

MORROW 

600 McCormick
San Leandro
California 94577
415 430-1970
TWX 910-366-2137

1 February, 1984

Dear MORROW USER:

Thanks for contacting us about your Morrow system.

Attached is a preliminary copy of the Micro Decision Questions and Answers book.

As more and more people purchase Morrow Systems, we're becoming familiar with the situations in which users may need outside support. To satisfy that, we've put together this book to answer our users' most frequently asked questions. In doing so, we've probably answered question that haven't even come up yet for you. If, however, we've missed a question you think should be in this book, please write it down and send it to me.

This book is only the first step in our efforts to disseminate information to Morrow users. We'll continue to refine and add to it, with the goal of ending up with a complete technical reference guide. Any comments you have on how to improve the book are most welcome.

Cordially,



David Block
Micro Decision Product Manager

=====

MORROW OWNERS REVIEW - P.O. Box 5487, Berkeley, CA 94705 (415) 644-2638
An international bi-monthly magazine for Morrow computer users.
MCI Mail: MREVIEW --- BAMDUA RBBS (415) 654-3882 for uploads.

=====

February, 1986

Dear MOR Manual owner:

Dave Block's Preliminary Question and Answer Book is now over two years old and in dire need of an update. We have asked the readers of MOR to come forward with suggestions for corrections, improvements and additions but we have not received any yet. We have heard that some of the information contained in this "Book" is incomplete, obsolete or even incorrect. On the other hand most of the information is still current and correct and has been helpful to hundreds of people. That is why it is distributed as part of the MOR Manuals. We hope that readers will send us suggestions for improvements and revisions that are usable for a future update.

The only pages that have been replaced and updated are the Morrow Users Group (MUG) listings of pages 9,10,11,11A. In stead we printed the current MUG list as printed in MOR, Vol. 3, #1, page 47.

Sincerely,



Sypko Andreae, Publisher MOR.

Micro Decision Questions And Answers

CONTENTS:	PAGE
1) Q & A	
A) General Interest	3
B) Micro Decision Users Groups	9
C) Foreign Disk Formats On The Micro Decision	12
D) Using Printers On The Micro Decision	14
E) Micro Decision Terminals	17
F) Using a MODEM with your Micro Decision	18
G) The PILOT Programming Language	20
H) WordStar and your Micro Decision	21
I) LogiCalc and your Micro Decision	25
J) CP/M Utilities and Operating System	26
K) Hardware Related Questions	28
2) SOFTWARE INSTALLATION	42
A) WORDSTAR	42
B) PERSONAL PEARL	48
C) BAZIC	60
D) TERMINAL CONTROL CODES	60
3) PRINTER INTERFACING - CABLE CHARTS	61

MICRO DECISION QUESTIONS AND ANSWERS

INTRODUCTION

This section is the result of many hours spent sorting through the hundreds of letters we have received from Micro Decision owners concerning questions about their machines. The rate at which letters arrive from end users makes it impossible to answer them all personally. Since the same questions arise over and over again, we have assembled them in this document, along with the answers.. In this way, we can answer not just the question you are asking today, but the question you will think of tomorrow. Have Fun!

NOTE:

Throughout this book, reference will be made to Rev 1 or Rev 2 Micro Decisions, old Micro Decisions vs new Micro Decisions, etc. It is important to know that two versions of the Micro Decision computer have shipped: first, REV 1 boards, and later, the REV 2 system with added features.

The main differences in the design are:

REV 1

2k ROM
2 serial ports
Switches for baudrate
Disk drives added using
expansion port on back
of machine

REV 2

4k ROM
2 serial ports and 1 parallel port
Software for baudrate selection
Disk drives added by daisy chain
from drive B.

The MD11 uses an entirely different CPU board than the MD1, MD2, and MD3.

GENERAL INTEREST

Question: I didn't get a copy of ASM, DDT, LOAD, ... with my Micro Decision. Why not?

Answer: You got it, but just didn't realize it. They are all on the Programmers Utility Diskette. The Programmers Utility Diskette is only necessary if you have a MD1 or MD2, since the programs on the Programmers Utility Diskette are on the CP/M distribution diskette included with the MD3.

Question: Why don't I have a "Programmers Utility Diskette" with my MD3?

Answer: The Programmers Utility Diskette contains programs that are a part of CP/M. As we have added features to the Micro Decision, the amount of space remaining on a single-sided diskette was quickly diminishing. Because of this, some files had to be put on another diskette. This diskette was the Programmers Utility Diskette. If you have an older Micro Decision, or your Micro Decision is double-sided, you do not need the Programmers Utility Diskette, as all the programs fit on the CP/M Distribution diskette.

Question: How do I find software for my Micro Decision? Can my dealer help me?

Answer: Many software distributors now supply software in the Micro Decision format as an option. If you cannot find a distributor which has the software you need, contact your dealer. He has a reference manual containing the names, sources, and descriptions of many different programs, all available in Micro Decision format.

Question: What manuals should I have with a MD1? MD2? MD3?

Included with all machines:

- Micro Decision User's Guide
- CP/M 2.2 Reference Manual
- WordStar manual (or NewWord)
- Correct-It manual (may be in back of WordStar manual, or separate)
- LogiCalc Manual
- Microsoft Basic (MBASIC) Manual
- BaZic Manual
- PILOT Programming manual

For MD3s, add:

Personal Pearl Users Reference Manual
Quest BookKeeper Manual

For MD11 add:

Addendum to Micro Decision Users Guide for MD11
CP/M Plus (CP/M 3.0) manual set) -- substituted for CP/M 2.2
Manual

Question: What kind of add-on products do you have available for the Micro Decision?

Answer: Add-on products for the Micro Decision include:

The MM300 MODEM: a 300-baud MODEM which comes complete with a powerful communications program known as ReachOut. (The MODEM and software are not sold separately).

The MP100, MP200, and MP300 daisy wheel printers, with print speeds varying from 14 to 30 characters per second.

Upgrade kits:

MD1-2 -- Turns your MD1 into an MD2.

MD2-3 -- Turns your MD2 into an MD3.

Question: What machines can be upgraded to 16 bits using the CP-88 board?

Answer: The CP-88 board will work only with MD3s and MD11s at the time of this writing.

Question: Why does my system always lock up whenever I try to print anything? Nothing clears it except reset.

Answer: This indicates that either your printer is not handshaking properly, or (if it's a REV 2 machine) the diskette you booted in Drive A is set up to use the other port. Use the SETUP program to correct this.

Question: Whom do I call if I have a question about any of the applications programs?

Answer: Your dealer. In most cases, the dealer can answer the question for you. If he cannot, he can call our dealer support staff and receive an answer.

Question: What is the difference between WordStar and NewWord? Is NewWord a new version of WordStar?

Answer: NewWord is a new word processing program that is very similar to WordStar, but has advanced features. The additional features of NewWord include:

- 1) An improved installation/modification program.
- 2) An UNDO command that allows the user to reverse the last command. If you accidentally delete a word, line, or block of text, the UNDO command allows you to recover the original information.
- 3) Built-in merge/print facility. The user is not required to buy another program such as MailMerge to print customized form letters.
- 4) Faster operation. NewWord has streamlined code that makes the operation of the program faster than WordStar.
- 5) Re-organized menus and improved help messages make NewWord significantly easier to use.
- 6) A clear, concise manual, oriented toward both novice and experienced users.
- 7) Compatibility with WordStar. Users accustomed to WordStar won't need to learn new commands to use NewWord.

Question: Please explain the difference between working diskettes and backup diskettes.

Answer: Copies of the programs supplied with your Micro Decision made by you are "Working" diskettes. These diskettes are installed and ready to run on your system. Backup copies are exact copies of diskettes that may contain data (such as account backups for Quest, or chapters of a book) or programs. It is a good idea to make a backup copy of all Working diskettes, in case you accidentally erase the data from them (No need to Create Working diskettes more than once!)

Question: I am confused about the difference between CP/M Version, and Revision. Please explain.

Answer: All MD1s, MD2s, and MD3s are shipped with CP/M 2.2. MD11s are shipped with CP/M 3.0 (also known as CP/M PLUS). These are VERSION numbers. When CP/M is put on a machine, the manufacturer (MORROW) must write special assembly language routines to enable CP/M to function. This customized part supplied by the manufacturer is called the CBIOS, and is assigned a revision number. So, the Version number is supplied by Digital Research, the authors of CP/M, and the revision number is supplied by Morrow.

Question: Please tell me what the OBASIC.COM file is on my MBASIC diskette. Also, what's RANTEST.BAS?

Answer: OBASIC.COM is a smaller, less powerful version of MBASIC.COM. It may be used if:

1) You are running short of memory in the Micro Decision, and

2) You are using a BASIC program that doesn't have complex file handling in it. Use OBASIC.COM at your own risk, however; it is not documented.

RANTEST.BAS is a sample program written in MBASIC. It is of no great use, but is part of the Microsoft Distribution package for MBASIC.

Question: Is the backup program supplied with the MD11 incremental? What is an incremental backup program?

Answer: Yes. BACKFIELD, the program supplied with the MD11 performs either incremental or full backups. A full backup occurs when all data on the hard disk are copied to floppies. Incremental backup only copies files that have changed since BACKFIELD last copied them to floppies. This means that backups will be faster.

Question: Can my MD3 read disks from my friend's MD2? MD11? How about reading MD3 disks on an MD2?

Answer: All Micro Decision floppy formats are compatible. It is possible to transfer files among different Micro Decision models without difficulty with the exception of reading double-sided diskettes on an MD2. (We are not magicians!) To transfer information from an MD3 or MD11 to an MD2, you must use a diskette that has been formatted single sided.

Question: How can I expand the memory on my Micro Decision from 64k?

Answer: There is no way to expand the memory on the MD1, MD2, or MD3. The maximum memory on these machines is 64k. The MD11 comes equipped with 128k of RAM. No further RAM can be added.

Question: Is UCSD PASCAL available for the Micro Decision?

Answer: No. UCSD is another operating system, and we have no plans to provide it for the Micro Decision. UCSD PASCAL SYSTEM disks from an OSBORNE will NOT work on a Micro Decision.

Question: Is there a technical reference manual available for the MD1, MD2, MD3, or MD11? How about for the MDT20?, MDT50, MDT60?

Answer: This manual is meant to serve as a technical manual for all versions of the Micro Decision. Technical service manuals for the MDT20, MDT50, and MDT60 are sold only to authorized Morrow dealers.

Question: Can I hook a Hard Disk to my MD3?

Answer: Morrow does not make a hard disk that can be connected to a MD3. Users may add a hard disk to their MD3 by purchasing the MD3 to MD11 upgrade when it becomes available. The upgrade adds a hard disk, 128k of RAM, CP/M 3.0, and an additional serial port, turning the MD3 into an MD11. The cost and introduction date of the upgrade have not yet been determined.

Question: Can I put two more drives inside my MD3? How about my MD11?

Answer: No. The power supply inside the Micro Decision cannot provide the power additional disk drives would require inside the case. Any additional disk drives would have to be powered from a separate power source.

Question: Can I put a new ROM (REV 2.x) in my old (REV 1) Micro Decision, and get a parallel port?

Answer: No. The Micro Decisions being shipped now have much different circuitry from that of the older Micro Decisions. The ROM revisions 2.x will not work correctly in the old board. If you absolutely must have a parallel port on your Micro Decision, an upgrade is available from your dealer, to replace the old circuit board with a new one. The cost is \$450 (not including installation).

Question: How do I upgrade my old Micro Decision to a new one so that I can have a Parallel port?

Answer: Your dealer is able to sell you the upgrade to convert a Micro Decision version 1.x to a Micro Decision version 2.x, thereby giving you a parallel port.

Question: Is CP/M 3.0 available for the MD1? MD2? MD3?

Answer: CP/M 3.0 is not available for the MD1, 2, or 3. It is optimized for a machine with a great deal more memory. To run it

on a machine with only 64k would not improve the performance of the machine, and could hinder it.

Question: Is CP/M 3.0 upward compatible with CP/M 2.2?

Answer: Yes, with the exception of programs that make direct BIOS calls, CP/M 3.0 is upward compatible with CP/M 2.2. Most programs do not make direct BIOS calls, so this should not be a problem.

MORROW USERS GROUPS

January 1, 1986

[Listed in zip code order]

Boston Morrow Users Group

45 North Beacon Street
Allston, MA 02134
Phone: (617) 254-3028
Contact: Alfred Butler

MUSE-PA

Morrow Users of Southeast Pennsylvania
2499 Lincoln Highway East
Lancaster, PA 17602
Phone: (717) 394-1812
Contact: Harper Hull

MUGW

Morrow Users Group of Washington
P. O. Box 9567
Washington, DC 20016
Phone: (703) 533-8152
Contact: Michael Kelly

BaltiMUG

8530 Dogwood Road
Baltimore, MD 21207
Phone: (301) 597-4709
(301) 944-4622
Contact: Tim Evans

GMUG/LMUG

Greensboro/Lynchburg Morrow Users Group
P.O. Box 18724
Greensboro, NC 27419
Phone: (919) 272-8399
Contact: Kenn Melton

MOR-Atlanta

5461 East Wind Drive
Lilburn, GA 30247
Phone: (404) 381-1384
Contact: David McDonald

Central Florida Morrow Users Group

c/o Micro Data Systems
2428 East Robinson Street
Orlando, FL 32803
Phone: (305) 896-6797
Contact: Peter Christensen

MUG Detroit

Morrow Users Group of Detroit
13825 Haverhill Court
Southgate, MI 48195
Phone: (313) 283-3016
Contact: Thomas C. Musolf

MAMUG

Milwaukee Area Morrow Users Group
1001 Keats Circle
Oconomowoc, WI 53066
Phone: (414) 567-5107
Contact: Helen Gust

WAMUG

Wichita Area Morrow Users Group
P.O. Box 47481
Wichita, KS 67210
Phone: (316) 788-4102
Contact: Frank Knipfer

DMUG

Denver Morrow Users Group
10070 East Ohio Avenue
Denver, CO 80231
Phone: (303) 344-0499
Contact: Jon Plachy

AZMUG

Arizona Morrow Users Group
1041 East 6th Street
Tucson, AZ 85719
Phone: (602) 622-0170
(602) 293-5557
Contact: Phil Miles

Albuquerque Morrow Users Group

11820 Palo Duro NE
Albuquerque, NM 87111
Phone: (505) 292-7902
Contact: Ted Cochran

West Los Angeles MUG

1833 Franklin Canyon Drive
Beverly Hills, CA 90210
Phone: (213) 276-9096
Contact: Dr. Bernice Ennis

South Bay Morrow Computer SIG

c/o Jade Computer Company
18503 Hawthorne Boulevard
Torrance, CA 90501
Phone: (213) 370-7474
Contact: Eric Turnquist

LANUG

Los Angeles Morrow Users Group
12613 Killion Street
North Hollywood, CA 91607
Phone: (818) 766-3307
Contact: Brian Leyton

The San Diego Computer Society

Morrow Users Group
P. O. Box 81444
San Diego, CA 92138

MDBUG

Micro Decision Bakersfield Users Group
P.O. Box 2594
Bakersfield, CA 93303
Phone: (805) 398-1885
Contact: Joe O'Bannon

SMUG

Stanford Morrow Users Group
221 Valencia Drive
Los Altos, CA 94022
Phone: (415) 941-1004
Contact: Lewis Dreyfous

DVMUG

Diablo Valley Micro Decision Users Group
31 Panoramic Way
Walnut Creek, CA 94595
Phone: (415) 935-9800
Contact: Curt Finney

BAMUGA

Bay Area Micro Decision Users Association
P.O. Box 5152
Berkeley, CA 94705
Phone: (415) 644-2805

PETMUG

Petaluma Morrow Users Group
293 Circulo Puebla
Rohnert Park, CA 94928
Phone: (707) 585-2980
Contacts: Frank Nance
Lloyd Booth

SCHMUG

Santa Cruz Micro Decision Users Group
376 Lucinda
Scotts Valley, CA 95066
Phone: (408) 438-0662
Contact: Marianne Russell

CP/MORROW Computer Group

7100 Witchinghour Ct.
Citrus Heights, CA 95621
Phone: (916) 725-0873
Contact: Maxine Gilman

Seattle MUG

2626 SW 351st Street
Federal Way, WA 98023
Phone: (206) 624-2646 (day)
(206) 838-2521 (eve)
Contact: Bill Simpson

Fourth Corner KUG/MUG

P.O. Box 3028
Bellingham, WA 98227
Phone: (206) 734-9287
(206) 671-4340
Contact: Morgan Freeberg

CP/M Bangkok Users Group

P.O. Box 11-213
Bangkok 10110, Thailand
Contacts/Phones:
Nikom Viravatanadej: 311-4966
Pornarong Chotiwan: 252-7864
Karl Kunz: 233-5275

Today's To-Morrow Computer Club

1552-2 Kerns Road
Burlington, Ontario L7P 3A7
Canada
Phone: (416) 632-3549
Contact: H. Penman Smith

Other Users Groups offering their services to Morrow users:

CPOG

Chicago First Osborne Group
Box 1678
Chicago, IL 60690
Contact: Benjamin Cohen

Kaypro Users Group

300 East Harmony Rd. #172
Ft. Collins, CO 80525
Phone: (303) 223-9017
Contact: James Sinning

FOREIGN DISK FORMATS ON THE MICRO DECISION

Question: What foreign formats exist, and will you be adding more soon?

Answer: On the MD1s, 2s, and 3s, with the parallel port (REV. 2.x), we are now supporting:

- OSBORNE SINGLE DENSITY
- OSBORNE DOUBLE DENSITY
- XEROX SINGLE DENSITY
- XEROX DOUBLE DENSITY
- IBM PC CP/M-86
- HEWLETT-PACKARD 125

On the MD11, we are supporting:

- OSBORNE SINGLE DENSITY
- OSBORNE DOUBLE DENSITY
- XEROX SINGLE DENSITY
- XEROX DOUBLE DENSITY
- IBM PC CP/M-86 SINGLE SIDED
- HEWLETT-PACKARD 125
- KAYPRO SINGLE SIDED
- TELEVIDEO DOUBLE SIDED

Micro Decision owners with the REV 1.x board (i.e., no Parallel port) are limited to:

- OSBORNE SINGLE DENSITY
- XEROX SINGLE DENSITY
- IBM PC CP/M-86

If you have a REV 2 board, and need the additional formats shown above, you must purchase a CP/M 2.2 rev 2.3 upgrade.

Question: Being able to read and write other formats on my Micro Decision is great, but can I also format for other machines?

Answer: No. We do not have any software available that will allow the Micro Decision to format diskettes for other machines.

Question: Can I run CP/M-86 programs on my Micro Decision using the IBM.COM program?

Answer: No. The IBM.COM program only allows you to read and write single-sided diskettes formatted on an IBM PC using CP/M 86. This

is of use in an office environment with 1 or 2 IBM PCs, dozens of Micro Decisions, and documents created on one that have to be transferred to the other by diskette.

Question: How do I know if the program I bought for my Micro Decision in XEROX (OSB,IBM) format will run?

Answer: Several requirements must be met if a program written for another type of computer is to be run on the Micro Decision:

- 1) The diskette must be in a compatible format
- 2) The computer must use the same type of microprocessor.
This is why IBM software cannot run on the Micro Decision, although data files can still be transferred between an IBM and a Micro Decision.
- 3) The program must not be hardware dependent. i.e., the program must not perform direct manipulation of the hardware. (EX. A program that outputs directly to an OSBORNE screen instead of using CP/M to do this will not work.)
- 4) The program should come with an installation program to allow setting up the applications program to work correctly with the screen and printer on the Micro Decision. Some OSBORNE software does not include this.
- 5) The software must not make use of any features that the Micro Decision does not have (i.e., graphics).

Question: Why is it that I can only read some XEROX diskettes on my Micro Decision?

Answer: Some XEROX diskettes are marginal when an attempt is made to read them on a Micro Decision. In most cases, the problem can be solved by putting a write-protect label over the INDEX hole in the diskette, and then copying the diskette to a Micro Decision formatted diskette. If you are using the XER.COM program to read the diskette, make sure the diskette is single sided and single density.

USING PRINTERS ON THE MICRO DECISION

Question: How can I connect my printer to the back of my terminal?

Answer: Using a printer connected to the back of the terminal is possible, but generally problematical.

The general procedure is:

Anything to be printed must first exist as a disk file so that you can tell CP/M to send the file to your terminal, and then out through the extra port to your printer. In WordStar, this is done by telling it to send the output to a disk file when choosing the print function. Most other programs allow you to do the same thing in different ways. Once you have a file on disk that you want to print, you must enable the auxiliary port on the back of the terminal, put it in transparent mode, and, finally, send the file to the terminal.

Question: Can my MP100 printer print with proportional spacing?

Answer: No. Only the MP200 and MP300 perform true proportional spacing. On the MP100, it is simulated by use of micro-justification.

Question: Why doesn't my Morrow Printer do all the fancy things WordStar says it can do?

Answer: We ship WordStar on the Micro Decision configured for the simplest, no-frills type of printer available. Morrow printers (and many others) have lots of features that will work only if you tell WordStar to use them. To do this, you must re-install WordStar for the type of printer you have. See the description of WordStar installation instructions elsewhere in this book.

Question: How do I get my printer to print bi-directionally? The manual says it can do it, but WordStar doesn't print that way.

Answer: If you have a Morrow printer, you should be sure that the switch is set for "Serial Print Mode." This is different from serial or parallel interfacing, and pertains to how data is printed out. Next, install your WordStar program for a Diablo 1610 printer, following the installation instructions in this book.

Question: I can't find ribbons for the MORROW PRINTER in my area. Are they the same as any other kind?

Answer: Yes. The ribbons used by the Morrow Printers are the same as those used by the Transtar daisy wheel printers, the Silver-Reed daisy wheel printers, and some Olivetti printers and typewriters.

Question: What parallel printers work on the Micro Decision?

Answer: Virtually all parallel printers will work on Micro Decisions equipped with parallel ports. We haven't heard of one that won't operate correctly with the Micro Decision.

Question: Where can I get a parallel printer cable that will work with my Micro Decision?

Answer: The parallel interface connector used on the Micro Decision is designed to enable Radio Shack parallel printer cables to work. The cable needed is sold by Radio Shack to connect their TRS-80 Model 3 to a parallel printer. The Radio Shack part number is: 26-1401.

Question: What kind of handshaking do I need to set my printer up for on the Micro Decision?

Answer: The Micro Decision can use either of two types of handshaking:

Software Handshaking using X-ON and X-OFF, or
Hardware handshaking on pin 20

When connecting a printer to the serial port on your Micro Decision, follow the procedures outlined below:

- 1) Decide which kind of handshaking you wish to use.
The method you choose will be dictated by the method of handshaking your printer supports.
- 2) A) If using Software handshaking:
 - a) pins 20 and 6 on the Micro Decision end of the cable should be connected together.
 - b) connect pin 2 on the Micro Decision end to pin 2 on the printer end.
 - c) connect pin 3 on the Micro Decision end to pin 3 on the printer end.
 - d) carefully check the description of the printer's

serial port interface requirements, and connect all handshaking inputs (ex. pin 8) to a signal line that is defined to be high. (ex. pin 6)

B) If using Hardware handshaking:

a) pin 20 on the Micro Decision end must be connected to the printer's signal pin that is used for indicating the printer is busy or ready to receive characters.

Common pins to check are:

pins 20, 19, 11, or 4.

b) same as 'b' above

c) same as 'c' above

d) same as 'd' above

Next, if you have a version 2.x Micro Decision (i.e. with Parallel port), you must run the program setup, and set the baud rate and handshaking method to be used. Be sure to make changes permanent before exiting from setup.

That's all there is to get a serial printer working on the Micro Decision.

Question: How should the switches be set on my MP100?, MP200?, MP300?

Answer:

MICRO DECISION TERMINALS

Question: How can I use the graphics on my MDT20? When I was playing around once, I somehow ended up in a graphics mode of the terminal, but don't know how to get in or out of it?

Answer: The MDT20 as supplied to Morrow has a built-in graphics mode with a major problem. Once graphics mode has been entered, there is only one way out - turn off the terminal. This is unacceptable to Morrow, so we didn't advertise it as having any graphics capability. With this as a warning to the adventurous, the code to get into graphics mode is:

ESC,@

Morrow does not support the graphics built into the MDT20. The information is provided only for the curious.

Question: What about graphics on the MDT50?, MDT60?

Answer: The only terminal on which Morrow will support the use of graphics is the MDT60. The graphics supported on the MDT60 are limited to those shown in the MDT60 USERS MANUAL. We will not guarantee that software purchased from any vendor will work correctly with our graphics, but any software we distribute for the graphics on the MDT60 will be supported.

Question: How should the switches be set on my MDT50? MDT60? How about the set-up on the MDT20?

Answer:

Question: What can I do to get the arrow keys and other special keys on my terminal to work with my software?

Answer: If you have a MDT20 terminal with a serial number less than 25220000, the function keys and arrow keys cannot be configured for use with the software. MDT20s with higher serial numbers, and MDT50s and 60s, can all be set up with:

Smart Key II available from:

Heritage Software, Inc.
2130 South Vermont Ave.
Los Angeles, CA 90007

USING A MODEM WITH YOUR MICRO DECISION

Question: How can I connect a MODEM and a serial printer to my Micro Decision at the same time?

Answer: The best way to do this is by purchasing an RS-232 "T" switch from your dealer. A "T" switch has two connectors on it for the cables from your MODEM and printer, and a plug on it that goes to your Printer / MODEM port on the Micro Decision. Depending on a switch position, you can connect to your MODEM or your printer. Using the second connector on the back of your terminal for a printer is possible, but quite difficult to do. None of the Morrow terminals will allow you to connect a MODEM to the second port on them.

Question: What kind of MODEM do you recommend?

Answer: Of course, Morrow recommends the Morrow MM300 MODEM. The MM300 is a 300-baud direct connect MODEM, complete with a powerful program that allows users to communicate with other computer users, THE SOURCE, COMPUSERVE, and other dial-up computers for the purpose of exchanging information or programs, or researching important topics. The MODEM and software are not sold separately.

Question: Can I use the MODEM 7 public domain program on my MD11 if it runs on an MD3?

Answer: No. The hardware for the MD11 is different and will prevent the MD3 version of MODEM 7 from operating correctly. You MUST use a version that has been installed for the MD11.

Question: How do I connect a MODEM to my Micro Decision?

Answer: There are two methods for connecting MODEMS to the Micro Decision.

The first method is to alter the jumper blocks on the inside of the Micro Decision as shown in your Users Guide. The illustrations in the manual provide detailed information on how to do this.

The other method involves constructing or buying a cable usually referred to as a "NULL MODEM CABLE." The cable should provide the following connections:

<u>MODEM</u> <u>END</u>		<u>Micro Decision</u> <u>END</u>
pin: 1	connected to:	1
2		3
3		2
4		5
5		4
6		20
7		7
20		6
8		8

The jumpers inside the Micro Decision should not be changed if you are using a NULL MODEM cable.

Of the two methods above, the first has the dis-advantage that you will have to change the jumper blocks inside the Micro Decision every time you switch between a modem and a printer on the port.

THE PILOT PROGRAMMING LANGUAGE

Question: Is a PILOT programming manual available?

Answer: Yes. If you need a PILOT programming manual, have your dealer contact us. Please don't call us directly. By going to your dealer, you can help us provide better and faster service for you.

Question: I didn't get a PILOT disk with my Micro Decision. How come?

Answer: PILOT is on the CP/M working disk supplied with your Micro Decision. It is called "PILOT.COM". The next question gives some brief details on how to use PILOT.

Question: How do I run a pilot program? Whenever I type "PILOT", the disk is accessed, and then I get the CP/M prompt, without anything happening.

Answer: The PILOT language is what is known as an "interpreter". This means that it works by interpreting (or translating) a file into a series of commands. To use PILOT, you must first use WordStar (or NewWord) to create a list of instructions (a PILOT program), and then tell PILOT to interpret the file and perform the functions given in the file. To do this, type "PILOT filename.ext", where filename.ext is the name of the file created using the wordprocessing program. There is no extension that must be used, but ".pil" (i.e. MYFILE.PIL) is recommended. If the file name ends in .PIL, then no extension need be given when telling PILOT to interpret a program. **EXAMPLE:**

PILOT MYFILE

will cause PILOT to interpret the file called MYFILE.PIL. If PILOT cannot find a file by that name, then it will give an error message telling you that it couldn't access the requested file. When creating the file, be sure to use the "N" command from WordStar or NewWord on the main menu to open a "non-document" file.

On the CP/M diskette there are a number of files that have extensions of ".pil" (MICRO.PIL, CPMENU.PIL, etc.) These are the files that make up the Micro Menu System which guides you through CP/M. Study these, and you will soon be on your way to getting your "PILOTS" license.

WORDSTAR AND YOUR MICRO DECISION

Question: How can I get WS 3.3?

Answer:

Question: MicroPro won't sell me the Professional pack, even though they sent me a special price announcement. They said I had to contact Morrow.

Answer:

Question: MicroPro won't sell me Mailmerge for the Micro Decision, and nobody has it for WordStar version 3.00. Can I order it from you?

Answer: No. However, as an alternative to Mailmerge, Morrow is now providing a new wordprocessing program which includes a Merge print capability similiar toMailmerge. The program, NewWord, uses the same commands as WordStar, and provides some extra very useful features. It is available for \$100 from your Morrow Dealer.

Question: Why does my printer work with CP/M but not with WordStar? Whenever I try to print from WordStar, the system just hangs, and needs to be reset.

Answer: This problem can exist for two reasons. One is very common, the other extremely rare. The common problem is that you have a Micro Decision with a parallel and serial port, and your CP/M disk has been set up to use the port your printer is connected to; but your WordStar disk which was never configured properly, can't find the printer, so it just hangs. To correct this problem, perform the following steps:

- 1) Insert your CP/M working diskette in drive A, and your WordStar disk in drive B.
- 2) From CP/M Prompt, type:
A>SYSGEN[RETURN]
- 3) To question "....Source Drive Name", enter A, followed by [RETURN] when instructed.
- 4) For "....Destination Drive Name", enter B, followed by [RETURN] when instructed.
- 5) Type [RETURN] to get back to CP/M.

This procedure should be repeated for each of your Working diskettes.

After performing the "SYSGEN", follow this procedure if you want your diskettes to "boot-up" into the program on them:

With your CP/M disk in drive A and your program disk in drive B, type:

A>AUTO *B WS

This will set up your WordStar disk to run WordStar automatically when you put it in drive A, and start up your system.

For programs, other than WordStar, use LC for LogiCalc, Correct for Correct-It, MBASIC for MBASIC, etc., in the AUTO command shown above.

The second reason this may be occurring is that you performed an incorrect installation of WordStar when using the INSTWS.COM program supplied on the WordStar DISTRIBUTION DISKETTE. To correct this problem, follow the instructions in the software installation section of this manual for installing WordStar.

Question: If I print a short document from WordStar, everything is fine, but on longer documents, my printer will drop characters in the middle of the document. What's wrong?

Answer: This problem indicates that your printer isn't communicating properly with the Micro Decision. Since computers can send information to a printer much faster than it can be printed, printers generally have the ability to store some number of characters of information before printing it. The amount that can be saved (or buffered) varies greatly among printers. When the character storage is nearly full, the printer must tell the computer to stop sending characters to it until there is room again. This process is called "handshaking". Printers connected to the Micro Decision must either handshake on pin 20 of the RS-232 connector, or must use software handshaking (XON-XOFF). Most dealers can supply proper cables for your printer.

See the question on "HANDSHAKING" in the PRINTER section of this manual for details on connecting a printer to the Micro Decision.

Question: I didn't get a copy of the installation program for WordStar. Why not?

Answer: You already have it. Look for the file named INSTWS.COM on your WORDSTAR DISTRIBUTION DISKETTE.

Question: How can I change WordStar's default margins, help level, etc..?

Answer: Follow the instructions for re-installing WordStar, but do not change any selections. When presented with the prompt:

ARE THE MODIFICATIONS TO WORDSTAR NOW COMPLETE?

IF THEY ARE ANSWER YES TO THE NEXT QUESTION.

IF YOU WISH TO MAKE ADDITIONAL PATCHES TO WORDSTAR'S USER AREAS, ANSWER NO TO THE NEXT QUESTION.

OK (Y/N): _

Answer No. This will put you into WordStar's "patcher" and allow you to change any of the defaults below. To do this, enter the address you wish to change, followed by a carriage return; then enter the new value when asked to do so.

To save the modified WordStar, enter an address of 0 at the "ADDRESS TO CHANGE" prompt.

WordStar Patch Addresses:

<u>FUNCTION</u>	<u>ADDRESS (HEX)</u>	<u>DEFAULT</u>
short delay	2CF	3
medium-short delay	2D0	9
medium-long delay	2D1	19
Long Delay	2D2	40
Redisplay Delay	2D3	9
Initial help level	360	3
Help message printing	361	0FF => print message 00 => omit message
Initial Insert Mode	362	0FF => insert on at start 00 => insert off
Display directory	363	0FF => dir display on 00 => dir display off
Left Margin	37F	0
Right Margin	380	64 (decimal)
Word Wrap	385	0FF => Wrap on 00 => wrap off
Justification	386	0FF => Justification on 00 => Justification off
Hyphen Help	389	0FF => Hyphen Help on 00 => Hyphen help off
Initial line spacing	38E	1
Page Numbering	3D3	00 => Include page numbers 0FF => Omit page numbers
Non-Document mode	392	00 => start in Doc mode 0FF => start in NON-DOC mode

LOGICALC AND YOUR MICRO DECISION

Question: I have been trying to use the '@' function as described in the LogiCalc manual, and it doesn't work. What's wrong?

Answer: The '@' function was automated in LogiCalc, and the manual was not updated when that happened. The purpose of the '@' function is to automatically enter a cell address into a formula by moving the cursor to the desired cell, and pressing the '@'. You will notice, that this isn't necessary since the cell address in a formula is automatically updated.

Question: Why doesn't my copy of LogiCalc have as many cells as the manual says it should?

Answer: LogiCalc was originally written for a different operating system, and then changed to work with CP/M. The manual gives the number of cells that were available in the other operating system.

Question: According to the LogiCalc manual, I should be able to get a directory of my files without having to go back to CP/M, but it doesn't work. What's up?

Answer: This ability was taken out of the program to provide for more memory for cell storage.

Question: The LCDUMP program doesn't operate correctly. Some of the data goes to the screen, and some of it goes to the printer. Can this be fixed?

Answer: No.

Question: Can LogiCalc print out with more than 132 characters per line?

Answer: No. The maximum number of characters on a line is fixed at 132 characters.

CP/M UTILITIES AND OPERATING SYSTEM

Question: Why doesn't BACKUP work on my Micro Decision, and how do I fix it?

Answer: BACKUP does not operate correctly on all MDT50 (Freedom 50 / 100) terminals. Because of the way the MDT50 terminal responds when characters are sent to it very quickly, BACKUP thinks it has received a character asking to cancel the BACKUP function. To fix this, turn your system on, and from the "A>", type:

SHIFT and ESC, followed by ^N.

Question: I have been trying to use STAT to change my I/O drivers, and it doesn't seem to work. Whenever I type "STAT DEV:", it indicates that all devices are the TTY:. This cannot be correct. What's the story?

Answer: Because of the clumsy, poorly-documented way in which the IOBYTE is talked about in the CP/M manual, we did not implement the IOBYTE function. If you were trying to use the STAT DEV: command to switch between the parallel and serial port, it won't work. You must use the SETUP program to do it.

Question: Why can't SETUP run from WordStar's "No-File Menu"?

Answer: With WordStar, critical pointers used by SETUP are modified. Because of this, SETUP cannot find the area of the CP/M system that it patches to switch ports or baud rates. Instead it thinks it is seeing an older version of CP/M that does not have the necessary pointers. Therefore, the message; "Old version of CP/M" is printed.

Question: What assembler do I use to modify the CBIOS supplied?

Answer: To take advantage of the expanded instruction set that the Z-80 processor provides over the 8080, the CBIOS on the Micro Decision was written using Z-80 assembly language, and assembled using M-80 (Macro-80) and L-80 from Microsoft.

Question: Do you supply the CBIOS listing for the Micro Decision?

Answer: The CBIOS listing is supplied as a file called CBIOS.MAC on your CP/M distribution diskette with MD3s, and on the Programmers Utility diskette with MD1s and MD2s.

Question: How do I get an updated CP/M system disk for my Micro Decision?

Answer: You can order this from your dealer for \$25.00.

Question: What is the current revision of CP/M for my machine?

Answer: If you have a REV 1 Micro Decision (without the Parallel port), then your current revision of CP/M is 1.6. If you have a REV 2 Micro Decision (with a Parallel port), then the revision level of CP/M for your machine is now 2.3.

Question: How do you get a copy of the Micro Decision ROM listing?

Answer: Although Morrow distributes listings of the CBIOS for the Micro Decision, it is the policy to not distribute ROM listings for the Micro Decision.

Question: How can I find out how to use the routines in the Micro Decision ROM?

Answer: Below is a list of the routines that exist in the ROM of the MD1, MD2, and MD3, and the ways they are used. Several rules must be followed prior to using any routines in the ROM.

- 1) Make sure the Stack is not below 1000h.
- 2) Make sure that the program calling the ROM is calling it from above 1000h.

The ROM entry points on the MD11 are considerably different and much more complicated to use. In addition, they can be FATAL to the machine, so Morrow is not publishing the ROM entry points for the MD11.

-----ROM ENTRY POINTS DESCRIPTION-----

ROM ENTRY POINTS GO HERE

HARDWARE RELATED QUESTIONS

Question: What are the port locations for the UARTS on my MD1, MD2, MD3, MD11?

Answer: The port locations for the UARTS on the MD1, MD2, and MD3, are:

UART DATA PORT FOR TERMINAL = 0FC hex
UART STATUS PORT FOR TERMINAL = 0FD hex

UART DATA PORT FOR PRINTER / MODEM = 0FE hex
UART STATUS PORT FOR PRINTER / MODEM = 0FF hex

For the MD11, port locations are as follows for the UARTs:

UART DATA PORT FOR TERMINAL = 060 hex
UART STATUS PORT FOR TERMINAL = 061 hex

UART DATA PORT FOR PRINTER / MODEM = 062 hex
UART STATUS PORT FOR PRINTER / MODEM = 063 hex

UART DATA PORT FOR AUXILIARY = 070 hex
UART STATUS PORT FOR AUXILIARY = 071 hex

Question: What UART is used and what bits are used for CHARACTER READY and TRANSMIT READY on the MD1, MD2, MD3, MD11?

Answer: The MD1, MD2, and MD3 all use the 8251A USART from NEC. The USART is the same as INTELs 8251A. On the MD11, there are two types of UARTS used: the Zilog Z-80 DART (dual UART), and the Zilog Z-80 SIO (serial I/O). The DART controls the Terminal, and the Printer / MODEM ports, whereas the SIO controls the Auxiliary port.

Bits used on the Micro Decision 1, 2, and 3 for Character RDY, and Transmit RDY in the STATUS register of the 8251A are:

CHAR RDY = Bit 1
TRANSMIT RDY = Bit 0

Bits used on the MD11 are:

CHAR RDY = Bit 0
TRANSMIT RDY = Bit 2

Again, these are bits in the STATUS register of the DART and SIO.

Answer: The I/O ports used on the MD1, 2, and 3 depend on which version of the Micro Decision you have. If your Micro Decision has a Parallel port, then you have a version 2.x Micro Decision. Otherwise, you have a version 1.x Micro Decision.

<u>PORT</u>	<u>FUNCTION</u>
0F5	Motor Check port
0F6	ROM Enable / Disable
	IN = disable
	OUT = enable
0F7	VFO Adjust port
0F8	MOTOR & Pre-comp set
0FA	NEC 765 Floppy disk controller STATUS
0FB	" " DATA
0FC	TERMINAL UART DATA
0FD	TERMINAL UART STATUS
0FE	PRINTER / MODEM UART DATA
0FF	PRINTER / MODEM UART STATUS

0F0	INTEL 8253 Counter Timer Chip Control
0F1	8253 Channel 1 Motor Time Out Delay
0F2	8253 Channel 2 Terminal Baud rate delay
0F3	8253 Channel 3 Printer / MODEM Baud rate delay
0F4	Centronics Data port
0F5	Centronics Status port Bit 3 = 1 implies ACK RCVD Bit 4 = 1 implies Printer busy Bit 7 = STROBE output

29

Question: What ports are used on the MD11?

Answer: The MD11 uses all 256 IO ports. The address lines are decoded to provide nine blocks of ports as follows:

Range	Name	Function
00 - 0F	IO00	Expansion bank 0.
10 - 1F	IO10	Expansion bank 1.
20 - 2F	IO20	Expansion bank 2.
30 - 3F	IO30	Expansion bank 3.
40 - 4F	LPORTS-WRITE	(See Low Port Decoding.)
50 - 5F	TIMER	8253 Counter Timer.
60 - 6F	DART	DART (Dual UART).
70 - 7F	SIO	SIO (Serial I/O).
C0 - CF	LPORTS-READ	(See Low Port Decoding.)

With the exception of LPORTS, all I/O addresses appear twice in I/O space -- once at the locations in the table above, and once at these locations plus 80 hex. The expansion banks refer to the decoded signals that go to the I/O expansion connector on the pc board.

The LPORTS-WRITE range 40 - 4F is decoded to provide:

Address	Write
40	DRIVE STROBE
41	BANK STROBE
42	CENTRONICS DATA
43	na
47	SHIFT REGISTER *
4B	MODE STROBE
4F	CONTROL STROBE

* The cycle will be held in a wait state until the end of the current disk byte.

The LPORTS-READ range C0 - CF is decoded to provide:

Address	Read
C0	DRIVE STATUS
C1	CENTRONICS STATUS
C2	CLEAR INTERRUPT
C3	na
C7	SHIFT REGISTER *
CB	na
CF	na

* The cycle will be held in a wait state until the end of the current disk byte.

Question: Can I attach an 8 inch floppy disk to my Micro Decision?

Answer: No. The interface requirements for an 8 inch floppy disk drive are different from those for a 5 1/4 inch floppy disk drive. In order to provide the Micro Decision at the lowest possible cost, we designed it with the electronic interface to only handle 5-1/4 inch disk drives.

Question: Are quad-density disks available for the Micro Decision?

Answer: No. The Micro Decision is available with double-density, single or double-sided, 48-TPI disk drives only.

Question: How do I add more 5-1/4 inch floppy disk drives to my MD1, MD2, MD3?

Answer: Adding disk drives to your Micro Decision depends on several factors:

- 1) whether you have a Micro Decision with the expansion drive connector on the back (version 1.x).
- 2) who makes the floppy disk drive you are adding.
- 3) which model Micro Decision you have.

General guidelines for adding more disk drives to your Micro Decision are as follows:

To add Shugart SA-200 disk drives to a version 1.x Micro Decision:

External drives for version 1.x Micro Decisions are driven from the edge card connector on the back of the computer.

Drive 'C' should have the drive select jumper set for DS0 and have no terminator.

Drive 'D' should have a jumper connecting pin 2 to pin 14 on the drive edge connector; the drive select jumper is set for DS2; the terminator should have all pins intact.

If only one drive is to be added, configure the drive as 'C' and install a terminator.

Don't forget to boot-up on your CP/M Distribution diskette and create a System diskette for your new drives!

To add drives to a version 2.x Micro Decision:

External drives for a version 2.x Micro Decision are "daisy chained" from the drive B connector on the PC board:

Drive 'C' should be set as DS1 and have no terminator resistor unless there will be no drive 'D' on the system.

Drive 'D' should be set up as DS2 and have the terminator resistor with all pins in.

You must remove the terminator resistor from Drive 'B', but leave Drive 'B' set up as DS0.

Don't forget to boot-up on your CP/M Distribution diskette and create a System diskette for your new drives!

Question: How do I set the baud rate in software on my Micro Decision?

Answer: On REV 1 Micro Decisions, there is a program called "SETBAUD." This program only allows you to switch between the Baud rate set on the switch inside the Micro Decision, and 1/4 the Baud rate set on the switches (i.e. 1200 and 300, or 4800 and 1200). It accomplishes this by telling the 8251A USART to use divide by 16, or divide by 64, when receiving characters (see 8251A data sheet).

On REV 2 Micro Decisions, there is a programmable timer (8253) chip used to determine the Baud rate of the serial ports. The CBIOS developed by Morrow for the Micro Decision has been provided with the necessary intelligence to allow easy setting of the Baud rate for either port from within an applications program. A sample assembly language routine to change the Baud rate of the Printer / MODEM port is given here. To change the routine to set the Baud rate of the Terminal port, just add one more "DEC L" to the code.

The following procedure will work only with REV 2 Micro Decisions.

```
SETRATE: LD HL, ($F242)      ; get pointer to baud rate index
          DEC L
          DEC L
          DEC L
          DEC L
          DEC L              ; baud rate index now in HL pair
          LD (HL), BAUDINDEX ; store index of desired baud rate
          CALL $F252         ; re-initialize counter timer chip
          RET
```

Note: The addresses given here are for 64k CP/M systems only.

BAUDINDEX is a number which corresponds to the baud rate desired, as follows:

<u>BAUDINDEX</u>	<u>BAUDRATE</u>
0	110
1	300
2	600
3	1200
4	2400
5	4800
6	9600

Question: Is there any way to make my MD3 disk drives run quieter?

Answer: If you have an MD3 with CP/M ver 2.2, REV 2.2 or lower, the following procedure will speed up the step rate of the drives, and, at the same time, cause them to run more quietly.

IMPORTANT: DO NOT ATTEMPT TO DO THIS WITH ANYTHING OTHER THAN AN MD3 OR YOU WILL GET AN INOPERABLE SYSTEM. IN ADDITION:

USE A BACKUP OF YOUR CP/M WORKING DISK, IN CASE YOU HAVE A PROBLEM. AFTER SUCCESSFULLY PERFORMING THIS CHANGE, AND VERIFYING THAT IT WORKS, SYSGEN THE NEW SYSTEM FROM THE BACKUP TO YOUR WORKING DISKETTES.

FROM CP/M, TYPE THE INFORMATION THAT IS UNDERLINED

A>SYSGEN[RETURN]
SOURCE DRIVE NAME (OR RETURN TO SKIP): A[RETURN]
DESTINATION DRIVE NAME (OR RETURN TO REBOOT): [RETURN]
A>SAVE 4B CPM64.COM[RETURN]

A>DDT CPM64.COM[RETURN]

DDT VERS. 2.2

NEXT PC
3100 0100

-S2344[RETURN]

2344 HH[RETURN]

2345 F7.[RETURN]

-S28HH[RETURN]

28HH 21

(NOTE: WRITE DOWN THE HEX NUMBER HH)

(HH IS FROM ABOVE)

(HIT [RETURN] UNTIL YOU SEE...)

28xx BF <-----

(This is what you are looking for. If you don't see this after pressing [RETURN] 4 or 5 times, then you have done something wrong. Ask a friend for help. When you get to this point, type in "DF", followed by [RETURN]. This should leave the screen looking like...)

xxxx BF DF[RETURN]

xxxx

-

(Now, press [RTETURN] 9 times, until you again see a "BF", and replace it with a "DF" as yoy did above. REPEAT THIS PROCESS FOR A TOTAL OF 5 TIMES.)

-

-

-

(Then, continue on.....)

-~C[RETURN]

A>SAVE 4B CPM64.COM[RETURN]

A>SYSGEN CPM64.COM

[RETURN]

A>

Now, re-boot your system using the backup diskette you have been working with. You should find that your machine sounds quieter.

Question: What is the TERMINAL.DAT file?

Answer: TERMINAL.DAT is a file on your CP/M DISTRIBUTION DISKETTE. It contains a summary of the commands that various terminals use to control the screen. When initially setting up your CP/M WORKING DISKETTE, the Micro Decision must be told what kind of terminal is being used. It then looks at the TERMINAL.DAT file for the commands used to control your terminal, and "patches" the operating system to use these commands.

You can add terminals to the list by editing the TERMINAL.DAT file, and adding definitions for the new terminal. When doing this, study the other terminals for an example of how a definition should look, and be sure to use the Non Document mode of WordStar or NewWord to make the change.

Question: What are terminal levels, and what codes are used for each level?

Answer: To simplify operation of the Micro Decision, Morrow has defined three levels of terminal capability:

- Level 1 -- Minimum (i.e., ADM3a)
- Level 2 -- Medium Capability (i.e., SOROC IQ 120)
- Level 3 -- Maximum Capability (i.e., ADM31)

Next, we defined the functions a terminal must perform to fit into a particular level, and the code that would be used within the computer to represent the function. This internal code is then translated by the CP/M system into the code required by the terminal being used.

By doing this, we were able to minimize the amount of installation necessary in order to use the Micro Decision with any of dozens of different computer terminals. All that must be done is to tell the CP/M DISTRIBUTION disk what kind of terminal is being used. It will then load up a translation table from the file "TERMINAL.DAT" and put it in the Working CP/M diskette, thereby automatically installing most of the programs with no more work by the user.

In order to be a level 1, 2, or 3 terminal, a terminal must provide all functions in the left hand column below for its intended level and those under it. For example Level 2 terminals must have all functions listed under level 1 and level 2. The right hand column below shows the code used internal to the Micro Decision to represent the various functions.

	<u>CODE</u>	<u>USED</u>
LEVEL 1 - Clear Screen		[^] Z
Home Cursor		--
Direct Cursor Positioning		ESC,=,R+32,C+32
LEVEL 2 - all of above, plus:		
Set Dim intensity		ESC,)
Set high intensity		ESC,(
Clear to End of Line		ESC,T
Clear to end of Screen		ESC,Y
Level 3 - all of above, plus:		
Insert Character		ESC,Q
Insert Line		ESC,W
Delete Character		ESC,E
Delete Line		ESC,R

Following is a list of terminals and their associated levels.

<u>TERMINAL</u>	<u>LEVEL</u>
Morrow 20	3
Morrow 50 (Freedom)	3
Morrow 60	3
ADM 3A or 5	1
ADM 22	3
ADM 31	3
Heath H19	1
Visual 200	2
Soroc 120	2
Televideo 910	2
Televideo 912C/920	3
Televideo 925/950	3
ADDS Viewpoint	2
ADDS Viewpoint 3A+	1
ACT 5A	2
Qume 102	3
ANSI	1
VT52	1
VT100	2
Wyse	3
Teleray	3
IBM 3101	1
Hazeltine 1420/1500	2
Hazeltine Esprit	2

IMPORTANT:

The next two questions refer to the connector on the back of the Micro Decision. On earlier Micro Decisions, the connector was used to add additional floppy disk drives to the system. On newer Micro Decisions, the connector is used as a parallel port, and additional floppy drives are added in another manner. It is important to understand that the earlier Micro Decisions do not have the capability to use the connector as a parallel port. The circuit board must be replaced to add a parallel port to older Micro Decisions.

Question: What are the pinouts on the parallel connector?

Answer: The Micro Decision's parallel port is a Centronics compatible port employing a 34-pin edge connector for connection to a printer.

The signals for the 34-pin edge connector are:

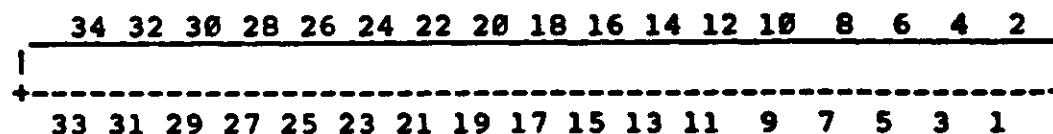
Odd pins 1 - 23 and 33 are grounded.

2	STROBE
4	DATA BIT 0
6	DATA BIT 1
8	DATA BIT 2
10	DATA BIT 3
12	DATA BIT 4
14	DATA BIT 5
16	DATA BIT 6
18	DATA BIT 7
20	ACKNOWLEDGE
22	READY/BUSY

All other pins not connected.

NOTE: Pin numbers are incorrectly marked on some of the boards. The correct numbering is:

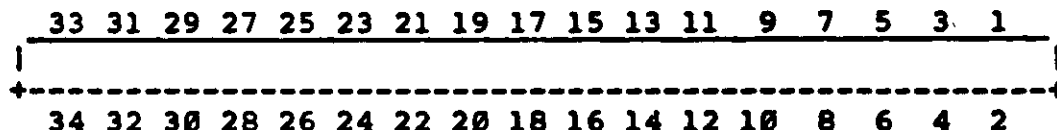
Rear View of Parallel Connector



Question: What are the pinouts of the expansion drive connector on my old Micro Decision?

Even pins 2-34 grounded.

NOTE: The expansion connector can be used **ONLY** to add external 5-1/4 inch floppy disk drives. Eight inch disk drives cannot be added.



NOTE: These signals come from the floppy disk controller chip. There is no way to access them directly.

Question: What is the 40-pin header inside the Micro Decision on the printed circuit board for?

Answer: The 40-pin connector on the pc board of the Micro Decision is for future expansion devices that Morrow will produce. In addition, it may be used as an interface for custom hardware circuits. It is important to note that it is NOT possible to use this connector for memory expansion of any kind.

The connector does not exist on REV 1 Micro Decision boards. On REV 2 Micro Decision boards, the connector may be in two different places depending on the circuit layout; either at locations F1 through K1, or at locations A6,6 through D6,7. The Connector is also available on the MD11 board.

The pinout of the I/O connector is as follows:

<u>PIN</u>	<u>SIGNAL NAME</u>	<u>DESCRIPTION</u>	<u>I/O</u>
1	/BRD	Buffered I/O READ	O
3	/BWR	Buffered I/O WRITE	O
5	/RESET	System Reset line	O
7	/4M	4 MHz Z-80 clock	O
9	/IO00	I/O Select 00-0Fh	O
11	/IO10	I/O Select 10-1Fh	O
13	/IO20	I/O Select 20-2Fh	O
15	/IO30	I/O Select 30-3Fh	O
17	AB3	Address line 3	O
19	AB2	Address line 2	O
21	AB1	Address line 1	O
23	AB0	Address line 0	O
25	DB7	Data Bus 7	I/O
27	DB6	Data Bus 6	I/O
29	DB5	Data Bus 5	I/O
31	DB4	Data Bus 4	I/O
33	DB3	Data Bus 3	I/O
35	DB2	Data Bus 2	I/O
37	DB1	Data Bus 1	I/O
39	DB0	Data Bus 0	I/O
34	-12	-12 Volts	
36	+12	+12 Volts	
38	+5	+5 Volts	
40	+5	+5 Volts	

Even pins 2 through 32 are grounded.

For more details, see the schematics at the rear of this book.

Question: Can the Micro Decision Rev 2. run at 19.2K baud?

Answer: No. Due to a mistake made by an engineer who shall remain nameless (give me a D! give me an A!...), when the Rev 2 board was designed a mistake was made that prevents the needed clock frequency from being generated.

Question: Is it possible to use the expansion connector on my Micro Decision REV 1 to connect a hard disk?

Answer: No. The expansion connector cannot be used for anything other than connecting up to two additional 5 1/4 inch disk drives to the Micro Decision.

Software Installation Procedure

This section contains instructions for installing WordStar, Personal Pearl, and Bazic on the Micro Decision. If you are encountering difficulty when trying to install one of these programs on your Micro Decision, this section should help you past the trouble.

WordStar

Question: How do I install Wordstar on my Micro Decision?

Answer: Many Micro Decision users have reported problems in getting their WordStar to work with their printer. They want to be able to perform sub- and super-scripts, alternate pitch, etc.....

Well, smile! Following is the procedure used to change the type of printer that WordStar thinks it's talking to. In the description, all user input is underlined. It is VERY important that you enter exactly what appears in the procedure. Failure to do so may not yield the results desired.

Step 1. Make a copy of your WordStar Working diskette, using the BACKUP selection from the Micro Menus.

Step 2. Place your copy of the WordStar working diskette in Drive A, and place your WordStar distribution diskette (the one with the MicroPro label on it) in drive B.

Step 3. Reset your system. If you go directly to the WordStar "No-File" menu, type X to get out of WordStar.

You should now be looking at the "A>" on your screen.

Step 4. Type:

A>B: [RETURN]

You should now have the B> on your screen. Type

B>INSTWS[RETURN]

Now we are in the WordStar installation program.

COPYRIGHT (C) 1981 MicroPro International Corporation

INSTALL version 4.2 for MicroPro WordStar release 3.00

Do you want a normal first-time INSTALLation of WordStar?

(Y = yes; N = display other options): N

answer no here, since you already have WordStar working on your system.

***** WordStar INSTALLATION OPTIONS MENU *****

- A INSTALLation of a distributed WordStar, INSTALLing WSU.COM, producing WS.COM, and then running the INSTALLED WordStar.
- B INSTALLation or re-INSTALLation of a WordStar COM file of your choice, placing the newly INSTALLED WordStar in a file of your choice, and then exiting to the operating system.
- C Same as B except run the INSTALLED WordStar.
- D Modification of the INSTALLation of a WordStar COM file of your choice. The modified WordStar replaces the original file. The modified WordStar is then run.

PLEASE ENTER SELECTION (A, B, C, or D): B

Select option B here, since you are re-installing a working version of WordStar.

Filename of WordStar to be INSTALLED? A:WS.COM

WS.COM is the name of the existing copy of WordStar you are modifying, and it is on the diskette in drive A.

Filename for saving INSTALLED WordStar? A:WS.COM

You want to put the new version back where it was.

MicroPro WordStar release 3.00 serial # WU55604K

***** WordStar TERMINAL MENU #1 *****

- | | |
|-----------------------------|-----------------------|
| A Lear-Siegler ADM-3A | C Lear-Siegler ADM-31 |
| D Hazeltine 1500 | E Microterm ACT-IV |
| F Beehive 150/Cromemco 3100 | G Insai VIO |
| H Hewlett-Packard 2621 A/P | I Infoton I-100 |
| J Processor Tech Sol / VDM | K Soroc IQ-120/140 |
| L Perkin-Elmer 550 (Bantam) | 2 Terminal Menu #2 |
| 3 Terminal Menu #3 | Z none of the above |
| U no change | |

PLEASE ENTER SELECTION (1 LETTER): U

It is very important that you do not change this. Do not be alarmed if you do not have the type of terminal that this says you do. The Micro Decision has built-in translation software to convert terminal control codes to those required by the terminal you are using. Remember that when you first created your CP/M

diskette, you told it what kind of terminal you were using, and it told you what level of terminal you have (1,2,or 3). It is from that single response that you were able to install all the programs supplied with your computer (except PERSONAL PEARL in some cases) to work with your terminal.

Previous selection kept unchanged:

Lear-Siegler ADM-31

This may say Lear-Siegler ADM-31, ADM-3A, or Soroc IQ-120/140. Because your Micro Decision has the translation capability mentioned above, WordStar must be installed for one of these terminals, or you may have problems with its operation.

NOTE:

See the section on Terminal Levels for further information, and to determine what level terminal you have.

OK (Y/N): Y

***** PRINTER MENU *****

(More specific info is displayed after choice is entered)

- A Any "Teletype-like" printer (ie almost any printer)
- C "Teletype-like" printer that can BACKSPACE
- D DIABLO 1610/1620 daisy wheel printer
- E DIABLO 1640/1650/630/Xerox 1700 series daisy wheel printer
- F QUME Sprint 5 daisy wheel printer
- G NEC Spinwriter 5510/5520 thimble printer
- I "Half-Line-Feed" Printers
- M I/O Master / O.E.M. Printer Combination
- R C. Itoh/TEC Starwriter Printer
- U no change
- Z none of the above

PLEASE ENTER SELECTION (1 LETTER): _

THIS IS IT!!!!!! When you get to this point, select your printer. Some hints on what to select if your printer is not listed:

You have a:	Select:
Morrow printer	D
TELETEX (TTX)	D
Transtar	D
Dot-Matrix	probably A

The text that follows will vary depending on the choice you made above.

Teletype-like printer

This selection will drive almost any printer. The printer must be capable of responding to ASCII printing characters, carriage return, and line feed only.

Make sure any AUTO LF or LOCAL LF switch is OFF.

If your printer is capable of backspacing, use CHOICE C instead for faster output.

If you have a DAISY WHEEL or thimble printer shown on the menu, use the appropriate choice in order to obtain "Micro-justified" output and additional formatting capabilities.

Refer to manual for instructions on patching in optional control sequences for ribbon color change, character pitch change, and half-line roll (for subscripts and superscripts) if your printer has these capabilities.

OK (Y/N): Y

Most Teletype-like printers use no communications protocol.

***** COMMUNICATIONS PROTOCOL MENU *****

A "Communications Protocol" is necessary with some printers to prevent printer buffer overflow and character loss.

E "ETX/ACK" Protocol

X "X-ON/X-OFF" Protocol

N NONE required (or handled outside of WordStar)

U no change

PLEASE ENTER SELECTION (E, X, N, B, or U): N

Do not specify any protocol here. The Micro Decision handles it outside of WordStar.

No communications protocol

OK (Y/N): Y

With no protocol, the usual driver selection (below) is L.

***** DRIVER MENU *****

Or, how should WordStar send characters to your printer?

L CP/M "List" device (LST:)
T CP/M primary console device (TTY:)
C CP/M secondary console device (CRT:)
P Port Driver (direct I/O to 8-bit ports)
N Parallel Centronics Printer Driver
Q Serial Driver on TRS-80 Model-2
S User-installed driver subroutines
U no change

PLEASE ENTER SELECTION (L,T,C,P,N,P,S,B or U): L

DO NOT SPECIFY ANYTHING OTHER THAN L HERE!!!!

If your Micro Decision is equipped with a Parallel printer, you must use the SETUP.COM program and set the printer port to be Centronics. This will assign the Centronics port to be the LST device.

CP/M List Output driver (LST:)

In most systems this is a "logical" device which must be assigned to the desired one of four "physical" devices with the STAT command before WordStar is invoked.

OK (Y/N): Y

ARE THE MODIFICATIONS TO WORDSTAR NOW COMPLETE?

IF THEY ARE ANSWER YES TO THE NEXT QUESTION.

IF YOU WISH TO MAKE ADDITIONAL PATCHES TO WORDSTAR'S USER AREAS, ANSWER NO TO THE NEXT QUESTION.

OK (Y/N): Y

CONFIRM TERMINAL AND PRINTER SELECTIONS:

Lear-Siegler ADM-31
Teletype-like printer
No communications protocol
CP/M List Output driver (LST:)

OK (Y/N): Y

That's all there is to it!

The possible terminal and printer selection shown above are:

For Terminal:

Lear-Siegler ADM-3A
Soroc IQ-120/140
Lear-Siegler ADM-31

For Printer:

Depends on what you have.

For Communications protocol:

No communication protocol

For output driver:

CP/M List Output Driver

If you do not have this setup, you should answer no when asked to confirm selections at the last question above.

Personal Pearl Installation

Question: I am having trouble getting Personal Pearl installed. What's the secret?

Answer: There are several answers to this depending on the revision of CP/M 2.2 you are using. Following are instructions for installing Pearl for the MD2, and MD3. Be sure to follow the instructions that pertain to your particular version of CP/M (i.e., Rev 1.3, Rev. 1.5, Rev. 2.1, etc...). The rev is not the same as the version. All Micro Decisions except the MD11 have CP/M Version 2.2, but may have different revisions of the system.

INSTALLING PERSONAL PEARL FOR CP/M REV 1.3

```
*****
*   USE THESE INSTRUCTIONS IF YOUR SYSTEM IS THE FOLLOWING:   *
*   *   *   *   *   *   *   *   *   *   *   *   *   *   *   *
*   a) Micro Decision II computer (2 single-sided drives)    *
*   b) CP/M Distribution Diskette, Vers.2.2 Rev. 1.3          *
*   *   *   *   *   *   *   *   *   *   *   *   *   *   *   *
*****
```

1) MAKE COPIES OF YOUR PERSONAL PEARL DISTRIBUTION DISKETTES

- a) Get fifteen blank diskettes and labels;
- b) Press reset (it's the button with the light on the front of your computer), insert your CP/M system diskette in drive A and press the RETURN key;
- c) When you have entered the Micro Menu, select item #5, FORMAT A DISKETTE. Follow the computer's instructions and format all fifteen blank diskettes;
- d) Get the five PERSONAL PEARL Distribution diskettes which you received with your system;
- e) Go back to the Micro Menu and select item #6, MAKE A BACKUP DISKETTE. Follow the computer's instructions and backup (copy) your PERSONAL PEARL Distribution diskettes onto five of the blank & formatted diskettes;

HANDY HINT: Label each new copy as soon as it's finished with:

- 1) the name "PERSONAL PEARL Backup diskette", and
- 2) the number from the original Distribution diskette (1 of 5, 2 of 5, etc.);

- f) Put your PERSONAL PEARL Distribution diskettes away in a safe place!

2) INSTALL CP/M ON YOUR DISKETTES

- a) Go back to the Micro Menu and select item #8, EXECUTE A CP/M COMMAND;
- b) At the COMMAND line, type SYSGEN and press RETURN. Insert your first PERSONAL PEARL Backup diskette (1 of 5) in drive B. The computer's questions and your responses should be:

```
SOURCE DRIVE:      A (press RETURN)
DESTINATION DRIVE:  B (press RETURN)
DESTINATION DRIVE:  (see below)
```

Each time the computer asks for a DESTINATION DRIVE, insert another PERSONAL PEARL Backup diskette in drive B,

type B and press RETURN. When you have completed all five PERSONAL PEARL Backup diskettes, do the same for the 10 blank & formatted diskettes, then press RETURN

3) CREATE PERSONAL PEARL WORKING DISKETTES

- a) Get the remaining ten blank & formatted diskettes;
- b) Remove your CP/M System diskette from drive A and press reset;
- c) Insert your first PERSONAL PEARL Backup diskette (1 of 5) in drive A and press RETURN;
- d) At the "A>" prompt, type WELCOME and press RETURN;
- e) PERSONAL PEARL will now take over with "WELCOME SERVICES" and guide you through the creation of your PERSONAL PEARL Working diskettes (select "Personalize", "Make Working Copies", "standard configuration" and destination drive B).

HANDY HINT: Shortly after it takes over, PERSONAL PEARL will show you a list of the names and numbers it wants to assign to the ten completed Working diskettes. When you see this, immediately label each of your ten blank diskettes with:
1) the name "PERSONAL PEARL Working diskette", and
2) a name and number from the list (5-SORT, 6-DESIGN REPORTS, etc.).

- f) When you have completed your PERSONAL PEARL Working diskettes, return to the "WELCOME SERVICES" portion of PERSONAL PEARL, select "Personalize" and "Personalize Your Working Copy".
- g) Put your PERSONAL PEARL Backup diskettes away in a safe place!

4) ENTERING THE WORLD OF PERSONAL PEARL

Congratulations on progressing this far! Now it's time to actually use PERSONAL PEARL:

- a) Press reset, insert your PERSONAL PEARL Working diskette #1 (Welcome) in drive A and press RETURN;
- b) Type WELCOME and press RETURN;
- c) Select "Demonstration".

You're on your own from here - enjoy!

INSTALLING PERSONAL PEARL FOR CP/M REV 1.5

* USE THESE INSTRUCTIONS IF YOUR SYSTEM IS THE FOLLOWING: *
*
* a) Micro Decision II computer (2 single-sided drives) *
* b) CP/M Distribution Diskette, Vers.2.2 Rev. 1.5 *

1) MAKE COPIES OF YOUR PERSONAL PEARL DISTRIBUTION DISKETTES

- a) Get fifteen blank diskettes and labels;
- b) Press reset (it's the button with the light on the front of your computer), insert your CP/M system diskette in drive A and press the RETURN key;
- c) When you have entered the "Main Menu", select item #9, "Utility menu";
- d) From the "Utility Menu" select item #5, "Format a diskette". Format all fifteen blank diskettes;
- e) Get your five Personal Pearl Distribution diskettes which you received with your system;
- f) Go back to the "Utility menu" and select item #6, "Make a backup diskette". Backup (copy) your Personal Pearl Distribution diskettes onto five of the blank & formatted diskettes.

HANDY HINT: Label each new copy as soon as it's finished with:

- 1) the name "Personal Pearl Backup diskette", and
- 2) the number from the original Distribution diskette (1 of 5, 2 of 5, etc.).

- g) Put your Personal Pearl Distribution diskettes in a safe place!

2) INSTALL CP/M ON YOUR DISKETTES

- a) Go back to the Utility menu and select item #8, "Execute a CP/M command";
- b) At the COMMAND line, type SYSGEN and press RETURN. Insert your first Personal Pearl Backup diskette (1 of 5) in drive B. The computer's questions and your responses should be:

SOURCE DRIVE: A (press RETURN)
DESTINATION DRIVE: B (press RETURN)
DESTINATION DRIVE: (see below)

Each time the computer asks for a DESTINATION DRIVE, insert another Personal Pearl Backup diskette in drive B, type B and press RETURN. When you have completed all five Personal Pearl Backup diskettes, do the same RETURN.

3) CREATE PERSONAL PEARL WORKING DISKETTES

- a) Get the remaining ten blank & formatted diskettes;
- b) Return to the "Main Menu" and select item #4, "Personal Pearl";
- c) Select item #1, "Welcome", from the "Personal Pearl function selection menu";
- d) The computer will instruct you to "Insert your WORKING diskette for PEARL". Do the following instead: insert your first Personal Pearl Backup diskette (1 of 5) in drive A and press RETURN;
- e) Personal Pearl will now take over with "WELCOME SERVICES" and guide you through the creation of your Personal Pearl Working diskettes (select "Personalize", "Make Working Copies", "standard configuration", and destination drive B).

HANDY HINT: Shortly after it takes over, Personal Pearl will show you a list of the names and numbers it wants to assign to the ten completed Working diskettes. When you see this, immediately label each of your ten blank diskettes with:

- 1) the name "Personal Pearl Working diskette", and
- 2) a name and number from the list (5-SORT, 6-DESIGN REPORTS, etc.).

f) When you have completed your Personal Pearl Working diskettes, return to the "WELCOME SERVICES" portion of Personal Pearl, select "Personalize" and "Personalize Your Working Copy";

g) Put your Personal Pearl Backup diskettes in a safe place!

4) ENTERING THE WORLD OF PERSONAL PEARL

Congratulations on progressing this far! Now it's time to actually use Personal Pearl:

- a) Press Reset and insert your CP/M System diskette in drive A;
- b) When you have entered the "Main Menu", select item #4, "Personal Pearl"
- c) Select item #1, "Welcome", from the "Personal Pearl function selection menu";

d) Insert your Personal Pearl Working diskette #1
"Welcome", and select "Demonstration";

You're on your own from here - enjoy!

INSTALLING PERSONAL PEARL FOR CP/M REV 1.5

```
*****
*   USE THESE INSTRUCTIONS IF YOUR SYSTEM IS THE FOLLOWING:   *
*   *   *   *   *   *   *   *   *   *   *   *   *   *   *   *
*   a) Micro Decision MD3 computer (2 double-sided drives) *
*   b) CP/M Distribution Diskette, Vers.2.2 Rev. 1.5        *
*****
```

1) MAKE COPIES OF YOUR PERSONAL PEARL DISTRIBUTION DISKETTES

- a) Get six blank diskettes and labels;
- b) Press reset. Insert your CP/M system diskette in drive A and press the RETURN key;
- c) When you have entered the "Main Menu", select item #9, "Utility menu";
- d) From the "Utility Menu" select item #5, "Format a diskette". Format all six blank diskettes;
- e) Get the two Personal Pearl Distribution diskettes you received with your system;
- f) Go back to the "Utility menu" and select item #6, "Make a backup diskette". Backup (copy) your Personal Pearl Distribution diskettes onto two of the blank & formatted diskettes;

HANDY HINT: Label each new copy as soon as it's finished with;

- 1) the name "Personal Pearl Backup diskette", and
- 2) the number from the original Distribution diskette (1 of 2 or 2 of 2).

- g) Put your Personal Pearl Distribution diskettes in a safe place!

2) INSTALL CP/M ON YOUR DISKETTES

- a) Go to the Utility menu and select item #8, "Execute a CP/M command";
- b) At the COMMAND line, type SYSGEN and press RETURN. Insert your first Personal Pearl Backup diskette (1 of 2) in drive B. The computer's questions and your responses should be:

```
SOURCE DRIVE:      A (press RETURN)
DESTINATION DRIVE:  B (press RETURN)
DESTINATION DRIVE:  (see below)
```

When the computer asks for the next DESTINATION DRIVE,

insert the other Personal Pearl Backup diskette in drive B, type B and press RETURN. When you have completed both Personal Pearl Backup diskettes, do the same for the 4 blank & formatted diskettes, then press RETURN.

3) CREATE PERSONAL PEARL WORKING DISKETTES

- a) Get the remaining four blank & formatted diskettes;
- b) Return to the "Main Menu" and select item #4, "Personal Pearl";
- c) Select item #1, "Welcome", from the "Personal Pearl function selection menu";
- d) The computer will instruct you to "Insert your WORKING diskette for PEARL". Do the following instead: insert your first Personal Pearl Backup diskette (1 of 2) in drive A and press RETURN;
- e) Personal Pearl will now take over with "WELCOME SERVICES" and guide you through the creation of your Personal Pearl Working diskettes (select "Personalize", "Make Working Copies", "double density" and destination drive B).

HANDY HINT: Shortly after it takes over, Personal Pearl will show you a list of the names and numbers it wants to assign to the four completed Working diskettes. When you see this, immediately label each of your four blank diskettes with;

- 1) the name "Personal Pearl Working diskette", and
- 2) a name and number from the list (2-Starter Library, 4-Design Forms/Reports-File Maintenance, etc.)

f) When you have completed your Personal Pearl Working diskettes, return to the "WELCOME SERVICES" portion of Personal Pearl, select "Personalize" and "Personalize Your Working Copy";

g) Put your Personal Pearl Backup diskettes away in a safe place!

4) ENTERING THE WORLD OF PERSONAL PEARL

Congratulations on progressing this far! Now it's time to actually use Personal Pearl:

- a) Press Reset and insert your CP/M System diskette in drive A;
- b) When you have entered the "Main Menu", select item #4,

"Personal Pearl" ;

c) Select item #1, "Welcome", from the "Personal Pearl function selection menu";

d) Insert your Personal Pearl Working diskette #1, "Welcome", and select "Demonstration".

You're on your own from here - enjoy!

INSTALLING PERSONAL PEARL FOR CP/M REV 1.6/2.1

* USE THESE INSTRUCTIONS IF YOUR SYSTEM IS THE FOLLOWING: *
* *
* a) Micro Decision MD2 computer (2 single-sided drives) *
* b) CP/M Distribution Diskette, Vers.2.2 Rev. 1.6/2.1 *

1) You should have on hand:

a) 5 Personal Pearl Distribution diskettes;

b) 11 blank diskettes

2) Press reset (it's the button with the light on the front of your computer), insert your CP/M system diskette in drive A and press the RETURN key;

3) From the "Main Menu", select item #8, "Create working diskettes";

4) At the OPTION line, enter item #4, "Personal Pearl";

HANDY HINT: You will be shown a list of names to assign to the eleven blank diskettes. When you see this, immediately label each of your eleven blank diskettes with;

1) the name "Personal Pearl ", and

2) a name from the list (Sort, Design Reports, etc.).

5) The Micro Decision computer will continue to instruct you in the installation of your Personal Pearl. However, there are a couple of mistakes which you should know about:

WHEN THE COMPUTER SAYS: IT SHOULD SAY INSTEAD:

"...upper disk drive..." "...right disk drive..."

"...lower disk drive..." "...left disk drive...."

6) When you have entered the "WELCOME SERVICES" portion of Personal Pearl (congratulations!) select "Personalize", "Make Working Copies", and "standard configuration";

7) When you have completed your Personal Pearl Working diskettes, return to the "WELCOME SERVICES" portion of Personal Pearl, select "Personalize", and "Personalize Your Working Copy";

NOW IT'S TIME TO ACTUALLY USE PERSONAL PEARL!

1) Press Reset and insert your CP/M System diskette in drive A;

2) When you have entered the "Main Menu", select item #4,

"Personal Pearl";

3) Select item #1, "Welcome", from the "Personal Pearl function selection menu";

4) Insert your Personal Pearl Working diskette #2, "Welcome", and select "Demonstration".

You're on your own from here - enjoy!

INSTALLING PERSONAL PEARL FOR CP/M REV 1.6/2.2

* USE THESE INSTRUCTIONS IF YOUR SYSTEM IS THE FOLLOWING: *
* *
* a) Micro Decision MD3 computer (2 double-sided drives) *
* b) CP/M Distribution Diskette, Vers.2.2 Rev. 1.6/2.2 *

1) You should have on hand:

a) 2 Personal Pearl Distribution diskettes;

b) 5 blank diskettes

2) Press reset (it's the button with the light on the front of your computer), insert your CP/M system diskette in drive A and press the RETURN key;

3) From the "Main Menu", select item #9, "Create working diskettes";

4) At the OPTION line, enter item #4, "Personal Pearl";

HANDY HINT: You will be shown a list of names to assign to the five blank diskettes. When you see this, immediately label each of your five blank diskettes with;

1) the name "Personal Pearl ", and

2) a name from the list (Sort, Design Reports, etc.).

5) The Micro Decision computer will continue to instruct you in the installation of your Personal Pearl.

6) When you have entered the "WELCOME SERVICES" portion of Personal Pearl, select "Personalize", "Make Working Copies" and "double density". DESTINATION DRIVE is "B";

7) When you have completed your Personal Pearl Working diskettes, return to the "WELCOME SERVICES" portion of Personal Pearl, select "Personalize", and "Personalize Your Working Copy";

NOW IT'S TIME TO ACTUALLY USE PERSONAL PEARL!

1) Press Reset and insert your CP/M System diskette in drive A;

2) When you have entered the "Main Menu", select item #4, "Personal Pearl"

3) Select item #1, "Welcome", from the "Personal Pearl function selection menu".

4) Insert your Personal Pearl Working diskette #2, "Welcome", and select "Demonstration".

BAZIC

Question: How do I install BAZIC for my Micro Decision?

Answer: To install Bazic on your Micro Decision, first run Bazic, and then LOAD the program called CRT. Next, RUN it. Select the version of Bazic you want to install, then, when presented with the terminal selection menu, select the SOROC. That's all there is to it!

Terminal Control Codes

Question: What codes should I use to clear the screen, home the cursor, perform cursor addressing, etc... on my Micro Decision terminal?

Answer: The following table lists the codes used by the Micro Decision for screen control:

<u>FUNCTION</u>	<u>CODE USED</u>
Clear Screen	^Z
Home Cursor	^^
Direct Cursor Positioning	ESC,=,R+32,C+32
Set Dim intensity	ESC,)
Set high intensity	ESC,(
Clear to End of Line	ESC,T
Clear to end of Screen	ESC,Y
Insert Character	ESC,Q
Insert Line	ESC,W
Delete Character	ESC,E
Delete Line	ESC,R

NOTE: All functions listed above operate on Morrow Terminals. For performing other functions, consult your terminal manual. If you have a non-Morrow terminal, the functions listed above may not all work.

LEGEND for Table

#1 MORROW MP 200 EPSON IDS PRISM	#4 SMITH CORONA
#2 OKIDATA	#5 C. ITOH DIABLO QUME NEC (Xon-Xoff)
#3 TI 810 QUME COMREX DAISY WRITER	

Sample #1

MORROW		PRINTER
1	←→	1
2	←→	2
3	←→	3
7	←→	7
20	←→	20

Sample #2

MORROW		PRINTER
1	←→	1
2	←→	2
3	←→	3
6	←→	6
7	←→	7
20	←→	11

Sample #3

MORROW		PRINTER
1	←→	1
2	←→	2
3	←→	3
7	←→	7
	←→	5
	←→	6
8	←→	8
20	←→	20

Sample #4

MORROW		PRINTER
1	←→	1
2	←→	2
3	←→	3
5	←→	5
7	←→	7
8	←→	8
20	←→	4

Sample #5

MORROW		PRINTER
1	←→	1
2	←→	2
3	←→	3
5	←→	5
6	←→	6
7	←→	7
20	←→	20