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ROTEL hifi

AM / FM STEREO TUNER PREAMPLIFIER

RTC-950AX

TECHNICAL MANUAL

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THE ROTEL CO., LTD.
1-36-8, OHOKAYAMA, MEGURO-KU, TOKYO 152, JAPAN
ROTEL ELECTRONICS CO., LTD.
3F-2, NO.35, FU HSING NORTH ROAD, TAIPEI, TAIWAN, REPUBLIC OF CHINA

MN20002012

Specifications RTC-950AX

PREAMPLIFIER SECTION

Total Harmonic Distortion.....No more than 0.004%
(20 to 20,000Hz from CD/AUX) (Rated output)
Intermodulation Distortion.....No more than 0.004%
(60 Hz: 7 kHz = 4:1) (Rated output)
Output Sensitivity/ Impedance.....1.0 V/ 100 ohms
Input Sensitivity / Impedance:
PHONO.....2.5 mV/ 47 kohms
CD, AUX, TAPE 1,2.....150 mV/ 20 kohms
Overload Level (THD 0.5 %, 1 kHz):
PHONO.....180 mV
CD, AUX, TAPE 1,2.....5 V
Frequency Respons:
PHONO.....20 to 20,000 Hz, +/– 0.2 dB (RIAA STD)
CD, AUX, TAPE 1,2.....4 to 100,000 Hz, +0 dB,–3.0 dB
Tone Control:
BASS..... +/– 6.0 dB (100 Hz)
TREBLE..... +/– 6.0 dB (10 kHz)
Signal-to-Noise Ratio (IHF, A netwrok):
PHONO.....80 dB
CD, AUX, TAPE 1,2.....100 dB

FM TUNER SECTION

Udsble Sensitivity.....10.8 dBf/ 0.95 uV (75 ohms)
50 dB Quieting Sensitivity:
Mono.....14.8 dBf/ 1.5 uV (75 ohms)
Stereo.....37.2 dBf/ 20 uV (75 ohms)
Signal-to-Noise Ration (at 65 dBf):
Mono.....80 dB
Stereo.....75 dB
Harmonic Distortion (at 65 dBf):
1 kHz.....0.07 % (mono), 0.25 % (stereo)
Frequency Response.....30 to 15,000 Hz, +/– 1.0 dB
Capture Ratio.....1.0 dB
Alternate Channel Selectivity:
(+/– 400 kHz).....70 dB
Spurious Response Ratio...100 dB
Image Response Ratio.....70 dB
IF Response Ratio.....85 dB
AM Suppression Ratio.....58 dB
Stereo Separation:
100 Hz/1 kHz/10 kHz.....42 dB/ 48 dB/ 35 dB
Subcarrier Product Ratio...60 dB
Antenna Input.....75 ohms unbalanced

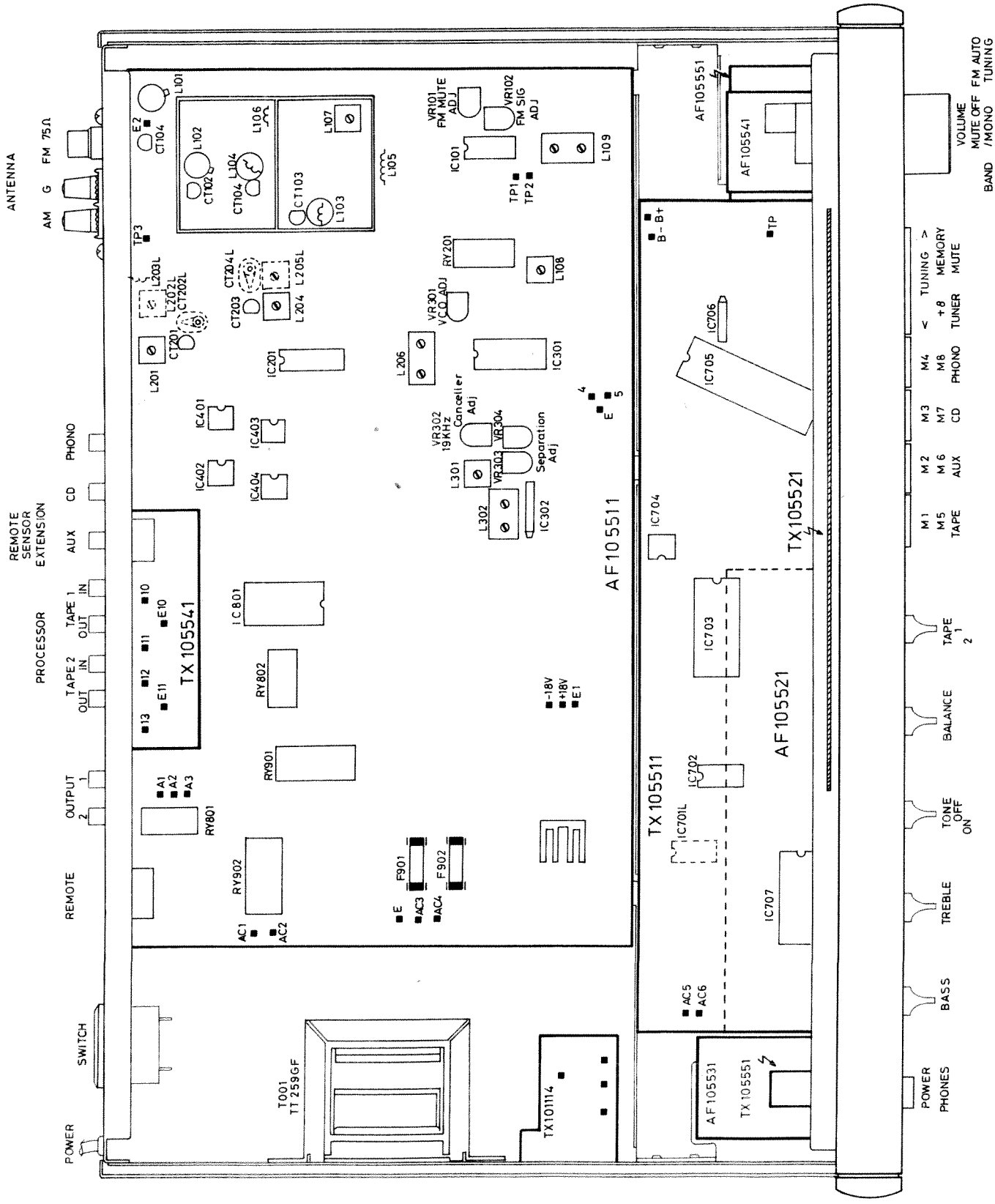
AM TUNER SECTION	**MW**	**LW**
Sensistivity	350 uV/ m	750 uV/ m
Selectivity	30 dB	30 dB
Signal-to-Noise Ratio	55 dB	55 dB
Image Response Ratio	40 dB	40 dB
IF Response Ratio	40 dB	40 dB
Antenna	Loop Antenna	

MISCELLANEOUS

Power Requitement .....120 V/ 60 Hz, 220 V/ 50 Hz, 240 V/ 50 Hz (depending on destinations)
Power Consumption.....20 watts
Dimensions (overall).....440 (W) x 92 (H) x 340 (D) mm
17-3/8" x 3-5/8" x 13-3/8"
Weight (net).....5.5 kg/ 12.10 lbs.

- Specifications and design subject to possible modification without notice.

Chassis Layout



FM IF and RF Alignment

Instruments: FM Signal Generator (400Hz,100% Modulated), THD Analyzer, Oscilloscope, AC VTVM, DC Voltmeter, Tuning Meter.
Terminated : DC Voltmeter---Between TP3 and Earth on AF-105511 P.C.B.
Tuning Meter---Between TP1 and TP2 on AF-105511 P.C.B.

Step	Generator		Tuning Dial Setting	Adjust	Adjust for
	Coupling	Frequency			
1	No use		87.5 MHz	L103	3V reading on DC Voltmeter
2			108 MHz	CT103	22V reading on DC Voltmeter
3	Repeat steps 1 and 2 unit no further improvement is noticed.				
4	Antenna terminal	90 MHz	90 MHz	L101,102 L104	Maximum reading on AC VTVM.
5		105 MHz	105MHz	CT101 CT102 CT104	Maximum reading on AC VTVM.
6	Repeat steps 4,5 and 6 unit no further improvement is noticed. (Muting OFF)				
7	Antenna terminal 1mV input	90 MHz	90 MHz	L109(A)	Adjust center on Tuning Meter
8				L109(B)	Minimum reading on THD Analyzer
9	Repeat steps 7 and 8 unit no further improvement is noticed (Muting OFF)				
10	Antenna terminal 15uV input Europe:7V	90 MHZ	90 MHz	VR101	Muting Level (Muting ON)
11	Antenna terminal 1mV input	90 MHz	90 MHz	VR102	Signal Indicator Level 5th LED light On

MW IF and RF Alignment

Instruments: AM Signal Generator (400Hz,30% Modulated), AC VTVM, Oscilloscope, DC Voltmeter.
Terminated : DC Voltmeter---Between TP3 and Earth on AF-105511 P.C.B.

Step	Generator		Tuning Dial Setting	Adjust	Adjust for
	Coupling	Frequency			
1	No use		530 kHz (531 kHz) Europe	L204	About 1.2V+/-0.1V on DC Voltmeter
2			1600 kHz (1602 kHz) Europe	CT203	About 9V+/-0.2V on DC Voltmeter
3	Repeat steps 1 and 2 unit no further improvement is noticed.				
4	Test loop radiate signal into loop antenna	450 kHz	530 kHZ	L206	Maximum reading on AC VTVM.
5		600 kHz	600 kHz	L201	
6		1400 kHz	1400 kHz	CT201	
7	Repeat steps 4 to 6 unit no further improvement is noticed.				

LW RF Alignment

Instruments: AM Signal Generator (400Hz,30% Modulated), AC VTVM, Oscilloscope, DC Voltmeter.
Terminated : DC Voltmeter---Between TP3 and Earth on IF-105511 P.C.B.

Step	Generator		Tuning Dial Setting	Adjust	Adjust for
	Coupling	Frequency			
1	NO use		153 kHz	L205L	About 2.5V+/-0.1V on DC Voltmeter
2			281 kHz	CT204L	About 7.5V+/-0.1V on DC Voltmeter
3	Repeat steps 1 and 2 unit no further improvement is noticed.				
4	Test loop radiate signal into loop antenna	160 kHz	160 kHZ	L202L	Maximum reading on AC VTVM.
5		250 kHz	250 kHz	CT202L	
6	Repeat steps 4 to 5 unit no further improvement is noticed.				

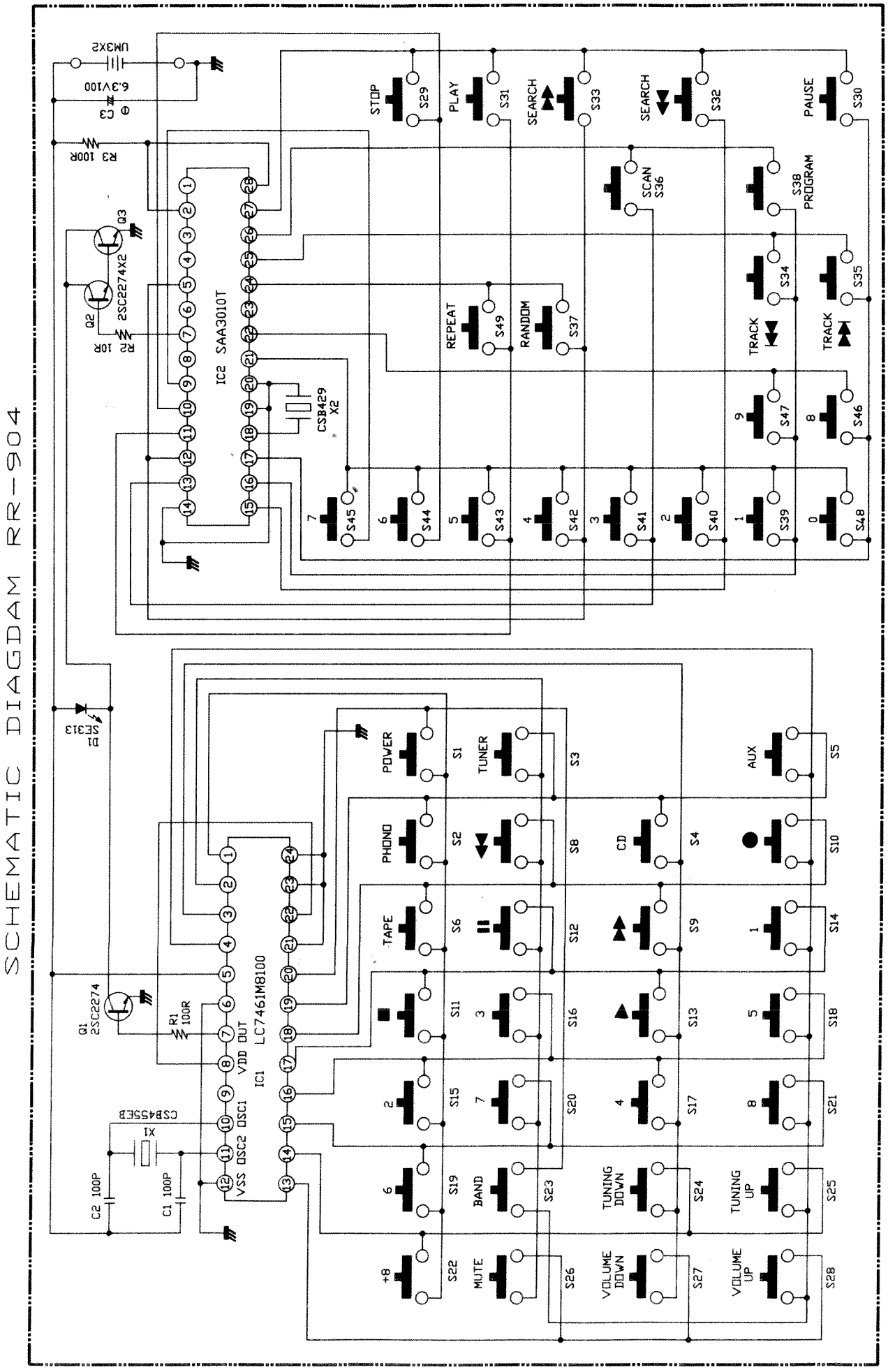
FM MPX Alignment

Instruments: FM Stereo Generator, AC VTVM, Oscilloscope, Frequency Countor, and THD Analyzer.

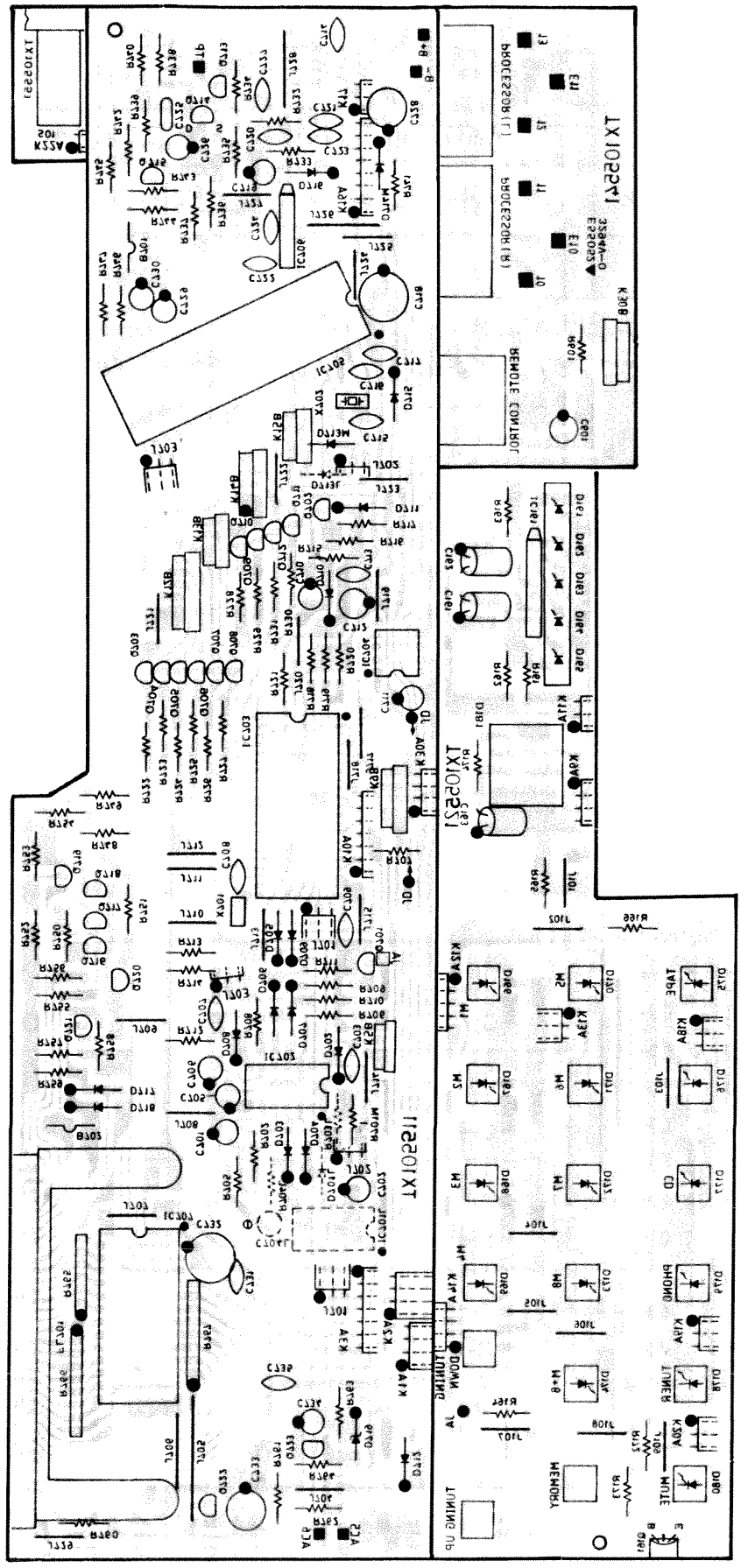
Step	Generator		Tuning Dial Setting	Adjust	Adjust for
	Coupling	Frequency			
1	No use		98 MHz	VR301	VCO 76KHz +/- 100Hz (Muting ON) TP4 Thru 220 kohms resistor
2	Antenna terminal 1mV input	98 MHZ Pilot--10% 1 kHz--90% Mod.	98 MHz	L107 VR302	Pilot Cancle 19 KHz Minimum Dist.
3	Antenna terminal 1mV input	98 MHZ Pilot--10% 1 kHz--90% Mod.	98 MHz	VR103 VR104	Best separation
4	Repeat steps 2 and 3 unit no further improvement is noticed. Check the stereo indicator can be operated normally when pilot signal is reduce from 10% to 5%.				

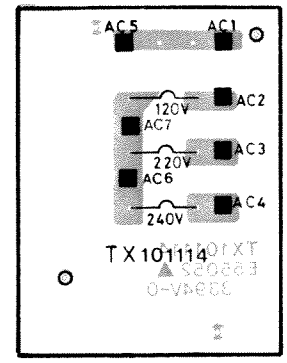
Schematic Diagram

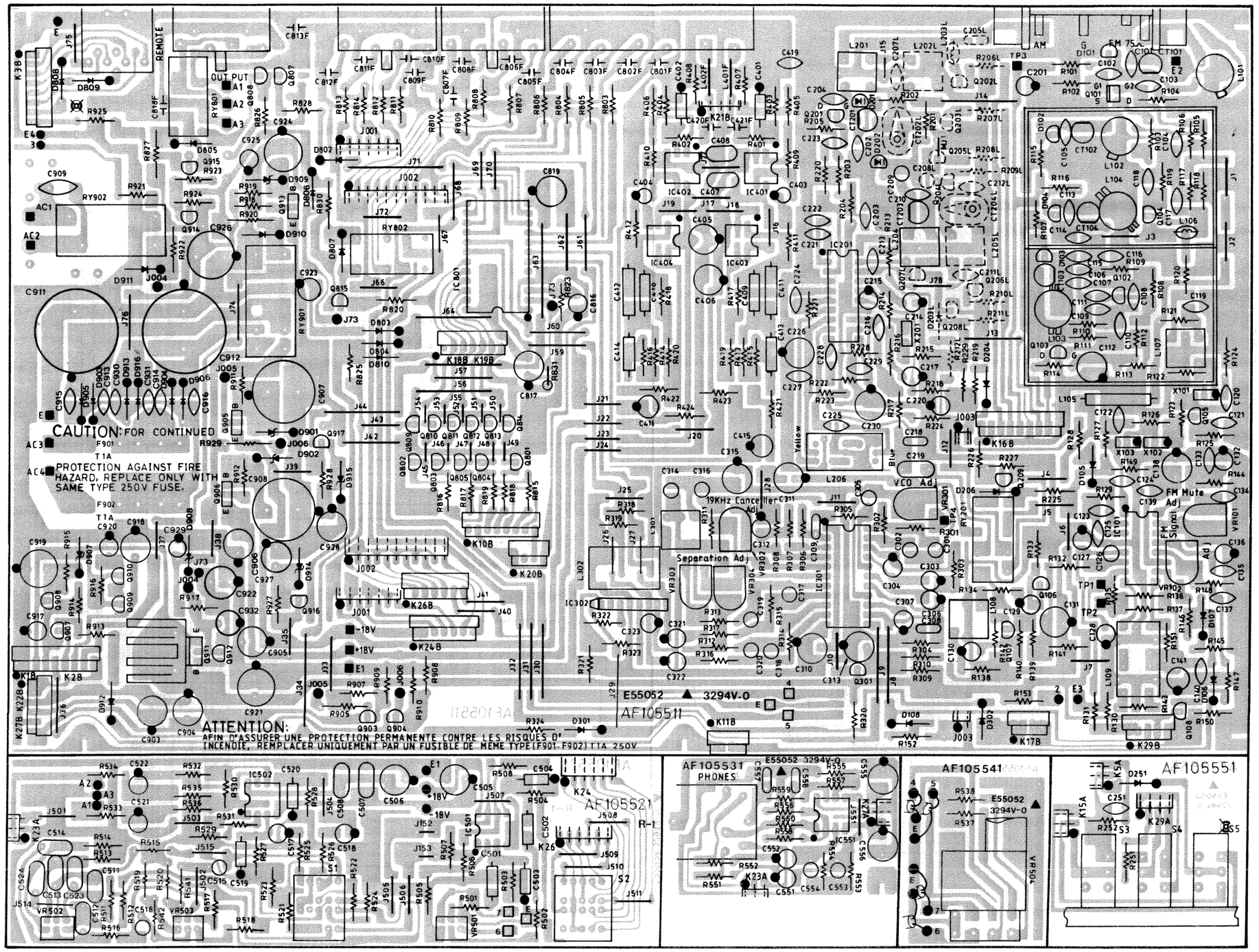
REMOTE CONTROL HANDSET



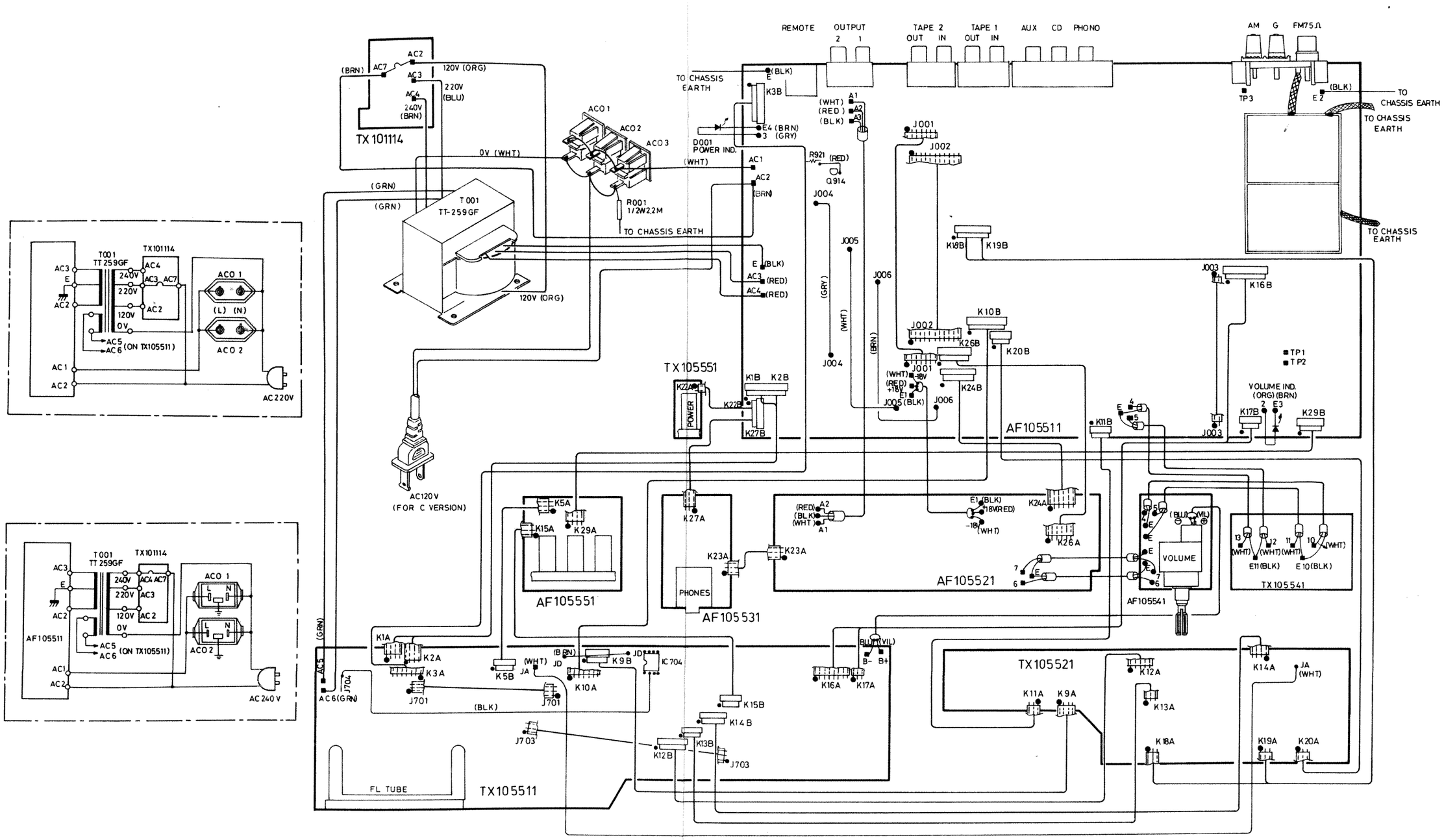
Printed Circuit Boards



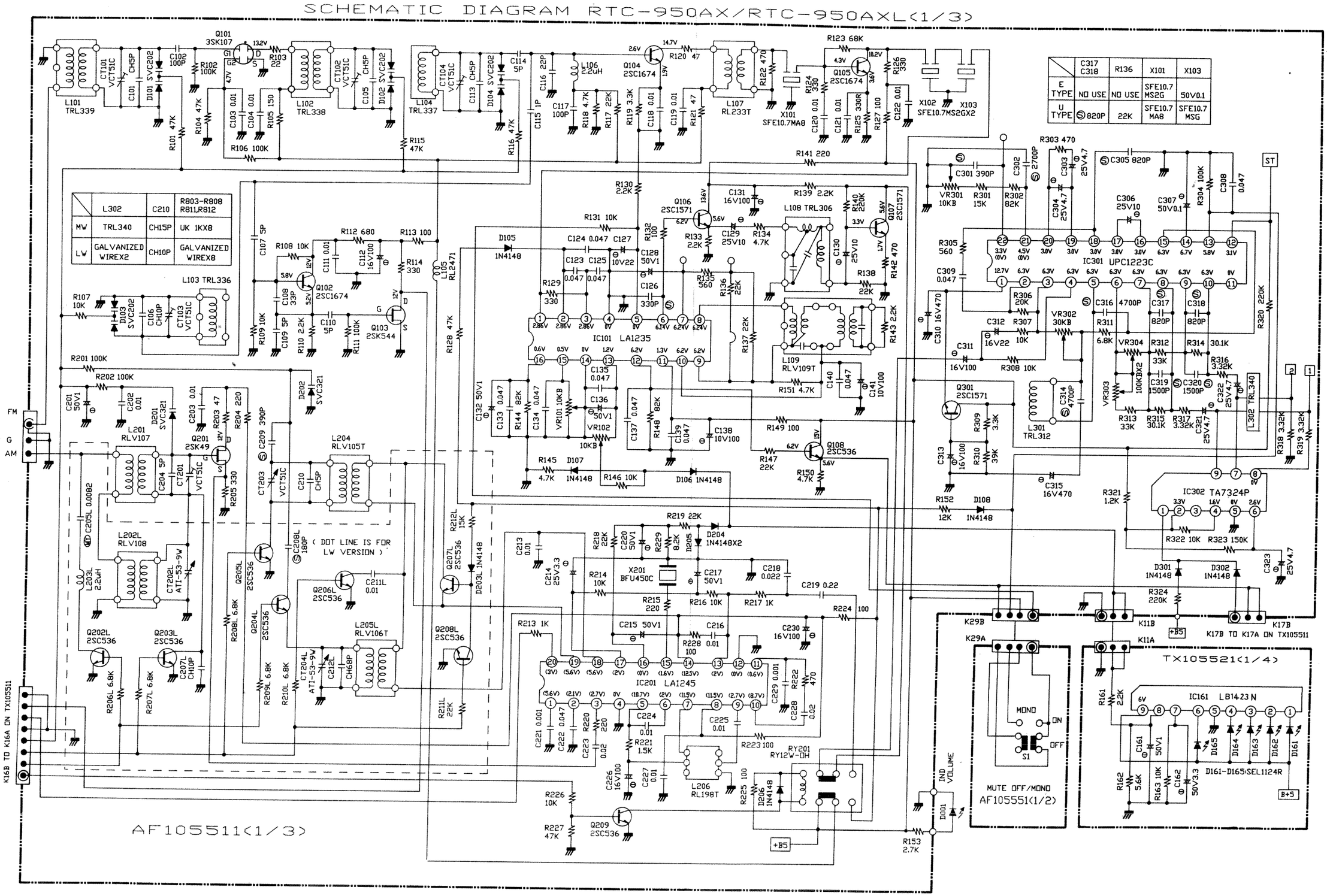



CAUTION: FOR CONTINUED PROTECTION AGAINST FIRE HAZARD, REPLACE ONLY WITH SAME TYPE 250V FUSE.
ATTENTION: AFIN D'ASSURER UNE PROTECTION PERMANENTE CONTRE LES RISQUES D' INCENDIE, REMPLACER UNIQUEMENT PAR UN FUSIBLE DE MÊME TYPE (F901-F902) T1A 250V
REMOTE
OUT PUT
A1
A2
A3
AM
FM 75Ω
Yellow
Blue
VCO Adj
19KHz Canceller Adj
Separation Adj
FM Mute Adj
FM Signal Adj
-18V
+18V
E55052 3294V-0
AF105511
AF105521
AF105531
PHONES
AF105541
AF105551

Wiring Diagram



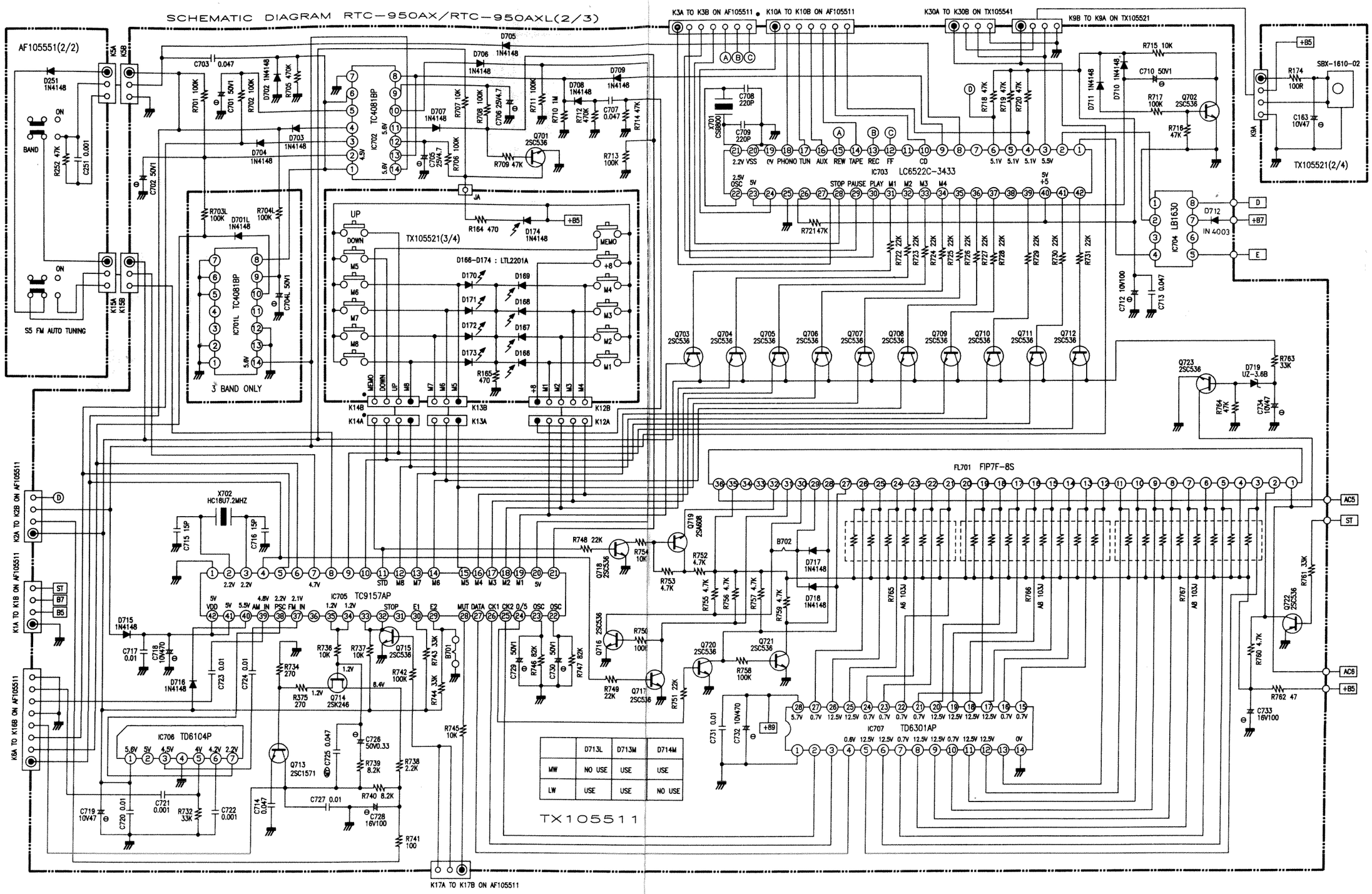
Schematic Diagram



	L302	C210	R803-R808 R811,R812
MW	TRL340	CH15P	UK 1KX8
LW	GALVANIZED WIREX2	CH10P	GALVANIZED WIREX8

	C317 C318	R136	X101	X103
E TYPE	NO USE	NO USE	SFE10.7 MS2G	50V0.1
U TYPE	Ⓢ820P	22K	SFE10.7 MA8	SFE10.7 MSG

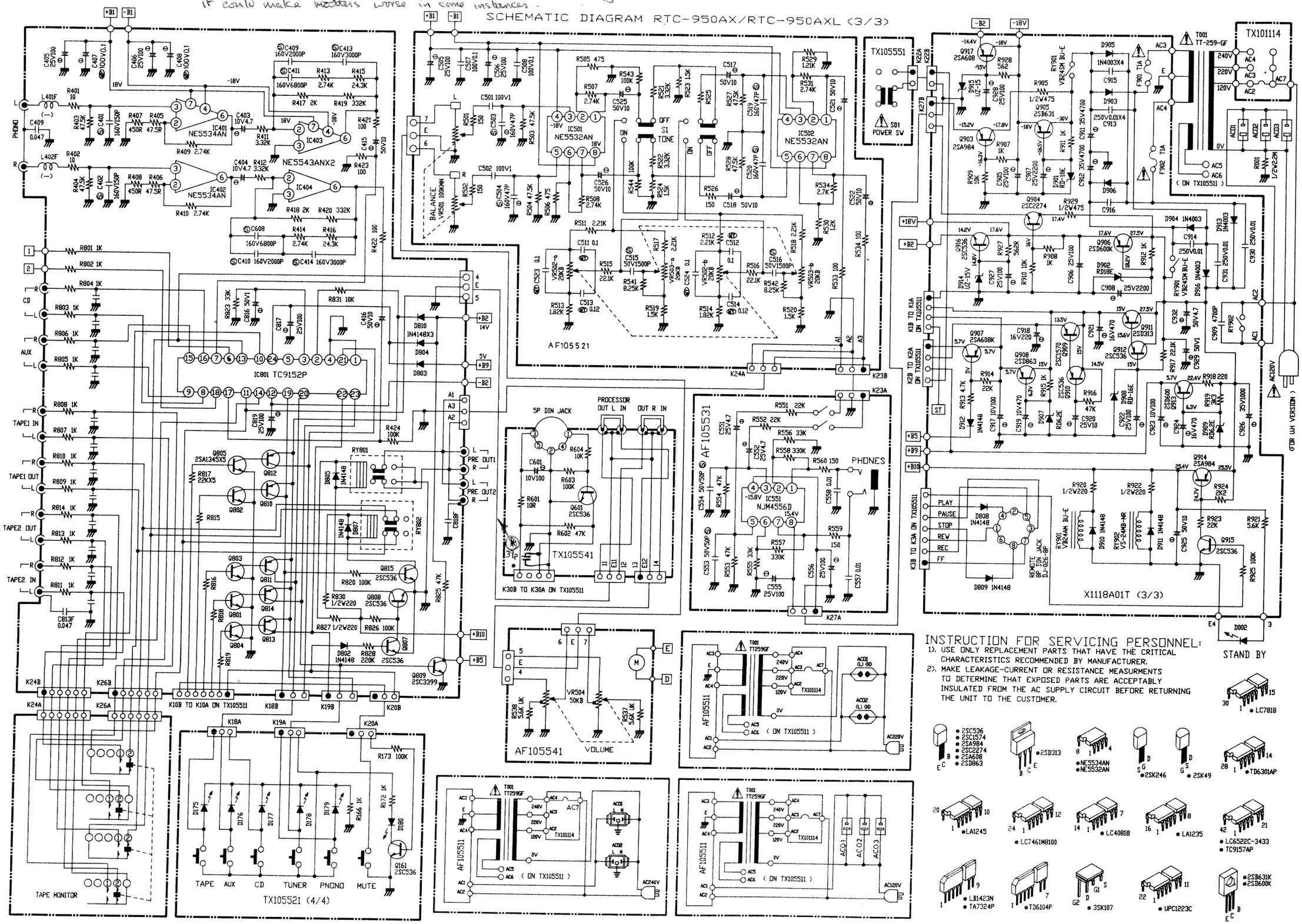
SCHEMATIC DIAGRAM RTC-950AX/RTC-950AXL(2/3)



	D713L	D713M	D714M
MW	NO USE	USE	USE
LW	USE	USE	NO USE

(*) Processor worse on quite few carriers. when using Remote control. fit a 39pf across Q601 E/collector - higher values should not be used due to data rounding. Note this mod depends of "Vintage" as it could make matters worse in some instances.

SCHEMATIC DIAGRAM RTC-950AX/RTC-950AXL (3/3)



INSTRUCTION FOR SERVICING PERSONNEL:

1). USE ONLY REPLACEMENT PARTS THAT HAVE THE CRITICAL CHARACTERISTICS RECOMMENDED BY MANUFACTURER.

2). MAKE LEAKAGE-CURRENT OR RESISTANCE MEASURMENTS TO DETERMINE THAT EXPOSED PARTS ARE ACCEPTABLY INSULATED FROM THE AC SUPPLY CIRCUIT BEFORE RETURNING THE UNIT TO THE CUSTOMER.

Parts List

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

SYMBOL	PARTS NO.	DESCRIPTION
	AF105511	P.C.B. ASSEMBLY
R101	RD54702824	R,CARBON 47K 1/4W J
R102	RD51003820	R,CARBON 100K 1/4W J
R103	RD22209828	R,CARBON 22 1/4W J
R104	RD54702824	R,CARBON 47K 1/4W J
R105	RD21500825	R,CARBON 150 1/4W J
R106	RD51003820	R,CARBON 100K 1/4W J
R107-109	RD51002827	R,CARBON 10K 1/4W J
R110	RD52201820	R,CARBON 2.2K 1/4W J
R111	RD51003820	R,CARBON 100K 1/4W J
R112	RD21201822	R,CARBON 1.2K 1/4W J (U,C)
	RD26800823	R,CARBON 680 1/4W J (E)
R113	RD53300829	R,CARBON 330 1/4W J (U,C)
	RD51000820	R,CARBON 100 1/4W J (E)
R114	RD53300829	R,CARBON 330 1/4W J
R115,116	RD54702824	R,CARBON 47K 1/4W J
R117	RD22202822	R,CARBON 22K 1/4W J
R118	RD54701820	R,CARBON 4.7K 1/4W J
R119	RD53301822	R,CARBON 3.3K 1/4W J
R120,121	RD54709820	R,CARBON 47 1/4W J
R122	RD54700827	R,CARBON 470 1/4W J
R123	RD26802820	R,CARBON 68K 1/4W J
R124-126	RD53300829	R,CARBON 330 1/4W J
R127	RD51000820	R,CARBON 100 1/4W J
R128	RD54702824	R,CARBON 47K 1/4W J
R129	RD53300829	R,CARBON 330 1/4W J
R130	RD52201820	R,CARBON 2.2K 1/4W J
R131	RD51002827	R,CARBON 10K 1/4W J
R132	RD51000820	R,CARBON 100 1/4W J
R133	RD52201820	R,CARBON 2.2K 1/4W J
R134	RD54701820	R,CARBON 4.7K 1/4W J
R135	RD55600828	R,CARBON 560 1/4W J
R137,138	RD22202822	R,CARBON 22K 1/4W J
R139	RD52201820	R,CARBON 2.2K 1/4W J
R140	RD52203828	R,CARBON 220K 1/4W J
R141	RD52200827	R,CARBON 220 1/4W J
R142	RD54700827	R,CARBON 470 1/4W J
R143	RD52201820	R,CARBON 2.2K 1/4W J
R144	RD58202822	R,CARBON 82K 1/4W J
R145	RD54701820	R,CARBON 4.7K 1/4W J
R146	RD51002827	R,CARBON 10K 1/4W J
R147	RD52202824	R,CARBON 22K 1/4W J
R148	RD58202822	R,CARBON 82K 1/4W J
R149	RD51000820	R,CARBON 100 1/4W J
R150,151	RD54701820	R,CARBON 4.7K 1/4W J
R152	RD21201822	R,CARBON 12K 1/4W J
R153	RD22701826	R,CARBON 2.7K 1/4W J
C102	CC31011435	CAP,CERAMIC 100P 50V
C103,104	CC31009465	CAP,CERAMIC 0.01uF 50V
C105	CC15013410	CAP,CERAMIC 5P CH 50V
C106	CC11012410	CAP,CERAMIC 10P CH 50V
C107	CC05013485	CAP,CERAMIC 5P 50V
C108	CC33312438	CAP,CERAMIC 33P 50V
C109,110	CC05013485	CAP,CERAMIC 5P 50V
C111	CC31009465	CAP,CERAMIC 0.01uF 50V
C112	CE01005167	CAP,ELEC. 100uF 16V
C113	CC15013410	CAP,CERAMIC 5P CH 50V
C114	CC05013485	CAP,CERAMIC 5P 50V
C115	CC31013481	CAP,CERAMIC 1P 50V
C116	CC32212436	CAP,CERAMIC 22P 50V
C117	CC31011435	CAP,CERAMIC 100P 50V
C118-122	CC31009465	CAP,CERAMIC 0.01uF 50V
C123-125	CC05009457	CAP,CERAMIC 0.047uF 50V
C126	CS43311421	CAP,STYROL 330P J 50V
C127	CE02206107	CAP,ELEC. 22uF 10V
C128	CE01007504	CAP,ELEC. 1uF 50V
C129,130	CE01006251	CAP,ELEC. 10uF 25V
C131	CE01005167	CAP,ELEC. 100uF 16V
C132	CE01007504	CAP,ELEC. 1uF 50V

SYMBOL	PARTS NO.	DESCRIPTION
C133,135	CC05009457	CAP,CERAMIC 0.047uF 50V
C136	CE01007504	CAP,ELEC. 1uF 50V
C137	CC05009457	CAP,CERAMIC 0.047uF 50V
C138	CE01005167	CAP,ELEC. 100uF 16V
C139,140	CC05009457	CAP,CERAMIC 0.047uF 50V
C141	CE01005106	CAP,ELEC. 100uF 10V
D101-104	DD50000020	DIODE SVC202AF
D105-108	DD80000021	DIODE 1N4148
Q101	TR50000140	TRANSISTOR 3SK107-F
Q102	TR30000133	TRANSISTOR 2SC1674 (K,L)
Q103	TR50000103	TRANSISTOR 2SK544 (F)
Q104,105	TR30000133	TRANSISTOR 2SC1674 (K,L)
Q106,107	TR30000108	TRANSISTOR 2SC1571 (E,F)
Q108	TR30000327	TRANSISTOR 2SC536G
IC101	IC00001103	IC LA1235
CT101,102	CF00000159	CAP,FILM TRIMMER VCT51C
CT103	CF00000184	CAP,FILM TRIMMER VCT51A
CT104	CF00000159	CAP,FILM TRIMMER VCT51C
L101	LC23390009	FM ANT. COIL TRL-339
L102	LC23380004	FM RF COIL TRL-338
L103	LC23360005	FM OSC COIL TRL-336
L104	LC23370000	FM RF COIL TRL-337
L105	LM00000346	MICRO INDUCTOR RL-247T
L106	LM00000073	MICRO INDUCTOR 2.2uH
L107	LC02330000	FM IF COIL RL-233T
L108	LC23060009	MPX FILER TRL-306
L109	LC31090007	IF COIL RLV109T
X101	LF00000014	CERAMIC FILTER SFE10.7MA8-A (U,C)
	LF00000166	CERAMIC FILTER SFE10.7MS2GA (E)
X102	LF00000166	CERAMIC FILTER SFE10.7MS2GA
X103	LF00000166	CERAMIC FILTER SFE10.7MS2GA (U,C)
	CC31009465	CAP,CERAMIC 0.01uF 50V (E)
VR101,102	RV20000193	R,SEMI-FIXED 08-301 10KB
R201,202	RD51003820	R,CARBON 100K 1/4W J
R203	RD54709820	R,CARBON 47 1/4W J
R204	RD52200827	R,CARBON 220 1/4W J
R205	RD53300829	R,CARBON 330 1/4W J
R206L	RD56801829	R,CARBON 6.8K 1/4W J
R207L	RD56801829	R,CARBON 6.8K 1/4W J
R208L,209L	RD56801829	R,CARBON 6.8K 1/4W J
R210L	RD56801829	R,CARBON 6.8K 1/4W J
R211L	RD52202824	R,CARBON 22K 1/4W J
R212L	RD21502822	R,CARBON 15K 1/4W J
R213	RD51001823	R,CARBON 1K 1/4W J
R214	RD51002827	R,CARBON 10K 1/4W J
R215	RD52200827	R,CARBON 220 1/4W J
R216	RD51002827	R,CARBON 10K 1/4W J
R217	RD51001823	R,CARBON 1K 1/4W J
R218,219	RD52202824	R,CARBON 22K 1/4W J
R220	RD52200827	R,CARBON 220 1/4W J
R221	RD21501829	R,CARBON 1.5K 1/4W J
R222	RD54700827	R,CARBON 470 1/4W J
R223-225	RD51000820	R,CARBON 100 1/4W J
R226	RD51002827	R,CARBON 10K 1/4W J
R227	RD54702824	R,CARBON 47K 1/4W J
R228	RD51000820	R,CARBON 100 1/4W J
R229	RD28201827	R,CARBON 8.2K 1/4W J
C201	CE01007504	CAP,ELEC. 1uF 50V
C202,203	CC31009465	CAP,CERAMIC 0.01uF 50V
C204	CC05013485	CAP,CERAMIC 5P 50V
C205L	CM08210426	CAP,MYLAR 822 J 50V
C207L	CC11012410	CAP,CERAMIC 10P CH 50V
C208L	CS41811426	CAP,STYROL 180P 50V
C209	CS43911424	CAP,STYROL 390P 50V
C210	CC11512418	CAP,CERAMIC 15P CH 50V (2 BAND)

SYMBOL	PARTS NO.	DESCRIPTION
	CC11012410	CAP,CERAMIC 10P CH 50V (3 BAND)
C211L	CC31009465	CAP,CERAMIC 0.01uF 50V
C212L	CC16812416	CAP,CERAMIC 68P CH 50V
C213	CC31009465	CAP,CERAMIC 0.01uF 50V
C214	CE03307254	CAP,ELEC. 3.3uF 25V
C215	CE01007504	CAP,ELEC. 1uF 50V
C216	CC31009465	CAP,CERAMIC 0.01uF 50V
C217	CE01007504	CAP,ELEC. 1uF 50V
C218	CM02209426	CAP,MYLAR 223 J 50V
C219	CM02208434	CAP,MYLAR 224 K 50V
C220	CE01007504	CAP,ELEC. 1uF 50V
C221	CC31010431	CAP,CERAMIC 0.001uF 50V
C222	CC05009457	CAP,CERAMIC 0.047uF 50V
C223	CC02009458	CAP,CERAMIC 0.02uF 50V
C224,225	CC31009465	CAP,CERAMIC 0.01uF 50V
C226	CE01005167	CAP,ELEC. 100uF 16V
C227	CC31009465	CAP,CERAMIC 0.01uF 50V
C228	CC02009458	CAP,CERAMIC 0.02uF 50V
C229	CC31010431	CAP,CERAMIC 0.001uF 50V
C230	CE01005167	CAP,ELEC. 100uF 16V
D201,202	DD50000031	DIODE SVC321B
D203L	DD80000021	DIODE IN4148
D204,206	DD80000021	DIODE IN4148
Q201	TR50000097	TRANSISTOR 2SK49 (F,H)
Q202L	TR30000327	TRANSISTOR 2SC536G
Q203L	TR30000327	TRANSISTOR 2SC536G
Q204L	TR30000327	TRANSISTOR 2SC536G
Q205L	TR30000327	TRANSISTOR 2SC536G
Q206L	TR30000327	TRANSISTOR 2SC536G
Q207L	TR30000327	TRANSISTOR 2SC536G
Q208L	TR30000327	TRANSISTOR 2SC536G
Q209L	TR30000327	TRANSISTOR 2SC536G
IC201	IC00001322	IC LA1245
CT201	CF00000159	CAP,FILM TRIMMER VCT51C
CT202L	CF00000263	CAP,FILM TRIMMER AT1-53-9W
CT203	CF00000159	CAP,FILM TRIMMER VCT51C
CT204L	CF00000263	CAP,FILM TRIMMER AT1-53-9W
X201	LF00000221	CERAMIC FILTER BFU450C
L201	LC31070008	AM ANT. COIL RLV107A00
L202L	LC31080002	LW ANT. COIL RLV108A00
L203L	LM00000073	MICRO INDUCTOR 2.2uH
L204	LC31050009	AM OSC COIL RLV105T
L205L	LC31060003	LW OSC COIL RLV106T
L206	LC01980000	AM IFT COIL RL198T
RY201	LY00000253	RELAY RY-12W-OH-KJ
R301	RD21502822	R,CARBON 15K 1/4W J
R302	RD58202822	R,CARBON 82K 1/4W J
R303	RD54700827	R,CARBON 470 1/4W J
R304	RD51003820	R,CARBON 100K 1/4W J
R305	RD55600828	R,CARBON 560 1/4W J
R306	RD22002821	R,CARBON 20K 1/4W J
R307,308	RM81002616	R,METAL MK2010KFECZ.
R309	RD53301822	R,CARBON 3.3K 1/4W J
R310	RD23902827	R,CARBON 39K 1/4W J
R311	RD56801829	R,CARBON 6.8K 1/4W J
R312	RD53302826	R,CARBON 33K 1/4W J
R313	RD53302826	R,CARBON 33K 1/4W J
R314,315	RM83012613	R,METAL MK2030K1FECZ.
R316,317	RM83321610	R,METAL MK203K32FECZ.
R318,319	RM83321610	R,METAL MK203K32FECZ.
R320	RD52203828	R,CARBON 220K 1/4W J
R321	RD21201822	R,CARBON 1.2K 1/4W J
R322	RD51002827	R,CARBON 10K 1/4W J
R323	RD21503826	R,CARBON 150K 1/4W J
R324	RD52203828	R,CARBON 220K 1/4W J
C301	CS43911424	CAP,STYROL 390P 50V
C302	CS42710435	CAP,STYROL 2700P 50V
C303	CE04707252	CAP,ELEC. 4.7uF 25V

SYMBOL	PARTS NO.	DESCRIPTION
C304	CE04708505	CAP,ELEC. 0.47uF 50V
C305	CS48211430	CAP,STYROL 820P 50V
C306	CE01006251	CAP,ELEC.10uF 25V
C307	CE01008508	CAP,ELEC. 0.1uF 50V
C308,309	CM04709426	CAP,MYLAR 473 J 50V
C310	CE64705164	CAP,ELEC. 470uF 16V
C311	CE01005167	CAP,ELEC. 100uF 16V
C312	CE02206107	CAP,ELEC. 22uF 10V
C313	CE01005167	CAP,ELEC. 100uF 16V
C314	CS44710426	CAP,STYROL 4700P J 50V
C315	CE04705164	CAP,ELEC. 470uF 16V
C316	CS44710438	CAP,STYROL 4700P K 50V
C317,318	CS48211430	CAP,STYROL 820P J 50V (U,C)
C319,320	CS31510326	CAP,STYROL SRA152J125
C321,322	CL34707259	CAP,LOW NOISE U25V4R7LN
C323	CE04707252	CAP,ELEC. 4.7uF 25V
Q301	TR30000108	TRANSISTOR 2SC1571 (E,F)
D301,302	DD80000021	DIODE IN4148
IC301	IC00001905	IC uPC1223C
IC302	IC00000603	IC TA7324P
L301	LM00000360	MICRO INDUCTOR TRL-312
L302	LC23400003	MPX FILTER COIL TRL-340 (2 BAND)
VR301	RV20000193	R,SEMI-FIXED 08-301 10KB
VR302	RV20000284	R,SEMI-FIXED 08-301 30KB
VR303,304	RV20000181	R,SEMI-FIXED 08-301 100KB
R401,402	RM81009611	R,METAL MK2010RFECZ.
R403,404	RM84752616	R,METAL MK247K5FECZ.
R405,406	RM84759611	R,METAL MK247R5FECZ.
R407,408	RM84750619	R,METAL MK2475RFECZ.
R409,410	RM82741615	R,METAL MK22K74FECZ.
R411,412	RM83321610	R,METAL MK23K32FECZ.
R413,414	RM82741615	R,METAL MK22K74FECZ.
R415,416	RM82432618	R,METAL MK224K3FECZ.
R417,418	RM82001619	R,METAL MK2002KFECZ.
R419,420	RM83323618	R,METAL MK2332KFECZ.
R421,422	RM81000619	R,METAL MK2100RFECZ.
R423,424	RM81003610	R,METAL MK2100KFECZ.
C401,402	CS31511318	CAP,POLYSTYRENE 160V 150P
C403,404	CA14707830	CAP,APYOAP 10PR-E4R7
C405,406	CE01005258	CAP,ELEC. 100uF 25V
C407,408	CP11008330	CAP,M.P FILM 100V 0.1uF
C409,410	CS32010301	CAP,POLYSTYRENE 160V 2000P
C411,412	CS36810300	CAP,POLYSTYRENE 160V 6800P
C413,414	CS33010308	CAP,POLYSTYRENE 160V 3000P
C415,416	CE51006477	CAP,ELEC. 50BGF10M
C419	CC05009457	CAP,CERAMIC 0.047uF 50V
IC401	IC00001735	IC NE5534AN
R803-808	RM81001612	R,METAL MK2001KFECZ.(2 BAND)
R809,810	RM81001612	R,METAL MK2001KFECZ.
R811,812	RM81001612	R,METAL MK2001KFECZ.(2 BAND)
R813,814	RM81001612	R,METAL MK2001KFECZ.
R815-819	RD52202824	R,CARBON 22K 1/4W J
R820	RD51003820	R,CARBON 100K 1/4W J
R823	RD53302826	R,CARBON 33K 1/4W J
R825	RD54702824	R,CARBON 47K 1/4W J
R826	RD51003820	R,CARBON 100K 1/4W J
R827	RM12200924	R,METAL OXIDE FILM 220 J 1/2W
R828	RD52203828	R,CARBON 220K 1/4W J
R830	RM12200924	R,METAL OXIDE FILM 220 J 1/2W
R831	RD51002827	R,CARBON 10K 1/4W J
C816	CE01007504	CAP,ELEC. 1uF 50V
C817,819	CE01005258	CAP,ELEC. 100uF 25V
D802-810	DD80000021	DIODE IN4148
Q801-805	TR30000327	TRANSISTOR 2SC536G
Q807,808	TR30000327	TRANSISTOR 2SC536G
Q809	TR30000492	TRANSISTOR 2SC3399

SYMBOL	PARTS NO.	DESCRIPTION
Q810-814	TR10000254	TRANSISTOR 2SA1345
Q815	TR30000327	TRANSISTOR 2SC536G
IC801	IC00001486	IC TC9152P
RY801,802	LY00000277	RELAY RY-24W-KJ ⚠
R905	RM84750619	R,METAL MK2475RFECZ.
R907,908	RM51001816	R,METAL 1K 1/4W F
R909,910	RM51002810	R,METAL 10K 1/4W F
R911	RM51001816	R,METAL 1K 1/4W F
R912	RM51001816	R,METAL 1K 1/4W F
R913	RD54701820	R,CARBON 4.7K 1/4W J
R914	RD52202824	R,CARBON 22K 1/4W J
R915	RD51001823	R,CARBON 1K 1/4W J
R916	RD54702824	R,CARBON 47K 1//4W J
R917	RM22212814	R,METAL 22K1 1/4W F
R918	RD52200827	R,CARBON 220 1/4W J
R919	RD53301822	R,CARBON 3.3K 1/4W J
R920	RM12200924	R,METAL OXIDE FILM 220J 1/2W
R921	RD25601820	R,CARBON 5.6K 1/4W J
R922	RM12200924	R,METAL OXIDE FILM 220J 1/2W
R923	RD52202824	R,CARBON 22K 1/4W J
R924	RD52201820	R,CARBON 2.2K 1/4W J
R925	RD51003820	R,CARBON 100K 1/4W J
R927	RM55620810	R,METAL 562 1/4W F
R928	RM55620810	R,METAL 562 1/4W F
R929	RM84750619	R,METAL MK2475RFECZ.
C905	CE01005258	CAP,ELEC. 100uF 25V
C906	CE01005258	CAP,ELEC. 100uF 25V
C907,908	CE71004255	CAP,ELEC. 1000uF 25V ⚠
C909	CK00000035	SPARK KILLER DE7150F472M ⚠
C911,912	CE14704351	CAP,ELEC. 4700uF 35V ⚠
C913-916	CC01009256	CAP,CERAMIC 0.01uF 250V ⚠
C917	CE01005106	CAP,ELEC. 100uF 10V
C918	CE02205164	CAP,ELEC. 220uF 16V
C919	CE04705103	CAP,ELEC. 470uF 10V
C920	CE01006251	CAP,ELEC. 10uF 25V
C921	CE04705164	CAP,ELEC. 470uF 16V
C922	CE01005258	CAP,ELEC. 100uF 25V
C923	CE01005106	CAP,ELEC. 100uF 10V
C924	CE04705103	CAP,ELEC. 470uF 10V
C925	CE01006500	CAP,ELEC. 10uF 50V
C926	CE01004357	CAP,ELEC. 1000uF 35V ⚠
C927,928	CE01005258	CAP,ELEC. 100uF 25V
C929	CE01007504	CAP,ELEC. 1uF 50V
C930,931	CC01009256	CAP,CERAMIC 0.01uF 250V ⚠
C932	CE74713502	CAP,ELEC. 4.7uF 50V
D901,902	DD20000041	DIODE RD18E
D903-906	DD80000010	DIODE IN4003
D907	DD20000181	DIODE RD6.2E
D908	DD20000077	DIODE RD16E
D909	DD20000181	DIODE RD6.2E
D910-912	DD80000021	DIODE IN4148
D914,915	DD20000193	DIODE RD15E
D913,916	DD80000010	DIODE IN4003
Q903	TR10000140	TRANSISTOR 2SA984K (E,F)
Q904	TR30000121	TRANSISTOR 2SC2274 (E,F)
Q905	TR10000047	TRANSISTOR 2SB631K (E,F)
Q906	TR40000069	TRANSISTOR 2SD600K (E,F)
Q907	TR10000126	TRANSISTOR 2SA608K (F,G)
Q908	TR30000080	TRANSISTOR 2SD863 (E,F)
Q909	TR30000108	TRANSISTOR 2SC1570
Q910	TR30000327	TRANSISTOR 2SC536G
Q911	TR30000029	TRANSISTOR 2SD313D
Q912	TR30000327	TRANSISTOR 2SC536G
Q913	TR40000069	TRANSISTOR 2SD600K (E,F)
Q914	TR10000140	TRANSISTOR 2SA984K (E,F)
Q915,916	TR30000327	TRANSISTOR 2SC536G
Q917	TR10000126	TRANSISTOR 2SA608K (F,G)

SYMBOL	PARTS NO.	DESCRIPTION
RY901	LY00000289	RELAY VB-24SMCU-E ⚠
RY902	LY00000265	RELAY VS-24MC-NR ⚠
F901,902	FU25000077	FUSE 250V T1A UL/CSA ⚠
	FU23000207	FUSE 250V T1A S ⚠
	AF105521	P.C.B. ASSEMBLY
R501,502	RM81500616	R,METAL MK2150RFECZ.
R503,504	RM84752616	R,METAL MK247K5FECZ.
R505,506	RM84750619	R,METAL MK2475RFECZ.
R507,508	RM82741615	R,METAL MK22K74FECZ.
R511,512	RM82211614	R,METAL MK22K21FECZ.
R513,514	RM81821615	R,METAL MK21K82FECZ.
R515,516	RM82212618	R,METAL MK222K1FECZ.
R517,518	RM82211614	R,METAL MK22K21FECZ.
R519,520	RM81501610	R,METAL MK201K5FECZ.
R521,522	RM83321610	R,METAL MK23K32FECZ.
R523,524	RM81501610	R,METAL MK201K5FECZ.
R525,526	RM81500616	R,METAL MK2150RFECZ.
R527,528	RM84752616	R,METAL MK247K5FECZ.
R529,530	RM81211618	R,METAL MK21K21FECZ.
R531,532	RM82741615	R,METAL MK22K74FECZ.
R533,534	RM81000619	R,METAL MK2100RFECZ.
R535,536	RM81003610	R,METAL MK2100KFECZ.
R541,542	RM88251610	R,METAL MK28K25FECZ.
R543,544	RM81003610	R,METAL MK2100KFECZ.
C501,502	CY01007303	CAP,LAYER 1uF 100V
C503,504	CS34712311	CAP,POLYSTYRENE 47P 160V
C505,506	CE01005258	CAP,ELEC. 100uF 25V
C507,508	CP11008330	CAP,M.P. 0.1uF 100V
C511,512	CM01008423	CAP,MYLAR 104 J 50V
C513,514	CM01208424	CAP,MYLAR 124 J 50V
C515,516	CS41510414	CAP,STYROL 1500P 50V
C517,518	CE51006477	CAP,ELEC. 10uF 50V
C519,520	CS34712311	CAP,POLYSTYRENE 47P 160V
C521,522	CE51006477	CAP,ELEC. 10uF 50V
C523,524	CM01208424	CAP,MYLAR 124 J 50V
C525,526	CE51006477	CAP,ELEC. 10uF 50V
VR501	RV10001644	R,VARIABLE 4TR-2856 100KMN
VR502,503	RV10001632	R,VARIABLE 4TR-2855 20KBx2
S1,S2	SH30000547	FUNCTION SW C-4174A12
IC501,502	IC00001693	IC NE5532AN
	AF105531	P.C.B. ASSEMBLY
R551,552	RD22202822	R,CARBON 22K 1/4W J
R553,554	RD24702822	R,CARBON 47K 1/4W J
R555,556	RD23302824	R,CARBON 33K 1/4W J
R557,558	RD23303828	R,CARBON 330K 1/4W J
R559,560	RD21500825	R,CARBON 150 1/4W J
C551,552	CE04707252	CAP,ELEC. 4.7uF 25V
C553,554	CS45012421	CAP,STYROL 50P 50V
C555,556	CE01005258	CAP,ELEC. 100uF 25V
C557,558	CM01009427	CAP,MYLAR 103 J 50V
IC551	IC00001474	IC NJM4556D
	AF105541	P.C.B. ASSEMBLY
R537,538	RM85621610	R,METAL MK25K62FECZ.
VR504	RV10001255	R,VARIABLE C-4170B15 50KBx2
	AF105551	P.C.B. ASSEMBLY
R251	RD21503826	R,CARBON 150K 1/4W J
R252	RD24702822	R,CARBON 47K 1/4W J
C251	CC31010431	CAP,CERAMIC 0.001uF 50V
D251	DD10000100	DIODE IN4148
S3,S4,S5	SH13000395	3 KEY PUSH SW 4TR-2554
	TX-105511	P.C.B. ASSEMBLY
R701M	RD21003829	R,CARBON 100K 1/4W J
R702	RD21003829	R,CARBON 100K 1/4W J

SYMBOL	PARTS NO.	DESCRIPTION
R703L	RD21003829	R,CARBON 100K 1/4W J
R704L	RD21003829	R,CARBON 100K 1/4W J
R705	RD24703826	R,CARBON 470K 1/4W J
R706	RD21003829	R,CARBON 100K 1/4W J
R707	RD21002825	R,CARBON 10K 1/4W J
R708	RD21003829	R,CARBON 100K 1/4W J
R709	RD24702822	R,CARBON 47K 1/4W J
R710	RD21004822	R,CARBON 1M 1/4W J
R711	RD21003829	R,CARBON 100K 1/4W J
R712	RD24703826	R,CARBON 470K 1/4W J
R713	RD21003829	R,CARBON 100K 1/4W J
R714	RD24702822	R,CARBON 47K 1/4W J
R715	RD21002825	R,CARBON 10K 1/4W J
R716	RD24702822	R,CARBON 47K 1/4W J
R717	RD21003829	R,CARBON 100K 1/4W J
R718-721	RD24702822	R,CARBON 47K 1/4W J
R722-731	RD22202822	R,CARBON 22K 1/4W J
R732	RD23302824	R,CARBON 33K 1/4W J
R734,735	RD22700822	R,CARBON 270 1/4W J
R736,737	RD21002825	R,CARBON 10K 1/4W J
R738	RD22201829	R,CARBON 2.2K 1/4W J
R739,740	RD28201827	R,CARBOMN 8.2K 1/4W J
R741	RD21000828	R,CARBON 100 1/4W J
R742	RD21003829	R,CARBON 100K 1/4W J
R743,744	RD23302824	R,CARABON 33K 1/4W J
R745	RD21002825	R,CARBON 10K 1/4W J
R746,747	RD28202820	R,CARBON 82K 1/4W J
R748,749	RD22202822	R,CARBON 22K 1/4W J
R750	RD21003829	R,CARBON 100K 1/4W J
R751	RD22202822	R,CARBON 22K 1/4W J(3 BAND)
R752	RD24701829	R,CARBON 4.7K 1/4W J
R753	RD24702822	R,CARBON 47K 1/4W J
R754	RD21002825	R,CARBON 10K 1/4W J
R755,756	RD24701829	R,CARBON 4.7K 1/4W J
R757	RD24701829	R,CARBON 4.7K 1/4W J(3 BAND)
R758	RD21003829	R,CARBON 100K 1/4W J(3 BAND)
R759	RD24701829	R,CARBON 4.7K 1/4W J(3 BAND)
R760	RD24701829	R,CARBON 4.7K 1/4W J
R761	RD24702822	R,CARBON 47K 1/4W J
R762	RD24709828	R,CARBON 47 1/4W J
R763	RD23302824	R,CARBON 33K 1/4W J
R764	RD24702822	R,CARBON 47K 1/4W J
R765	RN11002068	THICK FILM RS NETWORK A6103J
R766	RN31002087	THICK FILM RS NETWORK A8103J
R767	RN31002087	THICK FILM RS NETWORK A8103J
C701,702	CE01007504	CAP,ELEC. 1uF 50V
C703	CC05009457	CAP,CERAMIC 0.047uF 50V
C704L	CC01007504	CAP,ELEC. 1uF 50V
C705,706	CE04707252	CAP,ELEC. 4.7uF 25V
C707	CC05009457	CAP,CERAMIC 0.047uF 50VV
C708,709	CC32211432	CAP,CERAMIC 220P 50V
C710	CE01007504	CAP,ELEC 1uF 50V
C712	CE01005106	CAP,ELEC. 100uF 10V
C713	CC05009457	CAP,CERAMIC 0.047uF 50V
C715,716	CC01512434	CAP,CERAMIC 15P 50V
C717	CC31009465	CAP,CERAMIC 0.01uF 50V
C718	CE04705103	CAP,ELEC. 470uF 10V
C719	CE04706107	CAP,ELEC. 47uF 10V
C720	CC31009465	CAP,CERAMIC 0.01uF 50V
C721	CC31010431	CAP,CERAMIC 0.001uF 50V
C722,724	CC31009465	CAP,CERAMIC 0.01uF 50V
C725	CM04709426	CAP,MYLAR 473 J 50V
C726	CE01338508	CAP,ELEC. 0.33uF 50V
C727	CC31009465	CAP,CERAMIC 0.01uF 50V
C728	CE01005167	CAP,ELEC. 100uF 16V
C729,730	CE01007504	CAP,ELEC. 1uF 50V
C731	CC31009465	CAP,CERAMIC 0.01uF 50V

SYMBOL	PARTS NO.	DESCRIPTION
C732	CE04705103	CAP,ELEC. 470uF 10V
C733	CE01005167	CAP,ELEC. 100uF 16V
C734	CE04706107	CAP,ELEC. 47uF 16V
IC701L	IC00002340	IC TC4081BP
IC702	IC00002340	IC TC4081BP
IC703	IC00001759	IC LC6522C-3433
IC704	IC00001760	IC LB1630
IC705	IC00001346	IC TC9157AP
D701L	DD10000100	DIOIDE IN4148
D702-711	DD10000100	DIOIDE IN4148
D712	DD10000068	DIODE IN4003
D713L	DD10000100	DIOIDE IN4148
D713M	DD10000100	DIOIDE IN4148
D714M	DD10000100	DIOIDE IN4148
D715,716	DD10000100	DIOIDE IN4148
D717,718	DD10000100	DIODE IN4148
D719	DD20000107	DIODE RD3.6E
IC706	IC00000482	IC TD6104P
IC707	IC00000573	IC TD6301AP
Q701-712	TR30000327	TRANSISTOR 2SC536G
Q713	TR30000108	TRANSISTOR 2SC1571 (E,F)
Q714	TR50000127	TRANSISTOR 2SK246-Y
Q717,718	TR30000327	TRANSISTOR 2SC536G (3 BAND)
Q719	TR10000126	TRANSISTOR 2SA608K (F,G)
Q720,721	TR30000327	TRANSISTOR 2SC536G (3 BAND)
Q722,723	TR30000327	TRANSISTOR 2SC536G
X701	LF00000294	CERAMIC FILTER CSB 800J
X702	DD60000040	CRYSTAL OSCILLATOR HC49U7.2MHz
	TX105521	P.C.B. ASSEMBLY
R161	RD22201829	R,CARBON 2.2K 1/4W J
R162	RD25601820	R,CARBON 5.6K 1/4W J
R163	RD21002825	R,CARBON 10K 1/4W J
R164	RD24700825	R,CRABON 470 1/4W J
R165	RD24700825	R,CARBON 470 1/4W J
R166	RD21001821	R,CARBON 1K 1/W J
R172	RD21001821	R,CARBON 1K 1/W J
R173	RD21003829	R,CARBON 100K 1/4W J
R174	RD21000828	R,CARBON 100 1/4W J
C161	CE01007504	CAP,ELEC. 1uF 50V
C612	CE03307503	CAP,ELEC. 3.3uF 50V
C163	CE04706107	CAP,ELEC. 47uF 10V
Q161	TR30000327	TRANSISTOR 2SC536G
IC161	IC00000883	IC LB1423
D161-165	DD40000095	DIODE SEL1124R
D166-174	SH60000185	KEY BOARD SW WITH LED C-4177A01 (RED)
D175-179	SH60000197	KEY BOARD SW WITH LED C-4177A02 (GRN)
D180	SH60000185	KEY BOARD SW WITH LED C-4177A01 RED
D181	IC00002030	SONY REMOTE RECEIVER SBX1610-02 ✱ I3-06
	SH60000203	KEY BOARD SW C-4177A03
	TX105541	P.C.B. ASSEMBLY
R601	RD21009820	R,CARBON 10 1/4W J
R602	RD24702822	R,CARBON 47K 1/4W J
R603	RD12103829	R,CARBON 100K 1/4W J
R604	RD21002825	R,CARBON 10K 1/4W J
C601	CE01005106	CAP,ELEC. 100uF 10V
Q601	TR30000327	TRANSISTOR 2SC536G
	TX105551	P.C.B. ASSEMBLY
S01	SH11000227	1 KEY PUSH SW 4TR-2306

SYMBOL	PARTS NO.	DESCRIPTION
		OTHERS
	AB00000330	BOTTOM BOARD 3TTV-5A
	AF30000164	FRONT CHASSIS 2TTV-2A#2
	AM00001616	CHASSIS BODY 3TTV-4A
	AR30000180	PRINTED REAR CHASSIS TRP-606
	AS01000221	SIDE CHASSIS 3TTH-8A#1
	LB07068000	AM LOOP ANT. WITH HOLDER TRL-345
	PT25907105	POWER TRANSFORMER TT-259GF ⚠
	FT00000229	PLASTIC FOOT (BK) 4TSH-19#2 50Fx14H
	FT00000230	PU FOOT 4TR-2823 24Fx14H
	PN00000108	JUMPER PIN 4TR-2185#2 P-14
	SB00000716	PVC SHIELD PLATE 4TQU-9
	SP10005530	P.C.B. SUPPORT 4TTV-9
	CD00000218	AC CORD SPT-2 AWG#18 4TR-670#4 (C,U,A,J) ⚠
	CD00000292	AC POWER CORD 4TR-2631#1 (D) ⚠
	CD00000048	AC POWER CORD 4TR-1037 (H,E,K2) ⚠
	CD00000085	AC POWER CORD C-2504A (K1) ⚠
	CD00000115	AC POWER CORD C-3763-T (G) ⚠
	SC00000131	AC CORD STOPPER SR-5N-4 (A,K1) ⚠
	SC00000039	AC CORD STOPPER SR-6W-1 (D) ⚠
	SC00000027	AC CORD STOPPER SR-4N-4 ⚠
	NP00001949	NAME STICKER AC120V 4TR-2828A#1 TNP-382
	NP00001974	NAME STICKER AC120V-C 4TR-2828A#4 TNP-385
	NP00001962	NAME STICKER AC240V 4TR-2828A#3 TNP-384
	NP00001998	NAME STICKER AC230V 4TR-2828A#5 TNP-389
	NP00001950	NAME STICKER AC220V 4TR-2828A#2 TNP-383
	NP00002012	NAME STICKER AC100V 4TR-2828A#6 TNP-391
	RD02204928	R,CARBON FILM 2.2M 1/2W
	SA00001450	AC OUTLET SOCKET S-I6519 ⚠ (C,U,A,H,J)
	SA00001796	AC OUTLET SOCKET S-I6536#1 ⚠
	SA00001980	AC OUTLET SOCKET S2-741T-111/120 ⚠
	AA30000400	FRONT PANEL 2TQU-1#1 TFP-659
	AW00000617	PANEL WINDOW 4TQS-7#1
	BU00001145	POWER RING W/LED 4TQF-12 14x14
	BU00001169	KNOB RING 4TQF-17 39F
	BU00001250	PUSH BUTTON RING 4TQS-5 2 KEY
	KB20002681	POWER BUTTON 4TQF-15 14x14
	KB20002851	TACT BUTTON 2TQU-4 17 KEY
	OM10001272	ORNAMENTAL SIDE BOARD 4TR-2797 H=80MM
	OM70000065	PUSH BUTTON CONNECTOR 4TTL-15
	OM70000260	ACRYLIC LEVER 4TQT-5
	SN00000179	BUTTON SPRING 4TR-1988#2 10F
	AG00000287	REMOTE CONTROL HANDSET RR-904

SYMBOL	PARTS NO.	DESCRIPTION
	AU00001262	TOP COVER POLY 3TTF-5#8
	KB10001722	KNOB 4TQF-18 13F
	KB10001795	KNOB 33F 3TQF-5
	KB20002693	PUSH BUTTON 4TQF-16 5x10
	OM10001454	FL DAIL BOARD 4TTV-10A#2 TFP-660
	DD40000095	L.E.D LN224R
	SR00000882	UPPER COVER SPACER 4TR-2418
	MN10002896	OWNER'S MANUAL RTC-950AX/AXL
	PL00001099	STYROL SIDE MOULDING 2TTF-9A#2 TZ-165-1