

The diagram illustrates a 5-bit digital-to-analog converter (DAC) circuit. It consists of five identical stages, each controlled by a digital input bit (C1 to C5). Each stage uses a BD140 NPN transistor. The base of each transistor is connected to its corresponding input bit through a 470 ohm resistor (R9, R5, R14, R11, R17). The emitter of each transistor is connected to a common ground line through a 2.2K resistor (R10, R4, R13, R12, R16). The collector of each transistor is connected to a 5V supply through a 0 ohm resistor (R3, R6, R15, R7, R18). The output of each stage is taken from the collector and labeled COL1 through COL5. The ground connection is represented by a red line at the bottom of the circuit.

The schematic diagram illustrates the hardware setup for the proposed system. It features two X5621FV-2X06-C762D7430 modules, labeled SK3 and SK4. Each module has 12 pins: COL1-COL5 (bottom), 1-6 (left), 7-12 (right), and MOSI, GND, SCK (top). SK3 is connected to a 5V supply and a 25P7 component. SK4 is connected to a 5V supply and a DO2 component. A resistor R1 is connected between the two modules.

U2  
SEED XIAO ESP32S3

C1 0 D0/A0 13 5V  
C2 1 D1/A1 12 GND  
C3 2 D2/A2 11 3V3  
C4 3 D3/A3 10 MOSI  
SDA 4 SDA/D4/A4 9 MFP  
SCL 5 SCL/D5/A5 8 SCK  
C5 6 TX/D6 7 BUZ  
TP9 1 TP 23 MTDI 22 TP 1 TP1  
TP8 1 TP 21 EN 20 TP 1 TP2  
TP7 1 TP 19 MTMS 18 TP 1 TP3  
TP6 1 TP 17 D- 16 TP 1 TP4

5V  
GND  
3V3  
A10/D10/MOSI  
A9/D9/MISO  
A8/D8/SCK  
D7/RX  
MTDO  
GND  
MTCK  
D+

BAT+  
BAT-  
GND

15  
14  
1

Diagram illustrating the wiring for the U3 module:

- U3 Module Pins:**
  - Pin 1: RX
  - Pin 2: TX
  - Pin 3: TX/RX
  - Pin 4: RX/TX
- Connections:**
  - U3 Pin 1 (RX) connects to U3 Pin 4 (RX/TX).
  - U3 Pin 2 (TX) connects to U3 Pin 3 (TX/RX).
  - U3 Pin 4 (RX/TX) connects to the positive terminal of the battery (BAT+).
  - U3 Pin 3 (TX/RX) connects to the negative terminal of the battery (BAT-).

1 TESTPAD  
2 5V  
3 TESTPAD  
4 GND  
5 TESTPAD  
6 3V3  
7 TESTPAD  
8 BAT+  
9 TESTPAD  
10 BAT-  
11 TESTPAD  
12 MOSI  
13 TESTPAD  
14 MFP  
15 TESTPAD  
16 SCK  
17 TESTPAD  
18 BUZ1  
19 TESTPAD  
20 C1  
21 TESTPAD  
22 C2  
23 TESTPAD  
24 C3  
25 TESTPAD  
26 C4  
27 TESTPAD  
28 C5  
29 TESTPAD  
30 SDA  
31 TESTPAD  
32 SCL  
33 TESTPAD  
34 DO2  
35 TESTPAD  
36 VBAT  
37 TESTPAD  
38 COL1  
39 TESTPAD  
40 COL2  
41 TESTPAD  
42 COL3  
43 TESTPAD  
44 COL4  
45 TESTPAD  
46 COL5  
47 TESTPAD  
48 DI2  
49 TESTPAD  
50 DO2

REV: B

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