

Figure 9. Experimental setup diagram

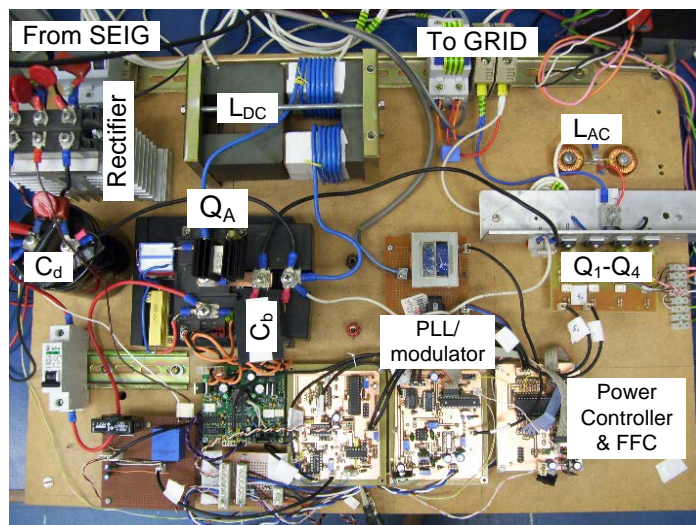


Figure 10. Photograph of inverter prototype

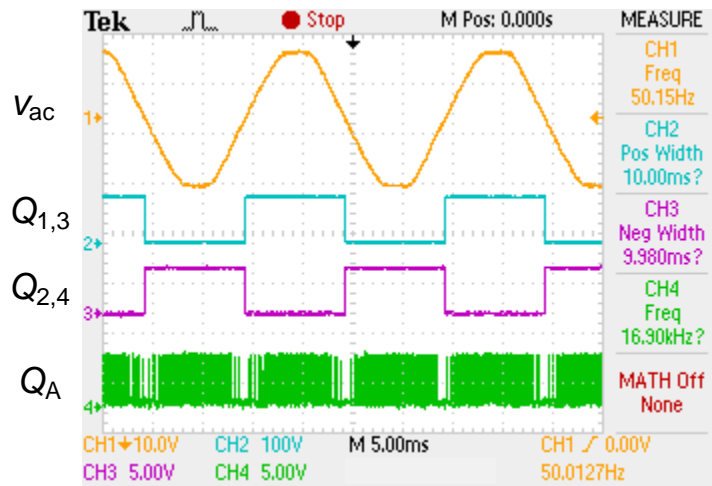


Figure 11. Measured grid voltage and gate signals generated by control circuit

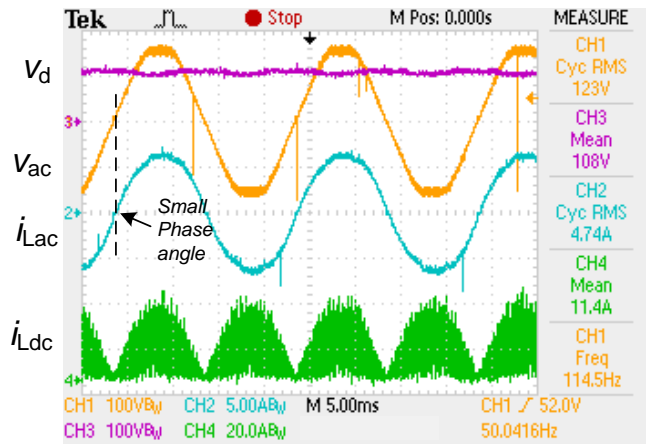


Figure 12. Measured voltage and current waveforms of buck-boost inverter

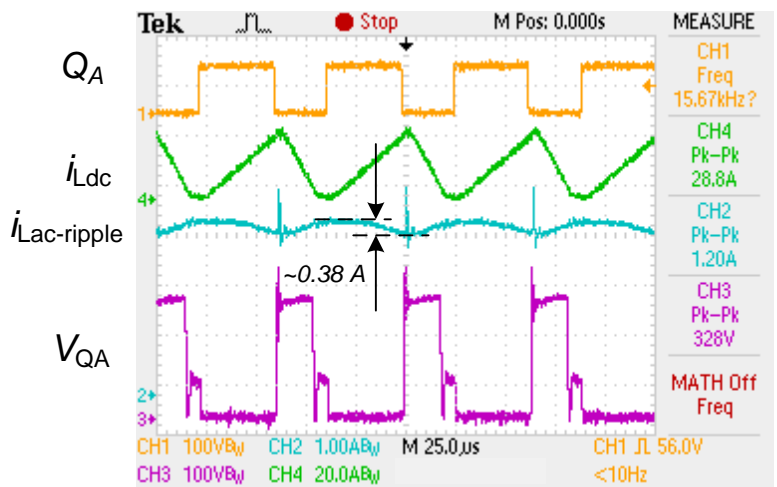


Figure 13. Detailed waveforms of buck-boost inverter

Low order frequency spectrum of inverter output current was also measured to reveal waveform quality. Frequency spectrum of output current depicted in Figure 14 shows total harmonic distortion and individual distortion which are well below 5%. Thus, it complies with most Total Harmonic Distortion (THD) limitation recommended by most power quality standards.



Figure 14. Measured frequency spectrum of inverter output current

IV. Conclusion

This paper has presented detailed analysis and design of the buck-boost inverter for wide input voltage application. Inverter parameters were obtained using both analytical and graphical methods which considers power quality of the inverter. Experimental results have been obtained using a scaled-down hardware prototype with results showing a strong correlation with simulations. A low cost microcontroller was sufficient to implement control circuit without compromising quality. Simulation result shows strong conformity to the converter design criteria. However, converter waveform test shows slight deviation from its design criteria. Test results showed ripple on output current is 3.25%. In term of waveform distortion, the THD of output current was less than 5% over a wide range of loads.

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