Distributed Imaging System for MAGIS-100

First Look at the 25mm High-Magnification Lens

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On behalf of SLAC MAGIS Group

MAGIS-100 Group Meeting
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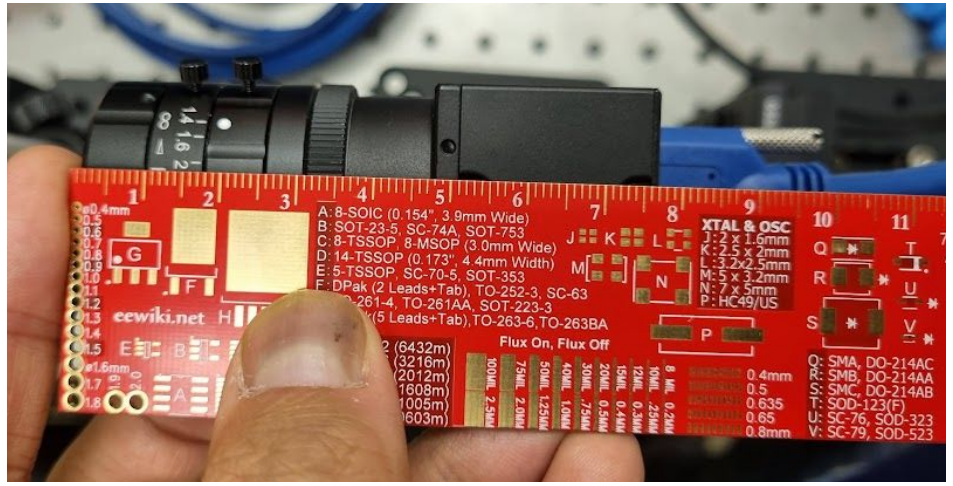
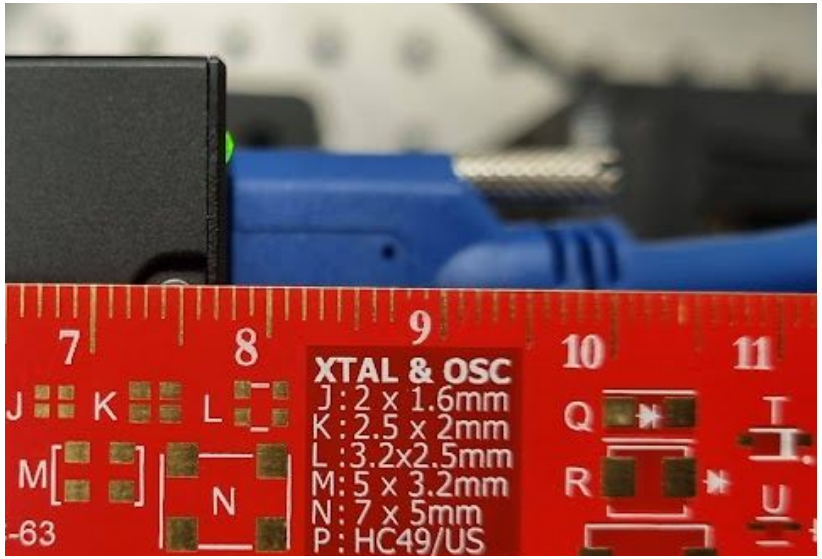
25mm Lens for High Magnification (1/2)

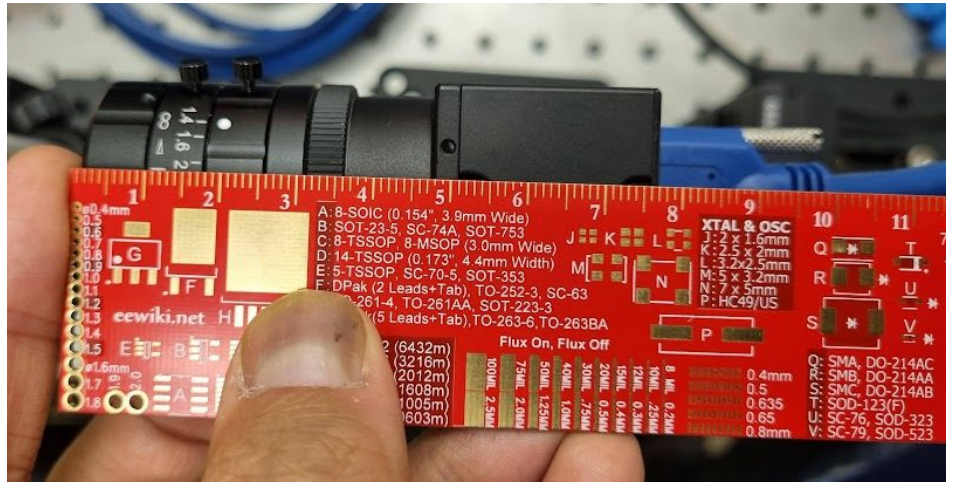
- Camera choice: **final for both systems, link**
- **25mm Lens (link)**
- Optics
  - Fixed focal length
  - Min. WD = 100mm,
    but 50-60mm achievable w/ 5mm extension ring
    - Our goal is about 60 - 65mm
      (4mm ext. may be okay, but probably not a huge gain)
  - Magnification of 0.44 (0.40) @ 60mm (65mm) WD
  - f/1.4 to f/16
- Mechanics
  - 31mm max. radius
  - Total length
    - 78mm including the camera,
      but not the USB / GPIO connectors
    - ~110mm including the connectors

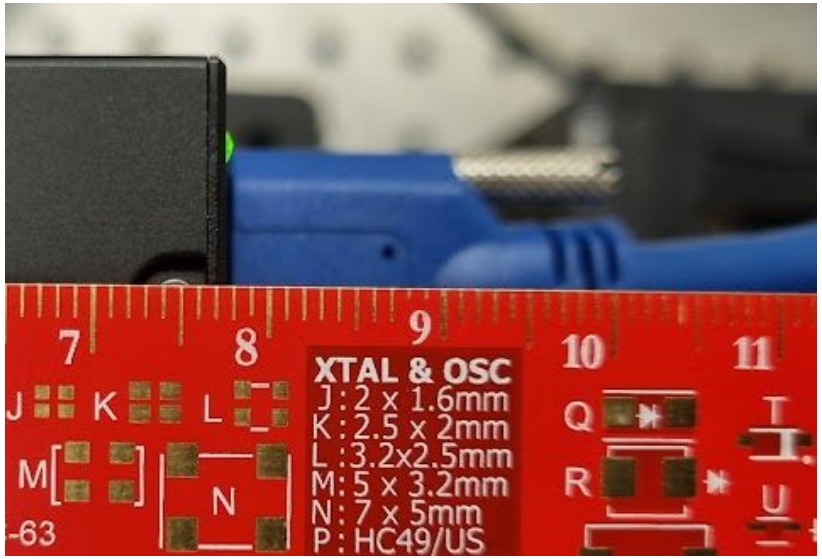




25mm Lens for High Magnification (2/2)

- Camera choice: **final for both systems, link**
- **25mm Lens (link)**
- Concerns / TODO's:
  - DoF
    - We want DoF > 2mm @ 5lp/mm
    - From a very rough test, this seems to enforce > f/5
    - Needs more detailed test,
      but 5lp/mm is certainly challenging!
      (will test this week)
  - Details of installation & alignment
    - Has the dimensions changed?
    - Installation bracket
    - Re-start the conversation with Noah
  - Cables & Powers
    - Dedicated trigger line?
    - USB switches for power control





DAQ & Power Layout

DAQ Layout

- Pursuing software trigger through RPi
- No globally clocked trigger-line
- Data stored temporarily on RPi, then moved to server
- **Camera requires USB 3 Micro-B**

Power Layout

- Cameras have no “power-off” state ⇒ Need actual power-cycle
- **USB relay switches** controlled by RPi GPI (Amazon link)