ROTEL hifi

STEREO FM TUNER

RT-990BX

TECHNICAL MANUAL

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THE ROTEL CO., LTD.
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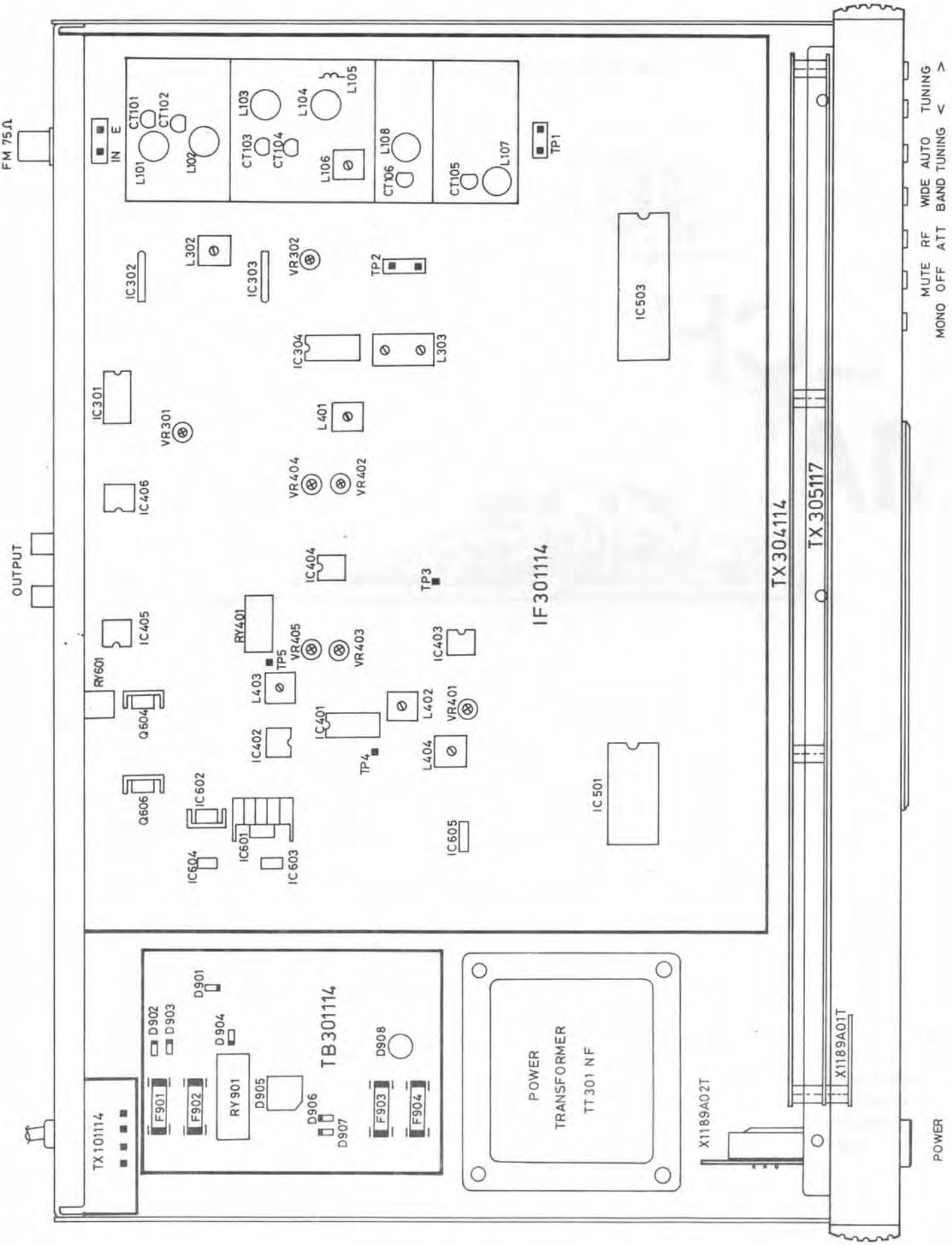
ROTEL ELECTRONICS CO., LTD.
3F-2, NO.35, FU HSING NORTH ROAD, TAIPEI, TAIWAN, REPUBLIC OF CHINA

MN20002139

Chassis Layout

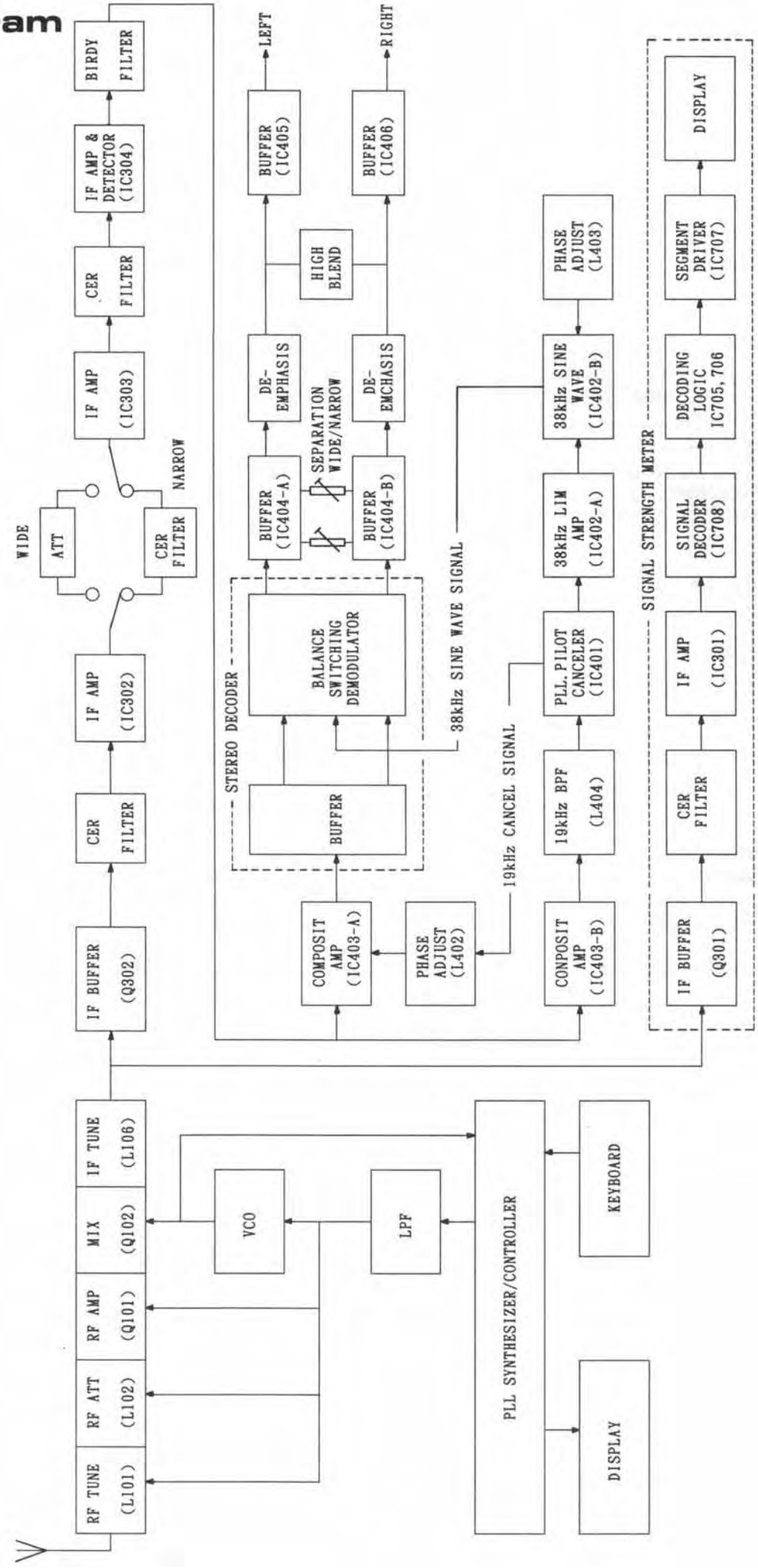


SPECIFICATIONS

Frequency Range	87.5 to 108 MHz
Antenna Input Impedance	75 ohms unbalanced
Usable Sensitivity:	
Mono	10.8 dBf (0.95 µV) at 75 ohms
50 dB Quieting Sensitivity:	
Mono	14.8 dBf (1.5 µV) at 75 ohms
Stereo	37.2 dBf (20 µV) at 75 ohms
Capture Ratio	1.0 dB
Alternate Channel Selectivity:	
Wide	50 dB
Narrow	80 dB
Adjacent Channel Selectivity	15 dB (Narrow)
Spurious Response Ratio	100 dB
Image Response Ratio	80 dB
IF Response Ratio	100 dB
AM Suppression Ratio	60 dB
Sub carrier Product Ratio	60 dB
SCA Rejection Ratio	70 dB
Muting Threshold	18 µV
Output Level	1.0 Vrms
Frequency Response	30 to 15,000 Hz ±0.5 dB
Signal to Noise Ratio (at 65 dBf):	
Mono	87 dB
Stereo	82 dB
Harmonic Distortion (at 65 dBf):	
Mono	0.05 % at 1 kHz
Stereo	0.12 % at 1 kHz
Stereo Separation:	
100 Hz	45 dB
1 kHz	50 dB
10 kHz	40 dB
De-emphasis	50µS (Europe), 75µS (America)
Power Requirement	120 V/ 60 Hz, 220-240 V/ 50 Hz (depending on destination)
Power Consumption	12 W
Overall Dimensions	440 (w) x 72 (h) x 318 (d) mm 17-3/8" (w) x 2-7/8" (h) X 12-1/2" (d)
Net Weight	5.0 kg / 11.0 lbs

NOTE: Specification and design are subject to possible modification without notice.

Block Diagram



FM IF and RF Alignment

Instruments: FM Signal Generator (400Hz,100% Modulated), THD Analyzer, Oscilloscope, AC VTVM, DC Voltmeter, Tuning Meter.
Test point : DC Voltmeter---Between TP1 and Earth on 016E1190A00T P.C.B.
Tuning Meter---Between TP2 A and B on IF-301114 P.C.B.

Step	Generator		Tuning Dial Setting	Adjust	Adjust for
	Coupling	Frequency			
1	N/A		87.5 MHz	L107	3V reading on DC Voltmeter
2			108 MHz	CT105	22V reading on DC Voltmeter
3	Repeat steps 1 and 2 unit until no further improvement is noticed.				
4	Antenna terminal	90 MHz	90 MHz	L101,102 L103,104 L107,108	Maximum reading on AC VTVM.
5		105 MHz	105 MHz	CT101-CT104 CT106	Maximum reading on AC VTVM.
6	Repeat steps 4 and 5 unit until no further improvement is noticed. (muting OFF) (RFF ATT ON)				
7	Antenna terminal 1mV input	90 MHz	90 MHz	L303(A)	Adjust center on Tuning Meter
8				L303(B)	Minimum reading on THD Analyzer
9	Repeat steps 7 and 8 unit until no further improvement is noticed. (Muting OFF)				
10	Antenna terminal 5uV input	90 MHz	90 MHz	VR302	Muting Level (Muting ON)
11	Antenna terminal 1mV input	90 MHz	90 MHz	VR301	Signal Indicator Level To "7" (Muting OFF)

FM MPX Alignment

Instruments: FM Stereo Generator, AC VTVM, Oscilloscope.
Test point : When adjust pilot cancel---Between TP3 and Earth
on IF-301114 P.C.B.

Step	Generator		Tuning Dial Setting	Adjust	Adjust for
	Coupling	Frequency			
1	Antenna terminal 1mV input	98 MHz Mod Pilot--10% 1 kHz--90% Sub signal (L or R)	98 MHz	L403 L404	VCO 76kHz+/-100Hz Maximum reading on AC VTVM at output.
2		98 MHz Mod Pilot--10%		VR401 L402	Pilot cancel Minimum reading on AC VTVM at TP3.
3		98 MHz Mod Pilot--10% 1 kHz--90% (L or R)		VR402 VR403	Separtion (Wide) Minimum reading on AC VTVM at output.
4				VR404 VR405	Separtion (Narrow) Minimum reading on AC VTVM at output
Note	It will be better to use 38 KHz low pass filter when adjust Separtion.				

CHANGING THE FM BAND FOR DIFFERENT MARKETS

	J501	FREQUENCY RANGE	TUNING INTERVAL
USA	OPEN	87.5 MHz—108 MHz	100 kHz
EUROPE UK	CLOSE	87.5 MHz—108 MHz	50 kHz

PRESETTING FM DE-EMPHASIS

	J401, J402	DE-EMPHASIS
USA	CLOSE	75 μS
EUROPE UK	OPEN	50 μS

PRESETTING FM MUTING (AUTO-STOP) LOCK RANGE

	J301	LOCK RANGE
USA	CLOSE	± 70 kHz
EUROPE UK	OPEN	± 30 kHz

Parts List

NOTE:THE COMPONENTS INDENTIFIED BY ⚠ MARK ARE FOR SAFFTY.REPLACE ONLY WITH ORIGINAL PARTS.DO NOT SUBSTITUTE.

SYMBOL	PARTS NO.	DESCRIPTION
	TB-301114 PCB ASSEMBLY	
R901,902	RM81002616	R,METAL MK2010KFECZ.
R903	RM84752616	R,METAL MK247K5FECZ.
C901	CC01009256	CAP,CERAMIC 0.01uF 250V ⚠
C902	CE01007504	CAP,ELEC. 1uF 50V
C903,904	CC01009256	CAP,CERAMIC 0.01uF 250V ⚠
C905	CE04705358	CAP,ELEC. 470uF 35V
C906-909	CC01009256	CAP,CERAMIC 0.01uF 250V ⚠
C910,911	CE64704449	CAP,ELEC. LGS1H472MHS
C912	CE02205449	CAP,ELEC. 220uF 63V
C913,914	CC01009256	CAP,CERAMIC 0.01uF 250V ⚠
C915	CE02205449	CAP,ELEC. 220uF 63V
C916-919	CC01009256	CAP,CERAMIC 0.01uF 250V ⚠
C920	CE04705164	CAP,ELEC. 470uF 16V
D901-904	DD10000068	DIODE IN4003
D905	DD10000380	DIODE PBPC604 ⚠
D906,907	DD10000068	DIODE IN4003
D908	DD10000123	DIODE W02 ⚠
RY901	LY00000289	RELAY VB-24SMCU-E ⚠
F901,902	FU25000077	FUSE 250V T1A UL/CAS ⚠
	FU23000207	FUSE 250V T1A S ⚠
Q901	TR10000059	TRANSISTOR 2SB764E/F
	TX-305117 PCB ASSEMBLY	
R801	RM81002616	R,METAL MK2010KFECZ.
R802	RM84752616	R,METAL MK247K5FECZ.
R803	RM81002616	R,METAL MK2010KFECZ.
R804-812	RM81211618	R,METAL MK21K21FECZ.
R813-817	RM84752616	R,METAL MK247K5FECZ.
R818	RM81212611	R,METAL MK212K1FECZ.
R819	RM81002616	R,METAL MK2010KFECZ.
R820-822	RM82212618	R,METAL MK222K1FECZ.
R825-827	RM81001612	R,METAL MK2001KFECZ.
R828	RM81002616	R,METAL MK2010KFECZ.
R829,830	RM82212618	R,METAL MK222K1FECZ.
R831,832	RM81001612	R,METAL MK2001KFECZ.
R833,834	RM86812616	R,METAL MK268K1FECZ.
C801-806	CC31009465	CAP,CERAMIC 0.01uF 50V
C807,808	CY21008428	CAP,LAYER 50MSA104J
C809,810	CC31009465	CAP,CERAMIC 0.01uF 50V
D802-806	DD40001245	LED LN21RPH
D807,808	DD80000021	DIODE IN4148
D809,810	DD40001233	LED LN513RK
D811-815	DD40000095	LED SEL1124R
Q801	TR30000327	TRANSISTOR 2SC536G-NP
Q802	TR10000126	TRANSISTOR 2SA608KF
Q803,804	TR30000327	TRANSISTOR 2SC536G-NP
FL801	DD40000976	FL TUBE FIP7F8S
IC801	IC00002740	uPD4511BAC
IC802	IC00002107	TC9130P
S802-808	SH60000252	KEY BOARD SW 4TR-2627
	TX-304114 PCB ASSEMBLY	
R701	RM34702085	THICK FILM RS NETWORK RA8-473-8K
R709-715	RM84752616	R,METAL MK247K5FECZ.
R716	RM82211614	R,METAL MK22K21FECZ.
R717	RM81000619	R,METAL MK2100RFECZ.
R718	RM85621610	R,METAL MK25K62FECZ.
R719	RM81002616	R,METAL MK2010KFECZ.
R728-733	RM81002616	R,METAL MK2010KFECZ.
R734	RM82212618	R,METAL MK222K1FECZ.
R735-737	RM81002616	R,METAL MK2010KFECZ.
R738-740	RM84752616	R,METAL MK247K5FECZ.
R741-743	RM81002616	R,METAL MK2010KFECZ.
R747	RN32202081	THICK FILM RS NETWORK SE8223JFU
R752	RN32202068	THICK FILM RS NETWORK SE6223JFU

SYMBOL	PARTS NO.	DESCRIPTION
R758	RN32202081	THICK FILM RS NETWORK SE8223JFU
C701-704	CC31009465	CAP,CERAMIC 0.01uF 50V
C705	CE01007504	CAP,ELEC. 1uF 50V
C706	CE01005167	CAP,ELEC.100uF 16V
C707	CE02207501	CAP,ELEC.2.2uF 25V
C708	CE01006251	CAP,ELEC.10uF 50V
C710	CC31009465	CAP,CERAMIC 0.01uF 50V
C711	CC31010431	CAP,CERAMIC 0.001uF 50V
C712	CC31009465	CAP,CERAMIC 0.01uF 50V
C713	CE04706168	CAP,ELEC. 47uF 16V
Q701-704	TR30000327	TRANSISTOR 2SC536G-NP
Q705-707	TR10000126	TRANSISTOR 2SA608KF
D701-728	DD80000021	DIODE IN4148
IC701,702	IC00002727	IC TC4532BP
IC703	IC00002340	IC TC4081BP
IC704	IC00001528	IC TC4013BP
IC705	IC00000883	IC LB1423N
IC709	IC00000573	IC TD6301AP
	X-1189A01T PCB ASSEMBLY	
IC001	IC00002030	REMOTE RECEIVER SBX1610-02
	X-1189102T PCB ASSEMBLY	
S001	SH11000252	1 KEY PUSH SW 4TR-2386-1
	IF-301114 PCB ASSEMBLY	
R101,102	RM84751612	R,METAL MK24K75FECZ.
R103	RM82743612	R,METAL MK227K4FECZ.
R105	RM82743612	R,METAL MK227K4FECZ.
R106,107	RM81003610	R,METAL MK2100KFECZ.
R108	RM84752616	R,METAL MK247K5FECZ.
R109	RM84759611	R,METAL MK247R5FECZ.
R110	RM81500616	R,METAL MK2150RFECZ.
R111,112	RM82742619	R,METAL MK227K4FECZ.
R113,114	RM81003610	R,METAL MK2100KFECZ.
R115	RM84759611	R,METAL MK247R5FECZ.
R116	RM82211614	R,METAL MK22K21FECZ.
R117	RM81000619	R,METAL MK2100RFECZ.
R118	RM82211614	R,METAL MK22K21FECZ.
R119	RM81002616	R,METAL MK2010KFECZ.
R120	RM84752616	R,METAL MK247K5FECZ.
R121	RM81002616	R,METAL MK2010KFECZ.
R122	RM84752616	R,METAL MK247K5FECZ.
R123	RM81002616	R,METAL MK2010KFECZ.
R124	RM84750619	R,METAL MK2475RFECZ.
R125	RM81003610	R,METAL MK2100KFECZ.
R126	RM82211614	R,METAL MK22K21FECZ.
R127	RM84759611	R,METAL MK247R5FECZ.
R128,129	RM81002626	R,METAL MK2010KFECZ.
R130	RM84759611	R,METAL MK247R5FECZ.
R131	RM82742619	R,METAL MK227K4FECZ.
R132	RM81003610	R,METAL MK2100KFECZ.
R133	RM82742619	R,METAL MK227K4FECZ.
R134	RM84750619	R,METAL MK2475RFECZ.
C101	CC33312438	CAP,CERAMIC 33P 50V
C102	CC34712436	CAP,CERAMIC 47P 50V
C103	CC31009465	CAP,CERAMIC 0.01uF 50V
C104	CC15013410	CAP,CERAMIC 5P CH 50V
C105	CC31009465	CAP,CERAMIC 0.01uF 50V
C106	CC31010431	CAP,CERAMIC 0.001uF 50V
C107	CC31009465	CAP,CERAMIC 0.01uF 50V
C108	CC13013417	CAP,CERAMIC 3P CH 50V
C109	CC34712436	CAP,CERAMIC 47P 50V
C110	CC31009465	CAP,CERAMIC 0.01uF 50V
C111	CC31010431	CAP,CERAMIC 0.001uF 50V
C112	CC13013417	CAP,CERAMIC 3P CH 50V

Parts List

SYMBOL	PARTS NO.	DESCRIPTION
C113	CC15013410	CAP,CERAMIC 5P CH 50V
C114	CC13013417	CAP,CERAMIC 3P CH 50V
C115	CE01007504	CAP,ELEC. 1uF 50V
C116	CC31011435	CAP,CERAMIC 100P 50V
C117-119	CC31009465	CAP,CERAMIC 0.01uF 50V
C120	CE04705164	CAP,ELEC. 470uF 16V
C121	CC15013410	CAP,CERAMIC 5P CH 50V
C122	CC17013412	CAP,CERAMIC 7P CH 50V
C123	CC33312438	CAP,CERAMIC 33P 50V
C124	CC15013410	CAP,CERAMIC 5P CH 50V
C125,126	CC31009465	CAP,CERAMIC 0.01uF 50V
C127,128	CC15013410	CAP,CERAMIC 5P CH 50V
C129	CC31009465	CAP,CERAMIC 0.01uF 50V
C130,131	CC15013410	CAP,CERAMIC 5P CH 50V
C132	CC17013412	CAP,CERAMIC 7P CH 50V
CT101-106	CF00000184	FILM TRIMMER CAP. VCT51A
D101	DD10000317	DIODE 1SS110
D102	DD50000055	DIODE SVC211SPA
D103	DD10000317	DIODE 1SS110
D104	DD50000055	DIODE SVC211SPA
D105-108	DD50000055	DIODE SVC211SPA
Q101,102	TR50000140	TRANSISTOR 3SK107F
Q103	TR30000327	TRANSISTOR 2SC536G-NP
Q104,105	TR10000126	TRANSISTOR 2SA608KF
Q106	TR30000327	TRANSISTOR 2SC536G-NP
Q107	TR50000103	TRANSISTOR 2SK544F
Q108	TR30000133	TRANSISTOR 2SC1674
Q109	TR50000103	TRANSISTOR 2SK544F
L101,102	LC23390009	FM ANT. COIL TRL-339
L103	LC23380004	FM RF COIL TRL-338
L104	LC23370000	FM RF COIL TRL-337
L105	LM00000073	MICRO INDUCTOR TRL-239
L106	LC02330000	FM IF COIL TRL-233T
L107,108	LC23360005	FM OSC COIL TRL-336
R301	RM84759611	R,METAL MK247R5FECZ.
R302	RM83320617	R,METAL MK2332RFECZ.
R303	RM81003610	R,METAL MK2100KFECZ.
R304	RM83320617	R,METAL MK2332RFECZ.
R305-308	RM84752616	R,METAL MK247K5FECZ.
R309	RM84759611	R,METAL MK247R5FECZ.
R310	RM81003610	R,METAL MK2100KFECZ.
R311	RM83320617	R,METAL MK2332RFECZ.
E312	RM84759611	R,METAL MK247R5FECZ.
R313,314	RM83320617	R,METAL MK2332RFECZ.
R315	RM84759611	R,METAL MK247R5FECZ.
R316	RM81211618	R,METAL MK21K21FECZ.
R317	RM83320617	R,METAL MK2332RFECZ.
R318	RM81001612	R,METAL MK2001KFECZ.
R319.320	RM83320617	R,METAL MK2332RFECZ.
R321	RM84759611	R,METAL MK247R5FECZ.
R322	RM82212618	R,METAL MK222K1FECZ.
R323	RM81003610	R,METAL MK2100KFECZ.
R324	RM82212618	R,METAL MK222K1FECZ.
R325	RM84759611	R,METAL MK247R5FECZ.
R326	RM81002616	R,METAL MK2010KFECZ.
R327	RM81000619	R,METAL MK2100RFECZ.
R328	RM82212618	R,METAL MK222K1FECZ.
R329	RM84751612	R,METAL MK24K75FECZ.
R330	RM81002616	R,METAL MK2010KFECZ.
R331	RM84751612	R,METAL MK24K75FECZ.
R332	RM81002616	R,METAL MK2010KFECZ.
R333	RM82212618	R,METAL MK222K1FECZ.
R334	RM81002616	R,METAL MK2010KFECZ.
R335	RM84752616	R,METAL MK247K5FECZ.
R336	RM83321610	R,METAL MK23K32FECZ.
R337	RM84762616	R,METAL MK247K5FECZ.
R338	RM81003610	R,METAL MK2100KFECZ.
R339	RM81001612	R,METAL MK2001KFECZ.
R340,341	RM82211614	R,METAL MK22K21FECZ.
R342,343	RM81000619	R,METAL MK2100RFECZ.

SYMBOL	PARTS NO.	DESCRIPTION
R344	RM83320617	R,METAL MK2332RFECZ.
R345	RM81002616	R,METAL MK2010KFECZ.
R346	RM84752616	R,METAL MK247K5FECZ.
R347	RM86810619	R,METAL MK2681RFECZ.
R348	RM82212618	R,METAL MK222K1FECZ.
R349	RM81002616	R,METAL MK2010KFECZ.
R350-352	RM84752616	R,METAL MK247K5FECZ.
R353	RM88251610	R,METAL MK28K25FECZ.
R354	RM84759611	R,METAL MK247R5FECZ.
R355	RM82431614	R,METAL MK22K43FECZ.
R356	RM82212618	R,METAL MK222K1FECZ.
C301-303	CC31009465	CAP,CERAMIC 0.01uF 50V
C304-312	CC05009457	CAP,CERAMIC 0.047uF 50V
C313-326	CC31009465	CAP,CERAMIC 0.01uF 50V
C327	CE01005258	CAP,ELEC. 100uF 25V
C328	CC31009465	CAP,CERAMIC 0.01uF 50V
C329,330	CE01006251	CAP,ELEC. 10uF 25V
C331	CC31009465	CAP,CERAMIC 0.01uF 50V
C332-334	CC05009457	CAP,CERAMIC 0.047uF 50V
C335	CE02206508	CAP,ELEC. 22uF 50V
C336	CS33311310	CAP,POLY. 160V 330P
C337,338	CE01007504	CAP,ELEC. 1uF 50V
C339-343	CC05009457	CAP,CERAMIC 0.047uF 50V
C344	CE51005679	CAP,ELEC. 25BGF100M
C345	CC05009457	CAP,CERAMIC 0.047uF 50V
C346	CE51005679	CAP,ELEC. 25BGF100M
X301,302	LF00000099	CERAMIC FILTER SFE 10.7MS3GY-A
X303	LF00000415	CERAMIC FILTER SFE10.7MXK-A
X304	LF00000439	CERAMIC FILTER SFE10.7M5-A
X305	LF00000427	CERAMIC FILTER SFE10.7MHY-A
X306	LF00000415	CERAMIC FILTER SFE10.7MXK-A
D301-309	DD80000021	DIODE IN4148
Q301,302	TR50000103	TRANSISTOR 2SK544F
Q303-307	TR30000327	TRANSISTOR 2SC536G-NP
Q308,309	TR10000126	TRANSISTOR 2SA608K
VR301	RV40000095	R,SEMI-FIXED VM6CKPV-1S-B 47KB
VR302	RV40000125	R,SEMI-FIXED VM6CKPV-1S-B 10KB
IC301	IC00001103	IC LA1235
IC302	IC00001516	IC TA7302P
IC303	IC00001656	IC MPC1163H
IC304	IC00001103	IC LA1235
L301	LM00000073	MICRO FILTER TRL-239
L303	LC31090007	IF COIL RLV-109T
R401	RM81000619	R,METAL MK2100RFECZ.
R402	RM82211614	R,METAL MK22K21FECZ.
R403	RM84751612	R,METAL MK24K75FECZ.
R404	RM86812616	R,METAL MK268K1FECZ.
R405	RM83322614	R,METAL MK233K2FECZ.
R406	RM81003610	R,METAL MK2100KFECZ.
R407	RM88250617	R,METAL MK2825RFECZ.
R408	RM81001612	R,METAL MK2001KFECZ.
R409	RM84759611	R,METAL MK247R5FECZ.
R411-413	RM81002616	R,METAL MK2010KFECZ.
R414	RM85621610	R,METAL MK25K62FECZ.
R416	RM82211614	R,METAL MK22K21FECZ.
R417	RM84752616	R,METAL MK247K5FECZ.
R418	RM84759611	R,METAL MK247R5FECZ.
R419	RM83322614	R,METAL MK233K2FECZ.
R420	RM81002616	R,METAL MK2010KFECZ.
R421,422	RM84751612	R,METAL MK24K75FECZ.
R423,424	RM81003610	R,METAL MK2100KFECZ.
R425	RM84752616	R,METAL MK247K5FECZ.
R426	RM83323618	R,METAL MK2332KFECZ.
R427	RM81543615	R,METAL MK2154KFECZ.
R428	RM84752616	R,METAL MK247K5FECZ.
R429,430	RM81001612	R,MERAL MK2001KFECZ.
R431	RM82212618	R,METAL MK222K1FECZ.

Parts List

NOTE:THE COMPONENTS INDENTIFIED BY ⚠ MARK ARE FOR SAFFTY.REPLACE ONLY WITH ORIGINAL PARTS.DO NOT SUBSTITUTE.

SYMBOL	PARTS NO.	DESCRIPTION
R432	RM81002616	R,METAL MK2010KFECZ.
R433	RM82212618	R,METAL MK222K1FECZ.
R434	RM83321610	R,METAL MK23K32FECZ.
R435	RM84752616	R,METAL MK247K5FECZ.
R436,437	RM82212618	R,METAL MK222K1FECZ.
R438	RM82743612	R,METAL MK2274KFECZ.
R439	RM83322614	R,METAL MK233K2FECZ.
R440	RM84751612	R,METAL MK24K75FECZ.
R441,442	RM85621610	R,METAL MK25K62FECZ.
R443,444	RM84751612	R,METAL MK24K75FECZ.
R447	RM84751612	R,METAL MK24K75FECZ.
R448	RM84751612	R,METAL MK24K75FECZ.
R449	RM88251610	R,METAL MK28K25FECZ.
R450	RM88251610	R,METAL MK28K25FECZ.
R451,452	RM82211614	R,METAL MK22K21FECZ.
R453,454	RM86819611	R,METAL MK268R1FECZ.
R455	RM86810619	R,METAL MK2681RFECZ.
R456,457	RM84751612	R,METAL MK24K75FECZ.
R458,459	RM83321610	R,METAL MK23K32FECZ.
R460,461	RM84751612	R,METAL MK24K75FECZ.
R463,464	RM81822619	R,METAL MK218K2FECZ.
R467,468	RM85622613	R,METAL MK256K2FECZ.
R469-472	RM84752616	R,METAL MK247K5FECZ.
R483,484	RM84752616	R,METAL MK247K5FECZ.
R485,486	RM81000619	R,METAL MK2100RFECZ.
R488,489	RM81002616	R,METAL MK2010KFECZ.
R490	RM84752616	R,METAL MK247K5FECZ.
R491	RM84759611	R,METAL MK247R5FECZ.
C401	CE51006477	CAP,ELEC. 50BGF10M
C402	CE54705640	CAP,ELEC. 25BGF470M
C403	CE51006477	CAP,ELEC. 50BGF10M
C404	CE61005743	CAP,ELEC. 16BGF100M
C406	CE51005679	CAP,ELEC. 25BGF100M
C407	CM01009427	CAP,MYLAR 103J 50V
C408	CE54707478	CAP,ELEC. 50BGF4R7M
C409	CY24708425	CAP,LAYER 50MSA474J
C410	CY21008428	CAP,LAYER 50MSA104J
C411,412	CM01009427	CAP,MYLAR 103J 50V
C413	CE01007504	CAP,ELEC. 1uF 50V
C414,415	CE64706677	CAP,ELEC. 25BGF47M
C416	CS41000429	CAP,STYROL 1000P 50V
C417	CM01009427	CAP,MYLAR 103J 50V
C419	CM04709426	CAP,MYLAR 473J 50V
C423,424	CE51005679	CAP,ELEC. 25BGF100M
C427,428	CE51005679	CAP,ELEC. 25BGF100M
C430	CS31510302	CAP,POLY. 1500P 160V
C431,432	CS33310304	CAP,POLY. 3300P 160V
C435,436	CE51006477	CAP,ELEC. 50BGF10M
C437,438	CS32211306	CAP,POLY. 220P 160V
C439,440	CS31011310	CAP,POLY. 100P 160V
C441,442	CE72205645	CAP,ELEC. 220uF 25V HFS
C443,444	CP61008321	CAP,M.P 104K 100V
C445,446	CE74705256	CAP,ELEC. 220uF 25V HFS
C447,448	CP61008321	CAP,M.P 104K 100V
C449,450	CE64706677	CAP,ELEC. 25BGF47M
D401	DD20000168	DIODE RD5.6E
D402,403	DD80000021	DIODE IN4148
D404	DD20000168	DIODE RD5.6E
D405,406	DD80000021	DIODE IN4148
D407	DD20000168	DIODE RD5.6E
D408	DD80000021	DIODE IN4148
Q401,402	TR30000121	TRANSISTOR 2SC2274E/F
Q403,404	TR30000327	TRANSISTOR 2SC536G-NP
Q405	TR10000254	TRANSISTOR 2SA1345
Q406	TR30000327	TRANSISTOR 2SC536G-NP
Q407	TR30000492	TRANSISTOR 2SC3399
Q408	TR50000127	TRANSISTOR 2SK246-Y
Q409	TR30000121	TRANSISTOR 2SC2274E/F
Q410,411	TR10000102	TRANSISTOR 2SA929
Q412	TR30000431	TRANSISTOR 2SC1570

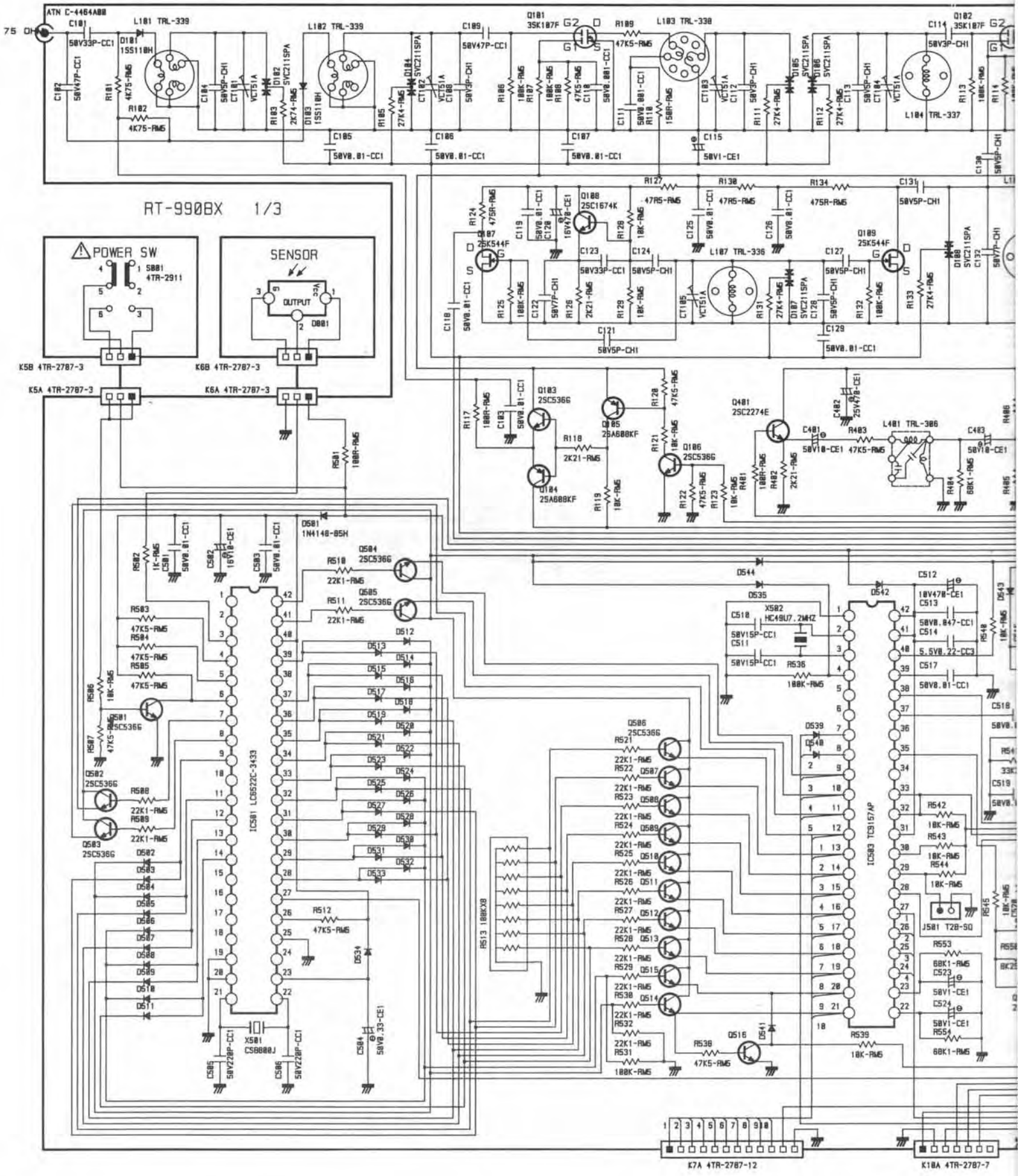
SYMBOL	PARTS NO.	DESCRIPTION
Q413	TR10000369	TRANSISTOR 2SA1238
Q414	TR30000649	TRANSISTOR 2SC3065
Q415	TR10000369	TRANSISTOR 2SA1238
Q416	TR30000649	TRANSISTOR 2SC3065
Q420	TR30000327	TRANSISTOR 2SC536G-NP
Q421	TR10000126	TRANSISTOR 2SA608KF
IC401	IC00002752	IC LA3433
IC402-404	IC00001693	IC NE5532AN
IC405,406	IC00001735	IC NE5534AN
RY401	LY00000253	RELAY RY-12W ⚠
X401	LF00000403	CERAMIC FILTER CSB456F15
VR401	RV40000101	R,SEMI-FIXED VM6CKPV-1S-B 20KB
VR402,403	RV40000113	R,SEMI-FIXED VM6CKPV-1S-B 3.3KB
VR404,405	RV40000125	R,SEMI-FIXED VM6CKPV-1S-B 10KB
L401	LC23060009	MPX FILTER TRL306
L402	LC23730003	COIL TRL373
L403	LM00000360	MICRO INDUCTOR RLV312
L404	LC23730003	COIL TRL373
R501	RM81000619	R,METAL MK2100RFECZ.
R502	RM81001612	R,METAL MK2001KFECZ.
R503-505	RM84752616	R,METAL MK247K5FECZ.
R506	RM81002616	R,METAL MK2010KFECZ.
R507	RM84752616	R,METAL MK247K5FECZ.
R508-511	RM82212618	R,METAL MK222K1FECZ.
R512	RM84752616	R,METAL MK247K5FECZ.
R513	RN31003080	THICK FILM RS NETWORK A8104J
R521-530	RM82212618	R,METAL MK222K1FECZ.
R531,532	RM81003610	R,METAL MK2100KFECZ.
R536	RM81003610	R,METAL MK2100KFECZ.
R538	RM84752616	R,METAL MK247K5FECZ.
R539,540	RM81002616	R,METAL MK2010KFECZ.
R541	RM83322614	R,METAL MK233K2FECZ.
R542-545	RM81002616	R,METAL MK2010KFECZ.
R546	RM82211614	R,METAL MK22K21FECZ.
R547	RM88251610	R,METAL MK28K25FECZ.
R548,549	RM81000619	R,METAL MK2100RFECZ.
R550	RM88251610	R,METAL MK28K25FECZ.
R551,552	RM82740611	R,METAL MK2274RFECZ.
R553,554	RM86812616	R,METAL MK268K1FECZ.
C501	CC31009465	CAP,CERAMIC 0.01uF 50V
C502	CE01005167	CAP,ELEC. 10uF 16V
C503	CC31009465	CAP,CERAMIC 0.01uF 50V
C504	CE01338508	CAP,ELEC. 0.33uF 50V
C505,506	CC32211432	CAP,CERAMIC 220P 50V
C510,511	CC01512434	CAP,CERAMIC 15P 50V
C512	CE04705103	CAP,ELEC. 470uF 10V
C513	CC31009465	CAP,CERAMIC 0.01uF 50V
C514	CE52208951	CAP,ELEC. FYDOH224Z
C515	CE01005106	CAP,ELEC. 100uF 10V
C516-519	CC31009465	CAP,CERAMIC 0.01uF 50V
C520	CE51005540	CAP,ELEC. 35BGF100M
C521	CM04709426	CAP,MYLAR 473J 50V
C522	CE01338508	CAP,ELEC. 0.33uF 50V
C523,524	CE01007504	CAP,ELEC. 1uF 50V
Q501-516	TR30000327	TRANSISTOR 2SC536G-NP
Q517	TR50000127	TRANSISTOR 3SK246-Y
Q518	TR30000509	TRANSISTOR 2SC1570
IC501	IC00001759	IC LC6522C-3433
IC503	IC00001346	IC TC9157AP
IC504	IC00000482	IC TD6104P
D501-545	DD80000021	DIODE IN4148
X501	LF00000294	CERAMIC FILTER CSB800J
X502	DD60000040	CRYSTAL OSC. HC49U7.2MHz
R601,602	RM81502613	R,METAL MK2015KFECZ.
R603	RM83321610	R,METAL MK23K32FECZ.
R604	RM81002616	R,METAL MK2010KFECZ.

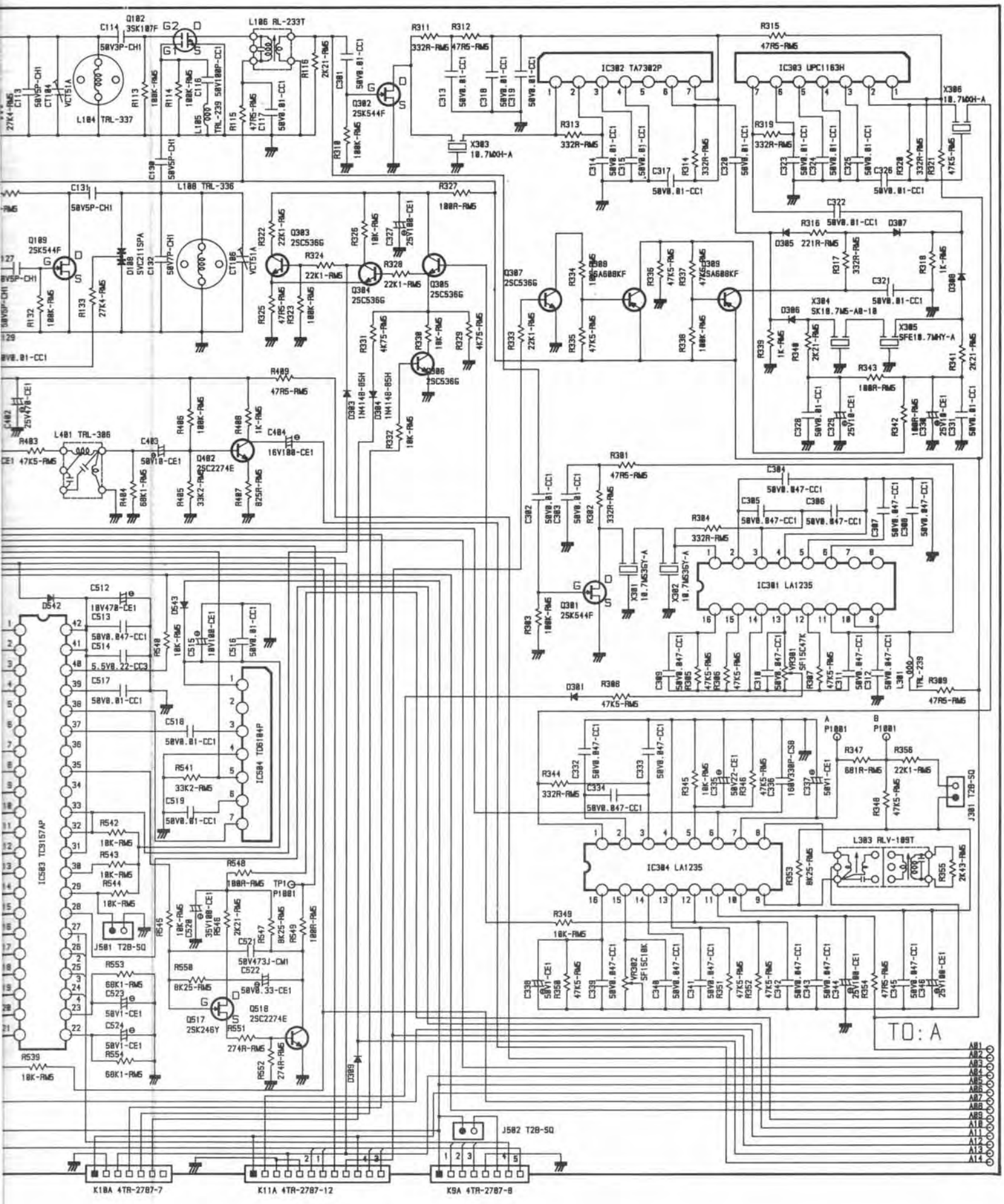
Parts List

SYMBOL	PARTS NO.	DESCRIPTION
R607-609	RM81002616	R,METAL MK2010KFECZ.
R610	RM84752616	R,METAL MK247K5FECZ.
R611	RM88250617	R,METAL MK2825RFECZ.
R612	RM86812616	R,METAL MK268K1FECZ.
R613,614	RM81002616	R,METAL MK2010KFECZ.
R615	RM84752616	R,METAL MK247K5FECZ.
R616	RM82741615	R,METAL MK22K74FECZ.
R617	RM82211614	R,METAL MK222K1FECZ.
R618	RM83323618	R,METAL MK2332KFECZ.
R619	RM84752616	R,METAL MK247K5FECZ.
R620	RM81002616	R,METAL MK2010KFECZ.
R621	RM81003610	R,METAL MK2100KFECZ.
R622	RM81002616	R,METAL MK2010KFECZ.
R623	RM84752616	R,METAL MK247K5FECZ.
R624	RM81000619	R,METAL MK2100RFECZ.
R625-627	RM84752616	R,METAL MK247K5FECZ.
R628,629	RM81002616	R,METAL MK2010KFECZ.
R630	RM84753610	R,METAL MK2475KFECZ.
R631	RM85620616	R,METAL MK2562RFECZ.
C601	CE51005540	CAP,ELEC. 35BGF100M
C602	CE64706677	CAP,ELEC. 25BGF47M
C603	CE02205449	CAP,ELEC. 220uF 63V
C604	CE72205645	CAP,ELEC. 25V 220uF HFS
C605	CE74705256	CAP,ELEC. 25V 470uF HFS
C606	CE72205645	CAP,ELEC. 25V 220uF HFS
C607	CE74705256	CAP,ELEC. 25V 470uF HFS
C608	CE04706508	CAP,ELEC. 47uF 50V
C609	CE04706259	CAP,ELEC. 47uF 25V
C610,611	CE51005679	CAP,ELEC. 25BGF100M
C612,613	CE51005679	CAP,ELEC. 100uF 25V
C614	CE01005167	CAP,ELEC. 100uF 16V
C615	CE04706168	CAP,ELEC. 47uF 16V
C616	CE04707252	CAP,ELEC. 4.7uF 25V
D601	DD80000021	DIODE IN4148
D602	DD20000193	DIODE RD15E
D603	DD10000391	DIODE E-562
D604,605	DD20000193	DIODE RV15
D606	DD10000391	DIODE E562
D607,608	DD80000021	DIODE IN4148
D609	DD20000016	DIODE RD12E
D610-613	DD80000021	DIODE IN4148
D614	DD10000068	DIODE IN4003
Q601,602	TR30000121	TRANSISTOR 2SC2274E/F
Q603	TR30000327	TRANSISTOR 2SC536G-NP
Q604	TR10000047	TRANSISTOR W/MICA 2SB631KE
Q605	TR10000126	TRANSISTOR 2SA608KF
Q606	TR40000069	TRANSISTOR W/MICA 2SD600K
Q607,608	TR30000492	TRANSISTOR 2SC3399
Q609	TR10000126	TRANSISTOR 2SA608KF
Q610,611	TR30000327	TRANSISTOR S2SC536G-NP
Q612	TR30000492	TRANSISTOR 2SC3399
Q613	TR10000126	TRANSISTOR 2SA608KF
Q614	TR10000059	TRANSISTOR 2SB764E/F
Q615,616	TR30000327	TRANSISTOR 2SC536G-NP
Q617	TR10000059	TRANSISTOR 2SB764E/F
Q618	TR10000126	TRANSISTOR 2SA608K
Q619	TR30000327	TRANSISTOR 2SC536G-NP
Q620	TR10000254	TRANSISTOR 2SA1345
Q621	TR30000492	TRANSISTOR 2SC3399
Q622	TR30000327	TRNASISTOR 2SC536G-NP
Q623	TR30000492	TRANSISTOR 2SC3399
IC601	IC00000615	IC NJM78M05
IC602	IC00000974	IC NJM78M12
IC603	IC00001267	IC NJM78M15
IC604	IC00000974	IC NJM79M12
IC605	IC00000615	IC NJM78M05
RY601	LY00000253	RELAY RY12W ⚠

SYMBOL	PARTS NO.	DESCRIPTION
		OTHERS
	AB00000754	BOTTOM BOARD 2TPA-4
	AF30000190	FRONT CHASSIS 2TPA-3
	AM00002128	CHASSIS BODY 3TPA-2
	AR30000210	PRINTED REAR CHASSIS TRP-634
	AS01000427	SIDE CHASSIS 3TTH-8A#2
	PT30110106	POWER TRANSFORMER TT-301-NF ⚠
	BC00000143	CYLINDER BUSH 4TVL-8#2 6Fx12H
	BC00000209	CYLINDER BUSH 4TVL-7#2 8MM
	BC00000829	CYLINDER BUSH 4TVL-7#9 6Fx9H
	FT00000229	PLASTIC FOOT 4TSH-19#2 50Fx14H
	SC00000027	AC CORD STOPPER SR-4N-4 ⚠
	CD00000218	AC CORD SPT-2 AWG#18 4TR-670#4 (U,C,A,J) ⚠
	CD00000322	AC POWER CORD 4TR-2757 (D) ⚠
	CD00000048	AC POWER CORD 4TR-1037 (H,E,Y1,Y2) ⚠
	CD00000085	AC POWER CORD C-2504A (K1) ⚠
	CD00000115	AC POWER CORD C-3763-T (G) ⚠
	NP00001949	NAME STICKER 120V 4TR-2828A#1
	NP00001974	NAME STICKER 120V (C) 4TR-2828A#4
	NP00001962	NAME STICKER 240V 4TR-2828A#3
	NP00001998	NAME STICKER 230V 4TR-2828A#5
	NP00002012	NAME STICKER 100V 4TR-2828A#6
	NP00001950	NAME STICKER 220V 4TR-2828A#2
	SA00001530	COAXIAL CONNECTOR 4TR-2290#1 (U) ⚠
	SA00001760	COAXIAL CONNECTOR 4TR-2439#1 (E,K) ⚠
	AA30000448	FRONT PANEL 2TPA-1 TFP-700
	AW00000654	RJ SENSOR WINDOW PT4-12A00T
	AW00000710	PANEL WINDOW 4TQS-7#5
	BU00001145	POWER RING 4TQF-13 14x14
	KB20002681	POWER BUTTON 4TQF-15 14x14
	KB20003030	TACT BUTTON 3TPA-5
	OM10001260	ORNAMENTAL SIDE BOARD 4TR-2797#1
	OM70000065	PUSH BUTTON CONNECTOR 4TTL-15
	SN00000179	BUTTON SPRING 4TR-1988#2 10F
	AU00001250	TOP COVER POLY 3TTE-6#4
	OM10001685	FL ORNAMENTAL PLATE 4TPA-6
	SR00000882	UPPER COVER SPACER 4TR-2418
	BU00001315	L.E.D RING 2F QE-10A00T
	MN10003074	OWNER'S MANUAL RT-990BX
	PL00001117	STYROL SIDE MOULDING 2TTI-7#2 TZ-167-1

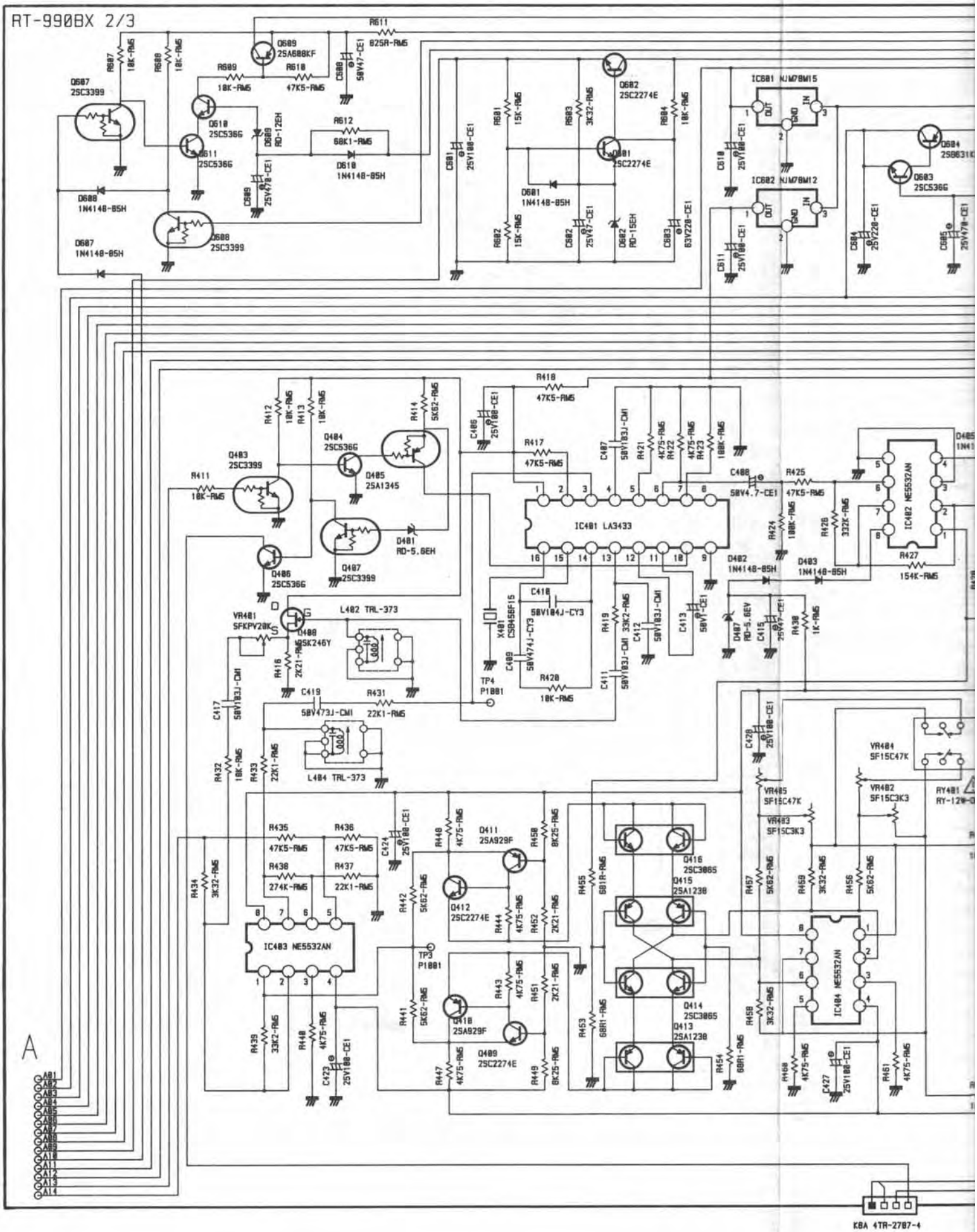
Schematic Diagram

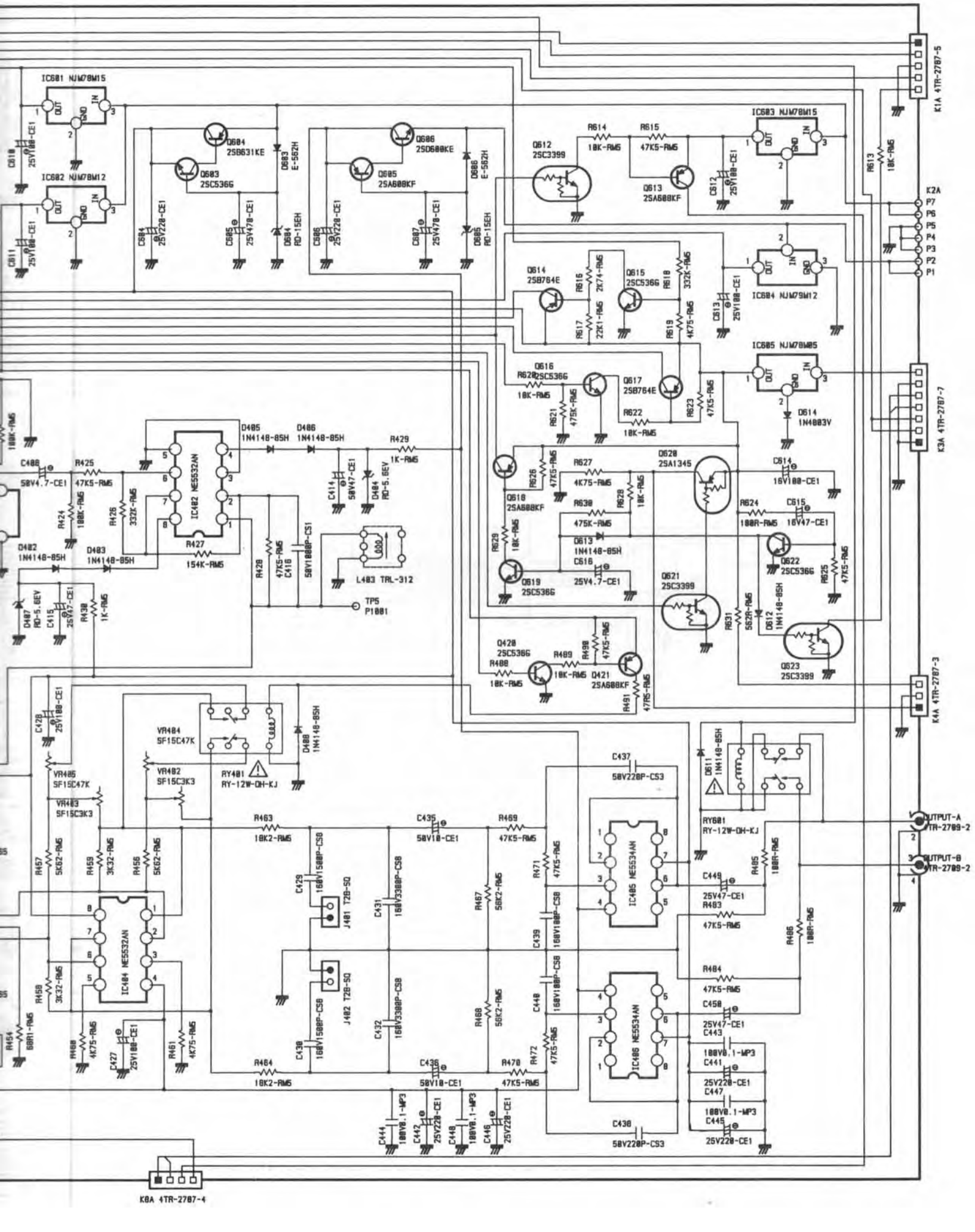



IC302 TA7302P
IC303 UPC1163H
IC301 LA1235
IC304 LA1235
IC583 TC9157AP
IC584 TD6184P
L303 RLV-109T
TO:A
K10A 4TR-2787-7
K11A 4TR-2787-12
K9A 4TR-2787-8

Schematic Diagram

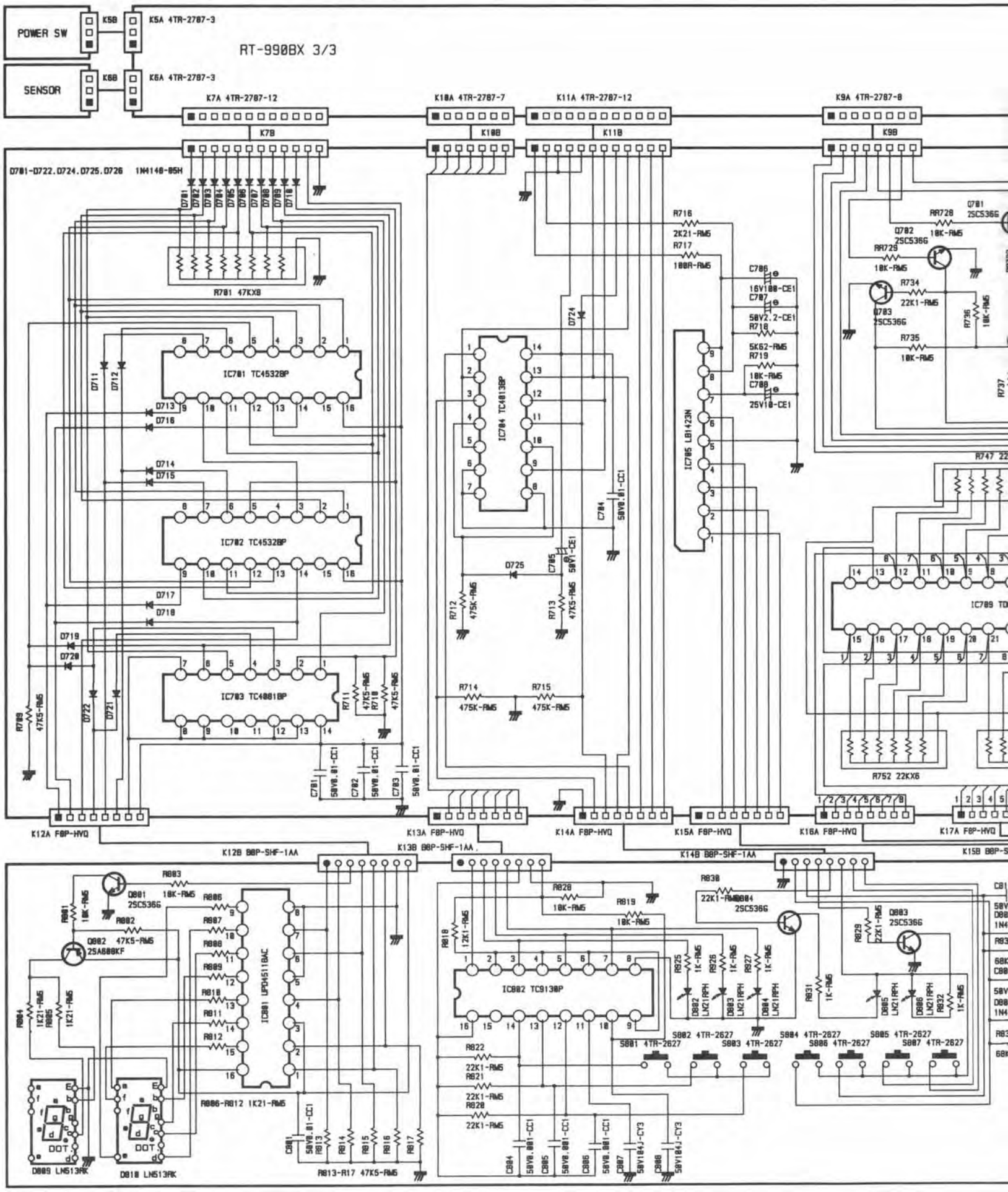
SCHEMATIC DIAGRAM RT-990BX 2/3

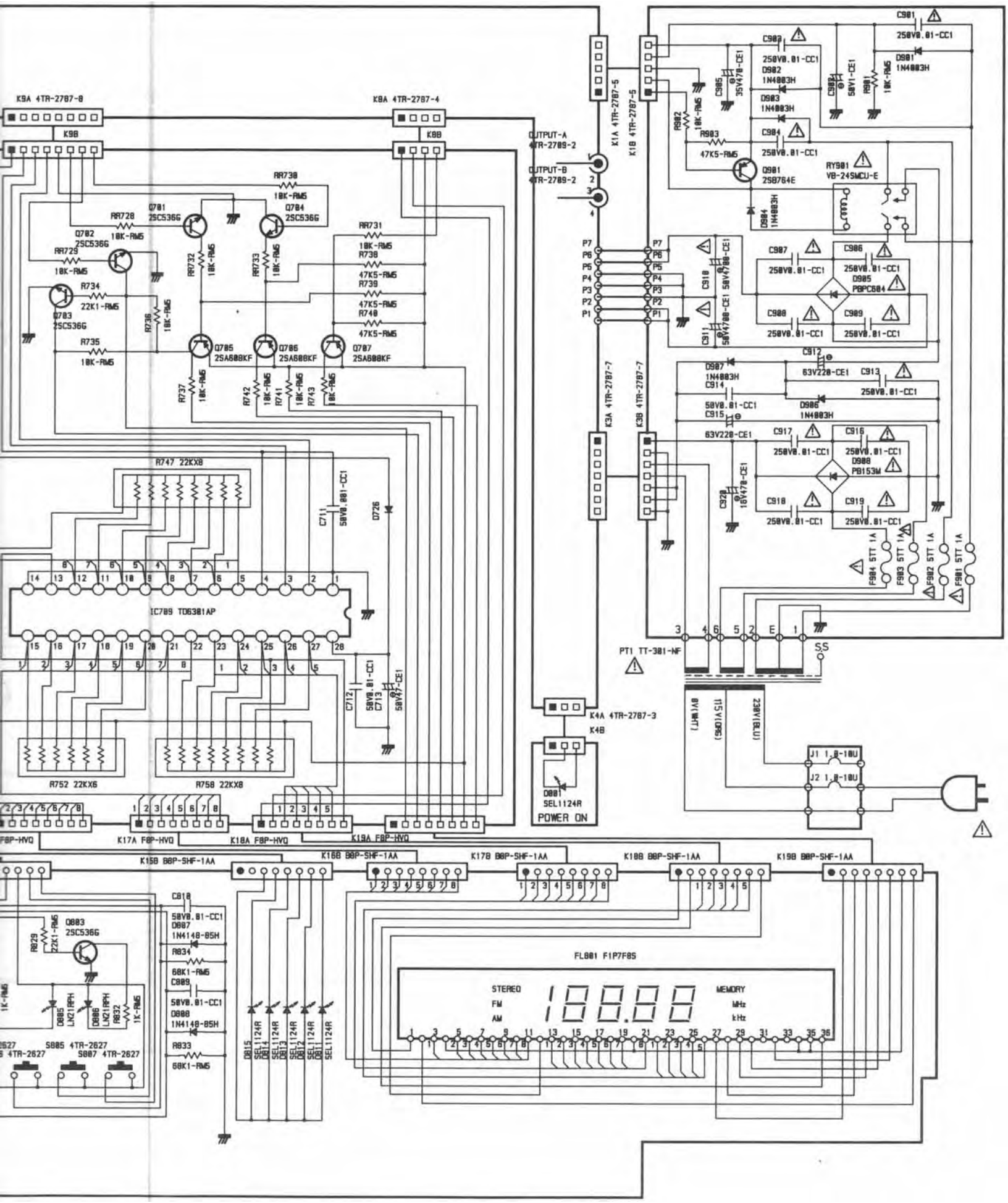



IC681 NJW78M15
IC682 NJW78M12
IC683 NJW78M15
IC684 NJW79M12
IC685 NJW78M05
Q684 2SB631KE
Q683 2SC536G
Q685 2SA608KF
Q686 2SD608KE
Q612 2SC3399
Q613 2SA608KF
Q614 2SB764E
Q615 2SC536G
Q616 2SC536G
Q617 2SB764E
Q618 2SA608KF
Q619 2SC536G
Q620 2SA1345
Q621 2SC3399
Q622 2SC536G
Q623 2SC3399
Q428 2SC536G
Q421 2SA608KF
IC482 NE5532AN
IC484 NE5534AN
IC485 NE5534AN
IC486 NE5534AN
L483 TRL-312
RY481 RY-12W-DH-KJ
RY601 RY-12W-DH-KJ
D614 1N4003V
K1A 4TR-2787-5
K2A
K3A 4TR-2787-7
K4A 4TR-2787-3
K0A 4TR-2787-4
OUTPUT-A 4TR-2789-2
OUTPUT-B 4TR-2789-2
TP5 P1001

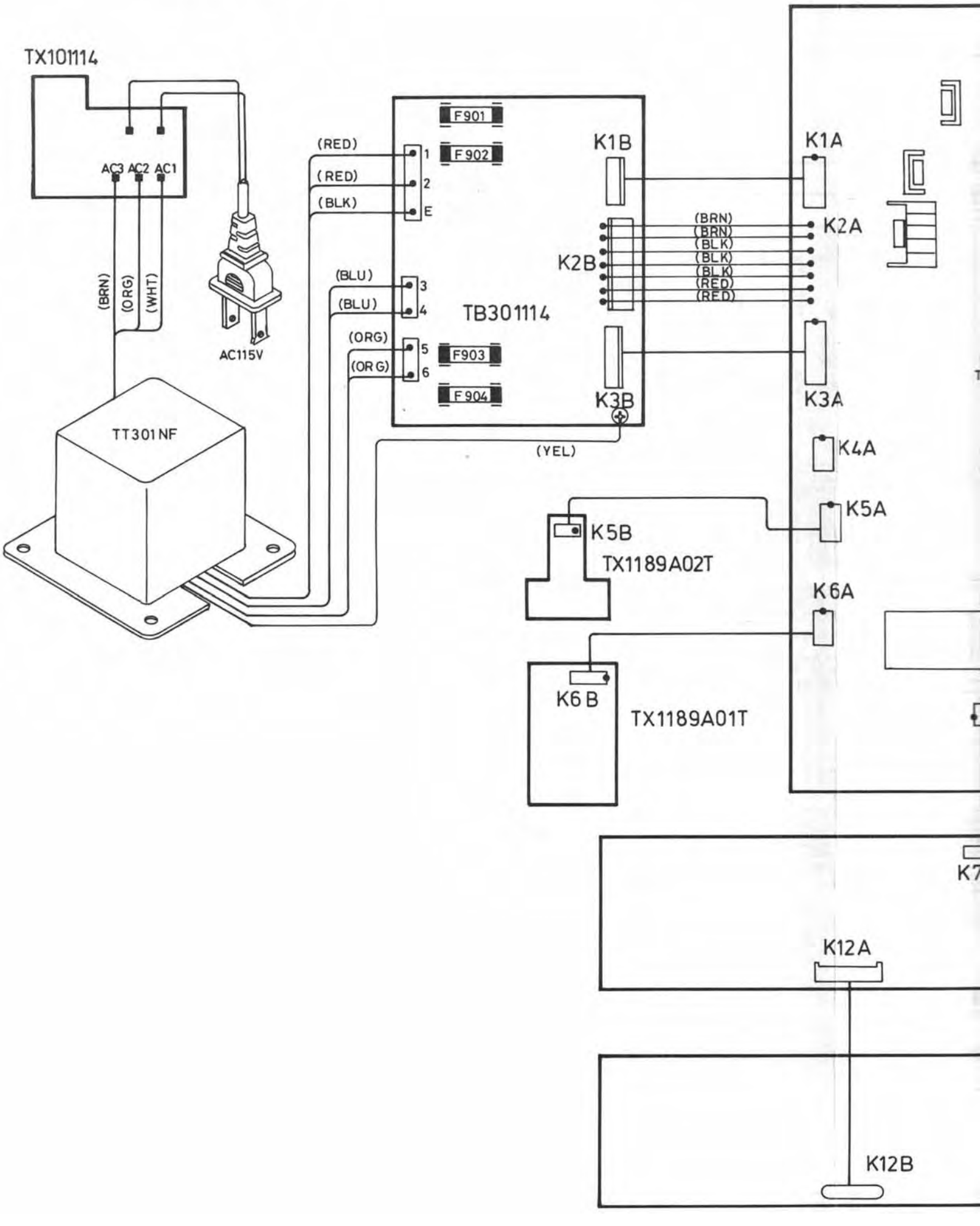
Schematic Diagram

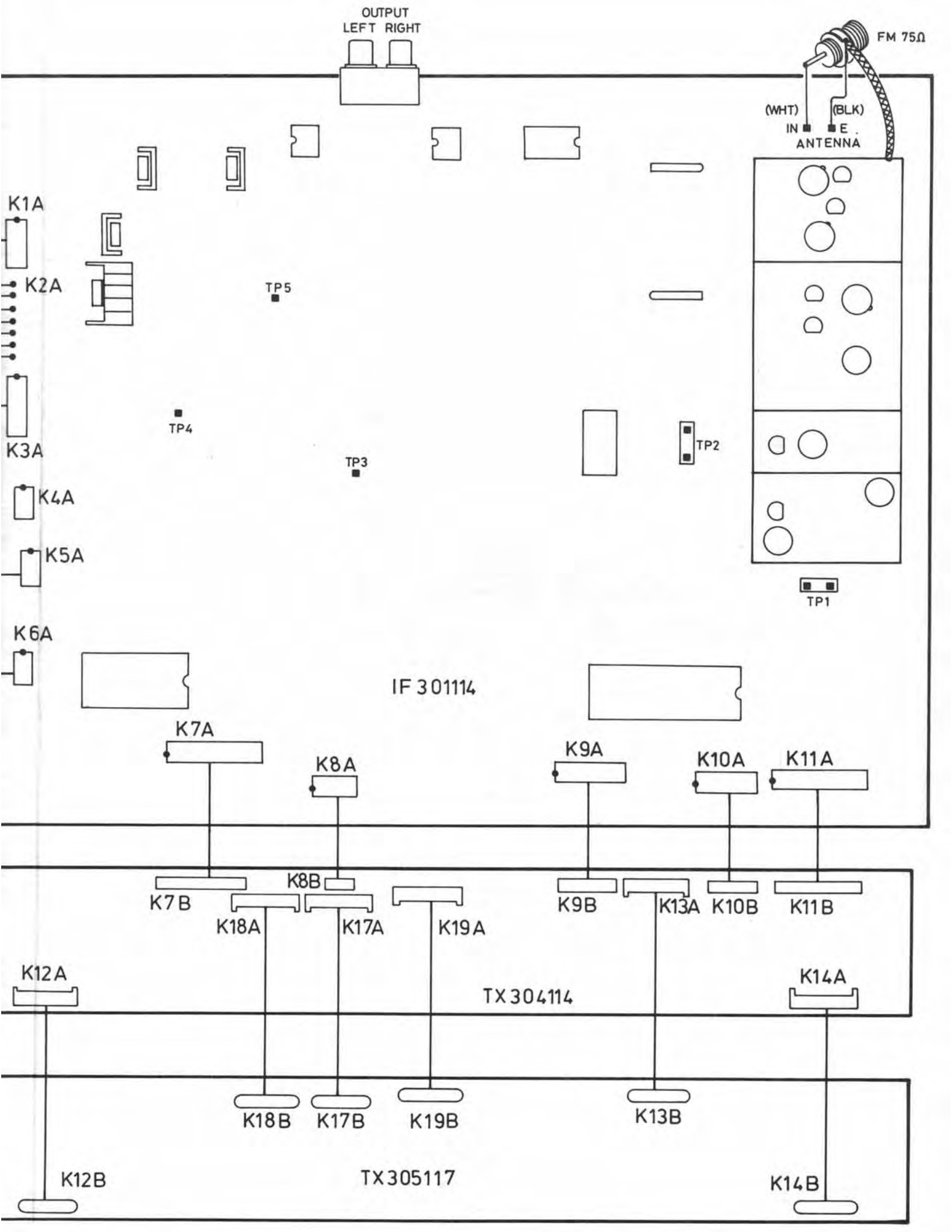
SCHEMATIC DIAGRAM RT-990BX 3/3




K9A 4TR-2787-8
K9B
K8A 4TR-2787-4
K8B
OUTPUT-A 4TR-2789-2
OUTPUT-B 4TR-2789-2
K1A 4TR-2787-5
K1B 4TR-2787-5
K3A 4TR-2787-7
K3B 4TR-2787-7
K4A 4TR-2787-3
K4B
Q781 2SC536G
Q782 2SC536G
Q783 2SC536G
Q784 2SC536G
Q785 2SA608KF
Q786 2SA608KF
Q787 2SA608KF
Q981 2SB764E
RY981 VB-245MCU-E
D981 1N4003H
D982 1N4003H
D983 1N4003H
D984 1N4003H
D985 PBPC604
D986 1N4003H
D987 1N4003H
D988 PB153M
D989 SEL1124R
POWER ON
IC789 TD6381AP
R747 22KX8
R752 22KX6
R758 22KX8
PT1 TT-381-NF
K15B B8P-SHF-1AA
K16B B8P-SHF-1AA
K17B B8P-SHF-1AA
K18B B8P-SHF-1AA
K19B B8P-SHF-1AA
K17A F8P-HVQ
K18A F8P-HVQ
K19A F8P-HVQ
J1 1.8-18U
J2 1.8-18U
FL881 F1P7F8S
STEREO
FM
AM
MEMORY
MHz
kHz
188.88

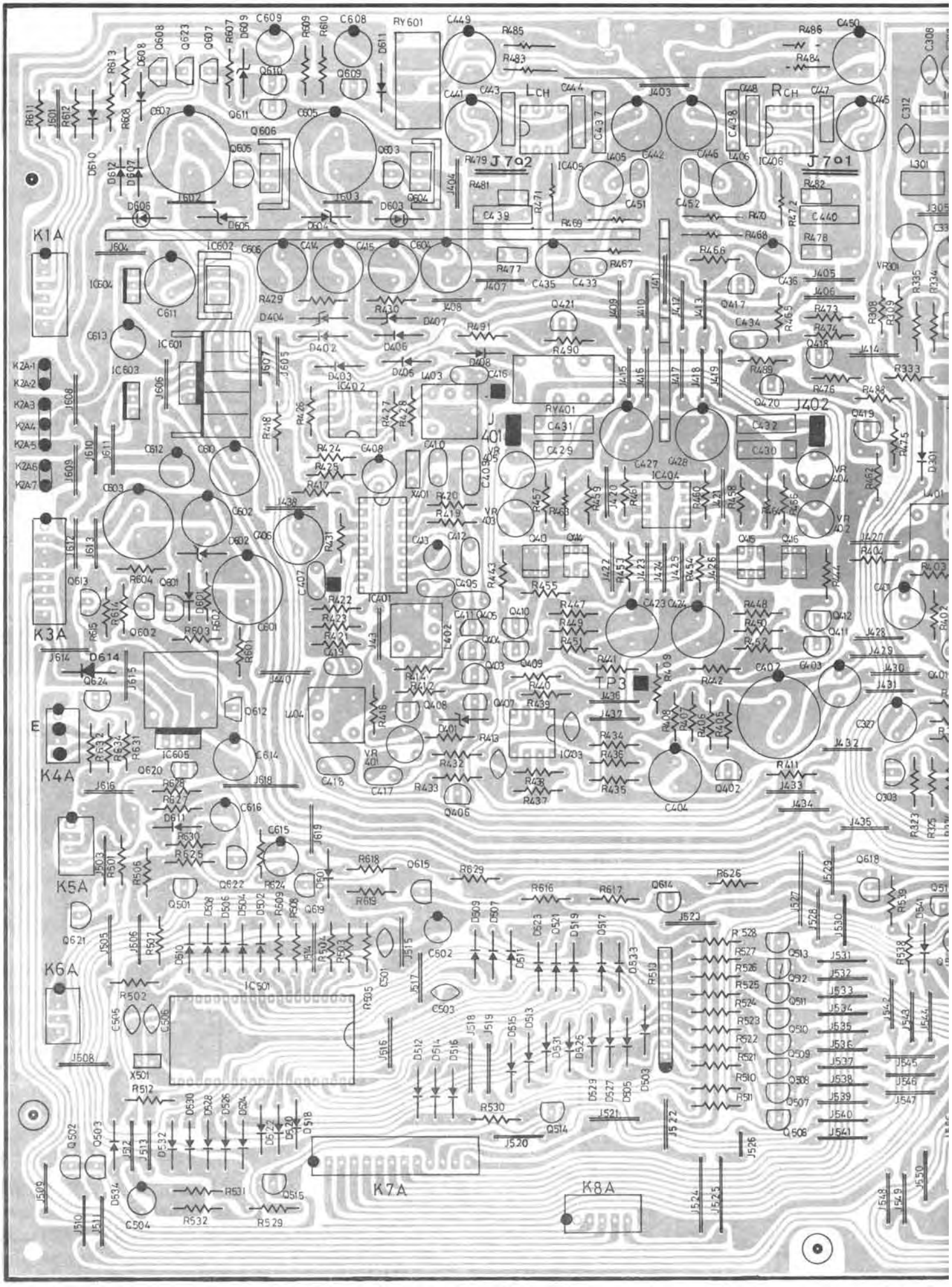
Wiring Diagram




OUTPUT
LEFT RIGHT
FM 75Ω
(WHT)
(BLK)
IN
E
ANTENNA
K1A
K2A
TP5
TP4
K3A
TP3
TP2
K4A
K5A
TP1
K6A
IF 301114
K7A
K8A
K9A
K10A
K11A
K8B
K7B
K18A
K17A
K19A
K9B
K13A
K10B
K11B
K12A
TX304114
K14A
K18B
K17B
K19B
K13B
K12B
TX305117
K14B

Printed Circuit Boards

IF 301114



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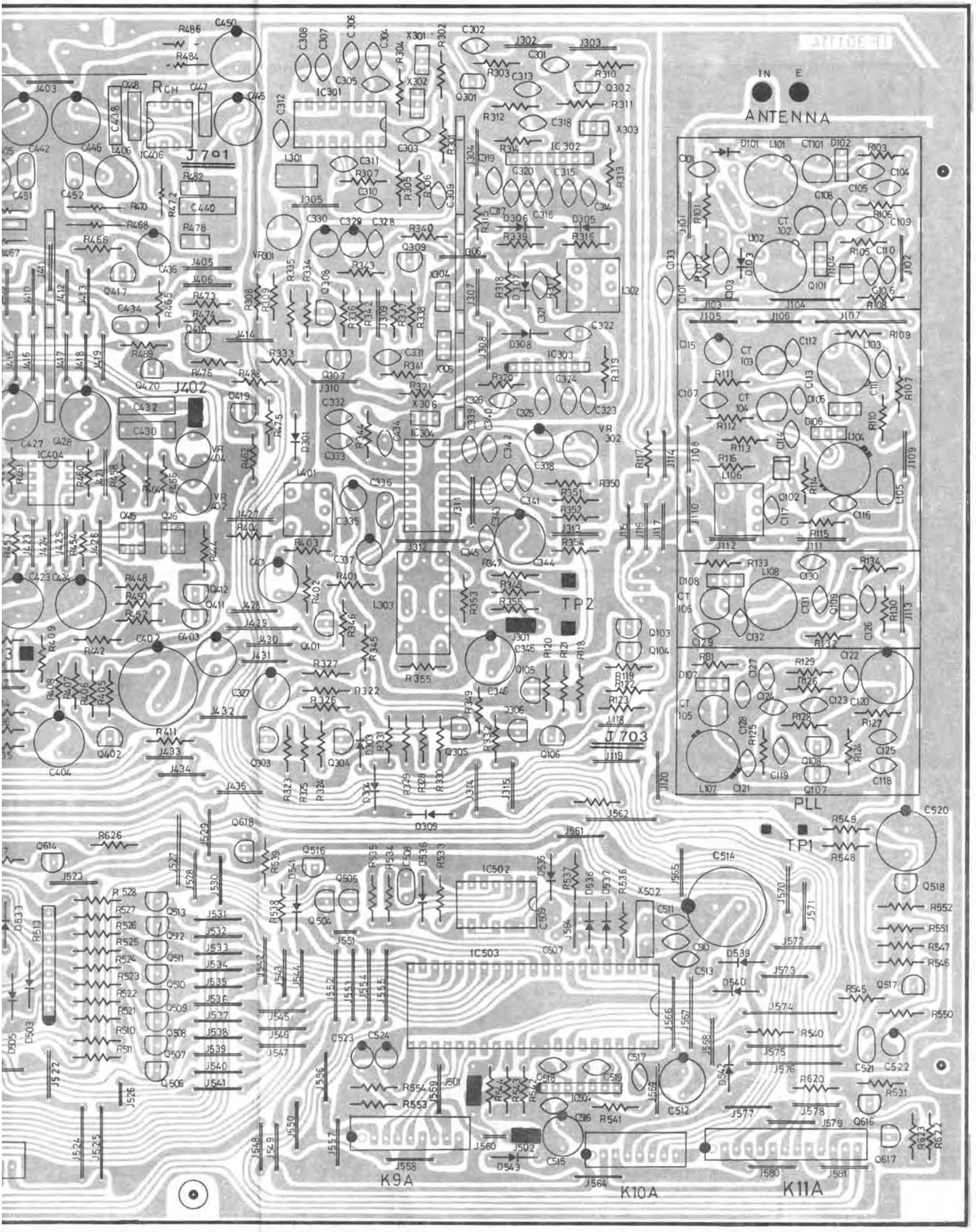
ANTENNA
IN
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PLL
TP1
TP2
J701
J402
J703
K9A
K10A
K11A
IC301
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IC303
IC304
IC404
IC502
IC503
L301
L302
L303
L401
X301
X302
X303
X305
X306
VR301
VR302
VR402
VR404
D101
L101
CT101
D102
Q101
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Printed Circuit Boards

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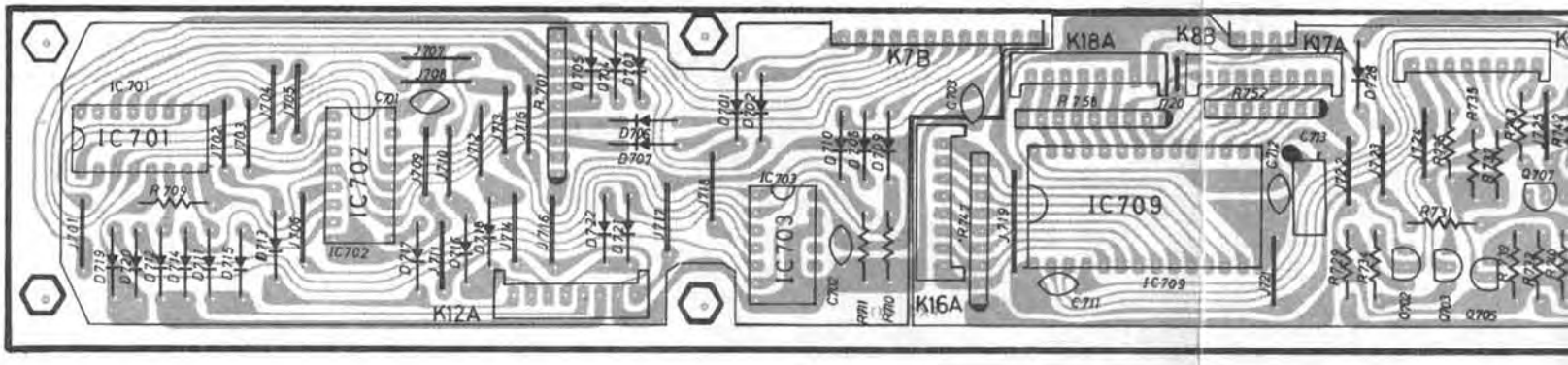

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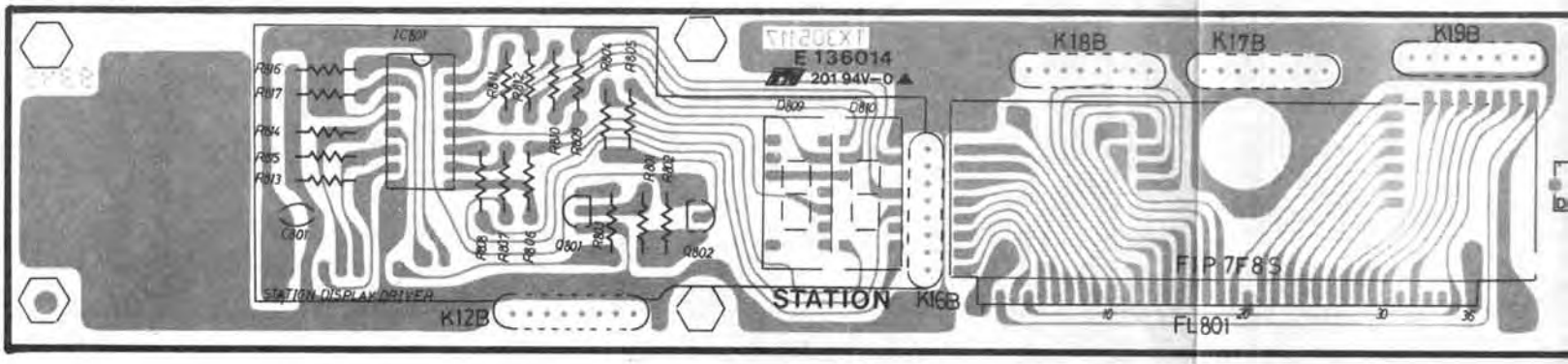

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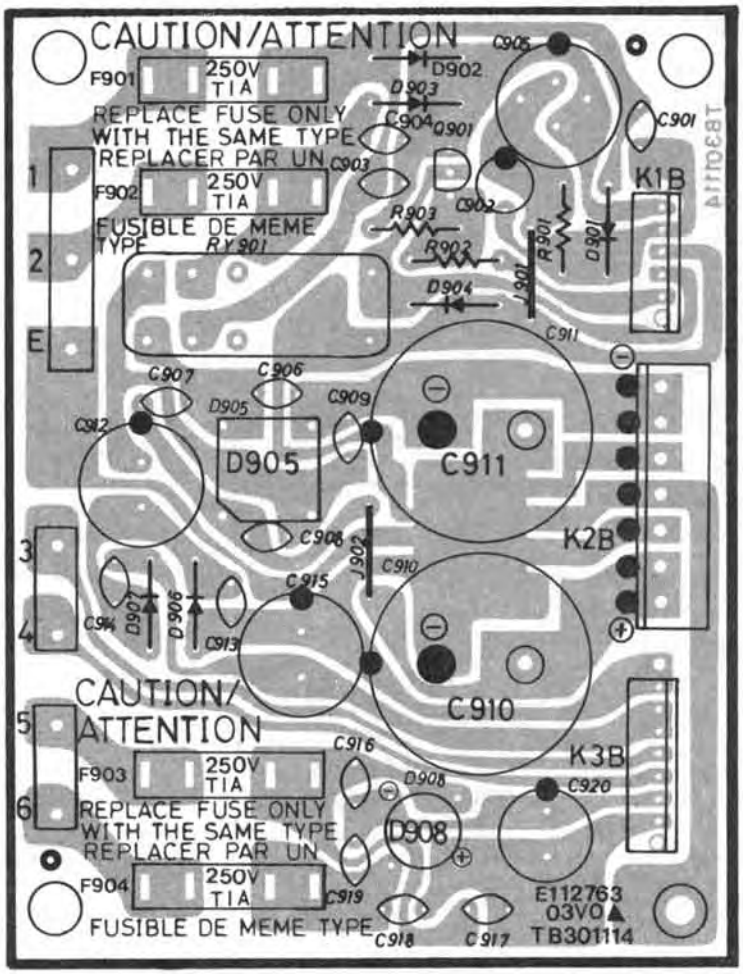

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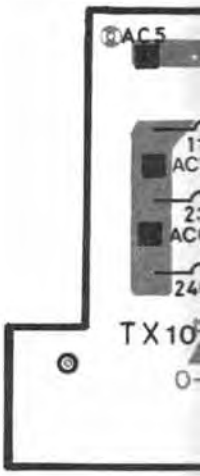

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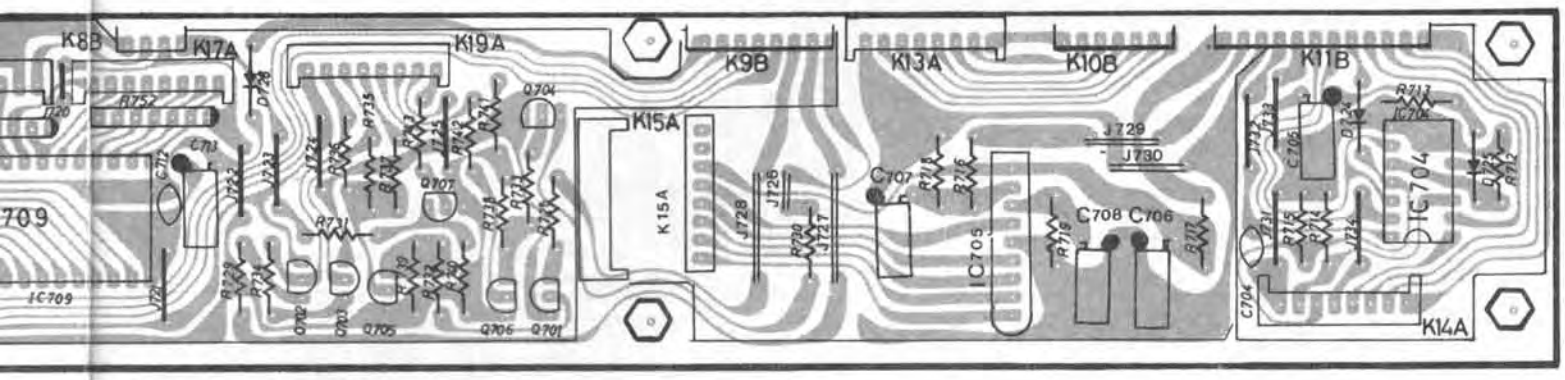

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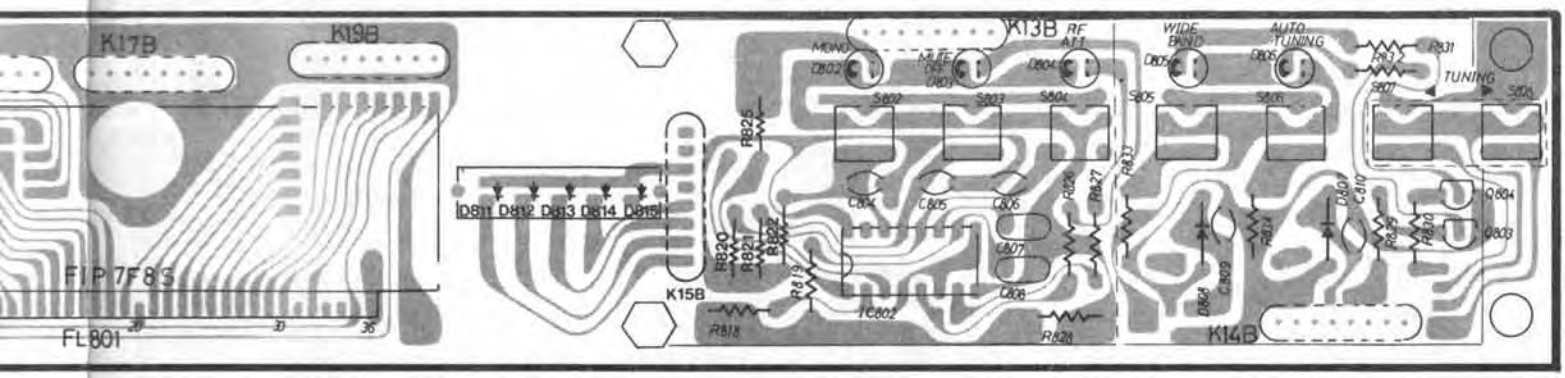

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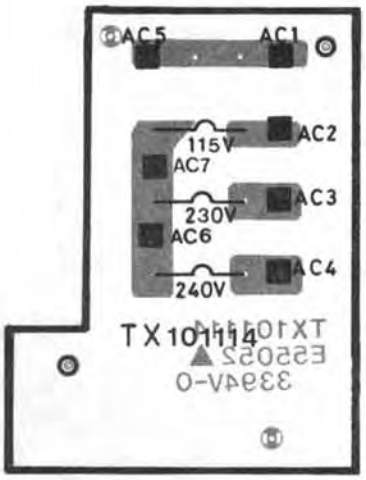
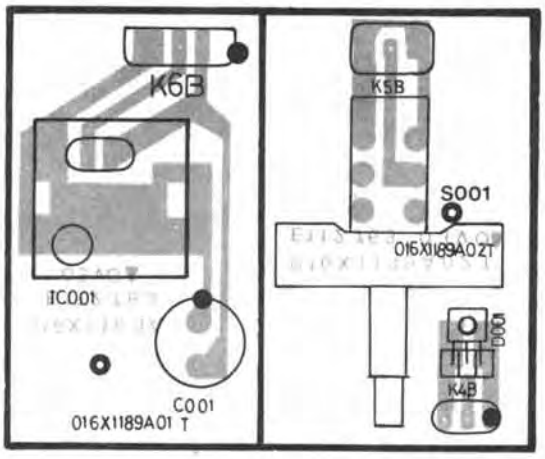
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