Junior
Small molecule preformulation

Walk up, set up your run and walk away. Junior automates the parts of your API screening process you’d normally do one by one at the bench. Preconfigured decks for high-throughput solubility and polymorph screenings are ready to go when you are. Examine more variables in a single day, get them done the same way every time and check out a broader developability and formulation space.

Applications

- Solubility screening
  - Chiral resolution
  - LogP and LogD determinations
- Polymorph screening
  - Solvent screening
  - Salt selection/solvent screening
  - Cocrystal screening
- Powder dispensing
- Reaction screening

Key features

- Evaluate up to 384 crystallizations per run
- Analyze samples by birefringence, XRD and Raman spectroscopy without wrecking a single crystal
- Transfer and filter 96 solutions at elevated temperatures with no API precipitation
- Heat, cool, and mix on-deck, allowing for parallel slurry, precipitation, cooling, and evaporation experiments on a single platform
- Design complex experiments quickly using LEA’s logical recipe-oriented approach
- Add process chemistry screening capabilities and screen up to 96 reactions in parallel to rapidly identify the best solvents, ligands, catalysts, and reagents for your chemistry

Junior configured for small molecule preformulation

SV dispensers use vibration for precise delivery

Crystallizer block for polymorph screening

Example Junior deck configured for small molecule preformulation

1. Solvent tray
2. Position passive plate rack
3. 3-Position passive plate rack
4. Spray wash
5. Heating/cooling/stirring
6. 3-position heating/stirring
7. Heated 4-tip liquid dispenser
8. Optional pH probe
Available options

**Heated 4-tip liquid dispenser – extended tip**
- Heated reservoir volume per tip: 1 mL
- Reservoir temperature: Up to 120 °C
- Temperature uniformity: ±2 °C (across tips)
- Tip pitch: 9 mm
- Extendible tip: 1
- Syringe sizes: 50 µL – 10 mL
- Needle size: 22 gauge, piercing

**Heating/cooling/stirring station**
- Temperature range: -20–180 °C
- Mixing: Up to 750 rpm
- Mixing type: Magnetic tumble stirring

**Heated filter block**
- Vial operating temperature: Ambient to 120 °C
- Temperature controller accuracy: ±1 °C
- Heater temperature ramp rate: 2 °C/min while heating
- Cooling: By convection
- Vial temperature uniformity: ±6 °C @ 60 °C
- Filter: High efficiency 0.7 µm binder-free glass microfiber

**Crystallizer**
- Format: 96 independent crystallizations, with a universal substrate

**pH measurement**
- Configuration: Single or 4-channel probe
- Measurement time per 96-well plate: <90 minutes
- Range: 1–13 pH unit
- Resolution: 0.05 pH unit
- Repeatability: ±0.1 pH unit

**Heated single-tip liquid dispenser**
- Heated reservoir volume: 1 mL
- Reservoir temperature: Up to 120 °C
- Syringe sizes: 1–2.5 mL (standard)
- Needle size: 16 gauge, non-piercing

**Vortexing station – 3 positions**
- Orbital: 60–3570 rpm
- Maximum vortexing mass: 2268 g (5 lb/plate)

**Deck screening pressure reactor (DSPR)**
- Max pressure rating: 200 psi @ 180 °C
- Pressure drop: <5 psi/hr

**Solid dispense**
- **Dispense technology:** Dispense algorithm dynamically controls the dispensing head to adjust for powders with different densities, particle sizes, particle shapes and static charges
- **Classic powder dispense:** Traditional stirrer dispense mechanism
- **Hopper volume range:** 10–100 mL
- **Storage vial (SV) powder dispense:** Unique vibratory dispensing mechanism for highly precise dispensing of small amounts as low as 0.5 mg
- **Hopper volume:** 4 mL

**Balance with integrated camera**
- **Maximum weight:**
  - Standard: 1200 g
  - High-sensitivity option: 220 g
- **Sensitivity:**
  - Standard: 0.1 mg
  - High sensitivity option: 0.01 mg
- **Resolution:**
  - Standard: 0.1 mg
  - High-sensitivity option:
    - 0.01 mg (0–110 g)
    - 0.1 mg (110–220 g)
- **Repeatability:**
  - Standard:
    - High weight (measured >200 g): 0.25 mg
    - Low weight (measured up to 200 g): 0.15 mg
  - High-sensitivity option:
    - High weight (measured at 200 g): 0.15 mg
    - Low weight (measured at 10 g): 0.04 mg
- **Response time:** <22s
- **Camera resolution:** 1032 pixels (max wide) x 779 pixels (tall)

**Off-deck third-party instrument integration**
- HPLC
- XRD
- Birefringence microscope
- Raman
- Other systems available for virtual integration. Please contact Unchained Labs for a full list of systems.

**Facilities requirements**

**Physical:**
- With integrated enclosure:
  - 105 cm W x 90.4 cm D x 140 cm H, ~150 kg
- With integrated table option:
  - 167 cm W x 90.4 cm D x 200 cm H, ~240 kg

**Electrical:**
- **Junior:**
  - 120–220 V ±10 %, 50–60 Hz, 16 A
- **Computer:**
  - US: 115 V ±10 %, 60 Hz
  - EU: 220 V ±10 %, 50 Hz
- **Compressed dry air:** 0.5 MPa to 0.9 MPa (70–130 psi), 4 L/min (8 mm hose)