Helix Movement Detection

Incorporating: Helix – Train Location Indicator & Helix Occupied Flasher

Helix – Train Location Indicator

- 10 LED's and 10 Infrared IR Reflectance Sensors covering the helix tracks
- When Sensor senses activity I want a location LED to light and stay on for a predetermined period
- Gaps between vehicles must not cause a location LED to "flicker"
- Multiple locations' LED's can be on simultaneously

Location Indicator Panel



Helix Sensor Locations



Quintet Optical Sensor & Timed Outputs

5 - 1

10

5 - 2

9



Prototype Trial



Putting it together

10 indicator LED's means 2 x Quintet Optical Sensor & Timed Outputs Launchpad boards required.

- The "Block Occupied LED was too inconspicuous so a more robust solution clearly visible from anywhere in the room was required.
 - 1 x Helix Occupied Flasher

Improved Location Indicator Panel





Helix Occupied Flasher V1.0

Prototype Trial



The Actual Indicator Panel



Count the Yellow LED's

Did you find the problem?

• 2 x Qunitet Launchpad Boards = 10 LED's

• Dunno how I did it but I fitted 11 Yellow LEDs!

 Too late to fix so I had to think of a solution... Ah-ha Spare pins on the Helix Occupied Flasher V1.0 Board so Helix Occupied Flasher V1.1 was born by adding one set of inputs/outputs like the Quintet Board.

Improved Location Indicator Panel





Helix Occupied Flasher V1.1

Putting it all together





Save the Launchpads!

• Implementation in Breadboard format using a MSP-EXP430G2553N20 chip programmed in the Launchpad and then implemented as standalone with 3.2v regulated power source.

Thanks to David Loman for the dea!

How?
– See the next slide

Now lets save space and money

Parts List

- IC Experimenters Board 140 x 95mm
- 3 x MSP430G2553N20 chips and sockets
- 1 x 5V Regulator LM7805
- 9 x 1A Power diodes
- 3 x 10k 1/4W resistors
- 17 x 100 ohm 1/4W resistors
- 0.100" male headers and/or machine pins
- Note: Power supply is based on a 12V Regulated DC source that has spare capacity available.

Tutorial 04: Stuck in a Loop

- I have added resistors to the LED's as detailed in the <u>tutorial 4</u>.
 - A LED connected to one of the GPIO (General Purpose I/O) pins (Connect it with a resistor to prevent too much current draw out of the MSP. A couple hundred ohms should be sufficient.)
 - I used one hundred ohms to limit current to about 30mA per LED.



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Checking Voltages





Remember to add a load when testing the 3V output

Wiring the LEDs



Note: All the cathodes are soldered together

Machine Pin Trial



I soldered one set of machine pins to the board and another to the LED anode wires to facilitate easy removal should this be necessary

Trial fitting Board in Indicator Panel



Indicator Board in position



Rear view Indicator Board in position



Connecting the Optical Detectors



Note: The original positions had to be amended for 11 detectors in stead of 10!

Wiring Sensor to Launchpad pins



Wire wrapping to header pins

Initial Testing

