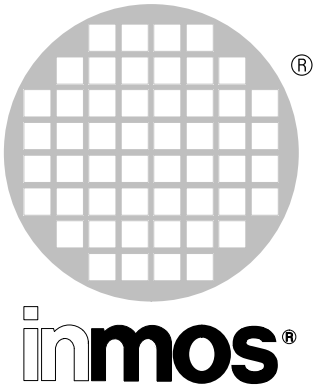

Networks, Routers and Transputers:

Function, Performance, and Applications

Edited by: M.D. May
P.W. Thompson
P.H. Welch

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Preface

High speed networks are an essential part of public and private telephone and computer communications systems. An important new development is the use of networks within electronic systems to form the connections between boards, chips and even the subsystems of a chip. This trend will continue over the 1990s, with networks becoming the preferred technology for system interconnection.

Two important technological advances have fuelled the development of interconnection networks. First, it has proved possible to design high–speed links able to operate reliably between the terminal pins of VLSI chips. Second, high levels of component integration permit the construction of VLSI routers which dynamically route messages via their links. These same two advances have allowed the development of embedded VLSI computers to provide functions such as network management and data conversion.

Networks built from VLSI routers have important properties for system designers. They can provide high data throughput and low delay; they are scalable up to very large numbers of terminals; and they can support communication on all of their terminals at the same time. In addition, the network links require only a small number of connection points on chips and circuit boards. The most complex routing problems are moved to the place where they can be done most easily and economically – within the VLSI routers.

The first half of this book brings together a collection of topics in the construction of communication networks. The first chapters are concerned with the technologies for network construction. They cover the design of networks in terms of standard links and VLSI routing chips, together with those aspects of the transputer which are directly relevant to its use for embedded network computing functions. Two chapters cover performance modelling of links and networks, showing the factors which must be taken into consideration in network design.

The second half of the book brings together a collection of topics in the application of communication networks. These include the design of interconnection networks for high–performance parallel computers, and the design of parallel database systems. The final chapters discuss the construction of large–scale networks which meet the emerging ATM protocol standards for public and private communications systems.

The 1990s will see the progressive integration of computing and communications: networks will connect computers; computers will be embedded within networks; networks will be embedded within computers. Thus this book is intended for all those involved in the design of the next generation of computing and communications systems.

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Credits

This book has been assembled from a number of sources. The authors of the chapters are as follows:

Chapter 1	M.D. May and P.W. Thompson
Chapter 2	M.D. May, R.M. Shepherd and P.W. Thompson
Chapter 3	M. Simpson and P.W. Thompson
Chapter 4	H. Gurney and C.P.H. Walker
Chapter 5	J.M. Wilson
Chapter 6	C. Barnaby, V.A. Griffiths and P.W. Thompson
Chapter 7	C. Barnaby and M.D. May
Chapter 8	C. Barnaby, M.D. May and D.A. Nicole
Chapter 9	J.M. Kerridge
Chapter 10	C. Barnaby and N. Richards
Chapter 11	C.J. Adams, J.W. Burren, J.M. Kerridge, P.F. Linnington, N. Richards and P.H. Welch
Appendix A	C.P.H. Walker
Appendix B	C.P.H. Walker
Appendix C	R. Francis
Appendix D	R. Francis

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Contents

Preface . . . . . **v**

1 Transputers and Routers: Components for Concurrent Machines . **1**

1.1 Introduction 1
1.2 Transputers 1
1.3 Routers 2
1.4 Message Routing 6
1.5 Addressing 9
1.6 Universal Routing 12
1.7 Conclusions 14

2 The T9000 Communications Architecture **15**

2.1 Introduction 15
2.2 The IMS T9000 15
2.3 Instruction set basics and processes 16
2.4 Implementation of Communications 18
2.5 Alternative input 24
2.6 Shared channels and Resources 28
2.7 Use of resources 34
2.8 Conclusion 36

3 DS-Links and C104 Routers **39**

3.1 Introduction 39
3.2 Using links between devices 39
3.3 Levels of link protocol 39
3.4 Channel communication 42
3.5 Errors on links 45
3.6 Network communications: the IMS C104 46
3.7 Conclusion 54

4 Connecting DS-Links **55**

4.1 Introduction 55
4.2 Signal properties of transputer links 55
4.3 PCB connections 56
4.4 Cable connections 58
4.5 Error Rates 64

4.6 Optical interconnections 65
4.7 Standards 67
4.8 Conclusions 68
4.9 References 69
4.10 Manufacturers and products referred to 70

5 Using Links for System Control 71

5.1 Introduction 71
5.2 Control networks 73
5.3 System initialization 75
5.4 Debugging 78
5.5 Errors 79
5.6 Embedded applications 81
5.7 Control system 81
5.8 Commands 83
5.9 Conclusions 84

6 Models of DS–Link Performance 85

6.1 Performance of the DS–Link Protocol 85
6.2 Bandwidth Effects of Latency 90
6.3 A model of Contention in a Single C104 95
6.4 Summary 103

7 Performance of C104 Networks 105

7.1 The C104 switch 105
7.2 Networks and Routing Algorithms 105
7.3 The Networks Investigated 107
7.4 The traffic patterns 109
7.5 Universal Routing 110
7.6 Results 110
7.7 Performance Predictability 116
7.8 Conclusions 117

8 General Purpose Parallel Computers 119

8.1 Introduction 119
8.2 Universal message passing machines 119
8.3 Networks for Universal message passing machines 122
8.4 Building Universal Parallel Computers from T9000s and C104s 126
8.5 Summary 131

9 The Implementation of Large Parallel Database Machines on T9000 and C104 Networks 133

9.1 Database Machines 133
9.2 Review of the T8 Design 134
9.3 An Interconnection Strategy 136
9.4 Data Storage 137
9.5 Interconnection Strategy 139
9.6 Relational Processing 140
9.7 Referential Integrity Processing 141
9.8 Concurrency Management 142
9.9 Complex Data Types 145
9.10 Recovery 146
9.11 Resource Allocation and Scalability 146
9.12 Conclusions 148

10 A Generic Architecture for ATM Systems 151

10.1 Introduction 151
10.2 An Introduction to Asynchronous Transfer Mode 152
10.3 ATM Systems 162
10.4 Mapping ATM onto DS–Links 177
10.5 Conclusions 181

11 An Enabling Infrastructure for a Distributed Multimedia Industry 183

11.1 Introduction 183
11.2 Network Requirements for Multimedia 183
11.3 Integration and Scaling 186
11.4 Directions in networking technology 186
11.5 Convergence of Applications, Communications and Parallel Processing 187
11.6 A Multimedia Industry – the Need for Standard Interfaces 188
11.7 Outline of a Multimedia Architecture 189
11.8 Levels of conformance 194
11.9 Building stations from components 195
11.10 Mapping the Architecture onto Transputer Technology 196

Appendices:

A New link cable connector 201

B Link waveforms 203

C DS–Link Electrical specification 205

D An Equivalent circuit for DS–Link Output Pads 209