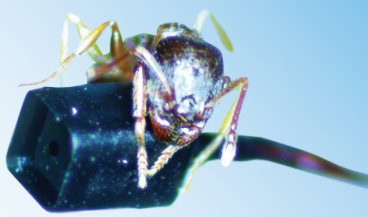

PRODUCT BRIEF

minnieCam™-XS; up to 1Mpixel resolution,
under 1.35mm OD for medical or industrial applications

introduction:

With a package footprint of less than 0.95mmx0.95mm, the minnieCam™ -XS is the world's smallest imaging sensor with up to 1Mpixel output resolution when used with Enable's Video Processing Units (VPUs).

It is an ideal solution for imaging applications that require good image quality within less than 1.35mm outside diameter at the distal end: For example medical devices where clinical use could be greatly enhanced with the addition of embedded real-time, low-cost, miniature size optical imaging. Or industrial applications for accessing narrow conduits or passages without compromising image quality or mechanical flexibility.

The minnieCam™ -XS assembly includes the CMOS image sensor, imaging optics (µObjective™ lens), a highly-flexible and miniature multi-conductor cable, and a proximal electrical connector; all in an incredibly compact footprint.

Still images or live video can be captured by connecting the proximal electrical connector into the company's proprietary VPU hardware. The hardware is available with HDMI or USB3.0 output for displaying an image on a monitor or a computer.

The unique architecture of the minnieCam™ -XS design allows for combined ultra-low power consumption with high sensitivity rolling shutter pixel and large full-well capacity, for applications where high SNR is mandatory.

product features:

- Up to 1Mpixel resolution in an extremely small footprint.
- highly-flexible and miniature cabling.
- ready for integration into existing products.
- sterilizable design.
- low-cost for use with disposable products, yet durable enough to withstand multiple sterilization cycles for re-usable devices.
- custom optical designs for different imaging needs.
- custom cable sizes and designs also available.
- video outputs include HDMI/DVI or USB 3.0.
- 360 degree steerable conduits with single-hand operation in the smallest possible OD profile are also available. Ideal for demanding endoscopic procedures.

In order to address a broad array of imaging needs, Enable, Inc., can provide a custom optical design and procurement of the µObjective™ lens, without compromising the miniature footprint of the sensor. Same customization goes for the electrical conductors.

Patented steering conduits are also available. They can provide full 360 degree steerability with single hand operation, in the smallest possible shaft profile, in a varying array of sizes and stiffness.

Custom arrangements can be made based on project and volume requirements.

Contact us to discuss your imaging needs.

product specifications: ENA-10002-AS

camera specifications:	
native resolution	160,000
effective pixels	400H x 400V
frame rate	60 fps full resolution
electrical connector	Mini-B USB, 5pin
color mosaic	RGB Bayer pattern
scan mode	progressive
optical size	1/25.7”
field of view (diagonal in air)[1]	90 deg or 100 deg[2]
device profile (LxWxH[3]) mm	0.95x0.95x2.0mm
including optics	<1.35mm OD

electrical cable:	
diameter	<0.56mm to <0.79mm[2, 4]
length	2.0 m typ. - 5.0 m max[5]
video processing unit (VPU):[6]	
voltage input	12VDC typ. 400mA max
signal output	HDMI/DVI (1080p/60fps)
	400x400 to 1000x1000[7]
	or
	USB 3.0 (400x400)

1 Custom optics with specific FOV values can be designed and manufactured on demand and adapted to the minnieCam™ -XS assembly.

2 There is a combination of electrical wire size (EC4) and lens type (L02) that are standard for the minnieCam™ -XS product line. See in the “part number and configuration ordering section” for more details.

3 The H dimension is perpendicular to the image plane of the sensor and is defined predominantly by the length of the micro-objective. This dimension can vary depending on the specific customer imaging requirements.

4 minnieCam™ -XS is available with 4 different sizes of electrical cables. Smallest one is < 0.56mm OD.

5 Shielded cable wire must be selected for applications that require electrical cable longer than 2m in length (EC1 or EC3 style wire from the configuration table).

6 Enable Inc VPUs ARE REQUIRED to get an image out of the minnieCam™ -XS sensor. Two different types of VPUs are available: ENA-10017-AS (HDMI output only) and ENA-10011 (HDMI and USB 3.0 output).

7 Interpolation algorithms allow increasing the output resolution of the HDMI output port of the VPU from half-VGA to XGA+ while maintaining sharp images and suppressing pixilation of the enlarged image. Both VPU models can step the resolution of the output image from 400x400 to 1,000x1,000 pixels in steps of 200 pixels. The USB3.0 output remains unchanged and always equal to 400x400.

Please contact us for all your imaging needs and more detailed data sheets.