Pinball life shaker motor

The shaker engine is one of my favorite feedback games. He does what the name suggests: shakes the cabinet when it's activated. When done properly, it's not a buzzy kind of shake like a cell phone vibrate; It's a deep, earthquake-like thunder. In fact, the shaker was used to evoke exactly this effect the first time it was featured on a real pinball machine, The Earthshaker (Williams, 1989). The shaker effect is so intensely palpable that it adds a high dose of drama and excitement to the game when it fires. And virtual pin taxi drivers aren't the only ones who think so. Shakers have become common to real machines as well. Almost all of the newer Stern machines (from the early 2000s onwards) have at least one option for a shaker, as has the recent remake release of 90s Williams Games (Medieval Madness Remake, Attack from Mars Remake). Like backbox fans, if you install the shaker, its use will not be at all just for games that were originally also shakers. The DOF database replicates the authentic shaker usage of the tables that were originally shaken, but also adds the effect to many games that don't. As of this writing, the DOF Config Tool database contains shaker effects for 237 (!) games. If you install the shaker, you can expect getting a lot of benefits from it. The shaker is just an engine with unbalanced weight attached to its axis. It acts as a washing machine for a spin cycle with an unbalanced load. If you want to design your own shaker engine from scratch, the basic parameters of a good shaker are: two 1-pound weights, placed about 1cm off-axis relative to the engine shaft, spinning about 3,000-4,000 RPM. These are not exact numbers that you need to slavishly replicate to make it work; they're just giving you a rough idea of what they found that works well for other taxi builders. Anything that should work in the same generic range. Most shakers are made with two-axle motors (an engine with an axle sticking out of both ends of the body). The two-axis design is beautiful because it allows you to split the weight and places half the total weight on both ends of the shaft. This helps to distribute the forces on the shaft more evenly to even out the motor bearings. A single-axle engine will also work. If you don't go for a single-axle engine, you obviously need to use a 2-pound weight instead of two 1-pound weights. Thanks to its popularity in recent years with shakers of real machines, it is easy to find complete shaker fittings for sale from pinball parts suppliers. Pinball Life and Marco Specialties both sell a variety of shakers designed for the past few generations of Stern machines. They sell for $100 to $200, depending on the target machine type. All Stern shaker fittings use the same mechanical components, so you can use any one in a virtual cab. The differences between the available stocks are both electronics - which you won't need because completely different type of system in a virtual booth. If you want to go with a pre-prepared kit, I advise you to buy the available Stern kits at the lowest price point (currently about $100). You can ignore the details of which Stern motherboard was designed, and when you get the kit, you can simply drop the interface electronics board. All you need is to connect the two wires to the engine. See Cabling below. There are several good designs for DIY shaker engines on the internet that can be built for $50 to $100 in parts. Given that you know (like writing) buy a full assembly of $100 from Flipper Life, I'm not sure the cost savings are enough to justify it, but you might prefer it if you enjoy this kind of project. Motors: The hardest element is the source of an improvised shaker on the engine itself. Hundreds (maybe thousands) of DC engines are available, but this creates a needle and haystack problem, making it difficult to find one of the right size and torque range. Ideally, you want a 12 VDC high torque two-axle engine with a 6mm or 1/4-inch axle. (The shaft size is not critical and by itself, but it's a good proxy for the engine power we're looking for.) Some specific models that are known to work well: The replacement engine option from Pinball Life is far the most the easiest choice, since you can just order one without hunting all over eBay. The problem with other engines is that you can not buy any of them from retail; they did in great runs for OEM customers, and the only way to buy them is from surplus stores and eBay vendors with used parts and residual inventory. If you find one of the models above on eBay or a similar alternative, it's probably a little cheaper than the replacement part of Flipper Life. If you don't or can't find one that's cheaper, go to the Flipper Life part as it's reasonably priced and exactly the right thing to do. If you know of other specific models that are similar to the above and are currently available, please let me know that I can add it to this list! Weights: The aforementioned plans are mostly about how to make improvised weights and fix them to the axes. There are no off-the-shelf components (that I know) that have good weights by themselves, so some manufacturing is required. Mounting: The other great DIY element that the above designs will help in mounting the assembly in the cabinet. Darkfall's scheme uses U-screws. Pinside designs use metal plates. Cover: The assembly must be closed with a strong lid containing the weights in case one of them ever loosens. If the weight is detached while the engine is running, a high and care for it through the cupboard. It is very important that this does not happen if the engine is surrounded by a good casing. Fittings outside the shelf use plastic boxes. It's pretty easy to fashion a proper box out of plywood if you don't have something else at hand Use. The real machines shakers, the standard place to install the device near the front of the cabinet, usually near a corner. The motor shaft is positioned parallel to the long shaft of the cabinet. This orientation makes the tremor a side-to-side movement that can pass more movement to the wardrobe body as it narrows in this direction. Placing the motor at the front of the cabinet makes most of the movement in advance, where the player can feel it directly. Some people have trouble with the nudge device picking up accelerations from the shaker. The nudge device is an accelerometer especially set to pick up wardrobe motion, so it's obviously going to detect motion from the shaker the same way it detects motion by the player. If you have a problem with the nudge device going crazy when the shaker is on, the first thing you need to do is ask yourself this question: What would a real pinball machine do? In other words, does the same exact shaker engine affect the ball of a real pinball machine, as it affects the virtual game? If the answer is yes, then there is no problem: the nudge tool does exactly what it should, copying what would happen in a real game. The problem is when the answer is no, when the effect of virtual nudge is wildly exaggerated as reality. In case you've never played a real pinball machine with a shaker, here's the reference point: a shaker is a real machine that doesn't affect the ball during noticeably. And the real shakers are strong; strong enough for people standing nearby to feel the effect. So if the virtual cab shaker makes the virtual ball fly wildly, something's wrong. There are two ways to fix this: Turn off the shaker intensity Turn off the sensitivity of the push device. Adjust the speed of the engine by adjusting the voltage or by adjusting the DOF PWM parameters; see Speed adjustment below. But don't let the tail wag the dog, as it was: don't keep turning down the shaker effect just because it's causing unwanted nudging. Adjust until you feel better and let it in. If the shaker continues to cause excessive shock interference after adjusting the force at will, the correct solution is to reduce the sensitivity of the nudge device. You may be hampered by this suggestion, but go back to that question of real machines: does the ball fly wildly on a real machine when the shaker is on? No, it's not. The point is that most virtual cab builders initially set their nudge devices too sensitive because they want to see an immediate big impact from the smallest touch of the cabinet. If the slightest touch affects the ball, then obviously the shaker will influence the ball. I always ask the new taxi builders to go find a real machine and play with it for a while to see how a real ball nudges. If you mostly play virtual pinball, you'll probably be surprised at how dead a real ball feels when you nudge it. A trapped ball from a real machine doesn't fly up a few inches from pinball if you give the machine a little push, as many people want to make visual flipball. If you want the shaker to live peacefully side by side with the nudge device, you need to adjust the sensitivity of the nudge device to resemble a real ball showing a more subdued response. Note: We recommend that you do not use the sensitivity of a nudge to set dead zones. Dead zones are terrible. They make erratic behavior even more unpredictable because they create a non-linear rock where there is no answer at all on one level and suddenly a huge response just over a hair. It is much better to use linear settings, such as Visual Pinball Gain settings. For more information about nudge settings, see Nudge and Tilt. The amount of shaking you get out of the engine will be the function of the weights, the distance between their off-axis, and the speed of the engine. It also depends on factors that are not related to the engine itself, such as where it is mounted in the closet, the total weight of the cabinet, the stiffness of the legs, and the construction of the floor of the machine sitting. The same shaker motor will have slightly different effects on different cabinets. For all of these factors, there is one that is easy to control: the speed of the engine. Once everything is set, you can fine tune the effect by adjusting the engine speed up or down to get the desired effect. There are two ways to control the engine speed: to adjust the power supply voltage and to adjust the performance of the software through the PWM control. Voltage adjustment: DC motors usually operate at a number of voltages. The nominally 12V engine should run at 10V or 9V, only a little slower than the 12V. To control the voltage, you can use a variable voltage regulator as the motor's power supply instead of connecting it directly to the 12V power supply. Find a DC-DC step-binding converter on eBay and look for a type that has a adjusting screw to adjust the output voltage. This allows you to lower the voltage to slow down the engine. Setting with PWM: The DOF Config tool allows you to adjust the power range of the shaker motor. Go to the Port Assignments page and look for the Shaker Motor section on the right side of the page. This allows you to adjust the maximum intensity on a scale of 1 to 48. Keep in mind that this only works if you're using a PWM-enabled output controller, such as LedWiz or Pinscape Power Board. If you use a relay-based controller (e.g. Sainsmart), pwm control will not work; you will need to use the voltage adjustment approach instead. Follow the general cabling plan for any output device (Feedback Wiring). Connect one of the shake motor terminals to the positive (+) power supply (usually 12V). Connect the other terminal to an available port in the output port The control and other electronics of the output must be protected against interference from the motor's magnetic field. See Roll diodes. If you are using a pre-made shaker assembly, you may no longer have a diode installed; If you don't see one, let's say you don't have one and add your own. If you're using a pre-made set and have some kind of interface board for a real pinball machine (e.g. Stern SAM connector), you don't need to connect to the virtual cab. These boards are designed to be connected to the electronics in the target fleet, making them irrelevant in the virtual cab. All we need is the engine itself. If you're using Pinscape expansion boards, you can connect the shaker directly to any MOSFET power board port. If you are using LedWiz, do not connect the engine directly, as it will consume too much power to a LedWiz port; You need a thunder or an amplifier circuit. See Performance limits and boosters in ledwiz setup. H-bridges: If you read the old posts on the forums, you might see people say that H-bridges are needed to control shaker engines. This idea is so embedded in the group's consciousness that some people still repeat it. But you have to ignore these posts; They are based on a misconception that came from Arduino robotics hobbyists. H-bridges are important for engines, but only if you need to change the polarity of the engine to run back and forth. Robotics people use H-bridges because they want their rovers to be able to back up. You don't need something like that with a shaker. If you're using Pinscape expansion boards, you can run the engine directly from any Power Board port. If you're using LedWiz, all you need is an ordinary booster circuit, just like any other type of device, not an H-bridge. LedWiz hack: You might have old posts about some really nasty LedWiz hacks involving soldering wires IC pins on the LedWiz board. Don't miss these. They reflect outdated advice based on the H-bridge misconception. If you're using LedWiz, you'll need some kind of accelerator circuit, but you don't have to hack LedWiz to add it. All you need is an external booster circuit, as described in the LedWiz installer (see Power Limits and Boosters). The engines produce a lot of electrical noise that can affect logic circuits (such as the feedback controller and PC motherboard). Diodes are essential, as already mentioned. In some cases, you may need to add additional noise canceling in addition to the diode. If the engine causes noticeable problems, such as usb disconnection or random keyboard input, try a couple of induts, one in a series by wiring to the engine, one by powering the engine, and one by connecting to the feedback controller. Try a 4.7 induktotor having the same current pertor rating as the engine operating current or higher. Here's an example part of Mouser that should work well: Coilcraft DR0608-472L 4.7µH, 5.8A 5.8A inductor - the Mouser < / > Inductors are not polarized, which means that you do not need a special orientation when installing them. It does not matter which wire is connected to the + side and which is connected to the - side. (The diode, on the other hand, must be mounted in such a way that the striped side is energized a + as shown in the figure.) This is not necessary in most virtual booths. I didn't need this if I had engines on my computer. But it's something to try if you have persistent interference problems with your shaker and nothing else helps. The same applies to all other feedback devices that contain motors, such as gear motors, fans and beacons. In the DOF configuration tool, go to the Port Assignments page. Find the port number where the shaker motor is connected. Assign it to the Shaker. On the right side of the page there is also a section labeled Shaker Motor, which allows you to adjust the intensity range. If you're using a PWM-compatible controller (such as a LedWiz or Pinscape power board), this allows you to set the power range that DOF uses when the shaker is running. Intensity values are on a scale of 1-48, where 48 is the highest power. The default settings use the entire available range. If you find that the effect of shaking is too strong when dof activates it during gameplay, you can reduce the maximum intensity to slow down the engine. Similarly, if the engine seems too weak for part of the time or does not have enough power to start spinning in some cases, you can raise the minimum setting. Note that the intensity setting will only work if you are using a PWM-compatible output controller. If the engine is connected via any relay, such as a Sainsmart board, the DOF PWM setting will not work and you will need to adjust the speed in other ways, such as with variable voltage supply (see Speed setting above). above).

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