

ROTEL*hifi*

AM / FM STEREO TUNER

RT-970BX

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

MN20002000

RT-970BX

Usable 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 Ratio (at 65 dBf):	
Mono.....	83 dB
Stereo.....	78 dB
Harmonic Distortion (at 65 dBf):	
1 kHz.....	0.05 % (mono), 0.21 % (stereo)
Frequency Response.....	30 to 15,000 Hz, +/- 0.5 dB
Capture Ratio.....	1.0 dB
Alternate Channel Selectivity:	
Wide/ Narrow.....	60 dB/ 80 dB
Adjacent Channel Selectivity...	15 dB (Narrow)
Spurious Response Ratio..	100 dB
Image Response Ratio.....	75 dB
IF Response Ratio.....	100 dB
AM Suppresion Ratio.....	60 dB
Stereo Separation:	
100 Hz/ 1 kHz/ 10 kHz....	43 dB/ 48 dB/ 38 dB

Subcarrier Product Ratio...60 dB
SCA Rejection Ratio.....70 dB
Output Level.....1.0 V
Antenna Input.....75 ohms unbalanced

Sensitivity.....350 uV/m
Selectivity (Wide/ Narrow).....27 dB/ 42 dB
Signal to Noise Ratio.....55 dB
Image Response Ratio.....40 dB
If Response Ratio.....60 dB
Antenna.....Loop Antenna

Power Requirement.....120 V/ 60 Hz, 220 V/ 50 Hz,
240 V/ 50 Hz (depending on
destinations)

Power Consumption.....10 watts
Dimensions (overall).....440 (W) x 72 (H) x 327 (D) mm
17-3/8" x 2-7/8" x 13 "

Weight (net).....3.9 kg/ 8.58 lbs.

- Specifications and design subject to possible modification without notice.

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 TP1 and Earth on IF103114 P.C.B.
 Tuning Meter---Between TP2 and TP3 on IF103114 P.C.B.

Step	Generator		Tuning Dial Setting	Adjust	Adjust for
	Coupling	Frequency			
1	No use		87.5 MHz	L108	3V reading on DC Voltmeter
2			108 MHz	CT106	22V reading on DC Voltmeter
3	Repeat steps 1 and 2 unit no further improvement is noticed.				
4	Antenna terminal	90 MHz	90 MHz	L102,103 L104,105 L109	Maximum reading on AC VTVM.
5		105 MHz	105 MHz	CT101- CT105	Maximum reading on AC VTVM.
6	Repeat steps 4 and 5 unit no further improvement is noticed. (muting OFF) (RFF ATT ON)				
7	Antenna terminal 1mV input	90 MHz	90 MHz	L301(A)	Adjust center on Tuning Meter
8				L301(B)	Minimum reading on THD Analyzer
9	Repeat steps 7 and 8 unit no further improvement is noticed (Muting OFF)				
10	Antenna terminal 5uV input	90 MHz	90 MHz	VR301	Muting Level (Muting ON)
11	Antenna terminal 1mV input	90 MHz	90 MHz	VR302	Signal Indicator Level (Muting OFF)

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	VR401	VCO 76kHz+/-100Hz (Muting ON) TP4, Earth
2	Antenna terminal 1mV input	98 MHz Pilot--10% 1 kHz--90% Mod.	98 MHz	L107 L401 VR402, 405 VR406	Minimum Dist.
3	Antenna terminal 1mV input	98 MHz Pilot--10% 1 kHz--90% Mod.	98 MHz	L302	Stereo indicator light up (Muting ON) L or R Max. reading on AC VTVM
4				VR403, 404	Best separation
5	Repeat steps 2 and 4 unit no further improvement is noticed. Check the stereo indicator can be operated normally when pilot signal is reduce from 10% to 5%.				

MW IF and RF Alignment

Instruments: AM Signal Generator (400Hz, 30% Modulated), AC VTVM, Oscilloscope, DC Voltmeter.

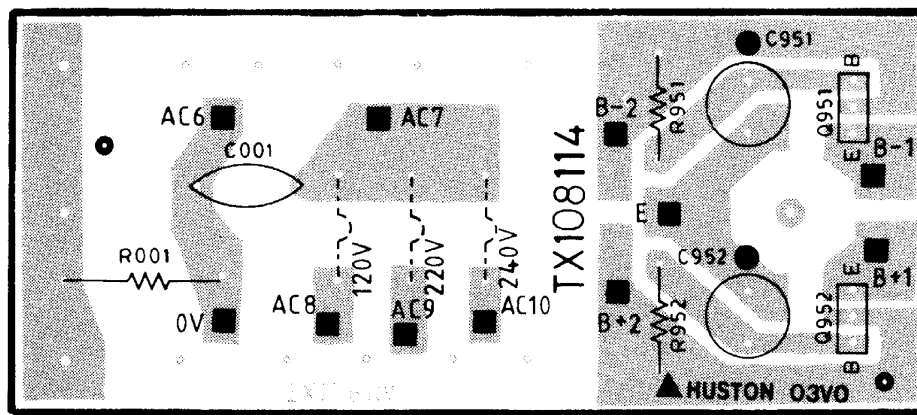
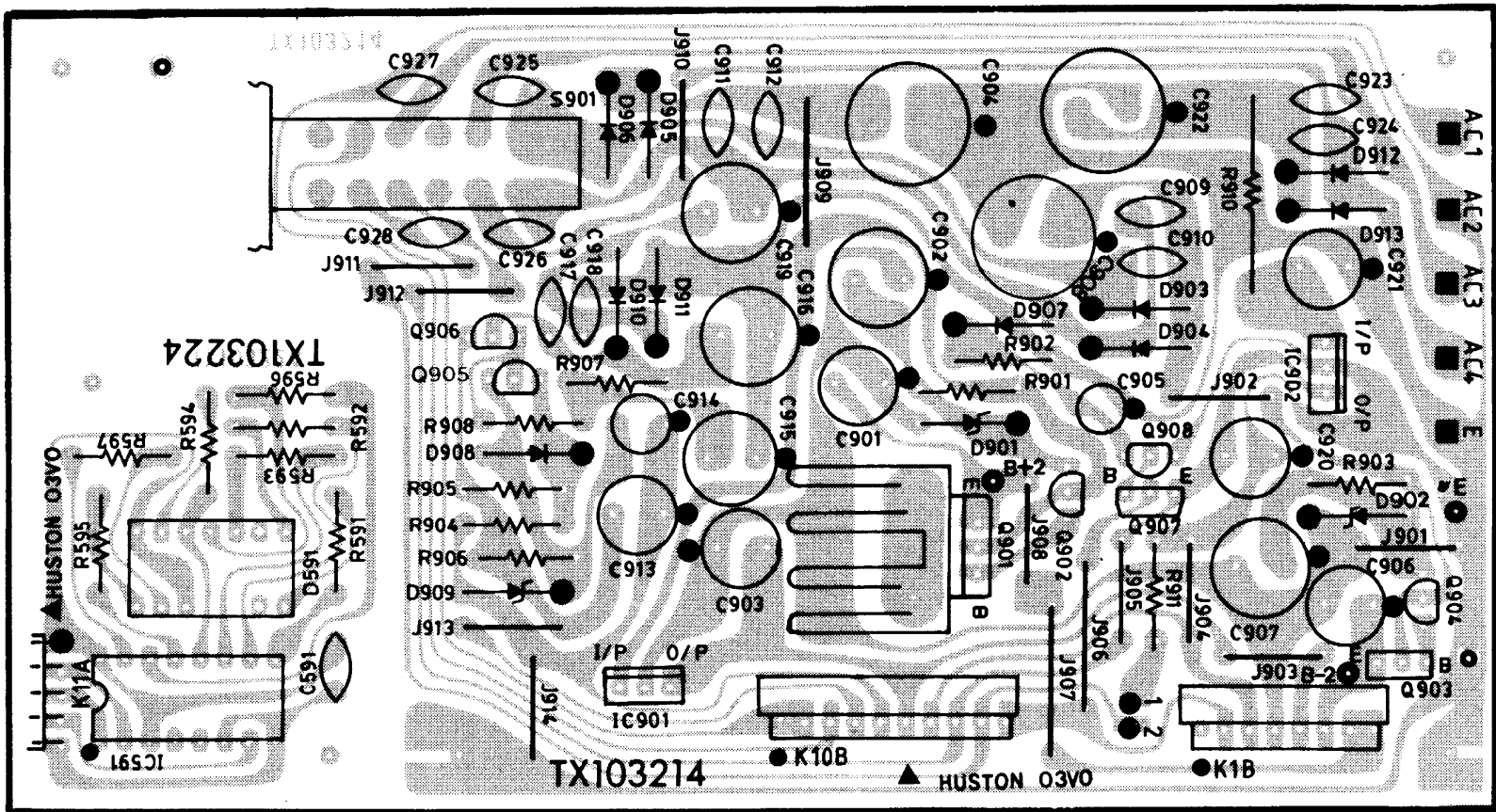
Terminated : DC Voltmeter---Between TP1 and Earth on IF103114 P.C.B.

Step	Generator		Tuning Dial Setting	Adjust	Adjust for
	Coupling	Frequency			
1	No use		530 kHz (531 kHz) Europe	L203	About 2.5V+/-0.1V on DC Voltmeter
2			1600 kHz (1602kHz) Europe	CT203	About 25V+/-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 L206	
6		1400 kHz	1400 kHz	CT201	
7	Repeat steps 4 to 6 unit no further improvement is noticed.				

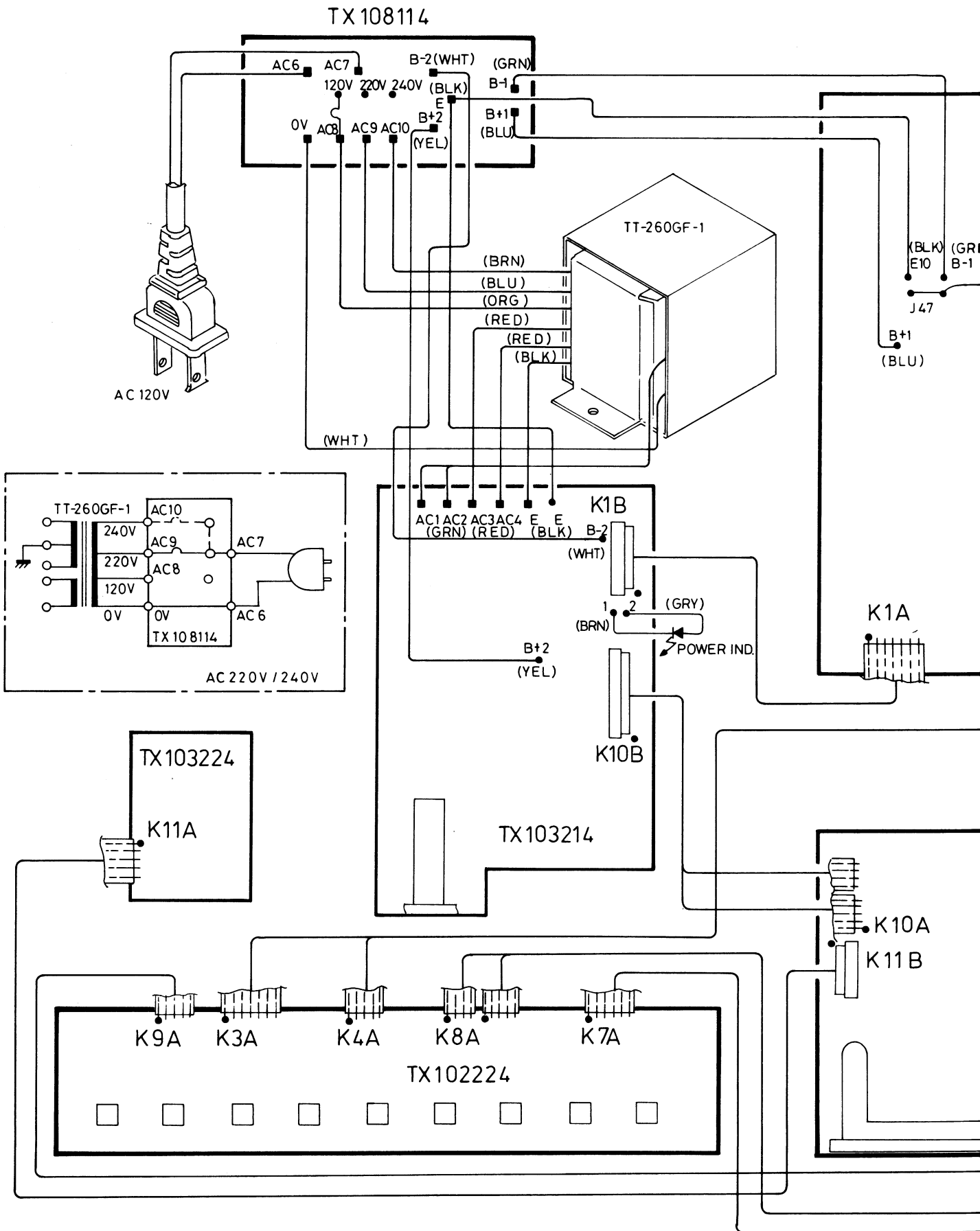
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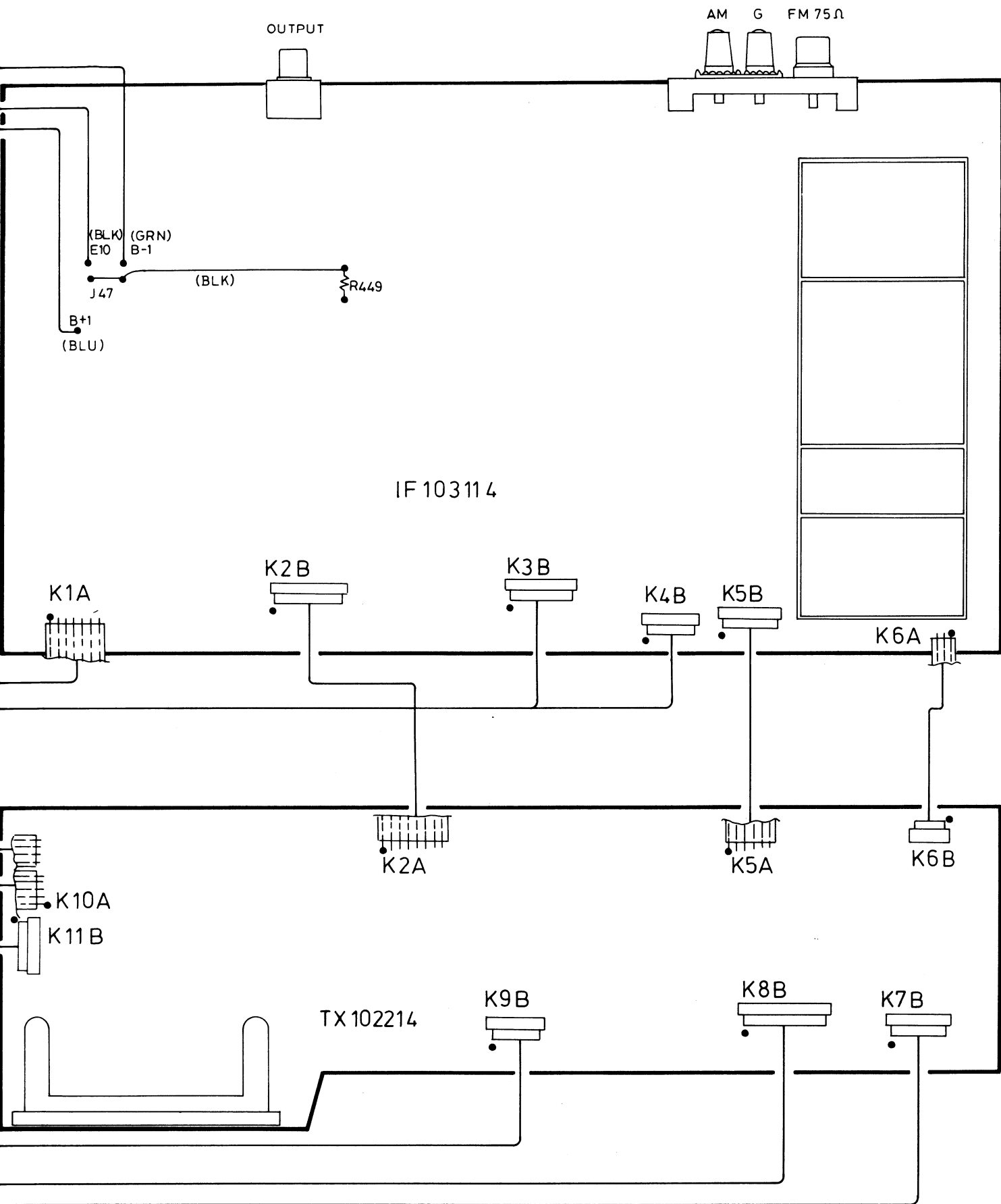






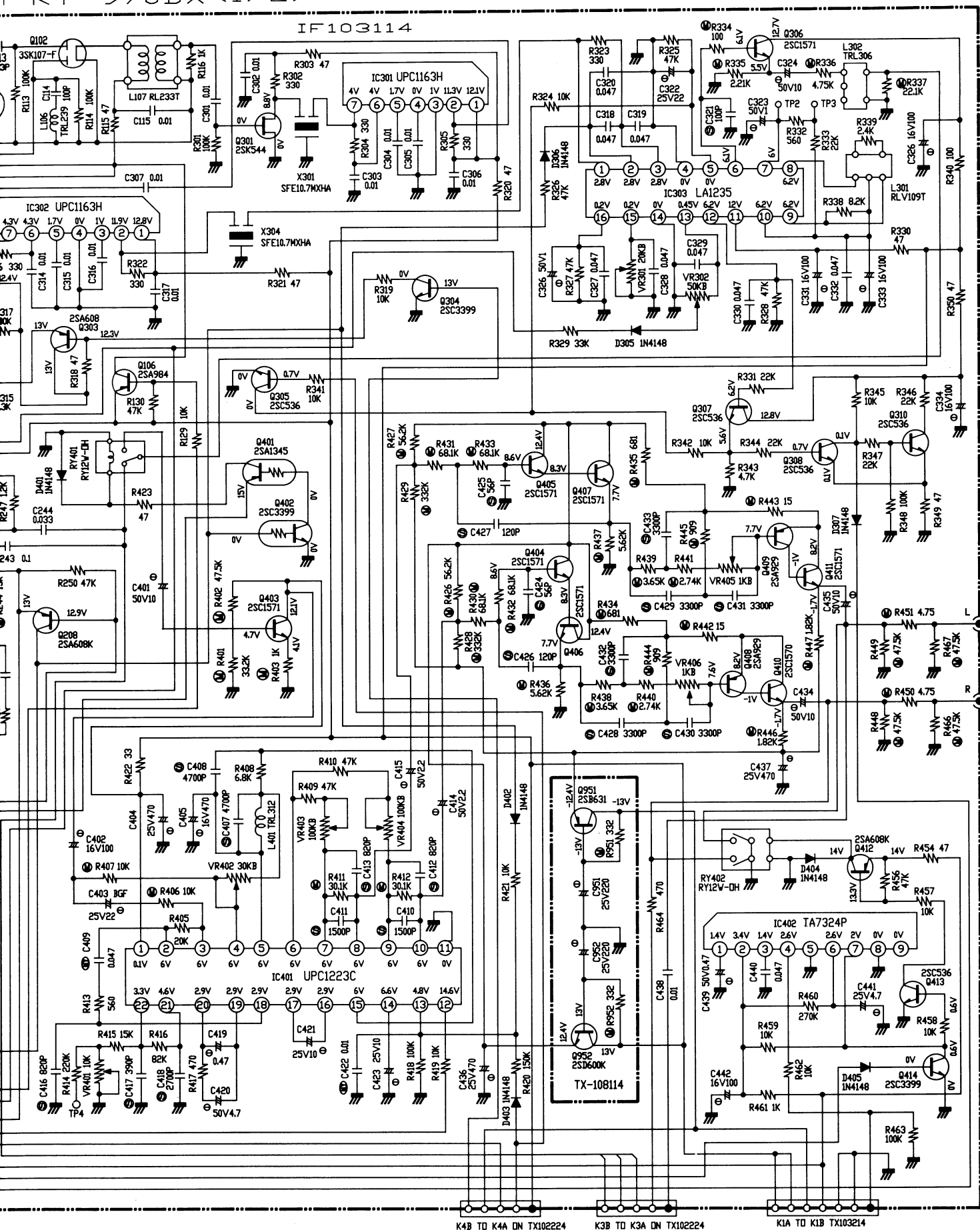
Wiring Diagram





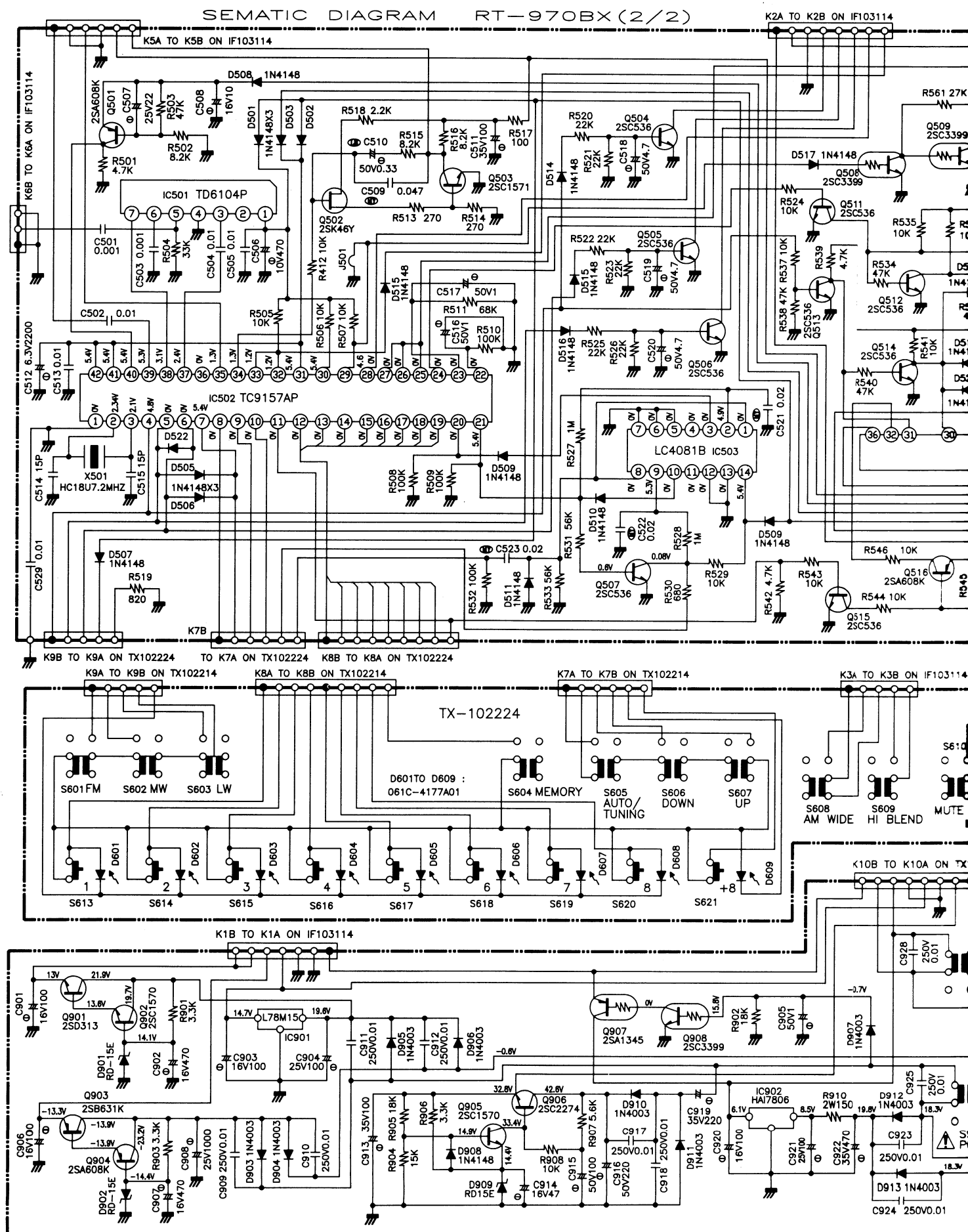
SCHEMATIC DIAGRAM RT-970





Schematic Diagram

SEMATIC DIAGRAM RT-970BX (2/2)



Parts List

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

SYMBOL	PARTS NO.	DESCRIPTION
	IF-103114	P.C.B. ASSEMBLY
R101, 102	RD54701820	R, CARBON 4.7K 1/4W J
R104, 105	RD52702821	R, CARBON 27K 1/4W J
R106	RD51003820	R, CARBON 100K 1/4W J
R107	RD54702824	R, CARBON 47K 1/4W J
R108	RD52209820	R, CARBON 22 1/4W J
R109	RD51003820	R, CARBON 100K 1/4W J
R110	RD51500827	R, CARBON 150 1/4W J
R111, 112	RD52702821	R, CARBON 27K 1/4W J
R113, 114	RD51003820	R, CARBON 100K 1/4W J
R115	RD54709820	R, CARBON 47 1/4W J
R116	RD51001823	R, CARBON 1K 1/4W J
R118	RD54709820	R, CARBON 47 1/4W J
R119	RD54700827	R, CARBON 470 1/4W J
R120	RD52702821	R, CARBON 27K 1/4W J
R121	RD51003820	R, CARBON 100K 1/4W J
R122	RD53300829	R, CARBON 330 1/4W J
R123, 124	RD51002827	R, CARBON 10K 1/4W J
R125	RD52201820	R, CARBON 2.2K 1/4W J
R126	RD52702821	R, CARBON 27K 1/4W J
R127	RD51003820	R, CARBON 100K 1/4W J
R128	RD54700827	R, CARBON 470 1/4W J
R129	RD51002827	R, CARBON 10K 1/4W J
R130	RD54702824	R, CARBON 47K 1/4W J
R131	RD51001823	R, CARBON 1K 1/4W J
C101	CC33312438	CAP, CERAMIC 33P 50V
C102	CC15013410	CAP, CERAMIC 5P CH 50V
C103	CC34712436	CAP, CERAMIC 47P 50V
C104	CC31009465	CAP, CERAMIC 0.01uF 50V
C105	CC13013417	CAP, CERAMIC 3P CH 50V
C106	CC31011435	CAP, CERAMIC 100P 50V
C107	CC31010431	CAP, CERAMIC 0.001uF 50V
C108	CC31009465	CAP, CERAMIC 0.01uF 50V
C110	CC31010431	CAP, CERAMIC 0.001uF 50V
C111	CC13013417	CAP, CERAMIC 3P CH 50V
C112	CC15013410	CAP, CERAMIC 5P CH 50V
C113	CC13013417	CAP, CERAMIC 3P CH 50V
C114	CC31011435	CAP, CERAMIC 100P 50V
C115	CC31009465	CAP, CERAMIC 0.01uF 50V
C116, 117	CC05013485	CAP, CERAMIC 5P 50V
C118	CC31009465	CAP, CERAMIC 0.01uF 50V
C119	CC17013412	CAP, CERAMIC 7P CH 50V
C120	CC31009465	CAP, CERAMIC 0.01uF 50V
C121	CC15013410	CAP, CERAMIC 5P CH 50V
C122	CC13013417	CAP, CERAMIC 3P CH 50V
C123	CC15013410	CAP, CERAMIC 5P CH 50V
C124	CC33312438	CAP, CERAMIC 33P 50V
C125	CC01012437	CAP, CERAMIC 10P 50V
C126	CC15013410	CAP, CERAMIC 5P CH 50V
C127	CC31009465	CAP, CERAMIC 0.01uF 50V
C128	CE02205164	CAP, ELEC. 220uF 16V
C129	CC31009465	CAP, CERAMIC 0.01uF 50V
C130	CC05009457	CAP, CERAMIC 0.005uF 50V
Q101, 102	TR50000140	TRANSISTOR 3SK107-F
Q103	TR50000103	TRANSISTOR 2SK544(F)
Q104	TR30000133	TRANSISTOR 2SC1674
Q105	TR50000103	TRANSISTOR 2SK544(F)
Q106	TR10000140	TRANSISTOR 2SA984(E,F)
D101	DD10000317	DIODE 1SS110
D102	DD50000055	DIODE SVC211
D103	DD10000317	DIODE 1SS110
D104, 105	DD50000055	DIODE SVC211
D107-109	DD50000055	DIODE SVC211
L102, 103	LC23390009	FM ANT. COIL TRL-339
L104	LC23380004	FM RF COIL TRL-338
L105	LC23370000	FM RF COIL TRL-337
L106	LM00000073	MICRO INDUCTOR 2.2uH
L107	LC02330000	FM IF COIL RL-233T
L108, 109	LC23360005	FM OSC COIL TRL-336

SYMBOL	PARTS NO.	DESCRIPTION
CT101-106	CF00000184	CAP, FILM TRIMMER VCT51A
R201	RD51003820	R, CARBON 100K 1/4W J
R202	RD51004824	R, CARBON 1M 1/4W J
R203, 204	RD52700824	R, CARBON 270 1/4W J
R205	RD54709820	R, CARBON 47 1/4W J
R206	RD51003820	R, CARBON 100K 1/4 W J
R231	RD51000820	R, CARBON 100 1/4W J
R232	RD51001823	R, CARBON 1K 1/4W J
R233	RD51501820	R, CARBON 1.5K 1/4W J
R235	RD51002827	R, CARBON 10K 1/4W J
R236	RD52200827	R, CARBON 220 1/4W J
R237	RD51000820	R, CARBON 100 1/4W J
R238	RD51002827	R, CARBON 10K 1/4W J
R239	RD53301822	R, CARBON 3.3K 1/4W J
R240	RD51000820	R, CARBON 100 1/4W J
R241	RD52202824	R, CARBON 22K 1/4W J
R242	RD25602823	R, CARBON 56K 1/4W J
R243	RD56801829	R, CARBON 6.8K 1/4W J
R244	RD51502824	R, CARBON 15K 1/4W J
R245	RD54700827	R, CARBON 470 1/4W J
R246	RD51000820	R, CARBON 100 1/4W J
R247	RD51201824	R, CARBON 1/2K 1/4W J
R248	RD52700824	R, CARBON 270 1/4W J
R249	RD51001823	R, CARBON 1K 1/4W J
R250	RD54702824	R, CARBON 47K 1/4W J
R251, 252	RD51002827	R, CARBON 10K 1/4W J
R254	RD54709820	R, CARBON 47 1/4W J
C201	CC31009465	CAP, CERAMIC 0.01uF 50V
C202	CC34712436	CAP, CERAMIC 47P 50V
C203	CC31009465	CAP, CERAMIC 0.01uF 50V
C204	CC12012417	CAP, CERAMIC 20P CH 50V
C205	CS44711420	CAP, STYROL 470P J 50V
C218, 219	CC31009465	CAP, CERAMIC 0.01uF 50V
C220	CC31010431	CAP, CERAMIC 0.001uF 50V
C221	CC05009457	CAP, CERAMIC 0.047uF 50V
C222	CC31009465	CAP, CERAMIC 0.01uF 50V
C224	CE01005167	CAP, ELEC. 100uF 16V
C225, 226	CC31009465	CAP, CERAMIC 0.01uF 50V
C231	CC31009465	CAP, CERAMIC 0.01uF 50V
C232	CE04707252	CAP, ELEC. 4.7uF 25V
C233	CE03307254	CAP, ELEC. 3.3uF 25V
C234	CC31009465	CAP, CERAMIC 0.01uF 50V
C236	CC31009465	CAP, CERAMIC 0.01uF 50V
C237	CE01005167	CAP, ELEC. 100uF 16V
C238	CE01338508	CAP, ELEC. 0.33uF 50V
C239	CC31010431	CAP, CERAMIC 0.001uF 50V
C240	CC02009458	CAP, CERAMIC 0.02uF 50V
C241	CM02209426	CAP, MYLAR 223 J 50V
C242	CM02210428	CAP, MYLAR 222 J 50V
C243	CM01008435	CAP, MYLAR 104 K 50V
C244	CM03309428	CAP, MYLAR 333 J 50V
C245	CE01005167	CAP, ELEC. 100uF 16V
Q201	TR50000097	TRANSISTOR 2SK49(F,H)
Q207	TR50000061	TRANSISTOR 2SK68A-KLM
Q208	TR10000126	TRANSISTOR 2SA608K(F,G)
D201, 202	DD50000092	DIODE VARICAP SVC333
D208-212	DD10000100	DIODE IN4148
L201	LC31290008	AM ANT. COIL RLV129T
L203	LC31270009	AM OSC COIL RLV127A00T
L206	LC01980000	AM IFT COIL RL198T
CT201	CF00000159	CAP, FILM TRIMMER VCT51C
CT203	CF00000159	CAP, FILM TRIMMER VCT51C
X201	LF00000221	CERAMIC FILTER BFU450C
IC201	IC00001322	IC LA1245
R301	RD51003820	R, CARBON 100K 1/4W J
R302	RD53300829	R, CARBON 330 1/4W J
R303	RD54709820	R, CARBON 47 1/4W J
R304-306	RD53300829	R, CARBON 330 1/4W J
R307	RD52200827	R, CARBON 220 1/4W J
R308	RD53300829	R, CARBON 330 1/4W J

SYMBOL	PARTS NO.	DESCRIPTION
R309, 310 R311	RD51001823 RD52201820	R, CARBOM 1K 1/4W J R, CARBON 2.2K 1/4W J
R312 R313 R314 R315 R316	RD51000820 RD52201820 RD51000820 RD53301822 RD54702824	R, CARBON 100 1/4W J R, CARBON 2.2K 1/4W J R, CARBON 100 1/4W J R, CARBON 3.3K 1/4W J R, CARBON 47K 1/4W J
R317 R318 R319 R320 R321	RD51003820 RD54702824 RD51002827 RD54709820 RD54709820	R, CARBON 100K 1/4W J R, CARBON 47K 1/4W J R, CARBON 10K 1/4W J R, CARBON 47 1/4W J R, CARBON 47 1/4W J
R322, 323 R324 R325-328 R329 R330	RD53300829 RD51002827 RD54702824 RD23302824 RD54709820	R, CARBON 330 1/4W J R, CARBON 10K 1/4W J R, CARBON 47K 1/4W J R, CARBON 33K 1/4 WJ R, CARBON 47 1/4W J
R331 R332 R333 R334 R335 R336	RD52201820 RD55600828 RD52202824 RM81000619 RM82211614 RM84751612	R, CARBON 2.2K 1/4W J R, CARBON 560 1/4W J R, CARBON 22K 1/4W J R, METAL MK2100RFECZ. R, METAL MK22K21FECZ. R, METAL MK24K75FECZ.
R336 R337 R338 R339 R340	RM84751612 RM82212618 RD58201829 RD52401821 RD51000820	R, METAL MK24K75FECZ. R, METAL MK22K1FECZ. R, CARBON 8.2K 1/4W J R, CARBON 2.4K 1/4W J R, CARBON 100 1/4W J
R341, 342 R343 R344 R345 R346, 347	RD51002827 RD54701820 RD52202824 RD51002827 RD52202824	R, CARBON 10K 1/4W J R, CARBON 4.7K 1/4W J R, CARBON 22K 1/4W J R, CARBON 10K 1/4W J R, CARBON 22K 1/4W J
R348 R349, 350 C301-308 C309 C310, 311	RD51003820 RD54709820 CC31009465 CE01005167 CC31009465	R, CARBON 100K 1/4W J R, CARBON 47 1/4W J CAP, CERAMIC 0.01uF 50V CAP, ELEC. 100uF 16V CAP, CERAMIC 0.01uF 50V
C312 C313-317 C318-320 C321 C322	CE01005167 CC31009465 CC05009457 CS41011422 CE02206259	CAP, ELEC. 100uF 16V CAP, CERAMIC 0.01uF 50V CAP, CERAMIC 0.047uF 50V CAP, STYROL 100P J 50V CAP, ELEC. 22uF 25V
C323 C324 C325 C326 C327-330	CE01007504 CE51006477 CE01005167 CE01007504 CC05009457	CAP, ELEC. 1uF 50V CAP, ELEC. 50VBGF10M CAP, ELEC. 100uF 16V CAP, ELEC. 1uF 50V CAP, CERAMIC 0.047uF 50V
C331 C332 C333, 334 Q301 Q302, 303	CE01005167 CC05009457 CE01005167 TR50000103 TR10000126	CAP, ELEC. 100uF 16V CAP, CERAMIC 0.047uF 50V CAP, ELEC. 100uF 16V TRANSISTOR 2SK544(F) TRANSISTOR 2SA608K(F, G)
Q304 Q305 Q306 Q307-309 D301-307	TR30000492 TR30000327 TR30000108 TR30000327 DD10000100	TRANSISTOR 2SC3399 TRANSISTOR 2SC536G TRANSISTOR 2SC1571(E, F) TRANSISTOR 2SC536G DIODE 1N4148
IC301, 302 IC303 X301 X302, 303 L301	IC00001656 IC00001103 LF00000324 LF00000166 LC31090000	IC uPC1163H IC LA1235 CERAMIC FILTER SFE10.7MXH-A CERAMIC FILTER SFE10.7MS2GA IF COIL RLV109T
L302 VR301 VR302 R401 R402	LC23060009 RV20000223 RV20000235 RM83322614 RM84752616	MPX FILTER TRL306 R, SEMI-FIXED 08-301 20KB R, SEMI-FIXED 08-301 50KB R, METAL MK233K2FECZ. R, METAL MK247K5FECZ.
R403 R405	RM81001612 RD52002823	R, METAL MK2001KFECZ. R, CARBON 20K 1/4W J

SYMBOL	PARTS NO.	DESCRIPTION
R406, 407 R408 R409, 410	RM81002616 RD56801829 RD54702824	R, METAL MK2010KFECZ. R, CARBON 6.8K 1/4W J R, CARBON 47K 1/4W J
R411, 412 R413 R414 R415 R416	RM83012613 RD55600828 RD52203828 RD51502824 RD58202822	R, METAL MK230K1FECZ. R, CARBON 560 1/4W J R, CARBON 220K 1/4W J R, CARBON 15K 1/4W J R, CARBON 82K 1/4W J
R417 R418 R419 R420 R421	RD54700827 RD51003820 RD51002827 RD51503828 RD51002827	R, CARBON 470 1/4W J R, CARBON 100K 1/4W J R, CARBON 10K 1/4W J R, CARBON 150K 1/4W J R, CARBON 10K 1/4W J
R422 R423 R426, 427 R428, 429 R430-433	RD53309821 RD54709820 RM85622613 RM83323618 RM86812616	R, CARBON 33 1/4W J R, CARBON 47 1/4W J R, METAL MK256K2FECZ. R, METAL MK233K2FECZ. R, METAL MK268K1FECZ.
R434, 435 R436, 437 R438, 439 R440, 441 R442, 443	RM86810619 RM85621610 RM83651610 RM82741615 RM81509619	R, METAL MK2681RFECZ. R, METAL MK256K2FECZ. R, METAL MK23K65FECZ. R, METAL MK22K74FECZ. R, METAL MK2015RFECZ.
R446, 447 R448, 449 R450, 451 R454 R456	RM81821615 RM84752616 RM84758618 RD54709820 RD54702824	R, METAL MK201K82FECZ. R, METAL MK2047K5FECZ. R, METAL MK204R75FECZ. R, CARBON 47 1/4W J R, CARBON 47K 1/4W J
R457-459 R460 R461 R462 R463	RD51001823 RD52703825 RD51001823 RD51002827 RD51003820	R, CARBON 10K 1/4W J R, CARBON 270K 1/4W J R, CARBON 1K 1/4W J R, CARBON 10K 1/4W J R, CARBON 100K 1/4W J
R466, 467 C401 C402 C403 C404	RM84752616 CE51006477 CE61005743 CE52206670 CE74705645	R, METAL MK2047K5FECZ. CAP, ELEC. 50VBGF10M CAP, ELEC. 16VBGF100M CAP, ELEC. 25VBGF22M CAP, ELEC. HFS 470uF 25V
C405 C407, 408 C409 C410, 411	CE04705164 CS44710426 CM04709426 CS31510302	CAP, ELEC. 470uF 16V CAP, STYROL 4700P J 50V CAP, MYLAR 473 J 50V CAP, POLYSTYRENE 1500P F 160V
C412, 413 C414, 415 C416 C417 C418	CS48211428 CE52207478 CS48211428 CS43911424 CS42710423	CAP, STYROL 820P J 50V CAP, ELEC. 50VBGF2R2M CAP, STYROL 820P J 50V CAP, STYROL 390P J 50V CAP, STYROL 2700P J 50V
C419 C420 C421 C422 C423	CE04708505 CE04707252 CE01006251 CM01009427 CE01006251	CAP, ELEC. 0.47uF 50V CAP, ELEC. 4.7uF 25V CAP, ELEC. 10uF 25V CAP, MYLAR 103 J 50V CAP, ELEC. 10uF 25V
C424, 425 C426, 427 C428-433 C434, 435	CS35612300 CS31211300 CS33310304 CE51006477	CAP, POLYSTYRENE 56P 160V CAP, POLYSTYRENE 120P F 160V CAP, POLYSTYRENE 3300P F 160V CAP, ELEC. 50VBGF10M
C436, 437 C439 C440 C441 C442	CE74705645 CE04708505 CC05009457 CE04707252 CE01005167	CAP, ELEC. HFS 470uF 25V CAP, ELEC. 0.47uF 50V CAP, CERAMIC 0.047uF 50V CAP, ELEC. 4.7uF 25V CAP, ELEC. 100uF 16V
Q401 Q402 Q403-407 Q408, 409 Q410, 411	TR10000254 TR30000492 TR30000108 TR10000102 TR30000108	TRANSISTOR 2SA1345 TRANSISTOR 2SC3399 TRANSISTOR 2SC1571(E, F) TRANSISTOR 2SA929(F, G, H) TRANSISTOR 2SC1571(E, F)
Q412	TR10000126	TRANSISTOR 2SA608K(F, G)

SYMBOL	PARTS NO.	DESCRIPTION
Q413	TR30000327	REANSISTOR 2SC536G
Q414	TR30000492	TRANSISTOR 2SC3399
D401-405	DD10000100	DIODE IN4148
IC401	IC00001905	IC uPC1223C
IC402	IC00000603	IC TA7324P
RY401, 402	LY00000253	RELAY RY12W-OH-KJ Δ
L401	LM00000360	MICRO INDUCTOR TRL-312
VR401	RV20000193	R, SEMI-FIXED 08-301 10KB
VR402	RV20000284	R, SEMI-FIXED 08-301 30KB
VR403, 404	RV40000071	R, SEMI-FIXED VM6CKPV-1S-B 100KB
VR405, 406	RV40000060	R, SEMI-FIXED VM6CKPV-1S-B 1KB
TX-102214 P.C.B. ASSEMBLY		
R501	RD24701829	R, CARBON 4.7K 1/4W J
R502	RD28201827	R, CARBON 8.2K 1/4W J
R503	RD24702822	R, CARBON 47K 1/4W J
R504	RD23302824	R, CARBON 33K 1/4W J
R505-507	RD21002825	R, CARBON 10K 1/4W J
R508, 509	RD21003829	R, CARBON 100K 1/4W J
R510	RD28202820	R, CARBON 82K 1/4W J
R511	RD26802820	R, CARBON 68K 1/4W J
R512	RD21002825	R, CARBON 10K 1/4W J
R513, 514	RD22700822	R, CARBON 270 1/4W J
R516	RD28201827	R, CARBON 8.2K 1/4W J
R517	RD21000828	R, CARBON 100 1/4W J
R518	RD22201829	R, CARBON 2.2K 1/4W J
R519	RD26800823	R, CARBON 680 1/4W J
R520-523	RD22202822	R, CARBON 22K 1/4W J
R524	RD21002825	R, CARBON 10K 1/4W J
R525, 526	RD22202822	R, CARBON 22K 1/4W J
R527, 528	RD21004822	R, CARBON 1M 1/4W J
R529	RD21002825	R, CARBON 10K 1/4W J
R530	RD26800823	R, CARBON 680 1/4W J
R531	RD25602823	R, CARBON 56K 1/4W J
R532	RD21003829	R, CARBON 100K 1/4W J
R533	RD25602823	R, CARBON 56K 1/4W J
R534	RD24702822	R, CARBON 47K 1/4W J
R535-537	RD21002825	R, CARBON 10K 1/4W J
R538	RD24702822	R, CARBON 47K 1/4W J
R539	RD24701829	R, CARBON 4.7K 1/4W J
R540	RD24702822	R, CARBON 47K 1/4W J
R541	RD21002825	R, CARBON 10K 1/4W J
R542	RD24701829	R, CARBON 4.7K 1/4W J
R543, 544	RD21002825	R, CARBON 10K 1/4W J
R545	RD24702822	R, CARBON 47K 1/4W J
R546, 547	RD21002825	R, CARBON 10K 1/4W J
R548	RD24702822	R, CARBON 47K 1/4W J
R549	RD21002825	R, CARBON 10K 1/4W J
R550	RD21003829	R, CARBON 100K 1/4W J
R551	RD24701829	R, CARBON 4.7K 1/4W J
R552	RN31002087	THICK FILM RS NETWORK A8103J
R553	RN11002068	THICK FILM RS NETWORK A6103J
R554	RN31002087	THICK FILM RS NETWORK A8103J
R555	RD21002825	R, CARBON 10K 1/4W J
R556	RD21000828	R, CARBON 100 1/4W J
R557	RD21002825	R, CARBON 10K 1/4W J
R558	RD21502822	R, CARBON 15K 1/4W J
R559	RD21001821	R, CARBON 1K 1/4W J
R560	RN14701051	THICK FILM RS NETWORK A5472J
R561	RD22702820	R, CARBON 27K 1/4W J
R562	RD24702822	R, CARBON 47K 1/4W J
C501	CC31010431	CAP, CERAMIC 0.001uF 50V
C502	CC31009465	CAP, CERAMIC 0.01uF 50V
C503	CC31010431	CAP, CERAMIC 0.001uF 50V

SYMBOL	PARTS NO.	DESCRIPTION
C504, 505	CC31009465	CAP, CERAMIC 0.01uF 50V
C506	CE04705103	CAP, ELEC. 470uF 10V
C507	CE02206259	CAP, ELEC. 22uF 25V
C508	CE01006160	CAP, ELEC. 10uF 16V
C509	CM04709426	CAP, MYLAR 473 J 50V
C510	CL33308503	CAP, LOW NOISE U50VR33LN
C511	CE01005350	CAP, ELEC. 100uF 35V
C512	CE02204068	CAP, ELEC. 220uF 6.3V
C513	CC31009465	CAP, CERAMIC 0.01uF 540V
C514, 515	CC015012434	CAP, CERAMIC 15P 50V
C516, 517	CE01007504	CAP, ELEC. 1uF 50V
C518	CE04707252	CAP, ELEC. 4.7uF 25V
C519, 520	CE04707252	CAP, ELEC. 4.7uF 25V
C521-523	CM02009425	CAP, MYLAR 203 J 50V
C524	CC05009457	CAP, CERAMIC 0.047uF 50V
C525	CE01005106	CAP, ELEC. 100uF 10V
C526	CC05009457	CAP, CERAMIC 0.047uF 50V
C527	CE01007504	CAP, ELEC. 1uF 50V
C528	CE03307254	CAP, ELEC. 3.3uF 25V
C529	CC31009465	CAP, CERAMIC 0.01uF 50V
Q501	TR10000126	TRANSISTOR 2SA608K(F, G)
Q502	TR50000127	TRANSISTOR 2SK246-Y
Q503	TR30000108	TRANSISTOR 2SC1571(E, F)
Q504-506	TR30000327	TRANSISTOR 2SC536G
Q507	TR30000327	TRANSISTOR 2SC536G
Q508, 509	TR30000492	TRANSISTOR 2SC3399
Q510	TR10000126	TRANSISTOR 2SA608K(F, G)
Q511-515	TR30000327	TRANSISTOR 2SC536G
Q516, 517	TR10000126	TRANSISTOR 2SA608K(F, G)
D501-522	DD10000100	DIODE IN4148
IC501	IC00000482	IC TD6104P
IC502	IC00001346	IC TC9157AP
IC503	IC00002340	IC TC4081BP
IC504	IC00000573	IC TD6301AP
IC505	IC00000883	IC LB1423
IC506	IC00002065	IC HD74HC148P
IC507	IC00001462	IC LC4011
X501	DD60000040	CRYSTAL OSCILLATOR HC49U7.2MHZ
FL501	DD40000976	FL TUBE 035 FIP7F8S
TX-102224 P.C.B. ASSEMBLY		
S601-609	SH60000185	KEY BOARD SW WITH LED C-4177A01 RED
S601-612	SH11200022	12 KEY PUSH SW 4TR-2579
TX-103214 P.C.B. ASSEMBLY		
R901	RD23301820	R, CARBON 3.3K 1/4W J
R902	RD21802829	R, CARBON 18K 1/4W J
R903	RD23301820	R, CARBON 3.3K 1/4W J
R904	RD21502822	R, CARBON 15K 1/4W J
R905	RD21802829	R, CARBON 18K 1/4W J
R906	RD23301820	R, CARBON 3.3K 1/4W J
R907	RD25601820	R, CARBON 5.6K 1/4W J
R908	RD21002825	R, CARBON 10K 1/4W J
R910	RM91500224	R, METAL OXIDE FILM 150 J 2W
R911	RD26800823	R, CARBON 680 1/4W J
C901	CE01005167	CAP, ELEC. 100uF 16V
C902	CE04705164	CAP, ELEC. 470uF 16V
C903	CE01005167	CAP, ELEC. 100uF 16V
C904	CE01004254	CAP, ELEC. 1000uF 25V Δ
C905	CE01007504	CAP, ELEC. 1uF 50V
C906	CE01005167	CAP, ELEC. 100uF 16V
C907	CE04705164	CAP, ELEC. 470uF 16V
C908	CE01004254	CAP, ELEC. 1000uF 25V Δ
C909, 910	CC01009256	CAP, CERAMIC 0.01uF 250V Δ
C911, 912	CC01009256	CAP, CERAMIC 0.01uF 250V Δ
C913	CE01005350	CAP, ELEC. 100uF 35V

SYMBOL	PARTS NO.	DESCRIPTION
C914	CE04706168	CAP,ELEC. 47uF 16V
C915	CE01005507	CAP,ELEC. 100uF 50V
C916	CE02205504	CAP,ELEC. 220uF 50V
C917,918	CC01009256	CAP,CERAMIC 0.01uF 250V Δ
C919	CE02205358	CAP,ELEC. 220uF 35V
C920	CE01005167	CAP,ELEC. 100uF 16V
C921	CE01005258	CAP,ELEC. 100uF 25V
C922	CE04705358	CAP,ELEC. 470uF 35V
C923-928	CC01009256	CAP,CERAMIC 0.01uF 250V Δ
D901,902	DD20000193	DIODE RD15E
D903-907	DD10000068	DIODE IN4003
D908	DD10000100	DIODE IN4148
D909	DD20000193	DIODE RD15E
D910-913	DD10000068	DIODE IN4003
Q901	TR30000029	TRANSISTOR 2DS313
Q902	TR30000431	TRANSISTOR 2SC1570(E,F)
Q903	TR10000047	TRANSISTOR 2SB631K(E,F)
Q904	TR10000126	TRANSISTOR 2SA608K(F,G)
Q905	TR30000431	TRANSISTOR 2SC1570(E,F)
Q906	TR30000121	TRANSISTOR 2SC2274(E,F)
Q907	TR10000254	TRANSISTOR 2SA1345
Q908	TR30000492	TRANSISTOR 2SC3399
IC901	IC00001267	IC NJM78M15
IC902	IC00002077	IC HA17806
S901	SH11000409	1 KEY PUSH SW 4TR-2861
	TX-103224	P.C.B. ASSEMBLY
R591	RD21501829	R,CARBON 1.5K 1/4W J
R592	RD21801825	R,CARBON 1.8K 1/4W J
R593,394	RD21501829	R,CARBON 1.5K 1/4W J
R595,596	RD21801825	R,CARBON 1.8K 1/4W J
R597	RD21501829	R,CARBON 1.5K 1/4W J
D591	DD40000927	FL TUBE LTS321AR
IC591	IC00002089	IC HD74LS47
C591	CC31009465	CAP,CERAMIC 0.01uF 50V
	TX-108114	P.C.B. ASSEMBLY
R951,592	RM83320617	R,METAL MK2332RFECZ.
C591,592	CE72205645	CAP,CERAMIC 220uF 25V HFS
Q951	TR10000047	TRANSISTOR 2SB631K(E,F)
Q952	TR40000069	TRANSISTOR 2SD600K(E,F)
C001	CK00000035	SPARK KILLER DE7150F472M Δ
R001	RD02204928	R,CARBON 2.2M 1/2W Δ (U,C,A,J,H6 ONLY)
OTHERS		
	AB00000602	PAINTED BOTTOM BOARD 3TTI-6A#2
	AF30000139	FRONT CHASSIS 2TTR-2A
	AM00001987	PAINTED CHASSIS BODY 2TTI-4D#2
	AR30000179	PRINTED REAR CHASSIS TRP-607
	LB03650004	AM LOOP ANT. W/HOLDER TRL-365
	PT26007114	POWER TRANSFORMER TT-260-GF-1 Δ
	FT00000229	PLASTIC FOOT (BK) 4TSH-19#2 50Fx14H
	FT00000230	PU FOOT 4TR-2823 24Fx14H
	SP10000919	P.C.B SUPPORT 4TYO-6C
	SP10005619	P.C.B SUPPORT 4TTR-4
	SP30000562	P.V.C PLATE 4TR-2805
	SP40000838	SHIELD COVER 4TTR-10A#2
	CD00000218	AC CORD SPT-2 AWG#18 4TR-670#4 Δ (C,U,A,J)
	CD00000292	AC POWER CORD 4TR-2631#1 Δ (D)

SYMBOL	PARTS NO.	DESCRIPTION
	CD00000048	AC POWER CORD 4TR-1037 Δ (H,E,K2)
	CD00000085	AC POWER CORD C-2504A (K1) Δ
	CD00000115	AC POWER CORD C-3763-T (G) Δ
	SC00000131	AC CORD STOPPER SR-5N-4 (A,K1) Δ
	SC00000039	AC CORD STOPPER SR-6W-1 (D) Δ
	SC00000027	AC CORD STOPPER SR-4M-4 Δ
	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
	NP00002012	NAME STICKER AC100V 4TR-2828A#6 TNP-391
	NP00001950	NAME STICKER AC220V 4TR-2828A#2 TNP-383
	AA30000394	FRONT PANEL 2TQT-1#1 TFP-661
	AW00000630	PANEL WINDOW 4TQS-7#3
	BU00000426	PUSH RING C-3547-T#3 5x5
	BU00001145	POWER RING W/LED 4TQF-13 14x14
	KB20002681	POWER BUTTON 4TQF-15 14x14
	KB20002838	TACT BUTTON 2TQT-4 9 KEY
	OM10001260	ORNAMENTAL SIDE BOARD 4TR-2797#1 H=60MM
	OM70000065	PUSH BUTTON CONNECTOR 4TTL-15
	OM70000260	ACRYLIC LEVER 4TQT-5
	SN00000179	BUTTON SPRING 4TR-1988A#2 10F
	AU000001250	TOP COVER POLY 3TTE-6#4
	KB20002840	PUSH BUTTON 4TQT-6 5x5
	OM10001442	FL ORNAMENTAL PLATE 4TTR-3A#2 TFP-662
	DD40000095	LED SEL1124R
	OM00000460	FILTER BOARD 4TYX-18A
	SR00000882	UPPER COVER SPACER 4TR-2418
	MN10002902	OWNER'S MANUAL RT-970BX