

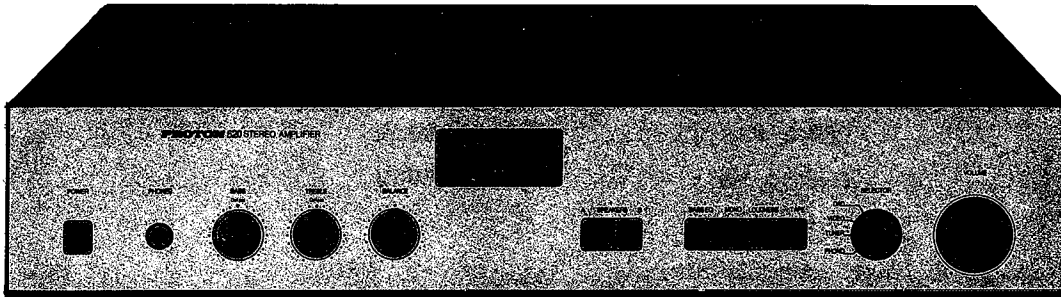


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# Service Manual

## PROTON MODEL 520 STEREO AMPLIFIER



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# SPECIFICATION

Continuous RMS Power Output per Channel	
at 8 OHM 20-20kHz:	20W
T.H.D. at Rated Power 20W:	0.015%
I.M.D. at Rated Power 20W:	0.015%
Clipping Power at 8 OHM/4 OHM/2 OHM:	27W/36W/40W
Dynamic Power at 8 OHM/4 OHM/2 OHM:	52W/80W/100W
Damping Factor:	90
Frequency Response 20-20kHz:	+/-0.2dB
Power Bandwidth at T.H.D. 1%:	10-60kHz
High Level Input Resistance/Capacitance:	40K OHM/220pF
Line Input Sensitivity (Video):	150mV
(Tape Play):	150mV
(Phono MM):	2.5mV
(Phono MC High/Low):	0.2mV/0.1mV
Residual Noise (flat):	0.4mV
Channel Crosstalk (1kHz):	90dB
Function Crosstalk (1kHz):	80dB
S/N Ratio (Unweighted) (DAD):	90dB
(Tape Play):	90dB
(Phono MM):	80dB
(Phono MC):	68dB
Bass Control @ 100Hz (Boost/cut):	+9/-9dB
Trable Control @ 10kHz (Boost/cut):	+9/-9dB
*Bass EQ @ 75Hz:	+3dB
Loudness @ -30dB (100Hz):	+6dB
(10kHz):	+3dB
Phono Input Resistance (MM/MC):	47K OHM/100 OHM
Phono Input Capacitance (Selectable):	100pF/200pF/320pF
Phono Overload @ T.H.D. 1% MM	
(20Hz/1kHz/20kHz):	28mV/280mV/2.8V
Phono T.H.D. at 4.5V Output (MM):	0.01%
(MC):	0.03%
Riaa Response Accuracy MM/MC:	+/-0.2dB/+/-0.5dB
*For UK Only Bass EQ Button is	
Replaced by Infrasonic Filter	
Turn Over Frequency:	20Hz
Slope:	12dB/oct

# ALIGNMENT

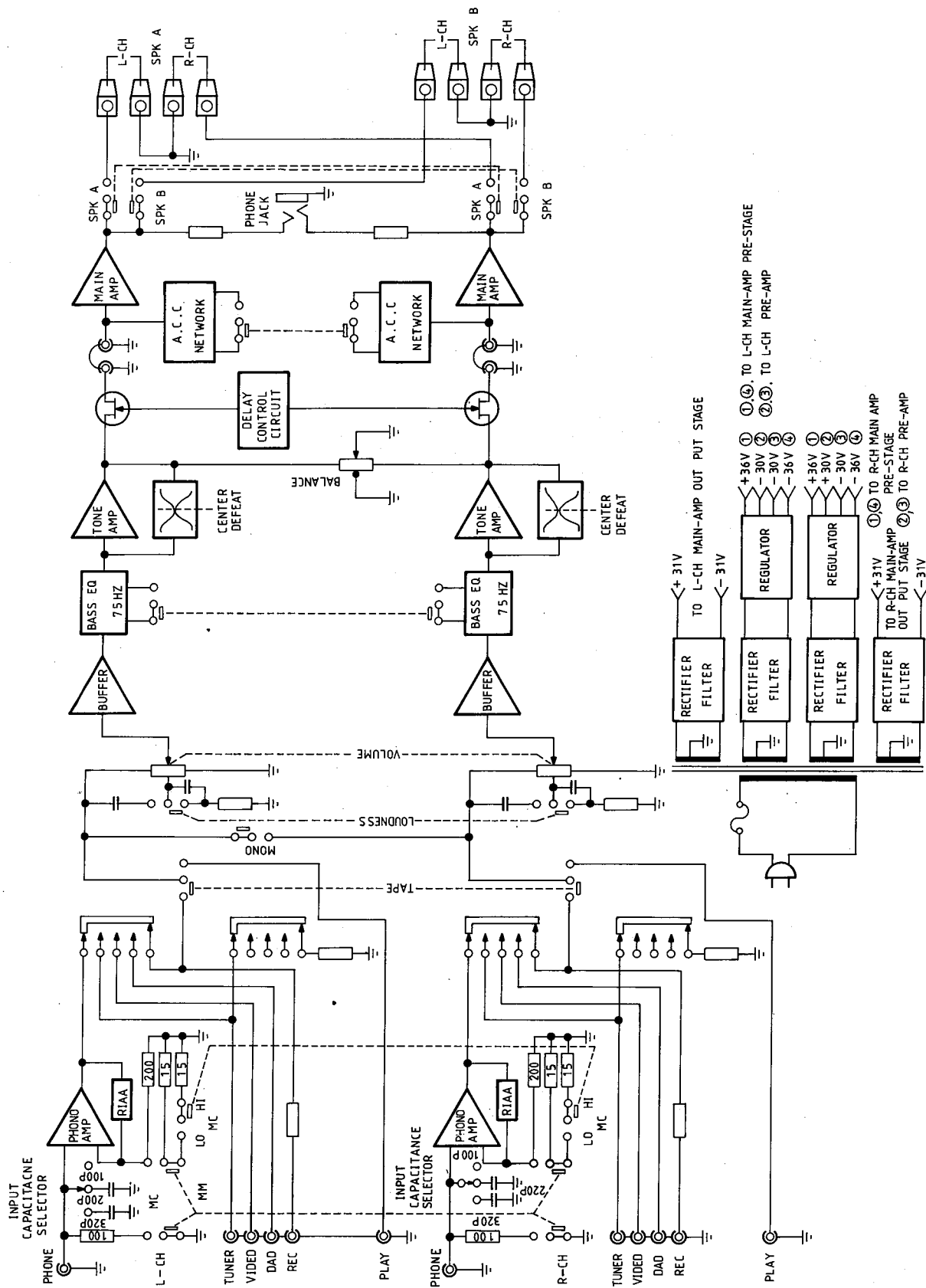
## IDLE CURRENT ALIGNMENT

1. Set the volume control at minimum position.
2. Push on POWER for 5 minutes pre-heating.
3. Remove the load from speaker terminals.
4. Connect DC millivolt-meter across R665 for left channel and R666 for right channel. The meter sensitivity should be set at 100mV full scale deflection.
5. Insert 560 OHM carbon resistor to Rx1(left channel) and Rx2 (right channel) paralalled with R657(left channel) and R658 (right channel).
6. After insert 560 OHM, if the reading from meter is between 25mV and 50mV, the alignment is completed.
7. If the reading were less than 25mV. The value of Rx1 or Rx2 should be reduced till the reading is between 25mV and 50mV.
8. If the reading were more than 50mV. The value of Rx1 or Rx2 should be increase till the reading is between 25mV and 50mV.
9. Finally , short the R665(left channel) and the R666(right channel) 1 OHM resistors.

## DC OFF-SET ALIGNMENT

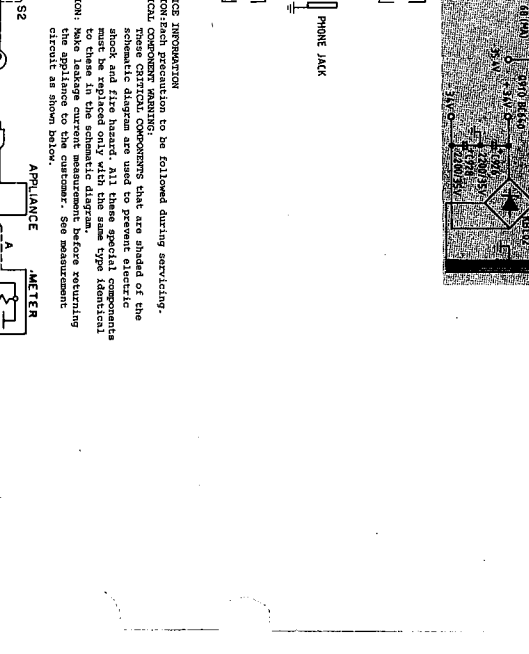
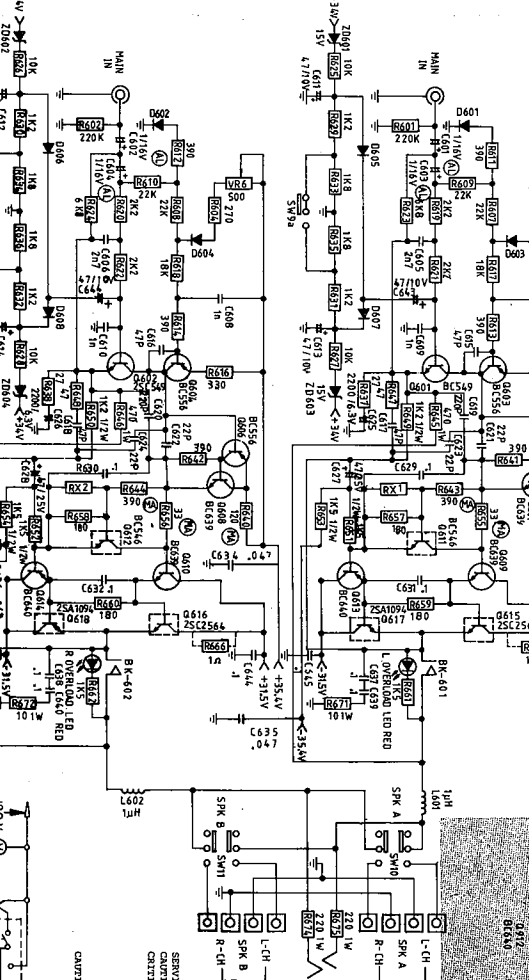
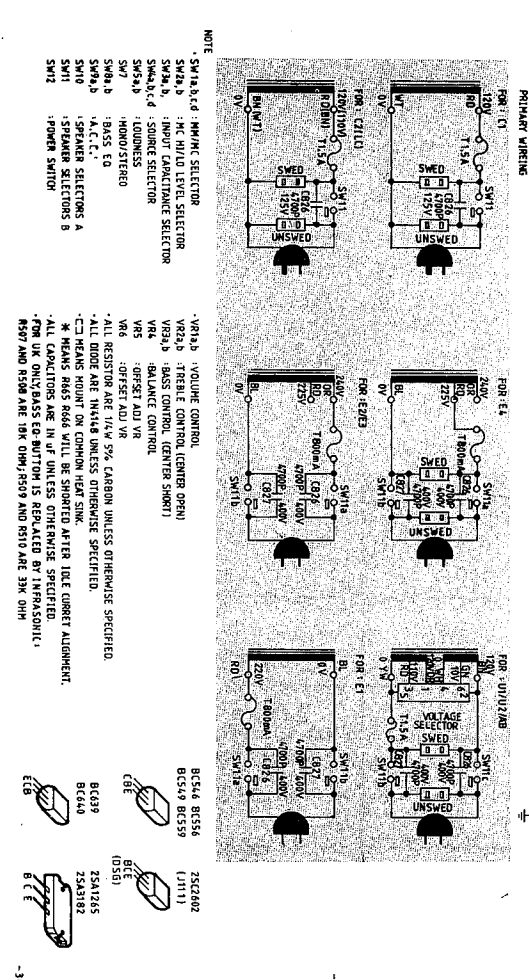
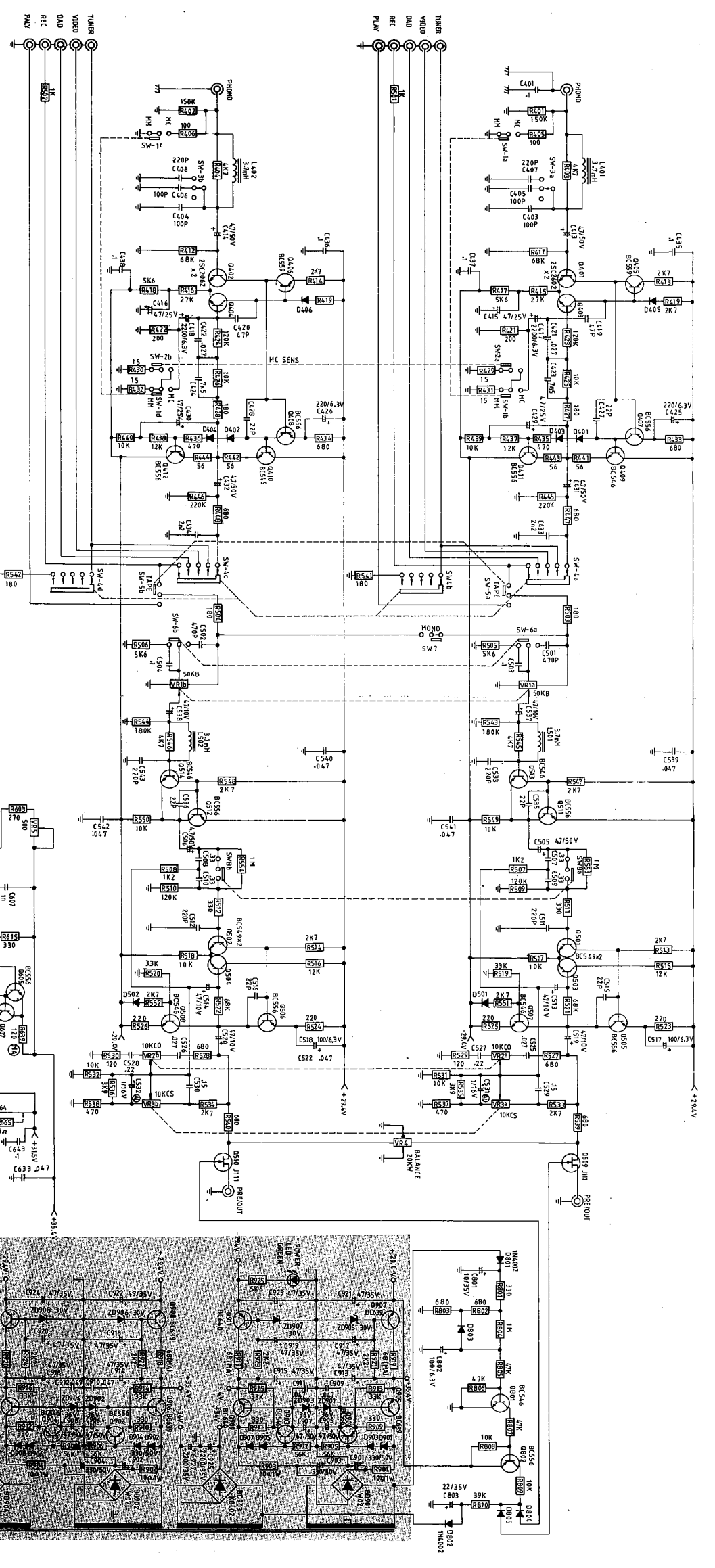
1. Set the volume control at minimum position.
2. Push on POWER for 5 minutes pre-hearting.
3. Connect a DC millivolt-meter to speaker terminals of each channel. The meter sensitivity should be set at 100mV full scale deflection. The positive input of the meter should be connected to the red (+) speaker terminal.
4. Adjust VR5(left channel) and VR6(right channel) till the meter reading is zero.

# BLOCK DIAGRAM





# CIRCUIT DIAGRAM



**NOTE:** SWA-B-D SWIRLING SELECTOR  
 SWA-B : HC HI-LO LEVEL SELECTOR  
 SWA-B : INPUT CAPACITANCE SELECTOR  
 SWA-B-C-D : SOURCE SELECTOR  
 SWA-B-C-D : LUMINANCE  
 SWA : MONOSTEREO  
 SWA-B : BASS  
 SWA-B : TREBLE  
 SWA-B : SPEAKER SELECTORS A  
 SWA-B : SPEAKER SELECTORS B  
 SWA-B : POWER SWITCH

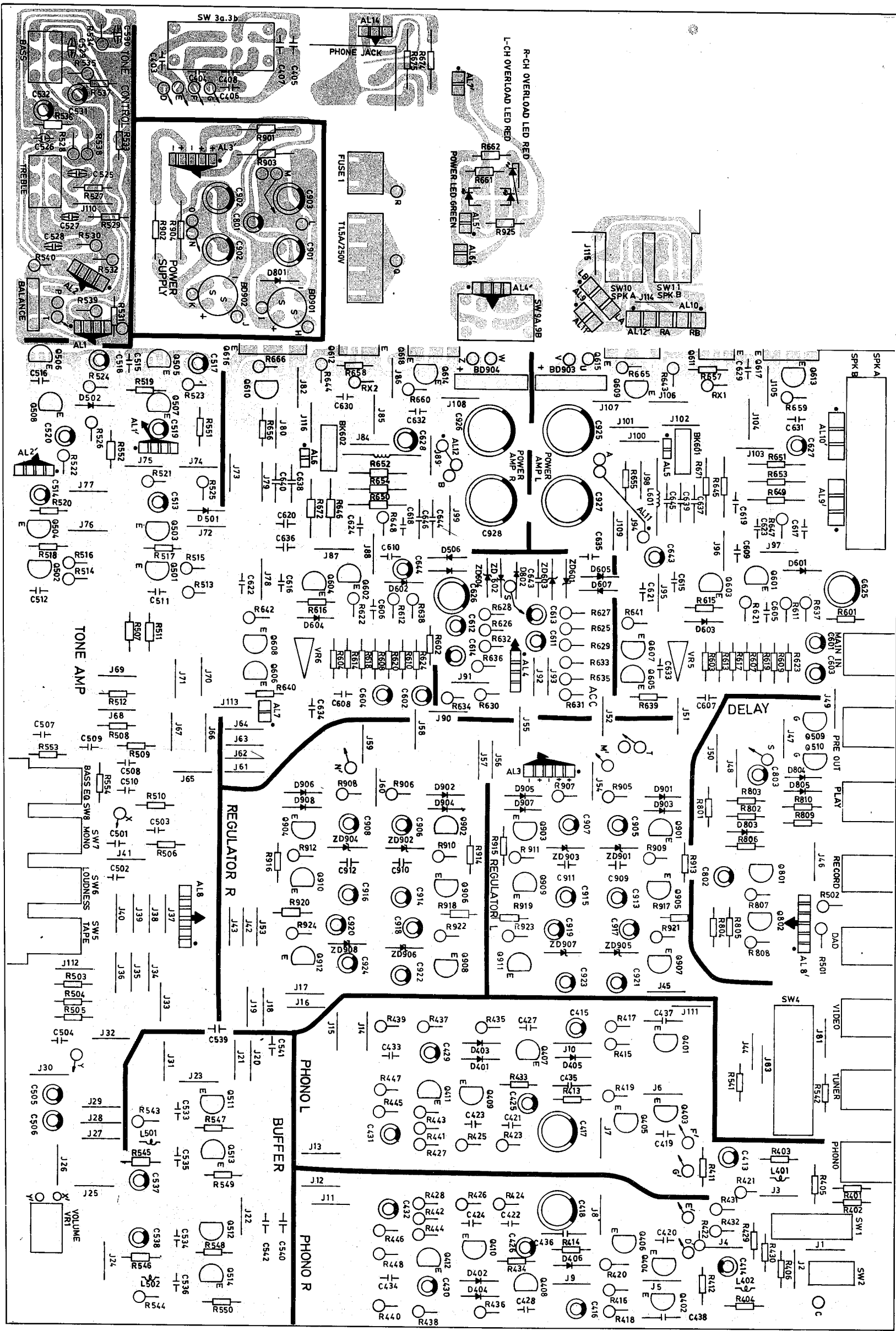
**NOTE:** SWA-B-D SWIRLING SELECTOR  
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 SWA-B : BASS  
 SWA-B : TREBLE  
 SWA-B : SPEAKER SELECTORS A  
 SWA-B : SPEAKER SELECTORS B  
 SWA-B : POWER SWITCH

**CAUTION:** When replacement is followed during servicing, observe the following:

**CRITICAL COMPONENTS:** These critical components that are marked on the schematic diagram must be replaced only with the same type identical to those in the schematic diagram. Before returning the appliance to the customer, see maintenance circuit as shown below.

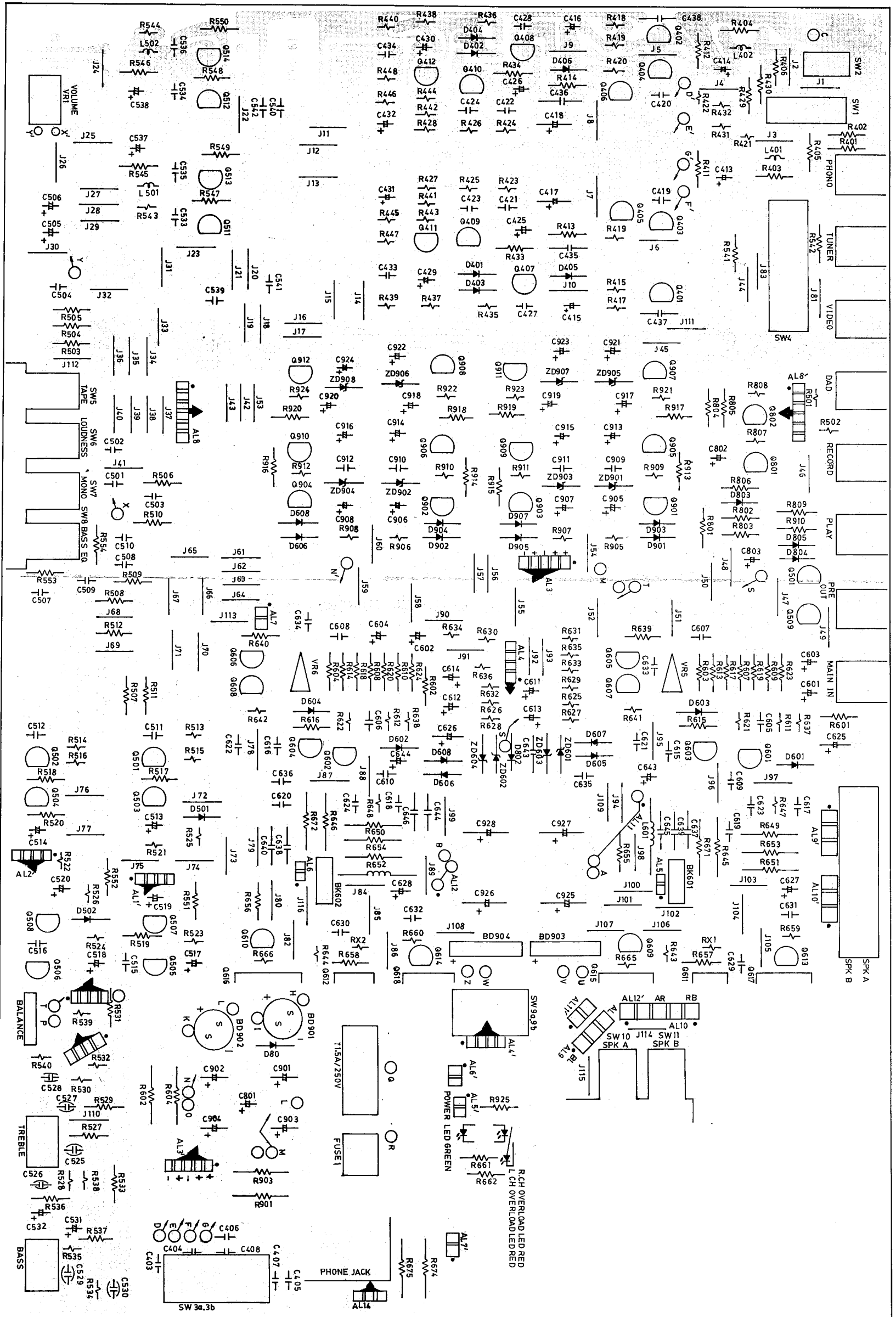
**METER:** METER  
 INSULATING  
 GROUNDING  
 GROUNDING SUPPLY CONDUCTOR

PCB PARTS LOCATION (TOP VIEW)





# PCB PARTS LOCATION (BOTTOM VIEW)



# ELECTRICAL PARTS LIST

REF. NO.	PART NO.	DESCRIPTION
RESISTORS (All are carbon film 1/4W +-5% unless noted otherwise)		
R401-R402	16-1/4CA154J	150K OHM
R403-R404	16-1/4CA472J	4K7 OHM
R405-R406	16-1/4CA101J	100 OHM
R411-R412	16-1/4CA683J	68K OHM
R413-R414	16-1/4CA272J	2K7 OHM
R415-R416	16-1/4CR273J	27K OHM
R417-R418	16-1/4CR562J	5K6 OHM
R419-R420	16-1/4CR272J	2K7 OHM
R421-R422	16-1/4CR201J	200 OHM
R423-R424	16-1/4CR124J	120K OHM
R425-R426	16-1/4CR103J	10K OHM
R427-R428	16-1/4CR181J	180 OHM
R429-R430	16-1/4CA150J	15 OHM
R431-R432	16-1/4CR150J	15 OHM
R433-R434	16-1/4CA681J	680 OHM
R435-R436	16-1/4CR471J	470 OHM
R437-R438	16-1/4CR123J	12K OHM
R439-R440	16-1/4CR103J	10K OHM
R441-R442	16-1/4CR560J	56 OHM
R443-R444	16-1/4CR560J	56 OHM
R445-R446	16-1/4CR224J	220K OHM
R447-R448	16-1/4CR681J	680 OHM
R501-R502	16-1/4CR102J	1K OHM
R503-R504	16-1/4CA181J	180 OHM
R505-R506	16-1/4CA562J	5K6 OHM
*R507-R508	16-1/4CA122J	1K2 OHM
*R509-R510	16-1/4CA124J	120K OHM
R511-R512	16-1/4CA331J	330 OHM
R513-R514	16-1/4CR272J	2K7 OHM
R515-R516	16-1/4CR123J	12K OHM
R517-R518	16-1/4CA103J	10K OHM
R519-R520	16-1/4CA333J	33K OHM
R521-R522	16-1/4CR683J	68K OHM
R523-R524	16-1/4CR221J	220 OHM
R525-R526	16-1/4CR221J	220 OHM
R527	16-1/4CA681J	680 OHM
R528	16-1/4CR681J	680 OHM
R529	16-1/4CA121J	120 OHM
R530	16-1/4CR121J	120 OHM
R531	16-1/4CA103J	10K OHM
R532	16-1/4CR103J	10K OHM
R533	16-1/4CA272J	2K7 OHM
R534	16-1/4CR272J	2K7 OHM
R535	16-1/4CR392J	3K9 OHM
R536	16-1/4CA392J	3K9 OHM
R537	16-1/4CA471J	470 OHM
R538	16-1/4CR471J	470 OHM
R539-R540	16-1/4CR681J	680 OHM
R541-R542	16-1/4CA181J	180 OHM
R543-R544	16-1/4CR184J	180K OHM
R545-R546	16-1/4CA472J	4K7 OHM
R547-R548	16-1/4CA272J	2K7 OHM
R549-R550	16-1/4CA103J	10K OHM
R551-R552	16-1/4CA272J	2K7 OHM
R553-R554	16-1/4CA105J	1M OHM
R601-R602	16-1/4CA224J	220K OHM
R603-R604	16-1/4CA271J	270 OHM
R607-R608	16-1/4CA223J	22K OHM
R609-R610	16-1/4CA223J	22K OHM
R611-R612	16-1/4CR391J	390 OHM
R613-R614	16-1/4CA391J	390 OHM
R615-R616	16-1/4CA331J	330 OHM

REF. NO.	PART NO.	DESCRIPTION
R617-R618	16-1/4CA183J	18K OHM
R619-R620	16-1/4CA222J	2K2 OHM
R621-R622	16-1/4CR222J	2K2 OHM
R623-R624	16-1/4CA682J	6K8 OHM
R625-R626	16-1/4CR103J	10K OHM
R627-R628	16-1/4CR103J	10K OHM
R629-R630	16-1/4CR122J	1K2 OHM
R631-R632	16-1/4CR122J	1K2 OHM
R633-R634	16-1/4CR182J	1K8 OHM
R635-R636	16-1/4CR182J	1K8 OHM
R637-R638	16-1/4CR270J	27 OHM
△ R639-R640	16-1/4AS121J	1/4W MO 120 OHM
R641-R642	16-1/4CR391J	390 OHM
R643-R644	16-1/4CR391J	390 OHM
△ R645-R646	16- 1AS471J	1W MO 470 OHM
R647-R648	16-1/4CR470J	47 OHM
R649-R650	16-1/2CS122J	1/2W CARBON 1K2 OHM
R651-R652	16-1/2CS152J	1/2W CARBON 1K5 OHM
R653-R654	16-1/2CS152J	1/2W CARBON 1K5 OHM
△ R655-R656	16-1/4AS330J	1/4W MO 33 OHM
R657-R658	16-1/4CA181J	180 OHM
R659-R660	16-1/4CR181J	180 OHM
R661-R662	16-1/4CA152J	1K5 OHM
R665-R666	16-1/4CR1R0J	1 OHM
△ R671-R672	16- 1AS100J	1W MO 10 OHM
△ R674-R675	16- 1AS221J	1W MO 220 OHM
R801	16-1/4CA331J	330 OHM
R802-R803	16-1/4CA681J	680 OHM
R804	16-1/4CA105J	1M OHM
R805-R806	16-1/4CA473J	47K OHM
R807	16-1/4CR473J	47K OHM
R808	16-1/4CR103J	10K OHM
R809	16-1/4CA103J	10K OHM
R810	16-1/4CA393J	39K OHM
△ R910-R902	16- 1AS100J	1W MO 10 OHM
△ R903-R904	16- 1AS100J	1W MO 10 OHM
R905-R906	16-1/4CR563J	56K OHM
R907-R908	16-1/4CR563J	56K OHM
R909-R910	16-1/4CR331J	330 OHM
R911-R912	16-1/4CR331J	330 OHM
R913-R914	16-1/4CA333J	33K OHM
R915-R916	16-1/4CA333J	33K OHM
△ R917-R918	16-1/4AS680J	1/4W MO 68 OHM
△ R919-R920	16-1/4AS680J	1/4W MO 68 OHM
R921-R922	16-1/4CR222J	2K2 OHM
R923-R924	16-1/4CR222J	2K2 OHM
CAPACITORS		
C403-C404	17-5DR101M	CERAMIC 100pF 50V +-20%
C405-C406	17-5DR101M	CERAMIC 100pF 50V +-20%
C407-C408	17-5DR221M	CERAMIC 220pF 50V +-20%
C413-C414	17-5ER475Y	ELECTROLYTIC 4.7uF 50V +50-10%
C415-C416	17-2.5ER476Y	ELECTROLYTIC 47uF 25V +50-10%
C417-C418	17-0.63EF228Y	ELECTROLYTIC 2200uF 6.3V +50-10%
C419-C420	17-5DR470M	CERAMIC 47pF 50V +-20%
C421-C422	17-5FR273J	MYLAR 0.027uF 50V +- 5%
C423-C424	17-5FR752J	MYLAR 0.0075uF 50V +- 5%
C425-C426	17-0.63ER227Y	ELECTROLYTIC 220uF 6.3V +50-10%
C427-C428	17-5DR220M	CERAMIC 22pF 50V +-20%
C429-C430	17-2.5ER476Y	ELECTROLYTIC 47uF 25V +50-10%
C431-C432	17-5ER475Y	ELECTROLYTIC 4.7uF 50V +50-10%
C433-C434	17-5FR222J	MYLAR 0.0022uF 50V +- 5%
C435-C436	17-5DH104Z	CERAMIC 0.1uF 50V +80-20%
C437-C438	17-5DH104Z	CERAMIC 0.1uF 50V +80-20%

Note: The components identified by shading and mark △ are critical for safety. Replace only with part number specified.

\* FOR UK ONLY, R507-R508 (18K OHM), R509-R510 (33K OHM)

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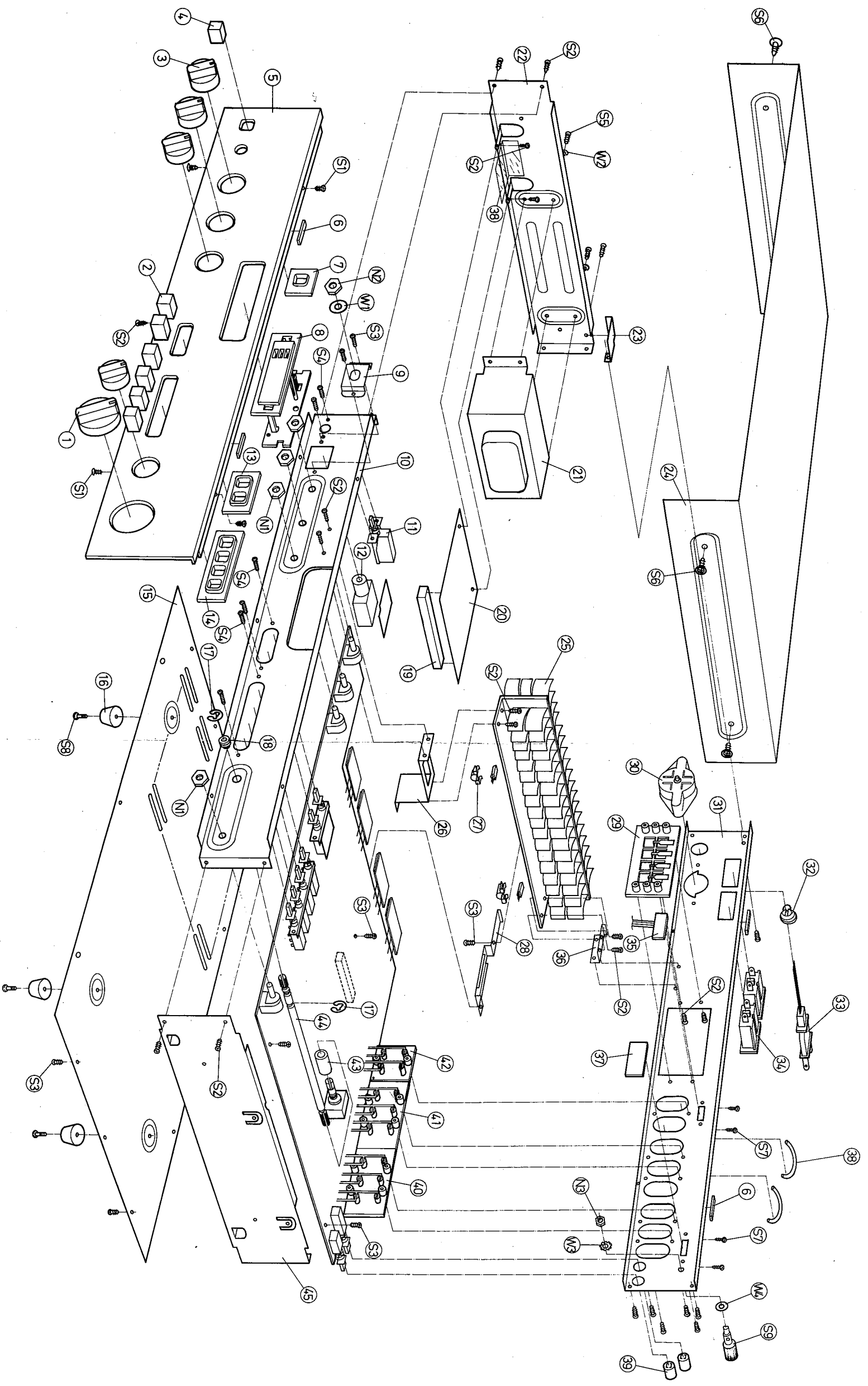
REF. NO.	PART NO.	DESCRIPTION
C501-C502	17-5DR471M	CERAMIC 470pF 50V +-20%
C503-C504	17-5FF104J	MYLAR 0.1uF 50V +- 5%
C505-C506	17-5ER475Y	ELECTROLYTIC 4.7uF 50V +50-10%
C507-C508	17-5HR334J	METALIZED 0.33uF 50V +- 5%
C509-C510	17-5HR334J	METALIZED 0.33uF 50V +- 5%
C511-C512	17-5DR221M	CERAMIC 220pF 50V +-20%
C513-C514	17-1ER476Y	ELECTROLYTIC 47uF 10V +50-10%
C515-C516	17-5DR220M	CERAMIC 22pF 50V +-20%
C517-C518	17-0.63ER107Y	ELECTROLYTIC 100uF 6.3V +50-10%
C519-C520	17-1ER476Y	ELECTROLYTIC 47uF 10V +50-10%
C525-C526	17-5FR273J	MYLAR 0.027uF 50V +- 5%
C527-C528	17-5HR224J	METALIZED 0.22uF 50V +- 5%
C529-C530	17-5HR154J	METALIZED 0.15uF 50V +- 5%
C531-C532	17-1.6RR105K	ALSICON 1uF 16V +-10%
C533-C534	17-5DR221M	CERAMIC 220pF 50V +-20%
C535-C536	17-5DR220M	CERAMIC 22pF 50V +-20%
C537-C538	17-1ER476Y	ELECTROLYTIC 47uF 10V +50-10%
C539-C540	17-5DR473Z	CERAMIC 0.047uF 50V +80-20%
C541-C542	17-5DR473Z	CERAMIC 0.047uF 50V +80-20%
C601-C602	17-1.6RR105K	ALSICON 1uF 16V +-10%
C603-C604	17-1.6RR105K	ALSICON 1uF 16V +-10%
C605-C606	17-5FR272J	MYLAR 0.0027uF 50V +- 5%
C607-C608	17-5FR102J	MYLAR 0.001uF 50V +- 5%
C609-C610	17-5FR102J	MYLAR 0.001uF 50V +- 5%
C611-C612	17-1ER476Y	ELECTROLYTIC 47uF 10V +50-10%
C613-C614	17-1ER476Y	ELECTROLYTIC 47uF 10V +50-10%
C615-C616	17-5DR470M	CERAMIC 47pF 50V +-20%
C617-C618	17-5DR470M	CERAMIC 47pF 50V +-20%
C619-C620	17-5DR221M	CERAMIC 220pF 50V +-20%
C621-C622	17-5DR220M	CERAMIC 22pF 50V +-20%
C623-C624	17-5DR220M	CERAMIC 22pF 50V +-20%
C625-C626	17-0.63EF228Y	ELECTROLYTIC 2200uF 6.3V +50-10%
C627-C628	17-2.5ER476Y	ELECTROLYTIC 47uF 25V +50-10%
C629-C630	17-5FF104J	MYLAR 0.1uF 50V +- 5%
C631-C632	17-5FF104J	MYLAR 0.1uF 50V +- 5%
C633-C634	17-5DR473Z	CERAMIC 0.047uF 50V +80-20%
C635-C636	17-5DR473Z	CERAMIC 0.047uF 50V +80-20%
C637-C638	17-5DH104Z	CERAMIC 0.1uF 50V +80-20%
C639-C640	17-5DH104Z	CERAMIC 0.1uF 50V +80-20%
C643-C644	17-5DH104Z	CERAMIC 0.1uF 50V +80-20%
C645-C646	17-5DH104Z	CERAMIC 0.1uF 50V +80-20%
C801	17-3.5ER106Y	ELECTROLYTIC 10uF 35V +50-10%
C802	17-0.63ER107Y	ELECTROLYTIC 100uF 6.3V +50-10%
C803	17-3.5ER226Y	ELECTROLYTIC 22uF 35V +50-10%
C901-C902	17-5EF337Y	ELECTROLYTIC 330uF 50V +50-10%
C903-C904	17-5EF337Y	ELECTROLYTIC 330uF 50V +50-10%
C905-C906	17-5ER476Y	ELECTROLYTIC 47uF 50V +50-10%
C907-C908	17-5ER476Y	ELECTROLYTIC 47uF 50V +50-10%
C909-C910	17-5DR473Z	CERAMIC 0.047uF 50V +80-20%
C911-C912	17-5DR473Z	CERAMIC 0.047uF 50V +80-20%
C913-C914	17-3.5ER476Y	ELECTROLYTIC 47uF 35V +50-10%
C915-C916	17-3.5ER476Y	ELECTROLYTIC 47uF 35V +50-10%
C917-C918	17-3.5ER476Y	ELECTROLYTIC 47uF 35V +50-10%
C919-C920	17-3.5ER476Y	ELECTROLYTIC 47uF 35V +50-10%
C921-C922	17-3.5ER476Y	ELECTROLYTIC 47uF 35V +50-10%
C923-C924	17-3.5ER476Y	ELECTROLYTIC 47uF 35V +50-10%
C925-C926	17-3.5EG228Y	ELECTROLYTIC 2200uF 35V +50-10%
C927-C928	17-3.5EG228Y	ELECTROLYTIC 2200uF 35V +50-10%
<b>DIODE</b>		
D401-D402	30-1152TA	1N4148
D403-D404	30-1152TA	1N4148
D405-D406	30-1152TA	1N4148
D501-D502	30-1152TA	1N4148

Note: The components identified by shading and mark  $\Delta$  are critical for safety. Replace only with part number specified.

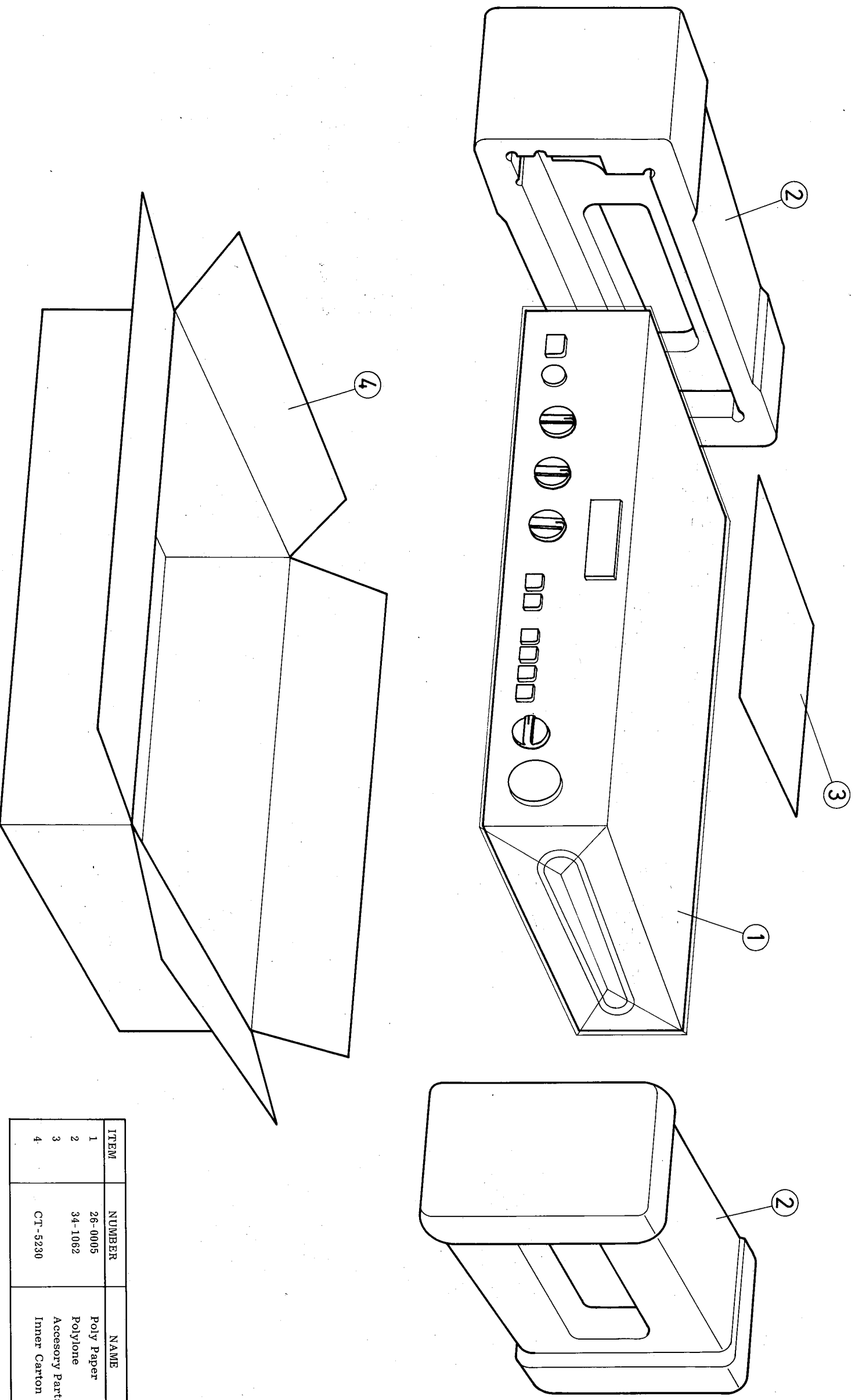
REF. NO.	PART NO.	DESCRIPTION
<b>DIODE</b>		
D601-D602	30-1152TA	1N4148
D603-D604	30-1152TA	1N4148
D605-D606	30-1152TA	1N4148
D607-D608	30-1152TA	1N4148
$\Delta$ D801-D802	30-1002	1N4002
D803-D804	30-1152TA	1N4148
D805	30-1152TA	1N4148
D901-D902	30-1152TA	1N4148
D903-D904	30-1152TA	1N4148
D905-D906	30-1152TA	1N4148
D907-D908	30-1152TA	1N4148
ZD601-ZD602	30-1044-1	ZENER 15V H215-2
ZD603-ZD604	30-1044-1	ZENER 15V H215-2
ZD901-ZD902	30-1224-1	ZENER 36V H236-2
ZD903-ZD904	30-1224-1	ZENER 36V H236-2
ZD905-ZD906	30-1147-1TA	ZENER 30V H230-2
ZD907-ZD906	30-1147-1TA	ZENER 30V H230-2
$\Delta$ BD901-BD902	30-1040	BRIDGE 200V 3A KBL02
$\Delta$ BD903-BD904	30-1049	BRIDGE 200V 3A KBL02
OVERLOAD L/R	30-1075	LED RD LT3211R/X-253PFR
POWER	30-1085	LED GN LT3231G/X-253PG
<b>TRANSISTOR</b>		
Q401-Q402	30-2349	2SC2602G/H
Q403-Q404	30-2349	2SC2602G/H
Q405-Q406	30-2085-2	BC559B
Q407-Q408	30-2096	BC556B
Q409-Q410	30-2090	BC546
Q411-Q412	30-2096	BC556B
Q501-Q502	30-2084-3	BC549C
Q503-Q504	30-2084-3	BC549C
Q505-Q506	30-2096	BC556B
Q507-Q508	30-2090	BC546
Q509-Q510	30-2265	FET J111
Q601-Q602	30-2084-3	BC549C
Q603-Q604	30-2096	BC556B
Q605-Q606	30-2096	BC556B
Q607-Q608	30-2353	BC639
Q609-Q610	30-2353	BC639
Q611-Q612	30-2090	BC546
Q613-Q614	30-2354	BC640
Q615-Q616	30-2356	2SC2564
Q617-Q618	30-2355	2SA1094
Q801	30-2090	BC546
Q802	30-2096	BC556B
Q901-Q902	30-2096	BC556B
Q903-Q904	30-2090	BC546
Q905-Q906	30-2353	BC639
Q907-Q908	30-2353	BC639
Q909-Q910	30-2354	BC640
Q911-Q912	30-2354	BC640
<b>MISCELLANEOUS</b>		
L401-L402	29-1175	COIL 3.7mH +-20%
L501-L502	29-1175	COIL 3.7mH +-20%
L601-L602	29-1040	COIL AIR 0.9 $\phi$ *4D*15T 1uH
VR1	29-4248	VR 16 $\phi$ 50KB*2
VR2	29-4246	VR 16 $\phi$ 10KC CENTER OPEN
VR3	29-4247	VR 16 $\phi$ 10KC CENTER SHORT
VR4	29-4249	VR 16 $\phi$ 20KW
VR5-VR6	VR01-F08501B	SEMI FIX VR 8 $\phi$ 500B FLAT
SW1	31-1075	SW PUSH SPJ242NE01-FL
SW2	31-1076	SW PUSH SPJ222NE01-FL

Note: The components identified by shading and mark  $\Delta$  are critical for safety. Replace only with part number specified.

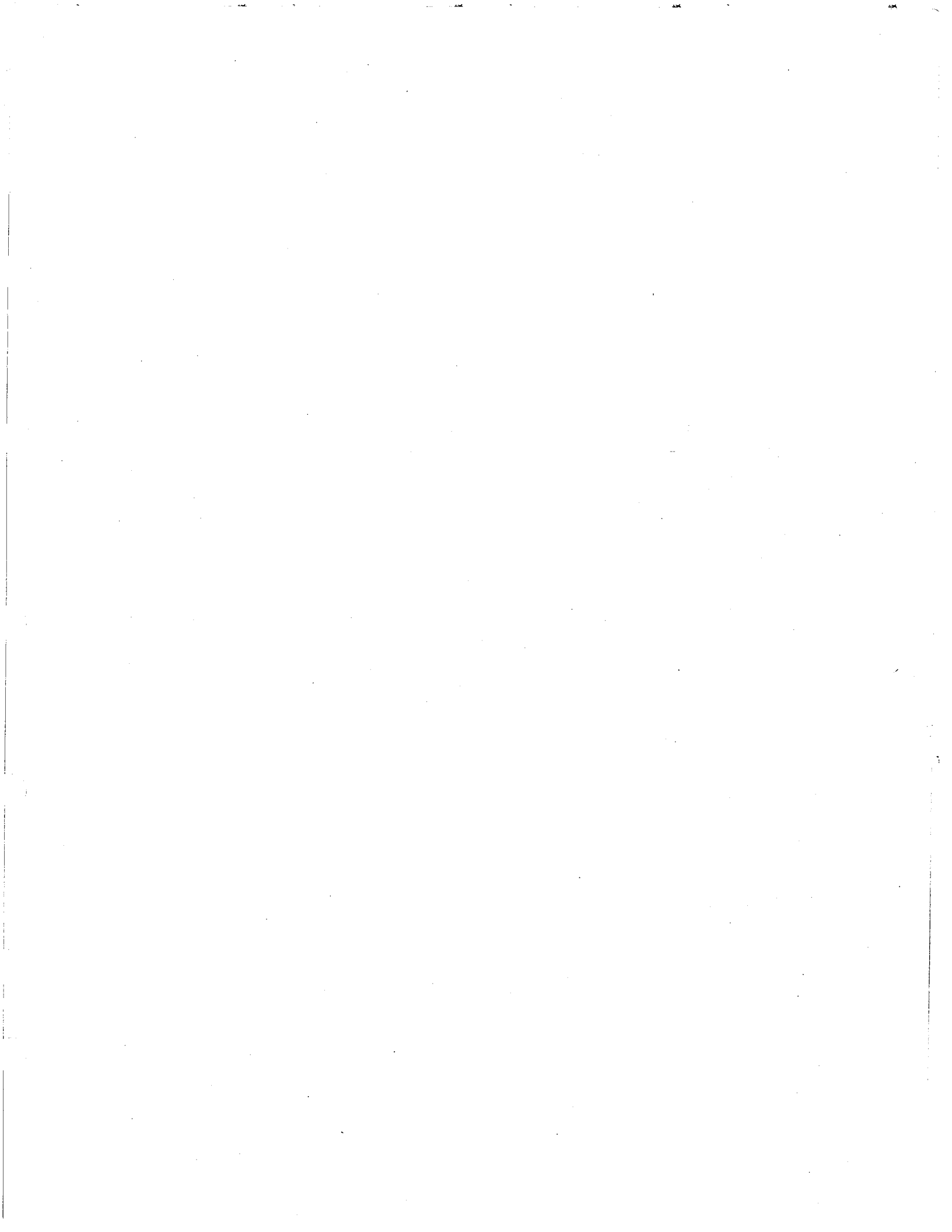
ASSEMBLY DIAGRAM



# PACKING DIAGRAM



ITEM	NUMBER	NAME
1	26-0005	Poly Paper
2	34-1062	Polythene
3		Accessory Parts
4	CT-5230	Inner Carton



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