

CP/M, NorthStar, Macintosh, Apple II, MS-DOS, and PS/2

Don't let incompatible diskette formats get you down — read them all with your PC!

Teach your PC to speak CP/M

UniDOS Z80 Coprocessor Board by MicroSolutions

Run your Z80 and 8080 code programs at LIGHTNING speed on your PC or AT with the UniDOS 8MHz. Z80 coprocessor board. UniDOS automatically switches from MS-DOS to CP/M mode when your CP/M program is executed. UniDOS emulates most common computers and terminals such as Kaypro, Xerox 820, Morrow, Osborne, and VT100. All standard CP/M system calls are supported. Includes UniDOS and UniForm-PC. UniDOS Z80 Coprocessor Card... \$ 169.95

UniDOS by Micro Solutions

Equip your PC/XT with an NEC V20 chip and run your favorite CP/M programs without taking up another card slot. Runs 8080 code directly on the V20, and uses emulation mode for Z80 code or systems without a V20. UniDOS by MicroSolutions... \$ 64.95
UniDOS w/UniForm & V20-8 chip... \$ 135.00

UniForm-PC by MicroSolutions

How have you ever wished you could use your CP/M diskettes on your PC? Now you can access your CP/M files and programs on your MS-DOS computer just as you would a standard MS-DOS diskette. Install UniForm and use standard DOS commands and programs right on your original diskette without modifying or copying your files. UniForm-PC allows you to read, write, format, and copy diskettes from over 275 CP/M and MS-DOS computers on your PC, XT, or AT. With UniForm-PC and the Compaticard, you can use 5 1/4" high density, 96TPI, 3 1/2" (720k/1.44M), and even 8" drives. UniForm-PC by MicroSolutions... \$ 64.95
Also available for Kaypro, & other CP/M computers

CompatiCard by MicroSolutions

THE universal four drive floppy controller board for the PC or AT. Run up to 16 disk drives (4 per Compaticard), including standard 360K, 96 TPI, high density 1.2M, 8" (SSSD or DSDD), and 720k/1.44M 3 1/2" drives. Comes with its own MS-DOS driver and format program. Use it with UniForm-PC for maximum versatility. Compaticard Board... \$ 119.95
Compaticard with UniForm-PC... \$ 179.95
8" Drive adaptor... \$ 15.00
External 5 1/4" drive cable... \$ 15.00

Compaticard II by MicroSolutions

Two drive version of the Compaticard, sorry no 8" or single density. Compaticard II... \$ 89.95
Compaticard II with 1.2M or 3 1/2" internal drive... \$ 199.95

Megamate by MicroSolutions

This is the 3 1/2" drive package that you've been waiting for. Run 720k or 1.44M diskettes in this attractive external drive. Comes complete with its own controller card. Easy to install, just plug it into your PC or AT and go. Megamate... \$ 329.95

MatchPoint-PC by MicroSolutions

The MatchPoint-PC board for the PC/XT/AT works with your standard controller card to let you read and write to NorthStar hard sector and Apple II diskettes on your PC. INCLUDES a copy of the UniForm-PC program, as well as utilities to format disks, copy, delete, and view files on Apple DOS, PRODOS, and Apple CP/M diskettes. MatchPoint-PC Board... \$179.95

MatchMaker by MicroSolutions

Now you can copy your Macintosh diskettes right on your PC/XT/AT with the MatchMaker. Just plug your external 3 1/2" Macintosh drive into the MatchMaker board and experience EASY access to your Mac diskettes. Includes programs to read, write, initialize, and delete files on your single or double sided Mac diskettes. MatchMaker Board... \$ 139.95
MatchMaker w/External Mac Drive... \$ 325.00

Hard Disks for CP/M systems

Pep up your CP/M computer with hard disk performance. Our simple to install kits allow you to connect up to two 5 1/4" hard drives to your Z80 system. The Winchester Connection software customizes your system from an easy to use menu, with flexible drive parameters, partition and block size, and includes complete installation and diagnostic utilities. A complete system requires a HDS daughter board, WD1002-05 hard drive controller board, hard drive, software package and cables. HDS Host Board with Software... \$ 79.95
HDS Board, WD1002-05, and software... \$ 245.00
WD1002-05 Controller Board only... \$ 185.00
External drive cabinet with power supply... \$ 139.95

Parts and accessories for the Kaypro and Xerox 820-1

Plus2 ROM Set for Xerox 820-1... \$ 39.95
Plus2 ROM with X120 bare board... \$ 49.95
KayPLUS ROM for Kaypro 2, 4, 10 - specify... \$ 69.95
Kaypro 2X Real-time Clock parts kit... \$ 29.00
Kaypro 2X Hard disk interface parts kit... \$ 16.00
Kaypro 10 Hard Disk controller board... \$ 185.00
Kaypro four drive floppy decoder board... \$ 35.00
QP/M Operating System - bootable - specify system... \$ 64.95
QP/M without CBIOS (installs on any Z80 system)... \$ 49.95
Complete parts and repair services available

Special Purchases!!

PC-Mastercard by Magnum Computer

This is probably the BEST multi-function card on the market. Use mixed banks of 64k and 256k chips to install up to 1.5 Megabytes of RAMDISK, and PRINT SPOOLER (or fill your system up to 640k). Serial, parallel, game ports, and real time clock installed! Comes with complete software. PC-MASTERCARD (Ok installed)... \$ 69.95

Turbo Editor Toolbox

by Borland International... \$ 29.95
Ever wanted to add text editing to your Turbo Pascal application, or write a word processor that does things the way that YOU want? Comes with source for two sample editors, modules for windowing, multi-tasking, and many other options. Requires PC or compatible and Turbo Pascal 3.0.

COPY II PC by

Central Point Software... \$ 24.95
Stop worrying about your copy protected disks. COPY II PC lets you back them up, so you can keep going when your master disk can't.

Printer/Data Switches

Quality with economy. These boxes switch all 25 lines so they can be used with either RS232, or IBM parallel (DB25) printer cables. Four port data switch... \$ 39.95
Two port data switch... \$ 34.95
IBM style Parallel Printer Cable... \$ 12.00
Three cable set ** Special **... \$ 30.00

MicroPro Manuals

WordStar V3.3 Manual... \$ 12.00
InfoStar Set (DataStar & ReportStar)... \$ 18.00

Call or write for our complete catalog of software, parts, accessories and complete repair services for the Kaypro, Xerox 820, and IBM PC/AT.

Prices subject to change without notice. VISA and Mastercard accepted. Include \$6.00 shipping and handling, \$8.50 for COD, UPS-Blue or RED Label additional. Please include your phone number with all correspondence.

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HARD DISK KITS AND SUBSYSTEMS
by Emerald Microware and MICROCode
Consulting

Now you can get a complete internal or external hard disk system designed specifically for the Kaypro and at a reasonable price.

- * Install up to three hard drives on your system at once
- * Software installs automatically under CCP unless specified
- * Drives may be mixed - each drive has its own parameter tables
- * Software runs diagnostic on controller board at boot up
- * Works with KPLUS ROM set for auto-boot for hard drive
- * Fully configurable parameters:
 - up to 8 logical drive partitions per physical drive
 - works with 2 to 8 heads
 - logical drives can be fully programmed for number of tracks, block size, and number of directory entries
 - drive step rate, including buffered seek
 - up to 1024 cylinders per drive
 - logical drives do not need to be matching sizes
- * Runs almost any ST506 compatible hard disk from 5 to 40 meg
- * Available with Z80 host or 50 pin Kaypro '84 type host
- * Uses WD1002 controller board (same as Kaypro 10 - 40 pin bus)
- * Fast - at least 40% faster than Kaypro 10 hard disk
- * Kits include all parts necessary for installation
- * External units may be installed in a matter of minutes
- * System tracks may be sysgened for warm boots, even on systems without boot rom
- * Includes format, swap, sysgen, safety, and install utilities
- * All parts come assembled and tested
- * Full ECC/CRC error handling
- * Utility program includes bad block testing and lockout
- * Single tracks may be reformatted should errors occur
- * Internal kits use 3 1/2" profile hard drives

Emerald Microware's hard disk systems are designed for reliability and ease of installation. External subsystems may be installed and running in a matter of minutes. Internal installations offer the maximum in compactness and portability. We use MicroSci and Rodime 3 1/2" profile hard disk drives for best immunity to physical damage and low power consumption. Buy the full system or just the parts that you need. Complete systems include all parts needed to install the system, including screws and drilling templates where required.

Host boards are available in two versions, the Z80 socket host for older models such as the Kaycomp and the '83 series II's and 4's, and the Kaypro 10 and '84 series host which plugs into the existing 50 pin J9 connector. Fan, J9 connector, and possible missing chips are supplied for 2X, and NEW 2 models.

Your operating system may be booted from the hard disk with the KPLUS ROM set installed. Standard software allows up to three ST506 compatible hard disks to be installed at once - 5 to 40 meg each, mixed or matched.

On '84 series Kaypros, the hard drive unit installs between your half height floppies, with no modification to your front panel other than to install one LED (if desired). A hard drive may be installed in the older '83 series Kaypros, although we do not recommend this installation because the Kaypro power supplies may be marginal without fan cooling. Kaypro did not make a cut out for a fan on the chassis on these model. If you are fairly confident that this is not a problem, the standard full height floppy drives may be replaced with half height units, and a half height hard drive with a full height front panel may be installed. We recommend half height floppy drives because most of them are much more reliable than the original drives and use much less power (we do not recommend Tandon half height drives).

The MICROCode Consulting software package included with our package represents one of the most comprehensive hard disk installation and maintenance packages available for any computer. The master utility allows you to completely define the parameters for the disk drive, such as step rate, number of heads, number of cylinders, BIOS driver load location, number and size of drive partitions, number of directory entries, and block size. The utility also allows you to test the interface and controller board, format the drive, sysgen operating system, erase selective directory areas, test the drive for bad sectors, and to lock out bad blocks where damaged sectors are located. Bad block lockout program also warns you if bad block is located in an existing file. The package also includes utility programs for moving the heads to a safety area for transportation, swap or reassign hard and floppy drive logical drive numbers. BIOS module also does full ECC/CRC error handling and reporting.

None of the programs included in the package require any editing or assembly; all modules are self locating, and may be installed either above or below operating system. For maximum speed and ease of use, use with KPLUS ROM set for autobooting from hard drive.

QP/M Operating System
by MICROCode Consulting

Here we have a full replacement for CP/M with all of the features that you always wanted. And it does it all in the same space as CP/M 2.2, with no sacrifices.

- * Full replacement for CP/M 2.2 with complete compatibility
- * Transparent time/date stamping of files as they are modified
- * Optimized for maximum throughput using native Z80 code
- * Uses the same space as CP/M 2.2
- * Simple installation from menu oriented program
- * Relocatable without having to assemble source files
- * Configurable from installation program
- * Automatically re-logs changed diskettes
- * Select drives and user areas using colon and semicolon
- * Drive search path definable from keyboard
- * Comes with at least nine new utility programs
- * QSUB utility has built in programming capability
- * QBACKUP utility only backs up modified files
- * Custom BIOS supports hardware real time clocks
- * Allows time/date stamping even without hardware clock
- * Use up to 31 USER areas

If you have been using ZCPR you are already familiar with many of the functions of QP/M, but with many new extensions, without the drawbacks of ZCPR3. QP/M is a complete operating system with full CP/M 2.2 compatibility and many new features. QP/M maintains time and date information on each file on your disks transparently to normal operations, WITHOUT taking any additional space from your TPA (your 64k stays 64k). Select user areas just as you would select a drive; use both semicolon and colon to log a drive; change your drive/user default search path from your keyboard; automatically relog a changed disk without having to type a control C, no more accidentally lost data; and many other features. QP/M is easy to install and customize from a menu oriented installation program, and is fully relocatable (you can change the system size), without having to edit or assemble any files (with the exception of your own custom BIOS).

QP/M has all of the resident commands found in CP/M 2.2 with 5 additional: DFD - define default drive, DFU - define default user, DFLT - display default drive/user, TIME - display time and date, and TOF - send top-of-form character to printer. Nine additional transient programs are also included in the package, QSTAT, QPIP, QSTAMP, D, TDCNFG, QSUB, QINSTALL, QPATCH, and QBACKUP. A public domain editor, a Z80 assembler, and a Z80 debugger are also distributed with the package.

There is no other operating system better adapted for use with hard disk systems. We recommend it highly.

CONFIDENTIAL DEALER PRICE LIST

Product	Suggested Retail	EMERALD MICROWARE PRICE	Dealer Prices	
			5 - 24	25+
<i>Uniform</i>	69.95	64.95	52.50	47.50
MatchPoint-PC	195.00	179.95	146.25	132.50
MatchMaker	149.00	139.95	111.75	101.30
External MAC drive	239.00	199.95	---	---
MatchMaker w/ External Mac Drive	---	325.00	---	---
Megamate	349.00	329.95	269.00	237.00
CompatiCard I	125.00	119.95	93.75	85.00
CompatiCard II	95.00	89.95	71.00	64.50
External cable (CED)	15.00	15.00	---	---
Internal cable (CID)	8.00	8.00	---	---
8 inch cable kit	30.00	30.00	---	---
Drive Adapter	15.00	15.00	---	---
3.5 inch drive (1.44/720)	149.00	129.95	102.00	98.00
1.2 MB 5.25 inch drive	150.00	129.95	---	---
Drive mounting rails	4.50	4.50	2.75	2.50
Single drive cabinet	99.00	99.00	---	---
Dual drive cabinet	99.00	99.00	---	---
UniDos	69.95	64.95	52.50	47.50
UniDos w/Z80 Coprocessor	175.00	169.95	131.25	119.00
V20-5	25.00	7.00	---	---
V20-8	30.00	12.00	---	---
V30-8	30.00	15.00	---	---

All prices are in USA dollars and do not include shipping charges.

What computer do you own?

All of Advent's hardware products integrate very tightly with the Kaypro computer. Because of this, it is important to determine which Kaypro you own.

All Kaypro CP/M computers can be reduced to three major versions.

'84 Computers

These are the most recent products produced by Kaypro. If you own one of the following models, 2'84, 4'84, 2X, 1, or New 2, you have what we consider an '84 model. All of these models are considered the same for the purposes of upgrading.

'84 computers are all provided with half height disk drives, graphic display, and 2 serial I/O ports.

Kaypro 10

Kaypro 10's have half height disk drives, graphic displays, and 2 serial I/O ports, as do '84 computers. There are two versions of the Kaypro 10 computer, we call them the 10'83 and 10'84. The only way to tell the difference is to remove the cover and note the mounting position of the gray colored 2.5" inch wide flat ribbon cable.

Kaypro 10'83

If the wide flat ribbon cable attaches near the center of the main Kaypro circuit board the computer is considered a 10'83. It requires a TurboROM adapter kit to install the TurboROM.

Kaypro '84

If the wide flat ribbon cable attaches at the edge of the main circuit board, the computer is a 10'84 and is treated as an '84 computer.

'83 Kaypro computers

Early Kaypro computers came in two basic versions: Kaypro II and Kaypro 4.

The simplest way to distinguish an '83 computer from the newer '84's is that it has only one serial I/O port. All other Kaypro computers have two. Other differences are that the '83's have full height disk drives and no video graphics display capabilities.

The Kaypro II came in two versions and it is important to know which one you have. If the sign-on message reads 'Kaypro II' you have an early Kaypro II on your hands. In addition to an '83 TurboROM you will also require a TurboROM Adapter Kit. If the sign-on message reads 'Kaypro' then no Adapter Kit is required.

Kaypro II's also require a Personality / Decoder board for installation of double sided disk drives.

Advent TurboROM

TurboROM Ver 3.4 Now Shipping!

The TurboROM offers several major enhancements to the Kaypro computer while retaining the capabilities of the original Kaypro ROM.

The TurboROM is an ideal choice to upgrade a Kaypro II to a 4. With the addition of DSDD floppies and a Personality / Decoder board which provides the side select logic for the double sided drives, you now have a deluxe Kaypro 4.

TurboROM Features

Fast Disk Read / Write - Disk writing times are faster by a factor of 2 to 4. Disk read times can be improved by 20% to 30% when using one of the Advent formats.

Larger TPA - K10s and UROM models can expand the TPA space by over 3K bytes of memory, depending on the hardware configuration.

Type Ahead Buffer - The type ahead keyboard buffer feature prevents loss of keyboard characters during disk or printer operations. The type ahead can be enabled and disabled as desired.

Supports four floppy drives - With the addition of the Advent Personality/Decoder board (purchased separately), any mix of 48 TPI and 96 TPI drives may be connected to your Kaypro.

Supports Two Hard Disks - One or two hard disk drives of up to 56Mb each is supported in the TurboROM. Our Host Adapter board, winchester controller, hard disk drives and cables are available for NON-K10 installations. Requires optional Hard Disk Formatter software.

Advanced Hard Disk Format - A hard disk formatter utility is provided for use with Kaypro 10 computers. By reformatting the hard disk you gain over 2Mb of additional disk storage. Additional features include the ability to select up to 7 logical drives instead of the 2 provided by Kaypro. Plus both user selected block size up to 16K and number of directory entries up to 8196 per logical drive.

RAM Disk Supported - RAM disk driver software is included in the TurboROM. Support is built in for the addition of up to 2 Mb of Advent RAM disk. With no need to load driver software, there is no decrease in the amount of memory available to your application programs (TPA) when using the RAM disk.

Clock Display - On screen display of Real Time Clock. With '84 and K10 models (2 serial ports) you can choose to display the time of day on the screen, using either the Advent Real Time Clock/Calendar, the Kaypro real time clock or others.

Screen Dump - Screen dump is available by a user selectable 'trigger' character. Type this single character and the entire displayed contents of the current screen will be printed.

Screen Saver - When no activity occurs at the keyboard during a time out period, the screen goes blank. Touch any key and the screen reappears. An optional item is required to implement this feature for '83 models.

User Selectable Cursor - Block or underline, fast or slow blinking. Key clicks can also be turned on and off.

Reads / Writes 10 Formats - Directly reads writes many different floppy disk formats without the need for disk format translation software. Formats include: Kaypro SSDD, DSDD, Advent SSDD, DSDD, DSQD (96 TPI), MicroC DSQD (96 TPI), Epson QX-10 DSDD, Osborne SSSD, SSDD, Xerox 820-1 SSSD.

256 Directory Entries - The Advent Floppy disk format provides 782K (DSQD 96 TPI) or 390K (DSDD 48 TPI) of disk storage and supports 256 directory entries as compared to 64 for a standard Kaypro diskette. This means four times as many filenames may be stored on disk as on the Kaypro double sided format.

Advanced Floppy Features - The TurboROM supports 3ms step rates for 96 TPI floppy disk drives. Step rates, head load and settle times can be set by the user as required. No extra circuitry is required to use the 3ms step rate option.

External Drivers - TurboROM Ver. 3.4 supports the ability to add external drivers which allow such devices as 3.5" and 8" floppies, streaming tape drives or other custom I/O devices to be added to your computer.

No Soldering or Wiring - No soldering or wiring is required to install the TurboROM. Comprehensive instructions and user's manual are included to make installation easy.

Supports other Products - Supports Plu*Perfect Systems CP/M Enhancements, DateStamper, Back-Grounder, and Multicopy software. The TurboROM is compatible with Uniform versions 3.xx, MITE, Media Master version 3.02, XTRAKEY, NEWORD and almost all software bundled with Kaypro CP/M version 2.2G and earlier. Patches are currently available for all software shipped with the 'U' ROM models, including MASMENU and Automite.

TurboROM Support Software:

TURBOCOPY.COM software to format and copy both single and double sided 48 and 96 TPI disks in 5 different formats.

TURBOCFG.COM utility program used to configure options such as serial port parameters, IOBYTE assignments, keyboard buffer on/off, clock display on/off, cursor appearance, cold boot auto-execute commands, warm boot drive assignment, floppy disk step rates and keypad/cursor key configuration.

TURBOMAP.COM utility to allow user selectable logical remapping of the disk drives connected to the computer.

TURBOGEN.COM utility to write the operating system on hard, floppy, and RAM disks.

MAKTURBO.COM utility to automate the construction of the TurboROM operating system.

MOVTURBO.COM utility to adjust the size of the TurboROM operating system for optimum software performance and to readjust the system size as the hardware configuration changes. This utility program will relocate the operating system on 1/4 boundaries, for maximum available TPA.

K10FMT.COM ('84 / K10 TurboROM only) is used to reformat the hard disk in Kaypro 10 computers providing an additional 2Mb of disk capacity as well as other user selectable options.

RELATED PRODUCTS

TurboROM Adapter Kit - Required to adapt the TurboROM to the early version of the Kaypro II'83 and K10'83.

Developer's Diskette - Software notes and tools for writing programs for the TurboROM. Includes ZCPR1 source, hard disk parking program, Warm Boot speed up patches, XON/XOFF printer driver, etc.

Application Software Patch Diskette - Menu-driven program to modify "U-ROM" application programs for compatibility with the TurboROM. Also, patches for AUTOMITE, MASMENU, and FASTBACK. Source code included.

TurboROM Features List:

- 2 X to 4 X speed on all disk writes (both hard and floppy)
- Faster disk reads (with Advent format)
- Supports 48 and 96 TPI drives
- Supports fast seek (3 ms) for 96 TPI floppies
- Up to 4 floppy drives in any mix of SS, DS, 48TPI and 96TPI drives
- 256 directory entries using Advent floppy format
- Up to 10 built in disk formats
- Super-speed disk copying with Turbocopy program
- Allows redefining of logical drive assignments
- Up to 2 Mbytes more storage on K10 hard disks
- Add a second or larger hard disk to K10s
- Up to 3.25K more program area on K10s
- Built-in screen dump
- Programmable cursor -- block, line, flashing, non-flashing
- Video screen blanking after 10 minutes of non-use (optional on '83s)
- Improved video performance on '84 computers
- Time displayed on 25th line of '84 computers (Real Time Clock required)
- Hard disk support built in (up to 112Mb)
- Ram disk support built in (up to 2048K)
- Driver Software available for MicroSphere and SWP RAM disks
- User written device drivers supported
- 32 character type-ahead keyboard buffer
- ZCPR1 included - Supports ZCPR2 and ZCPR3
- Advanced features list includes fine tuning floppy and hard disk performance
- Full set of utility software provided
- Compatible with all Plu*Perfect CP/M enhancements
- Compatible with Uniform, Media Master, Fast Back, etc.
- No modifications required to your computer to use the TurboROM

Hard Disk Systems

Advent Products offers internal and external hard disk systems on all models of Kaypro CPM computers, except the Robie.

NON Kaypro 10

Hard disk drives are available from Advent in 11Mb, 22Mb, 34Mb, 44Mb and 56Mb capacities. The 11Mb, 22Mb and 34Mb drives are half height 5.25" while the 44Mb and 56Mb drives are full height 5.25".

One or two hard disks may be connected to the computer. Only one may be mounted inside a floppy disk based Kaypro computer.

The Advent TurboROM Hard Disk Formatter (ADVFMT.COM) supports virtually any make and model of ST-506 hard disk.

The ADVFMT.COM hard disk formatter allows flexible partitioning. Each drive may be divided into, one thru seven logical drives. Maximum logical drive capacity is 8Mb.

Flexible CPM block size. The basic unit size for disk files can be assigned as 2K, 4K, 8K or 16K. The small block size is appropriate when there are mostly small files on a drive. The large block size is used for large files such as databases and also provides the fastest read and write times.

The number of directory entries is user defined and is specified at format time. The larger the logical drive size and smaller the block size, the greater the number of directories a drive can have. The maximum number of directory entries is over 8192 per logical drive.

The Advent Host Adapter board, and TurboROM are required when adding hard disk drives. The Host Adapter can be equipped with a real time clock and also provides the ability to add an Advent RAM Disk to your computer.

Kaypro 10

Together, the TurboROM and the K10FMT.COM Formatter (included with '84 / K10 TurboROM) provide significant speed improvements in reading from and writing to the hard disk.

Reformatting your hard disk with the K10FMT.COM formatter program will increase the Kaypro 10 hard disk capacity from 9,008K to 11,008K, depending on your particular disk drive and the number of bad tracks found.

Improved bad track handling. Bad tracks are withheld from use even if they are in the directory area. All formattable tracks are available for use.

Improved logical hard drive layout. Each logical drive is assigned by cylinders instead of being contained on a separate platter in the drive. Logical partitions are made to improve seek times and improve overall performance by 2 to 4 times over a Kaypro formatted hard disk.

Kaypro 10 computers with a half height drive can hold a second half height drive up to 34Mb.

Hard Disk Features List:

- High-speed disk read / write — much faster than K10
- Supports 1 or 2 hard disks up to 56 Mb each
- Each hard disk can be divided into 1 to 7 logical drives
- Each logical drive can be any size up to 8 Mb
- User may select number of directory entries for each logical drive
- User-selectable block size for each logical drive
- Expandable to include RAM Disk
- Expandable to include Real Time Clock / Calendar
- Supports all features of our TurboROM
- Includes the Advent hard disk formatter software
- Advanced features include complete user definable disk formatting
- Supports a wide range of hard disk manufacturers and models

Real Time Clock/Calendar & Host Adapter

The Advent Real Time Clock Calendar (RTC) distinguishes itself from all other similar products on the market. Not only does it provide complete RTC features like time keeping of hours, minutes, seconds, day and date, like other clocks, but also provides:

- Host adaptor for connection to our Hard Disk system.
- Precision time keeping - clock is factory calibrated to .0003% accuracy.
- High quality lithium battery for 1 year time and date backup.

Software is provided, complete with source code to set and display the time and date using dBASE II, MicroSoft MBASIC-80, SBASIC, TURBO Pascal, "C" and assembly language.

The Advent RTC is 100% compatible with Plu*Perfect Systems Datestamper software. This software provides automatic time and date stamping of files, logging computer time and other functions.

Installation is easy with comprehensive, step by step instructions provided in the user's manual. No soldering or wiring is required.

Floppy Disk Upgrade

Changing or adding new floppy disk drives is one method of expanding the usefulness of a computer that is otherwise beginning to restrict your computing activities.

There is basically three paths that can be taken in upgrading or changing your floppy disk drives.

- Changing from single sided to double sided, such as a Kaypro II to a 4.
- Changing from 48TPI (double density) to 96TPI (quad density) drives.
- Adding extra disk drives.

Older Kaypro computers with full height disk drives can easily be upgraded to 3 or 4 floppies. This is accomplished by using half height drives, a TurboROM and a Personality/Decoder board to provide the additional decoding for the third and fourth drives.

The Personality / Decoder board provides several important functions for the floppy disk system.

- Decoding for up to 4 floppies.
- Provides the side selection logic for II'83s.
- Provides circuitry for fast (3ms) step rate used for 96 TPI drives.
- Stores information about the number and size of floppies in the system.

Using the Personality / Decoder eliminates all need to make any circuit modifications to the computer, while maintaining the highest level of performance with the many different combinations of floppies.

All floppy upgrades from Advent are completely compatible with Uniform and Media Master, including the 96 TPI formats supported by these programs.

External Monitor Adaptors

You can now have all the advantages of a larger video display monitor for use with your Kaypro CP/M computer. A larger monitor can be extremely useful in training sessions demonstrations, aiding the visually impaired, or just making your Kaypro easier to read.

Unlike other adaptors, installation requires no soldering desoldering or wiring. In addition, installation in no way alters or damages any part of your Kaypro. Removing the cover from the Kaypro, removing one IC from its socket and plugging in the EMA and video cables is all that is involved. Of course complete illustrated instructions are included which make installation easy, even for the most nontechnical user.

The EMA allows for the simultaneous display data on the internal Kaypro monitor as well as the external monitor. The brightness control on the computer adjusts only the internal monitor allowing the external monitor to be adjusted separately.

The ability to 'daisy chain' monitors (connect together in series) is supported for applications where driving several monitors from one computer is desired. Examples for this use are large classroom-style training or demonstrations where one monitor is not sufficient. A possible business application would be where the data from one computer must be displayed at numerous desks throughout an office.

EMAs are available for each of the Kaypro CP/M computers.

Kaypro II and 4 computers

Use the '83 EMA for these computers. Any computer monitor may be used with this EMA.

Kaypro 2X, 2'84, 4'84, 10'84, New 2 computers

Use the '84 EMA for these computers. These computers produce nonstandard video which is not compatible with normal composite video monitors. The EMA provides the ability for these computers to drive a high resolution 12" monitor specially modified for this purpose by Advent.

Kaypro 10'83

Use the K10 EMA for this computer. This computer produces nonstandard video which is not compatible with normal composite video monitors. The EMA provides the ability for the K10'83 to drive a high resolution 12" monitor specially modified for this purpose by Advent.

Products Available:

- '83 EMA
- '84 EMA
- K10 EMA
- 12" Green Monitor for '83 EMA
- 12" Amber Monitor for '83 EMA
- 12" Green Monitor for '84 and K10 EMA
- 12" Amber Monitor for '84 and K10 EMA

Monitors come complete with a 5 foot video cable.

12ft. Keyboard Cable

This 12ft Keyboard cable is manufactured specifically to replace the 3ft cable provided with your Kaypro CPM computer. Four times the length of the original, it allows additional flexibility in placing the keyboard and computer. Although longer, it may be stored in the same manner as the original.

Telephone handset cables (or other cables that look similar to the computer keyboard cable) are not intended for use with computers and generally do not function reliably.

Advent's replacement cable is designed to the exact electrical and physical requirements for use with computer keyboards such as the Kaypro, Otrona, and other portables.

Price List

'83 TurboROM _____	\$ 59.95
'84/K10 TurboROM _____	\$ 59.95
TurboROM Adapter Kit _____	\$ 9.95
Personality/Decoder Board _____	\$ 39.95
Screen Blanking ROM (Kaypro II only) _____	\$ 19.95
Developers Diskette _____	\$ 25.00
Application Software Patch Diskette _____	\$ 10.00
Hard Disk Systems - Internal:	
Non K10 Systems:	
22Mb _____	\$ 586.00
44Mb _____	\$ 686.00
System less drive _____	\$ 326.00
K10 - Replacement of original 10Mb:	
22Mb _____	\$ 365.00
44Mb _____	\$ 465.00
System less drive _____	\$ 105.00
External Monitor Adapters:	
'83 EMA _____	\$ 29.95
'84 EMA _____	\$ 29.95
K10'83 EMA _____	\$ 29.95
12" Video Monitors:	
Green (for '83 EMA) _____	\$ 149.95
Amber (for '83 EMA) _____	\$ 159.95
Green (for '84/K1083 EMA) _____	\$ 159.95
Amber (for '84/K10'83 EMA) _____	\$ 169.95
Keyboard Cable _____	\$ 9.95

Pricing Notes

Prices shown for Hard Disk systems are assuming that every component is required to install the product. The price may be lower if your computer currently has other products already installed. Call Advent for further information.

Ordering Information:

To place an order or get further information about any product, call during normal business hours.

Voice (714) 630-0446
 Fax (714) 630-0921

Shipping:

All orders are shipped UPS within the United States including Hawaii and Alaska. Freight charges are as follows:

Ground	\$3.50
2nd day	current UPS rate
Next day air	current UPS rate

Orders shipped to Hawaii or Alaska are shipped via 2nd day or Next day air only. International orders are shipped best way. COD orders are charged \$3.50 for COD handling.

Insurance charges will be added to orders for hard disks at the rate of \$0.50 per \$100.00 of product value.

Terms of Payment:

Advent Products accepts MasterCard and Visa or COD. Retail COD orders over \$200.00 are shipped cash or cashiers check only. Personal or company check is accepted on COD orders under \$200.00.

International orders are accepted in U.S. funds only and must be drawn on a U.S. bank.

Technical Support: (714) 630-7116

If you require assistance with the installation or use of any hardware product manufactured by Advent Products, please call our Technical Support Department. Our trained technicians will be glad to provide you with whatever information you need.

Business Hours:

Advent Products, Inc. is open regular hours to serve your needs.

8:00AM to 5:00PM
 (PACIFIC TIME ZONE)
Monday thru Friday

Product Warranty:

All items are warranted for 90 days. A 15% re-stocking charge will be applied to any product not authorized by Advent for return.

Product specifications and pricing subject to change without notice.

KPLUS and KPLUS84 ROMS
by MICROCode Consulting

Have you been waiting for an easy way to expand and speed up your Kaypro? Now you can add hard disk, ramdisks, real time clocks and many other advanced features with the greatest of ease.

KPLUS ROM Features:

- * 32 stroke keyboard buffer
- * Supports four floppy drives
- * Auto-detect of quad drives
- * Ten disk formats supported
- * Selectable drive step rate
- * Automatic disk relogging
- * Screen dump from keyboard
- * Enhanced system utilities
- * Internal dumb terminal mode
- * Built in real-time clock
- * ADM-31 terminal emulation
- * Easy software installation
- * Rom resident debug monitor
- * Autoboot from floppy or hard disk
- * Automatic screen blanking
- * Supports two 5k to 40k hard drives
- * Logical-to-physical drive map
- * Fast hard drive backup utility
- * BIOS support of printer protocols
- * Multi-computer disk format utility
- * Dynamic pause from keyboard
- * Fast floppy and hard disk access
- * On-screen status/clock display
- * Improved screen scrolling
- * Built-in ramdisk support
- * Comes 2732 or expanded 2764

At last you can expand your Kaypro without having to learn to program, edit a file, or build up a mass of overlay or install files.

LUS can optionally support up to THREE hard drives - either using your current Kaypro 10, Advent card, or Emerald Hard Disk subsystem. Kplus increases storage on the Kaypro 10 from 4476k to 5176k per drive - an increase of 1.4 Megabytes with a minimum of 40% increase in speed! In addition, each hard drive can be partitioned into any number of logical drives. And of course you can boot from the hard drive or floppy.

KPLUS will automatically detect quad (96-tpi double-sided) drives. Any 48-tpi as well as 96-tpi disk will work properly in you quad drive. Further, you can even boot, run, and format 48-tpi disks on a quad drive.

KPLUS internally supports the following 5.25-inch disk formats:

- Kaypro 2, 4, and 8 (Micro Cornucopia quad format)
- Xerox 820 single density - single/double-sided
- Xerox 820-II double density - single/double-sided
- Osborne single-/double-density single-sided

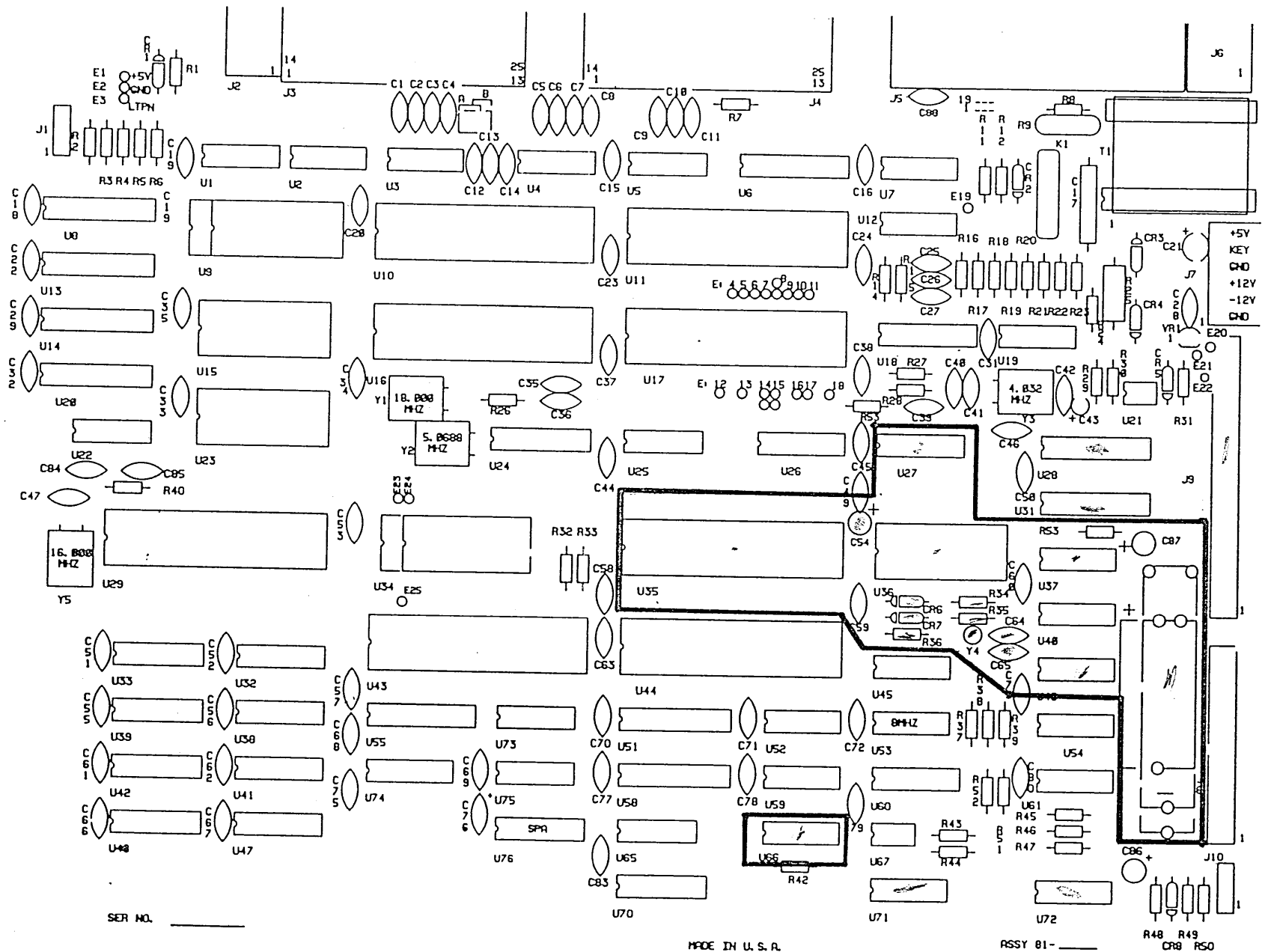
Through a simple hardware modification (a simple plug-in board or the addition of one IC and a few wires), the Kaypro is capable of supporting four floppy drives. Should you choose to add more drives to your Kaypro, KPLUS can be configured to use them.

KPLUS incorporates logical-to-physical drive mapping which allows you to name your drives in any manner. For example, if you boot on physical drive C, this becomes logical drive A. Any drive on the system may be reassigned to a different logical drive letter.

Have you had to press your reset button lately? If you've done it once, it was too often. Now is your chance to get rid of the drawbacks that came with your Kaypro, and add speed and versatility at the same time. Run all of your existing programs, with speed and unsurpassed reliability.

System utilities included with Kplus include KPCONFIG, FORMAT, and SYSGEN, as well as a number of other Kplus specific programs. KPCONFIG allows defining the entire system, such as drive type and step rate, keyboard type, screen dump key, printer type and protocol, and much more!

An additional utility, P2DSKDF.COM, adds the capability of installing, adding, or deleting up to 127 disk formats. For the first time a multi-computer format utility is available that allows you to install and save formats not in the supplied menu. When a drive's format is set with P2DSKDF, it is fixed until P2DSKDF is run again - all without additional memory being used!



KAYPRO

REAL TIME CLOCK

KAYPRO 2X IC IDENTIFICATION

<u>Location</u>	<u>IC Identification</u>	<u>Remarks</u>
U1	7406N	Hex Inverter Buffer Driver
U2	74LS14NA	Hex Schmitt Trigger Inverter
U3	MC1489P	Quad RS-232C Receiver
U4	MC1488	Quad RS-232C Driver
U5	MC1489P	Quad RS-232C Receiver
U6	74LS373N	Octal D-Type Latch
U7	Vacant	
U8	74LS374N	Octal D-Type Flip Flop
U9	NLS 81-187	Character ROM
U10	KPRO 81-189	
U11	MK3884N-4	Serial I/O Controller
U12	Vacant	
U13	74LS373N	Latch, 8 bit, Tri-state
U14	74LS373N	Latch, 8 bit, Tri-state
U15	SY2129-4	2Kx8 NMOS SRAM
U16	SY6845EA	CRT Controller, Enhanced
U17	MK3884N-4	Serial I/O Controller
U18	Vacant	
U19	Vacant	
U20	74LS245N	Octal Bus Transceiver
U21	Not Used	
U22	Vacant	
U23	SY2129-4	2Kx8 NMOS SRAM
U24	AY5-8116	Baud Rate Generator
U25	74LS14NA	Hex Schmitt Trigger
U26	74LS138N	3 Line to 8 Decoder/Demultiplexer
U27	74LS138N	3 Line to 8 Decoder/Demultiplexer
U28	74LS244N	Octal Bus Driver
U29	KPRO 81-194	
U30	Not Used	
U31	74LS245N	Octal Bus Transceiver
U32	2164A-20	64Kx1 DRAM
U33	2164A-20	64Kx1 DRAM
U34	27C64G-15	BIOS ROM
U35	Z80B PIO	Clock Port PIO
U36	MM58167AN	Real Time Clock
U37	74LS02	Quad 2 input NOR Gate
U38	2164A-20	64Kx1 DRAM
U39	2164A-20	64Kx1 DRAM
U40	74LS00P	NAND Gate
U41	2164A-20	64Kx1 DRAM
U42	2164A-20	64Kx1 DRAM
U43	Z80 CPU	CPU
U44	MB8877A	Mini FDC
U45	74LS02P	Quad NOR Gate
U46	74LS04P	Hex Inverter
U47	2164A-20	64Kx1 DRAM
U48	2164A-20	64Kx1 DRAM
U49	Not Used	
U50	Not Used	
U51	74LS244N	Octal Bus Driver

U52	74LS32P	Quad OR Gate
U53	Vacant	
U54	7406N	Hex Inverter Buffer/Driver
U55	74LS373N	Octal D-Type Latch
U56	Not Used	
U57	Not Used	
U58	74LS373N	Octal D-Type Latch
U59	74LS02N	Quad NOR Gate
U60	74LS195AN	4-bit Parallel Access Shift Registr
U61	74LS08N	Quad AND Gate
U62	Not Used	
U63	Not Used	
U64	Not Used	
U65	74LS10N	Triple NAND Gate
U66	74LA474AN	Dual D-Type Flip Flop
U67	WD9216	Data Separator Floppy Disk
U68	Not Used	
U69	Not Used	
U70	Vacant	
U71	74LS14NA	Hex Schmitt Trigger Inverter
U72	74LS02N	Quad NOR Gate
U73	74HC00E	Quad NAND Gate
U74	Not Used	
U75	74S74N	Dual D-Type Flip Flop

Kaypro '84 Series
Real Time Clock Parts Kit

The Kaypro real time clock parts kit contains the parts that Kaypro left off of many of the '84 series main boards. Some of the Kaypro main boards may have some of these parts installed, so do not worry if you do not need all of them. You may find boards with all of the resistors, capacitors, and even chip sockets installed, or only empty solder pads at each location.

If you have a board that does not have any of these components installed, you will probably need to remove solder from the mounting holes on the board. This portion of the job requires a moderately advanced level of skill to do without damaging the board. If you do not have the skill, correct tools, or a friend that can help you, please do not attempt to complete the installation. Please return the kit for a refund or send the kit and your board and we will do the installation for a fee of \$15.00. We feel that it is always better to stop while you are ahead, than to get involved in a lot of repairs.

The kit also contains a disk with two programs, TIME.COM and SETCLOCK.BAS. Both of these are Kaypro distribution programs that may have come with your original system disk. There are also other programs and operating systems available to make use of your real time clock. We distribute a replacement operating system that replaces CP/M, called QP/M, which use the real time clock to time/date stamp your diskette files each time a file is modified. There are also a number of other public domain and commercial packages available that do the similar things. We also have a replacement ROM set called the KayPLUS ROM that uses the real time clock to determine disk drive time outs, and CRT screen blanking.

The real time clock chip is a MM58167A, manufactured by National Semiconductor. If you want to develop your own applications for the clock, data sheets and programming examples are available from National. The real time clock is located at I/O ports 20, 22, & 24. The real time clock is accessed through a Z80-PIO which handles the latching and status of the clock chip. Port 20 is used for register select and interrupt status, 22 is the PIO control port, and 24 is the PIO data port. The registers bits function as follows:

- bit 0 - least significant register select
- bit 1 - register select
- bit 2 - register select
- bit 3 - register select
- bit 4 - most significant register select
- bit 5 - not used
- bit 6 - RTC interrupt output
- bit 7 - RTC standby interrupt input

Parts list:

Part	Qty	Location	Description
40 pin socket	~1	U35	PIO socket
24 pin socket	~1	U36	RTC socket
Z80A-PIO	~1	U35	PIO IC
MM58167	~1	U36	RTC IC
74LS138	~1	U27	IC
74LS74	~1	U66	IC
74LS02	~1	U37	IC
74LS04	~1	U46	IC
5.1K	~1	R36	resistor (green,brown,red)
10M	~1	R34	resistor (brown,black,blue)
200K	~1	R35	resistor (red,black,yellow)
1N4152	~2	CR6,CR7	diodes
20pF	~2	C64,C65	capacitors (20K)
.1mF	~1	C54	capacitor (104)
32,768 Hz	~1	Y4	crystal
BR-2/3A	~1	BT1	battery

Tools required:

Temperature controlled or 25 watt soldering iron, solder sucker or braid, thin nosed pliers, phillips screw driver

Installation:

1. Remove cover from Kaypro, and remove main board from cabinet. Note locations of connectors for reinstallation later.
2. If soldering is needed, remove RF shield from back of board.
3. Remove solder from filled holes where components will be mounted. Use solder sucker or braid carefully, so that traces are not damaged.
4. Solder sockets and IC's into board. Note that dots and notches line up with notches marked on the board, so that pin 1 is in the correct position on each.
5. Solder resistors, capacitors, and diodes into board. Banded ends of diodes will match bands marked on the board. The resistors and capacitors do not need any particular orientation.
6. Install crystal at location Y4. Leave about 1/8 to 1/4" extra leads on the top of the board so that the crystal can flex a small amount without breaking off.
7. Install battery, making sure that the + and - ends are properly oriented. Use the mounting holes that match the approximate

outline of the battery.

8. Clean and check the bottom of the board carefully for shorts and solder splashes. Cut off excess length on leads.

9. Install socketed IC's.

10. Replace RF shield on the bottom of the board.

11. Reinstall main board in cabinet and hook up cables.

12. Test the RTC by booting up your system and running the TIME program. It should set the clock, and correctly show the time each time that it is run.

13. Reinstall all screws and replace cover.

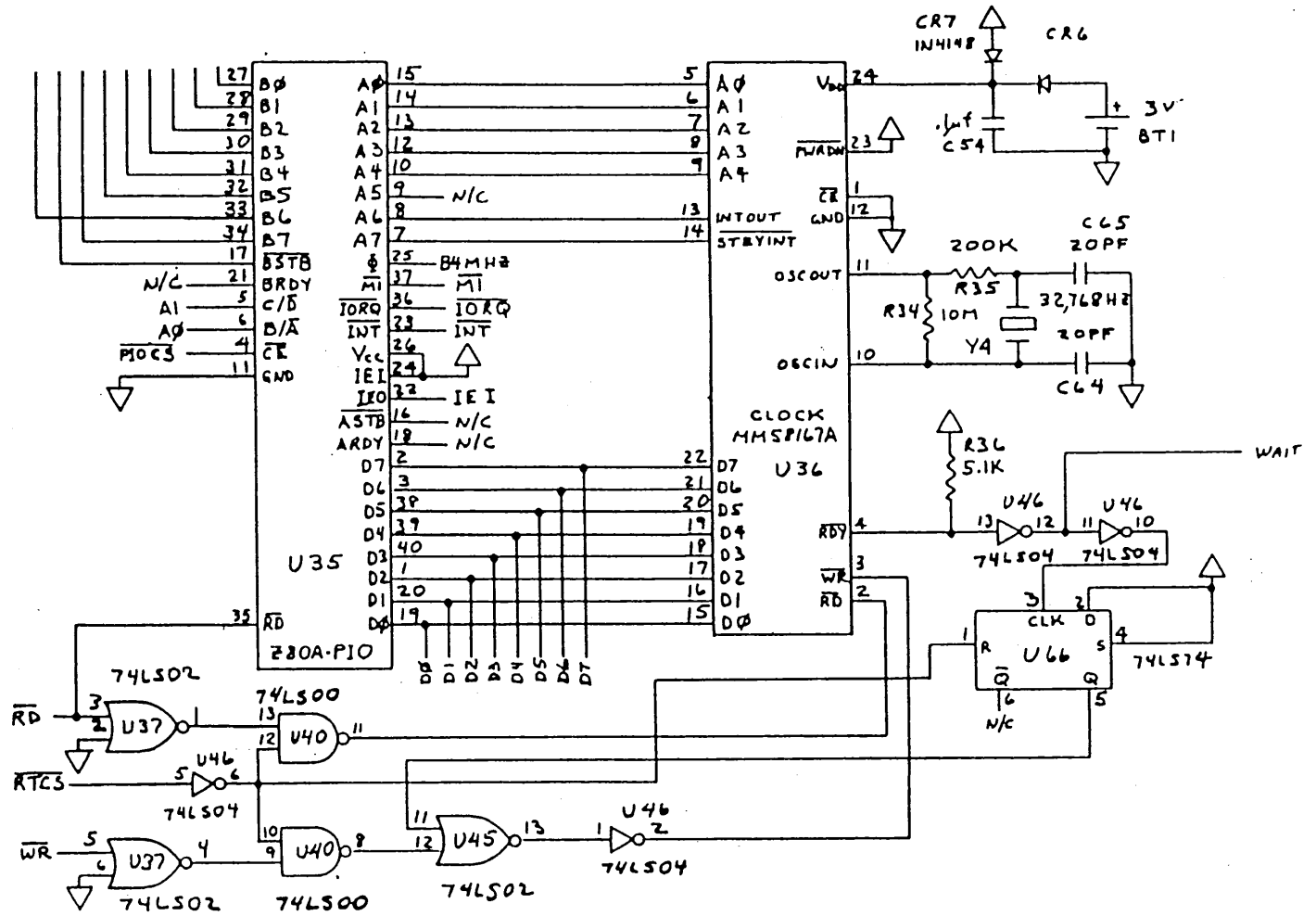
This completes the real time clock installation.

Addenda - Kaypro 2X RTC Kit

Some Kaypro motherboards (generally the ones with the two phone type connectors on opposite ends of the board) do not have the POWERDOWN pin tied to +5. These boards require a 22mf. cap (teardrop shape, red-red-blue) at C87 and a 1k resistor at R53 to work correctly. They are labeled with silk-screens on the board. Note that this is a polarized part. Mount the lead nearest the "dot" in the hole marked with a plus sign. Most boards will not have an R53 or C87 at all.

We are using crystals that are packaged slightly differently than the originals that came from Kaypro. The originals were round with both leads coming out of the same end. The crystal that we are using now is about 1/2" long with the leads at about 3/8" spacing on the side. It may be more convenient to place the right hand lead of the crystal in the left mounting hole of C64 instead of its standard mounting hole. The capacitor can be installed using the same hole, or the old hole for the crystal. The crystal can alternately be attached directly to the lead of C64. Make sure not to short the crystal can to any of the leads.

You may find that capacitors may have a slightly different value than listed on the parts list. We are using 27pf. instead of 20pf. Most other resistors and caps should be fairly close to the listed values.



Kaypro '84 Series
Hard Disk Interface Parts Kit

The Kaypro hard disk interface parts kit contains the parts that Kaypro left off of many of the '84 series main boards. Some of the Kaypro main boards may have some of these parts installed, so do not worry if you do not need all of them. You may find boards with all of the components installed, or only empty solder pads at each location.

If you have a board that does not have any of these components installed, you will probably need to remove solder from the mounting holes on the board. This portion of the job requires a moderately advanced level of skill to do without damaging the board. If you do not have the skill, correct tools, or a friend that can help you, please do not attempt to complete the installation. Please return the kit for a refund or send the kit and your board and we will do the installation for a fee of \$15.00. We feel that it is always better to stop while you are ahead, than to get involved in a lot of repairs.

The Kaypro hard disk interface is unusual in that it is not used to interface directly to a hard disk controller card. The interface is based on a 50 pin variation of a SASI port, but was used with an intermediate host board to adapt the signals for use with the Western Digital WD1002-HD0 (or WD1002-05) hard disk controller card. Host boards, WD1002-05 boards, and software packages are available at Emerald Microware. Used Kaypro host boards are also available occasionally on the surplus market. The Kaypro host boards must be matched to the version of the Kaypro software, as both existed in several versions, and may have inverted control signals. The interface is relatively simple, as it consists primarily of buffer chips for the data bus, and port addressing for the controller card. In the Kaypro the standard software addressed the WD1002 board at ports 80H through 87H.

Parts list:

Part	Qty	Location	Description
74LS244	✓ 1	U28	IC
74LS245	✓ 1	U31	IC
74LS14	✓ 1	U71	IC
74LS02	✓ 2	U37,U72	IC
50 PIN IDC	✓ 1	J9	Double row header strip
14 pin DIP	✓ 3	U37,71,72	IC socket
20 pin DIP	✓ 2	U28,U31	IC socket

Tools required:

Temperature controlled or 25 watt soldering iron, solder sucker or braid, thin nosed pliers, phillips screw driver

Installation:

1. Remove cover from Kaypro, and remove main board from cabinet. Note locations of connectors for reinstallation later.
2. If soldering is needed, remove RF shield from back of board.
3. Remove solder from filled holes where components will be mounted. Use solder sucker or braid carefully, so that traces are not damaged.
4. Solder sockets into board. Note that dots and notches line up with notches marked on the board, so that pin 1 is in the correct position on each.
5. Solder 50 pin header into board.
6. Clean the bottom of the board and carefully inspect the board for solder solders shorts.
7. Install socketed IC's.
8. Replace RF shield on the bottom of the board.
9. Reinstall main board in cabinet and hook up cables.
10. Test the interface with a host and WD1002 board connected. Test software comes with the Emerald Microware software package, or test by using the Kaypro format program.
13. Reinstall all screws and replace cover.

This completes the hard disk interface installation.

Add a Hard Disk to a Kaypro "84" Floppy Computer

The recent computer slump has resulted in massive parts dumping on the part of the computer manufactures to the surplus market. I am sure that you have seen all the ads in the papers hawking IBM ten megabyte drives for less than \$500. Let me tell you how you can add a hard disk to your computer.

All of the "84" series computers come with the larger power supply and the necessary power wiring for two drives and the hard disk controller. To convert to a K10 simply involves unplugging the lower drive, adding the controller and host interface boards, and plugging in some new cables.

The following is a list of the needed parts:

The hard disk itself

Shugart 712

Seagate 224

The hard disk controller

Western Digital 1002-HDC or 1002-05

Kaypro Host Interface 81-212A (must be "A")

System ROM

Kaypro 81-302C

Advent 84 Turborom

Software

Kaypro K10 F, G, or H System disk

Advent Turborom software is supplied with its ROM

Interconnect cables

Dual 50 pin IDC ribbon cable (computer to host)

Dual 40 pin IDC ribbon cable (host to controller)

34 pin IDC to 34 pin edge ribbon (controller to disk)

20 pin IDC to 20 pin edge ribbon (controller to disk)

Hardware

8 4-40 1/2 in spacers

4 4-40 1/4 in flat head screws

12 4-40 1/4 in binder head screws

8 #4 nylon or fiber washers

The hard disk is available from many sources. In the December Byte Advanced Computer Products is selling the Shugart for \$229 with a one year warranty.

The Western Digital controller is also a standard part. Its list is \$295. Xerox surplus outlet has them for \$75 as is (the five I have purchased have all worked), S100 is supposed to have them new for \$200, and ERAC has them used with warranty for \$200.

The host interface card is a Kaypro part. Your Kaypro dealer can order it for you for around \$30 or you can get it from ERAC for \$5.

The cables are all standard parts. Most of the connectors cost 5 to 6

dollars each and 50 conductor ribbon cable is about a buck a foot. ERAC has the stock kaypro cables for around \$3 each, but they are too short. You can reuse most of the connectors if you are careful and use them to help build up to ERAC's \$25 minimum order. Their ad states that they have 81 series ROMs, so they might have the 81-302c in stock.

Now for the construction. I despise overly detailed instructions, so I am only going to describe the work in general. If you need more specific hand holding, most user groups have at least one technical type that can help.

Remove the main board, the floppies, and the floppy cage.

Mount the host interface card on four spacers on the floor of the computer in the area normally covered by the cage. Mount it with the 50 pin connector facing the rear.

Mount the controller card on the left side of cage. Be sure to mount it low enough to miss hitting the main board. I only used three spacers as the lower front one would be a real bitch to get a screw into. Countersink the holes and use the flathead screws so that they don't interfere with the drives.

Temporarily set the cage back in place and make up the host cables. The forty pin connector goes to the forty pin connector on the controller. The fifty pin connector goes to the fifty pin connector on the main board next to the 34 pin floppy connector. Leave enough slack in the cables so that they can be adjusted to not block the air flow from the fan.

Remove the controller and mount the cage. Mount the hard disk on the bottom and the floppy on the top. Both drives should have terminators and be strapped for the lowest drive number, on some drives that is 0 and on some it is 1.

Mount the controller card using the insulators so that none of the foil tracks on the top or bottom are shorted.

Make up the drive cables. The 34 pin cable goes to the 34 pin connector on the controller next to the power plug. The 20 pin cable goes to the center of the three clustered 20 pin connectors J2.

Remount the main board and plug in all of its cables. Plug in all the power cables. The controller gets the one with only a white and black wire. Plug the floppy cable back in using either of the edge connectors.

Change the ROM. If you are using the Kaypro ROM it will be shorter and goes all the way to the rear of the socket.

The rest of this assumes that you are using the stock Kaypro ROM and software. For the Advent Turborom refer to its instructions. To use the Turborom, you must purchase their Hard Disk Formatter also.

Power up the computer with the system disk in the floppy. It should come up with Kaypro 10 1.9E message and then boot from the floppy normally.

After at least warming up for half an hour we can now format the hard disk. Run Format and tell it that your drive is 1,1 head 0,3 cylinders

0,305. It takes about 45 minutes.

Now run Findbad B: and Findbad C: to lock out any bad blocks. Run Putsys and Putovl to write the system to the hard disk and you are done. Open the floppy door, push reset and it should boot from the hard disk.

One of the nice things about Kaypro is the extensive public domain support. John Smith has supplied a turnkey ZCPR3 system that will run on your new machine by simply running a new set of put files. Most kaypro user groups have it and it is on the major boards. I recommend it highly. It would be a hardship to go back to the stock CP/M system. It makes a hard disk even nicer.

I have modified several machines with no problems. Since the entire job involves only board swapping, with a little care you should have none either.

Glenn Drayer
15200 Magnolia #19
Westminster, Ca 92683

...ONKUG, Newsdiskette to Kaypro Users Groups, Volume 2, Number 2.

ADDITIONAL/REPLACEMENT HARD DISKS
for
CP/M Kaypros with TurboROM

The Advent TurboROM allows any CP/M Kaypro (except Robie) to use up to two Hard Disks of up to 56 Mb (formatted) each. Adding a hard disk is not difficult and does not require a great deal of technical knowledge. It does require care and reasonable manual dexterity. Some situations require the use of tools other than simple screw drivers and these will be outlined later.

The components required to interface a hard disk are as follows:

- a) Host Adaptor or Clock. This special circuit board plugs into the Z-80 socket on the main circuit board and provides a 40 pin connector to which a Western Digital WD-1002-HDD (or -05) hard disk controller can be connected. A Kaypro 10 has the interface for the WD-1002-HDD built-in and the host adaptor is not needed unless an Advent RAM disk is also being used.
- b) A hard disk controller. The only controllers supported by the TurboROM is the WD-1002-HDD (and the WD-1002-05 which is the same controller with a floppy controller also on the board). A Kaypro 10 already has this controller mounted on the side of the floppy disk housing.
- c) Hard Disk(s). Any drive which supports the Seagate 506 interface can be used. (In fact some drives with Seagate 412 interface can be used but you should know what you are doing before you embark on this.)
- d) Power Cables. The Hard disk controller requires 5 volts at about 1.4 amps. The Hard disk requires 5 volts and 12 volts, the actual power required depends on the drive chosen. The standard method of providing power for an internal installation is to use 'Y' cables which are plugged into an existing disk power outlet and provide one additional outlet.
- e) Signal cables. The WD Controller is connected to the host adaptor via a 40 conductor cable with a socket on each end (it may have up to two additional sockets for RAM disks). It is recommended that this cable be limited to 3 feet or less. Each hard disk is connected to the controller via a 20 conductor radial cable. The controller has a plug for each radial cable. All hard disks are connected to a main daisy chained 34 conductor select cable. Both the radial and select cables can, if correctly terminated, be extended for a considerable distance (up to 15 feet) without any problem.

RECOMMENDED HARD DRIVES

Many drives will work. However, if you are purchasing a new drive you should look for the following features.

- a) Low Power. This is particularly important if you are considering mounting the drive internally. A Kaypro 10 can usually support up to two half high drives or one modern full high drive. Some older full high drives are beyond the capabilities of the power supply (and cooling fan).

b) Quiet operation.

c) The number of heads is preferably 2, 4, or 8 rather than 3, 5, 6, or 7. This improves performance. Other things being equal, a 20 Mb drive of 8 heads and 306 cylinders will perform better than a 20 MB drive of 4 heads and 612 cylinders. However, for characteristic (a) above the Seagate ST225 is still a desirable drive as half high 8 head drives are rare or non-existent.

Plu*Perfect Systems supplies the following drive types:

1) Rodime R0252. This is an 11 Mb half height drive. Actually it is a 3.5 inch drive that has been mounted in a 5.25 inch frame and incorporates liberal shock mounting. It is also low power, quiet and reliable.

2) Seagate ST225. This is a 22 Mb half height drive. It is also low power, quiet and reliable. It does not have special shock mounting but does have specifications similar to the Rodime (40G non-operational and 10G operational). This drive is excellent for adding (or replacing) a Kaypro 10 drive, external mounting on any machine and for a Kaypro II/4 that is NOT portable it can be mounted internally.

Many other drives have been used successfully, including Ampex, big Rodime, Atasi, Shugart SA604, SA712 etc, though most of these have been in external enclosures. In some cases it has been necessary to replace the Kaypro power supply when drives are internally mounted.

We specifically do not recommend MicroScience drives. These will work with the 84 TurboROMs (which supports both 512 and 1024 byte per sector formats) but will have less capacity than other similar drives. These drives cannot be reliably formatted to 1024 byte sectors and are thus not supported by the 83 Roms (which only supports a 1024 bytes/sector format).

CONNECTING THE DRIVE

Hard drives are similar to floppy drives in that they have to be configured for the application. The two options the user must set are:

a) Terminating Resistor - only one of the two drives can have a resistor installed. You should consult the drive manual for the location of this option. If you are adding a drive to a Kaypro 10 the present drive will already have a resistor pack installed. All drives purchased from Plu*Perfect Systems have the terminating resistors installed, these must be removed if the drive is to be used in multiple drive system.

Note that the drive manufacturers all recommend that the drive with the termination resistor should be that which is electrically most distant from the controller. With internal mounting in a Kaypro this is not a problem, but if long cables are being used from the drive to the controller this must be done correctly.

b) Drive Select Jumper - each drive must be set to select at a different address. On the TurboROM, the drives must be configured as either drive 1 or 2. (Note that drive manufacturers are not consistent about how they number their select options. Some use DS0, DS1, DS2, and DS3, and others DS1, DS2, DS3, and DS4 -- our terminology refers to 0, 1, 2, and 3.) All drives purchased from Plu*Perfect Systems with a Hard Disk

Controller are formatted using that controller before being shipped, so they are set up correctly for use in a single drive system. The Rodime drives which are purchased without a controller are shipped with DSO selected and must be changed before use. The Seagate drive without a controller has all 4 select jumpers installed, 3 of these must be removed before use (see manual excerpts included with the drive).

Note that MicroScience drives used in many Kaypro 10's use a DIP switch for both select and termination. However, there are two variants and you should have reliable data before modifying the switch settings.

c) Power Connection - Hard disk drives require both 5 and 12 volts. This is connected via a 3 or 4 wire cable which has a white nylon plug. This plug is keyed so it cannot be inserted incorrectly into the drive. Where the power is being derived from the Kaypro we usually use 'Y' connectors to expand the number of available outlets. Be especially careful on a Kaypro 10 because the power connector to the hard disk controller only provides 5 volts and cannot be used as a source of power for a drive. (It is useful for RAM disk power however.) On 84 machines, the same wiring harness was used as on the Kaypro 10 and thus there is often this spare 5 volt only connector available which can be used to power your controller.

d) Select Cable - All hard drives are connected in parallel to the controller via a 34 conductor cable. On the drive end the card edge (connector) is usually slotted near the end nearest pin 1. You generally will need to examine the legend silk screened on the circuit board to determine which side has the odd numbered pins. Pin 1 on the cable is usually marked with some identifying mark and is on the edge with the cable stripe. At the controller end pin one of the 34 pin plug is clearly marked with either a '1' or '^'.

e) Radial Cable - Each hard drive is connected to the controller via its own 20 conductor radial cable. The pin and cable markings are the same as outlined above for the select cable. Physical drive 1 (DS1) should connect to J2 of the controller and physical drive 2 (DS2) should connect to J3 of the controller. On modern versions of the WD 1002 this is no problem. On older revisions there is often a problem (on some boards the plugs were J1 J2 J3 and on others J3 J2 J1) with physically getting the radial cable connector over plug J3. Western Digital had a layout error which had placed plug J3 too close to the power connector. To resolve this requires some patience and care. We have found that a stiff backed razor blade (be very careful) can be used to remove much of the power connector plastic housing, then gently use a file to remove as much of the material from the connector on the radial cable without destroying its mechanical integrity.

MOUNTING THE DRIVE

A. Kaypro 10

The Kaypro 10 is in principal the simplest installation. However, if you are adding a second half height drive internally you must completely disassemble the disk drive enclosure/shock mount and drill mounting holes for the second drive. In some cases it may be advisable to drill new holes for the original drive. When jumpering the drive selects you should always make the drive that is slowest to start in position 1 or the TurboROM may not sense its presence.

It is a good idea if adding a second drive, to make some provision for

displaying the "select" light. Some people have simply drilled another hole in the front panel for an appropriate bezel. Others have gone to some trouble to obtain a red/green LED for mounting in the existing hole.

B. Kaypro II/2 and 4 '83

These machines have a disk enclosure which is large enough for 2 full height or 4 half height drives. These machines also have marginal power supplies. If you are adding an internal hard drive you may be faced with replacing the power supply, this is hard to predict in advance due to the great variability in the supplies used by Kaypro. For example, we are currently running a 2 '83 with (2) Mitsubishi 96 tpi floppies, (1) Shugart 48 tpi floppy, (1) Rodime R0252 hard disk, 1 Mb of RAM disk. This is however getting very near the limits of this individual power supply and we will probably replace it in the near future just to be conservative. We have also run an ST 225 hard disk and a standard Tandon floppy drive in another 2 '83 with no signs of power supply distress. On the other hand a 4'83 we converted suffered power supply overload with a single Tandon floppy and Rodime hard disk.

Physically mounting either a Rodime or a Seagate in these machines is simple. We recommend mounting in the bottom position where no holes require drilling and some air flow is available from the bottom slots. Both the Rodime and Seagate use #6 screws for mounting, be careful of using long screws that either bottom out in the Rodime or interfere with the case on the Seagate. Do not permanently mount the drive if you are going to use a blanking plate to fill the panel hole above the drive.

If you are using a half height blanking plate to fill the space above these drives, the recommended mounting procedure is as follows.

1/ With the drive temporarily in position slide the blanking plate into position above it.

2/ The securing latches on the side will prevent it from completely going into position. Use a marker to mark on the inside of the drive housing the position of these latches.

3/ Now dismount all drives and remove the drive enclosure.

4/ Using a small file, notch the front of the enclosure in a position corresponding to these latches. Make the notches deep enough to clear the back of the latches.

5/ Reassemble the drive enclosure.

6/ Mount the hard drive permanently. It is a good idea to connect the cables to the drive at this point when the rest of the enclosure is empty.

7/ Slip the blanking plate into position. It has to be bent gently in the middle so that the side latches can get past the front panel. When the bend is released it will snap securely into position.

8/ Now mount the floppy drive(s).

C Kaypro 2 and 4 '84

These machines have half height floppy drive cutouts and the same power

supply as a Kaypro 10. When mounting a hard drive in these machines the simplest is to replace the bottom floppy drive. However, if you wish to retain two floppy drives some mechanical work is required.

1/ Replacing a floppy.

If you are replacing a floppy with a ST225 then it is slipped in from the front exactly as a floppy drive would be. The RO 252 is more complicated due to the depth of the drive. The Rodime face plate should be removed by undoing the two Allen headed screws. The drive can then be slipped in from the rear (it is a good idea to attach the power and signal cables to the drive before this is done). Now slip the drive forward so that the face plate mounting holes stick out through the front panel. Reattach the face plate and then slip the drive back and secure it in the normal manner.

If you remove the old 'B' drive remember to move the terminating resistor pack up to the A drive. If you are not going to use the Advent Personality decoder it is a good idea to jumper the remaining drive as both DSO and DS1 so that the two drives that appear to be present to the ROM actually can be addressed. This will save some aggravation when using TURBOCOPY, though remember that you really only have one floppy and cannot use the copy option.

2/ Adding a Hard Drive.

You can either cutout the metal part of the panel between the two drives and slip the drive in from the front or blind mount the drive without a face plate behind the front panel. Blind mounting is much more difficult as the space between the floppy drives is very tight.

Do not attempt the metalwork required to cut out the front panel unless you are a reasonably competent craftsman or you will cosmetically scar your Kaypro for life.

1/ Remove both floppy drives.

2/ Carefully remove the sheet metal between the drive holes using a fine hacksaw. Cut on the interior of final opening so that the hole can be trimmed up with a file later.

3/ Now position both floppy drives to the top of the opening and mark the holes needed to mount the bottom floppy drive in this position.

4/ Check that the existing mounting holes in the bottom position are in the appropriate position for mounting the hard drive. If not mark any corrections needed.

5/ Remove the complete drive enclosure to drill the holes. Make them slightly oversize so that fine adjustment of drive position is possible.

6/ Reassemble the enclosure and now mount the hard drive in the bottom position. As above it is a good idea to connect its cables before mounting the floppy drives.

7/ Now mount the floppy drives. Beware of some brands of drive that can interfere with adjacent drive when the locking handle is in some positions. Double check that there is no interference between the any of the drives.