Click here to ask about the production status of specific part numbers.

MAX32680 Evaluation Kit

Evaluates: MAX32680

General Description

The MAX32680 evaluation kit (EV kit) provides a platform for evaluation capabilities of the MAX32680 microcontroller, which is an advanced system-on-chip (SoC) designed for industrial and medical sensors. Power regulation and management is provided by a single-inductor multiple-output (SIMO) buck regulator system and contains the latest generation Bluetooth® 5.2 Low Energy (LE) radio.

EV Kit Contents

- MAX32680 EV Kit Containing a MAX32680 with a Preprogrammed Demo
- MAX32625PICO Debugger w/Cables
- One USB Standard-A-to-Micro-B Cable

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

Features

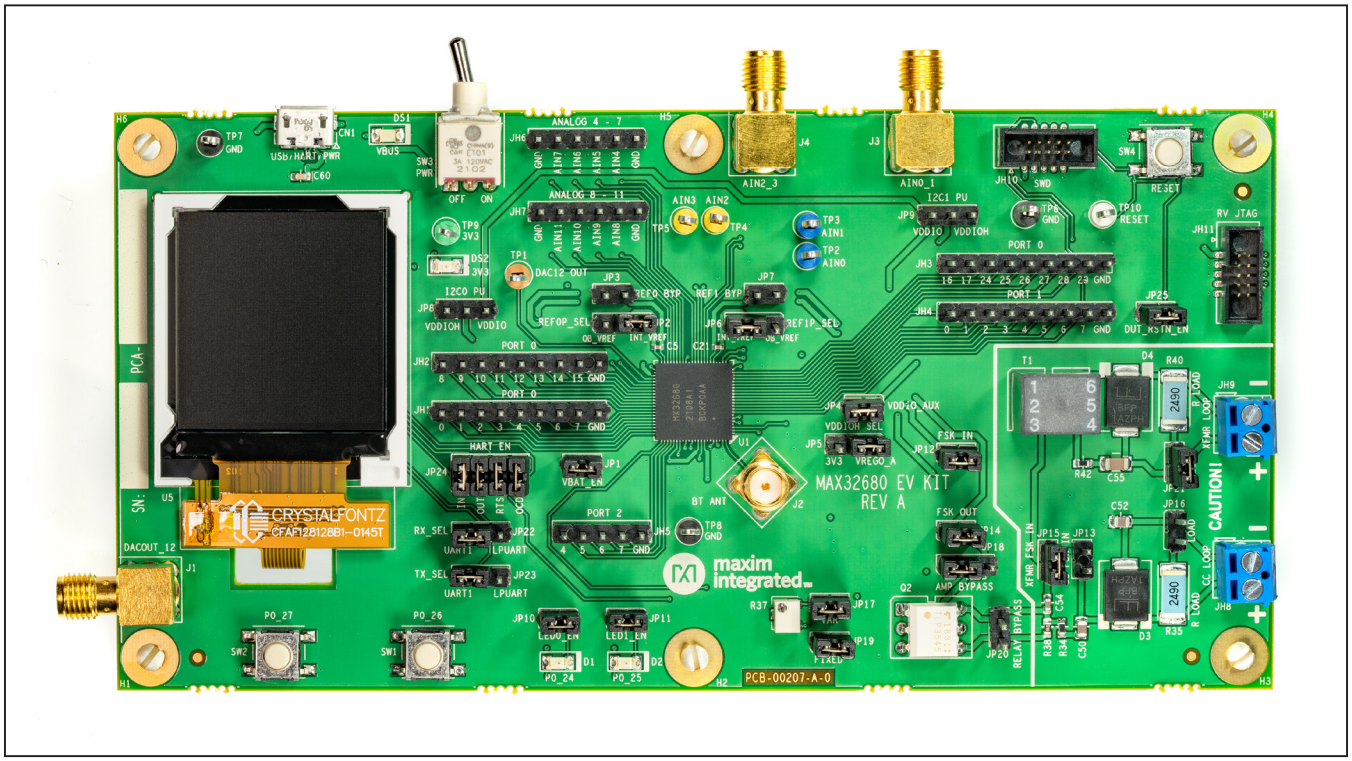
- SMA Connector for Attaching an External Bluetooth Antenna
- 128 x 128 (1.45in) Color TFT Display with SPI Interface
- Two Selectable On-Board, High-Precision Voltage References
- USB 2.0 Micro B to Serial UARTs
- UART1 and LPUART0 Interface is Selectable Through On-Board Jumpers
- All GPIOs Signals Accessed Through 0.1in Headers
- Access to Four Analog Inputs Through SMA Connectors Configured as Differential
- Access to Eight Analog Inputs Through 0.1in Headers Configured as Single-End
- Optional Discrete Filter for the Twelve Analog Inputs
- DAC Accessed Through SMA Connector or Test Point
- 10-Pin SWD Connector
- 10-Pin RV JTAG Connector
- Board Power Provided by USB Port
- On-Board 3.3V LDO Regulator to Power MAX32680 Internal SIMO
- Test Loops Provided to Supply Optional VCORE Power Externally
- Individual Power Measurement on All IC Rails Through Jumpers
- Two General Purpose LEDs and Two General Purpose Pushbutton Switches

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319-100801; Rev 0; 8/21

maxim integrated™

MAX32680 EV Kit Board



Quick Start

Required Equipment

- MAX32680 EV kit containing a MAX32680 with a preprogrammed demo
- One USB Standard-A-to-Micro-B cable

Procedure

The EV kit is fully assembled and tested. Follow the steps below to verify board operation:

1) While observing safe electrostatic discharge (ESD) practices, carefully remove the MAX32680 EV kit board out of its packaging. Inspect the board to ensure that no damage occurred during shipment. Jumpers/shunts are preinstalled prior to testing and packaging.
2) Power up the board by plugging in the provided USB cable to connector CN1. Verify that the VBUS blue LED (DS1) and the 3V3 (DS2) green LED are illuminated.
3) The MAX32680 is preprogrammed with a demo program. The program now initiates and displays the Maxim logo upon successful completion.

Detailed Description of Hardware (or Software)

Bluetooth 5.2 Interface

The SMA connector (J2) is provided to attach an external Bluetooth 2.4GHz antenna.

Power Supply

The EV kit is powered by +5V which is made available through VBUS on the Micro-USB type-B connector CN1. When the power switch SW3 is in the on position, the blue VBUS LED (DS1) and the green 3.3V LED (DS2) illuminate. The 3.3V powers the SIMO of the MAX32680.

Current Monitoring

A two-pin header VBAT EN (JP1) provides a convenient current monitoring point for the 3.3V LDO powering the MAX32680. If the jumper is removed, power can be sourced externally.

Low-Power Mode Current Measurements

To accurately achieve the low power current values, the EV kit needs to configure such that no outside influence (i.e., pullups, external clock, debugger connector, etc.) causes a current source or sink on that GPIO.

For these measurements, the board is needed to be configured as follows:

1) Remove jumpers JP8, JP9, JP10, JP11, JP12, JP14, JP22, JP23, and JP24.
2) Unplug the SWD connector at JH10.
3) Unplug the RV JTAG connector at JH11.

Clocking

The MAX32680 clocking is provided by an external 32MHz crystal (Y1).

Voltage Reference Selection

The external voltage reference inputs REF0P, REF0N, REF1P, and REF1N for the analog-to-digital converters (ADCs) can be sourced externally by high precision external reference sources, MAX6071 (U2 and U3), REF0P (JP2), and REF1P (JP6) or internally by VDDA.

JTAG Serial Wire Debug (SWD) Support

The SWD debug can be accessed through a Cortex® 10-pin connector (JH10). Logic levels are set to 1.8V (VDDIO_AUX).

JTAG RISC V Debug (SWD) Support

The JTAG RISC V debug can be accessed through a Cortex 10-pin connector (JH11). Logic levels are set to 1.8V (VDDIO_AUX).

UART Interface

The EV kit provides a USB-to-UART bridge chip, FTDI FT230XS-R. This bridge eliminates the requirement for a physical RS-232 COM port. Instead, the IC's UART access is through the Micro-USB type-B connector, CN1. The USB-to-UART bridge can be connected to the ICs UART1 or LPUART with jumpers JP22 (RX) and JP23 (TX). Virtual COM port drivers and guides for installing Windows® drivers are available at the FTDI chip website.

GPIO and Alternate Function Headers

The GPIO and Alternate Function signals from the MAX32680 can be accessed through 0.1in spaced headers JH1 through JH5.

Analog Headers

The four analog inputs (AIN0–AIN3) are accessed through differential SMA connectors J3 and J4 or test loops TP3 through TP5. The eight analog inputs (AIN4–AIN11) are accessed single-ended through 0.1in headers JH6 and JH7.

DAC12 OUT

The DAC12 output can be accessed through SMA connector J1 or test loop (TP1).

I^2C Pullups

The I^2C ports can be independently pulled up to 1.8V (VDDIO_AUX) or 3.3V through JP8 and JP9.

Reset Pushbutton

The IC can be reset by pushbutton SW4.

Indicator LEDs

General purpose indicators LED D1 (red) is connected to GPIO P0.24 and LED D2 (green) is connected to GPIO P0.25.

GPIO Pushbutton Switches

The two general purpose pushbuttons SW1 and SW2 are connected to GPIO P0.26 and P0.27, respectively. If the pushbutton is pressed, the attached port pin is pulled low.

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Table 1. MAX32680 EV Kit Jumper Settings

JUMPER	SIGNAL	SETTINGS	DESCRIPTION
JP1	VREGI	Open	Disconnects 3.3V power from the MAX32680 SIMO
		Close*	Connects 3.3V power to the MAX32680 SIMO
JP2	REF0P	2-1*	Connects the external high-precision voltage refernce to REF0P
		2-3	Connects the internal voltage refernce to REF0P
JP3	REF0N	Open*	Disconnects REF0N from ground
		Close	Connects REF0N to ground
JP4	VDDIO_AUX	Open*	Disconnects VDDIO_AUX from pull-ups and reference voltages
		Close	Connects VDDIO_AUX to pull-ups and reference voltages
JP5	VDDIOH	Open*	Connects VREGO_A to VDDIOH
		Close	Connects the 3.3V from the estrenal LDO to VDDIOH
JP6	REF1P	2-1*	Connects the external high-precision voltage refernce to REF1P
		2-3	Connects the internal voltage refernce to REF1P
JP7	REF1N	Open*	Disconnects REF1N from ground
		Close	Connects REF1N to ground
JP8	I2C0_SDA I2C0_SCL	2-1	Connects I2C0 pullups to VDDIO_AUX (1.8V)
		2-3	Connects I2C0 pullups to 3.3V
JP9	I2C1_SDA I2C1_SCL	2-1	Connects I2C1 pullups to VDDIO_AUX (1.8V)
		2-3	Connects I2C1 pullups to 3.3V
JP10	P0_24	Open	Disconnects red LED D1 from P0_24
		Close*	Connects red LED D1 to P0_24
JP11	P0_25	Open	Disconnects green LED D2 from P0_25
		Close*	Connects green LED D2 to P0_25
JP12	FSK_IN	Open	Disconnects FSK_IN from HART analog circuitry
		Close*	Connects FSK_IN to HART analog circuitry
JP13	RCV_FSK	Open*	Disconnects RCV_FSK from CC LOOP
		Close	Connects RCV_FSK to CC LOOP
JP14	FSK_OUT	Open	Disconnects FSK_OUT from HART analog circuitry
		Close*	Connects FSK_OUT to HART analog circuitry
JP15	RCV_FSK	Open	Disconnects RCV_FSK from XFMR LOOP
		Close*	Connects RCV_FSK to XFMR LOOP
JP16	RLOAD	Open*	Disconnects 249 ohm resistor shunt from CC LOOP
		Close	Connects 249 ohm resistor shunt to CC LOOP
JP17	FSK AMP GAIN	Open*	Enables FSK variable amp gain
		Close	Disables FSK variable amp gain
JP18	AMP BYPASS	2-1*	Enables FSK amp
		2-3	Bypasses FSK amp
JP19	FSK AMP GAIN	Open*	Enables FSK fixed amp gain
		Close	Disables FSK fixed amp gain

Table 1. MAX32680 EV Kit Jumper Settings (continued)

JUMPER	SIGNAL	SETTINGS	DESCRIPTION
JP20	HART_RTS	Open*	Enables HART_RTS optical transceiver
		Close	Bypasses HART_RTS optical transceiver
JP21	RLOAD	Open	Disconnects 249 ohm resistor shunt from XFMR LOOP
		Close*	Connects 249 ohm resistor shunt to XFMR LOOP
JP22	UART0_RX	2-1*	Disconnects the USB - serial bridge from UART1_RX (P0.12)
		2-3	Connects the USB - serial bridge to LPUART_RX (P2.6)
JP23	UART0_TX	2-1*	Disonnects the USB - serial bridge from UART1_TX (P0.13)
		2-3	Connects the USB - serial bridge to LPUART_TX (P2.7)
JP24	HART_IN	Open	Disconnects TX of USB - serial bridge from HART_IN (P0.1)
	HART_IN	1-2*	Connects TX of USB - serial bridge to HART_IN (P0.1)
	HART_OUT	Open	Disconnects RX of USB - serial bridge from HART_OUT (P0.0)
	HART_OUT	2-3*	Connects RX of USB - serial bridge to HART_OUT (P0.0)
	HART_RTS	Open	Disconnects RTS of USB - serial bridge from HART_RTS (P0.3)
	HART_RTS	3-4*	Connects TX of USB - serial bridge to HART_RTS (P0.3)
	HART_OCD	Open	Disconnects RTS of USB - serial bridge from HART_OCD (P0.2)
	HART_OCD	4-5*	Connects TX of USB - serial bridge to HART_OCD (P0.2)
JP25	RSTN	Open*	Disconnects DUT_3V3_RSTN from RSTN
		Close	Connects DUT_3V3_RSTN to RSTN

**Default position.*

Ordering Information

PART	TYPE
MAX32680EVKIT#	EV Kit

#Denotes RoHS compliance.

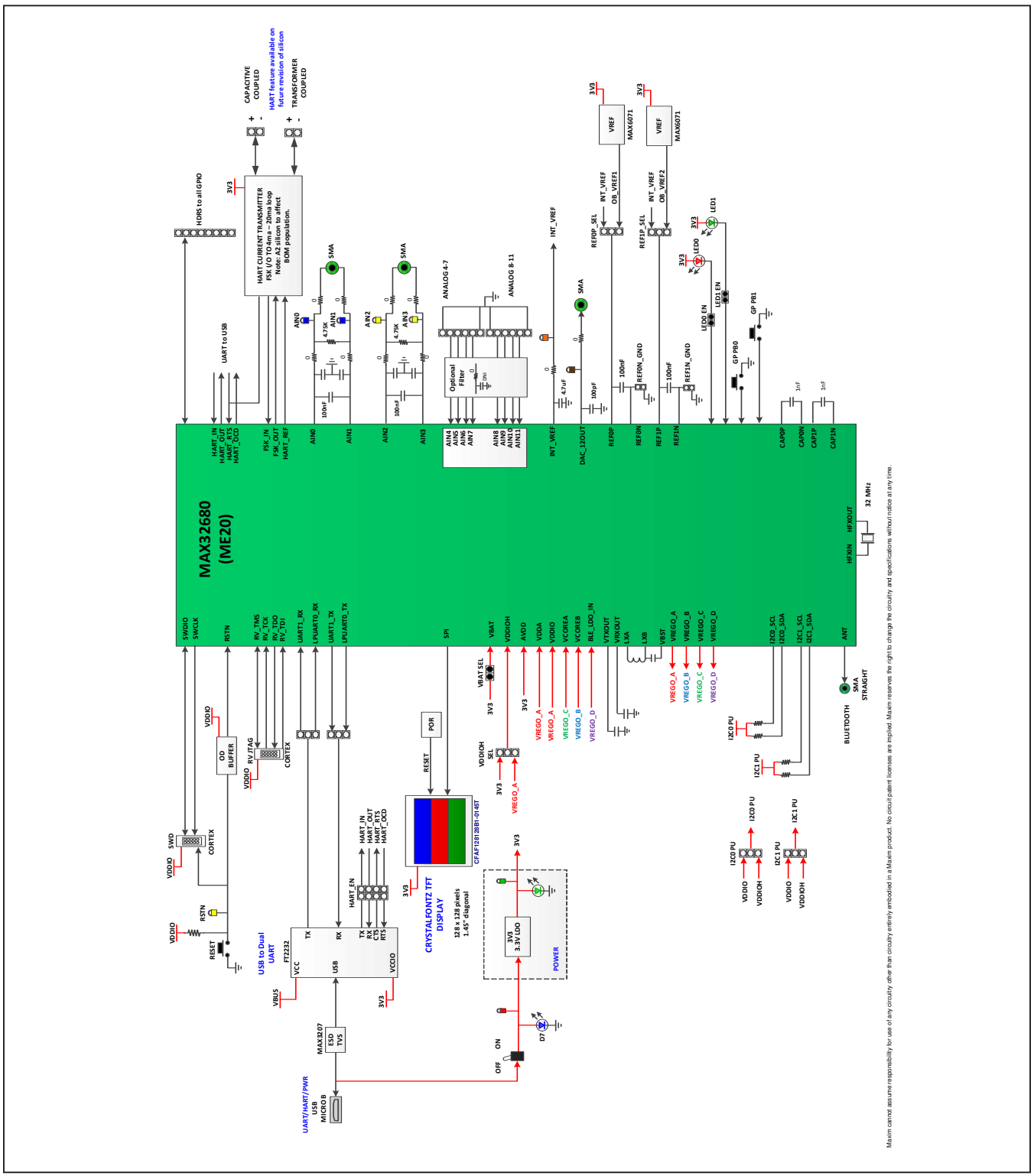
MAX32680 EV Kit Bill of Materials

QTY	VALUE	PART REFERENCE	BOM_DESCRIPTION	MANUFACTURER_PN	MANUFACTURER
12	100nF	C1 C2 C5 C13 C14 C21 C33 C42 C46 C58 C68 C70	CAP CER 0.1UF 16V 10% X7R 0402	GRM155R71C104KA88D	Murata Electronics
12	1uF	C3 C11 C12 C15 C16 C17 C18 C20 C23 C26 C49 C56	CAP CER 1UF 16V 10% X5R 0402	GRT155R61C105KE01D	Murata Electronics
1	47uF	C4	CAP CER 47UF 6.3V 20% X5R 0805	C2012X5R0J476M125AC	TDK Corporation
1	3.3nF	C6	CAP CER 3300PF 16V 10% X7R 0402	GRM15XR71C332KA86D	Murata Electronics
4	22uF	C7 C8 C9 C10	CAP CER 22UF 6.3V 20% X5R 0603	C1608X5R0J226M080AC	TDK Corporation
3	100nF	C19 C22 C24	CAP CER 0.1UF 6.3V 10% X5R 0201	GRM033R60J104KE19D	Murata
1	100pF	C25	CAP CER 100PF 50V +/-1% NP0 0402	04025A101FAT2A	AVX Corporation
2	12pF	C27 C29	CAP CER 12PF 50V 5% NP0 0402	CL05C120JB5NNNC	Samsung Electro
1	4.7uF	C28	CAP CER 4.7uF 10V 10% X5R 0603	C0603C475K8PACTU	Kemet
2	1nF	C30 C31	CAP CER 1000PF 10V 10% X7R 0402	C0402C102K8RACTU	Kemet
13	DNI	C32 C34 C35 C36 C37 C38 C39 C40 C41 C43 C44 C45 R41	DNI		
1	2.2nF	C47	CAP CER 2200PF 50V 5% NP0 0805	GRM2165C1H222JA01D	Murata Electronics
1	10nF	C48	CAP CER 10000PF 50V 5% NP0 0805	GRM2195C1H103JA01D	Murata Electronics
2	4.7uF	C50 C52	CAP CER 4.7UF 25V 10% X7R 0805	CGA4J1X7R1E475K125AC	TDK Corporation
3	33nF	C51 C53 C59	CAP CER 0.033UF 10V 10% X7R 0603	C0603C333K8RACTU	Kemet
1	2.2uF	C54	CAP CER 2.2uF 10V 10% X5R 0603	C0603C225K8PACTU	Kemet
1	2.2uF	C55	CAP CER 2.2UF 50V 10% X7R 1206	GRM31CR71H225KA88L	Murata Electronics
1	100nF	C57	CAP CER 0.1uF 16V 10% X7R 0603	C0603C104K4RACTU	Kemet
1	10nF	C60	CAP CER 10000PF 25V 10% X7R 0603	CL10B103KA8NNNC	Samsung Electro
1	10uF	C61	CAP CER 10UF 6.3V 20% X5R 0603	GRM188R60J106ME84D	Murata Electronics
4	100nF	C62 C63 C64 C67	CAP CER 0.1UF 10V 10% X5R 0402	GRM155R61A104KA01D	Murata
1	1uF	C65	CAP CER 1UF 35V 10% X5R 0603	GMK107BJ105KA-T	Taiyo Yuden
1	10uF	C66	CAP CER 10UF 6.3V 20% X5R 0402	GRJ155R60J106ME11D	Murata Electronics
1	10nF	C69	CAP CER 10000PF 16V 10% X7R 0402	GRM155R71C103KA01D	Murata Electronics
1	MICRO USB B R/A	CN1	CONN RCPT 5POS MICRO USB B R/A	47346-0001	Molex
1	RED	D1	LED 660NM RED WTR CLR 1206 SMD	SML-LX1206SRC-TR	Lumex Opto
2	GRN	D2 DS2	LED 565NM WTR CLR GREEN 1206 SMD	SML-LX1206GC-TR	Lumex Opto
2	SMCJ36CA	D3 D4	TVS DIODE 36VWM 58.1VC SMC	SMCJ36CA	Littelfuse Inc
1	BLUE	DS1	LED 469NM BLUE DIFF 1206 SMD	HSMR-C150	Avago Technologies
6	DNI	H1 H2 H3 H4 H5 H6	DNI MTG 125DRL 300PAD		
3	SMA RA	J1 J3 J4	CONN SMA JACK R/A 50 OHM PCB	142-0701-301	Cinch Connectivity
1	SMA	J2	CONN SMA JACK STR 50 OHM PCB	901-10112	Amphenol RF
1	503480-1000	J5	CONN FFC FPC 10POS 0.50MM R/A	503480-1000	Molex, LLC
4	9P 1x9	JH1 JH2 JH3 JH4	CONN HEADER .100 SINGL STR 9POS	PEC09SAAN	Sullins
1	5P 1x5	JH5	CONN HEADER .100 SINGL STR 5POS	PEC05SAAN	Sullins
2	6P 1x6	JH6 JH7	CONN HEADER .100 SINGL STR 6POS	PEC06SAAN	Sullins
2	2P 3.5mm	JH8 JH9	TERM BLOCK 3.5MM VERT 2POS PCB	OSTTE020161	On Shore Technology
2	10P CORTEX DEBUG	JH10 JH11	IDC BOX HEADER 0.050 10 POS SMD	3220-10-0300-00	CNC Tech
16	JUMPER	JP1 JP3 JP4 JP7 JP10 JP11 JP12 JP13 JP14 JP15 JP16 JP17 JP19 JP20 JP21 JP25	CONN HEADER .100 SINGL STR 2POS	PEC02SAAN	Sullins
7	3P 3x1	JP2 JP5 JP6 JP8 JP9 JP22 JP23	CONN HEADER .100 SINGL STR 3POS	PEC03SAAN	Sullins
1	3P JUMPER	JP18	CONN HEADER .100 SINGL STR 3POS	PEC03SAAN	Sullins
1	8P 2x4	JP24	CONN HEADER .100 DUAL STR 8POS	PEC04DAAN	Sullins
1	2.2uH	L1	FIXED IND 2.2UH 1A 150 MOHM SMD 0805	MLP2012H2R2MT0S1	TDK Corporation
1	HZ1206C202R-10	L2	FERRITE CHIP SIGNAL 2000 OHM SMD	HZ1206C202R-10	Laird-Signal Integrity
1	BLM21PG221SN1D	L3	FERRITE CHIP 220 OHM 0805	BLM21PG221SN1D	Murata Electronics
1	PCB	PCB1			
1	FDV304P	Q1	MOSFET P-CH 25V 460MA SOT-23	FDV304P	Fairchild
1	TLP3545(F)	Q2	PHOTOCOUPLER PHOTORELAY 6-DIP	TLP3545(F)	Toshiba

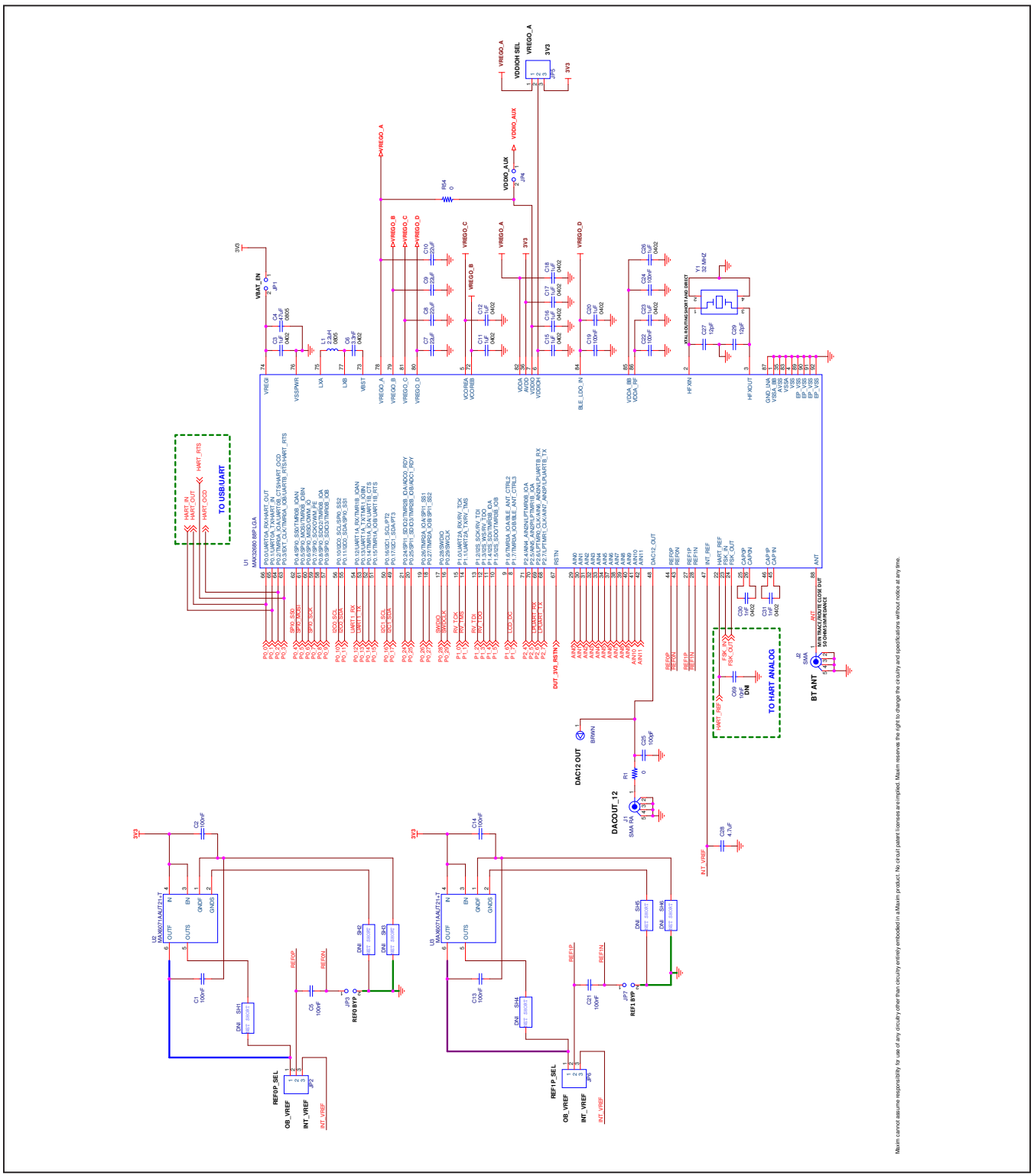
MAX32680 EV Kit Bill of Materials (continued)

QTY	VALUE	PART REFERENCE	BOM_DESCRIPTION	MANUFACTURER_PN	MANUFACTURER
19	0	R1 R6 R7 R8 R10 R11 R12 R13 R14 R15 R16 R17 R18 R19 R20 R22 R23 R29 R54	RES SMD 0 OHM JUMPER 1/10W 0603	RC0603JR-070RL	Yageo
4	2.21K	R2 R3 R4 R5	RES SMD 2.21K OHM 1% 1/10W 0402	ERJ-2RKF2211X	Panasonic
2	4.75K	R9 R21	RES 4.75K OHM 1/10W 1% 0603 SMD	ERJ-3EKF4751V	Panasonic
2	100	R24 R25	RES SMD 100 OHM 1% 1/10W 0603	RC0603FR-07100RL	Yageo
2	470	R26 R50	RES 470 OHM 1/10W 1% 0603 SMD	ERJ-3EKF4700V	Panasonic
2	332	R27 R52	RES 332 OHM 1/10W 1% 0603 SMD	ERJ-3EKF3320V	Panasonic
1	10K	R28	RES 10K OHM 1/10W 1% 0603 SMD	ERJ-3EKF1002V	Panasonic
1	0	R30	RES SMD 0 OHM JUMPER 1/10W 0603	RC0603JR-070RL	Yageo
1	1.58K	R31	RES 1.58K OHM 1/10W 1% 0603 SMD	ERJ-3EKF1581V	Panasonic
1	221K	R32	RES 221K OHM 1/10W 1% 0603 SMD	ERJ-3EKF2213V	Panasonic
1	301K	R33	RES 301K OHM 1/10W 1% 0603 SMD	ERJ-3EKF3013V	Panasonic
2	10	R34 R42	RES 10 OHM 1/10W 1% 0603 SMD	ERJ-3EKF10R0V	Panasonic
2	249	R35 R40	RES 249 OHM 1W 1% 2512 SMD	MCR100JZHF2490	Rohm Semiconductor
1	49.9	R36	RES 49.9 OHM 1/10W 1% 0603 SMD	ERJ-3EKF49R9V	Panasonic
1	100K	R37	TRIMMER 100K OHM 0.125W SMD	3223W-1-104E	Bourns Inc.
2	100K	R38 R44	RES 100K OHM 1/10W 1% 0603 SMD	ERJ-3EKF1003V	Panasonic
1	10K	R39	RES 10K OHM 1/10W 1% 0603 SMD	ERJ-3EKF1002V	Panasonic
2	1K	R43 R45	RES 1K OHM 1/10W 1% 0603 SMD	ERJ-3EKF1001V	Panasonic
2	27	R46 R47	RES 27 OHM 1/10W 1% 0603 SMD	ERJ-3EKF27R0V	Panasonic
1	1.5K	R48	RES SMD 1.5K OHM 1% 1/10W 0402	ERJ-2RKF1501X	Panasonic
1	1M	R49	RES SMD 1M OHM 5% 1/8W 0805	ERJ-6GEYJ105V	Panasonic
1	2.7K	R51	RES 2.7K OHM 1/10W 1% 0603 SMD	ERJ-3EKF2701V	Panasonic
1	10K	R53	RES SMD 10K OHM 1% 1/16W 0402	RC0402FR-0710KL	Yageo
6	DNI	SH1 SH2 SH3 SH4 SH5 SH6	DNI 2 NET SHORT		
3	B3S-1000P	SW1 SW2 SW4	SWITCH TACTILE SPST-NO 0.05A 24V	B3S-1000P	Omron Electronics
1	SPDT 3A	SW3	SWITCH TOGGLE SPDT 3A 120V	ET01MD1AGE	C&K Components
1	MET-26	T1	TRANSFORMER 1KCT:1KCT 3.0MADC	MET-26	Tamura
1	BRWN	TP1	TEST POINT PC MULTIPURPOSE BRWN	5125	Keystone Electronics
2	BLUE	TP2 TP3	TEST POINT PC MULTI PURPOSE BLUE	5127	Keystone Electronics
2	YLW	TP4 TP5	TEST POINT PC MULTI PURPOSE YEL	5014	Keystone Electronics
3	BLK	TP6 TP7 TP8	TEST POINT PC MULTI PURPOSE BLK	5011	Keystone Electronics
1	GRN	TP9	TEST POINT PC MULTI PURPOSE GRN	5126	Keystone Electronics
1	WHT	TP10	TEST POINT PC MULTI PURPOSE WHT	5012	Keystone Electronics
1	MAX32680 88P LGA	U1	MAX32680 88P LGA	MAX32680	Maxim Integrate
2	MAX6071AAUT21+T	U2 U3	IC VREF SERIES 0.04% SOT23-6	MAX6071AAUT21+T	Maxim Integrated
1	DS1233AZ-10+T&R	U4	IC SUPERVISOR 1 CHANNEL SOT223-3	DS1233AZ-10+T&R	Maxim Integrate
1	CFAF128128B1-0145T	U5	LCD TFT Full Color 1.45" 128x128	CFAF128128B1-0145T	Crystalfontz
1	MAX4166EUA+	U6	IC OPAMP GP 5MHZ RRO 8UMAX	MAX4166EUA+	Maxim Integrated
1	FT2232D-REEL	U7	IC USB FS DUAL UART/FIFO 48-LQFP	FT2232D-REEL	FTDI
1	MAX3207EAUT+T	U8	ESD PROT DIFF SOT23-6	MAX3207EAUT+T	Maxim Integrated
1	MAX1806EUA33+	U9	IC REG LDO 3.3V/ADJ 0.5A 8UMAX	MAX1806EUA33+	Maxim Integrated
1	NL27WZ07DFT2G	U10	IC BUFFER NON-INVERT 5.5V SC88	NL27WZ07DFT2G	ON Semiconductor
1	32 MHZ	Y1	CRYSTAL 32.00 MHZ 12PF SMD	FA-20H 32.0000MF12Y-W3	EPSON
1	6MHz	Y2	CRYSTAL 6MHZ 18PF SMD	ABMM-6.000MHZ-B2-T	Abracon Corp

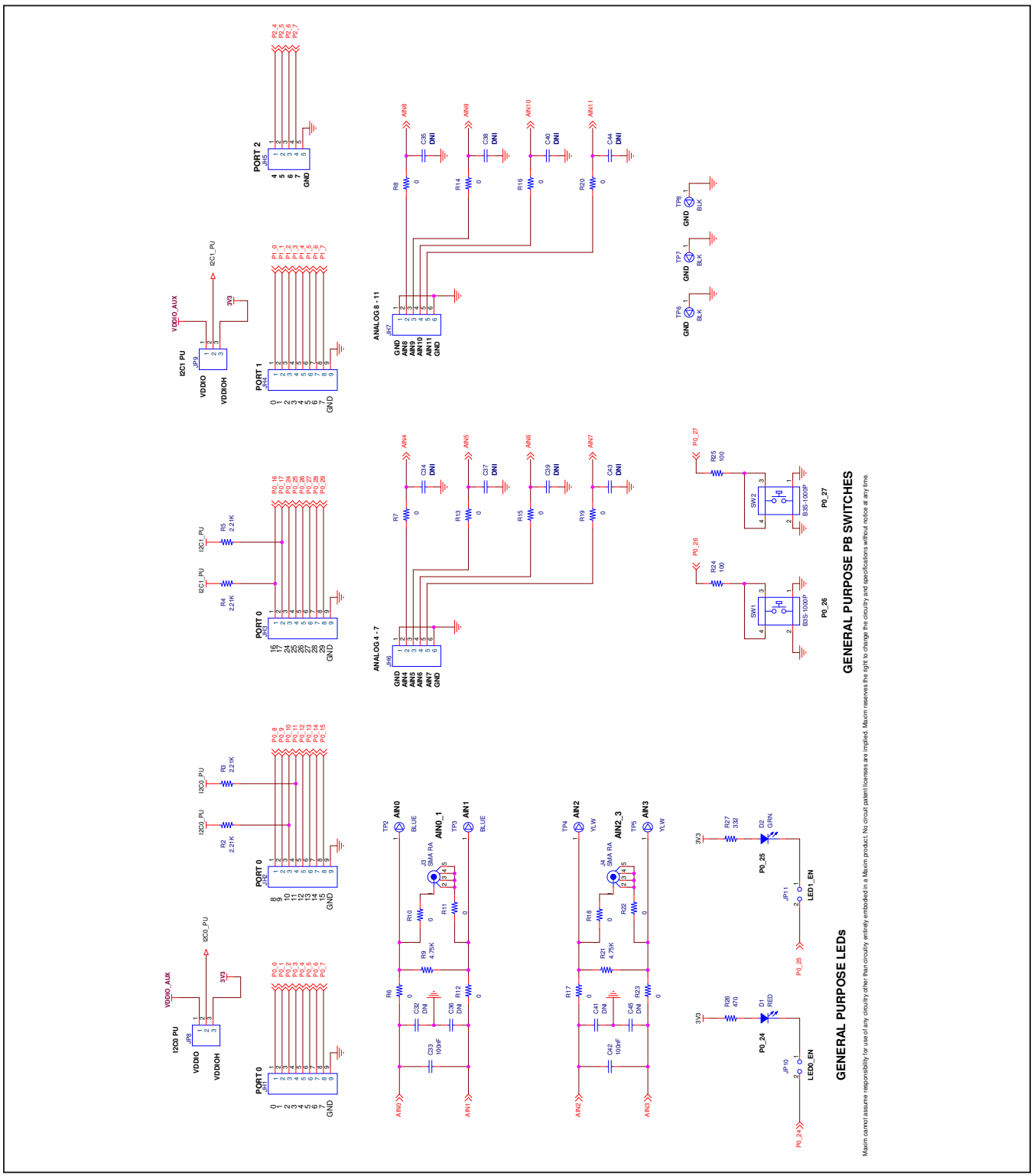
MAX32680 EV Kit Schematic



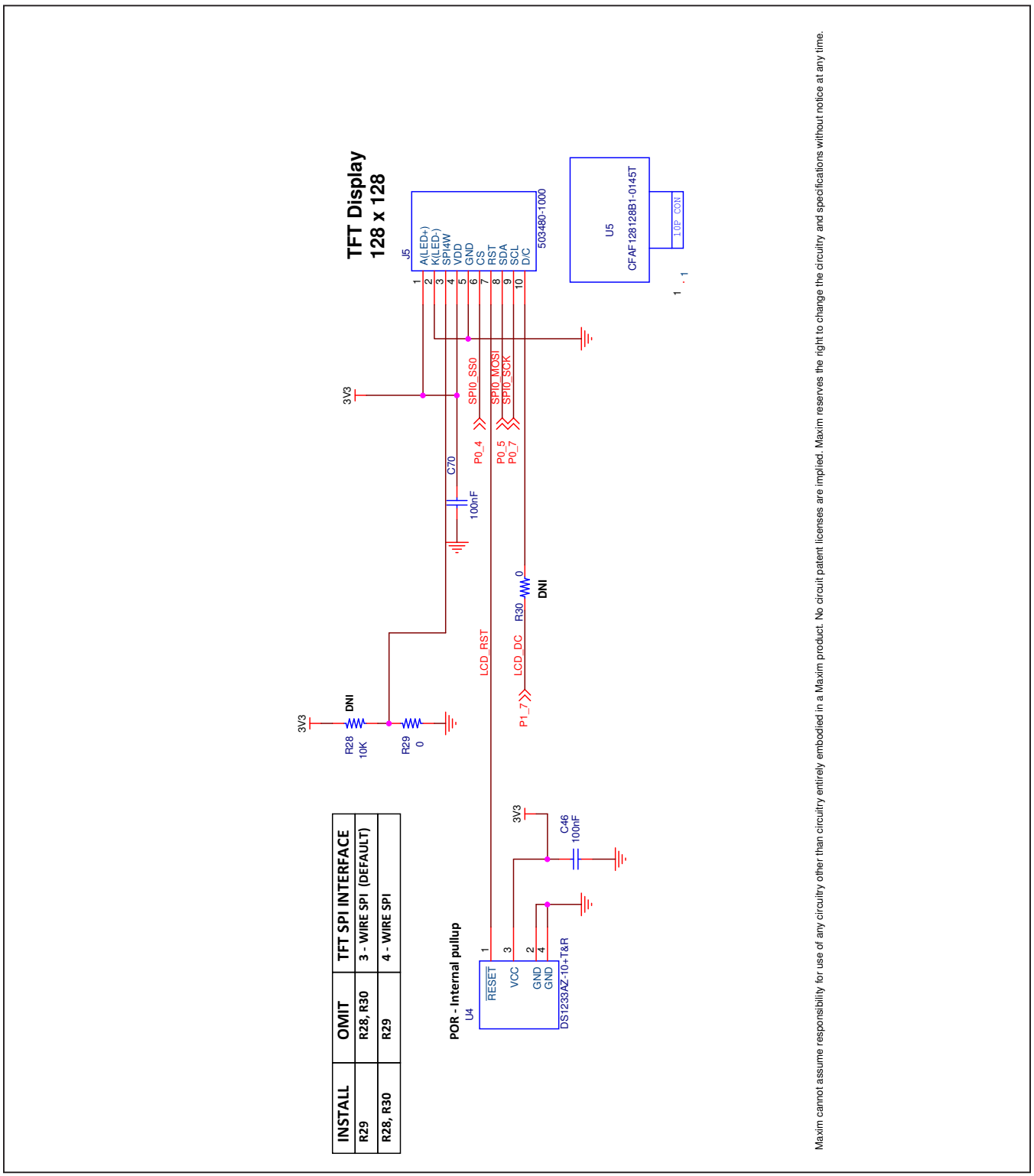
MAX32680 EV Kit Schematic (continued)



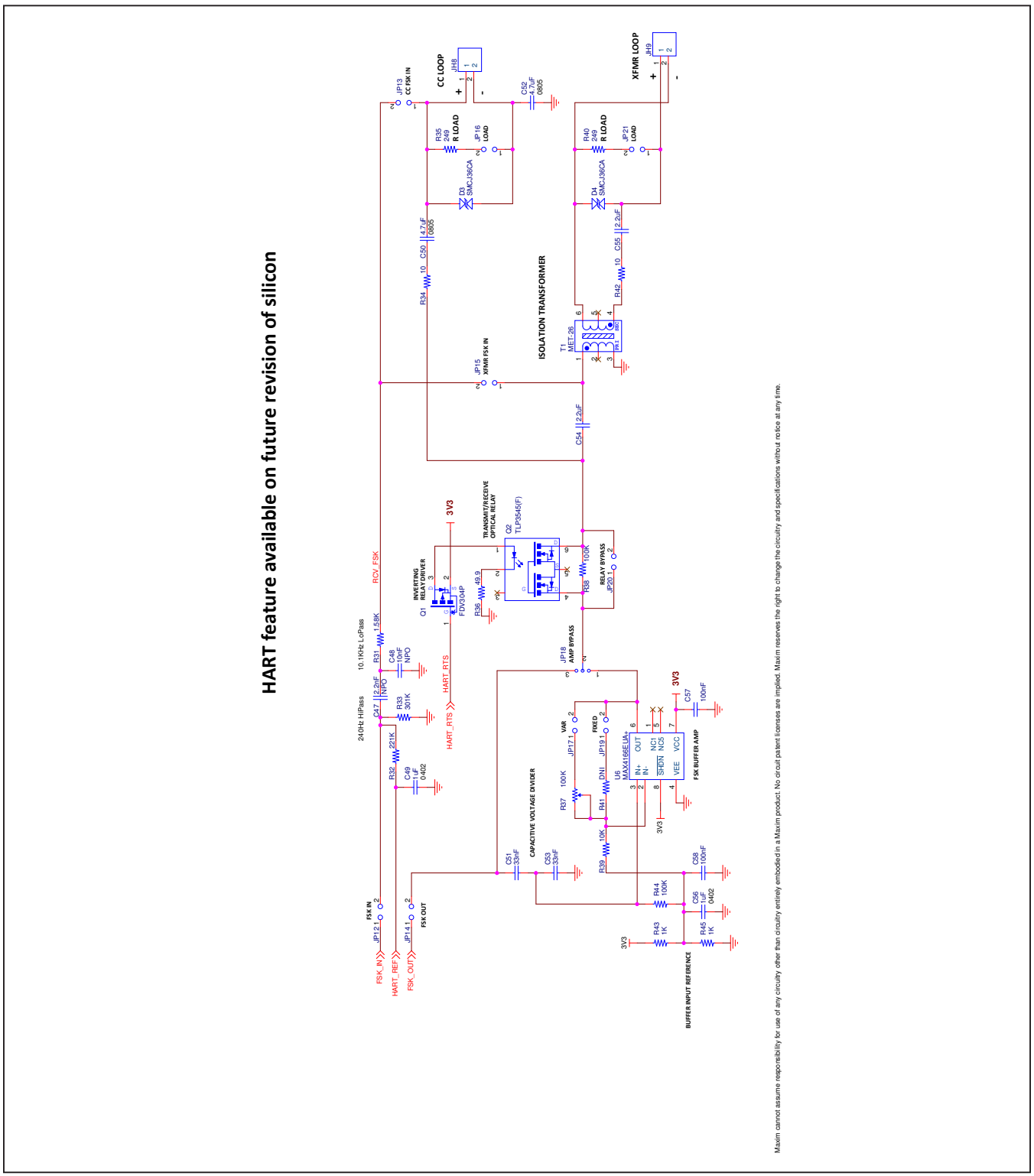
MAX32680 EV Kit Schematic (continued)



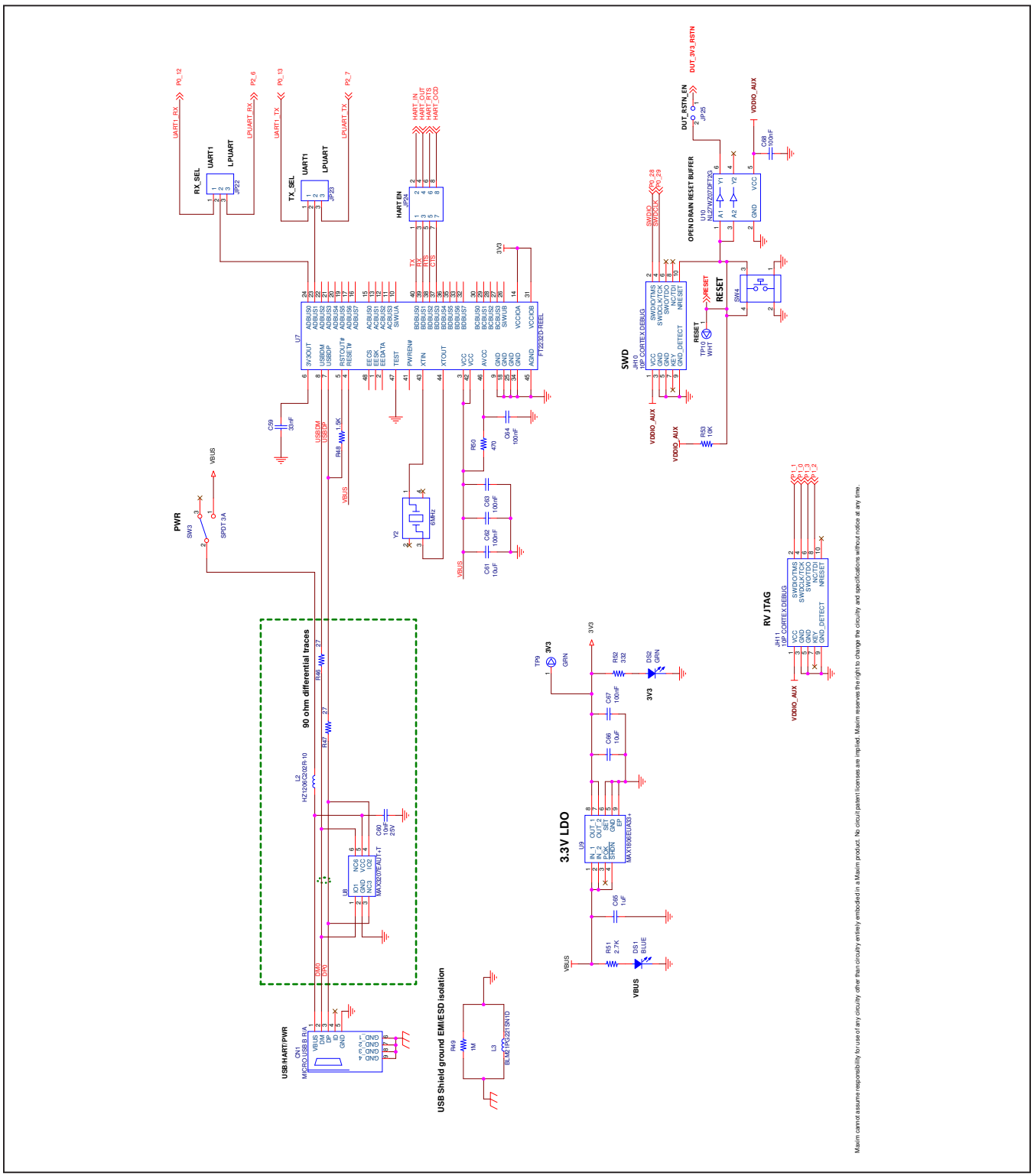
MAX32680 EV Kit Schematic (continued)



MAX32680 EV Kit Schematic (continued)



MAX32680 EV Kit Schematic (continued)



Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	8/21	Initial release	—

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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