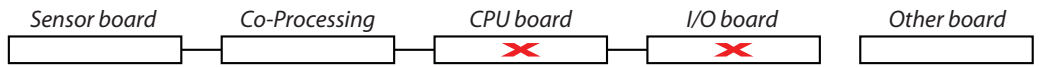# NEXVISION
eyetronic

World first IP camera based on DaVinci™ DM8148™
World highest embedded video processing power
(TI's best DSP/HDVICP + best FPGA based pre-processor)

1

Sensor board	Co-Processing	CPU board	I/O board	Other board
		✗	✗	

H264 *AVC* ™
Full HD | X-HD ™

TEXAS INSTRUMENTS DaVinci — DAVINCI TEXAS INSTRUMENTS — DSP TEXAS INSTRUMENTS TECHNOLOGY

CAM SMOOV

Network Camera
DaVinci™ DM8148
Reference Design

HDMI™ HIGH DEFINITION MULTIMEDIA INTERFACE

RoHS — ARM POWERED

IMAGE SENSOR BOARDS

CPU BOARD

FPGA
video enhancement processor

TI Davinci
DM8148
X-HD ™ H264 encoding

SATA Disc
2 x SD-MMC Card
RS485/RS 232 + GPIO
HDMI Full HD
High power LED
USB2.0
Audio
Giga Ethernet + POE

I/O BOARD

OVERVIEW

- Nexvision's CAMSMOOV smartcam is a complete Network Video Camera reference design
- TI's DaVinci™ DM8148 + H264 X-HD™ codecs
- On-board video analytics (DSP C674)
- Embedded Linux own distribution

HIGHLIGHTS

- 4 independent video inputs with extra high resolution from 2 (Full-HD) to 12 (X-HD™) megapixels
- H264-MP codec : HD1080P@60fps
- On-board dedicated 3D video enhancement and noise reduction chip (Nexvision's IP)
- Power over gigabit Ethernet, USB2.0, SATA, RS232, RS485, audio, HDMI video output
- Video analysis framework (third party accessible)
- SD card onboard video recording and meta data storage
- Digital PTZ/immersive view, no mechanical parts
- On board streaming server based on our NexStream technologies for 24/7/365 CCTV
- High power LED lighting
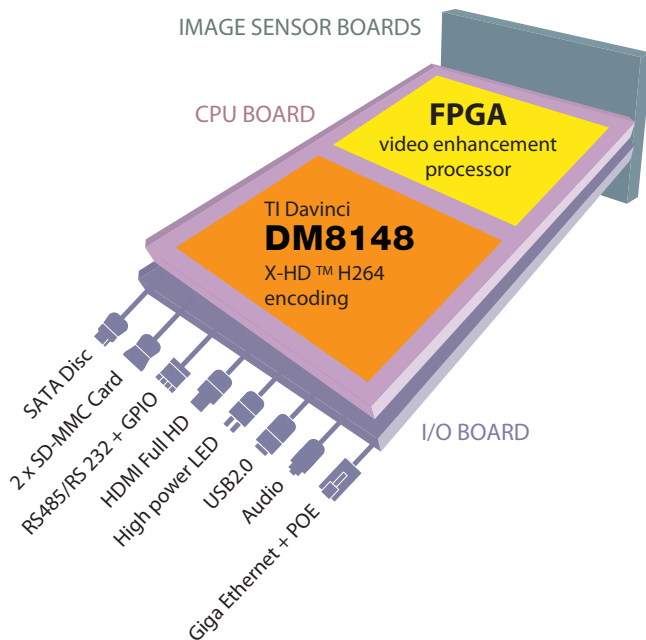
REFERENCE DESIGN PROCESS

1 Order a Nexvision Reference Design

2 Update your Specifications

3 Get your camera Ready to sell

www.nexvision.fr

Features

* Extra high resolution from 2 megapixels (Full-HD) to 12 megapixels (X-HD™)
* Full framerate, high quality video encoding
* On-board FPGA with two DDR3 SDRAM banks, dedicated to 3D video enhancement and picture noise reduction chip (NexVision's IP)
* 2x165 megapixels/s MSOC's video processing pipeline, two dedicated DDR3-SDRAM bank
Codec
* H264-Main Profil for minimal storage size and bandwidth : 120M pixel/s
Full HD 1080P (2 Megapixels @ 60fps) up to X-HD™ (12 megapixels @10fps)
* Optional video codec : Motion-JPEG, MPEG4-part2, RGB444 , YUV422, RAW
Image pre-processing
* Media processor image processing pipe
* Advanced 12-bit based color exposition for high fidelity color reproduction
* 3D Temporal filtering and contrast enhancement
* Multiple exposure blending provides realtime HDR for high details retention in low and over exposed area
* Multispectral band image sensor fusion (Visible, Short Wave IR, Thermal IR)
* Super resolution over multiple video sensor acquisition
* Multi sensor panoramic or 360° immersive video realtime on board unwarp
Audio/Video Streaming
Live video streaming
Full Duplex Audio
Full scene or partial view (virtual PTZ mode, D1 resolution)
Open onboard video analysis for automated video surveillance with dedicated DSP.
Video analysis framework, third party accessible : motion detection, fire detection, traffic surveillance, automatic number plate recognition (ANPR), human shape detection, Intelligent behaviour recognition, pedestrian observation, law enforcement & forensic, pet immune detection, suspicious person tracking, pedestrian counting, suspicious stationary object detection, Query-by-content, privacy masking, lens coverage & blinding.

Software Development

Linux 2.6.37 based operating system
U-boot bootloader, TFTP image download to flash support, OpenMAX multimedia framework
Multiple path video processing pipeline (GStreamer based) for simultaneous :
* multiple resolution
* multiple compression codec
* third party accessible video analysis and painting
* concurrent recording & streaming
DSP Integration with TI codec engine framework
USB mass storage for embedded NVR
HDMI output with FullHD@30fps resolution
Automatic and manual firmware update over network
Embedded Linux own distribution

System

MSOC : Texas Instrument DaVinci DM8148 media processor
Strong multimedia computing power (4GOPS integer/float DSP + 1080P60 H264 Video Codec IP + ARM CortexA8@1Ghz)
NOR FLASH : 32MBytes (up to 256MB)
DDR3-SDRAM : 2 banks of 256MB (up to 1GB)
FPGA : NexVision's IP video pre-processor front-end with 2 other dedicated DDR3-SDRAM banks
Integrated hardware watchdog

Remote Management

Web-based management, configuration and viewer
Compatible with any H264 RTP/RTSP compliant client like VLC, NexRMC*,
Compatible with any MJPEG HTTP compliant client like VLC, NexRMC*,
NexRMC is the Nexvision's Remote Media Center software.
NexRMC is our top edge software supporting CAMSMOOV's advanced features like X-HD™ resolution, sensors monitoring, firewall pass-through,
innovative search in recorded video content, intuitive and user configurable interface.

Network

Gigabit Ethernet 10BaseT/100Base/1000base TX (with PoE), RJ-45 connector
Protocols: RTP/RTCP/RTSP, HTTP Web Server, SMTP, Telnet, SSH Server, DHCP client, NTP Client, FTP Server...
Accept client through firewall
RTP/RTSP/RTCP Video Streaming onboard server is standard compliant
It also support real time bandwidth adjustment (from 40K up to 25Mbit/s),
video stream encryption (128 bits AES) when used with NexStream™ technologies
HTTP server (only for Motion JPEG streaming)
Power Over Ethernet Plus (PoE 802.3af)
Wireless : WIFI (802.11b/g/n) & Bluetooth/ANT module + Zigbee™ for remote control

Storage

SATA link: hard drive up to 2TB, SSD up to 256GB per SATA link
SD/MMC card x 2 (1 x microSD+1 x standardSD)
USB compliant Storage : Flash Disk on USB Key (1 to 8GB)

Video Input /Output

Input/Output : 4 x RAW 16 to 8 bits on FPGA - 30pins FPC connectors
Input : Image sensor subsystem - Raw 16bit or BT656/BT1120 8/16bit or serial CSI2 (MIPI)
Output :
- 1 x 148.5Mhz – 16/24/30 bits for VGA LCD display (with graphic co-processor)
- HDMI 1.3 (note : with audio stream) - miniHDMI 19pins connector
- D1 PAL/NTSC composite analog output - 2.5mm jack connector

CMOS Image Sensor

Progressive scan, color with 2, 5, 8 or 12 megapixels (X-HD™)
High sensitivity up to 12V/Lux-sec
Selectable video resolution and frame rate by image sensor daughter boards choise
Up to 4 sensor boards, any combinations, simultaneously + one separate direct image sensor input on MSOC:
"CAM12M" board : 12Mpixel, 5.5µm pixels (22.5x16.9mm), 4.64V/lux.s,
12Mpixel 4096 x 3072 pixels 180fps shoot & preprocess frame rate, H264@30fps
8M pixel 3264x2448 H264@45fps
"CAM2M" boards : FullHD 1080P(1920x1080) 340fps shoot & preprocess frame rate
"CAMPANO" boards : 4096 x 500 multisensor board, very high sensitivity 12V/lux.s
"SWIRCAM" : Short Wave Infra Red, 320x256, 100fps, with TEC cooling controller
Controlled high power white LED lighting when required on low light conditions

Lens

High resolution lens : from 60 to 185° field of view
Thread Diameter: C/CS or M12xP0.5mm

Power Supply

Input : 6-12VDC or 18-57AC-DC ,15W
5mm power jack connector or 2.54 terminal block connector
Power voltage level and reset supervision
Induction Charger (Wireless Power Consortium "Qi™") optional
Battery charger (LiPolymer or Li-Ion - 2 cell)
On board Power Over Ethernet (IEEE802.3af, 48V-Continuous 12.5W)
Transient voltage suppressor and EMI common mode filters

Inputs/Outputs

1 x optocoupled inputs on powered contacts - Connector : 2 poles terminal block
1 x powered general purpose On/Off switch (2A@40V) – 2 poles 3.5mm terminal block
Backup saved Real Time Clock
12 General purpose switch buttons + 1 scroll wheel
General purpose green LED indicators

USB & PCIe

USB OTG 2.0 high speed (up to 480Mb/s) - mini "AB" type USB connector
5V@1A protected power outputs
PCIe 2 x lines + USB 2.0 high speed (up to 480Mb/s) - miniPCIe connector

Audio

Digital I/O :
* I2S link on FPGA - 30pins FPC connectors
* I2S link on Bluetooth
Digital Output : HDMI connector
Analog Output : Line Out - 2.5mm audio - video jack
Analog Inputs : Microphone - MEMS on board

Sensors

GPS module
Inertial sensors (3D accelerometer, 3D Gyroscope, 3D Magnetometer)
Pressure sensor
Temperature sensor

Serial Links

* RS232 (RX/TX) + RS485 (full duplex) - 3.5mm terminal block connector
* I2C and SPI bus - Internal 1.27mm connector
* RS232/JTAG for system debug on separate board

Physical Dimension

Main board : 140mm (L) x 80mm (l) x 40 (h)
Temperature : 0 to +50 °C (–40°C to +85°C optional)
Humidity : 10~90% non condensing