BriLAN

Network Operating System

Installation Guide

January, 2002

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TABLE OF CONTENTS

1. INTRODUCTION

This Installation Guide provides instructions on how to install and configure devices using BriLAN Network Operating System.

Dear customer, thank you for purchasing our BriLAN Network Device. **BriLAN** is the most effective last-mile revolutionary One-Box solution in the entire fixed wireless broadband industry. Through combination of BriLAN NOS and standard "off the shelf" components from computer industry, based on Ix86 architecture you can build, multifunctional network device designed for wired or wireless transmission of data and analog as well as digital voice with features as Router, Bridge, Hub, Switch, Multiplexer, Voice Gateway and Access Point.

To build your BriLAN based **Network Device** (the **Device**), follow the steps included in the Task List chapter. To find more about operating the **Device**, read also **BriLAN User's Guide** and **BriLAN Reference Guide.**

To learn more about networking using the **Device**, please visit our web site: www.softhill.com or www.brilan.com.

2. TASK LIST

This chapter lists recommended steps for setting up your BriLAN Network Device.

Tasks
I. Read the chapter Understanding BriLAN Network Devices. This overview outlines the basic functionality and networking concepts.
II. Fill out the Setup Worksheet. This Worksheet helps you to plan and better understand the installation details.
III. Prepare the necessary hardware. Assembly and configure the necessary hardware as it is planned on the Setup Worksheet.
IV. Prepare bootable medium. Our networking software operates using it's own 32-bit environment, which requires preparation of a bootable medium.
V. Configure the software. Provide basic information about configuration using the management software after booting up from the prepared bootable medium.
VI. Fine-tune the software. Provide you with the ability to meet your specific requirements regarding the network setup to perform additional configuration.

IMPORTANT NOTE: After completion the above-mentioned installation steps, please read also BriLAN User's Guide (Designing and managing networks using the BriLAN NOS software), and BriLAN Reference Guide.

3. TERMINOLOGY

This chapter contains list of terminology used in this Guide.

- **BriLAN NOS** – BriLAN Network Operating System is software, which turns a common PC into a manageable network device with combined functionality: Bridge, Multiplexor, Router, Active Repeater, Access Point and Voice Gateway. This software, named **BNOS**, should be installed on your BriLAN Network Device.

- **BriLAN NMS** – BriLAN network management system, the software used for remote management of your BriLAN Network Devices. This software, named **BNMS.EXE**, should be installed on a PC with any 32-bit Windows operating system.

- **BriLAN Network Device** – (the Device) a complete network device powered by BriLAN NOS, including all hardware and software components.

- **BriLAN Management Station** – a PC running Windows operating system with BriLAN NMS software installed.

- **BriLAN Distribution Disk** – a disk containing all BriLAN system files. The BriLAN NOS X.Y.ZZ

directory contains files necessary for generating the BriLAN NOS on the BriLAN Bootable Medium, while the BriLAN NMS X.Y.ZZ directory includes installation files for the BriLAN NMS software. X.Y.ZZ denotes the current version of the software.

- **BriLAN Bootable Medium** – contains the BriLAN NOS in executable version.

- **BriLAN Policy** – defined by applied forwarding, filtering, and monitoring rules on selected **BriLAN Network Services**

- **Compatibility List** – contains the list of all BriLAN supported hardware components.

- **Interface** – means any applicable hardware extension interface card listed in the Compatibility List.

- **Interface Manufacturer** – for more information on the Interface Manufacturer see the Compatibility list

- **Manufacturer's Interface Configuration Utility** – software provided by the Interface manufacturer necessary to configure the Interface operation parameters within the hardware setup.

- **Manufacturer's Interface Test Utility** –software provided by the Interface manufacturer to test basic functionality of the particular setup.

4. SETUP WORKSEET

Installation date: [   ]   **Provided by:** [   ]

HARDWARE CONFIGURATION

CPU:	
RAM:	
BOOT DEVICE:	

Slot Number	Interface	IRQ	I/O	RAM	Media type
	Data Rate	DS channel	TX Power	Fragment Threshold	SSID
I.					
II.					
III.					
IV.					
V.					
VI.					

DEVCE IP PROPERTIES

IP ADDRESS	
SUBNET MASK	
DEFAULT GATEWAY	

SOFTWARE CONFIGURATION

BriLAN NOS version:	
BriLAN NOS serial number:	
Device name:	

Administration Password:					
Slot/Port (SxPx)[*]	Comments	Disabled/ Enabled	Bridge group	Shaping	Encrypting

IP NETWORKING

Slot/Port/Queue (sXpXqX)[**]	Net Mask	Gateway	Target Net	Metric	Channel

[*] **sXpX**   The SP nomenclature designates particular physical interfaces available on your Device (e.g. s2p1 means physical Port 1 on the Interface Card 2)

[**] **sXpXqX**   The SPQ nomenclature designates particular logical routes available on your Device (e.g. s3p2q1 means logical route 1 on physical Port 2 of the Interface Card 3)

5. UNDERSTANDING BRILAN NETWORK DEVICES

This chapter provides an overview of how BriLAN Network Device work.

BriLAN Network Devices are powered by the well-known **BriLAN system**. **BriLAN** is a PC based, unique global solution, solving one of today's critical network bottlenecks "last-mile broadband access", as well as enabling the extension of the reach of digital and analog phone lines to hard to reach places. It is the best way to create your last-mile connectivity, supporting transmission of data and both analog and digital voice communication.

5.1 Introduction

BriLAN powered devices offer an alternative to expensive leased lines, or fiber networks, providing high-performance and cost effective **LAN-to-LAN**, **LAN-to-WAN** and **PBX-to-PBX** or **Phone-to-Phone** connectivity.

The BriLAN package for PCs, designed for Ethernet, FastEthernet and Wireless Ethernet networks (using unlicensed 2.4 GHz ISM and 5.8 GHz ISM bands), contains two main software components: the network operation system (**BriLAN NOS**) and the management unit (**BriLAN NMS**).

BriLAN NOS comes in two versions:

- ✍ **BriLAN PRO** –software for handling different types of network data, combining multiple functions: Bridge, Multiplexor, Router, Hub, Switch, Active Repeater, Access Point.

- ✍ **BriLAN VOX** –software that interconnects the world of telecommunications with the world of information technologies, offering all the functionality of BriLAN PRO plus Voice features.

BriLAN NMS – sophisticated management system for managing BriLAN powered devices. Combines a complete set of network performance, planning and analysis tools into a single program running under Windows 95/98/NT/2000 OS.

The capacity of the MAC address table handled by **BriLAN NOS** is a maximum 2048 learned network nodes. Packets are forwarded by method "store and forward" with 2 x 512 Kb internal buffers, which allows full Ethernet speed on each segment. Standard transparent bridging can be modified on a wide scale: packets can be filtered (dropped) by MAC and IP address, specified by bridge groups and traffic queues or they can have fully disabled forwarding over the chosen queue, port or entire bridge.

Static IP-routing is available with user defined routing tables on the individual Interface ports along with proprietary IP tunneling.

Using **BriLAN NOS** you can run the following services (or any appropriate combination of them) on your **BriLAN Network Device**:

- ✍ **Bridge**
- ✍ **Router**
- ✍ **Traffic Shaper**
- ✍ **Virtual Channels**

The fully graphical network management 32-bit Windows software, **BriLAN NMS**, is capable of managing your **BriLAN Network Devices** from any networked PC over the Internet. **BriLAN NMS** performs all remote control functions for management, forwarding, filtering, and monitoring of listed network services, as well as traffic analysis and billing, built-in triggers and event logging in the one management system. Applied forwarding, filtering, and monitoring rules on selected **BriLAN Network Services** define your customised **BriLAN Policies**.

5.2 Product features

Bridging method

- ? level 2, store and forward
- ? up to 8 logical groups per port (VLAN)
- ? packet filtering on MAC address level

Routing method

- ? level 3, static routing tables
- ? up to 64 routing records per Device (128 optional)
- ? packet Filtering on IP address level

Voice features

- ? Voice Activity Detection (VAD)
- ? Comfort Noise Generation (CNG)

? Acoustic Echo Cancellation (AEC)
? True Speech G723.1 at 6.3, 5.3, 4.8 and 4.1 Kbps at 8 KHz sampling rate
? Pass-through 8/16-bit linear modes at 8 KHz sampling rate

Maximum forwarding rate

? up to maximum Ethernet/FastEthernet speed (depending on the used hardware)
? up to 22 Mbps radio
? 64 independent traffic shaping queues per port
? speed limit in range from 32 Kbps to 2048 Kbps

Packet buffer

? 2x512 kB shared software data buffer

Available Interfaces and Ports

Any combination of:

? Ethernet Interfaces (Single or Multiport)
? Fast Ethernet Interfaces (Single or Multiport)
? Wireless Interfaces
? Synchronous Interfaces (Single or Multiport)
? Voice Interfaces (Analog phone line)

Standard compliance

? IEEE 802.3   Ethernet
? IEEE 802.3u FastEthernet
? IEEE 802.1d Transparent learning bridge
? IEEE 802.11(b) WLAN - Wireless network
? ITU standards for Voice (Codecs G.729a and G.711)
? H.323/H.324 industry standard Voice

Routed protocols

? TCP/IP
? Frame Relay
? PPP

Wireless features

? point-to-point and point-to-multipoint
? 2.4 and 5.8 GHz ISM band
? speed up to 22 Mbps
? distance up to 15 miles

Port statistics

? complete port traffic statistics
? collection polling rate: 10 seconds

Address table features

? 2048 learned nodes per BriLAN Network Device
? 10 min flushing time

Compatibility list of supported Interfaces

? **Ethernet interfaces**

? 3Com EtherLink III (3C509) 10Mbps, ISA adapter
? SMC Ultra and EtherEZ, ISA adapter
? NE2000 compatibles 10Mbps, ISA adapter
? NE2000 compatibles 10/100Mbps, PCI adapter (with RTL8139 ethernet controller)

? **Wireless interfaces**

? Aironet PC4500/PC4800 11Mbps, ISA/PCI adapter
? Cisco/Aironet 340 Series 11Mbps, PCI adapter
? Samsung WSL-2000P 11Mbps, PCI adapter
? WaveLan Orinoco 11Mbps, ISA adapter

? **Asynchronous interfaces**

? UART 16450/16550 series

? **Synchronous interfaces**

? Moxa SuperSync C101, X.21/V.35 serial synchronous ISA adapter (up to 5Mbps)

? **Voice interfaces**

? QuickNet Internet LineJACK, analog phone line ISA adapter

Security features

? Password protected management
? 64 bit software encryption
? Encrypted proprietary management protocol
? 64-bits BlowFish encrypted traffic
? Additional hardware based encryption is available

6. PREPARING THE NECESSARY HARDWARE AND SOFTWARE

This chapter contains information about the hardware and software requirements essential for installing your BriLAN Network Device, information about compatibility list, mounting Interfaces and setting up their operating parameters.

BriLAN NOS is a software, handling different types of network data, combining multiple functions (Bridge, Multiplexor, Router, HUB, Switch, Active Repeater, Access Point, Voice), which runs on common PC hardware assembled from parts in the Compatibility List according to your Setup Worksheet. Prepare and check the hardware and assembly of your ***BriLAN Network Device*** (the Device) as it is given in the following task list:

> ✍ Assembly the hardware according to the compatibility-list given below.
>
> ✍ Modify the BIOS if necessary.
>
> ✍ Run Manufacturer's Interface Configuration Utility program of the interface cards and devices to setup Interface operation parameters.

6.1 Hardware checklist for completing the Device

✍ Installation Driver disk(s) for Interfaces provided by Manufacturer

✍ 1-6 expansion slot Interfaces according to the **Compatibility List**.

✏ Screws and appropriate screwdriver for fixing Interfaces

✏ A computer with minimum requirements of :

   ✏ CPU 486/133 MHz or higher

   ✏ min. RAM 8MB

   ✏ HDD, FDD or DiskOnChip with minimum 8 MB capacity **(To avoid mechanical parts of the storage medium, DiskOnChip device is recommended)**

   ✏ serial port interface (RS232) – required for basic setup

   ✏ HW key for licensing and security reasons (supplied with the BriLAN software)

   ✏ parallel port interface (required to connect the HW-key)

✏ **Setup Worksheet** included in this manual, filled in with your installation plan.

IMPORTANT NOTES:

   ✏ *Display adapter, monitor, floppy drive and PC keyboard are required temporarily, and will be only during the process of the setup of the Interfaces and computer BIOS.*

   ✏ *After completion of all the tasks for the hardware setup, the "extra" hardware may be removed from the BriLAN Network Device.*

   ✏ *When removing the "extra" hardware, please do not forget to set the* <u>*Halt on no errors*</u> *option in your PC's BIOS.*

6.2 Fully Supported and compatible Interfaces

The 100 % functionality of **BriLAN NOS** is guaranteed with the below listed expansion slot Interface cards.

6.2.1 Ethernet and Fast Ethernet interfaces

Type	Manufacturer	Slot type	Media connector	More info
3C509	3COM www.3com.com	ISA	TP, BNC, AUI	10 Mbps, the best performance ISA card
SMC8x16	SMC www.smc.com		TP, BNC, AUI	10 Mbps, Ultra and EtherEZ models
NE2000 (RTL8139)		PCI	TP	10/100 Mbps, NE2000 compatible with RTL8139A(B) C Ethernet controller
NE2000		ISA	TP, BNC, AUI	10Mbps

6.2.2 Wireless ethernet interfaces

Type	Manufacturer	Slot type	More info
PC4500* PC4800* 340 Series	Aironet www.aironet.com Cisco www.cisco.com	ISA/PCI	Currently the best - performance wireless 11 Mbps NIC with 6.4 Mbps real throughput in BriLAN devices.
WSL-2000P	Samsung www.sem.samsung.com	PCI	Standard 11 Mbps wireless adapter
WaveLAN Orinoco	Lucent www.lucent.com	ISA	Standard 11 Mbps wireless adapter

6.2.3 Asynchronous interfaces

Type	Manufacturer	Slot type	More info
UART 16450, 16550		ISA	Serial asynchronous adapter

6.2.4 Synchronous interfaces

Type	Manufacturer	Slot type	More info
SuperSync C101	Moxa www.moxa.com	ISA	Serial synchronous X.21/V.35 adapter, up to 5 Mbps,

6.2.5 Voice interfaces

Type	Manufacturer	Slot type	More info
Internet LineJACK	QuickNet www.quicknet.com	ISA	Analog phone lines with FXO and FXS interface.

6.2.6 Some remarks on setting up Interfaces

Hardware Interrupt (IRQ) - applicable to all Data Interface types, which defines the physical IRQ resources for the Interface.

IO Address - applicable to Ethernet and Wireless Interface types, which defines the physical IO address resources for the Interface.

Medium Type - applicable only to Ethernet Interface types, which defines the connector/media/speed associated with the specific Ethernet port.

Memory Address - applicable to Synchronous/Asynchronous Interface types, which defines a block of physical memory address resources for the Interface.

IMPORTANT NOTES:

✍ *Please ensure, that the settings of the interface parameters within your configuration is unique!*

✍ *Ethernet adapters require at least 0x20 bytes of I/O address space, Wireless adapters allocate 0x40 bytes of I/O address space and Voice adapters work with 0x20 bytes of I/O address space.*

SETTINGS OF ETHERNET INTERFACES

Parameter	Valid value (depends on adapter's type)
Interrupt Request Resource	3, 5, 9, 10, 11, 12, 15
IO Address Resource	0x200, 0x210, 0x220, ... , 0x2D0, 0x2E0, 0x2F0, 0x300, 0x310, 0x320, ... , 0x3D0H, 0x3E0
Media Type	RJ45/twisted pair, BNC/coaxial cable

IMPORTANT NOTE: Please make sure, that the Media Type parameter settings meets your hardware configuration!

SETTINGS OF WIRELESS INTERFACES

Parameter	Valid value (depends on adapter's type)
Interrupt Request	5, 9, 10, 11, 12, 15
IO Address	0x140, 0x180, ... 0x300, 0x340
Antenna Connector	SMA, TNC
Data Rates	1, 2, 5.5, and 11Mbps
DS Channels	**1** (2412 MHz), **2** (2417 MHz), **3** (2422 MHz), **4** (2427 MHz), **5** (2432 MHz), **6** (2437 MHz), **7** (2442 MHz), **8** (2447 MHz), **9** (2452 MHz), **10** (2457 MHz), **11** (2462 MHz), **12** (2467 MHz), **13** (2472 MHz), **14** (2484 MHz)
TX Power Levels	**1** (1mW), **5** (5mW), **20** (20mW), **50** (50mW), **100** (100mW)
Fragment Threshold	**0** (no fragmentation), **256** (256 Byte packets), **512** (512 Byte packets), **768** (768 Byte packets), **1024** (1kByte packets)
SSID	A hexadecimal value between 00000001H and FFFFFFFFH

IMPORTANT NOTES:

☎ *DS Channel parameter, denoting the frequency of max. 14 distinct channels. Number of available channels depends on Country Regulatory Domain.*

☎ *Transmit Power Level parameters are defining the transmit power of radio module. Maximum transmitting power depends of the local regulation in the country of use.*

SETTINGS OF SYNCHRONOUS INTERFACES

Parameter	Valid value
Interrupt Request	2, 3, 4, 5, 10, 11, 12, 15

Memory Addresses	0xCC00, 0xD000, 0xD400, 0xD800
Data Rate	0, 1200, 2400, 4800, 9600, 19200, 38400, 56 000, 64 000, 128 000, 256 000, 500 000, 1 000 000, 1 500 000, 2 500 000, 5 000 000

IMPORTANT NOTES:

? *Memory address space from 0xC800 0xCC00 is reserved for BriLAN NOS internal use. Please, do not assign it to your Interface card!*

? *The Data Rate parameter, defining the data flow in bits/second, is applicable only to Synchronous Interface types.*

SETTINGS OF ASYNCHRONOUS INTERFACES

Parameter	Valid value
Interrupt Request	2, 3, 4, 5, 10, 11, 12, 15
Memory Addresses	
Baud Rate	
Parity	
Data Bits	
Stop Bits	

SETTINGS OF VOICE INTERFACES

Parameter	Valid value
IO Address	0x140, 0x160, ... 0x320, 0x340
Card Serial Number	000000-FFFFFFFF
Port Type	Phone FXS, Line FXO
Compression Method	**G732.1** 6.3 kbps, **G732.1** 5.3 kbps, **TrueSpeach** 4.8 kbps, **TrueSpeach** 4.1 kbps, **G728**, **16bit linear** 128kbps, **8bit linear** 64kbps, **8bit linear WSS** 64kbps, **PCM A-law** 64kbps, **PCM Mu-law** 64kbps
Country	USA, UK, France, Germany, Australia, Japan

REQUIRED ADDRESS SPACES FOR INTERFACE TYPES

Interface Type	Address space	Interface Type	Address space
Ethernet	0x20 (IO)	Voice	0x20 (IO)
Wireless	0x40 (IO)	Serial	16kb (Memory)

IMPORTANT NOTE: You should not overlay any two addresses within the listed address spaces.

6.2.7 Setting up BIOS

This section describes the BIOS setup of your *Device*, to ensure that it boots from the requested medium and also no errors stop the boot-up process.

1. Switch ON the power and hold the **DEL** key down to start the **BIOS setup**

2. Set error checking at Boot sequence to **No Errors**

3. To boot from a BriLAN bootable floppy disk set the **Boot sequence** to **A** and set **Enabled** the **Boot up floppy seek** option also.

4. To boot from a BriLAN bootable hard disk set the **Boot sequence** to **C**.

5. To boot from a built-in DiskOnChip set the **Boot sequence** to **C**.

6. Save the setting and exit the BIOS Setup.

7. Restart the *Device*.

6.3 Software Checklist for setting up your Device

1. Installation disks of required Interfaces provided and shipped by Interface Manufacturer(s). For more information on available web sites of the Manufacturer(s), check out previous sections of this Guide.

2. A bootable disk containing any MS DOS operation system (min. version 3.0).

6.4 Assembling the Device

Complete your **Device** with Interface cards listed in the **Compatibility List**, as follows. For security reasons, please provide this task only if you are knowledgeable in PC hardware assembling. The procedure assumes that the basic PC hardware intended to use in your **Device** (containing motherboard, CPU and RAM memory), is functional and meets minimum hardware requirements listed in the **Compatibility List**.

1. Power off the PC.

2. Gently push the Interface card into the appropriate free slot (PCI or ISA).

3. Fix the Interface card with screws against releasing.

4. Repeat the above steps for each mounted Interface card.

5. If your assembly does not contain serial port, install an extension Serial Interface card (you can remove this card after completing all tasks).

6. Close the PC box and fix it using screws.

7. Attach the HW-Key in the parallel port. Each **Device** should be licensed with a separate HW-Key.

8. Power on the PC and check it's functionality booting up to MS DOS (you can use any commercial program for the hardware check).

6.5 Setting up Interface operating parameters

To successfully operate Interfaces assembled in your **Device**, all applicable Interface parameters should be set according to the section Remarks on the setting up Interface parameters mentioned in this Guide.

1. Insert a bootable MS DOS diskette into the floppy disk drive of the **Device**.

2. Boot up the computer to MS DOS and run the Manufacturer's Interface Configuration Utility program from the Manufacturer's configuration disk.

3. Using Manufacturer's Interface Configuration Utility program set up the Interfaces parameters, to meet the planned configuration. Please remember that all parameters must be unique within one **Device**.

4. Run the Manufacturers Interface Test Utility program, if applicable, to ensure that your setup does not contain configuration errors.

IMPORTANT NOTES:

    ✓ *BriLAN NOS supports plug-and-play automatic hardware configuration.*

    ✓ *After completion all tasks of the hardware setup, the "extra" hardware , as display adapter, monitor and PC keyboard, may be removed from the BriLAN Network Device.*

    ✓ *When removing the hardware, please do not forget to set previously the <u>Halt on no errors</u> option in the PC's BIOS, to prevent hanging up the computer during the bootup POS tests.*

7. PREPARING BOOTABLE MEDIUM

This chapter describes preparing the BriLAN Bootable Medium. You should do this before starting basic configuration of the BriLAN NOS software.

BriLAN Distribution Disk contains installation files in format readable for Microsoft operation systems. Because **BriLAN NOS** software operates based on it's own 32-bit operation system, it is required to prepare a bootable medium containing executables and data using files stored on your **BriLAN Distribution Disk.**

IMPORTANT NOTES:

? *Generating the BriLAN Bootable Medium DESTROYES all data on the target medium!*

? *After the bootable medium is prepared, please do not use it with other known 16/32-bit operation systems, because the BriLAN NOS file system is NOT compatible with them.*

7.1 Checklist of necessary items needed for preparation of your BriLAN Bootable Medium

Before you start with preparation of your BriLAN Bootable Medium, please ensure, that you have the following items:

1. A PC or notebook with MS DOS, Windows 9x/2000 or Microsoft NT operating system.

2. A storage medium with at least 1 MB of free space:

  ? 3,5" floppy disk or

  ? Hard disk drive or

  ? DiskOnChip device

IMPORTANT NOTE: We recommend using DiskOnChip devices instead of standard FDD or HDD drives, as DiskOnChip devices are not contain mechanical parts, and their expected life-time is significantly longer than that of the FDD or HDD drives.

7.2 Creating BriLAN Bootable Medium

1. To create a **BriLAN Bootable Medium** directly in your *Device*, boot it up using an MS DOS bootable disk. This option is usually used with DiskOnChip devices or HDD bootable medium.

2. To create **BriLAN Bootable Medium** on a floppy disk you can use any functional PC with install 16/32-bit Windows operating system.

3. Insert the *BriLAN Distribution Disk* into the floppy or CD drive and copy the content of NOS directory to a working directory on your HDD.

4. To **create a bootable floppy disk** insert a EMPTY floppy disk into the drive with at least 1-MB capacity. To **create a bootable hard disk**, connect the drive to the disk connector.

IMPORTANT NOTE: Creating the BriLAN Bootable Medium DESTROYES all data on the target medium!

5. In the working directory type command **WRIMAGE.exe BNOSXYZ.IMG**, where XYZ is the appropriate version number.

e.g. C:\brilan\wrimage.exe bnosxyz.img

6. Choose the target drive: **0-floppy disk, 1-hard disk**

IMPORTANT NOTE: Please remember, that the 1-hard disk option destroys all data on you hard disk.

7. Check the drive parameters.

8. To create a bootable *BriLAN NOS* medium on the selected drive press **Y** key.

9. Please wait, It can take up to 60 second, while the software is transferred to the medium.

10. After the **[OK]** message is displayed, your new **BriLAN Bootable Medium** is ready to use.
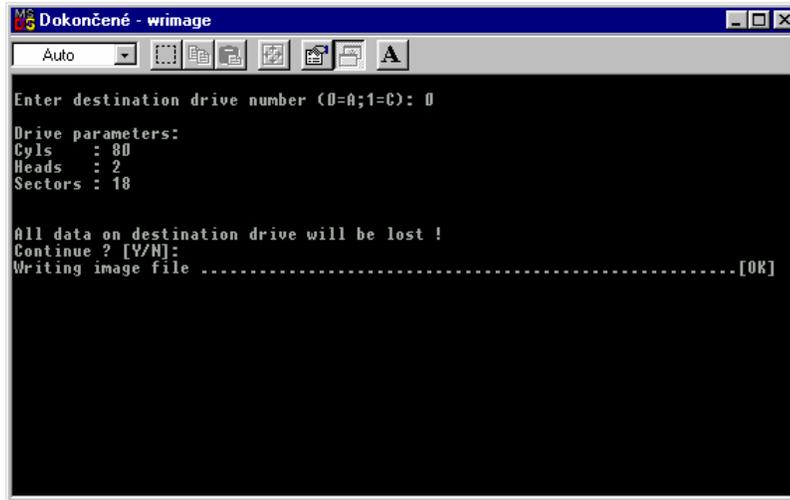
Fig. 7–1 Example of using WRIMAGE.exe command

Now you can continue the installation procedure with configuring the **BriLAN NOS** software.

8. CONFIGURING BRILAN OS

The chapter describes steps for providing basic setup of BriLAN NOS software, including configuration of interface parameters, assigning IP networking parameters, defining device name and changing the administration password.

Using the **BriLAN Configuration Utility** of **BriLAN NMS** software, you can set basic operating parameters of **BriLAN NOS**. This includes tuning software configuration with parameters set in the step of Interface setup using Manufacturer's Interface Setup Utility programs. During the basic set up of **BriLAN NOS**, which is controlled by **BriLAN NMS** program, all communication between the **BriLAN Management Station** and **BriLAN Network Device** (the Device) is realized through a crossover serial cable connection. To perform basic setup, follow instructions given in this chapter.

4.1 Checklist of requested items necessary for configuration of BriLAN NOS

Before you start with basic configuration of your **Device**, please prepare the following items:

1. **BriLAN Distribution Disk** containing all installation files.

2. A PC or notebook equipped with functional COM port and 32-bit Windows operating system used as the **BriLAN Management Station**.

IMPORTANT NOTE: Functional network interface card installed on this PC is not necessary in this installation step.

3. A PC configured as your *Device*, meeting at least the minimum hardware requirements, and equipped as it previously described.

4. The **BriLAN Bootable Medium** prepared as instructed in the appropriate chapter*.*

5. A standard crossed (null-modem) serial cable.

4.2 Basic configuration of BriLAN NOS software

Because *BriLAN NOS* is not designed to process commands through standard keyboard or mouse input, you should set up it's initial configuration using an another PC, by completing the following steps:

> ✎ Install BriLAN NMS software on a PC with Win95/98/NT operating system.
>
> ✎ Connect BriLAN Management Station to the Device.
>
> ✎ Set up Interface parameters and other operating conditions within the BriLAN NOS software.
>
> ✎ Disconnect BriLAN Management Station from the Device.

After finishing this procedure, your new *BriLAN Network Device* is ready to connect to the network.

8.1.1Installing BriLAN NMS software

Install **BriLAN NMS** as your configuration utility:

1. Insert *BriLAN Distribution Disk* into the drive (floppy or CD-ROM drive).

2. Click the **Start** button on the Windows Taskbar, click **Run** and than continue with clicking the **Browse** button.
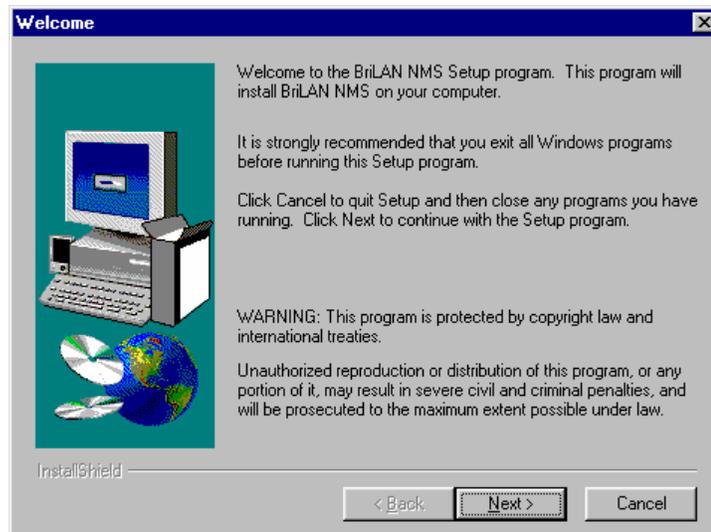
Fig.8–1 Welcome to the BriLAN NMS Setup

3. In the **Browse** window select the drive containing *BriLAN Distribution Disk*. Browse to **Disk 1**, select the file SETUP.EXE and close the dialog using the **Open** button.

4. In **Run** window click the **OK** button to start the selected **SETUP** program.

5. Follow the instructions displayed in the **Setup** window clicking the **Next** button.

6. To create the directory in **C:\Program Files** for your *BriLAN NMS*, accept the default settings by clicking the **Next** button in the **Choose destination location** window, or click **Browse** button to enter a new location.

Fig.8–2 Choosing default destination location

7. To create a new directory or to change the default location select drive in the **Drives** box, type the new directory name in **Path** box of the **Choose Directory** window.

Fig.8—3 Selecting custom installation path

8. To create a new program group for your *BriLAN NMS*, accept the default settings in **Select Program Folder** window or type a new name in the **Program Folders** box.

9. In the next window check your setup and clicking the **Next** button to start copying the files.

10. After completing the installation steps restart the computer. Your *BriLAN NMS* software should now be installed. Create a *BriLAN NMS* shortcut to your Windows Desktop if necessary.
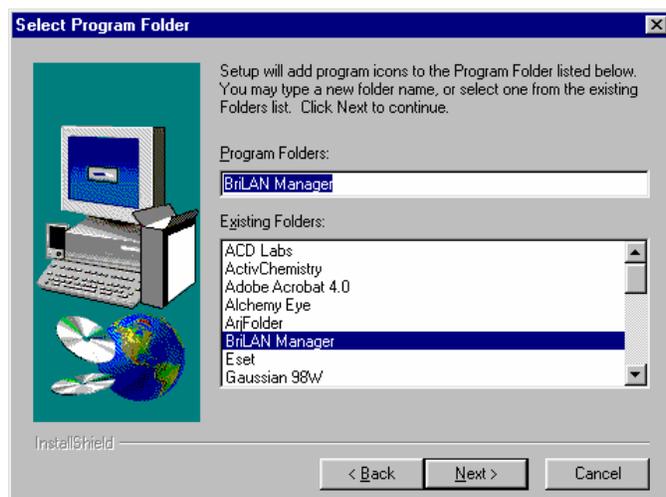
Fig.8—4 Defining new Program Folder

8.1.2 Establishing serial cable connection between BriLAN Management Station and the Device

The basic set up of **BriLAN NOS** requires a temporary serial cable connection between **BriLAN Management Station** and the **Device**. Provide this task after the **BriLAN NMS** software is installed on your **BriLAN Management Station**, connecting a standard crossed serial cable to the appropriate ports on the **BriLAN Management Station** and the **Device** as it is given here:

1. Shut down and power OFF both computers.

2. Connect the serial ports of your **BriLAN Management Station** and your **Device** via crossover serial cable with sufficient 9 or 25 pin connectors.

IMPORTANT NOTES:

> ✍ *COM1 port on the Device with 0x3F8 I/O address and IRQ = 4 is dedicated to BriLAN NOS! You must use this port of the Device for serial cable connection.*

> ✍ *Because the COM1 port is usually connected to the mouse pointing device on your BriLAN Management Station, we suggest using another available serial port. If the port is busy with anything other than your Device you will get the message: "Can't open port COMx!"*

3. Power up the **BriLAN Management Station** and start the **BriLAN NMS** software.

4. Select **Console** in the main menu and click **Serial Port Settings** command.

5. Specify port parameters in **Serial Port Settings** window. Select the appropriate serial port of your **BriLAN Management Station** in **Port** drop-down box. This port should be configured as follows:

> ✍ Bits per second: **9600**
>
> ✍ Data bits: **8**
>
> ✍ Parity: **None**
>
> ✍ Stop bits: **1**
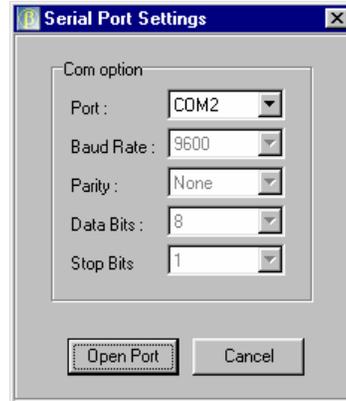
Fig.8–5 Configuring serial port

6. To use the set parameters, click **Open port** button of the **Serial Port Setting** window. The **Not connected** status message will be displayed next to the title in **Serial line console** window.
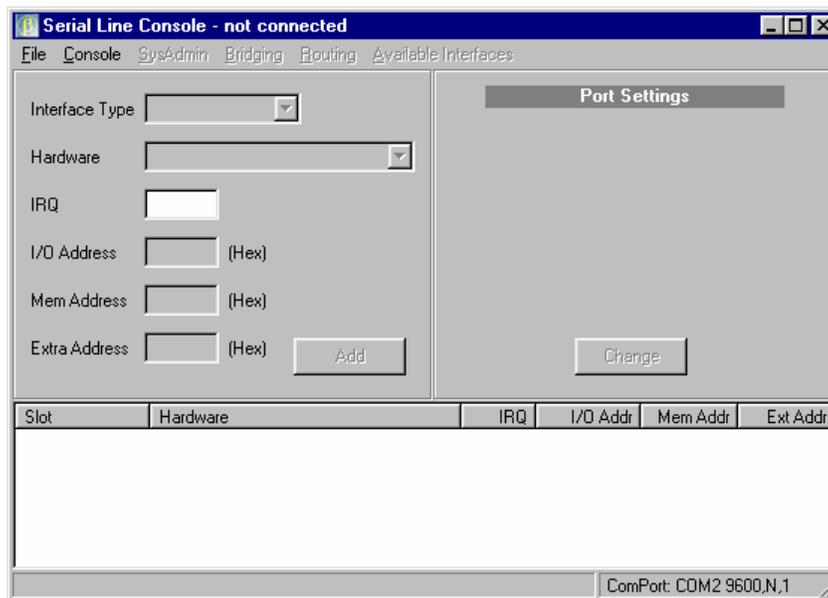
Fig.8–6 Serial line console is not connected

7. Select **Connect** on the Main Menu of **Serial Line Console** window, and click **Connect to device** command.

8. The **Device Connecting** dialog box is displayed after clicking **Connect** button in **Device connecting** dialog box.

Fig.8–7 The Device connecting dialog

9. Insert the **BriLAN Bootable Medium** to your **Device**, power it ON and wait for establishing connection.

Fig.8–8 Waiting for device response

10. After successful boot-up of your *Device*, the **BriLAN Configuration Utility** window is displayed. The **BriLAN Configuration Utility** program is now ready to accept your configuration commands via the serial link.
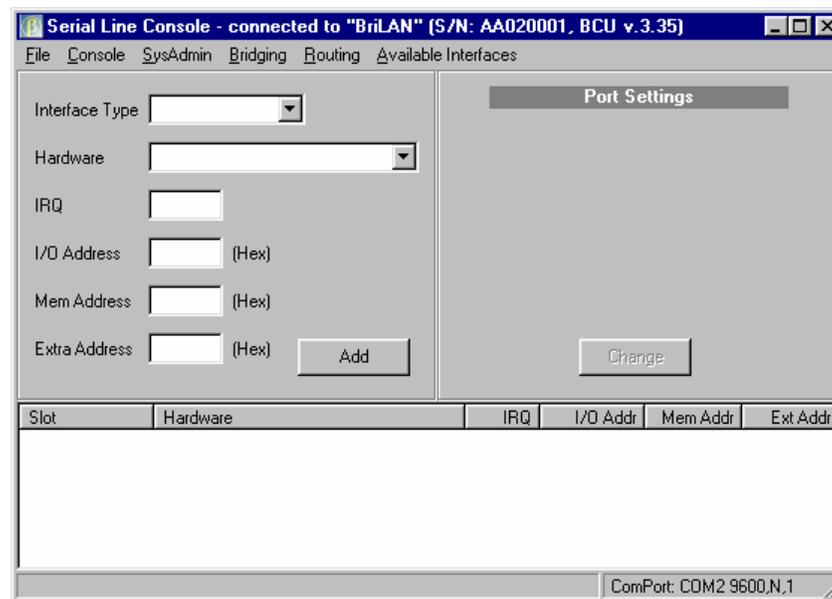
Fig.8–9 The serial line console connection is established.

You can continue at this moment with setting up initial configuration of operating parameters of the *BriLAN NOS* software.

IMPORTANT NOTE: If your Device is unreachable through the network, than the direct serial cable connection is the ONLY WAY to modify its operating parameters!

8.1.3 Setting up initial operating parameters of the BriLAN NOS software

All interface card specific settings of the **BriLAN NOS** software should be matched with Interface card settings provided by Manufacturer's Interface Setup Utility programs in this installation step. Other relevant **BriLAN NOS** operating data is also added during this step . Completion of these tasks requires:

> ✍ Setting Interface configuration parameters.
>
> ✍ Ordering Interfaces in the slots.
>
> ✍ Assigning IP networking parameters.
>
> ✍ Assigning Device name.
>
> ✍ Changing default Administration password.
>
> ✍ Writing all settings to the permanent memory.
>
> ✍ Disconnecting the serial cable.

8.1.3.1 Searching for available interfaces

If you prefer automatic detection of installed interfaces and settings, carry out the following steps:

1. From the **Serial Line Console** (**BriLAN Configuration Utility)** window click on **Available Interfaces**.

2. Move and resize the Available Cards window if necessary.

3. Record **Card Name**, **HW Type**, **IRQ**, **IOAddr** and other necessary parameters.

Card Name	HW Type	Bus	IRQ	IoAddr	Space	MemAddr	Space	ExtAddr
3Com EtherLink III, 3c509	Ethernet	ISA	10	300h	32	N/A	N/A	N/A

Available cards on device "BriLAN"   [Author`s note: I don`t like PnP]

Fig.8–10 Searching for installed interfaces

8.1.3.2 Setting of the Ethernet Interface configuration parameters

Set Ethernet Interface card parameters as follows:

1. From the **Serial Line Console** (**BriLAN Configuration Utility**) window select **Ethernet** in **Interface Type** drop-down box.

2. In **Hardware** drop-down box select the requested adapter type.

3. Type a unique Interrupt request number in **IRQ** edit box.
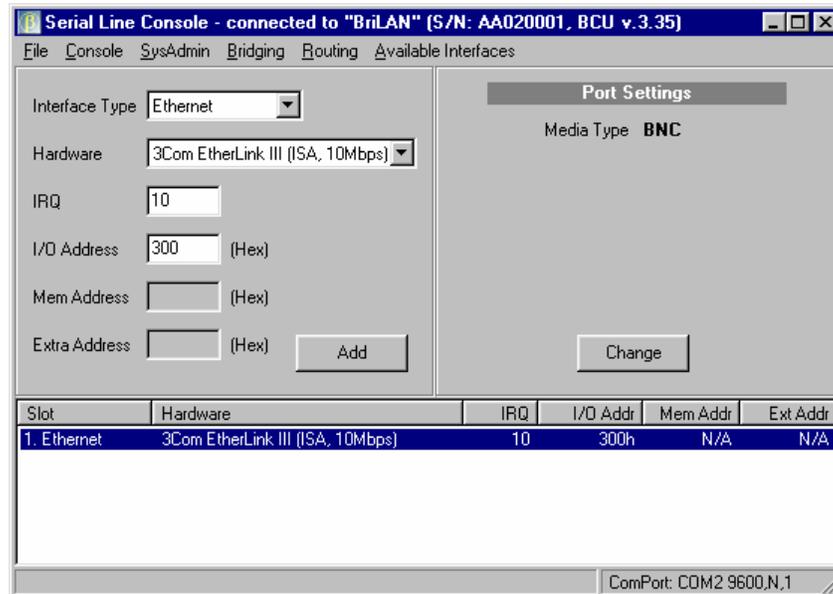
Fig.8—11 Setting up of Ethernet Interface parameters

4. Type an unique I/O Address resource in **I/O Address** edit box.

5. Type memory address and/or extra address parameters if applicable to the **Mem.Address** and/or **Extra Address** edit boxes.

6. Click **Add** button.

> *IMPORTANT NOTE: For more information on Interface settings, please refer to Compatibility list of supported Interfaces in THIS Guide, or refer to BriLAN Reference Guide.*

7. To change the media type, select the particular Interface in the bottom part of the **BriLAN Configuration Utility** window and click the **Change** button.

8. In the **New Value** box of the **Port settings** window, select the **Media Type** meeting your hardware. Click the **Save** button to accept the changes.

IMPORTANT NOTE: Available items in the Port settings window may vary depending on specific hardware.
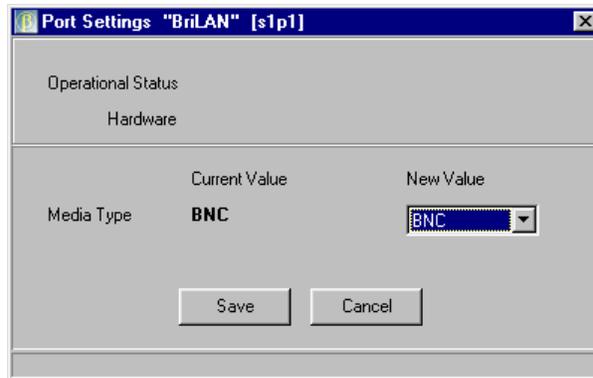
Fig. 8–12 Port settings dialog for Ethernet Interfaces

9. Repeat the above steps unless all Ethernet Interfaces are configured.

IMPORTANT NOTE: After completing the settings of selected parameters, write them to the permanent memory of your Device!

8.1.3.3 Setting of Wireless Interface configuration parameters

Set your Wireless Interface card operating parameters as follows:

1. From the **Serial Line Console** (**BriLAN Configuration Utility**) window select **Wireless** in **Interface Type** drop-down box.

2. In **Hardware** drop-down box select the requested wireless adapter type.

3. Type a unique interrupt-request-number in the **IRQ** box.

4. Type an unique I/O Address resource in **I/O Address** box.

5. Type memory address and/or extra address parameters if applicable to the **Mem.Address** and/or **Extra Address** edit boxes.

6. Click **Add** button.

7. To set other Interface specific parameters like **Data Rate, DS Channel, TX Power Level, Fragment Threshold and SSID,** to meet your hardware configuration, select the particular Interface in the bottom part of the **BriLAN Configuration Utility** window and click **Change** button. To accept the changes click the **Save** button in the **Port settings** window.
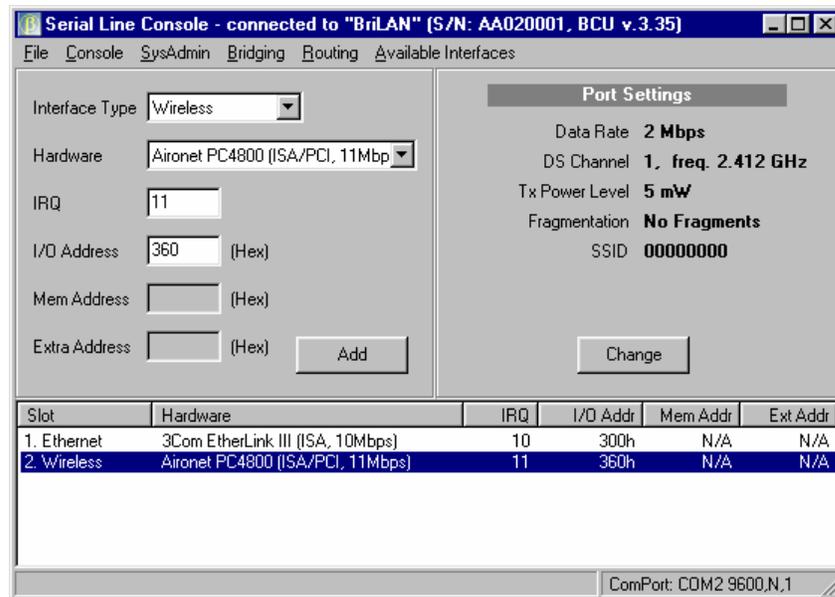
Fig.8–13 Setting up of Wireless Interface

8. Repeat the above steps until all Wireless Interfaces are configured.
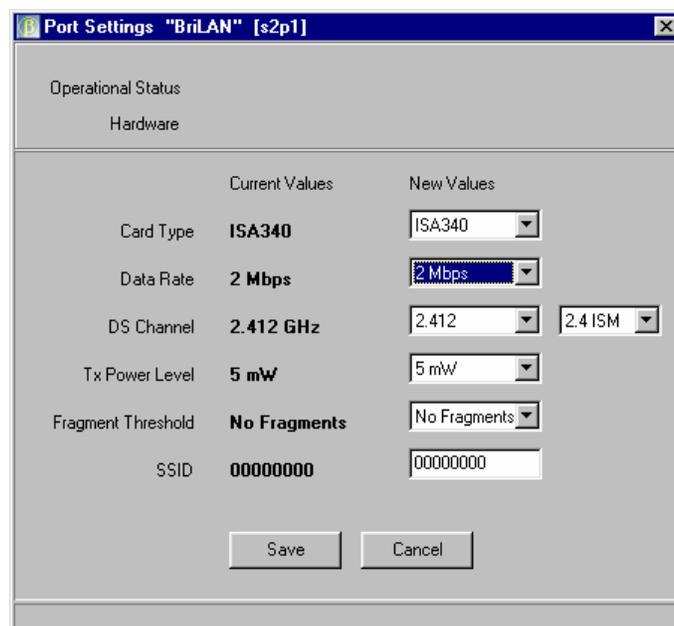
Fig.8–14 Port settings dialog for Wireless Interfaces

IMPORTANT NOTE: After completing the settings of selected parameters, write them to the permanent memory of your Device! (see instructions in section 3.2.3.10)

8.1.3.4 Setting of Asynchronous (UART) Interface configuration parameters

1. From the **Serial Line Console** (**BriLAN Configuration Utility**) window select **Asynchronous** in **Interface Type** drop-down box.

2. In the **Hardware** drop-down box select the **UART** type.

3. Type a unique-interrupt-request number in **IRQ** box.

4. Type an unique I/O Address resource in **I/O Address** box.

5. Click the **Add** button.

6. To set other Interface specific parameters like **Baud Rate, Parity, Data Bits, Stop Bits** and **Flow Control** options meeting your hardware configuration, select the particular Interface in the bottom part of the **BriLAN Configuration Utility** window and click **Change** button. To accept the changes click the **Save** button in the **Port settings** window.

7. Repeat the above steps unless all Asynchronous Interfaces are configured.

IMPORTANT NOTE: After completing the settings of selected parameters, write them to the permanent memory of your Device! (see instructions in section 3.2.3.10)
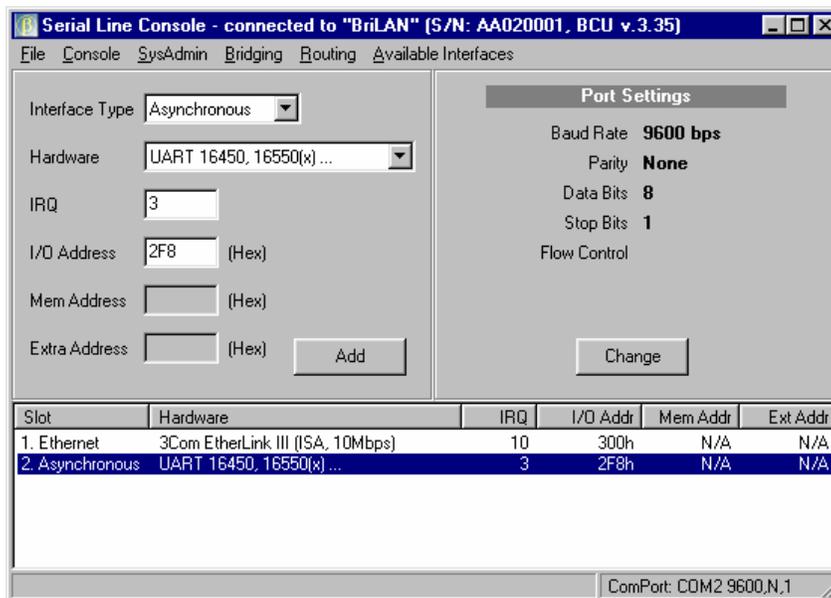
Fig 8-15 Setting up of Asynchronous Interface parameters

8.1.3.5 Setting of Synchronous Interface configuration parameters

1. From the **Serial Line Console** (**BriLAN Configuration Utility**) window select **Synchronous** in **Interface Type** drop-down box.

2. In the **Hardware** drop-down box select the requested adapter type.

3. Type a unique-interrupt-request number in **IRQ** box.

4. Type memory address parameter to the **Mem.Address** edit box.

5. Click the **Add** button.

6. To set other Interface specific parameters like **Data Rate, Encapsulation, Interface Type, LMI Type** options meeting your hardware configuration, select the particular Interface in the bottom part of the **BriLAN Configuration Utility** window and click **Change** button. To accept the changes click **Save** button in the **Port settings** window.

7. Repeat the above steps until all **Synchronous** Interfaces are configured.
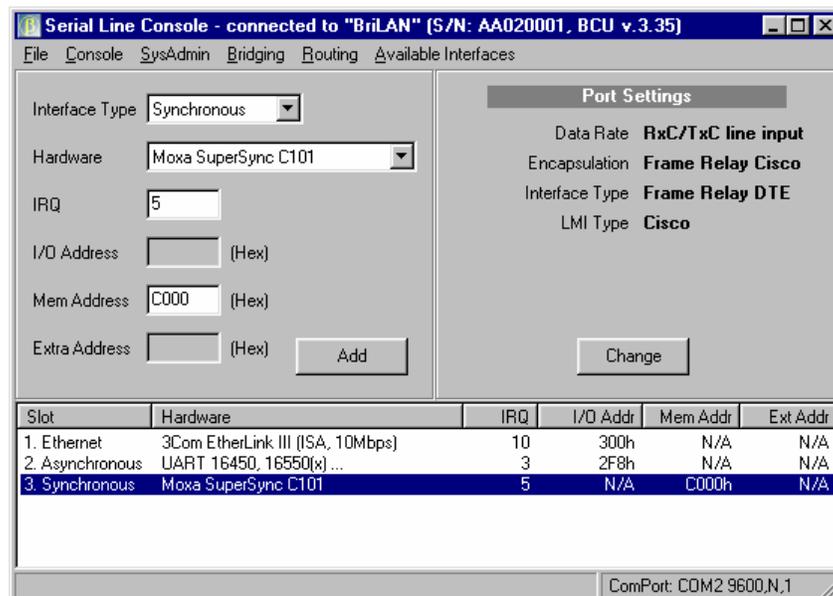
Fig.8–16 Setting up of Synchronous Interface

IMPORTANT NOTE: After completing the settings of selected parameters, write them to the permanent memory of your Device! (see instructions in section 3.2.3.10)
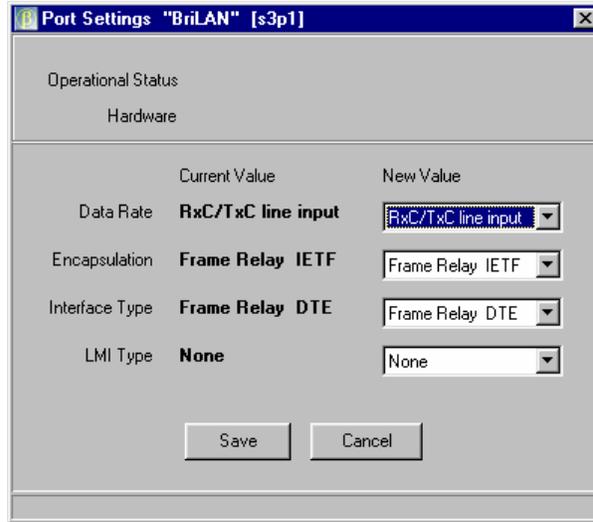
Fig.8–17 Port settings dialog for Synchronous Interfaces

8.1.3.6   Voice Interface configuration parameters

1. From the **Serial Line Console** (**BriLAN Configuration Utility**) window select **Voice** in the **Interface Type** drop-down box.

2. In the **Hardware** drop-down box select the requested adapter type.

3. Type unique I/O Address resource in **I/O Address** box.

4. Click the **Add** button.
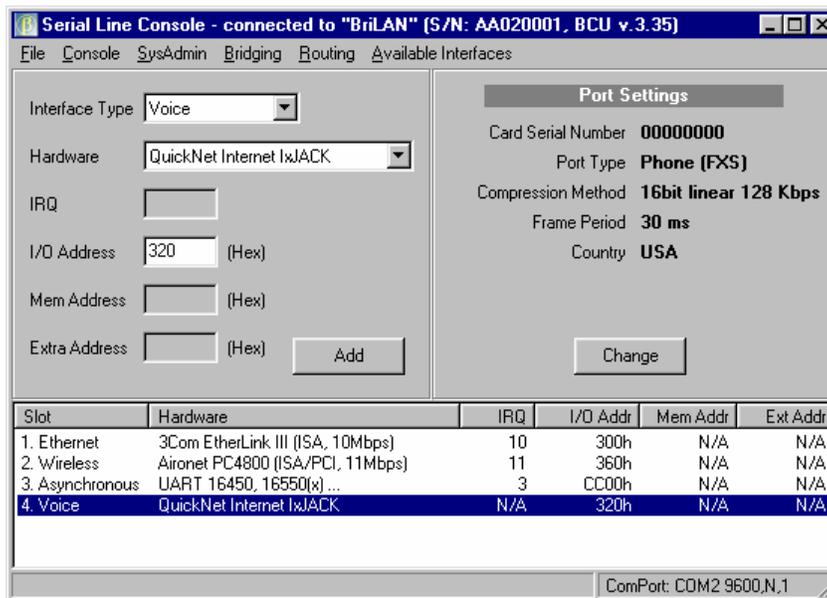
Fig.8–18 Setting up of Voice Interface

5. To set other Voice Interface specific parameters select the particular Voice Interface, in the bottom part of the **BriLAN Configuration Utility** window and click the **Change** button. You should set up **Card Serial Number** (must be UNIQUE within the Device), **Port Type** (phone or PBX), **Compression Method, Frame Period** and **Country** (if not listed please consult with your local telecom provider) parameter.

6. To accept the changes click the **Save** button in the **Port settings** window.

7. Repeat the above steps until all **Voice** Interfaces are configured.

Fig.8–19 Port parameters setup for Voice Interface

IMPORTANT NOTES:

✍ *Please remember that fax (modem) data should be transferred over the Voice Interface with NO compression method (16bit linear 128kbps mode).*

✍ *After completing the settings of selected parameters write them to the permanent memory of your Device! (see instructions in section 3.2.3.10)*

8.1.3.7 Reordering/Removing interfaces in the Slot list

1. To change the availability of the particular Interface within the **Slot** column, select the Interface in the bottom part of the **Serial Line Console** (**BriLAN Configuration Utility**) window.

2. To move the record up by one position in the **Slot** list, click **Move record up** in the pop-up menu after right-clicking the Interface.

3. To move the record down by one position in the **Slot** list, click **Move record down** in the pop-up menu after right-clicking the Interface.

4. To remove an unnecessary Interface from **Slot** list, click **Delete record** in the pop-up menu after right-clicking the Interface. To confirm removing the Interface, click the **Yes** button.
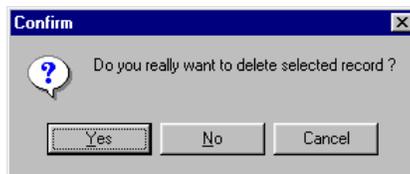
Fig.8–20 Confirmation dialog

IMPORTANT NOTE: After completing the settings of selected parameters, write them to the permanent memory of your Device! (see instructions in section 3.2.3.10)

8.1.3.8 Changing IP networking properties

Your **Device** communicates in normal operating mode with the **BriLAN Management Station** via standard IP protocol. To make your **Device** accessible in your network, set particular IP networking properties.

IMPORTANT NOTE: You can manage your Devices, operating in your LAN connected to the Internet, from any PC with Internet connectivity.

1. Click the **SysAdmin** command in the **BriLAN Configuration Utility** window.

2. Click **Admin properties** item in **SysAdmin** menu.
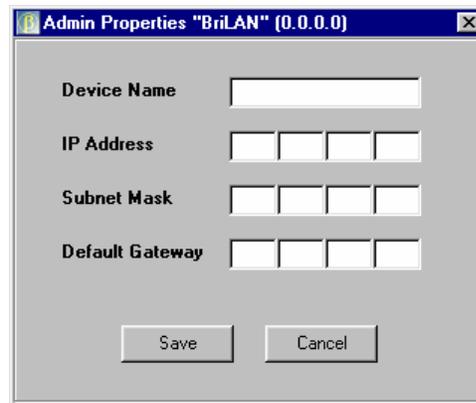
Fig.8–21 Empty Admin properties window

3. Type the device name, used to identify your Device, in **Device Name** box.
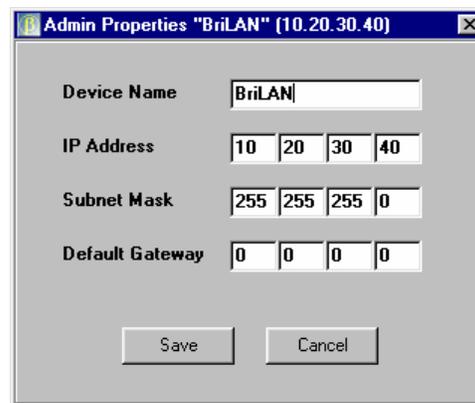
Fig.8–22 Admin properties before saving

4. Type IP Address in **IP Address** box according to the **Setup Worksheet**.

5. Set subnet masking in the **Subnet Mask** box.

6. Finally set the default gateway in the **Default Gateway** box. If your network is not interconnected with other ones, you can leave this box free.

7. To save the current settings click the **Save** button.
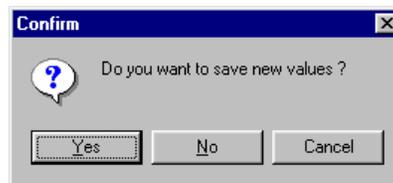
Fig.8–23 Admin properties confirmation dialog

IMPORTANT NOTE: After completing the settings of selected parameters, write them to the permanent memory of your

Device! (see instructions in section 3.2.3.10)

Fig.8–24 New settings was accepted

8.1.3.9 Changing administration password

The remote management of your **Device**, controlled by **BriLAN Management Station**, is available in normal operation mode via standard network connectivity. Without specifying the password of the **Device**, the traffic and status data are available, but all management functions are disabled.

IMPORTANT NOTE: Setting up parameters via serial cable does not require authorization using SysAdmin Password.

To improve management security, you can change the default password "*SysAdmin*" by following these steps:

1. To set the administration password click **SysAdmin** in the Menu Bar of the **Serial Line Console** (**BriLAN Configuration Utility**) window.

2. Click the **SysAdmin Password** item in **SysAdmin** menu.

3. Type the new password in **SysAdmin Password** dialog box, and than click the **OK** button.

Fig.8–25 Password changing dialog

IMPORTANT NOTE: Upper and lower case letters of the SysAdmin password are distinguished.

4. Confirm the password, retyping it in the **SysAdmin Password Confirmation** dialog box, and finally click **OK** button.

IMPORTANT NOTE: After completing the settings of selected parameters, writethem to the permanent memory of your Device! (see instructions in section 3.2.3.10)
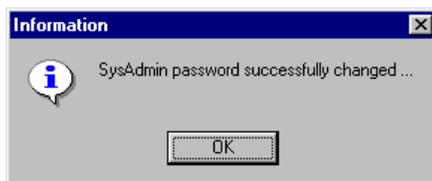
Fig.8–26 Password accepted message

8.1.3.10 Writing operation parameters to permanent memory

When providing the initial configuration of your *Device*, all changes of configuration parameters are sent via serial cable to the **Device**, where they are stored in RAM memory. To make these changes permanent, when rebooting the **Device**, it is necessary to write them to the permanent memory of your **Device**:

1. Click **File** command in the Menu Bar of the **Serial Line Console** (**BriLAN Configuration Utility**) window.

2. To write operation parameters to the permanent memory of your *Device*, click **Save settings to Device** in the **File menu**.

3. Click **Yes** button in **Confirm** dialog box.
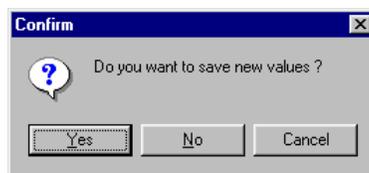
Fig. 8–27 Confirmation dialog

4. To close the **Information** box, click the **OK** button.

Fig.8–28 Information message

IMPORTANT NOTE: When you to return to the default parameters, use the Reset Device to Defaults command from File menu.

8.1.3.11 Finishing basic setup

Writing all operation parameters to permanent memory of the ***Device*** fixes all changes provided during the initial setup. Finish the initial setup by completing the following tasks.

1. Close the **Serial Line Console** (**BriLAN Configuration Utility**) window by clicking **Exit** in the **File** menu.

2. Switch OFF the power on your ***Device***.

3. Disconnect the serial cable from the COMM ports of your ***Device*** and the ***BriLAN Management Station***.

4. Your initial setup of ***BriLAN Network Device*** is now completed.

Now you can connect your new ***Device*** to the network. After finishing the initial setup you can continue with fine-tuning its other operating parameters. To read more about the tuning procedure, continue with the next chapter.

9. FINE TUNING

This section provides a brief overview of solution of common networking tasks using your BriLAN Network Device. Perform the fine tuning procedure after finishing the initial configuration and when your new BriLAN Network Device is connected to the network.

After completing all described configuration tasks of your **BriLAN Network Device** (the Device), it is ready to use in your network. However you can fine-tune some operating parameters of the BriLAN NOS software, to meet any special requirements on your network setup. You can achieve this by completing the following tasks:

- Enabling or disabling bridging.
- Enabling or disabling routing.
- Shaping the traffic.
- Grouping the ports.
- Accounting the traffic.
- Monitoring the network.

To use the mentioned special features available with your BriLAN Network Device please refer to the **BriLAN User's Guide** and **BriLAN Reference Guide**.

9.1 Enabling or disabling bridging

By default your BriLAN Network Device is configured as a standard MAC-layer multiport learning bridge. The capacity of the address table is 2048 learned MAC addresses.

This feature means that your ***Device*** works at the physical level of the OSI/ISO model, where it filters packets by the network node MAC addresses and it operates transparently to the higher-level protocols. To disable bridging, set the **Bridging** option disabled.

> ***IMPORTANT NOTE: For more information on this topic, refer to the BriLAN User's Guide.***

9.2 Enabling or disabling routing

You can set up your ***Device*** to provide IP-routing based on static routing tables.

This feature means that your ***BriLAN Network Device*** works at the network level of the OSI/ISO model, where filters packets by network node IP addresses and operates transparently to the application-level protocols. By default this feature of your ***BriLAN Network Device*** is disabled. To enable IP-routing, set the **Routing** option enabled. Please note that routing has higher priority than bridging.

> ***IMPORTANT NOTE: For more information on this topic, refer to the BriLAN User's Guide.***

9.3 Shaping the traffic

You can set up your ***Device*** to regulate packet transfer rate on the ports meeting your specific demands on the network throughput. Use this feature, when your setup requires guaranteed data flow on the particular network segment.

> ***IMPORTANT NOTE: For more information on this topic, refer to the BriLAN User's Guide.***

9.4 Grouping the ports

Using **Device** you can group Interface ports to create your virtual network groups. You can easily define set of port groups. This feature works as a selective packet filter. Filtering rules can control the traffic between particular network segments.

> *IMPORTANT NOTE: For more information on this topic, refer to the BriLAN User's Guide.*

9.5 Creating virtual channels

Virtual channels work as IP tunnels between two **Devices** and allows to connect your Voice devices over data networks (proprietary VoIP), allows to transmit terminal data or integrate your distant subnets over the Internet. Data directed to your virtual channel on the selected **BriLAN Network Device** are encapsulated to IP packets and forwarded to the next **BriLAN Network Device.**

> *IMPORTANT NOTE: For more information on this topic, refer to the BriLAN User's Guide.*

9.6 Accounting the traffic

Precise and up-to-date information about the transferred amount of data has a key role in commercially operated networks. Using the **Device** you can easily track the traffic between individual network nodes to create your network load statistics or you can bill your users.

> *IMPORTANT NOTE: For more information on this topic, refer to the BriLAN User's Guide.*

9.7 Monitoring the network

Knowing the exact status of your network may help to better understand current network requirements of your users, and also can help to plan the future development in your network infrastructure. The **Device** works as a continuous network traffic monitor, watching your network permanently. You can easily find all network load statistics in various time scales, locate your top-talker network nodes or error generating items.

> *IMPORTANT NOTE: For more information on this topic, refer to the BriLAN User's Guide.*

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