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# TurboDOS 1.22 Documentation Update

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## USER'S GUIDE REVISIONS

The following revisions should be made to the User's Guide to TurboDOS 1.2 (May, 1982):

On page 1-2 (in the "Improved Performance" paragraph), add:

> In addition to ordinary CP/M-compatible linear directories, TurboDOS also supports an optional hash-encoded directory format which employs a hashing algorithm to make look-up in large directories much, much faster.

On page 2-4 (after the "Disk Formats" section), add:

### Directory Formats

TurboDOS supports two alternate directory formats: linear and hashed. The standard linear directory format is compatible with CP/M, and is searched sequentially. Consequently, directory look-up speed deteriorates with increasing directory size, and can get rather slow on hard disks which contain a large number of directory entries. The linear directory format must be used for disks transported to or from non-TurboDOS systems.

The optional hashed directory format uses a hashing algorithm to make look-up in large directories much, much faster. A hashed directory may be used on any disk, but is especially suited for use on hard disks which contain a large number of directory entries. To set up a disk to use this optional hashed directory format, use the ERASEDIR command and answer "Y" to the prompt "Hashed directory desired (Y/N)?" Whether a directory is to be maintained in hashed or linear format is recorded in the directory label. The DIR command displays "(H)" to indicated that a directory is hashed. Hashed directories are not compatible with CP/M, or with older versions of TurboDOS prior to 1.21.

Note that directory searches which involve "wild cards" have to be done linearly regardless of whether the directory format is linear or hashed. In fact, such wild-card searches are typically slower if the directory is hashed.

On page 2-10, delete the final paragraph concerning "SGLLOG".

On page 2-12 (File Attributes), change the paragraph on the "archived" attribute to read:

> The archived attribute is set automatically whenever a file is archived by
> means of the COPY command with the ";A" option (see COPY command), and
> is automatically reset whenever a file is written or renamed.

On page 2-14 (File-Level Interlocks), add to the paragraph on the "permissive" open-mode:

> The exclusive write-lock is not gained when writing to a FIFO file.

On page 2-17 (File-Sharing Compatibility Modes), add to the paragraph on the "global-write" flag:

> Access to global FIFO files is always read/write regardless of the setting of
> the "global write" compatibility flag.

On page 2-20 (after the "Disk Error Handling" section), add:

> When spooling to disk, a full-disk condition causes the TurboDOS spooler to
> close the current print file (prematurely) and not queue it for de-spooled
> printing. TurboDOS then displays the following diagnostic message:
>
> > Spooler Error (Ignore, Abort)
>
> and waits for the operator to choose the desired error recovery option by
> keying the appropriate letter ("I" or "A"). The "Ignore" response causes the
> print mode to be set to "offline" and the user's program to continue with
> further print output discarded. The "Abort" response causes the user's program
> to be terminated. In either case, the incomplete print file will not be printed
> unless it is manually queued with a QUEUE command by the operator.

During de-spooled printing from disk, any unrecoverable disk error causes the
TurboDOS de-spooler to abort the print job in process and to place the printer
in "offline" status. Any remaining print jobs remain queued. No diagnostic
message is displayed (since the de-spooler is not attached to any console).

On page 2-21 (after the "Memory Management" section), add:

Sometimes it is desirable to gain additional TPA space by reducing the size of
the disk buffer pool. This can be accomplished with the BUFFERS command,
__provided__ that there is no other dynamic space allocated below the disk buffer
pool. Therefore, it is necessary to make sure that TurboDOS is quiescent (no
programs running, no files open, no print jobs queued, etc.) before changing
disk buffer parameters. In networking configurations, it is also necessary that
TurboDOS is generated with an adequate number of pre-allocated message
buffers and reply packets (see Configuration Guide). Otherwise, the BUFFERS
command will still cause the disk buffer pool to get smaller, but the TPA will
not get correspondingly larger.

On page 3-1 (AUTOLOAD Command), change the second paragraph to read:

The AUTOLOAD command enables you to create these .AUT files. The
command format is:

AUTOLOAD commandstring

where "commandstring" is any valid TurboDOS command or a string of
commands separated by a special delimiter, the vertical bar character "|".
The AUTOLOAD command converts each vertical bar "|" to a backslant "\" as
it is processing the command string.

and at the bottom of page 3-1, add:

NOTE: The command processor AUTOLOAD.COM has two patchable locations.
Location 103H contains the special command separator character and defaults
to "|". Location 104H contains the substituted command separator character
and defaults to "\".

NOTE: In order to work with release 1.22, all .AUT files created with AUTOLOAD under prior releases must be regenerated.

On page 3-3 (BATCH Command), change the "NOTE" to read:

NOTE: The command processor BATCH.COM has three patchable locations. Location 103H contains the special command separator character and defaults to "|". Location 104H contains the substituted command separator character and defaults to "\". Location 105H contains the drive on which the FIFO BATCH.DO is located and defaults to 0 (drive A).

On page 3-13 (DIR Command), add:

The directory display consists of a preamble followed by a list of files. The preamble includes the following information:

- disk label
- date and time
- the symbol "(H)" if the directory is hashed
- free space remaining on the disk
- number of files displayed
- requested drive and file specification
- combined size of files displayed

The list of files is alphebetized, and the size of each files is shown. Read-only files are distinguished by a colon ":" (rather than a period ".") preceding the file type. If there are too many files to fit on the screen, then the DIR command waits for a carriage-return at the end of each screenful.

On page 3-14 (DO Command), add to the end of the the second paragraph:

If the DO command is invoked by a privileged user under user-number zero, and if the original DO-file has the global attribute, then the temporary DO$-file is also given the global attribute.

and at the bottom of page 3-15, add:

NOTE:  The command processor DO.COM has two patchable locataions.  Location 103H contains the left parameter delimiter and defaults to "[".  Location 104H contains the right parameter delimiter and defaults to "]".

On page 3-16 (DRIVE Command), add to the end of the example display:

    Fixed (or removable) disk

On page 3-18 (ERASEDIR Command), change the example to:

    0A]ERASEDIR B:
    Hashed directory desired (Y/N)?  N
    OK to erase directory on drive B (Y/N)?  Y
    Directory erased
    0A}

On page 3-25 (MASTER Command), add:

    NOTE:  Do not attempt to run the MASTER command from more than one console at a time.  If you do, console output from the master processor will be randomly distributed across two or more consoles, and will consequently be undecipherable.  If this should ever occur by mistake, simply detatch all but one of the consoles.

    NOTE:  The command processor MASTER.COM has two patchable locations. Location 103H contains the special attention character and defaults to "^A". Location 104H contains the substituted attention character and defaults to "^S".

On pages 3-26 and 3-27 (MONITOR Command), change the syntax of the Load and Save directives to:

    L  filename[ addr]
    S  filename[ addr1,addr2]

On page 3-36 (SEND Command), add to the bottom of the page:

> NOTE: The command processor SEND.COM has two patchable locations. Location 103H contains the special command separator character and defaults to "|". Location 104H contains the substituted command separator character and defaults to "\".

On page 4-1 (introduction to CP/M-Compatible Functions), add:

> TurboDOS function calls generally destroy registers A-B-C-D-E-H-L. CP/M-compatible functions which return an 8-bit value in the A-register also return the same value in the L-register, and set both B- and H-registers to zero.

On page 4-6 (Function 17), change "Notes" to read:

> **Notes:** Returns with a directory record (four entries) in the record buffer, and with the A-register specifying which of the four entries was found. Function 17 searches the disk directory for the first file that matches the specified FCB. The FCB may contain wild cards. If the first byte of the FCB (drive) is set to a "?", then the first directory entry of the default drive is returned unconditionally (in most cases, the label entry).

On page 4-6 (Function 18), change "Notes" to read:

> Returns with a directory record (four entries) in the record buffer, and with the A-register specifying which of the four entries was found. Function 18 continues the search initiated by function 17, continuing from the last directory entry found. If the first byte of the FCB (drive) is set to a "?", then the next directory entry of the default drive is returned unconditionally, regardless of whether it is a valid file entry, a deleted file entry entry, or an allocation map entry.

On page 5-1 (introduction to Additional TurboDOS Functions), add:

> TurboDOS function calls generally destroy registers A-B-C-D-E-H-L.

On page 5-1 (Function 74), change the first item of "Returns with:" to read:

A = block size (3=1K, 4=2K,..., 7=16K), plus bit 7 = 1 if fixed disk

On page 5-12 (Function 115), change the "Called with" section to read:

C = 115
E = drive (0="A", 1="B",..., 15="P")
D = option flags:
    bit 7 = 1 to free buffers
    bit 6 = 1 to free buffer after disk error "abort" response
    bit 5 = 1 to continue after disk error "abort" response
    bit 4 = 1 to return after disk error "abort" response

On page 5-14 (Function 123), change "12-byte structure" to "5-word structure".

In Appendix (MicroPro WordStar Applications Note), change the first two bytes of the patch from 00 to 01, as follows:

At 02AE change 0A to 01 (DELCUS = 1)
At 02AF change 05 to 01 (DELMIS = 1)
(...remainder of patch unchanged...)

## CONFIGURATION GUIDE REVISIONS

The following revisions should be made to the Configuration Guide to TurboDOS 1.2 (May, 1982):

On page 2-3 (module hierarchy diagram), delete SGLLOG module.

On page 2-6, delete SGLLOG module.

On page 2-7, change length of PATCH module from 64 bytes to 128 bytes.

On page 2-13 (after GEN Command), add:

### PACKAGE Command

The PACKAGE command permits you to combine any collection of .REL files into a single .REL file. The command syntax for PACKAGE is identical to the GEN command, except the input filename defaults to type .PKG (instead of .GEN), and the output filename defaults to type .REL. The PACKAGE command may be used to construct custom packages of TurboDOS modules, make additions to the supplied "STD" packages, pre-package collections of driver modules, etc.

On page 2-16 the patch point COMPAT is in FILCOM module, not FILLOK module.

On page 2-17 (in NETMGR module), add the following patch point:

NMBRPS = 0   Number of pre-allocated reply packets

On page 2-17 (in OSLOAD module), add the following patch point:

SCANDN = 0   Scan drives from A-to-P (=0), or P-to-A (=OFF)

On page 2-20 (after NMBMBS paragraph), add:

NMBRPS is a byte value that specifies the number of network reply packets to pre-allocate at cold-start time. This value may be left zero, but memory fragmentation may be reduced by assigning a positive value (see NMBMBS above).

On page 2-25, change item 3 as follows:

single-user without spooling: .REL files for STDLOADR and STDSINGL; .COM files for AUTOLOAD, BACKUP, BOOT, BUFFERS, COPY, DATE, DELETE, DIR, DO, DRIVE, DUMP, ERASEDIR, FIXMAP, FORMAT, GEN, LABEL, LOGOFF, LOGON, MONITOR, PACKAGE, PRINT, RELCVT, RENAME, SET, SHOW, TYPE, USER and VERIFY; and .REL files for CPMSUP, OSBOOT, PATCH, RTCNUL, SUBMIT, and all necessary driver modules.

single-user with spooling: .REL files for STDLOADR, STDSINGL and STDSPOOL; .COM files for AUTOLOAD, BACKUP, BOOT, BUFFERS, COPY, DATE, DELETE, DIR, DO, DRIVE, DUMP, ERASEDIR, FIXMAP, FORMAT, GEN, LABEL, LOGOFF, LOGON, MONITOR, PACKAGE, PRINT, PRINTER, QUEUE, RELCVT, RENAME, SET, SHOW, TYPE, USER and VERIFY; and .REL files for CPMSUP, OSBOOT, PATCH, RTCNUL, SUBMIT, and all necessary driver modules.

multi-user networking: .REL files for STDLOADR, STDSINGL, STDSPOOL, STDMASTR, STDSLAVE and STDSLAVX; .COM files for AUTOLOAD, BACKUP, BATCH, BOOT, BUFFERS, CHANGE, COPY, DATE, DELETE, DIR, DO, DRIVE, DUMP, ERASEDIR, FIFO, FIXMAP, FORMAT, GEN, LABEL, LOGOFF, LOGON, MASTER, MONITOR, PACKAGE, PRINT, PRINTER, QUEUE, RECEIVE, RELCVT, RENAME, SEND, SET, SHOW, TYPE, USER and VERIFY; and .REL files for CONREM, CPMSUP, OSBOOT, PATCH, RTCNUL, SUBMIT, and all necessary driver modules.

On page 3-20 and 3-21 ("Disk Drivers"), change first byte of the disk specification table format as follows:

.BYTE BLKSIZ ;block size (3=1K,..., 7=16K), plus bit 7 = 1 if fixed disk

In Appendix (sample driver listings), substitute newest drivers provided on TurboDOS 1.22 release disk. In particular, note that sample network drivers (MCDxxx and SCDxxx) have been completely rewritten to handle a bidirectional network protocol. Also, a bug has been fixed in the sample serial drivers (SERxxx).

## LIST OF CHANGES IN RELEASE 1.21

1. **Error in Compute File Size (function 35) fixed:**
This error caused all files under user zero to be accessable whether or not the Global attribute was set.

2. **Error in NETMGR module fixed:**
This error caused message buffers to be discarded instead of re-used, resulting in erosion of TPA space, trapping of disk buffers, and possible system crashes. A temporary patch was issued to fix this problem in 1.20.

3. **Error in Load Program (function 113) fixed:**
This error caused program files to be opened in default mode rather than read-only mode. If the default open mode was Exclusive, then all but the first of multiple near-simultaneous program load or auto-load sequences would fail. A temporary patch was issued to fix this problem in 1.20.

4. **The SGLLOG module has been deleted:**
This module can no longer be supported due to the more generalized topology of TurboDOS networks introduced in 1.20.

5. **Error in Log-On/Log-Off (function 111) fixed:**
This error caused all files in user zero with the Global attribute set to be accessible when logged off, which defeated log-on security.

6. **Error in DATE command fixed:**
The sequence ESCAPE-I is no longer output to the console when re-displaying date and time prompts.

7. **Error in LOGON command fixed:**
This error caused LOGON to fail if a SYSLOG.SYS file was present, resulting in endless auto-loading of the LOGON command.

8. **Error in USER command fixed:**
This error caused the "Non-priveleged user" diagnostic to be followed by trailing trash on the console.

9. **Error in DIR command fixed:**
This error caused the three-column display mode (used when files of a megabyte or more are encountered) to exceed an 80-column display width.

10. **Enhancement to GEN command:**
The GEN command now diagnoses and ignores additional defined starting addresses (transfer addresses) after the first one.

11. **Error in MONITOR command fixed:**
This error caused hex digits A-F entered in lower case while in "Examine" mode to be ignored.

12. **Enhancement to network download facility:**
When a slave processor sends a download request message, it is no longer necessary for the message header to have MSGOID set equal to MSGSID by the driver; this is now done by TurboDOS internally. (See Configuration Guide, page 3-19.)

13. **Change to Return Buffer Parameters (function 97):**
The memory size returned in the A-register is now the memory size of the processor where the function originated, rather than the processor where the function was processed.

14. **Enhancement to NETMGR to pre-allocate reply packets:**
A new patchable system parameter, NMBRPS, has been added to the NETMGR module. It may be patched to a positive 8-bit value to pre-allocate reply packets, in the same fashion as NMBMBS pre-allocates message buffers. This may be used to prevent trapping of disk buffers.

15. **Error in VERIFY command fixed:**
This error caused duplicate map entries to be made occasionally in the BLOCKS.BAD file, consuming excess map area in the directory entry.

16. **Error in VERIFY command fixed:**
This error caused insufficient TPA not to be diagnosed properly, generally resulting in a system crash.

17. **User sign-on message capability added:**
An optional user-supplied sign-on message may now be defined. It must begin with the public entry name "USRSOM:" and terminated with a "$". If USRSOM is defined, then it will be displayed immediately following the normal TurboDOS sign-on message.

18. **Error in COPY, DELETE, DIR, QUEUE, RENAME, SERIAL, SET and SHOW commands fixed:**
This error caused insufficient TPA not to be diagnosed properly while building a sorted directory list, generally resulting in a system crash.

19. **Enhancement to COPY, DELETE, DIR, QUEUE, RENAME, SERIAL, SET and SHOW commands:**
The directory sort algorithm has been speeded up. It now sorts 1,000 files twice as fast as before.

20. **Error in MONITOR command fixed:**
This error caused the message "linker control error" to be displayed when attempting to load the MONITOR command into a TPA of insufficient size.

21. **Error in write to un-allocated block fixed:**
This error caused files extended in certain non-sequential orders (very rare) to become corrupted.

22. **Error in record locks fixed:**
This error caused an error-return if an attempt was made to write to a locked record when the Logical compatability flag was set.

23. **Addition of PACKAGE command:**
The PACKAGE command is a librarian utility for concatenating Microsoft-format .REL files. The command syntax for PACKAGE is identical to the GEN command, except that the input filename defaults to type ".PKG" (instead of ".GEN") and the output filename defaults to type ".REL". This command may be used to construct custom packages of TurboDOS modules, make additions to the supplied "STD" packages, pre-package collections of driver modules, etc.

24. **Enhancement to FIFO manager:**
If a RAM FIFO is not currently open by any process but does contain records, those records will be discarded if either (1) the FIFO is renamed, or (2) the FIFO attribute (F1) is turned off.

25. **Major enhancement: hashed directories:**
Disk directories will be maintained in an optional hashed format if so requested during the ERASEDIR command. Whether a directory is maintained as linear or hashed is recorded in the directory label. Hashed directories are not compatible with CP/M or previous TurboDOS versions. The DIR command displays the symbol "(H)" in its preamble to indicate the presence of a hashed directory. Hashing provides a dramatic improvement to non-wild-card directory searches on disks with large directories (e.g., hard disks).

26. **Fixed disk flag added to disk specification table:**
Bit 7 of the first byte of a DST (the block size byte) now signifies that the disk is non-removable, and enables various performance-enhancing shortcuts in TurboDOS which are possible for fixed disks. The DRIVE command now displays whether a disk is fixed or removable.

27. **PATCH module lengthened:**

The PATCH module has been lengthened from 64 bytes to 128 bytes.

28. **Error in OSBOOT fixed:**

This error caused the first OSLOAD.COM entry found in the directory to be loaded, whether or not the user number was zero.

## LIST OF CHANGES IN RELEASE 1.22

1.  **Error in COPY command fixed:**
    This error caused the archive option "/A" to copy all files (including those with the archived attribute).

2.  **Enhancement to spooler error handling:**
    When spooling to disk, a full-disk condition now causes the TurboDOS spooler to close the current print file (prematurely) and not queue it for de-spooled printing. TurboDOS then displays the following diagnostic message:

    Spooler Error (Ignore, Abort)

    and waits for the operator to choose the desired error recovery option by keying the appropriate letter ("I" or "A"). The "Ignore" response causes the print mode to be set to "offline" and the user's program to continue with further print output discarded. The "Abort" response causes the user's program to be terminated. In either case, the incomplete print file will not be printed unless it is manually queued with a QUEUE command by the operator.

3.  **Enhancement to de-spooler error handling:**
    During de-spooled printing from disk, any unrecoverable disk error now causes the TurboDOS de-spooler to abort the print job in process and to place the printer in "offline" status. Any remaining print jobs remain queued. No diagnostic message is displayed (since the de-spooler is not attached to any console).

4.  **Enhancement to AUTOLOAD command:**
    The AUTOLOAD command now accepts multi-command strings separated by a special delimiter, the vertical bar character "|". The AUTOLOAD command converts each vertical bar "|" to a backslant "\" as it is processing the command string. In order to work with release 1.22, all .AUT files created with AUTOLOAD under prior releases **must** be regenerated!

5. **Enhancement to all commands.**

   All TurboDOS commands can now accept interactive input from a DO-file.

6. **Enhancement to Flush/Free Buffers (function 115):**

   This function now accepts the following parameters:

   C = 115

   E = drive (0="A", 1="B",..., 15="P")

   D = option flags:
   > bit 7 = 1 to free buffers
   > bit 6 = 1 to free buffer after disk error "abort" response
   > bit 5 = 1 to continue after disk error "abort" response
   > bit 4 = 1 to return after disk error "abort" response

7. **Error in MP/M-format Set Date/Time (function 104) fixed:**

   This error caused the system time to be set incorrectly by this function.

8. **Error in RELCVT command fixed:**

   This error caused incorrect conversion to occur in some cases where multiple modules were assembled from one source file using the PSA assembler ".PRGEND" pseudo-op.

9. **Error in Compute File Size (function 35) fixed:**

   This error caused an incorrect file size to be computed on a file that had been extended and not closed, and resulted in problems with shared files under RM-Cobol.

10. **Error in COPY command fixed:**

    This error caused a spurious diagnostic message "Unable to Read Source File" when copying a file which was an exact multiple of 16K in length.

11. **Error in FILSUP module fixed:**

    This error caused incorrect allocation on drives with certain numbers of allocation blocks.

12.     **Error in NETSVC module fixed:**
This error caused improper operation of direct printing when implicit network forwarding was involved.

13.     **Error in NETREQ module fixed:**
This error caused failure to properly diagnose accesses to disk drives marked invalid (0FFH) in the disk assignment table (DSKAST). A "Not Ready Error" is now properly diagnosed.

14.     **Error in SPOOLR module fixed:**
This error caused creation of a new print file to interfere with proper operation of functions 17 and 18.

15.     **Error in FILMGR module fixed:**
This error caused Rename File (function 23) to fail on files larger than 528K.

16.     **Error in NETREQ module fixed:**
This error caused Comm Channel functions (87 through 93) and User-Defined function (127) to fail if the destination processor (specified by DEFDID) had a NETREQ module present.

17.     **Error in DSPOOL module fixed:**
This error caused a crash if an attempt was made to change a printer's queue assignment while the printer was in "stopped" mode.

18.     **Error in BUFMGR module fixed:**
This error caused many non-reproduceable file and directory errors during disk-intensive multi-user operations. Two known results of this problem are: (1) the same allocation block being assigned to two files simultaneously, and (2) spurious error conditions being returned during file read, write or close operations. (A patch was issued for release 1.21 to correct this error.)

19. **Error in DO command fixed:**
This error caused a bad temporary-file name to be generated if the DO-file name had a one-character type field.

20. **Enhancement to OSLOAD module:**
A new patchable symbol (SCANDN) has been added to the OSLOAD module. If SCANDN is patched to OFF hex, then the TurboDOS loader will scan from drive P down to drive A (instead of the normal scan from A to P).

21. **Error in FILSUP module fixed:**
This error caused various problems in connection with certain pathologically-ordered hashed-format directories.

22. **Enhancement to DO command:**
If the DO command is invoked by a privileged user under user-number zero, and if the original DO-file has the global attribute, then the temporary DO$-file is now given the global attribute as well.

23. **Error in FILSUP module fixed:**
This error caused function 17/18 sequences to repeat endlessly on hashed-format directories when a function 17 with an unambiguous file specification was followed by a function 18 with an ambiguous file specification.

24. **Enhancement to Rename File (function 23):**
The Rename File function now resets the archived attribute.

25. **Enhancement to FIFOs:**
Two changes have been made to improve shared access to FIFOs. An exclusive write-lock is no longer gained when writing to a FIFO opened in permissive mode. Access to global FIFOs from non-zero user numbers is now always read/write regardless of the setting of the "global write" compatibility flag.

26.  **Addition of several command patch points:**
     The following patchable locations now exist in TurboDOS command processors:

     AUTOLOAD.COM:
     103H  "|"    Special command separator character
     104H  "\"    Substitute command separator character

     BATCH.COM:
     103H  "|"    Special command separator character
     104H  "\"    Substitute command separator character
     105H  0      Disk for BATCH.DO FIFO file

     DIR.COM:
     103H  3      Left margin for printed directory (;L option)
     104H  "^L"   Clear-screen character for multi-screen directory

     DO.COM:
     103H  "{"    Left parameter delimiter
     104H  "}"    Right parameter delimiter

     LOGON.COM:
     103H  "^L"   Clear-screen character

     MASTER.COM:
     103H  "^A"   Special attention character
     104H  "^S"   Substitute attention character

     SEND.COM:
     103H  "|"    Special command separator character
     104H  "\"    Substitute command separator character