

NI-2060/61

3-MEGAPIXEL SMART CAMERA MODULE PROCESSOR

The NETHRA IMAGING™ NI-2060/61 is part of the NI-20xx family of Image Processors for compact consumer electronic devices where print quality image capturing is a requirement. The NI-20xx allows handset designers to deliver digital still camera image quality along with today's most in-demand features in mobile handsets and PDAs.

The core architecture of the NI-20xx is based on a highly scalable real-time image processing pipeline that allows OEMs to develop a platform that is applicable to various imaging applications. Support for up to 3 megapixels CCD and CMOS sensors allows the OEM to develop quality image processing products using the same base platform architecture.

The NI-20xx has an integrated high performance 32-bit RISC CPU and stacked flash (not available in NI-20x1), allowing OEMs to develop smart camera modules more quickly than competitive solutions, thus expediting time-to-market. Sophisticated true-color processing allows picture calibrating or tuning for different regions, offering region specific product development. In addition, support for multiple sensors helps simplify the OEM's supply chain.

The NI-2060/61 is the NI-2050 die in a chip scale package. The NI-2060 offers stacked flash memory, while the NI-2061 does not. They both offer digital still and video camera features. Key features include adaptive low light performance, smooth scaling, and histogram and statistical engine.

PRODUCT FEATURES

Sensor Interface

- Supports both CCD and CMOS sensors up to 3 megapixels
- Support for 8/10/12-bit interface
- Supports both master and slave modes

Video Output

- Bayer data, RGB (24 bits), RGB565, and YUV (4:2:2) (16 bits)

CPU Subsystem

- Integrated 32-bit RISC CPU to off-load application or host CPU
- Stacked 64 KB flash memory that allows fast boot-up (only in NI-2060)
- Boot ROM plus internal SRAM for code and data
- Fast and general purpose interrupts

Peripherals and Debugging Features

- Embedded debug interface using JTAG or UART
- 6 PWMs (in 168-pin package) and 4 PWMs (in 84-pin package) to create a motor control for focus & mechanical shutter
- 11 GPIOs, SPI for sensor or applications processor, on-board PLL to generate all on-chip clocks
- 2 I²C interfaces (84-pin package); 3 I²C interfaces (168-pin package)
- Direct glue-less interface to CMOS sensors

Scaling Engine

- High quality smooth image scaling engine, supports down scaling
- Multiple scaling modes allows image perfection
- Supports arbitrary cropping up to the maximum zoom level

Nethra Imaging Engine

- Hardware-based image processing pipeline capable of operating up to 54-million-pixels/second performance
- Intelligent true-color interpolation and conversion: adaptive Bayer to RGB conversion, YUV to RGB conversion
- Advanced edge enhancement
- Hardware color effects: monochrome, red, green, blue, color/mono negative, sepia
- High-end digital still camera features:
 - Auto White Balance & Auto Exposure
 - Programmable lens shading compensation
 - Adaptive low light performance
 - Histogram and statistical engine
 - Auto Focus

APPLICATIONS

The NI-2060/61 is a high performance, high quality image processor for low-cost imaging applications with the primary function set in a camera module. The programmable image processor family is highly suitable for applications in mobile handsets and camera modules. However, our SOC solutions provide the performance, flexibility and low power needed for a wide range of digital consumer applications.



CAPTURING YOUR IMAGINATION

IMAGE PROCESSING ENGINE

The NI-2060/61 features a high quality real-time image processing engine. Though the solution is in the hardware, it is highly programmable. The device is specifically designed to solve the limitation of the lower cost sensors in real-time while keeping the cost and power low. CMOS image sensors are used in most cost-sensitive consumer applications, even when CMOS sensors offer resolutions at 5 megapixels or higher. CMOS sensors are inherently lower in quality compared to CCD sensors. The proprietary image algorithm in the image pipeline that can solve specific image quality issues of the CMOS sensors makes the NI-206x/61 one of the best in the industry

SYSTEM INTEGRATION

The NI-2060/61 integrates a high performance 32-bit RISC CPU. This eliminates the need for an external CPU thus making it an ideal solution for handheld consumer devices, such as mobile handsets and PDAs. In addition, sophisticated Auto Exposure, Auto White Balance and Auto Focus algorithms can be implemented on the camera module instead of on the applications processor

In particular, the NI-2060 stacks a 64 KB flash memory which allows fast boot-up, and

field upgrade of the module parameters. This also allows module vendors to embed multiple sensor tuning parameters for easy sensor upgrade and fast time-to-market.

In addition, the NI-2060/61 integrates all the necessary interface for motor control thus reducing the overall bill of materials for a camera module. The NI-2060/61 168 -pin package is compatible with the NI-2090/91, thus the camera module vendor can make a single module design for four different products.

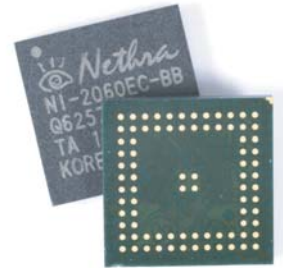
DEVELOPMENT KIT

The NI-2060/61 is available to customers with full development tool support, both hardware and software.

The kit will be delivered with:

- EnVision™ platform, Nethra's ISP development platform
- NICAM, Nethra Imaging Camera Control, -- a proprietary PC application
- Necessary documents and support

NICAM is developed for customers to calibrate their system to achieve high image quality when using the NI-2060/61 with various sensors.



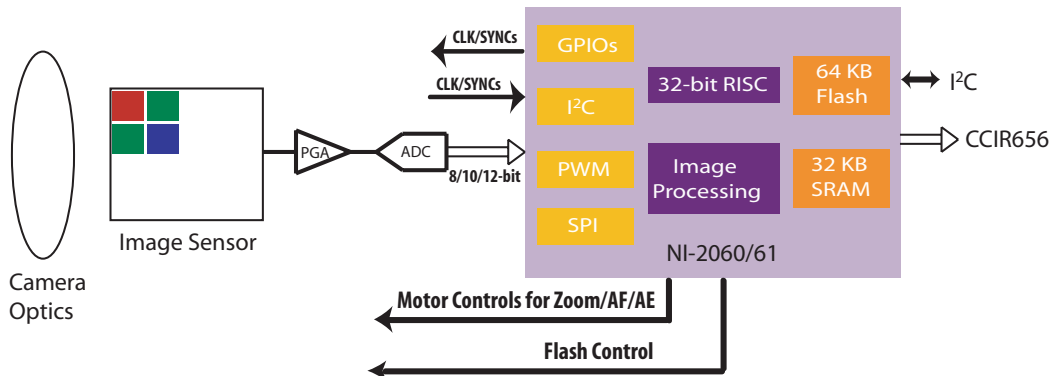
NI-2060 in 84-pin LGA Package

NI-2060/61 PACKAGES

- 84-pin packages (7 mm x 7 mm)
- 168-pin packages (8 mm x 8 mm)
- Package heights:
 - BGA NI-2060: ~ 0.97 mm
 - BGA NI-2061: ~ 0.84 mm
 - LGA NI-2060: ~ 0.74 mm
 - LGA NI-2061: ~ 0.61 mm
- 0.5 mm ball pitch
- 0.3 mm ball diameter

PRICING & AVAILABILITY

Contact NETHRA IMAGING Inc. for product availability and pricing information.



Typical Mobile Handset Camera Implementation

CORPORATE

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