Pocket MultiCom

User's Manual

Version 1.5 - 99/2/9

Copyright, Warranty, Liability

Warnings

COPYRIGHT

WARRANTY ON HARDWARE

LIGHTNING Instrumentation S.A. warrants all hardware products of its manufacture to be free from defects in material and workmanship for 12 months from date of delivery, provided that the product has been registered within 10 days of purchase.

Upon prompt notification by the purchaser, Lightning will correct, within the warranty period, any defects in equipment of its manufacture, either by repair at its factory or by supply of replacement parts to the purchaser.

Lightning must decide to its own satisfaction that the equipment is defective and has not developed malfunctions as a result of misuse, modification, or abnormal conditions of operation. Opening the products also voids the warranty. Lightning assumes no liability for consequential damages, and its liability shall in no case exceed the original purchase price of the equipment.

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Lightning provides its best effort in issuing high quality software and firmware, and will devote its best effort in finding and correcting potential problems occurring with other equipment following international standards, but does not make any express warranty to correct such problems, if they arise. Lightning assumes no liability for consequential damages, and its liability shall in no case exceed the original purchase price of the equipment.

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In no event shall Lightning be liable for costs of procurement of substitute goods. The potential liability of Lightning arising out of this product is in any case limited to the purchase price paid to Lightning for its products.

ISDN Costs

In no event shall Lightning be liable for costs incurred by a user on its ISDN line. The ***Pocket MultiCom*** is designed to open and close ISDN lines automatically, depending on traffic on the Ethernet and ISDN line and on parameters set in the configuration. Front-panel signals and specific commands may indicate the current state and activity of the ISDN line, and the user should keep an eye on those status indications to avoid excessive bills, due to misconfiguration, protocol errors, polling applications, potential software or firmware errors and so forth. **THE USER AND THE USER ONLY IS SOLELY RESPONSIBLE FOR ALL INCURRED ISDN COSTS.**

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Revisions

The information in this document is subject to change without notice. Revisions may be issued at any time. Watch http://www.lightning.ch/products/manual for the latest revision of our manuals.

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Chapter 1

Introduction

*Congratulations for your choice of the **Pocket** Multi**Com**!*

*The **Pocket** Multi**Com** is not only the world-smallest ISDN router today, but also a swiss quality product designed and manufactured by LIGHTNING Instrumentation SA in Lausanne, Switzerland.*

*The **Pocket** Multi**Com** is a small, efficient device designed to connect remote Ethernet networks through a Basic-Rate ISDN line. It is very easy to install and works with standard TCP/IP and/or IPX/SPX protocols. To set up your **Pocket** Multi**Com**, simply follow the few quick steps described in the following chapters.*

*We wish you a lot of pleasure using your **Pocket** Multi**Com**.*

CHECKING YOUR PACKAGE CONTENTS 1.1

Your ***Pocket** MultiCom* package includes a **CD-ROM** (with Reference Manual & Software), this **User's Manual**, as well as the following:

***Pocket** MultiCom*

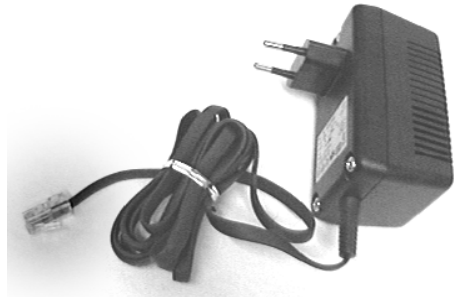
Special console cable: to connect to the Ethernet port of your ***Multi**Com* and a DB9 serial port

Straight Ethernet cable: a short grey cable with RJ45 connectors to connect to a hub

Crossed Ethernet cable: a short blue (or grey with a blue marking) cable with RJ45 connectors to connect directly to a PC or hub uplink

ISDN cable: a long black cable with RJ45 connectors

Power supply adaptor with cable



Please check that the power supply has appropriate voltage.

If the docking station option has been ordered, three cables may be assembled in it. Please refer to § 5, "Docking Station" on page 31.

UPGRADE KEY ON PACKAGE 1.2

The first time you configure your router you may need an upgrade key to install all the software options you ordered.

In this case, you should find the upgrade key (e.g.: “NOPQ1234DEFG”) on a sticker on the package of the router or on the delivery notice you got with the router. **Keep this key in a safe place. You will need it during the installation.**

IF THE PRODUCT IS RECEIVED DAMAGED 1.3

Forward an immediate request to the delivering carrier to perform an inspection and prepare a damage report. Save the container and packing material until contents are verified.

Report the nature and extent of the damage to Customer Support so that action can be initiated to repair or replace damaged items, or instructions issued for returning items.

The responsibility of the manufacturer ends at the delivery to the first carrier. ALL CLAIMS for loss, damage, or nondelivery must be made against the delivering carrier WITHIN 8 DAYS OF RECEIPT of shipment.

TO RETURN THE PRODUCT 1.4

Please obtain instructions and a Return Material Authorization (RMA) Number from Customer Support before returning any item(s). Report the fault or deficiency along with the model, type, and serial number of the item(s) to Customer Support. Upon receipt of this information, Customer Support will provide service instructions or shipping information. In any case, clearly mark the RMA number, your address, and shipping address on the original packaging, which has to be used for shipments. Improperly packaged products will loose their warranty. For warranty repairs, please include a dated proof of purchase.

ABOUT THE ETHERNET AND SERIAL CABLES 1.5

The two Ethernet cables that come in your package are 4-wire Ethernet-type cables**. Please note that universal-type 8-wire cables may in some cases (particularly with 10/100 Mbits/s interfaces) not work properly.**

The two Ethernet cables have the following uses:

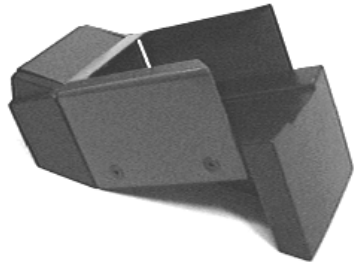
- **Blue or grey with a blue marking, crossed:** acts as a special Ethernet cable between your ***Pocket MultiCom*** and a single computer. As such, **it is not** a standard 10-Base-T Ethernet cable: it is wired as a crossover allowing you to connect your ***Pocket MultiCom*** **directly** to a computer without a hub. This cable can also be used to connect to the “uplink” (X) port of a hub.
- **Grey cable:** acts as a standard Ethernet cable between your ***Pocket MultiCom*** and a normal port of a hub, to build an Ethernet network with multiple computers.

The Serial cable has the following uses:

- Act as a cable for connecting the Console Port (embedded in the Ethernet port) of your ***Pocket MultiCom*** to a serial port of either a terminal or a computer (with a terminal-emulation software or EasyConfig™ wizard), for management purposes. This is useful for configuring or modifying the configuration of your ***Pocket MultiCom***. This type of connection is described in chapter § 2.9, "Connecting to the Command Interface" on page 19.

ABOUT THE DOCKING STATION 1.6

If your ***Pocket MultiCom*** comes with its optional desktop support, as shown below, please refer first to instructions in § 5, "Docking Station" on page 31.



Chapter 2

Getting Started

*This chapter describes the installation procedure for the **Pocket** Multi**Com** in a very few and detailed steps. First, installation with a single computer using Ethernet and a Web-browser is described. Then, network installation and fine-tuning is shortly described. Finally, the usage of the serial console is reviewed.*

***This manual is valid starting with Software and CD-ROM Release 2.5.** Please consult* http://www.lightning.ch/ *for newer releases.*

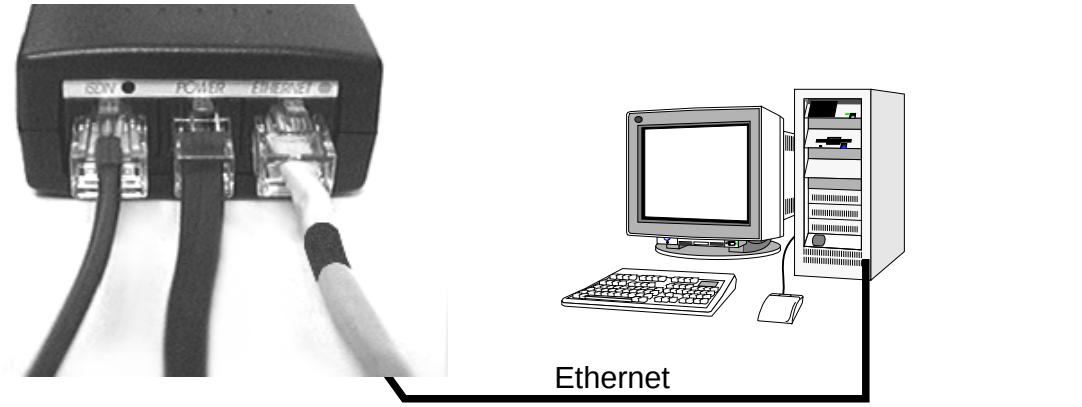
DO NOT CONNECT TO A NETWORK BEFORE… 2.1

Your *Pocket MultiCom* must be configured before being connected to an existing Ethernet network. You may do it yourself or ask your dealer or network specialist to configure it for you.

There are two possibilities to configure your ***Pocket MultiCom***: the simplest one is to do it using Ethernet to connect it to your PC and a Web-Browser, like Netscape™ or Explorer™, already installed on your computer, and also available on the CD-ROM. You can also use the serial cable and a terminal emulator or the Windows™ wizard EasyConfig, also on the CD-ROM (see § 2.9.2 on page 20).

PREPARING A SETUP WITH ETHERNET 2.2

The simplest installation procedure requires that you first connect the Ethernet port **to a single computer**:



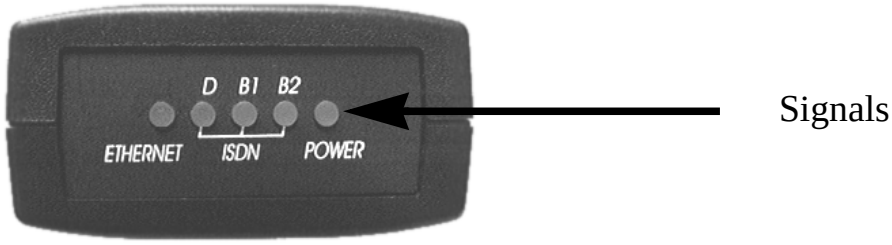
To connect your ***Pocket MultiCom*** to a single computer:

1. Plug the **crossed** Ethernet cable (blue or grey with blue mark) to the “Ethernet” port of the ***Pocket MultiCom*** and to the Ethernet port of your computer[1].

1. This connection applies to most laptops as well as to desktop computers. Installing the ***Pocket MultiCom*** with a NoteBook computer without a female Ethernet plug may require an Ethernet gender-changer: please refer to § 2.8, "Installing for a NoteBook Computer" on page 19.

2. Turn the computer on (if it is not already on).
3. Plug one end of the ISDN cable into the "ISDN" port of your ***Pocket MultiCom*** and the other end into a terminated ISDN BRI S_o wall socket.
4. **Check that the power supply has the correct voltage rating for your country.** Then connect the power supply cable into the "Power" port on your ***Pocket MultiCom*** and plug the power supply into an AC wall socket.

The ***Pocket MultiCom*** then automatically launches the start-up operation. The following series of signals provide information on the status of operations:



- **The Ethernet, ISDN (D, B1, B2), and Power signals turn orange.**

  This indicates that your ***Pocket MultiCom*** is carrying out the initial tests: memory, and peripherals, as described in the Reference Manual.
- **The Power signal remains orange slightly longer than the others**

  This indicates that your ***Pocket MultiCom*** is starting-up.
- **The Power signal turns green**[1]

  This indicates that start-up is successful. Your ***Pocket MultiCom*** is now ready for use.
- **The ISDN D signal turns green**

  This indicates that the ISDN connection is connected and properly wired[2].
- **The ISDN B1 and B2 signals remain off**

  This indicates that no data channel is in use. When a channel is connected, the corresponding signal will turn green, or blink orange when there is traffic on it.
- **The Ethernet signal turns green**

  This indicates that the Ethernet connection is working.

1. On models with the encryption option, the Power signal may stay orange at this stage. Please refer to "Visual Display", "Security" chapter of the Reference Manual on CD.
2. On some ISDN network, this ISDN D signal may go off or turn red after a while after the start-up. This is normal.

If one of the Ethernet or ISDN D signals stays red, the corresponding interface is not connected or wired properly, or the wrong cable has been used. Correct the problem and restart the ***Pocket MultiCom*** by disconnecting and reconnecting its power supply cable, to test the connections again.

When those Ethernet and ISDN signals are green, the ***Pocket MultiCom*** is now ready to provide all configuration services to your computer.

If your router is bundled with an Internet Access and you want to use it, please follow the specific installation instructions for this access, instead of the ones below, unless these instructions refer to the instructions below.

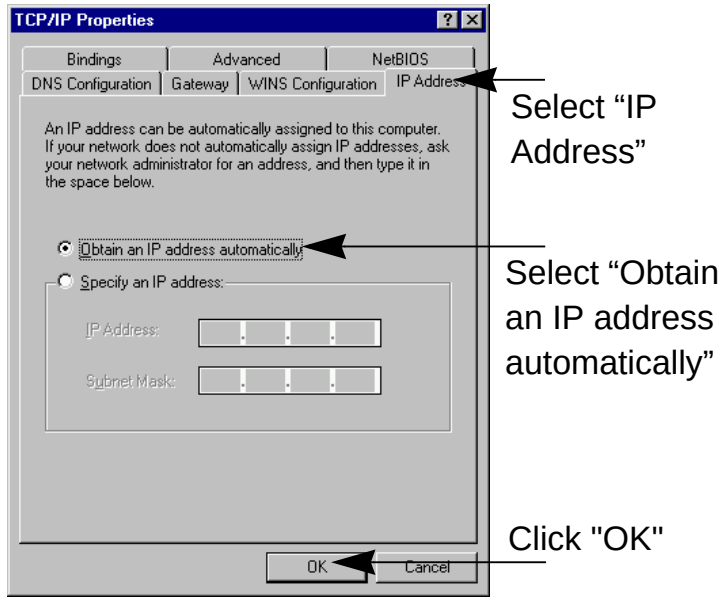
CONFIGURING THE COMPUTER INTO DHCP MODE 2.2.1

The next step is now to configure the computer to get its TCP/IP configuration automatically from the ***Pocket MultiCom***, using the "Dynamic Host Configuration Protocol" (DHCP).

NOTE - By default, the DHCP server on the ***Pocket MultiCom*** is enabled.

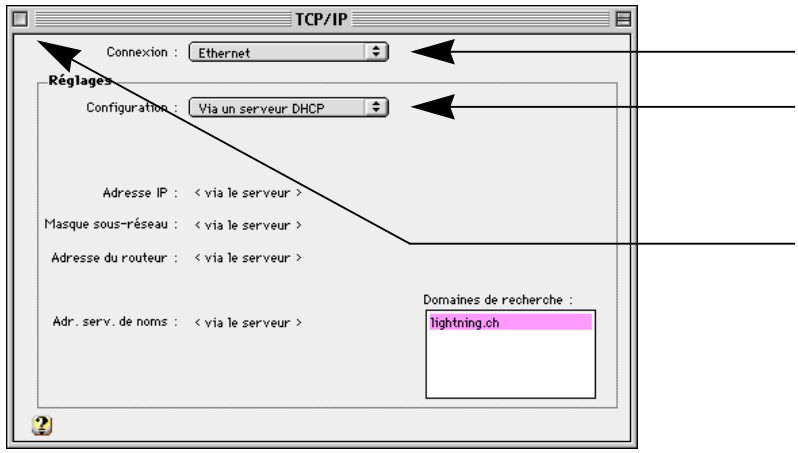
FOR WINDOWS 9X / NT USERS 2.2.1.1

1. If your computer is configured with an IP address, change the configuration to automatically get an IP address from a DHCP server (in Windows 95/98 this is in "Start" menu in:
   - "Parameters"
   - "Configuration pannel"
   - "Network"
   - "TCP/IP")
2. **Restart the PC**, even if not requested to.



FOR USERS OF MACINTOSH AND OTHER COMPUTERS 2.2.1.2

1. If your computer is configured with an IP address, change the configuration to automatically get an IP address from a DHCP server.
   For example, on a Macintosh with System 7.5.5 and newer, this can be done in the “TCP/IP” control panel in the “Apple” menu:



2. Make sure the computer requests a new address from the DHCP server, e.g. by restarting it.

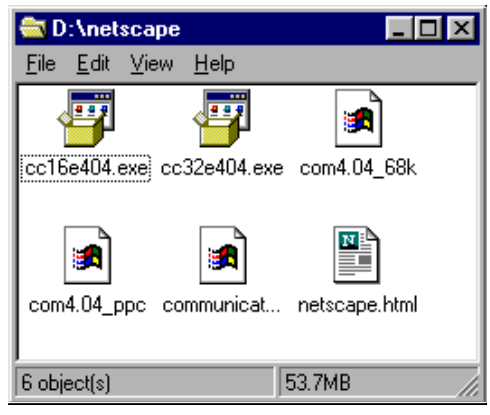
AUTO-CONFIGURING THE POCKET MULTICOM 2.2.2

The following few very easy steps will show you how to set-up an Internet connection using a Single Internet User Account (SIUA) with your Internet Service Provider (ISP). This auto-configures the TCP/IP parameters of your computers using the built-in DHCP server. Please check your ISP connection **first with this setup**. A short introduction for modifying this configuration for static IP addresses is given in § 2.5, "Configuring for Static IP Addresses" on page 14.

1. Start a Web navigator, for instance Netscape Navigator or Internet Explorer.

   If you don't already own any navigator, you can install one from the CD-ROM. In the “Netscape” folder of the CD you will find Netscape Navigator for:

   • Windows 95/NT (cc32e404.exe)
   • Windows 3.11 (cc16e404.exe)
   • Macintosh (com4.04_68k)
   • Macintosh PowerPC (com4.04_ppc)

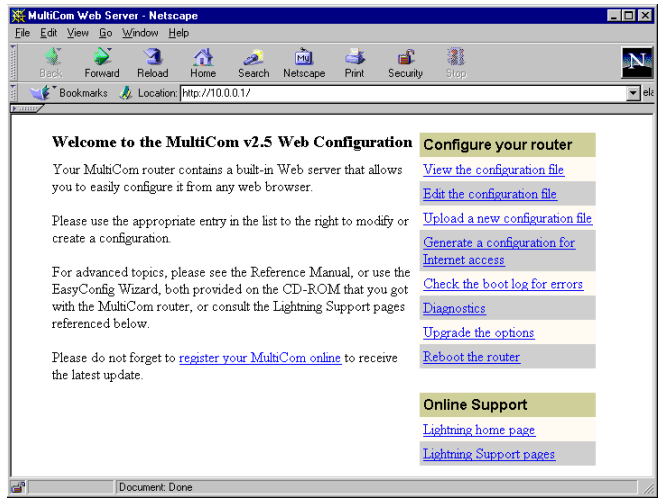


2. In the Web navigator choose your ***Pocket MultiCom*** IP address:

   http://10.0.0.1/

   and press Enter. The router's Welcome-page appears:

   If this form doesn't appear at this stage, please check the previous steps, and refer to § 3, "Trouble-shooting & FAQ" on page 21.

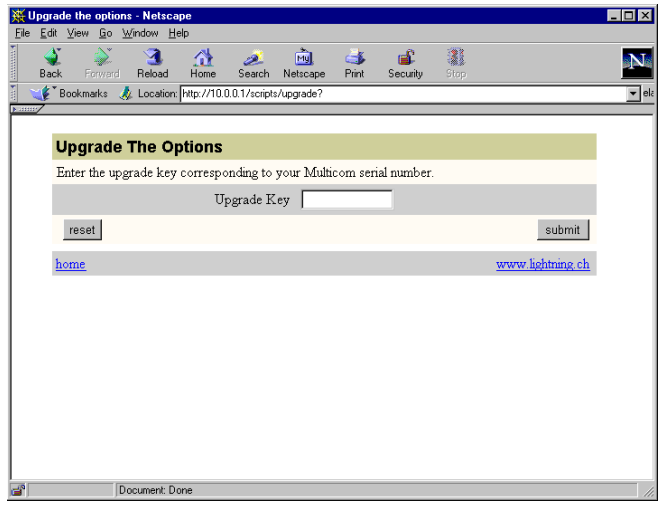


3. This step No. 3 has only to be done if you received an upgrade key with your ***Pocket MultiCom*** (usually written on the box or on the packing list, e.g. "NOPQ1234DEFG"). Otherwise go directly to the next step No. 4.

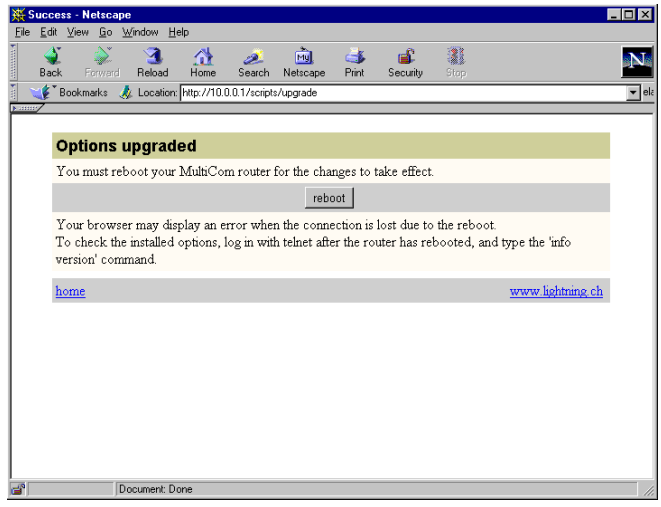
   - choose the link entitled "Upgrade the options"

   A fill-in form appears:

   - enter your key into the field "Upgrade Key", **verify very carefully the key spelling**, and click on the "submit" button. This will install the purchased options.

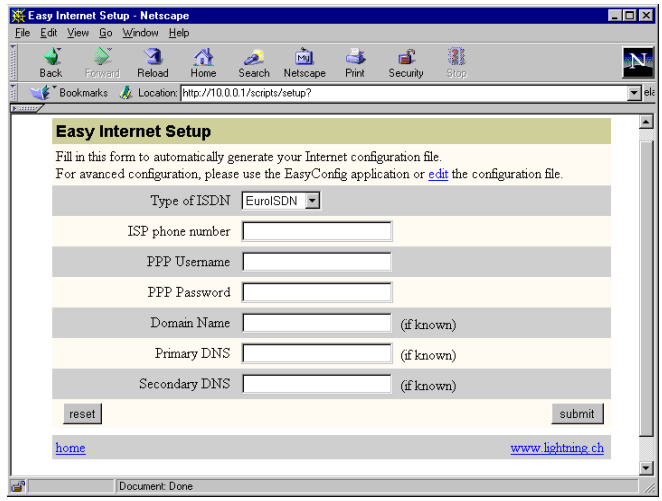


   - After a few seconds, a new screen appears:
     Click on "reboot" in order to restart the Pocket MultiCom with the new configuration. Your browser may indicate that it "lost the connection" to the Pocket MultiCom.
   - The router restarts. Ethernet, D-Channel and Power leds light green again after a while.

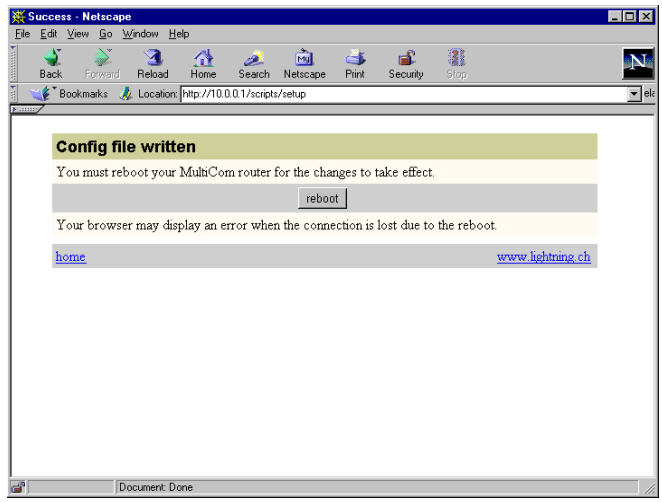


- Type-in again the ***Pocket MultiCom*** IP address: **`http://10.0.0.1`**
- The Welcome-page of your ***Pocket MultiCom*** appears again.

4. Click on the link entitled “Generate a configuration for Internet access”.
   A fill-in form appears:



5. Enter the following informations:
   - Your ISP phone number.
   - PPP Username: the username you have chosen (or received) from your ISP.
   - PPP Password: the password you have chosen or received.
   - If you have your own Domain-Name (for instance “lightning.ch”) you may type it into the appropriate field.
   - If you got DNS (Domain Name Server) IP-addresses information from your ISP, you may also enter them. Otherwise, just leave these fields empty. Most ISPs transmit these informations through the ISDN (PPP) connexion and your Pocket MultiCom will automatically learn them from there.
6. click on the “submit” button…
7. After a few seconds, a new screen appears:
   Click on “reboot” in order to restart the Pocket MultiCom with the new configuration. Your browser may indicate that it “lost the connection” to the Pocket MultiCom.



8. The router restarts. Ethernet, D-Channel and Power leds light green again after a while.
9. Restart your PC to make sure it gets its new DHCP parameters from the Pocket MultiCom.
10. Congratulations! Your router is configured! You can now test your access by registering your product and surfing on the Internet using your Web navigator.

REGISTERING YOUR PRODUCT ON-LINE 2.3

11. Type the following Internet Address in your Web-browser and ENTER:
    http://www.lightning.ch/register.html
12. The router now opens a link to your ISP (the signal B1 or B2 lights green).

    Lightning's registration page appears in the navigator. You may now enter your registration information to validate your warranty.

    If the ISDN B1 or B2 channel does not open, or the Lightning registration page doesn't appear, first check your parameters, and redo the configuration starting at step 2. on page 10. If the problem persists, please refer to § 3, "Trouble-shooting & FAQ" on page 21.

NOTE - The serial number of your Pocket MultiCom can be found on a sticker below the Pocket MultiCom.

You will then benefit from a free firmware update and will be able to request status updates of Lightning products. You may also use fax or mail with the Registration Card found in § 6.4 on page 39.

Congratulations, you are all done if you have a single computer. To configure further computers using the built-in DHCP server, please refer to § 2.7, "Installation for a Network" on page 17. If you already have fixed, static, IP addresses or need other special configurations, please refer to § 2.5, "Configuring for Static IP Addresses" on page 14 and to the Reference Manual on CD-ROM. To fine-tune the configuration to use a second B-channel with MPP, read the next section.

FINE-TUNING THE CONFIGURATION 2.4

For further configuration you can use the router's built-in Web server at the router's IP address (by default http://10.0.0.1/), and start from examples in the Reference Manual on CD-ROM, or use the Windows™ EasyConfig™ wizard and its manual setup option, as explained in § 2.5.1, "Installing EasyConfig on Windows 95/98/NT" on page 14.

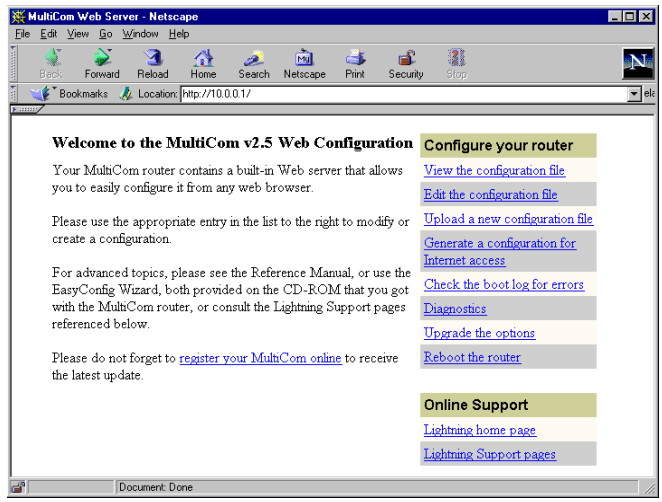
CONFIGURATION OF THE CHANNEL AGGREGATION (MPP) 2.4.1

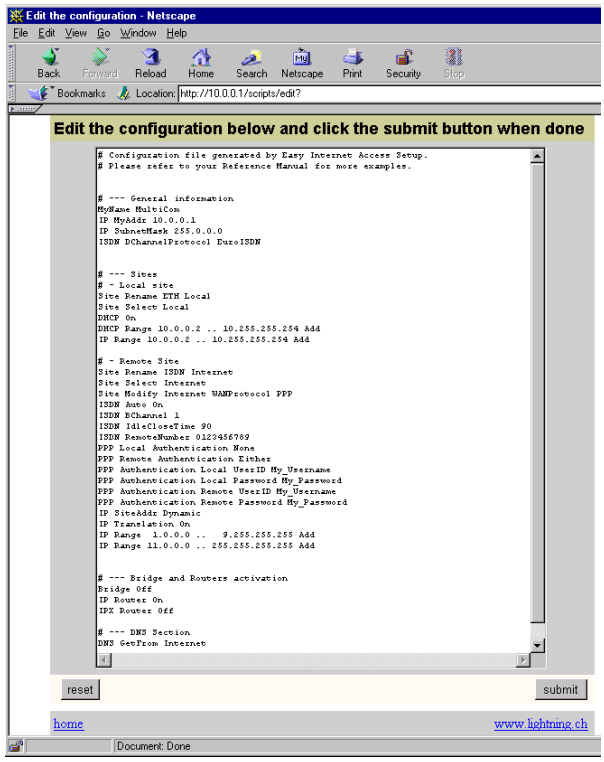
The channel aggregation isn't supported by all Internet Service Providers. In certain cases the use of the channels' aggregation can generate local problems.

The channel aggregation allows to double the ISDN bandwidth by using both 64 kbits/s B-channels of the ISDN link, if needed. The flow passes then from 64 kbits/s to 128 kbits/s (the data compression multiplies this flow some more). The second B-channel is automatically opened only if the first one is full.

WARNING: The channels aggregation can double the phone-costs since, if an important traffic occurs, two connections are established. Even if the data transfer duration is thus reduced, the additional costs may not be fully compensated. Notice also that it wont' be possible to make or receive a telephone call on an ISDN connection when both two B-channels are used by the router. In order to allow the channels aggregation, execute the following operations:

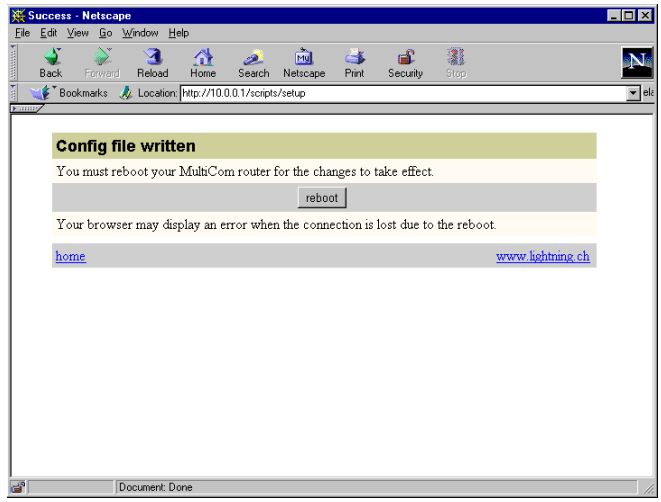
1. In the Web navigator choose your ***Pocket MultiCom*** address, by default `http://10.0.0.1/` and press Enter. The MultiCom home-page appears.





2. Click on the link entitled…
   "`Edit the configuration file`"
   A full-screen text editor appears.
3. Look for the line displaying:
   `ISDN BChannel 1`
4. Carefully replace it by:
   `ISDN BChannel 2`
5. Click on "`submit`". The new configuration is recorded.

6. Click on "**reboot**" to restart the Pocket MultiCom with the new configuration.
7. The Pocket MultiCom restarts. Ethernet, D-Channel and Power leds light green again after a while. In case of very important traffic the router can, from now on, open a second B-channel in order to increase the capacity. In this case both two leds B1 and B2 will light green.



In order to disable the channels aggregation and use only one ISDN B-channel, execute the same operations and reset **`ISDN BChannel`** to **`1`** instead of **`2`**.

CONFIGURING FOR STATIC IP ADDRESSES 2.5

The instructions from the previous sections allow to establish a standard DHCP configuration for the connection of a local network to the Internet. You might need a non-standard configuration, for instance if you want to use your own static IP addresses or if you already have a DHCP server on your network. In this case, you can use the EasyConfig wizard to establish the configuration corresponding to your needs. This installation needs some networking expertise.

The EasyConfig wizard takes your router's actual configuration, allows you to modify it through some simple dialog boxes and saves the modified configuration back into the router.

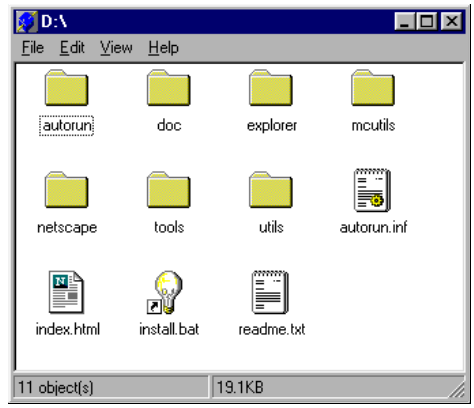
INSTALLING EASYCONFIG ON WINDOWS 95/98/NT 2.5.1

NOTE - EasyConfig runs also on Apple PowerMacintosh™ using the Windows 95/98 emulator "Virtual PC 2.1.2"™ (earlier versions are not fully compliant) by Connectix™ Corp.

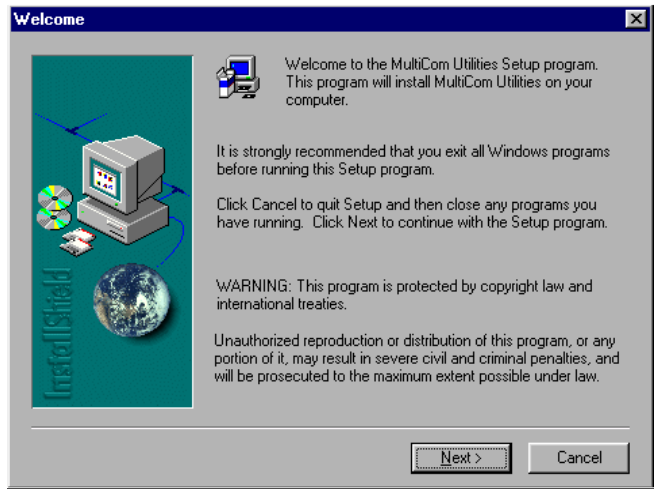
To install the EasyConfig wizard on your computer, execute the following operations:

1. Insert the CD-ROM in your computer.
2. Your CD-ROM's content is displayed on the screen.
   - If this doesn't happen so, open your CD by double-clicking on “Desktop” and then on “Whoop_2.5 (D:)”.

3. Double-click on the icon labelled **`install.bat`** in the root directory of the CD.

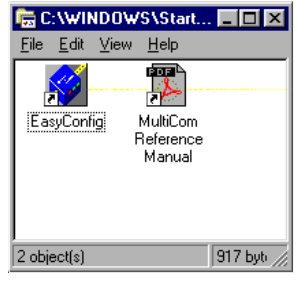


4. Then install the MultiCom Utilities by following the instructions. If possible, don't modify the proposed values:



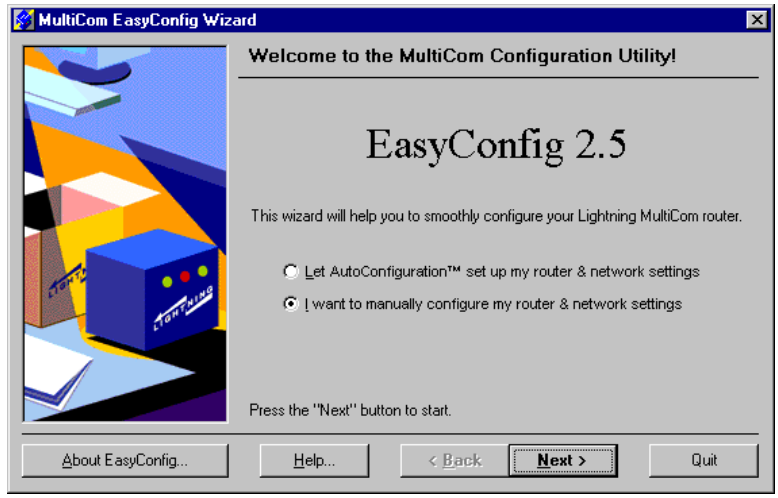
USING EASYCONFIG 2.5.2

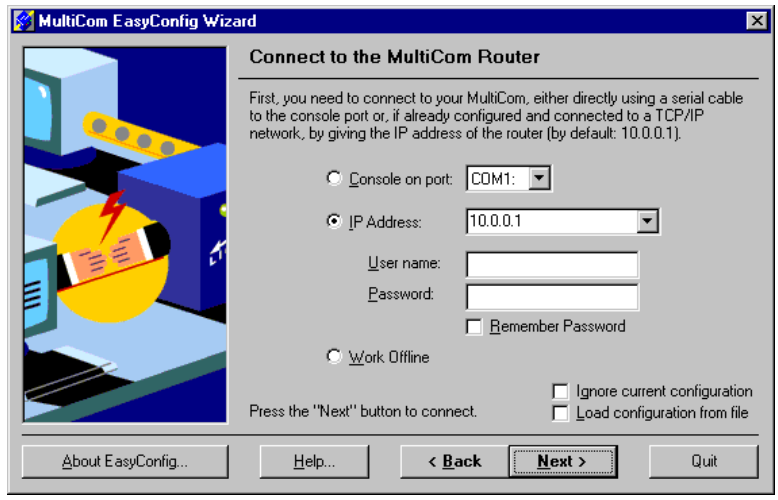
1. Start the EasyConfig from the place it has been installed in, by default:
   “Start” / “Programs” / “MultiCom Utilities” / “EasyConfig”.



2. Choose “I want to manually configure my router & network settings” and press on “Next”.
3. If this hasn't been done yet, choose the IP address 10.0.0.1 to communicate with the router.
4. Press on “Next”.
5. The EasyConfig wizard takes the configuration from the router. By clicking on “Next” you can see the configuration step by step and adapt it to your needs.

By clicking on “Help” you get help on the settings that you are currently editing.





USING EASYCONFIG TO SET STATIC IP ADDRESSING 2.5.3

On the CD-ROM, in the “doc” folder, you will find an Acrobat PDF file with a short tutorial on using EasyConfig, and particularily an example on how to configure your Pocket MultiCom for static IP addressing.

USING OTHER EXAMPLE CONFIGURATIONS 2.5.4

On the CD-ROM, you will also find in the “mcutils\Examples” folder all the example configuration files (*.LCF) of the “Examples” chapter of the Reference Manual. You may read these files, and adapt them for your own router setup using EditConfig™, also part of the MultiCom Utilities, installed from the CD-ROM. Please be advised that this requires some networking expertise and a good understanding of the examples, and associated commands explained in the Reference Manual (on CD-ROM).

REFERENCE MANUAL, WEB, AND FAQ 2.6

A detailed description of your router capabilities can be found in the Reference Manual on the CD-ROM. A copy of this manual has been made on your hard disk where the MultiCom Utilities EasyConfig and EditConfig have being installed.

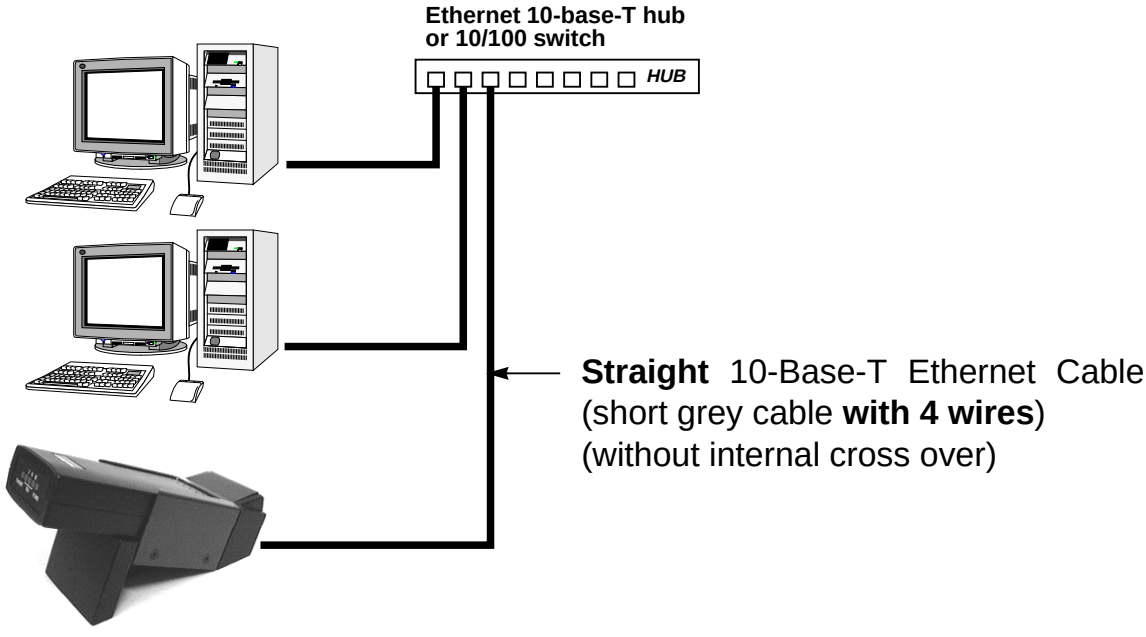
Please also check the Technical Support area of our Web server at:

`http://www.lightning.ch/support/`

for future improvements in configuration, software, and the latest list of Frequently Asked Questions (FAQ). A short list of these can also be found in § 3.1 on page 22.

INSTALLATION FOR A NETWORK 2.7

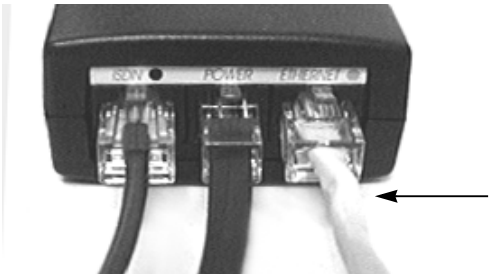
The illustration below shows a typical LAN (Local Area Network) setup with a ***Multi**Com* and an Ethernet Hub:



Proceed as follows:

1. Make sure that your hub or switch is working correctly.
2. Plug the **straight** 4-wire grey Ethernet cable into one of its Ethernet port.

3. Plug the other end into the "Ethernet" port on your ***Pocket MultiCom*** as shown below.
4. Plug one end of the ISDN cable into the “ISDN” port on the back of your ***Pocket MultiCom*** as shown below.
5. Plug the other end of the ISDN cable into an ISDN BRI S_o wall socket (terminated, if more than 6 meters away from the ISDN Network Terminator).
6. Connect the end of the AC cable into the “Power” port on your ***Pocket MultiCom*** as shown below, and the power supply into an AC wall outlet.



Straight 10-Base-T Ethernet Cable (short grey cable **with 4 wires**) (without internal cross over)

ISDN Power Ethernet

The start-up operation now begins automatically, as described in § 2.2, "Preparing a Setup with Ethernet" on page 6.

NOTE - Some hubs, especially 10/100 Mbits/s hubs, do connect unused pairs of the Ethernet cable, leading to a start-up with default configuration, when used with universal 8-wires cables. In this case, please use the provided standard 4-wires grey Ethernet cable.

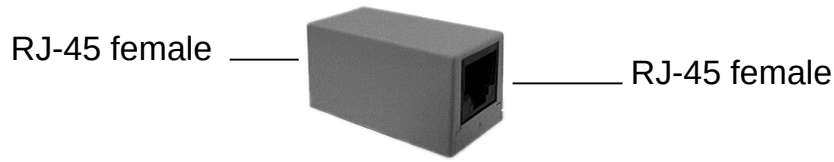
CONFIGURING OTHER COMPUTERS ON THE NETWORK 2.7.1

- Configure all computers to obtain IP addresses automatically from a DHCP server (see § 2.2.1, "Configuring the Computer into DHCP mode" on page 8).
- Connect all computers to the hub or switch, using standard Ethernet cables.

NOTE - By default, your ***Pocket MultiCom*** runs a DHCP server. If you already have one in your network or are using static IP addresses, you should first disable the DHCP function of your ***Pocket MultiCom*** and configure IP addresses accordingly using EasyConfig or consult the Reference Manual for static routing.

INSTALLING FOR A NOTEBOOK COMPUTER 2.8

Connecting your ***Pocket MultiCom*** directly to a NoteBook with a PCMCIA Ethernet card may require an adaptor for connecting the crossed Ethernet cable to the card. Otherwise the procedure is the same as for a single computer.



NOTE - The adaptor — with two female RJ-45 on each side, without cross-over — is supplied with the PCMCIA card, generally upon demand.

To connect your ***Pocket MultiCom*** to a NoteBook:

1. Insert the PCMCIA card into the appropriate slot in your NoteBook computer.
2. Connect the PCMCIA card's cable to the adaptor. **Do not connect the PCMCIA cable directly to the *Pocket MultiCom***, since it is not a crossed one.
3. Now you can proceed according to the instructions for a single computer except for the following change: *plug the crossed Ethernet cable into the adaptor instead of directly to your computer.*

CONNECTING TO THE COMMAND INTERFACE 2.9

To access to the command-line interface, you can use telnet or the serial interface.

USING TELNET TO ACCESS THE COMMAND INTERFACE 2.9.1

Run a Telnet program (like "C:\\WINDOWS\telnet" with Windows™ 95/98) to connect to your router using Ethernet, and open a Telnet-session.

NOTE - By default your router has IP address **`10.0.0.1`**

USING THE SERIAL INTERFACE 2.9.2

To connect to the serial interface, you need either a terminal or a computer with a terminal emulation software (this is included with most computers, like “Programs”/“Accessories”/“Hyper Terminal”™ with Windows™).

NOTE - For a direct connection, the serial port of your computer must have a specific configuration, see § 6.1.2, "Serial Configuration" on page 36 for details.

First, look for the special console cable, with a RJ-45 plug and a DB-9 plug:

To set up your ***Pocket MultiCom*** for configuration purposes:

1. Disconnect the power cable from your ***Pocket MultiCom***, if necessary.
2. Connect the RJ-45 end of the console cable to the “Ethernet” port on your ***Pocket MultiCom***.
3. Connect the DB-9 end of the console cable to a serial port (RS-232) of your computer.
4. Start the terminal emulation software, configure the serial port according to § 6.1.2, "Serial Configuration" on page 36, and then open a connection.
5. Re-connect the power cable to the "Power" port on your ***Pocket MultiCom***.

The five signals on front turn orange, indicating that your ***Pocket MultiCom*** is carrying out the start-up operation, as described in page 7.

Once the initialization process is finished, your ***Pocket MultiCom*** displays its user interface on your terminal screen. You can now auto-configure your ***Pocket MultiCom*** the commands “Upgrade Key” (if needed) and “Setup”, or use Easy-Config with the “COM” port. You can also reset the default configuration, as described in § 4.1.2, "Setting the Configuration With a Terminal" on page 30.

NOTE - If you see messages from the MultiCom in your terminal emulator window, but cannot type-in commands, check that the terminal handshake is set to “XON/XOFF”, instead of “RTS/CTS” or “Hardware”.

Chapter 3

Trouble-shooting & FAQ

*This chapter gives answers to Frequently Asked Questions (FAQ) and provides instructions for checking whether your **Pocket** Multi**Com** is correctly configured and that the Ethernet and ISDN connections are working correctly.*

It includes a general trouble-shooting scheme for AutoConfiguration and the following three tests:

- **Connecting to a Distant Site**
  This test is the easiest way to confirm that your ***Pocket** Multi**Com*** is in working order.
- **Checking the Ethernet Connection**
  Carry out this test if you encountered a problem with the first test.
- **Checking the ISDN Connection**
  Carry out this test if you could not connect to a distant site but the Ethernet connection is working.

Further trouble-shooting hints are found in the FAQ and in the last section of this chapter, describing the “diagnose” command and other “info” commands.

FREQUENTLY ASKED QUESTIONS (FAQ) 3.1

Please also consult the Technical Support area of the Lightning web site at: `http://www.lightning.ch/support/` for an up-to-date version of the FAQ.

1. **The IP address of the *MultiCom* is `10.0.0.1` by default.**
2. **Can I connect my *MultiCom* router to a Fast Ethernet network?**

   Your ***MultiCom*** router is built for 10 Mbps Ethernet, thus it will not work if connected to a 100 Mbps-only Ethernet port. Most Ethernet ports can do both 10 and 100 Mbps Ethernet. Your router will work if connected to such a port, but only when using a 4-wires cable like the grey Ethernet cable delivered with your router.

3. **Which Stac compression do you support?**

   We support the standard Stac LZS® compression (RFC1974). We do not support the obsolete draft-09 version of Stac (sometimes called Stac-9) neither Microsoft PPC (also know as MPPC or MS-Stac).

4. **The ISDN line keeps up or opens periodically even if I don't access the Internet**

   There can be multiple causes for such a behaviour. First of all, make sure that you have chosen a small timeout value for closing the line. The default value is 90 seconds. If the line stays open longer than that, you may have an internal problem (e.g. a misconfigured machine on your local network) or an external problem (a misconfigured router talking to your ***MultiCom***). To find out where the problem comes from, disconnect the Ethernet cable from the router and check if the line still keeps up. If the line goes down after a few minutes, then the problem is internal, if not then it is external. Use the command: **`Info Site Internet Frames`** to check which IP packets are opening the line, and **`Info Site Internet Frame n`** to display the most frequent one.

   Common internal problems are:

   • A mail program (e.g. Netscape, Eudora, MS Exchange) that is configured to check mail every few minutes.

   • A Web browser that has a starting page with an address that is outside your network. Use a blank page or a local file as start page instead, e.g. `file:/mystartpage.html`. Do not use an URL like `http://localhost/mystartpage.html`, as your computer will have to contact an external DNS server to resolve the name “localhost”!

• A Web page that updates automatically. Some Web pages, e.g. home pages, live images, update themselves automatically and can keep the line open. Don't keep a window with such a page open while you are not using it.

External problems may be:

• You are talking to a MaxPro RWS-NT V1.0.0.4 router. That router recognises "Echo Requests" as traffic and incorrectly keeps the line up. If you can make sure that the router on the other end of the line is a MaxPro RWS-NT V1.0.0.4, put the command "**`PPP EchoRequest Off`**" into the part of the configuration file relating to that site.

• If it is another external problem, try contacting the owner of the router at the other end of the line and make sure that the router does not send unsolicited traffic. Try setting the timeout to a small value e.g. by adding the following command to your configuration file: "**`ISDN IdleCloseTime 10`**".

5. I cannot connect to Telia with AutoConfiguration, why?

Telia is using the private A-class IP range `10.0.0.0`, which is a non-routable subnet that is also used locally by the AutoConfiguration setup! To connect anyway, you can manually change the generated configuration to use the private B-class **`192.168.0.0`** subnet with SubnetMask **`255.255.0.0`**. Such a configuration is given in the examples section of the Reference Manual on the CD-ROM.

6. When I use the SecureWall function, sending mail is very slow, why?

Some external mailers check the source port #113 to verify the identity of the sender. Since the SecureWall drops unsolicited incoming packets, the mailer will experience a timeout before giving up and accepting the mail anyway. If you are in that case, you can simply map this port to the ***MultiCom***, which will signal that the port is not reachable and cause the mailer not to wait. To do so add the following line to your configuration or chose the equivalent option in the EasyConfig wizard:

`IP Translation Map 113/tcp To <IP address of your MultiCom>`

7. The SecureWall prevents some types of FTP connections.

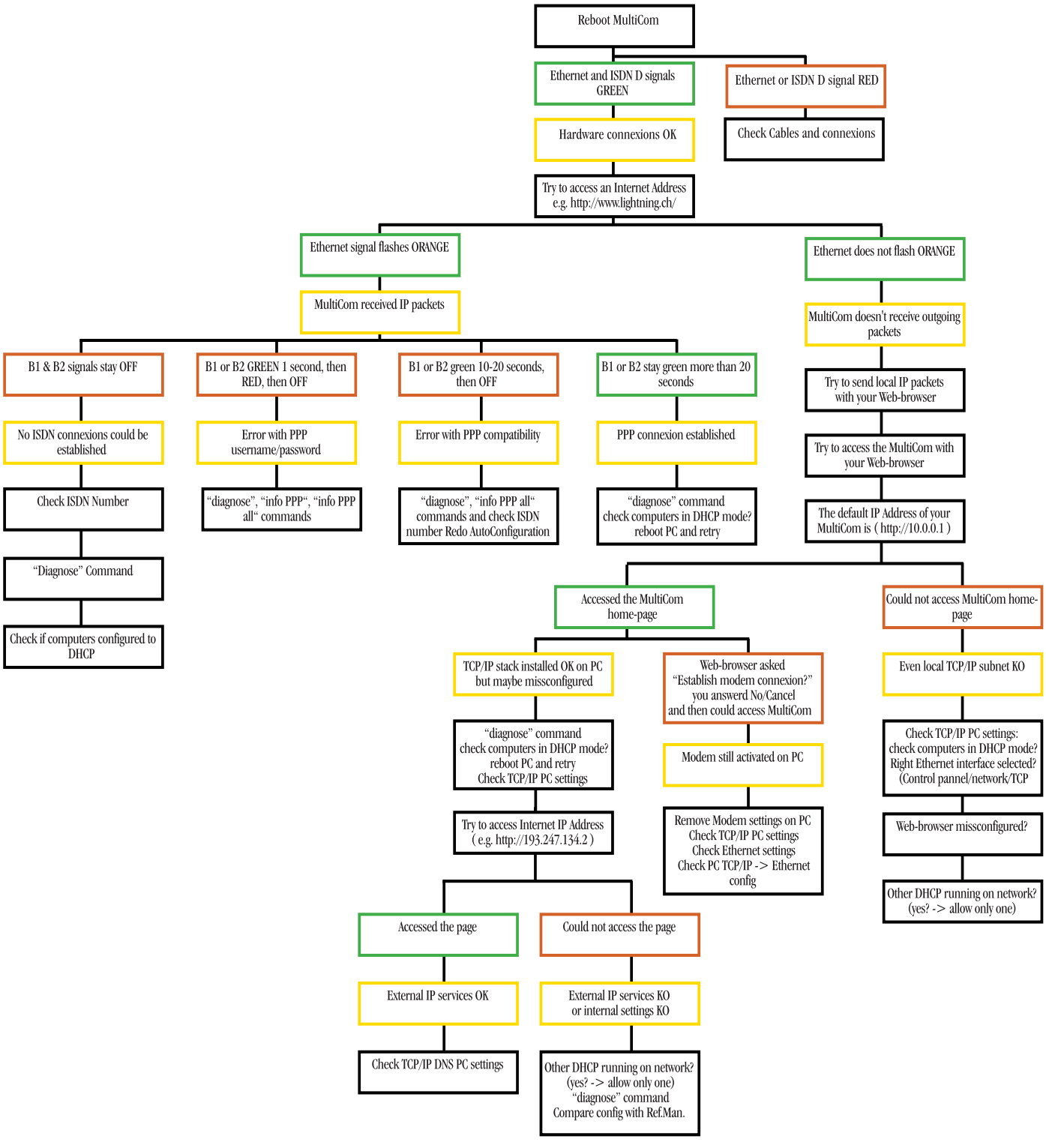
As with most firewalls, FTP transfers can only succeed if the FTP program is set to passive mode for gets and active mode for puts (these are standard in Internet Explorer, Netscape, pftp, CuteFTP and Fetch in firewall mode).

8. **Is the *Pocket MultiCom* Year 2000 compliant?**

Yes. A declaration of conformity is available on our web-site.

GENERAL TROUBLE-SHOOTING SCHEME 3.2

In case of connection problems, just looking at the signals behaviour can give useful hints for finding your configuration problem. A general scheme, valid for standard AutoConfiguration setting is shown below:



CONNECTING TO A DISTANT SITE 3.3

Connecting to a distant site using a Web browser, Telnet, or your particular software is the easiest ways to ensure that your Ethernet and ISDN connections are both functioning correctly. If you could not connect, try connecting to another site, or to an IP address, to make sure that the problem does not reside on the other side of the line. If you still cannot connect, carry out the following tests.

CHECKING THE ETHERNET CONNECTION 3.4

You can use either a Web-browser, Telnet, FTP or ping, specifying the IP address of your ***Pocket** MultiCom*, to connect to it directly. If you can reach the ***Pocket** MultiCom*, this confirms that your Ethernet software is working correctly.

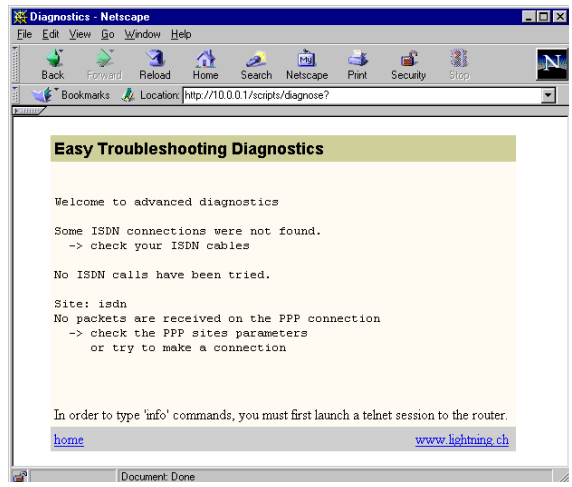
If you cannot reach your ***Pocket** MultiCom*, make sure that you typed in the correct IP address. If you did, there is probably a problem with either the configuration of your ***Pocket** MultiCom* or your computer. Refer to section 3.2 for details.

If you still can't access your ***Pocket** MultiCom*, you can reset it to factory default address 10.0.0.1 and DHCP mode by following section 4 on page 27.

DIAGNOSE COMMAND 3.5

Using Ethernet, Try the `Diagnose` command:

1. Run a Web-browser, specifying the IP address of your ***Pocket** MultiCom*.
2. The connection opens and asks for your user name and password, if set.
3. The ***Pocket** MultiCom* home-page appears.
4. Click on the link: "Diagnostics", corresponding to the `Diagnose` command.
5. You will receive basic diagnostics: Follow the suggestions provided.



CHECKING THE ISDN CONNECTION 3.6

Carry out the following test if your Ethernet connection is functioning correctly but you cannot connect to a distant site:

1. Run Telnet or a console connection, specifying the IP address of your ***Pocket MultiCom***, following instructions in section 2.9 on page 19.
2. The connection opens and asks for the user name and password, if set.
3. At the next prompt, type in the following command: `ISDN Conn`
   A B-channel signal should turn green, indicating a successful connection.

If the *ISDN connection is not OK*, check the configuration of your ***MultiCom*** for problems. Check also to see if there is a problem with your telephone wires.

If the *ISDN connection is OK*, but you still cannot connect to a distant site, it is probably because there is either a problem with your computer's configuration, or with the configuration of the other site's router or computer.

FURTHER TROUBLE-SHOOTING 3.7

Please refer to the Reference Manual for further trouble-shooting.

Especially, you may need to run Telnet (section 2.9.1 on page 19), specifying the IP address of your ***Pocket MultiCom***, logging-in, and typing some "info" commands, like:

- **`isdn info`**
- **`ppp info`**
- **`dhcp info`**
- **`dns info`**
- **`cat boot.rpt`**
- **`isdn info history`**
- **`ppp info all`**
- **`info ip`**
- **`info ip router`**
- **`ip siteAddr info`**
- **`site stats Internet`**
- **`site info internet frames`**
- **`site info internet frame n`**
- **`info site internet`**
- **`ip translation info`**

These commands and more are documented in the "Commands" chapter of the Reference Manual on CD, including also a trouble-shooting chapter.

Chapter 4

Resetting Factory Configuration

*This chapter provides instructions on how to restart your **Pocket** Multi**Com** in the factory-default configuration.*

RESETTING THE DEFAULT CONFIGURATION 4.1

There are two ways to set up your ***Pocket MultiCom*** with the default configuration once it has been changed, depending on whether you have a direct connection or not.

SETTING THE CONFIGURATION WITHOUT A TERMINAL 4.1.1

Resetting the configuration of a ***Pocket MultiCom*** that is not directly attached to a terminal requires manipulating the cables. Use the illustration on page 29 while following the steps described below to reconfigure your ***Pocket MultiCom***.

1. Connect one end of the ISDN cable to your ***Pocket MultiCom***'s ISDN port.
2. Connect the other end of the ISDN cable to your ***Pocket MultiCom***'s ***Ethernet*** port.
3. Attach the Power cable to your ***Pocket MultiCom***'s Power port.
4. Connect the other end of the Power cable to the appropriate wall socket. This turns on your ***Pocket MultiCom*** and begins the start-up operation.
5. Make sure that the start-up operation is completed: check that the power signal is green.
6. Disconnect the ISDN cable from your ***Pocket MultiCom***'s Ethernet and ISDN ports.
7. Re-connect the Ethernet port to your computer using the crossed cable.

   Do not remove power before setting and storing your new configuration.

You can now reconfigure your ***Pocket MultiCom*** from your computer with a Web-browser, or Telnet and FTP. Follow the instructions in section 2.2.1 and section 2.2.2 on page 9 or in the "Creating Your Config File" chapter of the Reference Manual.

NOTE - The default IP address for your ***Pocket MultiCom*** is: **`10.0.0.1`**.

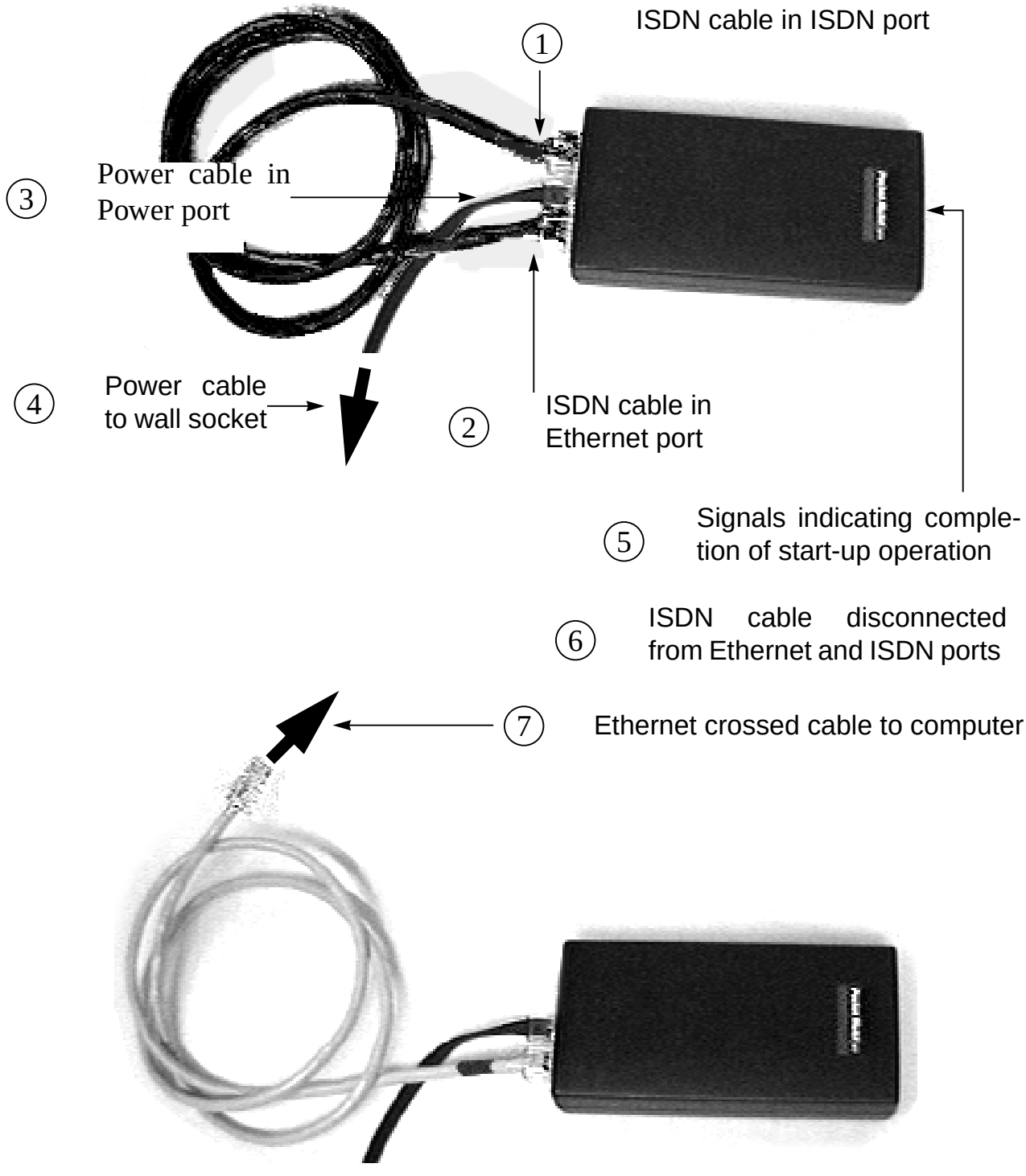


Figure 1 Setting the Default Configuration without a Direct Connection

SETTING THE CONFIGURATION WITH A TERMINAL 4.1.2

If you are directly connected to a terminal or a computer with terminal emulation software, you can quickly and easily set the default configuration when you start up your ***Pocket MultiCom***:

1. Install your ***Pocket MultiCom*** for a console connection, as described in § 2.9.2, "Using the Serial Interface" on page 20.
2. **During the start-up operation — when all five signals are orange — press the minus key (-) 10 times**.

   Upon initialization, your ***Pocket MultiCom*** will be started with the factory-default configuration. This can be seen on your terminal: the `MyIPAddr` should be **`10.0.0.1`**.

   Do not remove power before setting and storing your new configuration.

To permanently reset your ***Pocket MultiCom*** with the default configuration, follow the standard set of instructions for modifying the configuration, as described in the “Configuration” section of your Reference Manual.

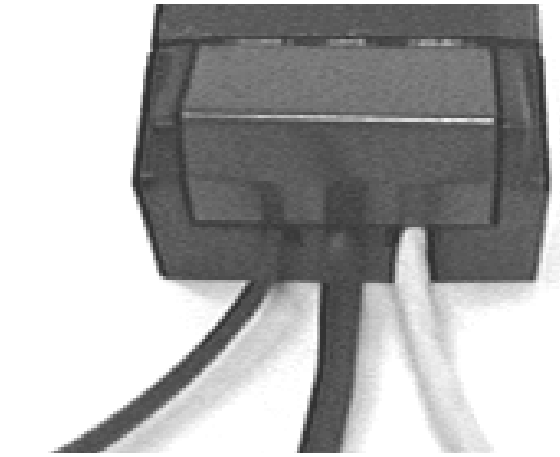
Chapter 5

Docking Station

This nice optional desktop accessory lets you easily move your router from one place to another.

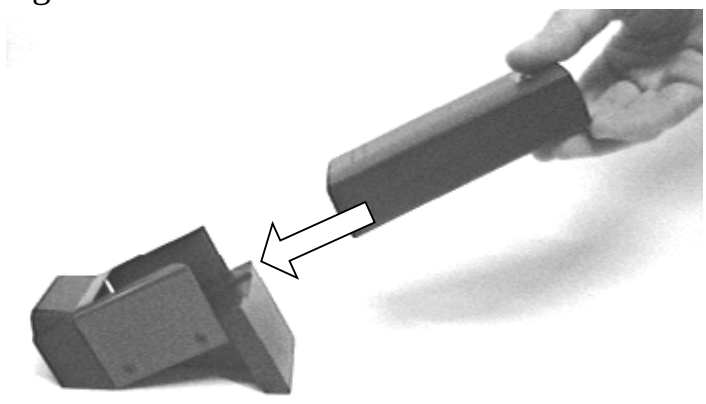
IDENTIFYING CABLES OF THE DOCKING STATION 5.1

The following illustration as a guide for identifying each cable of an *assembled* ***Pocket MultiCom*** Docking Station:



INSTALLING YOUR ***Pocket MultiCom*** 5.2

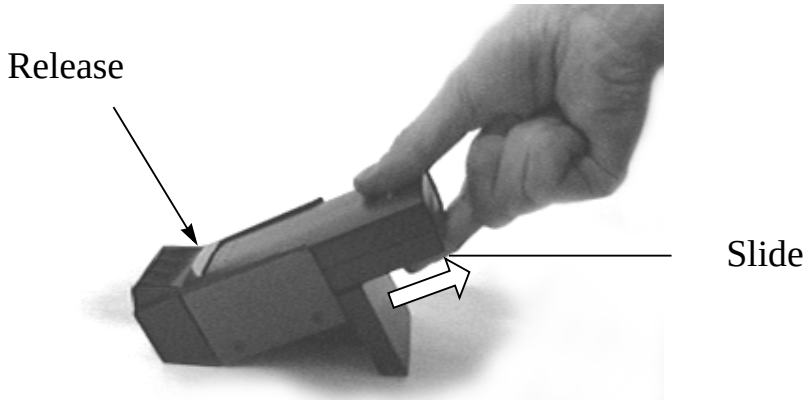
To insert your ***Pocket MultiCom*** into the Docking Station, push your ***Pocket MultiCom*** *firmly* into place, so that the ports are attached to the cable connectors inside the Docking Station:



REMOVING YOUR ***Pocket MultiCom*** 5.3

To extract your ***Pocket MultiCom*** from the Docking Station. simply pull your ***Pocket MultiCom*** out of the Docking Station. This will release the cable connections from the ***Pocket MultiCom***'s ports.

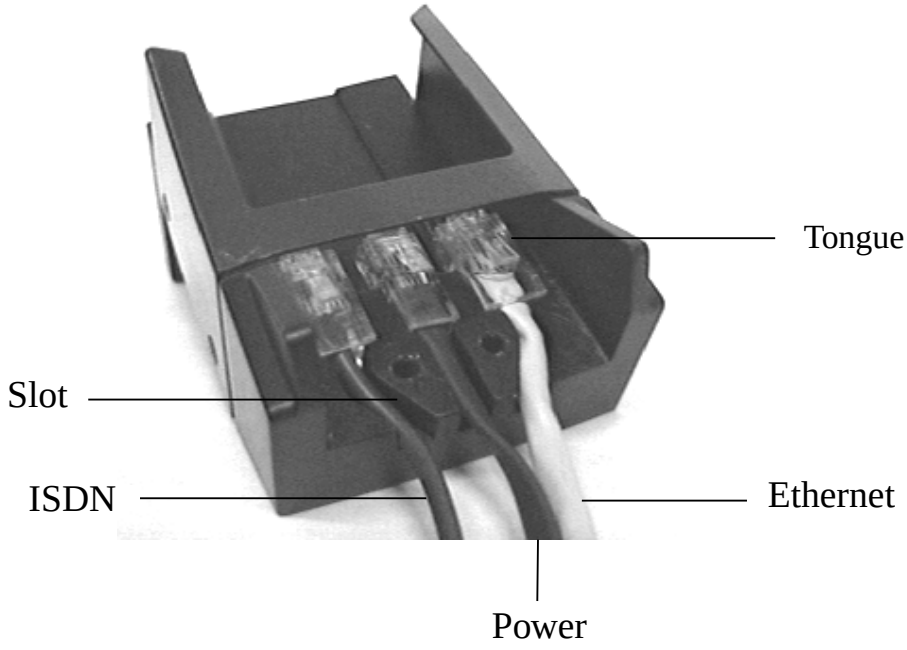
With some models of Docking Station, a simultaneous pressure on top of the blue release mechanism at the base of the Docking Station may be necessary.



NOTE - Do not jerk your ***Pocket MultiCom*** out of the Docking Station. It should slide out freely.

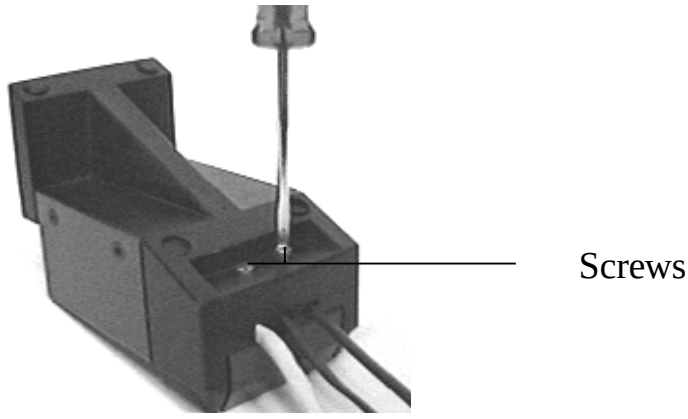
ASSEMBLING THE DOCKING STATION 5.4

Use the following illustration as a guide for fitting the cables into the correct slots.



When inserting the cable through the space, make sure that the tongue of each connector is facing up. Apply pressure to push the connector snugly into place.

Refer to the following illustration to fasten the back of the Docking Station in place. Use a screwdriver to secure the screws:



The cables and the back piece must be securely in place in order to fit your ***Pocket MultiCom*** correctly in the Docking Station.

Chapter 6

Appendix

You will find here the Warranty Registration Card (if you cannot use the on-line registration form) and detailed technical information.

SPECIFICATIONS 6.1

POCKET MULTICOM HARDWARE 6.1.1

Dimensions	12 x 6 x 3 cm
Weight	140 g
Ethernet Connection	IEEE 802.3 10-Base-T, 10 Mbits/s
ISDN Connection	FCC68 (EuroISDN-RJ45); 2 x 64 Kbits/s
Serial Connection	RS-232 (RX/TX only with special cable)
Power Requirements	6 V ⎓, 300 mA
Temperature Ranges	5° to 40° C
Humidity	10% to 85% non-condensing
Noise Level	Noiseless
Approvals	CE 0188 X EuroISDN (NET3) BZT (Germany): Z120863F BAKOM 95.0613.I.N and Swisscom Israel: 7-11151-0-97050 Taiwan: CNP-85-07-AP-04 Japan: T98-5062-0

SERIAL CONFIGURATION 6.1.2

Protocol	Asynchronous RS-232 (RX/TX only)
Baud Rate	9600 bits/s
Number of Data Bits	8
Number of Stop Bits	2
Parity Bit	No parity
Handshake	Software (XON/XOFF)
Line Drivers	RS-232

CONNECTORS PIN ASSIGNMENT 6.2

ETHERNET & CONSOLE 6.2.1

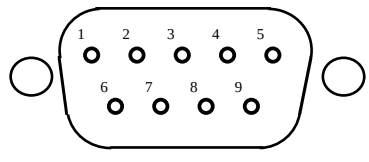
Pin #	Description
1	Ethernet TX+
2	Ethernet TX-
3	Ethernet RX+
4	Console TX
5	Console RX
6	Ethernet RX-
7	(reserved)
8	Console GND

ISDN 6.2.2

Pin #	Description
1	(not connected)
2	(not connected)
3	Tx+
4	Rx+
5	Rx -
6	Tx -
7	(not connected)
8	(not connected)

CONSOLE CABLE 6.2.3

Pin #	Description
2	Console RX
3	Console TX
5	Console GND



DECLARATION OF CONFORMITY 6.3

Conforms to EN45014 of the ISO/IEC

Manufacturer	LIGHTNING Instrumentation S.A.
Address	Avenue des Boveresses 50 CH-1010 Lausanne, Switzerland

declares that the product:

Name of Product	***Pocket MultiCom***
Reference Number	***Pocket MultiCom***

conforms to the following specifications:

Security Norms	IEC 950 / EN 60950, EN41003
EMC	EN 55022 Class B / CISPR-22 Class B EN 50082-1
French ISDN Deltas for VN4	ITAAB: Advisory NoteNumber 054 rev. 1
Commentary information	none

Lausanne, Switzerland
October 1996

WARRANTY REGISTRATION CARD

The user (purchaser) must fill out and return this warranty registration card by post or by fax within 10 days after the purchase date for activating your warranty and/or update or upgrade. Upon receipt of this Registration Card, LIGHTNING Instrumentation SA will register the product in the name of the purchaser.

Registered users will be notified when FREE UPDATES are available.

You can also register on-line at

http://www.lightning.ch/register.html

Name: _____

Job Title: _____

Company Name: _____

Address: _____

Post Code/City: _____ Country: _____

Phone: _____ Fax: _____

E-mail: _____

Product type: Pocket- IP _____ Serial number: LI-MU3-CH- _____

Date of delivery[1]: _____ Supplier[1]: _____

We would like to be kept aware of informations (new products, upgrades) about the ***MultiCom*** product range:

❒ Yes ❒ No

Please send this page (or a copy) by post or fax within 10 days of purchase to:

LIGHTNING Instrumentation SA
Avenue des Boveresses 50
CH-1010 Lausanne
Switzerland

Phone: + 41 21 654-2000
Fax: + 41 21 654-2001
E-mail: info@lightning.ch

1. In case of warranty repair, a proof of purchase with date may additionally be requested.

3) Tape Together here on top only (no staples please)

1) Fill-in completely opposite side (you may also just register on-line or fax)

2) Cut page and Fold in two here

4) stamp appropriately and ship

WARRANTY REGISTRATION

LIGHTNING Instrumentation SA
Sales Department
Avenue des Boveresses 50
CH-1010 Lausanne
Switzerland