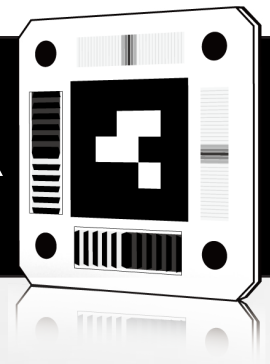


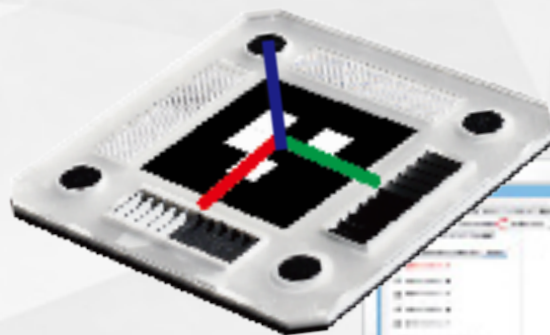
# Photron 6D-MARKER



Traditional 3D measurement techniques require a minimum of two cameras, precisely located through a complex calibration procedure, to produce multiple data streams that must then be crunched to produce precise 3D or 6D data. The new proprietary lenticular 6D-MARKER™ from Photron, a world leader in high-speed photo instrumentation, provides engineers with the ability to record, analyze and plot true 6DOF (six-degree of freedom) coordinate data from a single camera view.

As the marker is moved the 'holographic' lenticular bars on two sides are tracked by the Photron 6D-MARKER Analyst™ software to produce precise 6D (X, Y, Z, angle, pitch and yaw) data. Furthermore, the unique QR code in the markers center provides each marker with a unique identifier to enable multiple points to be tracked.

Photron MARKER Analyst™ software can track either high resolution real time or pre-recorded, slow or high-speed, image sequences.



## APPLICATIONS INCLUDE:

- Automotive safety testing
- Biomechanics
- Automated Guided Vehicles (AGV)
- Camera tracking
- Weapons testing
- Robotic vision systems

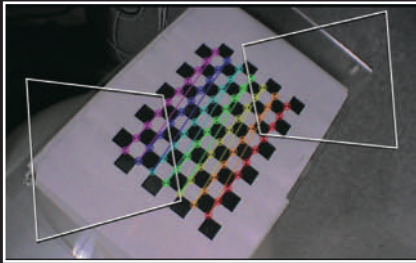
# Photron

PHOTRON USA, INC.  
9520 Padgett Street, Suite 110  
San Diego, CA 92126  
USA

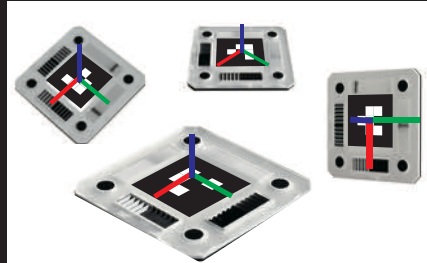
Tel: +1 858.684.3555 or 800.585.2129  
Fax: +1 858.684.3558  
Email: [analysis@photron.com](mailto:analysis@photron.com)  
[www.polarizationcameras.com](http://www.polarizationcameras.com)

# Product Highlights

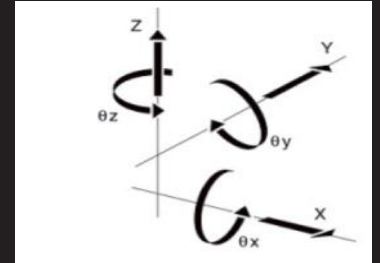
- Only a single camera and single 6D-MARKER™ are required for true 3D and 6D motion analysis data
- Photron 6D- MARKER Analyst™ software automatically identifies and tracks markers in the image
- Simple calibration process using checker board)
- Real time display of X, Y, Z, roll, pitch and yaw axis coordinate and axis information
- Live image tracking
- Analysis of pre-recorded movies, regardless of recorded framing rate
- AVI readable movie format
- CSV (coordinate, angle) tracking data output
- Photron 6D-MARKER Analyst™ can track up to 32 uniquely identified marker targets simultaneously
- Software directly controls newer Photron FASTCAM high-speed cameras



A simple checker board pattern is used for calibrating cameras using 6D-MARKER ANALYST. Makes calibration easy



3D coordinate data, superimposed on-screen, allows you to see and analyze 6D data in real time



X, Y, X, Roll, Pitch and Yaw coordinates can be captured with one camera and target

## Accuracy

A single camera can now capture six degrees of freedom by shooting this innovative state of the art lenticular motion tracking marker. Photron 6D-MARKER Analyst™ can output and save 3D coordinates / angle data (6Dof) in real time or analyze previously recorded images from any conventional or high-speed cameras.

Camera		2.3MP Camera		FASTCAM Mini WX		FASTCAM Mini AX	
Resolution		1920 x 1200 pixel		2048x2048 pixel		1024 x 1024 pixel	
Recommended focal length lens		12 mm	25 mm	20 mm	50 mm	20 mm	50 mm
Horizontal field of view angle		50.2°	25.4°	54.2°	23.1°	54.2°	23.1°
Calibration Using the 362mm card	Stable accuracy distance	460 ~ 1200 mm	1270 ~ 2600 mm	400 ~ 630 mm	1100 ~ 1600 mm	350 ~ 610 mm	1000 ~ 1500 mm
	Stable accuracy area range	430 ~ 740 mm	560 ~ 1180 mm	420 ~ 650 mm	440 ~ 650 mm	350 ~ 630 mm	410 ~ 630 mm
Calibration Using the 687mm card	Stable accuracy distance	660 ~ 1200 mm	2020 ~ 2600 mm	680 ~ 1200 mm	2000 ~ 3000 mm		
	Stable accuracy area range	620 ~ 1180 mm	910 ~ 1180 mm	700 ~ 1200 mm	800 ~ 1200 mm		
Measurement Accuracy X, Y & Z in millimeters		X,Y : ±0.081% Z : ±0.146%	X,Y : ±0.086% Z : ±0.334%	X,Y : ±0.081% Z : ±0.146%	X,Y : ±0.086% Z : ±0.334%	X,Y : ±0.081% Z : ±0.146%	X,Y : ±0.086% Z : ±0.334%
		X,Y : ±0.348 ~ 0.956 mm	X,Y : ±0.482 ~ 1.01 mm	X,Y : ±0.340 ~ 0.972 mm	X,Y : ±0.378 ~ 1.032 mm	X,Y : ±0.284 ~ 0.510 mm	X,Y : ±0.353 ~ 0.542 mm
		Z : ±0.672 ~ 1.75 mm	Z : ±4.24 ~ 8.68 mm	Z : ±0.584 ~ 1.75 mm	Z : ±3.67 ~ 10.02 mm	Z : ±0.511 ~ 0.890 mm	Z : ±3.34 ~ 5.01 mm
Measurement Accuracy Roll, Pitch & Yaw on degrees		Roll,Pitch,Yaw : ±0.777°	Roll,Pitch,Yaw : ±0.939°	Roll,Pitch,Yaw : ±0.777°	Roll,Pitch,Yaw : ±0.939°	Roll,Pitch,Yaw : ±0.777°	Roll,Pitch,Yaw : ±0.939°

◊ Accuracy measurements, for both distance and area range, can vary dependent on focal distance used.  
 ◊ Chart values were obtained using an f/4.0 aperture. Increasing the aperture will increase the resultant analysis area accordingly.  
 ◊ While every effort was made to reproduce realistic test conditions, this degree of accuracy cannot be guaranteed for all test conditions.

All measurements assume a minimum marker/image resolution of 40 pixels covering the outer lenticular segments.