SmoothWall Express 2.0

Installation Guide

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1   Introduction

1.1 Welcome

Welcome to SmoothWall and secure Internet connectivity.

SmoothWall Express allows non-technical users to easily build a firewall to securely connect a network of computers to the Internet. Almost any Pentium class PC can be used, even an old low specification PC long redundant as a desktop or server. SmoothWall Express creates a dedicated hardware firewall, offering the facilities and real security associated with hardware devices.

SmoothWall Express supports a wide range of Internet connections, including analogue modems, cable modems, ISDN, ADSL and direct Ethernet. By providing an easy to use installation routine, along with a web browser interface for administrative purposes, installation and configuration are both simple and quick. With features like the embedded SSH client for secure remote administration, the DHCP server, Intrusion Detection and graphical presentation of Internet traffic, SmoothWall Express delivers functionality as well as security.

This manual describes how to install SmoothWall Express and perform the initial setup configuration. Once this is complete the remained of the configuration process is covered in the companion Configuration Guide, augmented by the online help, which is available once the initial installation phase has been completed.

During their development, SmoothWall products have been subjected to exhaustive testing, which has shown no insecurities in a standard SmoothWall system. SmoothWall Express comes pre-configured to stop all incoming traffic that is not the result of an outgoing request. The rules files that implement this policy are part of the system configuration and should not normally be edited by other than the configuration procedure. Should any of the Linux system or configuration files be changed by other than the SmoothWall configuration and installation procedures there is a risk of compromising security, for which the SmoothWall Project Team cannot be held responsible. However we do not discourage people from experimenting with and further developing their SmoothWall system – it is just that we must point out that ill conceived or badly executed changes might compromise the security of the SmoothWall Express system.

1.2 The General Public License (GPL) and Open Source Software

SmoothWall Express is licensed under the General Public Licence (GPL); see www.gnu.org and www.copyleft.org for the full terms and conditions of the licence. All program code written specifically for SmoothWall Express is licensed under the GPL, the copyright to which remains with the original author. All code contributed to SmoothWall Express by SmoothWall Limited, even if previously released as part of their commercial products, is licensed under the GPL, the copyright of the code remaining with SmoothWall Limited.

The CD image file (.iso) by which SmoothWall Express is distributed also contains a large amount of Linux operating system and general purpose code, libraries etc. that was not written specifically for SmoothWall Express. Indeed it is the use of this pre-existing code base that makes the Open Source concept so powerful and enabled the rapid development of the initial SmoothWall firewall. The licensing and copyright of all this non SmoothWall specific code is the responsibility of the original author, ie the person who wrote the code. In general this code is licensed under the GPL or the Lesser GPL (LGPL). In adherence with the terms of the GPL, any changes that have been made to other people's GPL or LGPL licensed code in the creation of SmoothWall Express are published by the SmoothWall Open Source Project Team via the www.smoothwall.org website. All program code specifically written for SmoothWall Express is also available from the website. You can reproduce, modify or distribute any of this code without payment of any royalty or fees – but you are expected to publish any changes that you make so that other may benefit, especially if you distribute your changed code to other people.

Open Source is not Shareware and vice versa. Shareware may be available "free of charge", without royalties or fees but the whole source code of the software is not usually made freely available to you, unlike Open Source. The confusion is a result of the English language having two meanings for the word free, as in free of charge and free as in liberty (free to do what you want).

Your use and installation of SmoothWall Express acknowledges your acceptance of the terms of the General Public Licence (GPL).

You are encouraged to participate in and support the Open Source movement. The Free Software Foundation (FSF) is generally seen as the champion of the Open Source movement and you are encouraged to support their efforts to promote and defend Open Source.

1.3 Registration and Support

The first time you connect to the Internet from your newly installed SmoothWall Express, a registration script will run once only. In a manner similar to the way in which a web site cookie records a small amount of information for future viewing of that particular site, the registration script sends a few key pieces of information about your installation back to SmoothWall Limited. This data enables the development team to gauge the type of platforms on which SmoothWall Express is being deployed and to better judge what features it would be helpful to add to future releases. The information that is sent back is completely devoid of any personal details - it simply contains technical details about the hardware present in your SmoothWall Express system. The following system information is recorded:

- o The date of installation
- o The processor type and speed
- o Interface configuration
- o SmoothWall Express Version
- o The size of hard drive present
- o The amount of memory (RAM) present and

Please note that **none** of this information is sensitive and that all the information is stored securely in our database according to BS5750 and the Data Protection Act requirements. SmoothWall does **not** capture any other user information or any other data secretly or covertly – all information recorded is impersonal. We appreciate your concerns about security and data integrity. If you would like to voluntarily provide any further information to assist the future development of SmoothWall products there is a registration form on the web site that can be used for this purpose.

Support for SmoothWall Express is provided by way of mailing lists and forums accessible for the www.smoothwall.org website. This support is provided on an entirely voluntary basis by members of the SmoothWall Open Source community - nobody is paid to provide support for SmoothWall Express. Thus, the SmoothWall Open Source Project Team cannot be held responsible for the quality, accuracy or timeliness of the information provided by the volunteers who are kind enough to offer their time and knowledge to the benefit of others. For those users, particularly commercial users, who want professional support, we recommend the use of the commercial products of SmoothWall Limited, which are fully supported by both Smoothwall Limited and its world-wide network of Resellers. For further details see SmoothWall Limited's website at: www.smoothwall.net.

The SmoothWall Open Source Project Team would like to welcome you as a user of SmoothWall Express.

1.4 Terminology and Things to Understand before Installing SmoothWall Express

SmoothWall Express supports three interfaces. The first interface that is used to connect to the Internet is often referred to as the RED interface. It is the connection to the un-trusted network, the Internet, the network your user PCs and servers need to be protected from. Many different interface devices are supported, ranging from an analogue "dial-up" modem, through ISDN cards and terminal adapters, ADSL/DSL modems through to an Ethernet interface used to connect to a router (eg ADSL/DSL) or a cable modem. An Ethernet interface would be a Network Interface Card (NIC), sometimes knows as a LAN Card (LAN standing for Local Area Network). Whatever form the RED interface takes, it will present a public IP address to the Internet, one that can potentially be reached from any other computer on the Internet. The Public IP address will be allocated by your Internet Service Provider (ISP) and it will be unique.

For most users, the RED IP address will be a dynamic address, one that changes each time SmoothWall Express connects to the Internet. It will be selected from a range the ISP has available – it will not be allocated to anybody else whilst you are using it. The ISP may use a protocol known as Dynamic Host Configuration Protocol (DHCP) to allocate the IP address. Most ISPs can also provide static IP addresses – these are fixed so that your SmoothWall system will use the same RED IP address each time. This is of advantage for use with Virtual Private Networks (VPN) and for remote management of a SmoothWall system – but for the average small user is of no benefit. Most ISPs charge extra for the provision of static IP addresses. If a static IP address is to be used, more often the case with a router than with a modem, you will need to know this before you can install SmoothWall Express, along with details such as the IP address of the router and the IP addresses of the Domain Name Servers (DNS) servers to be used. Configuration of a dynamic address can be simpler as the ISP will normally pass SmoothWall Express the DNS Server information as part of the connection process.

The second interface is used to connect the local protected network to SmoothWall Express. It is to the local network to which the user PCs and possibly servers will be connected, typically by a hub or network switch. This interface is known as the GREEN interface – it will always be a Network Interface Card (NIC). The GREEN Network will always use a private IP address, one that cannot be directly reached from the Internet. A typical private IP address would be 192.168.0.1 – IP addresses are always expressed as four groups of three digits with a maximum value of 255. If somebody on the Internet tries to contact any IP address starting with 192.168 they will fail as it will not be possible to route traffic to a private address. Don't use an IP address ending in 0 or 255, they can have special meanings. Computers on the Green network can use either a static IP address or one allocated by a DHCP Server (eg SmoothWall Express). The use of DHCP is recommended, it saves having to configure each workstation computer with an IP address, gateway, DNS server information etc. In the case of a Windows PC, checking "Obtain an IP Address Automatically" in the Network Set-Up will cause the PC to send a DHCP request to SmoothWall Express, which will supply the user PC with all the information it needs to connect to the Internet.

The third interface is for the De-Militarized Zone (DMZ), the ORANGE network. If you understand what a DMZ is then you don't really need to be reading this rather elementary stuff. If you don't know what a DMZ is then you almost certainly don't need one. A DMZ is for things like web and email servers that you cannot fully trust as they will be exposed to incoming connections from the Internet. The ORANGE interface will always be a Network Interface Card (NIC).

Before starting the installation process you should know the relevant details for each interface that is to be configured, eg type of NIC or ADSL modem. It the RED interface is to connect to a router then the IP address of the router (which will be SmoothWall Express's gateway to the Internet) and the DNS Server IP addresses will need to be known. For an ISDN card you will need to know the telephone number of the ISDN line to be used as this information is needed during the set-up of the ISDN card.

1.5 Acknowledgements

We acknowledge the work, effort and talent of all those who have contributed to the SmoothWall Open

Source Project. For the latest team list see the www.smoothwall.org website but we would particularly like to thank: Lawrence Manning, Richard Morrell, William Anderson, Steve Hughes, Gordon Allan, Alex Collins, Bob Dunlop, Nigel Fenton, Mathew Frank, Pete Guyan, Toni Kuokkanen, Luc Larochelle, Piere-Yves Paulus, John Payne, Guy Reynolds, Kieran Reynolds, Chris Ross, Hilton Travis, Jez Tucker, Lucien Wells, Adam Wilkinson, Nick Woodruffe, Simon Wood, Dan Cuthbert, Dan Goscomb, Emma Bickley, Paul Tansom, Eric S. Johansson, Alan Hourihane, Rebecca Ward, Bill Ward, Marc Wormgoor.

1.6 Trademark and Copyright Notices

2   The Setup Program

To successfully install and use SmoothWall Express to protect your network it is necessary to have a suitable PC that can be used as a dedicated firewall on which to run SmoothWall Express.

Warning!

Any data stored on the hard drive of the PC on which SmoothWall is to be installed will be **overwritten without checking** as part of the installation, so it is imperative prior to SmoothWall installation to back up any data that is considered valuable. If you do not have a spare PC onto which to install SmoothWall Express, do **NOT** install SmoothWall onto your main or only PC – you **WILL** lose all the data on the hard disk. SmoothWall Limited cannot be held responsible for the loss of your data.

2.1 Requirements

In order to install and operate SmoothWall Express successfully the PC must meet or exceed the following hardware specification:

Processor*:*   All Pentium compatible processors, including Pentium I, II, III, IV, AMD 586 onwards, Cyrix, and IBM. A 150 MHz or faster processor is recommended.

Memory*:*   Minimum 32 Mbytes RAM, ideally 64 Mbytes or more. With less than 64 Mbytes RAM it may not be possible to run all services especially the Web Proxy Server and the Intrusion Detection System. Additional RAM may be needed for optimal performance if the Proxy Cache and Intrusion Detection features are utilised.

Hard disk*:*   An IDE drive of 2 Gigabytes capacity is recommended. It may be possible to operate on as little as 540 Mbytes of disk, although this may present capacity problems with proxy log files etc. Higher capacity disks allow for more and larger log files to be stored; 2 GBytes or more is advised if there are a large number of users behind the SmoothWall Express, as the more users and activity the quicker the proxy log files grow.

CD-ROM: An IDE CD-ROM drive is recommended for ease of installation, as although SmoothWall Express can be installed across a network, the installation is more straightforward when using a local CD-ROM drive. Using a bootable CD-ROM drive makes the installation even simpler. See the Hardware Compatibility List for supported CD-ROM drives.

Video card: Any – required only for initial installation – all subsequent administration is carried out remotely over the network.

Monitor: Any – required only for initial installation – all subsequent administration is carried out remotely over the network.

Keyboard: Any – required only for initial installation – all subsequent administration is carried out remotely over the network. If PC's BIOS allows it to boot without a keyboard present then the keyboard will not be required for regular use of the system.

Mouse: Not required.

Network card: At least one supported network card is needed to connect the SmoothWall Express to the protected local network. If connection to the Internet is via a broadband device such as

a cable modem, Ethernet-presented ADSL, or another Ethernet-presented connection, a second supported network card will be required. See the Hardware Compatibility List for supported network cards.

Modem: If using a dial-up (analogue) connection to the Internet, a supported modem must be present. See the Hardware Compatibility List for supported modems.

ADSL Modem: See the Hardware Compatibility List for USB connected and PCI card ADSL modems that are supported by SmoothWall Express.

ISDN: If connection to the Internet is via ISDN, a supported ISDN card or an external RS232 or USB connected adapter device must be present. See the Hardware Compatibility List for supported ISDN cards.

For ISDN connections, both internal PC cards and external devices are supported. The majority of popular internal ISDN cards are automatically detected and configured by SmoothWall. Analogue modems must be Hayes compatible with an external modem the recommended option. Internal ISA bus modems from the Hardware Compatibility List are supported. Note that internal PCI card software modems, such as WinModems and LinModems are not supported. These software modems dispense with much of the conventional modem circuitry by utilising the PC's main processor and operating system to process the modem data, resulting in performance degradation and compatibility problems.

The exact specification of the PC required depends primarily on the amount of network bandwidth that is to be protected by SmoothWall. For a modem or ISDN connection shared between a small number of computers, a low-end Pentium (eg P70) should be sufficient. To process the network traffic generated by a larger number of users, or to efficiently manage a connection with much greater bandwidth, a faster processor would be advisable, along with more disk capacity and memory.

2.2 Installation Messages and Conventions

SmoothWall Express employs a text based installation procedure so that the software can be installed and run using any type of video card. The installation screens typically display a number of options in a list format. Use the Up/Down arrow keys to move the focus (cursor or highlight) between the listed options. The Tab key will advance the focus to the next screen object, whereas Alt Tab behaves as a back tab. The following buttons are used:

Cancel – Exit this section of the Installation/Setup procedure without saving or activating any changes made. If the Setup program is being run post installation then control will return to the menu screen. If used during the initial installation procedure the Cancel button will terminate the installation and it will be necessary to restart the installation from the beginning.

Done – This configuration of this feature is complete, save and activate changes, return to menu or installation procedure.

Finished – Exit the Setup program having completed all changes.

No – Negative response to a question.

Ok – Confirm selection of the highlighted option, acknowledge a message and proceed to the next screen.

Quit – Abort and exit the Setup/Installation procedure. This may leave an incomplete software installation requiring re-installation of the software.

Yes – Affirmative response to a question.

Pressing the space bar whilst the focus is on a button will cause that button to be clicked. If the **ENTER** (Return) key is pressed whilst the focus is not on a button, the program will act as though the **Ok** button has been pressed. However, if the focus is on a button, that button will be clicked.

2.3 Installation Procedure

For the purposes of this section, it is assumed that the installation of SmoothWall Express will be performed from a bootable CD-ROM, as this will be the case for the majority of installations. Where the installation routine may differ from this it will be noted.

2.3.1 Installation from a bootable CD-ROM

Power on the PC and ensure that the BIOS has been set to give priority to booting from the CD-ROM drive rather than from the hard disk. Please refer to the instruction manual supplied with the PC for details of how to configure the BIOS settings.

Place the SmoothWall Express CD in the CD-ROM drive and reboot the system to allow the installation routine to begin.

Please ignore the next two steps (which relate to installation methods other than from a bootable CD-ROM drive) and refer instead to section 2.3.4 for the next stage of installation.

2.3.2 Installation from a non-bootable CD-ROM

Many early Pentium systems do not support booting from the CD-ROM drive. In this situation, you will have to create a bootable floppy disk from which to start the SmoothWall installation process.

Load the SmoothWall CD into another PC that is already running Windows (95/98/ME/2000/XP). In fact most computers that support a Web browser, including Apple MAC systems, should be OK. The Autorun procedure should cause the following page to be displayed in a browser window.

SmoothWall Express CDROM Autorun Page Display

If this is not automatically displayed then open the CDROM using either **Explorer** or **My Computer** icon from the desktop or the **Start Menu** and then running the **autorun.inf** file by double-clicking it. This will display the **README.htm** file, the output of which is illustrated above.

This HTML menu allows the administrator to explore the CD as well as view the documentation. Be careful not to accidentally boot this PC from the SmoothWall CD and inadvertently start the installation process on the wrong PC. The option we are interested in at the moment is the facility to create the floppy disks necessary for booting the SmoothWall Express PC from floppy disk rather than CDROM. Single click the **create boot disks for install** option - after an initial message about the advisability of reading the README.txt file and the need for two floppy disks, the contents of the CDROM's **/dosutils** directory will be

displayed in a new browser window. Alternatively this can be reached using the **explore cd** option. The **dosutils** directory contains both DOS (rawwrite.exe) and Windows (rawwritewin.exe) programs variants of the **RawWrite** program used to create the two boot floppy disks. The Windows version is the easiest to use, so run the **rawwritewin.exe** program icon in the dosutils directory.

Select the **Write** tab and enter the **Image file** name: **D:\images\bootdiskone-2.0.img**, where D: is the drive letter for the CDROM drive on the PC. Alternatively use the browse button (with the **…** legend) to the right of the **Image file** text box, which will cause a file **Open** (selection) window to be displayed and change to the **/images** directory. The file **\images\bootdiskone-2.0.img** contains an image of the first boot floppy disk and **\images\bootdisktwo-2.0.img** an image of the second floppy disk.
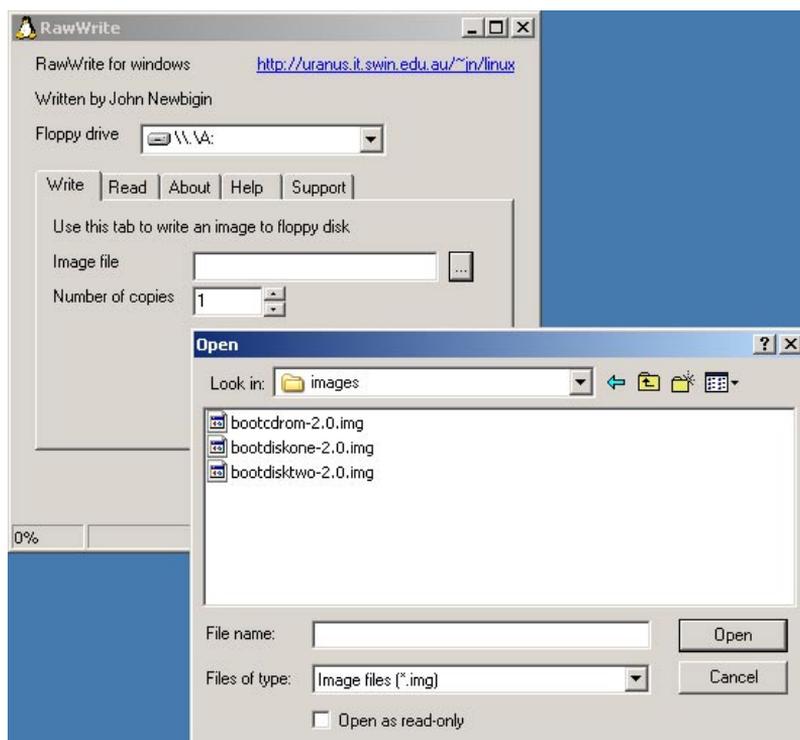
RawWriteWin, with File Selection (Open) window displayed

Load a formatted floppy disk and click the **Write** button to copy the disk image to a floppy disk.
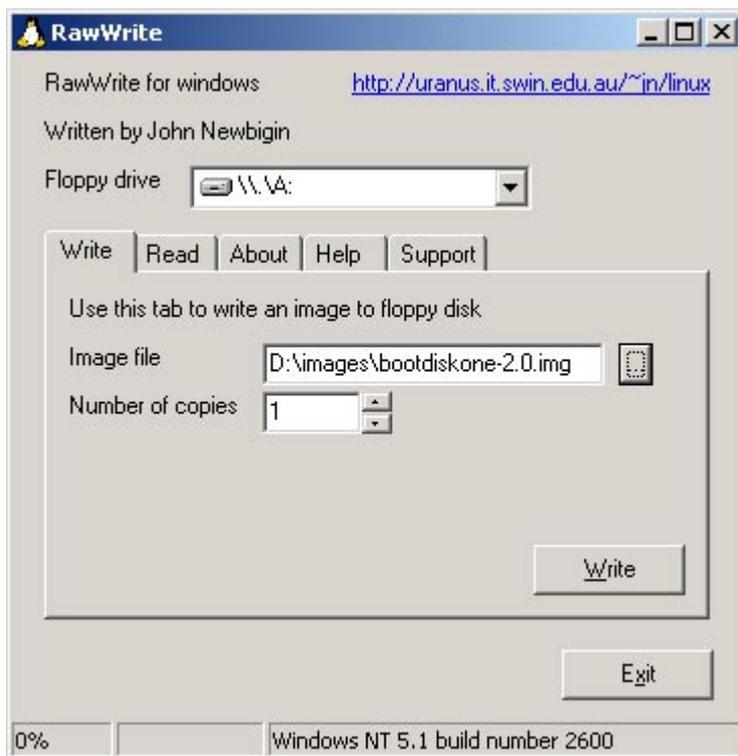
RawWriteWin, create a Linux compatible floppy disk from Microsoft Windows

This program requires the "diskio.dll" file to operate and in rare circumstances it may be necessary to copy the file to either the "\Windows" or "\Windows\System" folder in order for it to be included in the Windows search path. Instructions for use of the DOS program rawrite.exe are included in the README.TXT file in the dosutils directory.

Repeat the process for the second boot floppy disk. This second disk also contains the network card drivers required by the Network Installation procedure (ie where SmoothWall Express is installed from an image held on a web server rather than from CDROM).

For users with any sort of Linux/Unix system that has a CD-ROM fitted, use the following **dd** commands to write the disk images from the mounted SmoothWall CD to blank floppy disks:

dd if=/path/to/mounted/cdrom/images/bootdiskone-2.0.img of=/dev/fd0 bs=1k count=1440

dd if=/path/to/mounted/cdrom/images/bootdisktwo-2.0.img of=/dev/fd0 bs=1k count=1440

Check that the BIOS of the PC on which SmoothWall Express is to be installed is set to boot from floppy disk. If there is an old operating system on the hard disk (which will be overwritten by SmoothWall Express) then the BIOS will have to be set to use the floppy disk as its first boot device. Insert the first of the newly created SmoothWall boot floppy disks (ie the one created from bootdiskone-2.0.img) into the floppy disk drive of the PC on which you are going to install SmoothWall. Boot the system from this first floppy disk – this will boot the system and run the SmoothWall Express Loader program. From the first floppy disk will be loaded the Linux kernel and supporting libraries. Having loaded this operating system software, the loader program will request that the second floppy disk be inserted.

```
                        SMOOTHWALL 2.0

INSTRUCTIONS

You are installing from floppy disk. This method of installation requires
access to the second boot floppy disk to continue.

Insert disk two and press RETURN.
_
```

Loader program requesting insertion disk two

Remove the first boot floppy disk, insert the second disk and press the **ENTER** key. The second disk contains the Installation program and the Network Card drivers. Prior to SmoothWall Express Version 2.0 the Network Card drivers were read from a separate floppy disk.

When the SmoothWall Express Installation Program has finished loading from the second floppy disk, the installation will proceed as described in section 2.3.4.

2.3.3 Network Installation

If the PC on which you are to install SmoothWall does not have a CD-ROM drive, you can perform a network installation from a web server that you have access to. You will have to create a pair of bootable floppy disks from images on the SmoothWall Express CD. These will contain a cut down version of the SmoothWall Express installation program which will subsequently load the drivers necessary to support your particular network card, and will then download and install SmoothWall Express from the location of the web server that you specify. Further details on creating and using these bootable floppy disks are to be found in Section 2.3.2 above and Appendix A.

2.3.4 Booting from the SmoothWall Express CDROM

As the PC boots up from the CD, a welcome screen is displayed with basic information about SmoothWall Express - please read this carefully.

Welcome screen

Press the **ENTER** key to begin the installation process. Refer to the www.smoothwall.org web site for any last minute changes in documentation.

Not all versions of SmoothWall Express support multiple languages, in which case the following language selection screen will be omitted and the language is fixed as English.

Select the language for the installation, which defaults to English. Throughout the installation program use the cursor or Tab keys to move the highlighted selection bar, then either the space bar or **ENTER** key to confirm your selection and move to the next screen.

Selecting the language

After selecting the language you require you will be greeted with the welcome screen.

2.3.5 Select Installation Media

The next screen you will be presented with asks for the location of the SmoothWall Express files. The default setting assumes that you will be installing from a local CDROM drive, although you may not have been able to boot from it originally. For PCs without a CDROM drive the option is provided to perform an installation across the local network. In this case, the contents of the SmoothWall Express CD will have to be copied to a machine on your network that is running a web server.

```
         SmoothWall Express 2.0 -- http://smoothwall.org/

        ┤ Select installation media ├

 SmoothWall Express can be installed from multiple
 sources.  The simplest is to use the machines
 CDROM drive. If the computer lacks a drive, you
 may install via another machine on the LAN which
 has the installation files available via HTTP.

                    CDROM
                    HTTP


        ┌──────┐              ┌──────────┐
        │  Ok  │              │  Cancel  │
        └──────┘              └──────────┘



     <Tab>/<Alt-Tab> between elements  :  <Space> selects
```
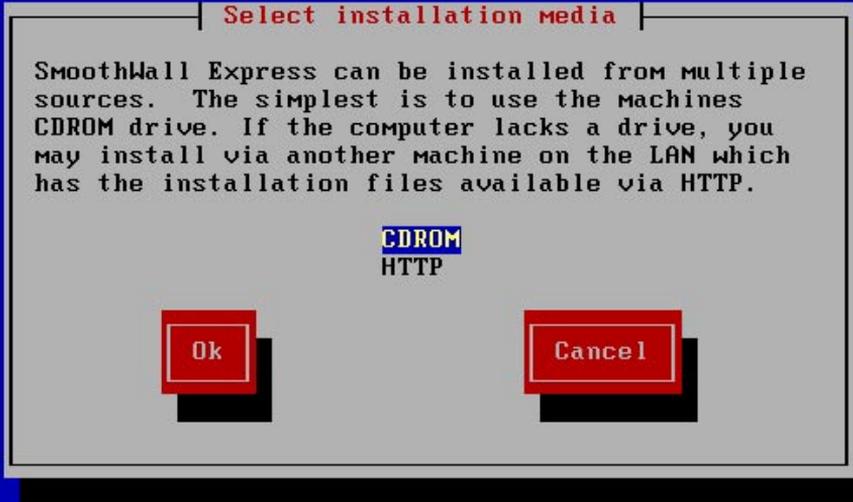
Selecting installation media

If you select CDROM as the installation medium, SmoothWall will first prompt you to insert the SmoothWall Express CD in the CD-ROM drive. If you choose an HTTP (Network) installation, the system will prompt for the local network URL where the smoothwall.tgz file can be found (see Appendix A for more information).

Selecting installation media

2.3.6 Disk Preparation

The initial part of the installation routine prepares the hard disk for the installation of SmoothWall Express. This is a two stage automatic process: first the disk is partitioned (Linux ext3 format), then the individual partitions are formatted. However, before the hard disk is formatted and any existing data on the disk permanently deleted, one last "are you sure" message is displayed.

SmoothWall Express 2.0 -- http://smoothwall.org/

!!! WARNING !!!

You are about to PERMANENTLY ERASE the contents of the harddisk. This will OVERWRITE ALL DATA ON ALL PARTITIONS on your first IDE harddisk. If you would like to continue with the installation of SmoothWall Express, press the Ok button. Otherwise press Cancel to ABORT the installation process. There is NO UNDO FEATURE once this has been done.

Ok   Cancel

\<Tab>/\<Alt-Tab> between elements : \<Space> selects

Selecting installation media

Pressing the **Cancel** button will terminate the installation of SmoothWall Express and no changes will be made to the PC's hard disk, no data will be deleted. If the **Ok** button is pressed then the installation procedure will start formatting the hard disk. This should take no more than minute for a typical modern hard disk (eg 30 GByte). During this process a number of status messages will be displayed, such as Partitioning disk, making boot filesystem, making root filesystem etc.

2.3.7 Basic Network Configuration

The next stage of the installation is to configure the network interface that will connect the SmoothWall Express PC to the local network, ie the network that is considered to be safe and needs to be protected from the Internet. This is often referred to as the 'Green' network and hence it is the SmoothWall Green Interface (or NIC) that connects to the Green network. A Network Interface Card (or NIC) for the local network must always be present, regardless of how SmoothWall is connected to the External network, referred to as the Red interface, usually the Internet.

The External interface is used for connection to an unsafe network. This will typically be a direct Ethernet connection to a router, a DSL/ADSL connection, a cable modem, an ISDN connection or even maybe an analogue modem. SmoothWall Express supports many different configurations to allow for the majority of network configurations and indeed many unusual setups.

At the **Configure networking** screen, clicking the **Probe** button will cause the installation program to automatically probe the SmoothWall PC to determine the type of network card installed, then automatically load and configure the required driver software. In the event that the automatic probing fails to detect your network card (probably because it is an older ISA type), click the **Select** button to manually select the card type from a list. Note that with manual selection of the network card you may have to supply additional information to the installation routine (such as driver name, IO port address and IRQ) – you will be prompted for this where necessary. Refer to the Hardware Compatibility Guide for details specific to your network card.

Auto-probe or manually Select the Local Network Interface Card (NIC) Driver

If your SmoothWall PC has more than one network card, the probe routine will report whichever card it finds first, as shown in the following screen picture.

Select or Skip Network Interface Card (NIC) for Green (Local) Network

If this is not the NIC you wish to allocate to the local network interface (Green), press the **Skip** button to

look for another NIC. If this is the correct NIC, press the **Ok** button. The installer will then display a screen to confirm the type of NIC selected and the MAC (hardware) address of the NIC.

NIC Selected for Green (Local) Network
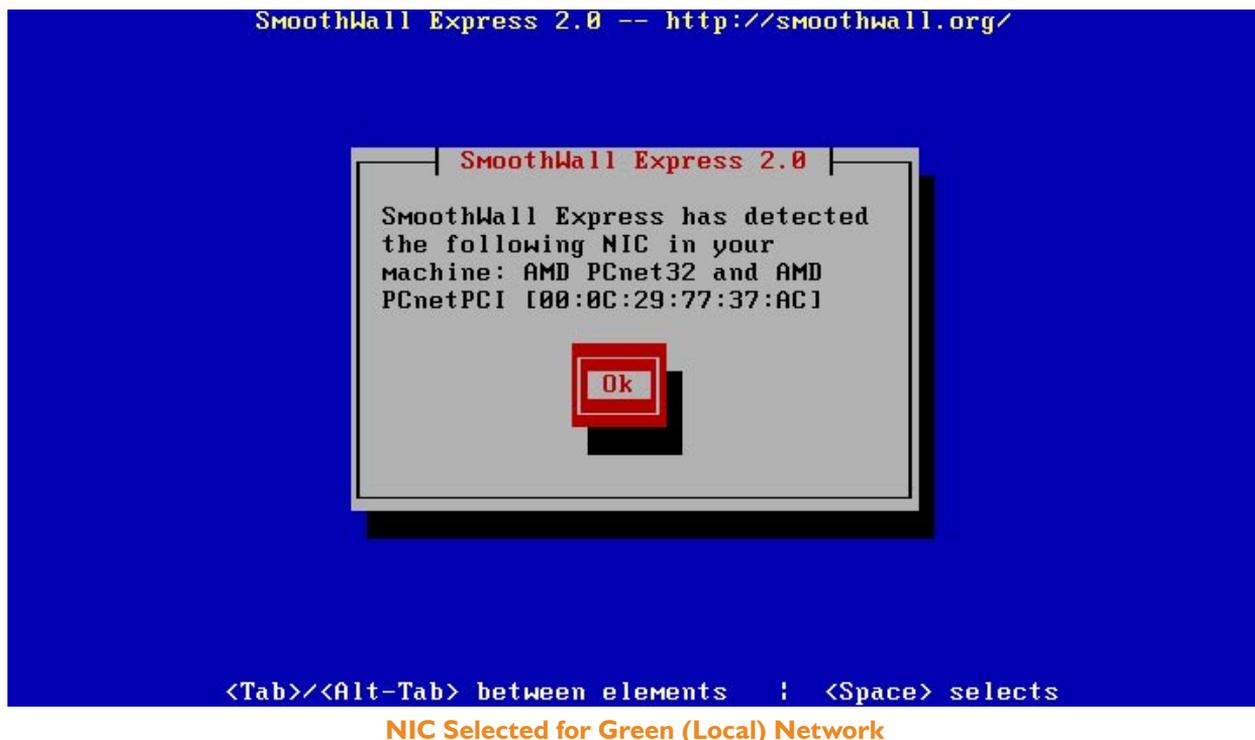
Press the **Ok** button to continue.

Once SmoothWall Express has detected the Local Network NIC, you will be prompted for the **IP address** that SmoothWall should assign it. In you do not already have a TCP/IP network addressing scheme for your network, we suggest you use the default address of 192.168.0.1. IP addresses starting with 192.168 (eg 192.168.0.1, 192.168.123.234) are un-registered (private) IP addresses that are normally used for local (private) networks. The main alternative to using a 192.168 address is to use an IP address starting with 10 (eg 10.0.0.1). The use of any other IP address should be avoided, as you might pick a perfectly valid public IP address that is already in use somewhere in the world – this could cause you problems later even it seemed to initially work OK.

The IP address you select can always be changed later if required. Enter the **Network mask** (often called a Netmask) according to your TCP/IP addressing scheme, or use 255.255.255.0 as the default value. Using the default value of 255.255.255.0 means that SmoothWall will communicate on the local network with computers that have an IP address with the same first three octets as the IP address of the SmoothWall Green NIC. If the default IP address of 192.168.0.1 is used, then a Netmask of 255.255.255.0 would permit IP addresses starting at 192.168.0.2 through to 192.168.0.254 to be used on the local (Green) network. The Netmask mechanism is typically used to select a group (or sub-network) of computers from a large network.

Configuring the Local (Green) Network interface

Once the Local Network NIC has been configured, the installation procedure will copy all the necessary Linux operating system and SmoothWall Express files to the hard disk.
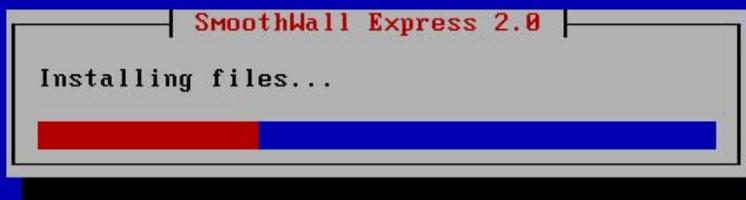
Copying Files

This should take about one minute to complete - upon completion the CD-ROM (if present) will be ejected.

Don't forget to eject the floppy disk if one was used for the installation.

Installation of SmoothWall is complete
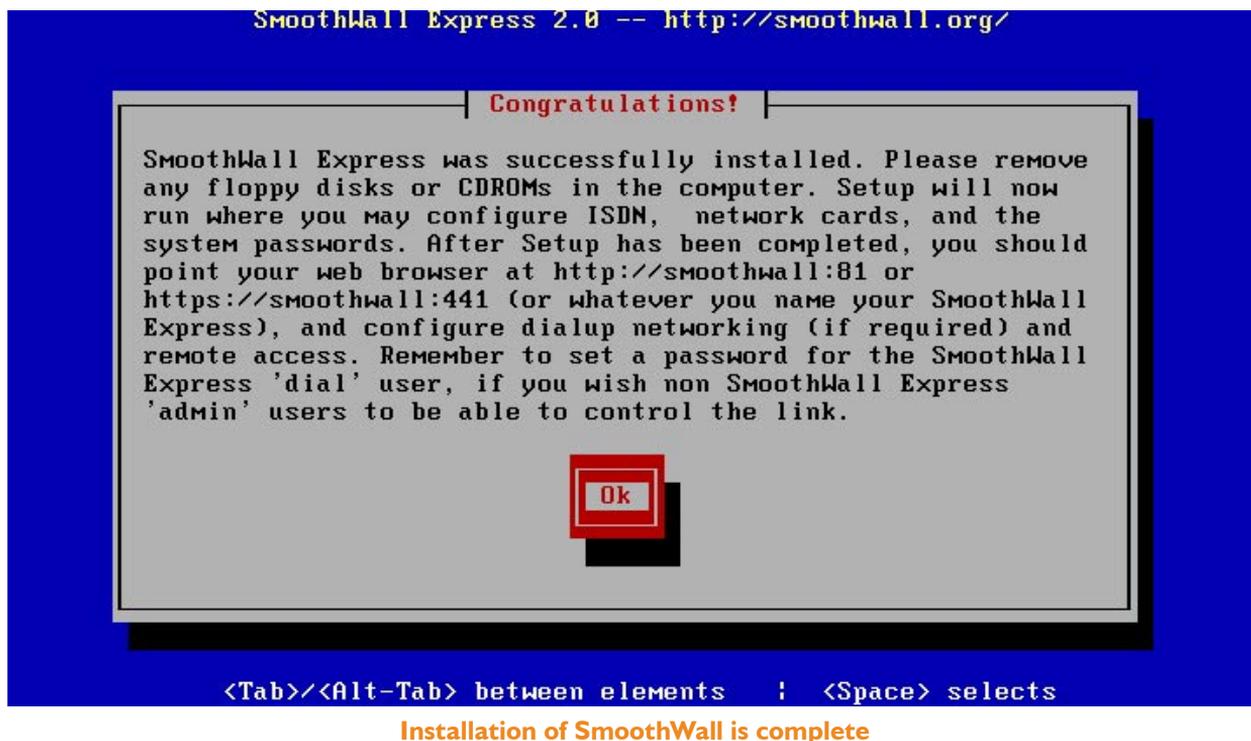
At this point, installation is complete but the system is yet to be configured. The Setup program will now be run.

2.4 The Setup Program

The Setup program is used to complete the configuration of SmoothWall Express and can be used at a later date to change an existing configuration (eg new External Network Interface or change of IP address).

If the setup program is being automatically run straight after the initial software installation the **Section menu** as described in 2.4.2 will not be displayed – the setup program will automatically sequence through each item from the **Section menu** in turn.

2.4.1 Restore Configuration from Backup Floppy Disk

The setup program starts by asking if the system is to be restored from a "backup floppy disk". SmoothWall Express Backup disks are created from the web browser based Configuration and Management GUI.

Restore Configuration Question

If not restoring from a "Backup Floppy Disk" then press the **No** button and the setup program will proceed to the Keyboard Mapping screen (see section 2.4.2).

If the **Yes** option is chosen then the system prompts for a "Backup Floppy Disk" to be inserted.

Insert Backup floppy disk for configuration Restore

Insert the previously created backup disk into the floppy disk drive on the SmoothWall Express PC and press the **Ok** button. Alternatively press the **Cancel** button to terminate the Setup process.

Having inserted the floppy disk and pressed the **OK** button, the Setup program will examine the floppy disk to determine that it contains a valid SmoothWall Express backup. Press the **OK** button to proceed with the restore and overwrite any existing SmoothWall Express configuration. Press the **Cancel** button to quit and not restore from the floppy disk.

Having pressed OK the system will display a "Restoring" message, followed after a few seconds by the following screen.

Restore successfully completed

2.4.2 Section Menu

The main **Section menu** screen of the Setup program is illustrated below. If Setup is being run automatically as part of the Installation procedure, this menu screen is not displayed, as you will be automatically taken through each item of the Setup program. If Setup is being run post Installation, then after having configured an item, control will return to the main **Section menu** screen.
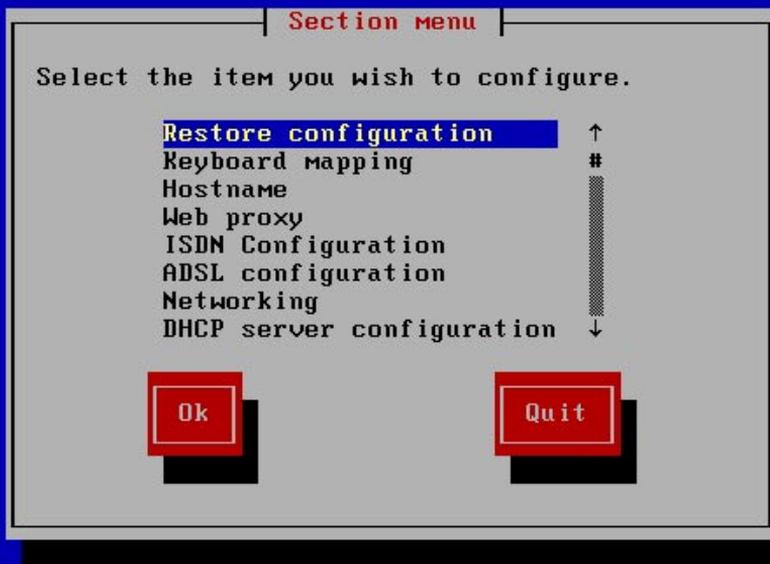
Section Menu

The **Section menu** no longer contains a USB ADSL configuration menu item. This was present in versions of SmoothWall Express prior to Version 2.0 in order to detect the USB controller type present on the SmoothWall Express PC. This is now done automatically by the software and a menu item is no longer necessary.

Use the Up and Down Arrow keys to select the required item and press the **Ok** button to select it and display the appropriate configuration screen. Having configured all necessary items then press the **Finish** button to complete the Setup program.

2.4.3 Keyboard mapping

At this early stage of the configuration process the Setup programs needs to determine the keyboard layout of the console keyboard connected to the SmoothWall Express system PC. This defaults to a British (UK) keyboard.
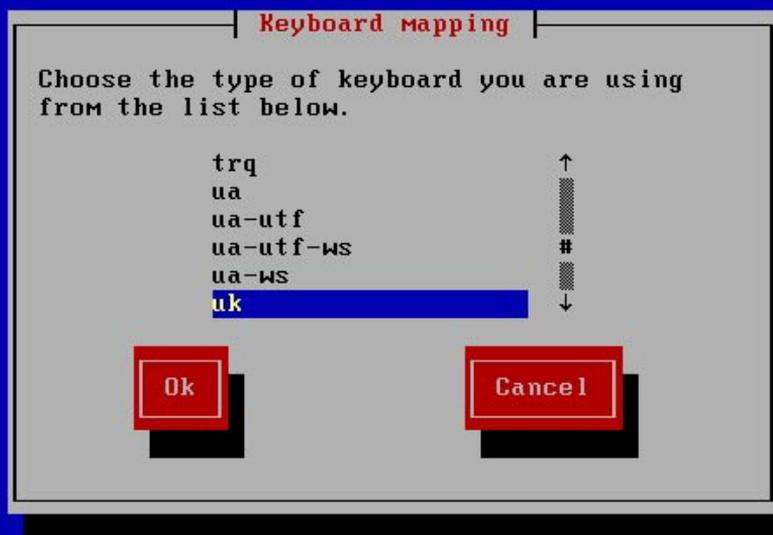
Select the keyboard mapping

2.4.4 Hostname

The facility is provided to allocate SmoothWall Express a Hostname, a 'human compatible' name by which it can be referenced, as an alternative to using IP addresses.

Setting SmoothWall Express's Hostname

Hostnames should normally be lower case alphanumeric, should not start with a numeric, may contain a hyphen '-' and may not contain spaces or any other character including the underscore '_' character. If upper case (capital) letters are used please note that Hostnames are case sensitive, the use of all lowercase characters is recommended. The default Hostname is **smoothwall**.

2.4.5 Web Proxy

Some Internet Service Providers (ISPs) require their customers to connect to the Internet via a Web Proxy Server. This screen allows SmoothWall Express to be configured to use the Proxy Server; otherwise any Internet traffic it generates on its own behalf will fail to reach its destination. This principally affects the Update facility where SmoothWall Express communicates with a SmoothWall web server in order to access details of available and applicable software updates. The majority of ISPs do not use Proxy Servers, in which case this screen is not needed and the data entry fields may be left blank. If your ISP does use a Proxy Server, you should already be aware of the configuration details, otherwise consult your ISP's customer support department.

If you do not know if your ISP uses a Web Proxy Server then leave the information blank and press the **Ok** button. Computers connected to the local (Green) network will still be able to access the Internet; only the Updates mechanism will not work. This information can always be changed later be re-running the Setup program.

This configuration of the name and port of an ISP's Web Proxy Server is nothing to do with SmoothWall Express's own Web Proxy Server, which is separately configured (see the Administrator's Guide).

Web Proxy configuration screen

The **Hostname** field is to contain the name of the Proxy Server. For example, if your ISP was called 'isp.com', then the name of the Proxy Server is likely to be something like 'proxy.isp.com'. You cannot guess the name, check with your ISP if you are uncertain.

The **Port** field is for the IP Port the ISP wants you to communicate with; 80 and 8080 are most commonly used ports.

Having entered the required Web Proxy configuration, or left blank in the case of no web Proxy, press the **Ok** button. If you press **Cance**l during the initial installation of the software the installation process will be terminated.

2.4.6 ISDN Network Configuration

The next stage is to configure any internal ISDN card present in your SmoothWall Express. If Setup is being run post installation, then ISDN cannot be configured whilst there is an active Internet connection (see below).
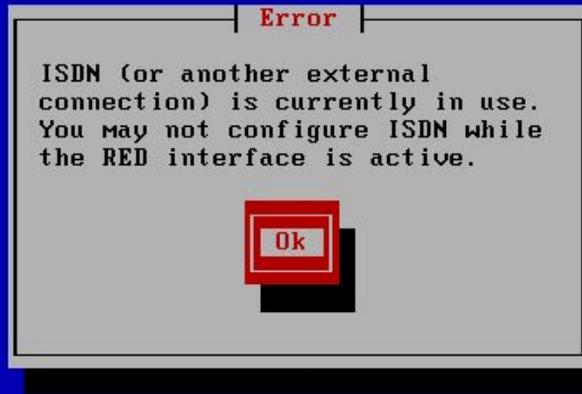
Attempt to configure ISDN whilst active Internet connection

If your connection to the Internet is via a modem or an external ISDN device, you will be able to configure the necessary dial-up PPP settings after installation is complete, using the browser-based interface. This is covered in detail in the companion Administrator's Guide. If you are not using an internal ISDN card, click the **Disable ISDN** button and proceed at section 2.4.7 instead.

```
        SmoothWall Express 2.0 -- http://smoothwall.org/
              ┤ ISDN configuration menu ├

    ISDN is currently Disabled.

       Protocol: UNSET
       Card: UNSET
       Local phone number: UNSET

    Select the item you wish to reconfigure, or
    choose to use the current settings.

          ┌────────────────────────────────────┐
          │Protocol/Country                    │
          │Set additional module parameters    │
          │ISDN card                           │
          │Local phone number (MSN/EAZ)        │

          ┌─────────┐   ┌────────────────┐   ┌──────────────────┐
          │   Ok    │   │  Enable ISDN   │   │   Disable ISDN   │
          └─────────┘   └────────────────┘   └──────────────────┘


    <Tab>/<Alt-Tab> between elements   :   <Space> selects
```

Main ISDN configuration menu

At this menu you can enable or disable ISDN, select the ISDN card that is to be used and configure a number of settings for the ISDN connection.

SmoothWall Express Version 2.0 introduced support for USB connected ISDN adapters such as the adapter integrated into recent BT Highway line termination units. The software automatically detects the SmoothWall Express PC's USB controller type.

Begin by selecting a card – choose the **ISDN card** menu option. This will lead to a screen that allows the selection of an ISDN card. The default selection is **AUTODETECT**, where SmoothWall will probe for an internal ISDN card and automatically load and configure the required software driver. If it is not possible to automatically determine the type of card, select your make and model of ISDN card from the list. Note many ISDN cards are simply re-badged cards from a major manufacturer, thus the auto-detection may report the card as being from a different manufacturer. See the Hardware Compatibility List for further information.

Selection of IDSN card

Setting additional ISDN module parameters

Manually selecting an ISDN card may require you to set a number of configuration parameters; this is especially likely with older ISA cards. In this situation, select the **Set additional module parameters** option from the main ISDN configuration menu. Documentation supplied with the ISDN card may be of assistance. Alternatively, change to one of the many PCI ISDN cards that are supported straight out of

the box by SmoothWall.   Although SmoothWall Express Version 2.0 now supports USB connected ISDN adapters they cannot be automatically probed and must always be manually selected/configured.

Once the ISDN hardware has been successfully detected and configured, the next steps in ISDN configuration are to set the ISDN protocol and country information and the local ISDN telephone number. These are set by the **Protocol/Country** and **Local phone number** options respectively on the main ISDN configuration menu. Note this phone number is not the number that SmoothWall should dial, this is set in the **Dialup** configuration at a later stage via the web browser interface. This **Local phone number** is often set to the ISDN telephone number that SmoothWall is dialling out from. Further information should be found with your ISDN card documentation and ISP/ISDN connection details.

Setting IDSN protocol
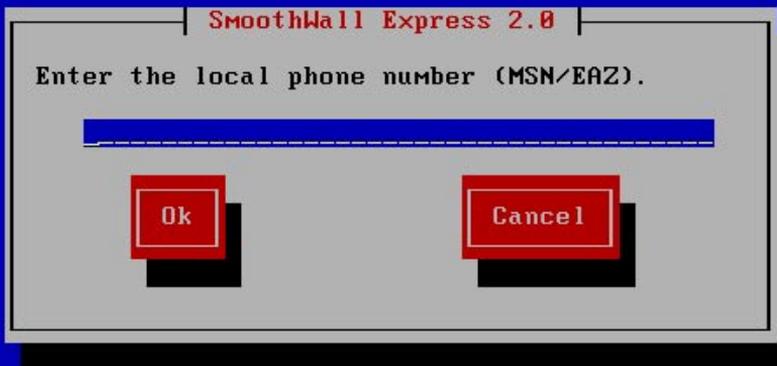
Setting local ISDN telephone number

Once all the details of the ISDN card have been configured, you can enable the ISDN connection by selecting the **Enable ISDN** button from the main ISDN configuration menu screen. After SmoothWall Express enables the appropriate ISDN software, the Setup program will return to its main **Section menu**.

2.4.7 ADSL Configuration

SmoothWall Express Version 2.0 supports support for a wide variety of ADSL modems including the original Alcatel/Thompson Speedtouch USB ADSL modem. If you are not using ADSL modem, or are using an Ethernet connection to an ADSL router, then select the **Disable ADSL** button and proceed at section 2.4.8 instead.

USB ADSL configuration menu

The ADSL configuration menu does not include the facility to detect the USB controller type present on the SmoothWall Express PC – this is now done automatically by the software and a menu item is no longer necessary.

The **Device type** menu item is used to select the make and model of ADSL modem to be used. Select this menu item and press the **Ok** button to be presented with a list of the supported ADSL modems as illustrated below.

ADSL modem selection

Auto-detection of the ADSL modem type is not possible so use the arrow keys to select the type of modem that is in use and press the **Ok** button to confirm the selection. The screen will revert to the **ADSL configuration** menu screen.

The final item in the ADSL configuration menu is the **Other settings** option that is used to set the modem parameters as required by the ISP/TelCo that is providing the ADSL service/telephone line.

Other ADSL settings

The **Other ADSL settings screen** has two text entry boxes for entry of the **VPI** (Virtual Path Identifier) and **VCI** (Virtual Circuit Identifier) required by the ISP. If you do not know what these should be set to, then ask your ISP. Appendix A does contain a brief list of VPI/VCI settings that have been communicated to SmoothWall Limited but we cannot vouch for their accuracy. It seems that VPI is always set to either 0 or 8, VCI is normally set to either 35 or 38. The settings default to the UK standard of 0 and 38. Prior to SmoothWall Express Version 2.0 of SmoothWall Express theses settings were configured in the Networking>PPP profiles page of the browser configuration procedure – however some ADSL modems require these parameters to be configured during installation hence their removal to the Setup program. Change the VPI and VCI as required and press the **Ok** button to record the changes and return to the ADSL configuration menu.

Having completed the ADSL configuration press the **Enable USB ADSL** button, a "Starting up ADSL" pop-up message will be displayed briefly before control returns to the main Setup program **Section menu**.

If ADSL has been configured post installation then it may prove necessary to close and restart the SmoothWall Express system in order for the necessary changes to be activated.

2.4.8 Network Configuration

2.4.8.1 Introduction to Network Configuration

SmoothWall Express supports a number of different network configuration options for its three network interfaces, which are:-

Red – The External (un-trusted) interface, usually the Internet
Green – The Local network (trusted), not visible to the outside world
Orange – The optional De-Militarized Zone (DMZ), for servers visible to the outside world

DMZ stands for De-Militarized Zone, a network normally used for servers that need to be accessible from the Internet, such as Mail and Web Servers. By default, SmoothWall blocks all traffic to hosts and servers behind SmoothWall that originates from the Internet. If external users need to use servers behind SmoothWall, then access to these servers has to be specifically unblocked - see the External Services Access section in the SmoothWall Express Administrators Guide for details. Obviously, the less unblocking that is configured, the more secure the firewall. It is better that such unblocking is limited to the DMZ network, where the information stored is not highly confidential. Keep private and confidential information on servers and hosts within the Local (Green) network that cannot be accessed from the Internet. Do not unblock traffic going from the Internet (Red) to the Local (Green) network, or you are opening a potential hole for hackers.

The default setting is for the Internet (external network) connection to utilise an internal ISDN card or a modem, this being the **GREEN (RED is modem/ISDN)** configuration option, as shown on the **Network configuration menu** screen below. For protecting a small network behind a dial-up modem or ISDN connection, this is all that is required. With this option there will only be one NIC in use. If this is not the required configuration, then select the **Network configuration type** option from the Network configuration menu.

Main Network configuration menu
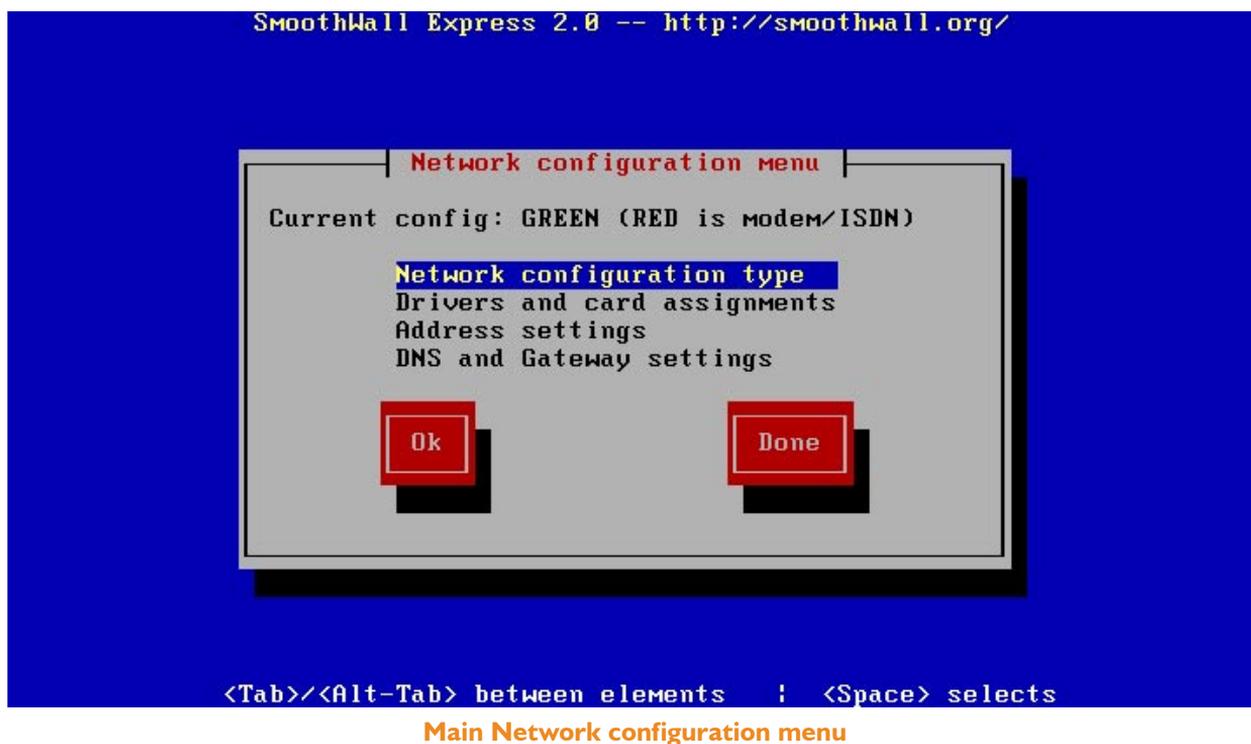
2.4.8.2 Network Configuration Type

This **Network configuration type** screen allows you to select an alternate configuration – for example, if your connection to the Internet is via a router or cable modem, you will have to select the **GREEN + RED** option. If you change the network configuration to include another interface that uses an Ethernet connection via a NIC (and not a modem/ISDN network connection), you must specify the Address settings for the second (or third) NIC.

The four network configuration types are:-

GREEN (RED is modem/ISDN) – Single NIC for local network, Internet via modem or ISDN card
GREEN + ORANGE (RED is modem/ISDN) – As above but with a second NIC for DMZ
GREEN + RED – Two NICs, for the local and external networks (eg Internet via cable modem or router)
GREEN + ORANGE + RED – Three NICs (eg Internet via cable modem or router plus a DMZ)
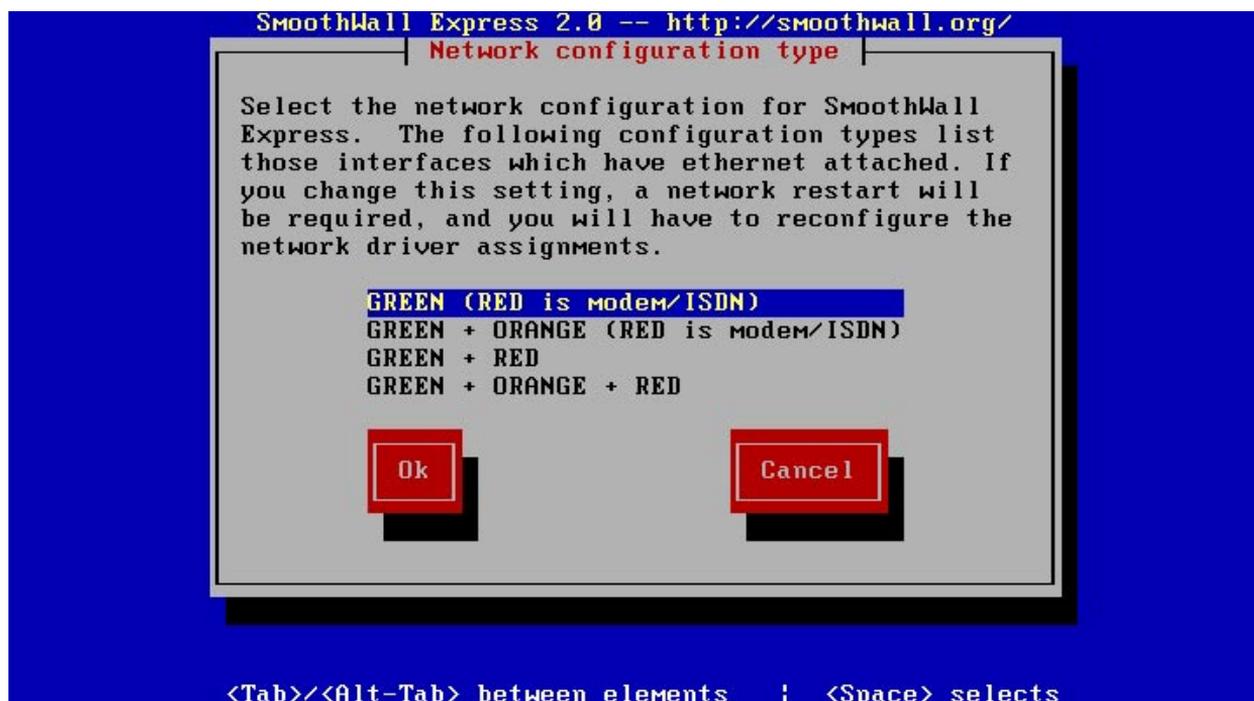
Network type configuration menu

At this stage, select by highlighting the type of network configuration that you want to use and click the
Ok button. If you selected anything other than **GREEN (RED is modem/ISDN),** then you should select
the **Drivers and card assignments** menu option on the main Network configuration menu to assign the
required NIC to the Red (Internet) connection. If you are going to use a DMZ, it will also be necessary to
assign the required (third) NIC to the Orange (DMZ).

The Green interface will have been set to use a particular NIC during the installation process - see section
2.3.7 above. This cannot be re-assigned by the Setup program.

2.4.8.3 Drivers and Card Assignments

Choosing the **Drivers and card assignments** menu option will cause the following screen to be
displayed:

Driver and card assignments

The **Drivers and card assignments** menu option allows you to probe or manually select the NIC for the second and optional third (DMZ) network interfaces. If you wish to change the current settings, select the **Ok** button. This will lead you to a screen where you can detect (or re-detect) any extra NICs, and assign them to the required interface.

Card assignment

By choosing the **Probe** option, an automatic search is made of the hardware in the SmoothWall PC to detect additional network cards. If this fails to detect an unallocated NIC, use the **Select** button to allow a manual selection of network card. Scroll through the list of NICs with the Up and Down Arrow keys and when the correct type of card is highlighted, select the **Ok** button.
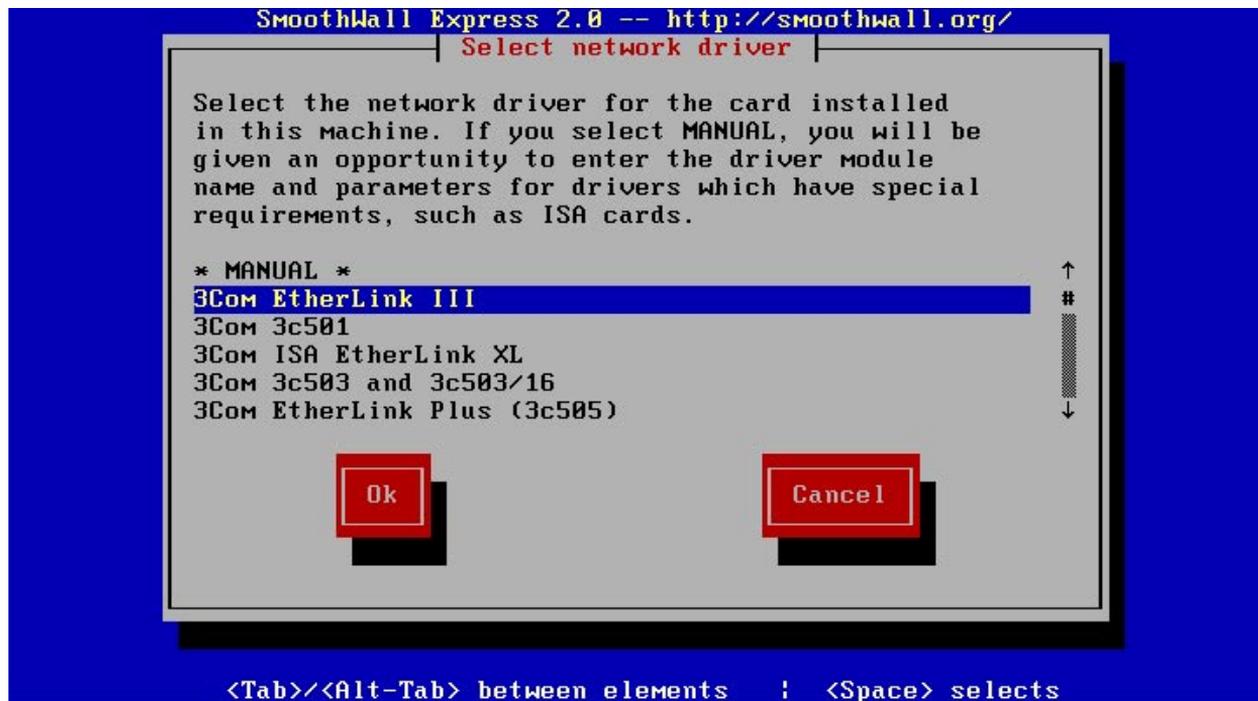
Manual selection of network card driver

The **MANUAL** selection allows you to specify the full driver command line for the network card, including the driver name, Input-Output port, IRQ etc. This option is rarely needed; for example if your network card is not listed or you need to enter some non-standard parameters. In either case, you will need to know the full details of how to configure the driver.

Manual configuration of a NIC's network driver

Example driver command lines for NE2000 type cards are:

>   **ne io=0x300 irq=5**
>   **ne io=0x300,0x340 irq=5,9 (for two cards)**

where the '0x' (Zero and a lower case x) prefix represents a Hexadecimal number.

If the "Failed to Load Module" error message is displayed this may indicate that the driver module is not present on the SmoothWall system. Perhaps more likely are an IO Port/IRQ conflict with another device, or that the network card cannot be accessed at the specified settings (eg IO address or IRQ). See the troubleshooting appendix for further information.

Having automatically detected or manually selected the NICs for the Red and or Orange interfaces, the **Drivers and card assignments screen** will have been updated, as illustrated below.

Updated Driver and card assignments

The Green (Local) interface will already have been assigned as device eth0 during initial installation (see section 2.3.7). The second NIC to be detected or manually selected will be assigned as device eth1, regardless of whether it is used for the Red (External) or Orange (DMZ) network. The third card to be detected will always be device eth3. It is possible to reassign the cards used for the Red and Orange interfaces; simply select **Ok** at the Drivers and Card assignments screen and repeat the probe/manual selection process.

2.4.8.4 Address Settings

Once all network cards have been detected and assigned you can set (or reset) the IP address and network mask for each of the network interfaces. This is accessed from the **Address settings** option in the main network configuration menu. Once you have selected an interface you can then adjust its settings.

In the case of the External (Red) network interface, three types of Ethernet connectivity can be configured. Select **Static** if you want SmoothWall to use a static IP address that has been assigned by your Internet Service Provider (ISP). You cannot make up your own address. The most common option for small networks is **DHCP**, where your ISP dynamically gives you a different IP address each time you connect to the Internet. This is not related to SmoothWall's internal DHCP server, where it provides a dynamic IP address service to computers on the local network. Select **PPPoE** if your ISP uses Point-to-Pont Protocol over Ethernet (PPPoE) to connect you to the Internet. Unlike the other options, using **PPPoE** requires you to "Dial" your ISP to make a connection. This means you will be required to configure a Dialup profile, just as you would do for a modem or ISDN connection.

Configuring the external Red network interface IP information

If the external network interface is set to use DHCP, then the **DHCP Hostname** field is enabled for user input, allowing you to change the hostname entered.

For the external (Red) interface, only if this is set to **Static** (ie use a fixed IP address supplied by your ISP) will the **IP address** and **Network mask** fields be enabled for user entry.

In the case of the Local (Green) and DMZ (Orange) network interfaces, only the **IP address** and **Network mask** fields may be changed, as illustrated below. All interfaces must use a different network address in order for SmoothWall to be able to route packets to the correct network. For example if the IP address of the Local (Green) interface is set to the default of 192.168.0.1 then the Orange (DMZ) should be set to say 192.168.1.1 or perhaps 192.168.10.1, setting the .Orange (DMZ) to anything in the range 192.168.0.2 through to 192.168.0.255 would not work.

Configuring the DMZ (Orange) network interface IP information

Note that if you try to reconfigure the Local (Green) Network interface whilst logged in to SmoothWall Express remotely via SSH, you will be presented with a warning message, for if you should make an error whilst changing the IP settings it might not be possible to reconnect to SmoothWall. It is safer to change the details of the Network interface while logged in to the SmoothWall console, ie its attached screen and keyboard. At least that way you will be able to reconnect to the machine in the event of a problem.

2.4.8.5 DNS and Gateway Settings

Returning to the main network configuration menu, the final option is to select and change the **DNS and gateway settings**. This is only used if the external (Red) interface is configured for either a Static IP Address or PPPoE. It is not applicable if the Red Interface is configured to DHCP; in this case the ISP's DHCP server will supply the DNS and Gateway information automatically. Choosing the **DNS and gateway settings** option will allow you to enter the addresses of your ISP's **Primary DNS** server, **Secondary DNS** server and the **Default gateway** address for reaching them. The gateway address will typically be the IP address of the router that provides the connection between your ISP and SmoothWall. Your ISP will be able to provide the details of their DNS servers.

Setting DNS and gateway information

This completes the network configuration of your SmoothWall Express. Upon leaving the Network Setup screens, the network will be started. For this reason, if you are using an Ethernet connection to the Internet, you should make sure the network cables are all connected so that SmoothWall can test the network.

After changing the network settings, it may prove necessary to close and restart SmoothWall for the necessary changes to become effective.

2.4.9 DHCP Server Configuration

The DHCP (Dynamic Host Configuration Protocol) configuration screen allows you to enable and configure the DHCP server that is built into your SmoothWall Express.

```
        SmoothWall Express 2.0 -- http://smoothwall.org/
                   ┤ DHCP server configuration ├

   Configure the DHCP server by entering the settings
   information.

    [ ] Enabled

    Start address:                    192.168.0.100_____
    End address:                      192.168.0.200_____
    Primary DNS:                      192.168.0.1_____
    Secondary DNS:                    _____
    Default lease (mins):             60_____
    Max lease (mins):                 120_____
    Domain name suffix:               _____


             Ok                           Cancel




      <Tab>/<Alt-Tab> between elements  :  <Space> selects
```

DHCP configuration screen

By far the easiest method of providing a shared Internet connection to a network of machines using TCP/IP is to allow your SmoothWall Express to act as a DHCP server and hence provide all the necessary network information for the client desktop computers on your network. If you wish to use DHCP, then enable it by using the Spacebar to check the **Enabled** checkbox. If DHCP is not enabled during installation, it will be necessary to later configure SmoothWall Express using a PC with a static (fixed) IP address, or utilise a separate DHCP server to provide its IP address. Of course there should normally only be one DHCP Server on a local network, so if another system is providing this function, either disable that system's DHCP Server or do not utilise SmoothWall's DHCP Server.

If you enable DHCP, the remainder of the data entry fields will be enabled for user input.

You need to define a range of IP addresses that can be used by machines on the rest of your network. The **Start address** should contain the first IP address you wish SmoothWall Express to offer to its client PCs. There is no need for the start address to be consecutive with the SmoothWall Express address. The first three parts of the IP address should normally be the same as that of SmoothWall Express, eg 192.168.0 in the above example. The **End address** sets the highest IP address that will be allocated by the DHCP server.

If, for example, SmoothWall Express was configured to use a Local (Green) network IP address of 192.168.0.1, then the **Start address** could be from 192.168.0.2 onwards. However, the default address range suggested by SmoothWall Express is from 192.168.0.100 to 192.168.0.200. This allows addressing space below the DHCP range for computers using fixed IP addresses, such as file and print servers. Obviously, no other computers on the local network should utilise a fixed IP address within the DHCP range specified.

SmoothWall Express also runs a DNS proxy server and can provide a DNS service to all the network clients that connect through it; ie the client PCs and MACs see your SmoothWall Express as their DNS server. Thus **Primary DNS** is defaulted to contain the IP address allocated to SmoothWall Express's Local

(Green) network interface. Alternatively, this could point to another DNS server, such as your ISP's. The **Secondary DNS field** is by default left blank (empty), or it could contain the IP address of a second DNS server.

The **Default lease time** and **Maximum lease time** (in minutes), limit the time that a client PC can retain an IP address provided by the DHCP server. Upon expiry of the lease, the client PC has to re-request a new IP address. For most users, these fields should be left at their default values. The **Domain name suffix** entry allows you to define the domain name that will be given to systems requesting an IP address, although for most small networks this can safely be left blank.

2.4.10 Setting User Passwords

The final stage in the installation of SmoothWall Express is to set passwords for three administrative users. The **'root' password** option allows you to enter a password for the 'root' user, a Unix concept; he who has complete control of the system - in this case your SmoothWall Express. The **'setup' password** option allows you to enter a password for the 'setup' user, who has the ability to change most of the configuration settings after the installation is complete. Both of these are Linux users, whereby you can login to the SmoothWall console or via the Secure Shell (SSH, non-standard Port=222) as either 'root' or 'setup'. Note if you login to the SmoothWall as 'setup', then the Setup program will automatically be invoked.

The **Admin password** option allows you to enter a password for the Administration user. This is not a Linux user and hence you cannot login to the SmoothWall console as "admin". However, it is the "admin" user which is the most frequently used, being the normal user ID for the Web Browser interface, with access to the routine configuration, control and information from the SmoothWall system. There is a fourth user as well, the "Dial" user, who has permission to initiate a dial-up connection to the Internet but nothing else. The password for this user is set and enabled through the browser-based interface by the "admin" user.
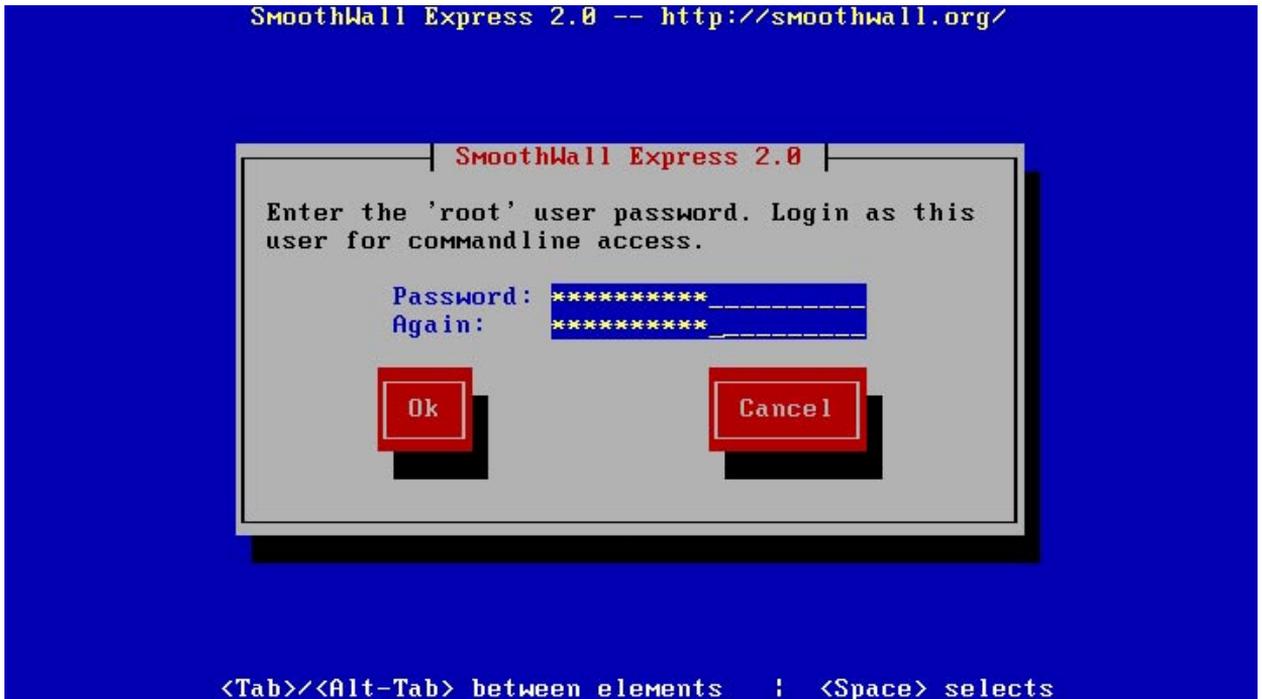
Setting the "root" user password

Note that the administrator password will be the one that is used most frequently – this password

grants access to change all the settings of the SmoothWall Express, monitor the log files and day-to-day maintenance of the system. The administrator also has the ability to change both the dial user and administrator passwords and to start or stop services provided by SmoothWall Express. The root password will only be required if you wish to physically log in to your SmoothWall Express. The 'setup' user will allow you to run the Setup program to make any post-installation configuration changes. All other maintenance and control of the system can be achieved through a web browser with the administrator password.

2.5 Installation Complete

After having set the three main user passwords, the system will display a message that SmoothWall Setup is complete and that the system needs to reboot in order to bring up a live SmoothWall Express. Before confirming the reboot with the **Ok** button, ensure that all necessary network cables are plugged in and that your modem or ISDN card (if present) is connected and ready for use. After the reboot, when SmoothWall has been initialised and is ready for use, you should be presented with a simple Unix/Linux style Login screen. You have now successfully installed SmoothWall Express.

The SmoothWall Express system should now be connected to the Internet. Before any add-on modules or updates/patches can be applied to the system it must first register with SmoothWall Limited's Registration Web Server in London. In the case of an Ethernet connection to the Internet this should be totally automatic. For a system using a dial-up (PPP) connection it will first be necessary to configure the details of the PPP connection (eg phone number, username/password etc.), then manually force it to connect using the Connect button on the SmoothWall Express **Control** page.

A   Appendix A - Alternative SmoothWall Installations

A.1   Network Installation

A.1.1   Creation of bootable floppy disks

A.1.2   Copy SmoothWall files to network server

A.1.3   Installation

A.1 Network installation

In addition to being able to install SmoothWall Express on a PC without a bootable CD-ROM, it is also possible to install SmoothWall onto a PC without a CD-ROM drive at all! In this case, the install files are transferred from a web server running on another machine on the local network.

A.1.1 Creation of bootable floppy disks

As with the installation from a non-bootable local CD-ROM drive, to install SmoothWall Express across a network requires the creation of two boot floppy disks (see Section 2.3.2).

A.1.2 Copy SmoothWall files to network server

In addition to this, you will have to copy the contents of the SmoothWall Express CD to a suitable location on your network. This needs to be a web server that can be reached by the PC on which SmoothWall is to be installed. Copy the smoothwall.tgz file from the root directory of the SmoothWall CD to this network location.

A.1.3 Installation

Check that the BIOS of the PC on which SmoothWall Express is to be installed is set to boot from floppy disk. If there is an old operating system on the hard disk (which will be overwritten by SmoothWall Express) then the BIOS will have to be set to use the floppy disk as its first boot device. Insert the first of the newly created SmoothWall boot floppy disks (ie the one created from bootdiskone-2.0.img) into the floppy disk drive of the PC on which you are going to install SmoothWall. Boot the system from this first floppy disk – this will boot the system and run the SmoothWall Express Loader program. From the first floppy disk will be loaded the Linux kernel and supporting libraries. Having loaded this operating system software, the loader program will request that the second floppy disk be inserted.

Remove the first boot floppy disk, insert the second disk and press the **ENTER** key. The second disk contains the Installation program and the Network Card drivers. Prior to SmoothWall Express Version 2.0 the Network Card drivers were read from a separate floppy disk.

When the SmoothWall Express Installation Program has finished loading from the second floppy disk, the installation will proceed as described in section 2.3.4.

When prompted for the installation medium as detailed in section 2.3.5, select the **HTTP** option to allow downloading of the necessary files from the web server. The system then prompts for the location of where to find the smoothwall.tgz file on the local network (the file that was copied in section A.1.2 above). Enter a URL that contains the location of the file so that it can be downloaded to a temporary location before installation proceeds as if SmoothWall was being installed from a local CD-ROM drive.

Enter URL for network location of smoothwall.tar.gz file

At this point the installation process occurs in the same manner as from a bootable CD-ROM drive, as described in section 2.3.6 and beyond, which should be followed to complete then network installation of SmoothWall Express.

B   Troubleshooting

B.1   Hardware Problems

B.2   Software Problems

This appendix details methods of troubleshooting the installation of your SmoothWall Express. The principal areas to consider are those of hardware support or failure.

B.1 Hardware Problems

If you are having problems getting SmoothWall to recognise the hardware installed in the PC, you may find the following information helpful.

The simplest course of action for any hardware that SmoothWall fails to detect and configure is to simply swap it out for an alternative item. For instance, modern PCI bus hardware is generally easier for all operating systems to detect and configure than ISA hardware.

If you cannot or do not wish to swap the hardware, then it is essential that you know exactly what hardware is present in the PC and how it is configured. One useful tool is Microsoft's diagnostics program MSD, which can be run from a DOS boot floppy disk. Like many other diagnostic programs, this will give you some basic information about the hardware in your machine, such as the type of video card, serial ports, network cards, size of hard disk, IRQ usage etc. The PC BIOS may also be able report the IRQ usage. Once you have determined the details of the hardware present in the SmoothWall PC, you will be able to check that it is supported by reference to the Hardware Compatibility List.

PCI LAN cards (NICs) are generally to be recommended for use with SmoothWall, especially if multiple NICs are being installed. SmoothWall will reliably auto detect most PCI LAN cards, which are automatically assigned their Input-Output (IO) Port Address and Interrupt Request (IRQ) settings by the PC's BIOS. This automatic configuration will avoid IO and IRQ conflicts with other cards and devices in the PC. However, if automatic configuration appears to fail, then try disabling Plug and Play mode on the LAN card. Inexpensive cards such as those with the Realtek chipset should be fine with SmoothWall. Finally, PCI cards normally offer a greater throughput than do ISA cards.

ISA LAN cards (NICs) need their IO Port and IRQ to be manually configured, either by jumpers on the circuit board, or by the use of a Setup / Diagnostics program (often a DOS program). Ensure the card is correctly configured, either by checking jumpers or by running the card manufacturer's Setup program as appropriate. Both the IO Address and IRQ must not conflict with those used by any other cards or PC components. Many older LAN cards default to use IRQ3, which is normally used by the COM2 communications port. If this is the case and COM2 is not in use, it is normally possible to disable COM2 in the PCs BIOS Setup routine; otherwise it will be necessary to reconfigure the LAN card to use another IRQ. The safest IRQ to use for an ISA card is normally IRQ5; the default assignment is a second parallel printer port, which few PCs have fitted. Alternatively, try IRQ10 or 11, which have no default assignment, or 12, which may be used by a bus mouse. However, not all LAN cards can be configured to use IRQs higher than 7. IO addresses usually represent less of a problem, as there are many more available IO addresses than IRQs.

Many older LAN cards cannot be automatically detected and certainly cannot be automatically configured by SmoothWall. Old Novell NE2000 ISA style cards can normally be detected by SmoothWall but it is impossible to determine what IO addresses and IRQ they are set to use. Such cards have to be manually configured (see section 2.4.8.3).

As with LAN cards, modems need their own dedicated IO port and IRQ. External modems, which are the preferred option for use with SmoothWall, will normally be connected to the PCs COM1 or COM2 port. Internal ISA modems will normally be configured by jumpers - again, check for IO address and IRQ conflicts, disable, remove or reconfigure to avoid conflicts.

If problems are experienced in detecting or configuring LAN cards (NICs), try to free up some IO Ports and IRQs by disabling all devices on the PC that are not actually needed by SmoothWall, such as COM

and printer ports. With a few PCs it may be necessary to disable the BIOS's Plug-and-Play facility in order for SmoothWall to detect your hardware. Also, check the BIOS configuration for potential problems, look for things like fixed PCI slot allocation to specific cards or for features that have been either enabled or disabled. For instance, if using an internal ISA modem, it will frequently be necessary to disable one or both of the PCs on board COM ports in order to avoid IO address or IRQ conflicts. It may be necessary to experiment with the BIOS settings. In very rare instances, the PCI bus controller on the PC mainboard might upset the hardware detection logic, in which case, PCI cards must either be manually configured or only ISA bus cards used.

Most hardware failures will be detected and reported by SmoothWall, eg failure to partition the hard disk due to disk errors.

In the event of disk or CDROM problems, check that all cables are correctly installed and that the drive/CDROM activity LED's are not constantly lit, which would indicate that its cable is inserted the wrong way round. Try alternative IDE cables, as some modern Ultra-IDE drives require higher specification cables than older types. Try temporarily removing cards and devices to try and identify the source of conflicts. Try another disk, CDROM, network card if you have one available.

If your hardware is listed as compatible with SmoothWall, yet after following all the above advice you still cannot get SmoothWall to work with the hardware, it is likely that you have a serious problem with your PC hardware. SmoothWall has been tested on a very wide variety of hardware combinations and there are very few hardware problems that cannot be solved by swapping the suspect device for an alternative.

Further information is available from the www.smoothwall.org web site.

B.2 Software Problems

With a network installation, it is always wise to check that the SmoothWall PC is visible on the network before trying to download software to it. Immediately before entering the URL of where the SmoothWall tarball file is located, go to another computer, preferably the web server with the SmoothWall tarball, and PING the SmoothWall PC. Remember, SmoothWall's IP address and network drivers have already been installed at this time. Failure to get a PING echo would indicate there is either a network connection problem - check cables and hubs etc., or that SmoothWall's IP address has not been entered correctly or is not on the same Subnet as the web server. If the URL is entered without first checking network connectivity, then it is likely there will be a long time out, in the order of five-minutes, before the error is reported.

C   Hardware Compatibility Guide

The SmoothWall installation and configuration software will automatically detect and configure the vast majority of common PC hardware. However, with older hardware there is often no reliable detection and configuration mechanism. In the event that the installer cannot correctly detect or automatically configure your hardware, you may have to enter some configuration details manually - see the Troubleshooting Appendix for further details.

We recommend you check the Hardware Compatibility List at: http://ww.smoothwall.org/support/hcl/ to check that your hardware is compatible with SmoothWall. We welcome feedback on all aspects of our software, including details of any hardware that you have found works with SmoothWall but is not included in this list; please email details to hcl@smoothwall.net.

CD-ROM drives

SmoothWall Express supports all ATAPI IDE CD-ROM drives, including CD writers CD rewriters and DVD drives. This accounts for the virtually all CD-ROM drives available today. Old CD-ROM drives that are connected to a sound card are not supported by SmoothWall Express.

Network/LAN cards (NICs)

SmoothWall Express supports a vast range of Ethernet network cards from a wide variety of manufacturers, as detailed in the Hardware Compatibility List. USB and PCMIA Ethernet cards are not supported. Note that a network card that claims compatibility with any of the supported cards is also likely to be supported – the prime example of these are cheaper network cards that are NE2000 compatible, or those that use one of the popular Realtek chipsets.

If your network card is an older model and has an ISA interface, you may well find that network configuration is more complex than with more modern PCI network cards. To configure SmoothWall Express to work correctly with these older ISA cards, you may be requested for additional information on some of the details of the configuration of the network card. How much information is required depends heavily on the type of card and manufacturer, as for some cards it is possible to determine nearly all the correct settings automatically.

The SmoothWall Express installation program will attempt to automatically determine the type of network card and then configure it, but may then prompt for additional information. To make the installation more straightforward, it is advisable to ensure that you have details of the configuration of any such network card available. To obtain these details, you may have to get involved in such tasks as physically setting jumpers on the network card, having to disable plug and play support in the BIOS, setting the values of IRQs, or even downloading DOS-based configuration tools from the appropriate manufacturer's web site. If obtaining this information is beyond your technical ability, it is advised that you make use of PCI network cards instead, as the vast majority of these can be automatically detected without requiring any additional user input whatsoever.

The Hardware Compatibility List includes both the most common name for a network card and alternative names for compatible cards. In addition, we have listed the name of the driver that is used to support each card, which you may be prompted for, along with values for the appropriate driver parameters that may also need to be included.

The driver parameters take one of a number of forms – the network card's I/O memory address (io=), the IRQ that the card uses (irq=) and, very occasionally, other parameters. When more than one parameter value is required, separate them with a space. Note that the value associated with the I/O (or other memory addresses) is typically given in hexadecimal format with a prefix 0x. For example, a NE2000 clone ISA

card may be set to use an I/O address of 300h (the h is to denote hexadecimal) and IRQ 5. Thus, the driver parameters required for this card would be ne io=0x300 irq=5, according to the table for NE2000 ISA cards.

Modem/IDSN/broadband connectivity devices:

SmoothWall Express supports both external and internal ISDN devices. Any external ISDN device that connects via a serial port will be supported, providing it uses Hayes AT command set and the manufacturer specified Initialisation string can be configured into SmoothWall's Dialup settings. The list of Internal ISDN cards supported by SmoothWall Express can be obtained from the Hardware Compatibility List on the www.smoothwall.org website.

Analogue modems

SmoothWall Express supports most analogue external and internal ISA bus modems that are compatible with the Hayes AT command set. Software modems such as WinModems, LinModems and PCI bus Plug and Play modems are not supported. USB connected devices and PCMIA modems are also not supported.

In addition, broadband connectivity hardware is supported for any device that offers connection via a regular Ethernet cable plugged into a common (and supported) network card. This includes such Internet connection methods as cable modems, leased lines, or ADSL that is presented via an Ethernet connection. Additionally, PPPoE (PPP over Ethernet) is supported.

USB

SmoothWall Express supports the UHCI and OHCI (OPTI) chipsets, with OPTI being the recommended choice. Most PC motherboards from Pentium P166 onwards normally include USB support. PCI USB cards should also work, providing the PC's BIOS can detect the card, which in turn is required by Linux for card detection. Such a problem would also affect Microsoft Windows™. We are informed that Belkin USB cards work reliably. Be aware that some motherboard USB ports do not appear able to reliably meet the power requirements of USB ADSL modems, in which case the substitution of a PCI USB card may be called for.

D   ADSL VPI / VCI Settings

The following table lists ADSL settings known to SmoothWall Limited. This is not an exhaustive list. Your ISP or ADSL equipment supplier should be able to supply this information

Country and ADSL Provider	ISP's Service Name	VPI	VCI	Connection Type
Belgium – Belgacom	Turboline Go / Plus	8	35	PPPoA
Belgium – Belgacom	Turboline Office	8	35	IPoA
China – Shanghai Telecom		8	81	PPPoE
UK – BT	BT Openworld	0	38	PPPoA
France – France Telecom	(All services)	8	35	PPPoA
France – France Telecom	Older Installations	8	67	PPPoA or PPPoE
Netherlands - KPN	MXSTREAM	8	48	PPPoA
Denmark – TeleDanmark	Tiscali (World Online)	0	35	PPPoA
Denmark – TeleDanmark	CyberCity	0	35	PPPoA
Spain – Telefonica	TERRA	8	32	IPoA
Spain / Telefonica	Retevision	8	35	PPPoA
Spain – Telefonica	Eresmas	8	35	PPPoA
Spain – Telefonica	Ola Internet	0	35	PPPoA
Spain – Telefonica	Colt Telecom	0	35	PPPoA
USA Bell South		8	35	