User Manual

SysKonnect SK-9521 V2.0
10/100/1000Base-T Adapter

SysKonnect
The Server Connectivity Company

SysKonnect SK-9521 V2.0 10/100/1000Base-T Adapter

User Manual

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Visit our web site: http://www.syskonnect.com

This manual refers to SysKonnect SK-9521 V2.0 10/100/1000Base-T Adapters. It describes the hardware and software installation and the functionality of the adapter.

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German and French versions of this manual are available on the SysKonnect installation CD-ROM and on our web site.

Conventions

The following conventions apply in this manual.

Warnings and Notes

Used to indicate a potentially hazardous situation which, if not avoided, could result in death or serious injury. Example: dangerous voltage.

Used to indicate a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. Example: electrostatic discharge.

Used for additional information and advice.

Font Styles applied

`Courier`:	Used to identify terminal input to be entered by the user and output to be issued by the system. Examples: Enter `sk98diag`. If the test was succesful, the message `passed` is issued.
Italics:	Used when new technical terms are introduced. Example: The station is operated in *Repeater Mode*.
SMALL CAPS:	Used to identify menu options to be selected by the user and buttons to be clicked by the user. Examples: In the main menu, select EXIT. Click NEXT.
Underline:	Used to identify hyperlinks, which, if clicked by the user, jump to the designated link. Example: Visit our web site: http://ww.syskonnect.com.

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Safety Precautions

To protect yourself from injuries and avoid damage of the device, always observe the following safety instructions when installing the network adapter.

Avoiding injuries

Electrical current!
Electrical current from power, phone, and communications cables can be hazardous.
Never touch any electrical elements with bare hands.

To avoid potential shock hazards:

- Do not carry out any installation, maintenance, or (re)configuration work during a thunderstorm.
- Do not connect or disconnect any power cables during a thunderstorm.
- For installation in a Hot-Plug system, observe the safety instructions specific to this system. Read the relevant documentation.
- Do not connect the network adapter to a telephone line.

Electrical installations must comply with the safety regulations of the country in which they are operated.

Avoiding damage

Electrostatic discharge!
Electrostatic discharge may damage or destroy the network adapter.

To avoid damaging the network adapter:

1. Switch off the computer.
2. Disconnect the power cord from the power outlet.
3. Remove the computer cover.
4. Connect the wrist straps (electrically conductive) to the computer chassis.
   Do not connect the wrist straps to the ground terminal of the power supply!
   Faulty wiring could make this terminal live and potentially lethal.
5. When you are ready to install the network adapter, open the antistatic bag.
   We recommend to wear an antistatic wrist strap when installing the network adapter.
6. Hold the antistatic packaging of the network adapter against the bracket of an expansion slot on your computer for at least two seconds.
   This reduces the static charge in the packaging and in your body.
   If you need to place the network adapter somewhere after removing it from the antistatic bag, make sure that you place it on the antistatic bag and on a level surface.
   Do not place the network adapter on the computer cover or on any other metal surface.
7. Cautiously insert the adapter into the corresponding slot.
   Do not touch any circuits on the network adapter or any of its port contacts.

In general, observe the following:

- Never use force when working with the network adapter or the PCI bus.
- Do not allow anyone else to touch the network adapter.
- Avoid unnecessary movement since this can increase electrostatic charge.

1 Installation of the Network Adapter

The installation procedure in Hot-Plug systems may differ from the following. For Hot-Plug systems read the corresponding documentation. Have the computer manual ready and if necessary, a key and/or screwdriver to open the cover and remove the bracket.

To install the adapter in the computer, proceed as follows:

1. Switch off the computer in which the network adapter is to be installed.
2. Disconnect the power cord from the power outlet.
   Observe the safety instructions (see page 11).
3. Open the computer cover as described in your computer manual.
   You may need a screwdriver or similar tool to remove the screws from the cover.
   If you are installing a network adapter in a tower computer, we recommend to put the computer on its side in order to be able to apply the correct force to insert the adapter into the PCI bus slot.
4. Locate a free PCI bus slot on the motherboard.
5. Consult the section in your computer manual that describes how to install expansion cards.
6. Remove the bracket from the expansion slot (if applicable).
   Follow the instructions in your computer manual.
7. Remove the network adapter from the antistatic bag.
   Observe the safety instructions (see page 11).
8. Insert the network adapter into the PCI bus slot as described in your computer manual (also see figure 1 "Insertion of the adapter into the computer").
   Make sure that the network adapter is correctly aligned with the PCI bus slot on the motherboard.
9. Push the network adapter down vertically into the slot until it is firmly seated.
10. If available, tighten the locking screw on the fixing bracket until the adapter is firmly connected to the computer cover (or to the attachment provided for expansion cards).
11. Replace the computer cover.
12. Replace and tighten all screws.
13. Reconnect the power supply.
    Observe the safety instructions (see page 11).

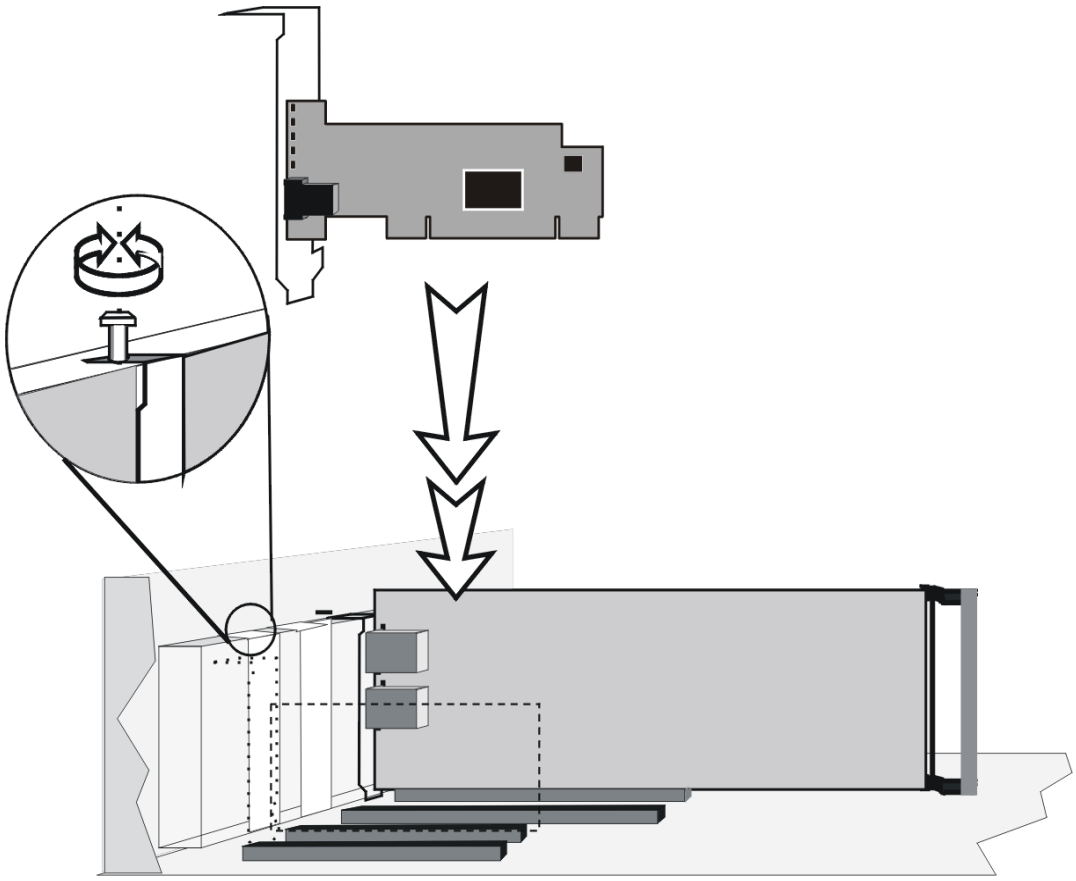


Figure 1. Insertion of the adapter into the computer

2 Connection of the Network Adapter

This chapter describes the physical connection of the network adapter to the network. General instructions for driver installation are given in chapter 3 "Installation of the Driver Software".

Transmission Distances

The maximum transmission distance for the SysKonnect SK-9521 V2.0 10/100/1000Base-T Adapter using a category 5 unshielded twisted pair cable is 100 m.

Connection to the Network

Observe the safety instructions given on page 11.

In order to connect the adapter to the data network, proceed as follows:

1. If necessary, configure the port on the switch to which the network adapter is to be connected (also see the switch manual).
2. If possible, disconnect the switch and the computer from the power supply.
3. At one end of the cable connect the RJ-45 connector to the port on the switch.
4. At the other end of the cable connect the connector to the port on the network adapter (see figure 2).

   The port type (e.g. 1000Base-T) on the network adapter and that on the switch must be identical.
5. Turn on the computer and the switch.

   If no protocol driver has been loaded, go to chapter 3 "Installation of the Driver Software". After driver installation, return to step 6 of this list.

   If a protocol driver has been loaded, continue with step 6.
6. Check the green link LEDs to find out if the cable is connected correctly.

   If the appropriate LED is on, the connection is established and active. Otherwise you have to check the network adapter more closely (for details, refer to chapter 5 "Testing the Network Adapter" and chapter 6 "Troubleshooting").

As soon as the connection to the network is established, the installation of the network adapter is complete. Keep this manual with your computer manual for future reference.

The network adapter will not be fully operational until suitable drivers are loaded. See chapter 3 "Installation of the Driver Software" for details.

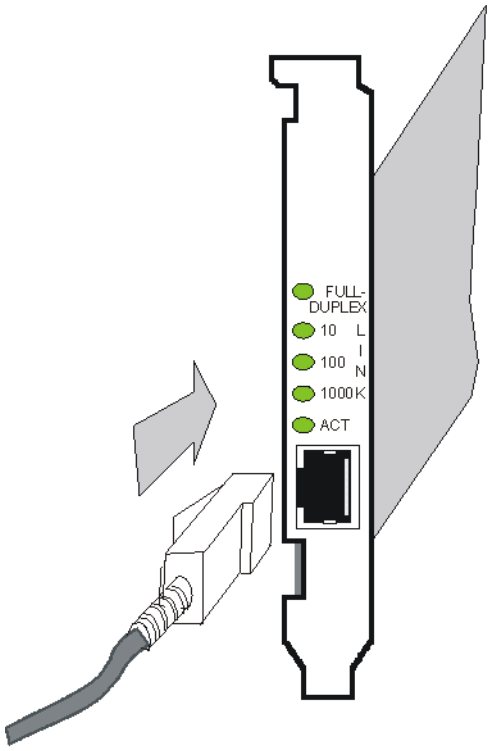


Figure 2. Connection of the RJ-45 cable / plug

In case the LEDs of your SysKonnect SK-9521 V2.0 10/100/1000Base-T Adapter do not correspond with the figure shown above you may have a SysKonnect SK-9521 V2.0 10/100/1000Base-T Adapter with a different hardware revision number. For further information refer to the appropriate version of the User Manual which is available on the SysKonnect web site.

3 Installation of the Driver Software

The network drivers are located in the appropriate product directory on the enclosed installation CD-ROM. This directory is organized into a number of subdirectories for the various operating systems. The subdirectories contain the driver files and the corresponding readme files. The readme files are available as ASCII text and in HTML format. Any last-minute changes are documented in the “Release Notes” (if applicable) and on the driver site of the SysKonnect web site.

To install a driver, follow the instructions given below and in the corresponding readme files.

The installation procedures described below are only valid for the SysKonnect SK-9521 V2.0 10/100/1000Base-T Adapter. For details on the installation of other SysKonnect adapters, refer to the corresponding readme files.

There are two possibilities to view the readme files:

- with an internet browser
- with a text editor

Use an internet browser

If you have an internet browser (or any other HTML viewer) installed on your computer, we recommend to use it for viewing the readme files.

To view the readme files with an internet browser, proceed as follows:

1. Insert the installation CD-ROM into your CD-ROM drive.
2. If the browser is not automatically launched, click START.HTM on the installation CD-ROM.
   The start page of the installation CD-ROM is displayed.
3. Click DRIVERS.
   A list showing all available network technologies is displayed.
4. Select your preferred network technology, e.g. GIGABIT ETHERNET.
   A list showing all available network adapters belonging to this technology is displayed.
5. Select your network adapter, e.g. SK-9521 V2.0.
   A list showing all available drivers for this adapter is displayed.
6. Click the operating system for which you want to install the driver, e.g. WINDOWS XP.
   The readme file is opened. Here, you will find detailed instructions on how to install the driver.

Use a text editor

To view a text file, proceed as follows:

1. Insert the installation CD-ROM into your CD-ROM drive.
2. Go to the appropriate product directory, e.g. SK-952X.
   A list of all available operating systems this network adapter supports is displayed.
3. Select the operating system for which you want to install the driver, e.g. SOLARIS > X86.
4. Open the corresponding text file, e.g. skge.txt.

Windows

SysKonnect offers drivers for Windows 2000, Windows XP, Windows Me, Windows 98 SE, and Windows NT 4.0. Additionally, a value added package is available for Windows 2000 and Windows XP enabling Virtual LAN (VLAN) and link aggregation support. This package also includes a utility program for easy installation and configuration. For details, refer to chapter "SysKonnect Network Driver Installation Packages for Windows 2000 and Windows XP" and chapter "SysKonnect Network Control for Windows 2000 and Windows XP".

Drivers downloaded from our web site are available in a packed format (.zip files). The downloaded file has to be unpacked before installation.

Windows NT 4.0

The NDIS 4.0 32-bit Miniport driver for the SysKonnect SK-9521 V2.0 10/100/1000Base-T Adapter supports Windows NT 4.0. This driver does not support Windows NT 3.51 or below. It is recommended to install the latest Windows NT 4.0 Service Pack after successful installation of the driver.

To install the driver, proceed as follows:

1. After you have installed the adapter in your computer (for details, see chapter 1 "Installation of the Network Adapter"), boot Windows NT 4.0.
2. Select START > SETTINGS > CONTROL PANEL.
   The window “Control Panel“ is displayed.
3. Select NETWORK.
   The window “Network“ is displayed.
4. Select the tab ADAPTERS.
5. Click ADD....
6. Click HAVE DISK....
7. Depending on the type of installation medium used (CD-ROM, floppy disk, network drive), type the path to the driver, e.g. `e:\SK-952x\Windows\Nt4`, where ”e” is the designation of the CD-ROM drive on your system.
8. Click OK.
   The window “Select Network Adapter“ is displayed.
9. Select the adapter for which the driver is to be installed.
10. Click OK.
    The window “Card Setup“ is displayed.
11. Configure the adapter (for details, refer to the corresponding readme file).
12. When you have finished the configuration, click OK.
13. After successful installation of the driver, install the latest Windows NT 4.0 Service Pack.
14. Restart your system.

For more information, refer to the corresponding readme file.

Windows 98 Second Edition

SysKonnect offers an NDIS 5.0 32-bit Miniport driver for the SysKonnect SK-9521 V2.0 10/100/1000Base-T Adapter supporting Windows 98 Second Edition (Windows 98 SE). This driver only supports Windows 98 SE and Windows Me.

With PCI adapters, due to the plug & play facility of PCI, Windows 98 SE is able to find, identify, and configure an adapter automatically.

To install the driver, proceed as follows:

1. After you have installed the adapter in your computer (for details see chapter 1 "Installation of the Network Adapter"), boot Windows 98 SE.
   Windows 98 SE detects the SysKonnect SK-9521 V2.0 10/100/1000Base-T Adapter as “PCI Ethernet Controller” during the boot operation.
   The window “Add New Hardware Wizard” is displayed.
2. Click NEXT.
   The menu “What do you want Windows to do?” is displayed.
3. Select the check box SEARCH FOR THE BEST DRIVER FOR YOUR DEVICE (RECOMMENDED).
4. Click NEXT.
5. Select the source from which the driver is to be installed (e.g. CD-ROM, floppy disk, hard disk).
6. Select the checkbox SPECIFY A LOCATION.
7. Type the path to the driver, e.g. `e:\SK-952x\Windows\Win98SE`, where ”e” is the designation of the CD-ROM drive on your system.
8. Click NEXT.
   The window “Location of driver” is displayed.
9. Click NEXT.
   The message “Please insert the disk labeled SysKonnect SK-98xx and SK-95xx Gigabit Ethernet Adapter Family Installation Disk" is displayed.
10. To continue the installation, click OK.
    The message "Setup could not find a file on the specified path" is displayed.
11. To continue the installation, click SKIP FILE.
12. Repeat step 10 and step 11.
    The menu “Windows has finished installing the software that your new hardware device requires” is displayed.
13. Click FINISH.
14. Restart your system.

For more information, refer to the corresponding readme file.

Windows Millennium Edition

SysKonnect offers an NDIS 5.0 32-bit Miniport driver for the SysKonnect SK-9521 V2.0 10/100/1000Base-T Adapter supporting Windows Millennium Edition (Windows Me). This driver only supports Windows Me and Windows 98 SE.

With PCI adapters, due to the plug & play facility of PCI, Windows Me is able to find, identify, and configure an adapter automatically.

To install the driver, proceed as follows:

1. After you have installed the adapter in your computer (for details, see chapter 1 "Installation of the Network Adapter"), boot Windows Me.
   Windows Me detects the SysKonnect SK-9521 V2.0 10/100/1000Base-T Adapter as “PCI Ethernet Controller” during the boot operation.
2. Select the check box SPECIFY THE LOCATION OF THE DRIVER (ADVANCED).
3. Click NEXT.
4. Select the check box SEARCH FOR THE BEST DRIVER FOR YOUR DEVICE (RECOMMENDED).
5. Select the source from which the driver is to be installed (e.g. CD-ROM, floppy disk, hard disk).
6. Select the check box SPECIFY A LOCATION.
7. Type the path to the driver, e.g. `e:\SK-952x\Windows\WinME`, where ”e” is the designation of the CD-ROM drive on your system.
8. Click NEXT.
   The window “Location of driver” is displayed.
9. Click NEXT to continue the installation.
   The menu “Windows has finished installing the new hardware device” is displayed.
10. Click FINISH.
11. Restart your computer.

For more information, refer to the corresponding readme file.

Windows 2000

SysKonnect offers an NDIS 5.0 32-bit Miniport driver for the SysKonnect SK-9521 V2.0 10/100/1000Base-T Adapter supporting Windows 2000. SysKonnect also offers the “Network Driver Installation Package for Windows 2000 and Windows XP”. For details on this package, refer to chapter "SysKonnect Network Driver Installation Packages for Windows 2000 and Windows XP".

To install the driver, proceed as follows:

1. After you have installed the adapter in your computer (for details, see chapter 1 "Installation of the Network Adapter"), boot Windows 2000.
   Windows 2000 detects the SysKonnect SK-9521 V2.0 10/100/1000Base-T Adapter as “Ethernet Controller” during the boot operation.
   The window „Found New Hardware Wizard“ is displayed.
2. Click NEXT.
   In the same window the menu „Install Hardware Device Drivers“ is displayed.
3. Select the check box SEARCH FOR A SUITABLE DRIVER FOR MY DEVICE (RECOMMENDED).
4. Click NEXT.
   The menu “Locate Driver Files” is displayed.
5. Select the source from which the driver is to be installed (e.g. CD-ROM, floppy disk, hard disk).
6. Type the path to the driver, e.g. `e:\SK-952x\Windows\Win2000`, where ”e” is the designation of the CD-ROM drive on your system.
7. Click OK.
8. Click NEXT.
   The menu “Driver Files Search Results” is displayed, listing the found driver and its location.
9. To install the driver, click NEXT.
   In case the driver does not have a Microsoft Digital Signature yet, the window “Digital Signature Not Found” is displayed.

10. To continue the installation, click YES.
    The window ”Completing the Found New Hardware Wizard” is displayed.
11. Click FINISH to complete the installation.

For more information, refer to the corresponding readme files.

Windows XP

SysKonnect offers an NDIS 5.1 32-bit Miniport driver for the SysKonnect SK-9521 V2.0 10/100/1000Base-T Adapter supporting Windows XP.

To install the driver, proceed as follows:

1. After you have installed the adapter in your computer (for details, see chapter 1 "Installation of the Network Adapter"), boot Windows XP.
   Windows XP detects the SysKonnect SK-9521 V2.0 10/100/1000Base-T Adapter as “Ethernet Controller” during the boot operation.
   The window “Found New Hardware Wizard“ is displayed.
2. Select the check box INSTALL THE SOFTWARE AUTOMATICALLY (RECOMMENDED).
3. Click NEXT.
   The menu “Please choose your search and installation options“ is displayed.
4. Select the check box SEARCH FOR THE BEST DRIVER IN THESE LOCATIONS.
5. Select the check box INCLUDE THIS LOCATION IN THE SEARCH.
6. Type the path to the driver, e.g. `e:\SK-952x\Windows\WinXP`, where ”e” is the designation of the CD-ROM drive on your system.
7. Click OK.
8. Click NEXT.
   In case the adapter has not passed Windows Logo testing to verify its compatibility with Windows XP, the window “Hardware Installation” is displayed.
9. To continue the installation, click CONTINUE ANYWAY.
   In the window ”Found New Hardware Wizard”, the menu “Completing the Found New Hardware Wizard” is displayed.
10. Click FINISH to complete the installation.

For more information, refer to the corresponding readme file.

SysKonnect Network Driver Installation Packages for Windows 2000 and Windows XP

There are two SysKonnect Network Driver Installation Packages for the SysKonnect SK-9521 V2.0 10/100/1000Base-T Adapter containing the NDIS 5.0 and 5.1 32-bit Miniport drivers, the Virtual LAN (VLAN) intermediate driver, the Link Aggregation (LAGG) intermediate driver, and the utility program “SysKonnect Network Control”. These packages support Windows 2000 or Windows XP, respectively. The installation process is identical for Windows 2000 and Windows XP. It is described for Windows 2000.

To install the package on Windows 2000, proceed as follows:

1. After you have installed the adapter in your computer (for details, see chapter 1 "Installation of the Network Adapter"), boot Windows 2000.
   Windows 2000 detects the SysKonnect SK-9521 V2.0 10/100/1000Base-T Adapter as “Ethernet Controller” during the boot operation.
   The window “Found New Hardware Wizard“ is displayed.
2. Click CANCEL to continue the package installation.
3. Go to the folder where the “SysKonnect Network Driver Installation Package” (setupsknet.exe) is stored.

4. Double-click SETUPSKNET.EXE to start the installation of the package.
   The window “Welcome to the SysKonnect Network Installation Package Installation Wizard“ is displayed.
5. Click NEXT to continue the installation.
   The window “License Agreement“ is displayed.
6. Select the check box I ACCEPT THE LICENSE AGREEMENT.
7. Click NEXT.
   The window “Readme Information“ is displayed.
8. Click NEXT.
   The window “Destination Folder“ is displayed.
9. Select a folder where the application is to be installed.
   The default destination folder is D:\Program Files\SysKonnect\. To install in a different folder, click BROWSE and select a different folder.
10. Click NEXT.
    The window “Ready to install the application“ is displayed.
11. Click NEXT to continue the installation.
    The window “Updating System - Installation of updated drivers“ is displayed.
12. Click NEXT to continue the installation.
    In case the driver does not have a Microsoft Digital Signature yet, the window “Digital Signature Not Found” is displayed (in Windows XP, the window “Software Installation” is displayed).
13. To continue the installation, click YES (in Windows XP, click CONTINUE ANYWAY).
    The window “Updating System - Scan for New Hardware” is displayed.
14. Click NEXT to continue the installation.
    The menu “SysKonnect Network Installation Package has been successfully installed” is displayed.
15. Click FINISH to exit the installation program.
16. If the system requests a reboot, restart your computer.
    The “SysKonnect Network Control” can now be started from the Control Panel window: START > SETTINGS > CONTROL PANEL > NETWORK CONTROL (in Windows XP: START > CONTROL PANEL > NETWORK CONTROL.)

For more information, refer to the corresponding readme file.

Linux

The Linux driver for the SysKonnect SK-9521 V2.0 10/100/1000Base-T Adapter supports the Linux kernel 2.2.x and higher stable versions. The installation procedure for the various Linux distributions differs. The driver will be integrated into the kernel, i.e. using the standard installation procedure of your distribution to install Ethernet adapters should cause no problems. For details on the installation of Ethernet adapters, refer to the distribution’s manual. The installation procedure described in this manual is a general description for Intel/x86 computers, which is valid for all distributions.

It is recommended to download the latest version of the driver from the SysKonnect web site http://www.syskonnect.com. If you have downloaded the latest driver, the Linux kernel has to be patched before the driver can be installed.

Patch the Linux kernel

To patch the Linux kernel, proceed as follows:

1. Login as “root”.
2. Download the original Linux source code named `linux-a.b.c.tar.gz` or `linux-a.b.c.tar.bz2` (e.g. `linux-2.4.22.tar.bz2`) into the directory `/usr/src`.

You can download the source code from the FTP site ftp://ftp.kernel.org or from one of its mirror sites.

The linux kernel version has to match the version of the patch file.

3. Unpack the original Linux source code with one of the following commands:

   `tar xvzf linux-a.b.c.tar.gz`

   or

   `tar xfvj linux-a.b.c.tar.bz2`

   After the sources have been installed, they can be found in a directory named either

   `/usr/src/linux-a.b.c`

   or

   `/usr/src/linux`.

4. Usually, the directory `/usr/src/linux` is a symbolic link to the target kernel source tree but in some cases you may need to create it manually with the following command:

   ```
   cd /usr/src
   ln -s linux-a.b.c linux
   ```

5. To start the kernel build process, go to the topmost directory in the kernel source tree with the following command:

   `cd /usr/src`

6. Patch the kernel with the following command:

   `zcat /patch-location/sk98lin_a_b_c_patch.gz | patch -p0`

For initial driver setup, the driver must be installed and then be started manually. After successful installation, the driver can be included into the system start. The driver can either be integrated into the kernel or be compiled as a module. Select the appropriate option during kernel configuration.

The installation procedure is described for installing the driver on x86 systems. In addition to installing the driver, standard development tools, e.g. “make”, “gcc”, etc. have to be installed.

Install the driver

To use the driver as a module or integrate it into the kernel, proceed as follows:

1. After you have installed the adapter in your computer (for details, see chapter 1 "Installation of the Network Adapter"), boot your Linux system.
2. Login as “root”.
3. Go to the directory /usr/src/linux.
4. Execute the command: `make menuconfig` for the console mode, or
   execute the command: `make xconfig` for the graphical mode.
   The kernel configuration menu is displayed.
5. Select the menu NETWORK DEVICE SUPPORT.
6. Select the menu ETHERNET (1000 MBIT).
7. To integrate the driver permanently into the kernel, mark SYSKONNECT SK-98XX SUPPORT with (*).
   The support for SK-9521 V2.0 adapters is included in the SK-98xx support.
8. To compile the driver as a module, mark SYSKONNECT SK-98XX V2.0 SUPPORT with (M).
   The support for SK-9521 V2.0 adapters is included in the SK-98xx support.
9. Select EXIT.
   The Main Menu is displayed.
10. Select LOADABLE MODULE SUPPORT.
    The menu “Loadable module support“ is displayed.
11. Select ENABLE LOADABLE MODULE SUPPORT.
12. Select KERNEL MODULE LOADER.
13. Select EXIT.
14. Configure other options, e.g. SCSI, file systems, etc.
15. To quit the configuration, select EXIT.

16. When the message "`Do you wish to save your new kernel configuration`" is displayed, select YES.
    Now build a new kernel by executing the following commands:
17. Execute the command: `make dep`.
18. Execute the command: `make clean bzImage`.
19. Execute the command: `make modules`.
20. Execute the command: `make modules_install`.
21. If you use "lilo" as a boot loader, execute the command:
    `make bzlilo`.
    If no errors occurred, the new kernel is installed in the "root" directory.
22. Go to the "root" directory by executing the command: `cd /`.
23. Copy the new kernel into your boot directory by executing the commands:
    `cp vmlinuz /boot/<name of the new kernel>` and
    `cp System.map /boot/`.
24. Edit the boot loader configuration file to boot the new kernel, e.g. "lilo.conf".
25. If you use "lilo" as a boot loader, execute the command: `lilo`.
26. Reboot your system with the new kernel.
27. If you use the driver as a module, continue with "Load the module".
    If you integrated the driver into the kernel, continue with "Assign an IP address".

Load the module

If you use the driver as a module, the module has to be loaded manually.

To load the module manually, proceed as follows:

1. Execute the following command: `modprobe sk98lin`.
2. If the SysKonnect adapter is installed in your computer and you have a /proc file system, execute the command:
   `ls /proc/net/sk98lin`.
   This should produce an output containing a line with the following format:
   `eth0 eth1 ...`
   which indicates that your adapter has been found and initialized.
   If several SysKonnect adapters are installed in your system, the adapters will be listed as "eth0", "eth1", "eth2", etc. The mapping is executed automatically.
   The module installation message (displayed either in a system log file or on the console) outputs a line for each adapter found containing the corresponding "ethX".
3. Assign an IP address.

Assign an IP address

In order for the adapter to work, an IP address has to be assigned. For each adapter, repeat steps 1 and 2 below.

To assign an IP address, proceed as follows:

1. Select an IP address by assigning it to the respective adapter:
   `ifconfig ethX <ip-address> <options>`
   (For detailed information about the available options refer to the system command reference.)
   With this command, the adapter is connected to the Ethernet. If your adapter is connected to the data network or another station, the green link LED is active after assigning the IP address. In addition, you will receive a status message on the console stating "ethX: network connection up using port Y" and showing the selected connection parameters. Now your adapter should be fully operational.
2. Execute `ping <other station>` to verify the connection to other computers on your network.

If you are in doubt about the IP addresses, ask your network administrator for assistance.

For more information, refer to the corresponding readme file or to the kernel documentation (which usually can be found in the directory `/usr/src/linux/Documentation/` on your system).

Sun Solaris (x86)

The Solaris x86 driver supports the SysKonnect SK-9521 V2.0 10/100/1000Base-T Adapter on Solaris 7 and higher.

There are two tools for installing the driver package:

- ”pkgadd”, which runs from the command line
- ”admintool”, which uses a GUI

The following description of the driver installation is based on an installation on Solaris x86. It is valid for all Sun Solaris systems.

In order to perform the installation, you need “root” access.

Driver packages downloaded from our web site are available in a compressed format (.tar.Z files). The package has to be uncompressed before installation.

Uncompress the driver

To uncompress the downloaded driver package, proceed as follows:

1. Go to the directory where the compressed driver package is located, e.g. `/usr/SKGE/skgesol_x86v6.09.tar.Z` for the x86 version.
   Uncompress the file with the following command:
   `uncompress skgesol_x86v<version number>.tar.Z`
   (e.g. `uncompress skgesol_x86v6.09.tar.Z`).
   The result is the file “skgesol_x86v<version number>.tar”.
2. Untar this file with the following command:
   `tar -xvf skgesol_x86v<version number>.tar`
   The result is a subdirectory containing the driver package and the readme files in .html and .txt-format.
   The driver package is now ready to be installed.

Install the driver with “pkgadd”

To install the driver using ”pkgadd”, proceed as follows:

1. After you have installed the adapter in your computer (for details, see chapter 1 "Installation of the Network Adapter"), boot your Sun Solaris system.
2. Go to the directory where the subdirectory “SKGEsol” is located.
3. Execute ”pkgadd”:
   `pkgadd -d . SKGEsol`
   A shell window is displayed asking whether you want to configure IP interfaces during installation or not.
4. If yes, type `y`.
   If no, type `n`.
5. Press <Enter>.
   If you have typed `y` in step 4, continue with step 6.
   If you have typed `n` in step 4, only the driver will be loaded and all interfaces have to be configured manually. For details, refer to the corresponding readme file.
6. Enter the following values for every interface you want to configure as the system requests them:
   - the new interface's name (“skge0” for the first interface’s name, “skge1” for the second one, etc.),
   - the IP address (e.g. 192.168.0.59), and
   - the netmask (e.g. 255.255.255.0).

Once you have entered all information, the message “`Are these settings OK (y/n)?`” is displayed.

7. If all settings are OK, type `y`.
8. Press <Enter>.
   The message “`Do you have more SysKonnect Gigabit Ethernet interface adapters installed (y/n)?`” is displayed.
9. If yes, type `y`.
   If no, type `n`.
10. Press <Enter>
    If you have typed `y` in step 9, repeat steps 6 to 8.
    If you have typed `n`, continue with step 11.
11. When the message “`Do you want to continue with the installation of <SKGEsol> [y, n, ?]`” is displayed, type `y`.
    The driver package is installed.
    ”pkgadd” will prompt you to reboot after successful installation, but this may be ignored.

Install the driver with “admintool”

To install the driver using ”admintool”, proceed as follows:

1. After you have installed the adapter in your computer (for details, see chapter 1 "Installation of the Network Adapter"), boot your Sun Solaris system.
2. Start ”admintool”.
   The window “Admintool: Users” is displayed.
3. Select BROWSE > SOFTWARE.
   The window “Admintool: Software”, listing all available software, is displayed.
4. Select EDIT > ADD.
   The dialog box “Admintool: Set Source Media“ is displayed.
5. Select the location of the “SKGEsol” subdirectory.
6. Click OK.
   In the displayed window, the left panel shows the available software packages.
7. Select SYSKONNECT SK-98XX AND SK-95XX ADAPTER FAMILIES.
8. Click ADD.
   The shell window “Admintool: Add Software” is displayed asking whether you want to configure IP interfaces during installation or not.
9. If yes, type `y`.
   If no, type `n`.
10. Press <Enter>.
    If you have typed `y` in step 9, continue with step 11.
    If you have typed `n` in step 9, only the driver will be loaded and you have to configure all interfaces manually. For details, refer to the corresponding readme file.
11. Enter the following values for every interface you want to configure as the system requests them:
    - the new interface's name (“skge0” for the first interface’s name, “skge1” for the second one, etc.),
    - the IP address (e.g. 192.168.0.59), and
    - the netmask (e.g. 255.255.255.0).

    Once you have entered all information, the message “`Are these settings OK (y/n)?`” is displayed.
12. If all settings are OK, type `y`.
    If no, type `n`.
13. Press <Enter>.
    If you have typed `n`, correct the settings and return to step 12.
    If you have typed `y`, the message “`Do you have more SysKonnect Gigabit Ethernet interface adapters installed (y/n)?`” is displayed.

14. If yes, type `y`.
    If no, type `n`.
15. Press <Enter>.
    If you have typed `y` in step 14, repeat steps 11 to 13.
    If you have typed `n`, continue with step 16.
16. When the message "`Do you want to continue with the installation of <SKGEsol> [y, n,?]`" is displayed, type `y`.
    The driver package is installed.
    "Admintool" will prompt you to reboot after successful installation, but this may be ignored.

For more information, refer to the corresponding readme file.

Novell NetWare

The driver is a 32-bit ODI HSM Novell NetWare driver for the SysKonnect SK-9521 V2.0 10/100/1000Base-T Adapter. The driver supports NetWare 4.20, NetWare 5.0 and 5.1, and NetWare 6.0 and 6.5.
To perform the installation, you must have access to the server console.

Drivers downloaded from our web site are available in a packed format (.zip files). The downloaded file has to be unpacked before installation.

The setting for MINIMUM PACKET RECEIVE BUFFERS in the startup.ncf must be increased to at least 120 per adapter (e.g. for three adapters you should add "`Set Minimum Packet Receive Buffers = 360`" to startup.ncf). On SMP systems, you may have to multiply this number with the number of active processors.

Installation on Novell NetWare 4.20

To install the network driver on Novell NetWare 4.20, proceed as follows:

1. After you have installed the adapter in your computer (for details, see chapter 1 "Installation of the Network Adapter"), boot NetWare 4.20.
2. On the console, execute the following command: `load install`.
3. Select DRIVER OPTIONS (LOAD/UNLOAD DISK AND NETWORK DRIVERS).
   The menu "Driver Options" is displayed.
4. Select CONFIGURE NETWORK DRIVERS.
   The menu "Additional Driver Actions" is displayed.
5. Select DISCOVER AND LOAD ADDITIONAL DRIVERS.
   The system detects the SysKonnect adapter as "PCI Lan Controller 1148.3221....".
6. To get a list of available drivers, press <Enter>.
   The menu "Select a driver" is displayed.
7. To install an unlisted driver, press <Insert> (the SysKonnect driver is not listed).
8. To specify the path to the driver, press <F3>.
   The window "Specify a directory path" is displayed.
9. Type the path to the driver.
   If you are installing from CD-ROM, the menu "Select an action" is displayed. Here, select CONTINUE AND ACCESS THE CD-ROM.
   The menu "Select a driver to install" is displayed.
10. Select the driver for your network adapter.
    The message "`Do you want to copy driver <driver name>.LAN?`" is displayed.
11. To copy the driver to the server, select YES.

If an older version of a SysKonnect driver is installed on the system, the messages "`Save existing file SYS:SYSTEM\<driver name.LAN?`" and "`Save existing file SYS:SYSTEM\<driver name>.LDI?`" are displayed.

12. To continue, select the desired options (YES or NO).
    The menu "Board SK-98NW_1 (Driver <driver name>) Actions" is displayed.
13. Select SELECT MODIFY DRIVER PARAMETERS/PROTOCOLS.
14. Configure the protocols to be used.
15. Configure the parameters, e.g. "slot number".
16. After the parameters have been configured, select SAVE PARAMETERS AND LOAD DRIVER.
    The driver is loaded.
    Once the driver has been installed, the adapter parameters or bindings can be changed in the autoexec.ncf file using the "Install" tool.

For more information, refer to the corresponding readme file.

Installation on Novell NetWare 5 and 6

The installation procedure for NetWare 5 and 6 is identical.

To install the network driver on Novell NetWare 5 or 6, proceed as follows:

1. After you have installed the adapter in your computer (for details, see chapter 1 "Installation of the Network Adapter"), boot NetWare 5 or 6.
   NetWare detects the new adapter and tries to install a driver.
2. To get a list of available drivers, press <Enter>.
   The menu "Select a driver" is displayed.
3. To install an unlisted driver, press <Insert> (the SysKonnect driver is not listed).
4. To specify the path to the driver, press <F3>.
   The window "Specify a directory path" is displayed.
5. Type the path to the driver.
   If you are installing from CD-ROM, the menu "Select an action" is displayed. Here, select CONTINUE AND ACCESS THE CD-ROM.
   The menu "Select a driver to install" is displayed.
6. Select the driver for your network adapter.
   The message "`Do you want to copy driver <driver name>.LAN?`" is displayed.
7. To copy the driver to the server, select YES.
   If an older version of a SysKonnect driver is installed on the system, the messages "`Save existing file SYS:SYSTEM\<driver name.LAN?`" and "`Save existing file SYS:SYSTEM\<driver name>.LDI?`" are displayed.
8. To continue, select the desired options (YES or NO).
   The menu "Board SK-98NW_1 (Driver <driver name>) Actions" is displayed.
9. Select SELECT MODIFY DRIVER PARAMETERS/PROTOCOLS.
10. Configure the protocols to be used.
11. Configure the parameters, e.g. "slot number".
12. After the parameters have been configured, select SAVE PARAMETERS AND LOAD DRIVER.
    The driver is loaded.
    Once the driver has been installed, the adapter parameters or bindings can be changed in the autoexec.ncf file using the "Nwconfig" tool.

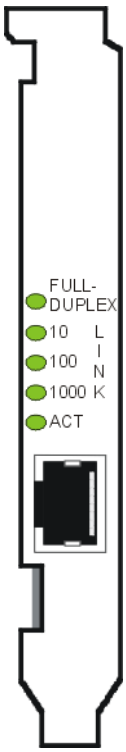
For more information, refer to the corresponding readme file.

4 Features

The SysKonnect SK-9521 V2.0 10/100/1000Base-T Adapter constitutes a follow-up model of the SK-98xx Gigabit Ethernet Family. At the moment, SysKonnect offers one copper single link version, which supports 1000Base-T, 100Base-T, and 10Base-T with an RJ-45 connector.

Type of Adapter

The following table lists the characteristics of the SysKonnect SK-9521 V2.0 10/100/1000Base-T Adapter.

	SysKonnect SK-9521 V2.0 10/100/1000Base-T Adapter
LAN interface	10/100/1000Base-T
Ports	Single link
Connector	RJ-45
Media	Copper
Type	Cat5
Bracket	

The type of port on the network adapter must be identical with that on the switch.

In case the LEDs of your SysKonnect SK-9521 V2.0 10/100/1000Base-T Adapter do not correspond with the figure shown above you may have a SysKonnect SK-9521 V2.0 10/100/1000Base-T Adapter with a different hardware revision number. For further information refer to the appropriate version of the User Manual which is available on the SysKonnect web site.

Operating System Support

The drivers for the SysKonnect SK-9521 V2.0 10/100/1000Base-T Adapter support the following operating systems:

- Windows NT 4.0, Windows 98 Second Edition, Windows Millennium Edition, Windows 2000, and Windows XP
- Linux kernel 2.2.x and higher stable versions
- Novell NetWare 4.20, Novell NetWare 5.0 and 5.1, and Novell Netware 6.0 and 6.5
- Sun Solaris 7 and higher on x86 systems

High Performance

The SysKonnect SK-9521 V2.0 10/100/1000Base-T Adapter is a high performance and highly reliable adapter. Best performance is reached with a 32-bit/66 MHz PCI bus.

Jumbo Frames

The SysKonnect SK-9521 V2.0 10/100/1000Base-T Adapter supports 9 KB Jumbo frames. It is tested according to the prevailing standard and switches on the market.

TCP, UDP and IP checksum calculation

The adapter supports the calculation of TCP, UDP, and IP checksums. These calculations are integrated in the hardware of the Gigabit Ethernet adapters. The checksums are calculated without time loss by the MAC controller for both receive and transmit path. This improves the overall performance of the system and shifts these CPU-intensive tasks away from the host CPU.

Dynamic Interrupt Moderation

If the network is running at gigabit speed and small packets are being transferred, there may in extreme cases be more than 100,000 interrupts per second. To reduce the load on the CPU, the Gigabit Ethernet adapters can use *interrupt moderation* to group these interrupts so that several data packets can be handled per interrupt.

For more information, refer to the White Paper “SK-NET GE Gigabit Ethernet Server Adapter”, which can be found on the installation CD-ROM and on our web site.

Promiscuous Mode / Multicast Support

The SysKonnect SK-9521 V2.0 10/100/1000Base-T Adapter supports *promiscuous mode* for analyzers. By default, the promiscuous mode is turned off. In addition, the adapter supports multicast for special applications, which use multicast addresses.

PXE / RPL Support

The SysKonnect SK-9521 V2.0 10/100/1000Base-T Adapter supports both the standard PXE 2.1 (*Pre-Boot eXecution Environment*) and the protocol RPL (*Remote Program Load*). This allows networked computers that are not yet loaded with an operating system to be configured and booted remotely by an administrator. PXE resp. RPL grants the advantage that client machines do not necessarily need an operating system or a hard disk and that they can be rebooted remotely in the event of hardware or software failures.

Advanced Power Management / Wake on LAN

The SysKonnect SK-9521 V2.0 10/100/1000Base-T Adapter supports power management as defined in the PCI Bus Power Management Interface Specification V1.1 and Network Device Class Power Management Reference Specification V2.0. The power management features are implemented according to the Advanced Configuration and Power Interface Specification V2.0.

The SysKonnect SK-9521 V2.0 10/100/1000Base-T Adapter utilizes an auxiliary power supply to keep some parts running. This setting enables the PCI network device to “Wake on LAN”.

The Wake on LAN functionality uses three mechanisms to create a wake up event:

- OnNow Pattern Match Detect
  Incoming packets are compared to up to seven patterns stored in a pattern matching table. A match causes a wake up event.
- Magic Packet™ Detect
  The incoming data stream is searched for a so-called *magic packet frame* that consists of 6 bytes of 0xFF followed by 16 iterations of the adapter’s MAC address. If this sequence is found, a wake up event is created.
- Link Change Detect
  Any change of the link status will cause a wake up event.

Wake on LAN is supported by Windows 98 SE, Windows Me, Windows 2000 and Windows XP.

Reliability

The SysKonnect SK-9521 V2.0 10/100/1000Base-T Adapter comes with a variety of reliability features. They aim at maintaining a connection as long as possible. This is reached by redundant or grouped links (link aggregation). The driver functions help to monitor the health of adapters and their ports enabling pro-active network management. The reliability features are described in the following chapters.

Link Aggregation

Link aggregation or *trunking* is a method of combining physical network links into a single logical link for increased bandwidth. With link aggregation, it is possible to increase the capacity and availability of the communications channel between devices (both switches and end stations) using existing Fast Ethernet and Gigabit Ethernet technology. Two or more Gigabit Ethernet connections are combined into a team in order to increase the bandwidth capability and to create resilient and redundant links. A set of multiple parallel physical links between two devices is grouped together to form a single logical link. Link aggregation offers an efficient and low-cost solution to increase bandwidth between server and switch. Another advantage it provides is that if a connection fails completely the remaining links can take over the traffic and thus replace the broken line.

Link aggregation also provides load balancing where the processing and communications activity is distributed across several links so that no single link is overwhelmed.

By taking multiple LAN connections and treating them as a unified, aggregated link, practical benefits can be achieved in many applications.

Link aggregation provides the following important benefits:

- Higher link availability
- Increased link capacity
- Improvements are obtained using existing hardware (no upgrading to higher-capacity link technology is necessary)

Demanding applications running in high-performance environments like servers in enterprises, web servers, and intranet servers gain particularly from the high-bandwidth and duplex capabilities of link aggregation.

All SysKonnect Gigabit Ethernet Adapters support link aggregation according to the IEEE standard 802.3ad. At the moment, SysKonnect provides a link aggregation driver for Windows 2000 and Windows XP. The drivers for Linux are able to support link aggregation according to the IEEE standard 802.3ad by installing third party open source modules. For details, refer to the corresponding readme file. In the future, link aggregation support according to IEEE 802.3ad will be implemented in SysKonnect drivers for other operating systems as well. For driver updates, refer to our web site: http://www.syskonnect.com.

For more information on link aggregation, refer to the white paper “Link Aggregation according to IEEE 802.3ad”, which can be found on the SysKonnect installation CD-ROM and on our web site.

Redundant Switch Failover

Beyond the features required for link aggregation in the IEEE 802.3ad standard, SysKonnect drivers support an additional failover feature, the so-called *Redundant Switch Failover* (RSF). If a switch fails completely, RSF can move the link to a different switch which then takes over the traffic.

At the moment, this feature is implemented in the driver package for Windows 2000 and Windows XP but will be available for other operating systems in the future. The standard requires that all links of a link aggregation group (team) are connected to the same partner (usually a switch supporting 802.3ad). With SysKonnect’s link aggregation driver, one team (group of logical links) can comprise several aggregators (sub-group beneath team level). If a team has several aggregators, which are connected to separate switches, the failover feature is utilized. Data is transferred via one aggregator, and is, if this aggregator fails, automatically switched over to another aggregator in the same team.

For more information on RSF, refer to the white paper “Link Aggregation according to IEEE 802.3ad”, which can be found on the SysKonnect installation CD-ROM and on our web site.

PCI Hot-Plug

As a member of the PCI Special Interest Group, SysKonnect participated in the standardization of the insertion and removal of PCI computer cards during normal operation. Like all SysKonnect PCI cards, the Gigabit Ethernet adapters comply with the Hot-Plug PCI standard. This technology increases the availability of the system(s) used.

Hot-Plug enables the replacement of failed devices in a running system.

The following conditions have to be met in order for Hot-Plug to work on SysKonnect Gigabit Ethernet Adapters:

- The target system has PCI Hot-Plug slots, i.e. the power can be switched on and off under the control of the operating system.
- The adapter is installed in one of the PCI Hot-Plug slots.

- The operating system supports PCI Hot-Plug on the target system.

The drivers for the following operating systems support PCI Hot-Plug:

- Windows 2000, Windows XP
- NetWare 4.20 and higher
- Solaris 7 and higher

Parity

The integrity of data that pass from the network through the system and back to the network is monitored by generating and checking parity information on all available data paths. All data errors are detected immediately and can be reported.

User Diagnostics (DOS)

The user diagnostics program provides system administrators and engineers with a profound tool to analyze the network adapter and check adapter specific data (for details, see chapter "Diagnostics Program").

SysKonnect Network Control for Windows 2000 and Windows XP

SysKonnect offers two utility programs for Windows 2000 and Windows XP each. The “SysKonnect Network Control” is part of the SysKonnect Network Driver Installation Packages available for Windows 2000 and Windows XP. With the “SysKonnect Network Control” all SysKonnect adapters can be controlled and configured. These tools display the current configuration and status of the SysKonnect SK-9521 V2.0 10/100/1000Base-T Adapter.

Predominantly, the “SysKonnect Network Control” helps to perform the following tasks:

- Configuration of the adapters and their corresponding ports
- Monitoring of the status of the adapter(s) installed
- Establishment of VLANs
- Building of teams / Enabling of link aggregation according to IEEE 802.3ad
- Enabling of RSF
- Enabling of RLMT for dual link adapters
- Monitoring of the voltage and temperature sensors
- Examining the attached cables by means of Virtual Cable Tester™ (VCT)

The “SysKonnect Network Control” is started from the Control Panel window: START > SETTINGS > CONTROL PANEL > SYSKONNECT NETWORK CONTROL.

The various tabs contain trees showing the currently installed adapters and their configuration:

- The “Adapter” tab displays the network adapters available in your system with their corresponding ports. It shows the ports, which have been configured as VLANs, for RLMT and those, which have been aggregated into a team.

  This tab only serves as an overview. For configuration, select one of the other tabs.
- The “Virtual LAN” tab lists all configured virtual LANs along with the corresponding ports and the ports, which may be bound by VLANs.

  In this tab, the user can add, remove, and configure VLANs and set VLAN specific parameters.
- The “Team” tab shows all links or ports which may be aggregated in a team or have already been aggregated to form a team.

  In this tab, the user can add, remove, rename, and configure teams.

- The “RLMT” tab offers the possibility to configure dual link adapters for *Redundant Link Management Technology* (RLMT). RLMT monitors the status of both ports. If the link of the active port fails, RLMT automatically switches to the standby link and the connection is maintained.

  In this tab, the user can add and remove RLMT to/from the ports and set RLMT specific parameters.
- The “Protocol” tab shows all entities (port, VLAN, RLMT, Team) and the protocols, which have been bound to these entities.
- The “Power Management” tab shows the current power management settings of all installed adapters.
- The “Statistics” tab lists statistic values, e.g. Transmit Packet OK (XMIT OK), etc.
- The “Sensors” tab (if applicable) shows the values of the voltage and temperature sensors.
- The “Specifications” tab lists fixed values during operating time, e.g. Hardware Revision, Software version, Max. Frame Size, etc.
- The tab "VCT“ (Virtual Cable Tester™) offers the possibility to examine the quality and characteristics of the attached cables. The VCT technology is available for SysKonnect SK-9821 V2.0 and SysKonnect SK-9521 V2.0 Gigabit Ethernet Adapters.
- The “Support” tab provides information on how to reach the SysKonnect Technical Support.

When a component in the tree is selected, the corresponding parameters are displayed.

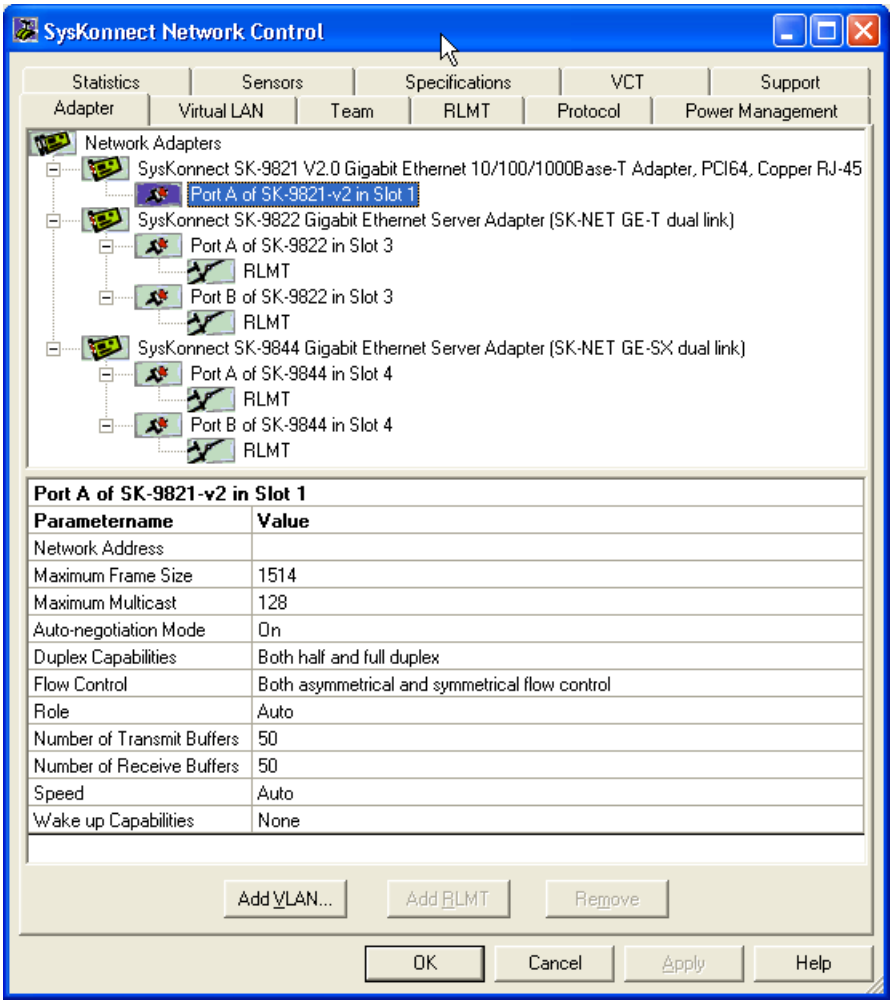


Figure 3. Adapter Overview in “SysKonnect Network Control”

For more information on the “SysKonnect Network Control”, refer to the online help available for this program (click the HELP button when the program is running).

Virtual LAN (VLAN) support

A Virtual LAN is a group of network devices that belong to the same network segment, regardless of the physical network structure. A logical network structure based on business requirements is possible. With virtual networks, physical location no longer specifies the network a user is assigned to: user clients with similar networking requirements can be united in one network group, or VLAN. This VLAN can be established to meet a wide variety of organizational or technical needs. All members of a department can, for example, be gathered into a network group, even if they are distributed over several buildings. Colleagues working on the same project can be united in a common VLAN, even if they belong to different departments in different buildings or even different locations. Other network groups can be made invisible to these users. Using Virtual LANs can improve network performance, limit broadcast storms, minimize security problems and ease the management task.

By means of frame tagging, the SysKonnect SK-9521 V2.0 10/100/1000Base-T Adapter can support up to 64 IP address assignments in a single network connection. Thus, multiple VLANs can be configured for one port. Stations can be accessed from systems in multiple IP sub nets without traversing routers. Additionally, multiple application VLANs can be defined to isolate traffic for performance and security purposes. For this reason, the server can be physically connected to a single switch port but still belong to several VLANs. The Gigabit Ethernet adapter can receive tagged packets and is able to tag outgoing packets. The switch the adapter is connected to must support VLAN tagging according to IEEE 802.1q.

For several operating systems, SysKonnect offers drivers that support VLAN tagging and thus can be applied for VLAN servers and terminal units.

For more information on Virtual LANs, refer to the White Paper “Virtual Networks”, which can be found on the installation CD-ROM under “White Papers” or on our web site under “Technology”. Also see the corresponding readme files for the respective drivers.

Virtual Cable Tester™ (VCT)

The VCT technology utilizes Time Domain Reflectometry (TDR) technology to remotely diagnose the quality and characteristics of the attached cables. Using this technology it is possible to detect and report potential cabling issues such as cable opens, cable shorts or any impedance mismatches in the cable and accurately report - within one meter - the distance to the fault. The VCT technology enables the IT manager or the end user to quickly identify the failing mechanism and isolate the source of the problem.

The VCT feature is available for SysKonnect SK-9821 V2.0 and SK-9521 V2.0 Adapters. If the port of a SysKonnect SK-9521 V2.0 10/100/1000Base-T Adapter is selected in the VCT tab of the SysKonnect Network Control, a table is displayed, which lists the cable pairs, the status of the corresponding cable pair, the distance to the fault (length), and the status of the test (see figure 4). If at the selected adapter a link is up, DSP (Digital Signal Processor) is activated, which reports the speed of the connection and the length of the cable (only if link is at Gigabit speed). VCT cannot be started if the link is active.

The following states of a cable pair are possible after VCT has been executed:

- `Normal cable`
  The cable pair is connected correctly.
- `Short cable`
  Two or more cable pairs are short-circuited together. VCT reports the distance to the short-circuit in meters.
- `Open cable`
  Lack of continuity between the pins at each end of the twisted-pair cable, i.e. the cable pair is not connected correctly. VCT reports the distance to the open location in meters.
- `Test failed`
  The test of the cable pairs was not successful.
- `Impedance mismatch`
  The impedance on the cable pair is not correct. Possible reasons for impedance mismatch:
  - The cable pair is not connected properly.
  - The cable pair is damaged.
  - The connector is faulty.

  VCT reports the distance to the impedance mismatch in meters.

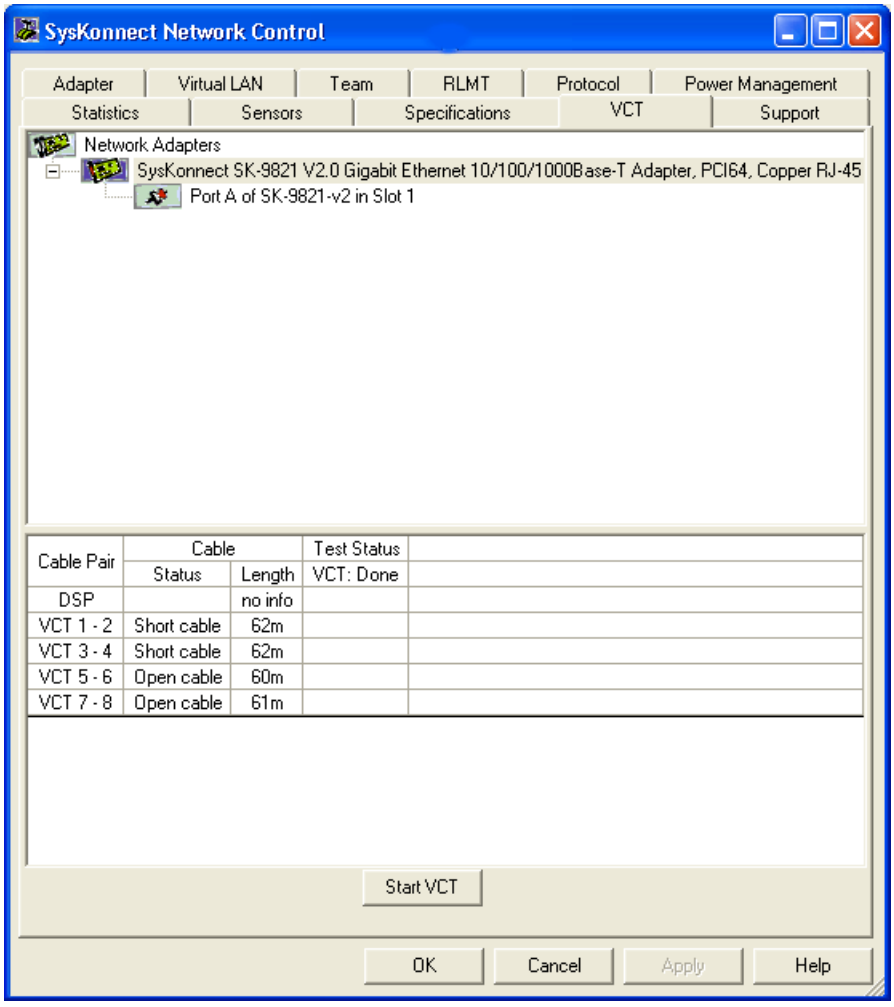


Figure 4. Display after a VCT test

5 Testing the Network Adapter

Diagnostics Program

The network adapter can be tested with the supplied diagnostics program (running on DOS). During testing the link of the tested port will be down, i.e. no data can be transferred. The following tests are available:

- Simple test without loopback:
  This test covers all components but not the port (socket including components for transmitting / receiving the data signals).
- Comprehensive port test with loopback:
  All components are tested, including the port.

The tests do not run in a Windows DOS box.

Repeater Test

For the SysKonnect SK-9521 V2.0 10/100/1000Base-T Adapter, a test via wrap plug is not available. However, loopback testing may be carried out by connecting the adapter to another adapter installed in a second computer running in repeater mode (further known as the “repeater computer”). The computer in which the adapter is installed, which is to be tested, is called “test computer”.

To carry out the test, proceed as follows:

1. Install an adapter in the “repeater computer”.
2. Boot the “repeater computer” to DOS.
   Wait until the operating system is loaded and the DOS prompt is displayed.
3. Insert the installation CD-ROM into the CD-ROM drive.
4. Go to the product directory.
5. Type `sk98diag`.
6. Press <Enter>.
7. From the main menu of the diagnostics program, select REPEATER MODE.
8. Select Port. A.
9. Press <Enter>.
   The window “Repeater Mode Port A” is displayed.
10. Install an adapter in the “test computer”.
11. Connect the adapter in the “repeater computer” to the adapter in the “test computer”. Use a category 5 cable with RJ-45 plugs.
12. Boot the “test computer” to DOS.
    Wait until the operating system is loaded and the DOS prompt is displayed.
13. Insert the installation CD-ROM into the CD-ROM drive.
14. Go to the product directory.
15. Type `sk98diag`.
16. Press <Enter>.
17. From the main menu of the diagnostics program, select LOOPB. WRAP PLUG.
18. Press <Enter>.
    The various components will now be tested; this may take a few minutes. If the test was successful, the message “`All tests passed successfully`” is displayed.

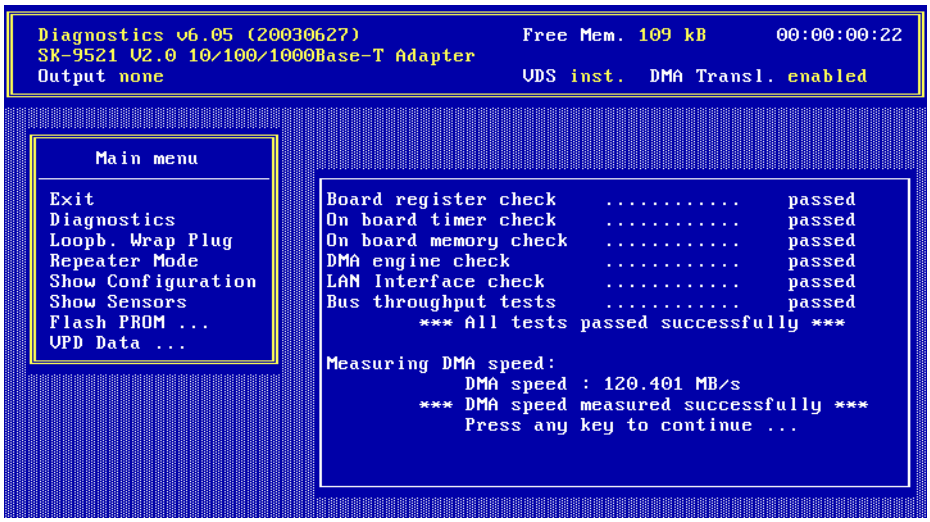


Figure 5. Typical display after successful test

When the test fails, the message “`failed`” is displayed. The further procedure is described in chapter "Failure of a Test".

19. Press any key to continue.
20. On the “test computer”, quit the diagnostics program with EXIT.
21. On the “repeater computer”, quit the diagnostics program with EXIT.

Failure of a Test

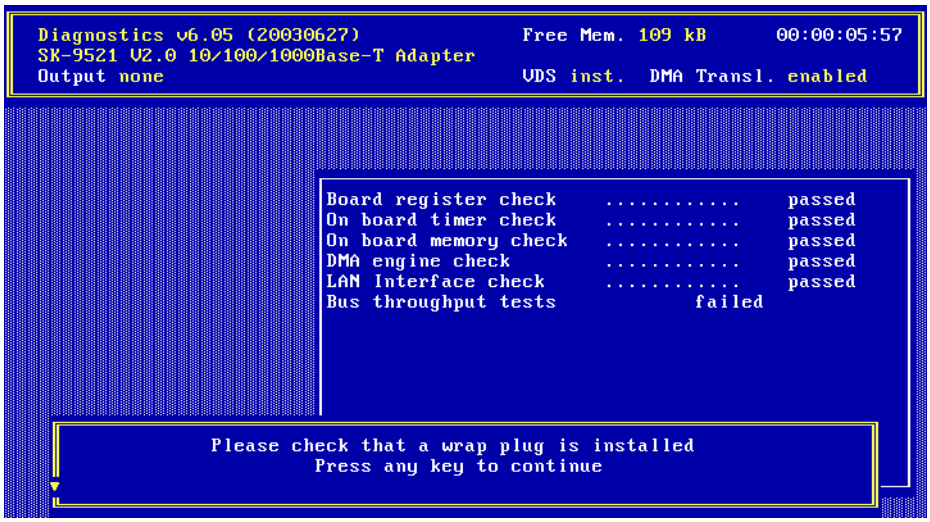


Figure 6. Typical error message from the diagnostics program

For a test to be completed successfully, each of the following conditions must be met:

- The network adapter operates correctly.
- The network adapter is cabled correctly for the test or is equipped with the correct connectors.
- The network adapter has been installed correctly in the computer.

The message `failed` does not necessarily imply that the network adapter is faulty. The reason for a failed test can e.g. also be a not installed wrap plug.

If the message “`failed`” is issued, proceed as follows:

1. Follow the instructions that are displayed in the window below the list of tests.
2. Make sure that the adapter is inserted correctly and the ports are connected properly (connectors are firmly seated, the correct end of the cable is connected).

If it is necessary to install the network adapter again, proceed as follows:

1. Switch off the computer.
   Observe the safety instructions (see page 11).
2. Remove the computer cover.
   Follow the instructions in the computer manual.
   You may need a screwdriver to loosen the screws from the cover.
3. Make sure the network adapter is properly seated in the PCI bus slot on the motherboard.
4. If not, do not remove the network adapter completely but raise it sufficiently to withdraw it from the PCI bus slot.
5. Carefully realign the bus connector on the network adapter with the PCI bus slot.
6. Press the network adapter until it is firmly seated in the slot.
7. Return to step 5 of the loopback / repeater test (”Type `sk98diag`”).
8. Repeat the test.
   If the defect persists, contact your vendor. If you wish to return faulty material directly to SysKonnect, follow the instructions given in chapter "Returning an Adapter for Repair".
9. To quit the diagnostics program, select EXIT in the main menu.
10. If necessary, remove the loopback connector from the port.
11. (Re)connect the ports to the data network.

Additional Functions of the Diagnostics Program

Checking Other Displays and Data

In addition to performing the three network adapter tests, the diagnostics program can also read out network adapter-specific data that may be useful for pinpointing the causes of failure.

You can

- read configuration data,
- read and write *Vital Product Data* (*VPD*),
- read and write Flash Memory data.

Starting the Main Program

To start the main program, proceed as follows:

1. Boot to DOS.
   Wait for the prompt.
2. Insert the installation CD-ROM into the CD-ROM drive of the computer in which the network adapter is installed.
3. Type the letter of your CD-ROM drive (e.g. D:)
4. Go to the appropriate product directory.
5. Type `sk98diag`.

6. Press <Enter>.
   The main menu will be displayed:

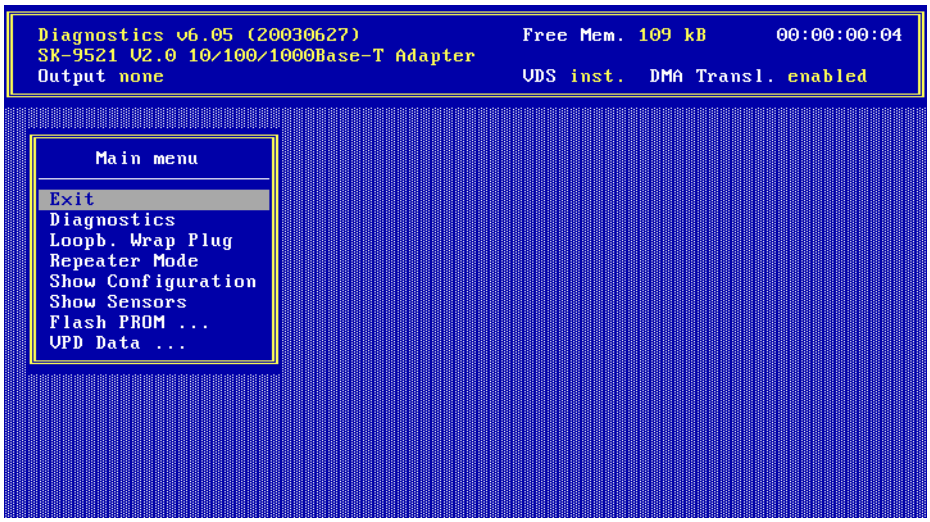


Figure 7. Diagnostics program, main menu

7. Select the appropriate item from the menu (see figure 7).
8. To quit the program, select EXIT in the main menu.
   This option is automatically offered for selection if you did not select a menu item previously.

Reading Configuration Data

To read configuration data, proceed as follows:

1. Start the main program (see page 41).
2. Select SHOW CONFIGURATION in the main menu.
   A separate window will be displayed showing:
   - Device code (`Device`)
   - Various vendor codes (`Vendor`)
   - Interrupt no. (`IRQ`)
   - Cache Line Size (`CLS`)
   - Latency (`Lat.`)
   - RAM size (`RAM`)
   - PCI slot index and size (`Slot` and `Slot size`)
   - PCI bus clock (`clk`)
   - MAC address (`MAC Addr`)
   - Port type (`PMD-Type`)
   - Connector (`connector`)
   - Hardware revision (`HW Rev`)
   - Chip ID (`Chip Id`)

   In the main menu, SHOW CONFIGURATION changes to HIDE CONFIGURATION.
3. You can close the window by selecting HIDE CONFIGURATION in the main menu.
   Other windows may be displayed while this window is still open, e.g. the window displaying the VPD data.

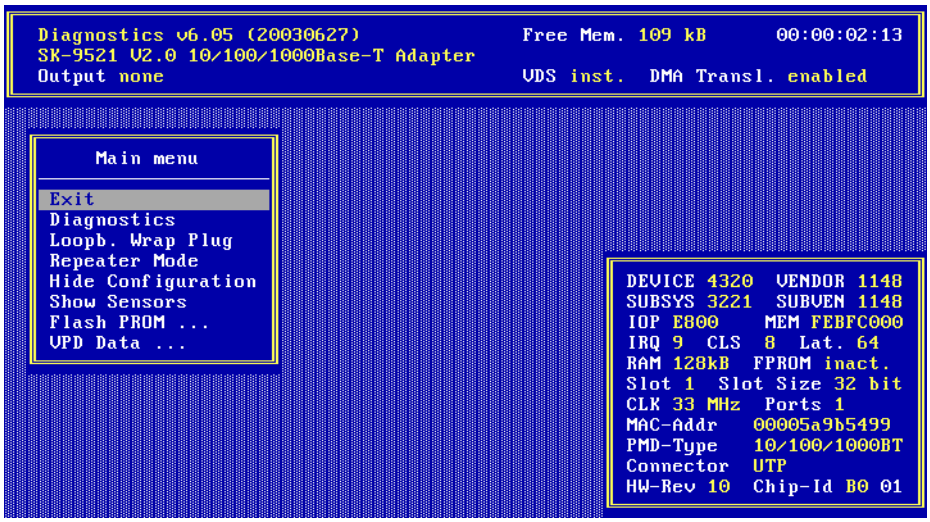


Figure 8. Display of configuration data

Reading Vital Product Data (VPD)

To read VPD, proceed as follows:

1. Start the main program (see page 41).
2. Select VPD DATA in the main menu.
   A submenu with the following options will be displayed:
   - EXIT (return to the main menu)
   - DISPLAY VPD DATA
   - CLEAR ERROR LOGS
   - ADD/MODIFY VPD DATA (you can enter user-defined data and keywords here)
   - DELETE VPD KEYWORDS

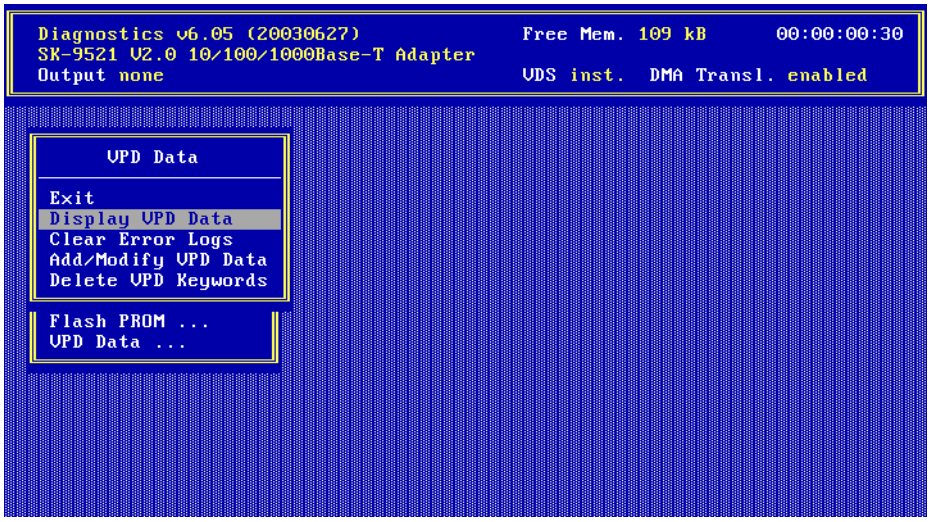


Figure 9. VPD menu

3. Select the desired option
   or
   Return to the main menu by selecting EXIT (default option).

Sample Usage of VPD / Asset Tag

Example

You want to store the inventory number of the network interface adapter (123-45) in the asset tag.

To store the inventory number, proceed as follows:

1. Look at all the VPD to determine the code for the asset tag.
2. Start the main program (see page 41).
3. Select VPD DATA > DISPLAY VPD DATA.
   The following screen is displayed:

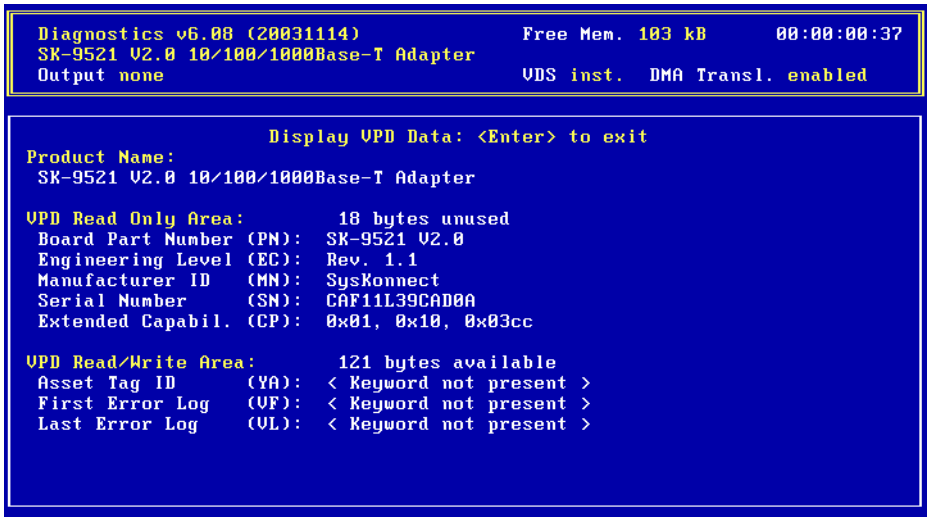


Figure 10. Display of VPD

   The keyword codes are shown in brackets. Here, the code is `YA`.
4. To return to the VPD DATA menu, press <Esc>.
5. Now select ADD > MODIFY VPD DATA.
   A dialog window will be displayed.
6. Enter the code `YA`.
7. Press <Enter>.
   A further dialog window will be displayed.
8. Enter the inventory number: `Invent. No. 123-45`
9. Press <Enter>.
10. To return to the VPD DATA menu, press <Esc>.
    You can now check the entry.

11. Go to DISPLAY VPD DATA again.
    After modifying the asset tag your screen should display the following:

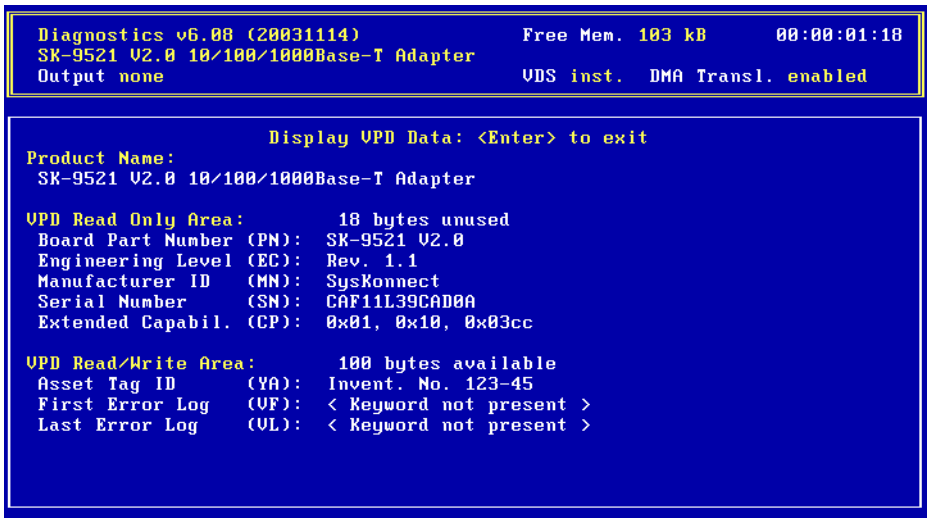


Figure 11. Screen showing updated asset tag

For more information on the diagnostics program, refer to the corresponding readme file.

6 Troubleshooting

Searching for errors

Problem	What to do
Another expansion card fails to work after the network adapter has been installed	Make sure all cables are connected to the correct expansion cards. Make sure the expansion cards are correctly inserted. Check if any internal connections in the computer have been disengaged or were damaged during the installation of the network adapter. Check for resource conflicts in the computer. Check PCI configuration and resource allocation.
The computer does not detect the network adapter	Make sure the adapter is properly seated in the computer. Try installing the adapter in a different bus master compatible PCI slot.
The network adapter fails during normal operation	Load or install the driver again.
Loopback test is successful (see page 39) but link LED does not light (no connection)	Check the connections and try another switch port if necessary. Is the switch port configured correctly? Is the network driver loaded? Is the maximum transmission distance exceeded (see page 15)?
LED for receiving / transmitting data packets (ACT) is not illuminated	Make sure the network driver is loaded. Is there any network overload? Is the switch port configured correctly? Is the maximum transmission distance exceeded (see page 15)? If you have any other SysKonnect adapter installed, compare your setup with this adapter.

If the problem persists, you can analyze the status of the network adapter with the aid of the LEDs and the diagnostics program.

LED Displays

Once the driver has been installed, the adapter is operational. The current status is indicated by the LEDs.

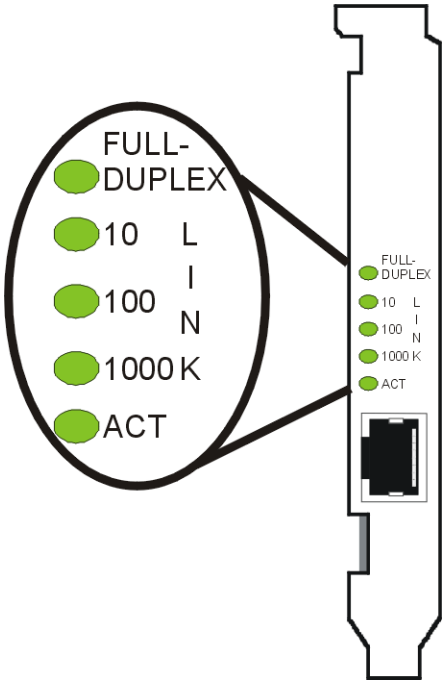


Figure 12. Location of the LEDs

The LEDs of the SysKonnect SK-9521 V2.0 10/100/1000Base-T Adapter have the following meaning:

Marking on bracket	Color	Status	Description
FULL-DUPLEX	green	ON/OFF	Full-Duplex / Half-Duplex
10	green	ON/OFF	Link up / down, speed 10 Mbit/s
100	green	ON/OFF	Link up / down, speed 100 Mbit/s
1000	green	ON/OFF	Link up / down, speed 1000 Mbit/s
ACT	green	ON/OFF	Receiving / Transmitting / Not Receiving / Not Transmitting

In case the LEDs of your SysKonnect SK-9521 V2.0 10/100/1000Base-T Adapter do not correspond with the figure shown above you may have a SysKonnect SK-9521 V2.0 10/100/1000Base-T Adapter with a different hardware revision number. For further information refer to the appropriate version of the User Manual which is available on the SysKonnect web site.

7 Important Information

Technical Support

If you encounter any problems, read the relevant chapters of the manual and the readme files on the CD-ROM. If you cannot solve your problems, consult our technical support.

If you contact our technical support engineers, have the following information ready:

- adapter type
- driver version
- operating system
- configuration of your computer
- type of cabling

Our support team can be reached as follows:

	North / South America, Pacific Rim	**Europe**
Office hours	24 hours support via paging service	Mon-Thu 8:00 AM - 5:00 PM Fri 8:00 AM - 03:30 PM (CET)
Phone	+1 866 782 2507 (toll free in the USA) +1 408 222 0666 (toll number for international callers) +1 408 787 5395 (pager)	+49 7243 502 330
Fax	+1 408 752 9029	+49 7243 502 364
WWW	http://www.syskonnect.com	http://www.syskonnect.com
E-mail	support@syskonnect.com	support@syskonnect.de
Address	SysKonnect, Inc. A Marvell®Company 700 First Avenue Sunnyvale, CA 94089 USA	SysKonnect GmbH A Marvell®Company Siemensstr. 23 D-76275 Ettlingen Germany

Calls received outside office hours in Europe are serviced by an answering machine and will be dealt with as soon as possible.

Returning an Adapter for Repair

If you want to return a faulty product to SysKonnect, follow these steps:

1. Contact us by phone, fax, or e-mail.

	North / South America, Pacific Rim	**European and other countries**
Phone	+1 866 782 2507 (toll free) +1 408 222 0666 (toll number)	+49 7243 502 476
Fax	+1 408 752 9029	+49 7243 502 364
E-mail	support@syskonnect.com	rma@syskonnect.de

   We will send you an RMA (Return Material Authorization) form by fax or e-mail.
2. Complete the form.

3. Return the form to us.
   We will send you a unique reference number and inform you if the product is still under warranty.
4. Send us the faulty product packed in an antistatic bag, with a copy of the completed form enclosed in its original packaging (or comparable packaging).
5. Write the reference number issued by SysKonnect clearly visible on the outer packaging.

SysKonnect cannot accept any returned product without an RMA number on the outer packaging. The warranty does not apply to products that have been damaged by electrostatic discharge or inadequate packaging.

Additional Documentation and Updates

On the installation CD-ROM additional information is available, i.e. about other SysKonnect products or other language versions of this manual.

To view a document on the CD-ROM, proceed as follows:

1. Insert the installation CD-ROM into your CD-ROM drive.
2. On the start page of the CD-ROM, click DOCUMENTATION.
   A list with the available manuals is displayed.
3. Click the appropriate document.
   The PDF file is displayed.

SysKonnect maintains a site on the World Wide Web where you can find the latest information on our product range and our customer support services. The latest drivers are also provided on the SysKonnect web site.

To download the latest drivers from our web site, proceed as follows:

1. Visit our web site: http://www.syskonnect.com.
2. Click the button DRIVER LIBRARY.
   The latest drivers, sorted by product groups, can be found here.
3. Click the appropriate network technology, e.g. GIGABIT ETHERNET.
4. Select the product family SK-95XX V2.0 GIGABIT ETHERNET ADAPTER.
   The available drivers for this product family are displayed.
5. Click the appropriate driver.
6. Click the diskette symbol to download the driver.

Technical Specifications

Network interface standard	IEEE 802.3 and IEEE 802.3u (Ethernet and Fast Ethernet) IEEE 802.3ab and IEEE 802.3z (Gigabit Ethernet) IEEE 802.3x (Flow-control and Auto-negotiation) IEEE 802.1p (Quality of Services) IEEE 802.1q and IEEE 802.3ac (VLAN and VLAN tagging) IEEE 802.3ad (Link Aggregation)
Supported buses	32-bit PCI slots with clock speeds from 33MHz to 66 MHz
Bus width	32-bit, supports 32-bit operation in 32-bit PCI slot; can also be operated in 64-bit slot
RAM	64 KB RAM on-chip buffer
SPI Flash Memory	128 KB
Serial EEPROM	Maximum size: 2 KB 256 bytes can be used for VPD (read-only and writable section)
Power management	Advanced Power Management according to PCI Bus Power Management Interface Specification, Revision 1.1 or later and Network Device Class Power Management Reference Specification V2.0
PCI Hot-Plug	Hot-Plug Support according to PCI Hot-Plug Specification, Revision 1.1
Safety standards	Europe: EN60950 – IEC 60950 – VDE 0805 USA / Canada: cULus listed accessory (UL 60950, CSA C22.2) International: CB certification
Approved use	The SysKonnect SK-9521 V2.0 10/100/1000Base-T Adapter is for use in a compatible Listed Personal Computer that has Installation Instructions detailing user installation of card cage accessories.
EMC standards	Europe: EN55022; IEC – CISPR-22 Class B EN 55024; IEC – CISPR-24 USA: FCC, CFR 47 Part 15, Declaration of Conformity Class B
Power consumption	@ +3.3V / VCC: max. 3.22 W @ +3.3V(aux): max. 375 mA / 20 mA (PME enabled / disabled)
Dimensions (max.)	119.91mm x 52.93 mm
Temperature range	Operation: 0°C to + 50°C Storage: -20°C to + 70°C
Relative humidity	Operation: 30% to 80% non-condensing Storage: 10% to 95% non-condensing
Warranty	5 years

Appendix A. License and Warranty Information

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SysKonnect Inc. warrants, that the hardware will be delivered free from defect and in working condition. SysKonnect Inc. does not assume liability for nor warrant damage to the hardware after delivery. SysKonnect also does not warrant total applicability for specific applications or customer Network environments.

Limited Warranty for Hardware and Software

Limited Warranty

SysKonnect Inc. warrants that the SOFTWARE will perform substantially in accordance with the accompanying Product Manual(s) for a period of 90 days from the date of receipt.

SysKonnect warrants

that NETWORK INTERFACE CARDS will be free from defects in materials and workmanship under normal use and service for a period of 5 years from the date of receipt, that NETWORK INFRASTRUCTURE COMPONENTS (e.g., hubs, switches, concentrators) will be free from defects in materials and workmanship under normal use and service for a period of 2 years from the date of receipt, and other HARDWARE for a period of 6 months from the date of receipt respectively.

This warranty is given by SysKonnect Inc. as producer of the PRODUCT; possible legal warranty or liability claims against the dealer, whom you have acquired your SOFTWARE or HARDWARE product from, shall neither replaced by nor limited through this warranty.

Customer Remedies

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Should individual stipulations of this Agreement be or become invalid, this invalid stipulation shall be replaced by a stipulation, which is as close as possible to the invalid stipulation.

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Hardware

The risk passes to you, the end user, upon taking possession (hand over) of the HARDWARE. Total qualities were not warranted.

Limited Warranty for Hardware and Software

Limited Warranty

SysKonnect warrants that the SOFTWARE will perform substantially in accordance with the accompanying Product Manual(s) for a period of 90 days from the date of receipt if you have created the required technical preconditions.

SysKonnect warrants that NETWORK INTERFACE CARDS will be free from defects in materials and workmanship under normal use and service for a period of 5 years from the date of receipt, that NETWORK INFRASTRUCTURE COMPONENTS (e.g., hubs, switches, concentrators) will be free from defects in materials and workmanship under normal use and service for a period of 2 years from the date of receipt, and other HARDWARE for a period of 6 months from the date of receipt respectively.

Any implied warranties on the SOFTWARE are limited to 90 days, to 5 years on the NETWORK INTERFACE CARDS, to 2 years on the NETWORK INFRASTRUCTURE COMPONENTS and to 6 months on all other hardware. This warranty is given by SysKonnect as producer of the PRODUCT; possible legal warranty or liability claims against the dealer, whom you have acquired your SOFTWARE or HARDWARE product from, shall neither replaced by nor limited through this warranty.

Customer Remedies

SysKonnect's entire liability and your exclusive remedy shall be, at SysKonnect's option, either

return of the price paid, or repair or replacement of the SOFTWARE or HARDWARE that does not meet SysKonnect's Limited Warranty and which is returned to SysKonnect with a copy of your receipt. This Limited Warranty is void if failure of the SOFTWARE or HARDWARE has resulted from accident, abuse, or misapplication. Any replacement SOFTWARE will be warranted by SysKonnect only for the remainder of the original warranty period or 30 days, whichever is longer. Any replacement HARDWARE will be warranted for the remainder of the original warranty period or 6 months, whichever is longer.

No other Warranties

SysKonnect disclaims all other warranties or liabilities with respect to the SOFTWARE, the HARDWARE, the accompanying Product Manual(s) and other written materials and any other accessories.

No Liability for Consequential Damages

SysKonnect does not warrant the software and Hardware for a specific application, nor does SysKonnect accept any consequential damages due to the use of the hardware or software. SysKonnect and its suppliers shall not be liable for any other damages whatsoever (including, without limitation, damages for loss of business profits, business interruption, loss of business information or data, property loss or other pecuniary loss), arising out of the use of or the inability to use this SysKonnect product, even if SysKonnect has been advised of the possibility of such damages. In any case, SysKonnect's entire liability shall be limited to the amount actually paid by you for the product.

Other

This agreement is governed by the procedural and substantive laws of the Federal Republic of Germany. UN Trade Laws shall not be applicable in any case. Place of litigation is Karlsruhe, FRG, as far as this can be agreed upon operatively in this way.

Should individual stipulations of this Agreement be or become invalid, this invalid stipulation shall be replaced by a stipulation, which is as close as possible to the invalid stipulation.

Should you have any questions concerning this Agreement, or if you desire to contact SysKonnect for any reason, please use the address information enclosed in this product or write to: SysKonnect GmbH, Siemensstrasse 23, D-76275 Ettlingen.

Deutschland, Schweiz, Österreich, Liechtenstein

Verehrte Kundin, verehrter Kunde

wenn Sie Ihr SysKonnect Produkt in DEUTSCHLAND, in der SCHWEIZ, in ÖSTERREICH oder in LIECHTENSTEIN erworben haben, gilt für Sie der folgende Lizenz- und Kaufvertrag. Dies ist ein rechtsgültiger Vertrag zwischen Ihnen, dem Endanwender, und der SysKonnect GmbH mit Sitz in Ettlingen/Bundesrepublik Deutschland.

SysKonnect Lizenz- und Kaufvertrag

Durch Öffnen der versiegelten Diskettenpackung und durch die Inbesitznahme der Hardware erklären Sie sich an die Bestimmungen der nachfolgenden Vereinbarung gebunden. Wenn Sie mit den Bestimmungen dieses Vertrages nicht einverstanden sind, geben Sie bitte die Diskettenpackung und die Hardware ungeöffnet und unbenutzt mit den Begleitgegenständen (einschließlich aller schriftlichen Unterlagen und dem sonstigen Zubehör) unverzüglich gegen volle Rückerstattung des Preises an die Stelle zurück, von der Sie sie bezogen haben.

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Die Software ist Eigentum von SysKonnect oder deren Lieferanten und ist durch Urheberrechtsgesetze, internationale Verträge und andere nationale Rechtsvorschriften gegen Kopieren geschützt.

Wenn die Software nicht mit einem technischen Schutz gegen Kopieren ausgestattet ist, dürfen Sie entweder eine einzige Kopie der Software ausschließlich für Sicherungs- oder Archivierungszwecken machen die Software auf eine einzige Festplatte übertragen, sofern Sie das Original ausschließlich zu Sicherungs- und Archivierungszwecken aufbewahren.

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Sie dürfen die Software oder Hardware weder vermieten noch verleihen, aber Sie dürfen die Rechte aus diesem SysKonnect Lizenz- und Kaufvertrag auf Dauer auf einen anderen übertragen, vorausgesetzt, dass Sie alle Kopien der Software und das gesamte schriftliche Begleitmaterial übertragen und der Empfänger sich mit den Bestimmungen dieses Vertrages einverstanden erklärt. Zurückentwickeln (Reverse Engineering), Dekompilieren und Entassemblieren der Software sind nicht gestattet. Eine Übertragung muß die letzte aktuelle Version (Update) und alle früheren Versionen umfassen.

Hardware

Mit der Inbesitznahme (Übergabe) dieser Hardware geht die Gefahr auf Sie, den Endanwender über. Eigenschaften wurden nicht zugesichert.

Beschränkte Garantie für Hardware und Software

SysKonnect garantiert für einen Zeitraum von 90 Tagen ab Empfangsdatum, dass die Software, soweit die technischen Voraussetzungen hierfür von Ihnen geschaffen wurden, im wesentlichen gemäß der begleitenden Dokumentation arbeitet. SysKonnect garantiert für

Netzwerkadapterkarten für einen Zeitraum von 5 Jahren,

Infrastrukturkomponenten (z.B. Konzentratoren, Hubs, Switches) für einen Zeitraum von 2 Jahren und die sonstige Hardware für einen Zeitraum von 6 Monaten ab Empfangsdatum, dass die gelieferte Hardware bei normaler Benutzung und Wartung frei von Material- oder Verarbeitungsfehlern ist. Die Garantie ist bezüglich der Software auf 90 Tage, bezüglich der Netzwerkadapter auf 5 Jahre für Infrastrukturkomponenten auf 2 Jahre und bezüglich der sonstigen Hardware auf 6 Monate beschränkt. Diese Garantie wird von SysKonnect als Hersteller des Produktes übernommen; etwaige gesetzliche Gewährleistungs- oder Haftungsansprüche gegen den Händler, von dem Sie Ihr Exemplar der Software oder Hardware bezogen haben, werden hierdurch weder ersetzt noch beschränkt.

Appendix B. Compliance Statements

FCC Compliance

Declaration of Conformity per FCC Part 2 Section 2.1077 (a)

Responsible Party Name:	SysKonnect, Inc. A Marvell®Company
Address:	700 First Avenue Sunnyvale, CA 94089 USA Phone: (408) 222-2500 Fax: (408) 222-9029

hereby declares that the product

Product Name:	Marvell Yukon-Plus Gigabit Ethernet 10/100/1000Base T-Adapter
Model Number:	Yukon 8001 Gigabit NIC

conforms to the following specification

FCC Part 15 Class B

Supplementary Information:

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. this device must accept any interference received, including interference that may cause undesired operation.

FCC Compliance Information Statement – Class B

NOTE: This equipment has been tested and found to comply with the limits for a “Class B” digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in strict accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio / TV technician for help.

The user may find the following booklet, prepared by the Federal Communications Commission, helpful:

“How to Identify and Resolve Radio-TV Interference Problems”.

This booklet is available from the U.S. Government Printing Office, Washington, DC 20402 Stock Number 004-000-00345-4.

SysKonnect is not responsible for any radio or television interference caused by unauthorized modifications of this equipment or the substitution or attachment of connecting cables and equipment other than those specified by SysKonnect. The correction of interference caused by such unauthorized modification, substitution or attachment will be responsibility of the user.

Caution

Changes or modifications not expressly approved by the part responsible for compliance could void the user’s authority to operate the equipment.

VCCI Statement (Japan)

この装置は、情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の基準に基づくクラスＢ情報技術装置です。この装置は、家庭環境で使用することを目的としていますが、この装置がラジオやテレビジョン受信機に近接して使用されると、受信障害を引き起こすことがあります。
取扱説明書に従って正しい取り扱いをして下さい。

Headquarters

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