

## Evaluation Board for the CS42L73

### Features

- ◆ Analog Inputs
  - Line-level In via 2x mono RCA jacks
  - Microphone In via 2x mono 1/8" jacks
- ◆ Analog outputs
  - Headphone out via 1x stereo 1/8" jack
  - Line-level out via 2x mono RCA jacks
  - Earphone out via terminal block
  - Speakerphone out via terminal blocks
- ◆ S/PDIF interface via RCA/optical jacks
  - Input: CS8416 digital audio receiver
  - Output: CS8406 digital audio transmitter
- ◆ External digital I/O via stake headers
  - Digital mic in
  - Serial audio port I/O
  - External I<sup>2</sup>C™ control port I/O
- ◆ Flexible power-supply configuration
  - USB, external power supply, or battery
- ◆ FlexGUI software control
  - Windows® compatible
  - Predefined and user-configurable scripts

### Description

The CDB42L73 board is a dedicated platform for testing and evaluating the CS42L73, an ultralow power mobile audio and telephony CODEC.

To allow comprehensive testing of CS42L73 features and performance, extensive hardware and software configurable options are available on the CDB42L73.

Hardware options, such as power-supply settings, are configured via jumpers on the stake headers.

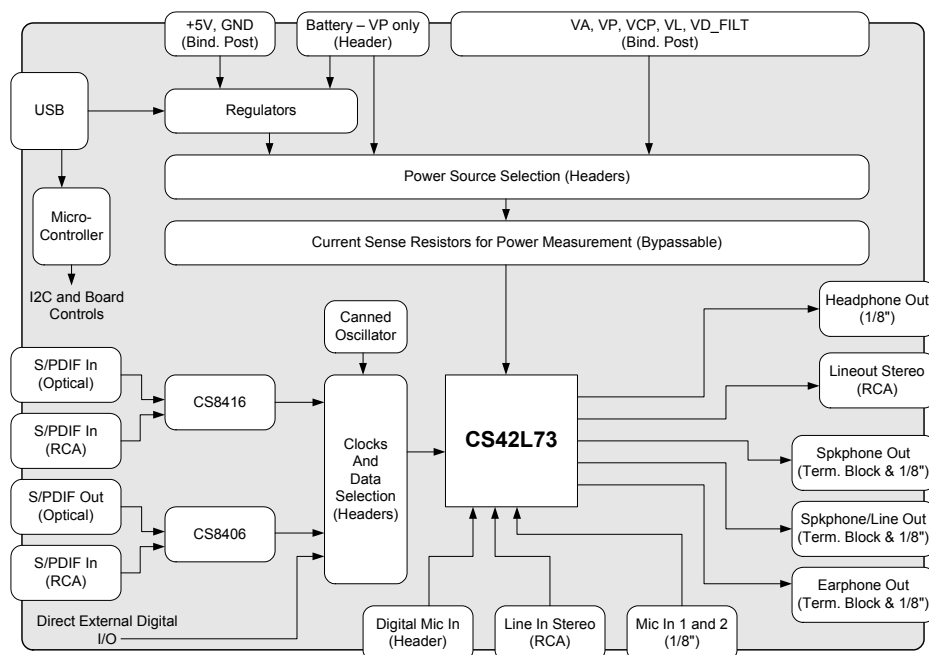
Software options, such as registry settings for the CS42L73, are configured with the FlexGUI software, which communicates with the CDB42L73 via USB from a Windows® compatible computer. In addition, digital I/O headers on the CDB42L73 allow external control signals (for example, an external DSP or microcontroller) to configure and interface with the CS42L73 and other devices directly without the use of FlexGUI.

The CDB42L73 also serves as a good component and layout reference for the CS42L73.

### ORDERING INFORMATION

CDB42L73

Evaluation Board



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## 1. QUICK SETUP GUIDE

This section describes a short procedure to set the CDB42L73 to a standard state for evaluation.

1. Return all jumpers to their factory default settings as described in [Table 2 on page 10](#), and displayed in [Figure 1 on page 11](#)
2. Install the FlexGUI software as outlined in [Section 4.2 on page 12](#).
3. Connect a +5 V power supply to the +5 V Ext (J1) and GND (J2) binding post on the CDB42L73.
4. Connect a USB cable from a Windows®-compatible PC to the CDB42L73.
5. Run the FlexGUI software. Restore one of the two factory pre-configured signal test paths (read more about restoring settings in [Section 4.2.2 on page 12](#)):
  - Line input to Audio Serial Port output; Audio Serial Port input to headphone/line output  
Restore register file: "Factory\_Default\_LINEIN\_to\_ASPOUT\_ASPIN\_to\_HP\_LINEOUT.fgs"  
The line inputs are labeled J32 and J33; the headphone output is J29; the line outputs J30 and J31. Audio Serial Port input/outputs are connected via the S/PDIF connectors J16 through J19.
  - Microphone input to Audio Serial Port output; Audio Serial Port input to speakerphone/earphone output  
Restore register file: "Factory\_Default\_MICIN\_to\_ASPOUT\_ASPIN\_to\_SPKrs.fgs"  
The microphone inputs are labeled J34 and J35; the speakerphone output is J48; the earphone output is J47. Audio Serial Port input/outputs are connected via the S/PDIF connectors J16 through J19.

## 2. THE CDB42L73 SYSTEM OVERVIEW

The CDB42L73 evaluation board is a convenient platform for evaluating the CS42L73 ultralow-power mobile and telephony CODEC. It supports multiple power supply and signal I/O configurations, including the option to drive the CS42L73 externally (which bypasses on-board circuitry). The CDB42L73 is also a good component and layout reference for the CS42L73.

Section 2.1 through Section 2.8 below describe the various features of the CDB42L73 evaluation board in detail. Section 2.9 lists several useful performance measurement tips when evaluating the CDB42L73.

### 2.1 Power Supply Circuitry

The CDB42L73 is designed to be powered by a single +5 V DC power supply. This can be provided by an external +5 V power supply unit or a regular USB connection, selectable via jumper pin block J50. If using a USB connection to supply power, the VP supply pin of the CS42L73 requires an external source (J7 or J49); this is due to the high power requirements of driving a speakerphone. At full speakerphone volume, the current consumption of the VP supply pin may exceed the current supply capabilities of a typical USB connection.

Low-dropout regulators (LDOs) step down the +5 V supply to provide clean and stable 3.3 V and 1.8 V rails to all the onboard circuitry and the CS42L73.

There is also a switching buck regulator which may be used to supply a 1.8 V rail. The buck regulator's source, either the main +5 V supply or an external battery, is selectable via jumper pin block J8. It is enabled/disabled with J15. The external battery connection is J49.

Jumper pin blocks J10, J11, J12, J13, and J14 select the power supply source for the CS42L73 supply pins. In most cases, the selections are between an external supply, the LDO-derived 1.8 V, or the buck-derived 1.8 V.

Jumper pin block J25 selects the source of the CS42L73's interface voltage, VL. When J25 is shunted in the "NORM" position, all devices on the board (including the CS42L73) share the same VL supply as selected on J11. However, in strict battery life testing of the CS42L73, it may be useful to decouple the power usage of VL of peripheral devices (such as signal level shifters) from that of the CS42L73. When J25 is shunted in the "+1.8V LDO" position, VL for peripheral devices on the CDB42L73 is sourced from the +1.8 V LDO, while VL for the CS42L73 is determined by the selection on J11.

### 2.2 Digital Inputs and Outputs

The S/PDIF interface on the CDB42L73 accepts coaxial or optical connections for both inputs and outputs. S/PDIF inputs are handled by the CS8416 receiver; S/PDIF outputs by the CS8406 transmitter. On the CDB42L73, the CS8416 is configured to operate only in master mode, while the CS8406 is to work only in slave mode.

Please note that the S/PDIF interface is routed only to the Audio Serial Port (ASP) of the CS42L73; however, the ASP may also be driven externally via header J23. The Voice Serial Port (VSP) and Auxiliary Serial Port (XSP) may only be driven externally via headers J24 and J22, respectively.

A complete description of the CS8416 S/PDIF receiver and CS8406 S/PDIF transmitter can be found in their respective datasheets, downloadable from <http://www.cirrus.com>.

### 2.3 Digital Mic Input

The digital mic input header, J26, allows up to two digital microphones to interface with the CS42L73. A ribbon cable is required to connect the digital microphones to J26.

## 2.4 Analog Inputs

Line input (via 2x mono RCA jacks) and microphone input (via 2x mono 1/8-inch jacks) are available on the CDB42L73. Analog input circuitry simply consists of DC-blocking capacitors and several resistors as shown in the Typical Connections Diagram of the CS42L73 datasheet.

Button switch S2 engages the CS42L73's MIC2 automute function when pressed.

Jumper pin blocks J54, J55, and J56 allow the user to evaluate the pseudo-differential analog input features of the CS42L73. By default, shunts are placed on these jumper pin blocks to emulate a typical single-ended input use case. When the shunts are removed, the pseudo-differential analog inputs will reject common-mode noise effectively; this is especially useful for eliminating ground loop related problems from the analog input source.

## 2.5 Analog Outputs

Line output (via 2x mono RCA jacks) and headphone output (via 1x stereo 1/8-inch jack) are available on the CDB42L73. The line output also has a selectable first order low-pass filter commonly used with DACs; this is done via jumper pin blocks J38 and J39. In addition, jumper pin blocks J36 and J37 allow the user to evaluate the pseudo-differential line/headphone output capability of the CS42L73. By default, J36 and J37 are shunted to emulate a typical single-ended output use case. When the shunts are removed, the pseudo-differential line/headphone outputs will reject common-mode noise effectively; this is especially useful for eliminating ground loop related problems arising from an external connection to the line/headphone outputs.

The differential earphone, speakerphone, and speakerphone line outputs are provided via terminal blocks J47, J48, and J52. Each of these outputs has a 1/8-inch jack in parallel to be used as the measurement point when test loads are connected to the terminal blocks.

It should be noted that the CS35L01 Class-D amplifier (reference designator U13) may be used to amplify the speakerphone line output. The CS35L01-amplified speakerphone line output may be selected by shunting jumper pin blocks J59 and J60 to the "AMP" position. This is useful when trying to achieve a stereo speaker driver configuration; for example, the speakerphone output of the CS42L73 may be used as the left speaker driver, while the amplified speakerphone line output may be used as the right speaker driver. The CS35L01 may be enabled or disabled via FlexGUI by toggling bit 7 of address 0x01 in the "Micro" tab of the Register Maps.

## 2.6 Control Port Interface

The Cirrus Logic FlexGUI software application (downloadable from <http://www.cirrus.com/msasoftware>) provides users an easy and intuitive way to configure the CDB42L73. A Windows®-compatible PC with USB connectivity is required to run FlexGUI.

The CDB42L73's onboard microcontroller handles the USB communication with FlexGUI and the control port interface of the CS42L73. The control port interface of the CS42L73 is routed through jumper pin block J21. When the pin columns marked "BOARD" are shunted (the default setting), the microcontroller handles all communication between the FlexGUI application and the CS42L73. If external control is to be used instead of FlexGUI, the shunts on J21 should be removed and the external signals wired in to the pin columns marked "EXT CONN" (please note the GND pins on the right hand side).

## 2.7 Layout Reference

The CDB42L73 utilizes a six-layer PCB that allows for clean trace fanout from the CS42L73. There are also dedicated ground planes between each routed layer, providing low-impedance return paths for high frequency signals and improving shielding between layers. Local decoupling and fly capacitors for the CS42L73 are placed as closely as possible to the device, with the critical components closest.

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## **2.8 CS42L73 Ultralow Power Mobile Audio and Telephony CODEC**

The CS42L73 is a highly integrated, ultralow power, audio and telephony CODEC for portable applications. It features microphone and line inputs; three bidirectional serial ports with high-performance ASRCs; and headphone, line, and speaker amplifiers. A complete description of the CS42L73 can be found in its datasheet, downloadable from <http://www.cirrus.com>.

## **2.9 Performance Measurement Tips**

- Low frequency THD+N and common mode rejection performance may be improved by increasing the capacitance of the DC-blocking capacitors on the line and microphone inputs (C81, C82, C83, C84, C85, C86, C87).
- Interchannel isolation (crosstalk) performance of the CS42L73's headphone output should be measured with headphone loads connected between TP22 and GND (TP36), and between TP23 and GND (TP36). These connection points provide the lowest impedance return paths for the headphone loads to reflect the full headphone crosstalk performance of the CS42L73.
- Dynamic range and THD+N measurement of the CS35L01 (when J59 and J60 are shunted to the "AMP" position) should be made with an external filter such as the AP AUX-0025 Switching Amplifier Measurement Filter. Filters such as the AUX-0025 prevent switching noise of Class-D amplifiers from affecting measurement accuracy of traditional audio analyzers.

### 3. SYSTEM CONNECTIONS AND JUMPER SETTINGS

Board connections and settings are shown in [Table 1](#) and [Table 2](#) below.

CONNECTOR	INPUT/OUTPUT	CONNECTION TYPE AND SIGNAL IF PRESENT
J1 +5V EXT	Input	+5V external power supply
J2 GND	Input	Evaluation board ground
J3 VA EXT	Input	CS42L73 VA external supply
J4 VL EXT	Input	CS42L73 VL external supply
J5 VCP EXT	Input	CS42L73 VCP external supply
J6 VD_FILT EXT	Input	CS42L73 VD_FILT external supply
J7 VP EXT	Input	CS42L73 VP external supply
J20 C2	Input	Microcontroller programming header
J9 USB	Input/Output	USB connection
J49 BATT	Input	External battery header
J51 MCLK1	Input	CS42L73 MCLK1 external master clock connection - By default, Y1 oscillator is populated and used for MCLK1. - Remove Y1 oscillator before connecting external master clock.
J46 MCLK2	Input	CS42L73 MCLK2 external master clock connection
J23 ASP	Input/Output	CS42L73 Audio Serial Port (LRCK, SCLK, SDIN, SDOUT) - By default, shunts connect the columns marked "BOARD." This connects the CS42L73 Audio Serial port to the S/PDIF interface. - To use external clock and data signals, remove shunts. Connect external signal and ground to columns marked "EXT CONN."
J24 VSP	Input/Output	CS42L73 Voice Serial Port (LRCK, SCLK, SDIN, SDOUT)
J22 XSP	Input/Output	CS42L73 Auxiliary Serial Port (LRCK, SCLK, SDIN, SDOUT)
J21	Input/Output	CS42L73 control port connections (SDA, SCL, INT, RESET) - By default, shunts connect the columns marked "BOARD." This connects the microcontroller to the control port of the CS42L73. - To use external control signals, remove shunts. Connect external signal and ground to columns marked "EXT CONN."
J26 DIG MIC	Input	CS42L73 Digital microphone connection (SCLK, SD, GND, +1.8 V supply)
J16 S/PDIF IN	Input	Coaxial S/PDIF digital input
J17 S/PDIF IN	Input	Optical S/PDIF digital input
J18 S/PDIF OUT	Output	Coaxial S/PDIF digital output
J19 S/PDIF OUT	Output	Optical S/PDIF digital output
J32 LINEINA	Input	CS42L73 line input channel A
J33 LINEINB	Input	CS42L73 line input channel B
J34 MIC1	Input	CS42L73 microphone input channel A
J35 MIC2	Input	CS42L73 microphone input channel B
J29 HPOUT	Output	CS42L73 headphone output channel A and B
J30 LINEOUTA	Output	CS42L73 line output channel A
J31 LINEOUTB	Output	CS42L73 line output channel B
J52 SPKLINEO	Output	CS42L73 speakerphone line output
J48 SPKOUT	Output	CS42L73 speakerphone output
J47 EAROUT	Output	CS42L73 earphone output

**Table 1. System Connections**



JUMPER PIN BLOCK	PURPOSE	POSITION	FUNCTION SELECTED
J50 +5 V	+5 V main supply select	[*] +5V EXT USB	+5 V supply source from J1 +5 V supply source from USB
J10 VA	CS42L73 VA supply source select	[*] VA EXT +1.8 V LDO +1.8 V BUCK	CS42L73 VA supply = J3 CS42L73 VA supply= 1.8 V derived from LDO CS42L73 VA supply= 1.8 V derived from switching buck regulator
J11 VL	CDB42L73 VL supply source select (see also J25)	[*] VL EXT +1.8 V LDO +1.8 V BUCK	CDB42L73 VL supply = J4 CDB42L73 VL supply = 1.8 V derived from LDO CDB42L73 VL supply = 1.8 V derived from switching buck regulator
J12 VCP	CS42L73 VCP supply source select	[*] VCP EXT +1.8 V LDO +1.8 V BUCK	CS42L73 VCP supply = J5 CS42L73 VCP supply = 1.8 V derived from LDO CS42L73 VCP supply = 1.8 V derived from switching buck regulator
J13 VD_FILT	CS42L73 VD_FILT supply source select	[*] VD_FILT_EXT NORM	CS42L73 digital core supply = J6 CS42L73 digital core supply = internally generated
J14 VP	CS42L73 VP supply source select	[*] VP EXT +5 V EXT BATT	CS42L73 VP supply = J7 CS42L73 VP supply = J1 CS42L73 VP supply = J49
J25 BOARD VL	CDB42L73 board peripheral and CS42L73 VL common supply toggle	[*] +1.8 V LDO NORMAL	Board peripheral VL is supplied by 1.8 V LDO while CS42L73 VL = J11 Board peripheral VL and CS42L73 VL = J11
J27 IVA	CS42L73 VA current measurement	[*] Shunted Open	0.1 $\Omega$ current measurement resistor is shorted 0.1 $\Omega$ current measurement resistor is in series with CS42L73 VA, allowing user to measure current draw of VA supply for power consumption calculations.
J42 IVL	CS42L73 VL current measurement	[*] Shunted Open	0.1 $\Omega$ current measurement resistor is shorted 0.1 $\Omega$ current measurement resistor is in series with CS42L73 VL, allowing user to measure current draw of VL supply for power consumption calculations.
J28 IVCP	CS42L73 VCP current measurement	[*] Shunted Open	0.1 $\Omega$ current measurement resistor is shorted 0.1 $\Omega$ current measurement resistor is in series with CS42L73 VCP, allowing user to measure current draw of VCP supply for power consumption calculations.
J40 IVD_FILT	CS42L73 current measurement	[*] Shunted Open	0.1 $\Omega$ current measurement resistor is shorted 0.1 $\Omega$ current measurement resistor is in series with CS42L73 VD_FILT, allowing user to measure current draw of digital core supply for power consumption calculations.
J41 IVP	CS42L73 current measurement	[*] Shunted Open	0.1 $\Omega$ current measurement resistor is shorted 0.1 $\Omega$ current measurement resistor is in series with CS42L73 VP, allowing user to measure current draw of VP supply for power consumption calculations.
J15 1.8V BUCK EN	+1.8 V switching buck regulator enable/disable	[*] DIS EN	Disables the +1.8 V switching buck regulator Enables the +1.8 V switching buck regulator
J8 1.8V BUCK SOURCE	+1.8 V switching buck regulator power supply source	[*] BATT +5V	+1.8V switching buck regulator power supply source = J49 +1.8V switching buck regulator power supply source = J50

JUMPER PIN BLOCK		PURPOSE	POSITION	FUNCTION SELECTED
J54	LINEIN_REF	Line input reference to GND select	[*] Shunted Open	Line input shield connection of J32 and J33 is shunted to board ground. Line input shield connection of J32 and J33 is not connected to board ground, thus the CS42L73 line input is referenced to the incoming signal reference instead of the board ground.
J55	MIC1_REF	MIC1 reference to GND select	[*] Shunted Open	MIC1 input shield connection of J34 is shunted to board ground. MIC1 input shield connection of J34 is not connected to board ground, thus the CS42L73 MIC1 input is referenced to the incoming signal reference instead of the board ground.
J56	MIC2_REF	MIC2 reference to GND select	[*] Shunted Open	MIC2 input shield connection of J35 is shunted to board ground. MIC2 input shield connection of J35 is not connected to board ground, thus the CS42L73 MIC2 input is referenced to the incoming signal reference instead of the board ground.
J36	HPOUT_REF	Headphone output reference to GND select	[*] Shunted Open	Headphone output shield connection of J29 is shunted to board ground. Headphone output shield connection of J29 is not connected to board ground, thus the CS42L73 headphone output is referenced to the outgoing connection reference instead of the board ground.
J38	LINEOUTA LPF	Line output A low-pass filter enable/disable	[*] BYPASS ON	Line output A low-pass filter is disabled Line output A low-pass filter is enabled
J39	LINEOUTB LPF	Line output B low-pass filter enable/disable	[*] BYPASS ON	Line output B low-pass filter is disabled Line output B low-pass filter is enabled
J37	LINEO_REF	Line output reference to GND select	[*] Shunted Open	Line output shield connection of J30 and J31 is shunted to board ground. Line output shield connection of J30 and J31 is not connected to board ground, thus the CS42L73 headphone output is referenced to the outgoing connection reference instead of the board ground.
J59, J60	SPKLINEO	Speakerphone line output to CS35L01 or passthrough	[*] AMP PASSTHRU	Output on J48 is amplified by the CS35L01 class-D amplifier. Output on J48 is direct connected to the CS42L73 speakerphone line output pins.

**Table 2. CDB42L73 Jumper Settings**

LED	STATUS	FUNCTION
D2 USB PRESENT	On Off	Indicates there is a USB connection to the CDB42L73. Indicates there is not a USB connection to the CDB42L73.
D3 SPDIF ERROR	On Off	Indicates there is either no S/PDIF input or error in the S/PDIF data stream. Indicates the connected S/PDIF input is valid.
D4 +5V	On Off	Indicates the +5 V main supply is powered. Indicates the +5 V main supply is not powered.

Table 3. LED Information

### Figure 1. CDB42L73 Factory Default Jumper Settings

## 4. SOFTWARE CONTROL USING FLEXGUI

### 4.1 Installation and First-time Setup

The Cirrus Logic FlexGUI application is a graphical user interface that allows users to easily configure software modifiable options on the CDB42L73, such as the register settings of the CS42L73 and the S/PDIF interface devices (CS8416, CS8406).

To set up FlexGUI for use with the CDB42L73, please follow these steps:

1. Download the latest version of the FlexGUI control software from [www.cirrus.com/msasoftware](http://www.cirrus.com/msasoftware). Follow the installation instructions on the download page.
2. Connect the CDB42L73 to the host PC using a USB cable.
3. Launch FlexGUI. Note: Once the GUI is launched successfully, all registers are set to their default reset state.

**Note:** To start evaluating the CS42L73 immediately with several standard configurations used at the factory, load the predefined register settings as described in [Section 4.2.2 Save or Restore Register Settings](#) for instructions.

### 4.2 Working with Register Settings

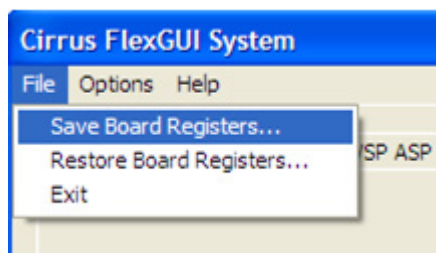
#### 4.2.1 Modifying Register Settings Manually

Once FlexGUI is up and running, there are two ways to modify register settings manually:

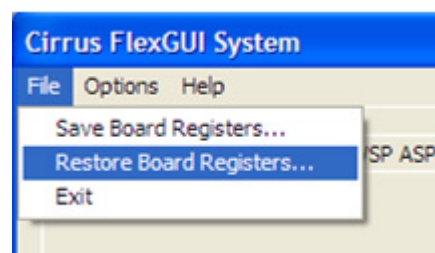
- Use the high-level interface, which features intuitive GUI elements such as sliders, check boxes, and drop-down menus. Please see [Section 4.3 Using the FlexGUI High-level Interface Layout](#) for more details on using the high-level interface.
- Use the low-level register map, which displays the entire user configurable register space for each device on the CDB42L73 in table form. Register changes may be done on a per-bit or per-address basis. Please see [Section 4.4 The Register Map](#) on [page 23](#) for more details on the register map.

#### 4.2.2 Save or Restore Register Settings

FlexGUI also allows saving the current state of all register settings to a file, which can be easily restored later.



**Figure 2. Save Register Settings**



**Figure 3. Restore Register Settings**

To save the current register settings, click on the File menu, then click “Save Board Registers” ([Figure 2](#)). Enter a suitable file name and click “Save.”

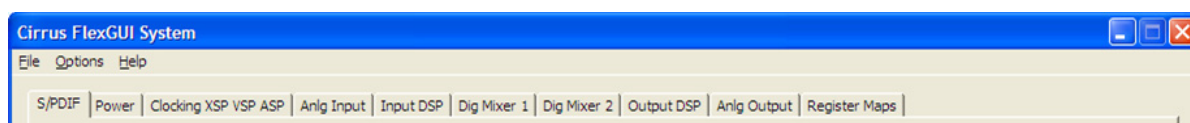
To restore pre-defined/saved register settings, click on the File menu, then click “Restore Board Registers” ([Figure 3](#)). Choose the desired register setting and click “Open.”

To restore one of several standard configurations pre-defined at the factory, load the register settings starting with “Factory\_Default” in its file name. The file names are meant to be self-explanatory. For example, if “Factory\_Default\_LINEIN\_to\_ASPOUT\_ASPIN\_to\_HP\_LINEOUT.fgs” is loaded, the Line Input is routed to the Audio Serial Port to the S/PDIF output, and the S/PDIF input is routed to the Audio Serial Port to the Headphone and Line Output.

### 4.3 Using the FlexGUI High-level Interface Layout

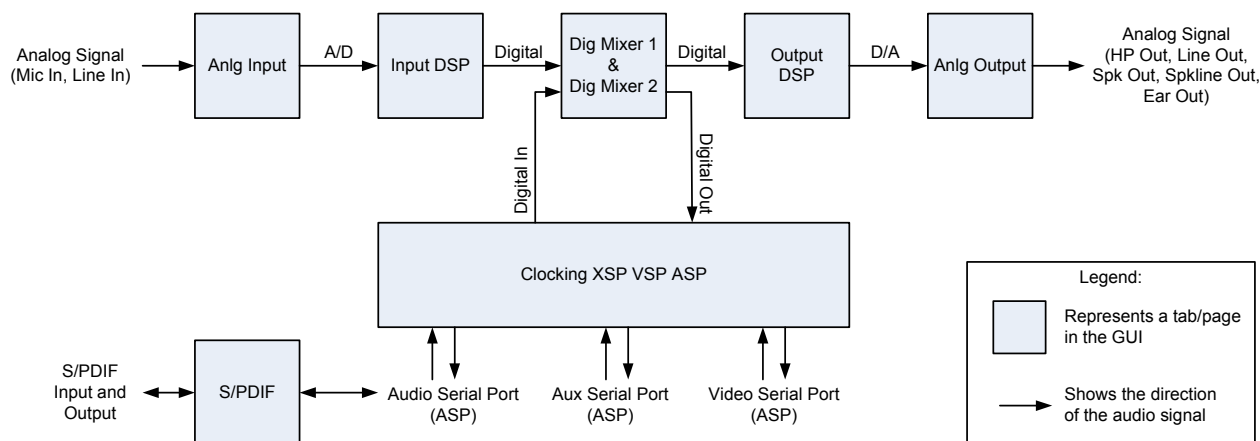
The CS42L73 is a versatile CODEC with many features and register settings. To keep the GUI easy to use and visually clean, register controls for the CS42L73 are grouped by function and their location in the signal chain. The result is a series of tabs arranged to mirror the CS42L73’s major functional blocks as closely as possible (the S/PDIF tab is an exception in that it is not part of the CS42L73 but its functionality in the system is important enough to warrant a tab in the GUI).

Figure 4 below shows the tabs in the FlexGUI high-level interface layout.



**Figure 4. FlexGUI Tabs**

Figure 5 below is a flow diagram to help users map the FlexGUI tabs to their respective function in the audio signal chain.



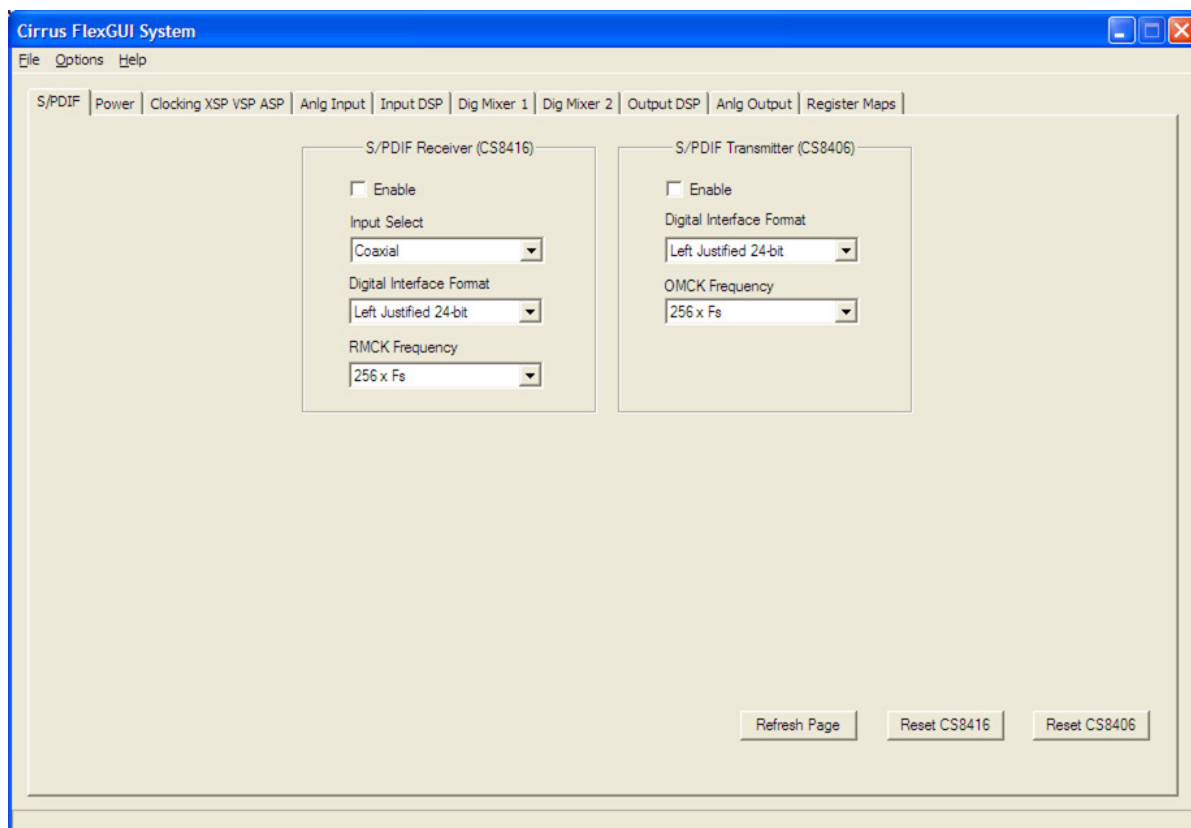
**Figure 5. Correlating the FlexGUI Tabs to the Audio Signal Chain**

The subsequent sections, [Section 4.3.1](#) through [Section 4.3.9](#), describe each tab in detail.

### 4.3.1 S/PDIF Tab

The “S/PDIF” tab contains the main controls for setting up the S/PDIF interface of the CDB42L73. A brief description of each control group is described below.

- S/PDIF Receiver (CS8416) - register controls for configuring the CS8416 to accommodate the S/PDIF input stream
- S/PDIF Transmitter (CS8406) - register controls for configuring the CS8406 to produce the desired S/PDIF output stream
- Refresh Page - reads all registers in all devices and updates the values in the GUI
- Reset CS8416 - resets the CS8416 S/PDIF receiver
- Reset CS8406 - resets the CS8406 S/PDIF transmitter



**Figure 6. The “S/PDIF” Tab in FlexGUI for the CDB42L73**

### 4.3.2 Power Tab

The “Power” tab contains the main controls for setting the power options of all functional blocks in the CS42L73. A brief description of each control group is described below.

- Power Down CS42L73 - the master power down register control for the CS42L73
- Serial Port - register controls to selectively power down serial port inputs/outputs
- Input - register controls to selectively power down analog input-related and digital mic functions
- Output - register controls to selectively power down analog outputs
- Misc - register controls to configure miscellaneous power-related options
- Device and Revision I.D. - displays the CS42L73 revision information
- Refresh Page - reads all registers in all devices and updates the values in the GUI
- Reset CS42L73 - resets the CS42L73

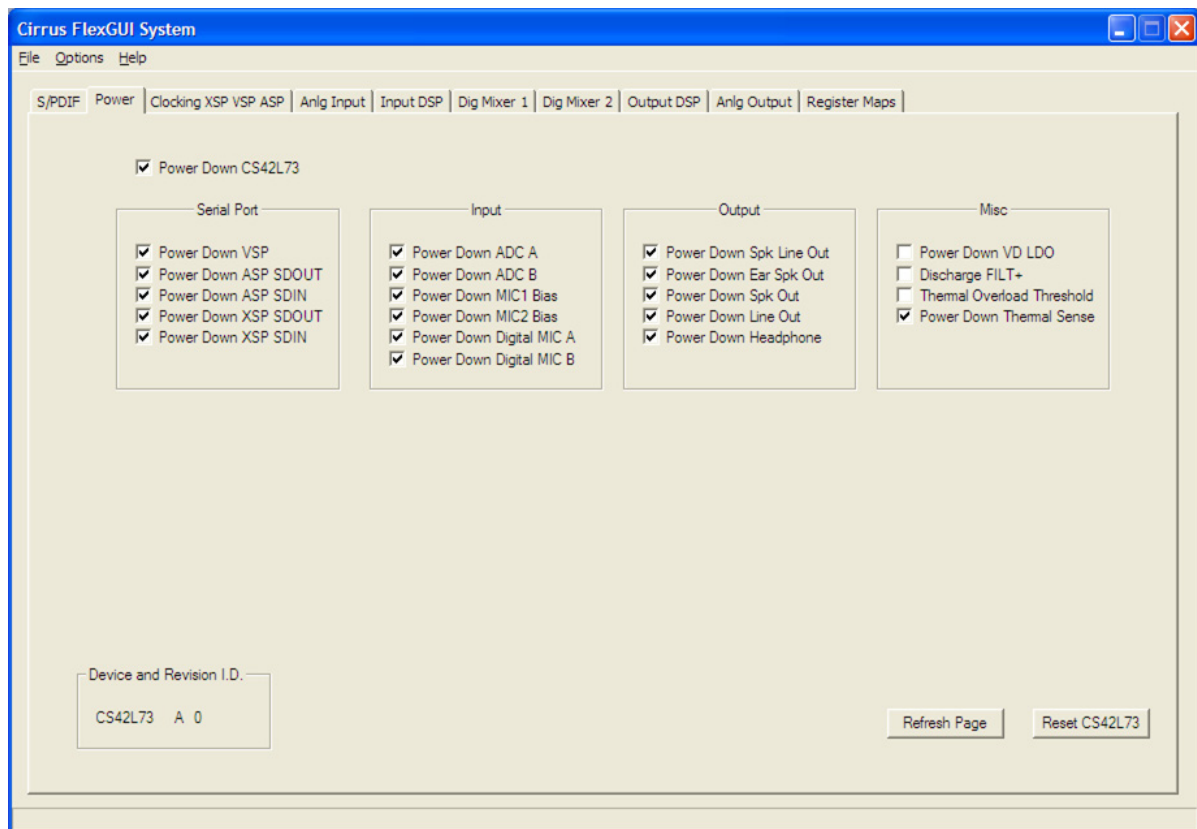


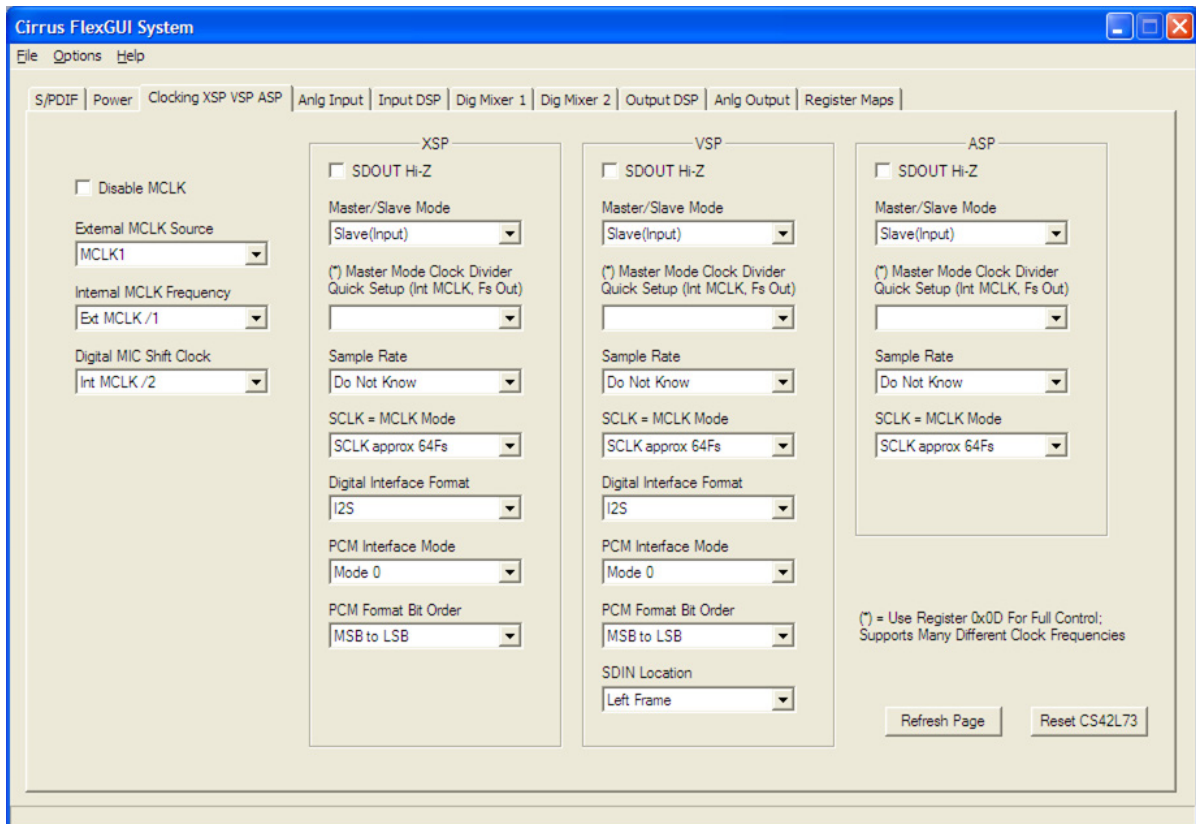
Figure 7. The “Power” Tab in FlexGUI for the CDB42L73



### 4.3.3 Clocking XSP VSP ASP Tab

The “Clocking XSP VSP ASP” tab contains the main controls for setting the clocking related options of all functional blocks in the CS42L73. A brief description of each control group is described below.

- Disable MCLK - register control that disables the master clock within the CS42L73 when checked
- External MCLK Source - register control to select either the MCLK1 or the MCLK2 pin on the CS42L73 as the external master clock source
- Internal MCLK Frequency - register control to select the internal master clock frequency (note: internal master clock is derived from the external master clock selected with the “External MCLK Source” menu)
- Digital MIC Shift Clock - register control to select the digital mic shift clock frequency (note: digital mic clock is derived from the internal master clock as configured with the “Internal MCLK Frequency” menu)
- XSP - register controls to configure the Auxiliary Serial Port
- VSP - register controls to configure the Voice Serial Port
- ASP - register controls to configure the Audio Serial Port
- Refresh Page - reads all registers in all devices and updates the values in the GUI
- Reset CS42L73 - resets the CS42L73



**Figure 8. The “Clocking XSP VSP ASP” Tab in FlexGUI for the CDB42L73**



#### 4.3.4 Analog Input Tab

The “Analog Input” tab contains the main controls for setting the analog input circuitry options of the CS42L73. A brief description of each control group is described below.

- Analog Input Path Basic Configuration - register controls to select the input (line or microphone) and configure volume settings of the CS42L73’s analog input
- MIC Bias Configuration - register controls to configure the CS42L73’s microphone bias circuitry
- Refresh Page - reads all registers in all devices and updates the values in the GUI
- Reset CS42L73 - resets the CS42L73

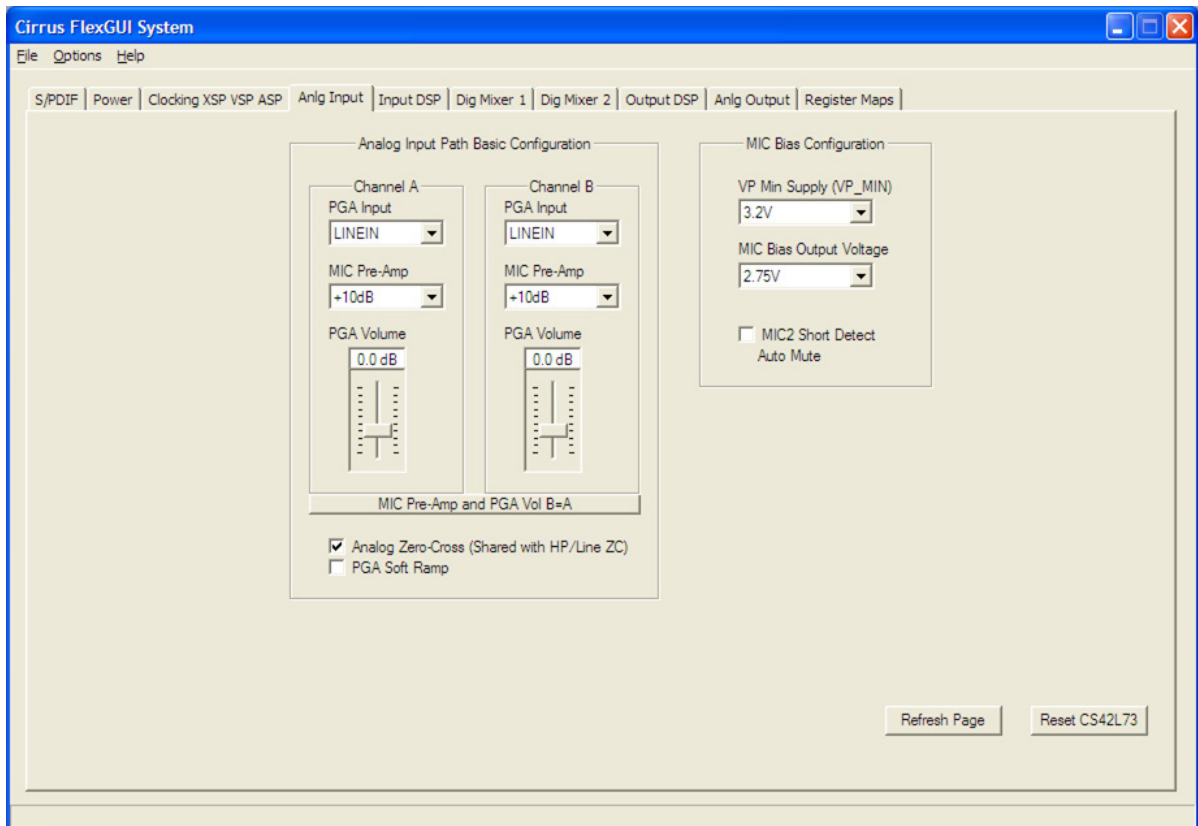


Figure 9. The “Analog Input” Tab in FlexGUI for the CDB42L73

### 4.3.5 Input DSP Tab

The “Input DSP” tab contains the main controls for setting the digital signal processing applied to the analog inputs (including the digital microphone) of the CS42L73. A brief description of each control group is described below.

- Noise Gate Configuration - register controls to configure the CS42L73’s analog input noise gate options
- ALC Configuration - register controls to configure the CS42L73’s analog input automatic level control options
- Digital Volume - register controls to configure the digital volume of the CS42L73’s analog inputs going into the pre-digital mixer stage (described in the next item below, the “Input to Mixer Configuration”)
- Input to Mixer Configuration (Digital Swap / Mono) - register controls to configure the channel mapping and mono downmixing options of the analog input signal going into the digital mixer
- Refresh Page - reads all registers in all devices and updates the values in the GUI
- Reset CS42L73 - resets the CS42L73

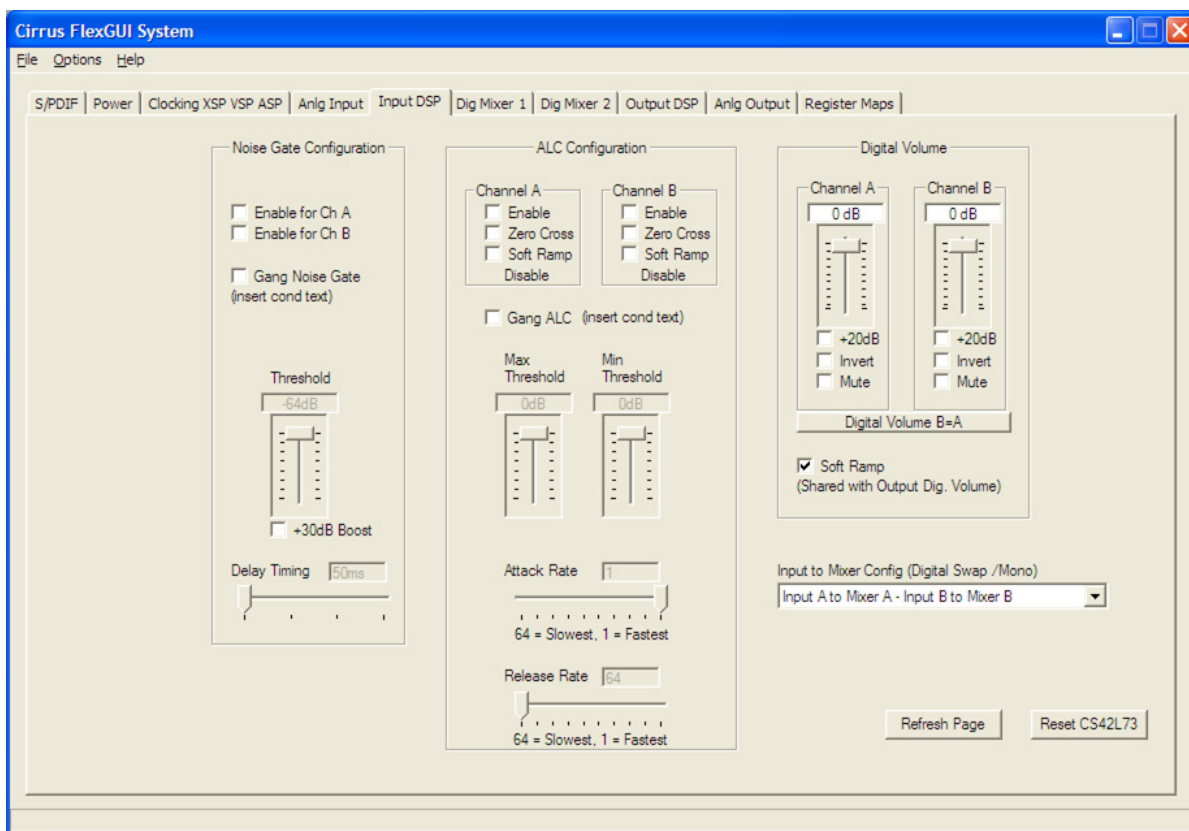


Figure 10. The “Input DSP” Tab in FlexGUI for the CDB42L73

### 4.3.6 Digital Mixer 1 Tab

The “Digital Mixer 1” tab contains the main controls for setting the digital mixing/routing options for all three serial ports of the CS42L73. A brief description of each control group is described below.

- To XSP Output - register controls to configure the mix of all the input signals to the Auxiliary Serial Port
- To VSP Output - register controls to configure the mix of all the input signals to the Voice Serial Port
- To ASP Output - register controls to configure the mix of all the input signals to the Audio Serial Port
- XSP, VSP Mono Output Options - register controls to select either stereo or dual-mono mode for the Auxiliary and Voice Serial Port outputs
- Refresh Page - reads all registers in all devices and updates the values in the GUI
- Reset CS42L73 - resets the CS42L73

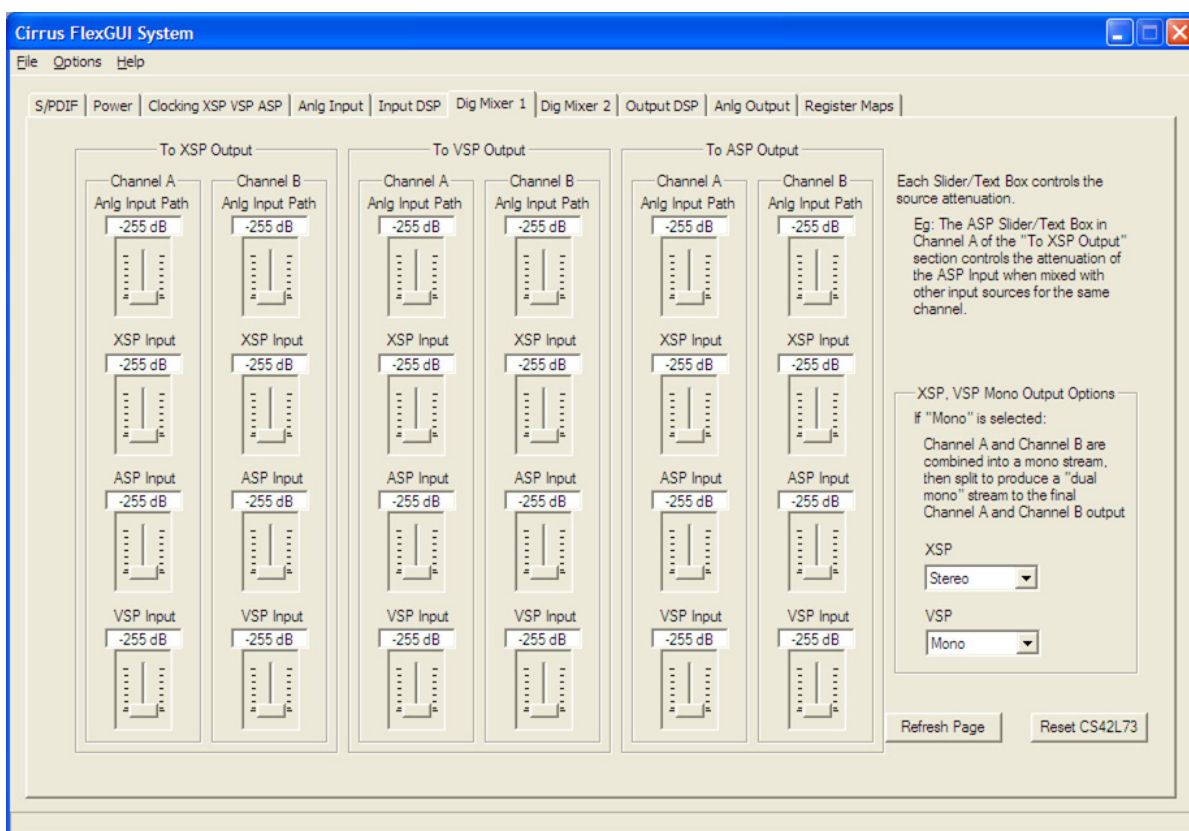
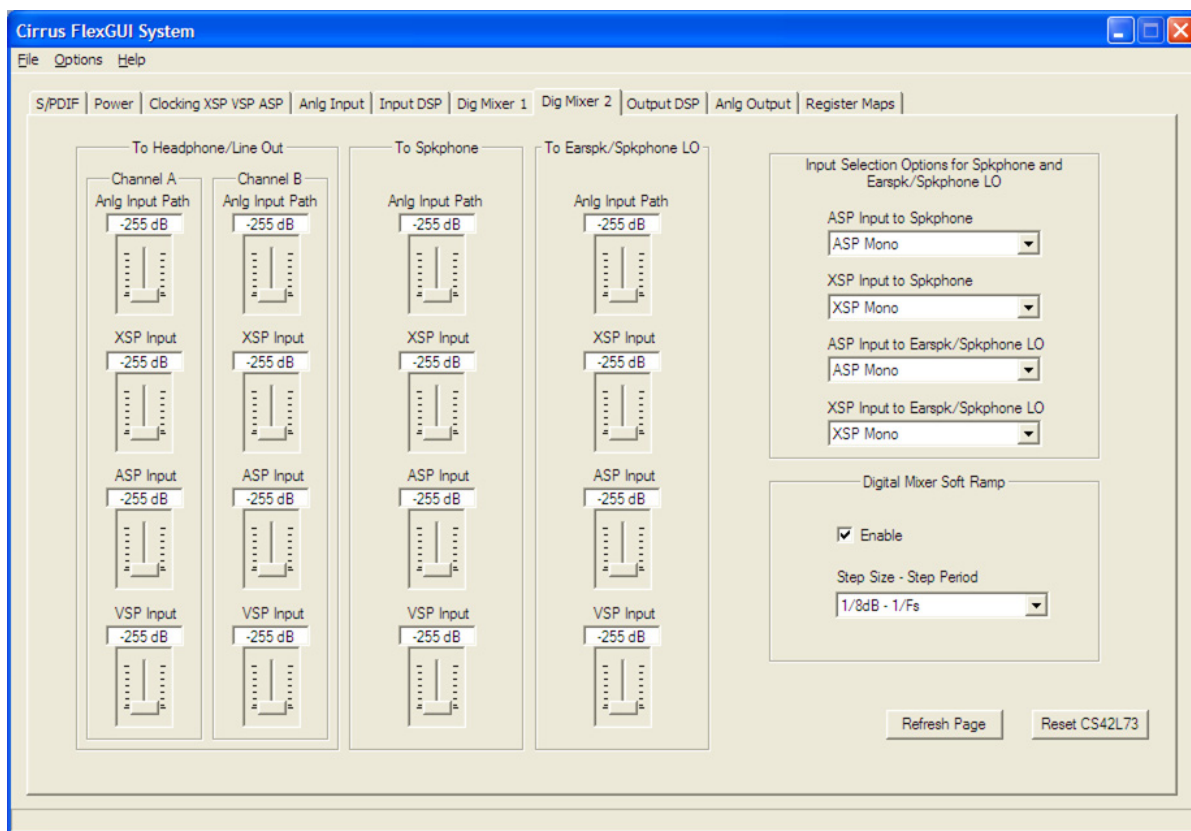


Figure 11. The “Digital Mixer 1” Tab in FlexGUI for the CDB42L73

### 4.3.7 Digital Mixer 2 Tab

The “Digital Mixer 2” tab contains the main controls for setting the digital signal mixing/routing to the analog outputs of CS42L73. A brief description of each control group is described below.

- To Headphone/Line Out - register controls to configure the mix of all the input signals to the headphone or line outputs
- To Spkphone - register controls to configure the mix of all the input signals to the speakerphone output
- To Earspk/Spkphone LO - register controls to configure the mix of all the input signals to the earphone or speakerphone-line outputs
- Input Selection Options for Spkphone and Earspk/Spkphone LO - register controls to select either Channel A from the stereo mix, Channel B from the stereo mix, or the dual-mono mix to the speakerphone, earphone, and speakerphone-line outputs
- Refresh Page - reads all registers in all devices and updates the values in the GUI
- Reset CS42L73 - resets the CS42L73



**Figure 12. The “Digital Mixer 2” Tab in FlexGUI for the CDB42L73**

### 4.3.8 Output DSP Tab

The “Output DSP” tab contains the main controls for setting the digital signal processing applied to the analog outputs of the CS42L73. A brief description of each control group is described below.

- Digital Volume - register controls to configure the digital volume of the audio routed to the peak detect and limiter circuitry prior to the analog outputs
- Peak Detect and Limiter - register controls to configure the peak detection and limiter functions applied to the analog outputs
- Refresh Page - reads all registers in all devices and updates the values in the GUI
- Reset CS42L73 - resets the CS42L73

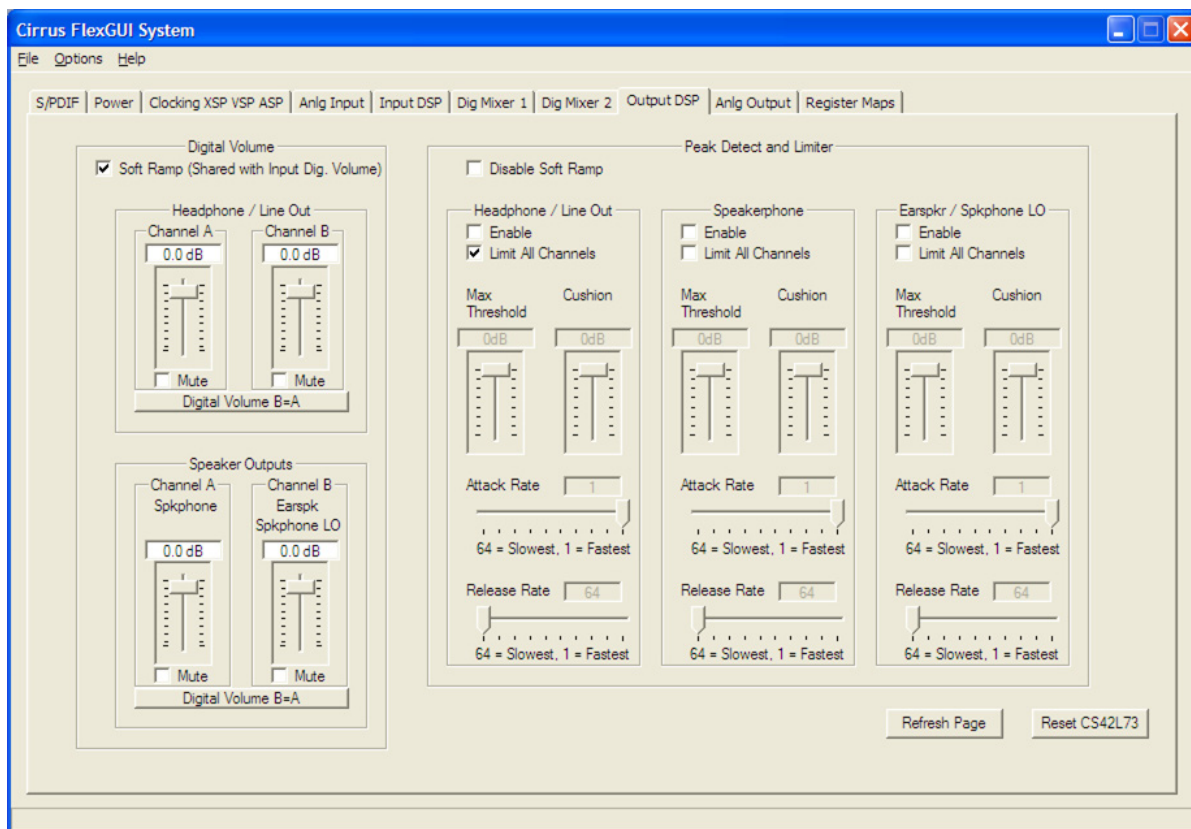
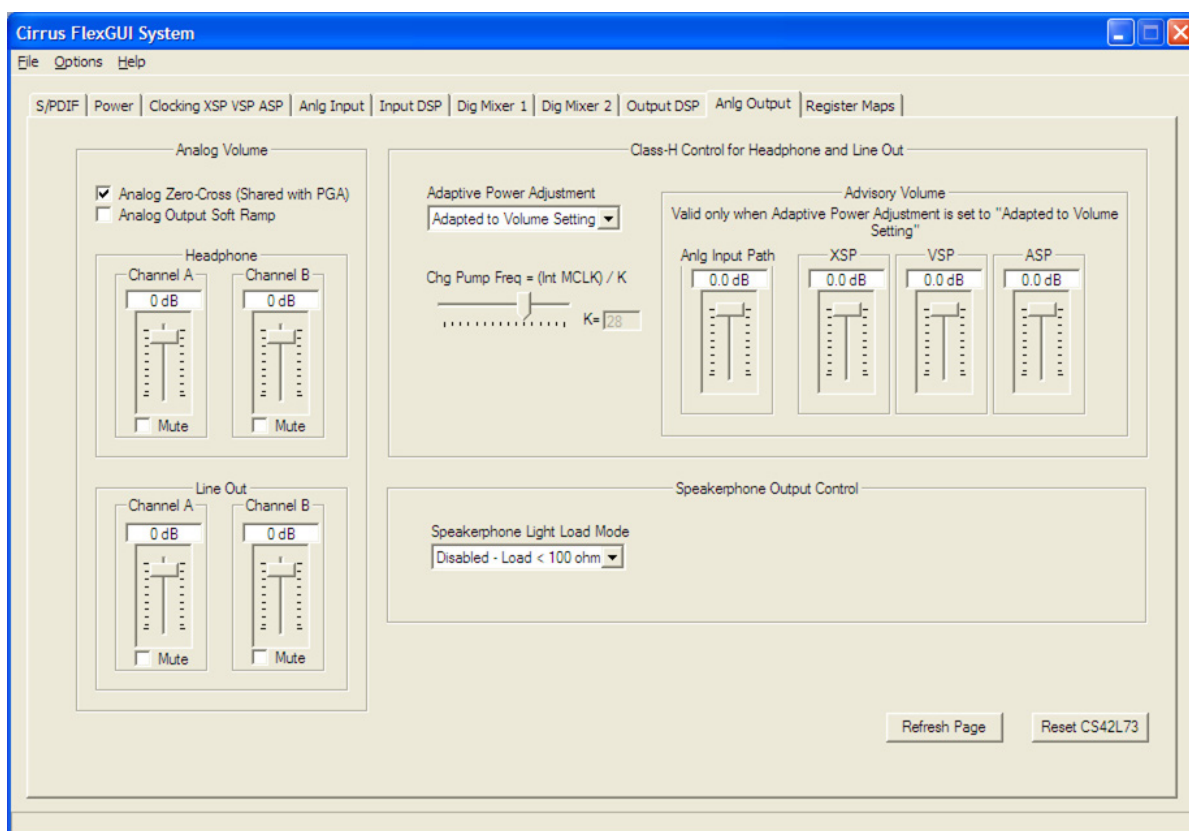


Figure 13. The “Output DSP” Tab in FlexGUI for the CDB42L73

### 4.3.9 Analog Output Tab

The “Analog Output” tab contains the main controls for setting the analog output circuitry options of the CS42L73. A brief description of each control group is described below.

- Analog Volume - register controls to configure the analog volume settings of the CS42L73’s analog outputs
- Class H controls for Headphone and Line Out - register controls to configure the Class H power mode related options and the charge pump frequency
- Speakerphone Output Control - register control to select the drive capability of the speakerphone output
- Refresh Page - reads all registers in all devices and updates the values in the GUI
- Reset CS42L73 - resets the CS42L73



**Figure 14. The “Analog Output” Tab in FlexGUI for the CDB42L73**



## 4.4 The Register Map

The register map shows the entire user configurable register space for all programmable devices on the CDB42L73.

It is especially useful for reading/writing a device's register settings directly, one whole register at a time. For example, the default value for register 0x11 is 0x15 (Figure 15). To modify register 0x11's value, first navigate to it by locating the cell at the intersection of row "10" and column "01." Click on the cell and simply type the desired hexadecimal value for that register, then press the return key (Enter) on the keyboard.

To modify one bit of a register at a time, navigate to the desired register cell, click it, then click on the applicable bits shown in the lower part of the register map page to toggle them.

Other useful controls:

- Reset All - clicking this button asserts reset to all devices on the CDB42L73
- Reset Device - clicking this button asserts reset to the device currently in view in the register map
- Released Reset - clicking this button holds/releases the device currently in view in the register map in/from reset.
- Update Register - clicking this button refreshes the current selected register value
- Update Device - clicking this button refreshes all register values of the device currently in view in the register map

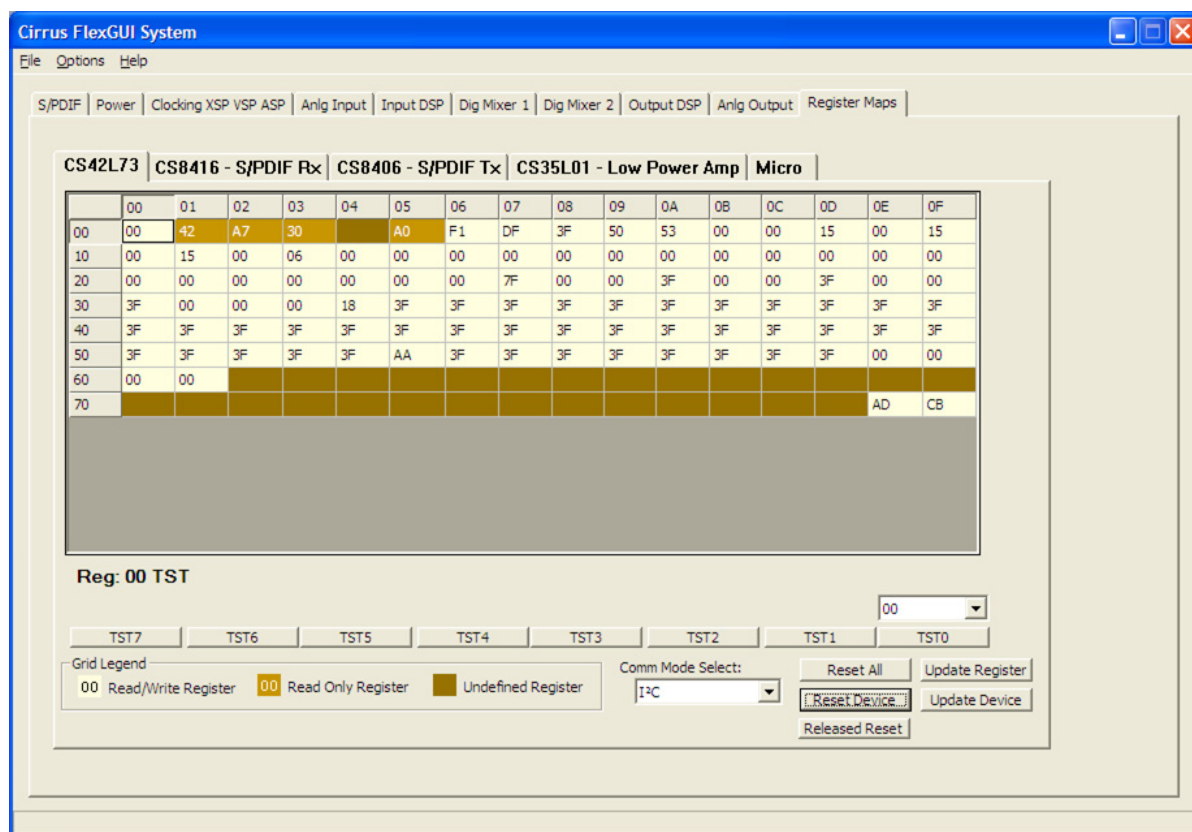


Figure 15. The "Register Maps" Tab in FlexGUI for the CDB42L73

## 5. SCHEMATICS AND LAYOUT

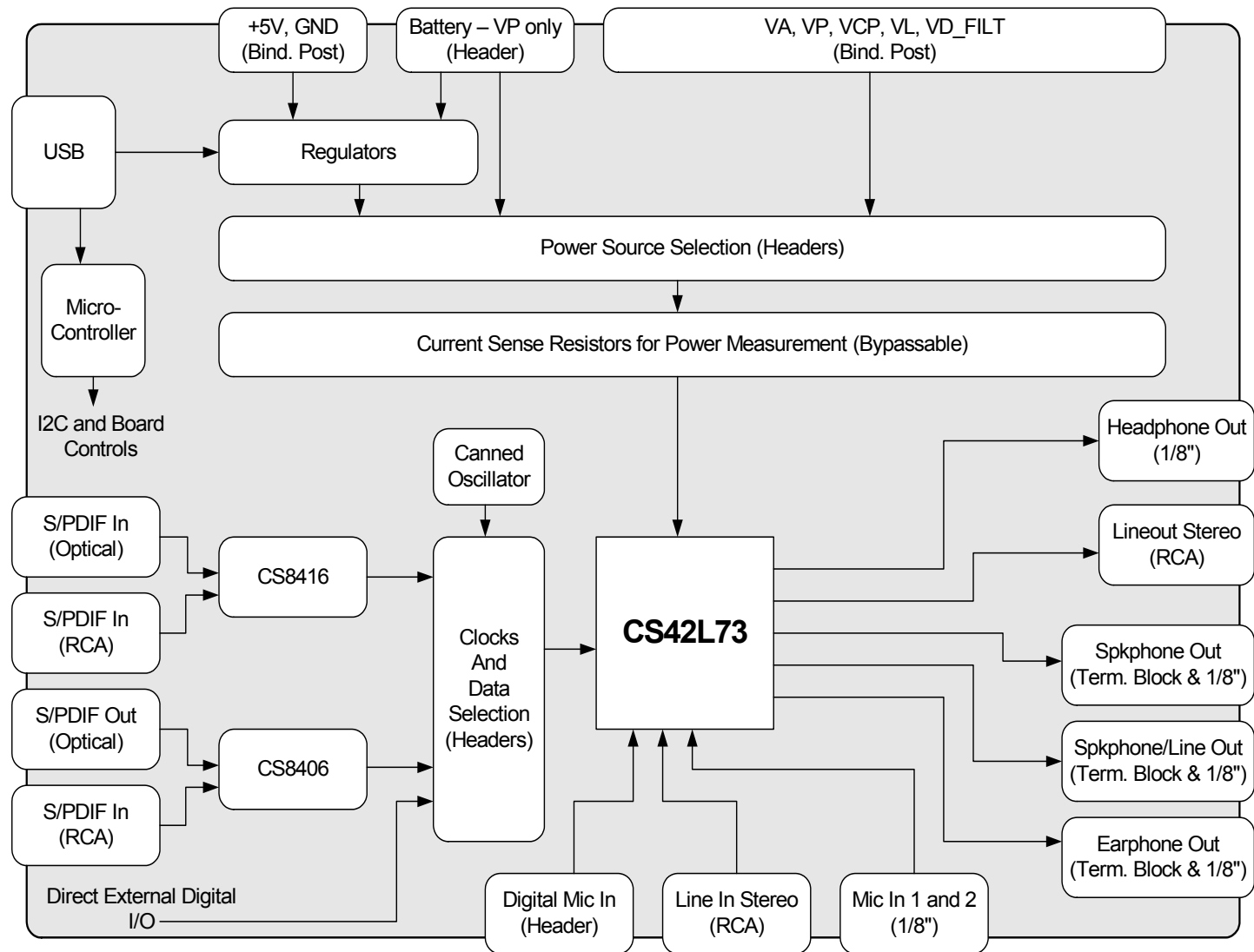


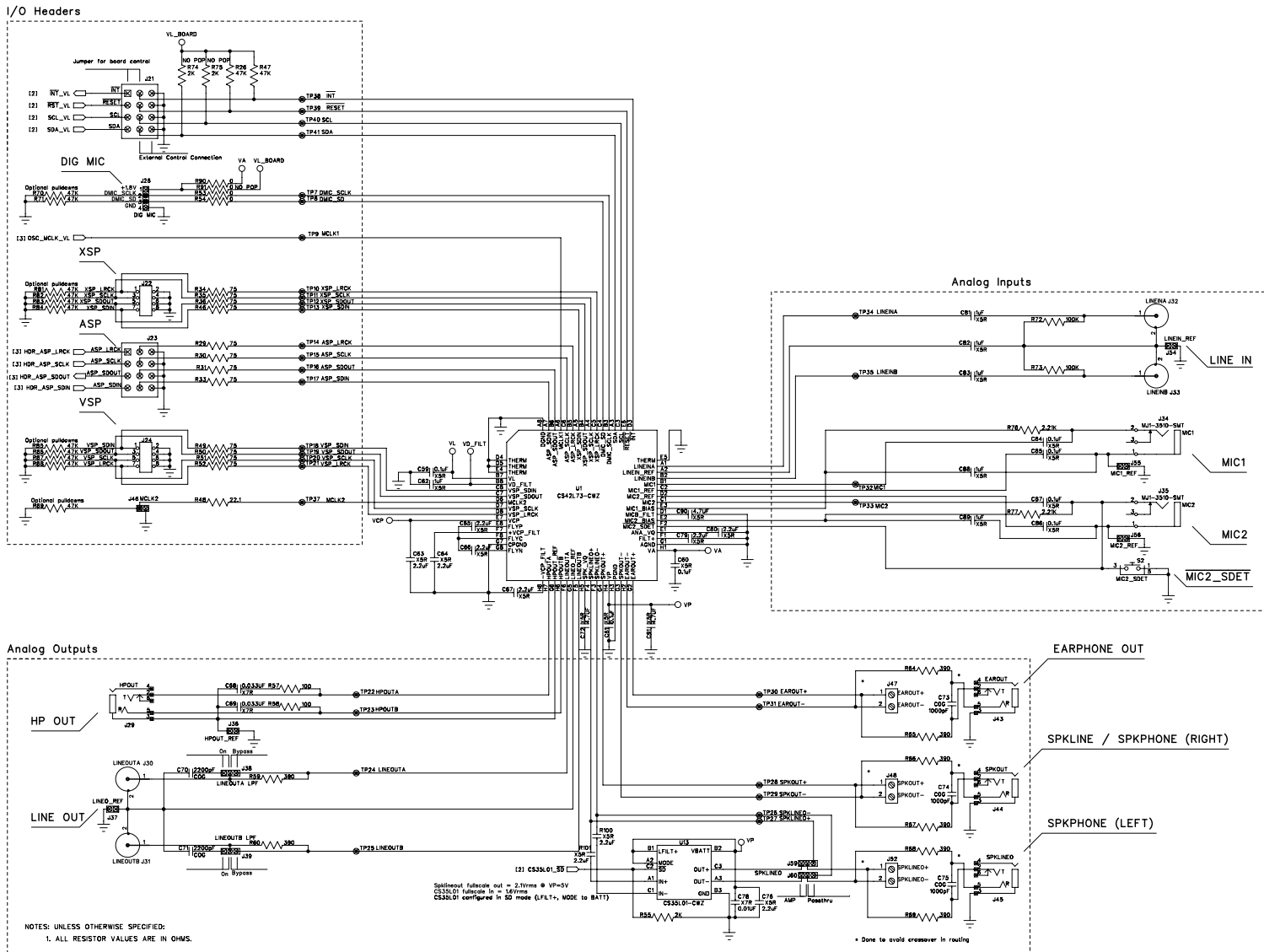
Figure 16. System Block Diagram



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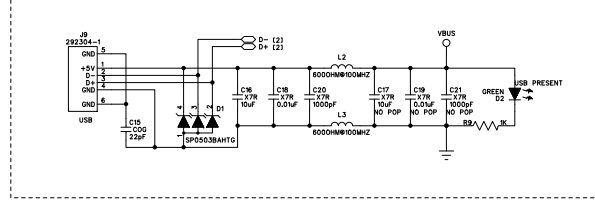




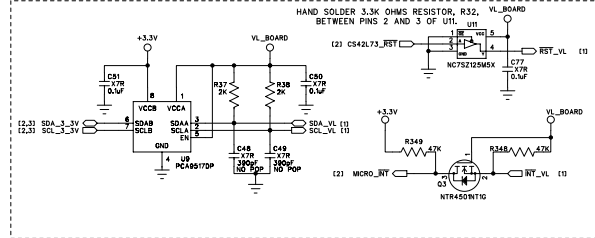
**Figure 17. CS42L73**



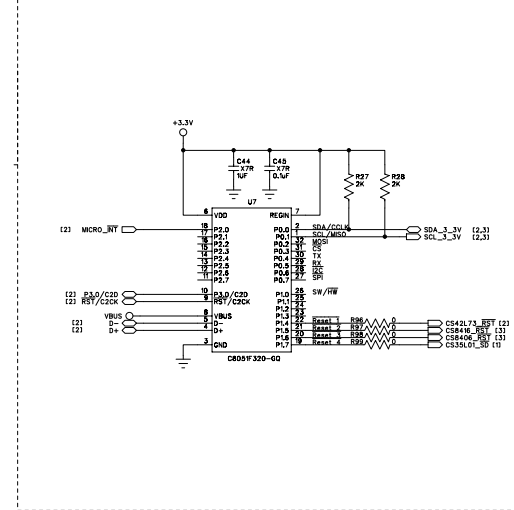
### USB I/O



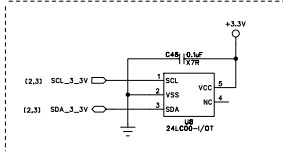
### Control Level Shifting & Buffers



### USB Microcontroller



### Serial EEPROM for Board ID



### USB Reset and C2 Header

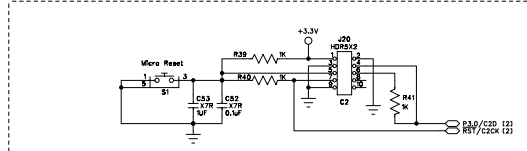
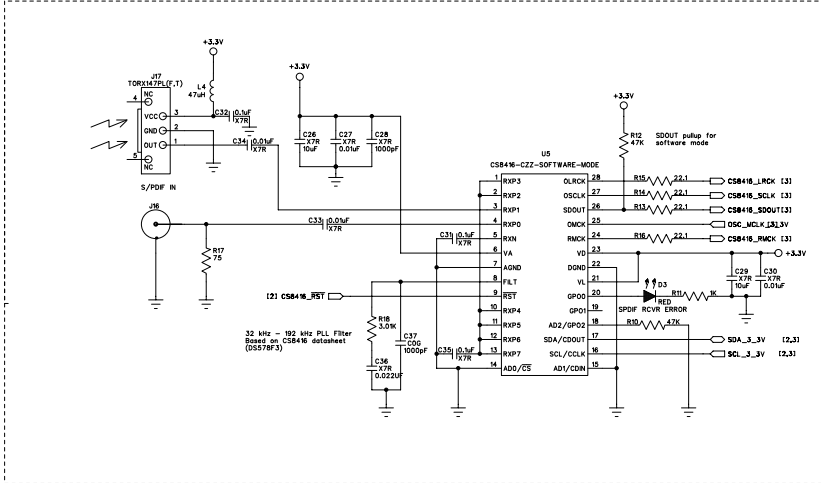


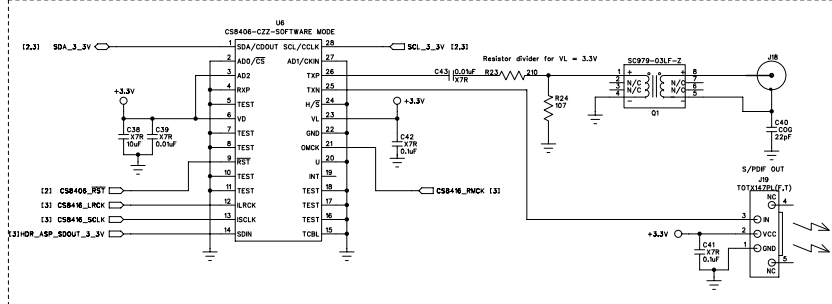
Figure 18. USB and Microcontroller



S/PDIF Receiver (I2C Address: 0x20) – Master Mode



S/PDIF Transmitter (I2C Address: 0x28) – Slave Mode



MCLK and PCM Buffers

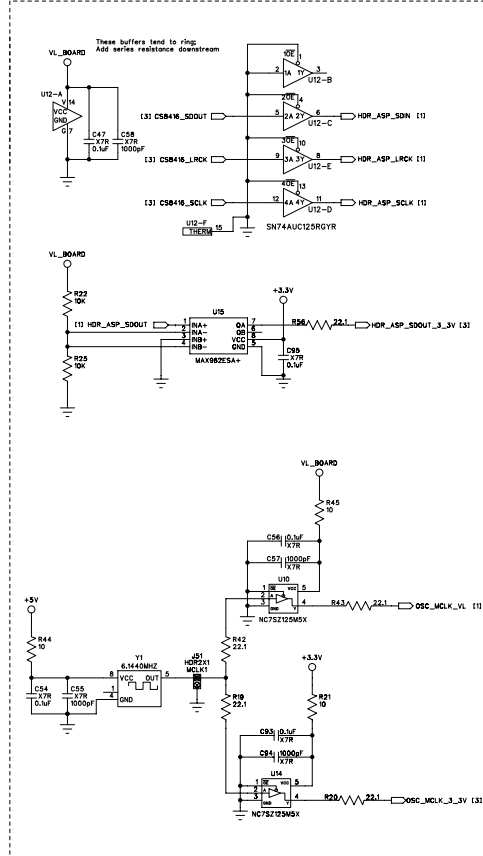
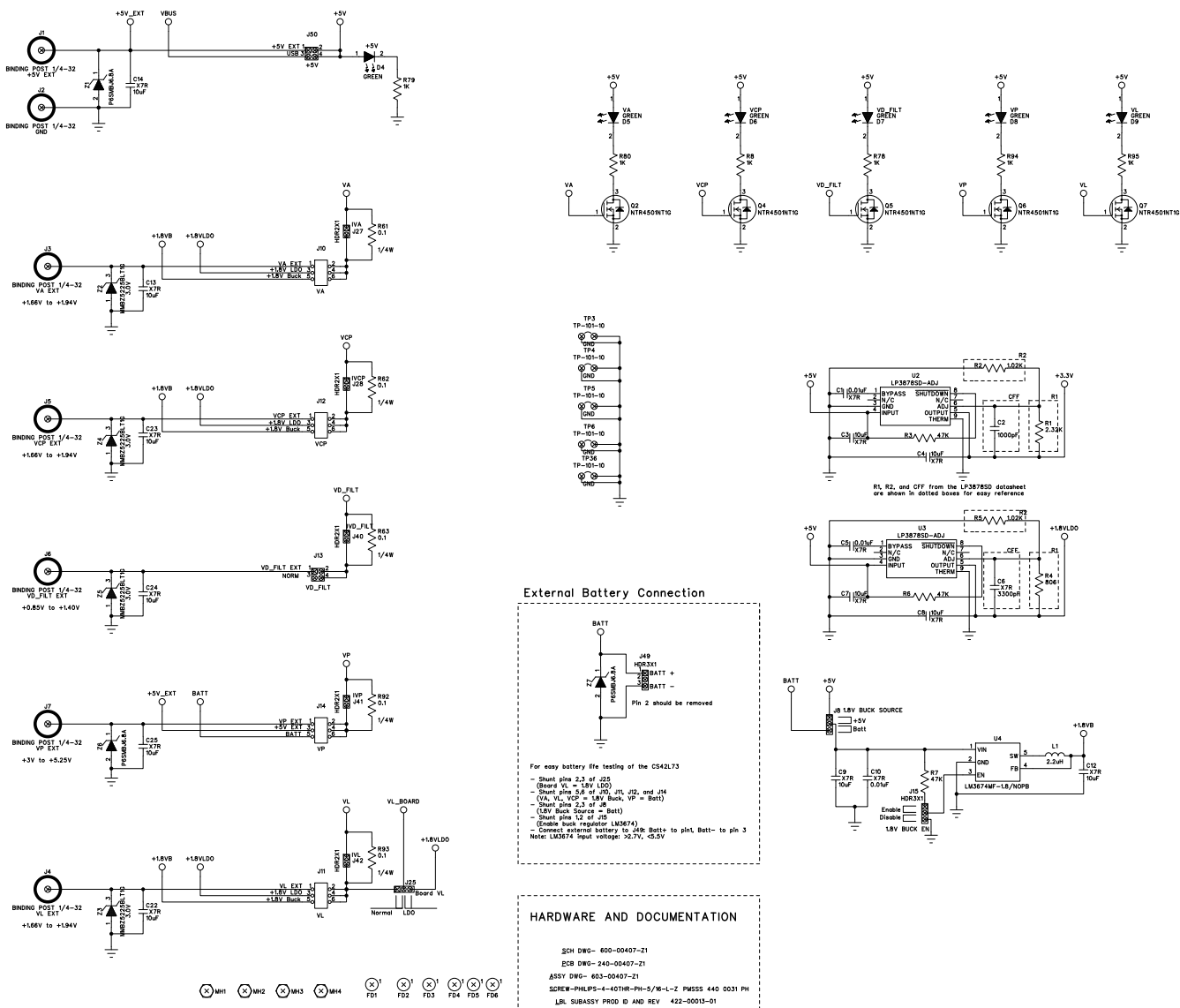


Figure 19. S/PDIF Receiver and Transmitter; Clock Buffers



### Figure 20. Power



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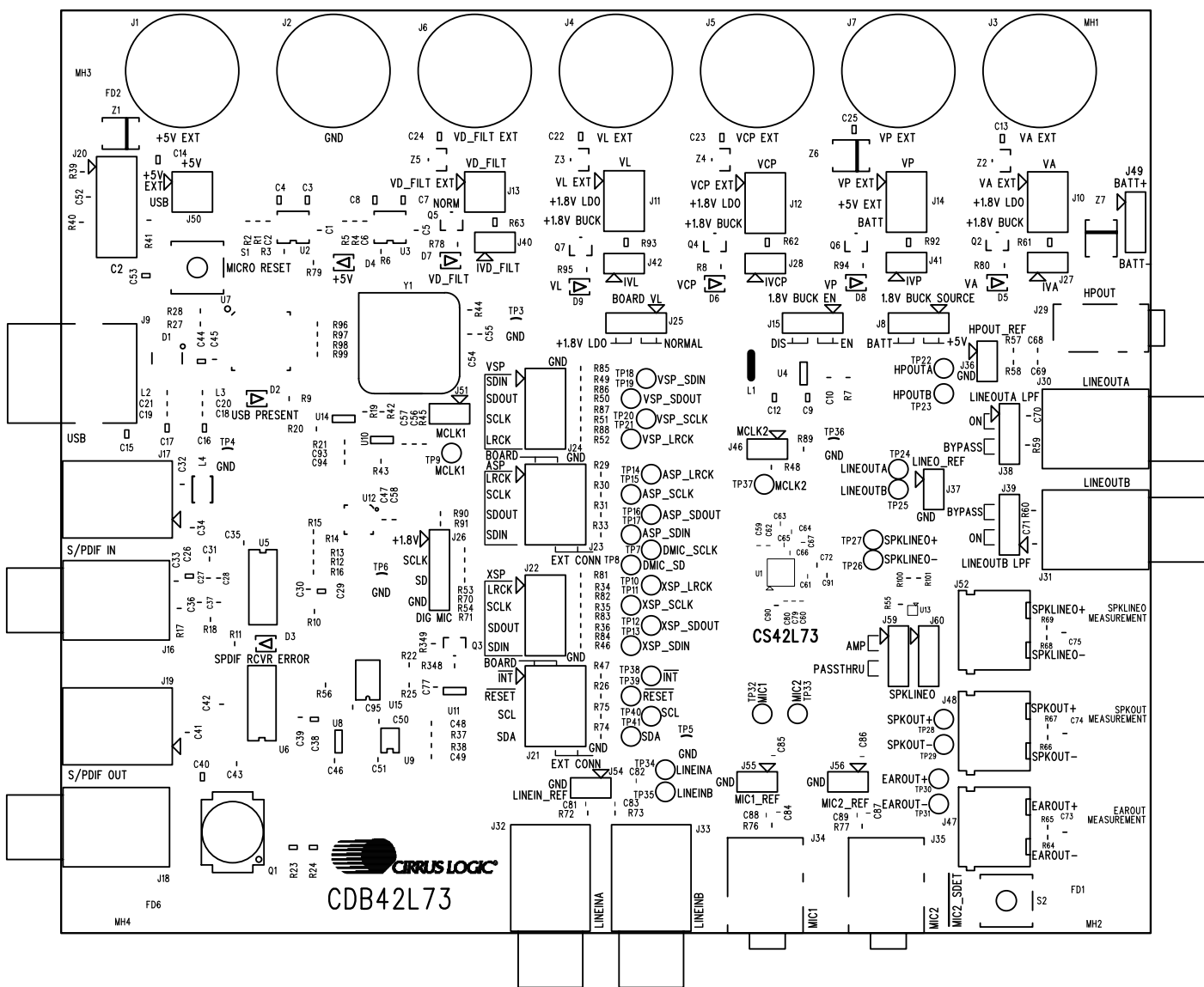


Figure 21. Top Side Silkscreen

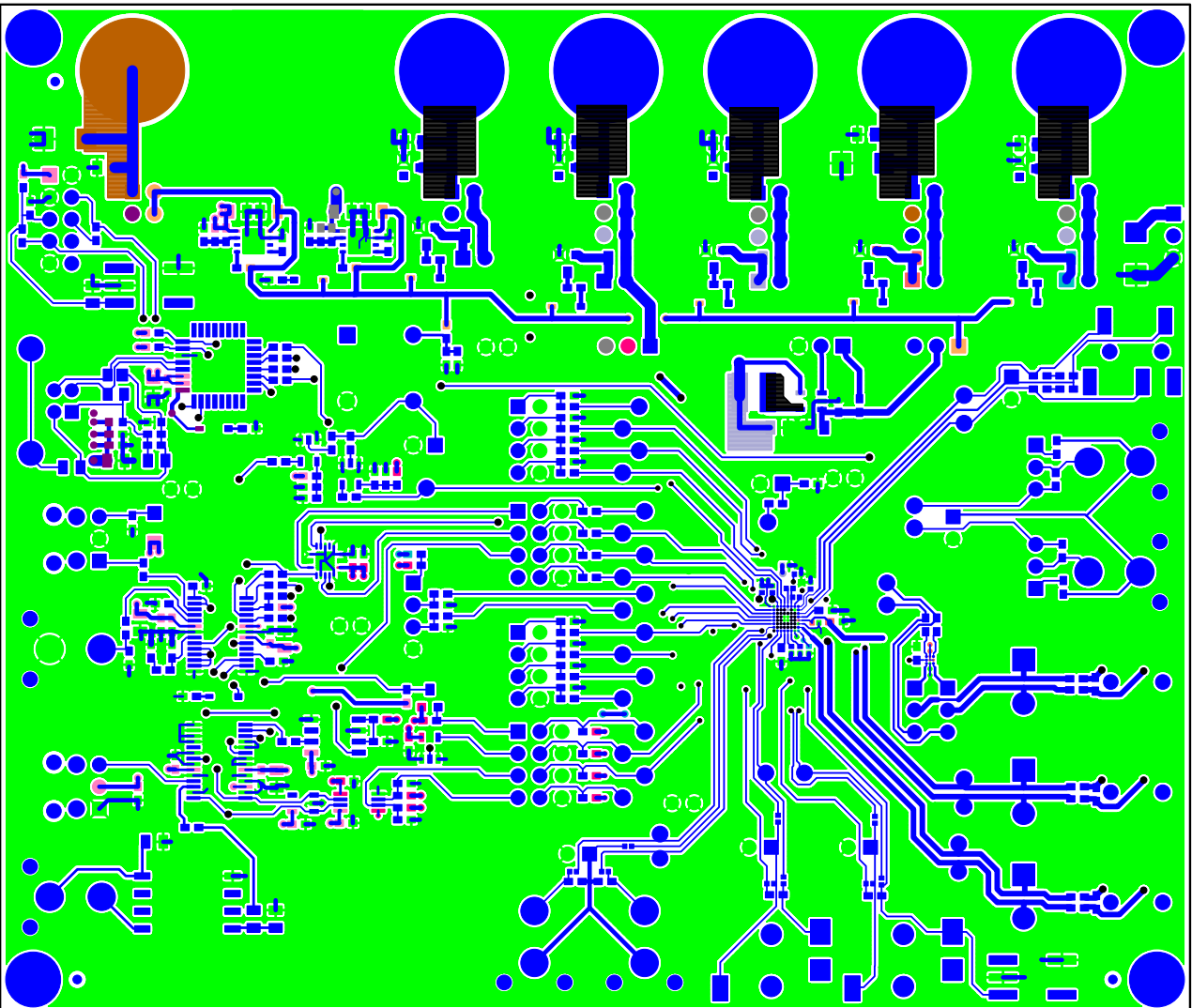
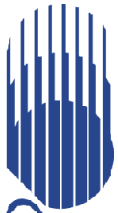


Figure 22. Layer 1

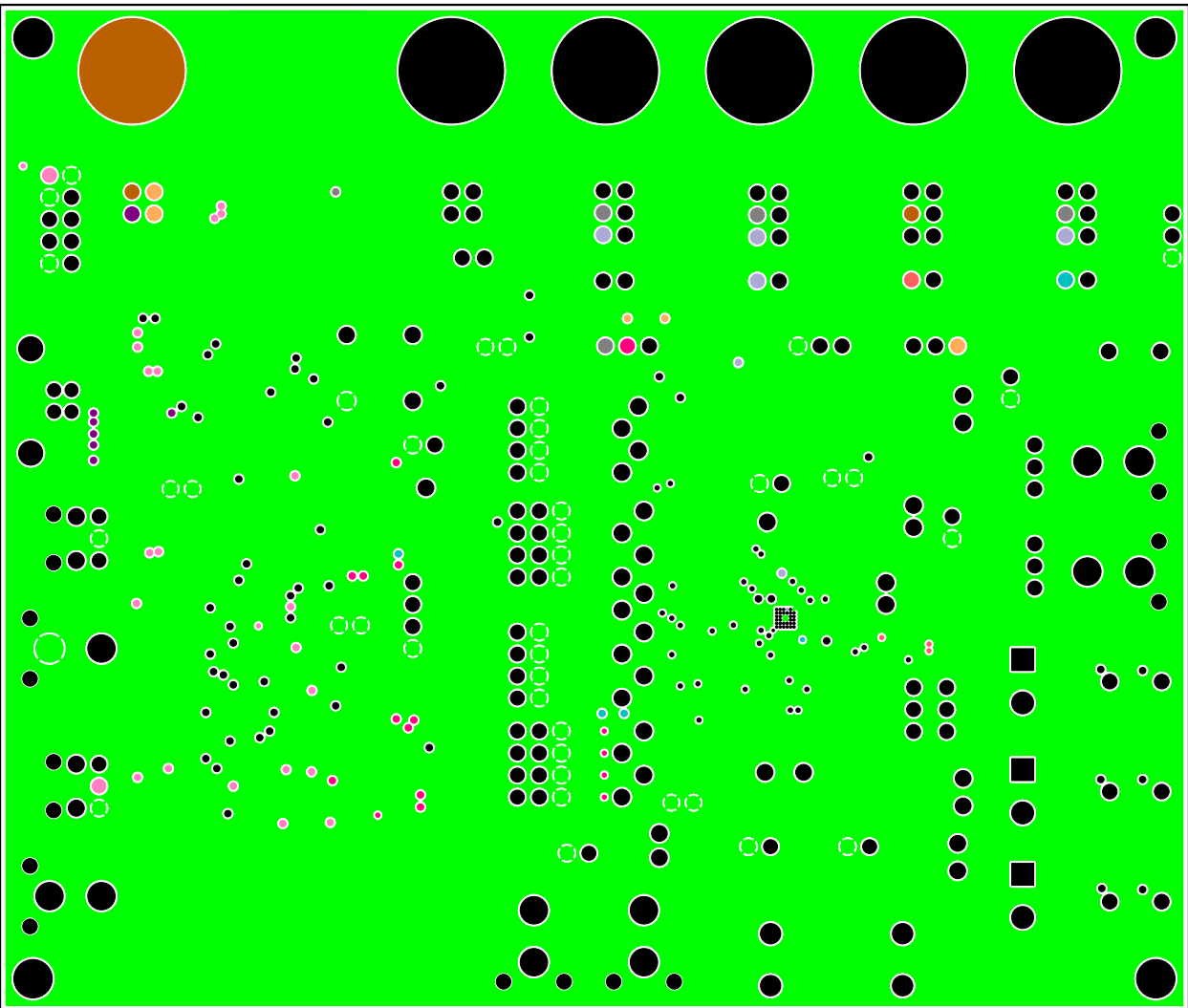


Figure 23. Layer 2

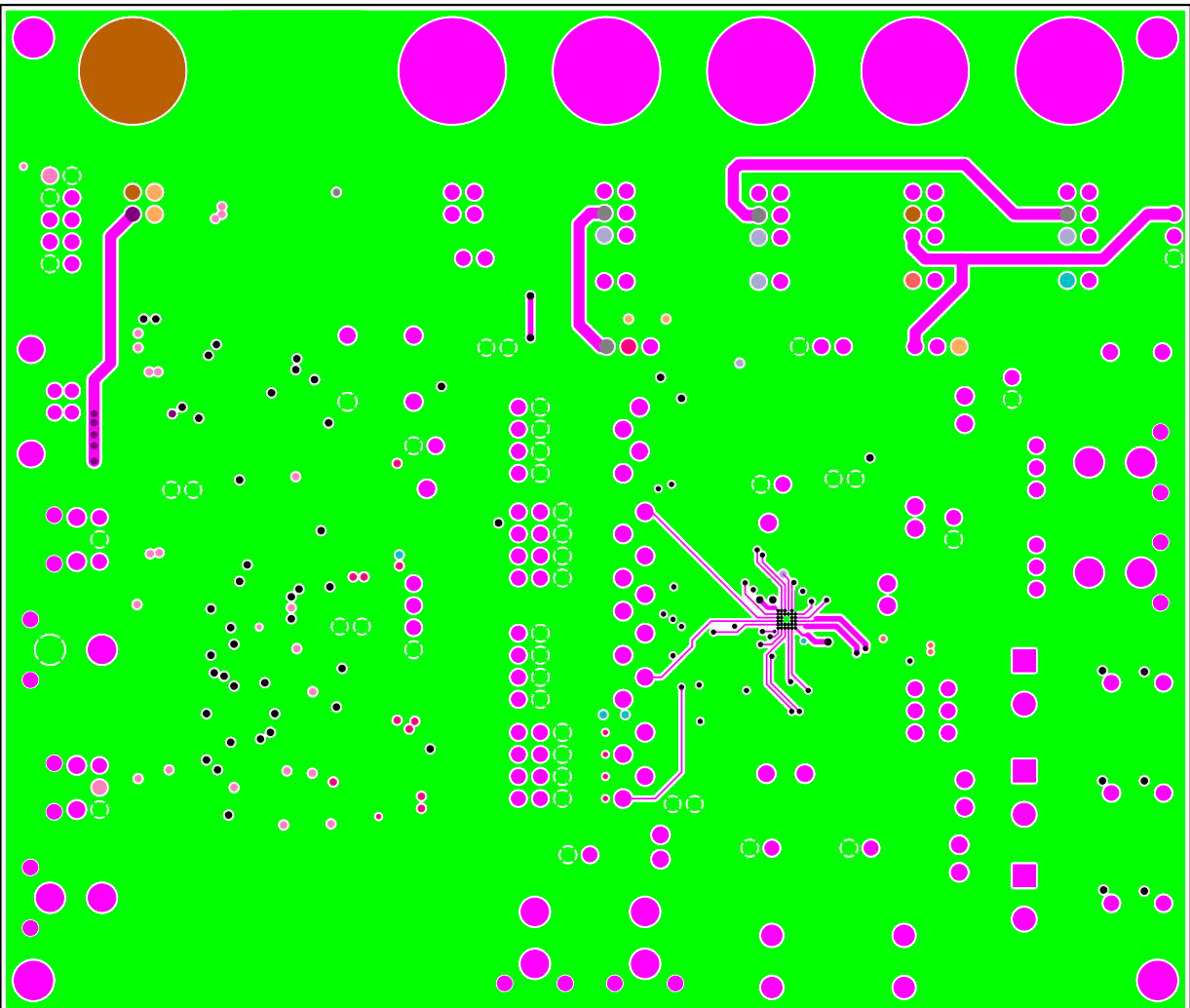


Figure 24. Layer 3



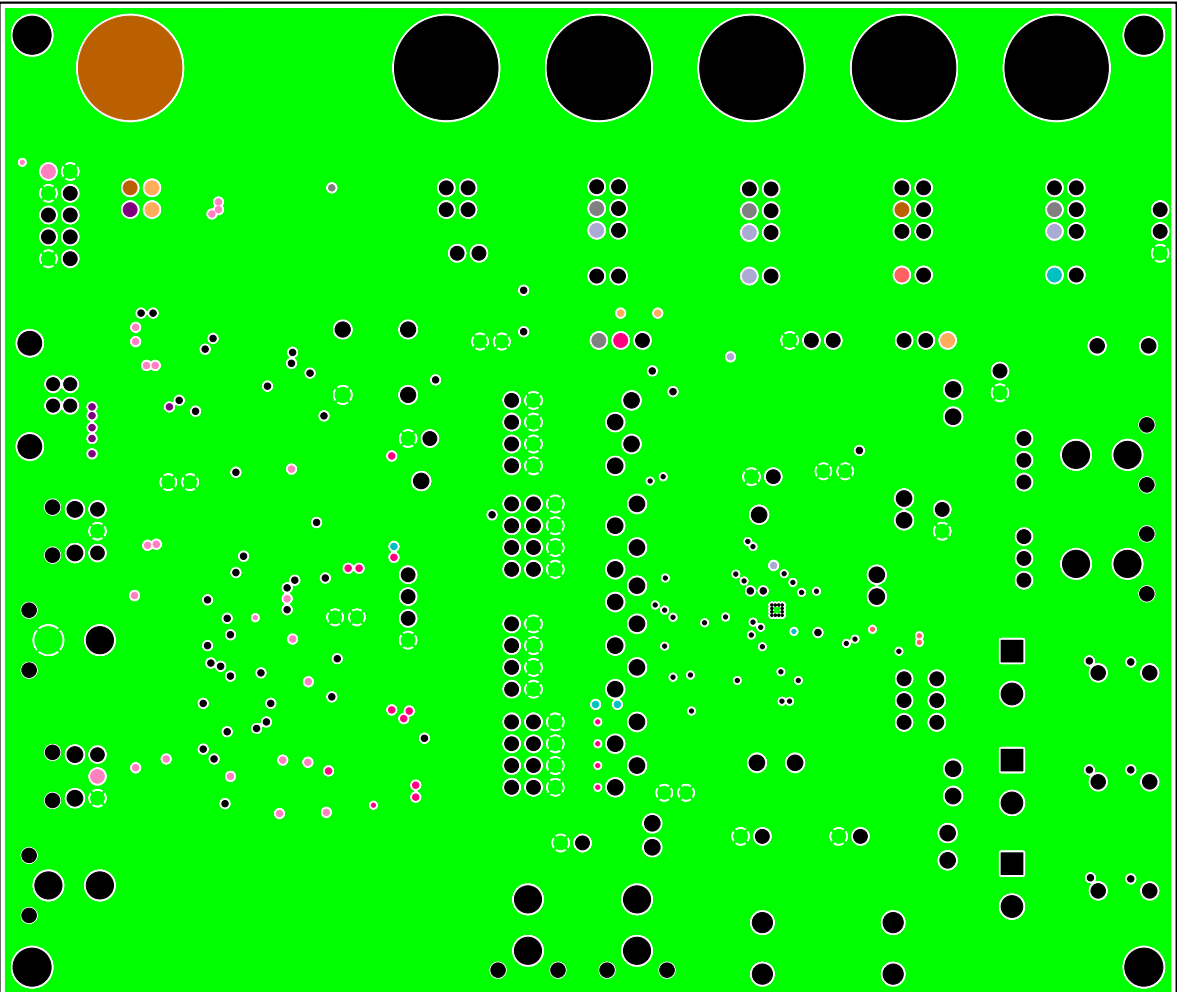


Figure 25. Layer 4

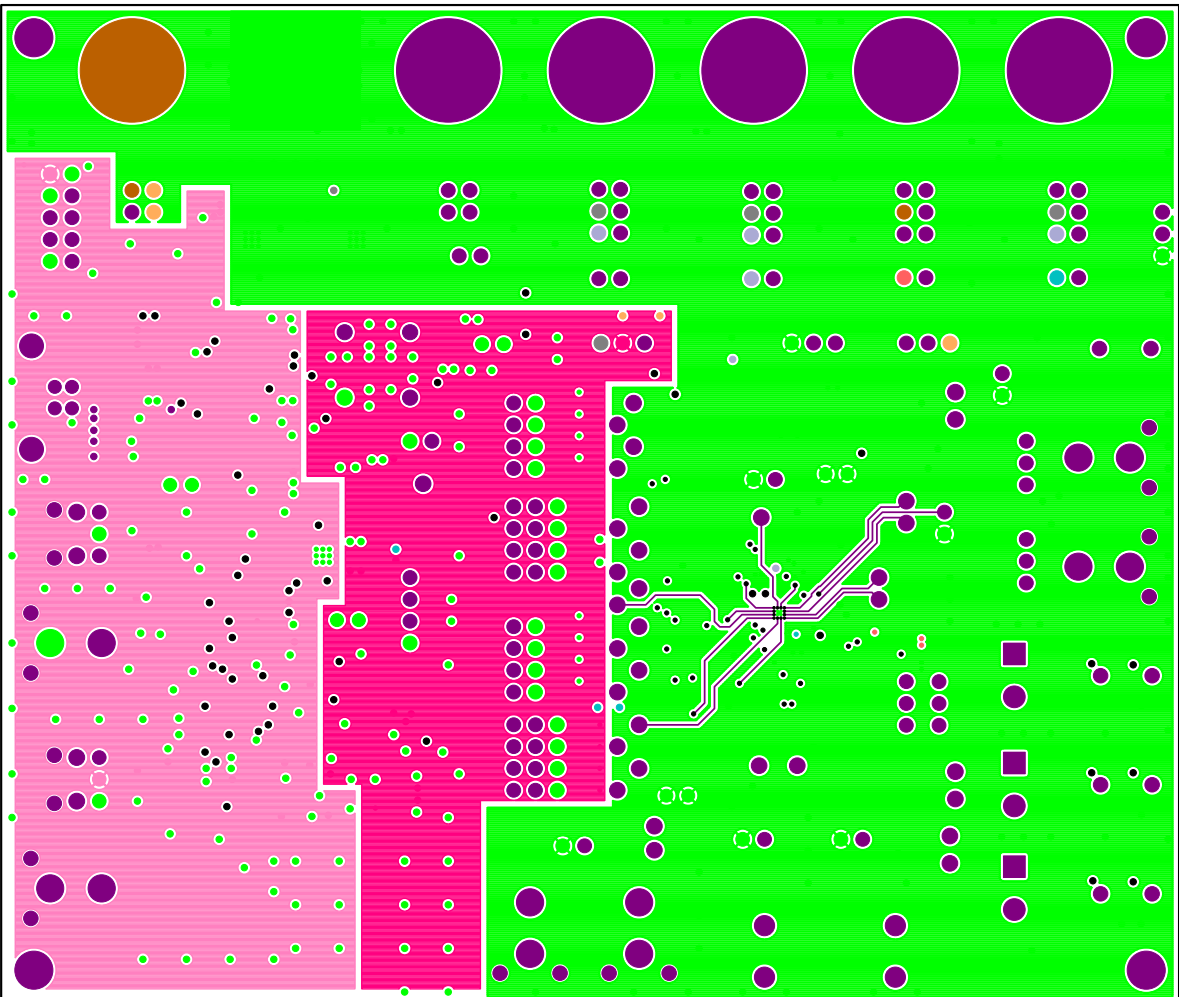


Figure 26. Layer 5

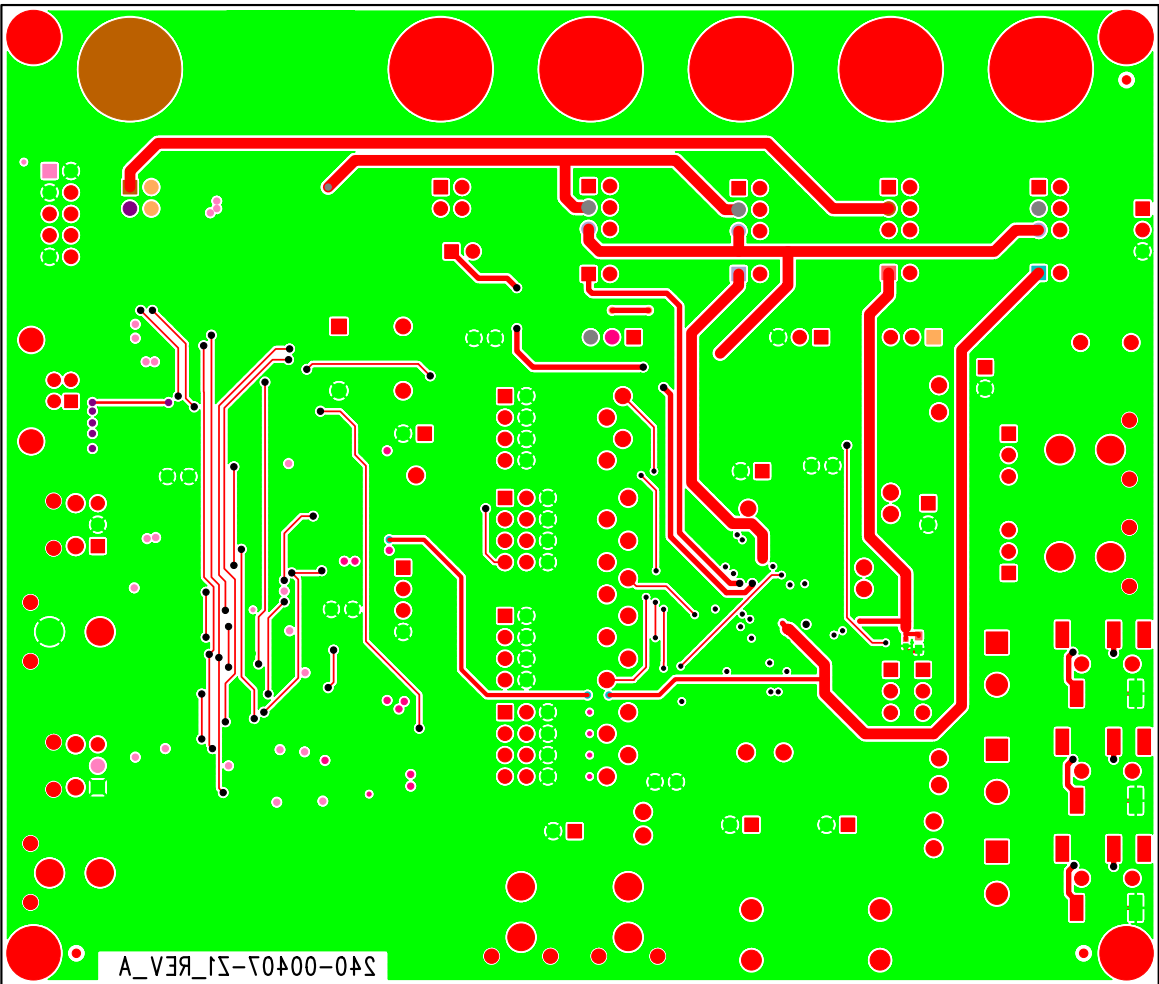


Figure 27. Layer 6

## 6. REVISION HISTORY

Release	Changes
DB1	Initial Release

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### Contacting Cirrus Logic Support

For all product questions and inquiries, contact a Cirrus Logic Sales Representative.

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