



MAX1282 Evaluation Kit/Evaluation System

General Description

The MAX1282 evaluation system (EV system) is a complete four-channel data-acquisition system consisting of a MAX1282 evaluation kit (EV kit), Maxim 68HC16MODULE-DIP microcontroller (μ C) module, and USBT0232. The MAX1282 is a high-speed, 12-bit data-acquisition system. Windows® 98/2000/XP-compatible software provides a handy user interface to exercise the MAX1282's features.

Order the complete EV system (MAX1282EVC16) for comprehensive evaluation of the MAX1282 using a PC. Order the EV kit (MAX1282EVKIT) if the 68HC16MODULE-DIP module has already been purchased with a previous Maxim EV system, or for custom use in other μ C-based systems.

Windows is a registered trademark of Microsoft Corp.

Component Lists

MAX1282 EV System

PART	QTY	DESCRIPTION
MAX1282EVKIT	1	MAX1282 EV kit
68HC16MODULE-DIP	1	68HC16 μ C module
USBT0232+	1	USB-to-COM port adapter board

+Denotes a lead-free and RoHS-compliant EV kit.

MAX1282 EV Kit

DESIGNATION	QTY	DESCRIPTION
C1–C4, C10	5	0.01 μ F ceramic capacitors
C9	1	4.7 μ F tantalum capacitor
C11, C13	2	0.1 μ F ceramic capacitors
C12, C14	2	10 μ F, 10V tantalum capacitors
J1	1	2x20 right-angle socket
JU1	1	2-pin header
JU2	1	3-pin header
R1–R4	4	300 Ω \pm 5% resistors
R9, R10	2	10 Ω \pm 1% resistors
TP1	1	8-pin header
U1	1	MAX1282BCUE (16-pin TSSOP)
—	1	PCB: MAX1282 Evaluation Kit

MAX1282 EV Kit Files

FILE	DESCRIPTION
INSTALL.EXE	Installs the EV kit files on your computer
MAX1282.EXE	Application program
KIT1282.C16	Software loaded into 68HC16 μ C

Features

- ◆ Proven PCB Layout
- ◆ Convenient On-Board Test Points
- ◆ Data-Logging Software
- ◆ Fully Assembled and Tested
- ◆ EV Kit Software Supports Windows 98/2000/XP with RS-232/COM Port
- ◆ EV Kit Software Supports Windows 2000/XP with USB Port

Ordering Information

PART	TEMP RANGE	INTERFACE
MAX1282EVKIT	0°C to +70°C	User supplied
MAX1282EVC16	0°C to +70°C	Windows software

Note: MAX1282 software is designed for use with the complete EV system, MAX1282EVC16 (includes 68HC16MODULE-DIP module, USBT0232, and MAX1282EVKIT). If the MAX1282 evaluation software will not be used, the MAX1282EVKIT board can be purchased by itself, without the μ C.

Quick Start

Recommended Equipment (USB Port/PC Connection Option)

Before beginning, the following equipment is needed:

- MAX1282 EV system:
 - MAX1282 EV kit
 - 68HC16MODULE-DIP
 - USBT0232 (USB cable included)
- A small DC power supply, such as a 12VDC, 0.25A plug-in transformer, or a 9V battery
- A user-supplied Windows 2000/XP computer with an available USB port to connect to the USBT0232 board

Note: In the following sections, software-related items are identified by bolding. Text in **bold** refers to items directly from the EV kit software. Text in **bold and underlined** refers to items from the Windows 2000/XP operating system.

Connections and Setup

The MAX1282 EV kit is fully assembled and tested. Follow the steps below to verify board operation. **Caution: Do not turn on the power until all connections are completed.**

- 1) Visit the Maxim website (www.maxim-ic.com) to download the latest version of the USBT0232 User Guide. Follow the steps in the USBT0232 User Guide *Quick Start* section and return to step 2 of this *Quick Start* section when finished.

Evaluate: MAX1282



MAX1282 Evaluation Kit/Evaluation System

- 2) Carefully connect the boards by aligning the 40-pin header of the MAX1282 EV kit with the 40-pin connector of the 68HC16MODULE-DIP module. Gently press them together. The two boards should be flush against one another.
- 3) Ensure that jumper JU1 is closed and jumper JU2 is in the 1-2 position (Table 1).
- 4) Connect a 7VDC to 20VDC power source to the μ C module at the terminal block located next to the on/off switch, along the top-edge of the μ C module. Observe the polarity marked on the board.
- 5) Connect the USBTO232 board to the 68HC16MODULE-DIP module if you have not done so already.
- 6) The MAX1282 EV kit software should have already been downloaded and installed in the USBTO232 Quick Start.
- 7) Start the MAX1282 program by opening its icon in the **Start | Programs** menu.
- 8) Turn on the power supply and slide SW1 to the ON position on the 68HC16MODULE-DIP module. Press the **OK** button to automatically connect and download the KIT1282.C16 file to the module.
- 9) Apply an input signal between analog common (COM) and input channel CH0. Observe the read-out on the screen.

Recommended Equipment (RS-232-to-COM Port/PC Connection Option)

Before beginning, the following equipment is needed:

- MAX1282 EV system:
MAX1282 EV kit
68HC16MODULE-DIP
- A small DC power supply, such as a 12VDC, 0.25A plug-in transformer, or a 9V battery
- A user-supplied Windows 98/2000/XP computer with an available serial communications port, preferably a 9-pin plug
- A serial cable to connect the computer's serial port to the 68HC16MODULE-DIP

Note: In the following sections, software-related items are identified by bolding. Text in **bold** refers to items directly from the EV kit software. Text in **bold and underlined** refers to items from the windows 98/2000/XP operating system

Connections and Setup

The MAX1282 EV kit is fully assembled and tested. Follow the steps below to verify board operation. **Caution: Do not turn on the power until all connections are completed.**

- 1) Visit the Maxim website (www.maxim-ic.com/evkit-software) to download the latest version of the EV kit software. Save the EV kit software to a temporary folder and uncompress the file (if it is a .zip file).
- 2) Install the MAX1282 EV kit software on your computer by running the INSTALL.EXE program. The program files are copied and icons are created for them in the Windows **Start | Programs** menu.
- 3) Carefully connect the boards by aligning the 40-pin header of the MAX1282 EV kit with the 40-pin connector of the 68HC16MODULE-DIP module. Gently press them together. The two boards should be flush against one another.
- 4) Ensure that jumper JU1 is closed and jumper JU2 is in the 1-2 position (Table 1).
- 5) Connect a 7VDC to 20VDC power source to the μ C module at the terminal block located next to the on/off switch, along the top-edge of the μ C module. Observe the polarity marked on the board.
- 6) Connect a cable from the computer's serial port to the μ C module. If using a 9-pin serial port, use a straight-through, 9-pin female-to-male cable. If the only available serial port uses a 25-pin connector, a standard 25-pin to 9-pin adapter will be required. The EV kit software checks the modem status lines (CTS, DSR, and DCD) to confirm that the correct port has been selected.
- 7) Start the MAX1282 program by opening its icon in the **Start | Programs** menu.
- 8) Turn on the power supply and slide SW1 to the ON position. The program will automatically download KIT1282.C16 to the module.
- 9) Apply an input signal between analog common (COM) and input channel CH0. Observe the read-out on the screen.

Table 1. Jumper Functions

JUMPER	POSITION	FUNCTION
JU1	Closed*	COM tied to GND
	Open	COM must be connected to analog common
JU2	1-2*	Operate
	2-3	Shutdown

*Default position.

MAX1282 Evaluation Kit/Evaluation System

Detailed Description

MAX1282 Stand-Alone EV Kit

The MAX1282 EV kit provides a proven PCB layout to evaluate the MAX1282. It must be interfaced to appropriate timing signals for proper operation. Connect +5V to VDD, and connect ground return to GND (Figure 1). Refer to the MAX1282 IC data sheet for timing requirements.

MAX1282 EV System

The MAX1282 EV system operates from a user-supplied 7VDC to 20VDC power supply. Windows 98/2000/XP-compatible software running on a PC interfaces to the EV system board through the computer's serial communications port (virtual COM port). See the *Quick Start* section for set-up and operating instructions.

Description of Software

The evaluation software's main window controls the serial clock speed and sample rate. It displays the voltage and output code, as well as some input signal statistics. A separate graph window shows the data changing in real time. The update rate is limited to about 10 samples per second, due to COM port bandwidth limitations.

Controls

The control word is divided into several fields. To change the active control word, drop down the appropriate field's combo box and select the desired option. If the QSPI™ clock is set to **STOP**, then configuration data will not be sent until the **READ** button is pressed.

Statistics

The **Minimum** and **Maximum** fields show the highest and lowest readings acquired. The **Average** field shows a running mean. The **Clear** button resets the statistics. To remove offset errors, first apply 0V to the active input channel, clear statistics, acquire some samples, and then check **Tare**. This average offset voltage will now be subtracted from all subsequent measurements.

Sampling

Choose the desired sampling rate (QSPI clock), sampling size (**Sample!** menu item), and press **Begin Sampling!** (in **Sample!** pop-up window). Sample size is restricted to a power of two to permit FFT processing once the data is saved to a file. After the samples have been collected, the data is automatically uploaded to the host and is graphed. Once displayed, the data can optionally be saved to a file.

Saving Graphs to Disk

Data in the real-time graph and in sampled data graphs may be saved to a file. Only the raw output codes are saved, but voltages may be inferred, based on the reference voltage and the maximum code value.

Scanning All Channels Input Signal

To scan through all channels, select **SCAN** from the **Input** menu.

Evaluating Shutdown

The evaluation software configures the 68HC16's QSPI submodule to continuously read data from the MAX1282 into the 68HC16. The sample rate is controlled by the QSPI clock. To evaluate power-saving modes, these automatic updates must be stopped. First, set the QSPI clock control to **STOP**. This reconfigures the 68HC16's QSPI submodule to stop driving the serial clock. Second, in the evaluation software's main window, uncheck the **Read Every...msec** check-box. Next, choose the desired software power-down control word, and press the **Read** button to send the new configuration to the MAX1282. If evaluating the hardware shutdown, move jumper JU2 to the 2-3 position.

Reference Voltage

The evaluation software assumes a 2.5V reference voltage, unless otherwise specified. Refer to the MAX1282 IC data sheet for more information. To override this value, type the new reference voltage into the **Vref** edit box and press the **Set Vref** button. Note: This new VREF value is used only by the evaluation software and does not physically change the reference voltage.

Description of Hardware

U1, the MAX1282, is a high-speed, multichannel, 12-bit data-acquisition system. Resistors R1–R4 and capacitors C1–C4 form single-pole, lowpass anti-aliasing filters with a nominal 3 μ s time constant and a corner frequency of approximately 50kHz. C9 and C10 bypass the ADC's voltage reference and reference buffer. When plugged into the 68HC16MODULE, the VDD circuit is powered by +5V. (See Figure 1 and refer to the MAX1282 data sheet.)

Troubleshooting

Problem: No output measurement. System seems to report zero voltage or fails to make a measurement.

Check the VDD supply voltage. Check the reference voltage using a digital voltmeter (DVM). Use an oscilloscope to verify that the conversion-start signal is being strobed. Verify that SHDN is being driven high.

Problem: Measurements are erratic, unstable; poor accuracy.

Check the reference voltage using a DVM. Use an oscilloscope to check for noise. When probing for noise, keep the oscilloscope ground return lead as short as possible, preferably less than 1/2in (10mm).

QSPI is a trademark of Motorola, Inc.

MAX1282 Evaluation Kit/Evaluation System

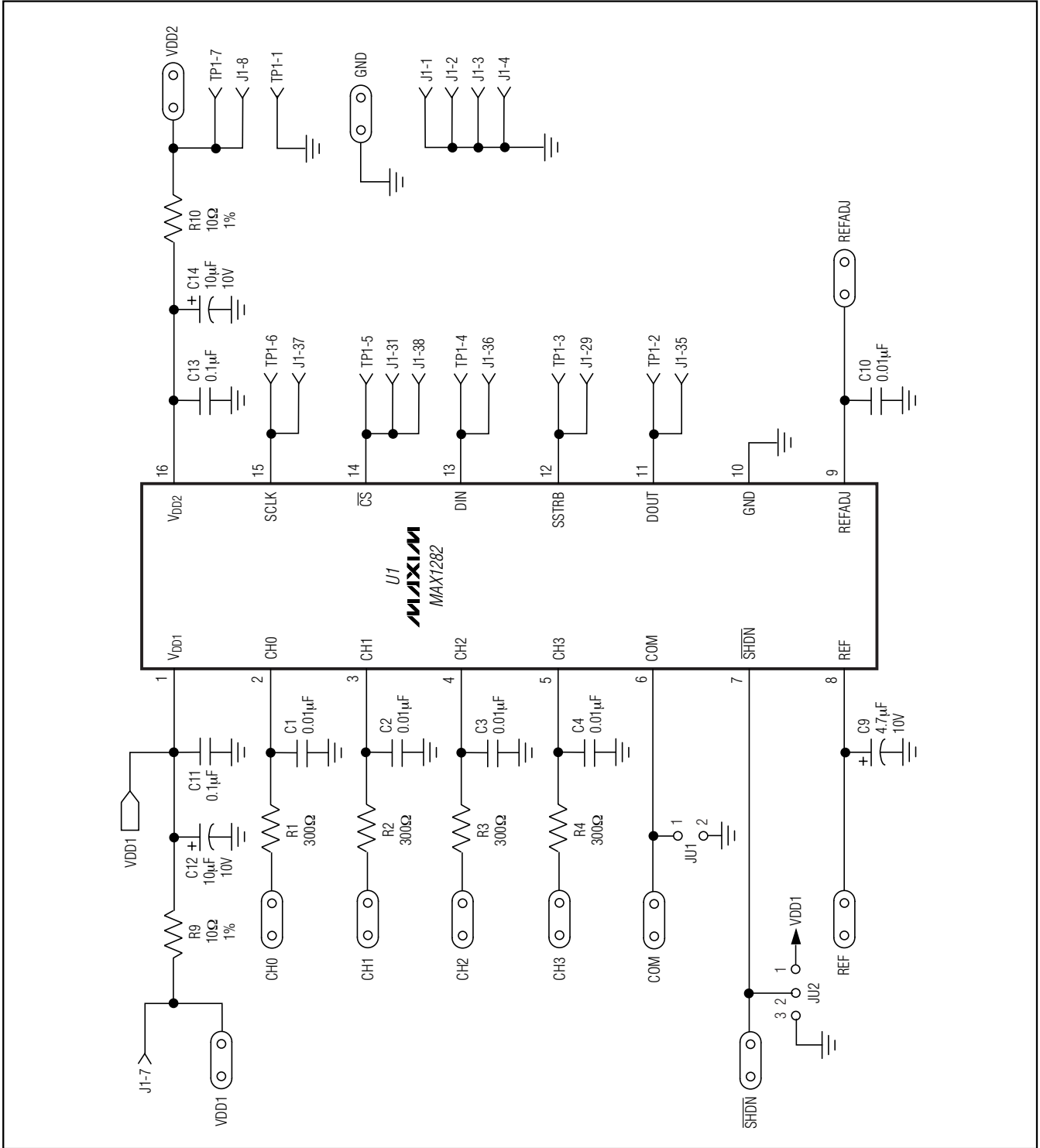


Figure 1. MAX1282 EV Kit Schematic

MAX1282 Evaluation Kit/Evaluation System

Evaluate: MAX1282

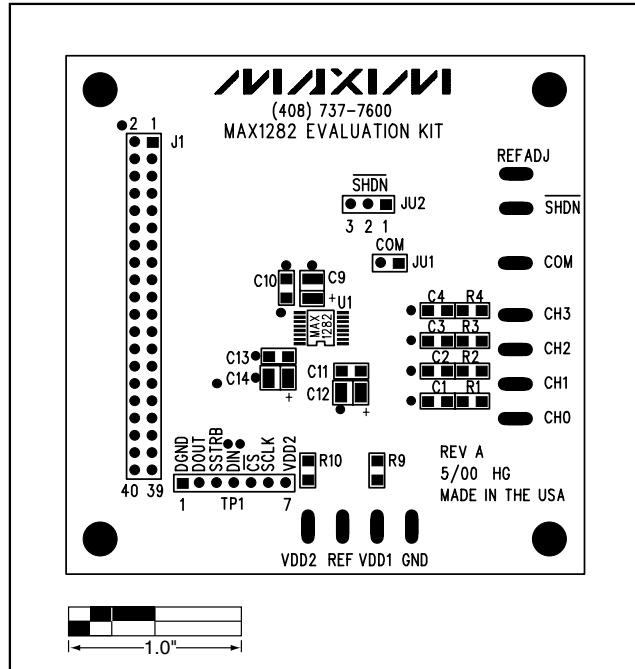


Figure 2. MAX1282 EV Kit Component Placement Guide—Component Side

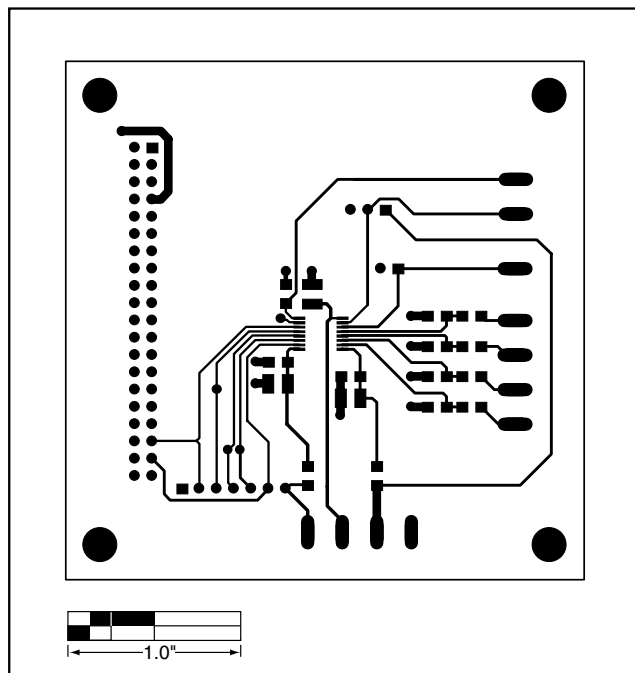


Figure 3. MAX1282 EV Kit PCB Layout—Component Side

MAX1282 Evaluation Kit/Evaluation System

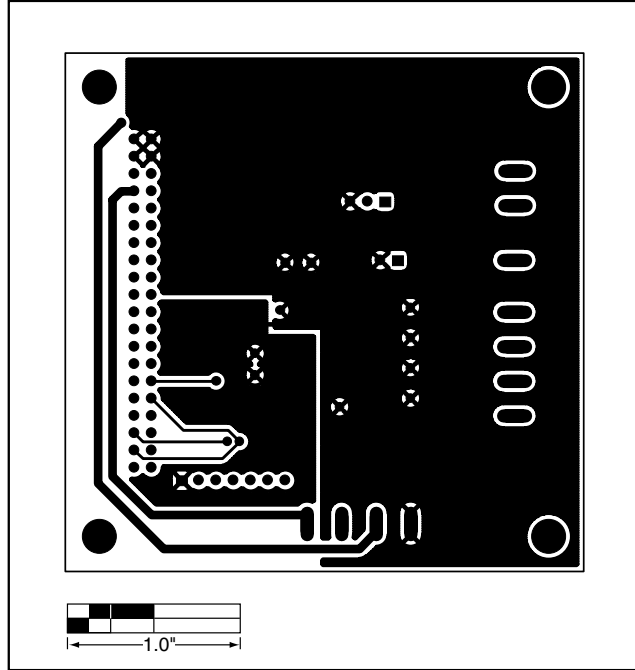


Figure 4. MAX1282 EV Kit PCB Layout—Solder Side

Revision History

Pages changed at Rev 1: Title change—all pages, 1, 2, 3, 5, 6

Maxim cannot assume responsibility for use of any circuitry other than circuitry entirely embodied in a Maxim product. No circuit patent licenses are implied. Maxim reserves the right to change the circuitry and specifications without notice at any time.

6 **Maxim Integrated Products, 120 San Gabriel Drive, Sunnyvale, CA 94086 408-737-7600**