

TECHNICAL USER'S MANUAL FOR:

MICROSPACE®

PC/104 Peripheral boards

MSME104

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1 PREFACE	6
1.1 HOW TO USE THIS MANUAL.....	6
1.2 TRADEMARKS	6
1.3 DISCLAIMER.....	6
1.4 WHO SHOULD USE THIS PRODUCT	6
1.5 RECYCLING INFORMATION	7
1.6 TECHNICAL SUPPORT.....	7
1.7 LIMITED WARRANTY.....	7
2 OVERVIEW	8
2.1 FEATURES OF THE MSME104 CARD	8
3 INSTALLATION	9
3.1 GENERAL	9
3.1.1 <i>Soft- or Hardware Configuration</i>	9
3.1.2 <i>Jumper setting for Base-Addr., IRQ, Bus, Interface</i>	9
3.1.3 <i>The Factory Setting</i>	10
3.2 THE CONFIGURATION FOR NW3.X (HARDWARE SELECTED).....	10
3.3 THE CONFIGURATION FOR NW4.X (HARDWARE SELECTED).....	12
4 BOARD LAYOUT	13
5 JUMPERS ON THE BOARD	14
6 CONNECTORS ON THE BOARD	15
7 REQUIRED EXTERNAL VOLTAGES FOR THE MSME104	15
8 SOFTWARE	16
8.1 DRIVER LOCATION	16
8.2 FILE NAMES OF THE SUPPORTED LAN DRIVERS.....	16
8.3 REQUIRED TOOLS TO SUPPORT TCP/IP.....	17
8.4 ETHERNET DRIVERS.....	18
8.4.1 <i>To find Ethernet Drivers</i>	18
8.4.2 <i>Possible Choices for your Novell Workstation</i>	19
8.5 HOW TO INSTALL A DRIVER.....	20
8.5.1 <i>Readme.txt from the directory ETH96_1</i>	20
8.6 QUESTIONS REGARDING THE DRIVERS.....	24
9 DIAGNOSTICS	25
9.1 PROGRAM BY DIGITAL-LOGIC AG	25
9.1.1 <i>BCONF.EXE</i>	25
9.1.2 <i>ETH.EXE for Software Configuration</i>	25
9.1.3 <i>ETHPROG.EXE to store the standard defaults in the EEPROM</i>	27
9.1.4 <i>NETCONF.EXE</i>	29
9.2 PROGRAM BY SMC	31
9.2.1 <i>Use these programs for Customer Modifications in the EEPROM</i>	31
9.2.2 <i>Use this program for Diagnostics</i>	31
10 FAILURES AND HINTS	32
10.1 GENERAL ETHERNET HINTS	32
10.2 ETHPROG.EXE HANGS ON THE ADDRESS 400HEX.....	32
10.3 LOGIN TO SERVER NOVELL DOES NOT WORK.....	32
10.3.1 <i>Config.sys LASTDRIVE=Z</i>	32
10.4 PATH IS NOT THE SAME AFTER LOGIN TO ETHERNET	33
11 INDEX	34

1 PREFACE

This manual is for integrators and programmers of systems based on the MICROSPACE card family. It contains information on hardware requirements, interconnections, and details of how to program the system. The specifications given in this manual were correct at the time of printing; advances mean that some may have changed in the meantime. If errors are found, please notify DIGITAL-LOGIC AG at the address shown on the title page of this document, and we will correct them as soon as possible.

1.1 How to use this Manual

This manual is written for the original equipment manufacturer (OEM) who plans to build computer systems based on the single board MICROSPACE-PC. It provides instructions for installing and configuring the MSME104, and describes the system and setup requirements.

1.2 Trademarks

Chips & Technologies	SuperState R
MICROSPACE, MicroModule	DIGITAL-LOGIC AG
DOS Vx.y, Windows	Microsoft Inc.
PC-AT, PC-XT	IBM
NetWare	Novell Corporation
Ethernet	Xerox Corporation
DR-DOS, PALMDOS	Digital Research Inc. / Novell Inc.
ROM-DOS	Datalight Inc.

1.3 Disclaimer

DIGITAL-LOGIC AG makes no representations or warranties with respect to the contents of this manual and specifically disclaims any implied warranty of merchantability or fitness for any particular purpose. DIGITAL-LOGIC AG shall under no circumstances be liable for incidental or consequential damages or related expenses resulting from the use of this product, even if it has been notified of the possibility of such damage. DIGITAL-LOGIC AG reserves the right to revise this publication from time to time without obligation to notify any person of such revisions. If errors are found, please contact DIGITAL-LOGIC AG at the address listed on the title page of this document.

1.4 Who should use this Product

- Electronic engineers with know-how in PC-technology.
- Without electronic know-how we expect you to have questions. This manual assumes, that you have a general knowledge of PC-electronics.
- Because of the complexity and the variability of PC-technology, we can't give any warranty that the product will work in any particular situation or combination. Our technical support will help you.
- Pay attention to the electrostatic discharges. Use a CMOS protected workplace.
- Power supply OFF when you are working on the board or connecting any cables or devices.

**This is a high technology product.
You need know-how in electronics and PC-technology to
install the system !**

1.5 Recycling Information

- Hardware:**
- **Print:** epoxy with glass fiber
wires are of tin-plated copper
 - **Components:** ceramics and alloys of gold, silver
check your local electronic recycling
- Software:**
- **no problems:** re-use the diskette after formatting

1.6 Technical Support

1. Contact your local DIGITAL-LOGIC Technical Support in your country.
2. Send an error description to our Technical Support:

DIGITAL-LOGIC AG
Dept. Tech. Support
Nordstr. 4F
CH-4542 Luterbach (SWITZERLAND) Fax: +41-32 681 53 31

1.7 Limited Warranty

DIGITAL-LOGIC AG warrants the hardware and software products it manufactures and produces to be free from defects in materials and workmanship for one year following the date of shipment from DIGITAL-LOGIC AG, Switzerland. This warranty is limited to the original product purchaser and is not transferable.

During the one year warranty period, DIGITAL-LOGIC AG will repair or replace, at its discretion, any defective product or part at no additional charge, provided that the product is returned, shipping prepaid, to DIGITAL-LOGIC AG. All replaced parts and products become property of DIGITAL-LOGIC AG.

Before returning any product for repair, customers are required to contact the company.

This limited warranty does not extend to any product which has been damaged as a result of accident, misuse, abuse (such as use of incorrect input voltages, wrong cabling, wrong polarity, improper or insufficient ventilation, failure to follow the operating instructions that are provided by DIGITAL-LOGIC AG or other contingencies beyond the control of DIGITAL-LOGIC AG), wrong connection, wrong information or as a result of service or modification by anyone other than DIGITAL-LOGIC AG. Neither if the user has not enough knowledge of these technologies or has not consulted the product manual or the technical support of DIGITAL-LOGIC AG and therefore the product has been damaged.

Except, as expressly set forth above, no other warranties are expressed or implied, including, but not limited to, any implied warranty of merchantability and fitness for a particular purpose, and DIGITAL-LOGIC AG expressly disclaims all warranties not stated herein. Under no circumstances will DIGITAL-LOGIC AG be liable to the purchaser or any user for any damage, including any incidental or consequential damage, expenses, lost profits, lost savings, or other damages arising out of the use or inability to use the product.

2 OVERVIEW

2.1 Features of the MSME104 Card

- Optimized for the use with a PC/104 Bus
- Ideal for embedded applications
- Low-power CMOS
- High speed 10 MBit/second operation
- Onboard buffer 4608 Byte
- Connects thin-wire and twisted pair cable

LAN Interface:	
Availability:	Standard
Controller:	SMC91C92, SMC91C94
Enhanced BIOS:	Optional, Boot-BIOS
Memory OnChip:	4608Byte RAM
Interface:	Ethernet IEEE802.3 Cheapernet, 10BASE-2 (Thinwire, Thin Coax), 10BASE-T (Twisted Pair) or 10Base-5 (AUI, Coax)
Data rate:	10 MB/s
Driver:	Packet-Driver, ODI, Novell approved
Compatibility:	ODI-Novell
Remote boot socket:	Yes
Cable type:	RG/58A/U 50 Ohms

BUS:	
Standard:	PC/104
Size:	8 or 16 Bit

Power Supply:	
Power:	5Volt +/- 5%, 1W

Physical Characteristics:		
Dimensions:	Length:	96 mm
	Width:	90 mm
	Height:	20 mm

Operating Environment:			
Relative humidity:	5 - 90% non condensing		
Vibration:	5 to 2000 Hz		
Shock:	10g		
Temperature:	Operating:	Standard version:	0°C to +70°C
		Industry version:	-25°C to +85°C (ask DIGITAL-LOGIC AG for additional temperatures)
	Storage:		-55°C to +85°C

Any information is subject to change without notice.

Ordering Information:	
MSME104-1	LAN-Ethernet PC/104 Module 10BASE-T
MSME104-2	LAN-Ethernet PC/104 Module 10BASE-2
MSME104-5	LAN-Ethernet PC/104 Module 10BASE-5

2.2 Related Application Notes

#	Description
28	Installing Ethernet with SMC91C94
29	Installing SCSI on Windows NT
36	MSME104 operating in 8 Bit Mode

→ Application Notes are available at <http://www.digitallogic.ch> ->support, or on any Application CD from DIGITAL-LOGIC.

3 INSTALLATION

3.1 General

3.1.1 Soft- or Hardware Configuration

The setting is hardware and software selectable and will be stored into an EEPROM.

We recommend the downloaded **software configuration** only for custom use, where the values must be altered, without soldering the jumpers onboard. **The downloaded configuration works only with Novell V3.11 and Novell Lite and all other ODI driver NOS.**

For OS/2, NT and UNIX applications always use the hardware configuration, because the drivers are only adapted for hardware configuration schemes.

3.1.2 Jumper setting for Base-Addr., IRQ, Bus, Interface

Make sure that no other device in the system uses **the same interrupt and base address** as the Ethernet Card. The operation may fail and produce a system hang up.

Jumper J6:

Position: Configuration	1-2 IOS0	3-4 IOS1	5-6 IOS2	7-8 ENEEP	Base-Addr.	IRQ	Bus	Interface
0	closed	closed	closed	open	340	5	8	AUI/COAX/WS
1	open	closed	closed	open	340	10	16	AUI/COAX/WS
2	closed	open	closed	open	320	11	16	AUI/COAX/--
3	open	open	closed	open	300	5	8	AUI/COAX
4	closed	closed	open	open	340	5	8	10BASE-T/WS
5	open	closed	open	open	340	10	16	10BASE-T/WS
6	closed	open	open	open	320	11	16	10BASE-T/--
7	open	open	open	open	downloadable software configuration			

3.1.3 The Factory Setting

Default	AUI / 10BASE-2: Position: Configuration 1
Default	10BASE-T: Position: Configuration 5

On the board, the default configuration and the selected configuration are labeled. The label also contains the unique node address:

Example label:

NODE:	aabbccddeeff			
0	340	i5	8	AUI
*1	340	i10	16	AUI
2	320	i11	16	AUI
3	300	i5	8	AUI
4	340	i5	8	10BASE-T
5	340	i10	16	10BASE-T
6	320	i11	16	10BASE-T

The asterisk * in front of the configuration 1 line marks the selected configuration. You can change the hardware configuration by modifying the jumper IOS0 - IOS2.

3.2 The Configuration for NW3.x (hardware selected)

The Ethernet controller is hardware selectable with preprogrammed values from the EEPROM. This is the **normal way** to start all operating systems:

A.) Select the configuration:

Selected by using the IOS0 - IOS2 jumper.
Refer to the table in the previous chapter.

RESTART THE PC-SYSTEM TO INITIALIZE THE NEW CONFIGURATION !

B.) Generate the corresponding NET.CFG file:

The NET.CFG file can be altered or created by using a normal ASCII editor or with the tools from DIGITAL-LOGIC AG. This step must be taken at the beginning or after selecting a new configuration.

BCONF Create the correct NET.CFG files (to be stored in the same subdirectory as the other drivers)

See this example of NET.CFG:

LINK DRIVER SMC9000	
INT 5	or , 9, 10, 11
PORT 300	or 320 (340, Hardware default)
NODE ADDRESS 909080804040	continuous
FRAME ETHERNET_802.3	
MEDIA_TYPE AUI	

C.) Starting the Network driver on the MSME104 (NW 3.11)

The following drivers and files are available on the tool disk.
Start the following files in this order (included in the Autoexec.bat file)

LSL	low level driver
SMC9000	SMC Driver for Novell V3.11 and Novell Lite
IPXODI	IPX-ODI-Driver
NETX	Novell Network Shell

Now you can login with your password.

or

D.) Starting the Network driver on the MSME104 (Novell Lite)

On the tool disk the following drivers and files are available.
Start the following files in this order (included in the Autoexec.bat file)

LSL	low level driver
SMC9000	SMC Driver for Novell V3.11 and Novell Lite
IPXODI	IPX-ODI-Driver
CLIENT	Lite V1.1 Workstation Shell

Now you can login with your password.

3.3 The Configuration for NW4.x (hardware selected)

A.) Select the configuration:

Selected by using the IOS0 - IOS2 jumper.
Refer to the table in the previous chapter.

RESTART THE PC-SYSTEM TO INITIALIZE THE NEW CONFIGURATION !

B.) Generate the corresponding NET.CFG file for NW4.x:

The NET.CFG file can be altered or created by using a normal ASCII editor or with the tools from DIGITAL-LOGIC AG. This step must be performed at the beginning or after selecting a new configuration.

```
NET.CFG          Link Driver SMC9000
                  PORT 340
                  INT 10
                  FRAME Ethernet_802.2

                  NetWare DOS Requester
                  FIRST NETWORK DRIVE = H
                  NETWARE PROTOCOL = NDS BIND
                  NAME CONTEXT = „TEST.PRODUKTION.DLAG“
```

Ask the netware administrator for the Name Context.

C.) Starting the Network driver on the MSME104 for NW4.x

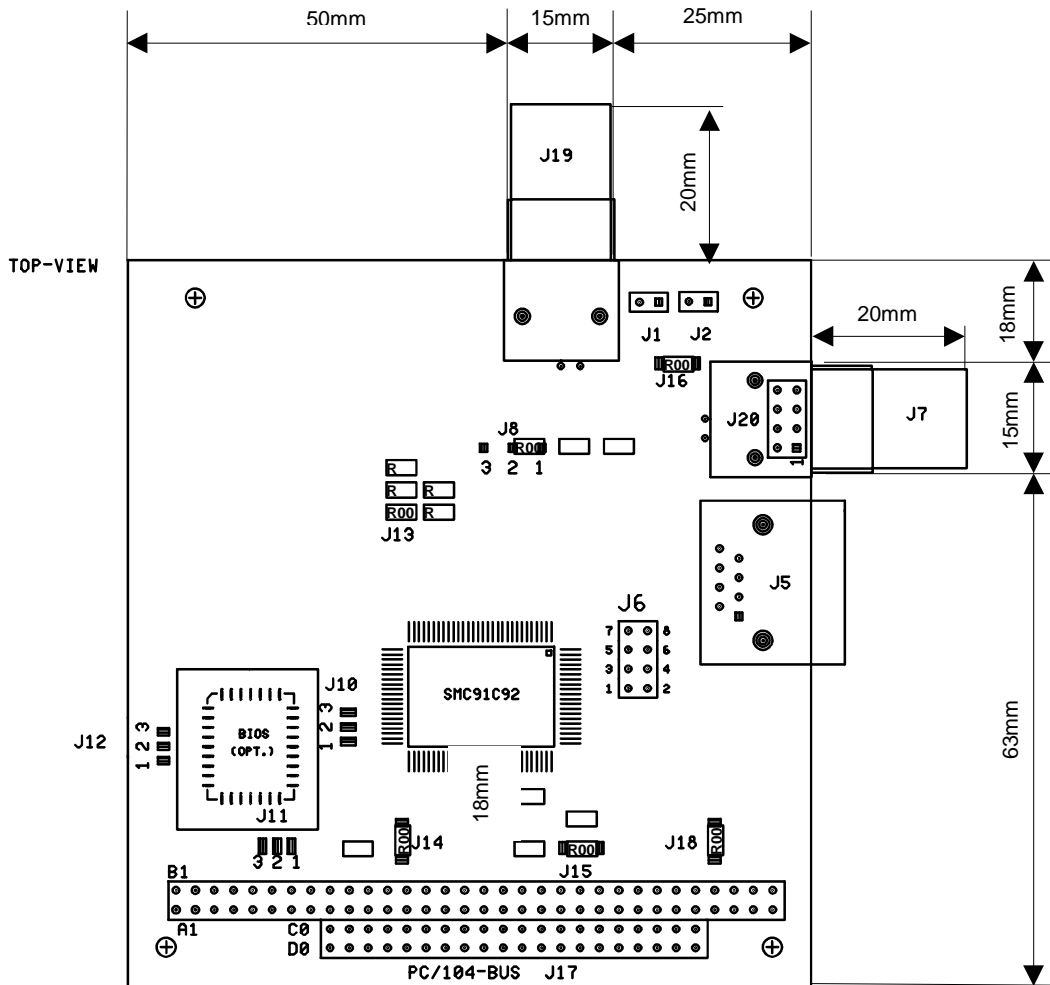
The following drivers and files are available on the tool disk.
Start the following files in this order (included in the Autoexec.bat file)

```
SET NWLANGUAGE = ENGLISH

LSL                low level driver          ( may be loaded into himem)
SMC9000            SMC Driver for Novell V3.11 ( may be loaded into himem)
IPXODI             IPX-ODI-Driver            ( may be loaded into himem)
VLM /MX           Novell Network Shell
```

Now you can login with your password.

4 BOARD LAYOUT



CONNECTOR-LIST:

- J1: RESERVE NET-OUTPUT
- J2: RESERVE NET-OUTPUT
- J5: RJ45 10-BASE-T
- J7: BNC CONNECTOR *
- J17: PC/104-BUS
- J19: BNC CONNECTOR OPTIONAL
- J20: AUI OUTPUT

JUMPER-LIST:

- PIN1-2 / 2-3
- J6: SEE TABLE P. 14
- J8: HBE EGND* /VEE
- J10: EPROM A16 VCC/GND OPEN*
- J11: EPROM A17 VCC/GND OPEN*
- J12: EPROM A18 VCC/GND OPEN*
- J13: 16BITCLOSE*/8-BIT OPEN
- J14: IOCHRY CLOSE*
- J15: ALE CLOSE*
- J16: ALWAYS CLOSE
- J18: -9V ENABLE CLOSE*

*= DEFAULT SETTING

5 JUMPERS ON THE BOARD

Jumper J6:

Position: Configuration	1-2 IOS0	3-4 IOS1	5-6 IOS2	7-8 ENEPP	Base-Addr.	RIQ	Bus	Interface
0	closed	closed	closed	open	340	5	8	AUI/COAX/WS
1	open	closed	closed	open	340	10	16	AUI/COAX/WS
2	closed	open	closed	open	320	11	16	AUI/COAX/--
3	open	open	closed	open	300	5	8	AUI/COAX
4	closed	closed	open	open	340	5	8	10BASE-T/WS
5	open	closed	open	open	340	10	16	10BASE-T/WS
6	closed	open	open	open	320	11	16	10BASE-T/--
7	open	open	open	open	downloadable software configuration			

Interface:

MSME104:	Signal:	Jumper 1 - 2	Jumper 2 - 3
J8	HBE	EGND*	VEE
J9	INTERRUPT	IRQ3	IRQ5*
J10	EPROM A16	VCC*	GND
J11	EPROM A17	VCC*	GND
J12	EPROM A18	VCC*	GND
J13	16Bit (8Bit = open)	closed*	
J14	IOCHRDY	closed*	
J15	ALE-Signal	closed*	
J16	Ethernet Level	closed*	
J18	-9V LAN Supply	closed*	

* = Default

Ethernet Configuration:

MSME104:	Signal:
J6	IOS Hardware Configuration Select

Interrupt Definitions

Card:

INTR3 = IRQ11
 INTR2 = IRQ10
 INTR1 = IRQ5
 INTR0 = IRQ9 (or IRQ2 on XT CPUs)

6 CONNECTORS ON THE BOARD

The selection of the active interface connector is made by software in the driver.

Coaxial Interface 10BASE-2:

J1, J2, J7, J19

10BASE-Interface:

J5

PIN:	Signal:
1	TX100R+
2	TX100R-
3	RX100R+
4	nc
5	nc
6	RX100R-
7	nc
8	nc

AUI

J20

PIN:	Signal:
1	12V (external)
2	GND
3	CD+
4	CD-
5	RX+
6	RX-
7	TX+
8	TX-

7 REQUIRED EXTERNAL VOLTAGES FOR THE MSME104

10BASE-2 / 10BASE-T

Only 5V needed from the PC/104-Bus.

AUI

5V needed from PC/104-Bus
 12V needed for AUI Output via
 - PC/104-Bus PIN B9 or
 - AUI Connector J20 PIN 1

8 SOFTWARE

8.1 Driver Location

1. On the LAN driver diskette that you get with your product, always read the read me file located on the disk for the latest updated and released drivers.
2. The latest drivers can be received from the manufacturer of your product using SMC LAN Ethernet Silicon. Contact the manufacturer directly.

Note: This should be your first line of support for additional drivers. Different manufacturers support a subset/superset of SMC LAN drivers.

3. SMC's BBS
Access: 516-273-4936
Library: „91C92“

Once you have logged in, select the „t“ command which brings you to the „download directory area“. Press „2“ or „3“ to select „91C92“ or „Fast Ethernet“ directory for downloading.

4. FTP Server site on the Internet:
Access: info.smc.com

8.2 File Names of the supported LAN Drivers

SMC9000S.ZIP	452,811 12-20-94 4:23p - SMC9000 Drivers and Utilities
NT35OBJ.ZIP	34,577 06-24-94 3:09p - Win NT 3.5 Drivers (also in SMC9000s.zip)
WFW311.ZIP	156,501 12-20-94 4:28p - Win for Work Groups required files (also in SMC9000s.zip except NetWare related connectivity drivers)
OS2NWCLT.ZIP	10,767 12-19-94 5:51p - OS/2 NetWare Client Software (also in SMC9000s.zip)
ENABLERS.ZIP	9,630 09-14-94 2:57p - PCMCIA Standalone enablers
UNIX driver	The UNIX driver is only located on the FTP server as a TAR-file. It is located in the /pub/chips/smc9000 directory, and its file name is: S9192.TAR.

Important: When you **PKUNZIP** the files, remember to use the „-d“ **option** to extract the sub-directories.

Example: `pkunzip -d smc9000s.zip`

This will put the contents of the superdisk in the current working directory and create sub-directories as well.

8.3 Required Tools to support TCP/IP

- A. A **physical LAN**, Ethernet for example, but it is not required. Token Ring ARCNET, WAN connectivity by PPP or SLIP is also acceptable.
- B. A „**Data Link Driver**“. In today's LAN environment, there are three major Data Link Interfaces.
1. Novel ODI (Open Data Link Interface) - This driver specification is supported by Novell and is used in all of Novell's Client and Server products.
 2. Microsoft's NDIS (Network Driver Interface Specification) - This driver specification is used as the interface to the other network components of Microsoft's operating systems. There are two flavors. They are NDIS Version 2.x (NDIS2) and NDIS Version 3.x (NDIS3).

NDIS2 is considered to be the older driver specification that has been around the longest and supported the OS/2 LAN Manager product. Since this specification has been around so long, many other OS manufacturers such as Artisoft's „Lantastic“, Banyan's „Vines“, FTP, Wollongong etc., have been supporting it as well.

NDIS3 drivers support the newer operating systems within Microsoft, specifically, Windows for Work Groups, Windows NT, and the Windows 95. These new OS also support NDIS2 drivers as well. Also, Novell's ODI drivers are supported in the new „Windows“ products.
 3. There are other proprietary drivers for other operating systems, including „Packet Drivers“ which is a Share-ware type of product. They are supported by the particular operating system vendor, not SMC.
- C. A **transport stack**. There are currently 3 major transport stacks.
1. IPX/SPX - This transport stack is primarily used in the Novell Network environment.
 2. TCP/IP - This stack is supported by many vendors and has been around in the UNIX world for many years.
 3. NETBIOS/NETBEUI - This transport interface was originally designed for OS/2 LAN Manager and the IBM Network, and is still supported by Microsoft and IBM.

This software is not supported by SMC. It is supplied by the major operating system vendors, such as Microsoft, Novell, IBM, Artisoft and Banyan. Also, there are other third party software companies that support TCP/IP stacks for the major operatin systems.

- D. **Applications and Operating systems** - Many operating systems have many of the above pieces built in and some are add-on's. Similarly for applications, some are network aware and some are not.

The interface to the operating system and network vaires from application and operating systems. See additional information from the operating system vendor.

As can be seen in the above mentioned, to support TCP/IP on a client, it depends on many network pieces from a number of network vendors. There are many combinations to get TCP/IP support. From SMC's perspective, as long as you have an ODI or NDIS driver, both of which are supported by SMC, you can get TCP/IP connectivity. Refer to the operating system and application vendor for additional information.

8.4 Ethernet Drivers

8.4.1 To find Ethernet Drivers

Operating System:	Vers:	Driver File Name:	Vers:	Datecode:	Directory:
Novell Workstation	V3.1x/4.x	LSL.COM	2.05	10.09.93	SMC9000S\NETWARE\NWODI
		SMC9000.COM	3.03	24.09.94	SMC9000S\NETWARE\NWODI
		IPXODI.COM	2.12	07.10.93	SMC9000S\NETWARE\NWODI
		NETX.EXE	3.32	24.05.94	SMC9000S\NETWARE\NWODI
NOVELL V3.1x Server	3.1x	SMC9000.LAN	2.01	10-11-93	SMC9000S\NETWARE\NW3x
NOVELL V4.1x Server	4.x	SMC9000.LAN	4.1	09-27-94	SMC9000S\NETWARE\NW4x
WFW		SMC9000.DOS/OS2	2.01		SMC9000S\NDIS2.01
Windows 95		SMC9000.DLL		08-27-95	ETH96_1\NETBEUI
Windows NT3.1	3.1	SMC9000.DLL	3.0		SMC9000S\NDIS3.0\NT3.1
Windows NT3.51	3.51	SMC9000.DLL	0.1A		SMC9000S\NDIS3.0\MINIPOINT
		SMCNCDET.DLL			
		SMC9000.SYS			
Windows NT4.x	4.x	SMC9000.DLL		08.27.95	ETH96_1\WIN95NT
OS/2 LAN-Manager	2.01	SMC9000.DOS/OS2		2.01	SMC9000s\NDIS2.01

Download the latest drivers from the DIGITAL-LOGIC AG BBS No. ++41 32 681 53 34.

8.4.2 Possible Choices for your Novell Workstation

Operating System:	Vers:	Driver File Name:	Vers:	Datecode:	Directory :
Novell Workstation	V3.1x/4.x	LSL.COM	1.21	10.03.92	O:\PRODUKTE\ETHALL\EXAMPEL\ETH_DL1 or EXAM1-4.zip ETH_DL1
		SMC9000.COM	3.00	05.01.94	
		IPXODI.COM	2.10	22.01.93	
		NETX.COM	3.32	04.04.95	
Novell Workstation	V3.1x/4.x	LSL.COM	2.01	05.11.92	O:\PRODUKTE\ETHALL\EXAMPEL\ETH_DL2 or EXAM1-4.zip ETH_DL2
		SMC9000.COM	3.00	05.01.94	
		IPXODI.COM	2.10	22.01.93	
		NETX.COM	3.32	04.04.95	
Novell Workstation	V3.1x/4.x	LSL.COM	2.05	10.09.93	BBS: SMC9000S.zip SMC9000S\ NETWARE\ NWODI or ETH96_1.zip ETH_DL3
		SMC9000.COM	3.03	24.09.94	
		IPXODI.COM	2.12	07.10.93	
		NETX.EXE	3.32	24.05.94	
Novell Workstation	V3.1x/4.x	LSL	2.14	11.10.94	O:\PRODUKTE\ETHALL\EXAMPEL\ETH_DL4 or EXAM1-4.zip ETH_DL4 or ETH96_1.zip ETH96_1\ODI\
		SMC9000.COM	4.00	07.03.96	
		IPXODI.COM	3.01	31.10.94	
		NETX.COM	3.32	04.04.95	or ETH90_95.zip \NW311\

Warning: This file does not work

		NETX.COM	3.32	17.02.93	ETH96_1\ODI\
--	--	----------	------	----------	--------------

On the ETHDISK, you will find the Example 1 and 4. Whereas on the DIGITAL-LOGIC AG BBS No. ++41/ 32 681 53 34 in the directory ETHERNET you will find all examples at exam1-4.zip .

8.5 *How to install a Driver*

8.5.1 Readme.txt from the directory ETH96_1

Use this files with the SMC9000 dual function (ethernet/modem) and single function PCMCIA boards.

These boards and set of drivers can operate both if Card and Socket Services compliant to the PCMCIA specification 2.1 (or upper) is present or not.

Procedure to use the board under DOS / Windows 3.1x / Windows 95 / Windows NT

You need to choose whether you want to use ODI, NDIS2 or NDIS3 drivers. Use the following table as a guide:

Software	Driver
1) Netware from DOS	ODI
2) Netware from DOS and/or Windows 3.1x	ODI
3) MS Windows Network from Windows 3.1x	NDIS2 (ODI also possible, see 4)
4) Netware AND MS Win Network Win 3.1x	ODI
5) Lan Manager	NDIS2
6) Windows NT and Windows 95 Miniport	NDIS3

ODI

Two methods are available:

1) With Card and Socket Services (preferred option):

WARNING: You MUST have a Card and Socket Services compliant to the 2.1 PCMCIA spec. (or better) installed in your config.sys!

- Power-up.
- Plug the card into the PCCard Slot.
(When you enable the Card Services and configure the Card as a modem you will hear some confirmation beeps. This will not happen with single function cards).
- Run the following from the A:\ODI directory
 - lsl
 - smc9000p (you will hear some confirmation beeps)
 - ipxodi
 - netx (or VLMs not supplied in this disk for burst mode)
 - f:
 - login
- You are ready to run under DOS

2) To run drivers with the enabler:

WARNINGS:

- Card and Socket Services must not be loaded in your config.sys!
- The current enabler supports INTEL PCIC PCMCIA controller only (other controllers will be added in the future).
- There should be access from D0000 to D1000 in upper memory (exclude this region of memory used by memory manager. i.e option X=D000-D0FF in EMM386.EXE in the config.sys).

- Plug the card into the PCCard Slot.

A1) ETHERNET OPERATIONS ONLY. DUAL FUNCTION BOARD

- Run A:\ENABLER\ETHERNET

This maps the board into your ISA bus (default at I/O 300h and IRQ 5) and from there to the PC Card. It works just as a regular ISA adapter. PC Card special features such as hot-swapping are not supported by the enabler.

- Change directory to A:\ODI.
- Then follow the same steps as above (Isl, smc9000p, etc.).

A2) ETHERNET OPERATIONS. SINGLE FUNCTION BOARD

- Run A:\ENABLER\ENABLER

This maps the board into your ISA bus (default at I/O 300h and IRQ 5) and from there to the PC Card. It works just as a regular ISA adapter. PC Card special features such as hot-swapping are not supported by the enabler.

- Change directory to A:\ODI.
- Then follow the same steps as above (Isl, smc9000p, etc.).

B) MODEM OPERATIONS ONLY. DUAL FUNCTION BOARD

- Run A:\ENABLER\MODEM.

This maps the modem to COM 2 IRQ 3 (default). Now you can use it as a regular ISA modem.

C) SIMULTANEOUS DUAL OPERATIONS. MODEM AND ETHERNET

- Run A:\ENABLER\DUAL400.

This maps the board into your ISA bus (default at I/O 300h and IRQ 5 for ethernet and I/O 2F8 for modem) and from there to the PC Card. It works just as a regular ISA adapter. PC Card special features such as hot-swapping are not supported by the enabler.

- Change directory to A:\ODI.
- Specify the following in the SMC9000P section of the NET.CFG:
 - + BOARD 1
 - + Int #2 <your COM port int>
 - + Mem #1 <your PCMCIA mem window> (i.e. Mem #1 D0000)
- Then follow the same steps as above mentioned (Isl, smc9000p, etc.).

WINDOWS SUPPORT FOR NETWORKS THROUGH ODI DRIVERS (after finishing the proceeding)

* To run Windows For Workgroups with complete Netware (Novell) Network support configure it through Network Setup to use Novell Netware type of Networks. You should always login in DOS before starting Windows.

<i.e.: check the "Install Windows support for the following Network only:"
and select Novell Netware (4.0 for VLMS and 3.X for NETX)>

* To run Windows For Workgroups with complete Netware (Novell) Network support AND Microsoft Windows

Network support simultaneously configure it through Network Setup in the following way:

- Check "Install Microsoft Windows Network"
- Check "Install support for an additional network" and select "Novell Netware..." Use shell 3.X for NETX and 4.0 for VLMS
- Select Drivers and Add Adapter. Select "Unlisted or updated..." and click OK. Type A:\NDIS in the box. Select "SMC9000 Ethernet PCMCIA..." click OK. The comment [ODI/NDIS3] will appear to indicate that it will give NDIS support through the ODI driver. Close and save everything. It will

prompt

to reboot, OK. Now you should have support for both networks.

NDIS2

Two methods are available:

1) *WFW with Card and Socket Services (preferred option):*

WARNING: You MUST have a Card and Socket Services compliant to the 2.1 PCMCIA spec. installed in your config.sys !

- Start Windows.
- Go into the Network Setup.
- Check Install Microsoft Windows Network and select OK.
- Select Drivers, Select Add Adapter, Select Unlisted or Updated Network Adapter.
- Type A:\NDIS into the box and select OK.
- Select SMC9000 Ethernet PCMCIA Adapter and click OK.
- Select Setup, Select Advanced. Use the PCMCIA value under Enable Card Services Use.
- Close and save everything. Windows will prompt to reboot, select yes.
- After rebooting the card will be enabled (confirmation beeps) and both modem and ethernet will be enabled (or ethernet only for single function card)

2) *WFW with Enabler*

- WARNINGS:**
- Card and Socket Services must not be loaded in your config.sys!
 - The current enabler supports INTEL PCIC PCMCIA controller only (other controllers will be added in the future).
 - There should be access from D0000 to D1000 in upper memory (exclude this region of memory used by the memory manager. i.e option X=D000-D0FF in EMM386.EXE in config.sys).

-Plug the card into the PCCard Slot.

Configuration using enablers is similar to that detailed in sections A1 to C in the ODI case. Please check on a future release of this Read me-file. The options that need to be selected through the network setup. Prior to starting the NDIS drivers one of the enabling programs will need to be run.

NOTES ON I/O AND INTERRUPT SETTINGS

The configuration files default to Port 300, IRQ 5 for the LAN part. Also, this new release of the drivers has the ability to automatically configure I/O and INT when operating under Card Services (CS). When the driver is loaded without any parameter selected in the NET.CFG (or PROTOCOL.INI) for the Port and Interrupt, it will request to CS to determine the I/O and Int location therefore minimizing the possibility of hardware conflicts (as long as CS is properly installed and knowledgeable about any hardware installed in the system). If you experience problems using the default settings (300,5) you may want to "comment out" the Port and Int settings from the configuration files and by doing this, CS will assign it for you.

NDIS3

WIN95

Make sure to have your Win95 Install CDROM (or install diskettes) available. Win95 will sense the new hardware upon a card insertion and ask you for the software drivers diskette. When this happens and you are prompted with a dialogue box, type A:\WIN95NT. Win95 will copy the necessary drivers from the diskette and depending on the previous software and hardware installed in your PC it may attempt to copy other files from the Win95 install source (CDROM or diskettes).

NOTE: If you are re-installing the card in a system where there is a previous version of the drivers for this card you must completely remove it (Network and modem from the Control Panel, and registry entries) before starting the installation.

WIN NT

After adding the new adapter in the network settings the system will ask you for the drivers diskette. Type in A:\WIN95NT.

8.6 Questions regarding the Drivers

1. Required drivers to get Windows NT LAN support

A NDIS3 driver is required. The driver can be found on the BBS and FTP server.
The file name is: SMC9000s.zip.

2. Required drivers to get Windows for Work Groups LAN support

The NDIS2 and/or ODI driver is required. The driver can be found on the BBS and FTP server.
The file name is: SMC9000s.zip. Depending on your connectivity requirement, you can use both or one of the drivers listed above.

3. Supported drivers from SMC

The MAC layer driver that supports DECnet, DEC Pathworks, Hays LANstep, Wollongong Pathway, Access for DOS and Banyan Vines is the SMC9000 NDIS 2.01 Driver (SMC9000s.zip). Contact the operating system vendor for additional information.

4. How to get an OS/2 Workstation to talk with a Novell Server

By using NetWare OS/2 V2.0, 2.1 Requester Drivers together with the SMC9000 ODI MAC driver you will achieve that an OS/2 Workstation talks with a Novell Server.

5. How to get an OS/ Workstation to talk to a Unix host

Use FTP PC/TCP V1.2 for OS/2 or Novell LAN Workplace V3.x for OS/2 together with the SMC9000 ODI client MAC driver.

6. How to get a DOS Workstation to talk to a Unix host

Use FTP PC/TCP V2.2 for DOS or Novell LAN Workplace V4.x for OS/2 together with the SMC9000 ODI client MAC driver.

7. How to get a DOS Workstation to talk to a server running on OS/2

Use IBM LAN Server V2.0 DOS Requester or Microsoft LAN Manager V2.x DOS Workstation with the SMC9000 NDIS 2.01 MAC driver.

8. How to get packet drivers

Currently Packet Drivers can be obtained for a fee from an outside consulting company (Company: Crynware; Contact: Russ Nelson; Ph.# (001 315) 268-1925; Internet address: Nelson@crynwr.com).

SMC will be providing these drivers directly in the near future.

	<p>----- For changing the selection press CURSOR DOWN or SPACE key.</p> <p>The Ethernet found at Base-Address: 0340 Enter the board version : 91C92-Type B Enter the Interface type : AUI / COAX Interface Enter the BUS-Width : 16-Bit BUS Enter the Wait-States : No Wait State Enter the Interrupt Type B : INTERRUPT 2 = IRQ 10</p> <p>Current Base_Addr. and Int-Addr. 1A01 31B5</p> <p>Enter the Node Addr. MSB-LSB Format: xx xx xx xx xx xx : Must be different for every ethernet-node in the LAN ! And must correspond with the values in the NET.CFG !</p>	
RESERVED		
EXIT AND SAVE TO EEPROM		

9.1.3 ETHPROG.EXE to store the standard defaults in the EEPROM

The EEPROM is factory programmed with the default values shown in chapter Installation.

ETHPROG.EXE Store the default value for IOBase, IRQ in the EEPROM
and ask for the node address number and store it .

ETHPROG Mainmenu		Description
ETHERNET DEFAULT PROGRAMMER DIGITAL-LOGIC AG V1.0		
Return to Mainmenu		
Test 91C92 Access	<u>ETHERNET DEFAULT PROGRAMMER DIGITAL-LOGIC AG V1.0</u> 91C92 Ethernet Test Diagnostic I/O Base Adress: 0340	Shows the I/O Base Address at the EEPROM

<p>Write Default EEPROM</p>	<p><u>ETHERNET DEFAULT PROGRAMER DIGITAL-LOGIC AG V1.0</u></p> <p>91C92 Ethernet Test</p> <p>Diagnostic I/O Base Address: 0340</p> <p><u>Ethernet Default Programming</u></p> <p>Setup: I/O: IRQ: INTx: BUS: LAN: WS: CREG: REG:</p> <table border="0"> <tr> <td>0</td> <td>340</td> <td>5</td> <td>(1)</td> <td>8 Bit</td> <td>Coax</td> <td>Yes</td> <td>2133</td> <td>1A01</td> </tr> <tr> <td>1</td> <td>340</td> <td>10</td> <td>(2)</td> <td>16 Bit</td> <td>Coax</td> <td>Yes</td> <td>0194</td> <td>1A30</td> </tr> <tr> <td>2</td> <td>320</td> <td>11</td> <td>(3)</td> <td>16 Bit</td> <td>Coax</td> <td>No</td> <td>1196</td> <td>1928</td> </tr> <tr> <td>3</td> <td>300</td> <td>5</td> <td>(1)</td> <td>8 Bit</td> <td>Coax</td> <td>No</td> <td>1112</td> <td>1830</td> </tr> <tr> <td>4</td> <td>340</td> <td>5</td> <td>(1)</td> <td>8 Bit</td> <td>Base-T</td> <td>Yes</td> <td>0012</td> <td>1A28</td> </tr> <tr> <td>5</td> <td>340</td> <td>10</td> <td>(2)</td> <td>16 Bit</td> <td>Base_T</td> <td>Yes</td> <td>0094</td> <td>1A30</td> </tr> <tr> <td>6</td> <td>320</td> <td>11</td> <td>(3)</td> <td>16 Bit</td> <td>Base-T</td> <td>No</td> <td>1096</td> <td>1928</td> </tr> <tr> <td>7 FIX</td> <td>300</td> <td>2/9</td> <td>(0)</td> <td>8 Bit</td> <td>Base-T</td> <td>Yes</td> <td></td> <td></td> </tr> </table> <p>Enter the Node Addr. MSB-LSB Format: xx xx xx xx xx xx :</p>	0	340	5	(1)	8 Bit	Coax	Yes	2133	1A01	1	340	10	(2)	16 Bit	Coax	Yes	0194	1A30	2	320	11	(3)	16 Bit	Coax	No	1196	1928	3	300	5	(1)	8 Bit	Coax	No	1112	1830	4	340	5	(1)	8 Bit	Base-T	Yes	0012	1A28	5	340	10	(2)	16 Bit	Base_T	Yes	0094	1A30	6	320	11	(3)	16 Bit	Base-T	No	1096	1928	7 FIX	300	2/9	(0)	8 Bit	Base-T	Yes			<p>Writes the default values to the EEPROM</p> <p>Shows the I/O Base Address: at the EEPROM</p> <p>Default values</p> <p>Gives in an Address. No other Workstation in the network showed uses the same address.</p>
0	340	5	(1)	8 Bit	Coax	Yes	2133	1A01																																																																		
1	340	10	(2)	16 Bit	Coax	Yes	0194	1A30																																																																		
2	320	11	(3)	16 Bit	Coax	No	1196	1928																																																																		
3	300	5	(1)	8 Bit	Coax	No	1112	1830																																																																		
4	340	5	(1)	8 Bit	Base-T	Yes	0012	1A28																																																																		
5	340	10	(2)	16 Bit	Base_T	Yes	0094	1A30																																																																		
6	320	11	(3)	16 Bit	Base-T	No	1096	1928																																																																		
7 FIX	300	2/9	(0)	8 Bit	Base-T	Yes																																																																				
<p>Read EEPROM</p>	<p><u>ETHERNET DEFAULT PROGRAMMER DIGITAL-LOGIC AG V1.0</u></p> <p>91C92 Ethernet Test</p> <p>Diagnostic I/O Base Address: 0340</p> <p>ETH-Selection 0 = 2133 1A01 ETH-Selection 1 = 0194 1A30 ETH-Selection 2 = 1196 1928 ETH-Selection 3 = 1112 1830 ETH-Selection 4 = 0012 1A28 ETH-Selection 5 = 0094 1A30 ETH-Selection 6 = 1096 1928 ETH-Selection 7 = FFFF FFFF ETH-Node Adress = 123455667788</p>	<p>Reads the default on the EEPROM and shows it on the screen.</p>																																																																								

9.1.4 NETCONF.EXE

NETCONF.EXE Programs also the EEPROM with defaults or custom values.

ETHPROG Mainmenu		Description
GENERATE NET.CFG PROGRAM V1.0 DIGITAL-LOGIC AG 94		
Exit		
Enter Maual Values	<u>GENERATE NET.CFG PROGRAM V1.0</u> <u>DIGITAL-LOGIC AG 94</u> Enter the IO-Base Address: IOBase Address 300h Enter the IRQ Number: IRQ 11 Enter the LAN-Interface: AUI / COAX Interface Enter the Node Addr. MSB-LSB Format: xx xx xx xx xx xx :	Enter Maual Values and Enter Configuration is the same only to use in another way.
Enter Configuration	<u>GENERATE NET.CFG PROGRAM V1.0</u> <u>DIGITAL-LOGIC AG 94</u> > Configuration 0 340 - i5 - AUI/COAX Configuration 1 340 - i11- AUI/COAX Configuration 2 320 - i10- AUI/COAX Configuration 3 300 - i5 - AUI/COAX Configuration 4 340 - i5 - 10BASE-T Configuration 5 340 - i11- 10BASE-T Configuration 6 320 - i10- 10BASE-T Enter the Node Addr. MSB-LSB Format: xx xx xx xx xx xx :	Enter Maual Values and Enter Configuration is the same only to use in another way.

Save into NET.CFG	<u>GENERATE NET.CFG PROGRAM V1.0</u> <u>DIGITAL-LOGIC AG 94</u> > Ethernet Type A Card Ethernet Type B Card	Saves the data in the net..cfg use B Card for Version 2.xx and higher.
Display Values	<u>GENERATE NET.CFG PROGRAM V1.0</u> <u>DIGITAL-LOGIC AG 94</u> LINK DRIVER SMC9000 INT 11 PORT 320 NODE ADDRESS 123455667788 FRAME ETHERNET_802.3 MEDIA_TYPE AUI	Shows data.
Read Values from 91C92	<u>GENERATE NET.CFG PROGRAM V1.0</u> <u>DIGITAL-LOGIC AG 94</u> > Ethernet Type A Card Ethernet Type B Card	Reserve I. Is the same as menu Save into NET.CFG

9.2 Program by SMC

9.2.1 Use these programs for Customer Modifications in the EEPROM

PRO9000.EXE	Enables you to modify every value in the EEPROM. Check the SMC91C92 datasheet for the register functions.
ISMS9000.EXE	ISMS9000.EXE is the same as PRO9000.EXE without the menu. File Script Hardware Setup.
SMCBOARD.SCR	Will be made with PRO9000.EXE on the menu File Script Hardware Setup.

9.2.2 Use this program for Diagnostics

SCEC_SRC.EXE	SCEC_SRC.EXE [ENTER] automatically unpackes the File SCECR.EXE and SCECR.C.
SCECR.EXE	91C92 diagnostic tools
SCECR.C	Source code in C to SCECR.EXE

10 FAILURES AND HINTS

10.1 General Ethernet Hints

1. Use a unique LAN-Node number in the LAN. No other station can use the same node number.
2. The node number must be stored in the EEPROM with the NETCONF or ETH tool. The same node number must be stored in the NET.CFG file. Otherwise the driver can not communicate with the LAN. Use the BCONF to generate the correct NET.CFG file.
3. Use the correct cables.
4. The card address must be unique, no other card can use the selected I/O card address.

10.2 ETHPROG.EXE hangs on the address 400hex

If the ETHPROG hangs on the address 400hex, the SMC91C92 is not accessible. Take the following steps:

1. Select the CONFIGURATION 7 (IO x Jumpers).
2. Restart the system.
3. Start ETHPROG.EXE and enter the node address.
4. Select the desired CONFIGURATION x (IO x Jumpers).
5. Restart the system.
6. Use BCONF to produce the new NET.CFG file.

10.3 Login to Server Novell does not work

10.3.1 Config.sys LASTDRIVE=Z

The Lastdrive=.... entry is one letter before the first server drive.
With Lastdrive=Z it does not work.

Example: On the Server the first drive you login is **F**, so in config.sys write **LASTDRIVE=E**.

```
Example: ethernet.bat
cd\
cd ETH_DL4
ls
SMC9000
ipxodi
netx
f:
cd\login
login superuser
c:
cd\
```

10.4 *PATH is not the same after login to ETHERNET*

Autoexec.bat

```
@Echo OFF
PROMT $p$g
PATH=C:\;C:\DOS;c:\BAT;c:\WINDOWS;
rem *****
LH /L:1,17424 KEYB SG,,C:\DOS\KEYBOARD.SYS
SET PATH=%PATH%;c:\BAT;c:\WINDOWS;
```

At the end of the Autoexec.bat you will have to type in
SET PATH=%PATH%;c:\BAT;c:\WINDOWS;

11 INDEX

1

10BASE-Interface:15

9

91C92 Ethernet.....31

A

AUI15

B

BCONF.....10
 BCONF.EXE25
 BUS.....8

C

Coaxial Interface 10BASE-2:15
 Config.sys lastdrive=z32
 Connectors on the Board15

D

Data Link Driver17
 DIAGNOSTIC.....25
 Dimensions8
 Driver location16

E

ENABLERS.ZIP16
 ETH.EXE.....25
 Ethernet-Drivers18
 ETHPROG.EXE27
 Example label:10
 example of NET.CFG10
 external Voltages for AUI Output15

F

factory setting.....10
 Failure and Hints32
 FTP Server16

H

Hardware Configuration10

I

INSTALL a driver.....20
 Installation.....9

Interrupt definitions:..... 14
 IPX/SPX 17
 ISMS9000.EXE 31

J

Jumper J6: 9
 Jumpers on the Board 14

L

label on board 10
 Lan Manager NDIS2..... 20
 Layout 13

M

MS Windows Network from Windows 3.1x..... 20

N

NDIS..... 17
 NET.CFG file 10
 NETBEUI..... 17
 NETBIOS..... 17
 NETCONF.EXE 29
 Netware from DOS and/or Windows 3.1x ODI 20
 Netware from DOS ODI..... 20
 Novell Lite 11
 NOVELL V3.1x Server..... 18
 NOVELL V4.1x Server..... 18
 Novell Workstation 18
 NT35OBJ.ZIP 16
 NW 3.11 11

O

ODI 17
 Operating Environment 8
 Operating System:..... 18
 Ordering Information 8
 OS/2 LAN-Manager 18
 OS2NWCLT.ZIP 16

P

PKUNZIP..... 16
 Possible choice for your Novell Workstation 19
 Power Supply 8
 PPP 17
 PRO9000.EXE 31
 Program from SMC 31
 Programm from Digital Logic AG..... 25

R

Readme.txt from the directory ETH96 20

S

SCEC_SRC.EXE31
SCECR.C31
SCECR.EXE31
SLIP17
SMC's BBS16
SMC9000S.ZIP16
SMC91C92.....8
SMC91C94.....8
SMCBOARD.SCR.....31
Software16
system hang up.....9

T

TCP/IP17

U

UNIX driver 16

V

vendor 17

W

warranty..... 7
WFW 18
WFW311.ZIP 16
Win 3.1x ODI..... 20
Windows..... 18
Windows NT and Windows 95 NDIS3 Miniport..... 20
Windows NT LAN support..... 24
Windows NT4..... 18