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MAX152 Evaluation Kit

General Description

The MAX152 evaluation kit (EV kit) is fully assembled, and provides a proven design and PC board layout for fast, easy evaluation of the MAX152 at sample rates to 400ksps. An oscillator continuously triggers the converter, and an LED displays the conversion results. Several jumpers allow the board to be configured for the various operating modes of the MAX152, and the board includes the low-current shutdown circuit shown in the data sheet. A 16-pin data connector provides easy interface between the MAX152 EV kit and the user's system.

The MAX152 EV kit can be used to evaluate the 5V MAX153 at sample rates to 1Msps.

Features

- **High-Speed 8-Bit ADC**
- **Unipolar or Bipolar Input**
- **No Clock Circuit Required**
- **+3V (MAX152) or +5V (MAX153) Operation**
- **Low-Power Shutdown Mode**
- **LED Display of Conversion Results**
- **3in^2 Prototyping Area**
- **16-Pin Data Connector for Interface to External System**

Component List

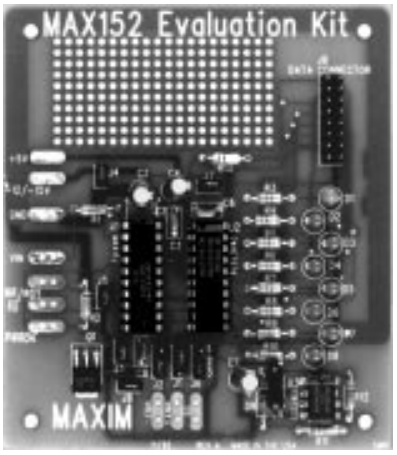
DESIGNATION	QTY	DESCRIPTION
U1	1	MAX152CPP
U2	1	74HCT574
U3	1	ICM7555CPA
C1, C3, C6, C7, C8	5	0.1µF ceramic capacitors
C2, C4	2	10µF 16V radial electrolytic capacitors
C5	1	100pF ceramic capacitor
D1-D8	8	Red LEDs
Q1	1	ME12N06EL Nihon N-channel logic-level MOSFET
R1	1	300Ω 5% resistor
R2, R12	2	510kΩ 5% resistors
R3-R10	8	620Ω 5% resistors
R11	1	10kΩ 5% resistor
J1, J3	2	3-pin jumper headers
J2, J4, J5, J6, J7, J8	6	2-pin jumper headers
None	8	Shunts
None	1	16-pin ribbon cable connector
None	1	3.50" x 4.00" PC board
None	4	Rubber feet
None	1	MAX152 data sheet and EV kit manual

Ordering Information

PART	TEMP. RANGE	BOARD TYPE
MAX152EVKIT-DIP	0°C to +70°C	Through-Hole

The MAX152EVKIT may also be used to evaluate the MAX153. To receive a free sample of the MAX153CPP, call 1-800-998-8800.

EV Kit



MAX152 Evaluation Kit

Quick Reference

The evaluation kit as shipped, is configured for the continuous-conversion mode. To verify operation, follow these steps:

1. Verify that the jumpers are configured as described in Table 2.
2. Connect the power supplies (+3V for MAX152, +5V for MAX153) to the power input connector.
3. Connect an analog input to AIN input.
4. Read conversion results displayed on the LEDs.

General Description

Jumper Functions

The MAX152 EV kit has several jumpers to alter the configuration. Table 1 lists the jumpers and their functions. Table 2 gives the jumper selection for a free-running mode used for board verification.

Note that Table 2's configuration drives both the $\overline{RD}$ and $\overline{CS}$ inputs and sets the MODE pin low. The timing diagram for this configuration is shown in the MAX152 or MAX153 data sheet. Refer to the data sheet for more information on the various operating modes.

Power Requirements

The MAX152 EV kit may be used with either the MAX152 or MAX153. The MAX152 will operate on supplies as low as 2.7V. The MAX153 operates on +5V or ±5V. The positive supply is also connected to the octal latch and ICM7555 timer on the board. The LEDs will cause the positive supply current to approach 60mA when all are on. The V_{SS} input is connected only to the MAX152/MAX153's V_{SS} pin. The V_{SS} pin will draw less than 50µA. Optionally, J4 can be shorted to connect V_{SS} to ground when not using a negative supply.

MAX152/MAX153 Reference Voltage

The VREF+ and VREF- pins may be connected to any potential between V_{DD} and V_{SS}. For single-supply operation, VREF+ can be connected to V_{DD} and VREF- can be connected to ground. Jumpers (J1 and J2) are provided for this configuration. If a reference voltage other than V_{DD} or ground is desired, connect the source to the VREF+ and/or VREF- pads and set J1 and J2 accordingly. Refer to Table 1 for their use.

MAX152/MAX153 Data Output/Display

The MAX152/MAX153's output is latched and buffered by a 74HCT574 so it can drive an LED display. The

Table 1. Jumper Functions

JUMPER	CONNECTION	FUNCTION
J1	1 & 2	VREF- connected to the drain of Q1
	2 & 3	VREF- connected to ground
	Open	Used when connecting a voltage source to the VREF- pad
J2	Open	Used when connecting a voltage source to the VREF+ pad
	Short	VREF+ shorted to V_{DD}
J3	1 & 2	$\overline{CS}$ grounded
	2 & 3	$\overline{CS}$ driven by the ICM7555
	Open	Used when an external digital signal is applied to the $\overline{CS}$ input
J4	Open	Used when driving V_{SS} with a negative source (-5V or -3V)
	Short	V_{SS} connected to ground
J5	Open	MODE pin open (internally pulled low)
	Short	MODE pin connected to V_{DD}
J6	Open	ICM7555 circuit disabled
	Short	ICM7555 circuit enabled
J7	Open	LED display disabled
	Short	LED display enabled
J8	Open	Used when an external digital input is applied to the $\overline{RD}$ input
	Short	$\overline{RD}$ driven by the ICM7555

Table 2. Jumper Selection for Free-Running Mode

JUMPER	CONNECTION	FUNCTION
J1	2 & 3	VREF- connected to GND
J2	Short	VREF+ connected to V_{DD}
J3	2 & 3	$\overline{CS}$ driven by ICM7555
J4	Short	V_{SS} connected to GND. Leave J4 open if a V_{SS} source is used.
J5	Open	MODE pin internally pulled low
J6	Short	Enable the ICM7555
J7	Short	Enable the LED display
J8	Short	$\overline{RD}$ driven by ICM7555

LEDs display the output of the MAX152/MAX153 after each conversion. Removing the J7 shunt will disable the LED display and lower the positive supply current.

The clock signal for the 74HCT574 is taken off the $\overline{RD}$ input. This latches the MAX152/MAX153 conversion results on the trailing (positive going) edge of the $\overline{RD}$ signal. This technique works as long as $\overline{RD}$ pulse is longer than the conversion time of the MAX152/MAX153.

The ready (RDY) signal can be observed by configurring the board per Table 2 and inserting a 4.7kΩ pull-up resistor in the location marked R13. The RDY signal will appear on the $\overline{WR}$/RDY pin. The resistor is normally not installed, in order to keep the pin input current as low as possible.

ICM7555 Circuit

A simple ICM7555 timer circuit on the board provides a clock for the stand-alone mode. The output can be connected to the $\overline{CS}$ and $\overline{RD}$ pins through J3 and J8. It will then trigger a conversion approximately every 2.5µs when J6 is shorted. J6 is provided to disable the ICM7555 when evaluating the shutdown currents.

When using external signal sources for $\overline{CS}$ and $\overline{RD}$, leave jumpers J3 and J8 open. Refer to the data sheet for timing specifications with external sources.

Shutdown Modes

The function of the power-down pin ($\overline{PWRDN}$) is to drop the MAX152/MAX153's supply current to typically 1µA. Note, however, that VREF+ will continue to appear to the source as a 2kΩ resistor, and this resistor draws current even when the device is in power-down mode. The addition of MOSFET Q1 opens VREF- to disconnect this internal reference resistor and remove its current drain. A 510kΩ resistor acts as the pull-up for the gate of Q1 and $\overline{PWRDN}$. You can evaluate the power-down mode simply by grounding the PWRDN pad.

The other chips on the board will continue to draw current if they are left enabled. Be sure to disable the LED display and the ICM7555 circuits for a true measurement.

With the device and LEDs enabled, the supply current may be 60mA. The current drops to less than 15mA with the LEDs disabled. Using $\overline{PWRDN}$ with VREF- connected to ground will reduce the current to about 3.5mA. Finally, in power-down mode with VREF- disabled by Q1 and the ICM7555 disabled, the supply current will typically be less than 50µA. The actual reading will include the MAX152/MAC153 V_{DD} current, static current for the 74HCT574, and 10µA drawn through the 510kΩ resistor R2.

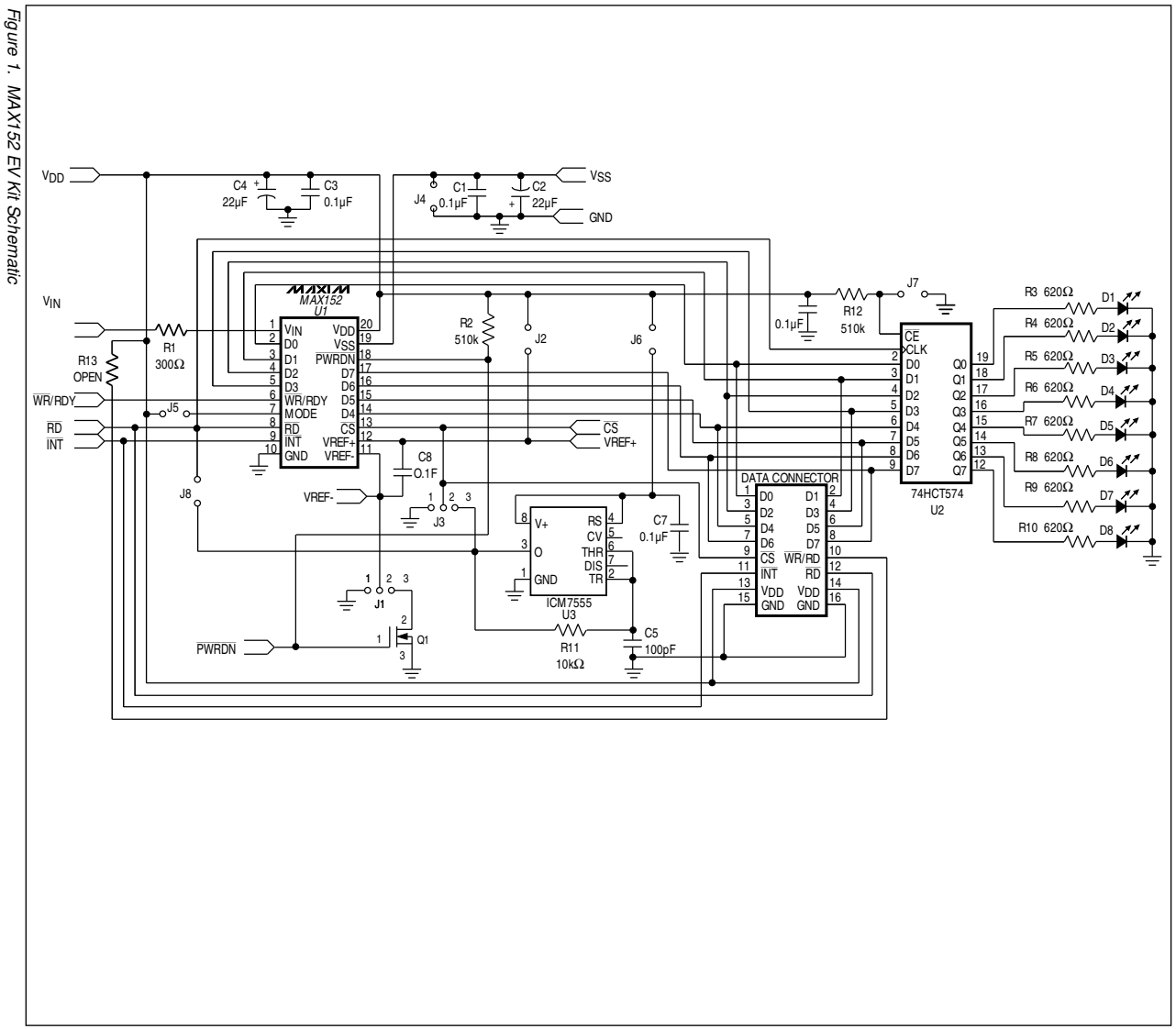


Figure 1. MAX152 EV Kit Schematic

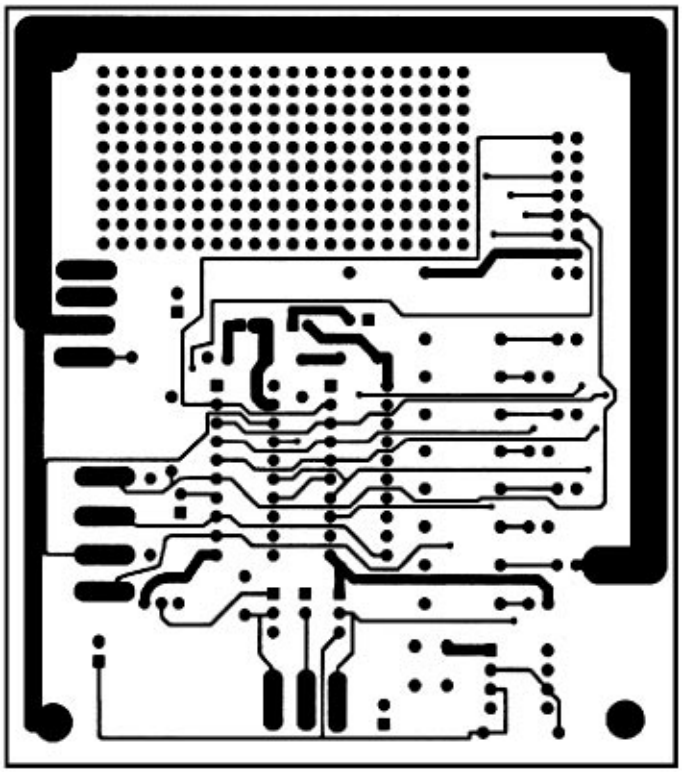


Figure 2. MAX152 EV Kit Component-Side Layout

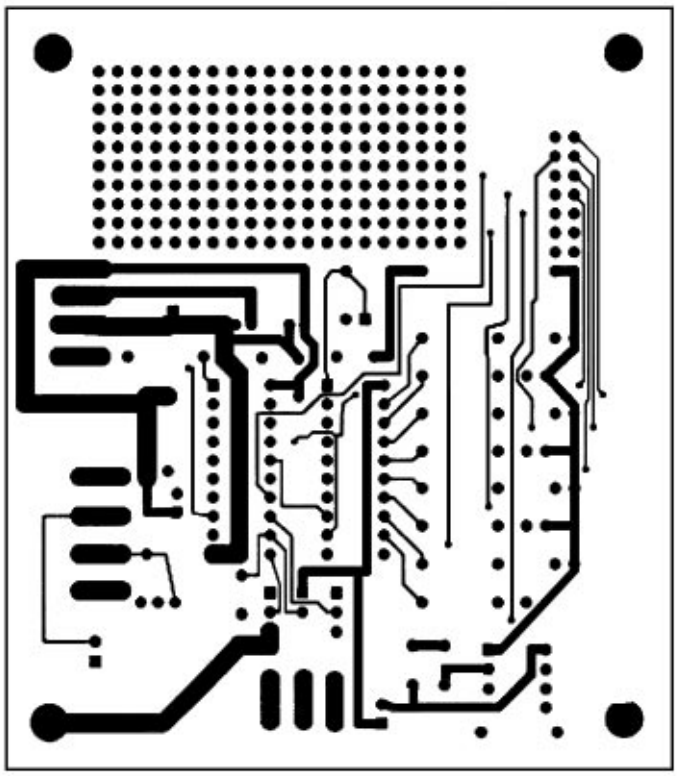


Figure 3. MAX152 EV Kit Solder-Side Layout (Mirror Image)

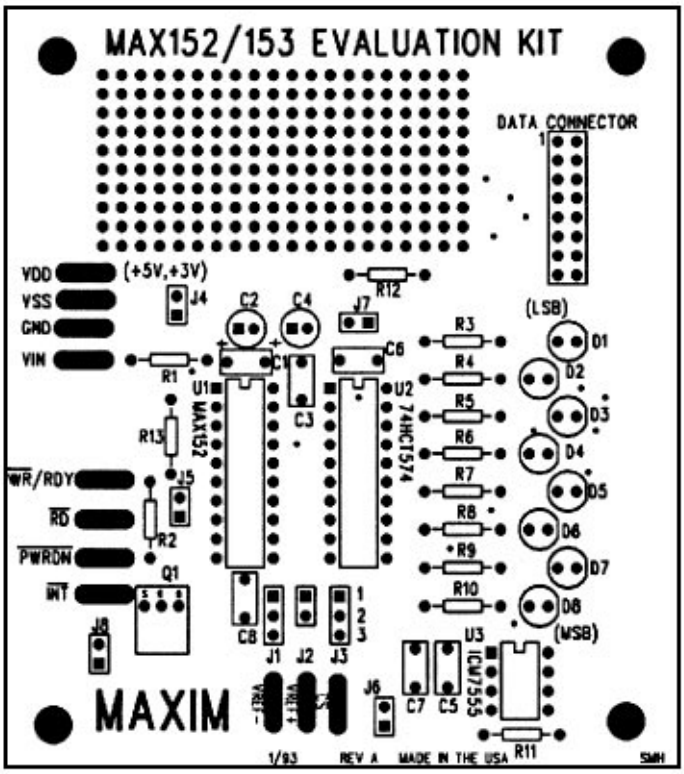


Figure 4. MAX152 EV Kit Component Placement Guide

MAX152 Evaluation Kit