

Makeline System

Hot-reloadable configuration for food assembly hardware

Edit JSON → auto-reload in 2.5s → zero downtime

Quick Start

```
just generate-makeline simulation  
just simulate simulation
```

```
# Edit profiles/simulation.json  
# Ctrl+S → reloads in 2.5s
```

Aliases: `gm` / `s`

Always use `just generate-makeline` (not `just generate`)

Where Files Live

```
generated/profiles/simulation/  
├─ simulation.json          # Don't edit (gets regenerated)  
├─ spawner.json            # Process launch config  
└─ custom_layers.json      # Your customizations  
  
profiles/                  # Edit here  
├─ simulation.json         # Active profile (watched)  
└─ simulation/  
    ├─ makeline.json       # Expanded result  
    └─ backups/            # Timestamped copies
```

Edit `profiles/` **for hot-reload** | `spawner.json` launches processes

System Architecture

Three-tier hierarchy: Generator expands types into instances

```
Profile: ["Initial", "Denest", "Dispense", "Lift"]  
    ↓  
CabinetKind → DeviceKind → ModuleKind  
    ↓  
Instance graph: buffer-1, hvac-2, dispenser-3  
    ↓  
Layers edit: { owner: "buffer-1", subject: "self" }
```

Each CabinetKind defines required DeviceKinds (`.devices()`)

Each DeviceKind defines required ModuleKinds (`.modules()`)

Profile Structure

Three sections define your makeline:

layouts: CabinetKind list (hardware topology)

- ```
{ "default": { "cabinets": ["Initial", "Denest", "Dispense",
"Lift"] }}
```

**layer\_groups:** Named edit collections (modifications)

- ```
{ "base": [layer1, layer2], "prod": [layer3] }
```
- Layers applied sequentially (order matters!)

line_builds: Combine layout + layer groups (final config)

Editing Workflow

Edit `profiles/simulation.json` → Save → 2.5s → Changed modules
reload

What happens: Diff → backup to `backups/{timestamp}/` → reload
affected modules

What keeps running: Planner, unchanged modules, active orders

Layer Edit Types

EditSectionField: Change single config field

```
{ "EditSectionField": {  
  "identity": { "owner": "buffer-1", "subject": "self" },  
  "section_name": "configuration",  
  "field_key": "motion_timeout_ms",  
  "field_value": 20000  
}}
```

AssignSections: Replace entire sections

```
{ "AssignSections": {  
  "identity": { "owner": "buffer-1", "subject": "self" },  
  "sections": {  
    "configuration": { "motion_timeout_ms": 15000, "homing_velocity": 2000 }  
  }  
}}
```

Custom Layers

Dev tweaks without modifying preset profiles

just generate-makeline-custom simulation → creates
custom_layers.json

```
[{
  "metadata": { "name": "Colder HVAC" },
  "edits": [{ "EditSectionField": {
    "identity": { "owner": "hvac-1", "subject": "self" },
    "section_name": "config",
    "field_key": "setpoint_celsius",
    "field_value": 2.0
  }}]
}]
```


Line Builds & Switching

One profile, multiple configs via different layer combinations

```
"line_builds": {  
  "production": { "layer_groups": ["base", "prod_ingredients"] },  
  "testing": { "layer_groups": ["base", "test_ingredients"] }  
}
```

At generation: just generate-makeline simulation testing

At runtime (Explorer):

- AvailableLineBuilds → see options
- SelectLineBuild { line_build_name: "production" } → switch (10- 9

How Targeting Works

Identity structure: `{ owner: "module-name", subject: "target" }`

owner: Module instance name

- `"buffer-1"`, `"buffer-2"` (multiple buffer modules)
- `"lifecycler-1"`, `"lift-1"`, `"dispenser-3"`

subject: Config target within the module

- `"self"` → module's own configuration
- `"motor-1"` → child motor module configuration
- `"home-sensor"` → child sensor configuration

System Behavior

Watch mechanism: Only `profiles/{preset}.json` triggers 2.5s reload

Spawner: Smart restart - only restarts processes with config changes

Generated files: Never edit `generated/` - gets overwritten on regeneration

generate-makeline vs generate: Always use `generate-makeline` for hot-reload support

Presets: `simulation`, `v5111`, `v5112`, `cabinet_tester`

Troubleshooting

Profile not reloading?

→ Server running? Wait 2.5s. Editing `profiles/` ?

Module not reconfiguring?

→ Check logs for `SectionChanged`. Use `-t` flag.

Bad config?

→ `profiles/simulation/backups/{timestamp}/makeline.json` → copy
over current

Rollback: Copy backup to `profiles/simulation/makeline.json`, save

That's It

```
just generate-makeline simulation [line_build]
just simulate simulation
# Edit profiles/simulation.json
```

Key features:

- Hot-reload (2.5s, no restarts)
- Custom layers (dev tweaks)
- Line builds (test/prod switching)
- Auto backups (rollback ready)

Remember: `profiles/` not `generated/`