VISION RESEARCH

PHANTOM
when it's too fast to see, and too important not to.®

v341

2560 x 1600 resolution

10-800 fps at full resolution

Breakthrough sensitivity

Phantom CineMag® compatible

Key Features:

10-800 frames-per-second (fps) at full resolution.
   Maximum FPS: 129,500 @ 256 x 8

2560 x 1600 CMOS sensor

Minimum Exposure (shutter speed): 1 µs

High-resolution timing system: Better than 20 ns resolution

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

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

Memory Segmentation: Up to 63 segments

Non-volatile, hot-swappable Phantom CineMag
   memory magazines (128 GB, 256 GB & 512 GB)

CineMag to CineStation®

Range Data input

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

   Breakthrough Sensitivity, ISO (ISO-12232 SAT method):
   Mono: 16,000 T; 6400 D
   Color: 1600 T; 1600 D (without OLPF)
   Color: 1250 T; 1600 D (with OLPF)
   QE 60% peak; NEP 0.011 fJ

Pixel Bit-depth: 12-bit

Gb Ethernet, 10 Gb Ethernet with optional CineStream
   X2SR module

Image-Based Auto-Trigger

Burst Mode

IRIG & SMPTE Time Code

Genlock

Phantom v341
Shown with optional CineMag interface
and On-Camera Controls

Key Benefits:

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

The Phantom v341 provides a 4 megapixel sensor and almost 3 gigapixels/second throughput. That means full-resolution frame rates of 800 frames-per-second (fps), and 2 megapixel 1920 x 1080 HD-resolution frame rates of 1440 fps. The minimum frame rate is 10 fps.

Take the wide view with our custom-designed 2560 x 1600 pixel CMOS sensor. The aspect ratio of the v341 allows you to keep moving targets in-frame longer and see more of the event you are recording.

Shutter speeds down to 1 microsecond and a **global electronic shutter** allow for crisp, sharp images with little or no image blur or motion artifacts.

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◇ PHANTOM®

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v341

Phantom v341 provides a 4 megapixel sensor and almost 3 gigapixels/ second throughput.

With a peak quantum efficiency (QE) of 60% – greatly improved over current sensor designs – and a significant reduction in readout noise, along with the addition of microlens technology, the v341's **four megapixel resolution can be used to full advantage** at speeds that normally called for large-pixel, lower resolution cameras.

That makes the v341 ideal for applications where **high sensitivity and high resolution** are needed. Coupled with a 1.4 microsecond straddle time the v341 is ideal for **PIV applications**, for example. And, our new **burst acquisition mode** can take a user-set number of frames with a programmed interframe time upon receiving a single frame synchronization (FSYNC) pulse. This greatly simplifies timing setups for repetitive events such as combustion studies, where bursts can be captured at a specific/precise position in the operating cycle.

Each camera supports **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 v341's **high-resolution timing system** yields a timing resolution of better than 20 nanoseconds. Frame rate, frame synchronization and exposure accuracy are all improved over previous generations of high-speed cameras. And, an external frame synchronization signal is available via a dedicated BNC for easier cabling and increased signal integrity.

Of course, the v341 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 mechanism** for cutting off all light to the sensor when doing a session-specific black reference (CSR). You now can do **remote CSRs** through software control without the need to manually cover the lens! With the optional **Canon EOS** lens mount installed you get remote control over lens aperture and focus, too. This enables **complete remote control** in environments where you cannot easily access the camera.

The v341 comes standard with 8 GB of high-speed dynamic RAM, but you can order 16 GB or 32 GB versions. Our **segmented memory** allows you to divide this into up to 63 segments so you can take multiple shots back-to-back without the need to download data from the camera.

You are able to 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 195 fps (360 fps for 1920 x 1080). That is over 4 minutes of continuous recording into the 256 GB CineMag or over 8 minutes into the 512 GB CineMag.

Or, record at higher speeds into camera RAM, then manually or automatically move your cine to the CineMag. If you need to **take multiple shots back-to-back**, you don't have to wait for a time-consuming download of camera memory over Ethernet. Instead, just upload the camera memory to a CineMag at about 800 megapixels/second, then take your next shot!

With CineMag storage you get maximum data protection and an ideal storage medium for secure environments. 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 10 Gb Ethernet, HD-SDI, or Component Video outputs.

When used on a tracking mount, elevation and azimuth data can be transferred to the camera and associated with image frames through our unique **Range Data** input. Signals available directly on the camera back panel include: FSYNC; Range Data; HD-SDI, two power inputs for hot swapping power or providing battery backup while on AC power; IRIG-In and IRIG-Out; Trigger; Gb Ethernet; Remote; and Genlock.

View your recordings immediately. There are two identical **4:2:2 HD-SDI ports** for previewing a shot or viewing recorded cines. One can optionally be configured with an on-screen display (OSD) of key camera information. And, a component viewfinder port supports a variety of viewfinders and monitors.

The v341 is controlled by the feature-rich Phantom Software. If you've used any Phantom camera before, you will know how to run the v341. As an option, you can add **On-Camera Controls** (OCC) to get full control of the camera without the need to connect to a PC. We also provide a full-featured **Remote Control Unit** (RCU) for wired or wireless control.

The v341 comes in two base models, either with or without a CineMag interface. An optical low-pass filter is available as an option.

H	V	FPS*
256	8	129,500
256	64	61,800
256	128	38,700
256	256	22,100
512	384	10,900
512	512	8,390
640	480	6,880
800	600	4,510
1280	720	3,180
1280	800	2,870
1280	1024	2,250
1920	1080	1,440
2048	1024	1,520
2048	1600	980
2560	1600	800

Typical results

ISO SAT			
Mono		Color	
ISO SAT T	ISO SAT D	ISO SAT T	ISO SAT D
16,000	6400	1600	1600

DATA SHEET
v341

Additional Features:

View recordings immediately via video-out ports

Analog video out: PAL, NTSC & HD Component (720p)

HD-SDI: All standard formats

Lensing: F-mount, C-mount, PL-mount, Canon EOS

Optional optical low-pass filter

Size (without lens, CineMag or handle):
11.5 x 5.5 x 5.0 inches (L x W x H);
29.2 x 14 x 12.7 cm

Weight (without lens or CineMag): 11.75 lb; 5.33 kg

Power: 90 Watts @ 24 VDC, without CineMag

Operating Temperature: 0°C to 40°C @ 8% to 80% RH

Storage Temperature: -10°C to 55°C

Non-operational Shock: 33G, half sine wave, 11ms,
all axes without CineMag

Operational Shock: 30G, half sine wave, 11ms,
10 times all axes (without CineMag
or lens) to Mil-Std-810 G

Operational Vibration: 0.25G, 5-500 Hz, all axes without
CineMag

Phantom v341
Back View

Phantom v341

Focused

Since 1950, Vision Research has been shooting, designing, and manufacturing high-speed cameras. Our single focus is to invent, build, and support the most advanced cameras possible.

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100 Dey Road
Wayne, NJ 07470 USA
+1.973.696.4500
phantom@visionresearch.com

www.**vision**research.com