

New CD Drive for A730

Retrofit Kit MkII 1.630.027.00

Reason: The CD drive CDM-4 Die-Cast (1.630.010.08/69) is no more available. Therefore, the Retrofit Kit MkII (with CD drive CDM-4/19) has been developed. The following text contains step-by-step upgrade instructions.

Contents of Retrofit Kit MkII 1.630.027.00:

CD drive	1.630.114.00	Mounting bracket	1.630.110.34
Div. wires w. connectors	1.630.114.93	2 Spacer bushes	1.010.161.27
2 Screws M3×10	21.53.0356	4 Washers 0,5 mm	23.01.2032
Driver Brush Motor PCB	1.630.075.00	Resistor 10 kΩ	57.11.3103
Resistor 22 kΩ	57.11.3223	Resistor 56 kΩ	57.11.3563
Resistor 130 kΩ	57.11.3134	Capacitor 330 nF	59.06.0334
Capacitor 100 nF	59.03.2104	Solder lug	29.26.1002
“Transport lock” inlay	1.630.110.38	2 Wire straps	35.03.0109
Label “1.630.072.00”	1.630.072.10	Label “1.630.070.20”	1.630.070.10
Auto-adhesive foam tape	65.99.0180		



The upgrade may be performed by trained personnel only. Please consider the prescriptions for handling of electrostatically sensitive components (“ESE”) in the “Safety” section at the beginning of the service manual.

Hardware and Software Versions

The following hardware and software modification indices are prerequisites for successful modification:

Servo Board:	1.630.051. 85/86	Main Board:	1.630.052. 22/23/24
Servo Software .23 (IC33):	1.630.066. 23/49/90	Control Software .23 (IC3):	1.630.065. 23/08/92

For Servo Boards 1.630.051.**84** and lower, the Service Kit 1.630.060.00 must be installed in addition (Servo Board 1.630.051.86 is part of this Service Kit). If the abovementioned assemblies have lower modification indices (the part of the order no. printed in bold characters), the A730 CD Player must be updated before.

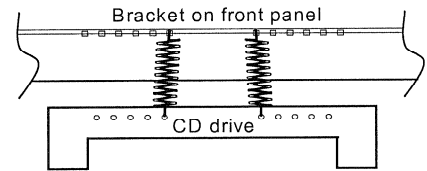
If yellow wrap wires are installed on the Main Board, then the Board has the correct modification status for a successful upgrade according to the “Main Board Modification” paragraph. Should this not be the case, please use the “Hardw. Mod. Kit A730” 20.010.730.03 for the modification instead of the Service Kit 1.630.060.00. The Servo Board 1.630.051.86 is contained in this kit, too.

Preparation, Modification

Unplug the unit from the mains and remove the old CD drive:

- Open the unit by carefully removing the front (operating) panel by means of unscrewing the six hex screws accessible from the bottom side. The complete front panel with the drive can then be flipped-over to the left and placed onto your workbench next to the bottom part of the CD player. Now you see the Servo Board installed at the rear of the CD drive.
- Unplug the two flat ribbon cables from the Main Board and the black ground wire to the housing. Put the bottom part of the CD player aside. Unplug all connectors and flex PCBs (after having opened the locks on the flex PCB connectors) from the Servo Board.
- Remove both tension springs between the die-cast frame and the CD drive. Put them aside for later use.
- Remove the Servo Board and its mounting brackets from the chassis. Put the four screws with lock washers aside for later use. Unscrew the special screws with rubber dampers from the front panel. Now the complete CD drive can be removed.
- Remove the microswitch from its mounting bracket (take care not to lose the small threaded part) and reinstall the microswitch in the same direction to the new mounting bracket (1.630.110.34) contained in the kit. Exact positioning of the microswitch will be performed later. Now remove the “old” mounting bracket which is fixed to the die-cast frame with two hex screws. The new mounting bracket with the switch installed must be fixed to the die-cast frame using two spacer between the bracket and the frame. Use two screws M3×10 (21.53.0356) and the lock washers put aside before.
- Microswitch adjustment: Slightly tighten the left screw in such a way that the switch can still be rotated around this pivot. Adjust the switch so that the switching point is just before closing or opening the hinged CD cover; however, the switching lever must never touch the switch body. When finished, carefully tighten both screws.
- Installation of the new CD drive: **Caution** – the four 0.5 mm washers (23.01.2032) must be placed as spacers between the front panel and the CD drive frame. The new CD drive is placed over the front panel opening and loosely fixed with the four hex screws put aside before, so that the CD drive frame still can be shifted.

- Fit the two tension springs put aside before according to the figure; the spring mounting holes are partially covered by the CD drive frame.



Position of the CD drive

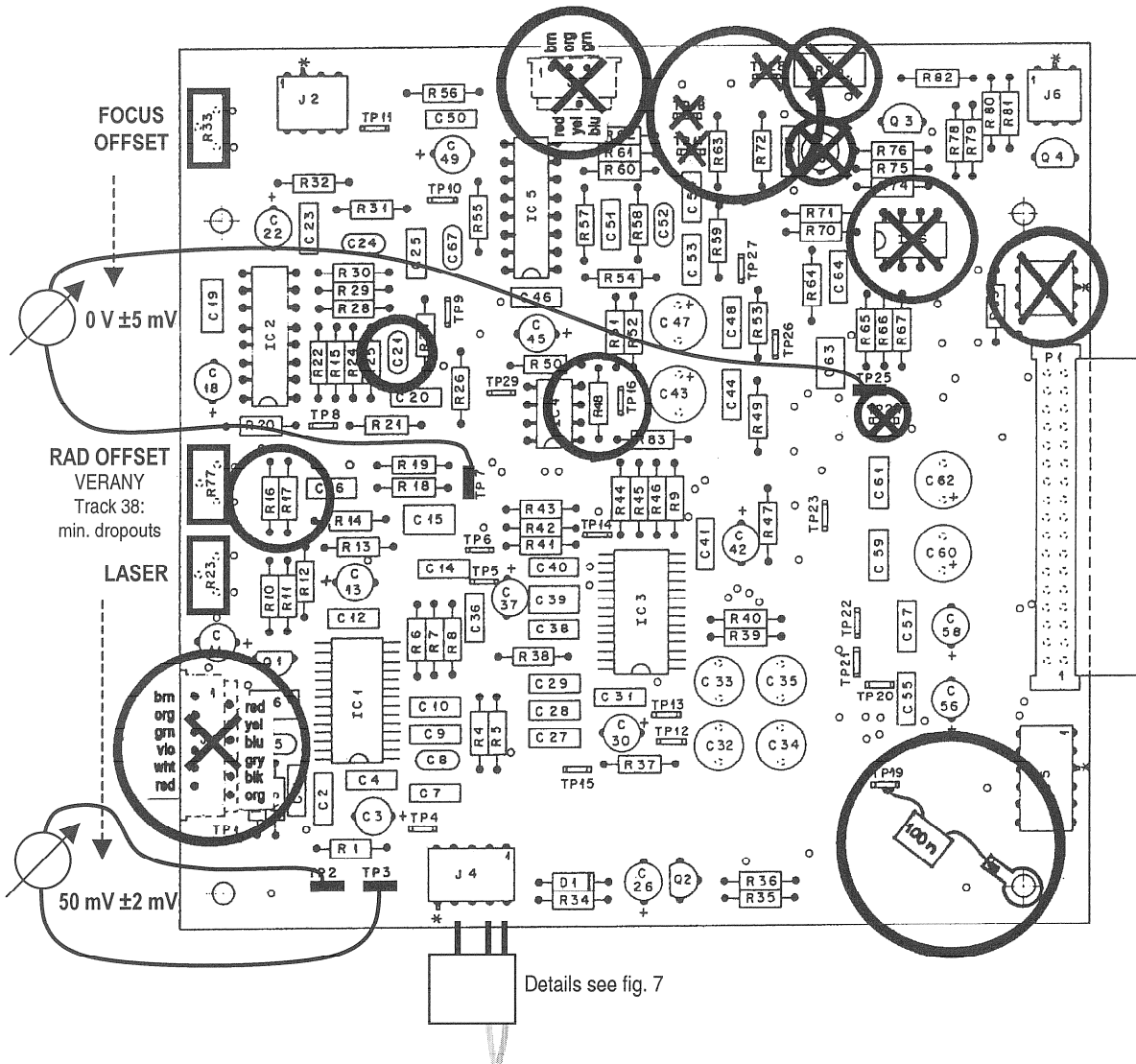
- The exact position of the CD drive is important. For adjustment, the front panel must be placed to the bottom of the player. Check with an inserted CD if the air gap is of equal width around the circumference of the disk. If so, tighten the four screws linking the CD drive frame with the front panel.

Servo Board Modification

- Remove the insulating sheet and all remainders of the adhesive foam tape from the solder side of the board (1.630.051.85/86). Put the insulating sheet aside for later use.
- Take care to use only appropriate tools for unsoldering and soldering!*
- Perform the following modifications on the Board (1.630.051.85/86):
- R48 (22 kΩ), replace by 10 kΩ (57.11.3103).
- R16 (270 kΩ), replace by 130 kΩ (57.11.3134).
- R17 (51 kΩ), replace by 22 kΩ (57.11.3223).
- C21 (68 pF) , replace by 330 nF (59.06.0334) in series with 56 kΩ (57.11.3563).
- Remove the following parts: TP17, TP18, TP24, TP28, J1, J3, J7, C66, R73 (trimmer pot), and IC6.
- Install the small Driver Brush Motor PCB (1.630.075.00) at the location of IC6; for details on its orientation please refer to fig. 1 and 2.
- The 100 nF capacitor (59.03.2104) is connected to TP19 (HF-RET); its second terminal is soldered to the solder lug (29.26.1002), refer to fig. 1. Test points TP2 and TP3 must be bent by 90°, refer to fig.1; we urgently recommend to unsolder them before bending.
- Solder the pre-fabricated wires (1.630. 114.93) to the corresponding solder pads according to the table below and to fig. 1 (at the former positions of connectors J1 and J3). Fix the connector to the PCB with a piece of adhesive foam tape (fig. 4). Tie the cables with the wire straps (35.03.0109) according to fig. 4 and 5. Solder the two twisted wires (brn, blk) to the corresponding pads on the PCB (refer to the table below and fig. 1).
- Caution:** *The clearance between the CD drive and the Servo Board is extremely narrow; therefore the component leads on the solder side marked grey in fig. 3 must be cut very short.*
- Cut a rectangular insulating sheet (dimensions: 122 x 100 mm) out of the insulating sheet put aside before; refer to fig. 1. Fix this insulating sheet as shown in fig. 3 to the solder side of the Servo Board, using five pieces of the double-sided adhesive foam tape contained in the kit. The foam tape has to be positioned according to fig. 1 and 3; press the insulating sheet firmly to the foam tape.
- Drill two holes Ø 3,2 mm into the insulating sheet such that they match the two mounting holes of the PCB.
- Fold the flat ribbon cable as shown in fig. 1. Stick the label "1.630.072.00" over the label "1.630.051.86" and solder the two twisted wires to the motor's soldering tags (brn wire to red dot). Reinstall the Servo Board. If using the additional Service Kit 1.630.060.00, replace the 3-pin housing of the lock solenoid connector (plugged to socket J4) by the 5-pin housing contained in this kit, refer to fig. 7.
- After having been connected, the flex PCB of the CD drive as well as the two wires to the motor must be free in all directions – it must by no means be under tensile stress. Take care to guide the wires accordingly.*

Source			Destination
J1, pin no.	Signal name	Wire color	Conn. CDM-4 (ZIF), pin no.
1	GND	brn	14
2	D1	red	10
3	D2	org	9
4	D3	yel	11
5	D4	grn	12
6	S	blu	13
7	G	vio	8
8	FOC-	gry	1
9	FOC+	wht	2
10	LO	blk	6
11	LM	red	7
12	LG	org	5
J3, pin no.	Signal name	Wire color	
1	RAD+	brn	3
2	RAD-	red	4
TP	Signal name	Wire color	DC-Motor, pin
24	+5V	brn	red dot
28	VM	blk	no mark

Servo Board, Component Placement



Flat Ribbon Cable and Insulating Sheet Position (Component Side View)

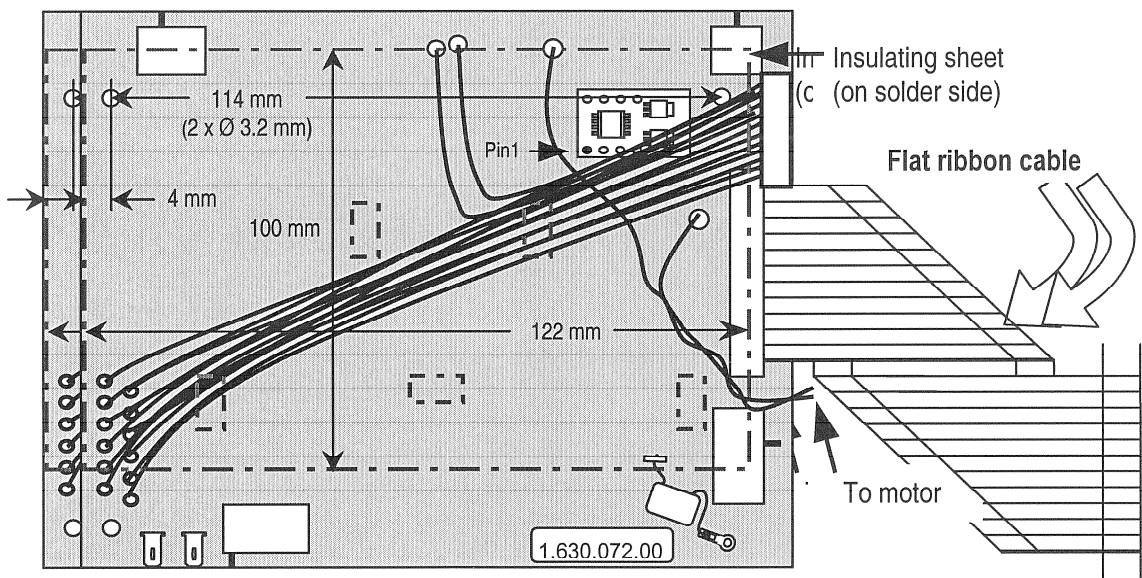


Fig. 1: Servo Board (assy. no. changed from 1.630.051.86 to 1.630.072.00 after the modification)

Modified Servo Board, Driver Brush Motor

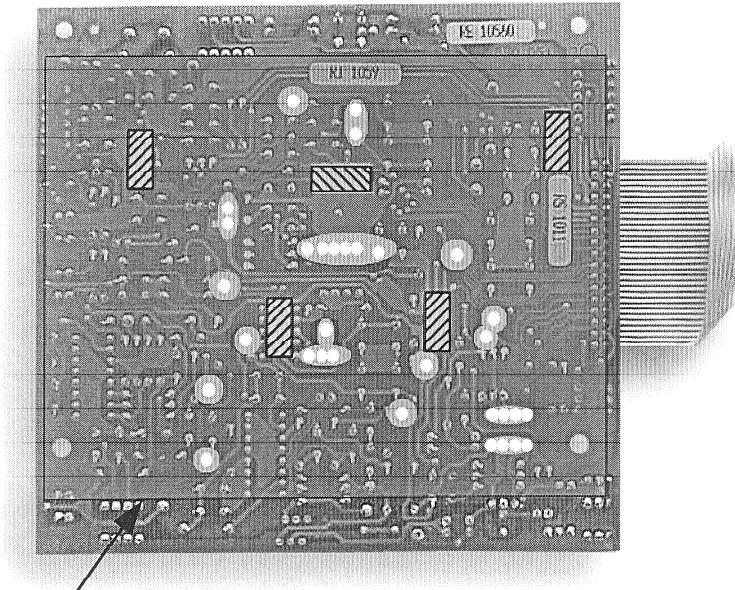


Fig. 3: Cut pin and wire ends on Servo Board; Insulating sheet w. 2 holes, fixed on solder side with 5 pcs. of self-adhesive foam tape

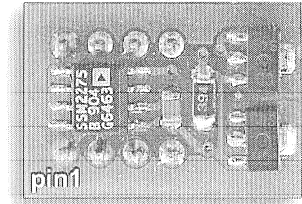


Fig. 2: Driver Brush Motor 1.630.075.00

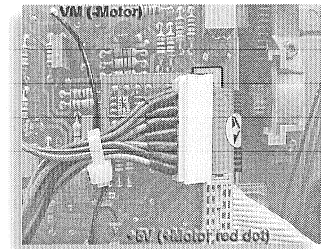


Fig. 4: Connection to CD drive. The flex PCB must by no means be under tensile stress. The connector is fixed to the PCB with auto-adhesive foam tape.

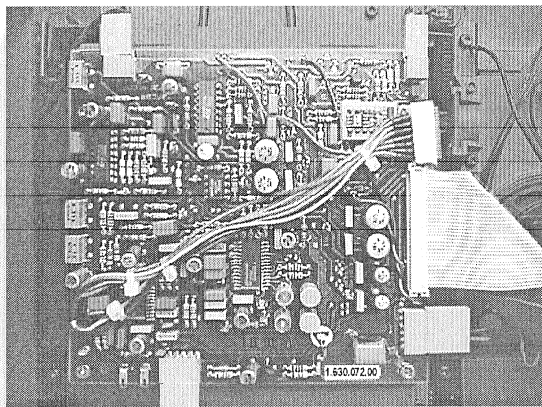


Fig. 5: View of the modified Servo Board

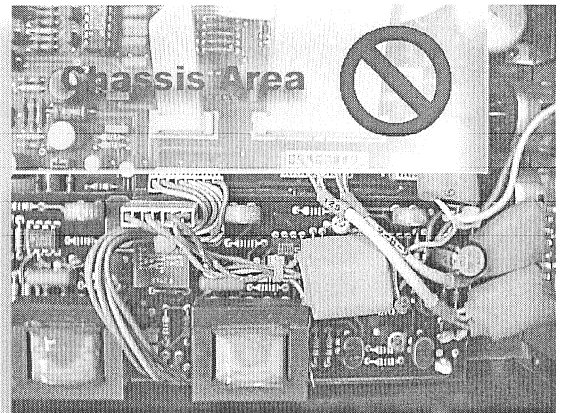


Fig. 6: Wire placement on Main Board (no wires in "Chassis Area"!)

Lock solenoid connector

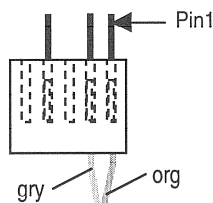


Fig. 7:

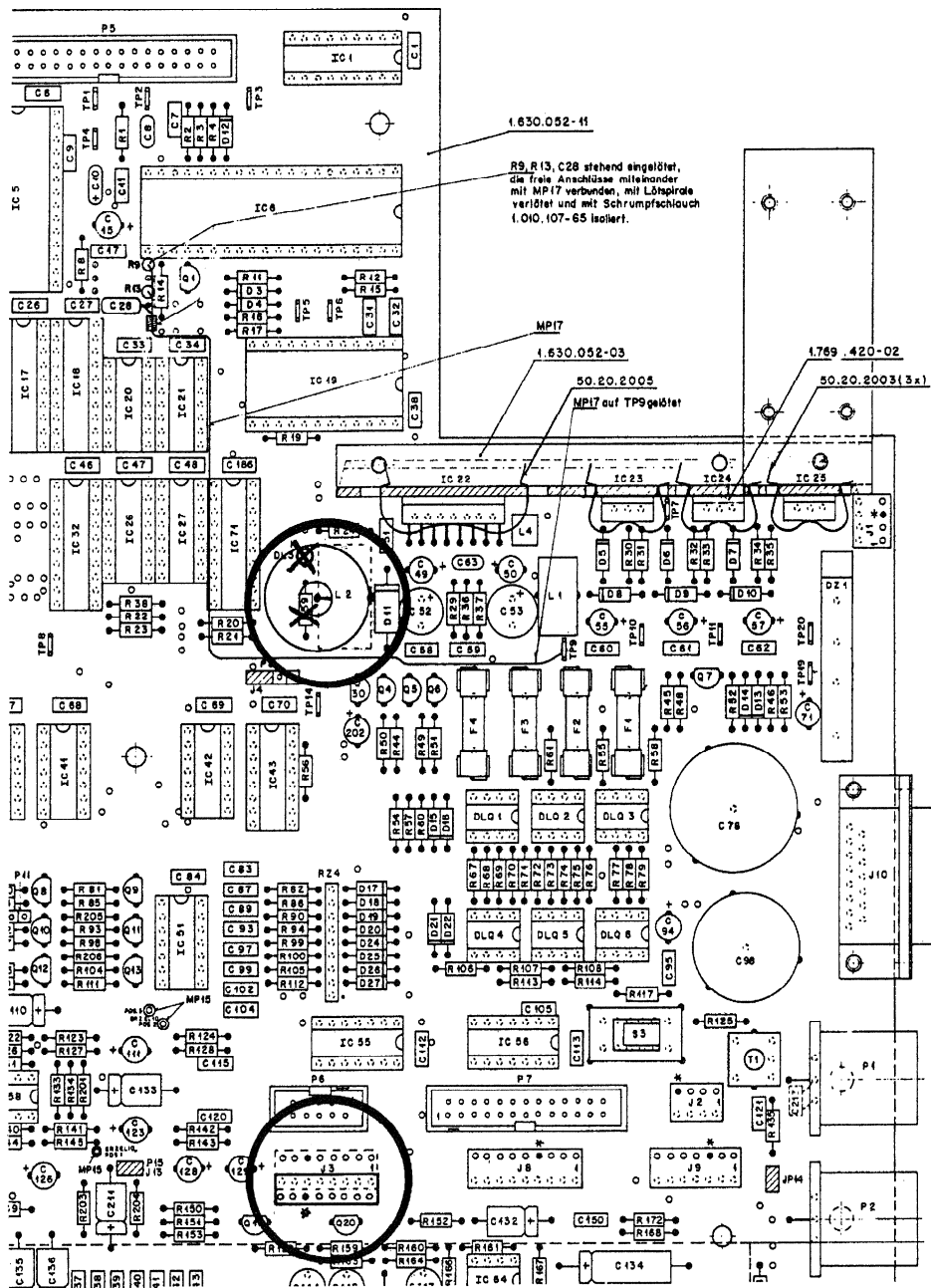
On the Servo Board 1.630.051.85/86 a 5-pin connector is used for the connection to the lock solenoid (the former version 1.630.051.00 had a 3-pin connector). Remove the two pin contacts from the former connector housing by carefully pressing down the detent spring with a pointed tool while pulling. Slightly bend the detent springs of the pin contacts up again and insert them into the 5-pin connector housing (contained in the kit 1.630.060.00). The flat part of the connector housing must face upwards when plugging it into J4 on the Servo Board.

Note: Of course, the 3-pin connector can be used as well, provided the wire colour/pin assignment is correct.

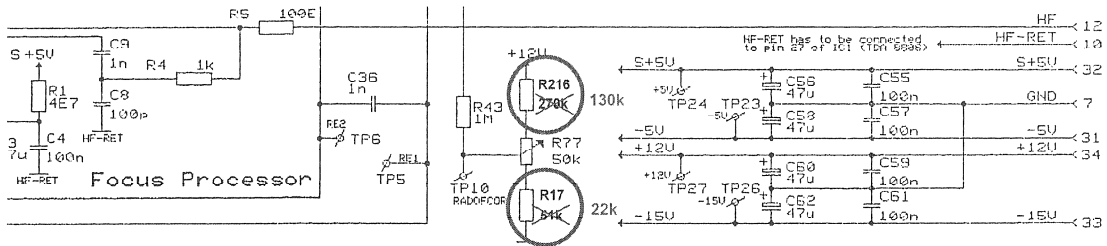
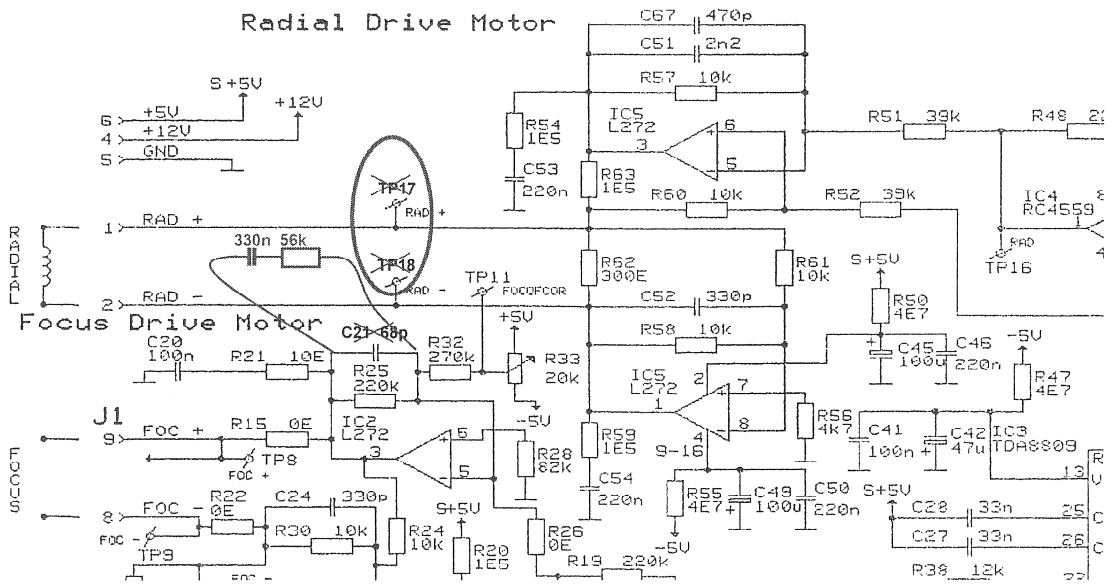
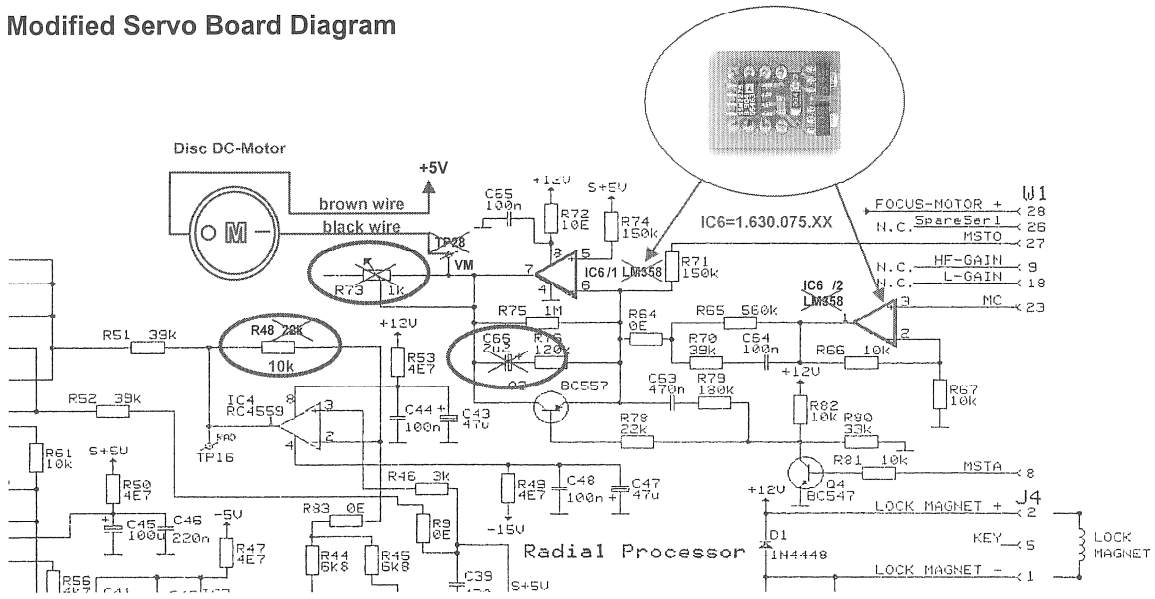
Main Board Modification

Due to the larger size of the new CD drive, the Main Board must be modified as well. The following changes avoid the toroidal inductor L2 from being touched. For this purpose, the Main Board must be removed.

- Unsolder R39 and DL3; these components are used no more.
- L2 has to be installed in a horizontal position. For this behalf, it should be unsoldered. One of its leads must be extended by unwinding one turn. Bend the leads in such a way that L2 can be mounted horizontally; fix it to the PCB with hot-melt or silicone adhesive and solder its leads to the corresponding pads.
- The Servo Board will be touching J3. Therefore J3 must be rotated by 180°. Unsolder J3, move the key wire from pin6 to pin3. **Caution:** Before inserting and soldering J3 in its new position, put an appropriate cutting of the insulating sheet (or possibly a piece of solid paper) between J3 and the PCB, as an insulation against the PCB tracks.
- Replace the label "1.630.052.22/23/24" by the label " 1.630.070.20".
- Reinstall and connect the Main Board. **Caution:** Take care to the placement of the wires with the filters (possibly in shrinking tube) relative to the Line Amplifier (refer to fig. 6). When installing the front panel, these filters must neither be touched nor pinched.

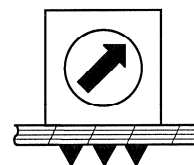


Modified Servo Board Diagram



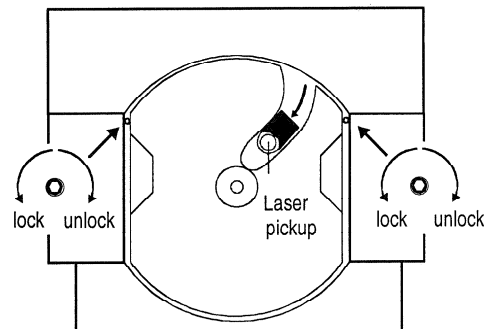
Electrical Adjustments

- Plug the two flat cables and the ground lead to their corresponding connectors. Place the front panel with the new CD drive above the unit's bottom, using appropriate supports so that the front panel is parallel to its installed position.
- **Preadjustment:** Turn R23 to its clockwise stop. Laser current is set now to its minimum setting. Turn R33 and R77 to their center positions. Switch the unit on. Verify if the pickup lens moves up and down when adjusting R33. If so, set R33 back to its center position. If not, check the wiring of the new cables to the Servo Board, and also check if the flex PCB is completely plugged into the ZIF connector.
- **Disc Motor Gain:** This setting is fixed now, no adjustment required.
- **Laser Current:** Insert a the "Philips SBC444" test CD (order no. see table below). Close the hinged cover. Press PLAY repeatedly and adjust R23 counterclockwise until a voltage of 50 ± 2 mV can be measured between TP2 and TP3. If the CD's table of contents ("TOC") can be read, two bars appear in the display.
- **Focus Offset:** While the CD is playing, adjust the voltage between TP7 and TP25 to 0 ± 5 mV with R33. Tip: The thickness of the inserted disc has a crucial influence on the focus offset adjustment and refers to a nominal disc thickness of 1.23 mm. The Philips SBC444 test disc fulfills this specification.
- **Radial Offset:** Insert the "Vérany Digital Test #2" test CD (order no. see table below). Play track 38 and adjust with R77 the reproduced sine-wave to minimum dropouts.
Workaround: If neither the Vérany nor the Philips test CDs are available, set R77 to a position corresponding to "01:30" on a clock dial (no matter whether AM or PM), as shown at the right.
- The upgrade is terminated now, the CD player can be reassembled.



Transport Lock

The new CD drive has a mechanical transport lock. Before transporting the unit, two hex screws 2.5 mm must be tightened (approx. 10 turns *counterclockwise*). If so, the drive is fixed in a defined position. Make sure to insert the "Transport Lock" sheet (1.630.110.38, contained in this kit) into the CD compartment after having closed the transport lock. These screws must be released (approx. 10 turns *clockwise*) before the unit is put into operation again.



Test CDs:

Type	Studer order no.
Philips SBC444 and SBC444 A	10.241.026.01
Vérany Digital Test #1 and #2	10.693.001.00