

64NET Version 1.68

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Manual Version 1.68

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Note that this manual, like the software it describes, is still evolving, and therefore may not accurately describe the version of the 64NET software you are using/testing.

Whilst the manual author is trying to keep up to date, and welcomes any corrections or suggestions, he can only say that if you get into difficulties due to this manual...

TOUGH!

Note also that this manual is going to be thoroughly revised and reordered soon...

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1. Introduction:

The Commodore 64 is, without question, the finest home computer ever released. Some of the features which made it the leader include high quality audio output, ease of use, the ability to be able to be plugged into a standard television set, and a plethora of arcade standard games available. Compared to other computers with similar capabilities the 64 was (and still is!) also great value for money.

However, the major problem with it, which was often pointed out by its detractors, was the slow speed of its mass storage devices such as the datassette and the 1541 disk drive. In more recent times such devices as the 1571 and 1581 disk drives from Commodore, and various high capacity floppy and hard drives from third party suppliers have improved this situation markedly, although not cheaply.

Commodore 64 owners have long looked at the cheap storage available to PC owners and bemoaned their inability to take advantage of this, or their inability to use the storage on their home PC for access by their 64.

NOT ANY MORE!

Paul Gardner-Stephen is proud to announce 64NET(c), the cheap, complete system which allows Commodore 64 owners to take advantage of the cheap mass storage available on PCs. With the price and availability of low-end PCs, 64NET is the cheapest mass storage for the Commodore 64 available today. 64NET even supports up to 4 Commodore 64s from the one PC simultaneously (if so licensed)!

64NET requires no special skills from its users, nor any programming. In fact, if you purchased 64NET with its interface cable you can be accessing your PC disks from your 64 immediately after loading and running the 64NET program, ie. a matter of minutes!

With 64NET you can access up to 65535 logical drives on your PC server from your Commodore 64 using standard Commodore commands. There is also no limit to the size of the PC drives accessible to the Commodore 64, subject to DOS limitations, due to the way 64NET interfaces the Commodore 64 to the PC.

64NET also supports the command structures of other disk systems popular on the Commodore 64, eg. partition and sub-directory access, and also allows the user to chose the device number which is the 64NET disk drive.

Whilst 64NET was developed to allow Commodore 64 owners access to the hard drives of their PCs, it is equally happy accessing floppy disk drives, CD-ROM drives, and network drives. In fact, 64NET will cheerfully access any device that presents itself as having a DOS file system!

2. Installation of 64NET:

64NET is designed to be as simple as possible to install, and setup. Whilst none of our testers had any difficulty performing the installation, we advise you to read the installation instructions carefully, and to seek advice where you feel uncertain as to anything contained herein. As pointed out earlier, we take no responsibility for any damage caused due to a faulty installation, even where such damage is caused by errors or omissions in these instructions.

Pre-install Checklist:

Before attempting to install 64NET, make sure the 64NET distribution kit you received from your supplier contains all of the following items.

1. A double sided disk, with the Commodore 64 64NET wedge programs on one side, and the IBM PC 64NET server software on the other.
2. This manual.
3. Either the patented 64NET cable, if you purchased it as part of your kit, or a detailed cable construction sheet if you did not. Note that the construction details are also duplicated in appendix D of this manual.

If you did not purchase the 64NET cable then you will have to construct one before you can use 64NET.

Hardware Installation:

- 1) Turn off both the Commodore 64 and IBM compatible. Failure to do this before plugging in the 64NET cable could result in the damage of your computers due to shorting. Again we stress that no responsibility will be accepted due to your failure to follow this instruction.
- 2) Connect your 64NET cable's DB25 connector to one of the parallel printer ports of the IBM compatible computer. It does not matter which parallel port you use if you have more than one, as 64NET will figure out which is being used!
- 3) Connect the other end of the same cable to the user port of the Commodore 64 (or compatible). Be sure to connect it the correct way up as the user port connector unfortunately is symmetric, therefore making it possible to insert the plug upside down. The simplest way of inserting the cable correctly is to make sure that the plug goes in with the cabled pins to the bottom, assuming that this component of the plug is visible. If the plug is protected by a shell, then insert it with the labeled side up (this should mean that the cable points away from the expansion (cartridge) port, if the shells are the same as those obtained by the 64NET test team).
- 4) Repeat steps 2 and 3 for each Commodore 64 computer you are connecting to your 64NET server computer.
- 5) Turn all computers back on.

Congratulations! You have successfully installed the hardware

component of 64NET.

Software Installation:

Before starting the software installation of 64NET, make sure that you have made a backup of your 64NET software disk(s). Instructions on how to do this are not the province of this manual.

- 1) Create a sub-directory on the hard disk of your PC, from the root directory with the name 64NET. This can be accomplished with the following commands in DOS (assuming installation to the C: drive):

```
C:  
MD \64NET
```

- 2) Copy the contents of the IBM compatible distribution diskette into this sub-directory. This can be accomplished with the following commands in DOS (assuming installation from the A: drive to the C: drive):

```
C:  
CD \64NET  
COPY A:*.*
```

This completes the installation of the server component of 64NET. See Appendix I for a complete list of files which should now be found in the 64NET directory on the hard disk.

- 3) Copy the file named "64NET WEDGE" from the Commodore 64 distribution diskette to your utility disk, or to a blank diskette. This will become your 64NET work (startup) disk.
- 4) Repeat 3) for each Commodore 64 you will concurrently be using with 64NET, subject to the license you obtained when you purchased 64NET.
- 5) Place your original distribution diskettes into a nice, safe, cool, dry place.
- 6) Congratulations! You have completed the 64NET software installation.

You are now ready to progress to using 64NET!

Adding registration details.

If you have purchased a registered copy of 64NET initially, then you need not read this section any further, as the normal installation process will automatically detect this.

If, however, you have decided to register 64NET after having used the public domain version, rest assured. Upgrading your version is a simple task, and does not overwrite your current configuration.

You will receive a file from your distributor called 64NET.KEY - place this in your 64NET directory in place of any file of that name which may be there.

That's all there is to it!

Note that this key file is registered to you, and you alone. Do not copy or otherwise distribute it. Each key file is uniquely identifiable so people using unauthorized copies will be prosecuted, as will those providing the key file.

3. Starting 64NET:

- 1) Move to your 64NET directory on the IBM compatible, eg CD \64NET
- 2) Type 64NET and press the ENTER key.

Note that the PC software MUST be run before the 64NET C64 wedge software to enable the server to synchronize with the clients. Failure to do this will not result in any damage to either system, but it will cause 64NET to fail to work, resulting in undoubted disappointment to the user.

This is not true of the 64NET C64 kernel replacement software, which synchronizes with the server on each access of the server.

You should see a screen similar to that in figure 1, below.

.....Insert screen shot here.....

Figure 1, Typical 64NET server initial screen.

Note that the rapidly "flashing" number on the screen is normal, and shows that 64NET is polling each of the possible parallel ports to see if a 64NET command has been received. This occurs whether or not your system contains multiple parallel ports or not.

The messages at the bottom of the screen are explained later, eg. F1, F2.

- 3) At this point you have 2 choices as to the type of installation used on your C64. The choice you make generally depends on whether or not you wish to use software or hardware found to be incompatible with 64NET. Examples of this are listed in Appendix A.

Normally it is expected that you will want to use the 64NET kernel replacement software which copies the kernel ROM to the underlying RAM, then patches that RAM with the 64NET access routines. The method of doing this is described in part A below. If you have software or hardware which expects to have free access to that RAM for its own purposes, then the 64NET kernel software will be corrupted by this, and undoubtedly fail! A possible hardware solution to this is described in Appendix J.

If you chose, or are forced, not to use the 64NET kernel replacement software, then you will need to install the 64NET wedge software, as shown in part B, below. Note that you have several choices as to the location in memory that the wedge is located, to provide maximum flexibility, and hence compatibility, with other software.

Common to either choice of C64 64NET installation is the default device number of the 64NET server. 64NET currently installs its server as device 7. This is done to avoid any possible device number conflicts with hardware already attached to your system. If for any reason you wish to alter the device number the 64NET server responds to, then all you need do is alter the value stored in location 167 (\$A7) to the device number you wish. This means that 64NET will allow your PC server disk drives to be accessed as anything from device 0 right through to device 255! Of course, not all software will accept such outlandish numbers, and certain numbers will cause problems to the operating system. That's where the flexibility of 64NET shines, in allowing you to choose device

numbers.

Part A. Installing the 64NET kernel replacement software.

LOAD and RUN the "64NET KERNEL" file on each Commodore 64 which is to have access to the IBM compatible's drives.

Part B. Installing the 64NET wedge software.

LOAD and RUN the "64NET WEDGE" file on each Commodore 64 which is to have access to the IBM compatible's drives. You will be asked where in memory you would like the wedge located. If unsure, or you have no reason to do otherwise, chose the default location shown by pressing the RETURN key once.

If you do not wish to accept the default location, then enter your preferred location as either a decimal, or hexadecimal (preceded by a "\$") number. The 64NET wedge cannot be loaded above \$9800, except in the range \$C000-\$C800, due to its size, and the lack of "normal" RAM which the operating system can easily see.

Please be aware that an inappropriate choice of location will cause 64NET to fail, and quite likely cause a machine lockup.

If the location chosen does not cause system conflicts, each Commodore 64 will attempt to make connection with the PC server, and then attempt to "auto boot" the "STARTUP n" file from the server, where n is the parallel port number that the particular Commodore 64 is connected to, eg "STARTUP 1" for parallel port 1. If that file doesn't exist, then the "auto boot" will attempt to load and run a file called "STARTUP SEQUENCE", if it exists. The startup files can be any C64 file which can be loaded and run. It may contain commands to set 64NET preferences, load your favorite application, or even run a game! Note that this is a perfect spot to alter the default device number used by 64NET.

Note that both the filenames mentioned above are illegal PC filenames.

They are actually the "real" names of possible files stored under 64NET, which allows full 16 character C64 compatible filenames.

Press the C= key when you RUN the 64NET wedge program to override this boot feature.

Irrespective of which installation method you used, success will be shown by your C64 displaying a black border, dark blue background, and white text.

If the kernel version was chosen you will also notice that a slightly different cold start message is displayed on the C64's screen.

You should also notice that the status field on the server PC has altered for one of the displayed ports. This indicated which parallel port address you are connected to, NOT which actual parallel port you are physically attached to. The reason that what you see is not what you may have been expecting is that not all PCs map their parallel ports to the "correct" locations.

64NET checks the following addresses as parallel ports 1 through 4.

Port	Address
1	\$378
2	\$3BC
3	\$278
4	\$2BC

Congratulations, you now have 64NET running! All references to device 7 (or whatever device you have set the 64NET server to) are now redirected to the logged drive and directory on the IBM compatible, and this is also now the default device, just as the datassette is the default device on a standard C64, and device 8 is on an SX64 or C65. All disk drives on the Commodore 64 are still accessible, unless you have chosen to override them with the 64NET server.

The RS-232 port is obviously now inaccessible, which is considered a very minor inconvenience compared to the advantages provided by 64NET! A pass-through version of the 64NET cable and software is being considered to overcome this limitation.

4. Features of 64NET:

Now that you have 64NET physically installed on your system, and have started the driver software, it is time to cover the many details and features of 64NET.

As this version (1.68) is a BETA release, some of the facilities may not always function correctly. When the public release is completed you will be sent your update disk (provided your copy of 64NET is properly registered, ie. you send in your registration form).

64NET attempts to logically emulate the 1541 file system as closely as possible, thus providing more than just a file transfer facility. Note that this does NOT mean emulate a 1541 disk drive, eg. access to 1541 RAM. All CBM file types are supported, with the exception of REL files.

Sector read and write functions are not supported as the emulated file system uses common DOS files to store each program or file, to provide maximum flexibility. This method means that there is no partitioning, "virtual disks", or other means to emulate the 1541. The end result is that sub-directories (8 character names only), and full 16 character file names are fully supported, and each drive may have well in excess of 664 blocks available, often around 160000 blocks for a 40MB drive (this author intends to connect his C64 to a PC on a network just to see the truly awesome site of "7812500 block free" [that's 2 Gigabytes!]) .

On top of the standard 1541 emulation (at KERNAL level), there are also many other facilities, including 5KB/sec fast loading (up to 12KB/sec on a Commodore 128, in C64 mode, with burst loading), off board machine code monitor,

PC to C64 file transfers with exceptional ease, networking facilities including pass-wording and differing access levels, improved loading and saving displays (percentage completed, address ranging or normal).

Further, due to 64NET's disk drive emulation, there is no limit to the number of files that can be stored on a "disk", subject of course to the physical size of the actual disk!

64NET allows you to access any physical disk drive on the PC including floppy drives, hard disks, removable drives, and even CD-ROMs! Drives A: to Z: are assigned by default to partitions 1 to 26 under 64NET, although this is easily re-configurable if desired. In addition to this, any PC sub-directory can also be assigned a logical partition name or number, making it simple to access that directory directly.

5. 64NET Functions:

Basic Functions

Almost all LOAD and SAVE commands which function on a 1541 will work correctly, unaltered under 64NET. 64NET however increases the scope of these commands, with the inclusion of sub-directory support and DOS file exchange.

i) General differences from a standard C64.

Whereas on a 1541 loading a directory has only a few options, in 64NET there is much more flexibility and choice. All 1541 directory loading

options are supported. The default directory load is a directory output almost identical to a 1541, listing all PRG, SEQ, USR and REL files (ie. all "CBM" files on the emulated drive), but adding the DIR files, which are the sub-directories of the logged drive and directory. Other file types which might be seen include IBM, which are files that are not definitely known to be C64 files of some type.

```
3 "/64NET          " 64NET
0  "CODE":         DIR
0  "TEMP":         DIR
0  "UTILS":        DIR
0  "GAMES":        DIR
0  "DEMOS":        DIR
0  "EDUCAT":       DIR
0  "DRIVERS":      DIR
0  "BACKUPS":      DIR
0  "PROGRAMS":     DIR
2  "64NET COPIER": DIR
5  "GEOS BOOT":    PRG
7  "MENU":         SEQ
1  "STARTUP 1":    PRG
2  "STARTUP 2":    PRG
50 "TURBO ASSEMBLER": PRG
0  "TACODE":       DIR
1  "TEST.SRC":     SEQ
0  "TEST.SRC":     *SEQ
67  BLOCKS LISTED.
30107 BLOCKS FREE.
```

Figure 2, Example directory listing from a 64NET 'LOAD"\$ [RETURN]'

There are several differences immediately apparent to that of a conventional directory listing derived from a 1541. Examining the header line you see something like the following, which can easily be interpreted.

```
3 "/64NET          " 64NET
^  ^                ^
|  |                |  -- Disk "ID", always 64NET.
|  |                |  -- Current logged directory on PC server.
|  |                |  -- Current logged disk drive on PC server.
```

You may notice that there is no disk header, instead the current path on the server (in UNIX style "slashes" forward instead of backward, ie "/" not "\") is displayed. Also note the drive unit number (which is always zero on a 1541). The three in the example corresponds to drive C: on the PC (0 is reserved for 1541 compatibility).

You might also have noticed that "splat" files (marked with a "**") are also supported under 64NET!

Here are some things to try:

```
LOAD"$:/*,*
```

(note you don't need a ,7 or end quote if you don't want to)

This will display ALL files of all types (IBM & CBM) in the root directory of the logged 64NET drive.

```
LOAD"$:/*,PC
```

This will display all files in the root directory of the logged 64NET drive which are not known C64 files.

```
LOAD"HELP
```

Get the online help system, self explanatory from there.

The help service is VERY FAR FROM COMPLETE, there are only about 6 man pages in it.

Advanced Functions:

Disabling and re-enabling the 64NET WEDGE.

In order to use certain features of your Commodore 64 you may find it necessary to disable 64NET temporarily.

To disable the 64NET wedge, just press and hold the RUN/STOP key, and smartly tap the RESTORE key. Your screen should return to the standard power-up message and colors.

To re-enable the 64NET wedge, type SYS 53242 (if you used the default location to install 64NET), and press RETURN. 64NET will not display any messages to indicate that it is active again at this point. If you believe that 64NET is not behaving correctly at this time, then entering SYS 53245 (again, assuming the default location) will go through the full boot sequence again.

Built in LOAD commands.

These give access to the built-in functions of the 64NET server.

LOAD"NETWORK STATUS

Displays the status of 64NET and the C64 you are using. You should see something similar to figure X below.

```
-----  
64NET V1.68N BETA  
4 USER RELEASE.  
USER NUMBER: 2  
USER NAME:ANONYMOUS  
PRIVILEGE LEVEL:HIGH  
-----
```

Figure X, result of a LOAD NETWORK STATUS.

LOAD"USER STATUS

This command requires MASTER level access, otherwise a PRIVILEGE ERROR is returned by the server. If you have appropriate access then you will see a display like that below in figure Y.

Figure Y, result of a LOAD USER STATUS.

LOAD"DOS STATUS

RJA Does nothing on my system, apart from thrashing the hard disk for a bit. Then "09,PRIVELEGE ERROR,03,03" on the server.

LOAD"MON

This is an off board dis-assembler, taking up no additional memory on the Commodore 64!

@ "command" sends "command" to the default disk drive, eg. @\$ will get a directory of the drive.

Note: try @fruit - who said utilities have to be dull?

X or Q will exit from it.

A to assemble,

D to disassemble,

M to view memory in block format,
I to view memory as ASCII,
F to fill,
` H to search memory (if you're really lucky!!)

64NET Disk commands:

"S:filespec" - Scratch file(s)
"UJ" - "Reset drive"
"RDdirectory" - Remove empty sub-directory
"MDdirectory" - Create a sub-directory
"CDdirectory" - Change current sub-directory, on logged drive.
"CPpartition" - Change current partition

RJA what directory will you be in? RJA to check

"I" - "initialize drive" => clear dos message to 00,OK
"NET:LOGOFF" - Log out of 64NET as a "network client"
"NET:DEFUSER:class" - Set security class of non-logged in users
(one of NONE,VISITOR,LOW,HIGH,MASTER)
"NET:FILECLASS:class:filename" - Set security on a file to one of the
classes
listed above.
"NET:CLASS:portno:class"-Set the security of another user (only MASTER may
do
this)
"O[%-][%+][\$+][\$-][D+][D-][B+][B-]" - Change various preferences
%/%- - Enable/Disable Percentage display on LOAD &
SAVE
\$+/\$- - Enable/Disable Address display on LOAD & SAVE
D+/D- - Enable/Disable "directory loading"
B+/B- - Enable/Disable Burst Loading

6. 64NET Utilities

64NET comes with a number of useful utility programs to enhance your use of the system.

For the C64

64NETCOPY provides a fast, simple means of copying files from your first CBM drive to the PC hard disk's logged directory. Note that it loads the CBM program into the normal load area for the program, so programs which load into the same area as the 64NET WEDGE will not be able to be saved using 64NETCOPY.

64NET FILE COPIER (v2.00.1)

- T/U tag/untag all.
- "space" to toggle all.
- "return" to tag file.
- C to start copy operation.

Has progress meter!

MON is an off board monitor/assembler. Details can be found (for now) in the Advanced usage section.

PC Utilities

Ok, now also included in the PC archive are a few other utilities:

C64DMON a bodgey X-Tree style sort of thing for the virtual file system.
64DIR do a directory showing .N64 files a bit better :)
DEHEADER (?) convert .N64 files to raw 64 format.
CNVRT64 will convert several popular PC C64 emulator file formats to the N64 format used by 64NET.

The C64DMON has a basic listing exporter for the really keen types.

7. Customization of 64NET

As mentioned earlier, when the 64NET WEDGE starts it loads a file from the server named STARTUP n, where n is the number of the parallel port that the particular Commodore 64 is connected to. This STARTUP program loads into the start of BASIC memory (\$0801) and is RUN. It can contain any Commodore 64 BASIC commands, stored as a Commodore BASIC program.

Some examples of what can be done are:

Change screen colors, load and access alternate character sets, load and run utility programs, load and run games, or just about anything else you might like to think of!

Permanent customization can be performed by editing the 64NET.INI file in the PC's 64NET directory.

The structure of the INI file is as follows:

```
[customization item]
customization details
more details
[another item]
details about that
```

etc..

To disable out an option temporarily, without deleting it from the .INI file, place a "#" character at the start of the line you wish to disable.

The data in the .INI file must strictly follow the order shown below, although no detail fields need be present. Any detail field not present will cause 64NET to use the default value shown between brackets after that detail field.

Specifically, the items that can be customized are:

[Security]

```
Details are:
  DefaultClass ()
  Prompt ()
  AllowVisitorLogging ()
```

[Preferences]

```
Percentage Display ()
Directory Load ()
Burst Loading ()
Help Path ()
```

[Partition Links] - allows you to assign PC devices and directories to a particular 64NET partition name or number. The default is to assign partitions 1 through 26 to drives A: through Z:

Details:

```
partition_name/number,path
```

eg. 7,C;\64net\games assigns logical partition 7 to the games directory under the 64net directory on the C: drive. Therefore, a CP7 command will take you straight to that directory, no matter

which drive and directory you previously had logged..

Ralphey's Directory,D:\TM\DOWNLOAD\CBM\SECRET is also quite valid. Therefore a CPRalphey's Directory command will take you to the specified directory.

Note that a maximum of 255 partitions can be assigned, although the partition numbers can be from 1 to 65535. Partition names, should you wish to use them instead or as well, can be up to 32000 characters long! The comma "," character may not be used as part of a partition name.

8. 64NET Limitations

In order for something as wonderful as 64NET to work, certain things about the Commodore 64 must be changed, or restricted. For instance, 64NET must occupy some memory on the Commodore 64, and divert operation through itself. This leads some potential problems.

Firstly, by occupying memory there will be certain programs which cause problems by wanting to use that same area of memory.

Secondly, by diverting operation, programs which rely on precise timing may be affected.

Finally, programs which wish to install fast-loaders or otherwise bypass normal kernel disk operations will undoubtedly fail, as 64NET is NOT a 1541 disk drive!

As programs are discovered which are 64NET incompatible, they will be noted. Attempts will then be made to either improve 64NET to remove the incompatibility, or the offending program's author will be contacted if possible to update the program.

9. 64NET Trouble-shooting Hints & Tips

Q. It hangs WHENEVER I try to use it!

A. Run the software on the PC FIRST, then after you see the 64NET server screen (see page XX) you can run the C64 wedge.

Q. 64NET hangs on me sometimes.

A. There's a few things you can do about this:

* If the hanging occurs in the MEMORY MONITOR or HELP SYSTEM, try taking your PC out of turbo during this time (i don't know why, but it helps!!).

* When in the MEMORY MONITOR or HELP system, don't type too fast (related to suggestion above, another unknown).

* Use a cable SHIELDED cable, as short as possible, as i believe that much of the problem it to do with "line talk". "Short" is no more than say about 3 meters (although working cables of 25 meters have been tested these cables experience more crashes and hanging than users of shorter cables). The PC parallel port expects to transmit over a distance of no more than 5 meters, so longer cables may cause your 64NET system to experience timing problems.

Q. When I load a file it loads in TWO BYTES UP from where it should.

A. When the file was converted to .N64 format, the load addr header was not processed correctly, try the conversion again.

Q. Some programs "hang" part way through loading, or don't load all parts of a multipart program.

A. Your program loads into the area occupied by the 64NET WEDGE (default \$C800-\$CFFF). Try loading the wedge into an alternate area. This may take some trial and error until you find a memory location "safe" from your program.

Another solution is to purchase 64NET-PRO, the plug-in replacement KERNEL ROM for the Commodore 64, which eliminates most known loading compatibility problems! Contact your distributor for further details.

Q. My program loads okay, but hangs when I run it.

A. Your program is being confused by the altered vectors that 64NET uses. The solution is that after the load finishes, reset the vectors by pressing and holding the RUN/STOP key, then smartly tap the RESTORE key until you see the standard "blue on blue" power up screen. Your program should work fine now. To reactivate 64NET after your program finishes, enter SYS 53242, if loaded into the default location.

10. Programming with 64NET.

64NET Extended function set

Dated: 25 May 1994

Purpose: To allow FAST usage of the features of 64NET for applications designed with 64NET in mind.

Calling Convention:

```
SendChar "X"  
SendChar "Function Id"  
{  
  Parameters  
}  
JMP 64NET_Serve_Loop
```

Check A for a nonzero value (or ST)

Functions Available:

"R" - Read a block of memory from a file (at the current position)
Parameters: low byte-high byte of start address and
 low byte-high byte of end address.

"W" - Write a block of memory to a file (at the current position)
Parameters: low byte-high byte of start address and
 low byte-high byte of end address.

"P" - Set current position in file
Parameters: "I" if setting input file
 "O" if setting output file
 32bit (least significant byte first) value for new
 file position.

Appendices

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A. Compatibility List

Does 64NET work with...

1. Jiffy DOS

Partly. the "Ctrl-D" function fails, but most of the loading procedures work. Negotiations are underway with CMD to hopefully enter into joint development.

2. Action Replay Cartridge

Also partly. Most of the loading procedures work, but the directory function only accesses the "real" device 8.

3. GEOS

Not at this time. A team of German programmers are working on a patch for GEOS to make it 64NET compatible.

4. C-128 & C-65

In C64 mode, yes. In native modes, not yet. It is being worked on. Note that the C64 wedge source code is available as part of every 64NET distribution, should you wish to make it compatible with some device or program of your own.

- > 1. Where does the C64 end software load, and what does it get in the way of?
> What programs do and don't work.

The wedge program default loads from \$c800-\$cfff (approximately). I am working on making some replacement "64NET" ROMs for the C64 that will make it 100% transparent, but with out drive bumping, and with conventional serial comms also. (Possibly at the expense of RS-232 on the user port because they can't both be used at the same time (ie. switch ROMs like an Amiga!))

- > 2. Does it work on the 128? If so, see question 1.

No idea! I don't own one. I would say, however, that the OPEN,CLOSE wedges would work. LOAD & SAVE would have to be managed through them (ie. goodbye burst loading)

- > 3. What about CP/M mode on the 128?

Hmm, different CPU!

I'd have to redo the code in Z80, but I can't see why it shouldn't work, pv I got some info on the file system, and where the wedges would have to go etc..

B. 64NET Support

The author of 64NET is dedicated to the support of 64NET, and welcomes your feedback, either in the form of suggestions for improvements to 64NET, or reports on problems with its use. Naturally only registered users can expect any formal response to problem descriptions.

You should contact the distributor you purchased 64NET from in the first instance with any questions. If the distributor cannot answer your question they will refer it to the author.

Authorized 64NET distributors are:

Australia, East:

Russell Alphey

Australia, Central and West:

Paul Gardner-Stephen

Germany:

Michael Renz

The software author can be contacted in a number of ways -

Voice: +61 8 2777479
BBS: +61 8 2771361 (answer all questions for instant d/l access)
The BBS carries the latest support files for 64NET, as well as a "problems" database with solutions.
Internet pgs@flinders.edu.au
Snailnet: Paul_Gardner-Stephen@1_Hurst_St.Morphettville.SA_Australia_5043
(Australia)

The manual author can also be contacted several ways -

Voice: +61 3 6513057 (BH)
+61 3 4278558 (AH)
Fax: +61 3 6514073
Internet: R.Alphey@dce.vic.gov.au (preferred)
ralphey@mirage.aero.rmit.edu.au
Russell.Alphey@p1.f100.n638.z3.fidonet.org
Fido: Russell Alphey at 3:638/100.1
Snail: Russell_Alphey@439_Punt_Rd.Richmond.Vic_Australia_3121

C. The Future of 64NET

customize dir separator?
64netpro - ROM? serial??
128mode
128-cp/m mode
65mode
Pet mode
Amiga version

D. Constructing the 64NET cable.

The 64NET cable requires no special skills to create, except confidence in your own soldering ability. A person with rudimentary soldering skills ought to be able to build a complete, working cable in under 10 minutes.

Parts required:

- 1 * CBM User Port female adapter (mandatory)
- 1 * DB25 connector, of suitable sex for plugging into your parallel port - usually male (mandatory)
- 1 length of 9 wire (minimum) cable [preferably shielded] (mandatory)
note that about 4 meters of cable is advised for maximum flexibility, but you should consider your own computer layout.
- solder (mandatory)

- 1 * CBM User Port adapter back shell (optional)
- 1 * DB25 back shell (optional)

The back shells protect the solder joints, by providing a secure place to grip whilst removing the cable ends from the computers which reduces the strain on the joints.

The pin-out for the cable is:

Userport CBM name	PC Printer port
A (GND)	25 (GND)
C (pb0)	10 (an input line)
D (pb1)	11 (an input line)
E (pb2)	12 (an input line)
F (pb3)	5 (data bit 3)
H (pb4)	6 (data bit 4)
J (pb5)	7 (data bit 5)
K (pb6)	8 (data bit 6)
L (pb7)	9 (data bit 7)

It is very simple to make! Just solder the individual wires to each adapter, making sure that each wire is connected to the correct pins at each end, and that there are no touching wires.

This author was able to make a working cable, first time, on only his second attempt at soldering. However, if you do not feel confident that you will be able to successfully build a 64NET cable, then contact the distributor from whom you purchased 64NET, and they will provide a 64NET cable for a nominal fee.

E. Differences between the Public Domain and Commercial releases of 64NET.

Whats in and whats not?

SAVING to the PC is out

LOADING is in (less than about 200 blocks though [as of 1.68])

OPEN is in (for command channel only)

INI parsing is in

BURST-LOADING is out

F. 64NET File Format

64NET v1.50 BETA .N64 File format

\$0000-\$0002 - "C64"
Note: Used to identify file as being a valid 64NET archive

\$0003 - 64NET File format version
Note: Current=\$01

Current use for version \$01 files:

\$0004 - 1541 equivalent file type
Valid types are: \$x0=DEL \$x1=SEQ
\$x2=PRG \$x3=SEQ
\$x4=REL (not implemented)
\$x5=DIR \$x6=DIR

Note: Assigning a file as a REL, DIR or IBM type could have strange side effects and is not recommended.

\$0005-\$0006 - Load Address (for ,8,1 loads) in standard CBM "low byte, high byte" format.

\$0007-\$000A - 32bit file length in bytes (NOT blocks). This is also stored in low through high byte format. Therefore the file size is actually
 $(\$07) + 256 * (\$08) + 65536 * (\$09) + 16777216 * (\$0A)$ bytes.
It is rather unlikely that any legitimate C64 file will ever have a value other than 0 (zero) in \$0A!

\$000B - 64NET Network security level (\$00 = none)
Note: if this value is >MASTER then the file is completely inaccessible, except through the disk monitor.

\$000C-\$001E - Reserved for future enhancement

\$001F-\$002E - 16 character file name padded with \$00's

RJA \$002F - ????????

\$0030-\$00FF - Reserved for future enhancement

\$0100 - Start of actual file body

NOTE: A known bug is that the first two bytes of the files (its load address) is NOT RETRIEVABLE through an OPEN and GETCHR combination, resulting in the possibility of incompatibilities. This problem will be solved in 64NET VERSION 2.

G. 64NET Error and Status Messages.

Conventional 1541 responses are given by 64NET, but these are not shown here. Please see your 1541 disk drive manual for a list of other (standard) status messages which are not listed.

00, OK,00,00	- OK!
00, WELCOME,00,00	- User logged on with network access
00, GOODBYE,00,00	- User logged off from system
01, FILES SCRATCHED,nn,00	
02, NO FORMAT,00,00	- You cannot format a PC drive from the C64
03, NOT 4040,00,00	- The 4040 drive D command (duplicate) is not supported by 64NET
04, OPTIONS SET,00,00	- Attempt to alter system option succeeded
05, SUBDIRECTORY EXISTS,00,00	- Attempted to create a dir that already exists
06, SUBDIRECTORY CREATED,01,00	- Attempt to create a dir successful
07, SUBDIRECTORY REMOVED,01,00	- Attempt to remove a dir successful
08, DIR NOT FOUND,00,00	- similar to "file not found" for directories
09, PRIVELIGE ERROR,01,00	- Unauthorized access to "system" files
09, PRIVELIGE ERROR,02,00	- Attempt to save with VISITOR access.
09, PRIVELIGE ERROR,03,01	- Unauthorized attempt to use "MON"
09, PRIVELIGE ERROR,03,02	- Unauthorized attempt to use "NETWORK STATUS"
09, PRIVELIGE ERROR,03,03	- Unauthorized attempt to use "USER STATUS"
09, PRIVELIGE ERROR,04,00	- Unauthorized access to network
09, PRIVELIGE ERROR,05,00	- User not allowed access to file
10, SYNTAX ERROR,00,00	- Error in "NET:" disk command
73, 64NET V1.68N BETA 1994,00,00	- Power-up message

H. 64NET Reserved Filenames and their Function.

All of these facilities are accessed by LOADING the filenames listed below. Note that if you chose to save files with these names, then your files are inaccessible from 64NET. This is to ensure that the 64NET facilities are always available. If you do save files with 64NET reserved names, then you will have to "repair" their names using the 64DMON program's (R)ename function.

Filename	Function
=====	=====
MON	- Off-board memory monitor
HELP	- On-line help system
DIR	- Loads full path and drive information
SYSTEM OPTIONS	- Displays (not loads) the current preferences
NETWORK STATUS	- Display info about yourself (not load)
USER STATUS	- Display info about all users (MASTER access required)
DOS STATUS	- LOAD the current DOS message (this does not clear the message however)

I. Files provided on the 64NET system disk.

1. C64 files

64NET WEDGE
64NET KERNEL
PATCH-ROM

2. PC files

64NET.EXE
DEHEADER.EXE
64DMON.EXE
64DIR.EXE

J. Installing 64NET permanently in your Commodore 64.

WARNING! The process described below will,

- a) Void any warranty on your C64,
- b) Possibly damage your C64 is done incorrectly,
- c) Frustrate you if you would like to install 64NET permanently in your C64, but can't (for one reason or another), and
- d) Possibly make you a little more aware of the insides of your C64!

At this point in time the author has not been authorized to provide modified copies of CBM's C64 kernel ROM. To do so without express permission would be in breach of CBM's copyright of that ROM, as what would be distributed is most substantially the work of CBM.

However, relief is at hand! If you have access to an EPROM reader and burner, then you can create your own, legal copy of a 64NET compatible kernel ROM. Here's how...

Firstly, use the EPROMMER to read your kernel ROM, and save a copy to disk. Then, run the "PATCH-ROM" program provided on your 64NET distribution disk, following the instructions shown on the screen. Finally, burn a new EPROM with the patched kernel (named KERNEL.64NET).

That's all there is to it!

If you don't have access to an EPROMMER, then your 64NET distributor *may* be able to assist you in this regard, but we make no guarantees of this.

K. Glossary.

logged drive - the PC server disk drive that 64NET is currently accessing.

logged directory - the (sub)directory of the PC server that 64NET is currently accessing.

wedge - a program loaded onto the C64 which is "wedged" into the operating system in order to alter normal operations.

kernel replacement - a program or ROM chip which is used instead of the kernel ROM provided with the C64, eg. JiffyDOS.

DOS - Disk Operating System. Also a commonly used abbreviation for the operating system used on PCs.

L. 64NET Registration Form.

Please take the time to fill in this form, and return it to the author. It will ensure that any updates to 64NET are forwarded to you, and that in the event of a problem with a distributor, you will still receive support for 64NET. Only registered purchasers will receive update notifications.

Name:

Street Address:

City / Town:

Country:

Post/Zip code:

Your email address, or fidonet node:

Contact phone number (optional): [...] (...) ...-.....
[country] (area) local-number

Your 64NET Distributor:

Thank you. If you could also fill out the following survey questions, it will help us make 64NET even better!

Where did you hear about 64NET?

What did you hear about 64NET?

What do you like about 64NET?

What do you dislike about 64NET?

Would you recommend 64NET to other C64 owners?

Why/why not?

Thank you again for taking the trouble to answer the survey. Please post the completed form to:

Paul Gardner-Stephen
1 Hurst St
Morphettville
South Australia 5043
Australia

or you can email it to:

pgs@flinders.edu.au

M. Recognized PC file types.

As at V1.68beta, 64NET recognizes the following "standard" file types on the PC as containing valid C64 files, as part of its virtual file system (VFS), and can therefore allow you, the user, access to the files contained therein.

.N64 - 64NET's own, preferred file type.
(64NET will only save as .N64 file type)

.T64 - C64S PC disk files.
The .T64s don't have the C64 filename stored in them correctly in all cases, so the 64NET displayed filename may not be absolutely descriptive.

.P00

"raw" - ie. files which are plain CBM \$0801 loading files.

"red raw" - what are these?

The author is also working at enabling recognition of other known file types, such as .D64, .P00.

N. Multi-lingual operation.

The file 64NETMSG.nnn (where nnn is the country code of the country the messages have been converted to the native language of) in the PC directory contains almost every message

that 64NET will ever display. These messages can be altered to display anything you wish, including in languages other than that which you originally received it.

Hopefully your distributor has already provided a copy of this file in your native tongue. The 64NET team would be pleased to receive copies of 64NETMSG converted to languages other than English, but be warned we will make sure that the messages contain the original meaning, and are not abusive, or offensive!

Files on your distribution disk named 64NETMSG.xxx contain a copy of the 64NETMSG file already converted to the language indicated by 'xxx'. Eg., 64NETMSG.GER contains a German (Deutsche) version of 64NET.MSG, and 64NETMSG.SWE contains a Swedish version.

Suffixes adopted by 64NET for the MSG files include the following. Please be aware that they only indicate the language which is contained in the particular MSG file, *IF IT EXISTS ON YOUR DISK*. It is not an indication of which languages 64NET.MSG has been converted to!

ENG - English
GER - German (Deutsch)
SWE - Swedish
NOR - Norwegian
FIN - Finnish (Suomi)
ITA - Italian
FRA - French (Francaise)
DAN - Danish (Dansk)

*** Junk to add into manual.

1)

```
LOAD "VMEM:xxxx:yyyy:zzzz"
```

```
SAVE "VMEM:xxxx:yyyy:zzzz"
```

xxxx = page number of first mem page to load/save (\$0000-\$ffff)

yyyy = first address to load into/save from

zzzz = last address to load into/save from

This will allow 16MB of Virtual memory!

A partition will have to be allocated as the "swap drive", and this can still be used for the normal VFS also.. The VMEM file will get as big as you swap into it! and will NOT necessarily be deleted at the end of a session (wow! - 'battery backed' RAM! :-)

2) REL files (finally!)

3) Fakey sector operations if i really feel up to it (fake copy protection?)

4) "off-board" file copier (bi-directional).

This will require a bit of work to get going well.

It may yet be easier to slack it and write the rest of the one I've already started.

*** This is the 941001 version of the manual, and refers to v1.68 of 64NET.

Questions / notes to Paul requiring answer/clarification:

Byte 002F in the .N64 file hasn't been defined/allocated??? (Only been waiting 3 months for an answer on this :)

Devices A: - Z: default to 64NET partitions 1 - 26...do they also default to partition names "A" - "Z"? If not, can they?