THE ULTIMATE HAUNTED HOUSE GUIDE

PROFESSIONAL BUILDS

The movie-FX tier, launch scope: projection mapping measured and aimed, pneumatics under a safety doctrine that outranks enthusiasm — and the Flying Crank Ghost, the genre's crown jewel

SPOOKY AT HEART

Contents

Launch scope, stated plainly: this book ships with the proven core — projection, pneumatics, the crank ghost. The chapters still in production are listed at the back as planned contents, labeled as such. Nothing in this book pretends to be more than it is.

Chapter 1 — Projection Mapping, Full Treatment: The 3-Surface System

Chapter 2 — Projection Throw Distance, Measured

Chapter 3 — Pneumatics I: The Jumpscare Stack

Chapter 4 — Pneumatics II: Pressure Doctrine, Safely

Chapter 5 — The Flying Crank Ghost: The Flagship

Chapter 6 — Safety Foundations: Outdoor Power & the 12V Doctrine

Chapter 1 — Projection Mapping, Full Treatment: The 3-Surface System

HAUNT #007: you're not animating anything — you buy the loop and aim the projector. That is the beginner's summary. This chapter is the professional's version: the three surfaces as separate crafts, the brightness truth, and the alignment discipline that separates a mapped house from a house with a movie on it.

What you need

- Rear-projection screen, 120-inch — AAJK holographic (window surface)
- Digital decorations USB kit — HoliScapes Ghostly Apparitions (AtmosFX) (content layer)
- A projector — deliberately unlinked in this book (the record's rule, §1.3 below)
- A media player or laptop (playback)

Build it

1. **1.1 Surface one — WINDOWS.** Rear-projection film or screen on the inside of the glass, projector inside the house. Ghosts in the windows: the figure is inside the room, the glass is the screen, and the yard sees an occupied house. The window is the easiest surface — it is flat, framed, and its size is fixed, which makes it the calibration surface for everything else you project.

2. **1.2 Surface two — WALLS.** Project straight onto siding or brick: crawling textures, bleeding walls, swarms. The wall is the spectacle surface and the least forgiving — every seam and texture of the siding joins the image. Choose content that uses the texture (cracks, creep, swarm) rather than fighting it (faces and text belong on the window).

3. **1.3 Surface three — GROUND.** Aim down at the driveway or yard: cracks opening, things crawling out. The ground surface performs for guests standing in it, which makes it the interactive one — and the one where the projector's mounting height and the guests' sightlines must be planned together (Chapter 2's throw math governs all three).

4. **1.4 The brightness truth (the record's rule).** Projector listings change fast and advertised lumens lie: buy on TRUE ANSI lumens, not marketing lumens. The SFX dive's figure for outdoor work is 3,000+ true ANSI lumens (F6). The episode's minimum viable setup is of record: one 3000-lumen projector plus one window — about $250 that stops traffic, reusable every year (HAUNT #007). This book does not link a projector, on purpose, for the record's reason: the listing you buy must be judged by its manual's ANSI figure and throw ratio at purchase time, not by any book's snapshot.

5. **1.5 Content.** The digital decorations kit is the content layer of record (HoliScapes / AtmosFX class) — ready-made loops built for these three surfaces. Bought content is not a shortcut in projection; it is the medium. The craft this chapter teaches is surface, aim, and alignment. (Home-animated content is real — the lane's own studio produces it — but a first mapping season should calibrate on loops made for the purpose.)

Haunter's note: Minimum viable, maximum lesson: start with the window. One projector, one surface, one loop, aligned perfectly teaches more about mapping than three surfaces aligned approximately — and it is the setup the after-season score can fund.

Troubleshooting

- Ghost looks washed out → ambient light is winning. Map after full dark, kill the porch light on that face, and check the ANSI figure you actually bought against the surface's size — an under-lumened projector on a big wall is a gray rectangle with ambitions.
- Wall content looks broken → the siding's texture is fighting detailed content. Move faces and fine detail to the window; give the wall textures, weather, and swarms.
- Image bleeds past the window frame → the projector is too close or the loop's frame doesn't match the window's aspect. Back the projector up or choose the loop framed for the surface; keystone is for tilt, not for framing (Chapter 2).

Video companion: HAUNT #007 — Projection-Mapping Your House. Throw math: Chapter 2.

Chapter 2 — Projection Throw Distance, Measured

HAUNT #017 — THE THROW RULE. The measurement that makes the window ghost the right size, written as the working procedure the Professional book owes you.

What you need

- Your projector's manual (the throw ratio lives there — it is a source document, not packaging)
- A tape measure
- The surface itself, measured first

Build it

1. **Step 1 — MEASURE the image you want.** Decide the image width first — most builders fill the window — then check the throw ratio in YOUR projector's manual. Throw ratio is the projector's own constant: distance divided by image width. The manual's number governs; no other projector's number substitutes.

2. **Step 2 — PLACE by the math.** Throw distance is lens to screen, and wider image means more feet. The record's field figure: most budget projectors land somewhere around a foot and a half back per foot of image width. Count it out — don't eyeball it. Mark the projector's position on the floor before the first test night and the setup becomes repeatable every night of the season.

3. **Step 3 — TEST in real dark.** Set up before dark and focus once, in real dark. Fix tilt with the keystone setting, not by re-shimming the projector all night — keystone corrects geometry; shims correct a setup that should have been measured. Re-focusing nightly is a symptom: it means the projector moved, which means its position wasn't marked, which means Step 2 was eyeballed.

4. **The surfaces, by throw.** Windows fix the image size for you (the frame decides), which is why Chapter 1 calibrates there. Walls let you choose size — and therefore distance — so the wall's throw is a design decision: bigger is dimmer at the same lumens (the same light spread over more surface). Ground throws are short and steep; the constraint is mounting height and keeping guests' shadows out of the image, or in it, on purpose.

Haunter's note: Write your throw numbers on the yard map (Intermediate Chapter 2's sheet, extended). A mapped house that can be re-aimed from a written sheet in twenty minutes is a professional setup; one that lives in someone's memory is a rehearsal that never ends.

Troubleshooting

- Ghost smaller than the window with the projector at the wall → the room is too shallow for that projector's ratio on that window. Swap to a shorter-throw unit or accept a smaller ghost framed inside the window with black borders — a framed ghost beats a cropped one.
- Focus drifts between nights → the projector is being moved by cleaning, pets, or vibration. Mark the feet positions, and focus becomes a check, not a ritual.

Video companion: HAUNT #017 — Projection Throw Distance, Measured.

Chapter 3 — Pneumatics I: The Jumpscare Stack

HAUNT #009: how pro haunts do jumpscares. A prop that does nothing — then, in a fraction of a second, lunges. Speed is the scare: electric motors ease in; compressed air snaps. This chapter builds the stack; Chapter 4 teaches the pressure doctrine that keeps it honest. Read both before you buy a single fitting.

What you need

- Solenoid valve, 12V pneumatic — Baomain (of record)
- PIR motion-sensor trigger — Waytronic player/controller class (of record)
- A pneumatic cylinder, sized to your prop (bore and stroke verified against the listing before buying — the record's caveat)
- A small air compressor — or a CO2 tank for portability
- Rated air line, fittings, and a regulator with gauge (Chapter 4 — metal/rated components only)

Build it

1. Leg 1 — MECHANISM. A pneumatic cylinder mounted vertically behind or below the prop body. The cylinder is the muscle: on the valve's signal it extends and the prop lunges along the cylinder's line. Mount for the lunge you want — the prop travels the stroke, so the stroke is the scare's distance. Keep the arc's end padded and its path empty (Chapter 4's test-zone doctrine).

2. Leg 2 — AIR. A solenoid valve on a small compressor (or a CO2 tank for portability) does the firing. The signal flow is: trigger → valve opens → air dumps to the cylinder → prop fires → exhaust sets the return. Exhaust flow controls set the return speed so the prop resets without slamming (SFX dive, F3) — a prop that slams home teaches the audience it's a machine; a prop that settles back teaches them nothing, which is the point.

3. Leg 3 — TRIGGER. A PIR motion sensor launches the prop when someone gets close. The build is straightforward; the SCARE is in the timing (the record's line). Timing doctrine is Intermediate Chapter 3 — the 2-Second Delay Rule — applied to air: sensor placed by walking time, peak of the lunge on the guest's arrival step. Hide the mechanism completely: the prop should look static until it isn't.

4. The audience truth (SFX dive, F3). Most viewers will never build one of these — and they follow the series to watch it fire. Build yours to the doctrine anyway. A jumpscare that hurts someone ends a haunt, a street's trust, and possibly more; a jumpscare built to Chapter 4 becomes the story guests tell at work on Monday.

Haunter's note: SAFETY — non-negotiable, from the episode record, repeated here and expanded in Chapter 4: limit the stroke, pad the prop, never aim at face height, and test without guests first.

Troubleshooting

- Prop fires late → the trigger leg, not the air leg. Apply Intermediate Chapter 3: move the sensor earlier and across the path; air is fast, walking is slow, and the math is walking math.

- Return slams → exhaust flow too open. Close the exhaust control in small steps until the prop settles; slamming also fatigues mounts and shortens the cylinder's life.
- Prop creeps or half-fires → pressure too low for the load or a leaking fitting. Chapter 4's doctrine: find the lowest pressure that reliably moves the prop — after the leak is fixed, with soap solution on the joints, not by ear.

Video companion: HAUNT #009 — The Pneumatic Jumpscare. Pressure doctrine: Chapter 4.

Chapter 4 — Pneumatics II: Pressure Doctrine, Safely

HAUNT #020 plus the SFX dive's safety block — the chapter this book exists to get right. HAUNT #009 built the stack and glossed the question this chapter answers: how much air to actually give it.

What you need

- The air path, in order: tank → regulator → valve → cylinder
- A regulator with a gauge (the boss of the rig)
- A pressure-relief valve (rated, on the storage side)
- Metal / rated components throughout the air path

Build it

1. 4.1 THE PATH. Tank, regulator, valve, cylinder. The regulator dial is the boss of the whole rig (the record's doctrine). Everything downstream of the regulator lives at the pressure the regulator allows; everything upstream lives at storage pressure and is treated with storage respect.

2. 4.2 START LOW. Set the lowest pressure that reliably moves the prop, then creep up in small turns, testing every change. More pressure is not more scare — it is more wear, more noise, and a harder hit (of record). The dive's working band for the family: a reservoir at 60–120 psi — and your prop's number is the lowest reliable point you find by testing, not the top of any band.

3. 4.3 THE TEST ZONE. Every test happens with the swing path empty, inside a marked zone, before guests ever see the prop move. The zone is marked physically — a rope, a fence line (Intermediate Chapter 4's contract), a second person whose only job is the zone. No test is casual: a test is a firing with paperwork habits.

4. 4.4 NEVER PVC. The dive's rule, in the dive's emphasis: NEVER PVC for air storage or air lines — brittle shrapnel failure; ASME B31 / OSHA prohibit above-ground PVC in compressed-gas service. Metal and rated components only. This rule has no exceptions, no 'just for the short run,' no 'it's only 40 psi.' PVC is fine as structure (a prop's frame) and never as an air path. The two uses are different materials decisions and this book never blurs them.

5. 4.5 The rest of the standing block (SFX dive §5, pneumatics). Regulator + pressure-relief valve, always. Working pressure stated and capped. Dump stored air when unattended — a charged rig with nobody home is a stored decision nobody is supervising. Cylinders pinned, never clamped by the rod. No face-height trajectories. Stroke limiters + padded impact surfaces — #009's rule, carried forward.

6. 4.6 Power for the rig. The valve and trigger run on 12V DC from a protected supply (dive architecture): mains stays at the supply, in the weatherproof box, on the GFCI run (Intermediate Chapter 13). The air is the hazard this chapter manages; the power doctrine keeps electricity from becoming a second one.

Haunter's note: The lane's trust position IS this chapter (the dive names it for Monster in a Box; it is true for every air build): a guide for beginners and experts that gets a pressure number wrong destroys the brand the funnel monetizes. When this chapter and your enthusiasm disagree, this chapter wins.

Troubleshooting

- Prop won't move at low pressure → do not reach for the dial first. Check for leaks, a binding mount, and an undersized cylinder (bore/stroke against the prop's weight) — pressure is the last variable, not the first.
- Valve chatters or fires weakly → supply voltage sag at the solenoid. Shorten the 12V run or size the supply with headroom; a starving valve mimics an air problem.
- You are tempted to store the rig charged 'just for the weekend' → dump it. The doctrine in 4.5 is one line long because it is meant to survive tired evenings in late October.

Video companion: HAUNT #020 — Jumpscare Pressure Basics, Safely. Stack: Chapter 3.

Chapter 5 — The Flying Crank Ghost: The Flagship

The genre's crown jewel (SFX dive, F4): a blacklit ghost that floats in a yard or window, rising, falling, and gesturing with both arms — independently, organically, endlessly. It stops traffic. Doug Ferguson (Phantasmechanics) pioneered it and made the plans public domain in 1997; Make: calls it 'a haunting classic' that 'literally stops cars in front of homes.' This chapter joins that tradition with the Guide's own full treatment.

What you need

- One slow motor (the crank drive — low-speed class)
- The crank + pulley system (three lines: head + two hands)
- Black monofilament line (the rigging — invisible by design)
- A cheesecloth-and-wireframe figure
- A UV/blacklight source (the Yacolit class — Beginner Chapter 6's bars serve here)

Build it

1. **5.1 The mechanism — one motor, three lines.** One slow motor turns a crank. Three lines — head and two hands — run from the crank/pulley system to the figure. Because the three lines attach at different crank radii and phases, head and arms move on different cycles from a single motor: the head bobs on the long cycle, one hand gestures against it, the other answers late. The complexity is in the geometry, not the parts count (dive, F4). The harvest correction rides here too: the line motions share a period — one crank, one revolution — with geometry-dependent phase. Nothing in this rig moves on its own clock; the illusion of independence is phase, arranged.

2. **5.2 The figure.** Cheesecloth over a wireframe: light enough for the lines to carry all night, translucent enough to take blacklight like a body takes moonlight. UV makes the dyed cheesecloth glow while the black monofilament rigging vanishes — the rigging is invisible, so the brain can't file the ghost as a machine. Build the frame at the scale of your throw: the ghost reads at the distance the yard gives it, and a too-small ghost at a long distance is a rumor, not a haunting.

3. **5.3 The rig.** The crank wants height and an anchor the wind respects — the overhead line runs are long, and long lines are sails in a gust. Anchor the drive point like the Intermediate book anchors its counterweights: pinned, caged, or placed where a failure lands in soil behind the fence line. Set the crank's speed slow: the ghost's whole authority is patience. A hurried ghost is a puppet; a patient one is a presence.

4. **5.4 The blacklight.** Phantasmechanics' own rule, quoted in the dive: blacklight never aimed at audience eyes. The UV source lights the figure from the side or below and its beam never crosses a sightline at face height. Test from every audience position: the figure should glow; the audience should never see the source.

5. **5.5 Why this is the flagship.** It is the most beautiful motion in the genre and the most mysterious, because there is nothing to see. Every other build in this Guide shows you its

mechanism somewhere — a pump, a valve, a projector. The crank ghost shows you a ghost. When your yard can do this, the yard is done arguing about whether it is a real haunt.

Haunter's note: Cost context from the dive: parts band $60–150, Tier 2 tools — labeled ESTIMATE in the dive's record (motor + pulleys/line + cheesecloth + blacklight, the blacklight pillar-verified at $15–25). Indicative, not a quote.

Troubleshooting

- Arms move in lockstep with the head → the three lines share a radius or a phase. Spread the attach points across the crank's radii; phase difference is the whole choreography.
- Ghost looks like laundry in daylight → it does. This build is judged only after dark, under its UV, from the street. Daylight opinions of night builds are how good haunts get talked out of existing.
- Lines tangle across a windy night → the run is too long for the exposure. Shorten the throw, add a guide pulley to discipline the longest line, or move the ghost to the yard's sheltered face.

Dive source: SFX dive F4 (mechanism + lineage) · Queue: Flagship #1 of the SPOOKY SFX pipeline.

Chapter 6 — Safety Foundations: Outdoor Power & the 12V Doctrine

The safety chapter, Professional edition. The doctrine is HAUNT #019 — unchanged — plus the architecture this level runs on: 12V DC at the prop, mains at the supply, and the discipline that keeps a professional yard's power boring. (The dive's rule: a plan that undersells a hazard is a refund-and-reputation event; in pneumatics and mains work it is worse than that. Chapter 4 covers air; this chapter covers everything that plugs in.)

What you need

- Outdoor-rated extension cords
- A GFCI-protected outlet
- A covered weatherproof box
- Flat cable covers
- Timers
- 12V DC supplies, sized with headroom (the prop-side architecture)

Build it

1. The three rules (of record). DRY — connections off the ground, in a covered weatherproof box, drip loop before the box. RATED — outdoor-rated cords only, on a GFCI-protected outlet; add up the watts (15A circuit = 1,800W nameplate; plan at 80% = 1,440W for hours-long loads; the device's label wins over any number in this book). ROUTED — cables along edges and fence lines; crossings under flat cable covers, never loose across the path.

2. The 12V doctrine (SFX dive §5). The genre-standard architecture is 12V DC at the prop from an indoor or protected supply — and this book defaults to it everywhere a build allows. Valves, triggers, motors: 12V at the device, so the yard's working runs carry low voltage and the only mains in the yard is the short, boxed, GFCI-protected list of supplies and Chapter 1-class gear. Anything mains: GFCI circuit, outdoor-rated enclosures and connectors, drip loops, no connections lying in water or fog paths.

3. Weather and weatherproofing. IP-rated components outdoors; vented-but-covered controller boxes; fog and rain rules stated per build — what must come in when it rains is part of each chapter's doctrine, not a judgment call at midnight. Wind and anchoring govern the tall builds: the dive's giant-build warning applies to the crank ghost's rig (Chapter 5) — a figure or a line run is a sail, and the plan states the anchor, not a hope.

4. The test rule. Every build in this book ships with the genre's standing rule: test without guests. First firings, first projections, first ghost flights happen on an empty yard, in the test zone, with the person who built it holding the stop. A professional is not someone who never has a failure — it is someone whose failures have no audience.

Haunter's note: This chapter and Chapter 4 are the book's safety review surface. They were written as a pair, and they are the two chapters to re-read every season before the yard goes live — doctrine decays, and re-reading is the maintenance.

Troubleshooting

- A supply runs hot → undersized or sun-baked. Size with headroom; shade the box; heat is a review, not a smell to ignore.
- GFCI trips when fog runs → a connection sits in the fog path. Move the joint out of the wet line and box it; never bypass the GFCI (Beginner Chapter 11's rule, repeated at every level because every level is tempted).

Video companion: HAUNT #019 — Outdoor Power & Cable Safety. Air doctrine: Chapter 4.

Planned Contents — In Production

In production for this book (planned contents — these chapters do not ship today): Cauldron Creep, the stirring witch (crank/linkage) · the Trigger & Control Layer ('Make Any Prop Smart') · Servo Characters & the Talking Skull · Pepper's Ghost at Room Scale · SPOOKY YARD SYNC, the synchronized full-yard show · Monster in a Box (the cam-lid build) · Axworthy Flying Ghost · the 12-Foot Class: giant-build engineering. Chapters join this book as they clear the Guide's verification standard — mechanism re-check, safety review, second reader — and owners of record are completed first, through the delivery page of record. The Collection carries the same promise for all three books.

How completion works: chapters are added to the same books as they clear the verification standard — never as a seasonal edition, never as a new purchase for owners of record. Announcements ride the Spooky At Heart page and the list first.

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