

PMH-300

2/4 MHz PATCH INSTALLATION INSTRUCTIONS

for

Magnolia Microsystems CP/M PLUS

Copyright 1983,1984,1985,1986

by
LIVINGSTON LOGIC LABS

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Magnolia Microsystems CP/M Plus 4 Mhz Patches
Version 1.00

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The files contained on this diskette will allow generation of bootable CP/M Plus Systems which will operate reliably at either a 2 Mhz or 4 Mhz CPU clock speed. All information supplied with this product is supplied strictly on an AS IS basis, with NO WARRANTY as to its merchantability, fitness for sale or for any particular purpose. All risk associated with the use of this product, and any damages resulting from the use of this product will be the sole responsibility of the purchaser.

Due to the number of existing 4 Mhz conversions available for the H/Z-89/90 computers, no claims whatsoever are made as to what machines this product will work with. For the same reason, Livingston Logic Labs will provide NO assistance in converting any systems to operate at 4 Mhz, and NO assistance will be provided in tracking down problems which occur on any system having ANY 4 Mhz conversion installed. Livingston Logic Labs strongly recommends the Kres Engineering DSM-240 conversion as the most complete, professional, and technically competent version.

This software has been extensively tested on several different configurations, and has been found to work reliably on a properly functioning 4 Mhz system. This package WILL NOT work with the H/Z-17 disk controller on ANY system which DOES NOT supply a constant 2.048 Mhz clock to P512-13. This package WILL NOT make it possible to boot from the H-17 disk controller without a suitably modified MTR-88/MTR-89/MTR-90 ROM or H-17 ROM. This package WILL work with PROPERLY executed software switchable CPU clocks, such as the KRES Engineering DSM-240.

INCLUDED SOFTWARE -

This package includes the following software modules/programs:

2/4 Mhz Boot Loader Modules:

LDRBZ17.REL - For H/Z-17
LDRBZ37.REL - For H/Z-37
LDRB8316.REL - For 8" Drives on Magnolia 77316 DD Controller
LDRB5316.REL - For 5" Drives on Magnolia 77316 DD Controller
LDRB320.REL - For Magnolia 77320 SASI Interface

2/4 Mhz System Loader Modules:

LDRZ17.REL - For H/Z-17
LDRZ37.REL - For H/Z-37
LDR316.REL - For Magnolia 77316 DD Controller
LDR320.REL - For Magnolia 77320 SASI Interface

2/4 Mhz Driver Modules:

Z17'3.REL - For H/Z-17
Z37'3.REL - For H/Z-37
M316'3.REL - For Magnolia 77316 DD Controller
M320'3.REL - For Magnolia 77320 SASI Interface

2/4 Mhz FORMAT.COM Patches:

FMT+PTCH.COM - Patches FORMAT.COM for 2/4 Mhz Operation

SUBMIT Files:

LDRGEN.SUB - To Generate Loader Operating System Modules
BIOS3GEN.SUB - To Generate BNKBIOS3.SPR Files

CLOCK SWITCHING UTILITIES:

SETCLK+.COM - Clock Switching Utility for KRES DSM-240

All of the above modules have been modified to allow proper operation with either a 2 Mhz or 4 Mhz CPU clock. The above .REL modules can be used in place of the standard Magnolia .REL modules in the standard CP/M Plus system generation procedures.

INSTALLATION OVERVIEW -

Installation of this package involves three steps:

- 1 - Generation of the patched FORMAT.COM to allow FORMATTing of all available disk formats at either 2 or 4 Mhz.
- 2 - Generation of the required 2/4 Mhz loader operating systems (LDRxxx.COM) for all disk controllers from which CP/M Plus is to be booted, and placing the new loader operating system on the system tracks of all bootable disks using COPYSYS.COM.
- 3 - Generation of the required 2/4 Mhz CPM3.SYS operating system file(s).

The above steps are described in the following section. However, before attempting the actual installation, you should re-read the Magnolia CP/M Plus User's Guide Supplement, paying particular attention to the sections on COPYSYS.COM, SETUP.COM, Generating a New Boot Loader, and Generating a New CP/M Plus System. When following the directions in the following section, do not be concerned if some of the command lines shown do not agree exactly with those shown in the Users Guide Supplement, as some versions of the Supplement contain typographical errors.

Note that ALL of the following procedures MUST be carried out with a 2 Mhz CPU clock.

INSTALLATION -

- 1 - Prepare a bootable CP/M Plus disk, and copy the following files onto it from your CP/M Plus Distribution Disk(s):

LINK.COM	- Digital Research Linking Loader
SETUP.COM	- Magnolia System Configuration Program
GENCPM.COM	- Digital Research CP/M PLUS System Generator
GENCPM.DAT	- Data File for GENCPM.COM
COPYSYS.COM	- System Track Loader
SUBMIT.COM	- Batch Command Processor
FORMAT.COM	- Magnolia Disk FORMATter
CPM3LDR.REL	- CP/M Plus Loader BDOS Module
RESBDOS3.SPR	- CP/M Plus Resident BDOS Module
BNKBDOS3.SPR	- CP/M Plus Banked BDOS Module
MBIOS3.REL	- BIOS Root Module
CHRIO3.REL	- Character I/O Driver Module
END.REL	- Driver String Termination Module
LPTBL.REL	- Logical to Physical Mapping Table
GETDP.REL	- Disk Parameter Locator Module
SCB.REL	- System Control Block Module

- 2 - Decide which disk controllers are to be supported in the new CP/M plus system, and copy the driver files for each of those devices from the CPM+PTCH Distribution Disk onto the disk used in step 1 above. For example, to generate a system which supports the 77316 DD controller and the H/Z-17 controller, copy the following files:

M316'3.REL	- 77316 Driver
------------	----------------

Z17'3.REL - H/Z-17 Driver

- 3 - Copy the following files from your CPM+PTCH Distribution Disk onto the disk used in steps 1 and 2 above:

FMT+PTCH.COM - Automatic Patch Program for FORMAT.COM
LDRGEN.SUB - To Generate Loader Operating System Modules
BIOS3GEN.SUB - To Generate BNKBIOS3.SPR Files
ALL LDRBxxx.REL Files - Boot Loader Modules
ALL LDRxxx.REL Files - Loader Operating System Modules

- 4 - Execute FMT+PTCH.COM by typing "FMT+PTCH" in response to the CP/M "A>" prompt. After a few seconds the "A>" prompt will return, and the patched FORMAT program will be on the disk as FORMAT+.COM. FORMAT+.COM will properly FORMAT disks with either a 2 Mhz or 4 Mhz CPU clock, and should always be used in place of FORMAT.COM.
- 5 - Generate the required loader operating system(s) for all disk devices. This is done by linking together CPM3LDR.REL, LDRxxx.REL, and LDRBxxx.REL. This is done automatically by LDRGEN.SUB. To execute LDRGEN, enter "SUBMIT LDRGEN" in response to the CP/M "A>" prompt.

This procedure will take some time to complete, since 6 loader operating systems will be generated. When the "A>" prompt finally returns, you should find 6 new files on the disk with file names in the format:

LDRxxx.COM

Where xxx is the identifier for the disk device:

Z17 => H/Z-17 Controller
Z37 => H/Z-37 Controller
8316 => 8" Drive on Magnolia 77316 DD Controller
5316 => 5" Drive on Magnolia 77316 DD Controller
320 => Magnolia 77320 SASI Interface

- 6 - Generate the new BNKBIOS3.SPR file. This is done by linking together MBIOS3.REL, CHRIO3.REL, END.REL, LPTBL.REL, GETDP.REL, SCB.REL, and all desired disk device drivers. This is done automatically by BIOS3GEN.SUB. To execute BIOS3GEN, enter a command line of the following format:

SUBMIT BIOS3GEN <diskio>

Where <diskio> is a list of the disk drivers to be included in the new BNKBIOS3, seperated by commas.

For example, to generate a BNKBIOS3.SPR file containing drivers for the 77316 DD controller and the H/Z-17 controller, enter:

SUBMIT BIOS3GEN M316'3,Z17'3

- 7 - When BIOS3GEN.SUB is done, SETUP.COM will automatically be executed. Follow the Magnolia SETUP documentation for setting ALL system parameters. Be sure to exit each sub-menu by striking the <BLUE> key so that any changes you entered will be made to the BNKBIOS3.SPR file. Be sure to exit the program by

using the "Generate new CP/M system and exit" option of the main menu. This will cause GENCPM.COM to be executed automatically, which will generate a new CPM3.SYS file.

When running SETUP.COM, it is particularly important that you setup the logical/physical drive assignments such that logical drive A: corresponds to the physical drive from which you will be booting. For example, if you are booting from 8" drive 0 on the 77316 DD controller, logical drive A: MUST be assigned to physical drive 29. CAREFULLY read the Magnolia CP/M Plus User's Guide Supplement for details.

- 8 - When the "A>" prompt returns, the only step remaining is to place the new loader operating system onto the system tracks of the boot disk. To do this, enter a command line of the following format:

```
COPYSYS LDRxxx.COM A:
```

Where xxx is the identifier for the disk device:

```
Z17      => H/Z-17 Controller
Z37      => H/Z-37 Controller
8316     => 8" Drive on Magnolia 77316 DD Controller
5316     => 5" Drive on Magnolia 77316 DD Controller
320      => Magnolia 77320 SASI Interface
```

For example, if you have booted from 8" drive 0 on the 77316 DD controller, enter:

```
COPYSYS LDR8316.COM A:
```

- 9 - If you have correctly followed all of the above instructions, you should now be able to re-boot your disk at either 2 Mhz or 4 Mhz, and FORMAT new disks using FORMAT+.COM at either 2 Mhz or 4 Mhz.

You now have a set of LDRxxx.COM files for generating 2/4 Mhz bootable disks, and a BNKBIOS3.SPR file for generating new CPM3.SYS files for all available drives. If any modifications are required, simply use the above files, and the CPM+PTCH driver .REL modules in place of the Magnolia supplied modules, for linking together new systems.

GENERATING ADDITIONAL BOOTABLE DISKS -

Two things are required in order for a disk to be bootable.

- 1 - The system tracks must contain a properly configured loader operating system (LDRxxx.COM).
- 2 - The CPM3.SYS file must be properly configured for the system hardware, with logical drive A: assigned to the boot drive.

The ONLY time COPYSYS can be used to copy the system tracks of one disk to the system tracks of another, is when the two disks are IDENTICALLY FORMATTed, and will be booted in the EXACT SAME PHYSICAL DRIVE. The DESTINATION disk should ALWAYS be placed IN THE DRIVE IN WHICH IT WILL BE BOOTED when COPYSYS is run.

Otherwise, you may end up with a disk which will not boot at all, or will only boot in some drive other than the one you wanted.

The safest way to ensure that the proper loader operating system is placed on the system tracks of a disk is to ALWAYS use the LDRxxx.COM file as the source for COPYSYS, rather than taking the loader from an existing drive. The correct loader to use is:

For ALL H/Z-17 Disks:	LDRZ17.COM
For ALL H/Z-37 Disks:	LDRZ37.COM
For 5" 77316 Disks:	LDR5316.COM
For 8" 77316 Disks:	LDR8316.COM
For SASI Winchester Disks.	LDR320.COM

It is also important that COPYSYS properly configure the boot loader for the correct physical drive. The safest way to accomplish this is to ALWAYS place the disk IN THE DRIVE IT IS TO BE BOOTED IN when running COPYSYS.

The ONLY time a CPM3.SYS file can be copied directly from one disk to another is when the two disks are IDENTICALLY FORMATTed, and are both bootable in the EXACT SAME PHYSICAL DRIVE. Under ANY other circumstances, it is necessary to run SETUP.COM and GENCPM.COM to reconfigure the BNKBIOS3.SPR file for the new disk format and logical A: drive, and generate a new CPM3.SYS file to be placed on that disk before it will be bootable.

ADDITIONAL PATCHES/ENHANCEMENTS -

The following section contains some additional patches that can be made to the MBIOS3.ASM file to add additional capability to the Magnolia CP/M Plus BIOS. In order to install any of these patches, you must first CAREFULLY make the changes indicated to the MBIOS3.ASM file from your CP/M Plus Distribution Disk(s), then re-assemble it using RMAC.COM to generate the new MBIOS3.REL module, by entering:

```
RMAC MBIOS3 $SZPZ
```

in response to the CP/M "A>" prompt. This assembly will take several minutes. The file Z80.LIB must also be on the default disk before RMAC is run. When RMAC has finished, repeat steps 6-8 above to generate a new CPM3.SYS file.

In the patches given below, locate the code given under the heading "ORIGINAL CODE", and CAREFULLY modify it to read EXACTLY as shown under the heading "REPLACEMENT CODE".

PATCH 1 - D-G SUPER-89 PATCHES

These patches will allow the Magnolia CP/M Plus to be run on a D-G Super-89 CPU at either 2 Mhz or 4 Mhz.

ORIGINAL CODE:

```
bnkerr: db      13,10,7,'No 77318$'
```

REPLACEMENT CODE:

bnkerr: db 13,10,7,'No Banked Memory\$'

ORIGINAL CODE:

```
bnkssel:
    sta    cbnk                ; remember current bank
    push  b                    ; save register b for temp
    push  h                    ;
    lxi   h,table              ;
    mov   c,a                  ;
    mvi   b,0                  ;
    dad   b                    ;
    mov   b,m                  ;
    lxi   h,intby              ;
    mov   a,m                  ;
    ani   11001011b           ;
    ora   b                    ;
    mov   m,a                  ;
    out   port                 ;
    pop   h                    ;
    pop   b                    ; restore register b
    ret
```

IF bnksiz EQ 56

bnktop equ 0e000h

```
table: db 20H ;select code for bank 0
        db 14H ; bank 1 (56K)
        db 34H ; bank 2 (56K)
```

endif

IF bnksiz EQ 48

bnktop equ 0c000h

```
table: db 20H ,select code for bank 0
        db 10H ; bank 1 (48K)
        db 30H ; bank 2 (48K)
```

endif

```
time: ;time is kept by tick interrupt
xmove: ret ; can't perform interbank moves
```

REPLACEMENT CODE:

```
bnkssel:
    sta    cbnk                ; remember current bank
    push  b                    ; save register b for temp
    push  h                    ;
    lxi   h,table              ;
    mov   c,a                  ;
    mvi   b,0                  ;
    dad   b                    ;
    mov   a,m                  ; Save bank select
    lxi   b,07c0h             ; Get base port and count
```

```

dglp:  outp   a           , Select a block
       inr   c           ; Update the port
       djnz  dglp        , Do next block
       lda   intby
       out   port
       pop   h           ;
       pop   b           , restore register b
       ret

```

```

bnktop: equ    0e000h

```

```

table:  db    000H
       db    011H
       db    022H

```

```

time:           ;time is kept by tick interrupt
xmove:  ret     ; can't perform interbank moves

```

ORIGINAL CODE:

```

boot:  lxi    sp,stack
       lda   13
       ani   1111101b      ;we must be in bank 0
       sta   intby
       out   port
, Verify that we have banked RAM...
       xra   a
       sta   bnkflg ;assume 77318 not installed (error)
       lxi   h,intby
       lxi   d,40h
       mvi   a,1
       stax  d           ,put bank number in 40h
       mov   a,m
       ani   11001011b
       ori   04h
       out   port
       mvi   a,2
       stax  d
       mov   a,m
       ani   11001011b
       ori   24h
       out   port
       mvi   a,3
       stax  d
       mov   a,m
       out   port
       ldax  d
       cpi   1
       jnz   noram
       mov   a,m
       ani   11001011b
       ori   04h
       out   port
       ldax  d
       cpi   2
       jnz   noram
       mov   a,m
       ani   11001011b
       ori   24h
       out   port

```

```

        ldax    d
        cpi    3
        jnz    noram
        mvi    a,true
        sta    bnkflg
noram:  mov    a,m
        out    port
; Initialize all modules and build tables.
        lxi    h,thread          ,thread our way through the modules,

```

REPLACEMENT CODE:

```

boot:   lxi    sp,stack
        lda    13
        ani    1111101b          ;we must be in bank 0 now
        sta    intby
        out    port
; Verify that we have banked RAM...
        xra    a
        sta    bnkflg ;assume no banked RAM (error)
        lxi    h,40h
        mvi    m,1
        mvi    a,011h
        out    0c0h
        mvi    m,2
        mvi    a,022h
        out    0c0h
        mvi    m,3
        xra    a
        out    0c0h
        mov    a,m
        cpi    1
        jnz    noram
        mvi    a,011h
        out    0c0h
        mov    a,m
        cpi    2
        jnz    noram
        mvi    a,022h
        out    0c0h
        mov    a,m
        cpi    3
        jnz    noram
        mvi    a,true
        sta    bnkflg
noram:  xra    a
        out    0c0h
        lda    intby
        out    port
; Initialize all modules and build tables.
        lxi    h,thread          ,thread our way through the

```

PATCH 2 - TICCNT PATCHES

The standard Magnolia CP/M Plus BIOS does not provide a 2 mSec TIC counter at locations 000BH-000CH in the TPA bank. Many programs written specifically for the H/Z-89/90 REQUIRE this TIC counter to operate properly. These patches setup a TIC counter at locations 000BH-000CH in the TPA bank.

ORIGINAL CODE:

```

iostk equ $
iostkp: dw $-$

clock: sspd istk
       lxi sp,intstk
       push psw
       push h
       lda intby
       out port
       lxi h,tick0
       dcr m
       jrnz xit

```

REPLACEMENT CODE:

```

iostk equ $
iostkp: dw $-$

super89: set FALSE ; Set to TRUE if using Super-89
ticcnt: equ 000bh

clock: sspd istk
       lxi sp,intstk
       push psw
       push h
       if super89
       in 0c0h
       push psw
       mvi a,011h
       out 0c0h
       else
       lxi h,table+1
       lda intby
       ani 11001011b
       ora m
       out port
       endif
       lhld ticcnt
       inx h
       shld ticcnt
       if super89
       pop psw
       out 0c0h
       endif
       lda intby
       out port
       lxi h,tick0
       dcr m
       jrnz xit

```

PATCH 3 - CONSOLE INTERRUPT PATCHES

The standard Magnolia CP/M Plus BIOS does not allow transient programs which setup their own console interrupt handlers in the TPA. Many commonly available text editors and word processors use their own console interrupt handlers and, therefore, will not work under CP/M Plus. These patches modify the console interrupt

processor so that transient programs CAN setup their own console interrupt processors.

ORIGINAL CODE:

```
        call    bnkssel ;
        jmp     ccp      , then reset jmp vectors and exit

set$jumps:
reset$pg0:
    di
    lda     intby
    ori     10b
    sta     intby
    xra     a            , ;redundant for Cold-Start
    call    bnkssel ;select bank 0 ;
    mvi a,(JMP)
    sta cpm ! sta bdos      ; set up jumps in page zero
    sta RST1
    lxi h, BIOS$0+3 ! shld cpm+1      , BIOS warm start entry
    lhld mxtpa ! shld bdos+1        ; BDOS system call entry
    lxi h, clock ! shld RST1+1      ;bank 0 is all set...
    lxi     h,0          ;
    lded    bnkbf      ;
    lxi     b,64        ;
    ldir    ;
    mvi     a,2
    call    bnkssel
    lhld    bnkbf      ;
    lxi     d,0         ;
    lxi     b,64        ;
    ldir    ;
    mvi     a,1
    call    bnkssel
    lhld    bnkbf      ;
    lxi     d,0         ;
    lxi     b,64        ;
    ldir    ;
    ei
    ret
```

xxmove: exaf ,save number of records

REPLACEMENT CODE:

```
        call    bnkssel ;
        jmp     ccp      , then reset jmp vectors and exit

super89:set      FALSE      ; Set to TRUE if using Super-89
RST3:  equ      8*3

set$jumps:
reset$pg0:
    di
    lda     intby
    ori     10b
    sta     intby
    out     port
    xra     a            , ;redundant for Cold-Start
    call    bnkssel ;select bank 0 ,
```

```

mvi a,(JMP)
sta cpm ! sta bdos      , set up jumps in page zero
sta RST1
lxi h,BIOS$0+3 ! shld cpm+1      ; BIOS warm start entry
lhld mxtpa ! shld bdos+1      ; BDOS system call entry
lxi h,clock ! shld RST1+1      ;bank 0 is all set...
lxi      h,inttrp
sta      RST3
shld     RST3+1
lxi      h,0      ;
lded     bnkbf  ;
lxi      b,64     ;
ldir     ,
mvi      a,2
call     bnkssel
lhld     bnkbf  ;
lxi      d,0      ;
lxi      b,64     ;
ldir     ,
mvi      a,1
call     bnkssel
lhld     bnkbf  ;
lxi      d,0      ;
lxi      b,64     ;
ldir     ,
lhld     RST3SAV
shld     RST3+1
ei
ret

```

```

inttrp:  sspd      trpsav
         lxi      sp, trpstk
         push     psw
         if      super89
         push     b
         in      0c0h
         push     psw
         mvi      a,011h
         else
         push     h
         lxi      h,table+1
         endif
         call     trpsel
         ei
         if      super89
         pop      psw
         nop
         di
         call     trpsel
         pop      b
         else
         lda      intby
         nop
         di
         out     port
         pop      h
         endif
         pop      psw
         lspd     trpsav
         ei

```

```

        ret
trpsel:
        if      super89
        lxi    b,07c0h
trplp:  outp   a
        inr   c
        djnz  trplp
        else
        lda   intby
        ani   11001011b
        ora   m
        out   port
        endif
        ret

RST3SAV:dw    0
trpsav:  dw    0
        ds    16
trpstk:  equ   $

xxmove:  exaf   ;save number of records

```

ORIGINAL CODE:

```

        lda   civec-10           ;location of search type flags
        ani   111$00$111b
        ora   c
        sta   civec-10
        jmp  boot$1

```

REPLACEMENT CODE:

```

        lda   civec-10           ;location of search type flags
        ani   111$00$111b
        ora   c
        sta   civec-10
        lhd   RST3+1
        shld  RST3SAV
        jmp  boot$1

```

.EOF.

NOTES ON 4 MHZ OPERATION -

A number of 4 Mhz conversions have become available in the past several months for the H-89 computer. Unfortunately, they vary widely in their completeness and technical correctness. For the most part, these are poorly executed "quick and dirty" conversions, and little or no consideration has been given to any compatibility problems which might arise with existing hardware and software.

Because of this, Livingston Logic, as well as many other vendors, have been experiencing a large increase in the number of complaints from customers who have installed these conversions. To date, NOT ONE of these complaints has proved valid. Tracking down such problems has begun taking up a great deal of our time, when, in fact, the problem is NOT ours! With the wide variety of different conversions and clock switching schemes available at the present time, it is simply not possible to provide software which will work in all cases. For this reason, we are forced to take the following position:

- 1 - LLL CANNOT and WILL NOT provide ANY assistance, either hardware or software, to anyone converting ANY system to 4 Mhz operation.
- 2 - LLL CANNOT and WILL NOT provide ANY support for any customer experiencing ANY problems with our products when operated in any system with ANY 4 Mhz conversion installed, whether the problem also occurs at 2 Mhz or not.

For the benefit of those who STILL wish to convert their systems to 4 Mhz, we would strongly recommend the KRES Engineering conversion as the most complete, professional and technically competent conversion. All LLL products have been verified as working with the KRES conversion. However, the above policies STILL apply.

IN CASE OF DIFFICULTY -

If you experience any difficulties in setting up and running the CP/M PLUS patches and utilities, PLEASE do the following BEFORE requesting assistance:

- 1 - READ and RE-READ ALL DOCUMENTATION, including the Heath/Zenith CP/M documentation. Be sure you understand EVERYTHING you are doing.
- 2 - Start the procedure over again FROM THE BEGINNING. Be VERY SURE that you follow all directions TO THE LETTER!! DON'T SKIP STEPS!! DON'T ASSUME THAT YOU KNOW ENOUGH TO LEAVE OUT OR MODIFY ANY STEPS!!
- 3 - If you are still experiencing trouble, have someone else try the procedure, preferably someone with more CP/M experience and knowledge.
- 4 - If, at this point you're STILL having trouble, GO BACK TO STEP 1 AND DO IT ALL ONE MORE TIME!!
- 5 - If you've made it this far and you're STILL having trouble, then write down, in as much detail as possible, EXACTLY what the problem is, any symptoms or problems, EXACTLY WHEN and HOW the problem manifests itself, and EXACTLY what the configuration of your system is, including both HARDWARE and SOFTWARE. Mail this letter, and, if possible, a bootable disk exhibiting the problem, to the vendor that sold you this product, whose address is on the front page of this document. Include a postage paid return envelope.

Livingston Logic has established a reputation as a supplier of high

quality, reasonably priced hardware and software for Heath/Zenith computers. It is our policy to provide as much support as is practical, and we are always happy to receive any comments or suggestions which our customers may have regarding the quality of our products or documentation, as well as any suggestions as to possible new products or improvements to existing products. We will also do whatever we can, within reason, to solve any problems which may occur, provided the customer has read and understood ALL supplied and suggested documentation, has followed all instructions faithfully, has made a reasonable effort to verify and isolate the problem, and has supplied enough information about any such problem for us to attempt to duplicate the problem on our systems. Most importantly, DO NOT phone for assistance unless you have BOTH your computer and our documentation in front of you when you call.

Our experience with customer complaints/problems has been:

- 1 - Over 60% simply did not take the time to read and understand the documentation, and made little or no effort to isolate or verify the problem before calling for help. In many cases, we have been called upon to provide VERY BASIC information about the operation of the computer or the operating system. This is NOT our responsibility!
- 2 - Roughly 30% have problems with hardware, other software, or simply have not properly configured the hardware or software correctly.
- 3 - In the last year, an increasing number of problems have centered around 4 Mhz operation. In EVERY case, the problem has been found to be either a hardware caused malfunction due to an improperly executed conversion violating one or more hardware timing requirement, or some feature of the conversion which by it's very nature makes it incompatible with ANY standard disk driver.
- 4 - Far less than 1% have legitimate problems with "bugs", defective distribution media, or other manufacturing problems.

Because of the recent increase in the number of calls falling into the first three categories above, we have been forced to adopt the following policy regarding alleged "bugs":

- 1 - Reports of suspected "bugs" MUST be made in writing, stating the exact nature of the bug, ALL hardware and software in use at the time of the problem, and all pertinent system configuration information (step rates, drive makes and models, etc).
- 2 - The original distribution disk MUST BE RETURNED for inspection, along with the selling dealers name and purchase date.
- 3 - If possible, a bootable disk which exhibits the problem should also be returned with the report.
- 4 - Should we determine that a bug or problem does exist, we may or may not provide a correction, as we see fit. We may or may not incorporate any such fixes in future releases of the software. Any such updates may or may not be available at a reduced rate. Any such updates may or may not be announced in such publications as H-SCOOP, BUSS, and local club newsletters.

LLL has always tried very hard to maintain compatibility with other existing products, both hardware and software, and we have often updated our products to take advantage of some new products features, or enhance compatibility. Unfortunately, this attitude is not shared by most sellers, and, as a result incompatibilities may arise, particularly with products developed AFTER the release of ours. For this reason, we DO NOT provide ANY products on a trial basis, and we further make NO warranties as to compatibility or suitability of any

of our products for any purpose whatsoever. All products are sold strictly on an "as is" basis. When incompatibilities are found, we may or may not update our product to provide compatibility, and we may or may not offer any such updates at a reduced rate.

LLL CANNOT and WILL NOT provide ANY of the following services, except on a prepaid hourly basis at our current consulting rate:

- 1 - Assistance in the installation, configuration debugging, or operation of ANY other company's products.
- 2 - Assistance in the location and identification of general system hardware or software problems.
- 3 - Assistance in the modification of any of our products for any purpose.
- 4 - General advice, technical information, or any other information not directly related to the operation of one of our products.

Further, any correspondence relating to the following subjects will not be acknowledged:

- 1 - Conversion of any system to 4 Mhz operation.
- 2 - Hardware or software problems which occur with 4 Mhz operation.
- 3 - Operation of ANY 80 track drive within the H-89 enclosure.

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**Magnolia Micro Systems CP/M+ Patches
Additional Information**

Extra Included Files

Two additional files have been included on the supplied CP/M+ patches distribution disk. These files are not mentioned elsewhere in the documentation. These files are.

FORMAT.COM
FORMAT+.COM

The FORMAT+.com file is complete and ready to be used. When operating at 4 MHz use this program **DO NOT** use the one that comes with your system.

When Livingston Logic Labs originally wrote these patches they were designed around the most current version of CP/M+ available from Magnolia. Since that time Magnolia has made changes to some files and utilities. The format utility is the one most effected. The new version of format will not work with the CP/M+ patches installed. For this reason KRES is supplying the original FORMAT.COM already modified for 4 MHz operation.

Winchester Operation

There is a bug in the original version of LDR320 for CP/M+. This file will not work properly on the winchester. The LDR320 files supplied by Magnolia in the CP/M+ package will operate properly at 4 MHz.

Thank-you
Kres Engineering

Information courtesy Ray Livingston and Henry Fale.

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02/5/86