

Networks, Routers and Transputers:

Function, Performance, and Applications

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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

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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

