
leboncoin
Belt Drive


AMSTRAD
MODEL TS87
MADE IN ENGLAND
S/85096


leboncoin

Informations importantes

SED

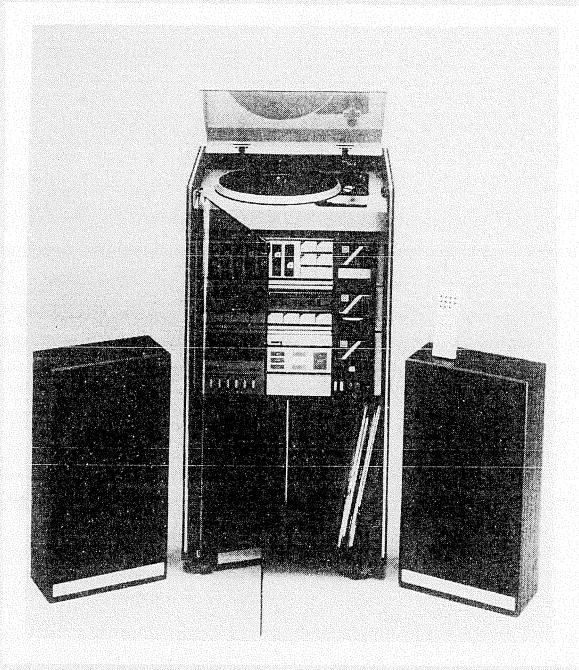
AMSTRAD

CHAINE COMPACTE A COMMANDE A DISTANCE
MODELES TS86/87

CARACTERISTIQUES TECHNIQUES

MISE EN PLACE DE LA PORTE EN VERRE

AMSTRAD



TS86/87
REMOTE CONTROL
TOWER SYSTEM

SERVICE MANUAL

CONTENTS

TECHNICAL SPECIFICATION

Power Output	: 8 Watts RMS per channel into 4 ohms
Frequency Response	: 30Hz–20kHz
Distortion	: 1% @ 1kHz Full Power
	: 0.2% @ 1kHz Half Power
Graphic Equaliser	: 50Hz ±12dB
	: 150Hz ±12dB
	: 400Hz ±12dB
	: 1kHz ±12dB
	: 2.5kHz ±12dB
	: 5kHz ±12dB
	: 15kHz ±12dB
Filters	: Rumble –10dB @ 100Hz
	: Scratch –10dB @ 10kHz
	: Loudness +10dB @ 100Hz
	: +6dB @ 10kHz
Signal to noise ratio	: Better than 55dB
TUNER SECTION	
FM Section	: 86.5 – 109MHz
MW Section	: 525 – 1680kHz
LW Section	: 155 – 280kHz
FM Sensitivity	: 2.5uV
FM Aerial Input	: 75 ohms
CASSETTE SECTION	
Tape	: Cassette Type
Tape Speed	: 4.75cm per second (TS87 only - 9.5cm per second @
Tracks	: 2 Track Stereo Hi-Speed Dubbing)
Wow and Flutter	: 0.2% WRMS
Distortion	: Less than 1% @ 1kHz
Frequency Response	: 30Hz – 14kHz
Microphone Sensitivity	: 0.5mV – 600ohms
TURNTABLE	
Cartridge	: TC-12M
Transmission	: Belt Drive
Speed Control	: Electronic
REMOTE CONTROL UNIT	
Method of Transmission	: Infra Red-Pulse Position Modulation (PPM)
Volume Up/Down	: 0dB max –80dB min
Balance Left/Right	: –25dB attenuation per channel
Bass Up/Down	: ±10dB @ 100Hz
Treble Up/Down	: ±10dB @ 10kHz
Batteries	: 2 x 1.5V Leak Proof Type Hitachi Maxell 200, Ever Ready R6PP or equivalent.
DIMENSIONS AND WEIGHT	
Main Unit	: H-86cm, W-43cm, D-39cm
	: Weight 25.0Kg
Speakers	: H-49cm, W-26cm, D-13cm
	: Weight 3.0Kg each
Mains Voltage	: 220-240V AC 50Hz

Safety

All units are tested to the following safety specification during manufacture:-

1. **Flash Test:** Tested at 2.2kV between live and neutral of the mains lead joined together and all accessible metal points on the exterior of the set.
2. **Insulation resistance test:** Tested between the live and neutral of the mains lead joined together and all accessible metal points on the exterior of the set to show a resistance of at least 4Mohms at 500V DC.
3. **Earth lead continuity test:** Tested for a continuity of less than 0.5ohms at 10 Amps between the earth of the mains lead and the record deck transit screw.

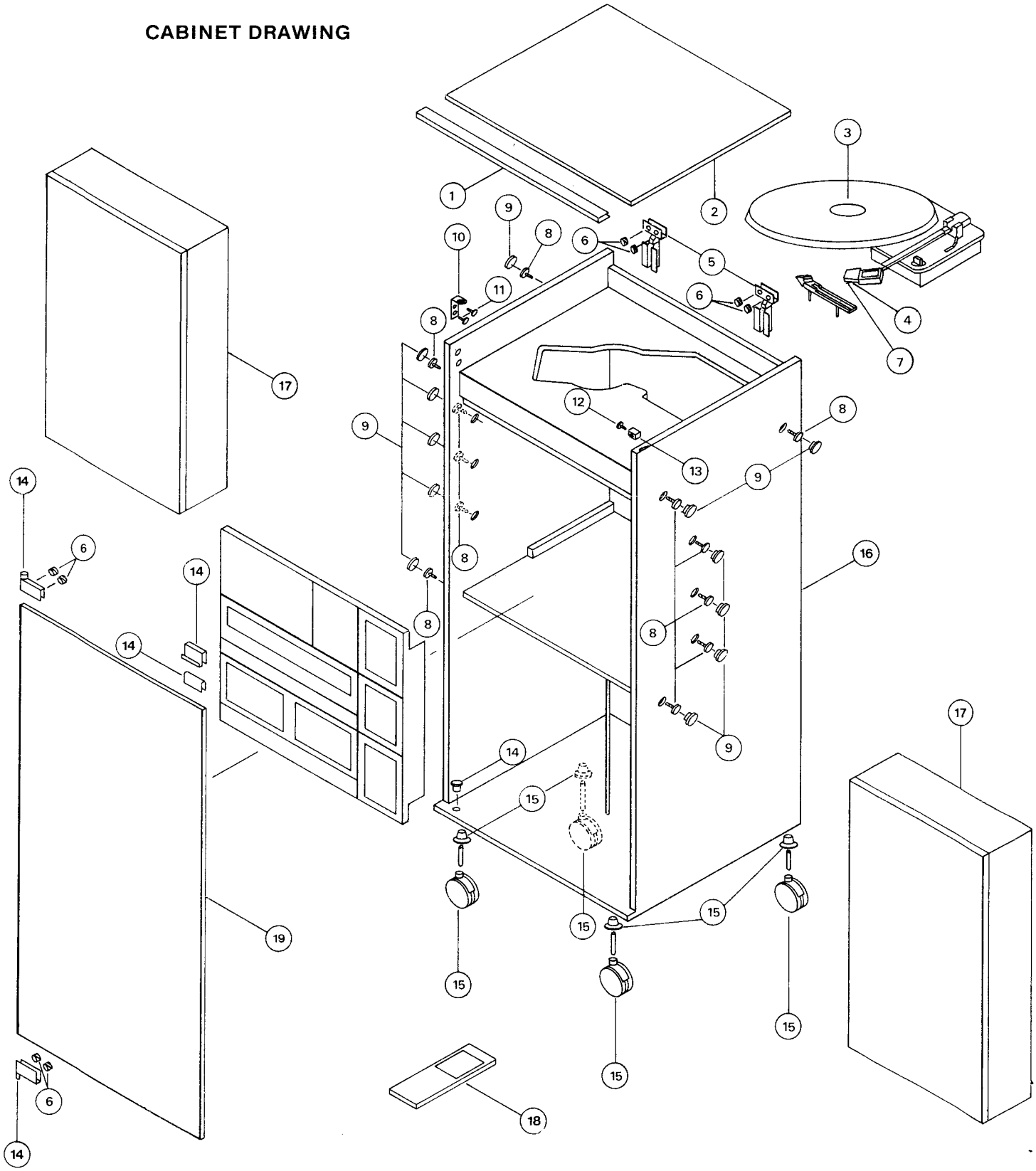
If there are any doubts about continued electrical safety after servicing, the above tests should be carried out.

AMSTRAD CONSUMER ELECTRONICS PLC
BRENTWOOD HOUSE, 169 KINGS ROAD,
BRENTWOOD, ESSEX CM14 4EF.
Telephone: Brentwood (0277) 228888
Telex: 995417 AMSELE G.

GENERAL TROUBLE SHOOTING GUIDE

SYMPTOMS	FAULT	CURE
All functions on unit fail to operate.	Lack of power supply.	Check mains plug/mains fuse.
All functions fail to operate except record deck mechanism.	Fuse TF501 blown. If fuse continues to blow check for faulty mains transformer.	Replace. Check and replace as necessary.
All functions fail to operate except record deck mechanism.	Fuses 502 or 503 blown. If either fuse continues to blow. If fuse still continues to blow.	Replace as necessary. Check Bridge Rectifier or Power IC. General circuit fault. Check and repair as necessary.
VU LEDs not working.	Connecting plug between cassette section and main amplifier not locating properly.	Re-locate.
FM Tuner section selects no station but gives loud hiss.	Aerial not connected or aerial faulty. If there is no fault in aerial.	Check aerial and replace or repair as necessary. General circuit fault in FM stage. Check and repair as necessary.
FM Tuner gives some sound but poor quality.	Poor aerial: 75ohm downlead broken. If aerial and leads are ok.	Repair/replace as necessary. General FM circuit fault. Check and repair as necessary.
FM works, but stereo light inoperative.	Decoder incorrectly aligned. LED Faulty. Check decoder IC201. If IC201 ok, fault is probably C211 (220pF Poly).	Re-align decoder (see alignment instructions). Replace. Check and replace as necessary. Check and replace as necessary.
AM radio section (MW/LW) inoperative or very weak.	Incorrect alignment. If alignment correct.	Check and re-align as necessary. Circuit fault. Repair as necessary. N.B. If replacing any components on the AM section, the set must be re-aligned.
Record deck fails to operate mechanically.	Wire disconnected from power supply. Motor fault. Belt disconnected.	Repair as necessary. Repair/replace as necessary.
Record deck operates mechanically but gives weak or distorted sound on both channels.	Stylus damaged. Stylus not located correctly in cartridge. Cartridge faulty.	Replace. Re-locate. Replace.
Record deck operates mechanically but gives no sound on either or one channel.	Cartridge faulty. Wiring between cartridge and amplifier section disconnected.	Replace.
Record deck wow or flutter.	Belt slipping or stretched.	Clean, relocate or replace as necessary.
Record deck speed control inoperative.	Speed control IC faulty.	Check and replace as necessary.
Cassette deck mechanism not turning.	Connecting plug between cassette section and main amplifier not locating. Motor faulty. Drive belt not in position. Cassette jammed. General mechanical fault in cassette mechanism.	Re-locate. Check and replace as necessary. Re-position drive belt. Check for stretching of the belt and replace if necessary. Replace cassette. Check and repair as necessary.
Cassette speed varies (wow and flutter).	Dirty or worn pinch roller assembly. Drive belt in incorrect position. Motor faulty. General mechanical fault in cassette mechanism.	Clean or replace as necessary. Re-position drive belt or replace if worn or stretched. Check and replace as necessary. Check and repair as necessary.
Poor quality of recording or playback.	Dirty R/P Head. R/P Head picks up dust deposit almost constantly. R/P Head worn. Pin on connecting plug between cassette circuit and amplifier circuit not locating properly. General electronic fault on cassette.	Clean as necessary. Head requires demagnetisation. Replace. N.B. Please refer to cassette re-alignment instructions. Re-locate plug correctly. Check and repair as necessary.
When making new recordings, old recordings not erasing properly.	Faulty erase head. Wire disconnected from erase head. Faulty oscillator coil (L3103).	Replace. Repair as necessary. Check and replace as necessary.
VU LEDs not working correctly.	Faulty leads from main amplifier and cassette. LEDs faulty.	Check and repair as necessary. Replace and re-adjust.
Severe hum on one or both channels with volume at minimum.	Output IC faulty.	Check and replace.
Hum on one or both channels at high volume only.	General circuit fault.	Check and repair as necessary.
One channel not working.	Check speaker and speaker leads by reversal.	Repair or replace as necessary.
One channel not working and blows fuse(s) 502 or 503.	Output IC faulty or cassette fault.	Check and replace as necessary.
Volume or tone controls crackling when operated.	Dirty or worn potentiometers.	Spray with switchclean or replace if necessary.
Output LEDs not working correctly.	Faulty LEDs. Fault on LED PCB.	Replace as necessary. Check and repair as necessary.
Sound through headphones but not speakers, one or both channels.	Headphone socket faulty. Lead disconnected between 'phone socket and speaker socket. Speaker socket faulty.	Check and replace. Check and repair as necessary. Check and replace as necessary.
One speaker gives distorted sound.	Faulty speaker. Check by reversal of speakers. If reversal of speakers demonstrates fault in amplifier section, faulty power IC. If fault condition persists, general amplifier fault.	Repair and replace as necessary. Check and replace. Check and repair as necessary.

CABINET DRAWING



CABINET PARTS LIST

Sym	Description	Part No.
1	Glass Lid Trim	90090
2	Glass Lid	70001
3	BSR P281 Record Deck	S/83008
4	Tetrad Cartridge	83007/A
5	Dust Cover Hinge	90002
6	Plastic Screws	B3510
7	Tetrad Stylus	83007/B
8	Chassis Mounting Screw	91010
9	Screw Cap	92002/MD

Sym	Description	Part No.
10	Hinge Mounting Bracket	90003
11	Bracket Screw	91061
12	Magnet Screw	91116
13	Magnet Assembly	90015
14	Glass Door Hinge Kit	90001
15	Castor Assembly	90100
16	Cabinet	B3086
17	Speakers (Pairs)	LS37
18	Remote Control	800061
19	Glass Door	70002

ALIGNMENT INSTRUCTIONS

Equipment required: VTVM; AM/FM Band SSG; Loop Antenna; AM/FM IF Genoscope; Non Metallic Trimming Tool; Dummy Load; – 470K; Oscilloscope; Frequency Counter.

AM Alignment

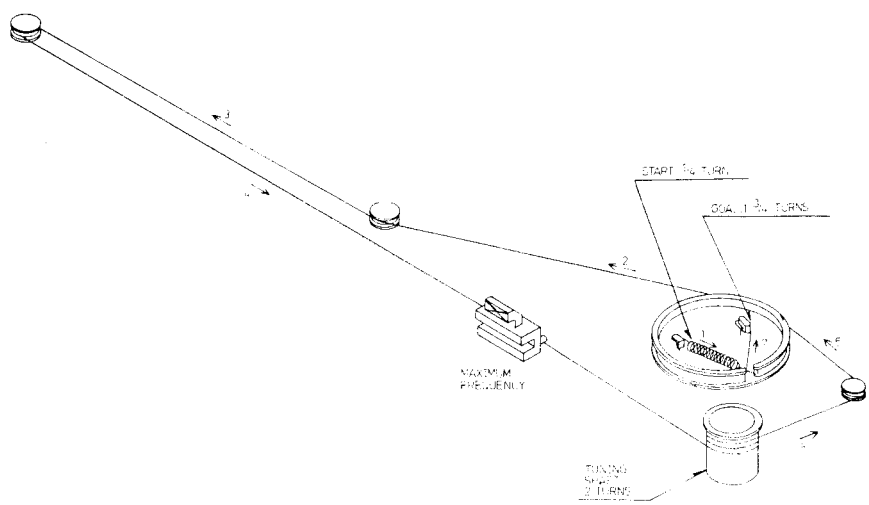
Step	FUNCTION	SIGNAL IN	SIGNAL OUT	METHOD	REMARKS
1.	AM IF Alignment at 468kHz.	Inject signal at L103 from AM IF SG. Select 468kHz AS IF.	Connect G'scope at TP3.	Adjust L107 and L105 to get max signal output on 'scope.	1. Ensure set switched to MW band. 2. Vol control max. Tone control at centre. 3. Sig. input optimum to avoid AGC action.
2.	REPEAT STEP 1 UNTIL NO FURTHER IMPROVEMENT IS OBSERVED.				
3.	MW Osc. Alignment at 525kHz.	Connect loop antenna to the ferrite rod. Inject signal from AM SSG at 525kHz.	Connect VTVM and O'scope across speaker output via dummy load.	Adjust L105 to obtain max sig. output on the meter and 'scope.	1. Ensure set tuned to 525kHz. 2. Vol control max. Tone control at centre. 3. Sig. input optimum to avoid AGC action.
4.	MW Osc. Alignment at 1650kHz.	Connect loop antenna to the ferrite rod. Inject signal from AM SSG at 1650kHz.	Connect VTVM and O'scope across speaker output via dummy load.	Adjust TC106 to obtain max sig output on the meter.	1. Ensure set tuned to 1650kHz. 2. Vol control max. Tone control at centre. 3. Sig. input optimum to avoid AGC action.
5.	REPEAT STEPS 3 & 4 UNTIL NO FURTHER IMPROVEMENT OBTAINED.				
6.	MW aerial alignment at 600kHz.	Connect loop ant. to the ferrite rod to inject sig from AM SSG at 600kHz.	Connect VTVM and O'scope across speaker output via dummy load.	Adjust L103 to obtain max sig. output on the meter and scope.	1. Ensure set tuned to 600kHz. 2. Vol control max. Tone control at centre. 3. Sig output optimum to avoid AGC action.
7.	MW aerial alignment at 1400kHz.	Connect loop ant. on the ferrite rod to inject sig from AM SSG at 1400kHz.	Connect VTVM and O'scope across speaker output via dummy load.	Adjust TC105 to obtain max sig output on the meter & scope.	1. Ensure set tuned to 1400kHz. 2. Vol control max. Tone control at centre. 3. Sig. input optimum to avoid AGC action.
8.	REPEAT STEPS 6 & 7 UNTIL NO FURTHER IMPROVEMENT.				
9.	LW Osc and aerial alignment at 140kHz.	Connect loop ant to ferrite rod. Inject 140kHz from AM SSG.	Connect VTVM and O'scope across speaker output via dummy load.	Adjust L104 and 103 to obtain max sig. output on the meter and scope.	1. Ensure set switched to LW. 2. Set tuned to 140kHz. 3. Vol control max. Tone control at centre. 4. Sig. input optimum to avoid AGC action.
10.	LW Osc alignment at 280kHz.	Connect loop ant to ferrite rod. Inject 280kHz from AM SSG.	Connect VTVM and O'scope across speaker output via dummy load.	Adjust TC104 and TC103 to obtain max sig output on the meter and scope.	1. Ensure set switched to LW. 2. Vol control max. Tone control at centre. 3. Sig. input optimum to avoid AGC action.
11.		REPEAT STEPS 9 & 10 UNTIL NO FURTHER IMPROVEMENT.			MW & LW alignment now complete. Ensure all the coils and transformers are sealed.

FM ALIGNMENT

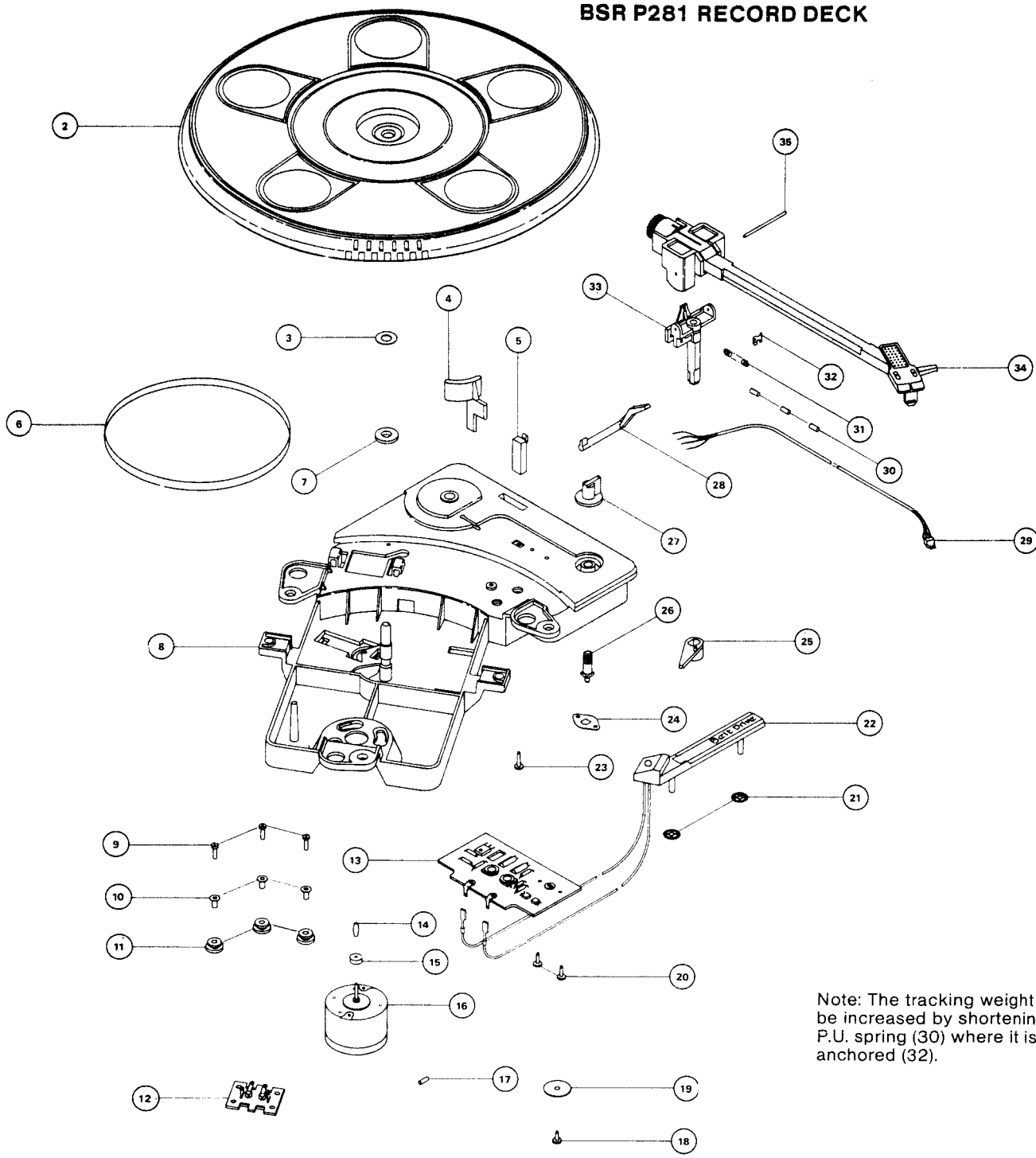
1.	FM IF alignment at 10.7MHz.	Inject 10.7MHz signal from FM IF SSG at TP1.	Connect O'scope to TP3.	Adjust L102 to obtain max output on the scope with a symmetrical 'S' curve centered at 10.7MHz.	1. Set switched to FM. 2. Ensure stereo/mono sw. switched to mono. 3. Sig. input optimum to avoid AGC action.
2.	FM IF alignment at 10.7MHz.	Inject 10.7MHz signal from FM IF SSG at TP1.	Connect O'scope to TP3.	Adjust L108 to obtain symmetrical 'S' curve.	1. Ensure set switched to FM. 2. Ensure stereo/mono sw. switched to mono. 3. Sig. input optimum to avoid AGC action.
3.	REPEAT STEPS 1 & 2 UNTIL NO FURTHER IMPROVEMENT				
4.	FO Osc alignment at 86.5MHz.	Inject 86.5MHz signal from FM IF SSG at J101.	Connect scope & VTVM across dummy load.	Adjust L102 to obtain max output on the meter.	1. Ensure set tuned to 86.5MHz. 2. Ensure stereo/mono sw. switched to mono. 3. Sig. input optimum to avoid AGC action.
5.	FM Osc alignment at 109MHz.	Inject 109.5MHz signal from FM IF SSG at J101.	Connect scope & VTVM across dummy load.	Adjust TC102 to obtain max output on the meter.	1. Ensure set tuned to 109.5MHz. 2. Ensure stereo/mono sw. switched to mono. 3. Sig. input optimum to avoid AGC action.
6.	REPEAT STEPS 4 & 5 UNTIL NO FURTHER IMPROVEMENT.				
6.	FM Osc tracking at 90MHz.	Inject 90MHz signal from FM IF SSG at J101.	Connect scope & VTVM across dummy load.	Adjust L101 to obtain max output on the meter.	1. Ensure set tuned to 90MHz, vol max. 2. Tone control to centre. 3. Sig. input optimum to avoid AGC action.
8.	FM Osc tracking at 106MHz.	Inject 106MHz signal from FM IF SSG at J101.	Connect scope and VTVM across dummy load.	Adjust TC101 to obtain max output on the meter.	1. Ensure set tuned to 106MHz, vol max. 2. Tone control to centre. 3. Sig. input optimum to avoid AGC action.
9.	REPEAT STEPS 7 & 8 UNTIL NO FURTHER IMPROVEMENT.				
10.	FM MXP adjustment.	Set tuned to a strong stereo station.	Frequency counter at TP5.	Adjust VR201 to get the stereo beacon on & to read 19kHz on frequency counter.	1. Ensure set switched to FM. 2. Ensure stereo/mono sw. to stereo. FM alignment now complete.

FM SEPARATION ADJUSTMENT

1.	FM SG to 98MHz.	Inject 98MHz from FM SSG at J101.	Listen to the speakers.	Adjust VR202 to obtain proper separation.	1. Set the FM SSG to 98MHz, 60dB, 65.7k deviation. 2. Tone control mid position. 3. Loudness, rumble controls off. 4. stereo/mono sw. to stereo.



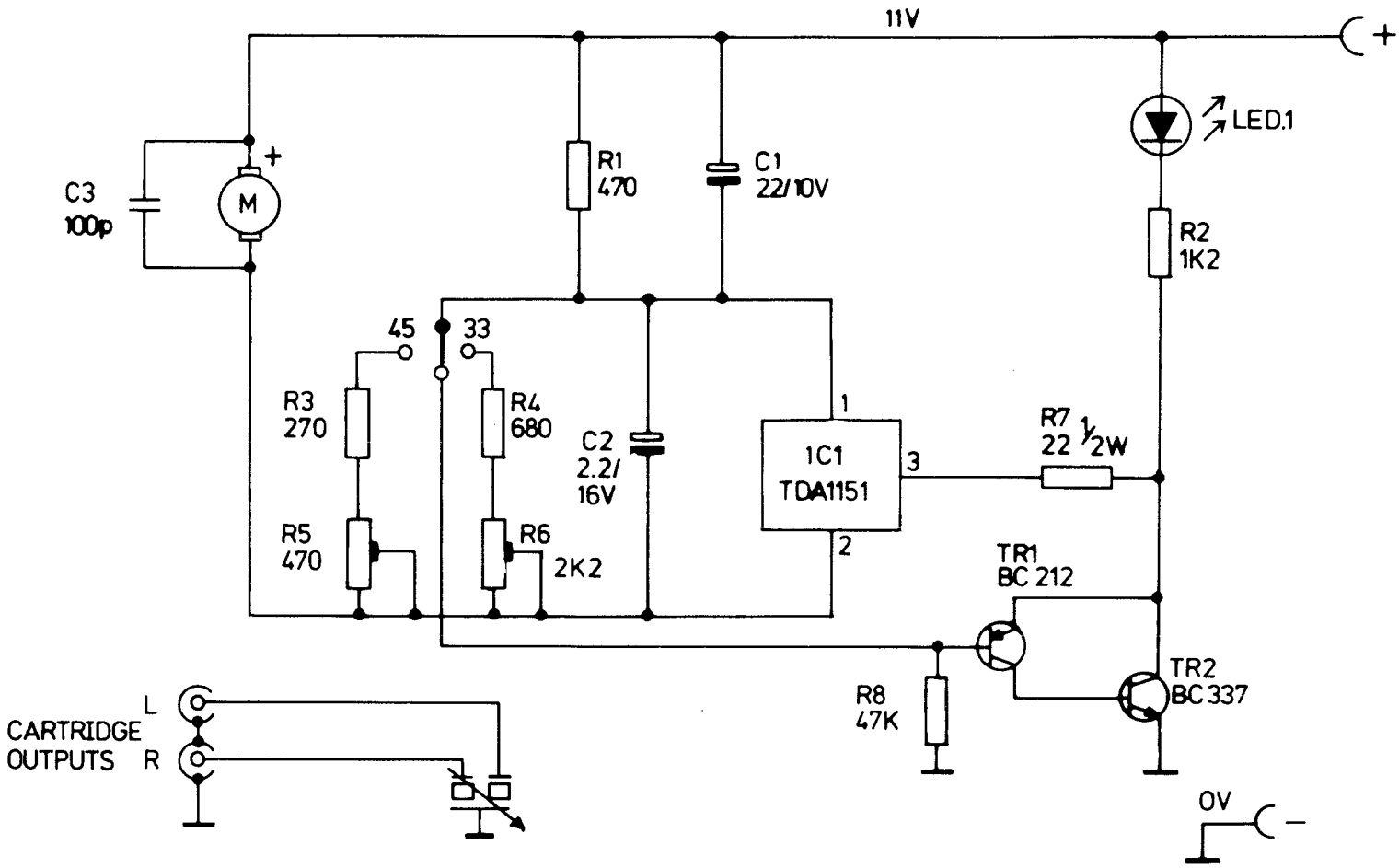
BSR P281 RECORD DECK



Note: The tracking weight can be increased by shortening the P.U. spring (30) where it is anchored (32).

Item	Part No.	Description	Item	Part No.	Description
1	A102110	Circlip	19	A105660	Control Washer
2	A117931	Turntable Assembly	20	A105267	Screw Type B.T.4-24 x 8 Rec.PanHd.(2 off)
3	A114621	Thrust Washer	21	A102251	Retaining Clip (2 off)
4	B117826	Raising Pad	22	A117994	Escutcheon Assembly
5	B117831	Pick Up Rest	23	A106511	Screw Type B.T.4-24 x 12 Rec.Pan Hd.
6	A114446	Drive Belt	24	A116564	Detent Spring
7	A117703	Spacer	25	A117829	P.U. Hinge Retainer
8	C117952	Unit Plate Assembly	26	A116565	Knob Spindle
9	A117660	Screw (3 off)	27	B117824	Control Knob
10	A117950	Spacing Bush (3 off)	28	B117828	Cue Lever
11	A117680	Grommet (3 off)	29	A117510	Quad P.U. Lead Assembly
12	A102616	Phono Socket (Bridged)	30	A103373	Securing Rubber (3 off)
13	A300196	On/off Speed Control Board Final Assembly	31		P.U. Balance Spring
14	A116570	Drive Sleeve	32	A105142	Spring Anchor
15	A117650	Drive Sleeve Flange	33	C117830	Pick-Up Hinge
16	B116574	D.C. Motor Requirements	34	D117823	Pick-Up Arm
17	A103373	Securing Rubber	35	A117840	Pivot Pin
18	A106510	Screw Type B No.6 x 6.5 Rec. Pan Hd.			

P281 CIRCUIT DIAGRAM AND PARTS LIST



ELECTRICAL PARTS LIST BSR P281

Circ Ref	Description	Part No.
Resistors (¼W/±5%)		
R1	470ohm	10048
R2	1K2ohm	10065
R3	270ohm	10042
R4	680ohm	10052
R8	47Kohm	10101
Resistors (½W/±5%)		
R7	22ohm	10039
Preset Resistors		
R5	470ohm	300329
R6	2K2ohm	300330
Capacitors		
C1	22mf/10V Electrolytic	20011
C2	2.2mfd/16V Electrolytic	20021
C3	100pF Ceramic	20416
Transistors		
TR1	BC212	50009
TR2	BC337/25	50002
IC		
IC1	TDA1151	806204

Note:-
Preset resistors R5 (45RPM) and R6 (33RPM) are for fine speed control adjustments.

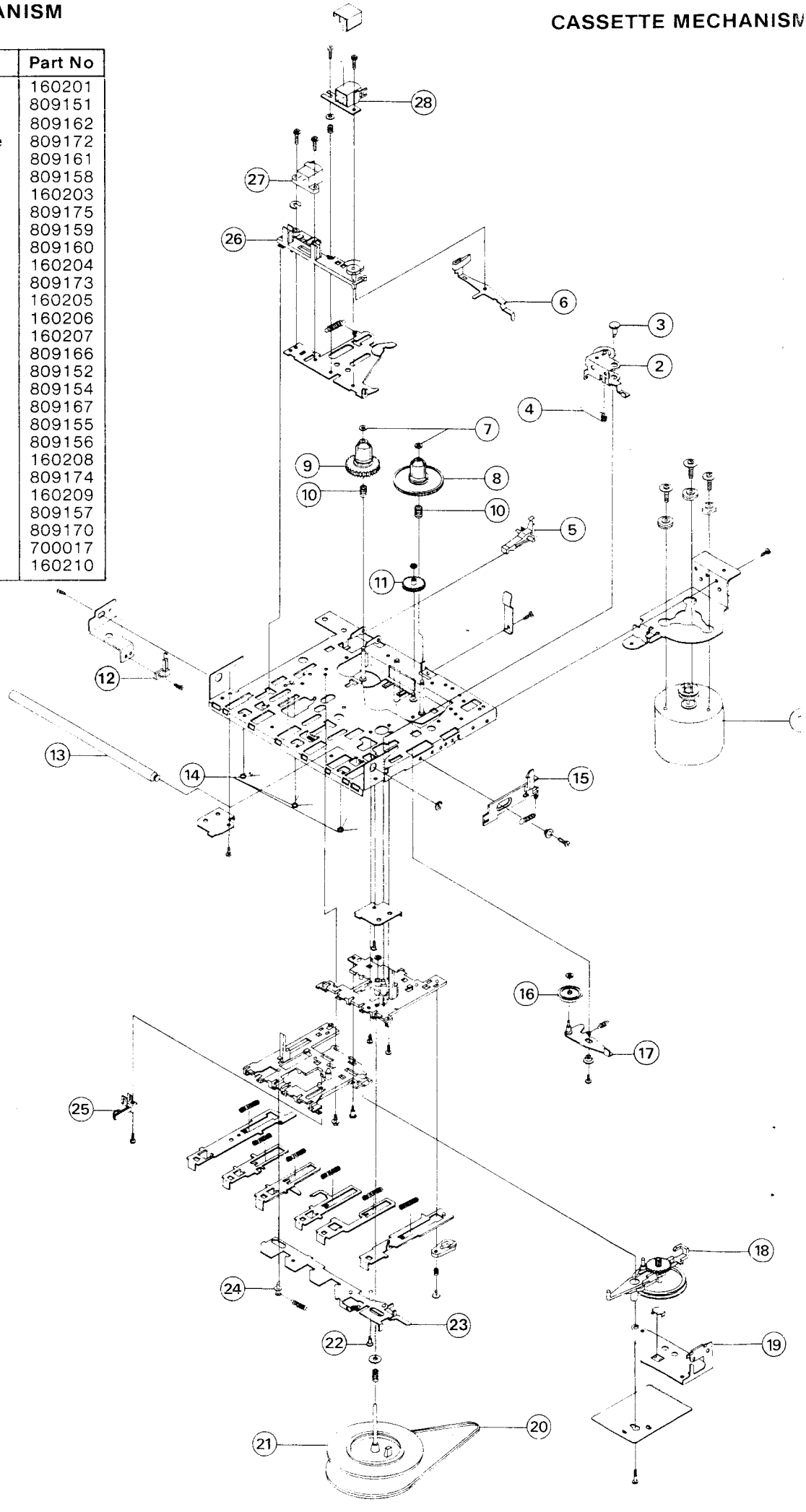
On the P281 record deck, they can be adjusted from the top of the deck through 2 small holes on the unit plate assembly near the safety selector control.

R6 (33RPM) is closer to the front of the turntable.

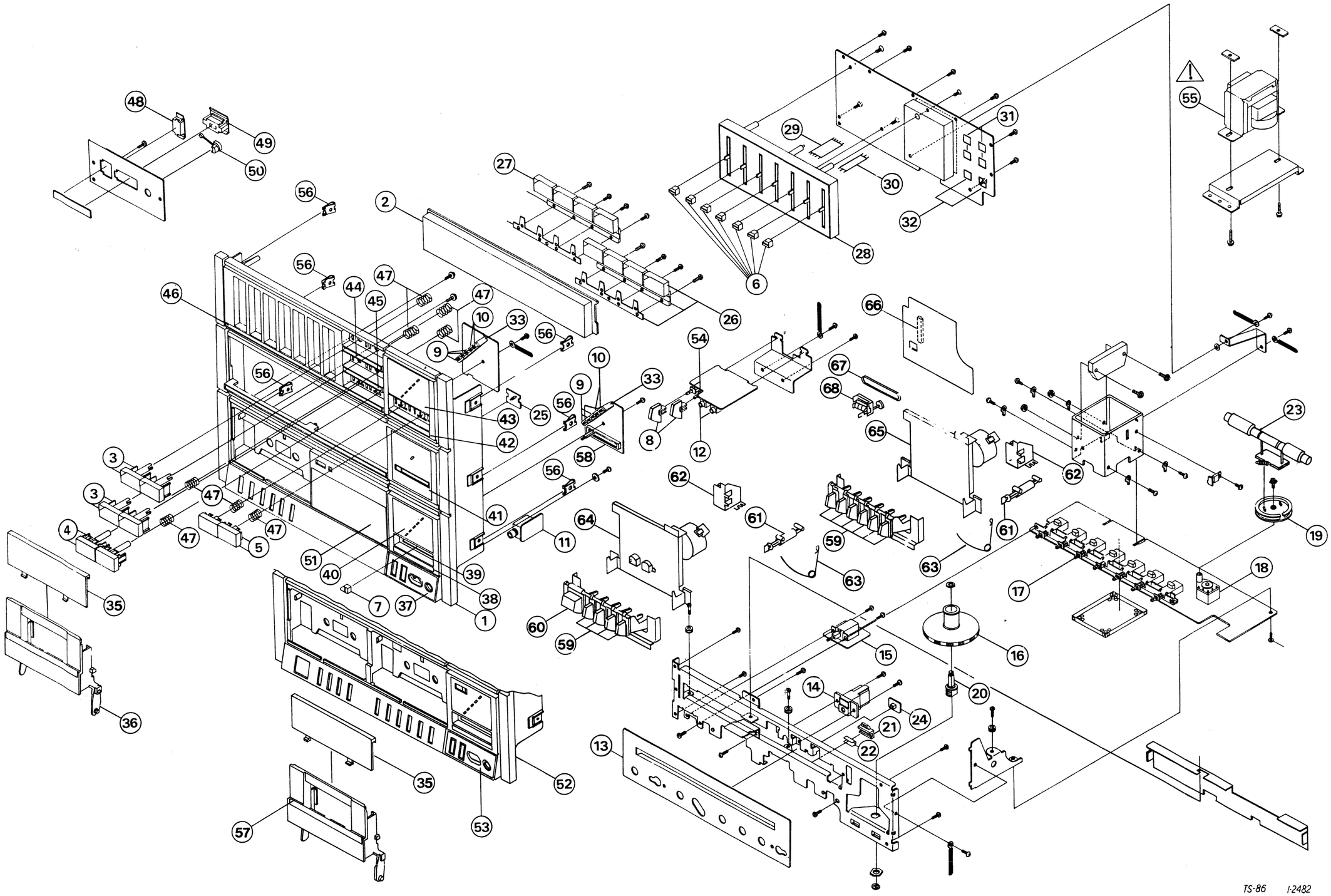
Information on Record Deck published by permission of BSR.

CASSETTE MECHANISM PARTS LIST

Sym	Description	Part No
1	Cassette Motor TS87	160201
1	Cassette Motor TS86	809151
2	Pinch Roller Assy	809162
3	Stopper Locking Plate	809172
4	Spring Pinch Roller	809161
5	Record Safety Lever	809158
6	Auto Stop Arm	160203
7	Poly Washer	809175
8	Take Up Spool Assy	809159
9	Rewind Spool Assy	809160
10	Spring Spool	160204
11	F.F. Gear	809173
12	Leaf Switch	160205
14	Spring Key	160206
15	Eject Lever	160207
16	F.F./Rew Idler	809166
17	Idler Arm Assy	809152
18	Idler Gear Assy	809154
19	Flywheel Bracket	809167
20	Mainbelt	809155
21	Flywheel	809156
22	Stopper	160208
23	Locking Plate	809174
24	Stopper Spring	160209
25	Leaf Switch	809157
26	Head Base	809170
27	Erase Head	700017
28	R/P Head	160210



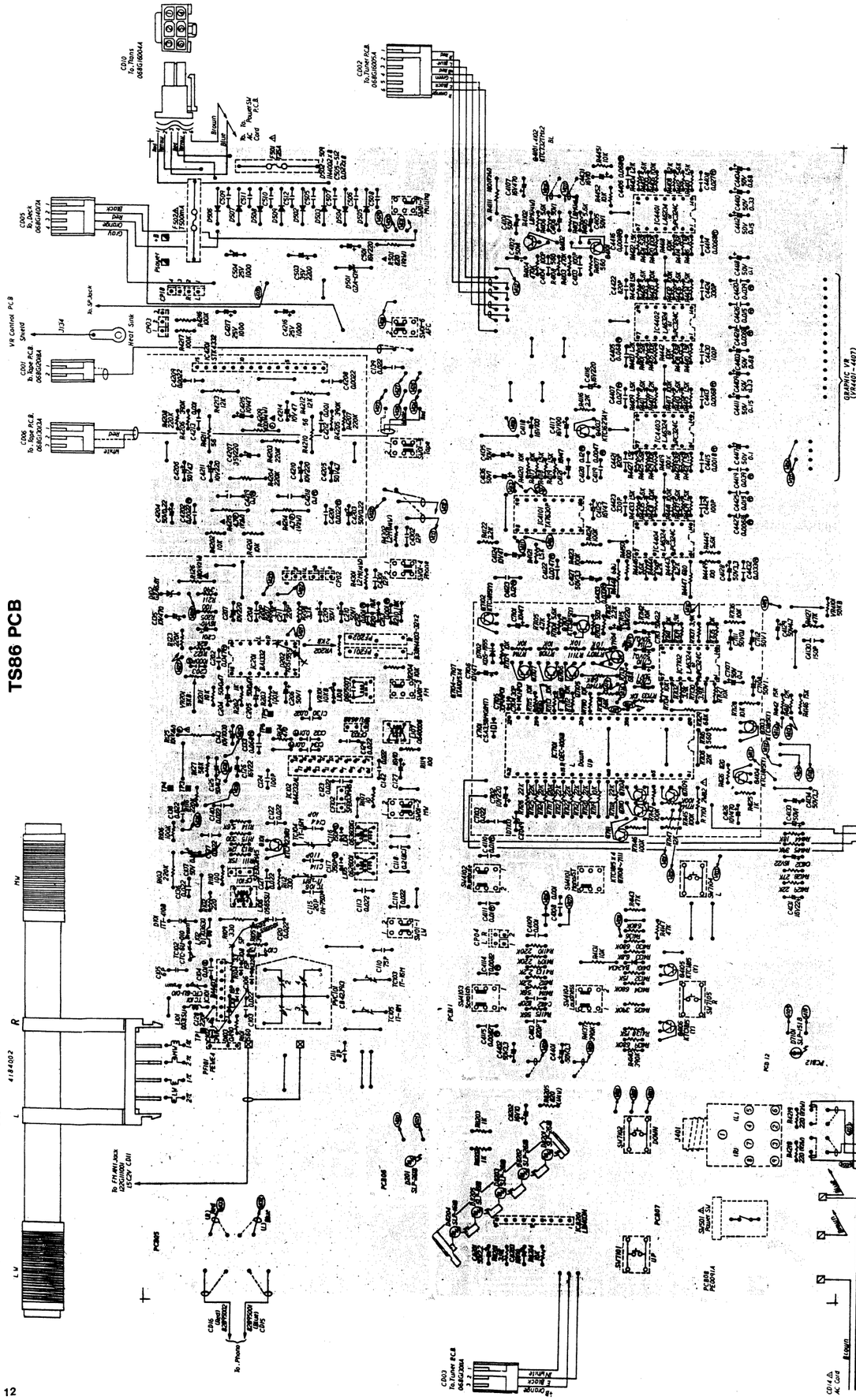
CHASSIS DRAWING



CHASSIS PARTS LIST

Sym	Description	Part No.
1	Front Panel TS86	130001
2	Dial Lens	130002
3	Mode Button	130003
4	Balance Button	130004
5	Volume Button	130005
6	Tone Control Button	130006
7	Record Level Button	130007
8	Tape Function Button	130008
9	LED Green	130050
10	LED Red	130051
11	Headphone Socket	130009
12	Mic. Socket	130010
13	Tuning Dial	130011
14	P.P.M. Sensor	800036
15	Power On/Off Switch	130012
16	Tuning Knob	130013
17	Function Switch Bank	130014
18	Tuning P.V.C.	130015
19	Tuning Drum	130016
20	Tuning Shaft	130017
21	Tuning Pointer	130018
22	Pointing Paper	130019
23	Ferrite Rod Assembly	130020
24	LED Stereo Indicator	130050
25	LED P.P.M. Indicator	130052
26	Function Button (Right) Assy.	130021
27	Function Button (Left) Assy.	130022
28	Tone Control Pot. Bank	130023
29	14 Way Flex.	130024
30	4 Way Flex.	130025
31	Mode Switch	130026
32	Balance Tact Switch	130027
33	LED Spacer	130028
34	Lens Cassette 1	130029
35	Lens Cassette 2	130030
36	Cassette Door (with Amstrad printed)	130031
37	Mic. Label TS86	130032
38	Record Level Label	130033
39	Record Level Graduation Label	130034
40	VU Label	130035
41	Tuning Label	130036
42	Volume Label	130037
43	Power Label	130038
44	Rumble/Scratch Label	130039
45	Mode/Loudness Label	130040
46	Graphic Eq./Bal. Label	130041
47	Spring Button	130042
48	Aerial Socket	90042
49	Speaker Socket	250012
50	Cable Restraint	S/25011
51	Label Decoration	130043
52	Front Panel TS87	130044
53	Mic. Label TS87	130045
54	Switch Tape Function	130046
55	Mains Tx.	130047
56	Chassis Retaining Nut	810013
7	Cassette Door	130048
58	Record Level Control	130049
59	Cassette Key	130061
60	Cassette Kay Play Only	130062
61	Air Damper	130066
62	Damper Bracket	130068
63	Spring Damper	130067
64	Cassette Mechanism B TS87	130064
65	Cassette Mechanism A TS87	130063
65	Cassette Mechanism TS86	130065
66	Record Play Switch	400134
67	Counter Belt	130070
68	Counter	130069

Note: All parts shown with either the safety symbol ⚠ or with an 'S' prefix on the part numbers; are safety critical items and must be replaced with items having an identical safety specification.
All these items may be purchased direct from:
AMSTRAD CONSUMER ELECTRONICS PLC.



TS86 PCB

75-86
1-2486

CASSETTE ALIGNMENT INSTRUCTIONS

Equipment required: Double Beam Oscilloscope; Frequency Counter; RMS Meter; Non Metallic Trimming Tool; 6.8kHz Test Tape; 1kHz Test Tape.

Step	FUNCTION	SIGNAL IN	SIGNAL OUT	REMARKS	REMARKS
1.	Bias frequency adjustment.	Switch SW3101 to record.	Monitor 'scope or frequency counter from junction C3135 & C3130.	Adjust L3103 to give 62.5kHz.	Ensure the AFC switch is off.
2.	Bias level adjustment.	Switch SW3103 to record.	RMS Meter across R301/302 in turn.	Adjust VR3101 & 3102 to show 10mV.	Ensure AFC switch is off.
3.	Head azimuth adjustment.	6.8kHz Test tape.	Double beam 'scope at speaker sockets.	Adjust azimuth screw for max amplitude on both channels ensuring both signals in phase.	Ensure set switched to tape.
4.	Tape speed adjustment.	1kHz Test tape.	Frequency counter at speaker socket.	Adjust motor with non-metallic trimming tool for correct frequency.	Ensure set switched to tape.

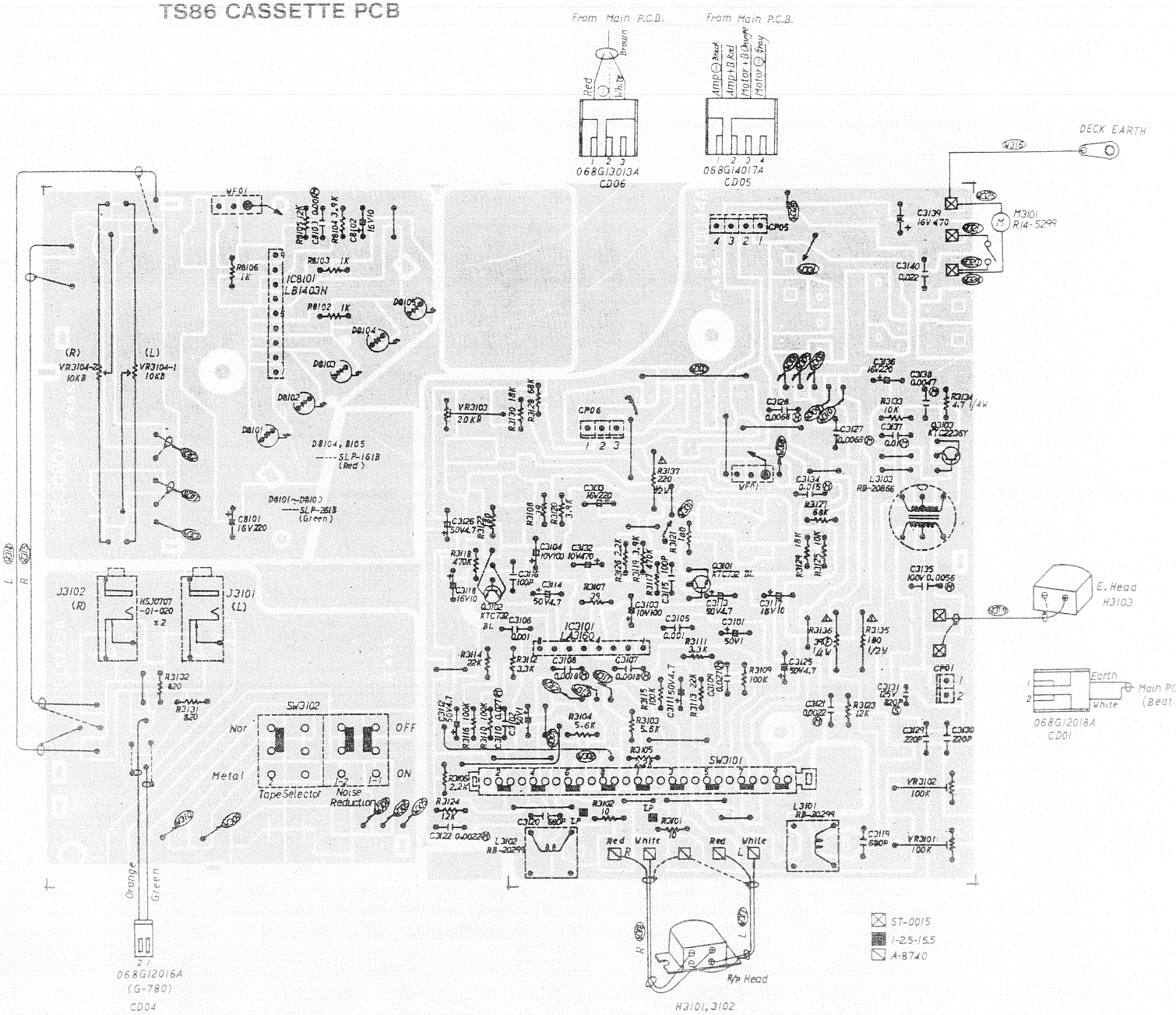
CASSETTE DECK MECHANISM – GENERAL MAINTENANCE

Before attempting any specific fault-finding on the cassette mechanisms, it is recommended that the following checks and maintenance procedures be carried out.

1. **R/P HEAD** (Symbol 28)
   Thoroughly clean the head and examine for signs of wear; replace if worn; de-magnetise.
2. **PINCH-ROLLER ASSEMBLY** (Symbol 2)
   Thoroughly clean, check general condition. If rubber roller is in any way distorted, replace the assembly.
   Check the tension of the Pinch-Roller Spring, the tension should be 40 to gm.
3. **MAIN BELT** (Symbol 20)
   Ensure the belt is correctly located. Check that it is not stretched or worn and replace if necessary.
   In any event, remove the belt and clean with methylated spirits.
4. **TAKE-UP SPOOL ASSEMBLY** (Symbol 8)
   Check the tension of this using a cassette torque meter. The correct reading should be 40gm per cm.
   A reading of between 30 and 50gm per cm may be regarded as within tolerance.
   Should the reading fall below 30gm per cm, it must be adjusted to give the correct torque.
   If it cannot be adjusted it should then be replaced.
5. **REWIND IDLER ASSEMBLY** (Symbol 9)
   Check the tension with the cassette torque meter using the rewind function.
   The torque should be 100gm per cm but a reading of between 80 and 110 gm per cm may be considered within tolerance.
   If the torque falls below 80gm per cm, it should be adjusted to give the correct reading.
   If it will not adjust sufficiently, it should be replaced.
6. **MOTOR** (Symbol 1)
   Ensure that the motor is securely mounted and that the motor rubbers are in good condition.
7. **FLY-WHEEL** (Symbol 21)
   Check that the Fly-wheel spindle is not worn or bent and that it is securely seated in its bearing.
8. **INTERNAL MECHANISM**
   After prolonged use, the internal mechanism will normally contain substantial deposits of oxide dust.
   Ensure that these are thoroughly cleaned.

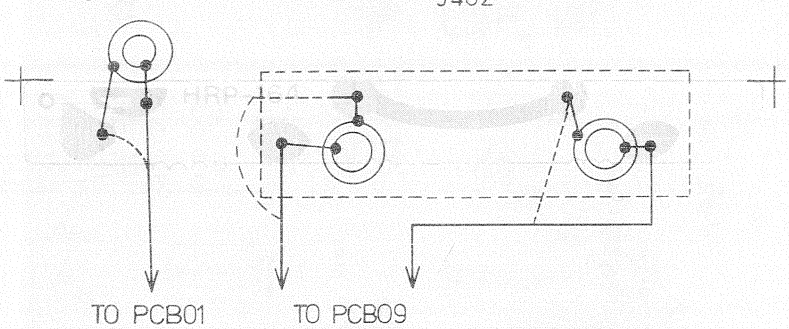
There are no places on either mechanism which require any oil or grease and the application of any such lubrication is likely to seriously harm the internal workings of the mechanism.

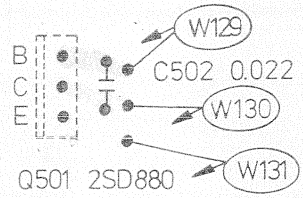
TS86 CASSETTE PCB



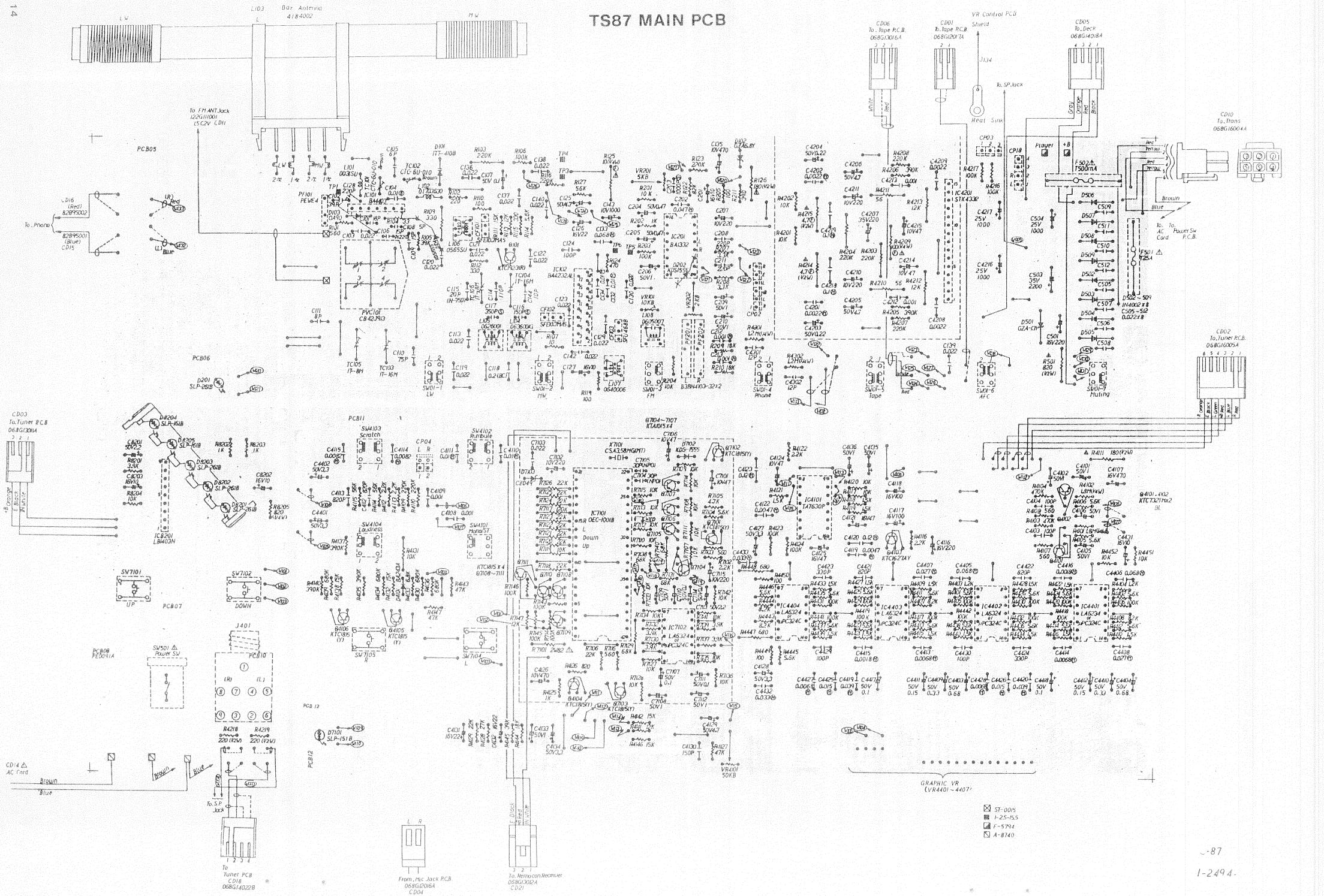
ANT. JACK
J101

SPEAKER JACK
J402

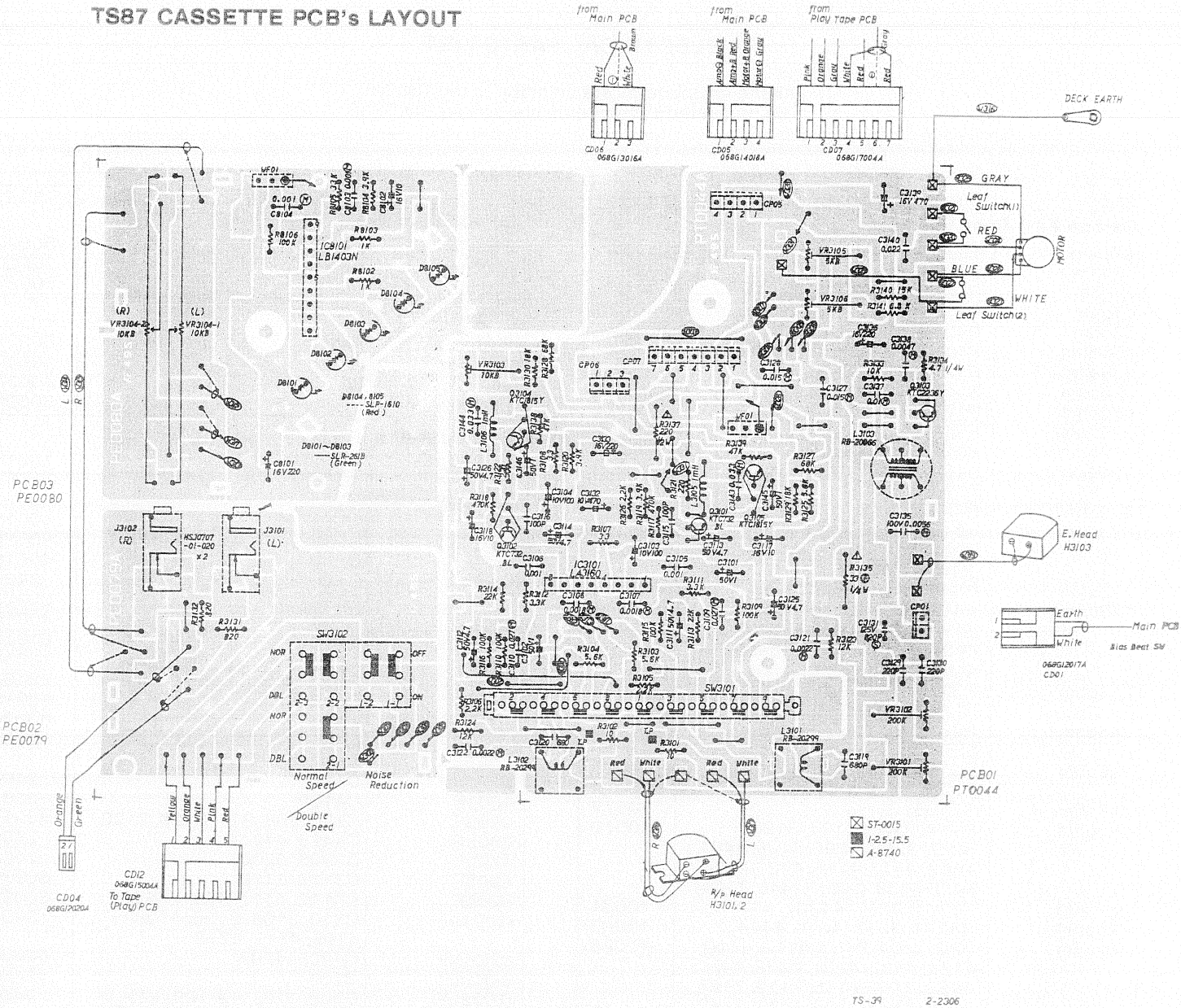


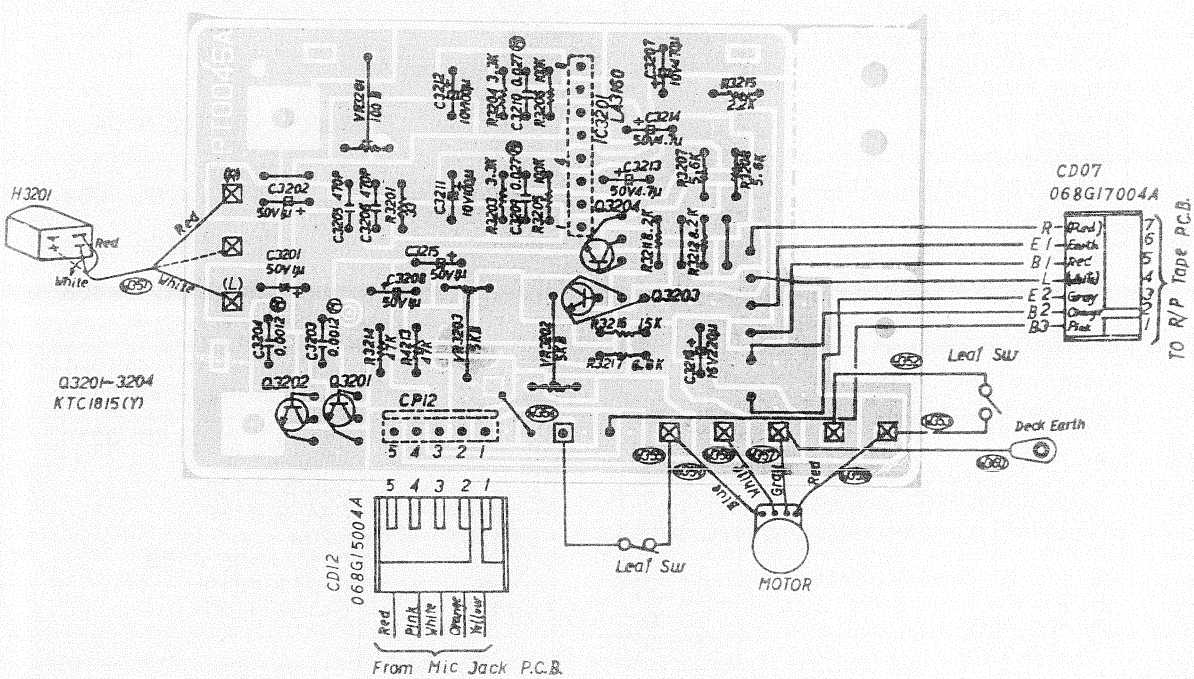


TS87 MAIN PCB



TS87 CASSETTE PCB's LAYOUT





ELECTRICAL PARTS LIST

All the components are common to the TS86/87.
The bracketed components are only for the TS86.

Value	Circuit Reference	Part No.
Carbon Film Resistors (all ¼W)		
4.7ohm	R3134	10004
10ohm	R107, 3101, 3102	10008
33ohm	R104, 3107, 3108, 3201	10018
47ohm	R3138, 3139	10020
56ohm	R4210, 4211	809247
100ohm	R110, 119, 205, 4449, 4450	10032
180ohm	R126, (3121, 3122)	10038
220ohm	R102, 3121, 3122	10040
330ohm	R109, 112, 115	10044
390ohm	R211	10046
470ohm	R124, (4103, 4104)	10048
560ohm	R101, 4107, 4108, 7103, 7116,	10050
680ohm	R4447, 4448	10052
820ohm	R3131, 3132, 4126, 8205	10054
1kohm	R202, 4125, 8102, 8103, (8106), 8202, 8203	10061
1k2ohm	R4403, 4404	10063
1k5ohm	R4118, 4119, 4121, 4409, 4410, 4415, 4416, 4421, 4422, 4427, 4428, 4433, 4434, 4439, 4440	10065
2k2ohm	R3105, 3106, 3126, 3215, 4112, 4113, 4116, 4122, 7102	10069
3k3ohm	R207, 208, 3111, 3112, 3203, 3204	10073
3k9ohm	R3119, 3120, 7130, 7132, 7137, 7139, 8104, 8201	10075
4k7ohm	R7105	10077
5k6ohm	R114, 3103, 3104, 3125, 3207, 3208, 4105, 4106, 4401, 4402, 4411-4414, 4423-4426, 4435-4438, 4445, (4446, 7104)	10079
6k8ohm	R3141, 3217, 4133	10081
8k2ohm	R3211, 3212, 4443, 4444	10083
10kohm	R201, 204, 3133, 4117, 4120, 4131, 4132, 4201, 4202, 4451, 4452, 7107-7115, 7119, 7127, 7128, 7133-7136, 7141, 7142, 8204, (3125)	10085
12kohm	R113, 3123, 3124, 4141, 4214, 4213, 7147, (8105)	10087
15kohm	R111, 3140, 3216, 4132, 4138, 4142, 4146	10089
18kohm	R209, 210, 3129, 3130, 4144	10091
22kohm	R3113, 3114, 4129, 7106, 7118, 7120-7126	10093
27kohm	R4128	10095
33kohm	R8105	10097
39kohm	R105, 4145	10099
47kohm	R3213, 3214, 4127, 4143, 4147	10101
56kohm	R127, 4114, 4115	10103
68kohm	R3127, 3128, 7129, 7131, 7138, 7140, (4134, 4136, 4139)	10105
82kohm	R122, 4407, 4408	10107
100kohm	R106, 203, 3109, 3110, 3115, 3116, 3205, 3206, 4123, 4124, 4216, 4217, 4405, 4406, 4417-4420, 4429-4432, 4441, 4442, 7143-7146, 8106	10109
120kohm	R7117	10111
220kohm	R103, 116, 127, 4109, 4110, 4203, 4204, 4207, 4208 (123)	10117
390kohm	R4135, 4137, 4140, 4205, 4206	10123
470kohm	R3117, 3118, 4103, 4104	10125
680kohm	R4130	10129
1M2ohm	R4301, 4302	10148
1M8ohm	R4101, 4102	10150

Value	Circuit Reference	Part No.
Carbon Film Resistors (all ½W)		
180ohm	R4111, (126, 3135)	800203
220ohm	R3137, 4218, 4219	300202
820ohm	R501	800205
Fuse Resistors		
10ohm/¼W	R125	809256*
100ohm/¼W	R4209	130101
380ohm/¼W	R3135	1400340
4.7ohm/½W	R4215	800206*
Cement Resistor		
82ohm/2W	R7101	130102
Ceramic Capacitors		
5pF	C108	400104
6pF	C105	809249
8pF	C111	400105
10pF	C144	24001
12pF	C4301, 4302	809251
15pF	C106, 109	400106
18pF	C101	610122
20pF	C115	130130
30pF	C7104, 7105	24029
39pF	C102	130131
75pF	C110	800208
100pF	C124, 3115, 3116, 4103, 4104, 4429, 4430	24016
110pF	C114	24016
150pF	C4130	24017
220pF	C128, 208, 211, 3129, 3130	400107
330pF	C4423, 4424	24003
470pF	C3205, 3206	24004
680pF	C3119, 3120	809239
820pF	C4112, 4113, 4421, 4422	800209
0.001uF	C310, 3105, 3106, 4108, 4109, 4212, 4213	24027
0.002uF	C4208, 4209	809240
0.01uF	C104	24011
0.022uF	C103, 113, 119-123, 129, 130, 136-142, 502, 505-512, 3140, 7103	24013
0.2uF	C118	24019
Poly Capacitors (all rated 50V unless otherwise stated)		
150pF	C116	800235
350pF	C117	800236
820pF/125V	C3131	130106
1000pF	C203	130132
0.001uF	C212, 213, 8103, 8104	130133
0.0012uF	C3203, 3204	130134
0.0018uF	C3107, 3108, 4415, 4416	130135
0.0022uF	C3132, 3122, 4201, 4202	130136
0.0033uF	C3143, 3144	130137
0.0047uF	C3138, 4119, 4122	170437*
0.0056uF/100V	C3155	170438
0.0068uF	C4413, 4414, 4427, 4428, (3127 3128)	170614
0.0082uF	C4114, 4115	170615*
0.01uF	C132, 134, 3117, 4110, 4111	170439
0.015uF	C3127, 3128, 4425, 4426, (3134)	170441
0.027uF	C3109, 3110, 3209, 3210, 4407, 4408	130129
0.033uF	C4432, 4433	130129
0.039uF	C4419, 4420	170440
0.047uF	C202	170442
0.068uF	C133, 4405, 4406	170443
0.1uF	C4218, 4219	130127
0.12uF	C4120, 4123	130128

ELECTRICAL PARTS LIST

Value	Circuit Reference	Part No.
Electrolytic Capacitors		
0.1uF/50V	C107, 4417, 4418, 7107, 7110, 7111, 7114	800210
0.15uF/50V	C4411, 4412	130103
0.22uF/50V	C4203, 4204	800211
0.33uF/50V	C4409, 4410	810307
0.47uF/50V	C204, 205	809245
0.68uF/50V	C4403, 4404	130104
1uF/50V	C206, 209, 210, 3101, 3102, 3145, 3146 3201, 3202, 3208, 3215, 4101, 4102, 4105, 4106, 4133, 4135, 4136, 7108, 7109, 7112	20062
2.2uF/50V	C7113, 8201	809246
3.3uF/50V	C4127, 4128, 4134, 4401, 4402	20146
4.7uF/50V	C125, 3111-3114, 3125, 3126, 3213, 3214, 4129, 4205, 4206	20101
10uF/16V	C127, 201, 3117, 3118, 4431, 8102, 8202, 8203	20024
22uF/16V	C126, 4131, 4132	20025
47uF/10V	C4124, 4214, 4215, 7101, 7106	20053
47uF/16V	C4121, 4125	20027
100uF/10V	C3103, 3104, 3211, 3212	20028
100uF/16V	C4117, 4118	20028
220uF/10V	C207, 4210, 4211, 7102, 7115	20029
220uF/16V	C501, 3133, 3136, 3216, 4116, 8101	20029
220uF/35V	C4207	20055
470uF/10V	C135, 3132, 3207, 4126	20044
470uF/16V	C3139, 4107	20044
1000uF/10V	C143	130105
1000uF/25V	C504, 4216, 4217	20118
2200uF/35V	C503	20119

Circuit Reference	Description	Part No.
ICs		
IC101	BA4403	130107
IC102	BA4232AL	130108
IC201	BA1332	130109
IC3101,3102	LA3160	901400
IC4101	TA7630P	800216
IC4201	STK4332	800217
IC4401-4404	UPC324C	800215
IC7101	OEC1001B	800218
IC7102	UPC324C	800215
IC8101,8102	LB1403N	809207
Transistors		
Q101	KTC1923	50014
Q3101, 3102, 4101, 4102	KTC732TM/BC237	50016
Q3103	KTC2236/BD371	50018
Q3104, 3105, 3201-3204, 4104-4106, 7101-7103, 7108, 7111	KTC1815	170114
Q4103	KTC1627/BC237	50016
Q501	2SD880/2N5496	50005
Q7104-7107	KTC1015Y/BF595	50047

Circuit Reference	Description	Part No.
Diodes		
D101	Varicap ITT410B	920117
D102	Zener GZA6.8Y	809219
D103	GER OA90	800220
D104, 202, 7102	SIL KDS1555	800222
D201, 7101, 8101, 8102, 8103, 8201-8203	LED R SLP261B	130051
D4101	Sil BA243A	800219
D501	Zener GZA13Y	15005
D502-509	Rect IN4002	15008
D7103	Zener CZ-049	800221
D8104, 8105, 8204, 8205	LED G SLP161B	130050
Coils & Tx.		
L101	FMRF Coil 0031SU	300616
L102	FM Osc Coil OI703831	130111
L103	Bar Antenna	130020
L104	L.W. Osc Coil 0636001G	130112
L105	M.W. Osc Coil 0626001	130113
L106	FM IFT 1565SU	130114
L107	AM IFT 0640006	130115
L108	FM IFT 0605007	130116
L3101, 3102	Bias Trap Coil RB20299	300619
L3103	Bias Osc RB20866	300620
L3105, 3106	Bias Osc 1000uH	130117
T501	Power Tx.	130047
Filters & Traps		
CF101, 102	SFE 10.7MHz	993034
CF103	SFU 468B	800225
X7101	CSA 3.58MT	800229
Semi Fixed Resistors		
VR101	S.F. 10k	130120
VR201, 3105, 3106, 3202, 3203	S.F. 5k	130121
VR3101, 3102	S.F. 200k	130122
VR202	S.F. 2k	130123
VR3103	S.E. 10k	130124
VR3104 (Record Level)	S.L. 10k	130049
VR3201	S.F. 100ohm	130125
VR4101	S.F. 50k	130126
VR4401 (Tone Control)	S.L. 100k	130023
Miscellaneous		
F501	Fuse 2.5A (T)	S/800033
F502	Fuse 500mA (T)	S/88005
OS701	P.P.M. Sensor	800036
P.F.01	FM Ant Band Pass Filter PFWE4	130118
PF201, 202	Low Pass Filter B3BN4103-32	800228
P.V.C.101	PVC CB42J913	130015
TM701	Transmitter Hand Set	800061
TC101, 102	Ceramic Trimmer CTC-6U-010	130119
TC103, 104	Film Trimmer IT-16M	800227
TC105, 106	Film Trimmer IT-8M	800226

IC VOLTAGES

STK4332

1 - 7.4V DC
2 - 7V DC
3 - 0V DC
4 - 0V DC
5 - 14.78V DC
6 - 3.47V DC
7 - 29.6V DC
8
9 - 28.7V DC
10 - 3.7V DC
11 - 15.8V DC
12 - 0V DC
13 - 0V DC
14 - 7.3V DC
15 - 7.7V DC

BA-1332

	A.M.	F.M.
1	2.2V DC	/
2	1.6V DC	1.6V DC
3	1.6V DC	1.6V DC
4	1.5V DC	0.8V DC
5	1.6V DC	1.6V DC
6	1.6V DC	1.6V DC
7	1.6V DC	1.6V DC
8	0V DC	0.8V DC
9	6.1V DC	6.0V DC
10	1.6V DC	1.6V DC
11	1.7V DC	1.7V DC
12	1.7V DC	1.7V DC
13	1.7V DC	1.7V DC
14	5.5V DC	5.5V DC
15	0V DC	0V DC
16	0.3V DC	0.3V DC

BA4232AL

	A.M.	F.M.
1	6.6V DC	0V DC
2	6.6V DC	0V DC
3	6.6V DC	0V DC
4	6.6V DC	0V DC
5	0V DC	0V DC
6	6.0V DC	5.9V DC
7	6.0V DC	5.9V DC
8	6.0V DC	5.9V DC
9	6.0V DC	5.9V DC
10	6.9V DC	6.8V DC
11	2.0V DC	2.1V DC
12	6.9V DC	6.8V DC
13	0V DC	0V DC
14	5.4V DC	5.3V DC
15	0V DC	0V DC
16	1.3V DC	1.3V DC
17	0V DC	0V DC
18	0V DC	0V DC

BA4403

1 - 4.7V DC
2 - 5.4V DC
3 - 5.5V DC
4 - 0V DC
5 - 6.6V DC
6 - 6.7V DC
7 - 4.8V DC

OEC 3001

1 - 0V DC
2 - 0V DC
3 - 0V DC
4 - 0V DC
5 - 4.0V DC
6 - 4.0V DC
7 - 4.0V DC
8 - 4.0V DC
9 - 0V DC
10 - 0V DC
11 - 5.0V DC
12 - 0V DC
13 - 0V DC
14 - 0V DC
15 - 0V DC
16 - 5.0V DC
17 - 5.0V DC
18 - 5.0V DC
19 - 5.0V DC
20 - 0V DC
21 - 0V DC
22 - 2V DC
23 - 1.2V DC
24 - 5.0V DC
25 - 2.6V DC
26 - 2.5V DC
27 - 2.6V DC
28 - 2.4V DC
29 - 2.6V DC
30 - 2.4V DC
31 - 3.9V DC
32 - 1.2V DC
33 - 4.0V DC
34 - 0V DC
35 - 0V DC
36 - 0V DC
37 - 0V DC
38 - 0V DC
39 - 0V DC
40 - 0V DC
41 - 5.0V DC
42 - 5.0V DC

TA7630P

1 - 0V DC
2 - 6.1V DC
3 - 6.1V DC
4 - 6.1V DC
5 - 4.3V DC
6 - 6.1V DC
7 - 2.1V DC
8 - 1.3V DC
9 - 4.4V DC
10 - 3.2V DC
11 - 6.1V DC
12 - 12.3V DC
13 - 6.2V DC
14 - 6.1V DC
15 - 6.1V DC
16 - 6.1V DC

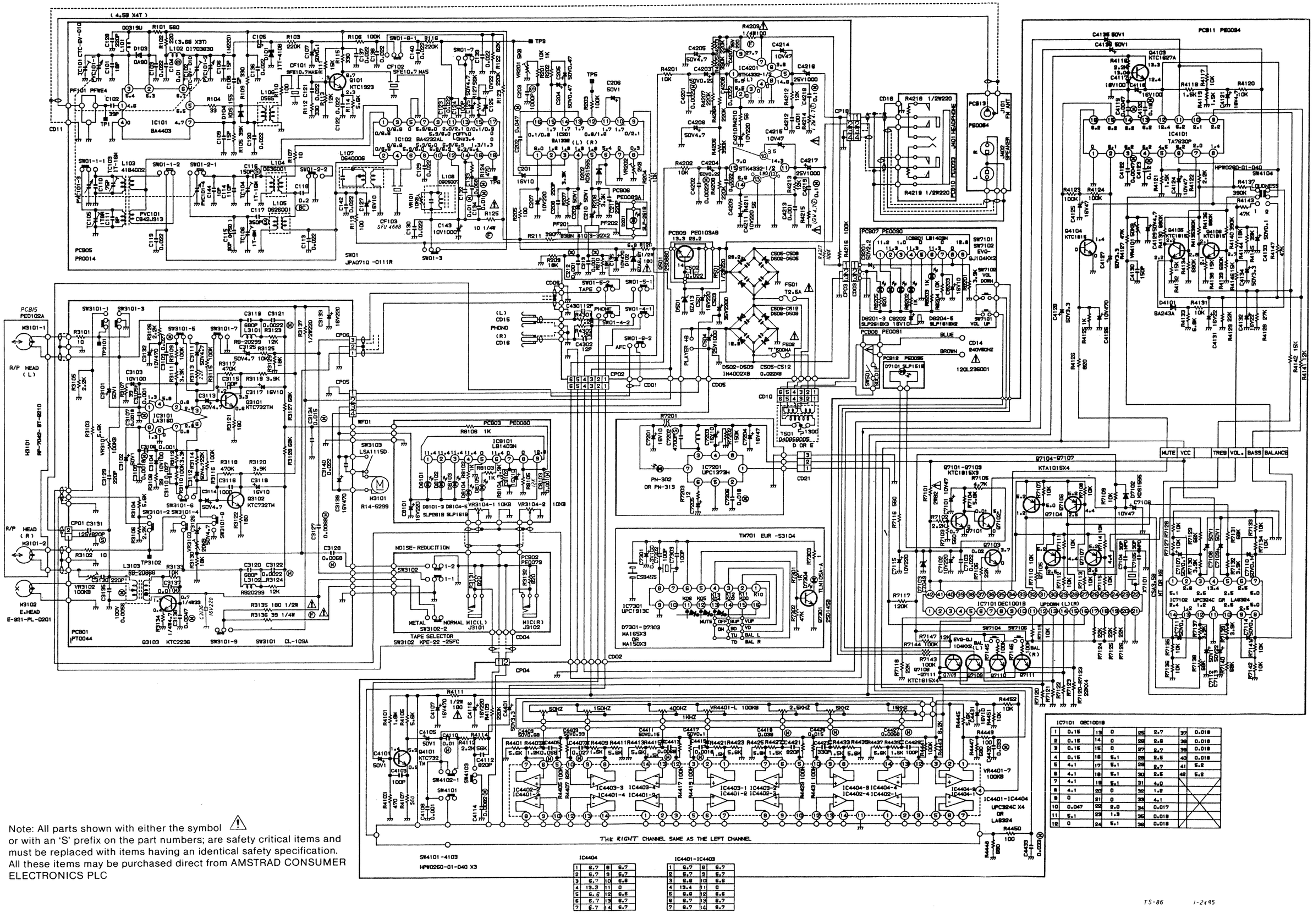
UPC324

1 - 6.6V DC
2 - 6.6V DC
3 - 6.6V DC
4 - 13.3V DC
5 - 6.6V DC
6 - 6.6V DC
7 - 6.6V DC
8 - 6.6V DC
9 - 6.6V DC
10 - 6.6V DC
11 - 0V DC
12 - 6.6V DC
13 - 6.6V DC
14 - 6.6V DC

LB1403

1 - 11.5V DC
2 - 11.5V DC
3 - 1.2V DC
4 - 11.5V DC
5 - 0V DC
6 - 11.5V DC
7 - 0V DC
8 - 0V DC
9 - 13.0V DC

TS86 CIRCUIT DIAGRAM



Note: All parts shown with either the symbol ⚠ or with an 'S' prefix on the part numbers; are safety critical items and must be replaced with items having an identical safety specification. All these items may be purchased direct from AMSTRAD CONSUMER ELECTRONICS PLC

IC4404

1	6.7	8	6.7
2	6.7	9	6.7
3	6.7	10	6.8
4	13.3	11	0
5	6.6	12	6.8
6	6.7	13	6.7
7	6.7	14	6.7

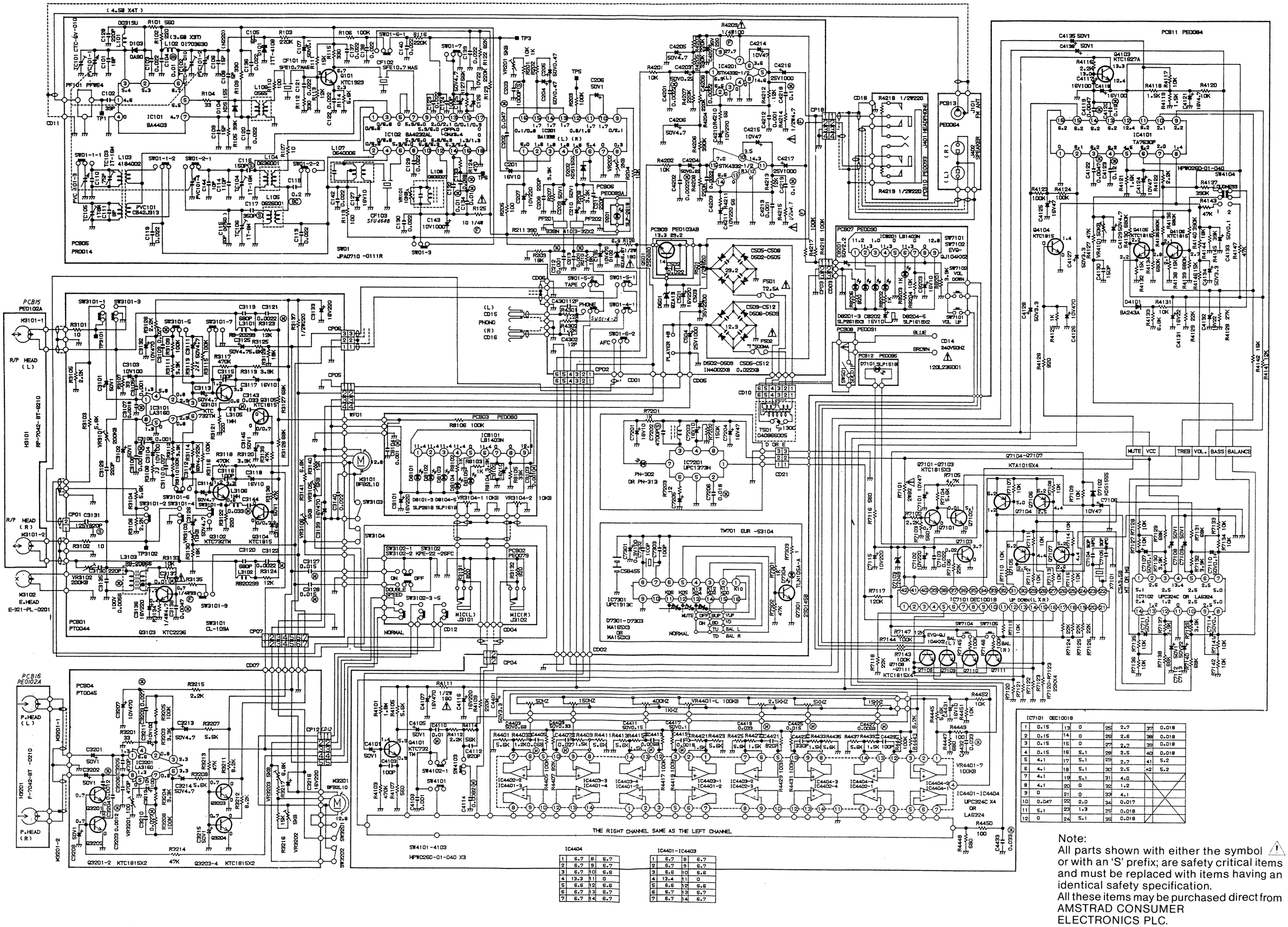
IC4401-IC4403

1	6.7	8	6.7
2	6.7	9	6.7
3	6.8	10	6.8
4	13.4	11	0
5	6.8	12	6.8
6	6.7	13	6.7
7	6.7	14	6.7

IC7101 DEC10018

1	0.15	13	0	25	2.7	37	0.018
2	0.15	14	0	26	2.8	38	0.018
3	0.15	15	0	27	2.7	39	0.018
4	0.15	16	5.1	28	2.5	40	0.018
5	4.1	17	5.1	29	2.7	41	5.2
6	4.1	18	5.1	30	2.5	42	5.2
7	4.1	19	5.1	31	4.0		
8	4.1	20	0	32	1.8		
9	0	21	0	33	4.1		
10	0.047	22	2.0	34	0.017		
11	5.1	23	1.3	35	0.018		
12	0	24	5.1	36	0.018		

TS87 CIRCUIT DIAGRAM



IC7101 DEC10018							
1	0.15	13	0	25	2.7	37	0.018
2	0.15	14	0	26	2.8	38	0.018
3	0.15	15	0	27	2.7	39	0.018
4	0.15	16	5.1	28	2.5	40	0.018
5	4.1	17	5.1	29	2.7	41	5.2
6	4.1	18	5.1	30	2.5	42	5.2
7	4.1	19	5.1	31	4.0		
8	4.1	20	0	32	1.2		
9	0	21	0	33	4.1		
10	0.047	22	2.0	34	0.017		
11	5.1	23	1.3	35	0.018		
12	0	24	5.1	36	0.018		

IC4404			
1	6.7	8	6.7
2	6.7	9	6.7
3	6.7	10	6.6
4	13.3	11	0
5	6.6	12	6.6
6	6.7	13	6.7
7	6.7	14	6.7

IC4401-IC4403			
1	6.7	8	6.7
2	6.7	9	6.7
3	6.6	10	6.6
4	13.4	11	0
5	6.6	12	6.6
6	6.7	13	6.7
7	6.7	14	6.7

Note:
All parts shown with either the symbol ⚠ or with an 'S' prefix; are safety critical items and must be replaced with items having an identical safety specification.
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