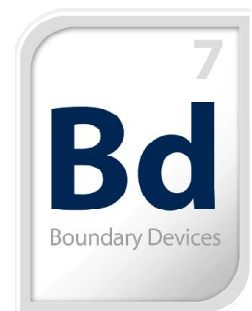


# Nitrogen6\_MAX Hardware User Manual

## Revision History

| Date       | Revision | Description |
|------------|----------|-------------|
| 07-20-2014 | 1.0      | First Draft |



# 1 Contents

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## 2 Overview

The Nitrogen6\_MAX is a turbo-charged version of our popular Nitrogen6X platform. The Nitrogen6\_MAX features the same Quad-Core i.MX6 processor from Freescale, but has some other notable upgrades to allow for high-end performance. The hardware specifications for the Nitrogen6\_MAX board are the following:

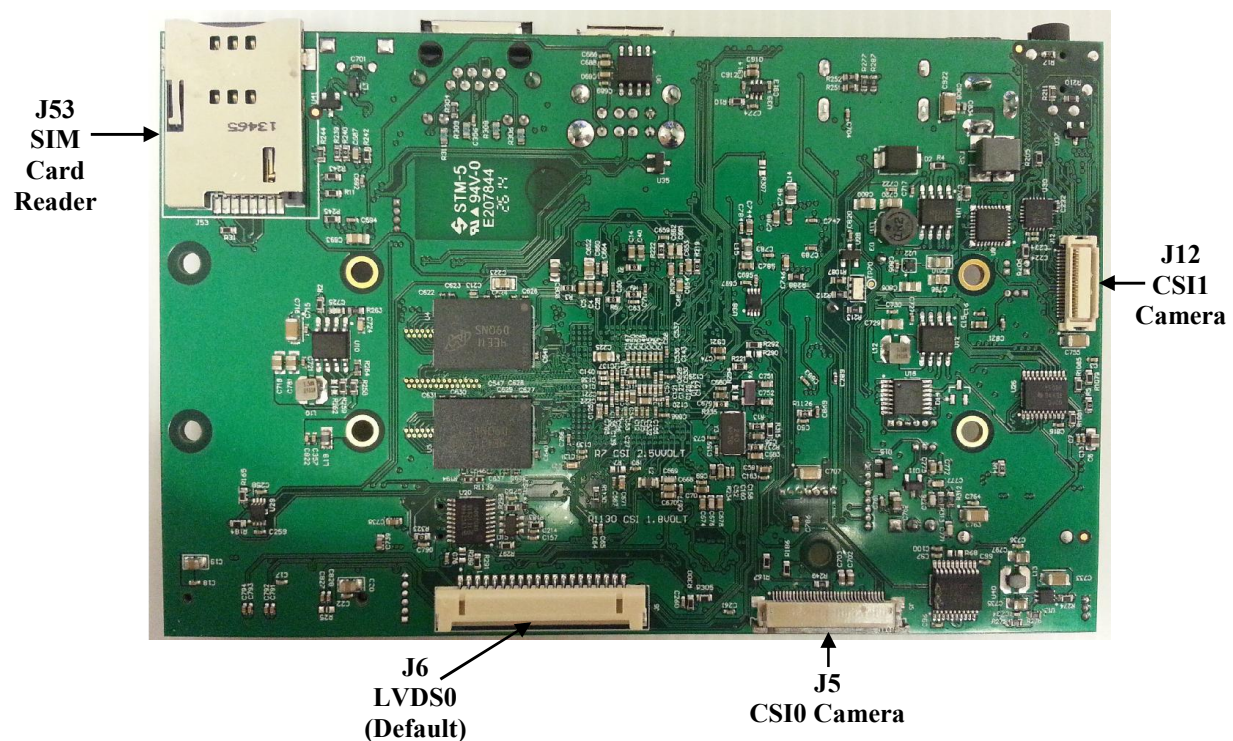
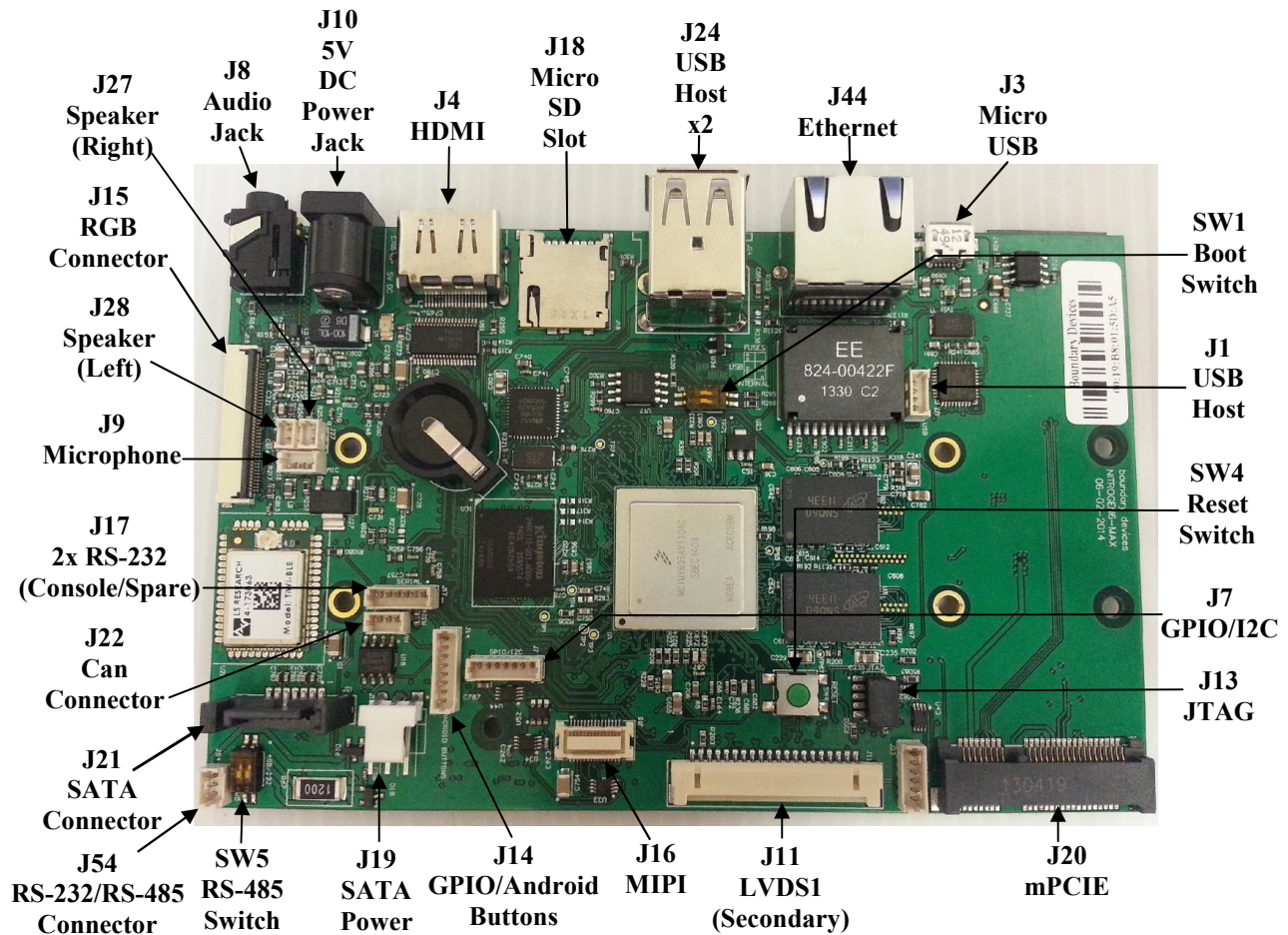
- Quad-Core ARM® Cortex A9 processor at 1GHz per core
- 4GByte of 64-bit wide DDR3 @ 532MHz
- 2 LVDS Outputs for Dual-Display or Dual-Channel 1080p displays
- RGB and HDMI 1.4a
- 4GB eMMC
- Three camera ports (2xParallel, 1x MIPI CSI-2)
- On-Board mPCIe connector with both PCIe and USB interfaces
- 2W Audio Amplifier to directly drive speakers
- 3 RS-232 serial ports, (1 software-selectable as RS-485)
- 802.11b/g/n WiFi/Bluetooth (LSR TiWi BLE) comes standard
- Serial ATA 2.5 (SATA) at 3Gbps
- 1 microSD 3.0/SDXC card slot
- Analog (headphone/mic) and Digital (HDMI) audio
- 10/100/Gb Ethernet
- 10-pin JTAG interface
- 3 High speed USB ports (2xHost, 1xOTG)
- 1xCAN port
- I2C
- Real-Time Clock with battery backup
- SIM Card Holder
- General Purpose I/O for Device Control

## 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



Revision 1.0

## 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     |
| J21            | SATA               |
| J24            | 2xUSB Host         |
| J44            | 10/100/1G Ethernet |
| J53            | SIM Card Holder    |

## 4.2 Custom Connectors

The Nitrogen6\_MAX 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 | .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    | LVDS0_TX0_N                  |
| 6    | LVDS0_TX0_P                  |
| 7    | GND                          |
| 8    | LVDS0_TX1_N                  |
| 9    | LVDS0_TX1_P                  |
| 10   | GND                          |
| 11   | LVDS0_TX2_N                  |
| 12   | LVDS0_TX2_P                  |
| 13   | GND                          |
| 14   | LVDS0_CLK_N                  |
| 15   | LVDS0_CLK_P                  |
| 16   | GND                          |
| 17   | LVDS0_TX3_N                  |
| 18   | LVDS0_TX3_P                  |
| 19   | DISP0_CONTRAST<br>(NANDF_D0) |
| 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    |

**J11: LVDS (Hirose DF14-20P-1.25H)**

| Pin# | Function                |
|------|-------------------------|
| 1    | 3.3V                    |
| 2    | 3.3V                    |
| 3    | GND                     |
| 4    | GND                     |
| 5    | LVDS1_TX0_N             |
| 6    | LVDS1_TX0_P             |
| 7    | GND                     |
| 8    | LVDS1_TX1_N             |
| 9    | LVDS1_TX1_P             |
| 10   | GND                     |
| 11   | LVDS1_TX2_N             |
| 12   | LVDS1_TX2_P             |
| 13   | GND                     |
| 14   | LVDS1_CLK_N             |
| 15   | LVDS1_CLK_P             |
| 16   | GND                     |
| 17   | LVDS1_TX3_N             |
| 18   | LVDS1_TX3_P             |
| 19   | LVDS1_GPIO<br>(EIM_CS0) |
| 20   | PWM2                    |

**J12: CSI1 (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 (20021121-00010T4LF FCI)

| 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       | NANDE_D4      |
| 4    | SEARCH     | NANDE_D3      |
| 5    | BACK       | NANDE_D2      |
| 6    | MENU       | NANDE_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 52991-0308)**

| 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)**

UART2 is used as the U-Boot and O/S console, so UART1 or UART5 on J54 should normally be used for external connections.

UART1/2 are mapped to /dev/ttymx0 and /dev/ttymx1 under Linux and COM1/2 under Windows Embedded.

| 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      |

**J20: PCIe (Molex 679100002)**

| Pin# | Function                 |
|------|--------------------------|
| 2    | +3.3V                    |
| 4    | GND                      |
| 6    | +1.5V                    |
| 8    | To SIM Card C1           |
| 9    | GND                      |
| 10   | To SIM Card C7           |
| 11   | CLK1_N                   |
| 12   | To SIM Card C3           |
| 13   | CLK1_P                   |
| 14   | To SIM Card C2           |
| 15   | GND                      |
| 18   | GND                      |
| 21   | GND                      |
| 22   | PCIE_Reset<br>(EIM_BCLK) |
| 23   | PCIE_RXM                 |
| 24   | +3.3V                    |
| 25   | PCIE_RXP                 |
| 26   | GND                      |
| 27   | GND                      |

|    |           |
|----|-----------|
| 28 | +1.5V     |
| 29 | GND       |
| 30 | I2C3_SCL  |
| 31 | PCIE_TXM  |
| 32 | I2C3_SDA  |
| 33 | PCIE_TXP  |
| 34 | GND       |
| 35 | GND       |
| 36 | USBDN_DM3 |
| 38 | USBDN_DP3 |
| 40 | GND       |
| 48 | +1.5V     |
| 50 | GND       |
| 52 | +3.3V     |

**J22: CAN Interface (Molex 53047-0310)**

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

**J27: 2W Amplified Audio – Right Channel (Molex 53047-0210)**

| Pin# | Function |
|------|----------|
| 1    | OUTRP    |
| 2    | OUTRM    |

**J28: 2W Amplified Audio – Left Channel (Molex 53047-0210)**

| Pin# | Function |
|------|----------|
| 1    | OUTLP    |
| 2    | OUTLM    |

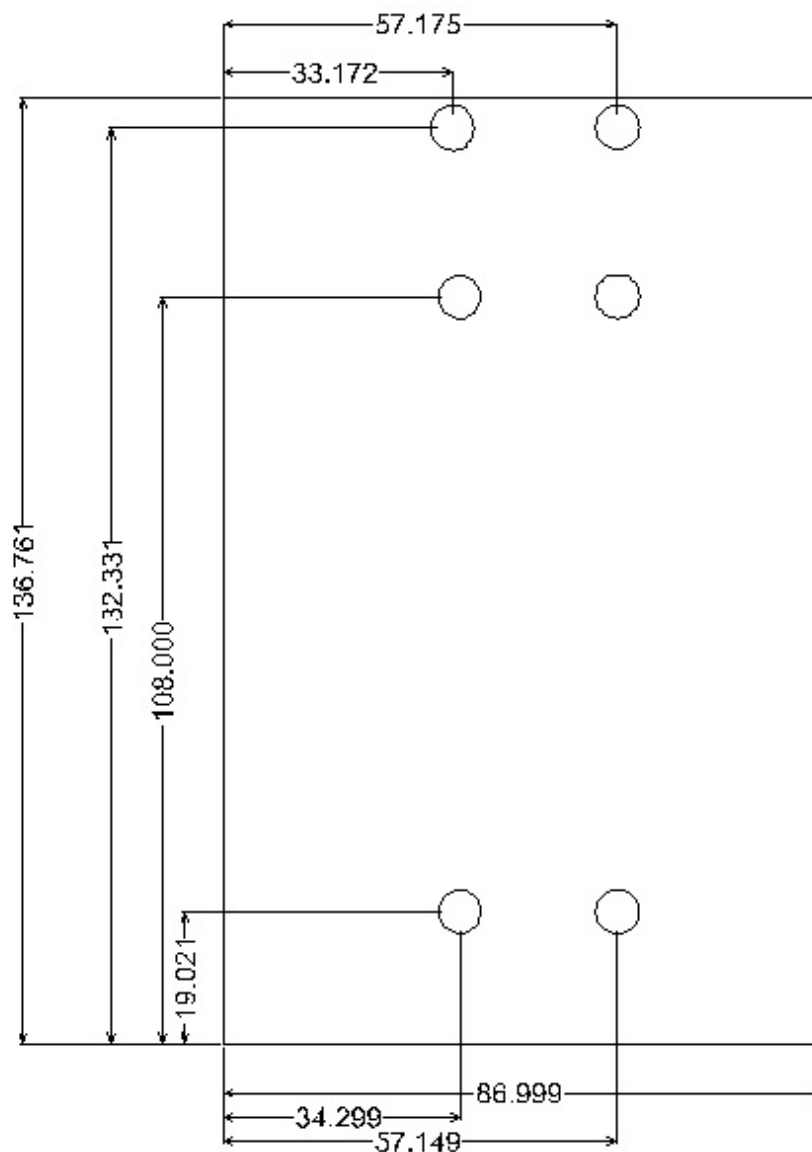
**J54: Selectable RS232/RS485 (Molex 53047-0310)**

UART5 is mapped to /dev/ttymx4 under Linux. SW5 needs to be set to either RS232 or RS485.

| Pin# | Function          |
|------|-------------------|
| 1    | GND               |
| 2    | UART5 TXD/RS-485+ |
| 3    | UART5 RXD/RS-485- |

## 5 Mounting

The overall dimensions of the Nitrogen6\_MAX board are 5.4" x 3.43"



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- Защиту от снятия компонента с производства.
- Оценку стоимости проекта по компонентам.
- Изготовление тестовой платы монтаж и пусконаладочные работы.



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