



## Intelligent Video Applications



# IVIN<sup>TM</sup>-2ME USB 2.0

Embedded Video Input, 1600 x 1200 Progressive Scan, with USB 2.0 and *Varioptic Liquid Lens Focus*

## Product Overview

The IVIN-2ME USB 2.0 is a progressive scan, 1600x1200 resolution, 1/3", YUV color, or monochrome, digitally interfaced board camera intended for integration into embedded applications.

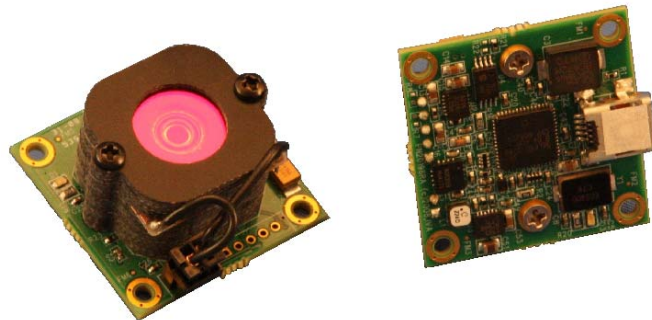
Measuring just 1.2" x 1.2" (30.5mm by 30.5mm), the IVIN-2ME is a very low power, high performance CMOS image acquisition device. Images are acquired using progressive scan (as opposed to interlaced scanning, which often introduces field-to-field motion artifacts) at up to 40 Frames Per Second depending on image format.

Electronic rolling shuttering is used to implement auto-iris functionality, and/or to eliminate motion artifacts. An optional electronic flash driver and LED module is also available.

Manual or auto gain, exposure, and white balance may be programmably selected in order to optimize the imager analog output to the input range of the 10-bit A/D converter(s).

Output resolution is independent of input window, so digital zooming is possible. For example the entire 1600x1200 field of view can be digitally filtered/zoomed down to a 640x480 output (or less), and the size and position of the input field can be varied all the way down to a 640x480 window anywhere within the 1600x1200 field of view, thus achieving 2.5:1 electronic zoom with no loss of precision.

The optional *Varioptic Liquid Lens* focus mechanism allows close-up to infinity focus control done completely electronically with no moving parts. The user has complete real-time control over focus. The power-up default focus may be changed by the user and stored in on-board non-volatile memory, thus allowing post-installation "tuning" to be done to eliminate any mechanical adjustments once installed.



## Applications

- Biometrics (excluding iris identification due to contractual agreements)
- Surveillance, Warning Systems
- Security Systems
- Robotic Vision Applications
- General Image Processing

## Imager Specifications

- Raw Resolution 1600 x 1200 pixels
- Pixel Size 2.8um x 2.8um
- Image Size 4.73mm x 3.52mm
- Frame Rate 30 FPS max at 640x480 output (including full 1600x1200 field zoomed down), or 15 FPS for full 1600x1200 output, may be affected by host USB performance.
- Sensitivity 1.0 V/Lux-sec
- S/N Ratio >42 dB
- Dynamic Range >71 dB
- Operating temp. range -20 to 60c (with liquid lens)
- Operating temp. range -30 to 70c (without liquid lens)
- Storage temp. range -40 to 85c (with or without liquid lens)



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## Mechanical/Electrical

- Single Printed Circuit Board, 30.48mm by 30.48mm with 4x #2 mounting holes at corners.
- Standard M12 x 0.5 lensholder for non-liquid lens version.
- Liquid lens version uses custom lens/lensholder.
- USB 2.0 Interface.
- Low power, supplied by USB.
- Complete control of on-board camera functions over USB via I2C serial control interface

## Versatile Connectors

The IVIN-2ME is intended for hardware integration into customer enclosures/systems, and I/O connectors are configurable with this in mind.

- USB-2.0 connector may be supplied as a MINI-USB horizontal (in the plane of the circuit board) on the bottom side, a 6-pin, 2mm spacing shrouded header, vertical or horizontal on the bottom side, or for extremely low-profile applications, horizontal on the lens side.
- The optional Flash module connector may be supplied as a 2-pin or 5-pin, 2mm spacing shrouded header, vertical or horizontal on the bottom side, or for extremely low-profile applications, horizontal on the lens side. The 2-pin version is used if the optional Flash driver circuitry is included on-board, and the 2 signals directly drive a high-intensity LED. Where brightness generated by the USB-powered flash is insufficient, the 5-pin version provides logic power, i2c, and flash trigger signals to an externally powered flash.

## Lens Information

Hi-res lenses have MTF's compatible with the 1600x1200 sensor. Standard resolution lenses are also available for higher magnification applications and greater depth-of-field fixed focus applications. Other non-standard focal lengths may also be available, check with factory.

**Hi-res lenses** offered for use with the IVIN-2ME, with or without liquid lens focusing are as follows:

- 5.1 mm f2.8 (dig zoom 5.1mm - 12.7 mm)
- 8.0 mm f2.0 (dig zoom 8mm - 20mm)
- 12.0mm f2.0 (dig zoom 12mm - 30mm)
- 16.0mm f1.2 (dig zoom 16mm - 40mm, not currently usable with liquid lens)

**Standard resolution lenses** offered for use with the IVIN-2ME are as follows. Note that higher f numbers allow more depth of field.

- 16.0mm f2.5 or f7.0 (DOES support liquid lens)
- 25.0mm f2.5 or f3.55 (not currently usable with liquid lens)
- 35.0mm f2.0 or f4.0 (not currently usable with liquid lens)

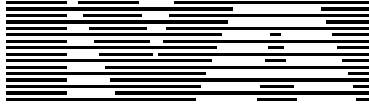
## Software

A standard Windows application is provided which includes the following functions:

- Acquire live video to screen using hardware video overlays.
- Capture single images to BMP or JPG files.
- Stream video to disk as AVI MJPEG file.
- Set video size, clock rate, USB transfer mode, color or monochrome.
- For liquid lens equipped cameras, adjust focus (with slider), Autofocus.

The supplied USB 2.0 driver allows operation in either Bulk or Isochronous transfer modes, and is able to operate the USB bus at its maximum performance.

Low level camera interace software and drivers are also available for custom user applciations.



Distributed by:  
RMA Electronics, Inc.  
Tel: 781-749-9700 Fax: 781-749-9707  
WWW.RMAELECTRONICS.COM

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The Windows demo app supports selection of the following:

- Preview sizes: 320x240, 384x288, 512x384, 640x480, 704x528, 768x576, 800x600, 1024x768
- Pixel Clock Rates: 20mHz, 27mHz, 33mHz, 40mHz, 60mHz, 80mHz, 30/60mHz, 40/80mHz (the dual modes are for preview/capture, where a higher clock rate is useful for higher resolution capture formats)
- Color or Monochrome for all sizes/rates
- Field of View: 1600x1200 or 1344x1008
- Preview sizes: 320x240, 384x288, 512x384, 640x480, 704x528, 768x576, 800x600, 1024x768
- Still Capture Format Selection: BMP, JPG Hi Qual, JPG Med Qual, JPG Low Qual
- Stream Capture Format Selection: AVI MJPEG, Individual JPG files
- Still/Stream Capture Sizes: 1600x1200, 1344x1008, 1280x960, 1024x768, 800x600, 768x576, 704x528, 640x480, 512x384, 384x288, 320x240

### Ordering Information

A standard evaluation kit including camera with tripod mount, hi-res lens, Varioptic liquid lens, USB cable, and software CD is immediately available. The order code is:

IVIN-2MEUSB-x.yyyyy-option...

where x.x may be 5.1HRLL (for 5.1mm hi-res liquid lens), 8.0HRLL (for 8.0mm hi-res liquid lens), 12.0HRLL (for 12.0mm hi-res liquid lens), or 16.0LL (for 16.0mm standard-res liquid lens). The 5.1mm hi-res lens is recommended for general applications.

A standard IR cut filter is included, which will prevent IR from reaching the sensor and disturbing color quality. For special applications, include -NOIR to exclude this filter.

The 16.0mm lens will be set up in a normal fashion with focus out to infinity, or a Macro mode that allows focus from very close (less than 1 inch) to approximately 1 foot may be specified, include -MACRO to choose this mode.

See separate Ordering Information guide for other configuration information.