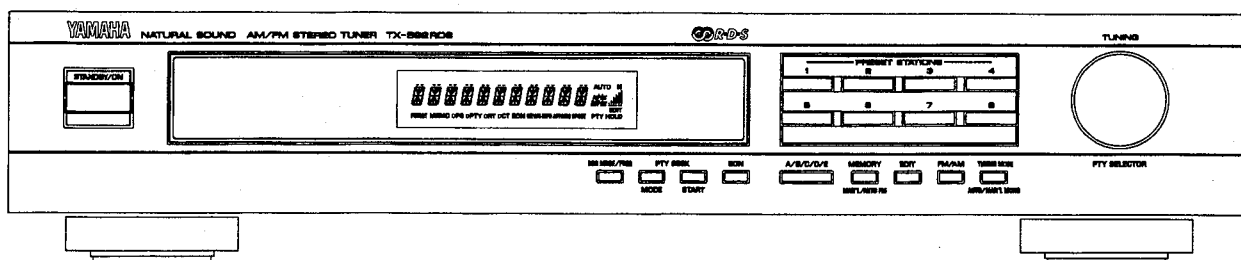


AM/FM STEREO TUNER TX-592RDS

SERVICE MANUAL

FRONT PANELS



IMPORTANT NOTICE

This manual has been provided for the use of authorized YAMAHA Retailers and their service personnel.

It has been assumed that basic service procedures inherent to the industry, and more specifically YAMAHA Products, are already known and understood by the users, and have therefore not been restated.

WARNING: Failure to follow appropriate service and safety procedures when servicing this product may result in personal injury, destruction of expensive components, and failure of the product to perform as specified. For these reasons, we advise all YAMAHA product owners that any service required should be performed by an authorized YAMAHA Retailer or the appointed service representative.

IMPORTANT: The presentation or sale of this manual to any individual or firm does not constitute authorization, certification or recognition of any applicable technical capabilities, or establish a principle-agent relationship of any form.

The data provided is believed to be accurate and applicable to the unit(s) indicated on the cover. The research, engineering, and service departments of YAMAHA are continually striving to improve YAMAHA products. Modifications are, therefore, inevitable and specifications are subject to change without notice or obligation to retrofit. Should any discrepancy appear to exist, please contact the distributor's Service Division.

WARNING: Static discharges can destroy expensive components. Discharge any static electricity your body may have accumulated by grounding yourself to the ground buss in the unit (heavy gauge black wires connect to this buss).

IMPORTANT: Turn the unit OFF during disassembly and part replacement. Recheck all work before you apply power to the unit.

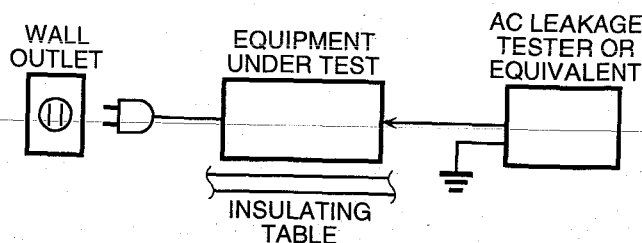
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■ TO SERVICE PERSONNEL

- Critical Components Information.**
Components having special characteristics are marked Δ and must be replaced with parts having specifications equal to those originally installed.
- Leakage Current Measurement (For 120V Models Only).**
When service has been completed, it is imperative to verify that all exposed conductive surfaces are properly insulated from supply circuits.
 - Meter impedance should be equivalent to 1500 ohm shunted by 0.15 μ F.
 - Leakage current must not exceed 0.5mA.
 - Be sure to test for leakage with the AC plug in both polarities.



WARNING: CHEMICAL CONTENT NOTICE!

The solder used in the production of this product contains LEAD. In addition, other electrical/electronic and /or plastic (where applicable) components may also contain traces of chemicals found by the California Health and Welfare Agency (and possibly other entities) to cause cancer and/or birth defects or other reproductive harm.

DO NOT PLACE SOLDER, ELECTRICAL/ELECTRONIC OR PLASTIC COMPONENTS IN YOUR MOUTH FOR ANY REASON WHATSOEVER!

Avoid prolonged, unprotected contact between solder and your skin! When soldering, do not inhale solder fumes or expose eyes to solder/flux vapor!

If you come in contact with solder or components located inside the enclosure of this product, wash your hands before handling food.

■ SPECIFICATIONS

■ FM SECTION

Tuning Range	87.50 to 108.00 MHz
Usable Sensitivity (DIN)	
Mono (S/N 26 dB)	0.9 μ V
Stereo (S/N 46 dB)	24 μ V
Alternate Channel Selectivity	
Selectivity (two signals) 40 kHz Dev. $\pm$ 300 kHz	70 dB
Signal to Noise Ratio (DIN-Weighted 40 kHz)	
Mono	75 dB
Stereo	70 dB
Harmonic Distortion 1 kHz	
Mono	0.1 %
Stereo	0.2 %
Stereo Separation	50 dB
Frequency Response	
20 Hz to 15 kHz	0 $\pm$ 1.5 dB

■ AM SECTION

Tuning Range	531 to 1611 kHz
Usable Sensitivity	200 μ V/m
Signal to Noise Ratio	50 dB
Harmonic Distortion	0.3 %

■ AUDIO SECTION

Output Level	
FM 40 kHz Dev.	500 mV
AM 30 % MOD 1 kHz	200 mV

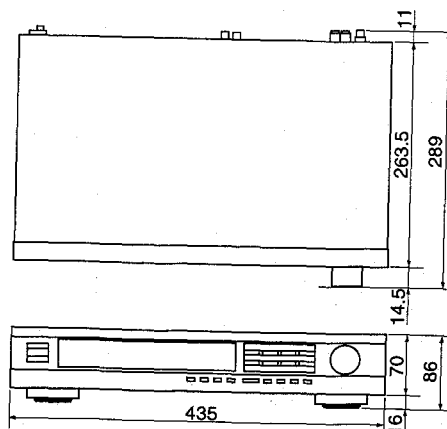
■ GENERAL

Power Supply	AC230V, 50Hz
Power Consumption	7 W
Dimensions (W x H x D)	435 x 86 x 289mm
Weight	3.2 kg

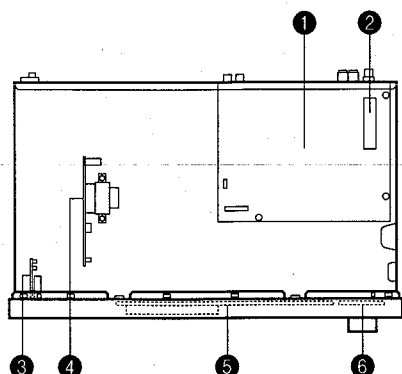
* Specifications subject to change without notice.

B British model G European model

• DIMENSIONS

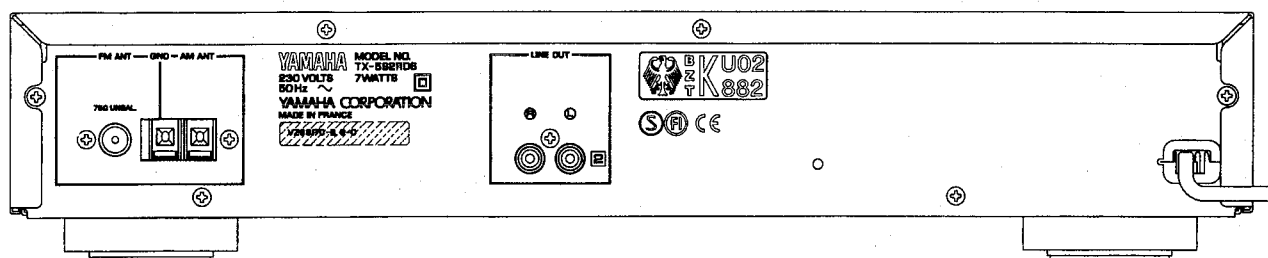


INTERNAL VIEW



- ① Tuner P. C. B. (1)
- ② Front-end pack
- ③ Operation P. C. B. (2)
- ④ Tuner P. C. B. (2)
- ⑤ Operation P. C. B. (1)
- ⑥ Operation P. C. B. (3)

REAR PANEL



DISASSEMBLY PROCEDURES

(Remove parts in the order as numbered.)

1. Removal of Top Cover

Remove 4 screws (①) and 2 screws (②) in Fig. 1.

2. Removal of Front Panel

- a. Remove 2 plastic rivets (③) in Fig. 1.
- b. Remove 5 screws (④) in Fig. 1.

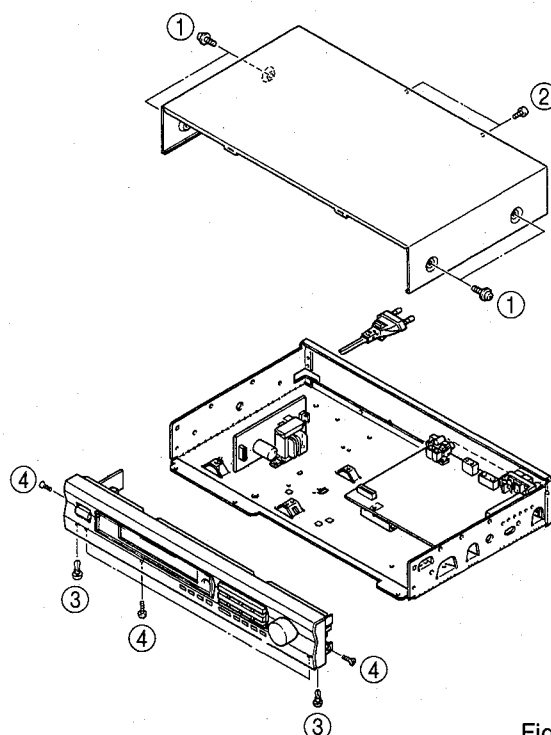


Fig. 1

ADJUSTMENTS

1. Before Adjustment

- (1) With the power turned on, wait for 5 minutes before starting adjustment so that operation becomes stable.
- (2) Adjust the OSC coil and IFT with insulated screwdriver.
- (3) Set the TUNING MODE to AUTO.
- (4) Decibel abbreviations
dB μ : Decibels above or below 1 μ V

Example :

$$0\text{dB}\mu = 1\mu\text{V}, 60\text{dB}\mu = 1\text{mV}$$

$$X\text{ dB}\mu = (X + 11.2)\text{ dBf}$$

When substituting 60 for X,

$$60\text{ dB}\mu = 72.2\text{ dBf}$$

2. Measuring instrument abbreviations

FM SG : FM signal generator
SSG : Stereo signal generator
AM SG : AM signal generator
DIST. M : Distortion meter
FC : Frequency counter
ACVM : AC voltage meter
DCVM : DC voltage meter
RDS SG : RDS signal generator

<POWER SUPPLY CHECK>

Check that the voltage obtained across each test point and ground on the tuner circuit is as follows.

Test points	Rating or Standard
+5 V terminal	+5.6 $\pm$ 0.5 V
-VP terminal	-23.0 $\pm$ 1.0 V

CAUTION :

Before setting to the TEST mode, write down the user preset memory content in the table as shown below. (This is because setting to the TEST mode will cause the memory content to be the factory preset memory content, i.e. all the user preset memory content will be erased.)

<User preset memory content>

Preset keys	P1	P2	P3	P4	P5	P6	P7	P8
A								
B								
C								
D								
E								

<TEST mode>

- Turn on the POWER switch while pressing the A/B/C/D/E and FM/AM(FM/MW/LW) keys simultaneously, and the unit enters the TEST mode for the display check.

After this, repeat (1) to (4).

- (1) All the segments on the display light up.
- (2) The model name, TX-492RDS is displayed.
- (3) The place of destination is displayed. (e.g., GB LW & RDS).
- (4) The μ COM-version is displayed.

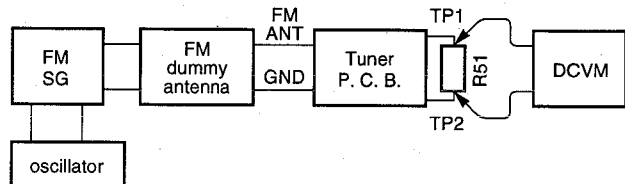
Pressing the P1 key will cause operation to start from (1). Pressing any other key will cause the mode to return to the NORMAL mode.

<Factory preset memory content>

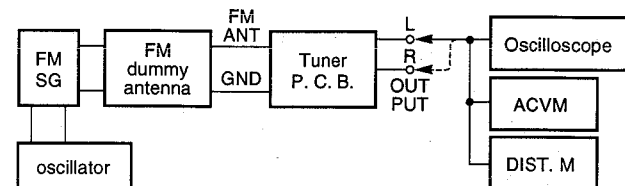
Preset	P1	P2	P3	P4	P5	P6	P7	P8
A, C, E	87.50	90.10	95.10	98.10	108.00	88.10	106.10	108.00
B, D	630	1080	1440	531	1611	900	1350	1404

<Connection Diagram (Measuring Instruments)>

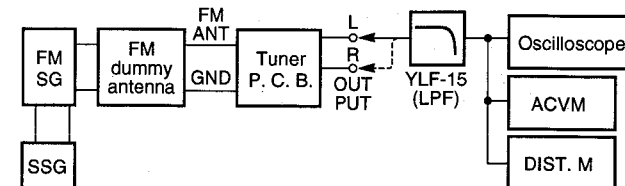
1) Discriminator balance adjustment



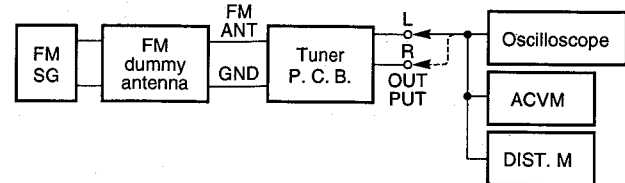
2) Monaural distortion adjustment



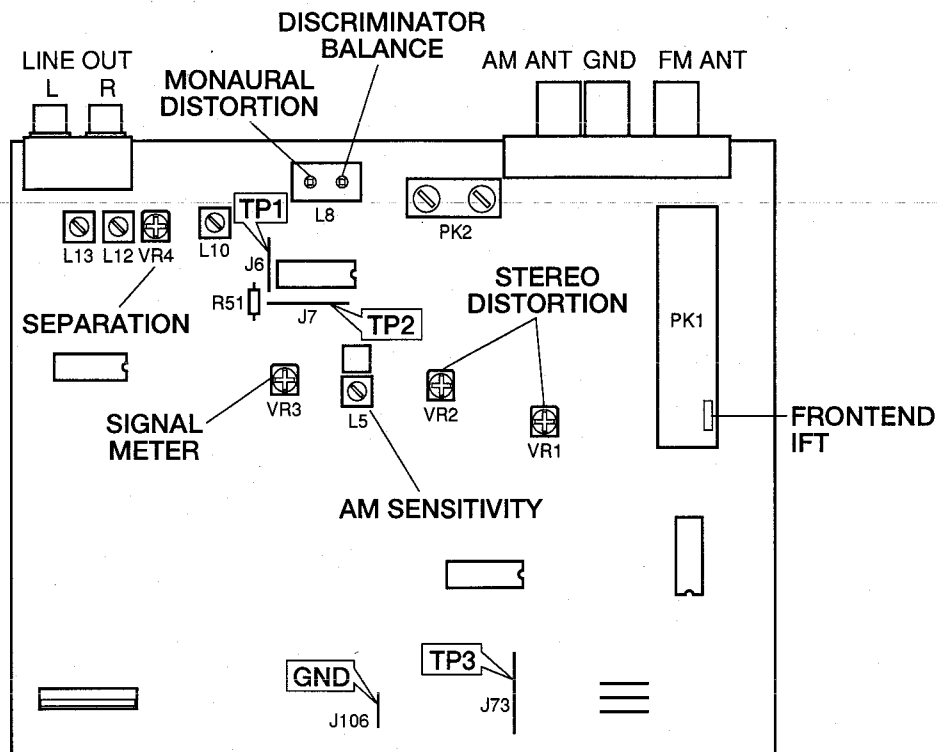
3) Stereo distortion adjustment



4) Sensitivity verification



● TEST POINTS



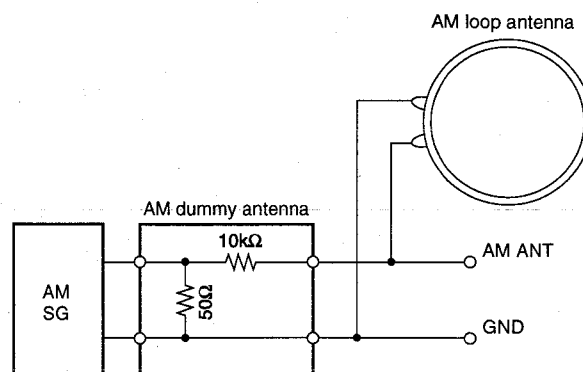
<FM TUNER SECTION>

Step	Adjustment item	Signal (ANT IN)	Reception frequency	Adjusted point	Test point	Rating
1	Rough adjustment of discriminator balance.	FM SG: 98.1 MHz 70 dBμ Modulation : 100 % Monaural : 100 Hz	Preset A-4: 98.1 MHz	L8 (right side)	TP1, TP2 (both end of R51)	DC 0 V ±100mV at turning point.
2	Rough adjustment of monaural distortion.	Same as Step 1.	Same as Step 1.	L8 (left side)	OUTPUT	Minimize distortion.
3	Fine adjustment of discriminator balance.	Same as Step 1.	Same as Step 1.	L8 (right side)	TP1, TP2	DC 0 V ±50mV
4	Fine adjustment of monaural distortion.	Same as Step 1.	Same as Step 1.	L8 (left side)	OUTPUT	Minimize distortion. (to less than -43dB)
5	Verification of discriminator balance.	Same as Step 1.	Same as Step 1.		TP1, TP2	DC 0 V ±50mV
6	Adjustment of frontend IFT.	FM SG: 98.1 MHz 30 dBμ Modulation : 100 % Monaural : 1 kHz	Same as Step 1.	Frontend IFT	TP3, GND	Adjust so that the DC voltage is maximum. CAUTION: If IFT core is turned excessively, the sensitivity reduces. (Maximum ±90°)
7	Adjustment of stereo distortion.	FM SG: 98.1 MHz 70 dBμ Modulation : 100 % Stereo L or R : 1 kHz	Same as Step 1.	VR1, VR2	OUTPUT	Minimize distortion. Tuning mode is AUTO.

Step	Adjustment item	Signal (ANT IN)	Reception frequency	Adjusted point	Test point	Rating
8	Verification of monaural distortion.	FM SG: 98.1 MHz 70 dB μ Modulation : 100 % Monaural : 1 kHz	Preset A-4: 98.1 MHz		OUTPUT	Minimize distortion. (to less than -43dB)
9	Verification of stereo distortion.	FM SG: 98.1 MHz 70 dB μ Modulation : 100 % Stereo L or R : 1 kHz	Same as Step 8.		OUTPUT	Minimize distortion. (to less than -37dB) Tuning mode is AUTO.
10	Verification of sensitivity.	FM SG: 88.1/98.1/106.1 MHz Modulation : 100 % Monaural : 1 kHz	A-6: 88.1 MHz A-4: 98.1 MHz A-7: 106.1 MHz			S/N should be 30 dB at each frequency of 88.1 MHz, 98.1 MHz and 106.1 MHz. Make sure that the voltage at the ANT terminal is 7 dB μ or less.
11	Adjustment of separation.	FM SG: 98.1 MHz 70 dB μ Modulation : 100 % Stereo L or R : 1 kHz	Preset A-4: 98.1 MHz	VR4	OUTPUT	To more than 35 dB. Tuning mode is AUTO.
12	Adjustment of the signal meter.	FM SG: 98.1 MHz 45 dB μ Modulation : 30 % Monaural : 1 kHz	Preset A-4: 98.1 MHz	VR3	Signal meter	Adjust so that the signal meter is maximum at rating level.
13	Verification of the signal meter to turn off.	ANT input minimum.				Make sure that the signal meter is turned off.
14	Verification of AUTO TUNING.	FM SG: 98.1 MHz 23 dB μ Modulation : 30 % Stereo L or R : 1 kHz	Preset A-4: 98.1 MHz	Tuning buttons		Automatic reception should be available when the tuning UP or DOWN is turned. Stereo indicator is turned on. Audio muting should be applied during tuning.
15	Verification of AUTO PS (program service name)	RDS SG: Modulation: 1.6 % (1.2 kHz) FM SG: 98.1 MHz 40 dB μ Modulation : 100 % Monaural : 1 kHz	Preset A-4: 98.1 MHz			Make sure that the display automatically turns to the PS mode and PS indicator turns on when the signal is tuned again.

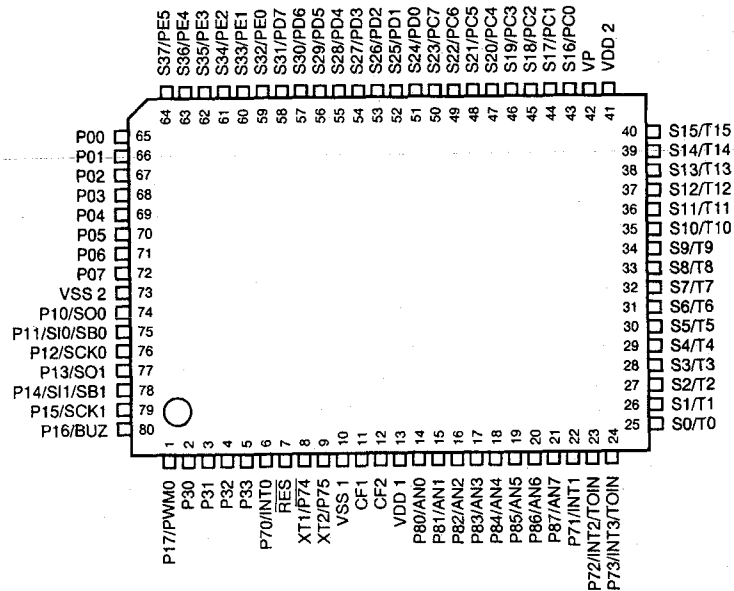
<AM TUNER SECTION>

- To be adjusted after FM section adjustment.
- Use the specified dummy antenna for loop antenna.



Step	Adjustment item	Signal (ANT IN)	Reception frequency	Adjusted point	Test point	Rating
1	Adjustment of sensitivity.	AM SG: 630 kHz 50 dBμ, 1 kHz, 30% modulation	Preset B-1: 630 kHz	L5	OUTPUT	Maximize detected signal output.
2	Verification of sensitivity.	AM SG: 630 kHz/1080 kHz/ 1440 kHz 50 dBμ, 1 kHz, 30% modulation	Preset B-1: 630 kHz B-2: 1080 kHz B-3: 1440 kHz			To be less than 54 dBμ.
3	Verification of the signal meter.	AM SG: 1080 kHz 90 dBμ, ANT input 90 dBμ	Preset B-2: 1080 kHz		OUTPUT	Make sure that the signal meter is turned on.
		ANT input -10 dBμ or less				Make sure that the signal meter is turned off.
4	Verification of auto tuning.	AM SG: 1080 kHz 60 dBμ, 1 kHz, 30% modulation	Preset B-2: 1080 kHz	Tuning button		Automatic reception should be available when the tuning UP or DOWN is turned. Audio muting should be applied during tuning.

IC501 : LC866420A

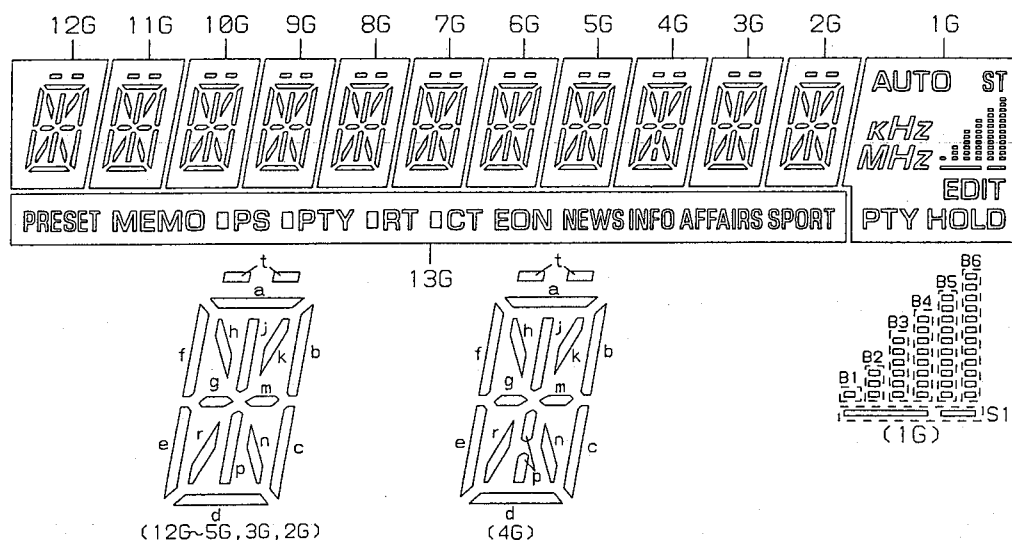
8 bit μ -COM

No.	Port	I/O	Name	Function	No.	Port	I/O	Name	Function
1	P17/PWM0	O	/MMUTE	Main mute	41	VDD2	I	VDD	+5V
2	P30	I	ROT1	Rotary encoder input	42	VP	I	VDDVPP	-24V
3	P31	I	ROT0	This input available for ROTSW=H	43	S16/PC0	O	P1	FL segment
4	P32	I	MODEL	Model 0	44	S17/PC1	O	P2	FL segment
5	P33	I	ROTSW	Rotary encoder yes(H) or no(L)	45	S18/PC2	O	P3	FL segment
6	P70/INT0	I			46	S19/PC3	O	P4	FL segment
7	/RES	I	/RESET	Reset	47	S20/PC4	O	P5	FL segment
8	/P74/XT1	I		Normal	48	S21/PC5	O	P6	FL segment
9	P75/XT2	I		Normal	49	S22/PC6	O	P7	FL segment
10	VSS1	I	GND	GND	50	S23/PC7	O	P8	FL segment
11	CF1		CF	6MHz	51	S24/PD0	O	P9	FL segment
12	CF2		CF	6MHz	52	S25/PD1	O	P10	FL segment
13	VDD1	I	VDD	+5V	53	S26/PD2	O	P11	FL segment
14	P80/AN0	ADI	KEYIN1	AD key input	54	S27/PD3	O	P12	FL segment
15	P81/AN1	ADI	KEYIN2	AD key input	55	S28/PD4	O	P13	FL segment
16	P82/AN3	ADI	KEYIN3	AD key input	56	S29/PD5	O	P14	FL segment
17	P83/AN3	ADI	METER	Signal level input	57	S30/PD6	O	P15	FL segment
18	P84/AN4	I			58	S31/PD7	O	P16	FL segment
19	P85/AN5	I			59	S32/PE0	I/O		
20	P86/AN6	I			60	S33/PE1	I/O		
21	P87/AN7	ADI	VER	Version input	61	S34/PE2	I/O		
22	P71/INT1	I	/RDSSTART	RDS start	62	S35/PE3	I/O		
23	P72/INT2	I	/POWERDOWN	Power down detect	63	S36/PE4	I/O		
24	P73/INT3	I	REM	REM input	64	S37/PE5	I/O		
25	S0/T0	O	13G	FL segment	65	P00	O		
26	S1/T1	O	12G	FL segment	66	P01	O		
27	S2/T2	O	11G	FL segment	67	P02	O		
28	S3/T3	O	10G	FL segment	68	P03	O		
29	S4/T4	O	9G	FL segment	69	P04	O	/TMUTE	Tuner mute
30	S5/T5	O	8G	FL segment	70	P05	O		
31	S6/T6	O	7G	FL segment	71	P06	O		
32	S7/T7	O	6G	FL segment	72	P07	O		
33	S8/T8	O	5G	FL segment	73	VSS2	I	GND	GND
34	S9/T9	O	4G	FL segment	74	P10/S00	O	RDSRESET	RDS IC reset
35	S10/T10	O	3G	FL segment	75	P11/SIO	SIN	RDS-DATA	RDS data input
36	S11/T11	O	2G	FL segment	76	P12/SCK0	SCL	RDS-CLK	RDS clock
37	S12/T12	O	1G	FL segment	77	P13/SO1	I	PLLDAT-in	Data input from PLL
38	S13/T13				78	P14/SI1	O	PLLDAT-out	Data output for PLL
39	S14/T14				79	P15/SCK1	O	PLL-CLK	PLL clock
40	S15/T15				80	P16/BUZ	O	PLLCE	PLLCE

KEY INPUT

PORT	1	2	3	4	5	6	7
KEYIN1	P3	P4	P5	P6	P7	P8	
KEYIN2	MODE	EDIT (KMODE)	MEMORY	PAGE	P1	P2	
KEYIN3	DISPLAY	PTY SELECT	PTY START	EON	FM/AM (MW/LW)	TUNING DOWN	TUNING UP
VER	G (RDS)	A, L/R (50k)	R (100k)	U, C	J	G (RDS, LW)	

■ DISPLAY DATA (13-BT-152GK)



PIN CONNECTION

PIN NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
CONNECTION	F1	F1	NP	P15	P14	P13	P12	P11	P10	P9	P8	P7	P6	P5	P4	P3	P2	P1

PIN NO.	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
CONNECTION	NC	1G	2G	3G	4G	5G	6G	7G	8G	9G	10G	11G	12G	13G	NP	F2	F2

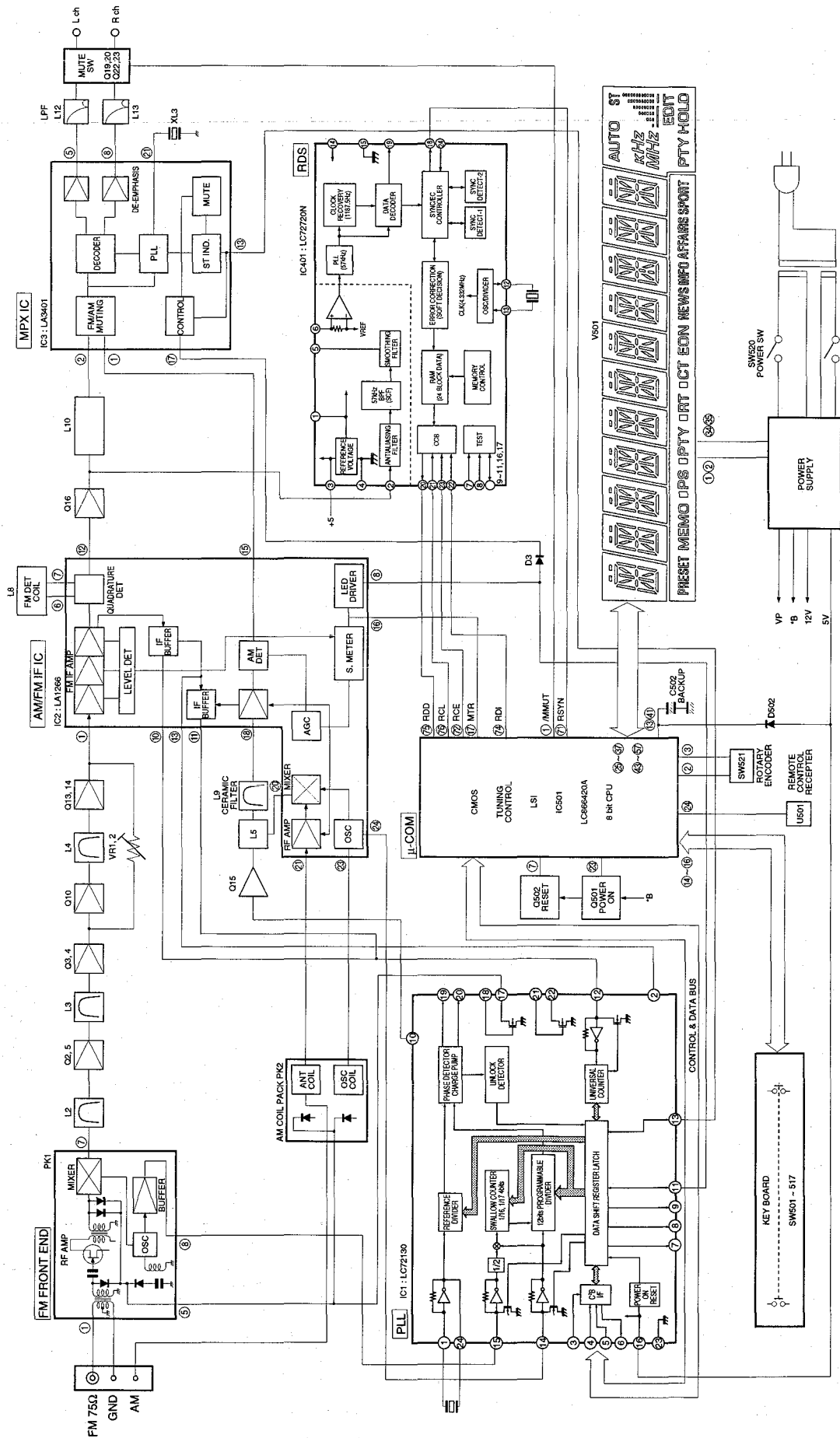
NOTE:

- 1) F1, F2 Filament
2) NP No pin
3) NC No connection
4) DL Datum line
5) 1G~13G Grid

ANODE CONNECTION

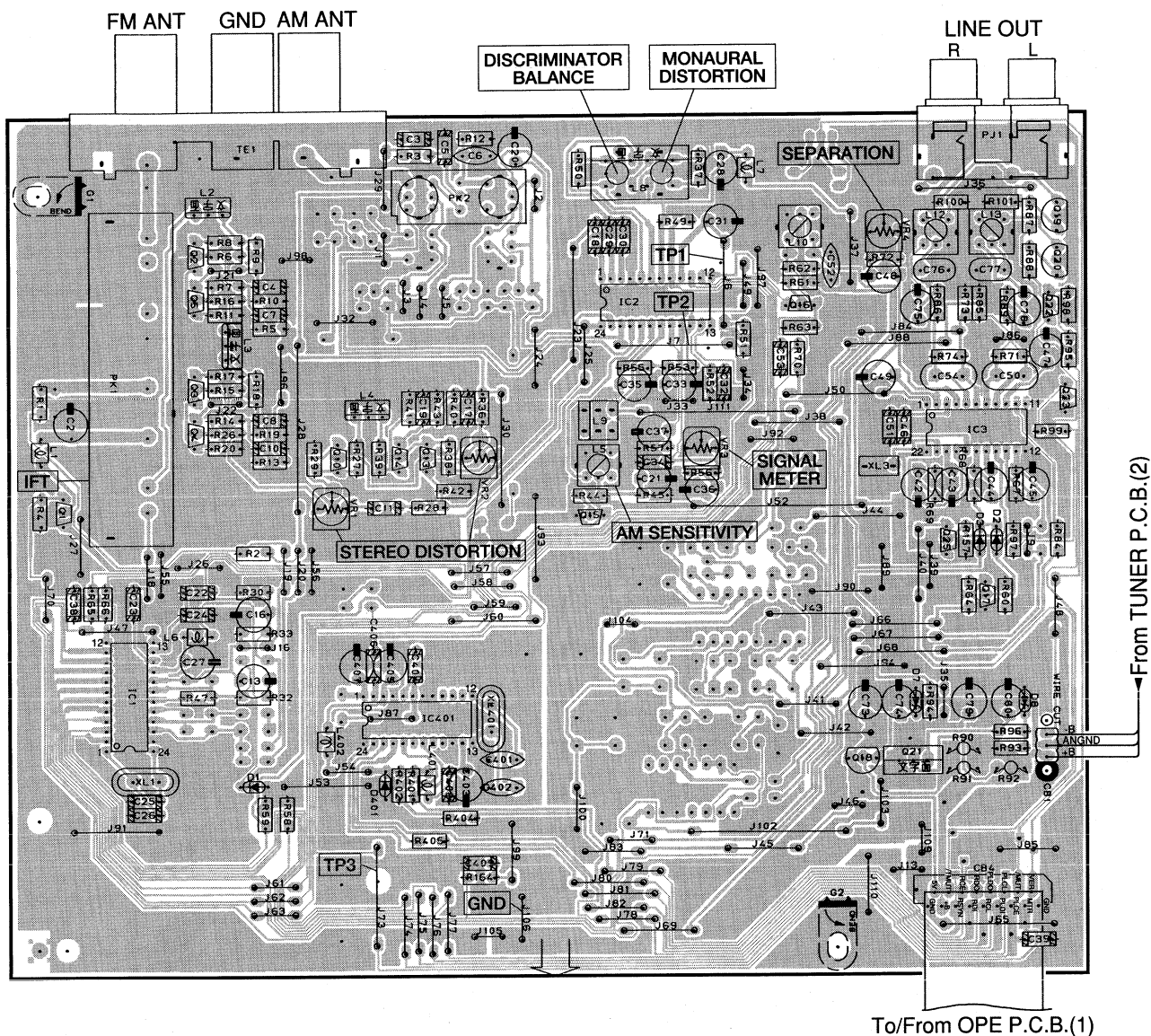
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BLOCK DIAGRAM

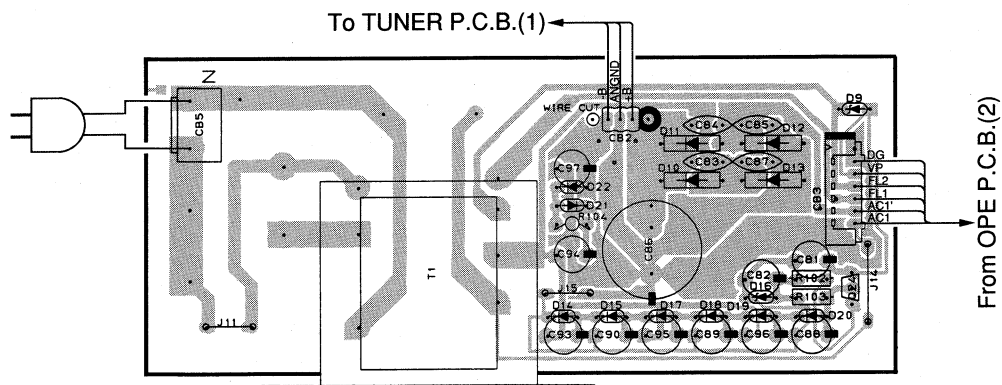


PRINTED CIRCUIT BOARD (Foil side)

TUNER P.C.B.(1)

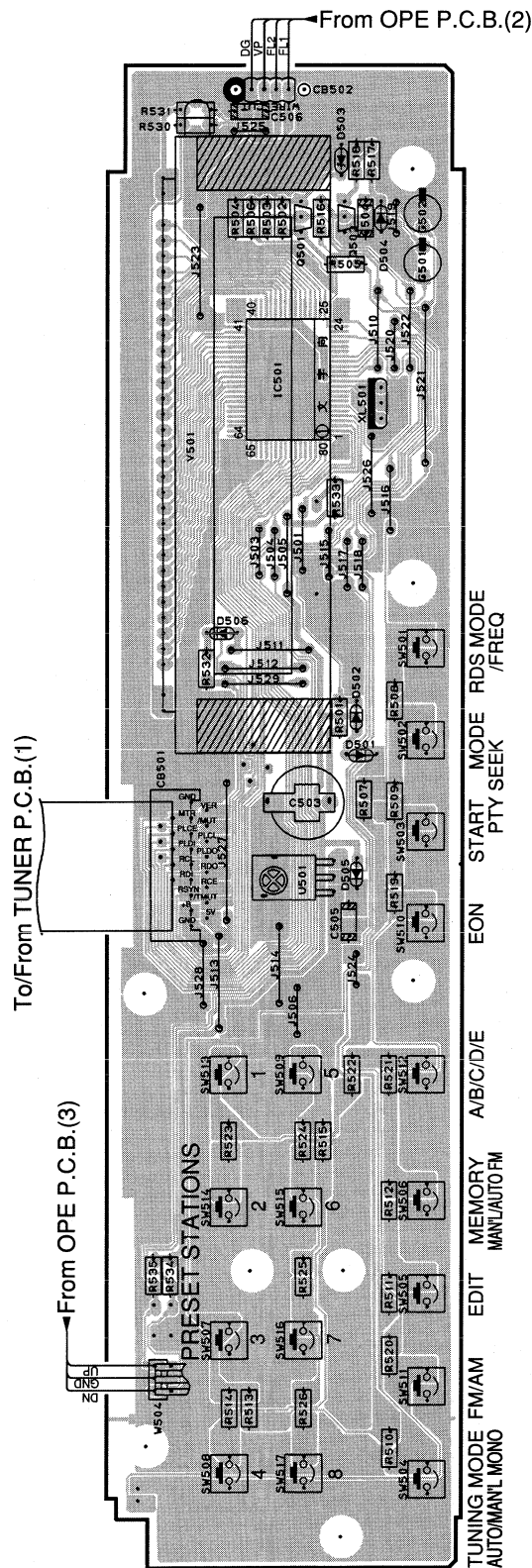


TUNER P.C.B.(2)

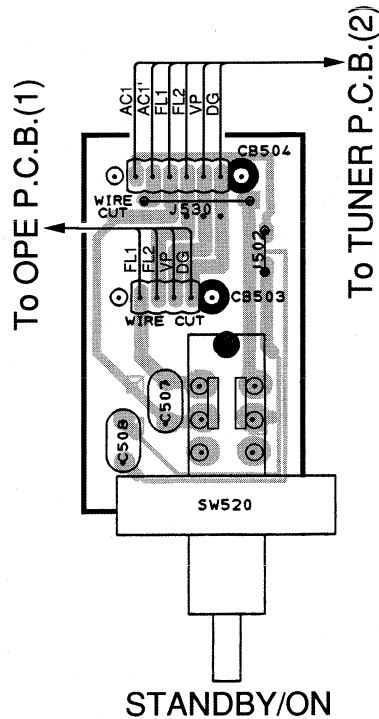


■ PRINTED CIRCUIT BOARD (Foil side)

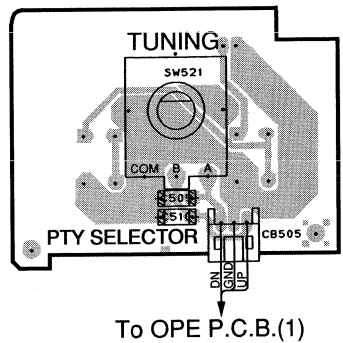
OPERATION P.C.B.(1)



OPERATION P.C.B.(2)



OPERATION P.C.B.(3)



SCHEMATIC DIAGRAM

TUNER(1)

ENV-17297G1
PK1

VT : FM 87.5MHz 1.7V
98.1MHz 4.2V
108.0MHz 8.6V
AM 531kHz 1.3V
1080kHz 5.0V
1611kHz 7.0V

Each voltage given here represents that in the FM (98.1MHz, STEREO) reception mode but the one in the parentheses () is that in the AM (1080kHz, MAN'L) reception mode.

FM IF

FM/AM DETECT

MPX DECOD

DISCRIMINATOR BALANCE

MONAURAL DISTORTION

STEREO DISTORTION

FRONTEND

AM IFT

SIGNAL METER

AM SENSITIVITY

TP3

SEPARATION

RDS DECOD

IC1 : LC72130 (PLL)

IC3 : LA3401 (FM MPX A

ONLY_RDS-Version [RDS]

AM M

IC3 : LA3401 (FM MPX A

ONLY_RDS-Version [RDS]

AM M

IC3 : LA3401 (FM MPX A

ONLY_RDS-Version [RDS]

AM M

IC3 : LA3401 (FM MPX A

ONLY_RDS-Version [RDS]

AM M

IC3 : LA3401 (FM MPX A

ONLY_RDS-Version [RDS]

AM DETECT

MPX DECODE

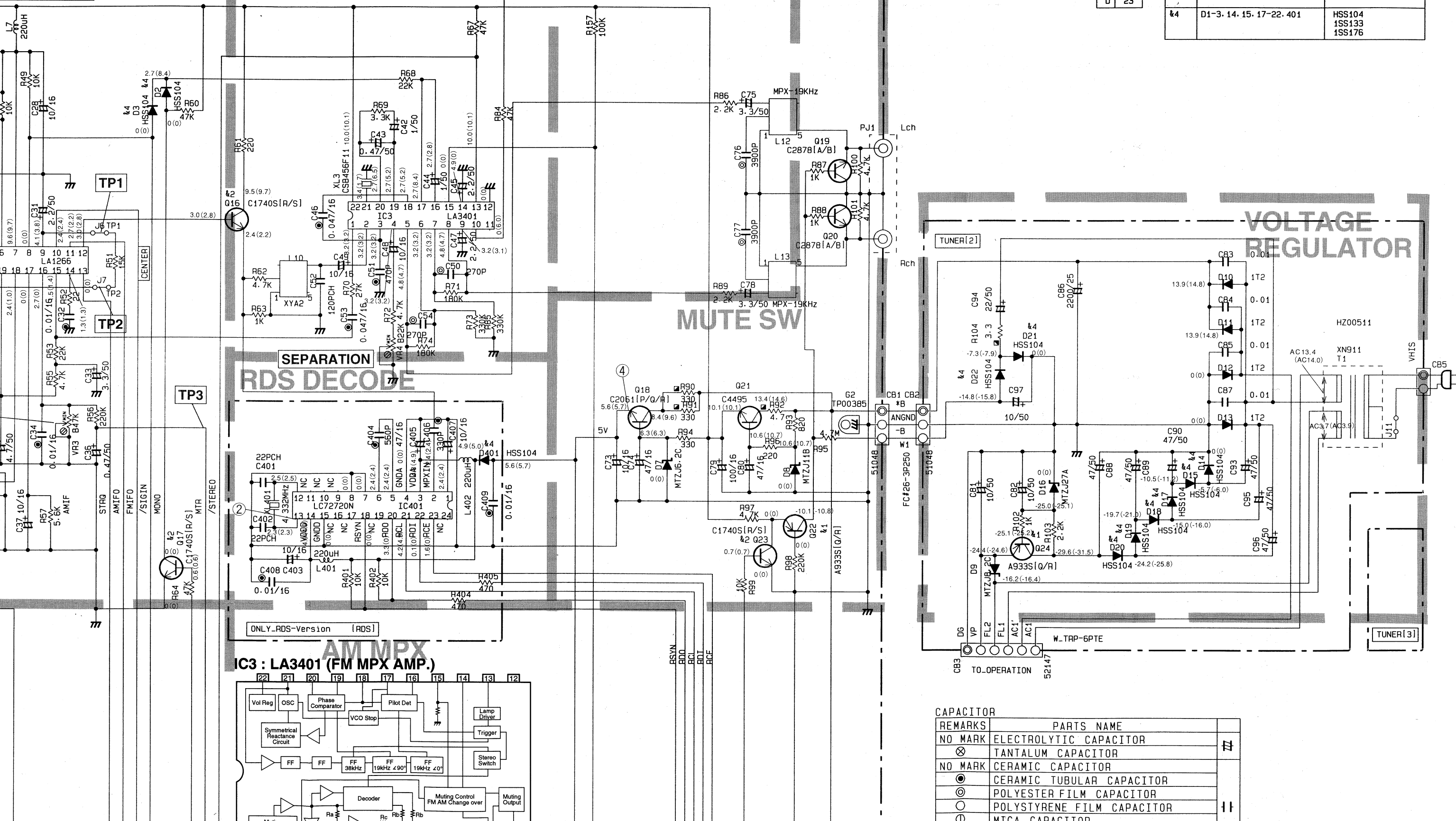
LPF

OR BALANCE

Interchangeable Parts at Manufacture-Stage

	No
R	165
C	97
Q	28
L	13
VR	5
W	5
D	23

Mark	Reference Parts Number	Parts Name
&1	Q22.24	2SA933S(Q/R) 2SA1115(E/F) 2SA1309A(Q/R/S)
&2	Q14.16.17.23	2SC1740S(R/S) 2SC2603(E/F) 2SC3311A(Q/R/S)
&3		
&4	D1-3.14.15.17-22.401	HSS104 1SS133 1SS176



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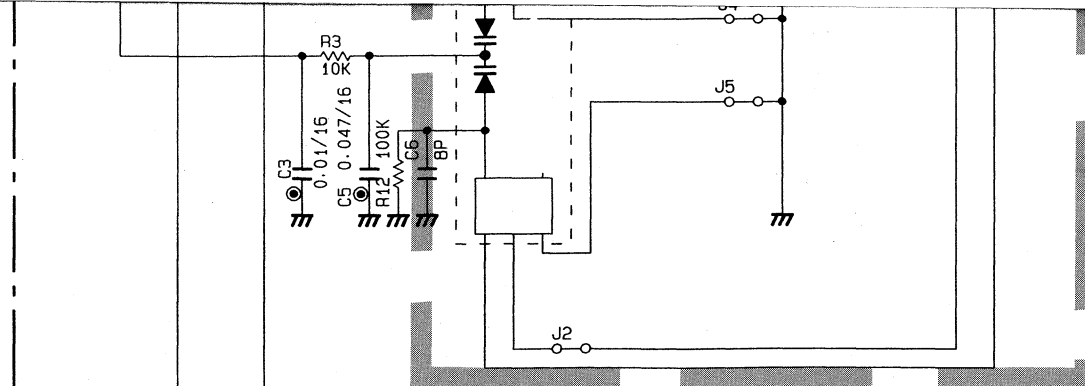
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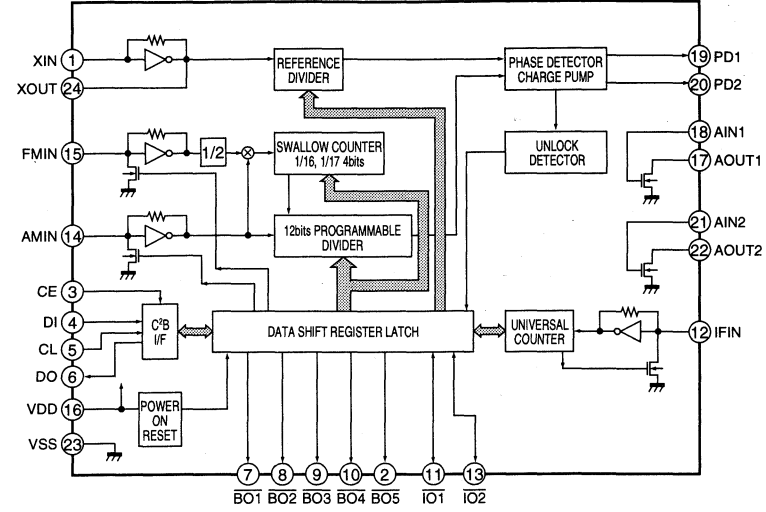
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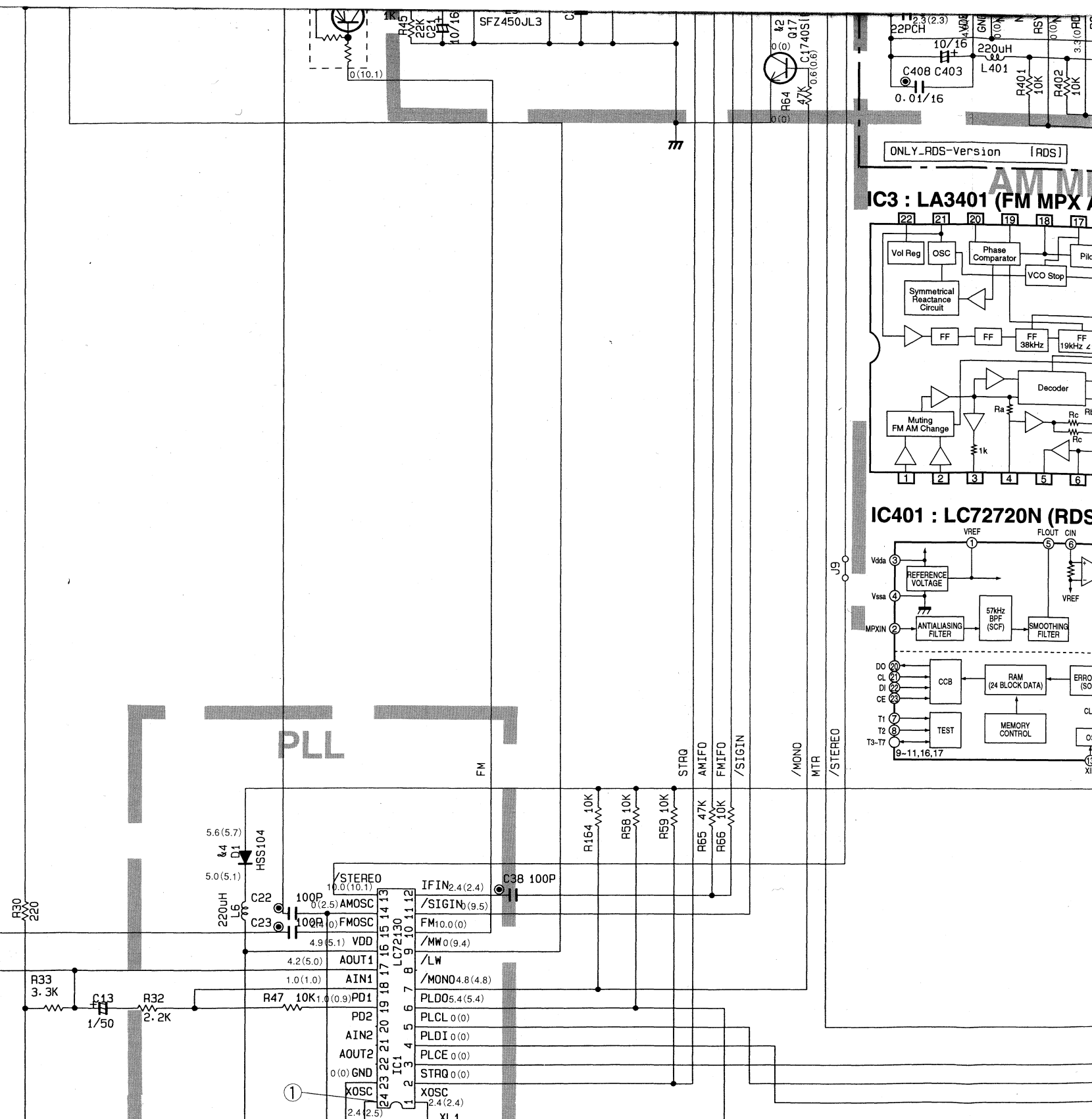
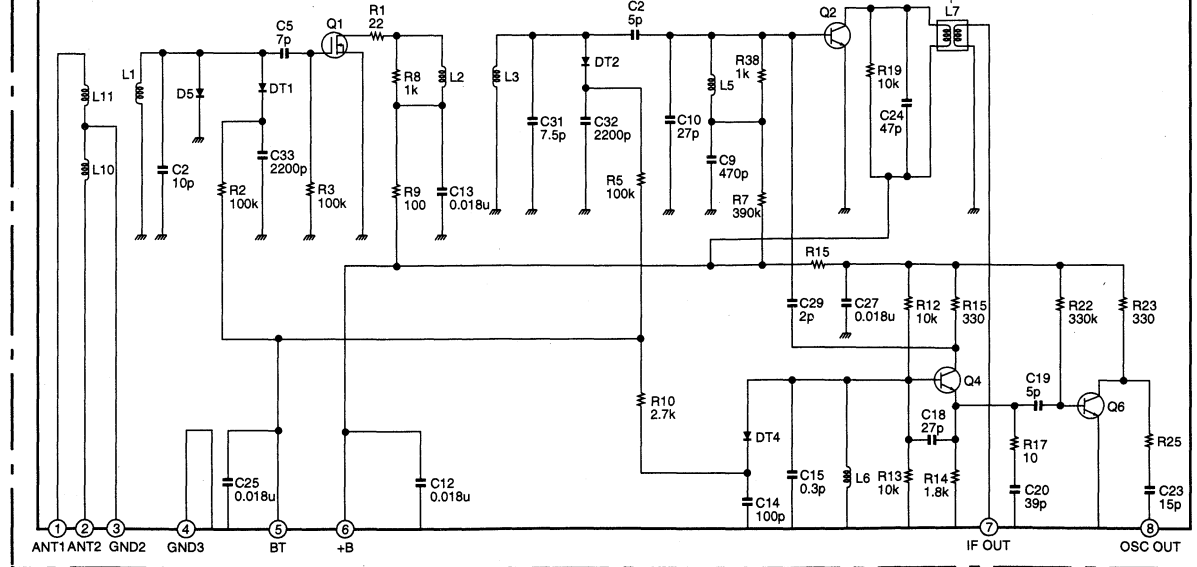


IC1 : LC72130 (PLL)



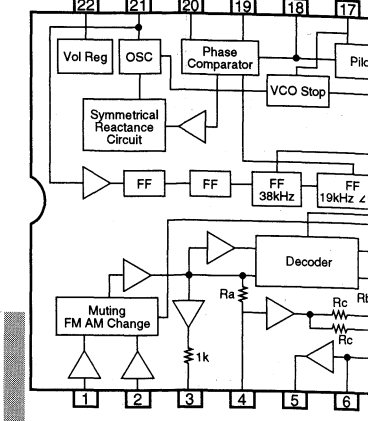
IC2 : LA1266 (AM/FM IF)

PK1 : ENV-17297G1 (VQ98760)

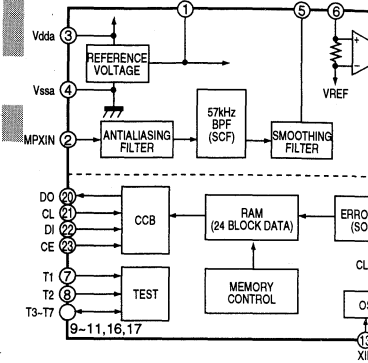


ONLY-RDS-Version [RDS]

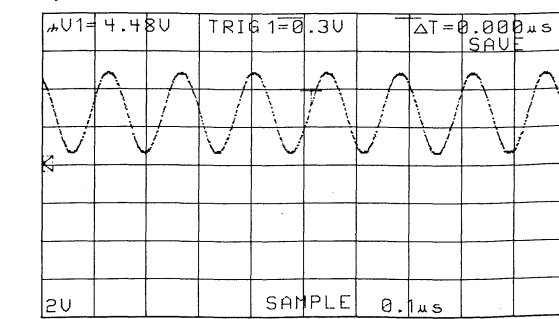
IC3 : LA3401 (FM MPX A)



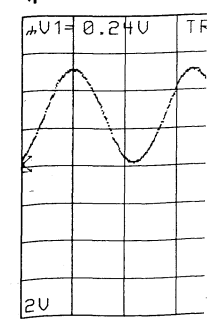
IC401 : LC72720N (RDS)

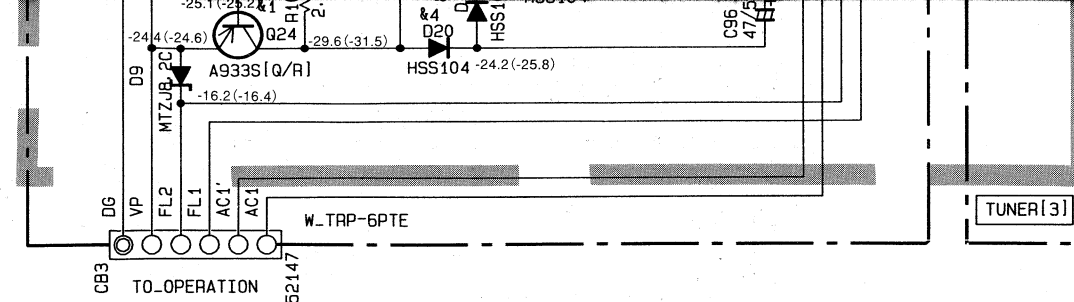
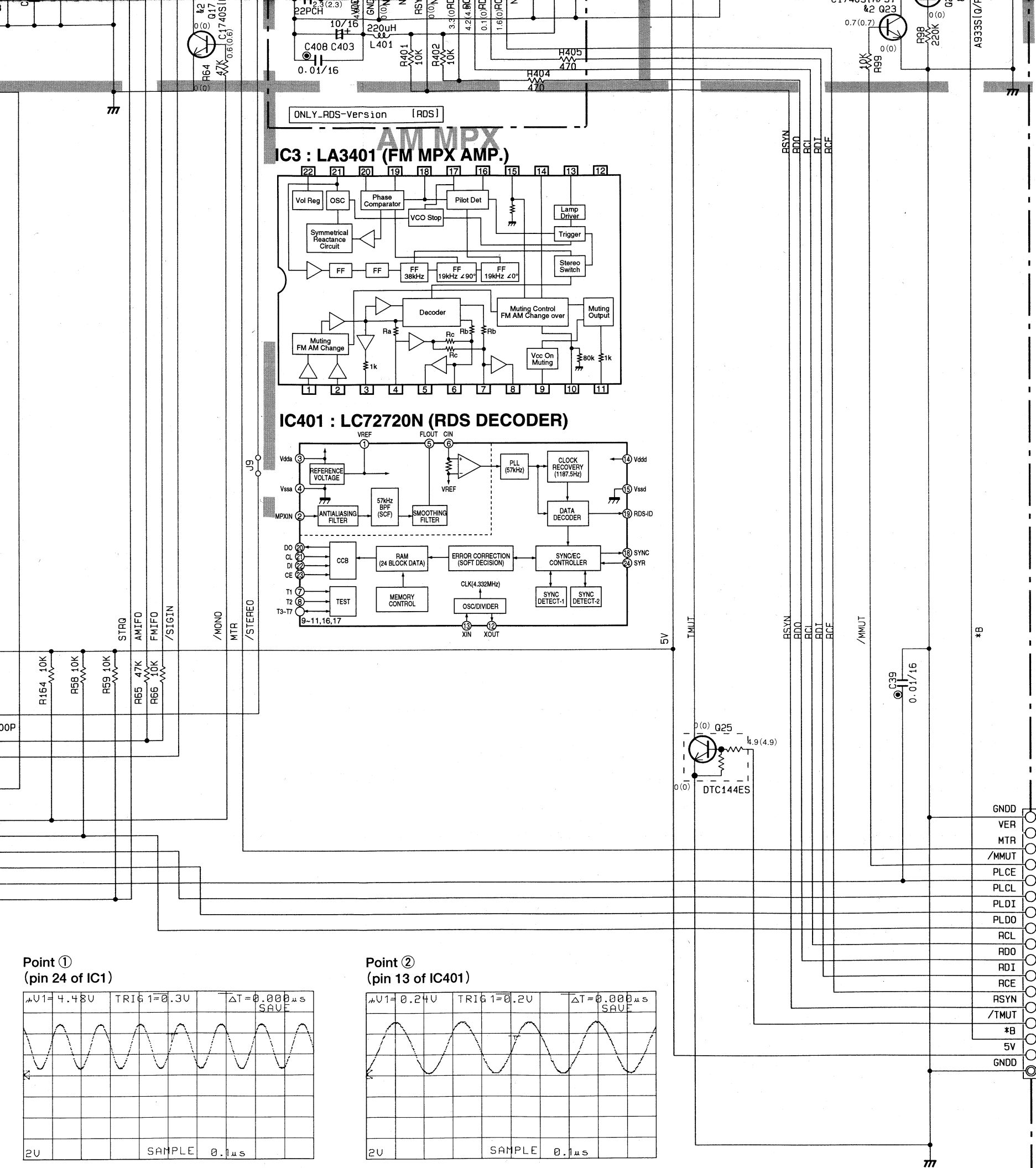


Point ①
(pin 24 of IC1)



Point ②
(pin 13 of IC401)





CAPACITOR

REMARKS	PARTS NAME	
NO MARK	ELECTROLYTIC CAPACITOR	7
⊗	TANTALUM CAPACITOR	
NO MARK	CERAMIC CAPACITOR	11
●	CERAMIC TUBULAR CAPACITOR	
⊙	POLYESTER FILM CAPACITOR	
○	POLYSTYRENE FILM CAPACITOR	
①	MICA CAPACITOR	
⊕	POLYPROPYLENE FILM CAPACITOR	
⊗	SEMICONDUCTIVE CERAMIC CAPACITOR	

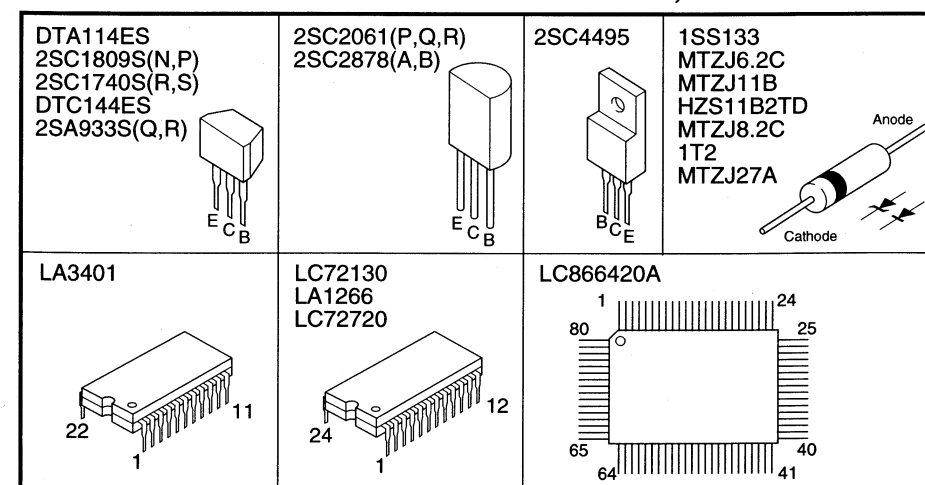
RESISTOR

REMARKS	PARTS NAME
NO MARK	CARBON FILM RESISTOR (P=5)
⊠	CARBON FILM RESISTOR (P=10)
△	METAL OXIDE FILM RESISTOR
▲	METAL FILM RESISTOR
⊠	METAL PLATE RESISTOR
⊠	FIRE PROOF CARBON FILM RESISTOR
□	CEMENT MOLDED RESISTOR
⊗	SEMI VARIABLE RESISTOR
■	CHIP RESISTOR

NOTICE (model)

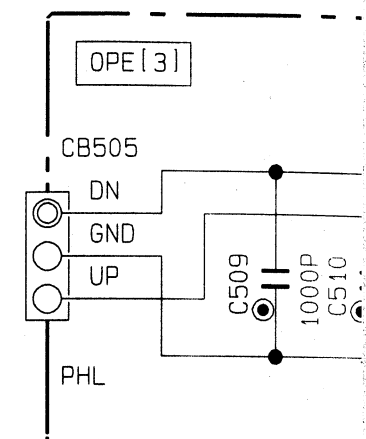
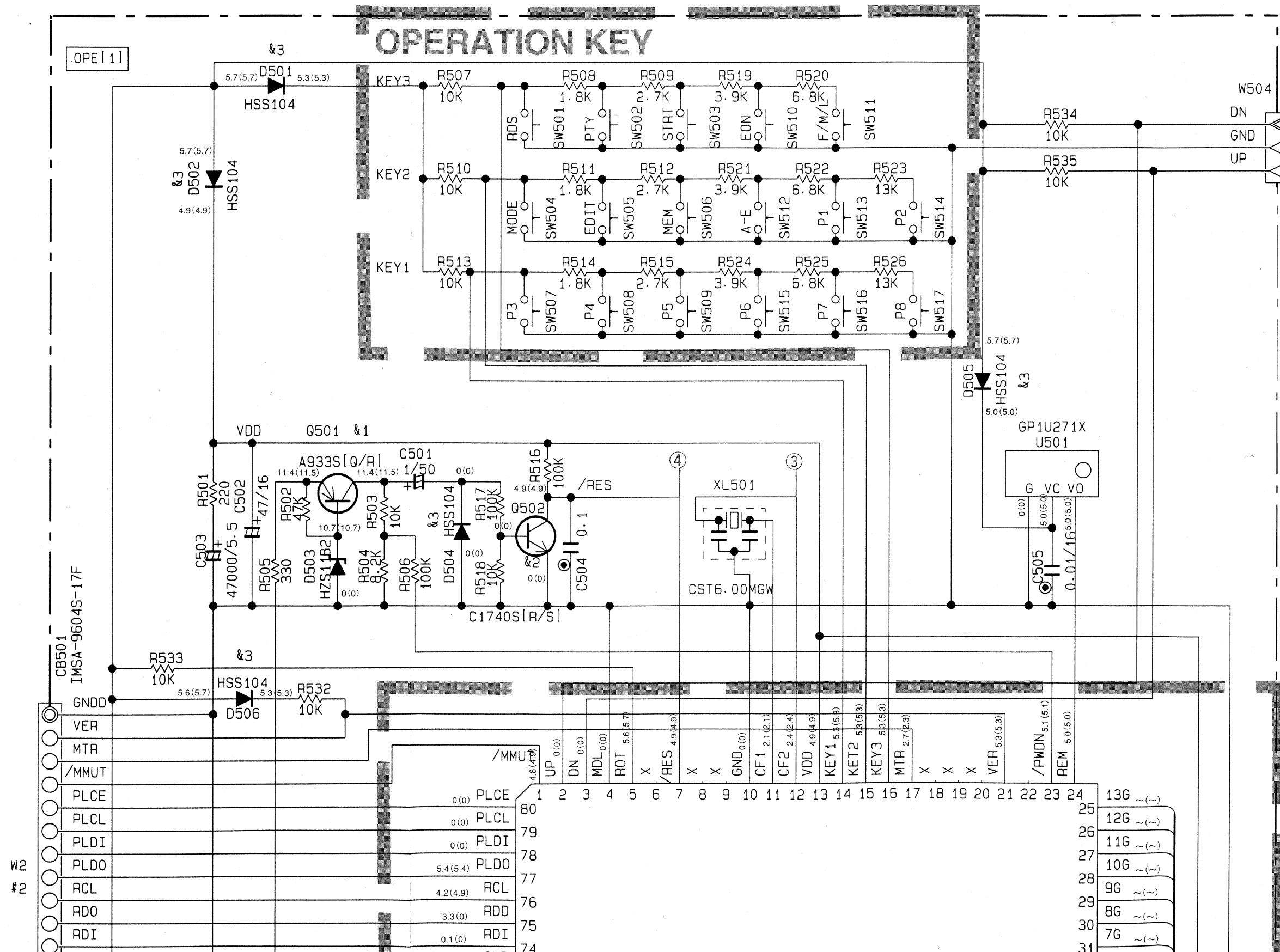
(J)..... JAPANESE
 (U)..... U. S. A
 (C)..... CANADIAN
 (R)..... GENERAL
 (A)..... AUSTRALIAN
 (B)..... BRITISH
 (G)..... EUROPEAN
 (T)..... CHINA
 (L)..... SINGAPORE

PIN CONNECTION DIAGRAM OF TRANSISTORS, DIODES AND ICS.



- ★ All voltage values are measured with a 10MΩ/V DC electric volt meter.
- ★ Components having special characteristics are marked and must be replaced with parts having specifications equal to those originally installed.
- ★ Schematic diagram is subject to change without notice.

SCHEMATIC DIAGRAM



RESISTOR

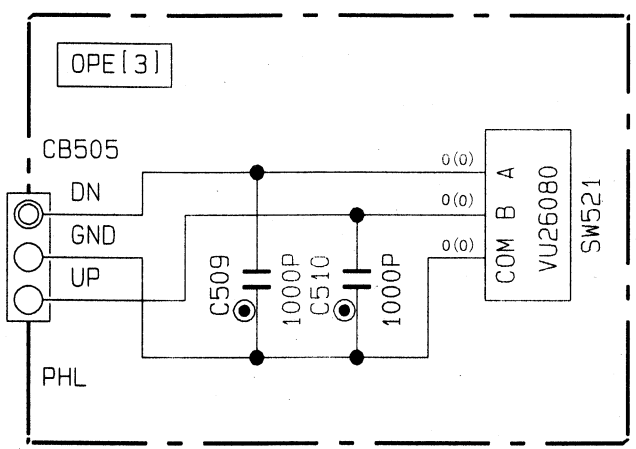
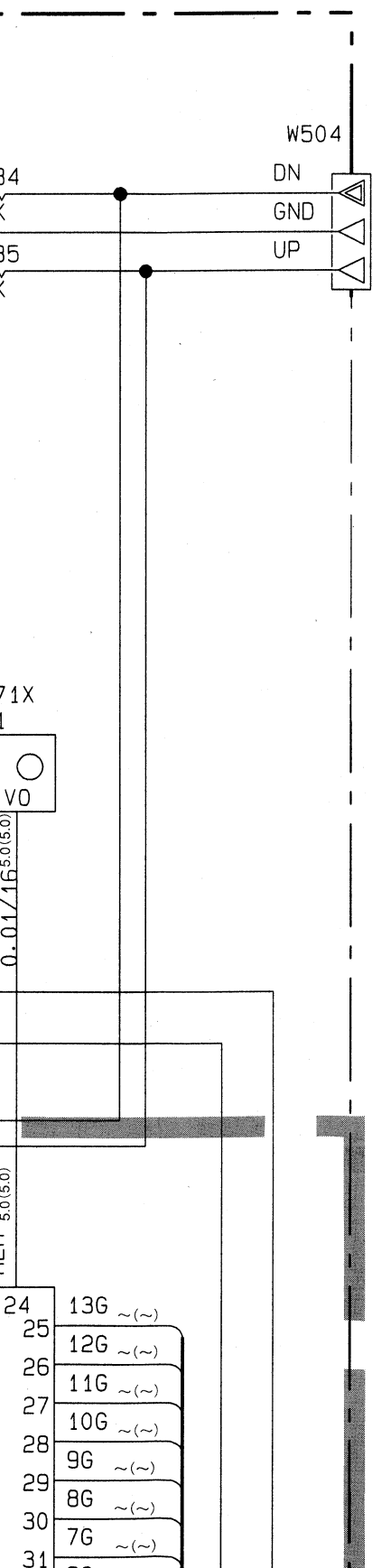
REMARKS	
NO MARK	CARBON
□	CARBON
△	METAL C
▲	METAL F
⊠	METAL P
▣	FIRE PI
□	CEMENT
⊗	SEMI V
■	CHIP R

CAPACITOR

REMARKS	
NO MARK	ELECTRO
⊗	TANTALUM
NO MARK	CERAMIC
●	CERAMIC
⊙	POLYESTER
○	POLYSTYRENE
⊖	MICA C
⊕	POLYPROPYLENE
⊗	SEMICOND

Interchangeable Parts

Mark	Reference Part
&1	Q501



NOTICE (model)

(J)..... JAPANESE
(U)..... U. S. A
(C)..... CANADIAN
(R)..... GENERAL
(A)..... AUSTRALIAN
(B)..... BRITISH
(G)..... EUROPEAN
(T)..... CHINA
(L)..... SINGAPORE

RESISTOR

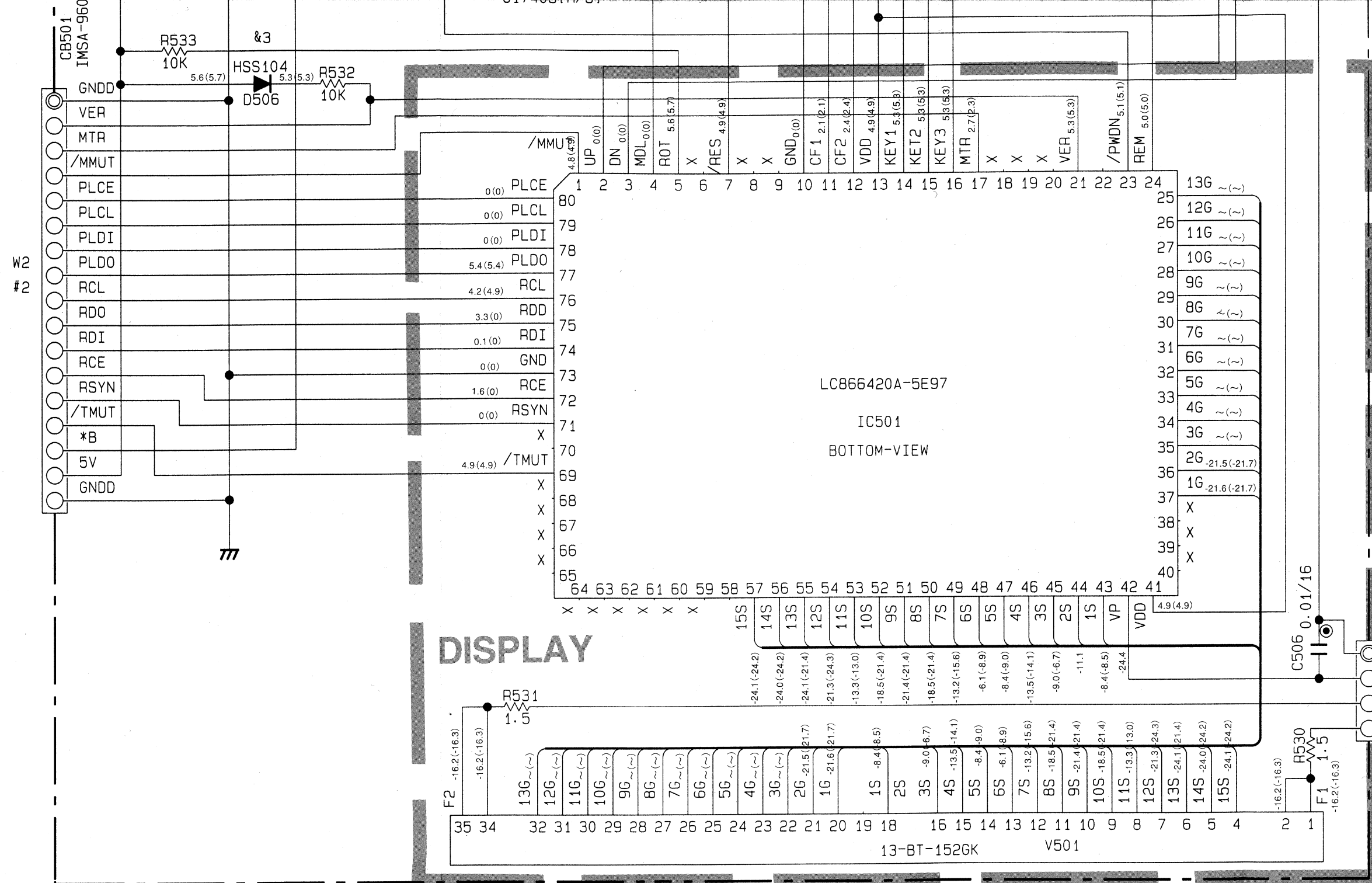
REMARKS	PARTS NAME
NO MARK	CARBON FILM RESISTOR (P=5)
▣	CARBON FILM RESISTOR (P=10)
△	METAL OXIDE FILM RESISTOR
▲	METAL FILM RESISTOR
⊠	METAL PLATE RESISTOR
▤	FIRE PROOF CARBON FILM RESISTOR
□	CEMENT MOLDED RESISTOR
⊗	SEMI VARIABLE RESISTOR
■	CHIP RESISTOR

CAPACITOR

REMARKS	PARTS NAME	
NO MARK	ELECTROLYTIC CAPACITOR	⌘
⊗	TANTALUM CAPACITOR	
NO MARK	CERAMIC CAPACITOR	⌘
●	CERAMIC TUBULAR CAPACITOR	
◎	POLYESTER FILM CAPACITOR	
○	POLYSTYRENE FILM CAPACITOR	
⊖	MICA CAPACITOR	
Ⓟ	POLYPROPYLENE FILM CAPACITOR	
⊙	SEMICONDUCTIVE CERAMIC CAPACITOR	

Interchangeable Parts at Manufacture-Stage

Mark	Reference Parts Number	Parts Name
&1	Q501	2SA933S[G/R] 2SA1115[F/F]

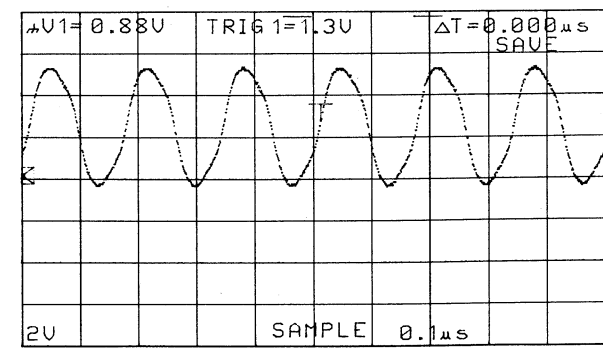


⊗	TANTALUM
NO MARK	CERAMIC
●	CERAMIC
◎	POLYESTER
○	POLYSTYRE
⊖	MICA CAP
Ⓟ	POLYPROPY
⊕	SEMICONDU

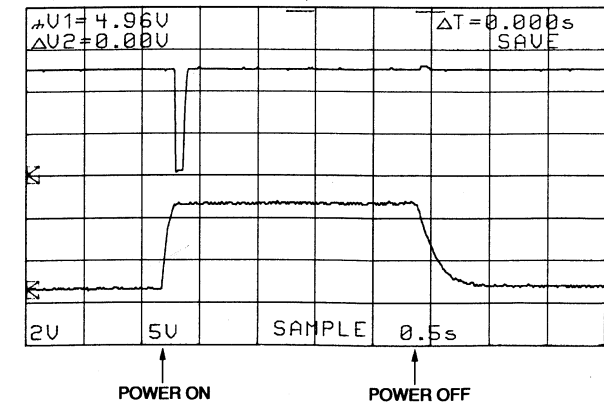
Interchangeable Part

Mark	Reference Parts
&1	Q501
&2	Q502
&3	D501, 502, 504-506

Point ③
(pin 12 of IC501)

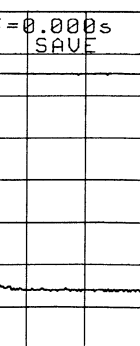


Point ④
(pin 7 of IC501 and Emitter of Q18)



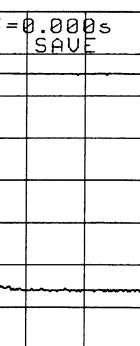
Interchangeable Parts at Manufacture-Stage

- ★ All voltage values are measured with a 10MΩ/V DC electric volt meter.
- ★ Components having special characteristics are marked  and must be replaced with parts having specifications equal to those originally installed.
- ★ Schematic diagram is subject to change without notice.



Interchangeable Parts at Manufacture-Stage

- ★ All voltage values are measured with a 10M Ω /V DC electric volt meter.
- ★ Components having special characteristics are marked  and must be replaced with parts having specifications equal to those originally installed.
- ★ Schematic diagram is subject to change without notice.



PARTS LIST

ELECTRICAL PARTS

WARNING

Components having special characteristics are marked Δ and must be replaced with parts having specifications equal to those originally installed.

- Carbon resistors (1/6W or 1/4W) are not included in the ELECTRICAL PARTS List. For the parts No. of the carbon resistors, refer to last page.

ABBREVIATIONS IN THIS LIST ARE AS FOLLOWS:

C.A.EL.CHP	: CHIP ALUMI.ELECTROLYTIC CAP	L.EMIT	: LIGHT EMITTING MODULE
C.CE	: CERAMIC CAP	LED.DSPLY	: LED DISPLAY
C.CE.ARRAY	: CERAMIC CAP ARRAY	LED.INFRD	: LED,INFRARED
C.CE.CHP	: CHIP CERAMIC CAP	MODUL.RF	: MODULATOR,RF
C.CE.ML	: MULTILAYER CERAMIC CAP	PHOT.CPL	: PHOTO COUPLER
C.CE.M.CHP	: CHIP MULTILAYER CERAMIC CAP	PHOT.INTR	: PHOTO INTERRUPTER
C.CE.SAFTY	: RECOGNIZED CERAMIC CAP	PHOT.RFLCT	: PHOTO REFLECTOR
C.CE.TUBLR	: CERAMIC TUBULAR CAP	PIN.TEST	: PIN,TEST POINT
C.CE.SMI	: SEMI CONDUCTIVE CERAMIC CAP	PLST.RIVET	: PLASTIC RIVET
C.EL	: ELECTROLYTIC CAP	R.ARRAY	: RESISTOR ARRAY
C.MICA	: MICA CAP	R.CAR.	: CARBON RESISTOR
C.ML.FLM	: MULTILAYER FILM CAP	R.CAR.CHP	: CHIPRESISTOR
C.MP	: METALLIZED PAPER CAP	R.CAR.FP	: FLAME PROOF CARBON RESISTOR
C.MYLAR	: MYLAR FILM CAP	R.FUS	: FUSABLE RESISTOR
C.MYLAR.ML	: MULTILAYER MYLAR FILM CAP	R.MTL.CHP	: CHIP METAL FILM RESISTOR
C.PAPER	: PAPER CAPACITOR	R.MTL.FLM	: METAL FILM RESISTOR
C.PLS	: POLYSTYRENE FILM CAP	R.MTL.OXD	: METAL OXIDE FILM RESISTOR
C.POL	: POLYESTER FILM CAP	R.MTL.PLAT	: METAL PLATE RESISTOR
C.POLY	: POLYETHYLENE FILM CAP	RSNR.CE	: CERAMIC RESONATOR
C.PP	: POLYPROPYLENE FILM CAP	RSNR.CRYS	: CRYSTAL RESONATOR
C.TNTL	: TANTALUM CAP	R.TW.CEM	: TWIN CEMENT FIXED RESISTOR
C.TNTL.CHP	: CHIP TANTALUM CAP	R.WW	: WIRE WOUND RESISTOR
C.TRIM	: TRIMMER CAP	SCR.BND.HD	: BIND HEAD B-TITE SCREW
CN	: CONNECTOR	SCR.BW.HD	: BW HEAD TAPPING SCREW
CN.BS.PIN	: CONNECTOR,BASE PIN	SCR.CUP	: CUP TITE SCREW
CN.CANNON	: CONNECTOR,CANNON	SCR.TERM	: SCREW TERMINAL
CN.DIN	: CONNECTOR,DIN	SCR.TR	: SCREW,TRANSISTOR
CN.FLAT	: CONNECTOR,FLAT CABLE	SUPRT.PCB	: SUPPORT,P.C.B.
CN.POST	: CONNECTOR,BASE POST	SURG.PRTCT	: SURGE PROTECTOR
COIL.MX.AM	: COIL,AM MIX	SW.TACT	: TACT SWITCH
COIL.AT.FM	: COIL,FM ANTENNA	SW.LEAF	: LEAF SWITCH
COIL.DT.FM	: COIL,FM DETECT	SW.LEVER	: LEVER SWITCH
COIL.MX.FM	: COIL,FM MIX	SW.MICRO	: MICRO SWITCH
COIL.OUTPT	: OUTPUT COIL	SW.PUSH	: PUSH SWITCH
DIOD.ARRAY	: DIODE ARRAY	SW.RT.ENC	: ROTARY ENCODER
DIODE.BRG	: DIODE BRIDGE	SW.RT.MTR	: ROTARY SWITCH WITH MOTOR
DIODE.CHP	: CHIP DIODE	SW.RT	: ROTARY SWITCH
DIODE.VAR	: VARACTOR DIODE	SW.SLIDE	: SLIDE SWITCH
DIOD.Z.CHP	: CHIP ZENER DIODE	TERM.SP	: SPEAKER TERMINAL
DIODE.ZENR	: ZENER DIODE	TERM.WRAP	: WRAPPING TERMINAL
DSCR.CE	: CERAMIC DISCRIMINATOR	THRMST.CHP	: CHIP THERMISTOR
FER.BEAD	: FERRITE BEADS	TR.CHP	: CHIP TRANSISTOR
FER.CORE	: FERRITE CORE	TR.DGT	: DIGITAL TRANSISTOR
FET.CHP	: CHIP FET	TR.DGT.CHP	: CHIP DIGITAL TRANSISTOR
FL.DSPLY	: FLUORESCENT DISPLAY	TRANS	: TRANSFORMER
FLTR.CE	: CERAMIC FILTER	TRANS.PULS	: PULSE TRANSFORMER
FLTR.COMB	: COMB FILTER MODULE	TRANS.PWR	: POWERTRANSFORMER ASS'Y
FLTR.LC.RF	: LC FILTER,EMI	TUNER.AM	: TUNER PACK,AM
GND.MTL	: GROUND PLATE	TUNER.FM	: TUNER PACK,FM
GND.TERM	: GROUND TERMINAL	TUNER.PK	: FRONT-ENDTUNER PACK
HOLDER.FUS	: FUSE HOLDER	VR	: ROTARY POTENTIOMETER
IC.PRTCT	: IC PROTECTOR	VR.MTR	: POTENTIOMETER WITH MOTOR
JUMPER.CN	: JUMPER CONNECTOR	VR.SW	: POTENTIOMETER WITH ROTARY SW
JUMPER.TST	: JUMPER,TEST POINT	VR.SLIDE	: SLIDEPOTENTIOMETER
L.DTCT	: LIGHT DETECTING MODULE	VR.TRIM	: TRIMMER POTENTIOMETER

Note) Those parts marked with “#” are not included in the P.C.B. ass'y.

ELECTRICAL PARTS

Schm Ref.	PART NO.	Description
*	VZ907900	P. C. B.
CB1	Vi878100	CN. BS. PIN
CB2	Vi878100	CN. BS. PIN
CB3	VF728300	CN
CB4	VU271700	CN
CB5	VG879900	CN. BS. PIN
C2	VJ837200	C. EL
C3	VF467300	C. CE. TUBLR
C4	VF467300	C. CE. TUBLR
C5	VJ599000	C. CE. TUBLR
C6	FG250800	C. CE
C7	VF467300	C. CE. TUBLR
C8	VF467300	C. CE. TUBLR
C10	VF467300	C. CE. TUBLR
C11	VF467300	C. CE. TUBLR
C13	VJ839100	C. EL
C16	VF964800	C. EL
C17	VF467300	C. CE. TUBLR
C18	VF467300	C. CE. TUBLR
C19	VF467300	C. CE. TUBLR
C20	UM416470	C. EL
C21	VJ836900	C. EL
C22	VF466800	C. CE. TUBLR
C23	VF466800	C. CE. TUBLR
C24	VF466700	C. CE. TUBLR
C25	VF466600	C. CE. TUBLR
C26	VF466600	C. CE. TUBLR
C27	VJ836900	C. EL
C28	VJ836900	C. EL
C29	VF467300	C. CE. TUBLR
C30	VF467300	C. CE. TUBLR
C31	VJ839200	C. EL
C32	VF467300	C. CE. TUBLR
C33	UM216330	C. EL
C34	VF467300	C. CE. TUBLR
C35	UM416470	C. EL
C36	VJ839000	C. EL
C37	VJ836900	C. EL
C38	VF466800	C. CE. TUBLR
C39	VF467300	C. CE. TUBLR
C42	VJ839100	C. EL
C43	VJ839000	C. EL
C44	VJ839100	C. EL
C45	VJ839200	C. EL
C46	VJ599000	C. CE. TUBLR
C47	VJ839200	C. EL
C48	VJ836900	C. EL
C49	VJ836900	C. EL
C50	UA652270	C. MYLAR
C51	VF466900	C. CE. TUBLR
C52	VA777400	C. CE
C53	VJ599000	C. CE. TUBLR
C54	UA652270	C. MYLAR

* New Parts

Schm Ref.	PART NO.	Description
C73	VJ836900	C. EL
C74	VJ837200	C. EL
C75	UM216330	C. EL
C76	UA653390	C. MYLAR
C77	UA653390	C. MYLAR
C78	UM216330	C. EL
C79	VF964800	C. EL
C80	VJ837200	C. EL
C81	UM417100	C. EL
C82	UM417100	C. EL
C83	FG214100	C. CE
C84	FG214100	C. CE
C85	FG214100	C. CE
C86	UJ649220	C. EL
C87	FG214100	C. CE
C88	UJ667470	C. EL
C89	UJ667470	C. EL
C90	UJ667470	C. EL
C93	UJ667470	C. EL
C94	Ui367220	C. EL
C95	UJ667470	C. EL
C96	UJ667470	C. EL
C97	UM417100	C. EL
C401	VA761000	C. CE
C402	VA761000	C. CE
C403	VJ836900	C. EL
C404	VG278800	C. CE. TUBLR
C405	VJ837200	C. EL
C406	VG278600	C. CE. TUBLR
C407	VJ836900	C. EL
C408	VF467300	C. CE. TUBLR
C409	VF467300	C. CE. TUBLR
D1	VD631600	DIODE
D2	VD631600	DIODE
D3	VD631600	DIODE
D7	VG438100	DIODE. ZENR
D8	VG439900	DIODE. ZENR
D9	VG439000	DIODE. ZENR
D10	VS997800	DIODE
D11	VS997800	DIODE
D12	VS997800	DIODE
D13	VS997800	DIODE
D14	VD631600	DIODE
D15	VD631600	DIODE
D16	VG442800	DIODE. ZENR
D17	VD631600	DIODE
D18	VD631600	DIODE
D19	VD631600	DIODE
D20	VD631600	DIODE
D21	VD631600	DIODE
D22	VD631600	DIODE
D401	VD631600	DIODE
G1	VR463400	TERM. GND

* New Parts

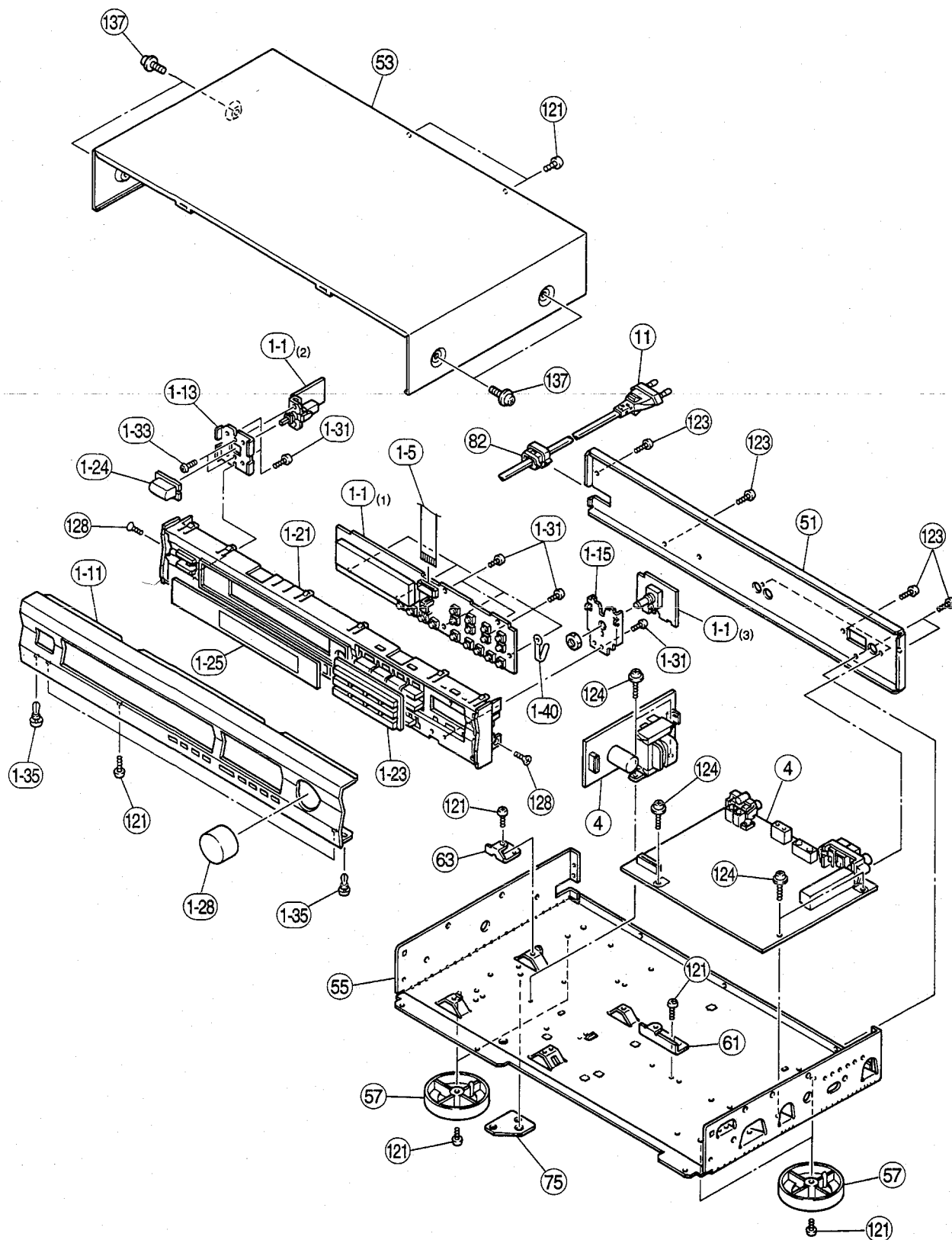
Schm Ref.	PART NO.	Description
G2	VR463400	TERM. GND D3.5 TP00385
IC1	XQ360A00	IC LC72130
IC2	XB760A00	IC LA1266
IC3	iG158100	IC LA3401
IC401	XT152A00	IC LC72720
L1	Vi546100	COIL 220uH
L2	GG000560	FLTR. CE SFE10.7MS3GHY-A
L3	GG000560	FLTR. CE SFE10.7MS3GHY-A
L4	GG000560	FLTR. CE SFE10.7MS3GHY-A
L5	GE100470	COIL. IF. AM 450KHz
L6	Vi546100	COIL 220uH
L7	Vi546100	COIL 220uH
L8	VC218600	COIL. DT. FM 10.7MHz
L9	VC219000	FLTR. CE SFZ450JL3
L10	VT486800	COIL XYA2
L12	VQ138200	FLTR. LC 19KHz
L13	VQ138200	FLTR. LC 19KHz
L401	Vi546100	COIL 220uH
L402	Vi546100	COIL 220uH
PJ1	VM725600	JACK. PIN 2P
PK1	VQ987600	TUNER. PK EXV-17296G1
PK2	VU333700	COIL. RF. AM 940536051A
Q1	VD678500	TR. DGT DTA114ES
Q2	VR497000	TR 2SC1809S N, P
Q3	VR497000	TR 2SC1809S N, P
Q4	VR497000	TR 2SC1809S N, P
Q5	VR497000	TR 2SC1809S N, P
Q10	VR497000	TR 2SC1809S N, P
Q13	VR497000	TR 2SC1809S N, P
Q14	iC174020	TR 2SC1740S R, S
Q15	VD678500	TR. DGT DTA114ES
Q16	iC174020	TR 2SC1740S R, S
Q17	iC174020	TR 2SC1740S R, S
Q18	iC206110	TR 2SC2061 P, Q, R
Q19	iC287820	TR 2SC2878 A, B
Q20	iC287820	TR 2SC2878 A, B
Q21	VN996900	TR 2SC4495
Q22	ia093320	TR 2SA933S Q, R
Q23	iC174020	TR 2SC1740S R, S
Q24	ia093320	TR 2SA933S Q, R
Q25	VG722000	TR. DGT DTC144ES
R90	HV455330	R. CAR. FP 330 Ω 1/4W
R91	HV455330	R. CAR. FP 330 Ω 1/4W
R92	HV453470	R. CAR. FP 4.7 Ω 1/4W
R104	HV453330	R. CAR. FP 3.3 Ω 1/4W
T1	XN911A00	TRANS. PWR
TE1	VU477800	TERM. ANT AJ-2038-040
VR1	VJ693200	VR. TRIM B2.2K Ω
VR2	VJ693200	VR. TRIM B2.2K Ω
VR3	VJ694000	VR. TRIM B47K Ω
VR4	VJ693800	VR. TRIM B22K Ω
XL1	VY734600	RSNR. CRYST 7.2MHz
XL3	GG000750	RSNR. CE 18.95KHz

* New Parts

Schm Ref.	PART NO.	Description	
XL401	VY704900	RSNR. CRYST	4. 332MHz
	VZ908000	P. C. B.	OPERATION
CB501	VU281700	CN	17P
CB502	Vi878200	CN. BS. PIN	4P
CB503	Vi878200	CN. BS. PIN	4P
CB504	Vi878400	CN. BS. PIN	6P
CB505	VB858200	CN. BS. PIN	3P
C501	VJ839100	C. EL	1uF 50V
C502	VJ837200	C. EL	47uF 16V
C503	VU545000	C. EL	47000uF 5. 5V
C504	VH053100	C. CE. TUBLR	0. 1uF 50V
C505	VF467300	C. CE. TUBLR	0. 01uF 16V
C506	VF467300	C. CE. TUBLR	0. 01uF 16V
C507	UA655100	C. MYLAR	0. 1uF 50V
C508	UA655100	C. MYLAR	0. 1uF 50V
C509	VF467000	C. CE. TUBLR	1000pF 50V
C510	VF467000	C. CE. TUBLR	1000pF 50V
D501	VD631600	DIODE	1SS133, 176, HSS104
D502	VD631600	DIODE	1SS133, 176, HSS104
D503	VM975300	DIODE. ZENR	HZS11B2TD 11V
D504	VD631600	DIODE	1SS133, 176, HSS104
D505	VD631600	DIODE	1SS133, 176, HSS104
D506	VD631600	DIODE	1SS133, 176, HSS104
IC501	XT287A00	IC	LC866420A-5E97 CPU
Q501	iA093320	TR	2SA933S Q, R
Q502	iC174020	TR	2SC1740S R, S
SW501	VG392900	SW. TACT	SKHVAA
SW502	VG392900	SW. TACT	SKHVAA
SW503	VG392900	SW. TACT	SKHVAA
SW504	VG392900	SW. TACT	SKHVAA
SW505	VG392900	SW. TACT	SKHVAA
SW506	VG392900	SW. TACT	SKHVAA
SW507	VG392900	SW. TACT	SKHVAA
SW508	VG392900	SW. TACT	SKHVAA
SW509	VG392900	SW. TACT	SKHVAA
SW510	VG392900	SW. TACT	SKHVAA
SW511	VG392900	SW. TACT	SKHVAA
SW512	VG392900	SW. TACT	SKHVAA
SW513	VG392900	SW. TACT	SKHVAA
SW514	VG392900	SW. TACT	SKHVAA
SW515	VG392900	SW. TACT	SKHVAA
SW516	VG392900	SW. TACT	SKHVAA
SW517	VG392900	SW. TACT	SKHVAA
SW520	VY758900	SW. PUSH	PS016-PA022BA-B
SW521	VU260800	SW. RT. ENC	EC16B24104
U501	VU591000	L. DTCT	GP1U271X
V501	VV115200	FL. DSPLY	13-BT-152GK
XL501	VH611900	RSNR. CE	CST6. 00MGW-TF01
	VQ948800	SHEET	FL
	VR380100	SPACER	FL-T6

* New Parts

EXPLODED VIEW



MECHANICAL PARTS

Ref. No.	PART NO.	Description	Remarks	Markets
* 1- 1	VZ908000	P.C.B. ASS'Y	OPERATION	
1- 5	MF117160	FLEXIBLE FLAT CABLE C&C	17P 160mm	
* 1-11	VZ681500	FRONT PANEL	BL	
* 1-11	VZ681600	FRONT PANEL	TI	
1-13	VV244200	SUPPORT	PWR	
* 1-15	VZ682400	SUPPORT	TU	
* 1-21	VZ682000	SUB PANEL	BL	
* 1-21	VZ682100	SUB PANEL	TI	
* 1-23	VZ682200	ESCUTCHEON	BL	
* 1-23	VZ682300	ESCUTCHEON	TI	
1-24	VV501000	BUTTON	9.5x22V	BL
1-24	VV501100	BUTTON	9.5x22V	TI
1-25	VV245300	SHEET, WINDOW PANEL		
1-28	VR217100	KNOB	D32/S	BL
1-28	VT274400	KNOB	D32/S	TI
1-31	EP630220	BIND HEAD P-TITE SCREW	3x8 ZMC2-BL	
1-33	EP630210	BIND HEAD S-TITE SCREW	3x6 ZMC2-BL	
1-35	VQ368600	PUSH RIVET	P3555-B	
1-40	CB502030	BINDING TIE	S-75B	
* 4	VZ907900	P.C.B. ASS'Y	TUNER	
△ 11	VN363700	POWER CORD ASS'Y		(G)
△ 11	VS680700	POWER CORD ASS'Y		(B)
* 51	VZ681700	REAR PANEL		
53	VV245400	TOP COVER	BL	
53	VV245500	TOP COVER	TI	
* 55	VQ709100	CHASSIS		
57	VQ780300	LEG	D60xH16	
61	VV244600	SUPPORT, PCB	PCB	
63	VZ037300	SUPPORT		
75	VY735100	SPACER		
82	VN158600	CORD STOPPER	No. 2104	
121	Ei330086	BIND HEAD B-TITE SCREW	3x8 FCRM3-BL	
123	VN413300	BIND HEAD BONDING B-T. SCREW	3x8 MFZN2-BL	
124	VT669300	PW HEAD B-TITE SCREW	3x8-8 MFC2	
128	EO030066	FLAT HEAD SCREW	3x6 ZMC2-Y	
137	EK365090	PW HEAD S-TITE SCREW	4x8-10 FCRM3-BL	BL
137	EX601150	BW HEAD S-TITE SCREW	4x8-10 FNM3-BL	TI
		ACCESSORIES		
	VQ147100	ANTENNA, FM	1P 1.4m	
	VR248500	ANTENNA, AM LOOP	1P 1.0m	
	VS381600	PIN-PLUG CORD	2P 1.0m	
	VE364900	ANTENNA ADAPTER	PAL 75-300Ω	

* New Parts

Parts List for Carbon Resistors

Value	1/4W Type Part No.	1/6W Type Part No.	Value	1/4W Type Part No.	1/6W Type Part No.
1.0	HJ35 3100	HF85 3100	10 k	HF45 7100	HF45 7100
1.8	HJ35 3180	*	11 k	HF45 7110	HF45 7110
2.2	HJ35 3220	HF85 3220	12 k	HJ35 7120	HF85 7120
3.3	HJ35 3330	HF85 3330	13 k	HF45 7130	HF45 7130
4.7	HJ35 3470	HF85 3470	15 k	HF45 7150	HF45 7150
5.6	HJ35 3560	HF85 3560	18 k	HF45 7180	HF45 7180
10	HF45 4100	HF45 4100	22 k	HF45 7220	HF45 7220
15	HJ35 4150	HF85 4150	24 k	HF45 7240	HF45 7240
22	HF45 4220	HF45 4220	27 k	HJ35 7270	HF85 7270
27	HJ35 4270	HF85 4270	30 k	HF45 7300	HF45 7300
33	HF45 4330	HF45 4330	33 k	HF45 7330	HF45 7330
39	HJ35 4470	HF85 4390	36 k	HF45 7360	HF45 7360
47	HF45 4470	HF45 4470	39 k	HF45 7390	HF45 7390
56	HF45 4560	HF45 4560	47 k	HF45 7470	HF45 7470
68	HF45 4680	HF45 4680	51 k	HF45 7510	HF45 7510
75	HF45 4750	HF45 4750	56 k	HF45 7560	HF45 7560
82	HF45 4820	HF45 4820	62 k	HF45 7620	HF45 7620
91	HF45 4910	HF45 4910	68 k	HF45 7680	HF45 7680
100	HF45 5100	HF45 5100	82 k	HF45 7820	HF45 7820
110	HJ35 5110	HF85 5110	91 k	HF45 7910	HF45 7910
120	HF45 5120	HF45 5120	100 k	HF45 8100	HF45 8100
150	HF45 5150	HF45 5150	110 k	HF45 8110	HF45 8110
160	HJ35 5160	*	120 k	HF45 8120	HF45 8120
180	HF45 5180	HF45 5180	150 k	HF45 8150	HF45 8150
200	HF45 5200	HF45 5200	180 k	HF45 8180	HF45 8180
220	HF45 5220	HF45 5220	220 k	HJ35 8220	HF85 8220
270	HF45 5270	HF45 5270	270 k	HF45 8270	HF45 8270
330	HF45 5330	HF45 5330	300 k	HF45 8300	HF45 8300
390	HF45 5390	HF45 5390	330 k	HF45 8330	HF45 8330
430	HF45 5430	HF45 5430	390 k	HJ35 8390	HF85 8390
470	HF45 5470	HF45 5470	470 k	HF45 8470	HF45 8470
510	HF45 5510	HF45 5510	560 k	HJ35 8560	HF85 8560
560	HF45 5560	HF45 5560	680 k	HJ35 8680	HF85 8680
680	HF45 5680	HF45 5680	820 k	HJ35 8820	HF85 8820
820	HF45 5820	HF45 5820	1.0 M	HF45 9100	HF45 9100
910	HF45 5910	HF45 5910	1.2 M	HJ35 9120	*
1.0 k	HF45 6100	HF45 6100	1.5 M	HJ35 9150	HF85 9150
1.2 k	HF45 6120	HF45 6120	1.8 M	HJ35 9180	HF85 9180
1.5 k	HF45 6150	HF45 6150	2.2 M	HJ35 9220	HF85 9220
1.8 k	HF45 6180	HF45 6180	3.3 M	HJ35 9330	HF85 9330
2.0 k	HJ35 6200	HF85 6200	3.9 M	HJ35 9390	*
2.2 k	HF45 6220	HF45 6220	4.7 M	HJ35 9470	HF85 9470
2.4 k	HJ35 6240	HF85 6240			
2.7 k	HF45 6270	HF45 6270			
3.0 k	HF45 6300	HF45 6300			
3.3 k	HF45 6330	HF45 6330			
3.6 k	HJ35 6360	HF85 6360			
3.9 k	HF45 6390	HF45 6390			
4.7 k	HF45 6470	HF45 6470			
5.1 k	HF45 6510	HF45 6510			
5.6 k	HF45 6560	HF45 6560			
6.8 k	HF45 6680	HF45 6680			
8.2 k	HF45 6820	HF45 6820			
9.1 k	HF45 6910	HF45 6910			

1/4W Type

HJ35 ○○○○

← 10mm →

1/6W Type

HF45 ○○○○

← 5mm →