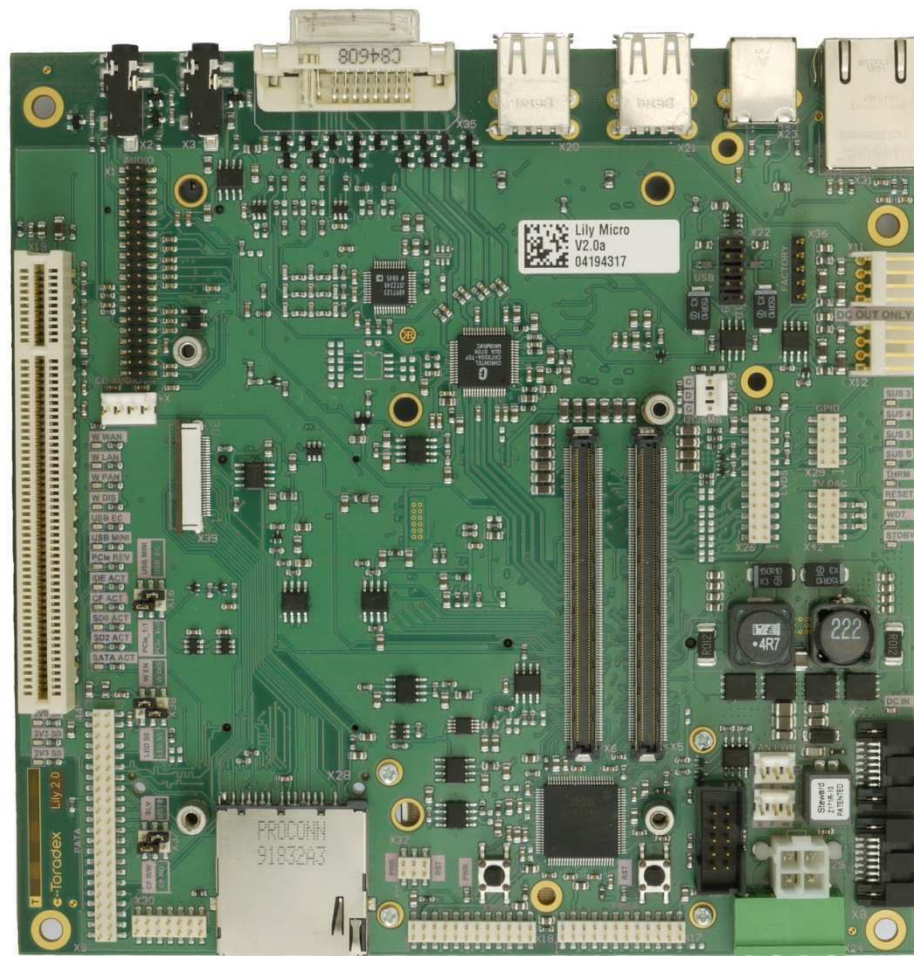


Lily V2.1 COM Express Baseboard

Datasheet



Revision History

| Date | Doc. Rev. | Lily Version | Changes |
|-----------|-----------|--------------|----------------------|
| 11-Nov-09 | Rev. 0.1 | V2.10 | Initial Release |
| 15-Jul-10 | Rev. 0.2 | V2.10 | Changes towards V2.0 |
| 01-Feb-11 | Rev 1.0 | V2.1 | New disclaimer |



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1. Introduction

Lily is a COM Express compliant carrier board that allows the convenient evaluation of Woodpecker and Robin COM Express computer modules. Since the Robin Module features only one COM Express Connector, a different assembly version of the Lily is needed for using the Robin module.

1.1. Reference Documents

For detailed technical information about suitable computer modules and the COM Express™ standard, please refer to the documents listed below.

1.1.1 COM Express™ Design Guide

Guidelines for designing a COM Express™ carrier board

http://www.picmg.org/pdf/PICMG_COMDG_100.pdf

1.1.2 Woodpecker Computer Module

http://www.toradex.com/En/Products/Woodpecker_modules

1.1.3 Robin Computer Module

http://www.toradex.com/En/Products/Robin_Z530_Z510



2. Features

2.1. Overview

Lily Micro implements all the peripherals required to evaluate COM Express Type 2 compliant modules such as the Toradex Woodpecker modules.

- Power management
- Connectivity such as USB, Ethernet, PATA, CF Card & SATA
- Video ports (VGA/DVI) on a DVI-I Connector
- A SDVO to DVI converter
- HD-Audio functionality with pin headers carrying all (unfiltered) analog signals
- GPIO header
- Mini PCIe including SIM holder for wireless modems

In addition to the usual features of a COM Express carrier board, Lily offers several unique enhancements not found on other evaluation platforms:

- A Xilinx Spartan 3A100 FPGA is tied to the LPC, I2C and SMB bus. The FPGA is fully user configurable and can be used for bus expansions or system management
- A LVDS to RGB converter in combination with a RGB to VGA DAC provides the VGA output of the DVI-I connector
- Two SDIO card slots, one of which (X8) with support for 8 bit wide data transfers
- Express-Card slot with card cage supporting 54mm and 34mm cards
- PCI-Express Lane switch

The Lily Nano is designed for COM Express Type 1 modules in the Nano form factor such as the Toradex Robin module. Due to the missing second module connector some of the Lily Micro features are not available.

2.2. Changes regarding specific Version of Lily

From Lily Micro V2.0 to Lily Micro V2.1 there are several small changes:

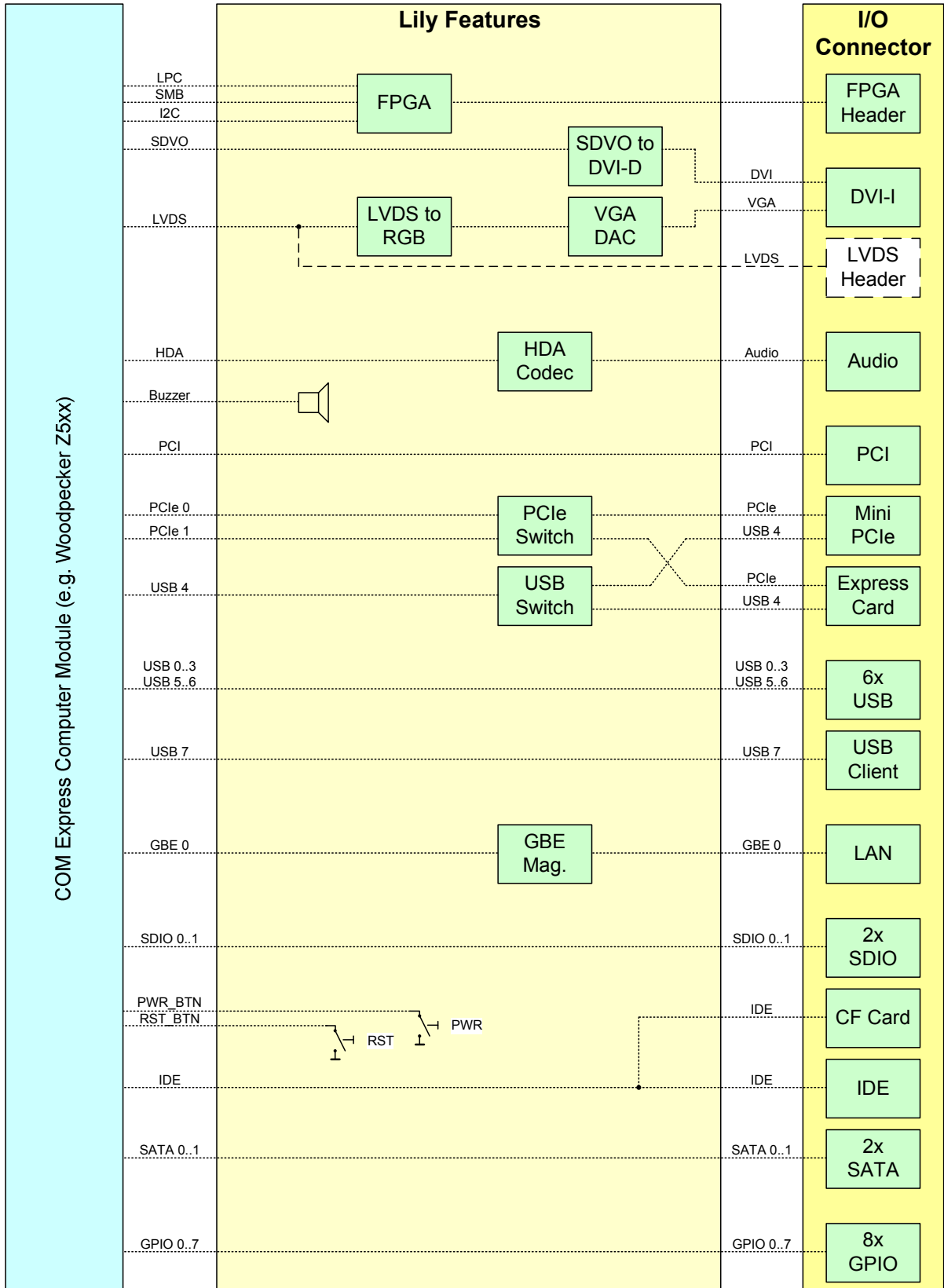
- The LVDS 2mm Header on V2.0 changed to a FFC Jili connector on V2.1.
- The Standoffs changed from M3 on V2.0 to M2.5 on V2.1.
- The Battery holder changed from MPD BA2032SM on V2.0 to BU2032SM-HD-G on V2.1.
- The SD cardholder on the bottom side of the Baseboard changed from the RD-RSMT-2-MQ-WF on the V2.0 to the SDSN13-A0-0005 on V2.1.
- The I2C Pins (X43) on Lily V2.0 changed to a 2mm Pin header with
 - PWR OK
 - WAKE1
 - SMB ALERT
 - BATTLOW
 - I2C (Data & Clock)
 - SMB (Data & Clock)

on Lily V2.1.



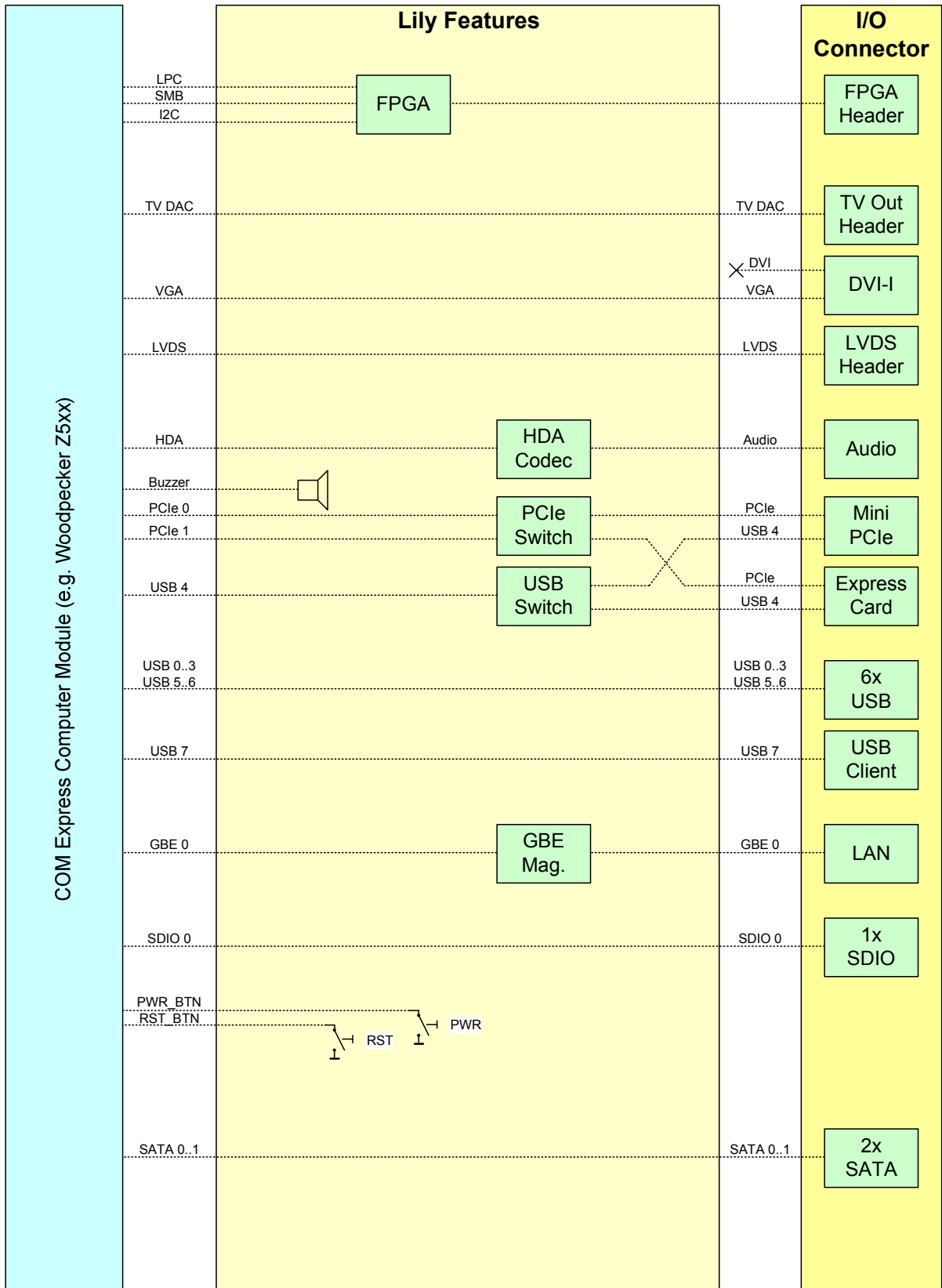
2.3. Block Diagram

2.3.1 Lily Micro





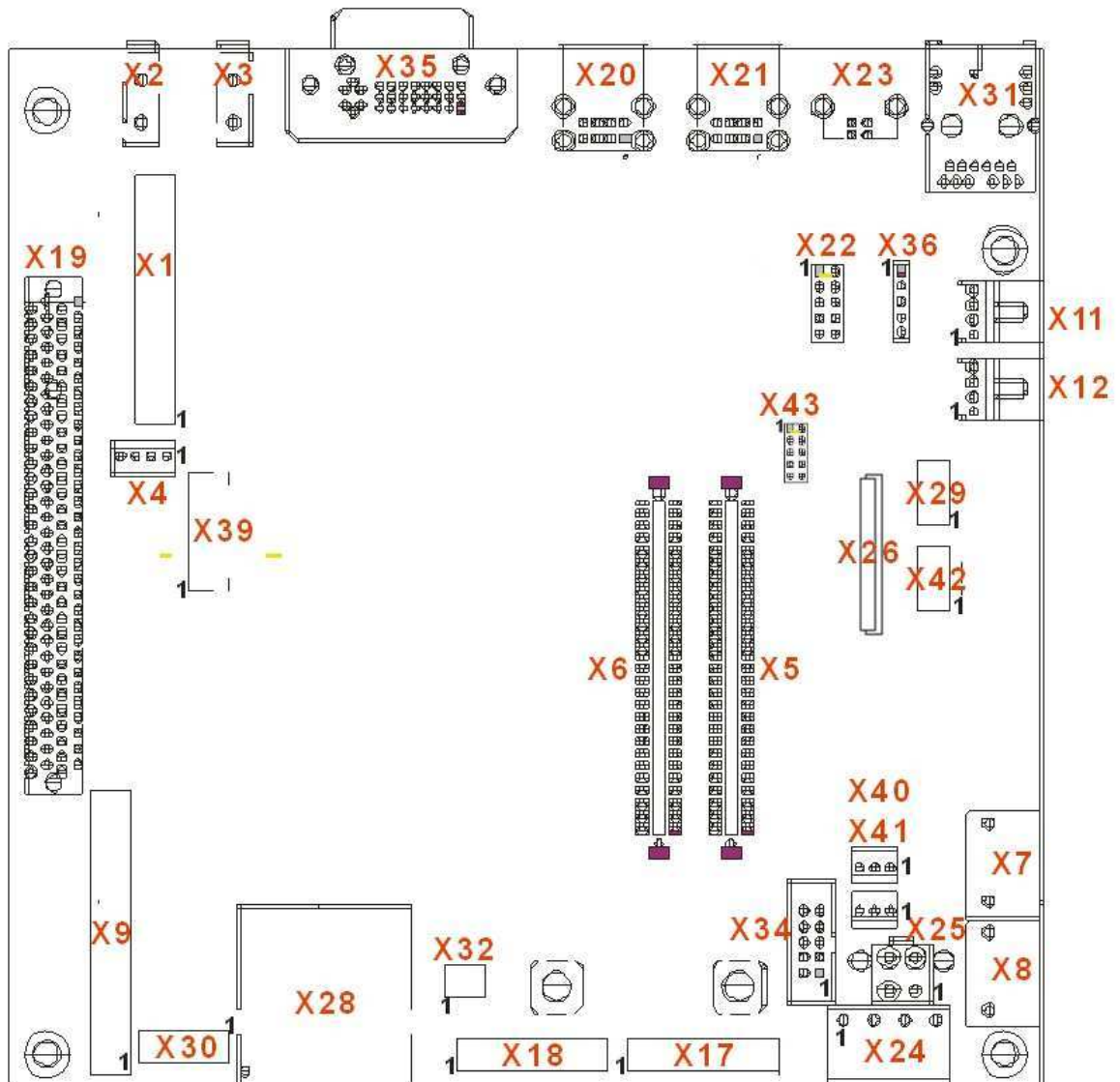
2.3.2 Lily Nano





3. Interfaces

3.1. Upper Side Connectors: Physical Drawing



| | Description | Lily Micro | Lily Nano | Remarks |
|----|------------------------------|------------|-----------|-------------------------------|
| X1 | Audio Header | X | X | |
| X2 | Mic 2 Jack | X | X | |
| X3 | Line 2 Jack | X | X | |
| X4 | CD Audio Input | X | X | |
| X5 | COM Express Connector Row AB | X | X | |
| X6 | COM Express Connector Row CD | X | | |
| X7 | SATA 0 | X | X | |
| X8 | SATA 1 | X | X | SATA 1 not supported by Robin |
| X9 | IDE (PATA) | X | | |



| | Description | Lily Micro | Lily Nano | Remarks |
|-----|--|------------|-----------|------------------------------|
| X11 | Hard Disk Power Out | X | X | 12V is UNREGULATED! |
| X12 | Hard Disk Power Out | X | X | 12V is UNREGULATED! |
| X17 | FPGA Expansion Header Bank 3 | X | X | |
| X18 | FPGA Expansion Header Bank 0 | X | X | |
| X19 | PCI | X | | 12V is UNREGULATED! |
| X20 | USB Ports 0 and 1 | X | X | |
| X21 | USB Ports 2 and 3 | X | X | |
| X22 | USB Ports 5 and 6 | X | X | |
| X23 | USB Client (USB Port 7) | X | X | |
| X24 | DC IN 8 – 14V | X | X | 12V if PCI or HD power used! |
| X25 | ATX DC IN 8 – 14V | X | X | 12V if PCI or HD power used! |
| X26 | LVDS | X | X | JILI 40 Single Channel |
| X28 | 8bit MMC / SDIO 2 | X | X | |
| X29 | GPIO | X | | |
| X30 | FPGA JTAG Header | X | X | |
| X31 | Ethernet Jack | X | X | |
| X32 | External Reset and Power Button Header | X | X | |
| X34 | Micro Controller Debug Header | X | X | |
| X35 | DVI-I | X | X | Nano: only DVI-A |
| X36 | PSoC Programming Adaptor Header | X | | |
| X39 | Additional FFC Connector for SDIO | X | X | |
| X40 | Switched Fan 12V Power | X | X | 12V is UNREGULATED! |
| X41 | Switched Fan 12V Power | X | X | 12V is UNREGULATED! |
| X42 | TV DAC | X | X | Not supported by Woodpecker |
| X43 | I ² C Header | X | X | |



3.2. Upper Side Connectors: Pin Assignments

3.2.1 Audio Header (X1)

| Pin | Description | Voltage | Active | Remarks |
|-----|--------------|---------|--------|-----------------------|
| 1 | GND | | | |
| 2 | SUR L | | | |
| 3 | VREF A | | | |
| 4 | SUR R | | | |
| 5 | GND | | | |
| 6 | MIC 1 L | | | |
| 7 | MIC 1 BIAS L | | | |
| 8 | MIC 1 R | | | |
| 9 | MIC 1 BIAS R | | | |
| 10 | GND | | | |
| 11 | FRONT L | | | |
| 12 | FRONT R | | | |
| 13 | GND | | | |
| 14 | MIC 2 L | | | Only if no Plug in X2 |
| 15 | MIC 2 VREF | | | |
| 16 | MIC 2 R | | | Only if no Plug in X2 |
| 17 | GND | | | |
| 18 | CENTER | | | |
| 19 | LOW FREQ | | | |
| 20 | GND | | | |
| 21 | SIDE L | | | |
| 22 | SIDE R | | | |
| 23 | GND | | | |
| 24 | LINE 1 L | | | |
| 25 | VREF C | | | |
| 26 | LINE 1 R | | | |
| 27 | GND | | | |
| 28 | LINE 2 L | | | Only if no Plug in X3 |
| 29 | VREF E | | | |
| 30 | LINE2 R | | | Only if no Plug in X2 |
| 31 | GND | | | |
| 32 | GND | | | |
| 33 | S/PDIF IN | 3.3V | | |
| 34 | S/PDIF OUT | 3.3V | | |
| 35 | GND | | | |
| 36 | SENSE B | | | |



| Pin | Description | Voltage | Active | Remarks |
|-----|-------------|---------|--------|------------|
| 37 | SENSE A | | | |
| 38 | GND | | | |
| 39 | GND | | | |
| 40 | +5V OUT | 5V | S0 | For S/PDIF |

3.2.2 CD Audio (X4)

| Pin | Description | Voltage | Active | Remarks |
|-----|--------------|---------|--------|---------|
| 1 | CD AUDIO L | | | ANALOG |
| 2 | DC AUDIO GND | | | |
| 3 | DC AUDIO GND | | | |
| 4 | CD AUDIO R | | | ANALOG |

3.2.3 PATA Header (X9)

| Pin | Description | Voltage | Active | Remarks |
|-----|-------------|---------|--------|---------|
| 1 | IDE RESET# | 3.3V | | |
| 2 | GND | | | |
| 3 | IDE D7 | 3.3V | | |
| 4 | IDE D8 | 3.3V | | |
| 5 | IDE D6 | 3.3V | | |
| 6 | IDE D9 | 3.3V | | |
| 7 | IDE D5 | 3.3V | | |
| 8 | IDE D10 | 3.3V | | |
| 9 | IDE D4 | 3.3V | | |
| 10 | IDE D11 | 3.3V | | |
| 11 | IDE D3 | 3.3V | | |
| 12 | IDE D12 | 3.3V | | |
| 13 | IDE D2 | 3.3V | | |
| 14 | IDE D13 | 3.3V | | |
| 15 | IDE D1 | 3.3V | | |
| 16 | IDE D14 | 3.3V | | |
| 17 | IDE D0 | 3.3V | | |
| 18 | IDE D15 | 3.3V | | |
| 19 | GND | | | |
| 20 | NC | | | |
| 21 | IDE REQ | 3.3V | | |
| 22 | GND | | | |
| 23 | IDE IOW# | 3.3V | | |
| 24 | GND | | | |
| 25 | IDE IOR# | 3.3V | | |
| 26 | GND | | | |
| 27 | IDE IORDY# | 3.3V | | |
| 28 | PD TO GND | | | |



| Pin | Description | Voltage | Active | Remarks |
|-----|-------------|---------|--------|---------|
| 29 | IDE ACK# | 3.3V | | |
| 30 | GND | | | |
| 31 | IDE IRQ | 3.3V | | |
| 32 | NC | | | |
| 33 | IDE A1 | 3.3V | | |
| 34 | IDE CBLID# | 3.3V | | |
| 35 | IDE A0 | 3.3V | | |
| 36 | IDE A2 | 3.3V | | |
| 37 | IDE CS1# | 3.3V | | |
| 38 | IDE CS3# | 3.3V | | |
| 39 | IDE ACTIVE | 3.3V | | |
| 40 | GND | 3.3V | | |
| 41 | +5V DRIVE | +5V | S0 | |
| 42 | +5V DRIVE | +5V | S0 | |
| 43 | GND | | | |
| 44 | NC | | | |

3.2.4 Hard Disk Power Out (X11/X12)

| Pin | Description | Voltage | Active | Remarks |
|-----|------------------------|---------|--------|---------|
| 1 | 12V Output Unregulated | 12V | S0 | |
| 2 | GND | | | |
| 3 | GND | | | |
| 4 | 5V Output | 5V | S0 | |

3.2.5 FPGA Expansion Header Bank 3 (X17)

| Pin | Description | Voltage | Active | Remarks |
|-----|--|---------|--------|-----------------|
| 1 | 3.3V Output | 3.3V | S0 | |
| 2 | 3.3V Output | 3.3V | S0 | |
| 3 | Bank 3 IO Power Input (default assembly: 0R to 3.3V) | | | NC ¹ |
| 4 | Bank 3 IO Power Input (default assembly: 0R to 3.3V) | | | NC |
| 5 | B3_0 | | | |
| 6 | B3_1 | | | |
| 7 | B3_2 | | | |
| 8 | B3_3 | | | |
| 9 | GND | | | |
| 10 | B3_4 | | | |
| 11 | B3_5 | | | |
| 12 | B3_6 | | | |
| 13 | B3_7 | | | |

¹ Since 0R to 3.3V is assembled on baseboard these pins can be left unconnected. If other IO levels required, unsolder 0R and supply IO bank voltage with this pin.



| Pin | Description | Voltage | Active | Remarks |
|-----|-------------|---------|--------|---------|
| 14 | GND | | | |
| 15 | B3_8 | | | |
| 16 | B3_9 | | | |
| 17 | B3_10 | | | |
| 18 | GND | | | |
| 19 | B3_11 | | | |
| 20 | B3_12 | | | |
| 21 | B3_13 | | | |
| 22 | 5V Output | 5V | S0 | |
| 23 | 5V Output | 5V | S0 | |
| 24 | 5V Output | 5V | S0 | |

3.2.6 FPGA Expansion Header Bank 0 (X18)

| Pin | Description | Voltage | Active | Remarks |
|-----|--|---------|--------|-----------------|
| 1 | 3.3V Output | 3.3V | S0 | |
| 2 | 3.3V Output | 3.3V | S0 | |
| 3 | Bank 0 IO Power Input (default assembly: 0R to 3.3V) | | | NC ² |
| 4 | Bank 0 IO Power Input (default assembly: 0R to 3.3V) | | | NC |
| 5 | B0_0 | | | |
| 6 | B0_1 | | | |
| 7 | B0_2 | | | |
| 8 | B0_3 | | | |
| 9 | GND | | | |
| 10 | B0_4 | | | |
| 11 | B0_5 | | | |
| 12 | B0_6 | | | |
| 13 | B0_7 | | | |
| 14 | GND | | | |
| 15 | B0_8 | | | |
| 16 | B0_9 | | | |
| 17 | B0_10 | | | |
| 18 | GND | | | |
| 19 | B0_11 | | | |
| 20 | B0_12 | | | |
| 21 | B0_13 | | | |
| 22 | 5V Output | 5V | S0 | |
| 23 | 5V Output | 5V | S0 | |
| 24 | 5V Output | 5V | S0 | |

² Since 0R to 3.3V is assembled on baseboard these pins can be left unconnected. If other IO levels required, unsolder 0R and supply IO bank voltage with this pin.



3.2.7 DC IN 8-14V (X24)

| Pin | Description | Voltage | Active | Remarks |
|-----|-------------|----------|--------|----------------------|
| 1 | +12V IN | 8-14V DC | | CAUTION ³ |
| 2 | +12V IN | 8-14V DC | | CAUTION |
| 3 | GND | | | |
| 4 | GND | | | |

3.2.8 ATX DC IN 8-14V (X25)

This connector can be used alternatively to X24 to supply the module. The connector is compatible with the 2x2 ATX 12V Connector

| Pin | Description | Voltage | Active | Remarks |
|-----|-------------|----------|--------|----------------------|
| 1 | GND | | | |
| 2 | GND | | | |
| 3 | +12V IN | 8-14V DC | | CAUTION ⁴ |
| 4 | +12V IN | 8-14V DC | | CAUTION |

3.2.9 LVDS connector JILI 40 Single Channel (X26)

The second channel of the JILI 40 connector is not connected to any further components.

| Pin | Description | Voltage | Active | Remarks |
|-----|---------------|---------|--------|---------|
| 1 | NC | | | |
| 2 | LVDS A0 N | | | |
| 3 | LVDS A0 P | | | |
| 4 | LVDS VDD EN | | | |
| 5 | LVDS A1 N | | | |
| 6 | LVDS A1 P | | | |
| 7 | NC | | | |
| 8 | LVDS A2 N | | | |
| 9 | LVDS A2 P | | | |
| 10 | GND | | | |
| 11 | LVDS AC N | | | |
| 12 | LVDS AC P | | | |
| 13 | GND | | | |
| 14 | LVDS A3 N | | | |
| 15 | LVDS A3 P | | | |
| 16 | LVDS DDC Data | | | |
| 17 | NC | | | |

³ CAUTION!! The supply voltage is forwarded **UNREGULATED** to all nominally 12V driven ports => Modules can operate over the entire range of 8 – 14V DC as specified; however user must take care to power peripherals (such as hard disk drives or PCI cards) within their specified voltage range.

⁴ CAUTION!! The supply voltage is forwarded **UNREGULATED** to all nominally 12V driven ports => Modules can operate over the entire range of 8 – 14V DC as specified; however user must take care to power peripherals (such as hard disk drives or PCI cards) within their specified voltage range..



| Pin | Description | Voltage | Active | Remarks |
|-----|----------------|---------|--------|---------|
| 18 | NC | | | |
| 19 | LVDS DDC Clock | | | |
| 20 | NC | | | |
| 21 | NC | | | |
| 22 | GND | | | |
| 23 | NC | | | |
| 24 | NC | | | |
| 25 | GND | | | |
| 26 | NC | | | |
| 27 | NC | | | |
| 28 | GND | | | |
| 29 | NC | | | |
| 30 | NC | | | |
| 31 | + 5V 0 | | | |
| 32 | + 5V 0 | | | |
| 33 | + 5V 0 | | | |
| 34 | + 5V 0 | | | |
| 35 | BKLT EN | | | |
| 36 | GND | | | |
| 37 | GND | | | |
| 38 | + 12V 0 | | | |
| 39 | + 12V 0 | | | |
| 40 | + 12V 0 | | | |

3.2.10 COM Express GPIO (X29)

| Pin | Description | Voltage | Active | Remarks |
|-----|-------------|---------|--------|---------|
| 1 | +3V3 EXP | 3.3V | S5-S0 | |
| 2 | GPIO4 | 3.3V | | |
| 3 | GPIO0 | 3.3V | | |
| 4 | GPIO5 | 3.3V | | |
| 5 | GPIO1 | 3.3V | | |
| 6 | GPIO6 | 3.3V | | |
| 7 | GPIO2 | 3.3V | | |
| 8 | GPIO7 | 3.3V | | |
| 9 | GPIO3 | 3.3V | | |
| 10 | GND | | | |

3.2.11 FPGA JTAG Header (X30)

| Pin | Description | Voltage | Active | Remarks |
|-----|---------------------|---------|--------|---------|
| 1 | GND | | | |
| 2 | VREF (VCC AUX FPGA) | 3.3V | S0 | |
| 3 | GND | | | |



| Pin | Description | Voltage | Active | Remarks |
|-----|-------------|---------|--------|---------|
| 4 | TMS | 3.3V | | |
| 5 | GND | | | |
| 6 | TCK | 3.3V | | |
| 7 | GND | | | |
| 8 | TDO | 3.3V | | |
| 9 | GND | | | |
| 10 | TDI | 3.3V | | |
| 11 | GND | | | |
| 12 | NC | | | |
| 13 | GND | | | |
| 14 | NC | | | |

3.2.12 External Reset and Power Button Header (X32)

| Pin | Description | Voltage | Active | Remarks |
|-----|--------------|---------|--------|---------|
| 1 | Reset Button | 3.3V | | |
| 2 | GND | | | |
| 3 | NC | | | |
| 4 | NC | | | |
| 5 | Power Button | 3.3V | | |
| 6 | GND | | | |

3.2.13 Micro Controller Debug Header (X34)

| Pin | Description | Voltage | Active | Remarks |
|-----|--------------------------------|---------|--------|---------|
| 1 | VREF (3.3V STDBY) | 3.3V | S5-0 | |
| 2 | GND | | | |
| 3 | GND | | | |
| 4 | C2D (8051 Debug Interface) | 3.3V | | |
| 5 | RBC2CK (8051 Debug Interface) | 3.3V | | |
| 6 | RBC2D (8051 Debug Interface) | 3.3V | | |
| 7 | C2CK (8051 Debug Interface) | 3.3V | | |
| 8 | NC | | | |
| 9 | GND | | | |
| 10 | NC | | | |

3.2.14 PSoC Programming Adaptor Header (X36)

This pin header can be used for programming the embedded controller of the Woodpecker Module with a PSoC MiniProg. The programming signals are not available for Robin Modules.

| Pin | Description | Voltage | Active | Remarks |
|-----|----------------|---------|--------|---------|
| 1 | VDD IN | 5V | | |
| 2 | GND | | | |
| 3 | NC | | | |
| 4 | SCLK (GPIO 1) | 3.3V | | |
| 5 | SDATA (GPIO 0) | 3.3V | | |



3.2.15 Additional FFC Connector for SDIO (X39)

| Pin | Description | Voltage | Active | Remarks |
|-----|----------------|---------|--------|---------|
| 1 | SD2 CLK | 3.3V | | |
| 2 | GND | | | |
| 3 | SD2 CMD | 3.3V | | |
| 4 | SD2 LED | 3.3V | | |
| 5 | SD2 CD# | 3.3V | | |
| 6 | SD2 WP | 3.3V | | |
| 7 | SD2 PWR# | 3.3V | | |
| 8 | NC | | | |
| 9 | SD2 DATA0 | 3.3V | | |
| 10 | SD2 DATA1 | 3.3V | | |
| 11 | GND | | | |
| 12 | SD2 DATA2 | 3.3V | | |
| 13 | SD2 DATA3 | 3.3V | | |
| 14 | SD2 DATA4 | 3.3V | | |
| 15 | SD2 DATA5 | 3.3V | | |
| 16 | GND | | | |
| 17 | SD2 DATA6 | 3.3V | | |
| 18 | SD2 DATA7 | 3.3V | | |
| 19 | NC | | | |
| 20 | USB CLIENT DET | 3.3V | | |
| 21 | SD0 LED | 3.3V | | |
| 22 | SD0 DATA0 | 3.3V | | |
| 23 | SD0 DATA1 | 3.3V | | |
| 24 | SD0 PWR# | 3.3V | | |
| 25 | SD0 DATA2 | 3.3V | | |
| 26 | SD0 DATA3 | 3.3V | | |
| 27 | SD0 WP | 3.3V | | |
| 28 | SD0 CMD | 3.3V | | |
| 29 | SD0 CD# | 3.3V | | |
| 30 | SD0 CLK | 3.3V | | |

3.2.16 Switched Fan 12V Power (X40/X41)

| Pin | Description | Voltage | Active | Remarks |
|-----|----------------------------|---------|--------|--------------|
| 1 | NC | | | |
| 2 | SWITCHED POWER (FAN POWER) | 12V | S0 | Unregulated! |
| 3 | GND | | | |

3.2.17 TV DAC (X42)

This pin header provides the TV out signals of the module connector. The standard Woodpecker does not provide these signals. The signals are only provided by the Robin module.

| Pin | Description | Voltage | Active | Remarks |
|-----|-----------------|---------|--------|---------|
| 1 | CONNECTOR EARTH | | | |



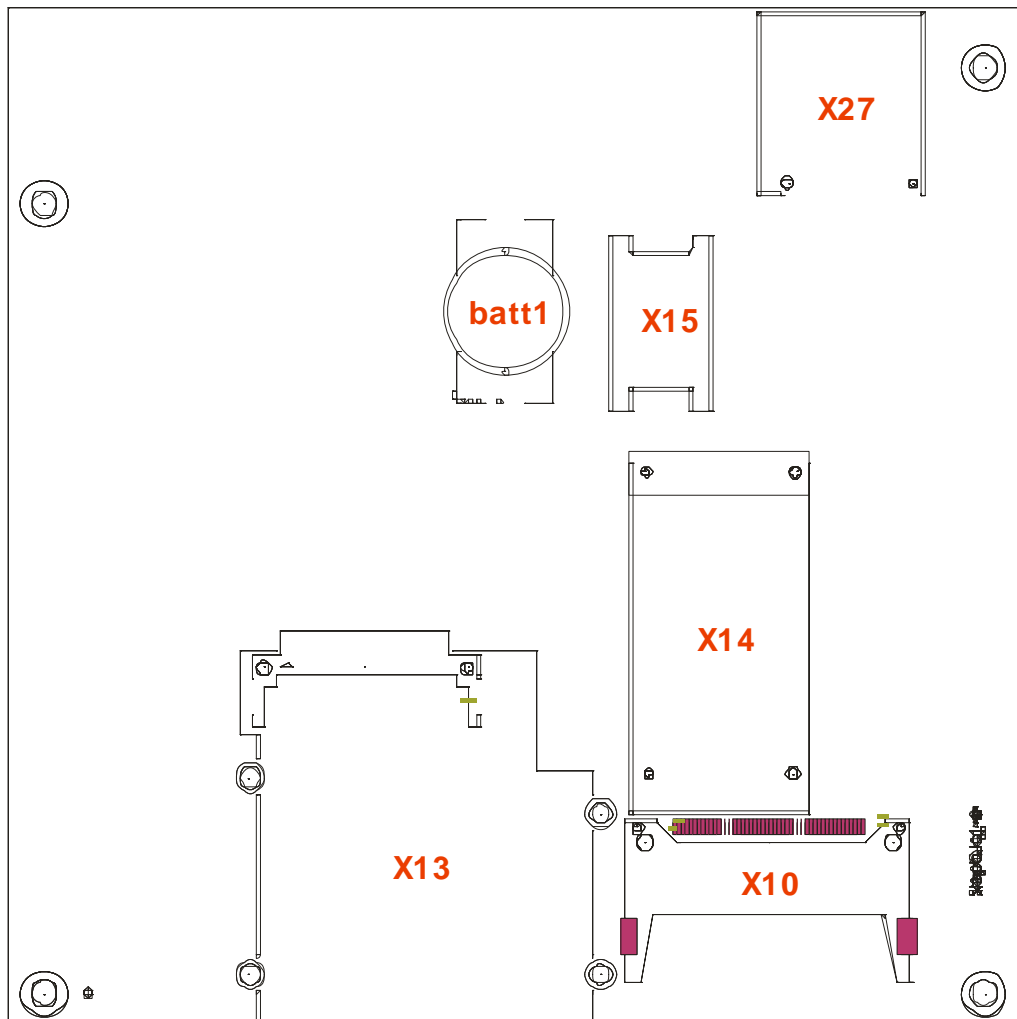
| Pin | Description | Voltage | Active | Remarks |
|-----|-----------------|---------|--------|---------|
| 2 | CONNECTOR EARTH | | | |
| 3 | TV DAC C | | | |
| 4 | GND | | | |
| 5 | TV DAC B | | | |
| 6 | GND | | | |
| 7 | TV DAC A | | | |
| 8 | GND | | | |
| 9 | CONNECTOR EARTH | | | |
| 10 | CONNECTOR EARTH | | | |

3.2.18 I²C Header (X43)

| Pin | Description | Voltage | Active | Remarks |
|-----|------------------------|---------|--------|---------|
| 1 | | | | |
| 2 | PWR OK | | | |
| 3 | WAKE1# | | | |
| 4 | GND | | | |
| 5 | I ² C Clock | 3.3V | | |
| 6 | I ² C Data | 3.3V | | |
| 7 | SMB Clock | | | |
| 8 | SMB Data | | | |
| 9 | SMB ALERT# | | | |
| 10 | BATTLOW# | | | |



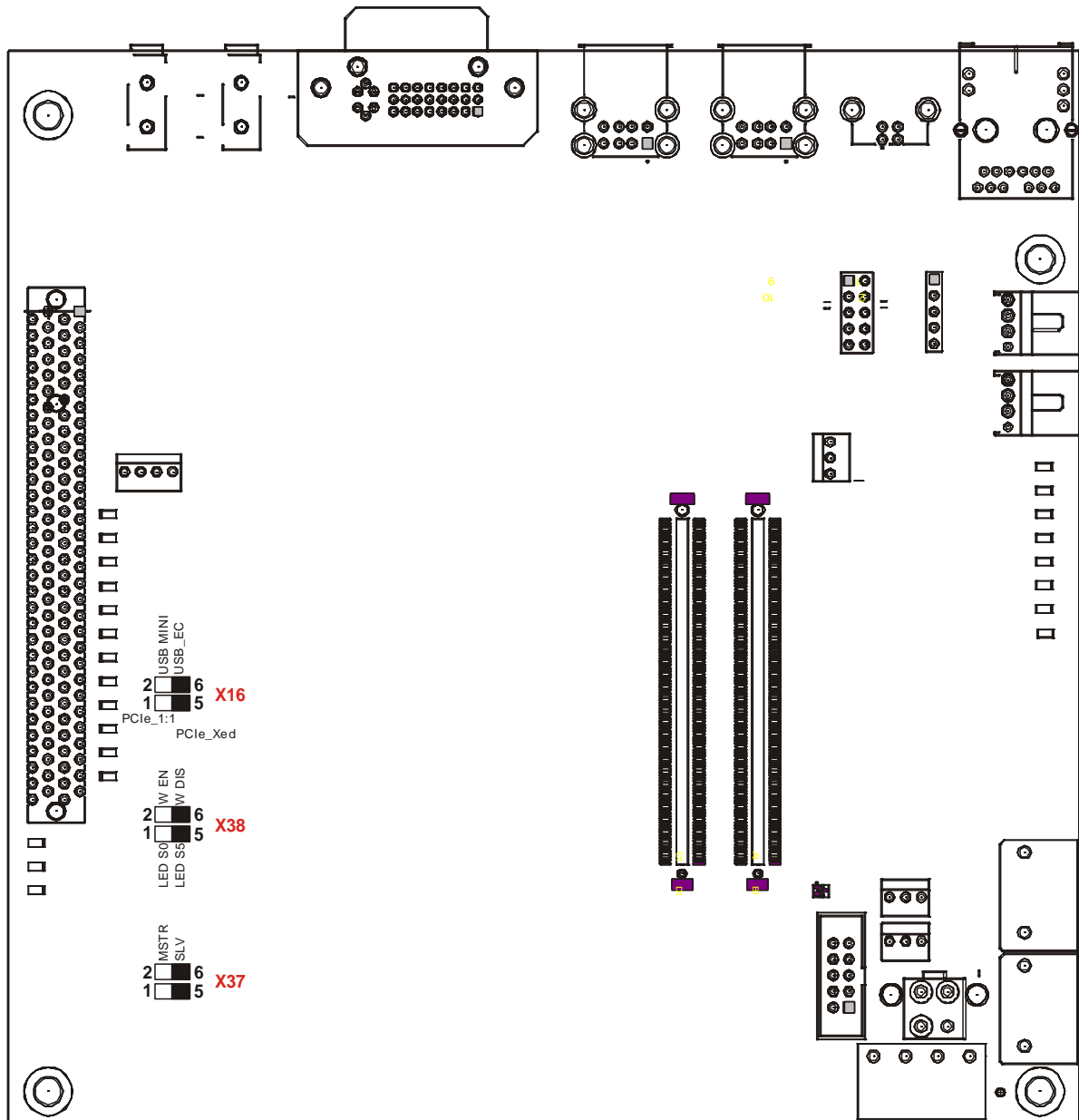
3.3. Physical Drawing: Lower Side Connectors



| | Description | Lily Micro | Lily Nano | Remarks |
|-------|-------------------------------|------------|-----------|------------------------------|
| batt1 | RTC Battery | X | X | Suitable Battery CR2032 |
| X10 | Compact Flash (IDE mode only) | X | | Parallel to IDE Connector |
| X13 | Express Card | X | X | USB Shared with Mini PCIe |
| X14 | Mini PCIe | X | X | USB Shared with Express Card |
| X15 | SIM Holder for Mini PCIe | X | X | |
| X27 | 4bit MMC / SDIO 0 | X | | |



3.4. Jumpers



| | Description | Lily Micro | Lily Nano | Remarks |
|------|--------------------------------|------------|-----------|-----------------------------|
| X16a | PCI Express Routing | X | X | |
| X16b | USB 4 Routing | X | X | |
| X37a | Compact Flash Write Protection | X | | Do not use Write Protection |
| X37b | Compact Flash Master/Slave | X | | |
| X38a | LED Power Enable | X | X | |
| X38b | Mini PCIe Wireless Enable | X | X | |



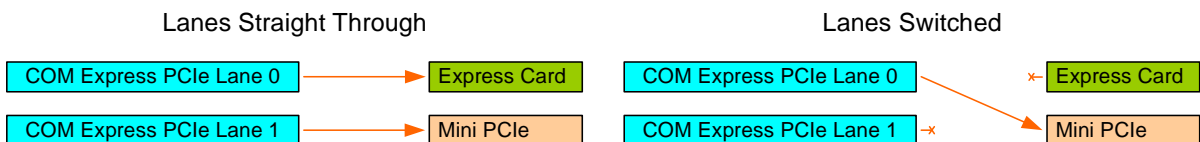
3.4.1 PCIe Routing (X16a)

| Pin | Signal | Set_0 | Set_1 | Remarks |
|-----|----------|-------|-------|---------|
| 1 | PCIE_SEL | | | |
| 3 | PCIE_SEL | | | |
| 5 | GND | | | |

Set_0 is the default. PCIe Lanes 0 and 1 are routed straight (PCIe Lane 0 to the Express Card and PCIe Lane 1 to Mini PCIe).

Use this setting for Woodpecker Z530 and third party COM Express Modules.

Set_1 is an option for Woodpecker Z510 and Robin modules that do not have PCIe Lane 1 available. With this setting lane 0 is crossed from the Express Card to the Mini PCIe. A red LED signals this condition (LED D14).

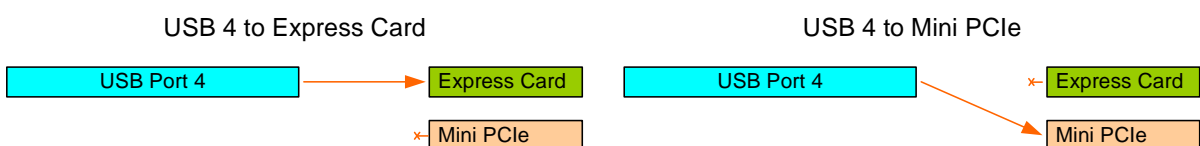


3.4.2 USB 4 Routing (X16b)

| Pin | Signal | Set_0 | Set_1 | Remarks |
|-----|---------|-------|-------|---------|
| 2 | USB_SEL | | | |
| 4 | USB_SEL | | | |
| 6 | GND | | | |

Set_0 routes the USB 4 to the Mini PCIe. LED D12 signals this condition.

Set_1 is the default. It routes the USB 4 to the Express Card. LED D11 signals this condition.



3.4.3 Compact Flash Master/Slave (X37)

| Pin | Signal | Set_0 | Set_1 | Remarks |
|-----|-----------------|-------|-------|---------|
| 2 | CF_MASTER_SLAVE | | | |
| 4 | GND | | | |
| 6 | GND | | | |

Set_0: The Compact Flash Card will be recognized as IDE master device. Use this option if no slave device connected at the PATA channel.

Set_1 is the default. The Compact Flash Card will be recognized as IDE slave device. Use this option if the card is used together with at IDE Master Hard Drive.



3.4.4 LED Power Enable (X38a)

| Pin | Signal | Set_0 | Set_1 | Remarks |
|-----|---------|-------|-------|---------|
| 1 | 3V3_S0 | | | |
| 3 | 3V3_LED | | | |
| 5 | 3V3_S5 | | | |

Set_0: The LEDs on the baseboard are only active in the S0 (running) state. This option saves energy in the standby mode.

Set_1 is the default. The LEDs on the Baseboard are always active.

Without a jumper, the LEDs are never active. This saves energy even in the S0 state.

3.4.5 Mini PCIe Wireless Enable (X38b)

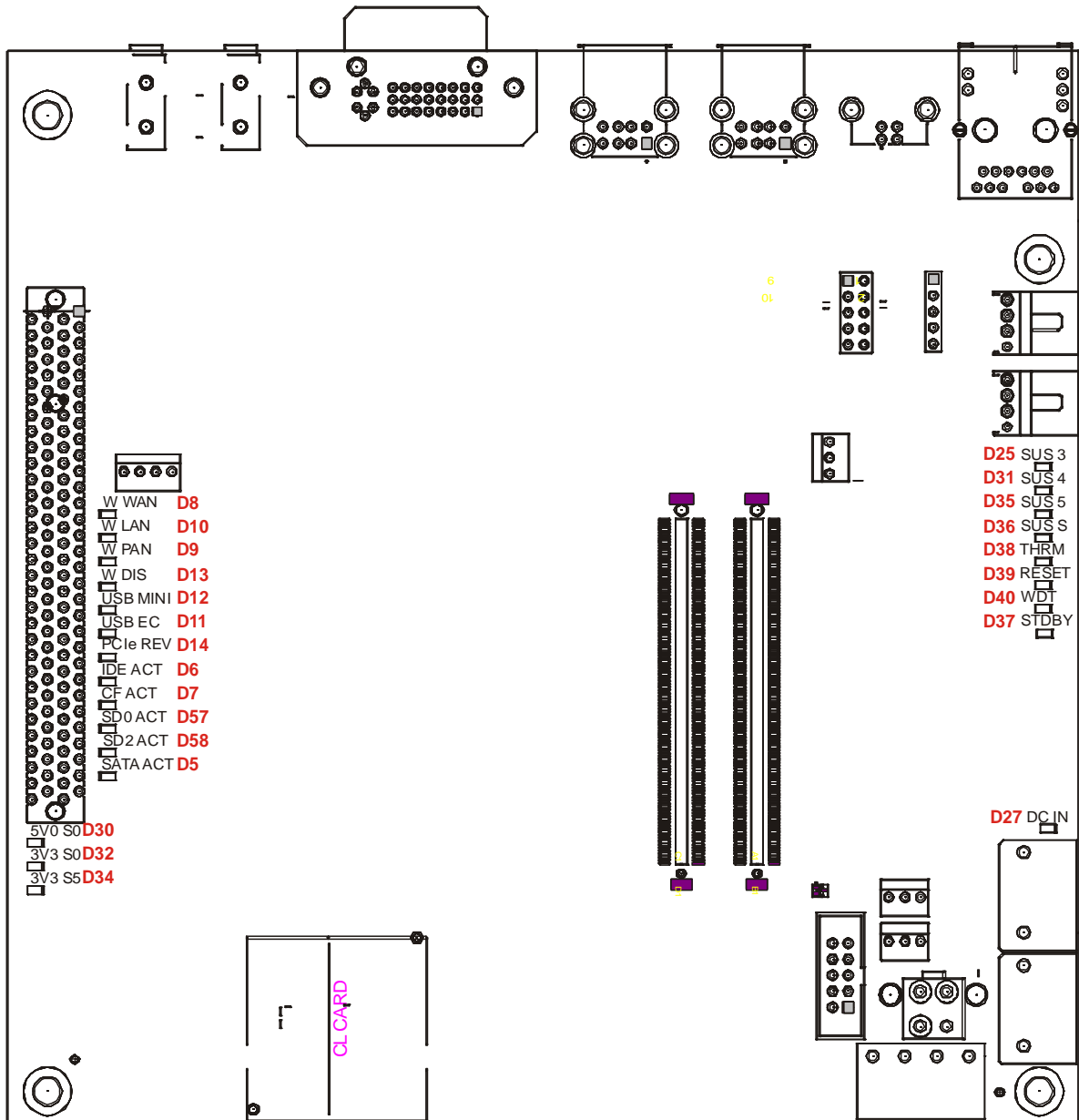
| Pin | Signal | Set_0 | Set_1 | Remarks |
|-----|------------|-------|-------|---------|
| 2 | W_DISABLE# | | | |
| 4 | W_DISABLE# | | | |
| 6 | GND | | | |

Set_0 is the default. The wireless of the Mini PCIe is enabled.

Set_1 disables the wireless of the Mini PCIe. The function of this setting is depending on the used Mini PCIe Card. LED D13 indicates this option.



3.5. LEDs



| | Name | Off | On | Remarks |
|-----|----------|------------------------------|--------------------------------|-------------------|
| D5 | SATA ACT | SATA no traffic | SATA traffic load | |
| D6 | IDE ACT | IDE HD no traffic | IDE HD traffic load | Only HD, not CF |
| D7 | CF ACT | IDE Compact Flash no traffic | IDE Compact Flash traffic load | |
| D8 | W WAN | Mini PCIe no W WAN traffic | Mini PCIe W WAN traffic load | Depending on Card |
| D9 | W PAN | Mini PCIe no W PAN traffic | Mini PCIe W PAN traffic load | Depending on Card |
| D10 | W LAN | Mini PCIe no W LAN traffic | Mini PCIe W LAN traffic load | Depending on Card |
| D11 | USB EC | USB 4 routed to Mini PCIe | USB 4 routed to Express Card | |
| D12 | USB MINI | USB 4 routed to Express Card | USB 4 routed to Mini PCIe | |
| D13 | W DIS | Mini PCIe Wireless enabled | Mini PCIe Wireless disabled | Depending on Card |
| D14 | PCIe REV | PCIe Lanes normal routed | PCIe 0 routed to Mini PCIe | |



| | Name | Off | On | Remarks |
|-----|---------|------------------------------|----------------------------|---------|
| D25 | SUS 3 | System in S0 | System in S5, S4 or S3 | |
| D27 | DC IN | No 12V Main Power | 12V Main Power available | |
| D30 | 5V0 S0 | 5V S0 not available | 5V S0 available | |
| D31 | SUS 4 | System in S3 or S0 | System in S5 or S4 | |
| D32 | 3V3 S0 | 3.3V S0 not available | 3.3V S0 available | |
| D34 | 3V3 S5 | 3.3V S5 not available | 3.3V S5 available | |
| D35 | SUS 5 | System in S4, S3 or S0 | System in S5 | |
| D36 | SUS S | System normal running | Imminent Suspend Operation | |
| D37 | STDBY | Baseboard in running mode | Baseboard in standby mode | |
| D38 | THRM | No thermal Shutdown occurred | Thermal Shutdown occurred | |
| D39 | RESET | System normal running | System Reset active | |
| D40 | WDT | No Watchdog Event occurred | Watchdog Event occurred | |
| D57 | SD0 ACT | SDIO 0 no traffic | SDIO 0 traffic load | |
| D58 | SD2 ACT | SDIO 2 no traffic | SDIO 2 traffic load | |



4. FPGA: IO Pin Mapping

4.1. Bank0 Signals

| Pin | Signal | Description | I/O Voltage ⁵ | Direction |
|-----|--------|--------------------|--------------------------|-----------|
| 90 | B0_0 | GPIO to X18 pin 5 | 3.3 | I/O |
| 78 | B0_1 | GPIO to X18 pin 6 | 3.3 | I/O |
| 77 | B0_2 | GPIO to X18 pin 7 | 3.3 | I/O |
| 84 | B0_3 | GPIO to X18 pin 8 | 3.3 | I/O |
| 83 | B0_4 | GPIO to X18 pin 10 | 3.3 | I/O |
| 86 | B0_5 | GPIO to X18 pin 11 | 3.3 | I/O |
| 85 | B0_6 | GPIO to X18 pin 12 | 3.3 | I/O |
| 89 | B0_7 | GPIO to X18 pin 13 | 3.3 | I/O |
| 88 | B0_8 | GPIO to X18 pin 15 | 3.3 | I/O |
| 94 | B0_9 | GPIO to X18 pin 16 | 3.3 | I/O |
| 93 | B0_10 | GPIO to X18 pin 17 | 3.3 | I/O |
| 99 | B0_11 | GPIO to X18 pin 19 | 3.3 | I/O |
| 98 | B0_12 | GPIO to X18 pin 20 | 3.3 | I/O |
| 82 | B0_13 | GPIO to X18 pin 21 | 3.3 | I/O |
| 97 | NC | Not Connected | | |

4.2. Bank1 Signals

| Pin | Signal | Description | I/O Voltage | Direction |
|-----|------------|------------------------------------|-------------|-----------|
| 57 | NC | Not Connected | | |
| 56 | LPC_FRAME# | LPC Bus from/to Com Express Module | 3.3V | I/O |
| 60 | LPC_SERIRQ | LPC Bus from/to Com Express Module | 3.3V | I/O |
| 59 | LPC_CLK | LPC Bus from/to Com Express Module | 3.3V | I/O |
| 62 | LPC_AD0 | LPC Bus from/to Com Express Module | 3.3V | I/O |
| 61 | LPC_AD1 | LPC Bus from/to Com Express Module | 3.3V | I/O |
| 65 | LPC_AD2 | LPC Bus from/to Com Express Module | 3.3V | I/O |
| 64 | LPC_AD3 | LPC Bus from/to Com Express Module | 3.3V | I/O |
| 71 | LPC_DRQ0# | LPC Bus from/to Com Express Module | 3.3V | I/O |
| 70 | LPC_DRQ1# | LPC Bus from/to Com Express Module | 3.3V | I/O |
| 73 | NC | Not Connected | | |
| 72 | NC | Not Connected | | |
| 68 | NC | Not Connected | | |

⁵ In standard assembly option, the I/O Voltage of the bank 0 signals is 3.3V. This voltage can be changed by disassembly a OR and provide the I/O Voltage at the pin header. Please contact Toradex for more details.



4.3. Bank2 Signals

| Pin | Signal | Description | I/O Voltage | Direction |
|-----|-------------------|--|-------------|-----------|
| 46 | MOSI | DATA to FLASH dedicated to configuration | 3.3V | O |
| 25 | M0 | Mode select dedicated to configuration | 3.3V | N/A |
| 23 | M1 | Mode select dedicated to configuration | 3.3V | N/A |
| 27 | CSO_B | CS to FLASH dedicated to configuration | 3.3V | O |
| 24 | M2 | Mode select dedicated to configuration | 3.3V | N/A |
| 30 | VS1 | Flash select dedicated to configuration | 3.3V | N/A |
| 28 | NC | Not Connected | | |
| 31 | VS0 | Flash select dedicated to configuration | 3.3V | N/A |
| 29 | VS2 | Flash select dedicated to configuration | 3.3V | N/A |
| 34 | HK_KBD_A20_GATE | Legacy Signal | 3.3V | I |
| 32 | W_DISABLE_CONTROL | Overrides the Jumper X38b setting | 3.3V | O |
| 35 | NC | Not Connected | | |
| 33 | DBG_RX | Serial Debug Port to Micro Controller P0.5 | 3.3V | O |
| 37 | DBG_TX | Serial Debug Port to Micro Controller P0.4 | 3.3V | I |
| 36 | HK_KBD_RST# | Legacy Signal | 3.3V | I |
| 41 | HK_BIOS_DISABLE# | Leave OPEN for normal operation | 3.3V | OC |
| 40 | HK_RESET# | System Reset Signal | 3.3V | I |
| 44 | HK_SMB_DAT | SMBus Data Line | 3.3V | I / OC |
| 43 | HK_SMB_CLK | SMBus Clock Line | 3.3V | I |
| 49 | HK_SUS_STAT | Status Signal from CPU | 3.3V | I |
| 48 | INIT_B | Dedicated to configuration | 3.3V | N/A |
| 51 | D_IN | Data from FLASH dedicated to configuration | 3.3V | I |
| 50 | HK_I2C_DAT | I ² C Data Line | 3.3V | I / OC |
| 53 | CCLK | Clock to FLASH dedicated to configuration | 3.3V | O |
| 52 | HK_I2C_CLK | I ² C Clock Line | 3.3V | I |
| 39 | NC | Not Connected | | |



4.4. Bank3 Signals

| Pin | Signal | Description | I/O Voltage ⁶ | Direction |
|-----|--------|--------------------|--------------------------|-----------|
| 4 | B3_0 | GPIO to X17 pin 5 | 3.3 | I/O |
| 3 | B3_1 | GPIO to X17 pin 6 | 3.3 | I/O |
| 6 | B3_2 | GPIO to X17 pin 7 | 3.3 | I/O |
| 5 | B3_3 | GPIO to X17 pin 8 | 3.3 | I/O |
| 10 | B3_4 | GPIO to X17 pin 10 | 3.3 | I/O |
| 9 | B3_5 | GPIO to X17 pin 11 | 3.3 | I/O |
| 13 | B3_6 | GPIO to X17 pin 12 | 3.3 | I/O |
| 12 | B3_7 | GPIO to X17 pin 13 | 3.3 | I/O |
| 16 | B3_8 | GPIO to X17 pin 15 | 3.3 | I/O |
| 15 | B3_9 | GPIO to X17 pin 16 | 3.3 | I/O |
| 20 | B3_10 | GPIO to X17 pin 17 | 3.3 | I/O |
| 19 | B3_11 | GPIO to X17 pin 19 | 3.3 | I/O |
| 21 | B3_12 | GPIO to X17 pin 20 | 3.3 | I/O |
| 7 | B3_13 | GPIO to X17 pin 21 | 3.3 | I/O |

⁶ In standard assembly option, the I/O Voltage of the bank 3 signals is 3.3V. This voltage can be changed by disassembly a OR and provide the I/O Voltage at the pin header. Please contact Toradex for more details.



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