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学位論文の題目	Design Issues in Switched Mode Power Supplies for Television Receivers (テレビ受信機のスイッチモード電源装置の設計問題)		
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<b>学位論文内容の要旨</b>			
<p>This thesis studies design issues in switched Mode Power Supplies for Television Receivers. The issues encountered are due to the applications of new technologies, and they required innovative solutions. The solutions implemented resulted in successful patent applications. This thesis consist of three chapters, which address three topics that are important to the application of switch mode power supplies for consumer applications, and were implemented in TV receivers.</p> <p><b>Chapter1</b></p> <p>This chapter describes the design of an overvoltage protection circuit that was developed for voltage doubler applications. There were two main factors that motivated this solution. One was an enormous cost reduction in the doubler circuit. The other factor, which is more important is improved safety of power supplies. The protection circuit has been patented by Philips. International patents were the issues for this design. This chapter describes some alternative approaches to the protection circuit, and a mathematical model is developed to predict the performance of this circuit. Some practical aspects to ensure a reliable design are also covered. Electrical design and safety evaluations are covered and detailed test results are provided. The protection circuit passed all compliance requirements for IEC 65 and Dentori.</p> <p><b>Chapter 2</b></p> <p>A new root cause for an old problem has been identified, Sound-In-Vision (SIV). The new problem is due magnetic cross talk in the flyback transformer. An overview of the problem is provided, and a method to diagnose the magnetic cross talk is described. The cross talk issue is due to the increased demand for more audio power.</p> <p><b>Chapter 3</b></p> <p>Some innovative solutions are described to reduce standby power consumption. The first method described, significantly reduces the standby power. The solution is not cost effective enough to make it to production. It also would require amendments to IEC 65 safety standards. The other method described is a switching system that allows the use of remote controls to switch on equipment. This solution has been granted international patents, and it redefines a standby system.</p> <p><b>Conclusion</b></p> <p>This section summaries the innovative solutions and proposes possible further investigation in the consumer power field.</p>			

## 論文審査結果の要旨

In this thesis, he studied design issues encountered in the development of a new switched mode power supply for a television receiver. The design issues encountered are not standard design problems which one encounters with known technology in new applications. The issues encountered are due to advanced technology and novel solutions being introduced in very competitive global markets, and for which there have not been any known solutions. Terrance Smith, a former president of the IEEE Consumer Electronics Society defined Consumer Electronics as a high volume, low margin industry. In an academic environment, the cost is generally not a driving factor, which is in stark contrast to consumer electronics. Every cent that can be shaved off a product is import to the success of the product. Thus the design strategy aims at cost effective solutions.

This thesis covers three chapters which relate to issues that are very important to consumer electronics. The first chapter deals with voltage doubling, and proposes an innovative overvoltage protection solution. The solution proposed has been patented internationally by Philips, and has found wide applications in the automotive industry. The second chapter deals with Sound-In-Vision (SIV) cross modulation. The phenomenon has been around for many decades. The root cause of this phenomenon changes as technology changes. In the early days of television, it was due to cross modulation between the sound and vision carriers in the Intermediate Frequency (IF) Stage of a receiver. Then, an underrated power supply was the next major issue. In this thesis, again the root cause is in the power supply, but is due to magnetic cross talk in the core of the switching transformer. The third chapter deals with standby power consumption. One of the early proposals promised significant standby power reduction. The cost issues, however, were the stumbling block. In order to provide a cost effective solution, some of the IEC 65 safety requirements were challenged. Thus, the first attempt did not progress into a product. The proposal that is described in this thesis is the world's first truly zero power standby solution. International patents have been granted for this solution.

From the overall evaluation of this thesis, the applicant has satisfied the qualification condition for the doctor degree in Engineering from the Graduate School of Natural Science and Technology at Okayama University.