

CHAÎNES MIDI MX 200 M & 200 T



MX 200 M

Cette superbe chaîne compacte midi 2 × 10 W comprend :

- une platine tourne-disques 33/45 tours,
- une platine double cassette avec dispositif de lecture continue (2 heures de musique en cassette non-stop !) et système de copie directe,
- un tuner PO/GO/FM stéréo à 8 présélections (4 en FM, 4 en GO) et affichage digital,
- un amplificateur 2 × 10 watts,
- un égaliseur graphique à 5 bandes,
- deux enceintes compactes à 2 voies.

Un ensemble musical très complet dans un encombrement minimum.



MX 200 T

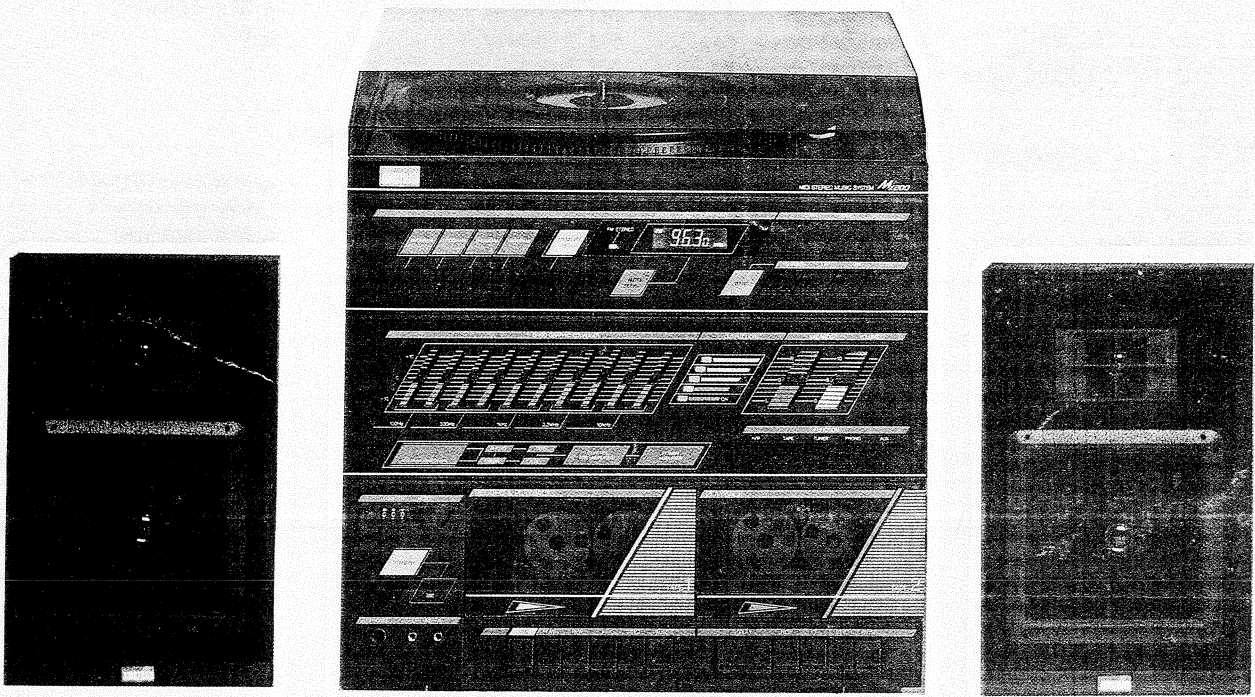
Chaîne identique à la MX 200 M, mais montée dans son meuble à portes vitrées et livrée avec enceintes assorties.

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CARACTERISTIQUES DES CHAÎNES COMPACTES AUDIO

RÉFÉRENCES	MX 100	MX 100 T	MX 200	MX 200 T	MX 300	CDX 400	CDX 400 T	CDX 500	STUDIO 100
Amplificateur stéréo									
Puissance de sortie	2 x 5 W	2 x 5 W	2 x 10 W	2 x 10 W	2 x 20 W	2 x 10 W	2 x 10 W	2 x 20 W	2 x 20 W
Réponse en fréquence	70-18000 HZ + -3 dB	70-18000 HZ + -3 dB	20-20000 HZ + -1 dB	20-20000 HZ + -1 dB	20-20000 HZ + -1 dB	20-20000 HZ + -1 dB	20-20000 HZ + -1 dB	40-18000 HZ + -3 dB	20-20000 HZ + -0,5 dB
Touche de volume	-	-	-	-	OUI	-	-	OUI	-
Volume par curseur	OUI	OUI	OUI	OUI	-	OUI	OUI	-	OUI
Contrôle de la balance	OUI	OUI	OUI	OUI	OUI	OUI	OUI	OUI	OUI
Contrôle de la tonalité	2	2	-	-	-	-	-	-	2 par voie
Egaliseur graphique	-	-	5 bandes	5 bandes	5 bandes	3 bandes	3 bandes	5 bandes	OUI 2 x 3 bandes
Filtre High-Low	-	-	-	-	-	-	-	OUI	-
Affichage de la puissance par voyants LED	OUI	OUI	OUI	OUI	OUI	OUI	OUI	OUI	Par vu-mètre
Entrée auxiliaire	-	-	OUI	OUI	OUI	OUI	OUI	OUI	OUI
Platine tourne-disque									
Cellule céramique	OUI	OUI	OUI	OUI	-	OUI	OUI	-	-
Cellule magnétique	-	-	-	-	OUI	-	-	OUI	OUI
Tuner									
Gamme d'ondes	3	3	3	3	3	3	3	3	3
Affichage digital	-	-	OUI	OUI	OUI	-	-	OUI	-
Touche de recherche	-	-	OUI	OUI	OUI	-	-	OUI	-
8 pré-sélections (4 AM-4 FM)	-	-	OUI	OUI	OUI	-	-	OUI	-
Recherche automatique	-	-	OUI	OUI	OUI	-	-	OUI	-
Voyant FM-stéréo	OUI	OUI	OUI	OUI	OUI	OUI	OUI	OUI	OUI
Platine-cassette									
Double cassette	OUI	OUI	OUI	OUI	OUI	OUI	OUI	OUI	OUI
Lecture continue	OUI	OUI	OUI	OUI	OUI	OUI	OUI	OUI	OUI
Copie d'une cassette à l'autre	OUI	OUI	OUI	OUI	OUI	OUI	OUI	OUI	OUI
Réducteur de bruit Dolby B	-	-	-	-	OUI	-	-	OUI	-
Réducteur standard de bruit	-	-	OUI	OUI	-	-	-	-	OUI séparé/piste
Commutateur de bande metal-chrome-normal	-	-	-	-	-	-	-	OUI	-
Compteur	-	-	OUI	OUI	OUI	-	-	OUI	OUI
Entrée micro	OUI (2)	OUI (2)	OUI (2)	OUI (2)	OUI (2)	OUI (2)	OUI (2)	OUI (2)	OUI (jusqu'à 6)
Sortie casque	OUI (1)	OUI (1)	OUI (1)	OUI (1)	OUI (1)	OUI (1)	OUI (1)	OUI (1)	OUI (2)
Lecteur Compact-Disc									
Affichage	-	-	-	-	-	LED	LED	LED	-
Pause	-	-	-	-	-	OUI	OUI	OUI	-
Sauts de plages	-	-	-	-	-	OUI	OUI	OUI	-
Recherche de plages	-	-	-	-	-	-	-	OUI	-
Répétition	-	-	-	-	-	-	-	OUI	-
Enceintes									
Nombre de voies	2	2	2	2	2	2	2	2	2
Meuble									
Porte + Abattant verre	-	OUI	-	OUI	-	-	OUI	-	-
Rangements disques	-	OUI	-	OUI	-	-	OUI	-	-
Dimensions									
Système	360 x 350 x 330	400 x 370 x 790	360 x 360 x 380	400 x 390 x 850	360 x 360 x 380	360 x 350 x 400	400 x 370 x 790	360 x 360 x 440	410 x 430 x 370
Enceintes	210 x 140 x 290	210 x 140 x 330	210 x 170 x 330	210 x 170 x 390	210 x 170 x 330	210 x 170 x 330	210 x 170 x 390	210 x 170 x 390	240 x 250 x 370
Poids									
Système	6 kg	20 kg	7 kg	21 kg	7 kg	8 kg	22 kg	8,5 kg	10 kg
Enceintes	1,7 kg chaque	2 kg chaque	2,5 kg chaque	3 kg chaque	2,5 kg chaque	2,5 kg x 2	3 kg x 2	3 kg chaque	3,5 kg chaque

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MX200M MIDI SYSTEM MX200T TOWER SYSTEM SERVICE MANUAL

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TECHNICAL SPECIFICATION

Total Output Power (MPO)	: 20
Graphic Equaliser	: 5 Band
Power Output	: 5 watts RMS per channel into 4Ω 20 watts total peak music power 20Hz-20kHz
Record Player	
Speed	: 33, 45 RPM
Wow & Flutter	: 0.1%
Transmission	: Belt Drive
FM Tuner	
Manual up/down	
Auto Seek Scanning	
Programmable 4-preset memory	
FM Frequency Range	: 87.5-108MHz
FM Sensitivity	: 5μV
AM Tuner	
Manual up/down	
Auto Seek Scanning	
Programmable 4-preset memory (MW, LW)	
AM Frequency Range	: MW 522-1611kHz LW 153-281kHz
AM Sensitivity	: MW 250μV/m LW 500μV/m
Tape Decks	
Twin tape, continuous play and tape counter	
Tape Speed	: 4.75cm/sec
Wow & Flutter	: 0.2%
Dimensions	: 36W x 36D x 38H cm
Speakers	: 21W x 17D x 33H cm
Weight	: 7Kg
Speakers	: 2.5Kg each
Mains	: 240V AC 50Hz

SAFETY

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

- 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.
- 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.
- 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.

In keeping with our policy of continually improving our service, and the technical quality of our products, we reserve the right to change components types, manufacturers, sources of supply or technical specification at any time.

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ALIGNMENT INSTRUCTIONS

AM Alignment

Circuit Alignment	Equipment Connection	Step	Gen. Freq.	Dial Setting	Adjustments
IF	AM signal genertor with loop antenna (See Fig. 1)	1	450kHz (1kHz Mod.)	552kHz	T4 (AM IFT) Adjust for maximum output.
		2			Repeat until no further improvement can be made.

Measure output across 4Ω load.

MW Alignment

Circuit Alignment	Equipment Connection	Step	Gen. Freq.	Dial Setting	Adjustments
LOCAL OSC (BAND)	Connect DC Volt meter to TP3 and GND.	1		522kHz	L5 (AM OSC. Coil) Adjust for 1.5V on the meter reading.
RF AMPLIFIER (TRACKING)	AM signal generator with loop antenna. SSVM across 4Ω load. 2ft from bar antenna.	2	603kHz (1kHz Mod.)	Tune to signal.	L3 (MW Ant. coil) Adjust for maximum output.
		3	1404kHz (1kHz Mod.)	Tune to signal.	TC2 (MW Ant. trimmer) Adjust for maximum output.
		4			Repeat steps 2 and 3 several times.

Measure output across 4Ω load.

LW Alignment

Circuit Alignment	Equipment Connection	Step	Gen. Freq.	Dial Setting	Adjustments
LOCAL OSC (BAND)	Connect DC Volt meter to TP3 and GND.	1		153kHz	TC4 (LW OSC. trimmer) Adjust for 1.2V on the meter reading.
RF AMPLIFIER (TRACKING)	AM signal generator with loop antenna. SSVM across 4 ohm load. (See Fig. 2)	2	160kHz (1kHz Mod.)	Tune to signal.	L4 (LW Ant. coil) Adjust coil on ferrite core for maximum output.
		3	270kHz (1kHz Mod.)	Tune to signal.	TC3 (LW Ant. trimmer) Adjust for maximum output.
		4			Repeat steps 2 and 3 several times.

Measure output across 4Ω load.

FM Alignment

Circuit Alignment	Equipment Connection	Step	Gen. Freq.	Dial Setting	Adjustments
LOCAL	Connet DC Volt meter to TP2 and GND.	1		87.5MHz	L2 (FM OSC) Adjust for 2V on the meter reading.,
RF AMPLIFIER (TRACKING)	FM Signal generator to antenna terminals though 75 ohm antenna matching network. SSVM across 4 ohm load.	2	90.0MHz (Mod.)	Tune to signal.	L1 (FM RF Coil) Adjust for maximum output – stretch or squeeze.
		3	106.0 MHz (Mod.)	Tune to signal.	TC1 (FM RD Trimmer) Adjust for maximum output.
		4			Repeat steps 2 and 3 to obtain sensitivity at 90.0MHz and 106.0MHz.

Circuit Alignment	Equipment Connection	Step	Gen. Freq.	Dial Setting	Adjustments
IF	Sweep output – TP4. output – TP1.	1	1.7MHz	87.5MHz	T1, T2 (FM IFT) Adjust for maximum and must symmetrical "S" curve.
		2			Repeat step 1. (10.7MHz at the center point)
	3	FM SG across FM ant.	87.5MHz (Mod.)	87.5MHz	T3 (FM IFT) Adjust for minimum distortion.

FM MPX Alignment

Circuit Alignment	Equipment Connection	Step	Gen. Freq.	Dial Setting	Adjustments
19kHz	Freq. counter from TP5 and GND.		98.0MHz (Mod.)	98.0MHz	First make sure FM section is properly aligned. Adjust SFR1 for frequency counter indication of 19kHz.

CASSETTE SECTION

Description	Equipment connection	Adjusting points	Adjustments
Measure output and frequency across 4Ω load.	See Fig. 8	Semi-fixed resistor VR601	A counter indicates 3kHz. (Use 3kHz Test Tape MTT-111)
Measure output and frequency across 4Ω load.	See Fig. 8	Adjust Screw (See Fig. 9)	Adjust for maximum output. (L/R) (Use 8kHz Test Tape)

Description	Equipment connection	Adjusting points	Adjustments
Recording Bias Frequency	See Fig. 10	Rec. OSC coil T5	Frequency Counter indicates 72kHz±0.2kHz

PHONO ALIGNMENT

Description	Equipment connection	Adjusting points	Adjustments
Phono Speed	See Fig. 11	Semi-fixed resistor (See Fig. 12)	A counter indicates 3kHz. (Use 3kHz Test Record)

SPECIFICATIONS

AM PERFORMANCE

	Test Item	Measured at (kHz)	Unit	Nominal	Limit
1.	Frequency coverage		kHz	520—1610	520—1610
2.	Intermediate frequency		kHz	450	—
3.	Sensitivity (S/N 20dB)	600	μV/m	500	1000
		1000	μV/m	350	800
		1400	μV/m	350	800
4.	S/N ratio at 5mV/m input	1000	dB	40	35
5.	Selectivity (at quiet sens.)	1000	dB	±25	±20
6.	THD at 5mV/m, 30% mod.	1000	%	2	4
7.	THD at 100mV/m, 80% mod.	1000	%	4	10
8.	AGC figure of merit	1000	dB	45	38
9.	Image rejection ratio	1400	dB	31	27
10.	IF rejection ratio	600	dB	31	27
11.	Whistle modulation (1mV/m input)	900 \$ 1350	%	5	15
12.	Whistle modulation (5mV/m input)	900 \$ 1350	%	5	10
13.	Whistle modulation (100mV/m input)	900 \$ 1350	%	5	15
14.	Auto stop sensitivity	1000	μV/m	500	2000
15.	Audio fidelity (−6dB, 1kHz 0dB)	1000	Hz	50—2100	100—1800
16.	Bandwidth	1000	kHz	6	4—9

FM PERFORMANCE

	Test Item	Measured at (MHz)	Unit	Nominal	Limit
1.	Frequency coverage		MHz	87.5—108.1	87.5—108.1
2.	Intermediate frequency		MHz	10.7	—
3.	Sensitivity (S/N 30dB)	90.1	μV	10	20
		98.1	μV	10	20
		106.1	μV	10	20
4.	IHF Sensitivity	90.1	μV	20	40
		98.1	μV	20	40
		106.1	μV	20	40
5.	Indicator Sensitivity	98.1	μV	15	30
6.	Image rejection ratio	106.1	dB	26	20
7.	IF rejection ratio	90.1	dB	65	50
8.	Selectivity (400kHz/1mV)	98.1	dB	±25	±15
9.	3dB limiting	98.1	μV	15	30
10.	AM suppression 1mV	98.1	dB	40	30
11.	Auto stop sensitivity	98.1	μV	15	30
12.	Harmonic distortion (1mV)	98.1	%	1.0	3.0
13.	Over load distortion (100mV)	98.1	%	2.0	3.5

	Test Item		at (MHz)	Unit	Nominal	Limit
14.	De-emphasis. (400Hz=0dB)	100Hz	98	dB	0	0±3
		10kHz	98	dB	-13	-13±3
15.	S/N ratio (1mV)		98	dB	50	40
16.	Channel separation at	100Hz	98	dB	30	20
		1kHz	98	dB	30	20
		10kHz	98	dB	20	15

TAPE PERFORMANCE — Play Back

	Test Item	Unit	Nominal	Limit	Test Tape & Condition	
1.	Harmonic distortion %	1.0	2.0	MTT-212E		
2.	S/N ratio (un weighted)	dB	50	45	MTT-150	
3.	Channel crosstalk w/1kHz B.P.F.	dB	40	30	MTT-141	
4.	Playback audio fidelity (±5dB)	Hz	-	60-10K	MTT-256	
5.	Tack crosstalk w/1kHz B.P.F.	dB	55	50	MTT-121	
6.	Tape speed deviation	%	+0.5	+3/-2	MTT-111	
7.	Wow & flutter WRMS/JIS	%	0.15	0.35	MTT-111	
8.	Rew/FF time	sec	112	130	C-60	
9.	Torque	Play	g-cm	-	35-70	
		Rew/FF	g-cm	-	50-105	

TAPE PERFORMANCE — Over All

	Test Item	Input level	Unit	Nominal	Limit
1.	Harmonic distortion	Dolby Level	%	1.5	3.0
2.	S/N ratio Dolby	Dolby Level	dB	48	44
3.	Channel crosstalk (w/1kHz BPF)	Dolby Level	dB	40	30
4.	Fidelity (±5dB)	Dolby Level	Hz	-	60-10K
5.	Mic. sens (Dolby Level)	-	dB	-65	±3
6.	Erase ratio (w/1kHz BPF)	Dolby Level	dB	60	50

Condition: AC-223 test tape; 500mW/8 ohm output.

AUDIO PERFORMANCE — AMP SECTION

	Test Item	Unit	Nominal	Limit
1.	Frequency response at 30W output with THD 0.9%	Hz		20-20K
2.	Sensitivity at 30W 1kHz (Aux input)	mV	150	±3dB
3.	Harmonic distortion (1kHz)	%	1.5	4
4.	Minimum Hum (RMS)	mV	1.0	5.0
5.	Overload capacity (clip point)	mV	2500	
6.	Equalizer control range	dB	±10	±7 - 13
7.	Crosstalk 1kHz (w/BPF) input shorted	dB	42	35
8.	S/N ratio (input shorted)	dB	50	40

Condition: 1kHz test frequency; 500mW/8 ohm output; AUX input.

NOTE: Nominal specs represent the design specs; all units should be able to approximate these – some will exceed and some may drop slightly below these specs. Limit specs present the absolute worst condition that still might be considered acceptable; in no case should a unit perform to less than within any limit spec.

DIGITAL TUNING SYSTEM DESCRIPTION

The MX200's Digital Tuning System provides full electronic control of a vari-cap tuned FM/MW/LW receiver. The block diagram of the system is shown in Fig-1. This is a phase locked loop Digital Tuning System. 4 bit CMOS 1 chip micro computer which consists of LCD driver, 150MHz pre-scaler, IF counter, PLL frequency synthesizer and controller, installed.

It accepts directly an AM local oscillator signal and a FM local oscillator signal, and outputs control signals for closed loop operation of these oscillators. The outputs drive filters for supplying analog voltages to the vari-cap tuners. The frequency of the tuned station is displayed on 5 digit multiplexed display. 4 favorite stations on each (FM x 4, MW/LW x 4) band can be stored as well as "last stations tuned" information.

Example of FM Operation

When receiving 98.0MHz, the VCO generates 108.7MHz ($98.0 + 10.7$ (IF) MHz). The signal passes through Buffer Amp (Q1) (Q2), and then is applied to Pin 8 of PLL IC, IC 4.

This frequency is divided by Programmable Divider of PLL IC (IC 4); the resulting output will be 25kHz.

The Reference Oscillator 4.5MHz is divided by Reference Divider of PLL IC (IC 4); the resulting in another 25kHz frequency.

These two 25kHz signals are fed to the Phase Detector. An error voltage is generated by the Phase Detector, which is proportional to the phase difference between these two 25kHz signals. This error voltage appears at Pin 12 of IC 4 and passes through the LPF where the error voltage is integrated, and harmonics and noise are filtered out. The resulting DC voltage is applied to the varicap Diodes D26 (part of VCO) whose capacity varies with applied DC voltage. Thus the output frequency of VCO is corrected. With proper circuit design and precise adjustments, the VCO frequency is accurate and precise when the system is "locked", meaning the Phase Detector sensed no phase differences between the two 25kHz signals and the VCO generates a frequency which is as accurate and stable as the reference crystal oscillator.

Example of AM Operation (The basic PLL circuitry system is same as in FM mode.)

When receiving 999kHz, VCO generates a 1449kHz signal ($999 + 450$ (IF) kHz). The AM VCO output signal, 1449kHz, which passes through Buffer Amp IC2 is applied to Pin 9 of PLL IC 4. This frequency is divided by N (=161). The resulting output will be 9kHz.

The Reference Oscillator 4.5MHz, is divided by 500 resulting in another 9kHz frequency.

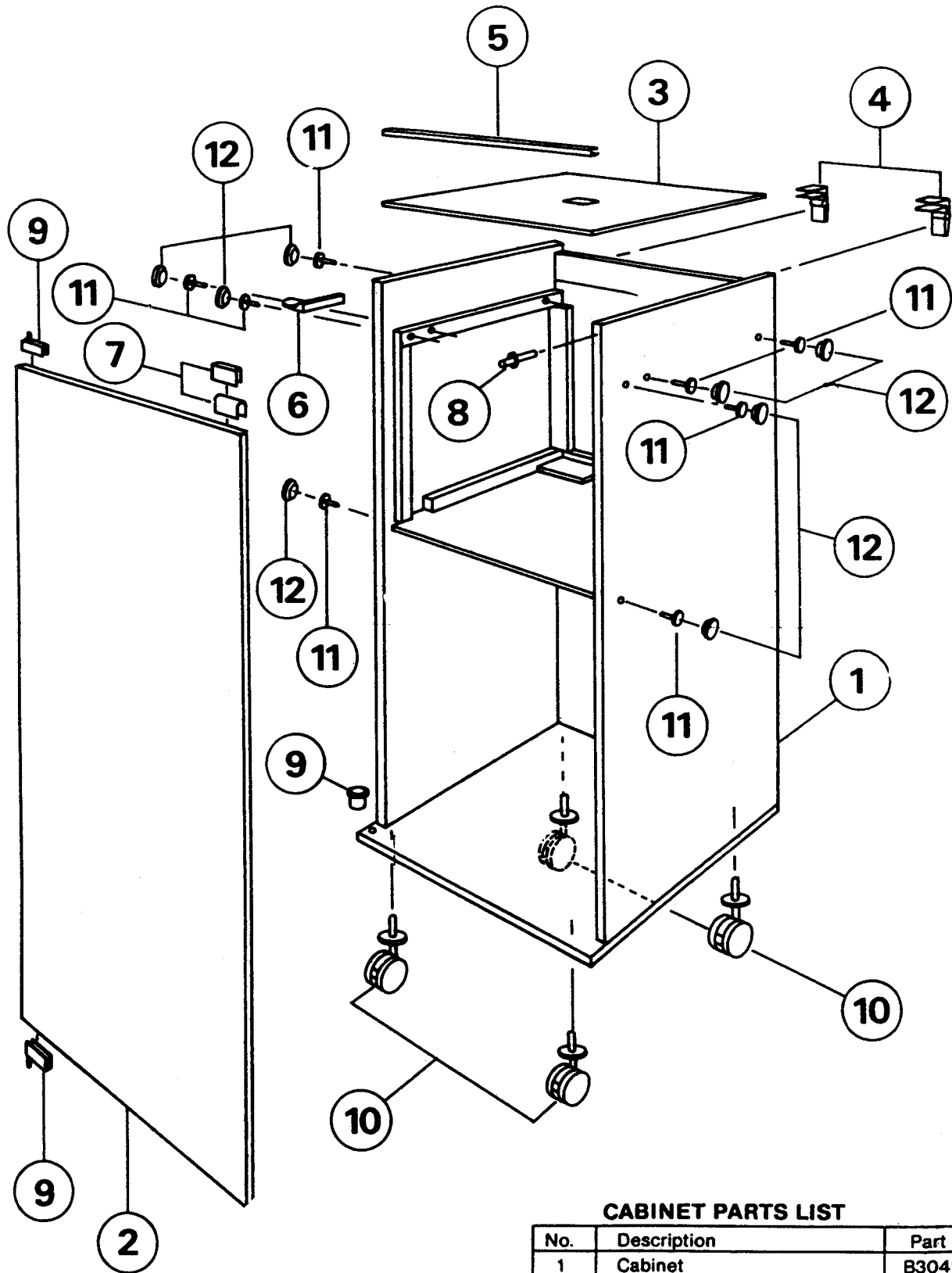
These two 9kHz signals are fed to the Phase Detector. An error voltage is generated by the Phase Detector, which is in proportion to the phase difference between these two 9kHz signals. This error voltage appears at Pin 11 of IC 4 and passes through the LPF where the error voltage is integrated, and harmonics and noise are filtered out. The resulting DC voltage is applied to the Varicap Diode D8 (part of VCO) whose capacity varies with applied DC voltage. Thus the output frequency of VCO is corrected. With proper circuit design and precise adjustments, the VCO frequency is accurate and precise.

When the system is "locked", the phase detector senses no phase differences and generates a frequency which is as accurate and stable as the reference crystal oscillator.

Note:

1. PLL Frequency synthesizer provides direct programmable divider so the system does not need pre-scaler circuit.
2. Receiving Frequency FM Band 87.5MHz ~ 108.0MHz (50kHz Step)
MW Band 520kHz ~ 1611kHz (9kHz Step)
LW Band 153kHz ~ 281kHz (1kHz Step)

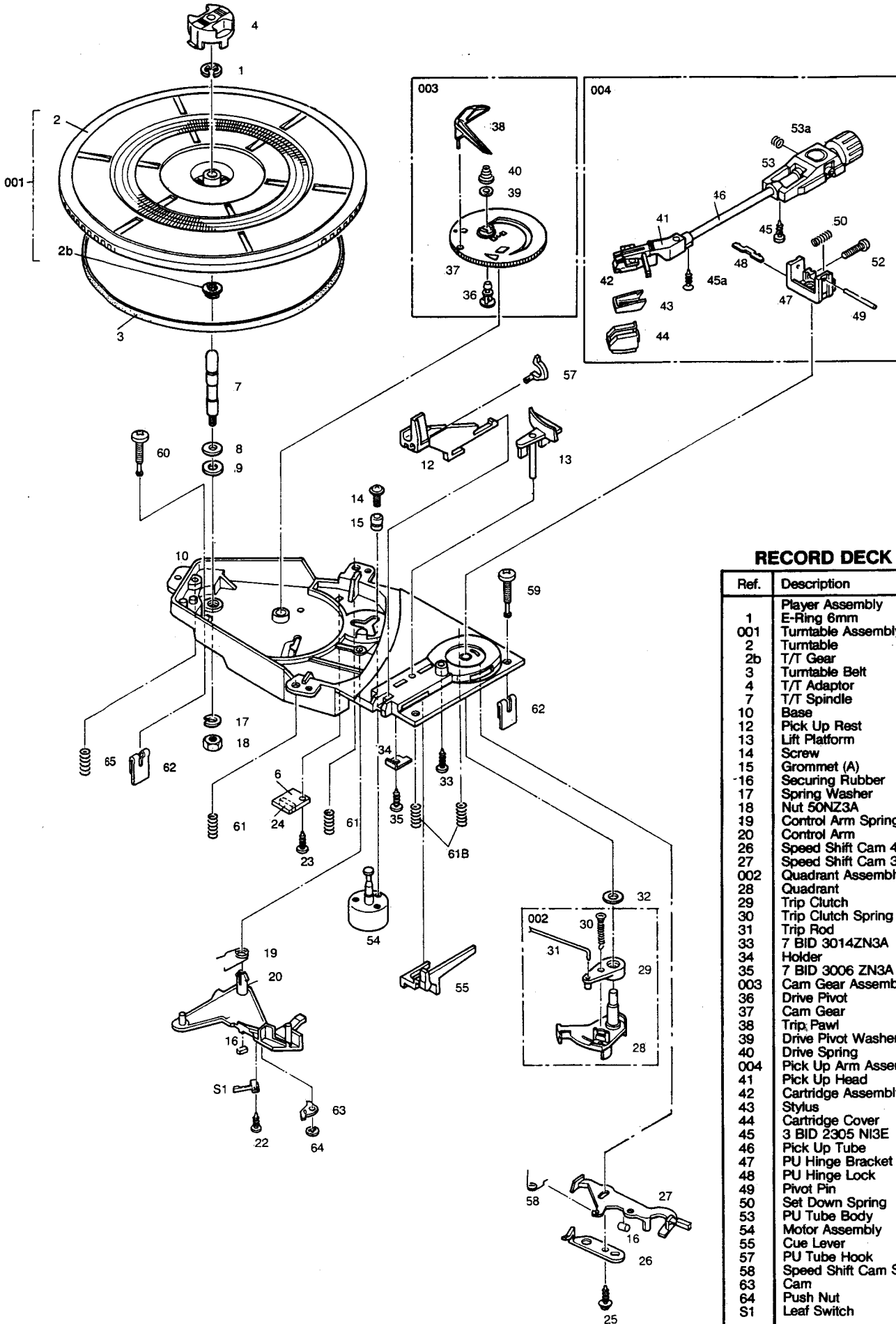
TOWER CABINET EXPLODED VIEW & PARTS LIST



CABINET PARTS LIST

No.	Description	Part No.
1	Cabinet	B3049/6
2	Glass Door	70004
3	Lid Record Deck	70003
4	Hinge Lid	90008
5	Trim Lid	90030
6	Rest Lid	
7	Handle Assy.	93003
8	Magnetic Lock	90016
9	Hinge Glass Door Kit	90011
10	Castors	90100
11	Screws	
12	Screw Caps	B1044

EXPLODED VIEW (PLAYER)



RECORD DECK PARTS LIST

Ref.	Description	Part No.
1	Player Assembly	202460
001	E-Ring 6mm	202487
2	Turntable Assembly	202488
2b	Turntable	202489
3	T/T Gear	202490
3	Turntable Belt	202491
4	T/T Adaptor	202492
7	T/T Spindle	202493
10	Base	202496
12	Pick Up Rest	202497
13	Lift Platform	202498
14	Screw	202499
15	Grommet (A)	202500
16	Securing Rubber	202501
17	Spring Washer	202502
18	Nut 50NZ3A	202506
19	Control Arm Spring	202504
20	Control Arm	202505
26	Speed Shift Cam 45	202510
27	Speed Shift Cam 33	202511
002	Quadrant Assembly	202512
28	Quadrant	202513
29	Trip Clutch	202514
30	Trip Clutch Spring	202515
31	Trip Rod	202516
33	7 BID 3014ZN3A	202517
34	Holder	202518
35	7 BID 3006 ZN3A	202519
003	Cam Gear Assembly	202520
36	Drive Pivot	202521
37	Cam Gear	202522
38	Trip Pawl	202523
39	Drive Pivot Washer	202524
40	Drive Spring	202525
004	Pick Up Arm Assembly	202526
41	Pick Up Head	202527
42	Cartridge Assembly	202528
43	Stylus	202529
44	Cartridge Cover	202530
45	3 BID 2305 N13E	202532
46	Pick Up Tube	202533
47	PU Hinge Bracket	202534
48	PU Hinge Lock	202535
49	Pivot Pin	202536
50	Set Down Spring	202538
53	PU Tube Body	202540
54	Motor Assembly	202541
55	Cue Lever	202542
57	PU Tube Hook	202543
58	Speed Shift Cam Spring	202544
63	Cam	202550
64	Push Nut	202551
S1	Leaf Switch	202553

TROUBLESHOOTING GUIDE

RECEIVER SECTION

CIRCUIT	SYMPTOM	CAUSE	REMEDY
GENERAL	Inoperative	Defective power switch (S19)	Replace as necessary.
		Open circuit in transformer (T8)	Check current and voltages. Replace as necessary.
	No sound	Defective volume control	Check volume control resistance for continuous operation. Replace as necessary.
		Defective function switch (S13-17) Defective SPEAKER FUSE (F401, 402)	Repair or replace switch. Replace as necessary.
AM	No sound	Defective detector	Check voltages in this circuit. Repair/replace as necessary.
		Open circuit in AM IFT, ANF RF coil or Osc. coil (T4, L3, 4, 5)	Check voltages and resistance. Replace as necessary.
	Weak sound (low sensitivity)	IF misaligned	Re-adjust (See Alignment Instructions).
		RF misaligned	Re-adjust (See Alignment Instructions).
		Defective IC2	Check voltages. Replace as necessary.
		Poor contact in Antenna circuit	Resolder and/or repair. Replace as necessary.
		Defective function switch (S15, 3, 4)	Repair replace switch.
		Defective in Detector	Check voltages.
FM	No sound	Open circuit in FM IFT (T1, 2, 3) Antenna coil or Osc. coil (L1, L2)	Check voltages and resistances. Replace as necessary.
	Weak sound (low sensitivity)	Defective FM tuner	Check RF, IF and Detector circuits. Check voltages of IC1 and IC2. Replace parts as necessary.
		RF misaligned	Re-adjust (See Alignment Instructions).
		Defective IC1, IC2	Check voltages and replace as necessary.
		Poor contact in FM Ant.	Resolder or replace as necessary.
MPX	Poor separation	Improper adjustment of VCO	Re-adjust SFR1. (See Alignment Instructions).
	No stereo Indicator	Faulty D25	Check indicator D25 and circuit. Replace as necessary.

AM or FM	No tuning (no Up/Down) (no Search)	Defective UP (DOWN) switch	Replace as necessary.
		Defect in PLL circuit	Check voltages of IC705, IC4.
	No preset	Defective memory switch (SW8) or preset switch (SW9-12)	Replace as necessary.
		Defect in PLL circuit	Check voltages of IC4.

CASSETTE SECTION

SYMPTOM		CIRCUIT	REMEDY
No sound	on both channels	Power supply	Check voltage of transformer of T6. Replace as necessary. Check voltage at emitter of Q305. Replace as necessary.
	on Rch (Lch)	Motor	Check voltage at motor (9V) If not proper voltage, change motor.
		Pre-amplifier	Check voltage of IC301. Replace as necessary.
Distortion	on Rch (Lch)	Pre-amplifier	Check voltage of IC301. Replace as necessary.
Poor high frequency	on Rch (Lch)	Tape head	Check head azimuth. Re-align as in the alignment instructions. Replace if head scratched.
		Equalizer amplifier	Check voltage of IC301. Replace as necessary.
No erasing or no recording	on both Lch & Rch	Bias oscillator	Check erase head. Check Bias current. Replace Osc. coil T5 as necessary.
Defect in recording (no recording, weak recording or excessive recording level)	on Rch (Lch)	Record amplifier	Check that rec-signal is supplied to R/P head. If no rec-signal is supplied, check mic jack, R/P slide switch and IC302 voltage.
		Bias	Check bias current. Replace Osc. coil T5 as necessary.

PHONO SECTION

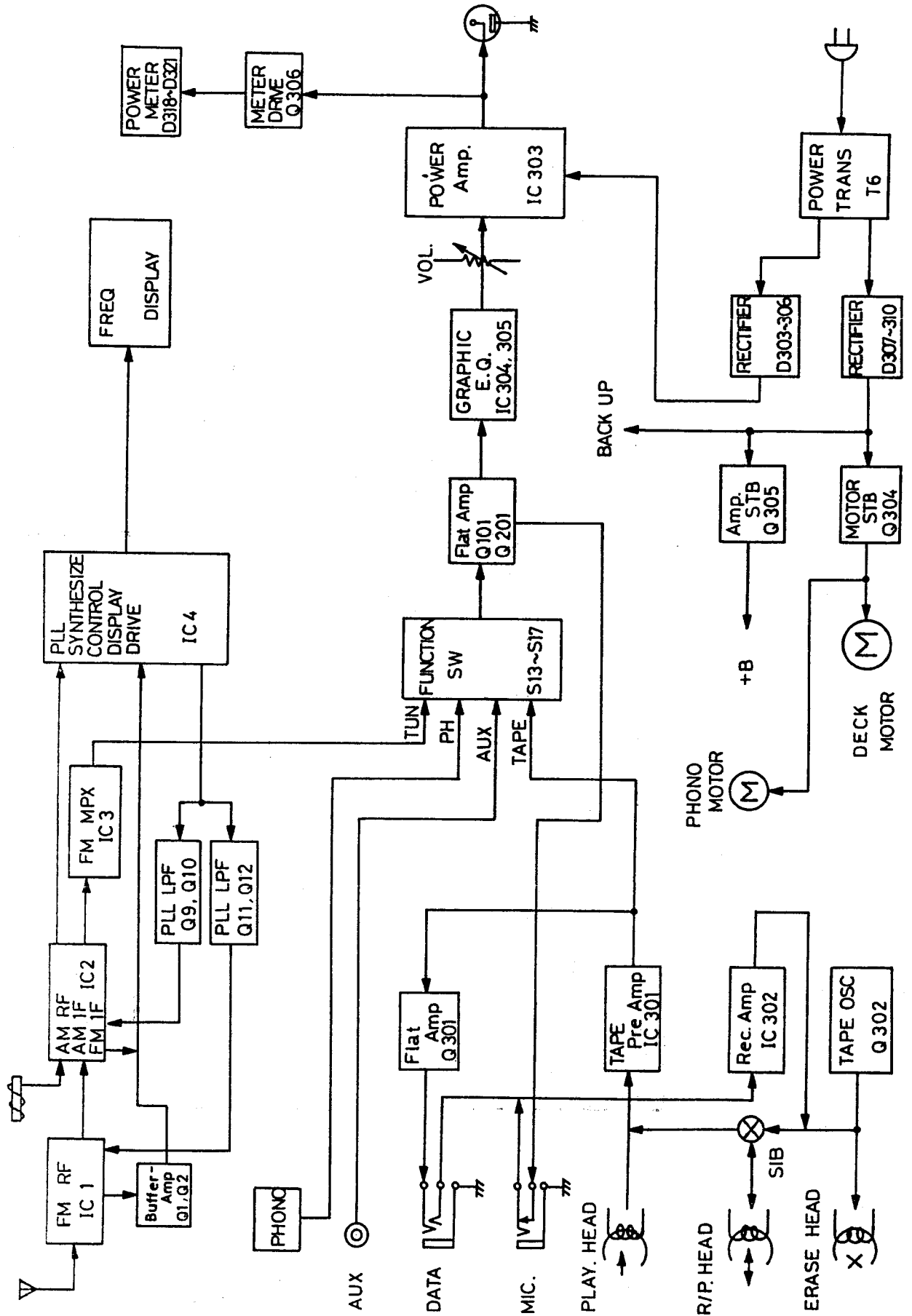
SYMPTOM		CIRCUIT	REMEDY
No sound	on both channels	Power supply	Check voltage of transformer of T6. Replace as necessary. Check voltages at emitter of Q305. Replace as necessary.
	on Rch (Lch)	Motor	Check voltage of Q304. If not proper voltage, change motor.

ELECTRICAL PARTS LIST

Circ. Ref.	Description	Part No.
I.C.s		
IC1	IC LA1185, Front End	202157
IC2	IC LA1266, AM/FM IF	202158
IC3	IC LA3361, MPX	200402
IC4	IC UPD1713AG-015, PLL/Counter	202159
IC301	IC BA3402, Play Amp	200902
IC302	IC BA3312N, Record Amp	202161
IC303	IC UPD1335V, Power Amp	202450
IC304	IC BA3812L, Graphic Eq.	200407
IC305	IC BA3812L, Graphic Eq.	200407
Transistors		
Q1, 2	Tr 2SC1923	202201
Q3, 6, 14, 15	Tr 2SA1015	170453
Q4, 5, 7-13, 101, 201, 301-303, 306	Tr 2SC1815	170447
Q304	Tr 2SC1383	202451
Q305	Tr 2SC1846	201073
Diodes		
D1, 2, 4, 5, 9-21, 29-37, 301	Diode 1SS176	201077
D303-306	Diode RL202F	202196
D307-310	Diode 1N4002F	202197
D316	Diode 1K261	202193
D3, 6	Varicap Diode	202188
D7, 8	Varicap Diode	202189
D26	Zener MTZ5.6	202190
D302	Zener MTZ12-	202198
D317-321	LED 365	202194
D311	LED 292	202195
D25	LED 205	201097
Coils & Transformers		
L3, 4	B791. Bar Antenna	202176
L2	M076. FM Osc Coil	202442
L1	M127. FM RF Coil	201082
L5	M635. AM Osc Coil	202443
T4	M300. AM IF Coil	202444
T1	M237. FM IF Coil	202445
T2	M637. FM IF Coil	202182
T3	M658. FM IF Coil	202183
T5	M351. Record Bias Coil	202446
Filters & Crystals		
F1	87.5-108MHz Band Pass Filter	202447
CF1	10.7MHz Ceramic Filter	202448
CF2	465kHz Ceramic Filter	202449
Description	Ref. No.	Part No.
Resistors (All resistors are 1/5 watt unless otherwise stated)		
1.5Ω/¼W	R601	152140
1.5Ω/1W	R317	151607
2.2Ω	R129, 229	152142
4.7Ω	R309	152146
8.2Ω/¼W	R315	152150
22Ω	R1	152156
47Ω	R4, 113, 213	152160
56Ω	R38, 126, 226	152161
82Ω	R335	152164
100Ω	R72	152166
100Ω/¼W	R336	10032
150Ω	R334	152168
180Ω	R20, 62	152169
180Ω/¼W	R332	10038
220Ω	R8, 10, 316, 319	152170
270Ω	R70, 305, 311	152171
390Ω	R117, 217, 314	152173
470Ω	R130, 230, 301	152174
470Ω/¼W	R333	10048
560Ω	R58, 312	152175
680Ω	R9, 66, 310	152176
820Ω	R22-24, 120, 220, 313	152178
1kΩ	R6, 7, 11, 13, 36, 45, 59, 67, 307	152179
1.2kΩ	R321	152180
1.2kΩ/¼W	R331	10063
2.2kΩ	R25, 30, 63-65	152183
3.3kΩ	R37, 52, 53, 61, 71, 119, 219	152185
3.9kΩ	R68, 69, 136, 138, 212, 236, 238	152187
4.7kΩ	R112, 137, 237, 303	152188
5.6kΩ	R28, 109, 209	152189
6.8kΩ	R108, 208	152190
8.2kΩ	R40, 51, 56, 57, 102, 202, 306	152192
9.1kΩ	R44	152193
10kΩ	R3, 19, 26, 34, 35, 47, 104, 204	152194
10kΩ/¼W	R602	10085
12kΩ	R14-16, 31, 50, 82, 121, 127, 128, 221, 227, 228	152195
15kΩ	R41, 106, 206	152196
18kΩ	R110, 210	152197
22kΩ	R29, 116, 216	152198
27kΩ	R54, 55	152199
39kΩ	R81, 115, 215, 302	152201
47kΩ	R2, 32, 43, 46, 48, 73-80, 114, 214, 308	152203
56kΩ	R12, 17	152204
82kΩ	R18, 33, 42	152207
100kΩ	R49, 83-85	152209
120kΩ	R101, 201	152210
180kΩ	R27, 103, 203	152212

Description	Ref. No.	Part No.
220kΩ	R21, 111, 211	152213
270kΩ	R320	152214
330kΩ	R5	152215
390kΩ	R107, 207	152216
680kΩ	R118, 218, 304	152219
Variable Resistors		
Slide Pot.	5 off for graphic eq.	202452
Slide Pot.	1 off for main volume	202453
Slide Pot.	1 off for balance	202454
6.8kΩ	Potentiometer	202455
1kΩ	Potentiometer	202456
2kΩ	Potentiometer	202211
Ceramic Capacitors		
4pF	C3	S/150487
5pF	C8	200507
10pF	C9	809250
13pF	C5	800363
15pF	C67	400106
56pF	C23	810311
68pF	C16	150516
100pF	C46, 114, 214	24016
270pF	C132, 232	150501
330pF	C30, 64	150518
470pF	C116, 216, 305	24004
680pF	C55	200522
820pF	C134, 234	800209
0.001μF	C2, 4, 11, 29, 66, 101, 107, 118, 142, 201, 207, 218, 242	24027
0.0012μF	C102, 202	153321
0.022μF	C1, 6, 10, 13, 25, 27, 28, 39, 40, 71, 320-327, 329	21027
0.047μF	C14, 17, 19-21, 31, 33, 54, 72, 330-333	21008
Semi-Conductive Capacitors		
0.001μF	C44	151579
0.0015μF	C109, 209	152582
0.0022μF	C312	151580
0.0027μF	C136, 236	200534
0.0082μF	C108, 138, 208, 238	200971
0.015μF	C37, 58, 59, 106, 206	152389
0.01μF	C18, 63, 65, 69, 70, 104, 110, 131, 204, 210, 231	151583
0.022μF	C311	151585
0.027μF	C140, 240	151941
0.033μF	C74, 233	151586
0.1μF	C222	150887
Styrol Capacitors		
300pF	C26	202559
370pF	C22	800236
1000pF	C47	130132
Polypropylene Capacitors		
470pF/100V	C314	202558
0.0039μF/100V	C313	202536
Electrolytic Capacitors		
0.1μF/10V	C115	202557
3.3μF/50V	C35, 43	1400343
4.7μF/50V	C12, 34, 38, 45, 51-53, 56, 57, 73, 112, 113, 117, 212, 213, 217, 304, 309, 319, 344	150520
10μF/16V	C32, 75, 144, 244, 307	20024
10μF/25V	C301	200528
22μF/10V	C36	20025
47μF/16V	C103, 119, 203, 219, 310	20027
100μF/10V	C41, 61, 111, 211, 303, 315	20028
100μF/16V	C76, 120, 220, 341	20028
220μF/16V	C62, 302, 318	20029
330μF/25V	C316	120102
1000μF/25V	C123, 223	152567
1000μF/16V	C223	1400345
2200μF/35V	C317	20120
Switches		
Push Switch Function		202457
Push Switch Power		202217
Push Switch MS, BC		202213
Slide Switch R/Pb.		202458
Miscellaneous		
Antenna Jack		202221
Record Lever		202427
Pin Jack AUX.		202222
Mic. Jack		202459
Speaker Jack		202226
Headphone Jack		202461
Power Transformer		202463
Display		202232
Lamp		202239
Crystal		202241
Trimmer FM/LW		202245
Trimmer L/W		202246
Head R/P		202464
Head Play		202465
Head Erase		202466
Motor		202235
Tape Counter		202248
Fuse 1.6A		202252
Fuse 800mA		202468

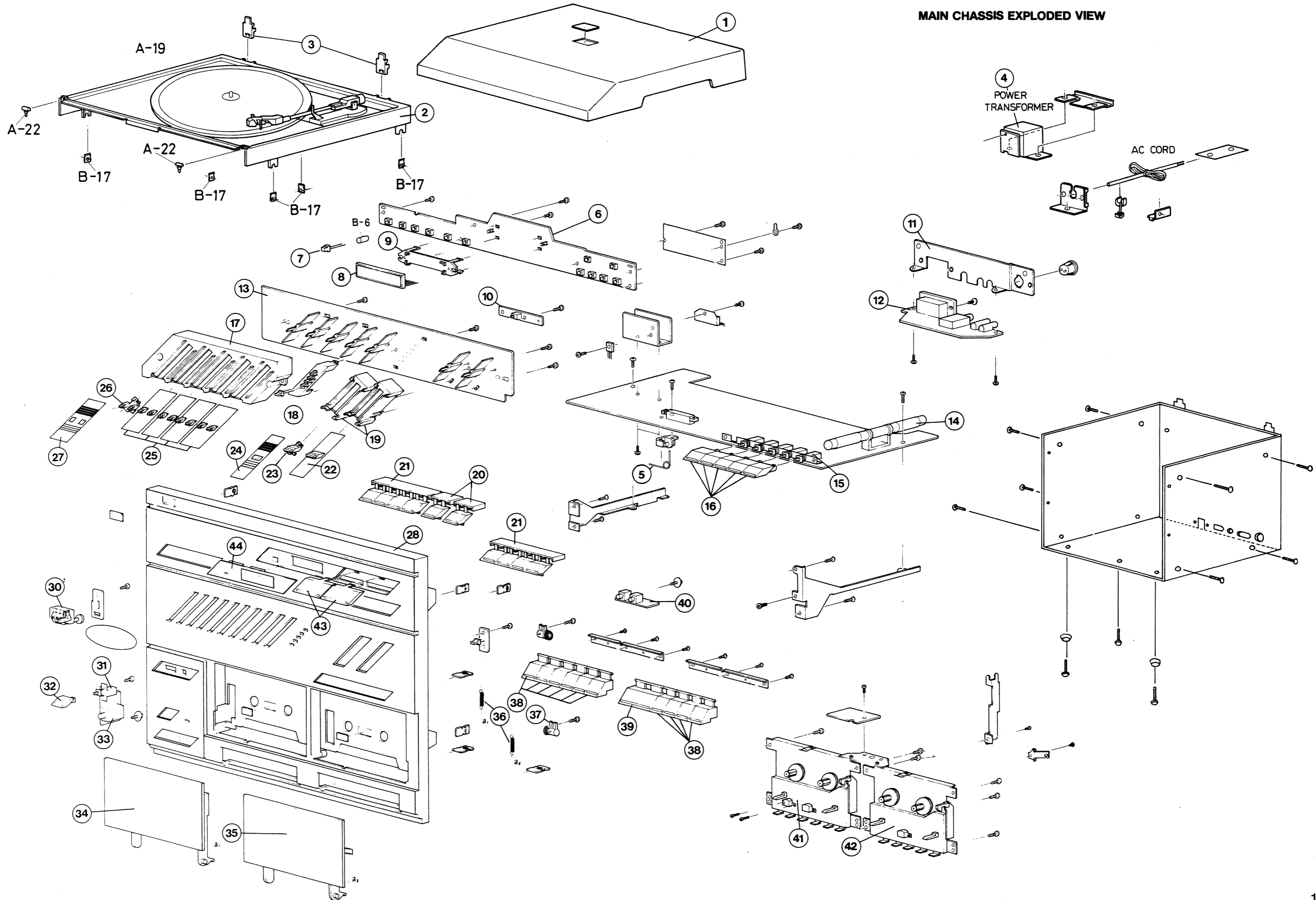
BLOCK DIAGRAM



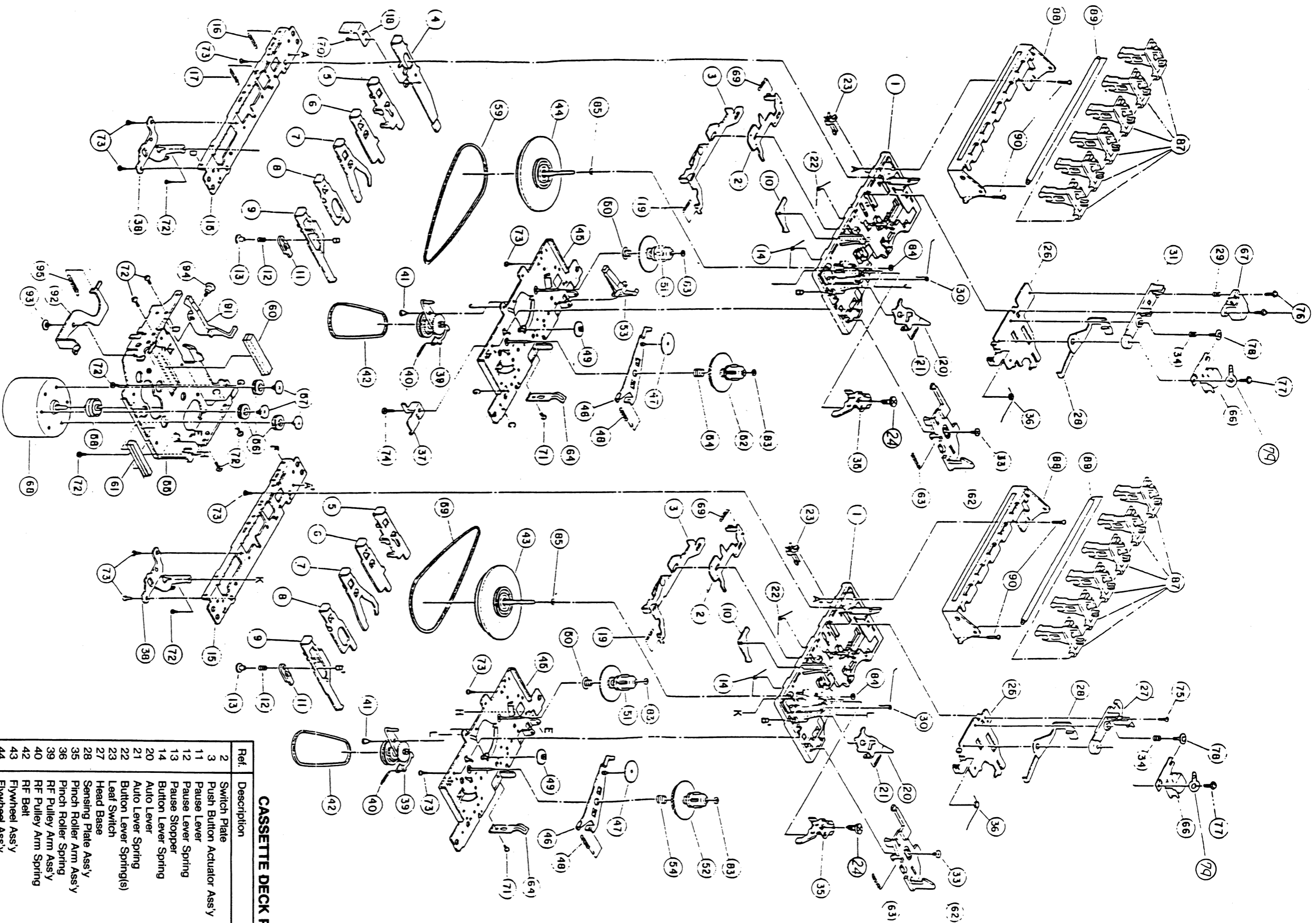
MAIN CHASSIS PARTS LIST

Ref. No.	Description	Part No.
1	Dust Cover	202031
2	Record Deck	202029
3	Hinge	202033
4	Power Transformer	202463
5	Record Spring	202056
6	Main PCB	202485
7	LED	201097
8	Display	202232
9	Display Back Plate	202040
10	LED Power O/P	202194
11	Terminal Chassis	202422
12	Terminal Plate	202501
13	Graphic Equaliser PCB	202484
14	Ferrite Rod	202176
15	Waveband Selector	202457
16	Push Button	202011
17	Slide Knob Base	202417
18	LED Holder	202419
19	Balance Knob Base	202418
20	Memory Button	202010
21	Selector Button	202009
22	Volume Graduation	202409
23	Balance Knob	202019
24	Balance Graduation	202408
25	Graphic Equaliser Graduation Rear	202502
26	Equaliser Knob	202406
27	Equaliser Graduation	202407
28	Front Assembly	202401
29	Tuning Knob	202008
30	Tape Counter	202248
31	Standby Switch	202217
32	Power Button	202012
33	Headphone Jack	202461
34	Cassette Door L	202404
35	Cassette Door R	202405
36	Door Spring	202057
37	Damper Assembly B	202046
38	Cassette Keys	202013
39	Play Key	202014
40	Mic. Jack	202459
41	Cassette Assembly A	202555
42	Cassette Assembly B	202556

MAIN CHASSIS EXPLODED VIEW



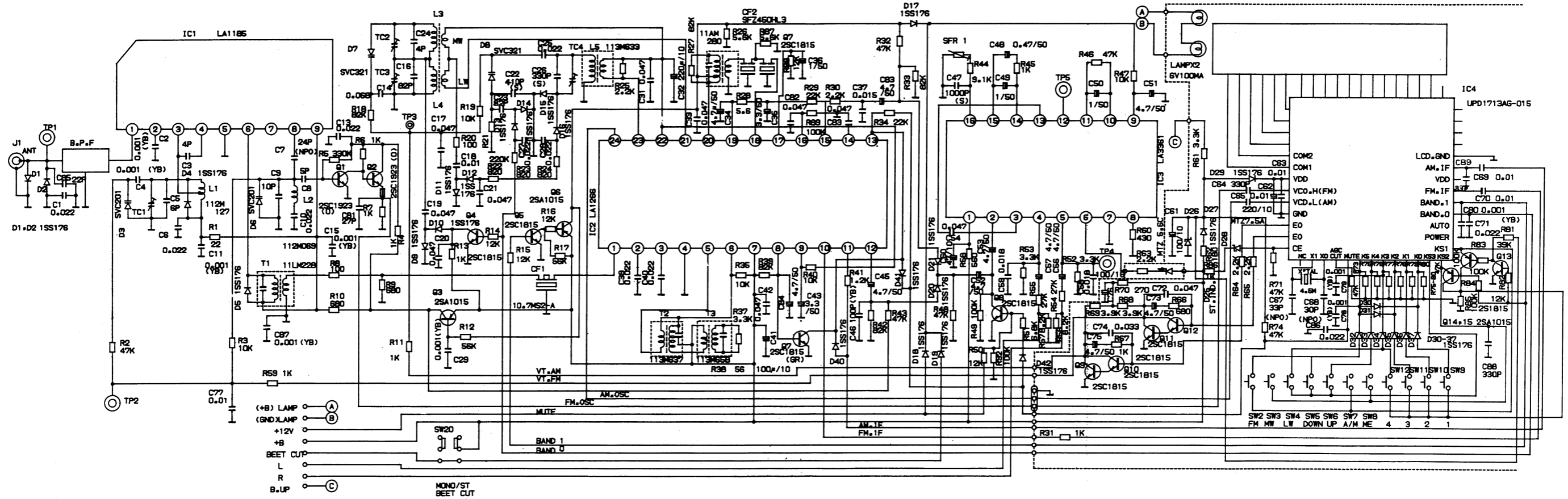
CASSETTE MECHANISM & PARTS LIST



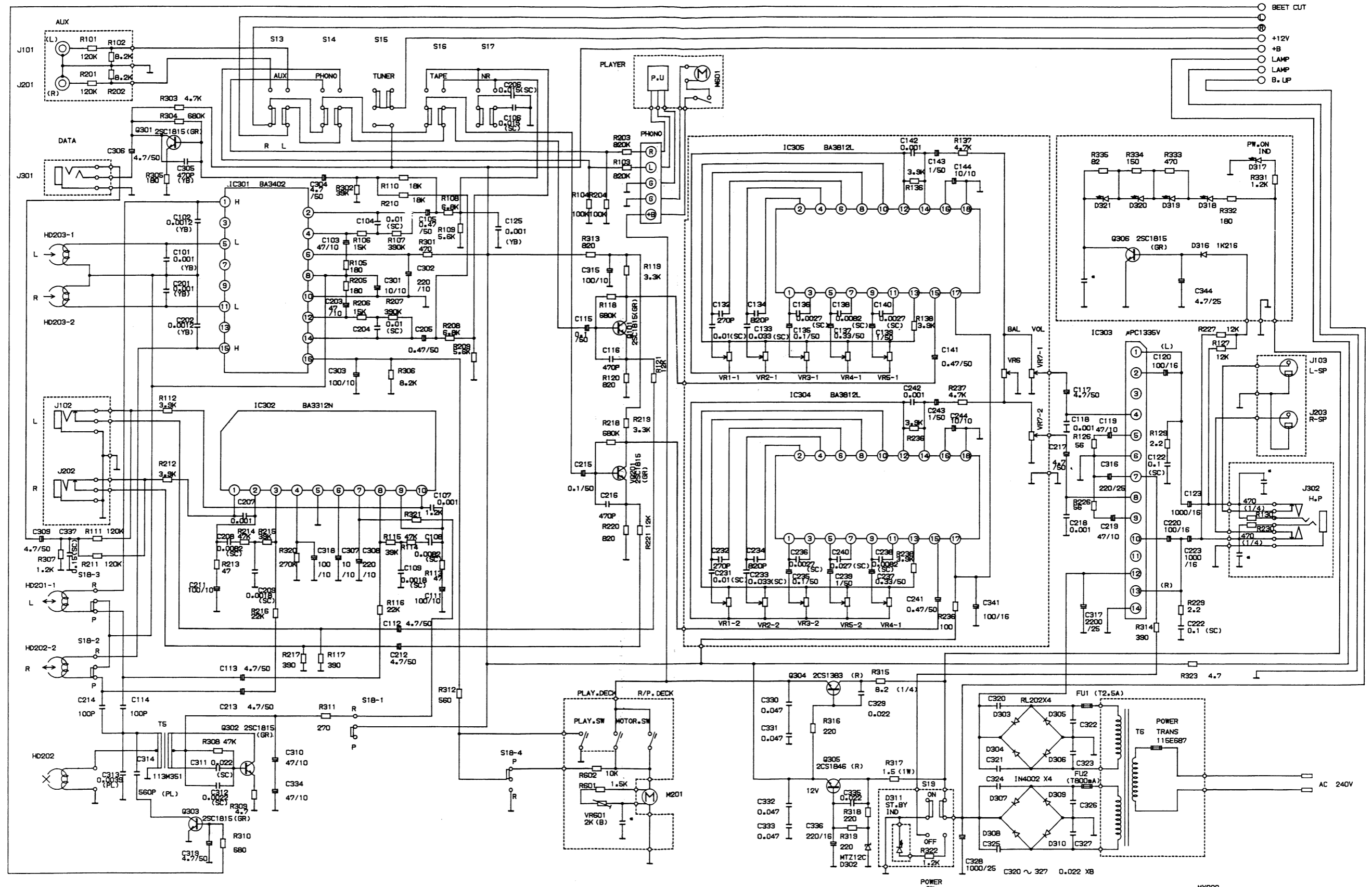
CASSETTE DECK PARTS LIST

Ref.	Description	Part No.
2	Switch Plate	201732
3	Push Button Actuator Ass'y	201733
11	Pause Lever	201734
12	Pause Lever Spring	201735
13	Pause Stopper	201736
14	Button Lever Spring	201737
20	Auto Lever	201738
21	Auto Lever Spring	201739
22	Button Lever Spring(s)	201740
23	Leaf Switch	201741
27	Head Base	201742
28	Sensing Plate Ass'y	201743
35	Pinch Roller Arm Ass'y	201744
36	Pinch Roller Spring	201745
39	RF Pulley Arm Ass'y	201746
40	RF Pulley Arm Spring	201747
42	RF Belt	201748
43	Flywheel Ass'y	201749
44	Flywheel Ass'y	201750
46	Take Up Gear Plate Ass'y	201751
47	Take Up Roller Gear	201752
49	FF Gear	201753
51	Supply Reel Ass'y	201754
52	Take Up Reel Ass'y	201755
53	Record Safety Lever	201756
58	Motor Pulley	201757
59	Main Belt	201758
62	Eject Slide Lever	201759
63	Eject Slide Lever Spring	201760
65	Play Head	201761
66	Record Play Head	201762
67	Erase Head	201763
68	Motor	201764
87	Operation Lever	201765
89	Button Lever Shaft	201766

TUNER SCHEMATIC DIAGRAM

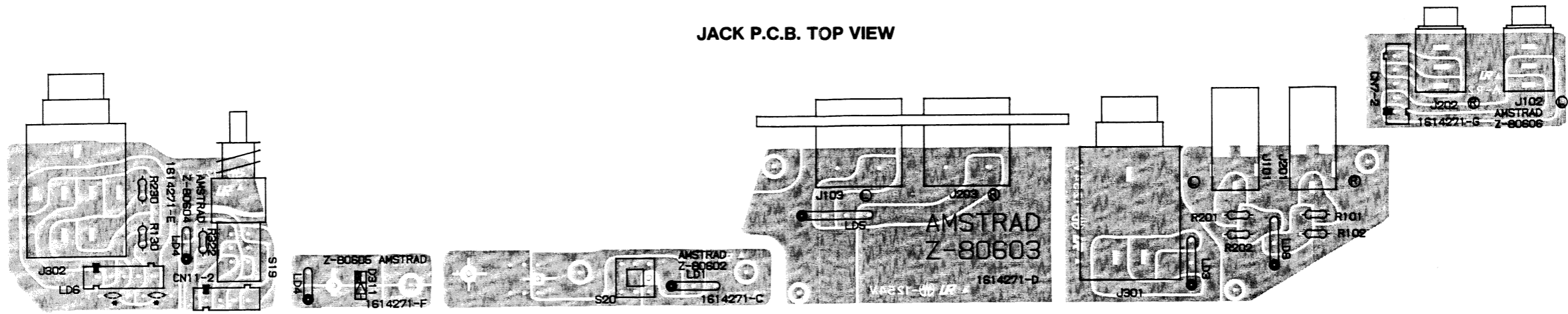


MAIN P.C.B SCHEMATIC DIAGRAM

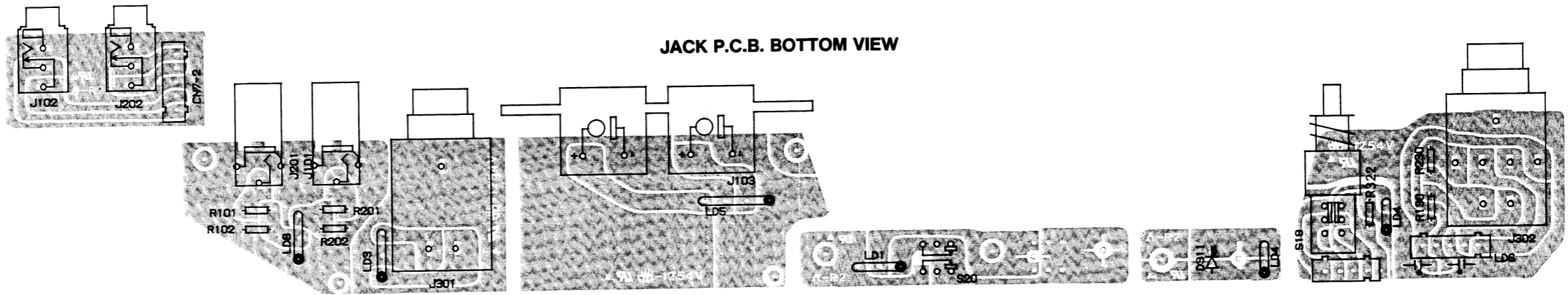


MX200
MODEL X3400B5

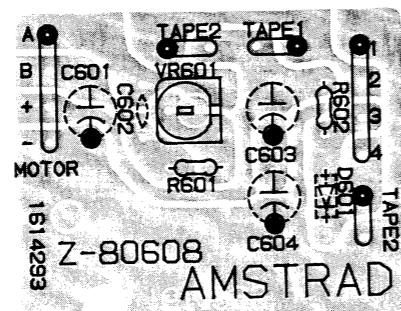
JACK P.C.B. TOP VIEW



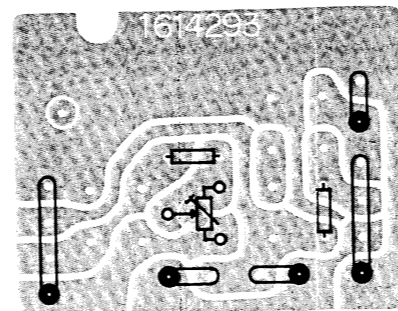
JACK P.C.B. BOTTOM VIEW



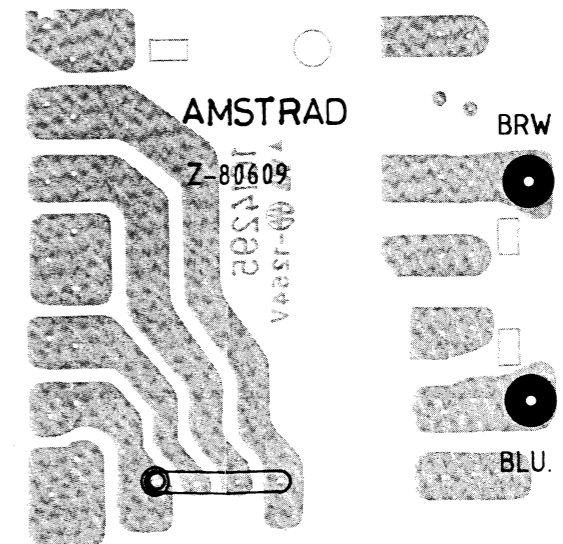
CASSETTE P.C.B. TOP VIEW



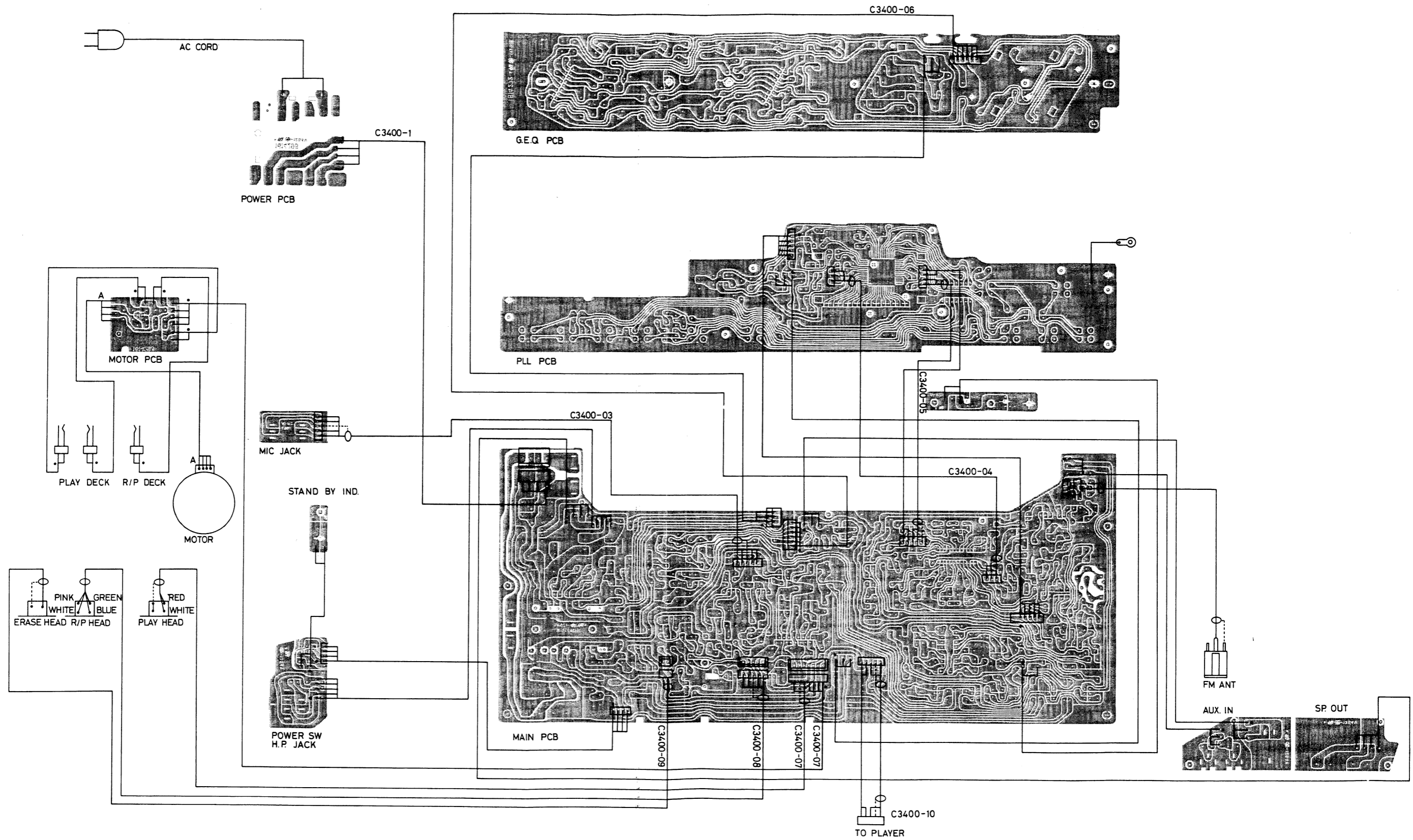
CASSETTE P.C.B. BOTTOM VIEW



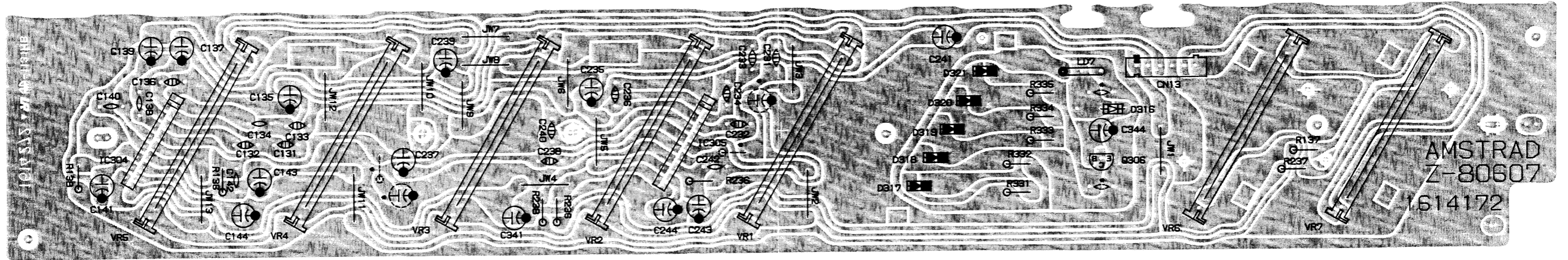
TRANSFORMER P.C.B.



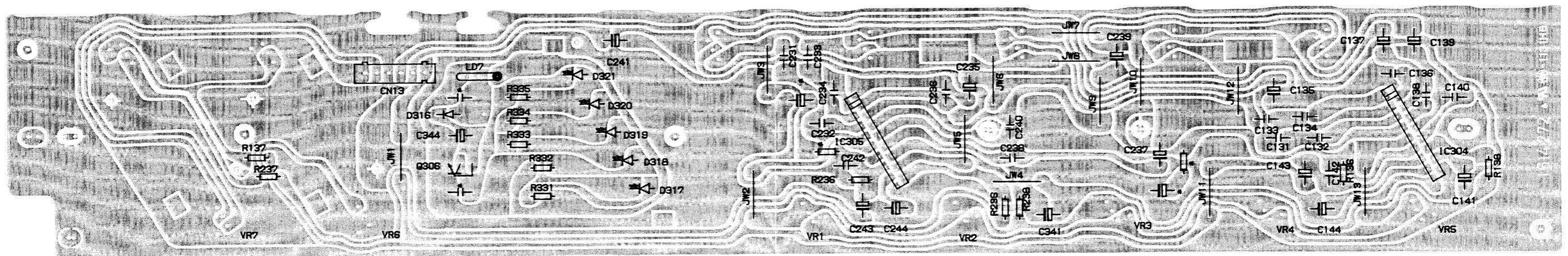
WIRING DIAGRAM



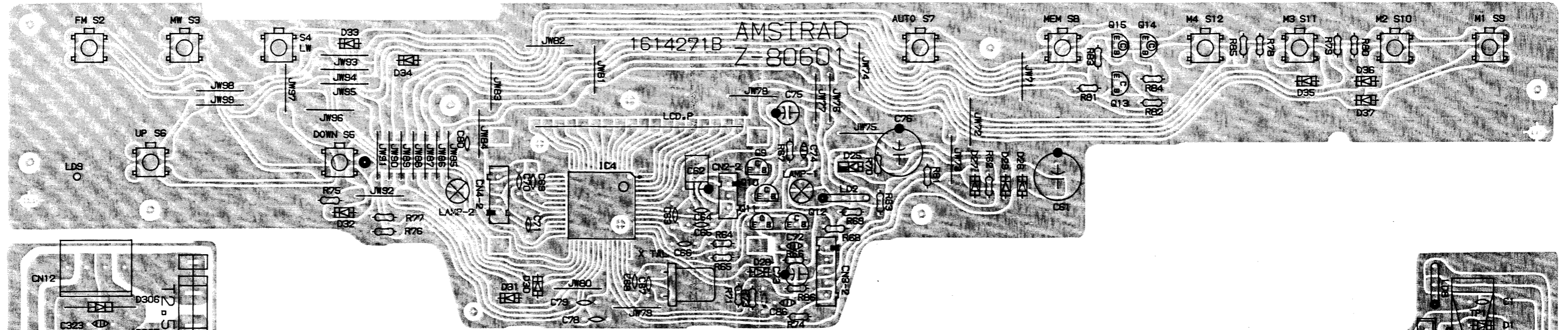
EQUALISER P.C.B. FRONT VIEW



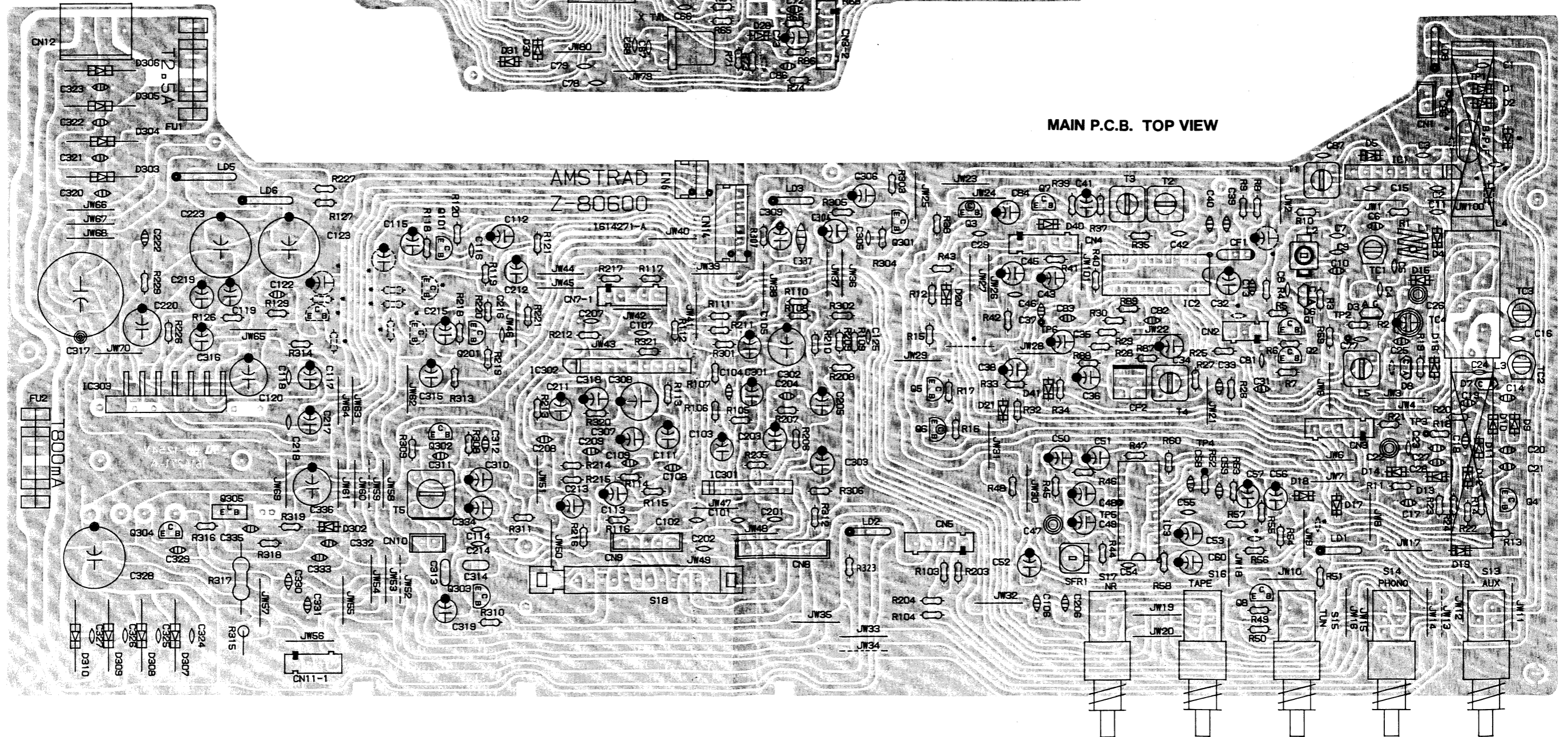
EQUALISER P.C.B. BACK VIEW



TUNER P.C.B. FRONT VIEW



MAIN P.C.B. TOP VIEW



I.C. & TRANSISTOR VOLTAGES

Pin No.	IC1	IC2		IC3		IC301	IC302	IC303	IC304,305
	FM (V)	FM (V)	AM (V)	FM (V)	AM (V)	TAPE (V)	TAPE.REC (V)	(V)	(V)
1	1.0	2.47	-	7.20	7.03	3.12	-	9.63	5.02
2	1.69	2.47	1.07	2.33	2.33	3.19	0.57	18.70	6.16
3	4.98	2.47	1.07	1.67	1.67	3.12	3.31	0.73	6.16
4	1.67	-	-	1.70	1.70	3.12	0-0.7	-	5.02
5	-	9.08	9.76	1.70	1.70	3.12	-	1.18	5.02
6	5.03	9.08	9.76	10.17	10.22	10.18	7.27	-	6.16
7	4.28	9.08	9.76	-	-	3.12	7.30	18.30	6.16
8	4.99	0.64	0.64	0.43	0.43	3.12	3.26	-	5.02
9	5.4	3.78	-	0.47	2.86	3.12	0.56	1.18	5.02
10	-	2.42	2.42	1.33	1.33	-	-	18.70	5.42
11	-	2.27	1.96	1.33	1.33	3.12	-	0.73	6.16
12	-	3.32	3.09	0.99	0.05	3.12	-	19.15	5.42
13	-	0.03	0.02	1.33	1.33	3.12	-	9.69	5.42
14	-	1.28	1.32	1.33	1.33	3.07	-	-	5.42
15	-	1.54	1.49	1.33	1.33	3.12	-	-	6.06
16	-	-	-	0.80	0.09	1.11	-	-	6.21
17	-	-	-	-	-	-	-	-	10.42
18	-	2.47	1.07	-	-	-	-	-	-
19	-	1.54	1.44	-	-	-	-	-	-
20	-	0.70	9.75	-	-	-	-	-	-
21	-	4.0	3.64	-	-	-	-	-	-
22	-	4.0	3.64	-	-	-	-	-	-
23	-	4.0	3.64	-	-	-	-	-	-
24	-	3.67	2.22	-	-	-	-	-	-

Pin No.	FM	MW	LW	Pin No.	FM	MW	LW	Pin No.	FM	MW	LW	Pin No.	FM	MW	LW
1	2.50V	2.6V	2.54V	14	-	-	-	27	0.25V	0.31V	0.30V	40	2.50	2.60	2.53
2	2.50	2.6	2.55	15	2.13	2.21	2.16	28	4.99	5.24	5.07	41	2.50	2.60	2.53
3	2.50	2.6	2.55	16	2.17	2.26	2.21	29	-	-	-	42	2.50	2.60	2.53
4	2.50	2.6	2.55	17	-	-	-	30	3.24	-	3.29	43	2.50	2.60	2.53
5	2.56	2.66	2.60	18	0.02	0.01	0.01	31	-	5.13	4.0	44	2.50	2.60	2.53
6	2.56	2.66	2.60	19	-	-	-	32	-	-	4.90	45	2.50	2.60	2.53
7	5.06	5.25	5.13	20	0.37	0.23	0.22	33	5.06	5.25	5.13	46	2.50	2.60	2.53
8	2.30	-	-	21	-	-	-	34	-	-	-	47	2.50	2.60	2.53
9	-	2.26	2.21	22	-	-	-	35	-	-	-	48	2.50	2.60	2.53
10	-	-	-	23	-	-	-	36	2.50	-	2.53	49	2.50	2.60	2.53
11	1.08	1.04	-	24	-	-	-	37	2.50	2.60	2.53	50	2.50	2.60	2.53
12	1.06	0.98	-	25	-	0.31	0.30	38	2.50	2.60	2.53	51	2.50	2.60	2.53
13	4.68	4.70	4.72	26	0.25	0.32	0.31	39	2.50	2.60	2.53	52	2.50	2.60	2.53

	Q1	Q2	Q3			Q4			Q5		Q6		
	FM	FM	FM	MW	LW	FM	MW	LW	FM	MW/LW	FM	MW	LW
B	0.68V	3.41V	8.27V	9.68V	9.6V	0.70V	-	0.71V	-	0.67V	8.87V	8.98V	8.90V
C	3.41V	4.79V	8.89V	-	-	0.08V	1.51V	0.08V	8.89V	0.01V	0.69V	9.68V	9.59V
E	-	2.75V	8.98V	9.75V	9.67V	-	-	-	-	-	8.93V	9.69V	9.61V

	Q7	Q8			Q9			Q10			Q11		
	FM	MW	LW	FM	MW	LW	FM	MW	LW	FM	MW	LW	
B	0.65V	0.05V	0.08V	0.10V	0.64V	0.65V	0.62V	1.11V	1.13V	1.08V	0.62V	0.64V	0.59V
C	-	-	-	-	4.60V	1.48V	7.05V	4.60V	1.48V	7.05V	7.03V	0.81V	9.74V
E	-	-	-	-	-	-	-	0.64V	0.65V	0.62V	-	-	-

	Q12			Q13		Q14		Q15		Q101
	FM	MW	LW	FM	MW/LW	FM	MW/LW	FM	MW/LW	Q201
B	1.08V	1.12V	1.02V	0.01V	0.68V	0.25V	5.0V	6.45V	0.31V	1.68V
C	7.03V	0.81V	9.74V	6.51V	0.01V	0.26V	0.32V	0.26V	0.32V	5.35V
E	0.62V	0.64V	0.59V	-	-	0.26V	0.32V	0.26V	0.32V	1.05V

	Q301	Q302	Q303	Q304	Q305	Q306	
		Rec.	Beetcut ON			Vol. Min.	Vol. Max.
B	0.98V	0.26V	0.80V	11.74V	12.45V	-	0.76V
C	4.32V	6.50V	-	17.67V	17.38V	16.1V	0.98V
E	0.34V	0.08V	-	11.37V	11.75V	-	-