



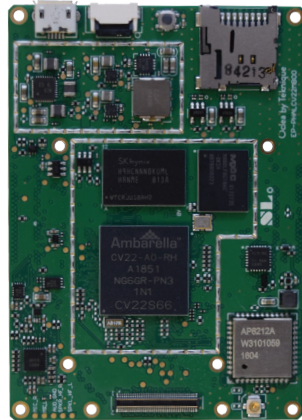
Endless Applications

by **teknique.**

# Oclea™ CV22 SoM Product Brief

## Overview

The Oclea™ CV22 System on Module (SoM) combines the Ambarella™ CV22 SoC, DRAM, FLASH, and key peripherals together in single package enabling the next generation of computer vision applications in surveillance, industrial automation, automotive, smart home/smart city, robotics and retail markets.



The integrated CV22 processor combines image processing, 4Kp30 video encoding, and CVflow™ computer vision processing into a single, low-powered design enabling products that operate 'on the edge' of the network and requires no external on-premise or cloud data processing. Therefore, operating costs are lowered, and the reduced latency is an advantage for products requiring real-time decision making.

Teknique's flexible SDK provides a Linux-based framework and an environment based on GStreamer and includes pre-defined demonstration applications that allow your software team to start immediate development. The Oclea™ software platform also includes integrations with leading CNN/DNN frameworks, 3rd party analytics, and cloud service providers, and provides a rich set of APIs that enable a range of product customization options.

## Key Features

### Great Power, Great Efficiency

4Kp30 + 1080p30 + 4Kp1 JPG encoding performance provides high quality video with efficient H.264 and H.265 encoding.

### Computer Vision Engine

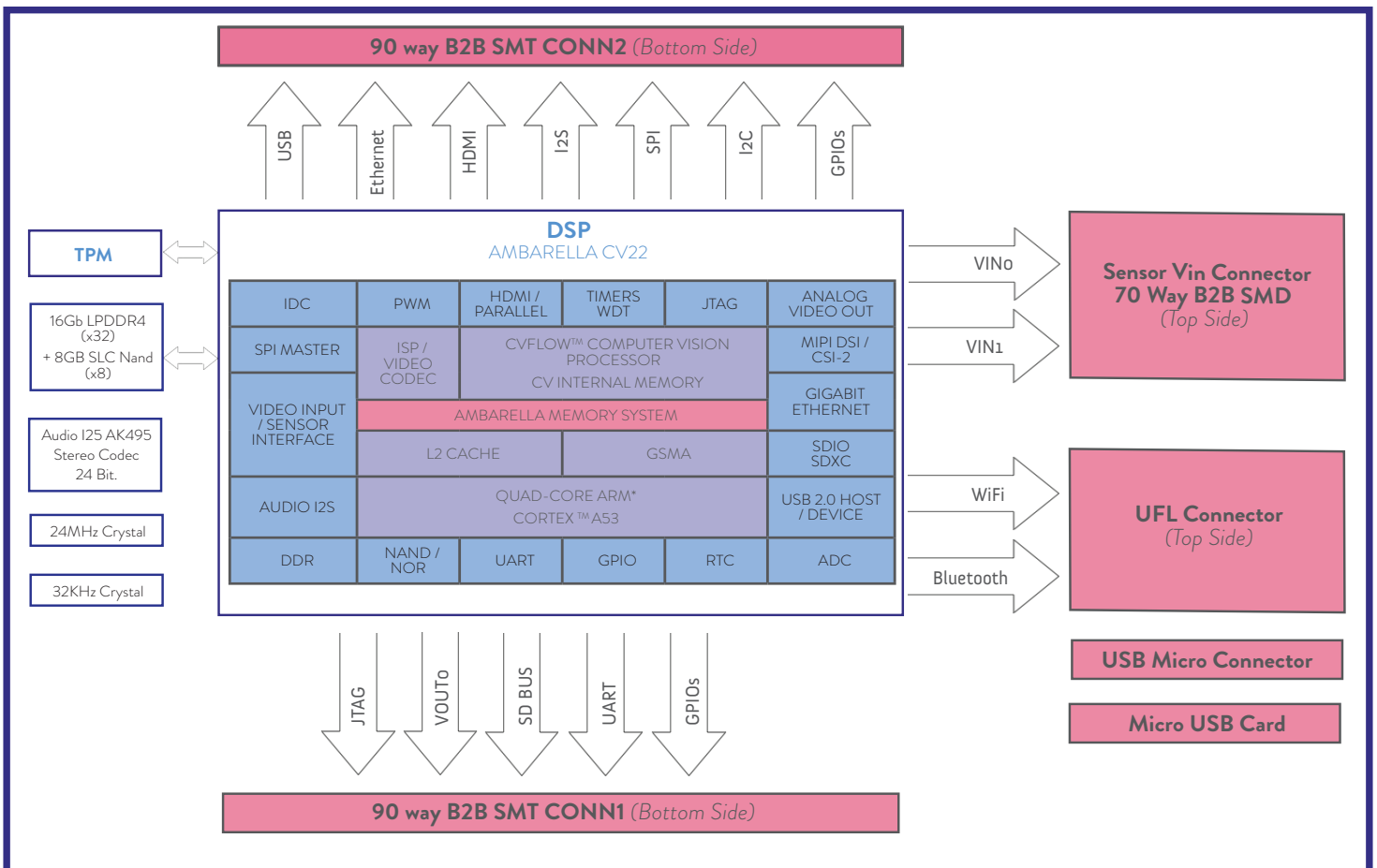
Built in hardware acceleration for CNN and DNN networks using CVFlow™ processing with the Oclea™ SoM for detection, classification, tracking, and more.

### Simplicity

Teknique's SDK simplifies development of your vision product and runs on Linux, with popular integrations already done for you – so you can start your development immediately.

### Advanced Image Processing

Electronic image stabilization, HDR, hardware de-warping engine support, and 2D/3D Noise correction for excellent low-light image quality.





## General Specifications

### CV22 Processor Cores

- 64-bit ARM® Quad Core Cortex™-A53 up to 1.0 GHz
- 32 KB / 32 KB I/D and 1 MB L2 Cache
- NEON™ SIMD and FPU acceleration
- OTP, Secure boot, TrustZone™, IO Virtualization
- AES / 3DES / SHA-1 / MD5 Cryptography Engine
- Ambarella Image and Video DSPs

### Computer Vision Engine

- CNN / DNN-based processing: detection, classification, tracking, and more
- Tools for high and low-level algorithm development
- CNN toolkit for easy porting from Caffe, TensorFlow, and ONNX
- Open SDK

### Platform

- Linux kernel version 4.9+ (64-bit)
- Linux SDK for standards-based development

### Sensor and Video I/O

- Single or dual sensor input with Independent ISP configuration
- Single 8-lane sub-LVDS / SLVS / HiSPi™ or dual 4-lane SLVS
- Single 8-lane MIPI or dual 4-lane MIPI CSI-2
- 16-bit parallel LVCMOS
- BT.601 / 656 video in and 16-bit BT.601 out
- HDMI® 2.0 output including PHY with CEC support
- PAL / NTSC composite SD video out
- 4-lane MIPI DSI/CSI-2 and FPD (VESA/ JEIDA) out

### Front End Sensor Processing

- 800 MHz maximum pixel rate
- Multi-exposure HDR

### Video/Image Processing

- 3D motion compensated noise reduction (MCTF)
- 3-Axis Electronic Image Stabilization (EIS) and rolling shutter correction
- Adjustable AE / AWB / AF
- High quality polyphase scalars
- Digital PTZ and Virtual Cameras

- OSD engine, overlays, privacy mask
- Crop, mirror, flip, 90° / 270° rotation
- On-chip stitching for VR / 360° applications
- Defect pixel correction
- Geometric lens distortion correction
- Chromatic aberration compensation
- Gamma compensation and color enhancement
- Backlight compensation
- Lens shading correction
- WDR with local tone mapping

### Video Encoding

- H.265 (HEVC) MP L5.1, H.264 BP/MP/HP L5.1 and MJPEG
- 4Kp30 + 1080p30 + 4Kp1 JPG maximum encoding performance
- Simultaneous stream encodes
- Flexible GOP configuration with I, P, and B frames
- Temporal Scalable Video Codec with 4 layers (SVCT)
- Dual encoding for VR / 360° cameras
- Multiple CBR and VBR rate control modules

### Memory Interfaces

- 2GB LPDDR4 DRAM and 8GB eMMC Flash storage
- High Speed SD bus for external interfacing with WI-FI or SD card storage

### Peripheral Interfaces

- Gigabit Ethernet with RMII / RGMII
- One USB 2.0 port for host/device
- Watchdog Timer, multiple general purpose timers
- HDMI® 2.0 with PHY out
- uSD connector (SDXC compatible)
- SDIO 4-pin interface (for SD card or WIFI module)
- 8x lane image sensor interface

- 4x lane MIPI DSI/CSI-2 output
- 4x PWM outputs
- 2x UART (max 115.2 Kb/s)
- 1x USB 2.0
- 2x I2C (max 3.4 Mb/s)
- 2x SPI
- 2x I2S
- 2x ADC input (12-bit resolution)
- 28x GPIO with many more available depending on the special functions required

### Wireless Communication

- Integrated dual-band WiFi (802.11bgn / 2.4 & 5GHz)
- Bluetooth (v4.1 / BTLE)

### Audio

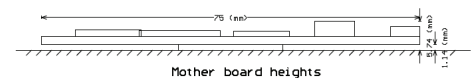
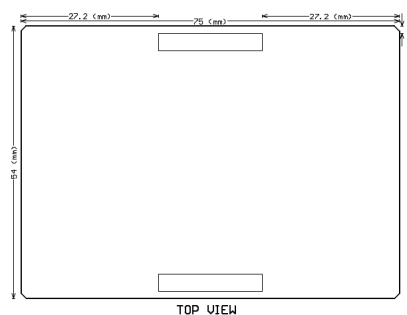
- 24-bit stereo codec with a microphone, headphone and speaker amplifiers
- Sampling frequencies from 8-48KHz supported
- 1W output power speaker amplifier

### Input Power Specifications

- Single supply input voltage range - 4.5V to 5.5V
- Nominal 2.5W power consumption during 4K video streaming
- Recommended Power supply - 5V 1A DC

### Physical

- 54mm x 75mm System on Module
- Operating temperature -20°C to +85°C
- 2x low profile 90-way connectors – Hirose DF40C-90DS-0.4V(51) (mating part #)



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