

Evaluates: MAX34461A

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## MAX34461A Evaluation Kit

### **General Description**

The MAX34461A evaluation kit (EV kit) provides the hardware and software graphical user interface (GUI) necessary to evaluate the MAX34461A PMBus™ 16-channel voltage monitor and sequencer. The EV kit includes a MAX34461AA01+ installed, as well as four power supplies that can be sequenced, monitored, and margined by the IC.

#### **EV Kit Contents**

- Assembled Circuit Board Including MAX34461AA01+
- Mini-USB Cable

#### **Features**

- Easy Evaluation of the MAX34461A
- Four Power-Supply Channels
- EV Kit Hardware Is USB Powered (USB Cable Included)
- USB HID Interface
- Windows® 10-Compatible Software
- RoHS Compliant
- Proven PCB Layout
- Fully Assembled and Tested

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



MAX34461A EV Kit Photo

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### Evaluates: MAX34461A

### MAX34461A EV Kit Files

FILE	DESCRIPTION
MAX344XXEVKitSoftwareInstall.EXE	Application program

Note: The .EXE file is downloaded as a .ZIP file.

### **Quick Start**

#### **Required Equipment**

- MAX34461A EV kit and hardware
- Windows 10 PC
- USB port
- Mini-USB cable (included)

**Note:** In the following sections, software-related items are identified by bolding. Text in **bold** refers to items directly from the install or EV kit software. Text in **bold and under**<u>lined</u> refers to items from the Windows operating system.

#### Procedure

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

- Ensure that jumpers/shunts J23 and J1 are installed.
   Note: The GND planes of the USB I<sup>2</sup>C dongle and the EV kit are not connected. The GND jumper on J23 must be connected for proper communication.
- 2) Ensure that switch S1 is in the high position and S4–S6 are in the on position.
- 3) Set the EV kit hardware on a nonconductive surface to ensure that nothing on the PCB gets shorted together.
- 4) Prior to starting the GUI, connect the EV kit hardware to a PC using the supplied Mini-USB cable, or equivalent. The power LED (D20) should be green and the com LED (D21) should be red and slowly flash orange.
- 5) Windows should automatically begin installing the necessary device driver. The USB interface of the EV kit hardware is configured as an HID device and therefore does not require a unique/custom device driver. Once the driver installation is complete, a Windows message appears near the <u>System Icon</u> menu indicating that the hardware is ready to use. Do not attempt to run the GUI prior to this message.

If you do, then you must close the application and restart it once the driver installation is complete. On some versions of Windows, administrator privileges may be required to install the USB device.

- 6) Once the device driver installation is complete. Visit www.analog.com/en/resources/evaluation-hardware-and-software/software.html to download the latest version of the EV kit software and click on MAX344XXEVKitSoftware.
- 7) Open the .ZIP file and double-click on the .EXE file to run the installer. A message box stating: **The pub-lisher could not be verified. Are you sure you want to run this software?** may appear. If so, click **Yes**.
- 8) The installer GUI appears. Click **Next** and then **Install**. Once complete, click **Close**.
- Go to <u>Start | All Programs</u>. Look for the <u>MAX344XXEVKitSoftware</u> folder and click on the MAX34460EVKitSoftware.EXE file inside the folder.
- When the GUI appears, the text at the bottom should display EV Kit Hardware Connected. The com LED (D21) on the EV kit board should turn green.

#### **Detailed Description of Software**

#### **Software Startup**

If the MAX34461A EV kit is connected when the software is opened, the software first initializes the hardware to communicate. Next, the software searches for all slave addresses on the I<sup>2</sup>C bus and connects to the first slave address that is valid. The model number is then read to see which device is connected. The GUI displays **EV Kit Hardware Connected** at the bottom.

If the EV kit is not connected on software startup, a **No Hardware** window pops up and asks the user to select the device they would like to run offline. Select a device and click **OK**. The GUI then populates with default EV kit values. Once the EV kit is connected, the GUI executes the sequence above.

#### Menu Items

The File menu item contains save, load, and exit options. To save the current GUI configuration, click Save Project As. This saves the device name and channel names to an XML file and saves PMBus configurations to a HEX file. If a device is connected, this reads and saves data directly from the device; otherwise, it saves the configuration that is currently displayed on the GUI. Save Project saves the GUI configuration to a file that was last saved or loaded. Load Project updates the GUI with the XML file, writes the HEX file to the device, and reads current values from the device. If a device is not connected, then the HEX file is written to a virtual device. The HEX file only contains data for the PMBus commands that are stored in flash. Create Report saves a CSV file that contains all the tables displayed on the Sequencing, Monitoring, and Margining tabs.

The **Connection** menu item allows the user to connect to a desired device. **Find Slave Addresses** searches for all slave addresses connected to the I<sup>2</sup>C bus. To select a device, click **Select Slave Address** and all the slave addresses found are shown and are selectable. Slave addresses 18h and 34h are not selectable to prevent communicating with the alert response address and factory-programmed address.

The **Auto Polling** menu item has options for automatic reading of the device. To start polling, select the delay between reads: **300ms**, **500ms**, **800ms**, or **1000ms**. Each poll reads the **Power Status** (STATUS\_WORD, 79h), **Fault Status** (STATUS\_WORD, 79h), and the polled values for the **Data Log Graph** tab. The **Status** and **Margining** tabs are only polled if the tab is currently selected. To stop polling, select **Off** from the menu. Polling can also be stopped by selecting items in the **File** menu, **Connection** menu, or by pressing buttons that involve action with the NV Fault Log or flash.

The **Device** menu item shows which device the tables and controls are configured for. To turn the power supplies on or off, select the **Power On/Power Off** button, which writes a value to the OPERATION (01h) command. The supplies power on with margining off and power off based on the **Power Down Action** drop-down list on the **Sequencing** tab. When the **GUI Lock** is on, all writing actions are disabled. The version of the GUI software and the device firmware can be checked by clicking the **About** option from the **Help** menu item on the status bar.

#### Status Log

The status log below the tabs displays all the actions the GUI performs. Whenever a PMBus command is read or written, the action is confirmed by the log. To save the log, press the **Save Log** button and the text in the box is saved to a .TXT file. The log can also be cleared by pressing the **Clear Log** button.

#### **Sequencing Tab**

The Sequencing tab sheet (Figure 1) includes all timing and alarm configurations. All values on the tab are read when the tab is selected. The channels can be sequenced based on time or event by selecting the option from the Sequencing Mode drop-down list. If PMBus (timebased) is chosen, then the values under the Timeslot (MFR SEQ TIMESLOT, D3h) column are all written to 0. The Sequencing Mode drop-down lists write to bits in MFR MODE (D1h). The channels can be powered down simultaneously or with a TOFF delay by selecting the option in the **Power Down Action** drop-down list that writes to a bit in ON OFF CONFIG (02h). The Fault Retry Time sets the value in MFR FAULT RETRY (DAh). The Output Type writes to MFR PSEN CONFIG (D2h) to set the PSEN behavior. For the PSEN pin to act as a normal enable/disable for a power supply, select one of the PSEN options under Output Type. If a GPO option is selected, the channel is no longer a part of the sequencer, so the Timeslot and TON Max are written to 0 and all the channel configurations on the table become read-only. The timeslot for each channel can be set by selecting a value in the **Timeslot** column, which writes to MFR\_SEQ\_TIMSLOT (D3h). Note that these values can only be changed when the Sequencing Mode is set to Timeslot (event-based). The sequencing delays can be set by writing values to TON Delay (TON\_DELAY, 60h), TON Max (TON MAX FAULT LIMIT, 62h), and TOFF Delay (TOFF DELAY, 64h). A channel can be set to global by checking the checkbox in the Global column to write to a bit in MFR FAULT RESPONSE (D9h). The Fault **Response** column writes to the TON Max Fault response bits in MFR FAULT RESPONSE (D9h). To log faults into the NV fault log, check the checkbox in the Log Faults column that writes to MFR\_FAULT\_RESPONSE (D9h).



Figure 1. MAX34461A EV Kit GUI (Sequencing Tab)

#### Sequencing Graph Tab

The Sequencing Graph tab sheet (Figure 2) displays the timing diagrams for all the channels. When the Power Up radio button is selected, the TON Delay (TON DELAY 60h) and TON Max (TON MAX FAULT LIMIT, 62h) values are displayed on the graph. To change the TON Delay, click and drag the green vertical bar; to change TON Max. click and drag the red vertical bar. The Power Down graph displays the TOFF Delay (TOFF DELAY 64h) and can be changed by clicking and dragging the green vertical bar. These values write to the PMBus command when the mouse is released. The Power Up graph can be changed to PMBus (time-based) or Timeslot (event-based) by selecting the option on the Sequencing tab (Figure 1). When Timeslot (eventbased) is selected, the power-up graph allows the Timeslot (MFR SEQ TIMSLOT D3h) to be changed by clicking and dragging the ramp.

#### **Monitoring Tab**

The Monitoring tab sheet (Figure 3) displays the fault/warn limit settings for each channel and for each temperature sensor. To read the settings, click on the Monitoring tab and all the values are automatically read. To write to a value, click on the corresponding cell, type in a valid value, and either click another cell or press Enter on the keyboard. In the **VOLTAGE** table, the **Sequencer** column shows the status of the channel and is read only. To turn on or off the sequencer, select a PSEN or GPO option, respectively, on the Sequencing tab (Figure 1) under the Output Type column. The Nominal and Resistive Ratio columns are calculated based on a nominal ADC level of 1.8V to set the VOUT SCALE MONITOR (2Ah). The Resistive Ratio is found by dividing 1.8V by the **Nominal** value. The fault/warn limits can be set by entering the voltage level or the percent of the nominal in the UV Fault (VOUT UV FAULT LIMIT, 44h), UV Warn (VOUT\_UV\_WARN\_LIMIT, 43h), OV Warn (VOUT OV WARN LIMIT, 42h), OV Fault (VOUT OV FAULT LIMIT, 40h), PG On (POWER GOOD ON, 5Eh), and PG Off (POWER\_GOOD\_OFF, 5Fh) columns. The Fault Response column writes to the OV and UV fault response bits in MFR\_FAULT RESPONSE (D9h). To write to the OT fault response bits in MFR FAULT RESPONSE (D9h), check the checkbox in the OT Fault column and it sets the same response selected in the Fault Response column. To log faults into the NV fault log, check the checkbox in the Log Faults column to write to MFR FAULT REPSPONSE (D9h). In the **TEMPERATURE** table, the sensors can be enable/ disabled in the **Enable** column, which writes to a bit in MFR\_TEMP\_SENSOR\_CONFIG (F0h). The OT warn/ fault limits can be set by entering a value in the **OT Warn** (OT\_WARN\_LIMIT, 51h) or **OT Fault** (OT\_FAULT\_LIMIT, 4Fh) columns.

The power-good delay can be adjusted with the **PG Delay** up/down spin box, which writes to MFR\_PG\_DELAY (DBh).

#### Margining Tab

The Margining tab sheet (Figure 4) includes the margin configurations, margin fault status, and a DAC calculator for the DS4424. All values on the tab are read when the tab is selected. The Margin column turns the margin on/off by writing to the OPERATION (01h) command. To force all the channels to the same margin, select the state in the Margin All Control drop-down list to the right of the table. The Slope, Open Loop, and DAC Value columns configure the DS4424 and are read from bits in the MFR MARGIN CONFIG (DFh) command. The margining limits can be set by entering the voltage level or the percent of the nominal in the Margin Low (VOUT MARGIN LOW, 26h) and Margin High (VOUT MARGIN HIGH, 25h) columns. When the margining is turned on, the fault status is shown in the Status column read from STATUS MFR SPECIFIC (80h). The Polled column displays the current channel voltage read from READ VOUT (8Bh). To read the Status and Polled values, press the Read Status and Vout button or turn on Auto Polling. The margin fault can be cleared by pressing the Clear Faults button on the Status tab (Figure 5).

The **Calculator** is used to find the DS4424 external resistor (R<sub>FS</sub>), which determines the full-scale and stepsize current for the DAC. If R<sub>FS</sub> is calculated to be outside its limits ( $40k\Omega < R_{FS} < 160k\Omega$ ), then the resistor is forced to the edge of the limit and the **DS4424 RFS** edit box turns red. The equations used to calculate the outputs are given in Table 1.

#### Table 1. DAC Calculator

OUTPUT EQUATIONS
IFB = (V <sub>OUT</sub> )/(R1 + R2)
DS4424 RFS = (7.75)/(I <sub>FB</sub> x margining range)
DS4424 full scale = (0.976 x 127)/(16 x R <sub>FS</sub> )
DS4424 step size = full scale/64



Figure 2. MAX34461A EV Kit GUI (Sequencing Graph Tab)

Ife         Connection         Auto Polling         Device         GII Less         Ferret Cir	Connection     Auto Polling       ng     Sequencing Gaph     Montoring       TAGE     NOTE: Nominal Channel       el     Sequencer     Nominal (V)       el     Sequencer     0.789       ON     2.281     0.789																	*
Sequencing         Monthal         Virtual         Virtua         Virtua         Virtual <th>Ing         Sequencing Graph         Montoring           TAGE         NOTE: Nominal Channel         Nome           Initial Sequencer         Nominal (N)         Rev           ON         2.281         0.789           ON         2.281         0.789</th> <th>Device GUI</th> <th>Lock H</th> <th>elp</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th>Power</th> <th>ы Ч</th> <th>ower Sta</th> <th>atus 🕚 F</th> <th>Fault St</th> <th>atus</th>	Ing         Sequencing Graph         Montoring           TAGE         NOTE: Nominal Channel         Nome           Initial Sequencer         Nominal (N)         Rev           ON         2.281         0.789           ON         2.281         0.789	Device GUI	Lock H	elp									Power	ы Ч	ower Sta	atus 🕚 F	Fault St	atus
VOLTAG         NOTE MATHEM REGISTER PARAMEMENT OF A CALCULATE A CALC	TAGE         NOTE: Nominal Channel           el         Sequencer         Nominal (V)         Rei           0N         2.281         0.789	Margining	Status Da	ita Log Gr	raph Fa	ult Log	Registers											
Channel         Sequence         Nominal (N)         Feasitye Ratio         UV Fault (N)         Feasitye Ratio         UV Fault (N)         Feasitye Ratio	I         Sequencer         Nominal (V)         Res           0N         2.281         0.789	iel Voltage and F	Resistive F	latio are c	alculated	based or	a Nomina	al ADC le	vel of 1.8V									
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R51ON22810.739190017%21008%24005%24038%21008%200012%R52ON22810.739190017%21008%24005%24338%21008%200012%R53ON22810.739130017%21008%24005%24538%21008%200012%R540FF18001000100010001000100027%17%0.000100%100%R540FF18001000100010001000100027%17%0.000100%100%R550FF18001000100010001000100027%17%27%17%0.000100%R560FF18001000100010001000100027%17%27%17%0.000100%R510FF1800100010001000100027%17%27%17%0.000100%R510FF1800100010001000100027%17%27%17%0.000100%R510FF1800100010001000100%27%17%27%17%0.000100%R510FF180010001000100%20%17%27%17%0.00100%100%R5	ON         2281         0.789           ON         2.281         0.789           ON         2.281         0.789		1.900	-17% 2	2.100	-8%	2.400	5%	2.463	8%	2.100	-8%	000	-12%		No Action	•	
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TEMPERATURE	IPERATURE																	
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DS75LV (addr 94h) 35.00 45.00 45.00	/ (addr 94h)	0 45.	8															
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▲ Clear Log						4	Clea	r Log							5	nive		
													Ĵ		2		+0	7
<ul> <li>Save Log</li> <li>FV Kh Hardware Connected</li> </ul>						ł	Save	e log	EVK	it Hardwa	are Conne.	cted	1		Ξ		Ľ	M

Figure 3. MAX34461A EV Kit GUI (Monitoring Tab)



Figure 4. MAX34461A EV Kit GUI (Margining Tab)

#### Status Tab

The Status tab sheet (Figure 5) displays all the faults, warnings, and device ID information. To read all the current output values, faults, and warnings, press the Read Status button or turn on Auto Polling. The fault and warning bits are read from STATUS VOUT (7Ah), STATUS MFR SPECIFIC (80h) and STATUS TEMPERATURE (7Dh). The Polled values are read from READ VOUT (8Bh) and READ TEMPERATURE (8Dh). Each color indicator turns green if the status is good, red if there is a fault, or yellow to indicate a warning. The Polled value may not reflect the fault or warning because some bits are latches and have to be cleared. To clear the faults and warnings, press the Clear Faults button, which sends the CLEAR FAULTS (03h) command. The Time Count displays the 32-bit counter read from the MFR TIME COUNT (DDh) command. This timer can be reset by pressing the Reset Time Count button, which writes a sequence of all zeros, all ones, and all zeros to MFR TIME COUNT (DDh). The ID COMMANDS table displays all the ID information of the device. Press the **Read ID** button to read all the commands in the table.

The **POR Status** section displays the status of the POR bit of STATUS\_MFR\_SPECIFIC (80h) (for Page 255). After a POR (Power-On-Reset) event, the **POR Status** section displays **POR Has Occurred**. The user may acknowledge the POR event by clearing the POR bit by performing any of the following actions: clicking the **Read/Clear POR button**, clicking the **Clear Faults** button, switching the auto polling on or by reading the register for Pg255 on the **Registers** tab. Any of this action resets the POR bit and the displayed message changes to **POR Has Not Occurred**.

#### Data Log Graph Tab

The Data Log Graph tab sheet (Figure 6) plots the polled values in a graph and keeps track of the minimum and maximum values for each channel voltage and each temperature sensor. To read and plot the polled values, press the Data Log Read button or turn on Auto Polling. Each data log reads every channel's voltage from READ VOUT (8Bh) and every temperature sensor from READ TEMPERATURE (8Dh). The software finds the minimum and maximum values over multiple reads. The Poll Count displays the number of reads that have been tracked in the data log. When the polled count reaches 10,000, the graph deletes the oldest polled values and adds a new polled value. The min/max values are still based on all the poll count values, but the graph only displays the latest 10,000 polled values. To reset the Poll Count and all the minimum and maximum values, press the Data Log Reset button. To turn off data logging during polling, check the Data Log Off checkbox. The Select Data combo box is used

to select the voltage or temperature data to display on the graph and in the **MIN/MAX Data** table. To save all the data graphed to a CSV file, press the **Save Data Log** button.

#### Fault Log Tab

The Fault Log tab sheet (Figure 7) displays the NV Fault Log and fault configurations. When the tab is selected, the Overwrite and Fault Log Depth are read. When the fault log is full, the Enable Overwrite can be checked to automatically overwrite previous logs. The fault log depth can be adjusted with the Fault Log Depth combo box. The Enable Overwrite and Fault Log Depth are read from bits in MFR NV LOG CONFIG (D8h). To read the fault log, press the Read NV Fault Log button and all 255 bytes from MFR\_NV\_FAULT\_LOG (DCh) are displayed in the table. To clear or force the fault log, press the Clear NV Fault Log or Force NV Fault Log button, respectively. These buttons write to a bit in MFR NV LOG CONFIG (D8h). To save the current fault log displayed in the table, press the Dump to a File button and the table is saved as a CSV file.

#### **Registers Tab**

The **Registers** tab sheet (Figure 8) displays all the PMBus commands and their current data. To read the registers, select a page from the top drop-down list and all the PMBus commands valid for that page are automatically read. The commands not valid for that page are grayed out. Press the Read All button to read the registers again. To write to a command, enter the hex value in the cell and click another cell or press Enter on the keyboard. The current register configuration can be saved to flash by pressing the Save to Flash button, which sends the STORE DEFAULT ALL (11h) command. To return the device to the configuration saved in flash, press the Restore from Flash button, which sends the RESTORE DEFAULT ALL (12h) command. To reset the device, press the Soft Reset button to write to a bit in MFR MODE (D1h). The Calculate CRC button sends the RESTORE DEFAULT ALL (12h) command and then calculates a 2-byte CRC based on PMBus configuration commands that are stored in flash. The Read CRC from MFR DATE button reads MFR DATE (9Dh) and displays the upper 2 bytes in the edit box below the button. The Calculate CRC & Write to MFR DATE button sends the RESTORE DEFAULT ALL (12h) command, calculates a CRC, writes the CRC to the upper 2 bytes of MFR DATE (9Dh), and sends STORE DEFAULT ALL (11h) command. The Command Description displays the bitmap for selected PMBus commands. Select the command from the drop-down list and the table below displays a description of each bit for that command.



Figure 5. MAX34461A EV Kit GUI (Status Tab)



Figure 6. MAX34461A EV Kit GUI (Data Log Graph Tab)

Ref       Concertion       Acre of Diring       Dere       Ottober       Heat       Derendition       Peranterial       Peranterial <th>😰 MAX34460/61 EV Kit Co</th> <th>nfiguration</th> <th>i Software</th> <th>-</th> <th></th> <th></th>	😰 MAX34460/61 EV Kit Co	nfiguration	i Software	-		
Accorded (Accorded) (Accord	File Connection A	uto Polling	Device GUI Lock Help			Power Off Power Status • Fault Status •
Bit         Transfer	Sequencing Sequencing Gr	aph Monit	oring   Margining   Status   Data Log Graph   Fault Log   Re <u>r</u>	gisters		
0       00		Byte	Parameter	Hex	Converted Value	Enable Overwite
2       Funt Line Count       000       00       000		0	00h/FAULT_LOG_INDEX	0000		
4       MR, TUNE, COURT       000156       7005       100 <td></td> <td>2</td> <td>FAULT_LOG_COUNT</td> <td>0000</td> <td></td> <td>Fault Log Depth</td>		2	FAULT_LOG_COUNT	0000		Fault Log Depth
8       RESERVED 0000h       000       000         10       517/102,017/104       000       000         12       517/102,017/1046       000       000         16       517/102,017/1646       000       000         16       517/102,0017/846       000       000         16       517/102,0017/846       000       000         17       517/102,0017/846       000       000         17       517/102,0017/846       000       000         17       517/102,0017/846       12/13       000       000         18       517/102,0017/846       12/13       000       000       000         18       517/102,0017/846       12/13       000       000       000       000         18       517/102,0017/846       12/13       000 </td <td></td> <td>4</td> <td>MFR_TIME_COUNT</td> <td>0001150E</td> <td>70926</td> <td>15ms</td>		4	MFR_TIME_COUNT	0001150E	70926	15ms
10       51/1US_CHUOR       000       000         12       51/UUS_WORF       000       0000         14       51/UUS_WORF       000       0000         15       51/UUS_WORF       0000       0000         16       61/UUS_MORF       0000       0000         17       0000       0000       0000         17       0000       0000       0000         25       51/UUS_MER_SFEICE Fages 0/1       0000       0000         26       51/UUS_MER_SFEICE Fages 6/7       0000       0000         27       51/UUS_MER_SFEICE Fages 6/7       0000       0000         28       51/UUS_MER_SFEICE Fages 6/7       0000       0000         29       51/UUS_MER_SFEICE Fages 6/7       0000       0000         29       51/UUS_MER_SFEICE Fages 6/7       0000       0000         29       51/UUS_MER_SFEICE Fages 6/7       0000 <td></td> <td>00</td> <td>RESERVED (0000h)</td> <td>0000</td> <td>10000</td> <td></td>		00	RESERVED (0000h)	0000	10000	
12       51/105, WORD       000		10	STATUS_CML/00h	0000	40000	
14       STATUS, NOIT Page U1       000       000         15       STATUS, NOIT Page U2       000       000         16       STATUS, NOIT Page U2       000       000         12       STATUS, NOIT Page U2       000       000         12       STATUS, NOIT Page U1       000       000         12       STATUS, NOIT Page U1       000       000         13       STATUS, NOIT Page U1       000       000         14       STATUS, NOIT Page U1       000       000       000         15       STATUS, NOIT Page U1       000       000       000       000         15       STATUS, NOIT Page U1       000       000       000       000       000         15       STATUS, MEL, SFECIE Cages U1       000       000       000       000       000         15       STATUS, MEL, SFECIE Cages U1       000       000       000       000       000       000       000         16       STATUS, MEL, SFECIE Cages U1       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       <		12	STATUS_WORD	0000	40000	Log 0
is       Strints, Your Fases 2.3       000       000h         is       Strints, Your Fases 4.5       000       000h         is       Strints, Mark SPECIAC Fases 0.1       000       000h       000h         is       Strints, Mark SPECIAC Fases 4.5       000       000h       000h       000h         is       Strints, Mark SPECIAC Fases 4.5       000       000h       000h       000h       000h         is       Strints, Mark SPECIAC Fases 4.5       000       000h       000h       00h       0h       0h       0h       0h		14	STATUS_VOUT Pages 0/1	0000	40000	Read NV Earth Lon
16       57AUG, NOUT Pages 6/5       0000       000h         20       57AUG, NOUT Pages 6/7       0000       000h         20       57AUG, NOUT Pages 1/13       0000       000h         20       57AUG, MRL, SFELFC Pages 1/13       0000       000h         20       57AUG, MRL, SFELFC Pages 1/13       0000       000h         21       57AUG, MRL, SFELFC Pages 1/13       0000       000h         22       57AUG, MRL, SFELFC Pages 1/13       0000       000h         23       57AUG, MRL, SFELFC Pages 1/13       0000       000h         24       57AUG, MRL, SFELFC Pages 1/13       0000       000h         25       57AUG, MRL, SFELFC Pages 1/13       0000       000h		16	STATUS_VOUT Pages 2/3	0000	40000	
2       STATUS, NOUT Pages 6/7       000       000h         2       STATUS, NOUT Pages 10/11       0000       000h         2       STATUS, NOUT Pages 10/11       0000       000h         2       STATUS, NOUT Pages 10/11       0000       000h         2       STATUS, NOUT Pages 10/13       0000       000h         2       STATUS, NOUT Pages 10/13       0000       000h         2       STATUS, NOUT Pages 10/13       0000       000h         2       STATUS, NUR, SFECIFC Pages 10/13       0000       000h         2       STATUS, MIR, SFECIFC Pages 4/5       0000       000h         3       STATUS, MIR, SFECIFC Pages 10/13       0000       000h         4       STATUS, MIR, SFECIFC Pages 10/13       0000       000h         4       STATUS, MIR, SFECIFC Pages 11/13       0000       000h         4       STATUS, MIR, SFECIFC Pages 11/13       0000       000h         4       STATUS, MIR, SFECIFC Pages 11/13       0000       000h         5       STATUS, MIR, SFECIFC Pages 11/13       0000       000h         6       STATUS, MIR, SFECIFC Pages 11/13       0000       000h         7       STATUS, MIR, SFECIFC Pages 11/13       0000       000h <td></td> <td>18</td> <td>STATUS_VOUT Pages 4/5</td> <td>0000</td> <td>40000</td> <td>Clear NV Fault Log</td>		18	STATUS_VOUT Pages 4/5	0000	40000	Clear NV Fault Log
22       51/1US. WOUT Pages 6/3       000       000         24       51/1US. WOUT Pages 10/11       000       000         25       51/1US. WIT. SPECIFIC Pages 10/11       000       0000         26       51/1US. WIT. SPECIFIC Pages 10/1       000       0000         26       51/1US. MIT. SPECIFIC Pages 10/1       0000       0000         27       51/1US. MIT. SPECIFIC Pages 12/1       0000       0000         28       51/1US. MIT. SPECIFIC Pages 12/1       0000       0000         29       51/1US. MIT. SPECIFIC Pages 12/1       0000       0000         20       0000       0000       0000       0000         21       0100       0000		20	STATUS_VOUT Pages 6/7	0000	40000	Force NV Fault Log
24       STATUS, NUT Pages 10/11       000       000h       000h         25       STATUS, NUT Pages 12/13       0000       000h       000h         26       STATUS, NUT Pages 12/13       0000       000h       000h         21       STATUS, NUT Pages 12/13       0000       000h       000h         26       STATUS, MIR, SFECHC Pages 6/7       0000       000h       000h         26       STATUS, MIR, SFECHC Pages 6/7       0000       000h       000h         26       STATUS, MIR, SFECHC Pages 6/7       0000       000h       000h         26       STATUS, MIR, SFECHC Pages 6/7       0000       000h       000h         26       STATUS, MIR, SFECHC Pages 1/11       0000       000h       000h         27       STATUS, MIR, SFECHC Pages 1/13       0000       000h       000h         26       STATUS, MIR, SFECHC Pages 1/13       0000       000h       000h         27       STATUS, MIR, SFECHC Pages 1/13       0000       000h       000h         26       STATUS, MIR, SFECHC Pages 1/13       0000       000h       000h         26       STATUS, MIR, SFECHC Pages 1/13       0000       000h       000h         27       STATUS, MIR, SFECHC Pages 1/		22	STATUS_VOUT Pages 8/9	0000	40000	Dimoto a File
26       517/115, NOUT Pages 12/13       000       000h         28       517/115, MRL, SFEICIE Pages 14/15       000       000h         20       517/115, MRL, SFEICIE Pages 14/15       000       000h         28       517/115, MRL, SFEICIE Pages 14/15       0000       000h         28       517/115, MRL, SFEICIE Pages 17       0000       000h         29       517/115, MRL, SFEICIE Pages 17       0000       000h         24       517/115, MRL, SFEICIE Pages 17/13       0000       000h         24       517/115, MRL, SFEICIE Pages 14/15       000       000h         24       517/115, MRL, SFEICIE Pages 14/15       000h       000h         24 <td< td=""><td></td><td>24</td><td>STATUS_VOUT Pages 10/11</td><td>0000</td><td>40000</td><td></td></td<>		24	STATUS_VOUT Pages 10/11	0000	40000	
28       STATUS_NOUT Pages 14/15         20       STATUS_NOUT Pages 14/15         20       STATUS_MEL_SPECIFC Pages 1/3       0000         22       STATUS_MEL_SPECIFC Pages 4/5       0000         24       STATUS_MEL_SPECIFC Pages 1/3       0000         25       STATUS_MEL_SPECIFC Pages 4/5       0000         26       STATUS_MEL_SPECIFC Pages 6/7       0000         27       STATUS_MEL_SPECIFC Pages 6/7       0000         28       STATUS_MEL_SPECIFC Pages 1/31       0000         29       STATUS_MEL_SPECIFC Pages 1/31       0000         42       STATUS_MEL_SPECIFIC Pages 1/31       0000         43       STATUS_MEL_SPECIFIC Pages 1/31       0000         44       STATUS_MEL_SPECIFIC Pages 1/31       0000         45       STATUS_MEL_SPECIFIC Pages 1/31       0000         46       STATUS_MEL_SPECIFIC Pages 1/718       0000         47       STATUS_MEL_SPECIFIC Pages 1/718       0000         48       STATUS_MEL_SPECIFIC Pages 1/718       0000         49       STATUS_MEL_SPECIFIC Pages 1/718       0000         40       STATUS_MEL_SPECIFIC Pages 1/718       0000         41       STATUS_MEL_SPECIFIC Pages 1/718       00000         42 <t< td=""><td></td><td>26</td><td>STATUS_VOUT Pages 12/13</td><td>0000</td><td>40000</td><td></td></t<>		26	STATUS_VOUT Pages 12/13	0000	40000	
30     51/TUG_MFR_SFECIFC Pages 0/1     000     000h       22     51/TUG_MFR_SFECIFC Pages 2/3     0000     000h       34     51/TUG_MFR_SFECIFC Pages 4/5     0000     000h       35     51/TUG_MFR_SFECIFC Pages 6/7     0000     000h       36     51/TUG_MFR_SFECIFC Pages 10/1     0000     000h       40     51/TUG_MFR_SFECIFC Pages 10/1     0000     000h       41     51/TUG_MFR_SFECIFC Pages 10/1     0000     000h       42     51/TUG_MFR_SFECIFC Pages 10/13     0000     000h       43     51/TUG_MFR_SFECIFC Pages 10/13     0000     000h       44     51/TUG_MFR_SFECIFC Pages 10/13     0000     000h       45     51/TUG_MFR_SFECIFC Pages 17/13     0000     000h       46     51/TUG_MFR_SFECIFC Pages 17/13     000h     000h       47     64     000h     000h		28	STATUS_VOUT Pages 14/15	0000	40000	
22       STATUG_MRT_SFECIFC Pages 2/3       0000       0000h         34       STATUG_MRT_SFECIFC Pages 4/5       0000       0000h         35       STATUG_MRT_SFECIFC Pages 4/5       0000       0000h         38       STATUG_MRT_SFECIFC Pages 4/5       0000       0000h         38       STATUG_MRT_SFECIFC Pages 4/5       0000       0000h         40       STATUG_MRT_SFECIFC Pages 12/13       0000       0000h         41       STATUG_MRT_SFECIFC Pages 12/13       0000       0000h         42       STATUG_MRT_SFECIFC Pages 12/13       0000       0000h         43       STATUG_MRT_SFECIFC Pages 12/13       0000       0000h         44       STATUG_MRT_SFECIFC Pages 12/13       0000       0000h         45       STATUG_MRT_SFECIFC Pages 12/13       0000       0000h         46       STATUG_MRT_SFECIFC Pages 12/13       0000       0000h         47       STATUG_STECH       0000       0000h       0000h         48       STATUG_T Fages 12/13       0000       0000h       0000h         49       STATUG_T Fages 12/13       0000       0000h       0000h         49       STATUG_T Fages 12/13       0000       0000h       0000h         50 <td></td> <td>30</td> <td>STATUS_MFR_SPECIFIC Pages 0/1</td> <td>0000</td> <td>40000</td> <td></td>		30	STATUS_MFR_SPECIFIC Pages 0/1	0000	40000	
34       51ATUS_MRT_SPECIFC Pages 4/5       000       000h         36       51ATUS_MRT_SPECIFC Pages 6/7       0000       000h         38       51ATUS_MRT_SPECIFC Pages 6/7       0000       000h         40       51ATUS_MRT_SPECIFC Pages 10/11       0000       000h         42       51ATUS_MRT_SPECIFC Pages 10/11       0000       000h         45       51ATUS_MRT_SPECIFC Pages 12/13       0000       000h         46       51ATUS_MRT_SPECIFC Pages 12/13       0000       000h         47       51ATUS_MRT_SPECIFC Pages 12/13       0000       000h         48       51ATUS_MRT_SPECIFC Pages 12/13       0000       000h         49       51ATUS_MRT_SPECIFC Pages 12/13       0000       000h         40       51ATUS_MRT_SPECIFC Pages 12/13       0000       000h         41       51ATUS_MRT_SPECIFC Pages 12/13       0000       000h         42       51ATUS_MRT_SPECIFIC Pages 12/13       0000       000h         43       51ATUS_MRT_SPECIFC Pages 12/13       0000       000h         44       51ATUS_MRT_SPECIFIC Pages 12/13       0000       000h         45       51ATUS_MRT_SPECIFIC Pages 12/13       0000       000h         46       51ATUS_MRT_SPECIFIC Pages 12/13 </td <td></td> <td>32</td> <td>STATUS_MFR_SPECIFIC Pages 2/3</td> <td>0000</td> <td>40000</td> <td></td>		32	STATUS_MFR_SPECIFIC Pages 2/3	0000	40000	
36       STATUS_MFR_SPECIFIC Pages 6/7       0000       0000+         38       STATUS_MFR_SPECIFIC Pages 10/1       0000       0000+         40       STATUS_MFR_SPECIFIC Pages 12/13       0000       0000+         42       STATUS_MFR_SPECIFIC Pages 12/13       0000       0000+         46       STATUS_MFR_SPECIFIC Pages 12/13       0000       0000+         47       STATUS_MFR_SPECIFIC Pages 12/13       0000       0000+         48       STATUS_MFR_SPECIFIC Pages 12/13       0000       0000+         49       STATUS_MFR_SPECIFIC Pages 12/13       0000       0000+         48       STATUS_MFR_SPECIFIC Pages 12/13       0000       0000+         49       STATUS_MFR_SPECIFIC Pages 12/13       0000+       0000+         40       STATUS_MFR_SPECIFIC Pages 12/13       0000+       0000+         41       STATUS_MFR_SPECIFIC Pages 12/13       0000+       0000+         42       STATUS_MFR_SPECIFIC Pages 12/13       0000+       0000+         43       STATUS_MFR_SPECIFIC Pages 12/13       0000+       0000+         44       STATUS_MFR_SPECIFIC Pages 12/13       0000+       0000+         45       STATUS_MFR_SPECIFIC Pages 12/13       0000+       0000+         46		34	STATUS_MFR_SPECIFIC Pages 4/5	0000	40000	
38     51ATUS_MRL_SPECIFIC Pages 0.0     0000     0000       40     51ATUS_MRL_SPECIFIC Pages 10/1     0000     0000       42     51ATUS_MRL_SPECIFIC Pages 11/15     0000     0000       46     51ATUS_MRL_SPECIFIC Pages 17/18     0000     0000       48     51ATUS_MRL_SPECIFIC Pages 17/18     0000     0000       49     51ATUS_MRL_SPECIFIC Pages 17/18     0000     0000		36	STATUS_MFR_SPECIFIC Pages 6/7	0000	40000	
40       STATUS_MER_SPECIFIC Pages 10/1       0000       0000         42       STATUS_MER_SPECIFIC Pages 12/13       0000       0000h         46       STATUS_MER_SPECIFIC Pages 12/18       0000       0000h         48       STATUS_MER_SPECIFIC Pages 12/18       0000       0000h         48       STATUS_MER_SPECIFIC Pages 12/18       0000       0000h         48       STATUS_MER_SPECIFIC Pages 12/18       0000       0000h         49       STATUS_MER_SPECIFIC Pages 255/00h       0000       0000h         40       STATUS_MER_SPECIFIC Pages 17/18       0000       0000h         41       STATUS_TEMPERATURE Pages 17/18       0000       0000h         42       STATUS_TEMPERATURE Pages 17/18       0000       0000h         43       STATUS_TEMPERATURE Pages 17/18       0000       0000h         44       STATUS_TEMPERATURE Pages 17/18       0000       0000h         45       STATUS_TEMPERATURE Pages 17/18       0000       0000h         46       STATUS_TEMPERATURE Pages 17/18       0000       0000h         47       Gart Lag       Status Lag       0000       0000h         48       Status Lag       Cart Lag       0000       0000h         49       <		38	STATUS_MFR_SPECIFIC Pages 8/9	0000	40000	
42       STATUS_MER_SPECIFIC Pages 12/13       0000       0000         44       STATUS_MER_SPECIFIC Pages 14/15       0000       0000         45       STATUS_MER_SPECIFIC Pages 14/15       0000       0000         48       STATUS_MER_SPECIFIC Pages 14/15       0000       0000         49       STATUS_MER_SPECIFIC Pages 14/15       0000       0000         0000       0000       0000       0000       0000         40       STATUS_MER_SPECIFIC Page 255/00h       0000       0000         6       STATUS_MER_SPECIFIC Page 255/00h       0000       0000h         40       STATUS_MER_SPECIFIC Page 255/00h       0000       0000h         40       STATUS_MER_SPECIFIC Page 255/00h       0000       0000h         41       STATUS_MER_SPECIFIC Page 255/00h       0000 h       0000h         42       STATUS_MER_SPECIFIC Page 255/00h       0000 h       0000h         43       STATUS_MER_SPECIFIC Page 255/00h       0000 h       0000h         44       STATUS_MER_SPECIFIC Page 255/00h       0000 h       0000h         45       STATUS_MER_SPECIFIC Page 255/00h       0000 h       0000h         46       STATUS_MER_SPECIFIC Page 255/00h       STATUS       STATUS         47 <td></td> <td>40</td> <td>STATUS_MFR_SPECIFIC Pages 10/11</td> <td>0000</td> <td>40000</td> <td></td>		40	STATUS_MFR_SPECIFIC Pages 10/11	0000	40000	
44       STATUS_MER_SPECIFIC Pages 14/15       0000       0000       0000         46       STATUS_MER_SPECIFIC Pages 255/00h       0000       0000h       1         48       STATUS_INER_SPECIFIC Pages 17/18       0000       0000h       1         48       STATUS_INER_SPECIFIC Pages 17/18       0000       0000h       1         49       STATUS_INER_SPECIFIC Pages 17/18       0000       0000h       1         40       STATUS_INER_SPECIFIC Pages 17/18       0000       0000h       1         5       Status_Interesting       0000       0000h       1       1         5       Status_Interesting       Status_Interesting       1       1       1         5       Status_Interesting       Status_Interesting       1       1       1       1         5       Status_Interesting       Status_Interesting       Status_Interesting       1       1       1       1       1         5       Status_Interesting       Status_Interesting       Status_Interesting       1		42	STATUS_MFR_SPECIFIC Pages 12/13	0000	40000	
46       STATUS_MER_SPECIFIC Page 255/00h       0000       0000h       1         48       STATUS TEMPERATURE Pages 17/18       0000       0000h       +         48       Status TemPerature       Earlog       0000       •       •         48       Status TemPerature       Status TemPerature       •       •       •         5ave Log       Eave Log       EV Ri Hardware Cornected       •       •       •		44	STATUS_MFR_SPECIFIC Pages 14/15	0000	40000	
48 STATUS TEMPERATURE Pages 17/18 0000 0000 1 Car Log Car Log C		46	STATUS_MFR_SPECIFIC Page 255/00h	0000	40000	
<ul> <li>Clear Log</li> <li>Save Log</li> <li>EV Ki Hardware Connected</li> </ul>		48	STATUS TEMPERATURE Pages 17/18	0000	+ H0000	
<ul> <li>Save Log</li> <li>EV Kt Hardware Connected</li> </ul>			•	Clear Log		minera
Save Log EV Ki Hardware Connected						
			*	Save Log	EV Kit Hardware Connected	III legra leu™

Figure 7. MAX34461A EV Kit GUI (Fault Log Tab)



Figure 8. MAX34461A EV Kit GUI (Registers Tab)

#### **Detailed Description of Hardware**

#### User-Supplied I<sup>2</sup>C Interface

To communicate with the MAX34461A using a usersupplied I<sup>2</sup>C interface, first remove the J23 jumper to disconnect the USB I<sup>2</sup>C dongle. If the dongle is no longer desired, it can be separated from the EV kit by snapping the PCB at the scored line. Connect test points SDA, SCL, GND, and 5V to the off-board I<sup>2</sup>C interface. The I<sup>2</sup>C interface should operate at 3.3V.

#### **User-Supplied Power Supplies**

To disconnect the on-board power supplies, turn the DAC (S4), RS (S5), and PSEN (S6) DIP switches off. The power supplies' GND should be connected to the banana jack GND. Connect the desired PSEN pins to the enable pin on the power supply, and the RS pins to a voltage-divider on the output of the power supply. The voltage-divider is only required if the output voltage is greater than 1.8V. For closed-loop margining with the on-board DS4424, connect DAC0–DAC3 to the feedback of the power supply channels 0–3.

#### **User-Supplied DS4424**

To margin with a user-supplied DS4424, disconnect the on-board current DAC by switching the DAC (S4) DIP switch to off. Then connect MSDA, MSCL, and GND on J3 to the external current DAC. The slave address for the user-supplied DS4424 should be 60h for power-supply channels 4–7, A0h for channels 8–11, or E0H for channels 12–15. The on-board DS4424 has slave address 20h, which margins channels 0–3.

#### **User-Supplied DS75LV**

To use an off-board digital temperature sensor, connect MSDA, MSCL, and GND on J3 to the DS75LV. The slave address for the user-supplied DS75LV should be 92h, 94h, or 96h. The on-board DS75LV has slave address 90h.

#### **Troubleshooting**

All efforts were made to ensure that each kit works on the first try, right out of the box. In the rare occasion that a problem is suspected, see <u>Table 5</u> to help troubleshoot the issue.

LED	COLOR	DESCRIPTION
D2	Red	Fault: A shutdown fault occurred for a global primary group.
D6	Green	Power Good (PG): All enabled channels for the primary group are above their associated power-good-on value.
D7	Red	Alert: A fault has occurred.
DA	Red	VOUT0: Channel 0 is on
DB	Red	VOUT1: Channel 1 is on
DC	Red	VOUT2: Channel 2 is on
DD	Red	VOUT3: Channel 3 is on
D20	Red	USB Power Fault: A fault occurred due to overvoltage limit, current limit, or thermal limit.
(Power)	Green	USB Power: USB power supply is on.
D21	Red	Communication: After the software has initialized the hardware, the LED flashes red when an I <sup>2</sup> C command is received.
(Com)	Green	Initialized: Hardware has been initialized by software.

#### Table 2. Description of LEDs

SW	тсн	SWITCH POSITION	DESCRIPTION
	24	HIGH	Control: Pulls the control pin high.
		LOW	Control: Pulls the control pin low.
S	33	Pressed	Reset: Pulls the reset pin low to reset the MAX34461A.
	1	SHORT	DAC0: Connects DAC0 of DS4424 to FB0 of the channel 0 power supply.
64	2	SHORT	DAC1: Connects DAC1 of DS4424 to FB1 of the channel 1 power supply.
34	3	SHORT	DAC2: Connects DAC2 of DS4424 to FB2 of the channel 2 power supply.
	4	SHORT	DAC3: Connects DAC3 of DS4424 to FB3 of the channel 3 power supply.
	1	SHORT	RS0: Connects RS0 of MAX34461A to the channel 0 power supply.
SE.	2	SHORT	RS1: Connects RS1 of MAX34461A to the channel 1 power supply.
35	3	SHORT	RS2: Connects RS2 of MAX34461A to the channel 2 power supply.
	4	SHORT	RS3: Connects RS3 of MAX34461A to the channel 3 power supply.
	1	SHORT	PSEN0: Connects PSEN0 of MAX34461A to the channel 0 power supply.
86	2	SHORT	PSEN1: Connects PSEN1 of MAX34461A to the channel 1 power supply.
30	3	SHORT	PSEN2: Connects PSEN2 of MAX34461A to the channel 2 power supply.
	4	SHORT	PSEN3: Connects PSEN3 of MAX34461A to the channel 3 power supply.

### Table 3. Description of Switches

## Table 4. Description of Jumpers

JUMPER	JUMPER POSITION	DESCRIPTION
J1	VDD-VDUT	MAX34461A Power: Connects VDD to VDUT (MAX34461A).
	5V-5V	5V: Supplies 5V from the USB I <sup>2</sup> C dongle to the EV kit board.
102 104	SDA-SDA	SDA: Connects SDA from the USB I <sup>2</sup> C dongle to the MAX34461A SDA.
JZ3-JZ4	GND-GND	GND: Connects GND from the USB I <sup>2</sup> C dongle to the EV kit board GND.
	SCL-SCL	SCL: Connects SCL from the USB I <sup>2</sup> C dongle to the MAX34461A SCL.

### Table 5. Troubleshooting

SYMPTOM	CHECK	SOLUTION
	Is the LED labeled D20 red?	If yes, then the electronic fuse (U7) is in a fault state. Inspect for electrical shorts on the PCB and make sure that the PCB is not sitting on a conductive surface.
GUI says hardware not found.	Does the LED labeled D21 turn green when the GUI is running?	If not, then exit the GUI and try running it again. If D20 still does not turn green, then exit the GUI and try connecting the USB cable to a different USB port on the PC and wait for a Windows message that states the hardware is ready to use. Run the GUI again.
	Are any of the LEDs illuminated?	If not, then the PCB may not be getting power from the USB. Try a different USB cable or a different USB port.
No slave address found	Jumper J1	Make sure jumper J1 is installed to power the MAX34461A.
and read/writes fail	Jumper J23	Make sure 4 jumpers on J23 are installed.
	Is there a CONTROL# fault on the Status Tab of the GUI?	Default configuration Control is active high. Make sure S1 is in the high position.
Channels do not turn on	Is the ALERT LED on and all channel LEDs off?	If so, make sure switch PSEN (S6) is in the on position to connect the PSENs of MAX34461A to the channels.
	Is the ALERT LED on and Channel 0 LED on?	If so, make sure switch RS (S5) is in the on position to connect the power-supply outputs to the MAX34461A.
Margining is not working, voltage is not changing	S4	Make sure the DAC (S4) switch is in the on position to connect the DACs from DS4424 to FB of channels 0–3.

### **Ordering Information**

PART	TYPE
MAX34461AEVKIT#	EV Kit

#Denotes an RoHS-compliant device that may include lead(Pb), which is exempt under the RoHS requirements.

# Evaluates: MAX34461A

### MAX34461A EV Kit Bill of Materials

DESIGNATOR	VALUE	QTY	MANUFACTURER
C0A, C0B, C0C, C0D, C2A,C2B, C2C,	10uF, X5R ceramic capacitors	14	Taiyo Yuden EMK212ABJ106KD-T
			-
C203, C214	0.010F, X7R ceramic capacitors (0805)	9	TDK C2012X7R1H103KT
C01, C05, C211	1uF, X7R ceramic capacitors (0805)	3	Murata GRM21BR71A105KA01K
C02, C03, C07, C08, C10, C11	0.1uF, X7R ceramic capacitors	7	TDK CGJ4J2X7R1H104K
C06	22nf	0	Do Not Populate
C23	470uF aluminum capacitor	0	Do Not Populate
C213	220nF. X7R ceramic capacitor	1	TDK CGJ4J2X7R1H224K
C215	DNP	0	Do Not Populate
D1. D22	Schottky diodes	2	Panasonic DB2W31900L
	Red I ED	6	Kingbright APTR3216EC
D6	Green   ED	1	Lumex SML-LX1206GC-TR
		2	Kingbright APHB M2012SUBKCGKC
11	2 pin booder 2 54mm pitch	1	
J1	2-pin header, 2.54mm pitch		901102-0404-AR
J2, J22	4-pin header, 2.54mm pitch	2	961102-6404-AR
J3	3-pin header, 2.54mm pitch	1	961102-6404-AR
J5-J12, J21	DNP	0	Do Not Populate
J20	5-pin female USB-mini header	1	54819-0519
J23	8-pin (2 x 4) header	1	961104-6804-AR
Q2	60V, 340mA nMOSFET (SC70)	1	ON Semi 2N7002WT1G
R0, R1, R2, R3, R4, R5, R6, R7, R8, R9, R10, R11, R12, R13, R14, R15, R16, R17, R36, R37, R102, R107, R108, R201	0Ω 1% resistors (0805)	26	Vishay CRCW08050000Z0EA
R0A, R0B, R0C, R0D, R77, R79, R80, R81, R82, R83, R84, R85, R86, R87, R88, R89, R90, R91, R92, R93, R94, R95, R103, R109, R123, R133	100kΩ 1% resistors (0805)	28	Vishay CRCW0805100KFKEA
R1A, R1B, R1C, R1D	8.66kΩ 1% resistors (0805)	4	Vishay CRCW08058K660FKEA
R2A, R2B, R2C, R2D	3.09kΩ 1% resistors (0805)	4	Vishay CRCW08053K09FKEA
R3A, R3B, R3C, R3D	49.9Ω 1% resistors (0805)	4	Vishay CRCW080549R9FKEA
R4A, R4B, R4C, R4D	267Ω 1% resistors (0805)	4	Vishay CRCW0805267RFKEA
R5A, R5B, R5C, R5D	1kΩ 1% resistors (0805)	4	Vishay CRCW08051K00FKEA
R20, R21, R22, R23, R24, R25, R26, R27, R28, R29, R30, R31, R32, R33, R34, R35, R40, R41, R42, R43, R44, R45, R46, R47, R48, R49, R50, R51, R52, R53, R54, R55, R76, R78, R110, R121, R132, R134, R162	DNP	0	Do Not Populate
R56, R57, R58, R59	150kΩ 1% resistors (0805)	4	Vishay CRCW0805150KFKEA
R100, R130, R131, R210	4.7kΩ 1% resistors (0805)	4	Vishay CRCW08054K70FKEA
R101, R161, R164, R207	10kΩ 1% resistors (0805)	4	Vishay CRCW080510K0FKEB
R104, R120, R124, R211, R212	330Ω 1% resistors (0805)	5	Vishay CRCW0805330RFKEA
R105, R106, R213	2.2kΩ 1% resistors (0805)	3	Vishay CRCW08052K20FKEA
R111, R122	330kΩ 1% resistors (0805)	2	Vishay CRCW0805330KFKTA
R160, R163, R206	45.3kΩ 1% resistors (0805)	3	Vishay CRCW080545K3FKEA

# Evaluates: MAX34461A

## MAX34461A EV Kit Bill of Materials (continued)

DESIGNATOR	VALUE	QTY	MANUFACTURER
R203, R205	560Ω 1% resistors (0805)	2	Vishay CRCW0805560RFKEA
S1	SW-SPDT	1	SLS121PC04
S3	Single-pole pushbutton	1	KSR221G LFS
S4, S5, S6	4-POLE DIP SW	3	BD04
TP8	Red test point	1	Keystone 5010
TP29-TP36	Black test points	8	Keystone 5011
TP1, TP11	Orange test points	2	Keystone 5013
TP3, TP12	Yellow test points	2	Keystone 5014
TP2, TP4-TP7, TP9, TP10, TP13-TP28	White test points	28	Keystone 5012
U1	MAX34461AA01+	1	PMBus 16-channel voltage monitor (48 TQFN-EP*)
U1A, U1B, U1C, U1D, U4, U5, U22	MAX8902BATA+	7	Analog Devices MAX8902BATA+
U2	DS75	1	Analog Devices DS75LVS+
U3	DS4424	1	Analog Devices DS4424N+
U20	PICfor DS3900	1	Microchip PIC18LF2550-I/SO
U21	MAX4995A	1	Analog Devices MAX4995AAUT+
X1	OSC_CMOS_4pin	1	AVX KC3225A48.0000C30E00
_	Mini-USB cable	1	Assmann WSW Components AK672M/2-1-R
_	PCB	1	PCB P/N: EPCBMAX34461AEVKIT

# Evaluates: MAX34461A

### MAX34461A EV Kit Schematics



# Evaluates: MAX34461A



## MAX34461A EV Kit Schematics (continued)

# Evaluates: MAX34461A



# MAX34461A EV Kit Schematics (continued)

# Evaluates: MAX34461A



# MAX34461A EV Kit Schematics (continued)

## Evaluates: MAX34461A



### MAX34461A EV Kit PCB Layouts

MAX34461A EV Kit PCB Layout Diagram—Silk Top



MAX34461A EV Kit PCB Layout Diagram—Bottom



MAX34461A EV Kit PCB Layout Diagram—Top



MAX34461A EV Kit PCB Layout Diagram—Silk Bottom

## Evaluates: MAX34461A

### **Revision History**

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	8/15	Initial release	—
1	4/24	Updated title, part number, schematics, and PCB layouts	All



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