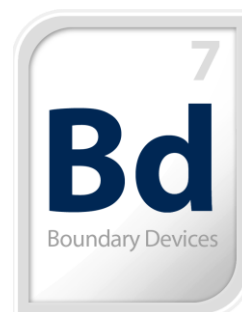

Nitrogen6X Hardware User Manual

Revision History

| Date | Revision | Description |
|------------|----------|------------------------------|
| 03-05-2012 | 1.0 | First Draft |
| 12-27-2012 | 1.1 | Nitrogen6X_Rev 2 change list |
| 06-21-2013 | 1.2 | Nitrogen6X_Rev 3 change list |



1 Contents

| | |
|------------------------------------|----|
| 1 Contents | 2 |
| 2 Overview | 3 |
| 3 Electrical Characteristics | 3 |
| 4 Connector Details..... | 4 |
| 5 Mounting..... | 12 |

2 Overview

Boundary Devices is excited to announce the availability of the i.MX6x Nitrogen6X Board, a low-cost development platform featuring the powerful i.MX 6Quad Application Processor. The hardware specifications for the Nitrogen6X board are the following:

- Quad-Core ARM® Cortex A9 processor at 1GHz per core
- 1GByte of 64-bit wide DDR3 @ 532MHz
- Three display ports (RGB, LVDS, and HDMI 1.4a)
- Two camera ports (1xParallel, 1x MIPI CSI-2)
- Multi-stream-capable HD video engine delivering H.264 1080p60 decode, 1080p30 encode and 3-D video playback in HD
- Triple Play Graphics system consisting of a Quad-shader 3D unit, and a separate 2-D and separate OpenVG Vertex acceleration engine for superior 3D, 2D and user interface acceleration
- Serial ATA 2.5 (SATA) at 3Gbps
- Dual SD 3.0/SDXC card slots
- PCIe port (1 lane)
- Analog (headphone/mic) and Digital (HDMI) audio
- 10/100/Gb Ethernet
- 10-pin JTAG interface
- 3 High speed USB ports (2xHost, 1xOTG)
- 1xCAN2 port
- I2C
- Real-Time Clock with battery backup
- 0-70C Operating Temperature (Industrial Temperature -40-+85C Versions Available)
- General Purpose I/O for Device Control

CHANGES In REV 2 Board:

1. Modified components to be Industrial Temperature ready
2. Added external Real Time Clock with Battery (ISL1208)
3. Modified NVCC_MIPI to meet new Rev 1.2 Silicon specification
4. Modified PCIe connector to be board-to-board and added ability to use i.MX6 internal PCIe clock signals

CHANGES In REV 3 Board:

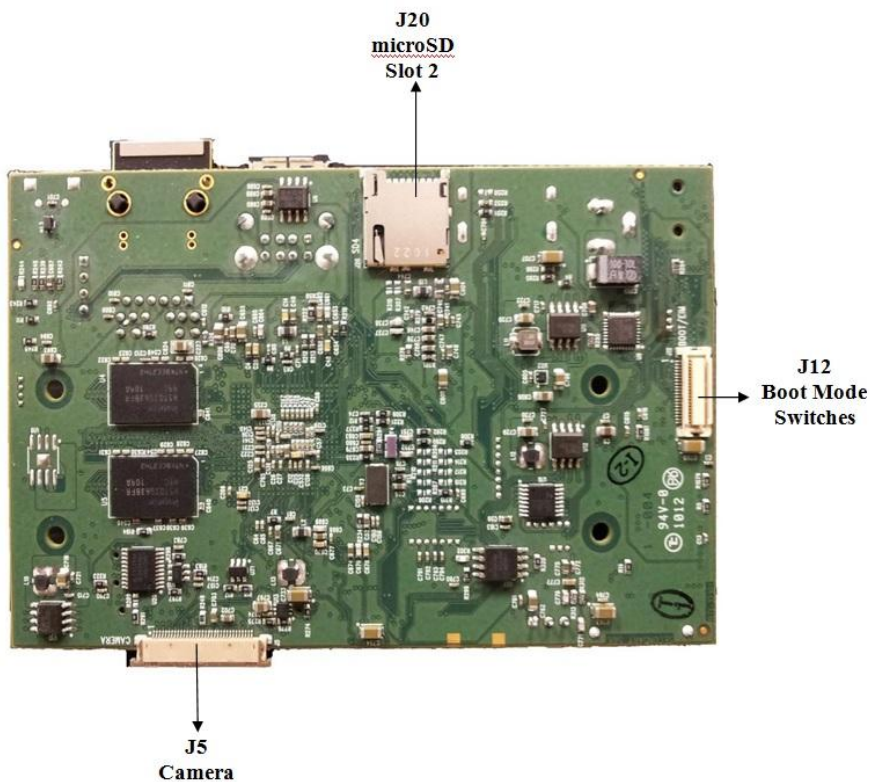
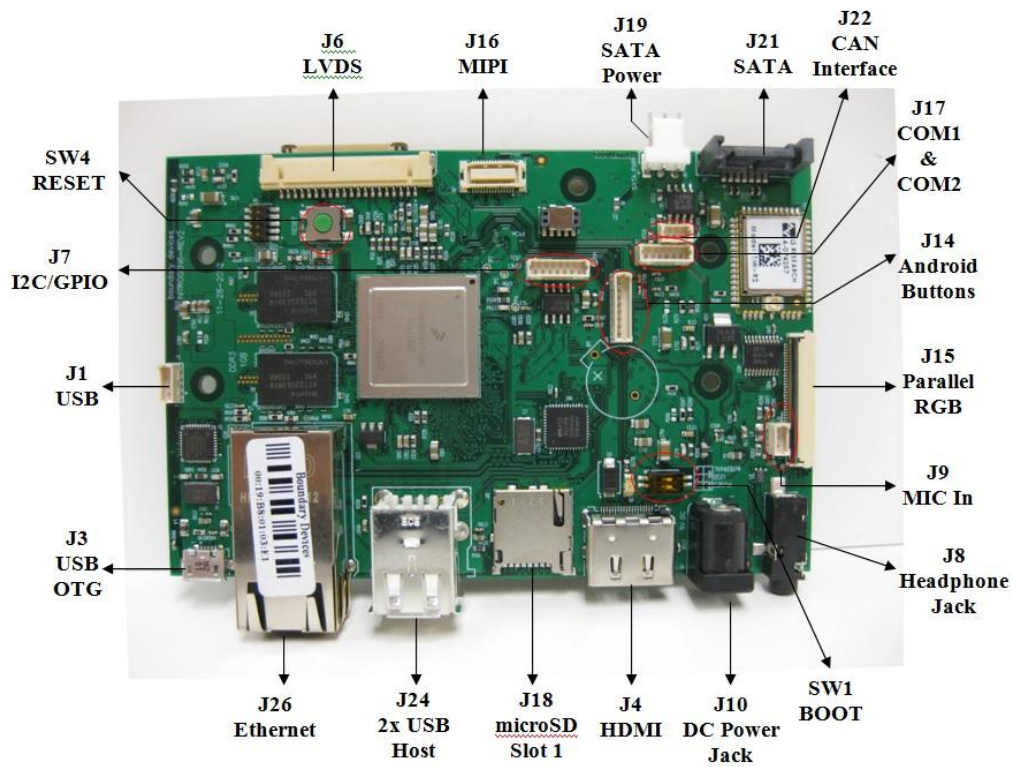
1. Added EMI Filters
2. Added 1.8V and 2.5V option for CSI Camera

3 Electrical Characteristics

| Parameter | Min | Typ | Max | Unit |
|--------------------|-----|-----|-----|------|
| Main Input Voltage | TBD | 5 | TBD | V |
| Power Consumption* | - | 1.5 | TBD | W |
| CPU Clock | - | 1.0 | 1.0 | GHz |

*The Power Consumption refers to a single board with no other peripherals plugged in.

4 Connector Details



4.1 Standard Connectors

The list of industry standard connectors with known pin outs is the following:

| Ref Designator | Function |
|----------------|--------------------|
| J3 | USB OTG |
| J4 | HDMI |
| J8 | Headphone Jack |
| J10 | DC Power Jack |
| J18 | microSD Slot 1 |
| J20 | microSD Slot 2 |
| J21 | SATA |
| J24 | 2xUSB Host |
| J25 | 10/100/1G Ethernet |

4.2 Custom Connectors

The Nitrogen6X board has a wide variety of peripheral interfaces available via custom connectors.

J1: USB (Molex 53047-0410)

| Pin# | Function |
|------|-----------|
| 1 | +5V |
| 2 | USBDN_DM3 |
| 3 | USBDN_DP3 |
| 4 | GND |

J5: Camera (AVX 086210033340800)

| Pin# | Function |
|------|----------|
| 1 | GND |
| 2 | D19 |
| 3 | D18 |
| 4 | D17 |
| 5 | D16 |
| 6 | D15 |
| 7 | D14 |
| 8 | D13 |
| 9 | D12 |
| 10 | D11 |
| 11 | D10 |
| 12 | D9 |
| 13 | D8 |
| 14 | SCL |
| 15 | SDA |
| 16 | GND |

| | |
|----|--------------|
| 17 | GPIO_3_CLKO2 |
| 18 | GND |
| 19 | 2.5V |
| 20 | 2.5V |
| 21 | 2.5V |
| 22 | 2.5V |
| 23 | GND |
| 24 | CSI0_DATA_EN |
| 25 | GND |
| 26 | CSI0_RST |
| 27 | CSI0_VSYNC |
| 28 | CSI0_HSYNC |
| 29 | GND |
| 30 | CSI0_PIXCLK |
| 31 | GPIO_6 |
| 32 | GND |
| 33 | GPIO1_16 |

J6: LVDS (Hirose DF14-20P-1.25H)

| Pin# | Function |
|------|----------------|
| 1 | 3.3V |
| 2 | 3.3V |
| 3 | GND |
| 4 | GND |
| 5 | TX0_N |
| 6 | TX0_P |
| 7 | GND |
| 8 | TX1_N |
| 9 | TX1_P |
| 10 | GND |
| 11 | TX2_N |
| 12 | TX2_P |
| 13 | GND |
| 14 | CLK_N |
| 15 | CLK_P |
| 16 | GND |
| 17 | TX3_N |
| 18 | TX3_P |
| 19 | DISPO_CONTRAST |
| 20 | PWM4 |

J7: I2C/GPIO (Molex 53047-0710)

| Pin# | Function |
|------|----------|
| 1 | +5V |
| 2 | +5V |

| | |
|---|----------|
| 3 | +5V |
| 4 | GPIO9 |
| 5 | I2C3_SDA |
| 6 | I2C3_SCL |
| 7 | GND |

J9: MIC In (Molex 53047-0310)

| Pin# | Function |
|------|------------|
| 1 | GND_Analog |
| 2 | MIC In |
| 3 | MIC Det |

J12: Boot Mode Switches (Molex 52991-0408)

| Pin# | Function |
|------|----------|
| 1 | EIM_A23 |
| 2 | EIM_DA0 |
| 3 | EIM_A22 |
| 4 | EIM_DA1 |
| 5 | EIM_A21 |
| 6 | EIM_DA2 |
| 7 | EIM_A20 |
| 8 | EIM_DA3 |
| 9 | EIM_A19 |
| 10 | EIM_DA4 |
| 11 | EIM_A18 |
| 12 | EIM_DA5 |
| 13 | EIM_A17 |
| 14 | EIM_DA6 |
| 15 | EIM_A16 |
| 16 | EIM_DA7 |
| 17 | EIM_EB3 |
| 18 | EIM_DA8 |
| 19 | EIM_EB2 |
| 20 | EIM_DA9 |
| 21 | EIM_RW |
| 22 | EIM_DA10 |
| 23 | EIM_EB1 |
| 24 | EIM_DA11 |
| 25 | EIM_EB0 |
| 26 | GND |
| 27 | EIM_LBA |
| 28 | EIM_DA12 |
| 29 | GND |
| 30 | DSI_D1M |

| | |
|----|----------|
| 31 | EIM_WAIT |
| 32 | EIM_DA13 |
| 33 | GND |
| 34 | GND |
| 35 | EIM_A24 |
| 36 | EIM_DA14 |
| 37 | +3.3V |
| 38 | GND |
| 39 | +3.3V |
| 40 | EIM_DA15 |

J13: JTAG (Molex 53047-0810)

| Pin# | Function |
|------|------------|
| 1 | +3.3V |
| 2 | JTAG_TMS |
| 3 | GND |
| 4 | JTAG_TCK |
| 5 | GND |
| 6 | JTAG_TDO |
| 7 | JTAG_MOD |
| 8 | JTAG_TDI |
| 9 | JTAG_nTRST |
| 10 | BRESET_N |

J14: Android Buttons (Molex 53047-0810)

| Pin# | Function | IMX6 Pad Name |
|------|------------|---------------|
| 1 | ON/OFF | |
| 2 | KEY_VOL_UP | GPIO_18 |
| 3 | HOME | NANDF_D4 |
| 4 | SEARCH | NANDF_D3 |
| 5 | BACK | NANDF_D2 |
| 6 | MENU | NANDF_D1 |
| 7 | KEY_VOL_DN | GPIO_19 |
| 8 | GND | |

J15: Parallel RGB (Omron XF2M-4015-1A)

| Pin# | Function |
|------|--------------|
| 1 | GND |
| 2 | GND |
| 3 | GND |
| 4 | DISP0_CNTRST |
| 5 | R0 |
| 6 | R1 |
| 7 | R2 |
| 8 | R3 |

| | |
|----|-------------|
| 9 | R4 |
| 10 | R5 |
| 11 | R6 |
| 12 | R7 |
| 13 | G0 |
| 14 | G1 |
| 15 | G2 |
| 16 | G3 |
| 17 | G4 |
| 18 | G5 |
| 19 | G6 |
| 20 | G7 |
| 21 | B0 |
| 22 | B1 |
| 23 | B2 |
| 24 | B3 |
| 25 | B4 |
| 26 | B5 |
| 27 | B6 |
| 28 | B7 |
| 29 | GND |
| 30 | DISP0_CLK |
| 31 | GND |
| 32 | DISP0_HSYNC |
| 33 | DISP0_VSYNC |
| 34 | DISP0_DRDY |
| 35 | I2C3_SCL |
| 36 | I2C3_SDA |
| 37 | PWM1 |
| 38 | +5V |
| 39 | +5V |
| 40 | +5V |

J16: MIPI (Molex 52991-0408)

| Pin# | Function |
|------|----------|
| 1 | CSI_D0M |
| 2 | +5V |
| 3 | CSI_D0P |
| 4 | +5V |
| 5 | GND |
| 6 | I2C2_SDA |
| 7 | CSI_D1M |
| 8 | I2C2_SCL |
| 9 | CSI_D1P |
| 10 | PWM3 |

| | |
|----|----------------|
| 11 | GND |
| 12 | MIPI_BAKLGT_ON |
| 13 | CSI_D2M |
| 14 | NANDF_D5 |
| 15 | CSI_D2P |
| 16 | DSI_D0P |
| 17 | GND |
| 18 | DSI_D0M |
| 19 | CSI_D3M |
| 20 | GND |
| 21 | CSI_D3P |
| 22 | DSI_CLK0P |
| 23 | GND |
| 24 | DSI_CLK0M |
| 25 | CSI_CLK0M |
| 26 | GND |
| 27 | CSI_CLK0P |
| 28 | DSI_D1P |
| 29 | GND |
| 30 | DSI_D1M |

J17: COM1 & COM2 (Molex 53047-0610)

| Pin# | Function |
|------|----------|
| 1 | UART1 TX |
| 2 | +5V |
| 3 | GND |
| 4 | UART2 TX |
| 5 | UART2 RX |
| 6 | UART1 RX |

J19: SATA Power (Tyco 640457-3)

| Pin# | Function |
|------|----------|
| 1 | +3.3V |
| 2 | GND |
| 3 | +5V |

J22: CAN Interface (Molex 53047-0310)

| Pin# | Function |
|------|----------|
| 1 | CANH |
| 2 | GND |
| 3 | CANL |

J23: PCIe (FCI 20021321-00010C4LF)

| Pin# | Function |
|------|----------|
| 1 | PCIE_RXM |

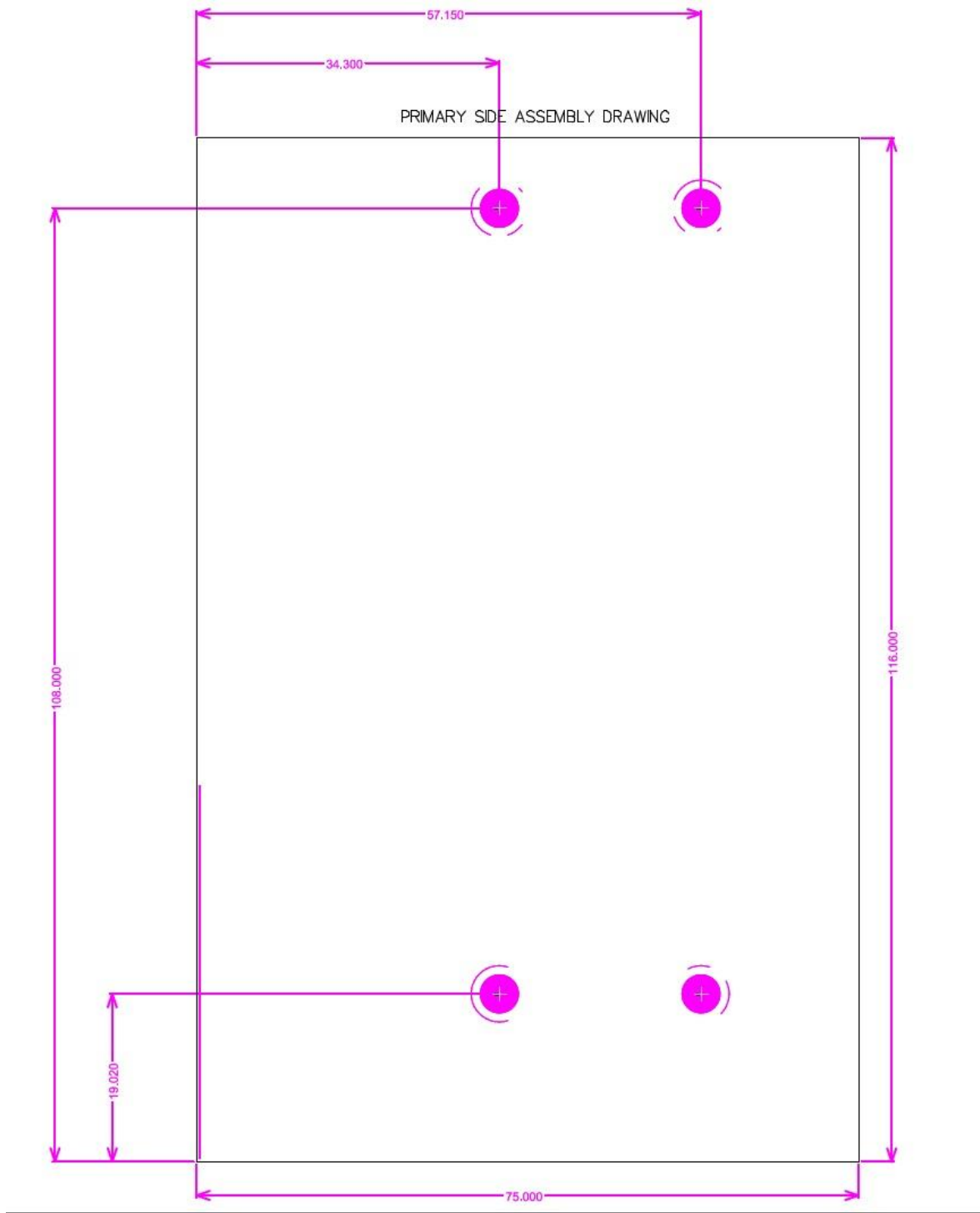
| | |
|----|----------|
| 2 | GND |
| 3 | PCIE_RXP |
| 4 | CLK1_N |
| 5 | GND |
| 6 | CLK1_P |
| 7 | PCIE_TXM |
| 8 | GND |
| 9 | PCIE_TXP |
| 10 | +3.3V |

J26: POE Output (Singatron SSW-1-04-01-T-S)

POE Output is meant to interface with BD POE module. If you need further details, please contact us.

5 Mounting

The overall dimensions of the Nitrogen6X board are 4.5" x 3"



Revision 1.2