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Smart camera system
CMOS image sensor and imaging processor for ADAS

ST's new camera-based advanced driver assistance system helps customers develop secure and high quality automotive applications

This smart camera system consists of a VG6640 high-performance 1.3-megapixel HDR image sensor and a versatile STV0991 system-on-chip with advanced and instant HDR image signal processing.
It's a perfect solution for a compact, low component count and low energy-consuming camera system for automotive and security applications.

KEY BENEFITS

- Front-side Illuminated technology with 3.75 micron pixel size
- Outstanding dynamic range of 132 dB
- Best-in-class low-light signal-to-noise ratio
- LED flicker mitigation
- Self-contained, HDR image processor
- ARM® Cortex®-R4 core @ 500 MHz
- 2-Mbyte SRAM and 2-Mbyte Flash memory
- MIPI and Parallel In and Out interfaces
- Dedicated hardware engines for video analytics (optical flow, edge detection) and geometrical lens correction
- Graphics overlay with transparency
- H.264 I/P encoder and JPEG 8/12-bit video compression with no DRAM
- Fail-safe strategy support (ISO 26262)
- AEC-Q100 Grade 2 qualified

TARGET APPLICATIONS

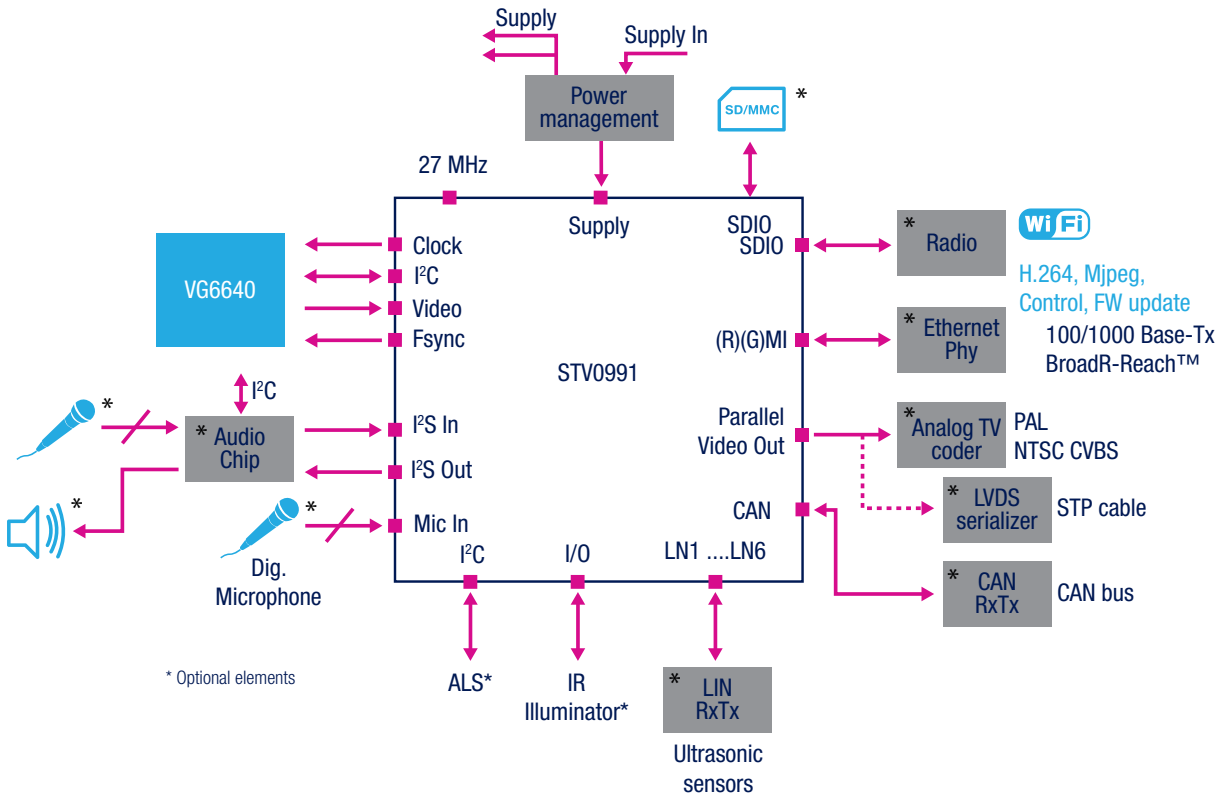
- Automotive
  - Ethernet rear-view camera
  - Smart rear-view camera
  - Surround-view camera
  - Traffic Alert camera
  - Virtual mirror replacement
  - In-cabin camera
- Consumer/Security
  - IP and Skype camera
  - Drone camera
  - Surveillance and intruder alarm camera
  - Building management smart camera
  - Wearable AV recorder

SYSTEM DESCRIPTION

The VG6640 image sensor offers an outstanding dynamic range of 132 dB, the highest on the market, thanks to its HDR pixel architecture. The sensor proposes various configuration modes that make this camera perfect for any tricky lighting environment. Based on three integration times, the sensor will not miss any details of the scene and the LED flicker will be mitigated. The sensor also provides a dual conversion gain function that is particularly suitable for improving sensitivity in low light conditions. That's why the minimum die illumination is only 1 mLux. What's more, the VG6640 offers a high level of ASIL functions.

The STV0991 companion chip is a self-contained image processor that does not require an external memory for its operations, including for predictive H.264 video encoding. A dedicated image reconstruction path, with specific image scaling and color space transformation support, feeds two hardware-accelerated video analytics functions: the 'edge detection' and 'optical flow'. These blocks provide energy-efficient pixels-processing horsepower that enables local execution of lightweight software-implemented ADAS algorithms such as 'Cross Traffic Alert'. Moreover, the execution at the ECU level of more complex algorithms, such as 'structure from motion' and 'objects classification', is done at largely reduced computational cost. This versatile smart camera solution is complemented by a wide range of external interfaces for generic peripherals including network support for both Ethernet and LVDS connectivity.

SYSTEM BLOCK DIAGRAM



Smart camera system explorer kit

Evaluation and development board available. Contact ST Sales Office for more information

PRODUCTS DETAILS

Part number	Package size	Operating temperature (Tj min, max)	Analog supply voltage (V_{CC})	Digital supply voltage (V_{DIG})	Output format	Frame ratio
VG6640	Im2BGA 9.0 x 9.3 mm	-40 °C 125 °C	2.8 V	1.8 V 2.8 V	RGB Bayer	45 fps at full resolution, 60 fps at 720 p resolution
STV0991	TFBGA 10.0 x10.0 mm	-40 °C 125 °C	2.5 V	1.1 V 1.8/3.3 V 1.2 V	JPEG/RGB/ YUV/H.264	JPEG 8-bit/12-bit, 5/2.1 MPixel@30 fps H.264 baseline I,P, 2.1 MPixel@30 fps

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