



Lindenis V5 SBC

Lindenis V5 is a cost-effective AI video processing SBC. Powered by Allwinner V5 V100, with various interfaces. Running on Linux. Integrated intelligent analysis accelerate engine and Allwinner ISP 5.0. Supports AI video analysis, 4K smart encoding and 360 panoramic stitching with hardware acceleration.

Designed by Lindenis Tech. Ltd.

Lindenis V5 Key Features

The most cost-effective AI video processing SBC

Powered by Allwinner V5 V100. Running on Linux.



Intelligent Video Analysis

- Face detection and recognition
- Intelligent motion detection
- Human counting
- Vehicle license plate recognition
- Binocular DOF image

4K Smart Encoding

- H.264 BP/MP/HP, H.265 MP, MJPEG/JPEG baseline encoding ٠
- I/P Frame, Smart P frame reference
- Real-time multi stream H.264/H2.65 encoding, 3840x2160@30fps+VGA@30fps+3840x2160@1fps snapshot
- Supports CBR and VBR mode, 2kbps~100Mbps
- H265/H264/MJEPG decoding, up to 4K@30fps



360 Panoramic Stitching with Hardware Acceleration

HDMI 1.4

- Lens distortion correction and fisheye correction
- Binocular stitching (360° panorama, 180° wide angle)











130 x 85mm size

Quad-core Cortex-A7

1GB/2GB (option) DDR3 RAM

USB 2.0



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Professional Image Effects

- Dual individual ISP, ISP1 supports 4244x3168, ISP2 supports 3264x2448
- Adjustable 3A functions (AE, AWB, and AF)
- Highlight compensation, backlight compensation, gamma correction, and color enhancement
- Supports defect pixel correction, 2D/3D denoising
- Supports sensor built-in WDR, 2F-Frame/Line base WDR, Local Tone mapping

Various interfaces

- Supports 2 x MIPI-CSI2, 4 x AHD, 1 x DVP input
- Supports BT1120 input/output
- Supports Line-in/Line-out
- Supports Dual-channel differential MIC inputs
- Supports WiFi 802.11ac / BT4.2 (option)





EVE – Embedded Vision Engine

- Designed for rigid target (such as human face, head, shoulders and etc.) detection
- 360p detection speed is more that 30fps
- Minimum single-image detection of 64x64 pixel
- Maximum 4K resolution input and internal scaling, supporting interesting region detection
- Supports classic HARR feature classifier detection, with at most 3200 features numbers
- Supports 4-channel integral graph calculation, performing 13 billion features per second
- Supports 3-channel feature calculation
- User-defined target size: up to 432 kinds of detection frame
- Classifier visual design, providing full tools such as training/debugging/testing/evaluation
- Customizable classifier, supporting arbitrary small deformation rigidity target detection

CVE – Computer Vision Engine

- Designed for moving target (car, pedestrian, animal and etc.) detection
- D1 resolution is up to 10fps
- Minimum 8x8 pixel for small object detection
- Maximum image of 720p
- Supports various intelligent analysis applications
- Perimeter intruder detection supports maximum warning region numbers of 32
- Perimeter intruder detection can classify people and car by combining calibration algorithm
- Warning line detection supports maximum trip wires of 32-line
 - Warning line detection supports single/dual direction detection



Image Signal Processor Performance

- 2-channel independent ISP processing, ISP1 Maximum support 4224x3168@30fps, ISP2 Maximum support 3264x2560@30fps
- Adjustable 3A functions (AE, AWB and AF)
- Highlight compensation, backlight compensation, gamma correction and enhancement
- Defect pixel correction, 2D/3D denoising
- Support sensor built-in WDR, 2F Frame base/line base WDR, Local tone mapping
- Support 4-channel 1/64~1x scale output, include 2-channel support frame buffer compression
- OSD overlaying of eight regions before encoding
- Picture mirroring and flipping

Image Stitch Engine Performance

- Fisheye correction and lens distortion correction
 - Supports Semi-Planar 420/422 input, minimum input resolution is 1366x768, maximum is 2048x2048 (for 360 mode), 3000x3000 (for other modes)
 - Supports Semi-Planar 420/422, Planar 420/422 output
- Binocular fisheye stitching
 - Supports dual channels of 8-bit YUV420/YUV422 image input, minimum resolution of each input channel is 320x320, maximum is 4032x4032
 - Supports 8-bit YUV420, YVU420, YUV420P/YUV422, YVU422, YUV422P image output
- Binocular image stitching
 - Supports dual channels of 8-bit YUV420/YUV422 image input, maximum resolution of each input channel is 2560x1728, maximum FOV is 115°
 - Supports spherical projection
 - Supports 8-bit YUV420/YUV422 image output, maximum resolution of output is 4096x2048, maximum FOV is 200°
- Supports scale (0.125~1), mirror and flip

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Video Encoding/Decoding Performance

- H.264 BP/MP/HP, H.265 Main Profile encoding
- I/P Frame, Smart P frame reference
- MJPEG/JPEG baseline encoding
- Real-time multi-stream H.264/H.265 encoding capability: 3840x2160@30fps + VGA@30fps + 3840x2160@1fps snapshot
- Maximum JPEG snapshot performance of 3840x2160@30fps
- Maximum H.264/H.265/MJEPG decoding performance of 3840x2160@30fps
- CBR, VBR modes
- Encoding of eight ROIs
- Support frame buffer uncompression





(b) Lindenis V5 Hardware Specification

- CPU: Quad-core ARM Cortex-A7 Processor@1512Mhz
- AIE: Built-in with intelligent analytics acceleration engine
- IPU: Dual ISP 13M@30fps + 8M@30fps, Fisheye, Stitching
- VPU: H.264/H.265 4K@30fps Encoding and Decoding
- Memory: 1GB/2GB (option) DDR3
- Storage: Bootable MicroSD card, do not have built-in flash
- Video out: HDMI 1.4, 4 lanes MIPI-DSI
- Video in: 2 x MIPI-CSI2
- Audio: 3.5mm Line in / out, 2 x mic
- Network: 10/100/1000Mbps Ethernet
- USB: 1 x MicroUSB, 4 x USB 2.0
- Input Power: 5V@2A micro USB connector, 3.7V Li-Ion battery connector
- Board Dimensions: 130 x 85mm

Expansion Ports

- Board to Board connector: Flash module interface
- Wi-Fi/BT Module Header: SDIO 3.0 and UART
- 2x20 pins "PI BUS" GPIO Header: compatible with Raspberry
- 2x3 pins GPIO Header: 2 x ADC
- 2x7 pins "I2S" GPIO Header
- VBAT: Battery connector
- 2x28 pins "CSI0" and "CSI1" GPIO Header: 4 x AHD, 1 x DVP, etc.



Lindenis V5 Dimensions

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b Lindenis V5 Software Specification

Linbian OS

- The recommended OS for normal use on Lindenis V5.
- A free operating system based on Debian, optimised for the Lindenis V5 hardware. You can use it to build some creativity app, or use it for engineering validation test. Feel free to coding and compiling on it directly, no need to cross build anymore.
- Scalable. The image is easy cut to 16MB and store on SPINOR.

Applications

- Media player: A GStreamer based video player.
- Camera: A GStreamer based camera app.
- Streaming Server: A GStreamer based RTSP server.
- Face recognition: A face detection and recognition app.
- Motion detection: A intelligent motion detection app.
- Human counting: A human counting app.
- VLPR: A vehicle license plate recognition app.

Framework

- GStreamer: An open source media framework with hardware acceleration.
- Tensorflow: An open source machine learning framework.



Linbian OS Architecture

(Cont.) Lindenis V5 Software Specification (Cont.)

Libraries

- OpenMAX: Video decoder / encoder plugin for GStreamer.
- Idcamsrc: Lindenis camera source plugin for GStreamer.
- EVE: is a embedded vision engine.
- CVE: is a compute vision engine.
- OpenCV / Compute Library: is open source compute vision and machine learning libraries.

Linux Kernel

• Official version: 4.4

Product Plan

- Commit to Linux mainline Started at 2019-03
- Joint Open AI Lab Realease Embedded Deep Learning Face Recognition SDK 2019-03

Lindeni Official Info:

Official Website: www.lindeni.org.

Product Link: https://www.aliexpress.com/store/4504082

https://shop581648038.taobao.com/

- Official Wiki: https://shop581648038.taobao.com/
- Official Forum: http://forum.lindeni.org/
- Official Email:services@lindeni.com



Lindenis Tech. Ltd. is a industry leading system soultion provider. Sinces its inception in 2017, Lindenis has focused on the R&D of embedded platform, helping to speed-up the time to market of products in industries.

The founding team is from the core team of Allwinner and has many years R&D and innovation experience in the Linux and Android and other operating system technologies.





Product & Solution

Single board computer Video codec system solution Smart home system solution Industrial control system solution



Operating System

Linux Android RTOS



Services

Product design Customized services Production services



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