

Supplement

Car Cassette Deck SCA-R/3.3/3.1

Service Manual

12 V 

1. GENERAL

This supplement must be used together with the SCA-R3 service manual 4822 725 25481.

Because of changes and modifications in the meantime, the following parts have been revised and re-written:

- Technical data
- Maintenance
- Check & alignment procedure
- Dis- / Re-assembly procedure

Besides, a detailed 'Functional Description' has been added now. To clarify the descriptions, photographs and drawings are added where necessary.

2. TECHNICAL DATA

Operating voltages	:	10.0 - 16VDC (V1) (13.2VDC nom.) 4.75 - 5.25VDC (V2) (5VDC nom.)
Tape speed	:	4.76 cm/s \pm 3%
Number of tracks	:	2 x 2
Wow and Flutter	:	\leq 0.5% (DIN w.)
S/N ratio	:	\geq 46dB (preampl.)
Crosstalk suppression (track 2-3)	:	\geq 50dB
Channel separation (track 1-2/3-4)	:	\geq 40dB
Fast winding time	:	\leq 100s (C-60)
Bus interface	:	I ² C
Weight (only mechanism)	:	400 g

3. DETAILED FUNCTIONAL DESCRIPTION

3.1 Function / Switch Status Overview

Position	Standby Switch	Play Switch	Insert Switch
Eject	Open	Closed	Closed
Standby	Open	Open	Open
Wind	Closed	Open	Open
Play	Closed	Closed	Open

3.2 Eject Position

The transport disc (pos. 33) must be in the position, shown in fig. 1.

***NEVER** turn the transport disc, **unless** it is not in the 'Eject' position (yet)! If not in 'Eject' position, turn the NOR fly-wheel pos. 11 counter-clockwise until the transport disc reaches the 'Eject' position.*

After this position has been reached, don't turn it anymore!

3.3 Insert Function

When a cassette is inserted, the 'Insert' switch is opened; the servo motor is turning clockwise so that the cassette lift moves backward until the 'Play' switch is opened.

At that moment, the servo motor stops and the deck is in 'Standby' position. Refer to fig. 2, especially to the 'Standby' switch position.

3.4 Standby-to-Play Function

The capstan motor turns in clockwise direction until the deck reaches the "Wind" position (FF / REW - fig. 3/4) and the standby switch closes. At the same time the coupling assy (pos. 65 and 70) and gear rod pos. 54 are uncoupled from the servo motor and swivel lever pos. 47 is released now.

The servo motor pos. 12 turns the swivel lever until it grasps into take-up wheel gear pos. 21.

The rotation direction of the servo motor, together with the movement direction of the swivel lever, determines the play direction of the deck (NOR or REV).

The capstan motor turns clockwise until the transport disc reaches the "Play" position (Nor / Rev - fig. 5/6). Now both the standby – and play switches are closed.

The servo motor starts to turn and tightens the tape.

Thereafter, the capstan motor starts to turn counter-clockwise for tape transport and uncouples the transport disc; simultaneously the servo motor now winds the tape (play function).

3.5 Tape End Detection

When the tape reaches the end when playing, this is detected by means of servo motor pulses. The microprocessor gives the command to the servo motor to change its rotation direction.

3.6 Play-to-Standby Function

The capstan motor now starts turning clockwise so that the transport disc assy is coupled again; the transport disc turns until both the standby- and play switches are open (refer to fig. 2).

During the transport disc rotation, the coupling assy (pos. 65 and 70) and gear rod pos. 54 are coupled again to the servo motor and the swivel lever is disabled from the take-up wheel.

3.7 Standby-to-Eject Function

The capstan motor turns until the transport disc is in the right position to couple the loading assy. The servo motor starts turning so that the loading assy moves forward until the insertion switch is closed. At that moment the deck reaches the "eject" position and the cassette is ejected.



Figure 1

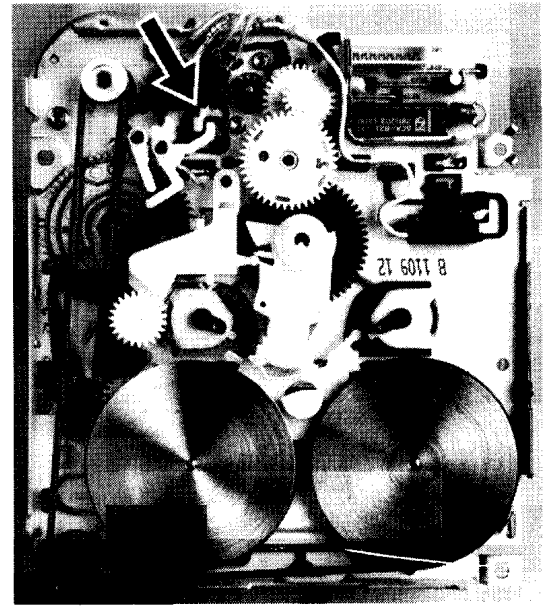


Figure 2



Figure 3

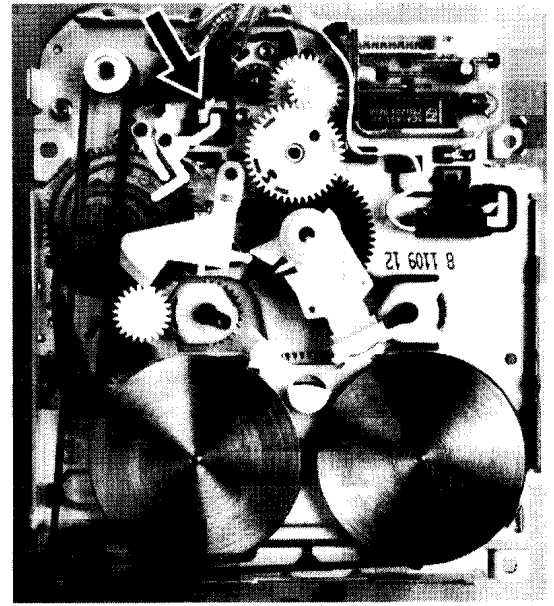


Figure 4

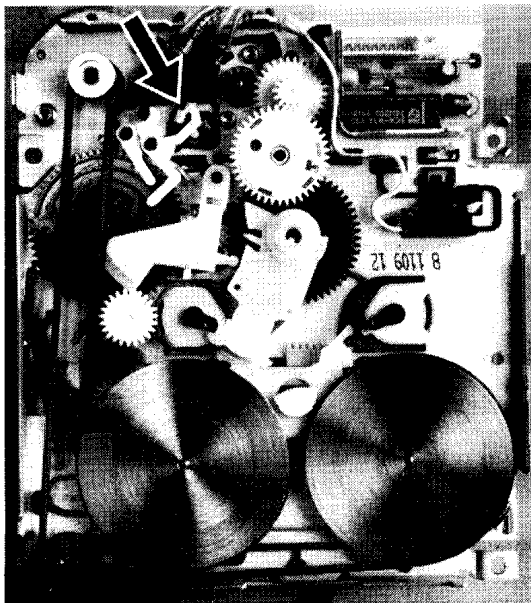


Figure 5

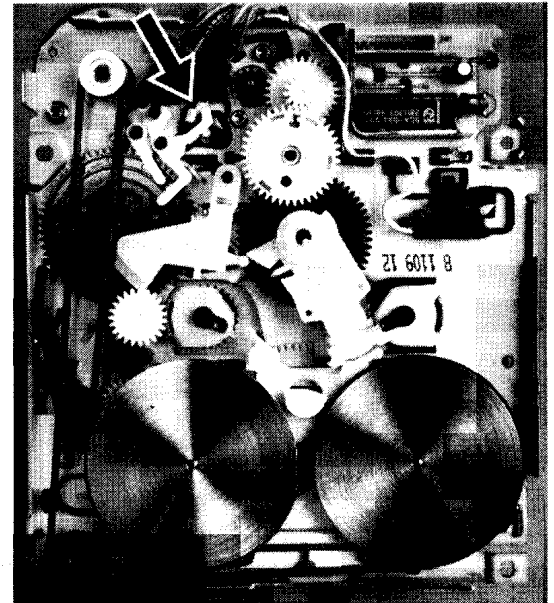


Figure 6

- 5.6 Mechanical Check**
If there is no improvement of deck operation, first clean the deck as described, then check the following parts for correct functioning:
- Motors pos. 1 and 12
 - Pressure rollers of pos. 42
 - Belt pos. 3
 - Flywheels pos. 9 and 11
 - Diverting wheel (pulley) pos. 10
 - All gears
- In case of need to replace one or more parts, refer to the 'Dis-/Re-assembly Procedure' part.

6. DIS-/RE-ASSEMBLY PROCEDURE

6.1 Important

Before disassembling the tape deck, take care that the cassette holder pos. 51/52 is in the **eject** position. See figures 1 and 11.

Handle the cassette lift assy carefully to prevent bending it.

For re-assembling, follow the procedures in reverse order. Take care that the wires, cams etc. are in the right position again after re-assembling.

For the exact position of the parts, refer to the exploded view (fig. 19).

6.2 Standby position

Refer to figure 2.

Take care that the cassette lift and the transport disc pos. 33 are in the right position (see '6.1') before to put it in the standby position!

The lift can be put in the standby position by turning gear assy pos. 16 / 17 / 92 to the right. Hold the lever on pos. 52 in such a way that the cassette holder is unblocked and can move backward completely; keep turning the gear assy until lift moves downwards.

Be careful not to bend metal parts unnecessarily and not to damage the gears, flywheels and belt!

6.3 Switches

To remove the

- PLAY switch pos.100,
- STANDBY switch pos.101,
- INSERT switch pos.102 and/or
- ME/CR switch pos.103,

carefully slide the switch(es) concerned out of the holder.

6.4 Capstan motor pos. 1

- Remove the belt pos. 3.
- Remove the screw pos. 88.
- Carefully slide out the pcb fixation pos. 58 and lift up the pcb pos. 86.
Take care not to damage the black pcb supports!
- Unscrew the two screws pos. 2.
- Unsolder the capstan motor connections and take out the capstan motor.
- When re-assembling, take care that the cam on the chassis grasps in the spare screw hole of the motor.

Note: Use a *new* belt when re-assembling!

6.5 Servo motor pos. 12

- Remove the screw pos. 88.
- Carefully slide out the pcb fixation pos. 58 and lift up the pcb pos. 86.
Take care not to damage the black pcb supports!
- Unscrew the two screws pos. 14.
- Unsolder the servo motor connections and take out the servo motor.
- When re-assembling, take care that the cam on the chassis grasps in the hole of the motor.
- Note: Take care *not* to damage the gears!

6.6 Pressure rollers pos. 42

- Remove the holders with the pressure rollers by unclicking them from the centre pivot which is at the right side of the base plate pos. 23.

6.7 Head assy pos. 28

- Remove the pressure rollers as described in '6.6'.
- Remove the spring pos. 30.
- Remove the head assy from the holder of the base plate pos. 23.
- Note: When re-assembling, take care to put the spring pos. 30 in the right position again! See figure 13.

6.8 Flywheel / gear assy (NOR) pos. 11

- Remove the belt pos. 3.
- Remove the oil protection ring pos. 7 from the capstan of flywheel pos. 11.
- Remove fixation retaining ring pos. 6.
- Take out the flywheel.
- Note: when re-assembling, use a new retaining ring and belt, and take care that the gear does not become damaged. Put the flywheel spindle into the bearing carefully and turn it slightly.
Clean the capstan.

(continued on page 5)

4. MAINTENANCE

The tape deck mechanism requires periodic cleaning.

4.1 Cleaning cassette

Use drop-in cleaning cassette
SBC114 (4822 389 20035)

4.2 Cleaning with alcohol or spirit

- Cleaning with alcohol or spirit is also possible.
- Especially the following parts need cleaning:
 - Playback head pos. 28 including tape guides.
 - Capstans pos. 9/11 and pressure roller assy pos. 42.

5. CHECKS AND ADJUSTMENTS

5.1 Equipment

Equipment required:

- Universal test cassette SBC419
 - 4822 397 30069
- Universal test cassette SBC420
 - 4822 397 30071
- Friction test cassette 811/CTM
 - 4822 395 30054
- Spring scale 50-500g
 - 4822 395 80028
- Jig / puller for clutch
 - 4822 395 60039
- Wow & Flutter meter
- AC mV meters
- Power supply unit with adjustable voltage
0 – 30VDC / $\geq 2A$

5.2 Wow & Flutter

This check has to be carried out on a COMPLETE car radio set; proceed as follows:

- Connect the wow & flutter meter to the LS outputs.
- Insert test cassette SBC419 or SBC420 and play the 3,150 Hz signal.
- The wow & flutter value must be $\leq 0.5\%$ (DIN weighted – overall life cycle).

5.3 Tape speed drift / Speed adjust

- The tape speed must be $4.76 \text{ cm/s} \pm 3\%$ (overall life cycle).
- The tape speed can be adjusted with the screw of the capstan motor.
- This screw can be reached via the hole in pcb pos. 86 (see figure 10).
- Use a screw driver of 1.8mm with an insulated shaft.

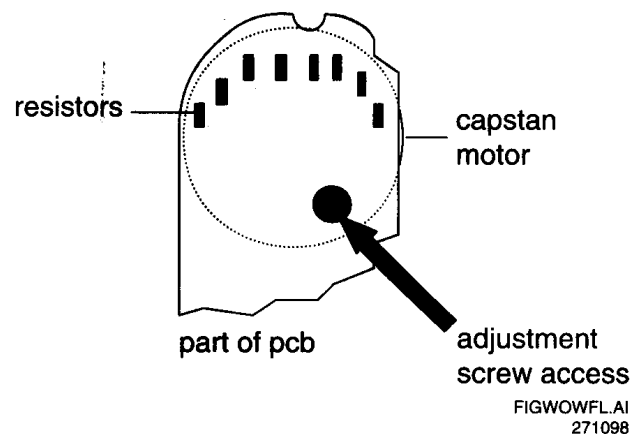


Figure 10

5.4 Play Torque

- Insert friction test cassette 811/CTM (NOR and REV).
- Play mode take-up torque must be 3.5 - 7.5 mNm.

5.5 Check Procedure of Electrical Operation

- **Note:** refer to figures 7 – 9.
- First check the voltage at TP3 (collector of pos. 7102). It must be equal to the normal car voltage (nom. 13.2VDC). If this value is not met, check pos. 7102 / 7103 and replace if necessary.
- Measure the voltage between GND and pin 20 of pos. 7101, as indicated in figure 9. It must be 150 ... 250mVDC and hence IR3113 must have a value between approx. 45 .. 76mA.
- Visually check resistors pos. 3109, 3110 and 3112. The value resp. must be: 9k1, 510Ω and 10k.
In case of doubts, check the value with help of an Ω-meter.
- Measure voltage at the indicated point (pos. 7101 pin 24); this must be 2.4VDC (typical value). If this value is not met, replace pos. 7101 or pcb.
- Check the servo motor by measuring its coil resistance; the value must be approx. 12Ω.
- Check the mechanical operation of the motor by applying a voltage of approx. 3VDC to it.
Notes: + to red-marked terminal;
disconnect motor from IC!

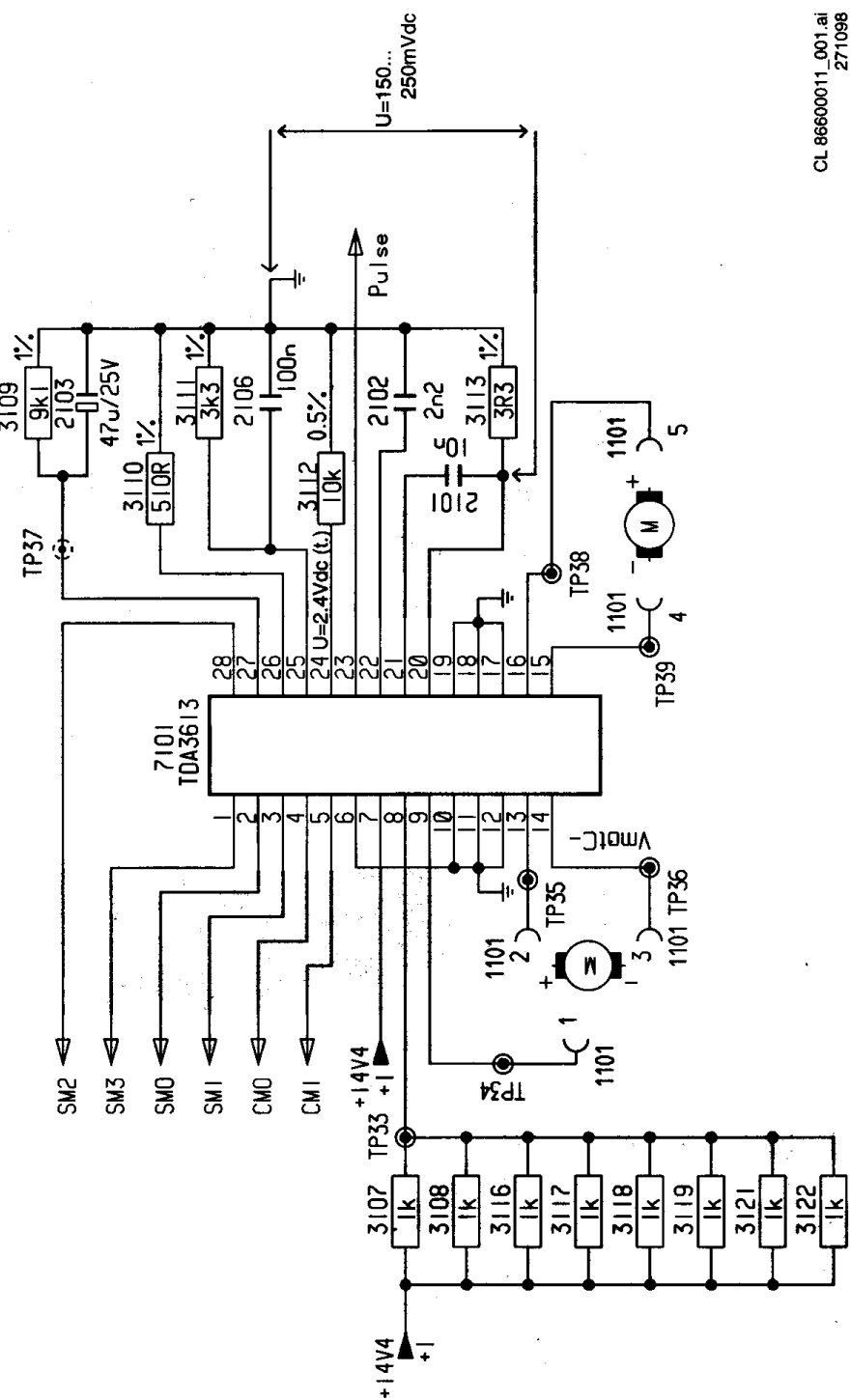


Figure 7

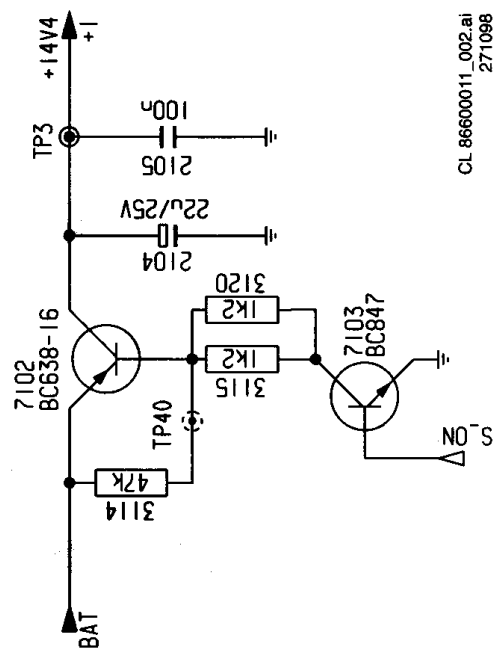




Figure 11

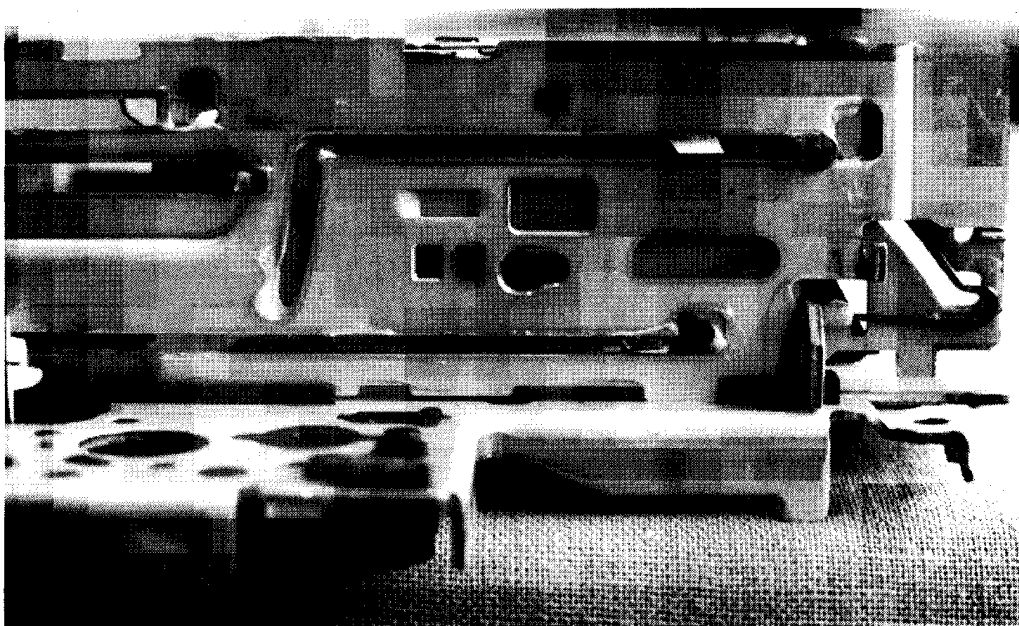


Figure 12

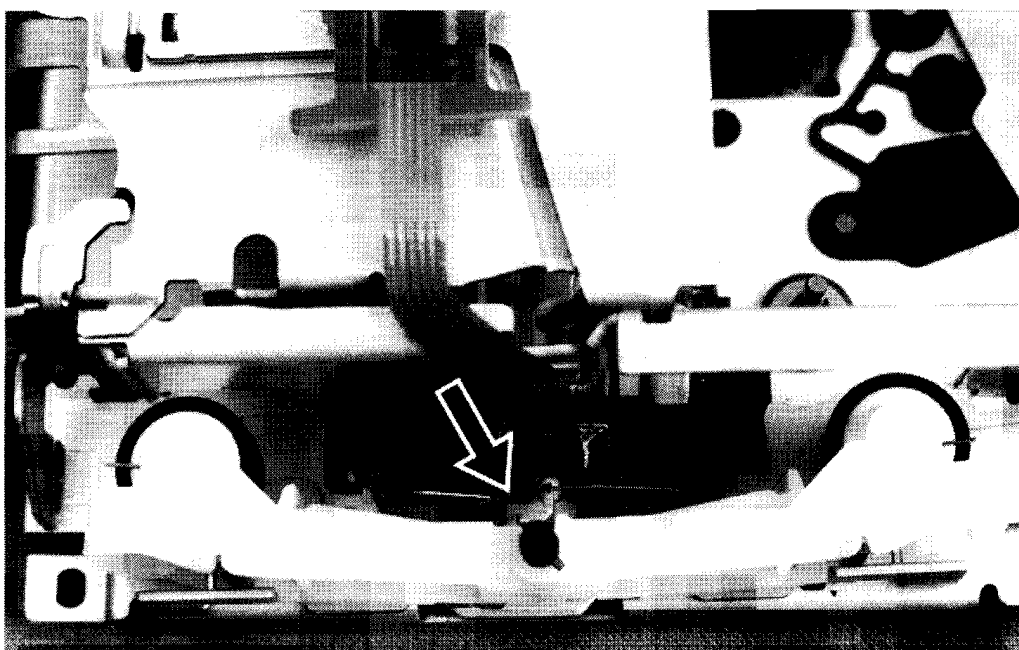


Figure 13

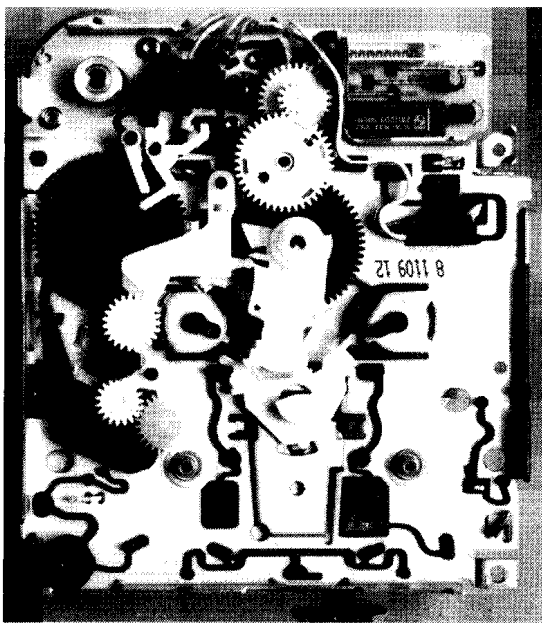


Figure 14

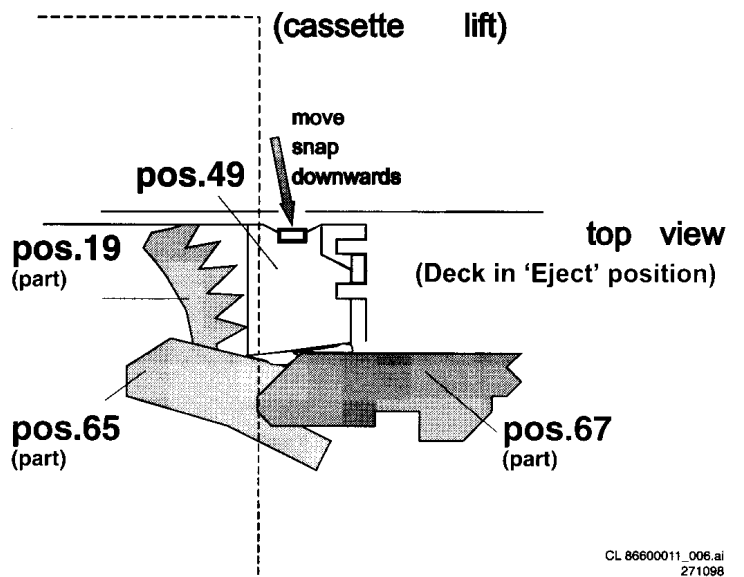


Figure 15

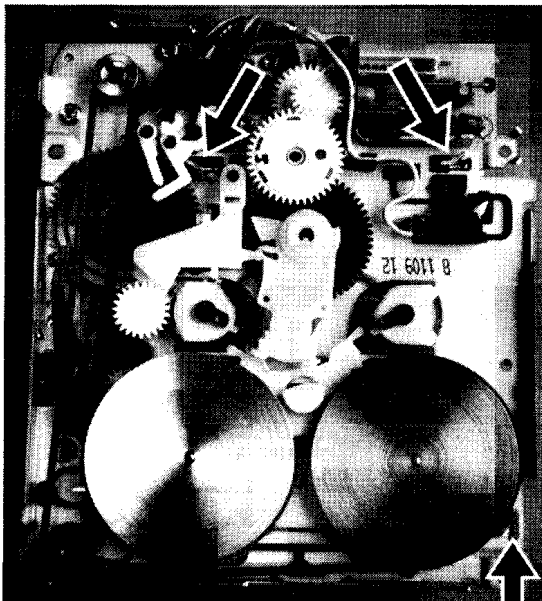


Figure 16

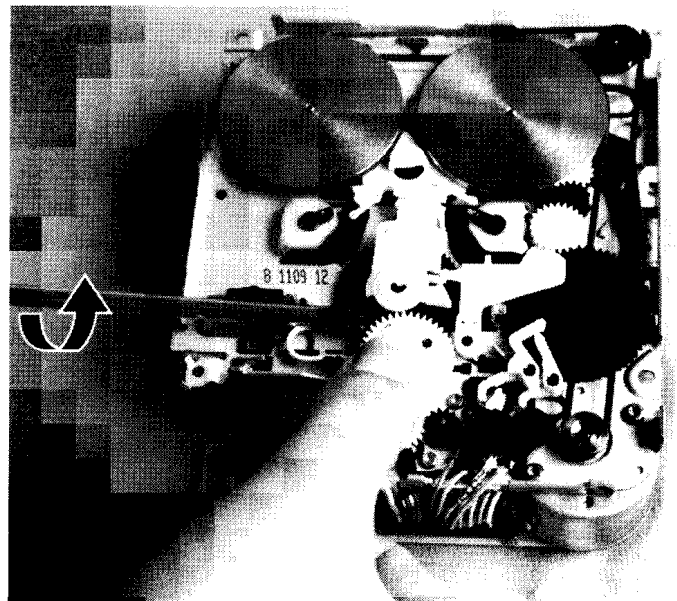


Figure 17

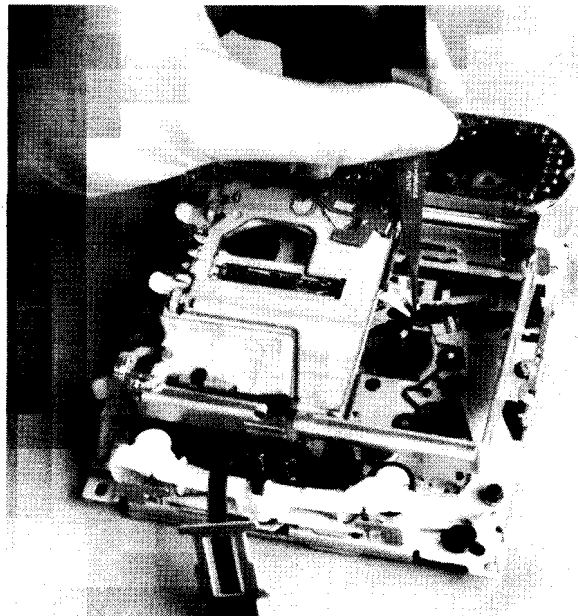


Figure 18

6.9 Flywheel (REV) pos. 9

- First move the cassette holder to the **standby** position. Refer to '6.2' and figure 2.
- When the cassette holder reaches the standby position, the capstan of flywheel pos. 9 can be reached.
- Remove the belt pos. 3.
- Remove the oil protection ring pos. 7 from the capstan of flywheel pos. 9.
- Remove fixation retaining ring pos. 6.
- Take out the flywheel.
- *Note: when re-assembling, use a new retaining ring and belt!*
Clean the capstan.

6.10 Take-up wheel (NOR) / back tension spring pos. 21

- The cassette holder assy pos. 51 / 52 must be in the **eject** position.
If the holder assy isn't yet, turn flywheel NOR pos. 11 to the left.
- When the cassette holder reaches the eject position, take-up wheel (NOR) can be reached.
- Carefully shift levers pos. 65 / 67 in backward direction until the take-up wheel becomes free.
- Take off take-up wheel by pulling it upward and holding the fixation snaps of the pivot together simultaneously.
- *Note: When re-assembling, grease the pivot. See figure 20.*

6.11 Take-up wheel (REV) / back tension spring pos. 21

- The cassette holder assy pos. 51 / 52 must be in the **standby** position.
Refer to '6.2' and figure 2.
- When the cassette holder reaches the standby position, take-up wheel (REV) can be reached.
- Take off take-up wheel by pulling it upward and holding the fixation snaps of the pivot together simultaneously.
- *Note: When re-assembling, grease the pivot. See figure 20.*

6.12 Replacing Special Parts

Unless replacing after damaging, the following parts may be taken out NEVER:

- Transport disc pos. 33
- Switch wheel 1 pos. 37 / Switch lever assy pos. 39
- Gear rod pos. 54 / Lift wheel gear pos. 68
- Servo drive gear cluster pos. 15
- Diverting wheel pos. 10
- Coupling lever assy pos. 65

The following sections describe the dis- / re-assembling procedure of these parts, when they need to be replaced.

6.13 Transport disc pos. 33

- Remove belt pos. 3.
- Remove switching lever pos. 49 by releasing the snap as shown in figure 15.
- Remove play switch lever pos. 80.
- Remove standby switch lever pos. 79.
- Carefully move the arm of switch lever assy pos. 39 away from the transport disc.
- Remove intermediate wheel pos. 34.
- Cut the three snappers of the transport disc pos. 33 and take out the disc. Do not damage the post!
- When re-assembling, insert a new transport disc. Take care that the head support contour is in the 'standby' position. Also take care that the switching lever pos. 49 is in the right position again!
See fig. 1.
Grease the head support contour at the right points. See figure 21.

6.14 Switch wheel 1 pos.37 / Switch lever assy pos. 39

- Remove flywheel (NOR) pos.11 as described in '6.8'.
- Cut pin of switch wheel 1 pos. 37.
- Take out switch lever assy pos. 39.
- When re-assembling, insert a new switch wheel.

6.15 Gear rod pos. 54 / Lift wheel gear pos. 68

- First remove the cassette loading assy pos. 50 by bending the three lips of the assy in straight position, lifting it at the front and sliding it out carefully. See figure 16.
- Take out gear rod pos. 54.
- Remove fixation retaining ring pos. 6.
- Take out lift wheel gear pos. 68.
- *Note: when re-assembling, use a new ring!*

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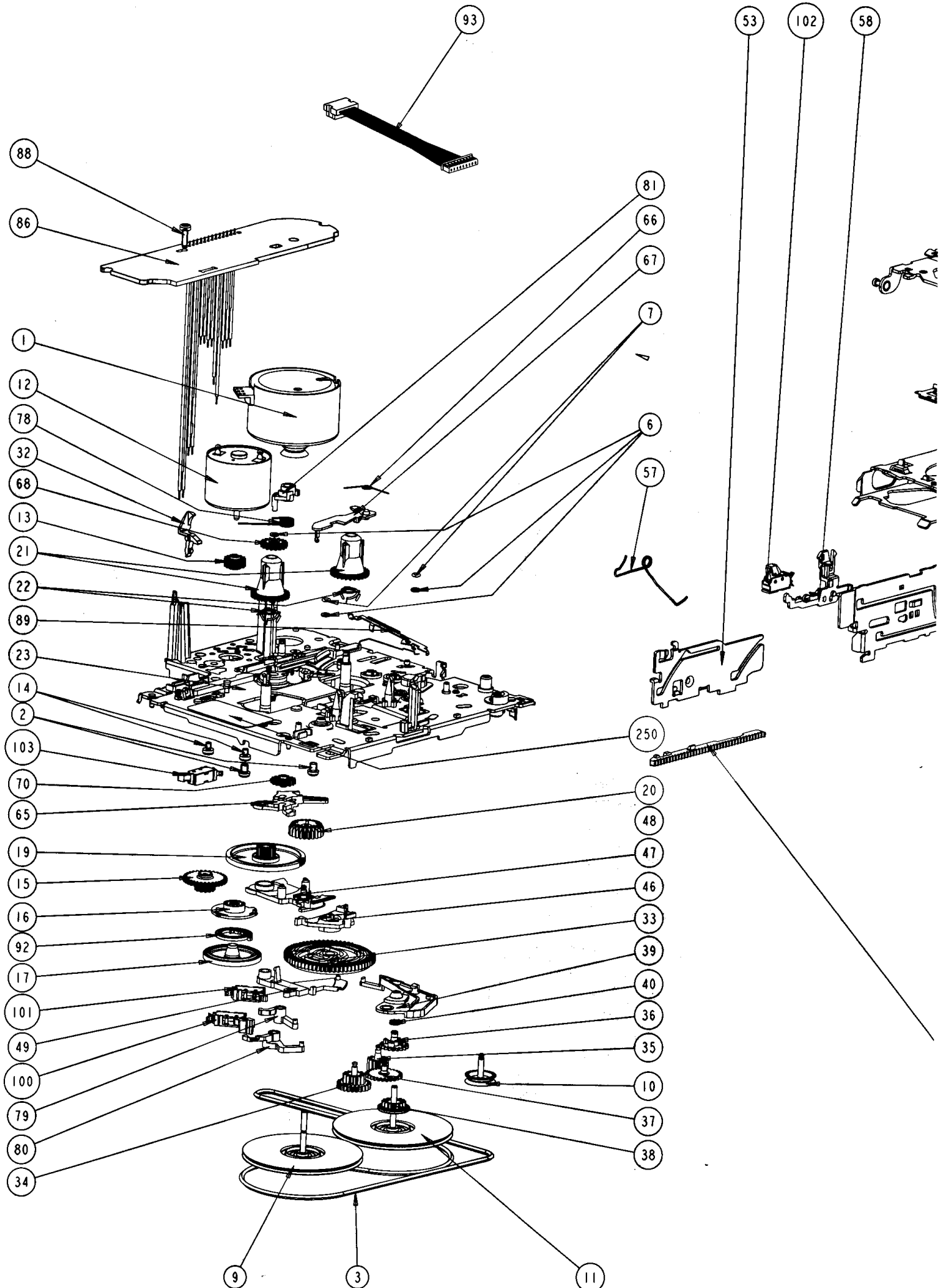
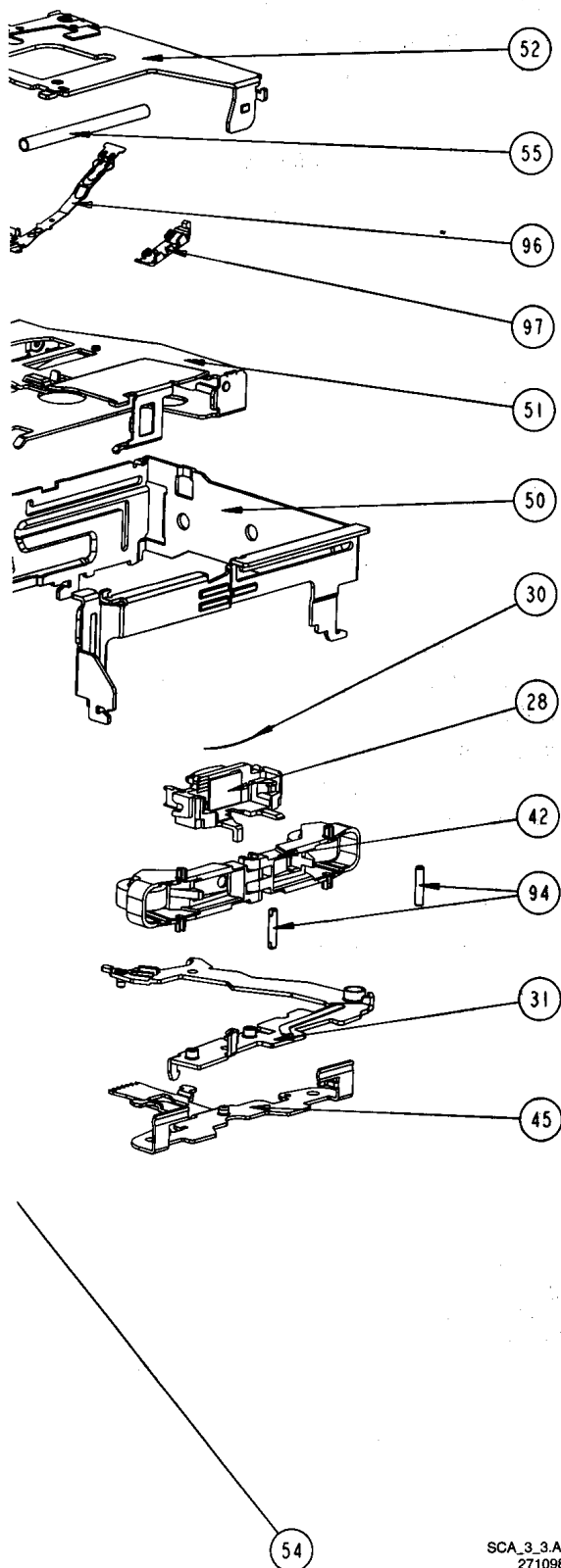


Figure 19



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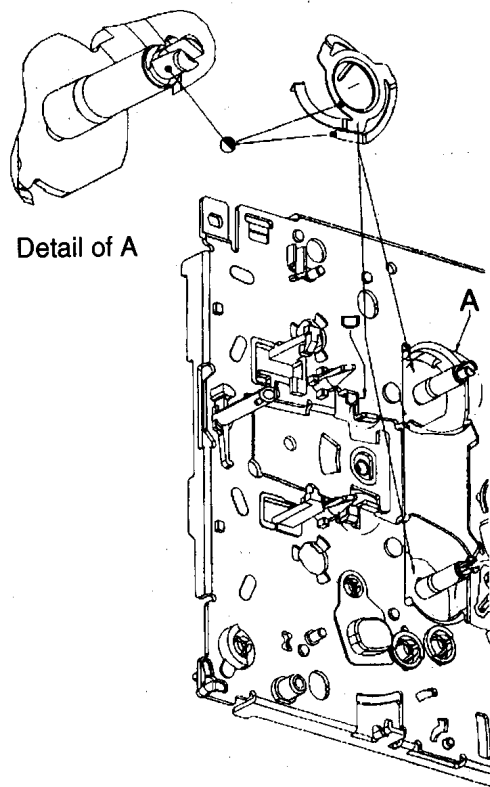


Figure 20

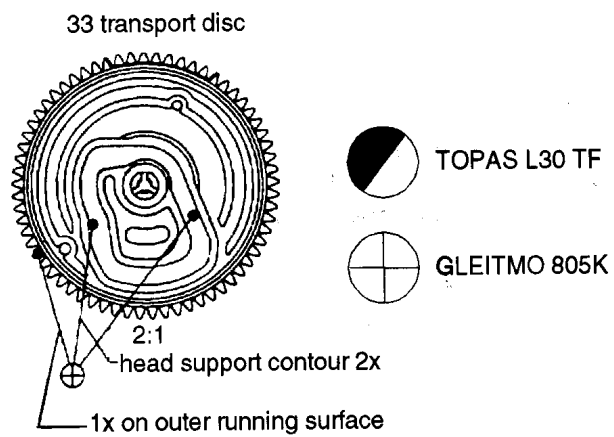


Figure 21

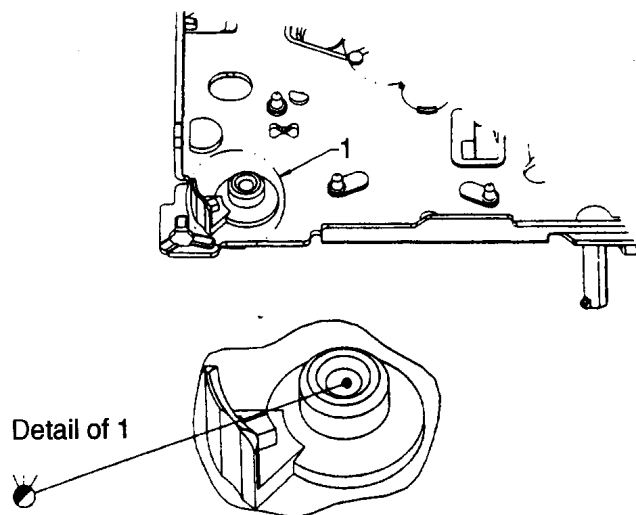


Figure 22

6.16 Servo drive gear cluster pos. 15

- *Note:* refer to figure 17.
- Carefully lift the damping gear pos. 16 / 17 / 92 by a screwdriver as shown in the figure and remove it.
Leave this assy complete!
- Remove switching lever pos. 49.
- Remove swivel lever assy pos. 47.
- Take out connection wheel pos. 19.
- Take out gear cluster pos. 15.
- *Important:* when re-assembling, oil the gear bearings.

6.17 Diverting wheel pos. 10

- Remove belt pos. 3.
- Remove the diverting wheel with help of special jig / puller.
- *Note:* When re-assembling, grease the wheel bearing in accordance with figure 22 and insert a *new* belt!

6.18 Coupling lever assy pos. 65

- *Note:* the deck must be in the **eject** position!
- Remove damping gear assy pos. 16 / 17 / 92 (see '6.16'). Leave this assy complete!
- Remove switch lever assy pos. 49 (see '6.13').
- Remove swivel lever assy pos. 47.
- Remove connection wheel assy pos. 19.
- Remove coupling spring pos. 66.
- Shift the coupling slider pos. 67 completely backward and remove it with help of a pair of tweezers.
See figure 18.
- Take out the coupling lever pos. 65.

6.19 Re-assembly precautions

When re-assembling the deck, take care of proper mounting of the cassette loading assy. The cam of the lift plate pos. 53 (A in figure below) must fall into the sleeve of the loading assy plate of pos. 50. See figures 11, 12 and 23.

The other cam B must fall into the notch of the gear rod.

The loading assy plate must match the base plate *completely*. Bend the three lips back into the right direction so that the loading assy plate is locked. See also figure 16.

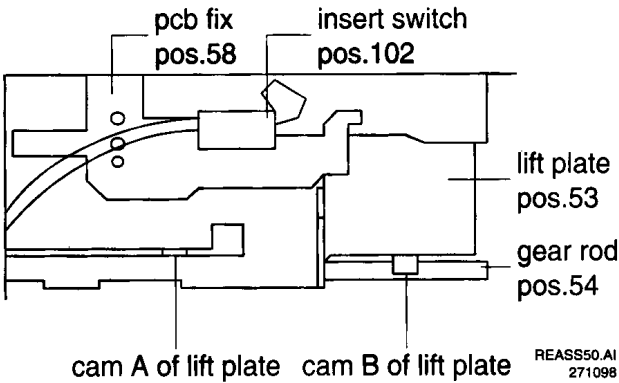


Figure 23

Always use a new belt when re-assembling it! The belt must be mounted as indicated in the figure below.

Take care that the belt is not twisted, not touched by grease and not damaged by sharp edges of the chassis!

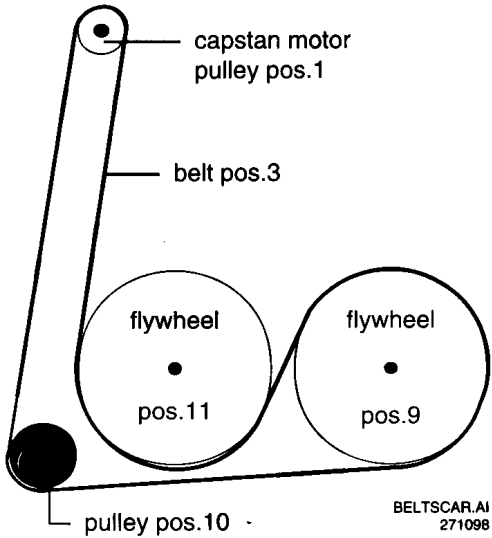


Figure 24

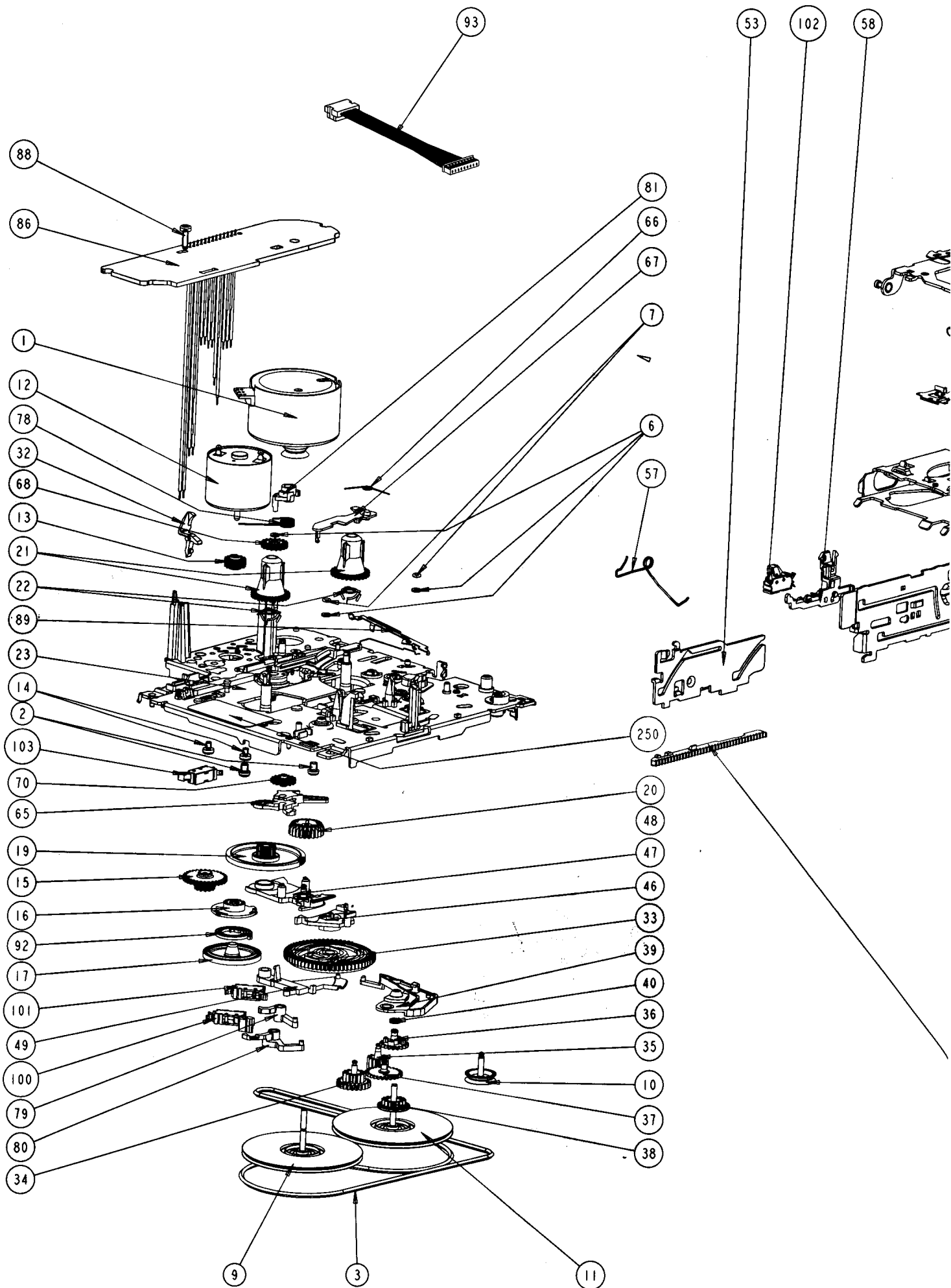
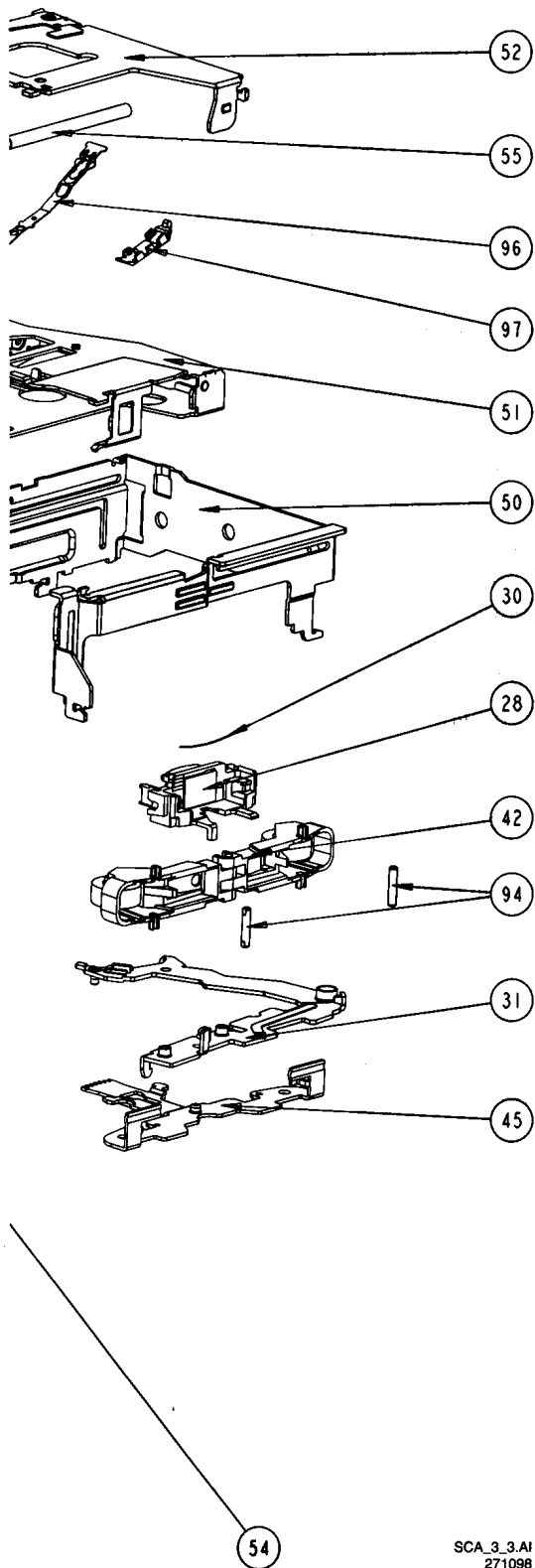


Figure 19



SCA_3_3.AI
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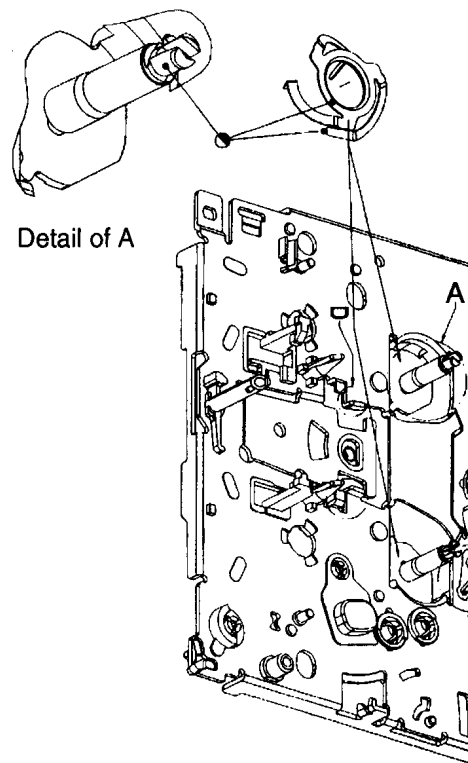


Figure 20

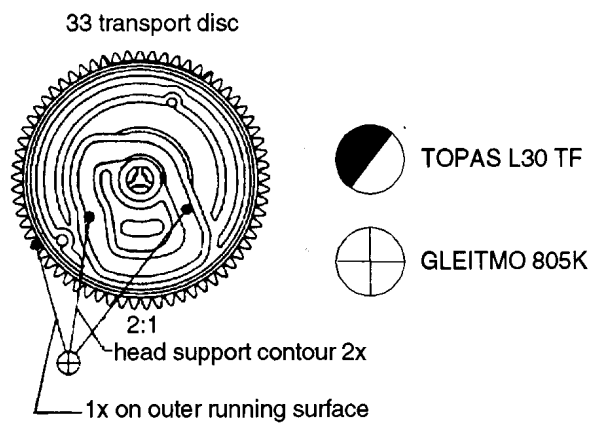


Figure 21

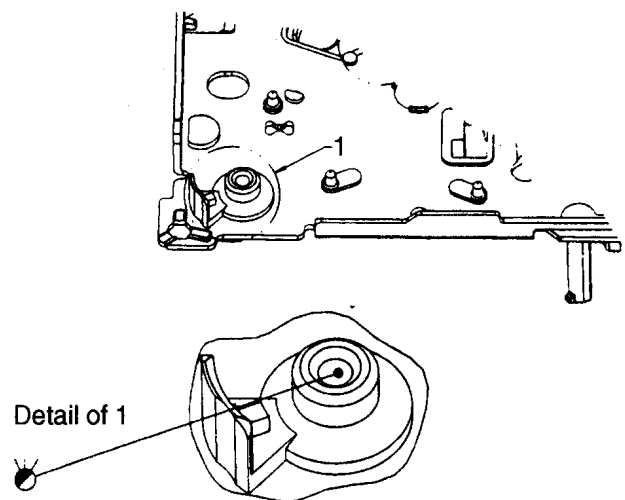


Figure 22