

**INSTALLING TURBODOS 1.4+
16 BIT MASTER SYSTEMS**

July 5, 1985



L/F Technologies
Carson City, Nevada

Publication 440-G007B

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INTRODUCTION

This document explains how to install TurboDOS 1.4+ on L/F systems. It is important that you read it thoroughly before you try to install TurboDOS.

The first section is a detailed explanation of TURBOGEN and how to use it. TURBOGEN is used to generate the operating system and allows the changing of patch points within TurboDOS. All of the complex parameters are given with their default values.

The second section contains examples of different system configurations to aid you in your installation.

The third section contains quick step-by-step procedures to install TurboDOS 1.4+ on a system with different hardware configurations. It assumes that the user has an understanding of how to use TURBOGEN and has a knowledge of how to work with the various TurboDOS commands.

The last section contains the new Utilities.

NOTE: If this is a new system with a Winchester drive, TurboDOS is already installed and the system is bootable.

IMPORTANT NOTE - PLEASE READ BEFORE INSTALLING TURBODOS

CHANGES:

1. The floppy format for 1600 series systems has changed drastically from the 800 series. The default floppy format for 16-bit is 9 sectors, 512 bytes per sector, 96 tpi for the 5" diskette, and 15 sectors, 512 bytes per sector, for the 8" diskette. A floppy boot can only be done on a 8 or 9 sector, 512 bytes per sector, 96 tpi disk and a 15 sector, 512 bytes per sector, 8" diskette.

The 8-bit 5 sectors, 1024 bytes per sector, 96 tpi format can still be written and read.

2. To make a bootable disk, both Winchester and floppy, RESTRK has to be run using the W option to load TDOS.LDR.

3. Changes from 1.41+c.00 to 1.41+c.01

a. The DATE program now uses the realtime clock. See DATE in section 6 for details.

b. READPC and COPYD have been added. See section 6 for details.

c. FMTF and FMTWIN have had a few bugs fixed, and a few cosmetic changes have been made, see section 6.

d. Support for the 860, 1080 slaves, the 1120 QIC-02, and the 480, 630 serial boards have been added.

HARDWARE SUPPORTED:

1230 Master, 1240, 1270, 860/740 and 1080 Slaves, 1100 DMA Winchester controller, 930 Floppy Controller and 1260 Memory Board, and I/O boards 1120 QIC-02.

SOFTWARE COMPATIBILITY:

1. With the new floppy format, old 8-bit software can still be read and written on a 16-bit system, but 16-bit software can not be read or written on an 8-bit system.

CAUTION: The new 1600 series cannot be implemented on an 8-bit system. Permanent damage to the diskette will result.

SECTION 1.

RUNNING TURBOGEN

Starting TURBOGEN

To start the TURBOGEN installation process, copy **OSLOAD.CMD** to either **STDSINGL.CMD**, **STDSPOOL.CMD** or **STDMASTR.CMD** and then simply type **TURBOGEN filename <cr>** after the prompt. The Filename is one of the following: **STDSINGL**, **STDSPOOL** or **STDMASTR**. This program has a "help" file associated with it. If you are confused about a certain point or you aren't sure how to answer a question, type **"HELP"** or **"?"** in response. The program will then give you more details about that particular question. This manual also contains information about each point.

Note: If you abort **TURBOGEN** (using a control-C), all of the changes to that point have already been saved to disk; therefore, you will have to go back and make any corrections to wrong entries.

The next few sections of this document contain details about each step of **TURBOGEN**.

Disk Assignments

In TurboDOS and CP/M, each disk drive is referred to by a letter in the range A to P. It is possible to divide a single physical Winchester disk drive into different logical parts and address each part with a different letter. The first section of the program is used to assign letters (i.e. A to P) to your drives.

First, **TURBOGEN** will ask if you would like to see the current disk assignment letters. If you answer **"Y"** (yes), a list will be displayed. You will then be asked if you want to change the disk assignments. If you answer **"N"** (no), the program will jump to the next section: Printer Assignments. If you type **"Y"**, the program will begin asking questions about your drives.

TURBOGEN numbers physical drives of the same type starting at unit 0. For example, if you had three 8-inch floppy disk drives, they would be labeled as units 0, 1 and 2.

First **TURBOGEN** will ask how many 8" floppy disk drives you have. If you have any, the program will begin asking for the letter(s) you want assigned to each drive. It will repeat the process for 5" floppy disk drives.

If you have a Winchester drive, **TURBOGEN** will ask for the drive letter of the first partition. It will automatically assign the drive letters for the rest of the partitions. For example, if the Winchester had three partitions and you enter 'C' as the first drive letter, the Winchester will assign drive letters C, D, and E automatically.

NOTE: Winchester are partitioned at the factory into 8.16 megabyte partitions. The last partition will not contain the full 8.16 megabytes, it will get the remaining storage area. The partitioning can be changed using the utility RESTRK. The instructions for doing this are found in the back of this manual. When the RESTRK utility is used, all data on the drive will be lost. You must back-up first before using this utility.

TURBOGEN will display the way that you've assigned the drive letters and ask if it is correct. If you answer "Y", it will write the changes to the disk and become part of the operating system and continue on to the memory assignment section. If it isn't correct, answer "N" and the program will ask the disk assignment questions again.

Memory Assignments for STDSINGL, STDSPool and STDMASTER

When the disk assignments are completed, TURBOGEN will ask if you want to see the current memory assignments. If the answer is yes "Y", the current memory assignments will be displayed. TURBOGEN will ask if you wish to change the assignments. If no, "N", TURBOGEN will go on to the next section.

When changing the memory assignments, you will be asked a series of questions: The first question indicates memory size. Answer yes, "Y" if the size of the memory has changed. Choose 256K, 512K or 1024K,(1M). The default is 256K.

The next question indicates the number of disk buffers in your system. A large number improves system performance, but decreases the TPA in the master.

You will also be asked if you want to change the size of the disk buffers. This is the number of bytes in each of the disk buffers you allocate with "Number of Buffers". The most commonly used size of your floppy sectors is 512.

If TURBOGENing a STDMASTR, you will be asked to change the time between disk updates. This is the number of clock ticks (a 50th of a second), that the system waits between writing the buffers to the disk. A typical value is 5 seconds, which is 250.

Memory Assignments for SLV1240

The only memory value accessible when using TURBOGEN on SLV1240 is the memory size value. All other values do not apply to SLV1240.

Printer Assignments for STDSINGL, STDSPool and STDMASTER

When the memory assignments are finished, TURBOGEN will ask if you want to see the current printer assignments. If yes "Y", a list will be displayed on the screen listing the types of printers, the queue assignments and the despool table. TURBOGEN will then ask if you want to change the assignments. If no "N", TURBOGEN will go to the next section.

If you are changing the printer assignments, you will be asked one printer at a time, from A to P, if the printer is serial, parallel or undefined. By choosing the undefined option, TURBOGEN will go on to the next part of the printer assignment section. If you choose Serial you will then be asked which channel to assign the printer too, what protocol and what baud rate to be used.

L/F supports three serial protocols: Clear-to-Send (CTS), ETX/ACK, and XON/XOFF. The baud rate supportable range is from 50 to 19200 baud. TURBOGEN will not allow invalid baud rates.

When the last printer that you want has been selected, choose the undefined option. This will end the printer selection section.

Next you will be asked if you want to change the Queue Assignment Table. The Queue Assignment Table tells the computer what drive and what partition to put the queues within the computer system. Enter Local for each queue needed and Unassigned to exit the queue assignment section.

The last question asked in the printer configuration is if you want to change the dispatch table. The dispatch table controls which queue will feed which printer. The advantage to this step can be to assign more than one printer to the same queue.

After setting the dispatch table values, you will be shown the new printer, queue and dispatch values. If they are correct, answer "Y" yes to the question. TURBOGEN will go on to the next section.

Channel Information

The port number refers to the physical board connector your printer is connected to. Each 1270, 1230 or 1240 board has two serial ports, 0 and 1. They refer respectively to J3 (left connector) and J4 (right connector). Each 862 and 1081 MPU also has two serial ports, 0 and 1, J1 (left connector) and J2 (right connector) respectively. Any additional I/O boards in your system will be either an SPIO (631) board or a 4SIO (481) board. The SPIO has three connectors along the top edge of the board. The two smaller connectors are the serial ports and the large connector is the parallel port. The 4SIO has 4 connectors along the top edge of the board. These are all serial I/O ports. The ports on the boards are numbered from left to right looking at the component side of the board.

For 1230, 1240 and 1270 boards:

Port 0 = J3 (left connector)
Port 1 = J4 (right connector)

For 862 (MPU-8) and 1081 (MPU-16):

Port 0 = J1 (left connector)
Port 1 = J2 (right connector)

For SPIO:

Port 0 = J1 (leftmost small connector)
Port 1 = J2 (2nd small connector from left)

For 4SIO:

Port 0 = J1 (leftmost connector)
Port 1 = J2 (2nd connector from left)
Port 2 = J3 (3rd connector from left)
Port 3 = J4 (rightmost connector)

The Channel number indicates to the operating system which I/O port your printer is attached to. Channel numbers are assigned according to your specific hardware configuration.

NOTE:

The Channel numbers described below DO NOT reflect the channel numbers on the computer's back panel. To identify which connectors on the back panel are connected to the specific I/O Channels on your system, it may be necessary to remove your system cover and trace the cabling from the back panel connectors to the individual ports.

The two ports on the master, and the two on the slave(s), are always Channels 0 and 1. For configurations with an SPIO, or an SPIO and a 4SIO the Channel assignments are:

<u>Board</u>	<u>Base Address</u>	<u>Port</u>	<u>Connector</u>	<u>Channel #</u>
1230	Master	0	J3	0
		1	J4	1
631	E0	0	J1	2
		1	J2	3
481	40	0	J1	4
		1	J2	5
		2	J3	6
		3	J4	7

For configurations with a single 4SIO, or two 4SIO's the Channel assignments are:

<u>Board</u>	<u>Base Address</u>	<u>Port</u>	<u>Connector</u>	<u>Channel #</u>
1230	Master	0	J3	0
		1	J4	1
481	E0	0	J1	2
		1	J2	3
		2	J3	4
		3	J4	5
481	40	0	J1	6
		1	J2	7
		2	J3	8

For local printer configurations with all slaves Channel assignments are always 0 and 1. For Slaves:

<u>Board</u>	<u>Base Address</u>	<u>Port</u>	<u>Connector</u>	<u>Channel #</u>
1230	All Addresses	0	J3	0
		1	J4	1
1240	All Addresses	0	J3	0
		1	J4	1
1270	All Addresses	0	J3	0
		1	J4	1
862	All Addresses	0	J1	0
		1	J2	1
1081	All Addresses	0	J1	0
		1	J2	1

Printer Assignments for SLV1270, SLV1240, SLV862 and SLV1081

Printer assignments for slaves can only be set while TURBOGENing a slave operating system. Slave printer assignments cannot be made while TURBOGENing STDMASTR.

To make printer assignments on a slave operating system do the following:

```
0X}TURBOGEN SLVXXXXX<cr>
```

Where SLVXXXXX is one of the following:

```
SLV1270
SLV1240
SLV1081
SLV862
```

TURBOGEN will begin by asking if you would like to see the current printer settings. If you answer "Y", you will be shown the current Printer, Queue and Despool Assignment Tables. A slave can have only one local printer (a printer directly connected to the slave on its second serial port). Printers attached to the master processor or I/O boards are remote printers and are accessed by the slave through the network.

The program will then ask if you want to change the printer assignments. If you type "Y", it will continue with the printer assignments; if you type "N", it will jump to the next section: Printer Queue Assignments.

Changing printers in the SLVxxxx operating system is done the same way as in the TURBOGENing of STDSINGL or STDMASTR. You will first be asked if printer A is Serial or Remote. Remote means a printer on the master. Serial means a local printer on the second serial channel on the slave.

As an Example, let your system have 2 spooled printers on the master and a local printer on the slave. The spooled printers will be called printer "A" and "B" with the local printer as "C".
ie: Slave Printer A => Master Printer A through the network
Slave Printer B => Master Printer B through the network
Slave Printer C => Local Printer on slave

First you will be asked if you want to change the printer assignment table. Answer **Y** to this question. You will then be asked if printer A is to be set Serial, Remote or Undefined. Answer **R** to this question. This will assign the slave's printer A to the master (Remote) printer A. You will next be asked the same for printer B. Answer **R**. This will assign the slave printer B to the master (Remote) printer B. When you are asked about printer C, answer **S**. This will make the C printer the local printer. When you are asked about printer D, enter **U**. This will end the Printer Assignment Table selection section.

You will now be asked about the Queue Assignments. The queue assignments in the slave operating system tell the computer where to put the slaves spooled file (file to be printed). A slave does not normally have a queue. If you want to have a local printer with a spooler you must add the SPOOLER.REL file to the slave operating system (.GEN file) and regen the slave operating system. Turbogen will not allow you to set a queue to a local printer if it has not been genned to support it. See section 4 for more information. Set Queue A (remote) **R** and Queue B to **R**. For Queue C choose **U**. This will end the queue assignment section.

You will next be asked if you want to change the Despool Table. The despool table tells the operating system which queue is printed to which printer. In our example we want printer A to be fed from queue A and printer B to be fed from queue B. To do this answer **Y** to the first question. Answer **A** for printer A and **B** for printer B.

If you desire the table can be set enabling the printers to be fed from opposite tables, or both printers fed from only one table.

You will now be shown the new changes and asked if the configuration is correct. If it is, answer **Y**. TURBOGEN will go on to the next section.

Circuit 0 Slaves

The circuit 0 slaves are the older 740, 862 and 1081 MPU boards. These slaves are treated the same as in previous releases of TurboDOS. These slaves are addressed using the JA jumpers and start on the S-100 bus address of 40h.

Circuit 1 Slaves

The circuit 1 slaves are the new 1200 series boards. These slaves are treated differently than the circuit 0 slaves. They do not communicate with the master via the S-100 bus, but through the new S-100+ bus. They are addressed differently than the older slaves and are treated differently by the master.

Patch Points

The third section of TURBOGEN involves different types of system parameters. These parameters are often called "patch points".

In TURBOGEN, the patch points are divided into two groups: standard and complex. The standard points include console baud rate, the default print mode, and other parameters that tend to change. The complex group includes parameters which usually don't change, such as the current year, printer parameters and special control characters.

The program will ask if you would like to change any other parameters. If you answer "Y", the program will let you change the patch point values. If you answer "N", the program will jump to the end.

If you answered "Y" above, the program will ask if you want to include complex parameters. If you type "N" the program will ask you the basic patch points only. If you type "Y" the program will allow you to change every patch point, standard and complex.

The following section is a discussion of all patch points.

Circuit 0 Slave Suffix Table(only in STDMASTR)

The slave suffix table requires modification when the system has different types of slaves (ie. 8- and 16-bit, and/or 8-bit slaves with or without local printers). The reason is that more than one slave operating system will be needed. Each slave operating system is named OSSLAVEx.SYS where the 'x' is a unique suffix (A,B,D,etc.). The slave suffix table lists these suffixes to indicate the slave operating system to run on each slave. The first character in the list is the suffix for the first slave, the second character for the second slave, etc.

If all of the slaves in a system are alike, the slave operating system is named OSSLAVE.SYS and the slave suffix table is blank and will not need any modification by TURBOGEN.

Let's look at an example. The system in question has five 8-bit slaves and one 16-bit slave. Two of the 8-bit slaves have local printers and three do not. To add a local printer to a circuit 0 slave, see Section 4 (pg.27). There are two different slave operating systems for circuit 0; one for the 8-bit 740/862 slaves, and one for the 16-bit 1081 slave. The slave suffix table identifies which slave uses which operating system. A third slave operating system is created for the slave with the local printer. This can be done using section 4 as a guide.

Below is a table showing the suffixes for this system.

<u>Slave</u>	<u>Bits</u>	<u>Printer?</u>	<u>O/S Name</u>	<u>Board Add.</u>	<u>O/S Name</u>
1	8	no	SLV862.SYS	40	OSSLAVEA.SYS
2	8	no	SLV862.SYS	44	OSSLAVEA.SYS
3	8	no	SLV862.SYS	48	OSSLAVEA.SYS
4	8	yes	PRT862.SYS	4C	OSSLAVEB.SYS
5	8	yes	PRT862.SYS	50	OSSLAVEB.SYS
6	16	no	SLV1081.SYS	54	OSSLAVED.SYS

Circuit 0 Slave Suffix table = AAABBD (in STDMASTR only)

Circuit 0 Slave Board Address List (in STDMASTR only)

Each slave board has a unique board address which is shunted onto the board. The slave board address list is used to tell the operating system the addresses of the boards. This list holds 16 addresses, even if your system has only a few slaves. The standard addresses are 40,44,48,4C,50,54,58,5C,E0,E4,E8,EC,F0,F4,F8,FC. Don't change the board addresses unless you are specifically directed to do so. If the addresses are changed, they must be changed on this list and on the board itself.

Circuit 0 Slave Type List (in STDMASTR only)

The operating system uses this list to know which slaves are 186-based slaves and which are Z80-based slaves. Enter a string of zeros and ones. A "1" will mark the 186-based slaves and a "0" will indicate the Z80-based slaves. For example, if your system has 7 slaves, and the first four were Z80's (addressed 40, 44, 48, 4C) and the last three were 80186's (addressed 50, 54, 58), you would enter the following string:

0,0,0,0,1,1,1<cr>

You can enter up to sixteen values in all cases.

Circuit 1 Slave Suffix Table (in STDMASTR only)

As in the circuit 0 slave suffix table, the circuit 1 slave suffix table must reflect the type of slave that is being used. The default value for this parameter is: "C,C,C,C,C,C,C,C,C,C,-C,C,C,C,C". Therefore, all 1270 series 8-bit slaves in their simplest form will use OSSLAVEC.SYS as their operating system. The circuit 1 slave suffix table works the same way as the circuit 0 slave suffix table.

An example of the circuit 1 slave suffix table with 6 slaves, 3 of which have local printers would look like the following table:

<u>Slave</u>	<u>#_bits</u>	<u>Printer?</u>	<u>O/S Name</u>	<u>Renamed to</u>	<u>O/S Name</u>
1	8	no	SLV1270.SYS		OSSLAVEC.SYS
2	8	no	SLV1270.SYS		OSSLAVEC.SYS
3	8	no	SLV1270.SYS		OSSLAVEC.SYS
4	8	yes	PRT1270.SYS		OSSLAVED.SYS
5	8	yes	PRT1270.SYS		OSSLAVED.SYS
6	8	yes	PRT1270.SYS		OSSLACED.SYS

Circuit 1 Slave Suffix Table = CCCDDD (in STDMASTR only)

Circuit 1 Slave Type List

The slave type list for the 1270 Z-80B boards defaults to "02,02,02,02,02,02,02,02,02,02,02,02,02,02,02,02" for all 1270 slaves. 1240 16-bit slaves are identified by a type code of "3" in this table. The circuit 1 slave type list serves the same function as the circuit 0 slave type list does for the older slaves, except with values of 2 and 3 instead of 0 and 1.

Compatibility Flag

The details about the compatibility flag are found in the TurboDOS 1.4 8086 Programmer's Guide. L/F normally sets this value to B0.

Console Switching Value

In 810 and 1610 multi-user system, the first slave MPU is connected through the master CPU to the internal terminal. Software is used to switch the terminal through the Master to the first slave board.

Note: This value should only be changed if your system is a multi-user series 810 or 1610. If so, the value is 04. In all other cases, this point should be set to 00.

Auto-Search Drive

All TurboDOS commands are programs with a .COM or .CMD file extension. When a user types in a command, the operating system looks on the drive it is presently using for the .COM or .CMD file. If it doesn't find it on that drive, it will look on the disk drive identified as the auto-search drive. Normally, therefore, the disk drive that the system booted from is used. Setting this point to a value of 255 will set the Auto-Search drive to default to the system boot drive.

Automatic Log-On User Number

This point indicates which user area the system will go to after booting up. If the sign-bit is set, it will go to a privileged user area. For single users on the master operating system, this point is set to 80, which means that the system comes up in privileged user 0. In slave operating systems, this point is set to FF, which brings the system to privileged user area 31. This user area contains the programs to run the log-on and password routines.

User Number for Log-Off

When someone logs off, the system will transfer to the user area indicated by this patch point. This user area contains the files necessary for logon and logoff. This point is set to 31 for 8-bit slaves and to 30 for 16-bit slaves.

Command Line Buffer Length

This point indicates the maximum length of any command line. The maximum is 255 characters, but the default value is 157 (two screen lines minus the 3 prompt characters).

Command Line Separator Character

TurboDOS allows you to type in multiple commands on a single line as long as they are separated by the backslash (\) character.

Command Line Prompt Character

The operating system prompt consists of the user number, the currently logged disk drive and a prompt character (e.g., 0A}). The prompt character can be changed at this patch point; the usual character is a left brace (}).

System Attention Character

This control character is pressed to get the attention of the operating system. The default value is a Control-@. When entering the Control value enter a circumflex (^) instead of holding down the control key, and then enter the character.

Attention-Received Character

When you press a system attention character (such as Control-@), the operating system verifies that you have its attention by sending this character back to the terminal. Usually this character is a Control-G which causes the bell in the terminal to ring. If some other character is used, it is displayed on the screen.

Screen-Attention Character

This control character is pressed to stop output to the screen. The default value is Control-S. To resume whatever process was in progress before the attention request, press Control-Q.

Resume Character

If you have received the operating system's attention by pressing the attention character, you can press this character to tell the computer that it should continue with whatever it was doing before the attention request. This character is usually set to a Control-^.

Abort Character

This character is pressed after an attention request to abort the current process. Usually, a Control-C is used.

Echo Character

TurboDOS has an echo-print feature, which echoes everything displayed on the terminal to the printer. Pressing the echo character, Control-P, after an attention request toggles this feature.

End-Print Character

When this character is pressed after an attention request, it tells the spooler that you are done with a print job. The system then sends the job to the printer. This is especially useful under certain application programs. In MBASIC or Wordstar, often the print job won't start until you exit the program, but if you do an attention request and press the end print character, it will start printing immediately.

Console Baud Rate

This point should be set to whatever baud rate the console is set. The following baud rates are available: 75, 110, 134.5, 150, 300, 1800, 2000, 2400, 3600, 4800, 7200, 9600 and 19,200.

Default Print Mode

The PRINT command is used to direct the routing of your output. When the system boots, the PRINT command finds its default value at this point. This point can have the following possible values:

- 0 = Direct Printing
- 1 = Spooled Printing
- 2 = Console Printing

In direct printing mode, the output is sent directly to a printer. This is useful on single-user systems, but it can be wasteful on multi-user systems. **If two users try to print directly to the same printer, the files will be interspersed.**

Spooled printing copies the print file onto the spool drive and puts a label in a queue. Then jobs are taken off the queue and sent to the printer that has been assigned to that queue. Spooled printing is especially useful in multi-user systems.

Console printing causes the print job to be displayed on the console.

Default Queue or Printer

This value points to the default queue or printer to be used. If the system is in the direct printing mode, this value indicates which printer is to be used. If the system is in spooled mode, this value points to the queue to be used. The possible values are:

0 = off	9 = printer (or queue) I
1 = printer (or queue) A	10 = printer (or queue) J
2 = printer (or queue) B	11 = printer (or queue) K
3 = printer (or queue) C	12 = printer (or queue) L
4 = printer (or queue) D	13 = printer (or queue) M
5 = printer (or queue) E	14 = printer (or queue) N
6 = printer (or queue) F	15 = printer (or queue) O
7 = printer (or queue) G	16 = printer (or queue) P
8 = printer (or queue) H	

The PRINTER command can be used to change the queue or printer used.

Default Spool Drive

When the system is in the spooled printing mode, print jobs are written to the spool drive specified at this point. Usually the drive that was used to boot up the system is designated as the spool drive. Possible values for this point are:

0 = drive A:	4 = drive E:	8 = drive I:	12 = drive M:
1 = drive B:	5 = drive F:	9 = drive J:	13 = drive N:
2 = drive C:	6 = drive G:	10 = drive K:	14 = drive O:
3 = drive D:	7 = drive H:	11 = drive L:	15 = drive P:
255 = system disk			

End-of-Print Character

If this character is found in the print output stream, it will automatically signal an end-of-print condition, causing a spooled file to be de-spooled and sent to the printer.

Formfeed Characters

In spooled printing, a form feed character is sent to the printer between print jobs so that each job will start at the top of a blank page. There are four patch points which hold the form-feed characters for four different types of printers: CTS, XON/XOFF, ETX/ACK and Centronics. The form feed character is usually a Control-L, but you can check this value in the manual for each printer.

Base Address of board with parallel port

This point holds the base address of the SPIO (631) board. In new systems, the 631 board is at E0 hex. Refer to the SPIO board documentation for further details.

CP/M Version Number

Some application programs use certain CP/M functions, so they ask the system which version of CP/M is running to find out which functions are available. Usually this point should be set to 31 (version 3.1), but it may need to be changed to 22 (version 2.2) for certain application programs.

User Sign-On Message

When the system is powered up or RESET, the operating system will display a sign-on message. This sign-on message can be changed by changing this point. This message can be up to 55 characters long. Control characters (explained in the manual for your terminal) can be entered at the beginning of the message to clear the screen or start a new line.

Load Drive

When the system is booting up, the Initial Program Loader ROM finds the OSLOAD program and loads it into memory. The OSLOAD program then looks on the drive specified at this point to find the operating system. Usually, this point is set to 0 to cause OSLOAD to search all the drives until it finds the operating system.

Console Channel

This is the channel number (0 - 5) to which your console will be assigned. It is normally set to 0.

Scan Direction

If the Load Drive patch point is set to 0, this point indicates the order in which the drives are searched. If this point is set to 00, drive A will be searched, then drive B, etc. The drives are searched from drive P to drive A if this point is set to FF. Normally it is set to FF.

5-Inch Floppy Step Rate

This value is multiplied by 2 to get the floppy drive step rate in milliseconds. For example, a value of 6 results in a step rate of 12 milliseconds. Change it to the values recommended for your floppy drive:

<u>Drive</u>		<u>Step Rate Patch Point Value</u>
TEAC	Half-width	3 or 4
Shugart	Half-Width	6
TEC	Half-Width	6

8-Inch Floppy Step Rate

This value is the step rate (in milliseconds) for 8" floppy disk drives. Change it to the suggested value for your system:

<u>Drives</u>	<u>Step Rate Patch Point Value</u>
Qume Half-Width	3 or 4

ETX/ACK Printer Patches

An ETX/ACK printer works in the following sequence:

1. The computer sends an ETX signal to the printer.
2. The computer sends an escape sequence to the printer as a header to the block of characters.
3. The computer sends a stream of characters to the printer.
4. If the printer received everything, it sends an ACK signal to the computer.
5. If the computer receives the ACK, it starts the sequence again with a new set of characters. Otherwise it repeats the sequence with the same characters.

There are two patch points which are set to conform to your particular ETX/ACK printer. The correct values can be found in the manual for the printer.

One patch point specifies the length of the escape sequence. Usually the escape sequence is 3 bytes long. The other point specifies the number of characters to be sent in a block. Usually 140 characters are sent between the ETX signals.

TURBOGEN COMPLEX PARAMETER DEFAULT VALUES

There are up to 42 complex parameters that can be changed. Below is a listing of the default values found in the STDMASTR installation. The other STDXXXX files do not use all of the parameters listed below.

How Many Circuit 0 Slaves Do You Have In Your System?
Default value = 1

How Many Circuit 1 Slaves Do You Have In Your System?
Default value = 1

Circuit 0 Slave Suffix Table:
Default value = (blank is default)

Circuit 0 Slave Board Address List:
Default value = 40,44,48,4C,50,54,58,5C,E0,E4,E8,EC,F0,F4,F8,FC

Circuit 0 Slave Type List:
Default Value = 00,00,00,00,00,00,00,00,00,00,00,00,00,00,00,00

Circuit 1 Slave Suffix Table:
Default value = CCCCCCCCCCCCCC

Circuit 1 Slave Type List:
Default value = 02,02,02,02,02,02,02,02,02,02,02,02,02,02,02,02

Compatibility Flag bit (in HEX)
Default Value = B0

Console Switching Value:
Default Value = 00

Auto Search drive:
Default Value = 255

Automatic Log-on User number:
Default Value = 80 (in master)
Default Value = FF (in slave)

User number for log-off:
Default value = 31

Command line buffer length:
Default length = 157

Command line separator character:
Default Value = \
Command line prompt character:
Default value = }

System Attention character:
Default value = ^@

Attention - received character:
Default value = ^G

Resume character
Default value = ^^

Abort character:
Default value = ^C

Echo character:
Default value ^P

End print character:
Default value = ^L

Console Baud Rate
Default Value = 8E

Default print mode:
Default value = 1

Default queue or printer:
Default value = 1

Default spool drive:
Default value = 255

End of print character:
Default value = ^@

What is the Form-Feed character for your CTS protocol printer?
Default value = ^L

What is the Form-Feed character for your XON/XOFF protocol printer?
Default value = ^L

What is the Form-Feed character for your ETX/ACK protocol printer?
Default value = ^L

What is the Form-Feed character for your centronics printer?
Default value = ^L

Base port of board with parallel port:
Default value = E0

CP/M version number:
Default value = 31

Load drive:
Default value = 0

Console Channel:
Default value = 0

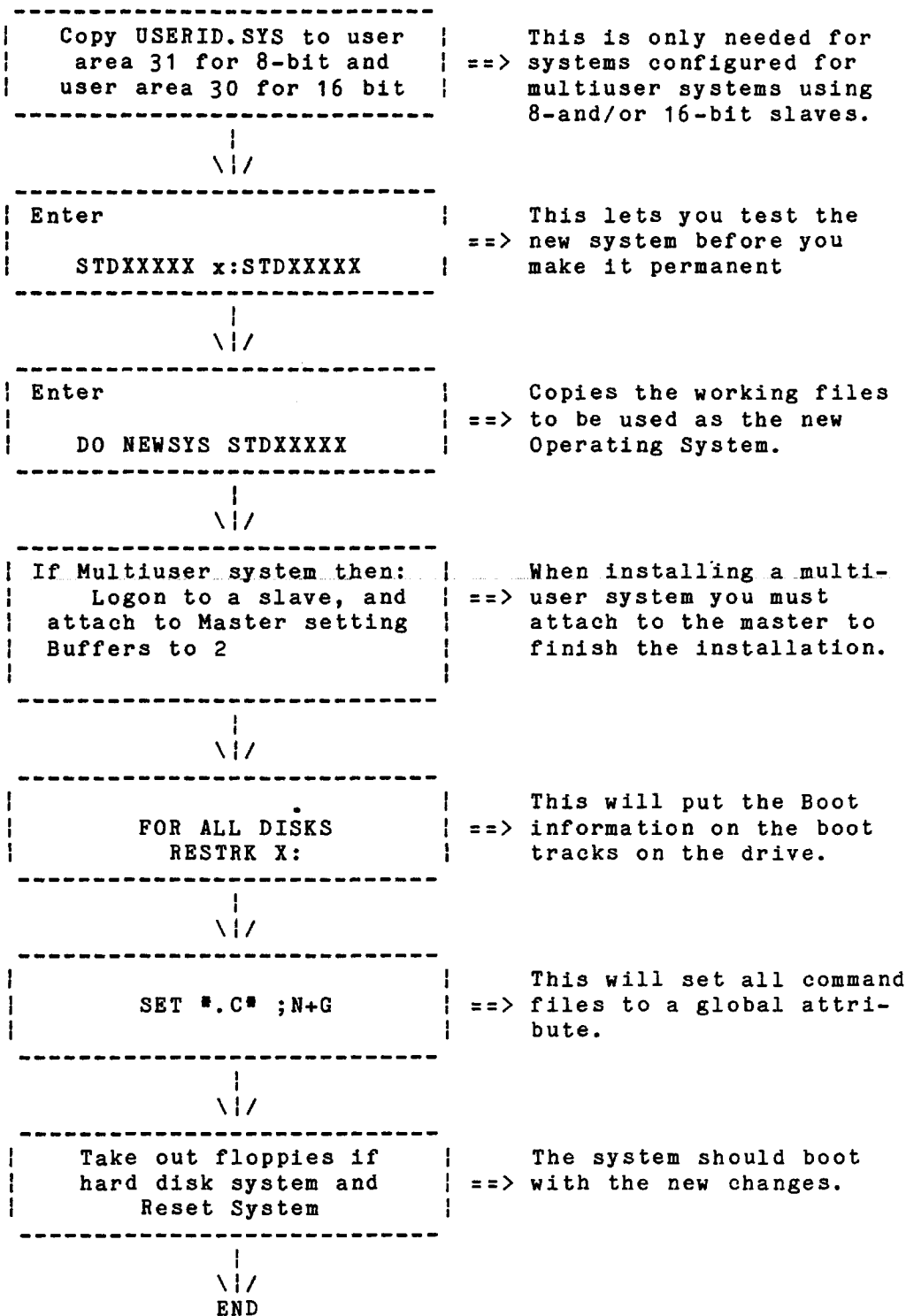
Scan direction:
Default value = 00

5-inch floppy step rate:
Default value = 3

8-inch floppy step rate:
Default value = 8

How many char. should be between ETXs for your ETX/ACK printer?
Default value = 140

What is the escape sequence length for your ETX/ACK printer?
Default value = 3



SECTION 2.

TURBOGEN EXAMPLE

Example

Consider a 2 user 1610 series system with one 12 megabyte Winchester and one 5-inch floppy disk drive. The Winchester controller is a 1100 and the drive has 1 partition. The 1230 has 1 megabyte of RAM and we wish to increase the number of disk buffers to 100. The two users are 8-bit 1270s with no local printers. The system printer is set for 4800 baud XON/XOFF protocol.

Enter from the prompt:

```
OX}COPY OSLOAD.COM STDMASTR.COM<cr>
OX}TURBOGEN STDMASTR<cr>
```

The system will inform you that a Standard Master operating system is being generated.

You will then be asked the following:

Do you wish to see the current disk assignments? **"N"<cr>**

Do you wish to change the current disk assignments? **"Y"<cr>**

How many 8-inch floppies do you have? **"0"<cr>**

How many 5-inch floppies do you have? **"1"<cr>**

Please enter the drive letters to be assigned to unit 0?
"B"<cr>

Note: Because the 1100 Controller is intelligent, you are not asked what type of drive you are using. It also knows how many partitions the drive is formatted for.

Please enter the letters to assigned to partition 0: **"A"<cr>**

The new disk assignments are displayed.

Is this Correct? **"Y"<cr>**

Do you wish to see the current memory configuration? **"N"<cr>**

Do you wish to change the current memory configuration? **"Y"<cr>**

Do you wish to change memory size? **"N"<cr>**

Do you wish to change the number of buffers? **"Y"<cr>**

Number of Buffers: 32

Enter value [2-255]? 100 <cr>

Do you wish to change the buffer size? **"N"<cr>**

Do you wish to change the disk write delay? **"N"<cr>**

Do you wish to see the current printer settings [Y, N] <> ? **N**<cr>

Do you wish to change the printer assignments table [Y, N]
<>? **Y**<cr>

Printer A: Serial, Parallel, Undefined [S, P, U] <> ? **S**<cr>
On Channel # [0, 1, 2, 3, 4, 5, 6, 7, 8, 9,] <> ? **1**<cr>
Protocol [CTS, XON, ETX] <> ? **XON**<cr>
Baud Rate [50 - 19200] <> ? **4800**<cr>

Printer B: Serial, Parallel, Undefined [S, P, U] <> ? **U**<cr>

Do you wish to change the Queue Assignment table [Y, N] <> ?
Y<cr>

Queue A: Local, Undefined [L, U] <> ? **L**<cr>
Queue B: Local, Undefined [L, U] <> ? **U**<cr>

Do you wish to change the Despool table [Y, N] <> ? **Y**<cr>
Printer A is to be fed from Queue [A - A] <> ? **A**<cr>

The new printer assignments are now displayed.

Is this configuration correct [Y, N] <> ? **Y**<cr>

How many Circuit 0 Slaves do you have in the system?
Current value: 1
New value = 0

How many Circuit 1 Slaves do you have in the system?
Current value = 1
New value = 2<cr>

Do you wish to alter any other parameters? **Y**<cr>

Do you wish to alter any complex parameters? **Y**<cr>

Note: Only the parameter that needs to be changed is shown;
all other parameters are skipped by entering **<cr>**.

Console switching value:
Current value = 00
New Value = 04<cr>

TURBOGEN will now finish the generation of the STDMASTR operating system.

The Slave operating system, SLV1270 , does not need to be modified. To finish the installation see " Installing TurboDOS on systems with the 1100 Winchester controller."

SECTION 3.

INSTALLING TURBODOS 1.4+ ON SYSTEMS WITHOUT WINCHESTER DRIVES

This section summarizes the procedure used to install TurboDOS 1.4 on an L/F system without a Winchester drive. It assumes that the system has at least two floppy drives.

PROCEDURE:

1. Boot up the system with the TurboDOS diskette (use diskette #1 if you have more than one). If the system has 8" drives, they will be labeled A and B. If the system has 5" drives, they will be labeled E and F.
2. Format a few blank diskettes. Insert a blank diskette into the second drive and type **FMTF** (for 5" system) or **FMTF** (for 8" system).
3. Copy the TurboDOS diskette onto the newly formatted diskette using the the COPY command. **RESTRK X:X:** after the diskette is copied.
4. Put the backup copy into the first drive and store the original diskette in a safe place.
5. If you have a single-user system, follow the procedure in step 7. If the system is multi-user, go to step 8.
6. **SINGLE-USER SYSTEM**

If you want to change the operating system (drive assignments, printer assignments, etc.) enter the following commands:

OX}TURBOGEN STDSINGL

This is used to change the operating system.

OX}STDSINGL Y:STDSINGL

Used to test the operating system. Y: is the drive that the new system will refer to.

Then enter the following commands:

OX}DO NEWSYS STDSINGL

To copy the modified files to the O/S files.

OX}SET *.CMD;NG

To set command files to global attributes.

OX}RESTRK X:

Reset the system. The new operating system should boot up.

8. MULTI-USER SYSTEM

Enter the following commands:

```
0X}TURBOGEN STDMASTR
    To configure the master O/S.
0X}TURBOGEN SLV1270
    To configure the slave O/S.
0X}COPY SLV1270.SYS OSSLAVEC.SYS
    Copies the new slave system to the file name that the
    master will look for.
0X}COPY LOGON.COM 31:WARMSTRT.AUT
0X}COPY USERID.SYS 31:USERID.SYS
    Set up user area 31 for slaves.
0X}STDMASTR Y:STDMASTR
    To test the new O/S before it is made permanent.(While
    in Single user system, :if already running in a
    multiuser system, you must attach to the master, set
    buffers to 2 and go to bank 0)
```

At this point, attach the terminal to a slave in any system other than a 810 series system

```
0X}DO NEWSYS STDMASTR
    To copy the O/S files to the proper file names.
0X}SET *.COM;NG
    Set command files to global attributes.

0X}MASTER
    To attach to the master processor.
    To reduce the buffers to a smaller size.
0X}RESTRK X:
    To write the O/S loader to the boot tracks.
```

Reset the system. A multi-user system will boot up.

INSTALLING TURBODOS 1.4+ ON SYSTEMS WITH 1100 WINCHESTER CONTROLLER

This section contains a short summary of the steps necessary to create a TurboDOS operating system on an L/F system with a Winchester drive and the 1100 controller. See Section 5 for details on the new TurboDOS Utilities.

PROCEDURE:

1. Boot up the system with the TurboDOS 1.4C AB-16 diskette. A single-user operating system will boot up.

Note: The Winchester is formatted from the factory and has an operating system installed on it already. Do not do the following unless it is necessary. Winchesters are formatted from the factory under a controlled environment. It is recommended not to reformat the drive.

2. Format the Winchester using the FMTWIN program. Enter the known bad sectors listed on the side of the drive.
3. FMTWIN partitioned the Winchester into CP/M compatible (8 MB) logical drives. If you wish to change the number of partitions, run RESTRK.
4. RESTRK will divide the Winchester into any number (1-15) of equal-sized partitions. If RESTRK is run, ERASEDIR must be run on every partition. The first partition of the Winchester is drive I, then drive J, etc. See RESTRK instructions in the back of the manual.
5. Copy the TurboDOS diskette(s) onto the Winchester by typing **COPY A: I:;N** if on 8-inch media.
6. If you have a multi-user system, skip this step and go on to step 7.

SINGLE-USER SYSTEM

If you want to change the operating system (such as changing the drive assignments, adding a printer, etc.), enter the following commands:

OX}TURBOGEN STDSINGL

This is used to change the operating system.

OX}STDSINGL X:STDSINGL

This is used to test the new operating system. X: is the drive that the new system will refer to.

Enter the following commands:

OX}DO NEWSYS STDSINGL
To copy the modified files to the O/S files.
RESTRK will write the O/S loader to the boot tracks of the drive.

OX}SET *.CMD;NG
To set command files to global attributes.

Remove the floppy diskette and reset the system. The new operating system should boot off the Winchester. Restore any data files that you have backed up onto the Winchester.

7. MULTI-USER SYSTEM

Enter the following commands:

OX}TURBOGEN STDMASTR
This is used to change the master operating system.

OX}TURBOGEN SLV1270
This is used to change the slave operating system.

OX}COPY SLV1270.SYS OSSLAVEC.SYS
Copies the new slave system to the file name that the master looks for.

OX}COPY LOGON.COM 31:WARMSTRT.AUT
LOGON.COM is put on user area 31 and is renamed to WARMSTRT.AUT.

OX}COPY USERID.SYS 31X:
Places the USERID.SYS file to user area 31.

OX}STDMASTR X:STDMASTR
This will allow you to test the new O/S before it is made permanent.

OX}DO NEWSYS STDMASTR
This will copy the new files to the files that the master system needs.

OX}MASTER
Will attach a slave to the master, and will reduce the buffer size.

OX}RESTRK X: X:

OX}SET *.COM;NG
To set the command files to global attributes.

Remove the floppy diskette and reset the system. The new operating system will boot from the Winchester drive. Restore any backed-up files to the Winchester.

NOTE: The above steps are for generating a multi-user system with 8-bit 1270 slaves. It is also possible to have systems with only 16-bit 1081 slaves or systems with both 8-bit 1270, 862/740 and 16-bit 1081 and 1240 slaves.

To generate an operating system for systems with both 8-bit 1270 slaves, 8-bit 862/740, 16-bit 1240, and 16-bit 1081 slaves, do the following steps:

OX}TURBOGEN STDMASTR

Be sure to enter the correct slave suffix table with the proper values. A "D" for each 16-bit 1240 slave, "C" for each 8-bit 1270 slave, "A" for each 862/740 and a "B" for each 1081 slave. Also check the slave type list. Enter a "0" for each 8-bit 862/740 slave, a "1" for each 1081 slave. In the Circuit 1 table a "2" must be entered for every 1270 and a "3" for each 1240 slave.

OX}TURBOGEN SLV1270

To configure the 8-bit 1270 slave O/S.

OX}TURBOGEN SLV1240

To configure the 16-bit 1240 slave O/S.

OX}TURBOGEN SLV862

To configure the 8-bit 862/740 slave O/S.

OX}TURBOGEN SLV1081

To configure the 16-bit 1081 slave O/S.

OX}COPY SLV1270.SYS OSSLAVEC.SYS

OX}COPY SLV1240.SYS OSSLAVED.SYS

OX}COPY SLV862.SYS OSSLAVEA.SYS

OX}COPY SLV1081.SYS OSSLAVEB.SYS

This will copy the newly installed files to the names that the master will use for the slaves.

OX}COPY LOGON.COM 31:WARMSTRT.AUT

OX}COPY USERID.SYS 31:USERID.SYS

Set up user area 31 for 8-bit slaves.

OX}COPY LOGON.COM 30:WARMSTRT.AUT

OX}COPY USERID.SYS 30:USERID.SYS

Set up user area 30 for 16-bit slaves.

OX}STDMASTR X:STDMASTR

Test new operating system.

Attach terminal to a slave.

OX}DO NEWSYS STDMASTR

Rename files needed for the new system.

OX}MASTER

Attaches a slave to the master processor.

OX}RESTRK X: X:

Place system on boot tracks of hard disk.

OX}SET *.C*;NG

Set all command files to global attribute.

SECTION 4

GENNING TURBODOS 1.4+

INTRODUCTION

The genning of TurboDOS 1.4+ is more complex than the installation of the preconfigured TurboDOS 1.4+. This procedure allows the user to change the .GEN and .PAR files for special configurations. If you do not plan to modify TurboDOS in this manner, you do not need to do the following procedures.

The genning of TurboDOS 1.4+ can require up to 3 major steps depending on the specific hardware configuration:

1. Modification of the standard library files and then repackaging them .
2. If you wish to have local printer support on the 862 or the 1081 slaves, the SLV862 or SLV1081.GEN and .PAR file must be copied and modified. If an ETX printer is needed in a SLV1270 or SLV1240 slave, the SLV12xx .PAR and .GEN files must be copied and modified.
3. Support for the SPIO (631) and or the 4SIO (480) boards can also be taken out if they are not used in the system.

GENNING TURBODOS 1.4+

The Following is a step by step procedure for genning TurboDOS 1.4+:

1. Copy your distribution disk to an open area on the Winchester drive or to another floppy diskette. **Do not make any changes on your distribution diskette.**
2. If you need to change the standard library files provided by L/F Technologies for a special configuration (ie: adding your own drivers) then do the following:
 - A. Modify the .PKG file for the needed library using a text editor or word processor.
 - B. Execute PACKAGE

OX}PACKAGE filename<CR>
3. At this point you can now modify the .GEN and .PAR files to fit your special application. For more details on modifying the .GEN and .PAR files, see the TurboDOS Installation Guide and TurboDOS 8086 Implementor's Guide. Once the modifications are complete, you must re-GEN the newly modified files with the TLINK.COMD Program.

Adding Local Printer Support to Non S-100+ Slaves

The slave operating system does not support local printers as shipped from the factory. To add local printers to the slave system do the following:

```
0X}COPY SLVxxxx.GEN PRTxxxx.GEN<cr>
0X}COPY SLVxxxx.PAR PRTxxxx.PAR<cr>
```

Where **xxxx** is equal to **862** or **1081**, or the special case of **1240** or **1270** when an ETX printer is needed.

Next edit the file **PRTxxxx.GEN** and add one or more of the following printer drivers by deleting the comment character ";".

```
LSTCTS (not required for 1270 slave)
LSTXON (not required for 1270 slave)
LSTETX
```

Next the newly configured file must be genned.

If it is an 862 or a 740 slave do the following:

```
0X}GEN PRT862.SYS<cr>
```

IF it is a 1270, do the following:

```
0X}DO GEN PRT1270<cr>
```

IF it is a 1240, do the following:

```
0X}DO TLINK PRT1240<cr>
```

Do The following to tlink a 16-bit 1081 slave:

```
0X}TLINK PRT1081.SYS<cr>
```

After the file has been genned and the new **PRTxxxx.SYS** file created, **TURBOGEN** must be run to set the new printer assignments.

```
0X}TURBOGEN PRTxxxx<cr>
```

The last step is to rename the **PRTxxxx.SYS** file to the proper operating system name.

```
0X}COPY PRTxxxx.SYS OSSLAVERx.SYS<cr>
```


SECTION 5

THE USERID.SYS FILE

The file USERID.SYS is used by TurboDOS to allow users to log off and log on the system. The file is placed in user area 31 for 8-bit slaves and user area 30 for 16-bit slaves. This file contains the user name, password, and user area and drive for the user to be logged on to. A flag can also be set which allows the user to be logged on as a privileged user. A privileged user is allowed to move between user areas and to attach to the master.

The following is the syntax for entries in the USERID.SYS file:

```
name1,name2,user area <privileged flag>,drive,
```

Where: name1 = User Name
 name2 = User Password
 P = privileged user

Example:

SYSTEM,SYSTEM,OP,A,	SYSTEM logs on to 0A, privileged
USER1,USER1,3,A,	User1 logs on to 3A
ACCOUNT,PASSWORD,0,C,	Account logs on to 0C
SAM,,4,D	User Sam has no password

Any type of text editor or word processor can be used to edit this file. When editing this file use a non-document mode. This will keep any special control characters from being hidden into the file that could cause problems.

It is important that this file be placed in the proper user areas or the system will not let you log on.

SECTION 6

User's guide for the COPYD Disk to Disk Copy Utility

Section 1: Program start-up

When COPYD first comes up, it checks that the user is operating from the master processor. If this is not the case, then the message:

COPYD may only be run from the master processor.

will appear, and COPYD will return to the operating system. If the user is operating from the master processor, then the command line is checked for the source and destination drive specifications. If nothing is entered on the command line, then the message:

Usage: COPYD srcdrv: dstdrv:

will appear, and COPYD will return to the operating system. If anything is entered on the command line, COPYD will continue on to check for the source and destination drive letters, and the format of the disks in the drives, among other things. If any errors occur during these preliminary checks, COPYD will print an error message (see Section 2: Error Messages for the list of possible error messages), and return to the operating system.

** WARNING **

COPYD will copy from one Winchester to another. Note that this feature is normally only used by the L/F factory, and that it does not work like you would think it should.

In order to copy Winchesters, the partitions to be copied must be identical, even to the beginning track number of the partition. When the copy is performed, THE ENTIRE WINCHESTER, UP TO THE END OF THE SPECIFIED PARTITION, IS COPIED. This includes the boot tracks (but not the bad track map).

We do not recommend the use of COPYD to copy Winchesters unless the copy is strictly a back-up copy of one Winchester to another.

COPYD
(Continued)

If all checks have been successfully completed, then COPYD will display the following:

COPYD: Disk to Disk Copy Utility, version 2.0

** Warning: All information on drive y: will be destroyed.

Ready to copy from drive x: to drive y: (Y/N)?

If the user types an "N" here, then COPYD will return to the operating system. Otherwise, COPYD will begin copying the disks a track at a time, displaying each track copied, as follows:

Copying track: xxxxx

If an error occurs reading the source drive, the message:

Error reading drive x:

will be displayed, and COPYD will exit to the operating system. Likewise, if an error occurs while writing to the destination drive, then the message:

Error writing to drive x:

will be displayed, and COPYD will exit to the operating system. If all of the tracks on the source drive have been successfully copied to the destination drive, then the message:

Copy complete.

will appear, and COPYD will return to the operating system.

COPYD
(Continued)

Source and destination drives are not identical.

In order to make an exact image copy of a disk, both the source and destination drives must have an identical number of sectors, sector size, density, and number of tracks.

Cannot copy floppy to Winchester or visa-versa.

Due to some inherent differences in the L/F floppy and Winchester disk formats, it is impractical to allow copying from one to the other. Note that L/F does not recommend the use of COPYD to copy a Winchester onto another.

Unable to lock drive x:

The drive specified is currently locked for use by a different user or process. Wait until the drive is free before attempting the copy.

Internal Error.

An unknown error has occurred. If this error occurs, then report the problem and the circumstances under which it occurred to your dealer.

User's Guide for the DATE Utility

SECTION 1: USER INTERFACE

When the DATE utility is executed, the following will be displayed on the screen:

PROG ID: DATE Revision 3.0

L/F TECHNOLOGIES
Date Utility

Date: dd mmm yy nnnn
Time: hh:mm:ss

The program will then exit to the operating system.

dd = day, mmm = month, yy = year, nnnn = day of week
hh = hour, mm = minute, ss = second

The hour is displayed in military time (00-23).

For example,

Date: 27 Jun 1985 Friday
Time: 13:02:33

If ";H" is entered in the command line, the following help screen will be displayed:

The DATE utility is used to display system date and time, and to set the clock chip date and time.

The system date and time are updated every second by the TurboDOS clock driver, using the values stored in the 58167 clock chip.

The 58167 clock chip can only be accessed from the Master processor.

The command line format is:

DATE ;x where 'x' is one of the options described below.

DATE
(Continued)

If no command line options are entered, DATE will display the current system date and time and return to the O/S.

- ;S will allow the user to set the clock chip date and time.
- ;V will display the system time and date continuously.
- ;H will display this help screen.

";S" Option (Set clock time and date)

If the ";S" option is entered, DATE will ask the user for the time and date values to set the clock with. Entering <ESC> at any time will abort the program without changing anything.

The following prompts will be displayed:

Enter Seconds [00 - 59] < > ?

Entering a "?" at this time will bring up the following help message:

Enter 2 digits for the seconds setting.

The new time will not be set until you strike "Y<CR>" after the "Proceed?" question, so you might want to enter a value slightly greater than the current seconds value to gain a more accurate time setting.

For example, suppose the current time is 09:13:00. Allow yourself at least 30 seconds to enter the new date and time by setting:

Seconds: 30
Minutes: 13
Hour: 09

Enter Minutes [00 - 59] < > ?

DATE
(Continued)

Entering a "?" at this time will bring up the following help message:

Enter 2 digits for the minute setting.
Enter Hours [00 - 23] < > ?

Entering a "?" at this time will bring up the following help message:

Enter 2 digits for the hour setting in military time:

Midnight = 00
1 a.m. through 12 p.m. = 01 through 12
1 p.m. through 11 p.m. = 13 through 23

Enter Day of month [1 - 31] < > ?

Entering a "?" at this time will bring up the following help message:

Enter the numeric day of the month. The day of the month will be checked for validity after the entire date has been entered.

If an invalid day of month is entered (February 30, for example) an error message will be displayed and the program will re-prompt beginning at day of month.

Enter Month [Jan - Dec] < > ?

Entering a "?" at this time will bring up the following help message:

Enter the first three letters of the current month. For example, "Jan" for January, "Feb" for February, etc.

Enter Year 19 [48-99] < > ?

Entering a "?" at this time will bring up the following help message:

Enter two digits representing the last two digits of the year. For example, "85" for 1985. The year will be set in the clock chip and will be retained even when system power is turned off.

DATE
(Continued)

The clock date and time will be set to the above values.

Proceed? [Y,N] <N> ?

ENTERING A "?" at this time will bring up the following help message:

If "Y" is entered, the clock chip will be set with the time and date values you specified.

If "N" is entered, the program will abort without changing anything.

If a <CR> is entered, the default value of "N" will be used.

If you have made an error entering a value, you can back up and correct it by entering <BACKSPACE> until you reach the value you want to change.

";V" Option (View system time and date continuously)

If the ";V" option is entered, DATE will display:

-- Hit any key to abort --

Date: dd mmm yy nnnn
Time: hh:mm:ss

The date and time will be updated on the screen every second. This will continue until a key is pressed.

SECTION 2: ERROR MESSAGES

The following error messages will be displayed when appropriate: (Explanations given where needed).

Unable to set time and date from a slave.
MMM only has DD days.

(MMM = month, DD = days in month. This error occurs if a the user enters a day of month greater than the number of days in that month).

Illegal entry.

DATE
(Continued)

SECTION 3: HARDWARE and OPERATING SYSTEM INTERFACE

The program will be O/S independent, and will access O/S device drivers via a common I/O interface.

The program will set the time and date in the 58167 clock chip only. The operating system time and date is set by the clock driver, which updates system time and date from the clock chip every second.

The year will be stored in battery backed clock chip RAM, allowing the year to be retained even when system power is turned off. The clock driver takes care of automatic year rollover and leap year processing.

The time and date displayed by DATE is the system time, taken from the operating system, which is updated from the clock chip by the clock driver.

User's Guide for the FMTF Floppy Formatter

Section 1: Program start-up

The first operation FMTF attempts is to allocate some memory (about 10K) for track buffers. If there is not enough memory available for these buffers, then the message:

Not enough memory to execute FMTF.
will appear, and the program will abort.

When the floppy formatter first comes up, it will check the command line to see if a drive letter has been specified. If an invalid drive letter has been entered, or if there is some extra input on the command line, then the message:

Usage: FMTF [x:]
will appear, and FMTF will return to the operating system. If no drive letter has been entered, FMTF will prompt for it as follows:

Enter drive letter of drive to be formatted or verified (A - P, <CR> exits)?

If just a carriage return is entered, FMTF will exit back to the operating system. Once FMTF has a drive letter (either specified on the command line or entered via the above prompt), it will make some checks on the drive. If the drive is a 5" drive, then the message:

Is this a 96 tpi drive (Y/N)?

will be displayed. The user should enter "Y" if the drive is a 96 tpi drive, and "N" otherwise. If the drive is not a floppy drive, then the message:

Drive x: is not a floppy drive.

**FMTF Command
(Continued)**

will appear, and FMTF will return to the operating system. If the drive cannot be locked, then the message:

Unable to lock drive x:
will appear, and FMTF will return to the operating system.

Once FMTF has a valid drive letter, and the drive specified is a floppy drive, and the drive can be locked, then FMTF will proceed to display the main menu.

Section 2: Menus

When the floppy formatter first comes up, the following menu will be displayed:

FMTF: Floppy formatter, Version 3.1

- A. Format Type
- B. Number of sides
- C. Selected drive
- D. Verify drive
- E. Format a single track
- F. Format and Verify drive
- G. Exit to operating system

Currently:

Format type is: L/F Standard, 9 sector
Selected drive is: E: (5" double-sided, 96tpi)
Number of sides is: 2

Select menu option ("?" for help):

Pressing a "?" at this time will bring up the following help screen:

Option A: This option is used to select the type of format to be used on the specified floppy. The standard floppy format is available, along with several non-standard, "special" formats.

Option B: This option is used to select the number of sides to format on the floppy. This should be set to 1 for single-sided drives, or to 2 for double-sided drives. (Note: When using the 8" single-sided, single-density, 128 byte, 26 sector format, this value is set to 1 and cannot be changed.

**FMTF COMMAND
(Continued)**

Option C: This option selects which drive is to be verified or formatted. The drive selected must be a floppy drive. This value is initially set to the A drive.

Option D: Use this option to verify the diskette in the selected drive.

Option E: This option is used to format a single track on the selected drive. This option is useful for data recovery in that losing one track of data is often preferable to losing the entire disk's worth.

Option F: Use this option to both format and verify the diskette in the selected drive.

Option G: This option is used to exit the program and return to the operating system.

To select any of the above options, just type the letter preceding it at the menu prompt. Pressing a G will allow you to exit the program. Typing a "?" at any of the menus will display help messages similar to this one. Pressing a <CR> at any other menu will return you to the menu immediately preceding it.

For each of the options A through F, the following menus or messages will be displayed:

Option A.

Format Type

- A. L/F Standard *
- B. Special type

Select menu option("?" for help, <CR> exits):
For this menu, the following help screen is provided:

Option A: Use this option to select the standard L/F floppy format. When this option is selected, the number of bytes per sector is set to 512, number of sectors per track is set to 9 for 5" drives and 15 for 8" drives, and the density is set to double. Note that selecting the 5" format with 8 sectors per track

FMTF COMMAND
(continued)

(all of the other parameters are the same as the standard) will be displayed as L/F since both formats are frequently used.

Option B: This option is used when a format other than a standard format is wanted. It allows a selection from a variety of formats for the size of drive being used.

Option B:

Enter the number of sides to format or verify (1 - 2)?

If the 8" single-sided, single density format is selected, and 2 is entered in response to the above question, then the following error message will be displayed:

This format is single-sided only.
Press the spacebar to continue:

Then, the main menu will be displayed again.

Option C:

Enter drive to be formatted or verified (A - P)?

After typing a drive letter (no carriage return is necessary because this option will only accept characters A through P) the message:

Drive x: has been selected. Is that correct (Y/N)?

Answering No will cause FMTF to ask for the drive letter again. If the selected drive is a 5" drive, then the following message will be displayed:

Is this a 96tpi drive (Y/N)?

If the drive is 96tpi, the user should answer yes, and if the drive is 48tpi, then the user should answer no.

Option D:

Ready to verify diskette in drive x:?

If the answer is no, then the main menu is re-displayed. If the answer is yes, FMTF will check to see if the drive is ready to verify (drive exists, and is formatted). If the drive is not ready, then the message:

FMTF COMMAND
(continued)

will be displayed, where vv is the error number returned from the floppy disk, ww is the cylinder on which the error occurred, x is the head (0 or 1), and zz...zz is a description of the error in English. When the format has finished, then the message:

Format Complete

Verify pass...

Verifying track xx

will be displayed. Any errors during the verify pass are handled the same as in the verify option described above. Once the format and verify are finished, control will return to the main menu.

Sub-Menus

Finally, there are two sub-menus left that need to be discussed. Both of these are called from the Format Type menu, option C. If the selected drive is a 5" drive, then the first of these two menus will appear, otherwise the second one will appear for 8" drives.

Special types (5" drives only)

- A. 5" double density, 1024 bytes per sector, 5 sectors per track *
- B. 5" double density, 512 bytes per sector, 8 sectors per track
- C. 5" double density, 512 bytes per sector, 9 sectors per track
- D. 5" double density, 256 bytes per sector, 16 sectors per track

Select menu option ("?" for help, <CR> exits):

The following help menu is available:

This menu allows you to select a special floppy format for the selected 5" drive. Note that the L/F standards are both option B and option C.

**FMTF Command
(Continued)**

Special types (8" drives only)

- A. 8" double density, 1024 bytes per sector, 8 sectors per track *
- B. 8" double density, 512 bytes per sector, 15 sectors per track
- C. 8" double density, 256 bytes per sector, 26 sectors per track
- D. 8" single density, 128 bytes per sector, 26 sectors per track

Select menu option ("?" to exit, <CR> exits):
The following help menu is available:

This menu allows you to select a special floppy format for the selected 8" drive. Note that the L/F standard is option B.

Section 3: Command line Arguments

(Please ignore the command line argument section, as it is not implemented yet.)

As per the old FMTF program description, the following command line arguments are supported:

- x: - Select drive to verify or format.
- T:- Select TurboDOS standard format.
- C: - Select CP/M standard format.
 - S - Select single-density format.
 - D - Select double-density format.
- 1 - Select single-sided format.
- 2 - Select double-sided format.
- 4 - Select 48 tpi drive.
 - (5" drive only)
- 8 - Select 96 tpi drive.
 - (5" drive only)
- V - Verify diskette only.

**FMTF Command
(Continued)**

With the new FMTF, if all the necessary command line arguments are not entered, then those values that have been entered will replace the default values on startup, and the main menu will be displayed.

If all necessary arguments are entered on the command line, then the main menu will be skipped altogether, and the format or verify will take place immediately.

If the drive specified is not a floppy drive, then the message:

Drive x: is not a floppy drive.
Press the spacebar to continue:
will appear.

Section 4: Operating System Dependent Information

By using an assembly language subroutine, it can be determined what operating system is being used and, if the operating system is TurboDOS, if the user is a privileged user. If the TurboDOS user is not a privileged user, then the message:

Non-Privileged user.
Program Aborted.

will be displayed, and the program will terminate. The reason for the privileged user lock-out is to prevent an un-authorized user from being able to destroy any information. This is consistent with current utilities on TurboDOS. If the program cannot lock out the selected drive, then the message:

Unable to lock drive x:
Program Aborted.

will be displayed, and the program will abort. This is to prevent other users from using the drive while it is being formatted.

FMTWIN Command

User's Guide for the FMTWIN Winchester Formatter

Section 1: Program startup

The first operation FMTWIN attempts to do is allocate some memory (about 8K) for track buffers. If there is not enough memory available for these buffers, then the message:

Not enough memory to execute FMTWIN. will appear, and the program will abort.

When the Winchester formatter first comes up, it will prompt for the drive letter as follows:

Enter a drive letter on the desired Winchester (A - P)?

If just a carriage return <cr> , is entered at this point, FMTWIN will return to the operating system. After a drive letter has been entered, FMTWIN will confirm the selection:

Drive x: has been selected. Is that correct (Y/N)?

If the user enters an "N" at this point, FMTWIN will once again ask for the drive letter. If the user answers "Y", FMTWIN will then do some checks on the drive entered. The first check is that the selected drive can be locked out from the rest of the users. If the drive cannot be locked, the message:

Unable to lock drive x:
Press the spacebar to continue:

will be displayed, and FMTWIN will once again prompt for another drive letter. If the specified drive is not a Winchester, the message:

Drive x: is not a Winchester.
Press the spacebar to continue:

will be displayed. FMTWIN will then prompt for another drive letter.

**FMTWIN Command
(Continued)**

After a drive letter on the desired Winchester has been entered, FMTWIN will prompt for any additional drives that should be locked before performing a format. As an example, suppose that drives I:, J:, K:, and L: exist on a given Winchester. Any of the letters I, J, K, or L may be specified as a drive letter on the Winchester, and the remaining drive letters are additional drives that should be locked before performing a format. FMTWIN will prompt for the additional drives in the following manner:

Enter drive letters of any additional drives on the desired Winchester (ex.JKL)?

At this point, the user should enter the additional drive letters. Note that the drive letters do not include a ':', and are not separated by spaces or commas. If more than 15 drive letters are specified, the message:

Too many drives entered (maximum is 15).
Press the spacebar to continue:

will be displayed, and FMTWIN will once again prompt for any additional drives. If one or more of the drive letters is not between A and P, the message:

All drive letters must be between A and P.
Press the spacebar to continue:

will be printed, and FMTWIN will prompt again for the additional drive letters. Once the additional drive letters have been entered, FMTWIN will attempt to lock them. If one or more of the drives cannot be locked, the following message will be displayed:

The following drive(s) cannot be locked: xyz
Press the spacebar to continue:

If the user is executing FMTWIN while in multi-user mode, and is going to perform a format of the Winchester, then it is recommended that he not proceed until the drives can be locked. It should be noted, however, that FMTWIN will continue normally at this point.

**FMTWIN Command
(Continued)**

- Option A:** This option selects the drive letter of the Winchester to be operated on. After the drive has been selected, FMTWIN will determine if it is formatted or not. If it is formatted, FMTWIN will read the drive information from the drive, and display the type of the Winchester via option B.
- Option B:** This option is used to select what type of Winchester is associated with the drive letter specified in option A. Whenever a new drive is specified, FMTWIN will check if it is formatted and, if so, will read the information from the drive.
This option allows the selection of one of several standard Winchester types; the selection of a modification of one of the standard types, or the definition of an entirely new type.
- Option C:** This option is used to display the bad sector map and drive information written on track 0 of a Winchester that has already been formatted. Note that this command will give an error message if the drive is not formatted.
- Option D:** This option is used to enter any additional known bad sectors so that they may be written to track 0. This option uses a small editor to make entering these sectors easier. Note that this option does NOT allow modification of the known bad sectors already stored on the disk, rather this option only allows you to add more bad sectors. Once these sectors are written to the disk, they also cannot be removed or modified.
- Option E:** This option is used to verify a Winchester that has already been formatted. During the verify, any new bad sectors that are found are displayed.
This option will produce an error message if the drive is not formatted, or if the type of the drive is unknown.
- Option F:** This option is used to format a single track on the Winchester. This option is useful when an error occurs in the middle of an existing file on the disk. This option, while losing a part of the file, may allow the rest of the information to be recovered.
This option will produce an error message if the type of the drive is unknown.

**FMTWIN Command
(Continued)**

Option G: This option is used to format and verify a Winchester. Before formatting a drive, the type must be specified using option B, and any known bad sectors should be entered using option D. This option will produce an error message if the type of the drive is unknown.

Option H: This option is used to exit the program and return control to the operating system.

To select any of the above options, just type the letter preceding it at the menu prompt. Just pressing an H will allow you to exit to the operating system. Typing a "?" at any of the menus will display help messages similar to this one. Pressing a <CR> at any other menu returns you to the menu immediately preceding it.

For each of the options A through G, the following menus or messages will be displayed:

Option A:

This option produces the same prompts and messages as described in Section 1: Program start-up. The only difference is that just pressing a carriage return at the first prompt will not return the user to the operating system. Instead, just pressing a carriage return will return control to the main menu.

Option B:

Winchester Type

- A. 20Mb MiniScribe *
- B. 40Mb Quantum
- C. 85Mb Maxtor
- D. 140Mb Maxtor
- E. Special type
- F. Low-level configuration

Select menu option ("?" for help, <CR> exits):
The help menu provided is as follows:

At this time, you should enter the type of Winchester that is in your system. The sizes of the disks are given as unformatted sizes. The E option (special type) should be used for drives not listed in the menu.

**FMTWIN Command
(Continued)**

The E option is used to specify the number of heads and cylinders on the drive. The F option is used to specify some low-level options; such as low current cylinder, precomp cylinder, on time, off time, sector offset, and sector interleave.

Option C:

If the current drive is not formatted, then the following message:

Drive x is not formatted.
Press the spacebar to continue:

will be displayed, and control will pass back to the main menu. Otherwise, the following display will appear:

Drive x, Number of Tracks: xxxxx

Number of Cylinders: xxxxx
Number of Heads: xx
Low current cylinder: xxxxx On time: xxx
Precomp cylinder: xxxxx Off time: xxxxx
Sector Interleave: xx
Sector offset: xx

Known bad sector map

Cyl.	Head	Sector (Track)	Cyl.	Head	Sector (Track)	
xxxx	xx	xx	xxxxx	xxxx	xx	xxxxx
xxxx	xx	xx	xxxxx	xxxx	xx	xxxxx
xxxx	xx	xx	xxxxx	xxxxx	xx	xxxxx

Option D:

Additional Bad Sector Mapping

- A. Add new sectors to the list
- B. Delete a sector from the list
- C. Display additional bad sector list

Select Menu option ("?" for help, <CR> exits):

**FMTWIN Command
(Continued)**

The help menu provided is as follows:

Option A: This option is used to add sectors to the additional bad sector list. The sectors are entered as cylinder, head, and sector number. To exit the addition process, simply type a <CR> at any cylinder, head, or sector prompt.

Option B: This option is used to delete a sector that has already been entered into the additional bad sector list. The sector numbers specified by cylinder, head, and sector number. This option will only delete those sectors added using option B. To exit this option, just type a <CR> at any cylinder, head, or sector prompt.

Option C: This option is used to list the sectors that have been entered on the screen.

Option E:

If the drive is not formatted, the message:

Drive x is not formatted.
Press the spacebar to continue:

will be displayed, and control will pass to the main menu.

Otherwise, the following will appear.

Verify Pass... (Total tracks = wwww)

Verifying Track: xxxxx

where the xxxxx is the track number. This number is updated periodically (every 10 tracks) during the verify process, or when an error occurs. If an error occurs, then the message will continue (on the same line as the track number):

Error ww occurred on cylinder xxxxx, head yy.
(zzzzz...zzzzz).

where ww is the error code in hex, xxxxx is the cylinder on which the error occurred, yy is the head on which the error occurred, and zzzz...zzzz is the description of the error in English. The verify will then continue on. When the verify is complete, the message:

**FMTWIN Command
(Continued)**

Verify complete
Press the spacebar to continue:

will be displayed, and control will return to the main menu.

Option F:

If the type of drive in the system is unknown, then the message:

Cannot format a track on an unknown drive.
Press the spacebar to continue:

will appear, and control will return to the main menu. If the Winchester has already been formatted, then the warning:

**** Warning: Formatting a track on a Winchester destroys all data previously stored on the track.**

Ready to format track on drive x: (Y/N)?

If the user answers no here, then control will return to the main menu. If he wants to continue on, then the message:

Formatting track: xxxxx

If an error occurs while formatting a track, the message (again, on the same line):

Error ww occurred on cylinder xxxxx, head yy.
(zzzzz...zzzzz)

where ww is the error code in hex, xxxxx is the cylinder on which the error occurred, yy is the head on which the error occurred, and zzzzz...zzzzz is a description of the error in English.

After the format is complete, the message:

Format track complete.
Press the spacebar to continue:

will be displayed, and control will return to the main menu.

**FMTWIN Command
(Continued)**

Option G:

If the type of drive in the system is unknown, then the message:

Cannot format an unknown drive.
Press the spacebar to continue:

will appear, and control will return to the main menu. If the Winchester has already been formatted, then the warning:

**** Warning: Formatting a Winchester destroys all data previously stored on it.**

Ready to format drive x: (Y/N)?

If the user answers no here, then he is returned to the main menu. If he wants to continue on, then the message:

Format pass... (Total tracks = xxxxx)

Formatting track: xxxxx

If an error occurs while formatting a cylinder, the message (again, on the same line):

Error ww occurred on cylinder xxxxx, head yy.
(zzzz...zzzz)

where ww is the error code in hex, xxxxx is the cylinder on which the error occurred, yy is the head on which the error occurred, and zzz...zzz is a description of the error in English. The program will then continue formatting the drive. After the entire disk has been formatted, the message:

Format Complete

Verify pass... (Total tracks = xxxxx)
Verifying track xxxxx

will be displayed, and the verify will be done as described above. Once the format and verify are finished, control will return to the main menu.

Sub-Menus

Finally, there are three sub-menus left that need to be discussed. The first of these is the E option of the Winchester types menu: Special type.

Special Type

A. Number of Heads 4
B. Number of Cylinders 612

Select menu option ("?" for help, <CR> exits):

The following help menu is available:

Option A: Use this option to set the number of heads that exist on the selected Winchester.

Option B: Use this option to select the number of cylinders that exist on the selected Winchester.

For the options A and B, the following messages will be displayed:

Option A.

Enter number of heads (0 - 15)?

Option B.

Enter number of cylinders (1 - 9999)?

The next menu available is under option F in the Winchester type menu: Low-Level Configuration:

Low-Level Configuration

A. Low Current Cylinder 255
B. PreComp Cylinder 0
C. On time 0
D. Off time 0
E. Sector Offset 11
F. Sector Interleave 1

Select menu option ("?" for help, <CR> exits):

There is no help available for this menu.

For each of the options A through F, the following messages are displayed:

Option A.

Enter low current cylinder (normally = 10000)?

**FMTWIN Command
(Continued)**

- Option B.
Enter precomp cylinder (normally = 0)?
- Option C.
Enter on load time (0 - 255, normally = 0)?
- Option D.
Enter off load time (normally = 0)?
- Option E.
Enter sector offset (0 - 31, normally = 11)?
- Option F.
Enter sector interleave (0 - 31, normally = 1)?
- The last menu options are for the additional bad sector map.

Option A:

If there are more than 255 bad sectors mapped, then the message:

Too many bad sectors

will appear, and control will pass back to the additional bad sector map menu. If there is room for another sector, the message:

Enter cylinder number to add (<CR> exits)?

Enter head number (<CR> exits)?

Enter sector number (0 - 31,<CR> exits)?

If a <CR> is entered, then control will pass back to the menu. After valid head, cylinder, and sector numbers have been entered, then these are entered into the additional bad sector list. If that particular sector has already been entered in either the additional bad sector map, or the known bad sector map, then no duplicate entry will be made, and a message will be displayed.

**FMTWIN Command
(Continued)**

Option B:

This selection allows the user to delete a sector from the additional bad sector list (not the list from the drive, if any):

Enter cylinder number to delete (<CR> exits)?
Enter head number (<CR> exits)?
Enter sector number (0 - 31, <CR> exits)?

If a <CR> is typed at any of the prompts, then control will return to the additional bad sector menu. If the sector to be deleted does not exist, or exists in the known bad sector map, then an error message will be displayed.

Option C:

This option allows the user to display all of the sectors in the additional bad sector map. These are printed in the following manner:

Additional bad sector map

Cyl.	Head	Sector (Track)	Cyl.	Head	Sector (Track)
xxx	xxxxx	xx	xxx	xxxxx	xx
xxx	xxxxx	xx	xxx	xxxxx	xx
xxx	xxxxx	xx	xxx	xxxxx	xx

Section 2: Command line arguments

As per the FMTWIN program description, certain command line arguments are supported. Namely, these are for verify drive (;V) and display drive information (;D). When FMTWIN starts up and one of these options has been selected, the message:

Enter physical drive unit number (1 - 3)?

is displayed. If the drive specified is not formatted, then the message:

Drive x has not been formatted.
Press the spacebar to continue:

will appear, and control will pass back to the main menu. If, on the other hand, the drive has been formatted, then the program will proceed directly to the verify or display. Once done, control will pass again to the main menu.

**FMTWIN Command
(Continued)**

As with the old FMTWIN, an undocumented feature is provided to initialize the known bad sector table on drives that have already been formatted. If this option is specified on the command line (with a ;I), then before a format will be done the message:

Do you wish to use the old bad sector information (Y/N)?

is displayed. If N is entered, then the old bad sector table will NOT be written back onto the disk after the format is complete. If Y is entered, then the old table WILL be written.

After the format, the main menu will be displayed.

Section 3: Hardware and Operating System Specific Information

By various means, it can be determined what operating system is being used and, if using TurboDOS, if the user is allowed to execute this program (privileged user). If the TurboDOS user is not privileged, the message:

Non-Privileged user.
Program Aborted.

will be displayed, and the program will abort. If the user is privileged, then all disk buffers are flushed and freed, and all drives on the Winchester are locked. This is done to prevent an un-authorized user from destroying data on a disk.

Finally, checks are made to ensure that the program is not running as a slave, and not running in bank 1. If either condition exists, then one of the following messages will appear:

FMTWIN cannot be executed by a slave processor.
Program Aborted.

or

FMTWIN cannot be executed in bank 1 of RAM.
Program Aborted.

**READPC
(Continued)**

If the operation to be performed is a copy operation, then as each file is copied, the message:

```
<srcdrv:>[<pathname>]<srcfile> copied to  
<dstdrv:><dstfile>
```

will be displayed on the screen.

If the operation to be performed is a display operation then the following will be printed:

Directory of <srcdrv:>[<pathname>]<srcfile>

```
<file0>  <file1>  <file2>  <file3>  <file4>  
<file5>  <file6>  <file7>  <file8>  <file9>
```

and so on. The names of sub-directories are listed just like files, with the exception that they are followed by a '/'.
(For an explanation of the terms <srcdrv:>, <pathname>, <srcfile>, <dstdrv:>, and <dstfile>, see section 4.)

Section 2: READPC Commands

The commands for READPC are differentiated by what is and is not entered on the command line. In general, specifying just a source (consisting of drive letter, and optional path and filename(s)) will display a directory of the matching files. If a source and destination is specified, then a copy is done of the files from the source to the destination. All possible combinations of directory display and copy options allowed by READPC are listed below:

Display Options:

READPC <srcdrv:>

Display all of the files and directories in the root directory on the drive <srcdrv:>.

**READPC
(Continued)**

READPC <srcdrv:><pathname>

Display all of the files and directories in the directory specified by <pathname> on the drive <srcdrv:>.

READPC <srcdrv:><srcfile>

Display all of the files and directories in the root directory on the drive <srcdrv:> that match the filename <srcfile> (which may be a wild-card file name).

READPC <srcdrv:><pathname><srcfile>

Display all the files and directories in the directory specified by <pathname> on the drive <srcdrv:> that match the filename <srcfile> (which may be a wild-card file name).

File Copy Options

READPC <srcdrv:> <dstdrv>

Copy all of the files in the root directory on the drive <srcdrv:> to <dstdrv:>.

READPC <srcdrv:><srcfile> <dstdrv:>

Copy all of the files in the root directory on the drive <srcdrv:> that match <srcfile> (which may be a wild-card file name) to the drive <dstdrv:>.

READPC <srcdrv:><srcfile> <dstfile>

Copy the file <srcfile> (which must not be a wild-card filename) in the root directory on the drive <srcdrv:> to the file <dstfile> on the current logged drive.

READPC <srcdrv:><srcfile> <dstdrv:><dstfile>

Copy the file <srcfile> (which must not be a wild-card filename) in the root directory on the drive <srcdrv:> to the file <dstfile> on the drive <dstdrv:>.

READPC
(Continued)

READPC <srcdrv:><pathname> <dstdrv:>

Copy all of the files in the directory specified by <pathname> on the drive <srcdrv:> to the drive <dstdrv:>.

READPC <srcdrv:><pathname><srcfile> <dstdrv:>

Copy all of the files in the directory specified by <pathname> on the drive <srcdrv:> that match the filename <srcfile> (which may be a wild-card file name) to the drive <dstdrv:>.

READPC <srcdrv:><pathname><srcfile> <dstfile>

Copy the file <srcfile> (which must not be a wild-card file name) in the directory <pathname> on the drive <srcdrv:> to the file <dstfile> on the current logged drive.

READPC <srcdrv:><pathname><srcfile><dstdrv:><dstfile>

Copy the file <srcfile> (which must not be a wild-card file name) in the directory <pathname> on the drive <srcdrv:> to the file <dstfile> on the drive <dstdrv:>.

(For an explanation of the terms <srcdrv:>, <pathname>, <srcfile>, <dstdrv:>, and <dstfile>, see section 4.)

Section 3: READPC options

READPC will accept either of the options "Y" or "N", either of which must be preceded by a ';'. These options are very similar to the corresponding COPY command options under Turbo-DOS, and are only used during copy operations. The effects of each option is given as follows:

No option

If a wild-card file name is given as the source file, or if copying an entire directory, then before the copy begins, the prompt:

READPC
(Continued)

Ambiguous filename: confirm individual files (Y/N)?

will appear. If the user answers "Y" to this prompt, then the copy will proceed as is the Y option had been selected. If the user answers "N" to this prompt, then he is will not be prompted as to whether or not each individual is to be copied. Furthermore, whenever a file with the same name as the file to be copied already exists, then the message:

Delete <dstdrv:><dstfile> (Y/N)?

will be displayed. If the user answers "Y", then that file will be deleted, and the new file copied over it. If the user answers "N", READPC will not attempt to copy that file and will go onto the next file to be copied.

'Y' Option

When the Y option is selected, the message:

Copy <srcdrv:>[<pathname>]<srcfile> to
<dstdrv:><dstfile> (Y/N)?

will be displayed. If the user answers "N", then that file will not be copied, and READPC will then continue on to the next file to be copied. If the user answers "Y", and a file with the same name already exists, then he will be prompted if he wants to delete the old file, as in "No option", above.

'N' Option

This option simply tells READPC not to prompt the user for any reason during the copy. No prompts will appear before any file is copied, or before any old file is deleted.

(For an explanation of the terms <srcdrv:>, <pathname>, <srcfile>, <dstdrv:>, and <dstfile>, see section 4.)

READPC
(Continued)

Section 4: Definition of terms

The terms <srcdrv:>, <pathname>, <srcfile>, <dstdrv:>, and <dstfile> have been used throughout this document, and have the following meanings:

[]

Any term surrounded by square brackets indicates that the term is optional. Note that leaving a term out will change the meaning of the command, or the search path for files.

<srcdrv:>

This term refers to the the drive letter of the drive that contains the PC-DOS diskette. Note that <srcdrv:> must be a letter A - P, followed by a ':'.

<pathname>

<pathname> refers to the search path through a list of sub-directories on the PC-DOS disk. A pathname is essentially a path followed by zero or more paths. A path is basically a file name (of the form xxxxxxxx.xxx), with a trailing '/'. The wild-card characters '*' and '?' are not allowed.

<srcfile>

<srcfile> is the name of the file(s) on the PC-DOS disk that are to be copied or displayed. The <srcfile> is a file name of the form xxxxxxxx.xxx. If <srcfile> is allowed to be wild-card file name, then '*'s and "?"s may be used in the file name.

<dstdrv:>

This term refers to the drive letter and/or user number of the drive that the PC-DOS files are to be copied to. The format of

READPC
(Continued)

<dstdrv:> is an optional user number (between 0 and 31, inclusive), an optional drive letter (between A and P, inclusive), and a ':'. Note that either the user number or the drive letter MUST be specified for <dstdrv:>, although both may be used.

<dstfile>

This term refers to the name of the file that the PC-DOS file is copied to. The format <dstfile> may take is xxxxxxxx.xxx.

Section 5: Error Messages

The following error messages are possible when using READPC. If one of these errors occur, make sure that you have satisfied the conditions listed below the error.

No source drive specified.

The source drive specification (<srcdrv:>) must be specified for all commands.

User numbers on source drive not allowed.

There are no user numbers associated with PC-DOS disks, and therefore have no meaning.

Invalid source path or filename.

Either <pathname> or <srcfile> contain invalid characters or <pathname> contains a blank path ('//').

Too many path names.

The maximum number of path names allowed with READPC is 16.

Cannot copy onto same drive.

The source and destination drives are the same drive. It is redundant to try to copy information onto itself.

READPC
(Continued)

Invalid destination file name.

The <dstfile> file name contains illegal characters, or it is a wild-card file name, both of which are illegal.

No wild-card path names allowed.

One or more paths in <pathname> contain one of the wild card characters '*' or '?', which is not allowed.

No wild-card file names allowed for destination file.

The <dstfile> specification is only used for copying one file at a time, and it cannot be a wild-card file name.

Invalid option(s) selected.

Only the options described in section 3 are allowed.

Too many arguments.

There is extra input on the command line. Since the meaning of the input is unclear to READPC, an error is generated.

Cannot copy multiple files onto a single file.

This error will occur if the source designation is for more than one file, and a destination file name is given.

Source drive does not contain a PC-DOS compatible disk.

The source drive <srcdrv:> does not contain a disk that is in PC-DOS format, or the disk is unreadable.

Unable to find specified directory.

READPC was unable to find the directory specified via <pathname>.

Unable to find specified file.

READPC was unable to find the file specified by <srcfile>.

**READPC
(Continued)**

Source drive is not a 5" floppy.

Currently, READPC will only read PC-DOS 5" disks.

Unable to delete existing destination file.

The destination file already exists, but it is write protected, and therefore cannot be deleted.

Error writing destination file.

An error occurred writing the new destination file. This may occur if the destination drive is not ready, or if it is full.

Source drive is not ready.

- ~~Either~~ A) the specified drive does not exist,
- B) the disk in the specified drive is not formatted,
- C) the disk in the specified drive is unreadable (may have bad reserved tracks), or
- D) the disk in the specified drive is not a PC-DOS format disk.

Error reading source drive.

READPC was unable to read one or more of the sectors on the disk. This is often due to a defect on the disk itself.

Internal Error.

An unknown error has occurred. If this error occurs, then report the problem and the circumstances under which it occurred to your dealer.

User's Guide for the RESTRK Reserved Tracks Utility

SECTION 1: USER INTERFACE

When the RESTRK utility is executed, the following sign on message will be displayed:

PROG ID: RESTRK Revision 1.0

IMS INTERNATIONAL
Reserved Track Utility

Enter drive letter [A - P] < > "?"

Entering a "?" at this time will bring up the following help message:

Tell RESTRK the logical drive letter of the drive you wish to access. If the target disk is a multi-partition Winchester, use the letter of the first logical partition.

After a valid drive letter has been entered, the following menu will be displayed:

- C Convert reserved tracks of disk to 8-bit
 or 16-bit
- D Display drive specifications
- W Write an intermediate loader to reserved
 tracks of a disk
- P Partition Winchester drive

[C, D, W, P] < > "?"

**RESTRK Command
(Continued)**

Entering a "?" will result in the help messages:

'C' will convert the reserved tracks of a disk from 8-bit to 16-bit format. (Or from 16-bit to 8-bit). This enables disks to be upgraded from 8-bit bootable to 16-bit bootable after the 'W' option (write intermediate loader) is used.

'D' will display the current drive specifications. If the drive is a model 1100 (DMA) controller type Winchester, the logical partitioning specifications will also be displayed.

'W' will write an intermediate loader to the reserved track of a floppy or Winchester disk, making the disk bootable. This will destroy any previous data on the reserved tracks.

'P' will allow the user to change the logical partitioning of a model 1100 (DMA) type Winchester. Before accessing the newly re-partitioned Winchester, the user MUST re-IPL, then run ERASEDIR on each of the new logical partitions. This will destroy any previous data on the Winchester.

All possible combinations of drive letters, menu options, and parameters may be entered in the command line when executing RESTRK by using the following invocation:

RESTRK x: ;yz

where x: is the logical drive letter of the desired drive [A - P]
y: is the menu option [C, D, W, P]
z: is parameter(s) for menu option

**RESTRK Command
(Continued)**

"C" Option (Convert reserved tracks of disk to 8-bit or 16-bit)

If the "C" option is selected, RESTRK will display the prompt:

Select 8-bit or 16-bit reserved track format
[8, 16] < > ?

Entering a "?" at this time will bring up the following help message:

If "16" is entered, the reserved tracks on the specified disk will be converted from 8-bit format to 16-bit format, allowing the 'W'rite intermediate loader function to be run on the disk to make it bootable on 16-bit master systems.

If "8" is entered, the reserved tracks on the specified disk will be converted from 16-bit format to 8-bit format.

After the value "16" or "8" has been entered, RESTRK will display the following prompt:

Reserved tracks of drive x will be converted to xx-bit format:
the specified drive will be converted to the specified 8-bit or 16-bit format. Previous data on the reserved tracks will be destroyed.

If "N" is entered, the program will abort without doing anything.

If <CR> is entered, the default value of "N" will be used.

Definitions:

Reserved tracks: Tracks of a disk reserved for special usage other than directory or data storage.

On L/F disks the reserved tracks are used for storing the information needed by the IPL ROM to boot a disk, in addition to the physical and logical characteristics of the disk.

RESTRK Command
(Continued)

"D" Option (Display drive specifications)

If the "D" option is selected, RESTRK will read track 0, sector 0 of the specified floppy or Winchester and display the following screen:

CURRENT drive specifications of x:

Cylinders xxxx Heads x Tracks xxxx

Sectors/Track xx Bytes/Sector xxx

If the disk is not a bootable L/F disk, RESTRK will display:

* Non-bootable disk *

If the disk is a bootable L/F disk, the following specifications will also be displayed:

* Bootable disk *

Loader O/S xxxx Load Address xxxx Load Size xxxx

Load Track xxxx Load Sector xx Execution Addr xxxx

Block size xxxx Blocks/disk xxxx Dir entries xxxx

Reserved tracks xx

If the specified drive is a model 1100 DMA Winchester, the following screen will also be displayed:

Formatted drive size: xx megabytes

(sizes are approximate)

Logical partitioning: xxxxx size

Partition Size Dir type

x mb xxxxxxxx

x mb xxxxxxxx

If the disk is a non-L/F format, RESTRK will display the following:

Displaying first record of non-L/F format disk:

xx xx xx xx xx xx xx xx xx xx xx xx xx xx
xx xx xx xx xx xx xx xx xx xx xx xx xx xx

**RESTRK Command
(Continued)**

(Disks not containing the L/F I.D. flag value of 0xC6FF for 16-bit or 0xC7 for 8-bit at track 0, sector 0, byte 0 are interpreted as non-L/F format disks).

Definitions:

Cylinders: number of physical cylinders on the disk
Heads: number of physical heads on the disk
Tracks number of physical tracks on the disk
Sectors/track: number of physical sectors per track on the disk
Bytes/sector: number of physical bytes per sector on the disk

Loader O/S: type of Operating System (TDOS or CDOS)
loader will boot
Load address address in RAM where the intermediate loader is loaded
Load size: size of the intermediate loader
Load track: beginning track of the intermediate loader
Load sector: beginning sector of the intermediate loader
Execution Ad: address in RAM where the intermediate loader is executed

Lock size: number of bytes per logical block
Locks/disk: number of logical blocks per disk
Directory entries: number of directory entries per disk
Reserved tracks: number of reserved tracks per disk

Formatted drive size: number of megabytes available for directory and data usage on the Winchester drive
Logical partitioning: type of logical partitioning on the drive (equal size, custom size, or CP/M size)
Partition: number of a logical partition
Size: number of megabytes available for directory and data usage on a particular logical partition
Dir type: type of directory entries format for a particular logical partition

**RESTRK Command
(Continued)**

"W" Option (Write intermediate loader to reserved tracks)

If the "W" option is selected, RESTRK will display the prompt:

Enter drive letter and filename of
intermediate loader
[] < > ?

Entering a "?" at this time will bring up
the following help message:

Enter the logical drive letter and filename
of the intermediate loader which is to be
written on the reserved tracks of the disk.

For example: I:TDOS.LDR

After a drive letter and filename have been
entered, RESTRK will display the following
prompt:

Loader file x:xxxxxxxx.xxx will be written to
reserved tracks of drive x:
Proceed? [Y,N] <N> ?

Entering a "?" will result in the following
help message:

If "Y" is entered, the specified
intermediate loader on the specified drive
will be written on the reserved tracks of the
specified drive. Previous data on the
reserved tracks will be destroyed.

If "N" is entered, the program will abort
without doing anything.

If <CR> is entered, the default value of "N"
will be used.

Definitions:

Intermediate loader: a portion of code executed by the IPL ROM
which loads and executes a particular
Operating System residing in a file or
files on the disk.

RESTRK Command
(Continued)

"P" Option (Partition a Winchester)

If the "P" option is selected, the following menu will be displayed:

Select desired type of Winchester partitioning:

- 1 single logical partition
- 2 multiple equal size partitions
- 3 multiple custom size partitions
- 4 multiple CP/M size partitions

[1-4] < > ?

Entering a "?" at this time will result in the following help message:

- 1 single logical partition = Winchester will be configured as one logical partition (or logical drive).
- 2 multiple equal size partitions = user will be prompted for the number of equal size logical partitions to divide the drive into.
- 3 multiple custom size partitions = user will be prompted for the size and directory formats for however many logical partitions are desired.
- 4 multiple CP/M size partitions = Winchester will be configured into CP/M size (8 megabyte) logical partitions.

**RESTRK Command
(Continued)**

"1" & "4" Options (Single logical partition, CP/M size partitions)

If the "1" or "4" options are selected, the program will display the drive specifications and the newly selected logical partitioning (either single partition or CP/M size), and will then prompt the user to proceed. (See below).

"2" Option (Equal size partition)

If the "2" option is selected, the program will display the following prompt:

Enter no. of partitions desired: [2-16] < > ?

Entering a "?" at this time will result in the following help message:

Enter the number of equal sized logical partitions (number of logical drives) that you wish to divide the Winchester into. All of the partitions will be the same size, except for the last one, which will be slightly smaller.

After a valid number is entered, the program will display the drive specifications and the newly selected number of partitions, and will then prompt the user to proceed. (See below)

"3" Option (Custom size partitions)

If the "3" option is selected, the program will display the following prompt:

There are xx megabytes available to partition.
Enter desired number of megabytes for
partition x [1-255] < > ?

Entering a "?" at this time will result in the following help message:

Enter the size, in megabytes, that you wish this logical partition to be. When you have used up all the available megabytes on the physical drive, this prompting will end.

After a valid megabyte size has been entered, the program will display the following prompt:

Enter directory type: S = standard, E =
expanded [S] < > ?

Entering a "?" at this time will result in the following help message:

Enter the type of directory entry format you wish for this logical partition.

"Standard" = 1 directory entry per 8k data space.
"Expanded" = 1 directory entry per 4k data space.

Previous releases of TurboDOS used the "standard" format, and the equal size partition option of RESTRK also uses the "standard" format. Selecting "expanded" format will allow twice as many directory entries as before with the "standard".

Entering a <CR> at this time will result in the default option of "S" ("standard") being selected. The program will continue prompting for size and directory type of logical partitions until all of the available megabytes on the physical drive have been assigned. At that time, the program will display the drive specifications and the newly selected partitioning (size and directory type of each partition are displayed), and will then prompt the user to proceed.

**RESTRK Command
(Continued)**

The "proceed" prompt for all of the above options is:

New partitioning data will be written to reserved tracks of drive x:

Proceed? [Y,N] <N> ?

Entering a "?" at this time will result in the following help message:

If "Y" is entered, RESTRK will re-write the reserved tracks of the drive with the drive specifications displayed.

If "N" is entered, RESTRK will abort without doing anything.

Entering a <CR> at this time will result in the default option of "N" being selected.

If the "Y" response is selected, the program will go ahead and write the new partitioning specifications to the reserved tracks of the specified drive. The program will then display the following message:

Re-IPL, then run ERASEDIR on each new logical partition immediately!

If the "N" response is selected, the program will abort without changing anything.

RESTRK Command
(Continued)

SECTION 2: ERROR MESSAGES

The following error messages will be displayed when appropriate: (Explanations given where needed).

Unable to execute from a slave.

(In multi-user O/S's, such as TurboDOS, RESTRK must be run from the Master.)

Drive x is not an L/F format disk.

Drive x not ready.

Drive x is an invalid drive letter.

No reserved tracks on drive x.

(RESTRK will not recognize disks without reserved tracks).

Option x is an invalid option.

Illegal entry.

Floppy disks cannot be partitioned.

Exceeded drive size. Try again.

(This error occurs if the total number of megabytes assigned is greater than the physical drive capacity when assigning custom size partitions).

Reserved tracks of drive x already 16-bit format.

(This error occurs when the 'C'onvert option is attempted on disk which doesn't require conversion).

Loader file not found.

Loader file is too large for reserved tracks.

Drive x reserved tracks not 16-bit format.

Use 'C'onvert option to convert reserved tracks to 16-bit format.

**RESTRK Command
(Continued)**

SECTION 3: HARDWARE and OPERATING SYSTEM INTERFACE

The program will be O/S independent, and will access O/S device drivers via a common I/O interface.

The program will expect and utilize standard LPB (Load Parameter Block) information on the reserved tracks of disks.

When writing an intermediate loader to the reserved tracks of a disk, (the "W" option), RESTRK will make a function call to the the O/S currently running, and determine the logical parameters of the disk. This logical information will be written to track 0, sector 0, location 81H of the disk for use by the IPL ROM at boot time. (This information allows the boot ROM to interpret the directories on the disk, enabling the loader to find the file containing the O/S to boot). Location 80H of this reserved sector will be written with a flag indicating which operating System will be loaded at boot time. (Please see the document "Description of New L/F Floppy and Winchester Formats" for more details).