MAX9277/MAX9281 Evaluation Kits

Evaluate: MAX9277/MAX9281 with Coax or STP Cable

General Description

The MAX9277/MAX9281 coax evaluation kits (EV kit) provide a proven design to evaluate the MAX9277 and MAX9281 high-bandwidth gigabit multimedia serial link (GMSL) serializers with spread spectrum and full-duplex control channel with the use of a standard FAKRA coaxial cable. The EV kit also includes Windows XP®-, Windows Vista®-, and Windows 7-compatible software that provides a simple graphical user interface (GUI) for exercising features of the device. The EV kit comes with a MAX9277GTM+ or MAX9281GTM+ installed.

For complete GMSL evaluation using a standard FAKRA coax cable, order the MAX9277 or MAX9281 coax EV kit and a companion deserializer board (MAX9276A or MAX9280A coax EV kit referenced in this document). For evaluating with STP cable, also order the MAXCOAX2STP-HSD adapter kit and refer to its data sheet. Only one adapter kit is required per link, connecting the serializer and deserializer (SerDes) boards.

Items Included in the EV Kit Package

DESCRIPTION	QTY
MAX9277 coax EV kit or MAX9281 coax EV kit board	1
USB cable	1

MAX9276A/MAX9280A EV Kit Files

FILE	DECRIPTION
MAXSerDesEV-D_Vxxxx_ Install.EXE	Installs the EV kit files on your PC
MAXSerDesEV-D.EXE	Graphical user interface (GUI) application
CDM20600.EXE	Installs the USB device driver
USB_Driver_Help_200.PDF	USB driver installation help file

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Features

- Accepts 4-Channel LVDS or 24-Bit/32-Bit Parallel Video
- Windows XP-, Windows Vista-, and Windows 7-Compatible Software
- USB-PC Connection (Cable Included)
- USB Powered
- Proven PCB Layout
- Fully Assembled and Tested

Note: In the following sections, MAX9277/81 and the term “serializer” refer to the MAX9277 and MAX9281 ICs, and MAX9276A/80A and the term “deserializer” refer to the MAX9276A and MAX9280A ICs. The term SerDes refers to serializer/deserializer.

Note: This document applies to evaluation of the product with both coax and STP cables. This document covers coax cables, but the information provided applies equally to STP cables.

Quick Start

Required Equipment

- MAX9277 or MAX9281 serializer EV kit (USB cable included)
- MAX9276A or MAX9280A deserializer EV kit
- 2m Rosenberger FAKRA cable assembly (included with the deserializer EV kit)
- 20MHz function generator
- PC with Windows XP, Windows Vista, or Windows 7 and a spare USB port (direct 500mA connection required; do not use a bus-powered hub)
- 5V DC, 500mA power supply

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.

Ordering Information ***appears at end of data sheet.***

19-7905; Rev 0; 1/16

maxim integrated™

Procedure

The EV kit is fully assembled and tested. Follow the steps below to verify board operation:

1) Download and install the latest version of the EV kit software from **www.maximintegrated.com/EVkit-software**.
   - Search for the MAX9277 and then select **MAX9277 | Design Resources | Software | GMSL SerDes Evaluation Kit Software-Dallas uC**.
   - The installation application will install the USB driver for the on-board Dallas microcontroller. A Windows message appears when connecting the EV kit board to the PC for the first time. Each version of Windows has a slightly different message. If you see a Windows message stating **ready to use**, the installation was successful.
   - If the USB driver installation was not successful, install the appropriate USB driver for your PC from the links below and refer to the USB_Driver_Help_200.PDF file, if needed.

     USB Driver FTDI VID FTDI PID (Windows Vista/Windows 7 32-/64-bit)
     www.maximintegrated.com/design/tools/applications/evkit-software/index.cfm?EVKit=1046

     USB Driver Maxim VID FTDI (Windows Vista/Windows 7 64-bit)
     www.maximintegrated.com/design/tools/applications/evkit-software/index.cfm?EVKit=871

     USB Driver Maxim VID FTDI (Windows XP/Windows Vista/Windows 7 32-bit)
     www.maximintegrated.com/design/tools/applications/evkit-software/index.cfm?EVKit=869
2) Verify that all serializer board jumpers are in their default positions, as shown in Figure 9.
3) Verify that all deserializer board jumpers are in their default positions, as shown in Figure 10.
4) With the power supply and function generator off, connect the 5V power supply to the +5VIN terminal pad on the deserializer EV kit.
5) Connect the FAKRA cable from the serializer board OUT+ connector to the deserializer board IN+ connector.
6) Connect the USB cable from the PC to the serializer EV kit (J10).
7) Connect the function generator output to the serializer board header (H1.PCLK_IN).
8) Turn on power supply and function generator.
9) Verify that LED_D2 on the serializer board turns on, blinks for a few seconds, then remains on, indicating that the microcontroller is powered, programmed, and enabled.
10) Verify that LED_PWR on the serializer board turns on, indicating that the board has power.
11) Set the function generator output to square wave, 20MHz, amplitude same as the IOVDD level selected on the board (3.3V), and offset at 0V.
12) Verify the function generator output with a scope.
13) Connect the function generator output to the serializer board header (H1.PCLK_IN).
14) Turn on the power supply and function generator output.
15) Verify that LED_LOCK on the deserializer board turns on, indicating that the link has been successfully established. If LED_LOCK is off or LED_ERROR is on, check the *Troubleshooting* section for possible fixes.
16) Start the EV kit software by selecting **Start | Programs | Maxim Integrated | MAXSerDesEV-D | MAXSerDesEV-D**. The **Configuration Settings** window will appear (Figure 1).
17) Press the **Connect** button to launch the **Evaluation Kit** window and show the serializer register map (Figure 2). The GUI will read all the internal registers of the SerDes and update the corresponding tabs.

Detailed Description of Software

To start the EV kit GUI, select **Start | All Programs | Maxim Integrated | MAXSerDesEV-D | MAXSerDesEV-D**.

Configuration Settings Window

The **Configuration Settings** window is the first window that opens after successful program launch. It allows the user to specify evaluation board setup and mode of operation.

Controller Group Box

In the **Controller** group box, select **Coax** or **STP** from the **LinkType** drop-down list; **I2C** or **UART** from the **Bus** drop-down list; and whether the **Serializer** or **Deserializer** is connected to the USB controller. Upon changing any of these parameters, conflicting jumper settings will be highlighted, guiding the user to check and make the corresponding changes to the evaluation boards. Only **LinkType** and **Device Address** selections on the **Configuration Settings** window affects the EV kit operation. Other items, including jumper selection, are for user reference only.

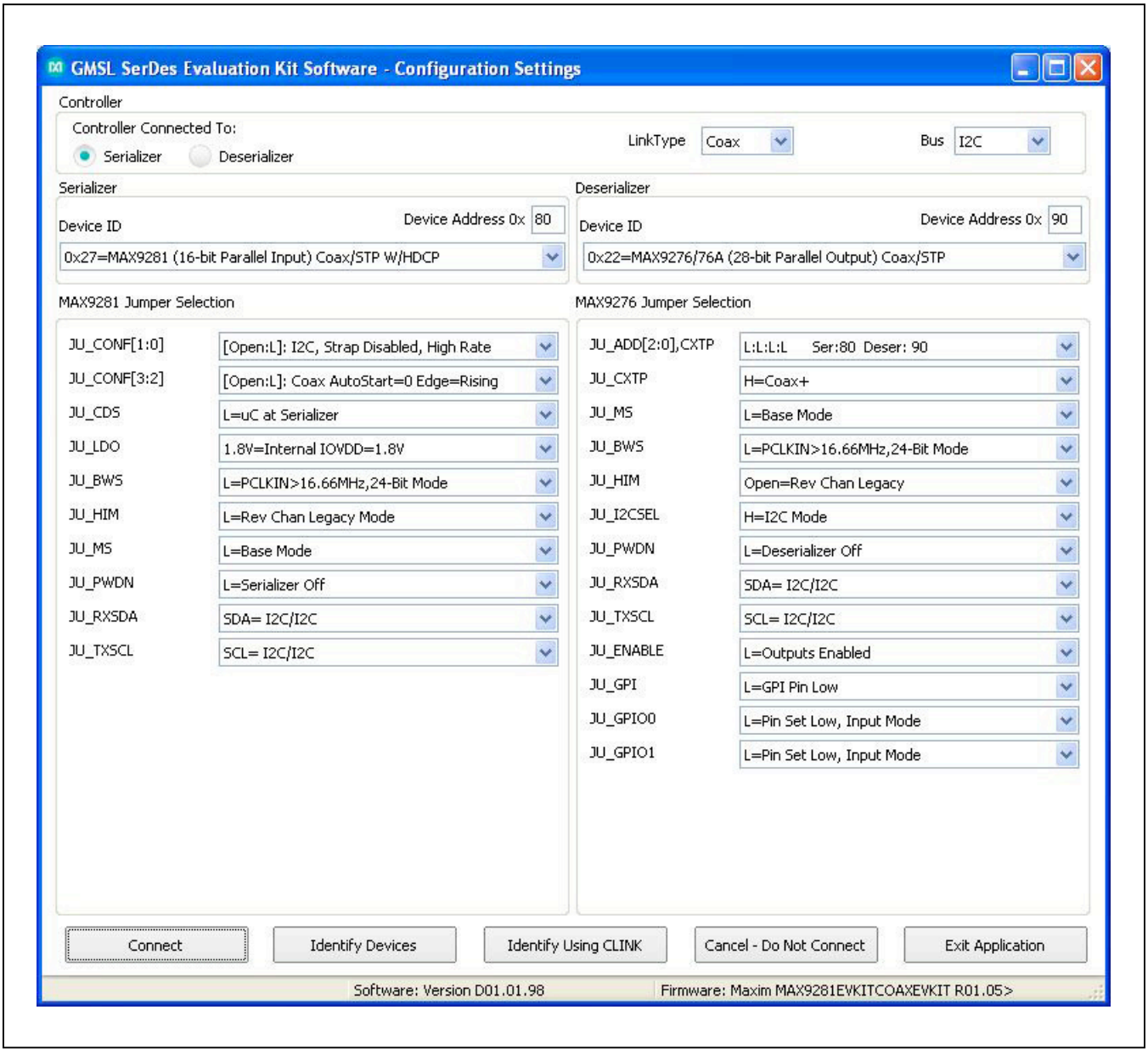

Figure 1. MAXSerDesEV-D Evaluation Kit Software: Configuration Settings Window

Serializer Jumper Selection Block

The **Serializer Jumper Selection** block lists jumpers on the evaluation board of the selected **Device ID** and displays the correct shunt positions based on the conditions selected in the **Controller** group box. Note that changing jumper selections in this group box does not affect actual operation of the serializer.

Deserializer Jumper Selection Block

The **Deserializer Jumper Selection** block lists jumpers on the evaluation board of the selected **Device ID** and displays the correct shunt positions based on the conditions selected in the **Controller** group box. Note that changing jumper selections in this group box does not affect actual operation of the deserializer.

Identify Devices Button

The **Identify Devices** button causes the GUI to scan the system and hunt for slave addresses selectable by the SerDes input address pins. Upon successful communication, the identified **Device ID** and corresponding jumper lists are displayed on the **Serializer** and **Deserializer Jumper Selection** blocks. It is also possible to manually select a device from the **Device ID** drop-down list and enter a slave address in the **Device Address** edit box. It is a good practice to utilize the **Identify Devices** button and verify communication with the devices under test (DUTs) before attempting to **Connect**.

Figure 9 and Figure 10 show jumper settings on the SerDes PCBs for coax cable and I^2C communication with the USB controller connected to the deserializer board. Refer to the respective serializer/deserializer IC data sheets for detailed configuration information. See Table 1 for PCB jumper settings/descriptions.

Connect Button

The **Connect** button opens the **Evaluation Kit** window. The GUI reads the SerDes registers and displays the register maps for both. Successful communication with DUTs is indicated by green LED indicators. If there is a communication problem, the LED indicators turn red.

Cancel - Do not Connect Button

The **Cancel - Do not Connect** button opens the **Evaluation Kit** window without attempting to connect to the on-board microcontroller. Although there is no communication with the microcontroller, all functions and tabs corresponding to the selected **Device ID**s become active once there.

Evaluation Kit Window

The **Evaluation Kit** window shown in Figure 2 provides access to all internal functions of the DUTs by means of reading and writing registers through different tabs, enabling the user to evaluate various functions of the SerDes.

The **Read All** button updates the SerDes' register maps by reading the DUT's internal registers.

The **Serializer** group box provides pushbuttons to access the serializer's registers. The **Read all MAX9281** button reads register contents from the serializer and updates the displayed register values. The **Load** button reads and updates registers from a previously saved register map file. The **Save** button saves the existing register values into a new file for future reference.

The **Deserializer** group box provides pushbuttons to access the deserializer's registers. The **Read All MAX9276/76A** button reads register contents from the deserializer and updates the displayed register values. The **Load** button reads and updates registers from a previously saved register map file. The **Save** button saves the existing register values into a new file for future reference.

The **Open Configuration** button opens the **Configuration Settings** window for any configuration changes. Use the **Open Configuration** and **Connect** buttons to navigate between the **Configuration Settings** and **Evaluation Kit** windows.

The **Wake Up** button applies the register write sequence described in the IC data sheets to wake the DUTs from sleep mode.

MAX9281 Tab

The **MAX9281** tab (Figure 2) lists the serializer's registers bitmaps. The **Read** and **Write** buttons in each register group box allow read/write access for each bit or group of bits that specify a function or condition, as defined in the serializer IC data sheet. The color of the small LED indicator next to the **Read/Write** buttons indicates the communication status. Green indicates successful communication and red indicates failed communication.

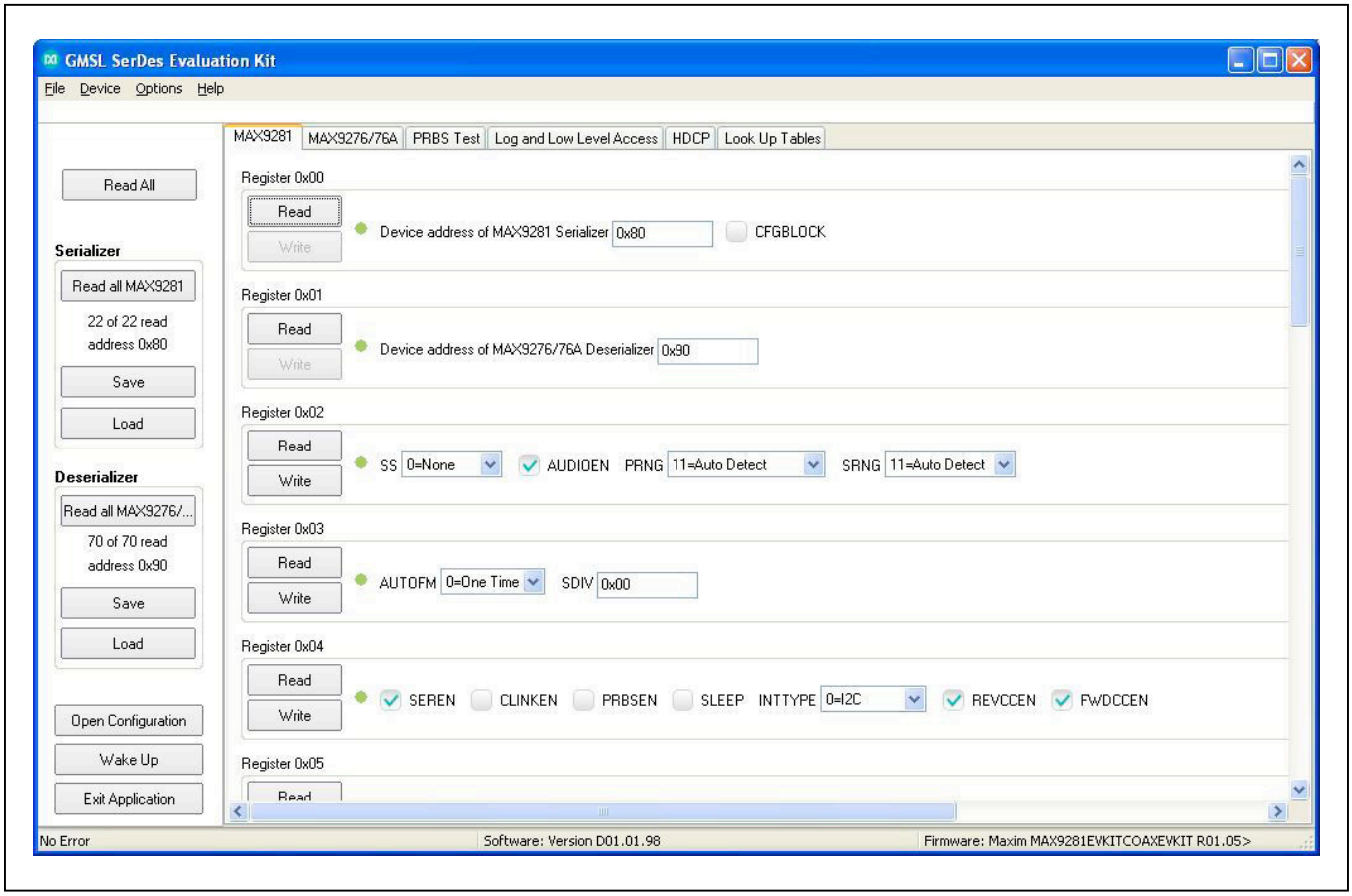

Figure 2. MAXSerDesEV-D Evaluation Kit Software (MAX9281 Tab (Serializer))

MAX9276/76A Tab

The **MAX9276/76A** tab (Figure 3) lists the deserializer's registers bitmaps. The **Read** and **Write** buttons in each register group box allows read/write access for each bit or group of bits that specify a function or condition, as defined in the deserializer IC data sheet. The color of the small LED indicator next to the **Read/Write** buttons indicates the communication status. Green indicates successful communication and red indicates failed communication.

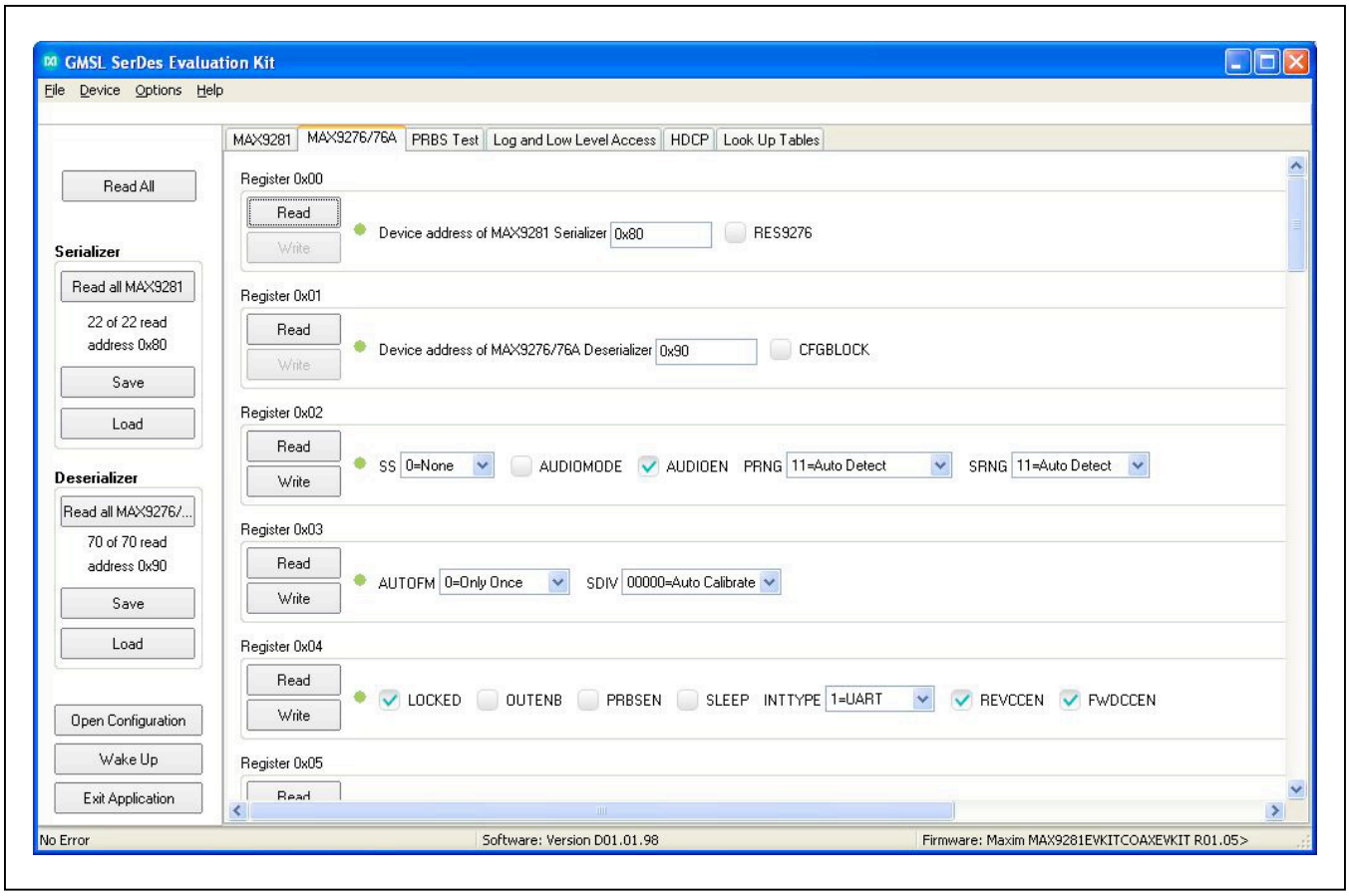

Figure 3. MAXSerDesEV-D Evaluation Kit Software (MAX9276/76A Tab (Deserializer))

PRBS Test Tab

The **PRBS Test** tab (Figure 4) facilitates PRBS testing. Upon pressing the **Start** button, the serializer and deserializer registers are programmed, per defined sequence in the IC data sheets, to perform a pseudorandom bit sequence (PRBS) error-rate test. Enter the test duration (maximum 32,767s = 9.1hrs) in the **Duration** edit box and press **Start** to begin the test. At the end of the specified elapse time, the number of bit errors are read from the **PRBSERR** register and displayed in the **PRBS Error Counter** box.

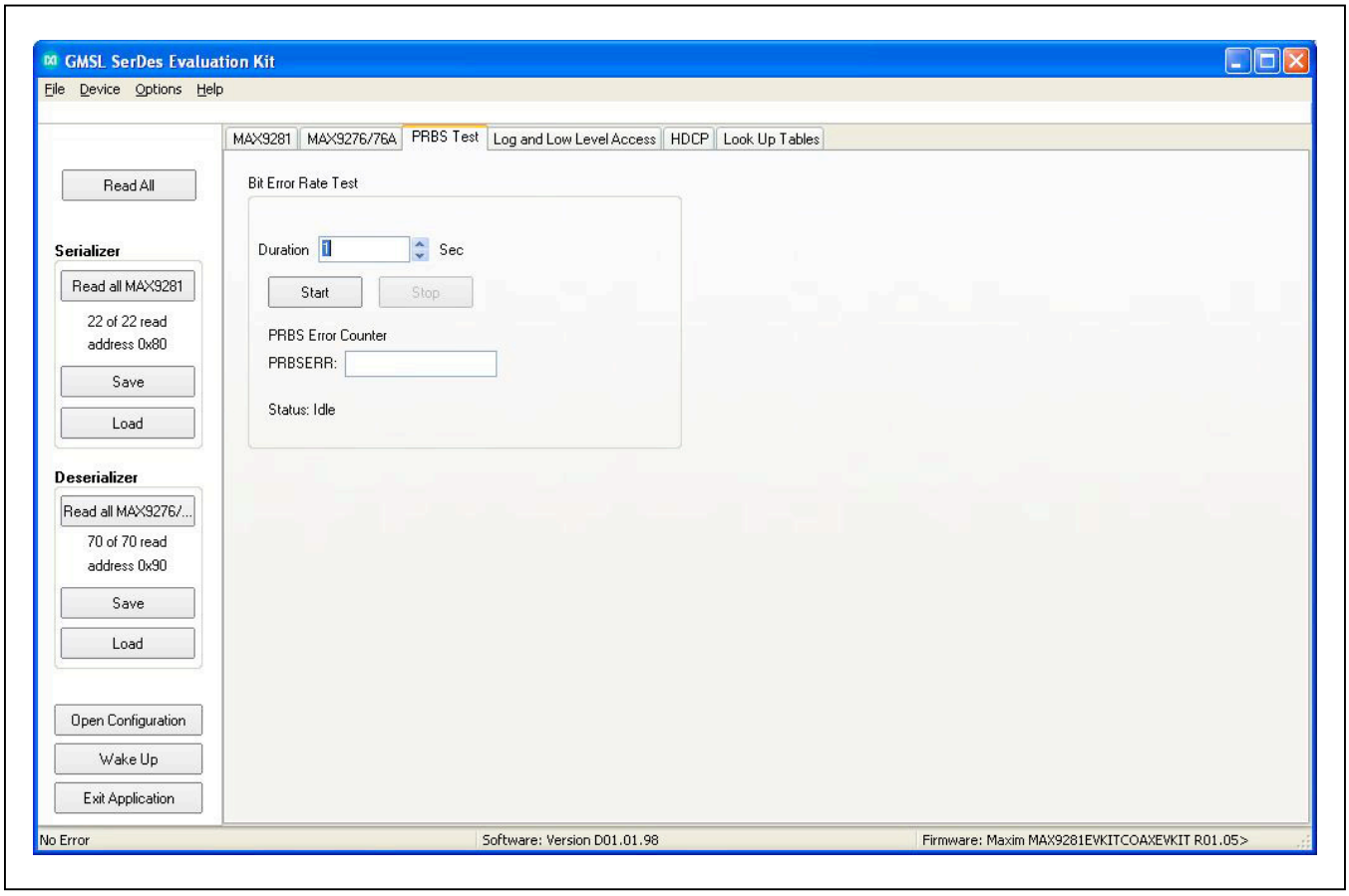

Figure 4. MAXSerDesEV-D Evaluation Kit Software (PRBS Test Tab)

Log and Low Level Access Tab

The **Log and Low Level Access** tab (Figure 5) logs all activities between the GUI and DUTs.

The **Register Access** group box allows 1-byte read or writes of the specified **Device Address** and **Register Address**. Press the **Send String to EVKIT** button to communicate with devices that are not register-based (such as the MAX7324). User-supplied devices requiring other interface protocols must use the **Raw TX byte codes** to communicate. Note that in bypass mode, raw data is passed to the user-supplied slave device directly without modification.

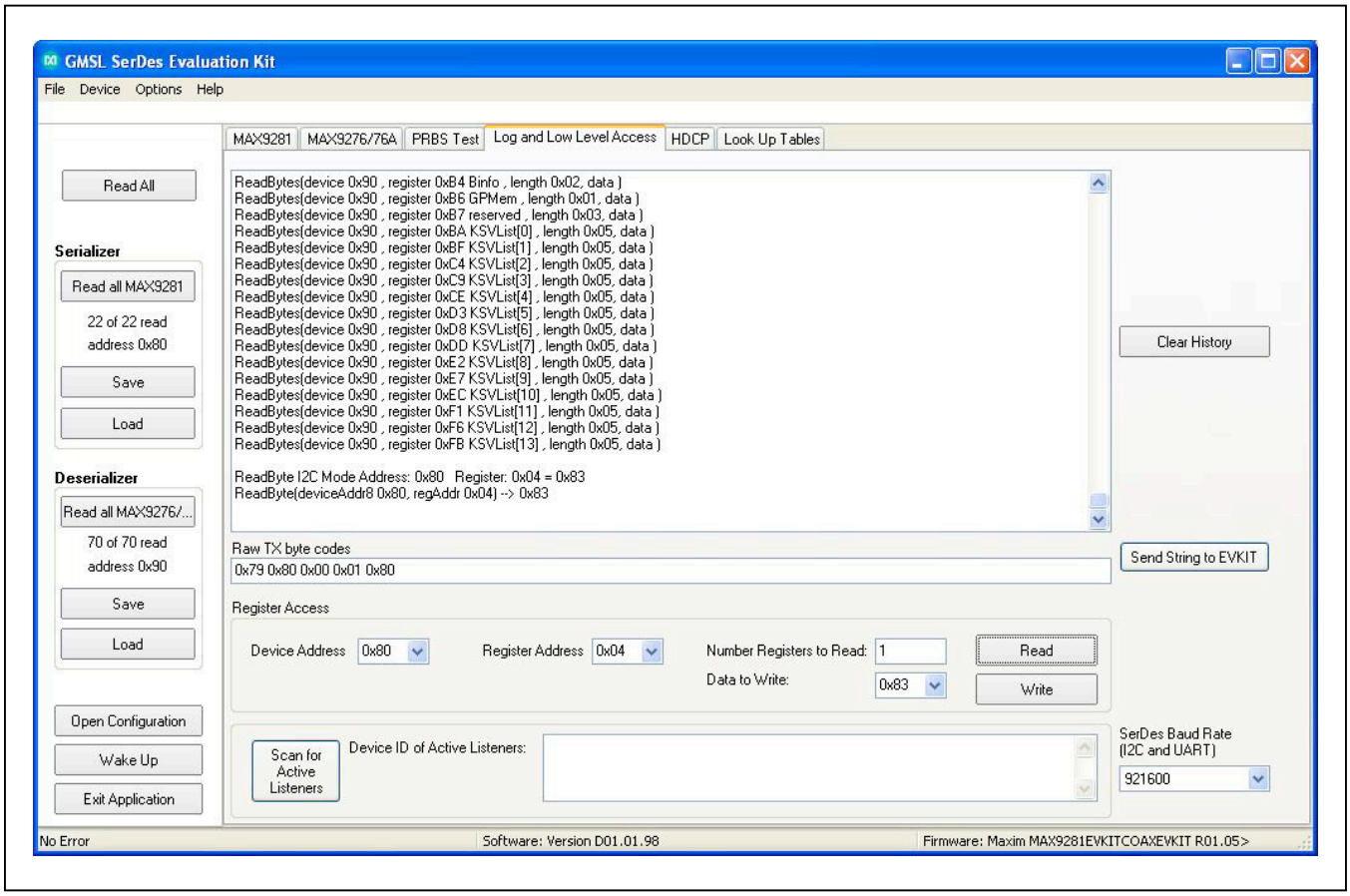

Figure 5. MAXSerDesEV-D Evaluation Kit Software (Log and Low Level Access Tab)

HDCP Tab

The **HDCP** tab (Figure 6) is viewable only for serializers and deserializers that support the HDCP function. The HDCP registers of both SerDes are listed side-by-side with **Read** and **Write** buttons for each register. **Authenticate** and **Enable Encryption** pushbuttons initiate the HDCP verification process. At the end of the operation, the color of the LED indicator turns green to indicate success or red to indicate failure of the function.

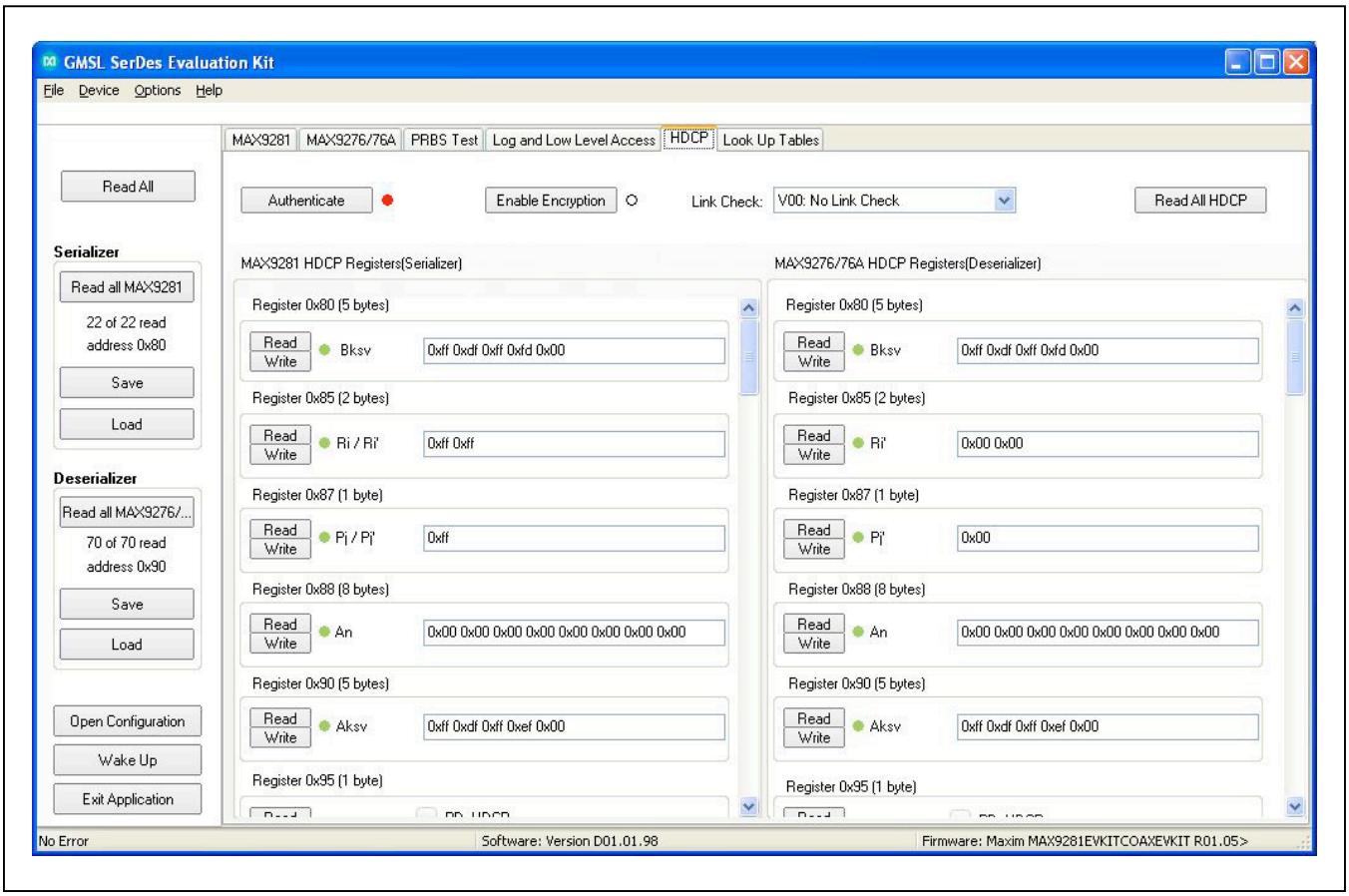

*Figure 6. MAXSerDesEV-D Evaluation Kit (HDCP Tab—**Note:** The MAX9276A does not support HDCP)*

Lookup Tables Tab

The **Lookup Tables** tab (Figure 7) provides access to the lookup tables (LUTs) of the deserializer. Use this tab to program/view/edit the LUT settings of the red, green, and blue colors for color translation. LUT content edits can be performed on the entire 256 bytes of all three colors, of an individual color or an individual pixel of any color table. The LUT contents can be saved as a .csv file for use as a template or can be uploaded from an existing file. Sample LUT content is provided in the evaluation kit software.

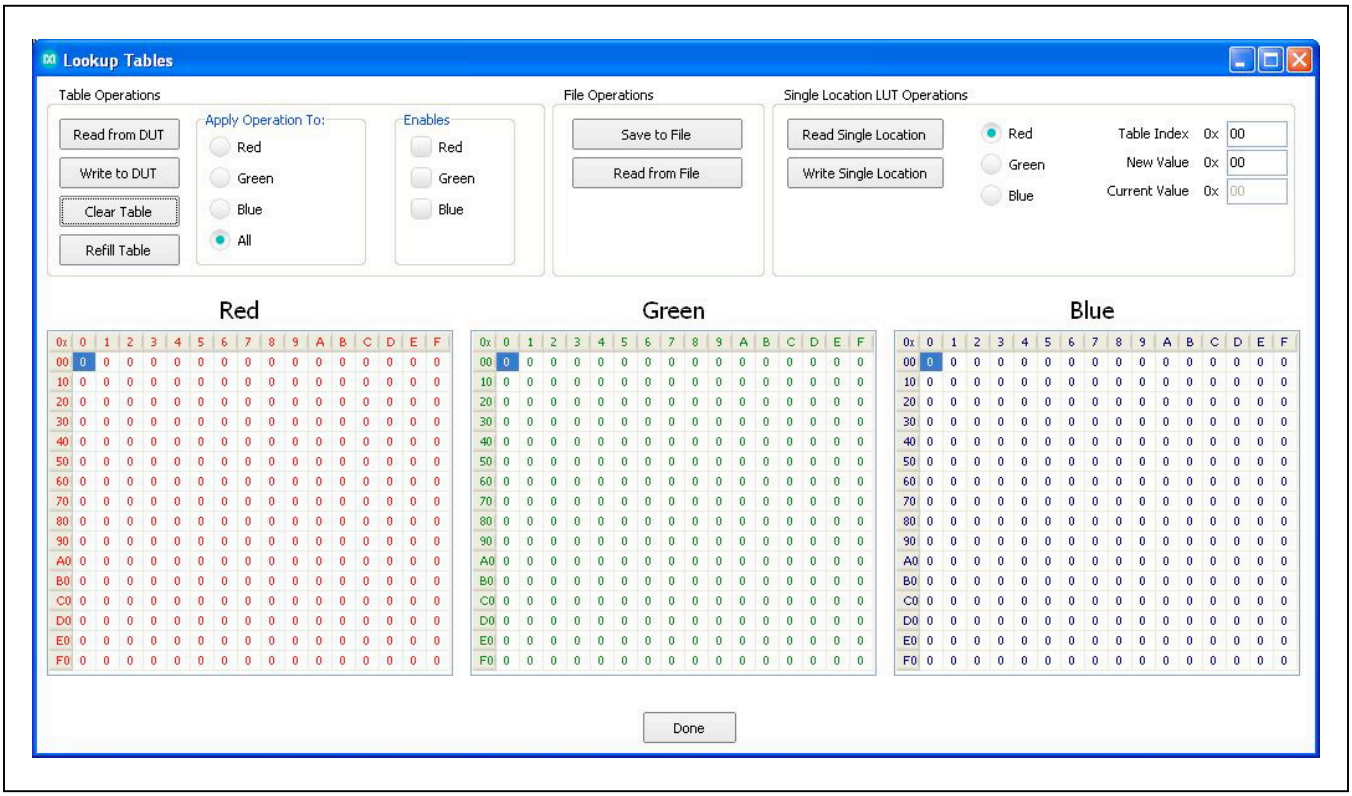

*Figure 7. MAXSerDesEV-D Evaluation Kit Software: LUT Tables Window (Lookup Tables Tab—**Note:** This tab is relevant only to deserializers with image-enhancing capability)*

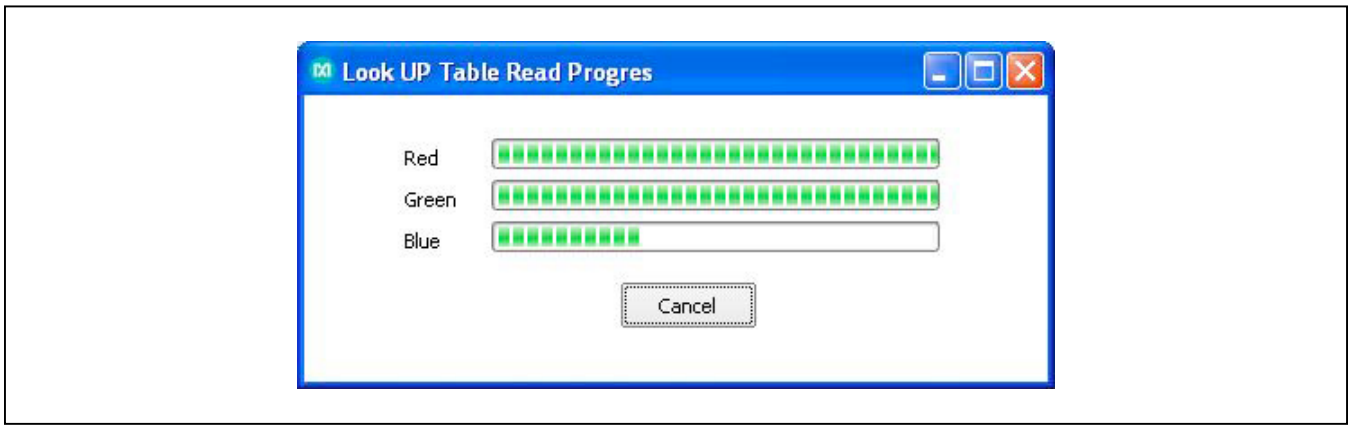

Figure 8. MAXSerDesEV-D Evaluation Kit Software (Lookup Table Read/Write Progress Window—this is relevant only to deserializers with image-enhancing capability)

Detailed Description of Hardware

The MAX9277/MAX9281 coax EV kits provide a proven layout for the MAX9277/MAX9281 GMSL serializers with the use of a standard FAKRA coax cable. On-board level translators and an easy-to-use USB-PC connection are included on the EV kit board.

The serializer EV kit board layout is divided into three principal sections:

1) Power-supply circuitry.
2) MAX9277/MAX9281 application circuit, including parallel-to-LVDS bridge circuitry.
3) USB interface microcontrollers (U10, U12) and support components.

On-Board USB Interface

The EV kit board provides UART and I^2C interfaces (through U10 and U12) intended to operate while both SerDes boards are powered on and locked.

User-Supplied Interface

To use a microcontroller other than the one provided on the evaluation board, remove the JU_TXSCL and JU_TXSDA jumpers and connect the corresponding user's TX/SCL, RX/SDA, and GND signals to the H_I/O header pins.

Refer to the respective serializer IC data sheet for details about communication protocol and proper pin configurations.

Board Power Supplied

The serializer board can be powered from the USB port (default) or 5V supplied on the +5VIN/GND terminals. Jumper JU_VIN selects between the 5V USB supply or the +5VIN. On-board LDO regulators U2, U3, U5, and U6 generate all different voltage levels required for operating the EV kit board from a single 5V power supply (+5VIN).

To provide different power supplies to AVDD, DVDD, and IOVDD, move the shunts from JU_AVDD, JU_DVDD, and JU_IOVDD headers from the INT to EXT positions and apply external user-supplied power at the AVDD_EXT, DVDD_EXT, and IOVDD_EXT terminals, respectively.

Detailed Description of Firmware

The DS89C450 microcontroller (U12) runs custom firmware that ensures that no breaks occur within register read/write commands. The firmware records 9-bit even-parity data received from the USB interface while RTS is set, and plays back the 9-bit data with 1.5 stop bits timing when RTS is cleared. Data received by the serializer is immediately relayed to the USB port.

Table 1. Jumper Settings/Descriptions

JUMPER	SIGNAL	DEFAULT POSITION	FUNCTION
JU_ADD0	ADD0	L*	(See Table 2)
		H	
		Open	
JU_ADD1	ADD1	L*	(See Table 2)
		H	
		Open	
JU_AUTO	$\overline{AUTO}$	L*	Enable serialization at power-up
		H	Disable serialization at power-up
JU_AVDD	AVDD	INT*	AVDD supplied internally
		EXT	AVDD supplied through the AVDD_EXT terminal
JU_BWS	BWS	L*	PCLKIN > 12.5MHz, 32-bit mode
		H	PCLKIN > 12.5MHz, 32-bit mode
		Open	PCLKIN > 33.33MHz 27-bit mode
JU_BWS59	BWS59	L*	24-bit mode
		H	32-bit mode
JU_CDS	CDS	L*	µC connected at the serializer side
		H	µC connected at the deserializer side

Table 1. Jumper Settings/Descriptions (continued)

JUMPER	SIGNAL	DEFAULT POSITION	FUNCTION
JU_CNTL1	RES/CNTL1	L*	Serialize RES to serial data bit 27
		H	Serialize CNTL1 pin to serial data bit 27
JU_CNTL2	CNTL2	L*	Do not map CNTL2
		H	Serialize CNTL2 pin to serial data bit 28
JU_CONF0	CONF0	L*	(See Table 2)
		H	
		Open	
JU_CONF1	CONF1	L*	(See Table 2)
		H	
		Open	
JU_CXTP	CX/TP	L*	Select coax as serial link
		H	Select STP as serial link
JU_DRS59	DRS59	L*	Parallel input data rate of 16.66MHz to 104MHz (24 bit)
		H	Parallel input data rate of 8.33MHz to 16.66MHz (24 bit)
JU_DVDD	DVDD	INT*	DVDD supplied internally
		EXT	DVDD supplied through the AVDD_EXT terminal
JU_ES59	ES59	L*	Trigger on rising edge of PCLKIN
		H	Trigger on falling edge of PCLKIN
JU_HIM	GPO/HIM	L*	Reverse channel in legacy mode
		H	Reverse channel in high-immunity mode
JU_IOVDD	IOVDD	INT*	IOVDD supplied internally
		EXT	IOVDD supplied through the AVDD_EXT terminal
JU_LDO	LDO	3.3V*	Internal IOVDD = 3.3V
		1.8V	Internal IOVDD = 1.8V
JU_LVDSVDD	LVDSVDD	INT*	LVDSVDD supplied internally
		EXT	LVDSVDD supplied through the LVDSVDD_EXT terminal
JU_MS	MS	L*	Base mode
		H	Bypass mode
JU_PLI0	—	L*	If the JU_PLI0 shunt is placed in the “L” position, then every other 4th pin starting with 1 is connected to GND
		H	
		Open	
JU_PLI1	—	L*	If the JU_PLI1 shunt is placed in the “L” position, then every other 4th pin starting with 3 is connected to GND
		H	
		Open	
JU_PWDN	PWDN	L	Serializer powered off
		H*	Serializer powered on
JU_RX59	RX/SDA (MA9259)	RXSDA59	MAX9259 RX pin connected to system RX/SDA
		IOVDD*	MAX9259 RX pin pulled up to IOVDD

Table 1. Jumper Settings/Descriptions (continued)

JUMPER	SIGNAL	DEFAULT POSITION	FUNCTION
JU_RX68	RX/SDA (MA9268)	RXSDA68	MAX9268 RX pin connected to system RX/SDA
		IOVDD*	MAX9268 RX pin pulled up to IOVDD
JU_RXSDAPU	RX/SDA	Short*	RX/SDA pulled up to IOVDD
		Open	RX/SDA pulled up to IOVDD externally
JU_SEL	—	L	LVDS input supplied externally through H3 header
		H*	LVDS input supplied on board
JU_T1	USB_RI	L	U1-11 to GND (factory use only)
		H	U1-11 to USB+5V (factory use only)
		Open*	U1-11 open factory use only)
JU_T2EX	T2/EX	L	U1-41 to GND (factory use only)
		H	U1-41 to USB+5V (factory use only)
		Open*	U1-41 open (factory use only)
JU_TX59	TX/SCL (MA9259)	TXSCL59	MAX9259 TX pin connected to system TX/SCL signal
		IOVDD*	MAX9259 TX pulled up to IOVDD
JU_TX68	TX/SCL (MA9268)	TXSCL68	MAX9268 TX pin connected to system TX/SCL signal
		IOVDD*	MAX9268 TX pin pulled up to IOVDD
JU_TXSCL	TX/SCL	TX*	UART-to-UART or UART-to-I²C mode
		SCL	I²C-to-I²C mode
JU_TXSCLPU	TX/SCL	Short*	TX/SCL pulled up to IOVDD
		Open	TX/SCL pulled up to IOVDD externally
JU_VDDIO	VDDIO	Short*	VDDIO applied to U1
		Open	Connect amp meter to measure I-VDDIO
JU_VIN	VIN	USB	5V supplied from the USB port
		+5V*	5V supplied from the external supply applied on the +5V terminal

**Default position.*

Table 2. Device Address Defaults (Register 0x00, 0x01)

PIN		DEVICE ADDRESS (binary)								SERIALIZER DEVICE ADDRESS (hex)	DESERIALIZER DEVICE ADDRESS (hex)
ADD1	ADD0	D7	D6	D5	D4	D3	D2	D1	D0		
Low	Low	1	0	0	X*	0	0	0	R/$\overline{W}$	80	90
Low	High	1	0	0	X*	0	1	0	R/$\overline{W}$	84	94
Low	Open	1	0	0	X*	1	0	0	R/$\overline{W}$	88	98
High	Low	1	1	0	X*	0	0	0	R/$\overline{W}$	C0	D0
High	High	1	1	0	X*	0	1	0	R/$\overline{W}$	C4	D4
High	Open	1	1	0	X*	1	0	0	R/$\overline{W}$	C8	D8
Open	Low	0	1	0	X*	0	0	0	R/$\overline{W}$	40	50
Open	High	0	1	0	X*	0	1	0	R/$\overline{W}$	44	54
Open	Open	0	1	0	X*	1	0	0	R/$\overline{W}$	48	58

**X = 0 for the serializer address; X = 1 for the deserializer address.*

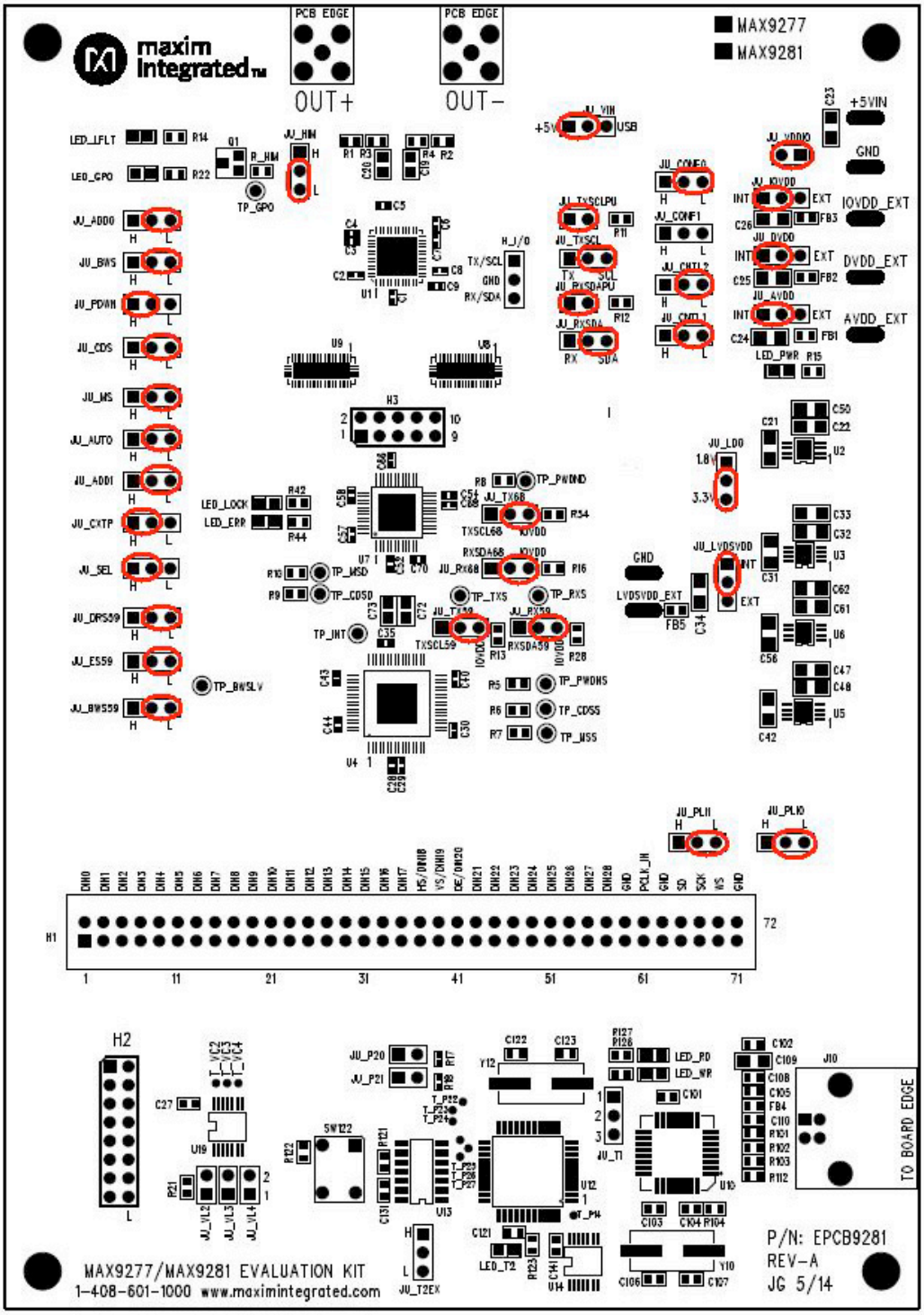

Figure 9. MAX9277/MAX9281 Serializers (Initial Jumper Settings for Coax Link and I²C Communication)

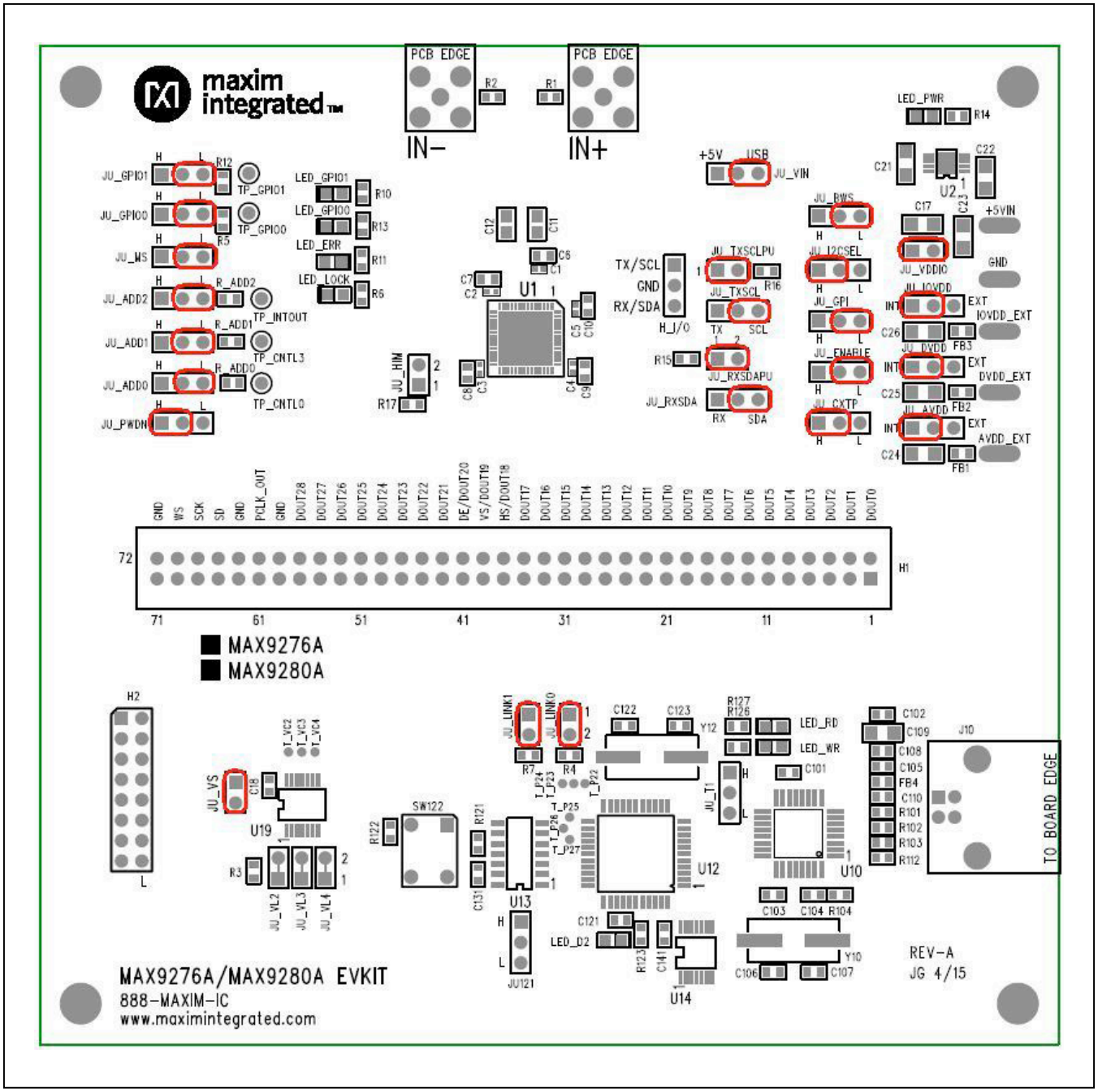

Figure 10. MAX9276A/MAX9280A Deserializers (Initial Jumper Settings for Coax Link and I²C Communication)

Troubleshooting

Possible causes of board test failure:

- Coax cable not properly connected between OUT+ of the serializer to IN+ of the deserializer
- PCLKIN is not applied (e.g., FG output is disabled): Verify signal at the pins on the board
- PCLKIN, function generator output is not correct: Verify signal at the pins on the board
- Incorrect jumper setting on the deserializer board: Reverify
- Incorrect jumper setting on the serializer board: Reverify
- Bus selection on the GUI is not consistent with jumpers' position on the boards: Check and verify that the USB cable has been properly connected
- USB port has locked: Exit application/GUI, remove the USB cable from the board, then reinsert the cable and relaunch the GUI
- Nuvoton µC is not communicating: Exit the application/GUI, remove the USB cable from the board, then reinsert the cable and relaunch the GUI
- Deserializer board is faulty: Try a different board (if available)
- Serializer board is faulty: Try a different board (if available)

Component Suppliers

SUPPLIER	PHONE	WEBSITE
Amphenol RF	800-627-7100	www.amphenolrf.com
Hong Kong X'tals Ltd.	852-35112388	www.hongkongcrystal.com
Murata Americas	770-436-1300	www.murataamericas.com
ON Semiconductor	602-244-6600	www.onsemi.com
Rosenberger Hochfrequenztechnik GmbH	011-49-86 84-18-0	www.rosenberger.de
TDK Corp.	847-803-6100	www.component.tdk.com

Note: *Indicate that you are using the MAX9277 or MAX9281 when contacting these component suppliers.*

Component Lists, Schematics, and PCB Layout Diagrams

Click on the links below for component lists, schematics, and PCB layout diagrams:

- **MAX9277 EV Kit BOM**
- **MAX9281 EV Kit BOM**
- **MAX9277/MAX9281 EV Kit Schematics**
- **MAX9277/MAX9281 EV Kit PCB Layout**

Ordering Information

PART	TYPE
MAX9277COAXEVKIT#	EV Kit
MAX9281COAXEVKIT#	EV Kit
MAXCOAX2STP-HSD#	Adapter Kit

#Denotes RoHS compliant.

Note: *The MAX9277 and MAX9281 coax serializer EV kits are normally ordered with a corresponding coax deserializer EV kit:*

- *MAX9276A coax deserializer EV kit, or*
- *MAX9280A coax deserializer EV kit*

Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	1/16	Initial release	—

For pricing, delivery, and ordering information, please contact Maxim Direct at 1-888-629-4642, or visit Maxim Integrated's website at www.maximintegrated.com.

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MAX9277EVKIT+ Rev A, 5/19/2014

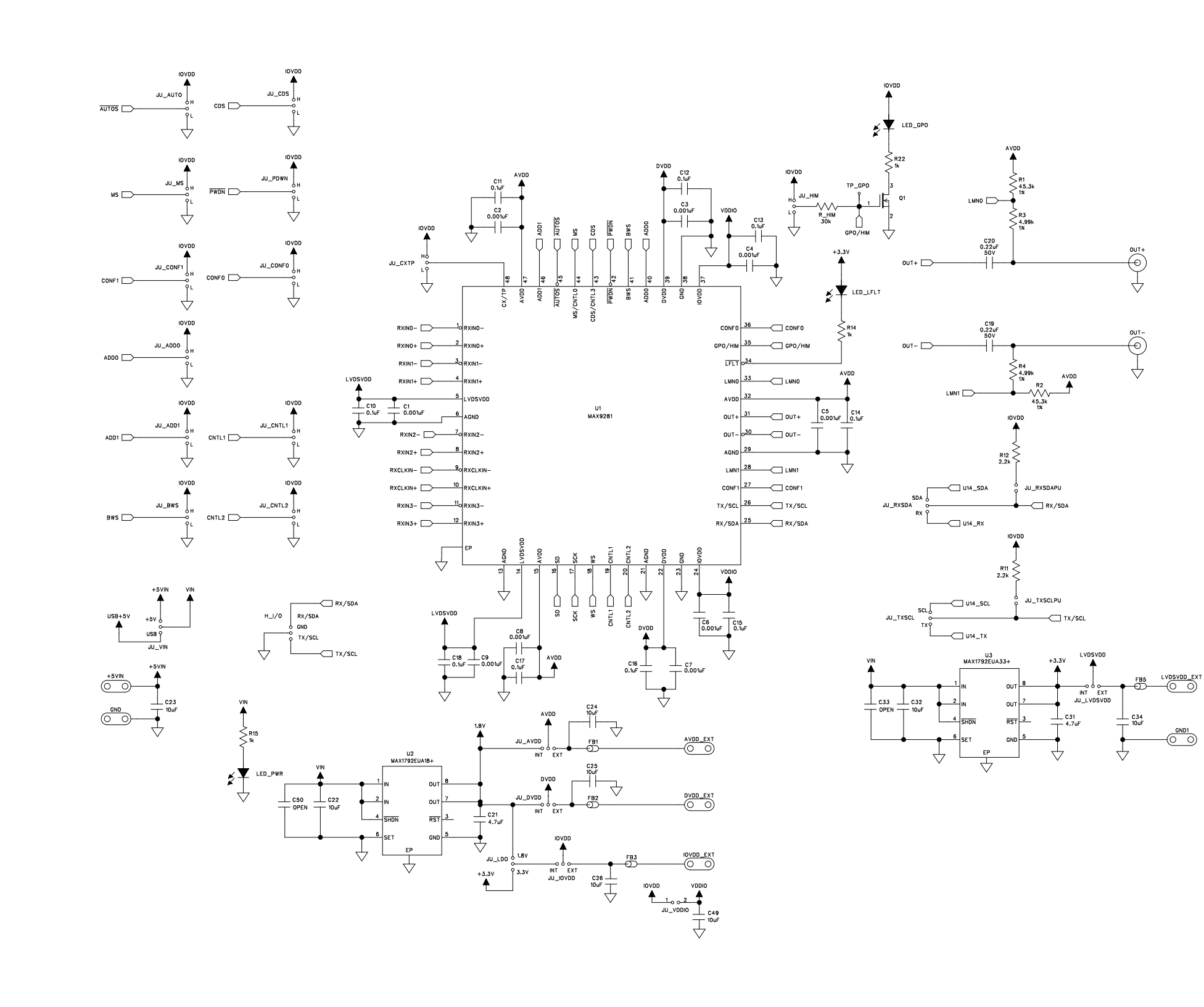
Parent Number	Parent Description	Item	Component Part	Component Description	QTY Per	Remarks (Reference Designators)	# of Char	Manufacturer Part Number
MAX9277EVKIT+	Evaluation Kit	1	EH0066	TEST POINT PC MINI .040"D RED	9	TP_BWSLV, TP_CDSD, TP_CDSS, TP_GPO, TP_MS, TP_MSD, TP_PWDND, TP_PWDNS, TP_INT	78>60	Keystone: 5000
		2	2	Not Installed	0	TP_RXS, TP_TXS	OK	Keystone: 5000
		3	EBUSS20W	20G tinned copper Bus wire formed into “U” shaped loops (0.25” off the PC board)	7	+5VIN, AVDD_EXT, DVDD_EXT, GND, GND1, IOVDD_EXT, LVDSVDD	OK	
		4	ECM0445	0.1uF 50volts X7R 10% Cer Cap (0603)	48	C10-18, C27, C36-39, C41, C45-46, C53, C55, C59-60, C67, C69, C71, C74-89, C101-105, C121, C131, C141	101>60	Murata: GRM188R71H104KA93D
		5	ECM0505	22pF ±5%, 50V C0G Cer Cap (0603)	4	C106-107, C122-123	OK	MURATA GRM1885C1H220J
		6	ECM0525	1uF ±20%, 10V X5R Cer Cap (0603)	1	C108	OK	MURATA GRM188R61A105M
		7	ECM0035	33000pF ±10%, 25V X7R Cer Cap (0603)	1	C110	OK	MURATA GRM188R71E333K
		8	ECM0619	1000pF ±10%, 50V X7R Cer Cap (0402)	23	C1-9, C28-30, C35, C40, C43-44, C52, C54, C57-58, C66, C68, C70	64>60	MURATA GRM155R71H102K
		9	ECM0323	0.22uF ±10%, 50V X7R Cer Cap (0805)	4	C19-20, C72-73	OK	MURATA GRM21BR71H224K
		10	EC2528	4.7uF 16volts Y5V 20% Cer Cap (1206)	4	C21, C31, C42, C56	OK	Vishay: VJ1206V475MXJTW1BC
		11	EC1140	10uF ±20%, 16V X5R Cer Cap (1206)	11	C22-26, C32, C34, C47, C49, C61, C109	OK	TDK: C3216X5R1C106M
		12		Not Installed (1206)	0	C33, C48, C50, C62	OK	
		13	EL0885	FERRITE CHIP 300 OHM 500MA (0603)	5	FB1-5	OK	TDK, MMZ1608R301A
		14	EH0205	CONN HEADER 72POS .100" DL TIN, 2X36 Pin Header	1	H1	OK	Sullins PEC36DAAN
		15	EH0205	CONN HEADER 16POS .100" DBL, 2X8 Pin Header	1	H2	OK	Sullins PEC36DAAN
		16	EH0205	CONN HEADER 10POS .100" DBL, 2X5 Pin Header	1	H3	OK	Sullins PEC36DAAN
		17	EH0072	CONN HEADER .100" SNGL TIN, 3 Pin Header	34	JU_ADD0, JU_ADD1, JU_AUTO, JU_AVDD, JU_BWS, JU_BWS59, JU_CDS, JU_CNTL1, JU_CNTL2, JU_CONF0, JU_CONF1, JU_CXTP, JU_DRS59, JU_DVDD, JU_ES59, JU_HIM, JU_IOVDD, JU_LDO, JU_LVDSVDD, JU_MS, JU_PDWN, JU_PLI0-JU_PLI1, JU_RX59, JU_RX68, JU_RXSDA, JU_SEL, JU_T2EX, JU_TI, JU_TX59, JU_TX68, JU_TXSCL, JU_VIN,	303>60	SULLINS PEC36SAAN
		18		Not Installed	0	JU_VL2-4	OK	SULLINS PEC36SAAN
		19	EH0077	CONN USB RTANG FEMALE TYPE B PCB	1	J10	OK	Assmann, AU-Y1007-R
		20	EH1157	FAKRA - HF Conn., Right Angle Plug For PCB	2	OUT+, OUT-	OK	Rosenberger, 59S2AX-400A5-Y
		21	EH0072	CONN HEADER .100" SNGL TIN, 2 Pin Header	5	JU_RXSDAPU, JU_TXSCLPU, JU_VDDIO, JU_P20, JU_P21	OK	SULLINS PEC36SAAN
		22	ED0565	LED RED 0805 SMD	3	LED_LFLT, LED_ERR, LED_PWR	OK	BR1112H-TR
		23	ED0838	LED GREEN 0805 SMD	1	LED_LOCK	OK	Stanley, PG1112H-TR
		24	ED0564	LED YELLOW 0805 SMD	4	LED_GPO, LED_RD, LED_T2, LED_WR	OK	Stanley, AY1112H-TR
		25	EQ0729	MOSFET 60V, 115mA N-Chan 2N7002	1	Q1	OK	Vishay 2N7002K
		26	ER0106033002	30Kohm Resistor 1% 0603	1	R_HIM	OK	
		27	ER01060327R0	27 ohm Resistor 1% 0603	2	R101-102	OK	
		28	ER0106031501	1.5Kohms Resistor 1% 0603	1	R103	OK	
		29	ER0106034700	470ohms Resistor 1% 0603	5	R47-50, R104	OK	
		30	ER0106032201	2.2Kohms Resistor 1% 0603	6	R11-13, R16, R28, R34	OK	
		31	ER0106034532	45.3Kohms Resistor 1% 0603	2	R1-2	OK	
		32	ER0106031101	1.1Kohms Resistor 1% 0603	1	R121	OK	
		33	ER0106031002	10Kohms Resistor 1% 0603	9	R5-10, R21, R112, R122	OK	
		34	ER0106031001	1K ohms Resistor 1% 0603	6	R14-15, R22, R123, R126-127	OK	
		35	ER0106034991	4.99Kohms Resistor 1% 0603	2	R3-4	OK	
		36	ER0106031801	1.8Kohms Resistor 1% 0603	2	R42, R44	OK	
		37	EH0102	SWITCH TACTILE SPST-NO 0.05A 24V	1	SW122	OK	Omron Electronics, B3F-1000
		38		Not Installed	0	T_P14, T_P20-27, T_VC2-4	OK	
		39	MAX9277GTM/V+	3.12Gbps GMSL Serializer with Coax or STP Output Drive and LVDS System Interface QFN\THIN\7X7X0.8MM\	1	U1	OK	MAX9277GTM/V+
		39	MAX9277GTM+	3.12Gbps GMSL Serializer with Coax or STP Output Drive and LVDS System Interface QFN\THIN\7X7X0.8MM\	1	U1	OK	MAX9277GTM+
		40	EQ0415	FT232BL USB UART (USB - Serial) I.C. TQFP_7X7X.8_32L	1	U10	OK	FTDI, FT232BL
		41	MAX1792EUA33+	500mA Low Dropout Linear Regulator MICROMAX\8L\EP	2	U3, U6	OK	MAX1792EUA33+
		42	90-89450+ENL	DS89C430/DS89C450 Ultra-High-Speed Flash Microcontrollers TQFP-44L	1	U12	OK	Maxim, DS89C450-ENL
		43	EQ0783	IC, Quad Buffer, Tri State	1	U13	OK	On Semi: MC74AC125DR2G
		44	MAX3378EEUD+	±15kV ESD-Protected, 1A, 16Mbps, Dual/Quad TSSOP-14L	2	U14, U19	OK	MAX3378EEUD+
		45	MAX1792EUA18+	500mA, Low-Dropout Linear Regulator in µMAX MICROMAX\8L\EP	2	U2, U5	OK	MAX1792EUA18+
		46	MAX9259GCB/V+	Gigabit Multimedia Serial Link with Spread Spectrum and Full-Duplex Control Channel TQFP-64L	1	U4	OK	MAX9259GCB/V+

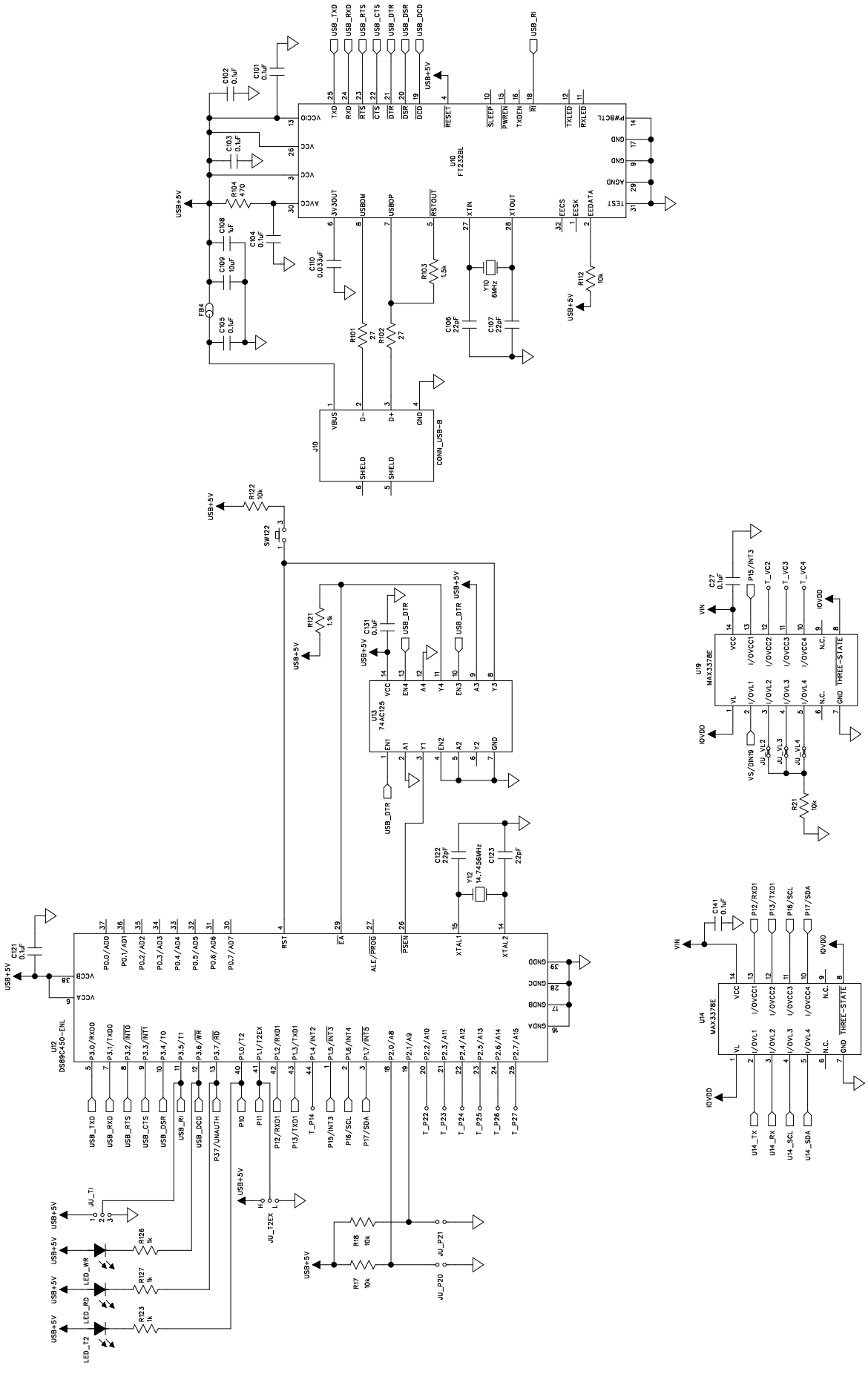
		47	MAX9268GCM/V+	Single-Link Deserializer with LVDS Interface TQFP\7X7X1.4MM\48L and Integrated Control Channel Is Ideal for Digital Video Applications	1	U7	OK	MAX9268GCM/V+
		48	MAX4886ETO+	Quad, High-Speed HDMI/DVI 2:1 Digital Video Switch QFN3_5X9_42L	2	U8-9	OK	MAX4886ETO+
		49	EX0343	6MHz crystal	1	Y10	OK	Hong Kong X'tals SSL60000N1HK188F0-0
		50	EX0381	14.7456MHz crystal	1	Y12	OK	Hong Kong X'tals SSM14745N1HK188F0-0
		51					OK	
		52	EPCB9281	PCB: MAX9277 / MAX9281 Evaluation Kit	1		OK	
		53	EH0071	Shunts	28	See Jumper Table	OK	
		54	EH0272 OR EH0487	CABLE, USB-A MALE to USB-B MALE 6' BEIGE	1	Pack-out	OK	JAMECO 229730
		55		BAG, STATIC SHIELD ZIP ~6"x~8", W/ ESD LOGO	1	Pack-out	OK	
			85-MAXKIT-PNK	FOAM, ANTI-STATIC PE 12"x12"X5MM	2	Pack-out	OK	
		55	88-00712-MDM	Box, Medium BROWN 9 3/8" x 7 1/4" x 2 1/2"	1	Pack-out	OK	Any
		57	85-84003-006	Label	1	Pack-out	OK	
		58	XXXXXXXXX	WEB instructions for Maxim Data Sheet	1	Pack-out	OK	

MAX9281EVKIT+ Rev A, 5/19/2014

Parent Number	Parent Description	Item	Component Part	Component Description	QTY Per	Remarks (Reference Designators)	# of Char	Manufacturer Part Number
MAX9281EVKIT+	Evaluation Kit	1	EH0066	TEST POINT PC MINI .040"D RED	9	TP_BWSLV, TP_CDSD, TP_CDSS, TP_GPO, TP_MS, TP_MSD, TP_PWDND, TP_PWDNS, TP_INT	78>60	Keystone: 5000
		2	EH0066	Not Installed	0	TP_RXS, TP_TXS	OK	Keystone: 5000
		3	EBUSS20W	20G tinned copper Bus wire formed into “U” shaped loops (0.25” off the PC board)	7	+5VIN, AVDD_EXT, DVDD_EXT, GND, GND1, IOVDD_EXT, LVDSVDD	OK	
		4	ECM0445	0.1uF 50volts X7R 10% Cer Cap (0603)	48	C10-18, C27, C36-39, C41, C45-46, C53, C55, C59-60, C67, C69, C71, C74-89, C101-105, C121, C131, C141	101>60	Murata: GRM188R71H104KA93D
		5	ECM0505	22pF ±5%, 50V C0G Cer Cap (0603)	4	C106-107, C122-123	OK	MURATA GRM1885C1H220J
		6	ECM0525	1uF ±20%, 10V X5R Cer Cap (0603)	1	C108	OK	MURATA GRM188R61A105M
		7	ECM0035	33000pF ±10%, 25V X7R Cer Cap (0603)	1	C110	OK	MURATA GRM188R71E333K
		8	ECM0619	1000pF ±10%, 50V X7R Cer Cap (0402)	23	C1-9, C28-30, C35, C40, C43-44, C52, C54, C57-58, C66, C68, C70	63>60	MURATA GRM155R71H102K
		9	ECM0323	0.22uF ±10%, 50V X7R Cer Cap (0805)	4	C19-20, C72-73	OK	MURATA GRM21BR71H224K
		10	EC2528	4.7uF 16volts Y5V 20% Cer Cap (1206)	4	C21, C31, C42, C56	OK	Vishay: VJ1206V475MXJTW1BC
		11	EC1140	10uF ±20%, 16V X5R Cer Cap (1206)	11	C22-26, C32, C34, C47, C49, C61, C109	OK	TDK: C3216X5R1C106M
		12		Not Installed (1206)	0	C33, C48, C50, C62	OK	
		13	EL0885	FERRITE CHIP 300 OHM 500MA (0603)	5	FB1-5	OK	TDK, MMZ1608R301A
		14	EH0205	CONN HEADER 72POS .100" DL TIN, 2X36 Pin Header	1	H1	OK	Sullins PEC36DAAN
		15	EH0205	CONN HEADER 16POS .100" DBL, 2X8 Pin Header	1	H2	OK	Sullins PEC36DAAN
		16	EH0205	CONN HEADER 10POS .100" DBL, 2X5 Pin Header	1	H3	OK	Sullins PEC36DAAN
		17	EH0072	CONN HEADER .100" SNGL TIN, 3 Pin Header	34	JU_ADD0, JU_ADD1, JU_AUTO, JU_AVDD, JU_BWS, JU_BWS59, JU_CDS, JU_CNTL1, JU_CNTL2, JU_CONF0, JU_CONF1, JU_CXTP, JU_DRS59, JU_DVDD, JU_ES59, JU_HIM, JU_IOVDD, JU_LDO, JU_LVDSVDD, JU_MS, JU_PDWN, JU_PLI0-JU_PLI1, JU_RX59, JU_RX68, JU_RXSDA, JU_SEL, JU_T2EX, JU_TI, JU_TX59, JU_TX68, JU_TXSCL, JU_VIN, H_I/O	303>60	SULLINS PEC36SAAN
		18		Not Installed	0	JU_VL2-4	OK	SULLINS PEC36SAAN
		19	EH0077	CONN USB RTANG FEMALE TYPE B PCB	1	J10	OK	Assmann, AU-Y1007-R
		20	EH1157	FAKRA - HF Conn., Right Angle Plug For PCB	2	OUT+, OUT-	OK	Rosenberger, 59S2AX-400A5-Y
		21	EH0072	CONN HEADER .100" SNGL TIN, 2 Pin Header	5	JU_RXSDAPU, JU_TXSCLPU, JU_VDDIO, JU_P20, JU_P21	OK	SULLINS PEC36SAAN
		22	ED0565	LED RED 0805 SMD	3	LED_LFLT, LED_ERR, LED_PWR	OK	BR1112H-TR
		23	ED0838	LED GREEN 0805 SMD	1	LED_LOCK	OK	Stanley, PG1112H-TR
		24	ED0564	LED YELLOW 0805 SMD	4	LED_GPO, LED_RD, LED_T2, LED_WR	OK	Stanley, AY1112H-TR
		25	EQ0729	MOSFET 60V, 115mA N-Chan 2N7002	1	Q1	OK	Vishay 2N7002K
		26	ER0106033002	30Kohm Resistor 1% 0603	1	R_HIM	OK	
		27	ER01060327R0	27 ohm Resistor 1% 0603	2	R101-102	OK	
		28	ER0106031501	1.5Kohms Resistor 1% 0603	1	R103	OK	
		29	ER0106034700	470ohms Resistor 1% 0603	5	R47-50, R104	OK	
		30	ER0106032201	2.2Kohms Resistor 1% 0603	6	R11-13, R16, R28, R34	OK	
		31	ER0106034532	45.3Kohms Resistor 1% 0603	2	R1-2	OK	
		32	ER0106031101	1.1Kohms Resistor 1% 0603	1	R121	OK	
		33	ER0106031002	10Kohms Resistor 1% 0603	9	R5-10, R21, R112, R122	OK	
		34	ER0106031001	1K ohms Resistor 1% 0603	6	R14-15, R22, R123, R126-127	OK	
		35	ER0106034991	4.99Kohms Resistor 1% 0603	2	R3-4	OK	
		36	ER0106031801	1.8Kohms Resistor 1% 0603	2	R42, R44	OK	
		37	EH0102	SWITCH TACTILE SPST-NO 0.05A 24V	1	SW122	OK	Omron Electronics, B3F-1000
		38		Not Installed	0	T_P14, T_P20-27, T_VC2-4	OK	
		39	MAX9281GTM/V+	3.12Gbps GMSL Serializer with Coax or STP Output Drive and LVDS System Interface QFN\THIN\7X7X0.8MM\	1	U1	OK	MAX9281GTM/V+

		39	MAX9281GTM+	3.12Gbps GMSL Serializer with Coax or STP Output Drive and LVDS System Interface QFN\THIN\7X7X0.8MM\	1	U1	OK	MAX9281GTM+
		40	EQ0415	FT232BL USB UART (USB - Serial) I.C. TQFP_7X7X.8_32L	1	U10	OK	FTDI, FT232BL
		41	MAX1792EUA33+	500mA Low Dropout Linear Regulator MICROMAX\8L\EP	2	U3, U6	OK	MAX1792EUA33+
		42	90-89450+ENL	DS89C430/DS89C450 Ultra-High-Speed Flash Microcontrollers TQFP-44L	1	U12	OK	Maxim, DS89C450-ENL
		43	EQ0783	IC, Quad Buffer, Tri State	1	U13	OK	On Semi: MC74AC125DR2G
		44	MAX3378EEUD+	±15kV ESD-Protected, 1A, 16Mbps, Dual/Quad TSSOP-14L	2	U14, U19	OK	MAX3378EEUD+
		45	MAX1792EUA18+	500mA, Low-Dropout Linear Regulator in µMAX MICROMAX\8L\EP	2	U2, U5	OK	MAX1792EUA18+
		46	MAX9259GCB/V+	Gigabit Multimedia Serial Link with Spread Spectrum and Full-Duplex Control Channel TQFP-64L	1	U4	OK	MAX9259GCB/V+
		47	MAX9268GCM/V+	Single-Link Deserializer with LVDS Interface TQFP\7X7X1.4MM\48L and Integrated Control Channel Is Ideal for Digital Video Applications	1	U7	OK	MAX9268GCM/V+
		48	MAX4886ETO+	Quad, High-Speed HDMI/DVI 2:1 Digital Video Switch QFN3_5X9_42L	2	U8-9	OK	MAX4886ETO+
		49	EX0343	6MHz crystal	1	Y10	OK	Hong Kong X'tals SSL60000N1HK188F0-0
		50	EX0381	14.7456MHz crystal	1	Y12	OK	Hong Kong X'tals SSM14745N1HK188F0-0
		51					OK	
		52	EPCB9281	PCB: MAX9277 / MAX9281 Evaluation Kit	1		OK	
		53	EH0071	Shunts	28	See Jumper Table	OK	
		54	EH0272 OR EH0487	CABLE, USB-A MALE to USB-B MALE 6' BEIGE	1	Pack-out	OK	JAMECO 229730
		55		BAG, STATIC SHIELD ZIP ~6"x~8", W/ ESD LOGO	1	Pack-out	OK	
			85-MAXKIT-PNK	FOAM, ANTI-STATIC PE 12"x12"X5MM	2	Pack-out	OK	
		55	88-00712-MDM	Box, Medium BROWN 9 3/8" x 7 1/4" x 2 1/2"	1	Pack-out	OK	Any
		57	85-84003-006	Label	1	Pack-out	OK	
		58	XXXXXXXXX	WEB instructions for Maxim Data Sheet	1	Pack-out	OK	

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C103 0.1uF
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C108 1uF
C109 10uF
C110 0.033uF
FB4
R101 27
R102 27
R103 1.5k
Y10 6MHz
C106 22pF
C107 22pF
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DS89C450-ENL
U13
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U19
MAX3378E
C27 0.1uF
VIN
IOVDD
VS/DNI9
JU_VL2
JU_VL3
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T_VC3
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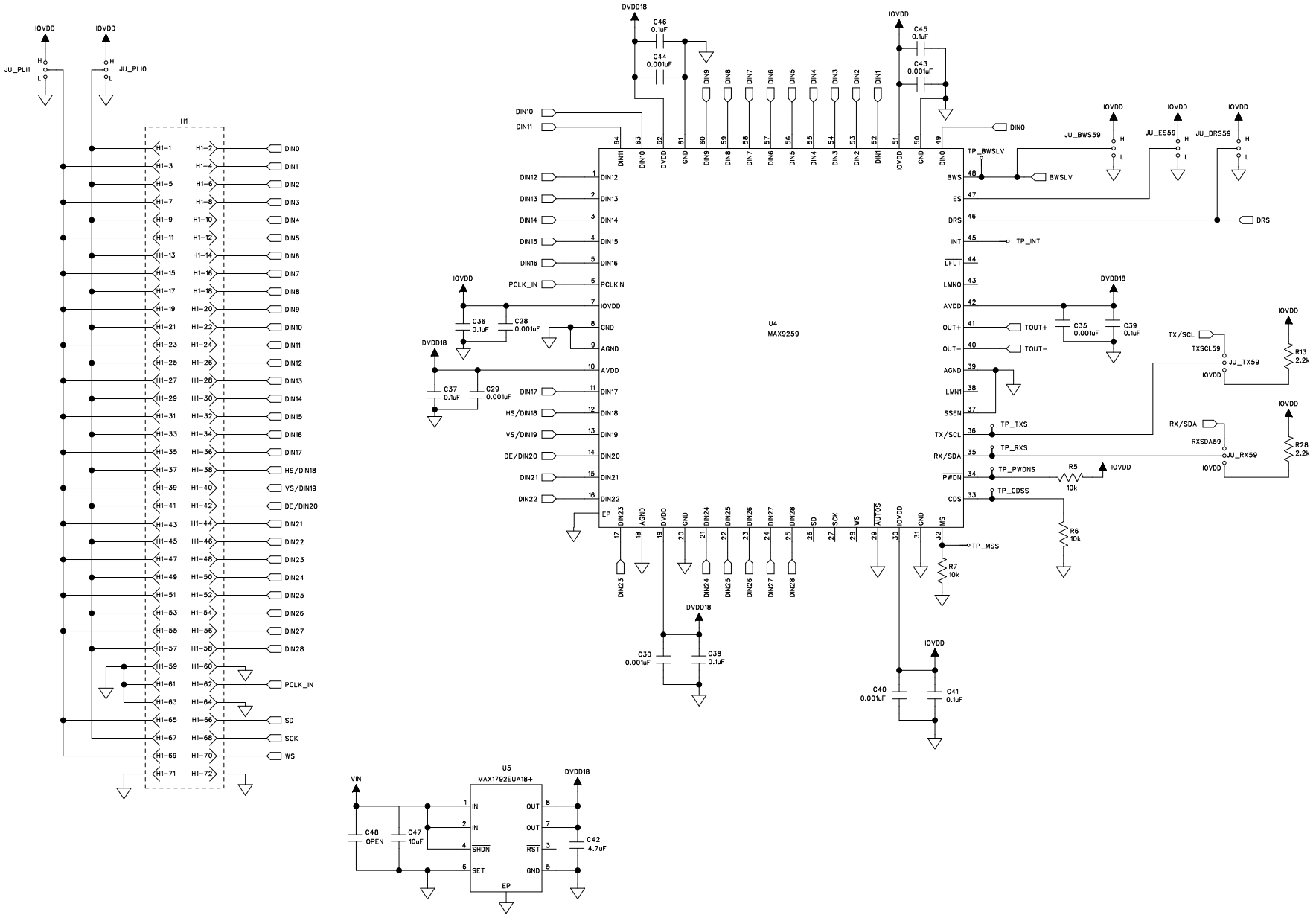
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SCK
WS
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MAX9259
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JU_ES59
JU_DRS59
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TP_INT
TP_TXS
TP_RXS
TP_PWDNS
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10k
R6
10k
R7
10k
C36
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C28
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C37
0.1uF
C29
0.001uF
C35
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C39
0.1uF
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JU_TX59
R13
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RX/SDA
RXSDA59
JU_RX59
R28
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C38
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C40
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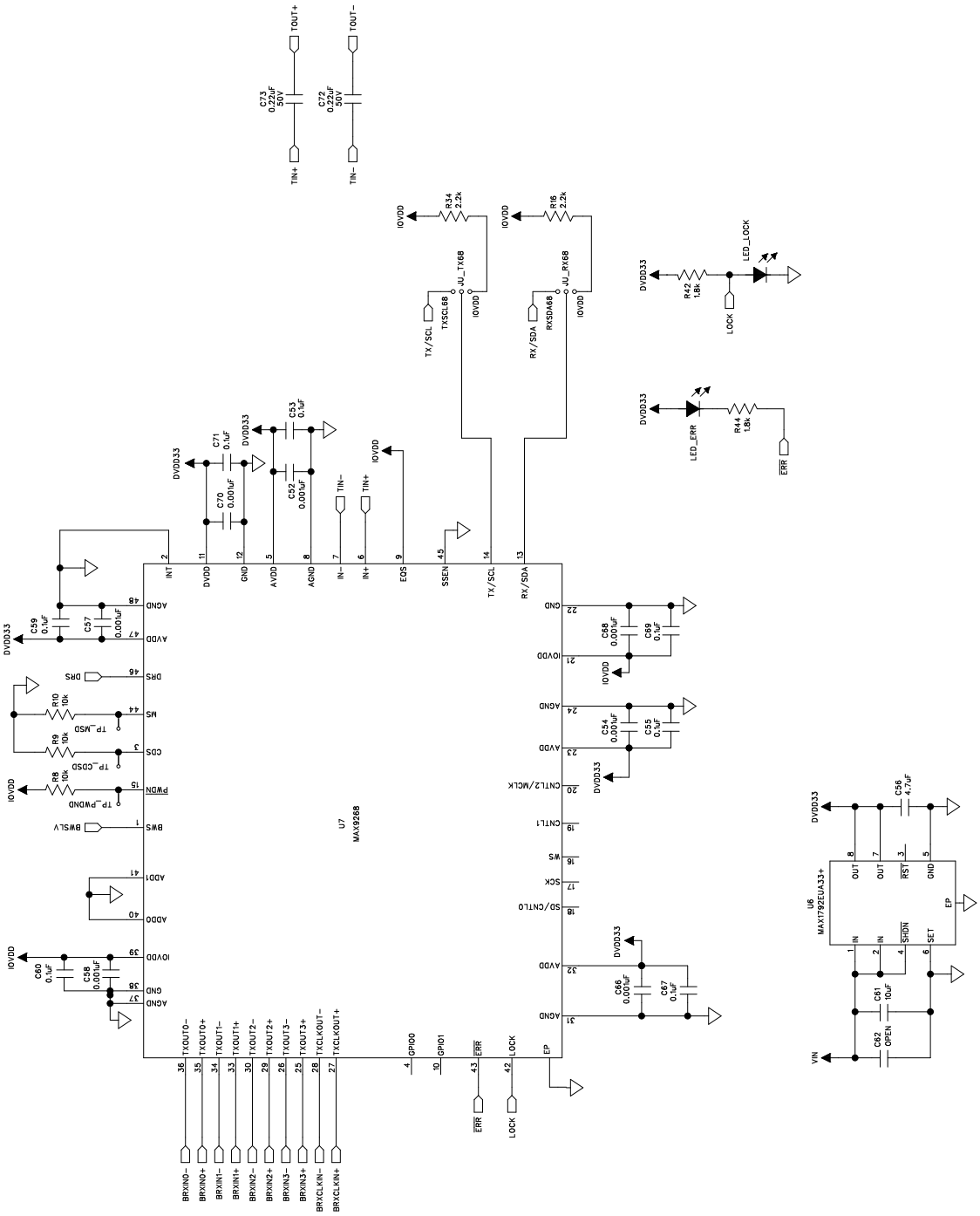
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R16 2.2k
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C68 0.001uF
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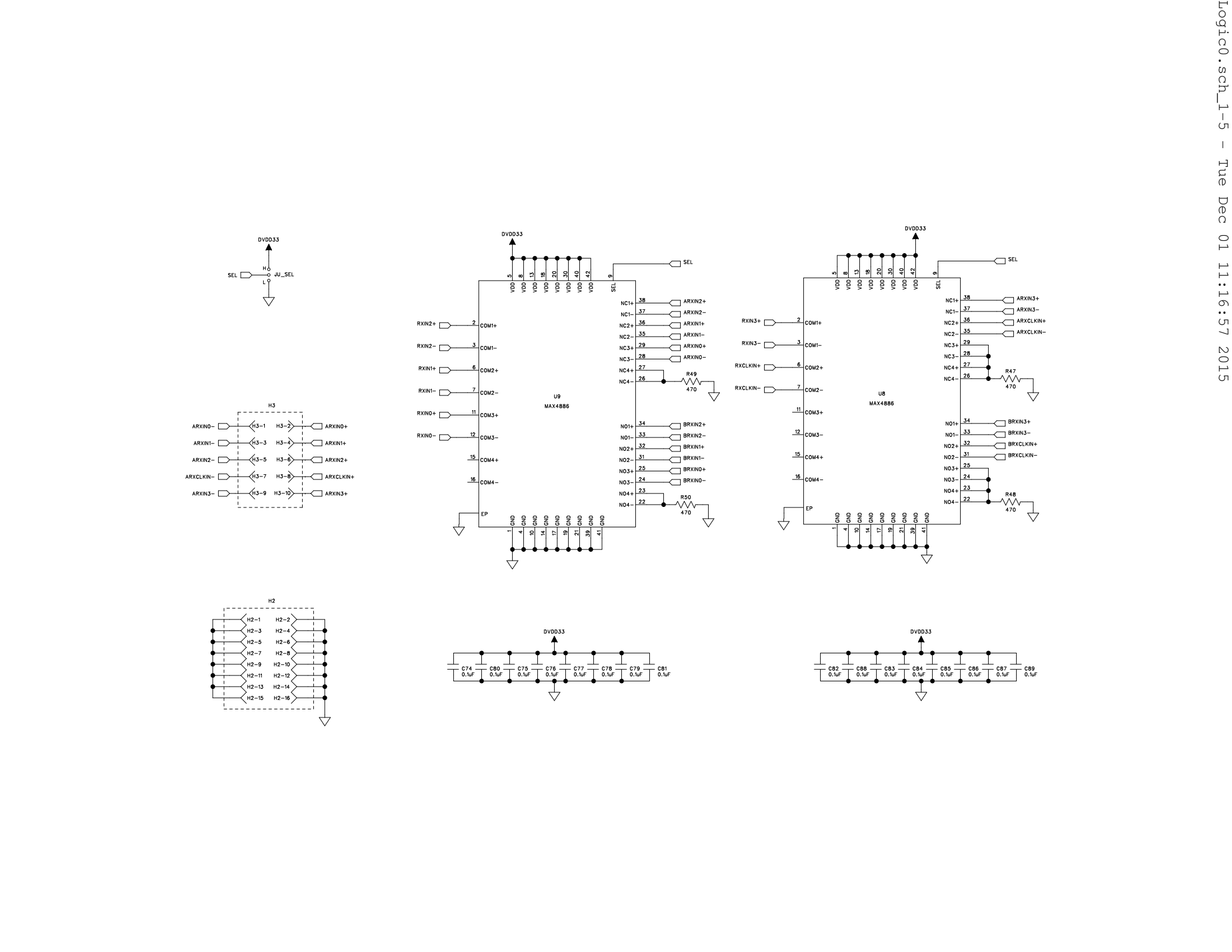
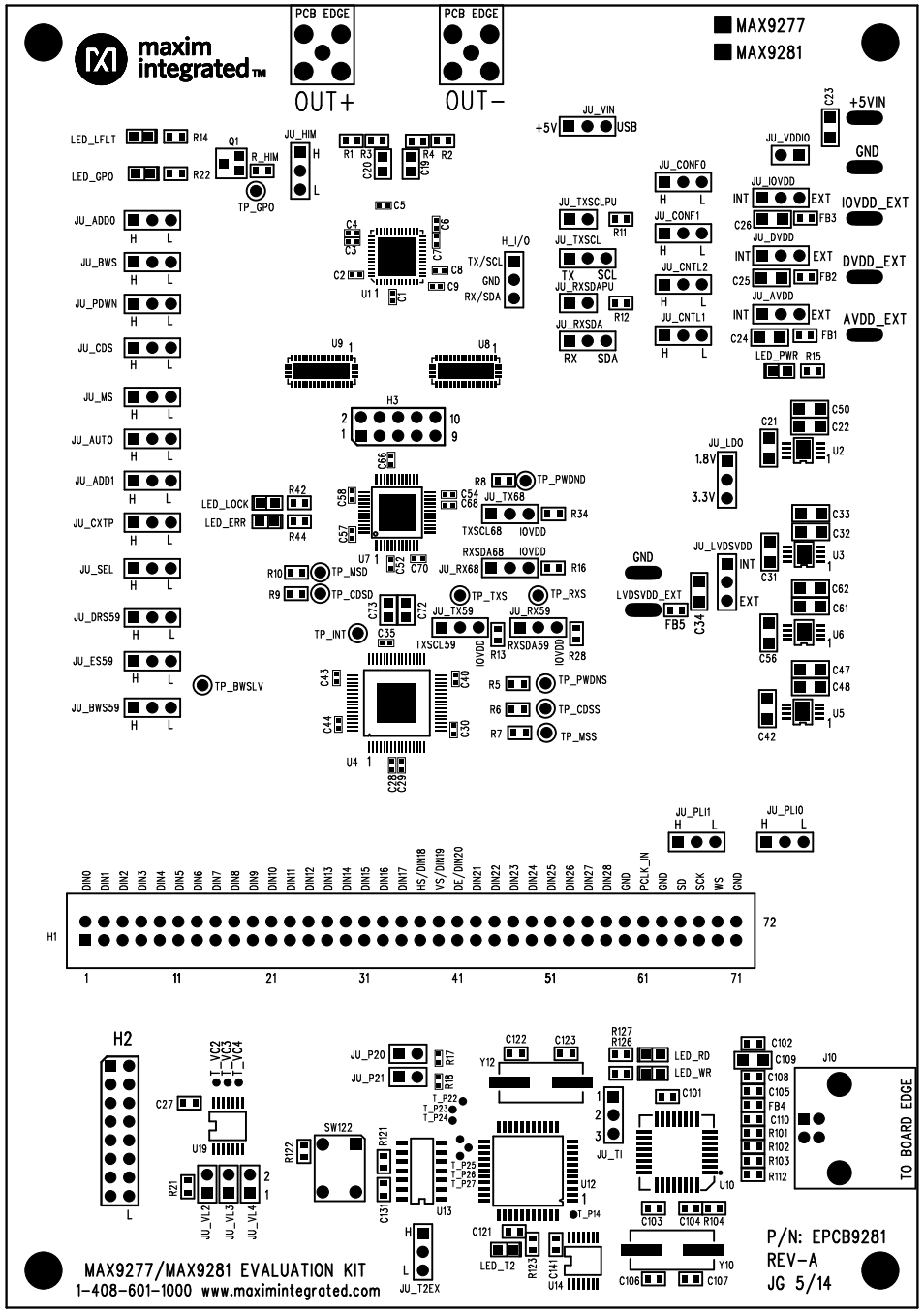
C67 0.1uF
C60 0.1uF
C58 0.001uF
R10 10k
R9 10k
R8 10k
TP_MSD
TP_CDSD
TP_PWDND
DRS
MS
CDS
PWDN
BWSLV
AD01
AD00
IOVDD
AGND
DVDD
GND
AVDD
IN-
IN+
EQS
SSEN
TX/SCL
RX/SDA
INT
CNTL2/MCLK
CNTL1
WS
SCK
SD/CNTL0
GPIO0
GPIO1
TXOUT0-
TXOUT0+
TXOUT1-
TXOUT1+
TXOUT2-
TXOUT2+
TXOUT3-
TXOUT3+
TXCLKOUT-
TXCLKOUT+
BRXIN0-
BRXIN0+
BRXIN1-
BRXIN1+
BRXIN2-
BRXIN2+
BRXIN3-
BRXIN3+
BRXCLKIN-
BRXCLKIN+
U6
MAX1792EUA33+
C56 4.7uF
C61 10uF
C62 OPEN
VIN
OUT
RST
SHDN
SET
EP



MAX9277_81_EVKIT_A		
P/N: EPCB9281		REV A
maxim integrated™		
LAYER	TOP SILKSCREEN	
DATE:		ALL UNITS ARE IN 0.001"



MAX9277_81_EVKIT_A	
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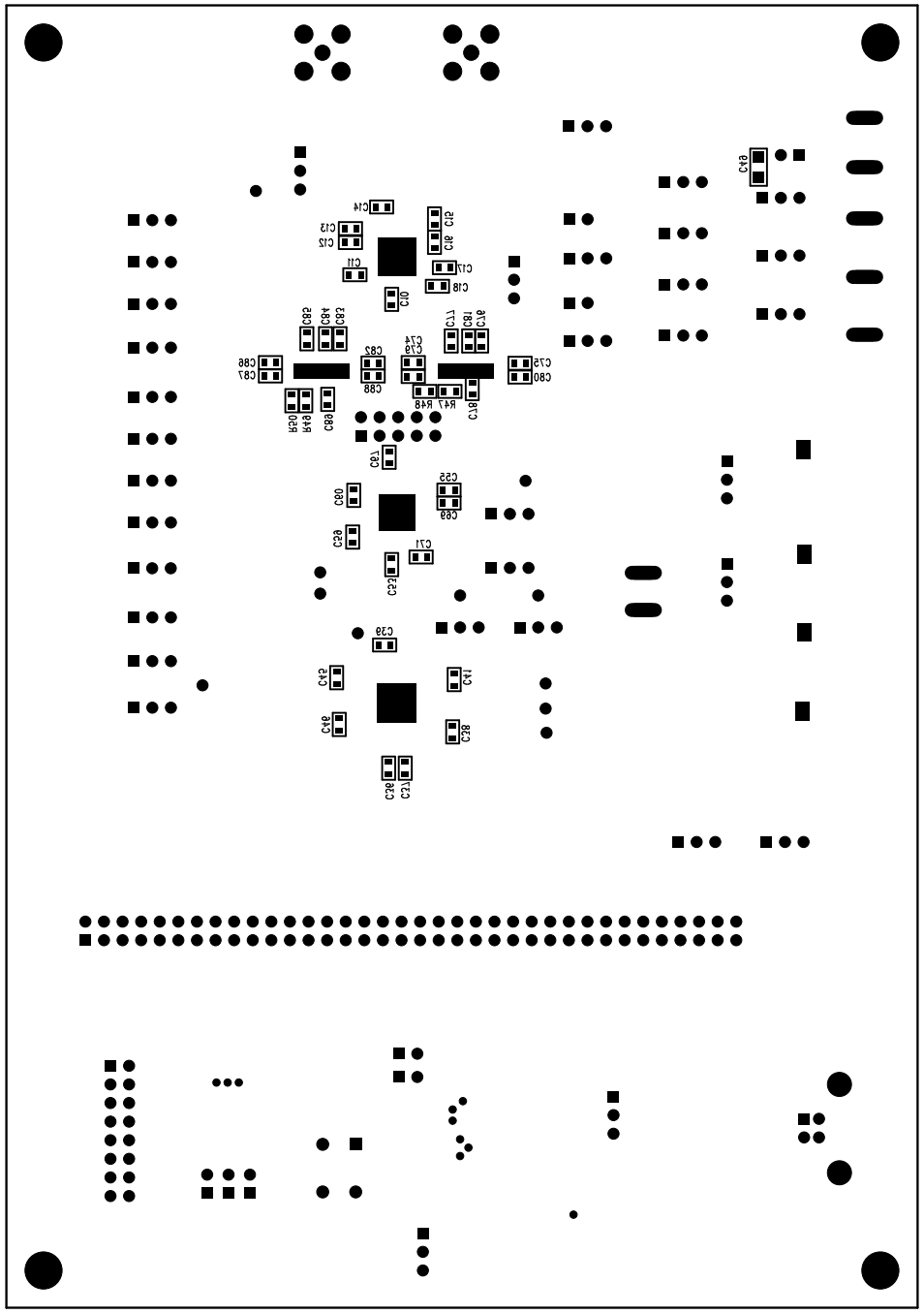
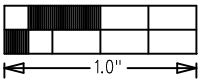
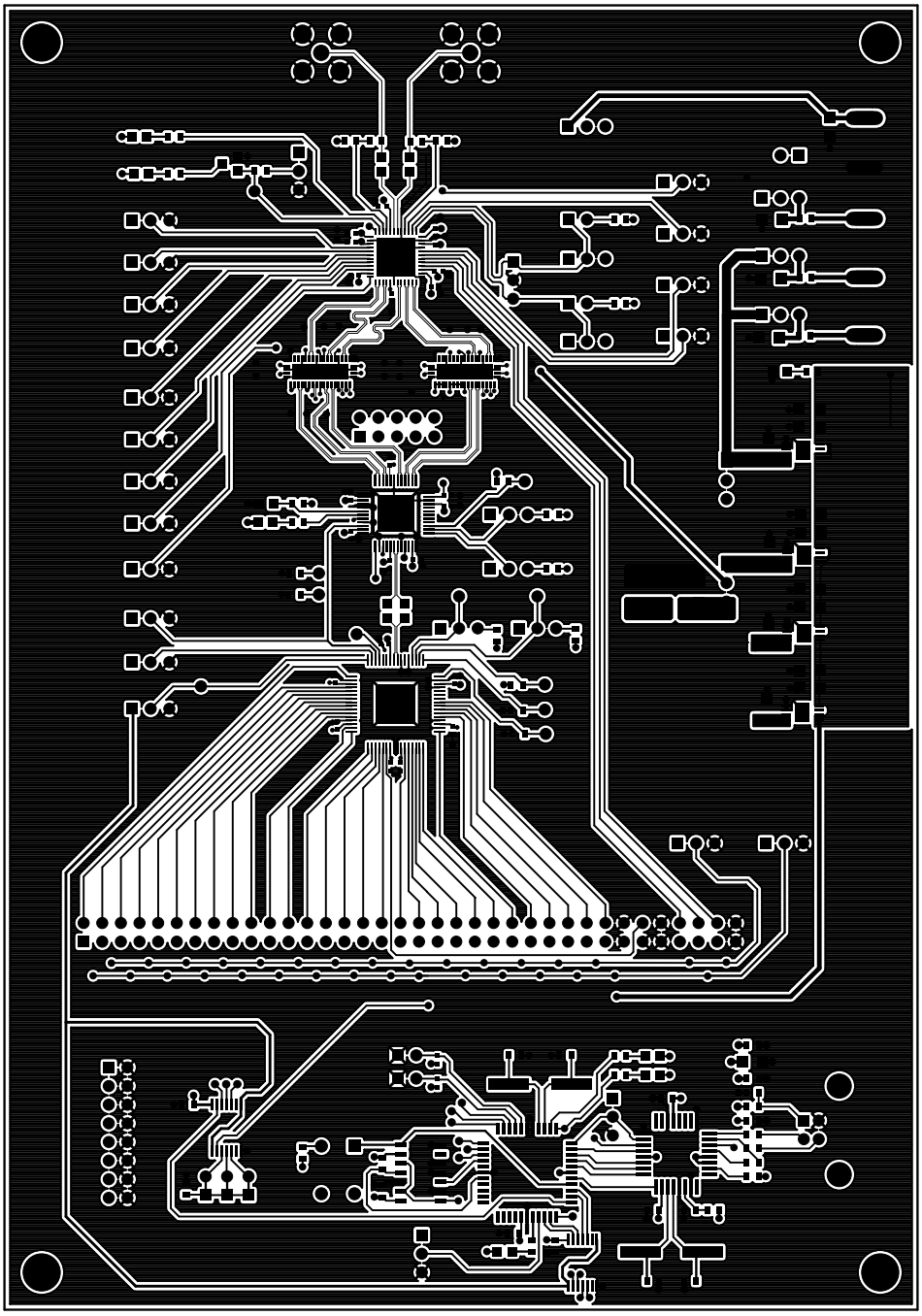
maxim integrated™	
LAYER: BOTTOM SILKSCREEN	
DATE:	ALL UNITS ARE IN 0.001"

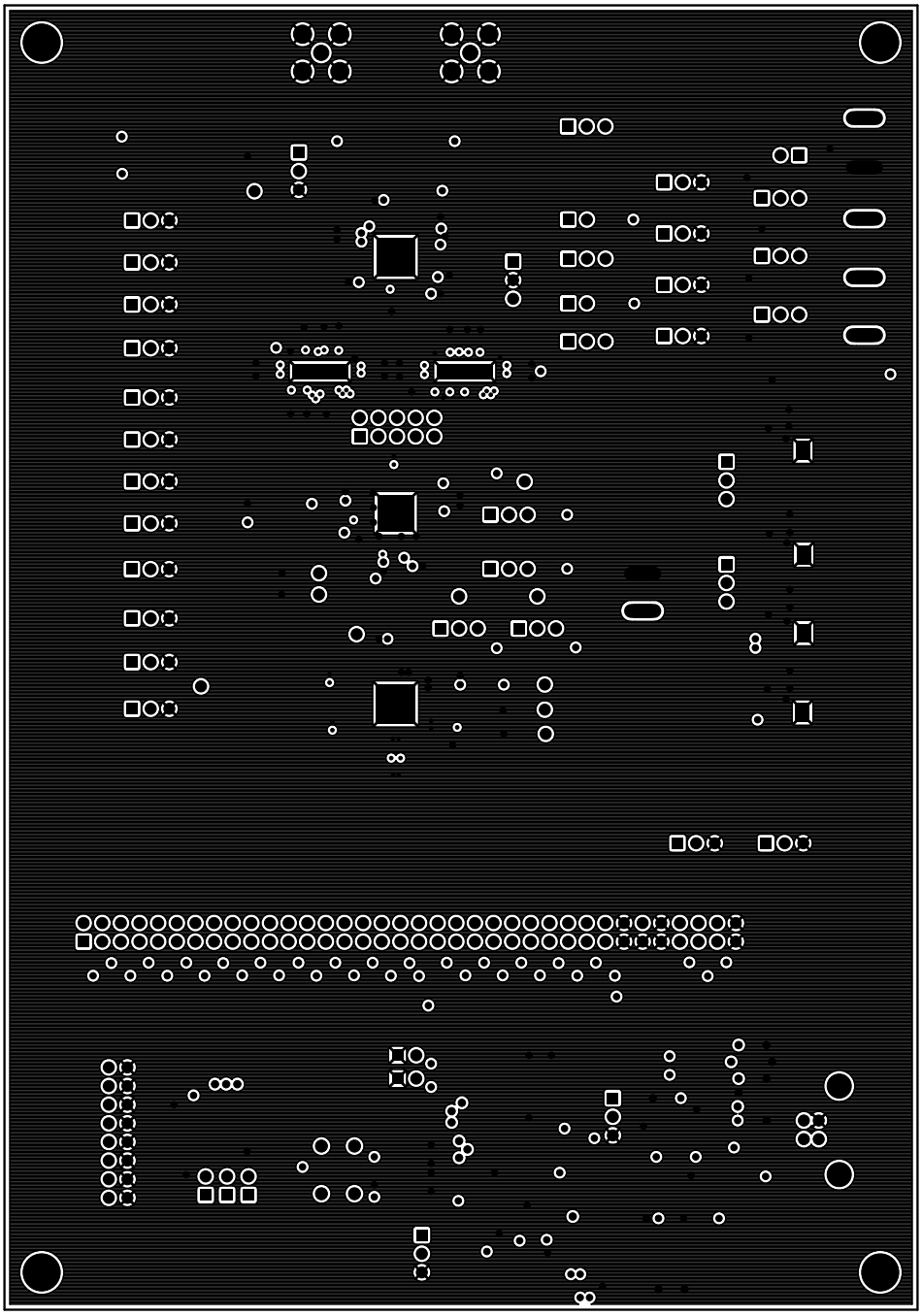




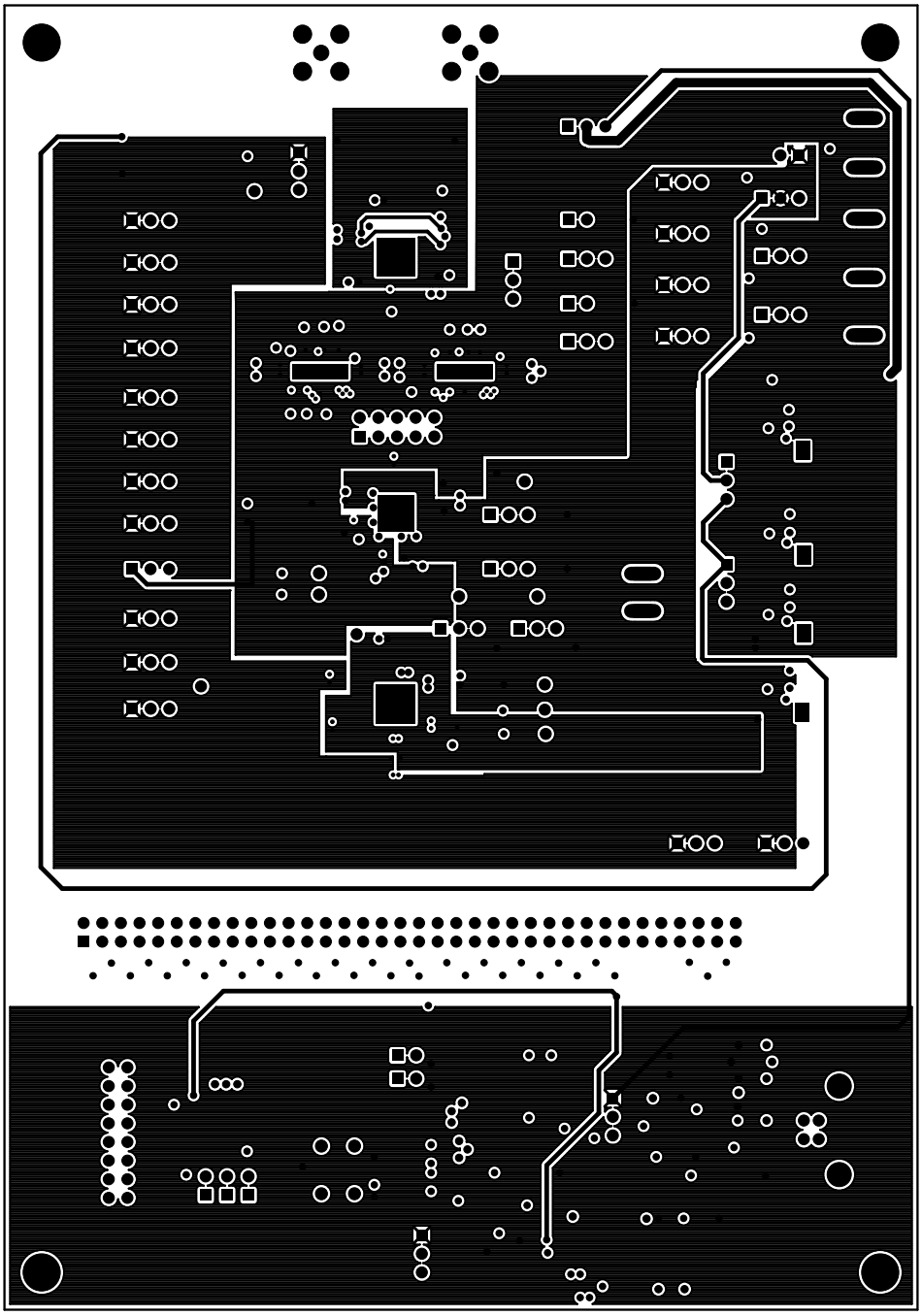
MAX9277_81_EVKIT_A	
P/N: EPCB9281	REV A
maxim integrated™	
LAYER COMPONENT SIDE	
DATE:	ALL UNITS ARE IN 0.001"



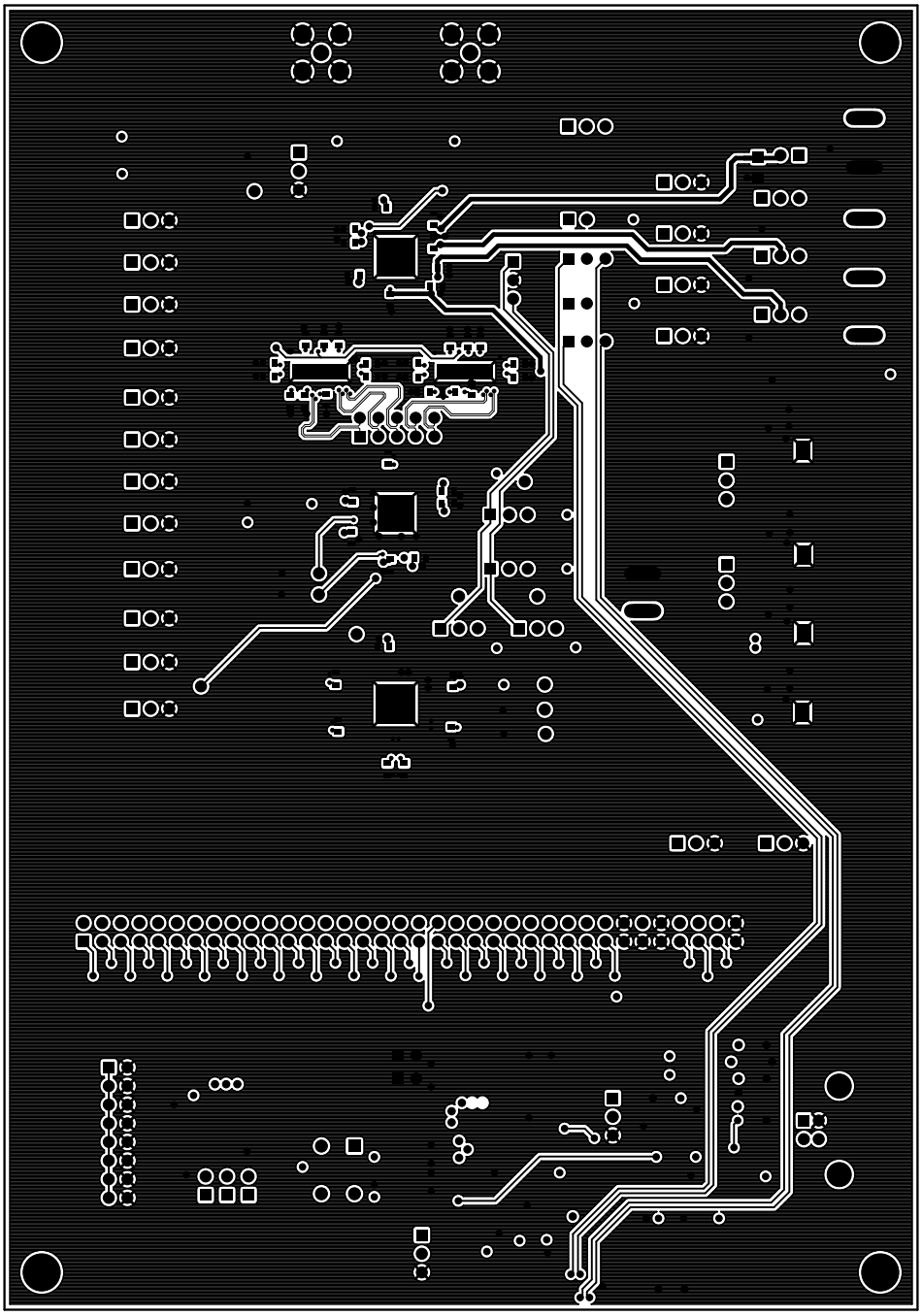
MAX9277_81_EVKIT_A	
P/N: EPCB9281	REV A
maxim integrated™	
LAYER: LAYER 2 GND	
DATE:	ALL UNITS ARE IN 0.001"

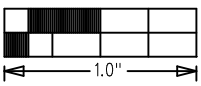


MAX9277_81_EVKIT_A	
P/N: EPCB9281	REV A
maxim integrated™	
LAYER: LAYER 3 PWR	
DATE:	ALL UNITS ARE IN 0.001"

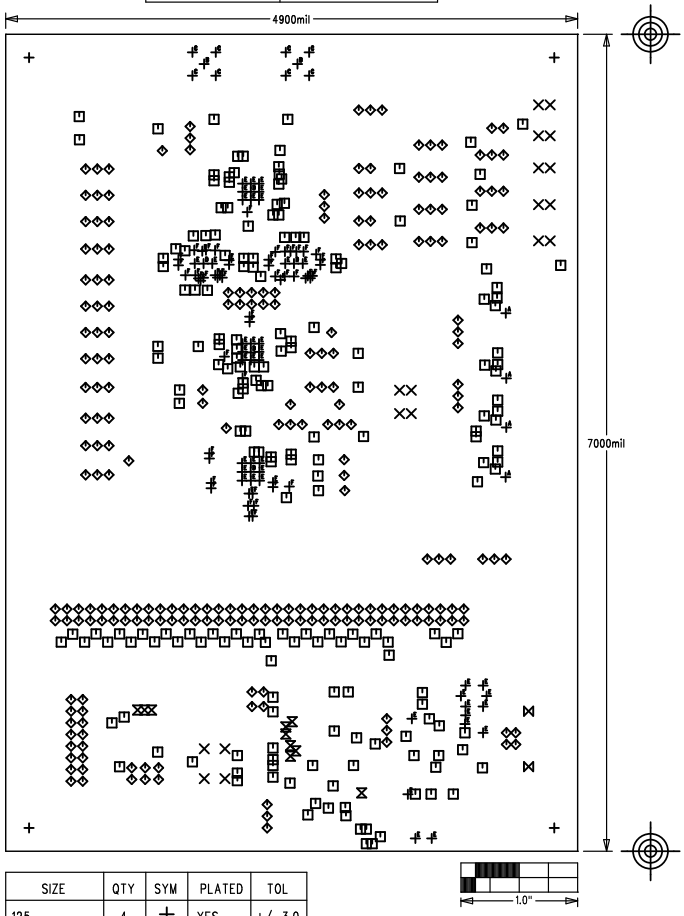


MAX9277_81_EVKIT_A	
P/N: EPCB9281	REV A
maxim integrated™	
LAYER SOLDER SIDE	
DATE:	ALL UNITS ARE IN 0.001"





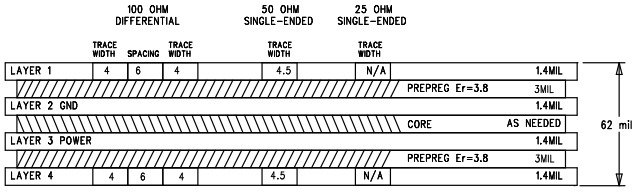
MAX9277_81_EVKIT_A	
P/N: EPCB9281	REV A
maxim integrated™	
LAYER: DRILL & MECHANICALS	
DATE:	ALL UNITS ARE IN 0.001"



SIZE	QTY	SYM	PLATED	TOL
125	4	+	YES	+/-3.0
40	18	X	YES	+/-3.0
15	197	□	YES	+/-3.0
37	231	◇	YES	+/-3.0
25	10	⧖	YES	+/-3.0
100	2	⋈	YES	+/-3.0
39	4	A	YES	+/-3.0
60	2	B	YES	+/-3.0
74.8	8	C	YES	+/-3.0
35	5	D	YES	+/-3.0
20	41	E	YES	+/-3.0
10	53	F	YES	+/-3.0

NOTES: UNLESS OTHERWISE SPECIFIED

1. FABRICATE USING PROVIDED GERBER FILES PER LATEST REVISION OF IPC-A-600 UNLESS OTHERWISE NOTED.
2. MATERIAL: RoHS COMPLIANT FR-408 WITH Tg>=170 AND COMPATIBLE WITH LEAD-FREE SOLDERING PROCESS.
3. BOARD DIMENSIONS: 4.90"X7.00" +/- 0.010". BOARD THICKNESS: 0.062"
4. LAYERS: 4. SEE LAYER STACKUP CHART.
5. MINIMUM TRACE/SPACING: 4MILS/5MILS.
6. COPPER CLAD FINISH: 1oz MINIMUM ALL LAYERS
7. SURFACE MOUNT PADS: 702.
8. SOLDERMASK: GREEN LPI SMOBC.
9. LEGENDS: WHITE. DOUBLE-SIDED. NON-CONDUCTIVE EPOXY INK OR EQUIVALENT. CLIPPED ALL LEGENDS FROM EXPOSED METAL.
10. PLATING: MUST BE LEAD FREE AND RoHS COMPLIANT.
11. FINISH: VENDOR SHOULD USE THE MOST ECONOMICAL LEAD FREE AND RoHS COMPLIANT PROCESS AVAILABLE OR AS SPECIFIED IN PURCHASE ORDER.
    APPROVED FINISH:
    HASL LEAD-FREE
    IMMERSION TIN
    IMMERSION GOLD
12. VENDOR LOGO & DATE CODE: ALLOWED IN INK ON BOTTOM SIDE ONLY.
13. THRU HOLES: 0.001" MIN.
14. TOLERANCES:
    PLATED-THRU HOLES: +/-0.003"
    PATTERN-TO-PATTERN: +/-0.005"
    LEGEND TO LEGEND: +/-0.007"
    SOLDERMASK TO PATTERN: +/-0.005".



ALL DIMENSION IN MIL (0.001 INCH) UNLESS OTHERWISE SPECIFIED.
N/A - NOT AVAILABLE. DO NOT ROUTE TRACES OF THIS TYPE ON THE INDICATE LAYERS.
IMPEDANCE TOLERANCE: +/- 10%