UnitV(OV7740)

SKU:U078-C

Description

UnitV(OV7740) is the new AI Camera powered by Kendryte K210, an edge computing system-on-chip(SoC) with dual-core 64bit RISC-V CPU and state-of-art neural network processor.

UNIT-V AI Camera features its integration with machine vision capabilities, featuring the unprocessed acceptability to AI Visioning with high energy efficiency and low cost. We co-oped with Sipeed providing the MicroPython environment makes programming on UNIT-V easier.

Support MicroPython development environment, which makes the program code more concise when you use UNIT-V for project development.Equipped with OV7740 image sensor, it is an ideal choice for machine vision project.

It is equipped with two programmable keys and an RGB LED indicator on the front for convenient status display.At the bottom, there is a HY2.0*4P interface and a type-C interface compatible with grove, which is convenient to connect with the main controller. Support TF card to expand memory, related material and model file call more convenient.

Product Features

- Dual-Core 64-bit RISC-V RV64IMAFDC (RV64GC) CPU / 400Mhz(Normal)
- Dual Independent Double Precision FPU
- 8MiB 64bit width On-Chip SRAM
- Neural Network Processor(KPU) / 0.8Tops
- Field-Programmable IO Array (FPIOA)
- AES, SHA256 Accelerator
- Direct Memory Access Controller (DMAC)
- Micropython Support
- Firmware encryption support
- On-board Hardware resources:
    - Flash: 16M
    - Camera :OV7740
    - Button: button * 2
    - Indicator light: WS2812 LED
    - External storage: TF card/Micro SD
    - Interface: HY2.0/compatible GROVE

Include

1x UNIT-V(include 20cm 4P cable and USB-C cable)

Applications

- Face recognition/detection
- Object detection/classification
- Obtaining size and coordinates of the target in real-time
- Obtaining the type of detected target in real-time
- Shape recognition
- Video recoder

USB Drive problems

> UnitV/M5StickV/M5StickC/ATOM may not work without driver in some systems. Users can manually install FTDI driver to fix this problem.

Specification

Resources	Parameter
Kendryte K210	Dual-Core 64-bit RISC-V RV64IMAFDC (RV64GC) CPU / 400Mhz(Normal)
SRAM	8MiB
Flash	16M
Input voltage	5V @ 500mA
KPU Neural network parameter size	5.5MiB - 5.9MiB
Interface	TypeC x 1, GROVE(I2C+I/0+UART) x 1
RGB LED	WS2812 x 1
Button	x 2
Image Sensor	OV2640
FOV	65deg
External storage	TF Card/Micro SD
Net weight	8g
Gross weight	45g
Product Size	40mm * 24mm * 13mm
Package Size	70mm * 50mm * 30mm
shell material	Plastic (PC)

About KENDRYTE K210

The Kendryte K210 is a system-on-chip (SoC) that integrates machine vision. Using TSMC's ultra-low-power 28-nm advanced process with dualcore 64-bit processors for better power efficiency, stability and reliability. The SoC strives for "zero threshold" development and to be deployable in the user's products in the shortest possible time, giving the product artificial intelligence

- Machine Vision
- Better low power vision processing speed and accuracy
- KPU high performance Convolutional Neural Network (CNN) hardware accelerator
- Advanced TSMC 28nm process, temperature range -40°C to 125°C
- Firmware encryption support
- Unique programmable IO array maximises design flexibility

- Low voltage, reduced power consumption compared to other systems with the same processing power
- 3.3V/1.8V dual voltage IO support eliminates need for level shifters

The chip contains a high-performance, low power RISC-V ISA-based dual core 64-bit CPU with the following features:

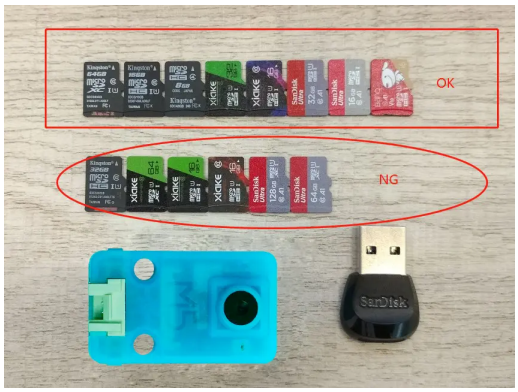
- Core Count： Dual-core processor
- Bit Width: 64-bit CPU 400MHz
- Frequency: 400MHz
- ISA extensions: IMAFDC
- FPU: Double Precision
- Platform Interrupts: PLIC
- Local Interrupts: CLINT
- I-Cache: 32KiB x 2
- D-Cache: 32KiB x 2
- On-Chip SRAM: 8MiB

OV7740

- support for output formats: RAW RGB and YUV
- support for image sizes: VGA, QVGA, CIF and any size smaller
- support for black sun cancellation
- support for internal and external frame synchronization
- standard SCCB serial interface
- digital video port (DVP) parallel output interface
- embedded one-time programmable (OTP) memory
- on-chip phase lock loop (PLL)
- embedded 1.5 V regulator for core
- Sophisticated Edge Rate Control Enables Filterless Class D Outputs
- 77dB PSRR at 1kHz
- Low RF Susceptibility Rejects TDMA Noise from GSM Radios
- Extensive Click-and-Pop Reduction Circuitry
- array size: 656 x 488
- power supply: – core: 1.5VDC ± 5% – analog: 3.3V ± 5% – I/O: 1.7 ~ 3.47V
- temperature range: – operating: -30° C to 70°C – stable image: 0° C to 50° C
- output format: – 8-/10-bit raw RGB data – 8-bit YUV
- lens size: 1/5"
- input clock frequency: 6 ~ 27 MHz
- max image transfer rate: VGA (640x480): 60 fps – QVGA (320 x 240): 120 fp
- sensitivity: 6800 mV/(Lux-sec)
- maximum exposure interval: 502 x tROW
- pixel size: 4.2 µm x 4.2 µm
- image area: 2755.2 µm x 2049.6 µm
- package/die dimensions: – CSP3: 4185 µm x 4345 µm – COB: 4200 µm x 4360 µm

SD card test

UNIT-V does not currently recognize all types of MicroSD cards. We have tested some common SD cards. The test results are as follows.



Brand	Storage	Type	Class	Format	Test Results
Kingston	8G	HC	Class4	FAT32	OK
Kingston	16G	HC	Class10	FAT32	OK
Kingston	32G	HC	Class10	FAT32	NO
Kingston	64G	XC	Class10	exFAT	OK
SanDisk	16G	HC	Class10	FAT32	OK
SanDisk	32G	HC	Class10	FAT32	OK
SanDisk	64G	XC	Class10	/	NO
SanDisk	128G	XC	Class10	/	NO
XIAKE	16G	HC	Class10	FAT32	OK(purple)
XIAKE	32G	HC	Class10	FAT32	OK
XIAKE	64G	XC	Class10	/	NO
TURYE	32G	HC	Class10	/	NO

PinMap

UnitV	GPIO8	GPIO19	GPIO18	GPIO34,GPIO35
Hardware	RGB LED	Button A	Button B	
HY2.0-4P				Interface