Test Project

A3 - PCB Assembly and Functionality

Electronics

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WSC2026_TP16_en

Test Project files

This Test Project consists of the following files:

- WSC2026_HWD_Datasheets.zip
- WSC2026_TP16_A3_actual_en.docx This File
- WSC2026_TP16_A3_answer_sheet.docx

Introduction

Competitors will solder components to their milled PCB. Competitors will then power up their PCB and take measurements to prove the functionality of their prototype using bench instruments. After completing the left drive circuit verification, connect another read-made PCB (right drive), conduct a functional demonstration of the entire machine.

Measurements will provide proof of and quality of circuit function in the following areas:

1. Running motor drive.
2. Constant current charging circuit.
3. Voltage regulator.
4. Drive circuit.
5. Current sampling circuit.
6. Servo drive circuit.

On site functional demonstration:

1. Bipedal wheeled robot maintains balance.
2. Bipedal wheeled robot walking.
3. Bipedal wheeled robot adjusts height.
4. Bipedal wheeled robot left and right rotation.
5. Bipedal wheeled robot passes wave bridge.
6. Bipedal wheeled robot passes through high and low bridges.

Instructions

- Open your PCB Layout designed on C1 (reference PCB only .pdf file).
- Solder the components onto your PCB.
- Power your PCB with 12V.
- Connect the your board according to the following diagram.(Attached diagram (schematic diagram of circuit board verification connection))
- Adjust the VR1 to output of TP6 =7.4V DC, Set the MCU module switch to testing mode.

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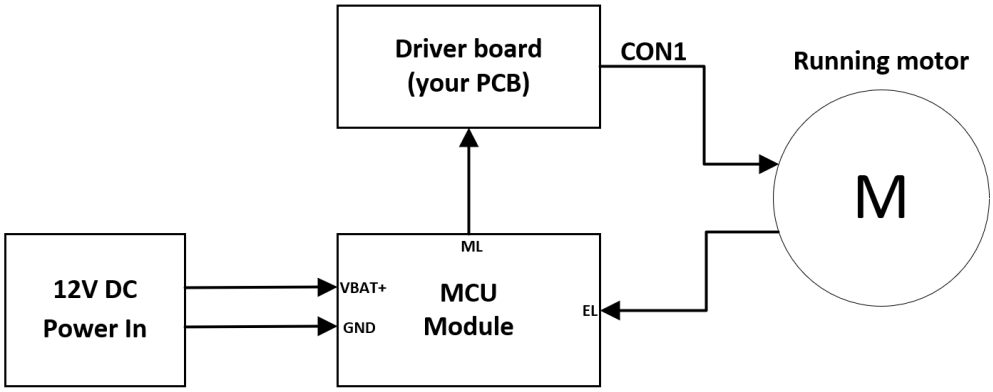


Figure 1 Schematic diagram of circuit board verification connection

Screen Captures

Capture the waveforms of CH1 (TP6) and CH2 (IC24_7) simultaneously using two channels of an oscilloscope, The oscilloscope screen displays CH1 and CH2 waveforms (frequency and amplitude readable). Name this "CountryCode_WS2026_HWD_A3_Capture1.jpg".

and store in a desktop folder named A3_CountryCode. Insert the captured screen in to "CountryCode_WSC2026_TP16_A3_answer_sheet.docx".

Capture the waveforms of CH1 (TP1) and CH2 (TP2) simultaneously using two channels of an oscilloscope, The oscilloscope screen displays CH1 and CH2 waveforms (frequency, duty cycle and amplitude readable). Name this "CountryCode_WS2026_HWD_A3_Capture2.jpg"

and store in a desktop folder named A3_CountryCode. Insert the captured screen in to "CountryCode_WSC2026_TP16_A3_answer_sheet.docx".

Capture the waveforms of CH1 (TP7) and CH2 (TP8) simultaneously using two channels of an oscilloscope, The oscilloscope screen displays CH1 and CH2 waveforms (frequency and phase readable). Name this "CountryCode_WS2026_HWD_A3_Capture3.jpg"

and store in a desktop folder named A3_CountryCode. Insert the captured screen in to "CountryCode_WSC2026_TP16_A3_answer_sheet.docx".

Capture the waveforms of CH1 (TP9) and CH2 (TP8) simultaneously using two channels of an oscilloscope, The oscilloscope screen displays CH1 and CH2 waveforms (frequency and phase readable). Name this "CountryCode_WS2026_HWD_A3_Capture4.jpg" and store in a desktop folder named A3_CountryCode. Insert the captured screen in to "CountryCode_WSC2026_TP16_A3_answer_sheet.docx".

Capture the waveforms of CH1 (TP9) and CH2 (TP7) simultaneously using two channels of an oscilloscope, The oscilloscope screen displays CH1 and CH2 waveforms (frequency and phase readable). Name this "CountryCode_WS2026_HWD_A3_Capture5.jpg" and store in a desktop folder named A3_CountryCode. Insert the captured screen in to "CountryCode_WSC2026_TP16_A3_answer_sheet.docx".

Capture the waveforms of CH1 (TP3), CH2 (TP4), and CH3 (TP5) simultaneously using three channels of an oscilloscope. The oscilloscope screen clearly displays the MATH=CH2-CH1, CH1, CH2, and CH3 waveforms (frequency and mean readable), and uses two cursors to display the time difference between the falling and rising edges of MATH and CH3. Name this "CountryCode_WS2026_HWD_A3_Capture6.jpg" and store in a desktop folder named A3_CountryCode. Insert the captured screen in to "CountryCode_WSC2026_TP16_A3_answer_sheet.docx".

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- Complete and submit the "WSC2026_TP16_A3_answer_sheet" before obtaining the Right Driver Board (read-made) from SCM.
- Assembly the MCU module, left driver board (your PCB), right driver board (ready-made PCB), and robot body, connect with the battery and joystick according to the "Bipedal wheeled robot assembly manual.docx". Demonstrate your wonderful work!

Demonstration:

1. Set the toggle switch to Run mode, Bipedal wheeled robot can maintain balance and stand upright, and gently pushing the cart can restore balance.
2. The bipedal robot can be controlled to move forward and backward by using the joystick.
3. The bipedal robot height can be adjusted using the joystick.
4. The bipedal robot can be controlled to rotate left and right by using the joystick.
5. The bipedal robot can be controlled to pass through the wave bridge using the joystick.
6. The bipedal robot can be controlled to pass through high and low bridges.

Marking Scheme

SUB CRITERION	SUB CRITERION NAME	WSOS
A3	Production and assembly of PCB	1,4
A4	Functionality of PCB prototype to specification	2,7

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