

Team 03 COATL Aircraft Particle Sensor

Breadboard Test Cases

Test Author: Felix						
	Test Case Name:	Input Testing	Test ID #:		1-1	
	Description:	Imitating the charged particles entering the device via a pulse wave to produce an amplified voltage output.			Type:	<input checked="" type="checkbox"/> white box <input type="checkbox"/> black box <input type="checkbox"/> _____
Tester Information						
	Name of Tester:	Nathan Truong, Eisa Alsharifi			Date:	2/19/25
	HW/SW Version:	V1.0			Time:	2:38 PM
	Setup:	Connect power supply and oscilloscope to test points on the breadboard circuit. Probes for the oscilloscope are set at the frequency input and the output. Set Power supply to 9V and 0.1A. Set the function generator to a PULSE wave with amplitude 10mV, offset 0, frequency 1kHz. (The current entering the coulomb-meter is about 20pA for these tests)				
S T E P	Action	Expected Result	P A S S	F A I L	N / A	Comments
1	Turn on the power and function generator.	No shorts should be evident on the power supply	<input checked="" type="checkbox"/>			
2	Probe the function generator output	A clear pulse wave (probes at function generator output) should be visible	<input checked="" type="checkbox"/>			
3	Probe the amplified coulomb-meter output	A voltage reading of between 4V to 8V		<input checked="" type="checkbox"/>		Oscilloscope displays nothing on the amplified coulomb-meter output
	Overall test result:			<input checked="" type="checkbox"/>		Oscilloscope displays nothing on the coulomb-meter output. Need

					to debug circuit and measurements.
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Test Author: Felix						
	Test Case Name:	Input Testing	Test ID #:		1-2	
	Description:	Second attempt at imitating the charged particles entering the device via a square wave to produce an amplified voltage output. Changed to SQUAREwave and Increased the wave amplitude to 100mV	Type:		<input checked="" type="checkbox"/> white box <input type="checkbox"/> black box <input type="checkbox"/> _____	
Tester Information						
	Name of Tester:	Nathan Truong, Eisa Alsharifi	Date:		2/19/25	
	HW/SW Version:	V1.0	Time:		2:55 PM	
	Setup:	Connect power supply and oscilloscope to test points on the breadboard circuit. Probes for the oscilloscope are set at the frequency input and the output. Set Power supply to 9V and 0.1A. Set the function generator to a SQUARE wave with amplitude 100mVpp, offset 0, frequency 100Hz. (The current entering the coulomb-meter is about 20pA for these tests)				
S T	Action	Expected Result	P A	F A	N /	Comments

E P			S S	I L	A	
1	Turn on the power and function generator.	No shorts should be evident on the power supply	✓			
2	Probe the function generator output	A clear pulse wave (probes at function generator output) should be visible	✓			
3	Probe the amplified coulomb-meter output	A voltage reading of between 4V to 8V		✗		Oscilloscope displayed a straight line around 0.5V
	Overall test result:			✗		Oscilloscope displayed a straight line around 0.5V.

Test Author: Felix			
	Test Case Name:	Input Testing	Test ID #: 1-3
	Description:	<i>Third attempt at imitating the charged particles entering the device via a SQUARE wave to produce an amplified voltage output.</i>	Type: <input checked="" type="checkbox"/> white box <input type="checkbox"/> black box <input type="checkbox"/> _____
Tester Information			
	Name of Tester:	Nathan Truong, Eisa Alsharifi	Date: 2/19/25
	HW/SW Version:	V1.0	Time: 3:10 PM
	Setup:	<i>Connect power supply and oscilloscope to test points on the breadboard circuit. Probes for the oscilloscope are set at the frequency input and the output. Set Power supply to 9V and 0.1A. Set the function generator to a SQUARE wave with amplitude 100mVpp, offset 0, frequency 100Hz. (The current entering the coulomb-meter is about 20pA for these tests)</i>	

S T E P	Action	Expected Result	P A S S	F A I L	N / A	Comments
1	Turn on the power and function generator.	No shorts should be evident on the power supply	✓			
2	Probe the function generator output	A clear pulse wave (probes at function generator output) should be visible	✓			
3	Probe the amplified coulomb-meter output	A voltage reading of between 4V to 8V		✗		Oscilloscope displayed a straight line around 0.5V
	Overall test result:			✗		Oscilloscope displayed a straight line around 0.5V. Going to change oscilloscopes and test the virtual ground.

Test Author: Felix				
	Test Case Name:	Input Testing	Test ID #:	1-4
	Description:	<i>Fourth attempt at imitating the charged particles entering the device via a square wave to produce an amplified voltage output. Changed to different oscilloscope for quicker debugging and tested virtual ground, changed amplitude to 20mVpp.</i>	Type:	<input checked="" type="checkbox"/> white box <input type="checkbox"/> black box <input type="checkbox"/> _____
Tester Information				
	Name of Tester:	Nathan Truong, Eisa Alsharifi	Date:	2/19/25
	HW/SW Version:	V1.0	Time:	3:25 PM
	Setup:	<i>Connect power supply and oscilloscope to test points on the breadboard circuit. Probes for the oscilloscope are set at the frequency input and the output. Set Power supply to 9V and 0.1A. Set the function generator to a SQUARE wave with amplitude 20mVpp, offset 0, frequency 100Hz. (The current entering the coulomb-meter is about 20pA for these tests)</i>		

S T E P	Action	Expected Result	P A S S	F A I L	N / A	Comments
1	Test virtual ground	Both sides of the virtual ground should be around 4.5V	✓			Both sides of the ground were operating within acceptable ranges.
2	Turn on the power and function generator.	No shorts should be evident on the power supply	✓			
3	Probe the function generator output	A clear pulse wave (probes at function generator output) should be visible	✓			
4	Probe the amplified coulomb-meter output	A voltage reading of between 4V to 8V		✗		Oscilloscope displayed nothing
	Overall test result:			✗		The Oscilloscope displayed nothing. Need to check all connections in accordance with the circuit schematic and continue debugging.

Test Author: Felix			
	Test Case Name:	Input Testing	Test ID #: 1-5
	Description:	<i>Fifth attempt at imitating the charged particles entering the device via a square wave to produce an amplified voltage output. After checking connections, we discovered there is too little current coming in from the circuit being used to generate a small current. The resistor value was changed from 67M to 1G.</i>	Type: <input checked="" type="checkbox"/> white box <input type="checkbox"/> black box <input type="checkbox"/> _____
Tester Information			
	Name of Tester:	Nathan Truong, Eisa Alsharifi	Date: 2/19/25

	HW/SW Version:	V1.1	Time:			4:12 PM
	Setup:	Connect power supply and oscilloscope to test points on the breadboard circuit. Probes for the oscilloscope are set at the frequency input and the output. Set Power supply to 9V and 0.1A. Set the function generator to a SQUARE wave with amplitude 20mVpp, offset 0, frequency 100Hz. (The current entering the coulomb-meter is about 20pA for these tests)				
S T E P	Action	Expected Result	P A S S	F A I L	N / A	Comments
1	Test virtual ground	Both sides of the virtual ground should be around 4.5V	✓			Both sides of the ground were operating within acceptable ranges.
2	Turn on the power and function generator.	No shorts should be evident on the power supply	✓			
3	Probe the function generator output	A clear pulse wave (probes at function generator output) should be visible	✓			
4	Probe the amplified coulomb-meter output	A voltage reading of between 4V and 8V	✓			Oscilloscope displayed the expected wave output with a mean peak to peak voltage of about 4.5V
	Overall test result:		✓			Oscilloscope displayed the expected wave output with a mean peak to peak voltage of about 4.5V