XILINX
ALL PROGRAMMABLE™

# Designing Multi-Channel, Real-Time Video Processors with Zynq All Programmable SoC


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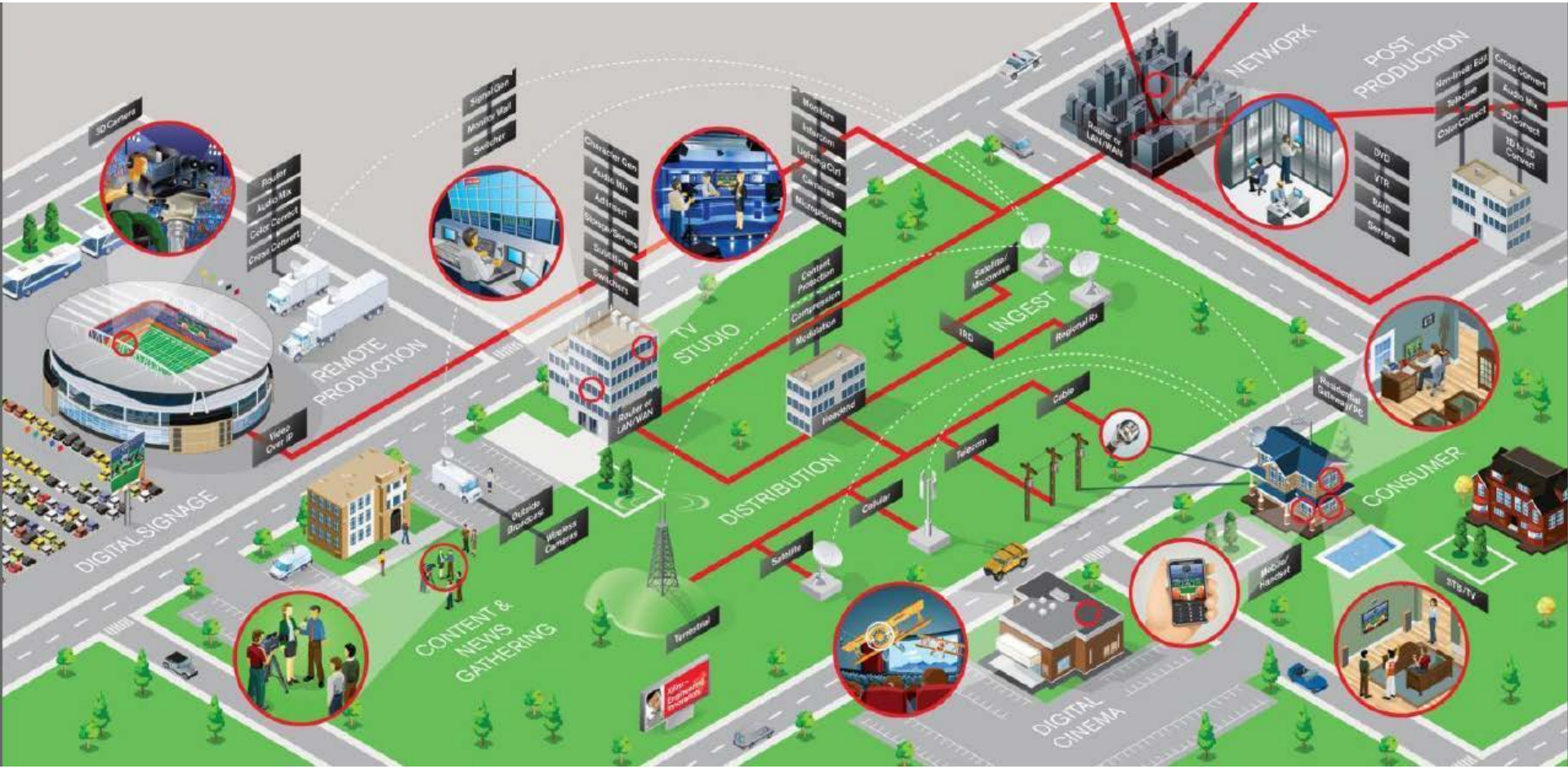
**Jun, 2014**

# Broadcast & Pro A/V Landscape



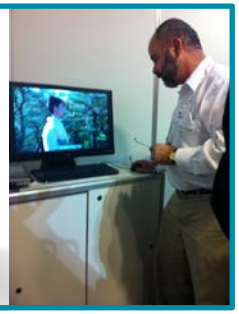

**Xilinx Smarter Vision in action across the entire broadcast chain!**

# Industry Trends

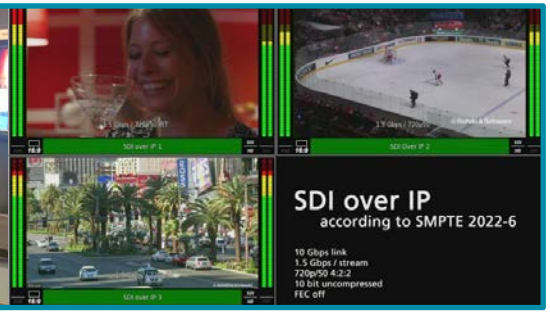
## 4K UHD


## HEVC





## IP Studio

# Smarter Vision Platform Development

Smarter Vision

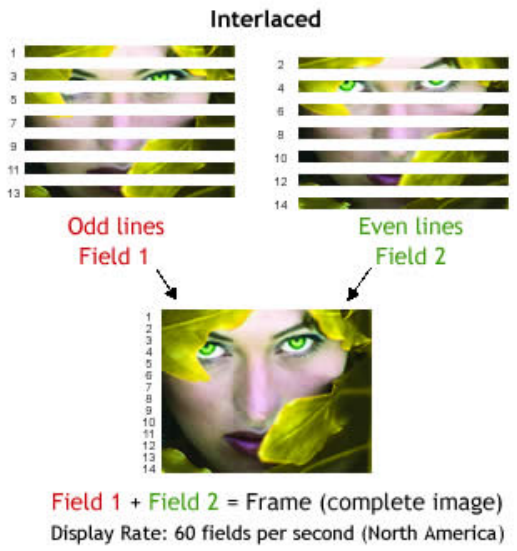
| Real Time Analytics | Intelligent Transport | Immersive Display |
| --- | --- | --- |
|  |  |  |
| Camera Platform | Video over IP Platform | Display Platform |

# Xilinx Real Time Video Engine


- **Real Time Video Engine**
  - Scaling, Deinterlacing, OSD
- **RTVE 2.1 up to 8 HD channels**
- **RTVE 3.0 up to 4K**
- **Linux O/S**

- **Reference Design for Immersive Displays**

# What Is the Real Time Video Engine (RTVE)?




Deinterlacing

Scaling


Overlay

## RTVE Offers a Typical Video Processing Pipeline

# RTVE Target Applications

| Broadcast | Consumer | Automotive | A&D | ISM |
|---|---|---|---|---|
|  |  |  |  |  |
| Pro Monitors<br>Multiviewers<br>Digital Cinema<br>Digital Signage | High End TVs<br>Projectors | Entertainment<br>Surround view | Simulation | Medical<br>Surveillance |

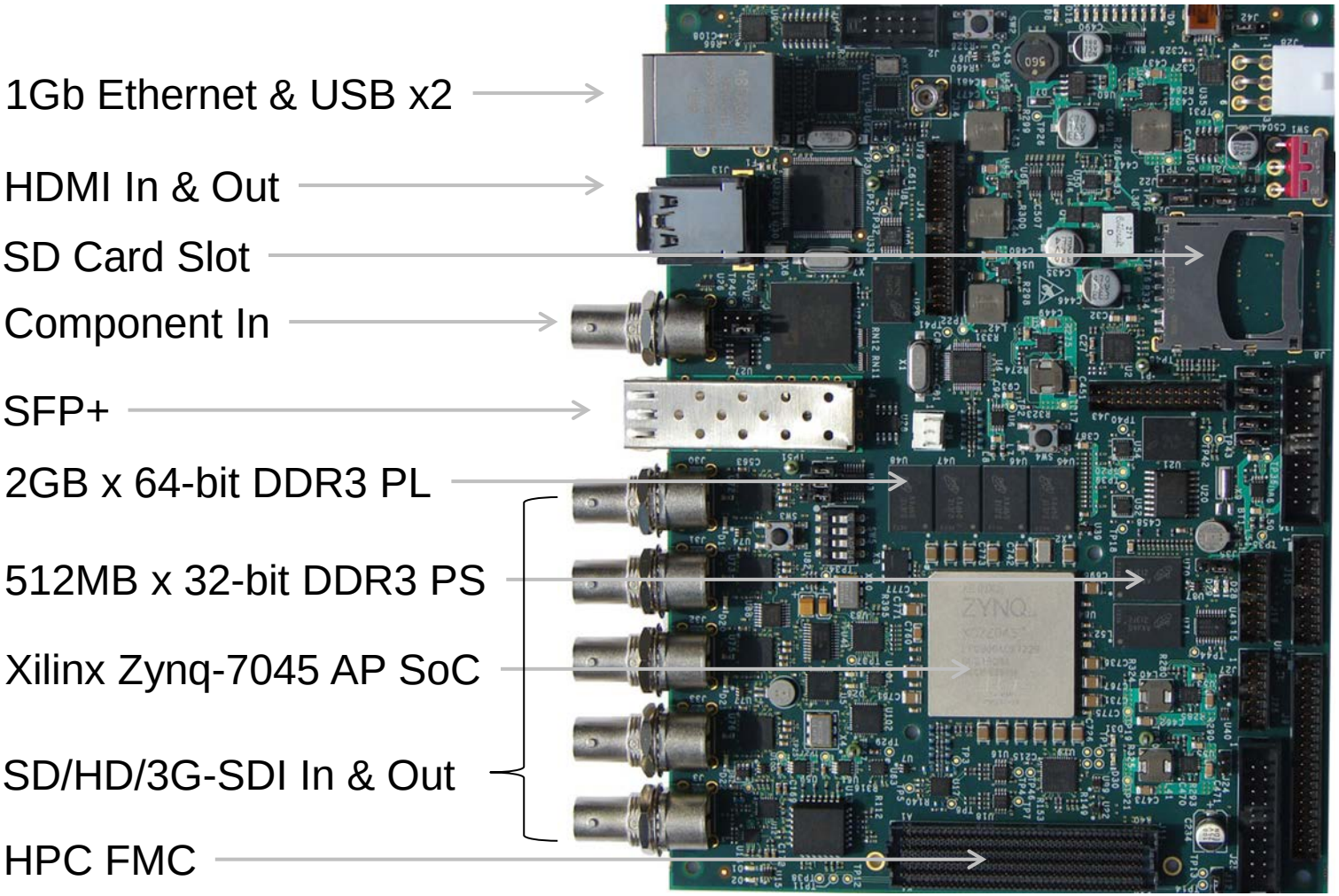
**RTVE Targets Virtually Anything with a Display!**

# OmniTek

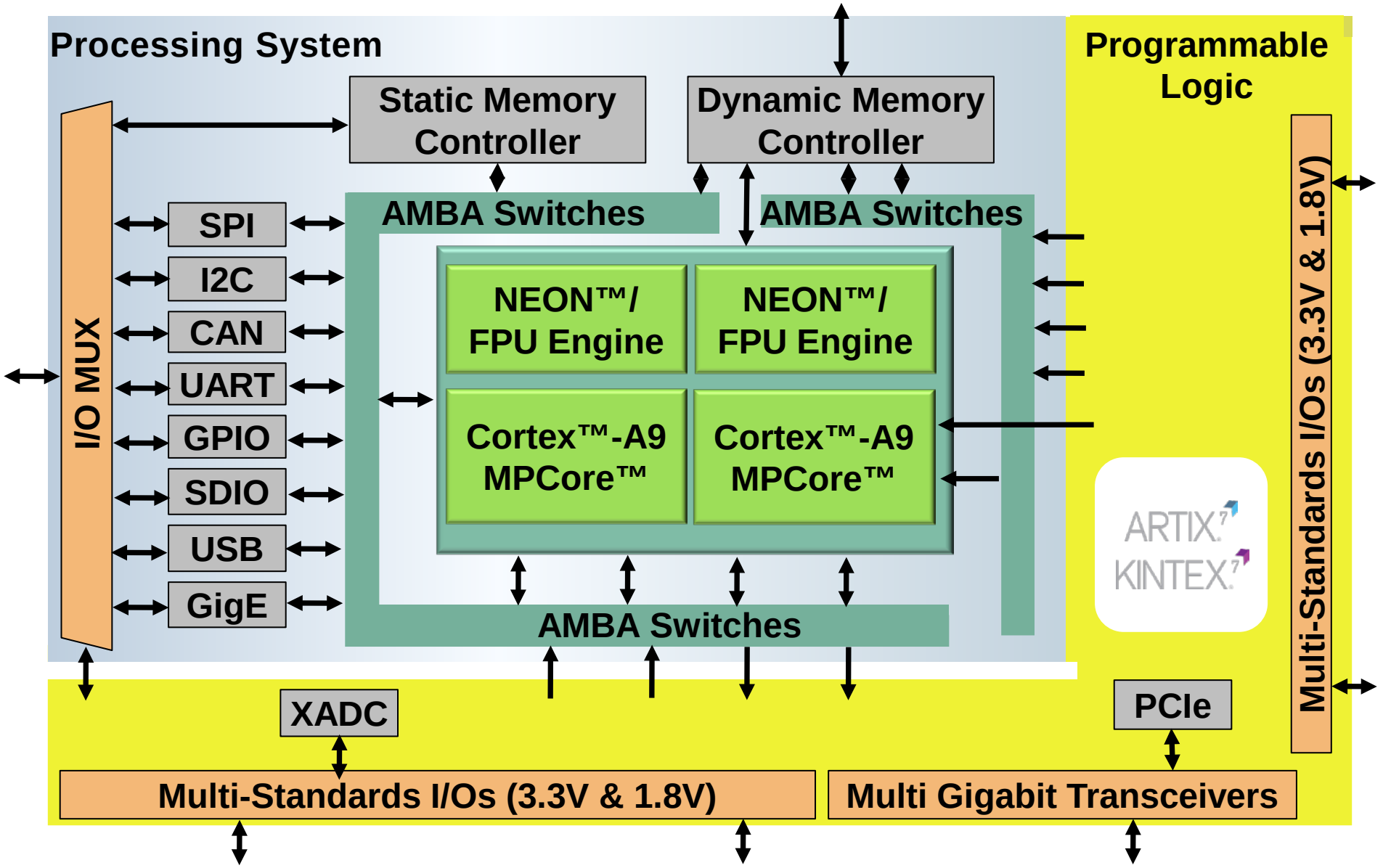
- FPGA design services, IP cores, development kits
- Video specialist: Broadcast, Medical, Industrial, Defense
- Products division: Test & Measurement
- Alliance Partner:  Xilinx Certification
- Developed Xilinx IP and reference designs
  - Xilinx Partner Collaboration Award 2012
- Queen's Award for technology
- UK "SMART" Award
- ISO 9001 Quality Certification


OmniTek
Advanced Measurement Technology

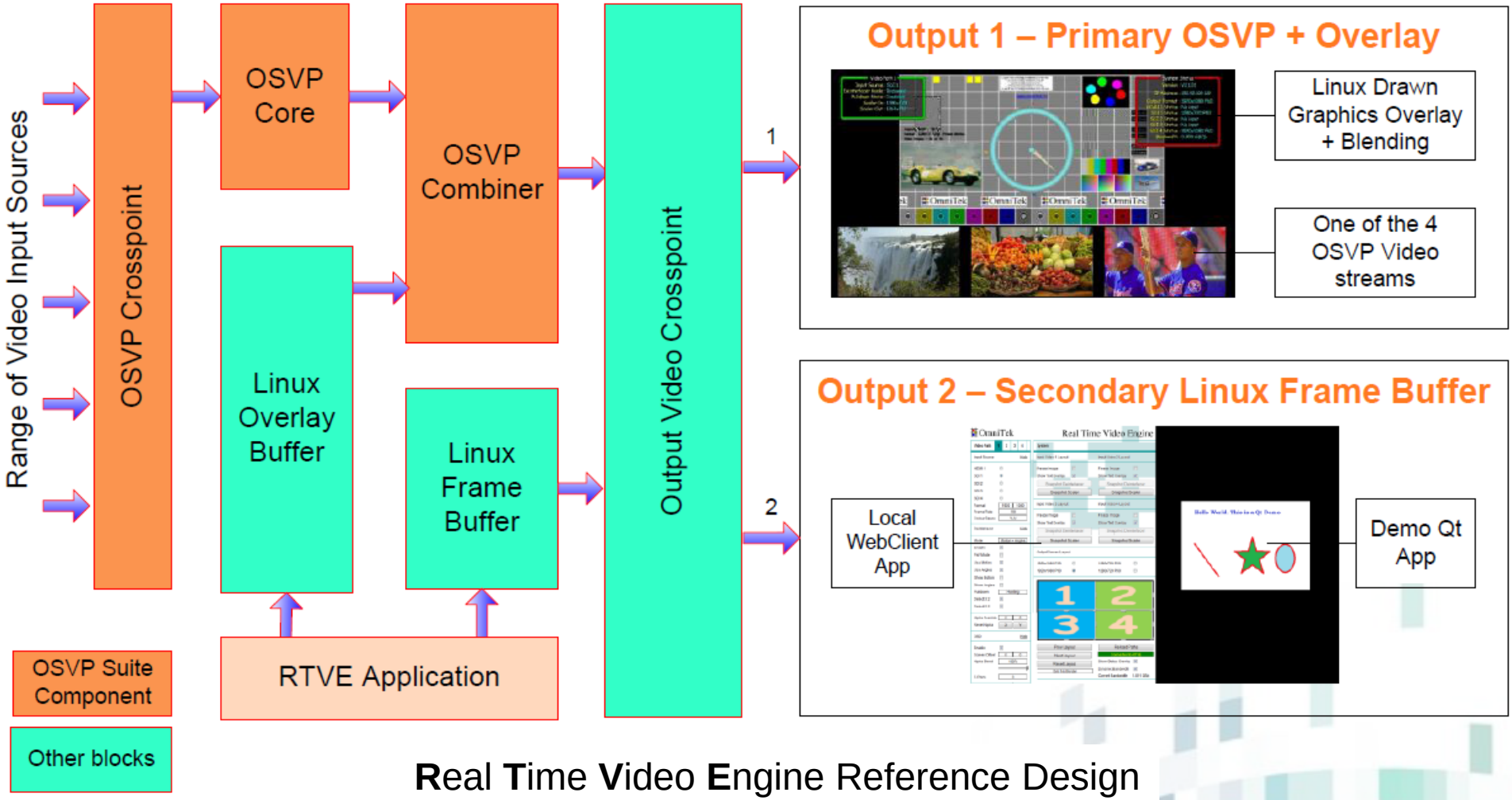
# OmniTek OZ745 Video Development Kit



# Zynq-7000 All Programmable SoC Block Diagram



# RTVE 2.1 for Multichannel HD on OZ745




**R**eal **T**ime **V**ideo **E**ngine Reference Design

# RTVE 2.1: Video Formats Supported

## Input Formats

- 8 or 10 bits per pixel
- YUV or RGB color spaces
- 4:2:2 or 4:4:4 packing
- Frame rates from 23.98Hz to 60Hz
- Interlaced, PsF or progressive
- Video resolutions, 128x128 to 2048x1080 or 1920x1200
- SD formats are 480i, 480p, 576i, 576p
- HD formats are 720p, 1080i, 1080p
- Digital Cinema 2K x 1080
- All PC resolutions up to 1920 x 1200

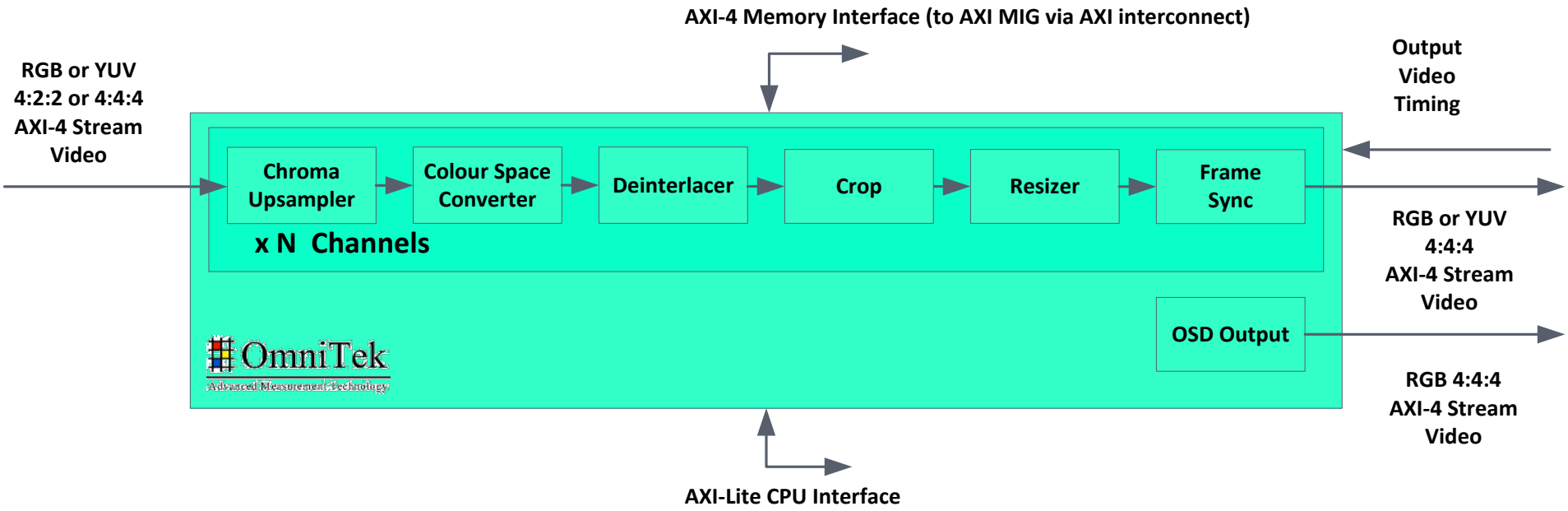
## Output Formats

- 8 or 10 bits per pixel
- YUV or RGB colour spaces
- 4:4:4 packing
- Frame rates from 23.98Hz to 60Hz
- Progressive
- Video resolutions, 128x128 to 2048 x 1080 or 1920 x 1200
- SD formats are  480p, 576p
- HD formats are 720p, 1080p
- Digital Cinema 2K x 1080

**All Typical Video Formats Supported**

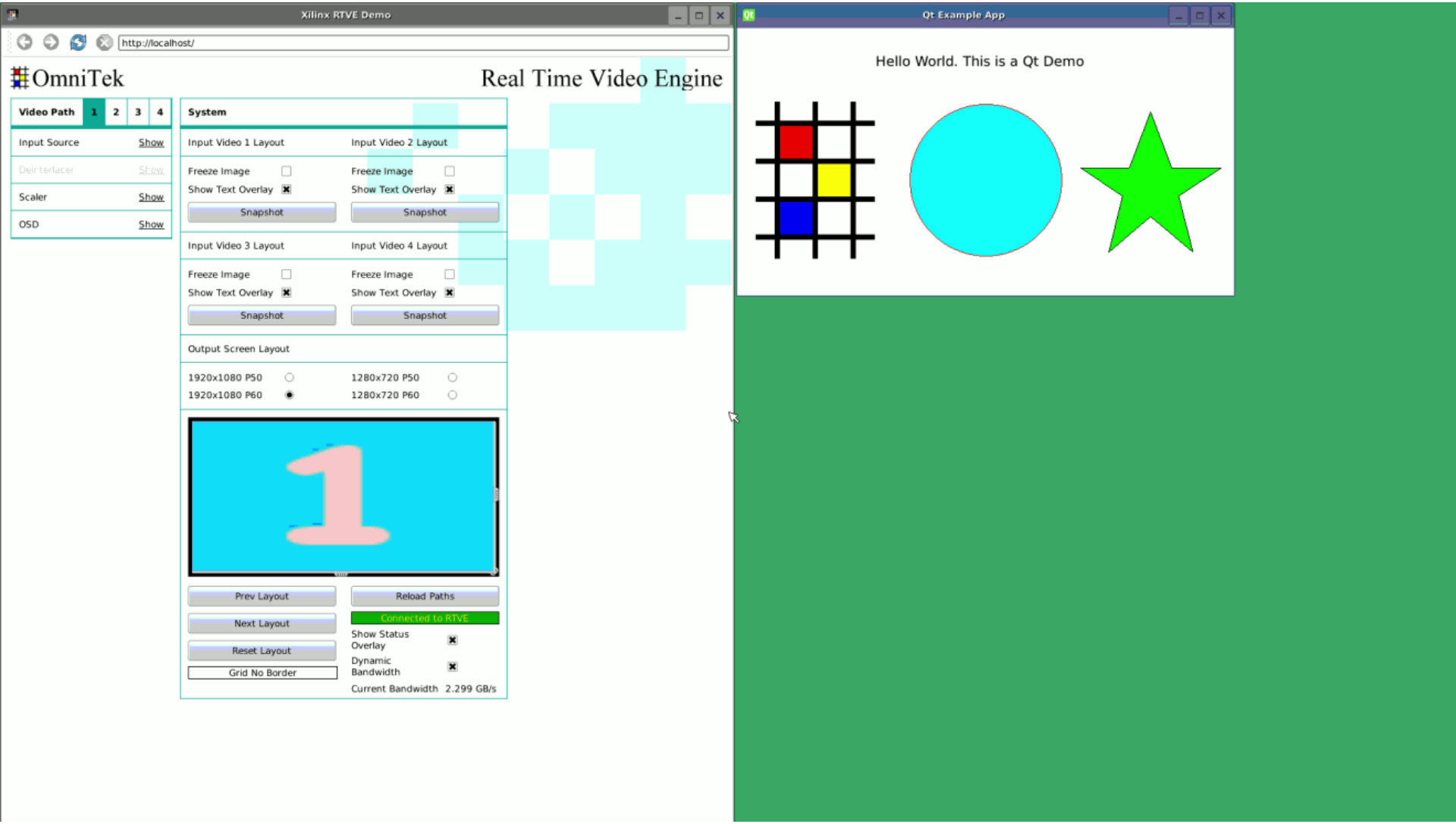
# OmniTek Scalable Video Processor (OSVP 1.0)

## *IP Core from OmniTek*

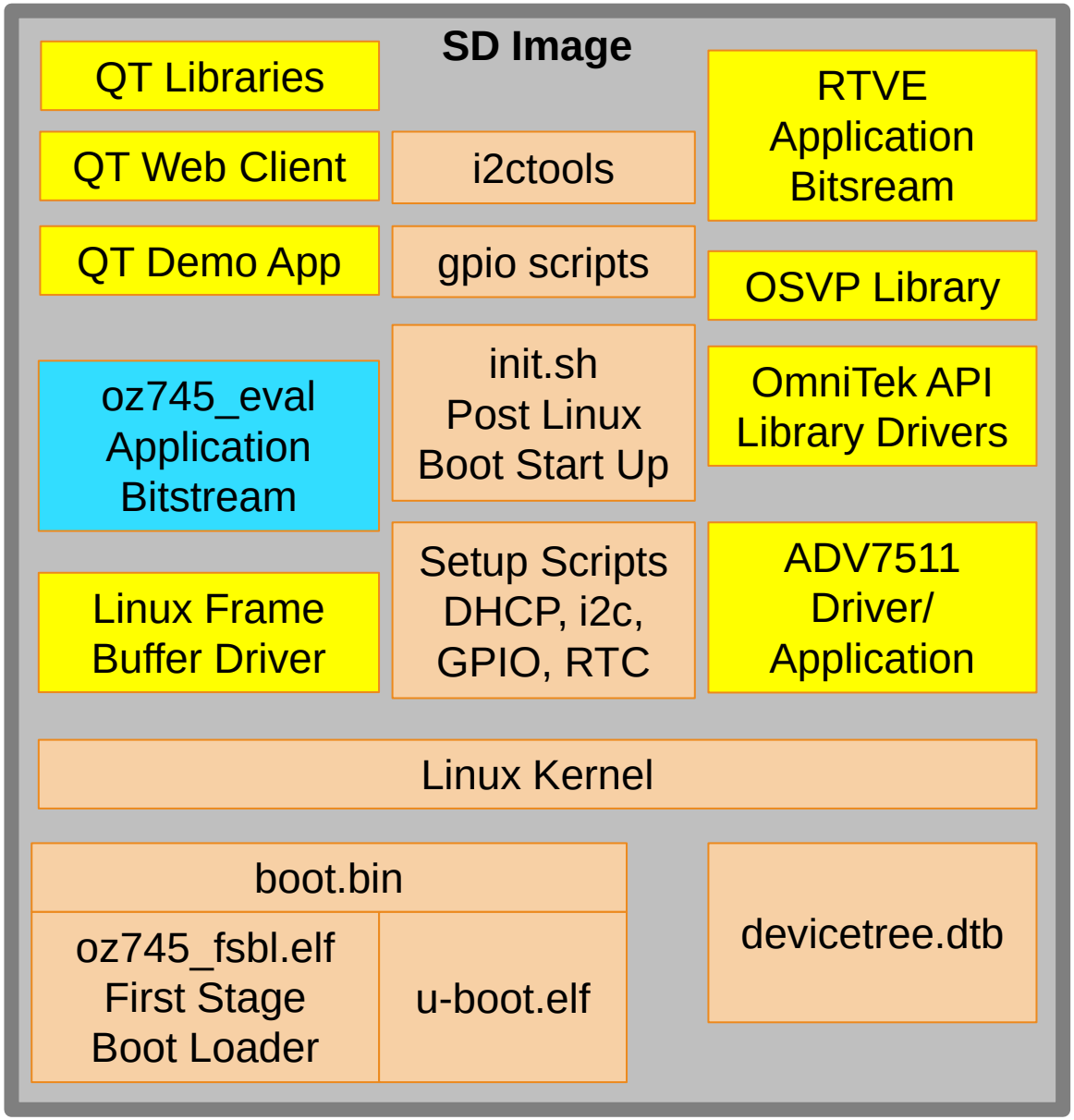



**Built-in Multiport Video DMA to Allow Full Scalability**

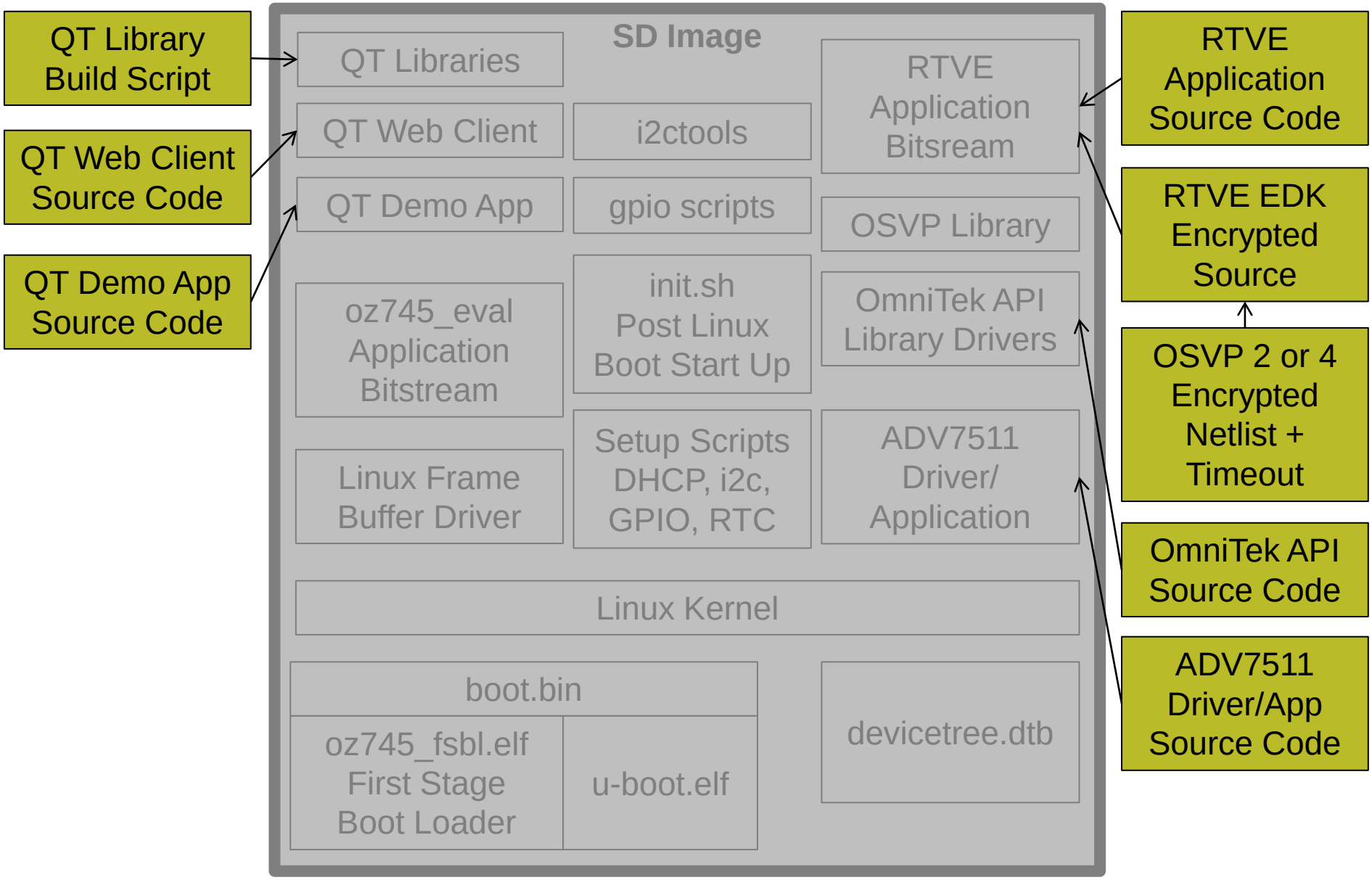
# Web Server GUI for RTVE



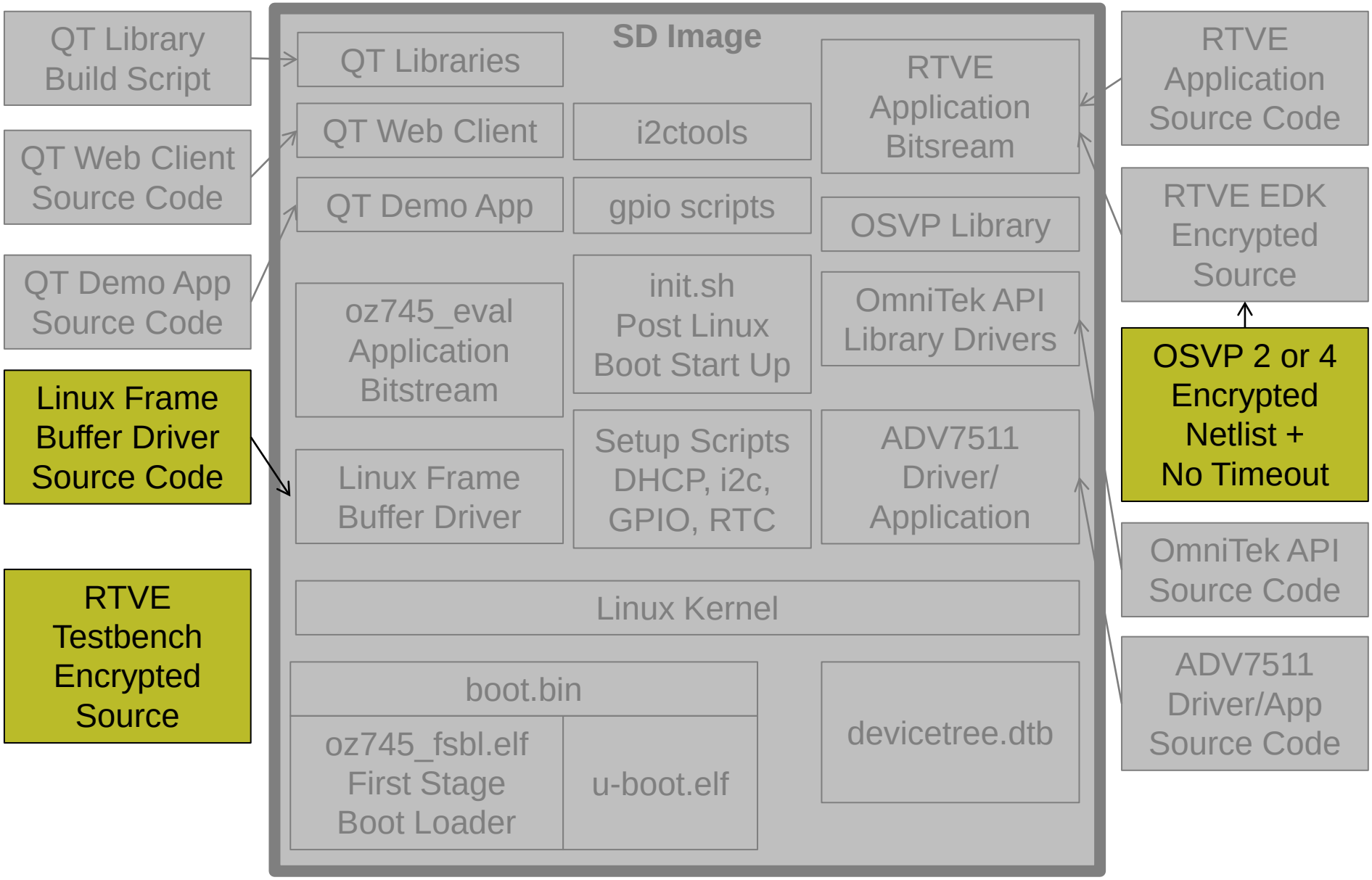
# RTVE 2.1 Deliverables – SD Image



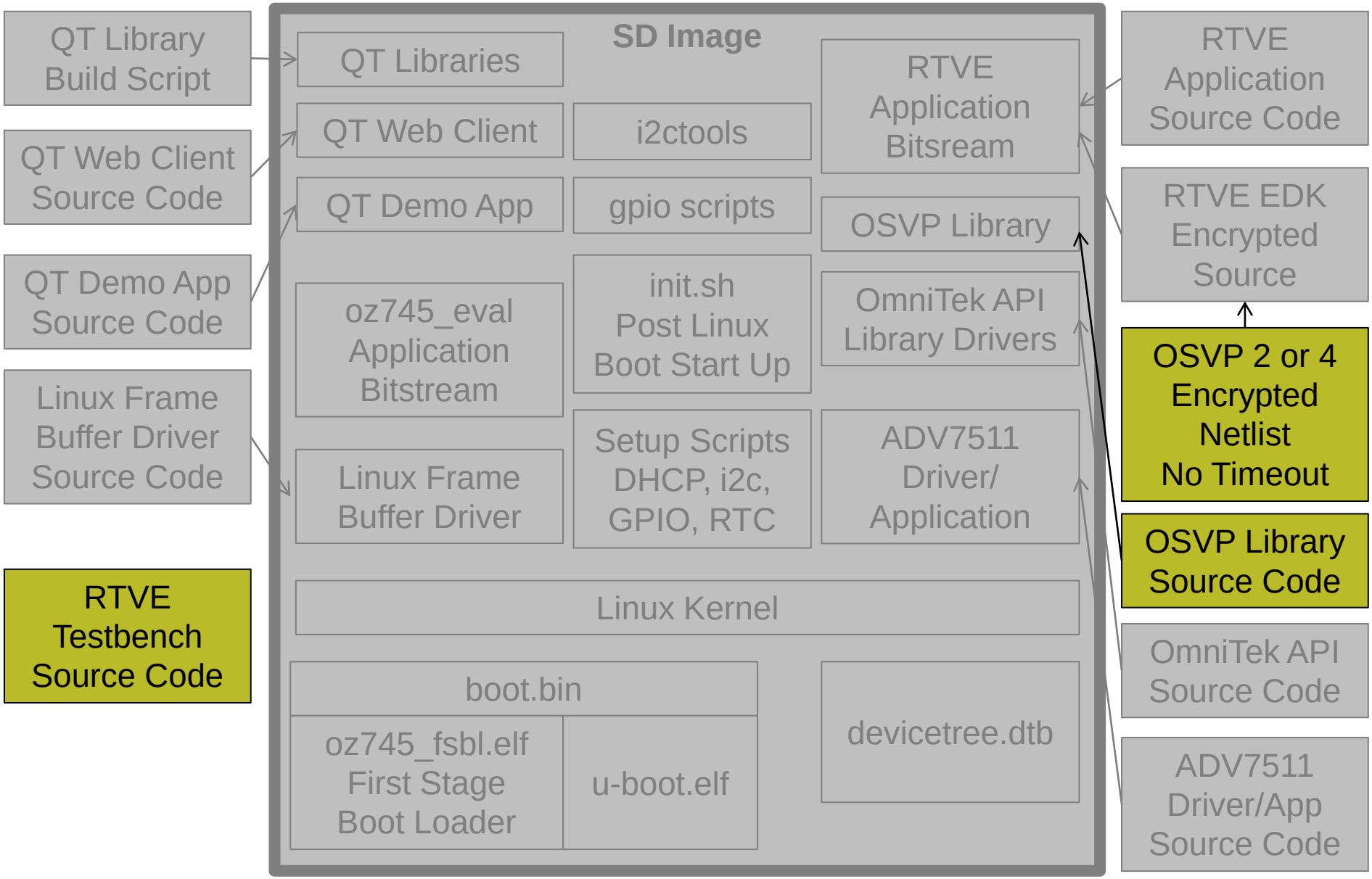
# RTVE 2.1 Evaluation Deliverables



# RTVE 2.1 Standard Deliverables



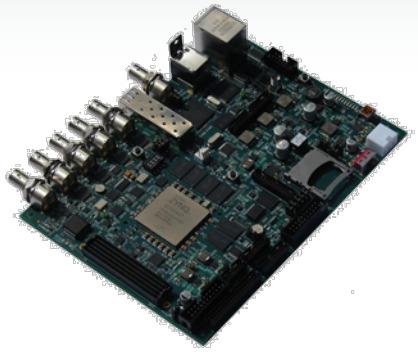
# RTVE 2.1 Full Deliverables



# Now Available RTVE 2.1

## Hardware Platforms

- OmniTek OZ745
- Device-locked Vivado



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## OmniTek Scalable Video Processor

- From OmniTek.tv:
  - SD Image
  - OZ745 BSP
- OSVP docs & collateral
  - Datasheet
  - User's guide
- OSVP Licensing

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## RTVE 2.1 Reference Design

- From Xilinx.com:
  - XAPP
  - Evaluation Lounge
  - OmniTek Ref Design
  - Evaluation Bitstream

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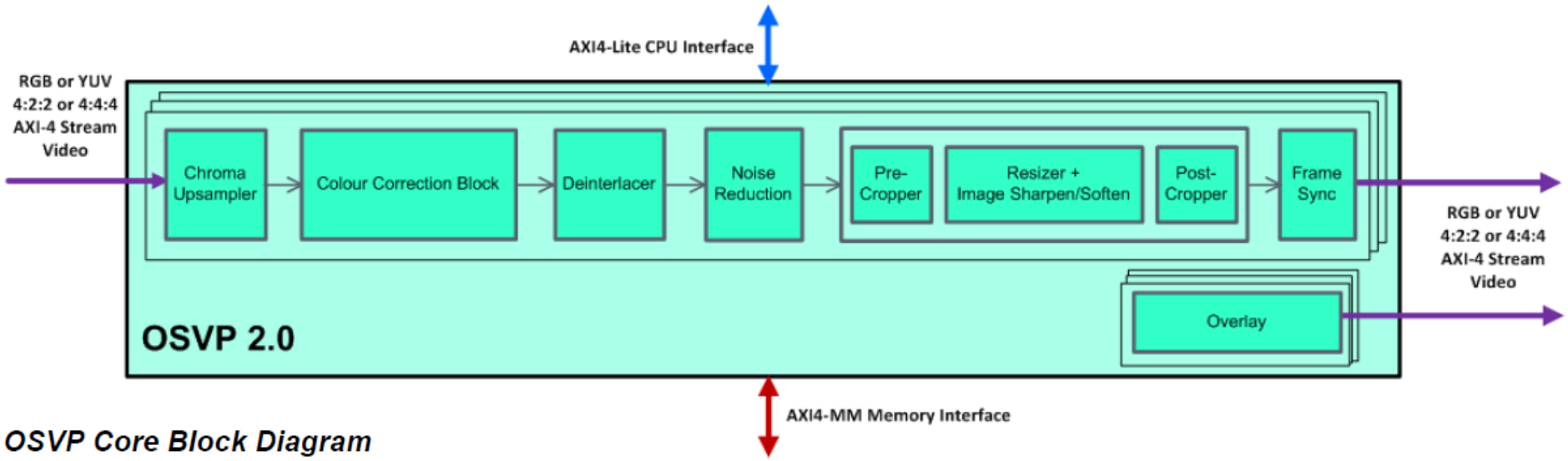
**Demos Available – Please Contact Your Local Xilinx Sales Office**

# OSVP 2.0 for 4K UHD on OZ745

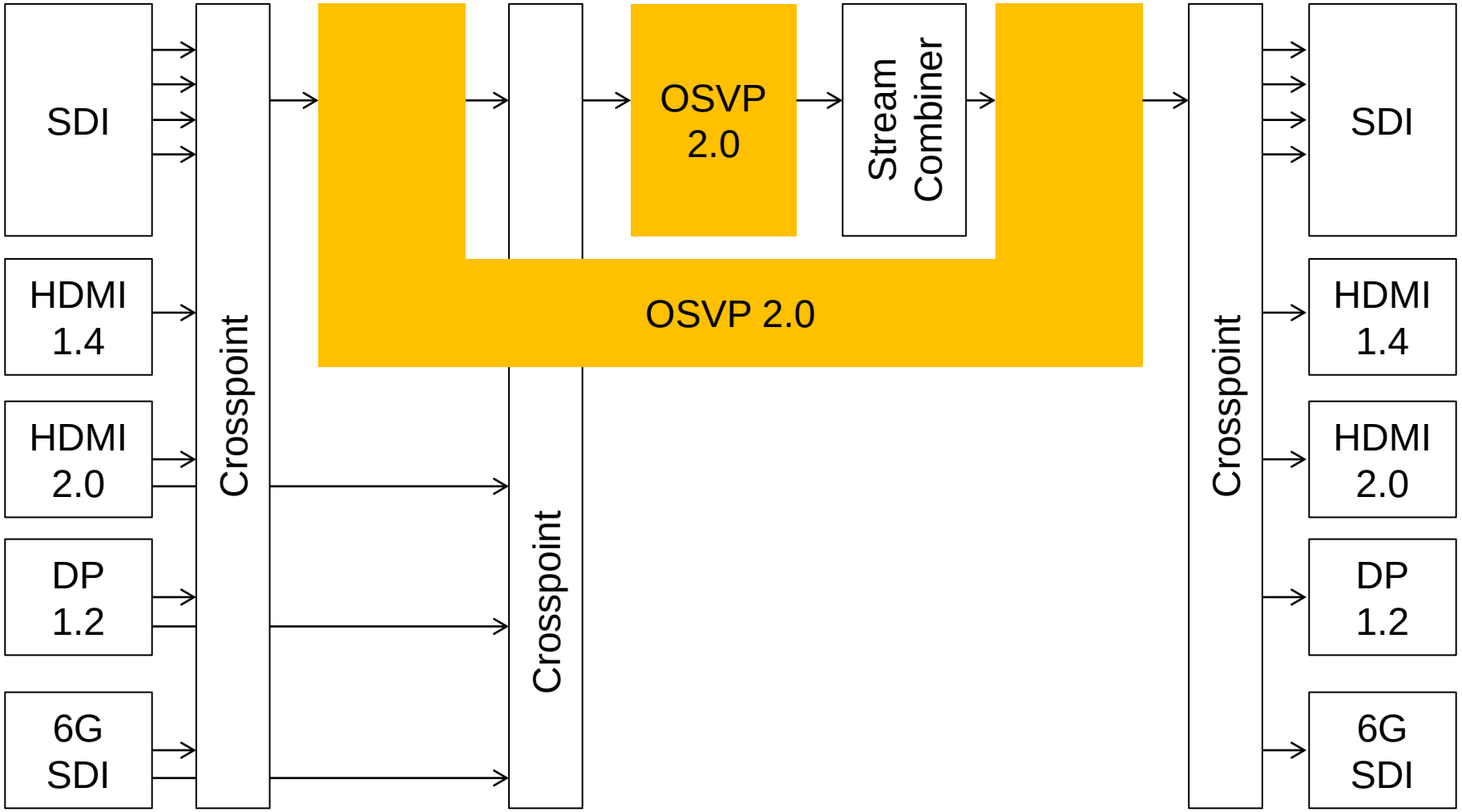



*OSVP Core Block Diagram*

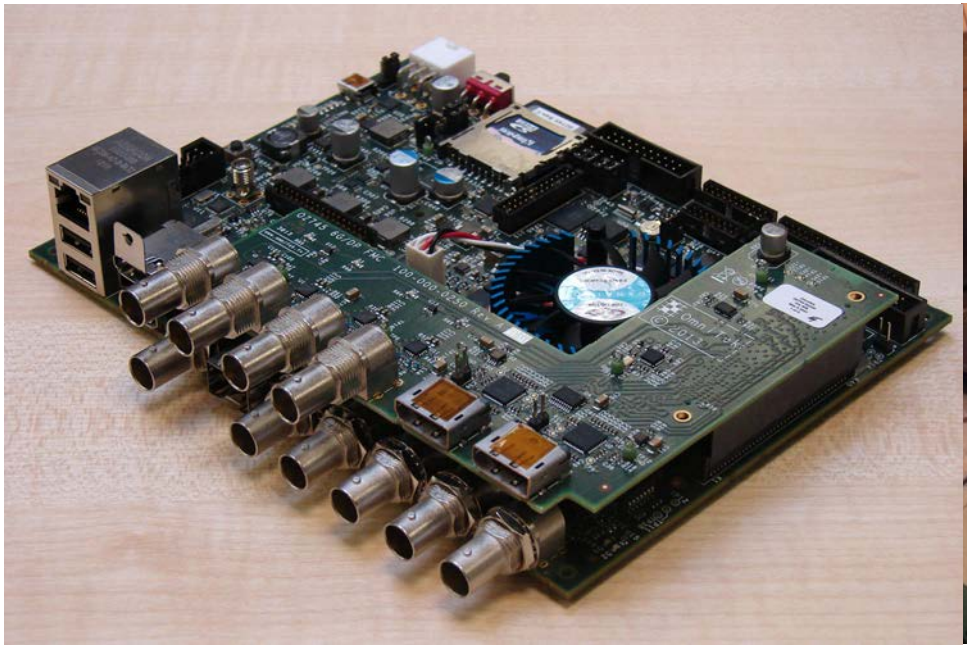
## New features in OSVP 2.0

- 4K up/down re-size support
- 6-axis Color Correction
- Enhanced De-interlacer
- Progressive to Interlace
- Noise Reduction
- Gaussian filter Cross Fades
- Image Sharpening
- Multiple Overlays
- Pre- and post-scaler Cropping
- Smooth animated transitions
- Programmable Chroma up-sampler
- Further video standard support, inc 3D

# Coming Soon! RTVE 3.0 for 4K



# 4K Support With 6G-SDI & DisplayPort 1.2 FMC



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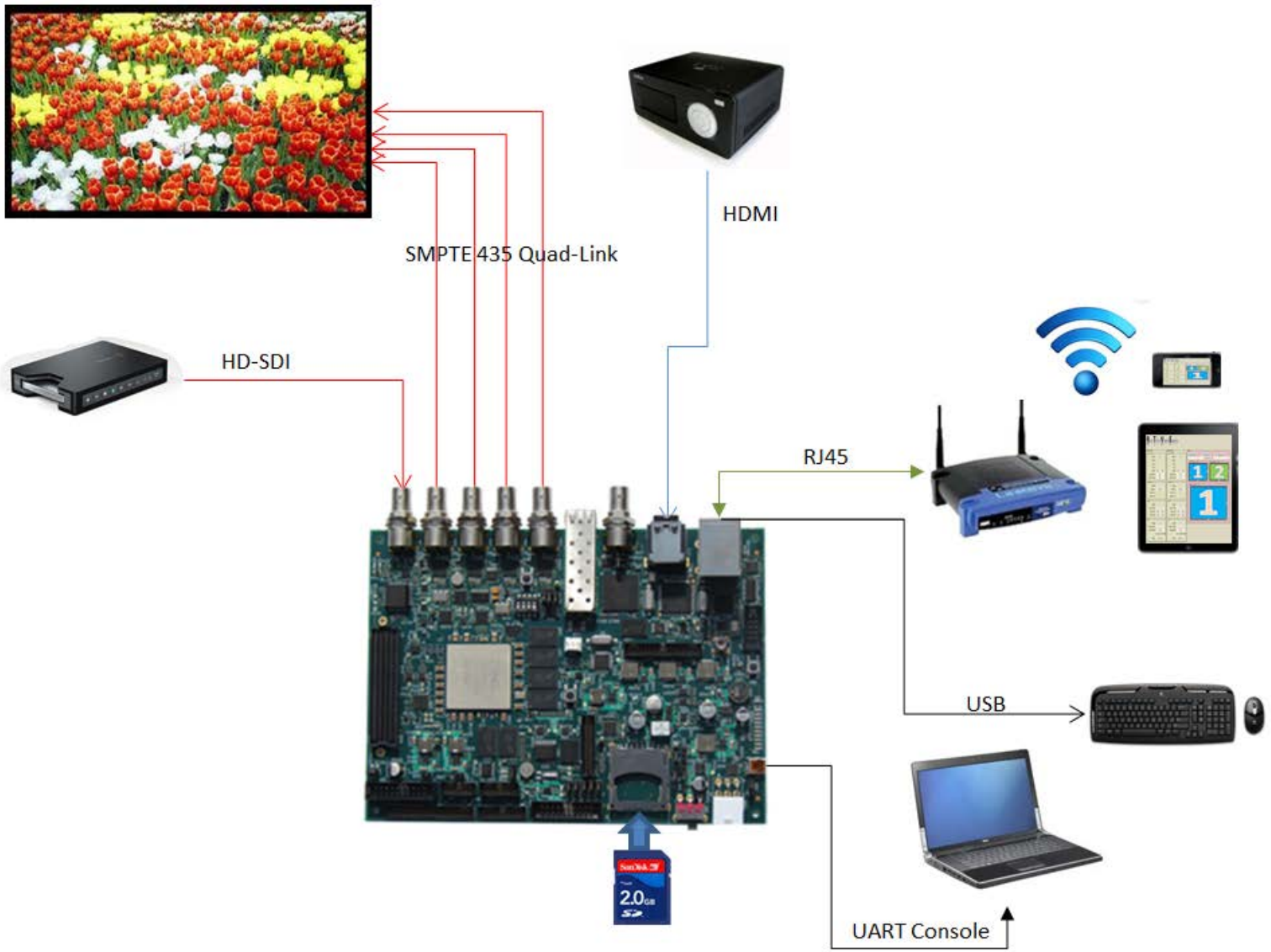
# Real-Time Video Engine 3.0



# Xilinx Real Time Video Engine

- Xilinx Reference Design based on OmniTek OSVP Core
- Based on OZ745 hardware platform targeting Zynq-7000 AP SoC
- Supports up to 8 channels of uncompressed HD processing
- Short roadmap to 4K processing for Immersive Displays

- Dramatically shortens time-to-market
- Optimized for performance and device resource
- Based on AXI infrastructure for ease of integration
- Tailored through turn-key design services from OmniTek

**Let's You Focus on Your Value-add and Differentiation**

# Take the Next Step…

- Check out the Smarter Vision web site:
  www.xilinx.com/smartervision
- Contact your local Xilinx or Distributor sales office:
  www.xilinx.com/company/contact/index.htm