

HORIZON JOURNEY™ 3 Family

Efficient Processing for Autonomous Machines

Automotive Grade Processor Optimized for ADAS Workloads

Fueled by the rapidly advancing research and development in autonomous machines, algorithms are evolving and diversifying at a breakneck pace. Horizon Journey 3 keeps up with this high velocity to offer the most optimized processing architecture in the market for low cost yet advanced ADAS applications.

Journey 3 processor is a carefully balanced system-on-chip, integrating the cutting-edge and energy efficient Bernoulli BPU™ (Brain Processor Unit) with a host of other engines such as a Quad core Cortex A53 CPU, an assisting Cortex R5 MCU, a high-performance ISP, a versatile video Codec, a Security crypto-engine and high-speed peripherals and I/Os for maximum flexibility. Manufactured in the mature 16nm FinFET process, Journey 3 is both cost effective and power efficient, using less than 2.5Watts for typical perception, fusion or localization workloads.

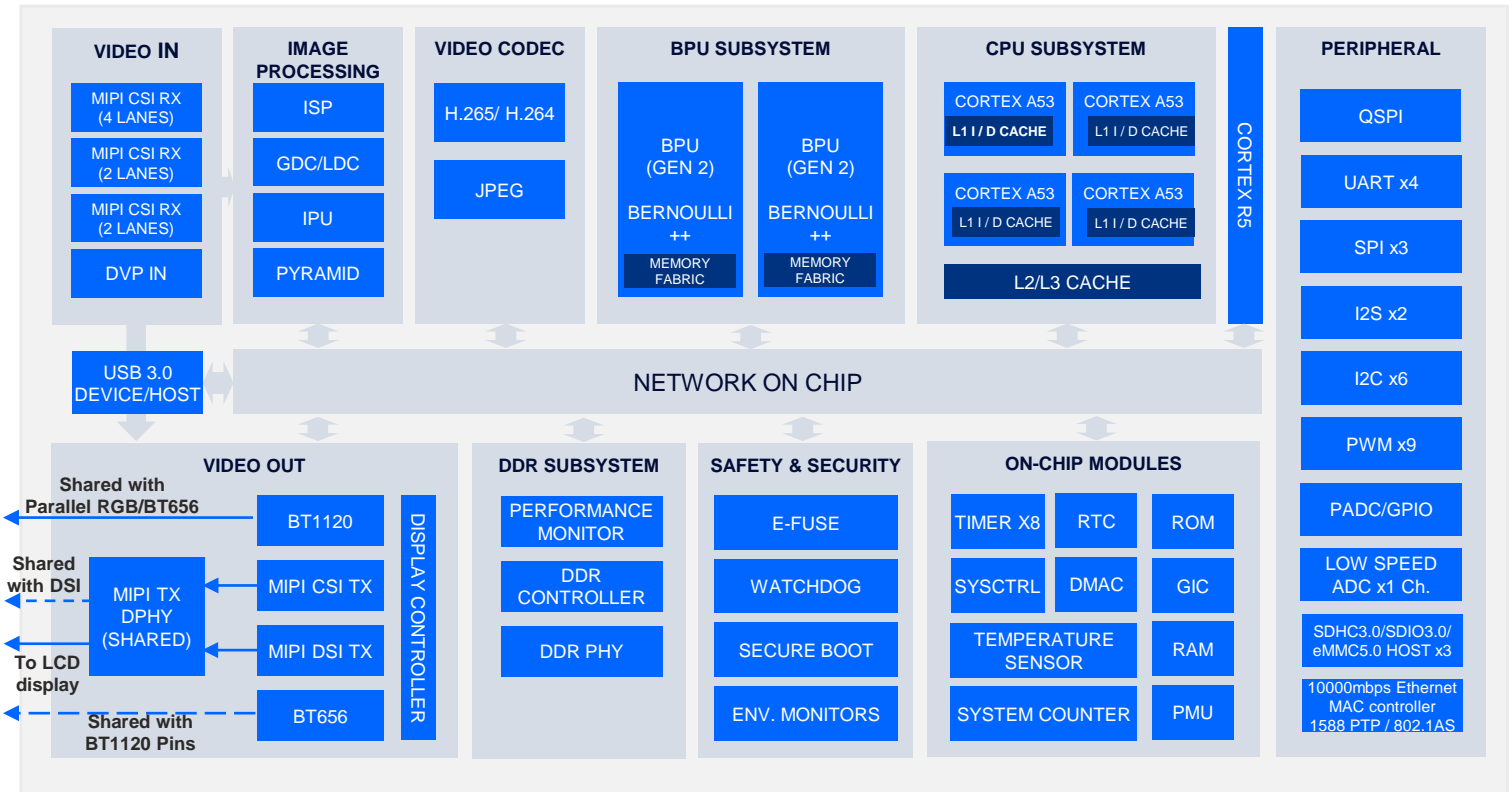
Journey 3 is your ideal automotive intelligence processor that will deliver the high-performance and low-latency you need, with high energy efficiency and cost effectiveness. Journey 3 performs better than other processors in running MobileNetV2 and EfficientNet models and other modern algorithms. Please contact your Horizon sales representative for details.

To harness the full potential of the innovation in modern and more efficient models, Journey 3 is offered as an open platform, with Horizon Robotics OpenExplorer™, an easy-to-use toolchain to train, quantize, optimize and deploy models on the Journey 3 BPU. Sample models from our Model Zoo helps accelerate developer’s projects.

5 BPU TOPS	A53 & R5 Quad core CPU One R5 MCU
2.5W Typical perception workload	Efficient With modern algorithms
16nm TSMC FinFET process	ISP/Codec On-chip
Open Toolchain and example code	Automotive AEC-Q100 grade 2 qualified

Journey3 SOC 	Journey3 Dev kit 	OpenExplorer toolchain 	Algorithms
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Journey 3 Block Diagram



Journey 3 Key Features

CPU Cores	<ul style="list-style-type: none"> Quad-Core ARM Cortex® A53 1x Cortex R5 MCU assistant
Brain Processing Unit	<ul style="list-style-type: none"> Dual core Bernoulli-architecture v2 BPU specialized in model inference Equivalent 5 INT8 TOPS . Fully optimized for ADAS and AV driving scenario
Memory	<ul style="list-style-type: none"> 32-bit off-chip DDR4/LPDDR4/LPDDR54x; Up to 4GB DRAM capacity; Inline ECC;
Image Processing	<ul style="list-style-type: none"> High performance ISP for superb image quality Multi-camera, multi-exposure HDR, 3A functions, local tone mapping, 3DNR/LDC/GDC Up to 8Mp@30fps
Video codec	<ul style="list-style-type: none"> H.264 and H.265 video codec at 4k@30fps. MJPEG, 8Mpixels@30fps CBR/VBR/AVBR/FixQp/QpMap Bitrate control JPEG encode/decode up to 16Mpixels resolution
Camera input and output	<ul style="list-style-type: none"> 3x MIPI CSI-2 receivers; 2.0Gbps per lane; Total 8 lanes/16Gbps; 4096x2160pixels@30fps input RAW 8/10/12/14/16-bit; 8/10-bit YUV 422 1x MIPI CSI-2 transmitter; 4 lanes; 8Mpixels@30fps output; Shared TX DPHY with DSI TX 1x MIPI DSI transmitter; 4 lanes; 2Mpixels@60fps output; Shared DPHY with CSI TX
High speed peripherals and I/Os	<ul style="list-style-type: none"> One 100M/1G Ethernet MAC; RMI and RGMII interface for external Ethernet PHY USB 3.0 Device/Host 3x SDIO/SD3.0; 4x UART; 3x SPI; 6x I2C; 2x I2S; 1x QSPI; 9x PWM
Security Engine	<ul style="list-style-type: none"> Secure boot; Memory and I/O security protected Hardware encryption and decryption accelerators; TRNG
OpenExplorer Toolkit	<ul style="list-style-type: none"> Linux SDK and Open SDK Easy porting and optimizing algorithms to Journey3 BPU; Tensorflow, ONNX and PyTorch support Design examples and best practices to achieve minimum time to market
Process and power	<ul style="list-style-type: none"> 16nm FinFET from TSMC 2.5Watts power consumption for typical perception workloads