Floor Harp Build Packet

Instrument-Maker Print Packet

Build packet folder: /tmp/floor-harp-codex-gina-r2-build-packet

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This packet is the printable companion to the build folder. Take it shopping or into the shop. Tear sheets at page breaks.

File Map

File	Purpose
design.md	Project intent, catalog metadata, assumptions, and validation plan.
bom.csv	Starter bill of materials with part categories, quantities, drawing refs, and notes.
sourcing.csv	Supplier/search tracker with specs, price/date fields, lead time, substitutes, and risks.
cut-list.csv	Rough/final stock sizes, material, grain/orientation, operations, yield, and offcuts.
drawing-brief.md	Manufacturing drawing and technical product sketch brief.
assembly-manual.md	Shop-facing sequence, tools, fixtures, safety, tuning, finishing, and maintenance notes.
validation.csv	Target/measured values, tolerance, environment, result, and tuning/build action log.
supplier-rfq.md	Supplier email/request-for-quote starter.
visual-bom-brief.md	Art direction for an image-forward visual BOM.
wolfram-starter.wl	Wolfram starter for physics, optimization, visualization, and validation.
README.md	Project artifact.
photo-shotlist.md	Project artifact.
risks.md	Project artifact.

design.md

Project intent, catalog metadata, assumptions, and validation plan.

Floor Harp Design

Intent

Create a practical L2 packet for a small floor-standing harp that is large enough to test graduated string lengths, frame stiffness, and ergonomic reach without claiming concert-harp maturity.

Readiness

L2 scaffold. This packet can support CAD layout and sourcing review, but the frame must be analyzed and proofed before a full string load is applied.

Governing Model

Strings use Mersenne-Taylor:

f = (1 / (2 L)) * sqrt(T / mu)

The harp also needs a structural load model because cumulative string tension dominates the neck, pillar, soundboard, and base joints.

Baseline Assumptions

Parameter	Baseline	Notes
String count	22	C3 through C6 diatonic first pass
Scale lengths	42 in bass to 13 in treble	Graduated after gauge selection
String materials	Nylon/fluorocarbon treble, wound bass as needed	Supplier tension data required
Frame	Hardwood neck, pillar, base	Lamination or reinforced joinery likely
Soundboard	Spruce/ply soundboard with ribs	Thickness and rib pattern TBD
Target total tension	300-600 lbf first-pass range	Must be refined before build

Tension Safety Notes

• Do not bring a prototype to full pitch until neck, pillar, and base joints have passed dry-load review.
• String from low to high in stages while checking frame movement.
• Keep the body out of the string plane during initial pitch-up.
• Add a proof-load hold point before final tuning.

Known Gaps

• No final string chart or lever/sharping plan.
• No frame FEA or physical proof-load result.
• No soundboard deflection data.
• No sourceability/pricing check.
• No prototype tuning record.

bom.csv

Starter bill of materials with part categories, quantities, drawing refs, and notes.

item	qty	unit	material_or_spec	estimated_cost_usd	notes
Neck blank or lamination set	1	set	hard maple, walnut, or laminated hardwood	120	Primary loaded member
Pillar blank or lamination set	1	set	hardwood, straight grain or laminated	80	Avoid short grain at joints
Base block/feet	1	set	hardwood or plywood core with hardwood caps	55	Must resist tipping and string load
Soundboard panel	1	ea	spruce, cedar, or birch ply, thickness TBD	70	Ribbing pattern TBD
Back/shell stock	1	set	plywood or hardwood strips	60	Prototype shell can be simple
Harp strings	1	set	22-string nylon/fluorocarbon wound schedule TBD	160	Must include tension data
Tuning pins	22	ea	harp or zither pins sized for frame	45	Pilot holes must be tested
Bridge pins/eyelets	22	ea	harp bridge pins or suitable string guides	35	Spacing and angle TBD
Adhesive/finish	1	lot	structural wood glue and clear finish	35	Use fresh adhesive

sourcing.csv

Supplier/search tracker with specs, price/date fields, lead time, substitutes, and risks.

item	required_spec	search_terms	supplier_candidates	date_checked	unit_price_usd	lead_time	substitution_risk	notes
Harp strings	22-string set or individual gauges with tension chart	lever harp strings nylon	Harp string suppliers	TBD	TBD	TBD	High	Gauge and tension data are man
Tuning pins	22 pins suitable for [illegible]	harp tuning pins zither pins	Harp hardware suppliers; luthier suppliers	TBD	TBD	TBD	Medium	Holding torque depends on pilot
Bridge pins	22 string guide pins or eyelets	harp bridge pins eyelets	Harp hardware suppliers	TBD	TBD	TBD	Medium	Must avoid string wear
Hardwood laminations	clear hardwood for neck/pillar	maple harp neck [illegible]	Hardwood dealer; [illegible] supplier	TBD	TBD	TBD	Medium	Long clear stock may be limited
Soundboard stock	stable panel for harp soundboard	harp soundboard spruce [illegible]	luthier suppliers; specialty plywood suppliers	TBD	TBD	TBD	Medium	Deflection properties matter

cut-list.csv

Rough/final stock sizes, material, grain/orientation, operations, yield, and offcuts.

part	qty	rough_dimensions_in	final_dimensions_in	material	grain_or_orientation	operation	notes	
Neck	1	2.0 x 5.0 x 42.0	profile TBD	hardwood/lamination	continuous along stem	template, bandsaw, CNC, drill	Do not final drill before string layout	
Pillar	1	2.0 x 3.0 x 48.0	profile TBD	hardwood/lamination	continuous lengthwise	shape and fit joints	Joint geometry is critical	
Base	1	2.0 x 8.0 x 20.0	profile TBD	hardwood/ply core	grain lengthwise	shape, join, add feet	Check tip stability	
Soundboard	1	0.160 x 14.0 x 36.0	taper/profile TBD	spruce/cedar/ply	long grain vertical	cut, brace, drill string holes	Deflection target TBD	
Back/shell	1	set	TBD	TBD	ply/hardwood	stable	cut and assemble	Can be simplified for prototype
Bridge strip	1	0.5 x 1.0 x 34.0	profile TBD	hardwood	long grain	shape and drill	Pin angle TBD	

drawing-brief.md

Manufacturing drawing and technical product sketch brief.

Floor Harp Drawing Brief

Required first drawings:

- Full-size side elevation with neck, pillar, base, soundboard, and string fan.
- String chart with note, frequency, scale length, gauge, and target tension.
- Neck drilling layout with pin spacing and edge distances.
- Pillar/base joint detail.
- Soundboard section with bridge strip, string angle, and rib layout.

assembly-manual.md

Shop-facing sequence, tools, fixtures, safety, tuning, finishing, and maintenance notes.

Floor Harp Assembly Manual

1. Lock the string chart and full-size side elevation before cutting.
2. Build neck and pillar from clear stock or laminations with conservative glue area.
3. Dry-fit neck, pillar, and base, then mark string paths and pin locations.
4. Build the soundbox/soundboard assembly and verify flatness.
5. Fit bridge strip, guide pins, and string holes without sharp edges.
6. Test tuning pin pilot holes in offcuts before drilling the neck.
7. Assemble frame and soundbox, then finish before final hardware if practical.
8. String gradually in stages, recording frame movement after each stage.

Safety: treat the first full string-up as a proof test. Wear eye protection and stand out of the string plane.

validation.csv

Target/measured values, tolerance, environment, result, and tuning/build action log.

check_id	area	target	method	tolerance	measured	result	action
VAL-001	String schedule	C3-C6 diatonic target	frequency and tuner check	+/-10 cents after settle	TBD	TBD	Adjust gauge or scale
VAL-002	String safety	all strings within supplier published range	supplier data and calculation	within published range	TBD	TBD	Change string set
VAL-003	Frame load	no permanent frame	measurement	[illegible]	TBD	TBD	Increase section or reinforce joints
VAL-004	Tuning pin hold	pins hold pitch over 24 hours	hold pin angle and log tuning drift	[illegible]	TBD	TBD	Revise pilot holes/hardware
VAL-005	Tip stability	instrument stable in playing position	push/pull test with consistent force	no tip movement	TBD	TBD	Revise base/feet
VAL-006	Ergonomics	player can reach full string range	mock-up photos and reach notes	comfortable reach	TBD	TBD	Revise height/string fan

supplier-rfq.md

Supplier email/request-for-quote starter.

Supplier RFQ Draft

Hello,

Please quote hardware and strings for a 22-string small floor-harp prototype covering approximately C3 through C6. I need individual string gauges with tension data, compatible tuning pins, and bridge pins or eyelets.

Please include material specifications, rated tension or breaking strength, unit price, minimum order quantity, lead time, and shipping options.

visual-bom-brief.md

Art direction for an image-forward visual BOM.

Visual BOM Brief

Show the full harp silhouette with callouts for neck, pillar, base, soundboard, back/shell, bridge strip, tuning pins, guide pins, string set, adhesive, and finish. Include a detail inset for the string path through pin, guide, bridge, and soundboard.

wolfram-starter.wl

Wolfram starter for physics, optimization, visualization, and validation.

```
(* Floor harp string schedule starter. Values are first-pass assumptions. *)
ClearAll["Global`*"];
a4 = 440;
freqFromMidi[m_] := a4*2^((m - 69)/12);
notes = Range[48, 84]; (* C3 through C6 chromatic range; select diatonic rows later *)
scaleLengthIn[m_] := 13 + (42 - 13)*(84 - m)/(84 - 48);

Dataset[
Table[
<|"midi" -> m, "frequencyHz" -> N[freqFromMidi[m]],
"firstPassScaleLengthIn" -> N[scaleLengthIn[m]]|>,
{m, notes}
]
]
```

README.md

Project artifact.

Floor Harp

Engineering documentation and parametric design table for a floor-standing concert-style harp.

Part of the [tonykoop/instrument-maker](https://github.com/tonykoop/instrument-maker) catalogue.

Readiness

L2 scaffold. This repo now contains root-mode build packet documentation for a small floor-harp prototype. It is not L3 because string schedule validation, frame-load analysis, CAD renders, sourceability checks, and measured prototype data are still open.

Packet Contents

- `design.md` - design basis, string schedule assumptions, and structural gaps.
- `bom.csv`, `sourcing.csv`, `cut-list.csv`, `validation.csv` - packet tables.
- `assembly-manual.md`, `risks.md`, `photo-shotlist.md` - build and review aids.
- `drawing-brief.md`, `drawings/README.md`, `cad/README.md`, `wolfram-starter.wl`, `wolfram/README.md` - starter technical artifacts.

String-Scale Assumptions

Baseline: 22 strings from C3 to C6 diatonic, graduated speaking lengths from about 42 in bass to 13 in treble, nylon/fluorocarbon/wound bass strings as needed, and a frame designed conservatively before any full-tension string-up.

License

photo-shotlist.md

Project artifact.

Photo Shotlist

- Full-size side elevation with string fan and frame members.
- Neck and pillar grain or lamination layout before cutting.
- Dry-fit frame joints before glue.
- Tuning pin scrap test with bit sizes labeled.
- Soundboard bridge/string-hole detail before stringing.
- Staged string-up with frame movement measurements.

risks.md

Project artifact.

Floor Harp Risks

• Cumulative string tension can damage the frame or injure the builder if the neck, pillar, or base joint fails.
• Tuning pin torque and holding power are unknown until scrap tests are done.
• Soundboard deflection is not validated.
• Long clear hardwood and harp strings may have cost/lead-time surprises.
• Remain at L2 until structural review, sourceability, and prototype tuning evidence are available.