

Smoothwall Express 3.1 Installation Guide

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express 3.1

Smoothwall Express 3.1 Installation Guide

Smoothwall Limited and the Smoothwall Express Team

July 2014

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Welcome to Smoothwall Express

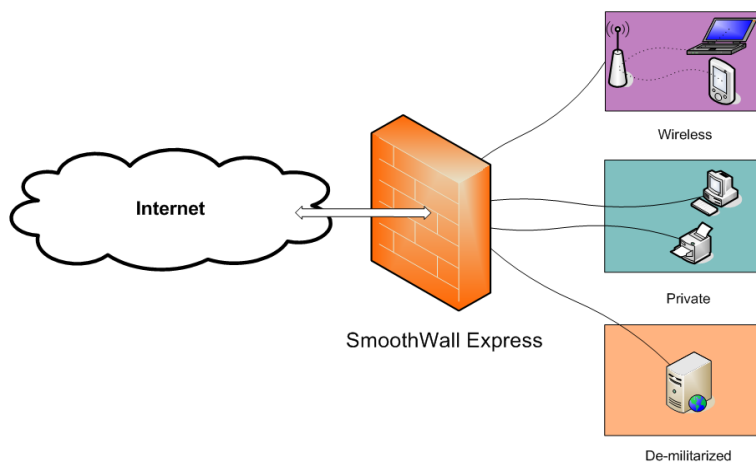
In this chapter:

- Smoothwall Express overview
- Documentation details and who should read them
- System and hardware information
- GNU GPL, registration and support information.

Welcome

Welcome to Smoothwall Express and secure Internet connectivity.

Smoothwall Express is an open source firewall distribution based on the GNU/Linux operating system. Designed for ease of use, Smoothwall Express is configured via a web-based GUI and requires absolutely no knowledge of Linux to install or use.



Smoothwall Express enables you to easily build a firewall that securely connects a network of computers to the Internet.

Almost any Pentium-class PC can be used to build a Smoothwall Express firewall; for example, an old

low specification PC long obsolete for use as a workstation or server may be a good candidate for deployment. Smoothwall Express provides a dedicated and robust hardware/software firewall platform comprised of a strong and secure firewall, excellent security and a rich menu of applications for administration, management, monitoring and control of internal private and public facing networks.

Smoothwall Express comes pre-configured to stop all incoming traffic that is not the result of an outgoing request. The rules that implement this policy are part of the system configuration and should not normally be edited by any process other than the Smoothwall Express configuration procedure.

Note If any of the Linux system or configuration files are changed by other than the Smoothwall Express configuration and installation procedures, there is a risk of compromising security, for which the Smoothwall Express Project Team will not be held responsible.

However, we encourage people to experiment with and further develop their Smoothwall Express; but we must point out that ill-conceived or badly executed changes might compromise the security of the Smoothwall Express system.

Who should read this guide?

Anyone installing and managing Smoothwall Express should read this guide.

Other documentation and user information

<https://my.smoothwall.org/> – here you can create a my.Smoothwall profile, access more documentation and sign up for newsletters and more information.

<http://www.smoothwall.org/> – this is the home of the Smoothwall Express community, containing the collective wisdom of hundreds of Smoothwall Express experts in forums, FAQs and IRC channels. The smart administrator/user will search the Smoothwall Express forum for discussions similar to problems that he/she may encounter. Often a quick search will reveal a solution that was discovered and documented by other members of the Smoothwall Express community.

System and hardware specifications

Note: Requirements may vary depending on traffic throughput and processing requirements, which themselves vary according to the number and size of protected networks.

System/hardware	Minimum requirements/recommendations	
Processor	Intel Pentium 200 Or Compatible Processors. SMP systems are supported. <i>A more modern multi-core CPU is recommend for systems that will support high levels of traffic and run applications like ClamAV antivirus, Snort intrusion detection and/or Squid web proxy.</i>	
Memory	128 Megabytes Of Ram. More RAM is required for memory-intensive applications like ClamAV and Snort.	
Storage	Hard disk drive with a minimum capacity of 2 gigabytes; IDE, SATA and SCSI devices are supported. <i>The most common hardware RAID systems should be supported, but are untested.</i>	
Network interface cards	A minimum of one supported network interface card (NIC). If the connection to the Internet is via a broadband device such as a cable modem, ethernet-presented ADSL, or another ethernet-presented connection, you will need a second NIC. You can use up to four NICs (one for each firewall zone). <i>USB network access devices (NAD) are supported, but are not recommended for high traffic systems.</i>	
Keyboard	If the system BIOS supports boot without keyboard, then a keyboard is only required to install Smoothwall Express.	
Video card	Only required to install Smoothwall Express.	
Monitor	Only required to install Smoothwall Express. <i>The Advanced Installer enables the use of a serial port as the system console.</i>	
CD-ROM/DVD	Only required to install Smoothwall Express. <i>The Advanced Installer enables booting and installing from hot-pluggable drives such as a properly configured USB thumb drive.</i>	
Floppy drive	Recommended for upgrading from previous Smoothwall Express versions prior to version 3.1.	
Internet connection type	Cable/DSL/Direct Connection	a suitable NIC is required.
	ADSL	a supported PCI or USB modem is required. <i>This excludes modems that present a NIC to the host.</i>
	ISDN	a supported ISDN card or external EIA-232 or USB connected adapter is required.
	Modem	a modem, a supported EIA-232, ISA or PCI modem is required.

Table 1: Minimum and recommended hardware requirements

About registration

The first time you connect to the Internet from your newly installed Smoothwall Express, a registration script runs 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 which features would be helpful additions to future releases.

The following system information is recorded:

- Date of installation
- Processor type and speed
- Interface configuration (RED, GREEN, ORANGE, and/or PURPLE)
- Smoothwall Express Version
- Hard drive size
- The amount of memory (RAM) present
- A list of PCI and USB devices installed.

Note Please be assured that none of the information collected is personal or business sensitive. All information is stored securely in the Smoothwall Limited database according to BS5750 and the Data Protection Act requirements.

Smoothwall Limited does not capture any user information or any other data secretly or covertly; no personal data of any sort is collected. Smoothwall Limited and the Smoothwall Express Team appreciate your concerns about security and data integrity.

If you wish to voluntarily provide any additional information to assist the future development of Smoothwall Express, there is a registration form on the web site that can be used for this purpose.

GPL and open source software

Smoothwall Express is licensed under the GNU General Public License (GPL); see <http://www.gnu.org/> for the full terms and conditions of the license.

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 preexisting code base that makes the open source concept so powerful and enabled the rapid development of the initial Smoothwall Express firewall.

The licence and copyright of code that is not specific to Smoothwall Express is the responsibility of the original author, i.e. 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 Express open source project team via the <http://www.smoothwall.org/> web site. All program code specifically written for Smoothwall Express is also available from the web site.

You can reproduce, modify or distribute any of this code without payment of any royalty or fees. However, *if you distribute your changed code to other people*, then in accordance with the GNU GPL, you must make your changes available so that other may benefit.

Open source is not shareware and vice versa. Shareware may be available ‘free of charge,’ without royalties or fees but unlike open source, the whole source code of the software is rarely made freely available to users. 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 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.

Need some help?

Support for Smoothwall Express is provided by way of mailing lists and forums accessible by visiting: <http://community.smoothwall.org/>.

This support is provided entirely by volunteers from the Smoothwall Express open source community. There is no paid support service for Smoothwall Express. Since all support is provided by volunteers from the Smoothwall community, the Smoothwall Express open source project team shall not be held responsible for the quality, accuracy or timeliness of the information provided.

For users—particularly commercial users—who want professional support, we recommend the use of Smoothwall Limited commercial products which are fully supported by both Smoothwall Limited and its world-wide network of resellers. For further details see the Smoothwall Limited web site at: <http://www.smoothwall.net/>.

Need some help?

**Smoothwall Express
Installation Guide**

CD/DVD Features

In this chapter:

- Explore other boot options
- View terse help for the boot options

Much of the information in this chapter is rather technical in nature; it is intended to help users with non-mainstream hardware and those users who wish to install optional software. Most users can skip to the next chapter.

ISO-9660 versions available

Three versions of ISOs are available. The development ISO contains the product, development and documentation (man page) tarballs. The plain ISO does not contain the development or documentation tarballs. The Offroad ISO contains none of the three tarballs. In a change from previous versions of Smoothwall Express, the basic installer does not install the development or documentation tarballs; only the advanced installer provides the option to install them.

The OffRoad ISO is a special version of the ISOs. It contains only the kernel and initramfs; all three tarballs are omitted. The install options are removed from the grub menus to reflect that Smoothwall Express cannot be installed with it. This ISO is provided as a convenient way to determine if Smoothwall supports your hardware (chipset, NICs, IDE/(e)SATA/SCSI/other disk interfaces, etc.) A 32MiB ISO is easier and quicker to download than a 200 to 350 MiB ISO if you just want to see if your hardware is supported, especially on a slow DSL, ISDN or dialup link.

Be aware that exploring the hardware is a command line operation only. There is no single tool that shows all hardware and associated drivers found, if any. If disk drives—be they optical, rotating read/write, solid state, flash, USB, (e)SATA or other—are found, there will be evidence of them in `/sys/class/block/`. If network interfaces are found—be they PCI, PCIE, ISA, Firewire, USB, or other—are found, evidence of them will be found in `/sys/class/net/`.

Note The basic installer only installs the basic firewall system. You must use the advanced installer if you wish to install the development and documentation tarballs during system installation. But you *can* install either or both of them after install via the command line if you have the install medium or have placed a copy of the development ISO on your firewall's hard drive.

Another departure from previous versions of Smoothwall Express is that the syslinux/isolinux bootloaders have been retired; LILO was retired with Smoothwall Express 3.0's Update 8. The Grub Legacy bootloader is used to boot all media: install ISO, bootable flash drives, and the runtime system. Grub Legacy made preparing a bootable flash drive a trivial task.

Grub Legacy

When you boot the CD/DVD or from a writable drive containing the converted ISO, the GRand Unified Bootloader (grub legacy) presents the Smoothwall boot menu. The installation menus are identified by the word 'install' which appears vertically at the bottom right of the



screen. When the system starts up after installation, the word 'protect' appears vertically at the bottom left instead. Now that grub is used for both bootloaders, we included this visual cue to indicate which system is booting.

Note Use the <UP> and <DOWN> arrow keys to highlight menu selections. Press <ENTER> to select the highlighted item.

Main Menu

When the system boots the ISO from the optical drive, or boots the converted hot-pluggable drive, it presents the Grub Legacy menu. The first menu item, `Install Smoothwall Express`, allows you to select the basic (traditional) automated installer; this will be familiar to users of previous version of Smoothwall Express. The second menu item, `Install Smoothwall Express (Advanced)`, allows you to select the advanced installer which gives you additional options and more control of the installation. These basic and advanced installation procedures are described in detail in the next chapter.

Other selections

In addition to running the basic or advanced installers on the normal VESA console, there are several other boot options available. These options will be discussed in detail after the Help menu discussion below, but briefly, the other Options menu provides the following options:

- Boot from the ISO to a GNU/Linux bash shell prompt to explore your hardware via the command line with or without the GNU/Linux device manager (udev) finding your hardware.
- Boot to run the ISO-to-flash converter to prepare a bootable install drive.

- Boot to a bash prompt using serial port (EIA-232 COM1) as the console.
- View a terse help screen.

Help

Highlight Help and press **<ENTER>**. Grub displays the terse help screen. Press **<ENTER>** to return to the main menu.

```
Smoothwall Boot Selection Help

Install Smoothwall Express:    install using the basic installer; you must
                              have *one* HD and *one* CD; serial port and
                              flash are not supported;
Install Smoothwall Express (Advanced):
                              install using the advanced installer; choose
                              the source and target drives; install from
                              flash; see 'Other Options' to boot using
                              serial console;

Other Options
  UESA Console Options
    Explore Hardware/System:    boot to a shell w/all devices ready;
    Convert ISO to Bootable Flash:
                                prepare a bootable flash to install;
                                boot to a shell without udev;
    Single-user (no udev):      boot to a shell without udev;

  Serial Console Options:      use a serial port as the console; the
                                options are otherwise described above;

Help:                          this text;
```

Other Options menu and sub-menus

At the main menu, highlight Other Options and press **<ENTER>**. Grub displays the Other Options menu. Each menu selection is described below.

```
GNU GRUB  version 0.97  (639K lower / 1047544K upper memory)

(Return to Main Menu)
Other UESA Console Options
. Explore Hardware/System
. Convert ISO to Bootable Flash
. Single-user (no udev)
Serial Console Options
. Install Smoothwall Express (Advanced)
. Explore Hardware/System
. Convert ISO to Bootable Flash
. Single-user (no udev)

Use the ↑ and ↓ keys to select which entry is highlighted.
Press enter to boot the selected OS, 'e' to edit the
commands before booting, 'a' to modify the kernel arguments
before booting, or 'c' for a command-line.

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install
```

Other Options menu and sub-menus

- Highlight (Return to Main Menu) and press **<ENTER>** to return to the main menu.
- Scroll into the Other VESA Console Options sub-menu and select one of the following:
 - Explore Hardware/System
 - Convert ISO to Bootable Flash
 - Single-user (no udev).
- Or scroll into the Serial Console Options sub-menu and select one of the following:
 - Install Smoothwall Express (Advanced)
 - Explore Hardware/System
 - Convert ISO to Bootable Flash
 - Single-user (no udev)

Other VESA Console Options: Explore Hardware/System

This first boot option exists primarily to assist the user with debugging early userspace and the advanced installer. In this environment, the user has many options available including:

- Edit the advanced installer scripts to handle unsupported hardware (provided udev loads the drivers). Procedures for editing the advanced installer scripts are beyond the scope of this document.
- Mount the firewall's root filesystem, reset the root and admin passwords, and perform other recovery-type operations. Details for these procedures can be found on the Smoothwall Express forum at <http://community.smoothwall.org/>.
- Create an EXT2 filesystem on a hot-pluggable drive to contain the converted ISO and backup archives from Smoothwall Express' plug-n-play backup system.
- Test hardware compatibility with Smoothwall Express. Most users will find it useful to find out if their disk drive and network interfaces are supported out-of-box. Execute the following commands to check if your hardware is supported. (Lines beginning with a '#' are comments and need not be entered.)

```
cd /sys/class
# display block drives (hard/SSD/flash/USB/optical/etc. drives)
# look for hda, sda, vda, cciss, cd and sr in the output
ls -Cl block | grep -v loop

# display network interfaces (NICs/NADs/bridges/taps/tuns/etc.)
# expect to see eth, lo, ipsec in the output; others are possible.
ls -Cl net
```

Also, **be very aware** that the root filesystem in this environment is a 'rootfs' held completely in RAM; there is no backing store. Any and all changes you make in it will vanish when the system is rebooted, reset or powered off.

The Explore environment makes it easier to open the 'black box' that Smoothwall Express has been traditionally.

Other VESA Console Options: Convert ISO to Bootable Flash

This option exists to make it nearly trivial to prepare a bootable hot-pluggable drive. Users will typically use this option to prepare a bootable USB thumb drive. But it can be used to convert the ISO to almost any hot-pluggable, writable solid state or rotating drive: USB, eSATA, Firewire, and possibly others.

Most users will burn the ISO image to a DVD+RW, then boot almost any PC with that disk, choose the Convert menu item and prepare a bootable thumb drive. There are several discussions on the Smoothwall Express forum, with easy step by step instructions on how to create a bootable USB drive, load the Smoothwall 3.1 distribution onto the USB drive and install Smoothwall Express onto the target appliance.

A technically savvy user can boot a virtual machine (KVM, VMware, VirtualBox, HyperV, Xen, etc.) with the ISO image and 'hotplug' her thumb drive to the VM when the conversion script prompts her to plug in the drive. This is very easy to do on Debian using KVM.

Note Use caution when booting 'any PC' to perform the ISO to flash conversion. The process has been carefully written to write to only the hot-plugged drive. In three years of using the process on Roadster (pre-3.1 development) and 3.1, it has never touched any other drive. But considering the vagaries of software and BIOSes, there are no guarantees. To be safe, unplug the data connectors on all drives you want to preserve as-is before powering on and booting to the conversion process. Then reconnect them after the conversion is complete and you've powered the system down.

The only requirements for the chosen drive are that it must have a valid MBR or GPT partition table, and have a valid file system (typically VFAT/FAT32 or EXT2) on partition #1. If you intend to use the thumb drive with the firewall's plug-n-play backup system, use an EXT2 file system.

Note VFAT limits files to 2GiB in size; if you have a large squid cache, save lots of log files or use the system to build Smoothwall Express, the archive tarballs may be much larger than 2GiB and will be truncated rendering the archives nearly useless.

When the converter starts, requirements and instructions will be displayed. You will be prompted to plug in the drive. You will be prompted to choose the baud rate for the target system's serial port; choose the default of 115200 if you will not be using a serial port console or unless you know that the target's serial port runs only at a slower baud rate. If you find out later that the serial port is slower, you can edit grub.conf and other.conf in the drives' /boot/grub/ directory and change 115200 to 9600, 38400 or another valid baud rate instead of reconverting the ISO. Note that 9600 baud will translate into a slow install.

The conversion process removes the **basic installer** from the grub bootloader menus discussed above because this installer works only with the traditional 'one CD and one hard drive'. The resulting bootable drive can only use the advanced installer.

Other VESA Console Options: Single-user (no udev)

This option exists primarily to debug udev in early userspace. In this environment, only those devices the kernel knows about will exist in /dev. Again, be very aware that the root filesystem in this environment is a 'rootfs' held completely in RAM; there is no backing store. Any and all changes you make in it will vanish when the system is reset.

Serial Console Options

It is best to use a VESA console when it's available. But some systems do not have a standard monitor and keyboard; they have only a serial port interface. This is where the serial console access is handy. The serial console options are essentially the same as their VESA console counterparts and the advanced installer on the main menu. The main difference is that the con-

sole is essentially a slow, dumb terminal. (Think back to before the advent of bit-mapped graphic displays.) Displaying the advanced installer's and setup's dialog boxes is usually a hit-or-miss proposition. Usually enough information is displayed to make selections, but there are so many types and kinds of dumb terminals—both hardware and emulated—that successful use of the serial console for installation cannot be guaranteed. But it usually works well enough in the explore environment and should work for the ISO-to-flash conversion process.

Chapter wrap-up

Thus ends the introduction to the other rather technical features of the boot ISO disk. These are advanced features expected to be used by more skilled admins. Most people installing Smoothwall Express 3.1 will use the basic installer on a system with one CD, one hard drive and a standard VESA console. Some will use the advanced installer to tailor the install to some degree or to install the development and/or documentation (man page) tarballs. Some may even use the Offroad ISO as a 'rescue disk' of sorts. A very few will use the explore environment to debug early userspace or to reprogram the advanced installer.

Install Smoothwall Express

In this chapter:

- Warning!
- Program messages and conventions
- Install Smoothwall Express, basic and advanced methods

Warning!

Do not install Smoothwall Express on your primary or on your only workstation!!! Installation of Smoothwall Express **ERASES ALL DATA** from the computer's hard drive. Before you start the installation, ensure that all valuable data is safely backed up in an alternate location or onto a separate storage medium.

Neither Smoothwall Limited nor the Smoothwall Express Team shall be held responsible for any loss of data.

Messages and conventions

The Smoothwall Express installation and initial setup programs use a text-based interface that is compatible with all types of graphic cards. See table 2 and table 3 below.

Key	Explanation
Arrows	Move the cursor/focus/highlight between options.
Tab	Advances the focus to the next screen object.
Space	Clicks a button if it has the focus.
Enter or Return	Clicks a button if it has the focus. Clicks the "Ok" if the focus is not currently on a button.

Table 2: Keyboard controls for the installer

Button	Explanation
Cancel	Exits the current section of the installation or setup process without saving or activating any changes. If the Setup program is being run as part of the first-time setup process, the Cancel button will exit the setup program and require the installation process to be restarted.
Done	Indicates that configuration of the current feature is complete. Changes will be saved and activated and control will return to the menu or installation procedure.
Finished	Exits once all configuration changes have been completed in the Setup program.
Ok	Confirms the selection of the highlighted option, acknowledges a message or proceeds to the next screen.

Table 3: On-screen buttons used during installation and setup

Installation option: basic or advanced?

Smoothwall Express now provides two options for system installation. The administrator may choose either the **basic** installer or the **advanced** installer based on system requirements and user preferences.

- **Basic installation**—provides a fairly simple install with minimal administrative options and decisions (see table 4 below). Select the basic installer to prepare a Smoothwall Express firewall on a PC with the most common configuration.
- **Advanced installation**—provides a more robust set of options for the administrator to use (see table 4 below). The extra options may significantly increase the complexity of the installation. Choose this option if you prefer to have, or require, extra control over the installation process.

Option	Basic	Advanced
Hard Drives	One	Multiple ¹
Optical Drives	One	Multiple ¹
Upgrade/Restore Archive	No	Yes
Disk Partition and Size Control	No	Yes
File system	EXT4	EXT4 and ReiserFS
Console	VESA	EIA-232 or VESA
Developer package installation	No	Optional when present
¹ More than one Hard Disk Drive or Optical drive may be in the computer, but Smoothwall Express will only use those selected.		

Table 4: Installation options

UEFI and boot problems

Some people have reported systems that install Smoothwall Express 3.1 but won't boot from the system disk. At least some of these systems will boot if the partition table is changed from GPT (GUID Partition Table) to MBR (Master Boot Record). For this reason, the install environment contains a script that converts the system disk's partition scheme from GPT to MBR. The layout is not changed; only the partitioning scheme.

If your system won't boot after you install Smoothwall Express and you have disabled UEFI (or enabled CSM) and/or disabled EFI power management settings, you can try the conversion script.

1. Boot the install medium (ISO or flash/HD/SSD).
2. Select `Other Options`, then select `Explore Hardware/System`.
3. At the shell prompt, enter `gpt2mbr`. It will display a usage statement and the node names of writable drives it finds; usually, only `sda` will be displayed. Be sure you choose the correct drive! For this manual, we assume it is `sda`.
4. Then enter `gpt2mbr sda`, wait a few moments, verify that the partition table information seems sane, then press enter to reboot.
5. Remove the ISO/flash boot medium and let the system boot Smoothwall Express.

If Smoothwall Express starts, you're good to go. If not and no BIOS/EFI settings correct the situation, your only recourse is to use another system.

Basic installer

[To use the advanced installer, skip this section.]

Minimum requirements: The Smoothwall Express basic installer is designed to run on a workstation with a bootable CD-ROM drive. The system must contain one hard drive, one optical drive, a VESA monitor and a PS/2 or USB keyboard. It automatically checks the workstation and hardware components and installs Smoothwall Express accordingly.

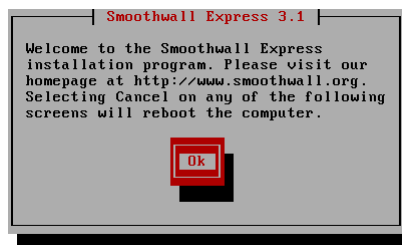
1. Browse to <http://www.smoothwall.org/>; based on your Smoothwall computer appliance processor specifications, select either the 32- or 64-bit ISO image to download. Burn the ISO image to a CD or DVD. *DVD±RW media works well, is fast, and minimizes the creation of coasters.*

Note Only test the new optical disk on your target Smoothwall appliance!! The installation program will delete all data on the hard drive.

2. Insert the disk into the CD drive of the workstation you want to use as a firewall appliance and reboot. Once the computer completes the reboot, the following screen is displayed:



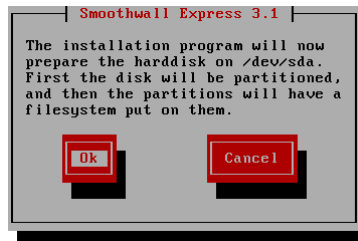
3. Press <ENTER> to boot from the CDROM. The welcome dialog box appears.



4. Press <ENTER> to continue. The following warning opens:

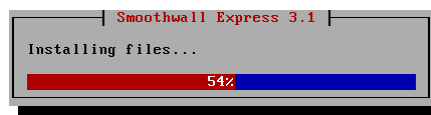


5. Press <ENTER> to continue. The hard drive preparation dialog box opens:

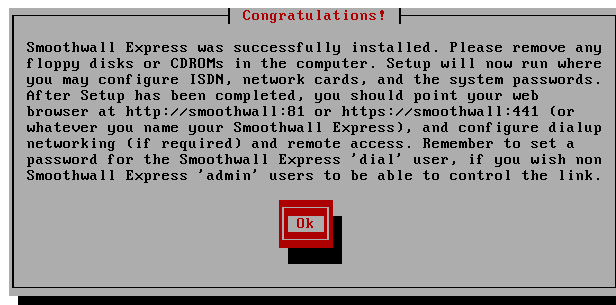


Note The installation process **ERASES ALL DATA** from the workstation's hard disk. Ensure that all valuable data is safely backed up before you continue. The Smoothwall Express Open Source Project cannot be held responsible for any loss of data.

6. Press <ENTER> to continue. Smoothwall Express files are installed. The progress bar is displayed.



7. When complete, the Congratulations! dialog box opens:



8. At this point, the files have been installed. Press <ENTER> to continue.
9. Skip to chapter 4 to configure your Smoothwall firewall.

Advanced installer

[If you just installed using the basic installer, skip this section.]

Note The advanced installer gives you some flexibility in your firewall appliance. However, this flexibility comes with complexity; you must carefully pay attention to the dialog boxes and the answers you provide because the system drives may not be detected in the same order each time you boot the installer. In short, you must

1. Choose the drive onto which you wish to install Smoothwall Express.
2. Choose the drive that contains the distribution files.
3. Optionally choose the drive that contains archives from previous PnP Backups.
4. Choose the filesystem you wish to install
5. Choose whether to use the serial console
6. Choose how to use the serial console, if selected

This installation guide only presents representative dialogs; you must keep in mind that your planned configuration may be different from the configuration present below. There are many Smoothwall configuration choices to make including:

- install on a rotating or a flash drive
- install from CD/DVD/ISO or rotating/flash drive
- install a fresh system only
- install with 'var' data restore (i.e., upgrade)
- restore a 'total' archive to restore a system that was previously running.

To guide you through every possible scenario would be exhaustive and complex. Generally speaking, the advanced installer default selections are safe; they approximate the actions the basic installer performs.

Even though it introduces some complexity, the advanced installer is rather straightforward. Selections pertain to the matter at hand and do not affect other selections. You should clearly understand each dialog box before selecting an option.

<p>Var: <i>Previously backed up archive of variable data</i> from a functional Smoothwall Express 3.1 system. This information includes system and user settings, logs, configuration parameters and other system unique data. It excludes the installed programs, directories, and some files. A 'var' archive includes all data in the folder tree under /var. It does not include the squid cache which can be huge (sometimes over 100GiB of data).</p> <p>Total: <i>Previously backed up archive</i> from a functional SmoothWall Express 3.1 system encompassing an entire SmoothWall 3.1 installation structure including system files, user and program stored data, programs software and everything else.</p> <p>Fresh Install: An installation that creates new disk partitions and file systems, installs the complete system from the distribution medium (ISO or flash), configures the Smoothwall system, then reboots to the running Smoothwall firewall. This is equivalent to (but not the same as) a 'basic' install.</p> <p>Installation with 'var' restore: A fresh install, with system data restored from a variable data ('var') archive, as described above. User will run setup to adjust the NIC assignments if needed, then reboot into the updated system. A 'var' install provides a more thorough upgrade than restoring from a floppy backup because 'var' restores logs and other historic data.</p> <p>Total Restoration (or 'complete restoration') means the installer will partition the disk, make the file systems, restore from an archive of the complete system (a 'total' archive), adjust NIC assignments if necessary, then reboot into the previously running firewall. It would typically be used to 'downgrade' a failed upgrade; it can also be used to clone a Smoothwall Express firewall or to migrate one to new hardware.</p>
--

Figure 1: Smoothwall 3.1 Installation Terminology

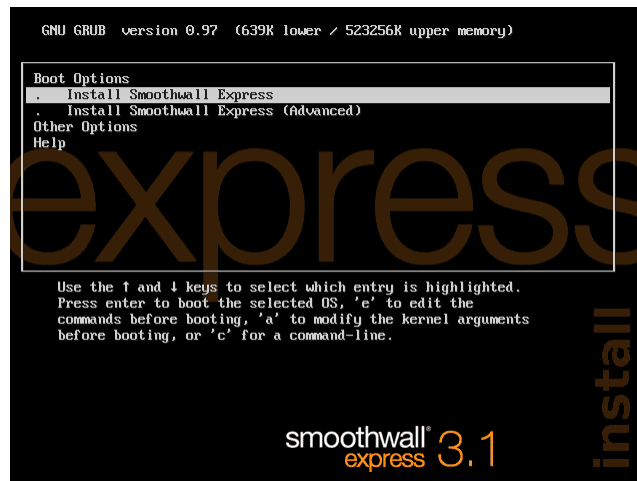
The Smoothwall Express advanced installer is designed to run on a workstation with a bootable CD-ROM drive or a bootable hot-pluggable drive (USB, SATA, or Firewire; rotating or flash). The system must contain at least one writable target drive and one bootable drive, and either a VESA monitor and PS/2 or USB keyboard or a connection to the first EIA-232 serial port.

The advanced installer has the ability to restore the variable data from an older version of Smoothwall Express (3.1 and later); this is the best way to upgrade to newer versions of the firewall or to change the mainboard or NICs. It also has the ability to completely restore a full archive of a previously running Smoothwall Express version 3.1 or later system.

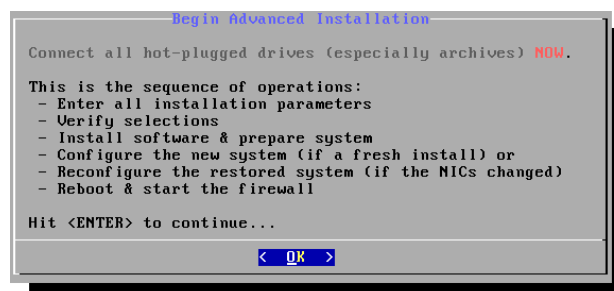
The advanced installer will ask you to answer a number of questions about your hardware and what you want to install or restore. Once you have answered all of them, you will have the opportunity to review your answers before anything is written to disk.

Configure the install

1. Browse to <http://www.smoothwall.org/> and download the appropriate 32- or 64-bit ISO image of Smoothwall Express version 3.1 and burn it to a a CD or DVD. *DVD±RW works well, is fast, and minimizes the creation of coasters.*
2. Insert the CD into the CD drive of the workstation you want to use as a firewall appliance and reboot. The following screen is displayed:



3. Press the <DOWN> arrow to highlight the advanced installer, then press <ENTER> to boot from the CDROM. The begin installation dialog box appears.



Press <ENTER> to continue.

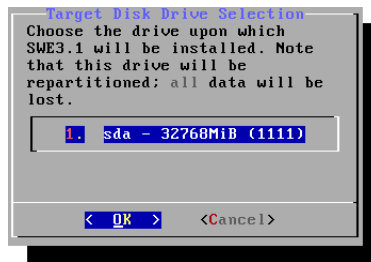
4. The installer first tells you it is looking for all optical and writable drives (flash or rotating).

```
Preparing lists of CDRoms and hard drives
└
```

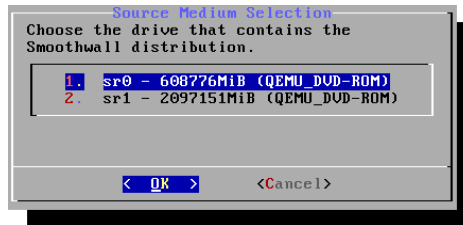
When it finishes—in a few seconds—it will tell you how many of each drive type it found. If an appropriate storage configuration is detected, the next dialog will be displayed after a short pause.

Note If the installer didn't find at least two writable drives, or at least one writable drive and one optical drive, it will post a message with the error and prepare to reboot.

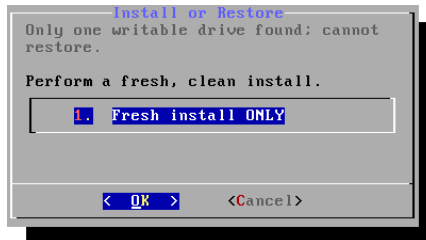
5. Next, the target drive selection dialog box opens. Select the drive on which Smoothwall Express will be installed and press <ENTER>.



6. Select your source drive (e.g., CDRom or USB flash) and press <ENTER>.



- 7a. If the installer found only one writable drive, you will only be able to perform a new installation. Press <ENTER> to continue, and *proceed to step 9*.



- 7b. If the installer found more than one writable drive, the following dialog is presented.

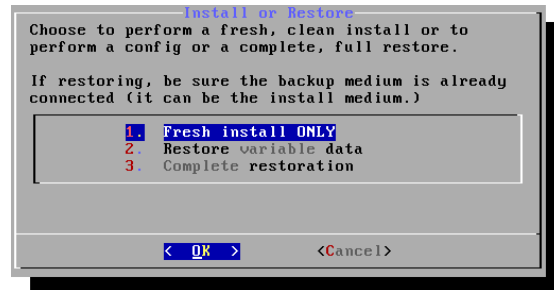
Select *Fresh install only* and press <ENTER> to continue. *Proceed to step 9.*

OR

Select *Restore variable data* to effect an upgrade and press <ENTER> to continue.

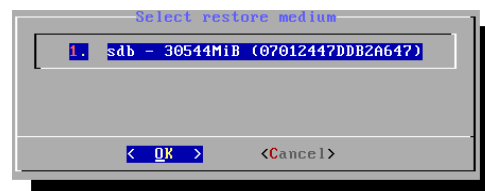
OR

Select *Complete restoration* to restore an archived system to operation (to migrate your firewall to a new hardware system or to revert should an upgrade prove faulty) and press <ENTER> to continue.

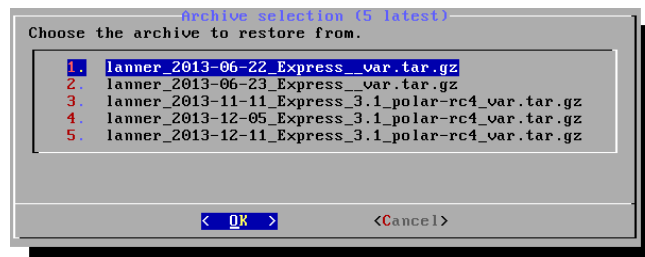


- 8a. *[If you chose a fresh install, skip to step 9.]*

Select the drive that contains the Smoothwall Express archives and press <ENTER> to continue.

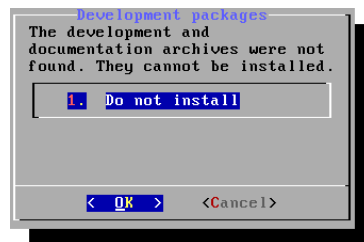


- 8b. If you chose to perform an install with variable data restore, 'var' archives will be displayed. But if you chose to perform a complete restoration, 'total' archives will be displayed.

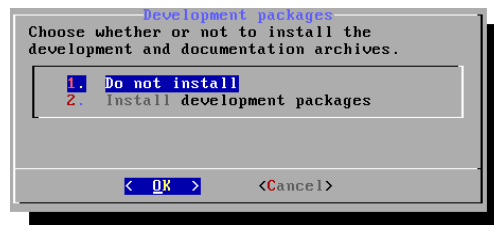


Choose the archive you wish to restore and press <ENTER>.

9. If you downloaded and booted the runtime (non-development) ISO, press <ENTER> to continue.

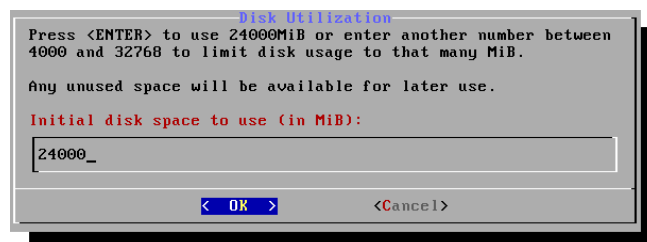


Otherwise, if you downloaded and booted the development version of the ISO, choose whether or not to install the development tools; then press <ENTER> to continue.



Note If you are installing an operational firewall, *do not* install the development tools; they are a security hazard. But if you intend to build Smoothwall Express from scratch or intend to develop mods for the firewall, you should install Smoothwall Express on a separate, secure internal system; modern virtual systems work well.

10. Decide how much of the target drive to use. There are several options. The installer will default to use the whole disk if it is between 4000MiB and 24000MiB; it will default to use 24000MiB if the target drive is larger than 24000MiB.

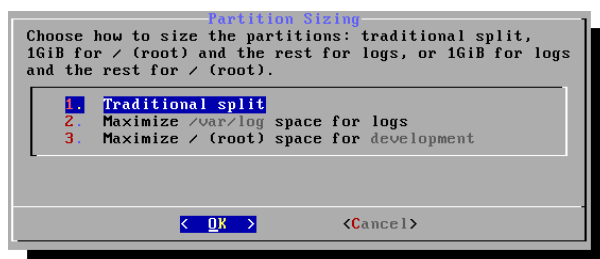


Press <ENTER> to use the default and continue.

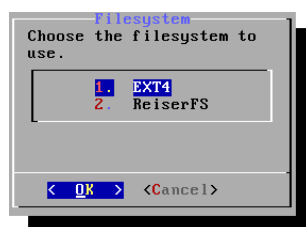
OR

Change the default to a value in the specified range (inclusive) and press <ENTER> to continue.

11. Choose how to split up the disk space; then press <ENTER> to continue.



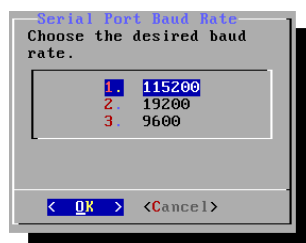
12. Choose the filesystem to use; then press <ENTER> to continue.



13. Choose how to use the serial port (while booting the system, for log-in, for both purposes or not at all), then press <ENTER> to continue.



If you chose to use the serial port, select the baud rate, then press <ENTER> to continue.



14. Verify the actions the installer will take.

```
Confirm installation configuration

Installing on target /dev/disk/by-id/1111
Booting from source drive /dev/sr0
Fresh install
Skipping development packages
Using first 24000MiB of hard drive
Making EXT4 filesystems
Not using serial port
Installing GRUB boot loader
NOT recording file access times

If this is OK, type yes.
To restart, type no.

OK? _
```

If everything is OK, enter **yes** to proceed with the installation.

Execute the install

At this point, the install proceeds automatically; no user input is expected unless there is a failure. During this phase of installation, the installer displays what it is doing on the top part of the console and displays details on the bottom few lines of the screen. When all goes well, the install proceeds without further user interaction. If an error occurs, it will be obvious and the install will await user input; progress of the install will stop.

The first step is to tweak udev's rules to create the /dev/harddisk* symbolic links.

```
Tweaking udev
Rules
/dev/harddisk's name
Triggering udev and waiting for it to settle
_
```

The next step is to partition the hard drive.

```
Partitioning hard drive

sda1 200MiB -> /boot
sda2 499MiB -> swap
sda3 7765MiB -> /log
sda4 15532MiB -> / (root)
sda5 2MiB -> grub_bios
      8768MiB -> (free space)

_
```

Next, the filesystems are created.

```
Preparing filesystems

/boot
swap
/var/log
/

Enabling swap
Mounting source media
Mounting new root filesystem
Mounting /boot and /var/log
-
```

Fourth, the system is unpacked onto the drive, the system is prepared, the initramfs is adjusted, and the boot loader is configured and installed.

```
Preparing Smoothwall

unpacking system
copying udev rules to target
creating new fstab, modules and mtab
saving configs and settings
prepping module dependencies
adjusting runtime initramfs
unpack
update
re-pack
configuring boot loader
installing boot loader
-
```

Finally, the Smoothwall Express 3.1 installation is complete! The system is ready for you to proceed through the setup program.

```
Installation is complete.
-
```

In a moment, the first dialog of the setup program will appear. Proceed to chapter 4 to configure your Smoothwall firewall.

Configure Smoothwall Express

In this chapter:

- Upgrade from Smoothwall Express 3.0 by installing version 3.1 and re-using the settings from your current Smoothwall Express, or
- Configure your new Smoothwall Express 3.1 firewall from scratch.

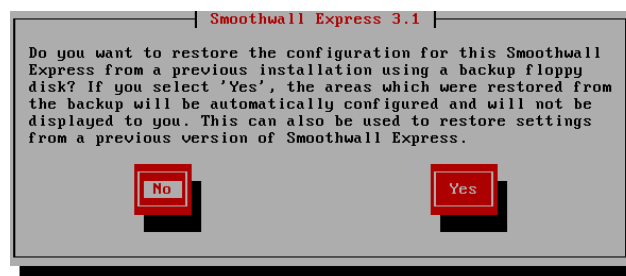
Prerequisites

In order to upgrade from an earlier version of a Smoothwall system:

1. Your firewall computer must have a floppy disk drive installed and recognized by Smoothwall 3.1 during installation that can read and transfer the SmoothWall 3.0 archive to the new system.
2. You must have a floppy disk archive containing the settings you want to use in the new version, see the Administrator's Guide delivered with your current Smoothwall system for information on how to archive settings for upgrades, and
3. You must have carried out the initial Smoothwall Express installation; see Chapter 3 on page 13.

Upgrade or configure from scratch?

After the installer has finished, the setup program runs and displays the following screen.



You must now choose whether you will restore settings from a floppy disk backup from an previous installation, or you will configure your Smoothwall Express from scratch.

If you wish to configure your Smoothwall Express from scratch, select *No*, press **<ENTER>** and skip to section Guided setup.

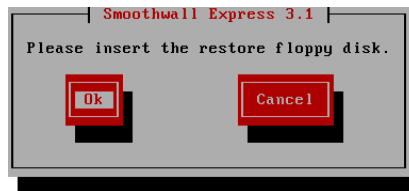
At this writing, upgrades from Smoothwall Express older than version 3.0 have not been tested.

Upgrade to version 3.1

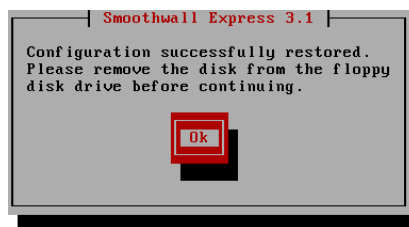
1. If you wish to restore settings from a previous installation, select *Yes* and press <ENTER>. The following screen is displayed:



2. Insert the floppy containing the archive of settings, select *Ok* and press <ENTER>. The following confirmation dialog is displayed:



3. Select *Ok* and press <ENTER>. A 'restoring' dialog is displayed while the settings are restored. Then following screen is displayed:
4. Remove the floppy, select *Ok*, and press <ENTER>. The installation program deploys your existing settings to the latest version of Smoothwall Express and displays the Keyboard mapping screen.
5. If you are familiar with the setup program, proceed through the guided setup dialogs and verify that your settings were restored. When you are satisfied with the settings, quit the installer. At



this point, installation is complete; the system will reboot and your Smoothwall Express fire-wall will be ready to use shortly.

If you are not familiar with setup, proceed to the next section; you will be guided through the setup program.

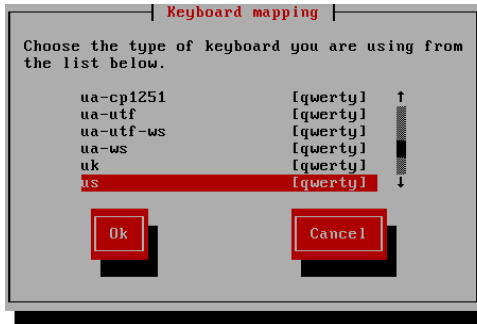
Guided setup

At this point, you chose either to restore settings from a floppy disk or to configure your new Smoothwall Express from scratch. Setup will guide you through the rest of the configuration steps.

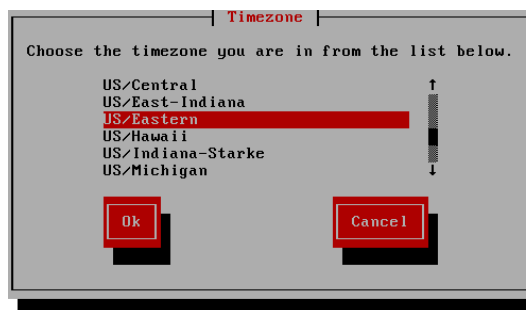
Note Only installing an all-ethernet system where RED uses DHCP is documented here. It will be noted in text where setup differs when RED receives a static IP address. Configuring RED as PPPoA, PPPoE or dialup is not documented. Stand-alone ethernet-based interface devices (modems) should work. We don't know if PCI- or USB-based ISDN or xDSL cards/devices will work because we don't have access to such systems and equipments,.

Setup runs in guided mode here. If you make a mistake, you can reinstall. Or you can boot the new system and, when the login prompt is displayed, immediately log in and run setup to finish the configuration, then reboot again.

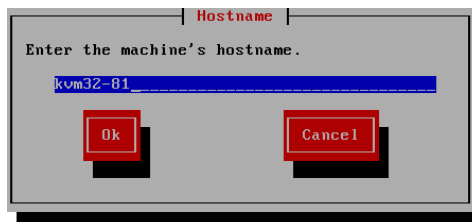
1. The following dialog is displayed. Scroll up or down as needed to select the type of keyboard you have connected to your system. Then press **<TAB>** to select **OK** and press **<ENTER>**.



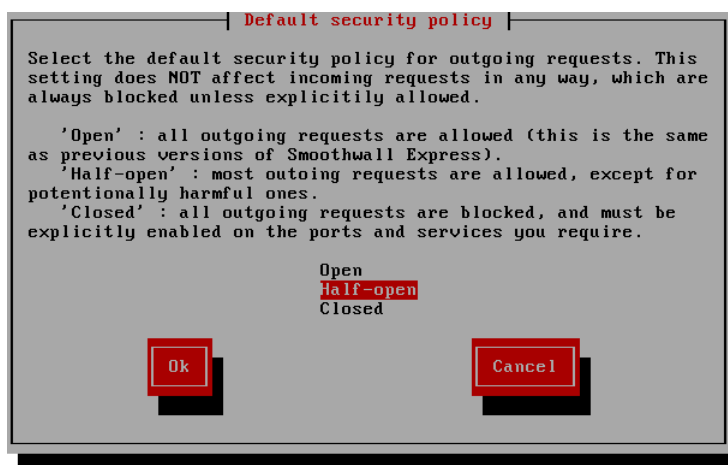
2. Scroll up or down as needed to select your timezone. Then press **<TAB>** to select **OK** and press **<ENTER>**.



3. Enter the hostname you wish to assign to this system. The default is *Smoothwall*. The name must begin with a letter; letters, hyphens and digits are allowed in the rest of the name. Then press <ENTER> twice.



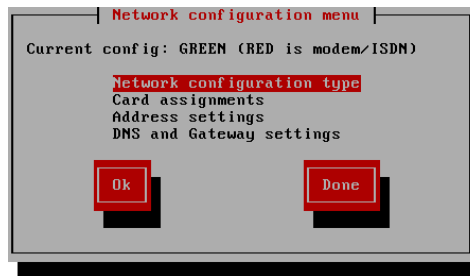
4. Select the security policy for the firewall. The default is *half-open*; this is *closed* but with some exceptions added so the firewall can be used immediately. *Open* means that all outgoing connections are allowed unless outgoing rules are added to prohibit specific connections. *Closed* means that no outgoing connections are allowed; outgoing rules must be added to allow specific connections. Then press <TAB> to select *OK* and press <ENTER>.



Policy	Description
Open	Smoothwall Express allows all outgoing requests. This is how previous versions of Smoothwall Express worked.
Half-open	The default policy, Smoothwall Express allows most outgoing requests and blocks potentially harmful requests.
Closed	Smoothwall Express blocks all outgoing requests. Anything to be allowed must be explicitly enabled.

Table 5: Available security policies

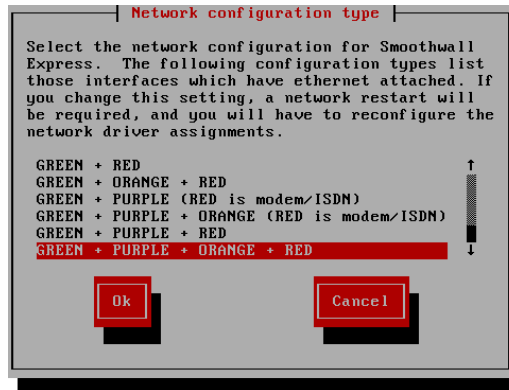
5. Next up is the network configuration submenu. Select *Network configuration type* and press <ENTER>. See table 6 below.



Type	Explanation
Green (Red is modem/ISDN)	Select if Smoothwall Express will use: <ul style="list-style-type: none"> • a network interface card (NIC) to connect to the internal network it is protecting • a modem or ISDN card to connect to the Internet or external network.
Green + Orange (Red is modem/ISDN)	Select if Smoothwall Express will use: <ul style="list-style-type: none"> • a NIC to connect to the internal network it is protecting • a NIC to connect to a de-militarized zone • a modem or ISDN card to connect to the Internet or external network.
Green + Red	Select if Smoothwall Express will use: <ul style="list-style-type: none"> • a NIC to connect to the internal network it is protecting • a NIC to connect to the Internet or external network.
Green + Orange + Red	Select if Smoothwall Express will use: <ul style="list-style-type: none"> • a NIC to connect to the internal network it is protecting • a NIC to connect to a de-militarized zone • a NIC to connect to the Internet or external network.
Green + Purple (Red is modem/ISDN)	Select if Smoothwall Express will use: <ul style="list-style-type: none"> • a NIC to connect to the internal network it is protecting • a NIC to connect to another internal network (often wireless) • a modem or ISDN card to connect to the Internet or external network.
Green + Purple + Orange (Red is modem/ISDN)	Select if Smoothwall Express will use: <ul style="list-style-type: none"> • a NIC to connect to the internal network it is protecting • a NIC to connect to another internal network (often wireless) • a NIC to connect to a de-militarized zone • a modem or ISDN card to connect to the Internet or external network.
Green + Purple + Red	Select if Smoothwall Express will use: <ul style="list-style-type: none"> • a NIC to connect to the internal network it is protecting • a NIC to connect to another internal network (often wireless) • a NIC to connect to the Internet or external network.
Green + Purple + Orange + Red	Select if Smoothwall Express will use: <ul style="list-style-type: none"> • a NIC to connect to the internal network it is protecting • a NIC to connect to another internal network (often wireless) • a NIC to connect to a de-militarized zone • a NIC to connect to the Internet or external network.

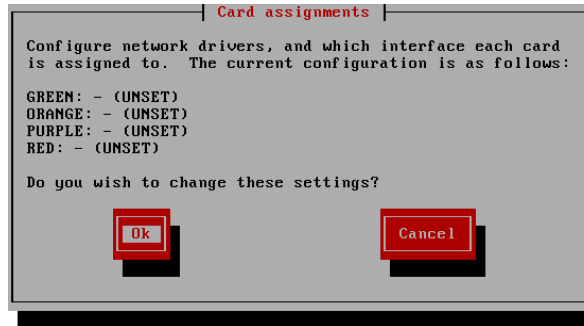
Table 6: Available network configuration types

6. Choose the network type. Choose one of the non-modem types to configure a standard ethernet-based firewall. Press <ENTER> to select and return to the network submenu.



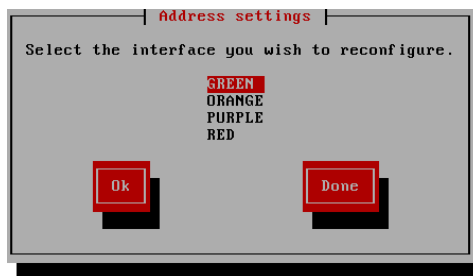
Note Only ethernet-based systems (*GREEN+RED*, *GREEN+ORANGE+RED*, *GREEN+PURPLE+RED* and *GREEN+ORANGE+PURPLE+RED*) have been well tested. ISDN- and dialup-based systems, and systems that use PCI-based ADSL cards have not been tested due to limited access to necessary systems and equipment.

7. Scroll down to *Card assignments* and press <ENTER>. The current list of assignments, if any, is displayed.

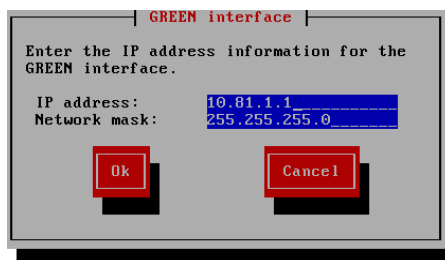


If needed, press <ENTER> to change the settings. The list of known network interface cards (NICs) and USB network access devices (NADs) is sorted in MAC address order. Press <ENTER> to begin assigning interfaces to zones. Carefully match each interface to the firewall zone it will control. It is advisable to prepare a list in advance to avoid scratching of noggins when things don't work right. If you have more interfaces installed than you need, you can *Skip* those you do not intend to use. A final dialog will be presented when enough interfaces have been assigned to zones.

8. Scroll down to *Address settings* and press <ENTER> to bring up the addressing submenu. The available zone interfaces are listed. Select GREEN (and ORANGE and PURPLE in turn,



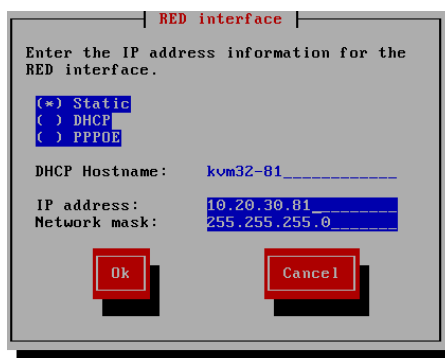
as configured) and press <ENTER>. You will receive a warning before you set GREEN's address; press <ENTER> to acknowledge the warning and continue. Enter the "dotted quad" IPv4 address and netmask you wish to use. Press <ENTER> to return to the addressing submenu.



Note You must assign distinct, non-overlapping addresses to each interface you use. That is, you must choose addresses and netmasks such that no address can appear on more than one interface. Search the Smoothwall Express forum (<http://community.smoothwall.org/>) for references and tutorials.

9. If you selected an ISDN or modem type for RED, press <TAB> to select *Done* and press <ENTER> to proceed to step 10.

Otherwise, select RED. Select *DHCP*, *Static* or *PPPoE* and press <SPACE> to set it. See table 7 below. For DHCP, you shouldn't need to change the DHCP hostname. For static, enter the IP address and netmask. For PPPoE/PPPoA, there is nothing to set.



Then press <TAB> to select *OK* and press <ENTER> to finish.

When you have assigned all the IP addresses and configuration data for all of your defined interfaces, press <TAB> to select *Done* and press <ENTER> to return to the network configuration menu.

Option	Explanation
Static	Select this option if you want Smoothwall Express to use a static IP address that your Internet Service Provider (ISP) assigned to you.
DHCP	Select this option if your ISP dynamically assigns you a different IP address each time you connect to the Internet.
PPPOE	Select this option if your ISP uses Point-to-Point Protocol over Ethernet/ATM (PPPoE/PPPoA) to connect you to the Internet.
DHCP Hostname	If you selected DHCP, you can change the DHCP hostname here.
IP address	If you selected Static, enter the static IP address to be used.
Network mask	If you selected Static, accept the default or enter a new network mask to be used.

Table 7: RED configuration options

- If you set RED to *Static*, scroll down to *DNS and Gateway settings* and press <ENTER>. Enter at least a primary DNS server address and the default gateway address; your ISP will supply these to you with your static IP address(es). Then press <ENTER> to return to the networking menu.

You have now completed networking configuration. Press <TAB> to select *Done* and press <ENTER> to leave the networking submenu and proceed with setup.

Option	Explanation
Primary DNS	Enter the IP address of your ISP's primary DNS server. Secondary DNS.
Secondary DNS	Optionally, enter your ISP's secondary DNS server.
Default Gateway	Enter the IP address of the router that provides the connection between your ISP and Smoothwall Express.

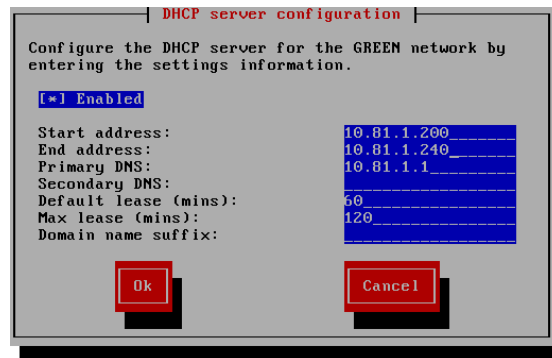
Table 8: DNS and default gateway addresses for RED

- The *Section menu* now appears. Some ISPs require you to use a proxy to access web sites; if so, select *Web Proxy* and enter your ISP's proxy hostname and port number. If you don't need to use a proxy (you most likely do not), leave these fields blank.

12. If you are using a PCI-based ISDN or ADSL card, select the respective menu item and press **<ENTER>** to configure your interface.

Note Configuring PCI-based ISDN and ADSL interfaces is not known to work in Smoothwall Express 3.1 due to the lack of access to these technologies.

13. You will most likely want to use DHCP on your GREEN LAN. If so, select *DHCP server configuration* and press **<ENTER>**.

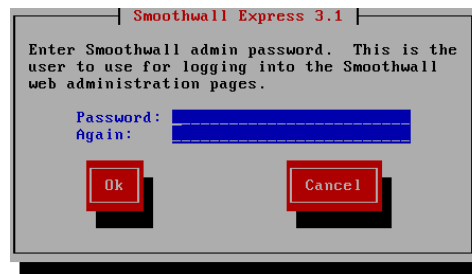


Press **<SPACE>** to enable the DHCP server for GREEN. The default values are adequate for most home/small office users. In most cases, you should use the GREEN IP address as the primary DNS server; you shouldn't specify a secondary DNS server. If the firewall's DNS server doesn't work, it's likely that other aspects of the firewall need repair as well; in this case, it's just as well that outgoing connections cannot be made. When done, press **<TAB>** to select *Ok* and press **<ENTER>**.

Press **<TAB>** to select *Finished* and press **<ENTER>** to exit the submenu.

Note You can change the DHCP settings for GREEN and for PURPLE via the web-based administrative interface. This setup allows you to reset your workstation's DHCP-configured IP address and immediately access your firewall's web-based admin UI.

14. The admin password dialog appears. Choose a secure password and enter it twice. You will use user 'admin' and this password to log into Smoothwall Express' web-based administrative interface. See table 9 below.

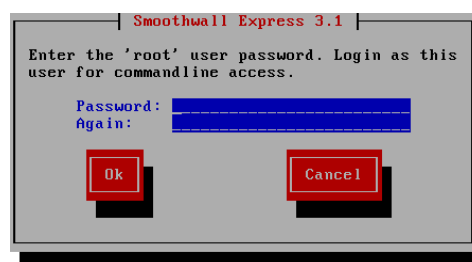


Press <ENTER> to continue.

Field	Explanation
Password	<p>Enter a strong password for the admin account.</p> <ul style="list-style-type: none"> • Minimum = 6 characters • Maximum = 25 characters • Use one or more non-alphanumeric characters <p>The admin account is used to access Smoothwall Express via a web browser connected to port 81 (HTTP) or port 441 (HTTPS) and carry out routine configuration and management.</p>
Again	Re-enter the password to confirm it.

Table 9: Admin password

15. The root password dialog appears. Choose a secure password and enter it twice. You will use user 'root' and this password to log into Smoothwall Express' command line console and via SSH. See table 10 below.



Press <ENTER> to continue.

Field	Explanation
Password	Enter a strong password for the admin account. <ul style="list-style-type: none">• Minimum = 6 characters• Maximum = 25 characters• Use one or more non-alphanumeric characters The root account has complete control of Smoothwall Express and is used to log on to the Smoothwall Express console and via SSH on the non-standard port 222.
Again	Re-enter the password to confirm it.

Table 10: Root password

16. The final dialog appears to indicate that setup is complete. Press **<ENTER>** to reboot the system and start the firewall. Once booted, you can access the web-based administrative interface by browsing to port 81 or port 441 on GREEN's IP address. Examples: <http://192.0.2.1:81> or <https://192.0.2.1:441>.



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