MAX31342 SHIELD

Evaluates: MAX31342

General Description

The MAX31342 shield is a fully assembled and tested PCB to evaluate the MAX31342, low-current, real-time clock (RTC) with I²C interface. The shield operates from a single supply, either from USB or external power supply, and the onboard crystal provides a 32.768kHz clock signal. This device is accessed through an I²C serial interface.

The MAX31342 shield provides the hardware and software graphical user interface (GUI) necessary to evaluate the MAX31342. The shield includes a MAX31342EWA+T installed. The shield connects to the PC through a MAX32625PICO Board and a micro-USB cable.

Features

- Easy Evaluation of the MAX31342
- +1.6V to 3.6V Single-Supply Operation
- Proven PCB Layout
- Mbed/Arduino Platform Compatible
- Fully Assembled and Tested

Shield Contents

- Assembled MAX32625PICO controller board
- Micro-USB cable
- Assembled circuit board includes the MAX31342EWA+T

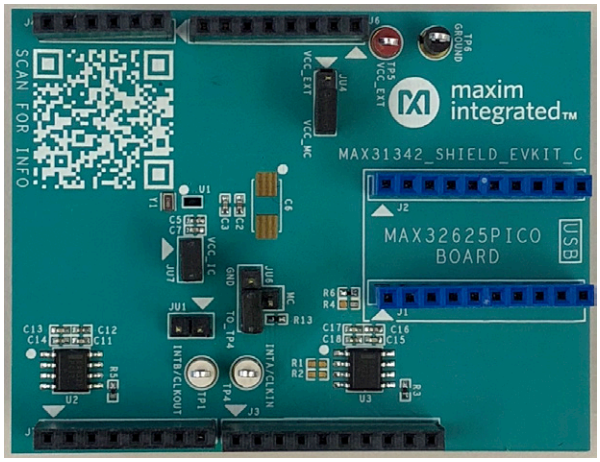
***Ordering Information* appears at end of data sheet.**

Quick Start

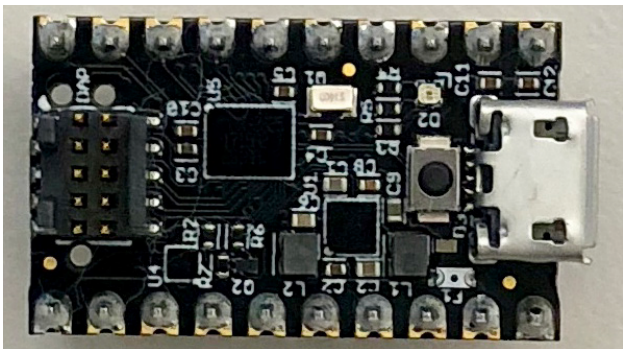
Required Equipment

- One Pico Ammeter for measuring the current
- One oscilloscope with probe
- One PC with Microsoft Windows 7, or later
- One USB A male to micro B USB cable
- One assembled and programmed MAX32625PICO board
- One MAX31342 Shield

Shield Board



MAX32625PICO Board



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Procedure

The shield is fully assembled and tested. Follow the steps below to verify board operation.

1) Place the MAX31342 shield on a nonconductive surface to ensure that nothing on the PCB gets shorted to the workspace.
2) Set the jumpers of JU4, JU6, and JU7 to their default positions. Leave the jumper JU1 open.
3) Connect the MAX32625PICO Board to the shield as shown in Figure 1.
4) Connect the USB A male to micro B male cable between the MAX32625PICO board and PC/laptop.
5) Go to the MAX31342 Shield product page to download and install the latest version of the MAX31342 RTC Shield software.
6) Open the MAX31342 RTC Shield software. Configuration and Time tab will be shown Figure 2.

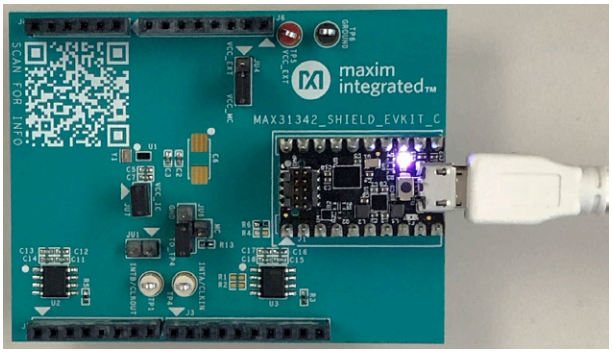

Figure 1. Connection and Setup

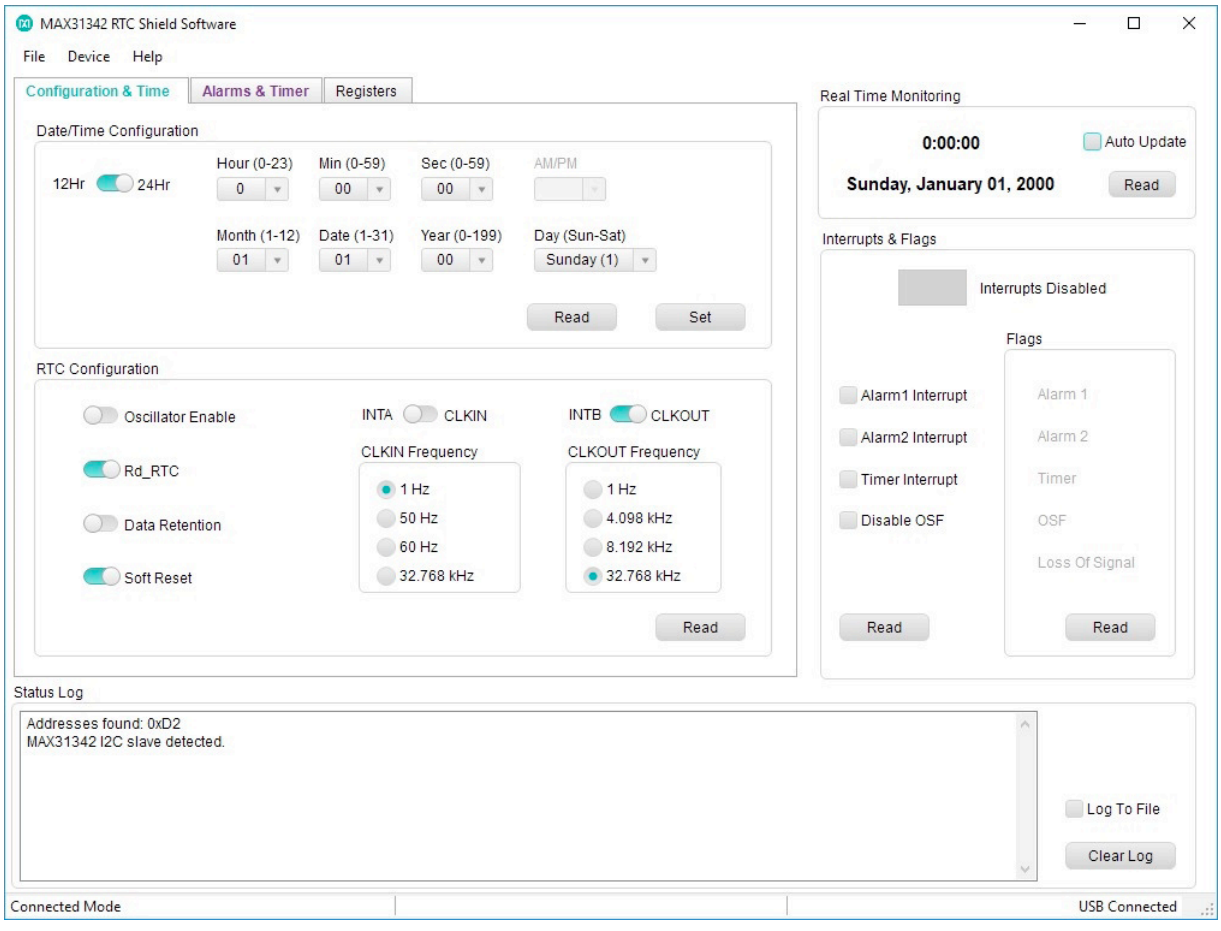

Figure 2. MAX31342 RTC Shield Software-Configuration andTime Tab

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Detailed Description

The MAX31342 shield is a fully assembled and tested PCB to evaluate the MAX31342, low-current, real-time clock (RTC) with I2C interface. The shield operates from a single supply, either from USB or external power supply, and the onboard crystal provides a 32.768kHz clock signal. This device is accessed through an I2C serial interface.

The MAX31342 shield provides the hardware and software graphical user interface (GUI) necessary to evaluate the MAX31342. The shield includes a MAX31342EWA+T installed. The shield connects to the PC through a MAX32625PICO board and a micro-USB cable.

Functional Test Procedure

Real-Time Monitoring

To monitor the time and date, on **Configuration and Time** tab, in **RTC Configuration** group box, enable **Oscillator Enable**, and under **Real Time Monitoring** group box, press **Read** button for one-time reading or check the **Auto Update** checkbox for continuous reading.

The time and date values can be updated by selecting the required values in the **Date/Time Configuration** group box and clicking the **Set** button.

The time stops counting when enabling **Data Retention** in **RTC Configuration** group box and restarts when disabling **Data Retention** and toggling **Oscillator Enable**. The time resets to **00:00:00** by enabling **Soft Reset** in **RTC Configuration** group box and it restarts by disabling **Soft Reset**.

Current Draw at Time-Keeping Mode

To measure the current draw under normal Real-Time Clock condition, without any interrupt or clock input/output:

1) Remove the jumper from **JU7** on the shield.
2) With the output set to the desired DC voltage (1.6V to 3.6V) and disabled, connect the positive terminal of the DC supply, through the pico ammeter, to pin 1 of **JU7** and negative terminal to the ground of the shield.
3) In **Configuration and Time** tab of the software, under **RTC Configuration** group box, press **Read** button, disable the **CLKIN** and **CLKOUT**, and select **1Hz** for **CLKIN** Frequency and **CLKOUT Frequency**. Under **Real Time Monitoring**, uncheck **Auto Update**.
4) The reading on the pico ammeter is the current drawn by MAX31342 only.

Note: *All instruments need to be disconnected from the I/O ports of the IC, since any loading would increase current consumption.*

CLKOUT Frequency

In **Configuration and Time** tab of the software, under **RTC Configuration** group box, select **CLKOUT** and the desired **CLKOUT Frequency**. The clock output can be monitored using an oscilloscope connected to the $\overline{\text{INTB}}$/CLKOUT test point. A frequency counter can also be used to measure the clock frequency accurately.

Alarm Configuration

On the MAX31342 shield board, set jumper JU1 to 1-2 and jumper JU6 to 1-4.

In **Alarms and Timer** tab of the software, under **Alarm 1 Configuration** group box, select the Repetition Rate to set the alarm, and make selections for all other relevant fields (such as Min, Sec, etc.). In **Interrupts and Flags** group box, enable alarm 1 by checking the **Alarm 1** Interrupt check box. When the Real-Time clock reaches the alarm1 match condition, $\overline{\text{INTA}}$/CLKIN will go from high to low. Under **Flags** group box, press **Read** button to read the status and clear the alarm flag bit if it has been previously set.

Repeat the same steps for Alarm 2 but measure the alarm interrupt output at $\overline{\text{INTB}}$/CLKOUT test point.

Note: *When testing alarm interrupts, CLKIN and CLKOUT need to be disabled under **RTC Configuration** group box in **Configuration and Time** tab of the software.*

For more detail on using the software, refer to the MAX31342 shield software user's guide.

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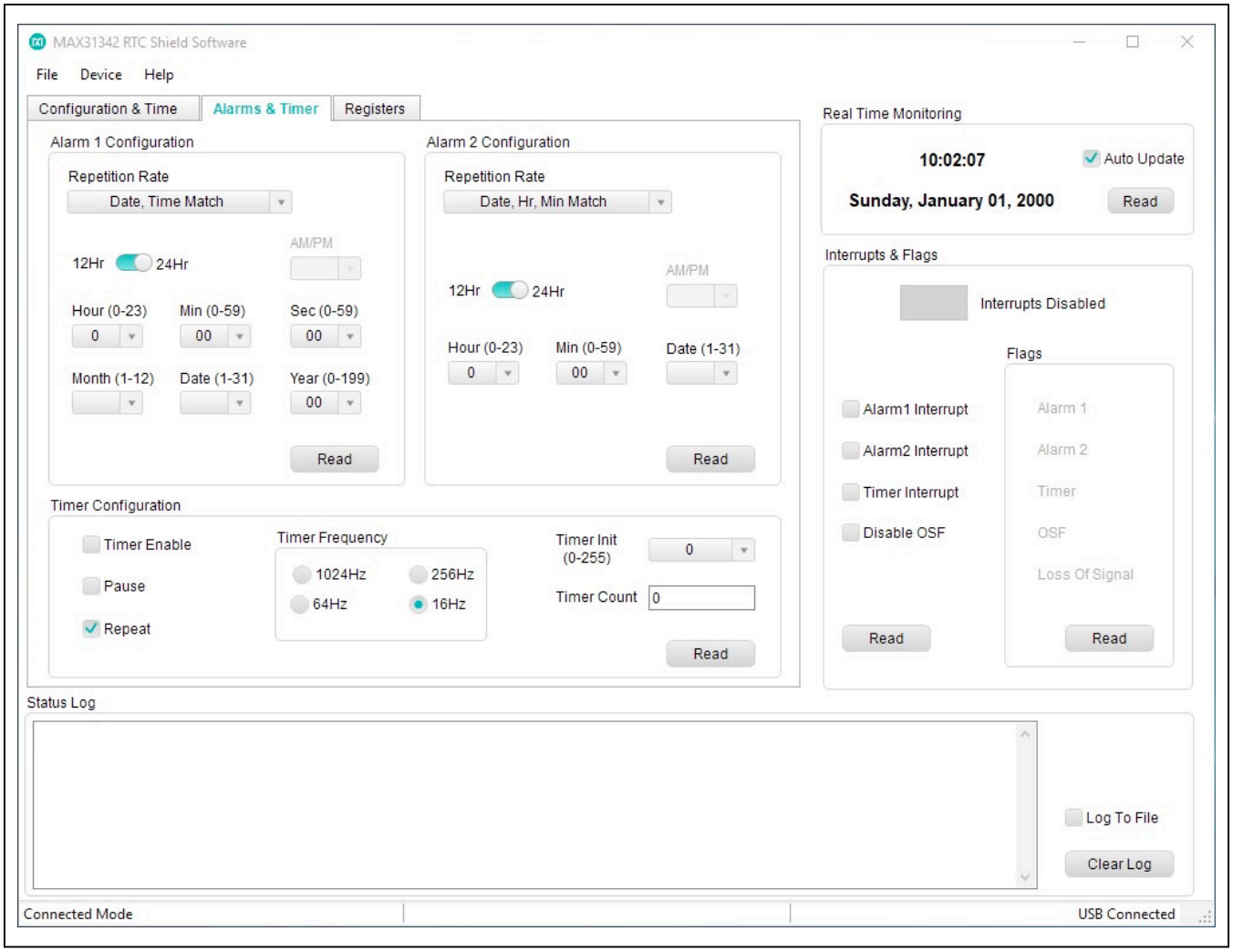

Figure 3. MAX31342 RTC Shield Software—Alarms and Timer Tab

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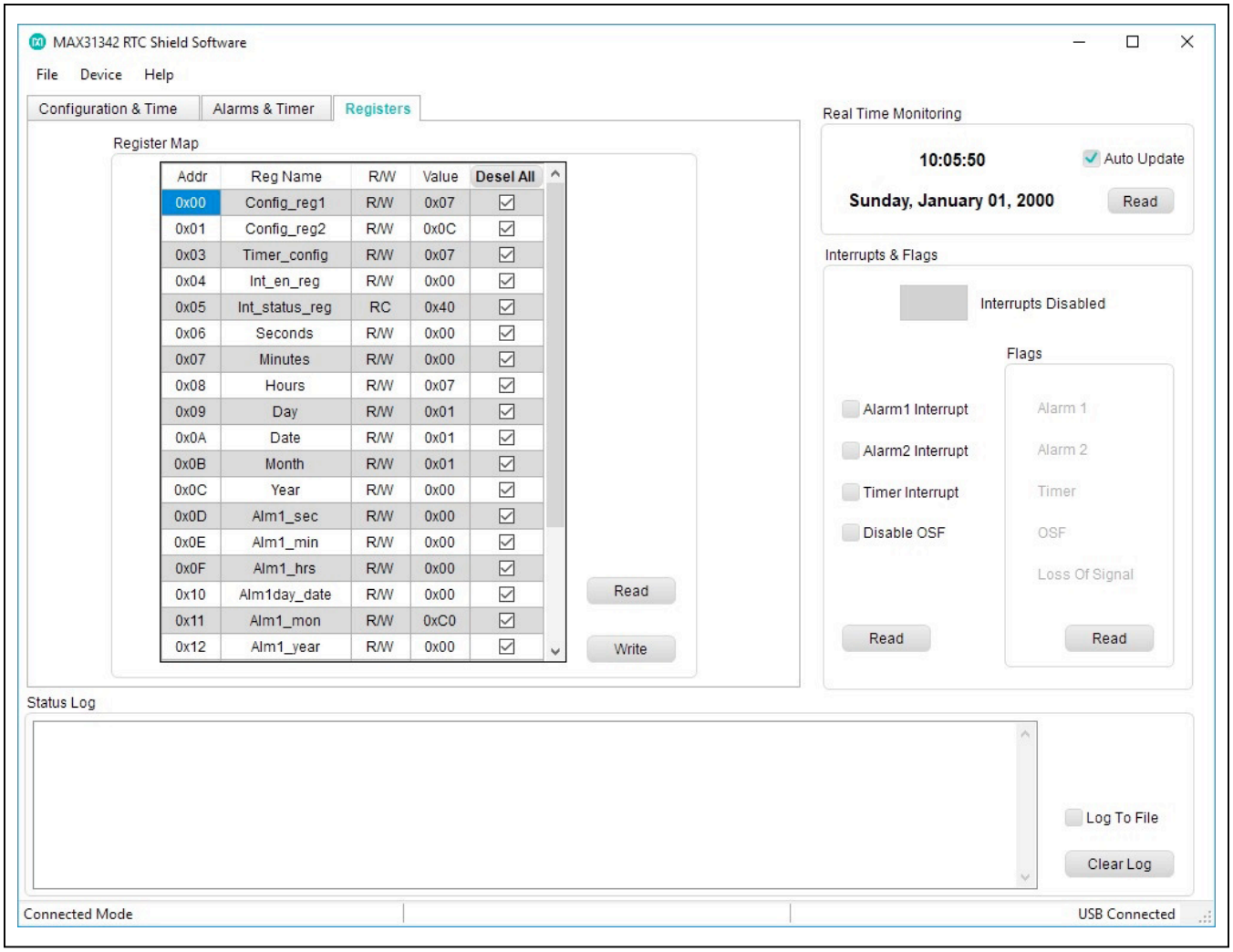

Figure 4. MAX31342 RTC Shield Software—Registers Tab

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Jumper Settings

JUMPER	SHUNT POSITION	DESCRIPTION
JU1	1-2	$\overline{INTB}$/CLKOUT pin of U1 is connected to IO V_{CC2} pin of the level translator (U2)
	OPEN*	$\overline{INTB}$/CLKOUT pin of U1 is unconnected
JU4	1-2	System V_{CC} powered by VCC_EXT test point
	2-3*	System V_{CC} powered by 3.3V supply on mbed/Arduino platform
JU6	1-2	$\overline{INTA}$/CLKIN pin of U1 is connected to ground
	1-3	$\overline{INTA}$/CLKIN pin of U1 is connected to IO V_{CC1} pin of the level translator (U2)
	1-4*	$\overline{INTA}$/CLKIN is connected to TP4 test point and a 4.7KΩ pullup resistor to system V_{CC}
JU7	1-2*	V_{CC} pin of U1 is powered by system V_{CC}
	OPEN	V_{CC} pin of U1 is unconnected. Connect an ammeter between the pins of JU7 to measure the current consumption of U1.

Ordering Information

PART	TYPE
MAX31342SHLD#	SHIELD

#Denotes RoHS compliant.

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MAX31342 SHIELD Bill of Materials

NOTE: DNI--> DO NOT INSTALL(PACKOUT) ; DNP--> DO NOT PROCURE

ITEM	REF_DES		QTY	MFG PART #	MANUFACTURER	VALUE	DESCRIPTION
1	C2, C5		2	CL05B105KQ5NQNC; GRM155R70J105KA12	SAMSUNG ELECTRONICS; MURATA	1UF	CAPACITOR; SMT (0402); CERAMIC CHIP; 1UF; 6.3V; TOL=10%; TG=-55 DEGC TO +125 DEGC; TC=X7R
2	C3, C7, C12, C14, C16, C18		6	GRM155R70J104KA01	MURATA	0.1UF	CAPACITOR; SMT (0402); CERAMIC CHIP; 0.1UF; 6.3V; TOL=10%; TG=-55 DEGC TO +125 DEGC; TC=X7R
3	C6		1	TAJC106K016RNJ	AVX	10UF	CAPACITOR; SMT (6032); TANTALUM CHIP; 10UF; 16V; TOL=10%; MODEL=TAJ SERIES; TG=-55 DEGC TO +125 DEGC
4	C11, C13, C15, C17		4	ATC520L103KT16T	AMERICAN TECHNICAL CERAMICS	0.01UF	CAPACITOR; SMT (0402); CERAMIC CHIP; 0.01UF; 16V; TOL=10%; MODEL=ULTRA-BROADBAND; TG=-55 DEGC TO +125 DEGC; TC=X7R
5	J1, J2		2	PPPC101LFBN-RC	SULLINS ELECTRONICS CORP.	PPPC101LFBN-RC	CONNECTOR; FEMALE; THROUGH HOLE; HEADER CONNECTOR; STRAIGHT; 10PINS
6	J3		1	SSQ-110-04-G-S	SAMTEC	SSQ-110-04-G-S	CONNECTOR; FEMALE; THROUGH HOLE; .025IN SQ POST SOCKET; STRAIGHT; 10PINS ;
7	J4		1	SSQ-106-04-G-S	SAMTEC	SSQ-106-04-G-S	CONNECTOR; FEMALE; THROUGH HOLE; .025IN SQ POST SOCKET; STRAIGHT; 6PINS ;
8	J6, J7		2	SSQ-108-04-G-S	SAMTEC	SSQ-108-04-G-S	CONNECTOR; FEMALE; THROUGH HOLE; .025IN SQ POST SOCKET; STRAIGHT; 8PINS ;
9	JU1, JU7		2	PBC02SAAN	SULLINS ELECTRONICS CORP.	PBC02SAAN	EVKIT PART-CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT; 2PINS; -65 DEGC TO +125 DEGC;
10	JU4		1	PEC03SAAN	SULLINS ELECTRONICS CORP.	PEC03SAAN	EVKIT PART-CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT; 3PINS; -65 DEGC TO +125 DEGC;
11	JU6		1	TSW-104-07-L-S	SAMTEC	TSW-104-07-L-S	EVKIT PART-CONNECTOR; MALE; THROUGH HOLE; TSW SERIES; SINGLE ROW; STRAIGHT; 4PINS
12	R1-R3, R5		4	CRCW040210K0FK;RC0402FR-0710KL	VISHAY DALE;YAGEO PHICOMP	10K	RESISTOR; 0402; 10K; 1%; 100PPM; 0.0625W; THICK FILM
13	R6		1	RC0402JR-070RL; CR0402-16W-000RJT	YAGEO PHYCOMP;VENKEL LTD.	0	RESISTOR; 0402; 0 OHM; 5%; JUMPER; 0.063W; THICK FILM
14	R13		1	CRCW04024K70JN	VISHAY DALE	4.7K	RESISTOR; 0402; 4.7K OHM; 5%; 200PPM; 0.063W; THICK FILM
15	TP1, TP4-TP6		4	5010	KEYSTONE	N/A	TEST POINT; PIN DIA=0.125IN; TOTAL LENGTH=0.445IN; BOARD HOLE=0.063IN; RED; PHOSPHOR BRONZE WIRE SIL;
16	U1		1	MAX31342EWA+	MAXIM	MAX31342EWA+	EVKIT PART-IC; MAX31342EWA+; LOW CURRENT REAL TIME CLOCK WITH I2C INTERFACE; PACKAGE OUTLINE: 21-100291; PACKAGE CODE: W80D1-1
17	U2, U3		2	NLSX4373DR2G	ON SEMICONDUCTOR	NLSX4373DR2G	IC; TRANS; 2-BIT 20 MB/S DUAL-SUPPLY LEVEL TRANSLATOR; NSOIC8
18	Y1		1	ECS-.327-6-12	ECS INC	32.768KHZ	CRYSTAL; SMT 2.0 MM X 1.2 MM; 6PF; 32.768KHZ; +/-20PPM; -0.03PPM/DEGC2
19	PCB		1	MAX31342SHIELD	MAXIM	PCB	PCB:MAX31342SHIELD
20	R4	DNP	0	N/A	N/A	OPEN	PACKAGE OUTLINE 0402 RESISTOR
TOTAL			38				

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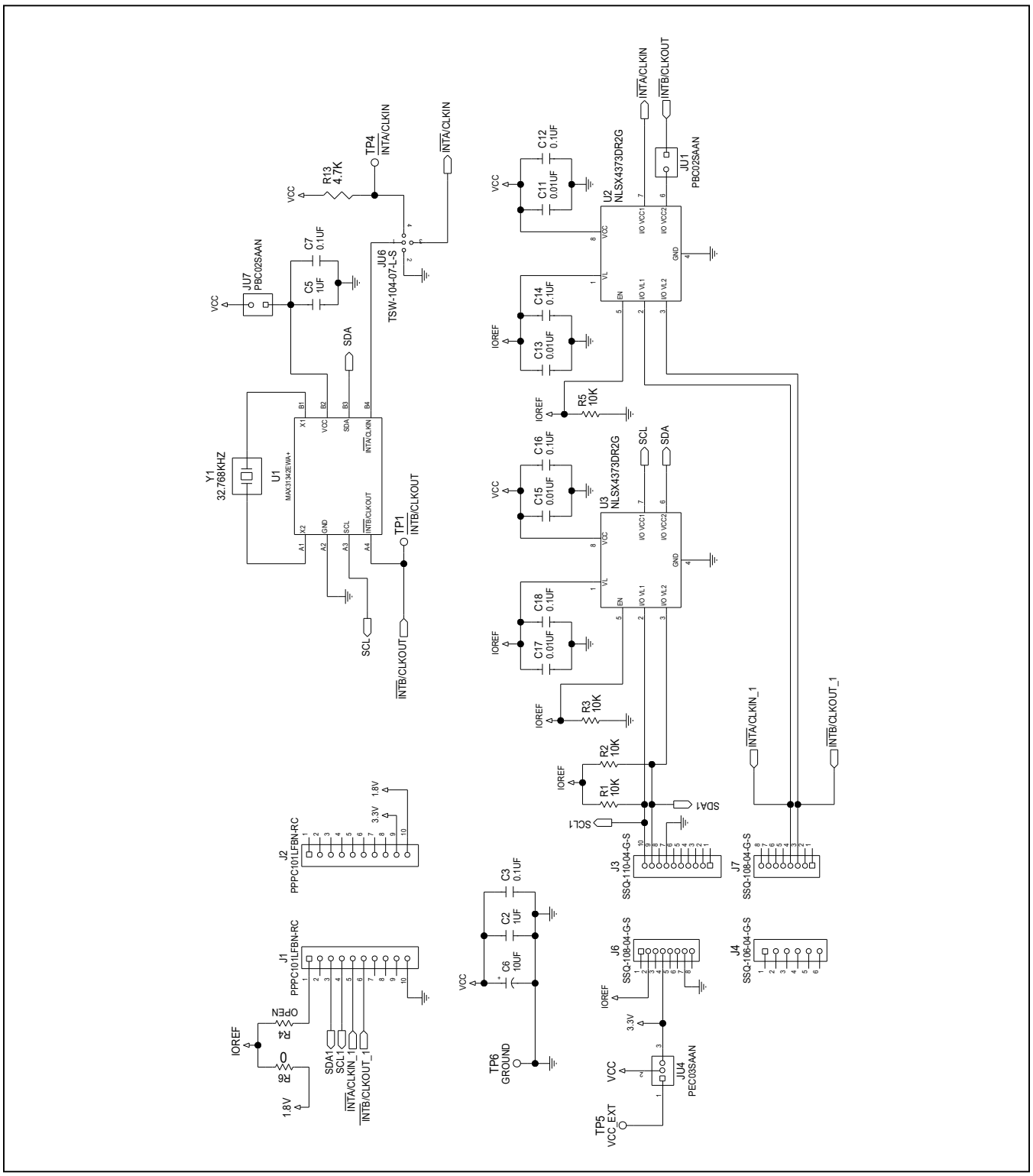
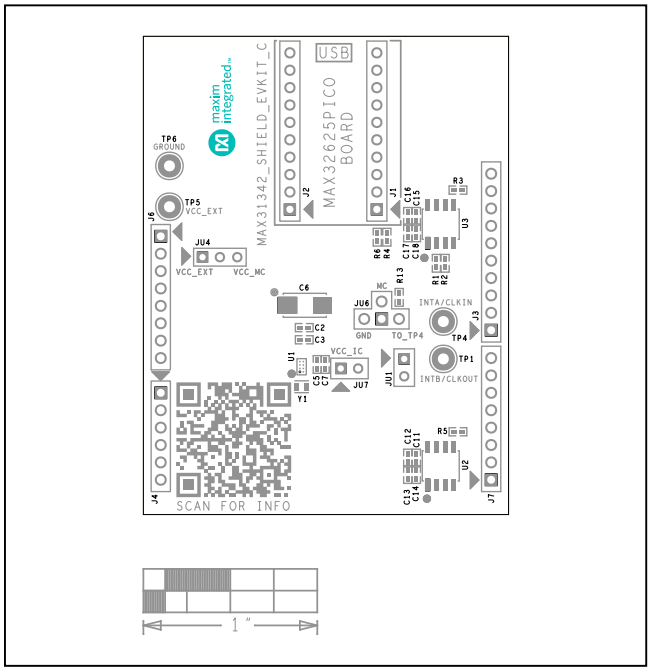
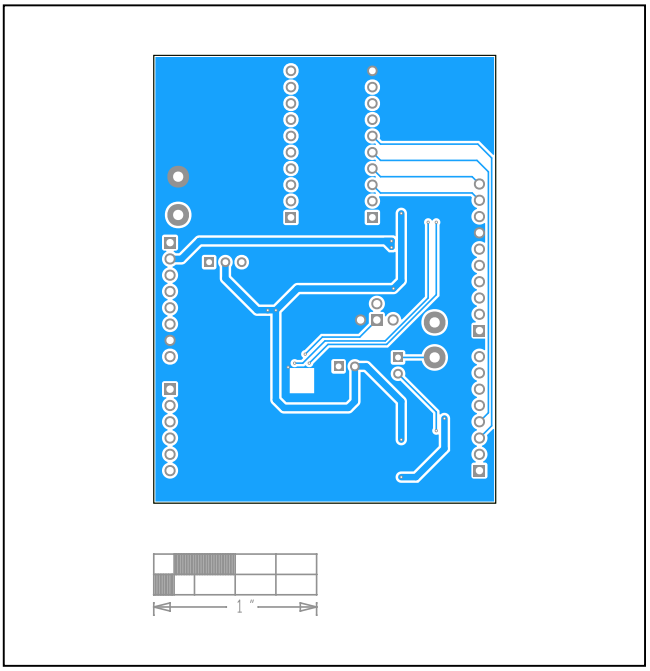
MAX31342 SHIELD Schematic



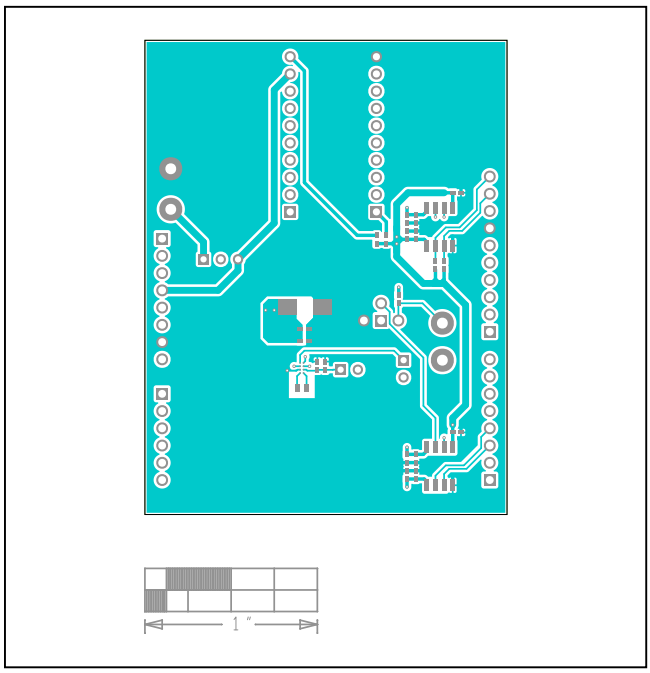
MAX31342 SHIELD PCB Layout Diagrams



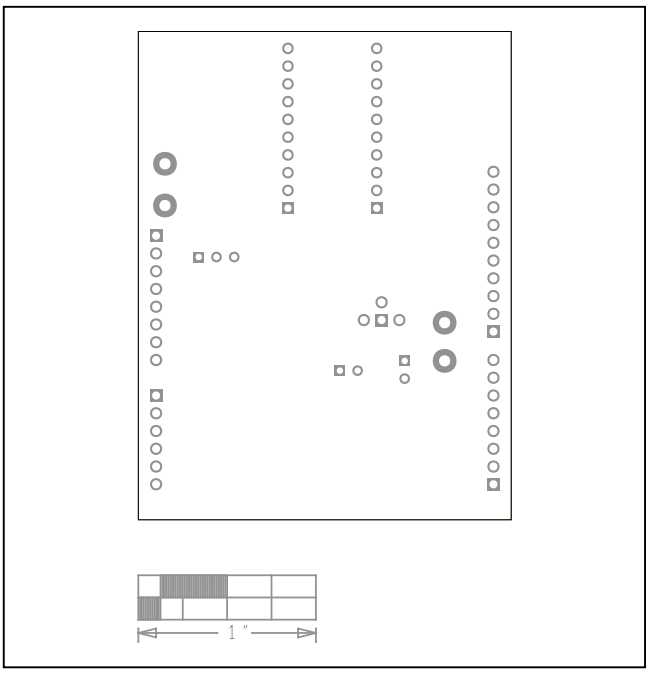
MAX31342 Shield—Assembly Top Silkscreen



MAX31342 Shield—PCB Bottom Layer



MAX31342 Shield—PCB Top Layer



MAX31342 Shield—PCB Bottom Silkscreen

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Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	2/19	Initial release	—

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For pricing, delivery, and ordering information, please visit Maxim Integrated's online storefront at https://www.maximintegrated.com/en/storefront/storefront.html.

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