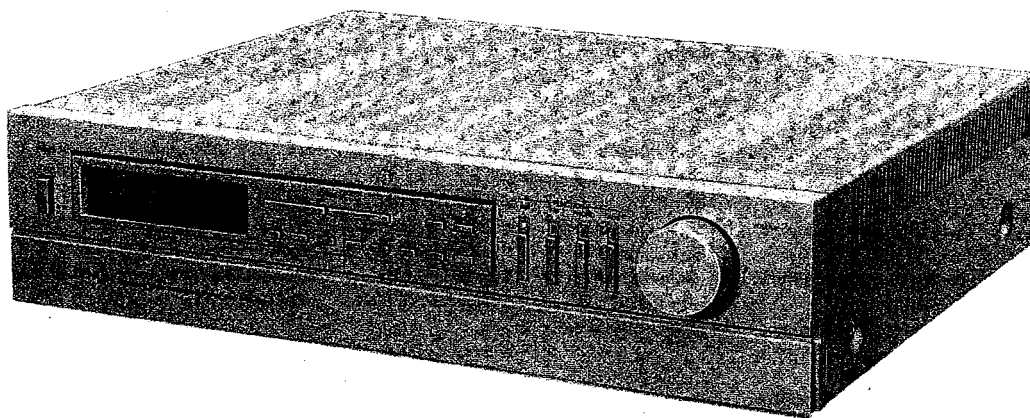


DENON

Hi-Fi Component Tuner Amplifier

SERVICE MANUAL MODEL DRA-600



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NIPPON COLUMBIA CO., LTD.

SPECIFICATIONS

AMPLIFIER SECTION

Continuous Power

Output: RMS both channels driven into 8 ohms
from 20 Hz to 20 kHz
60 W + 60 W

Power Bandwidth (IHF): 10 Hz ~ 35 kHz

Music Power: 95 W + 95 W / 8 ohms

Total Harmonic

Distortion: 0.03% (at -3 dB Power, 1 kHz)

Intermodulation

Distortion: 0.03% (60 Hz : 7 kHz, 4 : 1)

Damping Factor: More than 50 (at 1 kHz, 8 ohms)

PREAMPLIFIER SECTION

Frequency Response: PHONO RIAA Standard Curve
(Recording Output) ±0.3 dB
TAPE, AUX ±0.5 dB

Input Sensitivity and

Impedance: PHONO MM 2.5 mV 47 k ohm
MC 0.3 mV 100 ohm
TAPE, AUX 150 mV
More than 40 k ohm

Maximum Input Level

(at 1 kHz): PHONO MM 150 mV
MC 25 mV
TAPE, AUX 4 V

Signal to Noise Ratio

(IHF-A): PHONO MM @ 5.0 mV input 86 dB
PHONO MC @ 0.25 mV input 72 dB
TAPE, AUX @ 150 mV input 95 dB

Tone Control Range: BASS at 100 Hz ±10 dB
TREBLE at 10 kHz ±10 dB

Loudness Control Effect: at -30 dB attenuation 100 Hz / 10 kHz
+8 dB / +4 dB

Subsonic Filter Effect: 15 Hz / 6 dB octave.

TUNER SECTION

[FM]

Receiving Range: 88.1 ~ 107.9 MHz 87.50 ~ 108.00 MHz
(For European model)

Mono IHF Sensitivity: 1.8 μV

Signal to Noise Ratio: MONO 74-dB
STEREO 71 dB

Total Harmonic Distortion

1 kHz: MONO 0.1% at 1 kHz 100% mod.
STEREO 0.2%

Capture Ratio: 1.2 dB

Image Rejection: 75 dB

AM Suppression: 50 dB

Frequency Response: +0.2 dB

-1.5 dB

Stereo Separation: 45 dB

[AM]

Receiving Range: 530 ~ 1610 kHz 522 ~ 1611 kHz
(For European model)

Usable Sensitivity: 300 μV/m

Signal to Noise Ratio: 55 dB

GENERAL

Power Requirements: Europe: AC 220 V, 50 Hz, U.K.: AC 240 V, 50 Hz, U.S.A.: AC 120 V, 60 Hz, Hong Kong: AC 200 V, 50 Hz

Consumption: 200 W (U.S.A.)
250 VA (Canada)
160 W (at maximum output) (IEC)

Power Outlets: SWITCHED x 1, 100 W
UNSWITCHED x 1, 250 W

Dimensions: 434mm (W) x 112mm (H) x 408mm (D)

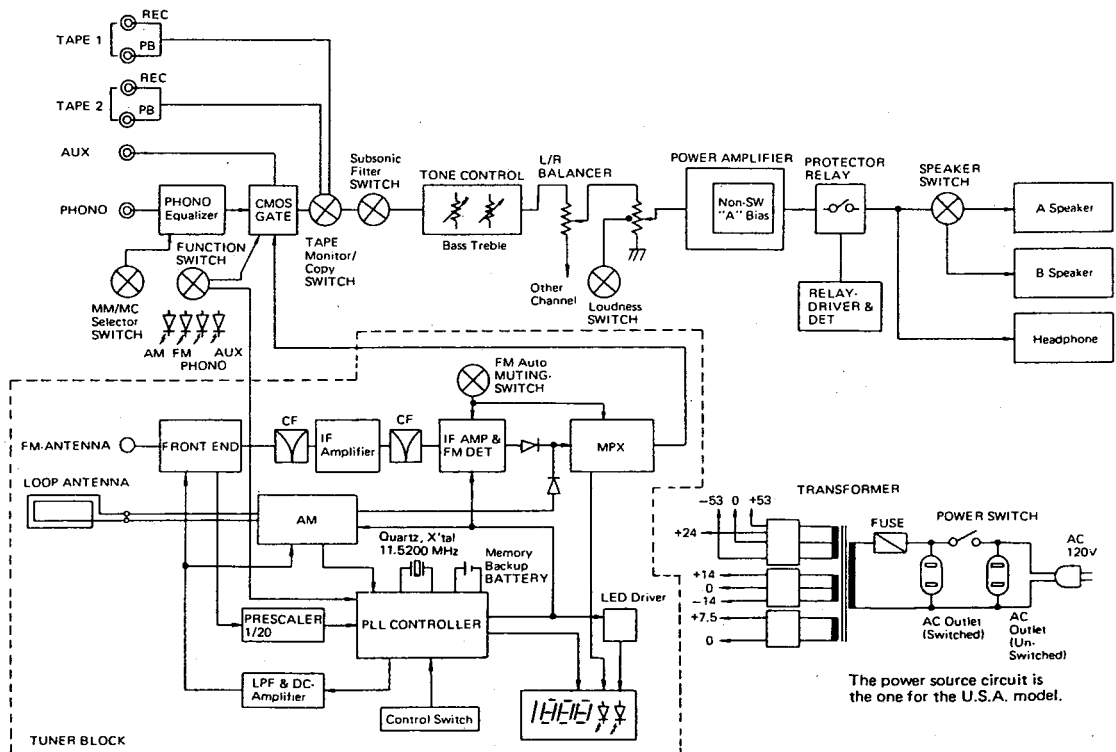
Weight: 11 kg

Design and specifications subject to change without notice.

NOTE: The following codes correspond to the appropriate models.

E3 for U.S.A., EC for Canada, E2 for Europe, EF for France, EG for Germany, E1 for Hongkong.

BLOCK DIAGRAM



The power source circuit is the one for the U.S.A. model.

NOTES ON SERVICING REMOTE SWITCH

(1) Hold the case when remove and install the speaker switch.

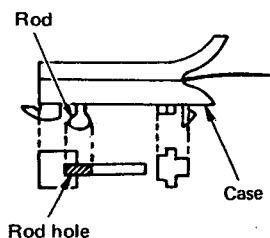


Fig. 1 How to install

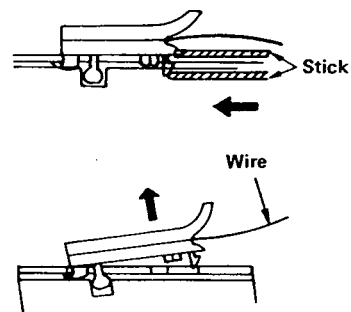
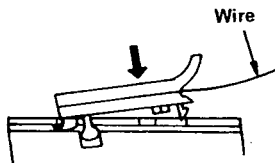


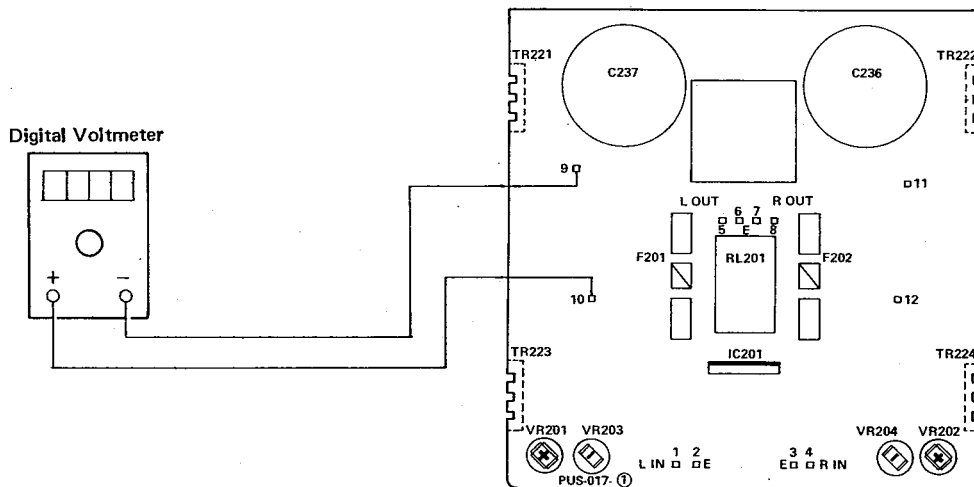
Fig. 2 How to remove

METHOD OF ADJUSTMENT

AMP SECTIONS

Carry out adjustments at room temperature and normal humidity and with the power source operating at the rated voltage.

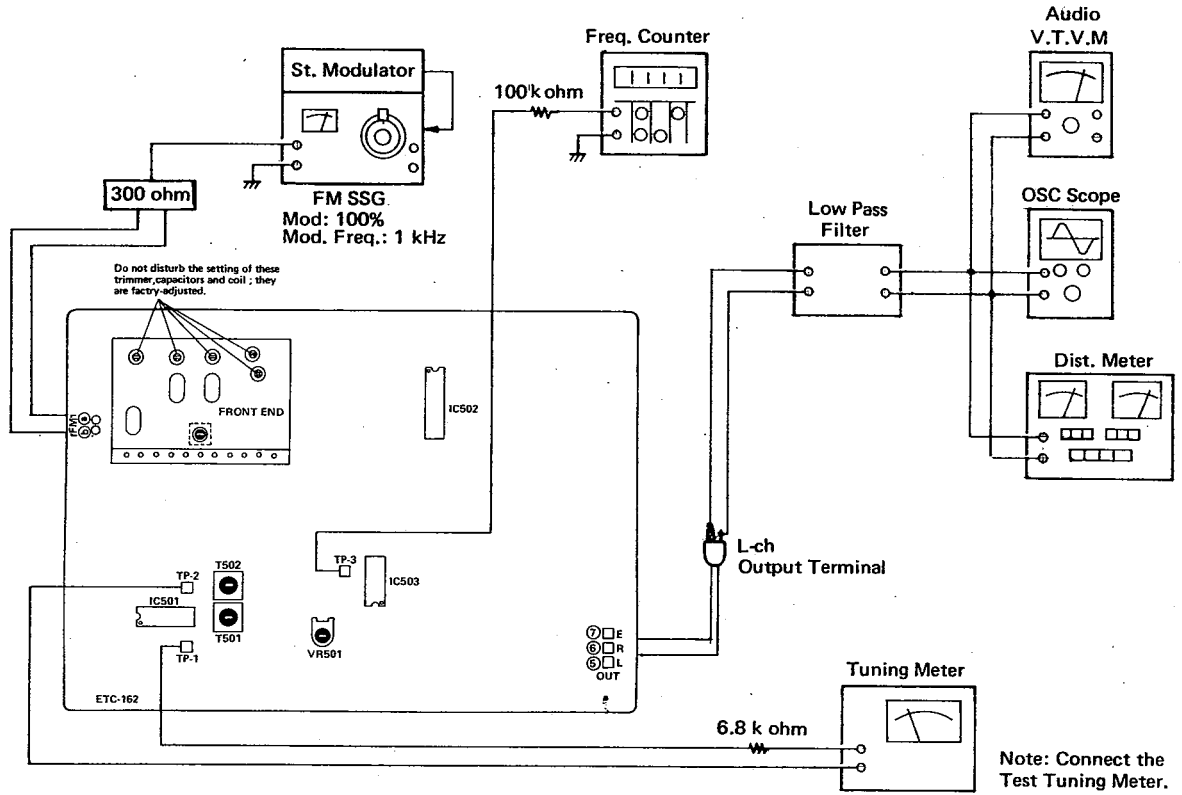
IDLE CURRENT ADJUSTMENT METHOD OF POWER AMP (PUS-017 PRINTED BOARD)



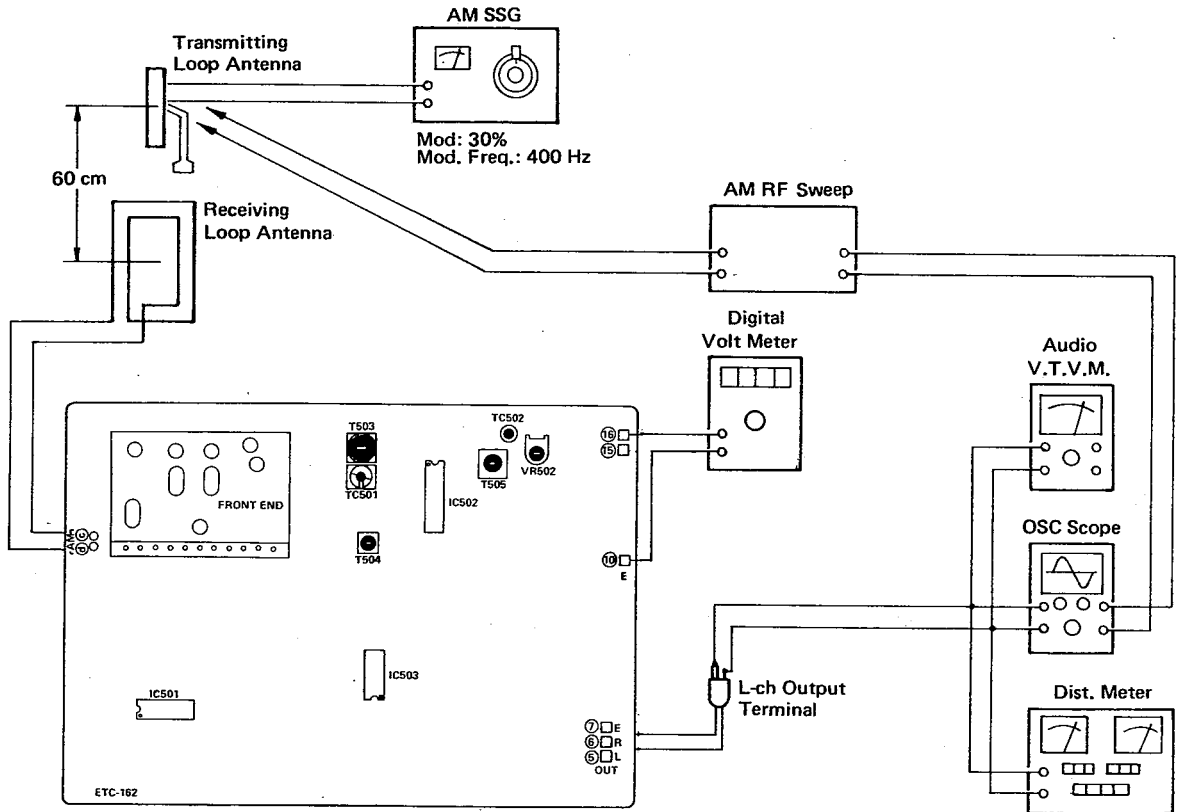
1. Connect a digital voltmeter to the L-ch test points (9) and (10) .
2. Set the MAIN VOL to MIN position.
3. Position the PUS-017 semi-fixed resistors VR201 and VR202 to extremely counterclockwise, VR203 and VR204 to extremely clockwise.
4. Turn the POWER SW on and wait about 3 minutes for warming-up, then conduct the following adjustments.
5. Rotate VR201 clockwise and obtain 20 mV on the digital voltmeter.
6. Rotate VR203 counterclockwise and obtain 46 mV on the digital voltmeter.
7. Connect the digital voltmeter to the R-ch test points (11) and (12) .
8. Rotate VR202 clockwise and obtain 20 mV on the digital voltmeter.
9. Rotate VR204 counterclockwise and obtain 46 mV on the digital voltmeter.

TUNER SECTIONS

FM/MPX ALIGNMENT POINTS & CONNECTIONS



AM ALIGNMENT POINTS & CONNECTIONS



METHOD OF ADJUSTMENTS

Carry out adjustment at room temperature and normal humidity with the power source operating at the rated voltage.

FM/MPX ALIGNMENT

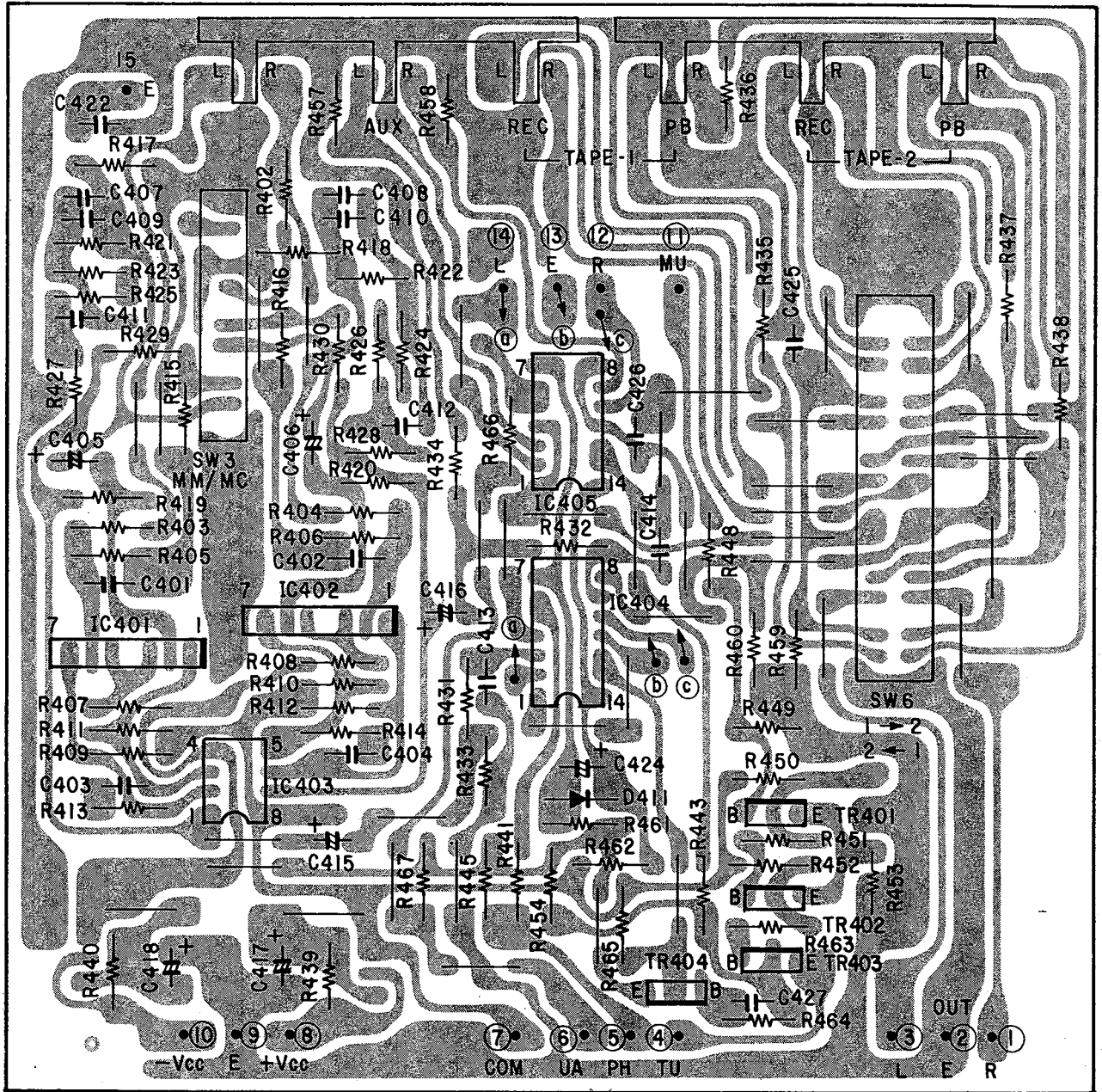
STEP	ITEM	RECEIVING FREQUENCY				INPUT SIDE			OUTPUT SIDE			REMARKS
		INSTRUMENT	FREQ.	INPUT LEVEL	MODULATION	COUPLING	INSTRUMENT	CONNECTION	ADJUST	ADJUST LIMIT		
1	Tuning meter to center position	FM S.S.G.	98.10MHz ±5kHz	60 dBμV	1kHz 100%	ANT.terminal (300 ohm dummy)	Tuning meter	Between TP-1 & IP-2	T501	Tuning meter to center position	Function FM(MODE MONO)	
2	Minimum distortion	FM S.S.G.	98.10MHz ±5kHz	60 dBμV	1kHz 100%	ANT.terminal (300 ohm dummy)	Distortion meter	Rec output terminal (L-channel)	T502	Minimum distortion	Function FM(MODE MONO)	
3	Tuning meter center position minimum distortion	Repeat Step 1 and 2 so that the pointer of the tuning meter comes to the center when minimum distortion is obtained.										
4	Front end IFT	FM S.S.G.	98.10MHz ±5kHz	60 dBμV	1kHz 100%	ANT.terminal (300 ohm dummy)	Distortion meter	Rec output terminal (L-channel)	Front end IFT core	Minimum distortion	Function FM(MODE MONO)	
5	19 kHz	FM S.S.G.	98.10MHz ±5kHz	60 dBμV	-	ANT.terminal (300 ohm dummy)	Frequency counter	Through 100 k ohm to TP-3	VR501	19 kHz ±30 Hz	MODE (STEREO/MUTING)	
6	Front end IFT	Stereo modulator FM S.S.G.	98.10MHz ±5kHz	60 dBμV	1kHz 90% Pilot 10%	ANT.terminal (300 ohm dummy)	Distortion meter	Rec output terminal (L-channel)	Front end IFT core	Minimum distortion	MODE (STEREO/MUTING)	

AM ALIGNMENT

1	AM IFT	AM IF Sweep generator	-	Regulate to a half of the level at which the waveform distorts	-	Loop ANT.	Oscilloscope	R583 = 27 k ohm	T504	Maximum height and best symmetry curve	Function AM	
2	T301	-	-	-	-	-	Digital voltmeter	Terminal 16	T505	3.9±0.1 Volts	Function AM	
3	OSC trimmer	-	-	-	-	-	Digital voltmeter	Terminal 16	TC502	20.0±0.6 Volts	Function AM	
4	Repeat Step 2 and 3 so that the tuning voltage at 600 kHz & 1400 kHz are within the adjust limit.											
5	ANT. coil	AM S.S.G.	600kHz ±0.2kHz	Below AGC level	400Hz 30%	Loop ANT.	VTVM	Rec output terminal (L-channel)	T503	Maximum audio output	Function AM	
6	ANT trimmer	AM S.S.G.	1400kHz ±0.2kHz	Below AGC level	400Hz 30%	Loop ANT.	VTVM	Rec output terminal (L-channel)	TC501	Maximum audio output	Function AM	
7	Repeat Step 5 and 6 so that 600 kHz and 1400 kHz are received at maximum gain, respectively.											

PRINTED CIRCUIT BOARD PATTERNS AND PARTS LIST

AUE-011 EQ. & CONTROL UNIT



AUE-011 PARTS LIST

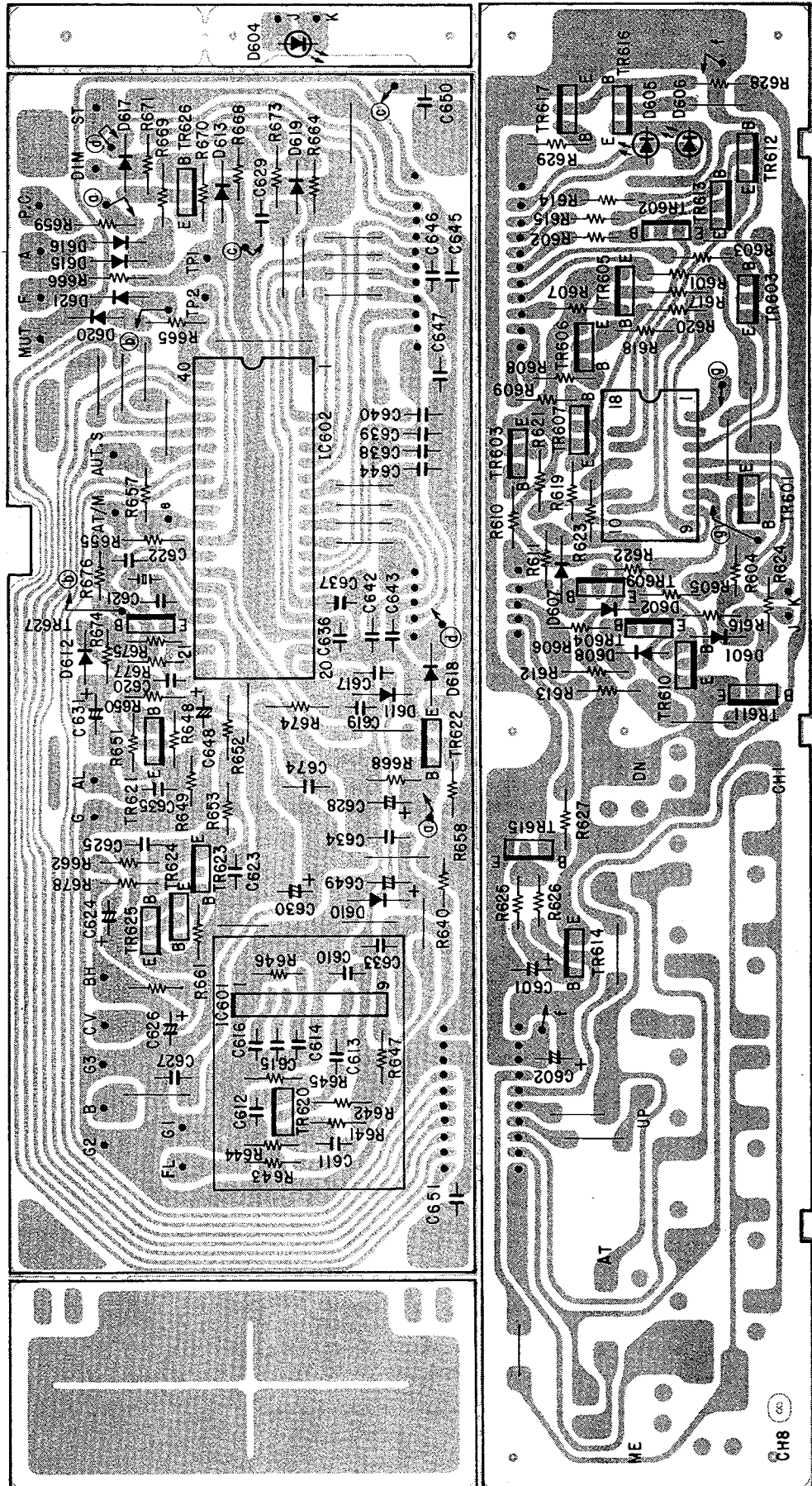
Ref. No.	Part No.	Part Name & Descriptions	Ref. No.	Part No.	Part Name & Descriptions
SEMICONDUCTORS					
IC401	2750024017	μ PA68H(L) INTEGRATED CIRCUIT	R451	2412267905	47 kohm \pm 5% $\frac{1}{4}$ W FIXED CARBON FILM
IC402	2750024017	μ PA68H(L) INTEGRATED CIRCUIT	R452	2412247909	6.8 kohm \pm 5% $\frac{1}{4}$ W FIXED CARBON FILM
IC403	2650030004	NJM4558D-D INTEGRATED CIRCUIT	R453	2412079009	300 ohm \pm 5% $\frac{1}{4}$ W FIXED CARBON FILM
IC404	2620276005	HD14066BP INTEGRATED CIRCUIT	R454	2412263909	33 kohm \pm 5% $\frac{1}{4}$ W FIXED CARBON FILM
IC405	2620276005	HD14066BP INTEGRATED CIRCUIT	R457	2412275900	100 kohm \pm 5% $\frac{1}{4}$ W FIXED CARBON FILM
TR401	2730198002	2SC1815(Y) TRANSISTOR	R458	2412275900	100 kohm \pm 5% $\frac{1}{4}$ W FIXED CARBON FILM
TR402	2730198002	2SC1815(Y) TRANSISTOR	R459	2412267905	47 kohm \pm 5% $\frac{1}{4}$ W FIXED CARBON FILM
TR403	2710102005	2SA1015(Y) TRANSISTOR	R460	2412267905	47 kohm \pm 5% $\frac{1}{4}$ W FIXED CARBON FILM
TR404	2730198002	2SC1815(Y) TRANSISTOR	R461	2412211906	220 ohm \pm 5% $\frac{1}{4}$ W FIXED CARBON FILM
D411	2760256008	HZ16-2 DIODE	R462	2412211906	220 ohm \pm 5% $\frac{1}{4}$ W FIXED CARBON FILM
RESISTORS					
R401	2412203901	100 ohm \pm 5% $\frac{1}{4}$ W FIXED CARBON FILM	R463	2412273902	82 kohm \pm 5% $\frac{1}{4}$ W FIXED CARBON FILM
R402	2412203901	100 ohm \pm 5% $\frac{1}{4}$ W FIXED CARBON FILM	R464	2412275900	100 kohm \pm 5% $\frac{1}{4}$ W FIXED CARBON FILM
R403	2412179909	10 ohm \pm 5% $\frac{1}{4}$ W FIXED CARBON FILM	R465	2412259900	22 kohm \pm 5% $\frac{1}{4}$ W FIXED CARBON FILM
R404	2412179909	10 ohm \pm 5% $\frac{1}{4}$ W FIXED CARBON FILM	R466	2412287961	330 kohm \pm 5% $\frac{1}{4}$ W FIXED CARBON FILM
R405	2412268904	51 kohm \pm 5% $\frac{1}{4}$ W FIXED CARBON FILM	R467	2412263909	33 kohm \pm 5% $\frac{1}{4}$ W FIXED CARBON FILM
R406	2412268904	51 kohm \pm 5% $\frac{1}{4}$ W FIXED CARBON FILM	CAPACITORS		
R407	2412236907	2.4 kohm \pm 5% $\frac{1}{4}$ W FIXED CARBON FILM	C401	2534438900	120 pF \pm 5% 50V FIXED CERAMIC
R408	2412236907	2.4 kohm \pm 5% $\frac{1}{4}$ W FIXED CARBON FILM	C402	2534438900	120 pF \pm 5% 50V FIXED CERAMIC
R409	2412232901	1.6 kohm \pm 5% $\frac{1}{4}$ W FIXED CARBON FILM	C403	2534424901	33 pF \pm 5% 50V FIXED CERAMIC
R410	2412232901	1.6 kohm \pm 5% $\frac{1}{4}$ W FIXED CARBON FILM	C404	2534424901	33 pF \pm 5% 50V FIXED CERAMIC
R411	2412232901	1.6 kohm \pm 5% $\frac{1}{4}$ W FIXED CARBON FILM	C405	2549022013	4.7 μ F 25V FIXED ELECTROLYTIC
R412	2412232901	1.6 kohm \pm 5% $\frac{1}{4}$ W FIXED CARBON FILM	C406	2549022013	4.7 μ F 25V FIXED ELECTROLYTIC
R413	2412247909	6.8 kohm \pm 5% $\frac{1}{4}$ W FIXED CARBON FILM	C407	2551213904	0.012 μ F \pm 5% 25V FIXED PLASTIC FILM
R414	2412247909	6.8 kohm \pm 5% $\frac{1}{4}$ W FIXED CARBON FILM	C408	2551213904	0.012 μ F \pm 5% 25V FIXED PLASTIC FILM
R415	242183908	15 ohm \pm 5% $\frac{1}{4}$ W FIXED CARBON FILM	C409	2551208906	0.0047 μ F \pm 5% 25V FIXED PLASTIC FILM
R416	242183908	15 ohm \pm 5% $\frac{1}{4}$ W FIXED CARBON FILM	C410	2551208906	0.0047 μ F \pm 5% 25V FIXED PLASTIC FILM
R417	2412203901	100 ohm \pm 5% $\frac{1}{4}$ W FIXED CARBON FILM	C411	2551122011	0.056 μ F \pm 5% 25V FIXED PLASTIC FILM
R418	2412203901	100 ohm \pm 5% $\frac{1}{4}$ W FIXED CARBON FILM	C412	2551122011	0.056 μ F \pm 5% 25V FIXED PLASTIC FILM
R419	2420203003	10M ohm \pm 10% $\frac{1}{4}$ W FIXED CARBON COMPOSIT	C413	2531116908	0.0022 μ F \pm 10% 50V FIXED CERAMIC
R420	2420203003	10M ohm \pm 10% $\frac{1}{4}$ W FIXED CARBON COMPOSIT	C414	2531116908	0.0022 μ F \pm 10% 50V FIXED CERAMIC
R421	2412243903	4.7 kohm \pm 5% $\frac{1}{4}$ W FIXED CARBON FILM	C415	2544120907	2.2 μ F 50V FIXED ELECTROLYTIC
R422	2412243903	4.7 kohm \pm 5% $\frac{1}{4}$ W FIXED CARBON FILM	C416	2544120907	2.2 μ F \pm 10% 50V FIXED ELECTROLYTIC
R423	2412269903	56 kohm \pm 5% $\frac{1}{4}$ W FIXED CARBON FILM	C417	2544112902	100 μ F 25V FIXED ELECTROLYTIC
R424	2412269903	56 kohm \pm 5% $\frac{1}{4}$ W FIXED CARBON FILM	C418	2544112902	100 μ F 25V FIXED ELECTROLYTIC
R425	2412215902	330 ohm \pm 5% $\frac{1}{4}$ W FIXED CARBON FILM	C419	2533603008	10pF \pm 0.5pF 50V FIXED CERAMIC
R426	2412215902	330 ohm \pm 5% $\frac{1}{4}$ W FIXED CARBON FILM	C420	2533603008	10pF \pm 0.5pF 50V FIXED CERAMIC
R427	2412186905	20 ohm \pm 5% $\frac{1}{4}$ W FIXED CARBON FILM	C422	2531146907	0.01 μ F $\frac{+80}{-20}$ 50V FIXED CERAMIC
R428	2412186905	20 ohm \pm 5% $\frac{1}{4}$ W FIXED CARBON FILM	C424	2544025002	10 μ F 25V FIXED ELECTROLYTIC
R429	2412288900	360 kohm \pm 5% $\frac{1}{4}$ W FIXED CARBON FILM	C425	2534442909	180 pF \pm 5% 50V FIXED CERAMIC
R430	2412288900	360 kohm \pm 5% $\frac{1}{4}$ W FIXED CARBON FILM	C426	2534442909	180 pF \pm 5% 50V FIXED CERAMIC
R431	2412211906	220 ohm \pm 5% $\frac{1}{4}$ W FIXED CARBON FILM	C427	2531114900	0.0015 μ F \pm 10% 50V FIXED CERAMIC
R432	2412211906	220 ohm \pm 5% $\frac{1}{4}$ W FIXED CARBON FILM	C429	2533627000	100pF \pm 5% FIXED CERAMIC
R433	2412275900	100 kohm \pm 5% $\frac{1}{4}$ W FIXED CARBON FILM	C430	2533627000	100pF \pm 5% FIXED CERAMIC
R434	2412275900	100 kohm \pm 5% $\frac{1}{4}$ W FIXED CARBON FILM	OTHER PARTS		
R435	2412227903	1 kohm \pm 5% $\frac{1}{4}$ W FIXED CARBON FILM		2220656009	P.C. BOARD
R436	2412227903	1 kohm \pm 5% $\frac{1}{4}$ W FIXED CARBON FILM		EP-5667H3	TERMINAL FOR WRAPPING PIN USED 14
R437	2412227903	1 kohm \pm 5% $\frac{1}{4}$ W FIXED CARBON FILM		4140139002	SHIELD PLATE
R438	2412227903	1 kohm \pm 5% $\frac{1}{4}$ W FIXED CARBON FILM		2040079002	6P CONNECTOR BASE
R439		NOT USED JUMPER WIRE		2124254002	SLIDE SWITCH (REMOTE)
R440		NOT USED JUMPER WIRE		2124255001	PUSH SWITCH (REMOTE)
R441	2412287901	330 kohm \pm 5% $\frac{1}{4}$ W FIXED CARBON FILM		2090042908	JUMPER WIRE ℓ =10mm USED 37
R443	2412287901	330 kohm \pm 5% $\frac{1}{4}$ W FIXED CARBON FILM		2090008104	JUMPER WIRE ℓ =15mm USED 15
R445	2412263909	33 kohm \pm 5% $\frac{1}{4}$ W FIXED CARBON FILM			
R448	2412259900	22 kohm \pm 5% $\frac{1}{4}$ W FIXED CARBON FILM			
R449	2412253906	12 kohm \pm 5% $\frac{1}{4}$ W FIXED CARBON FILM			
R450	2412253906	12 kohm \pm 5% $\frac{1}{4}$ W FIXED CARBON FILM			

(Con.)

Ref. No.	Part No.	Part Name & Descriptions
R329	2412251908	10 kohm ±5% ¼W FIXED CARBON FILM
R330	2412251908	10 kohm ±5% ¼W FIXED CARBON FILM
R331	2412239904	3.3 kohm ±5% ¼W FIXED CARBON FILM
R332	2412239904	3.3 kohm ±5% ¼W FIXED CARBON FILM
R333	2412168004	1.5M ohm ±5% ¼W FIXED CARBON FILM
R334	2412168004	1.5M ohm ±5% ¼W FIXED CARBON FILM
R335	2412243903	5.6 kohm ±5% ¼W FIXED CARBON FILM
R336	2412243903	5.6 kohm ±5% ¼W FIXED CARBON FILM
R337	2442007009	220 ohm ±5% ¼W FIXED METAL OXIDE FILM
R338	2442007009	220 ohm ±5% ¼W FIXED METAL OXIDE FILM
R339	2440092003	330 ohm ±5% 2W FIXED METAL OXIDE FILM
R340	2440092003	330 ohm ±5% 2W FIXED METAL OXIDE FILM
R341	2412259900	22 kohm ±5% ¼W FIXED CARBON FILM
R342	2412259900	22 kohm ±5% ¼W FIXED CARBON FILM
R456	2412237906	2.7 kohm ±5% ¼W FIXED CARBON FILM
CAPACITORS		
C101	2531053003	0.01 µF +100% 500V FIXED CERAMIC
C102	2531053003	0.01 µF +100% 500V FIXED CERAMIC
C103	2531053003	0.01 µF +100% 500V FIXED CERAMIC
C104	2531053003	0.01 µF +100% 500V FIXED CERAMIC
C105	2531026001	0.047 µF +80% 50V FIXED CERAMIC
C106	2544041002	470 µF 35V FIXED ELECTROLYTIC
C107	2544041002	470 µF 35V FIXED ELECTROLYTIC
C108	2544111903	47 µF 25V FIXED ELECTROLYTIC
C109	2544111903	47 µF 25V FIXED ELECTROLYTIC
C110	2544029008	220 µF 25V FIXED ELECTROLYTIC
C111	2544028009	100 µF 25V FIXED ELECTROLYTIC
C112	2531026001	0.047 µF +80% 25V FIXED CERAMIC
C113	2531026001	0.047 µF +80% 25V FIXED CERAMIC
C114	2544022005	1000 µF 16V FIXED ELECTROLYTIC
C115	2544105906	10 µF 16V FIXED ELECTROLYTIC
C116	2531026001	0.047 µF +80% 50V FIXED CERAMIC
C117	2551233900	0.01 µF ±10% 50V FIXED PLASTIC FILM
C118	2544038002	100 µF 35V FIXED ELECTROLYTIC
C301	2551241905	0.047 µF +80% 50V FIXED CERAMIC
C302	2551241905	0.047 µF +80% 50V FIXED CERAMIC
C303	2544119905	1 µF 50V FIXED ELECTROLYTIC
C304	2544119005	1 µF 50V FIXED ELECTROLYTIC
C305	2544034006	4.7 µF 35V FIXED ELECTROLYTIC
C306	2544034008	4.7 µF 35V FIXED ELECTROLYTIC
C307	2533643000	470 pF ±5% 50V FIXED CERAMIC
C308	2533643000	470 pF ±5% 50V FIXED CERAMIC
C309	2551233900	0.01 µF ±10% 50V FIXED PLASTIC FILM
C310	2551233900	0.01 µF ±10% 50V FIXED PLASTIC FILM
C311	2534422903	27 pF ±5% 50V FIXED CERAMIC
C312	2534422903	27 pF ±5% 50V FIXED CERAMIC
C313	2544119905	1 µF 50V FIXED ELECTROLYTIC
C314	2544119905	1 µF 50V FIXED ELECTROLYTIC
C315	2544034006	4.7 µF 35V FIXED ELECTROLYTIC
C316	2544034006	4.7 µF 35V FIXED ELECTROLYTIC
C317	2531003008	680 pF ±10% 50V FIXED CERAMIC
C318	2531003008	680 pF ±10% 50V FIXED CERAMIC
C319	2551241905	0.047 µF ±10% 50V FIXED PLASTIC FILM
C320	2551241905	0.047 µF ±10% 50V FIXED PLASTIC FILM

Ref. No.	Part No.	Part Name & Descriptions
C321	2544028009	100 µF 25V FIXED ELECTROLYTIC
C322	2544028009	100 µF 25V FIXED ELECTROLYTIC
OTHER PARTS		
	2220655000	P.C. BOARD
	EP-5667H3	TERMINAL FOR WRAPPING PIN USED 25
	2050092040	WRAPPING TERMINAL
	2048047007	HEAD PHONE JACK
SW01	2124256000	3P PUSH SWITCH
SW02	2124256000	3P PUSH SWITCH
SW03	2124256000	3P PUSH SWITCH
SW04	2124168004	1P PUSH SWITCH
SW05	2124257009	2P PUSH SWITCH
SW06	2124257009	2P PUSH SWITCH
SW07	2124258008	4P PUSH SWITCH
SW08	2124258008	4P PUSH SWITCH
VR01	2110265005	VARIABLE RESISTOR 250 KOHM
VR02	2110265005	VARIABLE RESISTOR 250 KOHM
VR03	2110198004	VARIABLE RESISTOR 250 KOHM
VR04	2110251006	VARIABLE RESISTOR 100 KOHM
F01	2061023082	FUSE 6.3A (UL)
	2033912008	2P AC OUTLET
	2090008120	JUMPER SHORT LEAD P=10mm USED 30
	4170021009	RADIATOR
	4730354019	TAPPING SCREW 3x8
	EP-5870	FUSE HOLDER USED 2

ETC-161 DISPLAY & KEY UNIT



ETC-161 PARTS LIST

Ref. No.	Part No.	Part Name & Descriptions	
SEMICONDUCTORS			
IC601	2630144004	AN6821	INTEGRATED CIRCUIT
IC602	2620275006	MN6045A	INTEGRATED CIRCUIT
TR601	2730198015	2SC1815(BL)	TRANSISTOR
TR602	2710102021	2SA1015(GR)	TRANSISTOR
TR603	2710102021	2SA1015(GR)	TRANSISTOR
TR604	2710102021	2SA1015(GR)	TRANSISTOR
TR605	2710102021	2SA1015(GR)	TRANSISTOR
TR606	2710102021	2SA1015(GR)	TRANSISTOR
TR607	2710102021	2SA1015(GR)	TRANSISTOR
TR608	2710102021	2SA1015(GR)	TRANSISTOR
TR609	2710102021	2SA1015(GR)	TRANSISTOR
TR610	2710102021	2SA1015(GR)	TRANSISTOR
TR611	2710102021	2SA1015(GR)	TRANSISTOR
TR612	2710102021	2SA1015(GR)	TRANSISTOR
TR613	2710102021	2SA1015(GR)	TRANSISTOR
TR614	2730198015	2SC1815(BL)	TRANSISTOR
TR615	2730198015	2SC1815(BL)	TRANSISTOR
TR616	2730198015	2SC1815(BL)	TRANSISTOR
TR617	2730198015	2SC1815(BL)	TRANSISTOR
TR620	2730043021	2SC535(C)	TRANSISTOR
TR621	2730025010	2SC461(B)	TRANSISTOR
TR622	2730198015	2SC1815(BL)	TRANSISTOR
TR623	2730198015	2SC1815(BL)	TRANSISTOR
TR625	2730198015	2SC1815(BL)	TRANSISTOR
TR626	2730198015	2SC1815(BL)	TRANSISTOR
TR627	2710102021	2SA1015(GR)	TRANSISTOR
D601	2760049008	1S2076	DIODE
D602	2760049008	1S2076	DIODE
D604	3939032007	TLR206(Red)	LIGHT EMITTING DIODE
D605	3939092005	LED(Red)	LIGHT EMITTING DIODE
D606	3939093004	LED(Green)	LIGHT EMITTING DIODE
D607	2760049008	1S2076	DIODE
D608	2760049008	1S2076	DIODE
D610	2760241000	MZ305R	DIODE
D611	2760002016	1N60P	DIODE
D612	2760049008	1S2076	DIODE
D613	2760049008	1S2076	DIODE
D615	2760049008	1S2076	DIODE
D616	2760049008	1S2076	DIODE
D617	2760049008	1S2076	DIODE
D618	2760049008	1S2076	DIODE
D620	2760049008	1S2076	DIODE
D621	2760049008	1S2076	DIODE

RESISTORS			
R601	2412251908	10 kohm	±5% 1/4W FIXED CARBON FILM
R602	2412231902	1.5 kohm	±5% 1/4W FIXED CARBON FILM
R603	2412096008	1.5 kohm	±5% 1/4W FIXED CARBON FILM
R604	2412250909	9.1 kohm	±5% 1/4W FIXED CARBON FILM
R605	2412115002	9.1 kohm	±5% 1/4W FIXED CARBON FILM
R606	2412251908	10 kohm	±5% 1/4W FIXED CARBON FILM
R607	2412251908	10 kohm	±5% 1/4W FIXED CARBON FILM
R608	2412251908	10 kohm	±5% 1/4W FIXED CARBON FILM
R609	2412109005	5.1 kohm	±5% 1/4W FIXED CARBON FILM
R610	2412251908	10 kohm	±5% 1/4W FIXED CARBON FILM
R611	2412250909	9.1 kohm	±5% 1/4W FIXED CARBON FILM
R612	2412115002	9.1 kohm	±5% 1/4W FIXED CARBON FILM
R613	2412251908	10 kohm	±5% 1/4W FIXED CARBON FILM
R614	2412231902	1.5 kohm	±5% 1/4W FIXED CARBON FILM
R615	2412231902	1.5 kohm	±5% 1/4W FIXED CARBON FILM
R616	2412194900	43 ohm	±5% 1/4W FIXED CARBON FILM

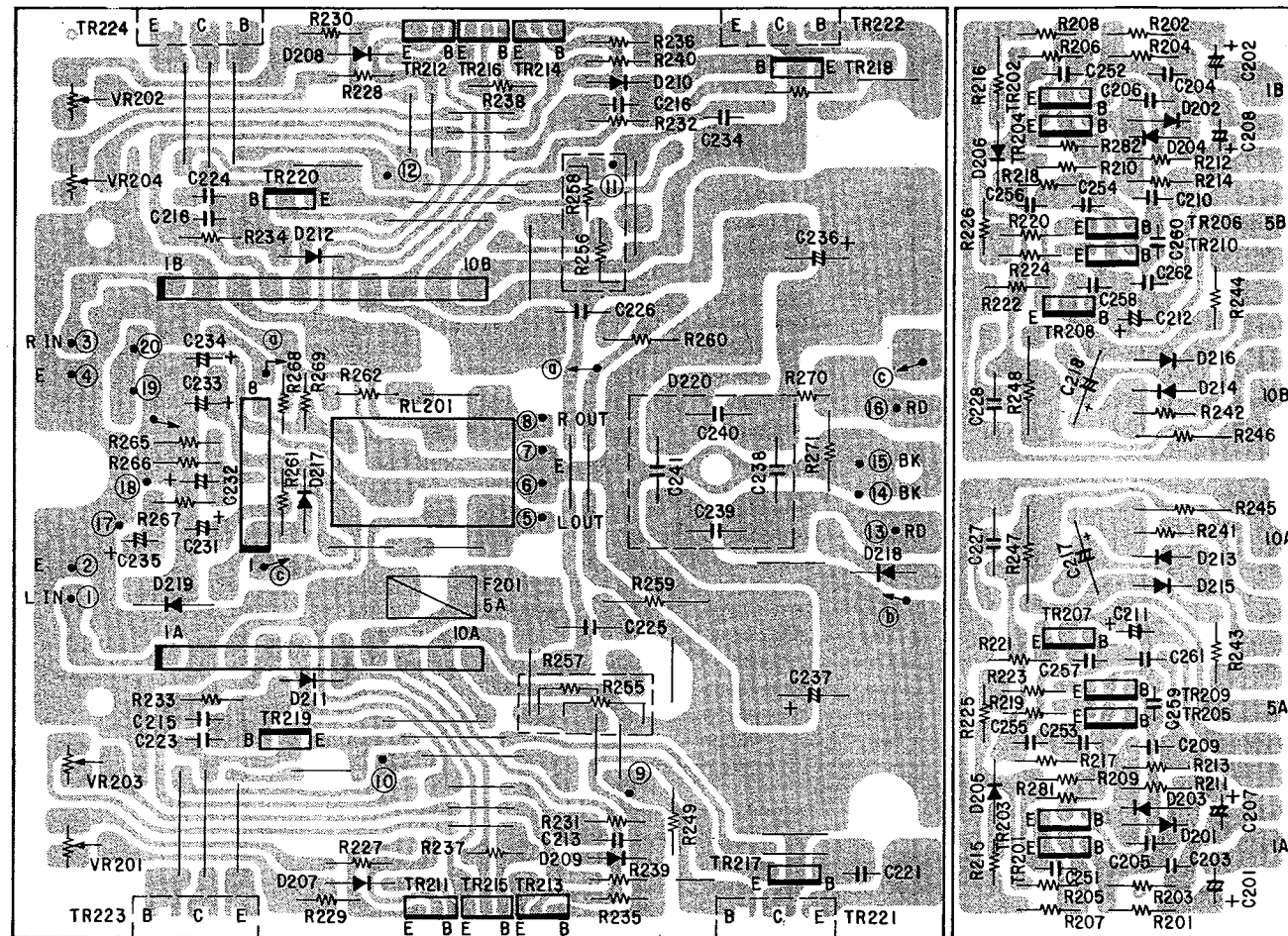
Ref. No.	Part No.	Part Name & Descriptions	
R617	2412194900	43 ohm	±5% 1/4W FIXED CARBON FILM
R618	2412059003	43 ohm	±5% 1/4W FIXED CARBON FILM
R619	2412059003	43 ohm	±5% 1/4W FIXED CARBON FILM
R620	2412194900	43 ohm	±5% 1/4W FIXED CARBON FILM
R621	2412194900	43 ohm	±5% 1/4W FIXED CARBON FILM
R622	2412194900	43 ohm	±5% 1/4W FIXED CARBON FILM
R623	2412194900	43 ohm	±5% 1/4W FIXED CARBON FILM
R624	2412194900	43 ohm	±5% 1/4W FIXED CARBON FILM
R625	2412203901	100 ohm	±5% 1/4W FIXED CARBON FILM
R626	2412211906	220 ohm	±5% 1/4W FIXED CARBON FILM
R627	2412251908	10 kohm	±5% 1/4W FIXED CARBON FILM
R628	2412244902	5.1 kohm	±5% 1/4W FIXED CARBON FILM
R629	2412275900	100 kohm	±5% 1/4W FIXED CARBON FILM
R640	2412195909	47 ohm	±5% 1/4W FIXED CARBON FILM
R641	2412251908	10 kohm	±5% 1/4W FIXED CARBON FILM
R642	2412084007	470 ohm	±5% 1/4W FIXED CARBON FILM
R643	2412209905	180 ohm	±5% 1/4W FIXED CARBON FILM
R644	2412260902	24 kohm	±5% 1/4W FIXED CARBON FILM
R645	2412231902	1.5 kohm	±5% 1/4W FIXED CARBON FILM
R646	2412261901	27 kohm	±5% 1/4W FIXED CARBON FILM
R647	2412239904	3.3 kohm	±5% 1/4W FIXED CARBON FILM
R648	2412281907	180 kohm	±5% 1/4W FIXED CARBON FILM
R649	2412133000	51 kohm	±5% 1/4W FIXED CARBON FILM
R650	2412104000	3.3 kohm	±5% 1/4W FIXED CARBON FILM
R651	2412227903	1 kohm	±5% 1/4W FIXED CARBON FILM
R652	2412246900	6.2 kohm	±5% 1/4W FIXED CARBON FILM
R653	2412253906	12 kohm	±5% 1/4W FIXED CARBON FILM
R657	2412251908	10 kohm	±5% 1/4W FIXED CARBON FILM
R658	2412229901	1.2 kohm	±5% 1/4W FIXED CARBON FILM
R659	2412296905	750 kohm	±5% 1/4W FIXED CARBON FILM
R660	2412267905	47 kohm	±5% 1/4W FIXED CARBON FILM
R661	2412241905	3.9 kohm	±5% 1/4W FIXED CARBON FILM
R662	2412239904	3.3 kohm	±5% 1/4W FIXED CARBON FILM
R663	2412251908	10 kohm	±5% 1/4W FIXED CARBON FILM
R664	2412229901	1.2 kohm	±5% 1/4W FIXED CARBON FILM
R665	2412251908	10 kohm	±5% 1/4W FIXED CARBON FILM
R666	2412251908	10 kohm	±5% 1/4W FIXED CARBON FILM
R668	2412251908	10 kohm	±5% 1/4W FIXED CARBON FILM
R669	2412271904	68 kohm	±5% 1/4W FIXED CARBON FILM
R671	2412094000	1.2 kohm	±5% 1/4W FIXED CARBON FILM
R674	2412283905	220 kohm	±5% 1/4W FIXED CARBON FILM
R675	2412148008	220 kohm	±5% 1/4W FIXED CARBON FILM
R676	2412251908	10 kohm	±5% 1/4W FIXED CARBON FILM
R677	2412203901	100 ohm	±5% 1/4W FIXED CARBON FILM
R678	2412227903	1 kohm	±5% 1/4W FIXED CARBON FILM

CAPACITORS			
C601	2544066003	2.2 μF	50V FIXED ELECTROLYTIC
C602	2544011003	220 μF	10V FIXED ELECTROLYTIC
C610	2531146907	0.01 μF	+80% 50V FIXED CERAMIC
C611	2533631009	150 pF	±5% 50V FIXED CERAMIC
C612	2533631009	150 pF	±5% 50V FIXED CERAMIC
C613	2531146907	0.01 μF	+80% 50V FIXED CERAMIC
C614	2531024003	0.01 μF	+80% 50V FIXED CERAMIC
C615	2531024003	0.01 μF	+80% 50V FIXED CERAMIC
C616	2531024003	0.01 μF	+80% 50V FIXED CERAMIC
C617	2531146907	0.01 μF	+80% 50V FIXED CERAMIC
C619	2531146907	0.01 μF	+80% 50V FIXED CERAMIC
C620	2531146907	0.01 μF	+80% 50V FIXED CERAMIC
C621	2533131004	27 pF	±5% 50V FIXED CERAMIC
C622	2533133002	33 pF	±5% 50V FIXED CERAMIC

(Con.)

Ref. No.	Part No.	Part Name & Descriptions	
C623	2551239904	0.033 μF	±10% 50V FIXED PLASTIC FILM
C624	2544066003	2.2 μF	50V FIXED ELECTROLYTIC
C625	2551072006	0.01 μF	±10% 50V FIXED PLASTIC FILM
C626	2544037003	47 μF	35V FIXED ELECTROLYTIC
C627	2531146907	0.01 μF	+80% 50V FIXED CERAMIC
C628	2544120907	2.2 μF	50V FIXED ELECTROLYTIC
C629	2531146907	0.01 μF	+80% 50V FIXED CERAMIC
C630	2544011003	220 μF	10V FIXED ELECTROLYTIC
C631	2544119905	1 μF	50V FIXED ELECTROLYTIC
C633	2534426909	39 pF	±5% 50V FIXED CERAMIC
C634	2531146907	0.01 μF	+80% 50V FIXED CERAMIC
C635	2531146907	0.01 μF	+80% 50V FIXED CERAMIC
C636	2531146907	0.01 μF	+80% 50V FIXED CERAMIC
C637	2531024003	0.01 μF	+80% 50V FIXED CERAMIC
C638	2531114900	0.0015 μF	±10% 50V FIXED CERAMIC
C639	2531114900	0.0015 μF	±10% 50V FIXED CERAMIC
C640	2531114900	0.0015 μF	±10% 50V FIXED CERAMIC
C641	2531114900	0.0015 μF	±10% 50V FIXED CERAMIC
C642	2531114900	0.0015 μF	±10% 50V FIXED CERAMIC
C643	2531114900	0.0015 μF	±10% 50V FIXED CERAMIC
C644	2531114900	0.0015 μF	±10% 50V FIXED CERAMIC
C645	2531146907	0.01 μF	+80% 50V FIXED CERAMIC
C646	2531146907	0.01 μF	+80% 50V FIXED CERAMIC
C648	2544102909	47 μF	10V FIXED ELECTROLYTIC
C651	2531146907	0.01 μF	+80% 50V FIXED CERAMIC
OTHER PARTS			
J20,28	2220652003	P.C. BOARD	
J08	EP-5667H3	TERMINAL FOR WRAPPING PIN USED 20	
	2090008120	JUMPER SHORT LEAD USED 2	
	2090008104	JUMPER SHORT LEAD USED 1	
	2090042908	JUMPER SHORT LEAD USED 30	
	2124253003	PUSH SWITCH	
	3939102005	SL-2436-01	
	3990012008	XTAL (11-520)	
	4140221004	SHIELD CASE	
	1440726008	MASK	
	4770096007	PUSH RIVET	
	4610121045	CUSHION	
	2030166019	CONNECTOR BASE	
	2090008133	JUMPER SHORT LEAD USED 1	

PUS-017 POWER & SUPPLY UNIT



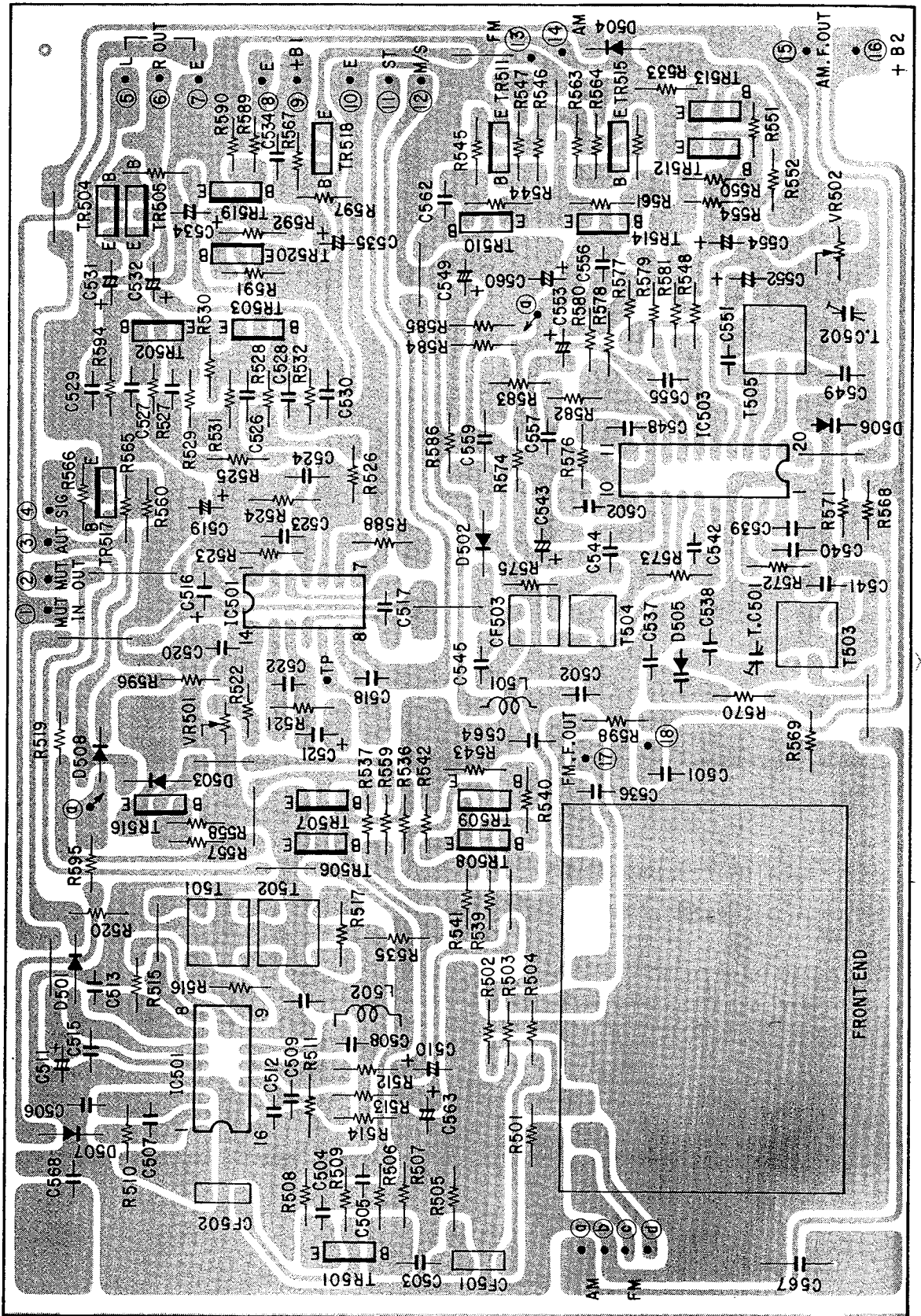
PUS-017 PARTS LIST

Ref. No.	Part No.	Part Name & Descriptions	Ref. No.	Part No.	Part Name & Descriptions
SEMICONDUCTORS					
IC201	2630102004	HA12002W INTEGRATED CIRCUIT	TR221	2730232023	2SC2579(O)(Y) TRANSISTOR
TR201	2710094016	2SA970(BL) TRANSISTOR	TR222	2730232023	2SC2579(O)(Y) TRANSISTOR
TR202	2710094016	2SA970(BL) TRANSISTOR	TR223	2710130022	2SA1104(O)(Y) TRANSISTOR
TR203	2710094016	2SA970(BL) TRANSISTOR	TR224	2710130022	2SA1104(O)(Y) TRANSISTOR
TR204	2710094016	2SA970(BL) TRANSISTOR	D201	2760049008	1S2076 DIODE
TR205	2730235004	2SC1841(F) TRANSISTOR	D202	2760049008	1S2076 DIODE
TR206	2730235004	2SC1841(F) TRANSISTOR	D203	2760049008	1S2076 DIODE
TR207	2710131005	2SA988(F) TRANSISTOR	D204	2760049008	1S2076 DIODE
TR208	2710131005	2SA988(F) TRANSISTOR	D205	2760049011	1S2076A DIODE
TR209	2730235004	2SC1841(F) TRANSISTOR	D206	2760049011	1S2076A DIODE
TR210	2730235004	2SC1841(F) TRANSISTOR	D207	2760049008	1S2076 DIODE
TR211	2730198002	2SC1815(Y) TRANSISTOR	D208	2760049008	1S2076 DIODE
TR212	2730198002	2SC1815(Y) TRANSISTOR	D209	2760049008	1S2076 DIODE
TR213	2730198002	2SC1815(Y) TRANSISTOR	D210	2760049008	1S2076 DIODE
TR214	2730198002	2SC1815(Y) TRANSISTOR	D211	2760049008	1S2076 DIODE
TR215	2710102005	2SA1015(Y) TRANSISTOR	D212	2760049008	1S2076 DIODE
TR216	2710102005	2SA1015(Y) TRANSISTOR	D213	2760051038	HZ7B-2 DIODE
TR217	2740060007	2SD667A(C) TRANSISTOR	D214	2760051038	HZ7B-2 DIODE
TR218	2740060007	2SD667A(C) TRANSISTOR	D215	2760051038	HZ7B-2 DIODE
TR219	2720053005	2SB647A(C) TRANSISTOR	D216	2760051038	HZ7B-2 DIODE
TR220	2720053005	2SB647A(C) TRANSISTOR	D217	2760049011	1S2076A DIODE
			D218	2760191008	W03C DIODE
			D219	2760191008	W03C DIODE
			D220	2760233005	M4C-51 DIODE

(Con.)

Ref. No.	Part No.	Part Name & Descriptions	Ref. No.	Part No.	Part Name & Descriptions
RESISTORS					
R201	2412227903	1 kohm ±5% 1/4W FIXED CARBON FILM	R258	2432026016	0.33/0.33 ohm ±10% 3.15W FIXED WIRE WOUND
R202	2412227903	1 kohm ±5% 1/4W FIXED CARBON FILM	R259	2440017020	10 ohm ±5% 1W FIXED METAL OXIDE FILM
R203	2412259900	22 kohm ±5% 1/4W FIXED CARBON FILM	R260	2440017020	10 ohm ±5% 1W FIXED METAL OXIDE FILM
R204	2412259900	22 kohm ±5% 1/4W FIXED CARBON FILM	R261	2412264908	36 kohm ±5% 1W FIXED CARBON FILM
R205	2412241905	3.9 kohm ±5% 1/4W FIXED CARBON FILM	R262	2412264908	36 kohm ±5% 1W FIXED CARBON FILM
R206	2412241905	3.9 kohm ±5% 1/4W FIXED CARBON FILM	R265	2412245901	5.6 kohm ±5% 1W FIXED CARBON FILM
R207	2412263909	33 kohm ±5% 1/4W FIXED CARBON FILM	R266	2412243903	4.7 kohm ±5% 1W FIXED CARBON FILM
R208	2412263909	33 kohm ±5% 1/4W FIXED CARBON FILM	R267	2412251908	10 kohm ±5% 1W FIXED CARBON FILM
R209	2412241905	3.9 kohm ±5% 1/4W FIXED CARBON FILM	R268	2440048002	3.9 kohm ±5% 1W FIXED METAL OXIDE FILM
R210	2412241905	3.9 kohm ±5% 1/4W FIXED CARBON FILM	R269	2412303908	1.5M ohm ±5% 1/4W FIXED CARBON FILM
R211	2412215902	330 ohm ±5% 1/4W FIXED CARBON FILM	R270	2412229901	1.2 kohm ±5% 1/4W FIXED CARBON FILM
R212	2412215902	330 ohm ±5% 1/4W FIXED CARBON FILM	R271	2412244902	5.1 kohm ±5% 1/4W FIXED CARBON FILM
R213	2412265907	39 kohm ±5% 1/4W FIXED CARBON FILM	R272	2412161001	750 kohm ±5% 1/4W FIXED CARBON FILM
R214	2412265907	39 kohm ±5% 1/4W FIXED CARBON FILM	CAPACITORS		
R215	2412207907	150 ohm ±5% 1/4W FIXED CARBON FILM	C201	2544146004	1 μF 50V FIXED ELECTROLYTIC
R216	2412207907	150 ohm ±5% 1/4W FIXED CARBON FILM	C202	2544146004	1 μF 50V FIXED ELECTROLYTIC
R217	2412252907	11 kohm ±5% 1/4W FIXED CARBON FILM	C203	2534452902	470 pF ±5% 50V FIXED CERAMIC
R218	2412252907	11 kohm ±5% 1/4W FIXED CARBON FILM	C204	2534452902	470 pF ±5% 50V FIXED CERAMIC
R219	2412187904	22 ohm ±5% 1/4W FIXED CARBON FILM	C205	2531112902	0.001 μF ±10% 50V FIXED CERAMIC
R220	2412187904	22 ohm ±5% 1/4W FIXED CARBON FILM	C206	2531112902	0.001 μF ±10% 50V FIXED CERAMIC
R221	2412207907	150 ohm ±5% 1/4W FIXED CARBON FILM	C207	2544004007	220 μF 6.3V FIXED ELECTROLYTIC
R222	2412207907	150 ohm ±5% 1/4W FIXED CARBON FILM	C208	2544004007	220 μF 6.3V FIXED ELECTROLYTIC
R223	2412187904	22 ohm ±5% 1/4W FIXED CARBON FILM	C209	2534412900	10 pF ±0.5 pF 50V FIXED CERAMIC
R224	2412187904	22 ohm ±5% 1/4W FIXED CARBON FILM	C210	2534412900	10 pF ±0.5 pF 50V FIXED CERAMIC
R225	2412211906	220 ohm ±5% 1/4W FIXED CARBON FILM	C211	2544010004	100 μF 10V FIXED ELECTROLYTIC
R226	2412211906	220 ohm ±5% 1/4W FIXED CARBON FILM	C212	2544010004	100 μF 10V FIXED ELECTROLYTIC
R227	2412219908	470 ohm ±5% 1/4W FIXED CARBON FILM	C213	2534426902	100 pF ±5% 50V FIXED CERAMIC
R228	2412219908	470 ohm ±5% 1/4W FIXED CARBON FILM	C214	2534436902	100 pF ±5% 50V FIXED CERAMIC
R229	2412227903	1 kohm ±5% 1/4W FIXED CARBON FILM	C215	2534436902	100 pF ±5% 50V FIXED CERAMIC
R230	2412227903	1 kohm ±5% 1/4W FIXED CARBON FILM	C216	2534436902	100 pF ±5% 50V FIXED CERAMIC
R231	2412227903	1 kohm ±5% 1/4W FIXED CARBON FILM	C217	2544045008	3.3 μF 50V FIXED ELECTROLYTIC
R232	2412227903	1 kohm ±5% 1/4W FIXED CARBON FILM	C218	2544045008	3.3 μF 50V FIXED ELECTROLYTIC
R233	2412227903	1 kohm ±5% 1/4W FIXED CARBON FILM	C221	2533633007	180 pF ±5% 50V FIXED CERAMIC
R234	2412227903	1 kohm ±5% 1/4W FIXED CARBON FILM	C222	2533633007	180 pF ±5% 50V FIXED CERAMIC
R235	2412256903	16 kohm ±5% 1/4W FIXED CARBON FILM	C223	2533633007	180 pF ±5% 50V FIXED CERAMIC
R236	2412256903	16 kohm ±5% 1/4W FIXED CARBON FILM	C224	2533633007	180 pF ±5% 50V FIXED CERAMIC
R237	2412256903	16 kohm ±5% 1/4W FIXED CARBON FILM	C225	2531027000	0.1 μF ±20% 50V FIXED CERAMIC
R238	2412256903	16 kohm ±5% 1/4W FIXED CARBON FILM	C226	2531027000	0.1 μF ±20% 50V FIXED CERAMIC
R239	2412251908	10 kohm ±5% 1/4W FIXED CARBON FILM	C227	2531053003	0.01 μF ±10% 500V FIXED CERAMIC
R240	2412251908	10 kohm ±5% 1/4W FIXED CARBON FILM	C228	2531053003	0.01 μF ±10% 500V FIXED CERAMIC
R241	2412227903	1 kohm ±5% 1/4W FIXED CARBON FILM	C231	2544004007	220 μF 6.3V FIXED ELECTROLYTIC
R242	2412227903	1 kohm ±5% 1/4W FIXED CARBON FILM	C232	2544054002	16V FIXED ELECTROLYTIC
R243	2412227903	1 kohm ±5% 1/4W FIXED CARBON FILM	C233	2544035005	10 μF 35V FIXED ELECTROLYTIC
R244	2412227903	1 kohm ±5% 1/4W FIXED CARBON FILM	C234	2544102909	47 μF 10V FIXED ELECTROLYTIC
R245	2440049027	4.7 kohm ±5% 1W FIXED METAL OXIDE FILM	C235	2549014005	0.1 μF ±20% 50V FIXED ELECTROLYTIC
R246	2440049027	4.7 kohm ±5% 1W FIXED METAL OXIDE FILM	C236	2546054000	6800 μF ±20% 63V FIXED ELECTROLYTIC
R247	2440049027	4.7 kohm ±5% 1W FIXED METAL OXIDE FILM	C237	2546054000	6800 μF ±20% 63V FIXED ELECTROLYTIC
R248	2440049027	4.7 kohm ±5% 1W FIXED METAL OXIDE FILM	C238	2531053003	0.01 μF ±10% 500V FIXED CERAMIC
R249	2442007009	220 ohm ±5% 1/4W FIXED METAL OXIDE FILM	C239	2531053003	0.01 μF ±10% 500V FIXED CERAMIC
R250	2442007009	220 ohm ±5% 1/4W FIXED METAL OXIDE FILM	C240	2531053003	0.01 μF ±10% 500V FIXED CERAMIC
R255	2432026016	0.33/0.33 ohm ±10% 3.15W FIXED WIRE WOUND	C241	2531053003	0.01 μF ±10% 500V FIXED CERAMIC
R256	2432026016	0.33/0.33 ohm ±10% 3.15W FIXED WIRE WOUND	C259	2533613001	27 pF ±5% 50V FIXED CERAMIC
R257	2432026016	0.33/0.33 ohm ±10% 3.15W FIXED WIRE WOUND	C260	2533613001	27 pF ±5% 50V FIXED CERAMIC

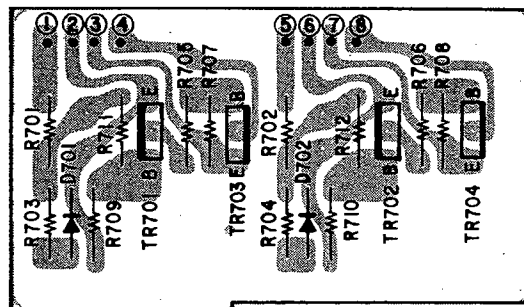
ETC-162 TUNER UNIT



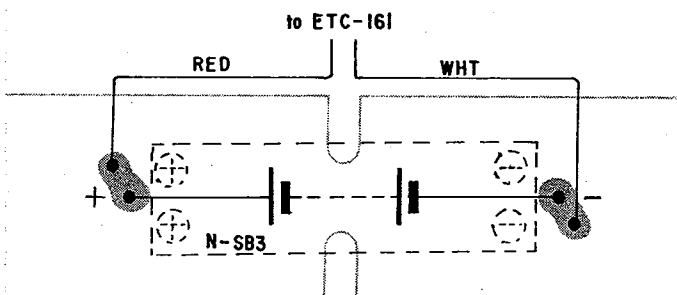
(Con.)

Ref. No.	Part No.	Part Name & Descriptions
OTHER PARTS		
	2220654001	P.C. BOARD
	EP-5667H3	TERMINAL FOR WRAPPING PIN USED 20
	2050127009	TERMINAL USED 2
	2061023079	FUSE 5A
	EP-5870	FUSE HOLDER
	2090042908	JUMPER SHORT LEAD P=10mm USED 25
	2090008104	JUMPER SHORT LEAD P=15mm USED 16
VR201	EP-5462H7	SOLID VOLUME
VR202	EP-5462H7	SOLID VOLUME
VR203	EP-5462H19	SOLID VOLUME
VR204	EP-5462H19	SOLID VOLUME
RL201	2140037009	RELAY
	4510064105	REFLECTOR
	4150185004	INSULATING SHEET
	5130270093	FUSE LABEL
	4170129008	RADIATOR FOR TR221, 222, 223, 224
	4711306015	CROSS PAN SCREW 3x12
		TAPPING SCREW 3x8 FOR RADIATOR
	4730354019	FIXED
	4120764002	RADIATOR BRACKET

ETC-169 BIAS UNIT



ETC-168 BATTER UNIT



ETC-168 PARTS LIST

Ref. No.	Part No.	Part Name & Descriptions
GENERAL		
	2220670001	P.C. BOARD
	3940004008	N-SB3 BATTERY
	4450033005	WIRE CLAMP BAND

ETC-169 PARTS LIST

Ref. No.	Part No.	Part Name & Descriptions
SEMICONDUCTORS		
TR701	2710113010	2SA999E TRANSISTOR
TR702	2710113010	2SA999E TRANSISTOR
TR703	2730198002	2SC1815(Y) TRANSISTOR
TR704	2730198002	2SC1815(Y) TRANSISTOR
D701	2760049008	1S2076 DIODE
D702	2760049008	1S2076 DIODE
RESISTORS		
R701	2412070008	120 ohm ±5% 1/4W FIXED CARBON FILM
R702	2412070008	120 ohm ±5% 1/4W FIXED CARBON FILM
R703	2412092002	1 kohm ±5% 1/4W FIXED CARBON FILM
R704	2412092002	1 kohm ±5% 1/4W FIXED CARBON FILM
R705	2412116001	10 kohm ±5% 1/4W FIXED CARBON FILM
R706	2412116001	10 kohm ±5% 1/4W FIXED CARBON FILM
R707	2412116001	10 kohm ±5% 1/4W FIXED CARBON FILM
R708	2412116001	10 kohm ±5% 1/4W FIXED CARBON FILM
R709	2412079007	1.6 kohm ±5% 1/4W FIXED CARBON FILM
R710	2412079007	1.6 kohm ±5% 1/4W FIXED CARBON FILM
R711	2412104000	3.3 kohm ±5% 1/4W FIXED CARBON FILM
R712	2412104000	3.3 kohm ±5% 1/4W FIXED CARBON FILM
OTHER PARTS		
	2220672009	P.C. Board

ETC-162 PARTS LIST

Ref. No.	Part No.	Part Name & Descriptions	
SEMICONDUCTORS			
IC501	2630051003	HA1137W	INTEGRATED CIRCUIT
IC502	2630043011	HA-1156(R)	INTEGRATED CIRCUIT
IC503	2630145003	LA1245	INTEGRATED CIRCUIT
TR501	2730025010	2SC461(B)	TRANSISTOR
TR502	2710113007	2SA999(F)	TRANSISTOR
TR503	2710113007	2SA999(F)	TRANSISTOR
TR506	2730204019	2SC2320(F)	TRANSISTOR
TR507	2730204019	2SC2320(F)	TRANSISTOR
TR508	2730204019	2SC2320(F)	TRANSISTOR
TR509	2730204019	2SC2320(F)	TRANSISTOR
TR510	2710113007	2SA999(F)	TRANSISTOR
TR511	2730204019	2SC2320(F)	TRANSISTOR
TR512	2730204019	2SC2320(F)	TRANSISTOR
TR513	2730204019	2SC2320(F)	TRANSISTOR
TR514	2710113007	2SA999(F)	TRANSISTOR
TR515	2730204019	2SC2320(F)	TRANSISTOR
TR516	2730204019	2SC2320(F)	TRANSISTOR
TR517	2730204019	2SC2320(F)	TRANSISTOR
TR518	2730201009	2SC2236(Y)	TRANSISTOR
D501	2760049008	1S2076	DIODE
D502	2760049008	1S2076	DIODE
D503	2760049008	1S2076	DIODE
D504	2760049008	1S2076	DIODE
D505	2760302004	SVC321SP-D2	VARIABLE DIODE
D506	2760302004	SVC321SP-D2	VARIABLE DIODE
D507	2760049008	1S2076	DIODE
D508	2760049008	1S2076	DIODE
COILS & TRANSFORMERS			
T501	2312024002	IF DET TRANS (A)	
T502	2312025001	IF DET TRANS (B)	
T503	2311061008	MW ANT. TRANS.	
T504	2310036005	AM IFT	
T505	2311065004	MW OSC COIL	
L501	TRT0565H1	INDUCTOR	
L502	TRT0565H1	INDUCTOR	
RESISTORS			
R501	2412253906	12 kohm ±5% 1/4W	FIXED CARBON FILM
R502	2412258901	20 kohm ±5% 1/4W	FIXED CARBON FILM
R503	2412221909	560 ohm ±5% 1/4W	FIXED CARBON FILM
R504	2412203901	100 ohm ±5% 1/4W	FIXED CARBON FILM
R505	2412215902	330 ohm ±5% 1/4W	FIXED CARBON FILM
R506	2412251908	10 kohm ±5% 1/4W	FIXED CARBON FILM
R507	2412233900	1.8 kohm ±5% 1/4W	FIXED CARBON FILM
R508	2412227903	1 kohm ±5% 1/4W	FIXED CARBON FILM
R509	2412215902	330 ohm ±5% 1/4W	FIXED CARBON FILM
R510	2412215902	330 ohm ±5% 1/4W	FIXED CARBON FILM
R511	2412267905	47 kohm ±5% 1/4W	FIXED CARBON FILM
R512	2412235908	2.2 kohm ±5% 1/4W	FIXED CARBON FILM
R513	2412229901	1.2 kohm ±5% 1/4W	FIXED CARBON FILM
R514	2412263909	33 kohm ±5% 1/4W	FIXED CARBON FILM
R515	2412248908	7.5 kohm ±5% 1/4W	FIXED CARBON FILM
R516	2412256903	16 kohm ±5% 1/4W	FIXED CARBON FILM
R517	2412234909	2 kohm ±5% 1/4W	FIXED CARBON FILM
R518	2412253906	12 kohm ±5% 1/4W	FIXED CARBON FILM
R519	2412251908	10 kohm ±5% 1/4W	FIXED CARBON FILM
R520	2412275900	100 kohm ±5% 1/4W	FIXED CARBON FILM
R521	2412235908	2.2 kohm ±5% 1/4W	FIXED CARBON FILM

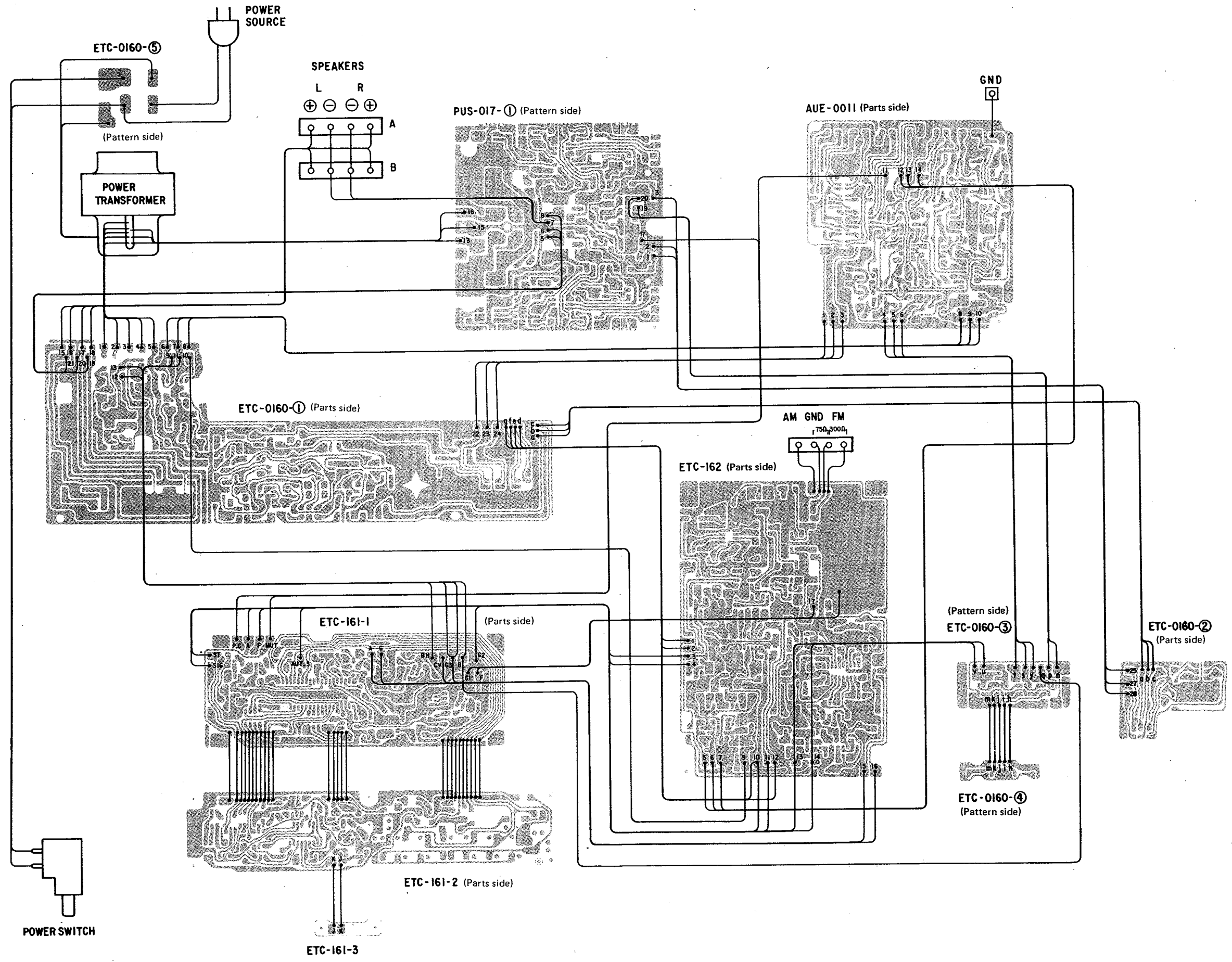
Ref. No.	Part No.	Part Name & Descriptions	
R522	2412256903	16 kohm ±5% 1/4W	FIXED CARBON FILM
R523	2412237906	2.7 kohm ±5% 1/4W	FIXED CARBON FILM
R524	2412237906	2.7 kohm ±5% 1/4W	FIXED CARBON FILM
R525	2412251908	10 kohm ±5% 1/4W	FIXED CARBON FILM
R526	2412251908	10 kohm ±5% 1/4W	FIXED CARBON FILM
R527	2412251908	10 kohm ±5% 1/4W	FIXED CARBON FILM
R528	2412251908	10 kohm ±5% 1/4W	FIXED CARBON FILM
R529	2412226904	910 ohm ±5% 1/4W	FIXED CARBON FILM
R530	2412261901	27 kohm ±5% 1/4W	FIXED CARBON FILM
R531	2412226904	910 ohm ±5% 1/4W	FIXED CARBON FILM
R532	2412245901	5.6 kohm ±5% 1/4W	FIXED CARBON FILM
R533	2412275900	100 kohm ±5% 1/4W	FIXED CARBON FILM
R534	2412275900	100 kohm ±5% 1/4W	FIXED CARBON FILM
R535	2412251908	10 kohm ±5% 1/4W	FIXED CARBON FILM
R536	2412251908	10 kohm ±5% 1/4W	FIXED CARBON FILM
R537	2412251908	10 kohm ±5% 1/4W	FIXED CARBON FILM
R539	2412251908	10 kohm ±5% 1/4W	FIXED CARBON FILM
R540	2412275900	100 kohm ±5% 1/4W	FIXED CARBON FILM
R541	2412251908	10 kohm ±5% 1/4W	FIXED CARBON FILM
R542	2412211906	220 ohm ±5% 1/4W	FIXED CARBON FILM
R543	2412263909	33 kohm ±5% 1/4W	FIXED CARBON FILM
R544	2412275900	100 kohm ±5% 1/4W	FIXED CARBON FILM
R545	2412245901	5.6 kohm ±5% 1/4W	FIXED CARBON FILM
R546	2412251908	10 kohm ±5% 1/4W	FIXED CARBON FILM
R547	2412245901	5.6 kohm ±5% 1/4W	FIXED CARBON FILM
R548	2412258901	20 kohm ±5% 1/4W	FIXED CARBON FILM
R550	2412251908	10 kohm ±5% 1/4W	FIXED CARBON FILM
R551	2412275900	100 kohm ±5% 1/4W	FIXED CARBON FILM
R552	2412263909	33 kohm ±5% 1/4W	FIXED CARBON FILM
R553	2412211906	220 ohm ±5% 1/4W	FIXED CARBON FILM
R554	2412251908	10 kohm ±5% 1/4W	FIXED CARBON FILM
R557	2412251908	10 kohm ±5% 1/4W	FIXED CARBON FILM
R558	2412251908	10 kohm ±5% 1/4W	FIXED CARBON FILM
R559	2412251908	10 kohm ±5% 1/4W	FIXED CARBON FILM
R560	2412251908	10 kohm ±5% 1/4W	FIXED CARBON FILM
R561	2412275900	100 kohm ±5% 1/4W	FIXED CARBON FILM
R562	2412245901	5.6 kohm ±5% 1/4W	FIXED CARBON FILM
R563	2412251908	10 kohm ±5% 1/4W	FIXED CARBON FILM
R564	2412245901	5.6 kohm ±5% 1/4W	FIXED CARBON FILM
R565	2412251908	10 kohm ±5% 1/4W	FIXED CARBON FILM
R566	2412222908	620 ohm ±5% 1/4W	FIXED CARBON FILM
R567	2412221909	560 ohm ±5% 1/4W	FIXED CARBON FILM
R568	2412285903	270 kohm ±5% 1/4W	FIXED CARBON FILM
R569	2412281907	180 kohm ±5% 1/4W	FIXED CARBON FILM
R570	2412275900	100 kohm ±5% 1/4W	FIXED CARBON FILM
R571	2412275900	100 kohm ±5% 1/4W	FIXED CARBON FILM
R572	2412211906	220 ohm ±5% 1/4W	FIXED CARBON FILM
R573	2412231902	1.5 kohm ±5% 1/4W	FIXED CARBON FILM
R574	2412203901	100 ohm ±5% 1/4W	FIXED CARBON FILM
R575	2412239904	3.3 kohm ±5% 1/4W	FIXED CARBON FILM
R576	2412219908	470 ohm ±5% 1/4W	FIXED CARBON FILM
R577	2412251908	10 kohm ±5% 1/4W	FIXED CARBON FILM
R578	2412269903	56 kohm ±5% 1/4W	FIXED CARBON FILM
R579	2412198906	62 ohm ±5% 1/4W	FIXED CARBON FILM
R580	2412211906	220 ohm ±5% 1/4W	FIXED CARBON FILM
R581	2412251908	10 kohm ±5% 1/4W	FIXED CARBON FILM
R582	2412227903	1 kohm ±5% 1/4W	FIXED CARBON FILM
R583	2412261901	27 kohm ±5% 1/4W	FIXED CARBON FILM
R584	2412211906	220 ohm ±5% 1/4W	FIXED CARBON FILM
R585	2412235908	2.2 kohm ±5% 1/4W	FIXED CARBON FILM
R586	2412267905	47 kohm ±5% 1/4W	FIXED CARBON FILM
R588	2412222908	620 ohm ±5% 1/4W	FIXED CARBON FILM
R594	2412245901	5.6 kohm ±5% 1/4W	FIXED CARBON FILM
R595	2412293908	560 kohm ±5% 1/4W	FIXED CARBON FILM

(Con.)

Ref. No.	Part No.	Part Name & Descriptions	
R596	2412275900	100 kohm ±5% 1/4W	FIXED CARBON FILM
R597	2412249907	8.2 kohm ±5% 1/4W	FIXED CARBON FILM
R598	2412249907	8.2 kohm ±5% 1/4W	FIXED CARBON FILM
CAPACITORS			
C502	2531146907	0.01 μF ±80% 50V	FIXED CERAMIC
C503	2531146907	0.01 μF ±80% 50V	FIXED CERAMIC
C504	2531146907	0.01 μF ±80% 50V	FIXED CERAMIC
C505	2531146907	0.01 μF ±80% 50V	FIXED CERAMIC
C506	2531146907	0.01 μF ±80% 50V	FIXED CERAMIC
C507	2531146907	0.01 μF ±80% 50V	FIXED CERAMIC
C508	2531146907	0.01 μF ±80% 50V	FIXED CERAMIC
C509	2531146907	0.01 μF ±80% 50V	FIXED CERAMIC
C510	2544119905	1 μF ±50% 50V	FIXED ELECTROLYTIC
C511	2544046007	4.7 μF ±50% 50V	FIXED ELECTROLYTIC
C512	2531146907	0.01 μF ±80% 50V	FIXED CERAMIC
C513	2544118906	0.47 μF ±50% 50V	FIXED ELECTROLYTIC
C514	2531146907	0.01 μF ±80% 50V	FIXED CERAMIC
C515	2534436902	100 pF ±5% 50V	FIXED CERAMIC
C516	2544045008	3.3 μF ±50% 50V	FIXED ELECTROLYTIC
C517	2551241905	0.047 μF ±10% 50V	FIXED PLASTIC FILM
C518	2544118906	0.47 μF ±50% 50V	FIXED ELECTROLYTIC
C519	2544021006	470 pF ±50% 50V	FIXED ELECTROLYTIC
C520	2556091008	470 pF ±5% 50V	FIXED PLASTIC FILM
C521	2544118906	0.47 μF ±50% 50V	FIXED ELECTROLYTIC
C522	2544118906	0.47 μF ±50% 50V	FIXED ELECTROLYTIC
C523	2551217900	0.027 μF ±5% 50V	FIXED PLASTIC FILM
C524	2551217900	0.027 μF ±5% 50V	FIXED PLASTIC FILM
C525	2531118906	0.0033 μF ±10% 50V	FIXED CERAMIC
C526	2531118906	0.0033 μF ±10% 50V	FIXED CERAMIC
C527	2534449902	360 pF ±5% 50V	FIXED CERAMIC
C528	2534449902	360 pF ±5% 50V	FIXED CERAMIC
C529	2531114900	0.0015 μF ±10% 50V	FIXED CERAMIC
C530	2531114900	0.0015 μF ±10% 50V	FIXED CERAMIC
C531	2544119905	1 μF ±50% 50V	FIXED ELECTROLYTIC
C532	2544119905	1 μF ±50% 50V	FIXED ELECTROLYTIC
C533	2531146907	0.01 μF ±80% 50V	FIXED CERAMIC
C534	2531146907	0.01 μF ±80% 50V	FIXED CERAMIC
C535	2544021006	470 μF ±50% 16V	FIXED ELECTROLYTIC
C536	2531146907	0.01 μF ±80% 50V	FIXED CERAMIC
C537	2531146907	0.01 μF ±80% 50V	FIXED CERAMIC
C538	2534407902	5 pF ±0.25 50V	FIXED CERAMIC
C539	2531146907	0.01 μF ±80% 50V	FIXED CERAMIC

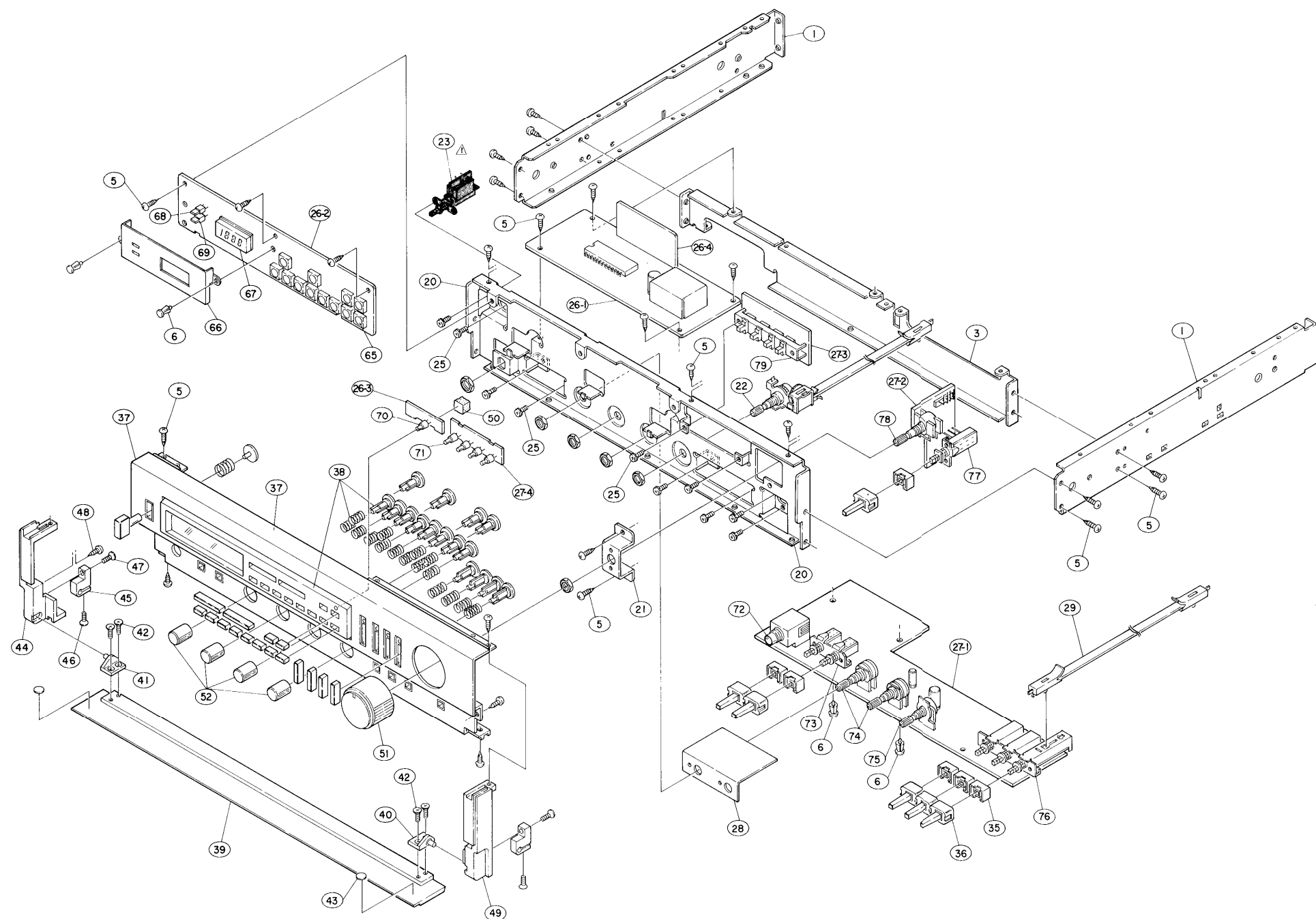
Ref. No.	Part No.	Part Name & Descriptions	
C540	2531146907	0.01 μF ±80% 50V	FIXED CERAMIC
C541	2531146907	0.01 μF ±80% 50V	FIXED CERAMIC
C542	2531146907	0.01 μF ±80% 50V	FIXED CERAMIC
C543	2544105906	10 μF ±16V	FIXED ELECTROLYTIC
C544	2531146907	0.01 μF ±80% 50V	FIXED CERAMIC
C545	2534432906	68 pF ±5% 50V	FIXED CERAMIC
C546	2544109902	100 μF ±16V	FIXED ELECTROLYTIC
C547	2531146907	0.01 μF ±80% 50V	FIXED CERAMIC
C548	2531116908	0.0022 μF ±10% 50V	FIXED CERAMIC
C549	2556090009	430 pF ±5% 50V	FIXED PLASTIC FILM
C551	2531146907	0.01 μF ±80% 50V	FIXED CERAMIC
C553	2544107904	33 μF ±16V	FIXED ELECTROLYTIC
C554	2544118906	0.47 μF ±50V	FIXED ELECTROLYTIC
C555	2531146907	0.01 μF ±80% 50V	FIXED CERAMIC
C556	2531146907	0.01 μF ±80% 50V	FIXED CERAMIC
C557	2551212905	0.01 μF ±5% 50V	FIXED PLASTIC FILM
C559	2551082009	0.068 μF ±10% 50V	FIXED PLASTIC FILM
C560	2544109902	100 μF ±16V	FIXED ELECTROLYTIC
C562	2531146907	0.01 μF ±80% 50V	FIXED CERAMIC
C563	2544118906	0.47 μF ±50V	FIXED ELECTROLYTIC
C564	2551138005	0.033 μF ±5% 50V	FIXED PLASTIC FILM
C565	2531146907	0.01 μF ±80% 50V	FIXED CERAMIC
C566	2531146907	0.01 μF ±80% 50V	FIXED CERAMIC
C569	2544015009	10 μF ±16V	FIXED ELECTROLYTIC
C570	2544015009	10 μF ±16V	FIXED ELECTROLYTIC
C571	2533600001	7 pF ±0.5 50V	FIXED CERAMIC
C572	2544044009	1 μF ±50V	FIXED ELECTROLYTIC
OTHER PARTS			
	2220653002	P.C. BOARD	
	2090042908	JUMPER SHORT LEAD P=10mm USED 13	
	2090008117	JUMPER SHORT LEAD P=12.5mm USED 2	
	EP-5607H3	TERMINAL FOR WRAPPING PIN USED 19	
	2160034008	FRONT END	
CF501	2610025004	CERAMIC FILTER	

CONNECTION DIAGRAM

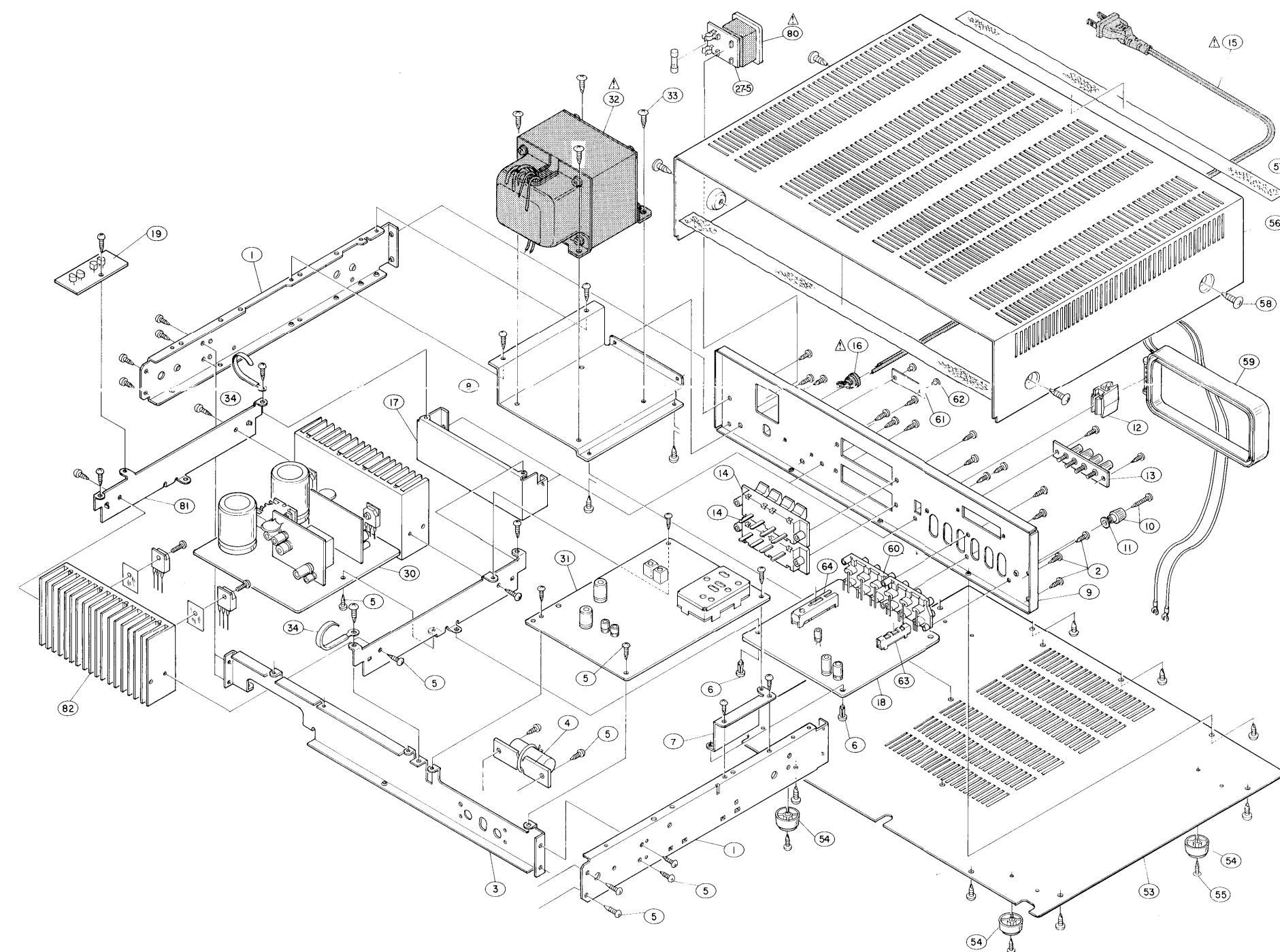


EXPLODED VIEW OF CHASSIS AND CABINET

FRONT VIEW



BACK VIEW



⚠ Means important safety item, which must be replaced, when necessary, by a part specified or meeting the specification by the manufacturer.

EXPLODED VIEW OF PARTS LIST

NOTE: See addendum list below for the parts with asterisk(*) on the Ref No. and the other parts not included in the list.

Ref. No.	Part No.	Part Name & Descriptions
1	4110216706	SIDE CHASSIS
2	4770064107	FIXING SCREW
3	4110260105	CHASSIS FRAME
4	ETC-168	BATTERY UNIT
5	4730354019	TAPPING SCREW 3x8
6	4770096007	PUSH RIVET
7	4120765001	FIX. BRACKET (A)
8	4120767203	TRANS BRACKET
* 9	1050344003	BACK PANEL
10	2050071016	TERMINAL
11	4770018001	WASHER
12	1460262005	ANTENNA HOLDER
13	2050050008	4P TERMINAL
14	2050129007	4P PUSH TERMINAL
⚠ 15	2062019008	AC CORD
⚠ 16	MD-3802	BUSHING
17	4120766000	FIX. BRACKET (B)
18	AUE011-	EQ. & CONTROL UNIT
19	ETC-169-	BIAS UNIT
20	4100258007	FRONT CHASSIS
21	4120763003	VOLUME BRACKET
22	2120177002	ROTARY REMOTE
⚠ 23	2124154021	POWER SWITCH
⚠ 24	2568019007	METALIZED CAPACITOR 0.01μF 125V
25	4700009006	CROSS PAN SCREW WITH S. WASHER 3x6
26	ETC-161	DISPLAY & KEY UNIT
27	ETC-160	CONTROL UNIT
28	4140223002	SHIELD PLATE
29	4350052005	FLEXIBLE SLIDER
30	PUS-017	POWER AMP & SUPPLY UNIT
31	ETC-162	TUNER UNIT
⚠ 32	2335259	POWER TRANS
33	4734454038	TAPPING TRUSS SCREW 4x8 BLACK
34	EP-4772	CORD HOLDER
35	1140056007	FLEXIBLE RING
36	1130225000	PUSH KNOB (C)
* 37	1440727007	FRONT PANEL ASS.
38	1460333206	CONTROL PANEL ASS.
39	1440719002	DOOR
40	4010057227	SHAFT (R)
41	4712302047	CROSS FLAT HEAD SCREW 3x5
42	4010058129	SHAFT (L)
43	1220039012	SPACER
44	1460305108	SIDE PANEL (L)
45	4010088102	HINGE
46	4712305015	CROSS FLAT HEAD SCREW 3x10
47	4732306010	CROSS FLAT HEAD TAPPING SCREW (1) 3x12
48	4730304014	TAPPING SCREW (1) 3x8
49	1460306107	SIDE PANEL (R)
50	1290002066	SOFT TAPE
51	1120312101	KNOB (A)
52	1120313003	KNOB (B)
53	1050345206	BOTTOM COVER
54	1048001002	FOOT
55	SC-06271	FIX. SCREW
56	1020107005	TOP COVER
57	1220064003	SPACER
58	4734801005	TAPPING TRUSS SCREW 4x8
59	2311060009	LOOP ANTENNA
60	2040079002	(AUE-011)
61	5130398140	SERIAL NO. PLATE
62	4770126016	RIVET
63	2124255001	PUSH SWITHC (REMOTE) (AUE-011)
64	2124254002	SLIDE SWITCH (REMOTE) (AUE-011)
65	2124253003	PUSH SWITCH (ETC-161)
66	1440726008	MASK (ETC-161)
67	3939162005	SL-2436-01 (ETC-161)
68	3939092005	LED (RED) (ETC-161)
69	3939093004	LED (GREEN) (ETC-161)
70	3939032004	LED (RED) (ETC-161)
71	3939040002	LED (GREEN) (ETC-160)
72	2048047007	HEAD PHONE JACK (ETC-160)
73	2124257009	2P PUSH SWITCH (ETC-160)
74	2110265005	VARIABLE RESISTOR 250 KOHM FOR TONE (ETC-160)
75	2110198004	VARIABLE RESISTOR 250 KOHM FOR BALANCE (ETC-160)
76	2124256000	3P PUSH SWITCH (ETC-160)
77	2124188004	1P PUSH SWITCH (ETC-160)
78	2110251006	VARIABLE RESISTOR 100 KOHM FOR MAIN VR. (ETC-160)
79	2124258008	4P PUSH SWITCH (ETC-160)
⚠ 80	2033912008	2P AC OUTLET (ETC-160)
81	4120764002	RADIATOR BRACKET (PUS-017)
82	4170129008	RADIATOR (PUS-017)
PACKING & ACCESSORIES		
	5130364006	CUATION SHEET
	5020496000	DOOR PAD
	5040055007	CABINET SHEET
	5030213202	CUSHION
	5010702005	CARTON CASE
	5050061007	ENVELOPE
	5110815009	INST. MANUAL
	3950005107	FM ANT. ASS.

NIPPON COLUMBIA CO., LTD.

No. 14-14, 4-CHOME AKASAKA, MINATO-KU, TOKYO 107 JAPAN
 TEL: 03-584-8111
 TLX: JAPANOLA J22591
 CABLE: NIPPONCOLUMBIA TOKYO

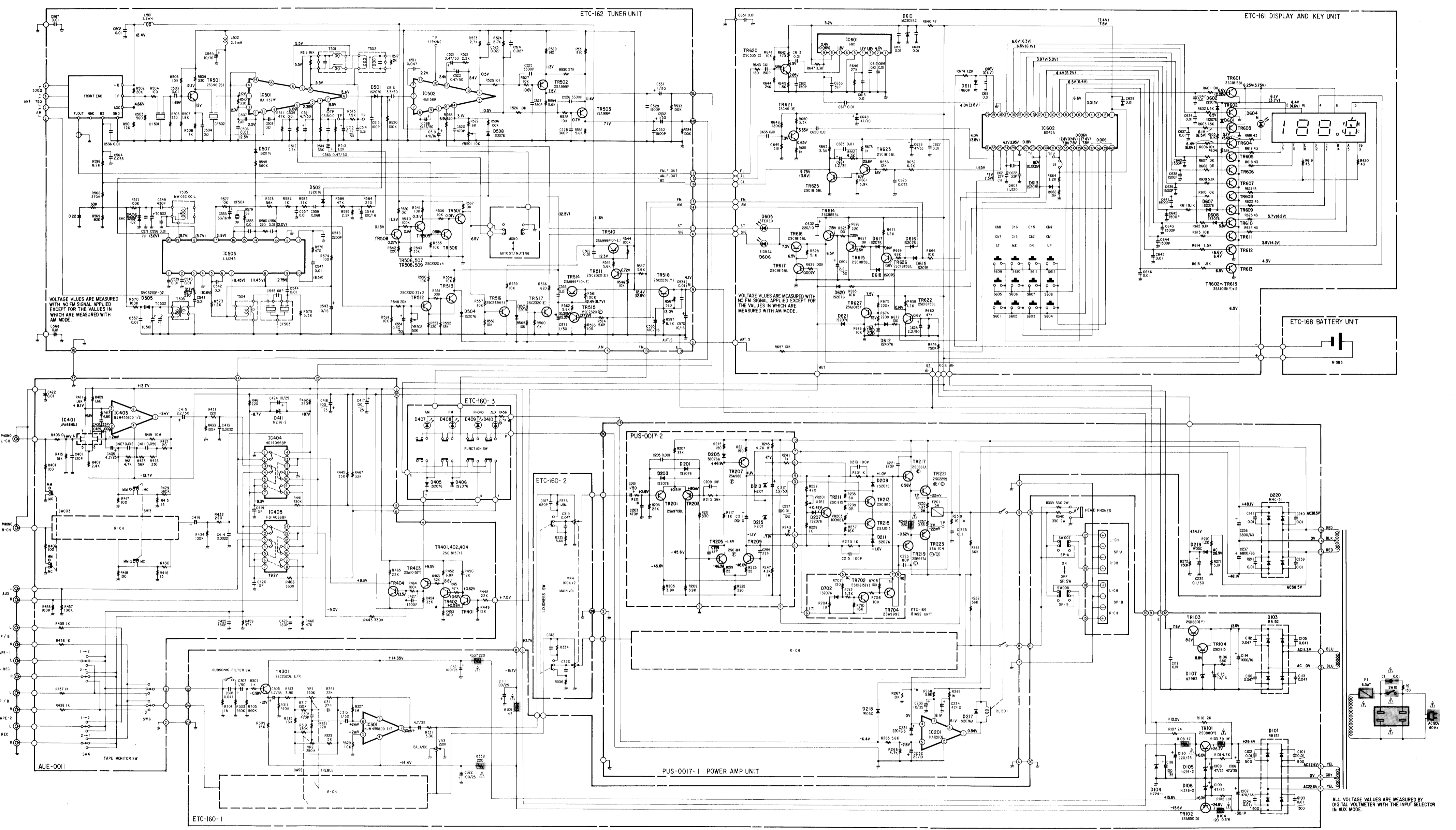
Printed in Japan

ADDENDUM LIST

Ref. No.	Part Name & Descriptions	E2 For Europe	EG For Germany	EF For France	E1 For Hong Kong Singapore
9	BACK PANEL				
⚠ 15	AC CORD				
⚠ 16	BUSHING				
⚠ 23	POWER SWITCH				
⚠ 24	CAPACITOR				
⚠ 32	POWER TRANS				
37	FRONT PANEL ASS.				
⚠ 80	2P OUTLET				2033912008

WIRING DIAGRAM

⚠ Means important safety item, which must be replaced, when necessary, by a part specified or meeting the specification by the manufacturer.



VOLTAGE VALUES ARE MEASURED WITH NO FM SIGNAL APPLIED EXCEPT FOR THE VALUES IN WHICH ARE MEASURED WITH AM MODE.

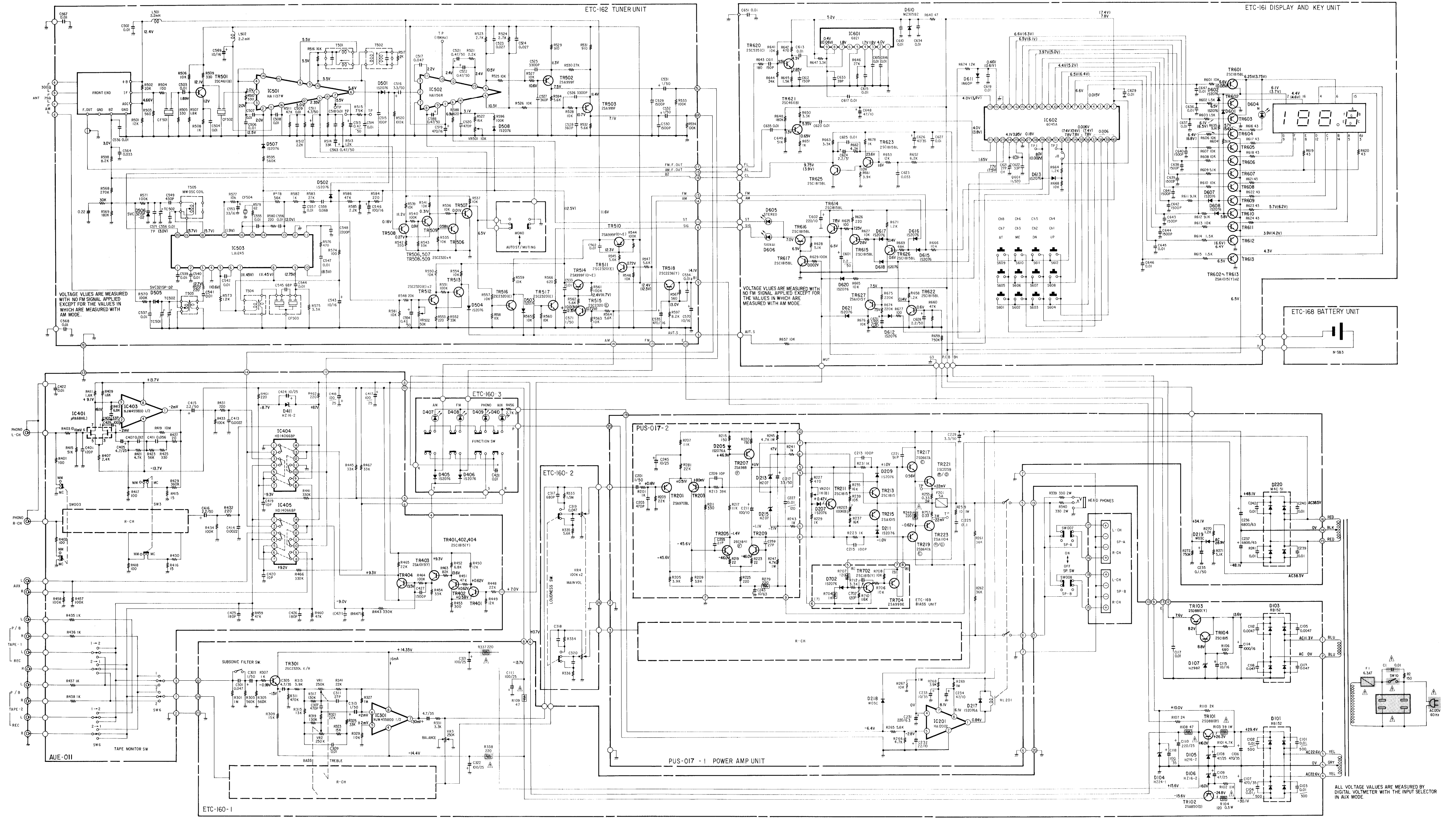
VOLTAGE VALUES ARE MEASURED WITH NO FM SIGNAL APPLIED EXCEPT FOR THE VALUES IN WHICH ARE MEASURED WITH AM MODE.

ALL VOLTAGE VALUES ARE MEASURED BY DIGITAL VOLT-METER WITH THE INPUT SELECTOR IN AUX MODE.

NOTES:
 ALL RESISTANCE VALUES IN OHM, K = 1,000 OHM, M = 1,000,000 OHM.
 ALL CAPACITANCE VALUES IN MICROFARAD, P = MICRO-MICRO FARAD.
 EVERY VOLTAGES AND CURRENTS IS MEASURED AT NO SIGNAL INPUT CONDITION.
 CIRCUIT AND PARTS ARE SUBJECT TO CHANGE WITHOUT PRIOR NOTICE.

WIRING DIAGRAM

⚠ Means important safety item, which must be replaced, when necessary, by a part specified or meeting the specification by the manufacturer.



NOTES:
 ALL RESISTANCE VALUES IN OHM, K = 1,000 OHM,
 M = 1,000,000 OHM.
 ALL CAPACITANCE VALUES IN MICROFARAD, P = MICRO-
 MICRO FARAD.
 EVERY VOLTAGES AND CURRENTS IS MEASURED AT
 NO SIGNAL INPUT CONDITION.
 CIRCUIT AND PARTS ARE SUBJECT TO CHANGE WITHOUT
 PRIOR NOTICE.