**Introduction**

**Aim**

To design the magnetic components of a push-pull DC-DC power converter according to the design specifications listed in the project outline.

**Report Layout**

In our design, we have made use of several documents that have been provided to us via the Moodle site, particularly the AN2794 design document (we shall refer to this as the reference document)

We had to fulfil 3 tasks, which were the design of the push-pull converter, the transformer and the inductor. Our specifications and calculations were performed in Excel and a complete printout is available below. For convenience, we have numbered our equations similarly to the reference document.

**Modifications**

We were also required to produce an auxiliary output of 12 V which differed from the reference document. We have made the required calculations which are documented in the appendix.

**Assumptions and Design Choices**

1. A switching frequency of 50 000 Hz was chosen.

2. Target efficiency of 80 % chosen with a 5% margin for error.

3. For our transformer, we chose an E44 N87 core with no gap.

4. For our inductor, we chose an E34 N27 core with an air gap.

5. Wire diameter of 0.09cm for the transformer chosen based on our calculation of the Skin effect.

**Results and Summary**

1. Push-pull Converter

Max Input RMS current 2.4712 A

Transformer turns ratio 0.667

Auxiliary turns ration 1.333

Output filter inductor value 107 uH

Input capacitor value 251.788 F

2. Transformer

Apparent Power 54.551 W

Core geometry parameter 0.03762

Primary Turns 3.9

Secondary Turns 2.6

Auxiliary Turns 5.2

Wire diameter 0.09 cm

Copper + Core losses 1.4 W

3. Inductor

Core ETD34 N27 with air gap of 0.20 mm

Number of Turns 18.5

**Conclusion**

Our report has extended up to the design of the magnetics involved in our push-pull converter. The next stage of the design process would involve the construction and testing of our design.

**References**

1. <http://www.epcos.com/blob/519704/download/2/ferrites-and-accessories-data-book-130501.pdf>

2 . <http://www.mag-inc.com/design/design-guides/powder-core-loss-calculation>

3. http://www.mhw-intl.com/assets/CSC/CSC%20Design%20Formulas%202011.pdf

4. <http://moodle.vle.monash.edu/pluginfile.php/2556969/mod_resource/content/1/ST%20Push->Pull%20Converter%20Detailed%20Design%20AN2794.pdf

5. http://trs-new.jpl.nasa.gov/dspace/bitstream/2014/36341/1/93-1878.pdf