

3125

## CHAPTER 1

## INTRODUCTION

1.0	Overview .....	1-1
1.0.1	Network Solutions Via Standards .....	1-1
1.1.0	CSMA/CD Overview .....	1-2
1.1.1	IEEE 802.3 .....	1-3
1.1.2	CSMA/CD User Benefits .....	1-3
1.2	The Intel LAN Solution .....	1-5
1.2.1	A Commitment to Standards .....	1-5
1.2.2	The 82586 LAN Coprocessor .....	1-5
1.2.3	The 82501 Ethernet Serial Interface .....	1-7
1.2.4	iNA 960 Transport Software .....	1-8
1.3	82586 System Overview .....	1-8
1.3.1	The 82586/CPU Shared Memory Structure .....	1-8
1.3.2	Receiving A Frame .....	1-12
1.3.3	Transmitting A Frame .....	1-13

## CHAPTER 2

## 82586 LAN COPROCESSOR

2.0	Overview .....	2-1
2.1	Overview of the 82586 LAN Coprocessor .....	2-1
2.2	82586 Transmit Function .....	2-3
2.2.1	Framing .....	2-3
2.2.2	Link Management .....	2-4
2.2.3	Priority Mechanism .....	2-4
2.2.4	Details of the Link Management Algorithm .....	2-5
2.3	82586 Receive Functions .....	2-6
2.3.1	Frame Reception .....	2-6
2.3.2	Addressing .....	2-6
2.4	82586 Network Management and Diagnostic Functions .....	2-7
2.4.1	Transmission/Reception Error Reporting .....	2-7
2.4.2	Network Planning and Maintenance .....	2-8
2.4.3	Station Diagnostics .....	2-8
2.4.4	82586 Self Testing .....	2-8
2.5	82586/Host CPU Interaction .....	2-9
2.5.1	Logical Interface .....	2-9
2.5.2	Hardware Bus Interface .....	2-11
2.5.3	Memory Addressing .....	2-11
2.6	Initializing the 82586 .....	2-13
2.6.1	Initialization Root Format .....	2-13
2.6.2	Initialization Process .....	2-13
2.7	Controlling the 82586 .....	2-14
2.7.1	System Control Block (SCB) Format .....	2-14
2.7.2	Starting and Completing Control Commands .....	2-16
2.7.3	Command Unit (CU) Control .....	2-16
2.7.4	Receive Unit (RU) Control .....	2-20
2.7.5	Reset .....	2-22
2.7.6	Error Statistics Registers .....	2-23
2.7.7	SCB Status Update .....	2-23
2.8	Action Commands .....	2-24
2.8.1	General Action Command .....	2-25
2.8.2	NOP .....	2-26
2.8.3	IA-Setup .....	2-27

# Table of Contents (Continued)

2.8.4	Configure	2-28
2.8.5	MC-Setup	2-30
2.8.6	Transmit	2-31
2.8.7	TDR (Time Domain Reflectometer)	2-35
2.8.8	Dump	2-36
2.8.9	Diagnose	2-43
2.9	Frame Reception	2-44
2.9.1	Receive Frame Area (RFA)	2-44
2.9.2	Frame Descriptor (FD) Format	2-44
2.9.3	Receive Buffer Descriptor Format	2-46
2.9.4	Initial Structure of Receive Frame Area	2-46
2.9.5	Detailed Operation of Receiving A Frame	2-46
2.10	Bus Interface	2-48
2.10.1	Memory Addressing and Organization	2-49
2.10.2	Bus Operation	2-49
2.10.3	Bus Acquisition	2-50
2.10.4	FIFO-Threshold Mechanism	2-52
2.10.5	Bus Cycle Interleaving	2-53
2.10.6	CPU/82586 (CA/INT) Handshake	2-54
2.11	Network Interface Hardware	2-55
2.11.1	Encoding/Decoding	2-55
2.11.2	Carrier Sense	2-55
2.11.3	Collision Detection	2-56
2.11.4	Serial Link Acquisition	2-56
2.11.5	Loopback	2-57
2.11.6	Interframe Spacing Timer	2-57
2.12	Configuration Parameters	2-57
2.12.1	Framing Parameters	2-57
2.12.2	Link Management Parameters	2-58
2.12.3	Serial Interface Parameters	2-59
2.12.4	Host Interface Parameters	2-60
2.12.5	Network Management Parameters	2-61
2.13	Internal Architecture	2-61
2.13.1	The Host Interface Module	2-62
2.13.2	The Channel Interface Module	2-63
2.13.3	The FIFO Module	2-63

## CHAPTER 3

### PROGRAMMING THE 82586

3.0	Introduction	3-1
3.1	Fitting the 82586 into a System	3-1
3.2	The 82586 Handler	3-2
3.2.1	The 82586 Handler as a Standard Device Driver	3-2
3.2.2	The 82586 Handler as a Special Driver	3-4
3.3	Initialization	3-5
3.4	Simple Command Processing	3-6
3.4.1	Adding CBs to the CBL	3-6
3.4.2	Basic Interrupt Service Routine	3-6
3.5	Advanced Command Processing	3-7
3.5.1	Adding Command Blocks to Static and Dynamic Lists	3-8
3.5.2	Static List Interrupts	3-8

# Table of Contents (Continued)

3.5.3	Dynamic List Interrupts	3-8
3.5.4	CU Command Simplification	3-11
3.6	Receive Frame Processing	3-12
3.6.1	Supplying FDs to the RDL	3-12
3.6.2	Supplying FDs to the FBL	3-13
3.6.3	Receive Interrupt Processing	3-14
3.6.4	Rules for Starting the RU	3-14
3.6.5	Considerations in Using Receive Buffers	3-15
3.7	Combining Receive and Command Processing	3-17

## CHAPTER 4

### 82501 SERIAL INTERFACE

4.0	82501 Overview	4-1
4.1	Functional Description	4-1
4.1.1	Clock Generation	4-1
4.1.2	The Transmit Section	4-2
4.1.3	Receive Section	4-4
4.1.4	Collision-Presence Section	4-5
4.1.5	Internal Loopback	4-6
4.2	Interface Example	4-6

## CHAPTER 5

### APPLICATION EXAMPLES

5.0	Overview	5-1
5.1	Minimum 82586 System Bus Speed	5-1
5.2	Setting the 82586 FIFO-Threshold	5-2
5.3	Minimum Buffer Size	5-3
5.4	System Configurations	5-4
5.4.1	80186 Elementary Maximum Mode System	5-4
5.4.2	8086 Elementary Maximum Mode System	5-5
5.4.3	Stand Alone Multibus System	5-5
5.4.4	Dual Port RAM Systems	5-5
5.4.5	8088 Elementary Maximum Mode System	5-11
5.4.6	Multiple Bus Master Systems	5-11
5.5	Calculating Unique Multicast Addresses	5-11
5.6	A Low Cost Dual Port Memory Design	5-15
5.6.1	Hardware Design	5-15
5.6.2	Application Software	5-23
5.6.3	Special Considerations	5-60
5.6.4	Conclusion	5-60
5.7	iNA 960 Transport Engine	5-60
5.7.1	Introduction	5-60
5.7.2	Transport Engine Hardware	5-62
5.7.3	Transport Engine Software	5-62

82586 Data Sheet	6-1
82501 Data Sheet	6-35
iNA 960 Data Sheet	6-46
iSBC 186/51 Data Sheet	6-58
Glossary	7-1
Index	8-1