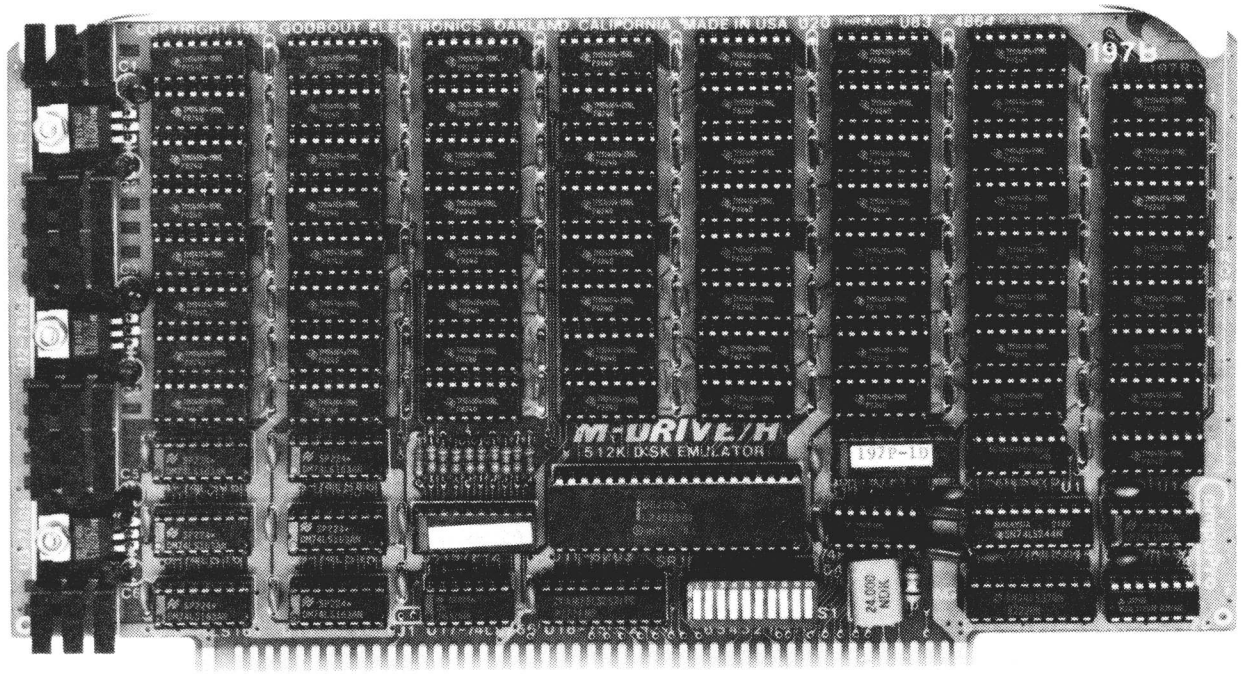
M-DRIVE/H™

TECHNICAL MANUAL



IEEE 696 / S-100

512K SOLID STATE DISK EMULATOR

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CompuPro®

A *GODBOUT* COMPANY

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M-DRIVE/H TECHNICAL MANUAL

CompuPro a Godbout Company
Oakland Airport, CA 94614

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How to get your M-DRIVE/H up and running in 5 minutes without reading the manual

This section is for those of you that can't wait long enough to read the rest of this manual to get your M-Drive/H board(s) working. This section assumes that you have a standard CompuPro system, and that the revision levels of your various operating systems are equal to or greater than those shown below:

CP/M 80™ : CP/M 2.2MDB or higher.
CP/M 86™ : CP/M 86 1.1PAA or higher.
MP/M 816™: MP/M 816 2.1D or higher.

If your CompuPro operating system revision level is lower than the above, return your original master diskette to CompuPro and we will upgrade it for you. There is no charge for this service. Make sure your diskette is packaged well and return it to:

CompuPro
ATTN: M-Drive/H Upgrade
Bldg. 727 PO Box 2355
Oakland Airport, CA 94614

If your disk system was not supplied by CompuPro, but uses a standard version of CP/M 2.2, or if your have an older version of the CompuPro operating system and can't wait for the mail, set the switches as shown below and then proceed to the section of this manual entitled "Installing M-Drive Drivers for other CP/M Systems".

SWITCH SETTINGS

There is only one dip-switch on the M-Drive/H board. Positions 1-7 are used to select the two port addresses where the M-Drive/H board resides. Positions 8-10 select the cascade address for each board in the system. Up to eight M-Drive/H boards can exist at the same port addresses, only the cascade address needs to be different for each board.

The standard port addresses for the M-Drive/H board are C6 and C7 hex. To set the board for the standard port address, set positions 1-7 of dip-switch S1 as shown below:

on			x	x	x		
S1*	1	2	3	4	5	6	7
off	x	x				x	x

* Markings on switch, not legend.

To set the cascade address, determine how many M-Drive/H boards there are in the system, and set each of them according to the table following:

1st board				2nd board				3rd board				4th board			
on	x	x	x	on	x	x		on	x		x	on	x		
S1*	8	9	10	S1*	8	9	10	S1*	8	9	10	S1*	8	9	10
off				off			x	off		x		off		x	x

5th board				6th board				7th board				8th board			
on		x	x	on		x		on			x	on			
S1*	8	9	10	S1*	8	9	10	S1*	8	9	10	S1*	8	9	10
off	x			off	x		x	off	x	x		off	x	x	x

*Markings on switch, not legend.

These are the only switch settings that are required on the M-Drive/H board.

Plug the M-Drive/H board into the system, making sure that power is off before doing so. Turn the system on and the left-hand drive light should be flashing (as it normally does). Put a system diskette in Drive A and close the door. The system should sign on.

The software should automatically format the M-Drive/H board(s) for use and print a message telling you how much M-Drive/H storage it thinks is available (in K bytes). Check this number to see if it seems correct, depending on the number of boards in the system (each M-Drive/H board contains 512K bytes of storage). If the size seems incorrect, power down the system and check your switch settings. If the size is correct, all is well.

The M-Drive/H appears in your system as drive M:. Once the system is booted, you may treat it just as if it were a disk drive. You can PIP files to it, log onto it, and use STAT to find out how big it is, or how much space is remaining. Remember that all data will be lost in the M-Drive/H when power goes away, so be sure to transfer important work back to permanent media before turning off power. It's a good idea to periodically perform this function anyway, to protect against a power failure.

ABOUT THE M-DRIVE/H

CompuPro, in a joint effort with G&G Engineering, pioneered the M-Drive concept for microcomputers. The M-Drive concept is to use RAM memory to emulate a disk drive. Thus, the convenience and familiarity of a disk drive was preserved, but the drive now operates at RAM speeds, which is considerably faster than a mechanical disk drive. The original M-Drive was implemented as a software product which used extended address memory beyond the first 64K under CP/M 80. The CompuPro dual processor board (CPU 8085/88) made this possible by actually using the 8088 to manage the M-Drive memory.

This system worked quite well, but had a few limitations. First of all, it was an all right technique for CP/M 80, because all that extra memory was never used. But when running CP/M 86 or MP/M 816, the operating system wants to use that memory for running programs. Secondly, although the extra memory was certainly cost-effective for some applications, it was still quite expensive to get a reasonably sized M-Drive.

Right from the start, we knew that a "hardware" M-Drive was the answer. The result is M-Drive/H (if you haven't figured it out, the /H stands for Hardware). The M-Drive/H board system comprises one to eight boards, providing between 512k bytes and 4 Megabytes of storage.

Now the M-Drive concept is extended easily to all operating systems, without taking up any precious memory space. All of CompuPro's standard operating systems, including CP/M 86 and MP/M 816, contain built in support for M-Drive/H. The 512K of M-Drive/H storage is certainly much less expensive than 512K of regular system memory, but of course the M-Drive/H RAM is dedicated to the M-Drive/H and cannot be used as system memory.

We feel that the M-Drive/H board is the best of its type for IEEE 696/S-100 systems, and we thank you for choosing it.

TECHNICAL OVERVIEW

The M-Drive/H board consists of 512k bytes of dynamic RAM, a dynamic RAM controller circuit and a method for addressing the data in the RAM array.

The M-Drive/H looks like two I/O ports to the system bus, it takes up no memory space. One I/O port is used to load a starting address into the board, and the other is used to read and write data.

The starting address is actually loaded into a series of counters on the board, and bytes are then transferred in sequence without the need to send a new address for each byte. The counters automatically increment themselves to point to the next byte. This speeds up transfers considerably.

The counter has 22 bits, 3 more than are needed for 512K bytes. These extra three bits determine which board of eight should send or receive the data. Thus, the array seems to the software like a contiguous 4 megabytes,

instead of eight separate chunks of 512k bytes each. This makes the programming task quite a bit easier, as well as using a minimum of port addresses.

The dynamic RAM controller circuit consists mainly of an Intel 8203-3 dynamic RAM controller and some external logic to permit operation with 512K of RAM. This circuit handles most of the DRAM access functions, as well as providing the necessary refresh operation and arbitration.

Since the DRAM is isolated from the IEEE 696/S-100 bus, problems normally associated with DRAM and the S-100 bus are avoided.

CONFIGURING THE M-DRIVE/H

There is only one dip-switch on the M-Drive/H board. Positions 1-7 are used to select the two port addresses where the M-Drive/H board resides. Positions 8-10 select the cascade address for each board in the system. Up to eight M-Drive/H boards can exist at the same port addresses, only the cascade address needs to be different for each board.

The standard port addresses for the M-Drive/H board are C6 and C7 hex. To set the board for the standard port address, set positions 1-7 of dip-switch S1 as shown below:

on			x	x	x		
S1*	1	2	3	4	5	6	7
off	x	x				x	x

* Markings on switch, <u>not</u> legend.

If you desire to use a different set of port addresses, the following table shows how positions 1-7 of S1 relate to the various address bits:

Paddle #	Address Bit
1	7
2	6
3	5
4	4
5	3
6	2
7	1

<u>OFF</u> = "1"

<u>ON</u> = "0"

To set the cascade address, determine how many M-Drive/H boards there are in the system, and set each of them according to the table following:

1st board				2nd board				3rd board				4th board			
on	x	x	x	on	x	x		on	x		x	on	x		
S1*	8	9	10	S1*	8	9	10	S1*	8	9	10	S1*	8	9	10
off				off			x	off		x		off		x	x

5th board				6th board				7th board				8th board			
on		x	x	on		x		on			x	on			
S1*	8	9	10	S1*	8	9	10	S1*	8	9	10	S1*	8	9	10
off	x			off	x		x	off	x	x		off	x	x	x

*Markings on switch, not legend.

These are the only switch settings that are required on the M-Drive/H board.

USING M-DRIVE/H

After making sure that power to the system is OFF, plug the M-Drive/H board(s) into the system, of course making sure that their switches are set accordingly. Boot the system in the normal manner. The system should recognize the presence of the M-Drive/H and display an appropriate sign-on message. It should display the size of the M-Drive/H in K bytes (each M-Drive/H board contains 512K bytes). If the size seems incorrect, power down the system and check your switch settings.

At power-up, the system will automatically format the M-Drive/H for use. You may "force" a re-format of the M-Drive by invoking the MFORM command. Type: **MFORM M** followed by a carriage return. The program will ask you if you indeed wish to re-format your M-Drive/H. If you do, it will re-format the M-Drive/H, but it will also wipe out all your files, so be careful.

Once the M-Drive/H is formatted (either automatically or "by hand") it is ready for use. Simply treat it as you would any other disk drive in your system. The M-Drive/H becomes drive M:, and you may PIP files to it, run programs from it, log onto it, in short anything you can do with a normal disk drive. However, operation will be much faster.

Remember that the data you store in the M-Drive/H will be lost when you turn off the power to your computer, so be sure and save any files you have worked on back to permanent storage media, such as a hard or floppy disk. It's a good idea to perform this "back-up" procedure often (even when you're not done for the day) to guard against an accidental power failure.

INSTALLING M-DRIVE/H DRIVERS IN OTHER CP/M SYSTEMS

To install the M-DRIVE/H drivers in other CP/M systems, copy the files "MDRIVE.COM" and "MFORM.COM" onto your system disk. You must now make some room for the new drivers above your current CP/M. Currently, the M-DRIVE/H drivers and buffers take about 1K (1024) bytes. This means that your must make a CP/M 1K less than the amount of memory available in your system. If you do not know how to move your CP/M down, see your system manual. The required program is usually called "MOVCPM".

Once you have 1K of room at the top of memory, each time you boot your system, you must call the MDRIVE program. The format of the MDRIVE command is as follows:

MDRIVE -DRIVE DESIGNATOR ADDRESS

Where DRIVE DESIGNATOR is the letter of the logical drive you want the memory drive to respond to (A-P), and ADDRESS is the address in hex of the end of your CP/M, or the TOP of your memory minus 1K. See table 1 to determine what hex address you should use for different memory sizes.

TABLE 1

Amount of memory	Size CP/M to make	Hex address to use
64K	63K	FC00
60K	59K	EC00
56K	55K	DC00
52K	51K	CC00
48K	47K	BC00
44K	43K	AC00
40K	39K	9C00
36K	35K	8C00
32K	31K	7C00
28K	27K	6C00
24K	23K	5C00

The following example will put the M-DRIVE/H drivers at the top of a 63K system with 64k of memory and put the memory drive as drive "M":

A>MDRIVE -M FC00

The MDRIVE program will first size the memory drive and report the amount of memory drive it found. It will then patch your BIOS, and install the new drivers at the given address. The memory drive is then automatically formatted. You can now use the memory drive like any other drive in the system, including reformatting it.

We have also included sample M-DRIVE/H drivers that can be assembled into an existing bios. This code was taken out of the standard CompuPro CPM 2.2

BIOS, so some modification and optimization may need to be done for individual CP/M implementations. The disk parameter blocks (DPB) will also need to be set for the number of M-DRIVE/H boards in your system.

SAMPLE READ/WRITE ROUTINES

```
;
;       M - D R I V E / H
;
;       This is a sample, skeletal bios that will drive the CompuPro
;       M-DRIVE/H memory disk.
;       To quickly add this to your existing bios, just replace the "JMP
;       NOTHING"s at the end of each routine with a jump to your BIOS,
;       and assemble it all together. The DPB is set for one M-DRIVE/H
;       board, if you have more boards you will have to adjust it
;       accordingly.
;       Information such as sector, track, and DMA address are saved even
;       if they are not intended for the memory drive.  This is intended
;       as an example and as a way for someone to use the M-DRIVE/H board
;       with a minimum amount of trouble and work.  The performance of
;       any CP/M BIOS can be greatly enhanced by integrating this code
;       directly into an existing BIOS, as well as save some memory space.
;
;       This code expects the M-DRIVE/H board to be addressed at the
;       following I/O ports:
;
;                       0C6H - Data
;                       0C7H - Address
;
;       Written L. Ott                          12/17/82
;       ^1982 by CompuPro div. Godbout Electronics
;
;
HBASE:  EQU     0C6H
HDATA:  EQU     HBASE
HADDR:  EQU     HBASE+1

MEMDRV: EQU     'M'             ;SET AS DRIVE "M"
F$RDAT: EQU     6               ;READ DATA
F$WRT:  EQU     5               ;WRITE DATA

MRTRY:  EQU     10              ;MAX RETRY COUNT
;
MDRIVE: JMP     NOTHING         ;COLD START
        JMP     NOTHING         ;WARM START
        JMP     NOTHING         ;CONSTAT
        JMP     NOTHING         ;CONIN
        JMP     NOTHING         ;CONOUT
        JMP     NOTHING         ;LIST
        JMP     NOTHING         ;PUNCH
        JMP     NOTHING         ;READER
        JMP     HOME            ;HOME
        JMP     SELDSK          ;SELECT DISK
        JMP     SETTRK          ;SET TRACK
```

```
        JMP     SETSEC          ;SET SECTOR
        JMP     SETDMA          ;SET DMA
        JMP     READ            ;READ
        JMP     WRITE           ;WRITE
        JMP     NOTHING         ;LIST STATUS
        JMP     SECTRN          ;SECTOR TRANSLATE
;
;DUMMY ROUTINE FOR NON IMPLEMENTED ROUTINES
;
NOTHING:
        RET
;
HMDSIB: EQU     2048/128        ;SECTORS IN MEMORY DRIVE DATA BLOCK
HMDDSM: EQU     ((512-4)*8)/HMDSIB
;
DPBHMD:                         ;SET FOR 1 BOARD, 8 SPT
        DB      128             ;MDRIVE TYPE FOR MFORM, DO NOT CHANGE
        DW      8               ;SECTORS PER TRACK, THIS AND DSM ...
                                ;...MUST BE INCREASED FOR MORE BOARDS
        DB      4,15,1          ;BSH, BLM, EXM
        DW      HMDDSM-1,128-1  ;DSM , NUMBER OF DIRECTORY ENTRIES
        DB      11000000B,00000000B     ;RESERVED DIR BLOCKS, MUST MATCH ...
                                ; ... NUMBER OF DIRECTORY ENTRIES
        DW      0               ;CHECK SUM
        DW      4               ;NUMBER OF RESERVED TRACKS FOR PARITY CHECK
                                ;  THIS IS ALWAYS 4
;
HMDDPH:
        DW      0               ;SECTOR TRANSLATE TABLE
        DW      0,0,0           ;SCRATCH
        DW      BUFDIR          ;DIRECTORY BUFFER
        DW      DPBHMD+1        ;DPB BLOCK
        DW      0               ;CHECKSUM VECTOR
        DW      ALV             ;ALLOCATION VECTOR
;
;
;       S E L E C T   D I S K   D R I V E
;
;       Select the disk drive for subsequent disk transfers and return
;       the address of the DPH for the memory drive.
;
;       ENTRY -- C = disk selection value
;         DE and 1 = 0 must determine disk type
;                  = 1 type already determined  (only needed for floppies)
;
;       EXIT -- HL = DPH address of the memory drive.
;                IF memory drive not selected, control is passed to BIOS
;
SELDSK: XRA     A               ;CLEAR A
        STA     SELFLG          ;CLEAR MEMORY DRIVE FLAG
        MOV     A,C             ;
        CPI     MEMDRV-'A'      ;IS MEMORY DRIVE SELECTED
BIOSSEL:JNZ     NOTHING         ;F NOT GO BACK TO BIOS
        MVI     A,0FFH
        STA     SELFLG          ;SET MEMORY DRIVE AS SELECTED
```

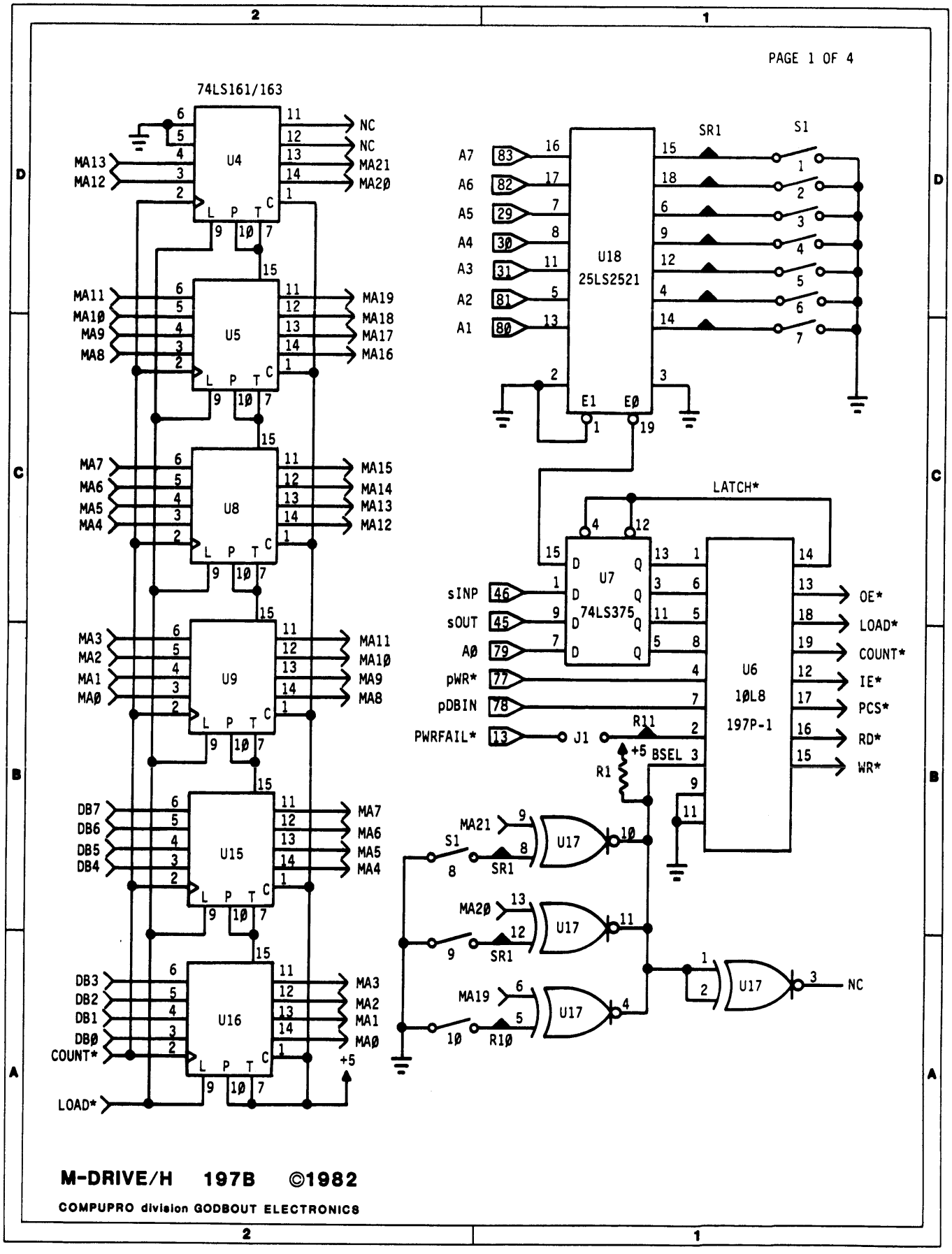
```
        LXI     H,HMDDPH        ;GET DPH ADDRESS
        RET                     ;AND DONE
;
;       H O M E
;       Set current track to 0
;
HOME:   XRA     A
        STA     CIOPB+2         ;SET TRACK AS 0
        STA     CIOPB+3
BIOSHOM:JMP     NOTHING         ;ON TO BIOS
;
;       S E T     T R A C K
;
;       Set track number.  The track number is save for later use during
;       a disk transfer.  The track is save whether or not the memory disk
;       is currently selected.
;
;       ENTRY -- BC = Track number.
;
SETTRK: MOV     L,C
        MOV     H,B
        SHLD    CIOPB+2
BIOSTRK:JMP     NOTHING
;
;       S E T     S E C T O R
;
;       Set sector number.  The sector number is save for later use during
;       a disk transfer.  The sector is saved whether or not the memory
;       disk is currently selected.
;
;       ENTRY -- BC = Sector number.
;
SETSEC: MOV     L,C
        MOV     H,B
        INX     H               ;+1 TO MAKE LIKE FLOPPIES (1-26)
        SHLD    CIOPB+4
BIOSSEC:JMP     NOTHING
;
;       S E T   D M A   A D D R E S S
;
;       Set the address for the next DMA transfer.
;       The DMA address is saved for later use during a disk transfer.
;       The address is saved whether or not the memory disk is
;       currently selected.
;
;       ENTRY -- BC = Disk memory address.
;
SETDMA: MOV     L,C
        MOV     H,B
        SHLD    DMAADR
BIOSDMA:JMP     NOTHING
;
;       S E C T O R   T R A N S L A T E
;
;       Translate the sector number from logical to physical.
```

```
;
;       ENTRY   DE = 0, no translation required.
;               DE = Translation table address.
;               BC = Number to translate.
SECTRN:
        MOV     A,D
        ORA     E
        RZ              ;No translation needed.
        JMP     NOTHING ;Let BIOS translate.
;
;       R E A D
;
;       Read the currently selected track,sector from the currently
;       selected drive.
;
READ:   LDA     SELFLG
        ORA     A
BIOSRED:JZ      NOTHING
        MVI     A,F$RDAT                ;MUST WANT THE MEMORY DRIVE
        STA     CIOPB                   ;TO COMMAND BUFFER
        JMP     HMDFNL
;
;       W R I T E
;
;       Write to the currently selected drive at the current track
;       and sector.
;
WRITE:  LDA     SELFLG
        ORA     A                       ;IS MEMORY DRIVE SELECTED
BIOSWRT:JZ      NOTHING
        MVI     A,F$WRT                 ;SET COMMAND AS WRITE
        STA     CIOPB
;       JMP     HMDFNL                  ;AND GO PROCESS
;
;       HMDFNL -- Hard memory disk final command processing
;       ENTRY -- CIOPB +0 = COMMAND
;                CIOPB +2 = TRACK
;                CIOPB +4 = SECTOR
HMDFNL:
        MVI     A,MRTRY         ;Set retry count
        STA     RTRY
HMFNL1: LHLD    CIOPB+2         ;GET TRACK
        DAD     H               ;*2
        DAD     H               ;*4
        DAD     H               ;*8
        DAD     H               ;*16
        DAD     H               ;*32
        DAD     H               ;*64
        DAD     H               ;*128
        LDA     CIOPB+4         ;GET SECTOR
        DCR     A               ;STARTS AT 0
        CALL    SETMDRV         ;SET HDRIVE BOARD AHL
        MVI     C,128           ;128 BYTE SECTORS
        MOV     B,C             ; also into B for parity check
        LHLD    DMAADR          ;DIRECTLY TO CPM BUFFER
```

```
        LDA     CIOPB           ;GET COMMAND
        CPI     F$RDAT          ;
        JNZ     HDINTO          ;IF WRITE COMMAND JUMP
;
;       JMP     HDOTOF
;
;       GET A 128 BYTE BLOCK FROM HDRIVE BOARD ADDRESS IS ALREADY SELECTED
;       C IS NUMBER OF BYTES TO MOVE
;       HL IS DMA BUFFER TO PUT DATA
HDOTOF: IN      HDATA           ;GET DATA BYTE
        MOV     M,A             ;PUT TO DMA BLOCK
        ADD     B               ;ADD UP PARITY BYTE
        MOV     B,A             ; AND SAVE
        INX     H               ;UP POINTER
        DCR     C               ;COUNT THIS MOVE
        JNZ     HDOTOF          ;AND DO AGAIN
        CALL    PARITY          ;DO PARITY CHECK
        IN      HDATA           ;GET PARITY BYTE
        SUB     B               ; 0 IF NO ERROR
        RZ                      ;  THEN RETURN
        LDA     RTRY            ;GET RETRY COUNT
        DCR     A               ;
        STA     RTRY            ;REPLACE WITH NEW COUNT
        JNZ     HMFNL1
        ORI     1
        RET                     ;RETURN WHEN DONE
;
;       PUT A BLOCK OF DATA INTO HDRIVE BOARD ADDRESS IS ALREADY SELECTED
;       C IS NUMBER OF BYTES TO MOVE
;       HL IS DMA BUFFER TO GET DATA FROM
HDINTO:
        MOV     A,M             ;GET BYTE FROM BUFFER
        OUT     HDATA           ;TO MDRIVE BOARD
        ADD     B               ;ADD UP PARITY BYTE
        MOV     B,A             ; AND SAVE
        INX     H
        DCR     C               ;COUNT THIS MOVE
        JNZ     HDINTO          ;IF DONE WITH 128 OR C COUNT
        CALL    PARITY          ;SELECT PARITY BYTE LOCATION
        MOV     A,B
        OUT     HDATA           ;WRITE PARITY BYTE TO MEMORY DISK
        XRA     A               ;AND SHOW NO ERROR
        RET                     ;RETURN
;
;     FIND LOCATION IF PARITY BYTE FOR TRACK IN CIOPB+2
;     AND THE SECTOR IN CIOPB +4
PARITY: LDA     CIOPB+4         ;Get sector
        DCR     A               ;Bias
        LHLD    CIOPB+2         ;Get track

;Set M-DRIVE/H board to address in A,HL
SETMDRV:
        OUT     HADDR           ;To M-DRIVE/H board
        MOV     A,H             ;H is always 0 or 1
        OUT     HADDR
```

```
        MOV     A,L             ;Upper bit of L picks track 0-3
        OUT     HADDR           ; remainder of byte picks sector and byte
        RET
;
MDRLNG: EQU     $-MDRIVE        ;LENGTH OF MDRIVE BIOS
SELFLG: DB      1               ;DISK SELECT FLAG
RTRY:   DB      1               ;RETRY COUNTER
CIOPB:  DS      8               ;COMMAND BUFFER
DMAADR: DW      1               ;ADDRESS OF DMA BUFFER
BUFDIR: DS      128             ;DIRECTORY BUFFER FOR CPM
ALV:    DS      (((HMDDSM*8)+7)/8)+1            ;
;
```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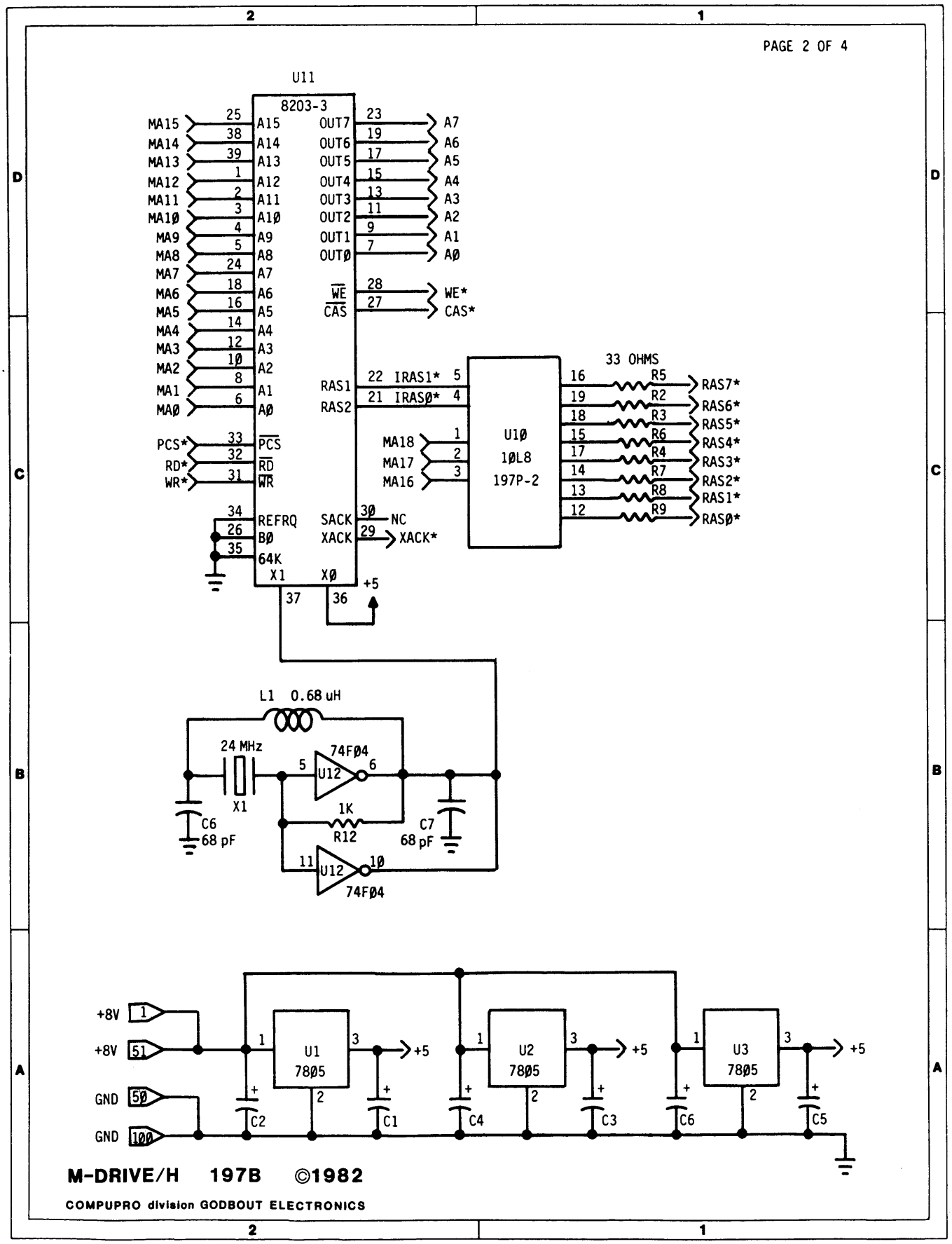

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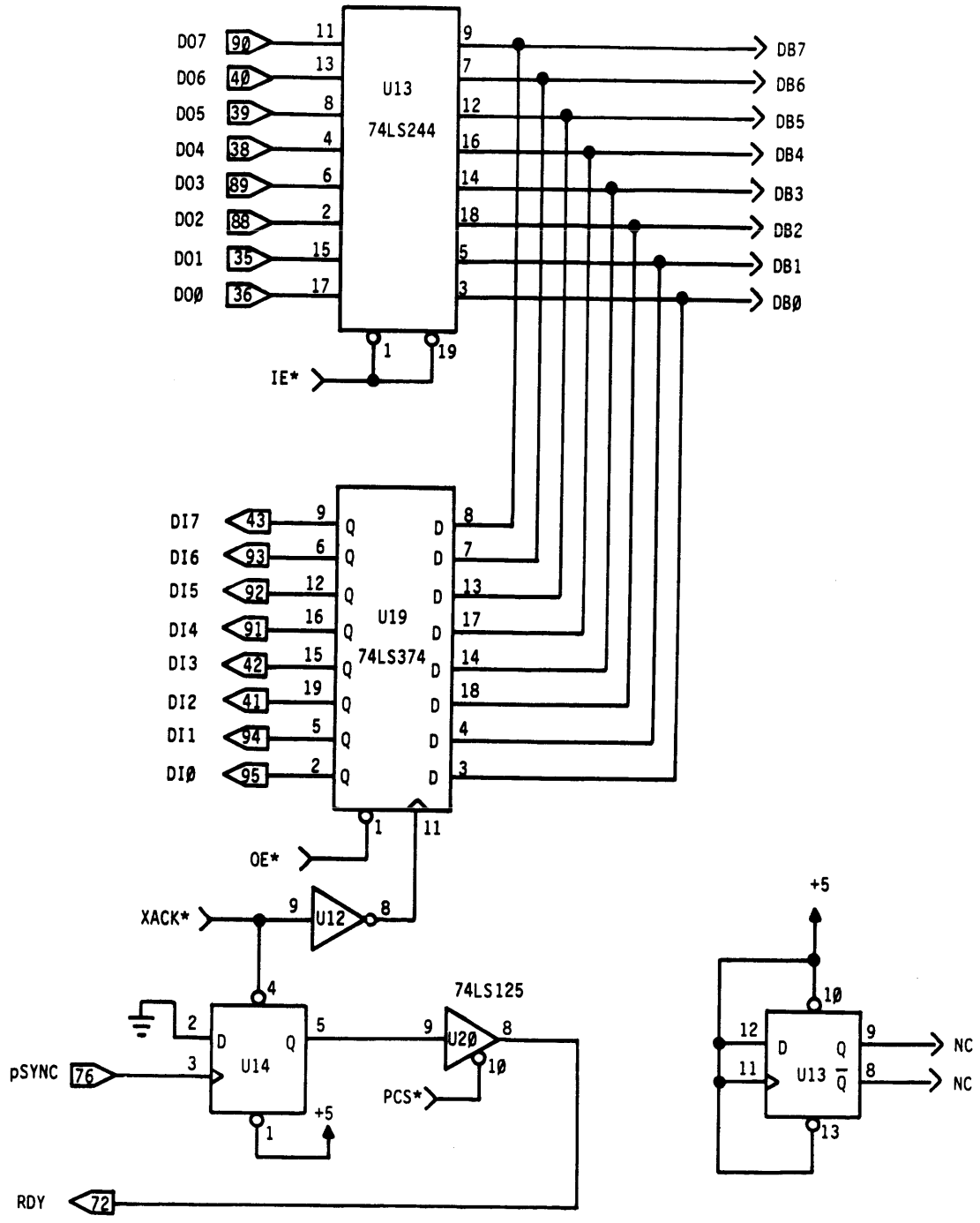

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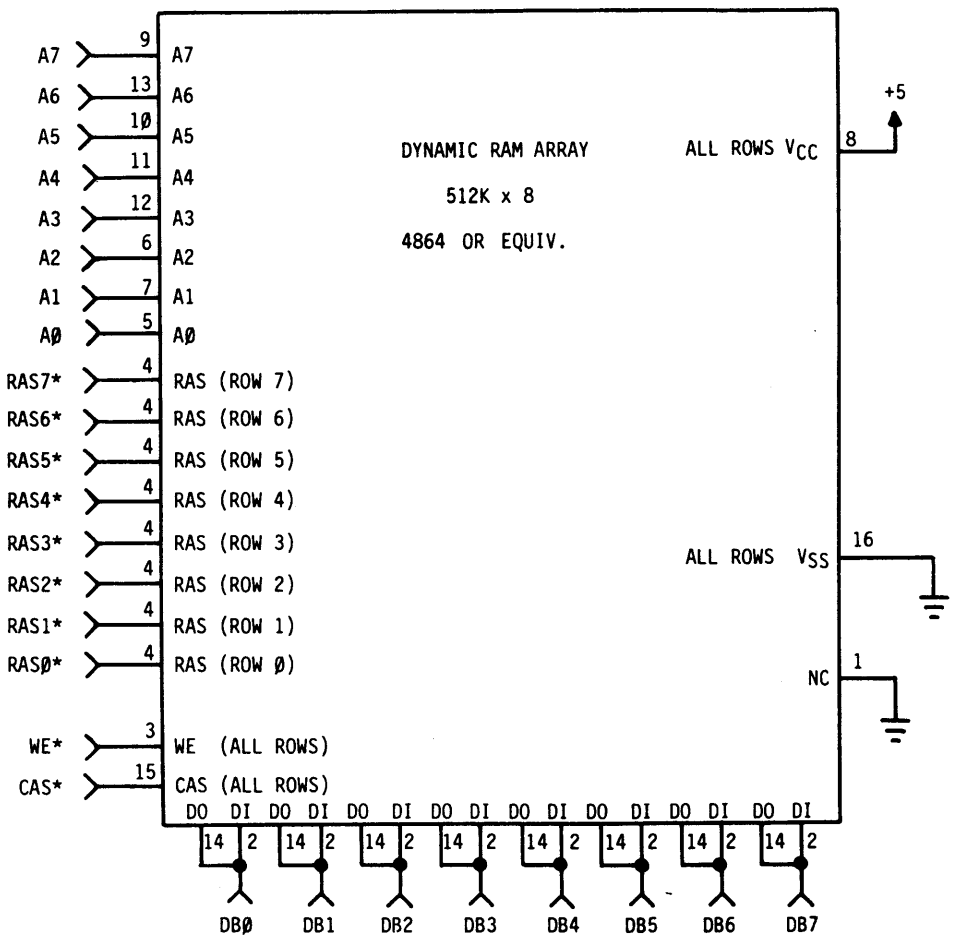

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PARTS LIST

SEMICONDUCTORS

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U6	197P-1
U7	74LS375
U8	74LS161/163
U9	74LS161/163
U10	197P-2
U11	8203-3
U12	74F04
U13	74LS244
U14	74LS74
U15	74LS161/163
U16	74LS161/163
U17	74LS266
U18	25LS2521
U19	74LS374
U20	74LS125
U21-84	4864 or equiv.

RESISTORS VALUE

R1	1.5K ohm
R2-9	33 ohm
R10,11	4.7K ohm
R12	1K ohm
SR1	5.1K ohm SIP

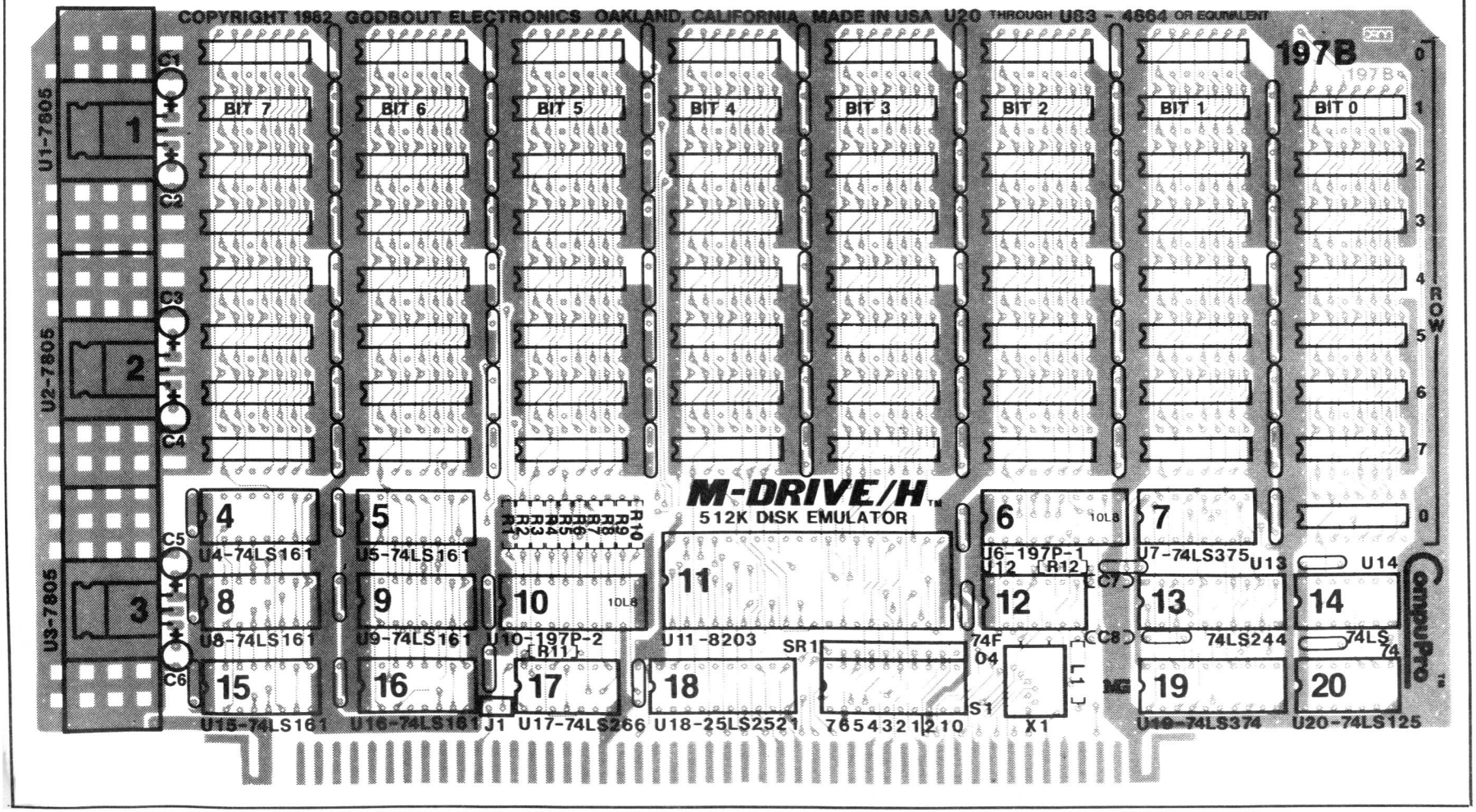
CAPACITORS VALUE

C1-6	10v or higher
C7,8	68 pF

OTHER ELECTRONIC PARTS

L1	.68uH inductor
X1	24 MHz crystal

COMPONENT LAYOUT



IF YOU NEED ASSISTANCE ALWAYS CONTACT
YOUR **COMPUPRO DEALER FIRST**

CUSTOMER SERVICE INFORMATION

Our paramount concern is that you be satisfied with any CompuPro product. If this product fails to operate properly, it may be returned to us for service; see warranty information below. If you need further information feel free to write us at:

Box 2355, Oakland Airport, CA 94614

LIMITED WARRANTY INFORMATION

CompuPro division Godbout Electronics will repair or replace, at our option, any parts found to be defective in either materials or workmanship for a period of 1 year from date of invoice. Defective parts MUST be returned for replacement.

If a defective part causes a CompuPro product to operate improperly during the 1 year warranty period, we will service it free (original owner only) if delivered and shipped at owner's expense to and from our Service Center in Building 725, Oakland Airport, CA 94614. If improper operation is due to error or errors on the part of the purchaser, there may be a repair charge. Purchaser will be notified if this charge exceeds $50.00. If the warranty period has expired, service for CompuPro products is available at a rate of $50.00 per hour labor plus parts.

We are not responsible for damage caused by use of solder intended for purposes other than electronic equipment construction, failure to follow printed instructions, misuse or abuse, unauthorized modifications, use of our products in applications other than those intended by CompuPro division Godbout Electronics, theft, fire, or accidents.

Return to purchaser of a fully functioning unit meeting all advertised specifications in effect as of date of purchase is considered to be complete fulfillment of all warranty obligations assumed by CompuPro division of Godbout Electronics. This warranty covers only products marketed by CompuPro division Godbout Electronics and does not cover other equipment used in conjunction with said products. We are not responsible for incidental or consequential damages.

Prices and specifications are subject to change without notice.