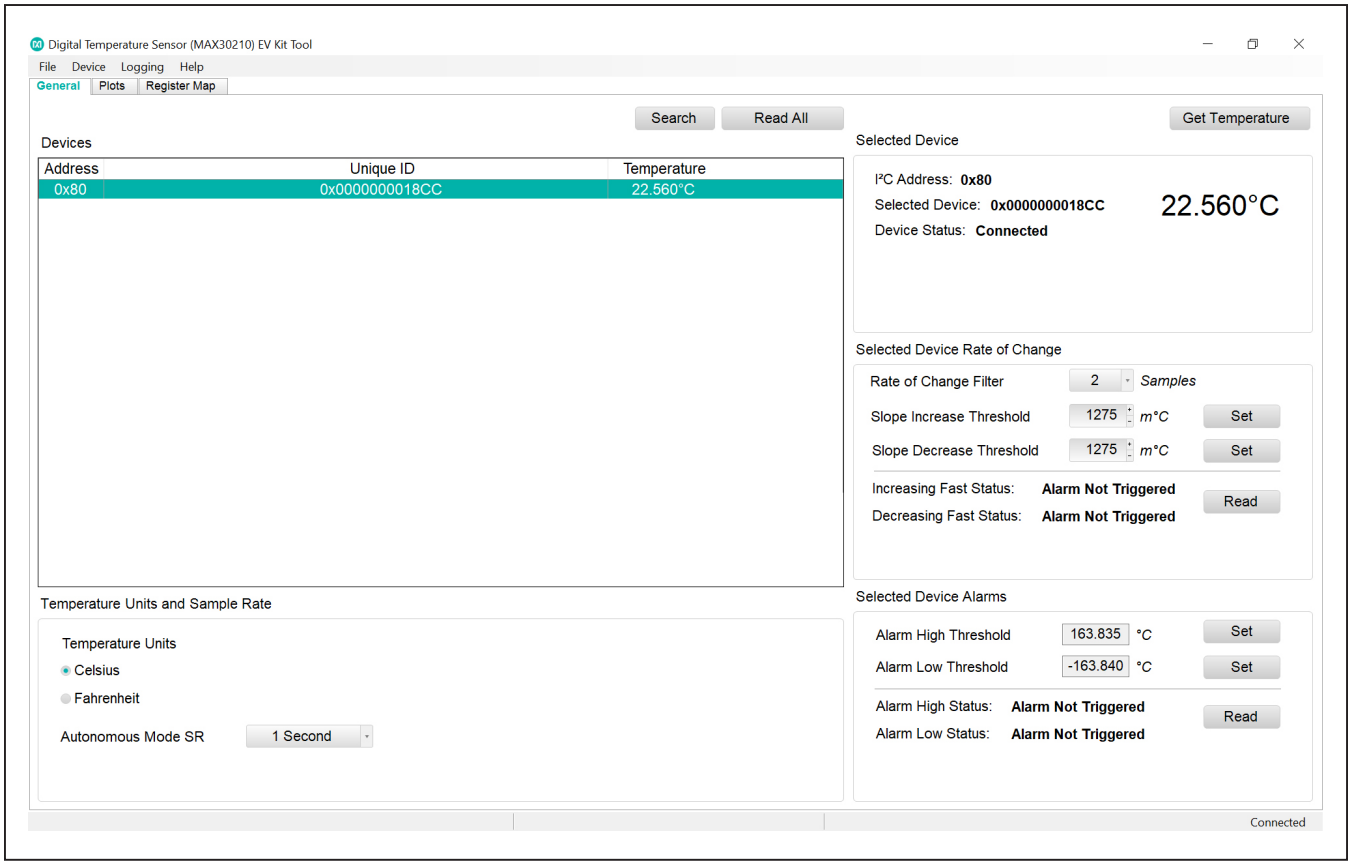


Figure 5: General Tab

Plots Tab

The **Plots** tab (Figure 6) provides a visual output of the MAX30210 temperature readings. From this tab, it is possible to select a duration, plot the data for the selected device, and save the plotted data to a log file. Plot duration can be selected in the **Plot Time** and plotting begins when the **Start** button is clicked. Plotted data can be saved to a CSV file by selecting **Save Plot Data** once the plot time duration has surpassed and plotting has stopped.

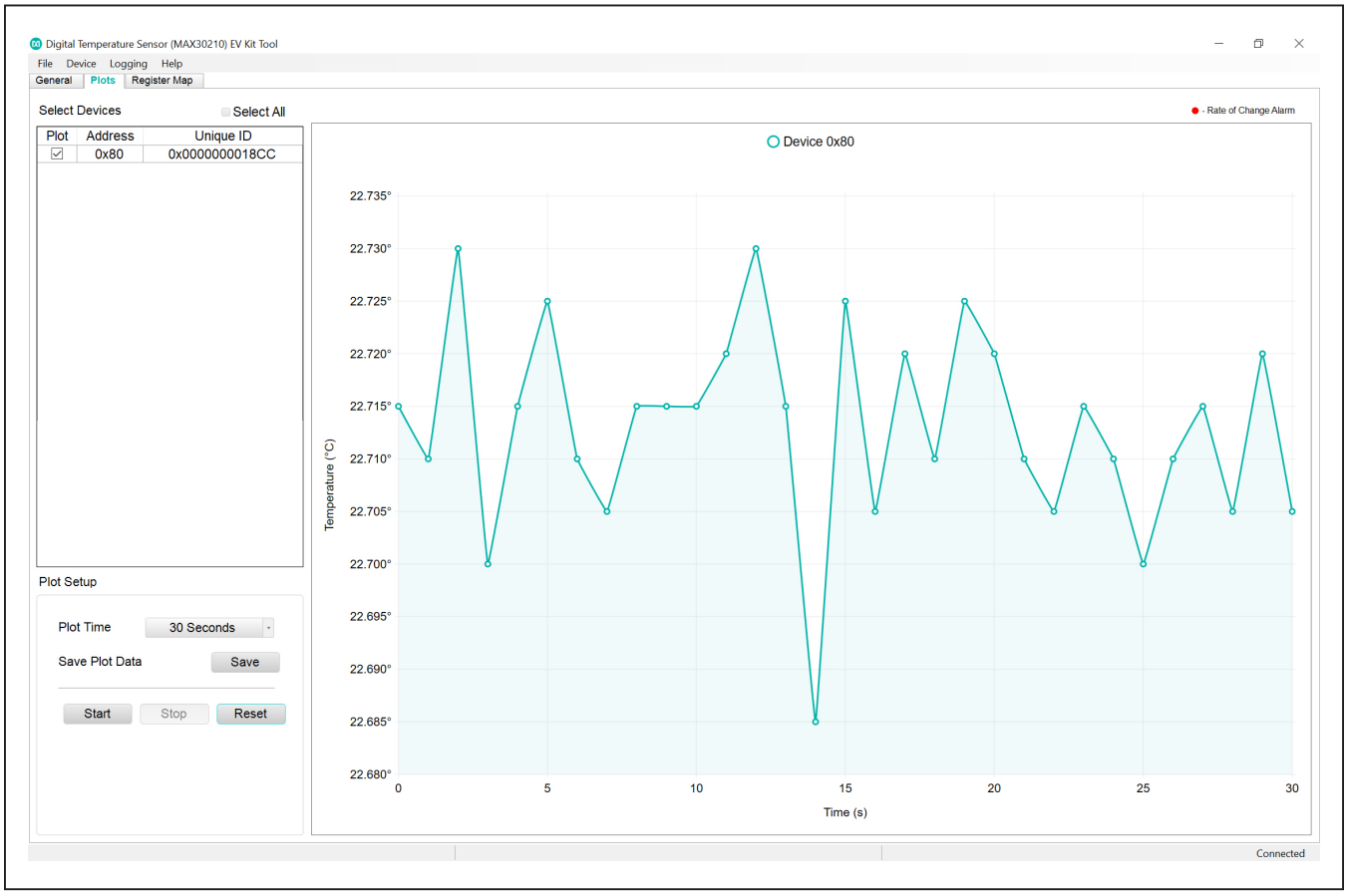


Figure 6: Plots Tab

Register Map Tab

The **Register Map** tab (Figure 7) provides more direct access to the internal registers of the MAX30210. From this tab, read the contents of individual registers and manually enter the desired bit settings using a write operation. For the register address selected in the table on the left, the bit values are displayed at the bottom of the tab and visualized as bold or non-bold bit names. When a bit is bold, its value is 1. Otherwise, the bit is 0. Full descriptions of each bit are available in the table on the right for quick reference. Pressing **Read** reads the selected register highlighted in teal. Pressing **Read All** reads all registers and updates their values in the **Register** tab. To write to a register, set the desired bit values by clicking on the bit names to make bold or non-bold and then press **Write**.

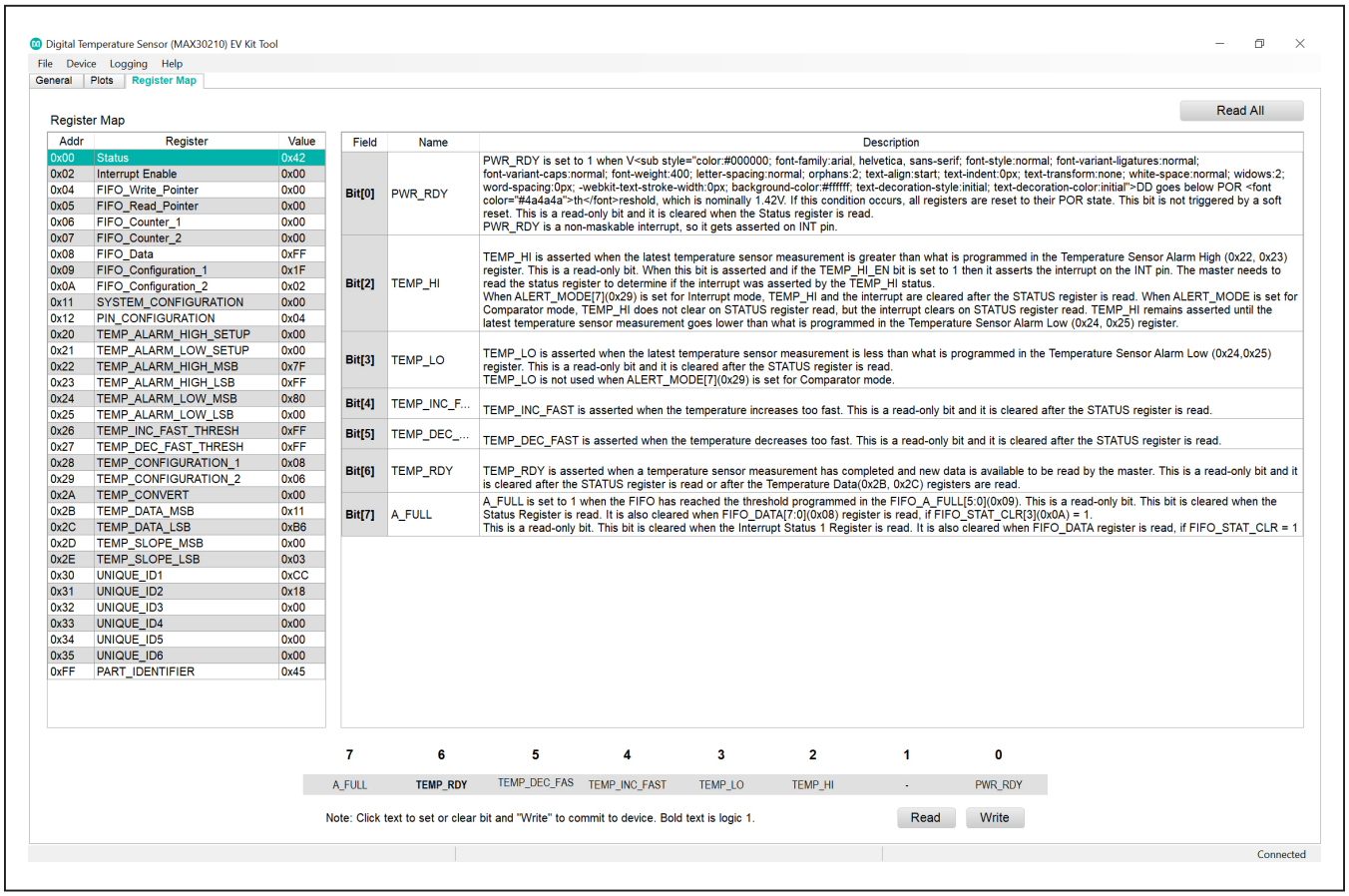


Figure 7: Register Map Tab

Detailed Description of Hardware

The MAX30210 EV kit provides a single platform to evaluate the functionality and features of the MAX30210. A list of all jumpers and their respective functions is available in Table 1.

Table 1. Description of Jumpers

JUMPER	DESCRIPTION
J3	Connect SCL to 4.7kΩ pullup to VDD
J4	Connect SDA to 4.7kΩ pullup to VDD
J5	Connect INTB to 4.7kΩ pullup to VDD
J6	Connect VDD to MAX32630FTHR 1.8V

Component Suppliers

SUPPLIER	WEBSITE
Analog Devices	www.analog.com
Keystone	www.keyelco.com
Molex	www.molex.com
Murata	www.murata.com
Panasonic	www.industrial.panasonic.com
Sullins	www.sullinscorp.com

Note: *Indicates using the MAX30210 when contacting these component suppliers.*

The EV kit utilizes the MAX32630FTHR Cortex-M4F Microcontroller for wearables to interface with the GUI and optionally provide power to the MAX30210. The MAX32630FTHR operates either from a host PC or directly from a Li+ battery. If an SD card is present in the MAX32630FTHR, pressing SW2 on the MAX32630FTHR initiates measurements and saves log files to the SD card. Logging is stopped by pressing SW2 a second time.

Powering the EV Kit

The MAX30210 EV kit is powered directly from the MAX32630FTHR through either a lithium-ion battery or a USB to Micro-USB cable. J5 must be connected to the 1.8V option in order to supply power from the MAX32630FTHR. J7 and J8 must each have a shunt connected to connect the serial data (SDA) and serial clock (SCL) lines from the MAX32630FTHR to the MAX30210 IC.

Ordering Information

PART	TYPE
MAX30210EVKIT#	EV Kit

#Denotes RoHS compliance.

MAX30210 EV Kit Bill of Materials

MAX30210 EV Kit Sensor Flex Bill of Materials

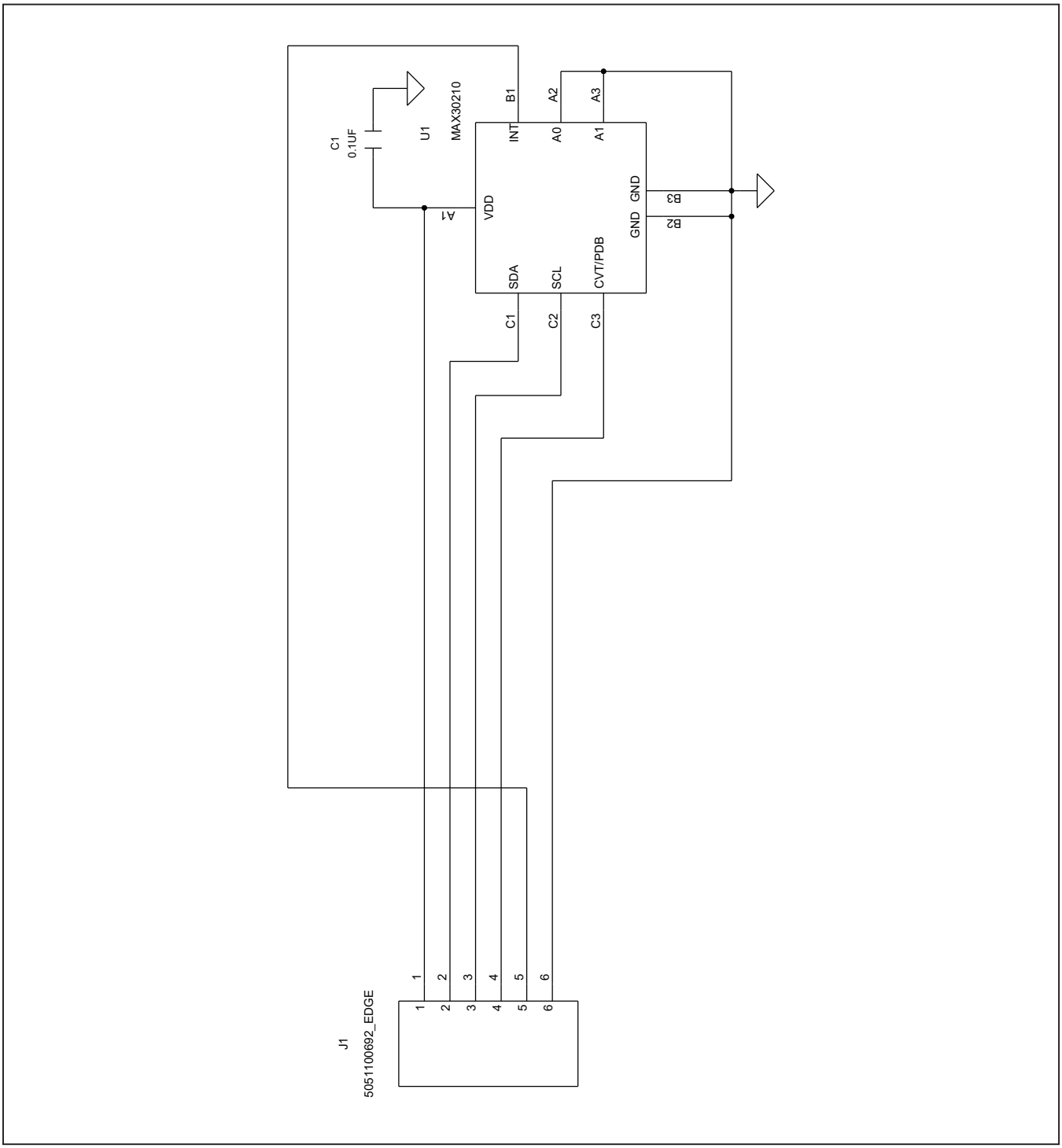
ITEM	REF_DES	DNI/DNP	QTY	MFG PART #	MANUFACTURER	VALUE	DESCRIPTION
1	C1	-	1	GRM033C81E104KE14	MURATA	0.1UF	CAP; SMT (0201); 0.1UF; 10%; 25V; X6S; CERAMIC
2	U1	-	1	MAX30210	ANALOG DEVICES	MAX30210	EVKIT PART - IC; MAX30210; WLP9; PACKAGE OUTLINE DRAWING:21-0486; PACKAGE CODE: W91D1+1
3	PCB	-	1	MAX30210SENSORFLEX	ANALOG DEVICES	PCB	PCB:MAX30210SENSORFLEX
4	J1	DNP	0	5051100692_EDGE	MOLEX	5051100692_EDGE	CONNECTOR; FEMALE; SMT; FD19 SERIES; RIGHT ANGLE; 6PINS;
TOTAL			3				

MAX30210 EV Kit Interface Board Bill of Materials

ITEM	REF_DES	QTY	MFG PART #	MANUFACTURER	VALUE	DESCRIPTION
1	CVT/PDB, GND, INT, SCL, SDA, VDD	6	5006	KEYSTONE	N/A	TEST POINT; PIN DIA=0.125IN; TOTAL LENGTH=0.35IN; BOARD HOLE=0.063IN; BLACK; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH;
2	J1	1	PPPC161LFBN-RC	SULLINS ELECTRONICS CORP.	PPPC161LFBN-RC	CONNECTOR; FEMALE; THROUGH HOLE; LFB SERIES; 2.54MM CONTACT CENTER; STRAIGHT; 16PINS
3	J2	1	PPPC121LFBN-RC	SULLINS ELECTRONICS CORP	PPPC121LFBN-RC	CONNECTOR; FEMALE; THROUGH HOLE; HEADER FEMALE; STRAIGHT; 12PINS
4	J3-J6	4	GRPB021VWVN-RC	SULLINS ELECTRONICS CORP.	GRPB021VWVN-RC	CONNECTOR; MALE; THROUGH HOLE; 0.050 SINGLE ROW MALE HEADER CONNECTOR; STRAIGHT; 2PINS; -40 DEGC TO +105 DEGC
5	J9	1	5051100692	MOLEX	5051100692	CONNECTOR; FEMALE; SMT; FD19 SERIES; RIGHT ANGLE; 6PINS
6	R1-R3	3	ERJ-2RKF4701	PANASONIC	4.7K	RES; SMT (0402); 4.7K; 1%; +/-100PPM/DEGC; 0.1000W
7	PCB	1	MAX30210INTERFACE	ANALOG DEVICES	PCB	PCB:MAX30210INTERFACE
TOTAL		17				

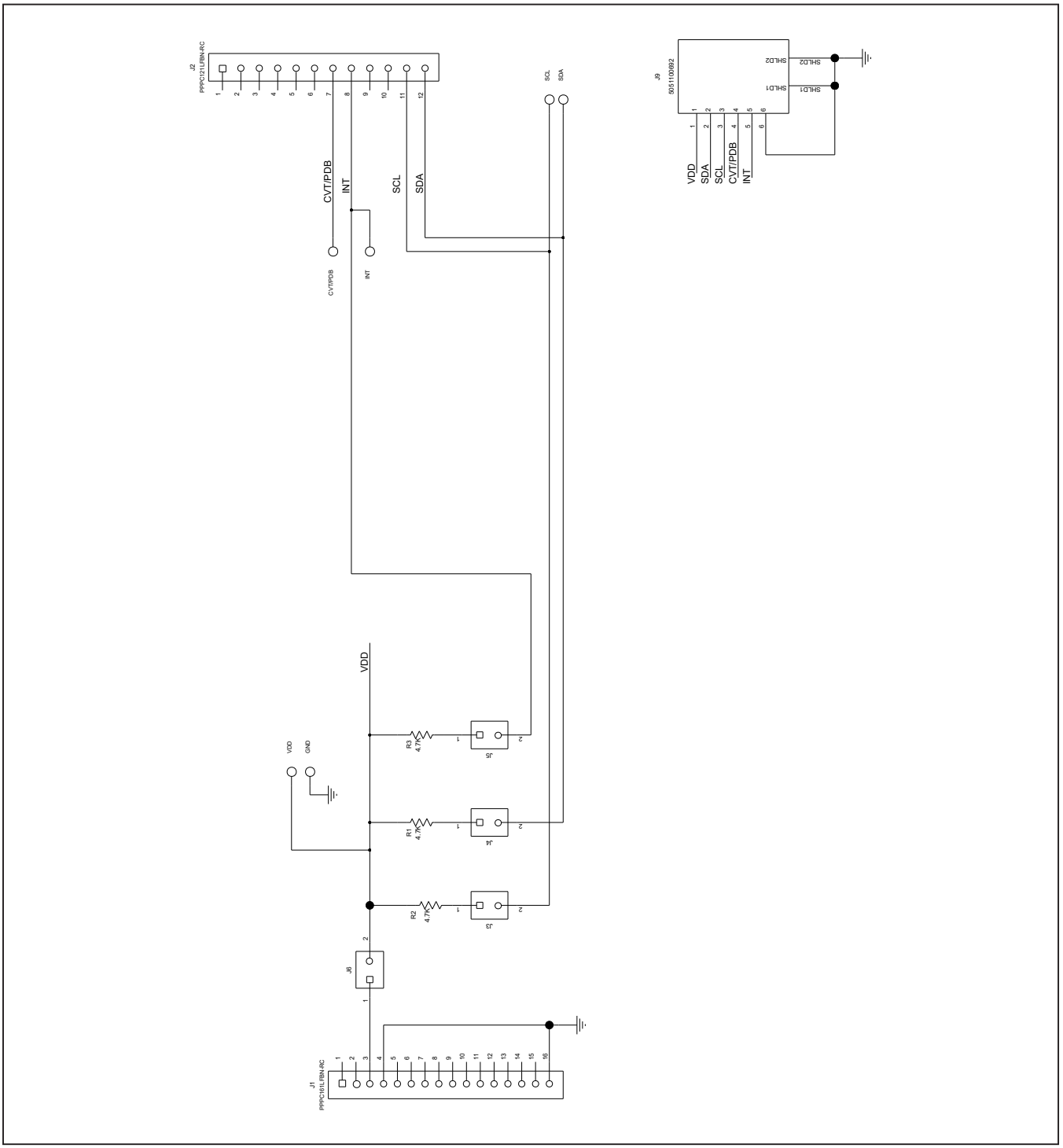
MAX30210 EV Kit Schematic

MAX30210 EV Kit Sensor Flex Schematic



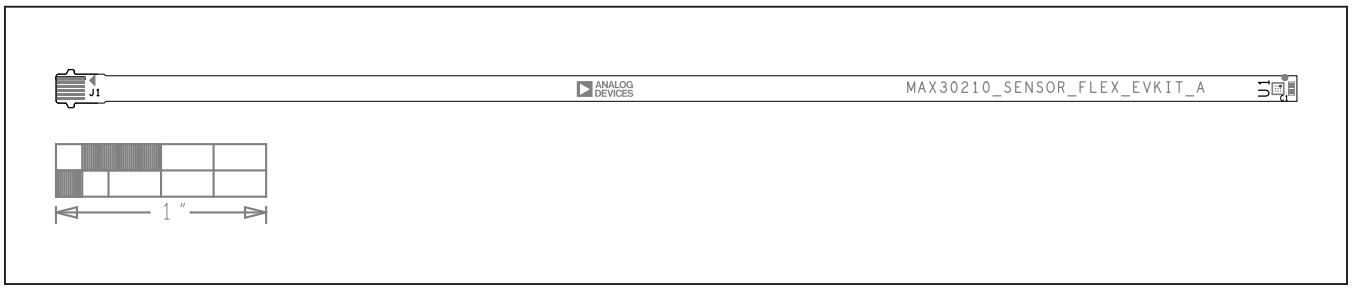
MAX30210 EV Kit Schematic (continued)

MAX30210 EV Kit Interface Board Schematic

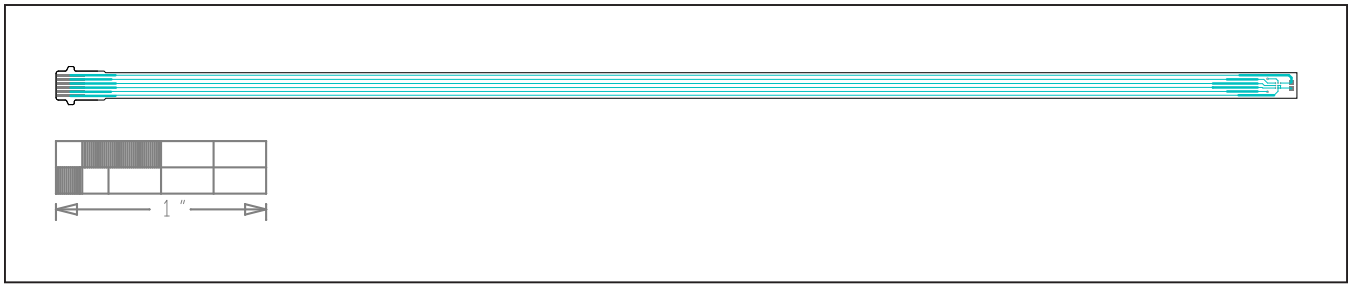


MAX30210 EV Kit PCB Layout Diagrams

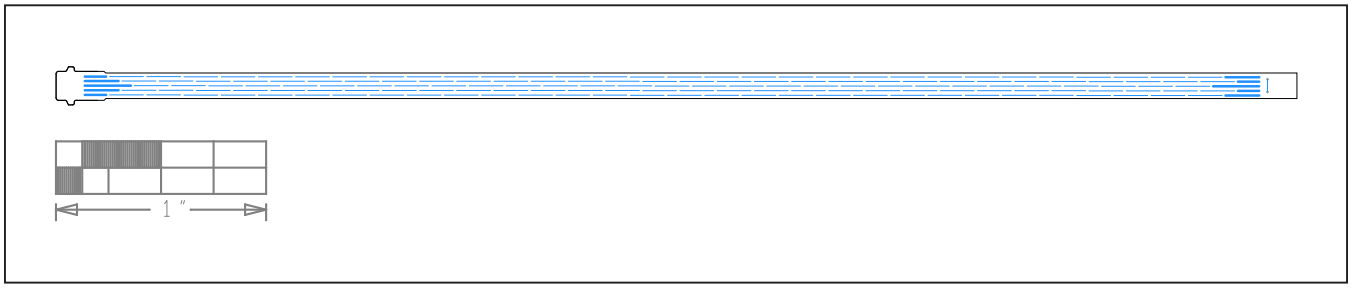
MAX30210 EV Kit Sensor Flex PCB Layout



MAX30210 EV Kit Sensor Flex PCB Layout—Silk Top



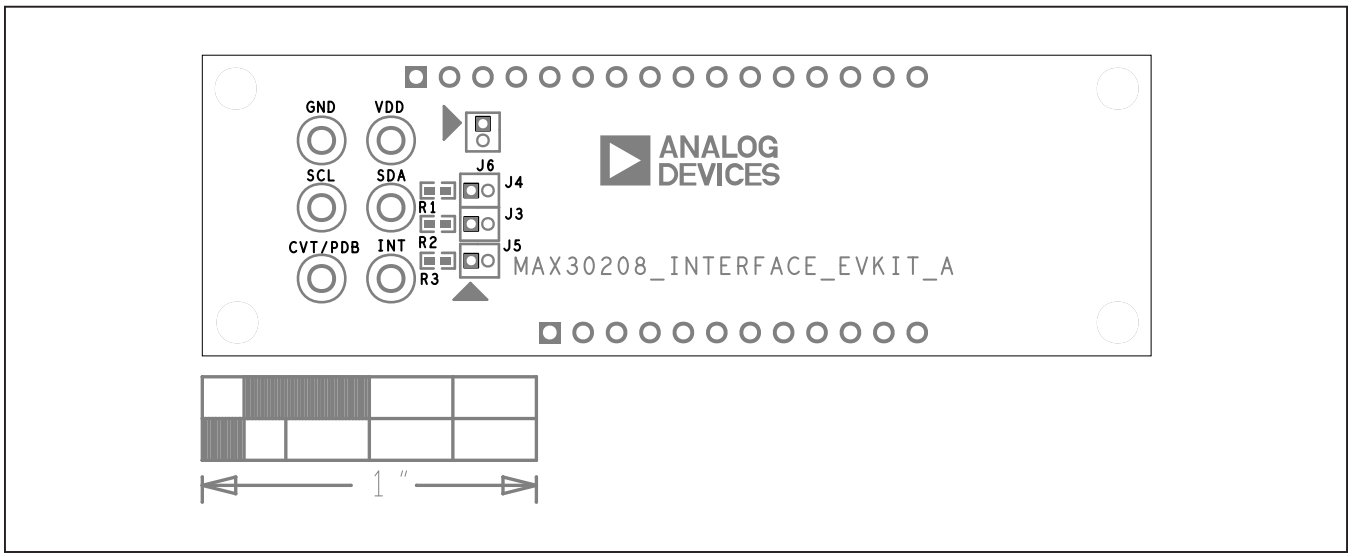
MAX30210 EV Kit Sensor Flex PCB Layout—Top View



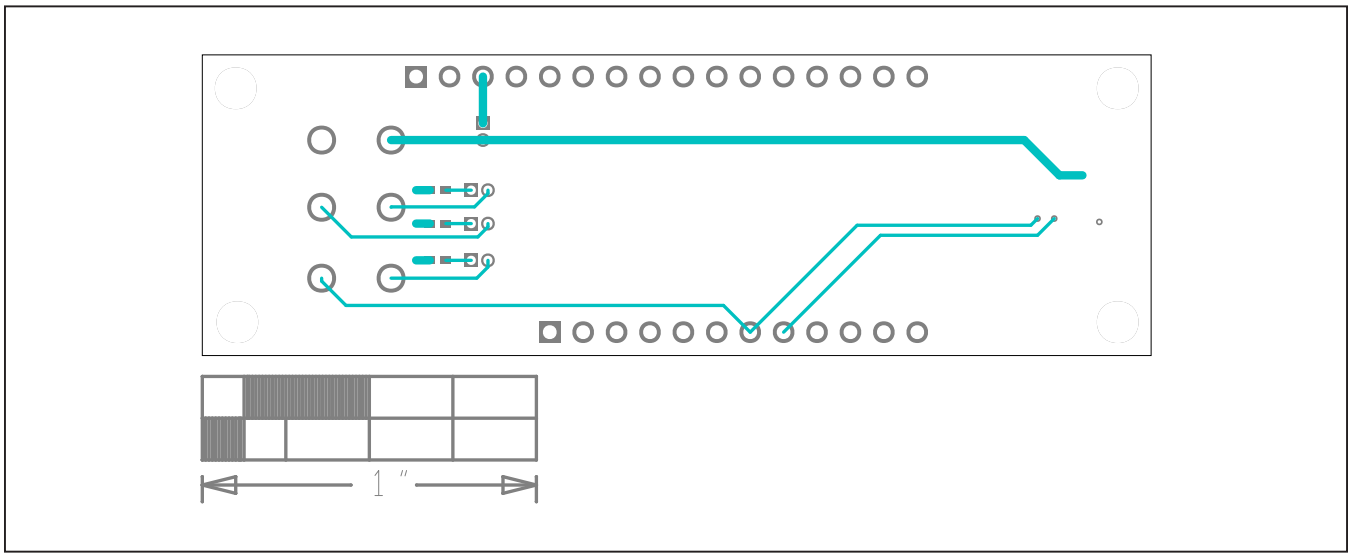
MAX30210 EV Kit Sensor Flex PCB Layout—Bottom View

MAX30210 EV Kit PCB Layout Diagrams (continued)

MAX30210 EV Kit Interface Board PCB Layout



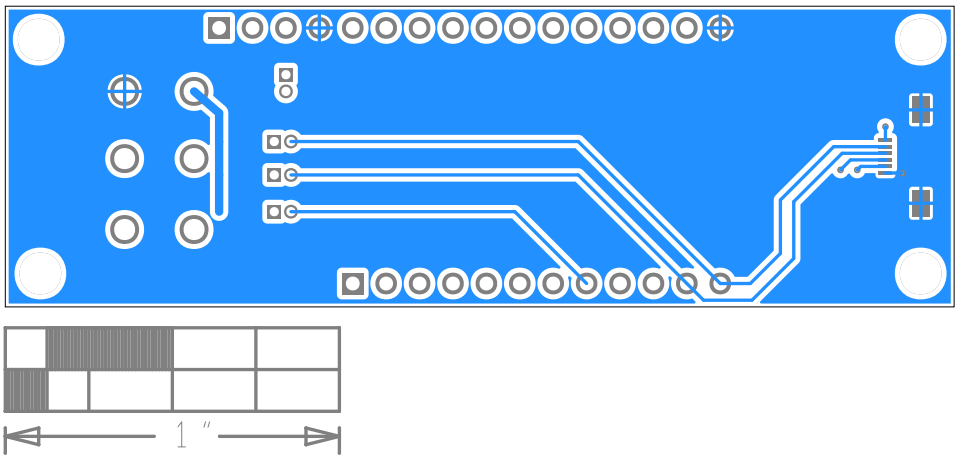
MAX30210 EV Kit Interface Board PCB Layout—Silk Top



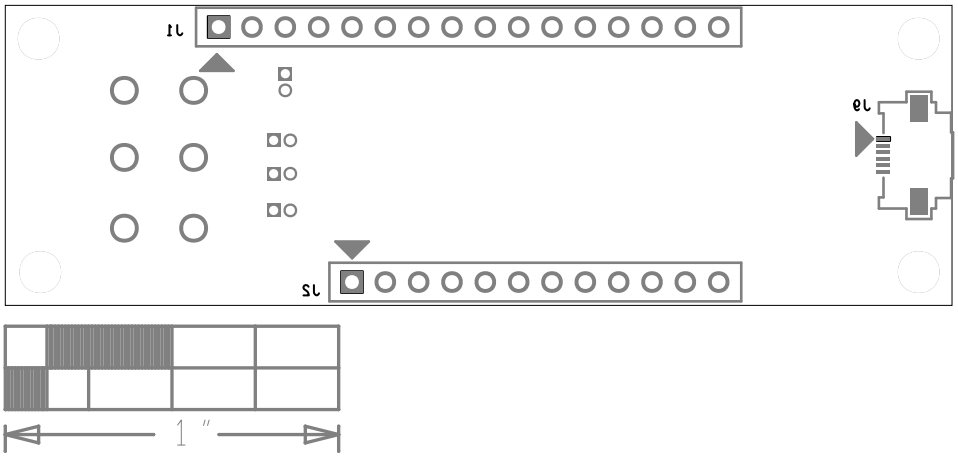
MAX30210 EV Kit Interface Board PCB Layout—Top View

MAX30210 EV Kit PCB Layout Diagrams (continued)

MAX30210 EV Kit Interface Board PCB Layout



MAX30210 EV Kit Interface Board PCB Layout—Bottom View



MAX30210 EV Kit Interface Board PCB Layout—Bottom Silkscreen

Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	11/22	Initial release	—
1	4/24	Added a note at the end of Required Equipment. Replaced the Maxim link with the latest Analog product page link. Replaced ‘Maxim’ with ‘Analog devices’ in the BOM.	1, 2, 10