

I2S AUDIO I/O CARD USER'S GUIDE

1. Introduction

The Unified Development Platform (UDP) provides a development and demonstration platform for Silicon Laboratories microcontrollers, short-range wireless devices, and software tools, including the Silicon Laboratories Integrated Development Environment (IDE).

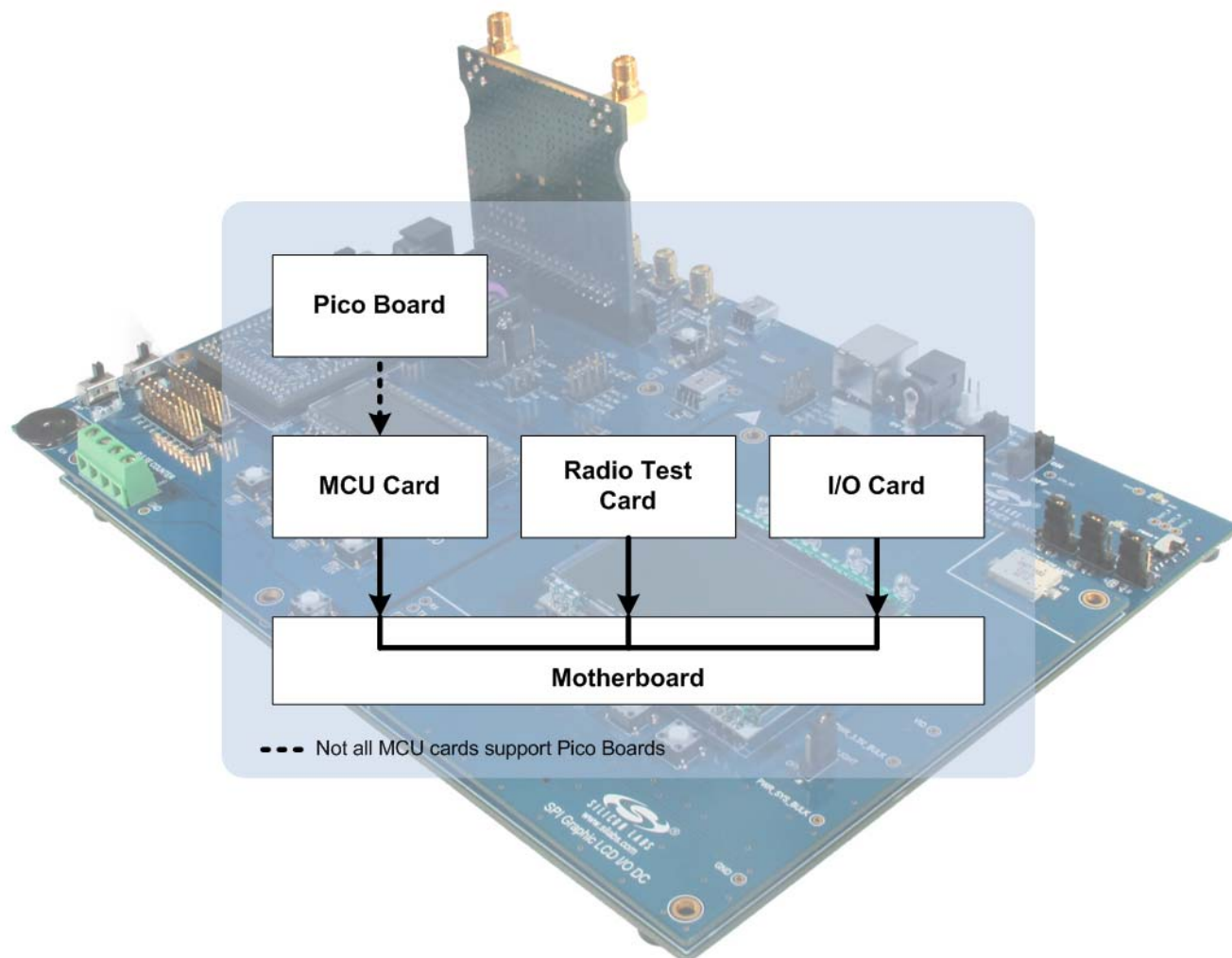


Figure 1. Unified Development Platform Block Diagram

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2. Relevant Documents

This document provides a hardware overview for the Unified Development Platform (UDP) system USB Audio I/O card. Additional information on the UDP system can be found in the documents listed in this section.

2.1. Motherboard User's Guide

The UDP Motherboard User's Guide contains information on the motherboard features and can be found at www.silabs.com/udp.

2.2. Card User's Guides

The UDP MCU, I/O, and radio test card User's Guides can be found at www.silabs.com/udp.

2.3. Examples

The Precision32™ Software Development Kit (SDK) includes example firmware using this board. More details on the use of the board can be found in the example documentation. The SDK can be downloaded from the website as part of the Precision32 package at www.silabs.com/32bit-software.

3. Hardware Setup

Refer to Figure 2 for a diagram of the hardware configuration

1. Connect an MCU card to the UDP motherboard slot.
2. Connect the I/O card to the UDP motherboard slot.
3. (Optional) Connect a radio test card to the radio test card slot in the UDP motherboard.
4. (Optional) Connect an EZLink card to the EZLink card slot in the UDP motherboard.
5. Connect the USB Debug Adapter to the 2x5 debug connector on the MCU card with the 10-pin ribbon cable.
6. Connect one end of the USB cable to the USB connector on the USB Debug Adapter.
7. Connect the other end of the USB cable to a USB Port on the PC.
8. Connect the ac/dc power adapter to power jack J20 on the UDP motherboard. The board can also be powered from the J16 USB or J1 mini USB connectors.
9. Move the S3 power switch on the UDP motherboard to the ON position.

Notes:

- Use the Reset button in the IDE to reset the target when connected using a USB Debug Adapter.
- Remove power from the target board and the USB Debug Adapter before connecting or disconnecting the ribbon cable from the target board. Connecting or disconnecting the cable when the devices have power can damage the device and/or the USB Debug Adapter.
- The MCU card can be used alone without the motherboard. However, the motherboard must be powered if an MCU card is connected.

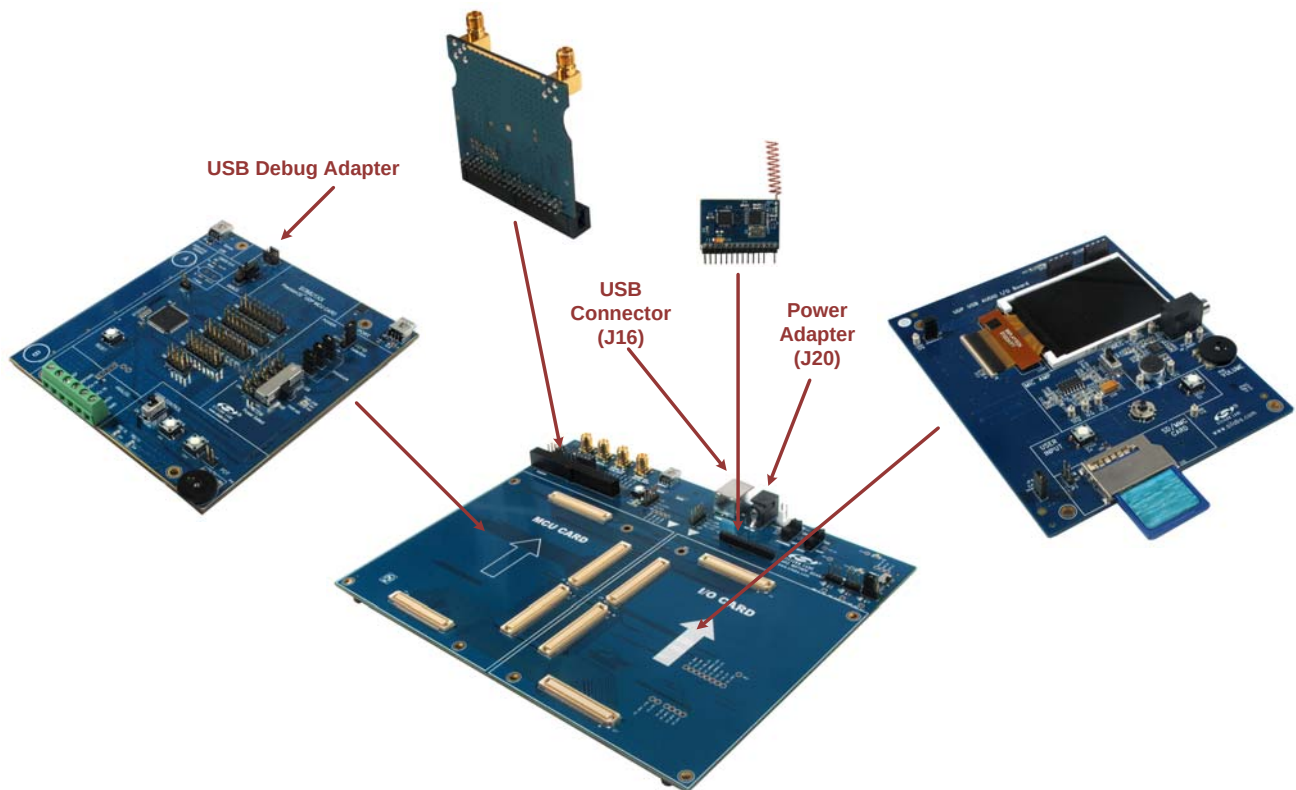


Figure 2. Hardware Setup using the Unified Development Platform

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4. UPIO-USB-AUDIO I/O Card Overview

The USB Audio I/O card adds a microphone, codec, and headphone jack for audio development and an SD card connector. The card connects to the I/O Card expansion slot on the UDP motherboard and provides complete access to the MCU resources. Each expansion board has a unique ID that can be read out of an EEPROM or MCU on the board, which enables software tools to recognize the connected hardware and automatically select the appropriate firmware image.

Figure 3 shows the USB Audio I/O card.

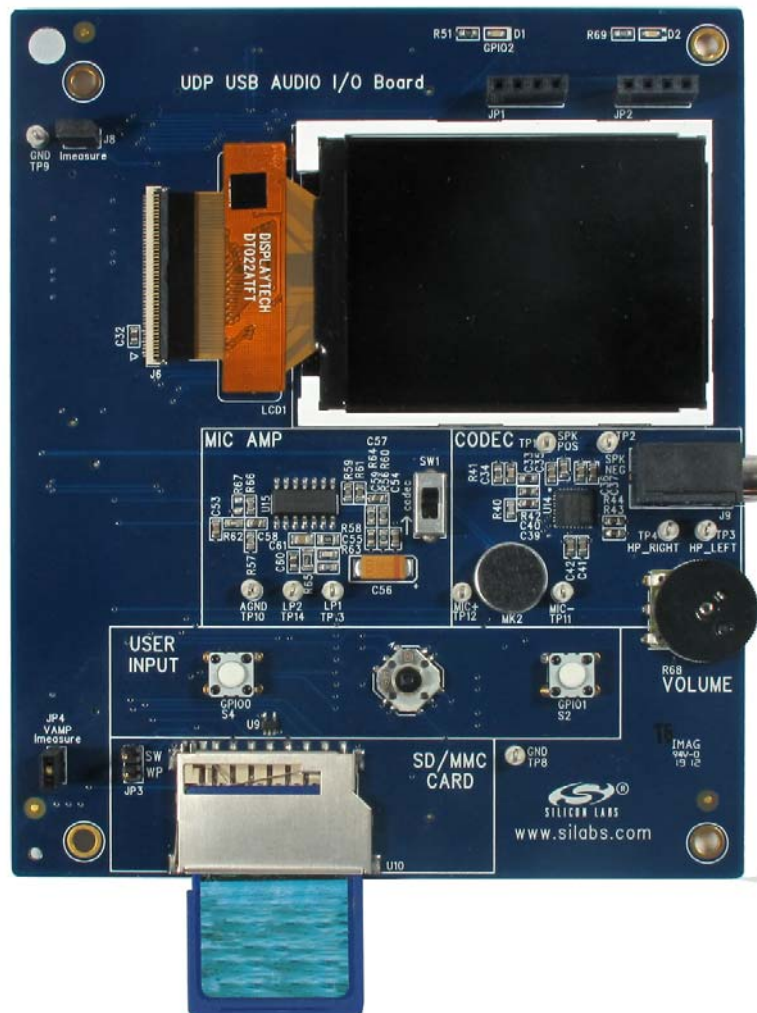


Figure 3. UPIO-USB-AUDIO I/O Card

Figure 4 and Figure 5 highlight some of the features of the USB Audio I/O card.

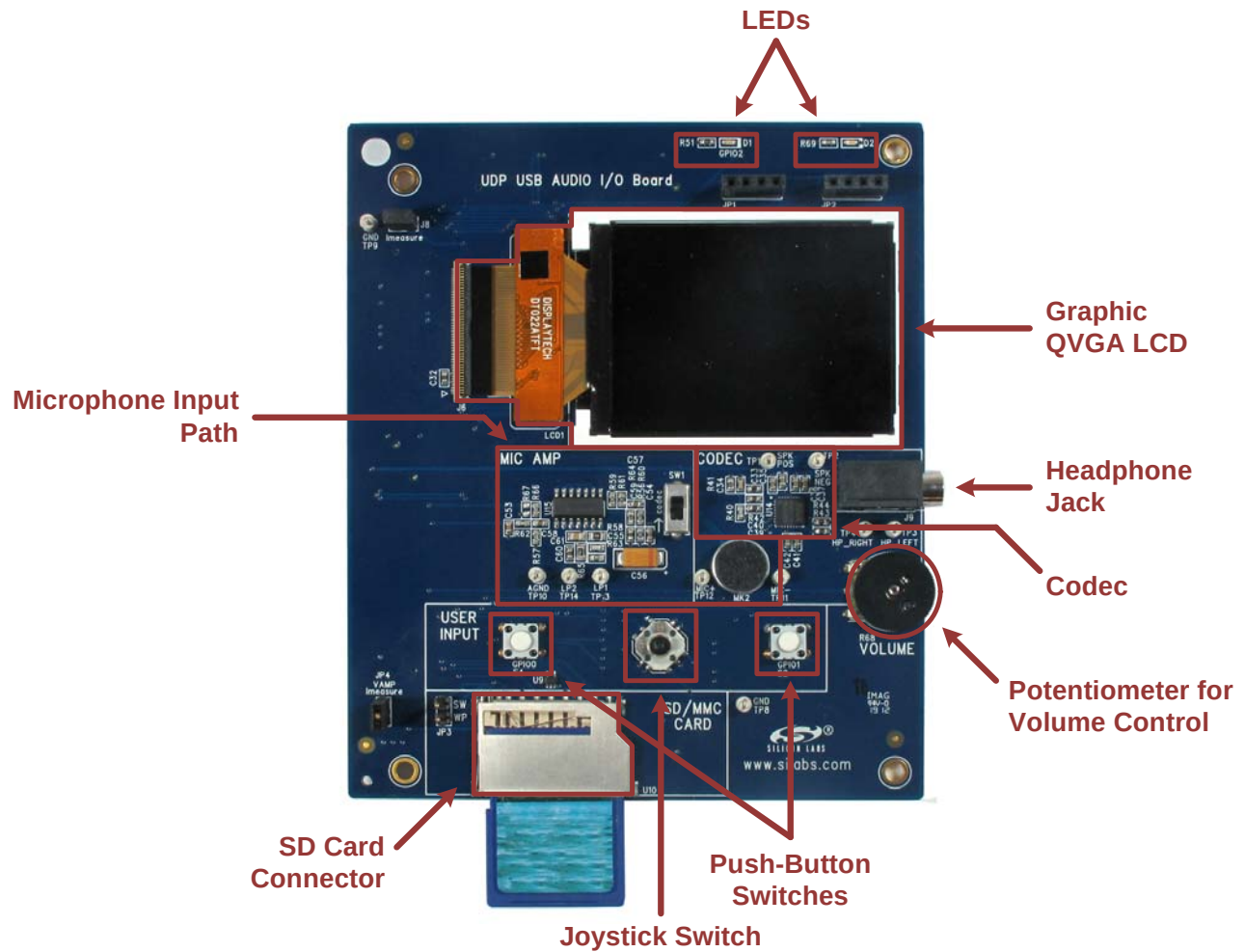


Figure 4. UPIO-USB-AUDIO I/O Card Features (Front)

I2S Audio I/O Card

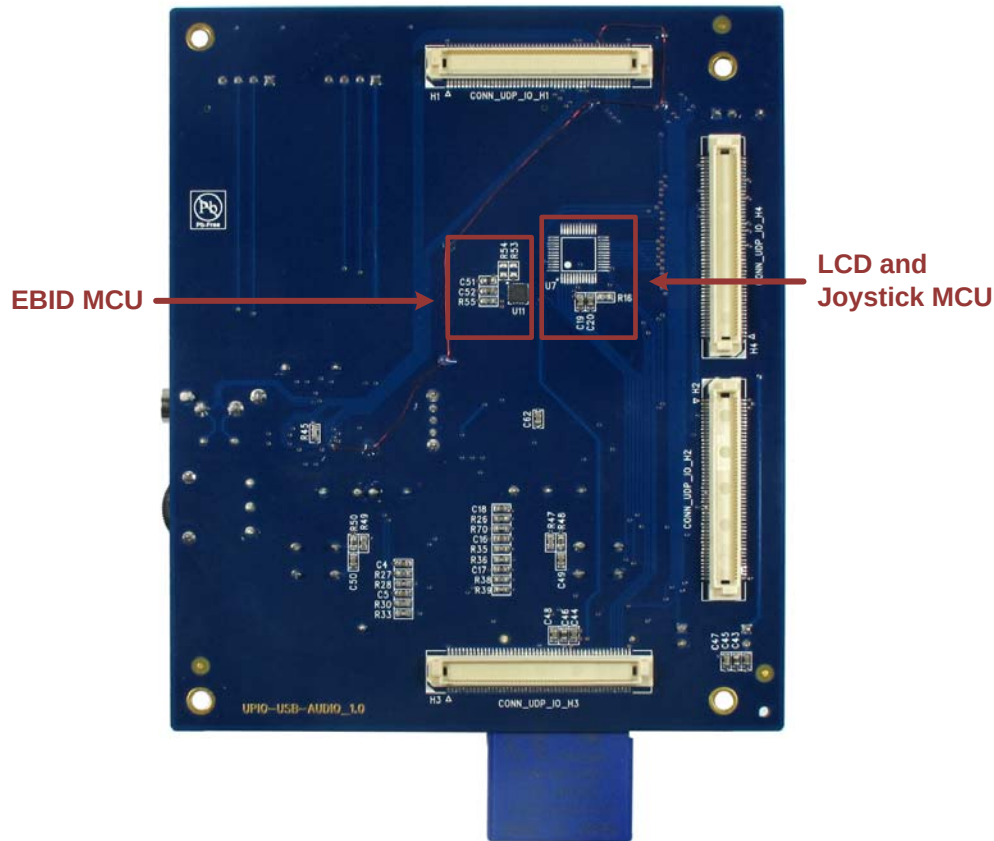


Figure 5. UPIO-USB-AUDIO I/O Card Features (Back)

4.1. Microphone Input

The microphone input system on the board consists of two input paths. When SW1 is in the upper position marked with →**codec**, the microphone connects to the codec (U14). When SW1 is in the lower position, the microphone connects to the ADC_IN1 UDP signal through a filter and gain circuit. This filter and gain circuit is biased with the ADC_VREF UDP signal.

4.2. Codec (U14) and Headphone Jack (J9)

This codec accepts register writes over I2C using the I2C_SDA_EZR and I2C_SCL_EZR signals. The TIMER_EX_A signal provides the clock, and I2SRX_DOUT_A and I2STX_DOUT_A are the digital audio data input and output signals. The I2S word sync (WS) and clock (SCK) signals can source from either the I2S receiver or I2S transmitter on the MCU card. The capacitors, resistors, microphone, and headphone jack connections surrounding the codec are based on the manufacturer's recommendations. Table 1 summarizes the codec connections.

Table 1. Codec Connections

Codec Signal	UDP Signal
Command I2C data	I2C_SDA_EZR
Command I2C clock	I2C_SCL_EZR
External clock	TIMER_EX_A
I2S word sync (WS)	I2STX_DFS_A and I2SRX_DFS_A
I2S clock (SCK)	I2STX_CLK_A and I2SRX_CLK_A
I2S input (to codec) data (SD) (DACDAT pin)	I2SOUT_DOUT_A
I2S output (from codec) data (SD) (ADCDAT pin)	I2SIN_DOUT_A

4.3. Potentiometer (R68)

The potentiometer connects to the ADC_IN0 signal and can be used for volume control. The MCU card must implement firmware to modulate the volume as the potentiometer value changes.

4.4. Switches and LEDs

The I/O card has two push-button switches (S2 and S4) and two LEDs (D1 and D2). The switches are normally open and pull the signal voltage to ground when pressed. Table 2 shows the UDP signal connections for these switches and LEDs.

Table 2. Switch and LED Connections

SW or LED	UDP Signal
Push-Button Switch (S4)	GPIO00
Push-Button Switch (S2)	GPIO01
Blue LED (D2)	PWR_3.3_BULK
Red LED (D1)	GPIO02

4.5. Co-processor MCU (U7)

The I/O card has a C8051F380 co-processor MCU (U7) that controls the Graphic QVGA LCD (LCD1) and reads the five-direction joystick switch (S1). This co-processor enables stand-alone demos that do not require a PC when connected with an MCU card through the UDP motherboard.

4.5.1. Graphic QVGA LCD (LCD1)

The graphic QVGA LCD (LCD1) connects to the co-processor C8051F380 MCU EMIF through the J6 connector. This color LCD (SDT022ATFT by Displaytech Ltd.) has a resolution of 320 x 240 resolution. The power consumption of the LCD can be measured using the J8 header. Table 3 show the co-processor port pin connections to the LCD.

Table 3. Joystick Switch Connections

LCD Signal	Co-processor Pin or UDP Signal
IM0	PWR_3.3_BULK
IM3	
LEDA	
VCC	
DB10	P4.0
DB11	P4.1
DB12	P4.2
DB13	P4.3
DB14	P4.4
DB15	P4.5
DB16	P4.6
DB17	P4.7
RD	P1.6
RS/SCL	P3.0
WR	P1.7
LCD_RESET	P1.1

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4.5.2. Joystick Switch

The I/O card has a five-position joystick switch (S1) that connects to the co-processor C8051F380 MCU. The joystick is normally open and pulls a signal voltage to ground when the joystick is placed in one of the five positions. Table 4 show the co-processor port pin connections to the joystick.

Table 4. Joystick Switch Connections

Joystick Position	Co-processor Pin
Center	P0.6
Up	P0.2
Down	P0.3
Left	P0.4
Right	P0.5

4.6. SD Card Connector (U10)

The SD card connector (U10) connects to any standard SD card. The card power from PWR_3.3_BULK can be enabled or disabled by the SPI_PWR signal connected to GPIO03.

The connector includes two mechanical switches: one detects if a card is inserted, and one indicates the write protection status of the card. The card detection switch connects to the GPIO04 signal. The JP3 header provides access to both the switch signals.

4.7. EBID MCU (U11)

The I/O card has a unique ID that can be read out from the Silicon Labs C8051F990 MCU (U11). This MCU enables software tools to recognize the connected hardware and automatically select the appropriate firmware image.

5. Using the I/O Card with the UDP Motherboard

5.1. Current Measurement

The power measurement circuitry on the UDP motherboard consists of a Silicon Labs C8051F351 8051 MCU that measures both input voltage and current consumption of the MCU card, I/O expander, and radio test card. When using the I/O card, install a shorting block on the UDP Motherboard J15 and J13 connecting the two left pins together.

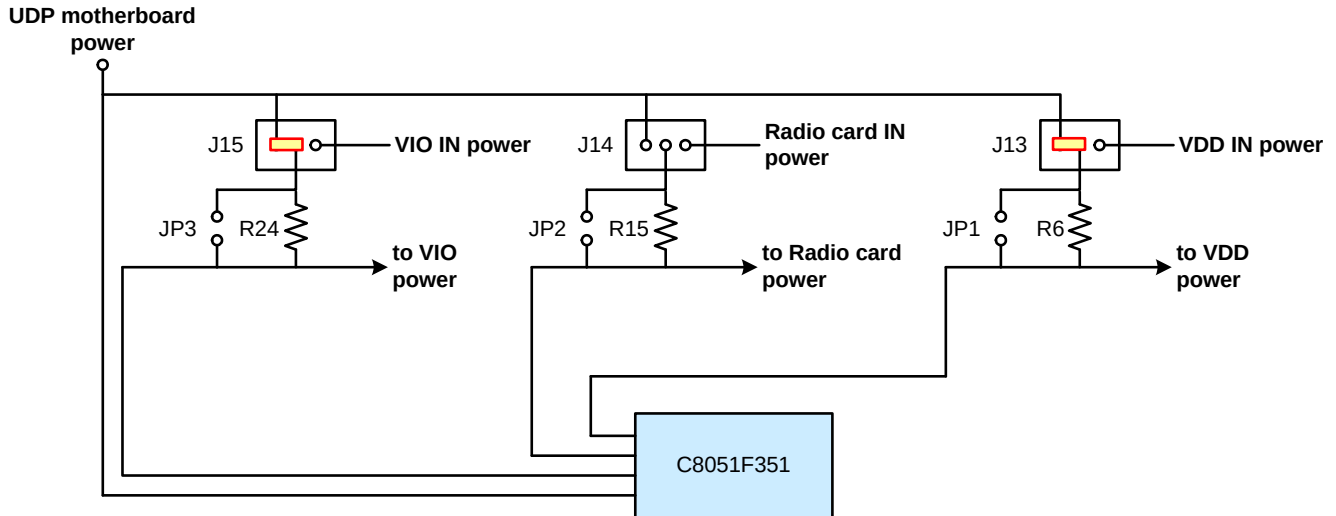


Figure 6. Power Measurement Diagram

5.2. I/O Card Header Connections

The I/O card has four connectors with 100 pins each. These 400 pins are directly tied to the UDP motherboard and MCU cards. These signals are named and designed to support a wide variety of features and applications, and the UPIO-USB-AUDIO card implements a subset of these connections.

The MCU cards and I/O cards are designed so that a maximum number of functions are shared between each card. This allows a particular type of I/O card to be shared amongst all MCU cards that connect to the same signals.

The I/O card slot includes the following components:

H1	I/O card connector H1
H2	I/O card connector H2
H3	I/O card connector H3
H4	I/O card connector H4

The UPIO-USB-AUDIO card implements the signals described in Table 6, Table 7, and Table 8, Table 9 in the Appendix.

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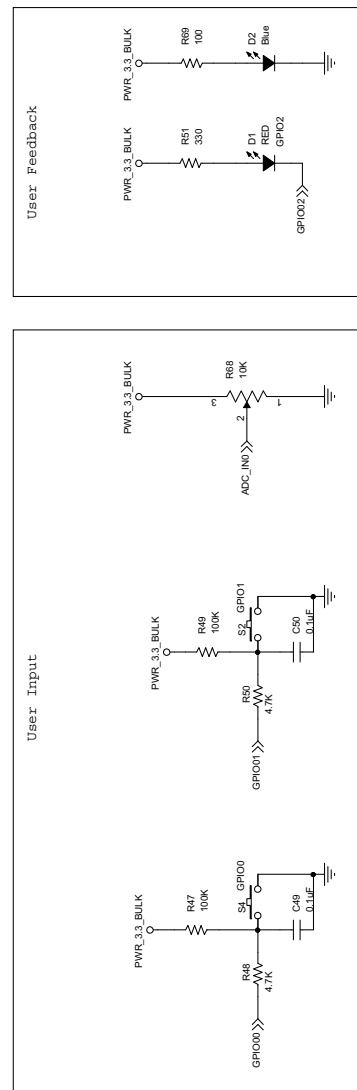


Figure 9. UPIO-USB-AUDIO I/O Card Schematic (2 of 5)



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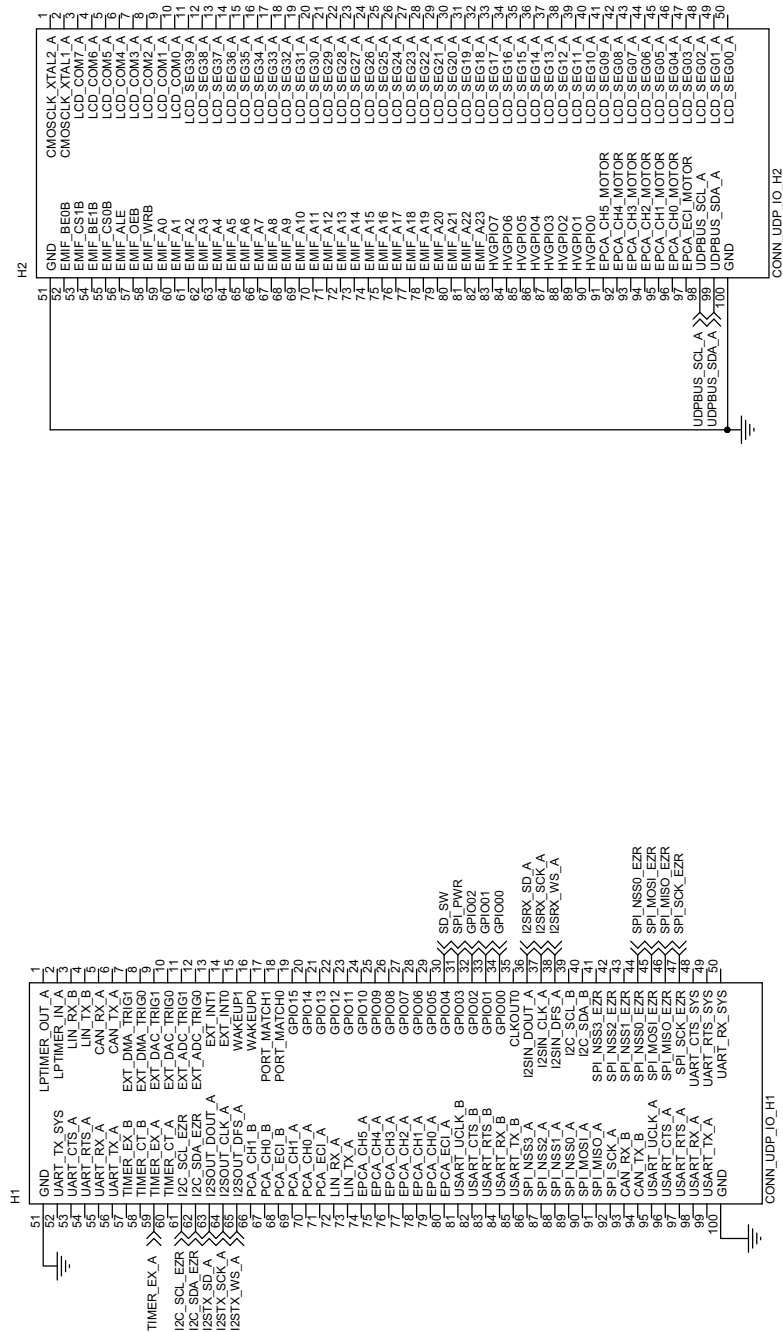


Figure 11. UPIO-USB-AUDIO I/O Card Schematic (4 of 5)

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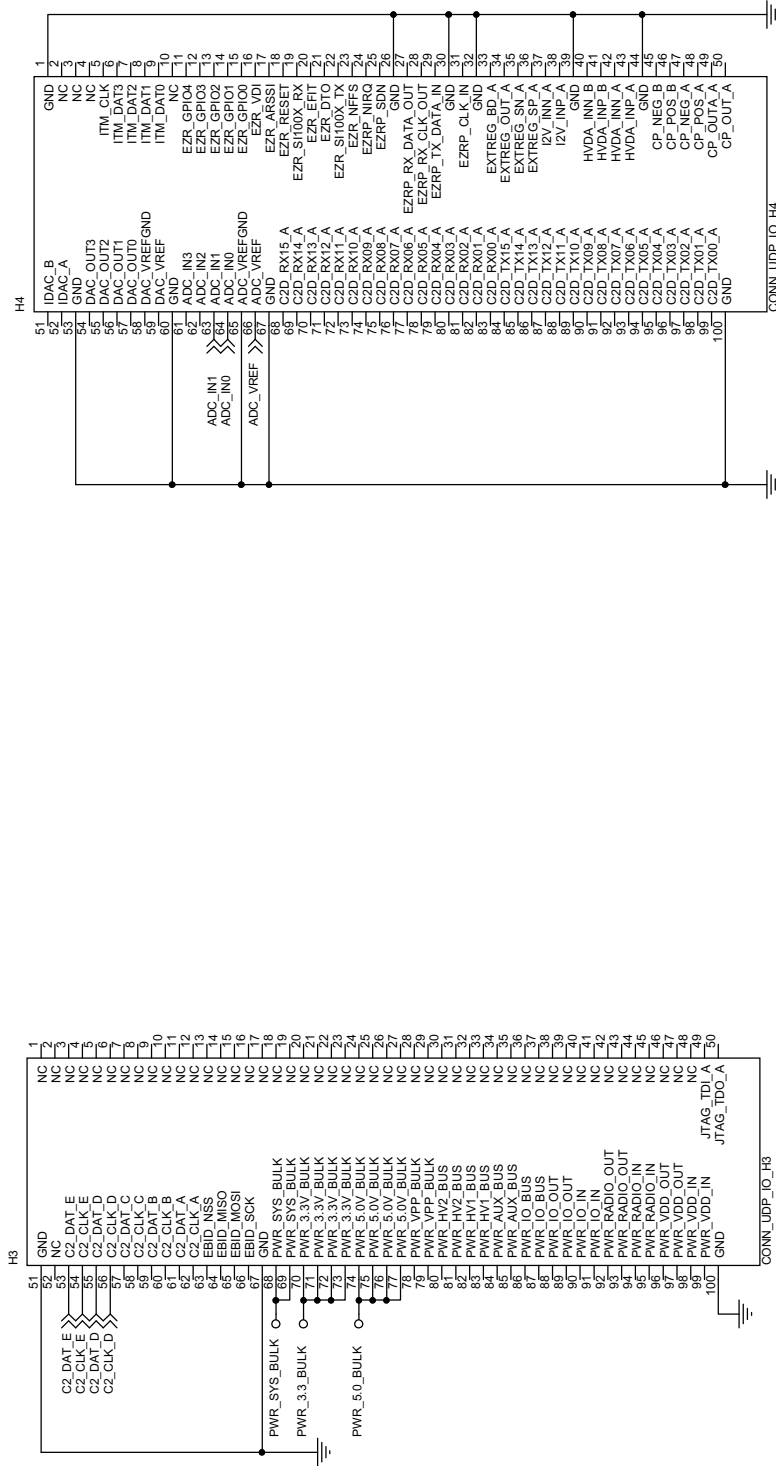


Figure 12. UPIO-USB-AUDIO I/O Card Schematic (5 of 5)

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7. Bill of Materials

Table 5. UPIO-USB-AUDIO Card Bill of Materials

Reference	Part Number	Source	Description
C20	C0603X5R6R3-475K	Venkel	4.7uF 6.3V $\pm 10\%$ X5R 0603
C32 C39 C40 C45 C46 C51 C59 C60	C0603X7R100-105K	Venkel	1uF 10V $\pm 10\%$ X7R 0603
C34	C0603COG500-221M	Venkel	220pF 50V $\pm 20\%$ COG 0603
C4 C5 C16 C17 C18 C19 C33 C35 C36 C37 C41 C42 C43 C44 C49 C50 C52 C54 C57 C58 C62	C0603X7R250-104K	Venkel	0.1uF 25V $\pm 10\%$ X7R 0603
C47 C48	C0603X5R6R3-106M	Venkel	10uF 6.3V $\pm 20\%$ X5R 0603
C53	C0603X7R160-822K	Venkel	8.2nF 16V $\pm 10\%$ X7R 0603
C55	C0603COG5006R8D	Venkel	6.8pF 50V $\pm 0.5\text{pF}$ COG 0603
C56	B45196H5106M309	Kemet	10uF 25V $\pm 20\%$ TANT
C61	C0805X7R500272K	Venkel	2700pF 50V $\pm 10\%$ X7R 0805
D1	SML-LX0603SRW	LUMEX INC	RED 30mA 0603
D2	LB Q39G-L2N2-35-1	OSRAM Opto Semiconductors Inc	Blue 15mA 2.85V SMT, ChipLED 0603
H1 H2 H3 H4	FX8-100P-SV1	HIROSE ELECTRIC	UDP DC HEADER Header
J6	FH19SC-45S-0.5SH(05)	HIROSE ELECTRIC	FH19SC-45S-0.5SH(05)
J8 JP3 JP4	TSW-102-07-T-S	Samtec	JUMPER Header
J9	SJ1-3534N	CUI	Stereo Audio Jack
JP1 JP2	SSQ-104-23-T-S	Samtec	4X1 Socket
JS1 JS2 JS3	SNT-100-BK-T	Samtec	Jumper Shunt
LCD1	SDT022ATFT	DISPLAYTECH LTD.	LCD MODULE
MK2	CMA-4544PF-W	CUI Inc	MICROPHONE
R16 R55	CR0603-10W-1001F	Venkel	1K 1/10W $\pm 1\%$ ThickFilm 0603
R26 R27 R30 R35 R38 R47 R49 R57 R66	CR0603-10W-1003F	Venkel	100K 1/10W $\pm 1\%$ ThickFilm 0603
R28 R33 R36 R39 R70	CR0603-10W-4751F	Venkel	4.75K 1/10W $\pm 1\%$ ThickFilm 0603
R40 R45	CR0603-16W-000	Venkel	0 ohm 1A ThickFilm 0603
R41 R48 R50	CR0603-10W-4701F	Venkel	4.7K 1/10W $\pm 1\%$ ThickFilm 0603

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Table 5. UPIO-USB-AUDIO Card Bill of Materials

Reference	Part Number	Source	Description
R42	CR0603-10W-6810F	Venkel	681 1/10W $\pm 1\%$ ThickFilm 0603
R43 R44	CR0603-16W-152J	Venkel	1.5k 1/16W $\pm 5\%$ ThickFilm 0603
R51	CR0603-16W-3300F	Venkel	330 1/16W $\pm 1\%$ ThickFilm 0603
R56	CR0603-10W-2001F	Venkel	2K 1/10W $\pm 1\%$ ThickFilm 0603
R58	CR0805-8W-515J	Venkel	5.1M 1/8W $\pm 5\%$ ThickFilm 0805
R59 R61	RC0603-16W-1543F	Venkel	154K 1/8W $\pm 1\%$ ThickFilm 0603
R60 R63	CR0603-16W-4991F	Venkel	4.99K 1/16W $\pm 1\%$ ThickFilm 0603
R62	CR0603-10W-4221F	Venkel	4.22K 1/10W $\pm 1\%$ ThickFilm 0603
R64	CR0603-10W-1333F	Venkel	133K 1/10W $\pm 1\%$ ThickFilm 0603
R65	CR0805-10W-9761	Venkel	9.76K 1/10W $\pm 1\%$ ThickFilm 0805
R68	RV100F-30-4K1B-B10K-B301	Alpha (Taiwan)	10K 0.03W 30% Thumbwheel 10MM
R69	CR0603-10W-1000F	Venkel	100 1/10W $\pm 1\%$ ThickFilm 0603
S1	EVQ-Q7GA50	PANASONIC CORP	JOYSTICK SW 5POS
S2 S4	EVQ-PAD04M	PANASONIC CORP	MOMENTARY tactile switch 6.5X4.5
SW1	OS102011MS2QN1	C&K	SW SLIDE 2POS .1A @ 12V
U10	101-00708-64	Amphenol Commercial Products	SD/MMC CARD MEM
U11	C8051F990-GM	Silicon Labs	C8051F990 MCU QFN20 3X3
U14	WM8976GEFL/V	Wolfson	WM8976 3.3V CODEC QFN32 5X5
U15	MC33204DR2	ON SEMICONDUCTOR	MC33204 QUAD op-amp SO14
U7	C8051F380-GQ	Silicon Labs	C8051F380 MCU QFP48 9X9
U9	SN74LVC1G66DCK	TI	SN74LVC1G66DCK SINGLE
R53 R54	CR0603-16W-000	Venkel	0 ohm 1A ThickFilm 0603 NI (not installed)
R67	CR0402-16W-000	Venkel	0 ohm 1A ThickFilm 0402 NI (not installed)

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8. Appendix

Table 6. UPIO-USB-AUDIO Card H1 Pin Descriptions (H1)

I/O Card Pin	Signal Name	Description
1	LPTIMER_OUT_A	
2	LPTIMER_IN_A	
3	LIN_RX_B	
4	LIN_TX_B	
5	CAN_RX_A	
6	CAN_TX_A	
7	EXT_DMA_TRIG1	
8	EXT_DMA_TRIG0	
9	EXT_DAC_TRIG1	
10	EXT_DAC_TRIG0	
11	EXT_ADC_TRIG1	
12	EXT_ADC_TRIG0	
13	EXT_INT1	
14	EXT_INT0	
15	WAKEUP1	
16	WAKEUP0	
17	PORT_MATCH1	
18	PORT_MATCH0	
19	GPIO15	
20	GPIO14	
21	GPIO13	
22	GPIO12	
23	GPIO11	
24	GPIO10	
25	GPIO09	
26	GPIO08	
27	GPIO07	
28	GPIO06	
29	GPIO05	
30	GPIO04	SD_SW SD card inserted detection switch
31	GPIO03	SPI_PWR SD card power switch
32	GPIO02	Red LED (D1)
33	GPIO01	Push-Button Switch (S2)
34	GPIO00	Push-Button Switch (S4)
35	CLKOUT0	

Table 6. UPIO-USB-AUDIO Card H1 Pin Descriptions (H1)

I/O Card Pin	Signal Name	Description
36	I2SIN_DOUT_A	Codec I2S output (from codec) data (SD) (ADCDAT pin)
37	I2SIN_CLK_A	Codec I2S clock (SCK)
38	I2SIN_DFS_A	Codec I2S word sync (WS)
39	I2C_SCL_B	
40	I2C_SDA_B	
41	SPI_NSS3_EZR	
42	SPI_NSS2_EZR	
43	SPI_NSS1_EZR	
44	SPI_NSS0_EZR	SD Card DAT3/CS pin
45	SPI_MOSI_EZR	SD Card CMD/MOSI pin
46	SPI_MISO_EZR	SD Card DAT0/MISO pin
47	SPI_SCK_EZR	SD Card CLK/SCLK pin
48	UART_CTS_SYS	
49	UART_RTS_SYS	
50	UART_RX_SYS	
51	GND	
52	UART_TX_SYS	
53	UART_CTS_A	
54	UART_RTS_A	
55	UART_RX_A	
56	UART_TX_A	
57	TIMER_EX_B	
58	TIMER_CT_B	
59	TIMER_EX_A	Codec external clock
60	TIMER_CT_A	
61	I2C_SCL_EZR	Codec command I2C clock
62	I2C_SDA_EZR	Codec command I2C data
63	I2SOUT_DOUT_A	I2S input (to codec) data (SD) (DACDAT pin)
64	I2SOUT_CLK_A	Codec I2S clock (SCK)
65	I2SOUT_DFS_A	Codec I2S word sync (WS)
66	PCA_CH1_B	
67	PCA_CH0_B	
68	PCA_ECI_B	
69	PCA_CH1_A	
70	PCA_CH0_A	
71	PCA_ECI_A	
72	LIN_RX_A	

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Table 6. UPIO-USB-AUDIO Card H1 Pin Descriptions (H1)

I/O Card Pin	Signal Name	Description
73	LIN_TX_A	
74	EPCA_CH5_A	
75	EPCA_CH4_A	
76	EPCA_CH3_A	
77	EPCA_CH2_A	
78	EPCA_CH1_A	
79	EPCA_CH0_A	
80	EPCA_ECI_A	
81	USART_UCLK_B	
82	USART_CTS_B	
83	USART_RTS_B	
84	USART_RX_B	
85	USART_TX_B	
86	SPI_NSS3_A	
87	SPI_NSS2_A	
88	SPI_NSS1_A	
89	SPI_NSS0_A	
90	SPI_MOSI_A	
91	SPI_MISO_A	
92	SPI_SCK_A	
93	CAN_RX_B	
94	CAN_TX_B	
95	USART_UCLK_A	
96	USART_CTS_A	
P	USART_RTS_A	
98	USART_RX_A	
99	USART_TX_A	
100	GND	

Table 7. UPIO-USB-AUDIO Card H2 Pin Descriptions (H2)

I/O Card Pin	Signal Name	Description
1	CMOSCLK_XTAL2_A	
2	CMOSCLK_XTAL1_A	
3	LCD_COM7_A	
4	LCD_COM6_A	
5	LCD_COM5_A	
6	LCD_COM4_A	
7	LCD_COM3_A	
8	LCD_COM2_A	
9	LCD_COM1_A	
10	LCD_COM0_A	
11	LCD_SEG39_A	
12	LCD_SEG38_A	
13	LCD_SEG37_A	
14	LCD_SEG36_A	
15	LCD_SEG35_A	
16	LCD_SEG34_A	
17	LCD_SEG33_A	
18	LCD_SEG32_A	
19	LCD_SEG31_A	
20	LCD_SEG30_A	
21	LCD_SEG29_A	
22	LCD_SEG28_A	
23	LCD_SEG27_A	
24	LCD_SEG26_A	
25	LCD_SEG25_A	
26	LCD_SEG24_A	
27	LCD_SEG23_A	
28	LCD_SEG22_A	
29	LCD_SEG21_A	
30	LCD_SEG20_A	
31	LCD_SEG19_A	
32	LCD_SEG18_A	
33	LCD_SEG17_A	
34	LCD_SEG16_A	
35	LCD_SEG15_A	
36	LCD_SEG14_A	
37	LCD_SEG13_A	

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Table 7. UPIO-USB-AUDIO Card H2 Pin Descriptions (H2)

I/O Card Pin	Signal Name	Description
38	LCD_SEG12_A	
39	LCD_SEG11_A	
40	LCD_SEG10_A	
41	LCD_SEG09_A	
42	LCD_SEG08_A	
43	LCD_SEG07_A	
44	LCD_SEG06_A	
45	LCD_SEG05_A	
46	LCD_SEG04_A	
47	LCD_SEG03_A	
48	LCD_SEG02_A	
49	LCD_SEG01_A	
50	LCD_SEG00_A	
51	GND	
52	EMIF_BE0B	
53	EMIF_CS1B	
54	EMIF_BE1B	
55	EMIF_CS0B	
56	EMIF_ALE	
57	EMIF_OEB	
58	EMIF_WRB	
59	EMIF_A0	
60	EMIF_A1	
61	EMIF_A2	
62	EMIF_A3	
63	EMIF_A4	
64	EMIF_A5	
65	EMIF_A6	
66	EMIF_A7	
67	EMIF_A8	
68	EMIF_A9	
69	EMIF_A10	
70	EMIF_A11	
71	EMIF_A12	
72	EMIF_A13	
73	EMIF_A14	
74	EMIF_A15	

Table 7. UPIO-USB-AUDIO Card H2 Pin Descriptions (H2)

I/O Card Pin	Signal Name	Description
75	EMIF_A16	
76	EMIF_A17	
77	EMIF_A18	
78	EMIF_A19	
79	EMIF_A20	
80	EMIF_A21	
81	EMIF_A22	
82	EMIF_A23	
83	HVGPI07	
84	HVGPI06	
85	HVGPI05	
86	HVGPI04	
87	HVGPI03	
88	HVGPI02	
89	HVGPI01	
90	HVGPI00	
91	EPCA_CH5_MOTOR	
92	EPCA_CH4_MOTOR	
93	EPCA_CH3_MOTOR	
94	EPCA_CH2_MOTOR	
95	EPCA_CH1_MOTOR	
96	EPCA_CH0_MOTOR	
97	EPCA_ECI_MOTOR	
98	UDPBUS_SCL_A	EBID SCL (C8051F990)
99	UDPBUS_SDA_A	EBID SDA (C8051F990)
100	GND	

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Table 8. UPIO-USB-AUDIO Card H3 Pin Descriptions (H3)

I/O Card Pin	Signal Name	Description
1	H3_100	
2	H3_99	
3	H3_98	
4	H3_97	
5	H3_96	
6	H3_95	
7	H3_94	
8	H3_93	
9	H3_92	
10	H3_91	
11	H3_90	
12	H3_89	
13	H3_88	
14	H3_87	
15	H3_86	
16	H3_85	
17	H3_84	
18	H3_83	
19	H3_82	
20	H3_81	
21	H3_80	
22	H3_79	
23	H3_78	
24	H3_77	
25	H3_76	
26	H3_75	
27	H3_74	
28	H3_73	
29	H3_72	
30	H3_71	
31	H3_70	
32	H3_69	
33	H3_68	
34	H3_67	
35	H3_66	
36	H3_65	

Table 8. UPIO-USB-AUDIO Card H3 Pin Descriptions (H3)

I/O Card Pin	Signal Name	Description
37	H3_64	
38	H3_63	
39	H3_62	
40	H3_61	
41	H3_60	
42	H3_59	
43	H3_58	
44	H3_57	
45	H3_56	
46	H3_55	
47	H3_54	
48	H3_53	
49	JTAG_TDI_A	
50	JTAG_TDO_A	
51	GND	
52	nc	
53	C2_DAT_E	C8051F380 co-processor C2D debugging data
54	C2_CLK_E	C8051F380 co-processor C2CK debugging clock
55	C2_DAT_D	C8051F990 EBID C2D debugging data
56	C2_CLK_D	C8051F990 EBID C2CK debugging clock
57	C2_DAT_C	
58	C2_CLK_C	
59	C2_DAT_B	
60	C2_CLK_B	
61	C2_DAT_A	
62	C2_CLK_A	
63	EBID_NSS	
64	EBID_MISO	
65	EBID_MOSI	
66	EBID_SCK	
67	GND	
68	PWR_SYS_BULK	3.3 V power supply for the EBID and co-processor devices
69	PWR_SYS_BULK	
70	PWR_3.3V_BULK	PWR_3.3_BULK 3.3 V supply used through the I/O board
71	PWR_3.3V_BULK	
72	PWR_3.3V_BULK	
73	PWR_3.3V_BULK	

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Table 8. UPIO-USB-AUDIO Card H3 Pin Descriptions (H3)

I/O Card Pin	Signal Name	Description
74	PWR_5.0_BULK	5.0 V power from the UDP motherboard
75	PWR_5.0_BULK	
76	PWR_5.0_BULK	
77	PWR_5.0_BULK	
78	PWR_VPP_BULK	
79	PWR_VPP_BULK	
80	PWR_HV2_BUS	
81	PWR_HV2_BUS	
82	PWR_HV1_BUS	
83	PWR_HV1_BUS	
84	PWR_AUX_BUS	
85	PWR_AUX_BUS	
86	PWR_IO_BUS	
87	PWR_IO_BUS	
88	PWR_IO_OUT	
89	PWR_IO_OUT	
90	PWR_IO_IN	
91	PWR_IO_IN	
92	PWR_RADIO_OUT	
93	PWR_RADIO_OUT	
94	PWR_RADIO_IN	
95	PWR_RADIO_IN	
96	PWR_VDD_OUT	
97	PWR_VDD_OUT	
98	PWR_VDD_IN	
99	PWR_VDD_IN	
100	GND	

Table 9. UPIO-USB-AUDIO Card H4 Pin Descriptions (H4)

I/O Card Pin	Signal Name	Description
1	GND	
2	H4_99	
3	H4_98	
4	H4_97	
5	ITM_CLK	
6	ITM_DAT3	
7	ITM_DAT2	
8	ITM_DAT1	
9	ITM_DAT0	
10	H4_91	
11	EZR_GPIO4	
12	EZR_GPIO3	
13	EZR_GPIO2	
14	EZR_GPIO1	
15	EZR_GPIO0	
16	EZR_VDI	
17	EZR_ARSSI	
18	EZR_RESET	
19	EZR_SI100X_RX	
20	EZR_FFIT	
21	EZR_DTO	
22	EZR_SI100X_TX	
23	EZR_NFFS	
24	EZRP_NIRQ	
25	EZRP_SDN	
26	GND	
27	EZRP_RX_DATA_OUT	
28	EZRO_RX_CLK_OUT	
29	EZRP_TX_DATA_IN	
30	GND	
31	EZRP_CLK_IN	
32	GND	
33	EXTREG_BD_A	
34	EXTREG_OUT_A	
35	EXTREG_SN_A	
36	EXTREG_SP_A	

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Table 9. UPIO-USB-AUDIO Card H4 Pin Descriptions (H4)

I/O Card Pin	Signal Name	Description
37	I2V_INN_A	
38	I2V_INP_A	
39	GND	
40	HVDA_INN_B	
41	HVDA_INP_B	
42	HVDA_INN_A	
43	HVDA_INP_A	
44	GND	
45	CP_NEG_B	
46	CP_POS_B	
47	CP_NEG_A	
48	CP_POS_A	
49	CP_OUTA_A	
50	CP_OUT_A	
51	IDAC_B	
52	IDAC_A	
53	GND	
54	DAC_OUT3	
55	DAC_OUT2	
56	DAC_OUT1	
57	DAC_OUT0	
58	DAC_VREFGND	
59	DAC_VREF	
60	GND	
61	ADC_IN3	
62	ADC_IN2	
63	ADC_IN1	Microphone ADC input
64	ADC_IN0	Potentiometer
65	ADC_VREFGND	board ground
66	ADC_VREF	Microphone ADC input bias
67	GND	
68	C2D_RX15_A	
69	C2D_RX14_A	
70	C2D_RX13_A	
71	C2D_RX12_A	
72	C2D_RX11_A	
73	C2D_RX10_A	

Table 9. UPIO-USB-AUDIO Card H4 Pin Descriptions (H4)

I/O Card Pin	Signal Name	Description
74	C2D_RX09_A	
75	C2D_RX08_A	
76	C2D_RX07_A	
77	C2D_RX06_A	
78	C2D_RX05_A	
79	C2D_RX04_A	
80	C2D_RX03_A	
81	C2D_RX02_A	
82	C2D_RX01_A	
83	C2D_RX00_A	
84	C2D_TX15_A	
85	C2D_TX14_A	
86	C2D_TX13_A	
87	C2D_TX12_A	
88	C2D_TX11_A	
89	C2D_TX10_A	
90	C2D_TX09_A	
91	C2D_TX08_A	
92	C2D_TX07_A	
93	C2D_TX06_A	
94	C2D_TX05_A	
95	C2D_TX04_A	
96	C2D_TX03_A	
97	C2D_TX02_A	
98	C2D_TX01_A	
99	C2D_TX00_A	
100	GND	

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