

**Car Cassette Deck SCA-R3.3 SCA-R3.1**

# Service Manual

12 V **1. GENERAL**

The SCA-R3.3 is a full-logic Servo Controlled Autoreverse tape deck which is fully  $\mu$ P-controlled. The deck is controlled by the headset via the standardized I<sup>2</sup>C bus.  
Version -R3.3 is the standard version with an 8-pole MOLEX PICOFLEX interface connector.  
The SCA-R3.1 has an 11-pole MOLEX SPOX interface cable.  
Mechanically the -R3.1 version is the same as the -R3.3.

**2. TECHNICAL DATA**

Operating voltages	:	10.0 - 16VDC (V1) (13.2VDC nom.) 4.75 - 5.25VDC (V2) (5.0VDC nom.)
Tape speed	:	4.76 cm/s (-1...+3%)
Number of tracks	:	2 x 2
Wow and Flutter	:	≤ 0.3% DIN weighted
S/N ratio	:	≥ 46dB (measured at preamplifier)
Crosstalk suppression (track 2-3)	:	≥ 50dB
Channel separation (track 1-2/3-4)	:	≥ 40dB
Fast winding time	:	≤ 100 sec (C-60)
Bus interface	:	I <sup>2</sup> C
Weight (only mechanism)	:	400 g

### 3. MAINTENANCE

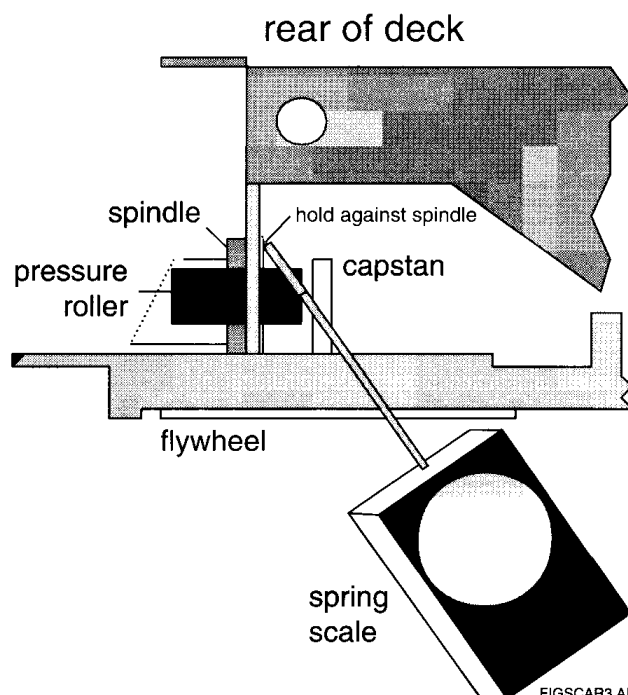
The tape deck mechanism requires periodic cleaning.

#### 3.1 Cleaning cassette

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

#### 3.2 Cleaning with alcohol or spirit

- Cleaning with alcohol or spirit is also possible.
- Especially the following parts need cleaning:
  - Playback head pos. 28.
  - Capstans pos. 9/11 and pressure roller assy pos. 42.
  - Pulley pos. 10 and motor pulley.



### 4. ADJUSTMENTS AND CHECKS

#### 4.1 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

#### 4.2 Roller pressure

The pressure on the capstan should be 250 - 350 grammes (2.5 - 3.5 N).

This pressure is measured as follows (in NOR and REV play):

- Select NOR play mode.
- Push the back pressure roller spindle of pos. 42 back by means of the spring scale.
- The back pressure roller can be reached via the opening at the rear of the deck (see figure i).

Figure i

- At the point where the pressure roller and capstan (of flywheel pos. 11) just dis-engage the spring scale should be read.
- If the pressure is incorrect, replace roller assy.
- Select REV play mode.
- Push the front pressure roller spindle of pos. 42 back by means of the spring scale.
- At the point where the pressure roller and capstan (of flywheel pos. 9) just dis-engage the spring scale should be read.
- If the pressure is incorrect, replace roller assy.

#### 4.3 Take-up wheels pos. 21

- Insert friction test cassette 811/CTM (NOR and REV).
- Play mode take-up torque should be 3.5 - 7.5 mNm.
- Fast wind torque should be 4 - 15 mNm.
- If the torque is incorrect, replace take-up wheel(s) pos. 21.

#### 4.4 Wow & Flutter / tape speed

This check should 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 should be  $\leq 0.3\%$  (DIN weighted).

- The tape speed should be 4.76 cm/s (-1..+3%).
- The tape speed can be adjusted with the screw of the capstan motor.
- This screw can be reached via the hole in the pcb pos. 86 (see figure ii).
- Use a screw driver of 1.8mm with an insulated shaft.

In case of an excessive wow & flutter value, 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

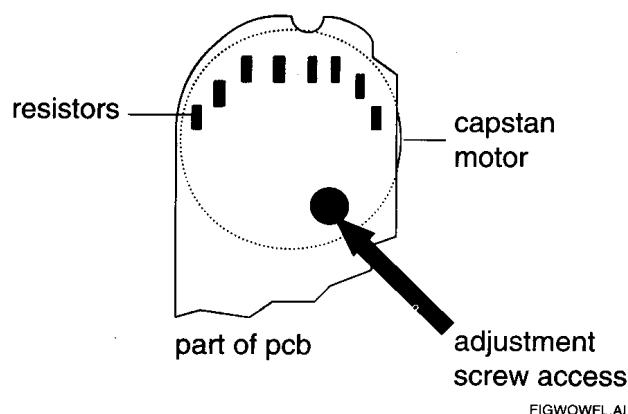


Figure ii

## 5. DISASSEMBLY PROCEDURE

### 5.1 Important

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

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.

### 5.2 Loading position

Take care that the cassette lift and the transport disc pos. 33 are in the right position before to put it in the load position!

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

### 5.3 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.

### 5.4 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 graps in the spare screw hole of the motor.

### 5.5 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 graps in the hole of the motor.

### 5.6 Pressure rollers pos. 42

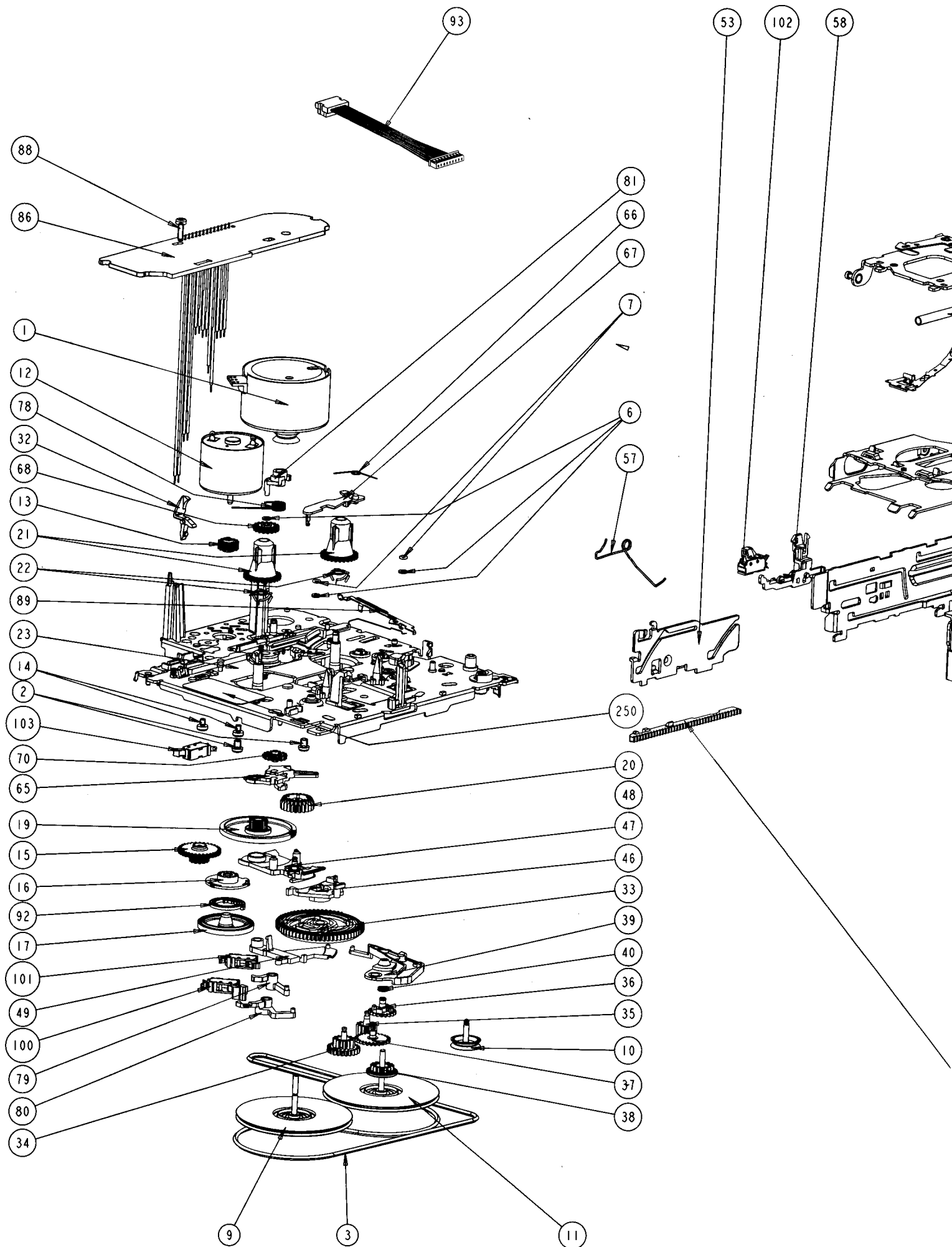
- Remove the holders with the pressure rollers by unclicking them from the centre pivot which is at the right side of the base plate pos. 23.

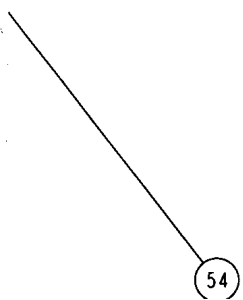
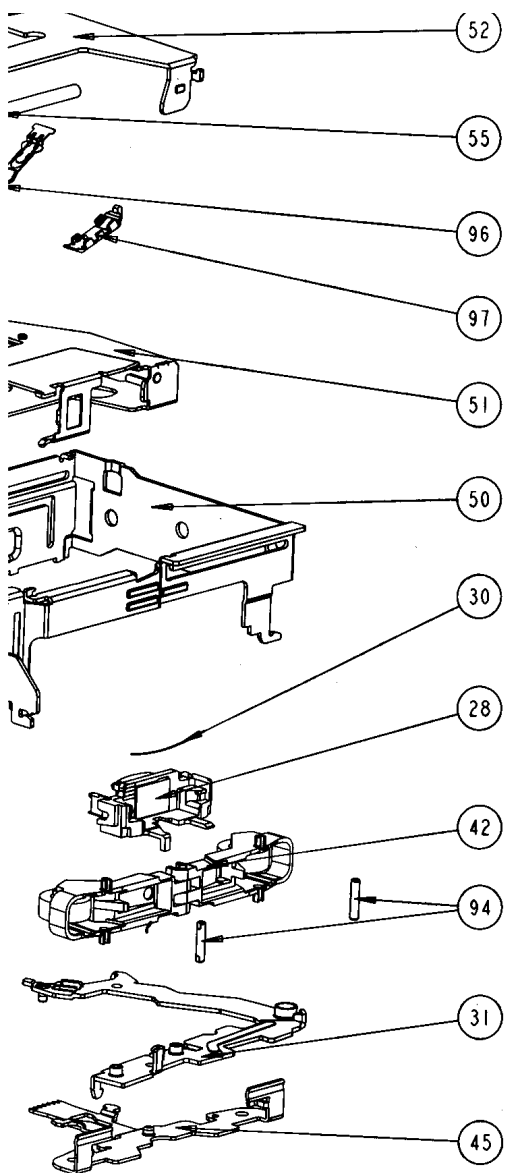
### 5.7 Head assy pos. 28

- Remove the pressure roller assy as described in section 5.6.
- Remove the spring pos. 30.
- Remove the head assy from the holder of the base plate pos. 23.

- continued on page 4 -

# 6. EXPLODED VIEW SCA-R3.3





SCA 3 3.A1

### 5.8 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.
- *Note: when re-assembling, use a new retaining ring, and take care that the gear does not become damaged. Put the flywheel spindle into the bearing carefully and turn it slightly.*
- Take out the flywheel.

### 5.9 Flywheel (REV) pos. 9

- *First* move the cassette holder to the **load** position by turning gear assy pos. 16 to the right.  
Hold the lever on pos. 52 in such a way that the cassette holder is unblocked and can move backward.
- When the cassette holder reaches the load 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.
- *Note: when re-assembling, use a new retaining ring!*
- Take out the flywheel.

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

- The cassette holder assy pos. 51/52 must be in the **ject** position.  
If the holder assy isn't yet, turn gear assy pos. 16 to the left.
- When the cassette holder reaches the load position, take-up wheel (NOR) 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.*

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

- The cassette holder assy pos. 51/52 must be in the **load** position.  
If the holder assy isn't yet, turn gear assy pos. 16 to the right.
- When the cassette holder reaches the load 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.*

### 5.12 Transport disc pos. 33

- Remove belt pos. 3.
- Remove switching lever pos. 49 (*note: Use the right tools.*)
- Remove play switch lever pos. 80.
- Remove standby switch lever pos. 79.
- Move the arm of switch lever assy pos. 39 away from the transport disc.
- Remove intermediate wheel pos. 34.
- Take out transport disc with help of the special jig / puller to release the three snaps. Do not damage the post!
- *Note: the head support should be in the 'standby' position. Grease the head support assy at the right points.*

### 5.13 Switch lever assy pos. 39 / Switch wheel 1 pos. 37

- Remove flywheel (NOR) pos. 11 as described in section 6.
- Remove switch wheel 1 pos. 37 with help of the special jig/puller.
- Take out switch lever assy.

### 5.14 Gear rod pos. 54 / Lift wheel gear pos. 68

- Remove the cassette loading assy pos. 50 as described before.
- Take out gear rod.
- Remove fixation retaining ring pos. 6.
- *Note: when re-assembling, use a new ring!*
- Take out lift wheel gear.

### 5.15 Servo drive gear assy

- *Note: Use the right tools.*
  - Remove damping gear assy pos. 16.
  - Remove switching lever pos. 49.
  - Remove swivel level assy pos. 47.
  - Take out connection wheel pos. 19.
  - Take out gear cluster pos. 15.
- Important: when re-assembling, oil the gear bearings.*

### 5.16 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 in accordance with the lubrication overview.

### 5.17 Coupling lever assy pos. 65

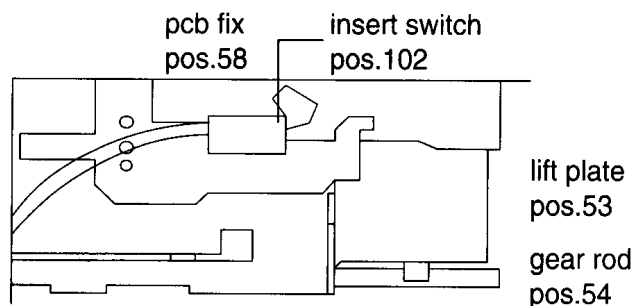
- *Note:* the deck should be in the **eject** position!
- Remove damping gear assy pos. 16.
- Remove switch lever assy pos. 39 (see '5.13').
- Remove swivel lever assy pos. 47.
- Remove connection wheel assy pos. 19.
- Remove coupling spring pos. 66 and coupling slider pos. 67.
- Take out the coupling lever.

### 5.18 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 iii) should fall into the sleeve of the loading assy plate of pos. 50.

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

The loading assy plate should match the base plate completely. Bend the three lips back so that the loading assy plate is locked.



cam A of lift plate   cam B of lift plate   REASS50.AI

Figure iii

The belt should 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!

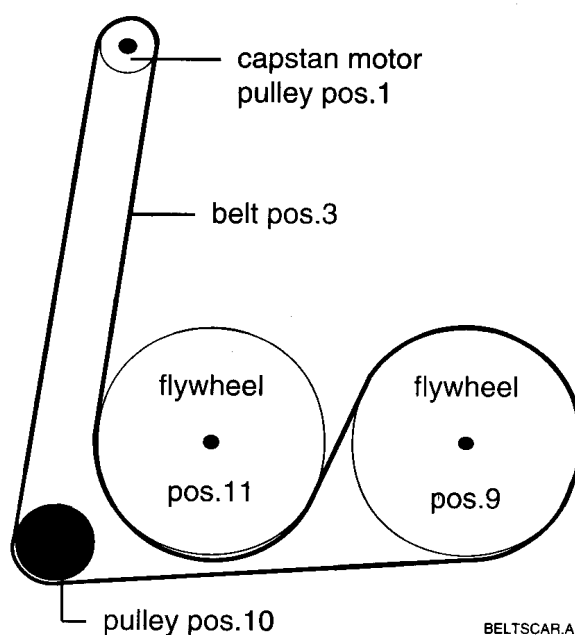
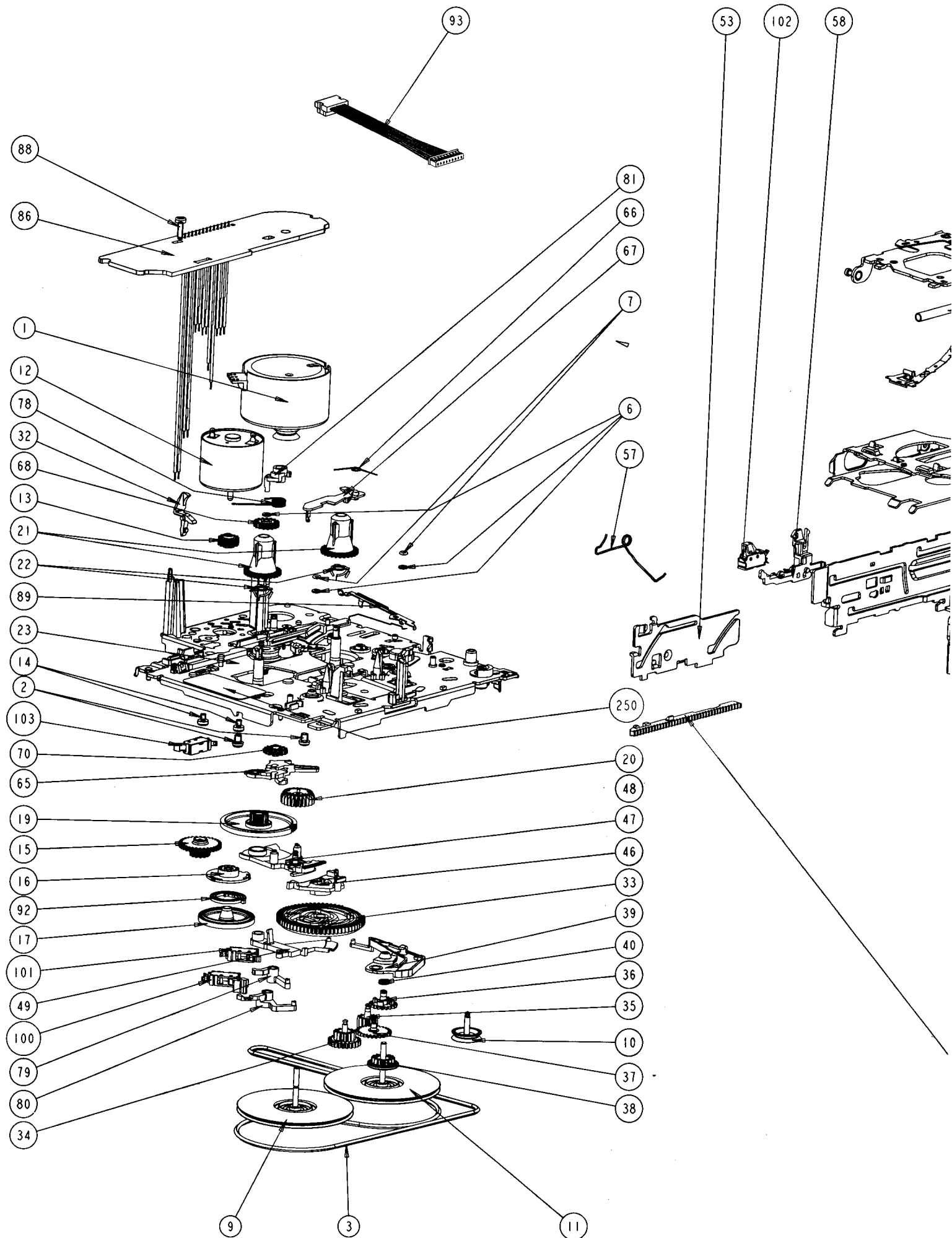
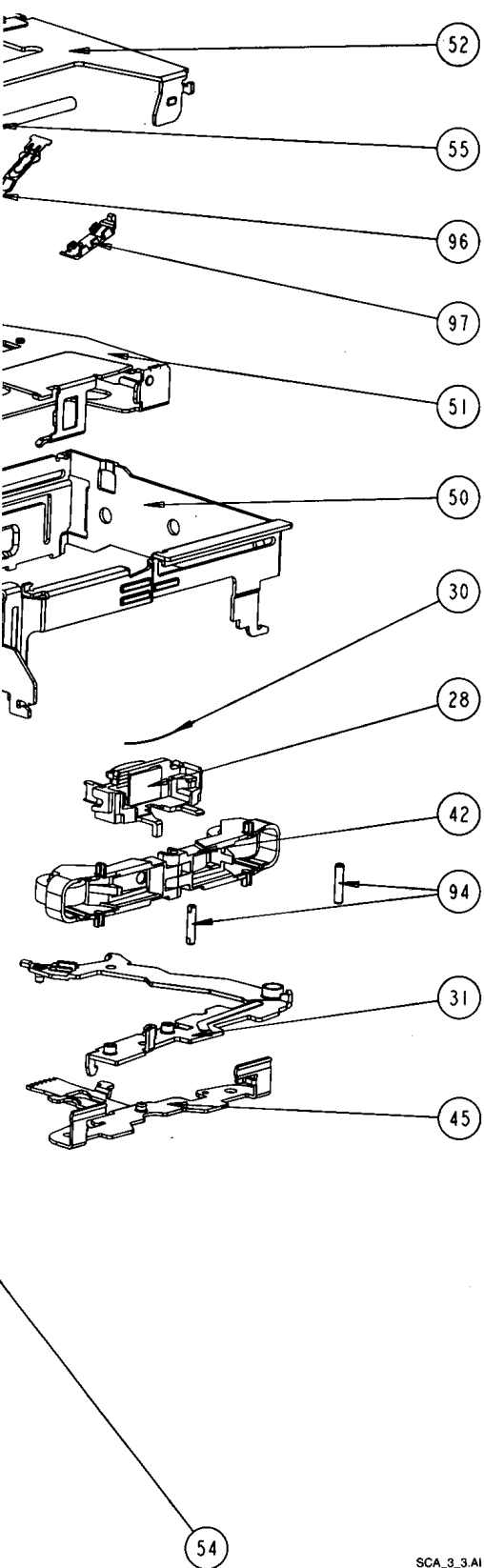


Figure iv

# 6. EXPLODED VIEW SCA-R3.3

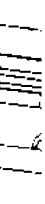






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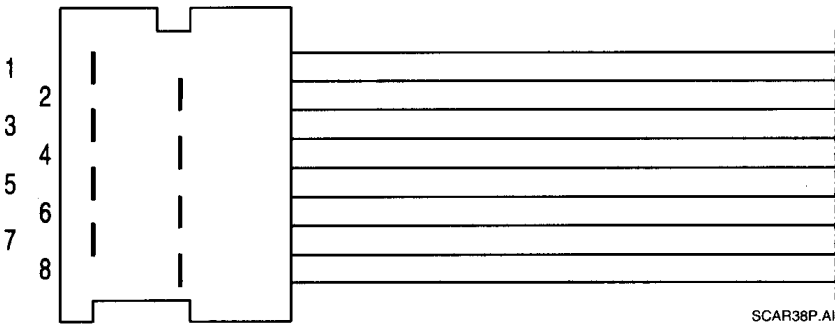
## 4





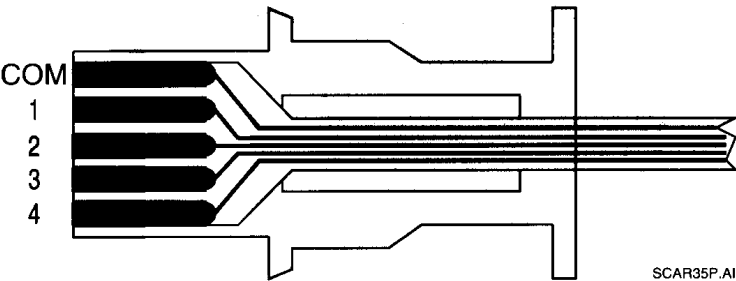
8. CONNECTIONS

8.1 SCA-R3.3 (basic version)



8 POLE CONNECTOR

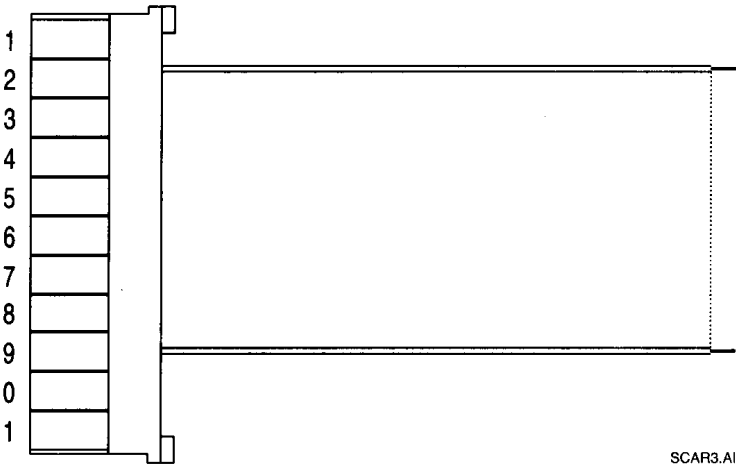
Pin	Signal
1	INSERT SWITCH
2	INSERT SWITCH - COM / GND
3	+ 12VDC
4	SERIAL CLOCK - SCL
5	SERIAL DATA - SDA
6	BUS REQUEST - CRQ
7	+ 5VDC
8	RESET



5 POLE HEAD CONNECTOR

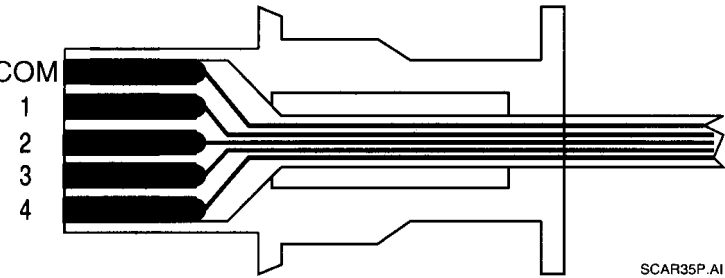
Pin	Signal
COM	COMMON
1	LEFT NOR (FORW.)
2	RIGHT NOR (FORW.)
3	RIGHT REV
4	LEFT REV

8.2 Connections SCA-R3.1



11 POLE CONNECTOR

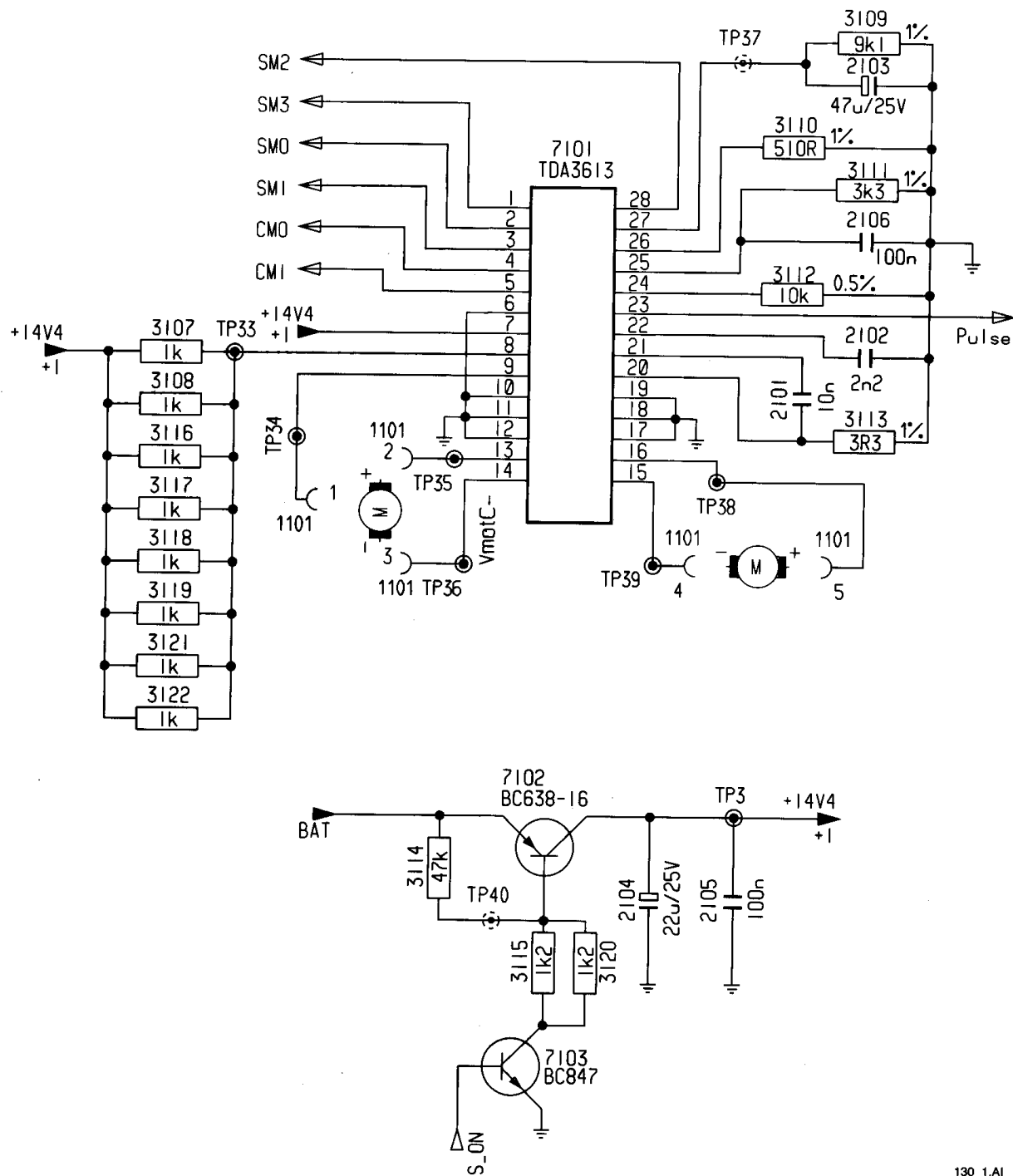
Pin	Signal
1	N.C.
2	INSERT SWITCH
3	INSERT SWITCH - COM / GND
4	+ 12VDC
5	SERIAL CLOCK - SCL
6	SERIAL DATA - SDA
7	BUS REQUEST - CRQ
8	+ 5VDC
9	RESET
10	N.C.
11	N.C.



5 POLE HEAD CONNECTOR

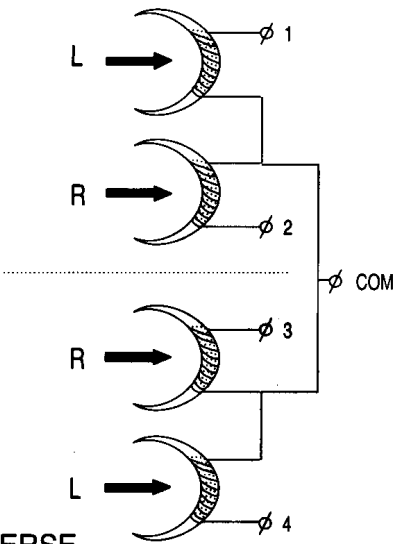
Pin	Signal
COM	COMMON
1	LEFT NOR (FORW.)
2	RIGHT NOR (FORW.)
3	RIGHT REV
4	LEFT REV

9. ELECTRICAL PART (CIRCUIT DIAGRAM 1 - HEAD CONNECTIONS - PCB LAYOUT)



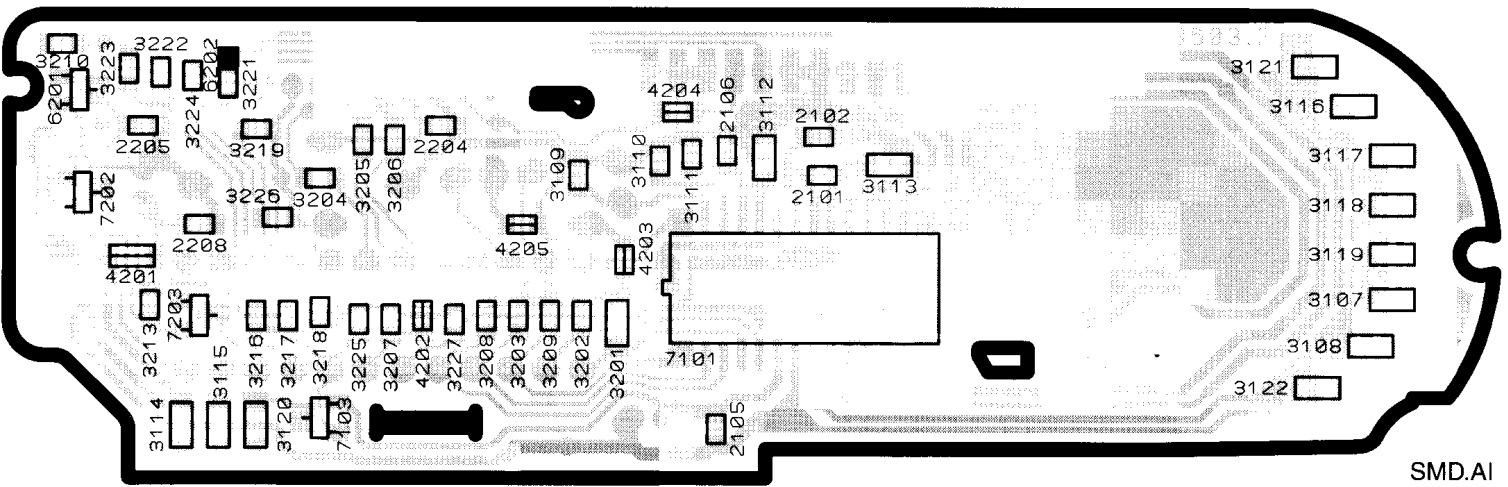
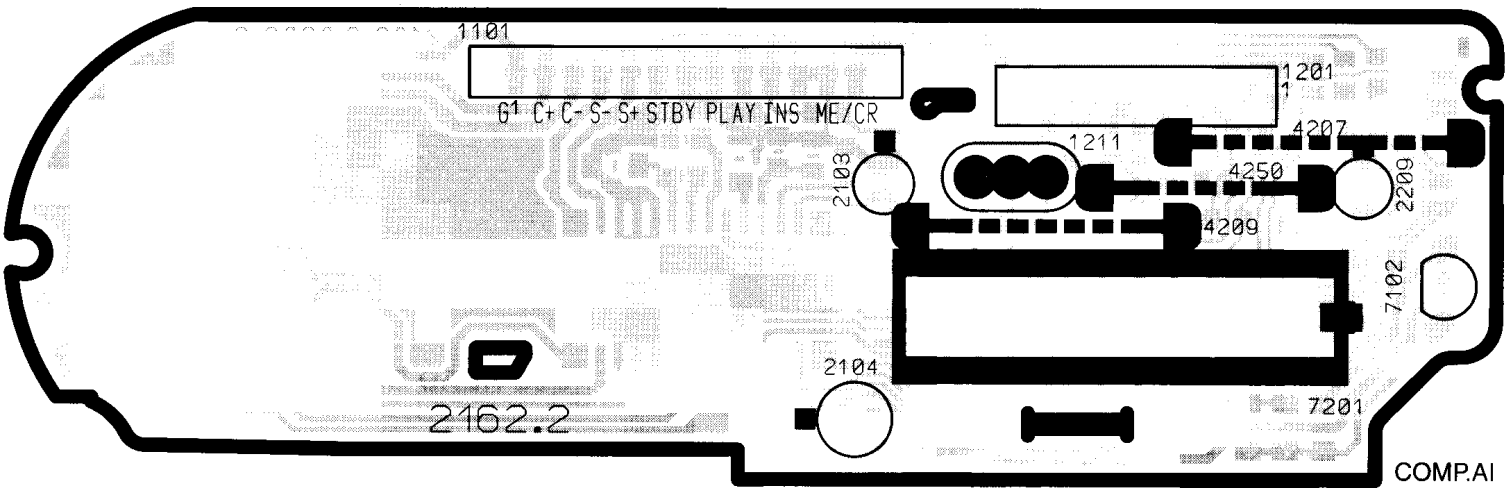
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NORMAL

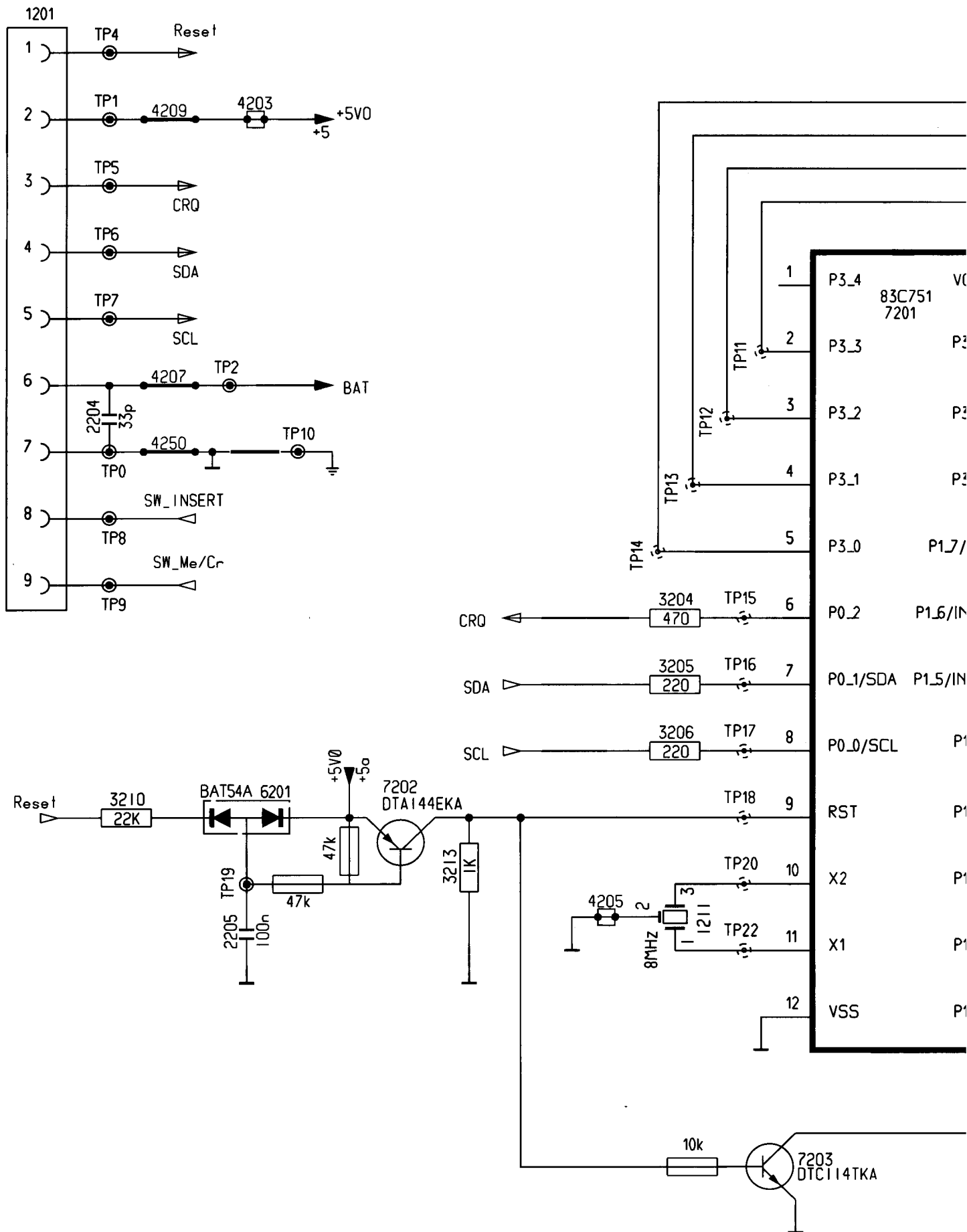


HEAD  
CONNECTIONS

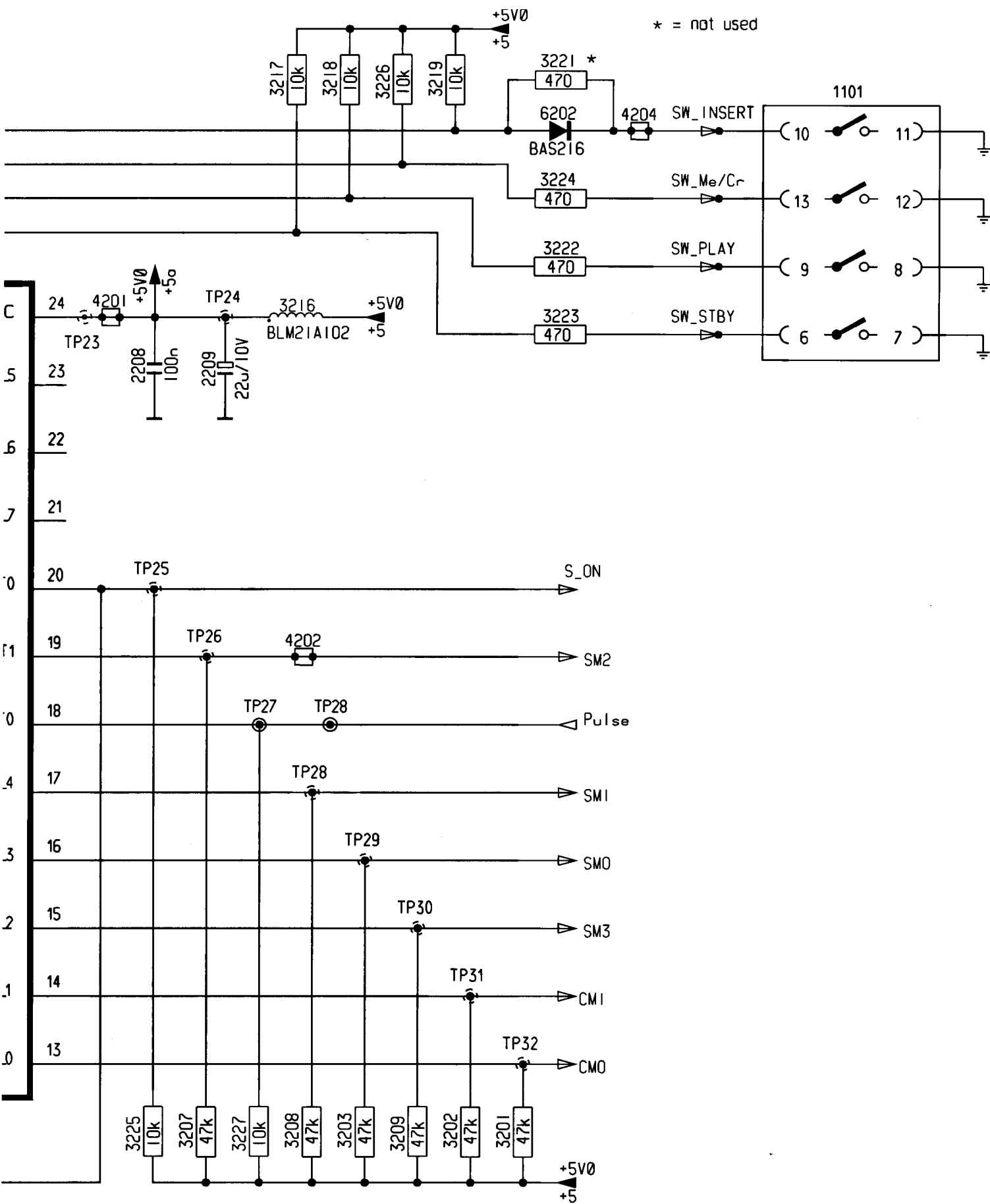
REVERSE



## 9. ELECTRICAL PART (CIRCUIT DIAGRAM 2)

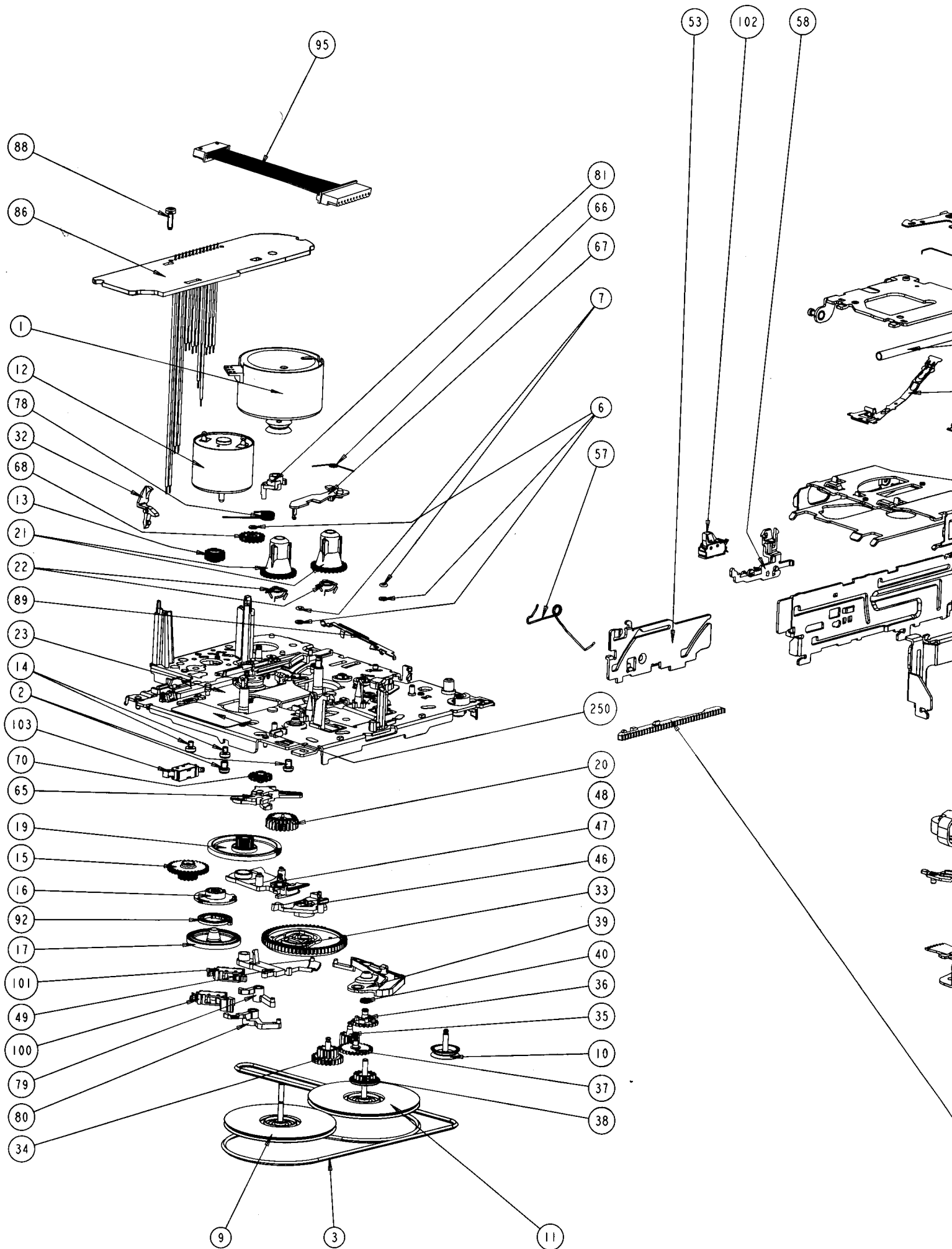


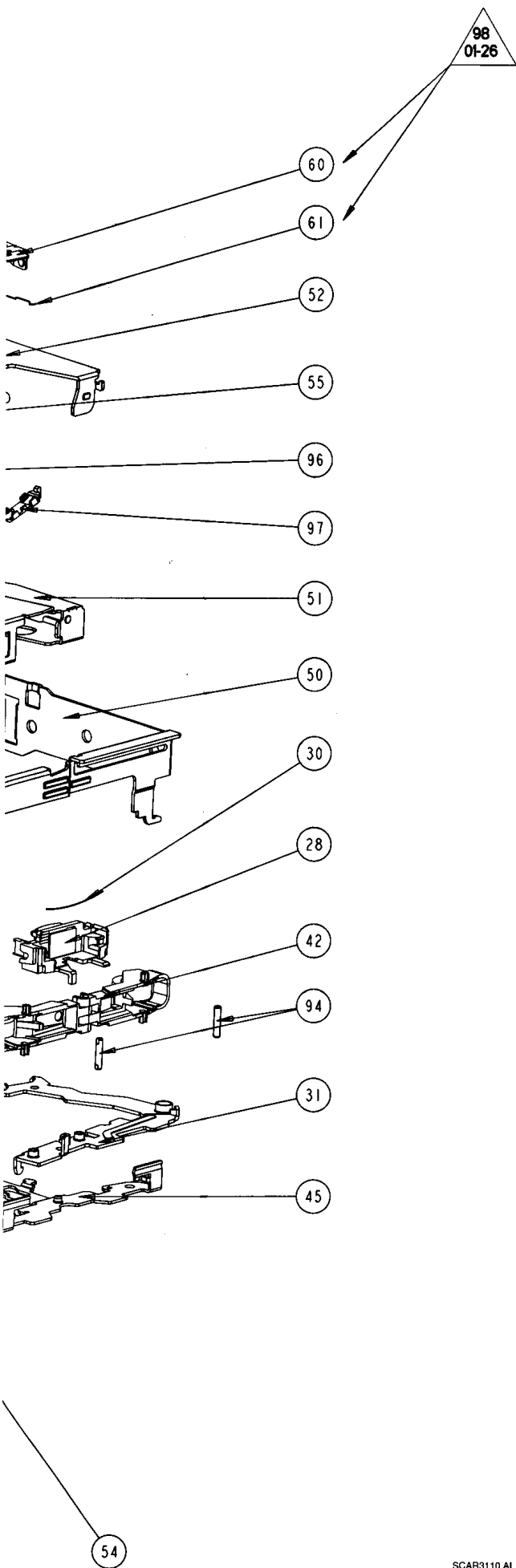




# 10. EXPLODED VIEW SCA-R3.1

(NOTE: for the SCA-R3.3 exploded view refer to section 6.)





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## 11. PARTS LIST

### 11.1 SCA-R mechanical parts

2	4822 502 12548	Special screw	39	4822 402 10829	Switch lever assy
3	4822 358 10221	Driving belt	42	4822 402 10831	Pinchroller brkt assy
6	4822 532 12841	Fixation retaining ring	45	4822 402 10819	Lever simpson
7	4822 532 12842	Ring oil protection	46	4822 402 10821	Anchor lever
9	4822 528 11176	Flywheel reverse	47	4822 432 11304	Swivel lever assy
10	4822 528 81144	Divertingwheel pulley	49	4822 402 10822	Lever switching
11	4822 528 11183	Flywheel assy normal (with pulley)	50	4822 691 10627	Loading assy
14	4822 502 14467	Screw torx M2x2,5	54	4822 522 10638	Gear rod
15	4822 522 10637	Gear cluster	58	4822 401 11716	Pcb fixation
16	4822 522 10641	Damping gears assy	65	4822 402 10832	Coupling lever assy
19	4822 528 11177	Wheel connection	66	4822 492 11484	Spring coupling
21	4822 528 11178	Take up wheel	67	4822 402 10824	Slider coupling
22	4822 492 11481	Spring back tension	68	4822 522 10639	Lift wheel
30	4822 492 11482	Spring head	78	4822 492 11485	Spring switch loading
31	4822 404 10937	Head support	79	4822 402 10826	Switch lever Standby
32	4822 402 10863	Rocking lever	80	4822 402 10827	Switch lever Play
33	4822 466 11665	Transport disc	81	4822 402 10828	Switch lever Loading
34	4822 528 11179	Wheel intermediate	88	4822 502 21488	ScrewM2x7 Ni tapt.
35	4822 528 11181	Drive wheel	89	4822 460 11098	Blocking disc transp.
37	4822 528 11182	Switch wheel 1			

### 11.2 SCA-R electrical parts

1	4822 361 11009	Capstan motor assy
12	4822 361 11011	Servo motor assy
28	4822 249 10542	Magnetic head w/flexfoil
86	4822 214 12502	Pcb assy SCA R3.1
93	4822 320 12057	Cable assy SCA R3.3
95	4822 320 12144	Cable assy SCA R3.1
100	4822 276 13913	Switch Play
101	4822 276 13914	Switch Standby
102	4822 276 13915	Switch Insert
103	4822 276 13916	Switch CR/ME
105	4822 214 12503	PCB assy SCA R3.3