

**EAGLE PC SERIES TECHNICAL NOTES**

---

*#1995*

	PC-E -----	PC-1 -----	PC-2 -----	PC-XL -----
RAM	64KB	128KB	128KB	128KB
FLOPPY DISKS	1 D/S 48 TPI	1 D/S 48 TPI	2 D/S 48 TPI	1 D/S 48 TPI
HARD DISK	N/A	N/A	N/A	FILE - 10
MONITOR + CARD	OPT.	12" 720X352	12" 720X352	OPT.
AVAILABLE EXPANSION SLOTS	2	1	1	0
SOFTWARE	OPT.	INCLD.	INCLD.	OPT.

*3*

\* All are 8088 based systems @ 4.7 Mhz.

\* Available or standard expansion boards.

1. Floppy disk controller board.
2. Video/Graphics board.
3. SASI board. (Std. in -XL model).

\* RAM is expandable to 512Kb, in 64Kb increments.  
The RAM provided is 65,536 words by 1-bit  
dynamic MOS RAM.

*MUST HAVE  
FOR FILE I/O  
EXPANSION* →

*CP refresher*

8088

- \* All systems come with two serial ports and one parallel port.

The parallel ports' major device is a 8255A and is centronics compatible.

The serial ports are asynchronous only and use two 8250s'.

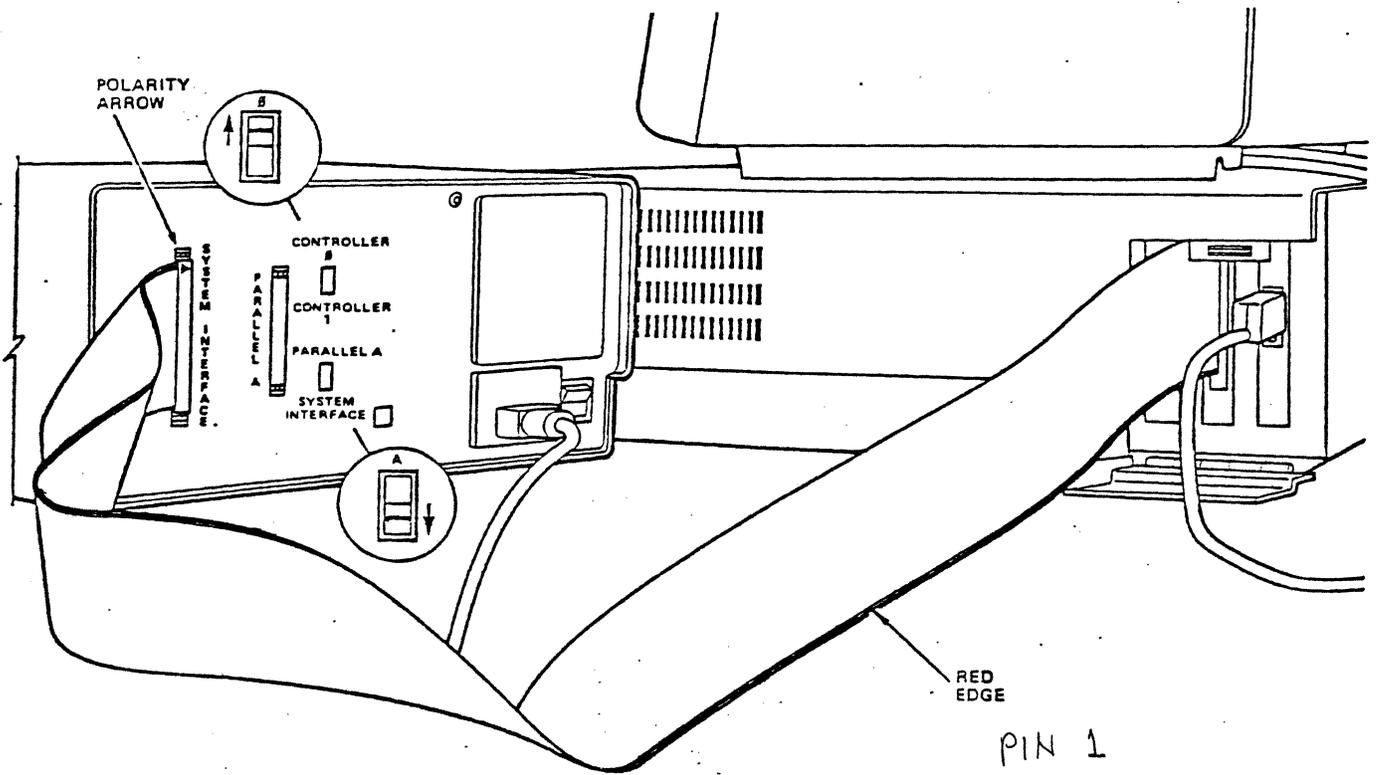
#### SERIAL PORT PIN-OUTS

Pin #	Signal Name
-----	-----
2	TX Data
3	RX Data
4	RTS
5	CTS
6	DSR
7	GND.
8	Carrier Detect
20	DTR
22	RI

*May not have been mentioned in customer manual*

- \* The EPROMs are 2764s' and contain the boot routine and diagnostics.

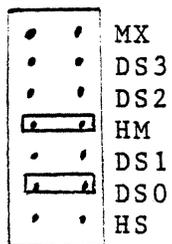
*2 EPROM  
SYSTEM  
DIAGNOSTIC PROM*



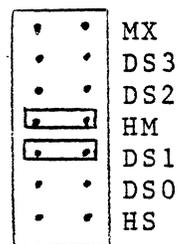
Eagle PC with a File 10/40 add-on.

HD LOADER XFERS DISKTTES MS DOS FORMATTED

Floppy disk drive strapping for a Teac FD-55B.



Drive "A".  
Add 330 ohm resistor pack.



Drive "B".

## EAGLE PC THEORY OF OPERATION

---

### THE 8088 AND SUPPORTING CIRCUITS

---

The Eagle PC computers use an Intel 8088 microprocessor. The 8088 utilizes an 8-bit data bus, and, depending on the instructions used, can operate on either 8-bit or 16-bit data. The address bus is 20 bits which provides for 1Mb of addresses. The Eagle PC, however, reserves the upper 512k of addresses for system use, so the maximum amount of RAM that the PC can support is 512kb.

Because the 8088 package has only 40 pins, the address bus, data bus, and certain status lines have been multiplexed on 20 pins. Thus, latching of address, data, and status information is necessary in order to capture that information while it is present on those pins.

The Intel 8088 is set up in the "maximum mode" of operation, whereby certain processor functions are performed by another chip, the Intel 8288 Bus Controller. This allows the 8088 to provide information on pins otherwise used for those functions. By decoding the first three status lines from the microprocessor, the 8288 will broadcast the ALE (Address Latch Enable), DEN (Data Enable), and I/O and memory read/write command signals when it determines that the system is ready for the particular information transfer desired by the microprocessor.

The socket adjacent to the 8088 is intended for an Intel 8087 chip, which in conjunction with the 8088, will provide extremely fast mathematical processing. The Intel 8087 would be called upon by the Intel 8088 when special software commands are used. The most common use of the Intel 8087 chip is with medium and high resolution color displays.

## THE INTEL 8259

---

The Intel 8259 Programmable Interrupt Controller provides the system with a set of prioritized interrupt signals with which peripheral devices can request servicing. When these devices issue interrupt signals, the 8259 determines the importance of the requests and whether it is appropriate to interrupt the microprocessor. After the microprocessor acknowledges an interrupt from the 8259, the 8259 provides the address of a subroutine which is appropriate for the type of interrupt and which subroutine it will attempt to follow. Before any interruption of the of the microprocessor takes place, the 8088 finishes performing the instruction it was on prior to receiving the interrupt and stores away all the information in the registers so that it can (if possible) resume its processing when the interrupt is concluded.

## THE INTEL 8284

---

A 14.31818 MHZ crystal and an Intel 8284 Clock Generator provide the 8088 and the rest of the system with a 4.77 Mhz clock signal and a 3.58 Mhz signal for the color burst required for color monitors.

## MEMORY / RAM & EPROMS

---

The 20 address pins of the Intel 8088 make it possible to address up to 1,048,576 locations. The upper 524,288 locations, though, have been reserved for special use. The Intel 8088 uses addresses FFF0H to FFFFH for initial system initialization. Thus upon starting up, or upon reset, the 8088 looks to the upper 16 addresses for its initial instructions. The Eagle PC uses other portions of the upper 512k for EPROM and color and monochrome display information.

## EPROMS

---

The Eagle PC has two, 8K, 2764 EPROMs which contain the bootstrap loader, memory test diagnostics, and the BIOS (Basic Input/Output System) module. Up to four 2764 EPROMs can be installed on the Eagle PC mainboard. As long as the EPROM with the BIOS is installed the system will function normally, the EPROM containing the diagnostics are not necessary. Such diagnostics, if installed, are available to the user through booting and holding down the "T" key. IBM makes RAM diagnostics mandatory upon booting.

## RAM

----

The Eagle PC can support up to 512k of RAM on the main board. The Eagle PC uses 64k 1-bit dynamic RAMs ( DRAMs ); eight are required for a full bank of 64Kb. The system has room for up to 8 banks. They are easily inserted, 8 devices at a time, starting with the lowest order of sockets.

Because the RAMs are dynamic, they require "refresh". To accomplish this, an Intel 8253 Programmable Interval Timer determines when a refresh cycle is due and has the DMA Controller perform a dummy read to refresh the DRAM.

A PE-21199, 20 - 100 nsec, Signal Delay line is used to provide the necessary delays between RAS and CAS signals and to provide the multiplexing strobe when supplying 16-bit addresses to the DRAMs.

## I/O PORTS & EXPANSION SLOTS

-----

### SERIAL PORTS

-----

Each of the two serial ports utilize a National Semiconductor 8250 Programmable Asynchronous Communications device to receive and transmit data. Baud rates from 50 to 9600 are permissible. The keyboard also interfaces through the 8250.

### PARALLEL PORT

-----

An Intel 8255 Programmable Peripheral Interface is used to configure and control data traffic through the parallel port. The parallel port is a standard, Centronics type, 36 pin connector.

### EXPANSION SLOTS

-----

The I/O Bus has three 62 pin connectors on the main board. In all models of the PC, at least one is taken up by a floppy disk controller board.

START ADDRESS

	HEX	DECIMAL
	FFFF	1024 K
EPR0M	FC000	1008 K
SOCKETS FOR EPR0M	F8000	992 K
POTENTIAL EPR0M	F0000	976 K
	C0000	816 K
HARD DISK CONTROL	C8000	800 K
	B0000	752 K
COLOR DISPLAY	B8000	736 K
	B40000	720 K
MONOCHROME DISPLAY	B0000	704 K
	80000	512 K
RAM		
	00400	1 K
INTERRUPT VECTORS	00000	0 K

DWG. NO.

SH

REV.

A

QTY REQD	FSCM NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL SPECIFICATION
PARTS LIST				
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:		CONTRACT NO.	<b>EAGLE COMPUTER</b> <small>11570 Marston River Circle Fountain Valley, CA 92708 (714) 957-1711</small>	
FRACTIONS =	DECIMALS =	APPROVALS	DATE	<b>EAGLE PC MEMORY MAP</b>
XX =	.XXX =	DRAWN <u>A.L. WILKINSON</u> 7-26-83		
FINISH		CHECKED	ISSUED	
DO NOT SCALE DRAWING		SCALE	DWG. NO.	REV.
			C	SHEET

## EAGLE MONOCHROME DISPLAY AND GRAPHIC ADAPTER

---

This adapter has dual functions; it provides the interface to the Eagle Monochrome Display and is a 720x352 graphics adapter.

The monitor interface is designed around the Motorola 6845 CRT Controller module. There are 16 kilobytes of dynamic memory on the card which are used for the display buffer. The memory is dual ported and may be accessed directly by the CPU. No parity is provided on the display.

The characteristics of the adapter are listed below:

TEXT MODE	GRAPHICS MODE
- 80x25 screen	- 720x352 pixels
- direct drive output	- 8x16 graphic box
- 9x14 character box	- direct drive output
- 18 KHz monitor	- 18 KHz monitor
- character attributes	

The adapter supports 256 character codes. A 4 kilobyte character generator contains the fonts for the character codes.

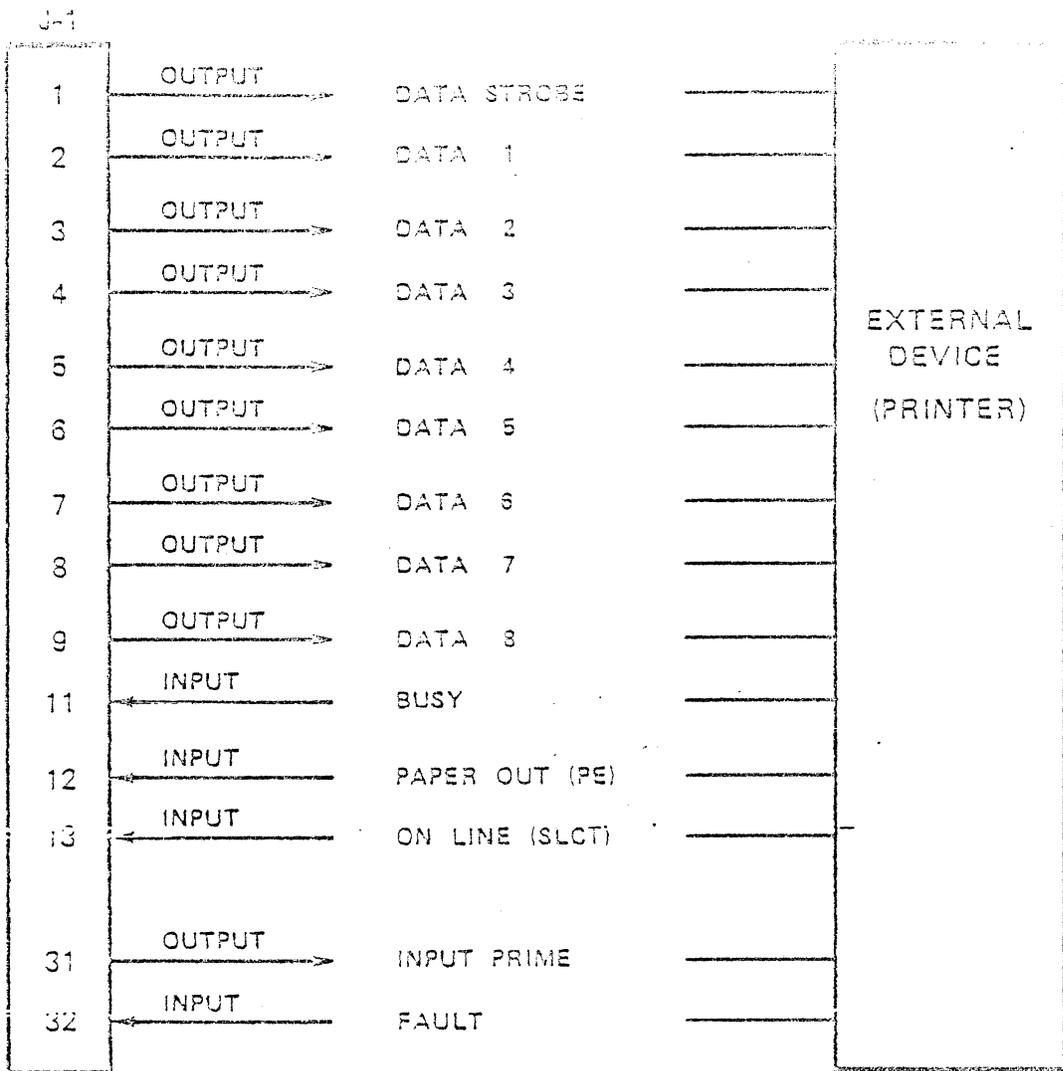
## PARALLEL PRINTER PORT

---

The Parallel Printer Port provides Centronics compatible interfacing for a parallel printer. The main board contains an AM 8255A-5 Programmable Peripheral Interface device and associated circuits.

The following is a list of signal names and functions used by the Parallel Port. The list indicates input or output from the Eagle system.

DATA STROBE (Output)	Indicates that DATA 1 to DATA 8 are effective. Pulse width requires 1 micro sec. MIN. HIGH --- normal condition LOW --- readout of data
DATA 1 to DATA 8 (Output)	Indicates information from 1 bit to 8 bits. (8th bit is ignored.) DATA 1 --- HIGH DATA 0 --- LOW
BUSY (Input)	DC level signal which indicates whether printer is available or not. LOW --- Data Input HIGH --- Only DC 1 code is inputted.
PE (Input)	DC level signal which becomes "HIGH" when paper is short.
SLOT (Input)	DC level signal which is "HIGH" when printer is selected.
INPUT PRIME (Output)	Puts printer to initial condition.
FAULT (Input)	DC level signal which becomes "LOW" when printer is in the following condition: * At PE * Character selection error, carriage error, PF error * Select Off



J-1

## KEYBOARD

---

The keyboard is a separate device from the main unit and is attached via a serial interface cable to the right side of the Main Enclosure.

The keyboard is of a low profile, capacitive microprocessor design. The microprocessor is contained in the keyboard and is an Intel-8084, which returns scan codes to the Main Processor Board. There are 105 keys total, with 24 dedicated function keys.

The keyboard is considered a separate module and if a problem occurs it is simply unplugged and replaced.

### WARNING

Do not unplug the keyboard with the power on.

Expansion Slots

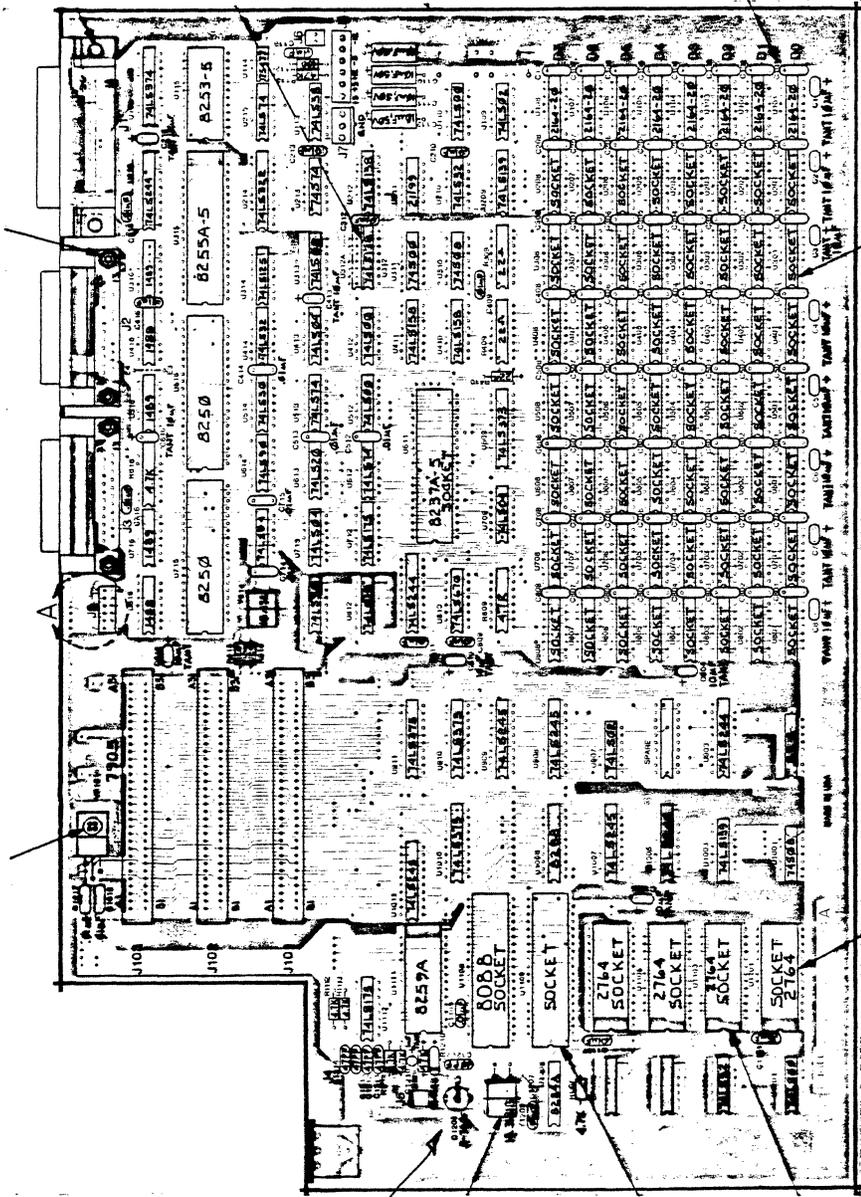
A B PARALLEL

APJ C1208  
BROUGHT IN COLOR

8087

DIAGNOSTIC  
EPROM

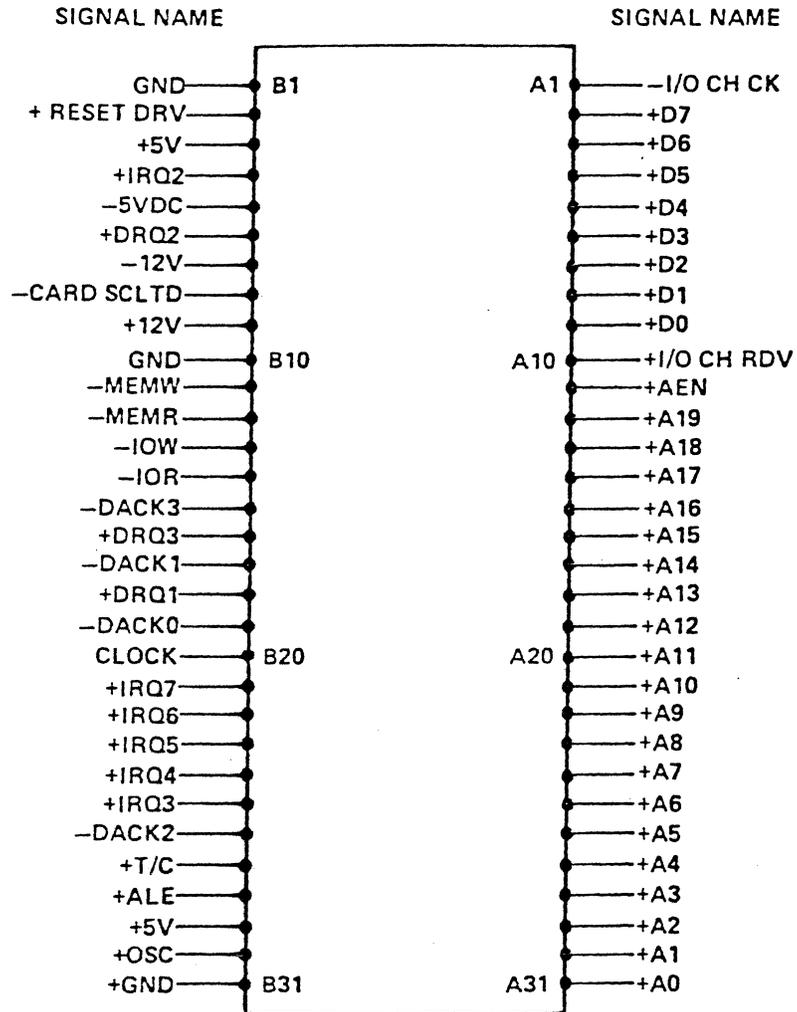
DISCONNECT BOARD TO MAKE ACCESSIBLE



SYSTEM EPROM REV C 8 7 6 5 4 3 2 1

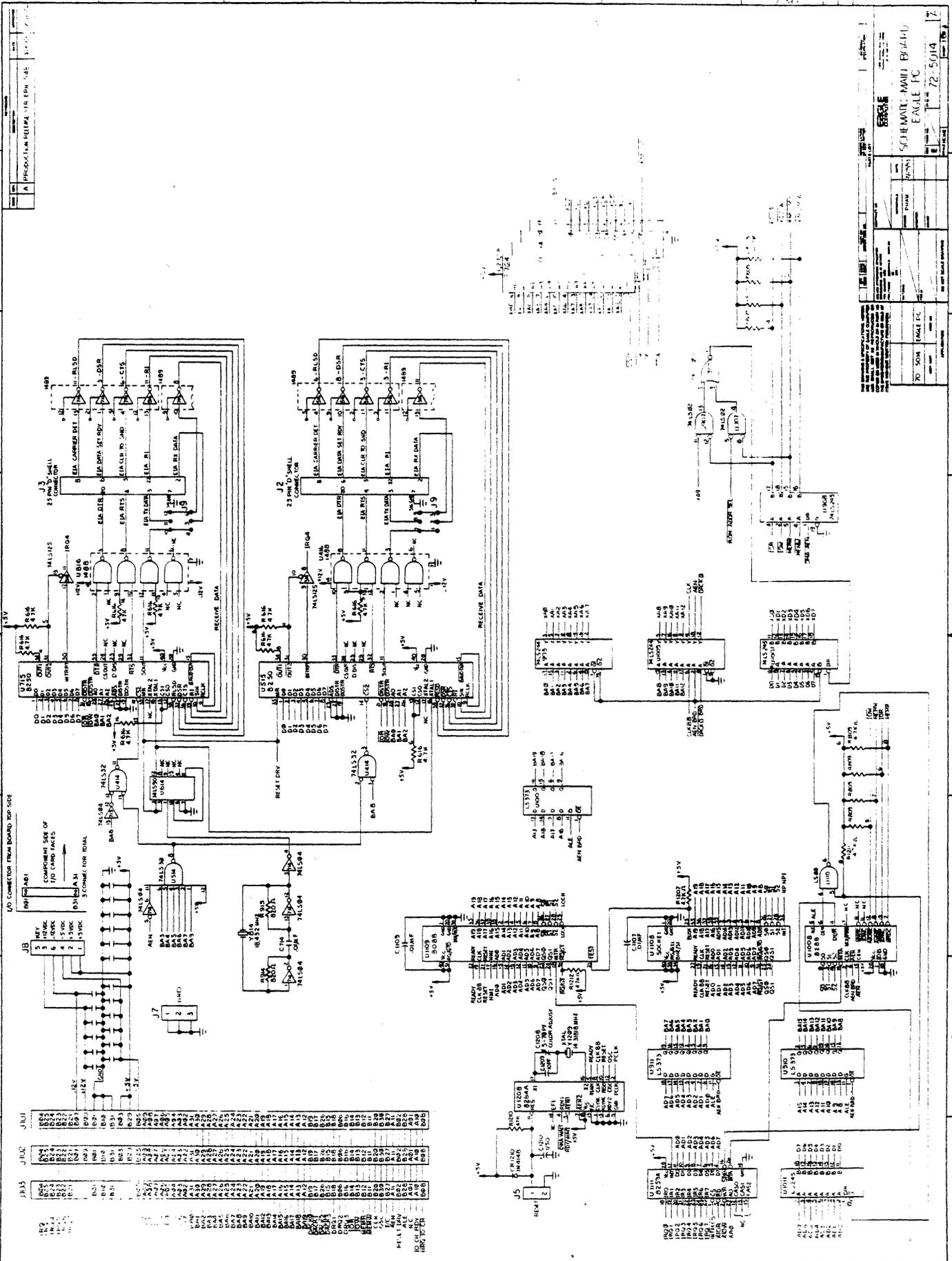
Eagle PC  
Main Assy. Drawing

FRONT

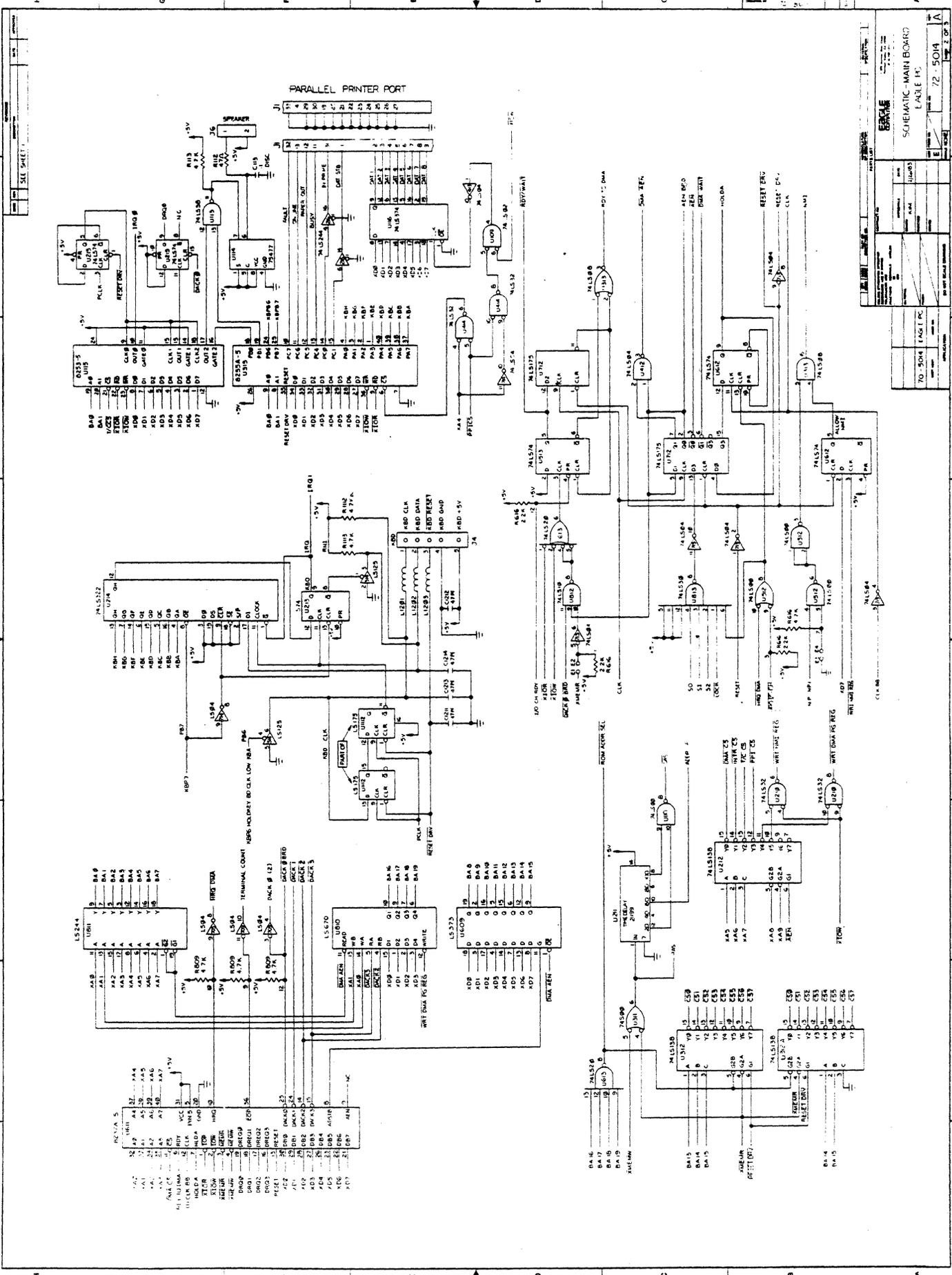


I/O Expansion Slot / Pins

*IDENTICAL TO IBM*



REF	SYM	VAL	DESC
100	RES	10K	RESISTOR
101	RES	1K	RESISTOR
102	RES	100K	RESISTOR
103	RES	100	RESISTOR
104	RES	10	RESISTOR
105	RES	1	RESISTOR
106	RES	1000	RESISTOR
107	RES	10000	RESISTOR
108	RES	100000	RESISTOR
109	RES	1000000	RESISTOR
110	RES	10000000	RESISTOR
111	RES	100000000	RESISTOR
112	RES	1000000000	RESISTOR
113	RES	10000000000	RESISTOR
114	RES	100000000000	RESISTOR
115	RES	1000000000000	RESISTOR
116	RES	10000000000000	RESISTOR
117	RES	100000000000000	RESISTOR
118	RES	1000000000000000	RESISTOR
119	RES	10000000000000000	RESISTOR
120	RES	100000000000000000	RESISTOR
121	RES	1000000000000000000	RESISTOR
122	RES	10000000000000000000	RESISTOR
123	RES	100000000000000000000	RESISTOR
124	RES	1000000000000000000000	RESISTOR
125	RES	10000000000000000000000	RESISTOR
126	RES	100000000000000000000000	RESISTOR
127	RES	1000000000000000000000000	RESISTOR
128	RES	10000000000000000000000000	RESISTOR
129	RES	100000000000000000000000000	RESISTOR
130	RES	1000000000000000000000000000	RESISTOR
131	RES	10000000000000000000000000000	RESISTOR
132	RES	100000000000000000000000000000	RESISTOR
133	RES	1000000000000000000000000000000	RESISTOR
134	RES	10000000000000000000000000000000	RESISTOR
135	RES	100000000000000000000000000000000	RESISTOR
136	RES	1000000000000000000000000000000000	RESISTOR
137	RES	10000000000000000000000000000000000	RESISTOR
138	RES	100000000000000000000000000000000000	RESISTOR
139	RES	1000000000000000000000000000000000000	RESISTOR
140	RES	10000000000000000000000000000000000000	RESISTOR
141	RES	100000000000000000000000000000000000000	RESISTOR
142	RES	1000000000000000000000000000000000000000	RESISTOR
143	RES	100	RESISTOR
144	RES	1000	RESISTOR
145	RES	100	RESISTOR
146	RES	1000	RESISTOR
147	RES	100	RESISTOR
148	RES	1000	RESISTOR
149	RES	100	RESISTOR
150	RES	1000	RESISTOR



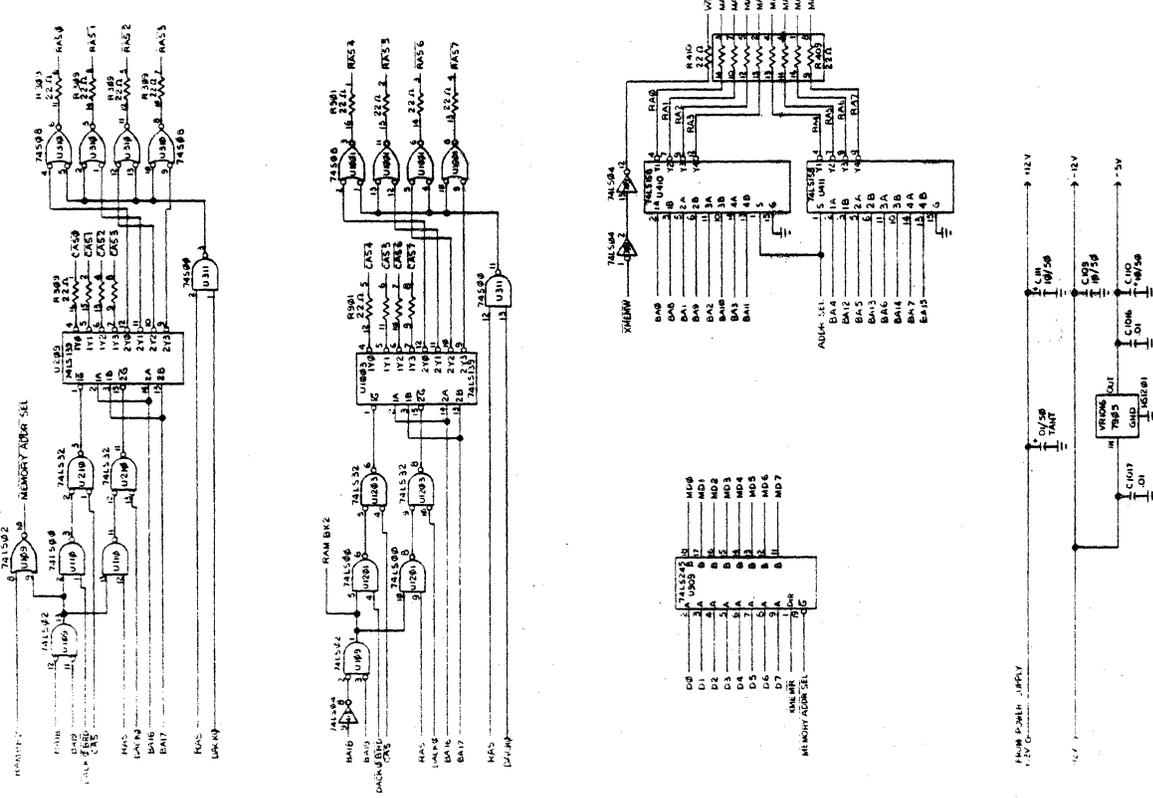
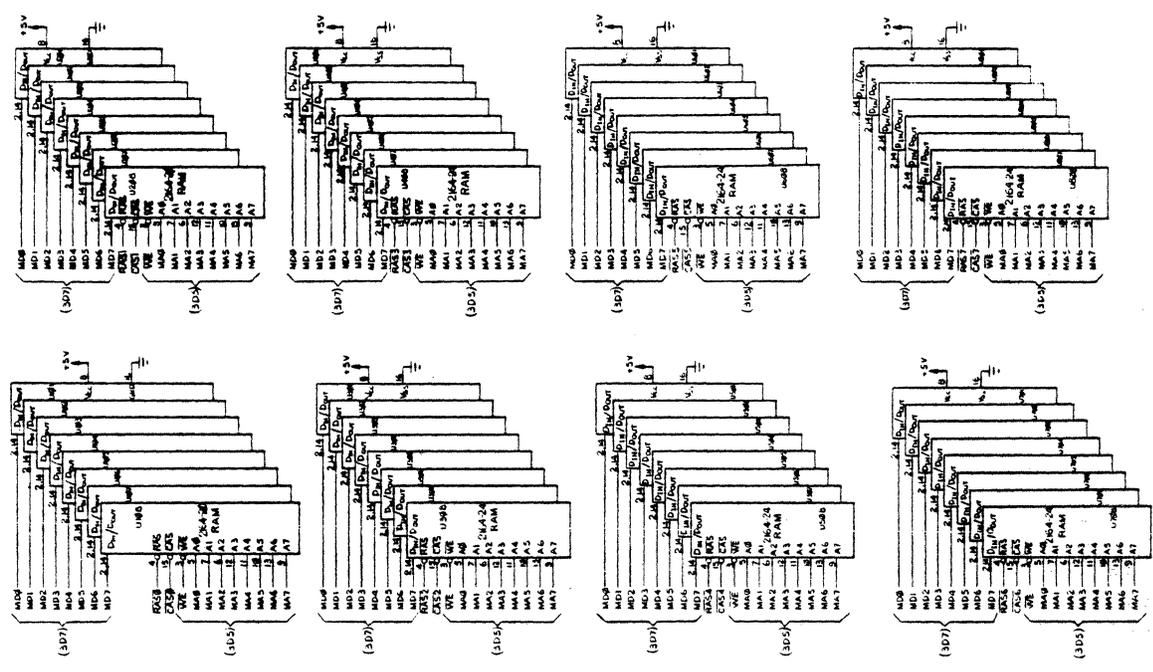
72-5014  
SCHEMATIC - MAIN BOARD  
PAGE 10

NO.	DESCRIPTION	QTY.	REF. DESIG.
1	74LS175	1	U1
2	74LS174	1	U2
3	74LS173	1	U3
4	74LS172	1	U4
5	74LS171	1	U5
6	74LS170	1	U6
7	74LS169	1	U7
8	74LS168	1	U8
9	74LS167	1	U9
10	74LS166	1	U10
11	74LS165	1	U11
12	74LS164	1	U12
13	74LS163	1	U13
14	74LS162	1	U14
15	74LS161	1	U15
16	74LS160	1	U16
17	74LS159	1	U17
18	74LS158	1	U18
19	74LS157	1	U19
20	74LS156	1	U20
21	74LS155	1	U21
22	74LS154	1	U22
23	74LS153	1	U23
24	74LS152	1	U24
25	74LS151	1	U25
26	74LS150	1	U26
27	74LS149	1	U27
28	74LS148	1	U28
29	74LS147	1	U29
30	74LS146	1	U30
31	74LS145	1	U31
32	74LS144	1	U32
33	74LS143	1	U33
34	74LS142	1	U34
35	74LS141	1	U35
36	74LS140	1	U36
37	74LS139	1	U37
38	74LS138	1	U38
39	74LS137	1	U39
40	74LS136	1	U40
41	74LS135	1	U41
42	74LS134	1	U42
43	74LS133	1	U43
44	74LS132	1	U44
45	74LS131	1	U45
46	74LS130	1	U46
47	74LS129	1	U47
48	74LS128	1	U48
49	74LS127	1	U49
50	74LS126	1	U50
51	74LS125	1	U51
52	74LS124	1	U52
53	74LS123	1	U53
54	74LS122	1	U54
55	74LS121	1	U55
56	74LS120	1	U56
57	74LS119	1	U57
58	74LS118	1	U58
59	74LS117	1	U59
60	74LS116	1	U60
61	74LS115	1	U61
62	74LS114	1	U62
63	74LS113	1	U63
64	74LS112	1	U64
65	74LS111	1	U65
66	74LS110	1	U66
67	74LS109	1	U67
68	74LS108	1	U68
69	74LS107	1	U69
70	74LS106	1	U70
71	74LS105	1	U71
72	74LS104	1	U72
73	74LS103	1	U73
74	74LS102	1	U74
75	74LS101	1	U75
76	74LS100	1	U76
77	74LS99	1	U77
78	74LS98	1	U78
79	74LS97	1	U79
80	74LS96	1	U80
81	74LS95	1	U81
82	74LS94	1	U82
83	74LS93	1	U83
84	74LS92	1	U84
85	74LS91	1	U85
86	74LS90	1	U86
87	74LS89	1	U87
88	74LS88	1	U88
89	74LS87	1	U89
90	74LS86	1	U90
91	74LS85	1	U91
92	74LS84	1	U92
93	74LS83	1	U93
94	74LS82	1	U94
95	74LS81	1	U95
96	74LS80	1	U96
97	74LS79	1	U97
98	74LS78	1	U98
99	74LS77	1	U99
100	74LS76	1	U100

NO.	DESCRIPTION	QTY.	REF. DESIG.
1	74LS175	1	U1
2	74LS174	1	U2
3	74LS173	1	U3
4	74LS172	1	U4
5	74LS171	1	U5
6	74LS170	1	U6
7	74LS169	1	U7
8	74LS168	1	U8
9	74LS167	1	U9
10	74LS166	1	U10
11	74LS165	1	U11
12	74LS164	1	U12
13	74LS163	1	U13
14	74LS162	1	U14
15	74LS161	1	U15
16	74LS160	1	U16
17	74LS159	1	U17
18	74LS158	1	U18
19	74LS157	1	U19
20	74LS156	1	U20
21	74LS155	1	U21
22	74LS154	1	U22
23	74LS153	1	U23
24	74LS152	1	U24
25	74LS151	1	U25
26	74LS150	1	U26
27	74LS149	1	U27
28	74LS148	1	U28
29	74LS147	1	U29
30	74LS146	1	U30
31	74LS145	1	U31
32	74LS144	1	U32
33	74LS143	1	U33
34	74LS142	1	U34
35	74LS141	1	U35
36	74LS140	1	U36
37	74LS139	1	U37
38	74LS138	1	U38
39	74LS137	1	U39
40	74LS136	1	U40
41	74LS135	1	U41
42	74LS134	1	U42
43	74LS133	1	U43
44	74LS132	1	U44
45	74LS131	1	U45
46	74LS130	1	U46
47	74LS129	1	U47
48	74LS128	1	U48
49	74LS127	1	U49
50	74LS126	1	U50
51	74LS125	1	U51
52	74LS124	1	U52
53	74LS123	1	U53
54	74LS122	1	U54
55	74LS121	1	U55
56	74LS120	1	U56
57	74LS119	1	U57
58	74LS118	1	U58
59	74LS117	1	U59
60	74LS116	1	U60
61	74LS115	1	U61
62	74LS114	1	U62
63	74LS113	1	U63
64	74LS112	1	U64
65	74LS111	1	U65
66	74LS110	1	U66
67	74LS109	1	U67
68	74LS108	1	U68
69	74LS107	1	U69
70	74LS106	1	U70
71	74LS105	1	U71
72	74LS104	1	U72
73	74LS103	1	U73
74	74LS102	1	U74
75	74LS101	1	U75
76	74LS100	1	U76
77	74LS99	1	U77
78	74LS98	1	U78
79	74LS97	1	U79
80	74LS96	1	U80
81	74LS95	1	U81
82	74LS94	1	U82
83	74LS93	1	U83
84	74LS92	1	U84
85	74LS91	1	U85
86	74LS90	1	U86
87	74LS89	1	U87
88	74LS88	1	U88
89	74LS87	1	U89
90	74LS86	1	U90
91	74LS85	1	U91
92	74LS84	1	U92
93	74LS83	1	U93
94	74LS82	1	U94
95	74LS81	1	U95
96	74LS80	1	U96
97	74LS79	1	U97
98	74LS78	1	U98
99	74LS77	1	U99
100	74LS76	1	U100

NO.	DESCRIPTION	QTY.	REF. DESIG.
1	74LS175	1	U1
2	74LS174	1	U2
3	74LS173	1	U3
4	74LS172	1	U4
5	74LS171	1	U5
6	74LS170	1	U6
7	74LS169	1	U7
8	74LS168	1	U8
9	74LS167	1	U9
10	74LS166	1	U10
11	74LS165	1	U11
12	74LS164	1	U12
13	74LS163	1	U13
14	74LS162	1	U14
15	74LS161	1	U15
16	74LS160	1	U16
17	74LS159	1	U17
18	74LS158	1	U18
19	74LS157	1	U19
20	74LS156	1	U20
21	74LS155	1	U21
22	74LS154	1	U22
23	74LS153	1	U23
24	74LS152	1	U24
25	74LS151	1	U25
26	74LS150	1	U26
27	74LS149	1	U27
28	74LS148	1	U28
29	74LS147	1	U29
30	74LS146	1	U30
31	74LS145	1	U31
32	74LS144	1	U32
33	74LS143	1	U33
34	74LS142	1	U34
35	74LS141	1	U35
36	74LS140	1	U36
37	74LS139	1	U37
38	74LS138	1	U38
39	74LS137	1	U39
40	74LS136	1	U40
41	74LS135	1	U41
42	74LS134	1	U42
43	74LS133	1	U43
44	74LS132	1	U44
45	74LS131	1	U45
46	74LS130	1	U46
47	74LS129	1	U47
48	74LS128	1	U48
49	74LS127	1	U49
50	74LS126	1	U50
51	74LS125	1	U51
52	74LS124	1	U52
53	74LS123	1	U53
54	74LS122	1	U54
55	74LS121	1	U55
56	74LS120	1	U56
57	74LS119	1	U57
58	74LS118	1	U58
59	74LS117	1	U59

SEE SHEET 1



SCHEMATIC MARKING

MARKING	DESCRIPTION
U100	74LS00
U101	74LS00
U102	74LS00
U103	74LS00
U104	74LS00
U105	74LS00
U106	74LS00
U107	74LS00
U108	74LS00
U109	74LS00
U110	74LS00
U111	74LS00
U112	74LS00
U113	74LS00
U114	74LS00
U115	74LS00
U116	74LS00
U117	74LS00
U118	74LS00
U119	74LS00
U120	74LS00
U121	74LS00
U122	74LS00
U123	74LS00
U124	74LS00
U125	74LS00
U126	74LS00
U127	74LS00
U128	74LS00
U129	74LS00
U130	74LS00
U131	74LS00
U132	74LS00
U133	74LS00
U134	74LS00
U135	74LS00
U136	74LS00
U137	74LS00
U138	74LS00
U139	74LS00
U140	74LS00
U141	74LS00
U142	74LS00
U143	74LS00
U144	74LS00
U145	74LS00
U146	74LS00
U147	74LS00
U148	74LS00
U149	74LS00
U150	74LS00
U151	74LS00
U152	74LS00
U153	74LS00
U154	74LS00
U155	74LS00
U156	74LS00
U157	74LS00
U158	74LS00
U159	74LS00
U160	74LS00
U161	74LS00
U162	74LS00
U163	74LS00
U164	74LS00
U165	74LS00
U166	74LS00
U167	74LS00
U168	74LS00
U169	74LS00
U170	74LS00
U171	74LS00
U172	74LS00
U173	74LS00
U174	74LS00
U175	74LS00
U176	74LS00
U177	74LS00
U178	74LS00
U179	74LS00
U180	74LS00
U181	74LS00
U182	74LS00
U183	74LS00
U184	74LS00
U185	74LS00
U186	74LS00
U187	74LS00
U188	74LS00
U189	74LS00
U190	74LS00
U191	74LS00
U192	74LS00
U193	74LS00
U194	74LS00
U195	74LS00
U196	74LS00
U197	74LS00
U198	74LS00
U199	74LS00
U200	74LS00
U201	74LS00
U202	74LS00
U203	74LS00
U204	74LS00
U205	74LS00
U206	74LS00
U207	74LS00
U208	74LS00
U209	74LS00
U210	74LS00
U211	74LS00
U212	74LS00
U213	74LS00
U214	74LS00
U215	74LS00
U216	74LS00
U217	74LS00
U218	74LS00
U219	74LS00
U220	74LS00
U221	74LS00
U222	74LS00
U223	74LS00
U224	74LS00
U225	74LS00
U226	74LS00
U227	74LS00
U228	74LS00
U229	74LS00
U230	74LS00
U231	74LS00
U232	74LS00
U233	74LS00
U234	74LS00
U235	74LS00
U236	74LS00
U237	74LS00
U238	74LS00
U239	74LS00
U240	74LS00
U241	74LS00
U242	74LS00
U243	74LS00
U244	74LS00
U245	74LS00
U246	74LS00
U247	74LS00
U248	74LS00
U249	74LS00
U250	74LS00
U251	74LS00
U252	74LS00
U253	74LS00
U254	74LS00
U255	74LS00
U256	74LS00
U257	74LS00
U258	74LS00
U259	74LS00
U260	74LS00
U261	74LS00
U262	74LS00
U263	74LS00
U264	74LS00
U265	74LS00
U266	74LS00
U267	74LS00
U268	74LS00
U269	74LS00
U270	74LS00
U271	74LS00
U272	74LS00
U273	74LS00
U274	74LS00
U275	74LS00
U276	74LS00
U277	74LS00
U278	74LS00
U279	74LS00
U280	74LS00
U281	74LS00
U282	74LS00
U283	74LS00
U284	74LS00
U285	74LS00
U286	74LS00
U287	74LS00
U288	74LS00
U289	74LS00
U290	74LS00
U291	74LS00
U292	74LS00
U293	74LS00
U294	74LS00
U295	74LS00
U296	74LS00
U297	74LS00
U298	74LS00
U299	74LS00
U300	74LS00
U301	74LS00
U302	74LS00
U303	74LS00
U304	74LS00
U305	74LS00
U306	74LS00
U307	74LS00
U308	74LS00
U309	74LS00
U310	74LS00
U311	74LS00
U312	74LS00
U313	74LS00
U314	74LS00
U315	74LS00
U316	74LS00
U317	74LS00
U318	74LS00
U319	74LS00
U320	74LS00
U321	74LS00
U322	74LS00
U323	74LS00
U324	74LS00
U325	74LS00
U326	74LS00
U327	74LS00
U328	74LS00
U329	74LS00
U330	74LS00
U331	74LS00
U332	74LS00
U333	74LS00
U334	74LS00
U335	74LS00
U336	74LS00
U337	74LS00
U338	74LS00
U339	74LS00
U340	74LS00
U341	74LS00
U342	74LS00
U343	74LS00
U344	74LS00
U345	74LS00
U346	74LS00
U347	74LS00
U348	74LS00
U349	74LS00
U350	74LS00
U351	74LS00
U352	74LS00
U353	74LS00
U354	74LS00
U355	74LS00
U356	74LS00
U357	74LS00
U358	74LS00
U359	74LS00
U360	74LS00
U361	74LS00
U362	74LS00
U363	74LS00
U364	74LS00
U365	74LS00
U366	74LS00
U367	74LS00
U368	74LS00
U369	74LS00
U370	74LS00
U371	74LS00
U372	74LS00
U373	74LS00
U374	74LS00
U375	74LS00
U376	74LS00
U377	74LS00
U378	74LS00
U379	74LS00
U380	74LS00
U381	74LS00
U382	74LS00
U383	74LS00
U384	74LS00
U385	74LS00
U386	74LS00
U387	74LS00
U388	74LS00
U389	74LS00
U390	74LS00
U391	74LS00
U392	74LS00
U393	74LS00
U394	74LS00
U395	74LS00
U396	74LS00
U397	74LS00
U398	74LS00
U399	74LS00
U400	74LS00

File 10

One 5 1/4" hard disk drive  
Stores 12.75 M bytes  
(10 M bytes formatted)  
3600 rpm rotational speed  
Two platters, four heads,  
1224 tracks  
85 milliseconds average access time

CMI - 5512

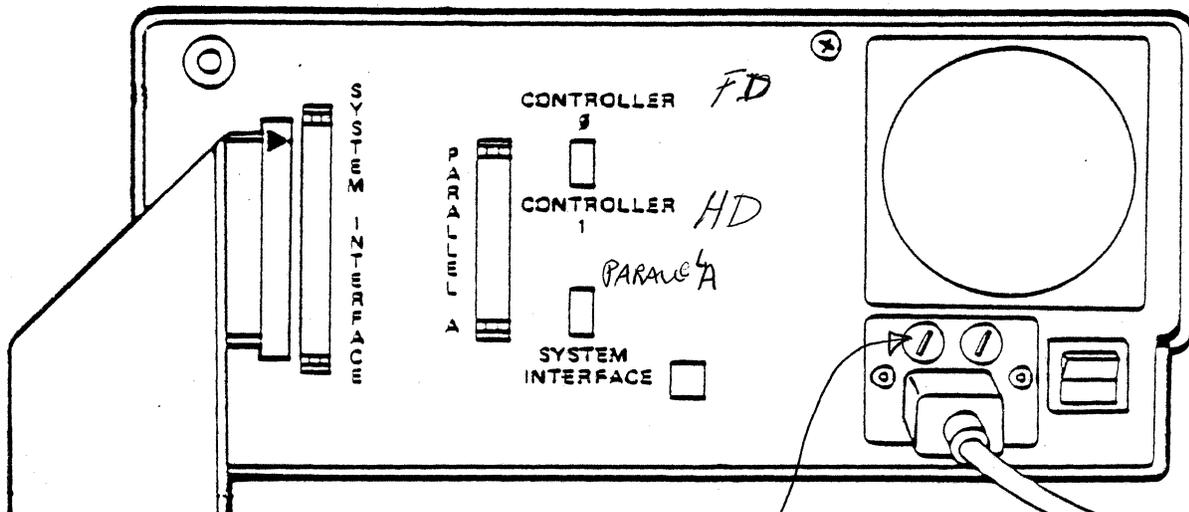
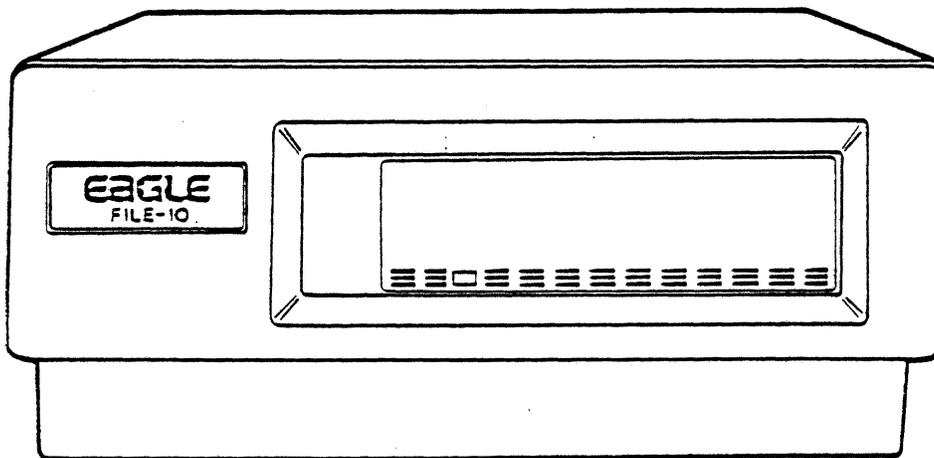
FORMAT IS  
DIFFERENT

ALCAGE - MINISCRIBE 2012

File 40

One 5 1/4" hard disk drive  
Stores 40 M bytes  
(32 M bytes formatted)  
3600 rpm rotational speed  
Three platters, six heads,  
3840 tracks  
85 milliseconds average access time

CMI - 6640



FILE 10 & FILE 40

2A Slo-Bro

EAGLE COMPUTER MODEL	DISK DRIVE CONFIGURATIONS			
	Left Drive	Hard Disk Drive	Right Drive	File 10
Eagle 1600 Floppy Disk OR PC	C	n/a	D	A
Eagle 1600 10Mbyte Hard Disk	n/a	A	C	B
Eagle 1600 40Mbyte Hard Disk	n/a	A	C	B

MS-DOS Designations

EAGLE COMPUTER MODEL	DISK DRIVE CONFIGURATIONS			
	Left Drive	Hard Disk Drive	Right Drive	File 40
Eagle 1600 Floppy Disk OR PC	C	n/a	D	A
Eagle 1600 10Mbyte Hard Disk	n/a	A	C	B
Eagle 1600 40Mbyte Hard Disk	n/a	A	C	B

MS-DOS Designations

EAGLE COMPUTER MODEL	DISK DRIVE CONFIGURATIONS				
	Upper or Left Drive	Hard Disk Drive	Lower or Right Drive	File 10	2nd File 10
Eagle II	I	n/a	J	A,B	C,D
Eagle III	E=,I,T	n/a	F=,J,T	A,B	C,D
Eagle IV	E=,I,T	A,B	n/a	C,D	n/a
Eagle 1600 Floppy Disk	E	n/a	F	A,B	C,D
Eagle 1600 10Mbyte Hard Disk	n/a	A,B	E	C,D	n/a
Eagle 1600 40Mbyte Hard Disk	n/a	A,B,C,D	E	n/a	n/a
Eagle PC Floppy Disk	E	n/a	F	A,B	C,D

CP/M-80 & CP/M-86 Designations

EAGLE COMPUTER MODEL	DISK DRIVE CONFIGURATIONS			
	Upper or Left Drive	Hard Disk Drive	Lower or Right Drive	File 40
Eagle II	I	n/a	J	A,B,C,D
Eagle III	E=,I,T	n/a	F=,J,T	A,B,C,D
Eagle IV	E=,I,T	A,B	n/a	n/a
Eagle 1600 Floppy Disk	E	n/a	F	A,B,C,D
Eagle 1600 10Mbyte Hard Disk	n/a	A,B	E	n/a
Eagle 1600 40Mbyte Hard Disk	n/a	A,B,C,D	E	n/a
Eagle PC Floppy Disk	E	n/a	F	A,B,C,D

CP/M-80 & CP/M-86 Designations

LEGEND:
= = when using double-sided diskettes
T = when using single-sided diskettes
n/a = not applicable

## QUESTIONS AND ANSWERS

---

**1. What software comes on the File 10/40?**

Standard system files, including TRANS.COM, which is a file users must use to initially move floppy disk information to the hard disk.

**2. Why is Drive A eight megabytes and Drive B two megabytes? Can this be changed?**

CP/M cannot address more than eight megabytes of storage. The storage structure was selected as the most common drive designator orientation. It cannot be changed.

**3. What are the drive designations for an additional File 10/40 hooked to another hard disk?**

For an additional File 10 the drive designators are C and D. Refer to Tables 1 and 2 in the text titled "ACCESSING THE FILE 10/40". The File 40 will not hookup to a File 10.

**4. What is a "Drive A Error Detected" message?**

This error message indicates a possible hardware problem with the File 10/40. Contact your authorized Eagle dealer.

## PROBLEMS AND SOLUTIONS

---

1. **When trying to back up or copy diskettes, a "Drive E Error Detected" message appears on the screen.**

The system is assuming that the floppy disk or drive is double-sided, when in fact either or both are single-sided. To correct the situation exit to CP/M, and enter:

**A>SETSIDE**

Select single-sided (Eagle II) diskettes. This will permanently orient your disk drives to single-sided.

2. **Why can't I PIP (copy) files to the hard disk?**

You can, but you run the risk of writing over crucial files necessary for normal operation. The most critical is called "HELLO.COM". All Eagle disks (except the CP/M disk) contain this hidden file, and it is this file that gives you the main menu when you re-boot (turn on) the system.

If you copy over the hard disk HELLO.COM with a floppy version, you lose access to options on the hard disk and to the operating system. To repair this problem with no harm to your data files a special disk named "Menu Restore/System Regeneration" is needed. Menu Restore/System Regeneration is contained in the 8 bit Service Kit available at Eagle distributors. Contact your dealer for this special disk.

3. **When I downloaded my backup diskettes to the hard disk using the Restore routine, only the first part of a split file, contained on a diskette, transferred to hard disk and the rest of the split file transferred from the next diskette was lost.**

When you originally backed up your hard disk to diskettes, the computer copied files until it ran out of space on a diskette. If it had only copied part of a file before it ran out of space, it continues to copy the rest of the file on the next diskette.

All of that file's information is complete on the backup diskettes, however; when you restore the information to the hard disk, the second half of the split file is overlooked, and not copied. The files are copied only from the beginning of the next file on. This problem occurs with systems which have not been updated, and can be easily corrected by obtaining an Eagle system update through your dealer.

6640

## CM 5640 Specifications

### Performance Specifications:

#### Capacity

<i>Unformatted</i>	
Per Drive	40 Mbytes
Per Surface	6.67 Mbytes
Per Track	10.4 Kbytes
<i>Formatted</i>	
Per Drive	31.5 Mbytes
Per Surface	5.24 Mbytes
Per Track	8.2 Kbytes
Per Sector	256 bytes
Sectors/Track	32
Transfer Rate	5.00 Mbits/sec
Average Seek Time	40 msec
Average Latency	8.3 msec

#### Functional Specifications:

Rotational Speed	3,600 rpm
Recording Density	9,650 bpi
Flux Density	9,650 fci
Track Density	690 tpi
Cylinders	640
Tracks	3840
R/W Heads	6
Disks	3

#### Physical Specifications:

<i>Environmental Limits</i>	
Ambient Temperature	= 50°F to 115°F (10°C to 46°C)
Relative Humidity	= 8% to 80%
<i>DC Power Requirements</i>	
+12 VDC	±10% 2.0A typical, 3.5A max
+5 VDC	±5% 0.9A typical, 1.0A max

#### Mechanical Dimensions:

Height	= 3.25 in. (82.6 mm)
Width	= 5.75 in. (146.1 mm)
Depth	= 8.00 in. (203 mm)
Weight	= 5 lbs. (2.3 Kg)
Heat Dissipation	= 100BTU/hr. typical (28.5 watts)

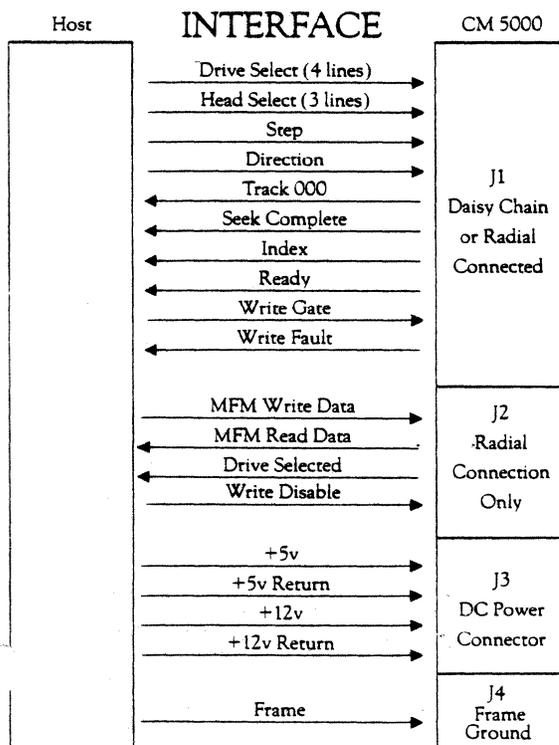
#### Reliability Specifications:

MTBF: 8000 POH	typical usage
PM:	Not required
MTTR:	30 minutes
Component Life:	5 years
<i>Error Rates:</i>	
Soft Read Errors:	1 per 10 <sup>10</sup> bits read
Hard Read Errors:	1 per 10 <sup>12</sup> bits read
Seek Errors:	1 per 10 <sup>6</sup> seeks

**CM 5640 disk drive, product information.** The Computer Memories series of Winchester technology disk drives offer the highest storage capacity currently available in a minifloppy size package. The CM 5640, at 40 Mbytes, offers the lowest cost/Mbyte in its capacity range. By means of a combination of Winchester technology and proven design techniques, the OEM is assured of the ultimate in quality and reliability.

In order to ease system integration, the CM 5640 has the same physical dimensions and mounting hole locations as a standard 5¼" floppy disk drive. DC voltage requirements are also the same as a mini-floppy drive thus enabling the use of a single power supply for both types of drives.

The high capacities of the CM 5640 are achieved by the utilization of a closed loop servo positioning system, on-board microprocessor, and manganese-zinc heads — unique in such a small device. The combination of the swing-arm actuator, associated electronics, and head allow the CM 5640 to achieve a track density of 690 TPI and bit density of 9650 BPI.



**Computer Memories, Inc.**

9216 Eton Avenue, Chatsworth, California 91311  
Telephone (213) 709-6445 TWX: 910 494-4834