

Options for Target Development Platform

Option 1. Samsung ARM 11

Option 2. NVDA NANO

Option 3. Pie3 B or Pie 4

Option 4. RISC-V Maix board

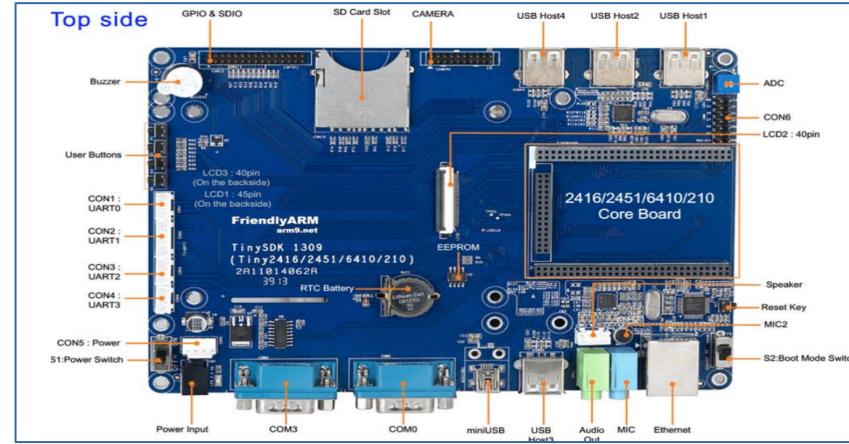
Option 5. NXP LPC1769

Option 6. FPGA board for RISC-V development

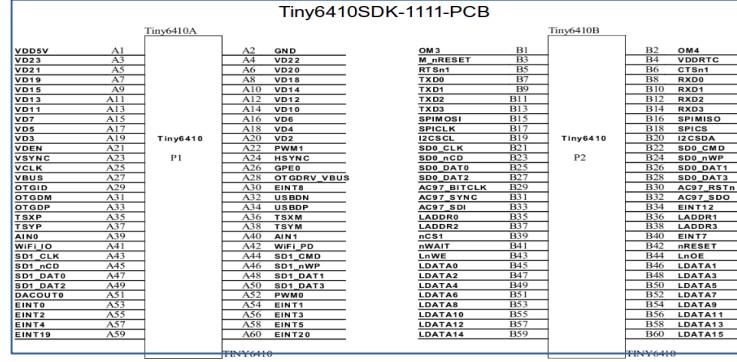
Option 1 Friendly ARM Development Platform

Process for GPIO Testing

Development Kit



Schematic of the development kit



Connector information

Modify menuconfig script

Compile and build device driver module

Upload the device driver module and user application program to the target platform

\$insmod device-driver.ko

Then run the user application program

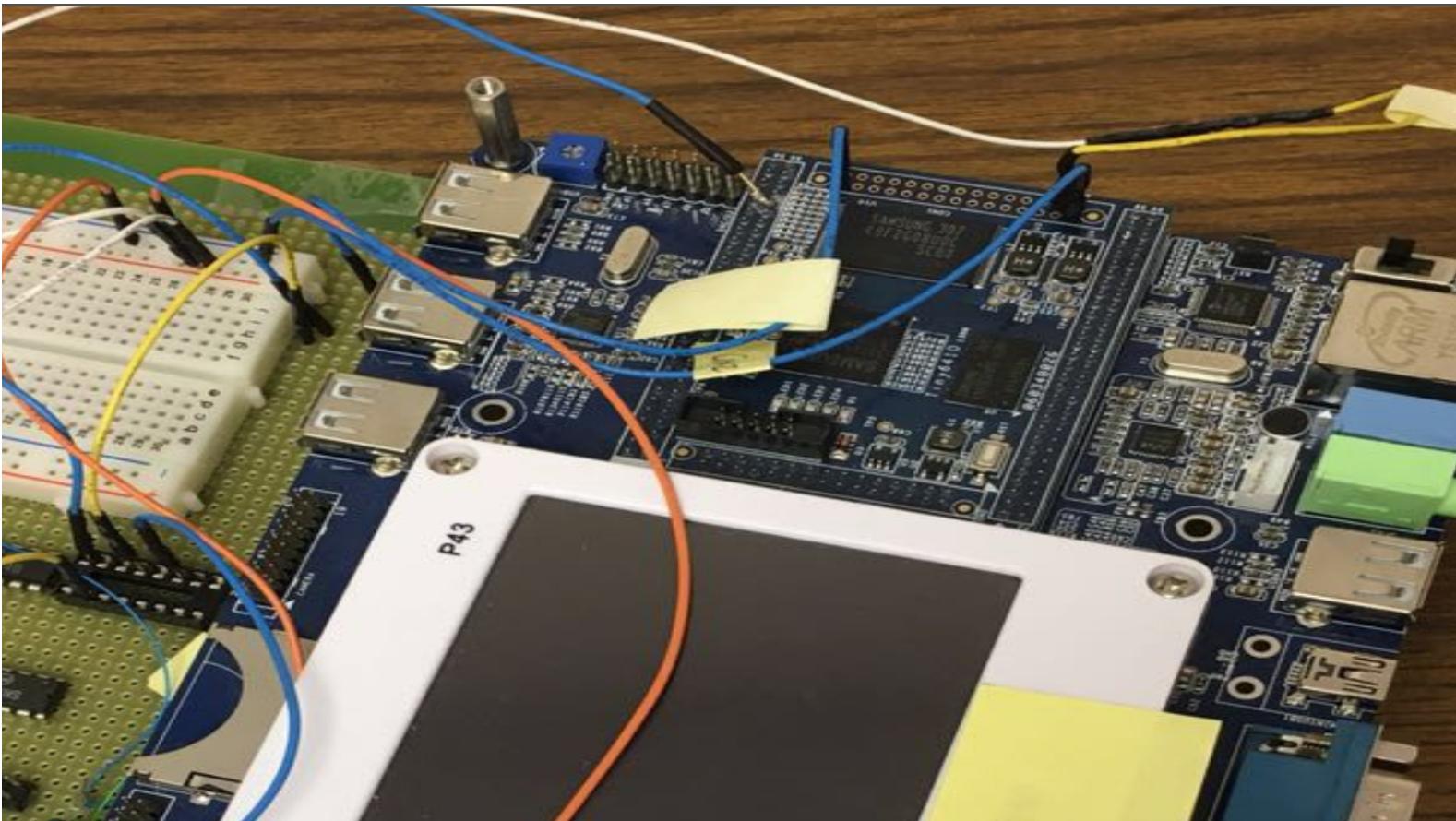
Harry Li, Ph.D.

Device driver

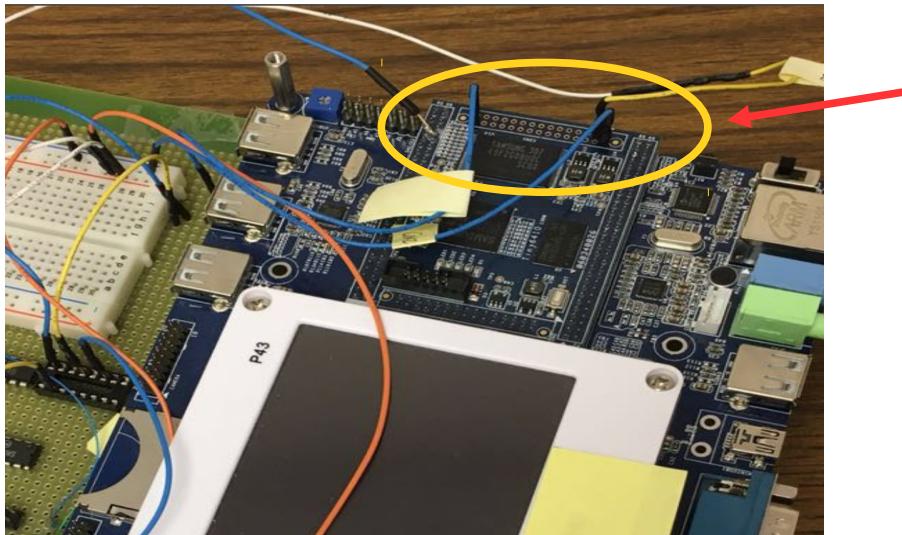
User space: user application program, compile and build the executable

Kernel space:
Device driver example code from source distribution

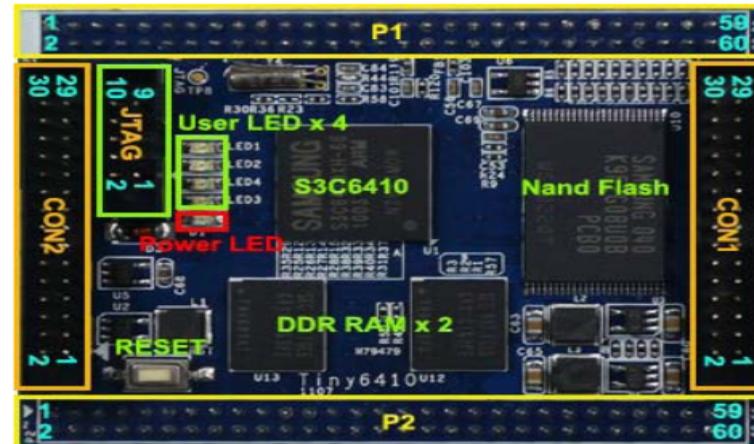
Hardware Pin Connections For HW1



Identify GPP Port From CON1 Connector



CON1.5	GPE3		CON1.6	GPE4
CON1.7	GPM0		CON1.8	GPM1
CON1.9	GPM2		CON1.10	GPM3
CON1.11	GPM4		CON1.12	GPM5
CON1.13	GPQ1		CON1.14	GPQ2
CON1.15	GPQ3		CON1.16	GPQ4
CON1.17	GPQ5		CON1.18	GPQ6
CON1.19	SPICLK0		CON1.20	SPIMISO0
CON1.21	SPICS0		CON1.22	SPIMOSI0
CON1.23	EINT6		CON1.24	EINT9
CON1.25	EINT11		CON1.26	EINT16
CON1.27	EINT17		CON1.28	AIN2
CON1.29	AIN3		CON1.30	DACOUT1



Option 2 NVDA NANO Development Platform

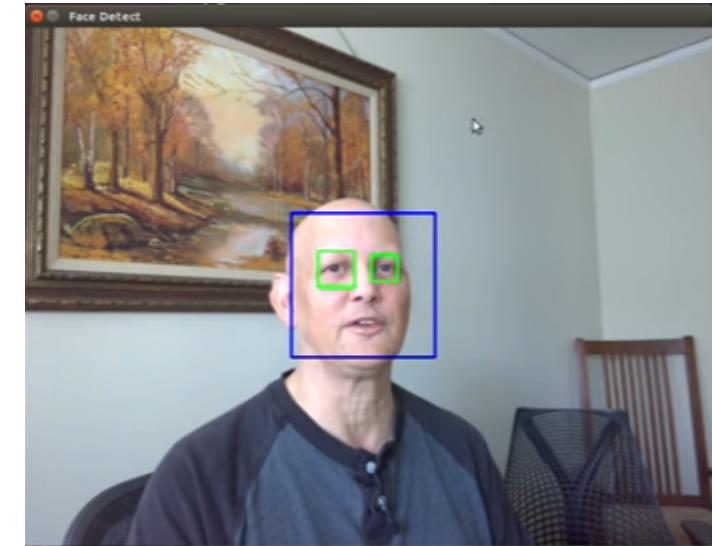
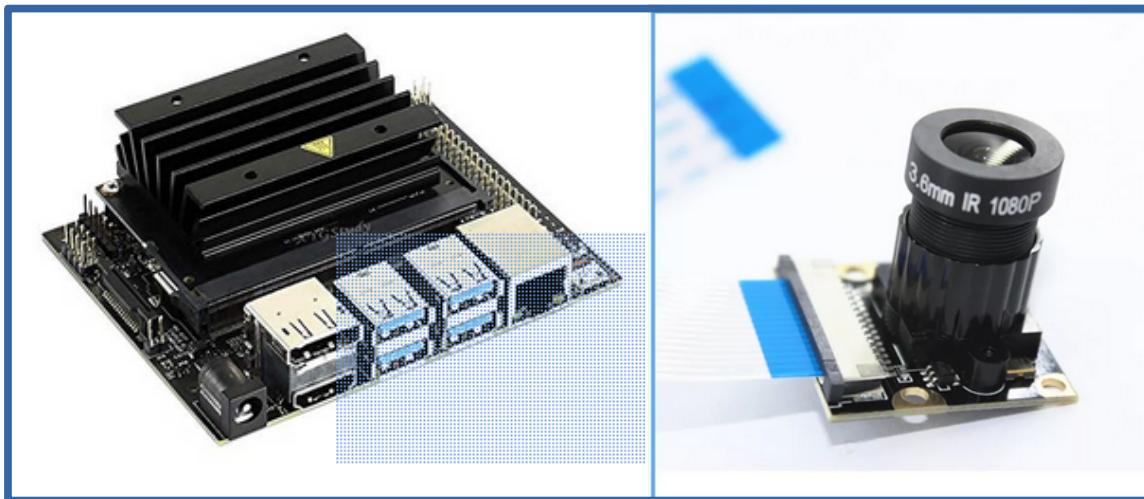


CAM Plus Jetson Nano

YouTube <https://www.youtube.com/watch?v=dHvb225Pw1s>

Python sample code for image processing.
Use Gstreamer pipeline for display video; openCV
demo for face detection.

1280 x 720 @ 120 frames per second



Jetson Nano
Developer Kit for AI
by NVIDIA Jetpack
Quad-core 64-bit

Jetson Nano delivers 472 GFLOPS for running modern AI algorithms fast, with a quad-core 64-bit ARM CPU, a 128-core integrated NVIDIA GPU, as well as 4GB LPDDR4 memory. It runs multiple neural networks in parallel and processes several high-resolution sensors simultaneously. Jetson Nano is also supported by NVIDIA JetPack, which includes a board support package (BSP), CUDA, cuDNN, and TensorRT software libraries for deep learning, computer vision, GPU computing, multimedia processing, and much more. The SDK also includes the ability to natively install popular open source Machine Learning (ML) frameworks such as TensorFlow, PyTorch, Caffe / Caffe2, Keras, and MXNet, enables the developers to integrate their favorite AI model / AI framework into products easily.

GPU: 128-core Maxwell GPU CPU: quad-core ARM Cortex-A57 CPU Memory: 4GB 64-bit LPDDR4 Storage: Micro



Spec

Table 1.1 Nano

System
Jetson Nano delivers 472 GFLOPS
quad-core ARM Cortex-A57 CPU
128-core Maxwell GPU
4GB LPDDR4 memory
Storage: Micro SD card slot (minimum 16G TF card)
Software
Supported by NVIDIA JetPack which includes a board support package (BSP)
CUDA, cuDNN, and TensorRT for deep learning

Table 1.2 Pie

System
Chip: Broadcom BCM2837B0, Cortex-A53 (ARMv8)
64-bit SoC @ 1.4GHz
1GB LPDDR2 SDRAM
2.4GHz and 5GHz IEEE 802.11.b/g/n/ac Wireless
Bluetooth 4.2, BLE
Gigabit Ethernet over USB 2.0 (upto 300 Mbps)
Full-size HDMI
4 USB 2.0 ports
CSI camera port
DSI display port for touchscreen display
4-pole stereo output and composite video port
Micro SD ports
Power-over-Ethernet (PoE) (separate PoE HAT)
Software
Linux OS
OpenCV
Deep Learning ready for Python and C/C++ code



CAM Plus Nano

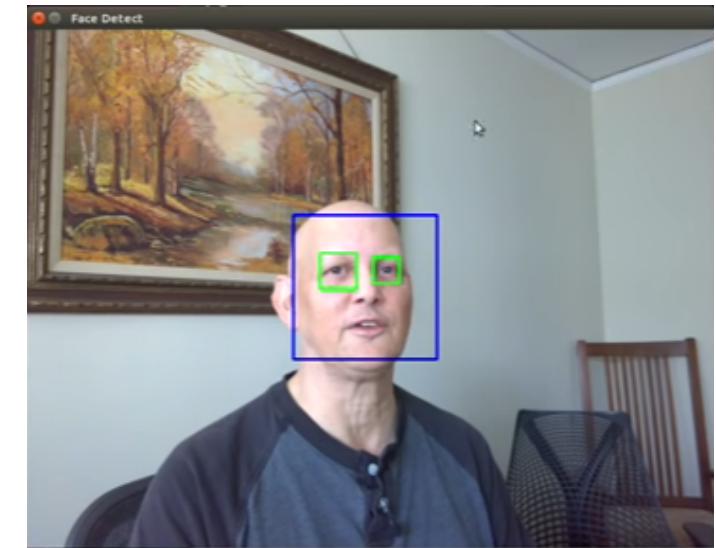
YouTube <https://www.youtube.com/watch?v=dHvb225Pw1s>

Python sample code for image processing.
Use Gstreamer pipeline for display video; openCV
demo for face detection.

1280 x 720 @ 120 frames per second



Price: \$161.81 &
FREE Shipping



Jetson Nano Developer Kit for AI by NVIDIA Jetpack Quad- core 64-bit ARM

Jetson Nano delivers 472 GFLOPS for running modern AI algorithms fast, with a quad-core 64-bit ARM CPU, a 128-core integrated NVIDIA GPU, as well as 4GB LPDDR4 memory. It runs multiple neural networks in parallel and processes several high-resolution sensors simultaneously. Jetson Nano is also supported by NVIDIA JetPack, which includes a board support package (BSP), CUDA, cuDNN, and TensorRT software libraries for deep learning, computer vision, GPU computing, multimedia processing, and much more. The SDK also includes the ability to natively install popular open source Machine Learning (ML) frameworks such as TensorFlow, PyTorch, Caffe / Caffe2, Keras, and MXNet, enables the developers to integrate their favorite AI model / AI framework into products easily.

GPU: 128-core Maxwell GPU CPU: quad-core ARM Cortex-A57 CPU Memory: 4GB 64-bit LPDDR4 Storage: Micro



Pie Intrusion Detection

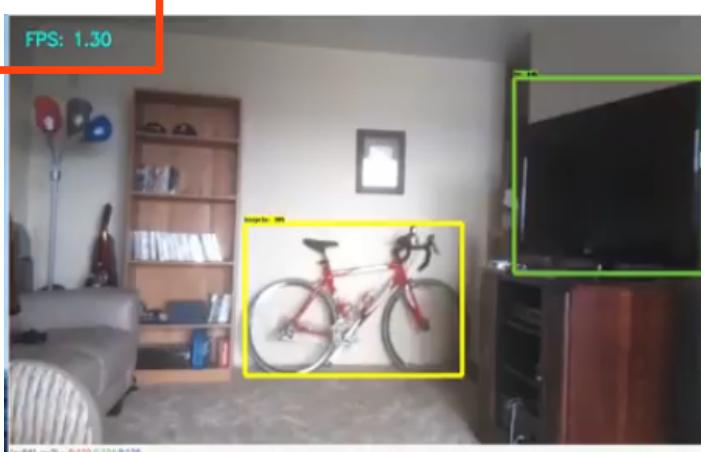
Example:



[https://www.youtube.com/watch?](https://www.youtube.com/watch?v=zqlBce4LKx8)

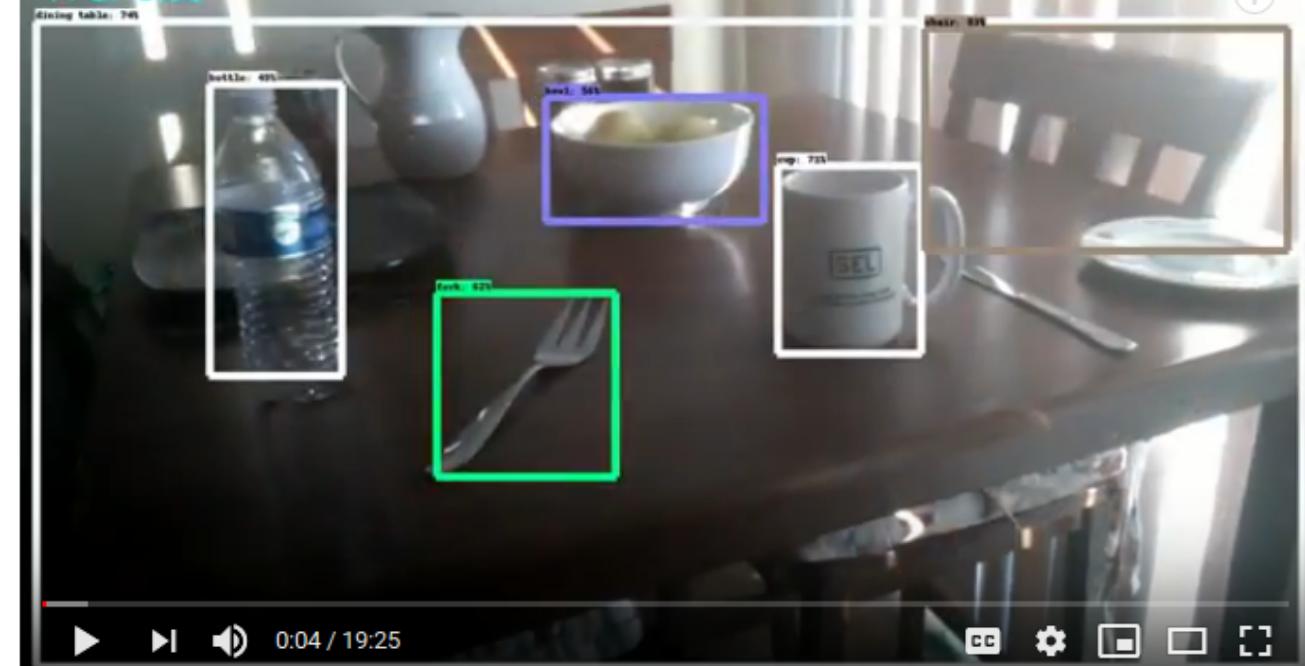
v=zqlBce4LKx8

<https://www.youtube.com/watch?v=npZ-8Nj1YwY>



Fps:

FPS: 0.93

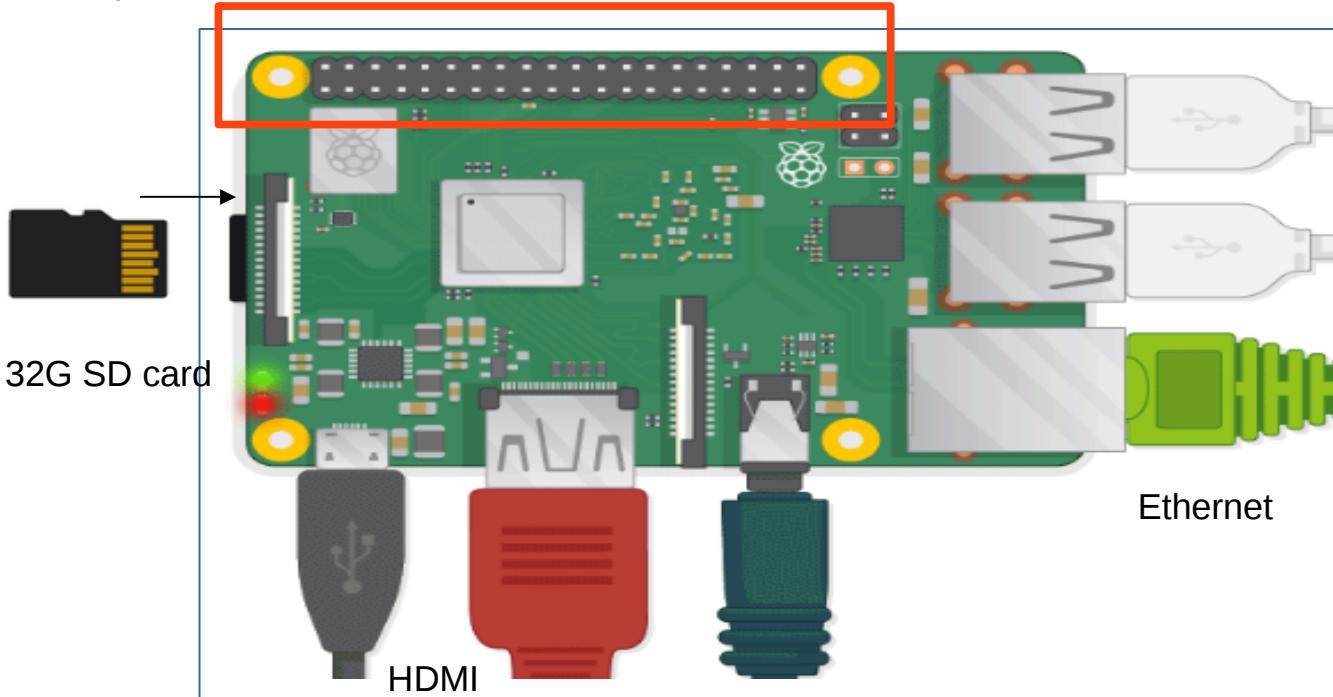


Option 3 Pie Development Platform

Pie-3 Board

<https://www.raspberrypi.org/help/>

Expansion Connectors



The Raspbian Operating System via NOOBS

Using the NOOBS software to install Raspbian OS on your SD card.

Download NOOBS at (<https://www.raspberrypi.org/downloads>).

OS: Raspbian, comes pre-installed with many software. It supports Python, Scratch, Sonic Pi, Java and more.

C++/C programming for pie

<https://raspberry-projects.com/pi/category/programming-in-c>

Eclipse Linux

Using A Linux PC With A Cross Compiler: this page does not exist

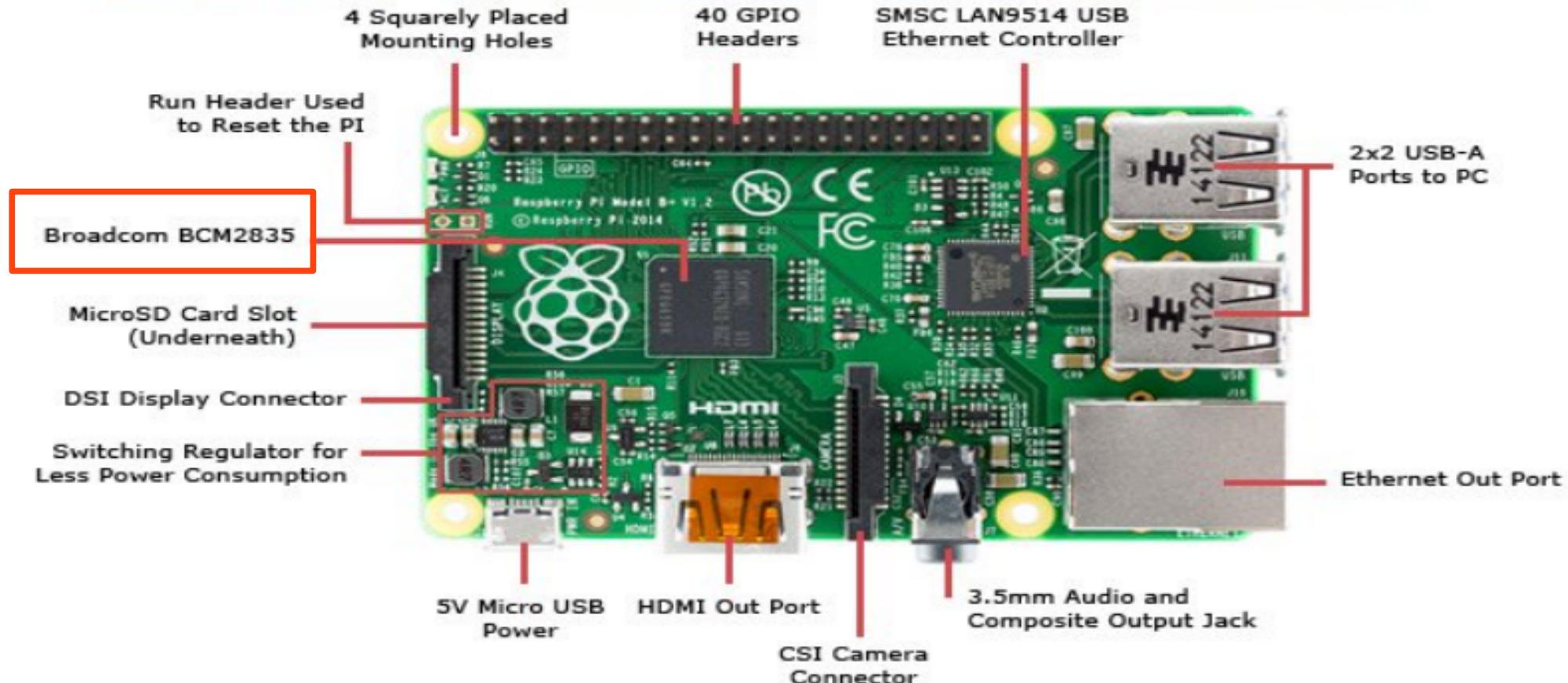
C programming for pie

<https://raspberry-projects.com/pi/programming-in-c/getting-your-raspberry-pi-ready-for-c-programming>

GPIO Testing

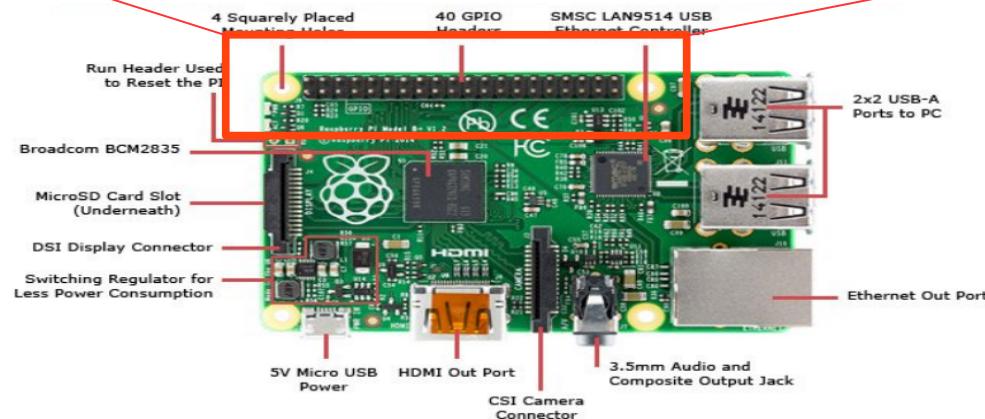
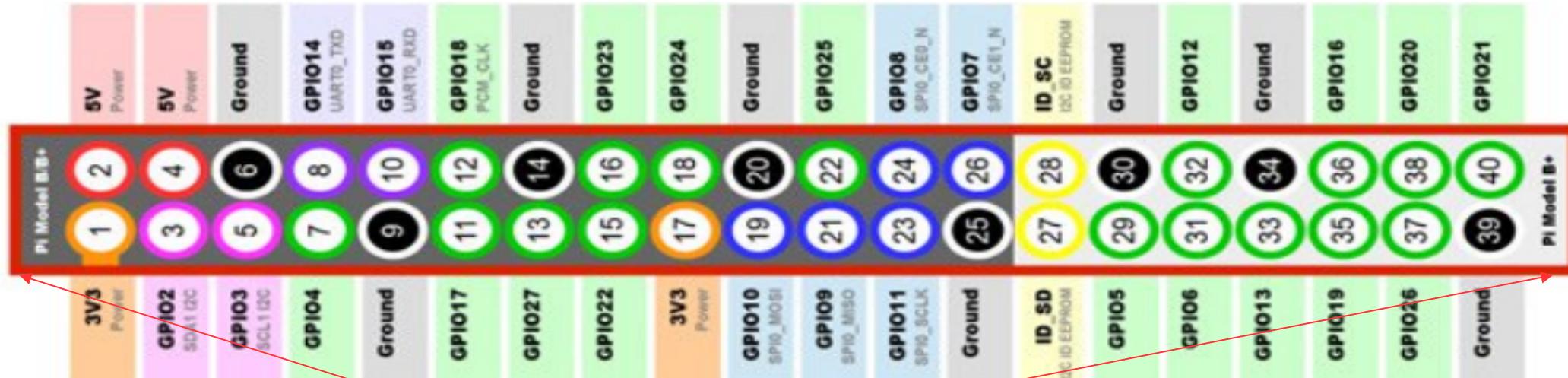
Pie-3 Version B GPIO Pins

<https://www.jameco.com/Jameco/workshop/circuitnotes/raspberry-pi-circuit-note.html>



Pie-3 Version B GPIO Pins

<https://www.jameco.com/Jameco/workshop/circuitnotes/raspberry-pi-circuit-note.html>



Option 4 RISC-V Target Development Platform



RISC-V SiFive Team

<https://www.crowdsupply.com/sifive/hifive-unleashed/updates>



**Andrew
Waterman**



Yunsup Lee



Krste Asanovic



Palmer Dabbet



Jack Kang



Naveed Sherwani



Sunil Shenoy



**The Rest of the
SiFive Team!**

Maix Development Kit For AI

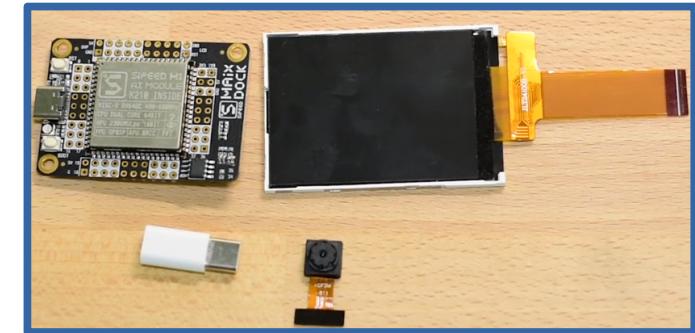
Get the one with
WIFI support

MAIX's Deep
learning

<https://www.seeedstudio.com/Sipeed-M1-dock-suit-M1-dock-2-4-inch-LCD-OV2640-K210-Dev-Board-1st-RV64-AI-board-for-Edge-Computing.html>

1. MAIX support fixed-point model that the mainstream training framework trains, according to specific restriction rules, and have model compiler to compile models to its own model format.

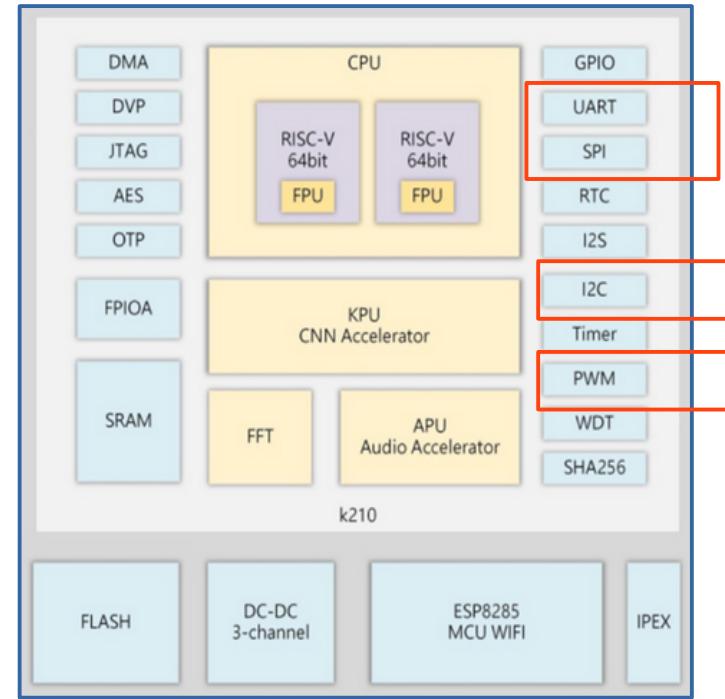
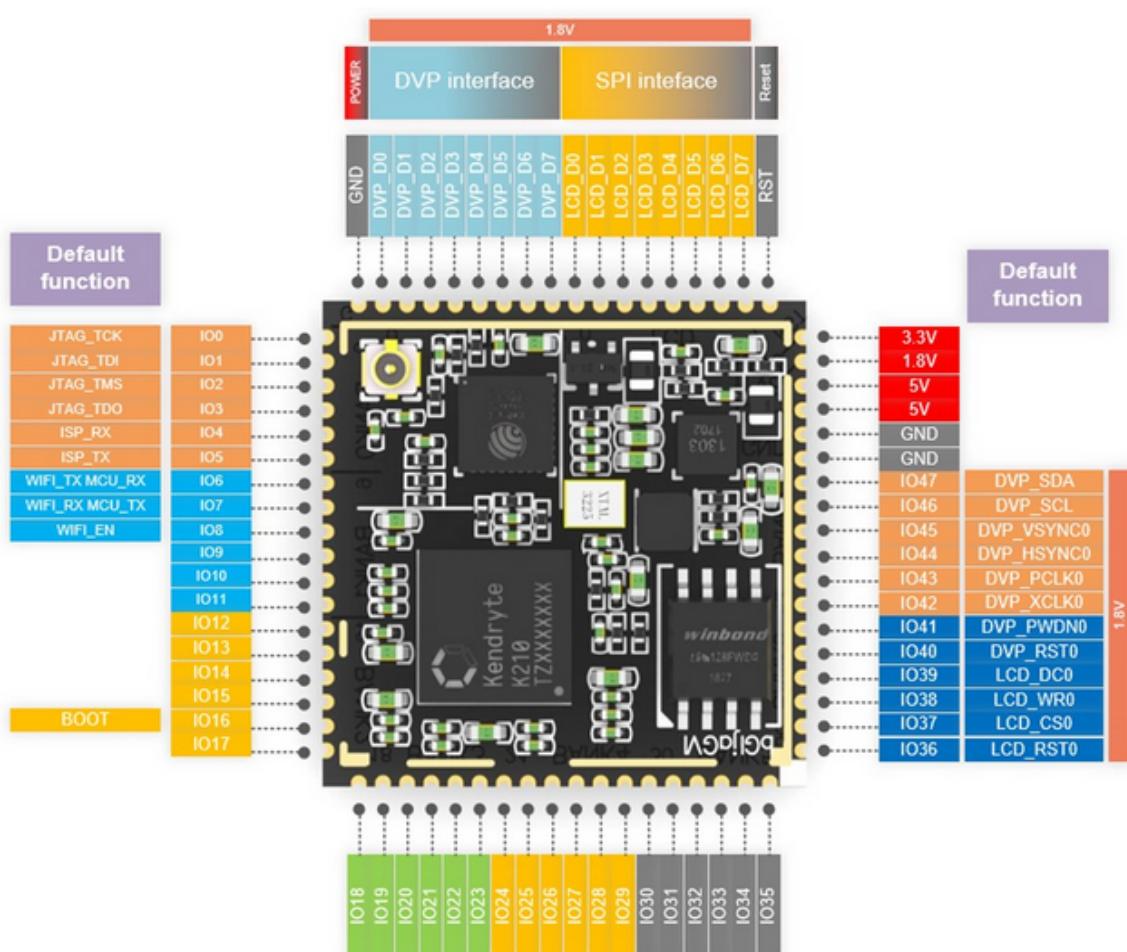
2. It support
(2.1) tiny-yolo,
(2.2) mobilenet-v1, and,
(2.3) TensorFlow Lite! Many TensorFlow Lite model can be compiled and run on MAIX!



SPECS/BOARD	K210
Number of Cores	2
Architecture	64 Bit
CPU Frequency	400 MHz
Neural Network Hardware	YES
WiFi	NO
BLUETOOTH	NO
RAM	8 MB
FLASH	16 MB
GPIO PINS	48
Busses	I2C, SPI,I2S

Maix Development Kit

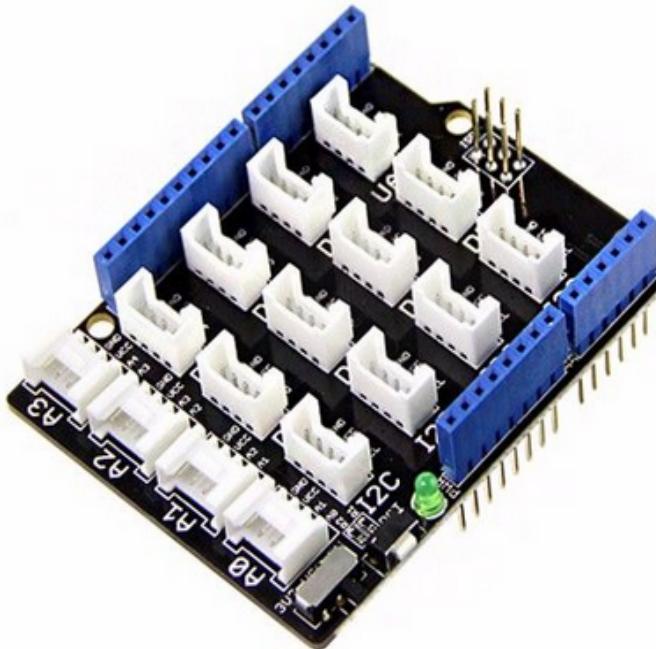
<https://www.seeedstudio.com/Sipeed-M1-dock-suit-M1-dock-2-4-inch-LCD-OV2640-K210-Dev-Board-1st-RV64-AI-board-for-Edge-Computing.html>



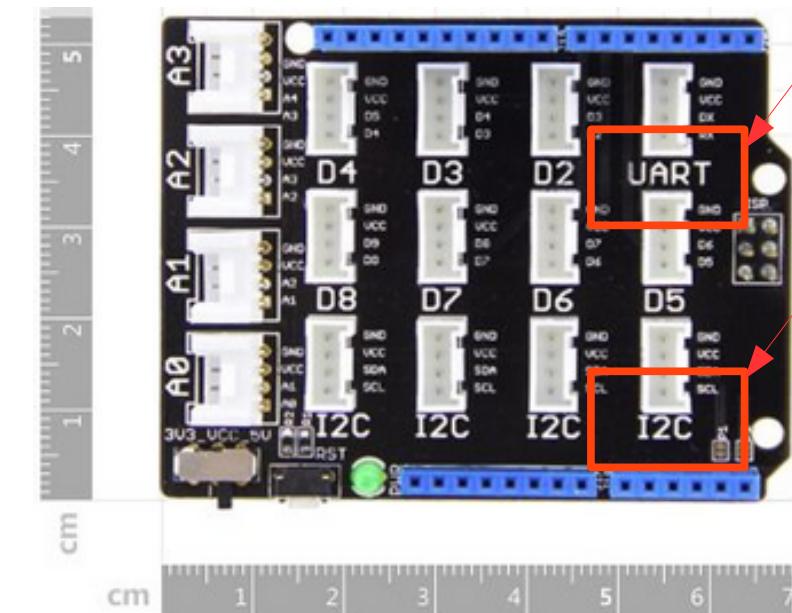
All usable IO breaks out as 1.27mm(50mil) pins, and pin's voltage is selectable from 3.3V and 1.8V.

Maix Shield Board

Compatible with lots of Arduino board [Rich grove](#)
connectors Same pinout as Arduino Uno R3
Selectable voltage

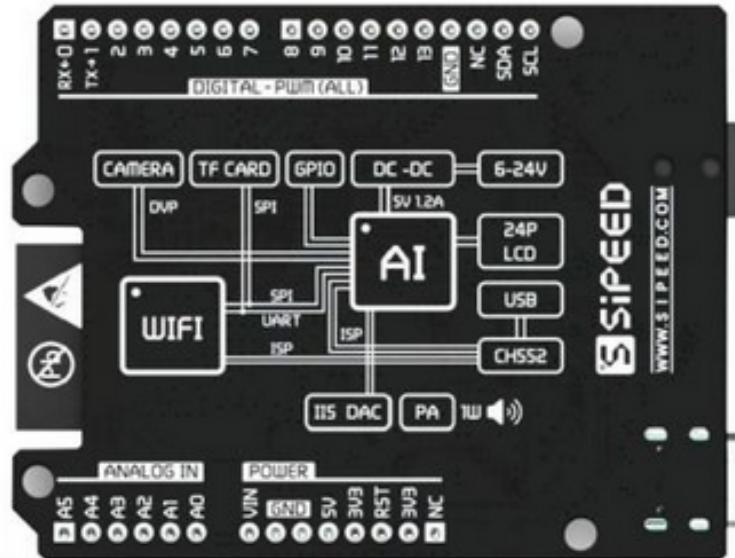
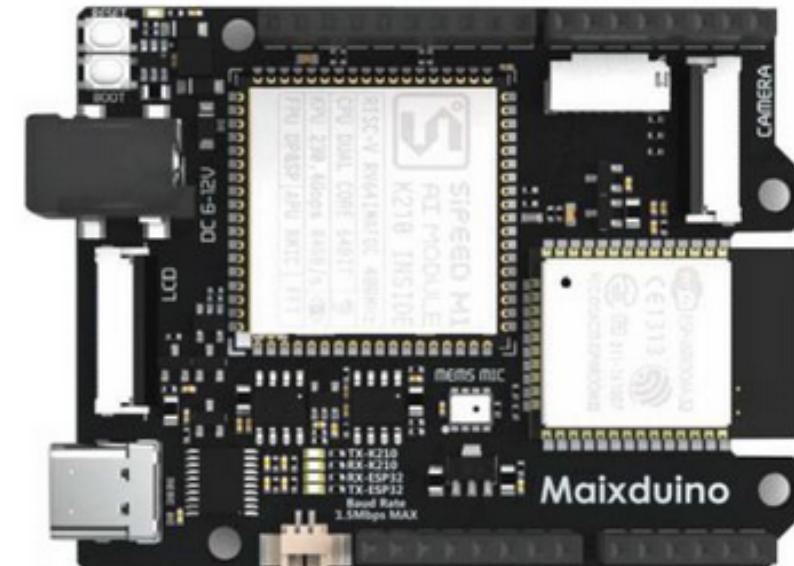
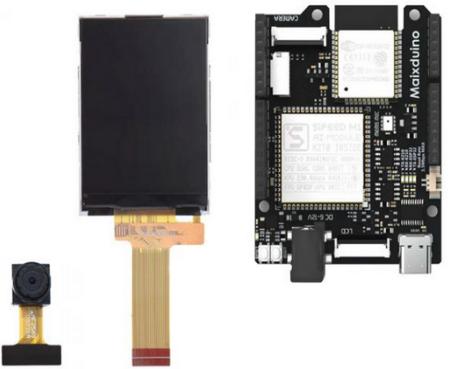


Specification	Name	Qty
Analog	A0/A1/A2/A3	4
Digital	D2/D3/D4/D5/D6/D7/D8	7
UART	UART	1
I2C	I2C	4



Kit For AI + IoT

<https://www.seeedstudio.com/Sipeed-Maixduino-Kit-for-RISC-V-AI-IoT-p-4047.html>



Option 6 RISC-V Target Development Platform

RISC-V FPGA SoC

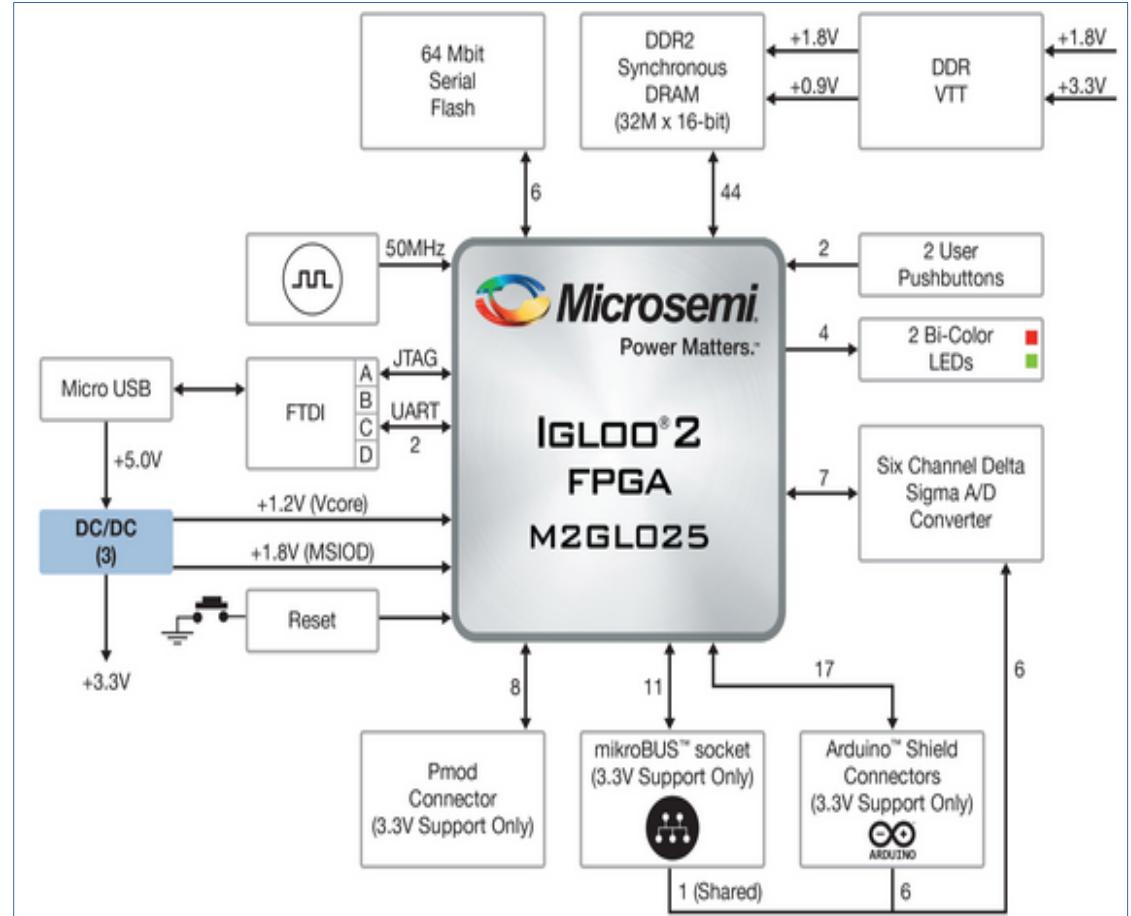
<https://www.microsemi.com/existing-parts/part/143948>

IGLOO2 RISC-V Creative Development Board

Microsemi's IGLOO2 FPGA is **pre-programmed with a RISC-V core** and peripherals. The IGLOO2 RISC-V Creative Development Board boasts a 25K logic element (LE) FPGA, offering the lowest cost of entry for both software and hardware engineers who want to evaluate and implement their own unique designs. The out of the box demo is the RISC-V core running a hello world demo.



To order
<https://www.futureelectronics.com/resources/videos/future-electronics-microsemi-creative-development-board>

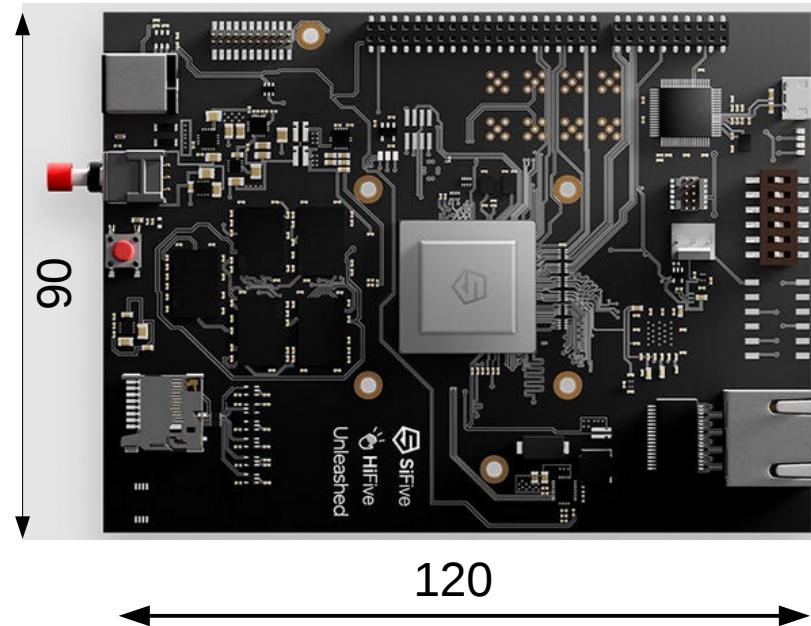




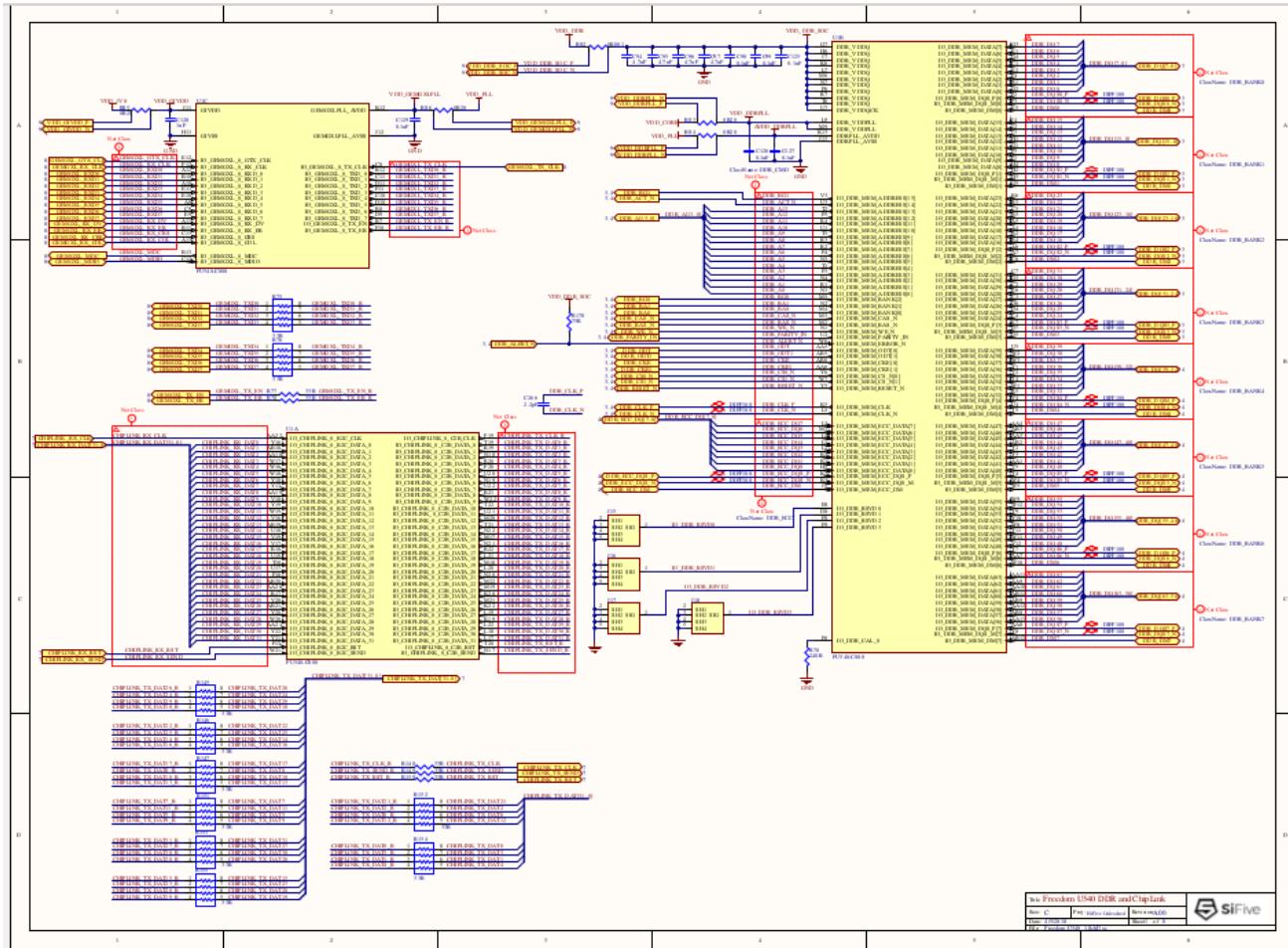
• Freedom U540 RISC-V With Linux

<https://www.sifive.com/boards/hifive-unleashed>

Freedom U540



• Freedom U540 RISC-V SCH





SiFive RISC-V Expansion Board

one year Libero GOLD License (\$995 value). Initially, the kit will include only a fixed bitstream that can enable a PCIe Root Complex.

<https://www.crowdsupply.com/microsemi/hifive-unleashed-expansion-board>

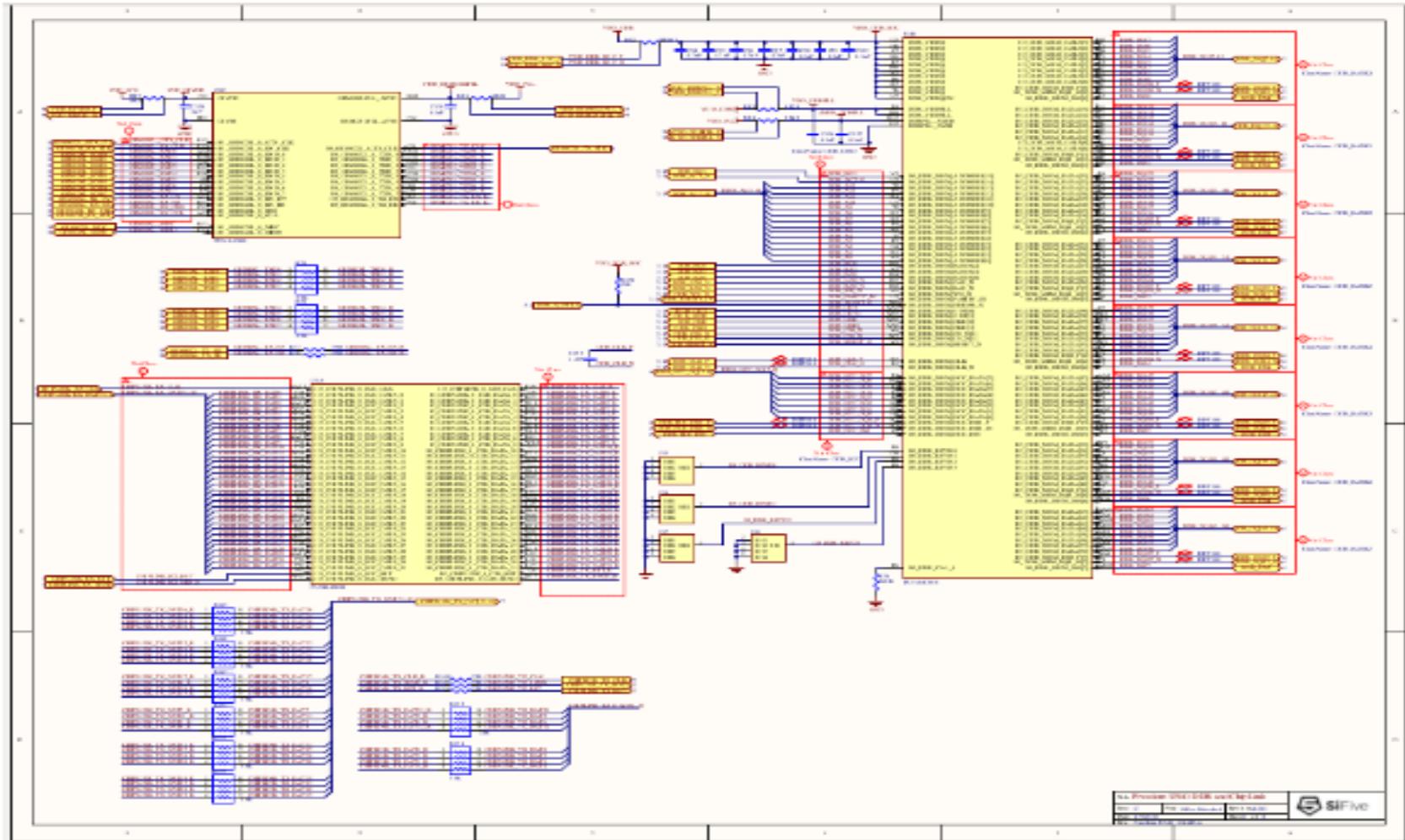
The HiFive Unleashed has a companion Expansion Board from Microsemi which features a mating connector, Polarfire FPGA and a bunch of peripheral I/O.



<https://www.crowdsupply.com/microsemi/hifive-unleashed-expansion-board>

complete Linux applications on a modern RISC-V CPU running at 1 GHz+

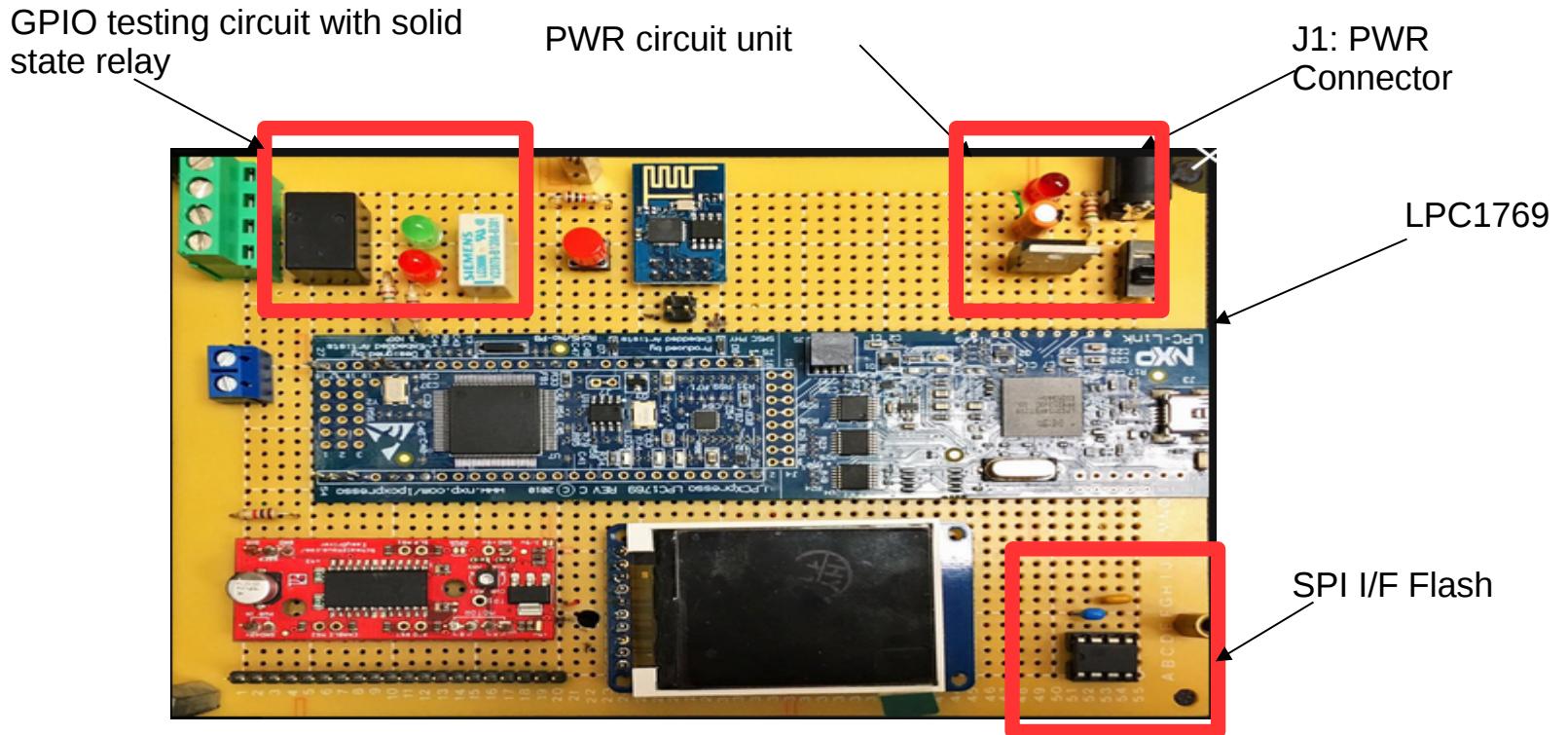
Freedom U540 RISC-V SCH



Option 5 NXP LPC1769 Development Platform

System Layout Design

Front Side



Dimension: 16 x 11 mm or 6.25 x 4.50 inch

Overview: Three Aspects Into One

For Advanced Microprocessor Systems

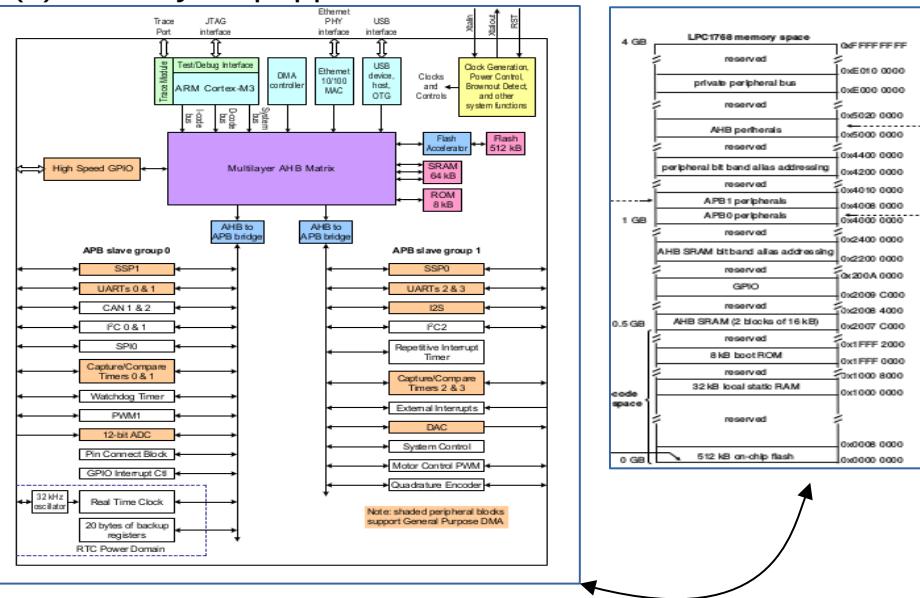
1. CPU data sheet UM10360

NXP Semiconductors

LPC17xx user manual

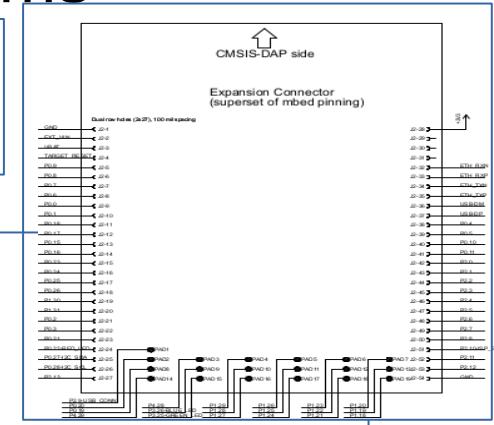
(1) CPU Block Diagram: pp. 9

(2) Memory map: pp. 14



2. Schematics of the board design

LPCXpresso1769_CD_revD(1)



3. Compiler (IDE: integrated development platform)

The MCUXpresso IDE

3.1 GUI

3.2 Cross compiler

3.3 flash writer

3.4 processor specific source code to port the compiled program to the CPU

lpcopen_2_10_lpcxpresso_nxp_lpcxpresso_1769

Identify CPU Pins From The Connector For SPI Interface Design

LPCXpresso	
GND	J2-1
VIN (4.5-5.5V)	J2-2
VBAT (battery supply)	J2-3
RESET_N	J2-4
P0.9 MOSI1	J2-5
P0.8 MISO1	J2-6
P0.7 SCK1	J2-7
P0.6 SSEL1	J2-8

Dual row holes (2x27).

