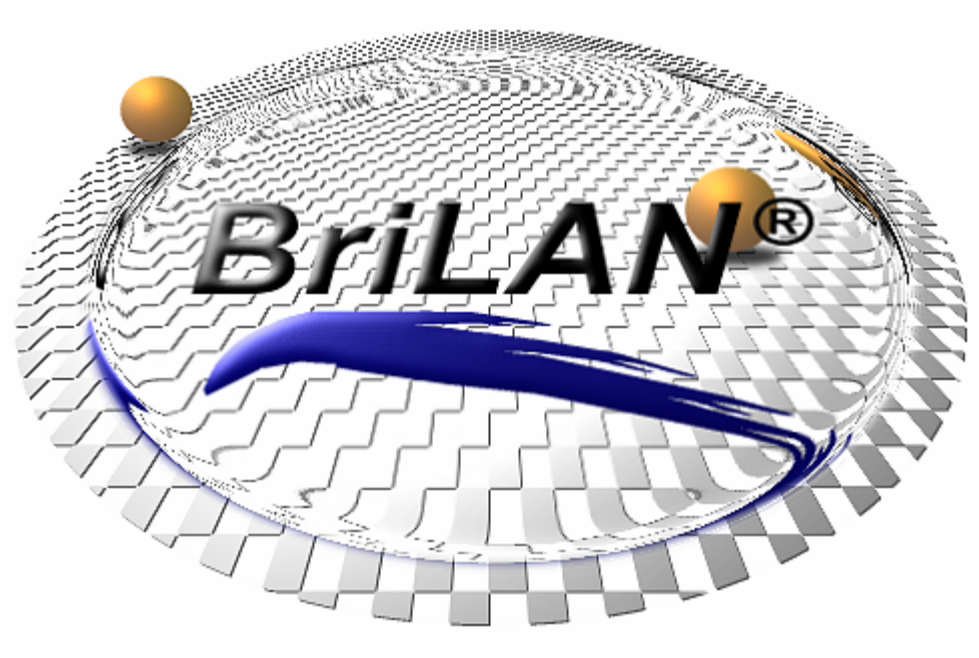


SoftHill Technologies Ltd.

SoftHill Technologies Ltd.

Phone +1 (604) 710 8089
Fax +1(208)379-8913
www.softhill.com; www.brilan.com
softhill@softhill.com

BriLAN™ NOS and BriLAN™ NMS

embedded

Network Operating System (NOS) and Network Management System (NMS)

BriLAN™ Network **O**perating **S**ystem **(NOS)** is highly optimized 32-bits Network Operating System and application designed for 80x86 processor architecture, capable of running on standard PC hardware. The seven years of continuous development and improvements, its stability, scalability and high performance pre-defined **BriLAN™** as "the kernel of choice" for number of OEM technology partners of SoftHill. **BriLAN™** allows them to build highly efficient yet cost-effective devices to provide solutions for simultaneous data and voice connections – ranging from simple point-to-point to more complex Point –to-Multipoint networks.

Support for voice communication build in **BriLAN™** technology allows voice and data users to share bandwidth on a single network. Every call has an assigned dedicated voice channel, which is prioritized over the data channel, enabling **BriLAN™** to guarantee delivery of high quality voice communications.

BriLAN™ based devices offer a combination of functionality previously only achievable by using several products from multiple producers and vendors. **BriLAN™ NOS** supports following features:

- Bridging
- Standard IP Routing
- Advanced Traffic Shaping
- Packet Filtering
- Wireless Point-to-Point
- Wireless Point-to-Multipoint connections (in AP mode) – in routing as well as bridging mode
- Wireless Access Point (for PC card as a client)
- Fixed Wireless and wired extension of the Analog phone lines
- Complete traffic statistics collection

BriLAN®

BriLAN Versions

	Bridging	Routing	Voice	Traffic Shaping	Synchronous interfaces	Access Point
BriLAN NOS SA	x	x	o	o	o	o
BriLAN NOS AP	x	x	o	x	x	x
BriLAN NOS VOX	x	x	x	x	x	x

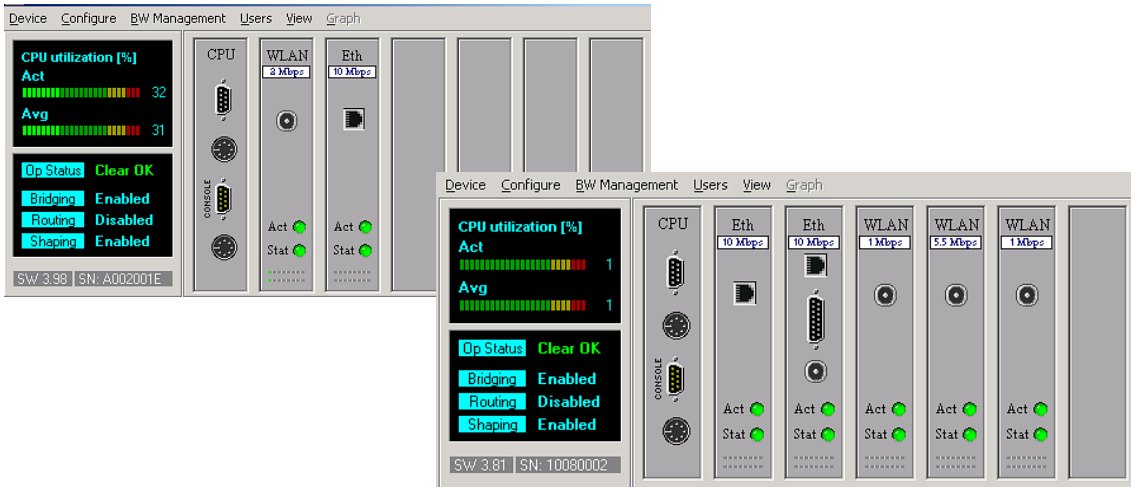
BriLAN™ NOS SA – Station Adapter –supports point-to-point connection and work as a part of Point-to-multipoint scenarion as a client station in connection with BriLAN PRO-AP

BriLAN™ NOS AP – Access Point - acting as a central station for Point –to- multipoint type of the wireless networks. Support ability to build network devices with above functions.

BriLAN™ NOS VOX – Voice - Supports functionalities as PRO-AP and SAwith additional support for extending analog phone lines over the wireless or wired network.

Scalability and Flexibility

BriLAN™ NOS based devices can be designed as simple - two port - or complex - multiport devices to answer all customers needs. Any combination of up to 6 interfaces per device is supported. Variety of different Interfaces is supported (Ethernet, Wireless 802.11, X.21, V.35, G.703 and more)



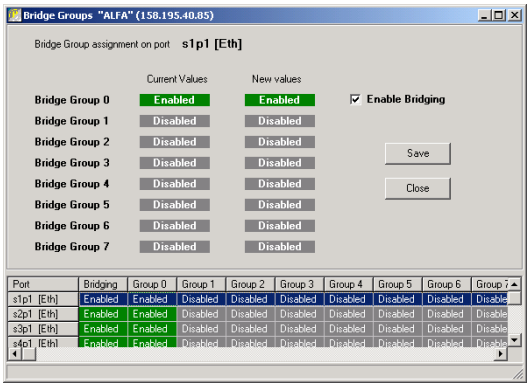
BriLAN ™ NOS functions

Bridging

Ethernet wireless bridge suitable for LAN –to- LAN environments , interconnecting LANs from two different locations.

Features:
LAN bridging where all of the LAN interfaces present at the network are bridging among themselves according to IEEE 802.3

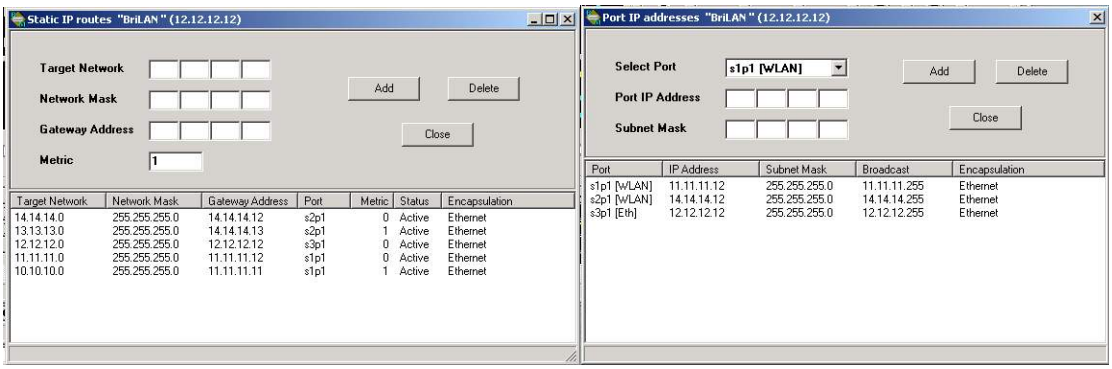
- transparent bridging
- up to 2048 MAC addresses, stored in bridge table
- Level 2, store and forward
- Broadcast Storm Protection – setup of the maximum number of packets per second broadcasting from the network device – protecting of the LAN against traffic overload
- Bridge Group Manager - up to 7 logical groups per port (VLAN)



Routing

Segregation of the networks on the network layer – LAN 1 to LAN xxx routing

- Level 3, static routing tables
- up to 64 routing records (128 optional)
- Available for physical and logical interfaces



BriLAN®

Point-to-Point, Infrastructure Client

Infrastructure client – communication as a part of the Infrastructure based on the AP function
Point-to-Point transmition providing connection between two points.

Access Point (Point-to-Multipoint connection)

Mainly **Point-to-Multipoint** transmition providing connection between several client stations as well as AP stations equipped with *wireless cards* – *communication type* **Infrastructure** mode.
Supports communication for up to 128 clients from one central point (AP)

Bandwidth Management

Speed limit, and queue membership are customizable rules for the Traffic Shaping service of BriLAN based WISP AP, available in **Traffic Shaping Manager**.

BriLAN based device regulates packet transfer rate on ports or network nodes meeting the specific demands on the network throughput. Without limiting the packet transfer rate users can achieve traffic performance up to maximum speed of the wireless or Ethernet interface. Speed can limit data flow on a physical Port or logical group of Network Nodes.
Ports or Network Nodes can be defined by MAC or IP addresses in 128 independent Traffic Shaping Queues. Traffic queues with 512 Kb shared data buffer, working at user defined data speed limit, can be independently started or stopped.

Traffic shaping queues
128 queues
Queue – speed limit

- predefined (from 32 Kbps up to 4096 Kbps)
- custom assignment

Assignment

- per physical port (up to 24 ports in one device)
- per IP address (up to 128 user definable records of IP hosts and/or network addresses)
- per MAC address (up to 2048 MAC addresses)

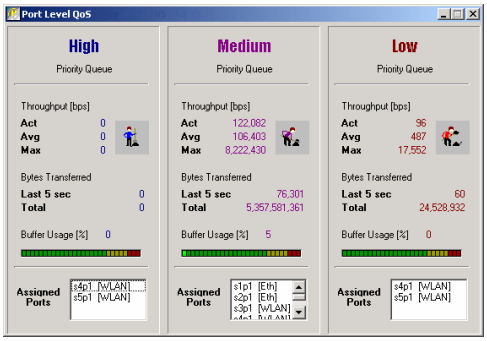
Other Features:
Queue Operation Status
Active – running based on settings
Inactive – keeps settings – queue in BYPASS mode
Discard – settings in Active mode – data will be blocked (discarded) for user

Statistical information:
Utilization of the queue
Buffer usage
Amount of data transferred, dropped (did not processed by queue – buffer overload)

BriLAN®

Quality of Service (QoS)

3 priority queues – data prioritization (based on transmitted packets)
(512 KB buffer, 256 packet entries per queue)



Assignment:
Per port (installed Interface)

Statistical Information:
Current throughput
Max. throughput
Current amount of transmitted data
Total amount of transmitted data

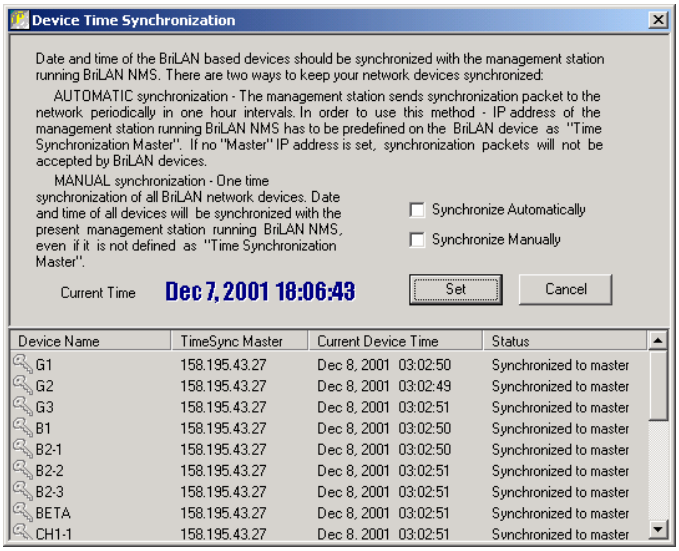
MAC address and IP address level Firewall

Protection against network access by unauthorized users. System Administrator can specify default port accessibility mask (permitted and/or denied ports) which will be applied to every new network user based on their MAC or IP address.

Device Time Synchronization

Synchronization of Device internal time with time of the Time Synchronization Master (TSM) – which is represented by management station running BriLAN NMS.

Automatic Synchronization – periodically synchronize time with
Manual TSM – manual (one time) synch. with any station running BriLAN NMS.



BriLAN®

BriLAN™ NMS

Management System – powerful tool for Network Administrators

BriLAN™ NMS - **Network Management System** – Software application (Windows 32-bit) providing ability to manage **BriLAN™** based devices remotely over the TCP/IP network.
Supports setup and monitoring of the devices with the ability to display information for data flow, status of the devices, event logging, and more. Setup allows user to set all important hardware and software parameters of the device.
All management data transmitted over the network are encrypted. Password protected access to the features of NMS provides users with highly secure way of managing it's networks.

Setting up of the BriLAN based devices:

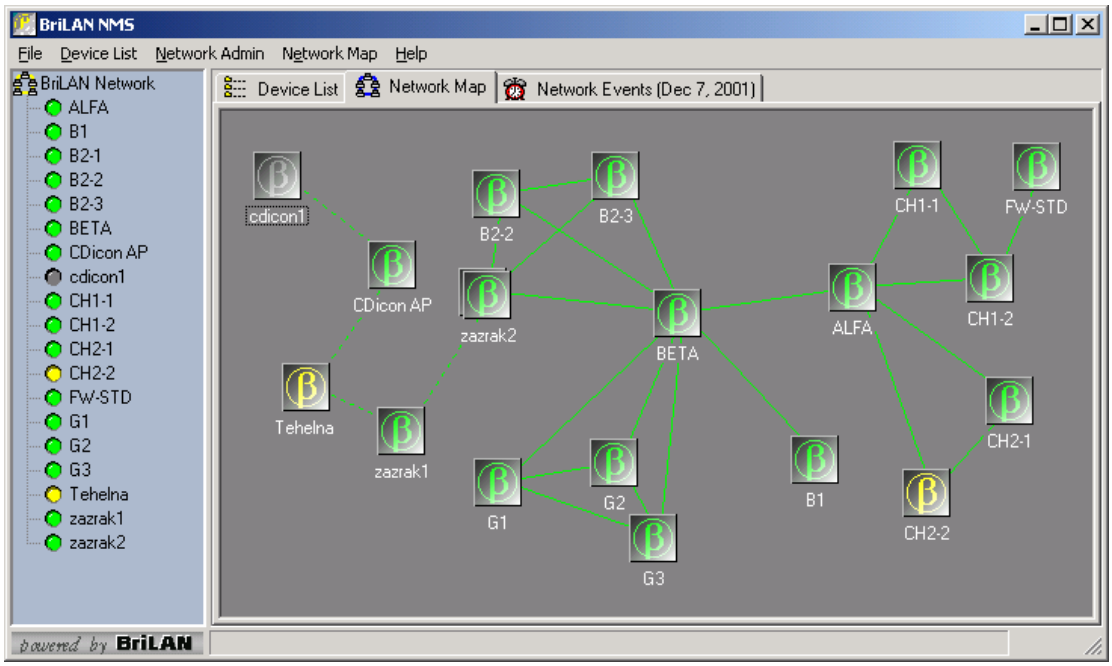
Local setup

- Serial port – terminal type connection – with build in terminal functions in NMS

Remote setup and monitoring

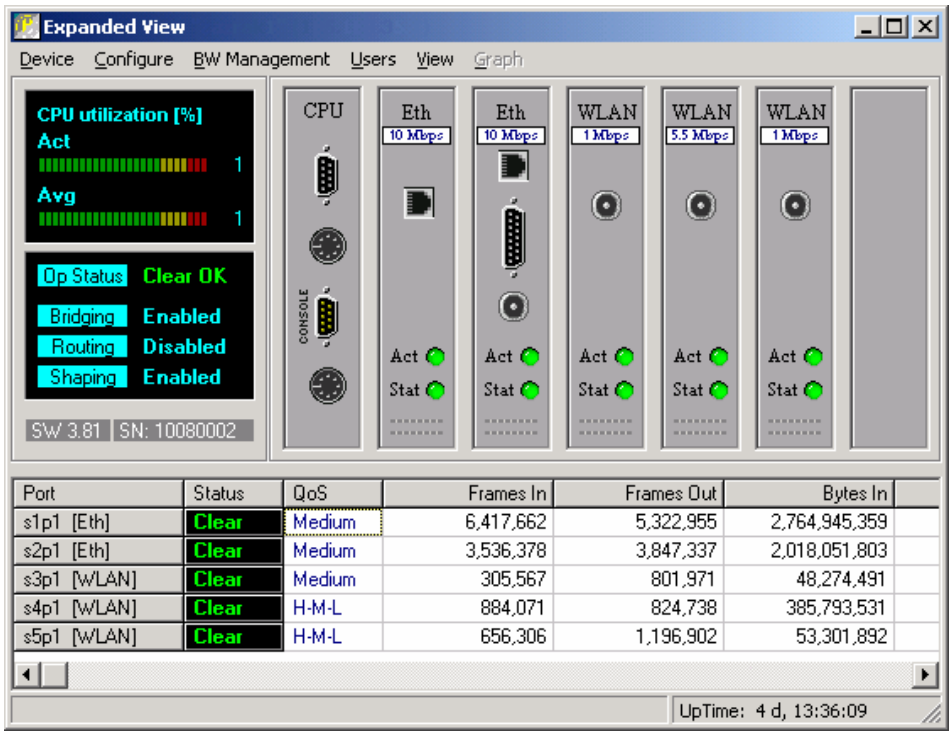
- Ethernet port – TCP/IP based connection

BriLAN™ NMS – Screen shots

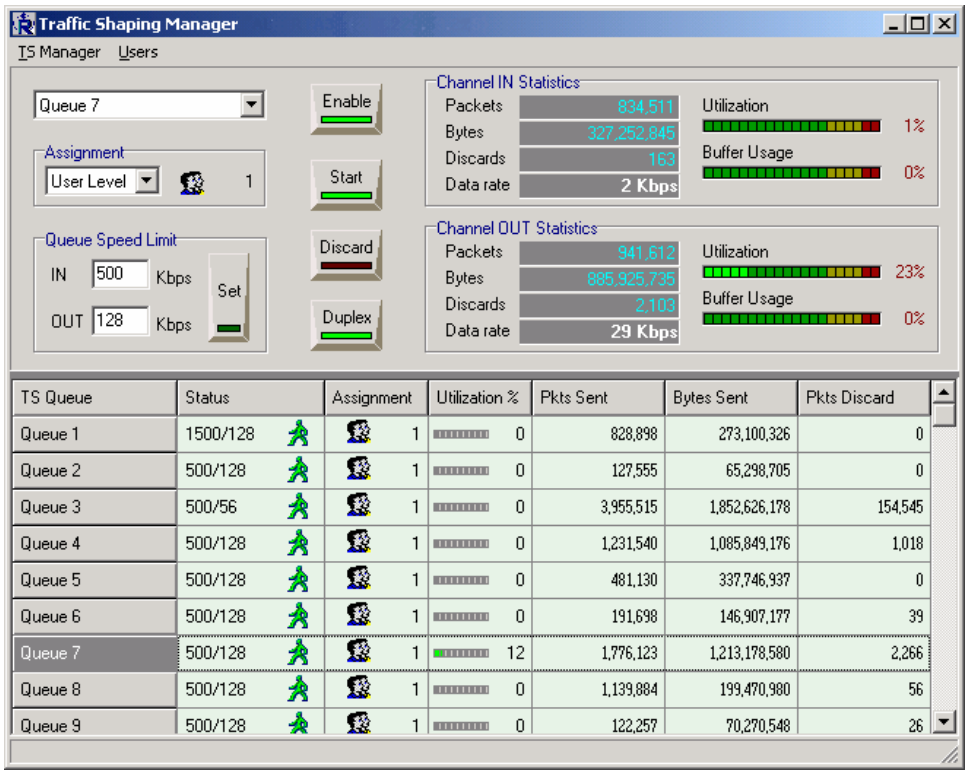


Map of the BriLAN Devices – different color represents status of the Device

BriLAN®

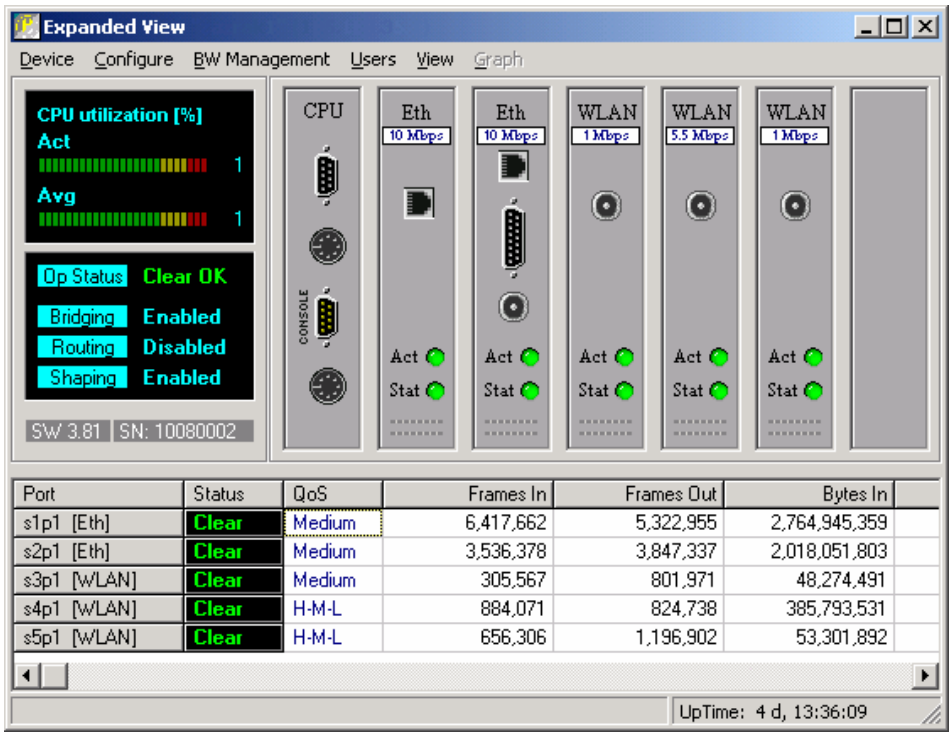


Graph – statistical data per physical port in the Device



Bandwidth Management – assignment of specific speed to a customer or to a device port

BriLAN®



Interfaces – display of installed interfaces in BriLAN based devices

For more and updated information on BriLAN technology please visit our web site at:

www.softhill.com , www.brilan.com

You can download fully functional BriLAN NMS together with database of IP addresses and see the performance of real network installation in the University of Technology, Bratislava, Slovak republic, Europe.

BriLAN®

Supported Hardware

Motherboard, BIOS, CPU, Memory, Ports and Storage Media

- **Motherboard:** standard PC AT type or higher with the support for 32-bit OS
- **BIOS:** support for plug-and-play OS required
- **CPU:** Intel compatible (Intel, AMD) - 386 or higher (depends on required performance) [**min. 486, 100 MHz recommended]**
- **RAM:** min. 6 MB
- **Boot media:** DiskOnChip, IDE Flash Disk, FDD or HDD to boot up the system with at least 1.4 MB. ***(DiskOnChip min. 2 Mb recommended to avoid problems with mechanical parts - FDD or HDD)***
- **Ports:**
  Serial port (RS 232) - used as console port for setting-up the device properties

BriLAN™ NOS supported interfaces

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) Ethernet controller
NE2000		ISA	TP, BNC, AUI	10Mbps

2. Asynchronous interfaces

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

3. 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,

4. Wireless Ethernet interfaces

Type	Manufacturer	Slot type	More info
PC4500* PC4800* 340 Series and higher	Aironet/Cisco www.aironet.com www.cisco.com	ISA/PCI	2.4 GHz DSSS 11 Mbps NIC
SWL-2100P	Samsung www.sem.samsung.com	PCI	2.4 GHz DSSS 11 Mbps wireless adapter (MagicLan)
EUSSO	Eusso Technolgies www.eusso.com	PCMCIA	11 Mbps 2.4 GHz DSSS
Raylink	Raylink Inc. www.raylink.com	PCMCIA ISA	2.4 GHz FHSS 2 Mbps wireless adapters
WaveLAN Orinoco	Lucent www.lucent.com	ISA, PCI	11 Mbps wireless adapter

5. Voice support interfaces

Type	Manufacturer	Slot type	More info
Internet LineJack	Quicknet Technologies www.quicknet.com	ISA	Adapter providing connection to extend the reach of analog phone lines