

FEATURES

- Full featured evaluation board for ADG2128
- Various link options
- Direct hookup to USB port of PC
- PC software for control of switches
- Can be used with or without PC

DESCRIPTION

This data sheet describes the evaluation board for the [ADG2128](#) I²C[®], CMOS, 8 × 12 analog switch array with dual/single supplies. The array is bidirectional; therefore, the rows and columns can be configured as either inputs or outputs, and any number of combinations can be active at one time.

The ADG2128 has a maximum difference of 15 V between its inputs, V_{DD} and V_{SS}, and therefore care must be taken not to exceed this parameter when connecting the power supplies.

The evaluation board interfaces to the USB port of a PC. Software is available with the evaluation board that allows the user to easily program the ADG2128.

Full data on the ADG2128 can be found in the data sheet and should be consulted in conjunction with this document when using the evaluation board.

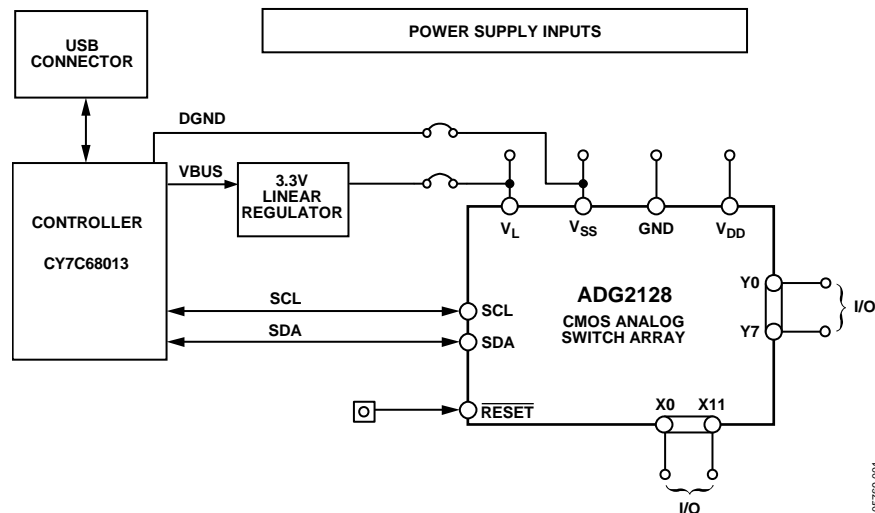


Figure 1. Evaluation Board Setup

Rev. A

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REVISION HISTORY

8/07—Rev. 0 to Rev. A

| | |
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7/06—Revision 0: Initial Version

HARDWARE DESCRIPTION

POWER SUPPLIES

The EVAL-ADG2128EBZ can be operated with both single and dual supplies. The device is specified to operate in single-supply mode at $12\text{ V} \pm 10\%$ and $8\text{ V} \pm 10\%$ operation. It is also specified to operate at $\pm 5\text{ V}$ dual supply. The following details how these supplies are applied to the evaluation board:

- V_L provides the digital supply for the ADG2128 and all digital circuitry on the board. This supply can be applied externally, or the USB port can be used to power the digital circuitry (with Link 5 inserted). In this case, the logic supply power is 3.3 V.
- Connect 8 V/12 V between the AVDD and AGND inputs for the positive analog supply (V_{DD}) of the ADG2128. Note that the maximum single supply that the chip can handle is 15 V. In this case, AV_{SS} must equal 0 V. In the case of an 8 V or 12 V supply, negative voltage can be applied to AV_{SS} if V_{DD} to V_{SS} is a maximum of 15 V.
- Connect -5 V between the AV_{SS} and AGND inputs for the negative supply (V_{SS}) of the ADG2128.

Both AGND and DGND inputs are provided on the board. The AGND and DGND planes are connected at one location close to the ADG2128. It is recommended not to connect AGND and DGND elsewhere in the system to avoid ground loop problems.

Each supply is decoupled to the relevant ground plane with $10\text{ }\mu\text{F}$ and $0.1\text{ }\mu\text{F}$ capacitors. Each device supply pin is also decoupled with a $10\text{ }\mu\text{F}$ and a $0.1\text{ }\mu\text{F}$ capacitor pair to the relevant ground plane.

LINK OPTIONS

There are a number of link and switch options on the evaluation board that should be set for the required operating setup before using the board. The link option functions are described in Table 1.

Table 1. Link Options

| Link No. | Function |
|----------|--|
| LK1 | This link is for choosing the LSB bit of the address of the chip on the USB I ² C interface. Note that the I ² C address should be set before the evaluation software is launched. When this link is inserted, the address bit is set to 0. When this link is removed, the address bit is set to 1. |
| LK2 | This link is for choosing the second LSB bit of the address of the chip on the USB I ² C interface. Note that the I ² C address should be set before the evaluation software is launched. When this link is inserted, the address bit is set to 0. When this link is removed, the address bit is set to 1. |
| LK3 | This link is for choosing the third LSB bit of the address of the chip on the USB I ² C interface. Note that the I ² C address should be set before the evaluation software is launched. When this link is inserted, the address bit is set to 0. When this link is removed, the address bit is set to 1. |
| LK4 | This link selects whether the supply at V_{SS} is sourced from ground or from the input AV_{SS} . If it is sourced from ground, it is a single-supply system. Position A— V_{SS} sourced from AV_{SS} . Position B— V_{SS} sourced from ground. |
| LK5 | This link selects if the logic supply power is from the USB power (when connected to a PC) or from the user-supplied V_L (when used as a standalone unit). When this link is inserted, the logic power supply is from the USB power. When this link is removed, the logic power supply is from the user-supplied V_L . |

EVAL-ADG2128EBZ

Link Setup Options for PC Control

The default setup for the EVAL-ADG2128EBZ is to be controlled by the PC via the USB port. The default link options are listed in Table 2.

Table 2. Default Link Options

| Link No. | Option |
|----------|---|
| LK1 | Inserted—the LSB is 0. |
| LK2 | Inserted—the second LSB is 0. |
| LK3 | Inserted—the third LSB is 0. |
| LK4 | Position A—AV _{SS} is supplying the power to V _{SS} . |
| LK5 | Inserted—the logic power supply is from USB power. |

Link Setup Options for Control Without a PC

The EVAL-ADG2128EBZ can also be used as a standalone board. This option is for PC users who do not have a USB port or for users wishing to hook up the board to their entire system.

Table 3 lists the link options that must be set to operate the evaluation board in this way.

Table 3. Link Setup Options for Control Without a PC

| Link No. | Option |
|----------|--|
| LK1 | User configurable—does not affect whether the board is connected to a PC or not. |
| LK2 | User configurable—does not affect whether the board is connected to a PC or not. |
| LK3 | User configurable—does not affect whether the board is connected to a PC or not. |
| LK4 | User configurable—does not affect whether the board is connected to a PC or not. |
| LK5 | Removed |

Switches are turned on and off via the I²C bus. The read/write procedures are provided in the [ADG2128](#) data sheet and should be consulted when using this evaluation board in its standalone mode.

EVALUATION BOARD SOFTWARE

The ADG2128 evaluation kit includes self-installing software on the CD-ROM. The software is compatible with Windows® 2000 and Windows XP. The evaluation software should be installed before connecting the evaluation board to the PC's USB port. This ensures that the evaluation board is correctly recognized when connected to the PC.

SOFTWARE INSTALLATION

To install the software

1. Start Windows and insert the CD. The installation software should launch automatically. If it does not, use Windows Explorer to locate the file **setup.exe** on the CD. Double-click this file to start the installation procedure.
2. At the prompt, select a destination directory. By default, it is **C:\Program Files\Analog Devices\ADG2128**.

After the directory is selected, the installation procedure copies the files into the relevant directories on the hard drive. The installation program creates a program group called **Analog Devices** with a subgroup called **ADG2128** in the **Start** menu of the taskbar.

3. After the installation procedure is complete, power up the ADG2128 evaluation board as described in the Hardware Description section. Then, connect it to the USB port of the PC using the supplied cable.
4. Double-click the **ADG2128** icon to start the program. The evaluation board is then automatically detected. Proceed through any dialog boxes that may appear to finalize the installation.

SOFTWARE OPERATION

To launch the software, click **Start > All Programs > Analog Devices > ADG2128 > ADG2128 Evaluation Software**. Figure 2 displays the main dialog box.

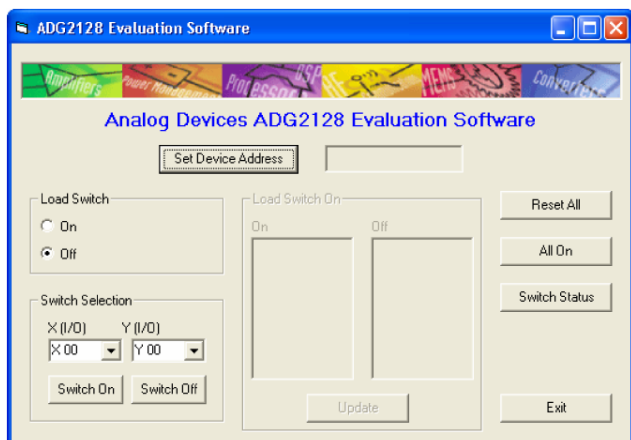


Figure 2. Main Dialog Box

Setting the I²C Address

From the main dialog box, the device address can be set by clicking **Set Device Address**. This brings up the **Device Address** dialog box (shown in Figure 3).



Figure 3. I²C Address Selection

The device address is set by double-clicking on the relevant bit. Note that the address set must correspond to the address set with the jumpers on the evaluation board, and it must also be set before the evaluation board software will work.

LDSW (Load Switch)

If the load switch function is on, the switches can be updated simultaneously (as an example, for the RGB colors in video switching). Otherwise, if the load switch is off, the switch condition updates upon completion of each I²C write, that is, immediately upon clicking **Switch On** or **Switch Off**.

If the load switch is on, clicking **Switch On** or **Switch Off** stores the switch status temporarily until **Update** is clicked. The switches in temporary storage are shown in the list boxes within the software. All switches are then updated simultaneously upon clicking **Update**.

To see what the status of the switch array is at any given time, click **Switch Status**. This brings up the dialog box shown in Figure 4, which indicates if a switch is on (LED lit) or off (LED not lit).

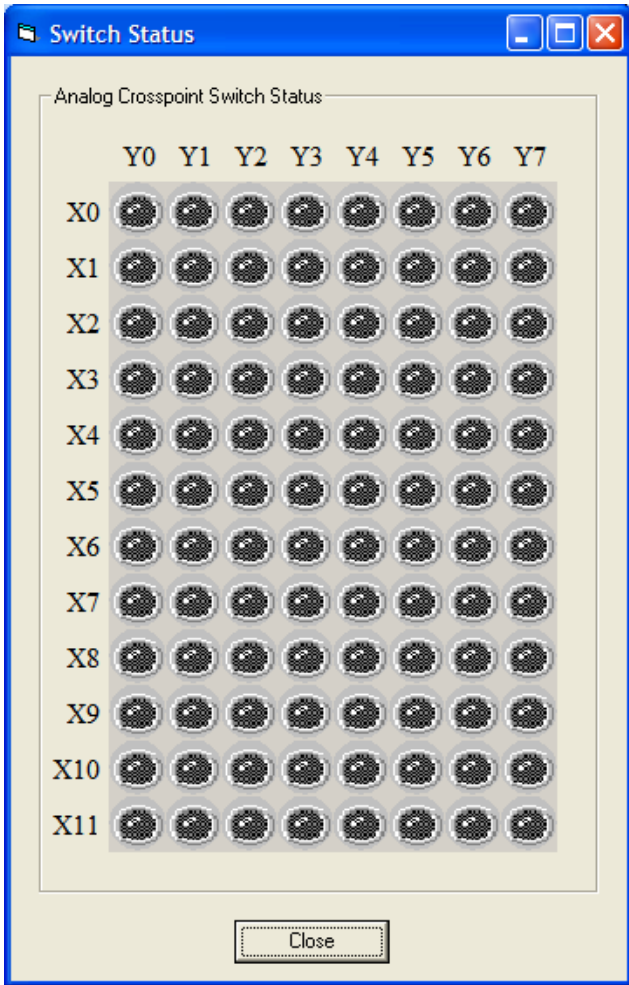


Figure 4. LED Display Showing Condition of All Switches

RESET Function

There is a **RESET** button on the board (see RESET on the schematic) that can be used to reset the switch array. Alternatively, clicking **Reset All** in the main dialog box of the software resets all switches. If the **Switch Status** dialog box appears after clicking **Reset All**, the **Switch Status** dialog box must be closed and reopened in order for the LED display to accurately reflect the states of the switches.

EVALUATION BOARD SCHEMATICS

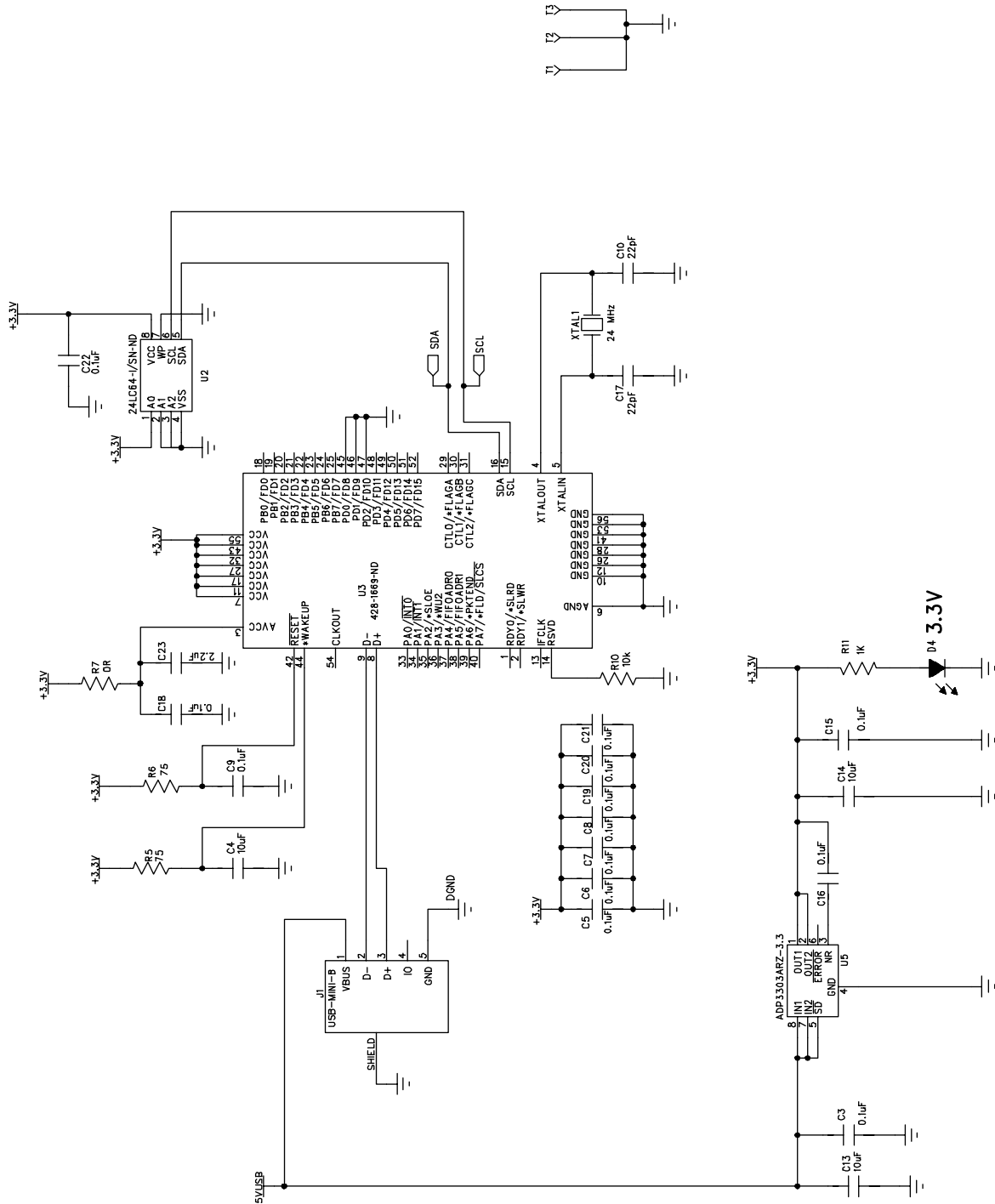


Figure 5. Schematic of USB Controller Circuitry

EVAL-ADG2128EBZ

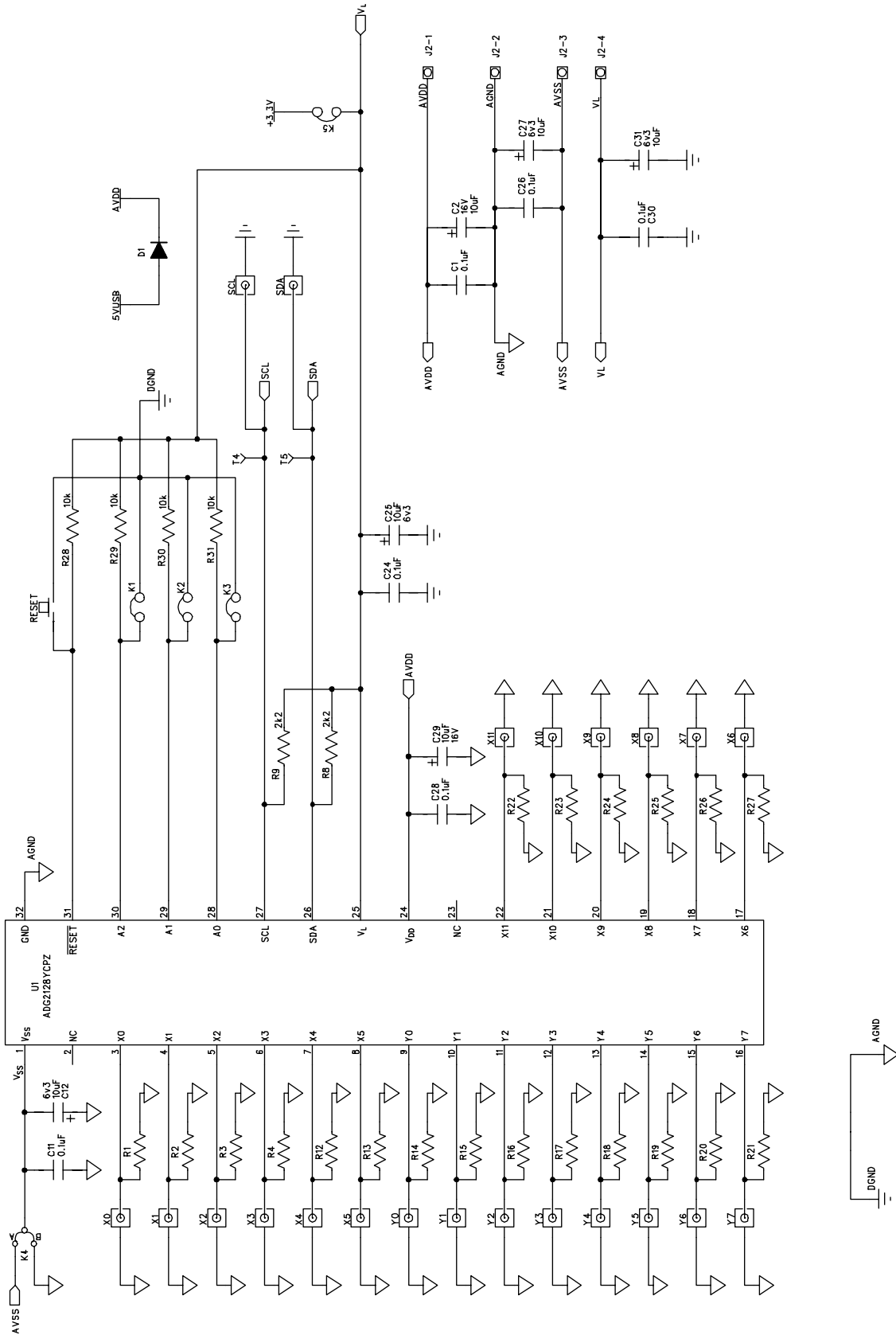


Figure 6. Schematic of ADG2128 Circuitry

05789-006

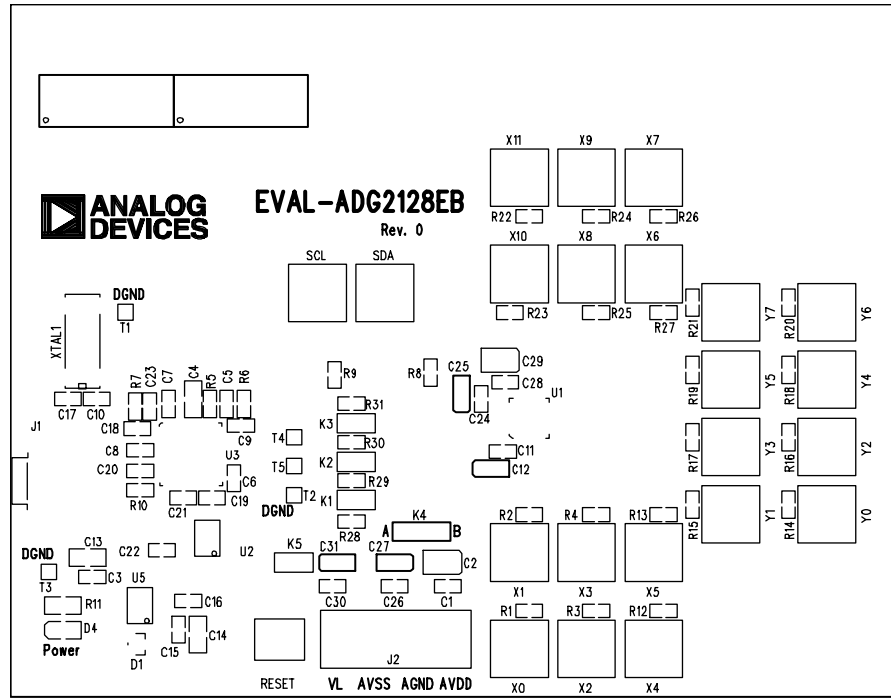


Figure 7. Component Placement Drawing

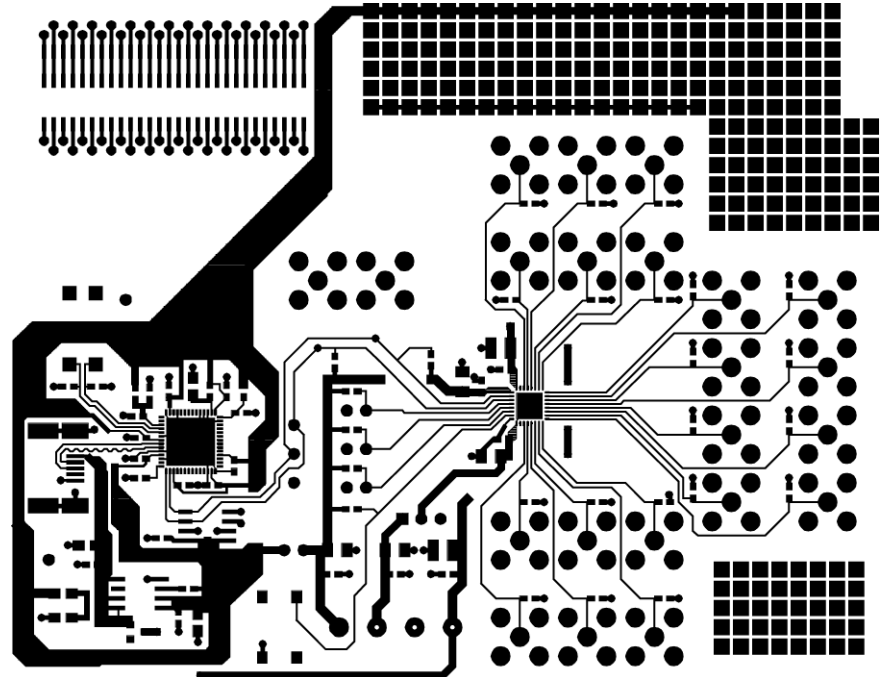


Figure 8. Component Side PCB Drawing

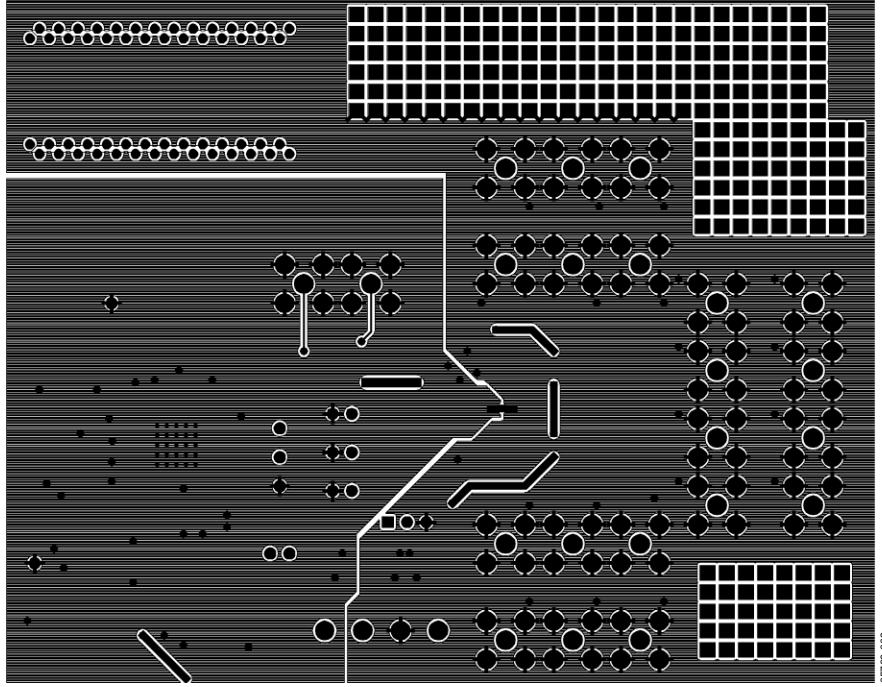


Figure 9. Solder Side PCB Drawing

ORDERING INFORMATION

COMPONENT LISTING

Table 4. Component Listing

| Qty. | Reference Designator | Description | Supplier/Number |
|------|---|--|--------------------------------------|
| 19 | C1, C3, C5 to C9, C11, C15, C16, C18 to C22, C24, C26, C28, C30 | 0.1 μ F (0603 package) 50 V X7R SMD ceramic capacitor | FEC 4765837 |
| 2 | C2, C29 | 10 μ F TAJ_B 16 V SMD tantalum capacitor | FEC 498-737 |
| 3 | C4, C13, C14 | 10 μ F (0805 package) X5R ceramic capacitor | Digi-Key 490-1709-1-ND |
| 4 | C12, C25, C27, C31 | 10 μ F TAJ_A 6.3 V SMD tantalum capacitor | FEC 197-130 |
| 2 | C10, C17 | 22 pF (0603 package) 50 V X7R SMD ceramic capacitor | FEC 722-005 |
| 1 | C23 | 2.2 μ F (0603 package) 6.3 V X5R SMD ceramic capacitor | Digi-Key 490-1552-1-ND |
| 1 | D1 | Diode SOT23 | FEC 984-3728 |
| 1 | D4 | LED (0805 package) | FEC 5790852 |
| 1 | J1 | USB mini-B connector | FEC 9786490 (Digi-Key WM17116CT-ND) |
| 4 | J2 | 4-pin terminal block | FEC 151-791 |
| 5 | K1 to K5 | SIP-2P 2-pin header and shorting shunt | FEC 511-705 and FEC 150-411 |
| 20 | R1 to R4, R12 to R27 | SMD resistor (0603 package) | Not inserted |
| 2 | R5, R6 | 75 Ω SMD resistor (0603 package) | FEC 933-1549 |
| 1 | R7 | 0 Ω SMD resistor (0603 package) | FEC 933-1662 |
| 2 | R8, R9 | 2.2 k Ω SMD resistor (0603 package) | FEC 933-0810 |
| 1 | R10 | 10 k Ω SMD resistor (0603 package) | FEC 933-0399 |
| 1 | R11 | 1 k Ω SMD Resistor (0603 Package) | FEC 933-0380 |
| 4 | R28 to R31 | 10 k Ω SMD resistor (0603 package) | FEC 933-0399 |
| 1 | RESET | Push-button switch (sealed 6 mm \times 8 mm) | FEC 177-807 |
| 5 | T1 to T5 | Test point | Not Inserted |
| 1 | U1 | 8 \times 12 analog switch array | Analog Devices, Inc., ADG2128YCPZ |
| 1 | U2 | | Digi-Key 24LC64-I/SN-ND |
| 1 | U3 | USB microcontroller | Digi-Key 428-1669-ND |
| 1 | U5 | 3.3 V regulator | Analog Devices, Inc., ADP3303ARZ-3.3 |
| 20 | X0 to X11, Y0 to Y7 | Socket, phono PCB gold one pair | FEC 382-4834 |
| 2 | SCL, SDA | 50 Ω straight SMB jack | FEC 1111349 |
| 1 | XTAL1 | 24 MHz CM309S SMD crystal | FEC 950-9658 |

EVAL-ADG2128EBZ

ORDERING GUIDE

| Model | Description |
|------------------------------|------------------|
| EVAL-ADG2128EBZ ¹ | Evaluation Board |

¹ Z = RoHS Compliant Part.

ESD CAUTION



ESD (electrostatic discharge) sensitive device. Charged devices and circuit boards can discharge without detection. Although this product features patented or proprietary protection circuitry, damage may occur on devices subjected to high energy ESD. Therefore, proper ESD precautions should be taken to avoid performance degradation or loss of functionality.