

MTS-33T Intelligent Micromouse Trainer



MTS-33T allows students to carry out 3 types of micromouse experiments on a lab table individually including wall maze solver, line maze solver, and line follower. With provided maze wall, post, and line track pad, students can setup corresponding experiment environments efficiently and flexibly.

Learning MCU programming for micromouse is an important course topic on MTS-33T. Students can see the behavior of micromouse instantly after MCU code is programmed, downloaded and executed.

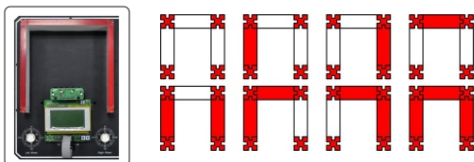
The provided simulation software allows students to create the map of line maze and wall maze so as to observe how micromouse solves the maze.

Features

1. The trainer is protected by a suitcase for easy carrying and storage.
2. The trainer can act as wall maze solving micromouse, line maze solving micromouse, and line tracer.
3. Adopts international standard size of maze wall and tracking line.
4. Automatically power off when make an over turning the micromouse.
5. Selectable sensor sets to detect either wall condition or line condition.
6. The trainer includes a dsPIC33F chip and peripheral circuits (power circuit, sensor circuit, input / output circuit, and so on), which is very helpful to understand the knowledge related with microprocessor control.

Hardware simulation function

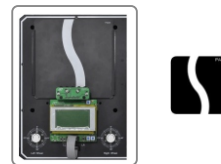
1. Road conditions for wall maze solving micromouse



2. Road conditions for line maze solving micromouse



3. Road conditions for line follower

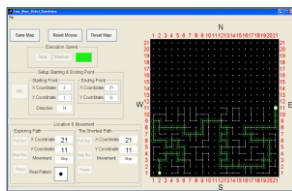


Software simulation function

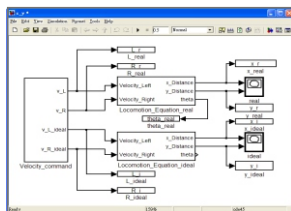
1. Simulation of wall maze solving micromouse
 Students design a 16x 16 wall maze from software interface and observe how micromouse solve the maze
 - (1) Maze size: 16x 16
 - (2) Users can save and load the designed map
 - (3) Algorithm : Gradient descent algorithm
 - (4) Simulation speed : Fast/Medium/Slow
 - (5) Micromouse movement : Full run/step run/pause



2. Simulation of line maze solving micromouse
 Students design 20 x 20 line maze from software interface and observe how micromouse solve the maze
 - (1) Maze size: up to 20x20
 - (2) Users can save and load the designed map
 - (3) Users can assign starting and ending point of the maze
 - (4) Algorithm : Simplification method
 - (5) Simulation speed : Fast/Medium/Slow
 - (6) Micromouse movement : Full run/step run/pause



- 3. Micromouse turning control (MATLAB,option)
- 4. Motor control (MATLAB,option)



- 16. Encoder
- 17. PID control (Require MATLAB SIMULINK,option)
- 18. Encoder feedback control
- 19. Motor speed control
- 20. Motor position control
- 21. Micromouse turning control simulation (Require MATLAB SIMULINK,option)
- 22. Micromouse central speed control
- 23. Micromouse central position control
- 24. Micromouse attitude control

● Hardware Specification

- 1. MCU : dsPIC33FJ128MC804 (ISP circuit included)
 - (1) 16-bit digital signal controller
 - (2) 44-pin
 - (3) 128K byte program flash memory
 - (4) 16K byte RAM
- 2. Gyroscope chip
 - (1) Measurement range : ± 1000 dps
 - (2) Sensitivity : 1.1 mV/dps
- 3. DC motor : 12V x 3
- 4. H bridge motor driver x 3
 - (1) Delivers up to 3A continuous output
 - (2) Operates at supply voltages up to 55V
 - (3) Low Rds(on) typically 0.3 Ω per switch
- 5. Rotary optical encoder 500 pulse x 3
- 6. Infrared transmitter : $\lambda p= 940nm$ x 9
- 7. Infrared receiver : Light-to-Voltage x 9
- 8. Fixture for infrared transmitter and receiver x 5
- 9. TACT switch x 3
- 10. Power switch : 5V, 12V
- 11. Limit switch x 2
- 12. Power LED x 1
- 13. LED x 6
- 14. Beeper x1
- 15. Display : 128 x 64 graphic / character LCD display
- 16. USB port
- 17. Power input : 90V ~ 264V AC, 47Hz ~ 63Hz
 output : DC 5V/5A, 12V/2.5A

List of Experiments

- 1. MPLAB software simulation
- 2. Digital I/O port control
- 3. LCD display control
- 4. Timer and timer interrupt control
- 5. Output compare module
- 6. PWM control
- 7. Analog-to-Digital converter module
- 8. Universal asynchronous receiver transmitter
- 9. Infrared signal normalization
- 10. Line detection
- 11. Wall following robot simulation
- 12. Line following robot simulation
- 13. Road condition detection for line following robot
- 14. Road condition detection for wall following robot
- 15. Line following control

● System Requirement

- 1. PC : CPU 2.4GHz
 USB Port x 2
 RAM 1GB
 HDD 3GB
- 2. OS : XP / VISTA / 7 / 10
- 3. Software : MATLAB SIMULINK
 (optional, please purchase it locally)

● Accessories

- 1. Power cord
- 2. Maze wall x 3
- 3. Maze post x 4
- 4. Line track pad x 7
- 5. Pad guide rail x 4
- 6. USB cable
- 7. 6 Pin programmer cable
- 8. Experiment manual
- 9. Experiment CD
- 10. PICKIT 3 programmer



PICKIT 3



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