Electric Violin Build Packet

Instrument-Maker Print Packet

Build packet folder: /tmp/electric-violin-codex-gina-r2-build-packet

Generated: 2026-05-09

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.

Electric Violin Design

Intent

Create an L2 packet for a solid-body electric violin that can become a CAD and shop prototype while keeping the unresolved pickup, ergonomics, and load questions visible.

Readiness

L2 scaffold. This is ready for CAD layout and component sourcing review, not for production or final electrical performance claims.

Governing Model

Pitch is controlled by Mersenne-Taylor string behavior. The body is primarily a mechanical support and ergonomic structure; output depends on bridge/piezo coupling, preamp impedance, wiring noise, and player setup.

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

Baseline Assumptions

Parameter	Baseline	Notes
Scale length	328 mm / 12.91 in	Violin standard
Primary tuning	G3-D4-A4-E5	Optional C3-G3-D4-A4-E5 variant
Body	Solid hardwood or laminated body	Chambering optional after stiffness check
Neck	Integrated or bolted maple neck	Joint must resist string pull
Pickup	Piezo bridge	Preamp/impedance matching required
Target total tension	45-65 lbf	5-string set likely higher

Tension And Electronics Notes

• Use published string tension data before sizing the neck/body joint.

- Shield and strain-relieve wiring before closing any cavity.
- Verify piezo output through the intended preamp, not only direct to an amp.
- Balance the instrument with shoulder rest/chin rest installed.

Known Gaps

- No body outline or ergonomic mockup evidence.
- No pickup/preamp selection or wiring test.
- No CAD neck-joint/load review.
- No sourceability/pricing check.
- No setup measurements.

bom.csv

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

item	qty	unit	material_or_spec	estimated_cost_usd	notes
Body blank	1	ea	maple, alder, walnut, or laminated hardwood body blank	70	Stability and weight matter
Neck blank	1	ea	maple or laminated neck stock	55	Integrated or bolt-on TBD
Fingerboard	1	ea	ebony, composite, or hard maple	35	Scoop/setup TBD
Piezo bridge	1	ea	4-string violin piezo bridge or 5-string variant if selected	85	Compatibility with string count is critical
Preamp/output jack	1	set	high-impedance piezo preamp and 1/4 in output	45	May be external for first prototype
Tuners/pegs	4	ea	violin pegs, geared pegs, or machine tuners	40	5-string variant needs five
Tailpiece/fine tuners	1	set	violin tailpiece compatible with pickup bridge	85	String spacing must match
String set	1	set	4-string or 5-string electric/acoustic violin set	55	Use published tension data
Chin/shoulder interface	1	set	chin rest and shoulder rest mounting plan	35	Balance validation item
Finish/electrical supplies	1	lot	finish, shielding, wire, solder, heat shrink	35	Noise control TBD

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
Piezo bridge	bridge compatible with 4/4 violin scale and selected strings	electric violin piezo bridge	music electronics suppliers; luthier suppliers	TBD	TBD	TBD	High	Pickup choice drives bridge geo
Preamp	high impedance piezo input, low noise	piezo violin preamp high impedance	music electronics suppliers	TBD	TBD	TBD	High	Direct piezo output may sound th
Strings	4 or 5 string set with published tension	electric violin strings tension chart	string manufacturers; music suppliers	TBD	TBD	TBD	Low	Use actual tension values
Body/neck wood	stable clear hardwood blank	electric violin body blank maple neck blank	hardwood dealer; luthier supplier	TBD	TBD	TBD	Medium	Weight and balance matter
Tuners/fittings	hardware matching headstock design	violin geared pegs or compact tuners	luthier suppliers	TBD	TBD	TBD	Medium	Geometry depends on CAD

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
Body	1	1.75 x 7.0 x 18.0	outline TBD	hardwood/lamination	stable, attractive face grain	CNC profile route, cavity routing	Weight/balance TBD
Neck	1	1.5 x 2.5 x 14.0	profile TBD	maple/lamination	quarter grain preferred	saw, route, carve	Joint design TBD
Fingerboard	1	0.35 x 1.75 x 11.0	scoop/profile TBD	ebony/composite/maple	long grain	plane and fit	Setup after stringing
Electronics cavity cover	1	0.125 x 3.0 x 5.0	fit to cavity	plastic/wood	stable	cut and drill	Shielding plan TBD
Bridge/pickup fit area	1	TBD	TBD	body/bridge interface	aligned to string path	route/drill after bridge selection	Do not cut before hardware arrives
Headstock/pegbox area	1	included in neck	layout TBD	neck stock	grain lengthwise	drill/ream or route tuner slots	4/5-string variant changes layout

drawing-brief.md

Manufacturing drawing and technical product sketch brief.

Electric Violin Drawing Brief

Required first drawings:

- Body plan with bridge line, string paths, pickup, controls, jack, and cavity.
- Side setup drawing with nut, fingerboard, bridge, action, and tailpiece.
- Neck/body joint detail.
- Headstock or pegbox drilling layout for 4-string and optional 5-string.
- Wiring schematic with shielding and strain relief.

assembly-manual.md

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

Electric Violin Assembly Manual

1. Choose 4-string or 5-string baseline before final CAD.
2. Select pickup bridge and preamp so the CAD reflects real hardware.
3. Produce body, neck, fingerboard, bridge, electronics, and ergonomic drawings.
4. Cut body and neck oversize, then dry-fit the neck/body joint.
5. Route electronics cavity and wire path only after component dimensions are confirmed.
6. Fit fingerboard, nut, bridge, tailpiece, and tuners.
7. Wire pickup, jack, shielding, and preamp with strain relief.
8. String gradually, test signal, and record setup/balance data.

Safety: protect eyes during first pitch-up and ventilate during soldering or finish work.

validation.csv

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

check_id	area	target	method	tolerance	measured	result	action
VAL-001	Scale length	328 mm / 12.91 in vibrating length	measure nut to bridge	+/- 1 mm	TBD	TBD	Reset bridge/nut position
VAL-002	String tension	within selected set published range	manufacturer chart	within published range	TBD	TBD	Change string set
VAL-003	Neck/body stiffness	no permanent movement after 24 hours at pitch	measure relief/projection before and after	no movement TBD	TBD	TBD	Revise neck or joint
VAL-004	Pickup output	clean signal through intended preamp	record direct test and listen for dropout	no crackle/noise	TBD	TBD	Revise wiring/shielding/preamp
VAL-005	Balance	comfortable standing/seated hold	neck-up and playing posture photos	no neck dive	TBD	TBD	Move mass/strap/shoulder interfac
VAL-006	Action	playable bowed action across strings	measure at fingerboard end	target TBD	TBD	TBD	Adjust bridge/fingerboard

supplier-rfq.md

Supplier email/request-for-quote starter.

Supplier RFQ Draft

Hello,

Please quote parts for a solid-body electric violin prototype: piezo bridge, high-impedance preamp or recommended electronics, output jack, violin string set with published tensions, tuners/fittings, and any wiring/shielding supplies.

Please include dimensions, compatibility notes, unit price, lead time, and recommended substitutions for 4-string and 5-string variants.

visual-bom-brief.md

Art direction for an image-forward visual BOM.

Visual BOM Brief

Show the solid body and neck with exploded callouts for pickup bridge, preamp, jack, wiring, shielding, tailpiece, tuners, fingerboard, strings, chin/shoulder interface, finish, and cavity cover.

wolfram-starter.wl

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

```
(* Electric violin open-string starter. Values are first-pass assumptions. *)
ClearAll["Global`*"];
a4 = 440;
freqFromMidi[m_] := a4*2^((m - 69)/12);
scaleLengthIn = 12.91;
tuning4 = <|"G3" -> 55, "D4" -> 62, "A4" -> 69, "E5" -> 76|>;
tuning5 = <|"C3" -> 48, "G3" -> 55, "D4" -> 62, "A4" -> 69, "E5" -> 76|>;

makeRows[tuning_] := KeyValueMap[
<|"string" -> #1, "frequencyHz" -> N[freqFromMidi[#2]],
"scaleLengthIn" -> scaleLengthIn|> &,
tuning
];

<|"fourString" -> Dataset[makeRows[tuning4]], "fiveString" -> Dataset[makeRows[tuning5]]|>
```

README.md

Project artifact.

Electric Violin

Engineering documentation and parametric design table for the electric violin - solid-body 4- and 5-string variants with piezo bridge pickup integration.

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

Readiness

L2 scaffold. This repo now includes root-mode build packet documentation for a solid-body electric violin prototype. It is not L3 because CAD, electronics verification, sourceability, ergonomic balance, and measured setup data remain open.

Packet Contents

• `design.md` - solid-body violin assumptions and 4/5-string variant notes.
• `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: 4-string violin scale at 328 mm / 12.91 in with optional 5-string variant adding C3. Use published string tension data, then verify bridge/piezo compatibility and neck/body stiffness before first full setup.

License

photo-shotlist.md

Project artifact.

Photo Shotlist

- Body and neck blank orientation.
- Full-size body/hardware layout before cutting.
- Pickup bridge and electronics dimensions on arrival.
- Neck/body dry fit and string path check.
- Wiring/shielding before cavity close.
- First signal test, action readings, and balance/posture photos.

risks.md

Project artifact.

Electric Violin Risks

• Pickup/preamp mismatch can produce weak, noisy, or brittle output.

• Neck/body joint and bridge support are not validated under final tension.

• Poor balance can make the instrument uncomfortable even if it works electrically.

• Hardware dimensions may force CAD changes after sourcing.

• Remain at L2 until CAD, electronics, setup, and balance evidence are logged.