

MAXIM

MAX1611 Evaluation Kit

General Description

The MAX1611 evaluation kit (EV kit) is an assembled surface-mount demonstration board. The kit embodies the standard cold-cathode fluorescent lamp application circuit shown in Figure 4 of the MAX1610/MAX1611 data sheet. Additional circuitry allows an IBM-compatible personal computer to use its parallel port to emulate an Intel System Management Bus (SMBus™) interface.

The board comes with a MAX1611 installed, but with minimal modification, the EV kit can also be used to evaluate the MAX1610.

Features

- ◆ Complete Surface-Mount Solution for Driving CCFL Backlights
- ◆ High Efficiency
- ◆ PC-Compatible Software Emulates Intel SMBus
- ◆ Fully Assembled and Tested

Ordering Information

PART	TEMP. RANGE	BOARD TYPE
MAX1611EVKIT-SO	0°C to +70°C	Surface Mount

Component List

DESIGNATION	QTY	DESCRIPTION
C1	1	0.1μF, low-dissipation capacitor WIMA SMD7.3
C2	1	18pF, 3.1kV, ceramic high-voltage capacitor Murata-Erie GHM1038-SL-180J-3K
C3, C5	2	0.027μF ceramic capacitors
C4, C6, C7, C8	4	0.1μF ceramic capacitors
C9	1	Low-ESR, 10μF, 35V surface-mount tantalum capacitor AVX TPSD106M035R0300
C20, C21	0	Open
D1, D3, D20, D21, D22	5	Diodes: Central Semiconductor CMPD4448 (or CMPD2838)
D2	1	1A, 30V Schottky diode Motorola MBRS130LT3
D23, D24, D25	3	6V, axial-leaded, type 1N5232B zener diodes
J1	1	Right-angle DB25 male connector
JU1–JU4	0	Open
L1	1	100μH, 1.0A inductor Coilcraft DO3316-104
Q1, Q2	2	NPN transistors Zetex FMMT619
Q20, Q21, Q23	3	NPN transistors Central Semiconductor CMPT3904
R2	1	510Ω5% resistor
R3	1	Open

DESIGNATION	QTY	DESCRIPTION
R4	1	8.2kΩ5% resistor
R5	1	150kΩ5% resistor
R6	1	51kΩ5% resistor
R7	1	20Ω5% resistor
R8, R9, R10, R13, R14	0	Open
R11	1	1Ω5% resistor
R12	1	1.2Ω5% resistor
R20, R21, R22	3	510kΩ10% resistors
R24, R25, R26, R30, R31, R32	6	10kΩ10% resistors
R27, R28, R29	3	100kΩ10% resistors
R33, R34, R35	3	100Ω10% resistors
SW1, SW2*	2	Momentary pushbutton switches (MAX1610)
SW3	1	Slide switch
T1	1	CCFT transformer Coiltronics CTX110605
U1	1	MAX1611ESE CCFT controller with SMBus interface
U1*	1	MAX1610ESE CCFT controller with up/down interface
U2	1	74HC14 hex Schmitt-trigger inverter
None	1	7" x 2.5" MAX1611 printed circuit board
None	1	Software disk: MAX1611 DEMO DISK

*Components supplied but not mounted.
SMBus is a trademark of Intel Corp.

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For small orders, phone 408-737-7600 ext. 3468.

Evaluates: MAX1610/MAX1611

MAX1611 Evaluation Kit

Component Suppliers

SUPPLIER	PHONE	FAX
AVX	(803) 946-0690	(803) 626-3123
Central Semiconductor	(516) 435-1110	(516) 435-1824
Coilcraft	(847) 639-6400	(847) 639-1469
Coiltronics	(561) 241-7876	(561) 241-9339
Motorola	(602) 303-5454	(602) 994-6430
WIMA	(914) 347-2474	(914) 347-7230
Zetex USA	(516) 543-7100	(516) 864-7630

Evaluating the MAX1611

- 1) A cold-cathode fluorescent lamp (CCFL) has two terminals. Usually the CCFL is built into an LCD panel, and a plastic female connector extends from the panel. The holes in the female connector are just big enough to allow insertion of the leads from a 1/8W through-hole resistor. Cut off the resistor's two leads and use them as pieces of stiff wire. Solder the wire into the two holes on the far-right side of the EV kit. Bend the wire to form a suitable male connector for attaching the plastic female connector from the LCD panel. Push the female connector onto the male connector (Figure 1).
- 2) Make sure the slide switch in the upper-left corner of the MAX1611 EV kit (SW3) is pushed toward the 28-pin connector (down). Also make sure that jumper JU1 is **not** installed.
- 3) Connect a +12V supply to the pad marked VIN on the MAX1611 EV kit. Be careful not to accidentally connect the +12V supply to the pads marked SDA, SCL, or SMBSUS, or to the holes labeled JU3. Before connecting the ground lead, double check that the +12V connection is in the right place.

- 4) Connect the ground lead of your supply to the pad marked GND. The CCFL should light up. **Be careful not to touch either the transformer on the MAX1611 EV kit or the stiff wire, as high voltages are present.**
- 5) Use a 28-pin, male/female parallel-port cable to connect LPT1 on your IBM PC-compatible computer to the MAX1611 EV kit.
- 6) Boot your IBM PC-compatible computer and exit Windows to the MS-DOS prompt. Insert the disk provided with the MAX1611 EV kit in drive A: and type the following at the MS-DOS prompt:

a: <ENTER>

Make sure you see the prompt "A: \>", then type :

maxsmb device max1611 <ENTER>

Your screen will look like this:

```

MAXIM SMBUS INTERFACE PROGRAM Ver: 1.0 Aug 21 1994 09:02:03
W)WRITE PATTERN: 01011010 1 1 1 1 0 0 0 0
                  ^-^
                  R S O D D D D D
D)DEVICE:         MAX1611  E S H 4 3 2 1 0
  CCFL device     S D
                  S W
                  E B
  )SELECT BIT     L
O)CHANGE BIT

R)READ PATTERN:  01011011  1 1 1 1 1 1 1 1
                  O x x D D D D D
                  T 4 3 2 1 0

SMBUS STATUS-----
  CABLE:connected  O
  SMBDATA:1        K
  SMBCLK:1
  S)SMBUS:1

X) Exit this software
  
```

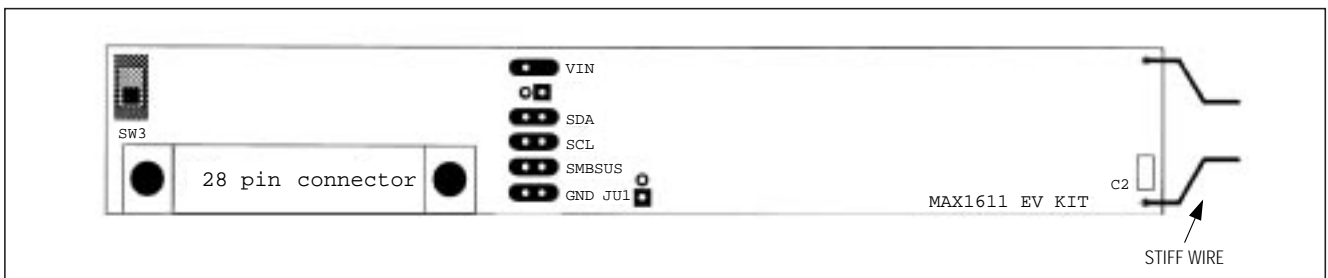


Figure 1. MAX1611 EV Kit Overview

MAX1611 Evaluation Kit

Evaluates: MAX1610/MAX1611

Use the left and right arrows on your keyboard to move the selected bit marker, "/-\". Press the "0" key or the "1" key to clear or set the selected bit. Pressing "w" on your keyboard writes the bit pattern to the MAX1611. Pressing "r" on your keyboard reads the status of the MAX1611.

- Press "r" on your keyboard. You should see the question marks on the screen replaced with ones and zeros, and the words "TUBE OK" should appear. This indicates that the MAX1611's status was successfully read, and that it reported that the CCFL is operating normally.
- To set the CCFL brightness to full scale, set bits D41, D31, D21, D11, and D10 to "1", then press the "w" key on your keyboard. The lamp will brighten and the screen will look as follows:

```
MAXIM SMBUS INTERFACE PROGRAM Ver 1.0 Aug 21 1996 09:02:03
/-\
WRITE PATTERN: 0101010 1 1 1 1 1 1 1 1
                /-\  R S 0 D D D D D
DEVICE:        MAX1611 E E N 4 3 2 1 0
CCFL driver    0 D 1 1 1 1 1 1
address acknowledged  0 0
ISELECT BIT    L 1
01) CHANGE BIT

READ PATTERN:  0101011 1 1 1 1 0 0 0 0
                0 x x D D D D D
                T 4 3 2 1 0
SMBUS STATUS-----
CABLE: connected  0 TUBE OK
SMDATA: 1        K
SMCLK: 1         0 0
SMBSUS: 1

X) Exit this software
```

- The SMBSUS line can be toggled via the keyboard. The MAX1611 has two fully configurable modes. SMBSUS selects the active mode. SMBSUS = 1 activates the REGSEL = 1 mode, and SMBSUS = 0 activates the REGSEL = 0 mode. Pressing the "s" key toggles CCFL on and off. As you press the "s" key, notice that the number to the right of "S) SMBSUS:" toggles between zero and one, indicating the current state of SMBSUS.
- The MAX1611's CCFL current-chopping mode can be evaluated easily by installing jumper JU1. With JU1 installed, the MAX1611's MINDAC pin is shorted to the VL pin. To increase the VIN supply voltage beyond +12V, follow the component modification instructions in the *Current-Chopping Mode* section of the MAX1610/MAX1611 data sheet

Evaluating the MAX1610

Be sure to make all board modifications with power disconnected.

- Remove the MAX1611 from the EV board. Carefully cut each of the MAX1611's leads, then desolder each lead individually so as not to damage the pads on the board. Install the MAX1610 on the board in the position previously occupied by the MAX1611.
- Cut traces. On the back side of the MAX1611 EV kit, near the 28-pin connector, are two small arrows that point to two traces. Cut the two traces at the positions the arrows point to.
- Install momentary switches SW1 and SW2.
- A cold-cathode fluorescent lamp (CCFL) has two terminals. Usually the CCFL is built into an LCD panel, and a plastic female connector extends from the panel. The holes in the female connector are just big enough to allow insertion of the leads from a through-hole resistor with a value of 1/8W. Cut off the resistor's two leads and use them as pieces of stiff wire. Solder the wire into the two holes on the far right side of the EV kit. Bend the stiff wire to form a suitable male connector for attaching the plastic female connector from the LCD panel. Push the female connector onto the male connector (Figure 1).
- Make sure the slide switch in the upper-left corner of the MAX1611 EV kit (SW3) is pushed toward the 28-pin connector (down). Also make sure that jumper JU1 is **not** installed.
- Connect a +12V supply to the pad marked VIN on the MAX1611 EV kit. Be careful not to accidentally connect the +12V supply to the pads marked SDA, SCL, or SMBSUS, or to the holes labeled JU3. Before connecting the ground lead, double check that the +12V connection is in the right place.
- Connect the supply's ground lead to the pad marked GND. As soon as you do so, the CCFL will light up. **Be careful not to touch either the transformer on the MAX1611 EV kit or the stiff wire, as high voltages are present.**
- Since the MAX1610 does not have an SMBus interface, do not connect the 28-pin male/female parallel port cable. The CCFL intensity can be increased by pressing then releasing switch SW2, or decreased by pressing then releasing switch SW1. To place the MAX1610 into shutdown mode, slide switch SW3 away from the 28-pin connector.

MAX1611 Evaluation Kit

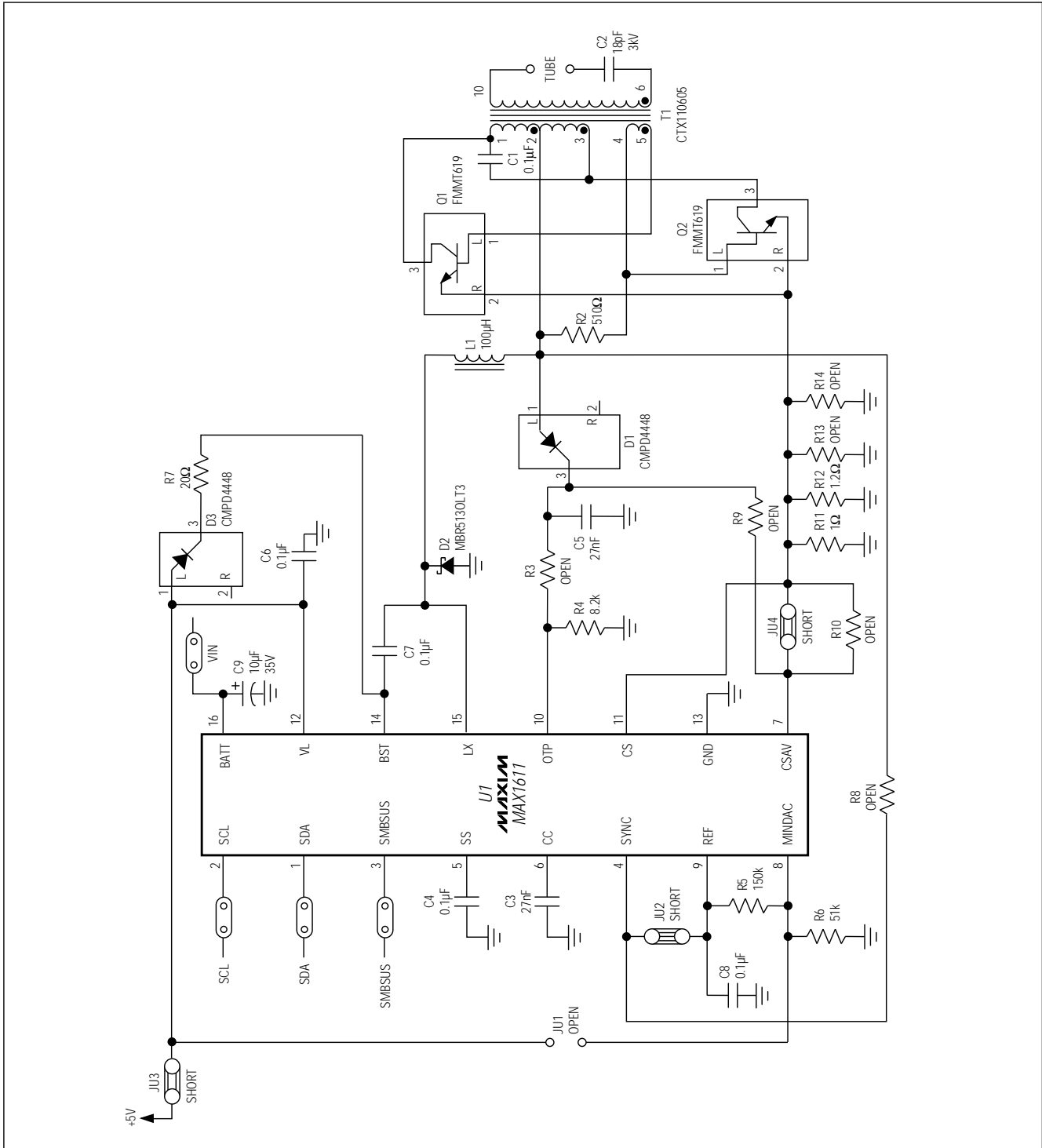


Figure 2. MAX1611 EV Kit Main Circuit Schematic

MAX1611 Evaluation Kit

Evaluates: MAX1610/MAX1611

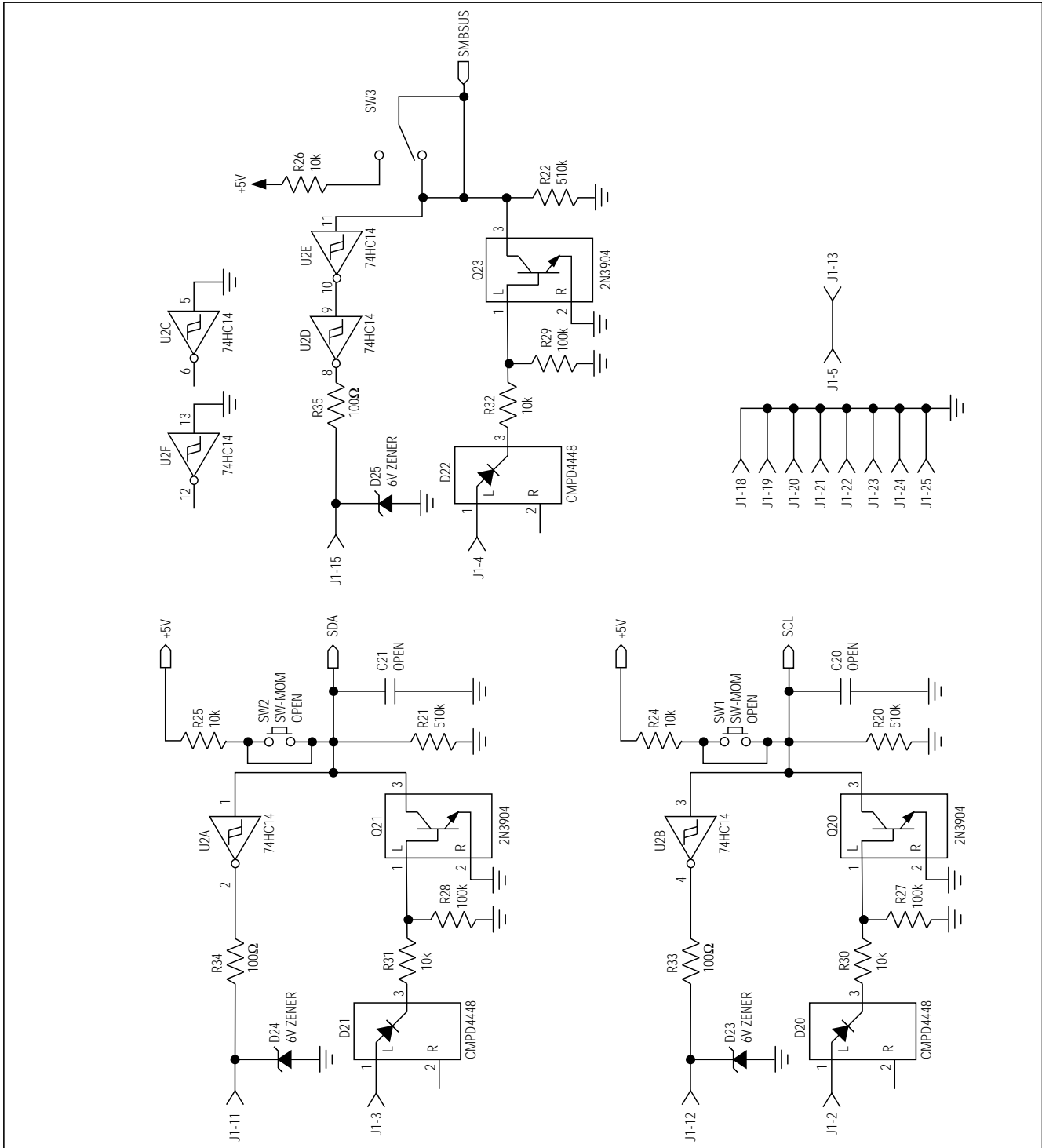


Figure 3. MAX1611 EV Kit Interface Logic Schematic

MAX1611 Evaluation Kit

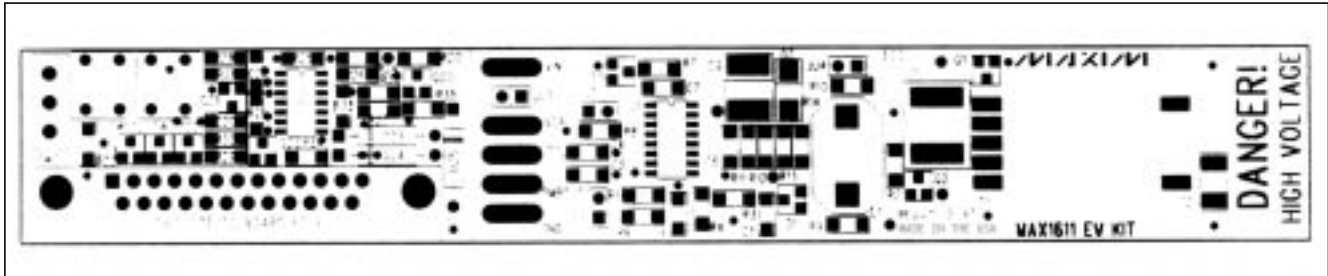


Figure 4. MAX1611 EV Kit Component Placement Guide—Top Silkscreen

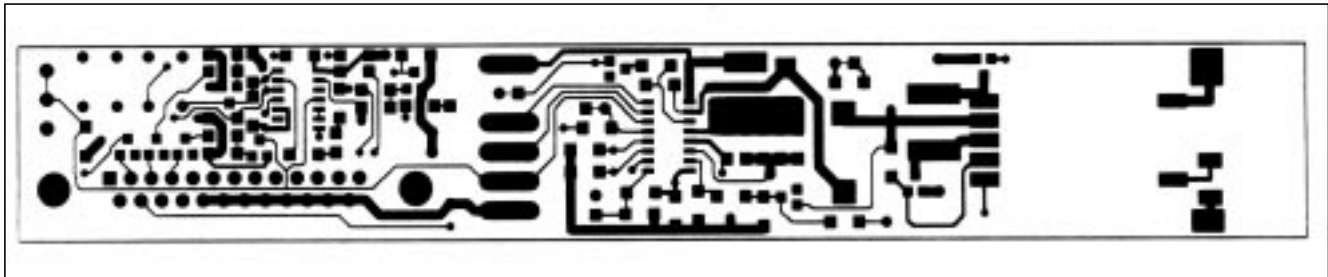


Figure 5. MAX1611 EV Kit PC Board Layout—Component Side

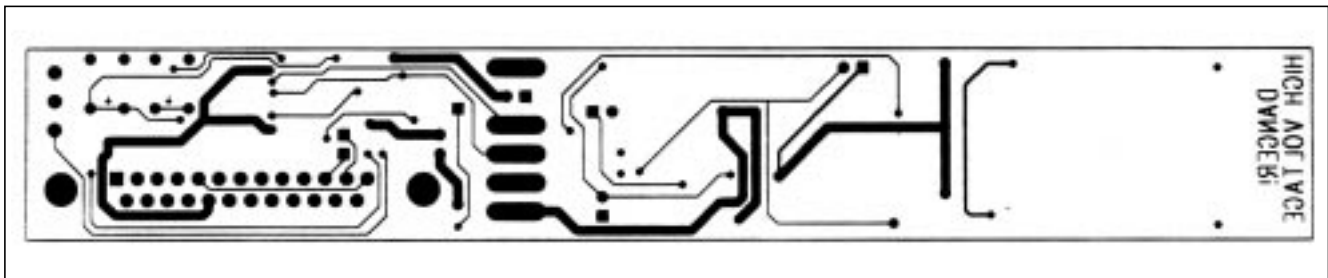


Figure 6. MAX1611 EV Kit PC Board Layout—Solder Side

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