MS-DOS Version 2.11.02 Enhancements

Some special utilities on the MS™-DOS Version 2.11.02 diskette make your Tandy® 2000 more versatile:

- PCMAKER™ formats a floppy diskette so that you can use it to exchange information among any of the following computers: the Tandy 2000, 1000, and 1200, and the IBM® PC, PCjr™, and PC/XT™.

- COPYDOS copies the MS-DOS system files to Tandy application diskettes to make them bootable. To use COPYDOS, you must have 2 floppy disk drives.

- MODE lets you set parameters for a monitor, a line printer, and a communications interface.

- LPDRVR, the loadable printer driver, provides several capabilities for all Radio Shack® printers running under MS-DOS on the Tandy 2000.

- CGPDMP, the screen dump utility, lets you produce either (1) a color or monochrome hard copy of screen graphics, using a CGP-220 Color Ink-Jet Printer or (2) a monochrome hard copy, using any DMP series printer, except the DMP-120.

- MS-LIB lets you create library files for use with MS-LINK Version 2.44. This utility is for advanced programmers.

Hard Disk Users: All instructions that follow assume that you have copied MS-DOS Version 2.11.02 to hard disk and are operating the computer under hard disk control.

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PCMAKER

To format a Tandy/IBM diskette, follow these steps:

1. Erase the diskette, using a magnetic bulk eraser.

2. Start up your Tandy 2ØØØ from the disk that contains MS-DOS
    Version 2.11.Ø2. At the system prompt, run PCMAKER.

    Enter the command in the format:

        PCMAKER [drive] [/V]

    drive is the drive to contain the diskette to be
    formatted. It is either A: or B:. If you omit the drive
    specification, PCMAKER formats the diskette in the current
    drive.

    /V causes PCMAKER to ask you to enter a volume label for the
    diskette. At the label prompt, enter a label that is a
    maximum of 11 characters, or press <ENTER> to bypass the
    prompt.

    For example, to format a diskette in Drive B and give it the
    label PCFORMDATA1, type:

        PCMAKER B: /V <ENTER>

    After you enter the command, PCMAKER displays:

        Insert new diskette for drive B:
        and strike any key when ready

    Insert the diskette to be formatted and press the space bar.
    At the volume label prompt, type PCFORMDATA1 <ENTER>.

3. Copy to the newly formatted diskette all files to be used on
    an IBM computer.

COPYDOS

Note: This information applies only to users who have
Tandy 2ØØØ computers with 2 floppy disk drives.

Some application program diskettes for the Tandy 2ØØØ do not
contain MS-DOS, and, therefore, are not bootable. If you have
such diskettes, you can boot your system from an MS-DOS system
diskette in Drive A and use your application in Drive B to
execute the program. For extra convenience, however, you can
make your application bootable through the use of a special
MS-DOS utility, COPYDOS.

Do not use COPYDOS unless you are instructed to use it by your
applications software manual.

Use COPYDOS only once for each application program diskette.
Follow these steps:

1.   If you have not done so, start up your Tandy 2ØØØ with a
      backup of your MS-DOS Version 2.11.Ø2 system diskette in
      Drive A and a backup of your application program diskette in
      Drive B. (Before inserting the application program
      diskette, be sure the diskette's write-protect notch is not
      covered.)

2.   At the A> prompt, type:

          COPYDOS <ENTER>

      The rest of the COPYDOS procedure is handled automatically
      by the computer. Once the files are copied and the system
      prompt reappears, you no longer need the system diskette
      when you use that application program. Simply insert the
      application diskette in Drive A and start up the program.

MODE

Different serial devices--including terminals, modems, and line
printers--may require different parameters. Whenever you hook up
a particular serial device, check its requirements. If they are
different from the default values, use MODE to set the necessary
parameters. The format of the MODE command is:

        MODE [video][width][line feed][COM baud parity
        data bit stop bit]

video can be either BW for black and white (color disabled) or
COLOR for color.

width is the number of characters per line. It can be either
4Ø or 8Ø.

line feed can be either LFON or LFOFF. LFON causes the line
printer BIOS driver not to suppress line feeds following a
carriage return. LFOFF suppresses line feeds following a
carriage return.

COM sets parameters for a communications interface. The
following are valid COM parameters:

   .   baud--sets the RS232 baud rate, which can be any of
        the following: 11Ø, 15Ø, 3ØØ, 6ØØ, 12ØØ, 24ØØ, 48ØØ,
        or 96ØØ.

   .   parity--sets the RS232 parity. It can be N (no
        parity), O (odd parity), or E (even parity).

   .   data bit--sets the RS232 data bits. It can be either
        7 or 8.

   .   stop bit--sets the RS232 stop bits. It can be either
        1 or 2.

Here are some sample uses of MODE:

MODE BW 4ø <ENTER>

sets the video monitor to black and white with 4ø characters per line.

MODE COM 3øø N 8 1 <ENTER>

sets the RS232 interface to 3øø baud, no parity, 8 data bits, and 1 stop bit.

LPDRVR

The loadable printer driver provides any Radio Shack printer
connected to a Tandy 2ØØØ with several capabilities. For
example, you can set the number of lines per page; then, having
given the printer that information, you can set the vertical
tabs, the form feed function, or both. Other functions of LPDRVR
are as follows:

- Set horizontal tabs
- Tab horizontally
- Set skip perforation
- Cancel skip perforation
- Set 132 characters per line
- Set 8Ø characters per line
- Ignore next n codes
- Reset printer driver

Note: DUMPCGP.SYS, DUMPBW.SYS, and CGPDMP.BIN are not
compatible with the loadable printer driver.

To use any of the printer functions, you must do the following:

1.   Install the printer driver by adding this line to your
      CONFIG.SYS file:

      DEVICE=LPDRVR.SYS

      Do this only once.

2.   Look up the function's control code sequence in the Printer
      Control Codes table; then find the equivalent ASCII code(s)
      in the ASCII Character Code table. For example, look up the
      control code needed to set lines per page. It is ESCAPE
      C;n.   The ASCII equivalent of ESCAPE is 27.   The ASCII
      equivalent of C is 67.   n is the number of lines to set.

3.   Send the control code sequence, in ASCII form, to the
      printer driver. You can do this in any of 3 ways:

- By using BASIC's LPRINT statement with the CHR$ function, as described in <u>Tandy 2ØØØ BASIC Reference</u>.

- By making an MS-DOS function call, as described in <u>MS-DOS Programmer's Reference</u>.

- By making a BIOS call, as described in <u>MS-DOS Programmer's Reference</u>.

Continuing the example, to use BASIC to set the lines per page to 55, type this command:

    LPRINT CHR$(27);CHR$(67);CHR$55 <ENTER>

CHR$(27) sends the ESCAPE, CHR$(67) sends the C, and CHR$(55) sends the number of lines.

The Printer Control Code and ASCII Character Code tables follow:

Printer Control Codes

==

Set lines per page

        ESCAPE C;n;

Sets the page length to n lines. n is a number in the range
1 to 127. Issue this instruction before setting vertical tabs or
the form feed.

Set horizontal tabs

        ESCAPE D;n1;n2;n3;...nk;NUL

Sets horizontal tab stops at n1, n2, n3, and so on. The
numbers can be in the range 1 to 8Ø in regular print mode or the
range 1 to 132 in compressed print mode. When the printer is
turned on, the tab stops are automatically set to every 8
character spaces. Use ESCAPE D to change them.

Set vertical tabs

        ESCAPE B;n1;n2;n3;...nk;NUL

Sets vertical tab stops at n1, n2, n3, and so on. The
numbers can be in the range 1 to 64. When the printer is turned
on, no tab stops are set, and the printer advances according to
line feeds. Use ESCAPE B to set the tabs.

Tab horizontally

        HT   CHR$(9)

Tabs to the next horizontal tab stop.

==

==
Tab vertically

      VT   CHR$(11)

Tabs to the next vertical tab stop.

Advance to top of page (form feed)

      FF   CHR$(12)

Advances the paper to the next top of page. When the printer is
turned on, the top of page is automatically set to 66 lines from
the line the printer is on. To change the number of lines per
page, use ESCAPE C.

Skip perforation

      ESCAPE N;n;

Sets to n the number of lines to skip after printing each page.
n is a number in the range 1 to 127. Reset the number each
time you change the page length.

Cancel skip perforation

      ESCAPE O

Set 132 characters per line

      SI

Turns on the compressed character mode.

Set 80 characters per line

      DC2

Turns off the compressed character mode.
==

===
Pass the next n codes directly to the printer

            ESCAPE X;n;

Reset (cancel) driver

            CAN or DEL

Resets all counters and tab stops to their default values.
===

ASCII Character Codes

CHR	Dec	Hex		CHR	Dec	Hex
NUL	000	00H		SPACE	032	20H
SOH	001	01H		!	033	21H
STX	002	02H		"	034	22H
ETX	003	03H		#	035	23H
EOT	004	04H		$	036	24H
ENQ	005	05H		%	037	25H
ACK	006	06H		&	038	26H
BEL	007	07H		'	039	27H
BS	008	08H		(	040	28H
HT	009	09H		)	041	29H
LF	010	0AH		*	042	2AH
VT	011	0BH		+	043	2BH
FF	012	0CH		,	044	2CH
CR	013	0DH		-	045	2DH
SO	014	0EH		.	046	2EH
SI	015	0FH		/	047	2FH
DLE	016	10H		0	048	30H
DC1	017	11H		1	049	31H
DC2	018	12H		2	050	32H
DC3	019	13H		3	051	33H
DC4	020	14H		4	052	34H
NAK	021	15H		5	053	35H
SYN	022	16H		6	054	36H
ETB	023	17H		7	055	37H
CAN	024	18H		8	056	38H
EM	025	19H		9	057	39H
SUB	026	1AH		:	058	3AH
ESCAPE	027	1BH		;	059	3BH
FS	028	1CH		<	060	3CH
GS	029	1DH		=	061	3DH
RS	030	1EH		>	062	3EH
US	031	1FH		?	063	3FH

CHR	Dec	Hex	CHR	Dec	Hex
@	Ø64	4ØH	'	Ø96	6ØH
A	Ø65	41H	a	Ø97	61H
B	Ø66	42H	b	Ø98	62H
C	Ø67	43H	c	Ø99	63H
D	Ø68	44H	d	1ØØ	64H
E	Ø69	45H	e	1Ø1	65H
F	Ø7Ø	46H	f	1Ø2	66H
G	Ø71	47H	g	1Ø3	67H
H	Ø72	48H	h	1Ø4	68H
I	Ø73	49H	i	1Ø5	69H
J	Ø74	4AH	j	1Ø6	6AH
K	Ø75	4BH	k	1Ø7	6BH
L	Ø76	4CH	l	1Ø8	6CH
M	Ø77	4DH	m	1Ø9	6DH
N	Ø78	4EH	n	11Ø	6EH
O	Ø79	4FH	o	111	6FH
P	Ø8Ø	5ØH	p	112	7ØH
Q	Ø81	51H	q	113	71H
R	Ø82	52H	r	114	72H
S	Ø83	53H	s	115	73H
T	Ø84	54H	t	116	74H
U	Ø85	55H	u	117	75H
V	Ø86	56H	v	118	76H
W	Ø87	57H	w	119	77H
X	Ø88	58H	x	12Ø	78H
Y	Ø89	59H	y	121	79H
Z	Ø9Ø	5AH	z	122	7AH
[	Ø91	5BH	{	123	7BH
\	Ø92	5CH	|	124	7CH
]	Ø93	5DH	}	125	7DH
^	Ø94	5EH	~	126	7EH
_	Ø95	5FH	DEL	127	7FH

Dec = decimal, Hex = hexadecimal (H), CHR = character,
LF = line feed, FF = form feed, CR = carriage return,
DEL = rub out

The Character Translation Table

In addition to the other capabilities it affords, LPRDRVR also
lets you convert any printer code you send into any other. It
does this by maintaining a 256-byte table called a "character
translation table."

This table contains the code into which the printer is to
translate the code you send. Initially, the printer translates
each code into itself. After obtaining the memory address of the
table, you can change codes into other codes. To obtain the
address, make the necessary BIOS call from an assembly-language
program as follows:

1.   Set the AH register to 3.
2.   Execute an INT 17H instruction.

The pointer to the character translation table is returned in the
ES:BX registers.

CGPDMP

MS-DOS Version 2.11.Ø2 contains a special "screen dump"
subroutine called CGPDMP that lets you produce a hard copy of the
graphics on your screen (everything that is in graphics memory).
You can use this command from BASIC, from another language, or
from the operating system.

> **Note:** DUMPCGP.SYS, DUMPBW.SYS, and CGPDMP.BIN are not
> compatible with the loadable printer driver.

To use CGPDMP, your Tandy 2ØØØ must have the following options:

- A Tandy 2ØØØ Monochrome Graphics Option Board
  optionally upgraded with a Tandy 2ØØØ Color Graphics
  Option Kit.

- A CGP-22Ø Color Ink-Jet Printer or any DMP series
  printer, except the DMP-12Ø

Previous versions of the screen dump utility did not necessarily
map colors correctly, nor did they support DMP series printers.

To use the DUMPCGP.SYS or DUMPBW.SYS program from MS-DOS, press
<CTRL> <1> to toggle the screen dump on or off. Notice that
once you stop the dump, you can restart it from the beginning,
but you cannot pause the dump and then continue it in
midstream.

To use CGPDMP.BIN from BASIC or from another language, follow
these steps:

1. Be sure your device driver is loaded. If it is not loaded,
    add one of the following lines to a CONFIG.SYS file:

        DEVICE=DUMPCGP.SYS (for CGP-22Ø printers)
        DEVICE=DUMPBW.SYS (for DMP series printers)

2.   Determine where to load the subroutine.

     If you are not experienced with calling assembly-language
     routines from BASIC, use the /M option when starting BASIC.

     For a 128K system, type:

          BASIC /M:&H7700 <ENTER>

     For all other systems, type:

          BASIC /M:&HFF00 <ENTER>

3.   Before calling the subroutine, include 2 BASIC statements.
     For a 128K system, type:

          CGPDMP=&H7700 <ENTER>
          BLOAD "CGPDMP.BIN",CGPDMP <ENTER>

     For all other systems, type:

          CGPDMP=&HFF00 <ENTER>
          BLOAD "CGPDMP.BIN",CGPDMP <ENTER>

4.   When you wish to dump the screen, type:

          CALL CGPDMP(ER%)

     ER% returns the printer port status byte, which is zero if
     the operation was successful.

MS-LIB

This utility is provided for advanced programmers. If you are
not an advanced user, you have no need for this utility.

With the MS-LIB library manager, you can create library files to
use with MS-LINK. You can also modify library files by:

* Deleting modules from a library.

* Adding object files (as modules) to a library.

* Replacing modules. To do this, first use the delete
  function and then the add function.

In addition, you can "extract" a module from a library file and
place it in a separate object file. Extraction does not delete
the module from the library; it copies it.

MS-LIB requires at least 38K bytes of memory (28K bytes for code
and 10K bytes for run space).

Order of Operations

During each library session, MS-LIB first deletes or extracts
modules; then it appends new modules to the end of the file.
During those operations, MS-LIB reads each module into memory and
checks it for consistency. It then writes back to the file all
modules you wish to retain. While doing so, it closes up the
disk space to keep the library file as small as possible.

After appending all new modules, MS-LIB creates the index that
MS-LINK uses to find modules and symbols in the library file. If
you wish, you can instruct MS-LIB to store the index in a listing
file. The file contains 2 lists. The first is an alphabetical
list of all PUBLIC symbols, each followed by the name of the
module that contains it. The second is a cross-reference
list--an alphabetical list of the modules, each followed by a
list of the PUBLIC symbols in the module.

Running MS-LIB

To start MS-LIB, you can do any of the following:

- Enter the LIB command without options; then respond to the 3 prompts.

- Enter the LIB command with options, thus avoiding the prompts.

- Enter the LIB command, specifying a response file (a file that contains answers to the prompts).

Several command characters help simplify the task of using MS-LIB. They are discussed later in the "Command Characters" section. You may want to refer to that section when reading about the different methods for starting MS-LIB.

Method 1: The Keyboard Responses

To use this method, type:

    LIB <ENTER>

This command loads MS-LIB into memory and displays 3 prompts, 1 at a time. The prompts--**Library Name:**, Operation:, and List File:--are discussed in detail below.

Library Name:

Enter the name of the library you want to create or modify. If you omit an extension, MS-LIB assumes .LIB. For example, to specify the library SAMPLE.LIB, at the prompt, type:

    SAMPLE <ENTER>

If you specify a library that does not exist, MS-LIB displays:

    Library does not exist. Create?

Type **YES** **<ENTER>** to create the file or **NO** **<ENTER>** to stop the session.

Operation:

List, in any order, any modules you want to delete or extract and any object files you want to append. Precede each name with the command character that specifies the type of operation you want to perform on that module or file. The command characters that apply are:

- Minus sign (-), which deletes
- Asterisk (*), which extracts
- Plus sign (+), which appends

For example, to delete the module LESS and append the object file MORE, at the prompt type:

        +MORE-LESS <ENTER>

Default drive specifications and extensions for the **Operation:** prompt vary with the type of operation. See "Command Characters" for a detailed explanation of the command characters and defaults.

List file:

Enter the filename of the listing file you want to create. For example, to create the listing file CROSSLST, at the prompt, type:

        CROSSLST <ENTER>

If you press only **<ENTER>** at the prompt, MS-LIB uses NUL and thus does not create a listing file.

Method 2:   Responses on Command Line

To use this method, enter the command in the form:

LIB library operations, listing <ENTER>

The command line options are defined under "Method 1: Keyboard
Responses," and accomplish the same purposes as outlined in that
section. For example, the following command deletes the module
HEAP from the library PASCAL.LIB and then appends the object file
HEAP.OBJ to that library:

    LIB PASCAL-HEAP+HEAP <ENTER>

Notice that there is no space between library and the first
command character.

If you type only a library name followed by a semicolon(;) MS-LIB
reads the library file and checks it for consistency. It
performs no other operations. For example, to perform a
consistency check on the PASCAL library file, type:

    LIB PASCAL; <ENTER>

If you type only a library name followed by a comma (,) and a
listing filename, MS-LIB checks the library file for consistency
and produces the listing file. It performs no other operations.
For example, to perform a consistency check on the library file
PASCAL and then create the listing file PASCROSS.PUB, type:

    LIB PASCAL,PASCROSS.PUB <ENTER>

Method 3: Response File

To use this method, enter the command in the form:

    LIB @filespec <ENTER>

filespec is the name of a previously created file that contains
responses to the MS-LIB command prompts.

A response file has 1 line of text for each response. Be sure
your responses are in order so that they apply to the appropriate
prompts.

Use the command characters in the response file the same as you
use command characters on the keyboard.

When the library session begins, MS-LIB displays each prompt with
its response. Whenever you have not specified a response, MS-LIB
uses the default.

If you type a library filename followed by a semicolon, MS-LIB
reads the file and checks it for consistency but performs no
other operations.

If you enter a library filename and then a comma, and then a
listing filename, MS-LIB performs the consistency check and
produces the listing file.

Here is a sample response file:

     PASCAL <ENTER>
     ,CROSSLST <ENTER>

This file causes MS-LIB to read the library file PASCAL.LIB,
perform a consistency check, and create the listing file
CROSSLST.

Here is another response file:
     PASCAL <ENTER>
     +MORE-LESS <ENTER>

This file causes MS-LIB to delete the module LESS from the
library file PASCAL.LIB and add the object file MORE.OBJ. MS-LIB
does not create a listing file.

Command Characters

Several command characters help simplify the task of using
MS-LIB. Four of these specify particular operations. They are:

     •   Plus sign (+) append
     •   Minus sign (-) delete

- Asterisk (*) extract
- Ampersand (&) extend line

The other command characters are the semicolon (;), which selects
default responses, and <CTRL><C>, which stops the session.

Plus Sign (+)

A plus sign preceding an object filename instructs MS-LIB to
append that object file as a module in the specified library.

When MS-LIB does this, it removes the drive specification and
extension from the object file specification. For example, the
object file B:CURSOR.OBJ becomes module CURSOR.

Minus Sign (-)

A minus sign preceding a module name instructs MS-LIB to delete
that module.

Asterisk (*)

An asterisk preceding a module name instructs MS-LIB to extract
(copy) that module from the library into an object file.

MS-LIB assigns the object file specification, using this format:

current drive:module name.OBJ

For example, if the current drive is Drive A and the module name
is CURSOR, the object file specification is A:CURSOR.OBJ. If you
do not want to use the current drive, copy the file to another.
If you want to use the current drive but not the .OBJ extension,
rename the file.

Ampersand (&)

The ampersand extends the current line when you specify the
operations to perform. When you place an ampersand at the end of
a line, MS-LIB displays the Operation: prompt again so that you
can type more responses:

        Operation: +CURSOR-HEAP+HEAP*FOIBLES&
        Operation: *INT+ASSUME+RIDE; <ENTER>

Use the ampersand as many times as necessary. Only disk space
limits the number of modules you can append or extract.   You can
delete as many modules as exist.

Semicolon (;)

At any time after the first prompt (**Library name:**), you can
select default responses to the remaining prompt(s). To do so
type <;><ENTER>.

        Caution: Once you have entered the semicolon, you can no
        longer respond to any of the remaining prompts. Therefore,
        do not use the semicolon to skip only the Operation:
        prompt. To skip 1 prompt, use the <ENTER> key.

<CRTL><C>

Typing <CTRL><C> stops the library session at any time. If you
enter an incorrect response, such as an incorrect filename or
module name, type <CTRL><C> to exit MS-LIB. Then restart the
session.

If you make an error before you press <ENTER>, use
<BACKSPACE> to delete characters in that line.