



Description of Functions
Version 1.8a

[system-99 user-group](#)

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Actual versions at [system-99 user-group](#)

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Overview

Start of the Program

COPY-C is presented as a simple program file that can be started with the Editor/Assembler Option 5 (RUN PROGRAM FILE). Every serious TI owner has such a thing so there should be no problems here. In addition, it functions from Option 3 (HELP PROGRAM) of the TI-Writer Modules.

The filename is COPY-C along with the disk drive number.

The disk must contain the files COPY-C and COPY-D as well as CC-README (the general instructions). If this is not the case, you cannot progress past the title screen. If you have changed the file CC-README, then no further reference appears and you should not be surprised if the program acts strangely or does not copy other disks. You have been warned!

Please do not misinterpret this software concept as a crippling of the software itself!

The Main Menu

Immediately after the start of COPY-C the Main Menu appears. If not, you have neglected to have the file CC-README on the same diskette as the main program. If you want to work seriously with COPY-C, then please put it back! If you have an 80-column card in your system you cannot use this version of COPY-C without more modification. There is an adaptation-program that mitigates the chaos in VDP caused by an 80-column card. It will be in the next new version for 80-column cards!

Besides the self-explanatory functions that can be called with the number keys 1 through 5 (that comes without saying!), are the other commands for you to use.

F, H, E, L, S, I, and R

In version 1.8a only F, H, E, L and S are active.

F – Set Color (Farbe einstellen)

Changes the colors in the screen from BLACK on CYAN to GRAY on BLACK and back.

H – Help (Hilfe)

Displays the Help Screen.

E – Single Track Copy (Einzelspurkopie)

Starts the single-track copy.

L – Load Configuration (Konfiguration laden)

Loads the copy parameters from the file CC-PAR.

S – Save Configuration (Konfiguration speichern)

Saves the actual copy parameters into CC-PAR.

I – Internal Notes (Interne Vermerke)

Displays the internal notes (Update-Date etc).

R – Activate Ramdisk (Ramdisk aktivieren)

Allows the activation of a RAM-Disk.

Now for the numbers 1 to 5.

1 – TURBO COPY

Starts the copy of a normal diskette and corresponds to a normal sector copy. The interleave factor of the source disk is observed (from Track 0) as well as the density. The number of tracks and sides (see number 3) is also determined. Likewise, you determine whether the target disk will be formatted and whether the formatting will be tested or not.

All TI formats and all 9 tracks per sector formatted in MS-DOS are copied!

2 - NON-STANDARD COPY

Starts the 'intelligent' copy. The relevant parameters, which you input are:

- Track count (Spuranzahl) (1 to 99)
- Sides (Seiten) (1 or 2)
- Interleave-Memory ('J' or 'N')
- Verify (J or N)

3 – COPY PARAMETERS (KOPIERPARAMETER)

Here you can set all of the required copy procedures with parameters that you set yourself. They can be consciously inferred from the data on the disk – the danger is that they might be too large to work properly.

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4 – AUXILIARY FUNCTIONS (ZUSATZFUNKTIONEN)

A second menu is displayed here and you can press the any appropriate key from those offered (even if they have not been implemented!).

5 – PROGRAM END (PROGRAMMENDE)

This leads to the title screen after a security question has been asked. The absolute end can be reached with BACK (FCTN 9) without further hinderance.

The Individual Options

SET COPY PARAMETERS

The most important point naturally comes first as a number comes before 3...

Pressing the 3 key from the main menu brings one to a screen-oriented editor that allows the setting of all of the important parameters for copying a diskette. The cursor can be moved to the aforementioned input position with the arrow keys FCTN S, D and X and ENTER is the starting point of the sequence.

Although you can press a key at each of the input positions and will see the character there, you must only use the editor to place the proper symbol in the proper area that makes good sense.

Thus letters with drive numbers or numbers in yes/no (Ja/Nein) fields are ignored. During the entry of the number of tracks, you must acknowledge the new value with the ENTER key but at all other points the key is immediately accepted.

The Editor can be exited with BACK (FCTN 9) provided that you have not indicated the same disk drive for the source AND target disk drive. In that case, BACK is ignored until different disk drive numbers are entered. All of the editor parameters are loaded or saved with 'L' and 'S' from the Main Menu and can be re-stored if necessary,

The following parameters can be edited:

From (Von)

Source drive to be read from

To (Nach)

Target drive to be written to

Valid disk drive numbers are 1 to 4 or, for example, 1 to 3 for TI Disk Controllers

Verify

'N' means that the data written to the target disk is NOT checked for correctness. That can save time but because of the danger of copy errors or faulty disks it is not recommended. It can be necessary to bypass some protection schemes!

Entering a 'J' causes the written data on the target drive to be checked and in the event of errors the writing procedure is repeated.

Tracks (Spuren)

Here you can input in decimal numbers from 0 to 99 that are allowed by your disk drive. If you give too large of a number, there is a danger that your disk drive can be damaged since the program does not know if your disk drive head is or is not in the proper position! Test here little by little until you hear a new type noise from your disk drive. This is not affected in single-track copy!

Step

Specifies the speed at which the write-read head of the disk drive moves (both are the same!). Here the values from 0 to 3 are allowed whereby 0 means the highest and 3 is the lowest speed (for specialists it is controlled by the Step-Timing-Mask with a Type-I command).

Original TI disk drives need 2 here but most of the others will work with 0.

The effective step times are as follows

- 0 - 6 Milliseconds (3 with CorComp)
- 1 - 12 Milliseconds (6 with CorComp)
- 2 - 20 Milliseconds (10 with CorComp)
- 3 - 30 Milliseconds (15 with CorComp)

If you have a still more ancient disk drive with head-load magnets, set your step time to the next highest value or remove the head-loads.

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Contr.

Owners of TI-Controllers input a '1' for 1771, all others input '3' for 1773 which is the correct input. If you should by mistake start the copy with the wrong controller identification, you can use auxiliary function 'I'. See there for more.

Sides (Seiten)

Enter for single side (input 1) or for double sided (input 2) for the diskette to be copied. Special function for single-track copy!

Vers.

Is the count of the number of attempts before one of the different types of errors are issued. Valid input is between 0 and 9. With 1, after the first error, an immediate abort occurs. Otherwise the appropriate number of attempts is made. The number of repetitions is affected.

- Sector read
- Verify-error, also write seek

Accordingly, for example, each track in the 9 sectors can be read 5 times (45 attempts) and there can be 5 write attempts until the track receives the correct information.

ATTENTION, The entry of '0' means that the number of errors will not be supervised! It is possible that the program will 'hang up' since the number of errors allowed is 65536. Use '0' if you absolutely want to pull down data from a defective diskette!

IL-Mem

With Non-Standard the address field and the track are separated. If you have switched this function off with 'N' the load will be tripped but nevertheless it will still work. With certain protection mechanisms the deactivation can be meaningful.

TCDF – Turbo Copy Disk Format

'J' indicates that by using TURBOCOPY the target diskette will be formatted, 'N' disables new formatting. You will receive the message 'SCHREIBFEHLER', which means that the target disk is not formatted. In the Non-Standard it is ALWAYS formatted so this flag is irrelevant.

DFVF – Disk Format Verify

With 'J' when a diskette is formatted and an immediate test of the diskette formatting is made. In the case of a formatting error, the program immediately aborts since the quality of the disk is at the least doubtful. With 'N' no test is made.

The option 'RD' cannot be reached through the editor function but can be chosen from the Main Menu with 'R'. This option will be first available in version 1.9! The cursor flashes in the left hand field where you can, with an input of 'H', choose a Horizon RAM-Disk with a save capacity of 180K that you have in the P-Box.

After this, you can make no further entries in the right hand field and input is ended and the presence of the given CRU-address of this card is examined in the help screen. If the card is not found, an error message follows.

If you have a Mechatronics 512-K GRAM-Karte, you input nothing in the left hand field and press ENTER. In the right hand field you input 'M' for the GRAM-Karte. Further information is given in the documentation of version 1.9 of COPY-C.

Owners of GRAM modules input 'G' in the right hand field for module type. That way the E/A module will NOT be lost!

Also during the input in the right hand field a check is made for the existence of a memory card!

TURBO-COPY FOR STANDARD-DISKETTES

Here the source- and target diskette are copied, and the density and interleave-factor is determined from track zero of the source disk.

Only the adjusted track count and number of sides are copied!

Defective sectors on the source disk are repaired on the target disk. The correctness of the data cannot be guaranteed since the errors must appear somewhere!

The following error message can occur:

DISKETTE IS NOT FORMATTED (DISKETTE IST NICHT FORMATIERT)

The source diskette is not formatted.

INCORRECT TRACK FORMAT (FALSCHES SPURFORMAT)

The track data does not agree with the allowed types (TI, IBM). Copy as Non-Standard!

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WRITE ERROR (SCHREIBFEHLER)

The target diskette is not formatted. Set the TCDF to 'J' for Ja!

ALL FOLLOWING UNSUCCESSFUL (ALLE VERSUCHE ERFOLGLOS)

The target diskette cannot be formatted. Either the diskette is defective or it is not compatible with your disk drive (HD-Types).

INCORRECT SECTOR RECOGNITION (FALSCHE SEKTORKENNUNG)

Most of the time a sector has a DELETED DATA MARK. Copy as Non-Standard!

SECTOR NOT FOUND (SEKTOR NICHT GEFUNDEN)

A sector with a standard number could not be found. Copy as Non-Standard!

For an overview of the hardware errors, see more there.

NON-STANDARD-DISKETTE COPY

Relevant parameters are listed in the short description. Defective sectors remain defective!

Error messages can be:

WRITE ERROR (SCHREIBFEHLER)

Target diskette is of poor quality. Repeat the copy process.

ABNORMAL TRACK LENGTH (ABNORMALE SPURLÄNGE)

The track analysis found an additive track length that cannot be physically realized. This message is only displayed for a few seconds. If you press any key during this time, the program waits for the track address in the correct range. The number was displayed under 'SPS'. The last sector is ignored during formatting and rebuilt at the end of the track.

These values must be determined via the track editor. The input of the values is as follows. First the track and side, then the sector and sector length input with ENTER!

If you do not press a key, the program will try to automatically find the values (I have always had good luck!). If the index gap of the concerned track is too small, then your intervention might be necessary.

The following is a list of possible Hardware Errors:

DISK IS WRITE-PROTECTED (DISK IST SCHREIBGESCHÜTZT)

Self-explanatory, or?

TRACK ZERO NOT REACHED (SPUR NULL NICHT ERREICHT)

The write-read head cannot travel back to track zero. This message according to experience comes when the head goes back across a diskette with errors.

Initialize the controller with 'I' in the Sub Menu.

It can also be the result of an incorrect controller setting.

DISK DRIVE NOT ACTIVE (LAUFWERK NICHT AKTIV)

Is displayed when there is no diskette in the drive, a cookie is wedged in there, or an unconnected disk drive has been specified. It can also occur when the wrong controller has been specified.

HELP SCREEN

You are brought here from the Main Menu by pressing 'H'. Displayed are the last 40 address arrays (depending on the density may not be actually current), the breaks that are inserted after switching drive assemblies, and the time it takes for the drive motor to reach the targeted number of revolutions. The numbers are only counters for the type of delay loop

LI, DEC, JNE

and have no correlation at present to the time in seconds. If you are using a T1 with a 14 MHz crystal, then the value will be 17% higher and with the use of 16-Bit RAMs about 40% or so.

Besides the CRU-addresses of the peripherals, the Skip Flag is displayed.

SWITCH BREAK (UMSCHALTPAUSE)

This is the time loop between switching off one disk drive and connecting to another disk drive. The minimal value at >3FF is on the immediate right.

This value is relevant to copy speed.

Pressing 'U' on the right allows you to alter the default value. BACK is permitted and will ignore the change, ENTER installs the displayed changed value.

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APPROACH BREAK (ANLAUFPAUSE)

This is the time loop for the approach of the disk drive motors. In a normal case, all of the motors are always running and this loop is only processed once. It can be changed by pressing 'A'.

CRU Diskcontr.

This is the CRU-base of the disk controller. Normally, it is >1100 but can deviate in customized setups. COPY-C also works with these, as long as the FDC-Trap vector is in the >5FFX range. It can be changed with 'D'.

CRU Horizon RD

This is the CRU-base of a possibly existing Horizon RAM-Disk. Only the 180KByte-version is supported! It can be changed with 'H'.

CRU GRAM-CARD (CRU GRAM-KARTE)

This is the CRU-base of the possibly existing Mechatronic GRAM-Karte. Only the 512Kbyte version is supported, with the EA-Module at >9800 and you do not wish to lose! It can be changed with 'G'.

RAM-Disk Skip J/N Flag

With 'J' (active) access to the diskette catalog, for example, (auxiliary function 'D') at the CRU-base >1000 is skipped through a DSRLNK and the disk drive, that has the same number as the RAM-Disk is addressed. With 'N' (inactive) the start is at >1000. It can be switched with 'S'.

BACK leaves the Help screen and returns to the Main Menu.

Apart from these adjustable parameters, 3 other additional functions are available that together with the single-track copy allow for the installation of individual copy protection for your software. These are callable with the 'E', 'L' and 'F' keys.

E

Permits the input of the address array of your own choice. After pressing 'E' you find yourself in the screen-oriented editor that allows the input of the address arrays. It is also possible to input non-existent sectors and replace the sector length byte with >F in place of the nibble in front. The end of the address array is indicated with >FF as the track number. After you have left the address array with BACK, your input is analyzed and formatting is begun. Existent non-specified sectors will receive the correct length byte and the information is secured. By jumping back and forth in the Main Menu one can read the 'SPS' field and see if your 'built' track structure is recognized correctly. If, for example, an SPS of 40 then a termination symbol >FF is placed in location of the track number. You must install the density that you wish to format before beginning the Single-Track Copy Menu. To set the density afterwards, go to the address array editor to fetch the non-existent indicators and leave the editor with BACK. Now, since SPS was updated you do not need to enter everything again!

F

Formats the track in the address array in the density that you indicated in the Menu of the single-track copy. In theory this track is written on the diskette but is built in the track-buffer where the data can once again be changed. You can get the details in the section about single-track copies.

L

Pressing 'L' empties the address-field buffer.

Now, you are probably upset with me that no more details about the structure and function of address fields and the track format are described in points E, F and L. In every headline we read that there is program documentation and manuals for 'cracking disk-jockeys'. If you want to do something bad with this program then you will have to know more than I am willing to give you voluntarily!

AUXILIARY FUNCTIONS (ZUSATZFUNKTIONEN)

With the '4' key, you will reach the Sub Menu with the following options:

A TRACK ANALYSIS (SPURANALYSE - not in V 1.8a)

Shows you what COPY-C thinks of the track.

D DISK CATALOG (DISKETTENKATALOG)

Give the number of the desired, connected disk drive. Pay attention to the Skip-Flag in the Help screen! A multipart catalog can be aborted with BACK. This catalog is strongly oriented toward Clint Pulley's SD. At this time my thanks to him.

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F FORMATTER

Allows the initialization of the target disk drive with the previously found density and interleave factor. The cursor blinks first on the density field where 'S' or 'D' is for single or double density. By pressing ENTER, the diskette is de-formatted (in SD formatted with >00) until no more tracks are readable. It will appear to be in quasi-new condition.

After the input of density the cursor blinks in the IL-Fak field. With the re-formatting this is irrelevant and is used only to prevent an immediate start. Otherwise, you indicate here how many sectors there are between the two sequential numbers. With single-density, '3' is the best value, and use '4' for double-density for standard diskettes, and '6' for diskettes that you wish to use in the p-Code System

Is a function of the DFVF flag during formatting all of the sectors in the track are tested and the contents are filled with the value >E5. If an error arises during reading or comparing, then the formatter breaks with the text.

FORMATTING ERRORS (FORMATIERUNGSFEHLER)

Try to format the disk again. If an error arises again, you should separate this disk from the rest (or maybe send it to a C64 user...).

The formatter starts after the input of the interleave factor and writes the obligatory parameters of tracks, density, SPS, and sides in sectors 0 and 1 and the diskname as always in COPY-C. Naturally, it does not do that if you de-format (logo!).

BACK

Brings you back from IL-Fak to density and from there to the Main Menu.

I INITIALIZE (INITIALISIEREN)

Resets the floppy controller chip. This should be done whenever you worked with the incorrect controller setting (or tried to work with it). Please stop and install the correct type!

S DISK SCANNER (not in V 1.8a)

BACK

You can leave the Sub Menu with BACK.

SINGLE TRACK COPY (EINZELSPURKOPIE)

With the press of 'E' you will find yourself in the Single-Track Copy Menu.

There you can work on the track number that is in the 'Spuren' field.

This track number (hopefully) was installed previously as a parameter in the editor. Contrary to the two copy options (keys 1 and 2) the Single-Track Copy interprets the input in 'SPUREN' as the number of the track that you wish to work on. Therefore, for example, you can input '0' as the track number where upon the Single-Track Copy will work on it but the two copying options refuse to work (track zero can only be copied and should not be left to the beginner!).

The density can be switched with 'D' and is also of importance for use by the address field editor. If you wish to install the density after having specified it, you can return to the Main Menu with BACK and switch to the help screen.

Aside from the density, you can install the side of the diskette that you wish to work on with 'S'. For this, the side number byte is abused which otherwise enters the number of sides to be copied. Here a '1' stands for the lower side of the diskette where a single-sided disk drive works. The '2' chooses the opposite side.

The available functions are:

BACK

Return to the Main Menu.

+

Track number plus 1 (No key repeat!).

-

Track number minus 1 (No key repeat!).

S

Switch sides (See above).

D

Switch density (See above).

1 - Read track (Spur lesen)

Through the press of the '1' key the chosen track on the source disk drive and the specified track contents and specified density is read. For security, it is read twice and there is always a problem with the floppy controller, the outgoing bytes are synchronized especially in double-density. While the command is being processed, an asterisk '*' appears beside the '1' in the function indicator.

2 - Load Track (Spur laden)

After you have read a track or, with the help of the address editor have built one yourself, you can use this option to load the track again at a later time. You will be asked for the filename that contains the contents of the track that you have in your library. A load error, for example; where the density does not correspond to this stored file or the file does not exist under this name (or the length of a program file causes the program to 'hang up') will result in the issuance of an error tone.

If everything went smoothly, then you did not hear a declaration of the program's displeasure. After the load, the track contents can be found in the editor buffer. The function selection is also indicated here with an asterisk '*'. If you enter a less than three characters for the input of a filename (this function) is aborted and you find yourself back at the Menu.

3 - Write Track (Spur schreiben)

This is the logical counterpart to option 1. Thus, the target disk is written in the track that you specified in the field 'SPUREN'. If you have changed the density or side between reading and writing the track number, then the buffer contents will be written to another track, another side, or in another density, they will make little sense. The editor buffer contents are always written to the chosen track!

4 - Save Track (Spur speichern)

Also, this is the reversal of the load function. You can save the contents of the editor buffer in the form of a program file if you find it necessary to use them later. You enter the density and how much you want to save from the buffer contents. With single-density use >D00 and double-density use >1A00 bytes. This varies the length of the produced program files so you can recognize them during loading for which the density of the track file can be deduced. Beginning is always from the start of the buffer.

5 - Edit Track (Spur editieren)

This is the central point of the Single Track Copier. The '5' key brings you to the screen-oriented editor with whose help you can change the track contents as you wish. You can, for example, in a normally formatted track, put some auxiliary data between the tracks that cannot be seen for disk identification so that no known copy program, not even COPY-C, can copy it. Subsequently, this track can be written anywhere on the diskette.

The Editor has available the following functions:

FCTN E,S,D,X

These are the well-known cursor keys. With them you can move to cursor here and there to and fro.

ENTER

Works as a HOME function and moves the cursor to the first column of the first row in the upper left corner.

FCTN 1

Switches from the HEX-Editor into the ASCII-Editor. All of the characters above '0' are accepted.

FCTN 2

Switches from ASCII- into the HEX-Mode.

FCTN 4

Empties the ENTIRE buffer and jumps to the beginning of the editor buffer.

FCTN 6

Switches to the next page in the buffer.

FCTN 8

Repeats the byte under the cursor 127 times.

FCTN 9 BACK,

Leaves the Editor.

The track editor displays, next to the actual data field, the address relative to the beginning of the track buffer. If you run the cursor below, over or momentarily past the side of the buffer, the following page will be displayed as long as you do not find yourself at then end of the buffer or, for example, at the beginning of the buffer. Exceeding the buffer borders leads you in each case to the beginning of the buffer with the HEX-Mode on.

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You can travel byte by byte through the whole buffer with the FCTN-D key and likewise backwards by means of FCTN-S. By pressing FCTN-S at the upper left corner of the data field, you are brought to the lower right corner of the previously saved page (exception at buffer start) and with FCTN-D accordingly from the lower right corner to the upper left corner of the following page.

M – Manual Sector Copy (Manuelle Sektorkopie)

The eleventh function of the Single Track Copier is chosen with the 'M' key. This starts the manual sector copy but only for the sectors that you entered in the Address Editor screen in your address array. The given track on the side and in the density are then written from the source diskette to the target diskette. It concerns a directed copy that you have selected with a linked copy algorithm but with a doubled address arrays bad things can happen (this starts first with version 1.9!).

THE PARAMETER FILE

As previously described one can save diverse parameters for COPY-C in a file named 'CC-PAR'.

These are the flags for

- VERIFY, TCDF, DFVF, CONTR.

and the values for

- Source- and Target disk drive,
- Track and Side count
- Step-Timing, Approach- and Switch break,
- A count of the found errors,
- As well as the 3 CRU-bases that can be adjusted in the Help screen.

If necessary you can save these parameters (the 'S' key in the Main Menu) and, if you wish read them again (the 'L' key from the Main Menu).

In both functions you are asked which disk drive contains your data or, for example, which one you want to read. The input of '0' or BACK returns you back to the Main Menu. If an error is detected a warning tone sounds.

Also here with each file access the SKIP-flag on the Help screen is observed. This flag is absolutely not in the parameter file since it is changed frequently during work.

The screen colors are not saved (do not be annoyed with me since it only takes a single keypress!).

ABORTING THE PROGRAM

During copying or formatting it may be sometimes necessary to interrupt the program. But honestly – who wants to destroy what they have worked on? COPY-C (in version 1.8) can only be stopped if you simulate a write-protected diskette that is possible with a switch or putting a piece of paper or cardboard between the diskette and the write-protect sensor. You are then presented with an error message and by pressing any key you are returned again to the Main Menu.

If you do it in the moment when the source diskette is being searched, you take the risk that your target diskette will be ruined (data only moderately understands itself!).

It is nice – you have read the instruction completely through! That was not quite so bad, or? There are a few tips and information at the end.

What does version 1.8a copy?

Basically, COPY-C copies any diskette, such as those for PCs or, for example, an ATARI ST, but you must have the proper disk drive and not a TI-Controller (double-density, of course!). If COPY-C cannot copy a diskette automatically, then one should assume that one must use other means of assistance.

How do I get Updates?

Naturally COPY-C continues to evolve. If you will support me by sending me your address and DM 10,-, you can have updates for the cost of postage.

Otherwise it should be said that there will be only updates to the Freeware version even if I notice some response to this venture. Otherwise, I see no sense in delivering better versions to the TI-community. You have in your hands whether or not you see other programs.

As a small incentive: planned are printout options for the track buffer, the employment of command files as in DIAGS, optimizing the disk drive head loads, an adaptive sector editor and other things.

How do I get to the copyright mark in the program?

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In principle, you should leave it as it is. COPY-C is written so that manipulating the program will immediately endanger the functions. The complete shell of the program in the normal conditions uses its own routines without explicitly testing them. There are other types (Tl'ers) who like to write their names into programs that they did not write and probably could not even if they tried. Such actions do not enhance their stature (if they had any to begin with!).

It requires so much to be done that is not favorable to the reputation of not only one disk editor, but again diminishes the achievements of all.

If you are one of that species you have much work ahead since we did not encrypt the text for no reason.

The program does not make a nice Kaboom! as does Bugout, but it just will not work correctly anymore!

It can be quite easy!

Send me a non-trivial bit of source code that you have produced so that we can see that you are not just an 'assembly beginner'. If we can arrive at an agreement, you can have the complete source code at a reasonable price (maybe without cost!).

Oh yes, should a 'cracked' version of COPY-C should fall into my hands, two things can happen. Either I will have no desire to produce anything more, or the next version will come with a hammer. The existing program manipulator is safe for the moment that subordinated the program protection. The others will be different!

How does one get my address?

Read the file CC-README! Or – ask a friend...!

P.S.: Also in CC-TIPS and CC-UPDATE are some nice facts! The read is worthwhile!

Otherwise have much fun and success with COPY-C!

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TIPS & TRICKS

This small bit of documentation is intended to provide some additional information about COPY-C.

STARTUP PROBLEMS

Unfortunately there are a few. One cannot say that COPY-C is not solely responsible for them.

As an example, in the course of the program development (on a Horizon RAMdisk) a somewhat strange development arose: depending on whether a program or DV80-File was present, it one time gave the Last-Drive Byte in V>3EEB and at another time in the File-Name-Compare-Buffer Byte at V>3FF5 and would give the correct information of where to load COPY-C and then look for it in CC-README.

COPY-C tests both of these bytes and if neither makes sense, assumes that disk drive 1 is the boot drive. Because of this error in the Horizon DOS, COPY-C will only start from this card only if it is setup as drive 1!

When booting from a diskette, this problem does not exist. However, we will attempt to optimize Version 1.9 in this regard.

ALWAYS START COPY-C VIA A DIRECT PATH FROM THE TITLE SCREEN TO THE LOADER!!!!!!

NON-STANDARD COPYING

Those who have studied disk protection schemes has found that the games that they play are almost without limits. With the TI there are limits due to the use of the IBM Standard 34 and also the use of commercial floppy controller formatter chips.

During the development phase of this program in the autumn of 1986 until the summer of 1987 some new protection tricks were discovered that, to overcome them, would have made taken a whole range of procedures necessary.

Since this could not be realized in the scope of a reliable program, various other functions were built in.

Although this might sound a bit ironic, they are intended for you to make up your own copy-protection schemes that even COPY-C will not be able to defeat. Even with these new functions that are provided will not make copying protected diskettes a simple process!

Should you hear of a copy-protected program, we can test it. Depending on the response of this public domain experiment it is conceivable that subsequent versions of COPY-C will also come with an assembly language library of program segments.

In the event that you are familiar with the Assembler, the following can be said: the error byte at >8350, that is actually after the Sector-I/O, should not just be tested for >00. The contents can help in telling whether a sector was defective and in analyzing the copy-protection scheme.

The following bytes at >8350 stand for the following error types:

- >21 Sector read: Sector not recognized, Record not found.
- >22 Sector read: CRC-checksum error in the sector.
- >23 Sector read: LOST-DATA, Hardware error in the Controller!
- >28 Sector write: Could not verify, error in diskette material.
- >31 Sector write: Sector not recognized, Record not found.
- >33 Sector write: LOST-DATA, Hardware error in the Controller!
- >34 Sektor write: Disk is write-protected.

POSSIBILITIES WITH TRACK EDITORS

Other than in the documentation it is not possible to manipulate the track contents with the track editor or the sectors within a track and write the track correctly back.

That is because of the way the data is interpreted while writing to a track!

TRICKING THE TRACK EDITORS

Perhaps you noticed while reading this remark: while it is technically possible, one cannot create an address field for track number >FF with the track field editor. There is another way to do it: give the track another track number and change it after formatting directly with the track editor.

INTERLEAVE FACTORS AND THEIR EFFECTS

The experienced 'Disk-Jockey' knows that interleave means the order in which the sectors are found on the tracks.

The uninitiated will say that it does not make any difference what order the sectors are in either ascending or decending order.

That is not it at all, particularly in double-density writing. As an example, the first sector of the track is read and then the floppy drive controller chip breaks off the work at this point and waits for a new command. After

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it arrives, it will try to synchronize itself with the data stream and by doing so wastes valuable milliseconds. Until all of the bytes are correctly recognized, by which time the searched-for sector has passed under the read head and it must wait for another revolution of the diskette and a new sector number can be read.

Then a few resourceful people got the idea that the sector numbers did not have to be sequential (observe the double meaning!) and placed some other numbers between the different sectors. The effect is obvious, with the correct number of sectors between the two, the time span would be sufficient that the two sectors to be synchronized for the correct access time between them.

The number of sectors arranged in such a way (not sequentially numbered) gives us the interleave factor.

But there is a drawback: a sufficiently fast CPU along with an equally fast floppy controller chip could read the sectors on a track in sequential order during a single revolution of the diskette (ca 0.2 seconds) which is what COPY-C simulates. If the sectors are not in order then an extra revolution is needed to read them.

What does that mean for us? The following example is valid for single-density. With ILF=0 if the sector numbers follow one after another, writing and reading are strongly slowed down. With ILF=1 the sectors follow 0,5,1,6,2,7,3,8,4, and it is even slower. With ILF=2 sometimes the diskette access works sometimes and sometimes it comes to a virtual stop. First ILF=3 stops the pause and everything is as it was before.

USING RAMDISKS OTHER THAN THOSE INDICATED

Future versions of COPY-C will support the 360K version of the Horizon RAM-Disk and the CorComp 512K Card (Memory plus). Since these do not allow direct hardware access, they will have to be accessed through a standard DSRLNK which means that the maximum copy speed will not be reached. But it is better than nothing!

ERRORS AND THEIR POSSIBLE CAUSES

The error messages were previously described but there are other things to say (write).

It can happen that COPY-C needs some extra time to determine the condition of a track. Depending on the type of copy protection it might be necessary to read different sectors more than once and also read the track structure. It must always wait for the disk controller chip to timeout while looking for a non-existent sector and it is possible that it might take as long as a minute per track. The disk controller in-use LED should be flashing during this time as with the CPS 99. If this is not the case and you have not specified a '0' for verify (VERS.) then the program has crashed. Wait a few seconds and then press RESET key or turn the console off (large sigh!).

If you have happened to have entered '0' in Vers., then it is your own fault. Go have a cup of coffee and in between check on your TI every once in a while.

CRC ADDRESS ERROR (CRC-ADRESSEFEHLER)

This bad (and ultimately fatal) error message occurs when more than the allowed defective tracks are found in the address field than were allowed in VERS. Try 9 in VERS: and if the error repeats then the diskette is totally dead (erased, it probably came by mail?!) or it was produced by a disk drive that is out of track adjustment (naturally your disk drive would never be thought to produce a few errors...).

Exchange the source and target diskettes, change the parameter fields and try to make a copy again. If this does not help with the error, a new disk is in order.

TRACK NOT REPRODUCABLE (SPUR NICHT REPRODUZIERBAR)

This can certainly happen. The message is caused by tracks that have too many address fields. There is always a buffer limit somewhere and when this limit is exceeded this message is error message is displayed. The copy algorithm cannot find the read address field and cannot repeat so it aborts. Diskettes such as this cannot be copied automatically by COPY-C.

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Update Information

Version 1.8a, Rev. 1 Stand: 27.2.1988

With the release of this version as well as the update list all of the old versions lose their right to exist. Delete your old files in order to preclude any mistakes with these old versions!

Version 1.8a, Rev. 1 Stand: 02.11.1987

The functions were changed, for example, IL-Mem. After the start of the program 'N' is automatically set. Write protected are copied diskettes with a single byte and the track structure is copied. IL-Mem 'J' accelerates the copy process but requires a test copy.

The instructions were not updated in this case since this function is not included and is completely voided.

Version 1.8a, Rev. 1 Stand: 09.11.1987

Until now, the DFVF option worked correctly only with the 1773 controllers. In the meantime it was changed and now with the TI controller the diskette can be immediately tested during formatting.

Version 1.8a, Rev. 1 Stand: 27.2.1988

COPY-C is not public domain software!! That was never so in principle since I was informed a short time ago that, as 'Public Domain' is interpreted – is the renouncing of all rights! Thanks to J. Fetzner who gave me this valuable information. COPY-C is FREEWARE, as was meant from the outset. Details in CC-README.

In the meantime COPY-C has received some good feedback. So now version 1.8 has a few new options.

A particularly bad error was eliminated: some WD1773 chips were lagging! When one gave them a command that they could not execute, they would do so at the next opportunity, even though the data sheets said the opposite. It could happen that if you did not have a disk in the target disk drive using options 1, 2, or the formatter and tried to catalog a disk afterwards that was not write-protected, track zero was emptied. The result: the entire disk was crap! That will happen no more!

The formatter now writes exotic track numbers with a good sector zero (one could even input something other than 40 or 80).

The most extensive changes were in the Turbo Copier. Here the structural possibilities of the Non-Standard algorithm were used. Result:

Immediately on 1773-Systems all DD-Formats, which the Ti uses, are copied flawlessly. The 18 SPS and also 16 SPS of the old Myarc format. It will copy a MS-DOS diskette, which also works in Turbo mode; the status display even shows 9 SPS and 4608 BPS. Even standard Atari-ST formats can be copied if a suitable disk drive is supplied.

It has been said that COPY-C cannot copy WriterEASE and the newer Qualitysoft 99 diskettes. This version of 1.8a can copy Qualitysoft diskettes that the older version that had the Single-Track editor could always copy WriterEASE. There are sufficient people who know that what goes around needs to be heard for yourself.

CC-README and the instructions were revised – print these new files out. An error is discovered in CC-README and it no longer jumps to the title screen but rather an error message is issued.

Naturally since the program was changed you must print everything again....

A Peek at Further Updates:

The track analyzer is in the works and will give at least as much information as DISKHACKER from Will McGovern. Suggestions are welcome at any time and my address is in the file CC-README!

In a pre-release version an adaptive sector editor has been realized by which it is possible for diskettes, for example, of an IBM or Atari ST to be directly sector edited and stuffed into a TI diskette that were normally unreadable in DOS. Since I have received somewhat more feedback from COPY-C owners, it is foreseen that these options will be installed in the public domain version of 1.8b!

UPDATE-SERVICE

(or what one must do to get new versions)

It is basically in CC-README but here is some additional information:

It is clear that the freeware Obulus of sending the newest update of COPY-C can be realized. Thus, anyone who sends me money (why does everyone adhere to the lower limit of DM 10,- ?) and writing a message and sending a self-addressed, stamped envelope will get the newest versions as they are completed (and a formatted disk, all clear!). I regard submissions without postage, envelope, or disk as a gift!

He who has received a version but has not paid the Obulus and wants a new version can (logically) bite on granite! Naturally, I will not send these persons an update. Finally, those few DM are not a purchase price but more of an expression of good will toward the TI software market.

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[Translator's note: SPS (Sektoren pro Spur) = Tracks per sector and DM = Deutsche Mark]