MTS-33T

Intelligent Micromouse Trainer

MTS-33T allows students to carry out 3 types of micromouse experiments on a lab table individually-they are 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 three types of micromouse is an important course topic in 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.

Notebook is excluded

▶Features

● The trainer is protected by a suitcase for easy carrying and storage.
● The trainer can act as wall maze solving micromouse, line maze solving micromouse, and line tracer.
● Adopts international standard size of maze wall and tracking line.
● Automatic power off when over turning the micromouse.
● Selectable sensor sets to detect either wall condition or line condition.
● 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
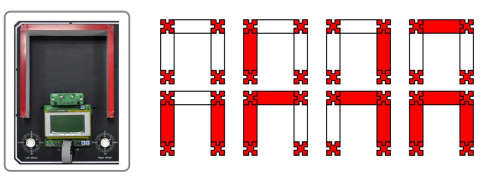
2. Road conditions for line maze solving micromouse
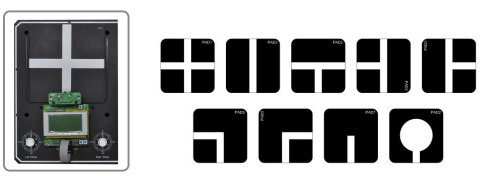
3. Road conditions for line follower

Software simulation function
1. Simulation of wall maze solving micromouse

Students design a 16 x 16 wall maze from software interface and observe how micromouse solve the maze

(1) Maze size: 16 x 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
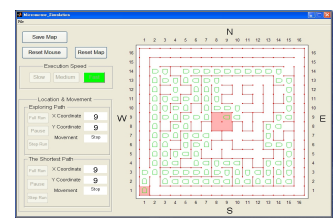
2. Simulation of line maze solving micromouse

Students design 20 x 20 line maze from software interface and observe how micromouse solve the maze

(1) Maze size: up to 20 x 20
(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
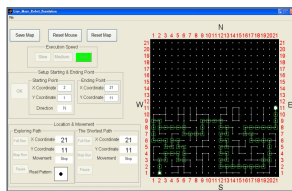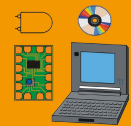
3. Micromouse turning control (MATLAB,option)

4. Motor control (MATLAB,option)
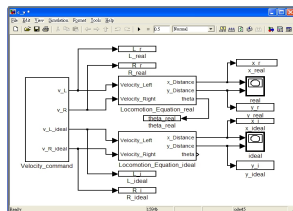
▶ Hardware Specification

1. MCU：dsPIC33FJ128MC804 (ISP circuit included)
   (1) 16-bit Digital signal controller
   (2) 44 Pins
   (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 0.3Ω per switch
5. Rotary optical encoder 500 pulse x 3
6. Infrared transmitter : λ 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 x 1 、12V x 1
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 : AC 90 ~ 264V, 47 ~ 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

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

▶ System Requirement

1. PC : CPU 2.4GHz
        USB Port x 2
        RAM 1GB
        HDD 3GB
2. OS : XP / VISTA / WIN7
3. Software : MATLAB SIMULINK
   (optional,please purchase locally)
4. Programmer : PIC KIT3 (optional but necessary)

▶ 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

PIC KIT3

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