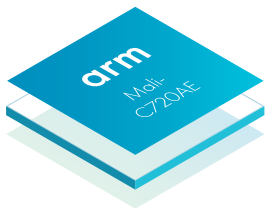




PRODUCT BRIEF

Arm Mali-C720AE



KEY FEATURES AND BENEFITS

- + **Highly Configurable ISP**
The highly configurable and scalable design of Mali-C720AE allows our automotive partners to balance PPA and functional safety and image processing capabilities across a variety of configurations.
- + **Dual Computer Vision (CV) and Human Vision (HV) Pipeline**
The Mali-C720AE dual CV and HV pipeline saves latency, while providing area and efficiency improvements in the processing of workloads with the same raw data inputs and different image quality requirements.
- + **Innovative Differentiable ISP Model**
The differentiable ISP model of Mali-C720AE improves perception performance and accelerates the time to market for our partners through automated image quality tuning, driven by objective perception metrics.

INTRODUCTION

Mali-C720AE is the first Arm ISP combining functional safety with configurability and designed for imaging applications in a software-defined vehicle (SDV). A dual pipeline architecture reduces latency for the most demanding computer vision applications without compromising outstanding image quality for human viewing. Accompanied by a suite of tools, including a novel differentiable ISP model, Mali-C720AE enables a cost-efficient hardware/software co-development, image quality tuning, and accelerated time to market. This is our most performant, most flexible, and most efficient ISP ever.

USE CASES

- + Advanced Driver Assistance Systems (ADAS)
- + Autonomous Driving
- + Digital Cockpit
- + In-Vehicle Infotainment (IVI)

HIGHLIGHTS

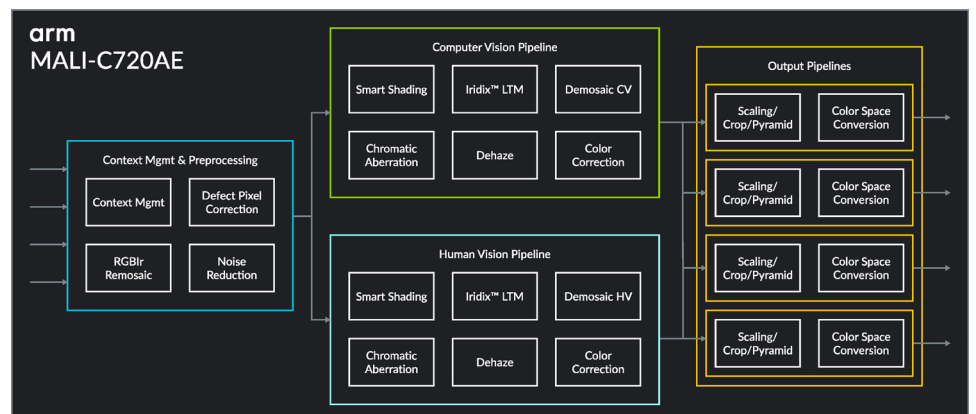
Image Processing Example

On the left, a night-time automotive scene processed with global tone mapping. On the right, the same scene processed with Iridix 8.3 local tone mapping, which is a key feature of Mali-C720AE.



Safety Ready

Mali-C720AE provides real-time safety features for functional safety applications and supports automotive vision systems that must achieve ISO 26262 ASIL-B diagnostic requirements in a variety of applications. These safety features also allow Mali-C720AE to achieve IEC 61508 SIL2 diagnostic requirements in a range of industrial applications, such as mobile robotics and factory automation. Learn more at www.arm.com/safety¹.



Specifications

Configurability	Three base configurations with complete functional safety documentation and multiple optional modules.
Dual CV/HV pipeline	PPA-efficient
Multiple camera support	Up to 16 sensors per ISP instance.
Native HDR support	Native 24 bit-per-pixel pipeline.
Local tone mapping	Iridix® 8.3 allows up to 16-bit dynamic range compression (from 24-bit input to 8-bit output) preserving color accuracy and staying free from haloing and other artefacts.
CFA support	RGGB, RCCB, RCCG, RYYCy, RGBIr 4x4.
Pixel throughput	Up to 1.5 Gpixels/s (in 5nm implementation).
Image resolution	Up to 8192x4608 pixels.
Cropping and scaling	Independent in up to four parallel outputs.
Foveated vision	High-resolution crop output with programmable ROI parallel to downsampled main output.
Pyramid output	Four-level Gaussian pyramid with configurable 5x5 filter.
Noise reduction	Spatial, temporal, and chroma noise reduction.
Dehazing	Local contrast enhancement enables earlier object detection even in challenging weather conditions.
RGB sharpening	Ensures aliasing and noise are not boosted even in case of extreme oversharping.
Defect pixel detection/correction	Noise level awareness and greater control over false detection.
Smart shading	Clipping-aware lens shading correction logic preserves up to two f-stops of dynamic range in highlights.
ASIL-D systematic	Developed under ISO26262 framework and supplemented by the extensive safety documentation pack.
ASIL-B diagnostic	Multiple hardware safety mechanisms from top-level and block-level built-in safe tests to CRC checks on critical memory paths. Accompanied by diagnostic software library.
Image quality tools	Supported by calibration tool for sensor characterization and control tool for real-time access to ISP settings to assist in the IQ tuning process.
Models support	Accelerated bit-exact model (providing up to 40 fps) and differentiable ISP model are available as standalone software products to assist with IQ tuning, neural network training, and application software development.

RELATED PRODUCTS

Differentiable ISP Model

The differentiable ISP model is designed to integrate in a partner perception engine training framework to automatically tune ISP maximizing perception performance. The model is available as a standalone software product that does not require an RTL license to provide access to broader ecosystem.

Accelerated ISP Model

A GPU-accelerated ISP model provides bit-exact software implementation of the Mali-C720AE pipeline, enabling early software development and image quality tuning before silicon is available. This model is also available as a standalone product that does not require an RTL license.

Mali-G78AE

Mali-G78AE is a highly scalable GPU that enables configurable workload separation and virtualization. Mali-G78AE is designed to IEC 61508 and ISO 26262 safety standards for industrial and automotive applications respectively, and is ASIL-B/SIL-2 safety-capable.

Arm Frame Buffer Compression (AFBC)

AFBC is a lossless image compression protocol and format that addresses the difficulty of creating increasingly complex designs within constrained thermal budget.