

## UPIO-M3U1xx 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).

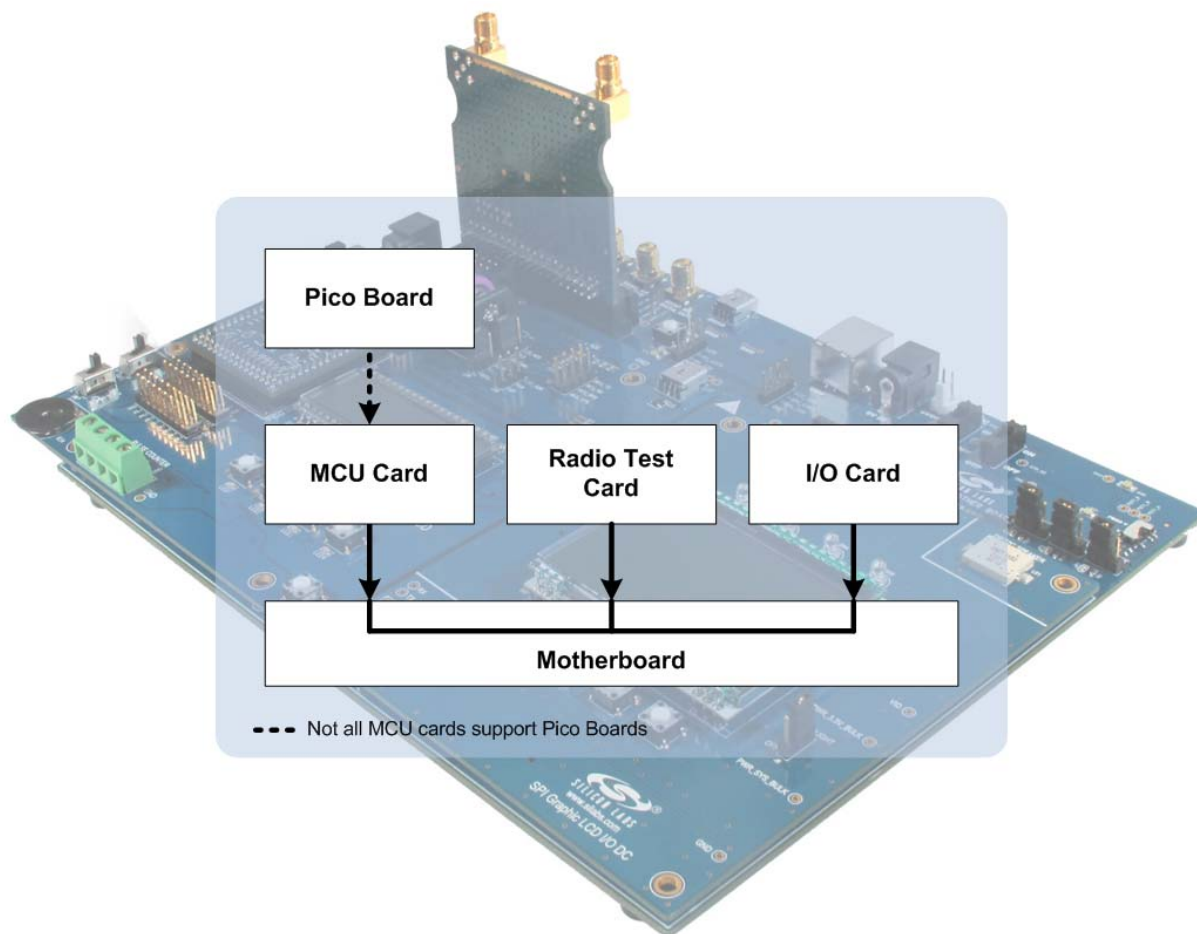


Figure 1. Unified Development Platform Block Diagram

## 2. Relevant Documents

This document provides a hardware overview for the Unified Development Platform (UDP) system SiM3U1xx 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](http://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](http://www.silabs.com/udp).

## 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.

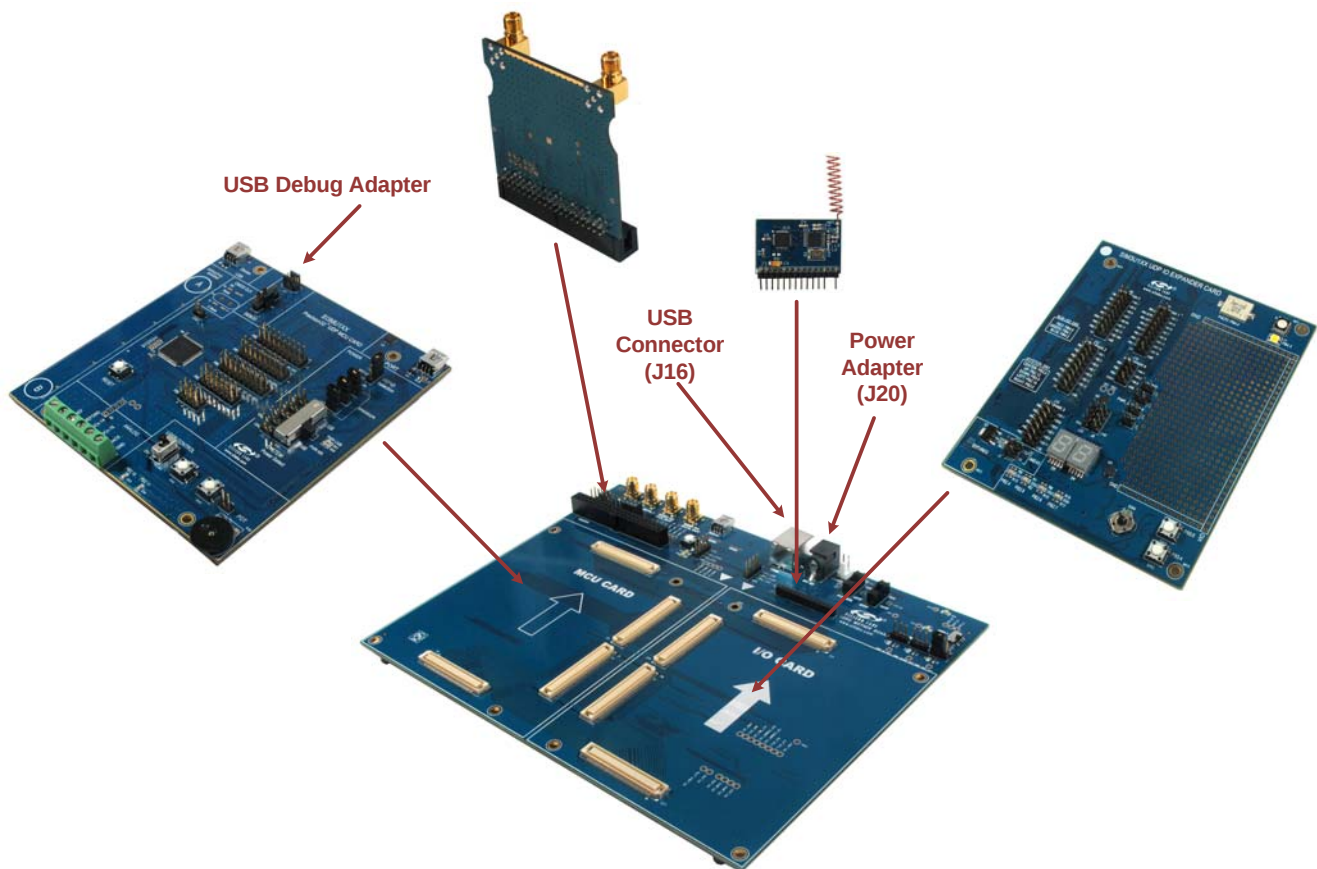
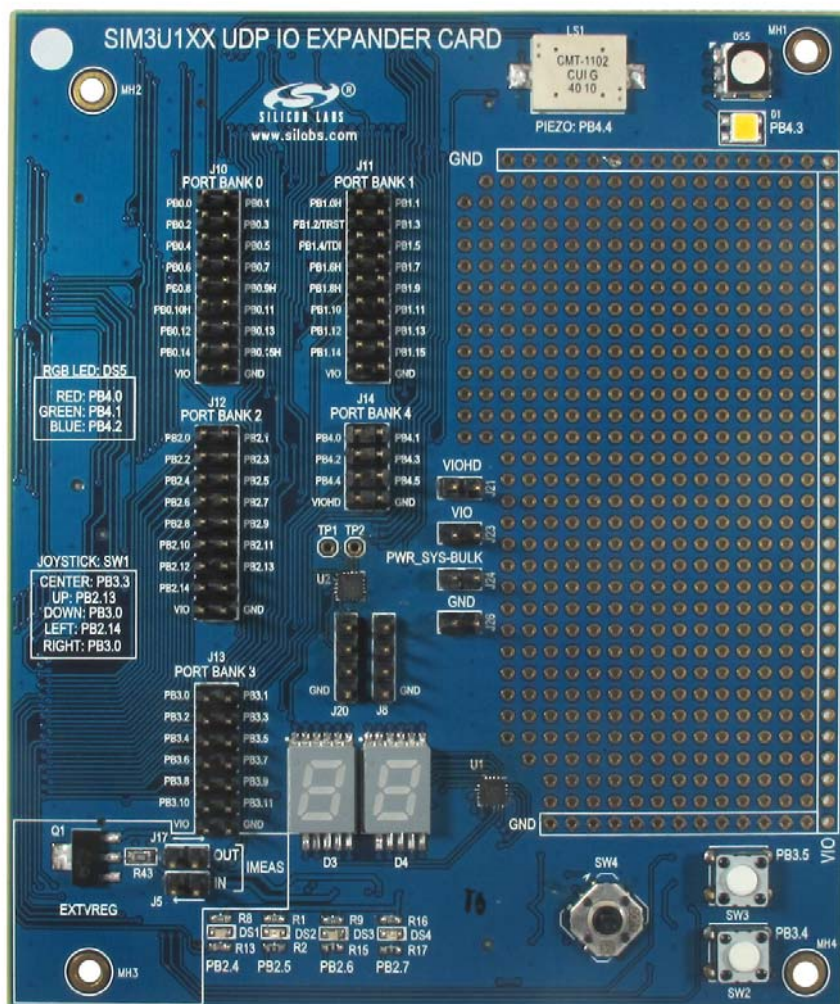


Figure 2. Hardware Setup using the Unified Development Platform

Figure 3 shows the SiM3U1xx I/O card.



... of the SIM2U1xx I/O card

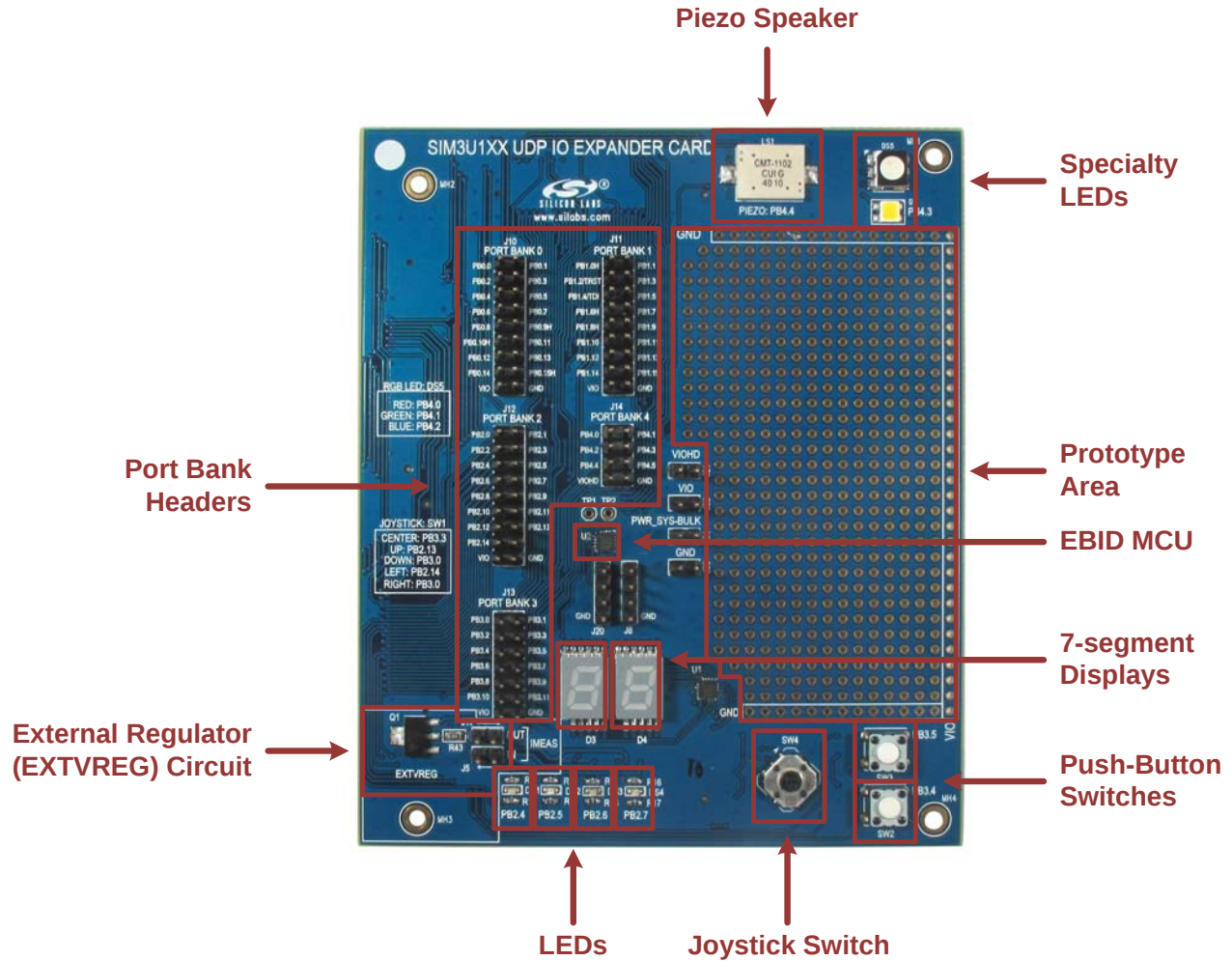


Figure 4. UPIO-M3U1xx I/O Card Features

## 4.1. 7-Segment Displays

The I/O card has two 7-segment displays driven by a Silicon Labs C8051F990 MCU. The C8051F990 is powered by the UDP motherboard and communicates to a UDP MCU card via I2C through the UDP connector.

Debug connections to the C8051F990 are available via the J8 header. Table 2 shows the header connections.

Table 1. J8 Header Connections

| J8 Pin Number | J8 Pin Description               |
|---------------|----------------------------------|
| 1             | C8051F990 VDD pin (PWR_SYS_BULK) |
| 2             | C8051F990 C2CK                   |
| 3             | C8051F990 C2D                    |
| 4             | GND                              |

## 4.2. Switches and LEDs

The I/O card has two push-button switches (SW2 and SW3) and six LEDs (DS1-5 and D1). The switches are normally open and pull the port pin voltage to ground when pressed. DS5 integrates a red, green and blue LED into a single component. D1 is a bright white LED. Table 2 shows the port pin connections.

**Table 2. Switch and LED Connections**

| SW or LED                | GPIO Pin |
|--------------------------|----------|
| Push-Button Switch (SW2) | PB3.4    |
| Push-Button Switch (SW3) | PB3.4    |
| Red LED (DS1)            | PB2.4    |
| Yellow LED (DS2)         | PB2.5    |
| Green LED (DS3)          | PB2.6    |
| Blue LED (DS4)           | PB2.7    |
| Red LED (DS5)            | PB4.0    |
| Green LED (DS5)          | PB4.1    |
| Blue LED (DS5)           | PB4.2    |
| Bright White LED (DS6)   | PB4.3    |

## 4.3. Joystick Switch

The I/O card has five-position joystick switch (SW1). The joystick is normally open and pulls a port pin voltage to ground when the joystick placed in one of the five positions. Table 3 show the port pin connections to the joystick.

**Table 3. Joystick Switch Connections**

| Joystick Position | GPIO Pin |
|-------------------|----------|
| Center            | PB3.3    |
| Up                | PB2.13   |
| Down              | PB3.0    |
| Left              | PB2.14   |
| Right             | PB3.1    |

## 4.4. Piezo Buzzer

The I/O card has a piezo buzzer (LS1) connected to PB4.4 that resonates audibly when the voltage input is toggled periodically.

## 4.5. External Regulator Circuit

The I/O card has a BJT transistor connected to four port pins to implement a regulator circuit with the SiM3U1xx EXTREG module. The positive supply to the circuit can be 5 V from the UDP motherboard or PB3.8. PB3.9 connects to the negative supply and the collector of the BJT. The positive and negative supply are used to create a voltage drop across R42 to regulate the collector current.

PB3.10 is connected to the output of the regulator circuit and the emitter of the BJT. PB3.11 is connected the base of the BJT and enables and disables the regulator circuit.

## 4.6. EBID MCU

The I/O card has a unique ID that can be read out from the Silicon Labs C8051F990 MCU (U2). 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.

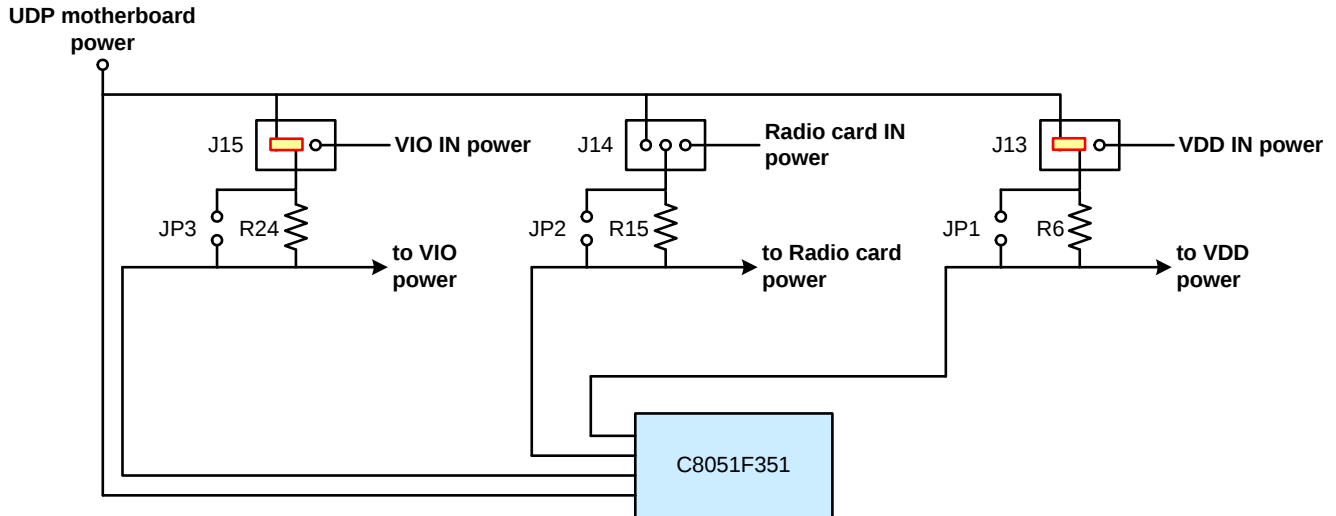


Figure 5. Power Measurement Diagram

### 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-M3U1xx 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:

|    |                       |
|----|-----------------------|
| J1 | MCU card connector H1 |
| J2 | MCU card connector H2 |
| J3 | MCU card connector H3 |
| J4 | MCU card connector H4 |

The UPIO-M3U1xx card implements the signals described in Table 5, Table 6, and Table 7, Table 8 in the Appendix.

## 5.3. Shorting Blocks: Factory Defaults

The UPIO-M3U1xx I/O Card has a factory pre-installed shorting block on J5. Figure 6 shows the position of the factory default shorting block.

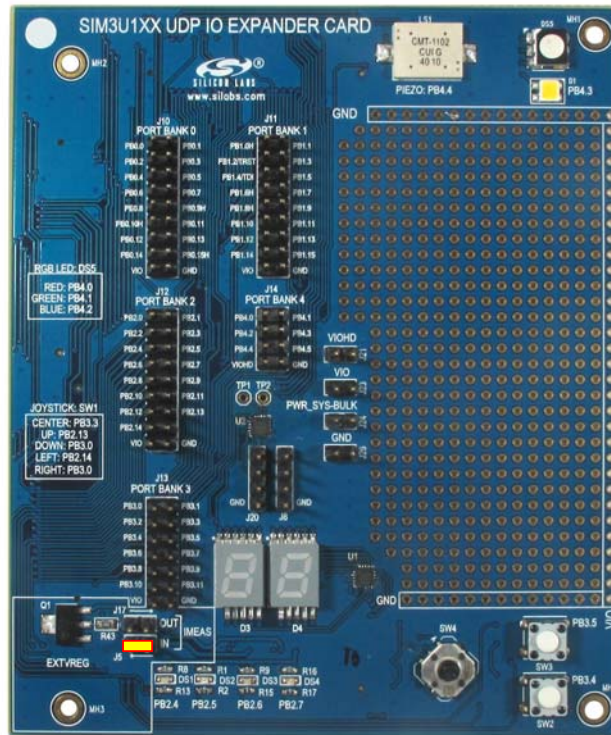


Figure 6. Shorting Blocks: Factory Defaults

## 6. Schematics

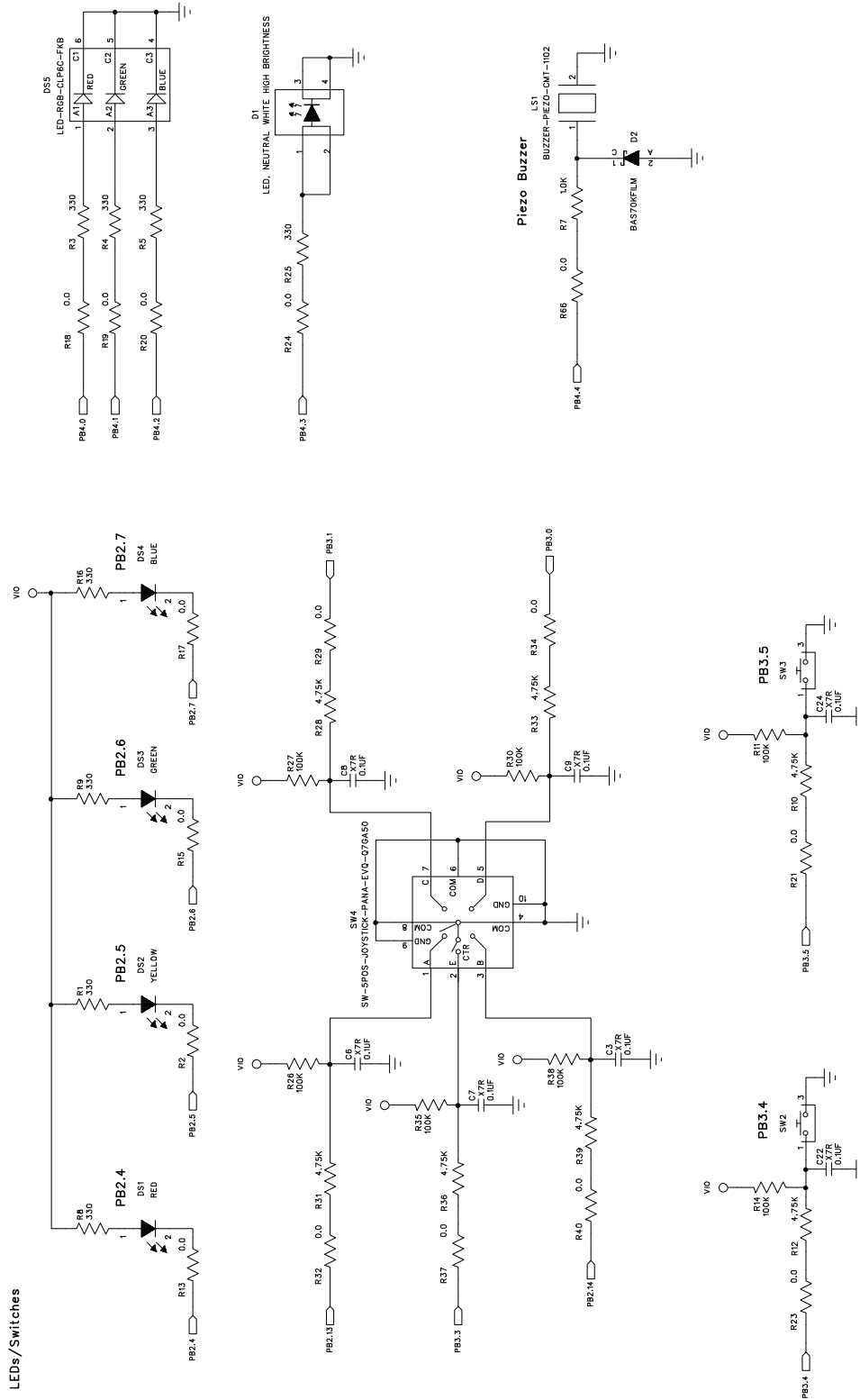


Figure 7. UPIO-M3U1xx I/O Card Schematic (1 of 4)

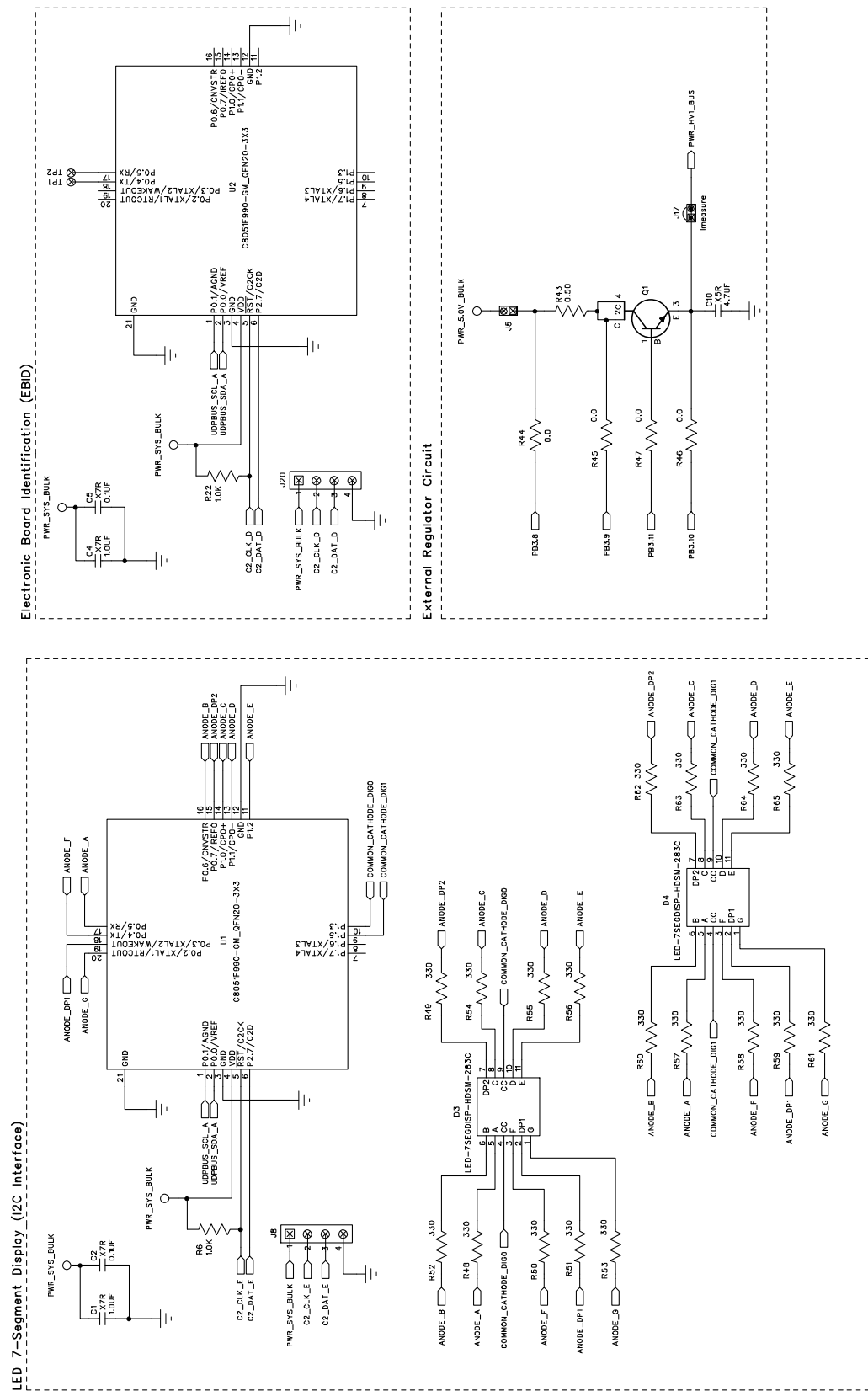
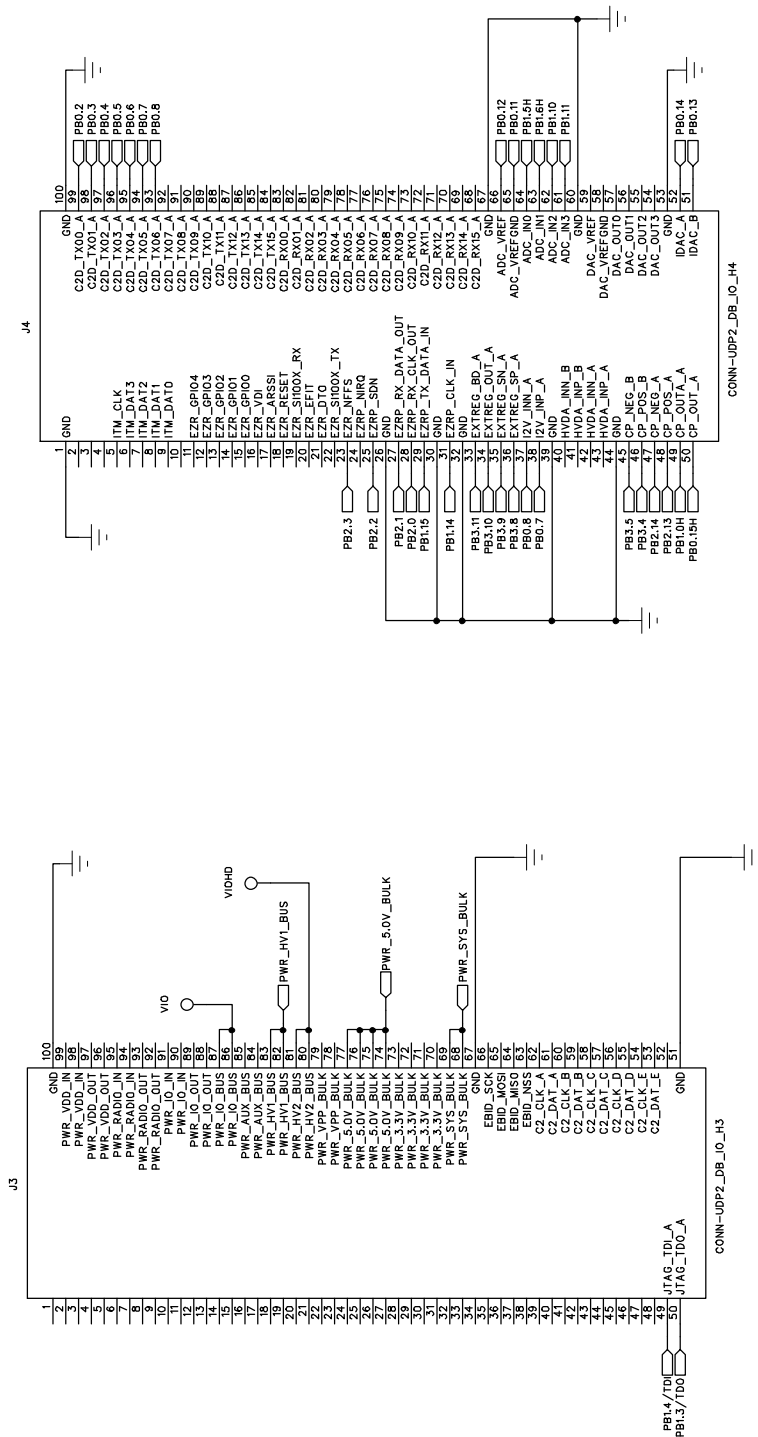


Figure 8. UPIO-M3U1xx I/O Card Schematic (2 of 4)



UDP Header 3 (Top View)



**Figure 10. UPIO-M3U1xx I/O Card Schematic (4 of 4)**

## 7. Bill of Materials

Table 4. UPIO-M3U1xx Card Bill of Materials

| Reference                                                               | Part Number              | Source                      | Description                                               |
|-------------------------------------------------------------------------|--------------------------|-----------------------------|-----------------------------------------------------------|
| LS1                                                                     | CMT-1102                 | CUI Inc                     | BUZZER, PIEZO, 25V(max), 4.1KHZ, SMD, RoHS                |
| U1-2                                                                    | C8051F990-GM             | Silicon Labs                | MIXED SIGNAL, MCU, QFN20-3X3, RoHS.                       |
| C2-3 C5-9<br>C22 C24                                                    | C0603C104J3RACTU         | Kemet                       | CAP, 0.1UF, X7R, CERAMIC, 0603, 25V, ±5%, OR EQ, RoHS     |
| C1 C4                                                                   | C1608X7R1C105K           | TDK Corporation             | CAP CERAMIC, 1.0UF, X7R, 0603, 16V, ±10%, OR EQ, RoHS     |
| C10                                                                     | ECJ-1VB0J475M            | Panasonic ECG               | CAP, 4.7UF, X5R, CERAMIC, 0603, 6.3V, ±20%, OR EQ, RoHS   |
| J1 J2 J3 J4                                                             | FX8-100P-SV1(91)         | Hirose Electric Co Ltd      | CONN, HDR, 100POS, 0.6MM, GOLD, SMD, RoHS                 |
| D2                                                                      | BAS70KFILM               | STMicroelectronics          | DIODE SCHOTTKY, SS SGL SOD-523, RoHS                      |
| J5 J17 J21<br>J23 J24 J26                                               | PBC02SAAN                | Sullins Connector Solutions | STAKE HEADER, 1X2, 0.1"CTR, GOLD, OR EQ, RoHS             |
| J8 J20                                                                  | PBC04SAAN                | Sullins Connector Solutions | STAKE HEADER, 1X4, 0.1" CTRS, OR EQ, RoHS                 |
| J14                                                                     | PBC04DAAN                | Sullins Connector Solutions | STAKE HEADER, 2X4, 0.1"CTR, OR EQ, RoHS                   |
| J13                                                                     | PBC07DAAN                | Sullins Connector Solutions | STAKE HEADER, 2X7, 0.1" CTR, GOLD, OR EQ, RoHS            |
| J10 J11 J12                                                             | PBC09DAAN                | Sullins Connector Solutions | STAKE HEADER, 2X9, 0.1" CTR, GOLD, OR EQ, RoHS            |
| D3-4                                                                    | HDSM-283C                | Avago Technologies          | LED, 7SEG DISP COMMON CATHODE, 0.28" SMD, RED OR EQ, RoHS |
| DS4                                                                     | LTST-C190TBKT            | Lite-On Inc                 | LED 468NM, BLUE, SMT0603, OR EQ, RoHS                     |
| DS3                                                                     | SML-LX0603GW-TR          | Lumex Opto/Components Inc   | LED, 565NM, GREEN DIFF, SMT0603, OR EQ, RoHS              |
| D1                                                                      | MLEAWT-A1-R250-0003E5    | Cree Inc                    | LED, NEUTRAL WHITE HIGH BRIGHTNESS                        |
| DS1                                                                     | SML-LX0603IW-TR          | Lumex Opto/Components Inc   | LED, RED DIFF, 635NM, SMT0603, OR EQ, RoHS                |
| DS2                                                                     | LTST-C190YK              | Lite-On Inc                 | LED, YELLOW CLEAR, SMT0603, OR EQ, RoHS                   |
| DS5                                                                     | CLP6C-FKB-CM1Q1H1BB7R3R3 | Cree Inc                    | DIODE, RGB LED, 6-PLCC                                    |
| R2 R13 R15<br>R17-21 R23-<br>24 R29 R32<br>R34 R37<br>R40 R44-47<br>R66 | RC0603JR-070RL           | Yageo                       | RES, 0.0, SMT, 0603, 1/10W, ±5%, OR EQ, RoHS              |
| R43                                                                     | WSL2010R5000FEA18        | Vishay/Dale                 | RES, 0.05 OHM, 2010, 1W, ±1%, OR EQ, RoHS                 |

# UPIO-M3U1xx

**Table 4. UPIO-M3U1xx Card Bill of Materials (Continued)**

| Reference                            | Part Number     | Source             | Description                                               |
|--------------------------------------|-----------------|--------------------|-----------------------------------------------------------|
| R11 R14<br>R26-27 R30<br>R35 R38     | ERJ-3EKF1003V   | Panasonic ECG      | RES, 100K, SMT, 0603, 1/10W, $\pm 1\%$ , OR EQ, RoHS      |
| R6-7 R22                             | RC0603JR-071KL  | Yageo              | RES, 1.0K OHM, SMT, 0603, 0W, $\pm 5\%$ , RoHS            |
| R1 R3-5 R8-9<br>R16 R25<br>R48-65    | RT0603DRD07330R | Yageo              | RES, 330, SMT, 0603, 1/10W, $\pm 0.5\%$ , OR EQ, RoHS     |
| R10 R12<br>R28 R31<br>R33 R36<br>R39 | ERJ-3EKF4751V   | Panasonic ECG      | RES, 4.75K OHM, SMT, 0603, 1/10W, $\pm 1\%$ , OR EQ, RoHS |
| SW4                                  | EVQ-Q7GA50      | Panasonic ECG      | 5POS SPST JOYSTICK                                        |
| SW2-3                                | EVQ-PAD04M      | Panasonic ECG      | SWITCH, LIGHT TOUCH, 130GF, 6MM SQ, RoHS                  |
| Q1                                   | STN724          | STMicroelectronics | TRANS, NPN, SW 3A, 30V, SOT223, STF724, RoHS              |

## APPENDIX—PIN DESCRIPTIONS

**Table 5. UPIO-M3U1xx Card H1 Pin Descriptions (J1)**

| I/O Card Pin | Signal Name   | Description                                         |
|--------------|---------------|-----------------------------------------------------|
| 1            | LPTIMER_OUT_A | PB4.5 header                                        |
| 2            | LPTIMER_IN_A  | PB3.3 header                                        |
| 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      | PB2.4 header/Red DS1 LED                            |
| 15           | WAKEUP1       |                                                     |
| 16           | WAKEUP0       | PB1.15 header                                       |
| 17           | PORT_MATCH1   | PB3.11/External Voltage Regulator base drive output |
| 18           | PORT_MATCH0   | PB3.10/External Voltage Regulator OUT output        |
| 19           | GPIO15        | PB0.10H header                                      |
| 20           | GPIO14        | PB0.9H header                                       |
| 21           | GPIO13        | PB0.13 header                                       |
| 22           | GPIO12        | PB0.12 header                                       |
| 23           | GPIO11        | PB0.11 header                                       |
| 24           | GPIO10        | PB1.9H header                                       |
| 25           | GPIO09        | PB1.8H header                                       |
| 26           | GPIO08        | PB1.7H header                                       |
| 27           | GPIO07        | PB2.12 header                                       |
| 28           | GPIO06        | PB2.11 header                                       |
| 29           | GPIO05        | PB2.10 header                                       |
| 30           | GPIO04        | PB2.9 header                                        |
| 31           | GPIO03        | PB2.8 header                                        |
| 32           | GPIO02        | PB2.7 header/Blue DS4 LED                           |
| 33           | GPIO01        | PB2.6 header/Green DS3 LED                          |
| 34           | GPIO00        | PB2.5 header/Yellow DS2 LED                         |

**Table 5. UPIO-M3U1xx Card H1 Pin Descriptions (J1) (Continued)**

| <b>I/O Card Pin</b> | <b>Signal Name</b> | <b>Description</b> |
|---------------------|--------------------|--------------------|
| 35                  | CLKOUT0            |                    |
| 36                  | I2SIN_DOUT_A       | PB3.5 header       |
| 37                  | I2SIN_CLK_A        | PB3.4 header       |
| 38                  | I2SIN_DFS_A        | PB3.3 header       |
| 39                  | I2C_SCL_B          |                    |
| 40                  | I2C_SDA_B          |                    |
| 41                  | SPI_NSS3_EZR       | PB3.2 header       |
| 42                  | SPI_NSS2_EZR       | PB3.1 header       |
| 43                  | SPI_NSS1_EZR       | PB3.0 header       |
| 44                  | SPI_NSS0_EZR       | PB0.8 header       |
| 45                  | SPI_MOSI_EZR       | PB0.7 header       |
| 46                  | SPI_MISO_EZR       | PB0.6 header       |
| 47                  | SPI_SCK_EZR        | PB0.5 header       |
| 48                  | UART_CTS_SYS       | PB1.15 header      |
| 49                  | UART_RTS_SYS       | PB1.14 header      |
| 50                  | UART_RX_SYS        | PB1.13 header      |
| 51                  | GND                |                    |
| 52                  | UART_TX_SYS        | PB1.12 header      |
| 53                  | UART_CTS_A         | PB4.5 header       |
| 54                  | UART_RTS_A         | PB4.4 header       |
| 55                  | UART_RX_A          | PB4.3 header       |
| 56                  | UART_TX_A          | PB4.2 header       |
| 57                  | TIMER_EX_B         |                    |
| 58                  | TIMER_CT_B         |                    |
| 59                  | TIMER_EX_A         | PB1.11 header      |
| 60                  | TIMER_CT_A         |                    |
| 61                  | I2C_SCL_EZR        | PB1.2/TRST header  |
| 62                  | I2C_SDA_EZR        | PB1.1 header       |
| 63                  | I2SOUT_DOUT_A      |                    |
| 64                  | I2SOUT_CLK_A       |                    |
| 65                  | I2SOUT_DFS_A       | PB0.14 header      |
| 66                  | PCA_CH1_B          |                    |
| 67                  | PCA_CH0_B          |                    |
| 68                  | PCA_ECI_B          |                    |
| 69                  | PCA_CH1_A          | PB0.14 header      |
| 70                  | PCA_CH0_A          | PB0.13 header      |
| 71                  | PCA_ECI_A          |                    |

**Table 5. UPIO-M3U1xx Card H1 Pin Descriptions (J1) (Continued)**

| <b>I/O Card Pin</b> | <b>Signal Name</b> | <b>Description</b>   |
|---------------------|--------------------|----------------------|
| 72                  | LIN_RX_A           |                      |
| 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         | PB2.2 header         |
| 85                  | USART_TX_B         | PB2.1 header         |
| 86                  | SPI_NSS3_A         | PB2.8 header         |
| 87                  | SPI_NSS2_A         | PB2.9 header         |
| 88                  | SPI_NSS1_A         | PB2.10 header        |
| 89                  | SPI_NSS0_A         | PB2.11 header        |
| 90                  | SPI_MOSI_A         | PB2.14/Joystick left |
| 91                  | SPI_MISO_A         | PB2.13/Joystick up   |
| 92                  | SPI_SCK_A          | PB2.12 header        |
| 93                  | CAN_RX_B           |                      |
| 94                  | CAN_TX_B           |                      |
| 95                  | USART_UCLK_A       | PB0.4 header         |
| 96                  | USART_CTS_A        | PB0.3 header         |
| P                   | USART_RTS_A        | PB0.2 header         |
| 98                  | USART_RX_A         | PB0.1 header         |
| 99                  | USART_TX_A         | PB0.0 header         |
| 100                 | GND                |                      |

Table 6. UPIO-M3U1xx Card H2 Pin Descriptions (J2)

| 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     |             |

**Table 6. UPIO-M3U1xx Card H2 Pin Descriptions (J2) (Continued)**

| <b>I/O Card Pin</b> | <b>Signal Name</b> | <b>Description</b>                                |
|---------------------|--------------------|---------------------------------------------------|
| 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          | PB3.9 header/External regulator circuit collector |
| 53                  | EMIF_CS1B          | PB3.8 header/External regulator circuit supply    |
| 54                  | EMIF_BE1B          | PB3.7 header                                      |
| 55                  | EMIF_CS0B          | PB3.6 header                                      |
| 56                  | EMIF_ALE           | PB3.5 header                                      |
| 57                  | EMIF_OEB           | PB3.4 header                                      |
| 58                  | EMIF_WRB           | PB3.3 header                                      |
| 59                  | EMIF_A0            | PB3.2 header                                      |
| 60                  | EMIF_A1            | PB3.1 header/Joystick right                       |
| 61                  | EMIF_A2            | PB3.0 header/Joystick down                        |
| 62                  | EMIF_A3            | PB2.14 header                                     |
| 63                  | EMIF_A4            | PB2.13 header                                     |
| 64                  | EMIF_A5            | PB2.12 header                                     |
| 65                  | EMIF_A6            | PB2.11 header                                     |
| 66                  | EMIF_A7            | PB2.10 header                                     |
| 67                  | EMIF_A8            | PB2.9 header                                      |
| 68                  | EMIF_A9            | PB2.8 header                                      |
| 69                  | EMIF_A10           | PB2.7 header                                      |
| 70                  | EMIF_A11           | PB2.6 header                                      |
| 71                  | EMIF_A12           | PB2.5 header                                      |
| 72                  | EMIF_A13           | PB2.4 header                                      |
| 73                  | EMIF_A14           | PB2.3 header                                      |
| 74                  | EMIF_A15           | PB2.2 header                                      |

**Table 6. UPIO-M3U1xx Card H2 Pin Descriptions (J2) (Continued)**

| <b>I/O Card Pin</b> | <b>Signal Name</b> | <b>Description</b>               |
|---------------------|--------------------|----------------------------------|
| 75                  | EMIF_A16           | PB2.1 header                     |
| 76                  | EMIF_A17           | PB2.0 header                     |
| 77                  | EMIF_A18           | PB1.15 header                    |
| 78                  | EMIF_A19           | PB1.14 header                    |
| 79                  | EMIF_A20           | PB1.13 header                    |
| 80                  | EMIF_A21           | PB1.12 header                    |
| 81                  | EMIF_A22           |                                  |
| 82                  | EMIF_A23           |                                  |
| 83                  | HVGPI07            |                                  |
| 84                  | HVGPI06            |                                  |
| 85                  | HVGPI05            | PB4.5 header                     |
| 86                  | HVGPI04            | PB4.4 header/Piezo Buzzer        |
| 87                  | HVGPI03            | PB4.3 header/Bright white D1 LED |
| 88                  | HVGPI02            | PB4.2 header/Blue DS5 LED        |
| 89                  | HVGPI01            | PB4.1 header/Green DS5 LED       |
| 90                  | HVGPI00            | PB4.0 header/Red DS5 LED         |
| 91                  | EPCA_CH5_MOTOR     | PB4.5 header                     |
| 92                  | EPCA_CH4_MOTOR     | PB4.4 header                     |
| 93                  | EPCA_CH3_MOTOR     | PB4.3 header                     |
| 94                  | EPCA_CH2_MOTOR     | PB4.2 header                     |
| 95                  | EPCA_CH1_MOTOR     | PB4.1 header                     |
| 96                  | EPCA_CH0_MOTOR     | PB4.0 header                     |
| 97                  | EPCA_ECI_MOTOR     |                                  |
| 98                  | UDPBUS_SCL_A       | UDP motherboard I2C A clock      |
| 99                  | UDPBUS_SDA_A       | UDP motherboard I2C A data       |
| 100                 | GND                |                                  |

**Table 7. UPIO-M3U1xx Card H3 Pin Descriptions (J3)**

| <b>I/O Card Pin</b> | <b>Signal Name</b> | <b>Description</b> |
|---------------------|--------------------|--------------------|
| 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 7. UPIO-M3U1xx Card H3 Pin Descriptions (J3) (Continued)

| 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           | UART_SYS_EN  |                                     |
| 48           | VCP_EN       |                                     |
| 49           | JTAG_TDI_A   | PB1.4/TDI header                    |
| 50           | JTAG_TDO_A   | PB1.3/TDO header                    |
| 51           | GND          |                                     |
| 52           | nc           |                                     |
| 53           | C2_DAT_E     |                                     |
| 54           | C2_CLK_E     |                                     |
| 55           | C2_DAT_D     |                                     |
| 56           | C2_CLK_D     |                                     |
| 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 EBID devices |
| 69           | PWR_SYS_BULK |                                     |
| 70           | VCC_3.3V     |                                     |
| 71           | VCC_3.3V     |                                     |
| 72           | VCC_3.3V     |                                     |
| 73           | VCC_3.3V     |                                     |

**Table 7. UPIO-M3U1xx Card H3 Pin Descriptions (J3) (Continued)**

| <b>I/O Card Pin</b> | <b>Signal Name</b> | <b>Description</b>                                          |
|---------------------|--------------------|-------------------------------------------------------------|
| 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        | High Drive I/O power 2                                      |
| 81                  | PWR_HV2_BUS        |                                                             |
| 82                  | PWR_HV1_BUS        | High Drive I/O power 1                                      |
| 83                  | PWR_HV1_BUS        |                                                             |
| 84                  | PWR_AUX_BUS        |                                                             |
| 85                  | PWR_AUX_BUS        |                                                             |
| 86                  | PWR_IO_BUS         | Connects power from the MCU card to the radio and I/O cards |
| 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 8. UPIO-M3U1xx Card H4 Pin Descriptions (J4)**

| <b>I/O Card Pin</b> | <b>Signal Name</b> | <b>Description</b>                                         |
|---------------------|--------------------|------------------------------------------------------------|
| 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           | PB2.3 header                                               |
| 24                  | EZRP_NIRQ          |                                                            |
| 25                  | EZRP_SDN           | PB2.2 header                                               |
| 26                  | GND                |                                                            |
| 27                  | EZRP_RX_DATA_OUT   | PB2.1 header                                               |
| 28                  | EZRO_RX_CLK_OUT    | PB2.0 header                                               |
| 29                  | EZRP_TX_DATA_IN    | PB1.15 header                                              |
| 30                  | GND                |                                                            |
| 31                  | EZRP_CLK_IN        | PB1.14 header                                              |
| 32                  | GND                |                                                            |
| 33                  | EXTREG_BD_A        | PB3.11 header/External Voltage Regulator base drive output |
| 34                  | EXTREG_OUT_A       | PB3.10 header/External Voltage Regulator OUT output        |
| 35                  | EXTREG_SN_A        | PB3.9 header/External Voltage Regulator SN input           |

**Table 8. UPIO-M3U1xx Card H4 Pin Descriptions (J4) (Continued)**

| <b>I/O Card Pin</b> | <b>Signal Name</b> | <b>Description</b>                               |
|---------------------|--------------------|--------------------------------------------------|
| 36                  | EXTREG_SP_A        | PB3.8 header/External Voltage Regulator SP input |
| 37                  | I2V_INN_A          | PB0.8 header                                     |
| 38                  | I2V_INP_A          | PB0.7 header                                     |
| 39                  | GND                |                                                  |
| 40                  | HVDA_INN_B         |                                                  |
| 41                  | HVDA_INP_B         |                                                  |
| 42                  | HVDA_INN_A         |                                                  |
| 43                  | HVDA_INP_A         |                                                  |
| 44                  | GND                |                                                  |
| 45                  | CP_NEG_B           | PB3.5 header/Switch SW3                          |
| 46                  | CP_POS_B           | PB3.4 header/Switch SW2                          |
| 47                  | CP_NEG_A           | PB2.14 header                                    |
| 48                  | CP_POS_A           | PB2.13 header                                    |
| 49                  | CP_OUTA_A          | PB1.0H header                                    |
| 50                  | CP_OUT_A           | PB0.15H header                                   |
| 51                  | IDAC_B             | PB0.13 header                                    |
| 52                  | IDAC_A             | PB0.14 header                                    |
| 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            | PB1.11 header                                    |
| 62                  | ADC_IN2            | PB1.10 header                                    |
| 63                  | ADC_IN1            | PB1.6H header                                    |
| 64                  | ADC_IN0            | PB1.5H header                                    |
| 65                  | ADC_VREFGND        | PB0.11 header                                    |
| 66                  | ADC_VREF           | PB1.12 header                                    |
| 67                  | GND                |                                                  |
| 68                  | C2D_RX15_A         |                                                  |
| 69                  | C2D_RX14_A         |                                                  |
| 70                  | C2D_RX13_A         |                                                  |
| 71                  | C2D_RX12_A         |                                                  |
| 72                  | C2D_RX11_A         |                                                  |

Table 8. UPIO-M3U1xx Card H4 Pin Descriptions (J4) (Continued)

| I/O Card Pin | Signal Name | Description  |
|--------------|-------------|--------------|
| 73           | C2D_RX10_A  |              |
| 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  | PB0.8 header |
| 94           | C2D_TX05_A  | PB0.7 header |
| 95           | C2D_TX04_A  | PB0.6 header |
| 96           | C2D_TX03_A  | PB0.5 header |
| 97           | C2D_TX02_A  | PB0.4 header |
| 98           | C2D_TX01_A  | PB0.3 header |
| 99           | C2D_TX00_A  | PB0.2 header |
| 100          | GND         |              |

**NOTES:**

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