

2. General Information about the system

The stepper system is used to shoot a repeating pattern over wafer. It is primarily needed for jobs where feature resolution and/or alignment is critical. The contact aligners can be used for many jobs. There is a sign-up sheet on the web for the stepper and you must look at the tool status before signing up for time on this equipment. Please plan your time out as this system can get heavily used.

Also, this system is very expensive and replacement parts, especially the optical column, are also expensive. Please be careful, slow, and meticulous when operating this piece of equipment. Many students rely on this piece of equipment for their research.

- System: GCA 6300 5x reduction i-line step and repeat, $\lambda = 365 \text{ nm}$
- Lens system mirrors both X and Y from mask to stepper
- I-line intensity is $\sim 180 \text{ mW/cm}^2$ at the wafer
- Lens: Olympus 2142: 21mm field on wafer, $\text{NA} = 0.42$,
- Depth of field = $1.2 \mu\text{m}$
- Maximum die size $\sim (14.8 \times 14.8) \text{ mm}^2$
- Resolution: $0.7 \mu\text{m}$ reproducible, $0.5 \mu\text{m}$ achievable R&D
- Registration tolerance: Max $0.30 \mu\text{m}$ global alignment, Max $0.15 \mu\text{m}$ local alignment (with care, you can achieve $< 0.10 \mu\text{m}$ registration)
- Minimum substrate size: $\sim (15 \times 15) \text{ mm}^2$ (I have seen smaller substrates used in stepper, but they were mounted on a carrier wafer)
- Maximum substrate size: $\sim 4\text{inch}$ wafer (round), 6inch wafer (using custom paddles)
- The baseline system focus and registration is checked weekly

The system will be down from the following lab conditions:

- 1) Power Outage. For outages of 1 hour or less, system will be back on line in 2 hours. Four outages more than 1 hour, system will be back on after 8 hours so that mechanical system restabilizes to the environmental chamber.
- 2) Cooling Water Outage. Environmental unit goes down. For outages of 1 hour or less, system will be back on line in 2 hours. Four outages more than 1 hour, system will be back on after 8 hours so that mechanical system restabilizes to the environmental chamber.
- 3) Compressed Air Outage. The vibration isolation table will not be operational. System back on line as soon as table legs refill with air.

This document should answer most questions and prepare you for most operations necessary to achieve good results on the stepper. Manuals are available for more detailed descriptions of the stepper operation.