

## DATA SHEET

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# Phantom® Miro® C210J & C210 Digital High-Speed Cameras

The Compact & Flexible Solution  
for the most difficult applications

### Key Features:

- 12-bit 1.3 Megapixel CMOS sensor
- 2,000 fps @ 1280 x 1024
- ISO Monochrome 5,000 (T), 2,500 (D)  
Color 640 (T), 640 (D), adjustable
- Compact, rugged design
- Hi-G: 170G, IAW MIL-STD 810G,  
17Grms, IAW MIL-STD-202G
- Reversible mount for C & CS lenses
- Internal battery to protect data
- Phantom RCU compatible
- HD-SDI output
- Internal CineFlash

**AMETEK®**  
MATERIALS ANALYSIS DIVISION



Miro JBox

Miro C210J & Miro C210

### Key Benefits:

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

- Small, light & rugged, to meet the most demanding applications
- Modular: Systems can be as simple or complex as needed
- 2,000 fps at full 1280 x 1024 resolution

The Miro C210J & C210 digital high-speed cameras are each smaller than 3-inch cubes (73 mm x 73 mm x 73 mm) and weigh just over 1 lb. (.5 kg), but are rugged enough to withstand shocks of 170G and vibration of 17 grms. With strategically placed mounting holes, these cameras can fit in the most difficult places. An internal battery and internal, non-removable **Phantom CineFlash®** are standard with each camera. In the event of AC power loss, the battery provides up to 30 minutes of backup power to protect the data as it saves to the **CineFlash**.

The Miro C210J & C210 are built on the same platform, each with distinguishing features to maximize their utility. Miro C-Series cameras can be used individually or grouped together with a Miro Junction Box to create almost any multi-camera configuration imaginable. They are complimentary to the Phantom Miro camera family and accessories, further expanding the configuration possibilities.

Both cameras achieve up-to 2,000 frames-per-second (fps) at the maximum resolution of 1280 x 1024, with very low noise to capture critical details. The cameras have a 1/2" image sensor format, and can take advantage of a large selection of C and CS lenses. Comprehensive motion analysis tools come standard in the camera software included with each camera.

## Miro® C210J & C210

### Protecting the Images

3 reasons images are safe with the C210J & C210 if a cable is severed during an experiment:

1. Memory is local, directly on the cameras
2. Every camera has battery backup
3. Cameras can immediately store images to non-volatile CineFlash

### JBox Connections (Each with status indicator LED):

<b>Ethernet</b>	Ruggedized RJ45 connector
<b>Power In</b>	20-28VDC, protected for reverse polarity, overcurrent (10A), undervoltage and overvoltage to 50V. Independent power is required for each Junction Box
<b>Ready BNC</b>	"Closed" for ready, "open" for not ready; covers all cameras connected to this JBox and any JBox up-chain of this one
<b>Trigger BNC</b>	Contact closure causes trigger. There is also Trigger on System connector: isolated, <1V deassert, 3 to 24V assert
<b>Camera Ports</b>	Each JBox has Six Camera ports with Fischer connectors, which carry Ethernet, power, serial, and Miro camera signals on capture connector. There are two status LEDs for each camera port – Ethernet and camera status. One port can be used to daisy chain or branch to another JBox's System port
<b>System</b>	Same Fischer connector as Camera port. Connects to a Camera Port on second JBox to daisy chain or branch the system for additional cameras.

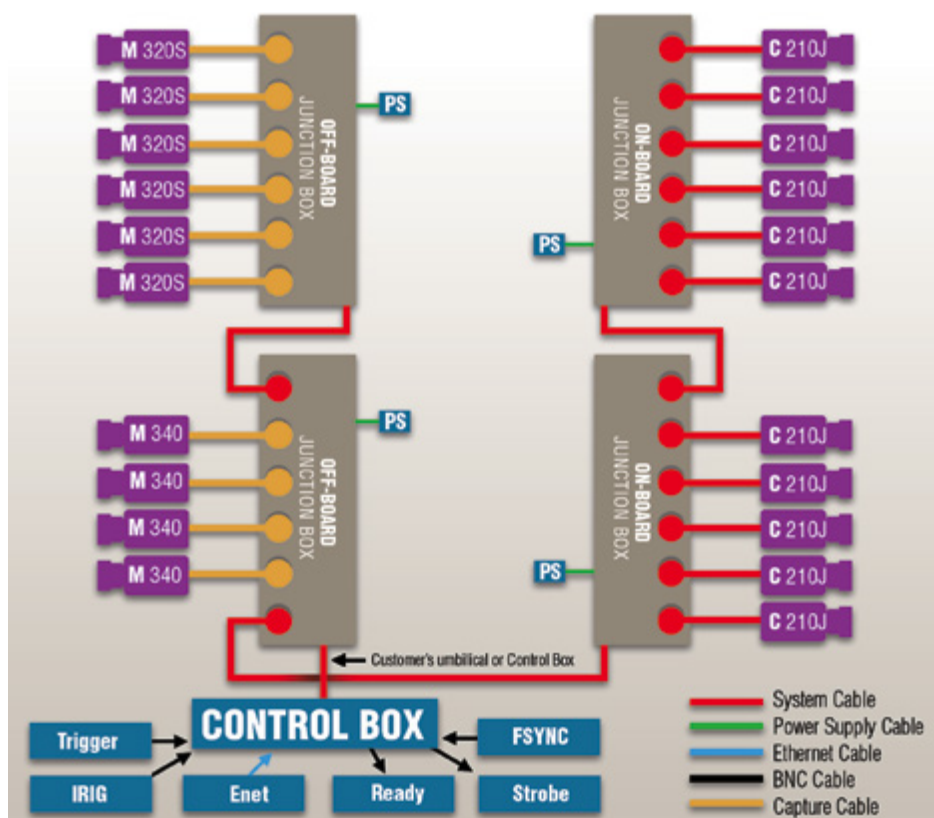
### Miro C210J Camera and Junction Box

Small, light, and rugged, the Miro C210J is **designed for tough and difficult situations**, such as automotive on-board applications. It uses just a single cable to connect to the Miro Junction Box (JBox). The Miro C210J is also versatile. It can be connected to a Remote Control Unit (RCU), and also has a DIN 1.0/2.3 connector for HD video.



Phantom Miro C210J and Junction box

The Miro Junction Box (JBox) is **flexible**: With six camera ports, it can host six cameras or dedicate any port to uplink to another JBox in a daisy chain or tree branch, expanding the number of cameras in a configuration. It is compatible with all Miro cameras, including the M and R series. Each JBox provides power to the cameras via customer supplied power source. It connects the cameras to either a central control system to manage Trigger, IRIG, Strobe, FSYNC, Ready control, and Ethernet, or directly to a computer with PCC or MultiCam software via Gb Ethernet.



## Miro C210 camera

The Miro C210 is **ideal for single camera applications** requiring a small, light, and rugged camera. With three connections for Ethernet, Power, and Capture, it is compatible with all cables for Miro cameras.

Additionally, the Miro C210 has a DIN 1.0/2.3 connector on the camera front for HD video. It comes with a power supply and MiniBoB to connect to the Capture connector. The MiniBoB is a simple and reliable way to control the Miro C210 with Trigger, Video, IRIG in, IRIG out, F-Sync, Ready, Strobe, Event and Memgate signals, greatly enhancing the Miro C210's capability. Alternatively, the camera may also connect directly to a computer via Ethernet.



Phantom Miro C210

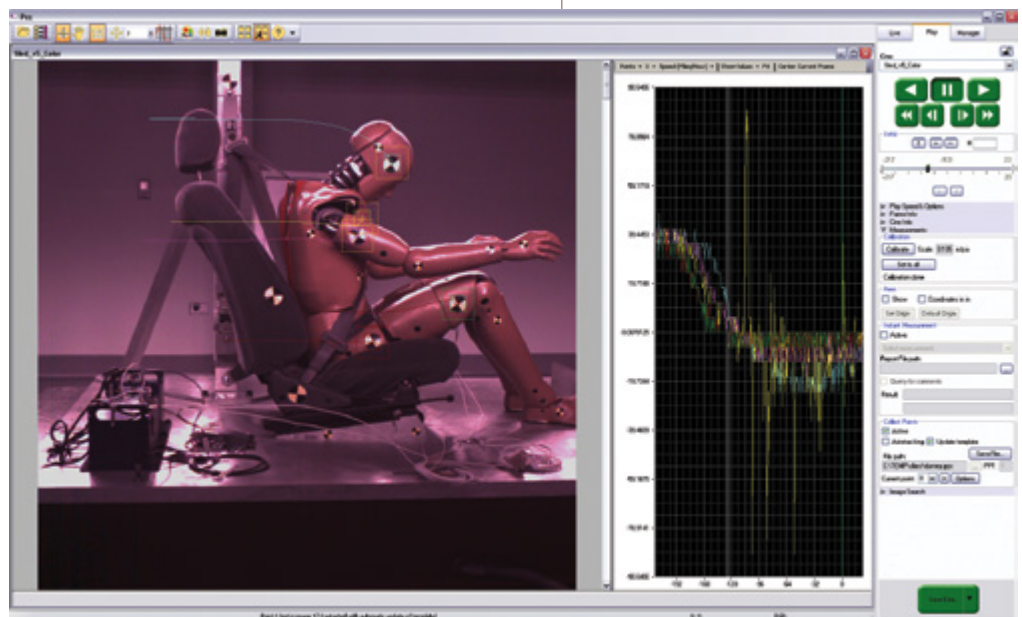
## Motion Analysis Capability

The Miro C210J & C210 use Phantom Camera Control (PCC) software, and take advantage of the **robust Motion Analysis features built into the software**. PCC can perform timing, position, distance, velocity, angle and angular speed measurements, and track multiple points or objects to compute and graph their XY-coordinates, speed, or acceleration. The software has several proven edge detection algorithms and image processing tools to enhance motion analysis. PCC also provides a Collect Point (tracking) tool to compute the position, speed, acceleration, and/or generate motion graphs of a point (or object) or multiple points (up to 99), with respect to the image plane, over time.

PCC Motion Analysis capabilities

## Specifications

The Miro C210J & C210 are based on a 1.3 Mpx sensor with 2.6 Gpx throughput. This provides 2,000 fps at 1280 x 1084, and higher frame rates at lower resolutions. These cameras utilize a 12-bit pixel depth, CMOS sensor, with 5.6  $\mu\text{m}$  pixel size.



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# Phantom® Miro® C210J & C210 Digital High-Speed Cameras

### Additional Features:

- Continuous Recording
- Auto-Exposure
- Multi-cine Acquisition
- Gb Ethernet
- Rechargeable Battery
- Size and Weight: 1.0 lb, 0.5 kg; 2.9 x 2.9 x 2.8 inches  
73 x 73 x 72 mm (W x H x D)
- Operating Temperature:  
0° C to 35° C
- Tiered Service Contracts to protect your investment

### 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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Maximum Frame Rates	
Resolution	FPS
1280 x 1024	2,000
1280 x 720	2,700
512 x 512	3,800
640 x 480	4,000
256 x 256	7,400
64 x 8	74,400



### Enhance your workflow with Phantom Accessories Remote Control Unit (RCU)

Both the Miro C210J & C210 are compatible with the Phantom Remote Control Unit (RCU). The RCU is a valuable accessory, offering simple local set-up and complete control when the camera is mounted remotely.

### Control Breakout Box (Control BoB)

The Control Breakout Box (Control BoB) offers a sleek and simple way to connect the required signaling to a Junction Box configuration without splicing cables. With ports for IRIG, Ethernet, Ready, Strobe, and FSYNC, the Control BoB is a clean and convenient solution to manage signaling.

### Vision Research Global Support - for wherever you are

Our Miro C-Series Digital High-speed camera line is supported by Vision Research's Global Service and Support network offering AMECare Performance Services from multiple sites around the globe. Maximize the value of your Phantom camera by learning more about our service and support options at [www.visionresearch.com/Service--Support/](http://www.visionresearch.com/Service--Support/)

*AMETEK Vision Research's digital high-speed cameras are subject to the export licensing jurisdiction of the Export Administration Regulations. As a result, the export, transfer, or re-export of these cameras to a country embargoed by the United States is strictly prohibited. Likewise, it is prohibited under the Export Administration Regulations to export, transfer, or re-export AMETEK Vision Research's digital high-speed cameras to certain buyers and/or end users.*

*Customers are also advised that some models of AMETEK Vision Research's digital high-speed cameras may require a license from the U.S. Department of Commerce to be: (1) exported from the United States; (2) transferred to a foreign person in the United States; or (3) re-exported to a third country. Interested parties should contact the U.S. Department of Commerce to determine if an export or a re-export license is required for their specific transaction.*