

CHAPTER 4

RESULTS AND DISCUSSION

This chapter will review about the results and dicussion of this project.Based on this chapter, both of results from theoretical and practical can be compared

4.1 Output Waveform from software part

Figure 4.1 below are shown the output waveform after done the simulation process by using Quartus II software.

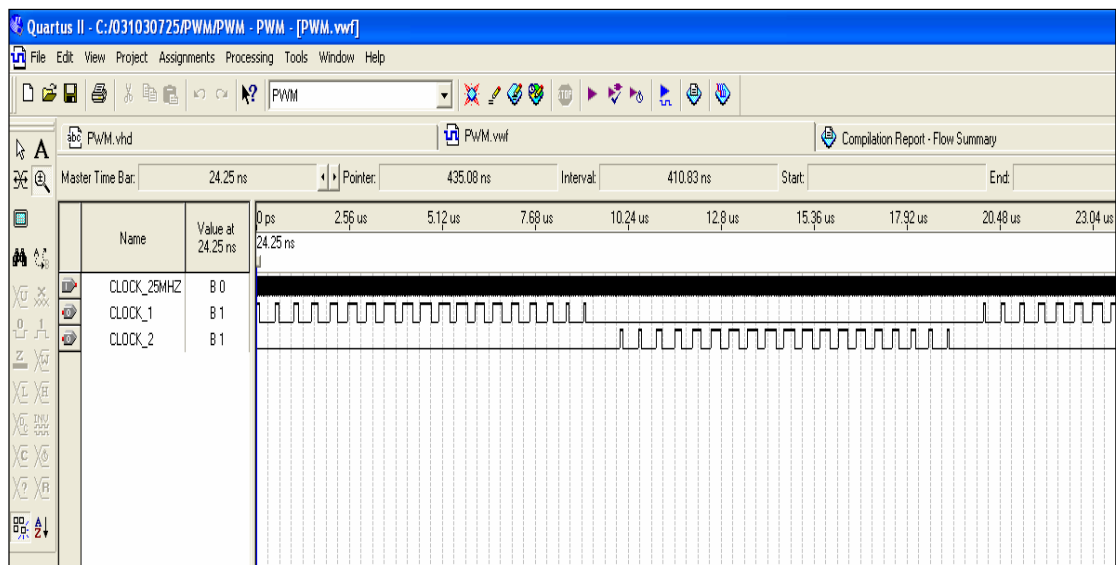
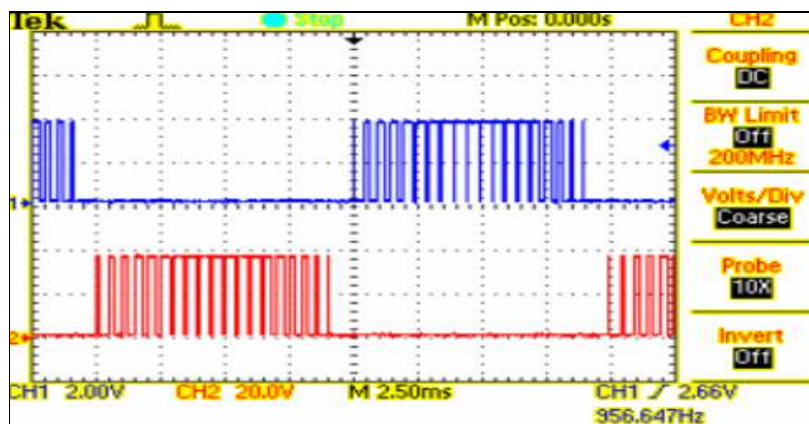
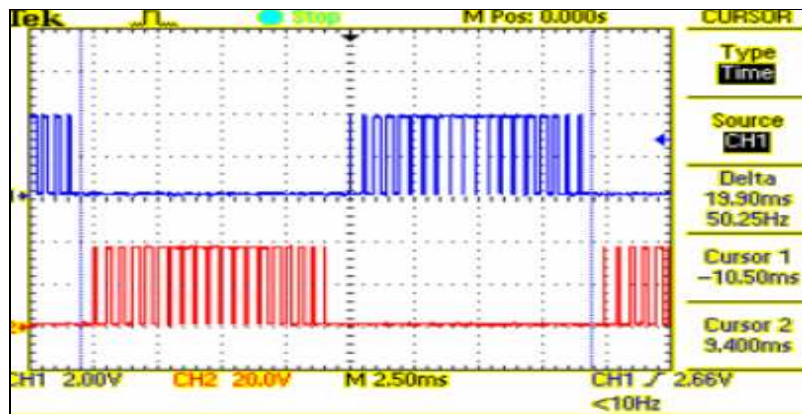


Figure 4.1: Software output waveform

The waveforms are shown that the design had one input and two outputs. The input is label with clock_25mhz. The first output had labeled clock_1 are shown on figure which is had first pulse then the pulse of second output which is labeled with clock_2 like as shown on figure. The first and second output shows that the pulse is continuous for each other. The output continuously like that and will stop based on end time had been set.



(a)



(b)

Figure 4.2: (a), (b) Output Waveform from UP3 board

Figure 4.2 is illustrated the output waveform of UP3 board that had measured with oscilloscope. It is had two output; which is first output refer to channel 1 and second output refer to channel 2. Figure 4.2 (b) shown that the fundamental frequency is equal to 50.25hz and time equal to 19.90ms.

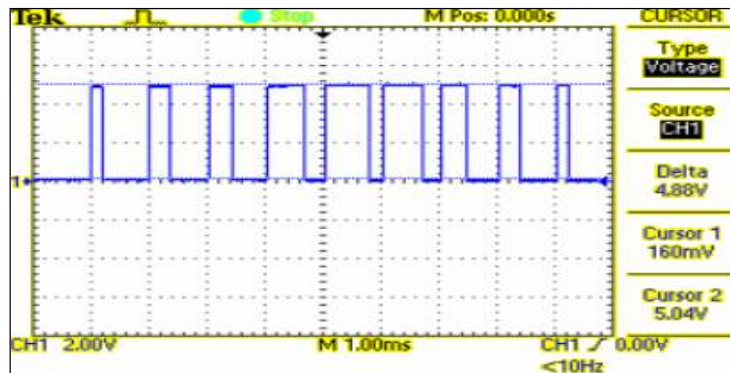


Figure 4.3: Output Waveform

Figure 4.3 shown that the output waveform of channel 1. For this project both of the output waveform are same for channel 1 and channel 2.

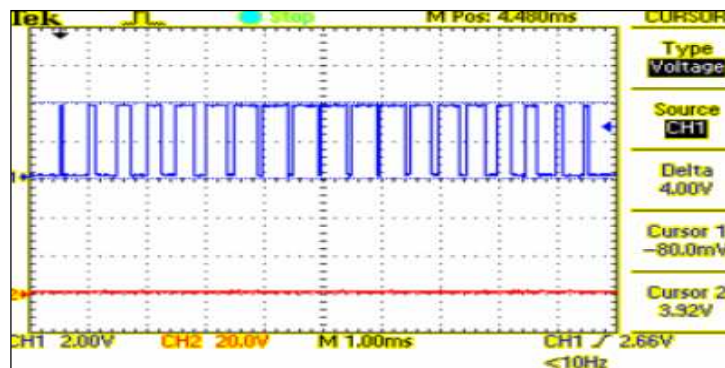


Figure 4.4: Waveform for voltage measurement

Figure 4.4 shown that the waveform for voltage measurement. The voltage is equal to 4V. Both of channel 1 and channel 2 for voltage measurement are same.

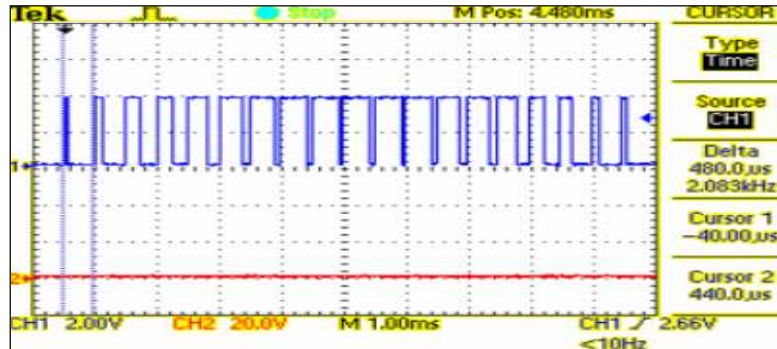


Figure 4.5: Waveform for time measurement

Figure 4.5 shown that the waveform for time measurement. The time equal to $480\mu\text{s}$ and the frequency equal to 2.083kHz .

4.2 Testing Buffer -74LS244

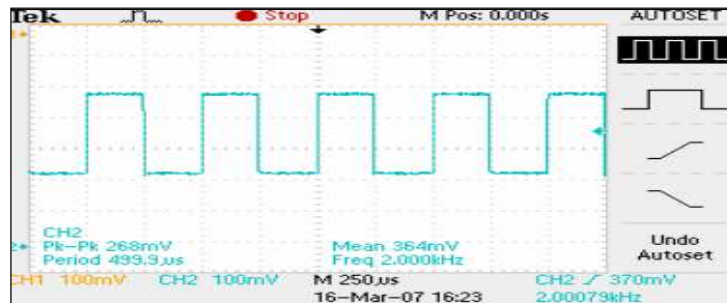


Figure 4.6: Output testing for Buffer

Figure 4.6 are shown the waveform for testing buffer. Before use this component it's should be test first. The waveform shows that the buffer is good to use.

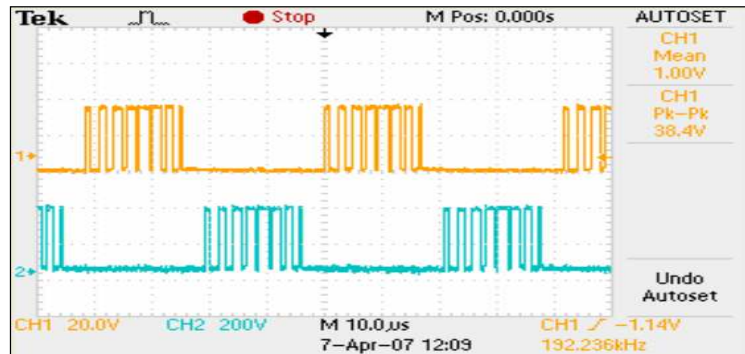


Figure 4.7: Output buffer

Figure 4.7 illustrated the output waveform buffer after combined the circuit with UP3 board. The waveform are shown that the output less from the noise. It is because the function of buffer is provides improved noise rejection and high fan-out outputs.

4.3 Testing MOSFET IRF840

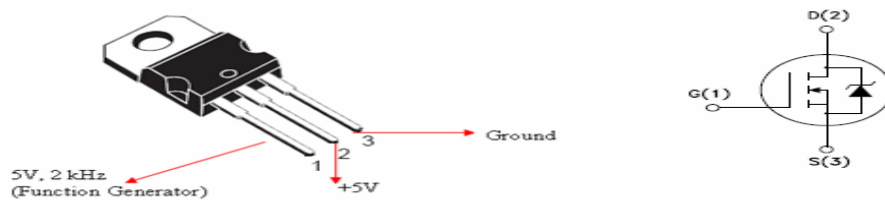


Figure 4.8: MOSFET IRF840

Figure 4.8 are shown the IRF840 and the internal schematic diagram. This component should connect like as figure above till testing process. Testing process to make sure the condition of component either its function or not. Table below are show the result after testing.

Table 4.1: Data after testing IRF840

V_G	V_{in}	V_{out}/V_{DS}
5V, 1kHz	5V	5.06V
5V, 2kHz	5V	5.06V
5V, 3kHz	5V	5.06V
5V, 4kHz	5V	5.06V
5V, 5kHz	5V	5.06V
5V, 6kHz	5V	5.06V
5V, 7kHz	5V	5.06V
5V, 8kHz	5V	5.06V
5V, 9kHz	5V	5.06V
5V, 10kHz	5V	5.06V

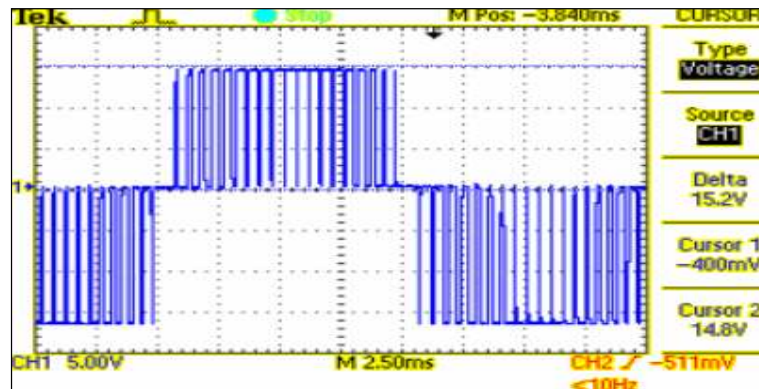


Figure 4.9: Waveform of IRF840

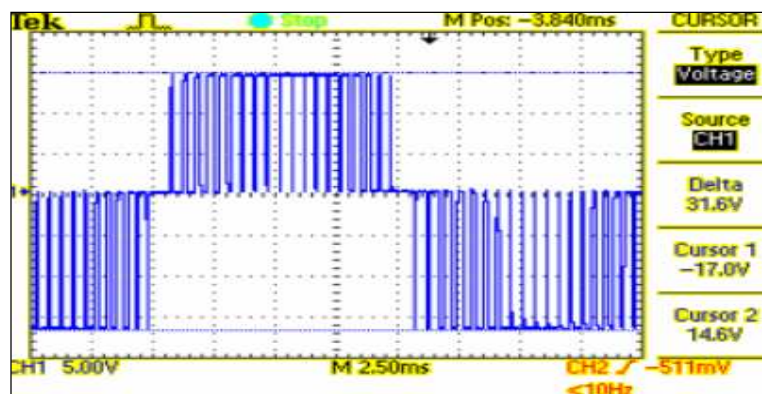
Based on figure 4.9, the condition of IRF840 is good. It is because V_{out}/V_{DS} is equal to V_{in} and the waveform also shown that channel 2 equal to channel 1.

4.4 Combined UP3 board and circuit

The last part of this project is combined UP3 board with the circuit; which is included buffer, interface circuit, single phase bridge inverter. The output waveform as shown like as Figure 4.10 (a) and (b) .Figure 4.10 (a) shown that the voltage equal to 15.2 v because the voltage only in positive part had been measured and 31.6v is shown from Figure 4.10 (b), which the voltage is doubled, because the voltage had measured both of positive and negative parts.



(a)



(b)

Figure 4.10: (a),(b) Output waveform

4.5 Discussions

During my Final Year Project (FYP), full attention and commitment must had to acquire as much knowledge and skills as possible. By the way, about this project; switching technique for inverter using software simulation to replace the traditional method to generate switching signal, also had the problem.

The problem statement below justified the need for the inverter circuit with high flexibility to change the control signal in order to get the output waveform as close as the purely sine wave as generated by the ideal inverter. One of the ways to accomplish this aim is to produce the control circuit to generate the control signal for inverter switching purpose and must has future modification through programming method. The existing method uses analog device such as a comparator to produce the control signal for the inverter switching.