CX1 Unit Technical Data Sheet

The CX1 sensor unit is at the heart of every Codamotion 3D system for indoor applications.

Uniquely, the CX1 combines three motion sensing MLA's into one unit. This allows a standalone CX1 unit to make a complete 3D measurement without reference to any other units. It also means that the unit can be pre-calibrated and sealed. All the user does is to point the unit at the action.

Advanced Technology

Each Masked Linear Array (MLA) measures the pattern produced when the flash of an active marker casts a shadow on its sensor array through a grid of lines (the mask).

Its extreme accuracy comes from measuring patterns of illumination across its whole array surface, not just the fraction used when, for example, a focused dot falls on a 2D camera array.

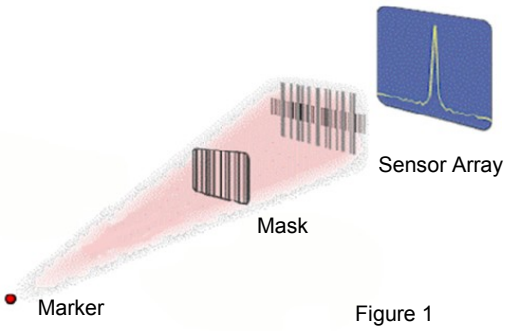


Figure 1

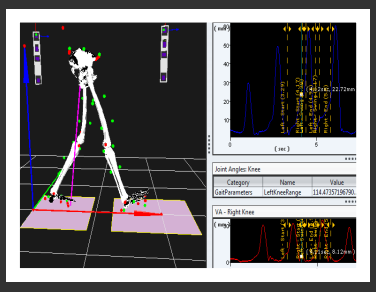
The MLA doesn't suffer from non-linear distortions caused by camera lenses and has an acceptance angle of over 75 degrees, allowing more measurement volume in less space, with sensor units placed closer to the action for added accuracy.

Portability

A CX1 unit weighs just 5kg!

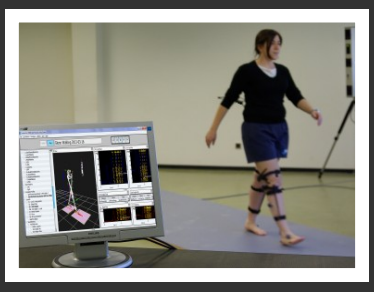
A user can move a CX1 unit to a new location, set up and start recording data in minutes without ever needing to recalibrate!

Precision



The use of MLA's allows the CX1 to achieve resolutions as high as 1 in 70,000 within its field of view (equivalent to 1/10th of a pixel in a 50 Megapixel camera).

Reliability



A CX1 uniquely identifies each marker with 100% reliability, so 3D marker trajectories are available for immediate analysis and display on a host computer with achievable latency (delays) of less than 0.5 milliseconds, perfect for real time applications.

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Summary Specifications (3D measurement from a single CX1 Unit)

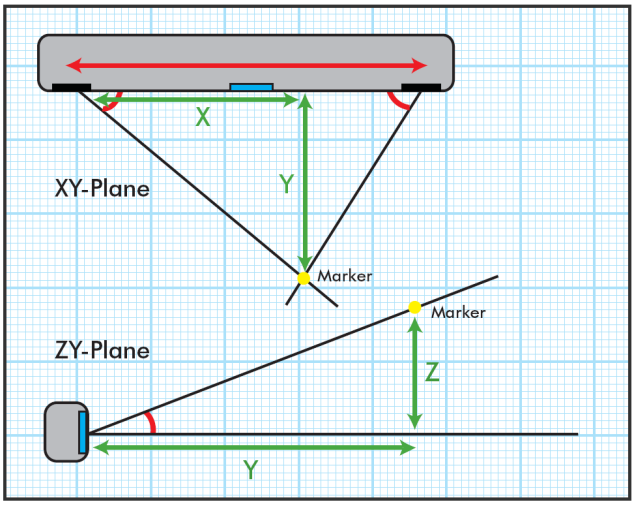

Figure 2

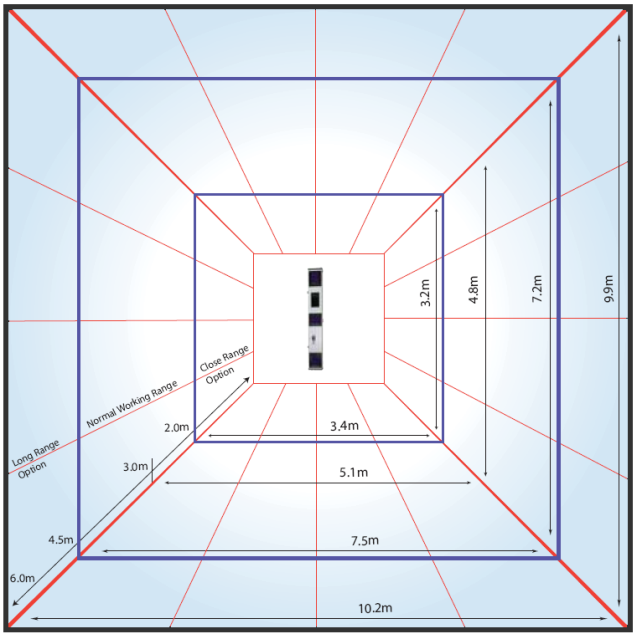

Figure 3

- **Physical Dimensions**
  Weight of unit: 5kg
  Dimensions (L x W x D): 800x112x80mm

- **Resolution**
  Standard deviation in position of a static marker at 3m range (axes as Figure 2):
  - 0.05mm (X and Z axes)
  - 0.3mm (Y axis)

  Resolution as fraction of field of view:
  - 1:70,000 (X and Z axes)
  - 1:12,000 (Y axis)

- **Sampling Rates vs. Marker Numbers**
  - 100Hz for 56 markers
  - 200Hz for 28 markers
  - 400Hz for 12 markers
  - 800 Hz for 6 markers

- **Real-Time Latency**
  - 0.5 milliseconds for applications using CODA SDK.
  - 5-10 milliseconds using Codamotion Analysis or ODIN software suites.

- **Capture Volume**
  - The linear capture range expands at approximately 1.6 x the distance from the CODA unit. Maximum accuracy is achieved between 2.0m and 4.5m from the unit, as in Figure 3.

  - The total capture volume within which maximum accuracy is maintained = 75 cubic metres.

Ordering Information

CX1-800-1	Standard CX1 Unit
CX1-800-F	CX1 Unit with quick-release connector
ACC-TPA	Mounting tripod for CX1
DCCH-xx*	Cable for standard CX1
FDCH-xx*	Quick release cable for '–F' version.

* Cable lengths: xx = 05, 10,15 or 20m

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