



PHOTOVOLTAIC INVERTER

SOLAR HERO

TEAM MEMBERS

MOHAMAD ELSALEH

KHALED ALBANNAI

Xuanyu Bai

Jiaxin Zheng

Client

Dr. Venkata Yaramasu

GTA

Han Peng

Technical

Kristiyan Milev

Jiaxin Zheng

Overview:

- Client
- Introduction
- WBS of Khaled Albannai
- WBS of Mohamad Elsaleh
- WBS of Xuanyu Bai
- WBS of Jiaxin Zheng
- Demo
- Conclusion

CLIENT

- Dr. Venkata Yaramasu
- renewable energy
- high power converters
- variable-speed drives and electric vehicles



Introduction:

Why choose Photovoltaic systems ?

- Less dependence on fossil fuels
- Clean and reliable energy
- The prices for photovoltaic modules is decreasing

Background:

- The partial shading on large-scale PV systems
- Affecting the power output to the grid
- Develop the next generation large scale PV system

WBS for Mohamad Elsaleh

ID	Activity/Task	Description	Deliverables	Other people working
1	Hardware			
1.1	Soldering	Soldering new gate drivers and fixing	1.Soldered gate drivers. 2.Fixed	Bai and Khaled
1.2	Purchase components	Buying components to attach heatsink to the wood board	Purchased	Khaled
1.3	Wiring	Connecting Gate drivers to the Interface board and IGBT's	1- All phases are connected 2- Connecting current and voltage sensor	Khaled
2	Testing			
2.1	Testing IGBT's	Making sure each IGBT is working properly to proceed with connection	All IGBT's have been tested	-
2.2	Testing set up	Connecting all devices together and making sure it's ready for simulation and testing	In progress	Khaled and bai
3	Website			
3.1	Update content	Updating and adding documents to the website	In progress	-

Mohamad Elsaleh

Tasks & Activities:

1-Hardware (90%):

- All gate drivers are soldered (Total of 12)
- Gate drivers LED's were fixed
- Wiring: All phases are connected

2- Testing (70%):

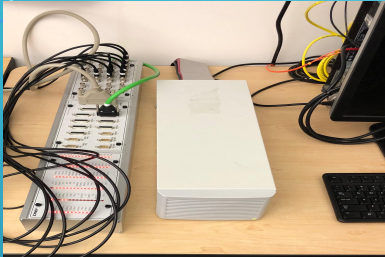
- All IGBT's (Insulated-gate bipolar transistor) are working.
- All IGBT's are tested with the gate drivers and ready to work.
- Interface board missing power connector

3- Website (90%):

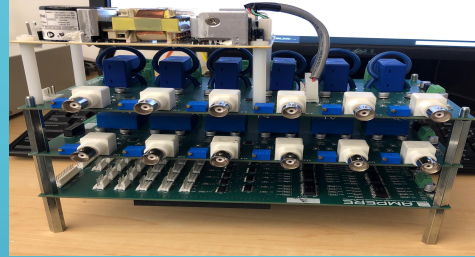
- Updated on 2/4/2019
- Updated on 2/26/2019

Testing Gate Drivers and IGBT

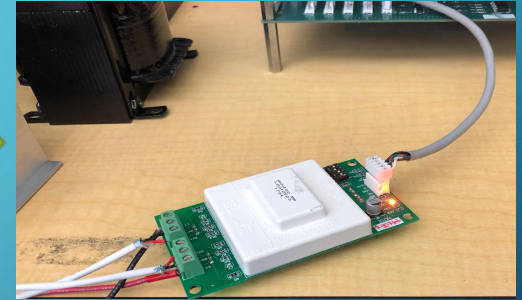
DSPACE



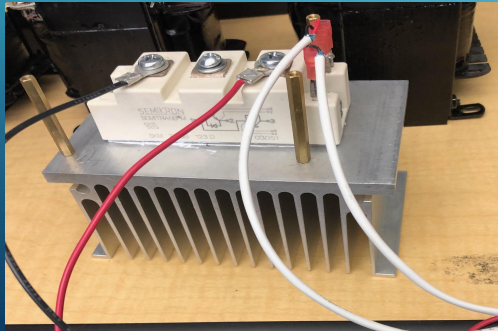
Interface board, voltage and Current Sensors



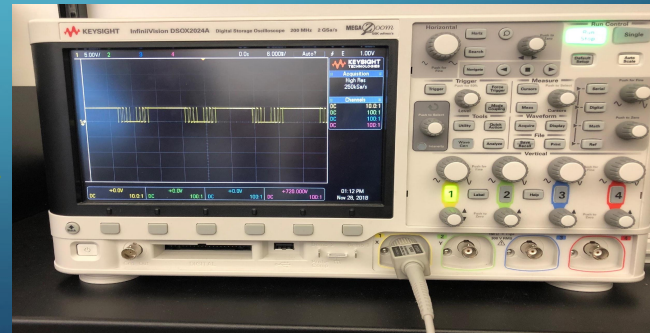
Gate Driver



IGBT



Oscilloscope



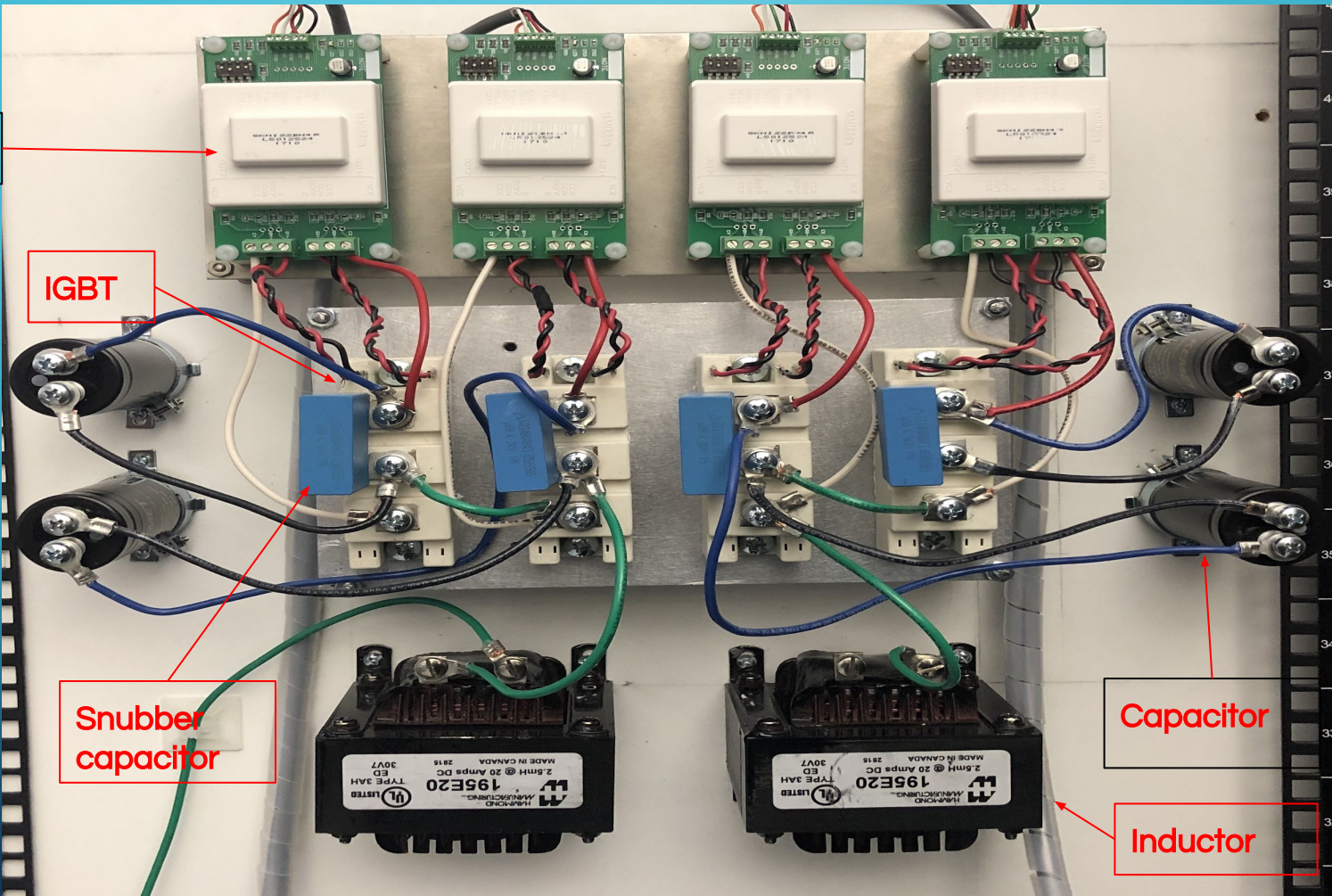
Gate Driver

IGBT

Snubber capacitor

Capacitor

Inductor



WBS of Khaled Albannai

Person Primarily Responsible: Khaled Albannai

ID	Activity/Task	Description	Deliverable(s)	Other People
1	Hardware	Installing the board stand	Assemble the parts (Finish)	
1.1	Buying stand board	Measuring and layout	To measure the correct parts sizes (Finish)	Mohamad
2.0	Cutting metal for gate drivers	Measure and make it fit perfectly	Attaching all 12 gate drivers (Finish)	Bai
2.1	Drilling holes	Drilling the correct	Make it easier and faster to attach (Finish)	Mohamad Jaixin
3.0	Attaching components	1- Inductor 2- capacitor 3- gate drivers	Attaching all of the inverter components (Finish)	Mohamad

Tasks & Activities:

1. Cutting and Drilling :
 - Metal sheets for the gater drivers
 - Attaching the heat sinks
2. Soldering:
 - Soldering relay board and attach it to the board
3. Wiring :
 - Interface board
 - Inductors



Relay board



Metal sheet



Heat sink



Inductors connections

WBS for Xuanyu Bai

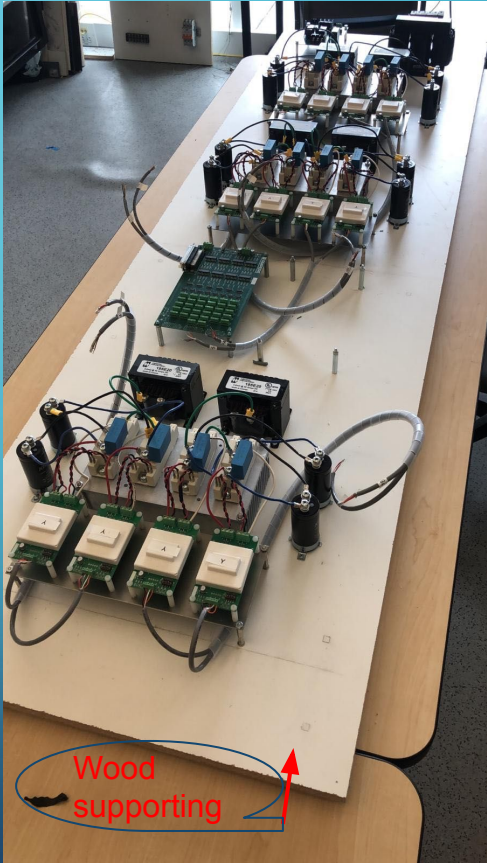
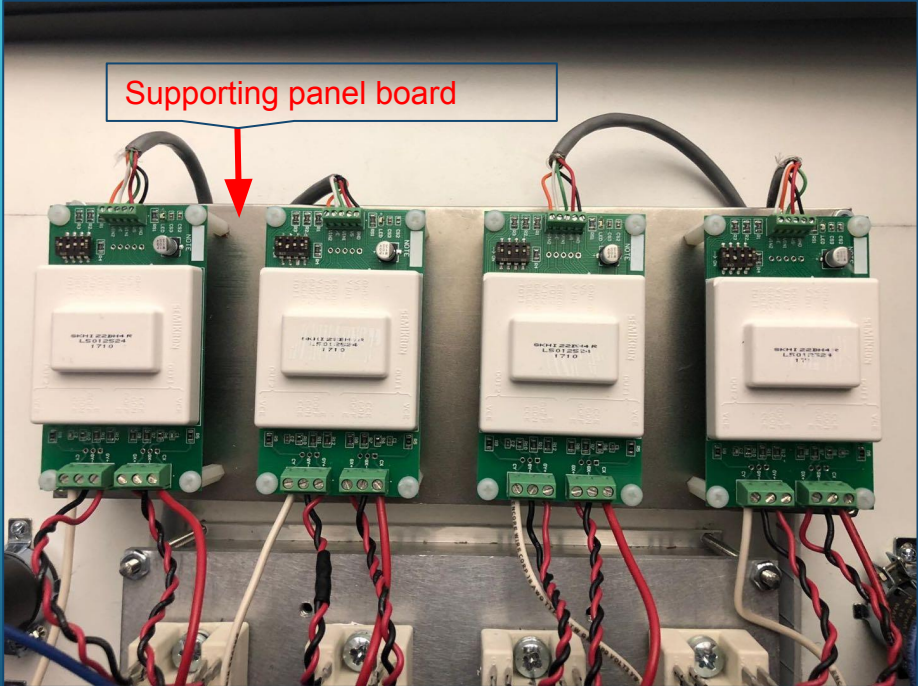
Person Primarily Responsible: Xuanyu Bai

ID	Activity/Task	Description	Deliverable(s)	Other People
1	Simulation			
1.1	Simulink	Build a part of MATLAB Simulink for PV system	<ul style="list-style-type: none"> ● Simulink model ● Waveform ● Running good without any errors. 	-
2	Construct			
2.1	Building devices	Wiring and cutting the wood for the show stand following the measurement	<ul style="list-style-type: none"> ● Show stand board ● Complete devices 	Khaled and Mohamad, Jiaxin
2.2	Soldering	Soldering new gate drivers	<ul style="list-style-type: none"> ● Total 12 new gate drivers 	Khaled and Mohamad
3	Interface board testing			
3.1	Testing the Gate drivers	Using MATLAB Simulink to test the gate drivers	<ul style="list-style-type: none"> ● Simulink model ● Good feedback signals 	Mohamad

Tasks & Activities

1. Simulation:
 - The demo was built base on the MATLAB
 - No errors show up on the Simulink
2. Construct:
 - Do the measurement and cut the metal and wood board
 - Complete soldering 12 gate drivers
 - Wiring
3. Interface board testing
 - All gate drivers are working properly
 - Next step-finally testing for whole system

Metal and wood materials



WBS of Jiaxin Zheng

WBS of Jiaxin Zheng				
ID	ACTIVITY/TASK	DESCRIPTION	DELIVERABLE	OTHER PEOPLE
1	Construction			
1.1	Drilling holes	According to the positions, measure the holes and then punch them	-We have drilled all the holes.	Khaled
1.2	Fixing	Place gate drives, current / voltage sensors in the measured positions and fix them with screws	-Gate drives and sensors have been fixed.	Khaled Mohamad Bai
1.3	Wiring	Cutting wires for the connections and attaching gate drives, inductions, switches, current /voltage sensors on the wood board	-We have cut the wires and attaching components.	Khaled Mohamad Bai
2	Simulink			
2.1	Establishing Simulink by Matlab	Use Matlab to establish Simulink as the software running on the central inverter system.	-The Simulink has been established.	Bai
3	Hardware			
3.1	Recreating gate drives	Some gate drives is not good to running. According to the circuit diagram, solder components on the PCB board to make new gate drives.	-The new gate drives have be created.	-

Tasks & Activities:

1-Construction

1.1 The work of punching holes in the board and fixing the device has basically been completed.

1.2 The wiring between most of the devices on the board is basically completed.

2-Hardware

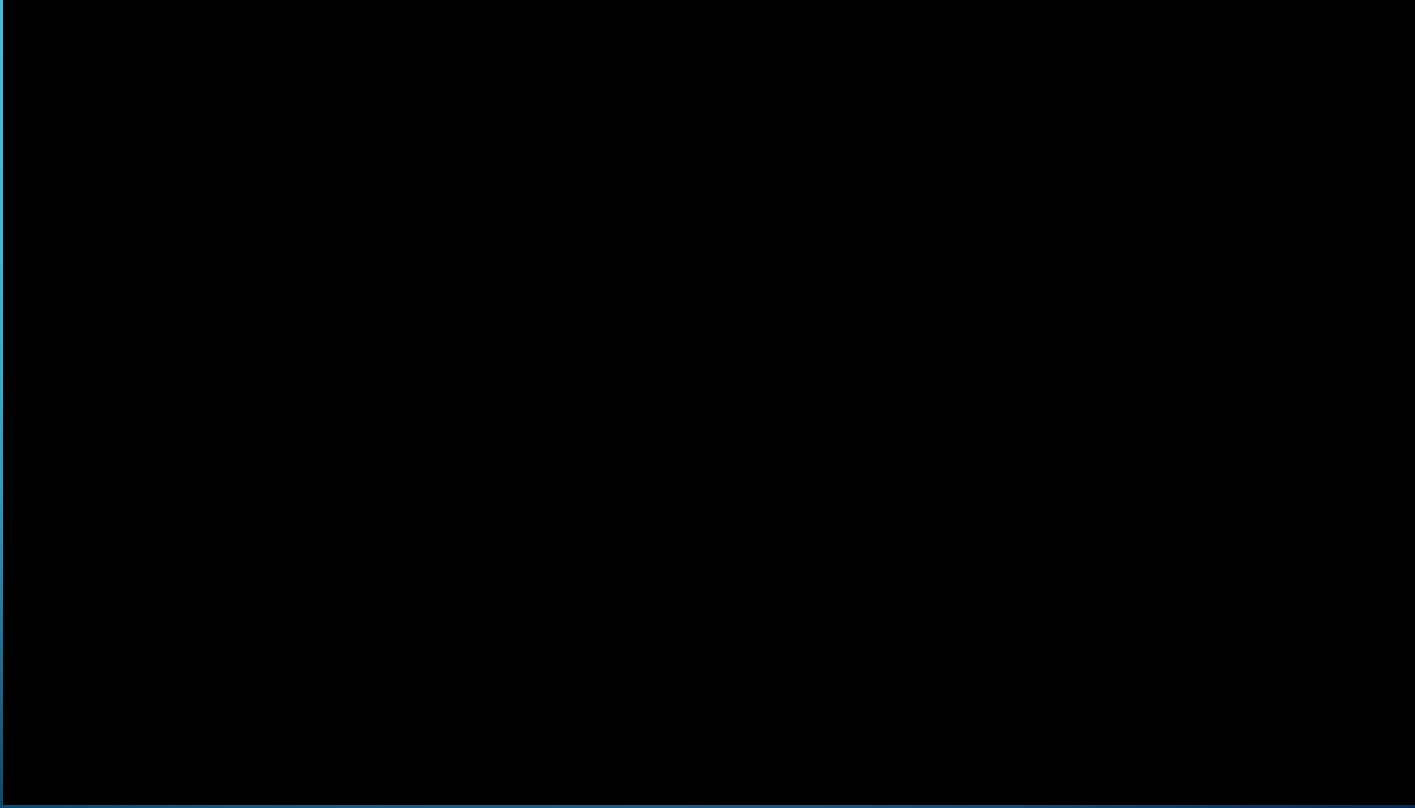
2.1 Some gate drives are not good to running, so we have recreated the gate drives on the PCB board.

3-Simulink

3.1 The software is programmed by Matlab, and the client has provided us with the code.

3.2 We tested and built simulink, and then we would need to test the final results.

Demonstration:



Conclusion:

- The team is lagging behind due to missing parts
- The hardware part is 90% done.
- The team will start testing and collecting data
- The progress made met client's requirements and specifications as much as possible

Mohamad Elsaleh