

MAX31953/MAX31963 Evaluation Kits

Evaluate: MAX31953/MAX31963

General Description

The MAX31953/MAX31963 evaluation kit (EV kit) provides the hardware and software (graphical user interface) necessary to evaluate these industrial octal digital input translators/serializers. The EV kit includes a MAX31953/MAX31963AUI+ installed and a USB-to-SPI interface.

The USB-to-SPI dongle is a separate PCB that can be used to interact with the EV kit software. This dongle is optional and is not necessary for the proper operation of the MAX31953/MAX31963 if the user supplies the SPI interface.

This EV kit is intended for functional and parametric evaluation of the IC only; it is not intended for EMC testing.

MAX31953/MAX31963 EV Kit Files

FILE	DESCRIPTION
MAX31953_63EVKitSoftwareInstall.exe	Application program

Note: The .EXE file is downloaded as a .ZIP file.

Features

- Easy Evaluation of the MAX31953/MAX31963
- Fully Assembled and Tested
- USB HID Interface
- Digital Isolator
- Windows XP® OS- and Windows® 7 OS-Compatible Software
- RoHS Compliant

EV Kit Contents

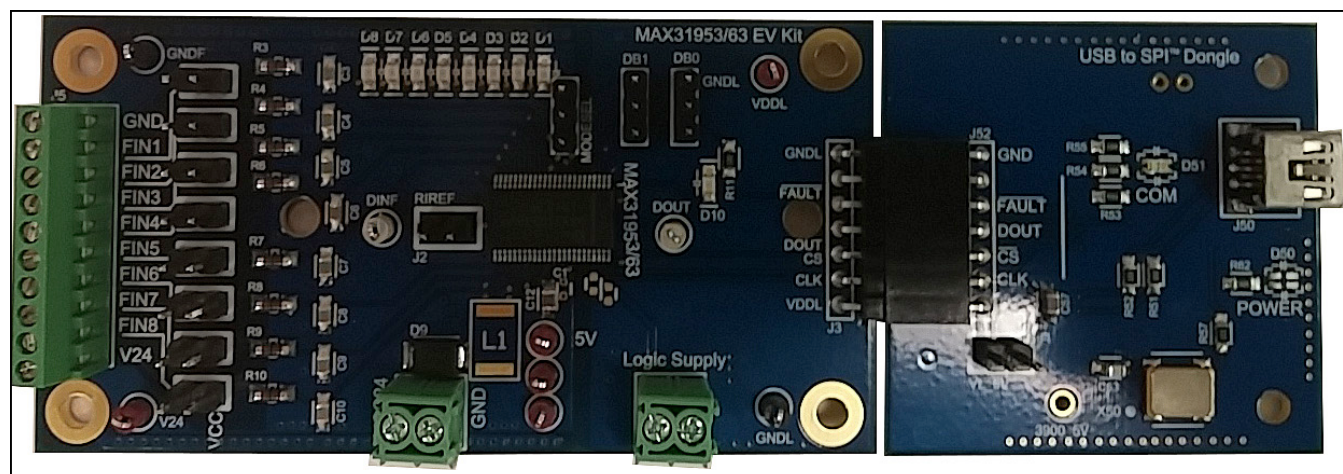
- Assembled circuit board including MAX31953/MAX31963AUI+
- USB-to-SPI dongle
- Mini-USB cable

Quick Start

Note: In the following sections, software-related items are identified by **bolding**. Text in **bold** refers to items directly from the install or EV kit software. Text in **bold and underlined** refers to items from the Windows operating system.

Ordering Information appears at end of data sheet.

MAX31953/MAX31963 EV Kit



Windows is a registered trademark and registered service mark of Microsoft Corporation.

Windows XP is a registered trademark and registered service mark of Microsoft Corporation.

Required Equipment

- PC with Windows XP or Windows 7 OS
- USB port
- Mini-USB cable (included)
- EV kit hardware (included)
- USB-to-SPI dongle (included)
- Screwdriver
- Wire
- Power supply

Procedure

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

- 1) Connect the USB-to-SPI dongle (J52) to the EV kit connector J3.
- 2) Install jumpers on RIREF (J2) and SIN-GND (J6).
- 3) Set the EV kit hardware on a non-conductive surface that will ensure that nothing on the PCB is shorted to the workspace.
- 4) Use the wires to connect J1 (VCC and GND) to a power supply and tighten the screws on the wire.
- 5) Prior to installing the GUI, connect the EV kit hardware to a PC using the supplied mini-USB cable, or equivalent. The POWER LED (D50) should be green and the COM LED (D51) should be red and slowly flash orange.
- 6) Windows should automatically begin installing the necessary device driver. The USB interface of the EV kit hardware is configured as a HID device and, therefore, does not require a unique/custom device driver. Once the driver installation is complete, a Windows message will appear near the system icon menu indicating that the hardware is ready to use. Do not attempt to run the GUI prior to this message. If you do, you will have to close the application and restart it once the driver installation is complete. On some versions of Windows, administrator privileges may be required to install the USB device.
- 7) Once the device driver installation is complete, save *MAX31953_63EVKitSoftwareInstall.zip* on the disk provided to a temporary folder.
- 8) Open the .ZIP file and double click the .EXE file to run the installer. A message box stating “**The publisher could not be verified. Are you sure you want to run this software?**” may appear. If so, click **Yes**.
- 9) The installer GUI will appear. Click **Next** and then

Install. Once complete, click **Close**.

- 10) When the GUI appears, the text above the status box should indicate that the EV kit hardware is connected. The COM LED (D51) will change to green.
- 11) Connect field inputs to J5 or install jumpers on FIN1-FIN8 and click **Single Read**.

Detailed Description of Software

Hardware Configuration

In this section, the user must provide hardware configuration information about the EV kit. Select the **8 Bits** radio button in the **Number of Bits** section if MODESEL does not have a jumper on J6. Select the **16 Bits** radio button if MODESEL is connected to GND on J6. If there are more devices daisy-chained to the EV kit, select the number of devices with the **Number of MAX31953/63** combo box.

Reads

To read the input channels of the devices, select **Single Read**. This will calculate the number of bits to read based on the **Hardware Configuration** settings and then display the read data in the table. **Continuous Reads** will read the input channels every 300ms and display the data in the table. Once the **Continuous Reads** starts, the button text will change to **Stop** for the user to stop the reads.

Data

The data table displays the 8 or 16 bits read from each device connected to the EV kit. The first row of data is the first 8 or 16 bits read from the device connected to the microcontroller. The second row is the data read from the device connected to the SIN/DINF of the first device. The **MAX31953/63** column displays the device name. The device name can be changed by clicking on the name twice. The **HEX** column displays the data in hexadecimal format for each device. The **Input Channels**, **CRC**, **UV Alarm**, and **OT Alarm** columns display the data in binary format.

Detailed Description of Hardware

User-Supplied SPI interface

The USB-to-SPI dongle is an optional PCB that is only needed to interact with the device software. The user has the option to supply an external SPI interface to communicate with the MAX31953/MAX31963. To connect a user-supplied SPI interface, remove the dongle from J3 and connect an external SPI interface to the pins on J3. Removing the dongle will also remove the isolator, so the user may also want to provide an external digital isolator.

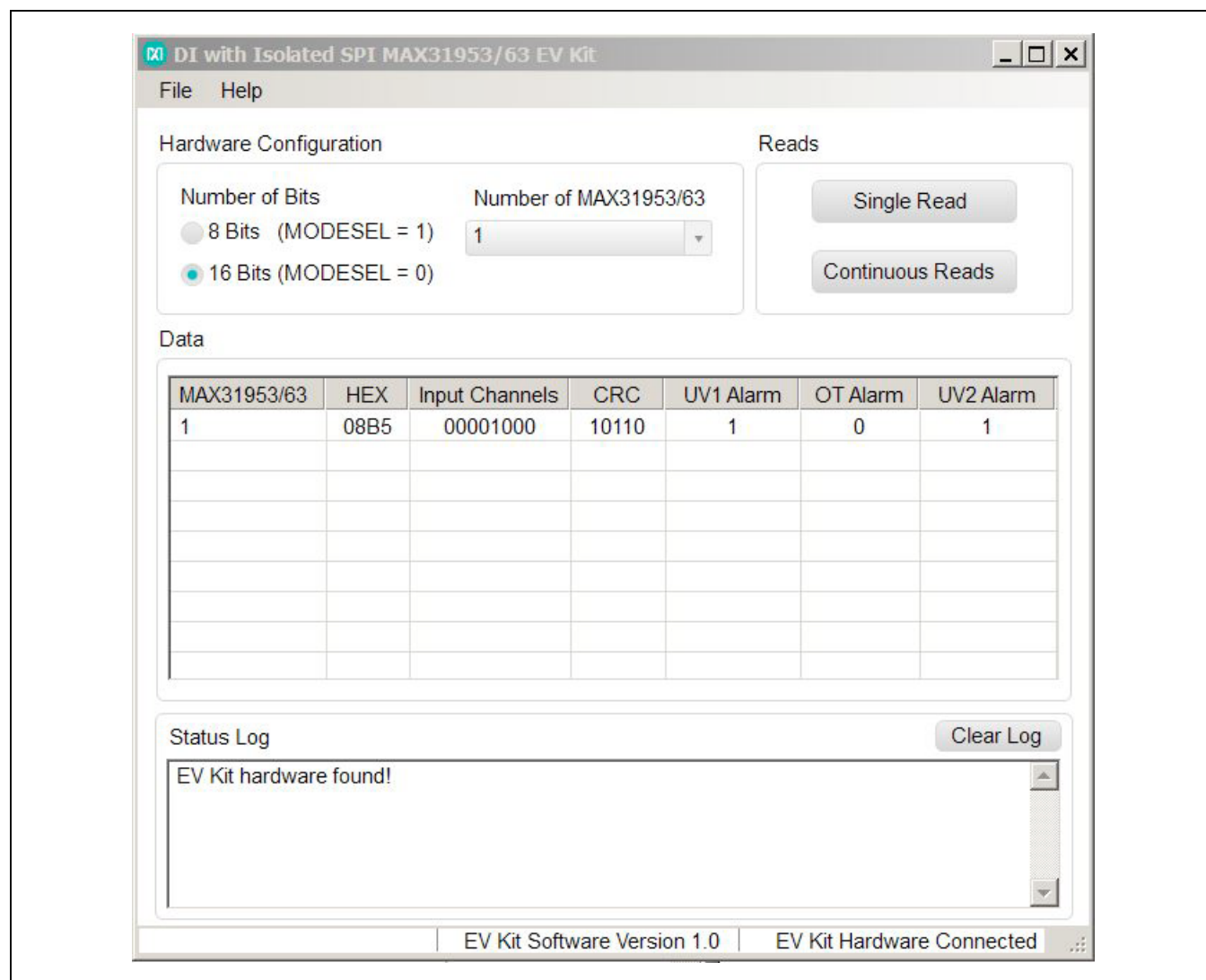


Figure 1. MAX31953/MAX31963 EV Kit Graphic User Interface (GUI)

Table 1. Hardware Configurations

HARDWARE ACTION	COMPONENTS	DESCRIPTION
Connect Field Inputs	J5	Remove pullup jumpers FIN1-FIN8 and connect field inputs to J5.
Adjust Current Limit	J2 (R1REF)	Remove jumper on J2 and connect external resistor to the R1REF pin on J2. Connect other end of resistor to GND.
Daisy Chain MAX31953/ MAX31963	D1NF (Resistor R12)	Remove D1NF resistor on R12 and connect external MAX31953/MAX31963 DOUT (or MAX3191x DOUT) to D1NF.
Connect User-Supplied SPI Interface	J3	Remove USB-to-SPI dongle from J3 and connect user SPI interface to J3 pins. Note: This will also remove the digital isolator. See User-Supplied SPI Interface for more details.

Table 2. Description of Jumpers

JUMPER	DESCRIPTION
J2	R1REF: Connects R1 to R1REF pin
DB0	Pulls DB0 down to GND
DB1	Pulls DB1 down to GND
MODESEL	Pulls MODESEL down to GND or pulls to VDD24V.
FIN1 – FIN8	Field Inputs: Connects field input FINX to VIN

Note 1: These inputs have internal pullups.

Table 3. Description of LEDs

LED	COLOR	DESCRIPTION
D1-D8	Red	Field Input LED Driver: Field input is logic high.
D10	Red	Fault: MAX31953/MAX31963 has detected a fault. The field supply is too low or the IC temperature is too high.
D50 (POWER)	Red	USB Power Fault: A fault occurred due to overvoltage limit, current limit, or thermal limit.
	Green	USB Power: USB power supply is on
D51 (COM)	Red	Communication: After the software has initialized the hardware, the LED will flash red when a command from the PC is received.
	Green	Initialized: Hardware has been initialized by software.

Troubleshooting

Significant effort was spent ensuring that each EV kit works right out of the box. On the rare occasion that a problem is encountered, refer to [Table 4](#) for troubleshooting guidance.

Table 4: Troubleshooting

SYMPTOM	CHECK	SOLUTION
GUI Indicates Hardware Not Found.	Is the LED labeled D50 red?	If yes, then the electronic fuse (U50) is in a fault state. Inspect for electrical shorts on the PCB and make sure that the PCB is not sitting on a conductive surface.
	Does the LED labeled D51 turn green when the GUI is running?	If not, exit the GUI and try running it again. If D51 still does not turn green, exit the GUI and try connecting the USB cable to a different USB port on the PC and wait for a Windows message that states the hardware is ready to use. Run the GUI again.
	Are any of the LEDs illuminated?	If not, the PCB may not be getting power from the USB. Try a different USB cable/different USB port.
CRC returns all 0's or all 1's	Check MODESEL	Place a jumper on MODESEL for the MAX31953/MAX31963 to be in proper (8-bit to VDD or 16-bit to GND) mode.

Ordering Information

PART	TYPE
MAX31953EVKIT#	EV Kit
MAX31963EVKIT#	EV Kit

#Denotes RoHS compliant.

Component List and Schematics

See the links below for component information and schematics:

- [MAX31953/MAX31963 EV BOM](#)
- [MAX31953/MAX31963 EV Schematic](#)

MAX31953/MAX31963
Evaluation Kits

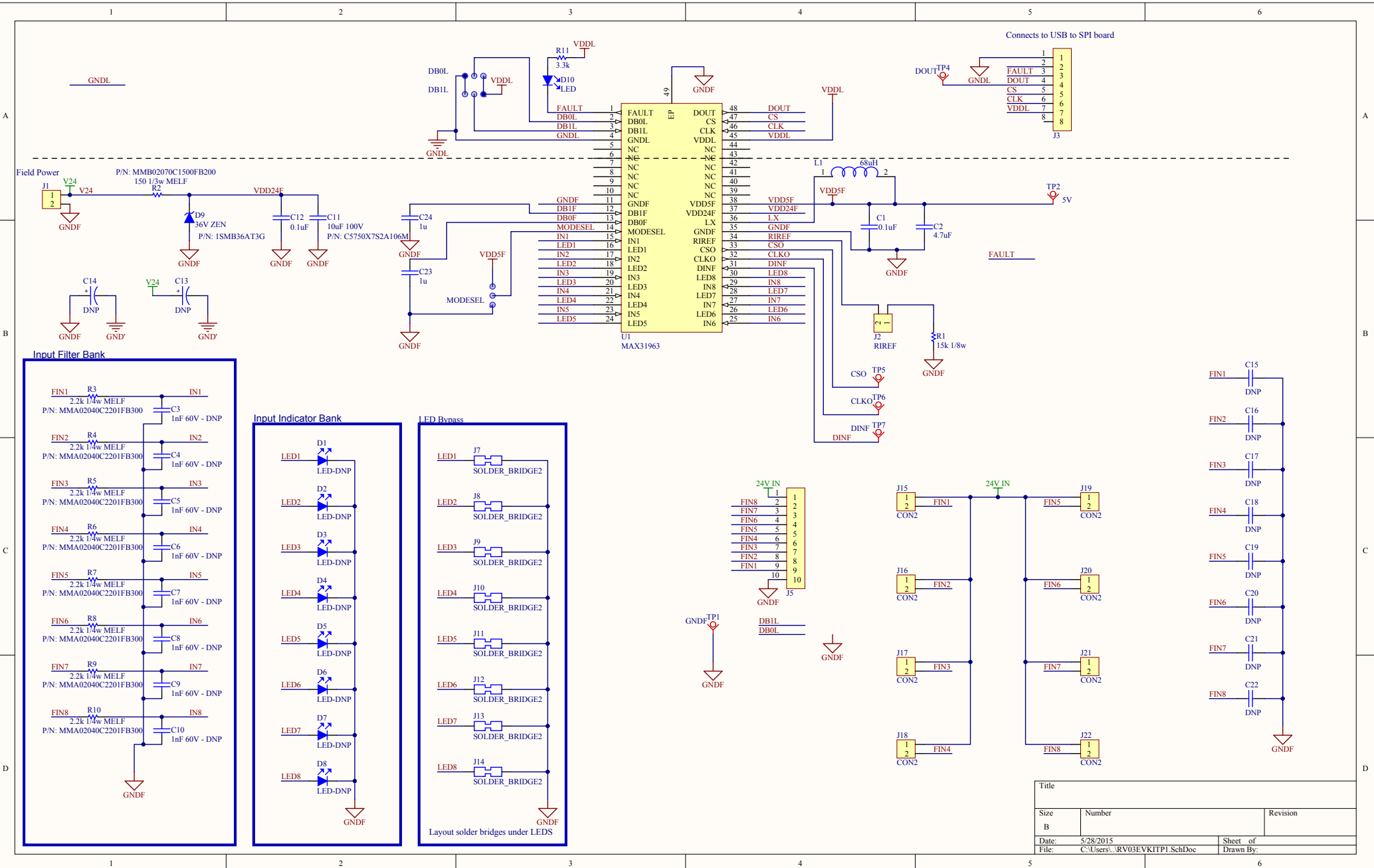
Evaluate: MAX31953/MAX31963

Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	6/15	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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BILL OF MATERIALS (BOM) Revision 6/15

Comment	DNP	Designator	Quantity	Manufacturer no	Manufacturer
0.1uF		C1, C25, C26	3	C1608X7R1H104K080AA	TDK
4.7uF		C2	1	GRM188R61E475KE11D	Murata
1nF 100V		C3, C4, C5, C6, C7, C8,	8	AVX08051C102KAT2A	AVX
10uF 100V		C11	1	C5750X7S2A106M	TDK
0.1uF		C12	1	CGA4J2X7R2A104K	TDK
4700pF - 2kV		C13, C14	2	1812GC472KAT1A	AVX
0.1uF - 1kV - DNP	DNP	C15, C16, C17, C18, C19, C20, C21, C22	8	C0805C102KDRACTU	Kemet
0.1uF - DNP	DNP	C23, C24	2	C1608X7R1H104K080AA	TDK
10uF		C27	1	C5750X7S2A106M	TDK
LED-Red		D6, D7, D8	8	HSMS-C170	Avago Technologies
LED		D10	1	HSMS-C170	Avago Technologies
36V ZEN		D9	1	1SMB36AT3G	ON Semi
Phoenix Contact 1984617		J1, J25	2	1984617	Phoenix Contact
R1REF		J2	1	961102-6404-AR	3M
CON2		J20, J21, J22	8	961102-6404-AR	3M
VL_5V		J4	1	961102-6404-AR	3M
DNP		J51	1	961102-6404-AR	3M
S1311E-07-ND		J3	1	22-28-8070	Molex
CON10		J5	1	1-282834-0	TE Connectivity
DB0L		J6	1	517-9611036404AR	3M
DB1L		J23	1	517-9611036404AR	3M
MODESEL		J24	1	517-9611036404AR	3M
SOLDER_BRIDGE2	DNP	J7, J8, J9, J10, J11, J12,	8		
68uH	DNP	L1	1	580-27683C	Murata
15k 1/8w		R1	1	CRCW080515K0FKEA	Vishay/Dale
150 1/3w MELF		R2	1	MMB02070C1500FB200	Vishay/Dale
2.2k 1/4w MELF		R9, R10	8	MMA02040C2201FB300	Vishay/Dale
3.3k		R11	1	CRCW08053K30FKEA	Vishay/Dale
0	DNP	R12, R13, R14, R15, R16, R17, R18, R19	8	CRCW08050000Z0EA	Vishay/Dale
GNDf, GNDL		TP1, TP9	2	534-5001	Keystone
5V, 3900_5V, VDDL, V24		TP2, TP3, TP8, TP10	4	534-5000	Keystone
DOUT, CSO, CLK0, DINF		TP4, 5, 6, 7	4	534-5002	Keystone
MAX31963		U1	1		

INTERFACE BOARD

B		R50, R62	2	CRCW0805560RFKEA	Vishay/Dale
0		R51, R52, R57	3	CRCW08050000Z0EA	Vishay/Dale
4.7k		R53	1	CRCW08054K70FKEA	Vishay/Dale
330		R54, R55	2	CRCW0805330RFKEA	Vishay/Dale
2.2k		R56	1	CRCW08052K20FKEA	Vishay/Dale
100K		R63	1	CRCW0805100KFKEA	Vishay/Dale
MAX4995A		U50	1	MAX4995AAUT+	Maxim
PICfor DS3900		U51	1	PIC18LF2550-I/SO	Microchip
OSC_CMOS_5V - TXCABfM5		X50	1	7W-48.000MAB-T	TXC Corporation
10uF		C50, C51	2	EMK212ABJ106KD-T	Taiyo Yuden
22pF		C53	1	C0805C220KBRACTU	Kemet
220nF		C54	1	C2012X7R1H224K	TDK
1uF		C55	1	C2012X7R1H105K/SOFT	TDK
0.1uF		C56, C57	2	CGA4J2X7R2A104K	TDK
LED_DUAL		D50, D51	2	APHBM2012SURKCGKC	Kingbright
SCHOTTKEY		D52	1	RB060M-30TR	ROHM Semiconductor
S5482-ND		J52	1	PPPC071LGBN-RC	Sullins Connectors
USB_5PIN		J50	1	54819-0519	Molex