

Spectranet Quick Start Guide

What you need to do first...

Do you have a Spectrum +3 or black +2? If so you must fit the jumper on J3 (the jumper closest to the black connector that connects to the Spectrum expansion port).

For the rubber key Spectrum, or the “toastrack” 128K or the grey +2 or the Harlequin, make sure this jumper is not installed. If the video display of the Spectrum is corrupted, it's probably because you have this jumper installed.

The usual advice for Spectrum peripherals applies: only connect or remove the Spectranet while the Spectrum is unplugged.

Spectranet commands.

The Spectranet extends ZX BASIC with some new commands. These commands start with the % character, and can easily be used in BASIC programs.

Basic configuration.

The Spectranet comes supplied configured to use DHCP. If you want to change the network settings, type the following command into ZX BASIC:

```
%ifconfig
```

You can also briefly close the NMI jumper to enter the NMI menu, and run the configuration utility from there.

The Spectranet supports the TNFS (network filesystem) by default. There are public TNFS servers on the Internet. You may also run a TNFS server on your PC by installing a small server program, and share files from your PC.

To connect to a TNFS filesystem, use the following command:

```
%mount 0, "address-of-server"
```

For example, to use the alioth.net public TNFS server, you can type:

```
%mount 0, "vexed4.alioth.net"
```

If you want the Spectranet to remember the filesystem, and mount it on power-on or reset, you can use the filesystem configuration utility. To use this, type:

```
%fsconfig
```

Up to four filesystems may be mounted at one time. Other filesystem types may be made available in the future too – the Spectranet's filesystem layer is modular.

There's a list of public servers at the end of this document.

Network filesystem commands.

Loading and saving files.

There are a number of commands to do this. The %load and %save commands are exactly equivalent to the ZX BASIC standard LOAD and SAVE commands. The %aload command can load arbitrary data files. The %loadsnap command can load a .sna formatted snapshot. The %tapein

command prepares a “virtual tape” for loading. Here are some examples:

`%load ""` Loads the boot file (a BASIC program called boot.zx)

Note that you can hold the CAPS SHIFT key down while the Spectrum is starting up to load the boot.zx file. You may also use the `%fsconfig` command to make the Spectrum always load boot.zx.

`%load "filename"` Loads a BASIC program named “filename”

`%save "filename"` Saves a BASIC program named “filename”

Note that the CODE keyword may also be used exactly as with the standard ZX LOAD command. The LINE keyword may be used when saving a BASIC program so that it runs when loaded.

`%aload "file.bin" CODE 32768` Loads an arbitrary block of data at address 32768.

`%loadsnap "jsw.sna"` Loads a snapshot called jsw.sna

`%tapein "manic.tap"` Opens a tape file. Follow this command with `LOAD ""` to load the contents of the tape file.

Navigating and managing a filesystem.

There are a few commands to do this: `%cat`, `%cd`, `%mkdir`, `%rmdir` etc. They are roughly similar to Unix or Windows command line commands. The filesystem supports hierarchical directories (“folders”) and all commands support paths, both relative and absolute. For example, if you have a file named “foo.zx” in a subdirectory “bar” which is in “baz” on the root, the full path is “/baz/bar/foo.zx”. Additionally, the filesystem number may be specified (e.g. “0:/baz/bar/foo.zx”).

`%cat` Lists the files available.

`%info "file"` Get information on a file.

`%cd "directory"` Change directory to the specified directory (“folder”)

`%mkdir "dir"` Make a directory named “dir”

`%rmdir "dir"` Remove a directory named “dir”

`%rm "file"` Remove a file named “file”

`%mv "file1","file2"` Move a file from “file1” to “file2”

`%cp "file1","file2"` Copy a file “file1” to “file2”

`%fs <fsnum>` Change filesystem (“drive”): <fsnum> is 0 to 3 inclusive.

Connecting and disconnecting from filesystems.

The `%mount` command has already been mentioned right at the start of this guide. Here's the full syntax of the command:

`%mount <fsnum>,"url"`

The <fsnum> argument can be 0 to 3 inclusive.

The url argument is just that – a URL. It works just like any other URL. For example, a full TNFS URL might look like “tnfs://name.of.server.com/path/to/files”. TNFS is the default protocol, so you don't have to specify it when mounting a TNFS filesystem. For example, if you install the tnfs server on your PC, and it has IP address 192.168.0.2, the following two commands are exactly equivalent:

```
%mount 0,"192.168.0.2"
```

```
%mount 0,"tnfs://192.168.0.2"
```

You may disconnect from a filesystem with:

```
%umount <fsnum>
```

You'll need to use this command before reusing a filesystem number.

As has already been said in this guide, you may use the `%fsconfig` command to start the filesystem configuration utility, and save a filesystem URL so the Spectrum mounts it whenever you reset it or turn it on.

Sharing files from your PC

You'll need to go to <http://spectrum.alioth.net/doc> and download the TNFS server program. There are ready-made TNFS executables for Windows, Linux on x86, Mac OSX and the Raspberry Pi running Debian (in other words, the Raspbian distro recommended by the Raspberry Pi foundation).

It is a standalone command line utility. Please read the `readme.txt` file that it comes with since this has much more information, but briefly, you'll need to make sure UDP port 16384 is not blocked by your computer's firewall, then:

Windows users:

- Save `tnfsd.exe` in your path.
- Start → Run → `tnfsd c:\folder\to\share`

Unix/Mac/Linux/BSD

- Save `tnfsd` in your path.
- Open a terminal, and type `tnfsd /path/to/share`

Obviously, substitute `"/path/to/share"` with something that actually exists on your PC!

If you wish to run a public TNFS server, bear in mind the following advice:

- Do not run `tnfsd` as root or administrator.
- It's best that public TNFS servers run on a Unix like operating system such as Linux, the program has some additional security options for Unix – you can make it drop privileges and `chroot` into the path you want to share. See the `readme` file in the Unix version for more details.

Saving snapshots

If you've mounted a filesystem which you can write to, for example, if you run the `tnfs` fileserver program on your PC, you can save `.sna` format snapshots very easily over the network. By triggering an NMI (briefly short the NMI jumper – the left most two pins on the group of three jumpers nearest the through port at the back of the board – and select the Snapshot Manager.

Note that the snapshot manager has two views – file and directory view. You might not see any files in the snapshot manager if there's no snapshots in the directory you're currently in. To navigate the filesystem, press `D` to go into Directory view. Once you've navigated to where you want to go, then you can press `D` again to go into file view. Only snapshots will be listed in the file view. Note that the snapshot manager doesn't rely on the file ending in `“.sna”` - in fact, it doesn't care what the file is called – it examines the file to see if it's likely to be a snapshot and displays it if it fits the pattern regardless of its filename.

Snapshots may be loaded either by using the snapshot manager, or by using the %loadsnap command from BASIC.

Firmware updates.

The public TNFS server at vexed4.alioth.net has a firmware updater, and the firmware is very easy to update over the internet. Just select the firmware check/update option from the menu and follow the instructions.

Firmware update gone wrong?

If you tried to update, something went wrong, and now the Spectranet won't work, it's usually easy to fix. You can download the most recent firmware from <http://spectrum.alioth.net/doc> as a TAP or TZX file.

Close the J2 jumper on the Spectranet (the middle jumper on the group of three jumpers nearest the back of the Spectranet). This stops the Spectranet firmware from paging in. Power everything up, then connect an audio lead from your PC's sound card to the Spectrum's sound input. Then you can use the playtzx or playtap utility to play the firmware tape file via your PC's sound card. On the Spectrum, enter the following commands:

```
CLEAR 26999
```

```
LOAD "" CODE
```

Use playtzx or playtap to play the firmware installer. Once it has finished, type:

```
RANDOMIZEUSR 27000
```

Once this is complete you may remove the jumper, and reset the Spectrum. None of your settings should be lost.

Where to get more information.

See <http://spectrum.alioth.net/doc>

There are a number of tutorials for programmers at this site, as well as reference material on the various system calls, example programs, source code for the Spectranet ROM and modules etc.

A complete manual is currently being written. This will be found at this website too, once it's complete. The manual will have full detailed information on how all of the commands work, and how to write programs that use the network from ZX BASIC.

Public TNFS servers

Use %mount 0, "servername" to use them. Typically %load "" will then load a menu. Keep a lookout on <http://spectrum.alioth.net> for the most recent list.

1. **vexed4.alioth.net** – Firmware updates for the Spectranet, example programs, games
2. **zx.kupo.be** – Utilities, demos, games, other software
3. **zxnet.zapto.org** – Games, demos, ZX Lab, +3 Lab
4. **nugget.no-ip.biz** -
5. **feertech.com** – Bridge to World of Spectrum archives (see below)

World of Spectrum TNFS bridge

A new beta service is being tested the 'WOSbridge'. This allows most games and programs to be run on a Spectrum + Spectranet direct from the World of Spectrum archive. To use it:

```
%mount 0, "feertech.com"
```

To search for a game, use the "%cd" command. For example:

```
%cd "manic"
```

Then:

```
%cat
```

to see the results.

You can use the %cd command to go into the subdirectory of the program you want to run, and use the %tapein command to open any TAP files. Wildcards are acceptable, so if you have a program "ManicMiner.tap", you can enter %tapein "*.tap" rather than typing the whole filename. Then follow up with LOAD "" and the tape file will be loaded.

The feertech.com address is temporary. Keep a lookout on <http://spectrum.alioth.net/doc> for its ultimate address. There is also a discussion thread about this service in the Hardware section of World of Spectrum forums.

Troubleshooting.

Video corrupted: +3 jumper is installed, but you're using a grey +2, 128K toastrack or a rubber key 48K machine. Remove the +3 jumper.

Spectrum +3 or black +2 crashes and behaves oddly: +3 jumper is not installed. Install it.

Boot looping – Spectrum keeps just re-initializing in a loop back to the blue Spectranet start screen: Most likely you have a Spectrum with a bad Z80 – the M1 signal is not working. The only fix is to replace the Z80. This seems most common on Spectrum+ machines with issue 4S motherboards, but the bad M1 problem has been seen in all models.

Spanish 128K machine – boot looping: Investrónica made an error in the PCB layout, and did not connect the CLOCK signal at the edge connector. The Spectranet needs this signal – this can be fixed by soldering a wire from the ULA's clock output pin (solder it to the PCB, rather than the ULA chip) to the CLOCK pin on the edge connector. (Consult the 128K schematic and the edge connector pin out to see where the wire should be connected. Also you can ask on World of Spectrum forums, or at the Spanish forum speccy.org.

Toastrack 128K machine, both UK and Spanish – odd behaviour and crashes: Unfortunately, the "toastrack" 128K machine has a few issues with complex peripherals due to its PCB layout and it's hit and miss whether they work. Additionally, the CLOCK signal on these machines is rather weak compared to 48K or +2/+3 models. This hasn't yet been observed to cause a problem, but it can't be ruled out.

General instability or crashes: Check the edge connector on the Spectrum is clean. With the age of these machines, it's not unusual that the edge connector isn't in great shape.

Instability/failure to boot on a Spectrum with a CMOS Z80: There seems to be a signal integrity issue with the CLOCK signal mostly on Issue 3 48K Spectrums whose original Z80 has been replaced with a modern CMOS Z80. The recommended fix is to replace the CMOS chip with an original NMOS chip. These can usually be found on Sell My Retro or eBay, and it is highly likely if you have a CMOS replacement in your Spectrum, this will be in a chip socket so no soldering will be required. If this is not possible, a 100 ohm resistor can be soldered in series with the clock signal.

The usual manner of performing this modification is to desolder the clock pin on the Spectranet's card edge connector, solder one side of the 100 ohm resistor to this pin and the other side of the 100 ohm resistor is soldered to the now vacant pad on the Spectranet PCB. If you're not sure about this modification, please ask!

Note that the Harlequin with the CMOS Z80 fitted as standard runs correctly with the Spectranet. If you are having trouble with the Harlequin, check that the two SIL resistor networks on the Harlequin have been soldered the correct way around.

If all this fails, it's possible your Spectranet is faulty – you can contact dyls@alioth.net for help.

(end)