



MAX3945 Evaluation Kit

General Description

The MAX3945 evaluation kit (EV kit) is an assembled electrical demonstration board that provides easy computer-controlled evaluation of the MAX3945 multirate limiting amplifier. The included software communicates with the EV kit through the USB port, and provides access to all the internal registers to optimize the functionality of the MAX3945. The EV kit is powered by a +3.3V supply and USB port. SMA connectors are used for the high-speed inputs and outputs. An LED indicates the status of USB power.

EV Kit Contents

◆ MAX3945 EV Kit Board

DESIGNATION	QTY	DESCRIPTION
C1–C4, C10, C12, C20, C25, C26, C27, C49, C52	12	0.1µF ceramic capacitors (0402)
C5, C6, C8, C9, C11, C19	6	1000pF ceramic capacitors (0402)
C7	1	100pF ceramic capacitor (0402)
C13	1	0.1µF ceramic capacitor (0603)
C14	1	0.1µF ceramic capacitor (0805)
C15	1	22µF tantalum capacitor (B case)
C18, C22	2	33pF ceramic capacitors (0402)
C34, C55	2	1µF ceramic capacitors (0603)
C35, C37, C38	3	4.7µF ceramic capacitors (0805)
D6	1	Green LED
J1	1	1 x 2, 0.1in pitch header Digi-Key S1012-36-ND
J2, J4, J5, J9	4	SMA PCB-mount RF connectors Johnson 142-0701-851
J3	1	USB connector Tyco 1734035-1
J6, J10, TP1, TP2, TP3, TP7, TP8, TP10–TP13	11	Test points Digi-Key 5000K-ND

Features

- ◆ Fully Assembled and Tested
- ◆ Software Control Through USB Port
- ◆ SMA Connectors for High-Speed Inputs and Output

Ordering Information

PART	TYPE
MAX3945EVKIT+	EV Kit

+Denotes lead(Pb)-free and RoHS compliant.

Component List

DESIGNATION	QTY	DESCRIPTION
L1	1	4.7µH inductor Taiyo Yuden CBC3225T4R7MR
L2, L3	2	1µH inductors (0603) Taiyo Yuden FB MH1608HM102-T
L13	1	22µH, 520mA inductor Taiyo Yuden CBC3225T220M
R1	1	1kΩ resistor (0402)
R7, R50	2	4.7kΩ resistors (0402)
R24	1	1.5kΩ resistor (0402)
R25, R29, R52, R62, R66	5	499Ω resistors (0402)
R30, R31, R51, R53	4	10kΩ resistors (0402)
R91	1	680Ω resistor (0402)
U1	1	Limiting amplifier (16 TQFN-EP*) Maxim MAX3945ETE+
U10	1	8-bit CMOS microcontroller with USB Microchip PIC16C745-I/SO
Y1	1	6MHz crystal ECS Inc. ECS-60-32-5 PXDN
—	1	PCB: MAX3945 EVALUATION BOARD

*EP = Exposed pad.

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Quick Start

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® operating system.

- 1) Reviewing the MAX3945 without the program is simple. Connect jumper J1, as shown in Figure 2. At this time, do not connect the USB cable from the EV kit to the computer. Without the program control, the MAX3945 operates in the default mode. The default mode is shown in Table 1.
- 2) From a 3.3V power supply, connect a wire from the 0V terminal to GND on the EV kit (J10). Then connect a wire from the 3.3V terminal to the VCC pin (J6). Connect two cables with SMA connectors from a digital signal source to the RIN+ (J4) and RIN- (J9) of the EV kit. Connect two more cables from ROUT+ (J2) and ROUT- (J5) to an oscilloscope.
- 3) On the signal source choose an NRZ signal between 10mV_{P-P} to 1.2V_{P-P} at a data rate from 1Gbps to 11Gbps. Observe the output signal on the scope.

Table 1. Default Mode

FUNCTION	CONTROL
Receive circuitry enabled	RX_EN = 1
High bandwidth signal path	RATE_SEL = 1
Differential output signal level (400mV _{P-P})	SET_CML[7:0] = 92d
No deemphasis	RXDE_EN = 0
Signal-loss detect enabled	LOS1_EN = 1
LOS assert threshold of approximately 15mV _{P-P}	SET_LOS[5:0] = 12d
LOS timer period	SET_LOSTIMER[6:0] = 0
Noninverted signal polarity	RX_POL = 1
Squelch disabled	SQ_EN = 0
Autozero loop enabled	AZ_EN = 1

Figures 1a and 1b show the electrical schematics of the MAX3945 EV kit, while Figures 2 to 6 show the various layers of the PCB.

General Setup

- 1) Set up the EV kit according to the *Quick Start* instructions. Then connect a USB cable from the EV kit to a computer.
- 2) Load the program onto the computer and click on the .ZIP file. Then click on **Setup**. Follow the instructions that come with the program. Users must have a Windows operating system.
- 3) When the GUI appears on the screen, click on the **USB Connect** and **Rx Read All** button. The default settings appear on the screen. Note that the soft reset resets the part when the **Rx Read All** button is clicked, but the GUI is not updated until the **Rx Read All** button is toggled a second time.
- 4) It is a simple matter to change the settings in the GUI. Figures 7, 8, and 9 show the GUI dialog boxes with the resulting waveforms. The input waveform is a 200mV_{P-P} PRBS31 signal at 6.25Gbps. Note the changes to the output waveforms as the settings are changed.

Windows is a registered trademark of Microsoft Corp.

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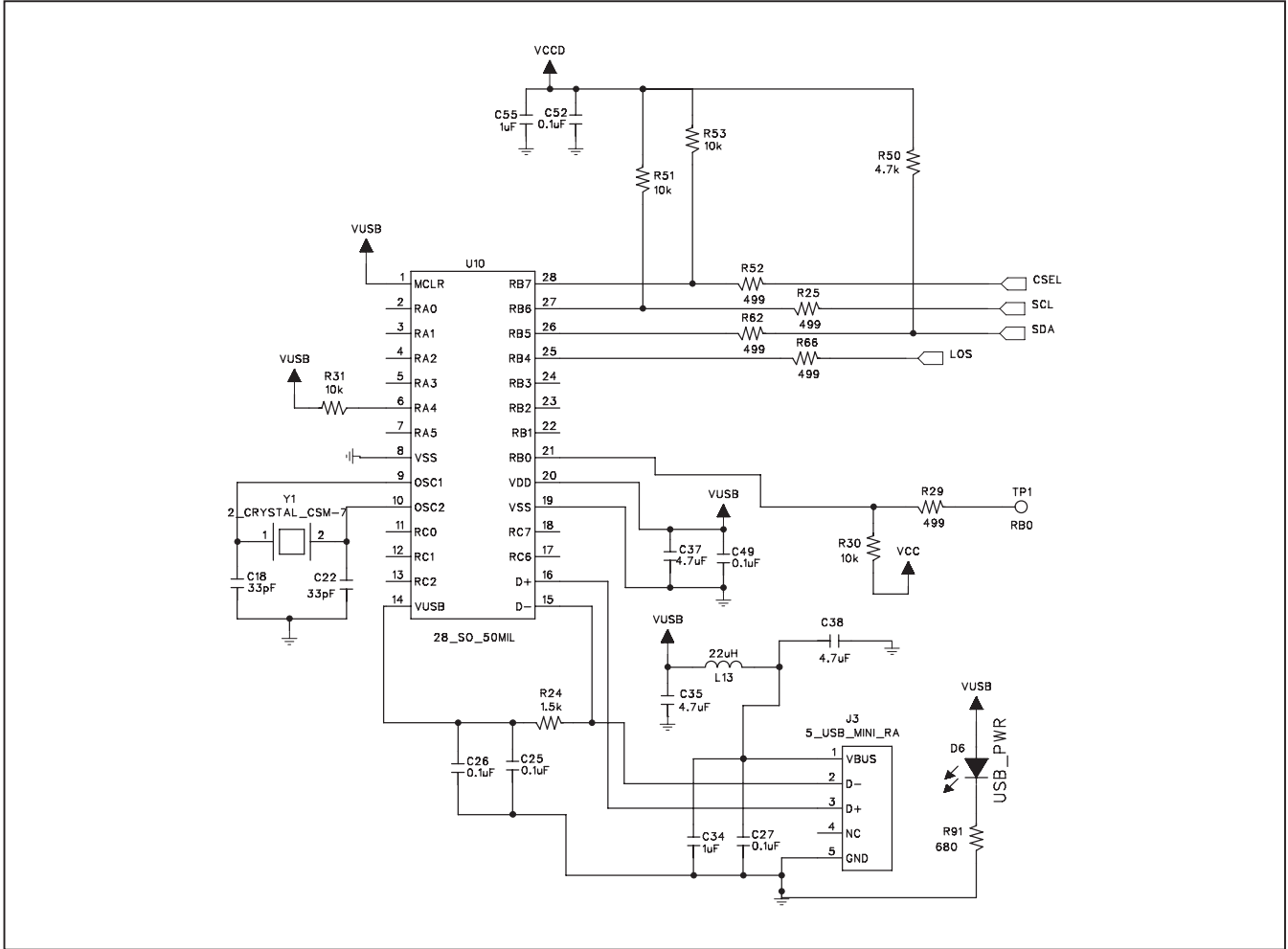
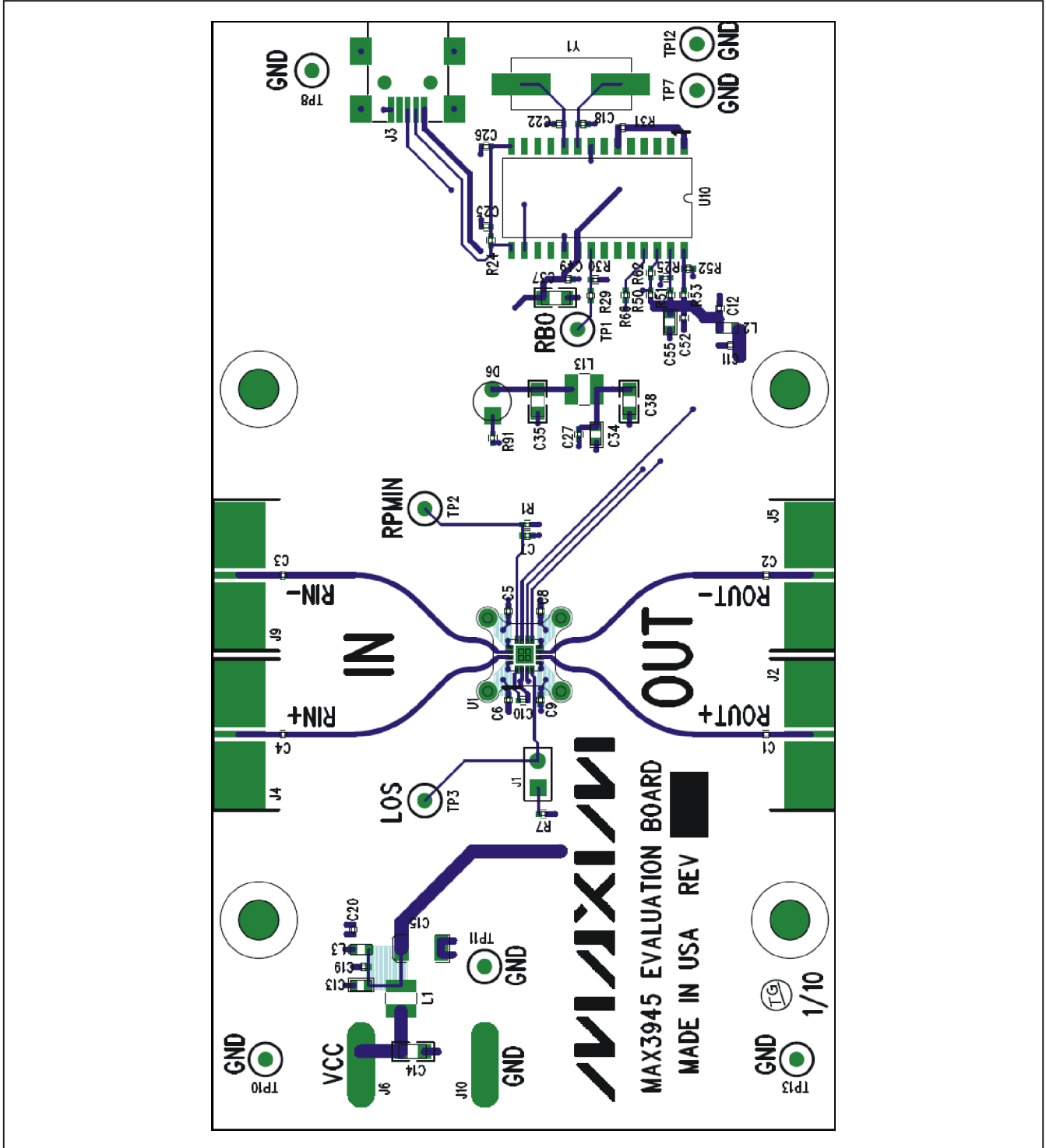


Figure 1b. MAX3945 EV Kit Schematic (Sheet 2 of 2)

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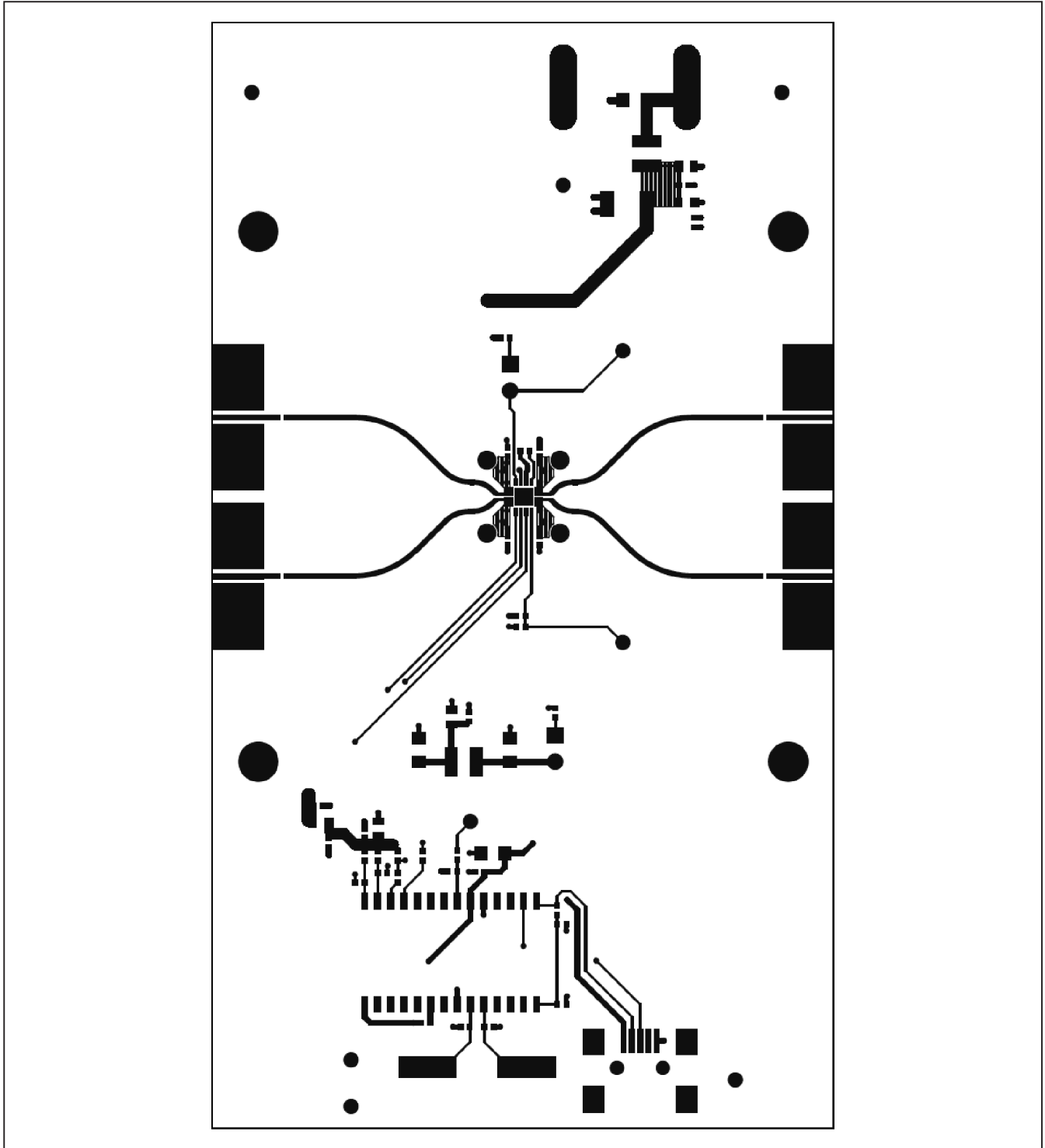


Figure 3. MAX3945 EV Kit PCB Layout—Layer 1 (Primary Side)

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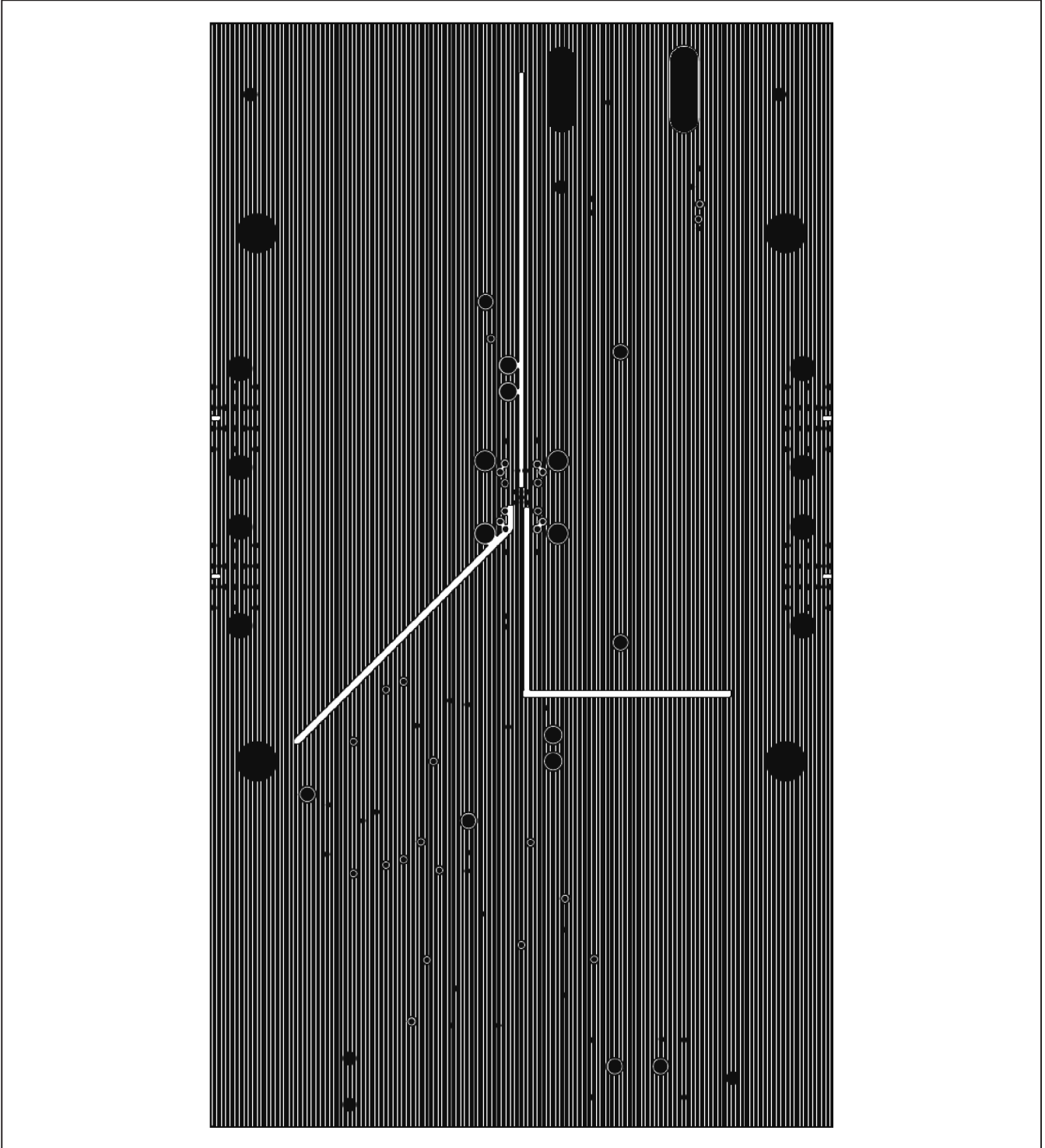


Figure 4. MAX3945 EV Kit PCB Layout—Layer 2 (Ground Plane)

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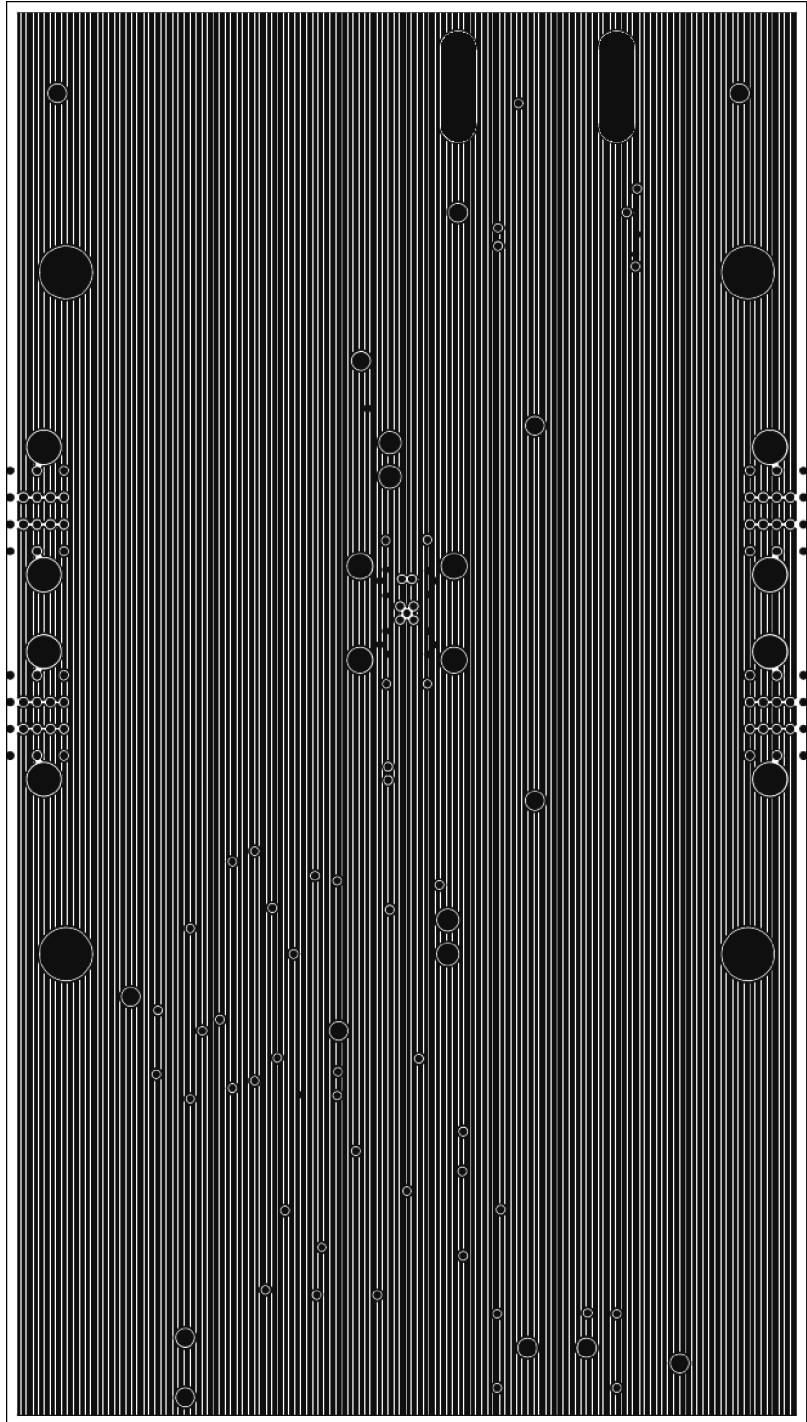


Figure 5. MAX3945 EV Kit PCB Layout—Layer 3 (Power Plane)

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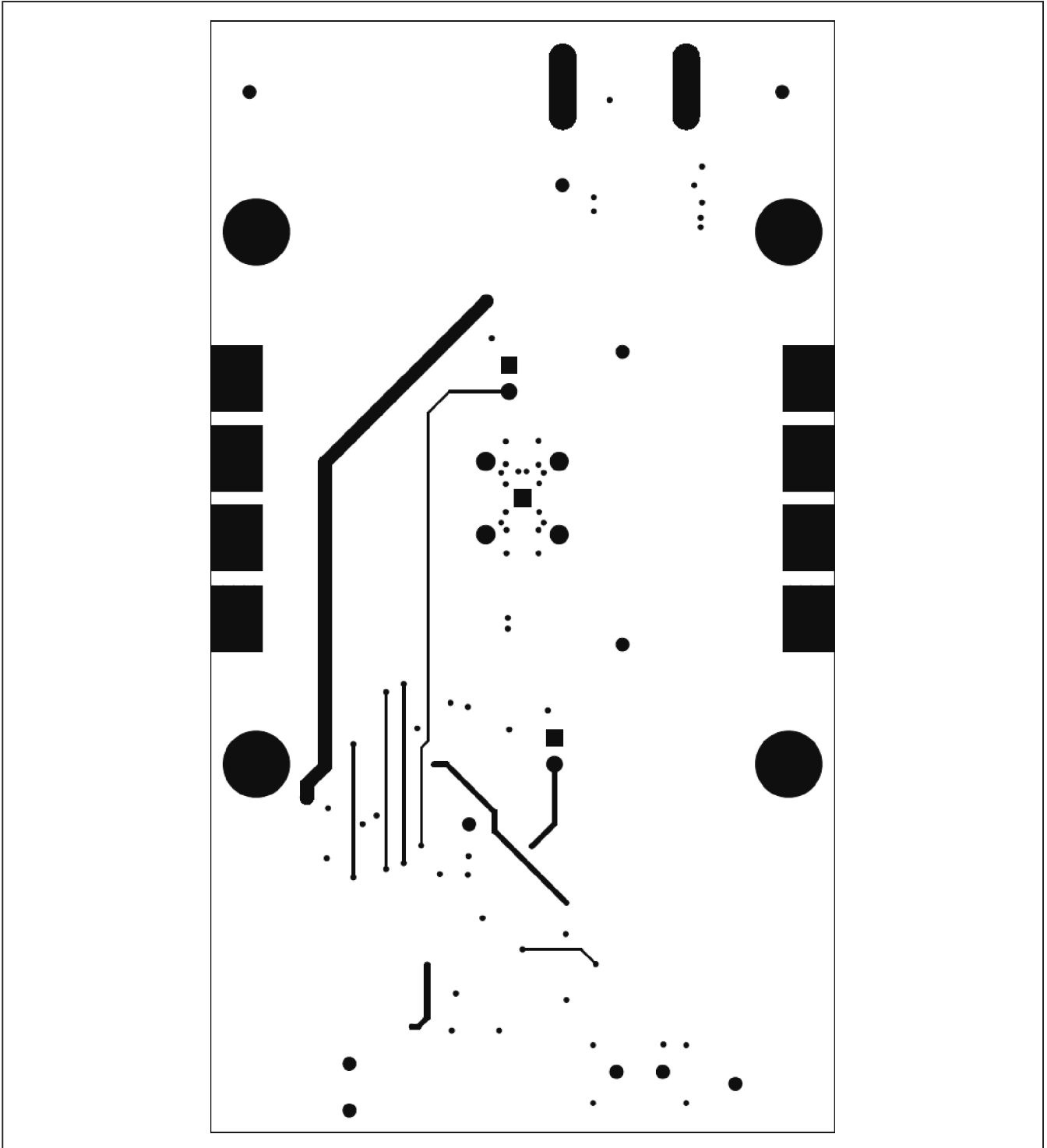
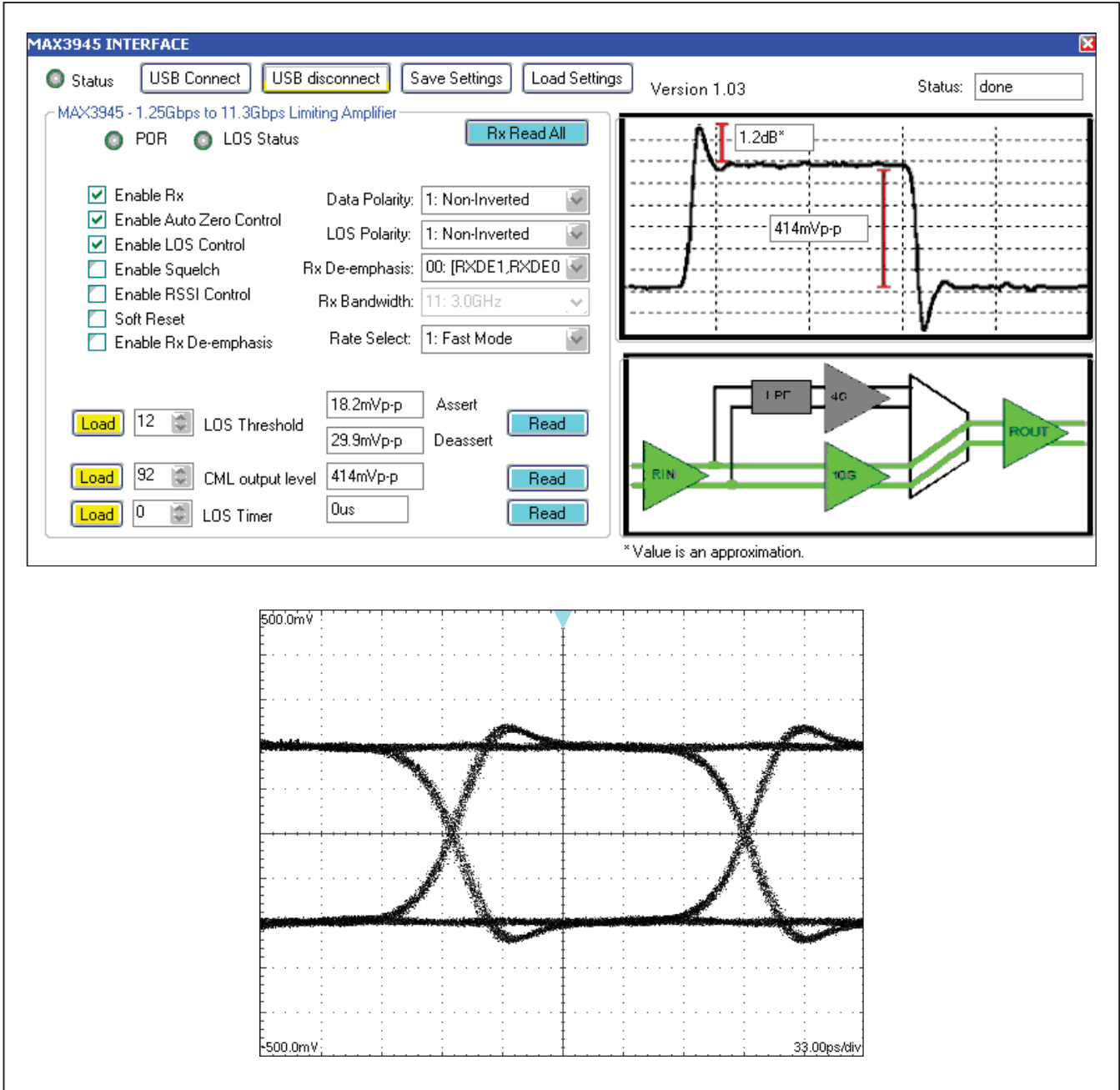


Figure 6. MAX3945 EV Kit PCB Layout—Layer 4 (Secondary Side)

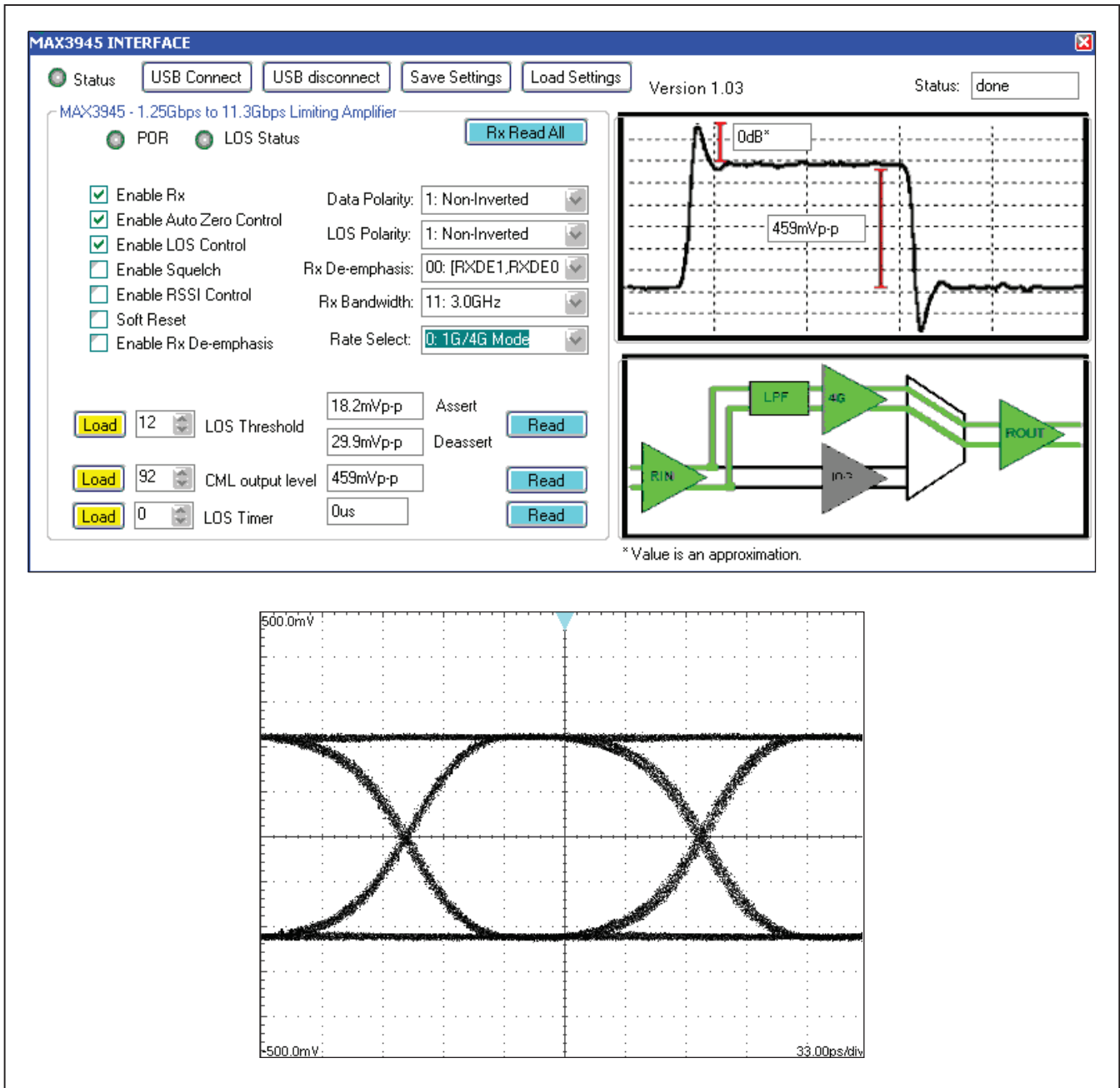
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Figures 7a and 7b. The MAX3945 EV kit GUI showing the opening dialog box with the initial default settings (Figure 7a) and the corresponding waveform (Figure 7b).

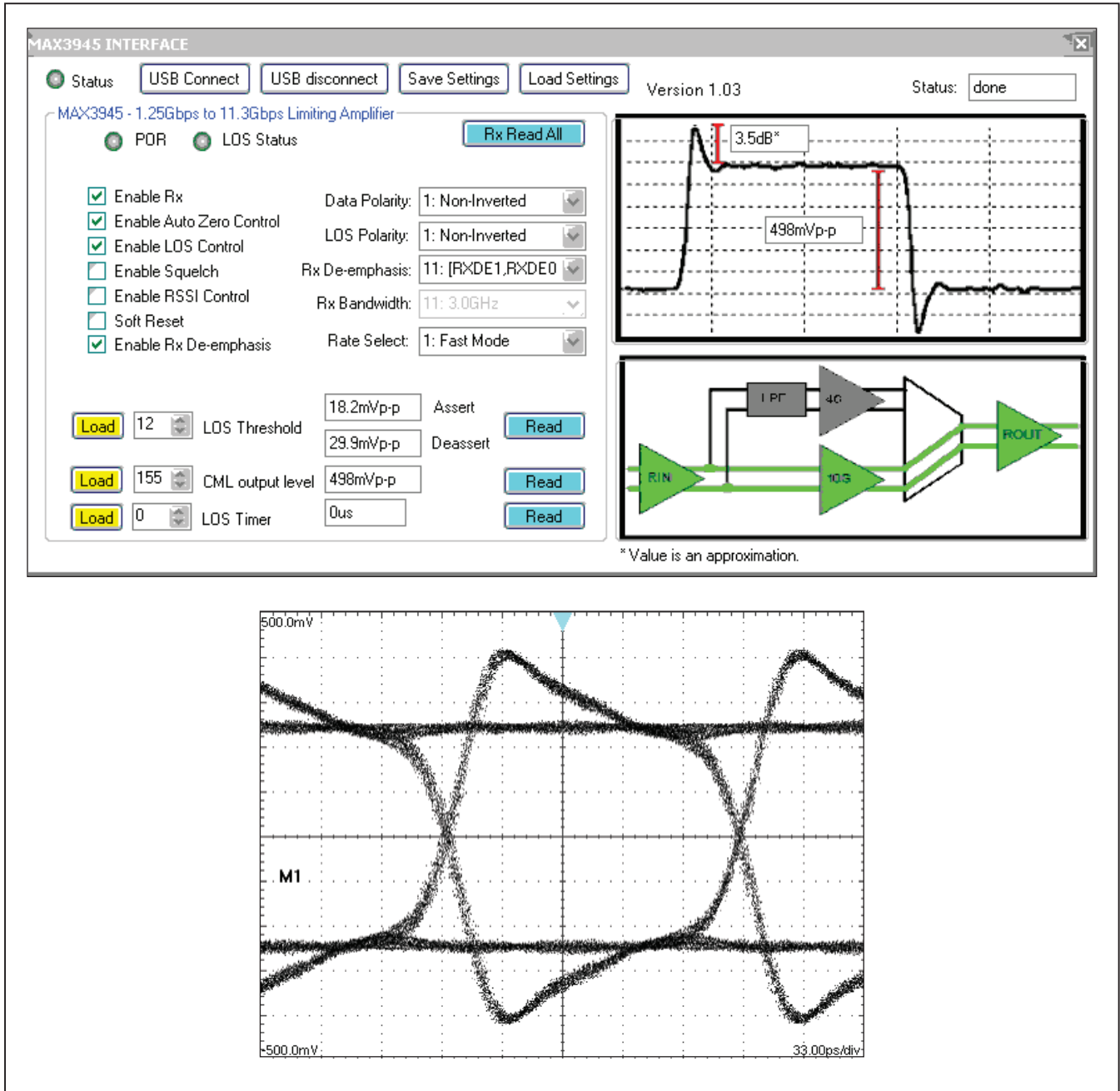
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Figures 8a and 8b. The MAX3945 EV kit GUI showing the dialog box (Figure 8a) with the low-bandwidth signal path ($RATE_SEL = 0$) and Rx bandwidth of 3.0GHz ($BW1 = 1$, $BW0 = 1$). Figure 8b presents the corresponding waveform.

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Figures 9a and 9b. The MAX3945 EV kit GUI showing the dialog box (Figure 9a) with the high-bandwidth signal path (RATE_SEL = 1), maximum deemphasis (RXDE1 = 1, RXDE0 = 1), and CML output level of 498mVp-p (SET_CML[7:0] = 155d). Figure 9b presents the corresponding waveform.

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Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	4/10	Initial release	—

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