

Tetracam Mini MCA - Frequently Asked Questions

Q: What does MCA stand for?

A: Multiple Camera Array. Our first MCA was introduced in 1993.

Q: What is the MCA designed for?

A: The MCA is a system designed specifically for aerial photography of natural and cultivated plant canopies. The system consists of the camera unit and the post processing software. The current Mini MCA cameras are suitable for both light UAV and manned aircraft installations.

Q: Do I need a framegrabber or any special computer hardware to use an MCA.

A: No. The basic interface is USB. The application program supplied with the MCA is a Windows application.

Q: Does the camera produce a video stream?

A: The camera has a video out from the master camera channel useful for viewfinding and menu operations. Since it's from only the master channel, it's a monochrome image of the passband fitted to that channel.

Q: Can the MCA be used for ground truthing or closeup photography.

A: Each camera unit in an MCA consists of a sensor, a camera/processor PCBA, a bandpass filter and an objective lens. The lens centerlines are arrayed on 1.5" centers (Mini MCA). The parallax (or difference in angle and field of view) of each lens limits how close the system can work. Similar to the different scenes viewed through each side of a pair of binoculars. The included software provides an easy method of aligning any image set to any distance from a few meters to infinity.

Q: What is the image size of the MCA?

A: The image is 1.3 mPel (million pixels) with array dimensions of 1280 x 1024.

Q: What is the ground resolution of the MCA?

A: Of course it varies with the altitude of the aircraft carrying the camera. For example; using 9.4mm lenses (which are normally supplied on the camera) a 1/2 meter/pixel ground resolution is achieved at 900 meters (2950') AGL.

Q: What shutter speed is used?

A: The default exposure mode is auto. Typical exposure times in bright sunlight run in the 0.5 to 5 mSec range. The camera can also be set to fixed exposure via the menu interface or the USB interface.

Q: Can the camera capture GPS or IMU data?

A: Yes. All versions have a serial input that is programmed to capture certain NMEA sentences from an external GPS receiver. The camera serial baudrate is adjustable to match the receiver output rate. The captured GPS sentence is written into the image file header where is later retrieved by PW2 along with exposure time and the image capture time.

Q: Can an MCA be used to take "regular" visible light color images?

A: Yes if the correct filters are installed in the system, you would need a red, green and blue channel to produce a natural color image.

Q: What is the spectral sensitivity range of the MCA?

A: The MCA utilizes a silicon CMOS imager behind each lens. The useful spectral sensitivity is from approximately 0.45 micron to 1.00 micron. This encompasses the visible and near-infrared spectrum but does not reach into the thermal infrared (heat signatures etc).

Q: How many channels are available?

A: The Mini MCA is typically built in a six channel configuration. We offer systems from 4 up to 12 channels.

Q: What filters are available?

A: The MCA uses a common 25mm diameter spectrometer filter at each position. This size is available in literally thousands of bandwidth and center frequency combinations. A "typical" filter set might have blue, green, red and near-infrared filters. A typical filter set might include filters at or near 450, 510, 540, 670, 720, 800nm. A 10nm wide band is commonly used above 480nm, 20nm at shorter wavelengths.

Q: Can I change the filters?

A: Yes. The filters are field replaceable.

Q: Can I change lenses?

A: The old design standard camera is a C-mount configuration. You could change lenses but they had to be changed as a set to maintain normal operation of the system. The Mini MCA uses fixed x-mount lenses which are not interchangeable.

Q: What's a global alignment file?

A: It's a file used by the application program supplied with the camera, PixelWrench2. It contains information needed to properly scale, rotate and translate each individual channel image when a multi-page TIF is compiled from the individual channels. A file is supplied with the camera.

Q: Why use an MCA instead of a Tetracam ADC?

A: The MCA should be used when narrow or closely controlled bands are needed or when more than the three ADC bands are needed.

Q: How quickly can images be captured in sequence?

A: The fastest continuous capture rate is approx. 1 frame/second.

Q: Can the camera trigger itself at fixed intervals?

A: Yes. The camera has an interval capture mode. If it's set, manually trigger the camera once to toggle it on, trigger again to toggle it off. Intervals are settable from 1 to 99 seconds.

Q: What format are images stored in?

A: There are three (user selectable) formats;

DCM - A losslessly compressed 10 bit format.
RAW 10 - An uncompressed 10 bit format.
RAW 8 - An uncompressed 8 bit format.

Q: How are images stored in the camera?

A: On CompactFlash memory cards. Each channel has its own card.

Q: How are images best stored on disk?

A: PixelWrench2 provides a means of extracting the DCM or RAW files from the camera and saving a multi-page TIF. Each TIF page contains a monochrome channel. Images from a four channel MCA would be saved to TIF files of 4 pages each.

Q: Can vegetation indexes such as NDVI be derived from the archived TIF files?

A: Yes. Again PW2 has a tool to make a 24bit Windows bitmap from any 3 pages of the archive TIF. An NDVI (or any of several other indexes) is then processed from the appropriate bitplanes of the 24 bit image.

Q: What computer interface is used?

A: USB 2.0 externally, the internal USB communications are USB 1.1.

Q: What kind of peripherals are needed to operate the camera?

A: The MCA requires an external power source of 12 VDC @ 1A. It can be used in a stand alone configuration, manually triggered with the trigger switch (supplied). It can also be triggered from a laptop running PixelWrench2 or SensorLink via the USB Streaming interface.

Q: What inputs and outputs are available?

A: The MCA I/O panel has;
USB 2.0
Power in (12 VDC @ 1A)
Trigger in
Serial in for NMEA GPS data
Video out - switchable from NTSC to several PAL formats.

Q: How much does an MCA weigh?

A: 0.7 kg (Mini 4-6 channel)
1.3 kg (Mini 8-12 channel)
Weights listed do not include any external batteries etc.

Q: Who's using the MCA?

A: MCA's are in use by research organizations, universities, analysts and producers, public and private, worldwide.

Q: How can I find out more?

A: Tetracam has authorized resellers worldwide. Contact the reseller in your area for pricing and more information. Links to all our resellers are located on the Agricultural Multispectral page of Tetracam's corporate website. In the USA, contact Tetracam directly.