

X1215/16 (ABOVE SERIAL NUMBER 2000)

Cartridge Disk Drive Unit
Vol. VI: Mechanics



**Data
Systems**

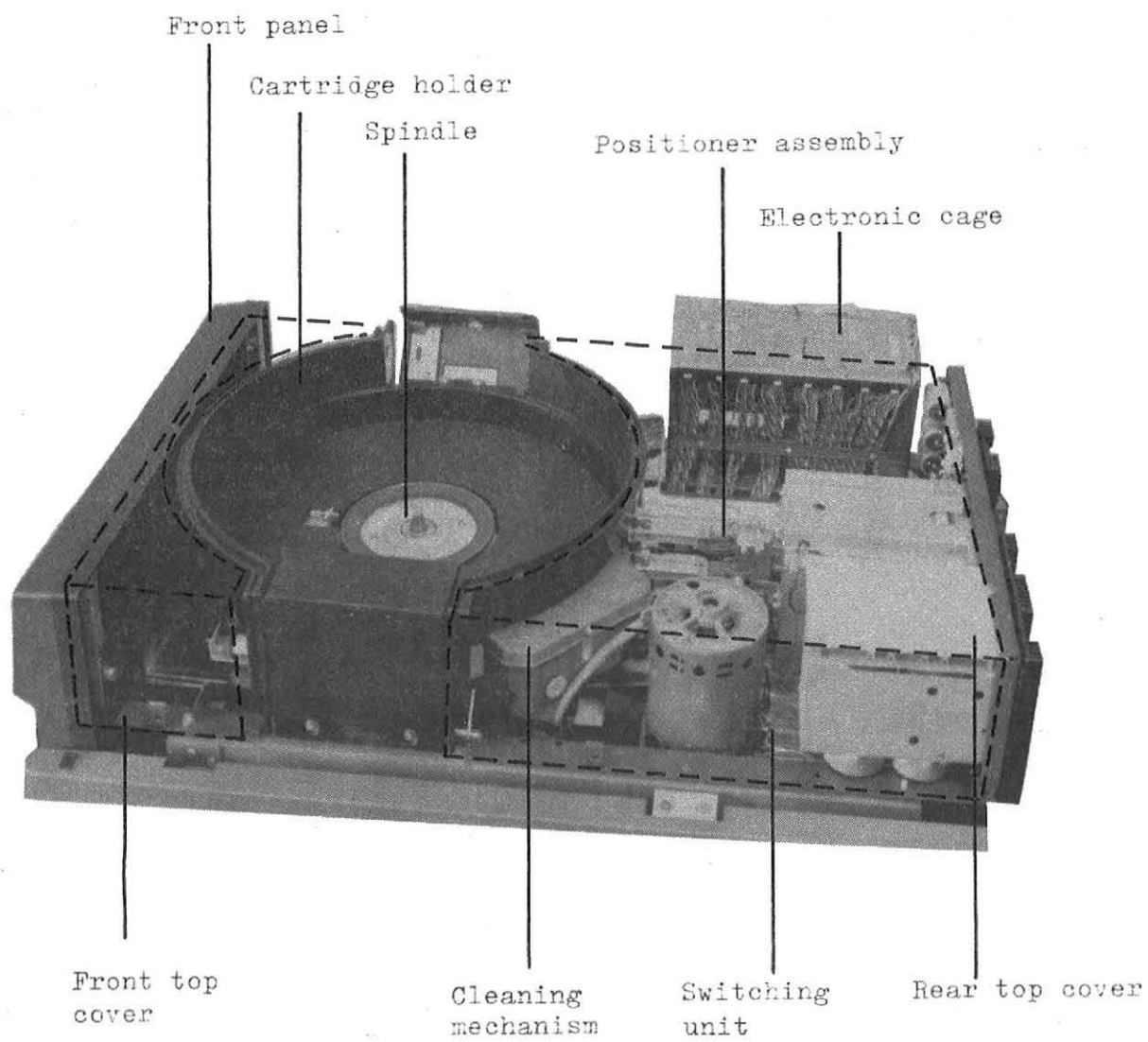


Figure 6-1

The basic structure of the CDD (Cartridge Disc Drive) is a T-shaped aluminium base plate which is spring-mounted on a metal frame. On the base plate are mounted the spindle, the positioner mechanism, the index/sector transducers, the spindle drive motor and the cartridge holder. The base plate precisely aligns the components, providing mechanical stability for compatible recording. In the metal frame are mounted the power, supply the switching unit, the cleaning mechanism, the electronic cage and the base plate.

The Disc Drive Unit is completed with the top covers, bottom cover and front panel.

1.2 DUST COVERS

The enclosure of the CDD is divided into five parts. The reasons are to prevent entry of dust into the machine and to make a number of compartments to effectively control the clean air flow in the machine.

The front panel covers the front side. This panel is removable (figure 6-1) so as to allow access to the air filters.

The rear of the disc drive is covered by a vertical casting on which are mounted the heat sinks of the power supply and power amplifier. The bottom is covered by the bottom cover. The plate can be removed by unscrewing the four screws.

The top is covered by two covers; the smaller of the two is called the front top cover, the other is called the rear top cover. The front top cover may be removed by unscrewing two bolts, and the rear top cover by unscrewing four bolts. All six bolts are located in the sides of the CDD.

1.3 SWITCHING UNIT

The Switching Unit, which is situated in the rear of the Disc Drive Unit contains:

- a) Three relays.
- b) A time elapsed meter.
- c) Fuse and fuse holder.
- d) Mains filter.
- e) One starting capacitors for the drive motor of the spindle.
- f) Suppression filter for the drive motor of the spindle.
- g) Power on/off switch.
- h) Rectifier for the brake voltage.

The first relay serves to energise the cleaning motor and switches on an extra starting capacitor. The second relay serves to energise the spindle motor, at the same time de-energising the third relay which connects the electrical brake to the spindle motor. When the third relay is energised, and the spindle motor is thus braking electrically, the second relay is de-energised.

1.4 COOLING AND CLEANING UNIT

The fresh air cooling system comprises an impellor fan which is fitted to the spindle and two filters. Air is drawn into the unit through an inlet in the underside of the front panel. The air passes through a coarse filter, and then through a fine filter. The air is then drawn into the cartridge and the fixed disc area. After cooling the disc area, the positioner voice coil, the electronics and power supply, the air finally exists the unit through openings in the dust cover.

However, for complete safety, each time a cartridge is loaded and the drive is started, a cleaning cycle is undertaken. This is done by a cleaning mechanism which consists of four brushes driven by a cleaning motor. $2\frac{1}{2}$ seconds after the disc drive unit is started, the cleaning motor starts swinging the brushes into the cartridge and over the fixed disc and then back to the rest position, slowly sweeping them across the rotating recording surfaces. Any undesirable particles present are dislodged from the surfaces and blown away by the clean air blow.

1.5 CARTRIDGE HOLDER

The cartridge holder is fixed to the base plate by three bolts, and is accessible when the drive is pulled out of the rack.

Four notches in the circumference of the cartridge correspond with four cams on the inside of the cartridge holder.

Only one position of the cartridge, with respect to the disc drive is possible.

Two clamps, fitted on the cartridge holder, push the cartridge to the cartridge when they are closed.

SPINDLE MECHANISM

The spindle assembly provides the mechanical coupling between the recording discs and the drive motor. The fixed disc is directly mounted on the spindle hub. The cartridge disc engages the spindle only when the cartridge is fully seated in the drive unit. The coupling is accomplished by means of a spindle mounted magnetic ring and an armature plate fastened to the cartridge disc. A conical top on the spindle centre engages an identically machined opening in the centre of the cartridge disc and thereby aligns the disc accurately on the spindle hub. The spindle hub also carries the fixed disc sector ring. The spindle is coupled to the spindle motor via a belt. The spindle incorporates a metal disc with blades, which, when the spindle is rotating, sucks external air via two filters. This air is used for cooling purposes. The spindle is earthed to eliminate static electricity acquired by the movement of the spindle. The spindle assembly is fixed to the T-shaped frame with three Allen screws.

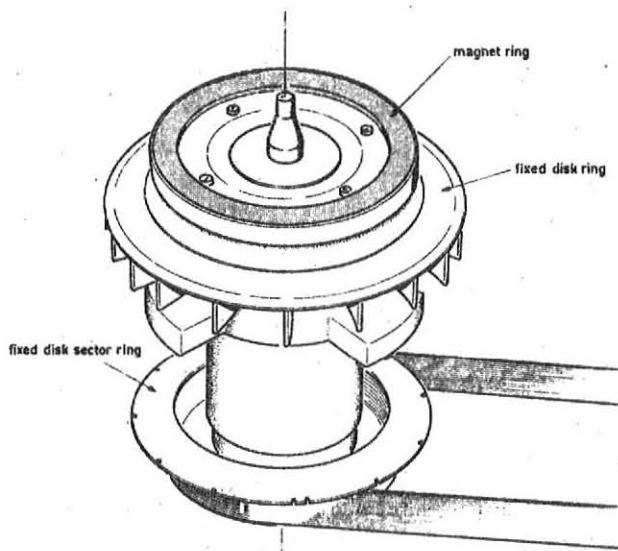


Fig. 6-2 SPINDLE

POSITIONER MECHANISM

The positioner loads and unloads the read/write heads and drives the heads to the correct position on the discs.

The four heads are mounted on a carriage that runs on guides, in and out of an assembly secured to the base plate. A voice coil attached to the carriage travels through an air gap in a large permanent-magnet, pole piece housed in the fixed part of the mechanism and this forms the means where-by the carriage is propelled in either direction:

By sending a current through the voice coil in one direction, the carriage is propelled in one direction. When reversing the current the carriage propelling force is reversed.

To monitor the speed of the positioner, a speed transducer is mounted in the magnet housing. The speed transducer consists of a coil in which a magnetic rod moves.

The position detector, used to count the number of tracks which are passed during a seek, is called the meander and consists of two parts, namely:

- a) The primary meander mounted on the moving part of the positioner.
- b) The secondary meander mounted on the base plate.

The magnet housing is also mounted on the base plate.

ELECTRONIC CAGE

The electronic cage contains the logics, the servo-electronics, the read/write electronics (partly) and interface circuits. Connections between the several cards in the electronic cage are made on a back panel by means of printed tracks and wire-wrap connections. On one side of the back panel, the electronics are connected, via plugs, to the various parts of the disc drive unit and to the control unit. These plugs are removable. The electronic cage can be swung out for service purposes. On the back panel, card names and numbers as well as pin numbers, are indicated as much as possible.

The CDD is designed to fit into a 19 inches wide and 30 inches deep rack. Necessary items are telescopic slides and a cable guide. The drive may also be installed in a stand-alone cabinet. In this case, it is advisable that a removable cover is introduced above the cartridge holder to prevent entry of dust into the recording area. See also Vol. X Installation.

The drive may be installed in a standard rack.