/VI/XI/VI

MAX781 Evaluation Kit

Evaluates: MAX781

_____General Description

The MAX781 evaluation kit (EV kit) demonstrates the various outputs of the battery-powered MAX781 computer controller. The evaluation board provides a 3.3V output, two programmable PCMCIA outputs, five gate drivers, and a digitally adjustable battery charger.

The board connects to the parallel port of an IBM-compatible computer and is controlled by software included in the EV kit.

_____Component List

DESIGNATION	QTY	DESCRIPTION
C1, C7, C13	3	0.1µF capacitors
C2	1	0.33µF, 16V capacitor Murata-Erie GRM42-6X7R334K016, or AVX 1206YC334MAT2A
C3, C8, C9, C12	4	1µF, 25V capacitors Sprague 595D155X0025A2T
C4	0	Open
C5	1	0.01µF capacitor
C6	1	100µF, 10V, low-ESR tantalum capacitor Sprague 593D107X0010D10D2W, or AVX TPS D107K010R0100
C10, C14, C15	3	22µF, 25V low-ESR capacitors Sprague 593D226X0025D2W, or AVX TPS D226K025R0200
C11	1	3.3µF, 25V capacitor Sprague 595D335X0025B2T
D1, D7	2	50V, 250mA switching diodes Central Semiconductor CMPD4150
D2, D3, D5	3	30V, 1A Schottky diodes Motorola MBRS130T3, or Nihon EC10QS03
D4	1	Red LED diode
D6	1	100V, 1A fast-recovery diode Motorola MBRS1100T3, or Nihon EC11FS2
L1	1	33µH, 2A inductor Coilcraft D03316-33, or Sumida CDR125-330
J1, J3	2	2-pin power connectors
J2	1	25-pin DB connector (male right-angle)
JU1, JU2	2	3-pin headers

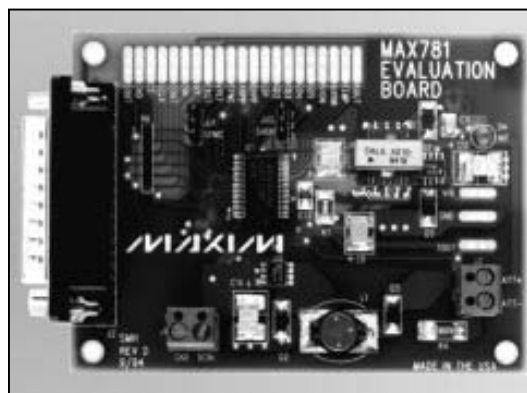*Component List continued on next page.*

_____Features

♦ **3.3V, 1A Step-Down Controller**

♦ **Dual PCMCIA-Compatible VPP Outputs (0V/3.3V/5V/12V)**

♦ **Digitally Adjustable Switching-Current Source for Battery Charging**

♦ **5 Gate-Driver Outputs for High-Side Switching**

♦ **EV Board Controlled through the Parallel Port of a Personal Computer**

♦ **Software Provided on a 5 1/4" Floppy Disk**

♦ **Surface-Mount Construction**

_____Ordering Information

PART	TEMP. RANGE	BOARD TYPE
MAX781EVKIT-SO	0°C to +70°C	Surface Mount

_____EV Kit

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MAX781 Evaluation Kit

_____Component List (continued)

DESIGNATION	QTY	DESCRIPTION
Q1	1	SMT 2N3904 NPN transistor Central Semiconductor CMPT3904
R1, R2	2	100kΩ, 5% resistors
R3	1	10kΩ, 5% resistor
R4	1	0.2Ω, 10% resistor IRC LC 2010-R200K, or Dale WSL 2010-R200K
R5	1	300Ω, 5% resistor
R6	1	6-pin, 100kΩ SIP resistor
R7	1	0.082Ω, 1% resistor IRC LC 2010-R082F, or Dale WSL 2010-R082F
T1	1	Flyback transformer Dale LPE-6562-A070, or LPE-5047-A154
U1	1	Maxim MAX781CBX
U2	1	Dual 50V, 3A, N-channel MOSFET Motorola MMDF1N05E, or IR IRF7102
U3	1	Dual 20V, 2A, P-channel MOSFET Motorola MMDF2P02E, or IR IRF7104
None	1	5 1/4" floppy disk
None	1	3.50" x 4.00" printed circuit board

_____Quick Start

The EV kit software is provided on a 5 1/4" floppy disk. Copy the disk to another floppy or hard drive and store the master in a safe place.

1) Connect a 25-pin straight-through cable between the parallel-port connector of an IBM-compatible personal computer and the MAX781 evaluation board.

2) Set the jumpers on JU1 and JU2 across pins 2 & 3 to enable the MAX781 at 200kHz.

3) Connect a 5 to 8 cell NiCd or NiMH battery to the battery connector (J3) on the evaluation board. Observe the polarity marked on the board when making these connections.

4) [OPTIONAL]: Connect a 10V to 18V power supply to the DCIN connector (J1) on the evaluation board. The DCIN voltage should be greater than two-times the number of cells in the battery. For example, DCIN should be greater than 12V for a 6-cell battery.

_____Component Suppliers

SUPPLIER	PHONE	FAX
AVX	(207) 282-5111	(207) 283-1941
Central Semiconductor	(516) 435-1110	(516) 435-1824
CoilCraft	(708) 639-6400	(708) 639-1469
Dale (Inductors)	(605) 668-4131	(605) 665-1627
Dale (Resistors)	(402) 564-3131	(402) 563-1841
International Rectifier	(310) 322-3331	(301) 322-3332
IRC	(512) 992-7900	(512) 992-3377
Motorola (Power Devices)	(602) 244-3576	(602) 244-4015
Murata-Erie	(814) 237-1431	(814) 238-0490
Nihon (USA) (Japan)	(805) 867-2555 81-3-3494-7411	(805) 867-2556 81-3-3494-7414
Siliconix	(408) 988-8000	(408) 970-3950
Sprague	(603) 224-1961	(603) 224-1430
Sumida (USA) (Japan)	(708) 956-0666 81-3-3607-5111	(708) 956-0702 81-3-3607-5144

This supply is only required for the battery-charging feature.

5) Start the EV kit software by setting the current directory to match the directory containing the MAX781 software, and enter "MAX781EV" on the computer's keyboard. The program displays the board status in the top section of the screen and allows the user to set the 32-bit data stream written to the MAX781.

NOTE: Many of the MAX781's functions are disabled until its 5V regulator is enabled and the MAX781 is programmed for **operate mode**. The MAX781 is reset to its power-up condition (5V regulator off, **low-power mode**) every time the program is restarted.

6) To turn on the MAX781's 5V regulator, use the direction arrows on the computer's keyboard to position the cursor to Bit 9 (5ON). Change Bit 9 to 1 using the "1" or "Insert" key. The function of the selected bit is indicated on the bottom status line.

7) Use the direction arrows on the computer's keyboard to position the cursor to Bit 4 (MODE0). Change Bit 4 to 0 using the "0" or "Delete" key.

8) Press the "ENTER" key to send the 32-bit data field to the MAX781. The board is now in **operate mode** and all functions are enabled.

NOTE: The battery-charging feature requires the user to monitor the charge cycle and terminate battery charging as soon as full charge is achieved. Only use batteries rated for a 1A or greater charging current.

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MAX781 Evaluation Kit

_____Detailed Description

Battery Charging

The MAX781 is designed for battery-operated applications. The evaluation board should be connected to a NiCd or NiMH battery with 5 to 8 cells. The user must monitor the charge cycle and terminate it before overcharging occurs.

An external DC supply (DCIN) is required for charging the battery. Typically, the input voltage needs to provide 2V for each cell in the battery. This allows for the battery's charging voltage, and also allows a small margin for the charging circuit.

To use the battery charger, connect the DCIN input to J1 and set the desired charging current using bits 10–16 (CHG0–CHG6). The charger DAC level and resulting output current are displayed on the right-hand edge of the screen. After the level has been set, set bit 7 (CHARGE) to enable the charger. To verify the actual battery current, measure the voltage across the 0.2Ω resistor R4.

Jumper Selection

The SYNC and SHDN pins are controlled by positioning shunts on jumpers JU1 and JU2 respectively. Placing a shunt across pins 1 & 2 of JU1 connects the SYNC pin to VREF and sets 300kHz operation. Placing the shunt across pins 2 & 3 grounds the SYNC pin and sets 200kHz operation. Remove the shunt if an external source is connected to the SYNC pad.

The shutdown (SHDN) pin is controlled by JU2. Placing a shunt across pins 1 & 2 connects SHDN to the bat-

Table 1. 25-Pin Connector Pinout

CABLE PIN	MAX781 FUNCTION	PARALLEL PORT FUNCTION
2	Chip Enable (CE)	Output Bit 0
3	Serial Clock (SCLK)	Output Bit 1
4	Data Input (DIN)	Output Bit 2
13	Data Output (DOUT)	Input (SEL)

tery (+) and forces the MAX781 into shutdown mode. Moving the shunt to pins 2 & 3 grounds the SHDN pin and enables the MAX781. Remove the shunt if an external source is connected to the SHDN pad.

Digital Interface

The MAX781 EV kit connects to the parallel port of an IBM-compatible computer. Table 1 gives the connector pinout, and Figure 1 is the timing diagram for the serial interface. The signals are generated by manipulating the individual bits of the computer's parallel port. This is an economical but somewhat slow method of communicating with the evaluation board.

A 25-pin straight-through cable (user provided) connects between the parallel-port connector on the back of an IBM-compatible computer and the board. No other device should be connected to the port when the MAX781EV program is running.
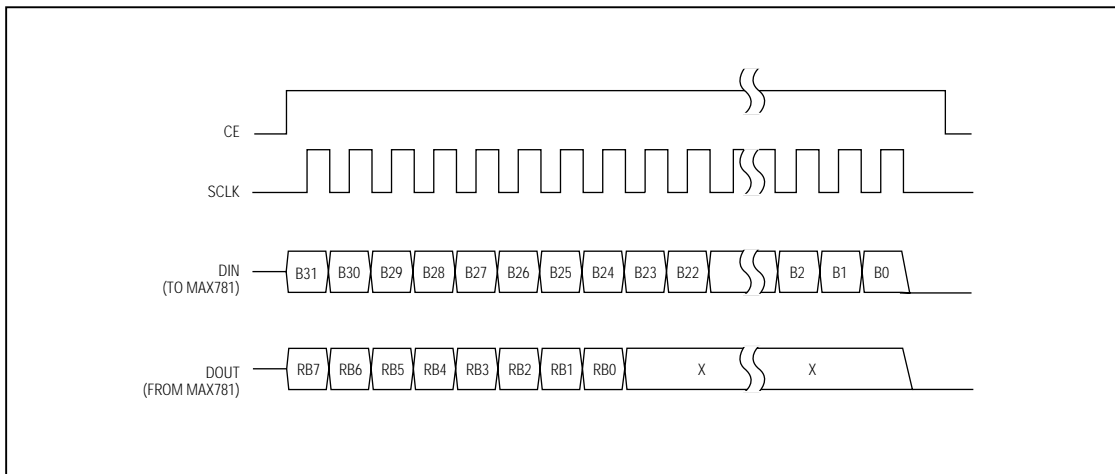

Figure 1. MAX781 EV Kit Timing Diagram

MAX781 Evaluation Kit

MAX781 EV Kit Software

Two programs are supplied on the 5 1/4" floppy disk included with the MAX781 EV kit. The MAX781EV.EXE program has the most features and displays. Most users will use this program to evaluate the MAX781. The second program, MAX781.BAS, is a core program for those users who wish to write their own program in QBASIC.

The MAX781EV program allows the user to control the various MAX781 functions and displays the programmed configuration. A 32-bit binary string is displayed in the bottom section of the screen. This is the 32-bit data stream that is sent to the MAX781 whenever the "Enter" key is pressed. The line just above the output stream displays the previous 32-bit data stream sent to the MAX781 and the 8 bits read from the MAX781 during that sequence.

The user positions the cursor to the desired bit using the directional arrows on the computer's keyboard. The selected bit number and bit function are indicated on the bottom display line. Bits are modified using the keys listed in Table 2. The table is displayed by the program whenever a question mark (?) is entered.

The top portion of the display indicates the programmed configuration of the MAX781. The display is updated every time the "Enter" key is pressed to send a new command.

Table 2. Keyboard Commands

KEY	FUNCTION
<−, −>	The directional arrows move the cursor to select the bits of the 32-bit data stream.
Home	Moves the cursor to Bit 0.
End	Moves the cursor to Bit 31.
Enter	Sends the new 32-bit stream to the MAX781.
0, Delete	Clears the selected bit.
1, Insert	Sets the selected bit.
Esc	Exits the program.

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Figure 2. MAX781 EV Kit Schematic Diagram

MAX781 Evaluation Kit
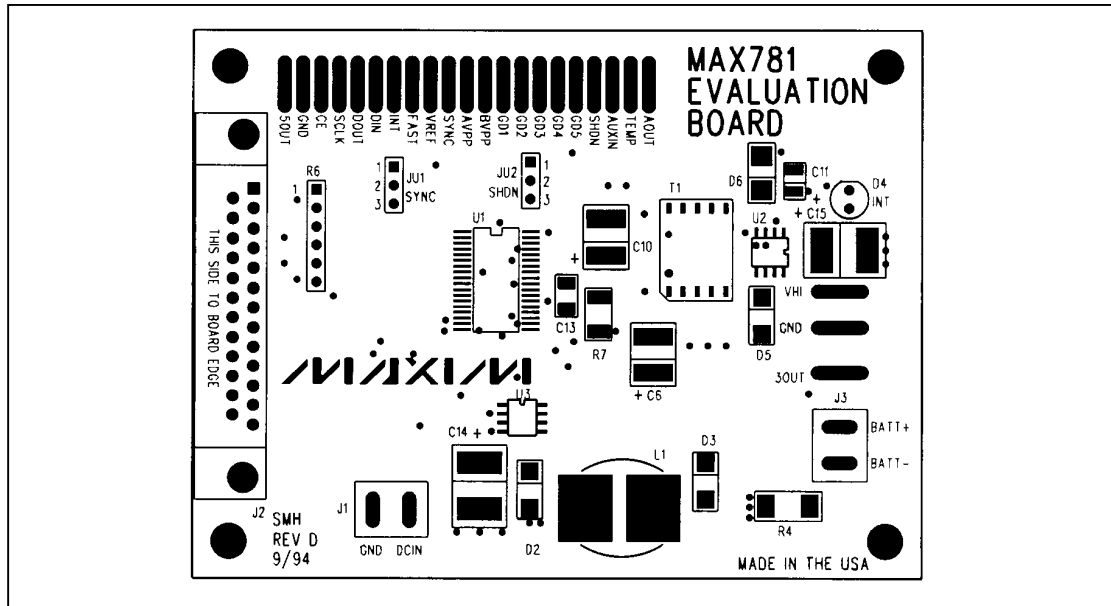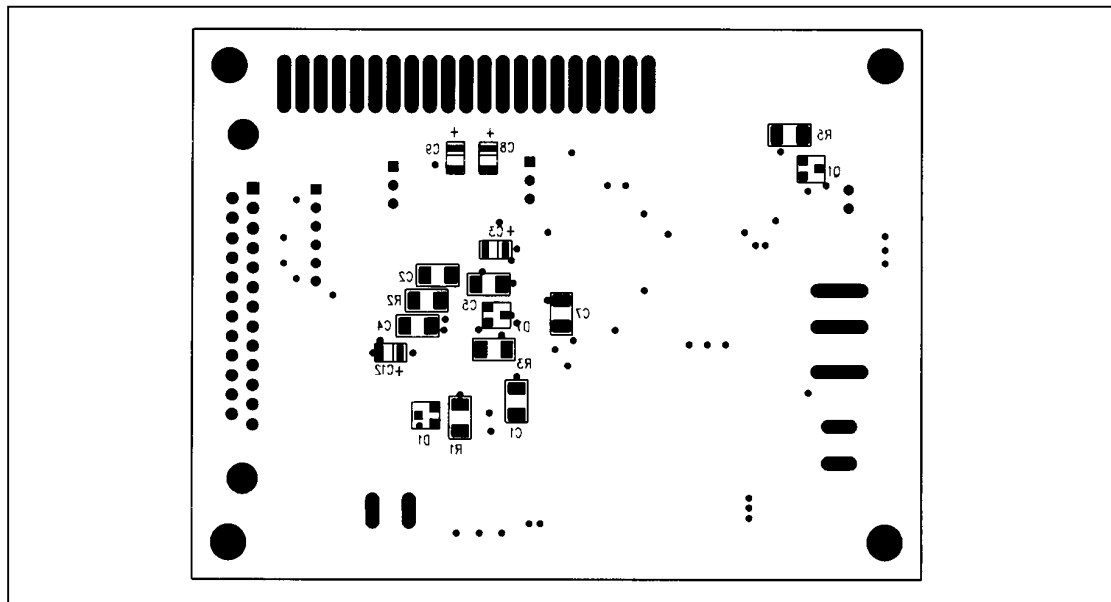
Figure 3. MAX781 EV Kit Component Placement Guide—Component Side

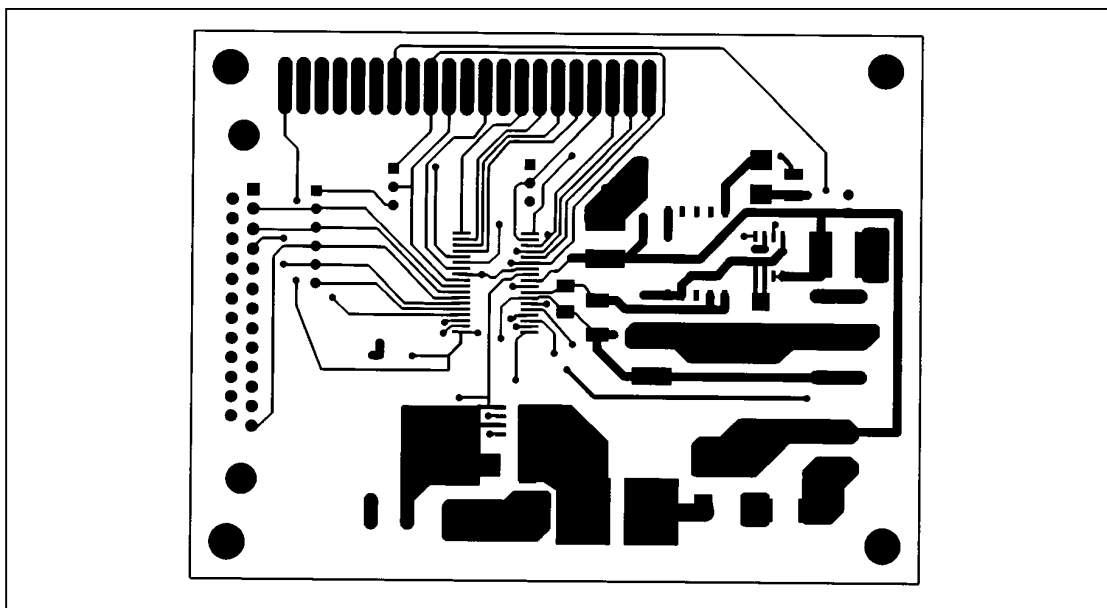Figure 4. MAX781 EV Kit Component Placement Guide—Solder Side

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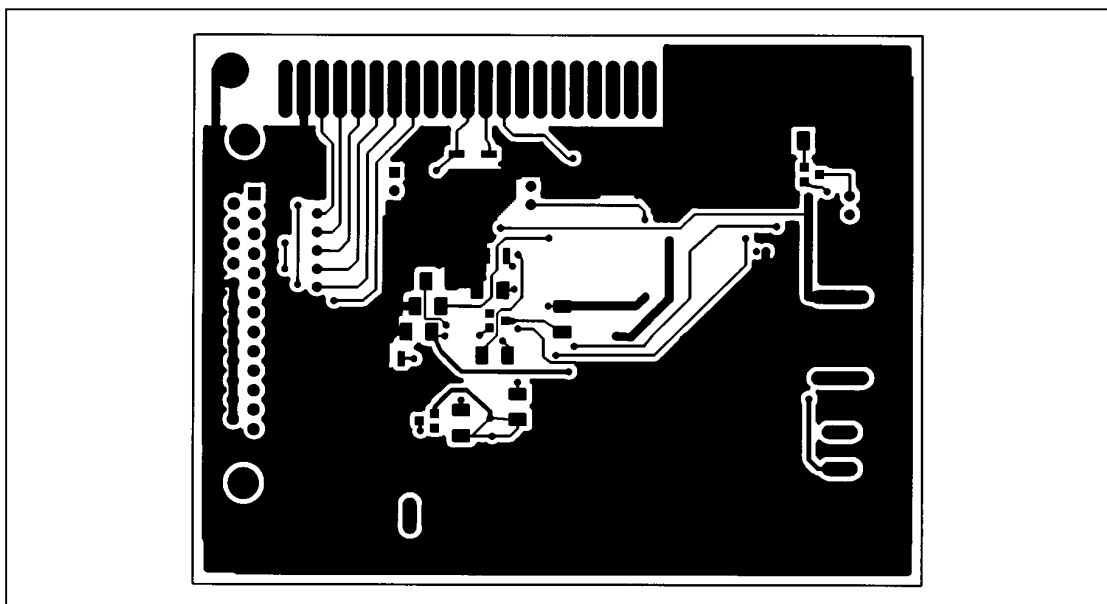
Figure 5. MAX781 EV Kit PC Board Layout—Component Side

Figure 6. MAX781 EV Kit PC Board Layout—Solder Side

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MAX781 Evaluation Kit

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