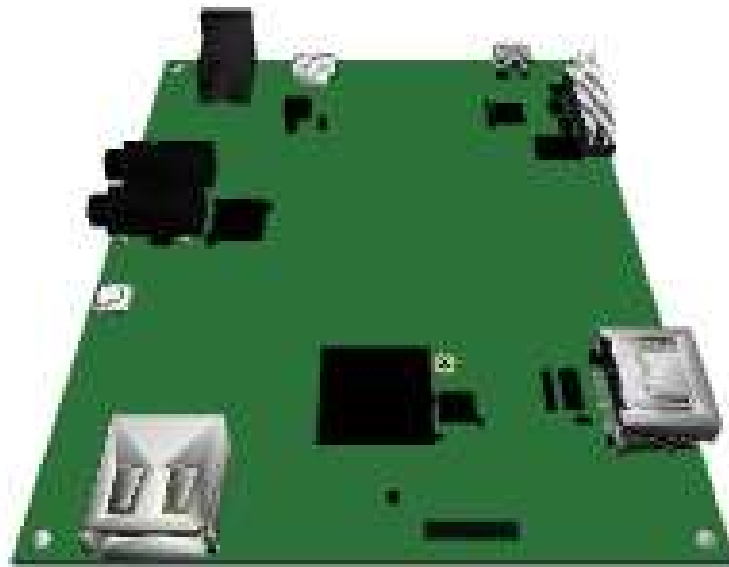


Cobalt MC



This board was designed and built by Geppetto

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No Minimum Order

Automated Supply Chain

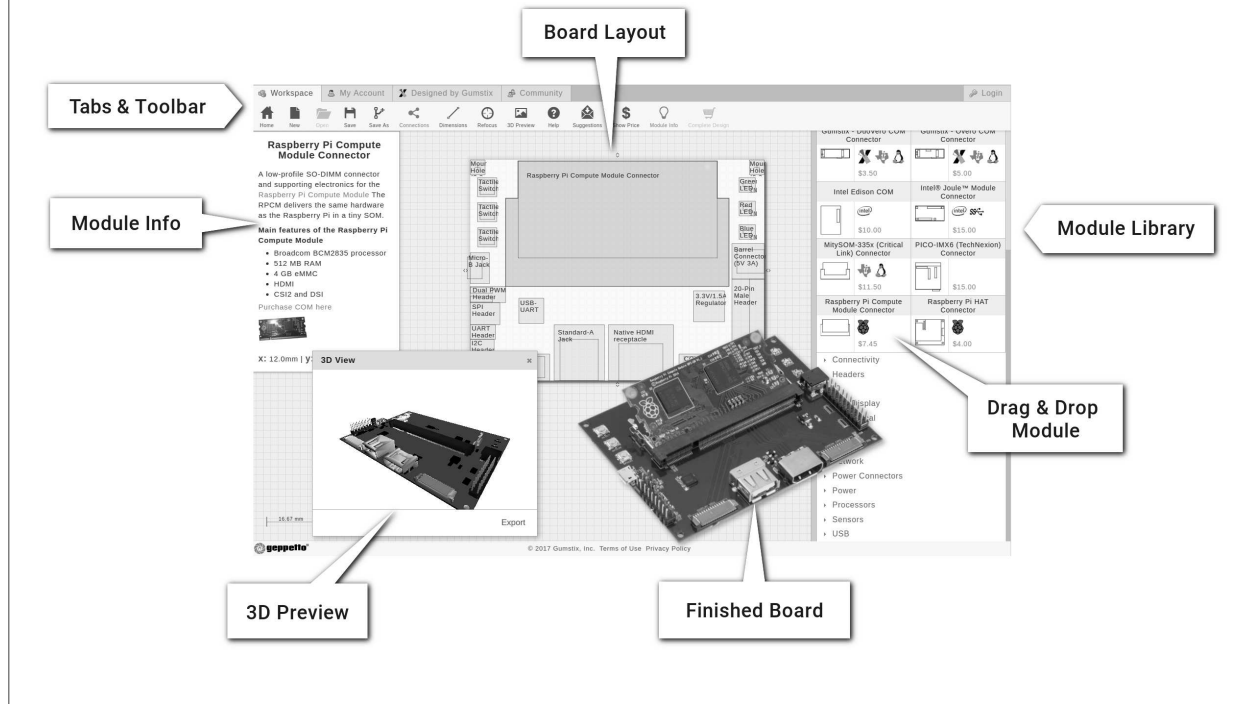
Reduce Cost and Errors



Thanks for using Geppetto to design this board!

One Stop Design-to-Order

Simply place displays, sensors, processors, and Geppetto connects it all.
No routing needed.



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Board Description

This connected i.MX6 Multimedia Board supports the evaluation of the extensive multimedia features of the NXP SCM-iMX6 with CSI-2 camera, native HDMI, and audio, and connects with Gigabit Ethernet, WiFi and Bluetooth.

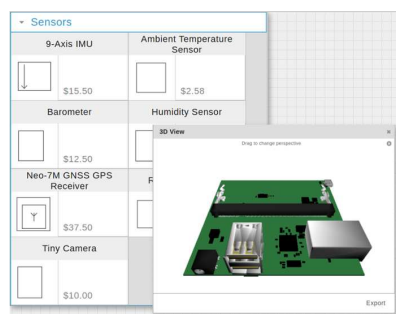
Features:

- SCM-i.MX 6Dual/6Quad SoC
- Mic and headphone jacks
- MicroSD card reader
- Native HDMI
- Gigabit Ethernet
- WiFi and Bluetooth 4.0/BLE
- USB 2.0 Host and OTG
- RTC battery housing
- 4-lane CSI-2 camera connection

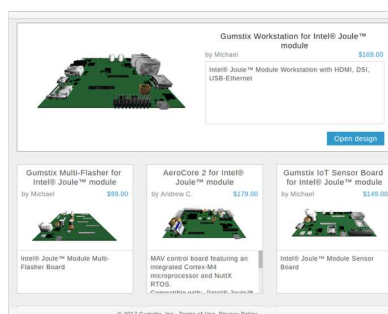
Board Dimensions

8cm x 10cm

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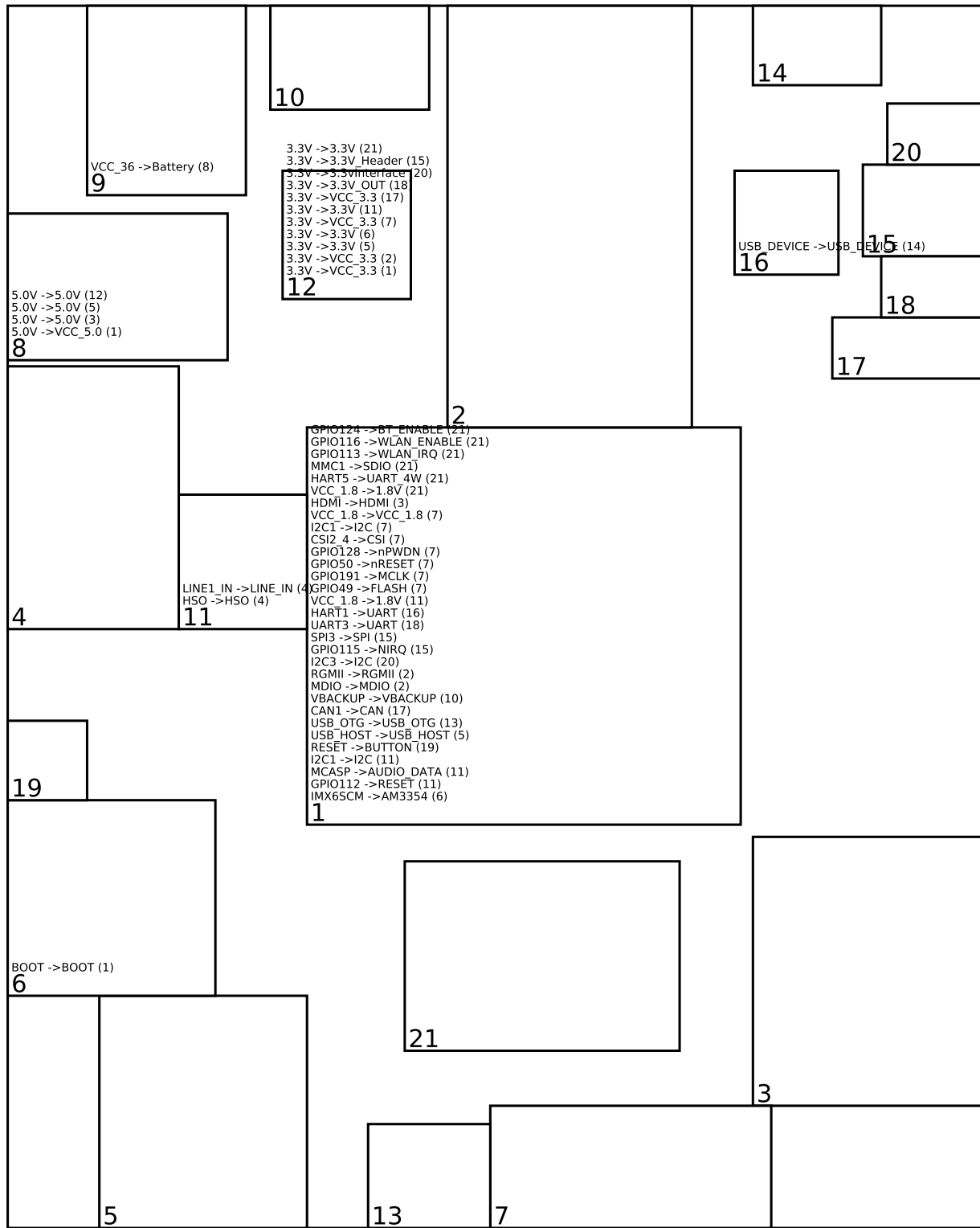
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1 Modules on Board



1.1 Processors

1.1.1 NXP SCM (v15) (1)

The NXP SCM i.MX6 Single Chip Module combines a quad-core 32-bit multimedia SoC, power management system, Flash memory, and over 100 passive circuit elements onto a single 14 x 17 mm chip.

Features:

- 16 MB Flash memory
- 4 x 900MHz ARM Cortex-A9
- 400MHz DDR2 RAM
- MIPI CSI2
- HDMI
- 2 x I2C
- 3 x SPI
- 2 x CAN
- Gigabit Ethernet
- 3D, vector and image processing acceleration

The SCM-i.MX6 integrates 3 independent chips: i.MX6, MMPF0100, and N25Q128. Datasheets for all of these chips, in addition to the i.MX6 manuals, are listed below.

- SCM Datasheet: <http://www.nxp.com/assets/documents/data/en/data-sheets/SCMIMX6DQIEC.pdf>
- i.MX6 Datasheet: <http://www.nxp.com/assets/documents/data/en/data-sheets/IMX6DQCEC.pdf>
- i.MX6 Reference Manual: <http://www.nxp.com/assets/documents/data/en/reference-manuals/IMX6DQRM.pdf>
- i.MX6 Errata: <http://www.nxp.com/assets/documents/data/en/errata/IMX6DQCE.pdf>
- MMPF0100 Datasheet: <http://www.nxp.com/assets/documents/data/en/data-sheets/MMPF0100.pdf>
- N25Q128 Datsheet: https://www.micron.com/~media/documents/products/data-sheet/nor-flash/serial-nor/n25q/n25q_128_3_volt_with_boot_sector.pdf

The NXP SCM i.MX6Q SoC recieves the following inputs:

- BOOT from Boot MicroSD Card Slot (6)
- VCC_5.0 from 5V/5A Regulator (8)
- VCC_3.3 from 3.3V/1.5A Regulator (12)

The NXP SCM i.MX6Q SoC provides the following outputs:

- IMX6SCM to Boot MicroSD Card Slot (6)
- GPIO112 to Audio Codec (11)
- VLOGIC_3.3 to:
 - Audio Codec (11)
 - Tactile Switch (19)
 - I2C Header (20)
 - SPI Header (15)
 - UART Header (18)
 - USB-UART (16)
 - Camera Connector (CSI-4) (7)
 - Native HDMI receptacle (3)
 - TI WiLink8 (21)
- MCASP to Audio Codec (11)
- I2C1 to:
 - Audio Codec (11)
 - Camera Connector (CSI-4) (7)
- RESET to Tactile Switch (19)
- USB_HOST to Standard-A Jack (5)
- USB_OTG to Micro-AB USB (13)
- CAN1 to CAN Header (17)
- VBACKUP to CoinCell Backup (10)
- MDIO to Gigabit Ethernet (2)
- RGMII to Gigabit Ethernet (2)
- I2C3 to I2C Header (20)
- GPIO115 to SPI Header (15)
- SPI3 to SPI Header (15)
- UART3 to UART Header (18)
- HART1 to USB-UART (16)
- VCC_1.8 to:
 - Audio Codec (11)
 - Camera Connector (CSI-4) (7)
 - TI WiLink8 (21)
- GPIO49 to Camera Connector (CSI-4) (7)
- GPIO191 to Camera Connector (CSI-4) (7)
- GPIO50 to Camera Connector (CSI-4) (7)

- GPIO128 to Camera Connector (CSI-4) (7)
- CSI2.4 to Camera Connector (CSI-4) (7)
- HDMI to Native HDMI receptacle (3)
- HART5 to TI WiLink8 (21)
- MMC1 to TI WiLink8 (21)
- GPIO113 to TI WiLink8 (21)
- GPIO116 to TI WiLink8 (21)
- GPIO124 to TI WiLink8 (21)

Select GPIOs and SPI2 signals have 10K pull-down or pull-up resistors used for i.MX6 boot setting. Loading these signals during i.MX6 reset could result in a boot failure. The signals affected are the following:

GPIO48	PD
GPIO49	PD
GPIO50	PU
GPIO78	PD
SPI2 CS0	PD
SPI2 CS1	PD

1.2 Network

1.2.1 Gigabit Ethernet (v4) (2)

This 10/100/1000 Base-T connector offers gigabit Ethernet over twisted pair for networking functionality with the Qualcomm Atheros AR8035 ethernet transceiver.

This networking interface is connected via RGMII to NXP SCM (1).

1.2.2 TI WiLink8 (v17) (21)

The TI Wilink8 module includes BT4.1 and 802.11(a/b/g/n) signals on one antenna. TI's WL1831MOD, a fully contained integrated WiFi/Bluetooth controller, provides SISO 802.11a/b/g/n and Bluetooth wireless communications via 2 external u.FL antennas. WLAN data is delivered to the host by way of an SDIO interface, while BT uses a UART bus. The module includes a dedicated oscillator, providing a 32.768kHz clock for the SDIO bus.

The datasheet for the WL18xx series is available from TI at:

<http://www.ti.com/lit/ds/symlink/wl1831mod.pdf>

The module connects to the following buses:

- UART_4W to HART5 on NXP SCM (1)
- VLOGIC to VLOGIC_3.3 on NXP SCM (1)
- SDIO to MMC1 on NXP SCM (1)

- WLAN_IRQ to GPIO113 on NXP SCM (1)
- WLAN_ENABLE to GPIO116 on NXP SCM (1)
- BT_ENABLE to GPIO124 on NXP SCM (1)
-

1.3 Monitors

1.3.1 Native HDMI receptacle (v14) (3)

The native HDMI receptacle module provides HDMI video and audio signals to an external display and speakers. This module uses the TI TPD12S016UFQN HDMI companion chip with a standard HDMI port to provide ESD-protected display connectivity.

The datasheet for the TPD12S016 IC can be found at:

<http://www.ti.com/lit/ds/symlink/tpd12s016.pdf>

The module transmits high definition video from **HDMI** on **NXP SCM (1)**.

1.4 Audio

1.4.1 Dual Audio (in / out) (v10) (4)

These two standard 3-position 3.5mm audio jacks offer stereo line input and stereo audio output. They are connected to Audio Codec (11)

1.4.2 Audio Codec (v19) (11)

A low-power stereo audio codec with stereo headphone amplifier, as well as multiple inputs and outputs programmable in single-ended or fully differential configurations.

For more information, visit <http://www.ti.com/product/tlv320aic3106>. This module requires NXP SCM (1).

This module provides the following output buses:

- HSO to Dual Audio (in / out) (4)
- LINE1_IN to Dual Audio (in / out) (4)

1.5 USB

1.5.1 Standard-A Jack (v11) (5)

A standard A USB host port that allows you to connect USB devices to the board. This port is connected to USB_HOST on NXP SCM (1).

1.5.2 Micro-AB USB (v7) (13)

The micro-AB USB port module offers USB On-the-Go connectivity. Devices can be connected to your design (e.g., USB peripherals) using a USB OTG cable, or your design can be connected to a host as a device using a micro-B to standard-A cable.

This port is connected to USB_OTG on NXP SCM (1).

1.5.3 Micro-B Jack (v11) (14)

The USB micro-B port module allows your design to connect as a USB device to a USB host.

This module is connected to USB_DEVICE on USB-UART (16).

This module does not supply power.

1.6 Memory

1.6.1 Boot MicroSD Card Slot (v13) (6)

The boot microSD card slot module connects to a TI Sitara AM335x or AM437x SoC to provide a bootloader and file system. An SD card with a valid disk image is required for startup.

A disk image for the Poblano AM4378 SoC module is available at:

https://catalina.gumstix.com/binaries/?sort=-last_updated&search=yocto-poblano

This module provides boot memory to NXP SCM (1).

1.7 Headers

1.7.1 Camera Connector (CSI-4) (v2) (7)

The CSI-2 connector module is a 40-pin ribbon connector that exposes a 4-lane MIPI camera system to an external high-resolution camera module.

The CSI port is connected to CSI2_4 on NXP SCM (1).

I2C communication is connected to I2C1 on NXP SCM (1).

MCLK is provided by GPIO191 on NXP SCM (1).

1.7.2 SPI Header (v13) (15)

The SPI header module provides a 6-wire SPI interface on a 2x3-pin header. In addition to the data and clock lines, chip select, ground and IRQ pins are also provided.

This header breaks out SPI3 on NXP SCM (1) .

1.7.3 CAN Header (v7) (17)

The CAN header module converts serial datastreams to and from ISO 11898-2 compliant signals. The TI SN65HVD232 IC provides the PHY layer for CAN bus communications. The digital TX and RX signals are also provided on the 4-pin header.

The datasheet for the TI SN65HVD232 CAN controller can be found at:

<http://www.ti.com/lit/ds/symlink/sn65hvd232.pdf>

The CAN header is connected to CAN1 on NXP SCM (1).

1.7.4 UART Header (v12) (18)

The UART header module provides a 2-wire serial data interface alongside power and ground pins for UART signals.

This module is connected to the UART3 bus on NXP SCM (1).

1.7.5 I2C Header (v14) (20)

The I²C header module provides a connection for external devices to communicate over a 2-wire Inter-Integrated Circuit (I²C) bus. This header breaks out I2C3 on NXP SCM (1).

1.8 Power

1.8.1 5V/5A Regulator (v8) (8)

Takes 6 - 36V input from Barrel Connector (20V 3A) (9) and provides up to 5A at 5V to:

- NXP SCM (1)
- Native HDMI receptacle (3)
- Standard-A Jack (5)
- 3.3V/1.5A Regulator (12)

1.8.2 CoinCell Backup (v4) (10)

The 6.8mm coin cell battery holder offers a short-term backup power option for your design.

This battery is connected to VBACKUP on NXP SCM (1).

1.8.3 3.3V/1.5A Regulator (v14) (12)

This DC to DC step down regulator provides a 3.3V DC output at 1.5A needed by certain components on this board. It is capable of accepting an input voltage between 3.1 to 16V DC and output is controlled by the TI TPS6211 buck regulator.

It receives 5.0V from 5V/5A Regulator (8).

The data sheet for the TPS6211 regulator is available at:

<http://www.ti.com/lit/ds/symlink/tps62110.pdf>

This regulator provides 3.3V to:

- NXP SCM (1)
- Gigabit Ethernet (2)
- Standard-A Jack (5)
- Boot MicroSD Card Slot (6)
- Camera Connector (CSI-4) (7)
- Audio Codec (11)
- CAN Header (17)
- UART Header (18)
- I2C Header (20)
- SPI Header (15)
- TI WiLink8 (21)

1.9 Power Connectors

1.9.1 Barrel Connector (20V 3A) (v4) (9)

This power jack is compatible with Gumstix 20V/3A DC power adapter using a barrel connector.

This power jack provides 13V to the following modules:

- 5V/5A Regulator (8)

1.10 Connectivity

1.10.1 USB-UART (v18) (16)

Also known as an FTDI, this USB to UART converter allows a USB connection to the board to behave as a virtual RS232 serial connection. It offers direct and complete access to the system from a development machine by way of the FTDI FT232RQ USB – UART IC.

Technical documentation for the FT232RQ is available at:

http://www.ftdichip.com/Support/Documents/DataSheets/ICs/DS_FT232R.pdf

This USB to UART converter connects a host machine from Micro-B Jack (14) to HART1 on NXP SCM (1).

1.11 IO

1.11.1 Tactile Switch (v18) (19)

This 4.9 sq. mm pull-down touch switch provides a user input for the signal RESET on NXP SCM (1).

2 Module Connections Graph

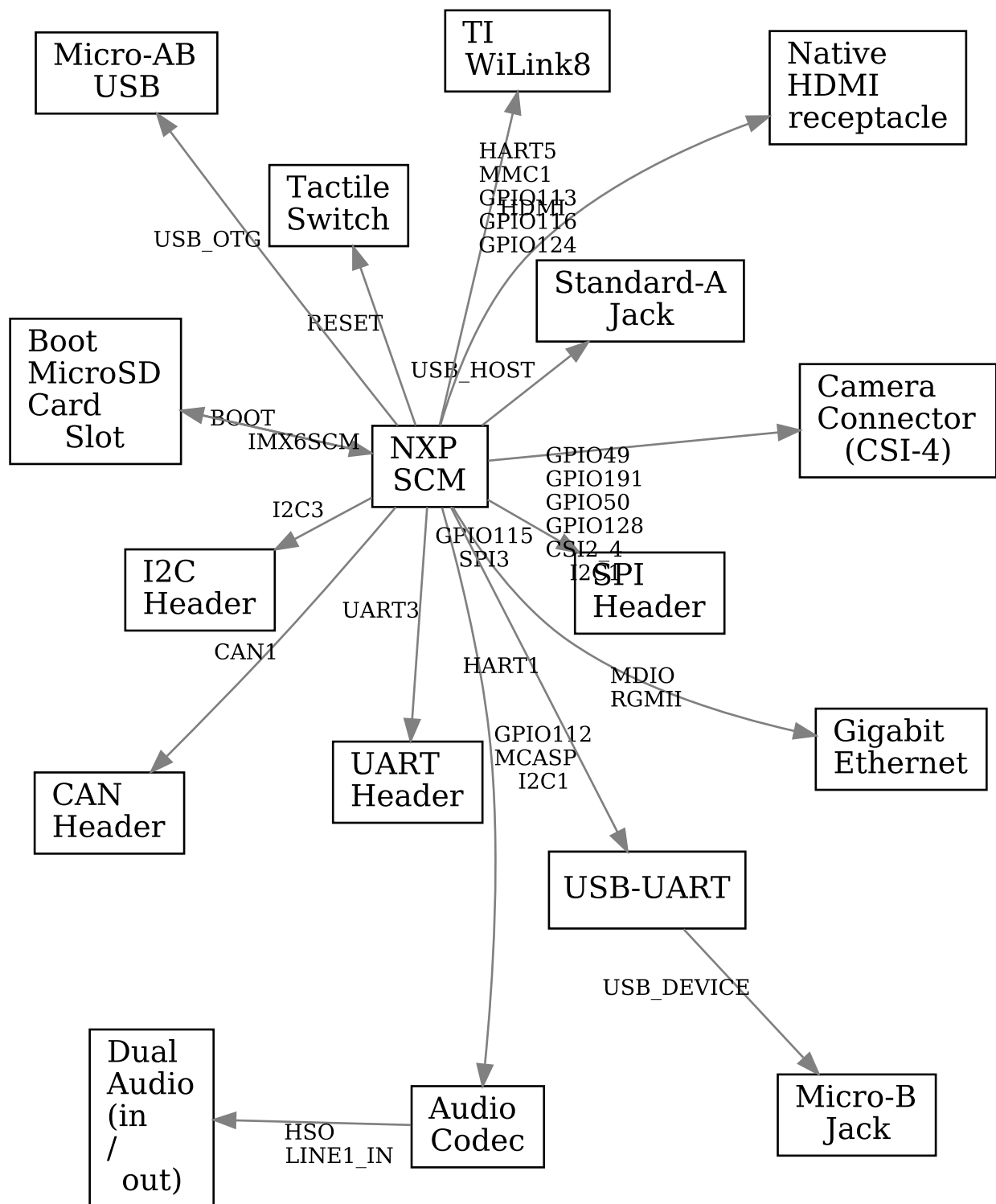


Figure 1: excludes power modules

3 Module Power Graph

