



Technical Manual

STEREO INTEGRATED AMPLIFIER **RA-972**

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Specification

Continuous Power Output (20 - 20 kHz, <0.03 %, 8 ohms)	60 watts/ch
Total Harmonic Distortion (20 Hz - 20k Hz)	<0.03 % at rated power, 1/2 power or 1 watt
Intermodulation Distortion (60 Hz : 7 kHz, 4:1)	<0.03 % at rated power, 1/2 power or 1 watt
Frequency Response - all inputs	10 Hz - 100 kHz, +1, -3 dB
Dampning Factor (20 - 20,000 Hz, 8 ohms)	150
Input Sensitivity / Impedance	160 mV / 33 kOhms
Input Overload	5 V
Preamplifier Output / Impedance	1 V / 470 ohms
Tone Controls - Bass/Treble	± 6 dB at 100 Hz / 10 kHz
Signal to Noise Ratio(IHF"A"weighted)	>95 dB
Power Requirements	
USA Version	115 volts, 60 Hz
European version	230 volts, 50 Hz
Dimensions(W x H x D)	440 x 92 x 347 mm 173/8" x 55/8" x 1311/16"
Weight	6.5 kg / 14.3 lbs.

THE ROTEL CO., LTD

SHINSEN-BLD. 4F 10-10 SHINSEN-CHO, SHIBUYA-KU,
TOKYO 150-0045, JAPAN

Serial. NO. Beginning

Y-323A-00015C/S-S

Parts List-1

SYMBOL	PARTS NO.	DESCRIPTION
X-1289-01PCBASSEMBLY		
C401	041	UTES1J220-FB CAP,ELEC.63V22UF
C501,502	041	50BGF10M CAP,ELEC.50V10UF
C503,504	044	FSC160V470H CAP,STYROL 160V47PF
C505,506	041	50BGF10M CAP,ELEC.50V10UF
C507-512	044	50MSAN104J CAP,FILM 50V0.1UF
C513,514	042	TP50V472J CAP,MYLAR 50V4700PF
C515,516	042	TP50V152J CAP,MYLAR 50V1500PF
C517,518	041	50BGF10M CAP,ELEC.50V10UF
C519,520	044	FSC160V101H CAP,STYROL 160V100PF
C521,522	041	50BGF10M CAP,ELEC.50V10UF
C523,524	041	ECEA1EFS221 CAP,ELEC.25V220UF
C527,528	041	ECEA1EFS221 CAP,ELEC.25V220UF
C529	044	50MSAN104J CAP,FILM 50V0.1UF
C613-616	044	FSC160V561H CAP,STYROL 160V560PF
C617,618	044	KT18-2A104K CAP,FILM 100V0.1UF
C701,702	043	TC50VCH330 CAP,CERA.50V33PF
C703	041	UTSS1H010-FB CAP,ELEC.50V1UF
C704	044	KT18-2A104K CAP,FILM 100V0.1UF
C705	041	UTSS0J222 CAP,ELEC.6.3V2200UF
C707-709	043	TC50V103 CAP,CERA.50V0.01UF
C710	041	UTSS1E470-FB CAP,ELEC.25V47UF
C901-904	043	TC500V103 CAP,CERA.500V0.01UF
C905,906	041	ALN20S1073DD CAP,ELEC.50V10000UF
C907,908	041	ECEA1EFS101 CAP,ELEC.25V100UF
C909,910	041	ECEA1EFS471 CAP,ELEC.25V470UF
C914,915	043	TC500V103 CAP,CERA.500V0.01UF
C916,917	041	UTES1J471 CAP,ELEC.63V470UF
C918,919	041	UTSS1V101-FB CAP,ELEC.35V100UF
C920	041	UTSS1A101-FB CAP,ELEC.10V100UF
C921,922	041	UTSS1E101-FB CAP,ELEC.25V100UF
D401-406	034	T1N4148-86 DIODE
D609-612	034	T1N4003-TB DIODE
D615-617	034	T1N4148-86 DIODE
D722	034	T1N4148-86 DIODE
D723	034	TRD5.6JST1 ZENER DIODE
D724	034	T1N4148-86 DIODE
D726-729	034	T1N4148-86 DIODE
D901	034	BR84 BRIDGE DDIODE
D902,903	034	T1N4003-TB DIODE
D904-906	034	T1N4148-86 DIODE
D907,908	034	TRD16JST1 ZENER DIODE
D909	034	TRD12JST1 ZENER DIODE
F601-604	036	5ST6.3 MINI FUSE 250VT6.3A
IC501	031	OPA2604AP IC
IC502	031	NJM2114D IC
IC701	031	TMP47C400BN-1 IC TMP47C400BN-1A57
IC702	031	TC74HC595AP IC
IC703	031	LB1641 IC
IC901	031	NJM7805FA IC
PJ1-4	066	4TR-2408#3 4P PINJACK

SYMBOL	PARTS NO.	DESCRIPTION
PJ5	066	4TR-2166#4 2P PINJACK
Q401-406	032	TA1345 TRANSISTOR
Q407-412	032	TC3399 TRANSISTOR
Q619,620	033	TC3478A-LKU TRANSISTOR
Q621,622	033	TA1376A-LKU TRANSISTOR
Q623,624	033	C3902-RS TRANSISTOR
Q625,626	033	A1507-RS TRANSISTOR
Q639	032	TC536-FG TRANSISTOR
Q901	033	D600-EF TRANSISTOR
Q902	033	B631-EF TRANSISTOR
Q903	033	D600-EF TRANSISTOR
Q904	032	TD863-EF TRANSISTOR
Q905	032	TC536-FG TRANSISTOR
Q906	033	TA1016-FG TRANSISTOR
Q907,908	032	TC3708-ST TRANSISTOR
Q909	032	TC536-FG TRANSISTOR
R401-404	054	TMK2001KFECZ R,METAL 1% 1K
R405	054	CR14-332J-A R,CARBON 3.3K
R501,502	054	EE10-151 R,METAL 150R
R503,504	054	EE10-104 R,METAL 100K
R505,506	054	TMK2680RFECZ R,METAL 1% 680R
R507,508	054	TMK203K9FECZ R,METAL 1% 3.9K
R509,510	054	TMK2100KFECZ R,METAL 1% 100K
R511,512	054	TMK202K2FECZ R,METAL 1% 2.2K
R513,514	054	TMK2002KFECZ R,METAL 1% 2K
R515,516	054	TMK2022KFECZ R,METAL 1% 22K
R517-520	054	TMK201K5FECZ R,METAL 1% 1.5K
R521,522	054	TMK2015KFECZ R,METAL 1% 15K
R523,524	054	TMK2100KFECZ R,METAL 1% 100K
R525,526	054	TMK2150RFECZ R,METAL 1% 150R
R527,528	054	TMK201K2FECZ R,METAL 1% 1.2K
R529,530	054	TMK2002KFECZ R,METAL 1% 2K
R531,532	054	TMK2100KFECZ R,METAL 1% 100K
R533,534	054	TMK2470RFECZ R,METAL 1% 470R
R631,632	054	TMK2001KFECZ R,METAL 1% 1K
R633,634	054	TMK2047RFECZ R,METAL 1%47R
R637-644	054	NIR2-0.22R R,METAL 2W 0.22R
R645,646	054	2WS10JF R,METAL 2W 10R
R653-656	054	TMK2220RFECZ R,METAL 1% 220R
R678	053	CR14-332J-A R,CARBON 3.3K
R680	053	CR14-104J-A R,CARBON 100K
R701,702	053	CR14-472J-A R,CARBON 4.7K
R703,704	053	CR14-104J-A R,CARBON 100K
R705	053	CR14-124J-A R,CARBON 120K
R706	053	CR14-473J-A R,CARBON 47K
R707	053	CR14-102J-A R,CARBON 1K
R709	053	CR16-100J-A R,CARBON 10R
R711,712	053	CR16-104J-A R,CARBON 100K
R713,714	053	CR14-104J-A R,CARBON 100K
R715	053	CR14-472J-A R,CARBON 4.7K

Parts List-2

SYMBOL	PARTS NO.	DESCRIPTION
R716	053 CR16-104J-A	R,CARBON 100K
R901,902	054 TMK203K3FECZ	R,METAL 1% 3.3K
R903	054 1WS820JF	R,METAL 1W 820R
R904	054 1WS1.2KJF	R,METAL 1W 1.2K
R905	053 CR14-472J-A	R,CARBON 4.7K
R906	053 CR14-103J-A	R,CARBON 10K
R907	054 1WS820JF	R,METAL 1W 820R
R908	054 1WS68JF	R,METAL 1W 68R
R909	053 CR14-333J-A	R,CARBON 33K
R910	053 CR14-223J-A	R,CARBON 22K
R911	053 CR14-104J-A	R,CARBON 100K
R912	054 1WS10KJF	R,METAL 1W 10K
R913	053 CR14-473J-A	R,CARBON 47K
R914	053 CR14-683J-A	R,CARBON 68K
R915,916	053 CR14-223J-A	R,CARBON 22K
R917	053 CR14-332J-A	R,CARBON 3.3K
R918	053 CR14-103J-A	R,CARBON 10K
R919	053 CR14-562J-A	R,CARBON 5.6K
R920	053 CR14-154J-A	R,CARBON 150K
R921	053 CR14-104J-A	R,CARBON 100K
RY401-406	063 V23106-24	RELAY
RY601,602	063 DH2TU-24	RELAY
RY603	063 V23106-24	RELAY
RY901	063 DG1U-24	RELAY
RY902	063 DH2U-24	RELAY
S401	062 C-4174A17	ROTARY SWITCH(RECORDING)
S501	062 4TR-2780	ROTARY SWITCH(TONE)
SP1,2	067 C-4493A00	SPEAKER TERMINAL
TH901	034 TTC-503	THERMISTOR
VR501	051 C-4170A27	VARIABLE RESISTOR(VOLUME)
VR502,503	053 4TR-2774	VARIABLE RESISTOR(TONE)
X701	023 CSA4.19MHZ	CERAMIC RESONATOR
	069 C-3417A	FUSE CLIP
X-1289-02,03PCBASSEMBLY		
C601,602	041 50BGF4R7M	CAP,ELEC.50V4.7UF
C603,604	044 FSC160V331H	CAP,STYROL 160V330PF
C605,606	044 FSC160V471H	CAP,STYROL 160V470PF
C607,608	041 25BGF100M	CAP,ELEC.25V100UF
C609,610	044 FSC160V331H	CAP,STYROL 160V330PF
C611,612	041 50BGF10M	CAP,ELEC.50V10UF
C619,620	044 FSC160V221H	CAP,STYROL 160V220PF
D601-608	034 T1N4148-86	DIODE
Q601-604	033 TC2362-FG	TRANSISTOR
Q605-610	033 TA1016-FG	TRANSISTOR
Q611,612	033 TC2362-FG	TRANSISTOR
Q613,614	033 TA1208-RST	TRANSISTOR
Q615,616	033 TC2910-RST	TRANSISTOR
R601,602	054 TMK2560RFECZ	R,METAL 1% 560R
R603,604	054 TMK2047KFECZ	R,METAL 1% 47K

SYMBOL	PARTS NO.	DESCRIPTION
R605-612	054 TMK201K5FECZ	R,METAL 1% 1.5K
R613-616	054 TMK2220RFECZ	R,METAL 1% 220R
R617,618	054 TMF1/4-5600F	R,MRS25 560R
R619,620	054 TMK2047KFECZ	R,METAL 1% 47K
R621-624	054 TMK2100RFECZ	R,METAL 1% 100R
R625,626	054 TMF1/4-6801F	R,MRS25 6.8K
R627,628	054 TMF1/4-1001F	R,MRS25 1K
R629,630	054 TMF1/4-3302F	R,MRS25 33K
R635,636	054 TMK2012KFECZ	R,METAL 1% 12K
R651,652	054 TMF3300	R,METAL 330R
VR601,602	051 SFR001-222	SEMI-FIXED RESISTOR 2.2K
X-1289-04 PCB ASSEMBLY		
D707-712	034 T1N4148-86	DIODE
D714-720	034 T1N4148-86	DIODE
S701	062 C-4174A13	ROTARY SWITCH(LISTENING)
X-1289-05 PCB ASSEMBLY		
D701-706	034 LN38GCPP	LED
R710	053 CR16-102J-A	R,CARBON 1K
X-1289-06 PCB ASSEMBLY		
HJ1	065 C-3399#1	PHONE JACK
R647-650	054 TMK2680RFECZ	R,METAL 1% 680R
R667,668	054 1WS1.2KJF	R,METAL 1W 1.2K
S601	062 C-4174A19	ROTARY SWITCH(SPEAKERS)
X-1289-07 PCB ASSEMBLY		
C706	041 UTSS1E470-FB	CAP,ELEC.25V47UF
IC704	031 SBX1810-52	IC
R708	053 CR16-101J-A	R,CARBON 100R
X-1289-08 PCB ASSEMBLY		
HJ2	065 YKB21-5103A	MINI JACK
X-1289-09 PCB ASSEMBLY		
C911	044 DE1307E472M	SPARK KILLER
S901	061 C-4176A08	POWER SWITCH
X-1289-14 PCB ASSEMBLY		
ACO1	069 C-4497A00	AC OUTLET
HEAT SINKER ASSEMBLY		
Q617,618	032 D600-EF	TRANSISTOR
Q627-630	033 D1047-DE	POWER TRANSISTOR
Q631-634	033 B817-DE	POWER TRANSISTOR
OTHERS		
011	FP-514	FRONT PANEL ASSY
012	QT4-09A00T	KNOB 25F (LISTENING)
012	SD4-16A00	PUSH KNOB 12F
012	3TQU-5	KNOB ASSY 33F
012	4TR-3134	KNOB 25F (RECORDING)
012	4TR-3136	KNOB 13F
012	4TSA-7	KNOB 11F
014	C-4550A09	UPPER COVER
014	SZ3-08A00	BOTTOM BOARD

Parts List-3

SYMBOL	PARTS NO.	DESCRIPTION
	015 RP-376	PRINTED REAR CHASSIS
	019 4TSH-19#2	PLASTIC FOOT
	022 TT-311-UR	POWER TRANSFORMER
	034 SEL1124R	LED
	069 C-4629A01	AC INLET
	072 C-4620A01	AC CORD SET for STD

SYMBOL	PARTS NO.	DESCRIPTION
	072 C-4622A01	AC CORD SET for AUSTRALIA
	072 C-4623A01	AC CORD SET for UK
	072 C-4624A01	AC CORD SET for CEE
	081 SZ4-21A00	INSIDE CARTON
	081 TZ-183	STYROL MOULDING
	092 RR-A91	REMOTE UNIT

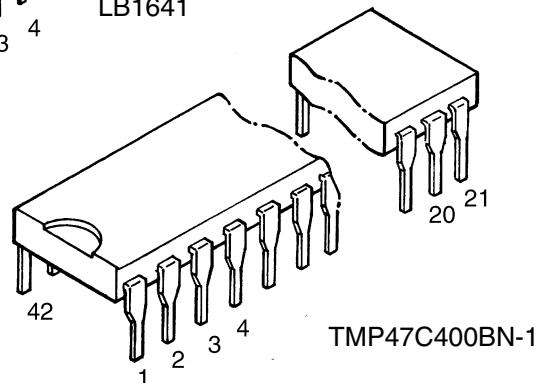
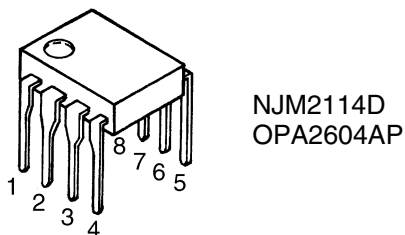
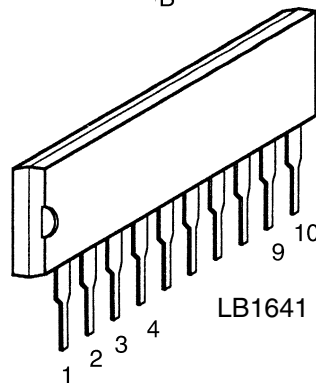
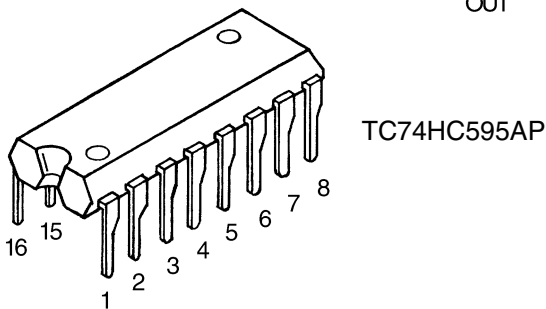
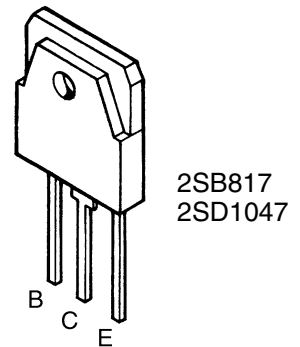
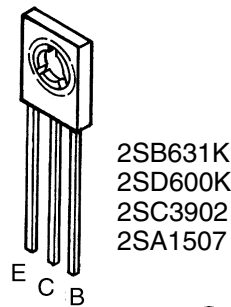
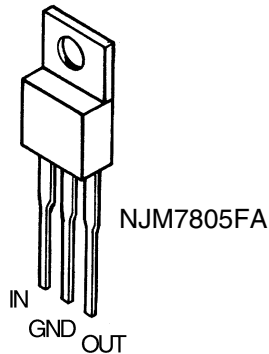
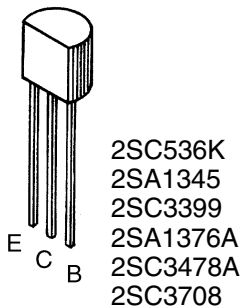
Adjustment

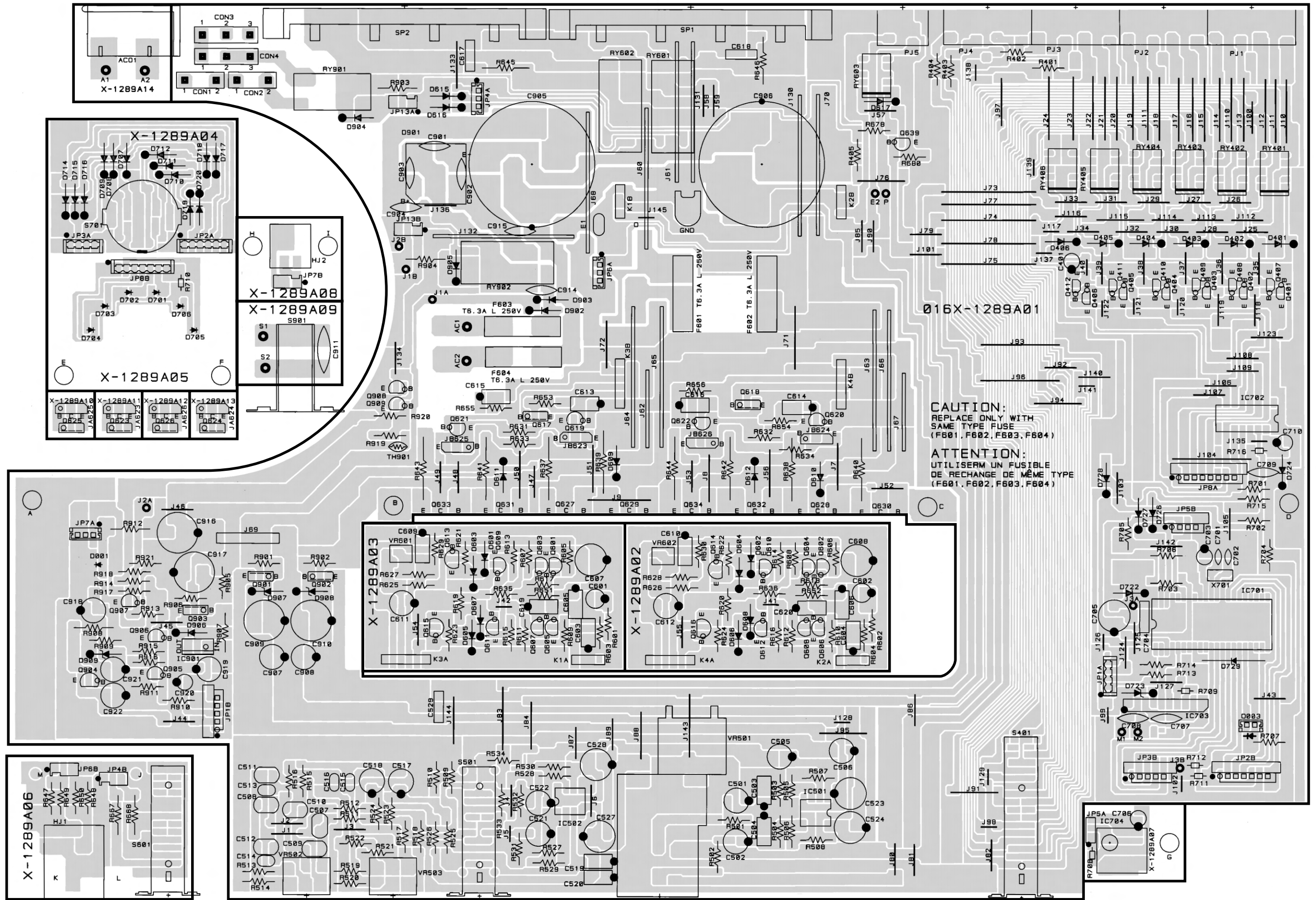
Instruments : DC milli-voltmeter

Notes : Prior to Bias Adjustment, run about 5minutes with rated output(8ohms) and warm up Power Transistor and Heat Sink. Set input off.

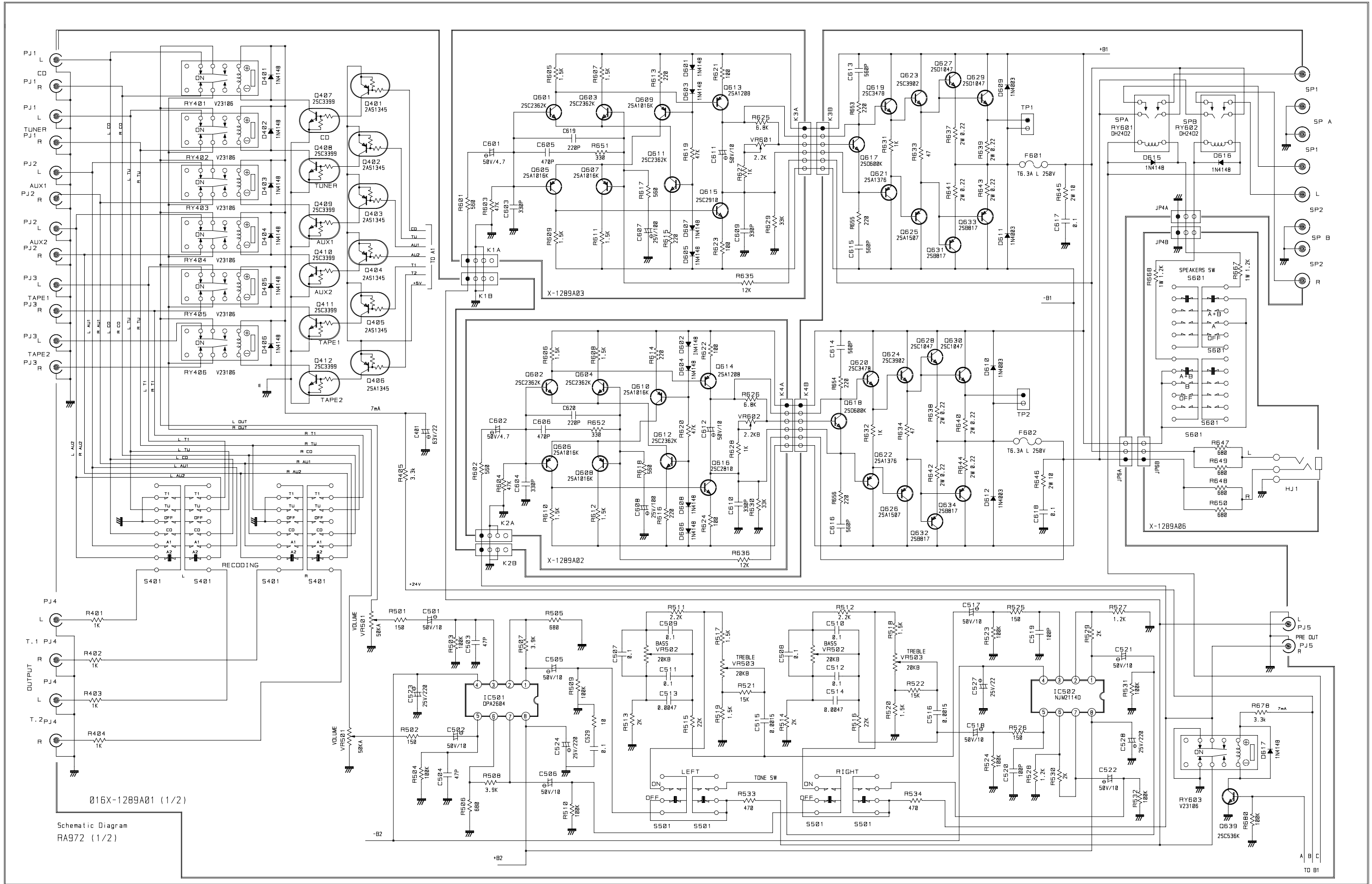
Step	Coupling	Location	Adjust for
1	X-1289-01 PCB R639	X-1289-03 PCB VR601	DC milli-voltmeter reads 5mV
2	X-1289-01 PCB R640	X-1289-02 PCB VR602	

Case Outlines

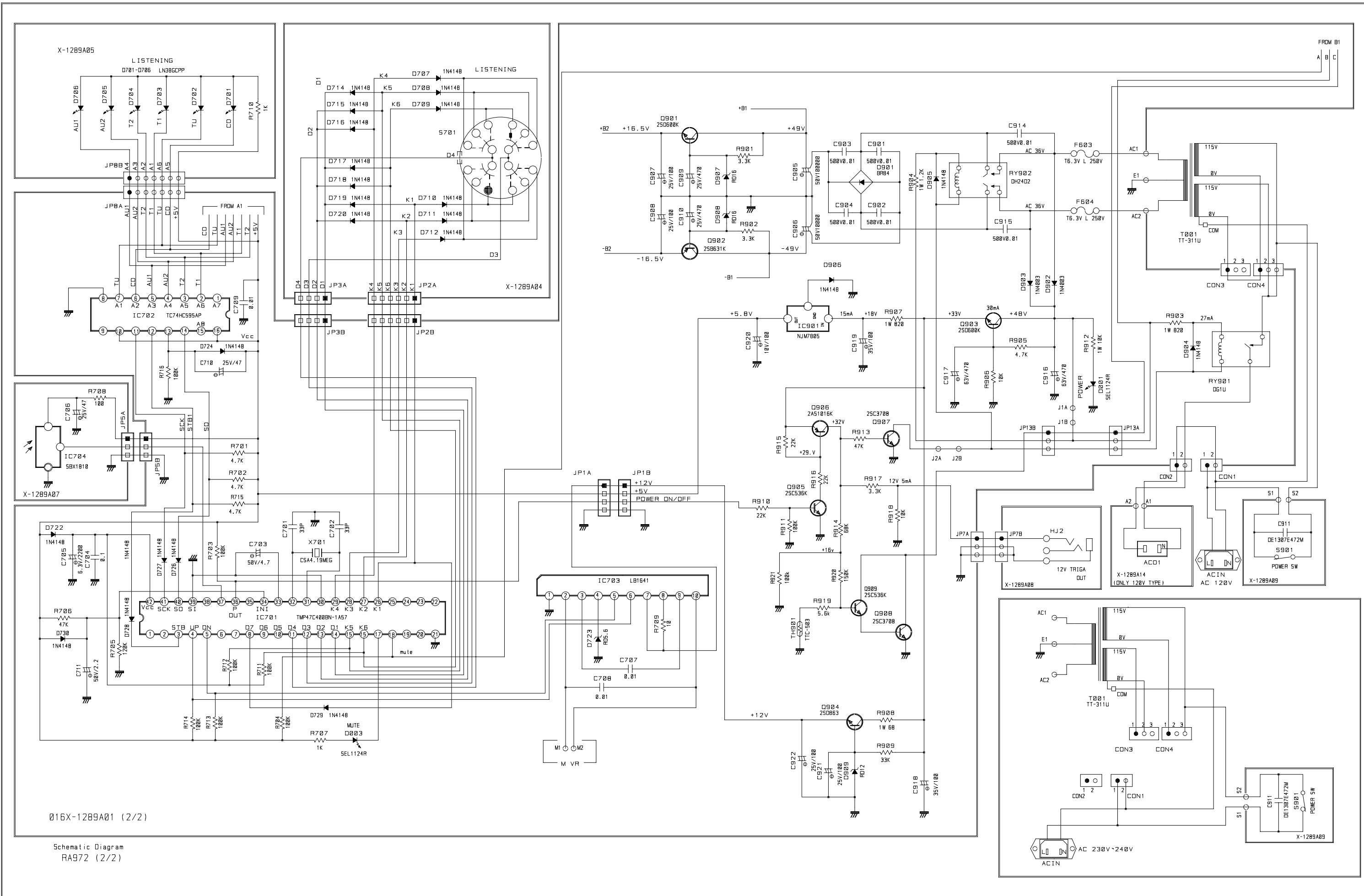




Schematic Diagram



Schematic Diagram



016X-1289A01 (2/2)

Schematic Diagram
RA972 (2/2)