Northrop Grumman utilizes many low volume electronic components. Due to the nature of low volume components, it is labor intensive and expensive to rework such components. Gantry automated rework interface cuts out years of experience and skill needed to perform such tasks with the ease of clicking a button.

**Overview / Design Specs**

- Remove components of edge length 1 mm x 1 mm
- 0.01" Gantry Motion Resolution
- Solder Reflow 200°C
- Max adjacent component temperature of 170°C
- Temperature ramp of 1.5°C/s
- Closed loop heating control

**Process**

- User clamps PCB board and powers GARI on
- User adjusts spot size and selects "aim" mode
- "Pointer" beam & joystick used to center laser over target
- User arms laser, selects "rework" mode
- Laser heats component to reflow temperature
- Laser shuts off and target is removed via vacuum chuck
- System allowed to cool

**Hardware / Key Components**

- **Laser Module**
  Precise heating to achieve reflow at 200°C at a controlled temperature ramp of 1.5°C/s avoiding damage to nearby components

- **Thermal Camera**
  Accurate thermal sensing from a thermal camera to allow for closed loop temperature control.

- **Vacuum Chuck**
  Pneumatically activated vacuum pen allows for precise removal of 1 mm x 1 mm PCB components

- **Adjustable Board Clamp**
  Allows for clamping of boards of various sizes

**Thermal Gradient Test**

The temperature of adjacent components drops rapidly beyond 1 mm, allowing safe part removal without damaging nearby components.

**Thermal Ramp Test**

Precise laser heating follows a thermal temperature ramp of 1.5°C/s

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