```
C P - 2 0 2 4 A T    CONNER
NO MORE PRODUCED                                          Native|  Translation
                                                          ------+-----+-----+----
-
Form                  2.5"/SUPERSLIMLINE    Cylinders     654|  615|     |
Capacity form/unform    21/      MB         Heads           2|    4|     |
Seek time   / track   23.0/ 5.0 ms          Sector/track   33|   17|     |
Controller            IDE / AT              Precompensation
Cache/Buffer              8 KB LOOK-AHEAD   Landing Zone
Data transfer rate     1.250 MB/S int       Bytes/Sector      512
                       3.750 MB/S ext
Recording method      RLL 2/7                          operating  | non-
operating
                                                     -------------+-------------
-
Supply voltage      5 V          Temperature *C          5 55     |    -40 60
Power: sleep           0.3 W     Humidity     %          8 80     |      8 80
       standby         0.5 W     Altitude    km     -0.061  3.050|
12.200
       idle            1.5 W     Shock        g         10       |    100
       seek            3.0 W     Rotation   RPM       3433
       read/write      3.0 W     Acoustic   dBA         34
       spin-up             W     ECC        Bit    64
                                 MTBF         h      100000
                                 Warranty Month
Lift/Lock/Park      YES           Certificates      CSA,IEC435,UL478,VDE
```

Layout

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```
  +-------------------------------------------------------+
  |                                                         |X44
  |                                                       I |XX Power
  | +-------+                                              N |XX +5V 41/42
  | +-------+                                              T |XX GND 43
  |                                                        E |XX
  |                                                        R |XX
  |                                                        F |X* Position
  |                                                        A |XX 20-Key
  |                                                        C |XX
  |                                                        E |XX
```

Jumpers

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Jumper setting

Interface Connector/Signal Levels

All signal levels are TTL compatible. A logic "1" is > 2.0 Volts. A logic "0" is from 0.00 Volts to 0.70 Volts. The drive capabolity of each of the inbound signals is described below.

Pin	Signal	Pin	Signal
01	-Reset	02	GND
03	+Data 7	04	+Data 8 (AT ONLY)
05	+Data 6	06	+Data 9 (AT ONLY)
07	+Data 5	08	+Data 10 (AT ONLY)
09	+Data 4	10	+Data 11 (AT ONLY)
11	+Data 3	12	+Data 12 (AT ONLY)
13	+Data 2	14	+Data 13 (AT ONLY)
15	+Data 1	16	+Data 14 (AT ONLY)
17	+Data 0	18	+Data 15 (AT ONLY)

19	GND	20	Key	
21	Reserved	22	GND	
23	-IOW	24	GND	
25	-IOR	26	GND	
27	-DACK (XT ONLY)	28	Reserved	
29	+DRQ (XT ONLY)	30	GND	
31	+IRQ	32	-IO16	(AT ONLY)
33	+ADDR 1	34	-PDIAG	(AT ONLY)
35	+ADDR 0	36	+ADDR 2	(AT ONLY)
37	-CS0	38	-CS1	(AT ONLY)
39	-Active	40	GND	
41	5 Volts (Logic)	42	5 Volts (Motor)	
43	GND	44	-XT/AT	

MS/CD Master/Slave

E1 E2 For Master (C Drive) when E1 is CLOSED, place Jumper as shown.

E1 E2 For Slave (D Drive) when E1 is open. Store jumper as shown.

The CP2024 drive is designed to operate either as a master drive (C Drive) or a slave (D Drive) depending on the state of Jumper E1. When E1 is closed, the drive will assume the role of master, when open it will act as the slave. In single drive configurations E1 must be closed.

Install

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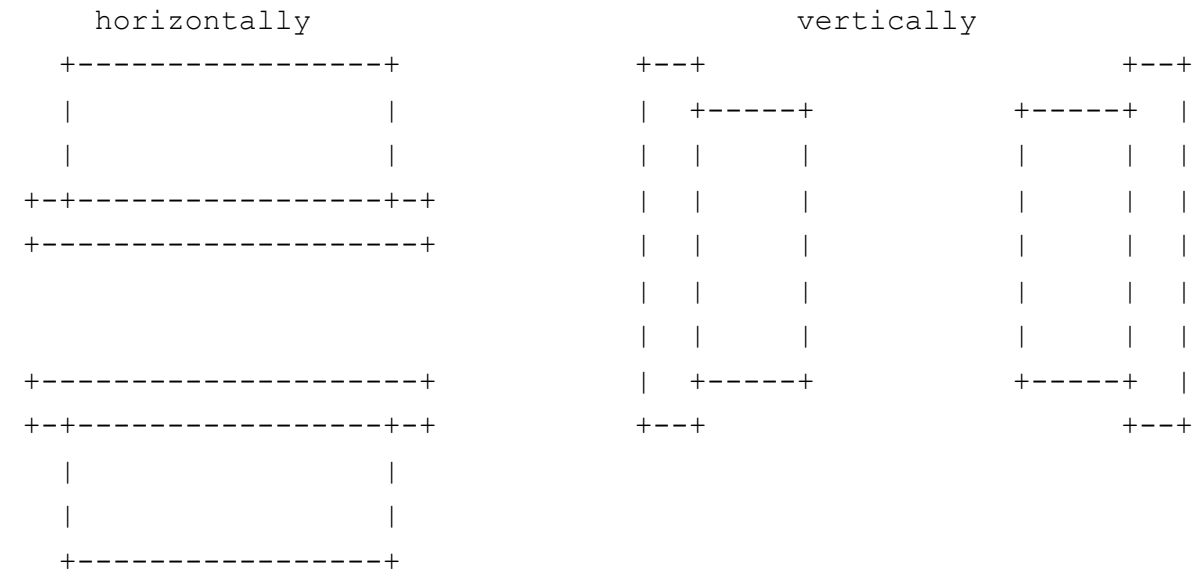
Notes on installation
==========

Installation direction



Installation direction

The drive may be mounted in any attitude!

Recommended Mounting Configuration

The CP2024 is designed to be used in applications where the unit may experience shock and vibrations at greater levels than larger and heavier disk drives.

The design features which allow greater shock tolerance are the use of rugged heads and media, a dedicated landing zone, closed loop servo positioning and specially designed motor and actuator assemblies.

Eigth (8) mounting points are provided to the customer. The drive is mounted from the bottom using 4-40 screws 0.19 inch max. insertion. Side mounting is also available using 2.5mm x 0.5 x 0.19 screws. The system integrator should allow ventilation to the drive to ensure reliable drive operation over the operating temperature range.

For additional vibration isolation, an external suspension system may be used.

Interface Connector

The CP2024 has a 44 pin right angle interface/power connector mounted on the PCB. The recommended mating connector part number from Elco Corporation for the Flat Ribbon type is 20-8394-2050-02101S; and for Solder Tail type it is Vertical PCB 20-8390-2050-00101. The maximum cable lenght is two feet.

Diagnostic Routines

The microprocessor performs diagnostics upon application of power. If an error is detected, the CP2024 will not come ready.

Magnetic Field

The disk drive will meet its specified performance while operating in the presense of an externally produced magnetic field under the following conditions:

Frequency	Field Intensity

0 to 1.5 MHz	6 gauss maximum
1.5 MHZ	1 gauss maximum

Acoustic Sound Emission

Power - TBD

Pressure - 34 dBa at 1 meter

Installation of the Drive and Adapter Card

---

1. Remove power to the computer

2. If another hard disk controller is installed, it is necessary to prevent it from responding to the addresses 1F0-7H and 3F6-7H. It is also necessary to ensure that the controller is electrically disconnected or tri-stated from IRQ14 of the mother-board bus. This may be done either by removing the board, by electrically disconnecting the signal from the interface, or by setting the jumpers of the board to disable the hard disk controller.

3. Insert the board into any available card slot.

4. Configure the Host adapter for the correct configuration of your computer BIOS.

   Adapter Card Jumpers E1 and E3 always not installed
                         E2 and E4 always installed

5. Connect power to the CP2024.

6. Run the DOS FDISK program to establish DOS partitions.

Note: DOS 3.3 and below have limitations of 32 megabytes unless software utility is used to overcome this.

7. Run the DOS format programm by typing "Format C:/S". The volume may be named with the addition of the "/V". The format will be completed and the system will ask for a volume name.

8. Files can then be copied to the C drive from floppy.

9. When the system is rebooted, the system should boot from the hard drive (Drive C) if the floppy is removed.

Features

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Key Features

The CP2024 is a high performance 2.5 inch low-profile (0.69") 21.4 megabyte (formatted) disk drive with average seek time not do exceed 23ms which is designed to operate on IBM PC/XT & PC/AT or equivalent computers. The drives feature a low 5V power requirement and high shock resistance, enabling battery operation in portable environments.

- 2.5" Form factor

- Single 5 Volt supply

- Low power requirements

- 6.0 oz

- High performance rotary voice coil actuator with embedded servo system.

- Single connector for power & interface

- Run length limited code (1/7 or 2/7)

- High shock resistance

- Internal air filtration system

- Sealed HDA

  - Automatic actuator latch over data free landing zone during standby mode or power-down

  - Microprocessor-controlled diagnostics routines that are automatically executed at start-up.

- Automatic error correction and retries

- Block size 512 bytes

- PC XT/AT Interface (interface selectable)

- 1:1 sector interleave

- Look Ahead Read Capability

- 8K Buffer

- Master/Slave option

AT Mode

The Host addresses the drive using programmed I/O. This method requires that the desired register address be placed on the three address lines A2-A0, a proper drive chip select is asserted and read or write strobe (-IOR/-IOW) is given to the chip.

The Host generates two independent chip selects on the interface. The high order chip select, -CS1, is used to access register 3F6 or 3F7. The low order chip select, -CS0, is used to address registers 1F0 - 1F7.

The Host data bus 15-8 is only enabled when I016 enable is active and the Host is addressing the data register for transferring data and not the ECC bytes which are only transferred if the operation is read or write long.

XT Mode

The Host addresses the drive using programmed I/O. This method requires that the desired register address be placed on the address lines A1 - A0, a proper drive select is asserted and a read or write strobe (-IOR/-IOW) is given to the drive. The drive is normally decoded at base address 320H.

Seek Times

Physical track to track	max.	8 ms
AT INTERFACE Average msec.		23
Average msec.	max.	40

```
+-----------------------------------+--------+
|Latency                msec. avg. |   8.7  |
+-----------------------------------+--------+
The timing is measured through the interface with the drive
operating at nominal DC input voltages. The timing also assumes
that:
      - BIOS and PC system hardware dependency have been
        subtracted from timing measurements.

      - The drive is operated using its translation parameters.

The average seek time is determined by averaging the seek time
for a minimum of 1000 seeks of random length over the surface
of the disk.
```

Functional Description

The CP2024 contains all necessary mechanical and electronic parts to interpret control signals, position the recording heads over the desired track, read and write data, and provide a contaminant free environment for the heads and disks.

Read/Write and Control Electronics

One integrated circuit is mounted within the sealed enclosure in close proximity to the read/write heads. Its function is to provide one of two head selection, read preamplification, and write drive circuitry.

The single microprocessor controlled circuit card provides the remaining electronic functions which include:

- Read/Write Circuitry
- Rotary Actuator Control
- Interface Control
- Spin Speed Control
- Dynamic Braking

- Power Management

At power down or the start of STANDBY MODE the heads are automatically retracted to the inner diameter of the disk and are latched and parked on a landing zone that is inside the data tracks.

Drive Mechanism

A brushless DC direct drive motor rotates the spindle at 3433 RPM. The motor/spindle assembly is balanced to provide minimal mechanical runout to the disks and to reduce vibration of the HDA. A dynamic brake is used to provide a fast stop to the spindle motor when power is removed, or upon initiation of STANDBY MODE.

Air Filtration System

Within the sealed enclosure, a 0.3 micron filter which provides a clean environment for the heads and disks.

Head Positioning Mechanism

The two read/write heads are supported by a mechanism coupled to the voice coil actuator.

Read/Write Heads and Disks

Data is recorded on 65mm diameter disk through two miniature thin film heads.

Error Correction

The CP2024 performs internal error correction. The error correction polynominal is capable of correcting one error burst with a maximum of 8 bits per 512 byte block.

Reliability and Maintenance

MTBF	100,000 hours POH (population is min. of 100 units)
MTTR	10 minutes typical
Preventive Maintenance	None
Component Design Life	5 years

Safety Standard

The CP2024 disk drive is designed to comply with relevant product safety standards such as:

- UL 478, 5th edition, Standard for Safety of Information Processing and Business Equipment, and UL 1950, Standard for Safety of Information Technology Equipment

- CSA 22.2#154, Data Processing Equipment and CSA 22.2#220, Information Processing and Business Equipment

- IEC 435 Saftey Requirements for Data Processing Equipment, IEC 380, Safety of Electrically Energized Office Machines, and IEC 950, Safety of Information Technology Equipment Including Electrical Business Equipment

- VDE 0805 Equivalent to IEC 435, VDE 0805 TIEL 100, Equivalent to IEC 950, and VDE 0806, Equivalent to IEC 380