

# 1 · Cover

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**Project:** Drone Flute Family (DRN-FAM-001)

**Date:** 2026-05-05 **Builder:** Tony Koop **Shop:** Maker Nexus

Four NAF-style drone flutes (Am, F#m, Em, Dm), walnut + maple, tunable drone block set per flute (U/5/8).

*Materials \$193 · Tooling \$245 (one-time) · Total first build \$438+*

## 2 · Quick Start

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1. Confirm walnut + maple acclimated 7 days.
2. Open `Drone-Flutes-Design.xlsx`, verify `Master_Inputs`.
3. Print `cut-list.csv`, tape to bandsaw.
4. Phase 1 → Phase 12 per `assembly-manual.md`.

### 3 · Design Intent

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- Open-open pipe + NAF K2 empirical correction
- A=440 Hz concert pitch
- 68°F reference temperature
- Octagonal body, 8 facets, walnut with hard-maple CNC inlay
- Drone offset = global var; flips all 4 flutes in one edit

## 4 · BOM Summary

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Group	Subtotal
Wood	\$193
Hardware + finish	\$78
CNC tooling + drills	\$245 (one-time)
<b>Total first build</b>	<b>\$516</b>

*Full BOM in bom.csv.*

## 5 · Sourcing

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See `sourcing.csv` for live URLs and lead times. RFQs ready in `supplier-rfq.md`.

## 6 · Cut List Highlights

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- 4 walnut body blanks (Am+F#m: 1.5×1.5×26; Em+Dm: 1.75×1.75×32)
- 1 walnut stick → 12 drone blocks (3/flute × 4)
- 1 offcut → 4 bird blocks
- 2 sheets 1/16" maple + 1 sheet 1/8" maple → all inlay

## 7 · Drawings + Tolerances

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Feature	Tolerance
Hole positions	$\pm 0.020$ " (tuning-critical)
Drone tenon	$\pm 0.003$ " (fit-critical)
Wall at bore	$\geq 0.20$ " (structural)
Splitting edge	knife-sharp (listen-test)
Inlay flush	$< 0.005$ " proud/recessed

## 8 · Validation Targets

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Member	f0	m3	P4	P5	m6	m7	oct
Am	440.0	523.3	587.3	659.3	698.5	784.0	880.0
F#m	370.0	440.0	493.9	554.4	587.3	659.3	740.0
Em	329.6	392.0	440.0	493.9	523.3	587.3	659.3
Dm	293.7	349.2	392.0	440.0	466.2	523.3	587.3

All values Hz. Tolerance  $\pm 5$  cents. Record measured + cents-error in `validation.csv`.

## 9 · Shop Notes (write here)

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Phase	Started	Done	Notes
1 — Stock prep	[ ]	[ ]	
2 — Split-body CNC	[ ]	[ ]	
3 — Glue-up	[ ]	[ ]	
4 — Lathe	[ ]	[ ]	
5 — Faceting	[ ]	[ ]	
6 — Tone holes	[ ]	[ ]	
7 — Window/edge	[ ]	[ ]	
8 — Inlay	[ ]	[ ]	
9 — Drone blocks	[ ]	[ ]	
10 — Bird blocks	[ ]	[ ]	
11 — Finish	[ ]	[ ]	
12 — Tune + QA	[ ]	[ ]	

## 10 · Risks Summary (top 3)

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- **A-1** · Hole 6 (octave) running sharp — listen during tune-step.
- **A-2** · Drone-melody chamber leak — verify pre-glue + post-glue.
- **E-1** · Em/Dm reach for 5th-percentile hands — measure before delivery.

*Full red-team list in `risks.md`.*

## Appendix · File Index

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- [Drone-Flutes-Design.xlsx](#) — Excel design source
- [design.md](#) — physics narrative
- [family-spec.csv](#) — auto-generator input
- [bom.csv](#) · [sourcing.csv](#) · [cut-list.csv](#) · [validation.csv](#)
- [assembly-manual.md](#) · [supplier-rfq.md](#) · [visual-bom-brief.md](#) · [drawing-brief.md](#)
- [risks.md](#) — failure-mode walk
- [wolfram-starter.wl](#) — Wolfram package
- [capstone-deck.pptx](#) · [capstone-deck.md](#)
- [print-packet.md](#) · [print-packet.html](#) · [print-packet.pdf](#)
- [capstone-manifest.json](#)
- [drawings/](#) — per-key SVGs
- [inlay-patterns/](#) — 16 DXF + 16 SVG
- [sw-reference/](#) — SolidWorks ref doc
- [site/](#) — recruiter web page