ANALOG DEVICES MAX22210 Evaluation Kit User Guide

Contents

ANALOG DEVICES MAX22210 Evaluation Kit

Product Information

- **Product Name:** MAX22210 Evaluation Kit
- **Evaluates:** MAX22210
- **Description:** The MAX22210 evaluation kit (EV kit) provides a proven design to evaluate the +36V, 3.8A (peak) two-phase stepper motor driver. It can drive a single stepper motor and provides an onboard microcontroller (MCU) and GUI to drive the MAX22210's inputs and configure the modes of operation. Microstep modes, decay modes, target speeds, and acceleration can also be configured using the GUI.
- **Benefits and Features:**
  - Easy Evaluation of the MAX22210 Stepper-Motor Driver
  - On-Board +3.3V Regulator to Supply I/Os of the MAX22210
  - Perforated Board and Headers Allow for Separation of the MAX22210 Circuit
  - Fully Assembled and Tested
  - Proven PCB Layout
- **Required Equipment:**
  - MAX22210 EV Kit
  - USB Type-A to Micro USB Type-B Male Cable
  - Up to +36V DC, 3.8A Power Supply
  - Stepper Motor

Product Usage Instructions

1. Ensure the power supply of the MAX22210 is clamped below +42V to avoid damage to the motor-driver IC.
2. Verify that shunts are installed in the default positions.
3. Connect a stepper motor to the J6 terminal block.
4. Connect the MAX22210 EV kit board to the PC with a USB cable.
5. Launch the MAX22210 EV kit GUI.
6. Click on "Device" in the menu bar and select the COM port of the EV kit board.
   - The GUI will display the Selected COM Port, Firmware Version, and Connected in the bottom status bar if the connection was successful.

7. Connect a supply (up to +36V) to the VM and adjust the VM voltage to the desired operating voltage.
8. Turn on the VM supply.
9. Click on the “WAKE” slider to wake the part from sleep mode.

General Description

- The MAX22210 evaluation kit (EV kit) provides a proven design to evaluate the +36V, 3.8A (peak) two-phase stepper motor driver. The MAX22210 EV kit can drive a single stepper motor and provides an onboard microcon-troller (MCU) and GUI to drive the MAX22210’s inputs and configure the modes of operation. Microstep modes, decay modes, target speeds, and acceleration can also be configured using the GUI.

Benefits and Features

- Easy Evaluation of the MAX22210 Stepper-Motor Driver
- On-Board MCU and GUI to Drive and Configure the MAX22210
- Configurable Target Speed
- Configurable Acceleration Profiles
- Configurable Microstepping and Decay Modes
- Motor-Coil Current Reporting
- Configurable Full-Scale Current
- On-Board +3.3V Regulator to Supply I/Os of the MAX22210
- Perforated Board and Headers Allow for Separation of the MAX22210 Circuit
- Windows® 7-, 8-, 10-Compatible Software
- Fully Assembled and Tested
- Proven PCB Layout

MAX22210 Evaluation Kit

MAX22210 EV Kit Files

FILE	DESCRIPTION
MAX22210_GUI_setup_v1.2.3.exe	GUI Install File

Quick Start Required Equipment

- MAX22210 EV Kit
- USB Type-A to Micro USB Type-B Male Cable
- Up to +36V DC, 3.8A Power Supply
- Stepper Motor
- It is recommended that the user reads the MAX22210 IC data sheet prior to using the EV kit and GUI.
- Ordering Information appears at the end of the data sheet.

EV Kit Board

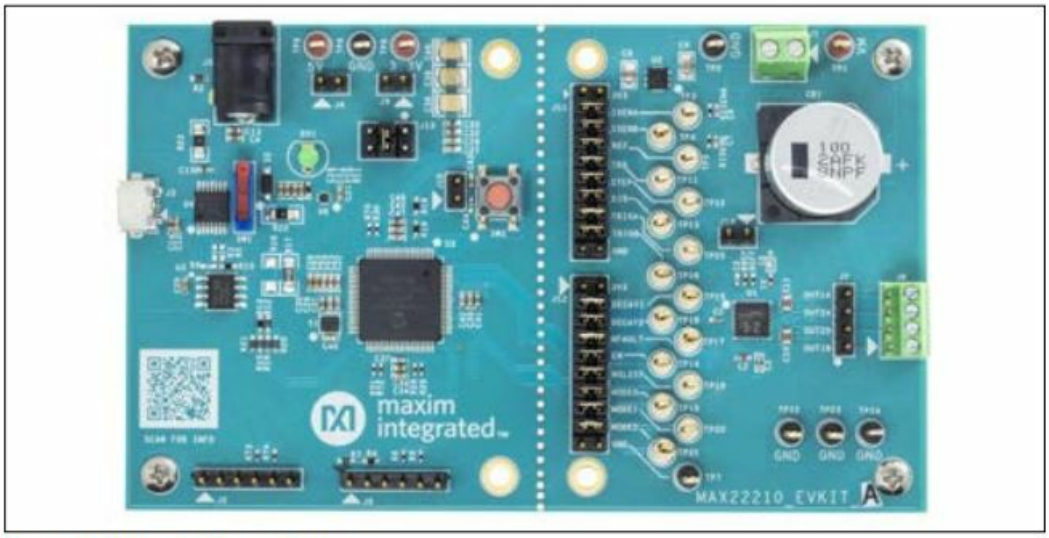


Figure 1. MAX22210 EV Kit Board Photo—Top

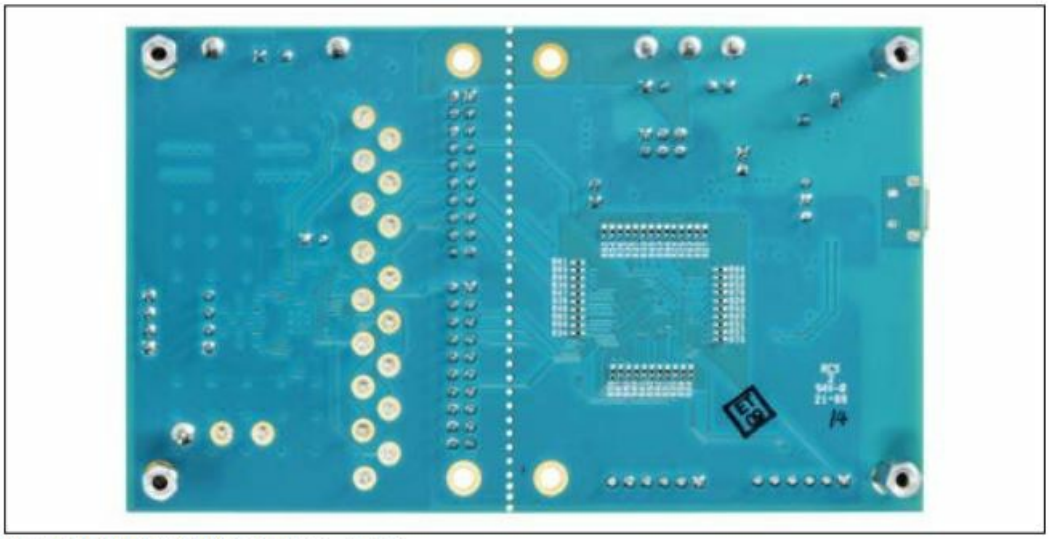


Figure 2. MAX22210 EV Kit Board Photo—Bottom

Software Installation

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

Follow the steps to install the GUI software:

1. Save the MAX22210_GUI_setup_v1.2.3.exe file to the user's PC and double-click to begin the installation.
2. Click the Next button in the welcome screen to begin the GUI installation.
3. Select the install directory and Start Menu folder name.
4. When installation is complete, click the Finish button to launch the MAX22210 EV kit GUI.

Procedure

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

1. As with all motor-driver applications, stopping or braking the motor can cause a back EMF (BEMF) current and voltage surge. At high supply voltages, this can cause the supply to rise above the absolute maximum

allowable voltage to the supply pins of a motor-driver IC. It is highly recommended that the power supply of the MAX22210 be clamped below
+ 42V to avoid damage to the motor-driver IC.

2. Verify that shunts are installed in the default positions.
3. Connect a stepper motor to the J6 terminal block.
4. Connect the MAX22210 EV kit board to the PC with a USB cable.
5. Launch the MAX22210 EV kit GUI.
6. Click on Device in the menu bar and select the COM port of the EV kit board.
    - **a.** The GUI displays the Selected COM Port, Firmware Version, and Connected in the bottom status bar if the connection was a success.
7. Connect a supply (up to +36V) to VM and adjust the VM voltage to the desired operating voltage.
8. Turn on the VM supply.
9. Click on the WAKE slider to wake the part from sleep mode.
10. Click on the ENABLE slider to enable the part.
11. Select the following settings in the Motor Control Graph to begin the first run of the stepper motor.
    - **a**. Target Speed (PPS) = 200
    - **b**. Acceleration Rate (PPSPS) = 100
    - **c**. Acceleration Starting/Ending Speed (PPS) = 100
    - **d**. Steps to Stop = 100
    - **e**. # of Steps = 500
    - **f**. Select Full Step in the Step Mode dropdown
12. Click on the Move # of Steps slider and for a 200 steps/rotation, confirm that the motor shaft rotates three times with the appropriate acceleration and deceleration profile.

Table 1. Default Shunt Positions

HEADER	SHUNT POSITION	DESCRIPTION
J2	Not installed*	MCU debug header 1
J4	Not installed*	External +5V probe header
J8	Not installed*	MCU debug header 2
J9	Not installed*	External +3.3V probe header
J10	Not installed*	Debug RC capacitor isolation
	3-4*	MAX22210 ISENA current output connected to MCU ADC input
	5-6*	MAX22210 ISENB current output connected to MCU ADC input
	7-8*	GND side of REF pin resistor connected to MCU DAC output. If left not installed, install a shunt on header J14 to connect the GND side of the RREF resistor to GND.

J11	9-10*	MAX22210 HFS input connected to MCU output
	11-12*	MAX22210 STEP input connected to MCU output
	13-14*	MAX22210 DIR input connected to MCU output
	15-16*	MAX22210 TRIGA output connected to MCU output
	17-18*	MAX22210 TRIGB output connected to MCU output
	Pins 1 and 2	+3.3V sourced from LDO option from J13
	Pins 19 and 20	GND
	All not installed	Even row of pins allow access to the MAX22210 pins to be driven or monitore d without the use of the on-board MCU
J12	3-4*	MAX22210 DECAY1 input connected to MCU output
	5-6*	MAX22210 DECAY2 input connected to MCU output
	7-8*	MAX22210 FAULT output connected to MCU output
	9-10*	MAX22210 EN input connected to MCU input
	11-12*	MAX22210 SLEEP input connected to MCU output
	13-14*	MAX22210 MODE0 input connected to MCU output
	15-16*	MAX22210 MODE1 input connected to MCU output
	17-18*	MAX22210 MODE2 input connected to MCU output
	Pins 1 and 2	+3.3V sourced from LDO option from J13
	Pins 19 and 20	GND
	All not installed	Even a row of pins allows access to the MAX22210 pins to be driven or monit ored without the use of the on-board MCU
J13	1-2	+3.3V sourced from external +3.3V test point (TP8)
	3-4*	+3.3V sourced from +5V USB VBUS voltage
	5-6	+3.3V sourced from VM voltage

HEADER	SHUNT POSITION	DESCRIPTION
J14	Not installed*	Allows the MCU to adjust the GND side voltage of the MAX22210's REF resistor. Leave this head not installed when using the GUI to control the full-scale current.
	1-2	Connects the GND side voltage of the MAX22210's 18kΩ REF resistor to GND. Install this header with a shunt if the GUI is not being used to control the full-scale current.
J7	Not installed*	The MAX22210 outputs can be monitored using pins 1 through 4 of header J7
SW1	1-2 (upwards)*	Uses the USB VBUS voltage for the +5V to +3.3V LDO conversion
	2-3 (downwards)	Uses an external +5V voltage applied to TP5 for the +5V to +3.3V LDO conversion

Indicates default position.

Detailed Description of Hardware

- The MAX22210 EV kit provides a proven layout, evaluation circuit, and software to evaluate the MAX22210 (U1) IC. The EV kit features a DSPIC33CH512MP508T (U3) microcontroller (MCU), an MCP2221A (U4) USB-to-UART/I2C serial converter, and a MIC5528 (U6) +3.3V LDO that enables serial communication between the GUI and EV kit, provides power to the MCU circuit from the USB port, and allows the user to drive and configure the logic inputs of the MAX22210 IC. The EV kit has perforations down the middle of the board to separate the microcontroller from the MAX22210 circuit.
- To operate the MAX22210 circuit without the use of the MCU or GUI, depopulate the shunts on headers J11 and J12 and install a shunt on header J14. This sets the maximum fixed IFS current to 2A. The maximum fixed IFS current can be adjusted by changing the RREF resistor to a value from 12kΩ to 60kΩ as shown in the equation below
  where KIFS = 36KV and HFS_VALUE = 1 when the HFS logic input pin is low, or HFS_VALUE = 0.5 when the HFS logic input pin is high:

$$IFS\_MAX(A) = \frac{K_{IFS}(KV)}{R_{REF}(K\Omega)} \times HFS\_VALUE$$

- The value of the full-scale current is proportional to the current flowing from the REF pin of the MAX22210 IC to GND through the RREF resistor. When using the MCU and GUI, the maximum fixed IFS current is scaled from 0% to 100% by applying a voltage (VREF) in the range of 0V to 0.9V to the GND side of the RREF resistor connected to pin 1 of header J14. The IFS value is determined using the following equation:

IFS(A) IFS_MAX(A) 0.9V VREF(V) 0.9V

- Where IFS_MAX = the fixed maximum full-scale current (IFS) as configured by the RREF resistor on the EV kit board and VREF is the voltage applied to pin 1 of J14.
- The EV kit board is shipped with RREF = 18kΩ, which sets the fixed maximum full-scale current to 2A or 1A depending on the state of the HFS pin. Refer to the MAX22210 IC data sheet for more information regarding the full-scale current settings.

Detailed Description of Software

- The MAX22210 EV kit GUI allows the user to control and communicate with the MAX22210 IC using a PC.

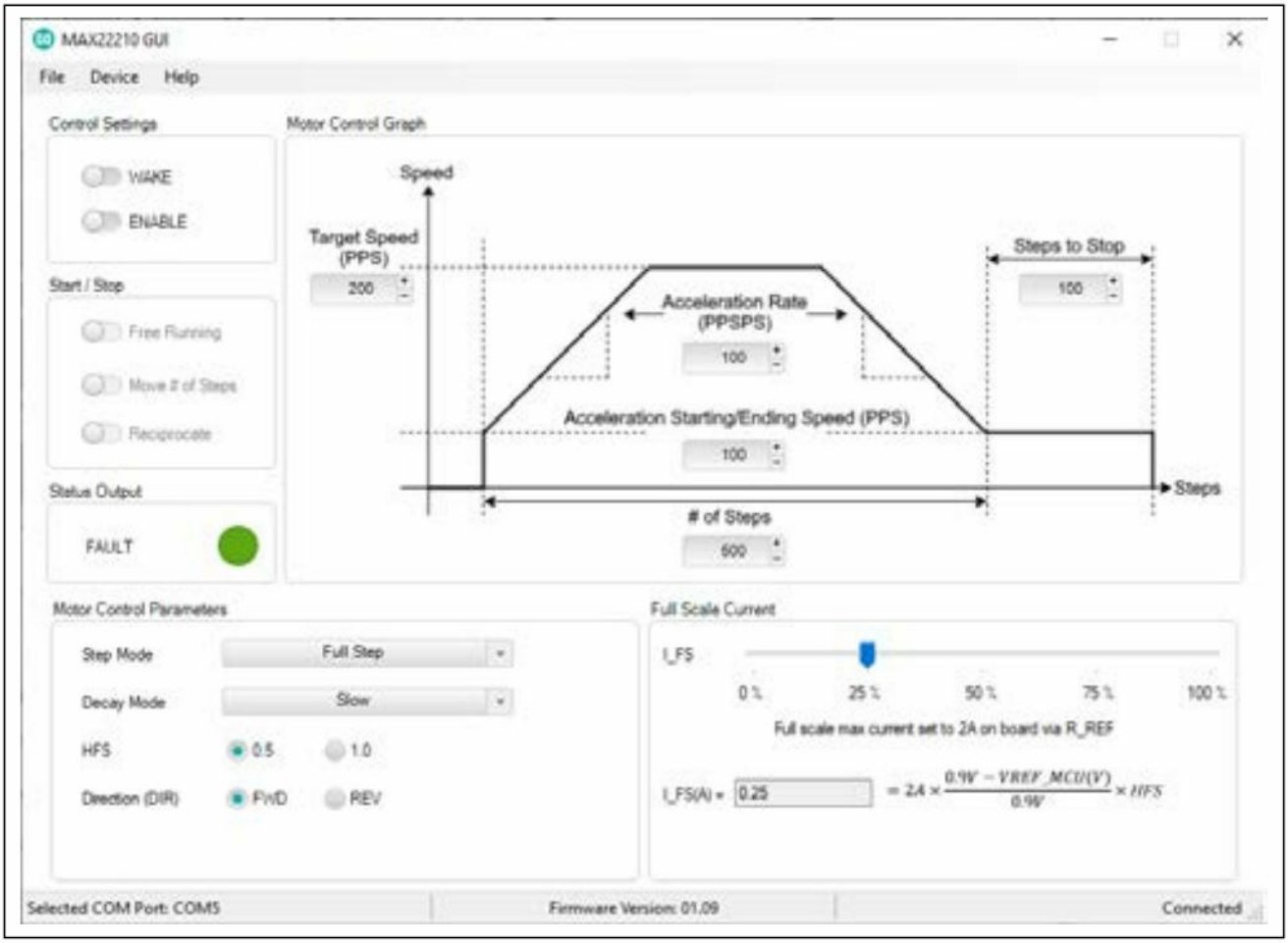


Figure 3. MAX22210 EV Kit GUI

Control Settings

- The Control Settings group box allows the user to enable or disable the MAX22210 or enter and exit sleep mode (see Figure 4).

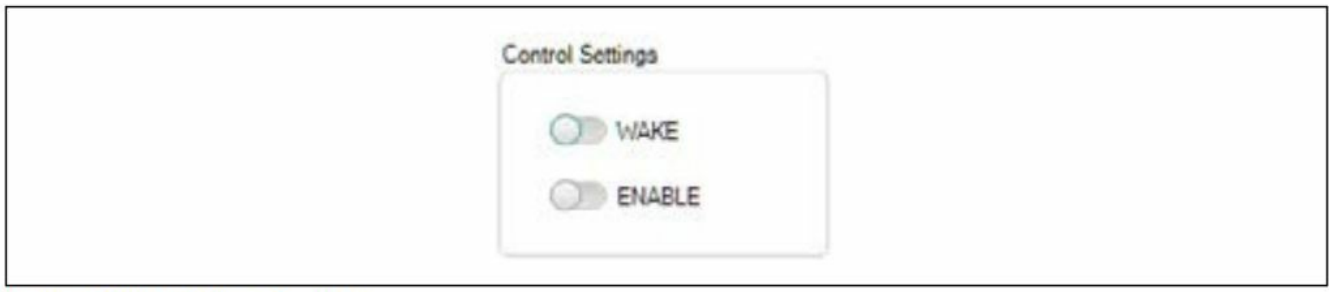


Figure 4. Control-Settings Group Box

Motor-Control Graph

- The Motor Control Graph group box allows the user to configure the speed and acceleration of the stepper motor (Figure 5).

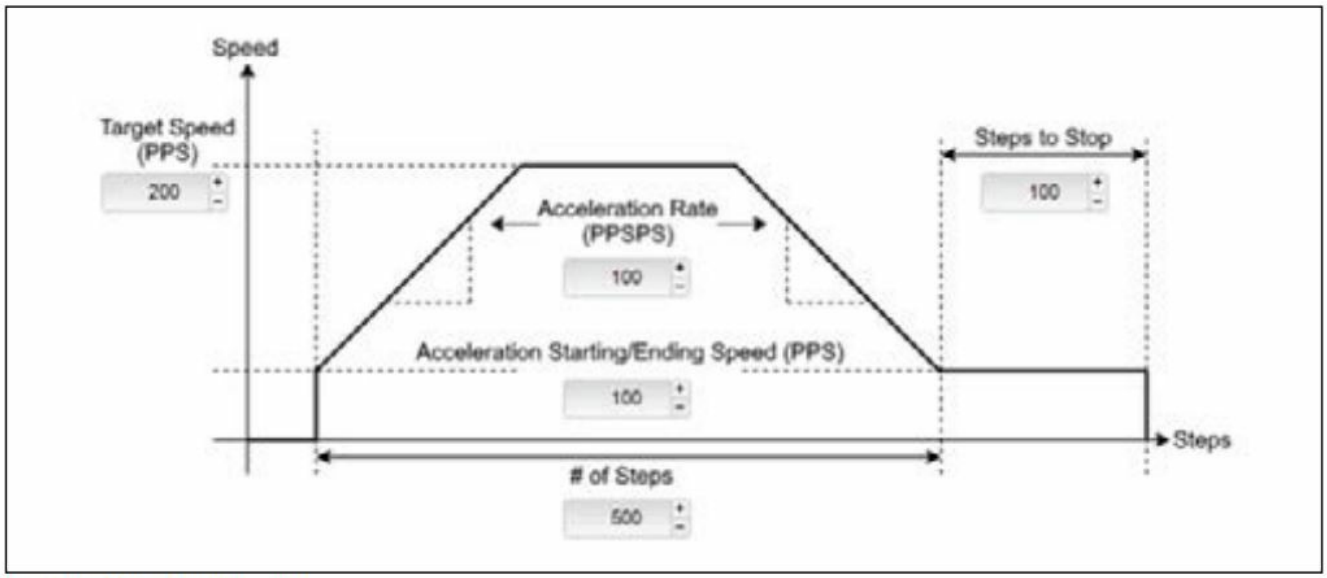


Figure 5. Motor-Control Graph

- The user can select the Target Speed (PPS), acceleration, and deceleration profiles (Acceleration
- Rate (PPS) and Acceleration Starting/Ending Speed (PPS)), and number of steps to travel (# of Steps). The acceleration profiles have a starting speed and an ending speed which is user-defined with an acceleration rate that applies to both the acceleration ramp and deceleration ramp. The user can choose to have the motor stop after the # of Steps have been traveled, or an additional number of Steps to Stop can be added, which run after the deceleration profile is completed and the # of Steps have been traveled. Additional steps prior to the motor stop can be added by entering the value in the Steps to Stop field.

Start/Stop

- The Start / Stop group box allows the user to move the motor in one of three modes (see Figure 6).

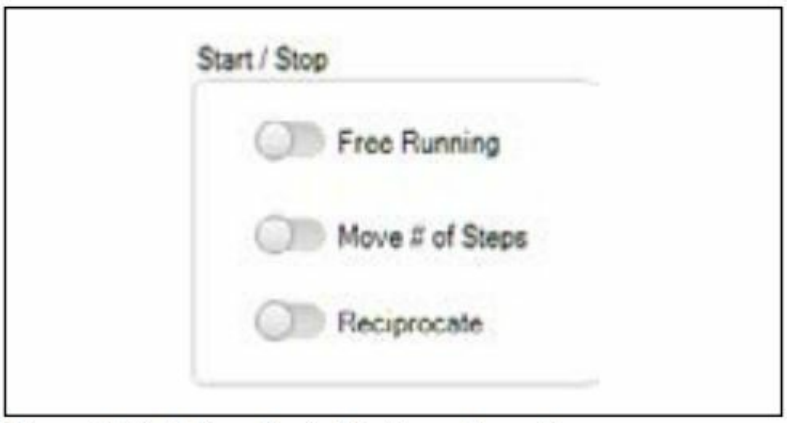


Figure 6. Start/Stop Control-Settings Group Box

- Enabling Free Running mode follows the acceleration profile used to reach the target speed and runs until Free Running mode is disabled.
  Enabling Move # of Steps mode follows the acceleration and deceleration profiles (Acceleration Rate (PPS) and Acceleration Starting/Ending Speed (PPS)), Target Speed (PPS), and Steps to Stop selections until the number of steps and steps to stop have been traveled.
- Enabling the Reciprocate mode follows the acceleration and deceleration profiles (Acceleration Rate (PPS) and

Acceleration Starting/Ending Speed (PPS)), Target Speed (PPS), and Steps to Stop selections until the user-defined number of steps have been traveled and then reverses direction with the same behavior until the Reciprocate slider is disabled.

Status Output

- The Status Output indicator shows the status of the FAULT pin (see Figure 7).

Figure 7. Status-Output Group Box

- Under normal operation, the on-screen indicator is green. During fault conditions, the on-screen indicator is red.

Motor-Control Parameters

- The Motor Control Parameters group box (Figure 8) allows the user to select the Step Mode, Decay Mode, motor current scaling factor (HFS_VALUE (HFS)), and motor direction (Direction DIR).

Figure 8. Motor-Control-Parameters Group Box

- These parameters correspond to logic input pins on the MAX22210 IC, and the GUI allows the user to drive these pins through the onboard MCU. The Step Mode dropdown menu allows the user to select a step mode from Full Step up to 1/128 Step. See Table 2 for more details about the microstep modes. The Decay Mode dropdown menu allows the user to select from the various decay modes of the MAX22210. See Table 3 and the Adaptive Decay Modes section of the MAX22210 IC data sheet for more details about the decay modes. The HFS (output-current full scale) and Direction (DIR) selections allow the user to select the torque scal-ing factor and direction of rotation. The MCU drives the MAX22210 IC's HFS and DIR pins according to the selections made.

Full-Scale Current

- The Full Scale Current group box allows the user to scale the maximum full-scale current used to drive the stepper motor from 0% to 100% (see Figure 9). The maxi-mum full-scale current is set to 2A by the on-board RREF resistor and can be scaled using the I_FS slider.

Table 2. Step-Mode Selection

MODE2	MODE1	MODE0	STEP MODE
0	0	0	Full Step (71% Current)
0	0	1	1/2 Step
0	1	0	1/4 Step
0	1	1	1/8 Step
1	0	0	1/16 Step
1	0	1	1/32 Step
1	1	0	1/64 Step
1	1	1	1/128 Step

Table 3. Decay Modes

DECAY2	DECAY1	INCREASING STEPS	DECREASING STEPS
0	0	Slow	Slow
0	1	Mixed 30% Fast	Mixed 30% Fast
1	0	Mixed 60% Fast	Mixed 60% Fast
1	1	Adaptive	Adaptive

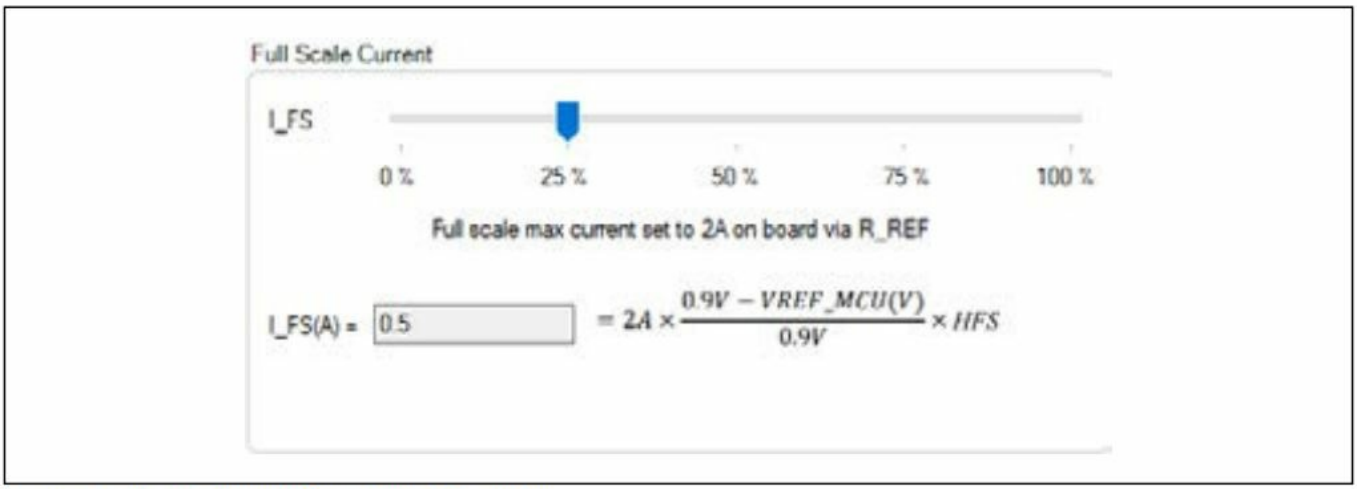


Figure 9. Full-Scale Current, Motor-Control Group Box

Ordering Information

- **PART TYPE**
  - MAX22210EVKIT# EV KIT
- Denotes RoHS compliant.

MAX22210 EV Kit Bill of Materials

ITEM	REF_DES	DNI/DNP	QTY	MFG PART #	MANUFACTURER	VALUE	DESCRIPTION	COMMENTS
1	C1	–	1	CL05A105KO5NNN; CC0402KRX5R7BB105	SAMSUNG;YAGEO	1UF	CAP; SMT (0402); 1UF; 10%; 16V; X5R; CERAMIC	
2	C2	–	1	CGA3E2X7R2A223K080AA	TDK	0.022UF	CAP; SMT (0603); 0.022UF; 10%; 100V; X7R; CERAMIC	
3	C3	–	1	TMK105BJ105MV	TAIYO YUDEN	1UF	CAP; SMT (0402); 1UF; 20%; 25V; X5R; CERAMIC	
4	C4, C16-C18, C25, C26	–	6	GRT188R61C106KE13	MURATA	10UF	CAP; SMT (0603); 10UF; 10%; 16V; X5R; CERAMIC	
5	C8	–	1	GRM21BR70J106K; C2012X7R0J106K125AB; CGA4J1X7R0J106K125AC	MURATA;TDK;TDK	10UF	CAP; SMT (0805); 10UF; 10%; 6.3V; X7R; CERAMIC	
6	C9	–	1	C0805C224K1RAC; GRM21AR72A224KAC5	KEMET;MURATA	0.22UF	CAP; SMT (0805); 0.22UF; 10%; 100V; X7R; CERAMIC	

7	C10, C11	–	2	C2012X7S2A105K125AB; GRJ21BC72A105KE11; GRM21BC72A105KE01	TDK;MURATA;MURATA	1UF	CAP; SMT (0805); 1UF; 10%; 100V; X7S; CERAMIC	
8	C12, C20, C23, C24, C27-C29, C34, C39, C45	–	10	885012206071; C1608X7R1E104K080AA; C0603C104K3RAC; GRM188R71E104KA01; C1608X7R1E104K; 06033C104KAT2A	WURTH ELECTRONICS INC; TDK;KEMET;MURATA;TDK;AVX	0.1UF	CAP; SMT (0603); 0.1UF; 10%; 25V; X7R; CERAMIC	
9	C13-C15, C30, C32, C33, C35, C41, C46	–	9	C0603X5R160-105KNP; EMK107BJ105KA; C1608X5R1C105K080AA; GRM188R61C105K; 0603YD105KAT2A; CL10A105KO8NNN	VENKEL LTD.;TAIYO YUDEN; TDK;MURATA;AVX;SAMSUNG ELECTRO-MECHANICS	1UF	CAP; SMT (0603); 1UF; 10%; 16V; X5R; CERAMIC;	
10	C19, C21	–	2	GRM188R71A225KE15; CL10B225KP8NNN; C1608X7R1A225K080AC; C0603C225K8RAC	MURATA;SAMSUNG; TDK;KEMET	2.2UF	CAP; SMT (0603); 2.2UF; 10%; 10V; X7R; CERAMIC	
11	C22, C31, C37, C42, C47	–	5	C1608C0G1E103J080AA	TDK	0.01UF	CAP; SMT (0603); 0.01UF; 5%; 25V; C0G; CERAMIC;	
12	C36, C38, C40	–	3	C1210C476M4PAC; GRM32ER61C476ME15	KEMET;MURATA	47UF	CAP; SMT (1210); 47UF; 20%; 16V; X5R; CERAMIC	

13	C43	–	1	C0603C474K4RAC; GRM188R71C474K; EMK107B7474KA; C1608X7R1C474K080AC	KEMET;MURATA;TAIYO YUDEN;TDK	0.47UF	CAP; SMT (0603); 0.47UF; 10%; 16V; X7R; CERAMIC	
14	C48	–	1	06033C104JAT2A	AVX	0.1UF	CAP; SMT (0603); 0.1UF; 5%; 25V; X7R; CERAMIC	
15	CB1	–	1	EEV-FK2A101	PANASONIC	100UF	CAP; SMT (CASE_J16); 100UF; 20%; 100V; ALUMINUM-ELECTROLYTIC	
16	D1	–	1	SML-P11UTT86	ROHM	SML-P11UTT86	DIODE; LED; SMT; PIV=1.8V; IF=0.02A;	
17	D2	–	1	SMF5.0A	MICRO COMMERCIAL COMPONENTS	5V	DIODE; TVS; SMT (SOD-123FL); VRM=5V; IF=21.7A	
18	DS1	–	1	SSL-LX3044GD-12V	LUMEX OPTO COMPONENTS INC	LX3044GD-12V	GREEN LIGHT EMITTING DIODE	
19	J1	–	1	1727010	PHOENIX CONTACT	1727010	CONNECTOR; FEMALE; THROUGH HOLE; GREEN TERMINAL BLOCK; RIGHT ANGLE; 2PINS	
20	J2, J8	–	2	PBC06SFCN	SULLINS ELECTRONICS CORP.	PBC06SFCN	CONNECTOR; MALE; THROUGH HOLE; .1IN CONTACT CENTER; BREAKAWAY HEADER; STRAIGHT; 6PINS	

21	J3	–	1	ZX62RD-AB-5P8(30)	HIROSE ELECTRIC CO LTD.	ZX62RD-AB-5P8(30)	CONNECTOR; MALE; THROUGH HOLE; MICRO-USB CONNECTOR MEETING REQUIREMENTS OF USB 2.0 STANDARD; RIGHT ANGLE; 5PINS	
22	J4, J9, J10, J14	–	4	PBC02SAAN	SULLINS ELECTRONICS CORP.	PBC02SAAN	CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT; 2PINS	
23	J5	–	1	PJ-102B	CUI INC.	PJ-102B	CONNECTOR; MALE; THROUGH HOLE; DC POWER JACK; RIGHT ANGLE; 3PIN	
24	J6	–	1	OSTVN04A150	ON-SHORE TECHNOLOGY INC	OSTVN04A150	CONNECTOR; TERMINAL BLOCK; FEMALE; THROUGH HOLE; STRAIGHT; 4PINS	
25	J7	–	1	PBC04SAAN	SULLINS ELECTRONICS CORP.	PBC04SAAN	CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT; 4PINS; -65 DEGC TO +125 DEGC	
26	J11, J12	–	2	PBC10DAAN	SULLINS ELECTRONICS CORP	PBC10DAAN	CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT; 20PINS	

27	J13	–	1	PEC03DAAN	SULLINS ELECTRONICS CORP.	PEC03DAAN	CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT THROUGH; 6PINS; -65 DEGC TO +125 DEGC	
28	R1	–	1	CRCW04021K40FK; RC0402FR-071K4L	VISHAY DALE; YAGEO PHICOMP	1.4K	RES; SMT (0402); 1.4K; 1%; +/- 100PPM/DEGC; 0.0630W	
29	R2, R7, R12, R14, R15, R20, R21	–	7	CRCW06030000ZS; MCR03EZPJ000; ERJ-3GEY0R00; CR0603AJ/-000ELF	VISHAY;ROHM SEMICONDUCTOR; PANASONIC;BOURNS	0	RES; SMT (0603); 0; JUMPER; JUMPER; 0.1000W	
30	R4, R18	–	2	CRCW06034K70FK	VISHAY DALE	4.7K	RES; SMT (0603); 4.7K; 1%; +/- 100PPM/DEGC; 0.1000W	

ITEM	**REF_DES**	**DNI/ DNP**	**QTY**	**MFG PART #**	**MANUFACTURER**	**VALUE**	**DESCRIPTION**	**COMMENTS**
31	R8, R9, R24-R26, R29, R30, R70-R74	–	12	ERJ-2GE0R00	PANASONIC	0	RES; SMT (0402); 0; JUMPER; JUMPER; 0.1000W	
32	R10	–	1	CRCW0603100KFK; RC0603FR-07100KL; RC0603FR-131000KL; ERJ-3EKF1003; AC0603FR-07100KL	VISHAY DALE;YAGEO;YAGEO; PANASONIC;YAGEO	100K	RES; SMT (0603); 100K; 1%; +/- 100PPM/DEGC; 0.1000W	

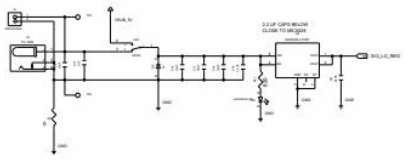
33	R11	–	1	ERJ-3EKF6200	PANASONIC	620	RES; SMT (0603); 620; 1%; +/- 100PPM/DEGC; 0.1000W	
34	R13, R19	–	2	CRCW06031K00FK; ERJ-3EKF1001; CR0603AFX-1001ELF; RMCF0603FT1K00	VISHAY; PANASONIC; BOURNS; STACKPOLE ELECTRONICS INC.	1K	RES; SMT (0603); 1K; 1%; +/- 100PPM/DEGC; 0.1000W	
35	R17	–	1	CSR1206FTR500	STACKPOLE ELECTRONICS INC.	0.5	RES; SMT (1206); 0.5; 1%; +/- 100PPM/DEGC; 0.5000W	
36	R22, R23	–	2	CRCW12060000ZS	VISHAY DALE	0	RES; SMT (1206); 0; JUMPER; JUMPER; 0.2500W	
37	R27, R28, R31-R69, R75, R76	–	43	RC0402FR-0710KL; CR0402-FX-1002GLF	YAGEO;BOURNS	10K	RES; SMT (0402); 10K; 1%; +/- 100PPM/DEGC; 0.0630W	
38	RISENA, RISENB	–	2	ERA-2AEB3741X	PANASONIC	3.74K	RES; SMT (0402); 3.74K; 0.10%; +/- 25PPM/DEGC; 0.0630W	
39	ROFF	–	1	ERJ-2RKF3002	PANASONIC	30K	RES; SMT (0402); 30K; 1%; +/- 100PPM/DEGC; 0.1000W	
40	RREF	–	1	ERJ-2RKF1802	PANASONIC	18K	RES; SMT (0402); 18K; 1%; +/- 100PPM/DEGC; 0.1000W	

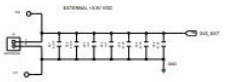
41	SW1	–	1	NK236	APEM	NK236	SWITCH; SPDT; THROUGH HOLE; 12V; 0.5A; NK SERIES; RCOIL= OHM; RINSULATION= OHM; APEM	
42	SW2	–	1	PTS645SK50SMTR92LFS	C&K COMPONENTS	PTS645SK50SMTR92LFS	SWITCH; SPST; SMT; STRAIGHT; 12V; 0.05A; TACT SWITCHES; RCOIL=0.1 OHM; RINSULATION=100G OHM	
43	TP1, TP5, TP8	–	3	5010	KEYSTONE	N/A	TEST POINT; PIN DIA=0.125IN; TOTAL LENGTH=0.445IN; BOARD HOLE=0.063IN; RED; PHOSPHOR BRONZE WIRE SIL;	
44	TP2, TP6, TP7, TP22- TP24	–	6	5011	KEYSTONE	N/A	TEST POINT; PIN DIA=0.125IN; TOTAL LENGTH=0.445IN; BOARD HOLE=0.063IN; BLACK; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH;	
45	TP3, TP4, TP9, TP11-TP21, TP25, TP26	–	16	5012	KEYSTONE	N/A	TEST POINT; PIN DIA=0.125IN; TOTAL LENGTH=0.445IN; BOARD HOLE=0.063IN; WHITE; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH;	

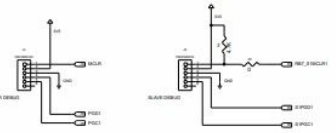
46	U1	–	1	MAX22210_TQFN	ANALOG DEVICES	MAX22210_TQFN	EVKIT PART – IC; MAX22210; 36V; 3.8A STEPPER MOTOR DRIVER WITH INTEGRATED CURRENT SENSE AND 128 STEPS INDEXER; PACKAGE OUTLINE DRAWING: 21-0140; PACKAGE LAND PATTERN: 90-0013; TQFN32-EP	
47	U2	–	1	MAX6765TTSD2+	ANALOG DEVICES	MAX6765TTSD2+	IC; VREG; AUTOMOTIVE MICROPOWER LINEAR REGULATOR WITH SUPERVISOR; TDFN6-EP	
48	U3	–	1	DSPIC33CH512MP508T-I/PT	MICROCHIP	DSPIC33CH512MP508T- I/PT	IC; CTRL; 16-BIT DIGITAL SIGNAL CONTROLLERS WITH HIGH-RESOLUTION PWM AND CAN FLEXIBLE DATA RATE; TQFP80-EP	
49	U4	–	1	MCP2221A-I/ST	MICROCHIP	MCP2221A-I/ST	IC; CONV; USB 2.0 TO I2C/UART PROTOCOL CONVERTER WITH GPIO ; TSSOP14	
50	U5	–	1	SI8422AB-D-IS	SILICON LABORATORIES	SI8422AB-D-IS	IC; DISO; LOW-POWER; SINGLE AND DUAL-CHANNEL DIGITAL ISOLATORS; NSOIC8	
51	U6	–	1	MIC5528-3.3YMT	MICROCHIP	MIC5528-3.3YMT	IC; VREG; HIGH PERFORMANCE 500 MA LDO; TDFN6-EP	
52	Y1	–	1	DSC6011JI1B-008.0000	MICROCHIP	DSC6011JI1B-008.0000	OSCILLATOR; SMT 2.5X2.0; 8MHZ; +/- 50PPM;	

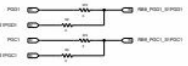
53	PCB	–	1	MAX22210	ANALOG DEVICES	PCB	PCB:MAX22210	–
54	C5	DNP	0	GRM155R61C104KA88	MURATA	0.1UF	CAP; SMT (0402); 0.1UF; 10%; 16V; X5R; CERAMIC	DNI
55	C6, C7	DNP	0	C0402X7R500-222KNE; GRM155R71H222KA01; C1005X7R1H222K050BA	VENKEL LTD.;MURATA;TDK	2200PF	CAP; SMT (0402); 2200PF; 10%; 50V; X7R; CERAMIC	DNI
56	C44	DNP	0	C0603C473K3RAC; GRM188R71E473KA01	KEMET;MURATA	0.047UF	CAP; SMT (0603); 0.047UF; 10%; 25V; X7R; CERAMIC;	
57	R3, R5	DNP	0	CRCW06030000ZS; MCR03EZPJ000; ERJ-3GEY0R00; CR0603AJ/-000ELF	VISHAY;ROHM SEMICONDUCTOR; PANASONIC;BOURNS	0	RES; SMT (0603); 0; JUMPER; JUMPER; 0.1000W	DNI
58	R6	DNP	0	CRCW0603100KFK; RC0603FR-07100KL; RC0603FR-131000KL; ERJ-3EKF1003; AC0603FR-07100KL	VISHAY DALE;YAGEO;YAGEO; PANASONIC;YAGEO	100K	RES; SMT (0603); 100K; 1%; +/- 100PPM/DEGC; 0.1000W	
59	R16	DNP	0	CRCW12060000ZS	VISHAY DALE	0	RES; SMT (1206); 0; JUMPER; JUMPER; 0.2500W	
TOTAL			173					

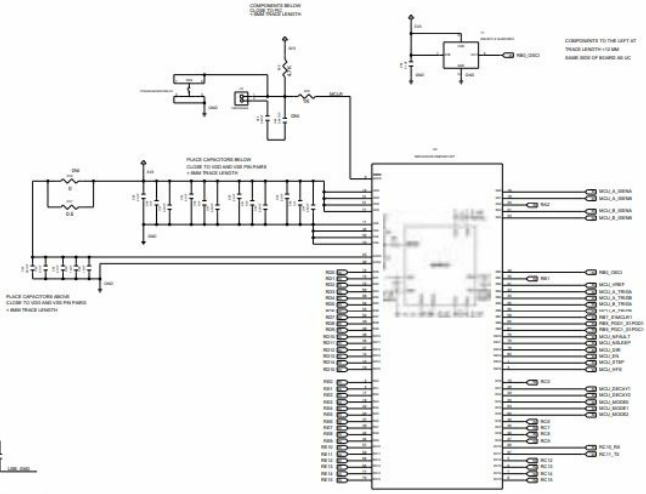
MAX22210 EV Kit Schematic

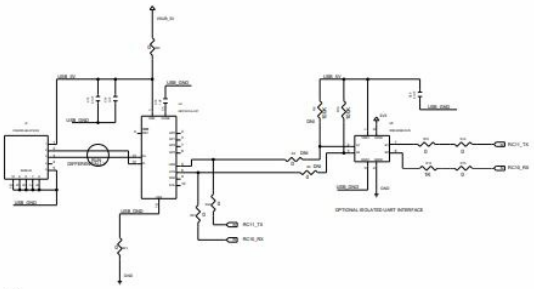

2.2 UF CAPS BELOW
CLOSE TO MCU28
3V3_LO_REG

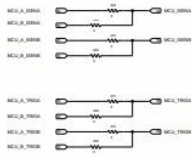

EXTERNAL +3.3V VDD
3V3_EXT

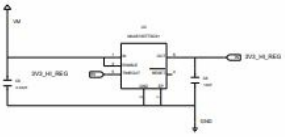

MCLR
MASTER DEBUG
PGD1
PGC1
SLAVE DEBUG
REF_0 FAULT1
0 PGD1
0 PGC1

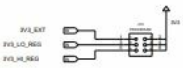

PGD1
0 PGD1
PGC1
0 PGC1
RMI_PGD1_0 PGD1
RMI_PGC1_0 PGC1

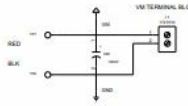

COMPONENTS BELOW
CLOSE TO PIC
1 INCH TRACE LENGTH
PLACE CAPACITORS BELOW
CLOSE TO VDD AND VSS PIN PAIRS
< 6MM TRACE LENGTH
PLACE CAPACITORS ABOVE
CLOSE TO VDD AND VSS PIN PAIRS
< 6MM TRACE LENGTH
MCLR
RMI_OSC1
COMPONENTS TO THE LEFT AT
TRACE LENGTH <12 MM
SAME SIDE OF BOARD AS UC
MCU_A_ISENA
MCU_B_ISENA
MCU_A_ISENB
MCU_B_ISENB
MCU_VREF
MCU_A_TRIGA
MCU_B_TRIGA
MCU_A_TRIGB
MCU_B_TRIGB
RMI_PGD1_0 PGD1
RMI_PGC1_0 PGC1
MCU_NFAULT
MCU_NSLEEP
MCU_DIR
MCU_STEP
MCU_HFS
MCU_DECAY1
MCU_DECAY2
MCU_MODE0
MCU_MODE1
MCU_MODE2
RC11_TX
RC10_RX


USB_5V
USB_GND
OPTIONAL ISOLATED UART INTERFACE
RC11_TX
RC10_RX

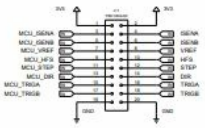

MCU_A_ISENA
MCU_B_ISENA
MCU_A_ISENB
MCU_B_ISENB
MCU_A_TRIGA
MCU_B_TRIGA
MCU_A_TRIGB
MCU_B_TRIGB

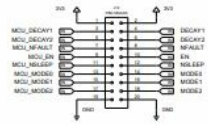

VM
3V3_HI_REG
3V3_HI_REG
GND


3V3_EXT
3V3_LO_REG
3V3_HI_REG
3V3

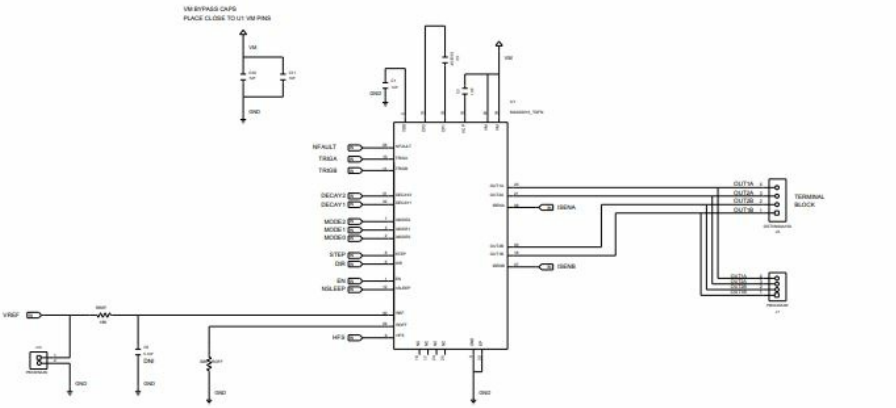

VM TERMINAL BLOCK
RED
BLK
GND

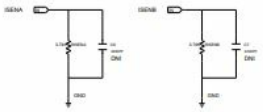

3V3
NFAULT


3V3
MCU_ISENA
MCU_ISENB
MCU_VREF
MCU_HFS
MCU_STEP
MCU_DIR
MCU_TRIGA
MCU_TRIGB
ISENA
ISENB
VREF
HFS
STEP
DIR
TRIGA
TRIGB
GND

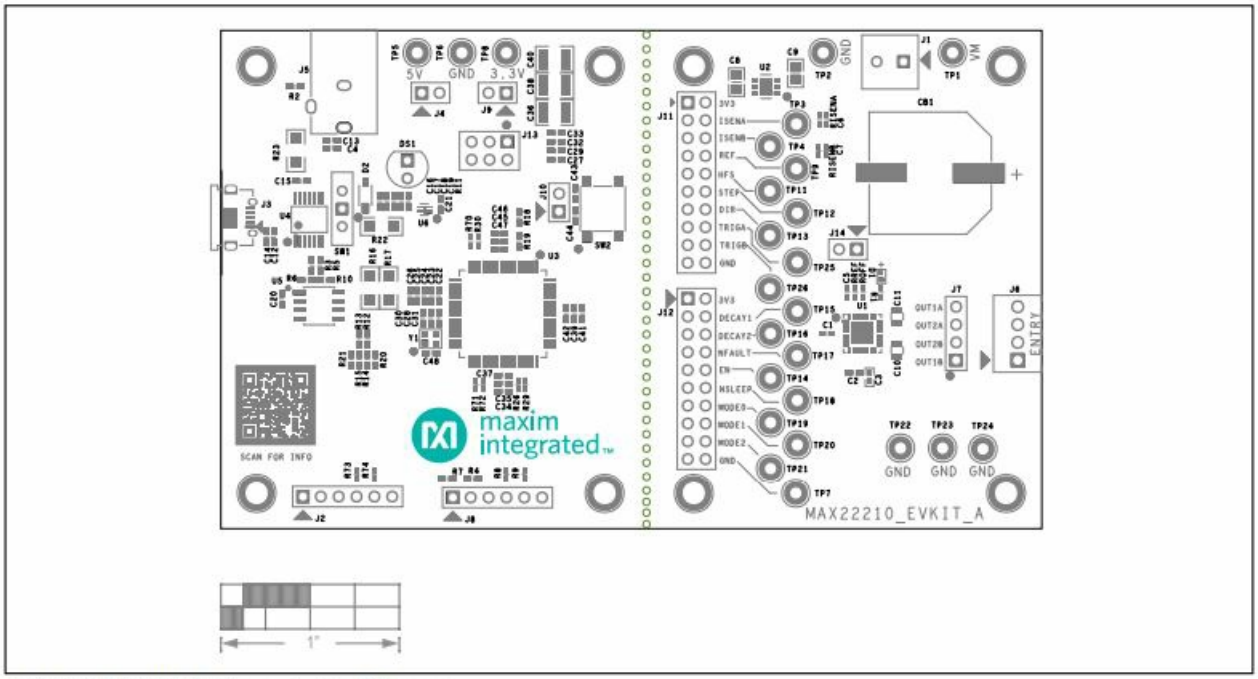

3V3
MCU_DECAY1
MCU_DECAY2
MCU_NFAULT
MCU_EN
MCU_NSLEEP
MCU_MODE0
MCU_MODE1
MCU_MODE2
DECAY1
DECAY2
NFAULT
EN
NSLEEP
MODE0
MODE1
MODE2
GND


ISENA
ISENB
VREF
HFS
STEP
DIR
TRIGA
TRIGB
DECAY1
DECAY2
NFAULT
EN
NSLEEP
MODE0
MODE1
MODE2
GND

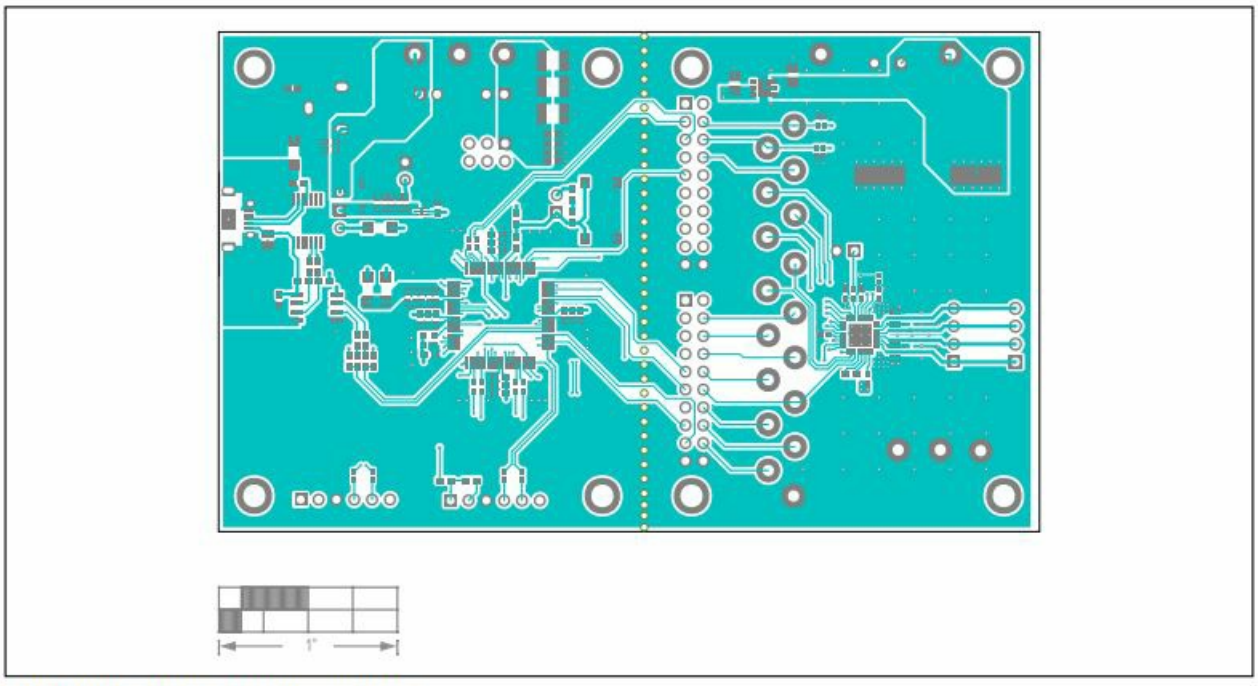

VM BYPASS CAPS
PLACE CLOSE TO U1 VM PINS
VM
GND
NFAULT
TRIGA
TRIGB
DECAY2
DECAY1
MODE2
MODE1
MODE0
STEP
DIR
EN
NSLEEP
VREF
HFS
ISENA
ISENB
OUT1A
OUT2A
OUT2B
OUT1B
TERMINAL
BLOCK


ISENA
ISENB
GND

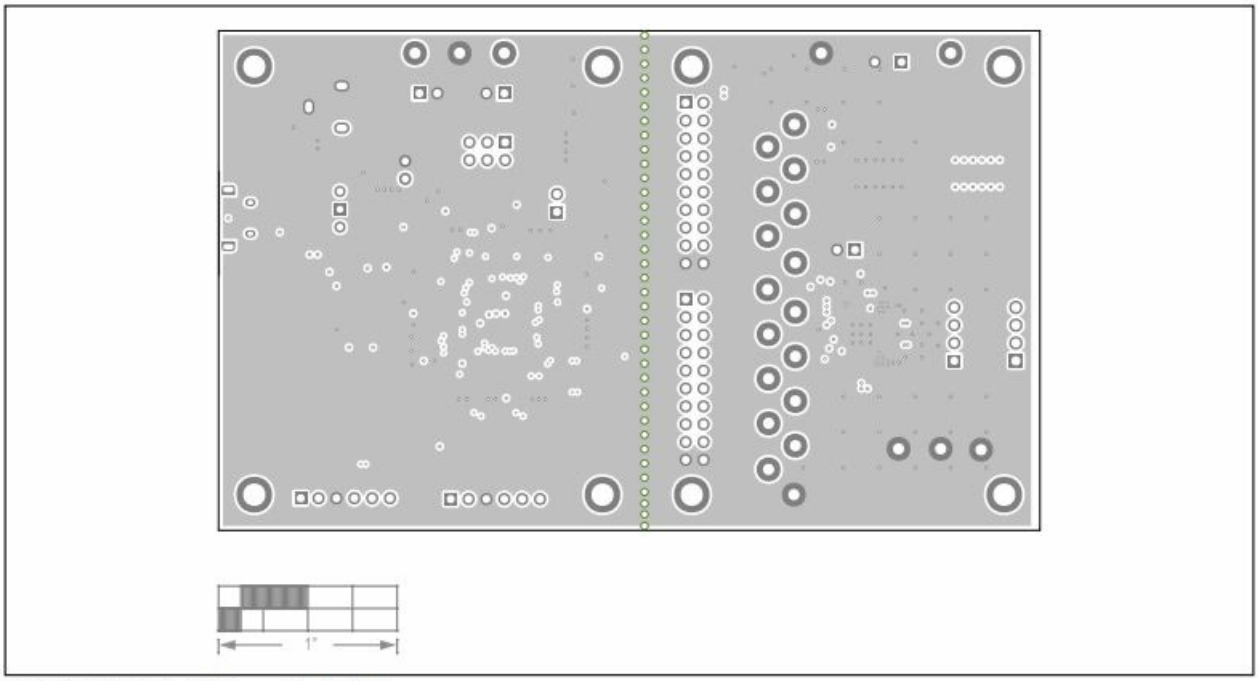
MAX22210 EV Kit PCB Layout



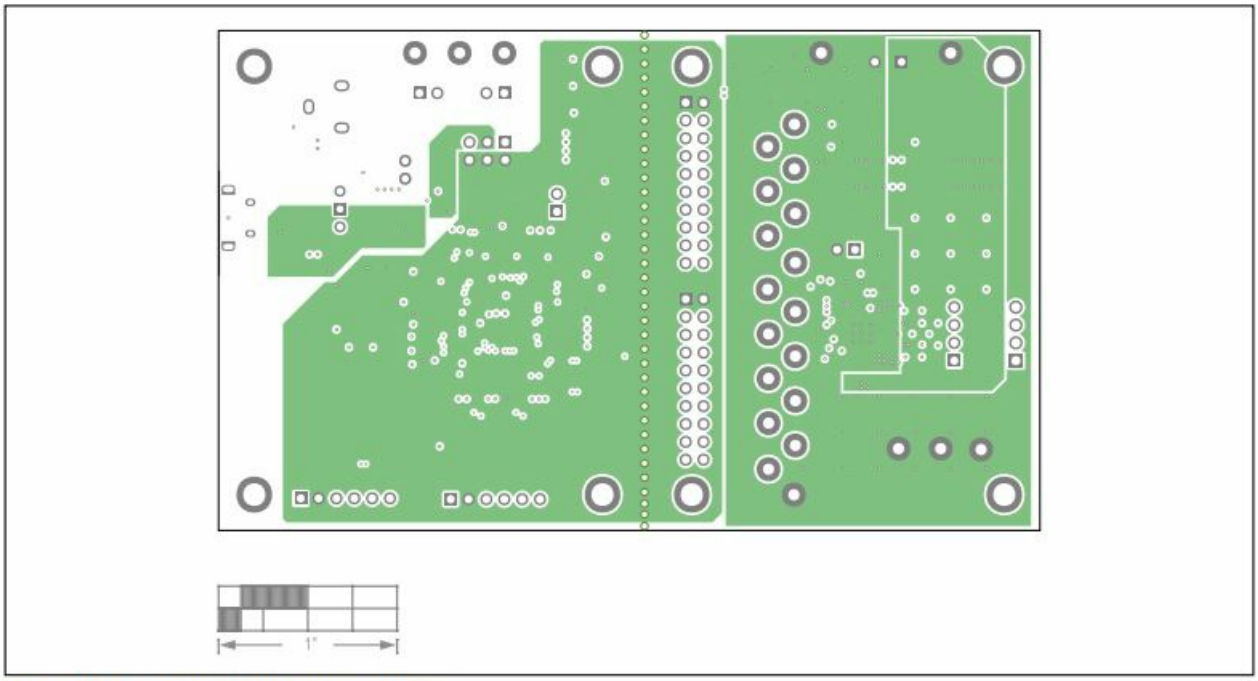
MAX22210 EV Kit PCB Layout—Top Silkscreen



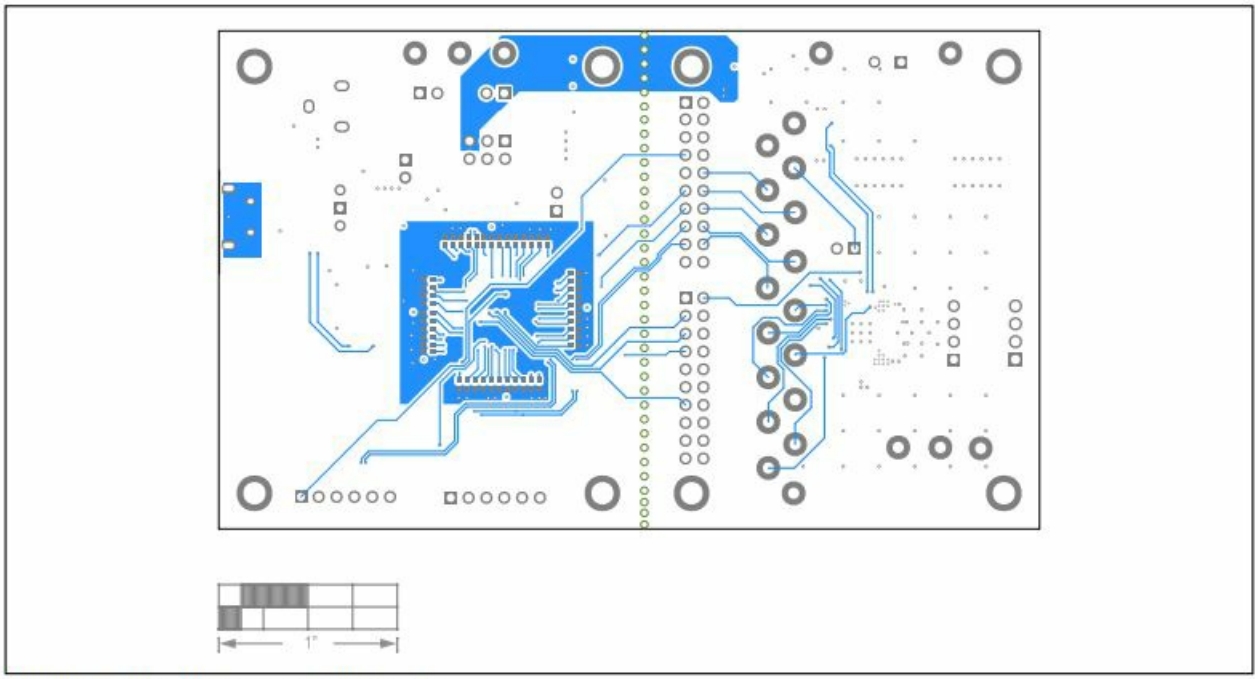
MAX22210 EV Kit PCB Layout—Top Layer



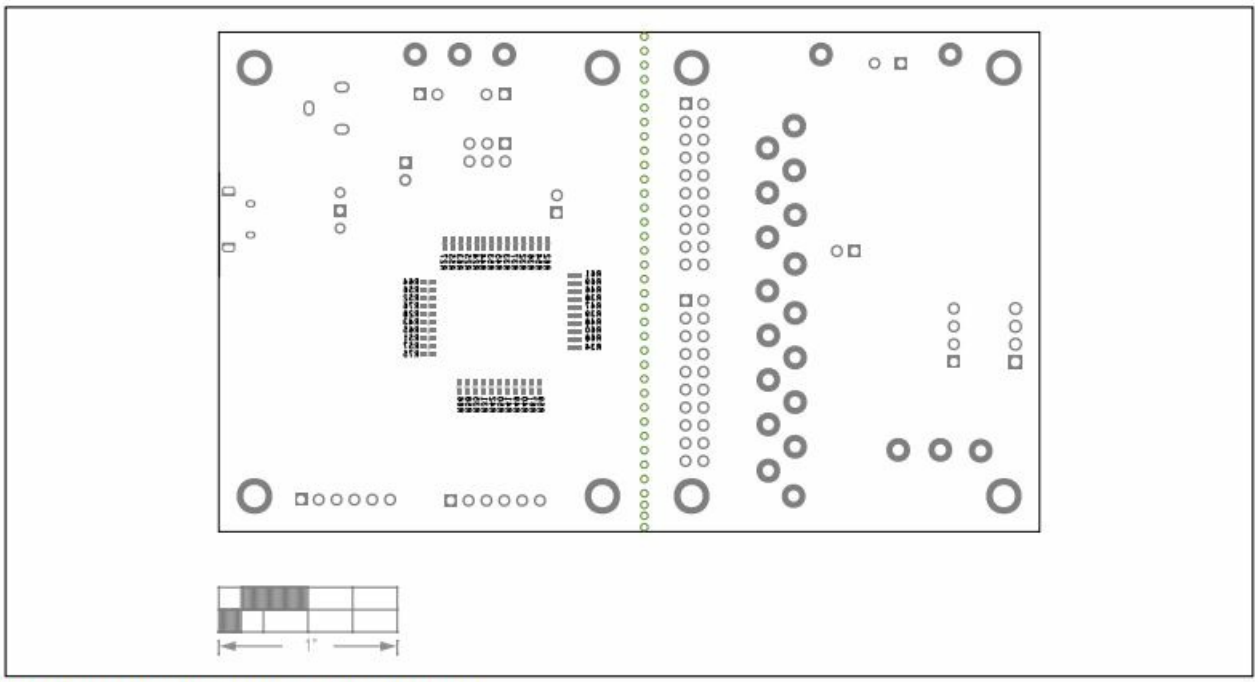
MAX22210 EV Kit PCB Layout—GND Plane



MAX22210 EV Kit PCB Layout—Power Plane



MAX22210 EV Kit PCB Layout—Bottom Layer



MAX22210 EV Kit PCB Layout—Bottom Silkscreen

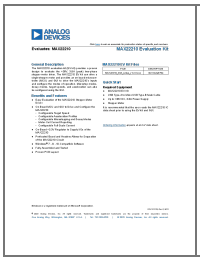
Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	8/23	Initial release	—

Click here to ask an associate for the production status of specific part numbers www.analog.com

One Analog Way, Wilmington, MA 01887 U.S.A. Tel: 781.329.4700

Documents / Resources

	ANALOG DEVICES MAX22210 Evaluation Kit [pdf] User Guide MAX22210 Evaluation Kit, MAX22210, Evaluation Kit, Kit

References

- Mixed-signal and digital signal processing ICs | Analog Devices
- Buy Parts, Request Quote and Sample from Maxim Integrated
- User Manual