

MAXIM

MAX3770 Evaluation Kit

General Description

The MAX3770 evaluation kit (EV kit) simplifies evaluation of the MAX3770/MAX3771 Fibre Channel data repeater ICs. This fully assembled and factory-tested kit enables testing of all the devices' functions.

50Ω SMA connectors and controlled impedance transmission lines are provided for the differential data inputs and outputs, as well as the voltage-controlled oscillator (VCO) clock outputs. A test/calibration path enables the user to calibrate test equipment so accurate measurements can be taken. On-board 75Ω to 50Ω impedance transformation networks simplify interfacing with standard 50Ω test equipment.

Jumpers allow the user to enable or disable the data repeater IC frequency lock indicator and the VCO's clock outputs. The VCO frequency lock can be monitored visually with the provided LED and through the LOCK test point.

Component List

| DESIGNATION | QTY | DESCRIPTION |
|--|-----|---|
| C1–C6, C8, C9, C12–C15 | 12 | 0.1μF ±10%, 25V (min) ceramic caps |
| C7 | 1 | 0.22μF ±10%, 25V (min) ceramic cap |
| C10 | 1 | 2.2μF ±10%, 25V (min) ceramic cap |
| C11 | 1 | 33μF ±10%, 16V (min) tantalum cap |
| J1–J6, J10–J13 | 10 | SMA connectors (edge mount) |
| J8, J9 | 2 | 3-pin headers (0.1in centers) |
| None | 2 | Shunts for J8, J9 |
| L1 | 1 | 56nH inductor Coilcraft 0805HT-56NTKBC |
| LED1 | 1 | Red LED T-1 package |
| LOCK, V _{CC} , GND | 3 | 1-pin headers (0.1in centers) |
| R1, R2, R4, R5, R7, R8, R11, R12, R14, R15 | 10 | 43.2Ω ±1% resistors |
| R3, R6, R9, R13, R16 | 5 | 178Ω ±1% resistors |
| R10 | 1 | 150Ω ±1% resistor |
| U1 | 1 | MAX3770CEE or MAX3771CEE 16-pin QSOP |
| None | 1 | MAX3770/MAX3771 circuit board |
| None | 1 | MAX3770/MAX3771 data sheet |

Features

- ◆ Fully Assembled and Tested
- ◆ Frequency Lock Indicator
- ◆ On-Board 75Ω to 50Ω Impedance Conversion Networks for Interfacing with Standard Test Equipment
- ◆ Test Signal Path for Board Characterization and Jitter Calibration
- ◆ Jumpers for Controlling the Clock Output and Frequency Lock Indicator

Ordering Information

| PART | TEMP. RANGE | IC PACKAGE |
|--------------|--------------|------------|
| MAX3770EVKIT | 0°C to +70°C | 16 QSOP |

Note: To evaluate the MAX3771, order the MAX3770 EV kit and obtain samples of the MAX3771.

Component Suppliers

| SUPPLIER | PHONE | FAX |
|-----------|--------------|--------------|
| Coilcraft | 847-639-6400 | 847-639-1469 |

Note: Please indicate that you are using the MAX3770 EV kit when contacting this component supplier.

Detailed Description

Quick Start

- 1) Connect a differential signal source to the input at IN+ and IN-. Set the differential signal amplitude to 500mV peak to peak (p-p). Set the input signal data rate to 2.125Gbps for the MAX3770 or 1.062Gbps for the MAX3771.
- 2) If the clock output is desired, connect a shunt across pins 2 and 3 of J9 (CLKEN) to enable the clock output. Shunt pins 1 and 2 of J9 if no clock output is desired (Tables 1 and 2).
- 3) Enable the frequency lock indicator by shunting pins 2 and 3 of J8 (LOCKEN). Shunt pins 1 and 2 if no lock indication is desired.
- 4) Connect the data and clock outputs (OUT+, OUT-, CLK+, and CLK-) through 50Ω matched-impedance cables to a 50Ω oscilloscope with a minimum bandwidth of 3GHz.

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Table 1. Adjustments and Control Descriptions*

| COMPONENT | NAME | FUNCTION |
|-----------|--------------------------|---|
| J8 | LOCKEN | Enables/disables the frequency lock indicator. Shunt between pins 1 and 2 to disable the frequency lock indicator; shunt between pins 2 and 3 to enable the frequency lock indicator. |
| J9 | CLKEN | Enables/disables the PLL's clock output. Shunt between pins 1 and 2 to disable the clock output; shunt between pins 2 and 3 to enable the clock output. |
| LED1 | $\overline{\text{LOCK}}$ | Provides a visual indication when the PLL is not frequency locked. LED is illuminated when the PLL is not frequency locked. |
| J7 | LOCK | Frequency lock indicator test point. A TTL high indicates the PLL is frequency locked; a TTL low indicates the PLL has lost lock. |

*See *Quick Start* first.

- 5) Power up the EV kit with a +3.3V supply. On the scope, the differential amplitude of the signal should be between 300mVp-p and 600mVp-p.

Control Functions

The MAX3770 EV kit is equipped with two 3-pin headers that allow the user to enable or disable the outputs of the VCO clock and frequency lock indicator. Header pin 1 is connected to ground, pin 2 is connected to the device's control pin, and pin 3 is connected to V_{CC} . Table 2 gives the output states obtained when the control pins are forced high or low. Program a 0 by shunting pins 1 and 2; program a 1 by shunting pins 2 and 3.

Input and Output Impedance Conversion

The MAX3770/MAX3771 are designed to operate in 75Ω environments—the default for most Fibre Channel applications. For convenient interface with standard test equipment, the MAX3770 EV kit is equipped with impedance-transformation resistor networks on its inputs (50Ω to 75Ω) and outputs (75Ω to 50Ω). The impedance-transformation networks also introduce signal attenuation. The input signal is attenuated by a factor of 0.64, and the output signal is attenuated by a factor of 0.43. For example, a 600mV differential signal applied to the input terminals of the MAX3770 EV kit will produce a 381mV differential input signal across the IC's input pins. If a 335mV differential signal is observed at the output terminals of the MAX3770 EV kit, the IC's actual output is a 780mV differential signal.

Table 2. Control Functions

| LOCKEN (J8) | CLKEN (J9) | LOCK | CLOCK |
|-------------|------------|----------|----------|
| 0 | 0 | Disabled | Disabled |
| 0 | 1 | Disabled | Enabled |
| 1 | 0 | Enabled | Disabled |
| 1 | 1 | Enabled | Enabled |

Test/Calibration Circuit

The test/calibration signal path contains the same type of SMA connectors, transmission line layout, and impedance-transformation networks provided for the data repeater IC's signal I/Os. The test/calibration circuit can be used for PC board characterization and jitter calibration.

Layout Considerations

MAX3770/MAX3771 performance can be greatly affected by circuit board layout and design. Use good high-frequency design techniques, including minimizing ground inductances and using fixed-impedance transmission lines on the data and clock signals.

MAX3770 Evaluation Kit

Evaluates: MAX3770/MAX3771

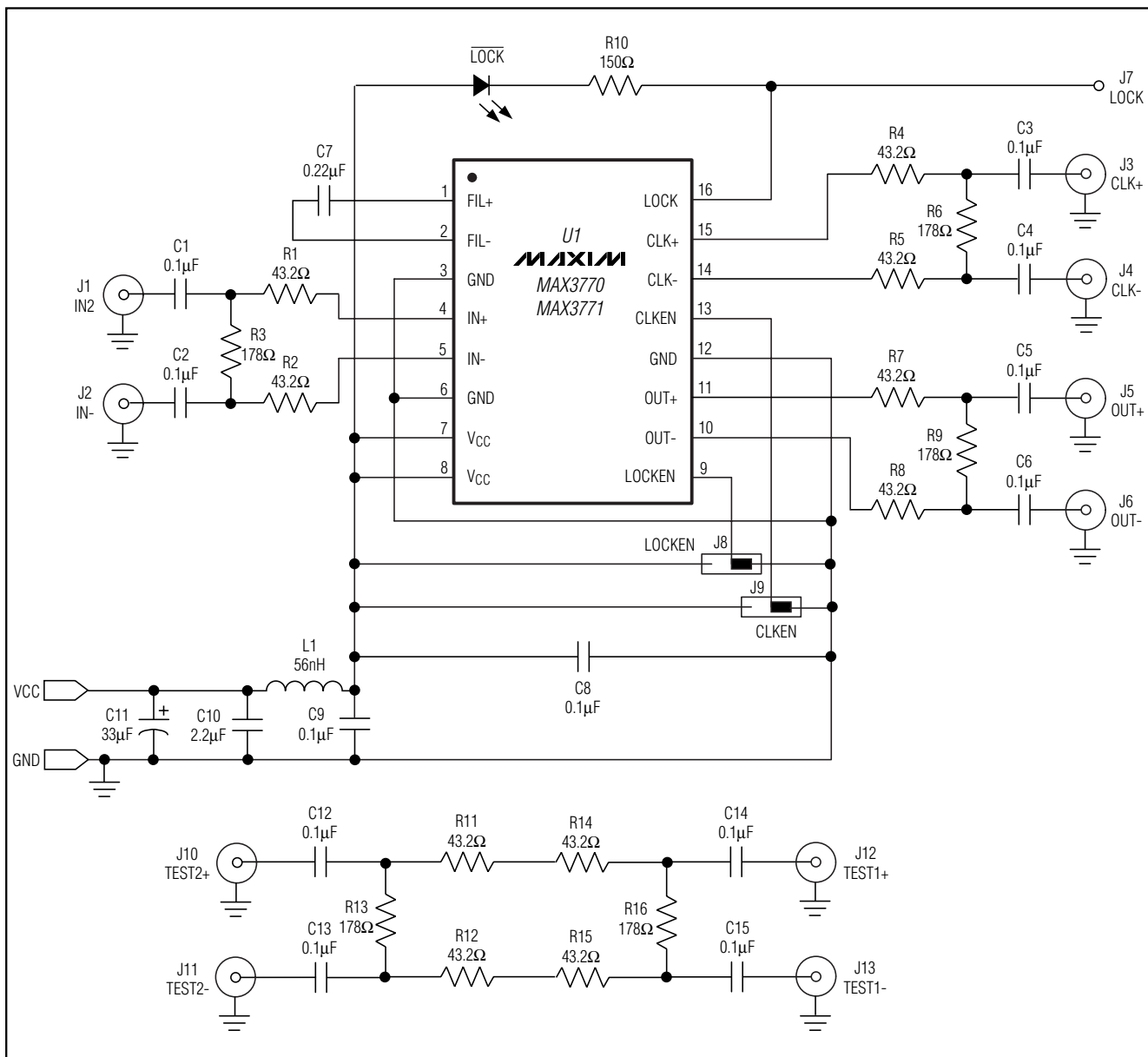


Figure 1. MAX3770 EV Kit Schematic

MAX3770 Evaluation Kit

Evaluates: MAX3770/MAX3771

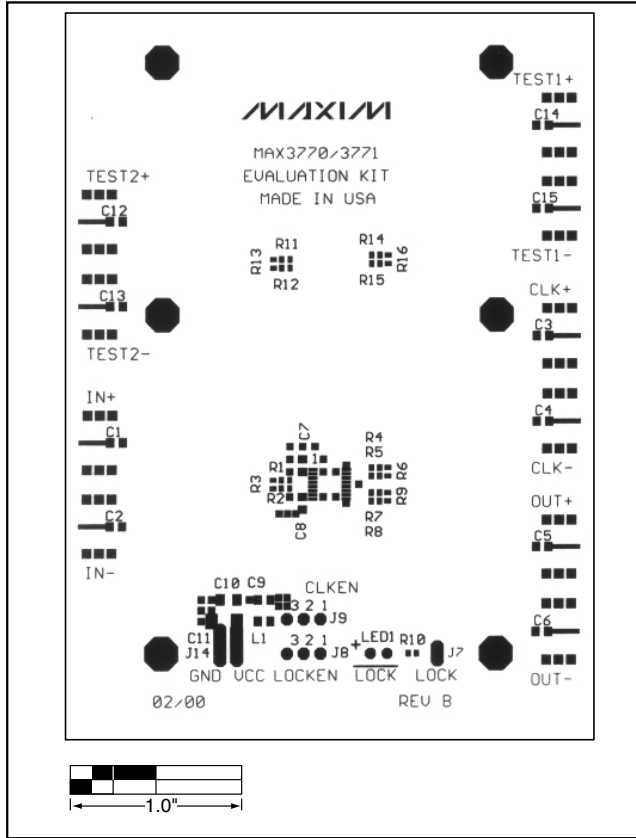


Figure 2. MAX3770 EV Kit Component Placement Guide—Component Side

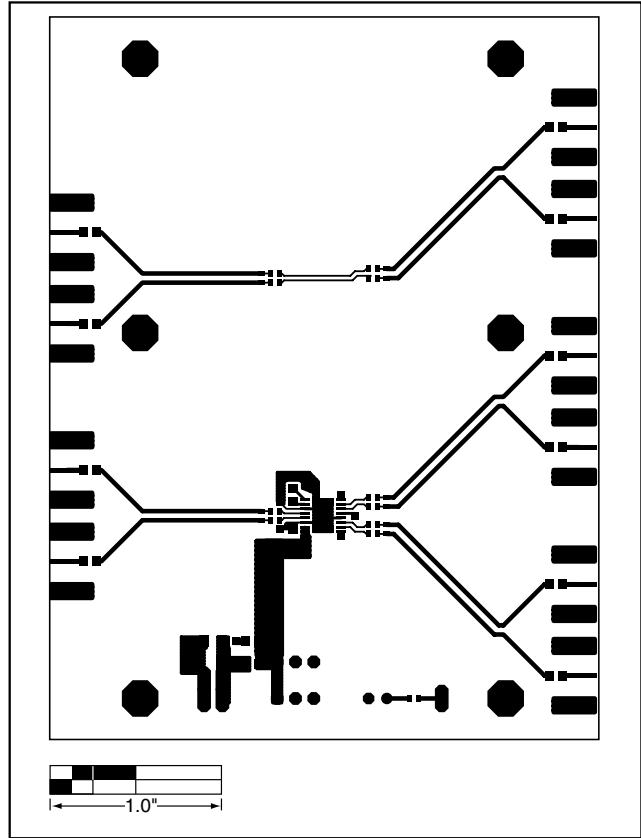


Figure 3. MAX3770 EV Kit PC Board Layout—Component Side

MAX3770 Evaluation Kit

Evaluates: MAX3770/MAX3771

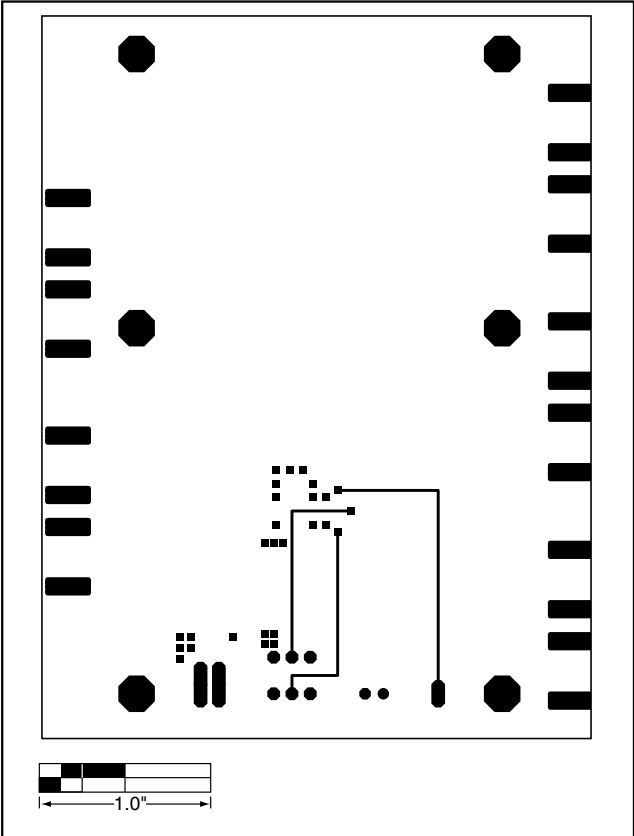


Figure 4. MAX3770 EV Kit PC Board Layout—Solder Side

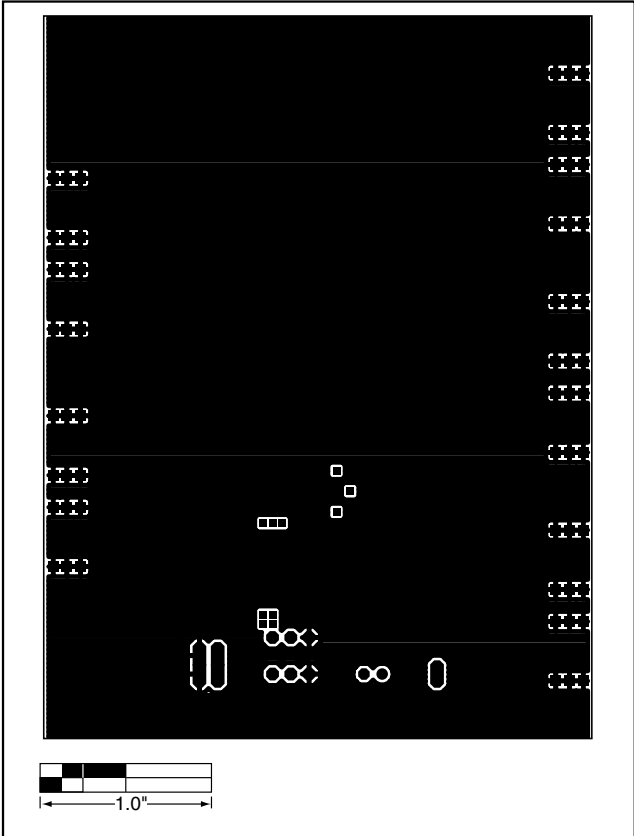


Figure 5. MAX3770 EV Kit PC Board Layout—Ground Plane

MAX3770 Evaluation Kit

Evaluates: MAX3770/MAX3771

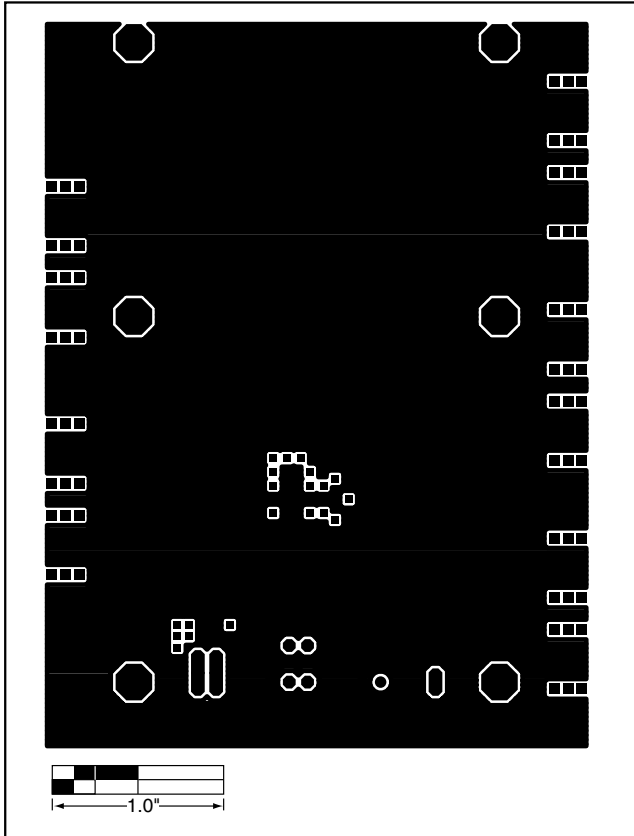


Figure 6. MAX3770 EV Kit PC Board Layout—Power Plane

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