

TVP5154EVM

User's Guide

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TVP5154EVM User's Guide

1 Functional Description

The TVP5154EVM evaluation module is a printed circuit board designed for evaluation of the TVP5154 quad video decoder. The board includes the TMS320DM642 digital signal processor (DSP) and is designed with a 120-pin connector, which allows a connection to multiple backends; the evaluation module (EVM) is shipped with a professional encoder module. The board is designed to provide ease of use, while allowing full evaluation of the video decoder.

1.1 Description Overview

The TVP5154EVM uses the PC parallel port to emulate the I²C bus, which provides communication with the TVP5154 video decoder, DM642, and the video encoder. The Windows™ Video Control Center (WinVCC) application software that communicates with the devices via the I²C is provided on the EVM CD-ROM.

The analog video inputs supported by the TVP5154EVM include composite video and S-video. More detail about the video inputs is discussed in section 2.3 Video Input Description. In general, the video decoder converts the analog video input signal into digital component data. This data and the associated clocks from the video decoder are sent to the DM642, which provides various image capture and display modes. The DM642 is setup in I²C slave mode and is controlled through virtual I²C registers. The video encoder then converts the digital data from the DM642 back into analog video. The analog video outputs supported by the EVM include composite video, S-video, and component video. These are all output simultaneously.

To experiment with the programmable features of the TVP5154 video decoder and the video encoder, the parallel port of the TVP5154 is connected to the parallel port of a PC. WinVCC, a Windows-compatible application provides the user interface for performing register-level and high-level control of the TVP5154 video decoder and the video encoder.

2 Board Level Description

The TVP5154EVM consists of the TVP5154EVM module and the encoder EVM module. A 4-row 120-pin connector connects the boards. The block diagram of the EVM set is shown in Figure 1.

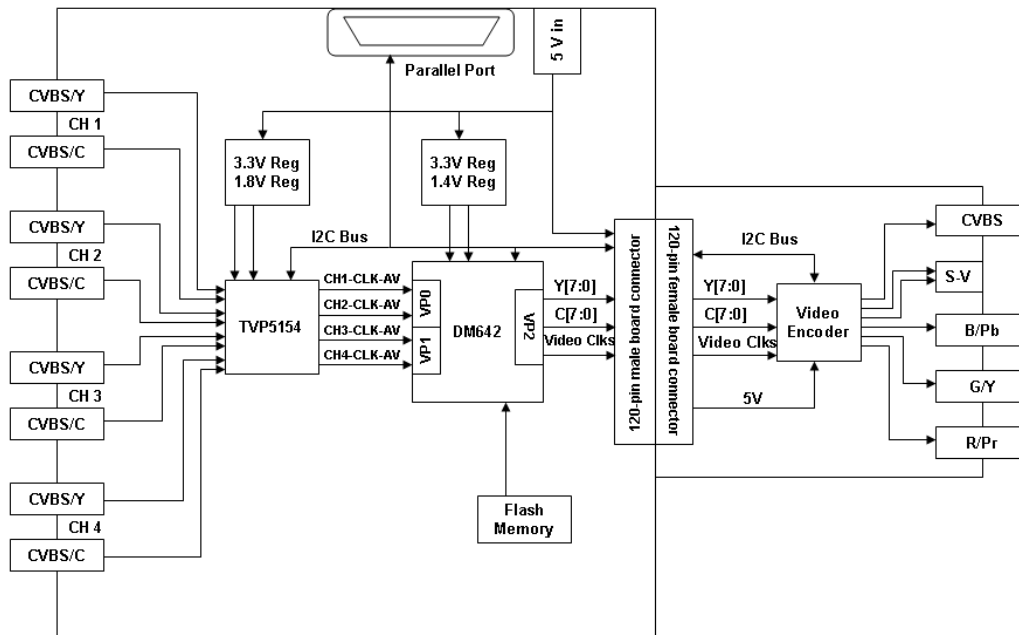


Figure 1. TVP5154EVM Block Diagram

2.1 Test Points and Jumpers

The TVP5154EVM was designed with test points and jumpers to help in evaluation and troubleshooting. Each jumper is set by default in its preferred state for the TVP5154EVM. There are test points for SCL, SDA, 3.3 V, and 1.8 V. All digital video data for each decoder core are brought out to a dual-row header, which allows easy hookup to test equipment. The I²C address selection is made with two shunt jumpers, which are only read after a reset or at power up. The default address is 0xB8. If the address needs to be changed, the TVP5154 must receive a reset.

Table 1. I²C Address Selection Jumpers (I2CSEL1, JP9 and I2CSEL2, JP10)

JP9	JP10	I ² C ADDRESS
2-3	2-3	0xB8
1-2	2-3	0xBA
2-3	1-2	0xBC
1-0	1-2	0xBE

Table 2. Power-Down-Mode Selection Jumper (PDN, JP11)

PWDN	
1-2	Normal operation
2-3	Power down

Note: If the I²C address is changed on either the TVP5154 board or the encoder board while the TVP5154EVM is powered up, that device will not recognize the new I²C address. The reset button on the TVP5154EVM must be pressed and WinVCC must be reconfigured for the new I²C address.

2.2 Common Board Interface

The TVP5154EVM uses a 4-row 120-pin connector to share common signals and the 5-V power supply between the boards. This connection allows multiple backends to be connected to the TVP5154EVM. The EVM package is shipped with an encoder module. This connector shares all digital video bits (Y[7:0]), all video clocks (VS, HS, GLCO/FID, and DATACLK), 5 V, ground, I²C bus (SCL and SDA), and reset.

2.3 Video Input Description

The TVP5154EVM decoder has an analog input channel that accepts two video inputs for each decoder core. The decoder supports a maximum input voltage range of 0.75 V, therefore, an attenuation of one-half is needed for most input signals with a peak-to-peak variation of 1.5 V. The parallel termination before the input to the device is 75 Ω. The two analog inputs can be connected as either two selectable composite video inputs, or one S-video input.

The TVP5154EVM allows the user to have up to two composite inputs or one S-video input for each of the four-channels. The EVM software sets up and controls this input selection. The S-video input uses two connectors, one for the luma channel and one for the chroma channel.

The EVM has a resistor network on each of the inputs. These networks attenuate the signal and allow a 75-Ω resistor to ground to be placed after the anti-alias filter for termination.

Each input has an anti-alias filter that can be in-circuit or bypassed by jumpers (JP1–JP8). To select the filter, the shunts need to be positioned to short positions 1-3 and 2-4. To bypass the filter, the shunts need to be moved to short positions 1-2 and 3-4 as shown in Figure 2. The boards are shipped with the filter bypassed.

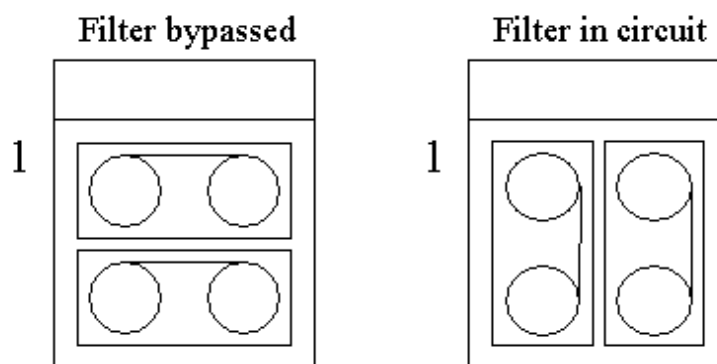


Figure 2. Anti-Aliasing Filter Selection

2.4 Video Output Description

The 8-bit digital video outputs of the TVP5154 are routed to the four 32-pin headers (H2–H5), the DM642, and finally to the 120-pin edge connector along with all video clocks on the TVP5154 module. The encoder module connects to the 120-pin connector, and is capable of receiving digital video with or without embedded syncs. The analog outputs of the encoder module are composite, S-video, and component. For the user's convenience, all of these outputs come out of the encoder module simultaneously.

3 System-Level Description

A system-level block diagram incorporating the TVP5154 is shown in [Figure 3](#). Typical commercially-available test equipment is also shown. The primary features of this configuration are:

- Power is provided by a single 5-V power supply provided with the EVM and is shared between both modules via the 120-pin connector.
- Supported analog inputs include composite video and S-video.
- Re-encoded composite video and S-video are output via the encoder module.
- Component (YPbPr) video is output via the encoder module.
- I²C bus initializes the video devices via a PC parallel port.
- The TVP5154 video decoder performance parameters may be measured with a video analyzer.

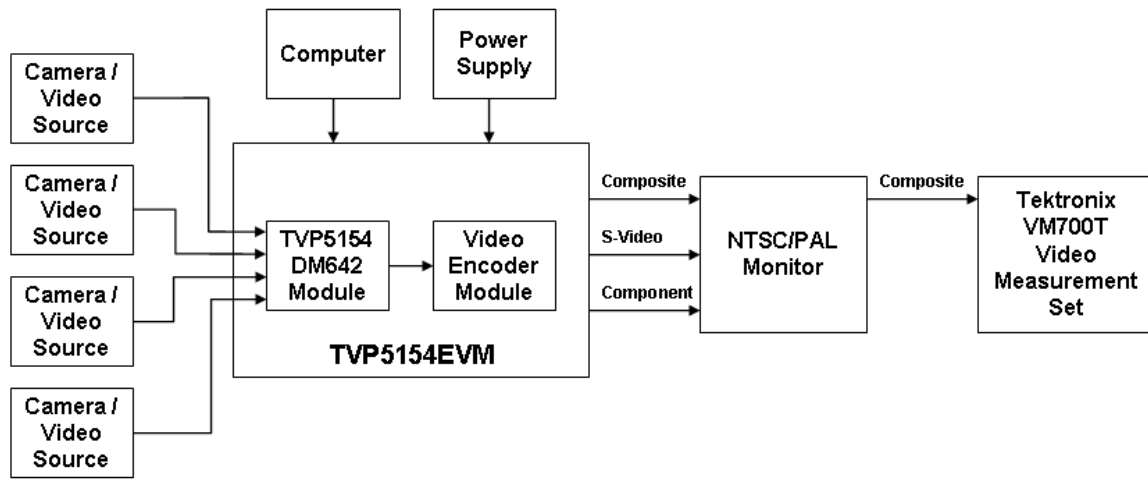


Figure 3. TVP5154EVM System-Level Block Diagram

4 Required Hardware and Equipment

The required hardware and equipment necessary to use the TVP5154EVM are:

- TVP5154EVM (provided)
- Universal 5-V power supply (provided)
- Parallel cable (provided)
- Windows-based PC with CD-ROM drive and Win95™ or later
- Composite or S-video cables for inputs
- Composite, S-video, or component cable for output
- Video sources (security camera, pattern generator, Quantum generator, DVD player, etc.)
- Display monitor that supports composite, S-video, or component video input

5 Hardware Setup

[Figure 1](#) shows the TVP5154EVM layout and indicates the location of the power supply and the appropriate connectors. All connectors are labeled according to their function. To prepare the EVM for evaluation, connect the following:

1. TVP5154 module to encoder module
2. Parallel port cable from TVP5154EVM to the PC
3. Analog video sources to TVP5154EVM inputs
4. Analog video out from TVP5154EVM to monitor
5. 5-V power supply to the dc jack on the TVP5154 board. A green LED on each board should now be lit.

The system comes with the anti-alias filters bypassed. To connect the filters, you must rotate the appropriate jumpers (JP1–JP8) as described in section 2.3.

The I²C slave address can be selected with jumpers JP9 and JP10. There are four possible addresses: B8, BA, BC, and BE. The default setting for these jumpers is for the shunt to short pins 2-3, which selects 0xB8. These are connected to pins 117 and 118, which are read at power up. If you move both the jumpers to positions 1-2 and reset the board, the video decoder now responds to I²C slave address 0xBE. If you choose to change the address, you must exit, restart WinVCC, and configure the software to use the new I²C slave address.

6 Software Installation

WinVCC is a Windows application that uses the PC parallel port to emulate I²C, providing access to each device on the I²C bus. WinVCC makes use of CMD files, a text editable file that allows preset video setups to be programmed easily.

This feature allows the user to easily set multiple I²C registers with the press of a button. WinVCC also has property sheets for the TVP5154, which allows the user to control the I²C registers with a GUI.

All necessary software for the TVP5154EVM is provided on the enclosed CD. Perform the following steps to install WinVCC:

1. Explore the provided TVP5154EVM Software CD.
2. Install Port95NT.exe. This is the parallel port driver used by WinVCC. This driver must be installed and the PC must be rebooted before WinVCC operates correctly. This does not affect normal parallel port operation.
3. Install Setup.exe. Click Next at all prompts and click Finish to complete the installation process. This installs WinVCC onto the PC. No reboot is required.
4. Run WinVCC.exe.

Note: A shortcut to WinVCC should now be available on the desktop. WinVCC and additional TVP5154-related documentation can also be found at Start→Programs→TVP5154EVM Software.

7 WinVCC Quick Start

Perform the following steps in order to see a video output from the TVP5154EVM.

1. Once WinVCC is executed, the WinVCC Configuration screen appears, as shown in [Figure 4](#). This dialog box configures the I²C bus. Next to VID_DEC, select the TVP5154 and ensure the I²C address is set to 0xB8 (default setting on EVM.) This must match the I²C ADDR jumper on the TVP5154 board.
2. Next to VID_ENC, select the 7311 Encoder and ensure the I²C address is set to 0x54 (default setting on EVM.) This must match the I²C ADDR jumper on the encoder board.

Note: If WinVCC is running and the TVP5154 or encoder board I²C address is changed, power must be cycled on the EVM.

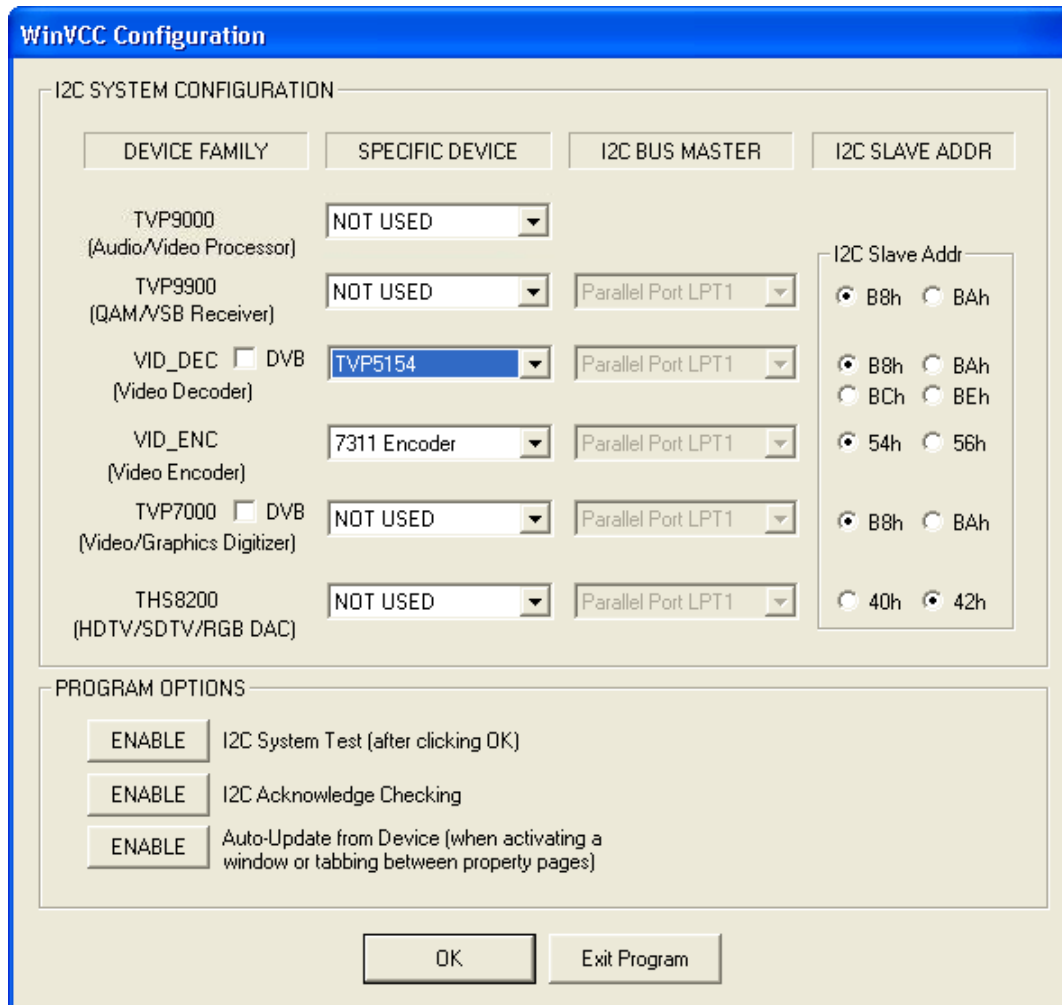


Figure 4. WinVCC – I²C Configuration Screen

3. Ensure that all other boxes are selected as “Not Used” and that all program options buttons are set to ENABLE. Click OK.
4. If there are no I²C communication issues, the Real-Time Polling dialog window displays next as shown in [Figure 5](#). If there are I²C issues, an I²C Test Report box displays. Completely exit out of WinVCC, double-check the parallel port cable connections, I²C address settings, cycle power on the TVP5154EVM, and re-run WinVCC.
5. When using the TVP5154 EVM with a composite output from the 7311 encoder, it is required to disable auto-switch polling in the Real-Time Polling dialog box by clicking on the ENABLED button. Click OK and then the Main Control Window is seen, as shown in [Figure 7](#).

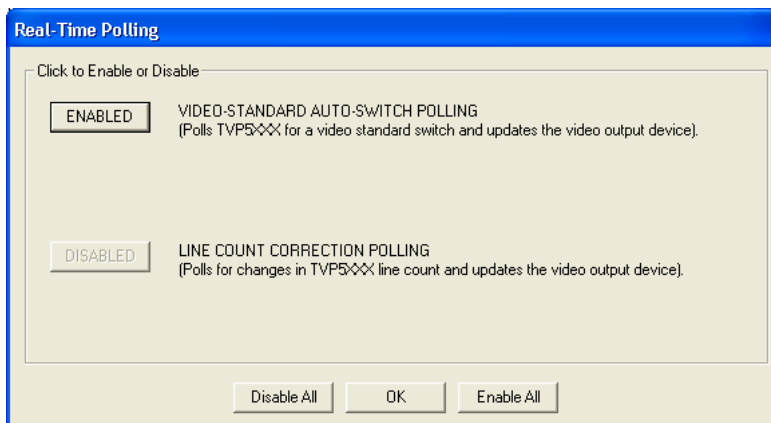


Figure 5. Real-Time Polling Dialog

- The TVP5154 I²C Write Enable(s) and Read Enable pop-up window is displayed as shown in [Figure 6](#). This is used to select which decoder or decoders (any combination of all four) will receive I²C Write commands, and which decoder (only one) will receive I²C Read commands. Decoder 1 is Enabled by default; enable the other three decoders by clicking on each decoder's enable button.

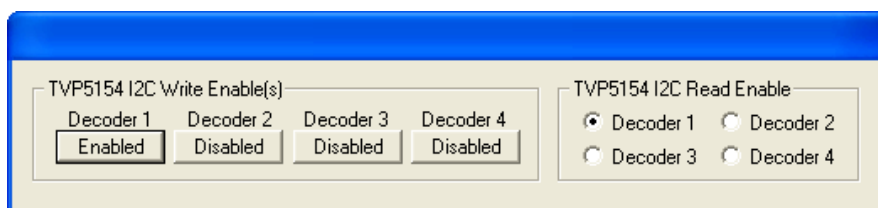


Figure 6. Decoder I²C Write and Read Enable

- Load the provided Initialization command (CMD) file into WinVCC by clicking on Tools→System Initialization→Browse. The default directory is C:\Program Files\Texas Instruments\TVP5154EVM\Initialization.

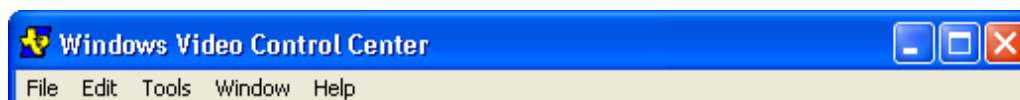


Figure 7. WinVCC – Main Screen

- In the System Initialization Window (see [Figure 8](#)), click the "TVP5154 ROM – Initialize for NTSC..." or "TVP5154 ROM – Initialize for PAL..." dataset in the window and then click the PROGRAM Device(s) Using Selected Dataset button to initialize the TVP5154EVM.

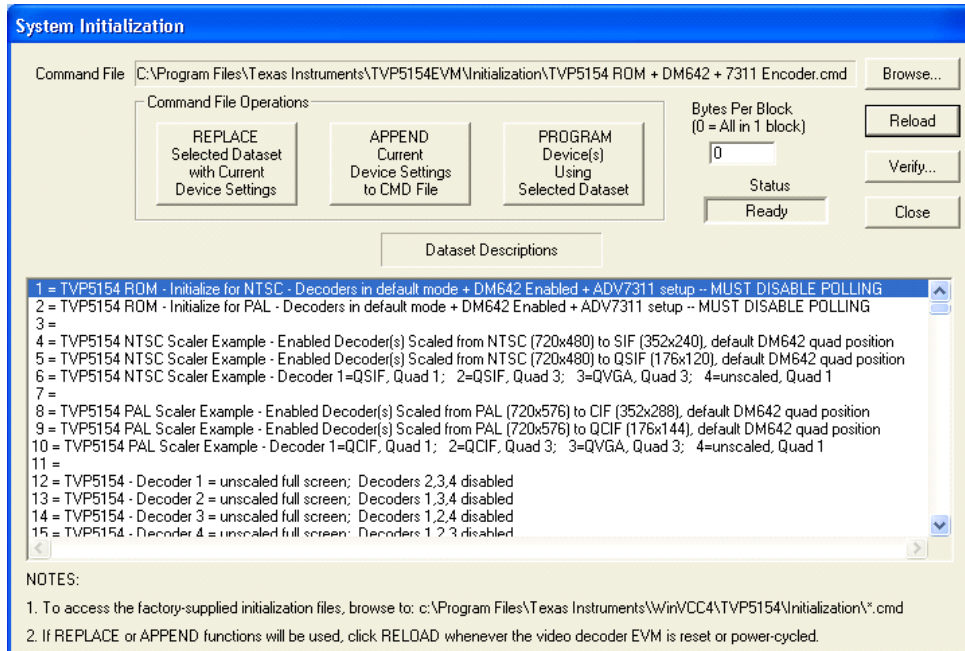


Figure 8. WinVCC – System Initialization

9. With video sources provided at the BNC connectors and the EVM output connected to a monitor, video from the source connected to CH1 should be viewable on the display monitor.
10. The other datasets in the command file are provided to demonstrate examples of 5154 scaling performance. Refer to the TVP5154 data sheet (SLES163) or Scaler application report for more details on programming the TVP5154 scaler. The DM642 settings can be controlled by using the DM642 Control Window, which is found by clicking on Tools→DM642 Control. Refer to Chapter 9 for details on programming the DM642 through this window or through the Generic I²C registers.

8 WinVCC in Depth

The following sections describe how to use Windows™ Video Control Center (WinVCC) in depth. It discusses various features and screens that the user may encounter while evaluating the TVP5154EVM.

8.1 Starting WinVCC

The Port95NT parallel port driver must be installed before using WinVCC. WinVCC may be started by clicking on Start→All Programs→TVP5154EVM Software→WinVCC.

If the dialog box shown in Figure 9 is displayed, it means one of two things:

- WinVCC did not run to completion the last time it ran. In this case, click OK to exit the program and restart WinVCC.
- There is more than one instance of WinVCC running at the same time. In this case, click OK to exit the program. Then, press CTRL-ALT-DELETE to bring up the Task Manager. Select and click End Task on all occurrences of WinVCC or WinVCC CONFIGURATION. Then restart WinVCC.

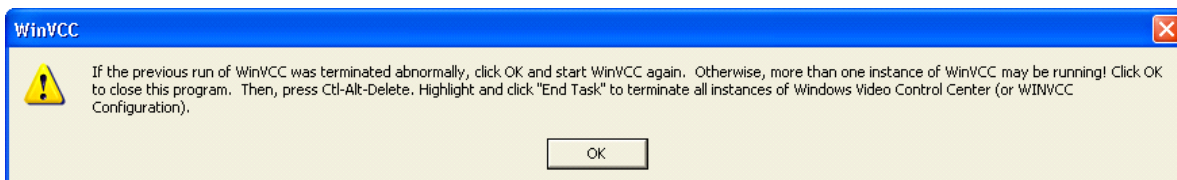


Figure 9. WinVCC Multiple Occurrences Error Message

8.2 WinVCC Configuration Dialog Box

The WinVCC Configuration dialog box (see [Figure 10](#)) should now be visible. This dialog box configures the I²C bus on the TVP5154EVM. All settings from this dialog box are stored in the Windows registry and are restored the next time the program is started. After initial installation, VID_DEC is set to TVP5154 and VID_ENC is set to 7311 Encoder.

The I²C slave address for each device must match the I²C slave address selected by jumpers on the TVP5154EVM. These jumpers are set by the factory to use 0xB8 for the TVP5154 and 0x54 for the Encoder. It is also important to select the correct Specific Device type for the video decoder. TVP5154 and 7311 Encoder must be selected for this EVM.

All Program Options must be enabled. Disabling these options is only required if debugging a problem with the I²C bus.

Clicking OK begins I²C communication with the selected devices.

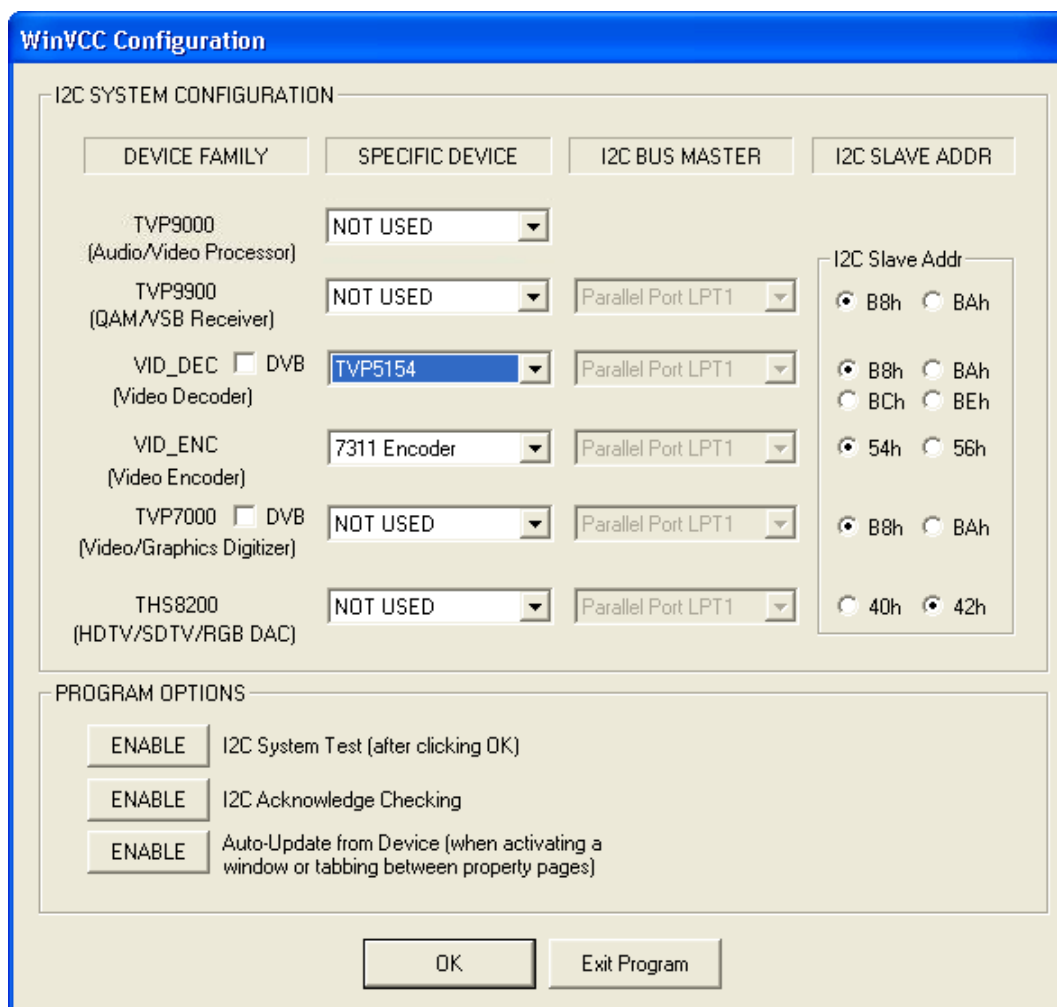


Figure 10. WinVCC I²C Address Configuration

8.3 I²C System Test

The I²C system test of selected registers runs immediately after closing the WinVCC Configuration dialog box with OK (unless the I²C system test program options button was disabled).

If the I²C system test passes, only a PASS message appears. If the test failed, a dialog box like the one shown in [Figure 11](#) appears. See Section 10, Troubleshooting, for details on how to resolve this issue.

The I²C system test can be run at anytime by clicking Run System I²C Test in the Tools menu.

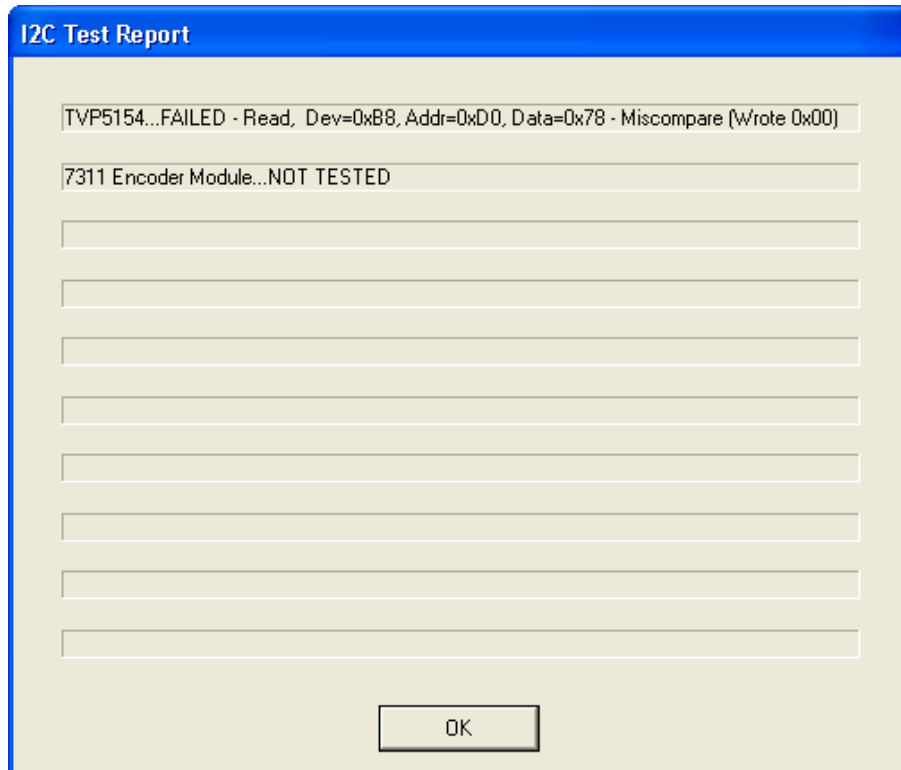


Figure 11. I²C System Failure

8.4 Real-Time Polling

Real-time polling provides polling functions that execute continuously in the background, when enabled via the Real-Time Polling dialog. There are two polling functions. The function that applies to the TVP5154 is VIDEO-STANDARD AUTO-SWITCH POLLING.

When the TVP5154 detects a change in the input video standard, it automatically switches to operation in the detected standard (which includes all necessary I²C register initialization) for proper decoding of the input video. To enable auto-switch on the TVP5154, the Set Video Standard register must be set to auto-switch mode (Reg 0x28 = 0x00).

If the WinVCC auto-switch polling function is enabled, the detected video standard status from the TVP5154 is polled until a change in the input video standard (or in the TVP5154 sampling mode) is detected. When a change is detected, the video encoder is reprogrammed as needed for the detected standard. Using this feature, the video source can change its video standard and the system displays using the new standard, without user intervention.

When using the TVP5154 EVM with the DM642 and a composite output from the 7311 encoder, it is required to disable auto-switch polling by clicking on the ENABLED button in the Real-Time Polling dialog box as shown in [Figure 12](#).

The real-time polling dialog can also be accessed once WinVCC is up and running by clicking Real-Time Polling in the Tools menu.

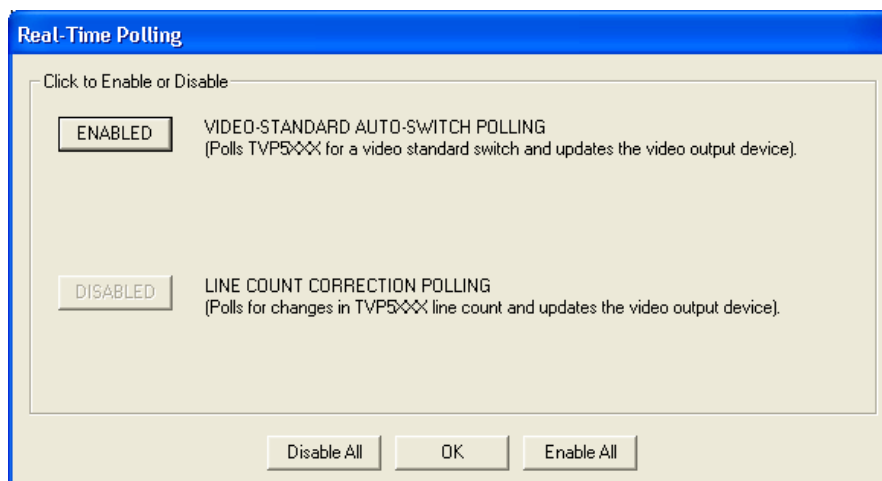


Figure 12. Real-Time Polling Dialog

8.5 Main Menu

After closing the real-time polling dialog, the main menu is displayed as shown in Figure 13. The menus, which are used to operate WinVCC, are File, Edit, Tools, Window, and Help. The File menu's only function is Exit, which terminates the program. Table 3 summarizes the main menu contents.

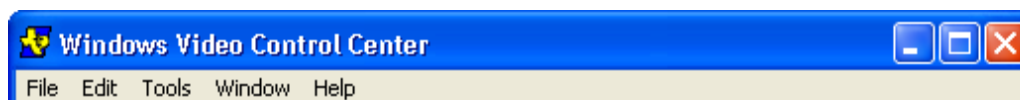


Figure 13. WinVCC – Main Screen

Table 3. Main Menu Summary

MENU	CONTENTS
File	Exit
Edit	Register Map TVP5154 7311 Encoder Module Generic I ² C Memory Map TVP5154 7311 Encoder Module Property Sheets TVP5154 7311 Encoder Module
Tools	System Initialization Real-time Polling TV Tuner Control (FQ12xx series only) Multiple-Byte I ² C Transfers Set I ² C Bit Rate Run System I ² C Test Run Continuous I ² C Test Read VBI FIFO Capture Live VBI Data DM642 Control
Window	Allows selection of the active window. Multiple windows can be open at the same time.
Help	Displays program version

The TVP5154 I²C Write Enable(s) and Read Enable pop-up window is displayed as shown in [Figure 14](#). This is used to select which decoder or decoders (any combination of all four) will receive I²C Write commands, and which decoder (only one) will receive I²C Read commands. Decoder 1 is Enabled by default; enable the other three decoders by clicking on each decoder's enable button.

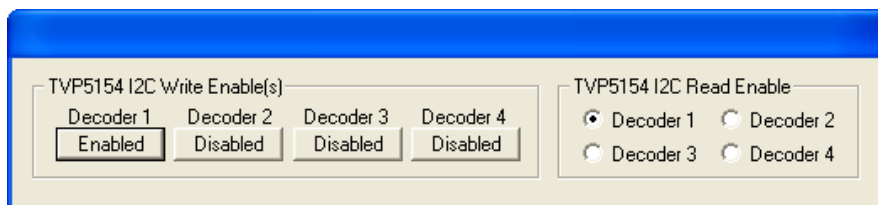


Figure 14. Decoder I²C Write and Read Enable

8.5.1 System Initialization

Clicking System Initialization in the Tools menu displays the dialog box shown in [Figure 15](#). This dialog box provides the means for initializing the TVP5154 decoder(s) and/or video encoder for a particular video mode, as well as programming settings for the DM642 through the Generic I²C registers. The details of the initialization are contained in the command file (with a CMD file extension).

The command file is loaded using the Browse... button. Once the command file is opened, a text list displays descriptions of the individual datasets contained within the command file.

Click once on the desired dataset description to select it. Click the Program Device(s) Using Selected Dataset button to run the selected dataset, which loads the devices via the I²C bus. When the device initialization has completed, the status indicator reads Ready.

Note: If Ready does not display, the devices are not initialized and the I²C bus is not communicating. See Chapter 10, Troubleshooting, for possible solutions.

Click the OK button to close the dialog box. Each time the System Initialization dialog box is closed, the initialization file pathname and the dataset selection number are saved in the Windows registry to allow these settings to be retained for the next time WinVCC runs.

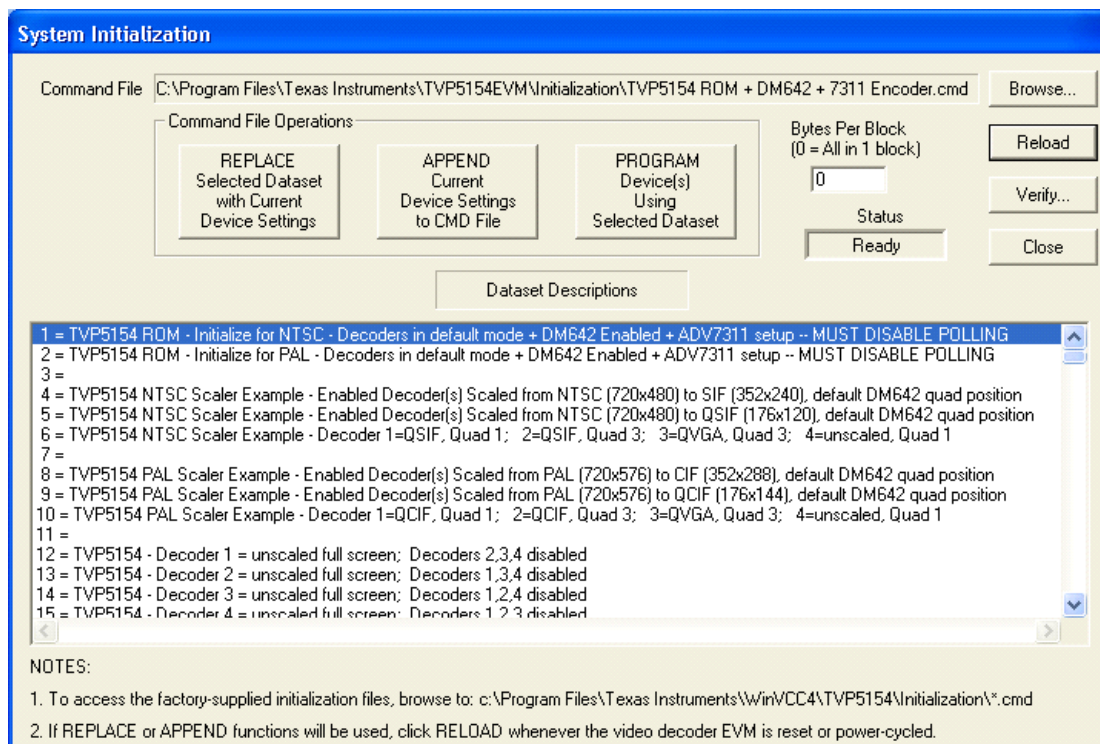


Figure 15. System Initialization

8.5.1.1 Adding a Custom Dataset

After programming the EVM via the System Initialization tool using the factory-supplied command file, you can customize the device register settings to fit your needs. Perform the following steps to save your custom settings:

1. Reopen the System Initialization dialog box via the Tools menu.
2. Click the Append Current Device Settings to Command File button. A dialog box requesting a description of the new dataset appears.
3. Optionally, click the drop-down box and select one of the existing descriptions.
4. Modify the description text or type your own description.
5. Click OK. All nondefault register values from the TVP5154, DM642, and encoder are appended to the current command file as an additional dataset.

Now, you can select your custom dataset and send it with a press of the Program... button.

By using the same procedure above with the Replace Selected Dataset with Current Device Settings button you can overwrite an existing dataset with the current settings.

Note: If editing the command file (.CMD) using a standard editor, the file must be saved as plain text.

8.5.1.2 Command Files

The command file is a text file that can be generated using any common editor; however, it must be saved as plain text. Command files are especially useful for quickly switching between the various system configurations. These .CMD files are unrelated to the typical Windows .CMD files.

A default command file is provided on the CD. This command file contains many examples of the desired setups. This command file is located at:

c:\Program Files\Texas Instruments\TVP5154EVM\Initialization\

A command file can contain up to 250 datasets. A dataset is a set of register settings to initialize the TVP5154 decoder, 7311 encoder, and/or DM642 for a particular video mode. Each dataset includes a description that is displayed in one row of the dataset descriptions list. The register settings may be located in the command file itself and/or may be stored in separate include file(s) (with an .INC file extension) and be included into the command file using the INCLUDE statement.

8.5.1.3 Example Command File

An example of one dataset within a command file is shown below.

```
BEGIN_DATASET

DATASET_NAME,"TVP5154, Auto-switch, Stable Sync, Fast-lock, 656 Out"
// Initialize video encoder using an include file
INCLUDE, EncoderNTSC656_RTC.INC
// Program TVP5154 registers
WR_REG,VID_DEC,1,0x7F,0x00 // Reset 5154 microprocessor
WR_REG,VID_DEC,1,0x03,0x0D // Enable YCbCr outputs and syncs
WR_REG,VID_DEC,1,0x15,0x81 // Enable Stable Sync mode
WR_REG,VID_DEC,1,0x02,0x80 // Enable Fast-lock mode

END_DATASET
```

Each command file may contain individual write-to-register (WR_REG) commands.

- The comment indicator is the double-slash //.
- The command file is not case sensitive and ignores all white-space characters.
- All numbers can be entered as hexadecimal (beginning with 0x) or as decimal.
- Every dataset in a command file begins with BEGIN_DATASET and ends with END_DATASET. The maximum number of datasets is 250.
- The dataset text description is entered between double quotes using the DATASET_NAME command. The enclosed text can be up to 128 characters in length. This text appears in the System Initialization dialog box when the command file is opened.
- The INCLUDE command inserts the contents of an include file (with an .INC file extension) in-line in place of the INCLUDE command. Therefore, the include file must not contain the BEGIN_DATASET, END_DATASET, and DATASET_NAME commands.

Note: All included files must be located in the same directory as the command (CMD) file.

- The write-to-register command is written as:
WR_REG, <DeviceFamily>, <Number of data bytes (N)>, <subaddress>, <Data1>, ..., <DataN>
or
WR_REG, <Literal slave address>, <Number of data bytes (N)>, <subaddress>, <Data1>, ..., <DataN>
The valid device family mnemonics are:
VID_DEC for the video decoders
VID_ENC for the video encoders
THS8200 for the THS8200 device
WinVCC translates the device family mnemonic to the slave address that was selected in the WinVCC Configuration dialog box upon program startup. This eliminates having to edit command files if the alternate slave address must be used.

If the literal slave address method is used, the slave address entered is used directly. This method is normally used for programming the video encoder.

The slave address 0x40h is used to access the DM642.

- A delay may be inserted between commands using the WAIT command, which is written as:
WAIT,<# milliseconds>

8.5.2 Register Editing

The next section describes the five available modes of register editing: TVP5154 Register Map editor, 7311 Encoder Module Register Map editor, Generic I²C Register Map editor, TVP5154 memory map editor, and TVP5154 Property Sheets. Each of these functions can be selected from the Edit menu.

8.5.2.1 Register Map Editor

The TVP5154 Register Map editor (see [Figure 16](#)) allows the display and editing of the entire used register space of the device within a simple scrolling text box. To open this, click on Edit Register Map in the Edit menu and click on the device type to edit. [Table 4](#) describes how to use each of the controls in the TVP5154 Register Map editor.

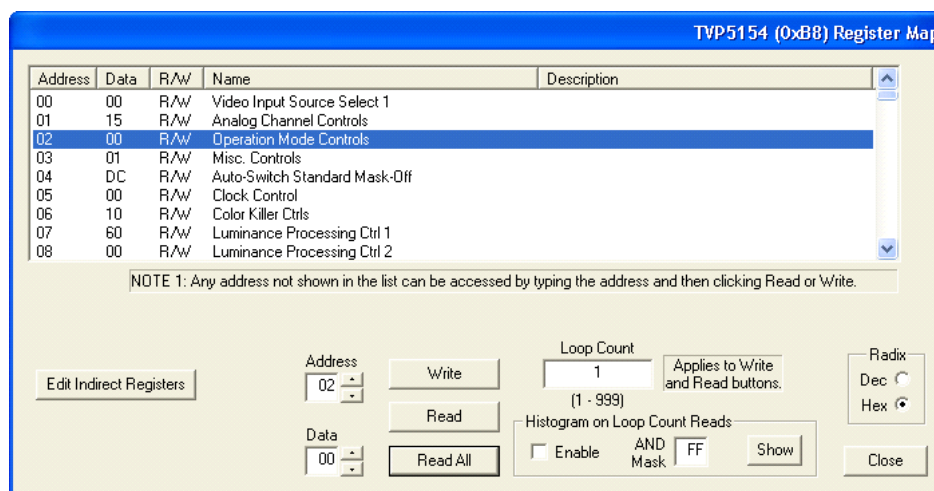


Figure 16. TVP5154 Register Map Editor

Table 4. TVP5154 Register Map Editor Controls

CONTROL	DEFINITION
Register Window	Scrolling text box that displays the address and data for the I ² C registers that are defined for the device
Address Edit Box	Contains the I ² C subaddress that will be accessed using the Write and Read buttons. Clicking on a row selects an address, which then appears in the address edit box. NOTE: After clicking on a row, the Data Edit box contains the data that was in the register window. The device has not yet been read. The address up/down arrows are used to jump to the next/previous subaddress that is defined for the device. If an address is not defined for the device, it can still be accessed by typing the subaddress in the Address Edit box.
Data Edit Box	Contains the data which will be written to, or was read from, the I ² C subaddress. The data up/down arrows increment/decrement the data value by 1.
Write Button	Writes the byte in the Data Edit box to the address in the Address Edit box. The I ² C register is written to whether or not the data is different from the last time the register was read.
Read Button	Reads the data from the address in the Address Edit box into the Data Edit box and the register window.
Read All Button	Reads all defined readable registers from the device and updates the register window.
Hex Button	Converts all values in the register window and address and data edit boxes to hexadecimal.
Dec Button	Converts all values in the register window and address and data edit boxes to decimal.
Close Button	Closes the dialog. NOTE: Multiple edit register map windows can be open at the same time (one for each device). Use the Window menu to navigate.
Loop Count	Causes subsequent write, read, or read all operations to be performed N times. N is entered as a decimal number from 1 to 999.

8.5.2.2 Encoder Module Register Map Editor

The Encoder Module Register Map editor (see [Figure 17](#)) allows the display and editing of the video encoder registers. This editor works like the TVP5154 Register Map editor.

To open this, click on Register Map in the Edit menu and click on 7311 Encoder Module.

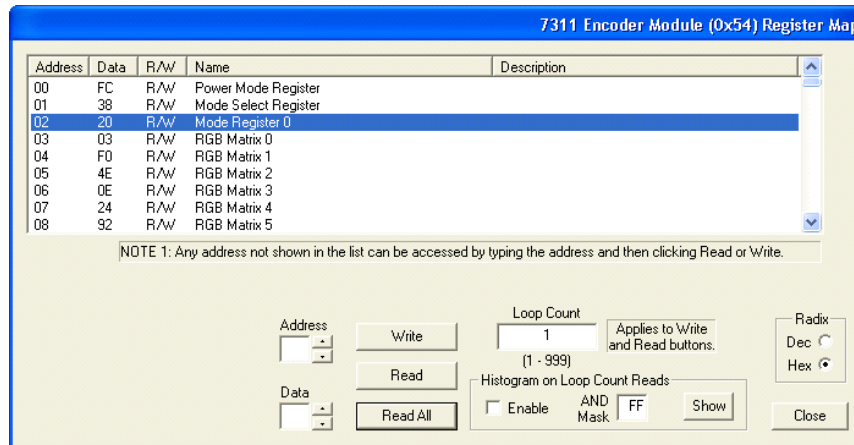


Figure 17. 7311 Encoder Module Register Map Editor

8.5.2.3 Generic I²C Register Editor

The Generic I²C Register editor (see [Figure 18](#)) allows the display and editing of any device on the I²C bus. This editor works like the TVP5154 Register Map editor, except that the I²C slave address must be entered and the Read All button is disabled.

To open this, click on Register Map in the Edit menu and then click on Generic I²C.

The DM642 I²C registers can be edited using I²C sub-address 0x40. See [Section 9](#) for details about the DM642 registers.

The video encoder module registers can be edited using I²C sub-address 0x54 (default) or 0x56 if the alternate slave address is being used.

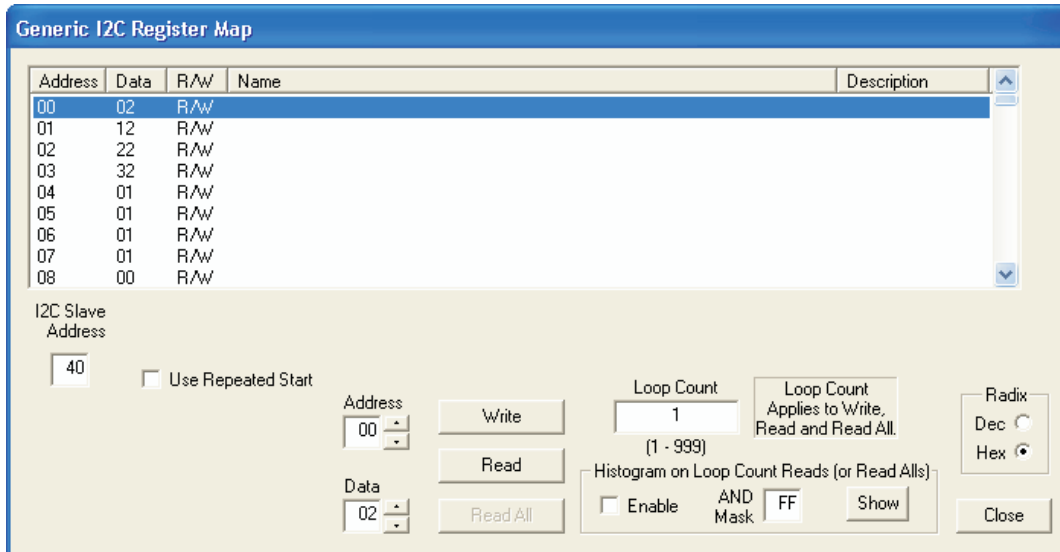


Figure 18. Generic I²C Register Map Editor

8.5.2.4 Memory Map Editor

The memory map editor (see [Figure 19](#)) allows the display and editing of the data memory and hardware registers of the device, such as the scaler setting registers.

To open this, click on Memory Map in the Edit menu and click on the device type to edit. The operation of the memory map editor controls are explained in [Table 5](#).

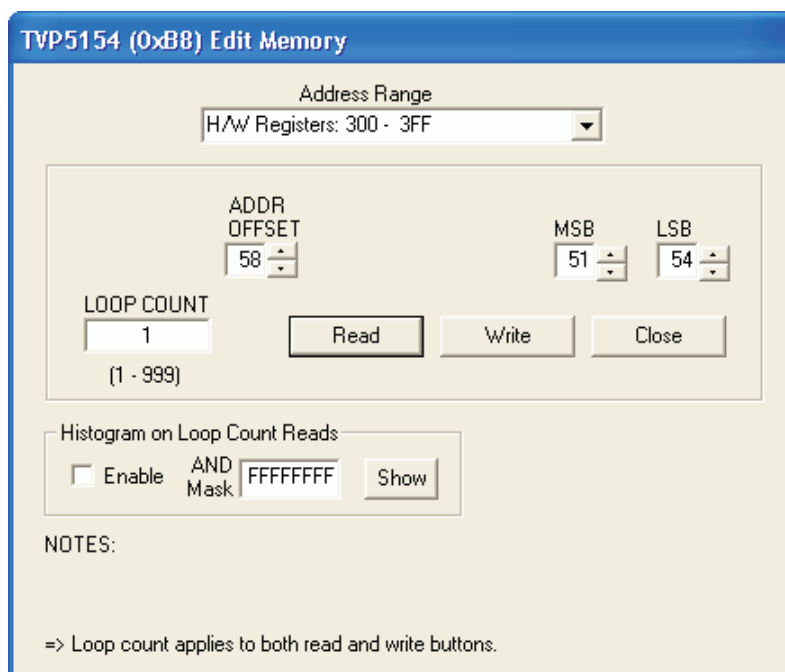


Figure 19. Memory Map Editor

Table 5. Memory Map Editor Controls

CONTROL	DEFINITION
Base Address Selector	The hardware registers use a 10-bit address internally. The base address selector allows quick entry of the base address. The list contains base addresses for the major functional blocks of the TVP5154.
Address Offset Edit Box	Contains the lowest byte of the 10-bit internal address. The full 10-bit address is formed by adding the base address to the address offset. The address up/down arrows increment/decrement the address offset by 1.
Data Edit Boxes	Contains the 16-bit data word that is written to or read from the register address. The LSB data is at the lowest address. The data is written/read LSB first. The data up/down arrows increment/decrement the data value by 1.
Write Button	Writes the (2) bytes in the data edit boxes starting at the 10-bit register address BASE+OFFSET.
Read Button	Reads (2) consecutive data bytes starting at the 10-bit register address BASE+OFFSET to the data edit boxes.
Loop Count Edit Box	Causes subsequent write or read operations to be performed N times. N is entered as a decimal number from 1 to 999.
Histogram on Loop Count Reads	Creates a histogram of the results from the Loop Count Reads.
Close Button	Closes the dialog. <hr/> <p>Note: The memory map editor can remain open with other windows. Use the Window menu to navigate.</p> <hr/>

8.6 TVP5154 Property Sheets

The property sheets represent the register data in a user-friendly format. The data is organized by function, with each function having its own page and being selectable via tabs at the top (see [Figure 20](#)).

To open this, click on Edit Property Sheets in the Edit menu and select the device type to edit.

When the property sheet function is started or whenever the user tabs to a different page, all readable registers in the device are read from hardware to initialize the dialog pages. Values on the page are changed by manipulating the various dialog controls as described in [Table 6](#).

OK, Cancel, and Apply buttons are at the bottom of each property page. These are described in [Table 7](#).

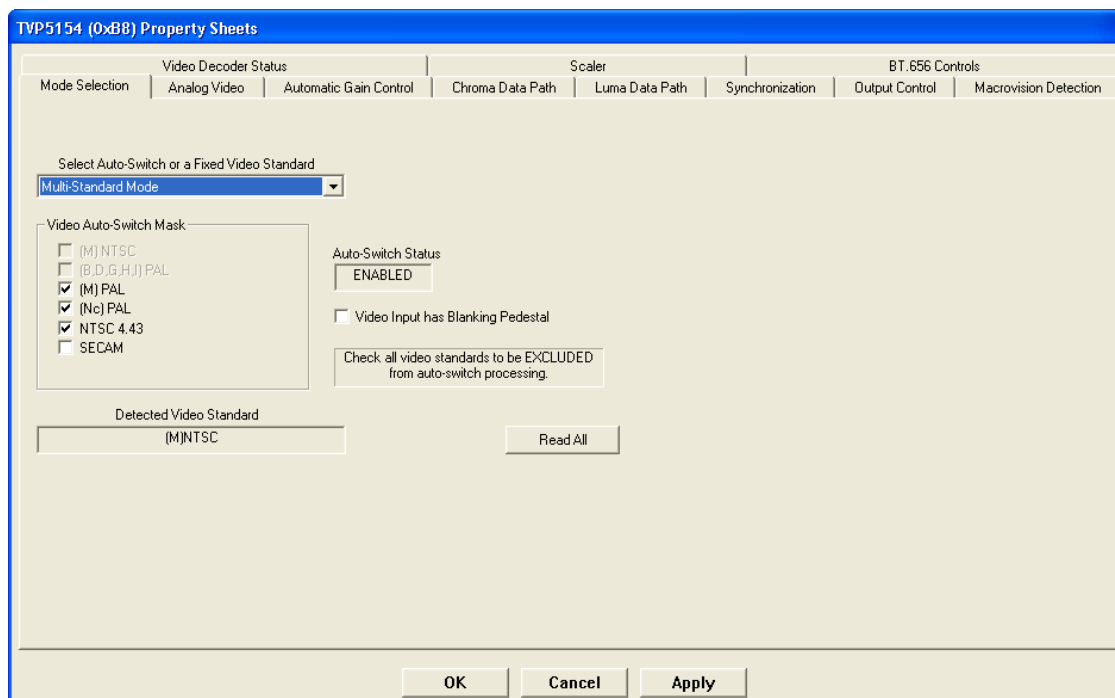


Figure 20. TVP5154 Property Sheets

8.6.1 Property Sheet Refresh

The property sheets are designed so that the data displayed is always current. Certain actions cause the entire register map to be read from the device and to update the property sheets. This happens when:

- Property sheets are initially opened.
- When tabbing from one page to another.
- When Read All is clicked.
- When making the TVP5154 Property Sheets window the active window (by clicking on it).
- When making a TVP5154 Register Map editor window the active window (by clicking on it).

8.6.1.1 Auto-Update From Device

The last two items in the Property Sheet Refresh list (see section 8.6.1) are referred to as the Auto-Update feature. Auto-Update can be disabled by setting its program option button to DISABLED. This button is located on the initial dialog box (WinVCC Configuration).

With Auto-Update enabled (default), the user can open both the TVP5154 Property Sheets and the TVP5154 Register Map editor at the same time. Changes made to the property sheets (and applied) are updated in the register map window as soon as the Register Map window is clicked on. Additionally, changes made in the TVP5154 Register Map editor are updated in the TVP5154 Property Sheets as soon as the property sheets window is clicked on.

Table 6. Use of Property Sheet Controls

PROPERTY SHEETS	DIALOG CONTROL	WHAT DO I DO WITH IT?
When is Hardware Updated?		
Read-Only Edit Box	Read status information	N/A
Check Box	Toggle a single bit	After <i>Apply</i>
Drop-Down List	Select from a text list	After <i>Apply</i>
Edit Box	Type a number	After <i>Apply</i>
Edit Box with Up/Down arrows	Use up/down arrows or type a number	Up/Down arrows: Immediately Type a number: After <i>Apply</i>
Slider	Slide a lever	Immediately
Pushbutton	Initiate an action	Immediately

Table 7. Property Sheet Button Controls

BUTTON CONTROL	DEFINITION
OK	Writes to all writeable registers whose data has changed. A register is flagged as changed if the value to be written is different from the value last read from that address. Closes the dialog.
Cancel	Causes all changes made to the property page since the last <i>Apply</i> to be discarded. Changes made to dialog controls with 'immediate hardware update' are not discarded, since they have already been changed in hardware. Does not write to hardware. Closes the dialog.
Apply	Writes to all writeable registers whose data has changed. A register is flagged as changed if the value to be written is different from the value last read from that address.

9 Programming the TMS320DM642

This chapter discusses how to change settings for the TMS320DM642 on this EVM. The DM642 settings can be controlled by using the DM642 Control Window, which is found by clicking on Tools→DM642 Control, or through the Generic I²C registers.

9.1 Development and Purpose of DM642 Code

The TVP5154EVM was developed by the TI Digital Video Department, which is responsible for the TVP5146 and TVP5150AM1 video decoders currently used on the DM642EVM released by Spectrum Digital. The TVP5154EVM hardware and software are both based on this DM642EVM.

The TVP5154EVM was designed specifically for security customers interested in a quad video decoder. The TVP5154EVM showcases the TVP5154 with various scaled/unscaled display modes, while making the DM642 transparent to the customer during evaluation. This is made possible by placing the DM642 into an I²C slave mode and controlling the capture/display modes using virtual I²C registers. The entire TVP5154EVM is controlled by a PC emulating I²C via the parallel port. By downloading the DM642 code from flash at power up, it is not required to use Code Composer Studio™ software to program the DM642; all relevant DM642 control registers can be accessed and controlled through a generic I²C address.

In addition to the command file provided with this EVM, additional command files to be used with TI's EVM control software (WinVCC) can be provided from TI to support easy programming of the TVP5154 and DM642 registers to show the most common scaling configurations for both NTSC and PAL formats. When using these command files or when setting the register values through a standard I²C bus interface, it is important to enable and program the 5154 outputs before configuring the DM642 registers. The DM642 portion of the TVP5154EVM consists only of the DM642, SDRAM, and flash memory.

9.2 Details of the DM642 Code and Control Registers

Details of the DM642 code and control registers are:

- The DM642 device address is 0x40h by default. The DM642 is setup as an I²C slave.
- The DM642 executes code on power up from the flash using the PCI GPIO to control the address MSB.
- Virtual I²C registers are created within the DM642 in order to control the capture and display of the scaled/unscaled data from the TVP5154 video decoder. These registers are described in [Table 9](#).
- The virtual I²C registers support scaled and unscaled video outputs independently for each of the four video decoders, with the option to overlay scaled video onto unscaled video, and to define the quadrant location of each scaled channel.
- The virtual I²C registers provide easy control/access to the GPIOs currently tied to LEDs. Please refer to the TVP5154EVM schematics for options to associate an LED on/off with a register setting.
- The DM642 is not responsible for any scaling. All video scaling is performed by the TVP5154. The DM642 is only responsible for image capture and display.
- The DM642 virtual registers can be controlled by using the DM642 Control Window or through the Generic I²C registers.

9.2.1 DM642 Control Window

The DM642 settings can be easily controlled by using the DM642 Control window. This window represents the DM642 register data in a user-friendly format. The data is organized for each of the four decoders (see [Figure 21](#)).

To open this, click on DM642 Control in the Tools menu.

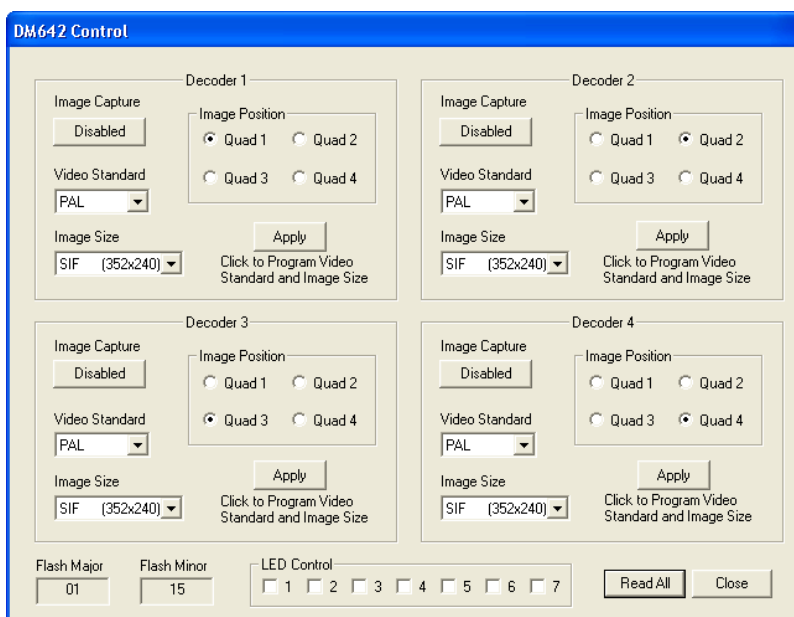


Figure 21. DM642 Control Window

When the DM642 Control window is opened, all readable registers for the device are read from software to initialize the dialog page. Register details are given in Table 8. Values on the page are changed by manipulating the various dialog controls as described in Table 8. The data is organized for each of the four decoders, allowing independent control of each decoder.

Table 8. DM642 Control Window Controls

CONTROL	DEFINITION
Read All	Reads all defined readable registers from the device and updates the register window.
Close	Causes all changes made to the page since the last Apply to be discarded. Changes made to dialog controls with 'immediate register update' are not discarded, since they have already been changed in the DM642 registers. Does not write to registers. Closes the dialog.
Image Capture	Enables image capture in the DM642 for that given decoder (1–4). Immediate register update.
Video Standard	Used to inform the DM642 of the input color standard for that given decoder (1–4). No change in register until Apply is clicked. Does not change the video standard setting for the TVP5154.
Image Size	Used to inform the DM642 of the input image size for that given decoder (1–4). No change in register until Apply is clicked. Actual scaling is done in the TVP5154.
Image Position	Defines the quadrant location for the input of that given decoder (1–4). Immediate register update.
Apply	Immediately changes DM642 registers for input image size and input color standard for that given decoder (1–4). Enables TVP5154 scaler and programs correct scaling register settings into TVP5154 based on selected input standard and image size for that given decoder (1–4).
Flash Major/Minor	Reads the data from the Flash Version registers and writes it into the register window.
LED Control	Changes LED (1–7) status. Checked: LED is ON. Unchecked: LED is OFF. Immediate register update.

9.2.2 DM642 Virtual I²C Register Map

Table 9. DM642 Virtual I²C Register Map

REGISTER DESCRIPTION	ADDRESS	DATA (DEFAULT)
Decoder 1 Register	00h	02h
Decoder 2 Register	01h	12h
Decoder 3 Register	02h	22h
Decoder 4 Register	03h	32h
Decoder 1 Input Format Register	04h	01h
Decoder 2 Input Format Register	05h	01h
Decoder 3 Input Format Register	06h	01h
Decoder 4 Input Format Register	07h	01h
LED Control	08h	00h
Flash Version: Major	09h	01h
Flash Version: Minor	0Ah	00h

9.2.3 DM642 Virtual I²C Register Details
Table 10. Decoder 1 Register

Address	00h							
Default	02h							
	7	6	5	4	3	2	1	0
	Reserved		Position		Capture Enable	Capture Size		

Capture Size	Bit 2	Bit 1	Bit 0
Unscaled	0	0	0
QSIF – 176 × 120	0	0	1
SIF – 352 × 240 (1/4 NTSC) (default)	0	1	0
QCIF – 176 × 144	0	1	1
CIF – 352 × 288 (1/4 PAL)	1	0	0
QVGA – 320 × 240	1	0	1
VGA – 640 × 480	1	1	0
Reserved	1	1	1

Capture Enable	Bit 3
Disable (default)	0
Enable	1

Position	Bit 5	Bit 4
Quadrant 1 (default)	0	0
Quadrant 2	0	1
Quadrant 3	1	0
Quadrant 4	1	1

Quad 1	Quad 2
Quad 3	Quad 4

Scaled capture sizes always take priority over unscaled capture sizes.

Decoder priorities are always such that Decoder 1 is the highest priority, Decoder 2 is the second highest, etc.

For example, if Decoders 1 and 4 are scaled to 1/4 size and Decoders 2 and 3 are unscaled, this display results:

Decoder 1 Scaled	Decoder 2 Unscaled
Decoder 2 Unscaled	Decoder 4 Scaled

Note: The unscaled Decoder 2 displays in both Quadrant 2 and 3 since Decoder 2 takes priority over Decoder 3 when both are unscaled.

Table 11. Decoder 2 Register

Address	01h							
Default	12h							
	7	6	5	4	3	2	1	0
	Reserved		Position		Capture Enable	Capture Size		

Capture Size	Bit 2	Bit 1	Bit 0
Unscaled	0	0	0
QSIF – 176 × 120	0	0	1
SIF – 352 × 240 (1/4 NTSC) (default)	0	1	0
QCIF – 176 × 144	0	1	1
CIF – 352 × 288 (1/4 PAL)	1	0	0
QVGA – 320 × 240	1	0	1
VGA – 640 × 480	1	1	0
Reserved	1	1	1

Capture Enable	Bit 3
Disable (default)	0
Enable	1

Position	Bit 5	Bit 4
Quadrant 1	0	0
Quadrant 2 (default)	0	1
Quadrant 3	1	0
Quadrant 4	1	1

Quad 1	Quad 2
Quad 3	Quad 4

Table 12. Decoder 3 Register

Address	01h						
Default	22h						
7	6	5	4	3	2	1	0
Reserved		Position		Capture Enable	Capture Size		

Capture Size	Bit 2	Bit 1	Bit 0
Unscaled	0	0	0
QSIF – 176 × 120	0	0	1
SIF – 352 × 240 (1/4 NTSC) (default)	0	1	0
QCIF – 176 × 144	0	1	1
CIF – 352 × 288 (1/4 PAL)	1	0	0
QVGA – 320 × 240	1	0	1
VGA – 640 × 480	1	1	0
Reserved	1	1	1

Capture Enable	Bit 3
Disable (default)	0
Enable	1

Position	Bit 5	Bit 4
Quadrant 1	0	0
Quadrant 2	0	1
Quadrant 3 (default)	1	0
Quadrant 4	1	1

Quad 1	Quad 2
Quad 3	Quad 4

Table 13. Decoder 4 Register

Address	01h						
Default	32h						
7	6	5	4	3	2	1	0
Reserved		Position		Capture Enable	Capture Size		

Capture Size	Bit 2	Bit 1	Bit 0
Unscaled	0	0	0
QSIF – 176 × 120	0	0	1
SIF – 352 × 240 (1/4 NTSC) (default)	0	1	0
QCIF – 176 × 144	0	1	1
CIF – 352 × 288 (1/4 PAL)	1	0	0
QVGA – 320 × 240	1	0	1
VGA – 640 × 480	1	1	0
Reserved	1	1	1

Capture Enable	Bit 3
Disable (default)	0
Enable	1

Position	Bit 5	Bit 4
Quadrant 1	0	0
Quadrant 2	0	1
Quadrant 3	1	0
Quadrant 4 (default)	1	1

Quad 1	Quad 2
Quad 3	Quad 4

Table 14. Decoder 1 Input Format Register

Address	04h						
Default	01h						
7	6	5	4	3	2	1	0
Reserved					Input Color Standard		

Input Color Standard	Bit 2	Bit 1	Bit 0
NTSC	0	0	0
(B, D, G, H, I, N) PAL (default)	0	0	1
Reserved	...		

The Input Color Standard register is used to inform the DM642 of the input color standard for that given decoder (1–4). The output format of the DM642 is set to the standard with the largest majority based on Registers 04h–07h. If the number of input color standards is equal, the DM642 automatically default to PAL output.

Table 15. Decoder 2 Input Format Register

Address	05h						
Default	01h						
7	6	5	4	3	2	1	0
Reserved					Input Color Standard		

Input Color Standard	Bit 2	Bit 1	Bit 0
NTSC	0	0	0
(B, D, G, H, I, N) PAL (default)	0	0	1
Reserved	...		

Table 16. Decoder 3 Input Format Register

Address	06h						
Default	01h						
7	6	5	4	3	2	1	0
Reserved					Input Color Standard		

Input Color Standard	Bit 2	Bit 1	Bit 0
NTSC	0	0	0
(B, D, G, H, I, N) PAL (default)	0	0	1
Reserved	...		

Table 17. Decoder 4 Input Format Register

Address	07h						
Default	01h						
7	6	5	4	3	2	1	0
Reserved					Input Color Standard		

Input Color Standard	Bit 2	Bit 1	Bit 0
NTSC	0	0	0
(B, D, G, H, I, N) PAL (default)	0	0	1
Reserved	...		

Table 18. LED Control Register

Address	08h						
Default	00h						
7	6	5	4	3	2	1	0
Reserved	LED 7 Status	LED 6 Status	LED 5 Status	LED 4 Status	LED 3 Status	LED 2 Status	LED 1 Status

LED (1–7) Status

= 0 (LED off)

= 1 (LED on)

Table 19. Flash Major Version Register

Address	09h						
Default	01h						
7	6	5	4	3	2	1	0
Flash Major Version							

Table 20. Flash Minor Version Register

Address	0Ah						
Default	00h						
7	6	5	4	3	2	1	0
Flash Minor Version							

10 Troubleshooting

This chapter discusses ways to troubleshoot the TVP5154EVM.

10.1 Troubleshooting Guide

If you are experiencing problems with the TVP5154EVM hardware or the WinVCC software, see [Table 21](#) for available solutions.

Table 21. TVP5154EVM Troubleshooting

SYMPTOM	CAUSE	SOLUTION
At startup, the error message <i>Cannot find DLL file DLPORTIO.DLL</i> appears.	The parallel port driver supplied with the EVM has not been installed.	Run Port95NT.EXE on the CD to install the driver.
Blank screen	Wrong video input is selected.	Go to Edit→Property Sheets→TVP5154, Analog Video page, select the correct video input(s) and click Apply. (The composite video input 1 is selected by default.)
	Source is connected to the wrong input connector.	Connect source to the correct input connector.
	YCbCr outputs or clock output is disabled.	Go to Edit→Property Sheets→TVP5154, Output Control page, check the enable YCbCr outputs and enable clock outputs check boxes and click Apply.
No color	Wrong mode is selected for color subcarrier genlock output.	Go to Edit→Property Sheets→TVP5154, Synchronization page, set the Fsc control format to RTC and click Apply.
	GLCO pin is not set to output the GLCO signal.	Go to Edit→Property Sheets→TVP5154, Output Control page, set the drop down box labeled FID/GLCO (pin 23) to genlock output (GLCO) and click Apply.
Screen colors are only magenta and green.	Wrong YCbCr output format	Go to Edit→Property Sheets→TVP5154, Output Control page, set the YCbCr output format to 8-bit 4:2:2 YCbCr w/ITU-R BT.656 embedded sync mode and click Apply.
Video standard auto-switch does not work on the video decoder side.	Auto-switch masks are not set correctly.	Go to Edit→Property Sheets→TVP5154, Mode Selection page, uncheck all standards to be included in auto-switch processing and click Apply.
	Video decoder is not in auto-switch mode.	Go to Edit→Property Sheets→TVP5154, Mode Selection page, set the drop-down box to multistandard and click Apply.
Video standard auto-switch does not work on the video encoder side.	Auto-switch polling is not enabled.	Click real-time polling in the Tools menu. Click Enable All and OK. This should be disabled if using a composite output.

Table 21. TVP5154EVM Troubleshooting (continued)

SYMPTOM	CAUSE	SOLUTION
No I ² C communication	Decoder I ² C slave address is wrong.	Make sure I ² C slave address jumpers on the TVP5154 decoder module are across pins 2 and 3.
	Encoder I ² C slave address is wrong.	Slave address is hard coded to be 0x54 in the command file. Make sure the I ² C slave address jumper on encoder module is across pins 2 and 3.
	Parallel cable is not connected from PC parallel port to the TVP5154 decoder module DB25 connector.	Connect cable
	EVM is not powered on.	Power supply must be plugged into a 100-V to 240-V/47-Hz to 63-Hz power source, and the cord must be plugged into the power connector on the EVM.
	Wrong type of parallel cable.	Some parallel cables are not wired straight through pin for pin. Use the cable supplied with the EVM.
	Device was placed in power-down mode.	Press the Reset button on the TVP5154 Decoder Module.
	EVM was configured for an external I ² C master.	Reinstall 0-Ω resistors R5 and R6. Control EVM using the PC parallel port.
	PC parallel port mode is not set correctly.	DO THIS AS A LAST RESORT. Reboot PC, enter BIOS setup program, and set parallel port LPT1 mode (Addr 378h) to ECP mode or bidirectional mode (sometimes called PS/2 mode or byte mode). If already set to one of these two modes, switch to the other setting (see Section 10.2).
Still no I ² C communication	PC may not be capable of operating in the required parallel port mode. This is true of some laptop computers. Use a different computer, preferably a desktop PC.	

When WinVCC is started and the WinVCC Configuration dialog box is closed with OK, the I²C system test is performed (unless the I²C System Test program options button was disabled).

If the I²C system test fails, a dialog box (see [Figure 22](#)) appears. This example reports that a read from TVP5154 failed, using slave address 0xB8, sub-address 0xD0. The data read was 0x78. The expected data was 0x00.

After noting which device had a problem, click OK to continue. Next, the Corrective Action Dialog box appears to fix the problem.

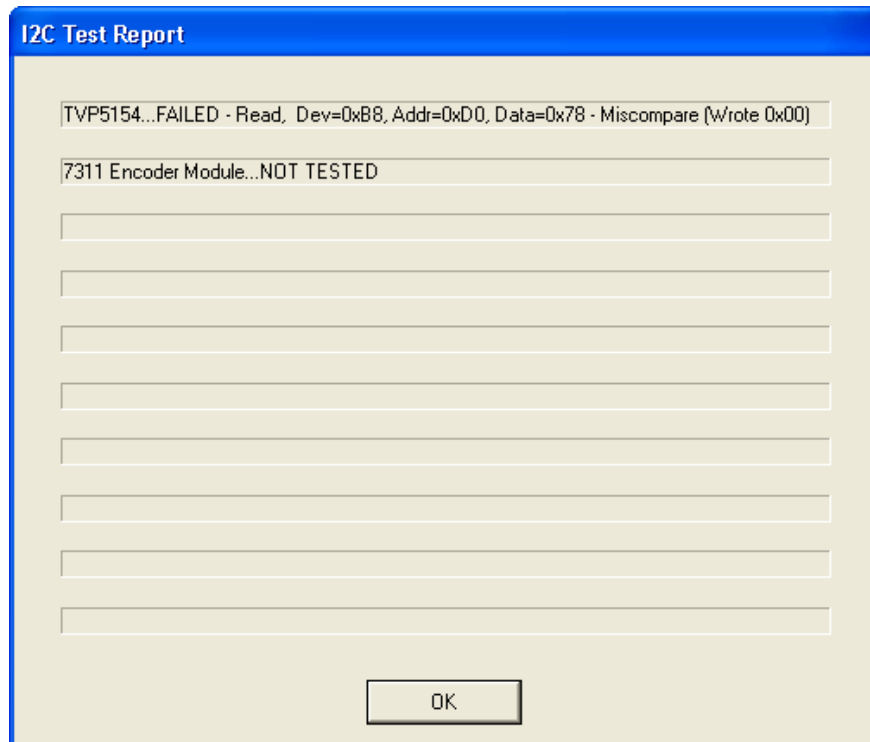


Figure 22. I²C System Failure Dialog Box

10.2 Corrective Action Dialogs

After closing the I²C system test report dialog box, a dialog box (see Figure 23) appears.

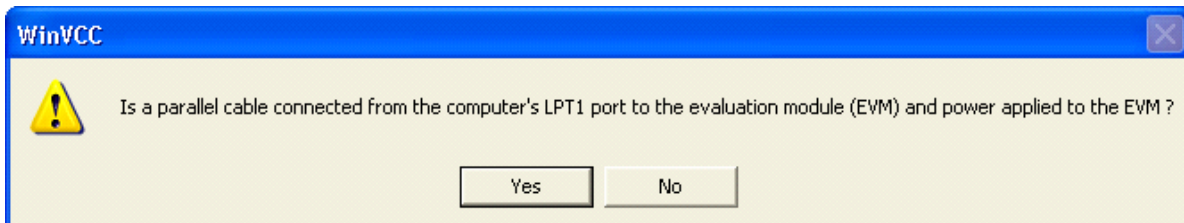


Figure 23. Corrective Action Dialog Box

1. If the parallel port cable is NOT connected between to PC and the TVP5154EVM, or if the EVM power is not on:
 - a. Click NO.
 - b. The dialog box shown in Figure 23 appears instructing you to correct the problem.
 - c. Correct the problem.
 - d. Click OK to continue. The Real-Time Polling dialog appears.

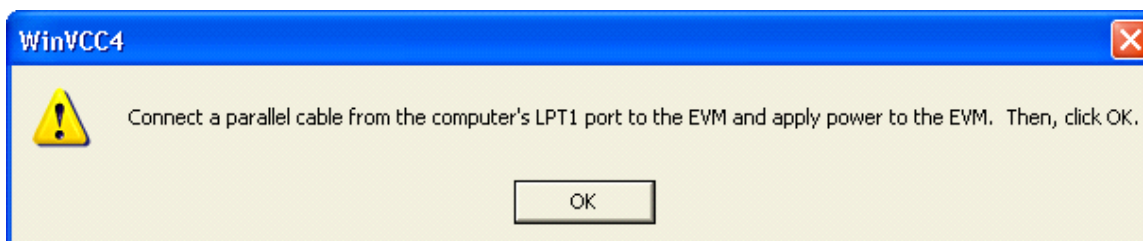


Figure 24. Corrective Action Required

2. If the cable is connected from the PC parallel port to the TVP5154EVM and the EVM power is on:
 - a. Click Yes.
 - b. The dialog box shown in [Figure 24](#) appears. This dialog box appears if the PC parallel port mode setting may need to be changed.

Note: Only run the PC BIOS setup program if the I²C communication problem cannot be resolved in another way (correct slave address settings, reset or power cycle the EVM, and/or check that the device type selected was TVP5154).

- c. Click OK to continue.
- d. The real-time polling dialog appears. Click OK to close it and get to the main menu.
- e. Click Exit in the File menu to exit the program.
- f. See the troubleshooting guide in [Table 21](#).

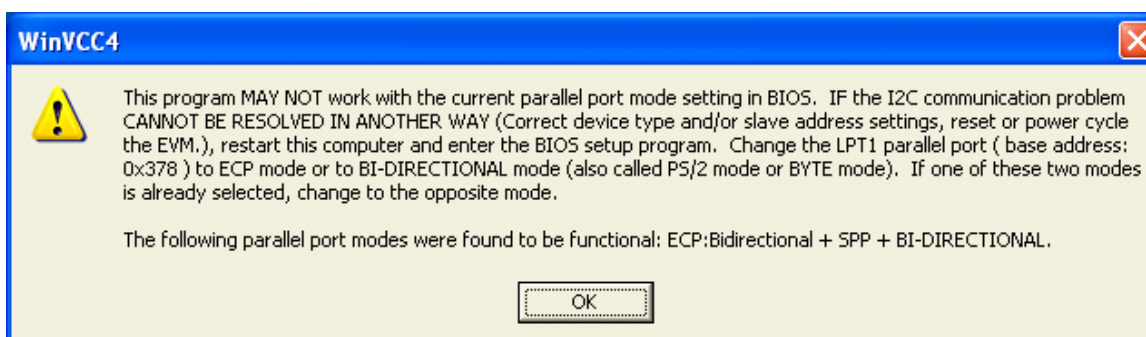


Figure 25. Corrective Action Required

10.2.1 Setting the PC Parallel Port Mode

Note: Only run the PC BIOS setup program if the I²C communication problem cannot be resolved in another way (correct slave address settings, reset or power cycle the EVM, and/or check that the device type selected was TVP5154).

1. Restart the PC.
2. During the boot process, enter the BIOS setup program by pressing the required key (usually the initial text screen indicates which key to press).
3. Find the place where the parallel port settings are made.
4. Set the parallel port LPT1 at address 378h to ECP mode or bidirectional mode (sometimes called PS/2 mode or byte mode). If one of these two modes is already selected, change to the opposite mode.
5. Exit and save changes.

10.2.2 General I²C Error Report

The I²C Error Report shown in [Figure 26](#) appears when an I²C error occurs at any time other than after the I²C system test. In this example, there is acknowledge error at slave address 0x54 (the video encoder module). The error occurred on Read Cycle Phase 1 on the device (slave) address byte.

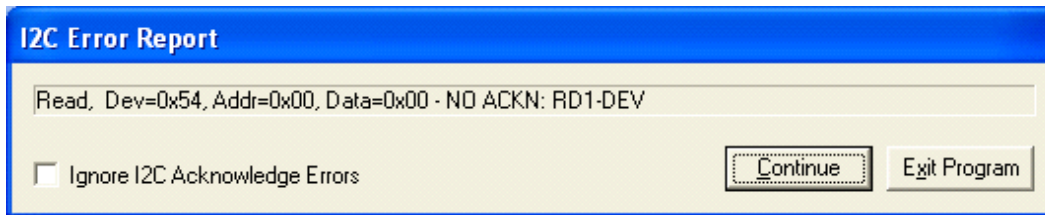
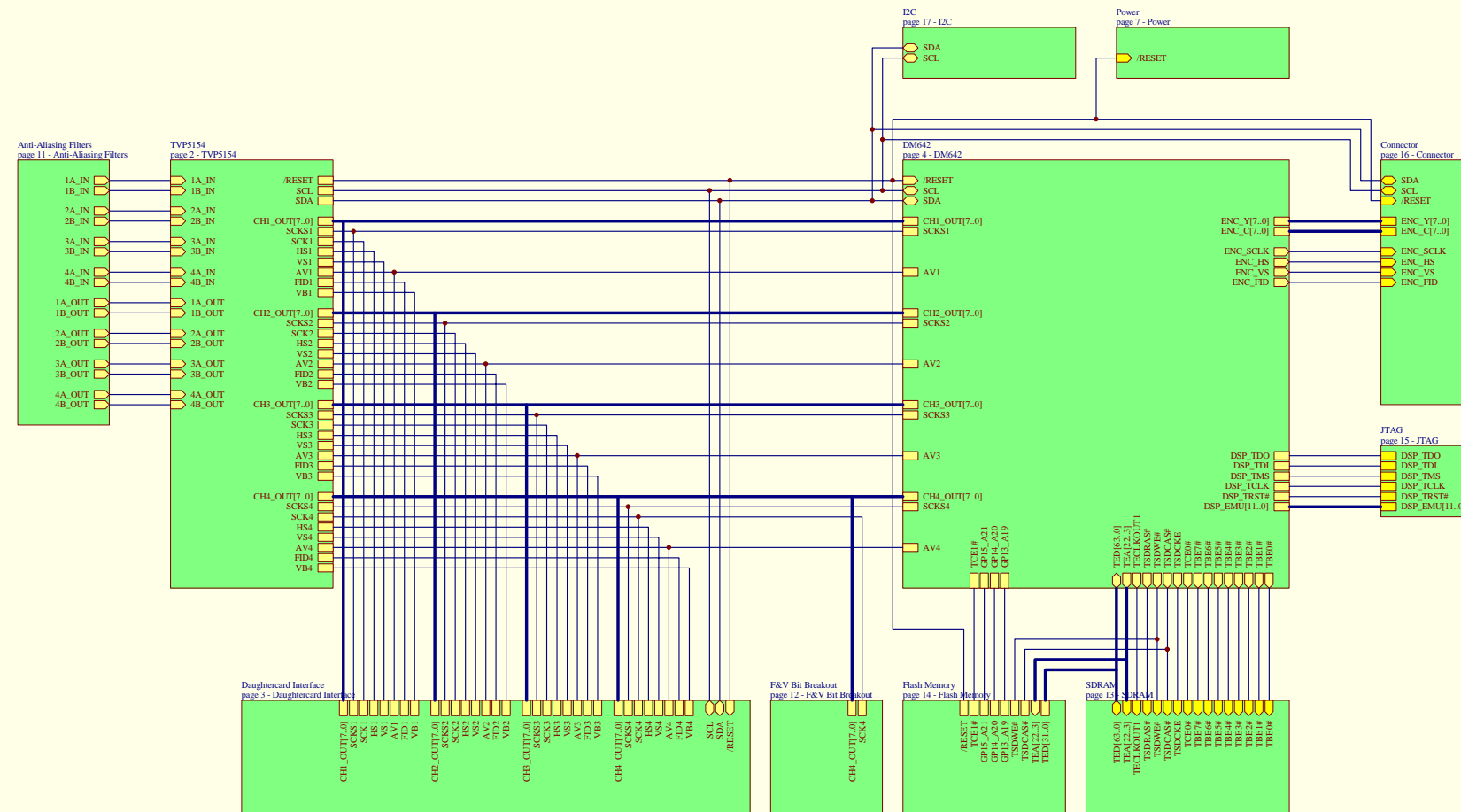


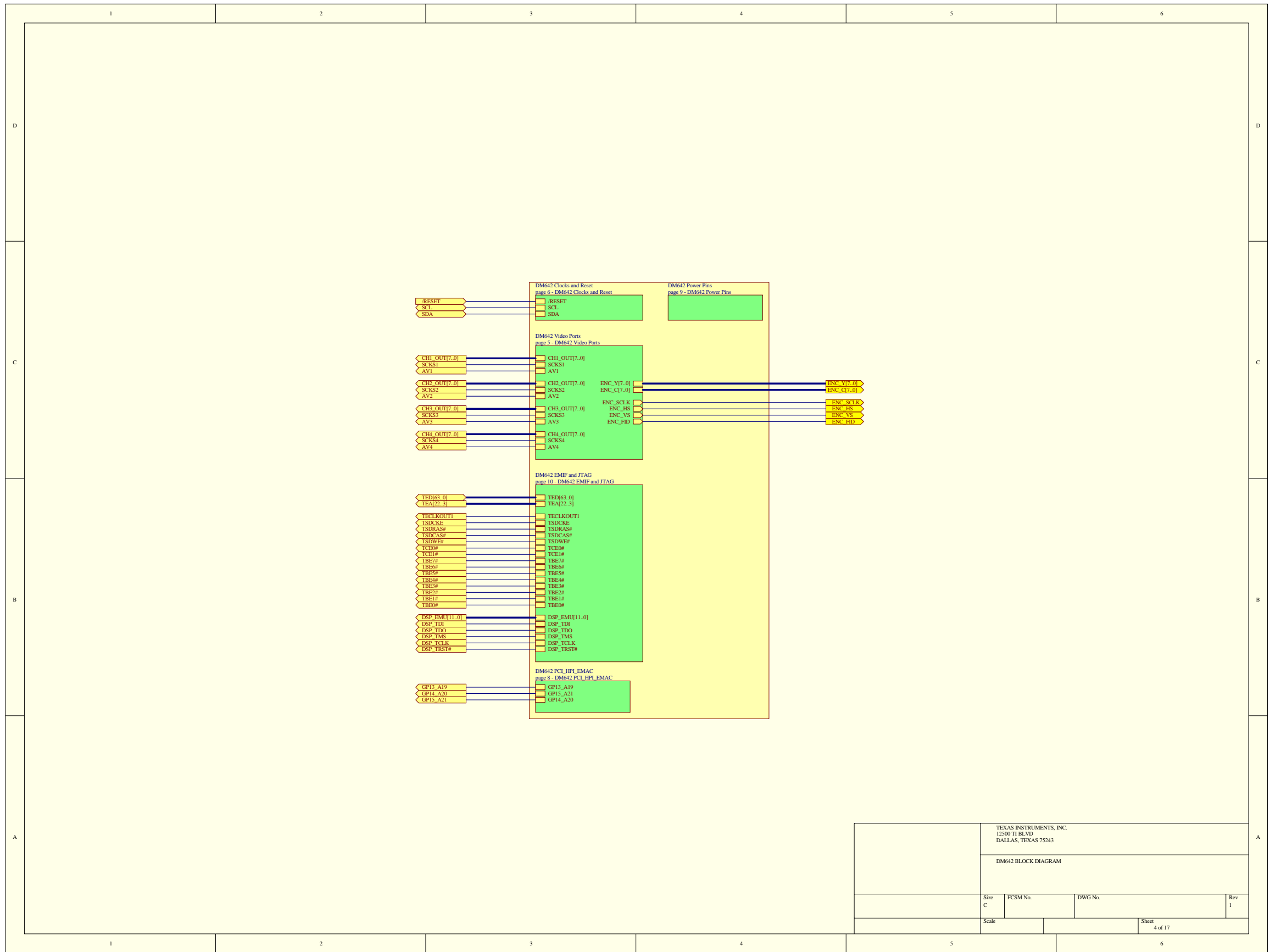
Figure 26. I²C Error

11 TVP5154EVM Schematics

TVP5154EVM DVB REV 1.2



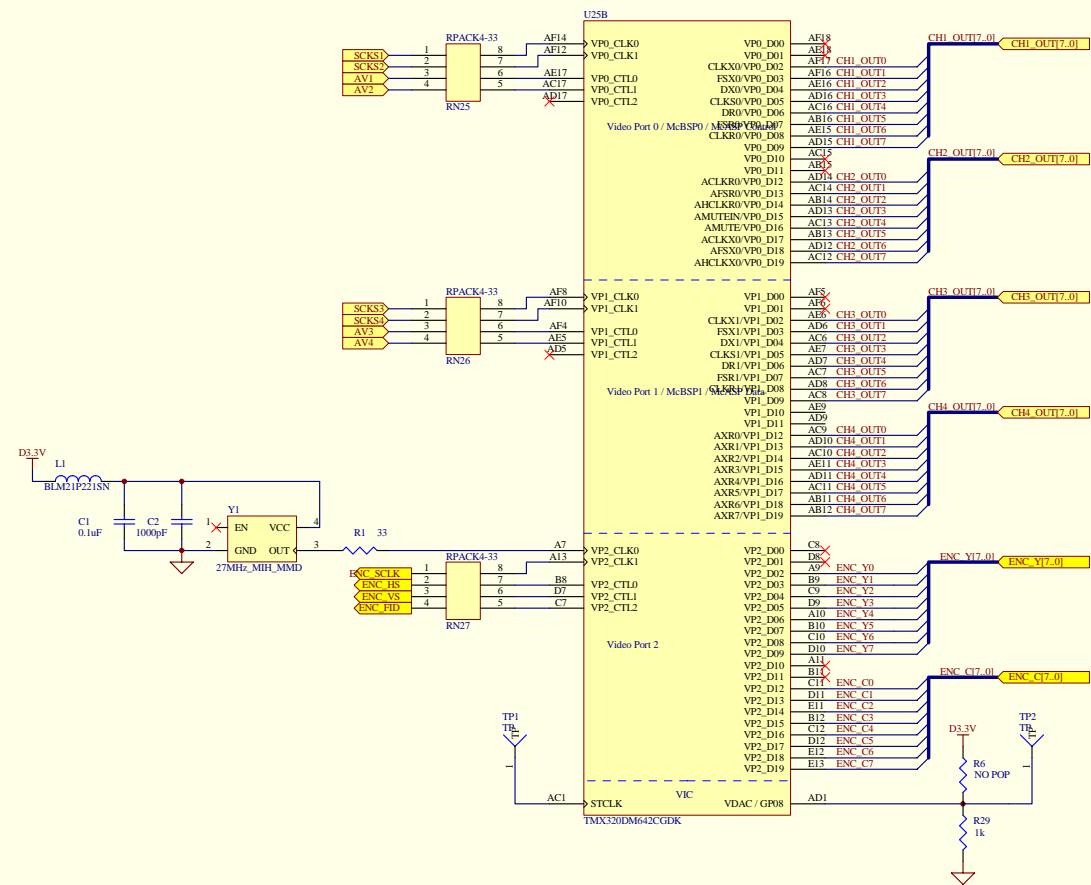
TEXAS INSTRUMENTS, INC. 12500 TI BLVD DALLAS, TEXAS 75243			
TVP5154EVM BLOCK DIAGRAM			
Size C	FCSM No.	DWG No.	Rev 1
Scale	Sheet 1 of 17		



TEXAS INSTRUMENTS, INC.
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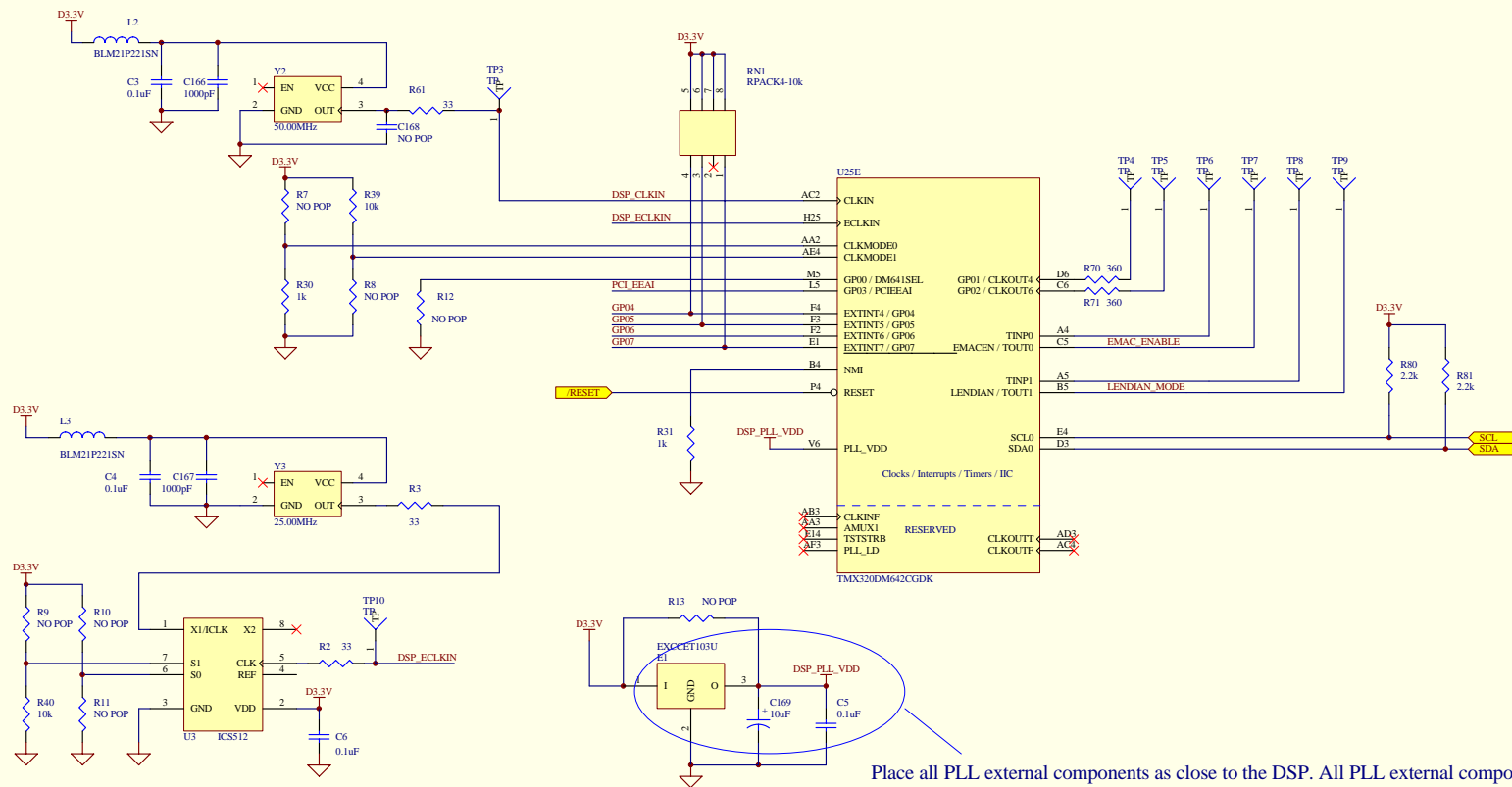
DM642 BLOCK DIAGRAM

Size C	FCSM No.	DWG No.	Rev 1
Scale	Sheet 4 of 17		



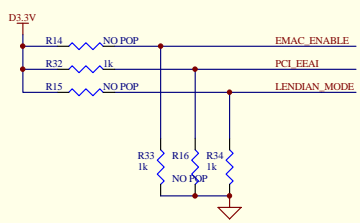
PCI FREQ CONFIGURATION	
R6/R27	MODE SELECTED
0	66MHz (DEFAULT)
1	33MHz

TEXAS INSTRUMENTS, INC. 12000 TI BLVD DALLAS, TEXAS 75243			
DM642 VIDEO PORT			
Size C	FCSM No.	DWG No.	Rev 1
Scale	Sheet 5 of 17		6



S1	S0	MULTIPLY	OUTPUT
0	0	4X	1.00 MHz
0	OPEN	5.33X	133.25 MHz
0	1	5X	125 MHz
OPEN	0	2.5X	62.5 MHz
OPEN	OPEN	2X	50 MHz
OPEN	1	3.33X	83.25 MHz
1	0	6X	150 MHz
1	OPEN	3X	75 MHz
1	1	8X	200 MHz

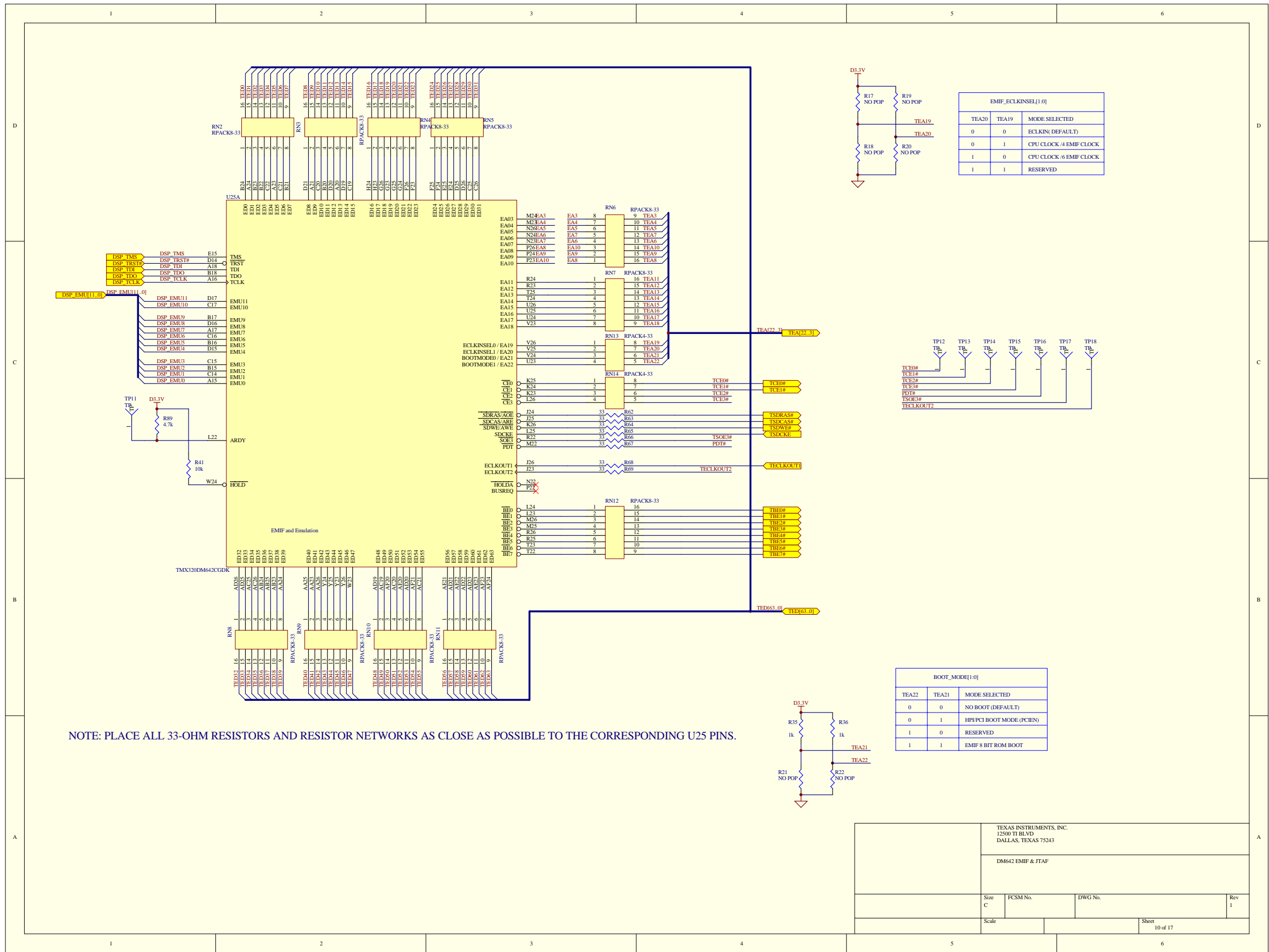
Place all PLL external components as close to the DSP. All PLL external components must be on a single side of the board.



PCI EEPROM AUTO-INIT CONFIGURATION	
R16/R32	MODE SELECTED
0	PCI EEPROM DISABLED(DEFAULT)
1	PCI EEPROM ENABLED; PCIEEN=1

ENDIAN MODE CONFIGURATION	
R15/R34	MODE SELECTED
0	BIG ENDIAN MODE
1	LITTLE ENDIAN MODE (DEFAULT)

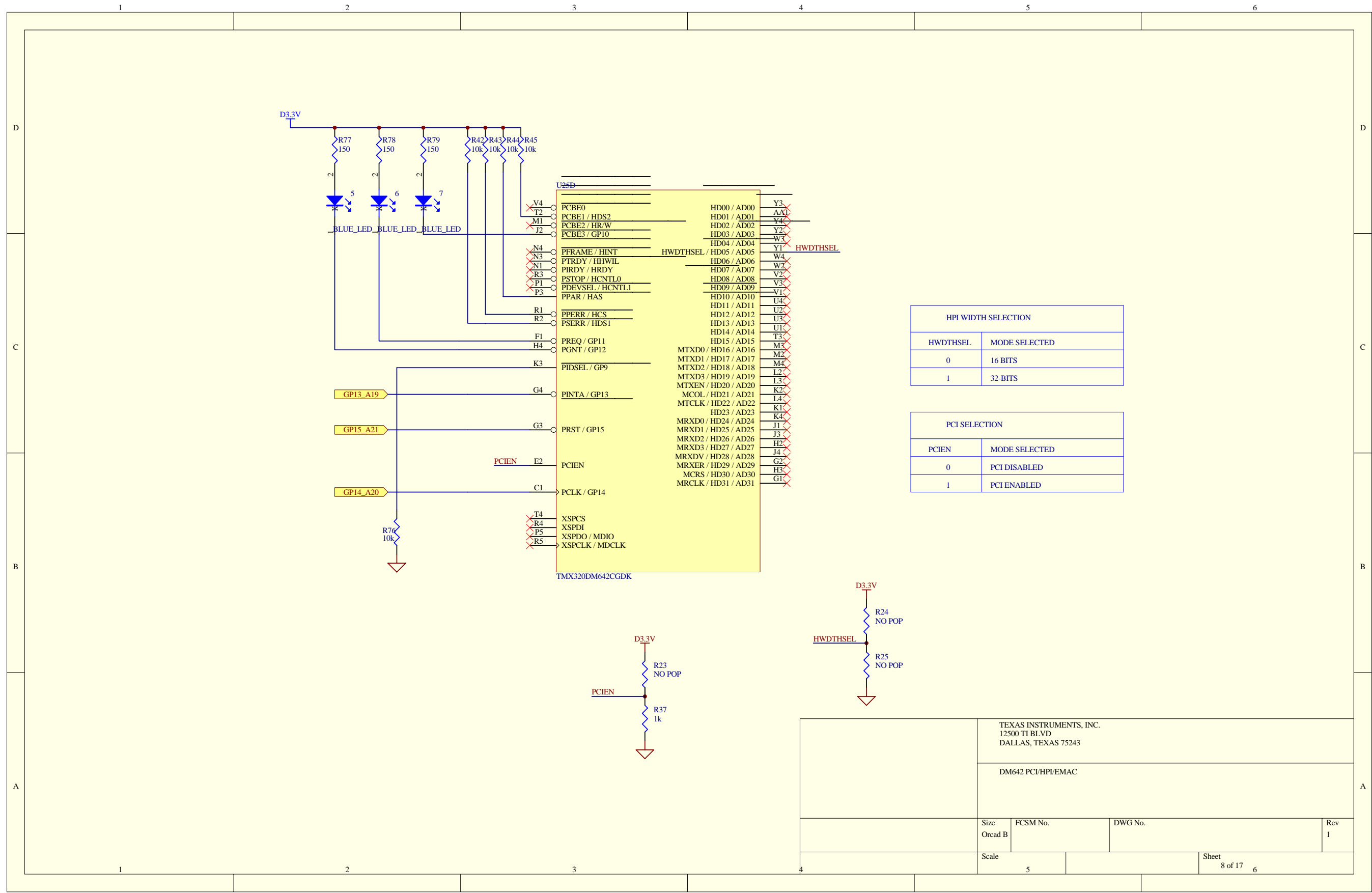
EMAC MODE CONFIGURATION	
R14/R33	MODE SELECTED
0	ETHERNET MAC DISABLED
1	ETHERNET MAC ENABLED



NOTE: PLACE ALL 33-OHM RESISTORS AND RESISTOR NETWORKS AS CLOSE AS POSSIBLE TO THE CORRESPONDING U25 PINS.

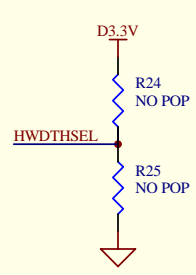
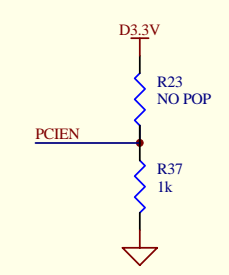
EMIF_ECLKINSEL[1:0]		
TEA20	TEA19	MODE SELECTED
0	0	ECLKIN (DEFAULT)
0	1	CPU CLOCK, 4 EMIF CLOCK
1	0	CPU CLOCK, 6 EMIF CLOCK
1	1	RESERVED

BOOT_MODE[1:0]		
TEA22	TEA21	MODE SELECTED
0	0	NO BOOT (DEFAULT)
0	1	HP/PCI BOOT MODE (PCEN)
1	0	RESERVED
1	1	EMIF 8 BIT ROM BOOT



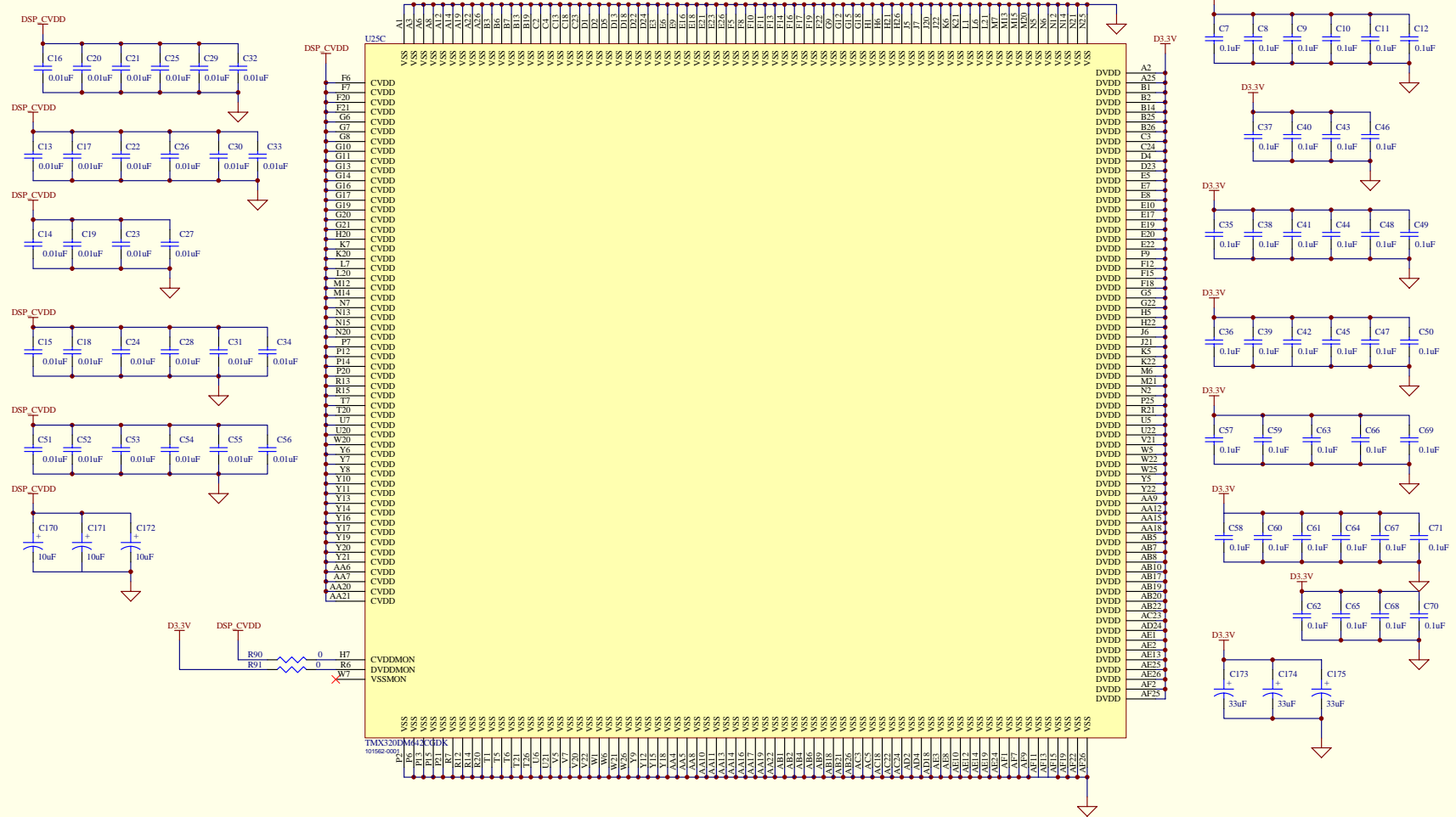
HPI WIDTH SELECTION	
HWDTHSEL	MODE SELECTED
0	16 BITS
1	32-BITS

PCI SELECTION	
PCIEEN	MODE SELECTED
0	PCI DISABLED
1	PCI ENABLED

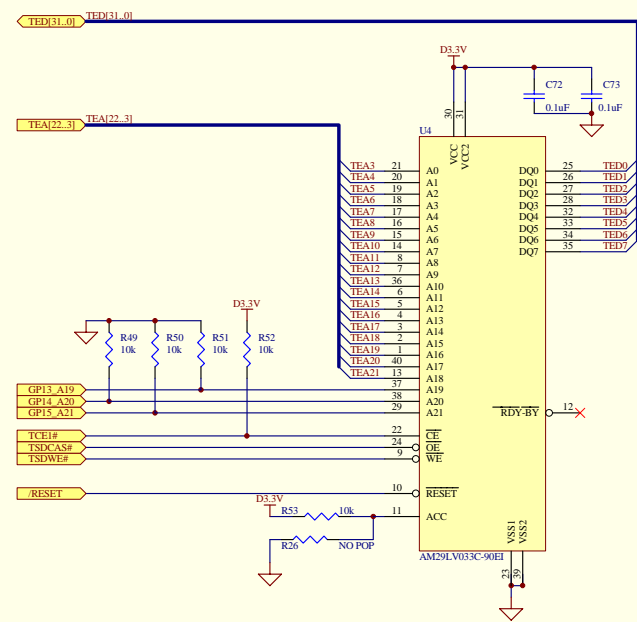


TEXAS INSTRUMENTS, INC. 12500 TI BLVD DALLAS, TEXAS 75243			
DM642 PCI/HPI/EMAC			
Size Orcad B	FCSM No.	DWG No.	Rev 1
Scale	5	Sheet	8 of 17 6

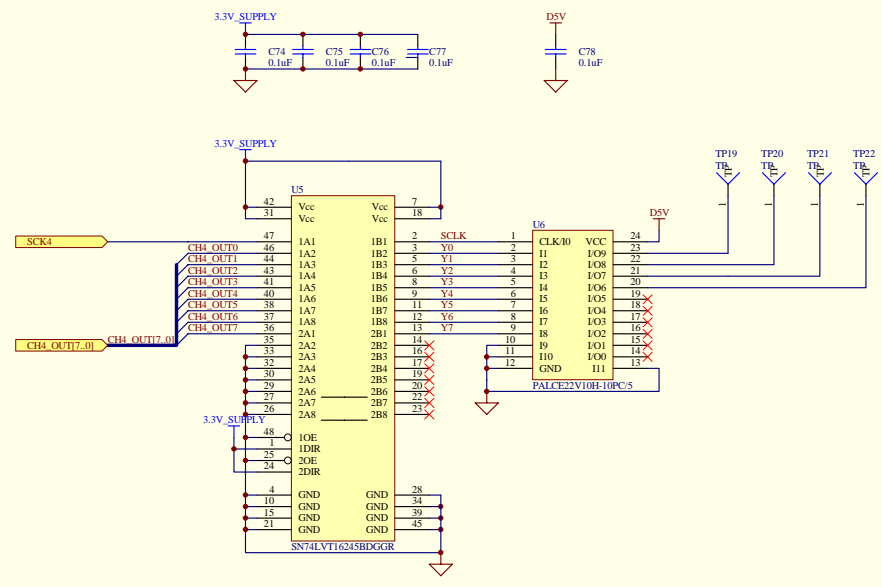
CORE CAPACITORS ARE 0402 SIZE



TEXAS INSTRUMENTS, INC. 12000 TI BLVD DALLAS, TEXAS 75243			
DM642 POWER PINS			
Size C	FCSM No.	DWG No.	Rev 1
Scale		Sheet 9 of 17	6

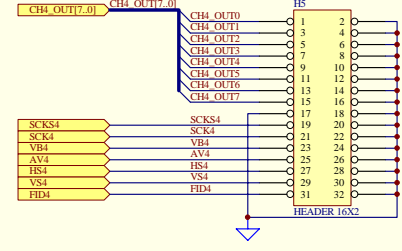
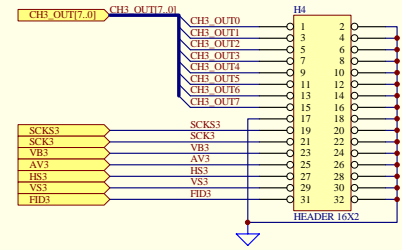
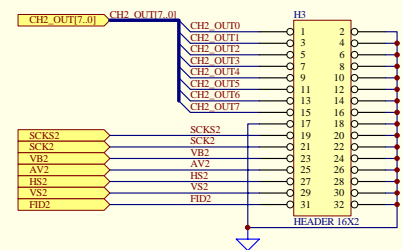
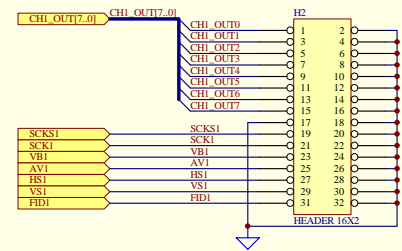
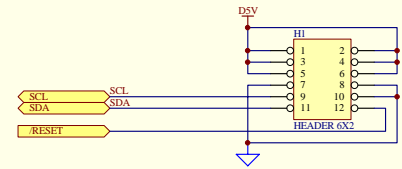


TEXAS INSTRUMENTS, INC. 12500 TI BLVD DALLAS, TEXAS 75243			
FLASH MEMORY			
Size C	FCSM No.	DWG No.	Rev 1
Scale	Sheet 14 of 17		



#OE DIR OPERATION
 L L A <--- B
 L H A ---> B
 H X ISOLATION

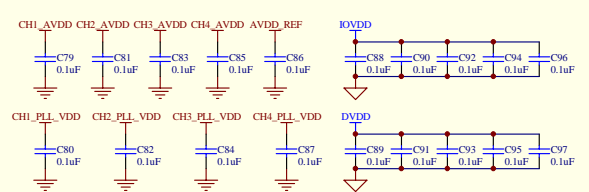
TEXAS INSTRUMENTS, INC. 12500 TI BLVD DALLAS, TEXAS 75243			
F&V BIT BREAKOUT			
Size C	FCSM No.	DWG No.	Rev 1
Scale	Sheet 12 of 17		6



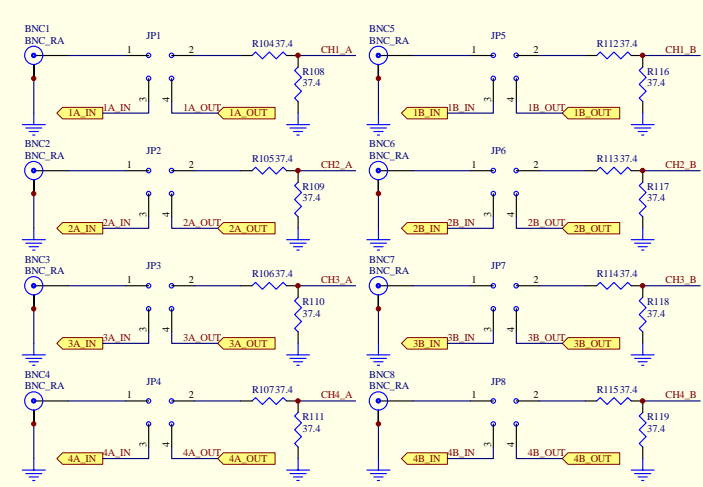
TEXAS INSTRUMENTS, INC.
12500 TI BLVD
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DAUGHTERCARD INTERFACE

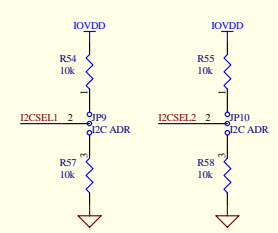
Size C	FCSM No.	DWG No.	Rev 1
Scale	Sheet 3 of 17		6



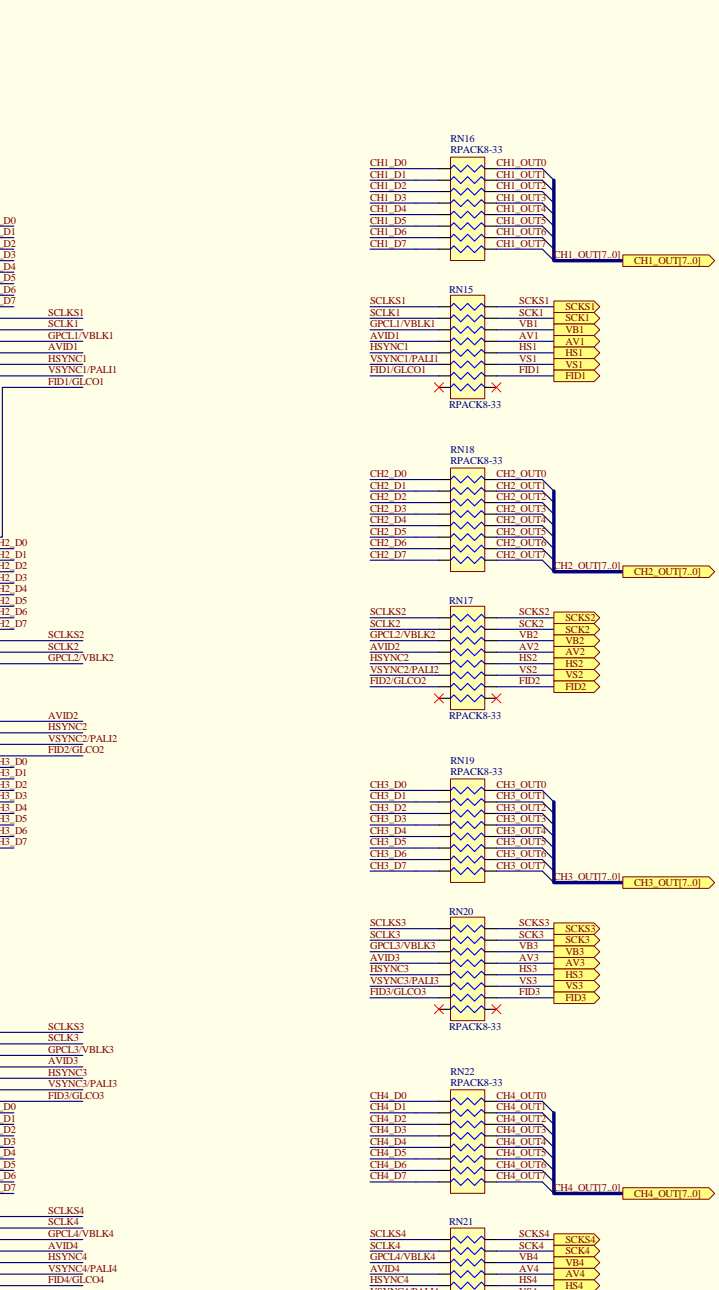
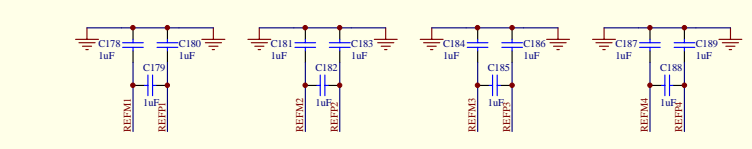
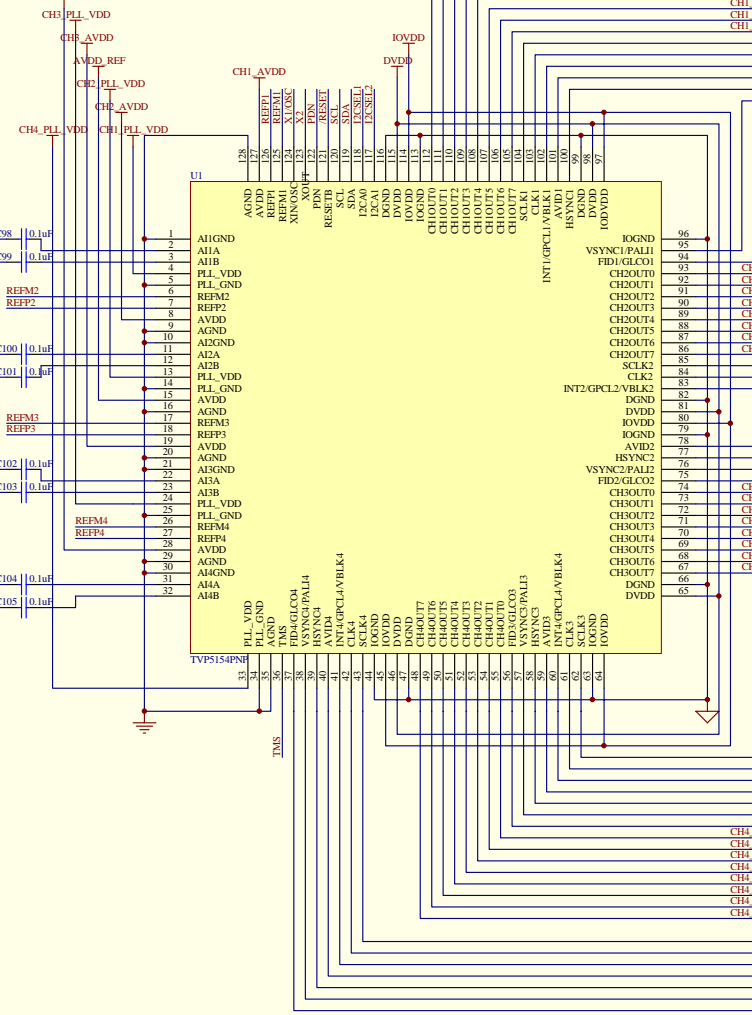
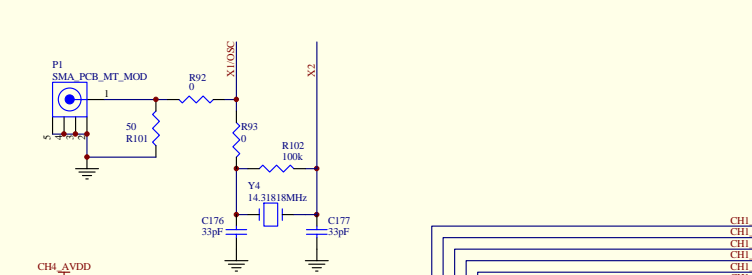
**INPUT V DIVIDER NETWORK
FOR 0-0.75V INPUT RANGE
REMEMBER 75ohm TERMINATION**



I2C ADDRESS SELECTION
2-3 Base Addr 0xB8 - Default

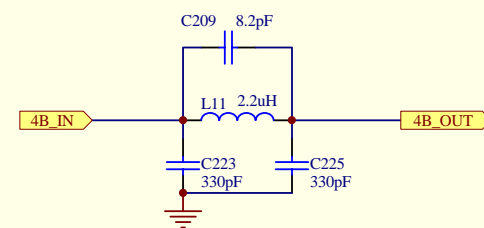
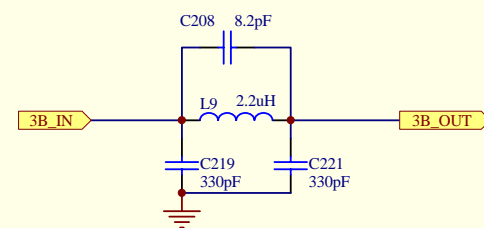
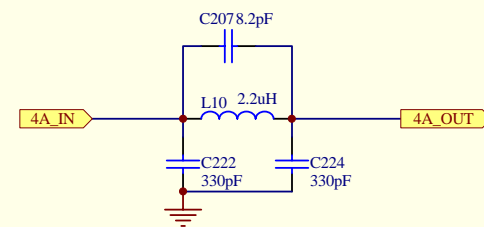
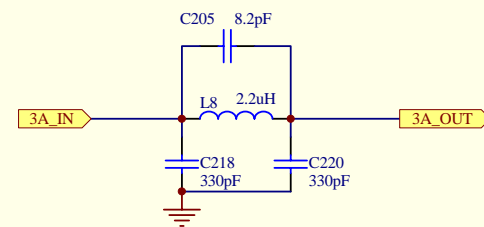
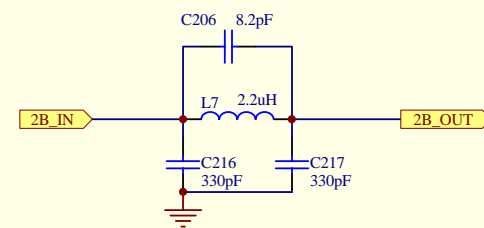
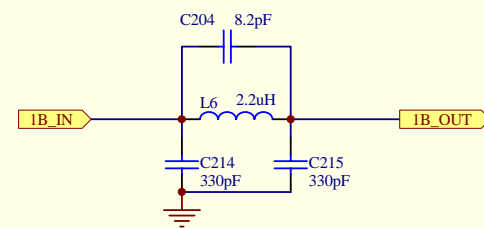
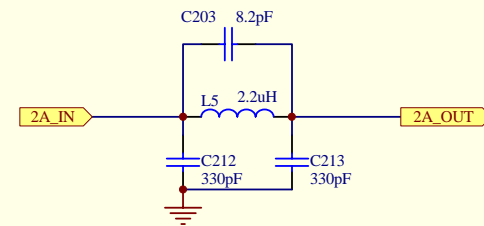
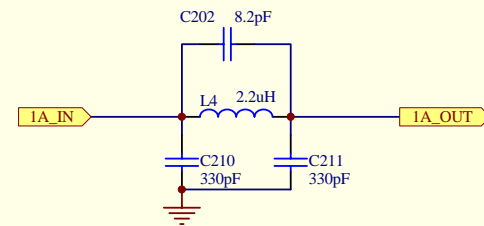


POWERDOWN
1-2 Normal Operation - Default
2-3 Powerdown



TEXAS INSTRUMENTS, INC. 12500 TI BLVD DALLAS, TEXAS 75243			
TVP5154			
Size	FCSM No.	DWG No.	Rev
C			1
Scale		Sheet	2 of 17
			6

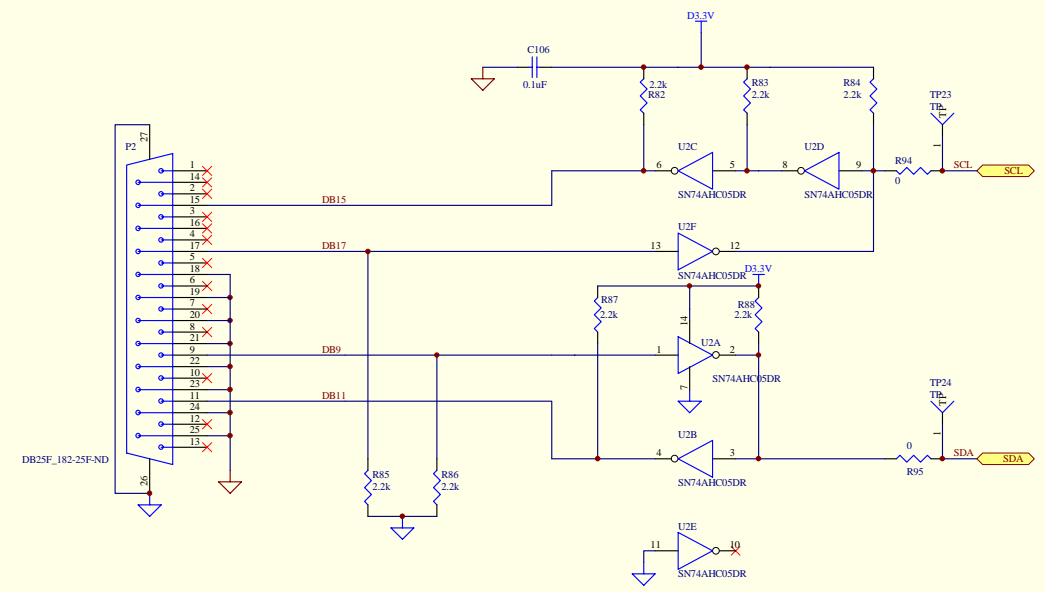
NOTE: FILTERS DESIGNED FOR CVBS INPUTS (ADC SAMPLING RATE = 27MHz)



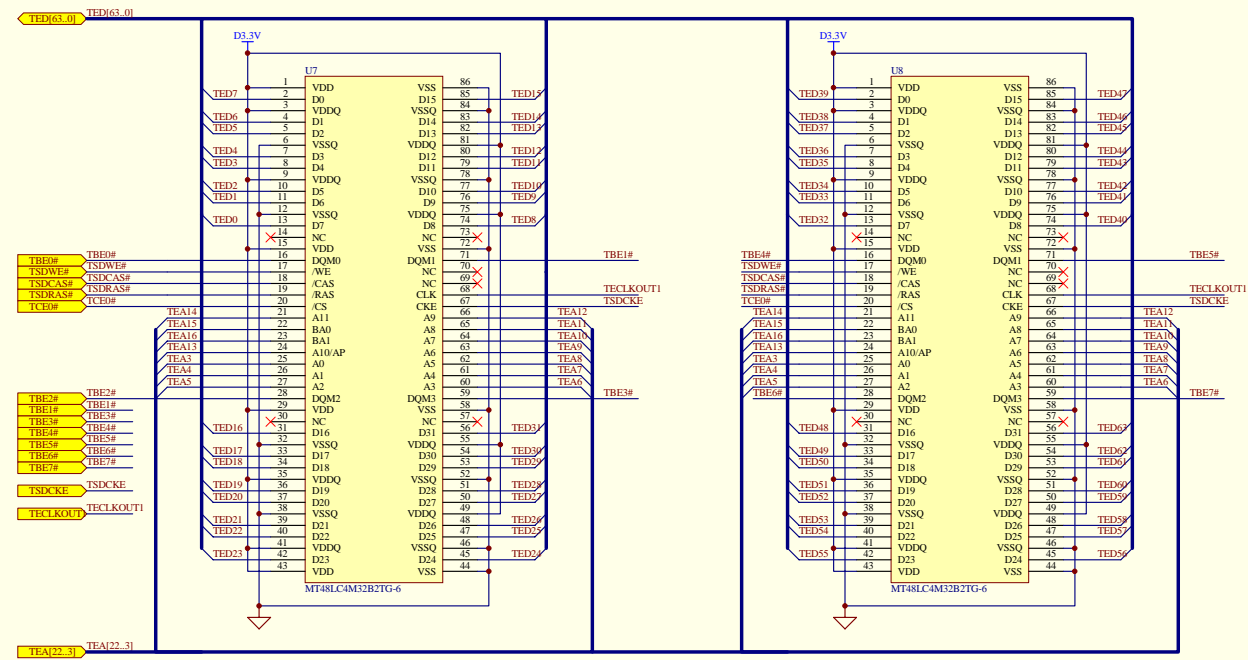
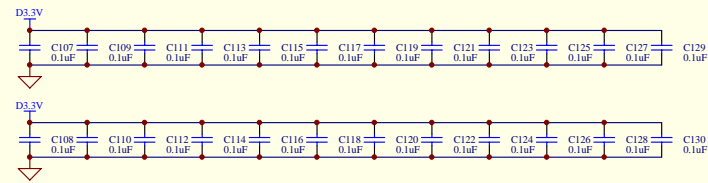
TEXAS INSTRUMENTS, INC.
12500 TI BLVD
DALLAS, TEXAS 75243

ANTI-ALIASING FILTERS

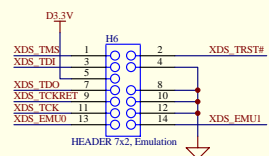
Size B	FCSM No.	DWG No.	Rev 1
Scale	5	Sheet 11 of 17	6



TEXAS INSTRUMENTS, INC. 12500 TI BLVD DALLAS, TEXAS 75243			
DC			
Size C	FCSM No.	DWG No.	Rev 1
Scale	Sheet 17 of 17		6

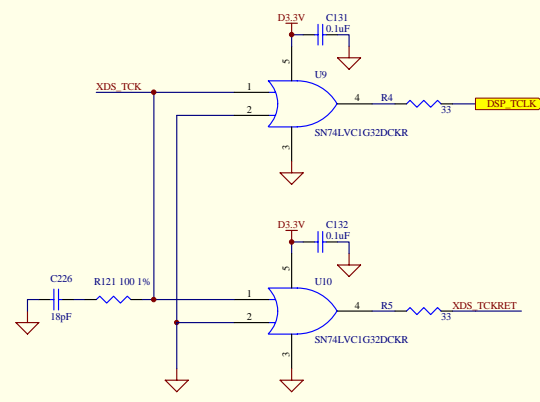
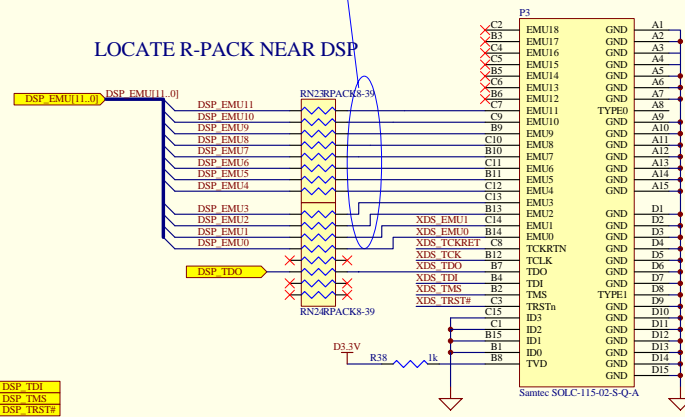


TEXAS INSTRUMENTS, INC. 12500 TI BLVD DALLAS, TEXAS 75243			
SDRAM			
Size C	FCSM No.	DWG No.	Rev 1
Scale	Sheet 13 of 17		6



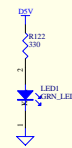
ROUTE TRACES AS ONE GROUP. MATCH SIGNAL LENGTH.

LOCATE R-PACK NEAR DSP

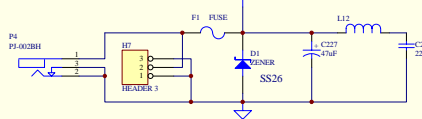


TEXAS INSTRUMENTS, INC. 12500 TI BLVD DALLAS, TEXAS 75243			
JTAG			
Size C	FCSM No.	DWG No.	Rev 1
Scale	Sheet 15 of 17		6

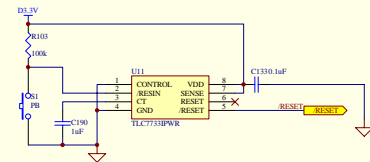
POWER ON LED (+5V)



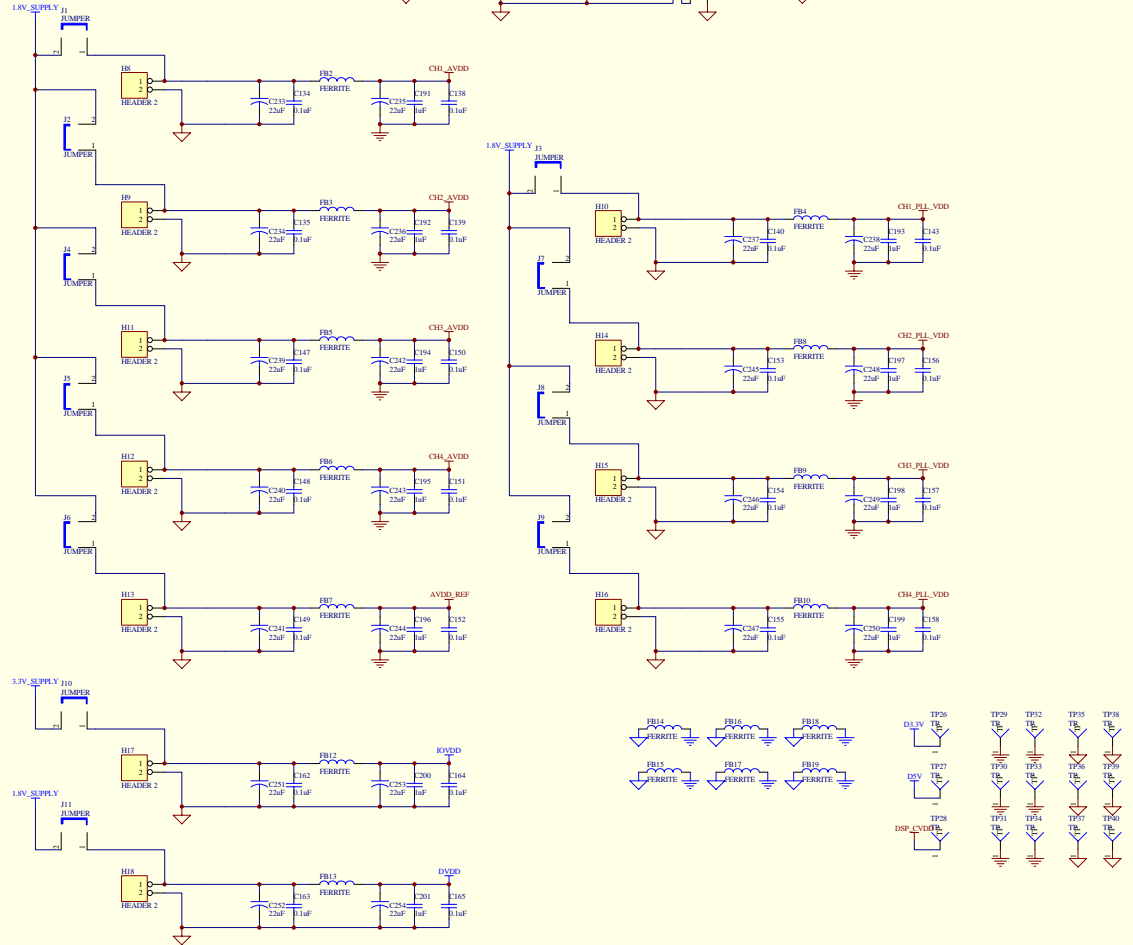
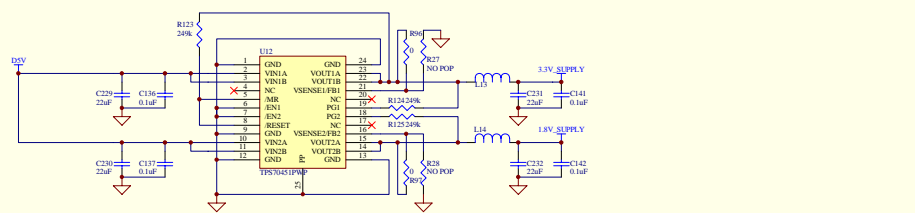
5V, 3.0A DC INPUT



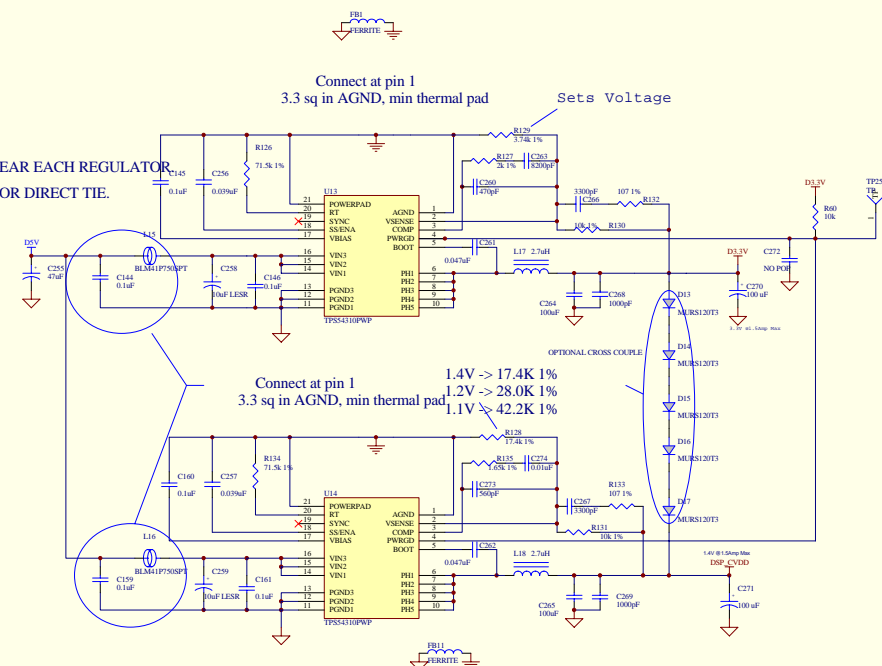
RESET ON POWER UP



VOUT1 IS 3.3V 1A
VOUT2 IS 1.8V 2A

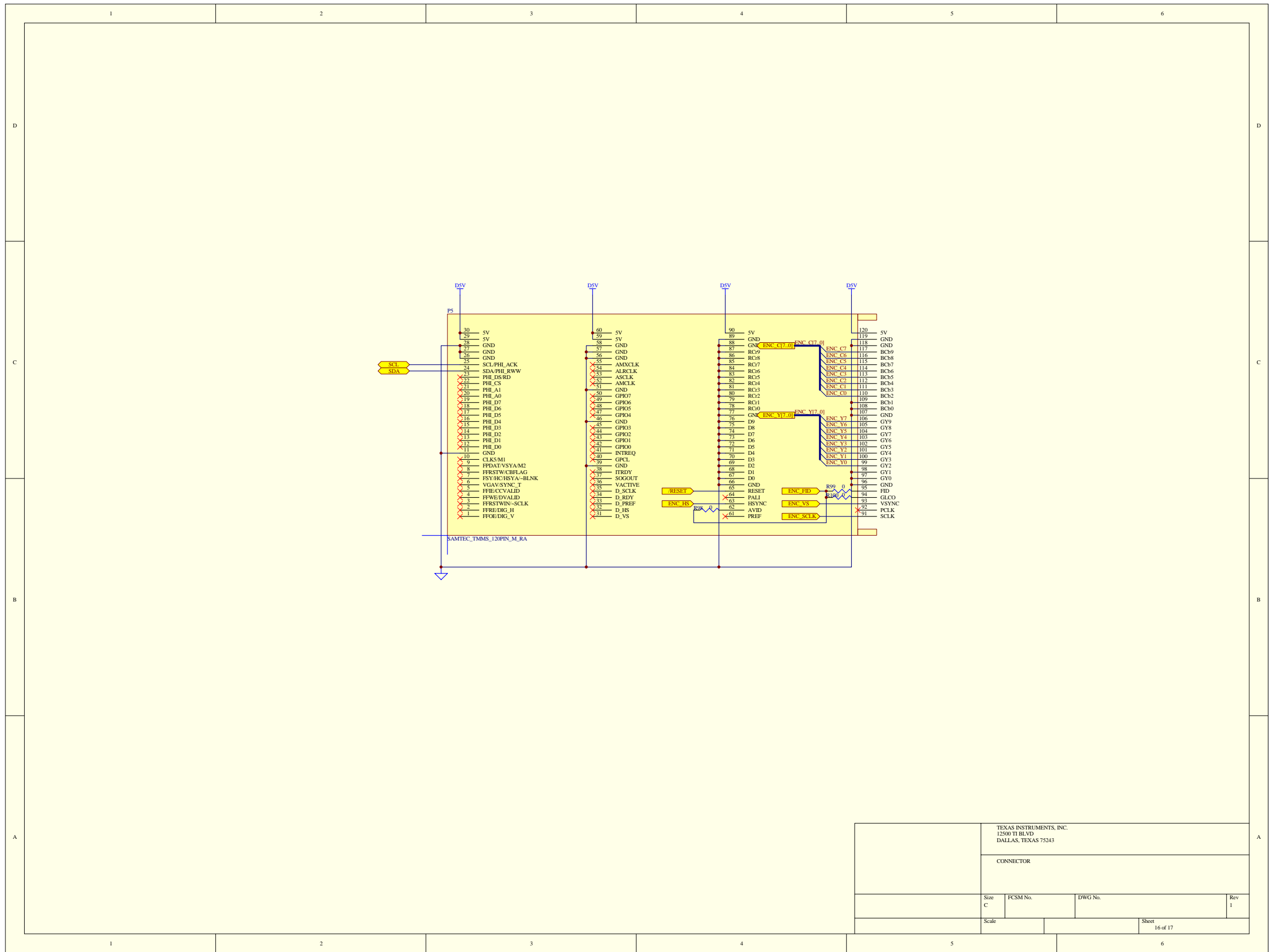


EMI SUPPRESSION. LOCATE NEAR EACH REGULATOR
6 VIAS FROM PAD TO PLANE OR DIRECT TIE.



POWER ESTIMATES BASED ON SPRU190
 1.4V@600MHz 1.09 W 0.778A
 3.3V@600MHz 0.52 W 0.157A (no emif clk)
 MEASURED CURRENT ON C6416TEB, -0.7A@5V
 EACH REGULATOR CAN SUPPLY UP TO 3A OF CURRENT. HOWEVER COMPONENT VALUES HAVE BEEN SELECTED FOR 1.5A OPERATION.
 VALUES CALCULATED WITH SWIFT DESIGN TOOL 2.0.
 FOLLOW TPS54310 EVM LAYOUT

TEXAS INSTRUMENTS, INC. 12500 TI BLVD DALLAS, TEXAS 75243			
POWER			
Size D	FCM No.	EWG No.	Rev 1
Scale		Sheet	7 of 17



TEXAS INSTRUMENTS, INC. 12500 TI BLVD DALLAS, TEXAS 75243			
CONNECTOR			
Size C	FCSM No.	DWG No.	Rev 1
Scale	Sheet 16 of 17		

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Logic	logic.ti.com	Military	www.ti.com/military
Power Mgmt	power.ti.com	Optical Networking	www.ti.com/opticalnetwork
Microcontrollers	microcontroller.ti.com	Security	www.ti.com/security
Low Power Wireless	www.ti.com/lpw	Telephony	www.ti.com/telephony
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		Wireless	www.ti.com/wireless

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