Acknowledgements

Firstly, I would like to thank my mother, Mrs Ramayee Muthuraman, for the love and encouragement she has given me. Her faith has been a great inspiration in compilation of this thesis. I would like to express gratitude to my younger brother Mr Valliappan Muthuraman who assists my mother in every respect while I am away from home.

Secondly, I am indebted to both my supervisors Mr Grant Maxwell and Dr Christopher MacLeod for their assistance and advice over the duration of the project. Without their supervision skills, the project would have been much more difficult and not nearly as enjoyable.

Thirdly, I am indebted to The Robert Gordon University for the award of a Research Studentship.

A special note of thanks is due to Mr Matthew G Crowley, who assisted in proof reading the thesis and made many valuable suggestions during the project and for his friendship.

Thanks to Dr Christopher MacLeod, Dr David McMinn and Mrs Ann B Reddipogu for their permission to include details of their work in the text.

Finally, I am also grateful for the encouragement during this project from The Robert Gordon University, School of Engineering staff, particularly Mr Kenneth S Gow and Mrs Ann B Reddipogu.

Sethuraman Muthuraman