

# Installation and Operation of Intersil's ISL98001 Analog Front End Evaluation System



## Note

*To simplify installation and prevent unnecessary Windows messages during installation, do not connect the USB cable to the ISL98001 Evaluation Board until the software installation is complete.*

## PC Requirements

Operating System: Tested under Windows XP (service pack 2) and Windows 2000. Windows 98 and ME not currently supported.

Hardware Requirements: USB Port, CD-ROM drive for install files, minimum 10MB free hard disk space.

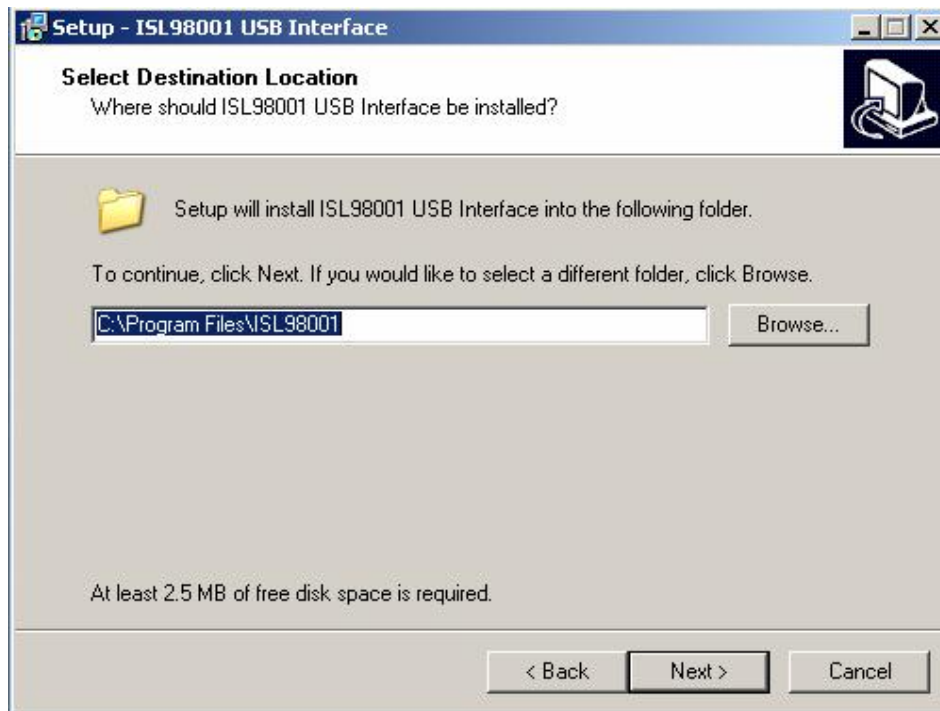
## Software Installation

Launch the "ISL98001 Installer.exe" file on the CD ROM and follow the instructions. The default installation will add an "Intersil" directory to the "Start Menu/Programs" tree. That directory will contain a shortcut to the ISL98001 executable and an uninstaller. The main program files will be installed in the Program Files/ISL98001 directory. The USB driver file windrvr6.sys will be placed into C:\WINDOWS\system32\drivers and ISL98001.inf will be installed under C:\WINDOWS\INF.

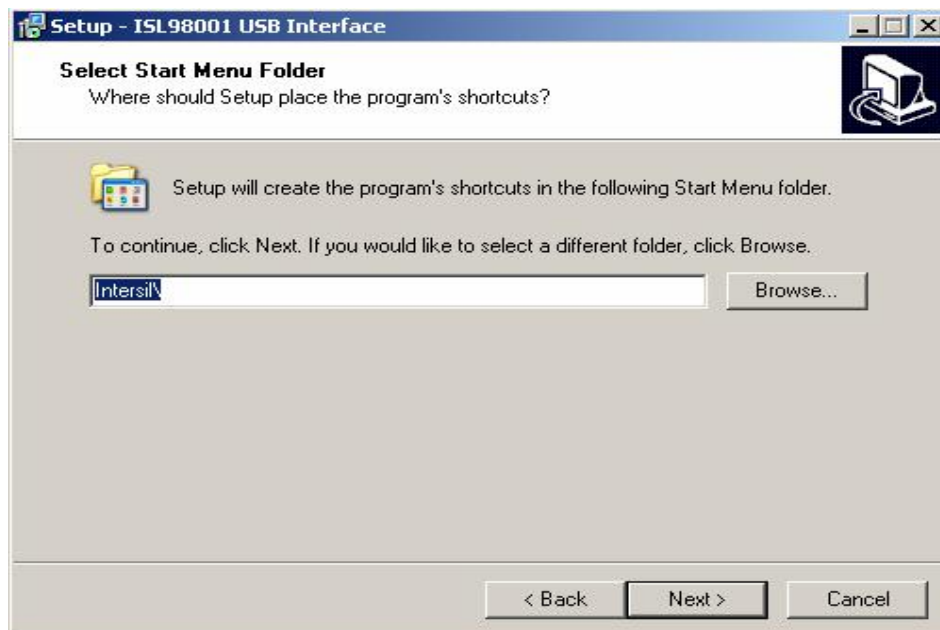


Press "Next" to continue.

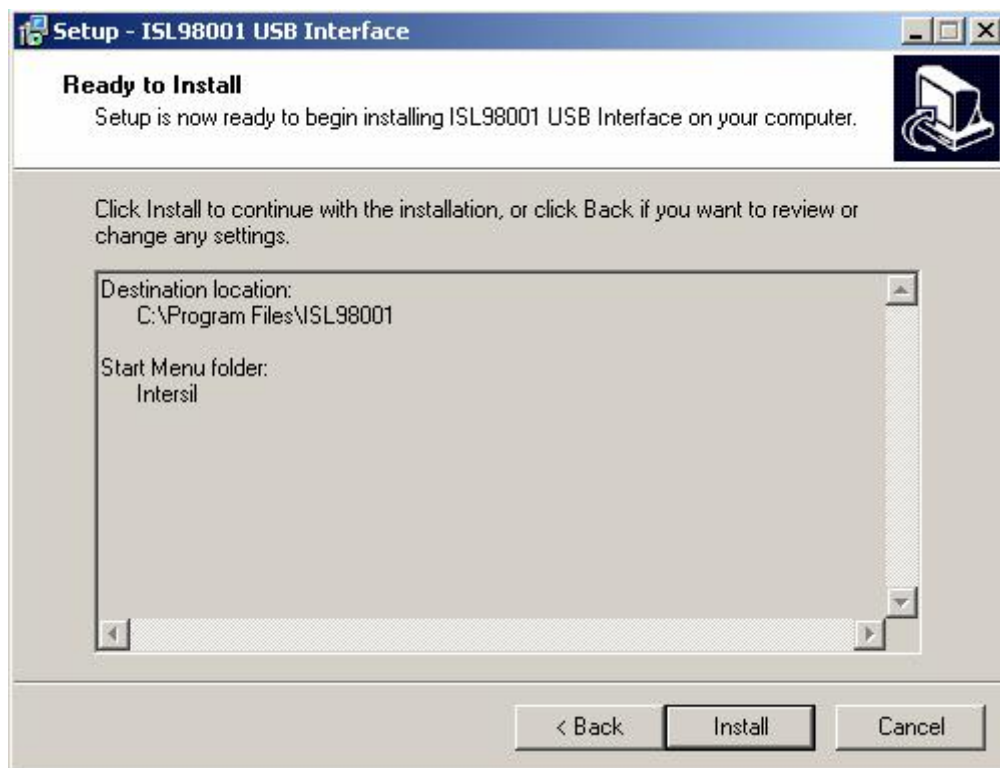
By default, the installer will put the evaluation software under c:\Program Files\ISL98001 directory. To use a different directory, select the “Browse” button.



Press “Next” to continue.



Press “Next” to create the Intersil folder in the Start Menu.



Press the “Install” button to copy all the necessary files onto the PC.

## Connecting the Evaluation Board

After installation of the ISL98001 software, re-boot the PC if requested. Apply power to the ISL98001 Evaluation Board with the provided 5V power supply. Connect the USB cable to the ISL98001 Evaluation Board. The Microsoft windows operating system will see the ISL98001 Evaluation Board as a new device, and will try to load appropriate driver for it.

Windows XP may pop up this message:



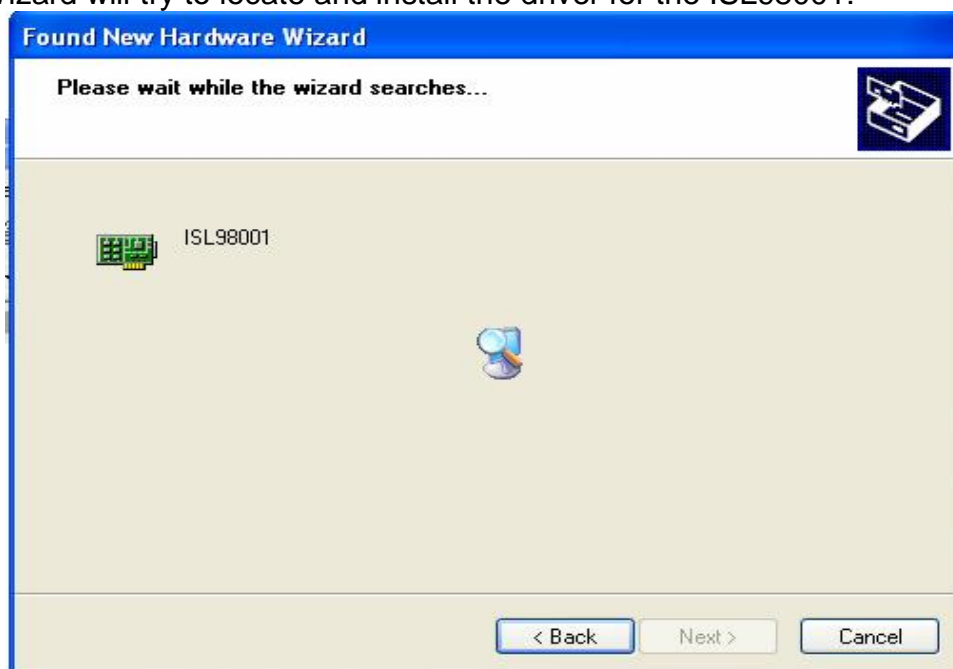
If you see this box, select “Yes, now and every time I connect a device” and click on “Next”. If you elect not to select “Yes, now and every time I connect a device”, you may see this requester whenever the device is reconnected after being disconnected.

The following screen will then appear:



Press Next (“Install the software automatically”).

The Hardware Wizard will try to locate and install the driver for the ISL98001:





Click Finish to complete the installation.

On XP systems, a pop-up message may display the status of the ISL98001 hardware.



## Hardware Setup

By default, the ISL98001 Evaluation board is configured for an input video resolution of 1280x1024@60Hz on the VGA1 connector. The quickest way to verify operation is this:

- Connect a monitor with a DVI input to the DVI output connector
- Connect a 1280x1024@60Hz RGB video source to VGA1
- Connect the 5V power supply to the power connector

At this point, the evaluation board's FPGA will format the data from the ISL98001 and generate SXGA video timing on the DVI output connector. The incoming SXGA image should appear on the DVI monitor.

Additional video modes and AFE configuration options are available using the ISL98001 evaluation software through the USB interface.

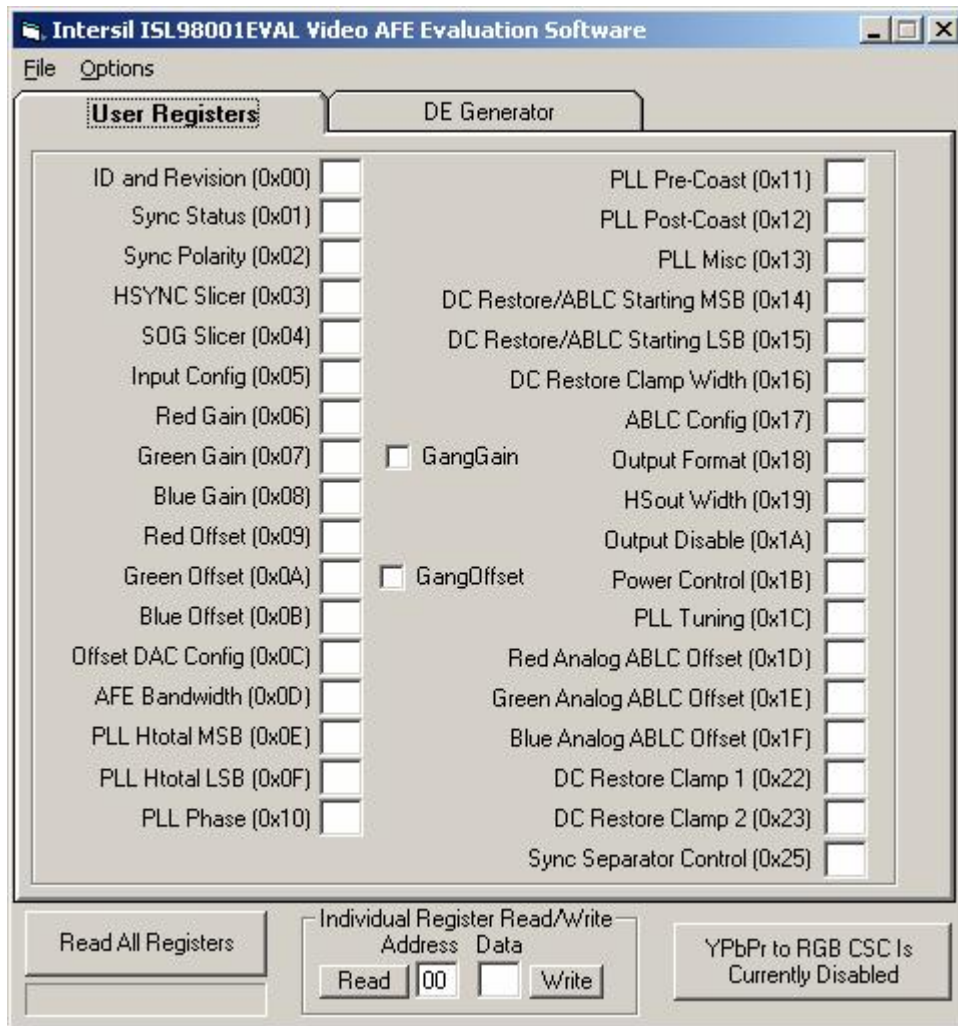




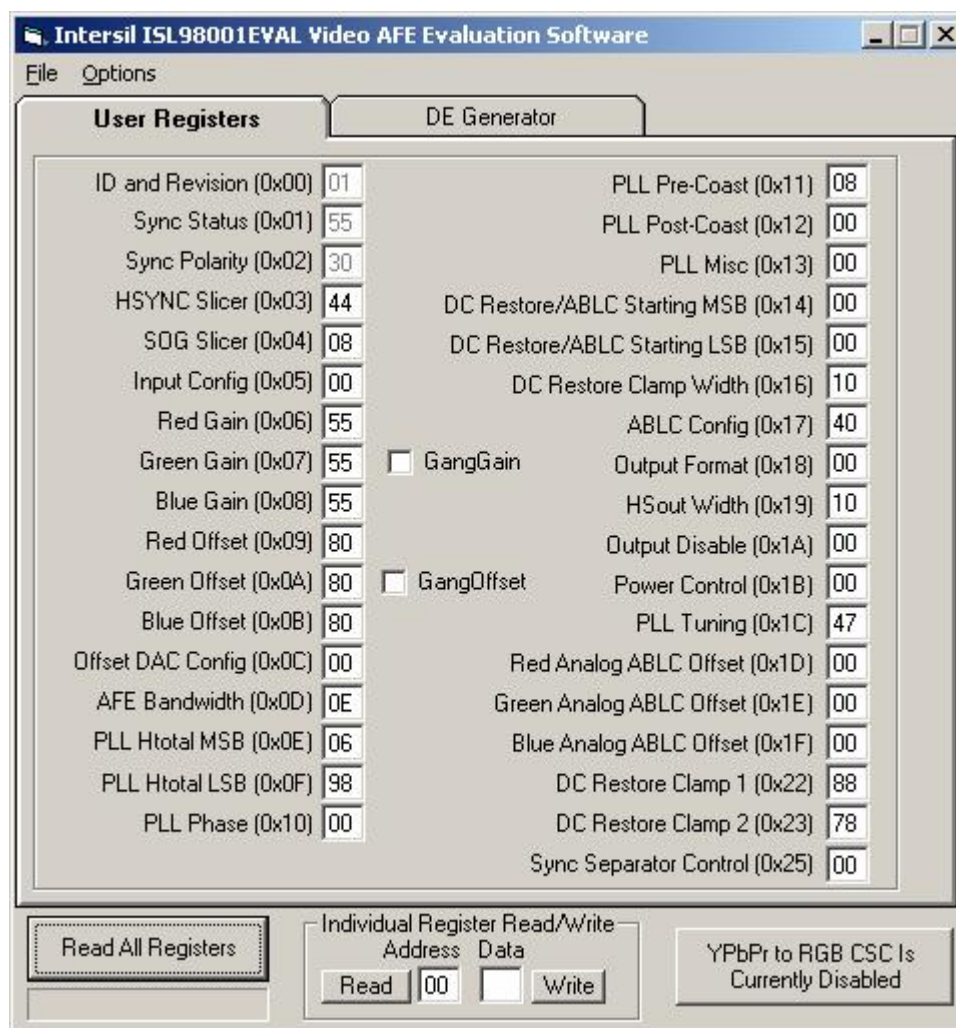
## Starting the Software

Launch the software (default location is Start/Programs/Intersil/ISL98001).

After the program has launched, you should see the following screen:



Click on the “Read All Registers” button in the lower left screen. All of the register values from the ISL98001 on the evaluation board should appear as shown in the next image. If the register values are not read correctly, proceed to the Troubleshooting section of this document.



To change a register value, simply change the hexadecimal number in the appropriate box. To change both digits of the 8 bit hex number, select both digits with the mouse (or double click inside the text box) **Blue Gain (0x08) 55**, then quickly type both digits of the desired value. If you type too slowly (more than 1 second between the first and second digit), the first digit typed will become the lower nibble, and the higher nibble will be 0. To only change one nibble using the keyboard, select the high nibble **Input Config (0x05) 00** or the low nibble **Input Config (0x05) 00** and type the new hexadecimal value.

You can also change the register values using the keyboard:

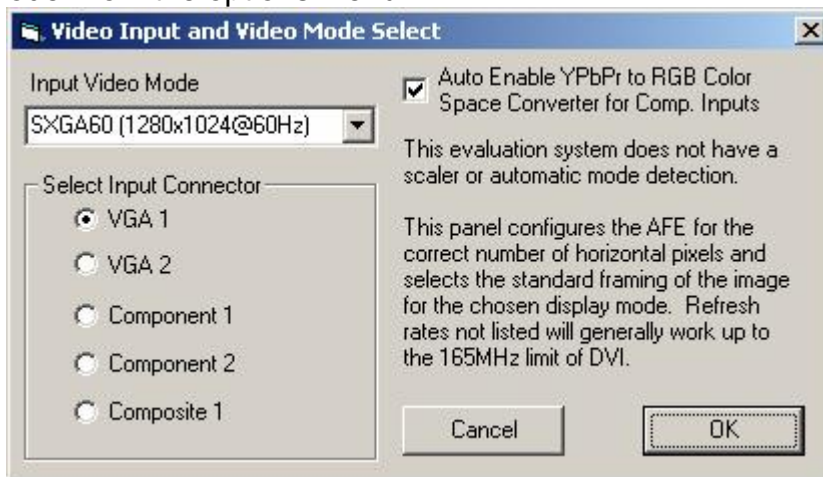
- Increment by 1: Up Arrow
- Decrement by 1: Down Arrow
- Increment by 16 (increment high nibble by 1): Page Up
- Decrement by 16 (decrement high nibble by 1): Page Up

This version of the software adds “GangGain” and ‘GangOffset” checkboxes. When one or both of these boxes are checked, changing the gain (or offset) of one color will simultaneously change the gain (or offset) of the other 2 colors.

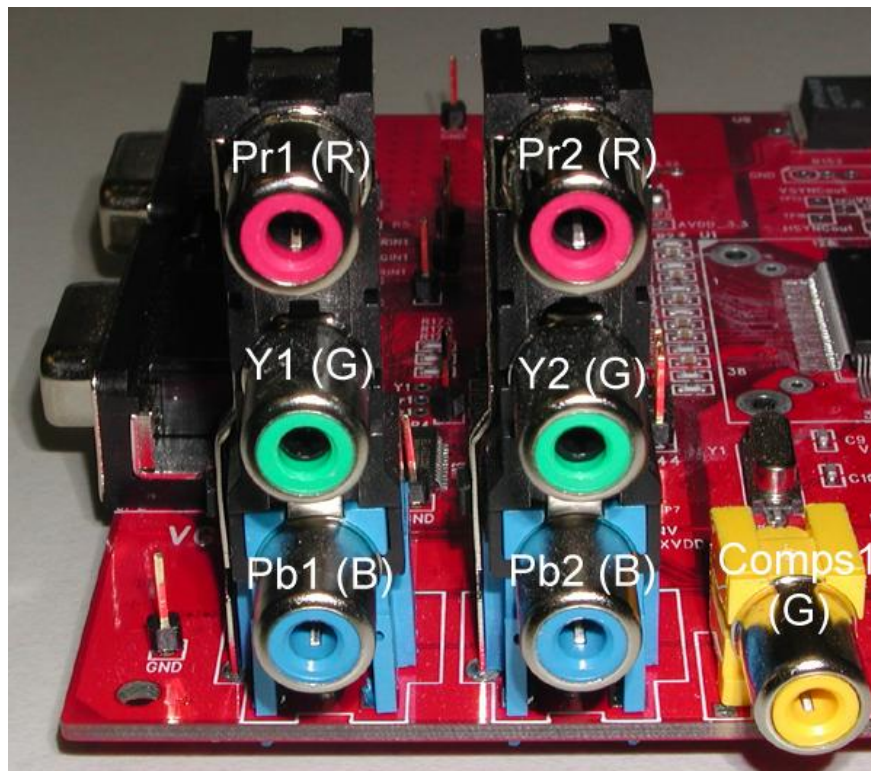
There is also a “YPbPr to RGB CSC...” button. This button displays the status of a YPbPr to RGB color space converter in the evaluation board’s FPGA. Clicking on the button toggles the state. There is more information about the color space converter in the next section.

### Video Input Configuration

The ISL98001 evaluation platform does not automatically detect the video mode of the incoming video signal. To obtain the correct image on the DVI monitor, the software needs to be told the format of the incoming video signal. This is done using the Video Mode box, which is opened by selecting “Select Input Video Mode” from the options menu.



Using the drop down menu, select the resolution and refresh rate that matches the resolution and refresh rate of the video signal to be digitized. The input connector can also be selected at this time. The ISL98001 evaluation board has a YPbPr to RGB color space converter (CSC) inside the FPGA. The CSC allows YPbPr/component video signals to be displayed on TVs that expect RGB format. If you are using such a TV, checking the “Auto Enable YPbPr to RGB Color Space Converter for Comp. Inputs” will automatically turn on the CSC when using a component or composite input.



Note that while there is a “composite” video connection, the ISL98001 AFE does not support composite video decoding. It will simply digitize the composite video signal through the AFE’s video channel. It is possible to take that digitized composite signal and perform digital decoding of the composite signal after it is digitized, but that is beyond the function of this evaluation system.

## **Operation**

The DVI monitor should now be displaying the image being received by the AFE.

At this point, all the registers of the ISL98001 can be adjusted. For example, the PLL Phase register (0x10) can be adjusted to find the optimum sampling phases for the signal.

The gain control registers (0x06 – 0x08) and the offset control registers (0x09 – 0x0B) can be adjusted for contrast and brightness control.

The Automatic Black Level Compensation (ABLC, register 0x17) function can be disabled to compare the image with and without ABLC

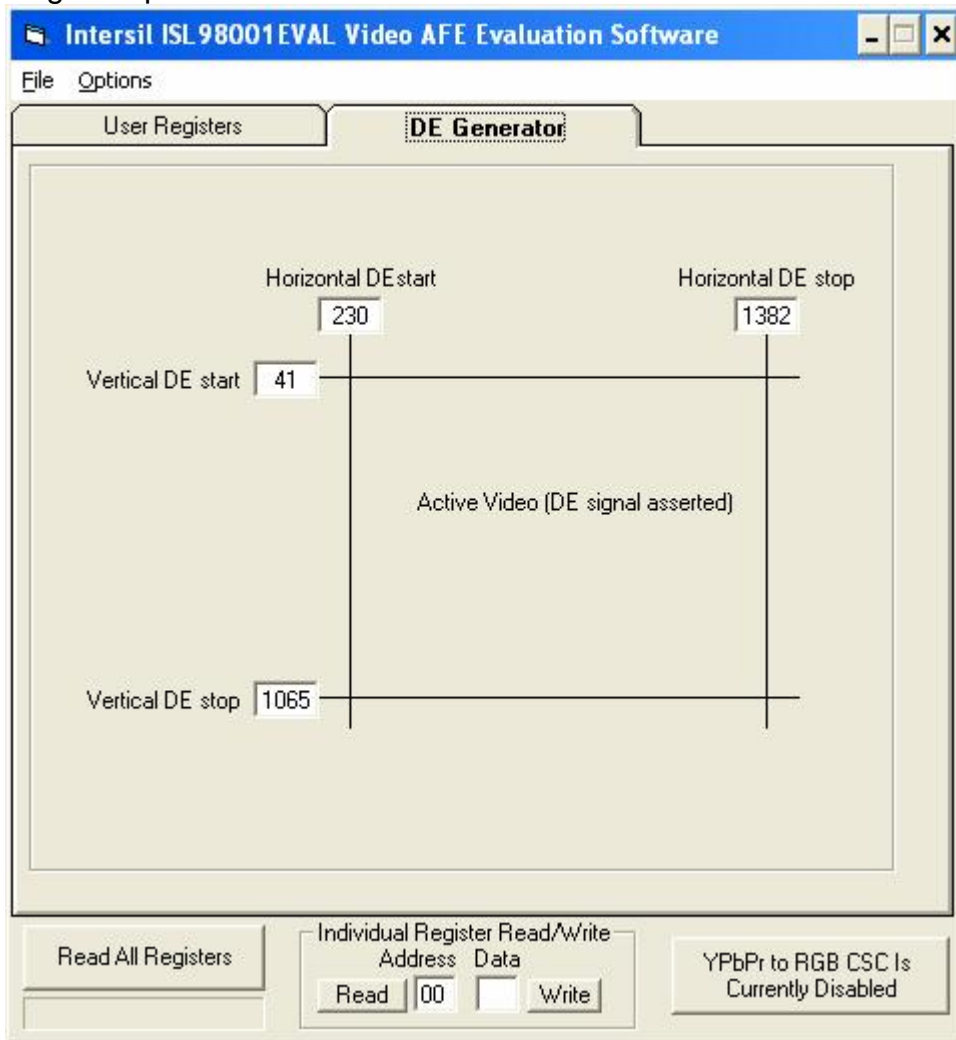
Please refer to the ISL98001 datasheet for more information on the ISL98001 and its configuration options.

## **Notes**

- All registers can be read by pressing the “Read All Registers” button.
- Registers 0x00 – 0x02 are read-only.
- The HTOTAL value is not latched by the ISL98001 until the LSB (0x0F) is written (i.e. writes to the MSB only will not change the HTOTAL used by the ISL98001).
- The box at the bottom of the display can be used to read or write any register, including some production test registers. These registers are not needed in normal operation of the Analog Front End and are therefore not documented.

### DE Adjust

If the image on the DVI monitor is clipped, the following window allows the Data Enable (DE) signal to be adjusted to change the position of the frame:



## Troubleshooting

### USB Driver Installation

After rebooting the PC, please verify that the following files are in the following locations:

- windrvr6.sys in C:\WINDOWS\system32\Driver
- ISL98001.inf in C:\WINDOWS\INF
- ISL98001.exe in C:\Program Files\ISL98001

### USB Port

The software should be able to communicate with the evaluation board as soon as it is launched. If there is a communication problem, the following dialog box will be displayed:



- If you see this dialog, open the Windows Control Panel. Double-click on the “System” icon and select the “Hardware” tab, then click on Device Manager:
- 



There should be a “Jungo” entry, with an ISL98001 sub category. This indicates the driver is properly installed and is communicating with the evaluation board. If this is not visible, or there are any error messages, take the following actions until the problem is resolved:

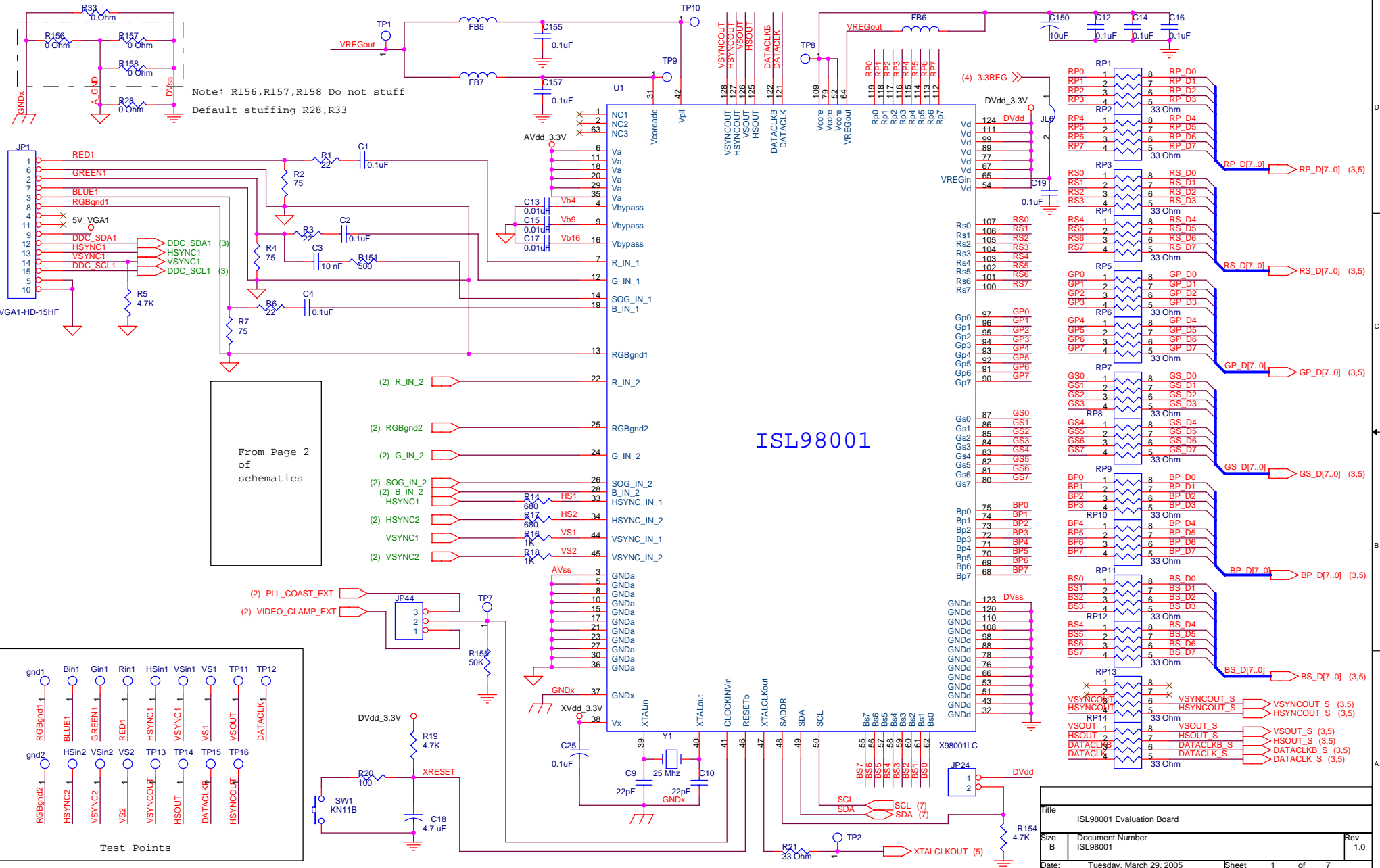
- Verify that the evaluation board has power and that the USB cable is connected between the evaluation board and the PC.

- Power off then power on the evaluation board. You should hear 2 tones from the PC's speakers when the USB device is enumerated.
- Close all instances of the ISL98001 application, reset the microcontroller (the switch is next to the USB connector), and restart the software.
- If none of this works, try installing the software on a different PC to verify correction operation of the evaluation board and software.
- Note: The ISL98001 Evaluation Board has a Vendor ID (VID) of 0x09AA and Product ID (PID) of 0x1004.

If the USB connection is functioning, but no image is displayed on the DVI monitor, take the following steps:

- Make sure the input video mode (resolution, refresh rate) matches the Input Video Mode selection in the software.
- Close the software, reset the ISL98001, reset the microcontroller, and restart the software.
- Try a different video resolution
- The Sil164 DVI transmitter used in the evaluation system is compatible with most DVI input monitors. However there some monitors have non-standard DVI receiver implementations that can cause incompatibilities in the DVI link. To rule this scenario out, try a different model monitor.

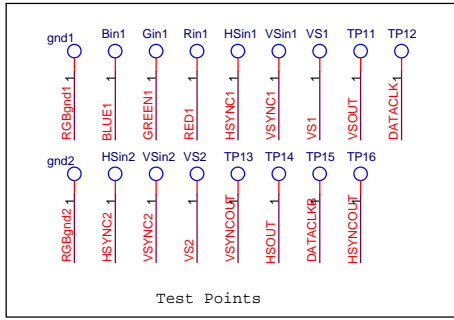




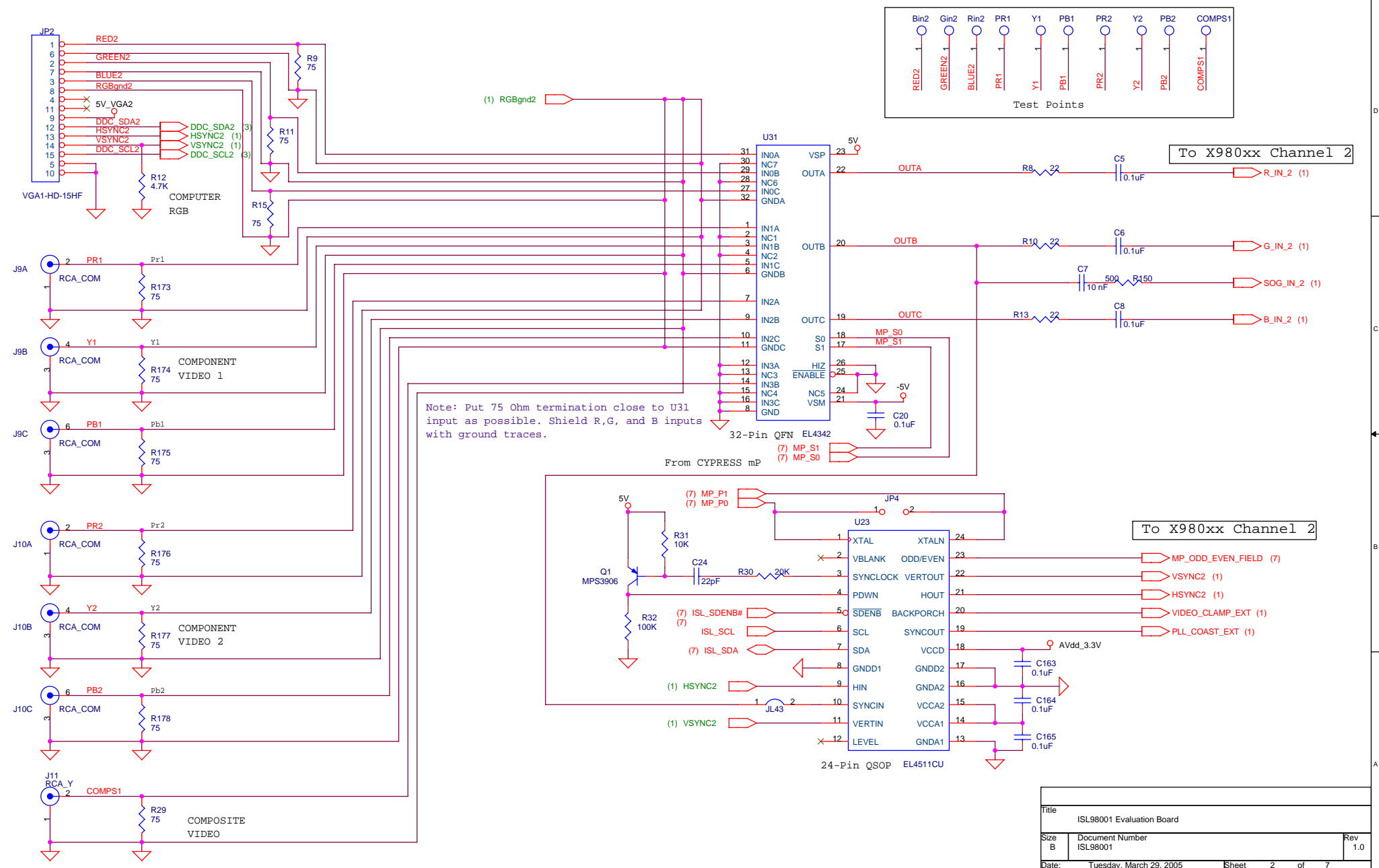
Note: R156, R157, R158 Do not stuff  
Default stuffing R28, R33

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schematics

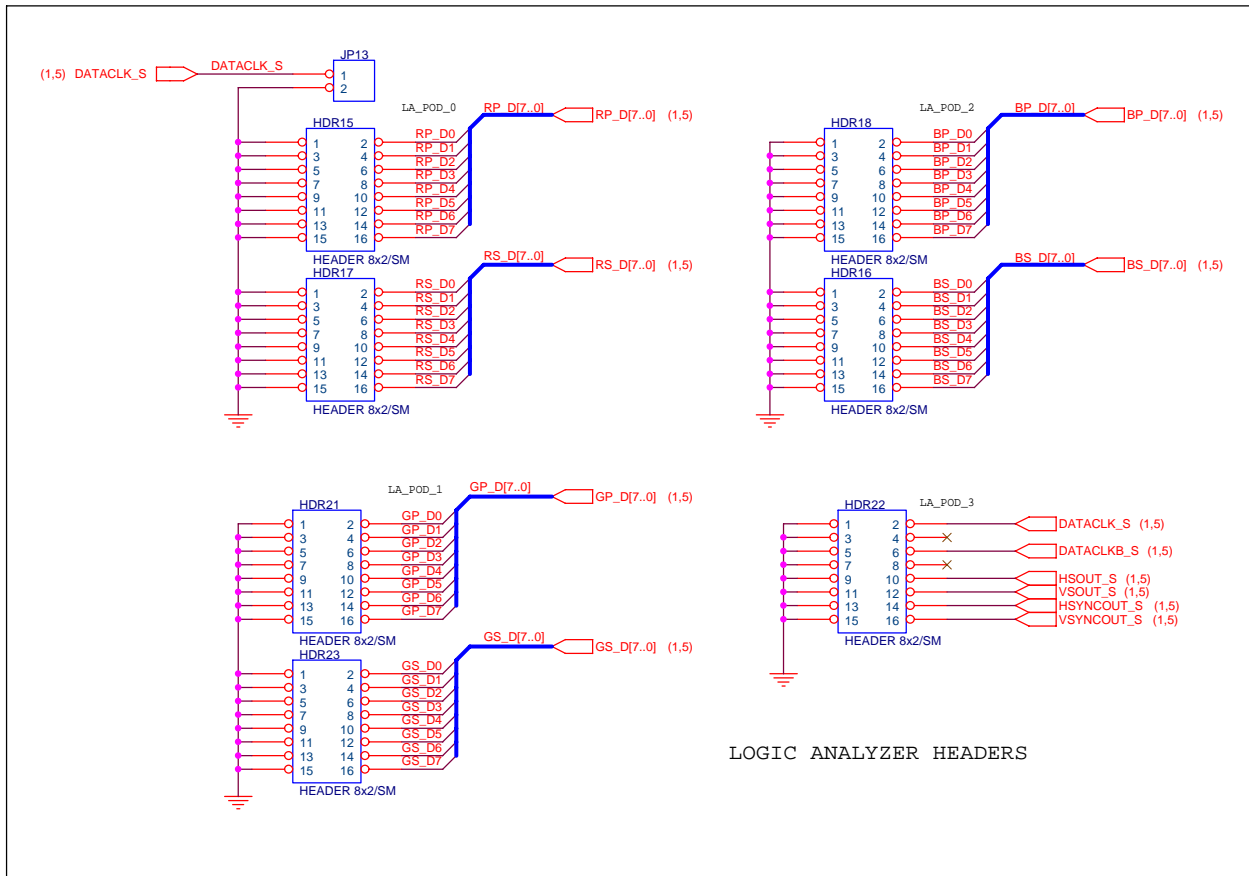
# ISL98001



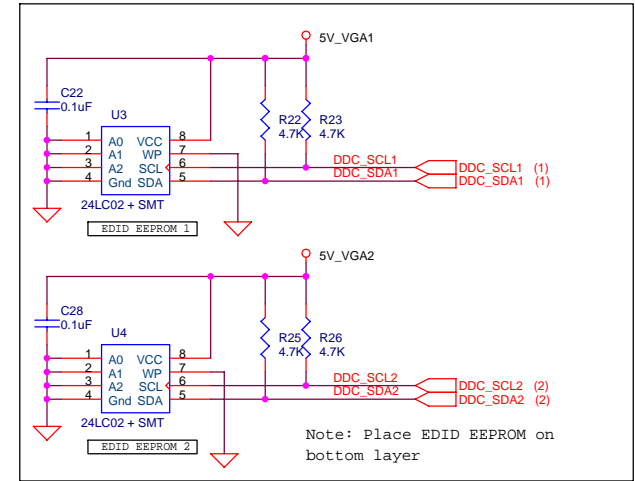
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Size	Document Number	Rev
B	ISL98001	1.0
Date:	Tuesday, March 29, 2005	Sheet 1 of 7



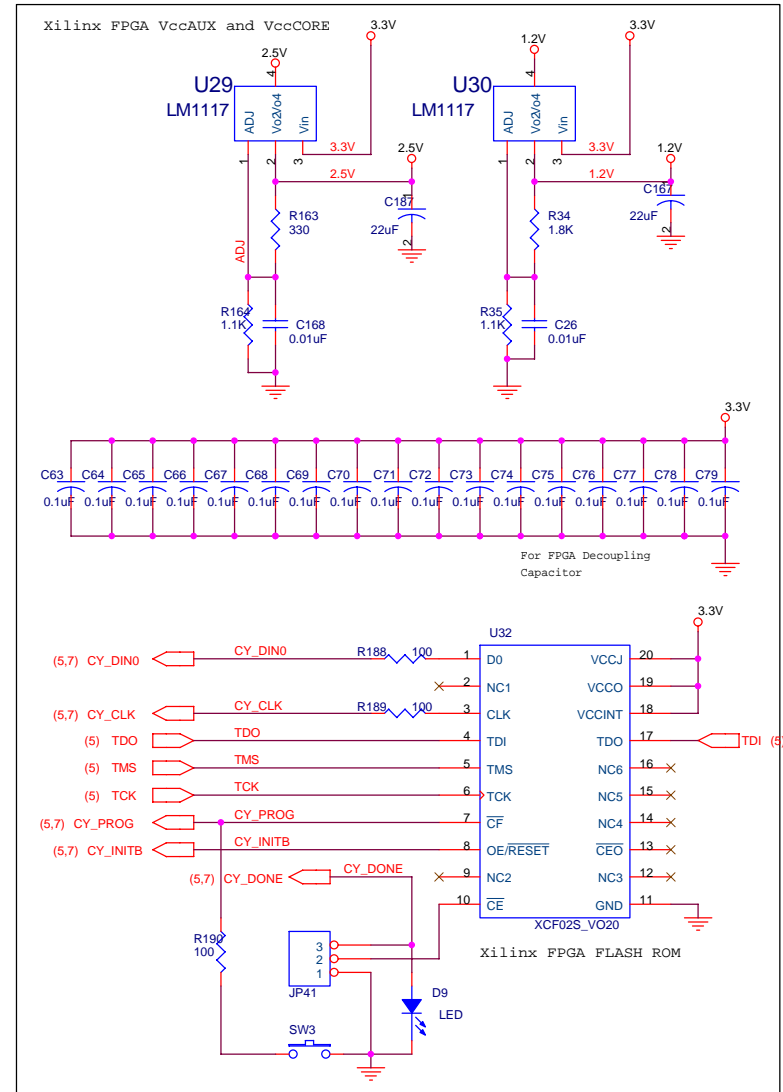
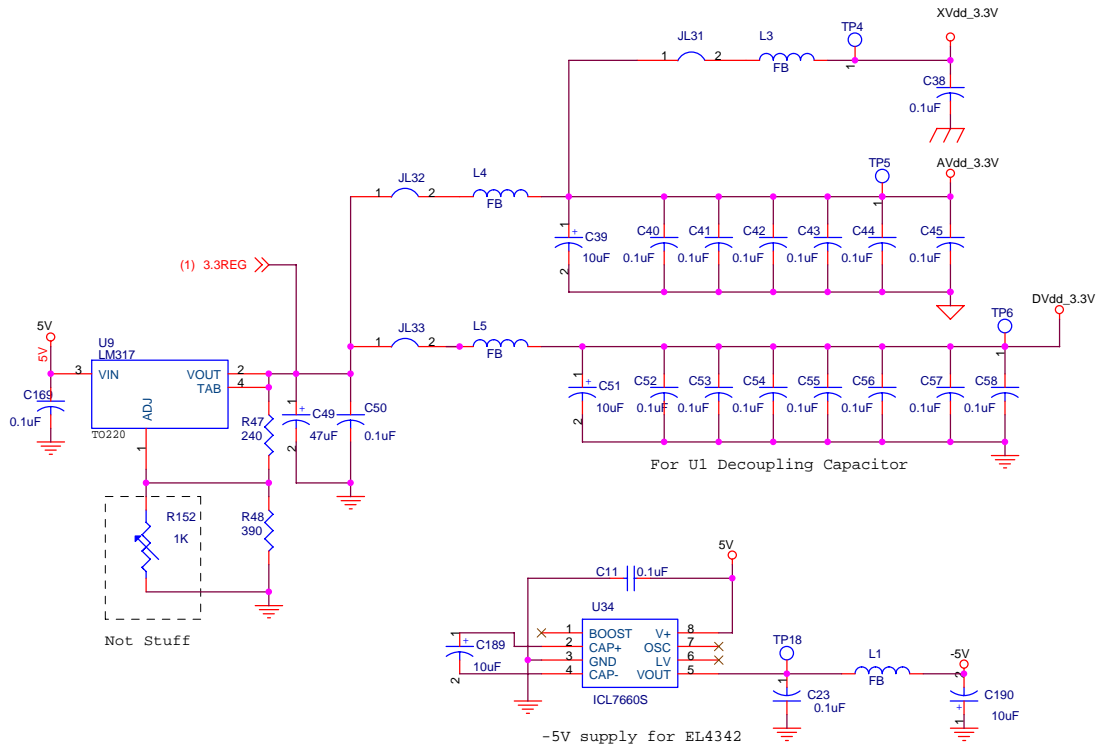
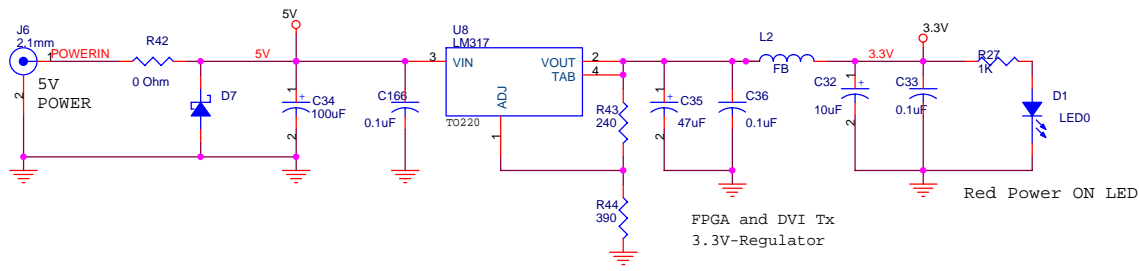
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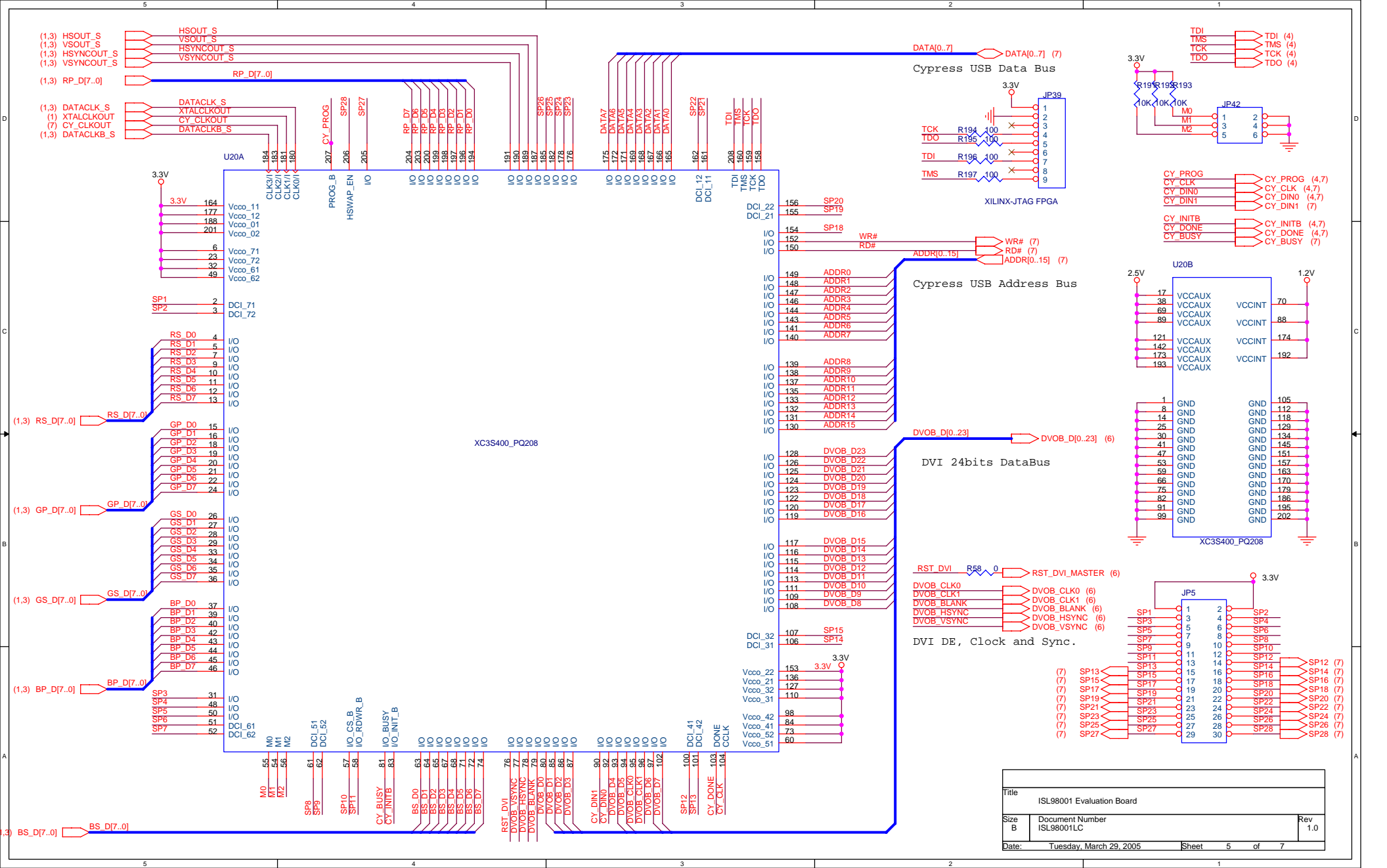
LOGIC ANALYZER HEADERS



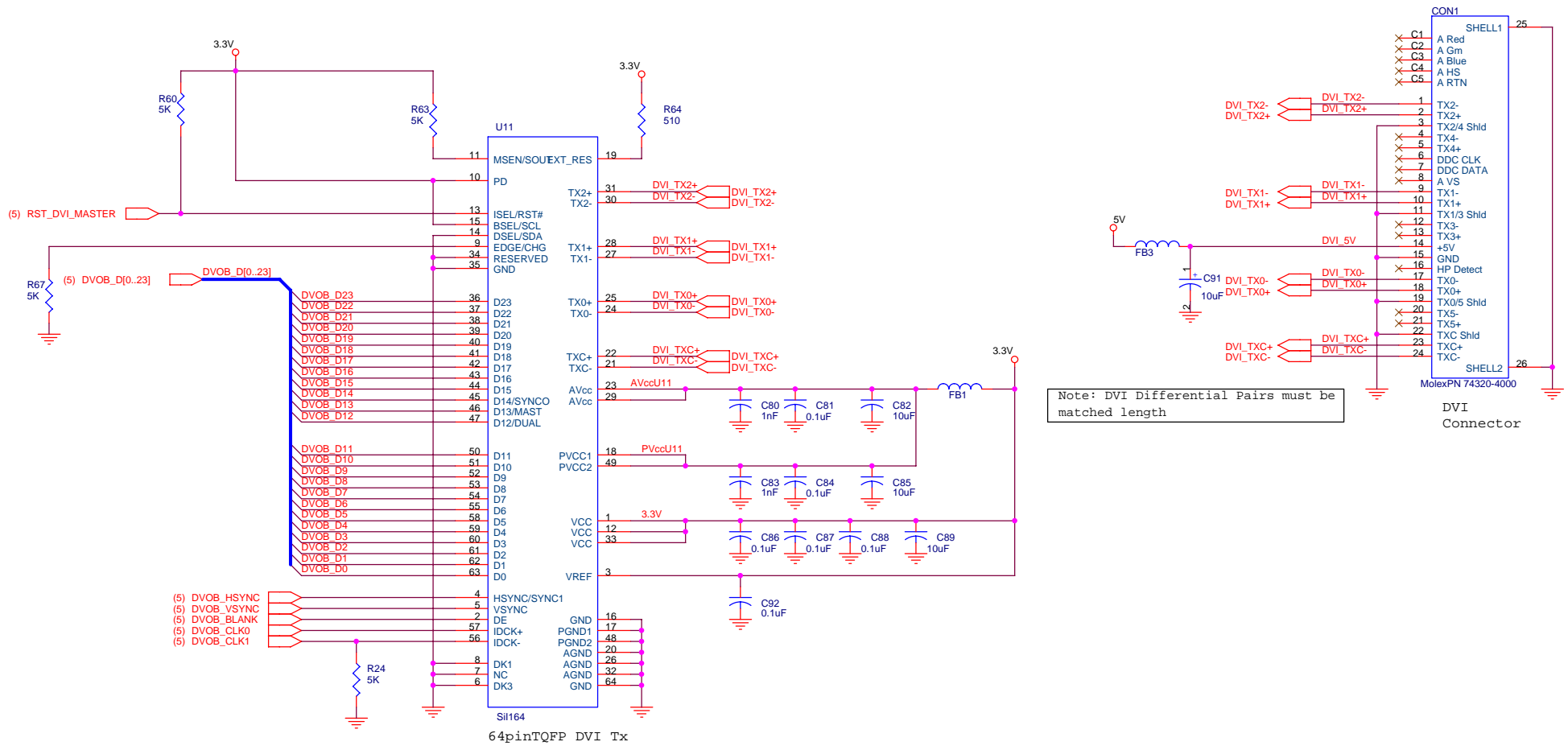
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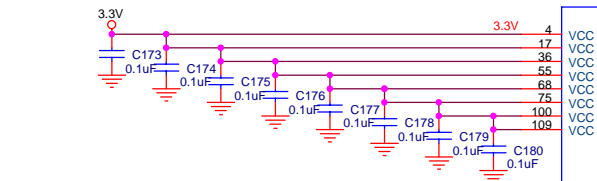


Note: DVI Differential Pairs must be matched length

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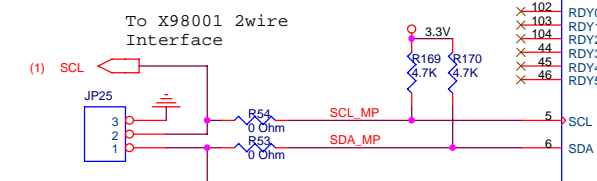
To Xilinx FPGA

(5) ADDR[0..15] ADDR[0..15]



To Xilinx FPGA

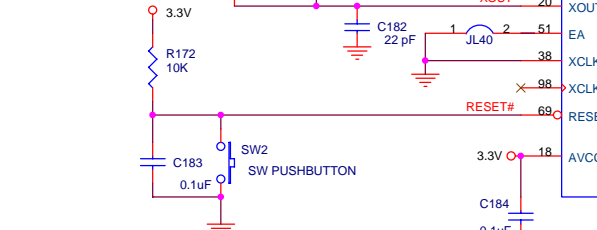
(5) DATA[0..7] DATA[0..7]



To X98001 2wire interface

(1) SCL SCL\_MP

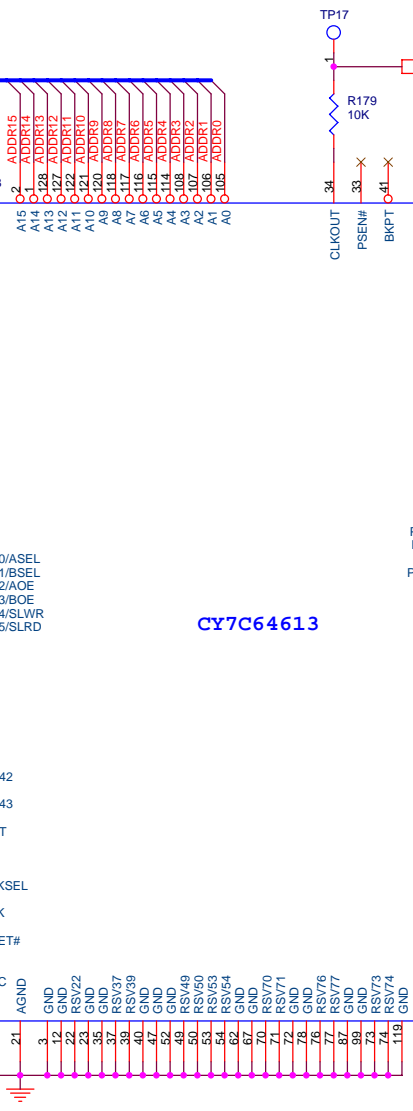
(1) SDA SDA\_MP



(1) SDA

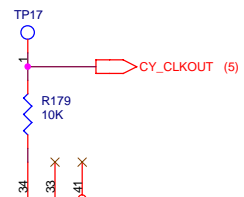


CYPRESS USB mP



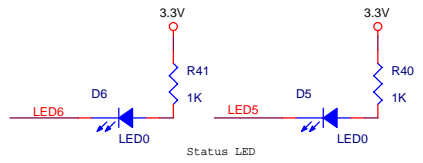
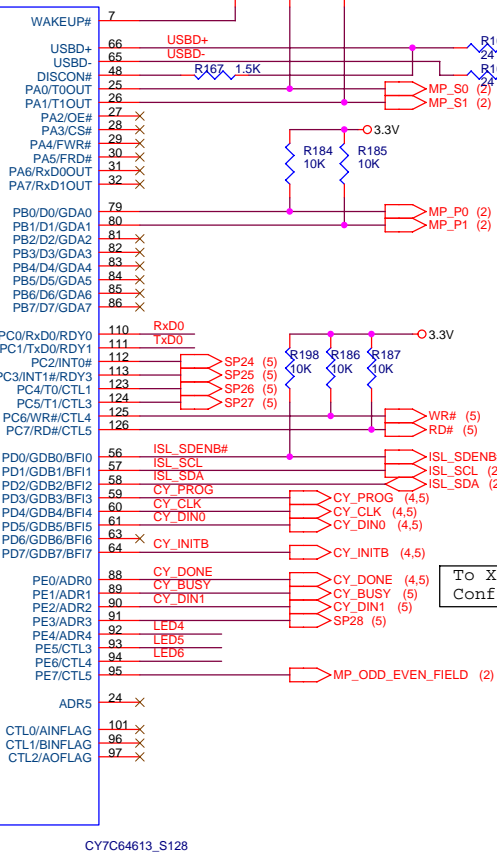
CY7C64613

CY7C64613\_S128

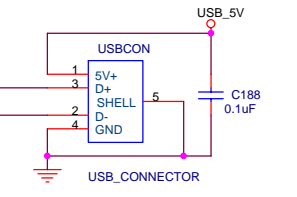


CLKOUT

FSEN# BKPT

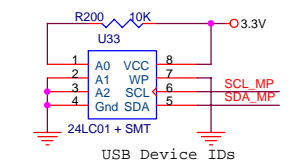


Status LED

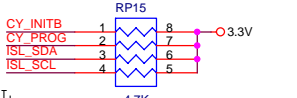


USB\_CONNECTOR

To ISL59443IL



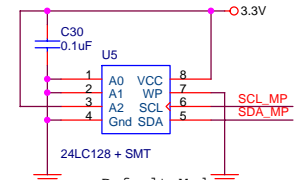
USB Device IDs



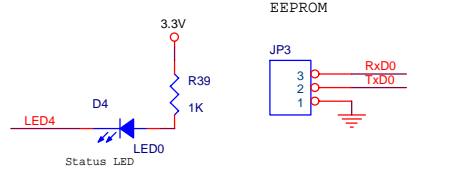
4.7K

To ISL59443IL

To Xilinx FPGA for Configuration RAM

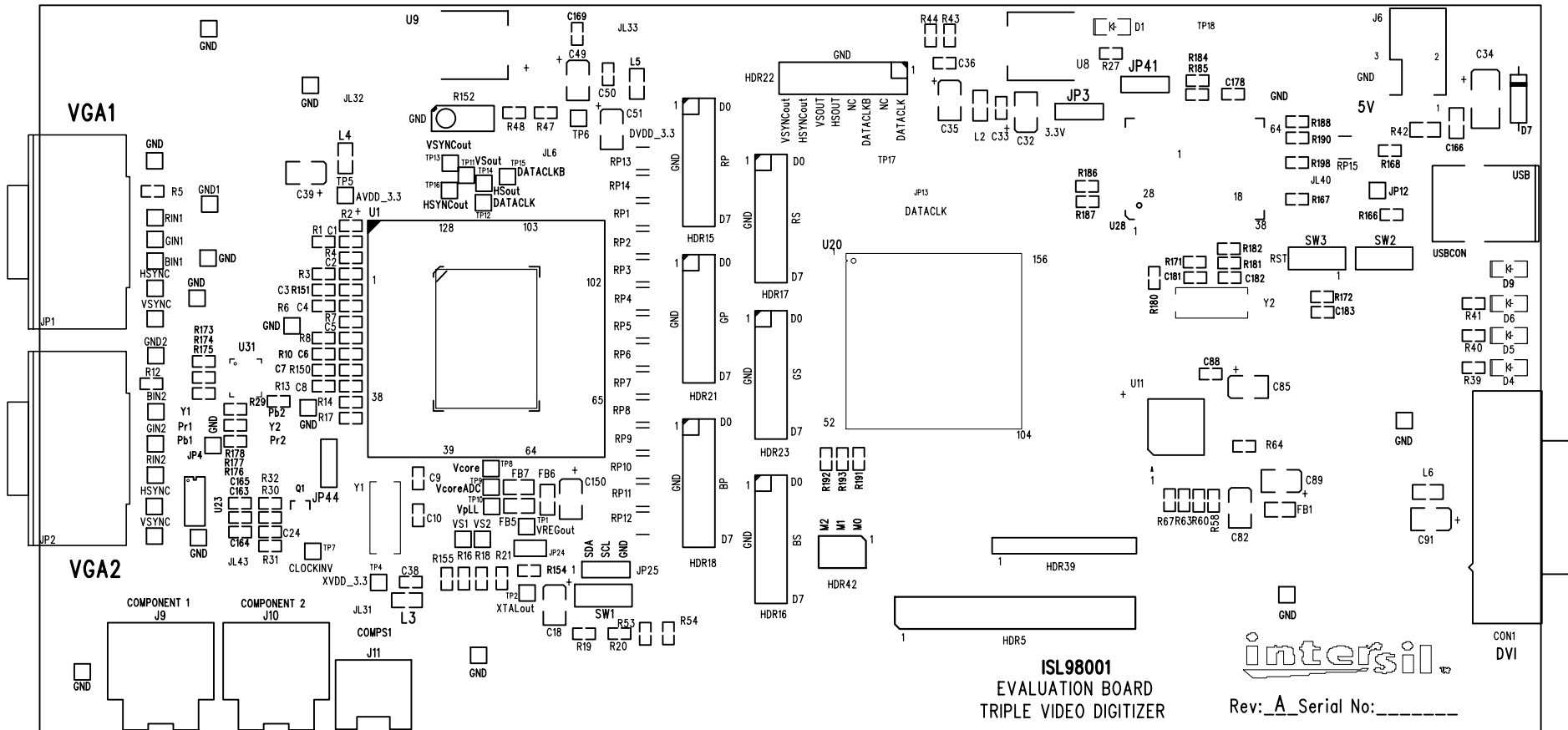


Default Mode EEPROM



Status LED

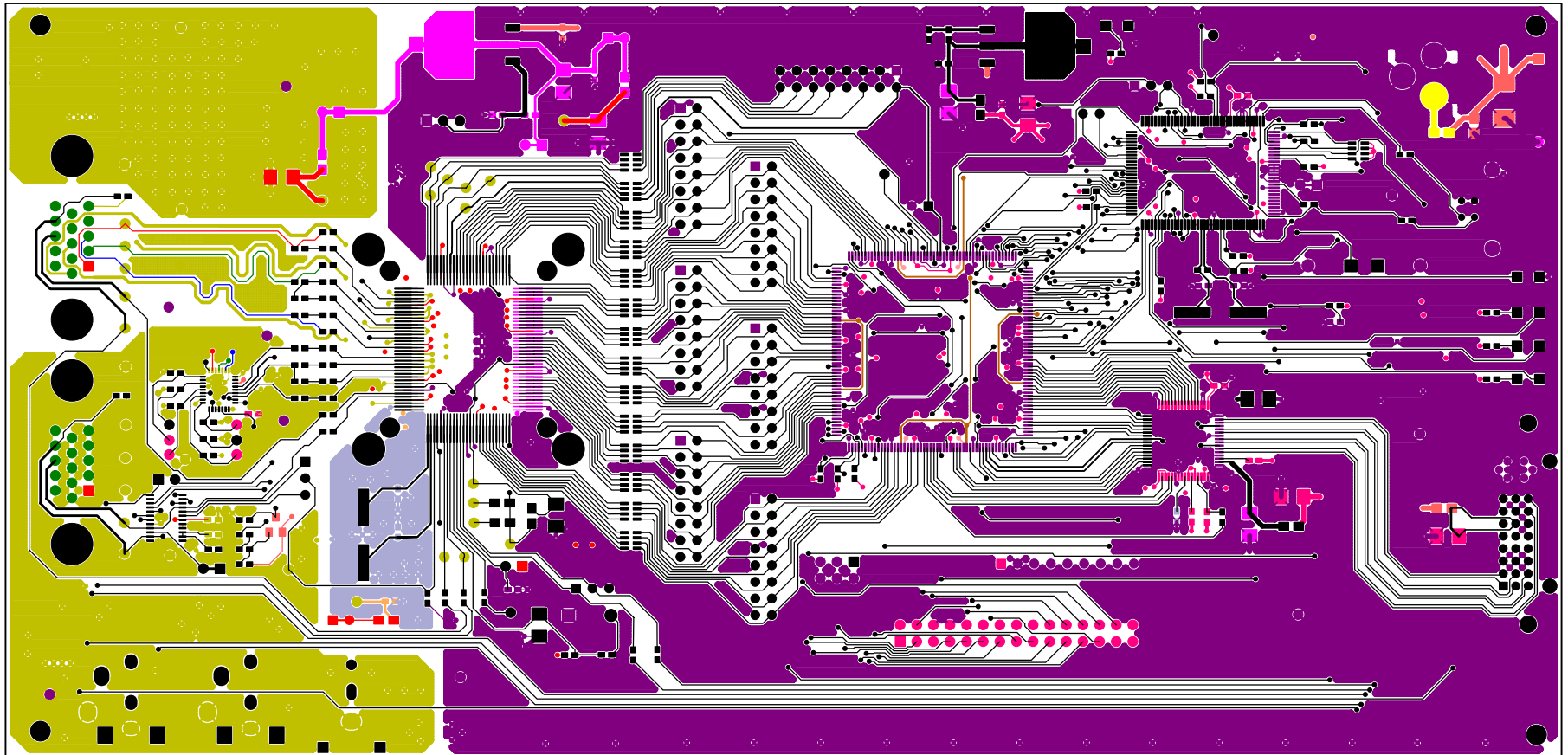
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INTERSIL CORPORATION  
 ISL98001 RevA. PCB  
 01 DECEMBER 2004

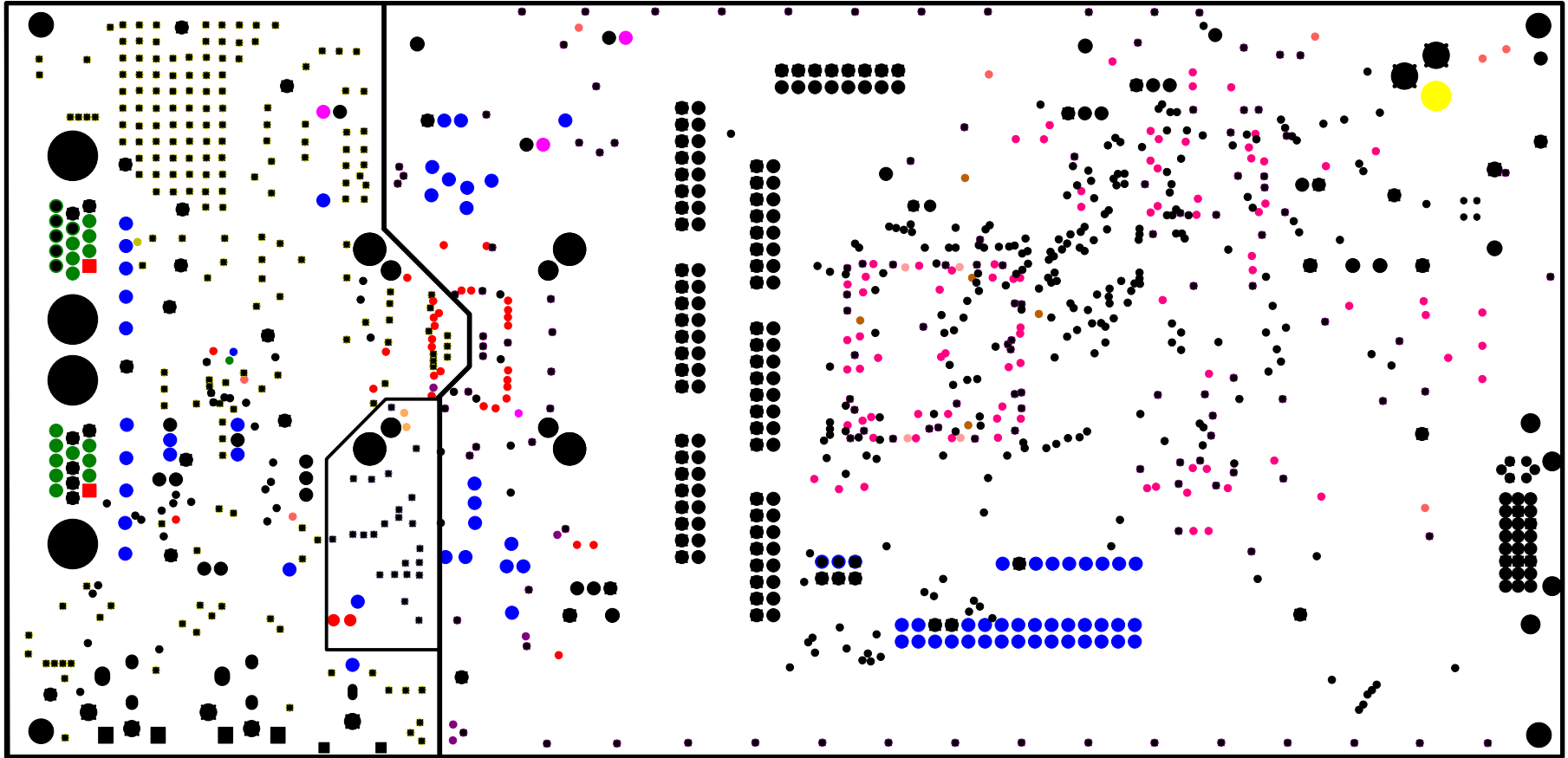
SILKSCREEN TOP SIDE





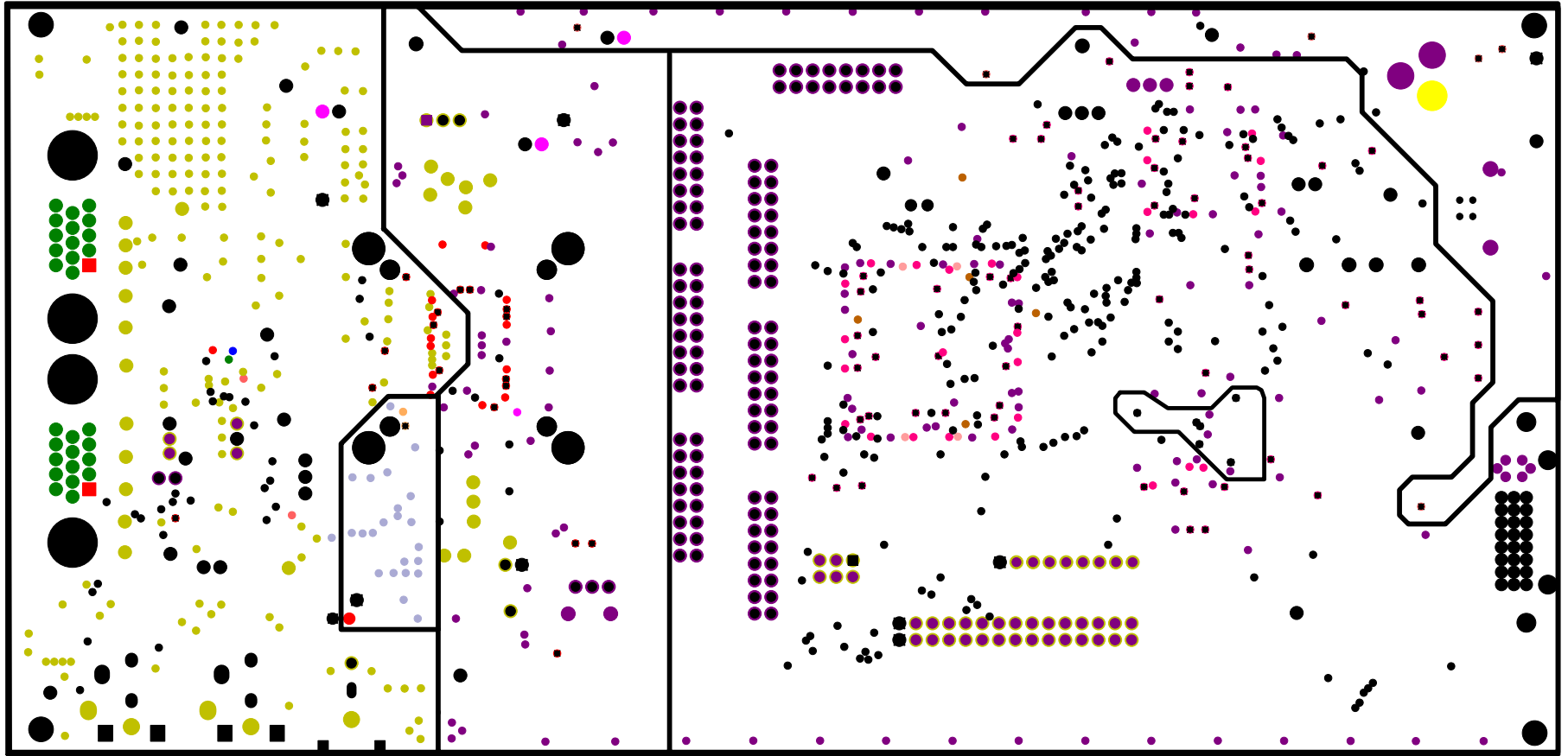
INTERSIL CORPORATION  
ISL98001 RevA. PCB  
01 DECEMBER 2004

TOP SIDE LAYER 1



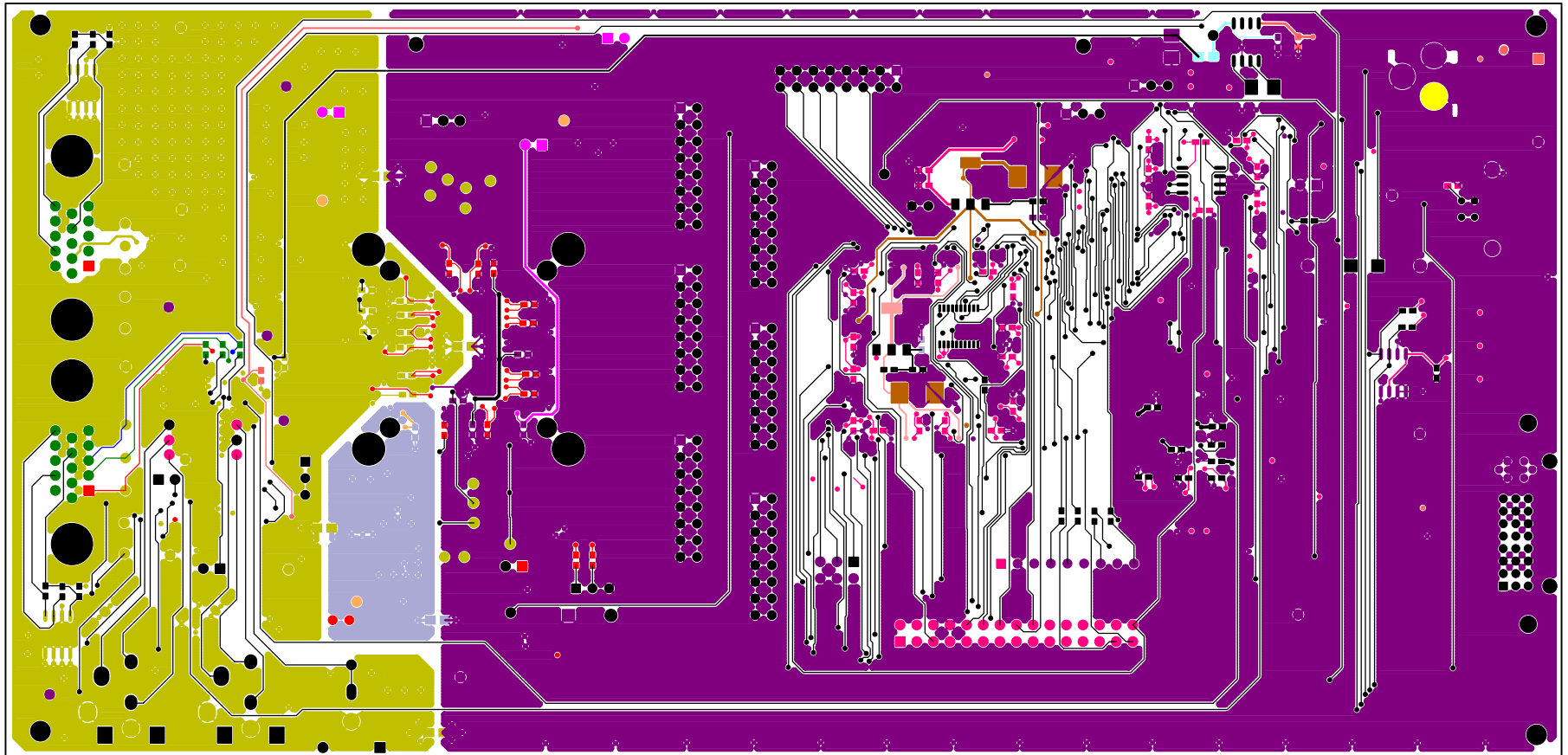
INTERSIL CORPORATION  
ISL98001 RevA. PCB  
01 DECEMBER 2004

GROUND PLANE LAYER 2



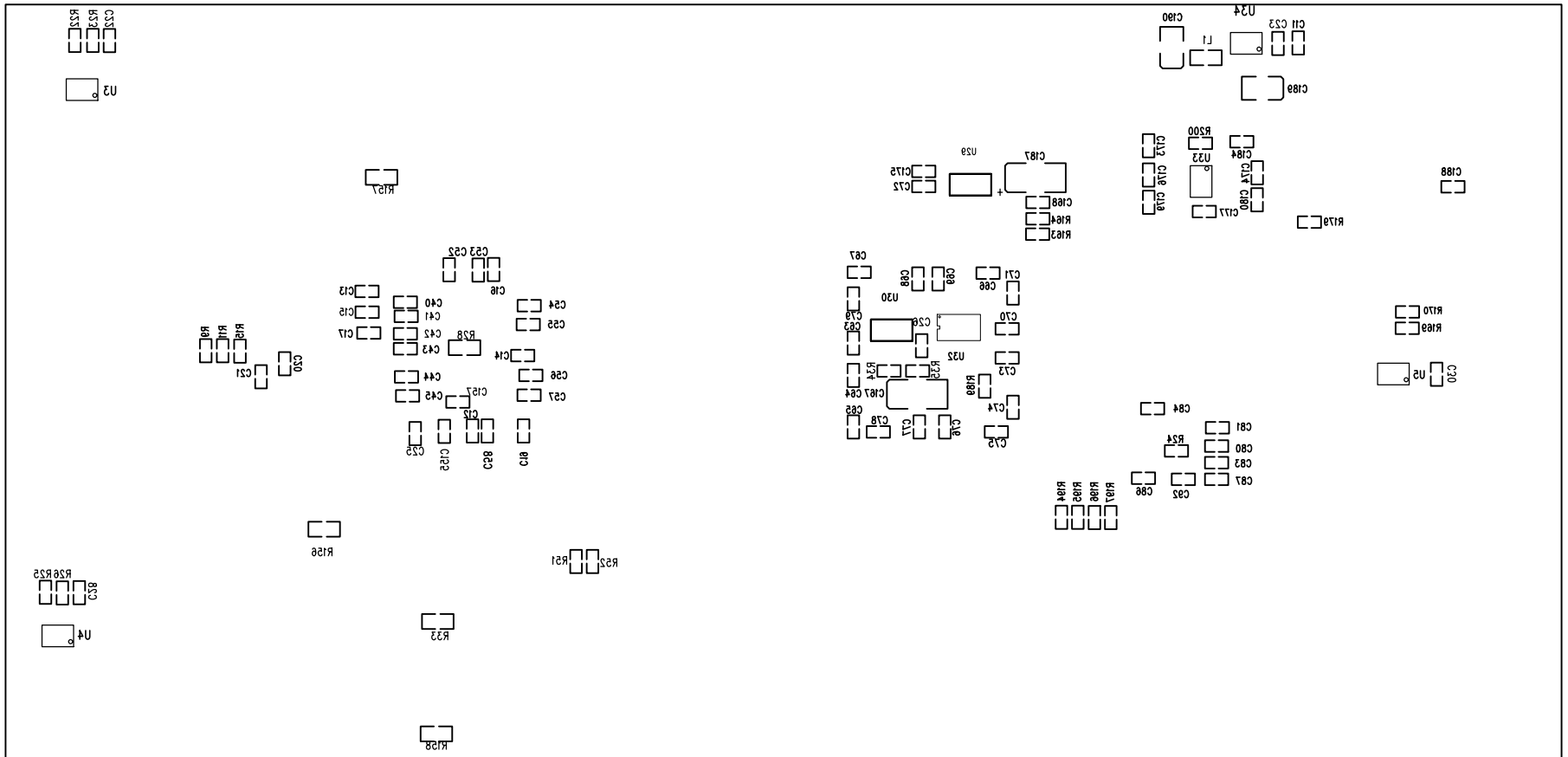
INTERSIL CORPORATION  
ISL98001 RevA. PCB  
01 DECEMBER 2004

POWER PLANE LAYER 3



INTERSIL CORPORATION  
ISL98001 RevA. PCB  
01 DECEMBER 2004

BOTTOM SIDE LAYER 4



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 ISL98001 RevA. PCB  
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SILKSCREEN BOTTOM SIDE