TANGLES' PIN PARTS

TPP-1023

Smart Eddy

Replacement for A-18543-1, A-18543-2, A-18543.1-2 and A-16922

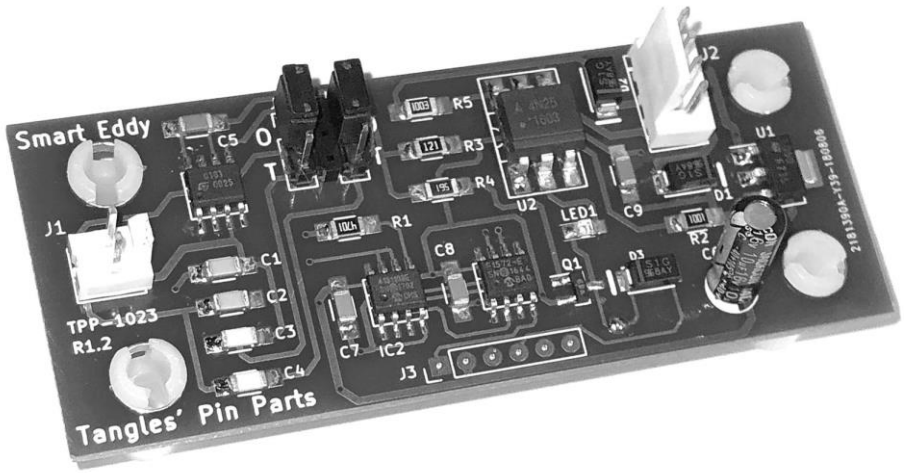
Description

Smart Eddy (TPP-1023) is a re-designed "Eddy" proximity detector compatible with the games "Theatre of Magic", "Star Trek – The Next Generation", "Scared Stiff" and "Road Show". The ***Smart Eddy*** board has an auto calibration feature that automatically adjusts the detector circuit each time the machine is turned on. This amazing auto calibration feature will free operators and owners from the tyranny of sensor adjustments that plague these games. Aging boards, playfield vibration and shaker motors all conspire to making the original boards a troublesome item.

The TPP-1023 board is a drop in replacement and amazing upgrade to the original boards. Matching the electrical and screw mounting* characteristics of the original parts, this re-designed unit can be installed easily with little fuss.

- Board automatically calibrates detector sensitivity.
- Fits original board mounting holes for A-18543-1, A-18543-2 and A-18543.1-2
- Comes supplied with nylon stand-off mounts.
- Single board compatible with all variants of the compatible game list.
- Designed and manufactured in Australia by Tangles.

As with all Tangles' parts, these boards have the highest quality parts available. Components have been sourced through Tier 1 suppliers to maintain the highest integrity possible.



Installation

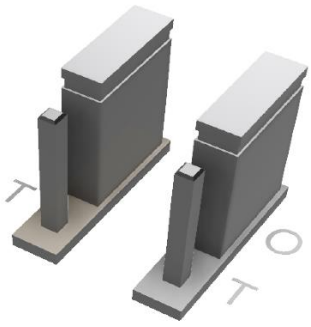
Warning: High voltages are present inside the pinball machine. Turn off the power and unplug the mains before you commence work.

1. Ensure power is off.
2. Lift playfield and remove old eddy board. Retain the 4 screws.
3. Set **Smart Eddy** jumper settings (See table below)
4. Install **Smart Eddy** board in original holes.
5. Reattach J1 (sensor coil) and J2 (control and power)
6. Lower playfield and reinstall glass.
7. Power on the pinball machine and **Smart Eddy** will automatically calibrate your sensor coil.

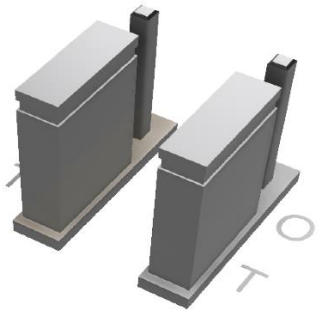
Jumper Settings

Please ensure you set the two jumper settings to suite your game or the board's position. ***Smart Eddy*** board has two user settable jumpers at position JP2 and JP3. These jumpers are labelled O and T. When setting the jumpers ensure both jumpers are in the same position; i.e. both set to O or both set to T.

"O" setting

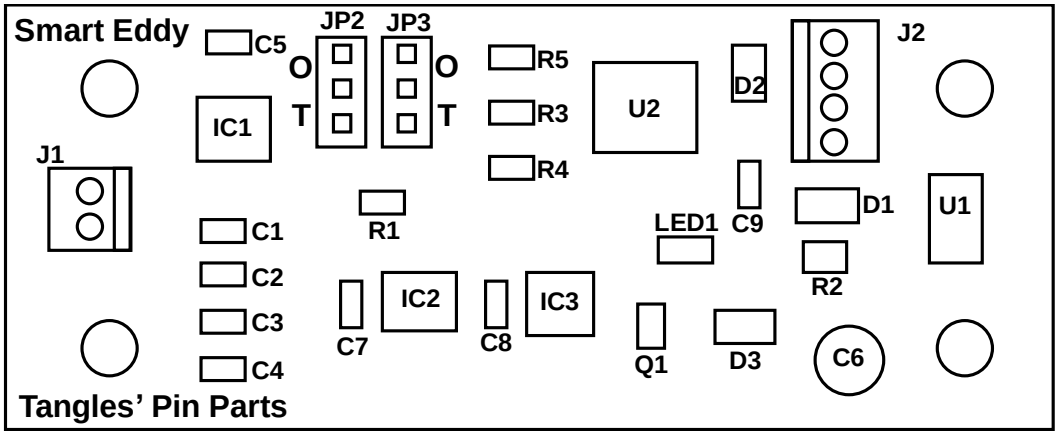


"T" setting



Machine / Position	Jumper Setting
Theatre of Magic (Trunk)	T
Theatre of Magic (Out-lanes)	O
Scared Stiff (crate)	T
Star Trek – The next Generation (all boards)	O
Road Show (all boards)	T

Board Layout – Rev 1.2



Parts List

Designator	Description
U1	LD1117S50TR
U2	4N25SR2M
D1, D2, D3	S1G
Q1	BC817
IC1	TDA0161FPT
IC2	MCP4131
IC3	PIC12F1572-I/SN
LED1	Red LED
C1	3.3nF 100v
C2	3.3nF 100v
C3	470pF 100v
C4	150pF 100v
C5	0.1uF 50v
C6	10uF 16v
C7,C8,C9	0.1uF 50v
R1	4.7K Ohm
R2	1K Ohm
R3	120 Ohm
R4	560 Ohm
R5	100K Ohm
J1	2 way Molex 22-23-2021
J2	4 way Molex 22-27-2041

Compatibility

Theatre of Magic (replaces A-18543-1 and A-18543-2)

Smart Eddy is compatible with all boards in *Theatre of Magic*. There are three eddy sensors in this game. The out lane boards need to be set in the "O" jumper configuration. The sensor in front of the trunk needs to be set in the "T" setting.

Smart Eddy mounts in the original board screw holes.

You may optionally connect J4 of the Trunk Sensor to the DC Motor Control Board using a 3 pin cable. See section at the end of this manual.

Scared Stiff (replaces A-18543.1-2)

Smart Eddy is compatible with the eddy sensor in front of the crate on *Scared Stiff*. Configure the board to the "T" setting on jumpers J2 and J3.

Smart Eddy mounts in the original board screw holes.

Road Show (replaces A-18543-2)

Smart Eddy is compatible with all three playfield sensors in Road Show. All boards need to be set to the "T" setting on jumpers J2 and J3.

Smart Eddy mounts in the original board screw holes.

Star Trek – The Next Generation (replaces A-16922)

Smart Eddy is compatible with the two boards used under the left and right in-lanes. Configure *Smart Eddy* to the "O" position on jumpers J2 and J3.

The *Smart Eddy* board is physically longer than the original A-16922 board. The new board can be mounted with only 2 screws or mounted with 4 screws if you self tap two new holes on the underside of the playfield.

LED Signals

When **Smart Eddy** is powered on it should display a quick flash of the LED. The LED should then come on solid for 2 to 4 seconds. The LED will then blink 3 times and go OFF. This indicates the board has completed its automatic calibration.

Here is a description of LED flashes given by the *Smart Eddy.*

1. Initial Quick Flash — Sensor coil has been detected
2. 2 to 4 Seconds of On — Auto calibration in progress
3. 3 quick flashes — Auto calibration completed successfully
4. LED Off — Ready for game play.

During game play or switch test, the LED will light when a ball is located on the sensor coil.

Trouble Shooting

Problem	Comments
LED does not come on.	• Check J2 connection. • Check Fuses for 12V.
LED Comes on solid and does not go off.	• Indicates the detection coil is not connected (J1). • Indicates incorrect setting of jumpers JP2 and JP3. • Indicates faulty detection coil.

Testing

Perform testing with the playfield in the up position so you can observe the **Smart Eddy** red LED.

- Power the pinball on.
- LED should blink... stay on for 2-4 seconds ... go off
- When LED is OFF, the sensor has completed it auto calibration.
- If LED does not go OFF or does not come on, see *Trouble Shooting* section above.
- Put machine into switch test mode.
- Roll, slide or hold a ball over the sensor coil.
- LED should come on and switch should register.

Theatre of Magic – Trunk Fix

Smart Eddy version 1.3 (May 2019) now includes a feature to fix the dreaded "Trunk Error" that occurs on Theatre of Magic.

The fundamentals of the problem are a bug in the game's firmware. This bug will put the trunk into a locked out state if the trunk eddy sensor sends a switch signal whilst the trunk is in motion. Once locked out, the trunk will not be allowed to move until the game is powered off.

A new Molex plug was added to the Smart Eddy to receive a signal from the Motor Control board. Using this communication, the Smart Eddy board will not send switch signals whilst the motor is running.

The signal connection into the Smart Eddy may come from the original A-16120 or from the Tangles TPP-1029 DC Controller board.

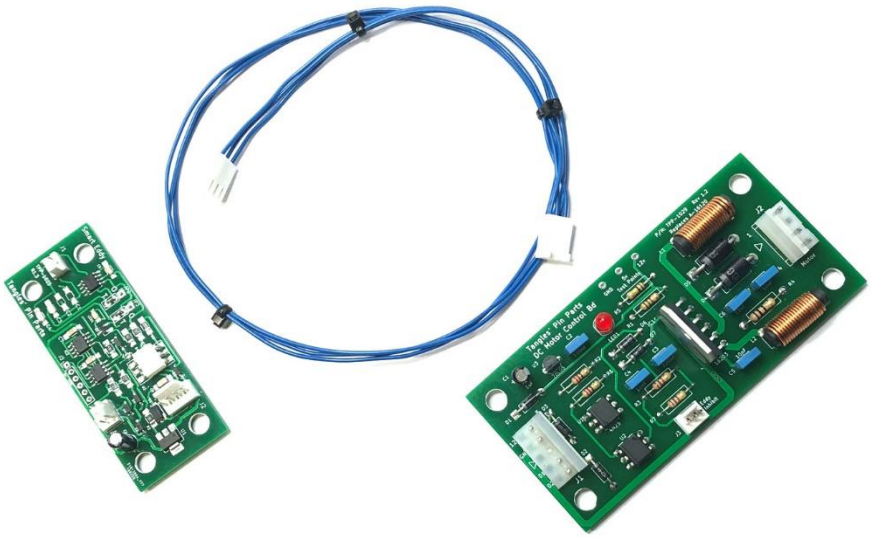
Version 1.3 board is fully compatible all support Eddy gmes. It works as per normal without a connection to the DC Motor Control Board.

Parts List:

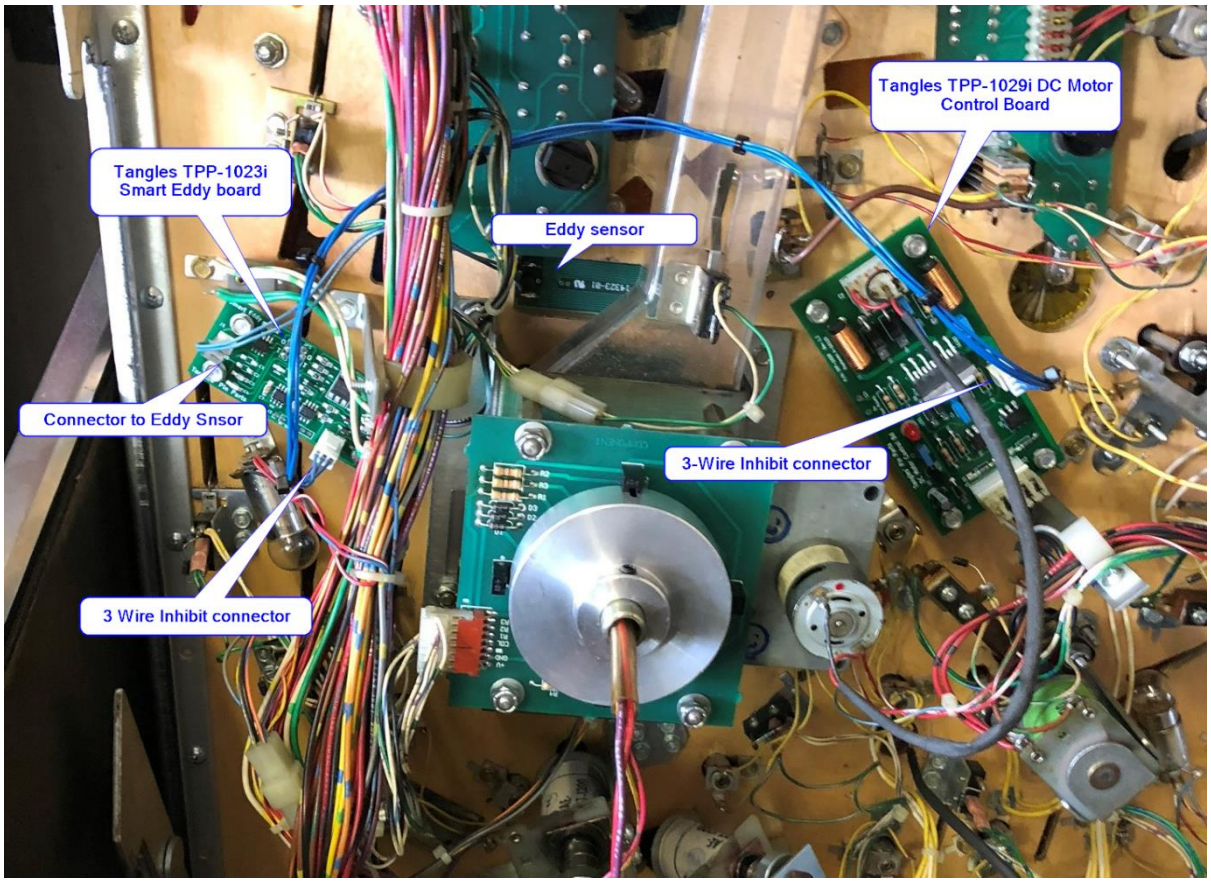
1 x TPP-1023 - Tangles' Smart Eddy board – with inhibit feature
1 x TPP-1029 - Tangles' DC Motor Control Board – with inhibit feature
1 x 3 wire cable (0.1" plugs - 560mm long)

INSTALLATION

- Install the Smart Eddy Board (replacing the trunk eddy board).
- Connect the 2 pin Eddy sensor.
- Connect the 4 pin power/signal connector.
- Install the Tangles DC Motor Driver board (replacing the original)
- Connect the trunk motor to the 4-way header.
- Connect the power/signal to the 5-way header.
- Install the 3-Wire "inhibit" cable from Smart Eddy to the DC Motor Board.
- Route the 3-wire cable under the wiring loom to stay clear of trunk opto.



Tangles' Pin Parts – ToM Trunk Fix



Tangles Smart Eddy with Trunk Fix option installed. Inhibit cable installed (blue)