

Techniques for Success on the Scalable i.MX 8 and 8X Platforms

Andres Lopez de Vergara

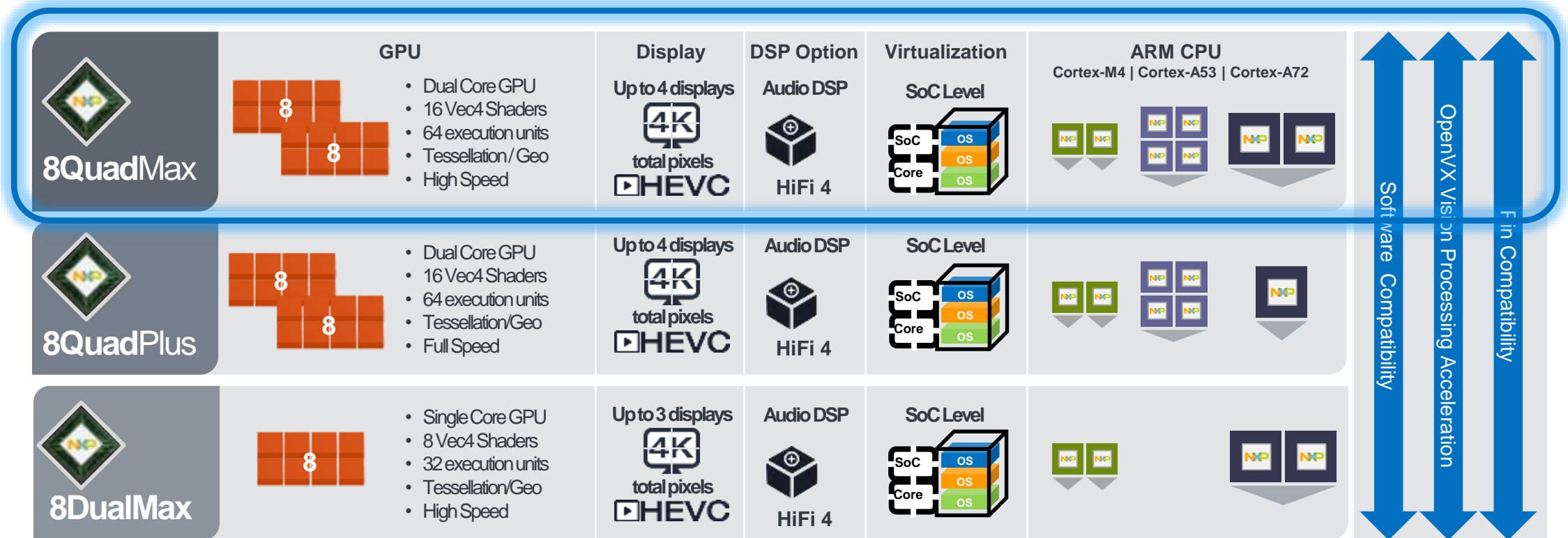
Technical Marketing

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SECURE CONNECTIONS
FOR A SMARTER WORLD

i.MX 8 Family of Applications Processors



Family of Scalable Multimedia Processors













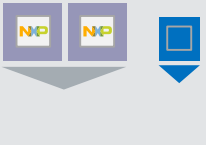






Multiple Operating Systems

Multiple Domains with Hardware Virtualization

Multiple Displays

Vision Processing Hardware Acceleration

i.MX 8X Family of Applications Processors

	GPU		Video	Displays	DSP	USB	DDR	ARM CPU	
 8QuadXPlus		<ul style="list-style-type: none"> Single Core GPU 4 Vec4 Shaders <i>high performance</i> 16 execution units OpenGL ES 3.1 OpenCL Embedded 	 + Legacy	Up to 3 2x 1080p 1x WVGA	 HiFi 4		x32 DDR3L-1866 (ECC option) LP-DDR4-2400 (no ECC)	Cortex-A35 + M4 	
 8DualXPlus		<ul style="list-style-type: none"> Single Core GPU 4 Vec4 Shaders <i>high performance</i> 16 execution units OpenGL ES 3.1 OpenCL Embedded 	 + Legacy	Up to 3 2x 1080p 1x WVGA	 HiFi 4		x32 DDR3L-1866 (ECC option) LP-DDR4-2400 (no ECC)		
 8DualX		<ul style="list-style-type: none"> Single Core GPU 4 Vec4 Shaders <i>power optimized</i> 16 execution units OpenGL ES 3.1 OpenCL Embedded 	 + Legacy	Up to 2 *1x 1080p+ 1x WVGA	 HiFi 4		x16 DDR3L-1866 (no ECC) LP-DDR4-2400 (no ECC)		

Family of Scalable Multimedia Processors

* Bandwidth limited

Industrial Grade Qualification with Error Correcting Code (ECC) on DDR3L interface
 Automotive Qualification for high temp, duty cycled applications

Hands On Hardware



i.MX 8QuadXPlus MEK System

Available for Alpha Program & Beta Programs

Part Number: MCIMX8QXP-CPU – works standalone w/o baseboard
Includes LVDS to HDMI adapter (IMX-LVDS-HDMI)

Overview

- NXP i.MX 8QuadXPlus
 - i.MX 8DualXPlus emulation on 8QuadXPlus
- NXP MMPF8100 PMIC
- 3 GB LPDDR4 memory, x32
- 32 GB eMMC 5.0
- 64 MB Octal SPI Flash
- 5.24" x 5.24" 8-layer PCB

Display Connectors

- 2x mini-SAS MIPI / LVDS connectors (Combo PHY)
- Camera MIPI-CSI through mini-SAS connector

Audio

- Audio Codec
- Microphone and headphone jacks

Connectivity

- 1x full-size SD/MMC card slot
- 10/100/1000 Ethernet port
- 1x USB 3.0 Type C



Debug

- JTAG connector
- Serial to USB connector

Expansion Connector

- M.2 Connector (PCIe, USB, UART, I2C and I2S)

Works With:

X-MX8QXPLPD4-21	✗	MINISASTOCSI	✓
IMX-VAL-SAS	✗	MCIMX8MIPI4CAM	✗
IMX8DV-BB1	✗	MX8XMIPI4CAM2	✓
MCIMX8QXP-CPU	✓	MCIMXCAMERA1MP	✓
MCIMX8-8X-BB	✓	IMX-RMII-BRPHY	✓
IMX-MIPI-HDMI	✓	IMXA12ETH-ATH	✓
IMX-LVDS-HDMI	✓	MURATA WIFI	✓

Additional Features

- NXP 3-axis accelerometer & eCompass [not populated]
- NXP Gyroscope
- NXP Light Sensor
- NXP Pressure Sensor
- RGB LED
- Power supply
- No battery charger

OS Support

- Linux, Android and FreeRTOS BSPs from NXP
- Others: 3rd parties

Tools Support

- Lauterbach
- ARM (DS-5)

WiFi: (not included with kit)

- Murata WiFi module

Part Numbers: MCIMX8-8X-BB

Includes Audio Board (IMX-AUD-IO)

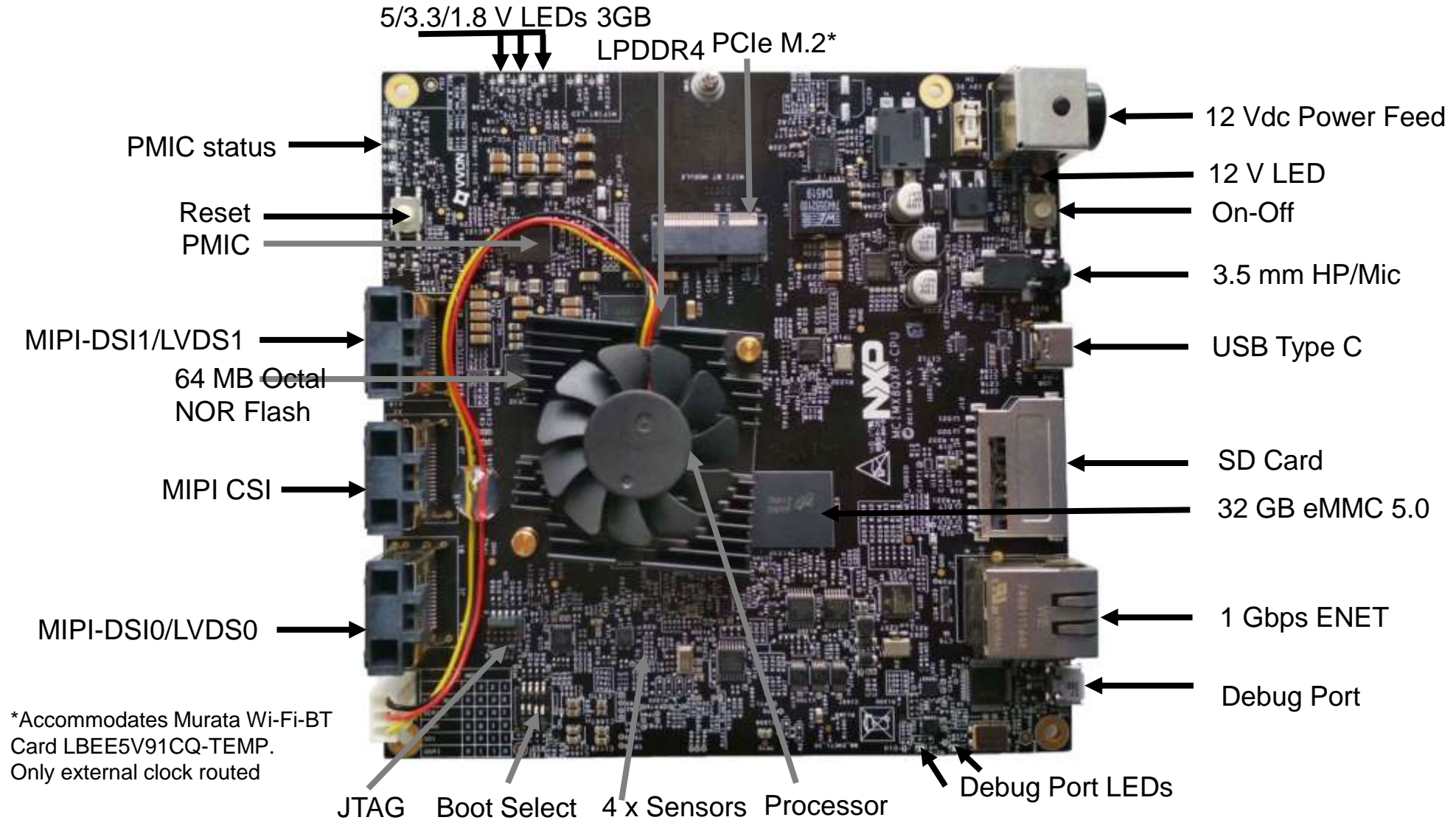
Connectivity

- 1x I2C Auxiliary Connector
- 1x Tamper Head
- 1x Parallel CSI Connector
- 1x UART, 2x CAN
- 1x uUSB OTG connector
- 1x Audio In Connector,
- 1x Audio Out Connector
- 1x 10/100/1000 Ethernet connector Muxed w/ Audio port)

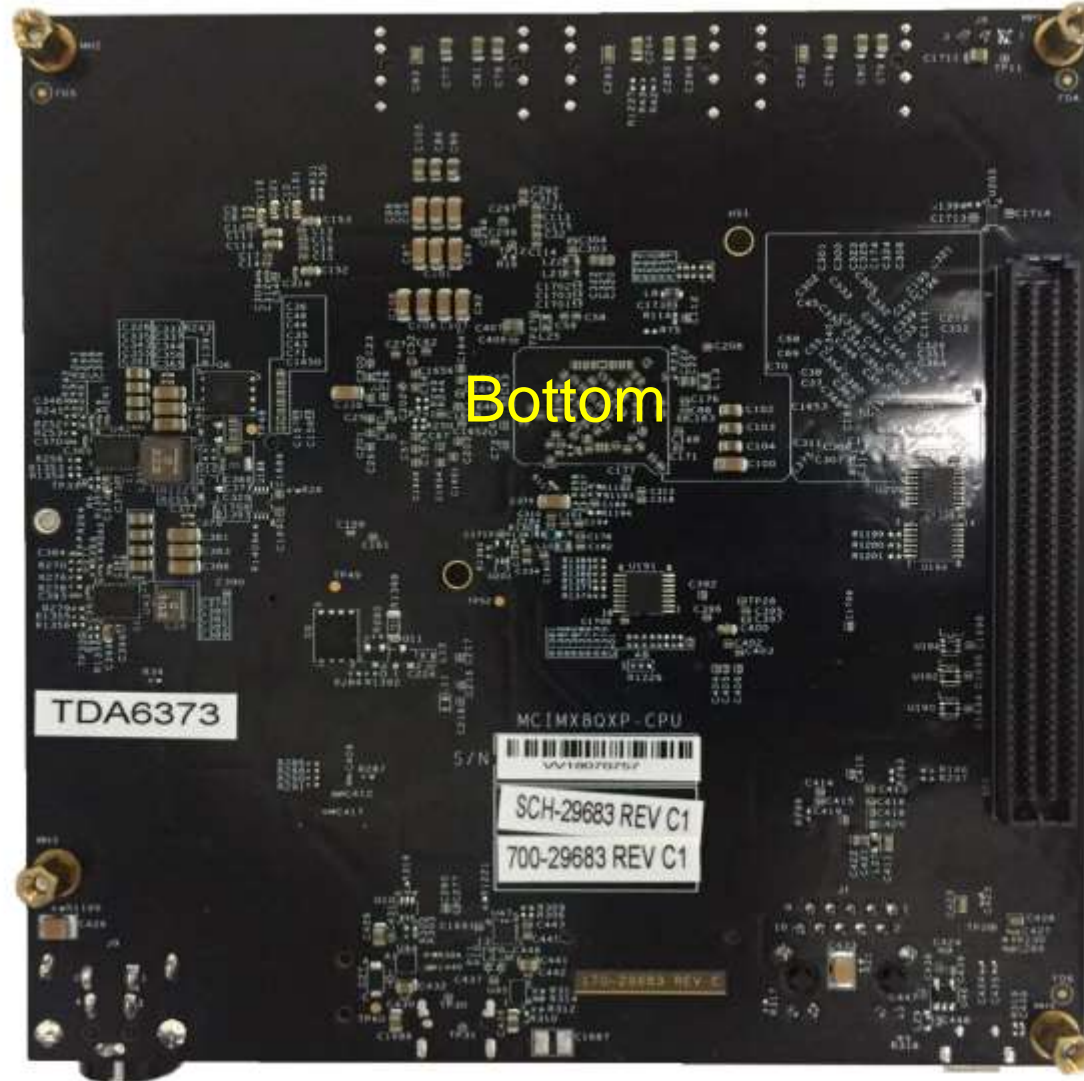
Expansion Connector

- Arduino Connector / MikroBus Interface

MX8QXP MEK CPU Card (1 of 3)



MX8QXP MEK CPU Card (2 of 3)



← Base Board Connector

Included in MX8 CPU Kits

Part Number MCIMX8QXP-CPU

- Power Brick
- LVDS-to-HDMI Adapter Card
- Mini SAS Cable
- JTAG 10- to 20-Pin Adapter with ribbon cable
- USB Type C Male to Type A Female adapter cable
- USB Mini to USB Type A cable
- SD Card with BSP Image
- QSG (Quick-Start Guide)

Hands On



Lab 1: Programming an Image to the eMMC

- How to use UUU
- Load Linux into eMMC

Lab 2: Mass Storage Devices via USB

- Mounting a USB device
- Copying files from USB stick

i.MX 8QXP Display Controller



Key Points

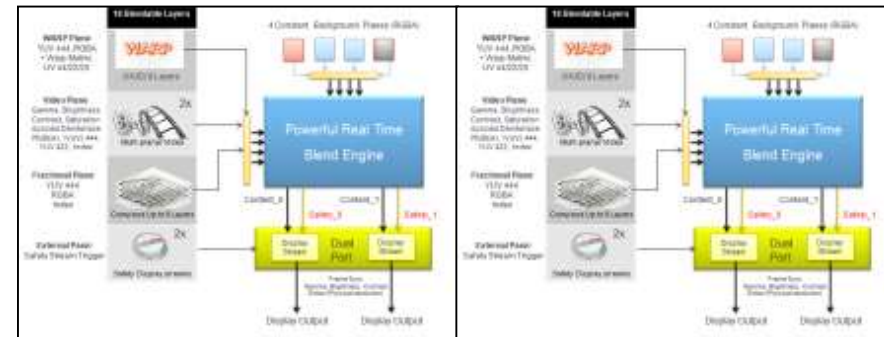
Display

- All devices share the same controller
 - Optimized Automotive display
 - Failover support
 - Warp support
- Offline blending capability
- Designed to support multiple displays
 - MX8QXP up to 2 1080p60 + 1 WVGA,
 - 1 DSI/LVDS combo, 1 Parallel

i.MX 8 Display Controller

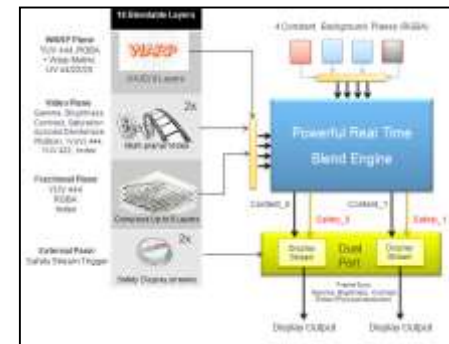
- All i.MX 8 Display Processors will have the same feature set and share the same programming model / code base
- Fetch from memory and generate pixel streams for “pixel link” interface
- Each pixel stream can be directed to a selection of output PHYs
 - LVDS / DSI / HDMI

2 Display Processor Instances:
i.MX 8 [QuadMax](#), [QuadPlus](#), [DualMax](#)



4K (4x1080p) Display Support using dual output ports

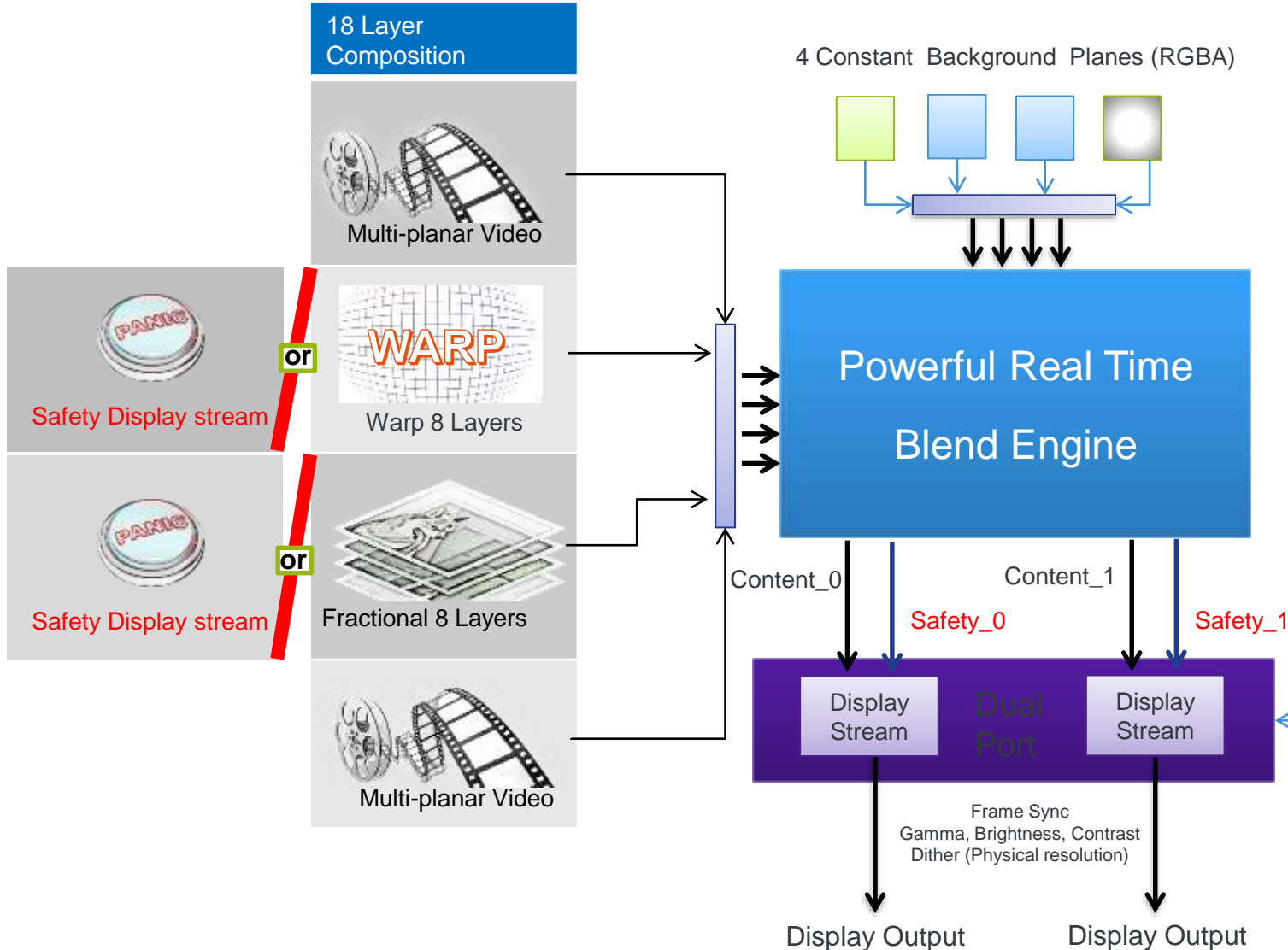
1 Display Processor Instance:
i.MX 8 [QuadXPlus](#), [DualXPlus](#), [DualX](#)



2K (2x1080p) Display Support using dual output ports



i.MX 8 Display Controller

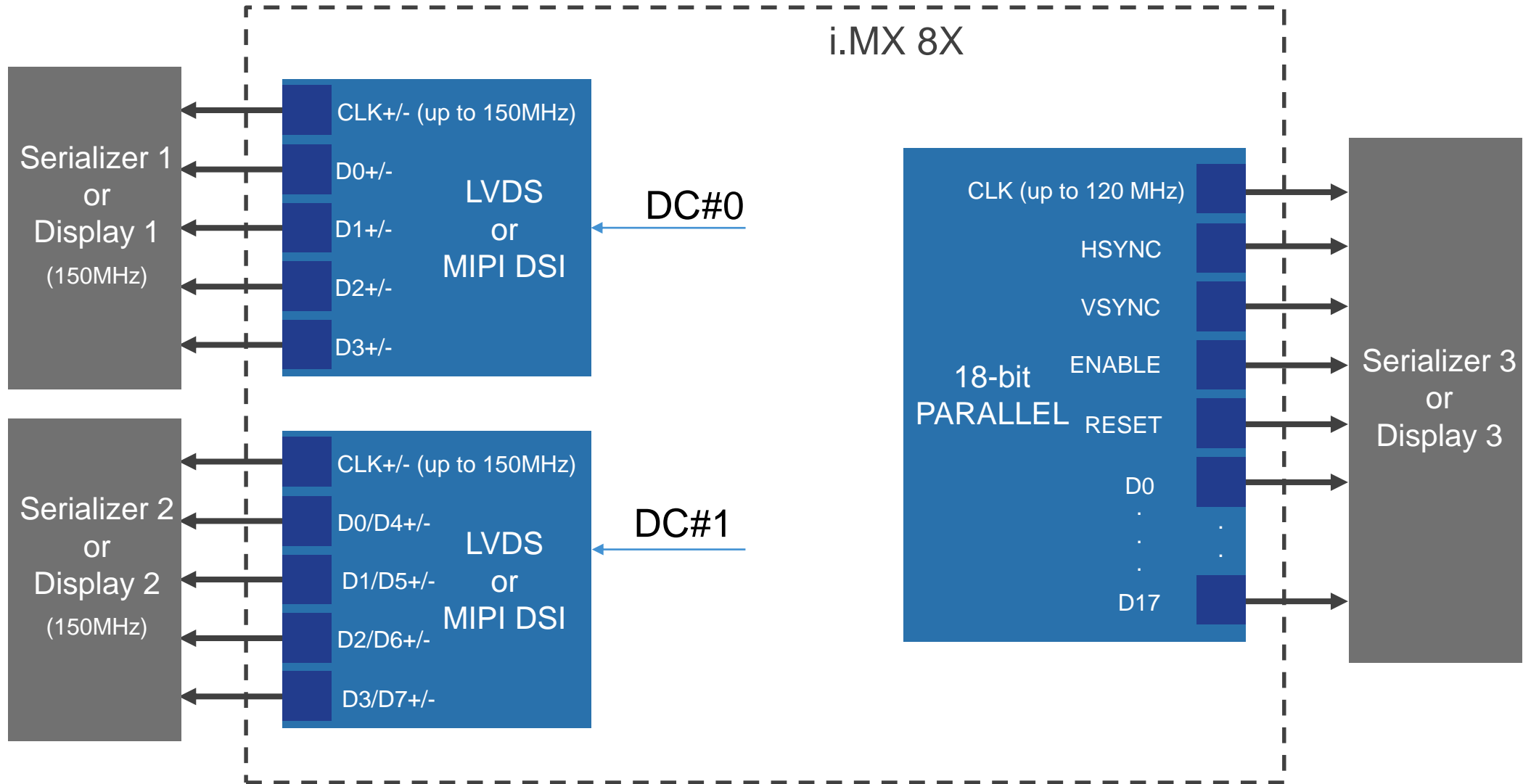


- i.MX 8 Display Composition Engine (32 bit)
- 2 Display Output Streams (independent panels)
- 10 bits per color component (30-bit resolution)
- 18 Total layers composition at 300 Mpixels / second
- Real-time blend and Warp, no DDR passes req'd
- Automatic Safety Stream Panic + Detection using CRC Matching

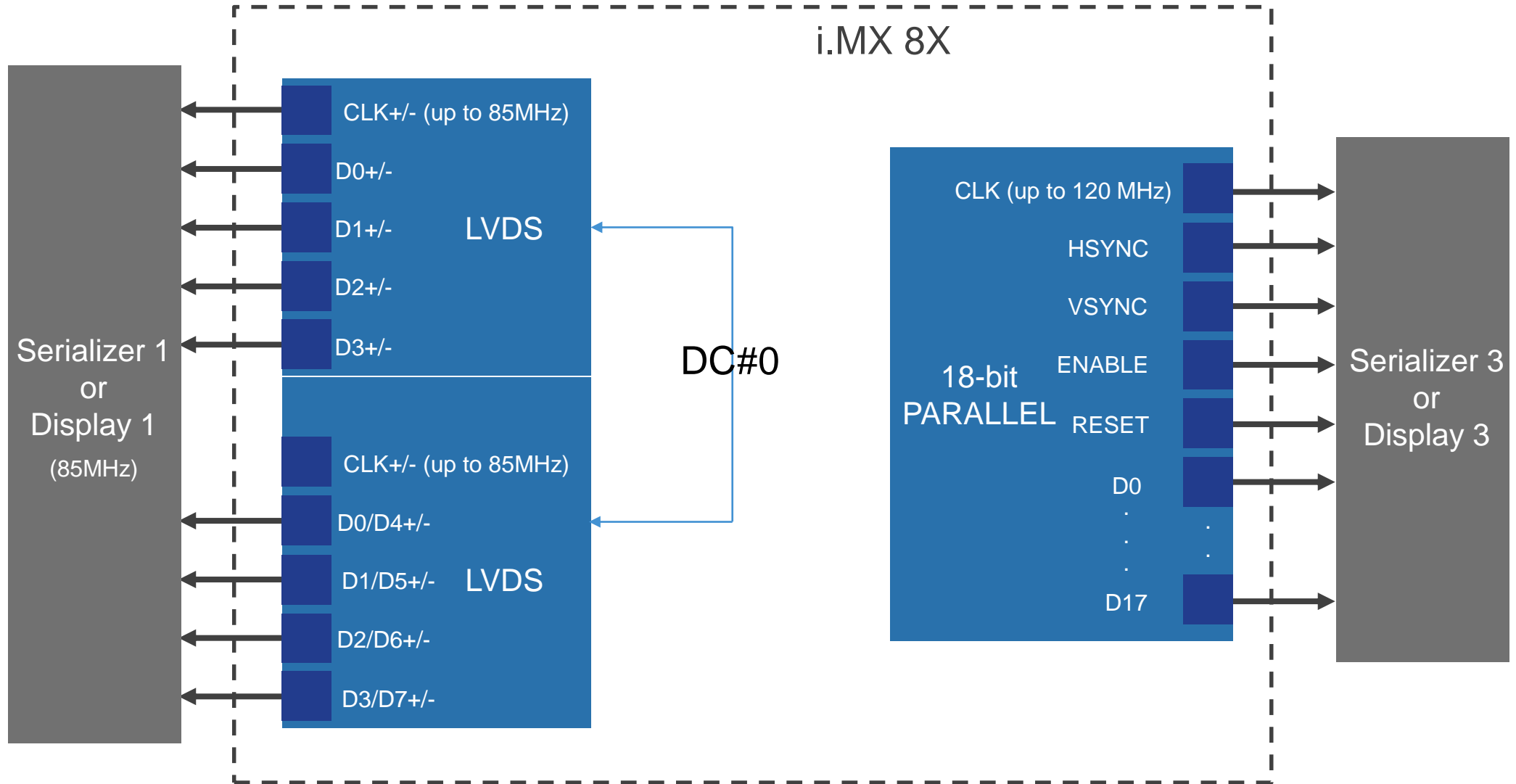
NXP provides turnkey solutions using this HW eg for rear view camera



i.MX 8X Display Support



i.MX 8X Display Support



Lab 3: Single Display Demo

- Simple instructions on how to run a single video file

Lab 4: Modifying Weston.ini

- Create Weston task bar icon
- Assign icon to video playback script

Lab 5: Dual Display Demo

- Use newly created Weston screen icon to run dual display demo



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