The activation function — the sigmoid function, was implemented by a look-up table. Its resolution also derived from the studies with the C neural net simulator.

Besides the neural processor design, the system global simulation involved the surrounding environment description, needed for its control, initialization and programming. An assembler based on a subset of the processor instructions was built, the host controlling tasks were emulated, and a C program for generating the configuration-dependent Verilog code and the system memories contents, has been developed.

Communicating with the host by means of independent interfaces, the neural hardware to be built and the simulator comprising the system description, the assembler and the configuration program, are functionally equivalent to the user.

With the use of the possibilities given by Verilog HDL and Verilog-XL, as tools for capturing, testing and characterising the design, fundamental issues in high complexity digital systems design, the adopted design procedure is in full agreement with the current developing methodologies. The description and system simulation with a variable number of processors operating simultaneously, further than validating the architecture, comprehend a rich set of future application possibilities: toward hardware and software optimization and test, and study of other issues related to parallel processing systems in general.

The design work done and the written dissertation, constitute are a major step in the development of a versatile and high performance neural computer.

Título: Análise de Sistemas Ópticos Coerentes FSK e Estudo de Receptores Ópticos de Elevado Desempenho

***Title**: Analysis of Coherent FSK Optical Systems and Study of High Performance Optical Receivers*

Autor/*Author*: Carlos Júlio Rodrigues Ferreira Lourenço

Orientador/*Advisor*: José Ferreira da Rocha

Data Apresentação/*Acceptance Date*: 06/95

Palavras Chave: Receptores ópticos, sistemas de transmissão coerente

***Key Words**: Optical receivers, optical tuned front-end, optical fibre system design, coherent systems.*

Mestrado/*Ms.C.*

Resumo

Este trabalho contribui com um estudo a nível de sistema e com o projecto cuidadoso do receptor óptico, designado vulgarmente por *front-end* óptico, o qual apresenta a novidade de ser simultaneamente balanceado e sintonizado. Assim, a contribuição desta dissertação consiste sobretudo no projecto e arquitectura do sistema, seu dimensionamento global em termos dos parâmetros técnicos e operacionais assim como também no projecto e implementação do *front-end* óptico. Este será aqui apresentado com grande detalhe pois é um bloco de primordial importância para se conseguir alcançar um sistema com elevado desempenho, sendo particularmente crítico num sistema coerente. O projecto do *front-end* reveste-se de particular dificuldade pelas suas características, nomeadamente, por oferecer uma considerável largura de banda e simultaneamente garantir a minimização do ruído e a maximização do ganho de transimpedância.

Abstract

This work contributes with a study at the system level and the careful design of the optical receiver, especially the optical front-end, which presents the novelty of being balanced and simoultaneously tuned. Then the contribution of this dissertation consists firstly on the system design, in terms of the technical and operational pararneters, as well as in the design and irnplernentation of the optical front-end. This will be presented here with great detail because it is a crucial block to implement a system with the best performance, being particularly critical in a coherent system. The front-end design is especially difficult due to its characteristics, since it must offer a considerable bandwidth and sirnoultaneously guarantee minimization of noise and maximization of the transimpedance gain.

Título: Estudo da Transmissão Simultânea de Canais Analógicos e Digitais num Sistema de Distribuição de Televisão por Fibra Óptica

***Title**: Analysis of Simultaneous Transmission of Analogue and Digital Channels in a Optical Fiber Television Delivery System*

Autor/*Author*: Paulo Emanuel da Costa Pereira Afonso

Orientadores/*Advisors*: A. Manuel de Oliveira Duarte e Paulo Henrique Grilo Domingues

Data Apresentação/*Acceptance Date*: 09/95

Palavras Chave: Fibra óptica, intermodulação, sobremodulação, *clipping*, distorção, modulação de subportadoras (SCM), linearidade, televisão

***Key Words**: Optical fiber, intermodulation noise, overmodulation, clipping, distortion, subcarrier multiplexing (SCM), linearity, television*

Mestrado/*M.S.*

Resumo

Sistemas de multiplexagem de subportadoras para distribuição de televisão e serviços. Função geradora de produtos de intermodulação. Efeito da fase sobre as não linearidades fracas. Sobremodulação e efeito de clipping. Transmissão de subportadoras analógicas e digitais em simultâneo.

Abstract

Subcarrier multiplexing systems for television and services delivery. Source function of intermodulation products. Phasis influence over the weak nonlinearities. Overmodulation and clipping. Simultaneous transmission of analogue and digital subcarriers.