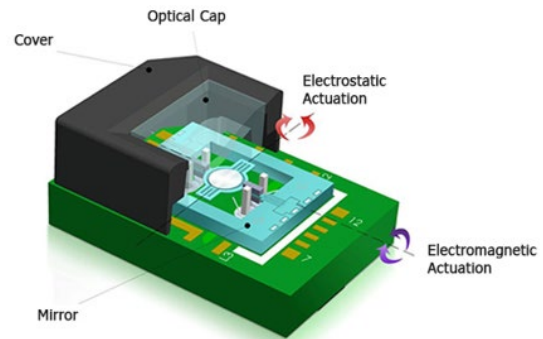


## MAR1100.E | 2D MEMS LASER SCANNING MIRROR

The MAR1100.E is a dual-axis MEMS based scanning mirror targeted for miniature laser projectors and laser steering applications.

It is based on industry-leading MEMS technology with novel and precise actuation schemes. The innovative MEMS device combines a fast electro-static actuator and a powerful electro-magnetic actuator, which yields peak performance under varying conditions.

The MAR1100\_E scanning mirror, combined with the MAR2100 controller IC, form the projection module of the system. A general block diagram of such systems is depicted in Figure 1.



### FEATURES

- A dual axis single mirror
- Resolution up to 1280 (H) x 600 (V) pixels
- Combination of electro-static (H) and electro-magnetic (V) actuators for wide optical field-of-view
- A full, real time FOV control (size and location)
- Accurate and continuous sensing mechanisms for precise mirror control
- Static mirror alarm signal for eye safety
- Non-hermetic plastic package

### APPLICATIONS



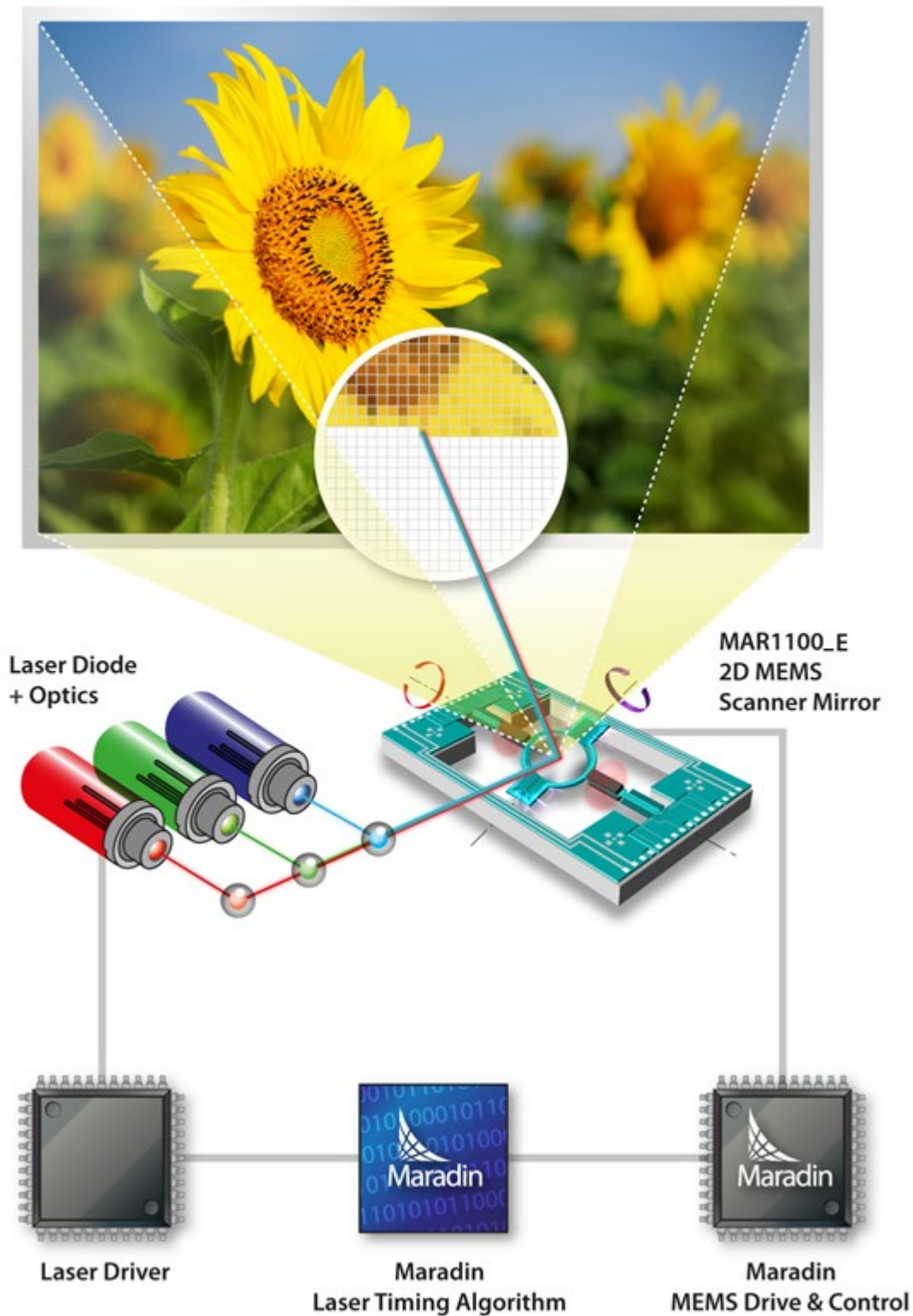


Figure 1: System Block Diagram

**SYSTEM CHARACTERISTICS**

|                | <b>Parameter</b>                       | <b>Min</b>            | <b>Typical Value</b> | <b>Max</b> | <b>Unit</b>                 | <b>Remarks</b>                              |
|----------------|--|-----------------------|----------------------|------------|-----------------------------|---|
| <i>General</i> | HFOV - Horizontal Optical angle        | 12                    |                      | 45         | Deg.                        |   |
|                | VFOV - Vertical Optical angle          | 3                     | 17                   | 30         | Deg.                        |   |
|                | Resolution (HxV)                       | 1x480                 | 1280X480             | 1280x600   | Pixel                       |   |
|                | Pixel position error                   |                       | ±1/5                 |            | Pixel                       | Both vertical and Horizontal                |
|                | Resonance frequency (H)                | 10,000                | 10,250               | 10,500     | Hz                          |   |
|                | Resonance frequency (V)                | 1600                  | 1800                 | 2000       | Hz                          |   |
|                | Effective mirror size (H)              |                       | 1                    |            | mm                          | X Horizontal direction<br>X for torsion bar |
|                | Effective mirror size (V)              |                       | 1.1                  |            | mm                          | Y Vertical direction<br>Y for torsion bar   |
|                | MEMS Scanning Module dimensions        |                       | 10x5.5x4.6           |            | mm                          | Length x Width x Height                     |
|                | MEMS Scanning module power consumption | TBD                   | 70                   | TBD        | mW                          | rms   |
| Package        |  | Plastic, Non-Hermetic |                      |            | Optional: Ceramic, Hermetic |   |
| <i>Optical</i> | Throw Ratio                            |                       | 1.2                  | 1          |                             | Distance/Diagonal FOV                       |
|                | Incident angle (H)                     |                       | 0                    |            | Deg.                        |   |
|                | Incident angle (V)                     | 15                    | 17                   | 22         | Deg.                        |   |
|                | Mirror reflectance                     | 90                    |                      | 99.5       | %                           | Wavelength dependent                        |
|                | Overall reflectance                    | 84                    |                      | 94         | %                           | Mirror and Optical window                   |
|                | Wavelength range for reflection        | 400                   | 450-700              | 1550       | nm                          | Any wavelength upon request                 |
|                | Laser spot size on mirror              |                       |                      | 0.7        | mm                          |   |

## OPTO-MECHANICAL INTERFACE

### Scanning module

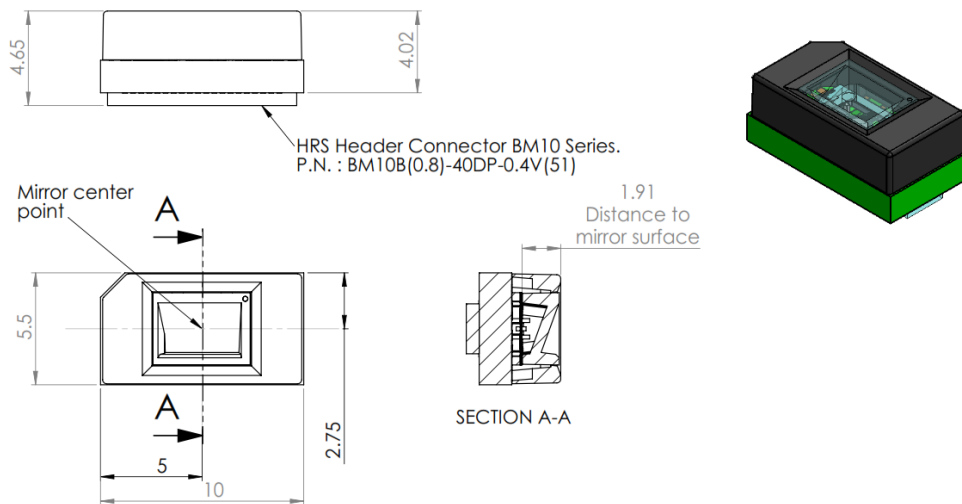


Figure 2: Scanning Head Module General View

### Scanning module electrical connection

The scanning module should be connected to the control board by a specified flat printed cable having a receptacle 40pin connector BM10NB (0.8)-40DS-0.4V (51).

### Laser Interface

The optical window of the MAR1100\_E enables typical projection of a 45[deg]x17[deg] FOV. The laser should be positioned according to the instructions detailed in Figure. For higher projection angles this should be modified accordingly.

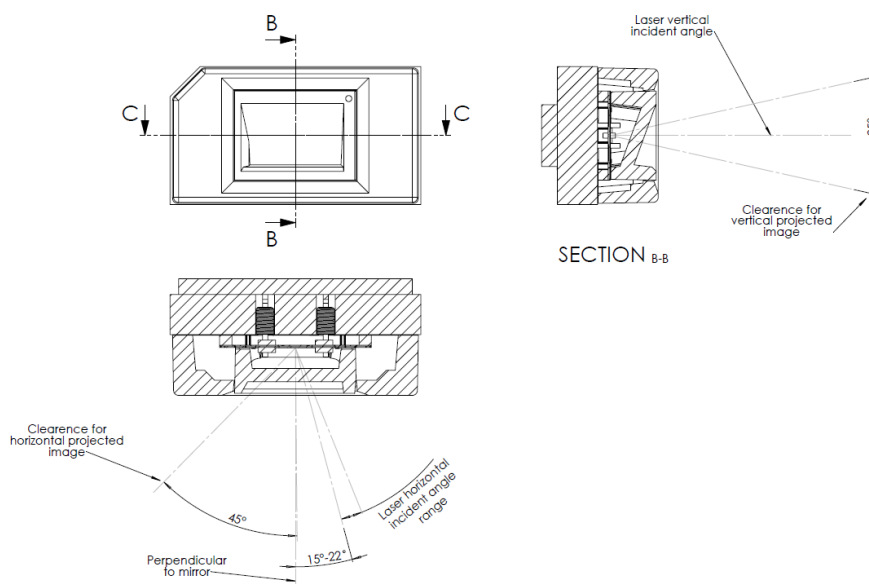


Figure 3: Scanning Head Module General View

## IMPORTANT NOTE

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