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CDB8427

Evaluation Board for CS8427

Features

- Receives and transmits AES/EBU, S/PDIF and EIAJ-340 compatible digital audio
- Convenient access to the Serial Audio Input Port and Serial Audio Output Port through headers.
- Runs from a single 5 Volt supply.
- Crystal supplied to allow operation at 48 kHz, sample rate.
- Digital patch area.

Description

The CDB8427 is designed to allow rapid evaluation of the CS8427. The board is set up for easy connection to an Audio Precision or a Rohde and Schwarz test system.

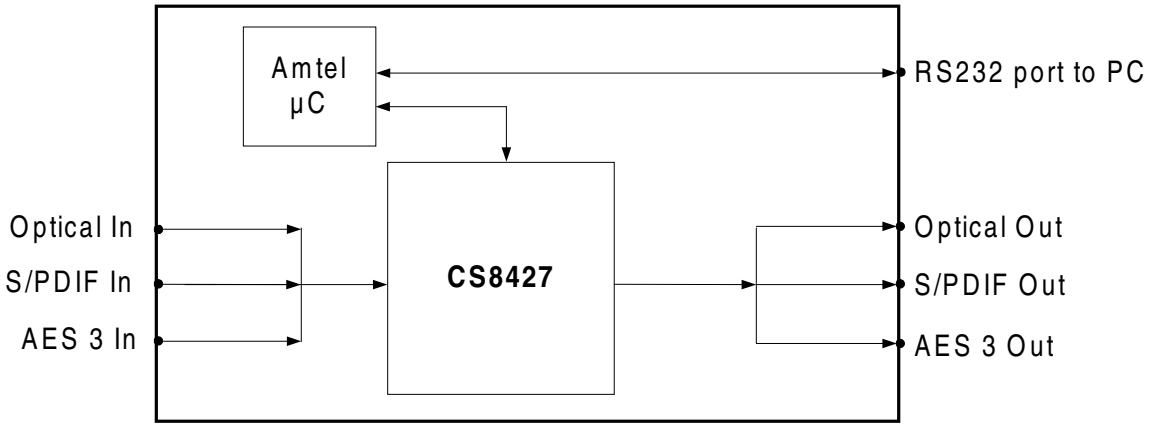
Input and output data formats may independently be set to either AES/EBU, or S/PDIF with either optical or coaxial physical format.

Separate headers are provided so the Serial Audio Input Port and Serial Audio Output Port may be interfaced to off board circuits.

Microsoft® Windows® 98 PC software provides a GUI interface to make configuration easy. The software communicates through the PC's RS232 port to a microcontroller on the evaluation board that controls the CS8427. All the possible software modes of the CS8427 may be tested.

ORDERING INFORMATION

CDB8427	Evaluation Board



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1. OVERVIEW

The CDB8427 evaluation board contains a CS8427 and the supporting circuitry necessary for it to operate. The input and output options include AES3 and S/PDIF in optical and coaxial formats. In software mode, the control registers of the CS8427 are set by an Atmel AVR RISC microcontroller. A Microsoft Windows 98 based program communicates with the micro through an RS232 port to control the configuration.

1.1 CS8427

The features and functions of the CS8427 are described in its data sheet.

1.2 Microcontroller and Memory

The functions of the board are controlled by an Atmel AVR RISC microcontroller. The board is equipped with 512 KBytes of static RAM so that Channel Status and User bits from the AES stream may be captured and uploaded to the host PC. The microcontroller communicates with the CS8427 through its SPI port. The Atmel AVR RISC microcontroller may be bypassed in order to utilize an external microcontroller through header J10. Header J9 allows the microcontroller on the board to be programmed with the programmer that is supplied in the Atmel STK-300 development kit. Additional software development tools and applications information for the Atmel microcontroller are available at: http://www.atmel.com.

1.3 Crystal Oscillators

There are positions for two crystal oscillators on the board. Both locations are equipped with pin sockets that allow the oscillators to be removed. The oscillator labeled U10 provides the 6 MHz clock for the microcontroller and should not be changed unless you plan on reprogramming the micro.

U3 is the oscillator that provides the Output Master Clock for the CS8427. The board is shipped with a 12.288 MHz crystal oscillator that can be stuffed at U3 to set the output sampling rate to 48 kHz.

1.4 RS232 Port

The RS232 port on the upper right hand side of the board should be connected to the serial port of the PC running the CDB8427 control software. Follow the software instructions to properly configure the serial port for use with the evaluation board.

1.5 LED Function Indicators

LEDs D8 and D9 on the upper right hand corner of the board allow the user to determine when data is being transmitted over the RS232 link. The red LED D4 is the reset indicator and the red LED D1 is connected to the RERR pin of the CS8427. The two remaining LEDs on the board are not currently of use to the end user

2. CDB8427.EXE QUICK START GUIDE

2.1 Setting up the Hardware

Note: See Table 1 on page 5 and Table 2 on page 5 for the configuration and jumper settings.

1) Connect the CDB8427 to a 5 V DC power supply.
2) Set: J11 to Optical, J16 to S/PDIF, enable J13 (S/PDIF), and disable J15 (MUTE).
3) Connect the CDB8427 to the PC COM port using RS232 cable.
4) Apply power to the board.
5) Press the RESET switch (S5).

At this point, the RERR and PROC should be lit. The hardware is now ready!

2.2 Installing the Software

1) Create a directory called CDB8427 anywhere on your system.
2) Copy CDB8427.exe into this directory.
3) If you do not already have them, copy the included DLLs msvcrt.dll and mfc42.dll into your \Windows\System directory.
4) If desired, create a shortcut to CDB8427.exe on your desktop.

At this point, you are ready to start up the software.

2.3 Starting up the Software

1) Double-click on `CDB8427.exe` or its shortcut.
2) If you get errors right away, the COM port needs to be set properly.
3) Click anywhere but inside one of the boxes, this brings up the Board Setup control panel.
4) Select the COM port you are using to connect to the CDB8427.
5) Shut down the application, reset the board, and then restart the application.

2.4 Starting up the Hardware

1) Click anywhere but inside one of the boxes, this brings up the Board Setup control panel.
2) Click on the Reset button. You should see the TX and RX leds light up briefly.
3) Click on the AES3 Transmitter tab, then set the Transmitter data source to AES3 Receiver.
4) Click on the Clock Sources tab, click on RMCK derived from AES3 input frame and uncheck the Stop Internal Clocks box.
5) Check the performance of the board by doing an FFT with a -1dBFS 1kHz sine wave for input at 44.1kHz and 48kHz sample rates using the optical input and optical output.

.

CONNECTOR	INPUT/OUTPUT	SIGNAL PRESENT
+5V	Input	+5 Volt power
GND	Input	Ground connection from power supply
OPTICAL INPUT	Input	Digital Audio Interface optical input
S/PDIF INPUT	Input	Digital Audio Interface coaxial input
AES3 INPUT	Input	Digital Audio Interface XLR input
RS232	Input/Output	Parallel RS232 port for connection to serial port of PC
OPTICAL OUTPUT	Output	Digital Audio Interface optical output (always enabled)
S/PDIF OUTPUT	Output	Digital Audio Interface coaxial output
AES3 OUTPUT	Output	Digital Audio Interface XLR output
J5	Input/Output	I/O for RMCLK, ISCLK,ILRCK, and SDIN
J6	Input/Output	I/O for OLRCK, OSCLK, OMCK, and SDOUT
J9	Input	10-pin header for external programming of Atmel AVR µC
J10	Input/Output	12-pin header for CS8427 control from external µC

Table 1. System Connections

JUMPER	PURPOSE	POSITION	FUNCTION SELECTED
J11	Selects physical format of digital audio interface input	AES3 & S/PDIF OPTICAL	Connects input as either AES3 or S/PDIF Connects input as OPTICAL
J12	Configures AES3 INPUT	ENABLE DISABLE	AES3 INPUT enabled AES3 INPUT disabled
J13	Configures S/PDIF INPUT	ENABLE DISABLE	S/PDIF INPUT enabled S/PDIF INPUT disabled
J14	Configures OPTICAL INPUT	ENABLE DISABLE	OPTICAL INPUT enabled OPTICAL INPUT disabled
J16	Selects physical format of digital audio interface output	AES3 S/PDIF	Connects output as AES3 XLR Connects output as S/PDIF coaxial
J17	Configures S/PDFIF OUTPUT	ENABLE DISABLE	S/PDIF OUTPUT enabled S/PDIF OUTPUT disabled
J15	Configures HARDWARE MODE MUTE	ENABLE DISABLE	Enables MUTE when in hardware mode 1 Disables MUTE when in hardware mode 1

Table 2. CDB8427 Jumper Settings

3. CDB8427.EXE USER'S GUIDE

3.1 Main Window

The CDB8427 Control Panel allows you to view and access the data flow configuration of the CS8427. See Figure 1. Clicking the right mouse button in any of the boxes will bring up a property menu containing all the register bits relevant to that block, as well as some high level functions, such as data sources and formatting options.

To access additional details about each block, click the left mouse button on the desired block. This will display a control panel for the selected block. If you click outside the boxes, you will bring up the Board Setup control panel, as shown on the next page. Note that you can click on any of the tabs to quickly access that section. Also, any changes you make in the panel are immediately reflected in the Main Window, so you may wish to arrange them so that they do not obscure each other.

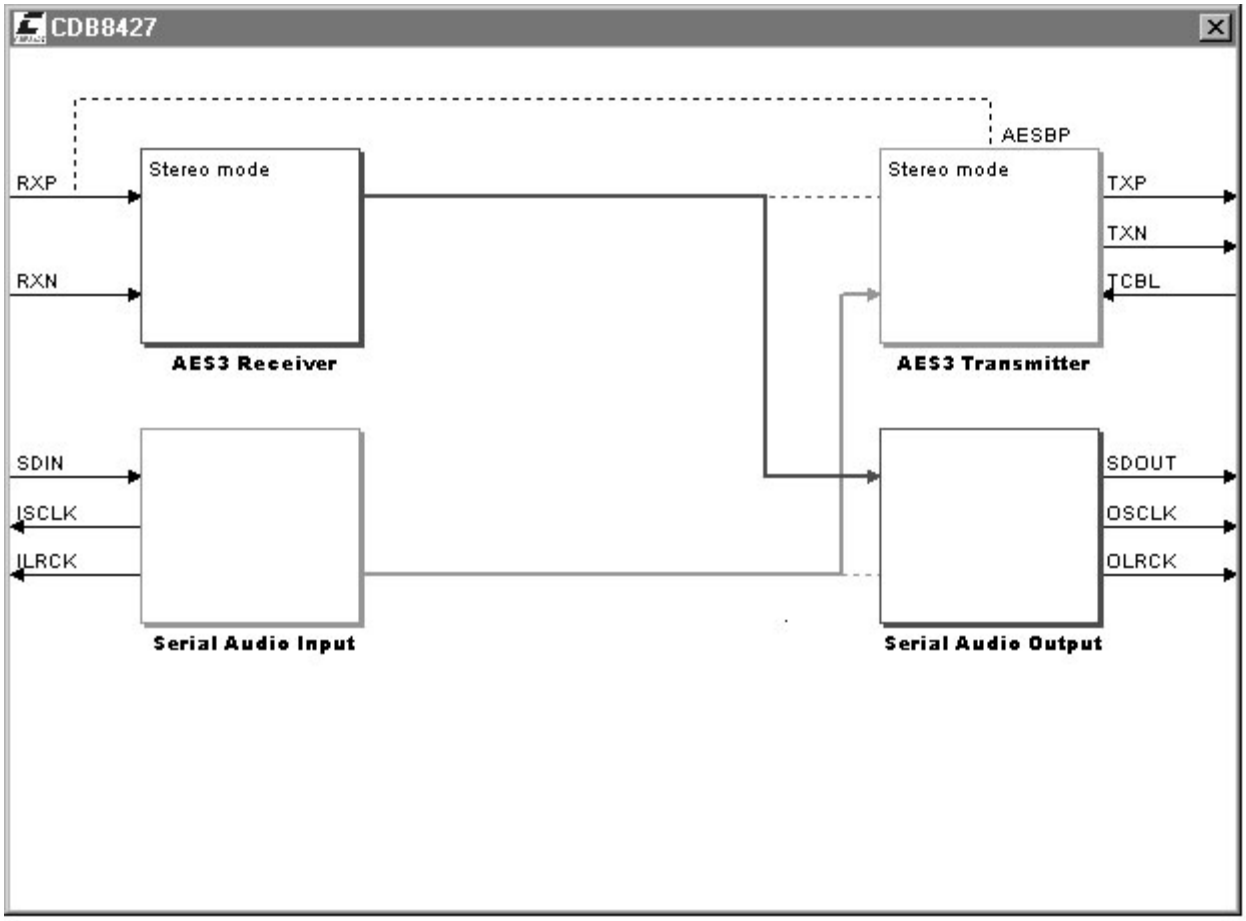

Figure 1. CDB8427 Control Panel Main Window

3.2 Board Setup

The Board Setup panel has some very useful functions, including setting the COM Port used by the application, resetting the CS8427 from software, as well as loading/saving register settings into files. See Figure 2. You can also can read or write any register on the CS8427 using the CS8427 Register Access.

3.3 Script file syntax

The setup files generated by the board setup function only record the state of the chip registers. There are many more useful commands that you can insert into the setup scripts. Table 1 contains a short description of these commands with their allowed syntax.

Note: Most commands accept either hexadecimal (indicated by either a “0x” prefix or “h” suffix) or decimal parameters.

//	used for single line comments
script scriptfile	call an external script file named “scriptfile”
reset 1	assert reset of the CS8427
reset 0	de-assert reset of the CS8427
wr 1 30h	write register 1 with hex 30
set RUN 1	set the bit field labeled RUN to 1
write 2 3 0x10 12h 13	write 3 consecutive registers starting from register 2 with hex 10, hex 12, and decimal 13

Table 3. Script file syntax description

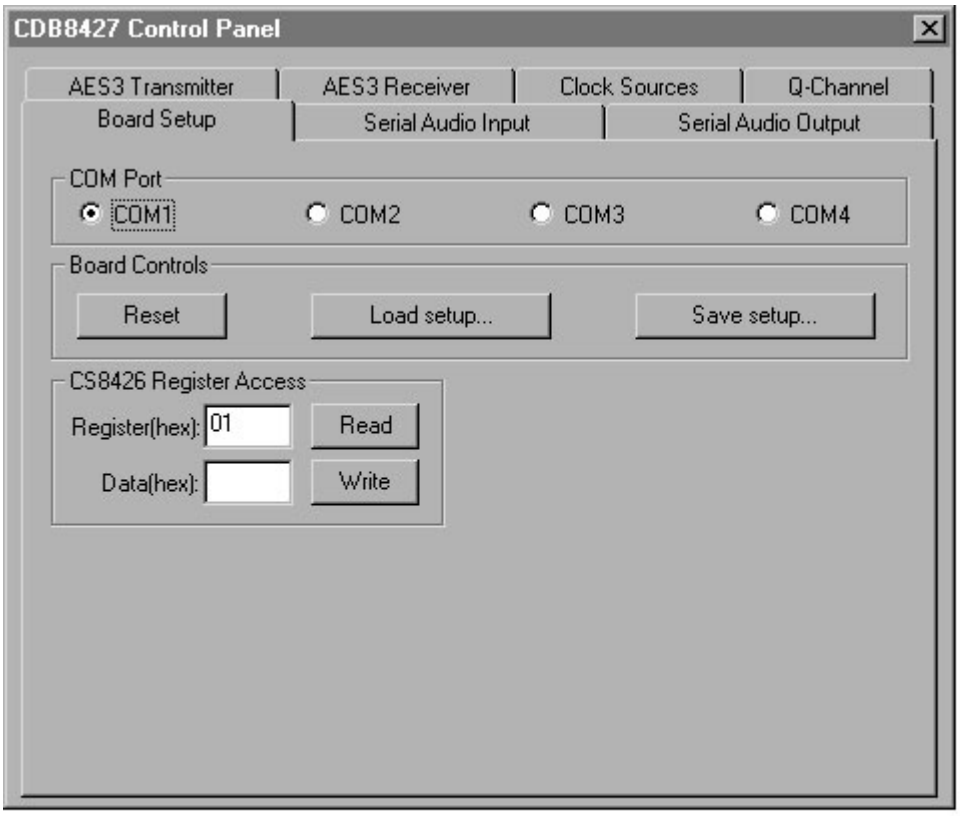

Figure 2. Board Setup Panel

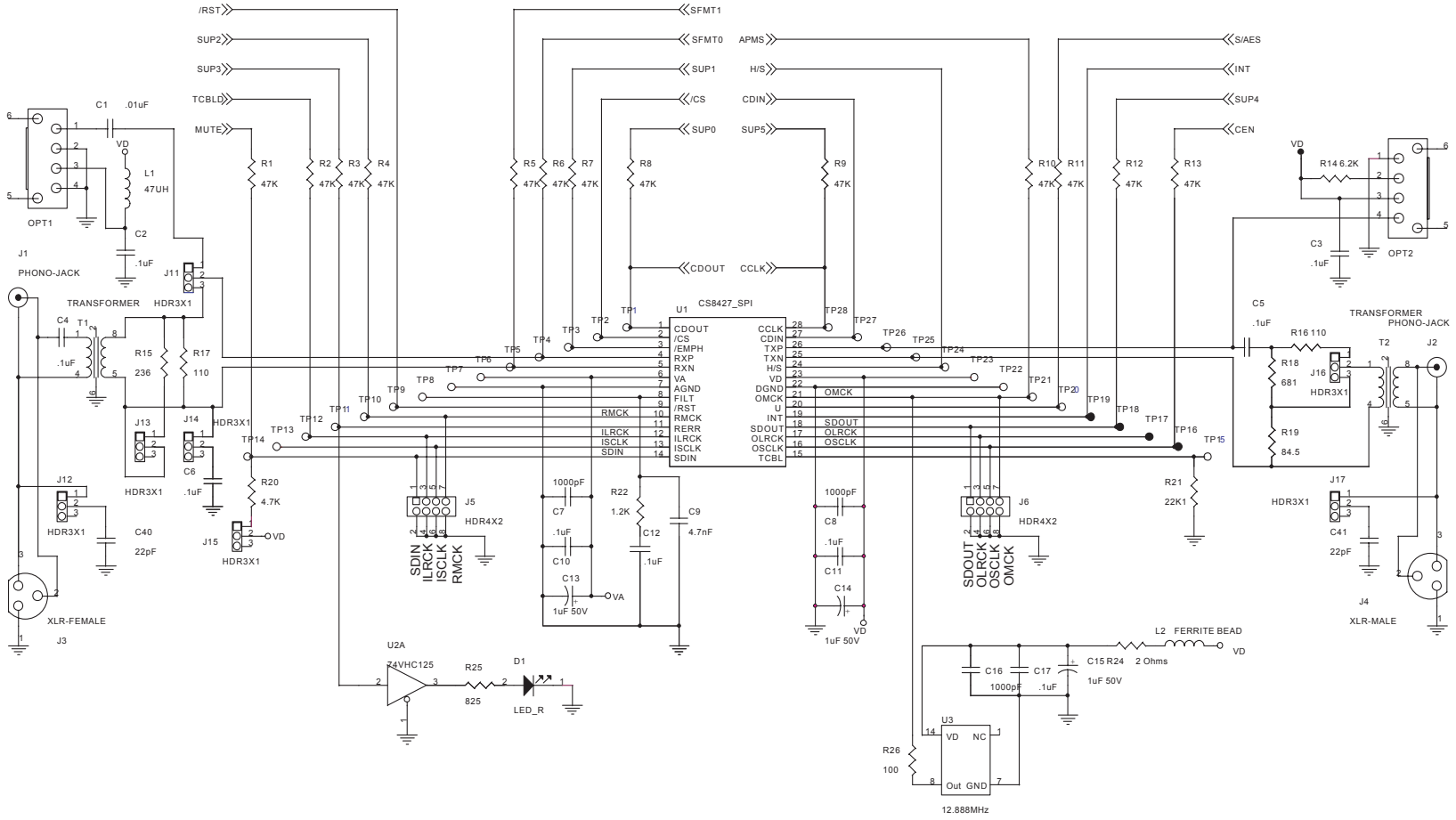

Figure 3. CS8427 Digital Audio Transceiver

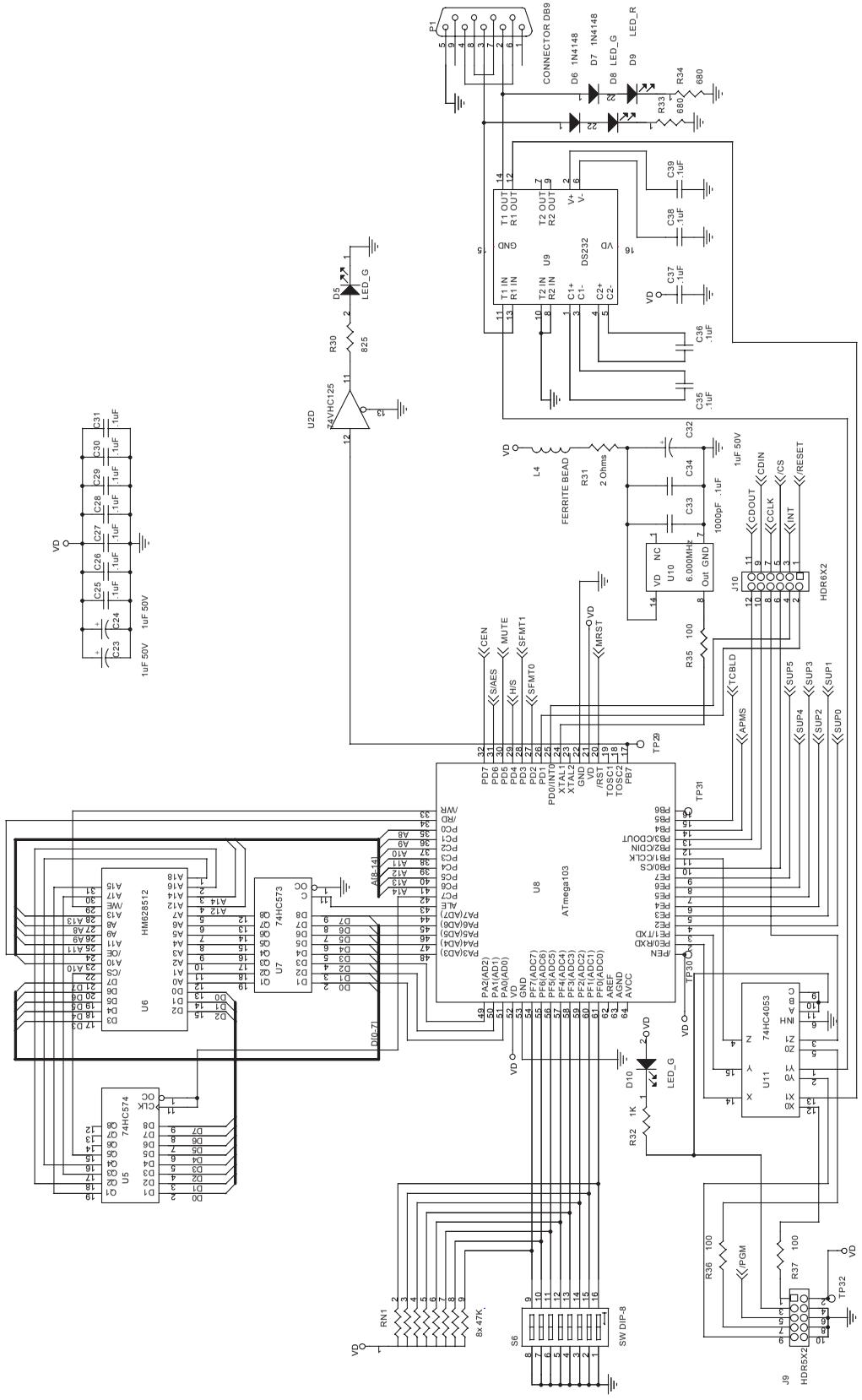

Figure 4. Atmel AVR RISC Microcontroller

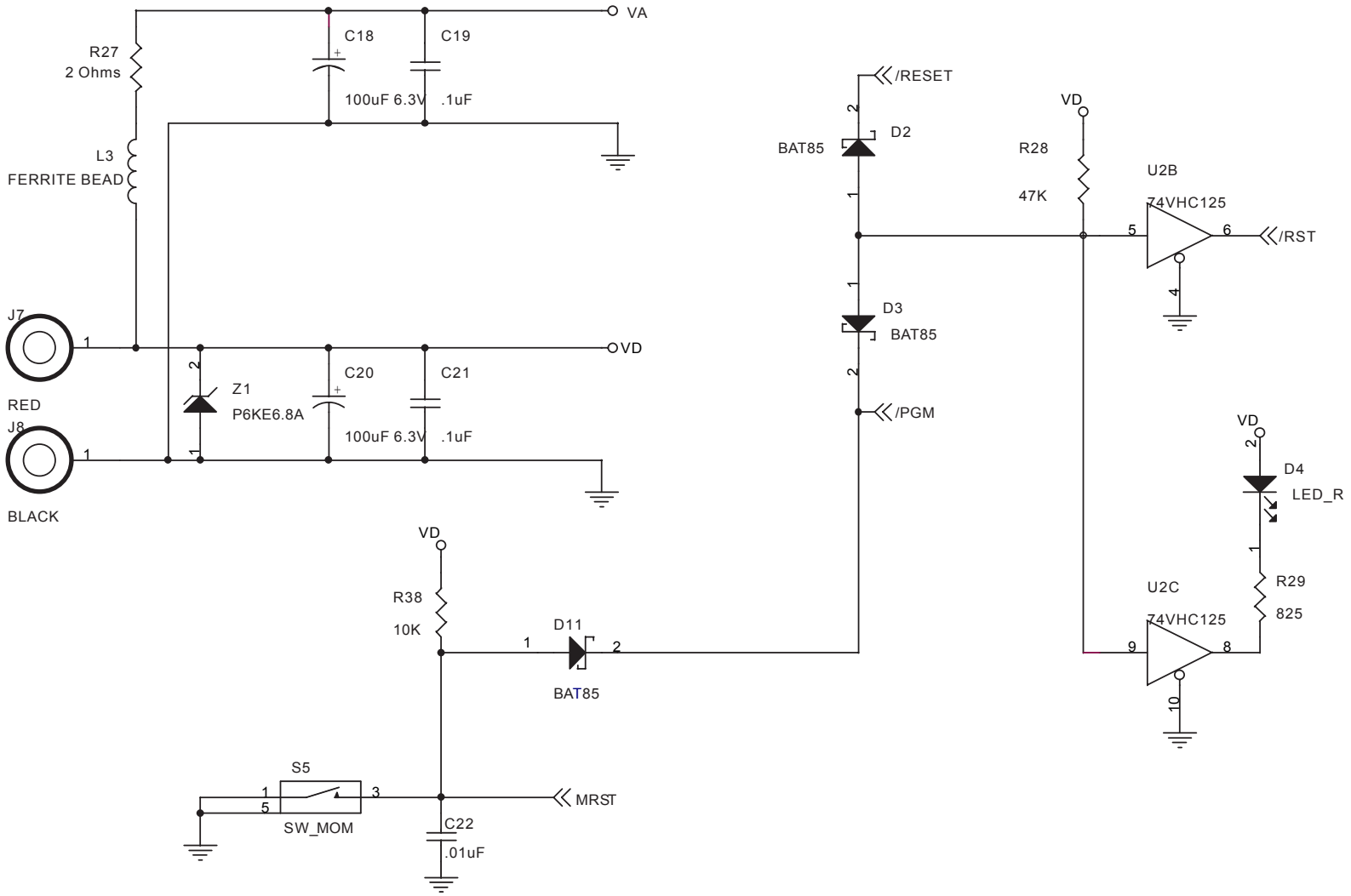

Figure 5. Power Supplies and Reset Circuit

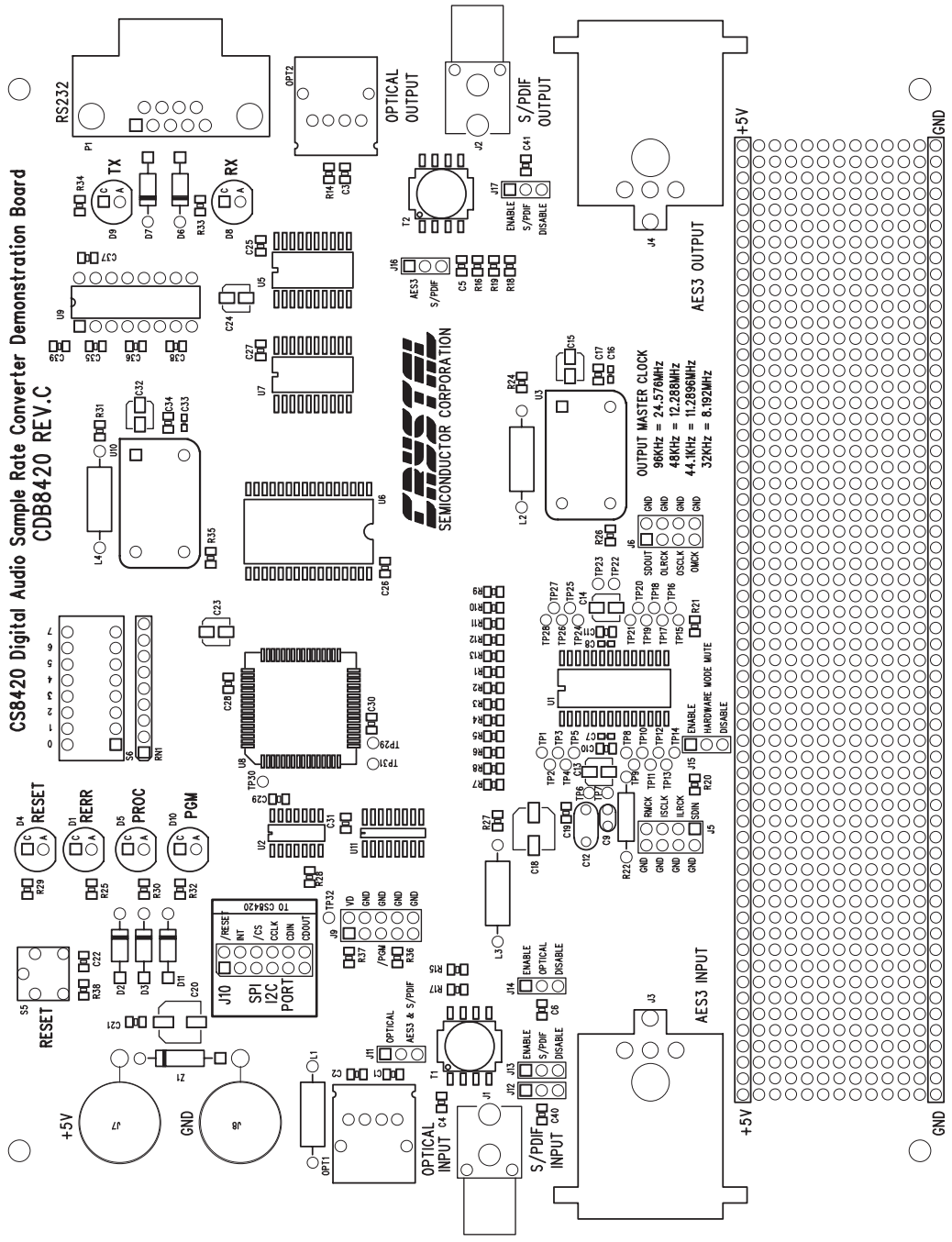

Figure 6. Silkscreen

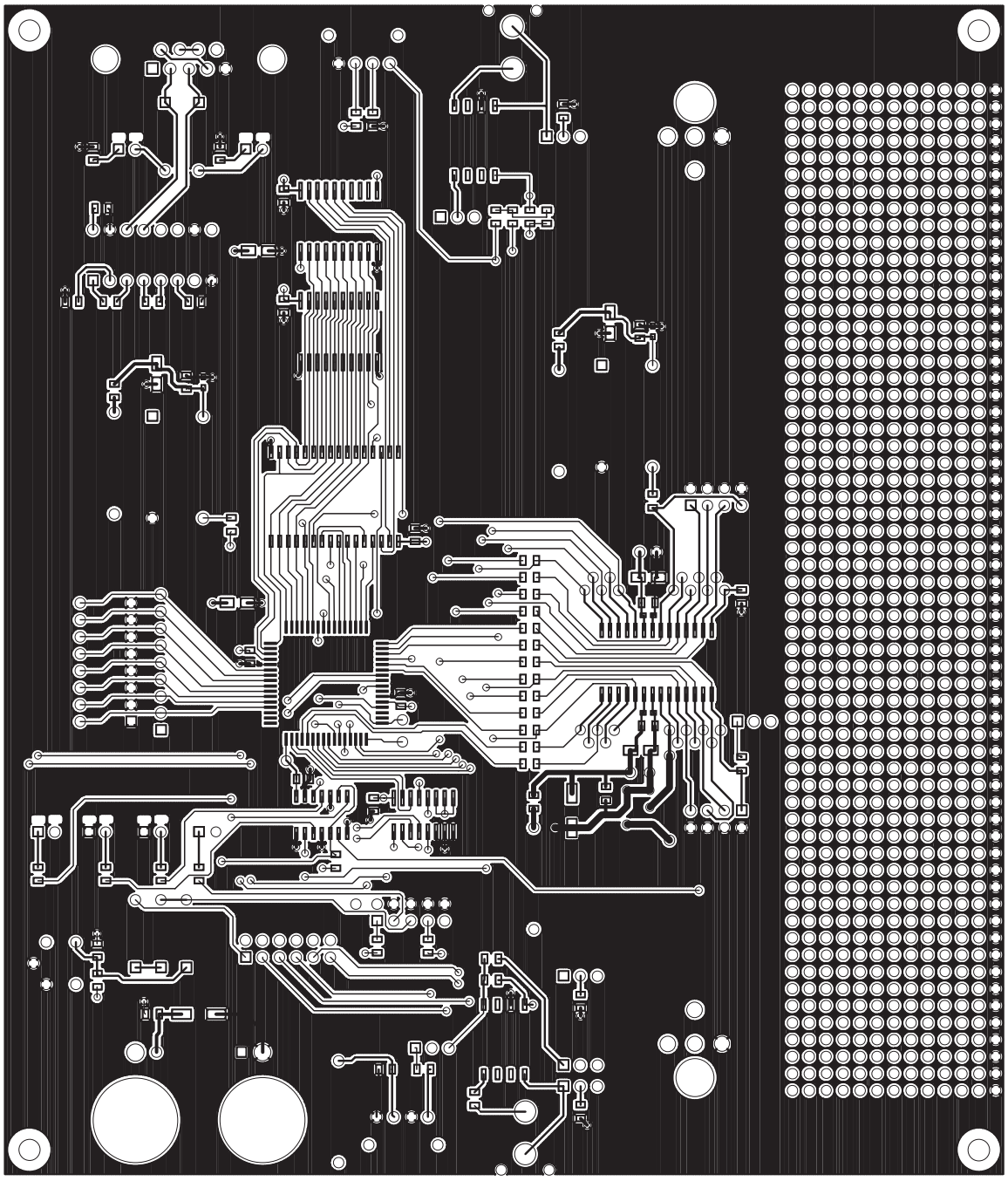

Figure 7. Top PCB

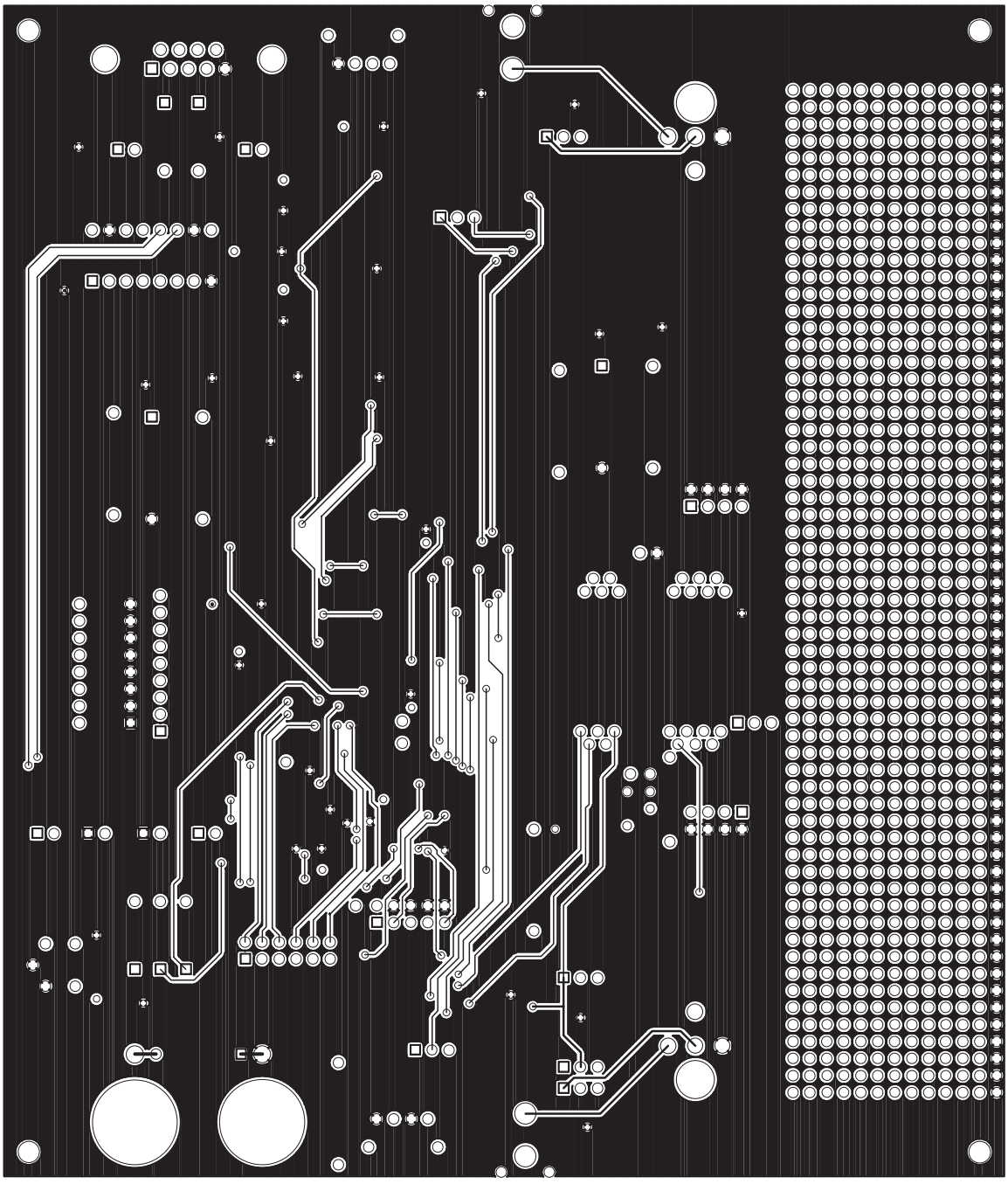

Figure 8. Bottom PCB