

# **LnxCopy**

a copy program for the ZX Spectrum in the 21st century

**User Manual**

Version 1.3

# LnxCopy

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Programming: **Lanex**

Design: **Lanex**

Ideas: **Lanex, SCjoe**

Manual: **SCjoe**

Support: **LMN128** (MB03+, eLeMeNt ZX), **lordcoxis** (esxDOS v0.8.8 and v0.8.9)

## Dear users and friends of the 8-bit ZX Spectrum computer!

The program LnxCopy was developed with the intention of archiving software for ZX Spectrum and compatible computers and transferring recordings from old tapes to modern storage media, to help to preserve programs and data for future generations.

I believe that this program will be an inspiration, also by how it uses the modern MB03+ interface and modern operating system (the esxDOS), memory expansion of your ZX Spectrum and other interfaces, color palette and how it works with files on memory cards directly readable on current PCs. LnxCopy connects the past and the future.

In the version 1.1, I improved a comfort for recordings jobs and added intelligent handling of extensions. The version 1.2 can be run on a new ZX Spectrum with the eLeMeNt ZX motherboard, which has the same author as the MB03+ interface. The version 1.3 brings, in addition to minor fixes and improvements, better keyboard control and unification of shortcuts when scrolling in the block-list and in file requesters.

The program can be further developed. For example, I can teach it to process tricky stored tape data. I look forward to your comments, recommendations and wishes

on `https://oldcomp.cz` in the section „ZX Spectrum software“

or by e-mail `www.ilnx.cz@gmail.com`

*Lanex*

## LnxCopy

is a modern copier, simple file manager and tape archives editor. This program allows you to do operations on your 8-bit computer that were previously a domain of more powerful PCs.

LnxCopy manages to:

- convert recordings of programs from tapes to SD and CF cards,
- create, merge and also split TAP emulator files,
- rename cleverly and save converted files in selected groups,
- work with media for PCs and for the ZX Spectrum without complications and conversions (in esxDOS),
- create and browse directories and save ZX Spectrum's and TAP files into them.

LnxCopy was developed and tested on the latest version of the esxDOS. We recommend all users to run this program with at least the version 0.8.9 of this operating system.

## Work screen

The screenshot shows the LnxCopy work screen with a menu bar at the top containing 'Load', 'Save', 'Delete', 'Rename', and 'Help'. Below the menu bar is a table listing files with columns for 'Name', 'Ext', and 'Len'. The files are numbered from 000 to 017. Annotations on the left and right sides of the screen identify specific parts of the interface: 'Main menu' points to the menu bar; 'List of recordings' points to the file list; 'Start of block' points to the first row; 'Selected start of block' points to the selected row (006); 'Headerless recordings' points to rows 008-010; 'Selected recording' points to row 011; 'Pointer' points to the cursor character '>' on row 015; 'Source of recordings' points to the 'Source: Tape (Audio)' text at the bottom left; 'Start of block' points to the first row; 'Standard recordings' points to rows 000-005; 'A whole block of recordings selected' points to rows 006-010; 'Start of block' points to row 011; 'Headerless recordings' points to rows 013-015; 'Start of block' points to row 016; and 'Operation memory' points to the bottom right status area.

|      | Name       | Ext | Len   |
|------|------------|-----|-------|
| 000  | pre-ZU     | BAS | 1481  |
| 001  | screen     | SCR | 6912  |
| 002  | code       | COD | 14167 |
| 003  | RRM        | BAS | 48    |
| 004  | RRMscr     | SCR | 6912  |
| 005  | RRMcode    | COD | 41000 |
| 006  | BONNIE     | BAS | 62    |
| 007  | Loader     | COD | 831   |
| 008  | File_008   | COD | 5029  |
| 009  | File_009   | COD | 31185 |
| 010  | File_010   | COD | 9666  |
| 011  | tulum128.b | BAS | 42    |
| 012  | tulum128.b | COD | 293   |
| 013  | File_013   | SCR | 6912  |
| 014  | File_014   | COD | 15206 |
| >015 | File_015   | COD | 16357 |
| 016  | File_016   | COD | 37123 |
| 017  | MFF        | BAS | 41    |

Source: Tape (Audio) Free Memory: 1852 KB  
MB03+/esxDOS/LnxCopy

## Basic terminology

**Recording** - a formatted section of tape data, most often storable on a *memory card* as a separate BASIC or CODE file or as a part of a *TAP file*.

**Headerless recording** - clean data without a format header, they are stored on a *memory card* as a separate CODE file.

**Block (of recordings)** - a group of *recordings* marked with a *start of a block*, ending before a next start of the block. The defined block specifies a storage path in a separate directory or in a separate *TAP file*.

**Start of a block** - a clearly highlighted *recording* (color attribute BRIGHT 1), its name determines a name of a storage directory or a name of the *TAP file*. Each recording that is a BASIC file automatically becomes a start of a block. Starts of block can be manually changed with the F key.

**Selected recording** - a *recording* (differentiated by cyan color) marked for DELETE and SAVE operations.

**Pointer (in the list of recordings)** - an arrow on the edge of the screen (to the left) in front of a recording name. The pointer is used to scroll with a list of recordings and it also specifies a recording to be *selected* or to mark a *start of a block*.

**Source of recordings** - an input medium used for taking recordings, it is either a tape cassette or a tape image in a *TAP file*.

**Memory card** - SD (Secure Digital) or CF (Compact Flash) card formatted with FAT16 or FAT32 file systems. It is a common storage medium, readable in a USB reader of your PC, a card the esxDOS operating system also operates with.

**Operational memory** - a part of memory of 2MB (MB03+), 984 KB (eLeMeNt ZX) or 472 KB (eLeMeNt ZX in Pentagon 1024 mode), large enough to store *recordings* from a whole tape cassette (with the MB03+) and allowing to play more recordings and combine multiple *TAP files* without any restriction.

**TAP file** - a file containing an image of recordings from a tape cassette. A popular and widespread emulator format that also your ZX Spectrum can read and run, thanks to the *esxDOS*.

**esxDOS** - <http://www.esxdos.org/index.html>

## Controls

LnxCopy is basically controlled by a key corresponding to the first or highlighted letter of a command listed in a program menu. You can exit or abort every operation using the **BREAK** key (**CAPS.SHIFT+SPACE**). Press (**H**) to display a summary of basic commands for operations with recordings.

### Function LOAD

should be, after trying the (**H**)**elp** key, a basic function you will start with the LnxCopy. After pressing (**L**)**oad** you can press **L** again to record data from a selected source.



The first source of recordings is the audio (EAR) socket. The source can also be a TAP file stored on a memory card, to select a file it is necessary to use (**O**)**pen TAP File**.

TAP files are automatically closed after processing and storage operations. If you do not want to use a whole file (or for some reason you have not finished processing a TAP file, e.g. a file was larger than an available memory), use (**A**) **Set Source to Audio**. This not only switches a recording source back to audio, but it also will close the current working TAP file.

### File requester



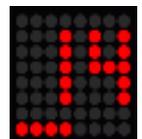
To select a file, LnxCopy offers you a detailed directory-listing window, consisting of items:

- function (name) of the selection window
- directory path
- listing of files and directories
- number of displayed directories and files
- help of available operations

Use up and down arrow keys to move around the window. You can page filelists and directories forward and backward using keys **1** and **2**. To move to the end, press **3** and use **4** to move to the beginning.

The **right cursor** enters subdirectories, the **left cursor** returns you to a parent folder. To select a file, press **ENTER**. You can only select a file with a TAP extension, otherwise the program will report "No TAP File".

Especially when using real cassettes, you will appreciate that you can trace a recording process visually on the LED display of the MB03+ interface. It indicates, by a recording just made, a number of kilobytes read.



FileRequester always works with one current card slot. You must change to a SD card in the second slot manually. Exit LnxCopy (**SYMB.SHIFT+Q**), enter the **GOTO hd1** command in BASIC. You can easily return to the program using **RUN** or **RANDOMIZE USR 32768**.

## List of recordings

can consist of up to 1000 items. As in a FileRequester, you can page file-lists and directories forward and backward using keys **1** and **2**. To move to the end, press **3** and use **4** to move to the beginning. To move to the end of the list, press **E**, use **T** to move to the beginning of the list.

You can select recordings with the **ENTER** or **SYMB.SHIFT + up** and **down**, respectively mark for other operations such as DELETE and SAVE. Rows of the selected recordings have a cyan or blue background.

```
006 BONNIE
007 Loader
```

Try **SYMB.SHIFT + 1 to 4** keys to see which color theme suits your eyes. You can choose from the following themes: Default, Ocean, Monochrome, and Dark.

|                         |                |     |       |  |
|-------------------------|----------------|-----|-------|--|
|                         | 000 pre-ZU     | BAS | 1481  |  |
|                         | 001 screen     | SCR | 6912  |  |
| Start of block          | 002 code       | COD | 14167 |  |
| Selected start of block | 003 RRM        | BAS | 48    |  |
|                         | 004 RRMscr     | SCR | 6912  |  |
|                         | 005 RRMcode    | COD | 41000 |  |
| Headerless recordings   | 006 BONNIE     | BAS | 62    |  |
|                         | 007 Loader     | COD | 831   |  |
|                         | 008 File_008   | COD | 5329  |  |
|                         | 009 File_009   | COD | 31165 |  |
|                         | 010 File_010   | COD | 9866  |  |
| Selected recording      | 011 tulum128.b | BAS | 42    |  |
|                         | 012 tulum128.b | COD | 293   |  |
| Pointer                 | 013 File_013   | SCR | 6912  |  |
|                         | 014 File_014   | COD | 15206 |  |
|                         | >015 File_015  | COD | 16357 |  |
|                         | 016 File_016   | COD | 37123 |  |
|                         | 017 MFF        | BAS | 41    |  |

Start of block  
Standard recordings  
A whole block of recordings selected  
Start of block  
Headerless recordings  
Start of block

In addition to selections of individual recordings, you can also mark blocks of recordings at the same time. A block specifies a group of recordings to be stored in a separate directory (named after the first file in this block) or in a separate TAP file. The block always starts with a marked recording and ends with a last unmarked one (before a next block). A line at the beginning of the block, marked with the **F** key, gets a vivid background (attribute BRIGHT). A highlighted line introduces a whole group of recordings, not one line! LnxCopy automatically sets a start of a block for each BASIC file at the moment it is recorded from a tape or a TAP file. If you play multiple BASIC recordings consecutively, then you have a same number of

```
000 pre-ZU
001 screen
002 code
```

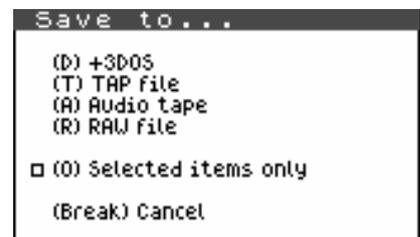
blocks, every such a block consist of one file. Use the **F** key to deselect starts of blocks and adjust everything to your needs.

Unlike older copy programs for the ZX Spectrum, LnxCopy does not display the so-called "loading header" and recorded data separately. It shows a headerless recording made from a tape or TAP file in a different color, it still remembers it internally and saves it back to a TAP file on a tape without change, e.g. without a header. In the list of recordings, however, it assigns for work a header with a name "File\_" plus a record number, under which the recording can be stored on a esxDOS memory card as a CODE block, with an appropriate extension (e.g. `FILE_008.COD`).

```
013 File_013
014 File_014
```

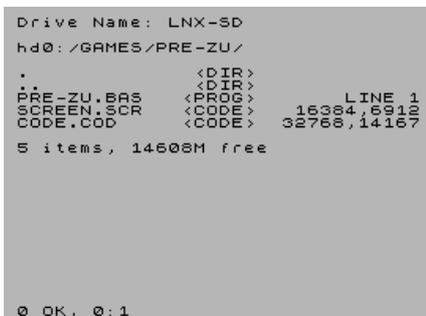
### Function SAVE

offers to save recordings in both traditional and modern ways. Before each SAVE, you can use **O** to specify whether to work with all or only selected recordings (you have marked them (in cyan color) with `ENTER`, or `SYMB.SHIFT + up` and `down`). If at least one recording is marked in this way, the program assumes that you will want to work with this selection, and therefore in the dialog **Save to** the option of selected recordings is pre-set.



At the first place is SAVE to a memory card. After selecting **(D) +3DOS**, a new dialog for a folder selection will open (a window similar to FileReguester from the LOAD function). SAVE recordings are made after selecting the storage directory by pressing **(D) Select Directory**.

You can check saved files on the memory card immediately. The fastest way is to press the **NMI** button, which displays files in the standard NMI browser for the esxDOS. Also check LOAD or SAVE dialogs for selection. Or exit LnxCopy to the ZX BASIC after pressing `SS+Q` and enter an esxDOS command **DIR** or **DIR \*** (back to program: **RUN** or **RANDOMIZE USR 32768**).



Remember that BASIC files (loaders) converted by this method from a tape or TAP file always need minor modifications to work in an esxDOS environment. This usually means to insert exact names of data files and also an asterisk to all file operations in the BASIC program, eg **LOAD \* "INTRO.SCR" SCREEN\$** and **LOAD \* "DATA.COD" CODE**.

Note, it was not necessary in the pictures above to create a new separate directory for the game listed in the directory-selection dialog. This is because when importing recordings from a TAP file, LnxCopy always marked a BASIC loader as the start of a block of recordings. When saving by the esxDOS, LnxCopy also created a directory for this block.

## Automatic file renaming

When storing recordings to the memory card, the LnxCopy renames recordings, using its programmed intelligence, so that all file names do not violate FAT/esxDOS conventions, do not contain tokens (BASIC command codes) or illegal characters. LnxCopy also prevents production of repeating identical names.

Next to characters of letters and numbers only two special characters, minus  and tilde  are left in a recording's name. With a char  are replaced all other characters:

BASIC tokens are in all names displayed as a character . A token is retained for storage to a tape or a TAP file until the recording is renamed and the "#" character is deleted. However, tokens are not transferred to a name when saving +3DOS files.

For a better clarity and in accordance with esxDOS (and FAT) conventions, LnxCopy automatically adds extensions to files, according to a file type information obtained from a tape and TAP headers.

|                     |                            |                            |
|---------------------|----------------------------|----------------------------|
| <b>.BAS</b> = BASIC | <b>.SCR</b> = SCREEN\$     | <b>.CAR</b> = String Array |
| <b>.COD</b> = CODE  | <b>.NAR</b> = Number Array | <b>.COD</b> = headerless   |

*Headerless recordings*, when saved to a card, are named "FILE\_" with a three-digit sequential number (0-999) and a .COD extension. If recordings with empty names (*noname*) occur, they are given the name "NONM", in case of two or more noname-files also a number (one to three digits, 0-999). This procedure is performed by LnxCopy at **(D) +3DOS** or **(R) RAW** functions until you rename headerless and noname recordings.

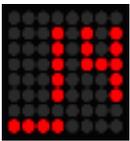
## Save to TAP files

LnxCopy works almost universally with TAP files. The Save TAP dialog saves everything to one big TAP file or to individual TAPs corresponding to recording blocks.



If you have a 90-minute cassette, a content of its both sides will fit into the LnxCopy's working memory of the MB03+ Ultimate interface at once. You can save recordings from an entire tape to a single TAP file and return to editing works later. LnxCopy will serve as a simple editor (and a cutting tool) of TAP archives, for example selected new recordings can be attached to existing TAP archives.

## Cassette storage



As with the LOAD function, the user's patience during long savings is supported by the counter displaying a number of saved KB on a LED display of the MB03+. From traditional copiers the LnxCopy has taken over an audio signal, which is recorded to a tape after each saved block of recordings.

## Saving RAW files

RAW or "binary" files are data that do not have any system information attached to them, in a so-called „file header“. A recording saved as "raw" does not contain information about a start address or a file type. It corresponds to data you save in esxDOS with the **SAVE \* "name" BIN** command. By such files only their length is displayed when a directory is being listed.

For compatibility reasons, esxDOS services work with files that have 128 bytes of the +3DOS floppy system header added, which is supported by the ROM and the ZX BASIC of the +3 and + 2A/B Amstrad models. The ZX Spectrum system needs some header information by BASIC files, for other file types an information is usually not needed with the modern esxDOS.

You will usually use this save method selectively, for files of a certain length, e.g. 6144 and 6912 bytes (.SCR images), 768 and 1024 bytes (.CHR fonts), 16384 bytes (alternative .ROM systems). You will certainly come across other cases when you need to have a clean content of (part of) the memory, texts, graphic data stored without an added header on the card and readable in another program directly on the PC, without having to convert them in any way.

## Function RENAME

opens a dialog for editing a recording name to which the pointer is aiming . You can enter up to 12 characters that esxDOS will accept, an 8-character *name*, a *dot*, and a 3-character *extension*, such as *LnxCopy1.BAS*.



To re-enter the same name for multiple recordings, use the clipboard commands, **SYMB.SHIFT+C** (copy) and **SYMB.SHIFT+V** (paste).

Commonly you rename a *name* only. When using a dot, the program recognizes that you also give an *extension* to the recording. The newly entered extension (created from up to three characters, next the dot) will be displayed in place of the original recording type and will always be used when saving to an SD/CF card with **(D) +3DOS** or **(R) RAW** options. If you insert only a dot at the end of the title, the recording will be named without an extension (an old extension will be deleted). When saving to an audio tape or a TAP file, the new extension is not used, as the original file type is written to the tape header.

The table with examples shows the entered text and the resulting name of the renamed recording:

| Original recording name | Characters entered by Rename | Name as a result |
|-------------------------|------------------------------|------------------|
| PreZu.BAS               | PREZUGAM                     | PREZUGAM.BAS     |
| prezucd                 | prezu.bin                    | prezu.bin        |
| PreZu.SCR               | PreZu.S                      | PreZu.S          |
| PreZu.BAS               | prezu.                       | prezu            |
| PreZu.COD               | PreZu.C.COD                  | PreZu.C          |
| PreZu.BAS               | .                            |                  |

Entering a single dot without other characters will erase the entire title of the recording. Also with such a files can the LnxCopy work, eg. when saving to a card, it automatically renames them to "NONM" and numbers them (if there are more unnamed recordings in the list).

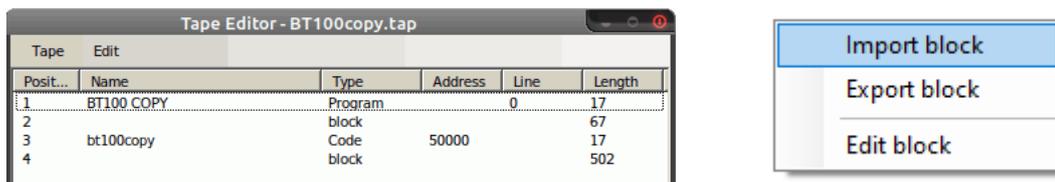
If you are editing a name with the intention of saving to TAP files or onto tapes, enter names up to 10 characters long. Standard ZX Spectrum cassette routines cannot work with more characters.

## Function DELETE

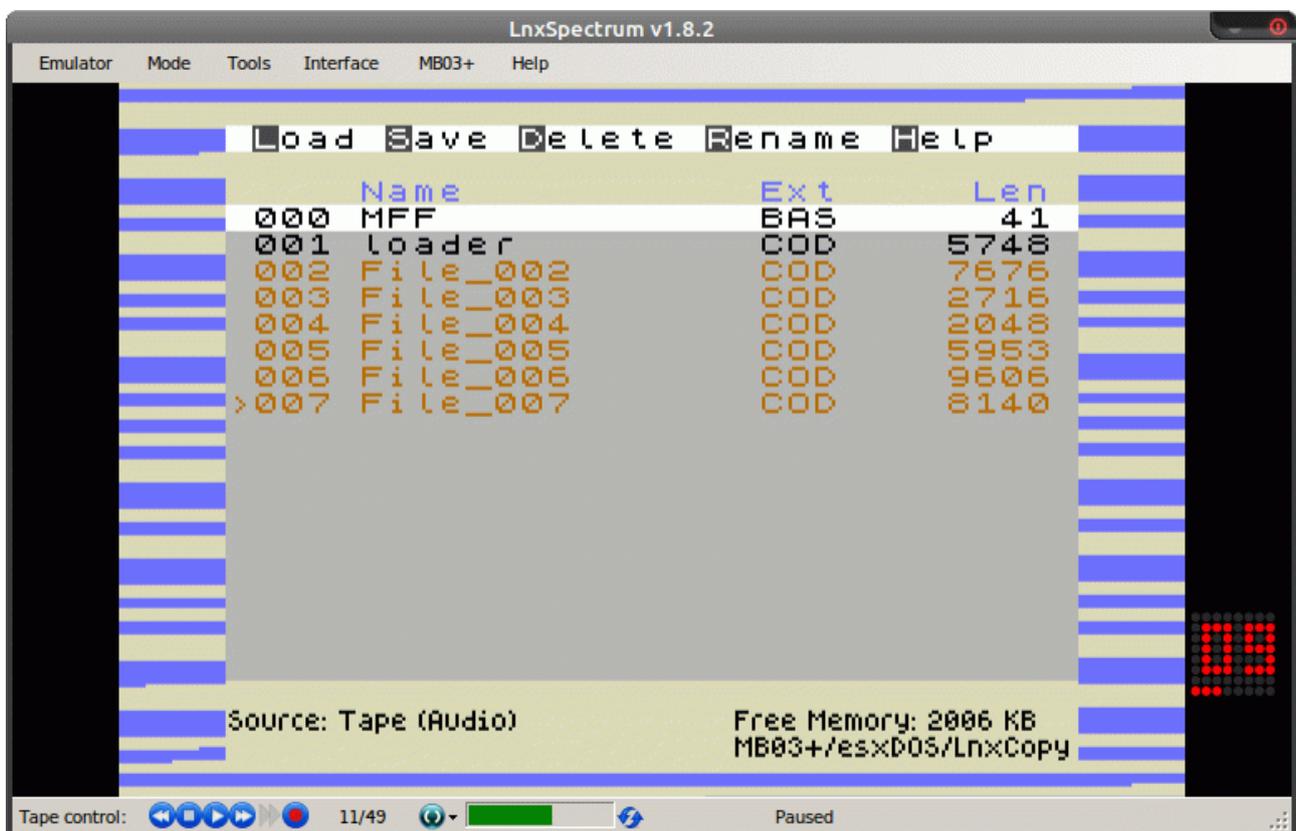
You can delete everything with **(A) All** or selected recordings only with **(D) Selected**.

## LnxCopy in a PC emulator

LnxCopy will also serve well to those who do not own the MB03+ or the eLeMeNt ZX. In an emulator environment, with the help of the LnxCopy, you can easily transfer data from the hard disk of a PC to any esxDOS directory in the HDF image file. Transfer the data to a TAP file using the *Tape Editor*, right-click to the context menu, select *Import* and select a file. Load the TAP file into the LnxCopy, save a recording to a selected folder ... and that's it!



Currently, the **LnxSpectrum**, [www.ilnx.cz](http://www.ilnx.cz), is the only emulator that combines most of all HW accessories included in the MB03+ interface. The program runs on Windows systems (at least the version XP) and also, with the Wine utility (possibly Winetricks), on Linux operating systems (tested in Debian, Ubuntu and Mint).



## System alerts and error messages

LnxCopy is designed so that it does not bother an user too much with system messages. It can automatically solve a number of special saving- and naming-situations.

If LnxCopy detects (at the startup) a HW configuration does not meet program's requirements, it returns to the BASIC and reports with a colored border:

```
red color: the MB03+ interface was not detected
magenta color: divIDE/divMMC mode for esxDOS was not started in the MB03+
```



```
eLeMeNt/MB03+, esxDOS required
9 STOP statement, 10:2
```

If you are inattentive or too demanding on the LnxCopy, you will receive a message:

```
Out of Memory: you have managed to fill up two megabytes of memory
Limit of files reached: you have reached a number of 1000 recordings
No TAP file: a file to be opened must be TAP
Disk Not Ready: you have not inserted a memory card
```

If esxDOS detects a problem during a communication with a memory card, LnxCopy will display:

```
Open File Error
Read Error
Write Error
```

In case of problems with a memory card, we recommend to test a card integrity, or back-up an entire contents of the card, reformat the card and copy all files to it again. Our experience shows that especially in the case of SD cards, a source of most problems is a short life or worn out of the card (unlike more durable CF cards) than any failure of the ZX Spectrum system.

## **F. A. Q. or What answers you do not find in this manual...**

**Can you change the program so that it does not use a large external memory and only uses 128KB of 128/+2/+2A/+2B/+3/128Ke models?**

No, such a version of the program would be too limited. We want to maintain a user comfort given sufficient memory capacity, e.g. for dealing with directories when saving files to PC media in esxDOS.

**Will there be a version for the DivMMCx2 with 512KB of RAM? Are you going to support other interfaces for the ZX Spectrum?**

Probably not, the memory space shared with the storage system is tight and the program, in future versions, has to meet requirements of the new esxDOS.

It is difficult and not without problems to connect more peripherals to the ZX Spectrum at the same time. The computer is not designed for this and can have issues with a load of an expansion port. For this reason, the program relies on extensions available in the MB03+, those together do not cause any problems. Therefore, we are considering even more capabilities of the MB03+ in the future, memory capacity, 64 characters per line mode (Timex Hires or HGFX mode), K-mouse and we will support more SD and CF slots or Wi-Fi transfers. This means to take an advantage of all hassle-free options that modern Spectrum's hardware offers.

**Will there be a version for the ZX Spectrum Next?**

A version of LnxCopy with a half of working memory was done for the eLeMeNt ZX, modern ZX Spectrum, created as a replacement for the original motherboards, into "cases" of Amstrad's models +2/+2A/+2B/+3. For various reasons, we do not have or do not use the SpecNext. LnxCopy is intended for users like us who do not want to put their original ZX Spectrums and clones to a museum, but want to revive them and use them actively with the attached MB03+.

**Will SAVE (files) function support older disk systems (Betadisk, Disciple, Opus, Didaktik) and classic floppies?**

No, it would be laborious to program it. Older disk systems have various and large limitations compared to the esxDOS. There are already alternatives, various Tape Archivers and Tape Managers, for some systems.

**Can the program software fix somehow a poor quality of recordings, ie readjust the sensitivity of the signal from the cassette player (as the BS-Copy does)?**

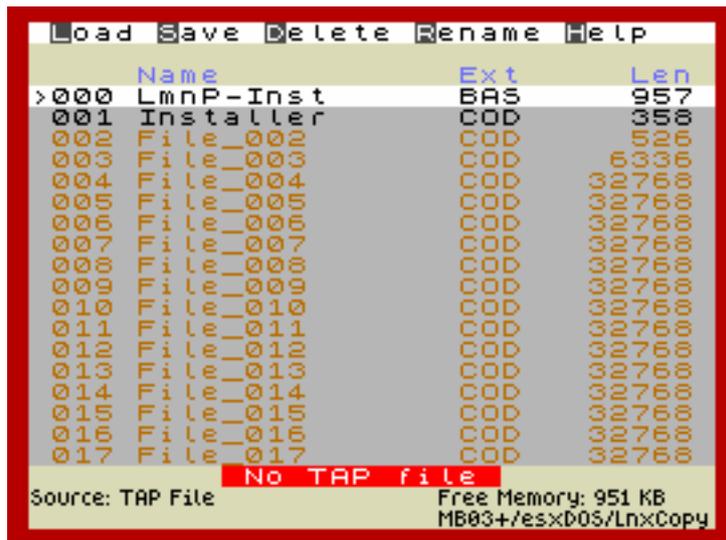
Not yet, this feature will be added in a next version.

**Why the program can't process special recordings of some commercial tapes ("tricky loaders")?**

The program now uses tape routines based on the original ROM. This will change in future versions, a detailed analysis of the data coming from the tape could be performed when saving data. However, the LnxCopy will never be able to overcome anti-piracy protection, it is only intended for backing-up „home“ tape cassettes and transferring data to PC media.

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## Keyboard Shortcuts

|                |  |
|----------------|--|
| L              | Load   |
| S              | Save   |
| R              | Rename   |
| D              | Delete   |
| H              | Help   |
| Cursor keys    | Previous / Next item                                     |
| 1, 2           | Page Up / Page Down                                      |
| 3, 4           | Top (First item), End (Last item)                        |
| F              | Toggle AutoCreate Folder                                 |
| SS+Cursor keys | Select / Unselect Files                                  |
| SS+A           | Select All Files   |
| SS+U           | Unselect All Files                                       |
| SS+M           | Change Color Theme<br>(default, Ocean, Monochrome, Dark) |
| SS+Q           | Exit   |

## Version 2.0?

- undo operation
- save settings to the LNXCOPY.INI file
- information on the number of records, marked and blocks in the info-line
- LOAD sensitivity adjustment
- SAVE/LOAD speed settings (TurboROM compatible)
- moderate time delays when saving files to tape
- COPY and PASTE operations with recordings
- switching between card slots in FileRequester (hd0 and hd1 in esxDOS)
- file headers edit
- import from disk-image files (DSK, MGT, TRD, D80, MBD, ...)