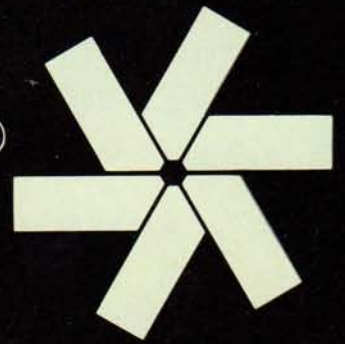


The Official **ZENITH** /Heath Computer Users Magazine

REMark®

October 1989



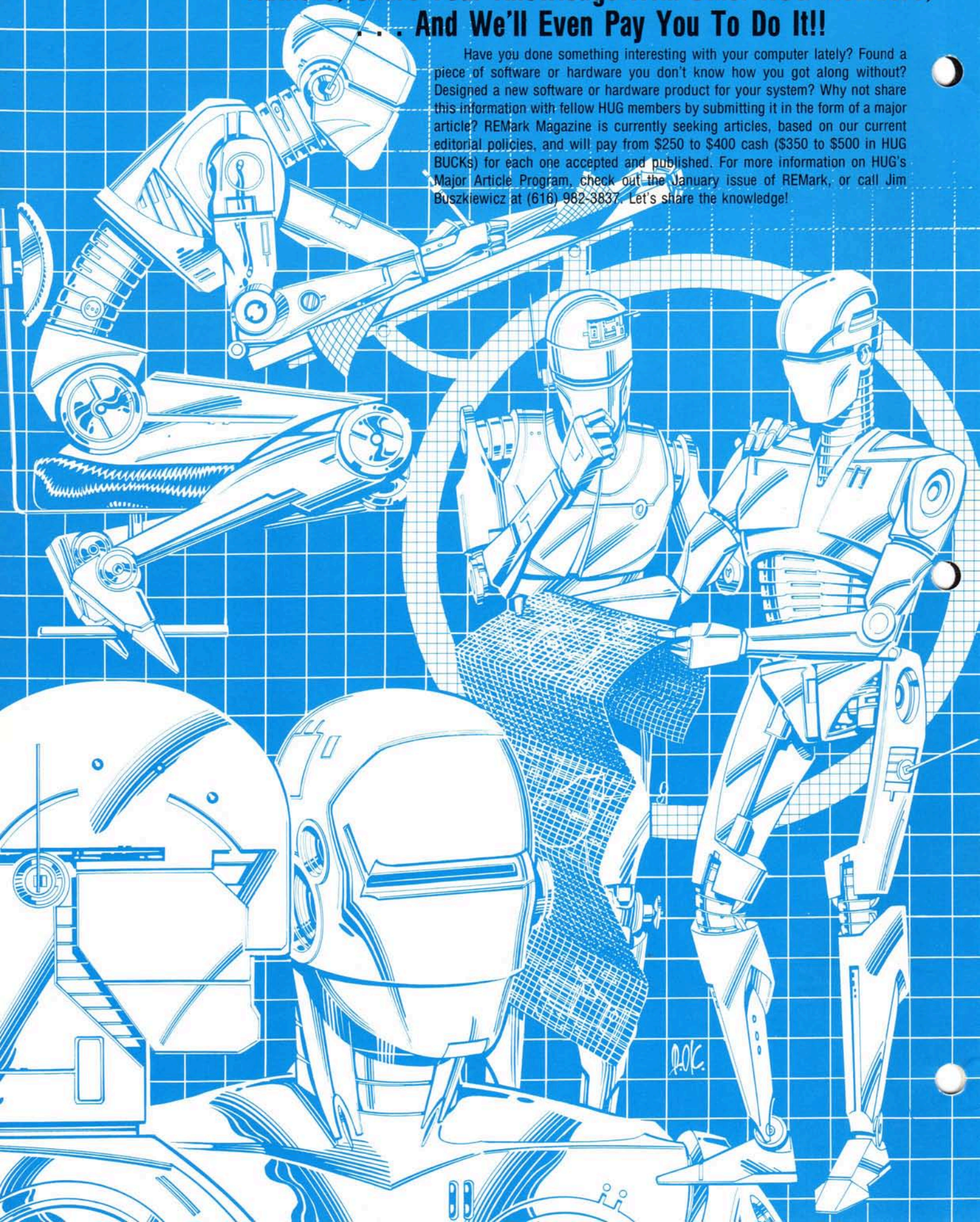
Get Ready for Christmas!
30% Off All HUG Software
Pages 2 & 3



Real World Portability
The MinisPort
Page 7 & 23

Authors, Share Your Knowledge With Other HUG Members, ... And We'll Even Pay You To Do It!!

Have you done something interesting with your computer lately? Found a piece of software or hardware you don't know how you got along without? Designed a new software or hardware product for your system? Why not share this information with fellow HUG members by submitting it in the form of a major article? REMark Magazine is currently seeking articles, based on our current editorial policies, and will pay from \$250 to \$400 cash (\$350 to \$500 in HUG BUCKs) for each one accepted and published. For more information on HUG's Major Article Program, check out the January issue of REMark, or call Jim Buszkiewicz at (616) 982-3837. Let's share the knowledge!



REMmark®

Volume 10, Issue 10 • October 1989

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PC Compatibles

All models include the following series of computers: H/Z-130, 140, 150, 160, 170, 180 H/Z-200 and 300.

FORM FILL-R & FORM EDIT-R

Fill in pre-printed forms, or create your own forms and print on blank paper. The FORM EDIT-R creates form definitions. Once you create the form definition, use the FORM FILL-R to fill in forms and print them, or save them to disk files for later recall and/or correction.

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PRODUCT NAME	PART NUMBER	OPERATING		PRICE
		SYSTEM	DESCRIPTION	
H8 - H/Z-89/90				
ACCOUNTING SYSTEM	885-8047-37	CPM	BUSINESS	20.00
ACTION GAMES	885-1220-[37]	CPM	GAME	20.00
ADVENTURE	885-1010	HDOS	GAME	10.00
ASCIRITY	885-1238-[37]	CPM	AMATEUR RADIO	20.00
AUTOFILE (Z80 ONLY)	885-1110	HDOS	DBMS	30.00
BHBASIC SUPPORT PACKAGE	885-1119-[37]	HDOS	UTILITY	20.00
CASTLE	885-8032-[37]	HDOS	ENTERTAINMENT	20.00
CHEAPCALC	885-1131-[37]	HDOS	SPREADSHEET	20.00
CHECKOFF	885-8010	HDOS	CHECKBOOK SOFTWARE	25.00
DEVICE DRIVERS	885-1105	HDOS	UTILITY	20.00
DISK UTILITIES	885-1213-[37]	CPM	UTILITY	20.00
DUNGEONS & DRAGONS	885-1093-[37]	HDOS	GAME	20.00
FLOATING POINT PACKAGE	885-1063	HDOS	UTILITY	18.00
GALACTIC WARRIORS	885-8009-[37]	HDOS	GAME	20.00
GALACTIC WARRIORS	885-8009-[37]	CPM	GAME	20.00
GAMES 1	885-1029-[37]	HDOS	GAMES	18.00
HARD SECTOR SUPPORT PACKAGE	885-1121	HDOS	UTILITY	30.00
HDOS PROGRAMMERS HELPER	885-8017	HDOS	UTILITY	16.00
HOME FINANCE	885-1070	HDOS	BUSINESS	18.00
HUG DISK DUPLICATION UTILITIES	885-1217-[37]	CPM	UTILITY	20.00
HUG SOFTWARE CATALOG	885-4500	VARIOUS	PRODUCTS THRU 1982	9.75
HUGMAN & MOVIE ANIMATION	885-1124	HDOS	ENTERTAINMENT	20.00
INFO. SYSTEM AND TEL. & MAIL SYSTEM	885-1108-[37]	HDOS	DBMS	30.00
LOGBOOK	885-1107-[37]	HDOS	AMATEUR RADIO	30.00
MAGBASE	885-1249-[37]	CPM	MAGAZINE DATABASE	25.00
MAPLE	885-8005	HDOS	COMMUNICATION	35.00
MAPLE	885-8012-[37]	CPM	COMMUNICATION	35.00
MICRONET CONNECTION	885-1122-[37]	HDOS	COMMUNICATION	16.00
MISCELLANEOUS UTILITIES	885-1089-[37]	HDOS	UTILITY	20.00
MORSE CODE TRANSCEIVER	885-8016	HDOS	AMATEUR RADIO	20.00
MORSE CODE TRANSCEIVER	885-8031-[37]	CPM	AMATEUR RADIO	20.00
PAGE EDITOR	885-1079-[37]	HDOS	UTILITY	25.00
PROGRAMS FOR PRINTERS	885-1082	HDOS	UTILITY	20.00
REMARK VOL 1 ISSUES 1-13	885-4001	N/A	1978 TO DECEMBER 1980	20.00
RUNOFF	885-1025	HDOS	TEXT PROCESSOR	35.00
SCICALC	885-8027	HDOS	UTILITY	20.00
SMALL BUSINESS PACKAGE	885-1071-[37]	HDOS	BUSINESS	75.00
SMALL-C COMPILER	885-1134	HDOS	LANGUAGE	30.00
SOFT SECTOR SUPPORT PACKAGE	885-1127-[37]	HDOS	UTILITY	20.00
STUDENT'S STATISTICS PACKAGE	885-8021	HDOS	EDUCATION	20.00
SUBMIT (Z80 ONLY)	885-8006	HDOS	UTILITY	20.00
TERM & HTOC	885-1207-[37]	CPM	COMMUNICATION & UTILITY	20.00
TINY BASIC COMPILER	885-1132-[37]	HDOS	LANGUAGE	25.00
TINY PASCAL	885-1086-[37]	HDOS	LANGUAGE	20.00
UDUMP	885-8004	HDOS	UTILITY	35.00
UTILITIES	885-1212-[37]	CPM	UTILITY	20.00
UTILITIES BY PS	885-1126	HDOS	UTILITY	20.00
VARIETY PACKAGE	885-1135-[37]	HDOS	UTILITY & GAMES	20.00
WHEW UTILITIES	885-1120-[37]	HDOS	UTILITY	20.00
XMET ROBOT X-ASSEMBLER	885-1229-[37]	CPM	UTILITY	20.00
Z80 ASSEMBLER	885-1078-[37]	HDOS	UTILITY	25.00
Z80 DEBUGGING TOOL (ALDT)	885-1116	HDOS	UTILITY	20.00

H8 - H/Z-89/90 - H/Z-100 (Not PC)

ADVENTURE	885-1222-[37]	CPM	GAME	10.00
BASIC-E	885-1215-[37]	CPM	LANGUAGE	20.00
CASSINO GAMES	885-1227-[37]	CPM	GAME	20.00
CHEAPCALC	885-1233-[37]	CPM	SPREADSHEET	20.00
CHECKOFF	885-8011-[37]	CPM	CHECKBOOK SOFTWARE	25.00
COPYDOS	885-1235-37	CPM	UTILITY	20.00
DISK DUMP & EDIT UTILITY	885-1225-[37]	CPM	UTILITY	30.00
DUNGEONS & DRAGONS	885-1209-[37]	CPM	GAMES	20.00
FAST ACTION GAMES	885-1228-[37]	CPM	GAME	20.00
FUN DISK I	885-1236-[37]	CPM	GAMES	20.00
FUN DISK II	885-1248-[37]	CPM	GAMES	35.00
GAMES DISK	885-1206-[37]	CPM	GAMES	20.00
GRADE	885-8036-[37]	CPM	GRADE BOOK	20.00
HRUN	885-1223-[37]	CPM	HDOS EMULATOR	40.00
HUG FILE MANAGER & UTILITIES	885-1246-[37]	CPM	UTILITY	20.00
HUG SOFTWARE CATALOG UPDATE #1	885-4501	VARIOUS	PRODUCTS 1983 THRU 1985	9.75
KEYMAP CPM-80	885-1230-[37]	CPM	UTILITY	20.00
MBASIC PAYROLL	885-1218-[37]	CPM	BUSINESS	60.00
MICRONET CONNECTION	885-1224-[37]	CPM	COMMUNICATION	16.00
NAVPROGSEVEN	885-1219-[37]	CPM	FLIGHT UTILITY	20.00
REMARK VOL 3 ISSUES 24-35	885-4003	N/A	1982	20.00
REMARK VOL 4 ISSUES 36-47	885-4004	N/A	1983	20.00
REMARK VOL 5 ISSUES 48-59	885-4005	N/A	1984	25.00
REMARK VOL 6 ISSUES 60-71	885-4006	N/A	1985	25.00
REMARK VOL 7 ISSUES 72-83	885-4007	N/A	1986	25.00
SEA BATTLE	885-1211-[37]	CPM	GAME	20.00
UTILITIES BY PS	885-1226-[37]	CPM	UTILITY	20.00
UTILITIES	885-1237-[37]	CPM	UTILITY	20.00

Price List

The following HUG Price List contains a list of all products in the HUG Software Catalog and Software Catalog Update #1. For a detailed abstract of these products, refer to the HUG Software Catalog, Software Catalog Update #1, or previous issues of REMark.

PRODUCT NAME	PART NUMBER	OPERATING SYSTEM	DESCRIPTION	PRICE
X-REFERENCE UTILITIES FOR MBASIC	885-1231-[37]	CPM	UTILITY	20.00
ZTERM	885-3003-[37]	CPM	COMMUNICATION	20.00

H/Z-100 (Not PC) Only

ACCOUNTING SYSTEM	885-8048-37	MSDOS	BUSINESS	20.00
CALC	885-8043-37	MSDOS	UTILITY	20.00
CARDCAT	885-3021-37	MSDOS	BUSINESS	20.00
CHEAPCALC	885-3006-37	MSDOS	SPREADSHEET	20.00
CHECKBOOK MANAGER	885-3013-37	MSDOS	BUSINESS	20.00
CP/EMULATOR	885-3007-37	MSDOS	CPM EMULATOR	20.00
DBZ	885-8034-37	MSDOS	DBMS	25.00
ETCHDUMP	885-3005-37	MSDOS	UTILITY	20.00
EZPLOT II	885-3049-37	MSDOS	PRINTER PLOTTING UTILITY	25.00
GAMES CONTEST PACKAGE	885-3017-37	MSDOS	GAMES	25.00
GAMES PACKAGE II	885-3044-37	MSDOS	GAMES	25.00
GRAPHICS	885-3031-37	MSDOS	ENTERTAINMENT	20.00
HELPSCREEN	885-3039-37	MSDOS	UTILITY	20.00
HUG BACKGROUND PRINT SPOOLER	885-1247-37	CPM	UTILITY	20.00
KEYMAC	885-3046-37	MSDOS	UTILITY	20.00
KEYMAP	885-3010-37	MSDOS	UTILITY	20.00
KEYMAP CPM-85	885-1245-37	CPM	UTILITY	20.00
MAPLE	885-8023-37	CPM	COMMUNICATION	35.00
MATHFLASH	885-8030-37	MSDOS	EDUCATION	20.00
ORBITS	885-8041-37	MSDOS	EDUCATION	25.00
POKER PARTY	885-8042-37	MSDOS	ENTERTAINMENT	20.00
SCICALC	885-8028-37	MSDOS	UTILITY	20.00
SKYVIEWS	885-3015-37	MSDOS	ASTRONOMY UTILITY	20.00
SMALL-C COMPILER	885-3026-37	MSDOS	LANGUAGE	30.00
SPELL5	885-3035-37	MSDOS	SPELLING CHECKER	20.00
SPREADSHEET CONTEST PACKAGE	885-3018-37	MSDOS	VARIOUS SPREADSHEETS	25.00
TREE-ID	885-3036-37	MSDOS	TREE IDENTIFIER	20.00
USEFUL PROGRAMS I	885-3022-37	MSDOS	UTILITIES	30.00
UTILITIES	885-3008-37	MSDOS	UTILITY	20.00
ZBASIC DUNGEONS & DRAGONS	885-3009-37	MSDOS	GAME	20.00
ZBASIC GRAPHIC GAMES	885-3004-37	MSDOS	GAMES	20.00
ZBASIC GAMES	885-3011-37	MSDOS	GAMES	20.00
ZPC II	885-3037-37	MSDOS	PC EMULATOR	60.00
ZPC UPGRADE DISK	885-3042-37	MSDOS	UTILITY	20.00

H/Z-100 and PC Compatibles

ADVENTURE	885-3016	MSDOS	GAME	10.00
ASSEMBLY LANGUAGE UTILITIES	885-8046	MSDOS	UTILITY	20.00
BOTH SIDES PRINTER UTILITY	885-3048	MSDOS	UTILITY	20.00
CXREF	885-3051	MSDOS	UTILITY	17.00
DEBUG SUPPORT UTILITIES	885-3038	MSDOS	UTILITY	20.00
DPATH	885-8039	MSDOS	UTILITY	20.00
HADES	885-3040	MSDOS	UTILITY	40.00
HELP	885-8040	MSDOS	CAI	25.00
HEPCAT	885-3045	MSDOS	UTILITY	35.00
HUG BACKGROUND PRINT SPOOLER	885-3029	MSDOS	UTILITY	20.00
HUG EDITOR	885-8012	MSDOS	TEXT PROCESSOR	20.00
HUG MENU SYSTEM	885-3020	MSDOS	UTILITY	20.00
HUG SOFTWARE CATALOG UPDATE #1	885-4501	VARIOUS	PROD 1983 THRU 1985	9.75
HUGMCP	885-3033	MSDOS	COMMUNICATION	40.00
HUGPBBS SOURCE LISTING	885-3028	MSDOS	COMMUNICATION	60.00
HUGPBBS	885-3027	MSDOS	COMMUNICATION	40.00
ICT 8080 TO 8088 TRANSLATOR	885-3024	MSDOS	UTILITY	20.00
MAGBASE	885-3050	VARIOUS	MAGAZINE DATABASE	25.00
MATT	885-8045	MSDOS	MATRIX UTILITY	20.00
MISCELLANEOUS UTILITIES	885-3025	MSDOS	UTILITIES	20.00
PS's PC & Z100 UTILITIES	885-3052	MSDOS	UTILITY	20.00
REMARK VOL 5 ISSUES 48-59	885-4005	N/A	1984	25.00
REMARK VOL 6 ISSUES 60-71	885-4006	N/A	1985	25.00
REMARK VOL 7 ISSUES 72-83	885-4007	N/A	1986	25.00
REMARK VOL 8 ISSUES 84-95	885-4008	N/A	1987	25.00
SCREEN DUMP	885-3043	MSDOS	UTILITY	30.00
UTILITIES II	885-3014	MSDOS	UTILITY	20.00
Z100 WORDSTAR CONNECTION	885-3047	MSDOS	UTILITY	20.00

PC Compatibles

ACCOUNTING SYSTEM	885-8049	MSDOS	BUSINESS	20.00
CARDCAT	885-6006	MSDOS	CATALOGING SYSTEM	20.00
CHEAPCALC	885-6004	MSDOS	SPREADSHEET	20.00
CP/EMULATOR II & ZEMULATOR	885-6002	MSDOS	CPM & Z100 EMULATORS	20.00
DUNGEONS & DRAGONS	885-6007	MSDOS	GAME	20.00
EZPLOT II	885-6013	MSDOS	PRINTER PLOTTING UTILITY	25.00
GRADE	885-8037	MSDOS	GRADE BOOK	20.00
HAM HELP	885-6010	MSDOS	AMATEUR RADIO	20.00
KEYMAP	885-6001	MSDOS	UTILITY	20.00
LAPTOP UTILITIES	885-6014	MSDOS	UTILITY	20.00
PS's PC UTILITIES	885-6011	MSDOS	UTILITIES	20.00
POWERING UP	885-4604	N/A	GUIDE TO USING PCS	12.00
SCREEN SAVER PLUS	885-6009	MSDOS	UTILITIES	20.00
SKYVIEWS	885-6005	MSDOS	ASTRONOMY UTILITY	20.00
TCSPELL	885-8044	MSDOS	SPELLING CHECKER	20.00
ULTRA RTTY	885-6012	MSDOS	AMATEUR RADIO	20.00

Magazines everywhere, and no way to reference the wealth of information they hold? Not anymore! Now there's **MAGBASE**; a database designed specifically for referencing magazine articles. Don't let those one-hundred-and-some back issues of REMark, or C Users Journal, or Veterinary Medicine, (or any magazine) gather dust, use **MAGBASE**, and find that article you read two years ago! **MAGBASE** is available for **MSDOS HUG P/N 885-3050** or **CP/M (P/N 885-1249-[27])**.

LAPTOP OWNERS . . . don't feel left out! All of HUG's MSDOS software is available on 3-1/2" micro-floppies too! When ordering, just add a "-80" to the 7-digit HUG part number. For the standard 5-1/4" floppy, just add a "-37".

Make the no-hassle connection with your modem today! **HUGMCP** doesn't give you long menus to sift through like some modem packages do. With **HUGMCP**, YOU'RE always in control, not the software. Order **HUG P/N 885-3033-37** today, and see if it isn't the easiest-to-use modem software available. They say it's so easy to use, they didn't even need to look at the manual. "It's the only modem software that I use, and I'm in charge of the HUG bulletin board!" says Jim Buszkiewicz. **HUGMCP** runs on ANY Heath/Zenith computer that's capable of running MS-DOS!

ORDERING INFORMATION

For VISA and MasterCard phone orders, telephone the Heath Users' Group directly at (616) 982-3463. Have the part number(s), descriptions, and quantity ready for quick processing. By mail, send your order, plus 10% postage and handling (\$1.00 minimum charge, up to a maximum of \$5.00) to: Heath Users' Group, P.O. Box 217, Benton Harbor, MI 49022-0217. VISA and MasterCard require minimum \$10.00 order. No C.O.D.s accepted.

Questions regarding your subscription? Call Margaret Bacon at (616) 982-3463.

*** ZENITH PC COMPUTER UPGRADES ***

SmartWatch from FBE Research Installs in ROM Socket on CPU Board in Zenith computer series Z-100/138/148/150/160. This clock/calendar contains a ten year battery and keeps your computer informed of both time and date at each boot-up. Instructions and software included. \$38.00

Z-150 Series Hard Disk Drive Kit Includes new generation High Speed Seagate Drive with Auto Park heads. Each kit is complete with controller card, cables, hardware and instructions to mount the Hard Disk under your two floppy drives in the Z-150 series computers. 31 MEG ST-138/150 Kit \$333.00

Z-148 Hard Disk Drive Kit Includes the Hard Disk Drive and controller in the kit above plus the Z-148 Expansion card described below. Each kit includes all cables, hardware and instructions to replace one floppy drive with a high speed low power Hard Disk Drive. 31 MEG ST-138/Z-148 Kit \$413.00

Z-148/ST-138 Kit With SmartWatch \$443.00

Z-148 Expansion Card adds 2 IBM expansion slots \$79.00
with SMARTWATCH clock/calendar. \$109.00

INTERNAL MODEM Fully Hayes compatible (software included)
1200/300 baud \$67.00
2400/1200/300 baud \$109.00

EXTERNAL MODEM Fully Hayes compatible (software included)
1200/300 baud \$89.00
2400/1200/300 baud \$128.00

VCE 150 Video Eliminator for Z-150
Allows use of EGA or any video card. Required memory chip included. \$54.00

Z-150 MEMORY ZP640 PLUS Replacement PAL chip for your Z-150/Z160 computer. Allows the use of 256K RAM chips to increased total memory to 704K. To complete this kit order 18 each 256x1 RAM chips. \$18.00

*** IBM COMPATIBLE SOFTWARE ***

PART NUMBER	DESCRIPTION	LIST PRICE	SALE PRICE
MS-5063-30	Microsoft Windows	\$99.00	\$14.00
NU-413	Norton Utilities Adv.	\$150.00	\$99.00
WP-528	WORDPERFECT 5.0	\$495.00	\$269.00

*** Z-100 SERIES COMPUTER UPGRADES ***

High Density 1.2 Meg Drives. External floppy drive set-up complete with drive, power supply, case and cable. Ready to connect to your 8" floppy controller Single Drive Unit 217.00 Dual Drive Unit \$309.00
Bare Drive and Cable for internal mount \$127.00

SmartWatch by FBE Research. If you don't have a clock for your Z-100, get this one. More details under PC UPGRADE listings \$38.00

ZMF100A by FBE Research. A modification package which allows 256K chips to be used on the old-style motherboard (part number 85-2653-1) to reach 768K. Simple assembly with no soldering or trace cutting. Compatible with Easy PC and Gemini Emulator. Order 27 256x1 RAM chips to complete this kit. \$60.00

Gemini Emulator Board. Makes the Z-100 compatible with the IBM PC library of programs. \$432.00

UCI EASY PC. IBM PC Emulator. Makes your Z-100 IBM Software Compatible. Full 8 MEG operation, color graphics and audio compatible. . . \$477.00

UCI EASY-I/O S-100 board that provides IBM PC communications port compatibility with your EasyPC. Easy/I/O-1, One Serial Port \$91.00. Easy/I/O-2, Two Serial Ports, One Game Port, Clock- Calendar \$127.00

UCI Memory Upgrade Pal Chip Set For the Z-100's with the newer motherboard part number 181-4918 or greater. This chip set allows the installation of 256K RAM chips on the motherboard. With the addition of 27 256K RAM chips (sold separately) a total memory of 768K is obtained. PAL Chip Set . \$64.00

UCI Memory Upgrade Card The board has sockets for up to 2 MEG of RAM (72 chips). Board with no RAM installed...\$288.00. Add \$35.00 for EasyDrive RAM Drive Software if desired. Either 64K or 256K RAM chips may be used, see prices under MEMORY CHIPS listing.

UCI EasyWin Winchester Drive System at a reasonable price. Complete Hard Disk System for mounting inside your Z-100. System includes S-100 bus board, matched XT hard disk controller, EasyWin software, manual and Misc installation hardware. Order a hard disk (ST-125 or ST-138 recommended) under the SEAGATE HARD DISK DRIVE ONLY listing to complete the kit. \$288.00

CDR Z-100 Speed Module Run your Z-100 Computer at 7.5MHz. Installs easily with no soldering. Externally switchable between Speed and Normal mode. Payload \$44.00

*** Z-100 SERIES SOFTWARE ***

PART NUMBER	DESCRIPTION	LIST PRICE	SALE PRICE
MS-463-1	Z-Basic (16 bit)	\$175.00	\$12.00
MS-253-1	Basic-80 (8-bit)	\$175.00	\$12.00
CD-463-2	Condor File Manager	\$299.00	\$12.00
LT-Z100-3	All 3 Listed Above	\$649.00	\$32.00

NEW LOW PRICES

** SEAGATE HARD DISK DRIVES **

All hard disks are shipped complete with installation instructions. The 100 series drives are 3.5" drives and come with a 5.25" frame and faceplate for standard mounting. RLL (run length limited) drives require a RLL controller. XT kits include controller card, cables, mounting hardware and instructions. Most AT computers contain a dual controller therefore only a \$7.00 cable set is required. If a dual AT controller is required add \$124.00 for a 1:1 interleave controller and cable set.

MODEL	CAPACITY/SPEED	DRIVE ONLY	XT KIT
ST-125	21 MEG, 28 MS	\$227.00	\$277.00
ST-225	21 MEG, 65 MS	\$199.00	\$249.00
ST-138	31 MEG, 28 MS	\$279.00	\$329.00
ST-238R	31 MEG, 65 MS RLL	\$218.00	\$273.00
ST-157R	49 MEG, 28 MS RLL	\$306.00	\$361.00
ST-251-1	42 MEG, 28 MS	\$329.00	\$379.00
ST-151	42 MEG, 24 MS	\$379.00	\$429.00
ST-4096	80 MEG, 28 MS	\$554.00	\$604.00
ST-4144R	122 MEG, 28 MS	\$614.00	\$673.00

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BUGGIN' HUG

Letter to Bill Adney

Dear Bill:

This is a note of thanks and appreciation, thus no return envelope. I just wanted you to know how much I enjoy your most informative articles in REMark and to let you know how much they help me — and all your readers too, I'm sure.

I particularly want to thank you for your "On the Leading Edge" article in the May issue. I have wanted to upgrade my highly modified Z-150 with a 101-key consol, but was frightened away by reports of problems with it. No one was sure why it worked in some cases, not in others.

Guys in our HUG group had told me that a new ROM (beyond the 2.9 version I was using) would be needed. One day I got up the nerve and installed the latest upgrade (V. 3.1c), but all sort of things went wrong — and that was just with my original 84-key keyboard. Of course, I had no idea what the problem was so I just re-

place the V. 2.9 ROM and returned to my old frustration.

Then your great article appeared and I immediately ordered a new version of SuperKey, as you suggested. Everything worked just fine so I ordered a Northgate "Omni Key/102)" and installed it. As you said it would, that too worked out beautifully and here I am now in seventh heaven.

So Bill, just a note of thanks for the in-depth coverage you give us. Please know we appreciate the tremendous work you do.

Sincerely,
John Membrino
Berwyn, PA

Softening the Hard Disk

Dear HUG:

There is a small error in one of the programs accompanying my article 'Softening the Hard Disk' in the April '89 issue of REMark.

In Rep.Bat, the listing no. 5 on page 20, there should be no /F parameter added in the CHKDSK lines. The reason is that the program here has transferred all its input and output from the console to a disk file, including its prompts. If it finds an er-

ror, it will ask the file for permission to write the orphan clusters to files of their own, and the user will never see the request. The machine will behave almost as if it has locked up.

The solution is to remove the /F parameter from each of the lines.

Sincerely yours,
J.A. Negus
Bessas
07150 Vallon Pont d'Arc
France

Needs a Workable Solution

Dear HUG:

I have an older Zenith Z-150 PC. I purchased an OMTI 5510-7 hard disk controller from my local Heath/Zenith Center a few years ago and have added a used Priam/Vertex V185 80 Meg disk. The combination works well, except that in formatting the drive with the OMTI software (the equivalent of PREP), I noticed that I was unable to use more than 1023 cylinders (the drive has 1166 cylinders). I was told at the time that there was a DOS limitation that prevented using the full disk (only 10 bits available for the CYL number).

I have recently upgraded to DOS 3.3

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PLUS, and I was wondering if you (or anyone) know of some way to utilize the full disk. I noted that there are new support features in DOS 3.3 for big drives, and I would even be willing to buy a new hard disk controller (much cheaper than a new drive) if anyone knows of a combination that would allow full disk utilization. I have heard that Golden Bow Systems may have a package to do this, but I have no information on it yet and know of nobody using it on a Heath/Zenith Z-150.

Along the same line, I was wondering if there were some way to upgrade the 5-1/4" 360 Kb floppy to add or change to a 1.2 Meg 5-1/4" or even a 1.4 Meg 3.5" drive. I'm still using the original Zenith floppy controller, but would consider switching if someone could recommend something that would work in a standard PC chassis. I asked my local Heath/Zenith Tech and he said that PCs can't run a denser floppy — only AT class machines. With all of the "after market" boards and

packages available, I was wondering if someone knows of a workable upgrade. My old 4.7 Mhz 8088 PC with CGA still does a good job for my needs. I can't see buying a new AT or 386 machine just to get more storage and denser/faster backups. Any suggestions?

Sincerely,
James E. Scharf
23 Allyson Road
Flanders, NJ 07836

Continued on Page 17

HUG New Products

HUG P/N 885-3047 Z-100 WordStar™ Connection UPDATE

The HUG Z-100 WordStar Connection, which allows the PC-compatible version of WordStar to be used on Z-100 series (non PC-compatible) computers has been upgraded to support WordStar re-

lease 5.5. The new Z-100 WordStar Connection provides support for all WordStar features that it supported before, including Advanced Page Preview. It now also provides limited support for Inset™, the graphics program provided with WordStar 5.5, which allows you to add graphic illustrations to your documents. If you have a hard disk, the new Z-100 WordStar Connection allows you to use the new WSSETUP utility, which makes installation a snap. If you have the old Z-100 WordStar connection and would like to

upgrade, send in your original Z-100 WordStar Connection disk and \$7.00 to HUG. New buyers can still get it for \$20.00 (plus shipping).

The Z-100 WordStar connection requires a Z-100 series computer with at least 384k of RAM and the Z-100 version of MS-DOS 2.0 or higher. To run Page Preview and the view and preview features of Inset, you need 768k of memory. For a more complete description of the Z-100 WordStar Connection, see the February 1989 issue of REMark. *



Related Products

The Staunch 8/89'er, the quality quarterly newsletter for H-8 and H/Z-89/90 computer users is extremely pleased to announce a formal expansion to twelve (12) editorial pages. As originally conceived by Hank Lotz in late '86, *Staunch* ran to eight pages. In mid-1988, editor Kirk L. Thompson added an insert of variable size to accommodate commercial advertising and listing of public-domain and royalty software for distribution. That insert is now formally merged with the eight editorial pages to provide expanded coverage of the eight-bit Heath/Zenith environment.

Software listings will continue, merged with the editorial content and appearing consistently on the second page in the expanded format. Occasional advertising and *Staunch's* annual article index will appear as a two- or four-page special insert.

This change means expanded information and service to the 8-bit H/Z computer user. Without an increase in cost; a subscription for the current year remains \$12. Back issues are also still available. These can be had for \$5 for the 1987 set (edited by Hank Lotz) and \$8 for the 1988

set (edited by Kirk Thompson). Please address all orders, subscriptions, and inquiries to the address below.

The Staunch 8/89'er
Kirk L. Thompson, Editor
#6 West Branch Mobile Home Village
West Branch, IA 52358
(319) 643-7136

HDOS 3.02 System and Manual

The "word mechanics" are at it again! A brand new manual is being constructed for HDOS 3.2. It illustrates extensive modifications and improvements over HDOS 2.0 and enhancements to the original HDOS 3.0. All data for HDOS 3.02 will be available in one place. When complete, the manual will range from 200 to 400 pages!

Reservations are now being taken for the completion of this manual. The price will be \$60. This will include the binary 3.02 system, documentation either on disk or as hardcopy (your choice), and binder with section dividers. The disks will be available as 40-track, single- or double-sided, hard- or 40-track, single- or

double-sided soft-sector.

All those interested are encouraged to contact Kirk L. Thompson, Editor, *The Staunch 8/89'er*, #6 West Branch Mobile Home Village, West Branch, IA 52358, (319) 643-6136. Send no money now, but a copy will be reserved for you. When ready, you will be contacted.

At present, Chapters 1 and 2 are complete. Other chapters will follow as time permits and update bulletins will be issued on the status of the effort. The final product is projected to have eight chapters: System Configuration, General Operations (including SYSCMD/PLUS and PIP/PLUS version 3.02), Console Debugger (DEBUG), Line Editor (EDIT), Assembly Language (ASM), Extended Benton Harbor BASIC, System Programmers' Guide (with a section for programming device drivers), and Miscellaneous Items.

Technical writer for the effort is Dan Jerome (who has already keyed the HDOS 2.0 manual for *The Staunch 8/89'er*) and HDOS 3.02 system developer is Richard Musgrave (MIGHTY-SOFT, Box 11164, Kansas City, MO 64119). *

Real World Portability



Nathan Baker
ZDS Publications

OR

How I Learned to Stop Worrying And Love the Silicon Disk

You've probably heard someone at some time lampooning portable 8088-based computers, usually it's someone who has a '386 desktop computer or at the very least a '286 based machine. I feel the small, low end machines receive a brunt of undeserved abuse. True, some portable computers, or "luggables", seem to have been developed by people who never intended to use them, but I'm pleased to discover the Zenith Data System's MinisPort portable computer is not one of them.

For my purposes, writing technical documentation and developing a novel in my spare time, the MinisPort is outstanding. It has freed me from the confines of my apartment for doing my personal work. So far I've avoided doing work related documentation under an apple tree, but even that is possible if worse came to worse. At any time I want to add to the story line, make a note, edit a chapter, or store an idea, my computer is a push of the power button away.

To be sure, you won't want to run any CAD or CAE programs on most 8088-based portables (the lack of hard drive storage space and slow processor clock speed can be detrimental to your sanity), but the same holds true for most desktop PC's and XT's. Memory hungry programs still consume most of the MinisPort's

meager DRAM, and most games run agonizingly slow. And it can realistically serve as a second computer only. So why do I love the MinisPort?

Well, you can't hide your TurbosPort under your car seat, for one. And would you leave your \$8,000+ portable computer, with a nifty (read that "expensive") page white LCD display in a car that goes through a rollercoaster of temperature extremes during the average summer day? Most people wouldn't. Even the SuperSport 286, the next machine I'd consider for writing purposes, makes my arm longer if I carry it around in the outback of Michigan. Of course, I could have detached my battery and put it in my backpack (adding more weight and consuming more valuable space), but I guess I'm lazy. I want a portable computer that has an internal battery. The external battery idea just doesn't seem to work in the real world, at least for me. The MinisPort, lightweight and dependable, is insignificant enough to pack along with a couple of extra batteries (what! extra batteries?! read on, knave).

The Machine

I normally do not adhere to outdated technology. If there was an 80386-based computer as small as the MinisPort and at the low end price range, I would probably

want it. But I don't think it would perform any better than the MinisPort for what I use it for. I'd still want it so the partially computer-literate masses wouldn't groan "Only a PC? Jeez, it's gotta be next to useless." or "It's too small." and "It's too slow." when they discover what it is.

The machine I've been using is a prototype, with 1 megabyte of RAM and a single 2-inch, 720K floppy disk drive. Since it's a prototype, I don't have a modem, or the optional 1 megabyte RAM upgrade, but the machine is still very useful. Some features from more advanced computer designs have found their way into the Minisport, and enhance it considerably.

The setup/configuration menu migrated to this machine from its AT-cousins, giving you a quick, efficient way to customize its operation for your own work style. Among other things, the setup menu lets you turn off various sub-circuits in the machine (serial port, parallel port, backlight timeout, etc.), allowing you to tailor your battery power consumption. For instance, when I'm sitting on a picnic table at lunch during these nice summer days I usually have all the external ports turned off, and the backlight disabled. Sunlight provides enough illumination to see the "supertwist" display, unless I'm wearing my sunglasses.

The MinisPort uses silicon disk technology, that is, essential DOS programs are always available in ROM, which the computer designates as drive C:. Drive C: is write protected by the nature of the ROM. And extra memory above 640K can be allocated as expanded memory or as a RAM disk. If you use the extra memory as a RAM disk, the computer designates it as drive D:. The setup/configuration menu lets you choose the size of the RAM disk or expanded memory easily. Set it once and forget it. I always use the extra memory as a RAM disk. Of course, with only 1M or RAM, that gives me only 368K of RAM disk space. I'll admit, with only 1 megabyte the 368K in drive D: seems paltry, but with some forethought it can be put to good use. For example, six weeks ago I transferred my word processing program to the RAM disk (taking up about 271K), then started cranking out text. A lot of original text can be stored in 97K, about forty or so pages. Every time my material fills up the RAM disk, I make a transfer to floppy disk drive A: (the 2-inch floppy disk drive) and delete the old text from drive D:. Problem solved. Transferring files between the RAM disk and the floppy disk is time consuming, but it's no more time consuming than the same operation on a desktop PC.

By using the RAM disk (which essentially serves as a tiny hard drive), I almost never need to access the floppy disk. And the RAM disk can be made non-volatile. The setup/configuration menu lets you select the option of backing up drive D: (the RAM disk) or not backing it up when you turn the machine off. When you choose to back it up, the computer keeps the RAM disk powered, so you don't lose anything stored there. This feature has performed flawlessly, and seems to have no visible affect on battery life. As I stated earlier, three weeks ago I transferred my word processor to drive D:, and the MinisPort has kept it intact, through many on-off cycles, charging cycles, and battery swaps. During battery swaps the computer relies on two small lithium batteries to keep the RAM disk safe. And the RAM disk is fast. During my usual mode of operation, the RAM disk makes the machine perform almost as fast (and in some cases, faster) than my desktop computer with its internal hard drives. Of course, all the essential files must be in the RAM disk.

To load your desktop computer's programs in the 2-inch floppy disk drive, or into the RAM disk, the MinisPort has built-in software that downloads or uploads data through the serial port. Included with the MinisPort is a cable that connects it to your desktop machine, as long as it has a serial port. The cable has dual connectors (why didn't someone think of this before?) and is designed to hook up to either a 9-pin or a 25-pin con-

necter, so you need not rely on adapters to convert your serial connector to a compatible form.

I've discovered one potential hazard that accompanies this operation, and, as usual, I learned about it the hard way. Don't use the same file names on work your developing concurrently on your portable computer and your desktop computer. If you inadvertently copy files from one machine to the other, your latest version of your work may be overwritten by the last version you might have left in the sending machine. It happened to me, chapter 9 in my desktop (22K original text) was blown away when I did just that, copying the entire disk (with the same chapter 9 file name, but only 6K of text) from my portable to my desktop. Alas, no backup. Live, become enraged, and learn. Now I end all of my portable files with the letter P, such as V202P.doc.

You can also use an external floppy disk drive to enhance the machine, and configure it as drive A: or drive B:, with the help of the setup/configuration menu. The external drive can be a 5.25-inch 360K or 3.5-inch 720K drive. I haven't needed to use an external drive yet, but certain copy protected software that's only available on 5.25-inch or 3.5-inch format could be used with the external drive.

About Batteries

Portable power for the MinisPort is provided by three batteries, one main battery and two small lithium power cells. The AC power supply can charge the main battery in a few hours. The main battery does not have to be installed in the MinisPort for charging, so if you have two batteries, you can operate the computer with the first main battery while you're charging the second battery. I've found most of these main batteries can be fully recharged in about three hours.

From my experience with Zenith's other portable computers, I've learned that battery life is a function of your disk drive accesses, backlight, and Neverready the battery god. When you buy a main battery (for a Z-171, the SupersPort, or the MinisPort), I suggest praying to the battery god. Batteries run in three types, average, very good, and very poor, and there's no way of telling until you use it a few times. I wish battery technology was better, but it's not, so I make do. For example, the first battery I used in the MinisPort would run for less than an hour (even with all the ports off and the backlight disabled) before it went under. Through experimentation, I discovered other batteries that would give me two or three hours of use before they died. Of course, the average user must decide if he wants to invest in extra battery packs at about \$80.00 a shot. In actual use, I've found that three good batteries will usually provide enough power for an average day, as long as you don't squander the energy by leaving the

communication ports (or the backlight) turned on, or by making a lot of floppy disk accesses.

If it was a Z-171, or even a SupersPort, carrying around extra batteries wouldn't be a good solution (the batteries are too large and heavy). But the MinisPort main battery is a small, lightweight package, and two extra (fully charged) batteries grace my glove compartment, or my backpack, at all times. This still isn't a solution to poor battery technology, but it's getting closer.

And Then, the Nightmares Began

But life with the MinisPort is not all wine and roses. A couple things about it are nagging at me.

The first problem is the vapor potential of the little machine. It's so small and lightweight, I keep constant vigil over it when I'm in public. I don't want to turn around and suddenly discover my computer has vaporized.

The second problem is the password scheme, which is another option in the setup/configuration menu. It's a good idea, with one potentially fatal drawback. If you insert a password, and forget it, say goodbye to your computer. There is no way to get into it if you don't have the password, which will initiate a very embarrassing trip to your local service center. They can correct the situation, but you can't. I haven't put a password in mine for that reason, but I think I will eventually. I have a recurring nightmare that someone will stop by my apartment, power up my MinisPort, put a password in it out of curiosity, then forget what they wrote. AAAAARRRRRGGGGGGGG! For that reason alone I think I'll eventually use a password, but a very simple one like Bogart. Who could forget the great one?

The third problem is only a petty annoyance, and revolves around the lithium batteries. The prototype I'm using was given to me with nearly dead lithium's. The computer would constantly lock up at power up, making it impossible to use. After consulting a knowledgeable engineering assistant, I removed the lithium batteries and tossed them in the trash. The machine worked fine from then on. It does not need the lithium batteries for normal operation, since the setup/configuration information and the RAM disk are energized (when the machine is off) by the main battery when the lithium batteries are gone or dead. However, removing a discharged main battery and installing a charged battery wipes out that information, since with no lithium batteries and no main battery the computer has no power. So, until I installed fresh lithium power cells I couldn't change main batteries without losing the setup and RAM disk data (which contained my priceless original manuscripts). I discovered that even when the main battery was too dead to power up the computer, there was still

enough energy in it to keep the setup and RAM disk data safe. I finally bought a pair of lithium batteries and installed them (a simple operation). Problem solved.

The fourth problem is the keyboard. But I consider that a rather petty annoyance that I outgrew. I like the MinisPort's keyboard better than the one on my desktop machine at work. I'll never learn to like the abominable 101-key keyboard that's currently in vogue, but that's another story.

And finally, to jump on that portable peeve bandwagon, the display can be annoying at times. I mentioned before that it watermelon-o-fies graphics. Text is immune to the compression (since it only displays half a page at a time) so it's not much of a problem. It becomes a problem when I fire up Battlehawks at the end of the pier on a Thursday night, flying a vertically compressed world war II fighter plane can be tough. I guess that's just another terrible drawback I have to live with. Friends who use the TurbosPort and SupersPort models never have to contend with that awful affect, they boast. But I never see them using their portables in as far ranging a manner that I have. In fact, I have yet to see them using a portable computer outside their house. I wonder why?

Portability Pitfalls

Portable products, whatever they are,



should be highly durable. Stress the word highly. If you need to worry about cracking the display, crashing the hard disk, snapping cabinet parts, or breaking your phalanges, it takes the fun (and true portability) out of your new toy.

I also have a Z-181, and have owned a Z-171 (groan). The Z-181 is a nice machine, but it's a porker compared to the MinisPort. And the regular floppy disk accesses I need (to insure my current work) seem to eat up the battery even faster in those earlier "luggables". And of

course, the weight. The Z-181 is awkward, and the Z-171, well, 'nuff said. I took it on a trip once and hurt myself.

And the MinisPort is durable. I'm rough on my surroundings (just look at my cars), and to put up with my daily routine my toys have to be durable. The MinisPort I've been using is one of the most durable portables I've had. My Z-181 is a finicky big sister compared to it. The Z-171 was a behemoth, and a piranha for batteries. The MinisPort represents a forward evolutionary step to smaller and better portable computers. The keyboard is about as small as you can get and still touch-type (which is my preferred mode).

I've used the MinisPort while fishing in a rowboat (and those big fish seem to know when your recording your best thoughts, then they take your bait), in a canoe in the middle of the White river, on picnics, in parks, in the middle of a cornfield at night, up a tree, in taverns (not recommended for meeting women), and in my car countless times within the couple months I've played with the little prototype.

I guess I'm a throwback, a user of archaic implements. A user of XT's. But the MinisPort has lived up to my expectations. And, with the future product enhancements I've heard rumors of (a real hard disk drive, and a solar power attachment, for instance), it could only get better. I wish it came in black.

RamTop-386

First Capitol Computer's Alternative to High Z-386/16 Memory Prices

It's **FINALLY** here, and just when you need it most! A way to increase the memory on your H/Z-386 (16MHz) computer system *without* sacrificing your savings in the process!

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Best of all, if you upgrade to the 4 megabyte configuration now, you can convert the board later on to a 16 meg model for just a little more than the cost of the new RAM chips!

RamTop-386 was crafted with the same quality

design and construction that you've come to *love* in your H/Z computer system, and expect from First Capitol Computer products.

If you'd like to be one of the first to plug the board into your computer system, we'd recommend ordering it *now* to beat the rush. Shipments may already be commencing when you read this article.

Initial shipments will be of the populated 4 meg version. Look for future announcements for other configurations in this publication.

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The logo for First Capitol Computer, featuring the company name in a stylized font with a graphic element resembling a computer chip or circuit board.

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Reader Service #105

PFS: First Choice

Alan Neibauer
11138 Hendrix Street
Philadelphia, PA 19116

In a previous article, I looked at Microsoft Works, an integrated software package that combines a word processor, spreadsheet, graphics program, data base, and communications program into one.

Because integrated packages contain all of these functions in one bundle, the user only has to learn one set of commands, one type of interface. While each of the separate modules may not be as powerful as their stand-alone competition, an inexpensive integrated package offers convenience and ease-of-use to the person who wants to get basic work done in the shortest time possible.

It's almost a shame that many users today get caught up in the real power-programs, such as WordPerfect and Lotus 1-2-3. No one can deny that these, and their competition, provide the full range of features not found in programs like Works. But for the occasional typist, or someone needing basic functions, integrated programs are an economic wonder.

This article looks at another such package, PFS: First Choice, version 2.0. Like Works, First Choice is complete with the five basic applications, including a spelling program. It provides a common graphic interface, allows transfer of data from one module to the next, and could serve as the primary piece of software for the application-oriented user. Also, like Works, it may lack some of the "advanced" features found elsewhere. But only you can weigh the cost against the benefits, deciding what you really need.

Say you're tired of checking a different keyboard template for each of your applications, or you're about to give up on linking that spreadsheet or data base file with your word processor. These are the type of problems you can avoid with an integrated package.

For example, with First Choice the menu bar and use of function keys are exactly the same for all of the applications. Once you learn that F4 is for printing, you know how to print documents, spreadsheets, data base reports, and graphics. It's now Shift-F7 in the word processor, /PP in the spreadsheet, and "I better look it up" in some other application.

With First Choice, learning the first application means knowing the basics of

them all. So you can spend more time on production than on learning how to perform basic tasks.

To understand the true nature of a program like First Choice, let's complete one application that uses the word processor, spreadsheet, graphics, and data base package.

Installing First Choice

Noting to it. If you have a hard disk, copy the files from the distribution disk onto a subdirectory of your choice. With floppy disk systems, make a back up copy of your disk.

The rest of the setup procedure, such as selecting printers, screen colors, and plotters, is done right in First Choice itself. There's no special Setup or Install program to worry about.

While you can use First Choice from floppy disks (like I'm doing right now to write this article), it is definitely more convenient to have it on a hard disk. That way, you won't have to swap disks to use the dictionary, or wait for the program to work its way between drive A and B looking for overlays.

Even so, you won't be disappointed in the program's performance if you do not have a hard disk. But before starting on our projects, let's make sure First Choice is set up for your printer.

By the way, while you can use both a mouse or the keyboard with First Choice, I'll cover just the keyboard instructions here.

Starting First Choice

Start First Choice by typing FIRST from the DOS prompt. In a moment (a rather long one if you have floppies) you'll see the main menu shown in Figure 1. This is the control panel for the program listing the major applications and the setup option.

Press 8 to start that option — you don't have to press Enter. (You could also have used the down arrow key to reach the option, then press Enter. Either method will work.)

The screen will display the setup menu with these options:

1. Select color or no color
2. Select a printer

3. Select a modem
4. Select a plotter
5. Select graph colors
6. Return to Main Menu

Press 2 to select your printer, and to display a screen as shown in Figure 2.

Look for your printer in the list on the screen. If you don't see it, press PgDn to display additional ones. When you do see your printer, type its number, then press Enter to return to the setup menu.

Now press 6 to return to the main menu. You're now ready to create a spreadsheet.

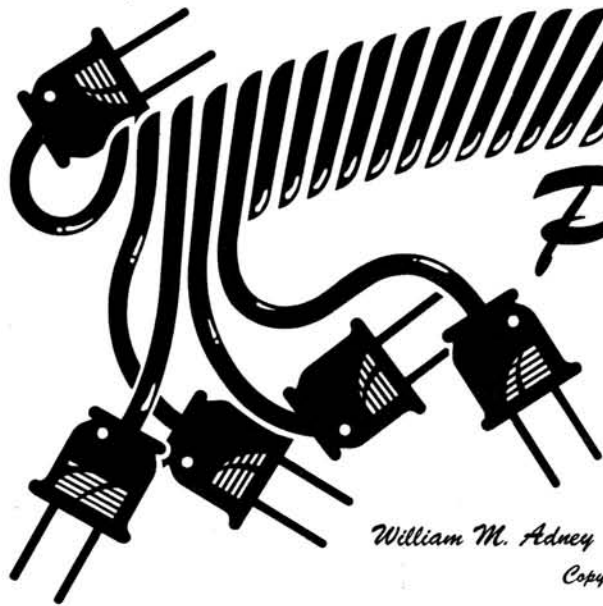
The Spreadsheet

Press 4 to create your spreadsheet. The spreadsheet applications appear as seen in Figure 3. The top row, the menu bar, lists the basic function key commands common to all First Choice applications. You can use the menu bar's pull down windows to perform commands or, in many cases, special speed keys — quick combinations of keystrokes. For instance, to enter a formula in a spreadsheet you could either press F3 for features, then select item 2 for entering formulas, or you could just press Alt-F (press and hold down the Alt key, then press F).

Below the menu bar is information about the current application — the application, how much of available memory has been used, and the row and column position of the active cell. Under that is the spreadsheet screen itself, typical except for the vertical lines separating the columns, and the fact that the title areas are not actual spreadsheet cells, but in something like Row 0, Column 0. The active cell, R1 C1, is highlighted. The numbers next to the columns show the maximum spreadsheet size possible with your system.

If you've already used a spreadsheet program, such as Lotus, then you have some adjustments to make with First Choice. To begin with, the column width will automatically adjust to fit the length of your entry. So there's no need to give any special commands if you want to enter a long column title or numerical amount. Second, formulas are entered using the pull down menus or speed keys, not by directly typing them on the screen.

Continued on Page 41



Powering Up

Using the Zenith

ROM Monitor

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The mysterious ROM. Actually, there is no need for all the mystery and myth that surrounds the ROM and its use in a computer system. You do not even need what a ROM does. This article really has two objectives. The first objective is to discuss the non-technical basics of what a ROM really is and why your computer has one. The second objective is to help you learn how to use some of the special features of the Zenith ROM. And although this article will include a brief review of some important information, you may also find it helpful to review Chapter 2 in the original *Powering Up* book as an introduction to the general subject of memory and some computer basics, such as the ROM.

Regardless of your knowledge of computers and operating systems, the Zenith ROM commands give you an easy and effective way to control your computer. Knowledge of how to use the Zenith ROM commands also allows you to perform some very basic tests on your system, such as checking out the keyboard, disk drives, memory, and color display among others. These tests can be performed independently of your operating system since they are part of the hardware inside your computer system.

From a user perspective, you may think you do not need to know anything about your computer's ROM because you are only interested in doing word processing or working with a spreadsheet. In an ideal world, that might be true. In the practical world of computers today, any knowledge you have can be extremely valuable, especially when you are trying to troubleshoot a problem in your system. This kind of knowledge can be especially valuable if you don't have a local friend who can help you troubleshoot problems, and you will be able to save considerable time and money if you understand the basics.

Learning something about your computer's hardware, like the ROM, is as important as understanding a few basics about an automobile. By checking a few basic items yourself — battery, oil, water, transmission fluid, and power steering fluid — you can perform these easy routine maintenance chores yourself and possibly save considerable money on repair bills. For example, if you

don't check the oil and radiator cooling levels regularly, say once a month, you run the risk of burning up the engine which can be very expensive. If you don't check the battery water regularly, and the water level is too low, the car won't start. And comparing a car's battery to a computer's ROM is especially appropriate because both are required to start the "engine" (or computer). Most people know what a car battery is and what it looks like. But far fewer know what a ROM looks like, so let's take a look at some ROMs and their general characteristics.

What a ROM Is

If you like buzzwords and computer jargon, a ROM (Read Only Memory) is technically known as firmware. As we discussed before (*Powering Up*, Chapter 2), FIRMWARE is a unit of hardware, such as the so-called microcomputer chip or Integrated Circuit (called an IC), which has been programmed and contains software. Programs (i.e., software) are copied to a ROM using a special technique, such as "high" voltage or ultraviolet light, which "burns" the program(s) into the memory circuits of the ROM. Because the internal circuits of the ROM are actually modified during this process, you (and your computer) cannot accidentally erase or destroy these programs. For this reason, a ROM has what is called non-volatile memory, which simply means that it does not lose the stored information when the computer is powered off. A floppy or hard disk is also a form of non-volatile memory for that reason, too. In contrast, the RAM (Random Access Memory), which is used as system memory, is volatile memory because when you power off your computer, all of the programs (including the operating system, such as DOS) and data stored in RAM are lost.

The actual physical characteristics of a ROM may vary slightly, depending on its capacity and capabilities, and Photo 1 includes ROMs for a couple of different Zenith computers.

The single ROM on the left is for a 16 MHz Z-386 computer and the two ROMs on the right are for a SupersPort 286 laptop. I chose those specific ROM "sets" because they illustrate the point that not all ROMs

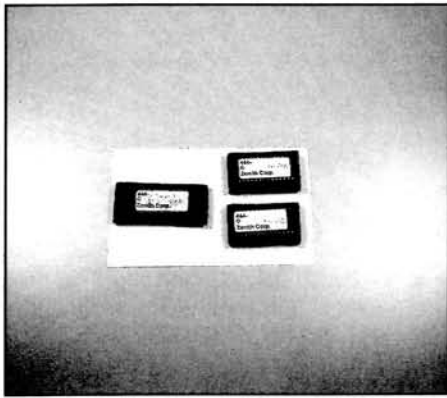


Photo 1
Various Zenith System ROMs

have the same internal characteristics, even though they may appear to be physically identical. Like RAM chips, ROMs are available in different capacities, such as 128 K, 256 K, and so on, and in general, a "larger" ROM with more memory will usually cost more than two "smaller" chips adding up to the same capacity. To keep costs down, most manufacturers will try to use a couple of smaller capacity ROMs rather than a single large, more expensive ROM, except of course where space is a consideration on a printed circuit board, such as in the Z-386. That's the reason you will find some price variation when you buy a "set" for your computer. By the way, it is customary to use the singular term "ROM", or more accurately System ROM in this discussion, regardless of how many ROMs it takes to make up a "set". That is important in the practical sense because you cannot successfully replace only one System ROM if your computer has two — you must replace both. If your system has two ROMs in a set, you will generally find them side-by-side on a printed circuit board inside your computer. On many Zenith computers, such as the Z-386, the ROM is located on the "CPU Board." On others, such as the SupersPort 286 laptop, the ROM is located on a motherboard. ROMs are usually easy to identify because they are fairly big, and you will find a Zenith Copyright date on each System ROM, as well as the part number, as shown in Photo 1. In addition, a ROM is usually easy to identify because it plugs into an appropriate socket on a printed circuit board.

You need to know one other important point about ROMs. Many, and in fact most, of today's computers have several different kinds of ROMs which are used for different purposes. You will probably find a couple of others if you look inside your computer. If you look at the video board for your system, especially for high resolution cards (i.e., EGA and VGA), you will probably find a video ROM that also has a manufacturer's copyright date. And if your system has a hard drive, you may also find a copyrighted ROM on the hard

drive controller board. Now let's take a look at the kinds of programs that the System ROM contains.

What the System ROM Contains

Now that you know there are several types of ROM functions (i.e., system, video, and hard drive), the term "ROM" in the rest of this article will refer only to the System ROM, which is the usual reference. The ROM in your computer contains several different programs, depending on the manufacturer, and each is used for a specific purpose.

Virtually all ROMs for PC compatible computers contain at least two common elements. The first element includes the various "programs" used to actually start the computer and load the operating system. The second element is called the ROM-BIOS (Basic Input/Output System), which is just a special "program" that provides unique functions that your computer needs to run. We will take a more detailed look at the BIOS later in this series, but for now, just keep in mind that it is just another program stored in the ROM. Let's take a look at the first element: the start-up programs.

When you power up a computer, nearly all PC compatible computers have a ROM program that begins a test of the basic computer hardware, such as power supply voltages, memory, and the keyboard. This program is usually called a Power On Self Test, or POST. If your computer does not successfully pass the POST, you will see an appropriate error message something like "Keyboard not connected." All of the Zenith ROM error messages — their causes and cures — will be discussed in the next article in this series.

One important point about the POST is that it is normally performed only when you first turn the computer on. You may have noticed that it takes slightly longer to boot up a system when you first power it up, as opposed to using the CTRL-ALT-DEL key sequence to reboot the system AFTER the computer has been running for some time. The time difference is due to the POST, which is NOT run when you use CTRL-ALT-DEL to reboot the system. If you have ever used an IBM system, you may have noticed that a comparable Zenith computer is ready to use in much less time. That's because the Zenith POST only checks a few banks of memory, not all of the installed memory, and the IBM POST checks out ALL available system memory each time the computer is powered on. One of the nice features of the Zenith ROM is that you can still test ALL of the system memory (if you wish) using the TEST command. There is no reason for overkill on the Zenith POST because memory will rarely fail when a computer is powered up. Memory will fail far more often after the computer has been running

for a while when heat has built up inside the cabinet. More on the TEST command later.

The POST is the first important function in the ROM. It performs various hardware checks, and it only runs when the computer is powered on, which is sometimes called a cold boot. All of the remaining programs execute each time the computer is booted, and it makes no difference whether it's just been powered on or you use CTRL-ALT-DEL to reboot (sometimes called a warm boot).

The second function is to set up, or *initialize*, the system by performing various tasks. For example, you can easily tell that the system has been initialized if you have a 101-key keyboard because the Num Lock light stays on. During this process, various other hardware which has a ROM, such as an EGA video board, will also be initialized too. Some information contained in the ROM-BIOS program is also copied to system memory during initialization.

The last, but not-at-all least, function is to run the ROM's bootstrap loader program. The BOOTSTRAP LOADER is a short, simple program that reads a sector from a disk — either a floppy or a hard drive. If the bootstrap loader can read the very first sector on a disk (called the boot sector), then it passes control to the boot loader that is physically located on the disk and will load the rest of the operating system, such as DOS.

In summary, all PC compatible ROMs contain at least two common elements. The first element includes the three start-up routines: POST, initialization, and bootstrap loader. The POST is performed during a system power up. The initialization routines set various parameters in the system, including loading some of the ROM-BIOS programs into system memory. The bootstrap loader reads the first sector on a disk, and if successful, transfers control to the boot loader program in that sector. If any of these functions are not successfully completed, an error message from the ROM will be displayed, and these will be discussed in the next article.

The second common element is called the ROM BIOS (Basic Input/Output System). The ROM BIOS is a special program designed to control the hardware in your computer. An application program, like a word processor, sends commands to DOS, which interprets them before sending them to the ROM BIOS. In turn, the ROM BIOS takes the general command (e.g., read a disk drive) and tells the hardware EXACTLY how to do it. In other words, the BIOS generally acts as a "translator" between the DOS and the actual hardware in your computer.

ROMs can also perform other functions, depending on the program elements they contain. For example, the IBM PC contains ROM-BASIC — a program-

ming language that can be run directly from the ROM. This ROM-BASIC is extremely limited and has the added disadvantage that programs cannot be saved to disk (because it is run exclusively in the ROM). For that reason, the disk-based Advanced BASIC (BASICA) is used far more often. Zenith, and most other manufacturers of PC compatibles, normally supply GW-BASIC which is virtually 100% compatible with IBM's Advanced BASIC, but is not part of the ROM.

The Zenith ROMs do provide some unique functions that are not available in other PC compatibles. With some minor exceptions, like the portable Z-171 (and eaZy PC) that have *other* ROM features, nearly all Zenith and Heath computers have the features described in the following paragraphs.

The Zenith Advantage

Most other PC compatibles do not allow the user to access the ROM, but Zenith has added a special set of commands and features to the System ROM on nearly all systems. This outstanding feature of Zenith (and Heath) computer systems provides you with some unique capabilities to control your system that are not available on other brands of computers.

We will look at these commands in several different categories. First, you will see how to access the Zenith ROM Monitor (another name for System ROM). Then, you will see how to access the Help command that describes how to use the Zenith ROM commands on your specific computer model. After that, you will see how to use the manual boot command to control the drive used to boot the system, the TEST command to check out some of your system hardware, a couple of useful debugging commands that most users may find helpful, and the SETUP command that is available in most Zenith computers that have at least an 80286 (or 80386) Micro Processor Unit (MPU). Let's begin by looking at how to access the Zenith Monitor ROM.

How to Access the ROM Monitor

Bringing up the Zenith ROM Monitor is quite easy, and you may want to power up your computer to follow along. If you want to follow along with this procedure, you should also have a formatted floppy disk (preferably a new one created with FORMAT and the /S switch) that does NOT contain any data or programs.

Power up and boot your computer normally so that you have the command prompt (e.g., A>) displayed on the CRT. Use the CTRL-ALT-INS key sequence to activate the ROM Monitor. Since it has come to my attention that not everyone understands how to use this key sequence convention described in the Zenith (and all other manufacturer's) manuals, let's be sure we are all doing the same

thing before we go on. When you see a key sequence, like CTRL-ALT-INS or CTRL-ALT-DEL or ALT-Z, you should press and hold the first one and two keys named. That is, press and hold *both* the CTRL and ALT keys (or just the ALT key in the last example). Then, type (i.e., momentary press and release) the last key named. At that point, you have entered the command and you can release all keys.

If you have followed these instructions exactly, you will see a display similar to the following:

```
MFM-300 Monitor, Version 2.6E
Memory Size: 640K
Enter "?" for help.
->-
```

This particular example appears on my 16 MHz Z-386, and your display may be slightly different, depending on exactly which Zenith computer model you have. Since the general information provided by this display is quite similar for most Zenith computers, it is important to understand what information is available here.

The first line includes the general series number of your computer (e.g., 150, 200 or 300) and the specific version number of your ROM (2.6E in this case). If you read the Zenith Owner's Manual carefully, you will also find that "MFM" is an acronym for Multi-Function Monitor.

The second line indicates the amount of conventional system memory, or RAM, that was found in the system — 640 K, in this example. For most 80286 and 80386 computers, this value is usually determined by the entry obtained from the SETUP command which will be discussed later in this article. If you also have additional memory installed on these computers, an additional line will display the amount of additional memory that is defined in the SETUP program.

The third line is just information to remind you that you can use the "?" command to display a help screen.

The last line is the Multi-Function Monitor command prompt (followed by an underline representing the cursor location), and all commands for the monitor are typed following the "->" prompt. Like any command prompt, you must enter the command, and then press the RETURN key to execute it. Now let's move on to the Help command.

The ROM Help Command

For the Zenith PC compatible computers, type a question mark (?) followed by a RETURN to see a display similar to that shown in Figure 1. The monitor's "->" command prompt will follow the help screen for additional input as shown.

Although the syntax for all Zenith ROM commands is actually displayed, Figure 1 only shows the syntax for commands that are discussed in this article. Figure 1 is only an example that was copied from my Z-386 system, and your display may be slightly different, depending on what Zenith computer model and ROM version you have. For example, the Zenith 8088-based computers do NOT have the SETUP command, and you won't see it on the Help Screen. Now that you know how to use the Help command, let's take a look at how to use the Boot command.

The Boot Command

Despite the rather formidable looking command syntax displayed on the Help Screen, using the Boot command is really easy. Figure 3 shows a different form of the general command syntax for the Zenith Boot commands.

Typing a B, followed by pressing the RETURN key, is all that's required to boot

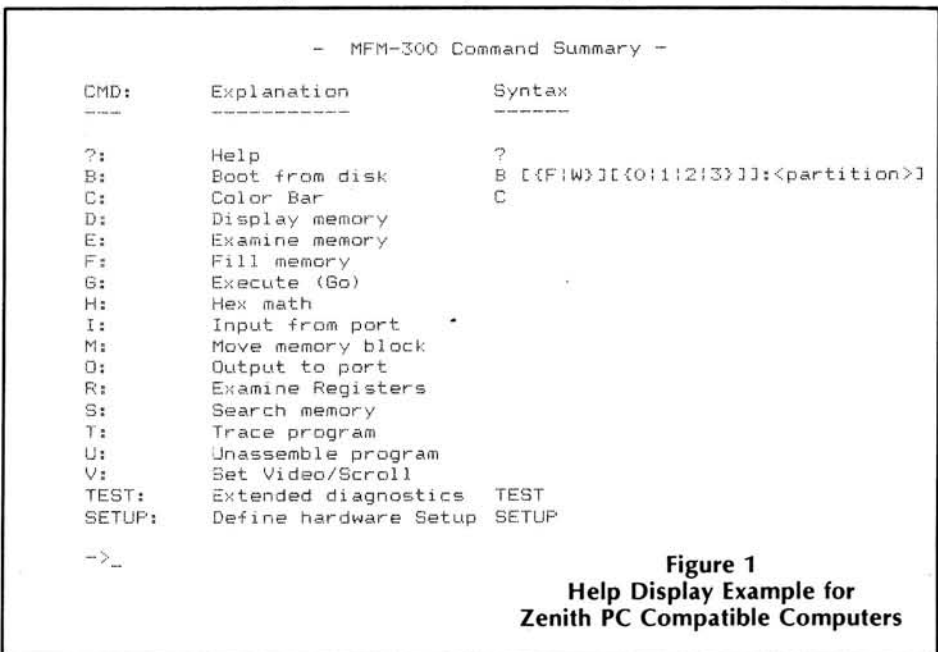


Figure 1
Help Display Example for
Zenith PC Compatible Computers

```

B (Boot default drive)
BF[drive-number] (Boot floppy drive) **
BW[drive-number][:PART-number]
  (Boot Winchester hard drive) **

```

**: The drive-number defaults to zero (0) if not entered. For hard drives, the PART-number (from the PART command) defaults to one (1). See text for explanation.

Figure 2
General Zenith Boot Command Syntax

from the default drive on the Zenith PC compatible computers. For 8088-based computers, the default drive is usually determined by special hardware switch settings inside the computer as described in the Owner's Manual. For 80286 and 80386 computers, the default drive is determined by your selection of the Boot Drive in the ROM's SETUP program.

Regardless of the setting (by switches or by the SETUP command) for the default boot drive, you can also boot the system from any valid floppy or hard disk drive in your system. The optional *drive-number* is a number that is usually set by the disk drive's programming plug or switch. Valid drive numbers for Zenith PC compatible computers are usually zero (0) and one (1), but may be in the 0-3 range if you have a reasonably current ROM. If no input, the default is to boot from drive 0.

As a standard, the first drive of a particular type (i.e., floppy or hard drive) is called the zero (0) drive, the second is the one (1) drive, and so on. This is physically "programmed", in a hardware sense, on the disk drive itself. Different disk drives use different techniques for setting this parameter. Programming plugs, jumpers, and switches are common techniques used to define the drive number. This information is usually supplied in the installation instructions for various disk drives, and your Owner's Manual may contain some information on this too.

To override the boot drive default executed using the *B* command by itself, you can add a second letter to indicate which type of drive you want to boot, either floppy or hard (i.e., Winchester) drive. That is, to boot the default floppy drive zero (0), you can type *BF* (or *BF0*, if you prefer), and to boot the default hard drive zero (0), you can type *BW* (or *BW0*). If you don't type the optional *drive number* for the boot drive, the zero drive is assumed as a default.

Many current ROM versions may allow you to also boot from any valid bootable primary partition on a hard drive. If you use this option, the *PART-number* is obtained by using the number of the partition (1 through 4) as displayed by the Zenith PART command. For Zenith MS-DOS versions 3.3 Plus and later, you can only boot from a PRIMARY partition, not an extended partition. All partitions

defined in earlier DOS versions were, by definition, primary partitions. In order to boot from any valid primary partition, remember that you must use the FORMAT command with the /S switch to ensure that the system files are available on that partition to make it bootable.

Even if the latest ROMs and DOS versions may support more than two floppy drives and two hard drives, keep in mind that you will find some older disk controllers which only support two of each drive type. For example, the dual floppy/hard disk controller in my Z-386/16 only supports two of each drive type.

Using the Zenith boot commands is quite simple, and they provide a degree of flexibility that is unique to Zenith computers. Because many of Zenith's PC compatible computers only support two drives of each type, Figure 3 summarizes all of the boot commands for these systems.

Command	Description
BF0	Boot floppy disk 0 in drive A
BF1	Boot floppy disk 1 in drive B
BW0	Boot winchester hard disk 0
BW1	Boot winchester hard disk 1

Figure 3
Zenith Boot Commands

All ROM commands can be typed in either uppercase or lowercase letters, and you must use the CTRL-ALT-INS key sequence to access the ROM Monitor before entering these commands. If CTRL-ALT-INS does not seem to work on your computer (it does not on the Z-171 or eaZy PC, for example), then your computer probably does not have this ROM feature.

The capability to control which drive is booted is quite useful when you want to run the Zenith Disk Diagnostics or suspect a hard drive failure and need to see if the system can be booted at all. Although many of the ROM commands are used by experts for debugging purposes, there is one command that you might find helpful, especially if you have a color monitor.

The Color (C) Command

Most of the Zenith computers support a color monitor, and the C (Color) command can be used to help you set the CRT's contrast and brightness controls for the best display. To use the Color command, just activate the ROM Monitor using the CTRL-ALT-INS key sequence, type the C command, and press RETURN. This displays 16 vertical color bars on the CRT so you can adjust the controls to suit your preferences.

The TEST Command

One of the most useful commands available on Zenith computers is the TEST command. Just type *TEST* at the Monitor

prompt and press RETURN. For an 80286 or 80386 computer, a menu is displayed as shown in Figure 4.

```

CHOOSE ONE OF THE FOLLOWING:
1. DISK READ TEST
2. KEYBOARD TEST
2. BASE MEMORY TEST
4. EXPANSION MEMORY TEST
5. POWER-UP TEST
6. EXIT
ENTER YOUR CHOICE:

```

Figure 4
Zenith TEST Command Menu

The appropriate test is activated by entering the *number* of that choice. The TEST command can be especially helpful in helping to isolate problems that cause a ROM error message, and Zenith ROM error messages will be discussed in more detail in the next article.

The Disk Read Test verifies that the boot drive — usually set by an internal switch or defined in the SETUP command — is working satisfactorily. Regardless of which drive is used, it must be a bootable system disk (created by the FORMAT/S command). A counter is displayed and incremented each time the boot code is successfully read from the disk. After the counter has reached 10 (successful disk reads) or so, you can interrupt the test with the ESCape key; otherwise, the testing will continue indefinitely. If the system cannot read the boot code, a DEVICE ERROR message is displayed.

The Keyboard Test displays the codes and printable characters transmitted from the keyboard to the computer. Pressing any printable character key will result in the complete screen display of that character. The character code will also be displayed in the upper right-hand corner of the CRT. If the character is not printable, such as a function key, only the hex character code will be displayed in the upper right corner of the screen.

The Base Memory Test allows you to test the RAM (up to 640 K) and the video memory in your computer. You will see a counter indicating the number of times that the test was run, and, like the Disk Read Test, this test will continue indefinitely unless interrupted by pressing the ESC key. During testing, the bank of memory being tested will be displayed in the upper right corner. While video memory testing is being performed, various test patterns will appear on the screen. This test should be run if you suspect that you have a problem with the system or video memory in your computer. Appropriate error messages can help identify a memory location where a problem is found during testing.

If you have added more memory to your computer, the Expansion Memory Test can be used to test each bank of that memory. Expansion memory is only avail-

able on 80286-based and later computers, and the amount of expansion memory is defined by the SETUP command. Each bank of expansion memory is tested in the same way as the Base Memory Test. If you try to run this test without any expansion memory installed, you will see the "NO EXPANSION MEMORY INSTALLED" error message displayed.

The Power-Up Test continuously cycles the power-up test sequence (i.e., POST) as indicated by the counter on the screen. Like the Disk Read Test, there is no need to let the counter go beyond 10 or so. This test is not perhaps as useful as some of the others, but it does provide an indication of possible hardware problems.

The last selection — Exit — exits the test mode and returns to the Monitor command prompt. In all cases, testing can be interrupted by pressing the ESC key or by using the CTRL-ALT-INS sequence to return to the ROM Monitor prompt.

The SETUP Command

The Zenith SETUP command is unique because it is contained in the ROM, not as a separate program on a disk supplied with the computer. One advantage of using this technique is that updates to the SETUP command can also be accompanied by appropriate updates to the ROM-BIOS or vice-versa, as new hardware is developed or enhancements are made to existing hardware.

To use the SETUP command, you activate the ROM Monitor with CTRL-ALT-INS, type the SETUP command, and press RETURN. The actual display and options depend on which computer model you have, as well as the ROM version. For example, the display on my SupersPort 286 is considerably different from that on my Z-386/16 and my Z-248, but the options are quite similar. To give you an idea of what the SETUP display looks like, the example in Figure 4 is the display I see on my Z-386/16 with ROM version 2.6E.

The arrow keys are used to move the highlight from one field to another on the screen. In most cases, except for Time and Date which are entered directly by typing the appropriate numbers, values for other settings are toggled with the Space Bar and Backspace keys.

Beginning at the upper left corner of the display and working down the left column, Time is entered in a 24-hour format, and the Date is entered in the standard mm/dd/yyyy format.

The Base Memory Size is the amount of conventional system memory (i.e., RAM) that your system contains, usually either 512 K or 640 K, depending on the system. The Expansion Memory Size is somewhat of a misnomer, and the term itself is a little confusing. Expansion memory is defined as "available" (i.e., not reserved) memory above 640 K. For systems that include at least 1 MB of memory,

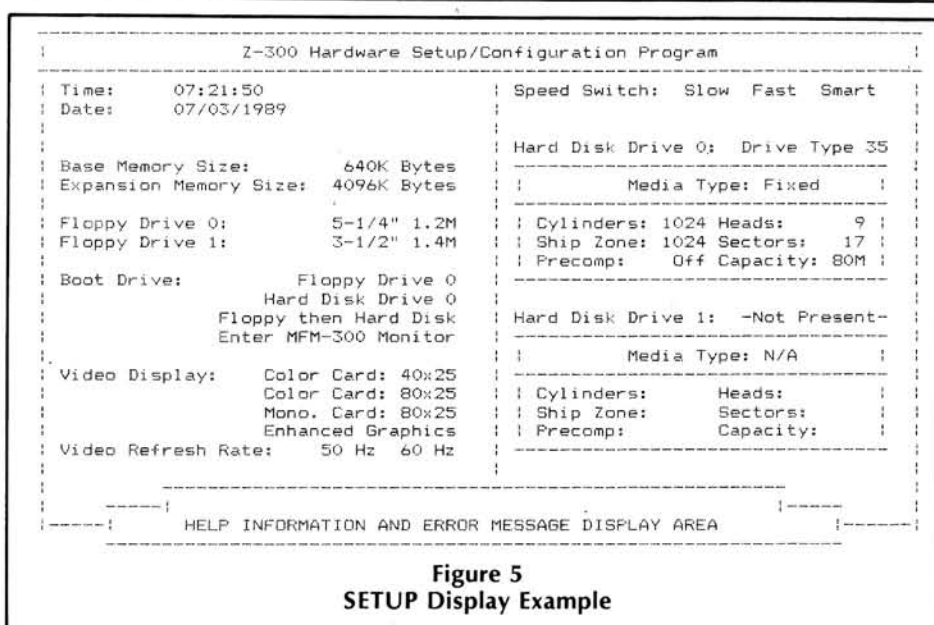


Figure 5
SETUP Display Example

such as the Z-386 or SupersPort 286, Expansion Memory Size is the amount of memory above 1 MB.

Floppy drive settings are set to the appropriate hardware in your system. Drive 0 is the A drive, and Drive 1 is the B drive. The Boot Drive has four different settings from which to choose. This entry takes the place of the hardware switch inside older computers. In most cases, you will want to set the system to "autoboot" from drive 0 — floppy or hard disk — for ease of use. If you want your system to work like IBM computers, you can select the "Floppy then Hard Disk" option that will attempt to boot a disk in drive A, and if none is found, it will attempt to boot hard drive 0. If you prefer to manually enter a boot command — useful when you have multiple operating systems on a hard drive — you can set the system to always display the Monitor prompt.

The Video Display entry identifies what kind of video card you have installed in your system. If you have a CGA video card and monitor, you will probably want to select the "Color Card: 80X25" option. If you have an EGA or VGA monitor, you should select the "Enhanced Graphics" option. The Video Refresh Rate is normally 60 Hz within the United States, and 50 Hz in some other countries.

At the top of the right column, the Speed Switch can be set to three values: Slow, Fast or Smart. In most cases, the best choice is "Fast" which will give top performance. The "Smart" speed is used when a program does not run correctly because it requires a slower input/output speed, although other functions still run at the fast speed. The "Slow" speed actually slows down the whole system by introducing wait states, and it is typically used when a program will not operate at faster speeds, such as some game programs.

Setting the Hard Disk Drive values re-

quires that you know the various parameters displayed for your specific hard drive, unless you happen to know the Zenith Drive Type. Since each microcomputer manufacturer has different recommendations for hard drives to be used in their systems, the value of the Drive Type (e.g., 35 in Figure 4), is NOT always the same. For example, I have a Seagate ST-4096 80 MB hard drive, and it is Drive Type 35 on the Z-386/16. As I recall, it is Drive Type 36 (or 37?) on an IBM computer, and it has a still different value on a Compaq. By the way, don't trust any software that will supposedly tell you what drive you have. It usually is the IBM Drive Type that may be different in a Zenith computer.

If you don't know the Zenith Drive Type, the easy way to set up a hard drive on a Zenith system is find out what the values are for the drive's characteristics displayed by the SETUP command. Then, use the Space Bar to toggle through the values (i.e., Drive Types) until you find an exact match. This may take as long as a minute or so to toggle through over 40 values, but the trick is to keep an eye on the Capacity and stop when you find one that looks close. Check the Cylinders and Heads for an EXACT match, and if they don't, keep going. If you don't find an exact match, then you MUST know these values anyway to set up the hard drive using the PREP/Q command, which will ask for them.

One quick hint on using the SETUP command. After you finish the SETUP and have tested everything to be sure it works, be sure to return to the ROM Monitor with CTRL-ALT-INS, enter the SETUP command, and print the screen for future reference using the SHIFT-PrtSc key sequence or just the "Print Screen" key on some 101-key keyboards. This works because the print screen feature is part of the hardware and has nothing to do with

DOS. Store the printout in your Owner's Manual or a file folder so you will easily be able to set up the system again when the battery runs out of juice or if you remove one of the boards from your computer. Depending on how much you use the computer, the battery should last from about one to three years, and it is easy to forget what options you selected during that time. Most of us don't use the SETUP command too often, and it is easy to forget exactly how things were originally set up.

ROM Rumors

There always seems to be a lot of myths, rumors, and general bad information about ROM upgrades, in general, and Zenith ROMs, in particular. One user told me that Zenith made a lot of money selling ROM upgrades, which is totally ridiculous if you know anything about the cost of these parts, programming, and handling of these small units. Based on parts cost and handling, I doubt that ROM upgrades are priced very much above cost.

One other interesting bit of information I keep hearing is that it is absolutely required to have the latest ROM version in a Zenith computer, whatever model you have. That goes from the ridiculous to the completely absurd. I suspect that this kind of bad information was partly a result of how Zenith started in the computer market, which was really a hobbyist market that came from Heath kit computers. ROMs became extremely important when Zenith began selling PC compatible computers (i.e., the Z-150 series) because compatibility with existing software and hardware became an important issue. During the first year or so that Zenith sold PC compatible computers, there were quite a few ROM updates to fix bugs of one kind or another. In the last couple of years, I haven't seen many bug fixes because that engineering is quite solid. What I have seen is a lot of new hardware, and some software, that does require a ROM upgrade. One example of new hardware is the 3.5-inch floppy drives that were not even available just a few years ago, but this was more of a DOS change.

Because some people already know how important the ROM is to the computer, I keep receiving letters from people who are absolutely certain their Zenith ROM version has a bug that is causing a problem. While this is certainly true in some cases, be careful before you make this assumption — you may be shooting at the wrong target. For example, I seem to recall that Word Perfect version 5 has had some problems with nearly all ROMs, except IBM. Version 4 worked just fine on all systems, including Zenith. The problem is that Word Perfect attempted to bypass some of the usually accepted ways of programming software and communicate directly with the hardware. The usual

reasons for doing this are to increase speed or to use special hardware features not available through normal DOS service functions. And if a program tries to work with a hardware device with which it isn't familiar, the results can be unpredictable. Such are the hazards of non-standard programming practices. And if you have a problem with Word Perfect version 5, I suggest you contact them, not Zenith.

Another example of new hardware is the 101-key keyboard that was introduced by IBM for the "new" AT computer in about April 1987. What IBM did not say much about was the fact that this new keyboard also required a new ROM, and even existing IBM computers had to have a new ROM to use this new keyboard. And if you spent the money to buy a new IBM 101-key keyboard and a ROM to support it, you may have been disappointed to find out that one general category of software — known as "keyboard enhancers," like Borland's SuperKey — would NOT work with the new ROM and keyboard. Then you had to shell out some more bucks to get a software upgrade for that kind of program. One Zenith computer user told me that he would not buy another Zenith computer because of this keyboard problem, even though the whole thing was a direct result of a hardware change by another manufacturer. Zenith made a similar change for compatibility and was unfairly blamed for the problem.

Sometimes new software requires a new ROM. I had to get a new ROM for my Z-248 in order to run the OS/2 operating system. Again, that was not a Zenith problem — it was just new operating system software with some new ROM requirements.

These stories are meant to describe some situations where you may find that a ROM upgrade is necessary, but they are the exception rather than the rule. In many cases, where a ROM upgrade is required for some reason, you will find that it was not Zenith that developed the "requirement," especially for new hardware like the 101-key keyboard. Many other computer manufacturers cleverly sidestep the problem by making ROMs unavailable to most users — it's a "factory" change. To their credit, Zenith has chosen to make ROM upgrades generally available at a very modest cost.

Should I Upgrade the ROM?

I suggest there is no real reason to spend the money to upgrade your system unless there is a particular problem that a ROM update is known to cure, such as some of the ones mentioned above. Sometimes software manufacturers develop new software, like OS/2, that requires an updated ROM. Occasionally, programmers use "non-standard" programming techniques that, for one reason or another,

require a ROM fix. Software used to control computer networks seems especially prone to this kind of problem. And sometimes new hardware requires a ROM change, like the 101-key keyboard. ROM enhancements due to new hardware are sometimes subtle, such as the addition of the 1.4 MB 3.5-inch floppy drive to the SETUP program in the current ROM versions. Or changes/additions to the hard drive table in the ROM to accommodate the new, high-capacity hard drives and disk controllers.

I do not recommend indiscriminately updating a ROM unless you know it will fix a problem. Consider the possibility that a ROM upgrade may also have a problem with your existing software, such as the keyboard enhancement programs mentioned above, even though it may provide a new capability like the 101-key keyboard. Problems that may appear to be ROM-related are more often due to some kind of user error — software installed incorrectly, program incompatibility with memory-resident programs or some kind of hardware installation problem. One computer user told me that he had a "ROM problem" because his 8088-based computer would not recognize an extended memory board and an error message appeared when he tried to use that extra memory. The problem was that an 8088 computer cannot use extended memory (see *Powering Up*, Chapter 10). He had actually installed an expanded memory board and failed to install the appropriate device driver in the CONFIG.SYS file.

If you believe that you are having a computer problem that is related to the ROM, you should first check with the dealer from whom you purchased it. That applies to all authorized Zenith dealers and representatives, including Heath/Zenith Electronics and Computer Centers. If you purchased the computer from a department or discount store, and they cannot help you, you should call Zenith at (800) 842-9000 to obtain the name and location of a dealer or service center that can help you. This 800 number can only provide dealer information, and it is NOT a technical support line, so do not expect any help with a specific computer problem.

Again, the bottom line is that I do not recommend spending money for a ROM upgrade unless it is known to solve a specific problem that you are having. My philosophy is: "If it ain't broke, don't fix it."

If you need a ROM upgrade for your computer, you can order it directly from Heath Company Parts Department by calling the 24-hour, toll-free number listed at the end of this article. A charge card, such as Master Card or Visa, will help speed up the order. If you don't know the specific part number(s) of the ROM in your computer, be sure to check the label

on the back of your computer and make a note of the Model Number, so you will have it available when you call. Heath has ROMs for all current and many older Zenith and Heath computers, but you must be sure to have at least the Model Number so they can help you. Heath always ships the most currently available ROM version for each computer.

I have included some price information from a Heath catalog for a couple of ROM upgrades to some Zenith and Heath computer models to give you an idea of the cost.

Powering Down

In this article, we have taken a look at the most common ROM commands for the Zenith and Heath PC compatible computers. You have learned how to access the ROM Monitor program; how to use the Help command, the Boot com-

mands, the Color (C) command, the TEST command, and the SETUP program. These features provide capabilities that are available at your command. Take a few minutes to experiment with some of the commands so that you will be familiar with the results when your computer is working correctly. That can save you a significant amount of time in the event you are trying to troubleshoot a problem and just can't quite seem to find it. Perhaps knowing something about these Monitor ROM commands will help you. Be sure to also check the manuals included with your computer for additional information about the ROM Monitor and its commands.

Next Time

The next article is really an extension of information about the Zenith ROM and it is titled "Understanding Zenith ROM Er-

ror Messages." This article includes information to help you identify the ROM error messages and specific steps you need to follow to fix a reported problem.

If you have any questions about anything in this column, be sure to include a self-addressed, stamped envelope (business size preferred) if you would like a personal reply to your question, suggestion or comment.

Products Discussed

ROM Upgrade for Z-200 (ZCA-10) \$24.80
 ROM Upgrade for Z-159 (ZCA-11) . 12.80
 Heath/Zenith Computer Centers
 Heath Company Parts Department
 Hilltop Road
 St. Joseph, MI 49085
 (800) 253-0570 (Orders only)



Continued from Page 6

Switch Speeds With Memory Resident Programs

Dear HUG:

They say that necessity is the mother of invention. I had a necessity, and the following program is the invention. The Z-248 has the ability to slow its operation to accommodate programs which do not function correctly at high speed. The Technical and Owner's manuals give the

MFM-200 commands to switch speeds, but sometimes it is advantageous to switch speeds while a program is running without jumping to the Monitor. This program, which remains resident in memory, creates a "hot-key" that will toggle between fast and slow speeds when pressed. I have chosen Alt =, as this combination is infrequently used by other programs. If you need to change this, replace the keyboard code with one of your choice. The MFM-200 Keyboard Test can give you the key code for your choice.

The program consumes only about 400 bytes in memory, and can be assembled and linked with the Microsoft Macro Assembler and Linker. I have tested it with versions 2, 3, and 4. I developed and tested this program on 0 and 1 wait states Z-248's. It should also work on the Z-286, and any other Heath/Zenith machine that uses the same CPU board as the Z-248. Enjoy!

Manfred W. Prange
 1571 Crooks Road
 Rochester Hills, MI 48309-2939

```

page 66,132
title Speed248
keyvect segment at 0
  org 16h*4
  keyint label dword
  keyvect ends

code segment para
  assume cs:code
  org 100h

  ;make a .COM file

display macro
  mov dx,offset string
  mov ah,09h
  int 21h
endm

string
dx,offset string
ah,09h
int 21h

keep_process
macro return_code,last_byte
  mov al,return_code
  mov dx,offset last_byte
  cl,4
  shr dx,cl
  inc dx
  mov ah,31h
  int 21h
endm

key proc far
start:
  jmp 8300h ;scan code for Alt =, change if desired
  swapdot dw 0b2h ;default to fast mode
  speed db 0eah
  key_call: db 0,0
  dw 0,0
  key_rtn: assume ds:code
  sti
  cmp ah,0
  jne key_call
  push ds
  push bx
  push cx
  push dx
  push es
  push di
  push ax
  mov bx,cs
  mov ds,bx
  pushf
  mov bx,offset key_call+1
  call dword ptr [bx]
  pop cx
  ax,swapdot
  cmp ax,swapdot ;Alt = pressed?
  jne get_out
  push ax
  mov al,speed
  mov al,0b2h
  cmp al,0b2h
  jne
  
```

Continued on Page 35

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ZENITH COMPUTER SAMPLE

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Z24812S1 - \$1595 (starter system)

Zenith Z159 8Mhz, 640K RAM, 101 keyboard, EGA video, dual floppies.

Z159-S1 - \$1295 (\$1549 for single floppy 21mb hard disk unit)

Zenith MinisPort notebook computer with 1MB RAM - \$1395

Call or write for a quote on any Zenith computer system.

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Quikdata also carries spike protection filters, backup power supplies, modems, printers, disk drives, drive enclosures, cables and connectors, laptop batteries, monitors, memory cards, memory chips and ICs, joysticks, accessory cards, serial and bus mouse, the complete Zenith line of computers, parts and accessories, a wide variety of useful and most popular software and much more!

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Z-100

Paul F. Herman
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New Port Richey, FL 34655

SURVIVAL KIT

Q&A

For the last few issues, I haven't had room for a question and answer section in the "Survival Kit" column, and I keep promising that the next issue will. Hopefully, this installment will help get us caught up. The whole column this month is devoted to answering some of the more interesting questions that I have received.

Question:

I miss the 'plus' key on my numeric keypad. Is there any way to make the Z-100's ENTER key into a plus (+) key?

Answer:

Yes, the Z-100 ENTER key can be mapped so that it is a plus (+) key. This is one of the nicest things about the Z-100; its versatility. There is a program named FONT.EXE that comes with version 2.x or 3.x of MS-DOS for the Z-100. You can use this program to remap the keyboard codes, as well as for changing the font designs.

To make the ENTER key perform as if it were a plus (+) key, follow this procedure . . .

- A. Invoke the FONT program, by typing 'FONT' at the DOS prompt.
- B. Select the Key Map Editor from the main FONT menu.
- C. Switch to page two of the key map by hitting the F1 function key.
- D. Select to change the code generated by the ENTER key by hitting F2, then typing 8D, followed by a RETURN.
- E. Map the key to the plus (+) key by entering 2B as the new code, followed by a RETURN (2B is the ASCII code for '+').
- F. Exit the Key Map Editor by hitting the F3 key.

G. Select to write the new font file to disk.

You might use a name like PLUS.FNT.

H. Exit the FONT.EXE program.

Now you have a font called PLUS.FNT that considers the ENTER key to be the same as the plus (+) key. In order to load this font, simply type;

```
FONT PLUS.FNT
```

You might want to include this command in your AUTOEXEC.BAT file if you want the modified key mapping to be in effect all the time.

One important consideration . . . some programs can't be used without the ENTER key. For instance, WatchWord uses the ENTER key to switch back and forth from insert to command mode. When you create your special key mapped font, you may want to assign the ENTER key function to another less-used key combination. A good choice might be to use the Shifted ENTER key (code CD) as the ENTER key (in other words, map CD to 8D in the Key Map).

Question:

I would like to speed up my Z-100 to 8 MHz, but I've heard that some Z-100s won't run at the faster speed. Which one of the speed upgrades should I use?

Answer:

Speeding up the Z-100 to 8 MHz can sometimes cause problems. The safest (and most expensive way) to do it is to use the Heath/Zenith HA-108 kit (see detailed description in July 1985 REMark Magazine). The HA-108 kit includes all the parts necessary to properly speed up the Z-100, and convert the motherboard to 256K memory chips. Alternatively, (and less costly) several vendors offer speed-up kits which simply include the parts to

speed up the system clock. The difference between these bargain priced kits, and Heath's HA-108 speed-up is that Heath's kit comes with faster versions of most speed critical ICs.

I have installed a speed-up kit from C.D.R. Systems Inc. in my Z-100, and have had no problems at all. But I may have been lucky. Many users report that they have to switch the main 8088 processor, I/O chips, and various other components in order to get their Z-100's operating at the faster speed. The manual that accompanied the C.D.R. speed-up kit was very thorough, and includes a complete troubleshooting section which lists probable slow chips, in the order they are most likely to fail.

Question:

I would like to upgrade my Z-100's operating system to version 3.1 of MS-DOS, but how will I convert all of my present floppy disks (formatted with Z-DOS) to the new system?

Answer:

Any new version of MS-DOS should be able to read file formats of previous versions. For example, MS-DOS 2.x or 3.x can read the old Z-DOS 1.1 format without any problems. After upgrading to the new version, you should format new floppies, and copy old data and programs to the new format disks.

Question:

Is there any way to use Zenith's FTM (flat tension mask) monitor with my Z-100.

Answer:

Sorry, but the news is bad. I don't know of any way to use the FTM monitor with a Z-100. The problem is that the

ZCM-1490 is a fixed frequency monitor, which uses a 31kHz video frequency. The output from the Z-100 is 15.75kHz. This means that the Zenith FTM monitor will not be able to sync on the Z-100's video frequency.

It would be nice if Zenith would make the Flat Tension Mask technology available in an autosynchronizing type of monitor (similar to NEC's MultiSync monitor). This way it could be used on virtually any computer, with any graphics card. But until that time comes, I don't know of any way to use it on a Z-100 computer.

Question:

I've heard that PC clones can be speeded up (especially screen I/O) by using a faster version of the ROM, which is copied into RAM memory. Can this be done on the Z-100?

Answer:

Writing a modified version of the Monitor ROM into an area of RAM may be possible on the Z-100, but there isn't much reason for doing it. I have examined the MTR-100 monitor ROM source code in some detail, and quite frankly, I don't think it can be speeded up by any significant degree. The original programmer was pretty sharp.

The majority of code in the IBM-PC ROM is actually the BIOS routines. It is the BIOS interrupt routines which are helped most by modifying the code for faster operation. The BIOS of the Z-100 is not held in ROM, but is provided on disk, as a software program. The Programmer's Utility Pack contains the complete source code for the Z-100 BIOS, and may be modified, and re-assembled to your heart's content. It is quite possible that the Z-100 BIOS could stand some fine tuning to increase speed, but beware; this type of thing should only be attempted by experienced systems programmers.

Question:

I have tried several programs that use interlace mode on the Z-100, but the screen seems to wrap around from the bottom to the top. In other words, some of the lines that are supposed to be on the bottom of the screen, appear at the top, and some of the text lines are split. I have 64K RAM chips installed on the video board. What's the problem here?

Answer:

It sounds like you have not configured the video board to use 64K RAM chips. Sure, you may have 64K chips installed, but you must also set jumper J307 on the video board to indicate that 64K chips are being used. There are three possible settings for jumper J307; Low 32K, High 32K, or 64K. These choices deserve some explanation.

The video logic board in the Z-100 was designed to use 64K chips. However, to decrease costs, Heath/Zenith allowed

'bad' 64K chips to be used as 32K chips. Generally, the faulty 64K chips would only have a few bad cells in them. So if you could find a set of 24 chips that had all good cells on the bottom, or all good cells on the top, it was okay to use them as 32K memory. Most of the "All-in-One" Z-100's came with one bank of good 64K RAM chips installed for monochrome operation. But most of the earlier low-profile models came with 'faulty' 64K chips jumpered to be used as 32K chips. Depending on whether the chips were good on the top or bottom, jumper J307 was set for either low 32K or high 32K.

Whenever you switch to good 64K chips in the video, you must also reflect this change by changing jumper J307. You may want to refer to the Z-100 Technical Manual for more information about the jumper settings. You may also want to note that you can put jumper J307 in the 64K position, even if you only have the 'faulty' 64K chips provided by the factory. This will allow you to use programs that operate in interlace mode, or use two pages of video memory. However, doing this with 'faulty' 64K chips will result in a few unwanted dots of color on the screen.

Question:

I have a Z-100 low profile model (ZW-110) which has three planes of 32K video memory chips. Everyone says I should replace the 32K video memory chips with the larger 64K chips. It won't cost much for the parts, but I don't like to take the computer apart, except for a good reason. What will I gain by putting in the 64K chips?

Answer:

Using 64K video memory chips provides more than twice as much memory as is required for the standard Z-100 display. But you must use a program which knows how to take advantage of the extra memory in order to get any benefit from the 64K chips. Most programs don't require this overabundance of memory, so you won't be able to tell any difference in their operation.

I can think of three reasons why a program would require that 64K chips be installed. First of all, they allow the Z-100 to display a higher resolution image. The standard Z-100 video provides a resolution of 640 x 225 pixels. Higher resolution modes, such as those available using interlace or ProScan, may have resolutions up to 640 x 512 pixels. In order to display these higher resolutions, more than 32K of memory is required to store the bit-mapped image.

Another advantage for having 64K memory chips is so the program can have two 'pages' of video memory. This allows the program to compose a page of text or graphics out of sight of the viewer. Then when the page is done, it can be dis-

played almost instantaneously simply by changing the CRT controller's start address register. This page switching scheme makes slide-show type presentations more attractive.

Another reason a program might want the large video memory chips is for extended scrolling capabilities when displaying text. With 64K RAM chips, the number of lines that can be scrolled forward or backward increases dramatically. This may be useful for text processing applications.

Keep in mind that all of these interesting uses for 64K video RAM chips depend on the proper software for support. Most of the programs you use (including all DOS utilities) probably don't care if you have 32K or 64K chips installed.

Question:

I have a printer, mouse, and modem, that all connect to the serial port of my Z-100. Most of my software that supports these devices will allow me to use them on either serial port A (J1) or serial port B (J2). Other than the obvious difference in gender, what is the difference between these two ports?

Answer:

Actually, there is quite a lot of difference between the two serial I/O ports on the Z-100, considering the fact that they both use identical 2661 interface chips. Most of the differences can be traced to simply pinout differences, but some of the RS-232 lines also have a different logic design.

One of the ports is supposed to be a DTE port (that stands for Data Terminal Equipment), and the other port is to be used as a DCE port (Data Communication Equipment). The DCE port (J1) is intended as a printer port, and the DTE port (J2) is for a modem. That's the way it's advertised to work, but it's not the way it always comes out in real life. For instance, it seems like most serial printers would rather compete for J2 with your modem.

Actually, for most RS-232 devices, the differences between the two ports can be corrected by something called a modem adaptor with full handshake. Or you can build your own adaptor cable with this wiring:

1	<----->	1
2	<----->	3
3	<----->	2
4	<----->	5
5	<----->	4
6	<----->	8, 20
7	<----->	7
8, 20	<----->	6

Notice that it doesn't matter which end is the right end, since the cable is symmetrical. (It looks the same from either end.) In order to use it as an adaptor, though, you'll want a female DB-25 on one end and a male on the other.

Question:

I would like to use my Z-100 and a graphics editor program to compose title frames for my home video movies (to be played back on a VCR). I haven't been able to get very good results trying to take a picture of the screen directly with my video camera. Do you have any good ideas?

Answer:

The obvious answer is simply to connect your VCR to the composite video output of the Z-100. The composite video output of the Z-100 is the same RS-170 video signal that your camera generates. (Conversely, the color video monitor you use with the Z-100, makes an excellent video monitor for your camera/VCR set-up.)

To do this, simply design the screen that you want with your favorite graphics editor. Then connect the composite video output of the computer to the input of your VCR. Record for a few seconds (however long you want the screen to be displayed) and then stop the recorder. That's it.

The disadvantage to this method is that the composite video output of the Z-100 is only a monochrome signal. So your title frames won't be able to take advantage of all the Z-100's colors. If you absolutely have to have color, there are devices available which will convert a digital RGB signal to color composite video, but they are fairly expensive (in the \$200 to \$300 range).

Question:

I just purchased a used Z-100, and being a late arrival, have lots of catching up to do. I want to learn all I can about the Z-100. Can you give me a fairly complete list of sources of information about the Z-100 computer?

Answer:

Okay, I'll try. I appreciate a person who has the initiative to try and become an expert through home study. Here is a list of reference materials which contain Z-100 information:

1. *Z-100 User's Manual*. You should have received this loose-leaf manual when you purchased your Z-100. It contains general user information about the operating system, BASIC programming, and most of the information necessary for a novice to program the computer. No price is available, since I don't believe this manual is sold separately. Published by Zenith Data Systems.
2. *Z-100 Technical Manual*. This is a three volume set which includes detailed descriptions of the Z-100 hardware (with schematics), manufacturer's spec sheets on all programmable IC devices, and a listing of the MTR-100 monitor ROM program. Every serious Z-100 programmer must have this manual. \$50.00 (but may not be available any longer). Published by Zenith

Data Systems. Available (maybe) through the Heath Catalog Order Center Phone (800) 253-0570

3. *Programmer's Utility Pack*. A loose leaf manual and disk set. Contains descriptions of all MS-DOS function calls, and the Z-100 BIOS functions. Describes EXE and COM program development, and how to write DOS device drivers. Many useful programmer's utility programs are included on disk, as well as complete source code for the Z-100's BIOS. A must for every Z-100 programmer's shelf. \$150.00. Published by Zenith Data Systems. Available (maybe) through the Heath Catalog Order Center Phone (800) 253-0570
4. *How To Use Zenith/Heath Computers* by Hal Glatzer. Softbound book (144 pages) giving entry level information for users of Heath/Zenith H-8, H-89, and Z-100 computers. \$19.95. Copyright 1982 by:
S-A Design Publishing Company
515 W. Lambert, Building E
Brea, CA 92621-3991
5. *Z-100 Software Directory*. A humorous, but outdated listing of software that works with the Z-100. I'm sure this loose leaf book is out of print by now. You'll need to find a used copy. Original cost \$30.00.
6. *Z-100 Service Literature*. This stuff is not generally available to the public — only to Zenith Data Systems Service Centers. Most of the programming information included with this stuff is available in the Z-100 Technical Manual. But the service literature contains in-depth "theory of operation" descriptions, as well as parts lists, troubleshooting information, and field service bulletins. Since the Z-100 is obsolete merchandise now, you might try checking with a local ZDS dealer to see if they will give you their Z-100 service literature, instead of throwing it in the trash. There are several thousand pages of it, so making photocopies wouldn't be practical.
In addition to the reference works listed above, there are a few periodical type publications which might be of interest to Z-100 owners:
 1. *REMark Magazine*. Includes this column (Hip, Hip, Hurray!) and other occasional articles specific to the Z-100. If you're serious, try to get all the back issues since July 1982. (That's the first issue that mentions the Z-100). \$22.95 initial/\$19.95 renewal per year, includes:
 - membership in the Heath Users' Group.
 - Published 12 times per year by:
Heath Users' Group
P.O. Box 217
Benton Harbor, MI 49022
Phone 616-982-3838
 2. *SEXTANT Magazine*. An independent

magazine (not related to Heath/Zenith) which generally has one or two Z-100 specific articles in each issue. Z-100 articles begin in issue #2 (Summer 1982). (No longer in existence.) Sextant Publishing Company.

3. *Z-100 LifeLine Journal*. 16-20 pages devoted exclusively to the Z-100. Can't plug this too much, since my company publishes it.
\$24.00 per year.
Published 6 times per year by:
Paul F. Herman Inc.
3620 Amazon Drive
New Port Richey, FL 34655
(800) 346-2152
4. *H-Scoop Newsletter*. Zenith corporate news and product announcements, along with product reviews and Heath/Zenith scuttlebutt. A little light on Z-100 specific information these days. \$24.00 per year.
Published 12 times per year by:
H-Scoop/Quikdata
2618 Penn Circle
Sheboygan, WI 53081-4250
(414) 452-4172
5. *BUSS Newsletter*. Zenith corporate news and product announcements. Consists mostly of contributions by readers. Occasional, but rare Z-100 specific topics. (No longer in existence.) Sextant Publishing Company.
6. *BUSS Directory*. Contains a list of Heath/Zenith vendors, local Heath Users' Groups, and the most complete Heath/Zenith periodical index around (which includes listings for REMark, SEXTANT, and BUSS). Last edition was 1987-88. (No longer in existence.) Sextant Publishing Company.

Question:

I would like to buy either a 'C' or Pascal compiler. Can you tell me which ones will run okay on my Z-100 computer?

Answer:

As far as I know, any compiler you care to purchase will run on the Z-100. Some of the more recent offerings include a graphics windowing type of user interface which will not run directly on the Z-100 (like Quick-C or Turbo Pascal). But even these compiler packages should include a command line version of the compiler which can be used on a 'generic MS-DOS' machine.

One thing these compilers will not include, however, is a graphics library that can be used with the Z-100. And some of their standard screen control functions (like clear screen) may also cause problems when used on the Z-100. You can get around this problem by investing in one of the Z-100 graphics libraries which are available, or you may want to write your own Z-100 function library.

Question:

I have version 2.11 of MS-DOS for the

Z-100, and am considering upgrading to version 3. But Heath/Zenith wants \$150 for the new version, which seems a little steep. Are there any compelling reasons to upgrade from version 2 to version 3 of MS-DOS?

Answer:

I used to answer this question with an immediate yes! After all, the operating system is the most important piece of software you own, and it should be kept up to date. But in recent times, I have had to reconsider this attitude in a new light, regarding the Z-100.

First of all, there isn't really that much difference between MS-DOS version 2.x and 3.x. Specifically, version 3 of MS-DOS introduced the following new features:

1. AT style 1.2 Mb floppy drive support.
2. Direct control of print spooler by application software.
3. Expanded international character and keyboard support.
4. Extended DOS function error reporting.
5. Support for networked applications, including file and record locking.
6. Support for larger hard disks (greater than 32 Mb).

But of these new version 3 features, the Z-100 implementation does not include the 1.2 Mb floppy drive support. And the Z-100 has always been able to use larger hard disks, up to 64 Mb. Direct

control of the print spooler is nice, but it requires appropriate application software, which is not available for the Z-100, to my knowledge. And besides, this feature seems to be present in version 2 of DOS, too — it was just documented when version 3 was released. Expanded international support would only be useful for persons living outside the United States. And extended DOS error reporting will only be interesting to programmers, who will probably choose not to take advantage of it, since doing so would make their programs version 3 dependent.

The only new features of version 3 that are left with any merit are the networking features. Are you using your Z-100 as a part of a network, or multi-user system? Probably not. Okay, I think we can agree that version 3 of MS-DOS doesn't offer much significant improvement over version 2.

Another reason put forth for upgrading the operating system is to insure that further updates will be available. In other words, what if version 4 of DOS is released, and you haven't upgraded to version 3 yet? This argument doesn't hold water — for two reasons.

First off, Z-100 owners needn't worry about staying current any longer. There will never be a version 3.3 for the Z-100, let alone a version 4. So if you are destined to be forever out of date, you might

as well stick with version 2.

Secondly, Microsoft (or Zenith) doesn't seem to have any upgrade policy when it comes to DOS. When a new version is released, you get to buy it all over again for the list price. Zenith offered a discount coupon to owners of version 2 of MS-DOS some time ago, but that offer has reportedly expired. If you didn't upgrade to version 3 before the coupon expired (or if you didn't receive the coupon), you're out of luck. You'll have to dish out \$150 for version 3.

Conclusion? If you have \$150 burning a hole in your pocket, buy MS-DOS version 3. Otherwise, forget it — it's not worth it!

IMPORTANT NOTE: The points made above only apply to the differences between MS-DOS version 2 and version 3, which are minor. If you are still using Z-DOS (MS-DOS version 1.x), you definitely need to byte the bullet and upgrade to version 2 or greater. The differences between version 1 of MS-DOS, and version 2 are staggering — it's almost like a different operating system. Most programs written these days are designed for version 2 or above, and may not run correctly using version 1.

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Zenith MinisPort, Upgrading Zenith MS-DOS, MS-DOS 3.3 Plus, Disk Sizes and Formats, Using CTRL-P

One of the dangers of being a manufacturer of PC compatible computers is that, by definition, new computers must follow the current "standard" to some extent. That has occasionally led to some criticism of Zenith because they have generally had to play a "follow-the-leader" game, whoever the leader is at the time. Although IBM was the leader in microcomputers with the IBM PC in the beginning, that is no longer true. Many users have decided not to IBM it, let alone PS/2 it! One only needs to look at the IBM sales figures and units shipped to see that their market share has continually decreased, particularly for the PS/2 series with the Micro Channel Architecture (MCA). In the past few years, there has apparently been little room or opportunity for innovation, regardless of new gadgets like MCA. But the sales in one market have skyrocketed, and that is the laptop.

Zenith has had outstanding success with the highly-rated SupersPort laptops, but they have a new laptop that demonstrates some really new innovations for small computers.

New Zenith MinisPort

The new Zenith MinisPort. It's a new, very small laptop that is truly in the laptop category because it weighs in at just under six pounds. By comparison, the SupersPort 286 weighs about 10 pounds without battery or external power supply. When I travel, I do not carry the battery because of the weight, and I figure that I can find an outlet when I need to use the computer. For various reasons, I'm not interested in using my computer on an airplane, so I don't need the battery. But the MinisPort may change a lot of that, and it has a lot of interesting features.

Size and weight are important when I travel. By the time I have everything ready for traveling with the SupersPort 286, it weighs about 15.5 pounds. That includes

the computer, carrying case, external power supply, a manual, and about 20 floppy disks in plastic cases. I also carry a briefcase, but I don't begrudge the weight of the computer because I have found it so valuable in my work. My SupersPort runs like a rocket and has a 40 MB hard drive. Still, I would like to have something lighter and smaller, and the MinisPort is the next step in the evolution of small computers.

The new MinisPort is small enough — about 12.5 inches wide, 9.8 inches deep, and about 1.3 inches high — to carry conveniently in just about any briefcase. Although the computer itself is about 6 pounds, I would guess that the total "travel weight" would be on the order of about 10 pounds with everything, including floppy disks.

The MinisPort is a single, floppy-disk-only system, and Zenith has used a new 2-inch, 720 KB floppy drive to help reduce the overall size of the unit. At the time of this writing, I was unable to get any reliable pricing information for 2-inch floppies, but based on the historical prices of new disk sizes and formats, you can bet they will be several times the cost of commonly available floppies. Standard 3.5-inch, 720 KB floppies are commonly available for about \$15 a box in the Dallas area, and I would expect that the new 2-inch floppies will probably sell for a minimum of two or three times that, at least for now. More on 2-inch floppy drives in a minute.

Technically, the MinisPort is an interesting computer. It features the "old" 80C88 microprocessor that can run at 8 MHz, so there is not really any new technology in that. Aside from the usual Zenith features, the MinisPort's ROM contains

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the Zenith MS-DOS 3.3 Plus and the Fastlynx file transfer program. The system boots almost instantly because there is no disk access delay in reading the operating system during the boot process.

The MinisPort has two standard memory configurations: either 1 MB or 2 MB. Memory above 640 K can be used as a "Silicon Disk Drive" (SDD) which is essentially what most of us called a RAM disk or memory disk that you can install on most systems with VDISK.SYS. Depending on the configuration, you will have about 360 KB or just over 1.3 MB to use as a disk drive. I suggest considering the larger memory unit even though it's more expensive. Given that the MinisPort uses 8088-based technology, you will find it is slower compared to the fast 80286 and 80386 systems. And if you use a lot of commercial software, you will find that the floppy disk technology will be quite slow, especially if you are used to a system with a hard drive. True, you will still have to copy (and configure) programs to use the SDD, but the programs will run a LOT faster. And if you have never experienced the joys of disk swapping with a turtle-paced floppy disk computer, be absolutely sure to try it.

Unlike most systems, however, the SDD (and the SETUP, of course) is not lost when you power off the system because it has a battery backup that uses non-rechargeable lithium batteries. General system power is provided by a rechargeable nickel-cadmium (NiCad) battery that provides about three to four hours of use under most conditions, depending on how much you use the floppy drive and screen backlighting. Since the NiCad battery is small and light (about 10 ounces), and relatively inexpensive (about \$80), it may be a good idea to carry an extra one if you need a lot of portable computing power. I would rather carry the recharger and not use the batteries so much when I

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travel.

Transferring files between a desktop computer and the MinisPort should not be too much of a problem because of the Fastlynx program included with the computer. This allows you to transfer files back and forth between two systems using the serial port. The MinisPort also includes a parallel port and a port for plugging in a full-size CGA monitor if you wish.

Overall, the MinisPort looks like a very nice computer that is priced very competitively with similar "notebook" style units. Perhaps Zenith has finally realized that price is a very important consideration for most of the computer market. I believe that the pricing information on the MinisPort included at the end of this article is correct at the time of this writing, but prices may change by the time you read this.

Disk Sizes and Types

With the introduction of the MinisPort, Zenith has also added another dimension to the wide variety of disk sizes and formats. Single- and double-sided, and single- and double-density 8-inch disks were used on standalone word processors in the "early" days. When 5.25-inch floppies were introduced, they were available in an incredible number of types. For example, the old H-89 included a standard 100 KB hard-sector drive (single-side). You could even add "monster" floppies if you had a soft-sector disk controller (called the Z-37) with a staggering capacity of 640 K (I had one), which was quite advanced for its day. Many people think that IBM was responsible for a lot of this technology, but Heath sold disk drives (and computers) with "high density" capacity long before IBM ever thought of personal computers. Incidentally, the Z-37 controller is the reason that, when you order HUG software, you add a "- 37" to the part number if you want the usual soft-sector 5.25-inch floppies for DOS. A bit of history to explain the "strange" number for those of you who may not be familiar with some of the older Heath computers.

Rumor had it that, for some reason, IBM was not convinced that these high capacity drives were not reliable, and the original original IBM PC actually had single-sided, soft-sector floppy drives with a capacity of 180 KB. Later versions of the IBM PC had double-sided drives (360 K), and this combination of drives led to all kinds of interesting disk swapping problems for reasons that I won't go into.

The Z-100 was introduced with double-sided 5.25-inch floppy drives (360 K), and this computer (and Zenith MS-DOS version 1, called Z-DOS) also provided support for 8-inch drives too, with a capacity of up to about 1.2 MB. By fooling with the floppy disk controller a little, you could even use the 640 K drives that I

mentioned earlier.

Most microcomputer manufacturers stayed with the relatively reliable 5.25-inch 360 K drives for a long time, at least until the 1.2 MB 5.25-inch drive was introduced on the IBM AT. Then, the 3.50-inch drives became the rage, and I admit that I really like them better, too. First, we saw the 720 KB drives, and finally the 1.4 MB drives were introduced.

Up to this point, there were three drive sizes that were popular: 8", 5.25", and most recently, 3.50". Aside from just the physical size of the floppy, there are also an incredible number of disk types based on the type of disk: single, double, quad or high density; not to mention whether a disk has one or two sides, or hard or soft sectors. Virtually all of the disk drives available today use a double-sided disk. Now Zenith has introduced the 2-inch drive in the MinisPort. Will this become a new standard?

It might. I think it will depend on whether or not another microcomputer manufacturer also decides to use this same drive size. It will also depend on which of the 2-inch formats is adopted by another manufacturer, if any. My research indicates that there are at least two different formats of 2-inch disks that are not compatible with each other. Zenith uses a 2-inch Panasonic drive that has the same 720 K capacity as the existing double-density 3.5-inch drives. Sony has a 2-inch drive with a capacity of about 812 K, so it is easy to see that disks written on one drive would not be compatible with the other. The real advantage of the Sony drive is that it is MUCH faster in transferring data, but it is not available in production quantities yet. Part of the floppy disk war is to see which manufacturer's format will win this particular battle for small computers. In the short term, Panasonic clearly has the edge because it is available now. In the long term, that may or may not help.

In the longer term, there are persistent rumblings that super high-capacity 3.5-inch floppy disks (e.g., 10 MB or so) are under development, and it would not surprise me to see that in the next release of drives and floppies. I expect that they will be considerably faster than today's floppies, and they will probably require a new disk controller to accommodate that speed. Most of the floppy drives available today use a 300 or 360 RPM rotation speed, and their disk controllers are only capable of transferring data at 500 Kbps (kilobits per second) maximum. In contrast, the 2-inch Sony drive that I mentioned earlier is designed for just over 14 Mbps (megabits per second) which is over 28 times as fast as current floppy systems.

With the available technology, I think Zenith made the best choice of the alternatives by using the 2-inch Panasonic

drive. The 2-inch disks are much like the 3.5-inch disks you have probably seen, just smaller. Since one of the clear objectives of the MinisPort was to build a SMALL computer, it's difficult to see how any other choice could have been made. Using a 3.5-inch drive in the MinisPort would have doubled the weight of the floppy drive, not to mention some kind of modest size increase to accommodate the larger form factor.

From a user perspective, I really don't appreciate another disk size and format very much. I already have PLENTY of different size disks and densities floating around my study: two types of 8-inch disks for the Z-100, 360 KB 5.25-inch, 1.2 MB 5.25-inch, 720 KB 3.5-inch, and 1.4 MB 3.5-inch. Since I only have 6 different types of disks, I obviously need another one to keep track of.

Moving Ahead

As I was working on this column, I received an interesting letter from Ed Wiggins (East Northport, NY) with some interesting comments on my June column on upgrading to Zenith MS-DOS 3.3 Plus. Based on my description of the new capabilities of this latest MS-DOS version in that article, he tells me that he decided to upgrade from version 3.1. Ed pointed out in his letter that neither that article nor the manuals clearly describe how to update to a new DOS version. Although it is also true that it is even less clear how to update an IBM PC-DOS version (based on the information in the manuals), his point is well-taken. It is one of those things that computer users are expected to "know," but is never described in detail. I have written about this subject in some detail in the *Powering Up (Volume 2)* article on "How Disks and DOS Work Together," but I have learned that many people who read one of my columns do not read the other one. And because it will be a few months before that article is published, I thought it would be useful to go through the installation process for Zenith MS-DOS, including those things that are not explicitly mentioned in the manual. In any case Ed, this one's for you.

Installing Zenith MS-DOS

Installing Zenith MS-DOS on a system for the first time has been quite easy because of the SETUP program (in versions prior to 3.3 Plus) that has been around for a long time. For version 3.3 Plus, the SETUP program has been renamed to INSTALL, but it is still basically the same program with some enhancements. Unfortunately, even the current INSTALL program in MS-DOS 3.3 Plus does not provide any specific instructions or procedure on how to upgrade to the new version. This is, as Ed pointed out in his letter, especially important on a hard drive system because INSTALL will run

the FORMAT command which will effectively destroy all existing programs and data on a partition. Fortunately, the INSTALL program has some excellent displays that provide an explanation of what is going on, but it could be improved by adding some real flexibility for the upgrade from an existing Zenith MS-DOS version, especially on a system with a hard drive. Hard drives are so popular because they are relatively inexpensive and provide lots of advantages. It really is not so important on a floppy only system because you will normally use new floppies when installing new or updated software. But there are really two ways or procedures that you can use to upgrade to the new MS-DOS 3.3 Plus on a hard drive. The first way is the obvious one, but there is one step which should always be first, regardless of which way you choose.

Back It Up!

Before you install ANY new or updated software (or hardware for that matter), including DOS, on a hard drive, you should ALWAYS back up all files on the entire drive FIRST, regardless of how many partitions you have defined with the PART command. Develop a regular backup schedule and follow it faithfully with NO exceptions. And if you are going to install updated software or change the system hardware (even a ROM), take a complete backup of all hard drive partitions BEFORE you start the software installation or open up the computer. If the software installation does not do what you expect, or fails because of a bug or power glitch, you will at least be able to restore all software and data to the original setup on the hard drive. Or if the new hardware has some kind of crazy bug and blows away the hard drive, you can yank out the offending hardware and restore everything with a comparatively minor loss of time.

I agree that all of the backups get to be a pain after a while, but I use the Imager board (see "On the Leading Edge" in the December 1988 REMark) with a VCR on my production system (currently a Z-386/16) to ease the pain. It does not matter how you back up a hard drive so long as you do it. And it doesn't matter what you know, or think you know, about software, hardware or computers in general. Running a hard disk without taking periodic backups is one of the biggest risks you can take, which is really borderline stupidity, in using any computer — mainframe or micro. Yes, those are strong words, but remember that a hard drive is nothing more than a complicated mechanical device, like an automobile. And like any mechanical device (e.g., an engine or transmission), parts in a hard drive will fail, many times without notice or prior hint of a problem. I'm a firm believer in taking backups because I've had six mechanical hard drive failures, one software

installation program that completely messed up a 20 MB hard drive partition, and one hardware unit that completely wiped out all programs and data on a 26 MB hard drive. And yes, I do follow my own advice and take regular backups, as well as special backups when I change software and hardware.

I'm sure that long-time HUG members are REAL tired of hearing about the importance of taking hard drive backups, but it is an unfortunate fact that many computer users still fail to do it. You never know what a software installation program or hardware change will really do until you try it. A software installation program may do something unexpected like execute FORMAT, or hardware may have a catastrophic bug that wipes out everything. Some of you may remember what happened to me when I was testing UCI's Easy PC emulator board on my Z-100 as reported in my column in the June 1986 REMark.

My Z-100 has a 26 MB hard drive, and I was using it as my production system at that time. I installed UCI's Easy PC hardware, and when I attempted to use it, it completely and totally wiped out everything on my entire hard drive because of a catastrophic bug in a certain ROM version on the Easy PC (this is NOT the Zenith eaZy PC). I had to start everything from the beginning, including a low-level format using the PREP command. That took a lot of time, but I did not really lose anything because I had taken the precaution of backing up all partitions before I installed the hardware. Admittedly, that is an extreme case, but it illustrates what can happen when you least expect it. I certainly did not expect a hardware add-on board to blow away my hard drive. All of this was especially for new HUG members who may not understand the importance of taking hard drive backups. Now, back to the Zenith INSTALL program.

The Zenith INSTALL Program

Assuming that you have a current backup of at least the bootable hard drive partition (i.e., drive C), the INSTALL program with MS-DOS 3.3 Plus works fine. The first real menu step is to make backup copies of the distribution disks. Do it. When you follow the menus for a hard disk drive system, INSTALL fires up the FORMAT program with the /S switch to transfer the new system files — IBMBIO.COM, IBMDOS.COM, and COMMAND.COM — to the hard drive. After that is finished, the INSTALL program copies all of the MS-DOS programs on the distribution disk to the \BIN subdirectory. When the INSTALL is complete, you can restore all programs and data to the hard drive, but you will need to use the "exclude file" feature of most backup/restore programs to NOT restore any of the latest DOS programs.

One quick note before we go on. The BIOS file (IBMBIO.COM) and the DOS System Kernel (IBMDOS.COM) are usually marked with special attributes of "Hidden" (from the DIR command), "System", and "Read Only" when they are copied to the hard drive with the /S switch during FORMAT. Before you proceed to restore the rest of the files on a hard drive, I recommend that the Command Interpreter, COMMAND.COM, and all programs in your \DOS subdirectory be marked as "Read Only" files, too. You can easily do that with the ATTRIB command, as shown in Figure 1.

```
ATTRIB +R COMMAND.COM
ATTRIB +R \DOS\*.*
```

Figure 1
Adding the Read Only Attribute to DOS Files

In these command examples, it is assumed that you already have a PATH set to the subdirectory containing the DOS program files (for ATTRIB) and you are logged onto the root directory. One good reason for doing this extra step is that it may help protect all of these DOS files from corruption by a virus. Unfortunately, this protection is not absolute because there are ways to write a program to ignore any file attribute, including Read Only, but it only takes a few seconds, and the modest protection it provides is worthwhile. This should not cause any problem during normal system operation because there is NO reason why any program should modify any of these files under any circumstances. Note that the Read Only attribute also protects the files from being erased with the DEL command, so it can help you by preventing accidental erasure of these marked files. If you want to use the DEL command on any Read Only file, you will need to use the ATTRIB command again with the -R parameter to remove the Read Only attribute. If you use the RESTORE command provided with DOS, I recommend you perform this step before you begin restoring files to the hard drive.

If you use the RESTORE program provided with MS-DOS 3.3 Plus, you would use the command syntax shown in Figure 2.

```
RESTORE A: C:\S\X:\DOS\*
```

Figure 2
RESTORE Command Example for MS-DOS 3.3 Plus

In this example, all files will be restored from floppy drive A to hard drive C. All subdirectories will be restored because of the /S switch except for the \DOS subdirectory that is excluded with the \X switch. The /P switch Prompts you

by asking if you want to restore files marked as Read Only which now includes all three system files, and of course you type an *N* for No. The */P* switch will also prompt for ANY file that has been updated or changed since the last backup, so you should also be prompted for at least the AUTOEXEC.BAT and CONFIG.SYS files too. For those two files, you will probably want them restored from your existing backup.

Once you understand what is going on with the current Zenith INSTALL program, it is quite easy to use. The first step is to back up at least drive C, and I recommend that you also back up ALL partitions if you have any others defined. Then, boot the floppy containing the new MS-DOS (Disk 1) and follow the INSTALL program prompts. INSTALL also asks if you want to make backup copies of the distribution disks during the process, and I recommend you do so. After INSTALL is complete, mark COMMAND.COM and all files in the subdirectory containing the DOS programs with the Read Only attribute using the ATTRIB command, as shown in Figure 1. And finally, restore all files on the hard drive, except for the system files and all programs in the DOS subdirectory.

The Second Way

I mentioned earlier that there are two ways to upgrade to this new DOS version. Zenith MS-DOS 3.3 Plus has a new feature, documented on page xii of the Command Reference, called the "Non-Contiguous Boot System." This information is contained in a general section which describes new features and enhancements as compared with the previous 3.21 version. Although this kind of information used to be included in early Zenith MS-DOS manuals, it was omitted from later ones. Some of you may remember that I criticized Zenith in this column for omitting this information, and apparently someone at Zenith read it because it has been added again. Despite some opinions to the contrary, I think that Zenith is really open to reasonable suggestions (except for prices) from the user community. In many cases, some of my suggestions for improvement have not been published, but they were included in letters that I wrote directly. Some of you may remember my recent comments about the "disappearing cursor" on the SupersPort 286. Just after the article was written for last month's REMark, I learned that a new ROM was available to fix that problem. I just got it, but haven't had time to install it yet. Now if we can just get Zenith to add a hardware reset switch to the design of all computers . . .

In any case, the non-contiguous boot system provides a feature that was not available before. Prior DOS versions required that the BIOS file (IBMBIO.COM)

be contiguous, which means that all clusters in the file had to be in numeric sequence. In other words, the file could not be "fragmented" with various clusters all over the hard drive because the boot loader was not smart enough to "find" them. By the way, file fragmentation can be a problem on a hard drive and is usually fixed by using a program that optimizes, organizes or defrags the files, such as the Mace Utilities.

Because of the previous requirement for a contiguous BIOS file, the ONLY way to upgrade to a new DOS version was to use FORMAT with the */S* command. The SYS command, which will transfer the BIOS and the System Kernel, would not work because the system file sizes had to be less than or equal to the existing files. In virtually all cases, the BIOS (and the other system files too) for each new DOS version is larger than the previous version because new hardware support and other changes are added. For example, the BIOS has been changed to add support for new types of disk drives and formats, such as 3.50" 720 K and 1.44 M floppy drives, not to mention the extended hard drive support described in my June 1989 article. As new hardware is developed, the BIOS must be updated to support it, and this results in a larger file for each new version.

The SYS command in earlier DOS versions checked to make sure that the BIOS file could be transferred so that it was contiguous. If you tried to use the SYS command to transfer the a new (and larger) DOS version of the BIOS and the System Kernel, you would usually get an error message of "No room for system on destination disk" or "Incompatible system size." In general, the only real use for the SYS command was to update the system files, usually the BIOS, when you made a configuration change with CONFIGUR or DSKSETUP, such as adding a new printer or floppy disk drive to your system. With that as background on what was going on, here's how to update to MS-DOS 3.3 Plus without having to use FORMAT.

The second way to update to the latest DOS version only works with MS-DOS 3.3 Plus or later. Boot the system using the MS-DOS distribution disk 1 for the new DOS version. When the INSTALL program starts and asks if you want to proceed, enter an *N*, and return to the DOS prompt. Transfer the BIOS and System Kernel files to drive C using the SYS C: command. Then you MUST also transfer COMMAND.COM to the hard drive using the COPY command. Figure 3 shows the commands necessary to set up the new system on partition C.

Both of these commands MUST be run from the booted floppy drive (e.g., A), which should be the current or default drive when you run these commands.

```
SYS C:
COPY COMMAND.COM C:\V
```

Figure 3
Transferring DOS to a Hard Drive

You must also remember to copy COMMAND.COM because the SYS command only copies the IBMBIO.COM (BIOS) and IBMDOS.COM (System Kernel) files to the hard drive. If you do not copy COMMAND.COM to the root directory (note the backslash in the second command) of the hard drive, the hard drive will not boot, and you will see an error message like "No system." Note that you do not need to copy a new version of the Command Interpreter — COMMAND.COM — when you are using SYS *within* the SAME DOS version because CONFIGUR and DSKSETUP do not change it. The Command Interpreter only needs to be copied when you are updating to a new DOS version, and that applies to all releases, not just MS-DOS 3.3 Plus.

As a matter of information, I have tested this procedure for upgrading from Zenith MS-DOS version 3.21 to 3.3 Plus. Everything works just fine in this case, but there is no guarantee that it will work with every version, particularly older ones. Even though I found that this works, I still recommend following the usual procedure of running FORMAT when updating an MS-DOS version for technical reasons. Zenith obviously "recommends" using FORMAT because of the way INSTALL works, and when in doubt, it is always best to follow the manufacturer's instructions.

This explanation is a real "nuts-and-bolts" description of how you can update to this new Zenith MS-DOS version, but there is a better way.

A Better Way to Update

I have already written a letter to Zenith suggesting that the INSTALL program needs some modification to make it easier to upgrade to a new Zenith MS-DOS version. Some of this explanation is, of necessity, somewhat technical, and I will make no apologies for that. Actually, I also suggest changing the INSTALL program slightly for the installation of MS-DOS on a brand new system.

For the installation of Zenith MS-DOS on a new system, I suggest adding a prompt for the name of the subdirectory that contains the programs to be copied from the MS-DOS distribution disks. I have never cared for the default \BIN subdirectory name, and I personally use the \DOS subdirectory for all of the MS-DOS "system" programs. Some people prefer the \SYSTEM subdirectory. But before the INSTALL program actually begins to copy programs to the hard drive, it should provide a prompt asking for another subdirectory name. Using the exist-

ing \BIN subdirectory is fine as a default, but it could be something like:

```
MS-DOS programs will be copied to the C
:\BIN subdirectory
Is this OK (Y/N)?
```

If you type a Y, then INSTALL would proceed as usual. If you type an N, then INSTALL would display a prompt like:

```
Enter new subdirectory name following t
he backslash (\): \
```

At that point, you could simply type a new subdirectory name, such as DOS, SYSTEM or whatever you like, and INSTALL would copy all of the system programs to that subdirectory, after the FORMAT, of course. That would help ease the addition of DOS to a new system, and it should be rather easy to do. After I finished the INSTALL program on my Z-386 and SupersPort 286, I had to go back and create a new \DOS subdirectory, copy the distribution programs to it, erase all programs from the \BIN subdirectory, and remove the \BIN subdirectory name. I thought it was easier and faster to install everything at the same time, rather than using the "install it later" option. A lot of extra steps to get the subdirectory name set up the way I wanted it.

For the upgrade to a new MS-DOS version, the INSTALL program need not be complex to be effective and useful. Since there are a variety of ways to do this, I would choose the simplest way.

Before the INSTALL program gets too involved in actually updating a hard drive, it should provide a simple explanation and ask something like: "Do you want to INSTALL MS-DOS on a new system or UPDATE an existing one (I/U)?" To install MS-DOS on a new system, just type an I, and the installation continues by asking for a subdirectory name as previously described. To update an existing system, you type a U, but the process is more complicated.

When updating a hard drive, INSTALL should at least ask if you want to back up the bootable partition using the DOS BACKUP command. Perhaps some additional information should also be added to this new screen stressing the importance of making a backup before updating the partition.

Assuming that the program will ALWAYS ask for the subdirectory name to locate the MS-DOS programs as suggested, the update gets a little tricky here, but here's what I think the INSTALL program should do. These steps are not necessarily in any required order, and no doubt, it can be improved. First, there should be a display warning the user to make a backup of the hard drive partition before proceeding with the update, just in case of a power glitch or something else that happens during the update.

To ensure that the entire system is set up correctly on the hard drive for the new DOS version, the new version's boot

loader code (and perhaps the jump instructions too) should be written to the boot sector on the hard drive. This could be a rather tricky technical problem because of the disk parameters also located within the boot sector, but I am confident that Zenith could solve it. I mention this specifically because I learned the hard way that a boot sector containing non-Zenith boot loader code (specifically IBM PC-DOS 3.1) would NOT boot MS-DOS 3.3 Plus. That was not a big surprise, but it is a consideration, and that step might eliminate some unpleasant future compatibility problems.

INSTALL could then use the SYS command to transfer the BIOS and System Kernel to the hard drive, and then it would have to copy the new COMMAND.COM to the root directory. After this has been completed, then the program would have to erase ALL of the prior version's programs from the appropriate subdirectory (specified in the installation for a new computer system). And finally, all of the new version's programs could be copied to this subdirectory.

This new procedure for the INSTALL program involves some assumptions, but they should be valid. For example, it assumes that the user knows what subdirectory contains the current MS-DOS programs. It also assumes that some display screens provide a good explanation of what is going on, and I think the MS-DOS manual should explicitly state what assumptions are made. As most of you probably know, there is no explanation of the INSTALL program in the Zenith MS-DOS 3.3 Plus manual, probably because of the good explanations provided during the process. Actually, there is no real need to update the manual because it would be easy to write up a small insert describing the procedure. I like the idea of a separate insert because it makes the information difficult to overlook.

It's true that implementing some of these comments could be more than a little tricky, but it would certainly ease the process of installing Zenith MS-DOS for the first time, as well as make it MUCH easier to upgrade to a new version. Special thanks to Ed Wiggins for suggesting this topic.

Using CTRL-P — A Bug?

The various CTRL-key sequences are something that most DOS users find quite helpful, and because this is one of those subjects that is difficult to find in many DOS manuals, it is included as an article in *Powering Up (Volume 2)* which will be published in *REMark* in the near future. Other than listing the possible key sequences, most DOS manuals don't give you a clue as to the real uses of these CTRL keys, so I have written a specific article about it.

As I was reading the Buggin' HUG let-

ters in the May 1989 *REMark* (page 6), I noticed that Dr. Harry Cole pointed out an interesting anomaly in MS-DOS 3.3 Plus. Unlike most prior DOS versions, the CTRL-P (printer echo) does not work if you follow the steps mentioned by Dr. Cole, especially when the command is preceded by the use of the F3 key to copy all remaining characters on a line. Whether or not this is a bug depends on your point of view, as well as how you use the feature. For example, this is one of those things I probably would never have noticed because of the way I do certain operations, especially when I use CTRL-P (or CTRL-PrtSc — effectively the same thing), which is rarely. So I checked out this specific anomaly on various systems, and I agree that it seems to be unique to MS-DOS 3.3 Plus.

For some reason, I have always had the habit of entering CTRL-P as the ONLY entry on a DOS command line and followed it with a RETURN. Then I use the DIR command to list the directory or whatever. And then I toggle the printer echo off. Maybe that's a carry-over from my CP/M days, I don't remember. But I simply don't use the F3 key as described, so it is doubtful that I would have noticed this. The real point is that I use another technique that is faster for me, probably because I touch type and don't think about it much.

You can perform what amounts to a "printer echo" by using I/O redirection. All you have to do is use a command line like:

```
DIR > PRN
```

This simple command reroutes the DIR command display to the printer, and I like to use it because I don't get any DOS prompt or command line entries printed on whatever I want to list. Although I have shown this example with the DIR command, you can use any command that provides information (e.g., CHKDSK) which you want to print. The only real hazard of using this technique is that the ENTIRE screen display, including any prompts, is sent to the printer and you do not see it on the screen. Depending on what command is entered, the system may appear to "freeze" because it is waiting for you to enter a response to a prompt. The only real way to see this is to check the printed listing.

If you really want to get fancy with I/O redirection, you can use a command line like:

```
DIR | SORT > PRN
```

When you use piping, indicated by the vertical bar (|), with the SORT command, the file names in the list will be printed in alphabetical order. I use this command most often (instead of CTRL-P) because I prefer an alphabetical listing of the file names to make it easier to find a specific one. Otherwise, the DIR command will simply list the file names in

whatever order they are found in the disk directory. I find it quite useful to use this command on just about any disk to generate a printed listing with file names that are easy to find.

To carry this approach one step further — have you ever tried to list ALL of the files on a disk that contains subdirectories? Most of you know that it is not possible to list ALL files in ALL subdirectories without a lot of typing and general fooling around. It's easy with I/O redirection, and you can even list the subdirectories and files in alphabetical order too. All you need to do is use the command line:

```
CHKDSK/V | SORT > PRN
```

In order for this example to work correctly, you must be logged on the root directory of the floppy drive or hard disk partition that contains the files. Of course, you must also have a PATH command to the subdirectory that contains the CHKDSK and SORT programs, too. The SORT command will take some time to do the sorting of the file names, and if you have a lot of files to sort, the system may appear to freeze, but it's just working. Give the SORT command a little time because it takes a while to sort a large number of files. By the way, the SORT command does have a limit which is a maximum of about 63 KB for a sorted file, but I have successfully sorted over 1,200 files this way. You may want to try routing this output to a file first by substituting a file name (e.g., SORTFILE) for the PRN in the example; then you can print the sorted file with the PRINT command. Try it, you'll like it, but be sure your printer has lots of paper if you try this on a hard drive.

Powering Down

As usual, I never made it halfway through my list of topics that I really wanted to include this time, so perhaps I will make more of a dent next time.

For help in solving specific computer problems, be sure to include the exact model number of your system (from the back of the unit), the ROM version you are using (use CTRL-ALT-INS to find it), the DOS version you are using (including both version and BIOS numbers from the VER command), and a list of ALL hardware add-ons (including brand and model number) installed in your computer. The list of hardware add-ons should specifically include memory capacity (either added to an existing board or on any add-on board), all other internal add-on boards (e.g. modems, bus mouse or video cards), the brand and model of the CRT monitor you have, and the brand and model of the printer, with the type of interface (i.e. serial or printer), you are using. Also be sure to include a listing of the contents of the AUTOEXEC.BAT and CONFIG.SYS files unless you have thoroughly checked them out for potential problems (e.g., TSR conflicts). If the problem involves any application software, be sure to include the name and version number of the program you are running when the problem appears.

If you have questions about anything in this column, or about Heath/Zenith systems in general, be sure to include a self-addressed, stamped envelope (business size preferred) if you would like a personal reply to your question, suggestion, comment or request.

Products Discussed

Powering Up (885-4604) \$12.00
 Heath/Zenith Computer Centers
 Heath/Zenith Users' Group
 P. O. Box 217
 Benton Harbor, MI 49022-0217
 (616) 982-3838 (HUG Software only)

MinisPort (1 MB memory) \$1999.00
 MinisPort (2 MB memory) 2799.00
 3.50" External Drive 299.00
 2" External Drive 349.00
 5.25" External Drive 399.00
 1200 Baud Internal Modem 199.00
 SupersPort 286 w/40 MB HD 5499.00
 MS-DOS 3.3 Plus (OS-51-3)

List Price 149.00
 Mail Order w/update card only .. 49.00
 Heath/Zenith Computer Centers
 Heath Company Parts Department
 Hilltop Road
 St. Joseph, MI 49085
 (800) 253-0570
 (Heath Catalog orders only)

Imager \$295.00
 HUG Members Only 195.00
 The Light Pen Company
 Box 45255
 Los Angeles, CA 90045-0255
 (800) 634-1967

Mace Utilities \$99.00
 Mace Gold Utilities 149.00
 Paul Mace Software, Inc.
 400 Williamson Way
 Ashland, OR 97520
 (800) 523-0258 (Orders only) *



"THE RESULTS OF THAT SEX SURVEY ARE PRINTING OUT RIGHT NOW."



First Publisher Everyman's Desktop Publishing

Alan Neibauer
11138 Hendrix Street
Philadelphia, PA 19116

Desktop publishing certainly is the magic phrase these days. New publishing packages are being released all the time and traditional word processors, such as WordPerfect 5.0 and Word 5.0, are moving into the area with graphic interfaces and layout tools.

It wasn't too long ago, however, that desktop publishing was an expensive proposition, requiring a heavy hardware and software commitment that most of us couldn't afford. The systems were designed for professionals, and required laser printers, high resolution video, and fast, powerful computers.

Well, in some ways, things have changed pretty rapidly. Desktop publishing software today can be used on minimal sized systems, outputting to dot matrix printers, and not even requiring a mouse or other pointing device. Whether you'll be happy with the results is another thing, but most of us can certainly now afford it.

Unfortunately, the growing glut of "desktop publishing" software has only confused the real issues, burying true desktop publishing among a cadre of imitators — programs that offer limited control over page design and producing output that should be burned, not published.

Let's be honest. Some of the desktop published "newsletters" I get are a dis-

grace, obvious low budget dot matrix attempts to simulate a professionally designed and printed publication. But what's worse are the letters that contain a dozen different fonts and type sizes, with charts or graphs out of proportion, and writing that's barely readable. You can see samples of these in most computer magazines — there is at least one small homemade advertisement that was obviously created with a low quality desktop publishing package. To me, no matter how good the product they're pitching, the ad screams AMATEUR. Any professional would be embarrassed to run an ad like that, or to send out a newsletter or mailing, of such quality.

So before reviewing First Publisher, a desktop publishing program of remarkable power for the money, let's clear the air with an understanding of what a desktop publisher should really be.

Desktop publishing was never designed to take the place of your neighborhood printer. Instead, desktop publishing is designed to perform two tasks — page layout and design, and generating camera-ready copy, a copy of your document that the printer can use to reproduce with little or no changes. The user creates the text, arranges its placement on the page, adds the necessary graphic elements, then prints out a copy that the printer can

duplicate.

If the program is being used for any commercial venture, then the output should be of high quality. It should reflect the image the user wants to project, representing the quality of the service or product for sale. That doesn't necessarily mean an expensive laser printer, although you can't beat one for quality. But as a minimum it requires quality dot matrix printing, smooth well-proportioned text and graphics, in a layout that's easy to read.

Now no desktop publishing program can prevent the user from cluttering up the layout with too many typestyles, meaningless graphics, and obnoxiously cute designs. But a real desktop publisher should provide these seven elements:

1. WYSIWYG Display.
2. Font support.
3. Quality output.
4. Integration of graphic elements.
5. Basic drawing tools.
6. Page layout tools.
7. Publication management tools.

As an example, let's see how two popular word processing programs — WordPerfect 5.0 and Microsoft Word 5.0 — handle desktop publishing functions.

The two newest versions of each program allow certain graphic files to be merged into documents, positioned on

the screen, and printed. These versions also provide some basic line drawing functions (horizontal and vertical only) and can use downloadable softfonts on laser printers. With this combination, both programs can perform some desktop publishing tasks. However, both programs provide no additional font support for dot matrix printers — the printer can only use the fonts built into it by the manufacturer. And both programs only display the graphics when in this special mode — not while you're actually editing a document or using the graphics functions.

What both programs do exceeding well, however, is word processing. No desktop publishing program provides the full range of WP functions. So here is the trade-off: excellent word processing support, medium desktop publishing support. So let's say you can only afford one program. You want to generally improve the quality of your documents, but rely heavily on word processing features — such as floating footnotes and indentation control, hyphenation, spelling, and a thesaurus, keyboard macros and form documents. Then buy a solid word processor that provides some desktop publishing features. You certainly can't go wrong with either WordPerfect and Word — especially if you do have a laser printer.

A desktop publishing program, on the other hand, excels in the other direction — layout and design, printer font support, WYSIWYG display at all times. While all of them allow some basic editing, and can merge files from a word processor into its own format, they are limited word processors in the true sense. Don't expect a desktop publisher to match WordPerfect, Word, or WordStar as an office workhorse. But do expect it to provide good quality output and complete control over the design process.

Now that you know where I'm coming from, let's look at First Publisher, version 2.

Here is an example of a desktop publisher that doesn't cost a fortune, but offers the features and support that are required of this type program. For a list price of \$129.00, it provides all seven of the listed criteria.

WYSIWYG Display

First Publisher has the look and feel we have come to expect from graphic applications, complete with pull down menus, a clipboard for storing text and graphics, and all fonts and graphics appearing on the screen as they will when printed. Screen quality is good even on CGA monitors. Figure 1 shows the First Publisher screen complete with a sample document and pull-down menu.

If you have a laser printer and soft fonts, First Publisher will even show your soft fonts as they will print, for true WYSIWYG display. You may have been

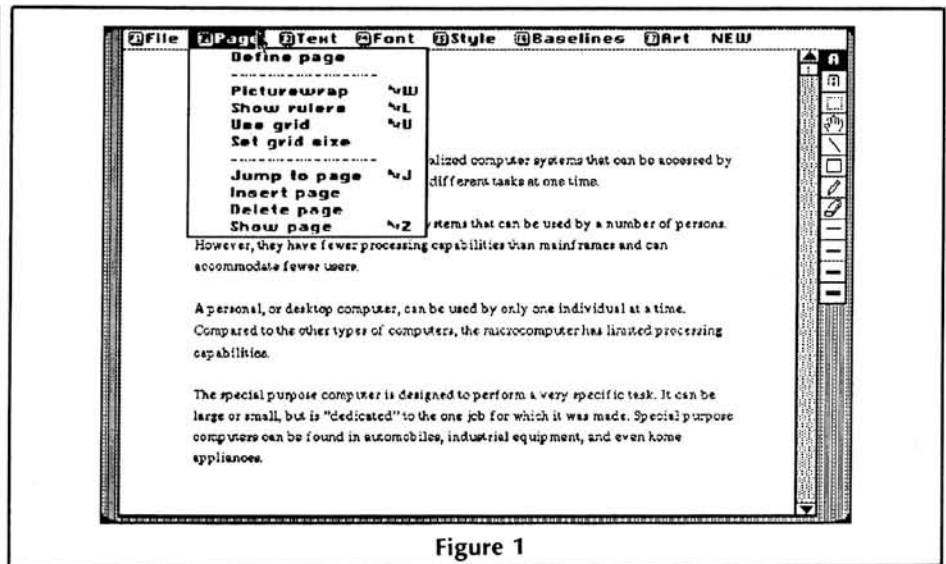


Figure 1

reading the hype about Display Postscript, that remarkable system that will display softfont text images. First Publisher does the same thing.

For example, I added Old English, Broadway, and Roman soft fonts to the First Publisher system. Then, to my surprise, text to be printed in these fonts appeared WYSIWYG on the screen, as shown in Figure 2.

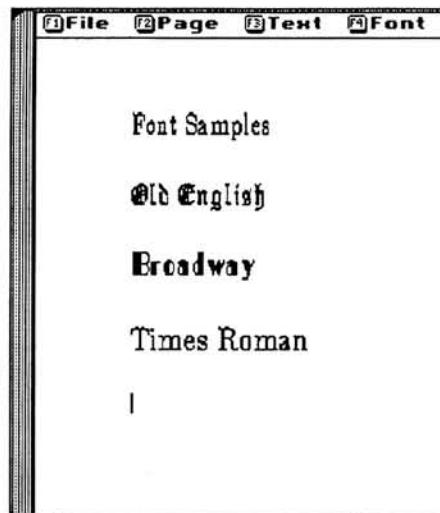


Figure 2

In some instances, however, the proportions of graphics on the screen do not exactly match that when printed. I noticed this mostly on a CGA system.

Font Support

The program allows you to use all of your printer's native (built-in) fonts, as well as its own set of supplied typefaces for headlines and decorative printing. Type sizes range from 9 point to 36 point in normal, bold, and italic in three styles — Geneva, Helvetica, and New York. You also get elite and pica, as well as a collection of other typestyles converted from the Macintosh.

All of these fonts can be used in supported dot matrix printers. When used with laser printers, however, they print in dot matrix resolution, so letter slants and curves won't look as smooth and professional as laser fonts themselves. Fortunately, version 2 of First Publisher can also use downloadable laser printer fonts, but you have to provide them yourself. This is a new feature, not found in the initial release of the program.

The number and sizes of the provided fonts are more than adequate for most applications. If you want more, additional dot matrix fonts are available in optional extensions, and you can of course purchase laser softfonts.

Quality Output

How your publication looks depends on the printer used — laser output is better than dot matrix, 24-pin printers better than nine-pin.

You can improve the quality of dot matrix fonts by selecting a smoothing option where the harsh steps normally seen in dot matrix printing are rounded off, especially useful in improving the image of dot matrix fonts in laser printers. Documents take longer to print in this mode, sometimes much longer with dot matrix printers, but the output is worth it.

Figure 3 shows some First Publisher output from an inexpensive 9-pin printer, in the smoothed mode. Figure 4 illustrates the same text from a Laserjet. Notice the difference in quality from the larger type in dot matrix resolution compared to the smaller type using a softfont. If you have a laser printer, then, try to use softfonts as much as possible.

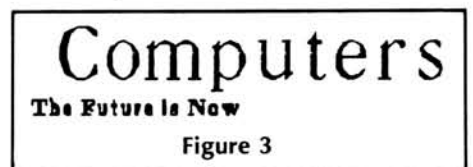


Figure 3

Computers

The Future is Now

Figure 4

Graphic Integration

First Publisher comes with a sampler of graphic images from its optional graphic files. The over 100 drawings can be merged into your publications, enlarged, reduced, rotated, flipped, and duplicated. So can drawings that you import from PC Paintbrush, Windows Paint, Logipaint, Publisher's Paintbrush, MacPaint (after transferring to an IBM disk), and scanned images at 75 dpi.

Just like text, output quality depends on your printer.

One First Publisher feature is particularly useful here. Normally, characters are printed as text, either using your printer's fonts or those supplied by the program, so you're limited to the styles and sizes provided. But you can convert characters to graphic text images, allowing them to be manipulated and merged into graphic files like any other artwork.

You can also create an art file from any screen image using the programs SNAPSHOT and SNAP2ART supplied. SNAPSHOT is a TSR program that saves any screen image into memory, while SNAP2ART converts the image into a First Publisher art file. I successfully used the programs to capture CGA and EGA screens from a Zenith 386.

While the programs work wonderfully, the operation is a little inconvenient since you can only "save" one snapshot image at a time. After saving the image you must exit whatever application you are in then run SNAP2ART to actually write the image to the disk.

So if you have a series of images you want to save you have to snap the first, exit the application, then convert it. You then have to reenter your application and repeat the process for each image you want. It would have been more convenient if snapshot directly creates the file on disk, or at least saves the image files on disk so they could be converted in a batch later on.

Basic Drawing Tools

Tools are provided to draw boxes, freehand and straight lines in four different thicknesses, and to magnify drawings for pixel manipulation. The drawing tools (Figure 5) and the art pulldown menu (Figure 6), perhaps aren't as complete as you'll find in a dedicated drawing program, like Paintbrush, but that's not what a desktop publisher is designed for anyway. With these tools, you can draw boxes around text and graphics, add lines, or modify art files.

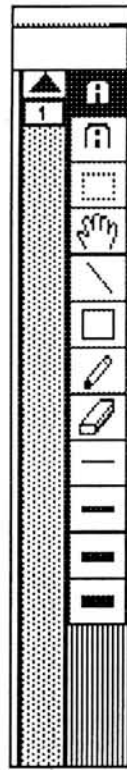


Figure 5

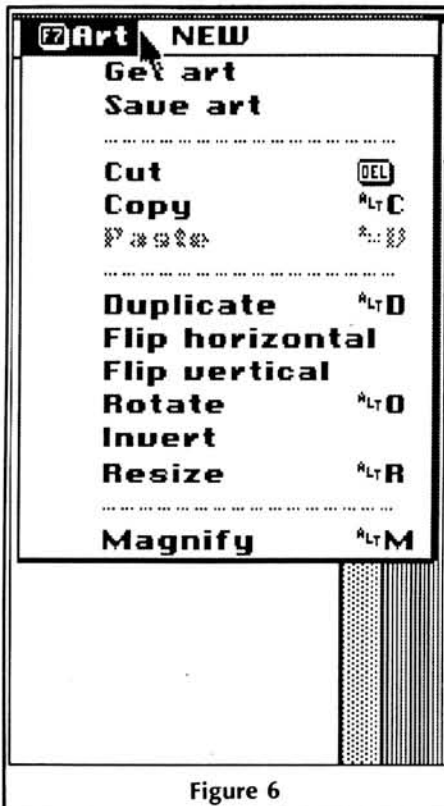


Figure 6

To create more complex drawings, use a painting program and merge the file into First Publisher.

Page Layout Tools

Using the Page pull-down menu, you control the overall design of the page.

You can set the margins, the number of columns, interline spacing (leading) and gutter width. All pages are limited to 8-1/2 by 11 inches — you can't change the page length and width itself. This may be a limitation for some work, although you could print a larger publication in sections. For example, we produce a four-page newsletter on academic computing. The newsletter is printed two sides on a single 11 inch by 17 inch piece of paper. So we just print out four 8-1/2 by 11 inch pages and put them together for duplication.

First Publisher uses a "baseline" approach to text layout, like the lines on a ruled piece of paper. When you want to adjust the position of columns or text, you display the baselines on the screen, select a range of baselines from a pull-down menu, then use the pointer (mouse or keyboard) to make the adjustment. You can also have text wrap around graphics and combine different numbers of columns on a single page.

I found this a little awkward at first but gradually grew to like the system. Since the width of baselines can be adjusted, you can easily widen or reduce column length by just moving a baseline without working through a complex menu of options trying to compute column width. After a little practice I was so adept at working with baselines that changing the page layout was second nature.

With the cross-grid and scale lines that can be displayed, your page layout can be very accurate.

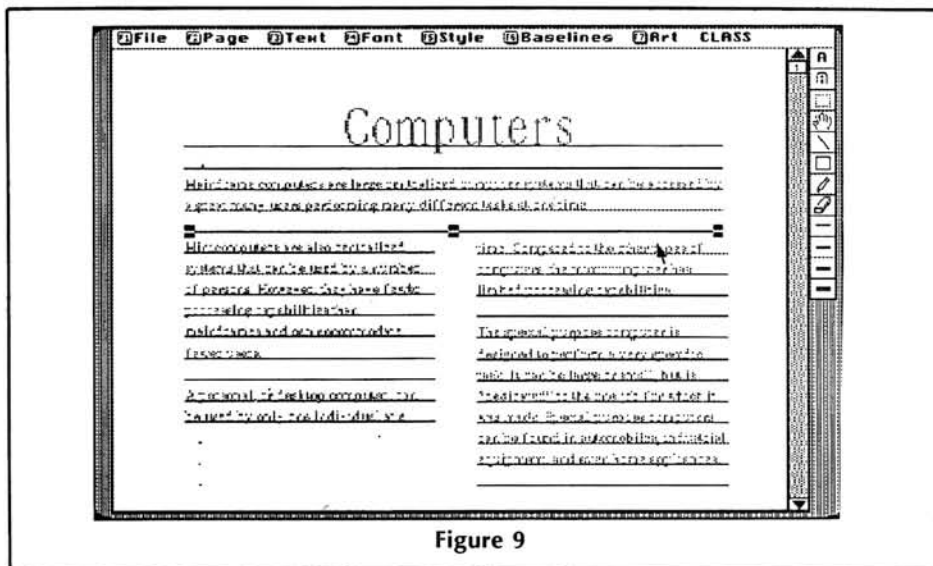
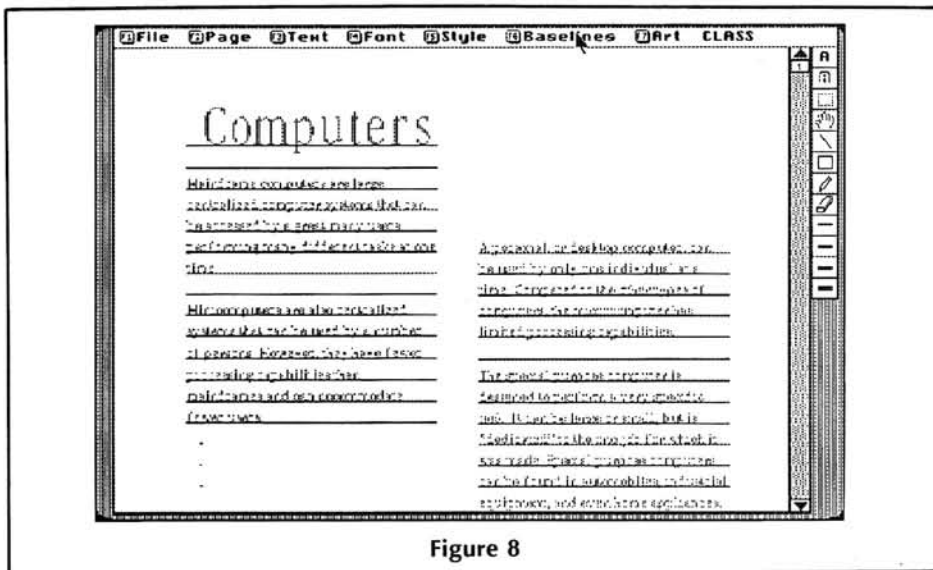
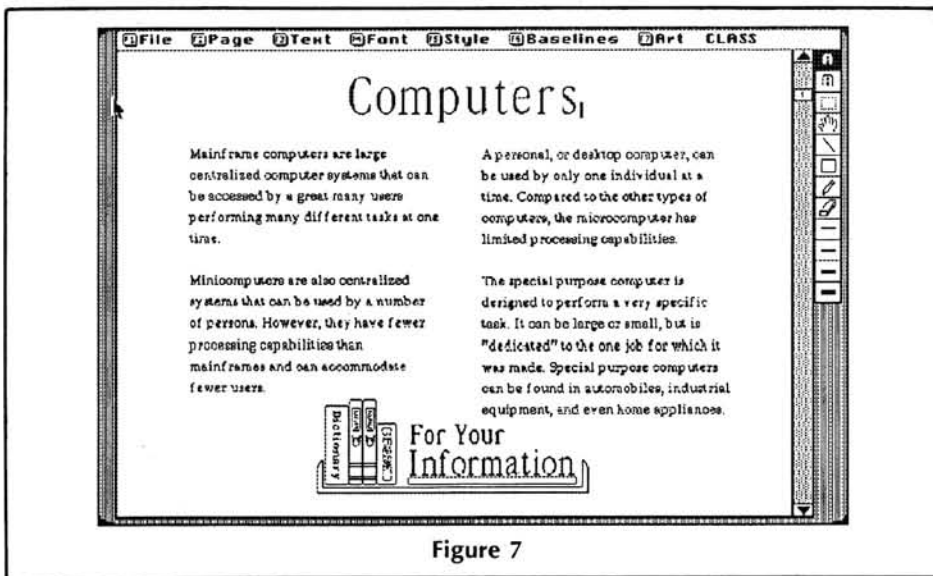
For example, Figure 7 shows a simple two column document with a small graphic. I wanted to extend the first lines across the entire page so I first displayed the baselines and moved down the column on the right (Figure 8). Then I extended the baselines for the first several lines (Figure 9) and moved the graphic into place (Figure 10). The operation took a few seconds.

Publication Management Tools

In this category, I include two functions: text manipulation and project management. While a desktop publisher isn't designed to replace a word processor, it should still provide basic text entry and editing functions. It should allow you to enter, delete, edit, move and copy text.

First Publisher meets these requirements. While you could actually type your document using the program, its better to use a word processor for large amounts of text, then merge it into the First Publisher document.

First Publisher can import document files created with a number of popular word processors, including WordPerfect (through version 4.2), WordStar, Microsoft Word, Wang PC, Multimate, PFS:First Choice, PFS:Write, Professional Write, and DCA formatted files. It can also directly



import ASCII text files from any other editor you have, and will translate imbedded character formatting codes into First Pub-

lisher directives, such as the code *F Helvetica 12 i* into 12-point italic Helvetica.

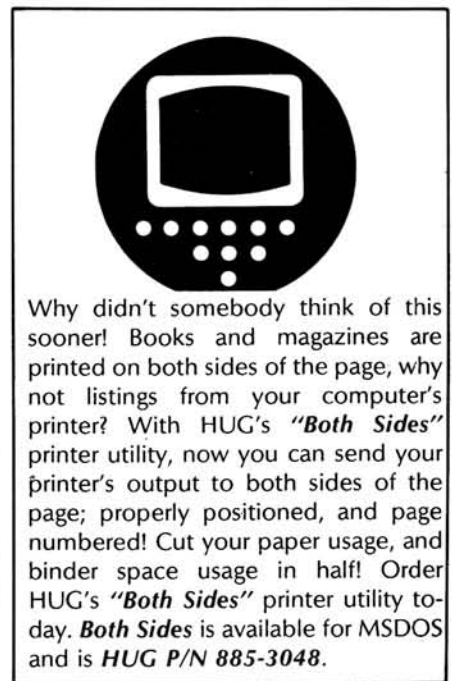
As a word processor, First Publisher just simply does not compete. Editing is slow, the screen characters can be difficult to read on some systems, and text does not paginate automatically. Long sections of text (the limit is 5,000 characters per page) do not automatically flow from one page to another, but into a page overflow area. You then have to create another page and paste the overflow text via the clipboard. Not very convenient, but the program's ability to import formatted files overcomes these disadvantages.

The other area that a good desktop publisher should provide is in project management — aiding in the storage, retrieval and manipulation of documents, pages, and publications. First Publisher perhaps doesn't go as far as its much more expensive competition, but it does provide the useful tools. Pre-designed page layouts can be stored as templates, then text files and graphics merged. Some useful samples are provided and it is an easy task to adjust the baselines, or add rules and lines that will serve as a template later on.

In all, First Publisher is a solid desktop publisher for light and medium-duty users. It is easy to learn and use, provides the necessary tools and output quality, particularly with a laser printer.

If you produce publications with a lot of text (as compared to letterheads and

Continued on Page 35



dBASE III

Having worked with dBASE III for approximately 2 years, I can appreciate the frustration of first-time users. Under pressure to develop a management information system, I didn't always read the manual for the full explanation of a command. For example, I once thought EXIT meant exit the program, and I had no idea how to repeat a series of commands with a "do" loop, such as would be used in a menu routine. Finally, after 15,678 syntax error messages, my programs run a lot smoother and are much more structured. So why not share some of this hard-won knowledge? Thus, the reason for this series of articles.

Compared with another unnamed data base program, I was forced to work with prior to obtaining dBASE III, the dBASE III programming language is powerful enough for the most sophisticated applications. At the same time, casual users can set up data bases for simple applications which can be manipulated strictly from the dot prompt, especially when in conjunction with the HELP and ASSIST functions. If, however, you want to go beyond casual use and delve into some of the intricacies of programming, these series of articles should be of help to you. In any event, the best place to start is to simply experiment. Try out the examples in the manual under various conditions. Just remember, if you are experimenting with a genuine data base, be sure to have a backup copy.

Probably the biggest mistake anyone can make in setting up a data base is to charge ahead with the CREATE command without giving any thought as to what the data base will be used for, how often will it need to be updated, what the structure should be, will it need to be indexed, etc. When you take this approach, it generally isn't too long before you discover that the basic structure of your data base needs to be changed, or that you really need two related data bases instead of one. I have found that planning the whole thing out on paper before actually creating the system will save time in the long run. Even for as simple a task as cataloging a CD or record collection, a little advance planning can save you the frustration of having to modify the structure of an existing data base at some later time.

When planning a data base system, you should consider in detail three basic areas:

- Input to the system —
 - What information must be entered into the computer?
 - Will data validation be required?
 - Who will enter the data?
 - How often will the data have to be updated?
- The processing performed by the system —
 - What calculations will be required?
 - Will sorting of the data be required?
 - Will information have to be transferred between files?
- Output of the system —
 - What information will be displayed on the screen?
 - Will the system have to produce reports and if so, how often?

Understand that this is not an exhaustive list of all the details that should be considered, only a representative sample to illustrate the three major requirements of any data base system.

In order to demonstrate more effectively the principles involved in setting up a dBASE system, I will use as a model an actual data base which I developed for the Department of Defense. The purpose of this data base was to keep track of project data for development of military drawings for microcircuits. Each project required keeping track of such information as project number, drawing number, type of project and various milestone dates.

The first step in planning any data base system is to identify all of the pieces of information the system must keep track of. Once this is done, you will be in a better position to determine how many data bases will be needed to achieve the overall goals of the system. A good rule to follow is that each data base file contains a group of related items of information that belong together logically.

For our case study, assume you must keep track of the following information for each drawing project:

1. Drawing number
2. Revision letter
3. Project number
4. Initials of engineer working on drawing
5. Date of start of project
6. Estimated completion date
7. Date in to editing group
8. Date back from editing group
9. Date drawing is approved
10. Document date

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11. Comments

In addition, each drawing may cover from one to 30 or more device types, so for each project, you must keep track of each device type and the equivalent vendor part number. So add two more items:

12. Device type.

13. Equivalent vendor part number.

Having identified all of the information that the system must keep track of, we can now begin to consider the structure of the data base or data bases. Items 12 and 13 present an immediate problem. From working with this system over a period of time, I know that most drawing projects cover only one or two device types, but there are some that cover as many as thirty. If we use one data base, we will have to create as many as thirty different device type fields and thirty different vendor part number fields. Although this is a possible approach (dBASE III allows up to 128 fields), it is not very efficient in regard to disk space, since most of these fields for the majority of projects will be blank. A better solution would be to create a second data base for the device types and link each record with the project record via a common field, such as project number or drawing number.

Another consideration for this system is the disposition of completed projects. Before I became involved in this system, the active projects were kept in one file and the completed projects in a completed file. This required that all of the projects completed for the month be joined with the device type records, copied to the completed file and then deleted from the active file. After studying the inefficiencies of this system, I decided that keeping all the records in one file and simply adding a status indicator — "A" for active, "C" for completed, "D" for discontinued — would greatly simplify the procedures required to do monthly reports.

Assuming that all the pieces of information have been itemized for the system, the next step is to start laying out the structure of the actual data bases — choosing proposed field names, estimating size of each field and determining type of field. A good way to start is with a

blank sheet of paper for each data base. The preliminary worksheet for the main project file is shown in Figure 1.

Project File			
1. Project status	C		1
2. Drawing number	C		10
3. Revision letter	C		1
4. Project number	C		12
5. Engineer	C		3
6. Start date	D		8
7. Est. completion date	D		8
8. Edit-in date	D		8
9. Edit-out date	D		8
10. Approval date	D		8
11. Document date	D		8
12. Comments	C		40

Figure 1
Preliminary Layout of Project File

Before laying out the proposed structure of the device type data base, some thought must be given as to what field should be used to link the two data bases. The two possible candidates are drawing number and project number. If we use drawing number, we will have to consider the possibility that a given drawing may be generated under one project and then revised later on under a different project. To distinguish between two records on the same drawing, we would have to include the revision letter as part of the key. This is definitely a possibility, since any data base can be indexed on more than one field. However, if it is known that no two projects will ever have the same project number, then linking the two data bases by a single field — the project number — may be the better choice. Certainly using a single field will make the programming easier. Therefore, choosing this last option, Figure 2 represents the preliminary outline of the device type data file.

Device Type File			
1. Project number	C		12
2. Device type	C		2
3. Vendor part number	C		15

Figure 2
Preliminary Layout of Device Type File

Now we are ready to create the actual data base files. At the dot prompt, type `CREATE PROJECTS`

(All input is assumed to be followed by pressing ENTER.) For the first field, type "STATUS". Leave the type as "Char/text" (press ENTER). Enter the width as 1.

For field 2, type "DWGNR". Leave as a character field. Enter 10 for width. Enter field 3 as "REV" with a width of 1. Enter field 4 as "PROJNR" with a width of 12. Enter field 5 as "ENGINEER" with a width of 3. Enter field 6 field name as "START-DATE". With the cursor in the Type column, press the space bar twice so that "Date" appears, then press ENTER. You will note that a width of 8 is entered auto-

matically, since all date fields have a standard format. Enter the remaining dates as follows:

7. ESTDATE
8. EDITIN
9. EDITOUT
10. APPDATE
11. DOCDATE

Finally, for field 12, type "COMMENTS" with a width of 40.

This completes the creation of the project data base "PROJECTS". Press CTRL plus END, then ENTER, to write the data base to disk. In answer to the query "Input data records now?", respond "N". To check on the structure of the data base, type "DISPLAY STRUCTURE" or press F5. You can print a copy of the structure by typing

```
LIST STRUCTURE TO PRINT
```

It always is a good idea to keep copies of the structure of all data bases as a part of your documentation. (You never know when you might have to reconstruct a data base from scratch!)

The total number of bytes for PROJECTS should be 116. If you do some fast addition, you will find that the sum of the widths is actually 115. So why the extra byte? Every record includes an additional byte which determines whether or not that record is marked as deleted. DBASE III does not actually remove a record from a file until you reconstruct the data base with the PACK command. This allows the possibility of recovering any records that may have been deleted by accident using the RECALL command.

The next step is to create the device type data base. Type

```
CREATE PROJXREF
```

then create this data base with the following structure:

- | | | |
|------------|------|----|
| 1. PROJNR | char | 12 |
| 2. DEVTYPE | char | 2 |
| 3. VENDPN | char | 15 |

Before continuing further with the development, a few words should be said about indexing data bases versus sorting.

Unless you are working with a very small data base, I recommend indexing as opposed to sorting. For one thing, sorting always creates a second data base, whereas indexing can achieve the same result without disturbing the original data base. Using the sort method, as you add records, you will have to re-sort the data base. With an indexed data base, the actual location of appended records does not matter, since the index keeps track of the location of each record. The one major advantage of indexing is the speed with which a record can be found, especially with a very large data base.

For example, using a non-indexed data base, the only command that can be used to locate a particular record is the LOCATE command. Using this command, dBASE starts at the first record and searches record by record until it finds a

record which matches the input. For a very large data base (10,000 records or more), this could take as long as a minute or more, totally unacceptable for a computer response. With an indexed data base, the SEEK or FIND commands will locate any record almost instantly.

Another advantage to indexing is that any data base may be opened with up to seven indexes, all of which will be automatically updated to reflect any additions or changes to the file, which would otherwise require re-sorting the file on several different fields.

To resume, what indexes will we need for our system? Assume that we know for a fact that almost all inquiries regarding the status of a particular project will be by drawing number rather than by project number. If we want to be able to locate and display a record without undue delay, the project data base should be indexed on drawing number as a minimum. (The need for other indexes may become apparent later.)

To distinguish between two projects on the same drawing, the index key should include the field DWGNR, plus the field REV as the key. To do this, you concatenate the two field names using the plus sign (+). The syntax for the INDEX command is

```
INDEX ON [<key expression> TO <file name>]
```

For PROJECTS, the key expression will be "DWGNR + REV". The file name of the index can be any name, but a good convention for naming indexes is to combine the name of the data base and the field or fields which make up the key. With this in mind, we can use PROJXREF for the name of the main index of PROJECTS, in which "DW" stands for drawing and "RV" stands for revision. (Unfortunately, DOS limits any file name to 8 characters, plus a 3 character extension; otherwise, we could come up with more descriptive names for our indexes.) When the index is created, dBASE will add the extension ".NDX" to indicate an index file.

To create the index, you must first open the project file with

```
USE PROJECTS
```

Then type

```
INDEX ON DWGNR + REV TO PROJXREF
```

dBASE should respond with "No records indexed" since we have not yet entered any data into the data base. Nonetheless, the index has been created, as you can see if you type "DIR *.NDX".

We are now ready to consider the device type cross-reference data base. The decision was made to link this data with the project file using the project number field. Therefore, the main index for this file should be keyed on PROJNR. To do this, first open the file with

```
USE PROJXREF
```

Using the name PROJXPJN, create the index:

INDEX ON PROJNR TO PROJXPJN

As before, the response should be "No records indexed". Again, you can type "DIR *.NDX" to see that both indexes reside on the default drive.

In my next article, we will enter actual data into both data bases and test how they respond with and without the indexes turned on. We will also explore the EDIT, BROWSE and APPEND commands. In addition, I will show how to DELETE and RECALL records and the effect of SET DELETED ON versus SET DELETED OFF.*

Continued from Page 32

announcements), I wouldn't trade in your word processor for it. But it definitely serves as an important partner with your word processor, giving you high-power tools for a low price.

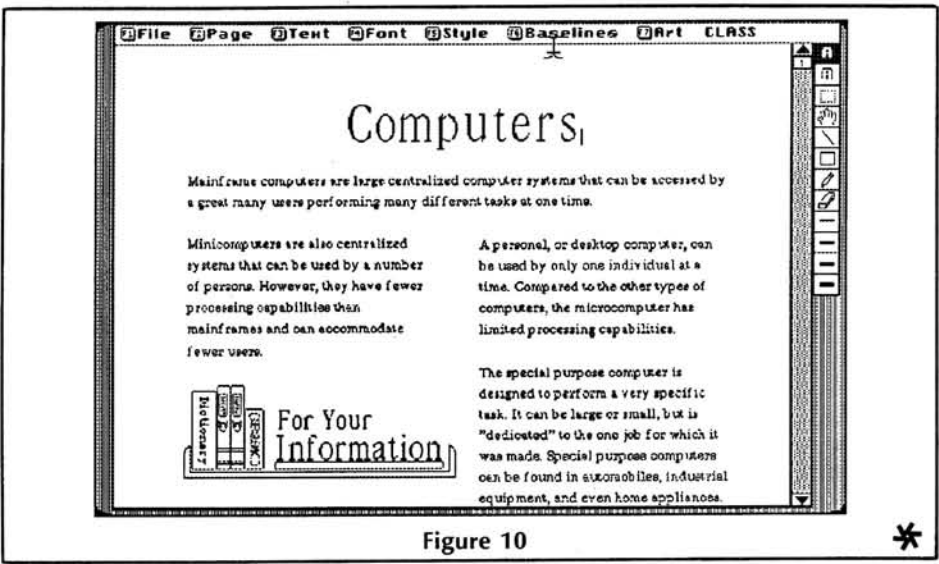


Figure 10

Continued from Page 17

```

mov     al,0b1h           ;toggle to slow mode
mov     speed,al
cmp     al,0
jne     ovr
f3:    mov     al,0b2h ;toggle to fast mode
mov     speed,al
ovr:    mov     dx,064h   ;put value in mode control port
out     dx,al
pop     ax
get_out:
pop     di
pop     es
pop     dx
pop     cx
pop     bx
pop     ds
iret
key endp
last:

;      End of resident code

init proc near
assume es:keyvect
cli
mov     ax,keyvect           ;point es to the
mov     es,ax                ;interrupt vectors.
mov     ax,word ptr es:keyint ;let ax point to kybd vect
or
mov     bx,offset key_call+1 ;
mov     [bx],ax
mov     ax,word ptr es:keyint[2]
mov     [bx+2],ax
mov     word ptr es:keyint,offset key_rtne
mov     ax,cs
mov     word ptr es:keyint[2],ax
sti
display msg                  ;sign on message
mov     dx,064h
mov     al,speed
out     dx,al
keep_process 0,last         ;stay resident
init endp
msg:    db     0dh,0ah
db     'Zenith Z-248 Speed Switch',0dh,0ah
db     'use Alt = to toggle fast/slow',0dh,0ah
db     'Written by Manfred W. Prange',0dh,0ah
db     '$'

code ends
end start

```

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EGA color monitor and tilt base.

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640x480/600x800 resolution card, VGA color monitor, tilt/swivel base and autosync.

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Graphics Printer or Epson FX Part 4

Character Sets, NLQ and Proportional Spacing

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In the first article in this series, I mentioned the different 'F' and 'G' character sets. Now, we'll see how to select them. If you are working with an IBM GP, you are best off with Character Set 2, selected by ESC "6". This has the same characters as Set 1, selected by ESC "7", except that from 128 to 159 you get an assortment of European accented characters, whereas Set 1 has an extra copy of the ASCII basic printer control codes.

With the 'F' set on the Epson FX compatibles, you have three selections to make to get a full character set. ESC "I" 1 (uppercase i) gives you printable characters for 0 to 31, and also for 128 to 159 except for positions occupied by the basic ASCII commands. As is usual, 0 to 31 concerns upright characters, and 128 to 159 is for italics. ESC "6" will give you printable characters for all codes from 128 to 159, and 255 also. Finally, you must decide which international Character Set you need. ESC "R" n selects Set n; 0 is USA, other numbers select Japanese and various European character sets. Don't forget that you can switch character sets while printing (as does WordStar 4.0), to get the best of nine different worlds. Look up in your printer handbook to see what you get, because the tables are quite long, covering characters 35, 36, 54, 91 thru 94, 96, 123 thru 126 and the corresponding italic characters (same codes + 128).

If you have extended graphics characters on your Epson, from 128 to 159,

you will select them with ESC "m" 4, and return to italics international characters with ESC "m" 0. You may not be able to get italics at the same time as extended graphics. Recent Epson printers, such as the LX series, also include the GP character set from 128 to 254. ESC "t" 1 switches you to 'G' characters, and ESC "t" 0 switches you back to 'F' italics. Since the characters don't switch on your computer screen, you need the full tables at hand while you are typing, to see which print character corresponds to which screen symbol. You can get used to typing "caf { cr}me" when you want to print "café crème..."

For data processing, you won't need any of these characters, so you can leave the printer in its native state.

DIP (dual in-line package) switches let you select several power-up options, including character sets. These are explained in your printer handbook. For everything except the character sets and emulation modes, you can usually leave the switches on their factory settings; they are fragile, so don't move them too often. With older printers, you have to remove the covers to get at the switches, whereas with more recent machines there are access hatches which pry off. The DIP's don't actually switch anything; the printer microprocessor reads their positions at initial power-on, and sets values accordingly. Turn the printer off before resetting them; otherwise, you may damage the

printer, and they are only read at power-on time anyway. Most DIP settings can be changed by software; however, you must check settings for 0 with or without a diagonal stroke, buffer use (download characters, which we are going to discuss, must be enabled on the DIP), -SLCT IN which should be ON, and CR (auto feed) which should be OFF. You may have to select 'F' or 'G' emulation, if you can't switch by software. If you are using the serial port, it will have switches to set baud rate, parity and protocol. For the rest, set the switches to what you want on power-up, and use software to give new settings as required.

Although working in France, I always power-up my printer to the standard USA character set. This is because copy and type functions usually concern files with MS-DOS commands, and I like to have \ print as \ and not as ç. Any software that needs French characters will be set to switch the National Character Set with ESC "R" 1 (the code for France), and reset with ESC "R" 0 at the end.

Near Letter Quality

In Part 3, we looked at emphasized print, which lets us use a 1/120" spacing between adjacent dots by reducing the head to half-speed, and double-strike, which gives us 16 horizontal lines instead of 8 by printing twice, with a 1/216" paper advance in-between passes. The two methods combined give us a high-quality

character, but which still uses the "draft" matrix of 11 × 8 dots. Most printers have a second set of characters, based on a matrix of 23 × 16 or 23 × 18, which uses the same half-speed/double-pass combination, but with each dot independent. Also, although the limit is 1/120" between dots, dots on different lines can be staggered by 1/240". This gives a much finer design for each letter, which can have about the same quality as an ordinary typewriter. This is the "Near Letter Quality", or NLQ mode. Printing is at less than a quarter of the speed used for standard draft characters, but the characters are far neater and give a much denser black.

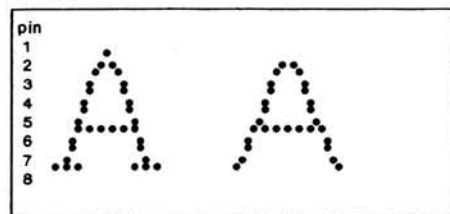


Figure 4-1
NLQ Characters
Prestige (Left) and Gothic (Right)

Your printer won't give you all the special effects with NLQ. Since the head is already running at half speed, it may not be able to slow down much more for condensed characters. My PS 220 goes down to 17 cpi in NLQ, but at 20 cpi it handles draft only. It also gives me emphasized NLQ, apparently by adding an extra dot 1/120" to the right of existing dots if there isn't one already — not all printers will handle this. Double-strike either won't work, or will be interpreted as emphasized. Sub- and superscripts will probably print in either draft or emphasized draft; these characters are on a 9-line vertical grid (two passes of half the head), and it takes 16 grid lines to define NLQ letters.

Since NLQ wasn't on the original Epson FX, there may be differences in the NLQ select sequence. The usual sequences are ESC "x" 1 to select NLQ, ESC "x" 0 to clear NLQ, and if you have more than one NLQ font available, ESC "k" n to select font n. On my printer, for instance, ESC "k" 0 gives Prestige characters, and ESC "k" 3 gives the Gothic style from an optional PCB.

Proportional Spacing

Up to now, we have always spoken of "so many characters per inch," as though every letter had the same width. Well, usually they are, on your printer anyway. But look at the dot patterns above for the letters "Mii!". The arrows mark the start of each letter. "M" fills up its 1/10" quite well, with 3/40" of letter and 1/40" of space to the right. "i" takes less than half of its allotted 1/10", and as for the exclamation mark, it's nearly lost in its single column. At least this way you know in ad-

vance how many characters fit on a line, and you can line up columns with no difficulty.

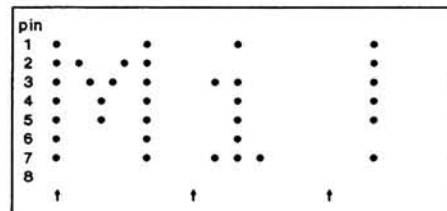


Figure 4-2
Three Draft Characters
in Standard Spacing

You can also squash characters up a bit so they only take up the necessary space:

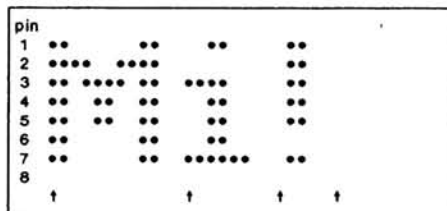


Figure 4-3
Three Draft Characters
in Proportional Spacing

Figure 4-3 shows the same three characters, but only the "M" keeps its 1/10 width. The "i" is now pitched at 1/15", and the exclamation mark at 1/24". This is done by selecting "proportional spacing", set by ESC "p" 1 and cleared by ESC "p" 0. The printer carries minimum width information on each character, and uses it instead of the fixed pitch when requested. Proportional spacing is usually emphasized as well, as shown in the drawing.

Since characters can have any width from 1/24" (the minimum for Pica mode) up to 1/10" (full width), it isn't easy to know how many characters you can get on a line; it all depends on the text you are printing. With an ordinary mix of letters, 80 characters will take up about 7-1/4" instead of the standard 8". About all you can do in ordinary programming is to use proportional spacing to get a bit more on a line, and use Tabs if you have to line up something to the right. It needs a word processor to make full use of proportional spacing; they have internal tables giving the exact width of each character, and calculate exactly how much text will fit on each line.

You will probably have to put up with a ragged right edge to a proportional document. On small printers, word processors justify the right margin by slipping in extra spaces between words. This sets the right edge of the line in 1/10" increments. Since the size of proportional letters is fixed in 1/120" increments, extra spaces can't pad the line to an exact right margin, so you have to leave it unjustified. If you're very lucky, you may have the 'D' code command to handle this: ESC 31 n

(or ESC 32 n on some printers). n is a pitch, in 1/120". In proportional mode, this changes the width of the space character to (n-1)/120". The word processor will calculate how many 1/120" it needs to get an exact right margin, and adds them across all the spaces on the line. The same instruction, in fixed spacing mode, controls the pitch of all characters; so if you're using it, you will have to issue an ESC 31 13 instruction to set characters to 10 cpi (12/120").

3/4" in 8" isn't a very big difference, but the letters in the standard sets have been fiddled to get them to look right in fixed 1/10" spacing. Wide letters like "M" and "W" have been squashed, and narrow letters like "l" and "i" have serifs added even in sans-serif styles to pad them out and avoid too much white space. Look at the capital "l" on your printer: it has enormous serifs top and bottom, to push it out to four dots wide (7/120"), the same width as the letter "r". All this padding means there's not much to be gained by going proportional. Most capital letters are at 12/120" pitch, so there's no saving, and most lowercase letters are at either 11/120" or 12/120" width, so the gain is minimal. The situation is very different with fonts specifically designed for proportional spacing, such as Anelia:

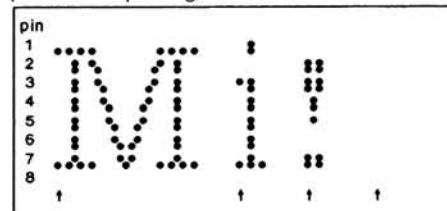


Figure 4-4
Three Anelia Proportional Characters

The characters are well-balanced, with each letter taking up a proper amount of space for an attractive presentation on the page. The dot pattern for the letter "i" is only about 1/40" wide, and would look stupid if it was given a full 1/10" of space on the page. As for the "M" — drawn properly instead of being squashed into 1/10", it takes over 1/10" for the dot pattern, without counting the narrow space to the right; the full width is 2/15" (16/120"), which would give a pitch of 7.5 cpi in fixed spacing — and is why there is no way to use this font at 10 cpi. The test line I was using to compare fixed and proportional in draft comes down to only 6-1/4" in Anelia, a very worthwhile saving of over 20%. If you've got Anelia on your printer and a word processor that will handle it, I strongly recommend this font for any commercial documents, because of its neat, professional appearance.

If you have to patch a word processor proportional spacing table, you will need to know the width of each character on your printer. Some manufacturers include the spacing tables in the basic literature;

Continued on Page 47

Some Questions & Answers

About Z-100's

Pat Swayne HUG Software Engineer

and ZPC

The Z-100 (for those of you who may not know) is a computer model that Heath/Zenith used to make that runs the MS-DOS operating system, but is otherwise not compatible with IBM's personal computers, as are computers currently manufactured by Heath/Zenith. ZPC is a program that allows you to run IBM PC software in H/Z-100 (dual processor) computers. ZPC is available from HUG as part no. 885-3037-37. An upgrade disk for ZPC is also available as part no. 885-3042-37.

Although many popular business programs for the IBM PC can be run on a Z-100 under ZPC, most of them must be patched first. The patches are usually done to remove port accesses that conflict with the Z-100's ports. If these ports are accessed improperly, the computer can "lock up", or do other unpredictable things. Patches for many PC compatible programs are included on the ZPC disk and the ZPC upgrade disk to fix the port conflicts and other problems. There is also an add-in board available for the Z-100 called the "Scottie Board", which resolves these port conflicts in hardware, making many of the patches unnecessary. The Scottie Board is available from Scottie Systems, Inc., 1609 S. Main St., Milpitas, CA 95035, (408) 262-5021.

Since I am the author of ZPC, I regularly get questions from ZPC users and others about the ZPC, along with other Z-100 related questions. Many of these questions are repeats. In fact, I recently received a letter containing nearly all of the repeated questions. So I decided to write this article to, hopefully, answer once and for all at least some of the repeat questions.

Question: How can I use a mouse with PC programs under ZPC, and also with native Z-100 programs?

Answer: Most PC programs that use a mouse require a mouse driver (that usually comes with the mouse). This driver works directly with the serial port hardware that the mouse is connected to, so it expects to "see" IBM compatible serial

port hardware. The Z-100 does not have such hardware, but a serial port option is available for the Scottie Board that will sometimes work satisfactorily with PC software and mice. However, because of the complexity of emulating PC-compatible video on a Z-100, mouse performance is often too sluggish to be practical.

Paul Herman, of Paul F. Herman, Inc., has modified ZPC to directly support a mouse with PFS First Publisher and GEM (a graphic environment like Windows). He sells these programs bundled with ZPC modification software. He also has mouse drivers that let you use a mouse with native Z-100 programs. Contact Paul F. Herman, Inc., 3620 Amazon Drive, New Port Richey, FL 34655, (813) 376-9347.

Question: Since the Z-100 can operate in a 640x480 graphics mode, why can't ZPC be made to emulate EGA graphics or the 43-line EGA text mode?

Answer: An EGA video card has 4 banks of video memory that all occupy the same video space, using a bank switching scheme. It would be impossible to emulate something like this with ZPC. You could emulate the EGA BIOS routines, but virtually all programs designed to work with an EGA video card access the card's video memory and ports directly. (In fact, I doubt if there is a single EGA graphics program that uses BIOS routines only.) You could emulate the 43-line text mode, but I can think of only one program, WordStar, that could take advantage of it. It would be easier to modify WordStar to use all 50 lines available in the 640x480 mode by running it under a modified version of the Z-100 WordStar Connection (HUG part no. 885-3047). But there would be problems with the Page Preview feature of WordStar version 5 in either case.

Programs other than WordStar that use the 43 line EGA mode are probably too hardware dependent to work under a modified ZPC. And the screen response time of any program running this way would be slowed down even more than it already is by running under ZPC. This

would be caused by having more video memory to maintain.

Question: I understand that the Z-100 was originally designed to incorporate sound hardware. Why can't what circuitry there is be developed to make sound for PC programs under ZPC or for native Z-100 programs. Or why can't a sound circuit be built on the Scottie board.

Answer: The only remnant of the originally proposed sound circuitry is a line from U159 (pin 14) which would have been the chip select line for the sound port, which apparently would have been F9 (hex). If you write to port F9 (doesn't matter what value, since the port is not there), it should cause that line to toggle. I suppose you could make primitive sounds if you connected that line to a speaker, and then wrote to F9 at varying rates. But remember, that line does not represent the actual port, but only the chip select for the port. So it would not latch to a particular state (high or low), but only toggle.

We looked into designing PC-style sound circuitry on the original ZPC hardware support board (the father of the Scottie board), but it got to be too complex, and never worked satisfactorily. The sound circuitry on a PC is part of the counter/timer circuitry, which also produces the timer interrupt. The whole counter/timer circuit would have to be implemented, in order for the sound circuit to work properly.

Question: Is there any way to provide true 16-color video with ZPC?

Answer: There is a third party add-on product for the Z-100 called the Hughes V1 board that adds 16-color video to the Z-100. Stanley Schwartz, a ZPC user, wrote up some ZPC mods to use the Hughes board to provide 16 color support for PC programs. His modifications were supposed to be published in Sextant magazine (now out of publication), but I do not know which issue, if any, has the mods. However, I have a printed copy of the modifications (just the modifications,

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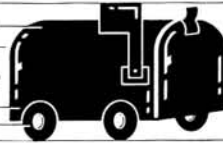
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with no accompanying instructions). If you would like a copy, send me (c/o HUG) a business-sized self addressed, stamped envelope.

Frankly, I never thought that much of the V1 board, because it did not provide adequate support for monochrome users (the monochrome output would not drive the internal monitor of an all-in-one Z-100 at all), and because the optional ZPC support circuit available on the board did not work. However, it does work OK at producing 16 colors on a color monitor. If you are interested in getting one, contact Paul F. Herman at the address given above, or Hogware Company, 470 Bellevue, St. Louis, MO, 63119, (314) 962-7833.

Question: Why doesn't CLS clear the screen when ZPC is in the PC mode?

Answer: The CLS command on a Z-100 causes the escape codes for clearing the screen to be sent to the console driver. When ZPC is in the PC mode, it takes over the console driver, and, like a real PC, does not support Z-100 escape codes. Therefore, CLS does not work in the PC mode. However, you can clear the screen by resetting the current video mode with the PC command. For example, if ZPC is set to the default video mode (mode 3), you can clear the screen by entering

PC 3

at the system prompt, and pressing Return. You can also replace any CLS commands in batch files that come with PC programs with PC 3, and the batch files will clear the screen when they are supposed to.

Question: Are there some patches for using Turbo 5.0 with ZPC?

Answer: I have not tried Turbo 5.0 myself. Apparently, there are some changes required to ZPC itself to make it work properly. The file ZPCFIXES.ZIP, available for downloading from the HUG Bulletin Board (616-982-3956), contains patches that are supposed to make Turbo 5.0 work. The ZPC fixes were prepared by Paul Sitz.

Question: Can I/O redirection and template editing within programs be made to work in the PC mode of ZPC?

Answer: ZPCFIXES, mentioned above, is supposed to fix these problems.

Question: Why don't the default "hot keys" of some TSR (Terminate and Stay Resident) programs work under ZPC?

Answer: On the Z-100, with the keyboard working in its normal manner, a key produces a code when it is pressed, and nothing when it is released. On a PC computer, a key produces a code both when it is pressed and when it is released. Although the Z-100 keyboard can be programmed to produce "make" and "break" codes, ZPC does not use this mode, but rather emulates the codes itself. This does not work for all programs. I guess it would have been better to have ZPC program the Z-100 keyboard in the "make-break" mode, but it would have been much more difficult, since I would have had to provide my own keyboard buffer, key repeating (when a key is held down), and key translation (from make-break codes into normal ASCII codes).

The solution to the problem, for programs that allow you to change the hot keys, is to change them to something that works. Remember that to get an Alt-key combination, you must press the Help key followed by the other key in the combination. Similarly, the F1 key must be used instead of the Ctrl key for some Ctrl-key combinations.

Question: Why does PC Paint (or some other graphic program) display strange characters under ZPC? (Graphic displays are OK, but text characters are messed up.)

Answer: In the graphics modes, text characters are sometimes formed using a table in the BIOS ROM. Since the Z-100 ROM does not contain this table, ZPC must provide it, and it must be at a different location (you can't overwrite a ROM). So programs that access this table must be patched to access it at the ZPC location. See page 18 in your ZPC manual for more information.

Question: Why doesn't AutoCAD work under ZPC when installed for a CGA card?

Answer: AutoCAD reprograms the CGA hardware so that video is addressed in a non-standard manner. Normally, the video memory on a CGA card is divided into two sections, with even scan lines on the screen stored in one section, and odd scan lines in the other. AutoCAD apparently modifies the CGA registers so that the memory is addressed in a single block, for faster video updating. ZPC has no way of adjusting for this non-standard modification.

Question: Why don't the free programs, MARK and RELEASE (available on many bulletin boards) work with memory resident programs on the Z-100, to make them removable.

Answer: Versions of MARK, RELEASE, and MAPMEM, that work on a Z-100 can be found in the file TSR.COM.ZIP on the HUG Bulletin Board. *



Figure 1

And third, while you can change the format for numeric entries, they will start by default as two decimal places with commas separating the thousands.

Let's start by entering the column and row titles.

1. Press the up arrow key to reach the column heading area in column 1.
2. Type First Quarter. Notice that the column expanded as you typed to accommodate the title.
3. Press the backspace key to erase what you just typed. The column width changed accordingly. Let's try something else.
4. Type QTR 1 in that same cell.
5. Press Alt-Q. This is the speed key command for Start quick entry in the Features menu.
6. Press the Tab key to reach the next cell. QTR 2 automatically appeared.
7. Press Tab twice more to display QTR 3 and QTR 4 in the proper cells.
8. Press ESC to exit the quick entry mode. You can use this feature to enter repeating column or row titles (press Enter to move from row to row), such as January, February, etc.; Mon, Tues, Wed; or Week 1, Week 2, and so forth.
9. Press Ctrl-Home (hold down the Ctrl key, then press Home). This moves the cursor directly to the "home" cell — R1C1.
10. Press the left arrow to reach the title area for that row.
11. Type Sales, then press the down arrow key.
12. Now complete the spreadsheet so it appears like this:

	QTR 1	QTR 2	QTR 3	QTR 4
Sales				
Expenses				
Rent				
Salary				
Overhead				
Total				
Net Profit				

As you can see, the spreadsheet shows sales and expenses for the four quarters of the year. Now it's time to enter the numbers.

13. Press Ctrl-Home to reach cell R1C1 again.

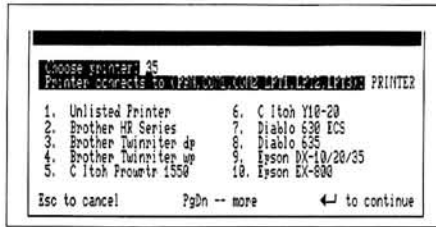


Figure 2

14. Type 10000, then press the Tab key to move to the next cell. First Choice changes the entry to 10,000.00 — the default format.
15. Now enter the following numbers into the spreadsheet at the cells given:

Cell	Enter
R4C1	500
R5C1	3500
R6C1	400

We now want to have the total of the expenses in cell R7C1 and the net profit, the difference between sales and expenses, in R9C1. Rather than manually calculate the figures and type them in, we'll enter formulas to do the work for us.

16. Place the cursor in cell R7C1.
17. Press Alt-F (the speed key for selecting Type or edit cell formula from the Features menu). A small box appears in the lower right corner, as seen in Figure 4.
18. There are two entries you can enter here — a cell name and the formula. By naming the cell, you can refer to it in other formulas by its name and not its cell coordinates. Since it would be easier referring to this cell as Total, not R7C1, let's name it.
19. Press the up arrow to reach the name option.
20. Type EXPENSES.
21. Press the down arrow to reach the formula option.
22. Type TOTAL(R3C1..R6C1). TOTAL is a built-in function of First Choice. It calculates the total of the range of cells shown (the first and last cells of the range are separated by two periods).

We want to enter another formula in cell R9C1. But let's first name the cell that holds the sales figure.

22. Press Ctrl-Enter. The formula box stays on the screen, but the cell it's

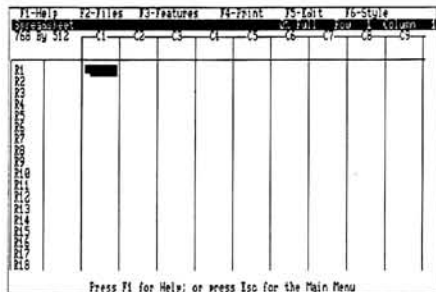


Figure 3

referencing changes to the next one just above. (You could also use the Enter key to move down, Tab to move right, or Shift-Tab to move left.)

23. Press Ctrl-Enter until you activate cell R1C1.
24. Press the up arrow to reach the name option, then type SALES.
25. Now press the Enter key to reach cell R9C1.
26. Type SALES - EXPENSES.
27. Press the up arrow to reach the name option.
28. Type NET.
29. Press Alt-F to exit that mode and return to the spreadsheet.

First Choice, like all spreadsheets, will recalculate automatically when you change cell references in formulas. Let's see how this works.

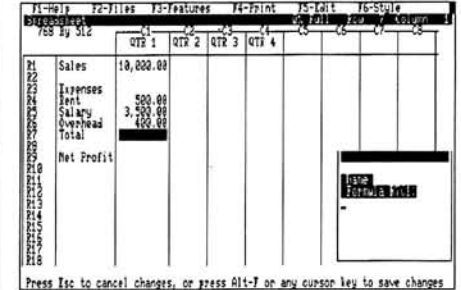


Figure 4

30. Place the cursor in cell R1C1.
31. Press DEL until the cell is empty. (If the cell's name wasn't referenced other places, you could press Alt-W to quickly erase the cell.)
32. Type 15000, then press Enter. Not only did that cell change, but so did the total expenses and net profit.

It's now time to complete the spreadsheet for the last three quarters. Since we want to enter formulas in the other columns for the total and net, we'll copy those we've already entered. But first, we have to change the formula we've given the net profit cell to include the cell references and not the names.

Here's why. When you give a cell a name, that name becomes a constant. So with the current spreadsheet, the name SALES always refers to the amount in cell R1C1. If we try to copy the formula for Net across the spreadsheet, then the net for every quarter will be exactly the same as the first. That's because each formula will use the constant SALES and EXPENSES not the figures in its own column.

By using cell references instead of names, the references will adjust automatically.

33. Place the cursor in cell R9C1, then press Alt-F.
34. Press Del until the formula is erased.
35. Type R1C1-R7C1, then press Alt-F. Now copy the two formulas.
36. Place the cursor in cell R7C1.
37. Press Alt-Q, for quick entry.
38. Press the Tab key to reach cell R7C4,

then press Alt-F.

39. Place the cursor in cell R9C1.
40. Press Alt-Q.
41. Press the Tab key to reach cell R9C4, then press Alt-F.

The formulas have been copied but the cell references changed. Prove this by completing the spreadsheet as shown in Figure 5. Enter all of the numbers for just the sales and expenses categories, not Total or Net. These will calculate automatically when you complete the spreadsheet.

	QTR 1	QTR 2	QTR 3	QTR 4
Sales	15,000.00	12,000.00	14,000.00	15,000.00
Expenses				
Rent	500.00	500.00	500.00	500.00
Salary	3,500.00	3,200.00	3,500.00	3,450.00
Overhead	400.00	500.00	600.00	500.00
Total	4,400.00	4,200.00	4,600.00	4,450.00
Net Profit	10,600.00	7,800.00	9,400.00	10,550.00

Figure 5

Now save and print your work.

42. Press F2 to display the Files menu.
43. Press 1 to select Save a copy of this spreadsheet.

A new dialog box appears asking for the name of the spreadsheet. All of your current First Choice documents are listed in the box so you don't use the same name. When you save a spreadsheet, First Choice automatically adds the extension SS.

44. Type QUARTERS, then press Enter.
45. Press F4 to see the Print menu, then press 1 to select Print this spreadsheet.

Another box appears with a number of printing options.

46. Press Enter to start printing.

The First Choice spreadsheet, while not as comprehensive as some others, is still powerful. You can create charts and graphics from spreadsheet data, use financial and statistical functions, and even use LOOKUP and IF.THEN.ELSE structures. With the IF structure, for example, you can enter this formula in a cell called commissions:

```
IF SALES >= 25,000 then .10 else .07
If the cell called SALES is 25 thousand or more, the commission rate will be 10%. Otherwise, the cell will contain 7%.
```

You can also change the style, or format, of numeric entries, and change the currency symbol, say from \$ to the pound sign. All in all, the spreadsheet is relatively comprehensive.

But now, let's tackle the data base manager. Press Esc to leave the spreadsheet and return to the main menu. If you haven't saved your work first, First Choice would have warned you.

The Data Base

Unlike Works, with First Choice you must actually leave one application before starting the next. If you remember Works, you can switch applications without having to save them first. But now that you're back at the main menu, press 2 for

Create a file folder. (The Report option, by the way, is to design a report using your data base files.) Type a name for the folder, try DATA1, then press Enter.

The screen clears and all you'll see is the standard First Choice menu bar, borders, and a scale line on the bottom (Figure 6). Think of the scale line as a ruler laying on the bottom of the paper. You use the line to plane the spacing and arrangement of your data base form. The left and right margins are shown by the [and] characters, tabs with T, and each character space with a small line.

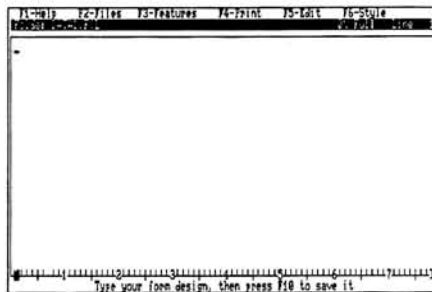


Figure 6

Use the form to "paint" a picture of your data base record. To better understand data bases, think of the file as an electronic version of a 3 by 5 inch index card box. Each of the cards in the box is called a record, and each card contains certain information about one entity (a client, inventory item, etc.) in your file. These items are called fields.

When you design your form on the screen, you are designing the look of the record — how each of the cards will look, so to speak.

Now let's design the form for our data base.

1. Type Last:. Make sure you enter the colon.
2. Press the space bar until the cursor in the scale line reaches the 4-inch position, then type First:

You now created two fields. One will hold the person's last name, the other the first name.

3. Press Enter.

Now complete the form by entering the next five fields:

```
Address:
City:
State:
Zip:
Department:
```

You can enter the fields underneath each other like that, or design a more attractive form. Just make sure you leave enough room between field names. While First Choice won't let you type over a field name, the screen could get cluttered and confusing.

4. When you're done creating the form, press F10.

The screen now changes from the design to the input form, as seen in Figure 7. Each of the fields become highlighted.

You use this same form to enter new records and to look for ones that already exist.

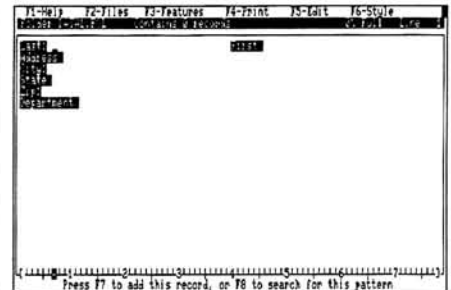


Figure 7

Let's enter a few records.

5. Type Chesin, then press Tab to reach the next field.
6. Type Adam, then press Tab.
7. Complete the rest of the record, pressing Tab to move from field to field:

```
124 Lock Road
Philadelphia
PA
19116
Finance
```

Before saving the record, suppose you have several persons to enter who work in the same department. Rather than retype the department name, you can paste it into the clipboard, a special area in memory that you can quickly use to copy text from one record to the next, or even one application to the next.

To copy something into the clipboard it must first be selected. Let's do that now.

8. Use the arrow keys to place the cursor on the first letter in Finance.
9. Press F5 to see the Edit pull-down menu (Figure 8), then 1 for the Select text option.

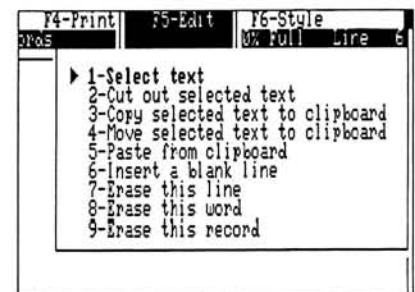


Figure 8

10. Press the right arrow key to move the cursor over the word Finance. The word becomes highlighted, or selected. (This is the same technique you'll use to select text in all of the applications.)
11. Press F5 again, then 3 to copy the selected text to the clipboard. The highlighting disappears but a copy of the word Finance is now stored in the clipboard, so go on to the next record.
12. Press F7 to save the record and dis-

play a screen for entering another. Enter the first five fields just as you did before — type the information, then press Tab to go to the next field:

Williams
Paul
62 Walnut Street
Camden
10012

Now with the cursor on the department field we'll copy the text in the clipboard.

13. Press F5, then 5 to paste the clipboard at the current location. The word Finance is copied from the clipboard into the current record.

Later on, I want to show how data base records can be selected for merging with form documents. So let's change this last entry.

14. Press the backspace key to erase the entry, then type MIS. You now have two records in your data base. Unlike some other programs, you didn't have to declare each field maximum length or whether it was alphabetic or numeric. In reality, you can use any field for numeric as long as it contains only numbers.

15. Press F7 to save that record and display another blank entry form.

Suppose you already have all of your names and addresses stored in the data base and you want to look up the address for Chesin. Well, the same entry form is also used for finding information.

16. Type Chesin in the Last field, then press F8. The record for that individual will be found and displayed.

17. Press F10 to search for the next Chesin in the data base. First Choice reports that no others can be found, so press Enter. To search for records, fill out any of the fields that can help identify who (or what) you are looking for. Through special syntax, you can also enter partial fields to be used as the search criteria, such as ..computer to find fields ending in computer, such as microcomputer. You can also specify numeric relations with fields such as >10,000.

Once you've saved the individual records, you do not have to save the data base itself, First Choice has already saved it with the extension FOL.

18. Press Esc to return to the main menu.

The report option on the main menu is used to design and print complete reports from your data base. It allows you to select fields to be listed, sort the data on any of the fields, and calculate and report totals, subtotals, and averages.

But let's go on to the word processor.

The Word Processor

If you are already familiar with a word processing program, First Choice takes a little while to get used to. Even so, it's complete enough for articles such as this, to create form letters, or for most of your

everyday typing. It is particularly useful when you use the built-in spelling checker to find and correct your mistakes.

In this section, we'll just explore the word processor a little to prepare and print form letters. We'll use the names and addresses in the data base.

1. From the main menu, press 1 to create a document. The screen that appears looks exactly like the form design screen in the data base module, complete with menu bar and scale line at the bottom. Below the menu bar is the status line, with the name of the application, the percent full, and the line and page number where the cursor is located.

Notice that the cursor is not at the top of the screen but several lines down. That space represents the default one inch top margin.

2. Type your address and date, starting at the left margin. We'll center it in the next step.

3. Move the cursor to the start of the address, then press Alt-S, the speed key for selection.

4. Move the cursor over the address to the end of the date. The text becomes highlighted just like it was when you selected the field in the data base.

Once text is selected, you can copy it to the clipboard with Alt-C, or move it to the clipboard with Alt-M. Use Alt-P to paste the contents of the clipboard at the location of the cursor.

5. With the text highlighted, press F6 to display the style menu (Figure 9), then 9 for Center.



Figure 9

The selected text becomes centered on the screen. Now move the cursor to the line under the date, then press Enter to insert a blank line.

To insert a data base field into your document, surround its name with asterisks, such as *first*. When you print the form letters, First Choice will insert the information in that field at that location in

the document. You can use all or just some of your data base fields in the form letter, but you can't enter field names that don't exist.

6. Type the address and salutation:

First *Last*
Address
City, *State* *Zip*
Dear *First*:

7. Press Enter to insert an extra blank line after the salutation.

If you make any mistakes when typing, use the backspace or DEL key to erase mistakes. But to insert text you have to know if you're in the insert or overtype modes. With overtype, the default mode First Choice starts in, new characters you type will erase any existing ones. You can tell you're in overtype if the cursor is a small underline. In the insert mode, characters to the right of new ones will shift over and down, if needed, to make room. You are in insert if the cursor is a small box. Switch between the two modes by pressing the INS key.

8. Now type the first words of the paragraph: Below is the

9. Press F6 to see the style menu, then 1 for boldface.

10. Type projected. The word appears brighter than the previous text and will print in boldfaced letters.

11. Press F6 6 to return to normal printing. You can also boldface, or apply any style to existing text by selecting it first, then choosing from the style menu.

12. Complete the paragraph:
Below is the projected budget for the first quarter of the fiscal year. Please review it with the members of the *department* department.

13. Press Enter twice after completing the paragraph. You now want to include the data from the spreadsheet in the document. So let's save the document so far so we can return to the spreadsheet application.

14. Press Alt-Q, the word processing speed key to save.

15. Type the name of your document, call it FORM, then press Enter. First Choice saves the document with the extension DOC.

16. Press Esc when the document returns to the screen to return to the main menu.

Merging Applications

You have to recall the QUARTERS spreadsheet to the screen so you can copy its data into the clipboard.

1. Press 6 for Get an existing file. The directory box appears.

2. Type QUARTERS.SS, then press Enter. Now you want to transfer the row labels and data in the first column to the word processing application. Do this by selecting the cells, then copying them to the clipboard.

3. Place the cursor in cell R0 C0, the

top-most right corner.

4. Press F5 1 to turn on the select mode.
5. Move the cursor to cell R9 C1.
6. Press F5 3 to copy the selected cells to the clipboard.
7. Press Esc to return to the main menu. Now get the document and paste in the spreadsheet data.
8. Press 6 to Get an existing file.
9. Type FORM.DOC, then press Enter.
10. Press Ctrl-End to quickly reach the end of the document.
11. Press Enter twice to insert two blank lines.
12. Press F5 5 to paste the contents of the clipboard into the document (Figure 10).



Figure 10

13. Now complete the letter.

Sincerely yours,

Alvin A. Aardvark



Figure 11

You're now ready to print the form letter since the data base file contains the names, addresses, and other information.

14. Press F4 to see the print menu, then 3 to select Print form letters.

The print options box appears asking for the name of the folder (Figure 11).

15. Type DATA1.FOL, then press Enter. The blank data base form appears. If you want to send form letters to everyone in the folder, just press F10. But what if you wanted to send letters to just certain individuals? For this example, let's say you only want to send letters to those in the Finance department.

16. Press Tab until you reach the Department field.

Now make sure your printer is turned on and ready.

17. Type Finance, then press F10. Since we only have one matching record, only one letter will be printed. But if

you had more records with Finance as the department, letters would be printed for them all.

Department Budget Fiscal Year 1989

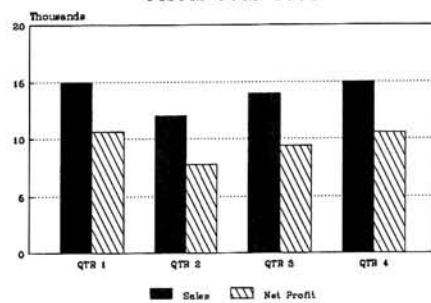


Figure 12

18. Press Enter to return to the document.
19. Now press Alt-Q to save the form letter document, then Esc to return to the main menu.
20. Press 9 to leave First Choice.

In this article, we've just touched on First Choice, and only the basic functions of three of its applications. In addition, you can create graphics (from either the spreadsheet, as seen in Figure 12, or a separate application), data base reports, and use the speller to check any of your work.

If you move back and forth between applications, and don't require some of the high-power and high-priced functions of stand-alone software, then an integrated package like First Choice is a pretty good choice. *

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I teach physics in a local community college, and publish a newsletter for my students. Figure 1 shows examples from the newsletters. The available hardware for my publishing endeavors, which include this article, is a trusty old Z-158 computer and an Epson LX-80 printer. Word processing is done with Microsoft Word (currently Version 4.0). As you can see, this equipment, plus some additional software, principally Softcraft's Fancy Word, provides a formidable graphics capability, as well as access to an almost unlimited variety of fonts.

It has taken me almost two years to develop my publishing capabilities to a satisfactory stage. Other HUGgers may, therefore, be interested in duplicating or improving upon my efforts.

In this article, I will discuss the use of Word, Fancy Word, Fontasy and EEMS for "typeset quality" desktop publishing with an inexpensive dot matrix printer.

The key to using an inexpensive dot matrix printer for producing quality text and graphics output is Softcraft's Fancy Word Version 3.0 or later. An earlier version of Fancy Word was described in RE-Mark about a year ago, but I've been unable to locate the article.

Typesetting

Fancy Word is a typesetting program that interfaces between Microsoft Word and your printer to provide what Softcraft calls "near typeset quality" output. The program functions (at least with my LX-80) by putting the printer in its graphics mode and then, so to speak, drawing the out-

put. Because the output is always treated as graphics, the program does not really "care" whether it is outputting text or pictures (except for some crucial details related to formatting). Pictures can accordingly be accommodated by Fancy Word as part of the text.

Fancy Word is accompanied by a variety of fonts and utilities for generating and modifying fonts.

Softcraft, by the way, also sells another program called Fancy Font which works with word processing programs other than Word.

So far, so good. Fancy Word provides the capability for printing graphic images. But where do the graphic images come from?

Capturing Graphics

The images must be stored in files. Fancy Word uses files that are stored in the Aldus/Microsoft standard TIFF (.tif), as well as certain other file formats. One way to obtain such files from programs that do not store graphics in the TIFF format is to use one of the screen capture utilities provided by Softcraft with current versions of Fancy Word.

To illustrate, suppose you want to reproduce a graph created by a spreadsheet program. First, load the appropriate screen capture program into memory, where it remains resident (you may call the program from your AUTOEXEC.BAT file). If, like me, you use a CGA monitor, then the appropriate call is to SCAPCGA.COM. Next, activate the spreadsheet program and put your graph on the

screen. Now press the "hot keys" for screen capture (Alt-F10). Nothing happens? Press them again. And keep pressing until you see your disk drive (hard or floppy) activate. You have now captured the image into a TIFF file.

The screen capture process is a bit mysterious because the number of times the hot keys have to be depressed to activate the screen capture program seems to vary randomly. In my experience, the number has varied between two and twenty.

If you now look for *.TIF files in your current directory, you will get a listing that looks like this:

```
SCRN001.TIF  
SCRN002.TIF
```

The three digit number following the "SCRN" indicates the sequential number of the file in a single session during which SCAPCGA was resident. That is, each time SCAPCGA is loaded it starts numbering again from SCRNO01.TIF. You must, therefore, look at the date/time of creation to find the most recent SCRNO0?.TIF file in the current directory.

Suppose SCRNO01.TIF is the file with the spreadsheet graph that you just created. Let's copy that file into the directory containing Fancy Word, giving the file a suitable name with a .TIF extension, say "GRAPH.TIF". Now you are ready to incorporate the file into a document.

Printing — General

Document preparation for output by



THE

PHYSICAL

CONTACT



SIMPLE HARMONIC

MOTION!!
THE ACCELERATION IS
NOT CONSTANT!

Stand in front of a mirror. Hold your

Note the negative sign in Eq (2).
Now let's divide the expression for a_x by
the expression for x to get

$$a_x/x = -c/x = -c \quad (3)$$

or

$$a_x = -Cx \quad (4)$$

where C is some positive constant. That is,
in

Figure 1

Fancy Word is, with one exception, no different from preparation of any other document using Word. The exception has to do with the designation of a printer description file using the PRINT-OPTIONS-PRINTER command in Word.

First, what is a printer description file? The Word program disks include a set of files with printer names and the extension .PRD. At the time of installation, you selected one using the PRINT-OPTIONS-PRINTER command that was appropriate to your printer. In my case, the selected file was EPSONLX.PRD. This file contains a list of the fonts available on the printer and the dimensions of the characters in each font. Because Fancy Word does not necessarily use the "native" printer fonts (although it can, if desired), the Fancy word, as well as means and instructions for editing these files. In my case, the appropriate files are FWFX.PRD and FWFXNR.PRD (for the Epson FX-series printers; Softcraft advised me that the LX-80 simulates Epson's FX80). The distinction between the two files merits some discussion, which I will postpone until the section of this article labeled "PITFALLS". At any rate, I load one of these file names into Word by invoking the PRINT-OPTIONS-PRINTER command (and making sure that the desired files are in the directory containing Word).

When you load the appropriate FW-xxxx.PRD file into Word, you will get a new set of options in response to the FORMAT-CHARACTER-F1 command (Word Version 4.0; for earlier versions, replace "F1" by the "ENTER" command). The new options are all the fonts that are available for use by Fancy Word. These include the 32 choices of fonts that Softcraft provides with Fancy Word, as well as many additional fonts that may be or-

dered separately and installed by the user.

Many of Softcraft's fonts are 256 character fonts and include the IBM extended character set, as well as Greek and other foreign letters and mathematical and other symbols.

Having chosen a printer *.PRD file and selected the fonts to be used in various parts of the document, you are now ready to print. The first step in printing is to use Word's PRINT-FILE command to print the document to a file. I always print to the same file, named MYDOC.FW, each time. Printing to file is then handled by a Word macro instruction. All of my word processing programs, by the way, including font files and the like and MYDOC.FW, are in a single directory of my hard disk — which is named \FW.

A call to the Fancy Word program FANCWORD.EXE activates the actual print process. FANCWORD.EXE can be invoked directly from Word by using the LIBRARY-RUN-FANCWORD commands followed by the name of the output file (\fw\mydoc.fw, in my case) followed by any options. Available options include a choice among six draft modes available, as well as the near "Typeset quality" print mode. Other options include page selections and pauses to adjust new pages.

The "typeset quality" mode is painfully slow because the printer is in graphics mode and six separate passes are needed to "draw" each line of print. If you have a long document, then start the printing and go to bed — or whatever!

Printing — Graphics

Now you have your document prepared and ready to be printed to a file for output by Fancy Word. A graphics image, call it GRAPH.TIF is stored in TIFF format in your word processing directory. How

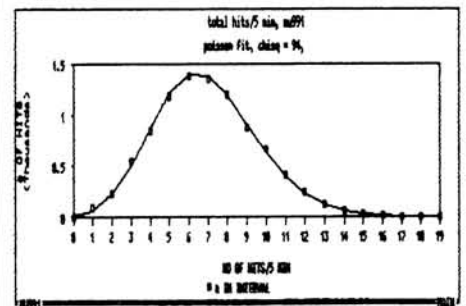
do you tell Fancy Word to include GRAPH.TIF in the document?

Move the cursor to the place in the document where you want the image to appear and then, on a separate line, type two "\$" signs followed by:

"g(image:graph,xxxxx)"

(without the quotation marks — and guess why I didn't put the "\$\$" symbol before the "g" in the above example) where "xxxxx" stands for a set of control instructions relating to the size and placement of the image on the page. The dollar signs followed by the "g..." command can be formatted in Fancy Word's "Dummy-NullFont" which occupies zero width on the page, so the command does not affect the formatting of the text.

Now follow the procedure that I described earlier for printing the document. If everything goes well, you will get something like this:



YOU MUST, however, provide enough blank lines in an empty paragraph after the "image" call to accommodate the image. Otherwise, Fancy Word will not know how to format the page.

Other Graphics Sources

There are a number of possible methods for generating graphics images that can be captured into TIFF image files.

Brightbill-Roberts and Company's Show Partner can remain resident in memory and be called to capture a graphics screen from another program. Show partner can then be used to edit the captured graphics screen, both as to text and artwork. The edited screen is then captured into a TIFF file with Fancy Word's capture utility.

If you happen to own PC Paintbrush, picture files from that program are useable by Fancy Word without modification. The same is true of Microsoft Windows' clipboard pictures, according to Softcraft's literature.

I have been using Prosoft's FONTASY (see Pat Swayne's article in REMark, March 1987) which provides a library of clip-art and font types and the wherewithal for modifying both.

More importantly, Version 3 of Fontasy provides a utility for translating Fontasy output directly into the TIFF format for use by programs, such as Fancy Word. This utility is marvelous for would-be desktop publishers and greatly enhances

the value of Fontasy. With many other low cost graphics programs, it is not possible to export the output into other programs. Let's hope that Prosoft has set a new standard for vendors of graphics programs.

Pitfalls

I have encountered a number of pitfalls while using Fancy Word. Extrication from these required many calls to Softcraft, and this is the place for me to express my appreciation for the total support that the Softcraft staff gives to their product — and gave to me.

Many difficulties arose because the LX-80 is one of a number of printers that is "non-reversing." This means that it is not possible to reverse the paper motion during the printing process (at least there is no documented printer command for doing so). This fact was not originally evident, and I used the FWFX.PRD file with the early versions of Fancy Word. That file was designed for the Epson FX series of reversing printers. The reverse paper command for the "reversible" FX printers was apparently interpreted as a "form feed" by my LX. The result was the inexplicable (at the time) ejection of partially printed pages when I tried to print out documents containing superscripts and subscripts (graphics was not yet available).

After some consultation with Softcraft I was advised to switch to the FWFXN.PRD file which is appropriate for use with the non-reversing FX series of printers. That switch dramatically cured the ejection disease.

A less traumatic illness then made its appearance. Spacing between lines in multi-column text was erratic. Specifically, groups of lines were printed with much closer spacing than the spacing specified by the formatting. Consultation with Softcraft again provided the answer. It is important, with non-reversing printers and multi-column text, to use only integer multiples of the basic line spacing (12 points — I don't know if a different basic line spacing would work). Otherwise, the printing algorithm tries to "catch up" by closely spacing some of the lines in a column.

Paradise Almost Attained

After curing the page ejection and crowded line spacing diseases, I was a fully operational desktop publisher. I was producing an acceptable newspaper product for my class in two-column format with graphics included. Business quality (single-column) documents were easy to generate. I even used Fancy Word and my little dot matrix printer to produce acceptable looking briefs for filing in the United States Court of Appeals (I forgot to mention that I'm also an attorney). But all was not yet perfect.

Some of my documents would occa-

sionally show slightly erratic line spacing. Also, Fancy Word was sometimes a bit cavalier in its calculations of page lengths, necessitating manually inserted page breaks. Furthermore, it was not possible to incorporate text and graphics side-by-side in multi-column documents. These imperfections, Softcraft advised me, were due to the limitations of my non-reversing printer.

The root of the difficulty is that page composition, which is what Fancy Word does, is a memory-gobbling process. Fancy Word apparently limits its use of memory by composing "on-the-fly", so to speak. This approach to composition apparently works well with a printer that can reverse paper motion.

On the other hand, the limitations of the non-reversing printer can be overcome by more intensive use of memory, and use of additional memory is an available alternative.

The Memorable Solution

I had been considering for some time the idea of increasing the memory of my Z-158 beyond the "640K" barrier. I like to use memory resident programs, but these can eat up the basic 640K available to DOS in an awful hurry. Addition of a memory board meeting the Lotus-Intel-Microsoft expanded memory standard (EEMS) might let me keep a lot more programs in residence.

While I was still hesitating over the expenditure, one of Softcraft's technical support people pointed out that Fancy Word could use expanded memory for page composition. That information did the trick, and I bought AST's SixPak-Premium board with (eventually) an added 512K of memory. The added board then gave me a total of 1.2M, just what Fancy Word requires to do complete page composition for a non-reversing printer.

SixPakPremium, at the time I bought it, came equipped with Quarterdeck office Systems' DESQview. DESQview is a windowing program that swaps programs in and out of memory. It also has some capability for making expanded (EEMS) memory available to applications programs. When I am willing to put up with minor line spacing irregularities I accordingly call Fancy Word from a separate DESQview window. Fancy Word then prints in the background while I switch back to the Word window and get to work on another document (print spoolers don't work well with Fancy Word according to Softcraft).

Fancy Word's expanded memory capability is brought into play by calling Fancy Word with a "+EM" switch. I do not, by the way, call Fancy Word from DESQview when using the expanded memory capability — nearly all of the memory must be clear for Fancy Word's use. After

the call, there is a long pause for the page composition process. The time required to compose a three column page with graphics is about two minutes. Fancy Word then prints the page and takes another long break from printing while it makes up the next page.

Summary

Fancy Word provides a relatively inexpensive means for producing near "typeset quality" printing with the lowest cost 9-pin dot matrix printers. Side benefits include a wide variety of font selections, the wherewithal to construct new fonts, and, most importantly, the ability to import and include graphics in documents prepared with Microsoft Word.

There are, to be sure, some substantial limitations in formatting unless Fancy Word is used with a printer capable of reverse paper motion, or the computer is equipped with expanded memory. Nonetheless, the graphics capability that Fancy Word gives to Word makes it possible to produce quality text-graphics documents with a modest capital investment. *

Continued from Page 38

one I use only gives it in an advanced programmers' reference handbook which you have to purchase; and Centronics seems to find width tables devoid of interest. But you can get the values quite easily from your printer. Print a line of characters in fixed 1/10" pitch, about 20 of them; underneath, print a string of 12 times the character you want to measure, in proportional spacing:
AAAAAAAAAAAAAAAAAAAAA
ccccccccccc

Use the characters in the first line to measure the length of the string; the number of them is the character size in 1/120". In this example, 9 A's (at 1/120") correspond to the 12 c's. This gives the size of the c as 9/120". If your proportional spacing is in 1/240" (unlikely, except on the big office machines), use about 40 characters in fixed pitch and a string of 24 proportional characters. It will take you a while to type in the strings for over 200 different characters, so keep the file in case you change fonts some day.

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