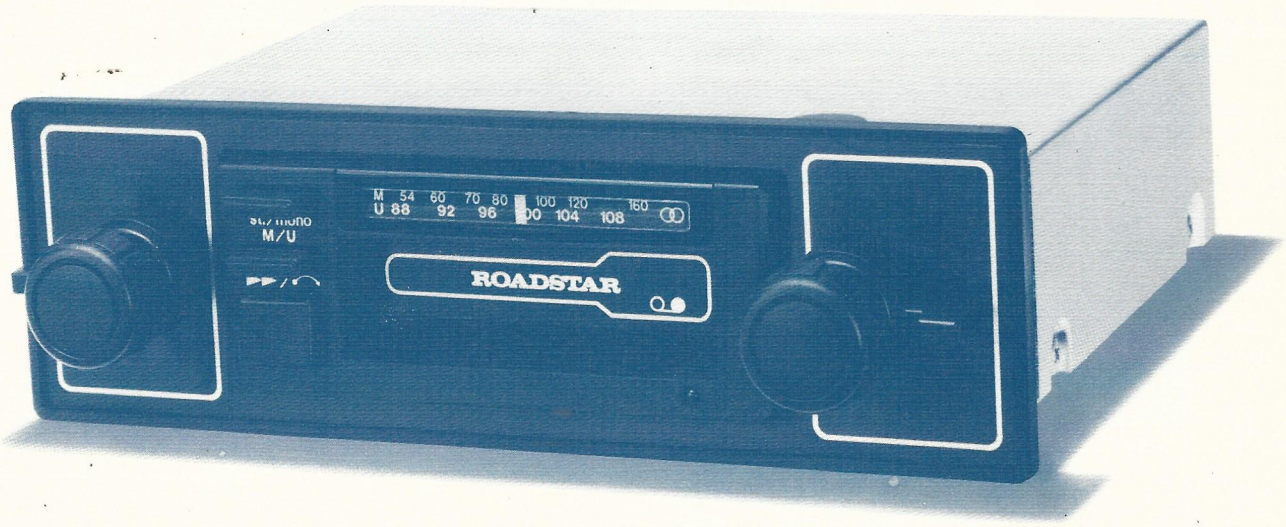
SERVICE MANUAL

Mini In-Dash Car Stereo Cassette Tape Player with AM/FM Stereo Radio

RS-2010



ROADSTAR®

Specifications

AM Receiver Section

Item	Condition	Unit	Limit	Nominal
Frequency range	MIN.	kHz	520	510
	MAX.	kHz	1,605	1,650
Intermediate frequency		kHz	455±5	455
Maximum sensitivity	600kHz	μV	16	10
	1000kHz	μV	16	10
	1400kHz	μV	16	10
Sensitivity for S/N 20 dB	600kHz	μV	40	23
	1000kHz	μV	40	23
	1400kHz	μV	40	23
Dial calibration	600kHz	kHz	±30	±20
	1000kHz	kHz	±30	±20
	1400kHz	kHz	±50	±30
S/N ratio (at 5 mV input)	1000kHz	dB	40	50
I.F. rejection	600kHz	dB	35	40
Image rejection	1400kHz	dB	50	55
A.G.C. figure of merit (at 5 mV input)	1000kHz	dB	60	65
Selectivity (off tuning ±10kHz)	1000kHz	dB	25	30
Band width	−6dB	kHz	4	6
Audio fidelity (1000Hz = 0dB) −6dB down (at 5 mV input)	LOW	Hz	100	70
	HIGH	Hz	2,000	2,200
Output power (at 5 mV input)	MAX.	W	5.0	6.0
	10% THD	W	4.0	5.0
Whistle modulation of I.F. 2nd. & 3rd. harnonic	5mV INPUT	%	6	4
Distortion (at 500mW output)	1000kHz	%	3	2

FM/MPX Receiver Section

Item	Condition	Unit	Limit	Nominal
Frequency range	MIN.	MHz	87.5	87.2
	MAX.	MHz	108	109
Intermediate frequency		MHz	10.7±0.5	10.7
Sensitivity for S/N 30dB	90MHz	μV	5.62	3
	98MHz	μV	5.62	3
	104MHz	μV	5.62	3
Dial calibration	90MHz	MHz	±0.8	±0.5
	98MHz	MHz	±0.8	±0.5
	104MHz	MHz	±1	±0.5
S/N ratio (at 1 mV input)	98MHz	dB	45	50
I.F. rejection	90MHz	dB	60	70
Image rejection	104MHz	dB	40	45
3dB limiting sensitivity (at 1 mV input)	98MHz	μV	6	4
A.F.C. holding range	98MHz	kHz	400-700	—
Audio fidelity (1000Hz = 0dB) −6dB down (at 1 mV input)	LOW	Hz	100	70
	HIGH	Hz	2,200	2,200
AM suppression	98MHz	dB	40	45
Output power (at 1 mV input)	MAX.	W	5.0	6.0
	10% THD	W	4.0	5.0
Distortion (at ref. output)	98MHz	%	3	2
Over load signal for 10% dist.	98MHz	dB	106	126
Stereo separation 1kHz	98MHz	dB	25	
Stereo lamp sensitivity (on)	98MHz	μV	5	6.2

Cassette Tape Section

Item	Condition	Unit	Limit	Nominal
Tape speed	3kHz	%	−1 +4	+2
Wow/flutter (W. RMS)	3kHz	%	0.3	0.15
Output power (at 1kHz)	MAX.	W	5	6
	10% THD	W	4	5
Distortion (at ref. output)	1kHz	%	3.0	1.5
S/N ratio (at ref. output)	1kHz	dB	40	45
Separation (at ref. output)	1kHz	dB	30	37
Track crosstalk (at ref. output)	1kHz	dB	40	48
Tone effect (at ref. output)	6.3kHz	dB	13	16
Channel balance (L & R) (at ref. output)	1kHz	dB	4	1.2
Noise level (empty tape)	R.O.	mV	30	20
	MAX.	mV	40	30
Frequency response (1kHz 0.775V = 0dB)	125Hz	dB	±6	+1.5
	6.3kHz	dB	+8 −10	−3
Current drain (at 1kHz)	R.O.	mA	460	360
	MAX.	mA	1,200	1,000
F.F. time	C-60	SEC.	180	150
Take up torque		GCM	45-75	55

General Instructions

Prior to servicing, check the following:

- Check that the head is not dirty. If it is dirty, either the level of the sound will drop or the high frequencies will deteriorate.
  Clean the head with a cleaner pen or a Q-tip dipped in alcohol.
- Check that the speakers are connected correctly. (Refer to the speaker connection diagram in the Owner's Manual.)
- Check that the grounding is completely satisfactory. If not grounded properly, the required power will not be supplied.
- Check that the fuse is not blown.
  Never use a fuse with a larger rating than specified. Do not by-pass the fuse.
- Check if the pinch roller or capstan is contaminated with oil, dust or any other substance.
  Clean them with a Q-tip dipped in alcohol to reduce wow-flutter and to maintain the correct tape speed.

Parts & Controls

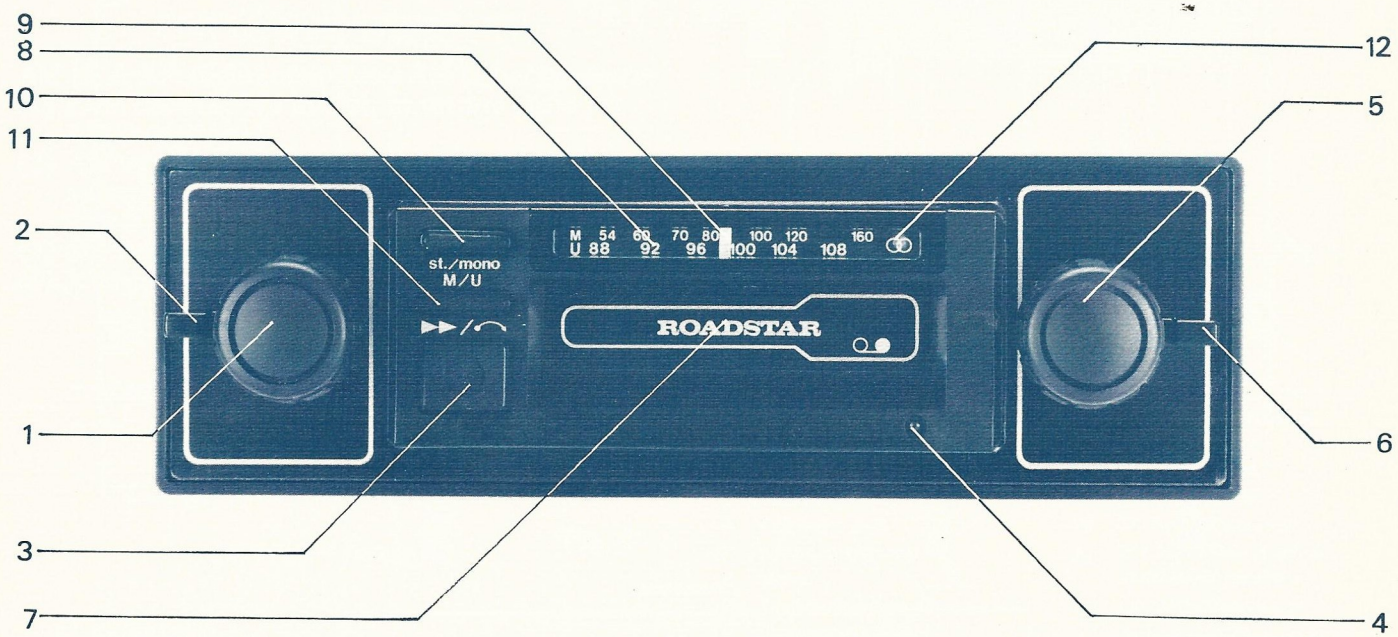


Fig. 1

1. Power Switch & Volume Control
2. Tone Control
3. Fast Forward & Eject Button
4. Tape Indicator Lamp
5. Tuning Control
6. Balance Control
7. Tape Slot
8. Tuning Dial
9. Dial Pointer
10. Stereo/mono Selector (push in for mono)
11. AM/FM Switch (M/U) (push in for FM)
12. Stereo Indicator Lamp

To Remove Metal Case

To take off the top cover remove screws numbered 1–7 as shown in Fig. 2

The nose piece is removed by undoing screws 8 and 9 and pulling it forward.

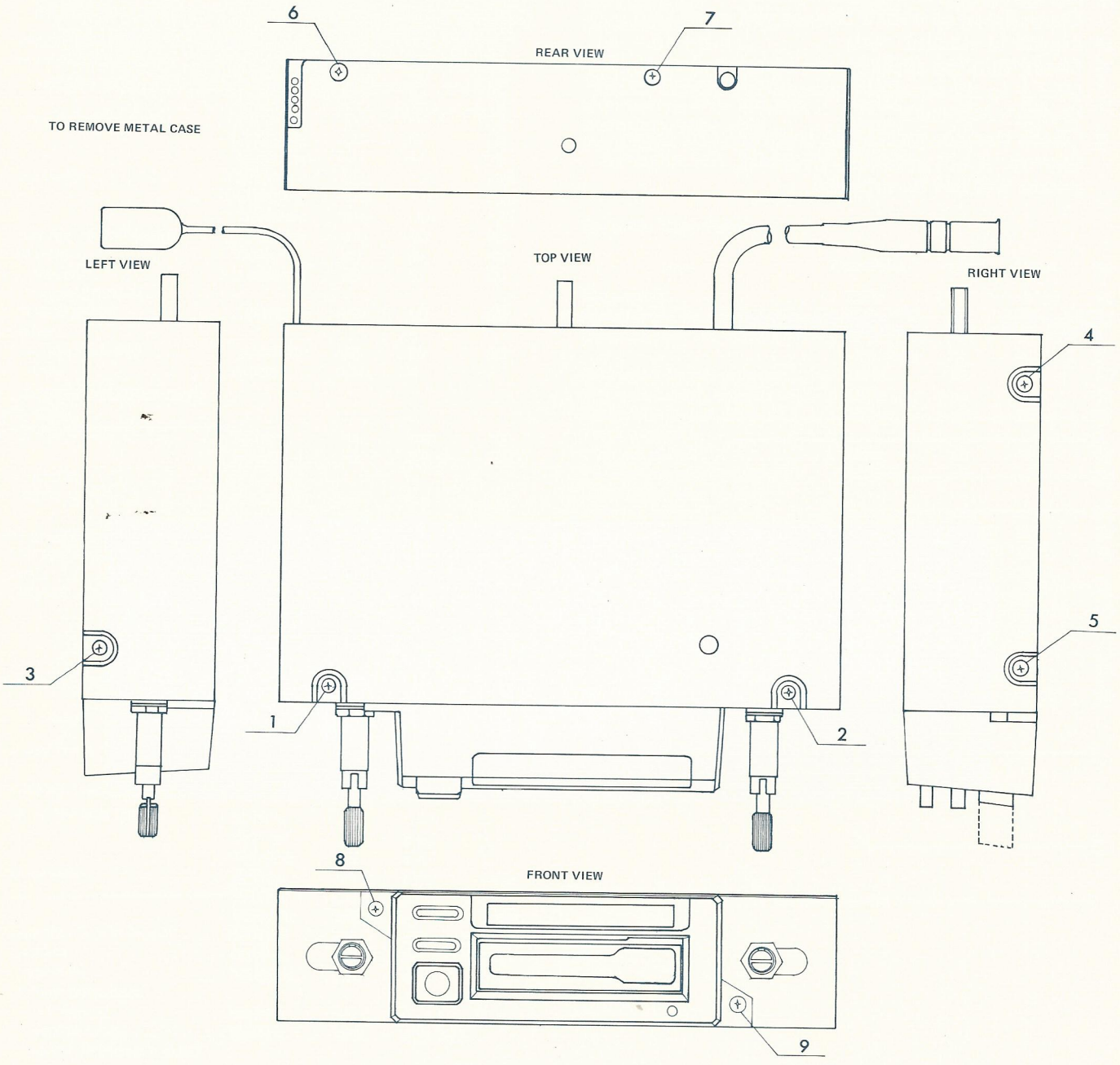


Fig 2

AM and FM-MPX Alignment Procedure

NOTES:

1. Check for specified source voltage—DC 14V.
2. Connect an AC voltmeter (VTVM) across speaker or dummy load (4 ohms, 10W, wire-wound resistor). See Fig. 3.
3. Signal input must be kept as low as possible to avoid overload and clipping (use highest possible sensitivity of output indicator).
4. Repeat adjustment to insure good results.
5. Non-metallic alignment tools must be used (especially for FM alignment).
6. Alignment location details: See Fig. 5 . 9. 10.

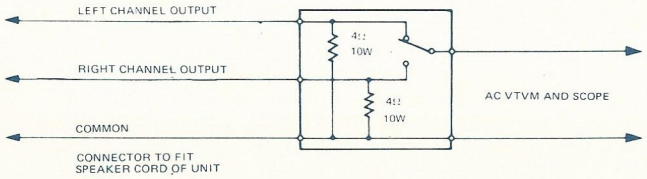


Fig. 3

DUMMY LOAD (FOR STEREO UNIT)

AM IF & RF alighnment using AM signal generator

(1) Press the AM/FM button to set the radio for AM reception.
(2) AM signal generator should be coupled with antenna receptacle through dummy antenna (See Fig. 4).
(3) Set volume control to maximum.
(4) Modulation 400 Hz 30%.

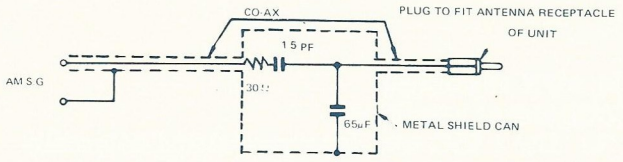


Fig. 4

AM DUMMY ANTENNA

1. IF alignment

The IF amplifier circuit in this unit uses a ceramic filter. Adjust L403 for maximum response. (at 455 kHz or 470 kHz)

2. Alignment of receiving frequency range

1) Adjust CV 402 for maximum response of a 1,650 kHz signal with radio dial indicator set to the high frequency end stop point.
2) Adjust L 401 for maximum response of a 520 kHz signal with the radio dial indicator set to the low frequency end stop point.

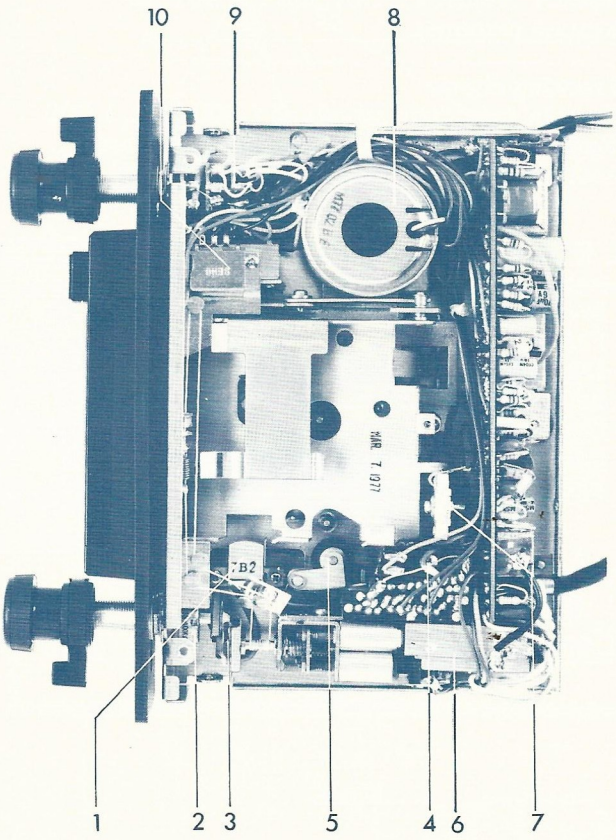


Fig. 5

1 Cassette tape head
2 Balance volume
3 Plastic coupling joint
4 Pre-amp board
5 Pinch roller
6 FM front end
7 Antenna trimmer
8 Motor
9 Tone/volume control
10 Stereo/mono sw
11 L 301/(FM IFT)
12 CV 402 (AM OSC trimmer)
13 CV 401 (AM RF trimmer)
14 L 401 (AM OSC trimmer)
15 FM/AM/AUDIO Board
16 AM IFT L 403
17 AM IFT L 404
18 AM IFT L 405
19 Choke transformer
20 UR 301 (19kHz adjust semi fixed resistor)
21 UR 302 (Separation adjust semi fixed resistor)
22 19kHz test point

3. Sensitivity alignment

Tune in a 1,400 kHz signal at the corresponding dial point. Adjust CU 901 and CU 401 for maximum response.

4. Tracking check

Tune in respective signals at 1,400 kHz, 1,000 kHz and 600 kHz to check tracking standard correctness.

FM, IF alignment using 10.7 MHz FM sweep generator

(1) Press the AM/FM button to set the radio for FM reception.
(2) Inject test signal to TP terminal of Front-End Pack. (Fig. 7)
(3) Connect high side of sweep generator through 0.01 mfd capacitor to the No. 1 terminal of IC-2. Low side to ground.

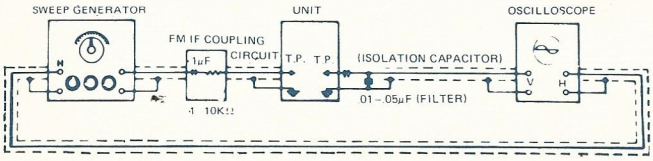
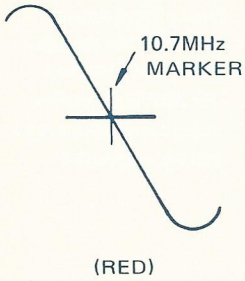


Fig. 6

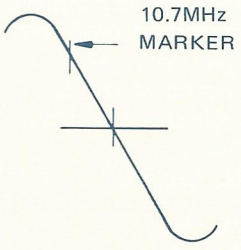
(4) Adjust L 301 (blue) so that the 10.7 MHz marker coincides with the mid-point of the ("S" curve) pattern.
(5) Adjust T1 to obtain maximum wave amplitude.



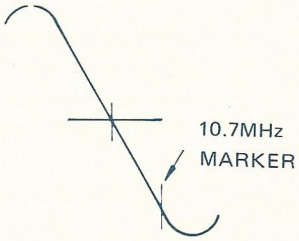
(RED)

NOTE:

1. FM Sweep Generator is convenient for FM/IF alignment, because Ceramic Filters are used in the IF cercuit.
   Five kinds of Ceramic Filters are used and they are different in their center frequencies as shown below. RED: 10.7 MHz, BLUE: 10.67 MHz, ORANGE: 10.73 MHz, BLACK: 10.64 MHz, WHITE: 10.76 MHz.
2. If the Ceramic Filters EXCEPT RED are used, 10.7 MHz market will not appear at the center of "S" curve.
3. The color of Ceramic Filters used in this radio is different according to the production lots, but the same color-dotted. Filters should be replaced on the individual unit.
4. Be careful of static coupling between output lead of sweep generator and input lead of scope. The leads must be as short as possible and carefully shielded.



(WHITE, ORANGE)



(BLACK, BLUE)

FM RF alignment using FM signal generator

1. Set the radio for FM reception. (See Fig. 7)
2. 400 Hz 22.5 kHz deviation.
3. Adjust TC4 for maximum response of an 87.5 MHz signal with Radio Dial Indicator set at the low frequency end stop point.
4. Tune in a 106 MHz signal at the corresponding dial point. Adjust TC5 and TC6 for maximum response.

FM, MPX alignment

1. Alignment conditions

1) Use a SSG test signal modulated externally with an MPX generator.
2) Use compatible MPX signal.
3) Modulation frequency at 1,000 Hz.
4) Feed test signal to Antenna Jack.

2. Alignment procedure

1) By adjusting 20KΩ VR1 make MPX lamp go on. (Fig. 8)
2) By adjusting 5KΩ VR2 obtain maximum separation between R and L channels.
3) The resulting difference in output levels should be more than 25 dB.
4) Check to see that an input signal of less than −25 dB illuminates the MPX indicator lamp.

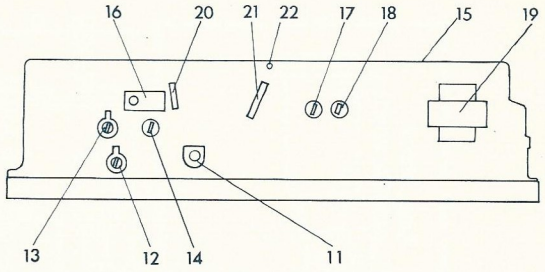


Fig. 8

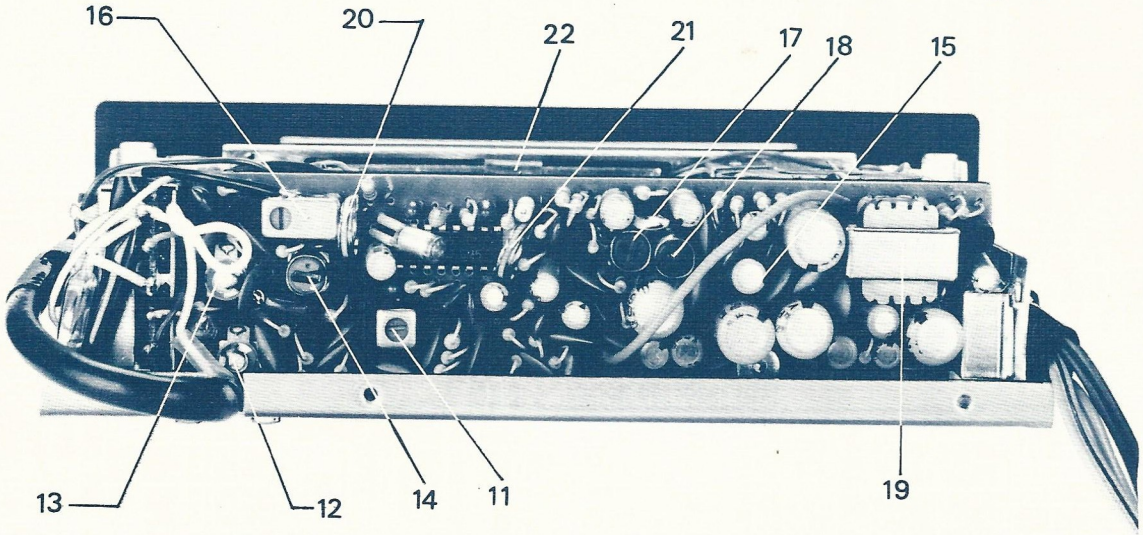


Fig. 9

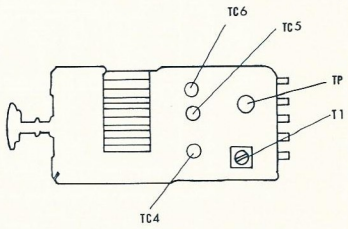


Fig. 7

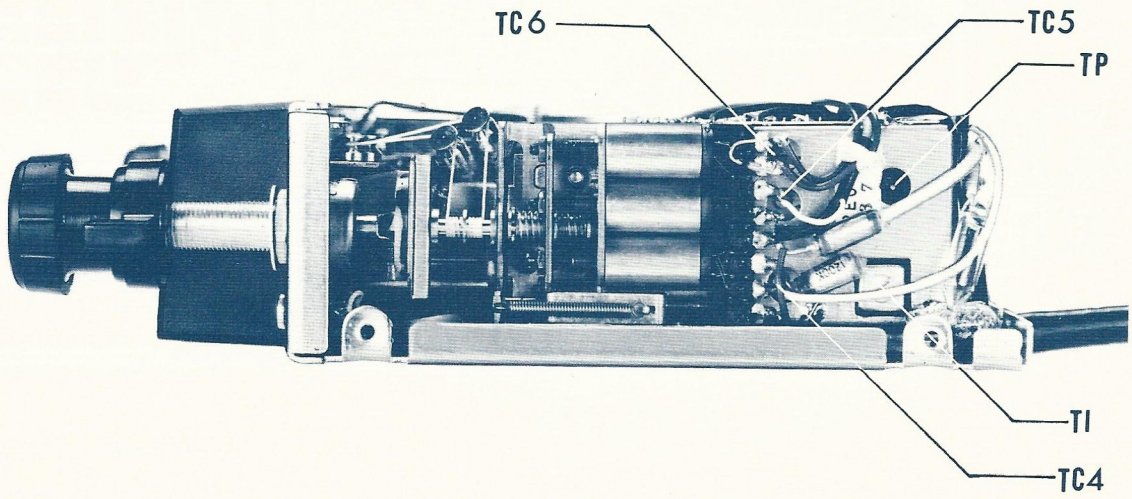
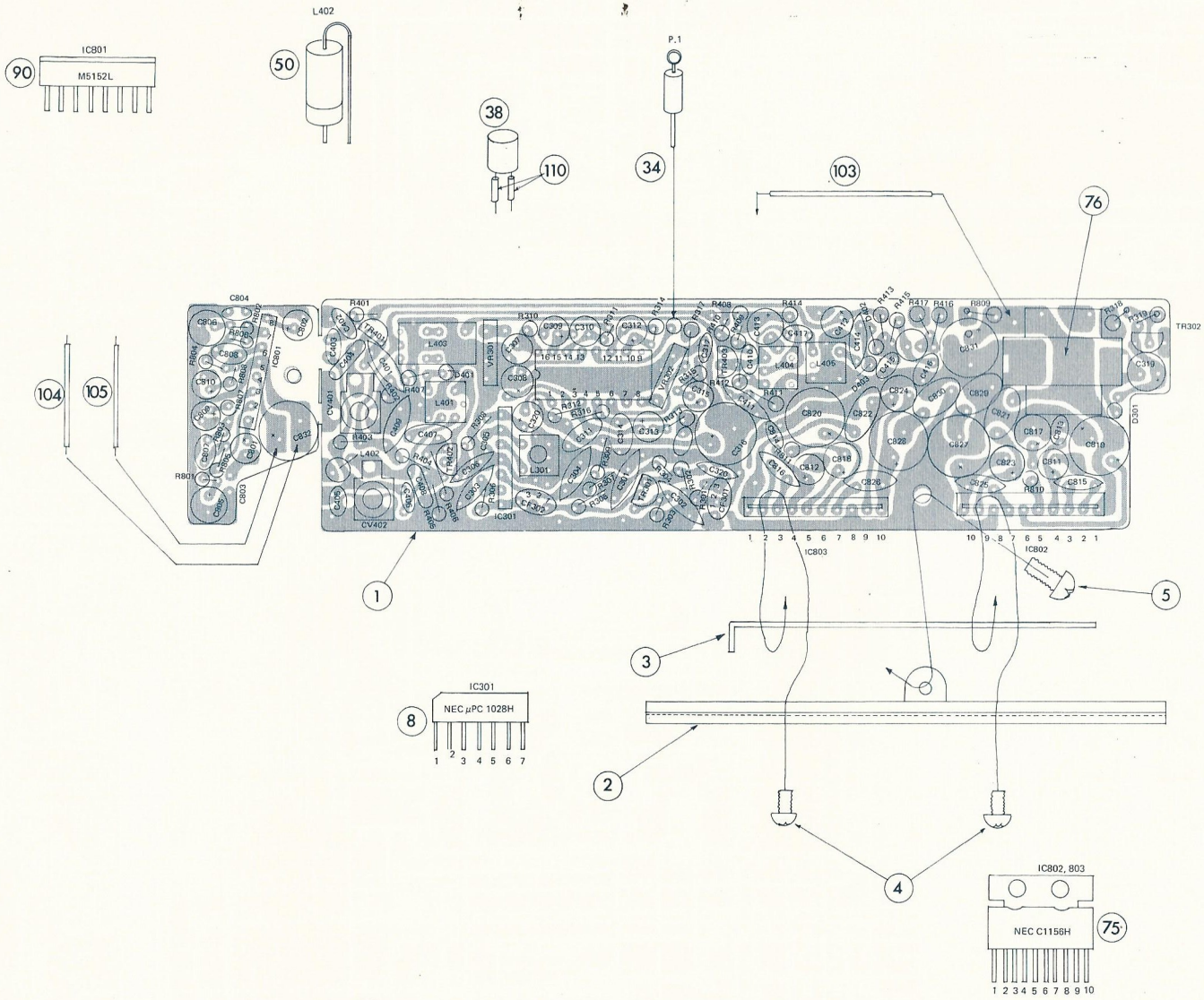
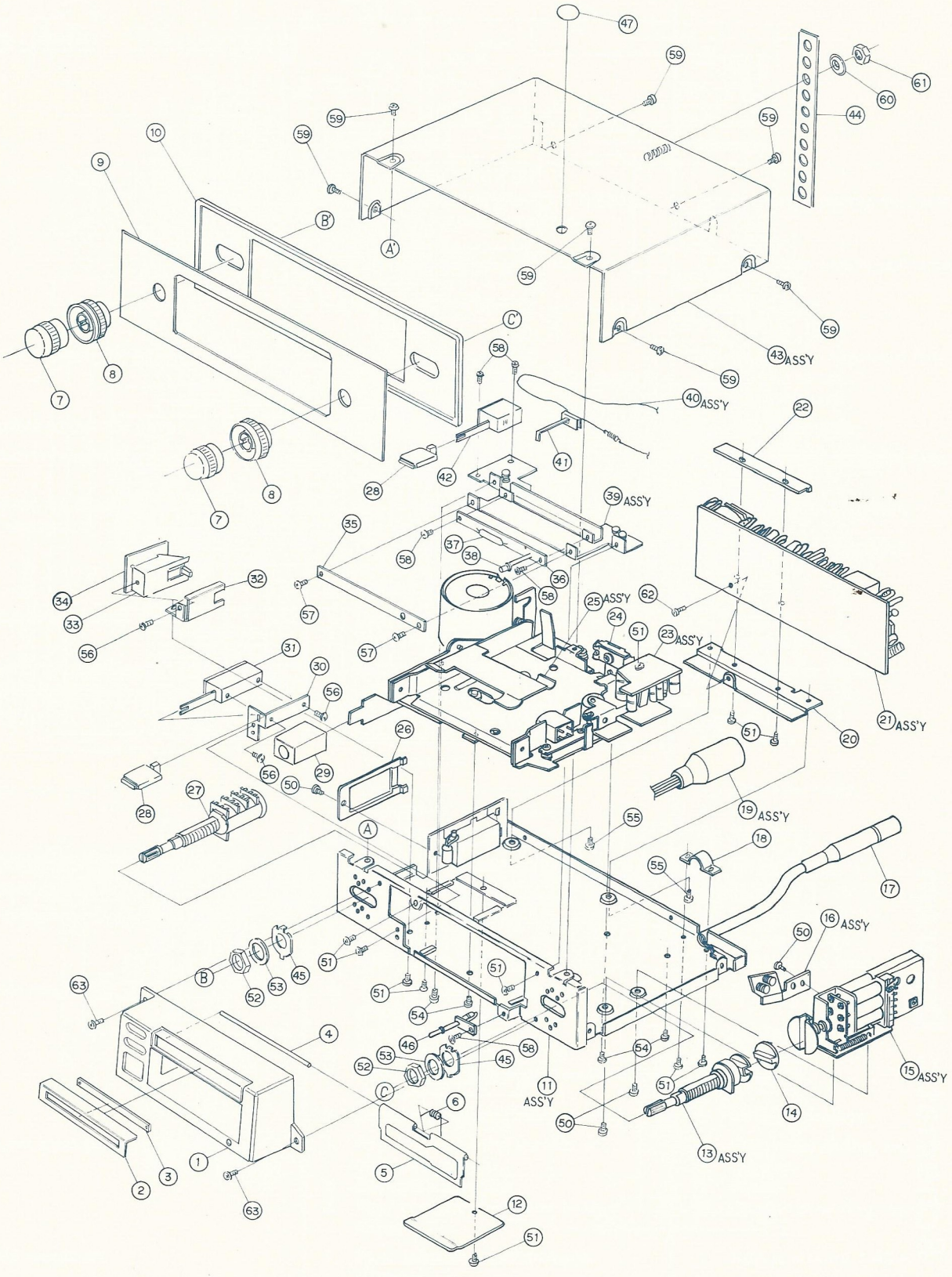


Fig. 10

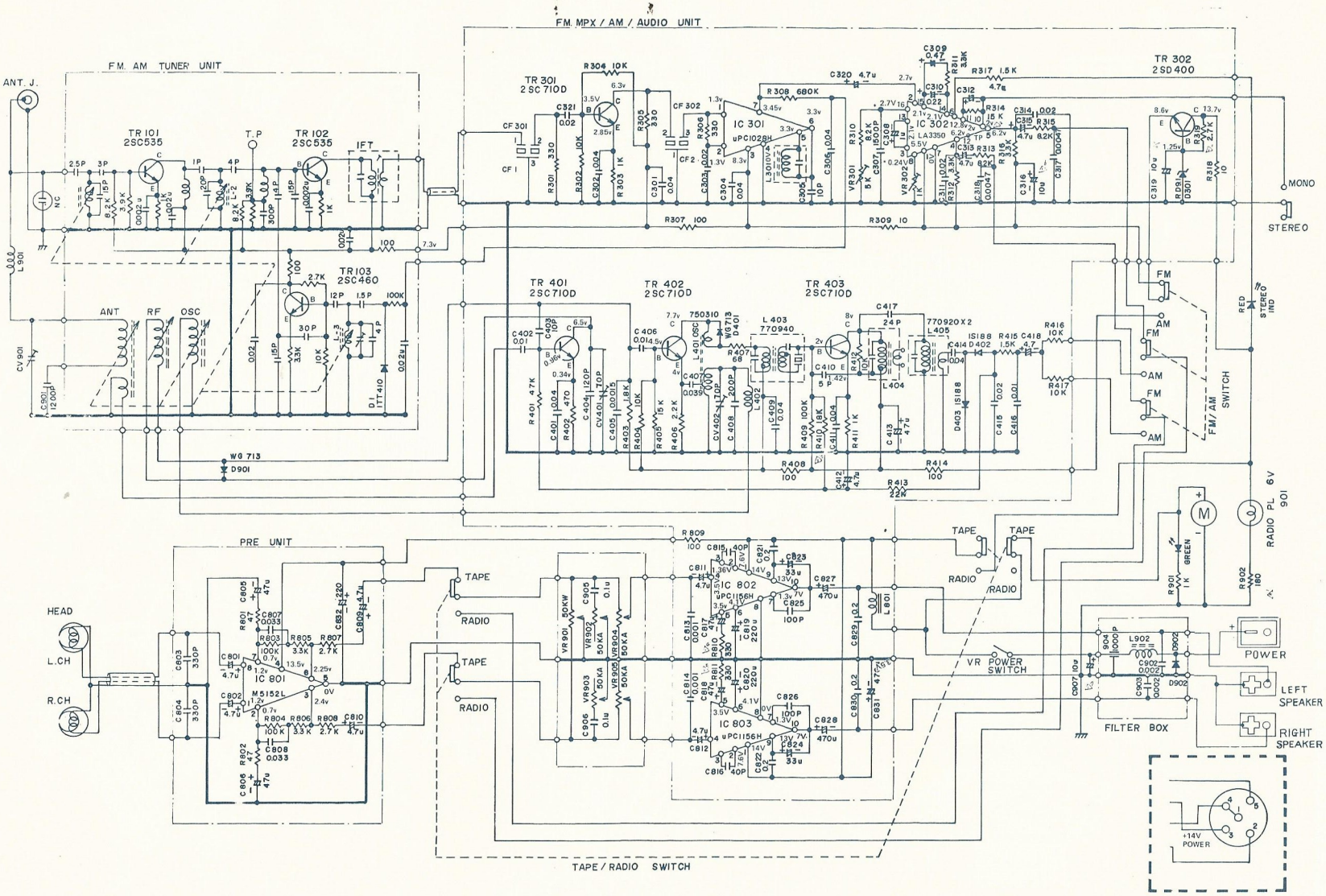
Wiring Connections



Exploded View (A)



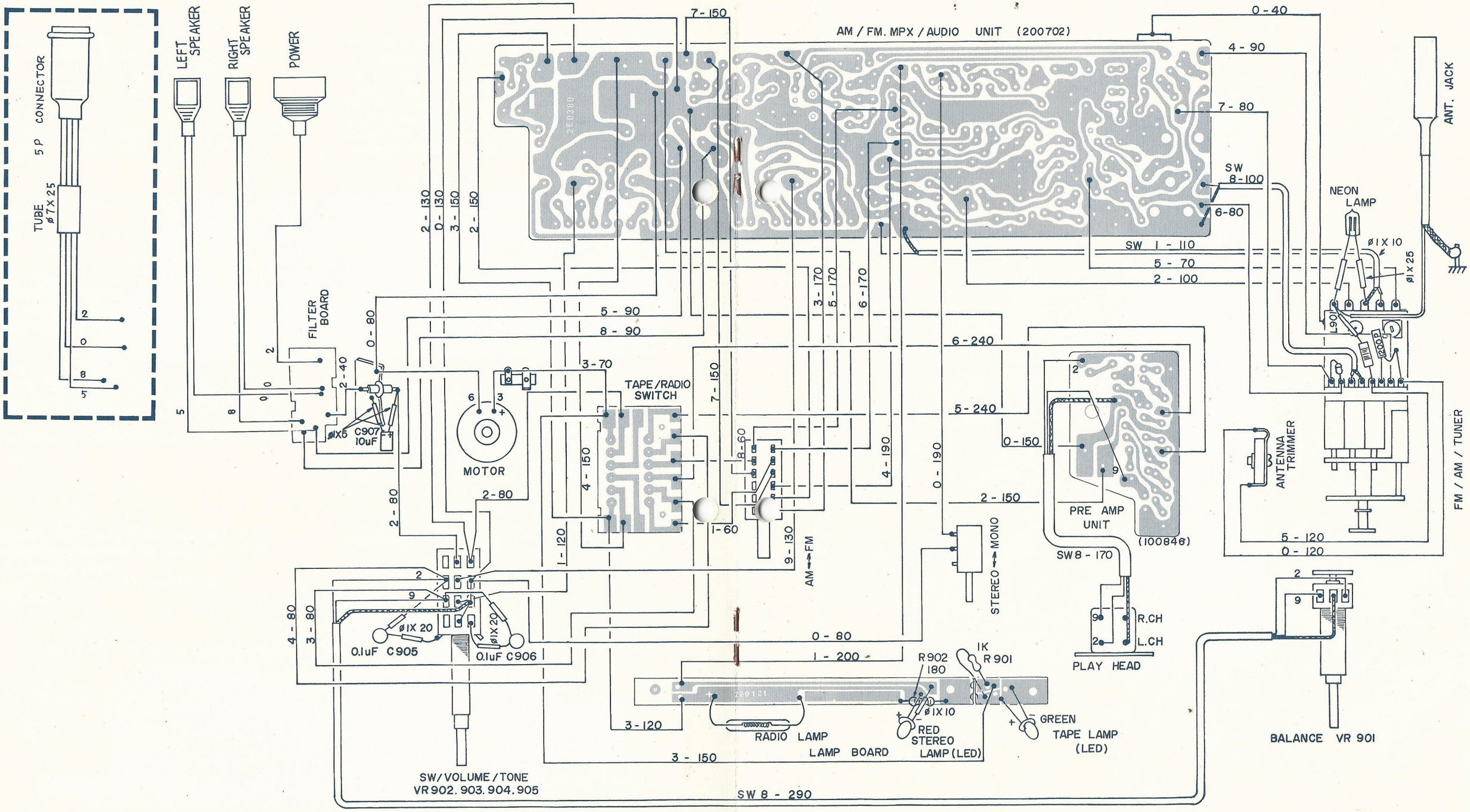
Schematic Diagram



Trouble Shooting

Symptoms	Possible Causes	Remedy
The power is dead.	1. The power is shut off.	
	2. Poor contact between the RS2010 body and power connector	2. Polish the poorly contacted part.
	3. Blown fuse	3. Replace.
	4. Poor contact between fuse and holder	4. Polish the poorly contacted part.
	5. Broken wires of the power supply cord.	5. Replace
Fuse blows when the power switch is on.	1. Lack of fuse capacity	1. Replace by regulated fuse.
	2. The power supply circuit is short.	2. Repair, check.
	3. The wiring is short.	3. Repair, check.
Impossible to cut the power.	Defective power switch	Replace the switch.
Fuse blows frequently.	1. Lack of fuse capacity.	1. Replace by regulated fuse.
	2. Defective output transistor.	2. Replace.
One of the speakers produces a bigger sound.	1. Big difference in the efficiency of the speakers.	1. Replace the speakers.
	2. Difference in the impedance of the speakers.	2. Replace the speakers.
	3. Defective tape recording.	
Impossible to control tone.	1. Defective tone/volume control.	1. Replace.
	2. Poor wiring of tone/volume control	2. Repair, check.
Volume is too loud, and it is impossible to control volume.	1. Defective volume control or loose grounding.	1. Replace or repair.
Crosstalk.	1. Poorly positioned tape guide.	1. Adjust.
	2. Distorted cassette tape resulted poor recording.	2. Replace.
No high compass in sound	1. Dirty and worn-out head	1. Clean the head.
	2. Adjustment of head angle.	2. Adjust
	3. Defective head itself.	3. Replace.
Motor rotation is too fast.	1. Belt slip	1. Polish (belt)
No motor torque	1. Defective motor	1. Replace
Great difference in speed change	1. Slippage of belt.	1. Replace, clean.
	2. Dirty pinch roller.	2. Replace, clean.
	3. Part of tape stretched.	3. Replace the tape.
Irregular revolution.	1. Tape winding is too tight, and revolution is slow.	1. Adjust winding.
	2. Partially stretched tape.	2. Replace.
	3. Stretched belt.	3. Replace.
	4. Head or flywheel is contaminated with oil.	4. Clean.
	5. Dirty or scratched pinch roller.	5. Clean or replace.
No sound from one of the speakers.	1. Poor wiring of the speaker or defective speaker.	1. Check the wiring, replace the speaker.
	2. Defective amplifier.	2. Repair.
	3. Poor contact of head or broken wires.	3. Check the wiring, replace.
Bad AM reception.	1. Poor adjustment of antenna trimmer.	1. Adjust around 1,400kHz.
	2. Broken wires in antenna.	2. Repair or replace.
	3. Poor insertion of antenna jack	

Wiring Connections

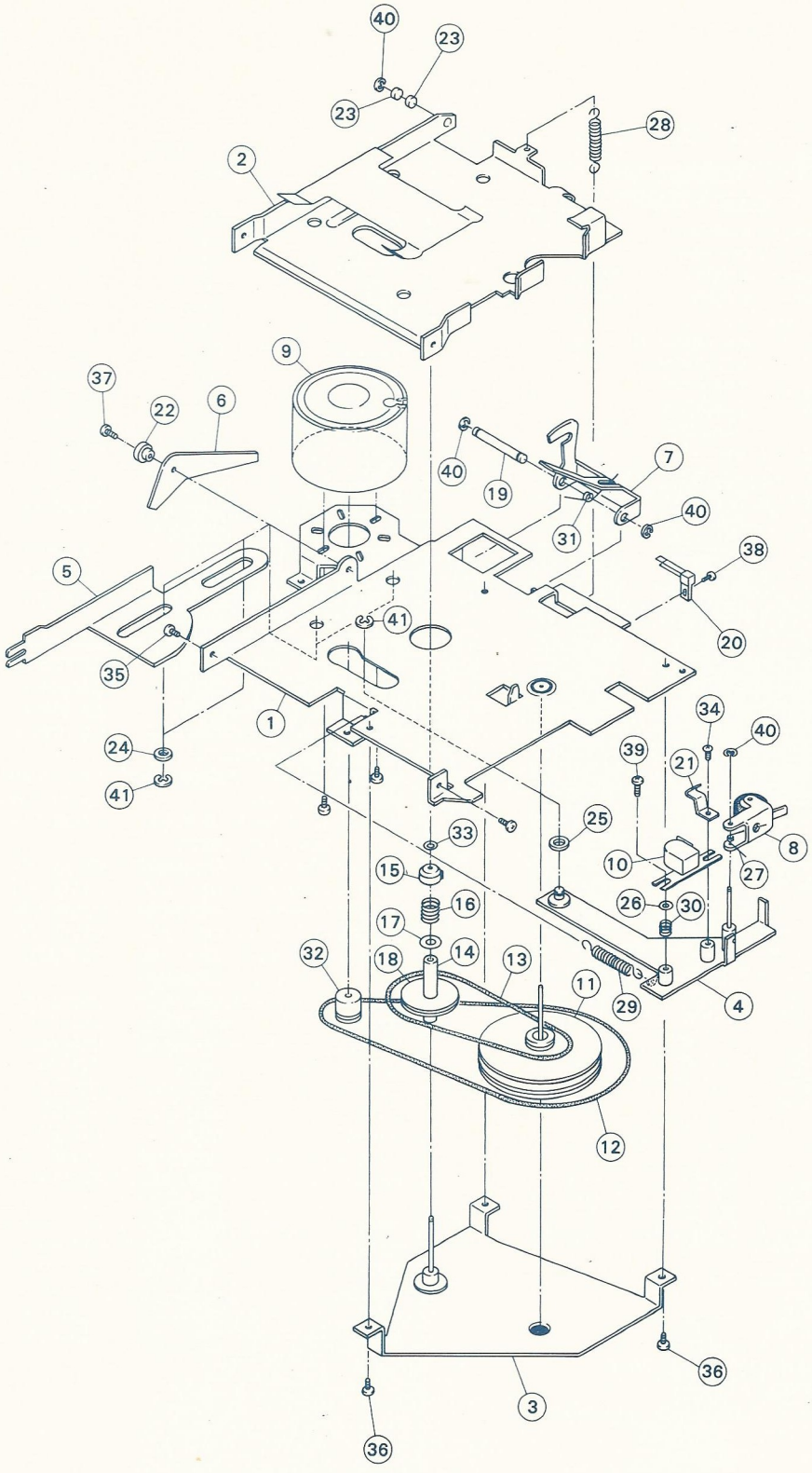


Parts List

REF. NO.	PART NO.	DESCRIPTION	Q'TY
1	2E0270	Nose Piece	1
2	2E0310	Scale Plate A	1
3	2E0420	Scale Plate B	1
4	2E0290	Door Shaft	1
5	2E0280	Cassette Door	1
6	2E0300	Door Spring	1
7	2E0361	Control Knob (Inner)	2
8	2E0370	Control Knob (Outer)	2
9	2E0352	Name Plate	1
10	2E0340	Front Panel	1
11	2E0023	Bottom Case	1
12	2E0030	B Case	1
13	021560	Rotary Volume (1 Gang)	1
14	014015	Joint Disk	1
15	2E0400	AM/FM Tuner	1
16	2E0181	String Bracket Ass'y	1
17	100490	Antenna Jack	1
18	2E0170	Antenna Holder	1
19	2E5020	5P Output Wire Ass'y	1
20	6C0680	Radiator	1
21	200702	AM/FM Audio PCB Ass'y	1
22	6C0670	Nut Plate	1
23	200702	Pre Amp Ass'y	1
24	027680	Antenna Trimmer	1
25	300611	Cassette Mecha. Ass'y	1
26	210300	Wire Clamp Cap	1
27	021310	Rotary Volume (4 Gang)	1
28	2E0330	Push Knob	2
29	2E0320	Eject Knob	1
30	2E0040	Switch Holder	1
31	840400	Push Slide Switch (AM/FM)	1
32	840822	Switch Bracket	1
33	840390	Push Slide Switch (Tape/Radio)	1
34	2E0410	Switch PCB	1
35	2E0131	Rear Plate	1
36	2E0121	Lamp PCB	1
37	026860	Pilot Lamp (6V-40mA)	1
38	027402	LED (Red)	1
39	2E0103	Cassette Guide Ass'y	1
40	840321	Dial Code Ass'y	1
41	2E00051	Pointer	1
42	022370	Push Slide Switch	1
43	2E0451	Top Cover Ass'y	1
44	014001	Supperter	1
45	820242	Position Washer	2
46	890490	Black Seal	1
50	011032	BHSPC 3004 Screw	4
51	011021	BHSPC 2604 Screw	11
52		Nut 9000	2
53		WFAL 9000 Washer	2
54	011060	STSPC 2605 Screw	4
55	011288	STBHSPC 3006 Screw	2
56	011022	BHSPC 2603 Screw	3
57	011010	BHSPB 2003 Screw	2
58	011011	BHSPC 2003 Screw	5
59	011128	FTBHSPC 3004 Screw	7
60	011196	WFSPC 5000 Washer	1
61	011176	N6SPC 5000 Nut	1
62	011113	STSPC 3006 Screw	1
63	011033	BHSPC 3005 Screw	2

REF NO.	PART NO.	DESCRIPTION	Q'TY
	MECHANISM CHASSIS ASSEMBLY		
1	0029235	Mechanism chassis ass'y	1
2	0029253	Cassette holder ass'y	1
3	0029262	CP plate ass'y	1
4	0029270	Head base holder ass'y	1
5	0022054	Control lever	1
6	0022063	Lift arm	1
7	0022072	Eject lever	1
8	0024117	Pintch roller ass'y	1
9	0021014	Motor	1
10	0021023	Head	1
11	0023169	Capstan flywheel	1
12	0024015	Driving belt	1
13	0024024	Clutch belt	1
14	0025019	Clutch base	1
15	0025037	Clutch bush	1
16	0024061	Clutch spring	1
17	0026031	Washer $5.2\phi \times 8\phi \times 0.25^t$	1
18	0025028	Clutch pulley	1
19	0023021	Eject lever shaft	1
20	0021032	Leaf SW BSW-47	1
21	0022341	Push spring	1
22	0023141	Special washer	1
23	0023049	Roller	2
24	0023113	Gide roller (B)	2
25	0023076	Gide roller (A)	1
26	0026161	Plain washer 2ϕ	1
27	0024089	Pintch spring	1
28	0024071	Holder spring	1
29	0024050	Head base spring	1
30	0024098	Azimuth spring	1
31	0024042	Eject spring	1
32	0023010	Motor pulley	1
33	0026252	Washer $1.8\phi \times 4\phi \times 0.4^t$ (nylon)	1
34	0026059	Screw P.H. M2x3	1
35	0026068	Screw P.H. M2.6x3	3
36	0026123	Screw P.T. M2.6x4	3
37	0026132	Screw P.T. M2.6x5	1
38	0026077	Screw B.H. M2x3	1
39	0026086	Screw B.H. M2x5	1
40	0026188	E-ring 2ϕ	4
41	0026197	E-ring 3ϕ	3
42	0026012	Slip felt $6\phi \times 14\phi \times 1^t$	1
43	0026020	Washer $2.2\phi \times 4\phi \times 0.13^t$	1
44	0026041	Screw S.S. M2x4	1
45	0022351	Head PCB	1
46	0029013	Mechanism ass'y	1

PART NO.	SYMBOL NO.	DESCRIPTION	Q'TY
2E0381	N	AM/FM/AUDIO P.C.B.	1
6C0680		Radiator	1
6C0670		Nut plate	1
011022	TR stopper	BHSPC 2604	2
011113		STSPC 3006	1
FM Receiver Section			
003516	1C302	LA-3350 (L6)	1
003519	IC301	UPC-1028H	1
003429	TR301	2 SC710D	1
003467	TR302	2 SD400E	1
003110	D301	RD9.1EB Diode	1
241010	L301:	Coil	1
021850	VR301	Variable Resistor	1
021890	VR302	Variable Resistor 1KΩ	1
001106	R318	RD12VK 10 Ω	1
001506	R309	RD18VK 10 Ω	1
001518	R307	RD18VK 100Ω	1
001532	R317	RD18VK 1.5KΩ	1
001524	R301,305 R306	RD18VK 330Ω	3
001530	R303	RD18VK 1.0KΩ	1
001536	R311,312 R316	RD18VK 3.3KΩ	3
001535	R319	RD18VK 2.7KΩ	1
001541	R310,313 R315	RD18VK 8.2KΩ	3
001542	R302,304	RD18VK 10KΩ	2
001544	R314	RD18VK 15μ	1
001563	R308	RD18VK 68OK	1
002008	C313,315	CEUZ 10V 4.7μF	2
002004	C308	CEUZ 10V 1μF	1
002014	C319	CEUZ 10V 47μF	1
002034	C316	CEUZ 16V 10μF	1
002152	C310	Tautal condensor CTUM 0.22μF	1
002153	C309	CTUM 0.47μF	1
002155	C320,312	CTUM 4.7μF	2
006315		Test point	1
002344	C303,321	COY 50V 0.02μF	2
002349	C301,302 C304,306	COY 50V 0.04μF	4
002444	C305	CCYC 50 10PF	1
002620	C307	Styrol condensor CS 50VJ 1500P	1
002511	C317,318	CM 50VK 0.0047UF	2
002520	C311,314	CM 50VK 0.02UF	2
004701	CF301,302	Seramic Filter 10.7MHz	2
AM Receiver Section			
003429	TR401,402 TR403	2 SC710D	3
003001	D402,403	1 S188	2
003008	D401	WG713	1
027750	CV401,402	Trimmer 70PF	2
770920	L404,405	IF Coil	2
770940	L403	IF Coil with Ceramic Filter 455K	1
750310	L401	OSC Coil	1
004202	L402	Series coil	1
001516	R407	RD 18VK 68Ω	1
001518	R408,414	RD 18VK 100Ω	2
001530	R411	RD 18VK 1KΩ	1
001526	R402	RD 18VK 470Ω	1

PART NO.	SYMBOL NO.	DESCRIPTION	Q'TY
001532	R415	RD18VK 1.5KΩ	1
001533	R403	RD18VK 1.8KΩ	1
001534	R406	RD18VK 2.2KΩ	1
001545	R410	RD18VK 18KΩ	1
001542	R404,412 R416,417	RD18VK 10KΩ	4
001544	R405	RD18VK 15KΩ	1
001549	R401	RD18VK 47KΩ	1
001553	R409	RD18VK 100KΩ	1
001546	R413	RD18VK 22KΩ	1
002014	C413	CEUZ 47μF	1
002008	C412,418	CEUZ 4.7μF	2
002502	C405	CM 50VK 0.0015μF	1
002516	C402,406 C416	CM 50VK 0.01μF	3
002520	C415	CM 50VK 0.02μF	1
002525	C407	CM 50VK 0.039μF	1
002349	C401,409 C411,414	CCY 50V 0.04μF	4
002439	C410	CCYC50V 5PF	1
002444	C403	CCYC50V 10PF	1
002718	C404	CK 50VJ 120PF	1
002721	C408	CK 50VJ 200PF	1
002460	C417	CCYC50V 24PF	1
AUDIO Section			
003536	IC802,803	UPC 1156H	2
890510		Choke transformer	1
002111	C831,827 C828	CEUZ 16V 470μFϕ10	3
002042	C819,820	CEUZ 16V 220μFϕ10	2
002014	C817,818	CEUZ 10V 47μFϕ6	2
002013	C823,824	CEUZ 10V 33μF	2
002008	C811,812	CEUZ 10V 4.7μF	2
003421	C821,822 C829,830	SCY 12Z 0.2μF	4
002501	C813,814	CM 50VK 0.001μF	2
002308	C825,826	CCY 50V 100PF	2
002302	C815,816	CCY 50V 40PF	2
001518	R809	RD 18VK 100	1
001524	R810,811	RD18VK 330	2
003510	IC801	M5125L	1
002042	C832	CEUZ 16V 220μF 10ϕ	1
002014	C805,806	CEUZ 10V 47μF	2
002008	C801,802 C809,810	CEUZ 10V 4.7μF	4
002316	C803,804	CCY 50VK 330PF	2
002524	C807,808	CM 50VK 0.033μF	2
001514	R801,802	RD 18VK 47Ω	2
001535	R807,808	RD18VK 2.7K	2
001536	R805,806	RD18VK 3.3K	2
001553	R803,804	RD18VK 100K	2

Exploded View (B)