

# INSTALLATION PROCEDURE FOR THE THEATER OF MAGIC TIGER SAW.

## 1.4 HOME ROM VERSION

CUSTOMER WILL NEED FOLLOWING ITEMS TO CONVERT THEATER OF MAGIC TO A 1.4 VERSION:

- 1) 1.4 HOME VERSION GAME ROM-SUPPLIER: RAY AT ACTIONPINBALL.COM
  - 2) U22 PIC CHIP -SUPPLIER: COREY STUP AT SHIFTEDBITS.COM
  - 3) MOTOR EMI BOARD-SUPPLIER: MARCOSPEC.COM
- THERE ARE OTHER SOURCES BUT THESE SOURCES WERE CONTACTED FIRST.

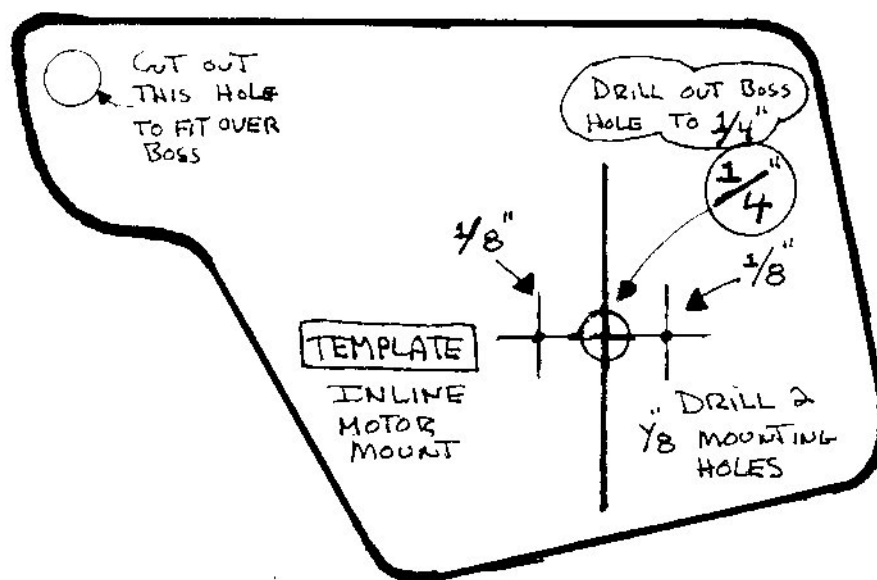
CUSTOMER WILL SUPPLY FOLLOWING 3 SPECIAL THEATER OF MAGIC GAME PARTS SHOWN IN THIS CONVERSION- (PLASTIC SAW, METAL BRACKET, And TIGER PLASTIC). INSTALLATION IS DIVIDED INTO 2 PARTS:

**PART #1 (PAGES 1-2) COVER REWORKING THE SAW BRACKET, INSTALLING THE MOTOR AND DRIVE MECHANISMS AND RE-FITTING THE SAW BRACKET BACK INTO THE GAME.**

**PART #2 (PAGES 3-5) COVER INSTALLING EMI PCB AND MAKING CONNECTIONS TO MOTOR AND POWER DRIVER BOARD.**

**START WITH: REMOVE THE SAW BRACKET AND DISASSEMBLING THE PARTS. TAKE THE SAW ASSEMBLY OUT OF THE GAME AND PERFORM THE FOLLOWING STEPS:**

- 1) REMOVE THE 2 SCREWS HOLDING THE TIGER SAW PLASTIC TO THE FRAME.
- 2) REMOVE THE SCREW THAT FASTENS THE PLASTIC SAW BLADE TO THE FRAME.
- 3) USING CARE, DRILL OUT THE CENTER HOLE OF THE SAW BLADE TO 1/4".
- 4) COPY THE TEMPLATE BELOW AND CUT IT OUT ALONG THE OUTSIDE



- 5) After making a copy, DRILL OUT THE CENTER BOSS OF THE BRACKET TO 1/4" DIAMETER. Try fitting the motor hub into the 1/4" hole. Ream out the 1/4" hole to provide a good fit over the motor hub. Lay template on bracket with outlines matching. Center-punch the crosshairs on either side of the 1/4" hole. Drill these out to 1/8". Clean up all burrs and trial fit the motor onto the bracket. Motor has to lay flat with hub centered in hole and both screw holes lined up. Use the (2) 4/40 machine screws to secure the motor to the bracket.

**THERE ARE 2 SAW BLADES THAT CAN BE USED WITH THIS KIT: THE ORIGINAL PLASTIC SAW BLADE AND THE (OPTIONAL) METAL SAW BLADE.**

**INSTALLING THE PLASTIC OR METAL SAW BLADE**

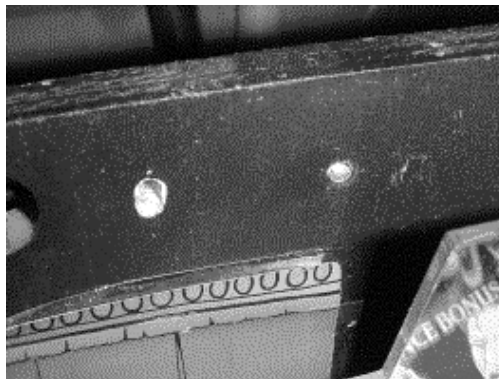


With motor bolted to bracket- slide the Allen bolt adapter onto the motor shaft (without blade). Push it on till it contacts the hub. Then back it out enough for the adapter to free-spin. With Allen wrench (provided), turn both set screws until they **JUST** make contact with the motor shaft. Do a final (firm) tightening on both set screws. DO NOT OVER TIGHTEN SET SCREWS. Hardware is the same for both Plastic and (optional) Metal saw blades- with one difference. The Metal blade has a larger center hole that requires a special washer for fitting blade onto 1/4" hub. This washer is supplied with each Metal blade. With saw blade installed up against the Allen head – install another washer and 1/4-20 nut and tightened. Hand-spin the assembly and check for alignment. The smoother it rotates by hand-the less chance for vibration under power. If there is a pronounced wobble then remove blade and realign the Allen bolt adapter by adjusting the tension of both socket head screws. When adjusted correctly the Allen Bolt adapter should spin straight and smooth.

**CAUTION: INSTALLING THE METAL SAW BLADE**

Observe the warnings printed on the METAL saw blade and use caution handling the very sharp edges of the blade. When the final tightening is done, the blade must be centered on the shaft for a balanced match up.

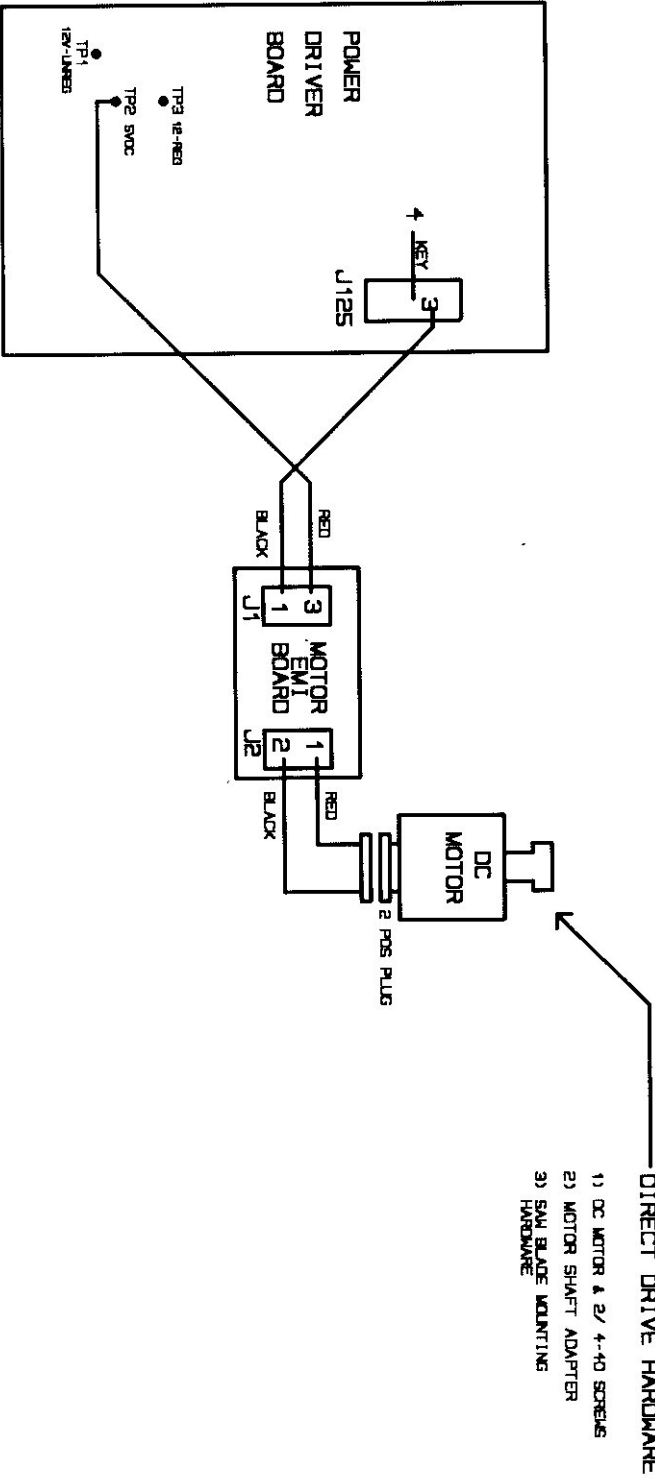
Before installing the reworked saw assembly, there are two clearance points to address. First, the left mounting hole for the bracket (in the backboard) must be rotated (upwards) as shown in the photo below.



This is to allow the bracket to be lifted and rotated slightly allowing the motor to clear the plastic ramp behind the saw assembly. One last point refers to the Tiger Plastic. There is a 1" long nylon spacer and a 1- 1/2" long # 8 Pan Head screw in the hardware package. The use of these two items will enable the Tiger Plastic to clear the saw blade. Depending on what type of saw blade is being used, the 1" spacer can be cut down to allow for correct clearance between rotating saw hub and back of Tiger Saw Plastic.

## PART 2: THE ELECTRONICS

### TOM ANIMATED SAW 1.4 DIRECT DRIVE VERSION 1A REQUIRES 1.4H GAME ROM - U22 PIC CHIP & EMI.PCB

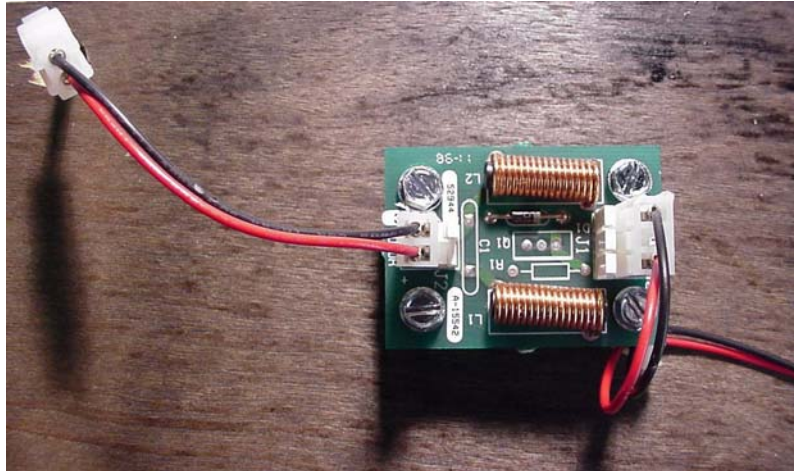


The Electronic circuit to run the animated Saw feature is very basic. The 1.4 Home Game Rom drives the Animated Saw. However, with the Stock Factory 1.0 Game Rom it is necessary to provide a Driver/timer circuit (that works independently of the Games normal play) to provide the Animated saw feature.

This Diagram shows what is needed to get a Saw to spin in a game with the 1.4 Rom. It is assumed that the following items have been purchased and installed:

- 1) 1.4 (Home Version) Theater of Magic Game Rom.
- 2) U22 PIC chip
- 3) EMI Motor PCB

The best location for the EMI PCB is behind the Playfield Back Panel in the corner nearest the Saw Assembly:



The harness on the left connects to the 2 Pin connector going to the Motor. The wire harness on the right goes to the Power Driver Board. The purpose of the Motor EMI Board is to isolate any 'noise' made by the motor. The EMI shown here is from a Twilight Zone and is part # A-15542. The board has 2 Inductors and one Diode. The Power (Red Wire) enters Pin 3 of J1 (connector on right) passes thru the Inductor and then to the Motor. Power returns from Motor (Black Wire) across the Diode, through the Inductor- and is eventually Grounded by Transistor Q38 thru the program (Solenoid test #19). The 1.4 Home Game Rom controls the action of the Animated saw including periods of continuous spinning. To keep the speed of the blade at a practical level (600-800 RPM), power to the Motor is regulated to 5 VDC. Lower RPM helps reduce 'kinetic spin' after power is removed. J125 (Black wire -Pin 3) was chosen for the connection to the Q38 Transistor because it shares the same pin designations as J126 but is not used on the ToM Power Driver Board. Route the harness down from the backboard along the bottom of the cabinet and up into the back-box. Locate connector J125 (just above J126-bottom row of headers-left of center).The 6 Pin connector from the harness goes onto the right side of the 9 Pin J125. The #3 key will assure correct placement. The remaining (Red) Wire slides onto TP 2 (5VDC). To check the circuit put the Game in solenoid test and go to Solenoid # 19.

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