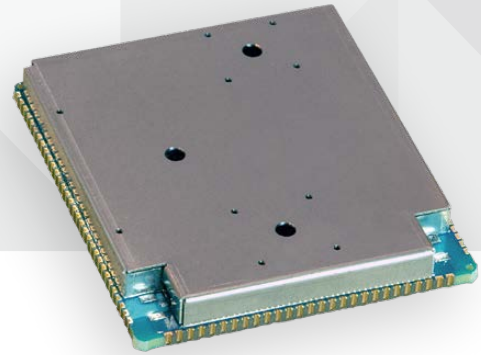# DIGI CONNECTCORE 8X

Intelligent and connected embedded system-on-module based on the NXP i.MX 8X with scalable dual/quad-core performance for industrial IoT applications
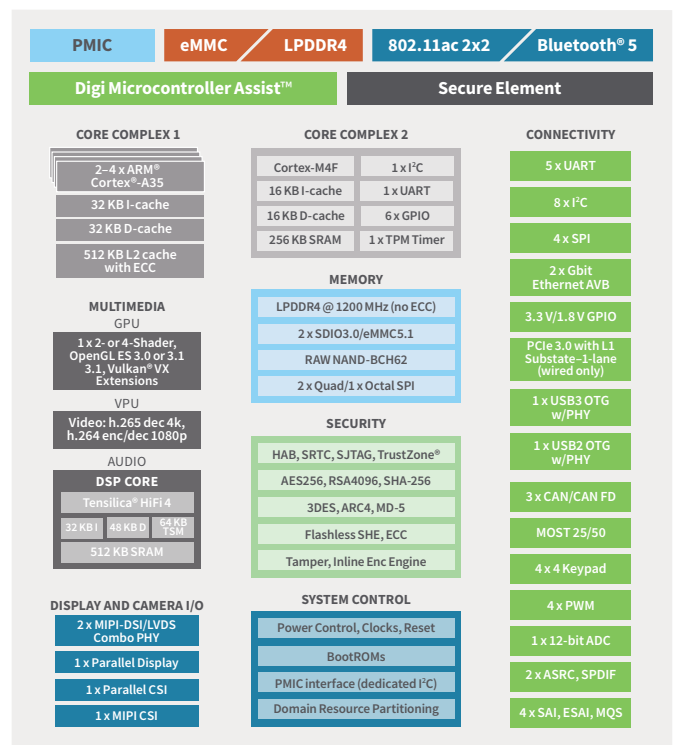
Digi ConnectCore® 8X delivers a secure and cost-effective connected system-on-module platform that measures in at just 40 mm x 45 mm. The Digi SMTplus® surface mount form factor allows you to choose simplified design integration leveraging proven and easy-to-use edge-castellated SMT technology, or a versatile LGA option for ultimate design flexibility with access to virtually all interfaces.

Built on the NXP i.MX 8X application processor, the module is the intelligent communication engine for today's secure connected devices. Digi ConnectCore 8X can help jump-start the development of streaming video/audio devices, voice control and general human-machine interface solutions. With a multitude of high performance interconnecting options, including 1x USB 3.0 port, dual Gigabit Ethernet, PCIe 3.0, and pre-certified dual-band 2x2 MU-MIMO WLAN, Digi ConnectCore 8X is ideal for developing a wide range of embedded and IoT applications.

BLOCK DIAGRAM

PMIC	eMMC / LPDDR4	802.11ac 2x2 / Bluetooth® 5
Digi Microcontroller Assist™		Secure Element

CORE COMPLEX 1
- 2–4 x ARM® Cortex®-A35
- 32 KB I-cache
- 32 KB D-cache
- 512 KB L2 cache with ECC

MULTIMEDIA
GPU
- 1 x 2- or 4-Shader, OpenGL ES 3.0 or 3.1 3.1, Vulkan® VX Extensions

VPU
- Video: h.265 dec 4k, h.264 enc/dec 1080p

AUDIO
DSP CORE
- Tensilica® HiFi 4
- 32 KB I | 48 KB D | 64 KB TSM
- 512 KB SRAM

DISPLAY AND CAMERA I/O
- 2 x MIPI-DSI/LVDS Combo PHY
- 1 x Parallel Display
- 1 x Parallel CSI
- 1 x MIPI CSI

CORE COMPLEX 2
Cortex-M4F	1 x I²C
16 KB I-cache	1 x UART
16 KB D-cache	6 x GPIO
256 KB SRAM	1 x TPM Timer

MEMORY
- LPDDR4 @ 1200 MHz (no ECC)
- 2 x SDIO3.0/eMMC5.1
- RAW NAND-BCH62
- 2 x Quad/1 x Octal SPI

SECURITY
- HAB, SRTC, SJTAG, TrustZone®
- AES256, RSA4096, SHA-256
- 3DES, ARC4, MD-5
- Flashless SHE, ECC
- Tamper, Inline Enc Engine

SYSTEM CONTROL
- Power Control, Clocks, Reset
- BootROMs
- PMIC interface (dedicated I²C)
- Domain Resource Partitioning

CONNECTIVITY
- 5 x UART
- 8 x I²C
- 4 x SPI
- 2 x Gbit Ethernet AVB
- 3.3 V/1.8 V GPIO
- PCIe 3.0 with L1 Substate–1-lane (wired only)
- 1 x USB3 OTG w/PHY
- 1 x USB2 OTG w/PHY
- 3 x CAN/CAN FD
- MOST 25/50
- 4 x 4 Keypad
- 4 x PWM
- 1 x 12-bit ADC
- 2 x ASRC, SPDIF
- 4 x SAI, ESAI, MQS

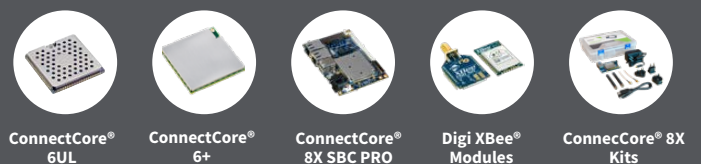(See table for Dual SOM differences)

BENEFITS

- Industrial i.MX 8X quad/dual-core SOM and SBC platform family
- Digi SMTplus® form factor (40 mm x 45 mm) for ultimate reliability and design freedom
- Power management with both hardware and software support for low-power designs
- Multi-display and camera capabilities with hardware acceleration
- Pre-certified dual-band 802.11a/b/g/n/ac 2x2 and Bluetooth® 5 connectivity
- Seamless cellular modem and Digi XBee® 3 integration
- Cloud and edge-compute services integration
- Built-in device security with Digi TrustFence®
- Yocto Project® Linux® and Android™ support

RELATED PRODUCTS

ConnectCore® 6UL

ConnectCore® 6+

ConnectCore® 8X SBC PRO

Digi XBee® Modules

ConnecCore® 8X Kits

SPECIFICATIONS	Digi ConnectCore® 8X Quad	Digi ConnectCore® 8X Dual
APPLICATION PROCESSOR	NXP i.MX8QuadXPlus • 4x Cortex-A35 cores @ 1.2 GHz • 1x Cortex-M4F @ 266 MHz core for real-time processing • 1x Tensilica® Hi-Fi 4 DSP	NXP i.MX8DualXZ • 2x Cortex-A35 cores @ 1.2 GHz
MEMORY	Up to 64 GB eMMC, up to 4 GB of LPDDR4	
PMIC	NXP PF8100	
GRAPHICS	Multi-stream-capable HD video engine with H.265 (4Kp30), H.264 (1080p60), VP6/VP8 (1080p60), MPEG-2 (1080p60), MPEG4 (1080p), RealVideo (1080p) decode and H.264 (1080p30) encode; 3D video playback in HD in high-performance families; Superior 3D graphics performance with up to four shaders	H.264 (1080p60), VP6/VP8 (1080p60), MPEG-2 (1080p60), MPEG4 (1080p), RealVideo (1080p) decode and H.264 (1080p30) encode; 3D video playback in HD in high-performance families; Superior 3D graphics performance with up to four shaders
SECURITY	Digi TrustFence®, TRNG, TrustZone, ciphers, security control, secure RTC, secure JTAG, eFuses (OTP)	
PERIPHERALS/INTERFACES**	1x SD 3.0 card interface handles SD/SDIO/MMC protocols (1x additional one reserved on the SOM for supporting eMMC); 5x UARTs (4x UARTs from Cortex-A35 core, 1x UART from Cortex-M4), S/PDIF Tx/Rx; 8x I²C (4xI²C high-speed DMA support 4x I²C low-speed no DMA support); 4x SPI, ESAI, 4x I²S/SSI, 3x FlexCAN, MLB150 + DTCP, USB 3.0 OTG with PHY, USB 2.0 OTG with PHY; 4x PWM, GPIO, Keypad, PCIe 3.0 (x1 lane)*, 2x MIPI DSI/LVDS, MIPI CSI, 8/10-bit CSI; 24-bit RGB, RTC, Watchdog, Timers, JTAG	1x SD 3.0 card interface handles SD/SDIO/MMC protocols (1x additional one reserved on the SOM for supporting eMMC); 5x UARTs (4x UARTs from Cortex-A35 core, 1x UART from Cortex-M4), S/PDIF Tx/Rx; 8x I²C (4xI²C high-speed DMA support 4x I²C low-speed no DMA support); 4x SPI, ESAI, 4x I²S/SSI, 3x FlexCAN, MLB150 + DTCP, USB 2.0 OTG with PHY; 4x PWM, GPIO, Keypad, PCIe 3.0 (x1 lane)*, 1x MIPI DSI/LVDS, MIPI CSI, 8/10-bit CSI; 24-bit RGB, RTC, Watchdog, Timers, JTAG
ETHERNET	2x 10/100/1000M Ethernet + AVB	
WI-FI	802.11a/b/g/n/ac: 2.412 - 2.484 GHz, 4.900 - 5.850 GHz 802.11b: 1, 2, 5.5, 11 Mbps (17 dBm typical ±2 dBm) 802.11a/g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps (15 dBm typical ±2 dBm) 802.11n: 15, 30, 45, 60, 90, 120, 135, 150 Mbps (12 dBm typical ±2 dBm) HT40, MCS 0-7 802.11ac: 15, 30, 45, 60, 90, 120, 135, 150, 180, 200 Mbps (10 dBm typical ±2 dBm) HT40, MCS 0-9 Note: All data rates provided above are for 1x spatial stream (double the data rate for 2x spatial streams) Security: WEP, WPA-PSK/WPA2 personal, WPA/WPA2 enterprise, 802.11i, access point mode (up to 10 clients), Wi-Fi Direct Industry certifications: Wi-Fi Alliance Logo Certification Ready, CCXv4 ASD Ready	
BLUETOOTH®	Bluetooth® 5	
ON-MODULE MICROCONTROLLER ASSIST	Digi Microcontroller Assist™ • Independent Cortex-M0+ microcontroller subsystem • Supporting ultra-low power modes @ <3µA	
OPERATING TEMPERATURE	Industrial: -40° C to 85° C (-40° F to 185° F), depending on use case and enclosure/system design	
STORAGE TEMPERATURE	-50° C to 125° C (-58° F to 257° F)	
RELATIVE HUMIDITY	5% to 90% (non-condensing)	
RADIO APPROVALS	US, Canada, EU, Japan, Australia/New Zealand	
EMISSIONS/IMMUNITY/SAFETY	FCC Part 15 Class B, EN 55022 Class B, EN 61000-3-2, EN 61000-3-3, ICES- 003 Class B, VCCI Class II, AS 3548, FCC Part 15 Subpart C Section 15.247, IC (Industry Canada), RSS-210 Issue 5 Section 6.2.2(o), EN 300 328, EN 301 489-17, EN 55024, EN 301 489-3	
DESIGN VERIFICATION	Temperature: IEC 60068-2-1, IEC 60068-2-2, IEC 60068-2-78 Vibration/Shock: IEC 60068-2-6, IEC 60068-2-64, IEC 60068-2-27, HALT	
MECHANICAL DIMENSIONS	118 castellated vias, LGA-474, 1.27 mm pitch, fully shielded for radio emissions and thermal management (heat-spreading) 40 mm x 45 mm x 3.5 mm (1.6 in x 1.8 in x 0.1 in)	
PRODUCT WARRANTY	3-year	

*PCIe is only supported on wired variants.
**Each single PHY can either be a 1 x 4 lane MIPI-DSI or a 1 x 1 channel LVDS interface for a total of 2 display interfaces. In combination, the two PHYs can be configured to be a single 2-channel LVDS interface.