19-1322; Rev 0; 10/97

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MAX125/MAX126 Evaluation Systems/Evaluation Kits

Evaluate: MAX125/MAX126

General Description

The MAX125/MAX126 evaluation systems (EV systems) consist of a MAX125/MAX126 evaluation kit (EV kit) and a Maxim 68HC16MOD-16WIDE microcontroller (µC) module. The MAX125/MAX126 are high-speed, 8-channel, 14-bit data-acquisition systems with four simultaneous track/holds. Windows 3.1™/Windows 95™ software provides a handy user interface to exercise the MAX125/MAX126's features.

Order the complete EV system for comprehensive evaluation of the MAX125/MAX126 with a personal computer. Order the EV kit if you have already purchased the µC module (68HC16MOD-16WIDE) with another Maxim EV system or if you desire custom use in other µC-based systems.

Stand-Alone EV Kits

The MAX125/MAX126 EV kits provide a proven PC board layout to facilitate evaluation of the MAX125/MAX126. The EV kits must be interfaced to appropriate timing signals for proper operation. Apply dual power supplies (±8V min, ±20V max) to connector P1, pin 5 (P1-5), and P1-9, with ground at P1-1. Connect the active-low read strobe to P1-38, the write strobe to P1-37, the chip selects to P1-35, and the convert-start signal to P1-36 (Table 1 and Figure 1). Refer to the MAX125/MAX126 data sheet for timing requirements.

EV Systems

The MAX125/MAX126 EV systems operate from a user-supplied +13V to +20V DC power supply. Windows 3.1/Windows 95 software running on an IBM PC interfaces to the EV system board through the computer's serial-communications port. The software can be operated with or without a mouse. Refer to the *Quick Start* section for setup and operating instructions.

Table 1. Power-Supply and Timing Signal Connections

PIN	SIGNAL
P1–1	Ground
P1–5	Positive Supply, +8V to +20V
P1–9	Negative Supply, -8V to -20V
P1–35	Chip Select
P1–36	Convert-Start
P1–37	Write Strobe
P1–38	Read Strobe

Features

♦ **Proven PC Board Layout**

♦ **Complete Evaluation System Samples to 40ksps**

♦ **Convenient Test Points Provided On Board**

♦ **Data-Logging Software with FFT Capability**

♦ **Fully Assembled and Tested**

Ordering Information*

PART	TEMP. RANGE	INTERFACE TYPE
MAX125EVKIT	0°C to +70°C	User Supplied
MAX125EVB16	0°C to +70°C	Windows Software
MAX126EVKIT	0°C to +70°C	User Supplied
MAX126EVB16	0°C to +70°C	Windows Software

* The MAX125 software can be used only with the complete evaluation system (MAX125EVB16 or MAX126EVB16), which includes the 68HC16MOD-16WIDE module together with the MAX125EVKIT or MAX126EVKIT.

MAX125EVB16 System Component List

PART	QTY	DESCRIPTION
MAX125EVKIT	1	MAX125 evaluation kit
68HC16MOD-16WIDE	1	68HC16 µC module with 16-bit parallel interface

MAX126EVB16 System Component List

PART	QTY	DESCRIPTION
MAX126EVKIT	1	MAX126 evaluation kit
68HC16MOD-16WIDE	1	68HC16 µC module with 16-bit parallel interface

Windows 3.1 and Windows 95 are trademarks of Microsoft Corp.

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MAX125/MAX126 Evaluation Systems/Evaluation Kits

MAX125EVKIT/MAX126EVKIT Component List

DESIGNATION	QTY	DESCRIPTION
C1, C2, C4, C5, C6, C9, C10	7	0.1µF ceramic capacitors
C3, C8	2	10µF, 25V tantalum capacitors
C7	1	4.7µF, 6.3V tantalum capacitor
C11	1	100pF ceramic capacitor
P1, P2	2	2x20 right-angle connectors
R1, R6	2	100Ω, 1% resistors
R2–R5	4	10kΩ, 5% resistors
R7, R8	2	10Ω, 5% resistors
U1	1	Maxim MAX125 or MAX126
U2	1	78L05 voltage regulator
U3	1	74HCT244
U4	1	79L05 negative-voltage regulator
U5	1	16MHz clock-oscillator module
None	1	PC board
None	1	Software disk: *MAX125 Evaluation Kit*

List of Files in MAX125 EV Kit

FILE	FUNCTION
INSTALL.EXE	Installs EV kit files onto your computer
MAX125.EXE	Application program
MAX125.HLP	Help file
KIT125.B16	Loads software into the 68HC16 µC
MAX125.INI	Program settings
UNINST.EXE	Removes EV kit files from your computer

Quick Start

Recommended Equipment

You will need the following equipment before you begin:

- A small DC power supply (+13V to +20V DC at 250mA)
- An IBM PC-compatible computer capable of running Windows 3.1 or Windows 95
- A spare serial-communications port, preferably a 9-pin plug
- A serial cable to connect the computer's serial port to the Maxim 68HC16MOD-16WIDE module

Connections and Setup

Perform the following steps to evaluate the MAX125 or MAX126:

1) Carefully connect the boards by aligning the two 40-pin headers of the MAX125/MAX126 EV kit with the two 40-pin connectors of the 68HC16MOD-16WIDE module. Gently press them together. The two boards should be flush against each other.

2) Connect a +13V to +20V DC power source to the µC module at the terminal block (J2) next to the on/off switch, along the top edge of the µC module. Observe the polarity marked on the board.

3) Connect a cable from the computer's serial port to the µC module. With 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 is required. The EV kit software checks the modem status lines (CTS, DSR, DCD) to confirm that the correct port has been selected.

4) Install the EV kit software on your computer by running the *INSTALL.EXE* program on the floppy disk. The program files are copied, and icons are created for them in the Windows 3.1 program manager (or the Windows 95 Start menu). The EV kit software evaluates both the MAX125 and the MAX126.

5) Start the program by opening its icon in the program manager (or Start menu).

6) The program prompts you to connect the µC module and turn its power on. Slide SW1 to the on position. Select the correct serial port and click OK. The program automatically downloads *KIT125.B16* to the module. The default device setting is for the MAX125. If using the MAX126, select "MAX126" in the device characteristics dialog box and click on "apply."

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7) Apply input signals to the inputs labeled CH1A–CH4A at the bottom edge of the MAX125/MAX126 EV kit board. Observe the readout on the screen.

__Detailed Description of Software

The MAX125/MAX126 digitize up to four inputs from either the A or the B input bank. Conversion time is determined by the number of enabled inputs. The software collects samples at a maximum throughput of 40ksps (one channel) and 26ksps (four channels). The various program functions are grouped into dialog boxes, which are accessible from the Window menu on the main menu bar.

Keyboard Navigation

If a mouse or other pointing device is not available, use the following keyboard shortcuts (Table 2):

- Press ALT+W to display the Window menu, and then select a tool window.

- Press the TAB key to select controls within the selected tool window.

- Activate buttons by pressing the spacebar.

- Use the up/down arrow keys for check boxes, radio buttons, and combo boxes.

Scan Tool

You can automatically take readings at regular intervals up to 10 samples per second from user-selected channels by selecting Scan Tool from the Window menu. The "Channel Selection and Configuration" group controls which channels will be scanned. The "Bipolar and Differential" controls are disabled because the MAX125/MAX126's transfer function is bipolar.

The "Scan Rate" combo box controls the rate at which measurements are made. Readings are displayed in the "Recent Values" text area.

Table 2. Keyboard-Navigation Shortcuts

KEY	FUNCTION
TAB	Selects next control
ALT+W	Window menu
ALT+space	System menu of main program window
ALT+minus	System menu of child window
Spacebar	Clicks on the selected button
ALT+PrintScreen	Copies the image of the main window onto the clipboard

You may optionally record readings into a data-log file. Click on the "New Log" button to begin or end data logging. The "Log File Format" dialog box is displayed. One complete line of data is written after all enabled channels have been sampled. The first line of the log file contains the column headings. Each subsequent line contains all enabled channels, separated by commas, tabs, or spaces (previously selected in the "Log File Format" dialog box). Once a log file has been opened, it can be paused or resumed with the corresponding Log menu commands. The program continues to write data to the log file until the "Stop Log" button is clicked.

One-Shot Read Tool

The "One-Shot Read Tool" allows direct control of the analog-to-digital converter (ADC) configuration. Select the channel and mode of operation to update the "Control Byte" display. Or, change the "Control Byte" bits directly and observe the change in the "Channel Selection" control. The "Read Now" button writes the configuration information to the ADC and performs one reading.

Power Cycling Tool

To reduce average supply current demand, the MAX125/MAX126 can be shut down between conversions. From the Window menu, select "Power Cycling Tool." The amount of power saved depends primarily on how long the part is off between conversions. Conversion accuracy depends on the power-up delay, reference capacitor, and time in power-down. Adjust the off-time with the "Delay Between Samples" command. Adjust the on-time with the "Power-Up Delay" command.

Using an adequate power-up delay ensures that the desired conversion accuracy is achieved during power-cycling modes. The reference must be allowed enough time to stabilize before the measurement is performed. Start with zero power-up delay, and increase the delay time until no further change in accuracy is observed. The power-up delay requirement depends on the value of the reference capacitor and the off-time (delay between samples).

The MAX125/MAX126 EV kit software performs power-up by writing a configuration word with the shutdown bit cleared. After power-up, the power-up delay is executed to allow time for the reference voltage to stabilize so that an accurate measurement can be performed.

Sampling Tool

To sample data at rates up to 40ksps, select "Sampling Tool" from the Window menu, make your selections, and click on the Start button. Adjust the timing delays as appropriate to control the sample rate. Estimate the effective sample rate by taking the reciprocal of the sum of the delay between samples, the power-up delay, and the conversion time. Sample size is restricted to a power of two so that the "Fast Fourier Transform" (FFT) tool can process the data. "Sample Size" controls the number of samples collected on each selected channel. After the samples have been collected, the data is automatically uploaded to the host and graphed. Once displayed, the data can optionally be saved to a file.

FFT Tool

The EV software includes an FFT tool that can display the spectral content of data collected with the high-speed sampling tool.

To view the spectral content of a waveform, first select a data sample that was previously collected with the "Sampling Tool." Then select "FFT Tool" from the Window menu. Check the output plots desired and click on the Start button.

A data-windowing function preprocesses the data sample before performing an FFT.[1] When the input signal is not synchronized to the sampling clock, spectral energy appears to leak into nearby frequency buckets. A suitable data window tapers the raw data to zero amplitude at the beginning and end, reducing this spectral leakage.

Device Characteristics

The "Device Characteristics" dialog box contains parameters that are not expected to change often. The device selection is used to select between the MAX125 and the MAX126.

Evaluating the MAX126

The MAX125 software can evaluate the MAX126 directly. From the Window menu, select "Device Characteristics." Next, change the device type from MAX125 to MAX126. This tells the program that the input voltage span is $\pm V_{REF}$ instead of $\pm 2V_{REF}$.

Changing the Reference Voltage

The EV kit software assumes a 2.5V reference voltage, unless otherwise specified. Apply an external 2.5V reference to the REFIN pad to overdrive the internal reference. See the MAX125/MAX126 data sheet for more information. From the Window menu, select "Device Characteristics." Next, type the new reference voltage into the "Reference Voltage" edit box.

Detailed Description of Hardware

The ADC (U1) is an 8-channel, 14-bit data-acquisition system with four simultaneous track/holds. Linear regulators U2 and U4 provide clean analog $\pm 5V$ power supplies for the ADC. R8 and C1 filter digital noise out of the analog power supply. U3 isolates the $\overline{CS}$, $\overline{RD}$, $\overline{WR}$, and CONVST signals from the main system bus to further prevent digital noise from entering the ADC. R7 and C11 filter the TTL clock oscillator to prevent overshoot at the CLK input.

The MAX125/MAX126's chip-select ($\overline{CS}$) is memory-mapped to location 7E000 on the 68HC16 module. This location is used for writing configuration bytes and reading data. The convert-start ($\overline{CONVST}$) signal is also memory-mapped and is asserted for one memory-access cycle when memory location 7E800 is accessed. The MAX125/MAX126's interrupt ($\overline{INT}$) output triggers an interrupt on the 68HC16 through the input capture vector.

Measuring Supply Current

To monitor supply current, measure the voltage across resistor R1 (for the +5V supply) or R6 (for the -5V supply). These resistors are $100\Omega \pm 1\%$, so every 1mV across R1 or R6 represents 10µA of supply current.

Table 3. Troubleshooting Guide

PROBLEM	CORRECTIVE ACTIONS
No output measurement. System seems to report zero voltage or fails to make a measurement.	- Check the +5V and -5V supply voltages. - Check the 2.5V REFOUT reference voltage using a digital voltmeter. - Use an oscilloscope to verify that the 16MHz clock is running and that the conversion-start signal is being strobed.

1) *For more information on the FFT and data-windowing functions, refer to W.H. Press, et al.,* Numerical Recipes in Pascal: The Art of Scientific Computing, *Cambridge University Press, 1989, ISBN 0-521-37516-9.*
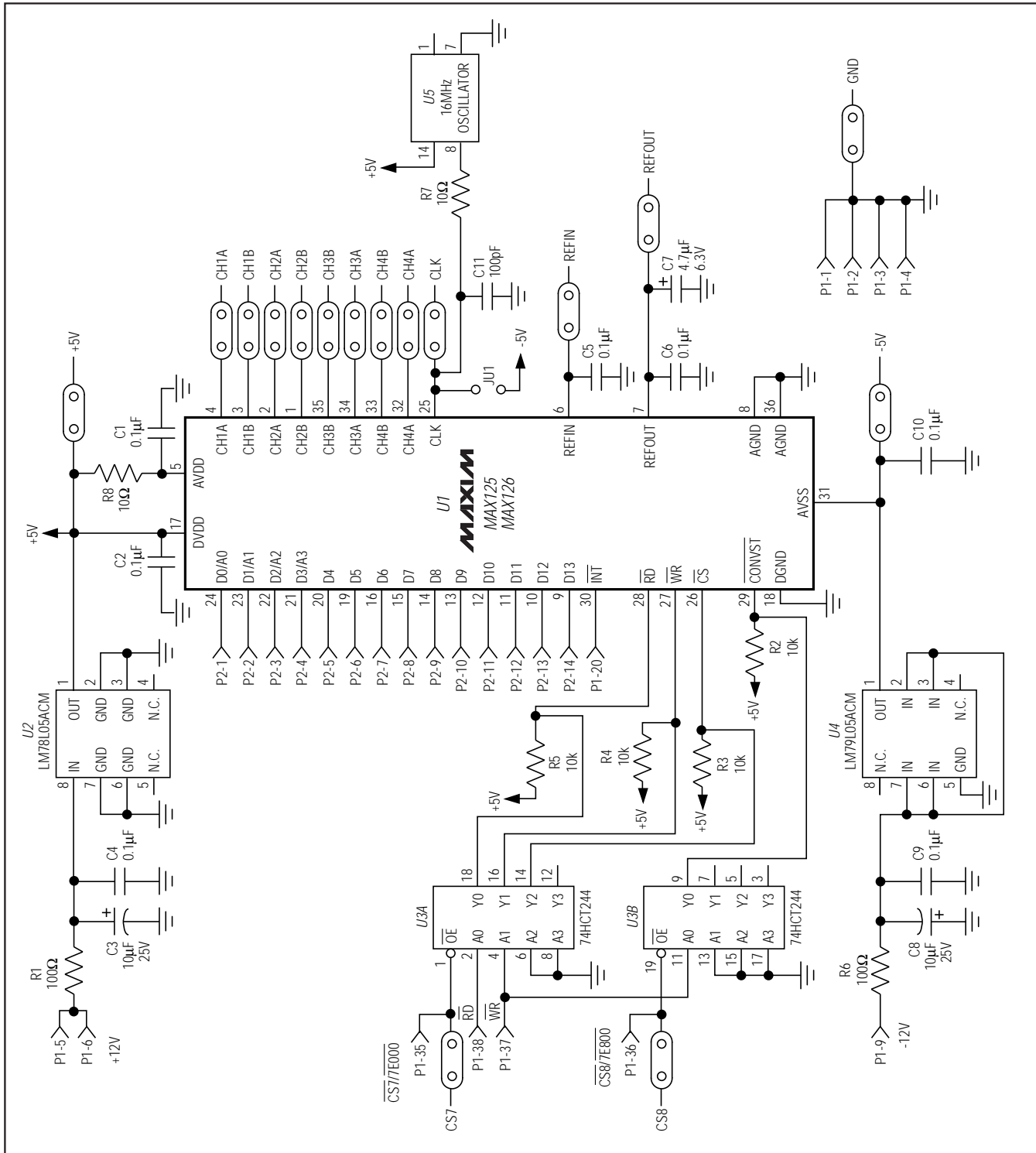
/VI/IXI/VI

Figure 1. MAX125 EV Kit Schematic

MAX125/MAX126 Evaluation Systems/Evaluation Kits
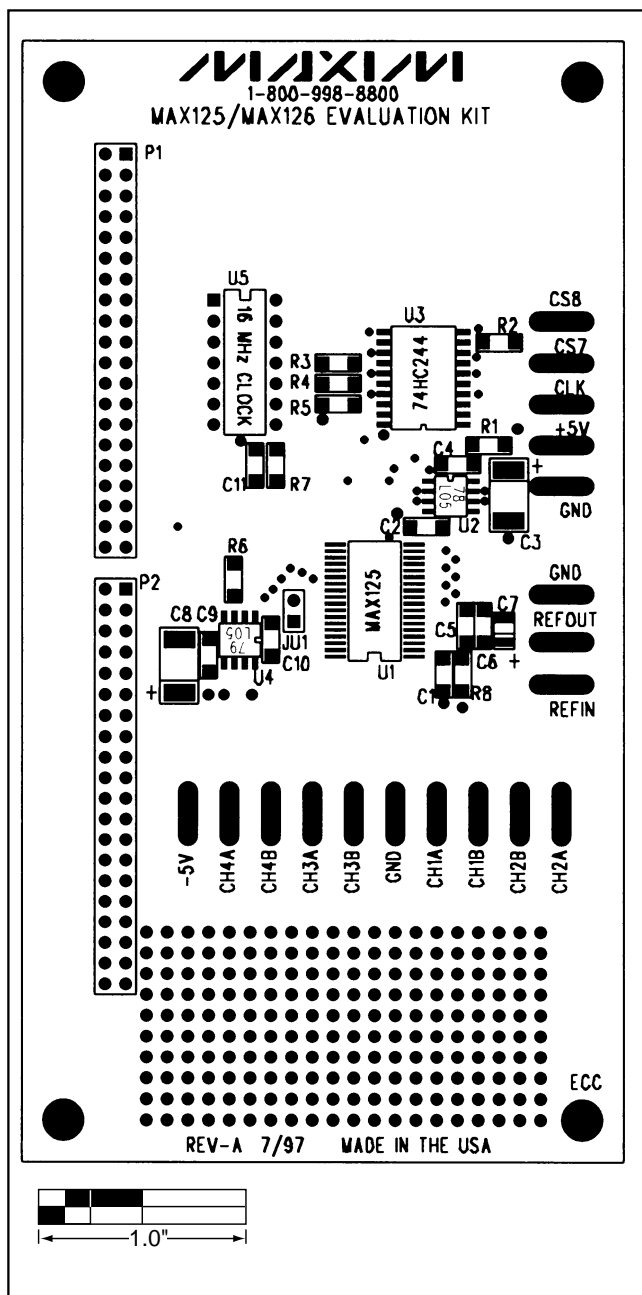
Figure 2. MAX125/MAX126 EV Kit Component Placement Guide

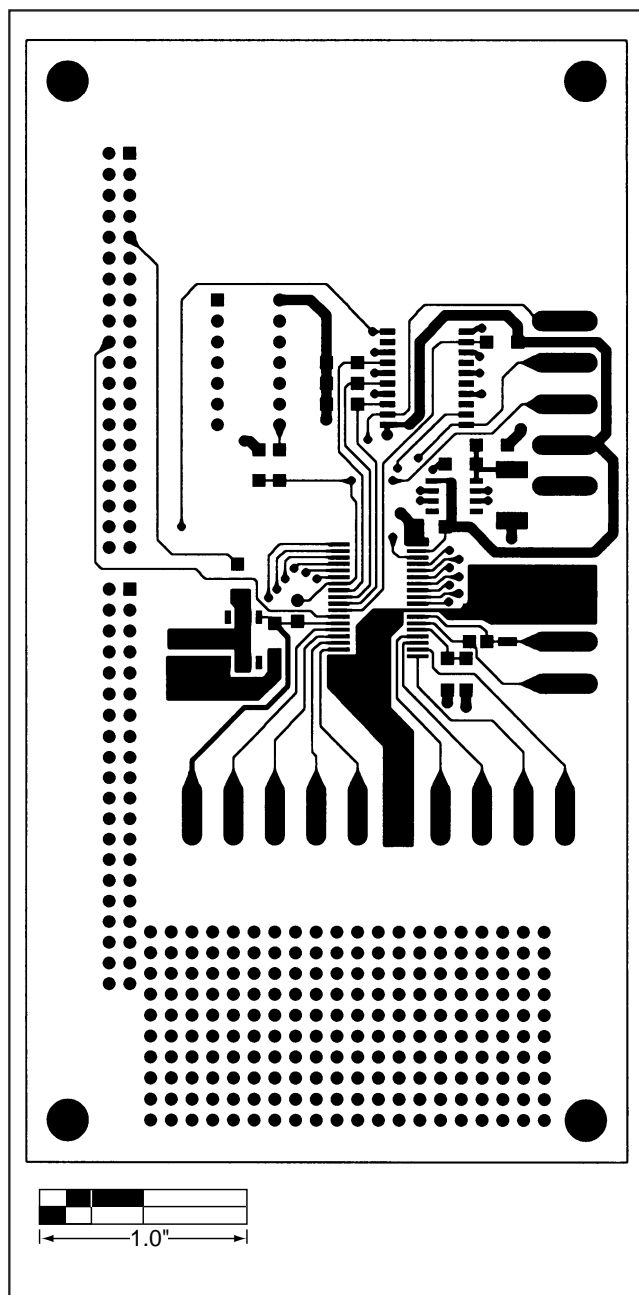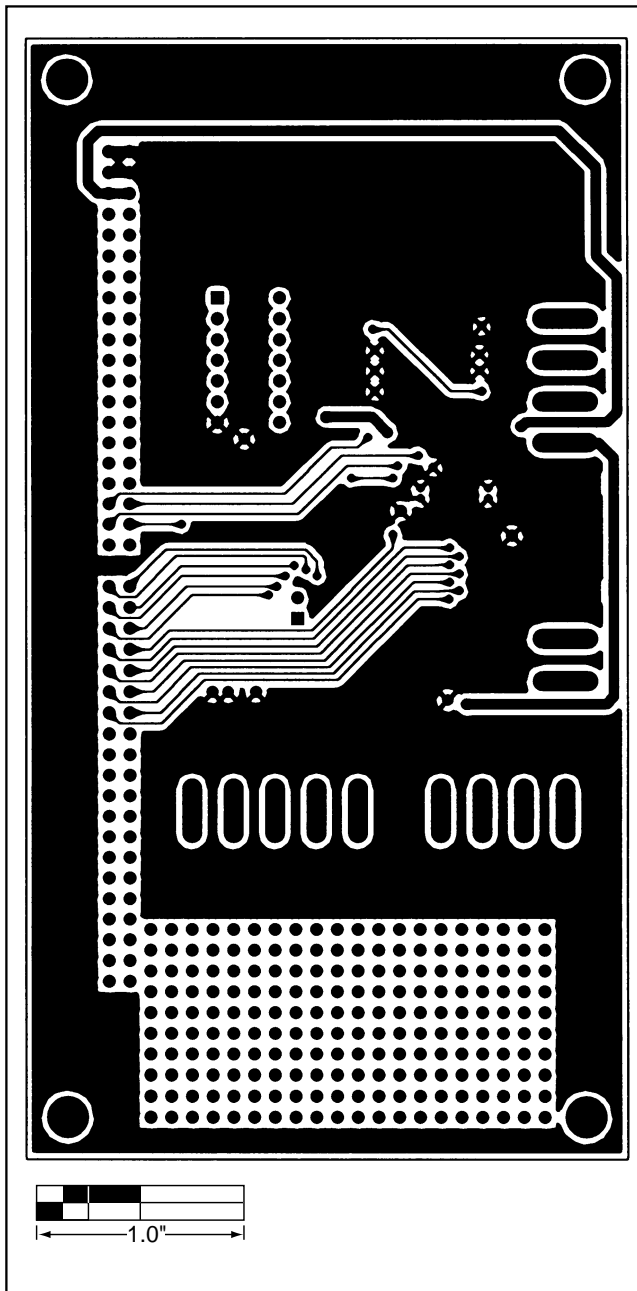Figure 3. MAX125/MAX126 EV Kit PC Board Layout— Component Side

Figure 4. MAX125/MAX126 EV Kit PC Board Layout—Solder Side

MAX125/MAX126 Evaluation Systems/Evaluation Kits

NOTES

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68HC16MOD-16WIDE

_____*Component List*

DESIGNATION	QTY	DESCRIPTION
C1	1	10µF, 25V electrolytic capacitor
C2, C8–C12, C14	7	0.1µF ceramic capacitors
C3	1	1µF ceramic capacitor
C4, C5	2	22µF, 25V electrolytic capacitors
C6, C7	2	22pF ceramic capacitors
C13	1	100µF, 25V electrolytic capacitor
D1	1	1N4001 diode
D2	1	1N4742A 12V, 1W zener diode
J2	1	2-circuit terminal block
J3	1	Right-angle printed circuit board mount, DB9 female socket
LED1	1	Light-emitting diode
P1, P2	2	40-pin right-angle male connectors
R1	1	10MΩ, 5% resistor
R2	1	330kΩ, 5% resistor
R3, R4	2	10kΩ, 5% resistors
R5	1	470Ω, 5% resistor
R6	1	10kΩ, SIP resistor
R7	1	100Ω, 5% resistor

DESIGNATION	QTY	DESCRIPTION
SW1	1	Slide switch
SW2	1	Momentary pushbutton switch
U1	1	68HC16 microcontroller MC68HC16Z1CFC16 (132-pin plastic quad flat pack)
U2	1	Maxim MAX233CPP
U3	1	27C256 EPROM containing monitor program
U3	1	28-pin socket
U4	1	7805 regulator, TO-220 size
U4	1	Heatsink, thermalloy # 6078
U5, U8	2	62256 (32K x 8) static RAMs
U6, U9	2	74HCT245 bidirectional buffers
U6, U9	2	20-pin sockets
U7	1	Maxim MAX707CPA
U10	1	Maxim ICL7662CPA
Y1	1	32.768kHz watch crystal
None	4	Rubber feet
None	1	5" x 5" printed circuit board

_____*General Description*

The 68HC16MOD-16WIDE module is an assembled and tested printed-circuit board intended for use with Maxim's high-speed evaluation kits (EV kits). The module uses a full 16-bit implementation of Motorola's MC68HC16Z1 microcontroller (µC). It requires an IBM-compatible personal computer and an external DC power supply, typically 12V or as specified in the EV kit manual.

Maxim's 68HC16MOD-16WIDE module allows customers to evaluate selected Maxim products. It is not intended to be used as a microprocessor development platform, and such use is not supported by Maxim.

_____*Detailed Description*

Power Input Connector J2

The 68HC16MOD-16WIDE module draws its power from a user-supplied power source connected to terminal block J2. Be sure to note the positive and negative markings on the board. A three-terminal 5V regulator allows input voltages between 8V and an absolute maximum of 20V. The 68HC16MOD-16WIDE module typically requires 200mA of input current.

68HC16 Microcontroller

U1 is Motorola's 68HC16Z1 µC. Contact Motorola for µC information, development, and support. Maxim EV kits may use the 16-bit wide bus or use the high-speed queued serial peripheral interface (QSPI™) and the internal chip-select generation.

A MAX707 on the module (U7) monitors the 5V logic supply, generates the power-on reset, and produces a reset pulse whenever the reset button is pressed.

QSPI is a trademark of Motorola Corp.

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The 68HC16MOD-16WIDE module uses a phase-locked loop (PLL) to set its bus speed. Crystal Y1 is a 32.768kHz frequency reference. The internal oscillator runs 256 times faster than the external crystal. When the 68HC16MOD-16WIDE module is reset, it waits for the PLL to lock before it executes any software. After the PLL locks onto the reference frequency, the software doubles the clock speed by writing to the clock synthesizer control register, selecting a bus speed of 16.78MHz.

U5 and U8, the user RAM area, are 32kbyte CMOS static RAMs.

The 74HCT245 octal buffers let the 68HC16MOD-16WIDE module access a 16-bit port on the interface connectors. This memory-mapped port consists of separate read and write strobes, four chip selects, four address LSBs, and sixteen data bits.

Serial Communications
J3 is an RS-232 serial port, designed to be compatible with the IBM PC 9-pin serial port. Use a straight-through DB9 male-to-female cable to connect J3 to this port. If the only available serial port has a 25-pin connector, you may use a standard 25-pin to 9-pin adapter. Table 1 shows the pinout of J3.

The MAX233 is an RS-232 interface voltage level-shifter with two transmitters and two receivers. It includes a built-in charge pump with internal capacitors that generates the output voltages necessary to drive RS-232 lines.

40-Pin Connectors P1 and P2
The 20 x 2 pin headers (P1 and P2) connect the 68HC16MOD-16WIDE module to a Maxim EV kit. Table 2 lists the function of each pin.

Address Ranges
The 68HC16 µC generates various enable signals for different address ranges. The ROM and RAM enable signals are fed directly to the respective chips. Several additional signals (P1–33 to P1–36) are available on the data connector to be used by Maxim EV kits. Table 3 outlines the address ranges for each of the elements found on the 68HC16MOD-16WIDE module, and Table 4 is a truth table that describes the logic for each of the module's chip-select outputs. Because the addresses are not completely decoded, the boot ROM and has a shadow at address 08000 hex.

Table 1. Serial Communications Port J3

PIN	NAME	FUNCTION
1	DCD	Handshake; hard-wired to DTR and DSR
2	RXD	RS-232-compatible data output from 68HC16MOD-16WIDE module
3	TXD	RS-232-compatible data input to 68HC16MOD-16WIDE module
4	DTR	Handshake; hard-wired to DCD and DSR
5	GND	Signal ground connection
6	DSR	Handshake; hard-wired to DCD and DTR
7	RTS	Handshake; hard-wired to CTS
8	CTS	Handshake; hard-wired to RTS
9	None	Unused

Boot ROM
The boot ROM, U3, is configured as an 8-bit memory device. Resistor R4 pulls data bit 0 low during system reset, forcing the µC to fetch instructions using only the upper eight data bits. The boot ROM checks the system and waits for commands from the host. Refer to the EV kit manual for specific start-up procedures.

Software
All software is supplied on a disk with the EV kit. Instructions for operating the software are included in the EV kit manual. Refer to the EV kit manual for more information.

Use the 68HC16MOD-16WIDE module only with those EV kits that are designed to support it, and only download code that is targeted for the 68HC16MOD-16WIDE module. Downloading incorrect object code into the 68HC16MOD-16WIDE module will have unpredictable results.

Self Check

The 68HC16MOD-16WIDE module includes a self-diagnostic routine, which checks the power supply, microprocessor, RAM, and ROM, independent of the EV kit or computer. Note that it does not exercise the RS-232 port or the EV kit 80-pin interface. Connect the power supply to the power terminals (J2) and slide the power switch SW1 to the "ON" position. The LED will light up, and will flash within 5 seconds.

If the LED flashes with a 50% duty cycle, then the module passed its self check.

If the LED flashes with a 10%-on/90%-off duty cycle, then the module failed its self check. Most likely, one of the RAM chips (U5 or U8) is bad.

If the LED remains on and does not flash, then the problem is either U3 (the EPROM), U1 (the microprocessor), U4 (the regulator), the MAX707 reset generator, or the power supply. Use a voltmeter to verify that the power supplies are good; check the power-supply input and the +5V output from the regulator. Use an oscilloscope to see if the 32.768kHz reference oscillator is running.

Table 2. P1 and P2 Data-Connector Signals

HEADER	PIN	NAME	68HC16-16WIDE MODULE FUNCTION
P1	1, 4	GND	Ground return
	5, 6	VPREREG	+12V from wall cube
	7, 8	+5V	+5V from 78M05
	9, 10	-12V	-12V from ICL7662 (typically -8V at 15mA load)
	11	PCS2	QSPI peripheral chip select 2
	12	PCS3	QSPI peripheral chip select 3
	13	PCS0/SS	QSPI peripheral chip select 0
	14	PCS1	QSPI peripheral chip select 1
	15	MOSI	QSPI Master Output, Slave Input
	16	SCK	QSPI Serial Clock
	17	—	Not used
	18	MISO	QSPI Master Input, Slave Output
	19	IC2	General purpose I/O; Input Capture 2; can be used as an IRQ
	20	IC1	General purpose I/O; Input Capture 1; can be used as an IRQ
	21	OC1	General purpose I/O; Output Compare 1
	22	IC3	General purpose I/O; Input Capture 3; can be used as an IRQ
	23	—	Not used
	24	OC2	General purpose I/O; Output Compare 2
	25	OC4	General purpose I/O; Output Compare 4
	26	OC3	General purpose I/O; Output Compare 3
	27	PAI	Pulse Accumulator Input
	28	IC4	General purpose I/O; Input Capture 4; can be used as an IRQ
	29	PWMB	Pulse-Width Modulator B output (drives the status LED)
	30	PWMA	Pulse-Width Modulator A output

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Table 2. P1 and P2 Data-Connector Signals (continued)

HEADER	PIN	NAME	68HC16-16WIDE MODULE FUNCTION
P1	31	—	Not used
	32	PCLK	Pulse Accumulator Clock Input
	33	CS10/7F800	Chip select strobe for I/O area $7F800
	34	CS9/7F000	Chip select strobe for I/O area $7F000
	35	CS7/7E000	Chip select strobe for I/O area $7E000
	36	CS8/7E800	Chip select strobe for I/O area $7E800
	37	CS5/WRIO	Active low write strobe for I/O area
	38	CS1/RDIO	Active low read strobe for I/O area
	39, 40	—	Not used
P2	1	EXTD0	External I/O data bus LSB
	2–15	EXTD1–14	External I/O data bus
	16	EXTD15	External I/O data bus MSB
	17, 18	—	Not used
	19	A01	Word address LSB
	20	A02	Word address
	21	A03	Word address
	22	A04	Word address
	23–40	—	Not used

Table 3. Memory Map (all address values are in 20-bit hex)

PIN	FUNCTION
00000–07FFF	Boot ROM (U3, strobed by CSBOOT)
08000–0FFFF	Shadow of boot ROM
10000–1FFFF	User RAM (U5 and U8, strobed by CS0 and CS2)
20000–203FF	Internal standby RAM; 1kbyte
20400–7DFFF	Unused
7E000–7E7FF	External chip select (P1 pin 35) (CS7)
7E800–7EFFF	External chip select (P1 pin 36) (CS8)
7F000–7F7FF	External chip select (P1 pin 34) (CS9)
7F800–7FFFF	External chip select (P1 pin 33) (CS10)
80000–F7FFF	Not accessed by the 68HC16

PIN	FUNCTION
F8000–FF6FF	Unused
FF700–FF73F	68HC16's built-in ADC (not used)
FF740–FF8FF	Unused
FF900–FF93F	General-purpose timer module (GPT)
FF940–FF9FF	Unused
FFA00–FFA7F	System integration module (SIM)
FFA80–FFAFF	Unused
FFB00–FFB07	Internal standby RAM (SRAM) control registers
FFB08–FFBFF	Unused
FFC00–FFDFF	Queued serial module (QSM)
FFE00–FFFFF	Unused

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Table 4. Chip-Select Outputs Truth Table

ADDRESS RANGE	CSBOOT	CS0	CS1	CS2	CS5	CS6	CS7	CS8	CS9	CS10
0xxxx read	L	H	H	H	H	H	H	H	H	H
1xxxx read	H	H	H	L	H	H	H	H	H	H
1xxxx write	H	L	H	H	H	H	H	H	H	H
7E0xx read	H	H	L	H	H	L	L	H	H	H
7E0xx write	H	H	H	H	L	L	L	H	H	H
7E8xx read	H	H	L	H	H	L	H	L	H	H
7E8xx write	H	H	H	H	L	L	H	L	H	H
7F0xx read	H	H	L	H	H	L	H	H	L	H
7F0xx write	H	H	H	H	L	L	H	H	L	H
7F8xx read	H	H	L	H	H	L	H	H	H	L
7F8xx write	H	H	H	H	L	L	H	H	H	L
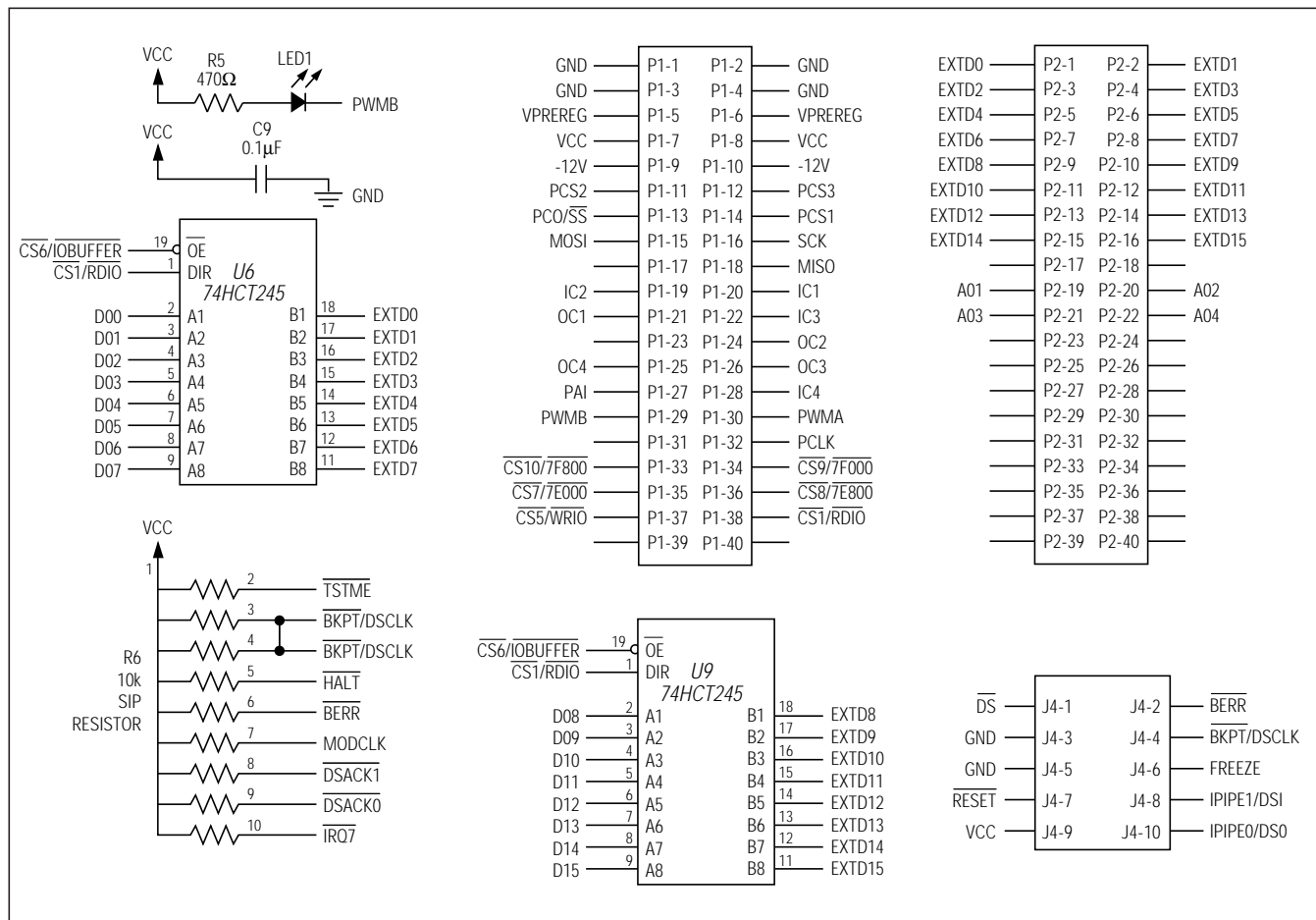
Figure 1. 68HC16MOD-16WIDE Module Schematic
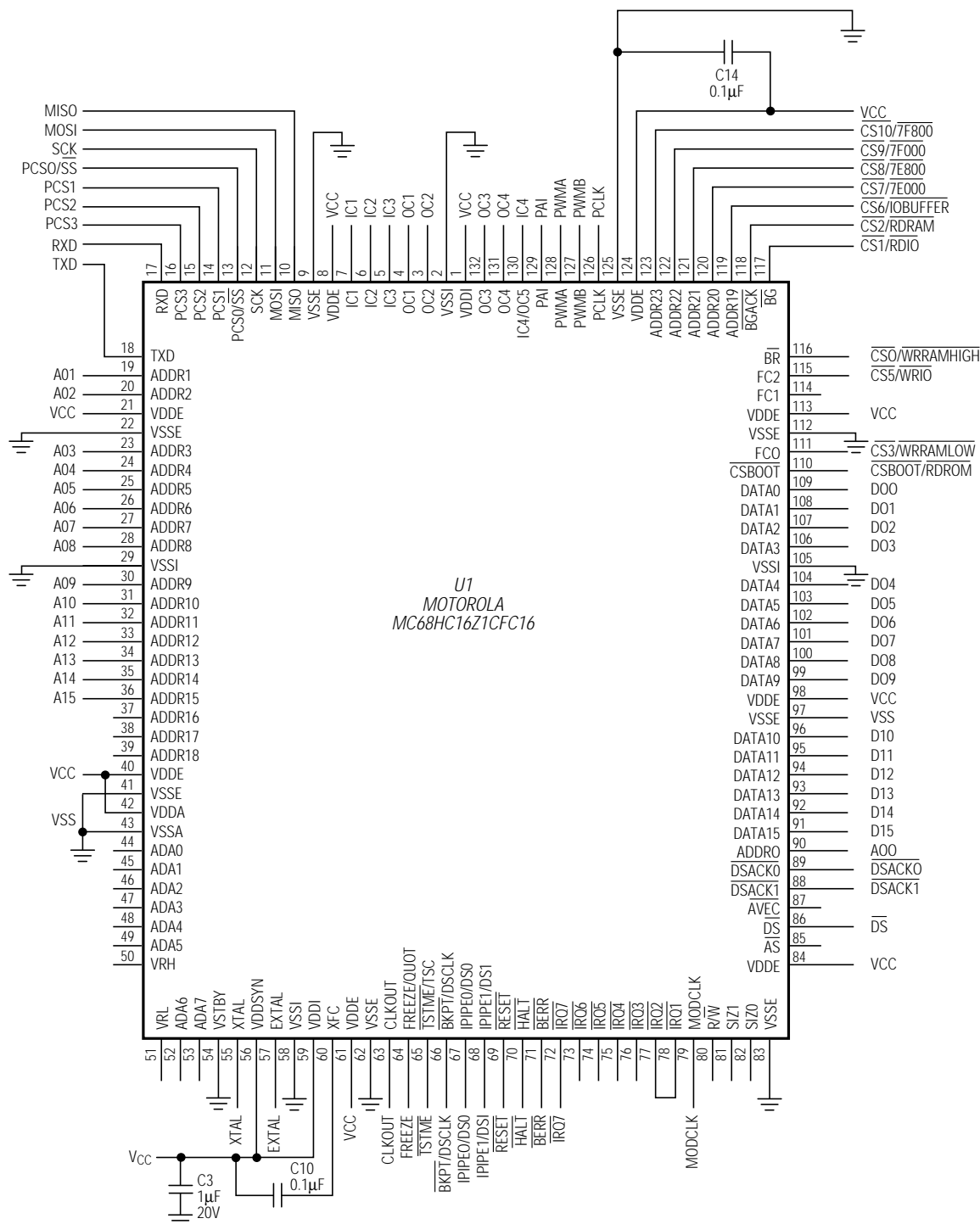
68HC16MOD-16WIDE

Figure 1. 68HC16MOD-16WIDE Module Schematic (continued)

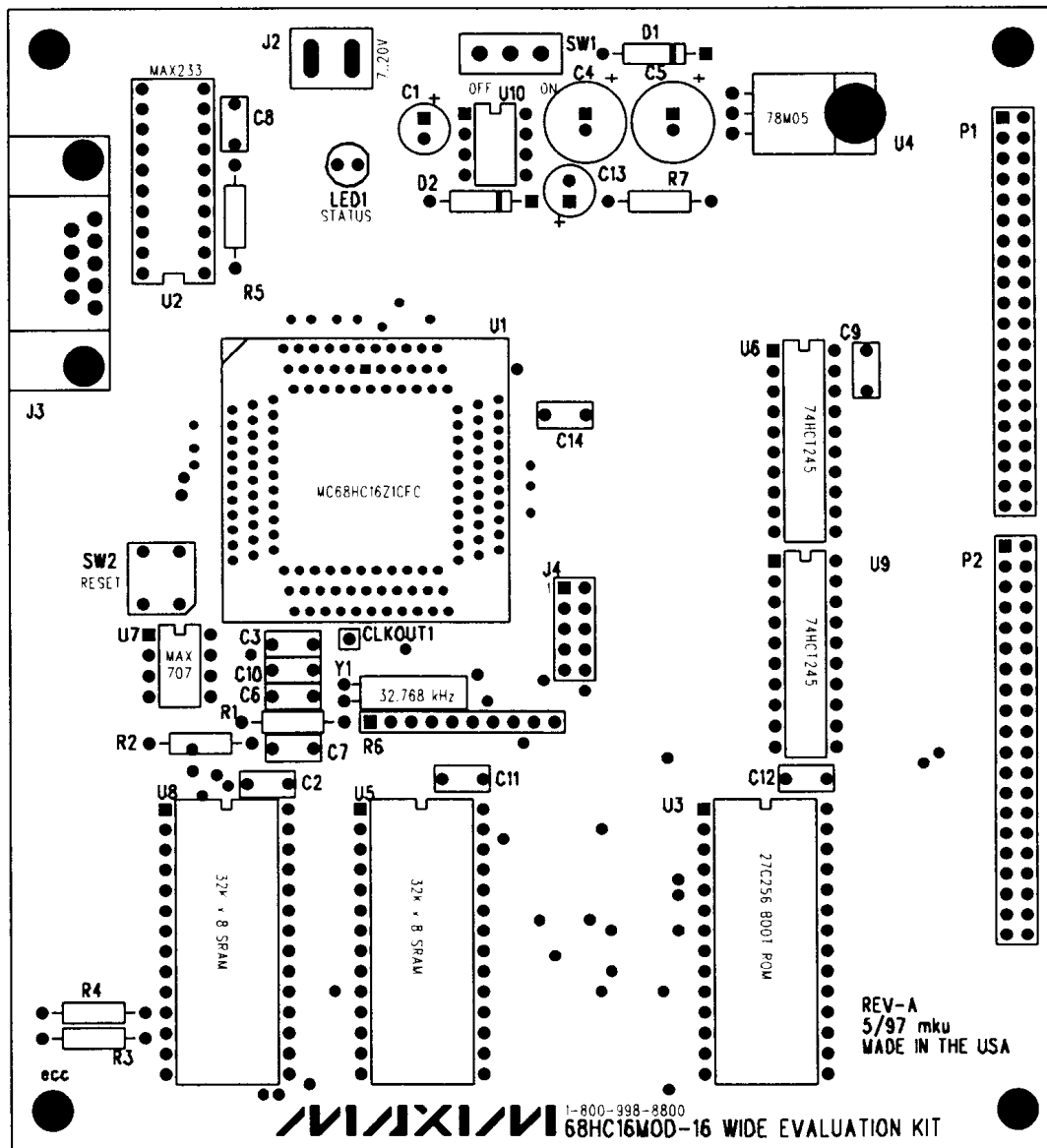**MAXIM**
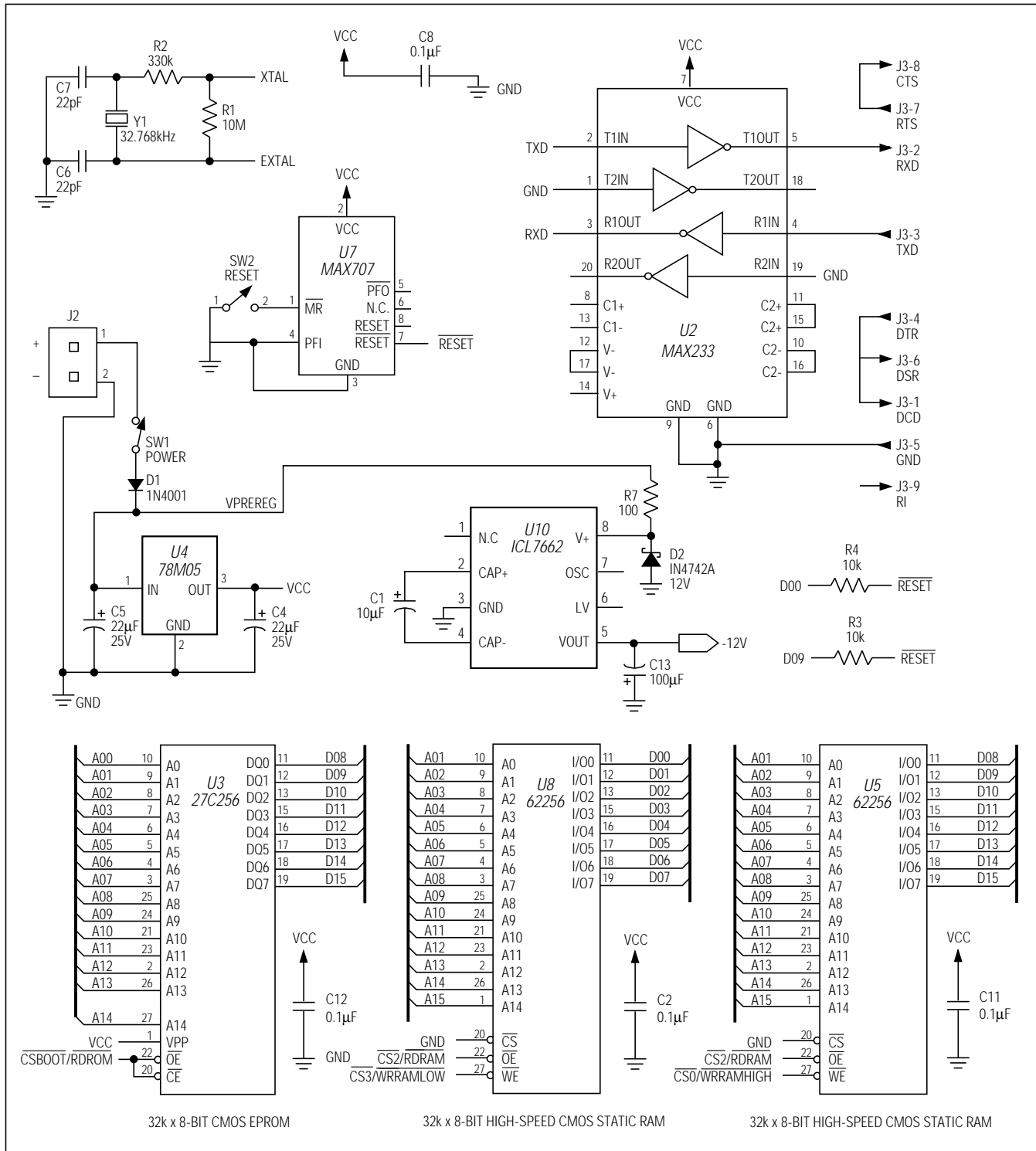
Figure 1. 68HC16MOD-16WIDE Module Schematic (continued)

68HC16MOD-16WIDE

Figure 2. 68HC16MOD-16WIDE Module Component Placement Guide

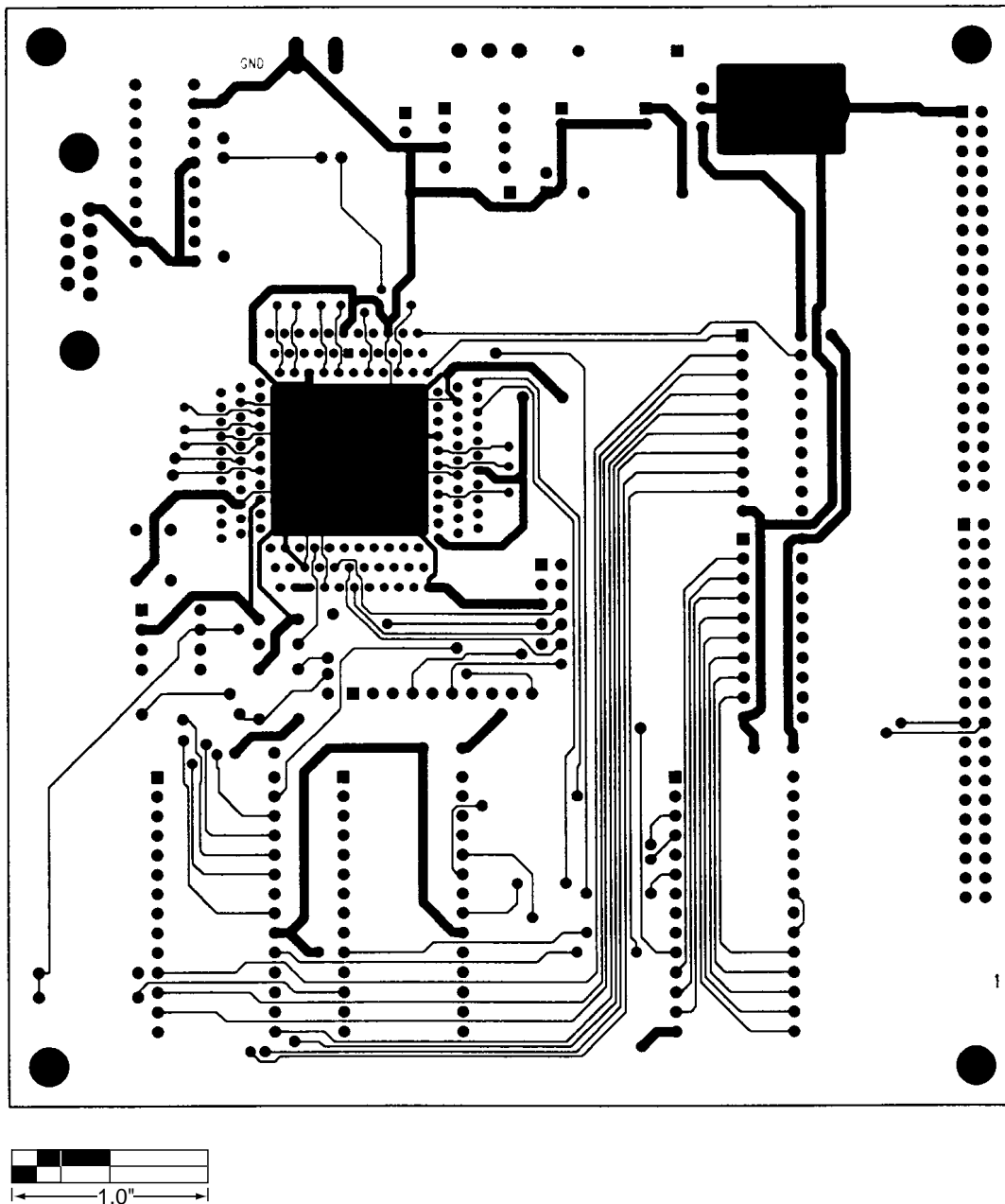*Figure 3. 68HC16MOD-16WIDE Module PC Board Layout—Component Side*
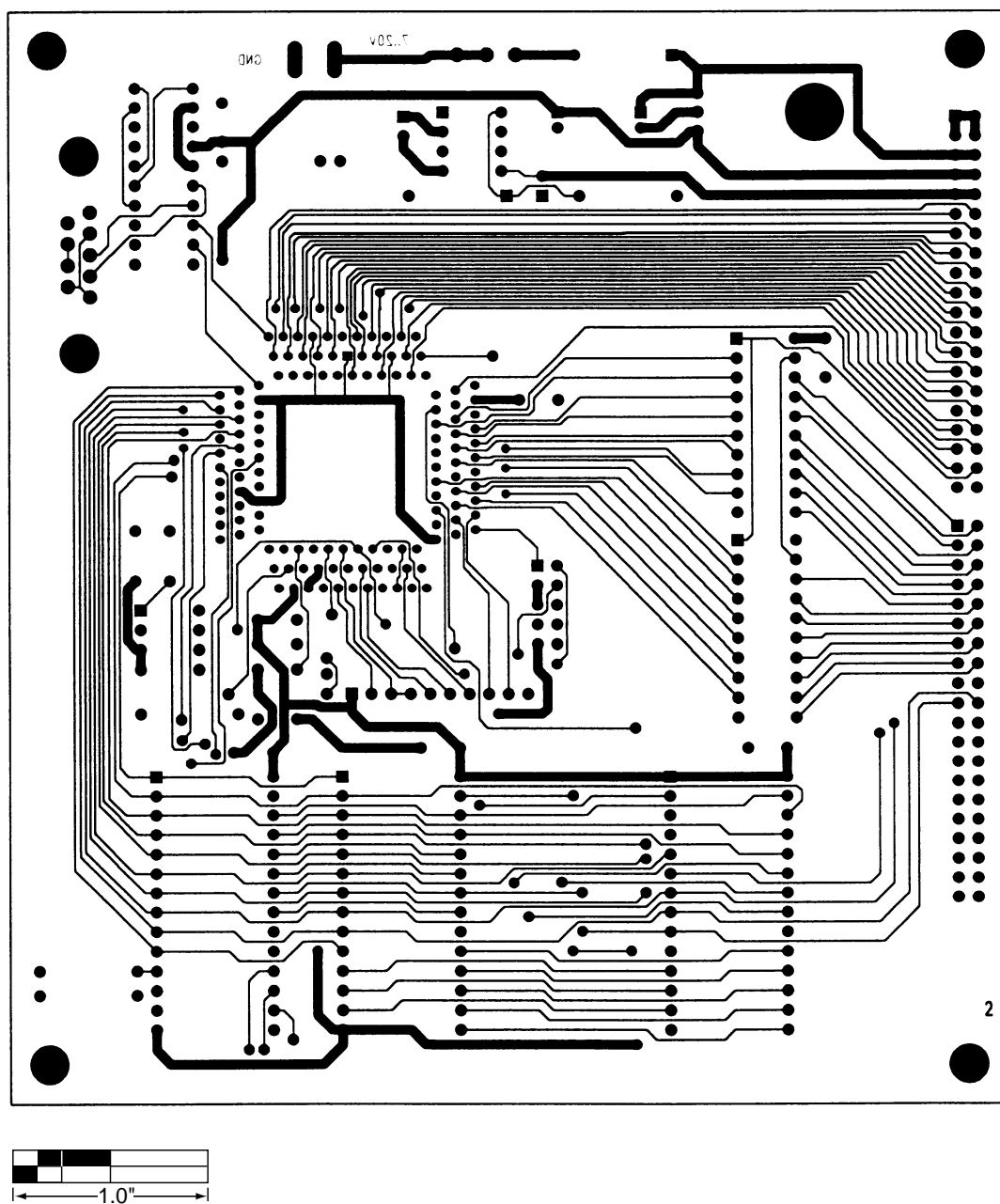
Figure 4. 68HC16MOD-16WIDE Module PC Board Layout—Solder Side

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68HC16MOD-16WIDE

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