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R E S E A R C H<sup>®</sup> I N C .

*mm-1 notes*

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## PC-DOS mode offered in new CP/M<sup>®</sup> release

**C**oncurrent<sup>™</sup> CP/M 3.1, the latest version of Concurrent CP/M operating system that is targeted for the Intel 8086/8088 microprocessors, offers a host of new features. Concurrent CP/M 3.1 provides both single user and multiuser support within one real time operating system with increased capabilities that include networking, shared code, graphics and 8087 support.

In the single user mode, Concurrent CP/M 3.1 provides the professional workstation within the corporate environment with the following features: real-time kernel, virtual consoles, graphics support, networking and inter-task communication and synchronization. The multiuser mode is an ideal solution to the needs of a small business or an office within a large corporation. It has benefits such as a high performance file system, a multiple virtual console environment at each terminal and network capability. Because Concurrent CP/M provides multiuser support, it will replace Concurrent CP/M 2.0 and MP/M-86.

DR Soft/Net<sup>™</sup>, Graphics System Extension (GSX<sup>™</sup>) and a generic PRINT utility are all bundled with the product at no additional charge. The CHSET utility is included to toggle

those bits in the command header needed in order to invoke the Intel 8087 math coprocessor support, the Shared Code Support facility to lower memory requirements and to lessen program load time, and the Suspend Mode that halts program execution when that program is pushed into the background.

### PC-Mode compatibility option

A PC-Mode compatibility option is also available that allows most applications programs written for PC-DOS 1.1 to be run under Concurrent CP/M 3.1. The user can run PC-DOS application program from PC-DOS, MS-DOS<sup>®</sup> or CP/M formatted floppy diskettes in a concurrent multitasking environment. PC-Mode also allows the user to run application programs and read/write data contained in the root level directories of MS-DOS and PC-DOS 2.0.

PC-Mode supports the PC-DOS 1.1 system functions initiated by INTERRUPT 21. Programs using routines embedded in ROM in the IBM PC can now be run in a concurrent environment if the OEM includes PC-Mode in the Concurrent CP/M system and special routines in the I/O system. The major utilities — COPY, ERASE, RENAME, DIR, DATE, TIME and BATCH — are included in PC-Mode.

## DR Soft/Net<sup>™</sup> links CP/M based computers

**D**igital Research has just released DR Soft/Net, the first software to link CP/M based microcomputers via any local area network (LAN). The DR Soft/Net package enables offices to tie together diverse microcomputer work stations using any LAN such as Ethernet, Arcnet and Omnet. Its high level software provides a swift, flexible and inexpensive means of creating a network based on any combination of LAN and microcomputer hardware.

DR Soft/Net comes in two versions that can be efficiently

customized by original equipment manufacturers (OEMs) for the retail market. One version is for CP/M and MP/MII<sup>™</sup> systems, and the other is for Concurrent CP/M. The 16-bit version supports full Concurrent CP/M functionality and is compatible with the 8-bit version. Now 8- and 16-bit systems can be networked together to share files and peripherals while permitting password protection and record and file locking.

Two different types of network stations, requesters and servers are supported. Requesters act as CP/M<sup>®</sup> work stations, initiating all network activity. Servers respond to network requests, managing files, printers and console activity for multiple requesters. Stations are designated as servers or requesters when the network is configured. Concurrent CP/M systems can act as both a server and a requester due to the multitasking capabilities. In fact, a Concurrent CP/M system can act as both a server and a requestor simultaneously.

An additional feature, print spooling, proves of great advantage to office automation. Print requests can be sent to a server to await the next available networked printer or they may be assigned to a designated printer.

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# DRI agreements reached on UNIX™ System V

Digital Research is making a major commitment to the UNIX System V operating system by signing three separate agreements with AT&T, Intel and Motorola. The primary objective of these agreements is to increase the commercial value of the UNIX System V operating system and to bring about the system's emergence as an industry standard.

Digital Research and AT&T have agreed to jointly produce a UNIX System V Applications Library. The products included in the library will be released by the end of 1984. They will be marketed through Digital Research's retail channels.

"AT&T Technologies is very pleased about what promises to be a constructive and mutually beneficial relationship with Digital Research," said Jack Scanlon, AT&T Vice President, Computer Systems. "We believe that relationships such as this will help us achieve our ultimate goal of making UNIX System



tions, windows, hierarchical files support, single or multiuser configuration and GSX, the graphics extension. The agreement also includes development of these Digital Research languages for the VME/10; Digital Research C™, Pascal/MT+™, CBASIC Compiler™, DR FORTRAN-77™, PL/I™ and BASIC Interpreter™.

According to Tom Beaver, Director of Motorola Microsystems Operations, "The agreement reinforces Motorola's commitment to support the M68000 microprocessor family with state-of-the-art operating systems that facilitate implementation of the myriad of applications software developed by third party vendors. This latest development provides designers and end-users increased flexibility in software development along industry-standard lines and is being combined with development and support of advanced semiconductor components to provide a portable, performance oriented environment for applications software. This is the first in a series of moves to provide complete portability between the UNIX System V, the VME/10 standard and other major operating system software libraries."



Intel contracted with DRI to develop System V 286 UNIX after another company failed to do the job. DRI will release a UNIX System V Applications Library including a line of high quality applications and systems software by the end of the year for AT&T. When the Motorola project is complete, also by the end of the year, it will be possible to port source-code from Concurrent DOS to UNIX System V, or vice versa, with little or no code conversion required. This will allow new software products to enter the market earlier and at less expense.



For Motorola, Digital Research is implementing its Concurrent DOS operating system on the VME/10 computer. Concurrent DOS provides support of CP/M and PC-DOS applica-

## DRI data base now provided on CompuServe

Go DRI™ to get on-line with Digital Research's newest microcomputer data base on the CompuServe Information Service. On January 26, 1984, just one week after CompuServe reached 100,000 subscribers, DRI went on-line with information aimed at the professional microcomputer user. The goal set for this data base is to provide microcomputer professionals with the timely and accurate information that is needed to keep up with this rapidly changing industry.

In order to accomplish this goal, DRI needs your help to find out what types of information you would like to see on the DRI data base on CompuServe and the MICROLINE™ data base on THE SOURCE™. Please help us provide you with what you want by completing the questionnaire found on MICROLINE or DRI or completing and returning the questionnaire in this issue of Micro Notes.

Go DRI and take a look at our latest data base offering and let

us know what you think by completing the questionnaire or by sending a Letter to the Editor. See the next issue of Micro Notes to read about data base enhancements. Maybe one of your suggestions will result in an enhancement to the data base.

### Letters welcomed

Let Digital Research know what you think of Micro Notes and the DRI and MICROLINE data bases by sending a Letter to the Editor. Send your messages by electronic mail addressed to CompuServe ID 76703,615 or Source ID STA809 or by mail to Editor, Technical Support Department, Digital Research, P.O. Box 579, Pacific Grove, CA 93950.



# Common Questions and Answers

## Digital Research C

**Q:** When trying to compile the SAMPLE.C program supplied with the C Language for CP/M-86, a banner is displayed and the system prompt reappears. Some Temporary files may be created. What is happening?

**A:** At least two situations will cause these symptoms:

1) Not all of the appropriate files are present on the disk. Refer to section 1.4 in your documentation.

2) The patches to BDOS function 59 have not been installed on your CP/M-86 system. R.COMD relies heavily on function 59 to load the various compiler modules. Without the patch, R.COMD is overwritten when the next program is loaded. Request CP/M-86 V1.1 patches #8 and #13.

**Q:** When trying to use the C Language V1.1 with Display Manager V1.0, a link-time error is generated that reads:

NO FILE

FILE: SYSLIBx.L86

**A:** An incompatibility exists due to the renaming of the DR C system run-time libraries from SYSLIBx.L86 to CLEARx.L86. A quick solution is to create and compile a C program which consists of only a "dummy" function. (EX: dummy()**{}]**) Then rename the object module to SYSLIBx.L86. A patch is available to correct the Display Manager libraries, DMDRCx.L86. Request Display Manager Application Note 04.

**Q:** DRC V1.1 does not work properly under MP/M-86. The banner displays and the system prompt reappears.

**A:** The compiler is searching for its modules on the drive specified as one lower than the current default drive. Place all compiler modules on the A: drive or use the -0 and -1 toggles to specifically reference the current drive. (i.e. 0E>DRC TEST -0E: -1E:). DRC.ERR will not be found unless placed on the drive below the current drive. (D: in our example above.) If the lower drive is a floppy drive, be certain to have a disk logged into that drive, to avoid system error messages. This problem will be corrected in a future release.

**Q:** Using Digital Research C under the CP/M-86 operating system, the -f switch for 8087 support does not seem to work correctly in all cases. Will I ever be able to use my 8087?

**A:** While the floating point routines have been improved tremendously under version 1.1, the 8087 support is not completely functional. The PC-DOS version has been corrected and another revision to the CP/M-86 product is planned in the near future.

## Level II COBOL

**Q:** I am trying to link an Assembly Language module to my COBOL program. How are the "01", "02" value clauses used as defined in the Working Storage?

**A:** Those value clauses serve as indexes into the jump table. They complement the routine definition for which they serve as an index for. Depending on where the routine resides in the table, determines the definition given to the routine within the Working Storage.

## PASCAL/MT+86

**Q:** When I try to link an Assembly Language module to my Pascal program, I am told that the entry point is an undefined label. I have declared the entry point external from the Pascal program and the symbol has been defined in my assembly module. Why is the linker unable to locate the entry point?

**A:** The entry point name and the assembly module name must each be a unique identifier. If the same name is given to both labels the linker attempts to use the module name as the entry point when in reality the program intended to use a name within that module.

## CBASIC Compiler (CB86) V2.0

**Q:** In my application program, running under Concurrent CP/M V1.1, I call TIMES but only the hours and minutes are returned, not the seconds. I have checked and rechecked my code and I

think that there must be something wrong with CBASIC COMPILER.

**A:** The reason that TIMES does not return seconds is because of an operating system limitation. When you call TIMES, CB86 performs a BDOS Function 105, which in your version of Concurrent CP/M does not return the time in seconds. See the description of that call in your operating system manual. In the newest release of Concurrent, version 3.1 with Windows, the BDOS call has been modified to return the number of seconds, so if you should update at some point you will be able to get access to the seconds without changing your code. For this reason, I would recommend that you allow for the seconds in your TIMES string handling routines, so that you could take advantage of this feature in the future. If it bothers you to see the 00 seconds, then you could do a version check, BDOS Function 147, and then use the appropriate code for that version to break the time string into its components. Checking the version number would also allow you to avoid returning a null string under CP/M V2.2 or CP/M-86, neither of which return a time at all. CP/M V3.0 will return 00 for seconds. Finally, MP/M II and MP/M 86 behave like Concurrent V1.1 and do not return seconds in the TIMES.

## ACCESS MANAGER™

**Q:** I have just modified the "files" parameter in the CONFIG.SYS file to operate under DOS 2.0. However, the maximum number allowed open simultaneously remains sixteen. What am I doing wrong?

**A:** DOS 2.0 can only allow sixteen open files at any one time. This is a feature of the operating system, however it is possible to code an assembly language module, which if called after the access manager SETUP function, forces AM to think it is operating under DOS 1.1; which does not limit the number of files. The code looks as follows:

DGROUP	GROUP	IDATA
IDATA	DSEG	PUBLIC
	EXTERN	?AMP25 : WORD
CODE	CSEG	PUBLIC
	PUBLIC	FORCE
FORCE:	MOV	?AMP25, BYTE PTR 0
	RET	
	END	

FORCE should be called immediately after SETUP.

## Display Manager™

**Q:** When I run DMSET on the IBM PC, I discover that multiple attributes and underlining are not supported. Why is this?

**A:** Multiple attributes are supported under PC DOS and CP/M-86, and underlining is supported under DOS. An error in DMSET accounts for this discrepancy and a patch is available to correct it. You can verify support for these attributes by testing them using the demonstration file, ORDERS.DIS.

## PL/I-86™

**Q:** How can I clear the screen and control cursor movements through PL/I-86 V1.0 application programs under PC DOS V1.1?

**A:** The DRI Technical Support staff has developed an assembler subroutine and a PL/I-86 program for Screen Control Functions to help solve this problem.

Licensed users may write to the DRI Technical Support Department for a hard copy of the subroutine and program or they may send a 5 1/4" blank disk to get electronic copy.

**Q:** Why am I not able to get SUBSTR to work correctly and consistently?

**A:** SUBSTR does not work correctly when you attempt to take a SUBSTR of a variable and assign it back into that variable in the same statement. It will work correctly if you assign it to a Temporary Variable and then reassign it to the original variable.

## Application Notes

On MICROLINE data base or may be ordered by Professional Programmer Support subscribers

# Application Notes on DRI products listed

Application Notes are available for each of our Digital Research products. These are available on our MICROLINE data base on THE SOURCE. Only Professional Programmer Support subscribers may order them for no charge from our Technical Support Department, PO Box 579, Pacific Grove, CA 93950. Be sure to specify which set of application notes you are requesting and include your name and mailing address and Professional Programmer Support access number.

### CP/M-86® V1.1 for the IBM® Personal Computer and Personal Computer XT

*Applicable Products and Version Numbers:* CP/M-86® V1.1 for the IBM® Personal Computer and Personal Computer XT

This implementation of CP/M-86 V1.1 supports a console status line that reports current user number, time, date, and the name of the file currently being processed by the PRINT.COM spooler. The information is updated once a second. The CPU overhead involved with each update is less than 4 milliseconds.

Some communications software might need data transmission at rates which do not allow such overhead. In this case, the status line can be disabled while the comm. program is active, then reenabled when the program terminates. If the updated version of CP/M-86 that supports the XT hard disk (serial number 1027-000-xxxxxx) is used, the comm. software need only send a ESC 0 sequence to the console to disable the status update, and a ESC 1 sequence to reenable it.

The older version of the operating system, which does not support the XT (serial number 1024-000-xxxxxx), requires a more involved method to toggle the status update. This is done by pointing the double-word vector for interrupt 1Ch to any location in memory that contains a byte with the value CFh. This is the opcode for an 8086 or 8088 IRET instruction. Thus, after such a switch is made, subsequent one second interrupts are terminated with no status line processing.

Attached is a program, written in ASM-86 assembly language, that demonstrates this method. When invoked at the CCP level, this program toggles the status line enablement. That is, it will enable if disabled and disable if enabled.

Licensed users are granted the right to include these changes in CP/M-86 V1.1 for the IBM Personal Computer software.

#### STATUS.A86

Program to toggle the status line update, CP/M-86 V1.1 for the IBM PC

from Digital Research, Inc.

Command file generation:

ASM86 STATUS

GENCMD STATUS 8080

```
INT_NUM    equ 1Ch      ;"user" TOD interrupt number
INT_ADR     equ INT_NUM * 4 ;offset of vector
PRNT_STR    equ 9       ;BDOS print-string function
BDOS        equ 224
YES_OFF     equ 02E4Ah   ;vector offset for normal update
YES_SEG     equ 00051h   ;vector segment for normal update
NO_OFF      equ 0FEF2h   ;vector offset of IRET in ROM
NO_SEG      equ 0F000h   ;vector segment of IRET in ROM
```

```
org 100h    ;8080 model
```

```
xor ax,ax   ;point ES at interrupt vectors
```

```
mov ES,ax
```

```
mov di,INT_ADR ;DI at appropriate vector
```

```
mov si,offset YES_STATUS ;prepare for possible jump
```

```
mov dx,offset MSG_Y
```

```
cmp ES:[di], YES_OFF ;check for present value
jnz SWITCH           ;jump if the status line is
                      ;disabled
```

```
mov si,offset NO_STATUS
mov dx,offset MSG_N
```

SWITCH:

```
cld ;forward direction
```

```
cli ;disable interrupts for the switch
```

```
movsw
```

```
movsw
```

```
sti
```

```
mov cl,PRNT_STR ;print the message
```

```
int BDOS
```

```
xor cl,cl ;do system reset
```

```
xor dl,dl
```

```
int BDOS
```

```
YES_STATUS dw YES_OFF ;normal value
```

```
dw YES_SEG
```

```
NO_STATUS dw NO_OFF ;IRET instruction
```

```
dw NO_SEG
```

```
MSG_Y db 0dh,0ah,'STATUS update enabled.S'
```

```
MSG_N db 0dh,0ah,'STATUS update disabled.S'
```

END

### CBASIC COMPILER (CB80)

#### Application Note: CB-06

*Applicable Products and Release Numbers:* CB80, all versions

**CP/M Utility Required:** RMAC (Relocatable Macro Assembler)

1) Compile this program with CBASIC:

.....  
This program will pass an assembly module a string of data to print then return, demonstrating the method used to pass parameters to an assembly language module. When a string is passed only the pointer to the location of the string is actually placed on the stack.

Note: To print the string with BDOS function 9 it must be terminated with a \$

.....  
STRING MY.STRING  
DEF PRTMSG (MSG) EXTERNAL  
INTEGER PRTMSG  
STRING MSG  
FEND

*Continued on next page*

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Licensed users are granted the right to include these modifications in their Digital Research software.

# Application Notes

*continued from preceding page*

```
MY.STRING = "This is the string to be printed.S"

PRINT "Calling Assembly Module..." : PRINT
CALL PRTMSG (MY.STRING) : PRINT
PRINT "...and the printing is completed."
END
```

2) Compile this Assembly module with RMAC:

.....

This assembly module will print a string using BDOS FN 9.

Note: It is the responsibility of the programmer to save and restore the register contents.

.....

```
PUBLIC PRTMSG

PRTMSG: POP H      ;get the return address
        POP D      ;get pointer to the string
        PUSH H     ;put return address on stack
        INX D      ;make D point to first char. in
        INX D      ;string rather than string length
        MVI C,9    ;BDOS print string function
        CALL 5     ;call BDOS

        RET        ;return to the BASIC program
```

3) Link the modules together:

LK80 TEST = TEST, PRTMSG

## Concurrent CP/M™ V1.0 for the IBM® Personal Computer and Personal Computer XT

*Applicable Products and Version Numbers:* Concurrent CP/M™ V1.0 for the IBM® Personal Computer and Personal Computer XT

Concurrent CP/M version 1.0 for the IBM Personal Computer and Personal Computer XT is distributed on two single-sided, double-density 5¼-inch floppy diskettes. These diskettes are also readable on double-sided drives. If a hard disk is not used, both diskettes must be present in the drives to boot.

After the operating system loads from the boot disk, it reads a DIP switch on the system board (SW1) to determine how many 5¼-inch disk drives are attached (0 to 4) and automatically configures for the correct number of diskettes. During the initialization sequence, Concurrent CP/M assigns the highest numbered drive described by SW1 to be the system drive. The system drive is the one searched when a command is not found on the default disk. It is also the TEMP drive used for temporary file storage by the O.S. and its utilities. If memory is found in the MDISK address space, C0000h to EFFFFh (D0000h to EFFFFh in the new XT version), drive M: becomes the TEMP drive.

If a hard disk is found by the initialization code and has been properly initialized by HDMAINT, it becomes the SYSTEM disk. It also becomes the TMP disk when no MDISK is present.

If double-sided 5¼-inch drives are attached, enough space exists on one diskette to eliminate the two-disk boot requirement. However, if no hard disk is present, the last drive is assigned as the TEMP drive and a second diskette is still required to be present when no MDISK is found.

**Note:** Some applications require SW1 to be set to reflect something other than the number of physical 5¼-inch drives. As this is a nonstandard use of the switch settings, Concurrent CP/M is unable to complete its initialization sequence because it attempts to write temporary files on the last drive.

The Concurrent CP/M operating system, contained in the file CCPM.SYS, can be patched to cause it to do the following:

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- disregard the settings of switches 7 and 8 on SW1 and force the operating system to recognize two (or one) 5¼-inch drives
- assign drive A: as the default SYSDISK and TEMPDISK on boot. (See Note 2.)

The following procedure explains how to do this. You should have a backup copy of CCPM.SYS and a working knowledge of how to use the DDT-86™ utility before you patch CCPM.SYS with these commands. User entries are in **bold type** and comments are parenthesized.

**Note 1:** The following addresses apply to the original or non-XT version of Concurrent CP/M V1.0 for the IBM Personal Computer (serial number CCP-000-xxxxxx or 1009-000-xxxxxx). If the updated version that supports the XT (serial number 1026-000-xxxxxx) is to be patched, see the second DDT-86 session below.

0A>set ccpm.sys [rw]

A:CCPM .SYS set to system (SYS), read write (RW)

```
0A>ddt86
DDT86 1.2
-rccpm.sys
START END
XXXX:0000 YYYY:6FFF (Note: XXXX and YYYY will vary)
-1890b,891d
```

```
XXXX:890B      MOV     CL,06
XXXX:890D      SHR     AL,CL
XXXX:890F      AND     AL,03
XXXX:8911      MOV     [2AAE],AL
XXXX:8914      CS:     MOV     [004B],AL
XXXX:8918      CS:     MOV     [0050],AL
XXXX:891C      ADD     AL,31
-a890b
XXXX:890B      xor al,al
XXXX:890D      cs: mov [4b],al
XXXX:8910      cs: mov [50],al
XXXX:8912      mov al,01 <—(replace 01 with number of 5¼-
XXXX:8916      mov [2aae] inch floppy drives in the system
XXXX:891A      add al,31 minus 1)
XXXX:891C      nop
XXXX:891D      nop
XXXX:891E      .
```

```
-s8ae6
XXXX:8AE6      20 28
XXXX:8AE7      20 46
XXXX:8AE8      20 6f
XXXX:8AE9      20 72
XXXX:8AEA      20 63
XXXX:8AEB      20 65
XXXX:8AEC      20 64
XXXX:8AED      20 29
XXXX:8AEE      20 .
```

-wccpm.sys

- ^ c

DDT86: Abort (Y/N) ? y

0A>set ccpm.sys [ro]

A: CCPM .SYS set to system (SYS), read only (RO)

0A>

Use the following commands to patch only Concurrent CP/M V1.0 for the IBM Personal Computer and Personal Computer XT (serial number 1026-000-xxxxxx):

0A>set ccpm.sys [ro]

A:CCPM .SYS set to system (SYS), read only (RO)

0A>ddt86

DDT86 1.2

-rccpm.sys

*Continued on next page*

# Application Notes

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## DISPLAY MANAGER V1.0

```

START      END
XXXX:0000  YYYY:94FF (Note: XXXX and YYYY will vary)
-L99bb,99cd
XXXX:99BB  MOV    CL,06
XXXX:99BD  SHR    AL,CL
XXXX:99BF  AND    AL,03
XXXX:99C1  MOV    [333A],AL
XXXX:99C4  CS:    MOV [004A],AL
XXXX:99C8  CS:    MOV [0050],AL
XXXX:99CC  ADD    AL,31
-a99bb
XXXX:99BB  xor     al,al
XXXX:99BD  cs:mov  [4b],al
XXXX:99C1  cs:mov  [50],al
XXXX:99C5  mov     al,01 <—(replace 01 with number of 5¼-
XXXX:99C7  mov     [333A],al inch floppy drives in the system
XXXX:99CA  add     al,31 minus 1)
XXXX:99CC  nop
XXXX:99CD  nop
XXXX:99CE  .
-s9cc6
XXXX:9CC6  20 28
XXXX:9CC7  20 46
XXXX:9CC8  20 6F
XXXX:9CC9  20 72
XXXX:9CCA  20 63
XXXX:9CCB  20 65
XXXX:9CCC  20 64
XXXX:9CCD  20 29
XXXX:9CCE  20 .
-wccpm.sys
- ^ c
DDT86:      Abort (Y/N) ? y

0A>set ccpm.sys [ro]

A:CCPM .SYS set to system (SYS), read only (R0)

0A>

```

### CP/M-86® V1.1

Application Note 01, 12/01/83

### BDOS System-Data Area Fields (Including TOD)

Applicable Products and Version Numbers: CP/M-86® V1.1

The public portion of the operating system data area, the base address of which is returned by BDOS function 49, contains the following information that can be accessed by transient programs or the BIOS:

DMAADD	equ word ptr 0	;user DMA address
DMABASE	equ word ptr 2	;user DMA base
CURDSK	equ byte ptr 4	;current user disk
USERCODE	equ byte ptr 5	;current user number
CNTL_P_FLAG	equ byte ptr 22	;list echo toggle
DATE	equ byte ptr 32	;set by TOD
TIME	equ byte ptr 41	
CONSOLE_WIDTH	equ byte ptr 64	
PRINTER_WIDTH	equ byte ptr 65	
CONSOLE_COLUMN	equ byte ptr 66	
PRINTER_COLUMN	equ byte ptr 67	

The DATE field format is as follows:

MM/DD/YY,

The TIME field format is as follows:

HH:MM:SS,

The slashes, colons, and commas must be included.

### Applicable Products and Version Numbers:

Display Manager V1.0, Digital Research C V1.1 or Later

**Error Description:** When trying to link DMDRCS.L86 (for small model programs) or DMDRCB.L86 (for large model programs) LINK-86 aborts with the message:

NO FILE

FILE: SYSLIBC.L86 (or SYSLIBB.L86)

due to the renaming of the DR C system subroutine libraries to CLEAR.S.L86 and CLEARL.L86.

**Patch Procedure:** Make backup copies of DMDRCS.L86 and DMDRCB.L86 before making the following changes.

For use under CP/M-86:

```

A>ddt86
DDT86 1.2
-rdmdrcs.186
START      END
NNNN:0000  NNNN:39FF
-s37c3
NNNN:37C3  F0 20
NNNN:37C4  80 .
-s37cc
NNNN:37CC  E5 b5
NNNN:37CD  96 .
-wdmdrcs.186
-rdmdrcb.186
NNNN:0000  NNNN:39FF
-s37e1
NNNN:37E1  F0 20
NNNN:37E2  80 .
-s37ea
NNNN:37EA  36 b6
NNNN:37EB  96 .
-wdmdrcb.186
- ^ C
A>

```

For use under the IBM Personal Computer Disk Operating System:

```

A>debug dmdrcs.186
-e 38c3 20
-e 38cc b5
-w
Writing 3A00 bytes
-q
A>

A>debug dmdrcb.186
-e 38e1 20
-e 38ea b6
-w
Writing 3A00 bytes
-q
A>

```

### Micro Notes

First Quarter 1984

Founder: Gary Kildall  
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# The Rev Table

The following is a list of current Digital Research product versions and last revision dates:

## LANGUAGES:

PRODUCT NAME	OS FAMILY	VERSION	LAST UPDATE
Digital Research C™	CP/M-86	1.1	See NOTE #1
Digital Research C	PC DOS	2.1	February 84
CBASIC®	CP/M	2.8	June 83
CBASIC	CP/M-86	1.4	See NOTE#2
CBASIC Compiler (CB80)™	CP/M	2.0	June 83
CBASIC Compiler (CB86)	CP/M-86	2.0	June 83
CBASIC Compiler (CB86)	PC DOS	2.1	June 83
CIS COBOL™	CP/M	4.5	November 82
CIS COBOL	CP/M-86	4.5	November 82
LEVEL II COBOL™	CP/M	2.1	February 84
LEVEL II COBOL	CP/M-86	2.1	February 84
LEVEL II COBOL	PC DOS	2.1	August 83
LEVEL II COBOL	MS DOS	2.1	August 83
DR LOGO™	CP/M-86	1.0	---
FORTRAN-77™	CP/M-86	1.0	March 84 release
PASCAL/MT+™	CP/M	5.6	See NOTE #3
PASCAL/MT+	CP/M-86	3.2	February 84
PASCAL/MT+	PC DOS	3.1	---
PERSONAL BASIC™	CP/M-86	1.1	See NOTE #4
PL/I™	CP/M	1.4	February 83
PL/I	CP/M-86	1.0	---
PL/I	PC DOS	1.0	---

NOTE #1: DR C upgrade from 1.0 to 1.1 supports overlays for both small and large memory models, includes the new common run-time library and allows the user to call routines in FORTRAN -77 and vice versa. Registered users will receive update notification automatically.

NOTE #2: V1.4 is a free update to V1.3 owners due to a banner change bug. Registered users will receive update notification automatically.

NOTE #3: Upgrade from 5.5 to 5.6 is a maintenance release only. Registered users will receive update notification automatically.

NOTE #4: Upgrade from 1.0 to 1.1 eliminates the 512 line limit restriction and fixes some minor bugs. Registered users will receive update notification automatically.

## PRODUCTIVITY TOOLS:

PRODUCT NAME	OS FAMILY	VERSION	LAST UPDATE
Access Manager™	CP/M	1.1	July 83
Access Manager	CP/M-86	1.1	August 83
Access Manager	PC DOS	1.1	---
ANIMATOR™ for CIS COBOL™	CP/M	4.5	November 82
ANIMATOR for CIS COBOL	CP/M-86	4.5	November 82
ANIMATOR for LEVEL II™	CP/M	2.1	January 83
ANIMATOR for LEVEL II	CP/M-86	2.1	January 83
ANIMATOR for LEVEL II	PC DOS	2.1	August 83
ANIMATOR FOR LEVEL II	MS DOS	2.1	August 83
Display Manager™	CP/M	1.1	July 83
Display Manager	CP/M-86	1.0	---
Display Manager	PC DOS	1.0	---
FORMS-2 for COBOL™	CP/M	1.3	July 83
FORMS-2 for COBOL	CP/M-86	1.3	July 83
FORMS-2 for COBOL	PC DOS	1.3	August 83
FORMS-2 for COBOL	MS DOS	1.3	August 83
micro/SPF™	CP/M-86	2.0	February 84
micro/SPF	PC DOS	2.0	February 84
DR Assembler Plus Tools™	CP/M	1.0	See NOTE #5
DR Assembler Plus Tools	CP/M-86	1.0	See NOTE #5
DR Assembler Plus Tools	PC DOS	1.0	See NOTE #5

NOTE #5: DR Assembler Plus Tools combines PUB and SID to include RASM, XREF, LINK, LIB and SID. This new package is available for CP/M and CP/M-86.

## GRAPHICS:

PRODUCT NAME	OS FAMILY	VERSION	LAST UPDATE
DR Access10	CP/M	1.0	---
DR Access10	CP/M-86	1.0	---
DR Graph™	CP/M	1.0	---
DR Graph	CP/M-86	1.0	---
DR Graph for IBM PC	CP/M-86	1.01	September 83
DR Graph for IBM PC	PC DOS	1.02	December 83
GSX™	CP/M	1.1	November 83
GSX-86	CP/M-86	1.2	September 83
GSX-86	MS DOS	1.0	October 83
Programmers Tool Kit™	8-bit OS	1.0	See NOTE #6
Programmers Tool Kit	16-bit OS	1.0	See NOTE #6

NOTE #6: GSX Programmers Tool Kit is available for 8-bit and 16-bit systems and includes ISV redistribution license, tailoring tools and documentation. The 16-bit kit contains development details for the CP/M-86 family, IBM PC DOS and MS DOS.

*Continued on next page*

# The Rev Table

*continued from preceding page*

## OPERATING SYSTEMS:

PRODUCT NAME	VERSION	LAST UPDATE
Concurrent CP/M (generic)	2.0	May 83
Concurrent CP/M for IBM PC/XT	3.1 (Windows)	January 84
CP/M®	2.2	February 80
CP/M PLUS™	3.0	January 83
CP/M-86® (generic)	1.1	February 82
CP/M-86 for IBM PC/XT	1.1	August 83
CP/M-86 for IBM DW	1.1	March 82
CP/M-68K	1.0	March 83
CP/NET®	1.2	November 82
MP/M II	2.1	February 82
MP/M-86	2.1	July 82

## Questionnaire

We need your opinions on the DRI data base on CompuServe and on the MICROLINE data base on the Source.

- Please indicate your status as one of the following:  
☐ Professional Support Subscriber    ☐ Dealer    ☐ Other (specify) \_\_\_\_\_
- Which of the following information services do you use?  
☐ CompuServe    ☐ Source    ☐ Other (specify) \_\_\_\_\_
- Which information on DRI or MICROLINE is most useful to you?  
 \_\_\_\_\_  
 \_\_\_\_\_
- What additional types of information would you like to see?  
 \_\_\_\_\_  
 \_\_\_\_\_
- How would you rate your usage of DRI or MICROLINE?  
☐ daily    ☐ weekly    ☐ monthly    ☐ rarely
- How would you rate your usage of CompuServe or the Source?  
☐ daily    ☐ weekly    ☐ monthly    ☐ rarely

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# MICRONOTES

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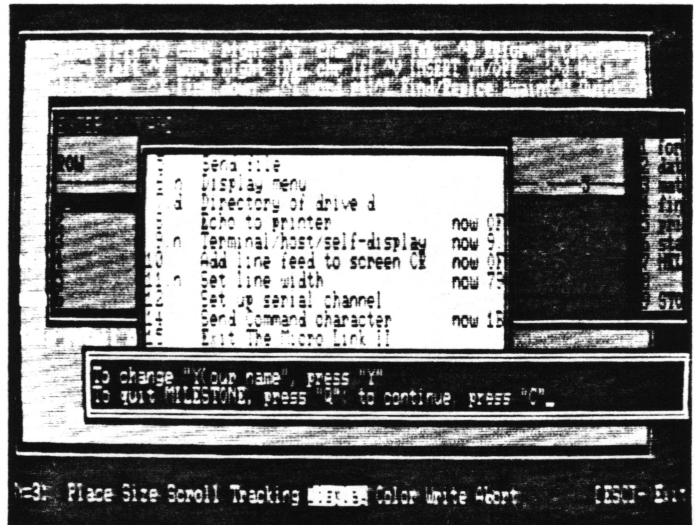
## Concurrent™ DOS provides PC-Mode

The power and sophistication of 16-bit microcomputers and their experienced operators are wasted if the operating system in use has to wait for one operator to process one application at a time. At the same time a multiuser, multitasking operating system is wasted if it is not available on a variety of machines running a wide range of applications. Concurrent DOS (Concurrent CP/M® 3.1) is the operating system to take full advantage of the advances in technology if OEMs and ISVs take advantage of its powerful capabilities.

ISVs can fully exploit the capabilities of Concurrent DOS if they exercise care and caution in their adaptations, particularly when it comes to memory requirements. Concurrent DOS can run its four virtual consoles on a system with as little as 256K bytes of memory. It must be kept in mind that memory management is controlled by OEMs who determine the partition boundaries based on an extended fixed-partition model. OEMs also have the option to create a virtual disk in RAM that can be used to store system utilities and temporary files, and can improve system responsiveness as much as five times.

Programmers and users alike will appreciate that some of the old annoyances, such as the error-handling facilities, have been improved. Many of the old favorite features have been retained. A user who encounters a disk error will be given a choice to "try again," "abort" or "replace disk." Many familiar CP/M features such as virtual RAM disks, start-up files, multisector I/O, date/time stamping and automatic diskette log-in are supported. The same operator interface is maintained as with the 8-bit CP/M systems including device and file naming conventions, the command language, line editing control characteristics and even the standard utility programs. That is because the difference between the systems is mostly internal.

Concurrent DOS provides some exciting capabilities such as two screen output modes, dynamic and buffered, that allow the user a choice of seeing a process in action as it is happening or of saving the progress of a process in a buffer and viewing the accumulated changes since it was last monitored. Each step of the executing processes is normally attached to one of the four virtual consoles. If you don't need to monitor a process, like print spooling, it can be detached from a console which frees that console for another task.



Concurrent DOS lets users run their PC-DOS applications in a multitasking environment. Each application may be viewed from a separate window with the windows representing virtual consoles.

Data can be transferred between processes by means of queues which allow data from one virtual console (a spreadsheet program, for example) to be fed directly to another virtual console (a word processing program, for example). Data files can be shared if separate applications are running on more than one console and they are attached to the same disk drive. These features are particularly important to users who take advantage of the built-in DR Net™ networking capability.

In addition to multitasking, Concurrent DOS also offers multiuser capability that provides a low cost means for many terminals in one office to be tied into a single CPU. This approach, however, can exact a price in speed and performance since there is only one computing source available to all the users. DR Net, on the other hand, allows 8- and 16-bit CP/M workstations to share peripherals such as hard disk and printers while keeping full local processing capabilities.

A comprehensive status line that lets users know what process is running on each of the virtual consoles is a significant feature that all OEMs and ISVs are encouraged to implement.

See Concurrent, page 4

### Welcome to MicroNotes

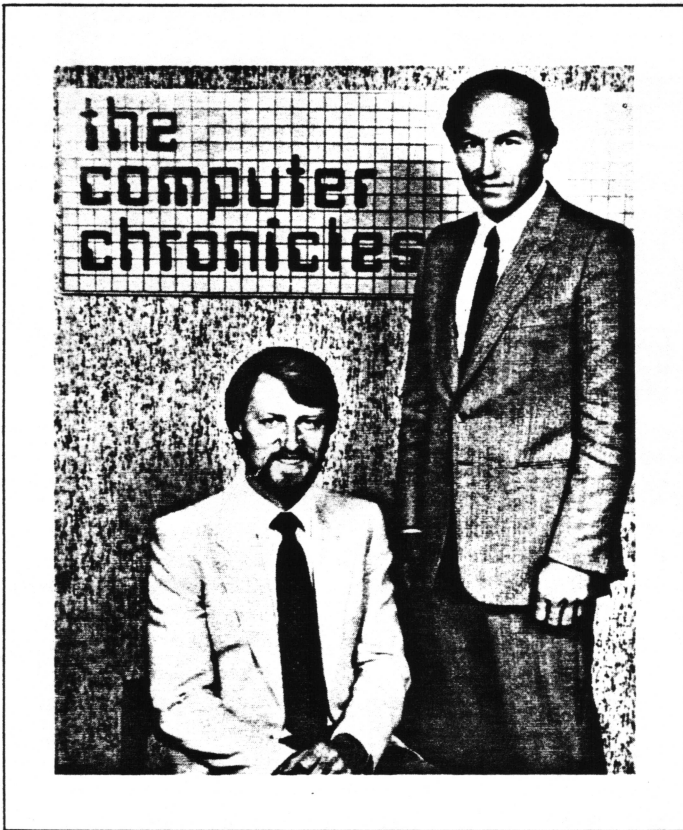
MicroNotes is a newsletter published bi-monthly for the technical community of Digital Research customers. This newsletter provides technical information on Digital Research products, explanations of support programs, announcements of new product releases, questions and answers, application notes, lists of available application notes, patches and revision tables.

MicroNotes will be sent to original equipment Manufacturers who have contracts with Digital Research and to Professional Programmer Support subscribers. Others, who are receiving this issue on a complimentary basis, may continue to receive MicroNotes by subscribing to Professional Programmer Support. Subscription services and procedures are described on page 2.

# Technical Support service expands

**D**igital Research is continuing its efforts to provide the best and most innovative professional support program available in the microcomputer software industry.

The Professional Programmer Support (PPS) service is presently available to subscribers on an unlimited access basis. Service includes an unlimited number of communications per period for the designated contact person plus 24 hours per day



Digital Research Founder and Chief Executive Officer Gary Kildall, seated, cohosts the "Computer Chronicles." The PBS series is anchored by Stewart Cheifet, Silicon Valley correspondent for the PBS Nightly Business Report. Half-hour segments cover a variety of topics from chip technology to computer security.

electronic access to information on THE SOURCE<sup>SM</sup> and CompuServe information services.

DRI Technical Support, as part of this continuing effort to expand services, now offers two new data bases on the CompuServe Information Service. The DRI display data base went on-line in January with news and information of general interest to the microcomputer industry. The DRI data base also includes new product announcements as soon as they become available.

In addition to the DRI display data base, a Special Interest Group (SIG) or Forum, named DR SIG, is now available on CompuServe. Just enter GO PCS-13 to access the DR SIG communications support system. DR SIG is divided into 11 different sections with three functions available for each section. For example, Section 8 is a section where PPS subscribers can leave messages for a technical support analyst or engineer, conference with any other member or participate in a scheduled conference with a technical support analyst or engineer. They also can send information, such as source code,

for review by an analyst or engineer without waiting for it to travel through the mails.

Some of the other sections of DR SIG are: Section 0 — General Interest; Section 1 — Application Notes & Patches; Section 2 — Common Questions and Answers; Section 3 — Ask the SYSOP; and Section 7 — "Computer Chronicles" PBS television program transcripts. Each of these sections has a data base library that is key word searchable; what you have to do is enter a product name, for example, and you will be presented with a selection of the available information. Most important of all, this information is available 24 hours a day, every day of the year.

One new addition to the DRI electronic information system is the "Computer Chronicles," a PBS television program aimed at microcomputer professionals. It is hosted by Stewart Cheifet and Gary Kildall, founder of Digital Research. The program is broadcast on 129 PBS stations nationwide and is being considered for international broadcasts in London, Tokyo and Sydney. Information on upcoming segments is available on MICROLINE on THE SOURCE and on DRI on CompuServe. Complete transcripts of the segments are available in the Section 7 data base library on DR SIG. "Computer Chronicles" is being incorporated into a telecourse by SRI International with a textbook and manuals published by Wadsworth Publishing.

If you would like more information about MICROLINE on THE SOURCE or DRI and DR SIG on CompuServe, call (408) 646-4928. If you would like to offer your comments or suggestions regarding the DRI and MICROLINE data bases, please complete the on-line questionnaire found on the main menu of each data base.

If you are interested in learning more about the PPS service, call (408) 646-4928 or write Professional Programmer Support, Technical Support Department, Digital Research Inc., P.O. Box 579, Pacific Grove, CA 93950.

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- Digital Research's family of graphic products help OEMs reach a wide user market, page 12.



# DRI support team offers wide range of expertise

The Technical Support department at Digital Research has undergone a reorganization in order to provide even better service to Professional Programmer Support (PPS) and OEM subscribers.

The number of Technical Support analysts and engineers available to reply to subscriber questions has increased by more than 60 percent. The analysts or engineers subscribers contact are experienced, trained microcomputer professionals. They are divided into two groups, languages and operating systems, according to their special area of expertise.

The languages group is managed by Bob Prince who has a Ph.D., five years of experience as a programmer analyst and two years of experience with DRI. Jim Needham and Gary Croom are the technical engineers for all of the CBASIC languages. Needham has a background in program design, independent graphic consulting, technical writing and is a published photographer. Croom has more than 13 years of experience working with IBM mainframe systems in operations and technical support for such companies as Bank of America, California Casualty and Nabisco.

Joe Cotham and John Aliotti are the technical engineers and Kathy Welch is the analyst for the Pascal product line, Display Manager™, Access Manager™ and Dr. Logo. Cotham has a Ph.D. degree in science education and has taught college courses in computer literacy, BASIC and Pascal. Aliotti has experience with B1960, VM/CMS, HP3000, PDP 11/70, has worked as a junior applications programmer and has a degree in computer science. Welch has spent three years with DRI, and is studying for a degree in computer science.

Kishore Pradhan is the technical engineer and Nancy Wood is the technical analyst for both 8- and 16-bit versions of PL/I. Pradhan was sales manager for Electro Service Corp. and has degrees in chemistry and computer science. Wood has spent nearly a year with DRI, has a degree in biology and has studied

extensively in the field of microcomputers.

Bob Becker, manager of the operating systems group, has more than a year of experience with Digital Research Inc. and 12 years before that as a field engineer working on mainframe computers. Lynda Haigh is the technical engineer and Mitch Smith is the technical analyst for the Digital Research C™ product line. Haigh has spent over a year and a half with DRI in Customer Service and Technical Support and has a degree in business administration and information systems management. Smith has a year in Sales Support and Technical Support with DRI, eight years of computer experience with the Navy and a degree in computer science.

Gary Silvey is the technical engineer and Dave MacKenzie is the technical analyst for the 8-bit operating systems. Silvey was a software engineer at Ford Aerospace and Communications Corp. and has a degree in computer science. MacKenzie directed the Navy's Fleet Numerical Oceanography Center's mainframe computers and has degrees from the U.S. Naval Academy and the Naval Postgraduate School.

Donna Schoenecker is the technical engineer and Bill Wobber is the technical analyst for the 16-bit operating systems. Schoenecker was with Victor Technologies in technical support and founded the International Microcomputer Society and is working on a degree in computer science. Wobber has worked in technical support for TeleVideo Inc. and has degrees in computer science and earth sciences.

Dick Lovelace is the manager of the data base system that monitors and tracks the PPS contacts with Technical Support personnel. Lovelace has worked for more than two years with DRI's Technical Support Department, has operations experience with IBM mainframes and has taught computer operations. His degrees are in computer science, public administration and police sciences.

Engineers and analysts available to assist subscribers to Professional Programmer Support include (left to right) front row: Bob Prince, Gary Silvey, Jim Needham; middle row: Mitch Smith, Bob Becker, Kathy Welch, Donna Schoenecker, Gary Croom; back row: Dick Lovelace, Kishore Pradhan, Joe Cotham, John Aliotti, Bill Wobber, Dave MacKenzie; not pictured: Lynda Haigh and Nancy Wood.



# DRI ships 128K version of Dr. Logo™

**O**EMs may profit from the growing popularity of Dr. Logo with a series of products aimed at the consumer and educational markets.

Generic versions of Dr. Logo may be licensed from Digital Research. An 8-bit version is currently available and a 16-bit version is being released in May. The availability of these versions supports a marketing effort to promote Dr. Logo as a standard. Meanwhile, dealer programs and advertising are increasing awareness for the product.

Promotions are timed with the introduction of a 128K version of Dr. Logo for the IBM PCjr. The new release runs under PC-DOS and may also be used on the IBM PC, PC/XT or most compatible computers. All of the features found on the 192K version are included on the smaller version except debugging windows.

The package provides a diskette and documentation in the form of the Dr. Logo Dictionary and an enjoyable guide called "Dennis the Menace Meets Dr. Logo." The guide was written and designed by cartoonist Hank Ketcham, creator of Dennis the Menace.

Dr. Logo first appeared on the retail market in fall of 1983 for the IBM PC and climbed to the top of the SoftSel Hot List. The retail release included SpeedStart CP/M, an abridged version of CP/M that boots automatically when the system is turned on.

Trade and business press have published favorable reviews on Dr. Logo's design and versatility. InfoWorld has rated it "excellent" on the basis of performance, documentation, ease of use and error handling.

Some of the features found in Dr. Logo are:

- A "Help" facility for on-line assistance
- Turtle graphics, a triangular pointer that indicates paths and headings of the cursor
- Split-screen mode to simplify debugging programs
- Double-precision floating point that supports up to 15 significant digits. This feature makes Dr. Logo suitable for business or advanced graphics applications.
- Game programming primitives such as SHUFFLE, which organizes elements of a list into a random sequence, or RANDOM, which creates a random integer between zero and the input number
- Sophisticated debugging facilities that aid programmers. The screen may be split to simplify editing. A TRACE facility displays the name and level of each procedure as it is called on. WATCH causes a pause after the execution of each program statement.

For more information about Dr. Logo and the expanding line of Digital Research products that support this language, call Sales Support at (408) 649-5500.

## Advanced features bundled with Personal CP/M

**P**ersonal CP/M was shipped May 1 to microprocessor manufacturers who are embedding the operating system on an inexpensive ROM chip. The first shipments have been made to Zilog Corp., American Microsystems Inc. and Sord in Japan.

Zilog and AMI are implementing Personal CP/M on a Z-80 microprocessor. Under terms of the agreement, AMI is designing the ROM chip. It will be manufactured, distributed and marketed by both AMI and Zilog for 8-bit microcomputers.

"Personal CP/M brings a new technology to microcomputer design," said Jim Tillinghast, product manager. "It's the first major operating system to be placed on a ROM chip, and users can draw from literally thousands of applications written for CP/M."

Computers may be produced cost effectively since the chip can be incorporated into assembly of the system, Tillinghast explained. Using a ROM chip avoids the inconvenience of having to load the operating system from disk.

The Visual Console Command Processor was included in the

first shipments of Personal CP/M. The VCCP was designed to be an easy-to-learn method of operating a microcomputer. Based on menus, it provides a system of help screens. Users are given a list of options for opening, copying, renaming and printing a file.

Some of the advanced features in the operating system include auto disk login, improved communications support, support for hard or floppy disks and extended error trapping so applications are easier to write. Error messages are stored in a separate file that may be transferred easily into different international languages. There's also an easy-to-use code for direct screen functions and character graphics.

Personal CP/M is compatible with CP/M Release 2.2. A 16-bit version of Personal CP/M also may be licensed from Digital Research.

"Personal CP/M makes computers easier to learn and use. Non-technical people don't have to remember cryptic commands for operating a computer," Tillinghast said. "The availability of a ROM-based version of CP/M increases the applicability of the operating system in home computers."

mail message with an order to buy, doing correspondence and overseeing his spreadsheet crunch numbers that will feed into that correspondence.

With an operating system as powerful and flexible as Concurrent DOS at your fingertips, the responsibility of implementing and using it correctly is great. But along with that high level of responsibility comes an equally high level of opportunity, and great opportunities have made great successes in the microcomputer industry.

## Concurrent

(continued from page 1)

The status line can be toggled "on" to let a user keep track of what processes are where and "off" so as not to intrude into what may well be a screen full of windows or data.

The windowing feature becomes particularly significant as communications become increasingly electronic and instantaneous. For example, a stockbroker can keep a window on a Wall Street ticker while watching for an important electronic

## CP/M Plus

**Q:** I am running CP/M Plus on a 128K system. How can my program access memory past 64K?

**A:** A transient program running under CP/M Plus can only access memory that is in the TPA. Any memory beyond 64K is divided into "Banks". These banks store part of the BDOS and BIOS, and the rest is used by BDOS for sector buffering.

**Q:** When I run programs that use direct cursor addressing under Banked CP/M Plus, sometimes the cursor appears in column 1 on the line below where it should be. The program works fine under Non-banked CP/M Plus and CP/M 2.2 but not under Banked CP/M Plus. Why is that?

**A:** To enable command line editing under Banked CP/M Plus, the BDOS keeps track of what column the cursor is in. When an application program uses direct cursor addressing, the BDOS loses track of the current cursor position. If you cannot change the program you are using, use the DEVICE command to set the column width to 0 before running the program. If you are writing a program that will use direct cursor addressing, change the function that moves the cursor to include code that updates the Console Column Position field in the System Control Block.

## DR Assembler Plus Tools

**Q:** When using the I and R commands while running SID, I type I<filename> followed by an R. SID responds with a question mark and the file is not read in. Why is this?

**A:** The new version of SID included with DR APT has changed the commands R and W. The format to read in a file is now:

Rfilespec {offset}

The format to write a file is:

Wfilespec {start,finish}

The I command still functions the same as before and can be used to set up a command line tail.

## Concurrent CP/M With Windows

**Q:** I have just purchased Concurrent CP/M With Windows for my IBM PC and did not get the CCP/M programmers guide or any manuals on programming with GSX. How can I get these manuals?

**A:** In the back of your CCP/M Manual is a coupon for the Concurrent CP/M PC/XT Programmers PAK. This package includes the items you mentioned plus programming examples and the assembly language utilities. It is available for \$70.00 from the address listed on the coupon.

## DR Graph

**Q:** I am having problems positioning the cursor when running DR Graph on the NEC Advanced Personal Computer. The arrow keys fail; it is impossible to backspace. The distributor (or dealer) who sold me the product, downloaded for the NEC APC format, has instructed me to call DRI.

**A:** Check the serial number of the product which you are trying to use. If the first four digits are 5017, you are using a non-generic version which has been keyboard mapped to the IBM Personal Computer, as the documentation indicates. You should return the product to your distributor (or dealer). NEC has licensed with Digital Research to distribute DR Graph for their hardware. You should contact them for a version designed for the APC.

## PL/I-86

**Q:** In some programs I get a SYNTAX ERROR when I use an ON ERROR(1) condition statement. There does not seem to be anything wrong with my code.

**A:** This can happen if you have used the following %REPLACE statement:

%REPLACE ON BY '1'B;

In this case the compiler substitutes '1'B on every occurrence of 'ON'. The Work-Around is:

%REPLACE ONN BY '1'B;

**Q:** When I am using PL/I-86 with CP/M-86, why do I get a syntax error when I specify a procedure as external at the option statement? EXAMPLE: PROCEDURE OPTIONS (EXTERNAL);

**A:** Do not specify the 'OPTIONS' nor use the parentheses in the procedure statement. EXAMPLE: PROCEDURE EXTERNAL;

## PASCAL/MT+86

**Q:** I am unable to utilize any of the Compiler Command Line Options under DOS. What am I doing wrong?

**A:** MT+86 under DOS expects to read the options in caps, therefore lower case letters will not be recognized.

**Q:** When I try to link an Assembly Language module to my Pascal program I am told that the entry point is an undefined label. I have declared the entry point external from the Pascal program and the symbol has been defined in my assembly module. Why is the linker unable to locate the entry point?

**A:** The entry point name and the assembly module name must each be a unique identifier. If the same name is given to both labels the linker attempts to use the module name as the entry point when in reality the program intended to use a name within that module.

**Q:** When I use the function @HERR my system hangs. Am I over-looking something?

**A:** The function @HERR resides in FULLHEAP. A correct call is made when the function is declared as an external boolean and FULLHEAP is linked. You must also specify to the linker how many paragraphs of extra segment to allocate for FULLHEAP. This is accomplished by using /X:nnnnn.

## Display Manager

**Q:** When running Display Manager on the IBM PC, I have some trouble using the cursor control keys. What do you suggest?

**A:** All keys except "insert" and "delete" work as you would expect. With CP/M-86, the insert key must be avoided and ctrl-V used instead. Also, the delete key on the PC is a delete-left key. Delete-under is not a cursor control key and must be generated using ctrl-G for both CP/M-86 and PC DOS.

**Q:** While using Display Manager on the IBM PC (PC DOS or CP/M-86) with Pascal/MT+86, I'm unable to access display files on a nondefault drive. Why is this?

**A:** OPNDIS won't accept a drive specification unless you place a space after the colon and before the file name. Note that the file name including the blank space cannot exceed eight characters.

## CBASIC Compiler (CB86/CB80) V2.0

**Q:** I have written a program that will fill out insurance claim forms with information that I enter interactively at the keyboard. My problem is that I am frequently executing a LPRINTER or CONSOLE statement to switch the destination of my output, and each execution of the CONSOLE statement causes a linefeed to be sent to the printer. Of course this means that I cannot continue to write information on that line. Is there any way to suppress this linefeed?

**A:** No, there isn't really a way to directly suppress the linefeed, but there is a solution to the problem. Reposition the printer head to POSITION 1 before executing the CONSOLE statement. This will prevent a linefeed from being executed, but you will have to TAB over to the spot at which you wish to continue printing on that line. Here is a function that you may include in your code that will position the printer head at POSITION 1:

DEF RSTPOS

INTEGER RSTPOS \this function only requires 2 bytes  
WHILE POS <> 1 \ check to see if printer is at POS 1  
PRINT CHR\$(13);\ if not, print a carriage return  
WEND

FEND

(Be sure to call this function before each CONSOLE statement.)

*On data bases or may be ordered:*

# Application Notes and Patches on DRI products

The following is our complete list of the Application Notes and Patches available for each of our Digital Research products. These are available on our electronic data bases on **THE SOURCE** and CompuServe or may be order for no charge from our Technical Support Department, PO Box 579, Pacific Grove, CA 93950. Be sure to specify which set of Application Notes or Patches you are requesting, and include your name, mailing address and zip code.

## **CBASIC®:**

- CA01 - Assembly Language and CBASIC-80 Under CP/M PLUS
- CA02 - Assembly Lang. & CBASIC Under CP/M V2.x - Calc. Space on Disk
- CA03 - Assessing MP/M II Internal Time/Date with Assembly Lang. & CBASIC-80
- CA04 - CBASIC-80/86 Dynamic Memory Management
- CA05 - Chaining to a .COM/.CMD File From CBASIC
- CA06 - Assembly Lang in CBASIC Compiler under CP/M-86

## **CBASIC COMPILER™:**

- CB01 - Dynamic Memory Management ('OM' error)
- CB02 - Disk Files in a Shared Environment
- CB03 - Using the GET and PUT Functions
- CB04 - Accessing MP/M II's Time-Date Function
- CB05 - Assembly Lang. in CBASIC Compiler under CP/M-86

## **Concurrent CP/M-86 For The IBM PC:**

- 01 - Using The IBM PC ROM BIOS Under Concurrent CP/M-86
- 02 - Shifting The Horizontal Sync Position of the CRT Display
- 03 - Booting Concurrent CP/M-86 (PC) From A Single Drive
- 04 - Self attaching RSP

## **CP/M V2.2:**

- 01 - The CCP Autoload Feature
- 02 - Reversing or Equivalencing the Backspace and Rubout Key Functions
- 03 - Sample BIOS For a Serial Printer Device
- 04 - BIOS Error Return Code Options
- 05 - Improving the Control-S Function
- 06 - Changing the Lines Per Page
- 07 - Changing the Restart Number in DDT
- 08 - Nested SUBMIT Files
- 09 - Configuring CP/M For Page Boundaries
- 10 - Booting CP/M On Drives Other Than Drive A
- 11 - Chaining Programs
- 12 - Interpreting Control-Z in SUBMIT Files
- 13 - Exiting PIP When Using SUBMIT and XSUB
- 14 - Turning Control-P On and Off From Within a SUBMIT File
- 15 - Debugging a CP/M V2.2 BIOS

## **CP/M Plus:**

- 01 - Implementating A Menu Driven CP/M Plus System
- 02 - Changing the Restart Vector For SID v. 3.0

## **CP/M-86 V1.0 For the IBM Display Manager:**

- 01 - OPNDIS and DISPD Functions
- 02 - Accessing Display Files

## **CP/M-86 V1.1:**

- 01 - BDOS System-Data Area Fields (Including TOD)
- 02 - DDT-86 Customization
- 03 - Debugging a CP/M-86 CBIOS Using DDT-86 or SID-86
- 04 - Booting From Drives Other Than A:
- 05 - Program Control Of The Printer-Echo (Control-P) Switch
- 06 - Examples of Intersegment Program Transfer in ASM-86
- 07 - The CCP Autoload Feature

## **CP/M-86 V1.1 For the IBM DisplayWriter:**

- 01 - Nonstandard Printer Page Lengths
- 02 - Keyboard Customization

## **CP/M-86 For The IBM PC:**

- 01 - Using The Color/Graphics Adaptor With a Monochrome Display
- 02 - Disabling The Status Line
- 03 - Field Installable Device Driver Software (FIDDS)

## **CP/NET®:**

- 01 - Writing Improved NETWRKIF Modules for CP/NET
- 02 - Allowing CP/NET Servers To Use Bank-Switched Technology
- 03 - Changing The CP/NET and CP/NOS Version Number

## **DR Graph™:**

- 01 - Additional Features for the IBM Personal Computer User

## **LEVEL II COBOL™:**

- 01 - Defining Additional Key Functions

## **LINK-86™ V1.02:**

- 01 - Data Section ORIGIN Customization

## **CP-NOS:**

- 01 - Loading the CP/NET requestors from different drives

## **MAC™ V2.0:**

- 01 - Cross Assembling To Different Microprocessors

## **MAC/RMAC:**

- 02 - Relative Jumps Using 280 LIB

## **MP/M II:**

- 01 - Suppressing the MP/M Loader Display
- 02 - Setting and Resetting the Raw Console I/O Mode
- 03 - Changing PRL File Minimum Buffer Size Requirements
- 04 - Accessing the Internal MP/M II TOD (Time-of-Day) Function
- 05 - DMA Disk Controllers With Banked Memory Systems
- 06 - Using the SEND CLI Command XDOS Function
- 07 - Creating a SUBMIT File From An Applications Program
- 08 - File Sharing
- 09 - Program Control of the Control-P Switch
- 10 - Cold Boot Startup
- 11 - SUBMIT Enhancements
- 12 - SPOOL Utility Modifications
- 13 - Record Locking/Unlocking
- 14 - GENSYS Enhancements
- 15 - Changing the Priority of SPOOL.PRL
- 16 - Changing the Backspace and Rubout Key Functions

## **PASCAL/MT+:**

- MT80-01 - Program Chaining Under CP/M V2.2 or CP/M PLUS V3.0
- MT80-02 - Memory Peeks and Pokes Using Inline Only
- MT80-03 - Modification to the Built-In ODD Function
- MT80-04 - An Improved @ BDOS Function
- MT80-05 - Improved Utilities Module
- MT80-06 - Overlay Linker Switch Calculator
- MT80-07 - Direct Console I/O Using BIOS Calls

## **PASCAL/MT+86™:**

- MT86-01 - Improved Utilities Module
- MT86-02 - Improved @BDOS86 Function With a New Name: @SERVICE
- MT86-03 - An Alternative Method of Chaining Using CP/M-86 Function 47

## **PERSONAL BASIC™:**

- PB01 - Appending To A Sequential File

## **PL/I-80™:**

- 01 - Including Local Symbols in RMAC (revision of RMAC app note #1)
- 02 - Linking Fortran Overlays (revision of LINK-80 app note #1)

## **PL/I-86:**

- 01 - Cursor Movement under PC DOS V1.1 & V2.0
- 02 - To GET/SET TIME & DATE Under PC DOS V2.0

## **SID™ V1.4:**

- 01 - Changing the Restart Vector of TRACE.UTL and HIST.UTL

## **ZSID™ V1.4:**

- 01 - Changing the Restart Number
- 02 - Changing the Screen Display
- 03 - Changing the Restart Vector of TRACE.UTL and HIST.UTL

## **TEX 2.1:**

- 01 - Editor Compatibility



## Patch List

CP/M V2.2	10, BDOS	MP/M II V2.0	02, PIP.CMD
01, MOVCPM	11, BDOS	01, XDOS	03, BDOS
01, DD, MOVCPM	12, SUBMIT	02, KDOS	04, Real-time Monitor
01, 4200H	13, BDOS	03, XDOS	05, CIO.MPM
02, ASM	CP/M V1.1 for the IBM PC	04, RESBDOS	06, Real-time Monitor
03, SUBMIT	01, BIOS	05, RESBDOS	07, BDOS
04, PIP	02, BIOS	06, PIP	08, BDOS
05, PIP	03, BIOS	07, PIP	09, Real-time Monitor
06, PIP	CP/M-86 V1.1 for the	08, PIP	10, BDOS.MPM
09, DEBLOCK.ASM	IBM Displaywriter	09, PIP	11, SUP.MPM
CP/M Plus V3.0	01, BIOS	10, SCHED	12, BDOS.MPM
01, RESBDOS3 patch 01	CP/M-68K V1.1	11, SPOOL	13, BDOS
02, HELP Patch 01	01,	12, SDIR	14, SDIR
03, PIP patch 01	Concurrent CP/M-86 V2.0	13, LINK.COM	Pascal/MT+ V5.5
04, PATCH patch 01	01, BDOS.CON	14, PRINTER	01, MTPLUS
05, INITDIR patch 01	02, BDOS.CON	15, SHOW	02, LINKMT
06, PIP patch 02	03, BDOS.CON	16, RESBDOS	03, MTPLUS.COM
07, BDOS3, BNKBDOS3,	04, BDOS.CON	17, MPMLDR	04, TRANCEND.ERL
Patch 01	05, BDOS.CON	18, GENSYS	05, Run-time Source
08, HELP patch 02	06, LOADER.H86,	19, XDOS	06, PASLIB.ERL
09, INITDIR patch 02	LOADER.CMD	20, BNKBDOS	07, PASLIB.ERL
10, DIRLBL patch 01	07, BDOS	21, PIP	08, SPP.COM
11, HELP patch 03	08, BDOS	MP/M II V2.1	09, LINKMT
12, CCP patch 02	09, BDOS	01, RESBDOS	10, MTPLUS
13, BDOS Patch 02	10, BDOS	02, XDOS	Pascal/MT+ V5.6.1
14, PATCH	11, BDOS.CON	03, XDOS, BNKXDOS	01, BCDREALS
CP/M-86 V1.0	CP/NET V1.1	04, PIP	03, MTPLUS
01, GENCMD	01, PIP	05, TMP	04, FPREALS.ERL
02, ASM-86	02, SLVSP	06, BNKBDOS	Programmer's Utilities-86 V1.0
03, ASM-86	03, SLVSP	07, XDOS	for IBM PC Disk O/S
04, ASM-86	CP/NOS V1.1	08, SPOOL	01, XREF-86
05, GENCMD	01, SLVSP	MP/M-86 V2.0	Programmer's Utilities-86 V1.2
06, GENCMD	02, SLVSP	01, PIP	for DRI O/S
07, CCP and BDOS	Display Manager V1.1	02, PIP	01, XREF-86
08, DDT-86	for CP/M	03, GENSYS	SID V1.4
CP/M-86 V1.1	02, DMALLO	04, ASM-86	01,
01, BDOS	03, DMSET 3.0VR	05, DDT86.CMD	02,
02, LDCOPY	04, Modifying DM	06, GENDEF	SID-86 V1.0
03, GENDEF	Run-time Libraries	07, GENSYS	01,
04, ED	MAC V2.0	08, SUP	02,
05, ED	01,	09, SUP	TEX-80 V2.1
06, BDOS	02,	10, MEM	01,
07, BDOS	03,	14, PIP	02,
08, BDOS	04,	MP/M-86 V2.1	03,
09, PIP		01, Real-time Monitor	

### WOULD YOU LIKE TO RECEIVE MICRONOTES?

(You are eligible if you are an Original Equipment Manufacturer working with Digital Research products or a subscriber to Professional Programmer Support.)

NAME \_\_\_\_\_

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This is an \_\_\_\_\_add \_\_\_\_\_delete \_\_\_\_\_change

Please mail to: Mail Department  
Digital Research Inc.  
P.O. Box 579  
Pacific Grove, CA 93950

# Application Notes and Patches

## Concurrent CP/M-86 Release 1.0 for the IBM Personal Computer Application Note 02, 12/29/82

### Shifting the Horizontal SYNC Position of the CRT Display

#### Program: SHFTRITE.A86

Applicable products and version numbers: Concurrent CP/M-86 (PC) R1.0

This program is used to adjust the horizontal SYNC position of the monochrome (or color/graphics) monitor attached to the IBM™ Personal Computer. It sends instructions to the 6845 CRT controller, as described in the IBM PC Technical Reference Manual (IBM part number 6025008). You can use the program two ways:

- interactively, or,
- with a one-digit (zero to nine) command tail, specifying the number of character positions to shift the display.

To customize this program, change the appropriate equates, then:

```
A>ASM86 SHFTRITE
A>GENCMD SHFTRITE 8080
```

This program has been tested only on the IBM PC Monochrome Display.

```
;*****
BDOS equ 224 ;function call interrupt #
CON_OUT equ 2 ;console_out function #
CON_IN equ 1 ;console_in function #
PR_STR equ 9 ;print-string function #
DEF_BUFF equ 80h ;default buffer offset

CRT_ADDR equ 3B4h ;monochrome 6845 address reg.
;use 3D4h for color
CRT_DATA equ 3B5h ;monochrome 6845 data register
;use 3D5h for color
HOR_SYNC_REG equ 2 ;HSYNC position register #
HOR_SYNC_DEF equ 52h ;default value for mono-80 col.
;use 5Ah for color, 80 col.
;use 2Dh for color, 40 col.
;use 2Dh for color, graphic

;main program:

org 100h ;this pgm. is written as 8080
;model

call PARSETAIL ;see if interactive mode
call STRINGOUT ;print 80 numbers across screen
call SHIFT_SYNC ;here if non-interactive

BACK: ;routine to return to Concurrent
;CP/M-86
mov cl,0 ;function 0
mov dl,0 ;
int BDOS ;

PARSE_TAIL:

cmp byte ptr .def_buff,0 ;check for command tail
jz INTERACT ;if zero, interactive mode
mov al,.def_buff+2 ;get single digit
cmp al,'0' ;see if valid
jb pl ;jump if invalid
cmp al,'9' ;see if valid
ja pl ;jump if invalid
sub al,'0' ;convert to binary
sub col_num,al ;update column variable
pl: ret

INTERACT:

call STRINGOUT ;print 80 numbers
call QUERY ;ask for another shift
or dl,00100000b ;to lower case
cmp dl,'Y' ;yes, another shift
jz int1 ;else back to O.S.
jmps BACK

int1: dec col_num ;for one character shift
call SHIFT_SYNC ;shift it
jmps INTERACT

QUERY: ;ask for another shift
mov cl,PR_STR ;BDOS print-string function
mov dx,offset message ;address of message
int BDOS ;function call
mov cl,CON_IN ;console-in function #
int BDOS ;function call
ret
```

```
message db 0dh,0ah,' '
db 'Shift right another column? (y/n) $'

STRING_OUT: ;routine to print 80 numbers

mov dl,0dh ;carriage return
call CHAR_OUT ;print it
mov dl,0ah ;line-feed
call CHAR_OUT ;print it
mov dx,'I'-1 ;initialize counter
mov cx,80 ;
w0: inc dx ;
cmp dx,'9'+1 ;see if > '9'
jb w1 ;no, jump
sub dx,10 ;back down to 0
w1: call CHAR_OUT ;print number
loop w0
ret

CHAR_OUT: ;routine to print char. in dl

push cx ;save reg.
push dx ;
mov cl,CON_OUT ;BDOS con-out function
int BDOS ;BDOS call
pop dx ;restore reg.
pop cx ;
ret

SHIFT_SYNC: ;routine to talk to the CRT
;controller

mov dx,CRT_ADDR ;address register
mov al,HOR_SYNC_REG ;number of horizontal sync.
;register
out dx,al ;set up for HSYNC reg. write
mov dx,CRT_DATA ;data register
mov al,col_num ;our data variable
out dx,al ;write it
ret

;The byte variable follows. This is the value which is output
;to the CRT controller.
```

```
col_num db HOR_SYNC_DEF
```

END

## Display Manager

for CP/M-86 V1.0 Application Note 03  
Accessing Display Files In User 0 Under  
CCP/M-86, CP/M-86, & MP/M-86

Applicable Products and Release Numbers: Display Manager V1.0;  
Concurrent CP/M-86 V1.0, 2.0; MP/M-86 V2.1; CP/M-86 V1.1

### Description of Problem:

Display files set to SYS and RO in user 0 are not accessible in other user areas. The Display Manager run-time procedures don't check for operating system information to determine if the process is multi-user or multi-task.

### Workaround:

Set the high-order bits of bytes 5 and 6 of the filename that is passed to OPNDIS. This allows Display Manager to find the file in user 0 that is set to SYS and RO. In the example, ORDERS.DIS, the high-order bits of "R" and "S" are set. Note that if the filename is less than 6 characters in length, spaces with high-order bits set must be inserted.

1) Pascal

```
fname:=concat('ORDE',chr(82+128),chr(83+128),'.DIS');
```

2) Cbasic

```
as$="ORDE"+chr$(82+80h)+chr$(83+80h)+".DIS"
```

3) PL/I

```
astrng="ORDE"||ascii(210)||ascii(211)||".DIS".
```

# Application Notes and Patches

## Display Manager V1.0 for PC DOS Patch 03 Patch to DMSET

Products that require updating: *Display Manager for PC DOS V1.0*

**Program:** DMSET3.OVR

**Error Description:**

Testing the terminal control codes with DMSET produces erroneous results for multiple attributes and the underline attribute. The test results are that multiple attributes and underlining are not supported. This is an error. Both are supported on the IBM PC. Note that these attributes are available in spite of the error in DMSET.

**Patch Procedure:**

Make a backup copy of DMSET3.OVR before using DEBUG to install the patch as shown below (user entries are in bold type):

```
A>debug dmset3.ovr
-ec22
xxxx:0c22      03.6
-ea4b
xxxx:0a4b      03.4
-w
Writing 4800 bytes
-q
A>
```

## Display Manager V1.0 Patch 04

Modifying the Display Manager Run-time Libraries  
to Accept the Updated DR C Library Names  
Digital Research C V1.1 or Later

**Applicable Products and Version Numbers:** Display Manager V1.0,  
Digital Research C V1.1 or Later

**Error Description:** When trying to link DMDRCS.L86 (for small model programs) or DMDRCB.L86 (for large model programs) LINK-86 aborts with the message:

```
NO FILE
FILE:      SYSLIBC.L86 (or SYSLIBB.L86)
```

due to the renaming of the DR C system subroutine libraries to CLEAR.S.L86 and CLEAR.L.L86.

**Patch Procedure:** Make backup copies of DMDRCS.L86 and DMDRCB.L86 before making the following changes. User entries are in bold type.

For use under CP/M-86:

```
A>ddt86
DDT86 1.2
-rdmdrcs.l86
START      END
NNNN:0000 NNNN:39FF
-s37c3
NNNN:37C3 F0 20
NNNN:37C4 80 .
-s37cc
NNNN:37CC E5 b5
NNNN:37CD 96 .
-rdmdrcs.l86
-rdmdrcb.l86
NNNN:0000 NNNN:39FF
-s37e1
NNNN:37E1 F0 20
NNNN:37E2 80 .
-s37ea
NNNN:37EA E6 b6
NNNN:37EB 96 .
-wdmdrcb.l86
-C
A>
```

For use under the IBM Personal Computer Disk Operating System:

```
A>debug dmdrcs.l86
-e 38c3 20
-e 38cc b5
-w
Writing 3A00 bytes
-q
A>

A>debug dmdrcb.l86
-e 38e1 20
-e 38ea b6
-w
Writing 3A00 bytes
-q
A>
```

## CP/M-86 V1.1

Application Note 02, 12/01/83  
DDT-86 Customization

**Applicable Products and Version Numbers:** CP/M-86 V1.1 and DDT-86 V1.1 and 1.2

DDT-86 V1.1 and V1.2 can be altered in three ways to support smaller console displays and operate in systems with limited memory:

1. The program can be patched to force a 40 column rather than 80 column output.
2. The assembler portion can be removed, resulting in a 9K version of DDT-86.
3. The assembler and disassembler portions can be removed, resulting in a 5K (V1.1) or 6K (V1.2) version.

In the smaller versions, DDT-86 responds to an A command, or A and L commands, with a question mark.

Before doing the following procedures, ensure that you have a backup copy of DDT86.cmd present on another disk. User entries are in bold type.

Do the following to force a 40 column display:

Version 1.1:

```
A>ddt86
DDT86 1.1
-rddt86.cmd
START      END
xxxx:0000 xxxx:367F
-s12f0
xxxx:12F0 00 1
xxxx:12F1 00 .
-wddt40.cmd
-C
A>
```

Version 1.2:

```
A>ddt86
DDT86 1.2
-rddt86.cmd
START      END
xxxx:0000 xxxx:37FF
-s149e
xxxx:149e 00 1
xxxx:149F 00 .
-wddt40.cmd
-C
A>
```

Do the following to remove the assembler:

Version 1.1

```
A>ddt86
DDT86 1.1
-rddt86.cmd
START      END
xxxx:0000 xxxx:367F
-s1
xxxx:0001 60 0d
xxxx:0002 03 02
xxxx:0003 00
xxxx:0004 00
xxxx:0005 66 0d
xxxx:0006 03 02
xxxx:0007 00 .
-s1286
xxxx:1286 01 00
xxxx:1287 00 .
-wddt9K.cmd,0,217F
-C
A>
```

Version 1.2

```
A>ddt86
DDT86 1.2
-rddt86.cmd
START      END
xxxx:0000 xxxx:37FF
-s1
xxxx:0001 72 1d
xxxx:0002 03 02
xxxx:0003 00
xxxx:0004 00
xxxx:0005 78 1d
xxxx:0006 03 02
xxxx:0007 00 .
k-s1432
xxxx:1432 01 00
xxxx:-1433 00 .
-wddt9K.cmd,0,227F
-C
A>
```

To remove both the assembler and disassembler, do the following:

Version 1.1

```
A>ddt86
DDT86 1.1
-rddt86.cmd
START      END
xxxx:0000 xxxx:367F
-s1
xxxx:0001 60 2b
xxxx:0002 03 01
xxxx:0003 00
xxxx:0004 00
xxxx:0005 66 32
xxxx:0006 03 01
xxxx:0007 .
-s1286
xxxx:1286 01 00
xxxx:1287 00 .
-s12b9
xxxx:12B9 01 00
xxxx:12BA 00 .
-wddt5K.cmd,0,13ff
-C
A>
```

Version 1.2

```
A>ddt86
DDT86 1.2
-rddt86.cmd
START      END
xxxx:0000 xxxx:37FF
-s1
xxxx:0001 72 46
xxxx:0002 03 03
xxxx:0003 00
xxxx:0004 00
xxxx:0005 78 4d
xxxx:0006 03 01
xxxx:0007 .
-s1432
xxxx:1432 01 00
xxxx:1433 00 .
-s1465
xxxx:1465 01 00
xxxx:1466 00 .
-wddt6K.cmd,0,14ff
-C
A>
```

see Notes, page 11

## The Rev Table

If you have any questions about these products and their availability, call Digital Research Sales Support at (800) 227-1617, ext. 400 or, in California, (800) 772-3545, ext. 400. The following is a list of current Digital Research product versions and last revision dates:

### LANGUAGES:

PRODUCT NAME	OS FAMILY	VERSION	LAST UPDATE
Digital Research C™	CP/M-86	1.1	See NOTE #1
Digital Research C	PC DOS	1.1	February 84
CBASIC®	CP/M	2.8	June 83
CBASIC	CP/M-86	1.4	See NOTE#2
CBASIC Compiler (CB80)™	CP/M	2.0	June 83
CBASIC Compiler (CB86)	CP/M-86	2.0	June 83
CBASIC Compiler (CB86)	PC DOS	2.1	June 83
CBASIC Compiler (CB86)*	MS DOS	3.1	April 83
CBASIC Compiler (CB68K)***	CP/M 68K	1.0	—
CIS COBOL™	CP/M-86	4.5	November 82
LEVEL II COBOL™	CP/M	2.1	February 84
LEVEL II COBOL	CP/M-86	2.1	February 84
LEVEL II COBOL	PC DOS	2.1	August 83
LEVEL II COBOL*	MS DOS	2.1	August 83
DR LOGO™	CP/M-86	1.0	—
PASCAL/MT+™	CP/M	5.6.1	See NOTE #3
PASCAL/MT+	CP/M-86	3.2.1	February 84
PASCAL/MT+	PC DOS	3.2	—
PERSONAL BASIC™	CP/M-86	1.1	See NOTE #4
PL/I™	CP/M	1.4	February 83
PL/I	CP/M-86	1.0	—
PL/I	PC DOS	1.0	—

NOTE #1: DR C upgrade from 1.0 to 1.1 supports overlays for both small and large memory models, includes the new common run-time library and allows the user to make notes and call routines in FORTRAN -77 yet to be released, and vice versa. Registered users will receive update notification automatically.

NOTE #2: V1.4 is a free update to V1.3 owners due to a banner change bug. Registered users will receive update notification automatically.

NOTE #3: Upgrade from 5.5 to 5.6 is a maintenance release only. Registered users will receive update notification automatically.

NOTE #4: Upgrade from 1.0 to 1.1 eliminates the 512 line limit restriction and fixes some minor bugs. Registered users will receive update notification automatically.

### PROGRAMMING TOOLS:

PRODUCT NAME	OS FAMILY	VERSION	LAST UPDATE
Access Manager™	CP/M	1.1	July 83
Access Manager	CP/M-86	1.1	August 83
Access Manager	PC DOS	1.1	—
Access Manager*	MS DOS	—	—
ANIMATOR for LEVEL II	CP/M-86	2.1	January 83
ANIMATOR for LEVEL II	PC DOS	2.1	August 83
Display Manager™	CP/M	1.1	July 83
Display Manager	CP/M-86	1.0	—
Display Manager	PC DOS	1.0	—
Display Manager*	MS DOS	1.0	—
FORMS-2 for COBOL**	CP/M-86	1.3	July 83
FORMS-2 for COBOL	PC DOS	1.3	August 83
FORMS-2 for COBOL*	MS DOS	1.3	August 83
micro/SPF™	CP/M-86	2.0	February 84
micro/SPF	PC DOS	2.0	February 84
Speed Programming Package	CP/M 80	5.5	—
Speed Programming Package	CP/M 86	3.0	—
DR Assembler Plus Tools™	CP/M	1.0	See NOTE #5
DR Assembler Plus Tools	CP/M-86	1.0	See NOTE #5
DR Assembler Plus Tools	PC DOS	1.0	See NOTE #5

NOTE #5: DR Assembler Plus Tools for CP/M combines SID and PUG to include MAC, RMAC, LINK, XREF, SID, ZSID. DR Assembler Plus Tools for CP/M-86 includes RASM-86, LINK-86, LIB-86, XREF-86, and SID-86.

### GRAPHICS:

PRODUCT NAME	OS FAMILY	VERSION	LAST UPDATE
DR Graph for IBM PC	CP/M-86	1.01	September 83
DR Graph for IBM PC	PC DOS	1.02	December 83
GSX™	CP/M	1.1	November 83
GSX-86	CP/M-86	1.2	September 83
GSX-86*	MS DOS	1.0	October 83
Programmers Tool Kit™	CP/M-86, Concurrent CP/M-86, PC DOS	1.0	See NOTE #6

NOTE #6: GSX Programmers Tool Kit is available for the IBM PC and includes ISV redistribution license, tailoring tools and documentation. The 16-bit kit contains development details for the CP/M-86 family, IBM PC DOS and MS DOS.



# The Rev Table

## OPERATING SYSTEMS:

PRODUCT NAME	VERSION	LAST UPDATE
Concurrent CP/M (generic)	3.1	May 83
Concurrent CP/M With Windows	None	January 84
CP/M®	2.2	February 80
CP/M PLUS™	3.0	January 83
CP/M-86® (generic)	1.1	February 82
CP/M-86 for IBM PC/XT	1.1	August 83
CP/M-86 for IBM DW	1.1	March 82
CP/M-68K**	1.0	March 83
CP/NET***	1.2	November 82
MP/M II	2.1	February 82
MP/M-86**	2.1	July 82

## HARDWARE:

PRODUCT NAME	OS FAMILY	VERSION	LAST UPDATE
CP/M Gold Card™ 64k	CP/M 3.0	1.0	Note #7
CP/M Gold Card 128k Disk Cache	N/A	1.0	—
CP/M Gold Card 192k	CP/M 3.0	1.0	—

NOTE #7: The CP/M Gold Card is a 6 Mhz Z-80B microprocessor board for the Apple II, II Plus, and IIe. Product ships with CP/M 3.0 and CBASIC language.

## CONSUMER PRODUCTS:

PRODUCT NAME	OS FAMILY	VERSION	LAST UPDATE
Owlcats™ Diagnostic P.S.A.T.	PC DOS	1.0	Note #8
Owlcats Diagnostic P.S.A.T.	Apple DOS	1.0	—
Owlcats 15 hour S.A.T. Preparatory Course	PC DOS	1.0	—
Owlcats 15 hour S.A.T. Preparatory Course	Apple DOS	1.0	—
Owlcats 60 hour S.A.T. Preparatory Course	PC DOS	1.0	—
Owlcats 60 hour S.A.T. Preparatory Course	Apple DOS	1.0	—

Note #8: The Owlcats is designed to test and train students to take their S.A.T.®, an aptitude test often required for college entrance.

\* MS DOS products are only available from Original Equipment Manufacturers of Digital Research.

\*\* No longer available effective April 1, 1984.

\*\*\* Contact Digital Research Sales and Support staff for product availability.

## MicroNotes

May 1984

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NWS-106-002

## Application Notes

(continued from page 9)

### Display Manager

V1.1 for CP/M.

Patch Note 02

Patch to DMALLO

Products that require updating: *Display Manager for CP/M V1.0*

Program: DMPASC.ERL

### Error Description:

For Pascal/MT+86, calls to DMALLO(6) result in "OUT OF MEMORY" when this is not the condition. This only occurs when the argument is 6.

### Patch Procedure:

Make a backup copy of DMPASC.ERL before using DDT to install the patch as shown below (user entries are in heavy type):

```
A>DDT DMPASC.ERL
-D4E0,4E6
04E0: 52 8D AA 66 02 2A A2      (these bytes must be here)
-S4E0
04E0 52 56
04E1 8D ED
04E2 AA .
-^C
A>SAVE 40 DMPASC.ERL
>A
```

The string of bytes at 04E0 must be indicated (it confirms that the version is 1.1). This patch will allow the use of DMALLO(6). Please note that allocation of less space than needed will not cause an error but will have unpredictable results.

DRI specifically disclaims any express or implied warranty and shall not be liable for any loss of profits, loss of business, loss of use or of data, interruption of business, nor of indirect, special or consequential damages caused by use or adaptation of these application notes.

Licensed users are granted the right to include these modifications in their Digital Research software.

# MICRONOTES

## DRI promotes graphics standards

**D**igital Research is promoting the development and use of graphics applications with a family of products that may be licensed by OEMs. The products complement each other to provide solutions for day-to-day business assignments involving visual communications.

"The advent of new and inexpensive peripheral graphics hardware has brought quality graphics within the reach of personal computer owners," said Bill Higgs, product line manager. "Our family of products are a first step toward implementing standards so that graphics applications may take advantage of the latest technology. The products help OEMs reach a wide user market."

Digital Research provides a standard software link to different peripherals with GSX™, a graphics extension to popular operating systems. GSX allows software writers to develop applications that are machine-independent. Users can then choose different types of peripherals and software rather than being locked into specific products on the basis of their operating systems.

"GSX is an emerging standard. It helps create an expanding pool of software by providing portability of object code between computers and operating systems," Higgs said. "OEMs who have licensed GSX do not have to completely rewrite their graphics applications."

Digital Research is leading the way for office graphics that run under GSX. The following products may be licensed for redistribution by OEMs:

- **DR Draw™**, a picture editor for creating foils, word slides and charts. Users pick from a menu of arcs, circles, polygons, lines and text that may be written in different font styles. Images

may be saved, recalled, copied and modified. There are zoom and pan options for enlarging or condensing pictures.

- **DR Graph™**, which produces a variety of bar charts, pies charts and scatter plots. Data may be entered manually or from electronic spreadsheets such as SuperCalc, MultiPlan or VisiCalc. Axes are labeled automatically by DR Graph.

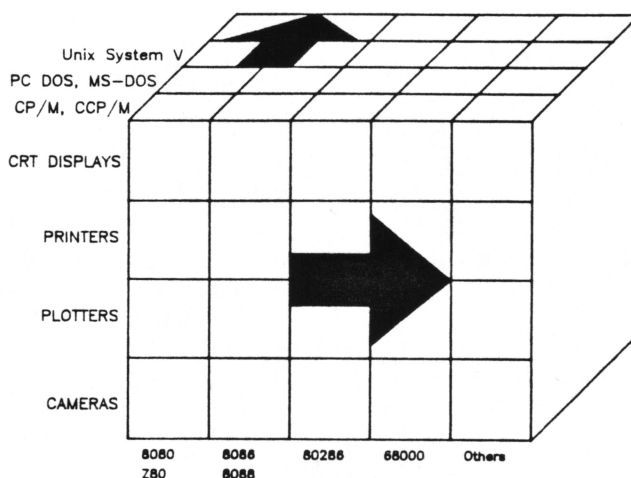
- **Access 10™**, a software link between a personal computer and mainframes. It gives users the graphics power of a mainframe while retaining the autonomy of a desktop computer. Access10 turns the microcomputer into the functional equivalent of a Tektronix 4010, 4012 or 4014 graphics terminal.

Software vendors are being encouraged to develop new applications for GSX with the introduction of the GSX-86™ Programmer's Toolkit for the IBM PC. The Toolkit includes two versions of GSX — one for PC-DOS and the other for CP/M-86 (including Concurrent DOS).

Included in the kit are the GSX Programmer's Manual, GSX Programmer's Language Reference Manual, the GSX-86 User's Guide and GSX-86 Technical Note for Customizing GINSTALL (a menu-driven program that allows end users to install GSX-86 drivers). GINSTALL may be modified for any computer-specific set of screen and peripheral devices.

GSX now supports hardware from 16 manufacturers. The list of device drivers supplied in GSX grows as new products are introduced. Here are some of the newest peripherals supported by GSX: Polaroid Palette™ (part of the Presentation Master™ package from Digital Research), Diablo C150 Color Ink Jet printer, Transtar color printer, Houston Instruments CMP-29/40/41/42 plotter series, Strobe 100/260 plotter series, the Hewlett-Packard 7475A plotter and Phillips GP 300L Hi and Lo Res printers.

GSX — PRODUCT EVOLUTION



# MICRONOTES

DIGITAL RESEARCH®

## Concurrency enters PC-DOS world

**C**oncurrent™ PC-DOS, an operating system that brings multitasking CP/M® to the PC-DOS world, helps programmers develop applications efficiently and for a wider market than previously possible.

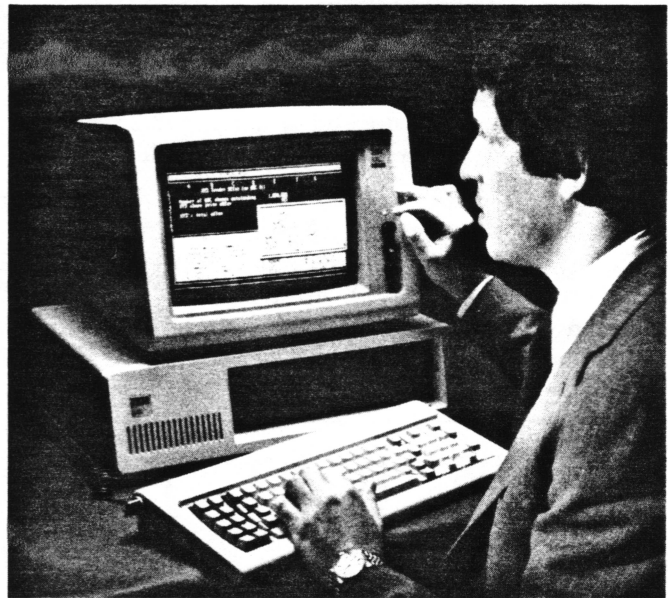
"Concurrent PC-DOS is a complete solution to increase the productivity of professionals who rely on computers," said Darrell Miller, marketing manager for operating systems at DRI. "Digital Research has included all of the necessary applications to expand the utilization of personal computers."

For the first time software written for PC-DOS may be used in a multitasking environment. Concurrent PC-DOS supports most popular applications developed for PC-DOS—Lotus 1-2-3™, dBASEII™, WordStar®, MultiPlan®, the pfs:™ series and a growing list of others.

"Differences in the operating system are transparent to professional users," Miller said. "Support for PC-DOS is called on automatically, and the operating system recognizes diskettes formatted for PC-DOS or CP/M."

Concurrent PC-DOS reads data files and program code from both CP/M-86® and PC-DOS operating systems. Concurrent PC-DOS supports hierarchical files as in PC-DOS Release 2.0. According to Miller, applications written under Concurrent PC-DOS may be sold with little or no modification for CP/M or PC-DOS markets. Further, syntax from both operating systems is supported by Concurrent PC-DOS. All of the traditional CP/M® commands are provided since the system is compatible with previous versions of CP/M-86.

Those who prefer PC-DOS syntax may continue to use system commands such as "dir," "erase," "copy," "rename" and "batch." Function calls provided are ABSOLUTE DISK READ and WRITE, PROGRAM TERMINATE, TERMINATE ADDRESS and calls up to 30 hex through INTERRUPT 21. Common ROS functions supported include I/O calls to the video terminal, keyboard, disk, printer, memory size detect and equipment detect.



Concurrent PC-DOS offers multitasking to PC-DOS users for the first time. According to Darrell Miller, marketing manager for operating systems at Digital Research, it gives applications writers the opportunity to develop sophisticated communications packages.

Like its predecessors, Concurrent PC-DOS lets professionals run up to four programs at once. Now, however, professional users may use PC-DOS applications in a multitasking environment. Also, PC-DOS and CP/M applications can be run at the same time.

Each application is provided a virtual console that may be displayed in its own window or run as a background task. For instance, one program may be edited while a different one is compiled and a third is debugged.

Professionals who access electronic data bases may dedicate one of the four virtual consoles to communicating over a modem. A communications package is included with Concurrent PC-DOS. The package provides asynchronous communication to remote computers or data

See Concurrent, page 2

### INDEX

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- Subscribers to CompuServe and THE SOURCE<sup>SM</sup>

offered DRI language bindings at no charge, page 4.

- OEMs can license generic version of Digital Research's popular Dr. Logo™, page 4.
- DR FORTRAN-77™: Heralding a new age of portable applications, page 5.
- What subscribers think of Digital Research's Professional Programmer Support, page 12.



# StarLink opens up new multiuser market for PC

**A**pplications writers may enter a new market for multiuser software as a result of StarLink, a package that expands an IBM® PC from one to five users.

StarLink supports applications written for CP/M or PC-DOS. Concurrent PC-DOS recognizes .EXE and .COM files for instant, error free commands. Programmers may call on CP/M or PC-DOS utilities, including those for creating and debugging 8086/8088 assembly language programs, listing directories, transferring files and editing.

Concurrent PC-DOS recognizes the .EXE and .COM files for instant and error free commands. Programmers may call on CP/M or PC-DOS utilities, including those for creating and debugging 8086/8088 assembly language programs, listing directories, transferring files and editing.



Also, StarLink provides RS-232 connection for the addition of four dumb terminals. The stations perform as if they were single user systems, and different applications may be run by each user. Speed of the system is increased with the addition of an 8088 microprocessor and 64K of RAM on the expansion board to provide I/O buffering between the terminals and the IBM PC.

## Time saving applications possible with Concurrent PC-DOS

from page 1

bases services such as CompuServe or THE SOURCE.

Data files may be transferred from a lap computer in the field to a desktop running Concurrent PC-DOS in the office. The transfer proceeds without interfering with other tasks — such as word processing or printing — that are performed on the office computer.

"Concurrent PC-DOS addresses the growing need for communications between data base services and work stations," Miller explained. "Digital Research has integrated communications into the multitasking environment of Concurrent PC-DOS. It is the only major operating system for the IBM PC that transmits data over a modem and offers multitasking."

Since communications proceeds without interference of other programs, Miller said new applications that incorporate multitasking are possible.

"Programmers are limited only by their imaginations," said Miller. "The field of communications is facing dramatic growth as businesses seek software that helps them transfer data among computers easily and efficiently. Also, Fortune 2000 companies are expanding rapidly into pc communications."

An additional aid to communications is provided with a Rolodex®-like file for storing hundreds of names, addresses and related information. The electronic card file searches or sorts automatically.

The card file may be incorporated into a menu system designed for Concurrent PC-DOS. Experienced users may bypass the menus in favor of using traditional systems commands.

A standard configuration is provided, and users may

modify or create their own menus using the "make-menu" utility. Free-form menus may be assigned to items in the menu.

"The menus are especially helpful for non-technical professionals because they provide a way to operate computers intuitively," Miller said. "Programmers may incorporate the menus into highly sophisticated applications that may be called on with a single keystroke."

Several other features have been bundled with Concurrent PC-DOS. Among them:

- A "queue" facility for developing integrated applications. Data from one window may be cut and pasted to another window.
- A simple editor suitable for writing programs and short memos.
- Applications may call on auxiliary hardware through GSX™, the graphics extension to operating systems. GSX supports the latest hardware including plotters and ink jet printers.
- An on-line help facility that serves as a reference to utilities and commands.
- A software print spooler that allows users to print text files without interrupting other tasks.

Concurrent PC-DOS requires 256K of memory and two disk drives. For multiple applications, 512K of memory and a hard disk are recommended. The package includes a "Getting Started" guide and a reference manual.

"In summary," Miller concluded, "this is really an operating system with the functionality and power of a minicomputer operating system, but with the user interface that people expect in micros, such as windows and menus."

# European offices of DRI assist foreign OEMs

OEMs who wish to market their microcomputers in Europe can turn to Digital Research for help in making their efforts a success.

"The European market is growing as rapidly as the American market," said Paul Bailey, vice president of European operations. "Europeans are interested in the latest technology from overseas, especially Digital Research products. Our overseas operations are expanding to keep up with the demand for products and technical expertise. We are providing all of the key services OEMs need to enter the European market."

European headquarters was opened almost two years ago in Newbury, England. Operations in France and Germany were added during the past year along with full staffs of technical and sales specialists in all three locations.

Each country in Western Europe poses slightly different challenges for the introduction of new products, Bailey said. The Digital Research experts help OEMs clear hurdles in language and hardware.

The European engineering staff is stationed at the Newbury office. Under the direction of Andy Wightman, OEM software group manager, the group specializes in implementation of Digital Research operating machines to OEM hardware.

"The effort to provide various translations is an on going job that involves the latest Digital Research products," said Howard Kornstein, director of technical support in Europe. "We have completed the legwork necessary to market microcomputer products in Europe, and our staff keeps informed about the needs of users in different countries."

"Small or large computer manufacturers who want to sell their products overseas may not have the resources to develop foreign implementations of operating systems and other software products," Kornstein explained. "We have acquired a staff that is knowledgeable in conversions, and we have established procedures to produce translations easily."

The strategy to translate Digital Research products has created a successful line of well-supported software for Europe, Kornstein said. Among the products translated into foreign languages are Personal BASIC™, DR DRAW™, DR Graph™, Dr. Logo in 8-bit and 16-bit versions, CP/M and CP/M-Plus™.

Concurrent™ DOS, a new operating system from Digital Research that runs applications for CP/M and PC-DOS, has gained support throughout Europe, Kornstein said. He attributed part of the product's success to the availability of versions in French and German languages.

Europeans received their first look at Concurrent DOS

in April at the Hanover Faire, a German trade show that has become one of the most popular European exhibitions. At the fair, more than 20 OEMs demonstrated microcomputers running under Digital Research's multitasking operating system.

"European manufacturers and ISVs are excited about the potential applications for Concurrent DOS, especially communications and electronic mail," Kornstein said. Some 40 machines using Concurrent DOS have been introduced in Europe, and another 40 personal computer manufacturers are expected to offer it by fall.

Meanwhile, Digital Research has conducted several field seminars to assist with the development of applications running under foreign versions of Digital Research's products. The Digital Research Software Forum in April at London's Cavendish Conference Centre was attended by some 200 ISVs and OEMs. Experts from Digital Research discussed DR Net™, DR Draw, the GSX graphics extension to operating systems, multiuser systems, multitasking, windows and Concurrent DOS including its PC-Mode™ emulation.

Similar topics were discussed at a technical forum in France. More than 60 ISVs participated in the day-long session, a follow-up to a seminar presented in March.

In Germany, the EDP Training Centre and Digital Research have agreed to develop technical seminars for Concurrent DOS. EDP already offers training for CP/M, Personal Basic, CBasic Compiler™, Pascal/MT+™, CIS COBOL, Level II COBOL, SID™, Display Manager™, PL/I™, DR Graph and GSX.

"We have committed ourselves to expanding our product line and increasing our support to the technical community," Vice President Bailey said. "We are meeting a growing demand for high quality products in Europe, a market that represents some 30 percent of worldwide computer-related sales."



The acceptance of Concurrent DOS follows the enthusiastic reception received by Concurrent CP/M. Thames Television's Database program named Concurrent CP/M "The Software of the Year." The award presentation was made at the British Microcomputer Awards Ceremony.



## DRI expands engineering with new facility in Austin

**A** new engineering facility has been opened by Digital Research to broaden the company's base of operations and strengthen its ties with OEMs located in Texas.

The Austin Development Center initially supports a group of system engineers working on projects for languages and operating systems. Allen Beebe, director of Systems Software at the Pacific Grove headquarters of Digital Research, is relocating to manage the operation.

"The Austin Development Center is dedicated to specific projects for OEMs in Texas," Beebe explained. "It helps facilitate the completion of contracts and makes the company more accessible to clients in the Southwest. The projects carried out in Austin are intended to complement those at Digital Research headquarters, where the majority of engineering development continues."

Larry Wolfe, previously the director of research and development at Execucom Systems Corp., was hired as director of engineering. Wade Shaw, a technical project manager at Execucom, was retained as manager of language engineering.



Bill Davis of Digital Research, left, Tom Beaver of Motorola, center, and Murray Goldman of Motorola, were on hand when Digital Research's Austin Development Center opened this spring. Among the projects proceeding in the Texas facility are development of language compilers for Motorola.

"The center places Digital Research inside one of the most influential and fastest growing areas of high technology in the United States," said Beebe. "Digital Research is committed to supporting the facility. We have ample room for growth, and it gives us the opportunity to draw on the diverse resources of the region, including talent from several major universities."

## Language bindings available on data base services

**A**ssembler source code programs to call GSX from all major microcomputer languages have become part of the public domain software available on CompuServe and THE SOURCE.

Subscribers to either of the electronic data base services may use these "bindings" to develop graphics applications with GSX, a graphics extension to operating systems. Also, Digital Research is supplying bindings for all of its 8- and 16-bit language compilers and for Microsoft's 16-bit compilers.

Bindings are required to transform high level language pass parameters to the GSX integer convention. Says Product Line Manager Rob LaTulipe, "The availability of bindings means that users of the major languages for microcomputers easily program to GSX without writing any assembler code. This is a value added to GSX with no additional cost to subscribers to MICROLINE and THE SOURCE. We are providing the source code which simply needs to be assembled. We also will provide short sample programs to show how the calls are made."

Further documentation in the form of the GSX Language Reference manual is available for 16-bit DRI languages inside the GSX-86 Programmer's Toolkit. The product contains both versions of the newest GSX version 1.3 — one for CP/M-86 (including Concurrent

CP/M) and the other for PC-DOS.

The Toolkit provides ISVs a license to distribute GSX with their graphics applications on the IBM/PC, PC/XT and 3270 PC.

The GSX-86 Programmer's Toolkit is available from Westico, a value-added distributor of Digital Research products located at 25 Van Zant St., Norwalk, CT 06855. (203) 853-6880.

## Generic versions of Dr. Logo ship to 8- and 16-bit OEMs

**O**EMs may license 8- and 16-bit versions of Dr. Logo, which is being shipped by Digital Research in formats for CP/M and MS-DOS.

The generic versions are directed toward the consumer and education markets. The 8-bit version provides most of the same functions as the 16-bit version, including turtle graphics, list processing, an on-line help facility, sophisticated debugging and easy-to-understand user's guides.

For more information on Dr. Logo and licensing agreements, call Becky Jones at (408) 649-3896, extension 6332.

# DR FORTRAN-77 aids portability

The shipment of DR FORTRAN-77 from Digital Research introduces a new technology and makes portability of applications between mainframes, mini-computers and microcomputers a reality.

DR FORTRAN-77 was shipped in versions for CP/M-86, MS™-DOS and PC-DOS. It meets the specifications set by the American National Standards Institute, and is the only full-featured version of FORTRAN for Intel 8086 and 8088 microprocessors.

According to Lowell Wolf, product marketing manager, no other microcomputer FORTRAN meets all of the ANSI standards. DR FORTRAN-77 is compatible with mainframe and minicomputer versions of the language, which have become popular for scientific and engineering applications involving algebraic equations.

"Software developers benefit from the ease of transferring applications from one type of computer to the next," said Wolf. "This means they can spend their time developing new ideas rather than poring over laborious conversions.

"The ease of transferring software increases its value and means products may be brought to market quickly," said Wolf. "OEMs benefit because they may attract the software solutions needed for new systems."

DR FORTRAN-77 is the first compiler to incorporate Digital Research's common backend technology, the basis for all of the company's future compilers. The technology speeds development of compilers for new chips and operating systems.

The compilers use a common intermediate language and couple to a code generator and run-time library, which constitute the common backend. The compiler

frontend and backend then produce object code.

The new compilers are written in C. Eventually they will provide source code compatibility across the 8086, 80286 and 68000 chips, and across CP/M-86, Concurrent CP/M, PC-DOS, MS-DOS and UNIX™ System V operating systems.

Further, the new version 4.0 compilers, including DR FORTRAN-77, allow programmers writing in one language to call subroutines written in another language.

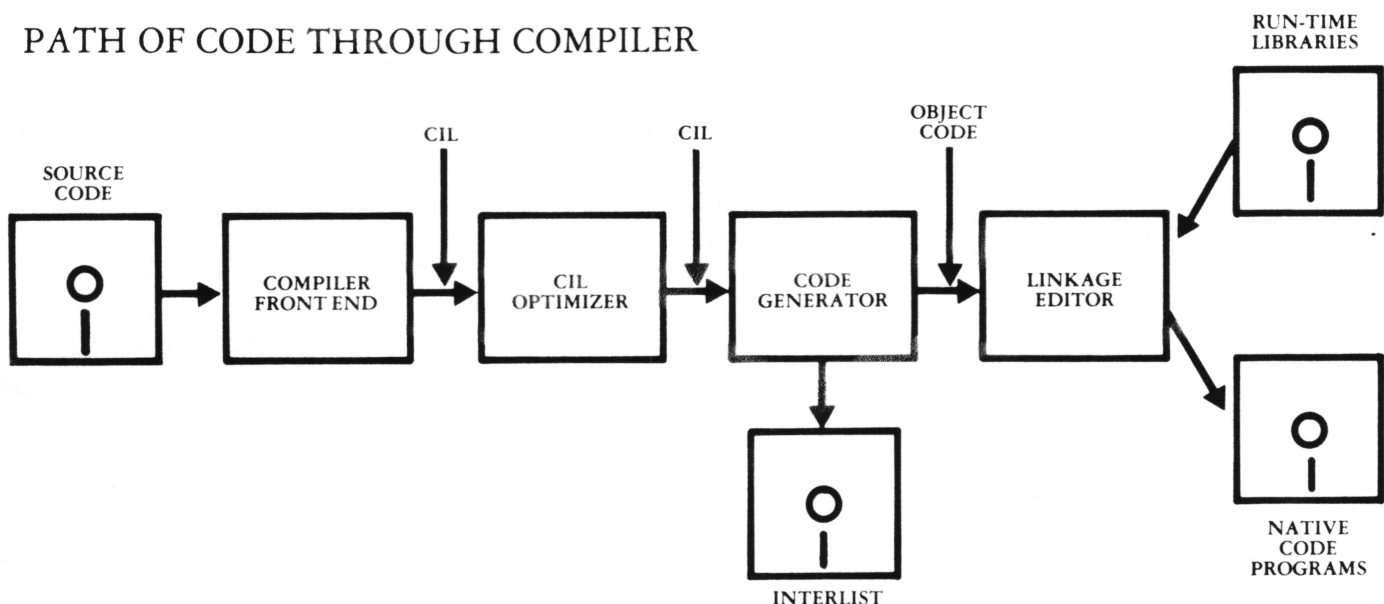
DR FORTRAN-77 supports programs as large as one megabyte of combined code and data. For programs of less than 64K of data, there is a compiler option to produce shorter memory addresses for faster execution. This is one of the few compilers that can invert a 100 by 100 matrix.

Floating point calculations using the 8087 math coprocessor may be performed with DR FORTRAN-77. A linker option determines whether the compiler produces in-line math coprocessor functions or simulates floating point operations in software.

Subroutines for the compiler may be organized into overlays. These may be organized into a tree-like structure so each overlay can call others. The size of the "root overlay" plus the largest individual overlay determines the maximum memory size requirement.

"Digital Research is helping develop standards that benefit end users who depend on software writers and OEMs for new applications," Wolf said. "DR FORTRAN-77 is the first of several forthcoming compilers that provide a consistent set of software tools that increase portability."

## PATH OF CODE THROUGH COMPILER



# Application Notes on DRI products

The following is our complete list of the Application Notes for each of our Digital Research products. These are available on our electronic data bases on **THE SOURCE** and CompuServe or may be ordered for no charge from our Technical Support Department, PO Box 579, Pacific Grove, Ca 93950. Be sure to specify which set of Application Notes you are requesting, and include your name, mailing address and zip code.

## **CBASIC®:**

- CA01 - Assembly Language and CBASIC-80 Under CP/M PLUS
- CA02 - Assembly Lang. & CBASIC Under CP/M V2.x - Calc. Space on Disk
- CA03 - Assessing MP/M II Internal Time/Date with Assembly Lang. & CBASIC-80
- CA04 - CBASIC-80/86 Dynamic Memory Management
- CA05 - Chaining to a .COM/.CMD File From CBASIC
- CA06 - Assembly Language & CBASIC-86 Under CP/M-86

## **CBASIC COMPILER™:**

- CB01 - Dynamic Memory Management ('OM' error)
- CB02 - Disk Files in a Shared Environment
- CB03 - Using the GET and PUT Functions
- CB04 - Accessing MP/M II's Time-Date Function
- CB05 - Assembly Lang. in CBASIC Compiler under CP/M-86
- CB06 - Calling Assembly Language Subroutines from CBASIC Compiler

## **Concurrent CP/M-86 For The IBM PC:**

- 01 - Using The IBM PC ROM BIOS Under Concurrent CP/M-86
- 02 - Shifting The Horizontal Sync Position of the CRT Display
- 03 - Booting Concurrent CP/M-86 (PC) From A Single Drive
- 04 - Self attaching RSP

## **CP/M V2.2:**

- 01 - The CCP Autoload Feature
- 02 - Reversing or Equivalencing the Backspace and Rubout Key Functions
- 03 - Sample BIOS For a Serial Printer Device
- 04 - BIOS Error Return Code Options
- 05 - Improving the Control-S Function
- 06 - Changing the Lines Per Page
- 07 - Changing the Restart Number in DDT
- 08 - Nested SUBMIT Files
- 09 - Configuring CP/M For Page Boundaries
- 10 - Booting CP/M On Drives Other Than Drive A
- 11 - Chaining Programs
- 12 - Interpreting Control-Z in SUBMIT Files
- 13 - Exiting PIP When Using SUBMIT and XSUB
- 14 - Turning Control-P On and Off From Within a SUBMIT File
- 15 - Debugging a CP/M V2.2 BIOS

## **CP/M Plus:**

- 01 - Implementating A Menu Driven CP/M Plus System
- 02 - Changing the Restart Vector For SID v. 3.0
- 03 - Making the BDOS Open File Function Compatible with CP/M 2.2
- 04 - Direct Cursor Addressing under Banked CP/M Plus

## **CP/M 68K™ V1.0**

- 01 - Customization of the CCP

## **CP/M-86 V1.0 For the IBM Display Manager**

- 01 - OPNDIS and DISPD Functions
- 02 - Keyboard Customization

## **CP/M-86 V1.1:**

- 01 - BDOS System-Data Area Fields (Including TOD)
- 02 - DDT-86 Customization
- 03 - Debugging a CP/M-86 CBIOS Using DDT-86 or SID-86
- 04 - Booting From Drives Other Than A:
- 05 - Program Control Of The Printer-Echo (Control-P) Switch
- 06 - Examples of Intersegment Program Transfer in ASM-86
- 07 - The CCP Autoload Feature
- 09 - Early iAPX 8088 Problem

## **CP/M-86 V1.1 For the IBM DisplayWriter:**

- 01 - Nonstandard Printer Page Lengths
- 02 - Keyboard Customization

## **CP/M-86 For The IBM PC:**

- 01 - Using The Color/Graphics Adaptor With a Monochrome Display
- 02 - Disabling The Status Line
- 03 - Field Installable Device Driver Software (FIDDS)
- 04 - Early iAPX 8088 Problem
- 05 - Floppy Disk Format

## **CP/NET®:**

- 01 - Writing Improved NETWRKIF Modules for CP/NET
- 02 - Allowing CP/NET Servers To Use Bank-Switched Technology
- 03 - Changing The CP/NET and CP/NOS Version Number

## **DR Graph™:**

- 01 - Additional Features for the IBM Personal Computer User

## **LEVEL II COBOL™:**

- 01 - Defining Additional Key Functions

## **LINK-86™ V1.02:**

- 01 - Data Section ORIGIN Customization

## **CP-NOS™**

- 01 - Loading the CP/NET requestors from different drives

## **MAC™ V2.0:**

- 01 - Cross Assembling To Different Microprocessors

## **MAC/RMAC:**

- 02 - Relative Jumps Using 280 LIB

## **MP/M II:**

- 01 - Suppressing the MP/M Loader Display
- 02 - Setting and Resetting the Raw Console I/O Mode
- 03 - Changing PRL File Minimum Buffer Size Requirements
- 04 - Accessing the Internal MP/M II TOD (Time-of-Day) Function
- 05 - DMA Disk Controllers With Banked Memory Systems
- 06 - Using the SEND CLI Command XDOS Function
- 07 - Creating a SUBMIT File From An Applications Program
- 08 - File Sharing
- 09 - Program Control of the Control-P Switch
- 10 - Cold Boot Startup
- 11 - SUBMIT Enhancements
- 12 - SPOOL Utility Modifications
- 13 - Record Locking/Unlocking
- 14 - GENSYNS Enhancements
- 15 - Changing the Priority of SPOOL.PRL
- 16 - Changing the Backspace and Rubout Key Functions

## **PASCAL/MT+ :**

- MT80-01 - Program Chaining Under CP/M V2.2 or CP/M PLUS V3.0
- MT80-02 - Memory Peeks and Pokes Using Inline Only
- MT80-03 - Modification to the Built-In ODD Function
- MT80-04 - An Improved @ BDOS Function
- MT80-05 - Improved Utilities Module
- MT80-06 - Overlay Linker Switch Calculator
- MT80-07 - Direct Console I/O Using BIOS Calls

## **PASCAL/MT+86™:**

- MT86-01 - Improved Utilities Module
- MT86-02 - Improved @BDOS86 Function With a New Name: @SERVICE
- MT86-03 - An Alternative Method of Chaining Using CP/M-86 Function 47

## **PERSONAL BASIC™:**

- PB01 - Appending To A Sequential File

## **PL/I-80™:**

- 01 - Including Local Symbols in RMAC (revision of RMAC app note #1)
- 02 - Linking Fortran Overlays (revision of LINK-80 app note #1)

## **SID™ V1.4:**

- 01 - Changing the Restart Vector of TRACE.UTL and HIST.UTL

## **ZSID™ V1.4:**

- 01 - Changing the Restart Number
- 02 - Changing the Screen Display
- 03 - Changing the Restart Vector of TRACE.UTL and HIST.UTL

## **TEX 2.1:**

- 01 - Editor Compatibility

# Application Notes and Patches

## CP/M-86® V1.1 for IBM PC and PCXT Application Note 05 Floppy Disk Format

*Applicable Products and Release Numbers:* CP/M-86® V1.1 for the IBM PC and PCXT.

The IBM PC Floppy Disk Drive can be either a Single (SS) or Double (DS) sided, double density, 40 track per side unit. It is capable of reading and recording data using the Modified Frequency Modulation (MFM) method. Additional information regarding the specifics of the IBM Floppy Disk Controller and Floppy Disk Adapter can be found in Chapter 2 of the IBM PC Technical Reference Manual.

The drive characteristics are as follows:

Single Sided Drive:  
1,248: 128 Byte Record Capacity  
156: Kilobyte Drive Capacity  
64: 32 Byte Directory Entries  
64: Checked Directory Entries  
128: 128 Byte Records / Directory Entry  
8: 128 Byte Records / Block  
32: 128 Byte Records / Track  
1: Reserved Track

Double Sided Drive:  
2,528: 128 Byte Record Capacity  
316: Kilobyte Drive Capacity  
64: 32 Byte Directory Entries  
64: Checked Directory Entries  
256: 128 Byte Records / Directory Entry  
16: 128 Byte Records / Block  
32: 128 Byte Records / Track  
1: Reserved Track

Format Character : ESH

Physical Tracks:	Double Sided	Single Sided
	0 --> 39	0 --> 39
	0 --> 39	

Logical Tracks:	0 --> 39	0 --> 39
	79 <-- 40	-----

Disk Parameter Block:	Double Sided	Single Sided
SPT	0020	0020
BSH	04	03
BLM	0F	07
EXM	01	00
DSM	009D	009B
DRM	003F	003F
AL0	80	C0
AL1	00	00
CKS	0010	0010
OFF	0001	0001

FIELD	DEFINITION
SPT	Total number of Sectors Per Track
BSH	Data allocation Block Shift Factor, determined by the data block allocation size
BLM	Block Mask which is also determined by the data block allocation size
EXM	Extent Mask, determined by the data block allocation size and the number of disk blocks
DSM	Maximum number of Data blocks Supported, determined the total storage capacity of the disk drive measured in BLS (data allocation Block Size) units
DRM	Maximum number of Directory entries for the drive
AL0 AL1	determine reserved (ALlocated) directory blocks
CKS	Size of the directory Check vector
OFF	Offset from the beginning of the physical disk, the number of reserved tracks at the beginning of the disk

The values of BSH and BLM determine (implicitly) the data allocation size BLS, which is not an entry in the Disk Parameter Block (DPB). For the values listed above the BLS is 2048 and 1024, respectively for the double and single sided drive.

The product of BLS \* (DSM+1) is the total number of bytes held by the drive and, of course must be within the capacity of the physical disk, not counting the reserved operating system tracks.

The DRM entry is one less than the total number of directory entries, which can take on a 16-bit value. The values of AL0 and AL1, however, are determined by DRM. The two values AL0 and AL1 can together be considered a string of 16-bits numbered 00-15 (left to right). Each bit position reserves a data block for a number of directory entries (bits are assigned starting at 00 and filled to the right). Each directory entry occupies 32 bytes, thus for 64 directory entries 1 bit is set for the

double sided drive (BLS = 2048) and 2 bits are set for single sided drive (BLS = 1024).

The CKS value is determined as follows:

CKS = (DRM+1)/4, where DRM is the last directory entry number.

CP/M Plus™  
V3.0 Patch 15, 3/7/84  
CCP Patch 03

*Products and Serial Numbers Affected:* CP/M Plus™ V3.0, Serial numbers 2-000-00001 through 2-000-xxxxx.

*Program:* CCP.COM

*Error Description:*

- If a DIR command that is given for a disk that has System files on it is terminated by a control C, a subsequent DIR command for a disk that does not have System files on it will incorrectly print the message "SYSTEM FILE(S) EXIST".
- The error message "Cannot Load Program" is not terminated with a "\$". This results in garbage being displayed after the error message is printed.

*Patch Procedure:*

Make a back-up copy of CCP.COM before making any changes. The program SID is required to make the changes. The changes are made by the following sequence of commands. User entries are in bold type.

```
A>REN CCP.SAV=CCP.COM
A>SID CCP.SAV
CP/M 3 SID - Version 3.0
NEXT MSZE PC END
0000 0000 0100 C0FF
#A683
0683 CALL 403
0686
#A403
0403 XRA A
0404 STA D4D
0407 JMP 699
040A
#S0368
0368 20 24
0369 J2 .
#WCCP.COM
0019h record(s) written.
#G0
A>
```

## CP/M-86® V1.1 for IBM PC and PC/XT Application Note 04 Early iAPX 8088 Problem

*Applicable Products and Release Numbers:* CP/M-86® V1.1 for the IBM PC and PCXT.

Early Intel 8088 microprocessor chips have an obscure design problem that can cause unexpected memory writes if an interrupt occurs when the stack is moved. It takes two instructions to load the Stack Segment:Stack Pointer (SS:SP) register pair, and if an interrupt is acknowledged after the stack segment is loaded and before the stack pointer is loaded, the interrupt status will be "pushed" to an arbitrary place with indeterminate results.

It is recommended that all iAPX 88/86 software disable interrupts prior to doing stack loads. The following is a representative sample of a code sequence which will accomplish this:

```
mov     bx,new_stack_segment
pushf   ; save old interrupt flag
pop     ax ; into AX
cli     ; disable interrupts

mov     ss,bx ; these two instructions
mov     sp,new_stack_pointer; must be contiguous.

push    ax ; place flags in new stack
popf    ; so we can
sti     ; restore interrupt flag
```

Non-maskable Interrupts (NMI) can still occur, as can trace interrupts generated by the debuggers using the TRAP flag.

The CPU chips were fixed some time ago (1Q, 1980). The new i8088's mask ALL interrupts automatically for one instruction following any segment register load.



i8088 chips with "(C) INTEL '78" have the problem.  
i8088 chips with "(C) INTEL '79" have been fixed.

All IBM PC's and PCXT's shipped prior to the middle of 1983 seem to have the OLD version of the 8088 and will have the problem. It is possible that they are still shipping machines with the old chip.

### CP/M 68K™ Application Note 01 Customization of the CCP

*Applicable Products and Release Numbers:* CP/M™ 68K V.1.0.

The standard CP/M 68K CCP contains four different program modules. In order to write your own customized version of the CCP it is necessary to substitute your CCP for two of the four existing modules. However, it is essential to understand the interfacing procedures between the four different modules and their relationship to the BDOS and BIOS of CP/M 68K.

The Four CCP Program modules are:

- (1) CCPIF.O
- (2) CCPBDOS.O
- (3) CCPLOAD.O
- (4) CCP.O

The first three modules of the CCP perform general CP/M house-keeping functions. CCPIF.O is the coldboot and warmboot interface between the CCP, the BDOS, and the BIOS. CCPBDOS.O is an assembly language module that performs the BDOS function calls for the main CCP module: CCP.O. CCPLOAD.O is the assembly language module that performs the program load function for CCP.O. CCP.O is the main module of the CCP. Substitute your custom CCP for modules three and four of the standard CCP for CP/M 68K. A description of the CCP input and output interface requirements with modules one and two as well as the BDOS and BIOS follow.

#### CCP INPUT INTERFACE

The main module for the CCP is entered via a jsr (jump to subroutine) instruction from CCPIF.O. Here is the exact instruction as it appears in CCPIF.O:

```
jsr      _main      *call the CCP
```

The label \_main contains the underscore character because the C compiler places an underscore before every external variable and function name. CCP.O contains the function:

```
main()
{
    /*main CCP module */
}
```

which orchestrates the function of the Console Command Processor. This jsr instruction is the only entry point to the CCP.

#### CCP OUTPUT INTERFACE

The CCP needs to access the BDOS to perform its function. The module CCPBDOS.O contains assembly language instructions to fill registers D0 and D1 with the BDOS function number and the BDOS parameter, respectively. This module is expecting to pull off the stack a word for the function number and a long word for the parameter. The function is defined in the main module as follows:

```
EXTERN UWORD  bdos();
```

The BDOS will return a word value for the current user number.

```
(1)  userno = bdos(GET_USER_NO,(long)255);
(2)  move.l  #255,-(sp)
      move.w #GET_USER_NO,-(sp)
      jsr    bdos
      tst    d0
      move.w d0,userno  *return value in register D0
                        *get return value
      etc....
```

The BDOS will return a word value for the current user number.

In the standard CP/M 68K CCP, a warmboot occurs after the termination of every transient program. Upon warmboot, control is transferred to the BDOS and eventually back to the CCP via that jsr instruction. Before entrance to the main module, the system stack is reset to its original starting address. CCPIF.O must be the first module

of CP/M 68K. This module also performs coldboot startup procedures essential to coldboot loading. Any interface to the BIOS is done through the BDOS direct BIOS call. See the Programmer's Guide for details.

If you experience problems with doubly defined global variables, use the NM68 utility to get a listing of the system symbol table. For example:

```
A>NM68.REL
```

will give you a listing of the CP/M 68K symbol table. For further details regarding the use of NM68 see the CP/M 68K Programmer's Guide.

Finally it is necessary that the CCP use BDOS function 10 to read in a command line from the console if you wish to make use of BDOS function 47 (Chain to Program). The chain to program function traps function calls and supplies the CCP with the next command to execute from an internal buffer.

CP/M Plus™  
V3.0 Patch 16, 3/7/84  
SHOW Patch 01

*Products and Serial Numbers Affected:* CP/M Plus™ V3.0, Serial numbers 2-000-00001 through 2-000-xxxxx.

*Program:* SHOW.COM

#### Error Description:

The display for SHOW with the [USER] option is incorrect if files exist in all user areas. The last column of the display is either written over or displayed on the next line.

#### Patch Procedure:

Make a back-up copy of SHOW.COM before making any changes. The program SID is required to make the changes. The changes are made by the following sequence of commands. User entries are in bold type.

```
A>REN SHOW.SAV=SHOW.COM
A>SID SHOW.SAV
CP/M 3 SID - Version 3.0
NEXT MSZE PC END
2200 2200 0100 C8FF
#S55E
055E 20 00
055F 00 .
#S56D
056D 20 00
056E 00 .
#S57C
057C 20 00
057D 00 .
#WSHOW.COM
0042h record(s) written.
#G0
A>PATCH SHOW 1
```

CP/M 3 PATCH - Version 3.0

Do you want to indicate that patch 1 has been installed for SHOW.COM ? Y

Patch installed

A >

## LIST OF COMMON QUESTIONS AND ANSWERS

Access Manager  
CBASIC  
CBASIC Compiler  
CP/M V2.2  
CP/M Plus  
Concurrent CP/M  
With Windows  
CP/M Gold Card  
DR Assembler Plus Tools  
DR Graph  
Digital Research C

Display Manager  
Display Manager for PC DOS  
Level II Cobol  
MP/M II  
micro/SPF V2.0  
Pascal/MT+ V3.1  
Pascal/MT+ V5.6.1  
for CP/M  
Pascal/MT+86  
PL/I-80 and LINK-80  
PL/I-86 and LINK-86



# Common Questions and Answers

## micro/SPF V2.0™

**Q:** *How can I make use of PC-DOS 2.0 hierarchical directories when using micro/SPF?*

**A:** If you are using DOS 2.0 with a fixed disk, you are probably familiar with the new tree-structured directories. Currently, very little software supports this new directory structure adequately. micro/SPF intends to fully support tree-structured directories in a future release. As a temporary measure, we have included a utility program which we find useful. This program allows you to 'rename' a file, using the full path and file names for both the old and the new name. If the path names are different, the file is 'moved' from the first directory to the second directory; no copying is performed, only the directory entries themselves are changed. The command format is:

XREN [d:] [path] old-name [path] new-name

The drive name may be used ONLY for the old file name. Both old and new file names must be specified.

**Q:** *What changes have been made regarding the use of the function keys?*

**A:** 1) The default definition of the Program Function Keys has been changed to be compatible with the PC Keyboard. The <PgUp> and <PgDn> keys are now the SCROLL-UP and SCROLL-DOWN functions.

2) Alt-1 through Alt= keys may now be used as functional equivalents for the F1-F10, PgUp, and PgDn keys.

**Q:** *What constitutes a valid USERID?*

**A:** A valid USERID consists of from one to eight of the following characters:

A) Letters A .. Z (lower case letters are converted to upper case).

B) Numbers 0 .. 9.

C) The following special characters:

! @ # \$ % & ( ) - \_ { } ' "

**Q:** *Are there any special considerations when using an IBM Personal Computer (not an XT) with a fixed disk?*

**A:** micro/SPF now uses all of the available memory, therefore it overlays the transient portion of COMMAND.COM. This normally causes no problems since the transient is reloaded by DOS as necessary. However, if you are using a PC (not an XT) with a fixed disk, the transient portion will normally be reloaded from the A: drive only, since this device was used to boot the system. The following solution to this problem was found in the January 1984 edition of *Softalk* magazine, but has not been submitted to any formal testing.

1) Copy COMMAND.COM from your boot disk to a directory on your hard disk.

2) Add the following command to the CONFIG.SYS file on your boot disk:

SHELL=d:\pathname\command.COM d:\pathname /P

The drive and pathname should point to the drive and directory on your hard disk where you have put the copy of COMMAND.COM.

3) Make sure that the path used in step 2 is included in your default PATH.

**Q:** *What does the message: "EDIT MEMORY CAPACITY: xxxK" mean?*

**A:** micro/SPF "grabs" all available memory for your editing purposes. The message is telling you how much is left after the operating system and micro/SPF have been loaded.

**Q:** *What are the minimum memory requirements to load micro/SPF V2.0?*

**A:** The IBM PC-DOS version requires a minimum of 320K; 384K is needed for use under CP/M-86 and 512K under Concurrent CP/M-86 on the IBM Personal Computer.

## DR Graph™

**Q:** *I am having problems positioning the cursor when running DR Graph on the NEC advanced Personal Computer. The arrow keys fail; it is impossible to backspace. The distributor (or dealer) who sold me the product, downloaded for the NEC APC format, has instructed me to call DRI.*

**A:** Check the serial number of the product which you are trying to use. If the first four digits are 5017, you are using a non-generic version which has been keyboard mapped to the IBM Personal Computer, as the documentation indicates. You should return the product to your distributor (or dealer). NEC has licensed with Digital Research to distribute DR Graph for their hardware. You should contact them for a version designed for the APC.

## Digital Research C™

**Q:** *When trying to compile the SAMPLE.C program supplied with the C Language for CP/M-86, a banner is displayed and the system prompt reappears. Some Temporary files may be created. What is happening?*

**A:** At least two situations will cause these symptoms:

1) Not all of the appropriate files are present on the disk. Refer to section 1.4 in your documentation.

2) The patches to BDOS function 59 have not been installed on your CP/M-86 system. R.CMD relies heavily on function 59 to load the various compiler modules. Without the patch, R.CMD is overwritten when the next program is loaded. Request CP/M-86 V1.1 patches #8 and #13.

**Q:** *When trying to use the C Language V1.1 with Display Manager V1.0, a link-time error is generated that reads:*

NO FILE

FILE: SYSLIBx.L86

**A:** An incompatibility exists due to the renaming of the DR C system run-time libraries from SYSLIBx.L86 to CLEARx.L86. A quick solution is to create and compile a C program which consists of only a "dummy" function. [EX: dummy() ]. Then rename the object module to SYSLIBx.L86. A patch is available to correct the Display Manager libraries, DMDRCx.L86. Request Display Manager Patch 04.

**Q:** *DR CV1.1 does not work properly under MP/M-86. The banner displays and the system prompt reappears.*

**A:** The compiler is searching for its modules on the drive specified as one lower than the current default drive. Place all compiler modules on the A: drive or use the -0 and -1 toggles to specifically reference the current drive. (i.e. 0E>DRC TEST -0E: -1E:). Direct the compiler to look for DRC.ERR with an additional -4E: toggle. If the lower drive is a floppy drive, be certain to have a disk logged into that drive, to avoid system error messages. This inconsistency has been corrected in V1.11.

**Q:** *Using Digital Research C under the CP/M-86 operating system, the -f switch for 8087 support does not seem to work correctly in all cases. Will I ever be able to use my 8087?*

**A:** While the floating point routines have been improved tremendously under version 1.1, the 8087 support is not completely functional. DR C V1.11 for CP/M-86 corrects the 8087 deficiencies; DR C for PC-DOS will be corrected in a future release.

## PL/I-86™ and LINK-86™

**Q:** *I am unable to link the new OVERLAY without linking the root and all other overlays.*

**A:** Since the \$OZ does not function properly the way to get around it is to rename the .COM file which was created by the first link execution and then relink the new overlay with the root module.

**Q:** *How do I use record LOCKING/UNLOCKING facility under PL/I-86 V1.0?*

**A:** Since record LOCKING/UNLOCKING has not been implemented under PL/I-86 V1.0 it is recommended that you use Access Manager to use that feature.

## The Rev Table

The following is a list of current Digital Research product versions and last revision dates:

### LANGUAGES:

PRODUCT NAME	OS FAMILY	VERSION	LAST UPDATE
Digital Research C™	CP/M-86	1.1	See NOTE #1
Digital Research C	PC DOS	1.1	February 84
CBASIC®	CP/M	2.8	June 83
CBASIC	CP/M-86	1.4	See NOTE#2
CBASIC Compiler (CB80)™	CP/M	2.0	June 83
CBASIC Compiler (CB86)	CP/M-86	2.0	June 83
CBASIC Compiler (CB86)	PC DOS	2.1	June 83
CBASIC Compiler (CB86)*	MS DOS	2.1	April 83
CBASIC Compiler (CB68K)**	CP/M 68K	1.0	---
CIS COBOL™	CP/M-86	4.5	November 82
LEVEL II COBOL™	CP/M	2.1	February 84
LEVEL II COBOL	CP/M-86	2.1	February 84
LEVEL II COBOL	PC DOS	2.1	August 83
LEVEL II COBOL*	MS DOS	2.1	August 83
DR LOGO™	CP/M-86	1.0	---
PASCAL/MT+™	CP/M	5.6.1	See NOTE #3
PASCAL/MT+	CP/M-86	3.2.1	February 84
PASCAL/MT+	PC DOS	3.2	February 84
PERSONAL BASIC™	CP/M-86	1.1	See NOTE #4
PL/I™	CP/M	1.4	February 83
PL/I	CP/M-86	1.0	---
PL/I	PC DOS	1.0	---

NOTE #1: DR C upgrade from 1.0 to 1.1 supports overlays for both small and large memory models, includes the new common run-time library and allows the user to call routines in FORTRAN -77 yet to be released, and vice versa. Registered users will receive update notification automatically.

NOTE #2: V1.4 is a free update to V1.3 owners due to a banner change bug. Registered users will receive update notification automatically.

NOTE #3: Upgrade from 5.5 to 5.6 is a maintenance release only. Registered users will receive update notification automatically.

NOTE #4: Upgrade from 1.0 to 1.1 eliminates the 512 line limit restriction and fixes some minor bugs. Registered users will receive update notification automatically.

### PROGRAMMING TOOLS:

PRODUCT NAME	OS FAMILY	VERSION	LAST UPDATE
Access Manager™	CP/M	1.1	July 83
Access Manager	CP/M-86	1.1	August 83
Access Manager	PC DOS	1.1	---
ANIMATOR for LEVEL II	CP/M-86	2.1	January 83
ANIMATOR for LEVEL II	PC DOS	2.1	August 83
Display Manager™	CP/M	1.1	July 83
Display Manager	CP/M-86	1.0	---
Display Manager	PC DOS	1.0	---
Display Manager*	MS DOS	1.0	---
FORMS-2 for COBOL*	CP/M-86	1.3	July 83
FORMS-2 for COBOL	PC DOS	1.3	August 83
FORMS-2 for COBOL*	MS DOS	1.3	August 83
micro/SPF™	CP/M-86	2.0	February 84
micro/SPF	PC DOS	2.0	February 84
Speed Programming Package	CP/M 80	5.5	---
Speed Programming Package	CP/M 86	3.0	---
DR Assembler Plus Tools™	CP/M	1.0	See NOTE #5
DR Assembler Plus Tools	CP/M-86	1.0	See NOTE #5
DR Assembler Plus Tools	PC DOS	1.0	See NOTE #5

NOTE #5: DR Assembler Plus Tools combines SID and PUG to include MAC, RMAC, LINK, XREF, SID XSID. DR Assembler Plus Tools for CP/M to include RASM-86, LINK-86, LIB-86, XREF-86, and SID-86.

### GRAPHICS:

PRODUCT NAME	OS FAMILY	VERSION	LAST UPDATE
DR Graph for IBM PC	CP/M-86	1.01	September 83
DR Graph for IBM PC*	MS DOS	1.0	November 83
DR Graph for IBM PC	PC DOS	1.0	February 84
DR DRAW*	CP/M-80	1.0	April 84
DR DRAW*	CP/M-86	1.0	April 84
DR DRAW*	MS DOS	1.0	April 84
DR DRAW for IBM PC	PC DOS	1.0	April 84
DR ACCESS-10 for IBM PC	PC DOS	1.0	April 84
DR ACCESS-10*	CP/M-80	1.0	April 84
DR ACCESS-10*	CP/M-86	1.0	April 84
DR ACCESS-10*	MS DOS	1.0	April 84
GSX-80™*	CP/M-80	1.1	November 83
GSX-86*	CP/M-86	1.2	September 83
GSX-86*	MS DOS	1.0	November 83

## The Rev Table

Programmers Tool Kit™	CP/M-86, PC DOS, Concurrent CP/M-86	1.0	April 84
Presentation Master	PC DOS 2.0	1.1	May 84
OPERATING SYSTEMS:			
PRODUCT NAME	VERSION	LAST UPDATE	
Concurrent CP/M (generic)	3.1	May 83	
Concurrent CP/M With Windows	None	January 84	
CP/M®	2.2	February 80	
CP/M PLUS™	3.0	January 83	
CP/M-86® (generic)	1.1	February 82	
CP/M-86 for IBM PC/XT	1.1	August 83	
CP/M-86 for IBM DW	1.1	March 82	
CP/M-68K*	1.0	March 83	
CP/NET®*	1.2	November 82	
MP/M II	2.1	February 82	
MP/M-86*	2.1	July 82	

### HARDWARE:

PRODUCT NAME	OS FAMILY	VERSION	LAST UPDATE
CP/M Gold Card™ 64k	CP/M 3.0	1.0	Note #6
CP/M Gold Card 128k Disk Cache	N/A	1.0	---
CP/M Gold Card 192k	CP/M 3.0	1.0	---

NOTE #6: The CP/M Gold Card is a 6 Mhz Z-80B microprocessor board for the Aple II, II Plus, and IIe. Product ships with CP/M 3.0 and CBASIC language.

### CONSUMER PRODUCTS

PRODUCT NAME	OS FAMILY	VERSION	LAST UPDATE
Owlcet™ Diagnostic P.S.A.T.	PC DOS	1.0	Note #7
Owlcet Diagnostic P.S.A.T.	Apple DOS	1.0	---
Owlcet 15 hour S.A.T. Preparatory Course	PC DOS	1.0	---
Owlcet 15 hour S.A.T. Preparatory Course	Apple DOS	1.0	---
Owlcet 60 hour S.A.T. Preparatory Course	PC DOS	1.0	---
Owlcet 60 hour S.A.T. Preparatory Course	Apple DOS	1.0	---

Note #7: The Owlcet line is designed to test and train students to take their S.A.T., an aptitude test often required for college entrance.

\* These products are not available from Digital Research.

\*\* Contact Digital Research Sales and Support Staff for product availability.

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# MICRONOTES

## Professional support draws subscribers' praise

**P**rofessional Programmer Support (PPS) subscribers are a diverse group with one strong, common interest: they need to get a quick and accurate response to their requests for technical information. PPS was established for just that purpose: to provide microcomputer professionals with the technical assistance that they need when they need it. How are PPS subscribers using this information and what do they think of the PPS service?

### "... worked perfectly"

"PPS worked perfectly for me," said Bill Pryor who joined the program in January, 1984. "We would have been lost without the help from PPS," Pryor of Priority Software predicted. Pryor used DRI's Pascal language to develop game programs and felt that PPS was a real asset to his efforts.

### "No delay ..."

"No delay in accessing the right people is the main advantage of PPS," said Jean Vanderbrouke. "Developing a good working relationship with the analysts is a great thing," explained Vanderbrouke who has been working with the PPS program since the beginning. Vanderbrouke works with the Northern California Conference to create vertical applications for churches and missions using DRI's PL/I language.

### "... very helpful"

"The phone always gets answered and the PPS people are very helpful in getting Patches, Application Notes and Common Questions and Answers out to me right away," said Frank Barberis. Barberis who also has been with PPS since its inception feels that "the PPS fee is reasonable for the serious software developer." Barberis works with the Computa-Link Company that provides laboratory data control systems using DRI's MP/M operating system.

### "... eliminates hours of frustration"

Bob King of Crown Software was one of the first PPS subscribers when the program started. He finds that PPS "helps eliminate hours of frustration" when trying to resolve a problem. King also remarked that PPS is a "very helpful, very fast service that rarely causes him to wait long to contact an analyst." King uses DRI's Access Manager, Display Manager and CBASIC to create vertical market applications. One of his projects is a comprehensive sports center management package that includes membership management.

### "... saved my life"

"PPS saved my life a few times," is a strong statement, but that is how John Zumsteg of NW Micro feels about the program. Zumsteg points out that he "figured out problems with the help of PPS that he could never have figured out otherwise. The analysts I have worked with are always helpful and friendly and well worth the money. PPS paid for itself on the first phone call." He uses Pascal/MT+ and Display Manager for writing systems for the commuter aviation industry that include doing everything from creating a model of the air routes to designing accounting and scheduling programs.

### "... someone in the know"

Bill Page of General Electric Energy Enterprises offered his reaction to the PPS Program. "You get to talk to someone in the know; someone is almost always there when I call; I am never put on hold and I always get to talk to someone; I have questions on many products and the analysts that I have worked with know the nature of my questions from previous conversations." Page works with the DOS and CP/M versions of Pascal, Access Manager and Display Manager to create a sophisticated file handling systems for oil and gas reserves.

### "PPS has been great ..."

"PPS has been great for us," reported Roland Myer of Tech America. "One of the nice things is to get on the phone and the guy is there. Professionals need to get through immediately with their problems without competing on a 'Hot Line' with a bunch of end users." Myer's work involves using Pascal/MT+ with 17 overlays in a network of grocery store scales. He saw the need for being able to upload source code to DRI and have it evaluated by an analyst without waiting for it to go through the mails. He is anticipating the electronic support that is planned for PPS subscribers through the use of DR SIG on CompuServe.

The above PPS subscribers do have a common need to get the information that they want when they want it. This need is being met for a group that ranges from the start-up software house to Fortune 500 OEMs and systems integrators. These individuals have put PPS through some pretty sophisticated hurdles since its inception, and they are pleased with the results. If you have some experiences with PPS that you would like to share, please contact the Technical Communications Manager, Technical Support Center, Digital Research, P.O. Box 579, Pacific Grove, CA 93950.