# iCube

*Makes trends compatible.*

USB2.0 CMOS CAMERAS – INDUSTRIAL AND OEM VERSION

iCube

## net
NEW ELECTRONIC TECHNOLOGY

# iCube - MAKES TRENDS COMPATIBLE

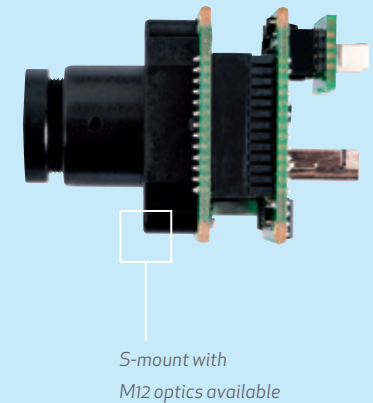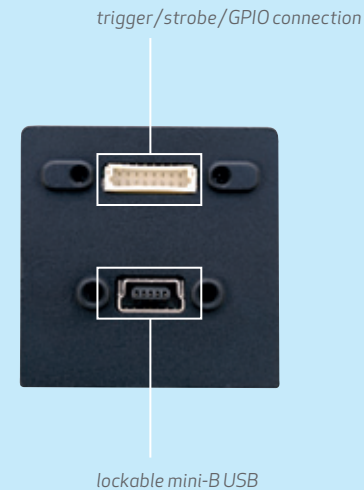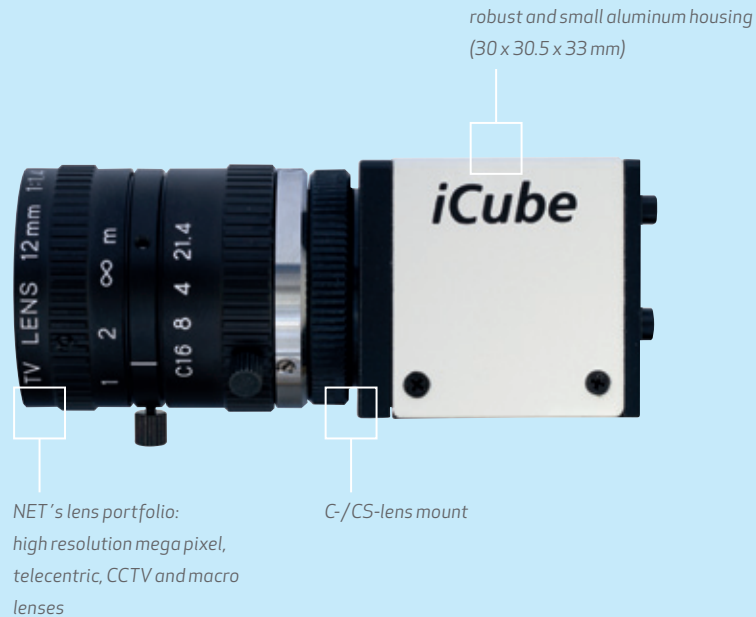iCube – a challenge in performance & price.

## iCube USB2.0 SERIES

NET has designed an easy to use compact camera with USB interface. iCube is dedicated for the integration into professional factory automation, quality inspection, surveillance and non-industrial applications like biometrics and microscopy. iCube cameras are equipped with the latest available high performance CMOS image sensors to offer the best image quality achievable with camera process electronic.

The iCube series supports monochrome and color image sensors, allowing a wide selection of resolutions and selectable frame rates. Furthermore the iCube series is offered as industrial and board level version. Fast connection and power via USB port makes the iCube series a universal plug and play camera linked with a notebook, a PC or even for an embedded computer system.

A single cable connection, no additional power supply devices and inexpensive cabling turn iCube into a flexible and fast to implement solution.

The included viewer software iControl allows a quick implementation, access and handling of all iCube cameras at once.

robust and small aluminum housing
(30 x 30.5 x 33 mm)

trigger/strobe/GPIO connection

NET´s lens portfolio:
high resolution mega pixel,
telecentric, CCTV and macro
lenses

C-/CS-lens mount

lockable mini-B USB

S-mount with
M12 optics available

# TECHNICAL DATA – CMOS CAMERA LINE

## PRODUCT OVERVIEW

iCube supports monochrome and color image sensors, allowing a wide selection of resolutions and selectable frame rates. iCube is offered as small sized and lightweight industrial and board level version. The CMOS image sensors provide an excellent image quality and are equipped with global shutter for fast moving objects and rolling shutter, also with global reset image readout, to capture images with outstanding signal quality. iCube offers multiple free scalable regions of interest (ROI). Due to its enhanced image sensor sensitivity, the camera realizes a high quantum efficiency and thus is a perfect fit for applications in the near infrared region.

The benefits of a USB interface with low power consumption combined with CMOS technology make the iCube series a precise camera for easy and quick implementation in various applications.

*iCube – the easy-to-use vision solution camera.*

| | INDUSTRIAL | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NS1044BU | NS1044CU | NS1130BU | NS1130CU | NS4133BU | NS4133CU | NS4133IR | NS1201CU | NS4203BU | NS4203CU | NS1300CU | NS1500BU | NS1500CU | NS11000BU | NS11000CU |
| **BOARD** | KS1044BU | KS1044CU | KS1130BU | KS1130CU | KS4133BU | KS4133CU | KS4133IR | KS1201CU | KS4203BU | KS4203CU | KS1300CU | KS1500BU | KS1500CU | KS11000BU | KS11000CU |
| Resolution (H x V) [px] | 752 x 480 / WVGA | | 1280 x 1024 / SXGA | | 1280 x 1024 / SXGA | | | 1600x1200/UXGA | 1600 x 1200 / UXGA | | 2048x1536/QXGA | 2592 x 1944 / QSXGA | | 3840 x 2748 / WQUXGA | |
| Sensor | CMOS | | CMOS | | CMOS | | | CMOS | CMOS | | CMOS | CMOS | | CMOS | |
| Image sensor | MT9V032 | | MT9M001 | MT9M131 | EV76C560 | | EV76C661 | MT9D131 | EV76C570 | | MT9T001 | MT9P031 | MT9P001 | MT9J003 | |
| Sensor size | 1/3" | | 1/2" | 1/3" | 1/1.8" | | | 1/3.2" | 1/1.8" | | 1/2" | 1/2.5" | | 1/2.3" | |
| Pixel size [µm] | 6.00 x 6.00 | | 5.20 x 5.20 | 3.60 x 3.60 | 5.30 x 5.30 | | | 2.80 x 2.80 | 4.50 x 4.50 | | 3.20 x 3.20 | 2.20 x 2.20 | | 1.67 x 1.67 | |
| Frame rate [fps] | 86 | | 25 | | 25 | | | 15 | 20 | | 11 | 6 | | 3 | |
| Shutter | global | | rolling | | global; rolling; global reset | | | rolling | global; rolling; global reset | | rolling with global reset | rolling with global reset | | rolling with global reset | |
| Shutter speed | 0.049 - 603 ms | 0.062 - 745 ms | 0.02 - 394 ms | 0.039 - 633 ms | 0.09 - 2933 ms | | | 0.046 - 860 ms | 0.075 - 600 ms | | 0.056 ms - 21.8 s | 0.085 ms - 89 s | 0.074 ms - 77 s | 0.146 ms - 135 s | |
| Dynamic range [dB] | 55 | | 68 | 71 | 62 | | | 71 | 62 | | 61 | 70 | | 65 | |
| Binning | 2 x 2 / 4 x 4 | | - | | 2 x 2 | | | 2 x 2 | 2 x 2 | | 2 x 2 / 4 x 4 | 2 x 2 / 4 x 4 | | 2 x 2 / 4x4 | |
| Skipping | - | | 640 x 512 | | 640 x 512 / 320 x 256 multiple ROI's / user-defined | | | 768 x 576 / 384 x 256 | 640 x 512 / 320 x 256 multiple ROI's / user-def. | | 1024 x 768 / 512 x 384 | 1280 x 960 / 640 x 448 | | 1920 x 1344 / 960 x 640 | |
| Aspect ratio | 14:9 | | 5:4 | | 5:4 | | | 4:3 | 4:3 | | 4:3 | 4:3 | | 4:3 | |
| Gain [dB] | 12 | | 23 | 24 | 24 | | | 24 | 24 | | 18 | 18 | | 18 | |
| Lens | C- / CS-mount | | | | | | | | | | | | | | |
| Scanning system | progressive scan | | | | | | | | | | | | | | |
| Trigger | external / software | | | | | | | | | | | | | | |
| Strobe | yes | | | | | | | | | | | | | | |
| GPIO | 3x | | | | | | | | | | | | | | |
| Interface | USB2.0 / 480 Mbps | | | | | | | | | | | | | | |
| Dimension (WxHxD) [mm] | **industrial:** 30 x 30.5 x 33  **board:** 28 x 28 x 22 | | | | | | | | | | | | | | |
| USB connection | mini-B USB | | | | | | | | | | | | | | |
| Digital I/O connection | 8 pin lockable | | | | | | | | | | | | | | |
| Power consumption [W] | < 1.0 | | < 1.0 | | < 1.0 | | | < 1.5 | < 1.0 | | < 1.5 | < 1.5 | | < 1.5 | |
| Operating temperature | 0 to +45° C | | | | | | | | | | | | | | |

# APPLICATION & SOFTWARE

## APPLICATION OVERVIEW

iCube targets industries in rough environments like quality inspection, completeness, surface and printing inspection, bar code, data matrix applications and others. Being also appropriate for non-industrial segments like medicine applications and microscopy, security, document management and access control, the small and efficient iCube is a versatile and reliable solution for your application requirements.
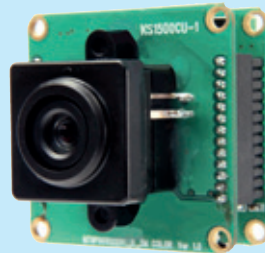
## CAMERA CUSTOMIZATION

Particular applications require specific camera features and functions. To fulfill these requirements NET is able to offer camera customization, e.g. through onboard processing of specific available NET or customers' algorithms.

## OEM APPLICATION

The iCube series is also available as small sized and lightweight board level cameras for OEM use. All advantages of the iCube camera plus additional customer requirements can be implemented
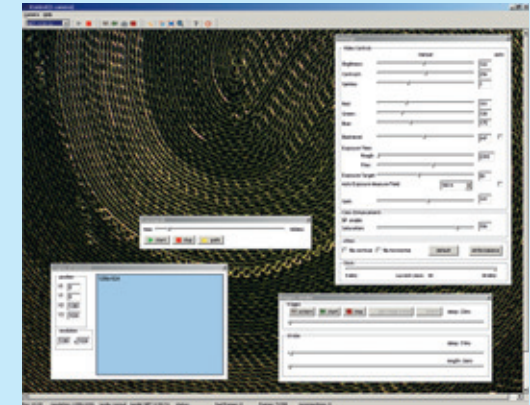
in a board camera e.g. customized firmware, FPGA/DDR RAM, real-time processing.

*iCube customized solution with AUTOFOCUS lens*

## VIEWER SOFTWARE

The iControl viewer is a part of the provided software development kit (SDK) and enables an easy and quick access to all iCube cameras via Windows and LINUX for testing and evaluation. It allows a fast access to camera and image processing settings, and the creation of customer modes. iControl supports the possibility to save images as jpg, bmp or tiff as well as videos as avi file on a connected computer.

## SOFTWARE DEVELOPMENT KIT (SDK)

The flexible SDK from NET makes the integration into existing and customized image capturing and processing systems simple. Programming samples are available for Microsoft Visual C++, Visual Basic and C#.

## 3RD PARTY SOFTWARE-APPLICATION

The integration of iCube USB cameras is supported through a wide variety of common drivers, e.g. for Cognex, and allows an easy handling of the camera. The iCube family is compatible to common software libraries with Direct-X/Direct-Show interface. The software allows an easy integration into commercial vision systems from suppliers like Halcon and Matrox.