

## DATA SHEET



### Key Benefits:

#### WHEN IT'S TOO FAST TO SEE, AND TOO IMPORTANT NOT TO®

**One million fps** is the new benchmark in high-speed imaging. Introducing the Phantom v12.1 – a megapixel camera capable of taking 1,000,000 pictures-per-second.

With the Phantom v12 camera, Vision Research broke the high-speed digital imaging speed barrier. With the v12.1, the fastest camera now adds remote/automatic black referencing, versatile dual HD-SDI outputs, a component viewfinder port, high-speed synchronization and range data input.

**Take the wide view** with our custom-designed 1280 x 800 CMOS sensor. The wide aspect ratio of the v12.1 allows you to see more of the event you are recording with a “widescreen” view.

Get 6,242 frames-per-second (fps) at full resolution. At lower resolutions, you will get even higher frame rates, up to 1,000,000 fps (optional).

With an active pixel size of 20 microns and improved quantum efficiency, the Phantom v12.1 camera has **sensitivity** superior to our acclaimed v7.3. So, even if you are using our sub-microsecond shuttering, you'll get the highest sensitivity with the lowest noise possible.

## v12.1

High-Definition

1280 x 800

1 million fps

sub- $\mu$ s shutter

Phantom CineMag® compatible

### Key Features:

Up to 6242 frames-per-second (fps) at full resolution.  
Maximum fps: 680,000 standard, 1,000,000 optional

1280 x 800 CMOS sensor

Exposure Time (shutter speed): 1  $\mu$ s standard  
Sub-microsecond shuttering: 300ns, programmable in 18ns increments (optional)

High-resolution timing system: Better than 20ns resolution

Extreme Dynamic Range (EDR): Two different exposures within a single frame

Internal Shutter: Hands-free/remote current session reference (CSR)

Memory Segmentation: Up to 64 segments

Non-volatile, hot-swappable Phantom CineMag memory magazines (256GB & 512GB)

CineMag to CineStation®

Range Data input

Built-in Memory: 8GB, 16GB, 32GB

ISO (ISO-12232 SAT): 6400 Mono, 1600 Color

Pixel Bit-depth: 8- and 12-bit

GB Ethernet

View recordings immediately via video-out port

Versatile Dual HD-SDI ports configured to meet your needs

Phantom v12.1  
a megapixel  
camera  
capable  
of taking  
1,000,000  
pictures-  
per-  
second...

That's right. You can eliminate blur and see the most minute detail by using our optional **sub-microsecond shuttering**. Down to 300 nanoseconds, programmable in 18ns increments.

Each camera supports **8- and 12-bit pixel depth**. Smaller bit-depth gives you more recording time and smaller files. Greater bit-depth gives you more gray levels and finer detail. With the greater latitude of 12-bits, you can pull more detail out of the image.

The v12.1's **high-resolution timing** system yields a timing resolution of better than 20ns. Frame rate, frame synchronization and exposure accuracy are all improved over previous generations of high-speed cameras. And, a frame synchronization signal is now available via a dedicated BNC for easier cabling and increased signal integrity. This makes the camera perfect for **PIV applications** with a 500 nanosecond straddle time and no image lag.

Of course, the v12.1 offers our unique **Extreme Dynamic Range (EDR)** feature giving you the ability to get two different exposures within a single frame. And, with **auto exposure**, the camera adjusts to changing lighting conditions automatically.

There is an **internal shutter** for shading the sensor when doing a session-specific black reference (CSR). Whenever you do a CSR from the Phantom Software, the shutter closes automatically. You no longer have to manually shade the sensor with a lens cap!

The v12.1 comes with 8GB of high-speed dynamic RAM standard, but you can order 16GB or 32GB versions. Our **segmented memory** allows you to divide this into up to 64 segments so you can take multiple shots back-to-back without the need to download data from the camera.

Or, record directly to our **Phantom CineMag** non-volatile, hot-swappable memory magazines. They mount on the CineMag compatible version of the camera. Continuously record full resolution cines into non-volatile memory at up to 700 fps.

Move the CineMag from the camera to a **CineStation** connected to a PC and view, edit, and save your cines using the Phantom Software supplied with the camera. Keep them in their original cine raw format, or convert them to TIFF, QuickTime, AVI, or a number of other formats. Move the files from the CineStation to a disk or tape deck via GB Ethernet, dual HD-SDI, or Component Video outputs. (A 10Gb Ethernet interface is available.)