



The Basic DISK II Pages the DuoDisk

The DuoDisk is added to this chapter related to the fact that this unit was introduced during the period of the Apple II+ to the market and the DuoDisk was intended to be the regular sold set of 2 Disk II systems with the computer. In that days the storage capacity still was limited by the fact that 1 Floppydisk only contained 140 Kbyte of Data and 1 Disk contained the operation system (at the right side as Drive 1) and maybe a program and the second disk (as Drive 2 at the left side) was intended to be used for storage of the data (bearing in mind that a long period of time only diskdrives offered single-side mechanic).

Other factors in that days have been limited by the fact that important components for the mechanic in that days have been limited too: The head positioning mechanic was too expensive and at the time of introduction the stepping motors got miniaturized and first stepping motors offered construction of so called "halfheight" drives saving space and reducing the track problems still caused by the mechanical positioning of the read/write head and its mechanical wearout.

This page is focused on the service and splits in two sections: first section displays details about mounting / dismounting the drive and cables as well as locating the electronic components and second sections displays the circuitplan and electronic details comparing the duoDisk with the DISK II. The similarities demands to also read the previous pages of the DISK II because from view of the service still a lot of procedures still remain similar to the former drives.

The case of the DuoDisk consists with two parts: the shell for bottom and front - and the shell for top and upper rearpart. It contains two single drives inside, each in a kind of Faraday-cage - which I call in the further part of the text a "RFI-protection-cage" (acting as shielding). The internal drives are locked each by 4 screws to the bottomshell.

Pay attention to the 2 small holes in the bottom shell each for access to the trimmer of the internal drive that controls the speed of the drive. In that case a very small screwdriver is an important demand and the screwdriver should look a bit like one of the ones displayed here:



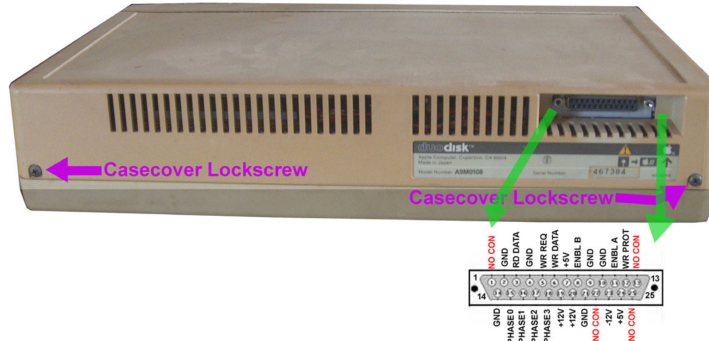
TIP: to avoid electronic shortcut between PCB and grounded RFI protection cage the major part of the metal of the screwdriver should be covered except a tiny tip of the screwdriver blade with isolating shrink hose.

The 2 screws at the rear of the topshell fix it at the bottomshell where that topshell is in place by support of the groove in the bottomshell.

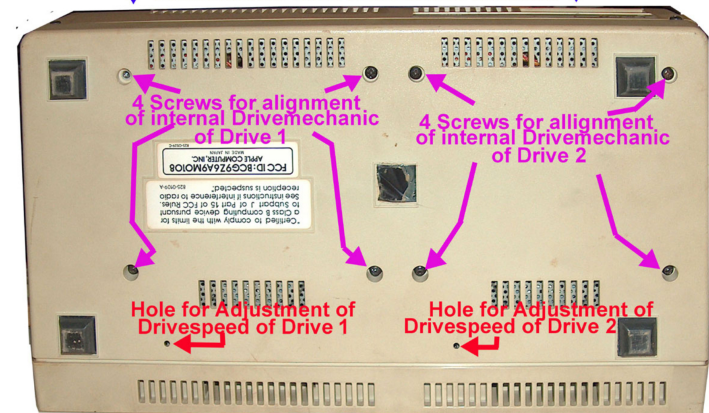
Important info: the connector at the rear for the attachment of the cable from the Computer is NOT locked by any screws to the topshell. It is only locked in its place by screws to the internal cage of the internal drive!



DuoDisk Case Rearview



▼ DuoDiskdrive Case Bottomview Rearside ▼

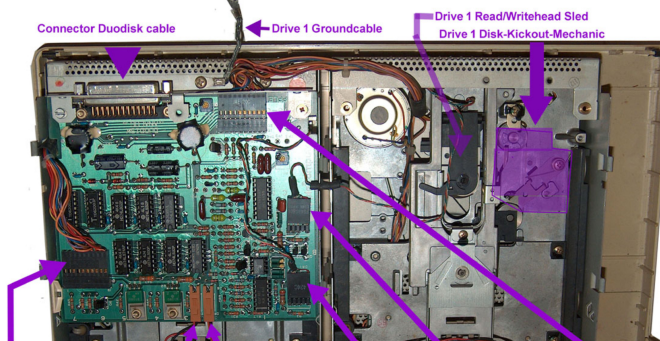


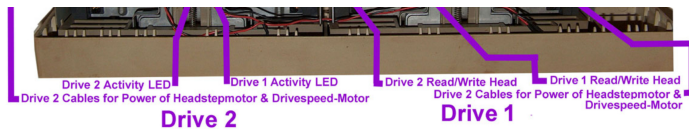
At the bottom each internal driveframe and its bottom cage is attached in its position at the bottom part of the caseshell with four screws to the bottom part of the outer case.

Here in this picture at the right side is a view displayed after the top caseshell has been removed and you can see the connectors and cables and the connections within the duoDisk.

But keep care to inspect the orientation of the cables and plugs and their orientation marked by the colors of the wires.

Cables and Connectors in the DuoDisk





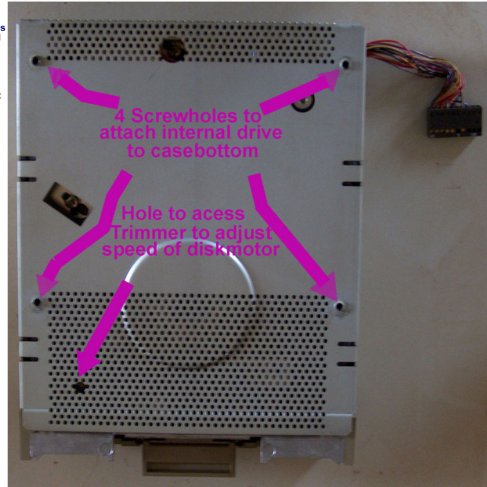
This section displays the both parts of the "RFI protection cage", that cover the internal drive mechanic.
 Each bottom part of the two RFI protection cages is attached at the alternating sides by two screws to the frame of the internal drive mechanic.

Before attaching the top part of the RFI-protection cage pay attention to the protection sleeves at the cables that shall protect the cable wires against contact / shortcuts with the grounded shield cage and lead then to the outer electronic PCB on top above the drive 2.

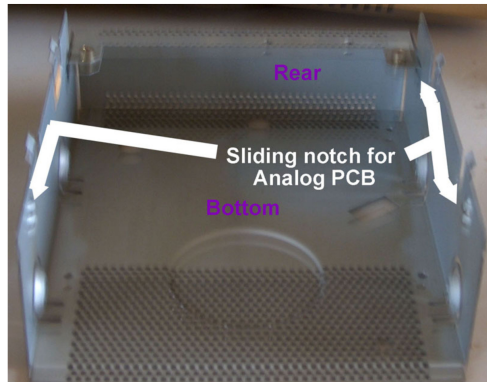
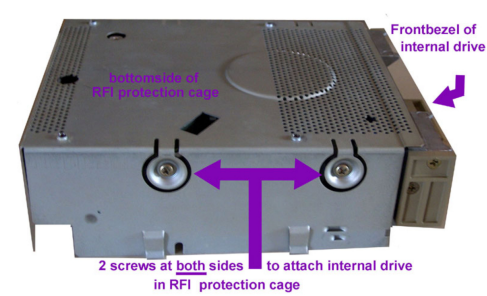
Then the top part of the RFI protection cage is mounted to the bottom part by slipping into the two clamps at the bottom part of the RFI protection cage.

Both RFI-cage parts must have good and firm electronic contact with the grounding cable at the rear of the drives which is attached with screws and lead the grounding rail to the shielding of the cable connector at the rear of the duodrive.

Rear of the dismantled internal but still boxed drive

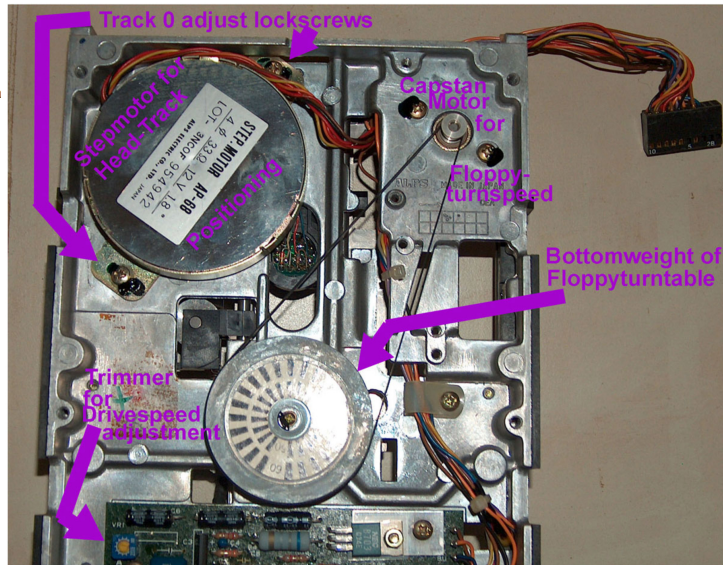


Front of the dismantled internal but still boxed drive



View inside of RFI protection cage

Bottomview to internal drive



The picture at the right side displays at the left top the most remarkable difference to the DISK II - the step-motor that is responsible for positioning of the read/write head to the tracks.

While in the old system a Disk with groove and gliding steel-ball (see page 3) was used for movement here now is a steel-band fixed to the read/writehead to perform direct movement.

Except the location of the trimmer related to the speed adjustment the procedure of the speed adjustment itself is same like explained at page 2 for the DISK II !





▲ Frontbezel of internal drive ▲

At this point the section starts that is related to the electronics of the Duodisk

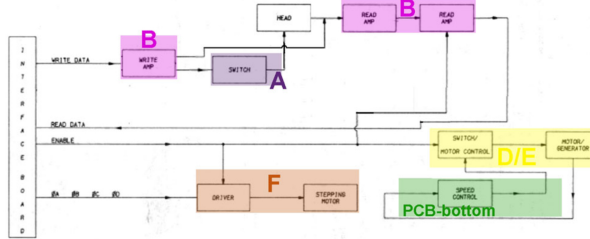
the Block-shema

The major part of the the electronic at the Duodisk is similar to the DISK II - the remarkable difference results to the fact that a set of electronic switches has been added. That switches ensure that the signals from the Driveable at the rear splits apart in 2 sections and detects to which internal drive the signals shall be sent - either Drive 1 - or Drive 2 - but never both drives at the same time.

a second switch just splits between the function at the MC3470 - either read or write mode.

At the moment the first switch has not been completely analyzed. This will be added to this page in a later stage in several weeks in detail. At the moment its for service in general important to publish that parts, that are similar to the DISK II - and the minor differences to that drive.

The color markings and the capitals used in this block shema are same color and capitals I used in the following circuitplan and PCB-pictures.



part of the circuitplan

At part A the circuit is allocated to the CA3146 and the writecoil within the Read/Write head responsible for writing data to disk.

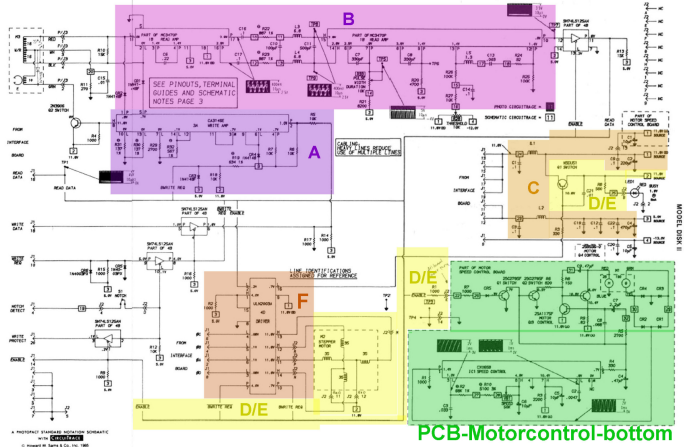
At part B of the plan the MC3470 is responsible for the amplification and "fashioning" of the signals from the read-coil reading data from disk.

Part C is buffering and cleaning the supplyvoltage and shall block spikes of away from the electronics.

Part D and E are sections for switching between read and write mode and indicating activity at the drive.

Part F related to the ULN2003 is responsible for buffering the handshakesignals between controller and the drives. Similar is valid to the 74LS125.

The remaining 6 chips that have been left without colormarking belong to the switching between Drive 1 and Drive 2.



the PCB

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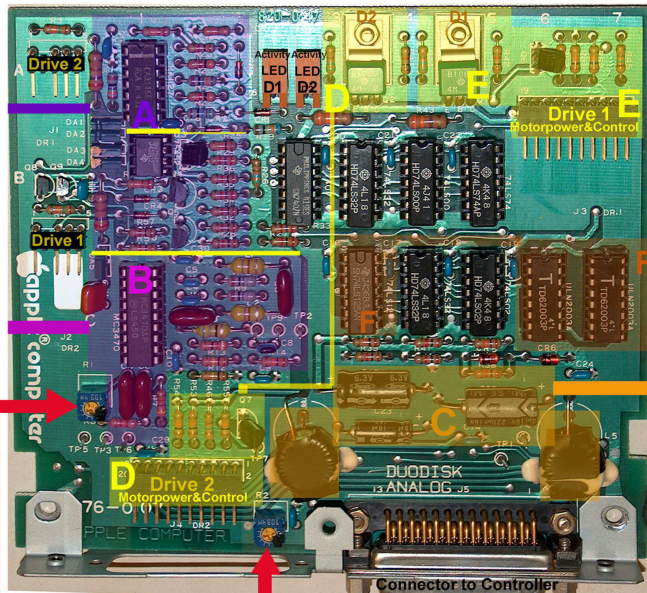
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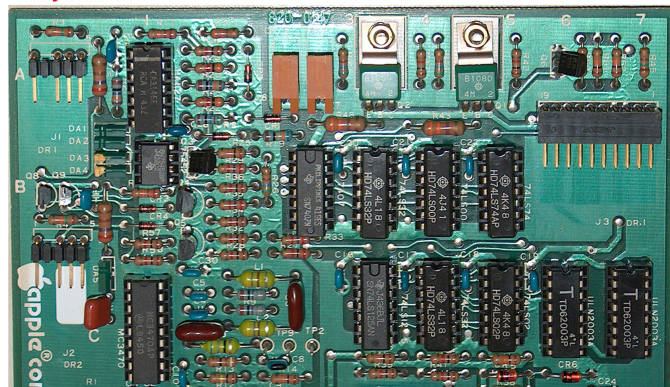
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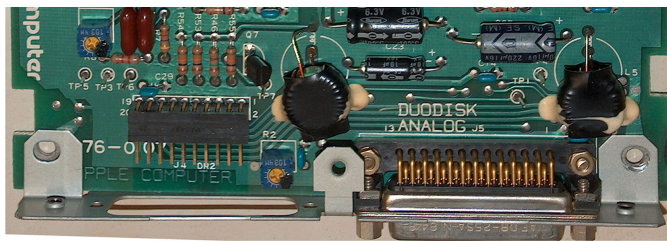
Beware of the orientation of the missing pins at the plugs of the Read/Writeheads at the connectors to Drive 1 and Drive 2!



MC3470 Pulsewidth adjustment

MC3470 Threshold adjustment





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