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Radio-Fernsehen

7940 Riedlingen-Hindenburgstr. 21

**SERVICE
MANUAL**

ST440/ST440L

EINGEGANGEN 26. März 1985

marantz®

model ST440/ST440L

Stereophonic Tuner

MARANTZ DESIGN AND SERVICE

Using superior design and selected high grade components, MARANTZ company has created the ultimate in stereo sound. Only original MARANTZ parts can insure that your MARANTZ product will continue to perform to the specifications for which it is famous.

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20525 Nordhoff Street
Chatsworth, California 91311
Phone: 1-800-423-5108
Phone: 1-213-998-9333

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1. Complete address
2. Complete part numbers and quantities required
3. Description of parts
4. Model number for which part is required
5. Way of shipment
6. Signature: any order form or telex must be signed otherwise such part order will be considered as null and void.

PARTS ORDERING:

Parts may be ordered from the following addresses:

EUROPE

MARANTZ S.A.
European Parts Department
2, Avenue Léopold III
B-7120 Péronnes-lez-Binche
Belgium
Telex: 57589

MARANTZ DENMARK
Bregnerødvej 132b
3460 Birkerød
Denmark
Telex: 39137

MARANTZ BELGIUM
45 Rue Auguste Van Zande
1080 Brussels
Belgium

MARANTZ NEDERLAND B.V.
Wagenmackersweg 3
3449 H.V. Woerden
Netherlands

MARANTZ AUSTRIA Ge.M.B.H.
25 Franz Lisztgasse
2380 Perchtoldsdorf
Austria
Telex: 113583

MARANTZ S.A.
326 Avenue Louise Bte 32
1050 Bruxelles
Belgium
Telex: 26602

MARANTZ FRANCE
4 Rue Bernard Palissy
92600 Asnières
France
Telex: 611651

MARANTZ SVENSKA A.B.
Svartviksvägen 56
Träneberg Bromma
Sweden
Telex: 13449

MARANTZ ITALIANA S.p.A.
Via Monte Napoleone, 10
20121 Milano
Italia

MARANTZ GERMANY G.M.B.H.
Max-Planckstrasse 22
6072 Dreieich 1
Germany
Telex: 4185316

MARANTZ AUDIO U.K. LTD.

Unit 15/16
Saxon Way Industrial Estate
Moor Lane
Harmondsworth UB7 0LW
Great Britain
Telex: 935196

AUSTRALIA

MARANTZ AUSTRALIA PTY., LTD.
19 Chard Road
Brookvale, NSW 2100
Australia
Telex: 24121

U.S.A.

MARANTZ COMPANY, INC.
National Service Dept.
P.O. Box 577
Chatsworth, CA 91311
U.S.A.
Telex: 4720284

JAPAN

MARANTZ JAPAN, INC.
35-1, 7-chome, Sagamiono
Sagamihara-shi, Kanagawa
Japan
Telex: 22878

All of the above locations are fully equipped to take care of your total service needs. Because various countries have differing configuration requirements, it is necessary that you contact the service facility in your particular country. In the event that there is no service location listed for your country, please, contact the nearest facility for the necessary assistance.

In case of difficulties, do not hesitate to contact the Technical Department at abovementioned address.

NOTE—FOR U.S.A. ONLY

Parts for your MARANTZ stereo are generally available within 72 hours throughout the nation via a toll-free line to our National Parts Depot in California. The sales professionals who take your call immediately refer to their own desk top computer terminal and can quickly determine the availability and price information you require. If, for some reason, your order should exceed our available stock, we usually can instantly provide an alternate replacement part or current delivery information. When the order is placed and confirmed, the computer simultaneously generates "hard copy" orders at the distribution center. As hard copies come directly from the computer to the national parts depot, your requested stock is assembled and prepared for shipment and placed on the first available carrier for delivery to you.

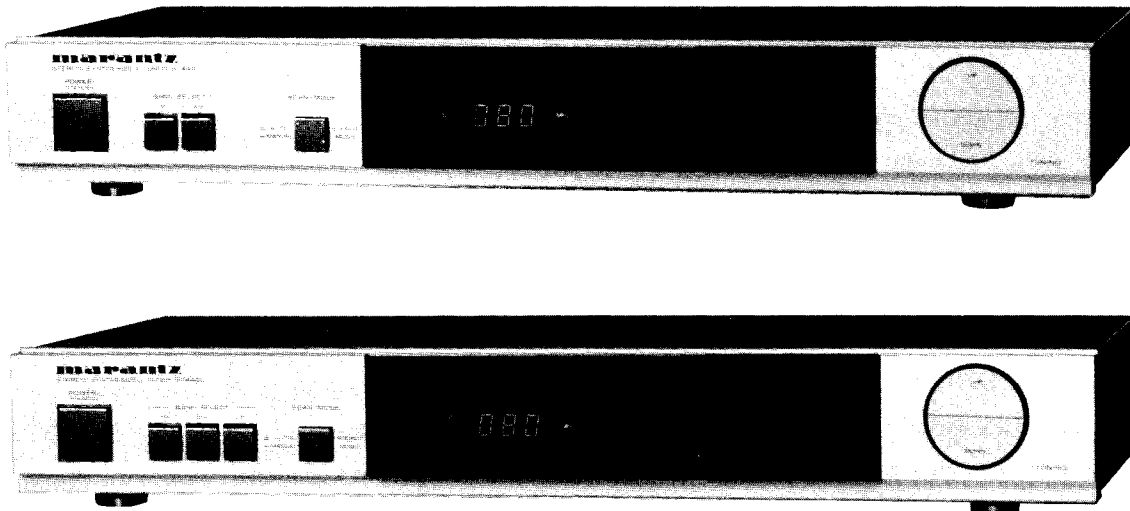
Phone orders will eliminate mail delays, and we encourage the use of this method. If you order by mail, use MARANTZ parts order forms which are available from SUPERSCOPE NATIONAL PARTS DEPARTMENT.

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MODEL ST440/ST440L STEREOGRAPHIC TUNER



INTRODUCTION

This service manual was prepared for use by Authorized Warranty Stations and contains service information for the Marantz Model ST440/ST440L Stereophonic Tuner.

Servicing information and voltage data included in this manual are intended for use by knowledgeable and experienced personnel only. All instructions should be read carefully. No attempt should be made to proceed without a good understanding of circuitry operation.

The parts list furnishes complete ordering information. Most replacement parts should be ordered from the Marantz Company. However, a simple description is included for parts which can be obtained locally.

1. SHOCK, FIRE HAZARD SERVICE TEST:

CAUTION: After servicing this appliance and prior to returning to customer, measure the resistance between either primary AC cord connector pins (with unit NOT connected to AC mains and its Power switch ON), and the face or front Panel of product and controls and chassis bottom.

Any resistance measurement less than 1 Megohms should cause unit to be repaired or corrected before AC power is applied, and verified before return to user/customer.

Ref. UL Standard No. 1270. Para. 66. 3. D (Mandatory Test after servicing Electrical Appliances, effective 7-1-88).

2. P.W. BOARDS

As can be seen from the circuit diagram the chassis of Model ST440/ST440L consists of the following units. Each unit mounted on a printed circuit board is described within the square enclosed by a bold dotted line on the circuit diagram.

1. Tuner mounted on P.W. Board P100
2. Preset Key Switch mounted on P.W. Board PS00
3. Power Switch mounted on P.W. Board PU00

3. TEST EQUIPMENT REQUIRED FOR SERVICING

Item	Use
AM Signal Generator	Signal source for AM alignment
Test Loop	Use with AM signal generator
FM Signal Generator	Signal source for FM alignment
MPX Signal Generator	Stereo separation alignment and trouble shooting
Distortion Analyzer	Distortion measurements
Audio Oscillator	Sinewave and squarewave signal source
AC VTVM	Voltage measurements (AC)
Oscilloscope	Waveform analysis and trouble shooting and ASO alignment
Frequency Counter	MPX oscillator adjustment (VCO)
Circuit Tester	Trouble shooting
DC VTVM	Voltage measurements (DC)
AC Wattmeter	Monitors primary power to tuner
Line Voltmeter	Monitors potential of primary power to tuner
Variable Autotransformer (0 ~ 140V AC, 10A)	Adjusts level of primary power to tuner

4. TUNER ALIGNMENT PROCEDURES

A dummy resistor of 47 kohms must be connected across the tuner output terminals before alignment.

4.1 FM Alignment Procedures (Function switch in the "FM" position, MODE switch in the MONO position.)

1. FM RF Alignment

Step	Signal Source Connection	Signal Frequency	Indicator Connection	Set the Digital Readout Frequency	Adjust:
1	FM signal generator to FM antenna terminal (300Ω) through matching network Set the SG RF output level so that some noise can be observed on the upper and lower side of the output waveform.	98.00 MHz	VTVM to L or R channel output (J102)	98.00 MHz	FRONT END IFT (L8) for maximum output and minimum distortion.
2	FM signal generator 1 mV output to FM antenna terminal (300Ω) through matching network Modulation Level DIN 40 kHz DEV. IHF 75 kHz DEV.	98.00 MHz	"O" center meter or DC current meter in 100 μA range between (J201, J202)	98.00 MHz	L201 (Primary) core so that the meter indicates its center or may read "O".
3	FM signal generator 1 mV output to FM antenna terminal (300Ω) through matching network.	98.00 MHz	Distortion meter to L or R channel output (J102)	98.00 MHz	L201 (Secondary) core for minimum distortion.

4.2 Muting Level Alignment (Function switch in the "FM" position, MODE switch in the "AUTO STEREO" position.)

Step	Signal Source Connection	Signal Frequency	Indicator Connection	Set the Digital Readout Frequency	Adjust:
1	FM signal generator 12.5 μ V output to FM antenna terminal through matching network (300 ohm, balanced)	98.00 MHz	VTVM to L or R channel output (J102)	98.00 MHz	Adjust R216 until output is developed.

4.3 Multiplex Alignment Procedures (Function switch in the "FM" position, MODE switch in the "AUTO STEREO" position.)

Step	Signal Source Connection	Signal Frequency	Indicator Connection	Set the Digital Readout Frequency	Adjust:
1	FM signal generator 1 mV output modulated by MPX signal generator to FM antenna terminal (300 Ω) through matching network Modulation Level DIN 40 kHz+8% Pilot DEV. IHF 67.5kHz+9% Pilot DEV.	No modulation	Frequency counter to (J301)	98.00 MHz	R303 so that Frequency may precisely read 19,000 kHz \pm 10 Hz
2		Stereo left (1,000 Hz)	VTVM to right channel output (J102 R ch)		R317 or same separation in both channels.
3		Stereo right (1,000 Hz)	VTVM to left channel output (J102 L ch)		

4.4 AM Alignment Procedures (Function switch in the "AM" position.)

1. AM IF Alignment

Step	Signal Source Connection	Signal Frequency	Indicator Connection	Set the Digital Readout Frequency	Adjust:
1	Sweep generator to AM Antenna Terminal.	450 kHz marker	Oscilloscope to (JA01)	—	LA05 for maximum and symmetric response.

2. AM Local Oscillator Alignment

Step	Signal Source Connection	Signal Frequency	Indicator Connection	Set the Digital Readout Frequency	Adjust:
1	—	—	DC voltmeter in 3V range to (J501, J502)	522 kHz (520 kHz)	LA01 for 1.0 V

3. AM RF Alignment

Step	Signal Source Connection	Signal Frequency	Indicator Connection	Set the Digital Readout Frequency	Adjust:
1	Apply the signal to the AM loop antenna from the AM signal generator using the test loop.	603 kHz (600 kHz)	VTVM to L or R channel output (J102)	603 kHz (600 kHz)	LA03 for maximum output.
2		1,404 kHz (1,400 kHz)		1,404 kHz (1,400 kHz)	CA01-1 for maximum output.
3		Repeat steps 1 and 2.			

4. LW Local Oscillator Alignment (Function switch in the "LW" position) ST440L Only

Step	Signal Source Connection	Signal Frequency	Indicator Connection	Set the Digital Readout Frequency	Adjust:
1			DC voltmeter in 3 V range to (J501, J502)	153 kHz	LA02 for 1.5 V.

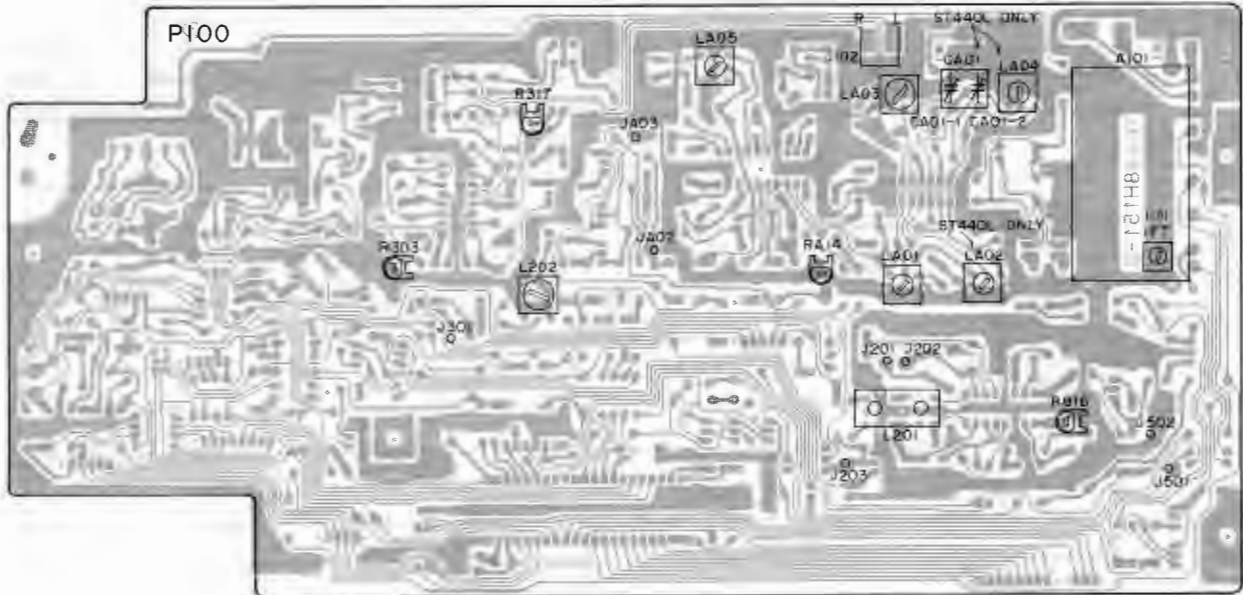
5. LW RF Alignment (Function switch in the "LW" position) ST440L Only

Step	Signal Source Connection	Signal Frequency	Indicator Connection	Set the Digital Readout Frequency	Adjust:
1	Apply the signal to the AM loop antenna from the RF generator using the test loop.	270 kHz	VTVM to L or R channel output (J104)	270 kHz	CA29-2 for maximum output.
2		170 kHz		170 kHz	LA04 for maximum output.
3	Repeat steps 1 and 2 as necessary to obtain maximum sensitivity.				

6. AM Signal Alignment (Function switch in the "AM" position)

Step	Signal Source Connection	Signal Frequency	Indicator Connection	Set the Digital Readout Frequency	Adjust:
1	Apply a signal to the AM loop antenna from the RF generator via the test loop. 5 mV signal	999 kHz	—	999 kHz	Adjust RA14 so that 5 signal LEDs light.

5. TEST POINT AND ALIGNMENT POINTS



6. CIRCUIT DESCRIPTION

● TC9158P C-MOS Digital IC Silicon Monolithic

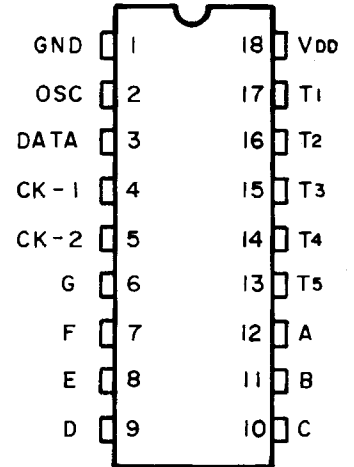
1. Dynamic Driver TC9158P (QS01) for indicating reception frequencies

TC9158P is a driver for indicating reception frequencies developed for use in DTS-6/8. The driver latches serial data transferred from system controller LSI, computes and corrects intermediate frequency, and indicates data. With built-in driver, there is no need for additional transistor.

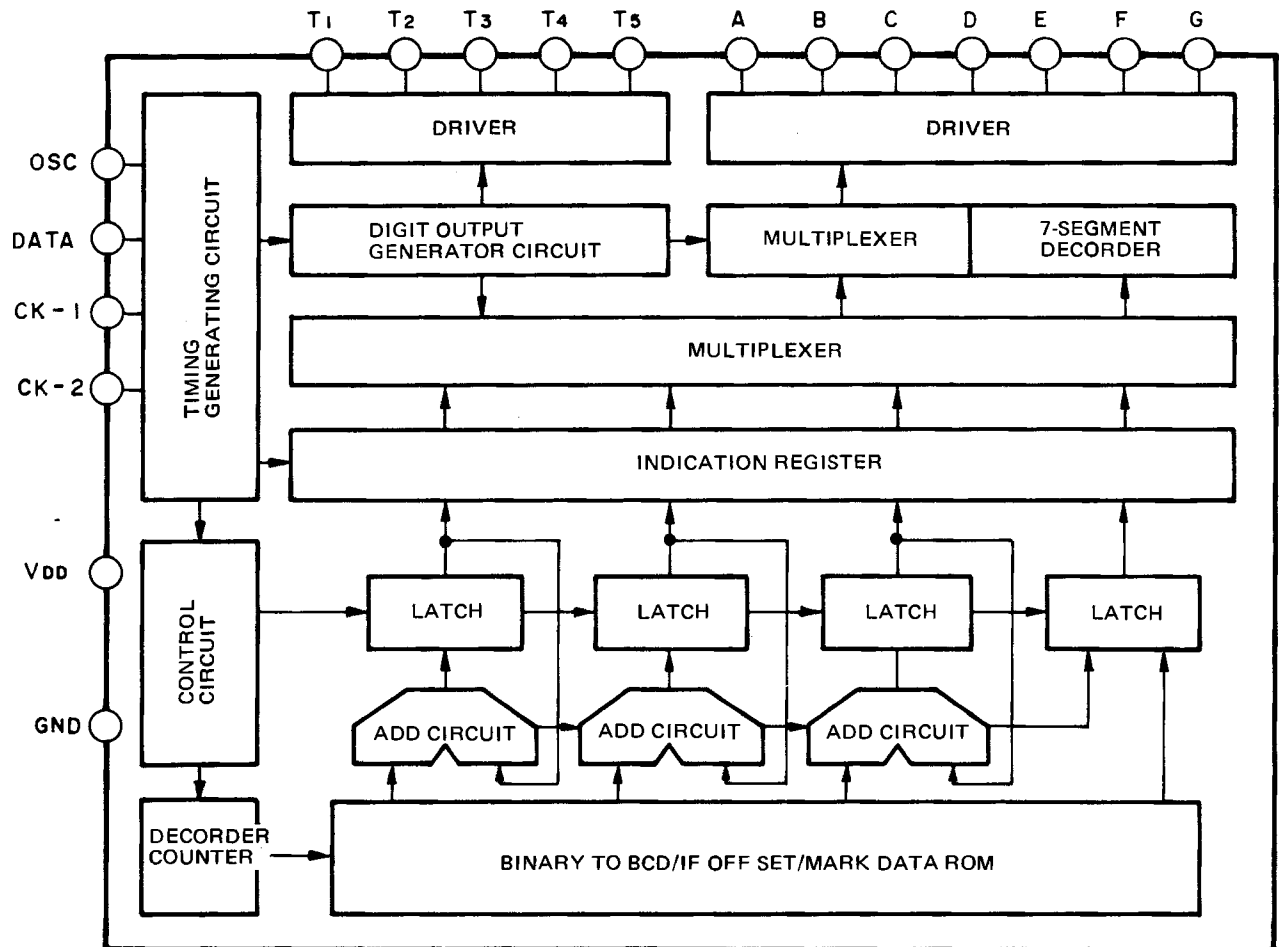
● Maximum Ratings (Ta=25°C)

Characteristic	Symbol	Ratings	Unit
Supply Voltage	V _{DD}	7	V
Input Voltage	V _{IN}	-0.3 ~ V _{DD} + 0.3	V
Output Voltage	V _{OL}	V _{DD} - 35	V
Output Current (Note)	I _{OH}	50	mA
Power Dissipation	P _D	350	mW
Operating Temperature	T _{opr}	-30 ~ 75	°C
Storage Temperature	T _{stg}	-55 ~ 125	°C

● Pin Connections



● Block Diagram



● Pin Description

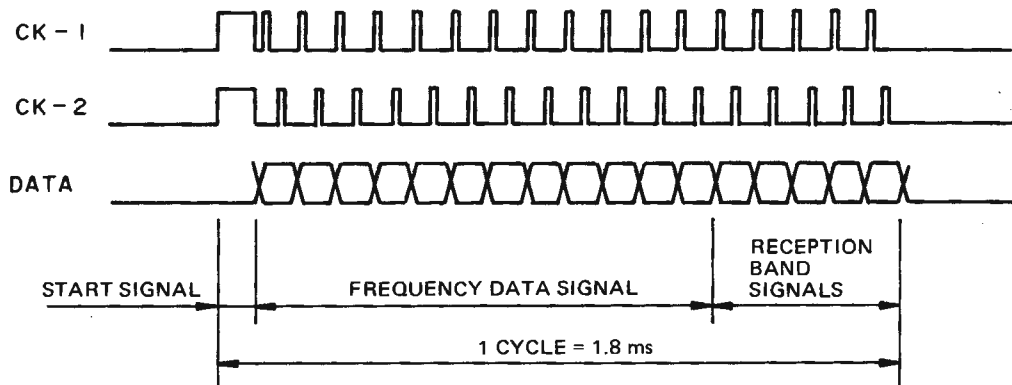
Pin No.	Name	Functional Description	Remarks
2	OSC	One-terminal oscillation-circuit input terminal for digit signal output.	
3	DATA	Receiving frequency data signal input.	Input circuit
4, 5	CK-1 CK-2	Timing clock signal input.	
6 ~ 12	A ~ G	Segment drive signal output.	Built-in high pressure-resistant transistor.
13 ~ 17	T ₁ ~ T ₅	Digit signal output terminal.	
1, 18	V _{DD} GND	Power supply GND.	

● Electrical Characteristics (Unless otherwise specified, V_{DD}=5V, T_a=25°C)

Characteristic	Symbol	Test Circuit	Test Condition	Min.	Typ.	Max.	Unit	
Operating Supply Voltage	V _{DD}	—	T _a =-30 ~ 75°C	4	5	6	V	
Operating Supply Current	I _{DD}	—	No load f _{OSC} =50 kHz	—	0.2	1.0	mA	
Input Voltage	"H" Level	V _{IH}	—	DATA, CK-1, CK-2	4.0	—	5.3	V
	"L" Level	V _{IL}	—	DATA, CK-1, CK-2	-0.3	—	1.0	V
Input Current	"H" Level	I _{IH}	—	DATA, CK-1, CK-2, V _{IH} =5V	—	—	±1	μA
	"L" Level	I _{IL}	—	DATA, CK-1, CK-2, V _{IL} =0V	—	—	±1	μA
Timing Input Frequency	f _{opr}	—	DATA, CK-1, CK-2	—	25	100	kHz	
OSC Oscillation Frequency	f _{OSC}	—	R _X =24kΩ, C _X =1200pF	—	50	—	kHz	
Output Current	I _{OH}	1	T ₁ ~ T ₅ , V _{OH} =3V	3	5	—	mA	
			A ~ G, V _{OH} =3V	10	15	—	mA	
Leak Current	I _{OL}	—	T ₁ ~ T ₅ , A ~ G, V _{OL} =-27V	—	—	±10	μA	

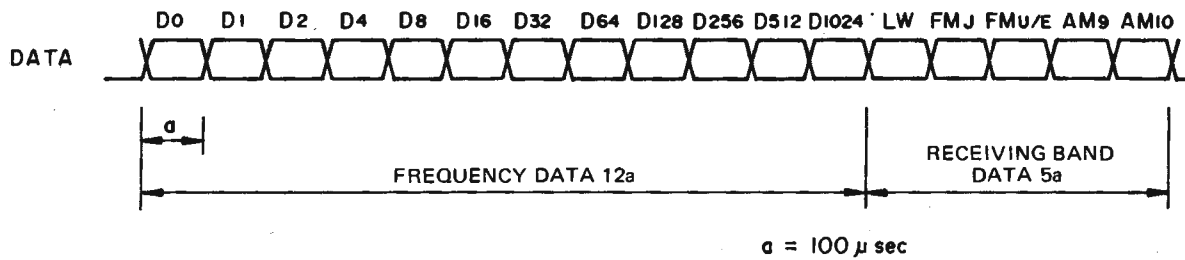
2. Function

If reception frequency is renewed by system controller LSI, timing signals indicated below and serial data are transferred by one cycle only.



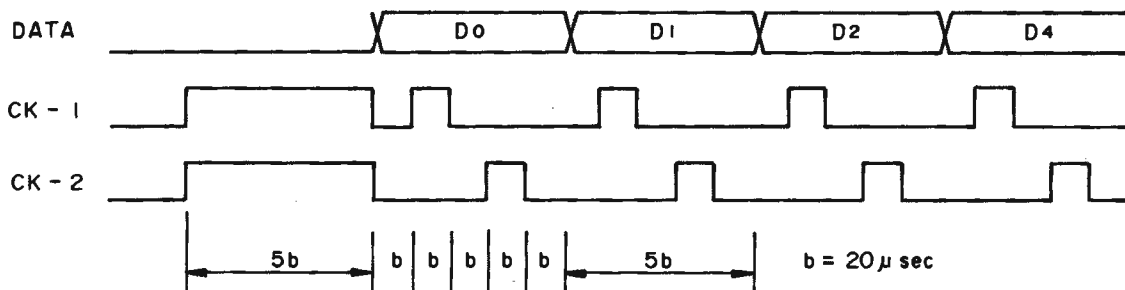
2.1 Data signal

Data signal is composed of 17 bits, of which 12 bits are for frequency data and 5 bits are for reception band signals (LW/FMJ/FMU/AM9/AM10).



2.2 Timing signals (CK-1, CK-2)

Data signals are loaded with the timing shown below.



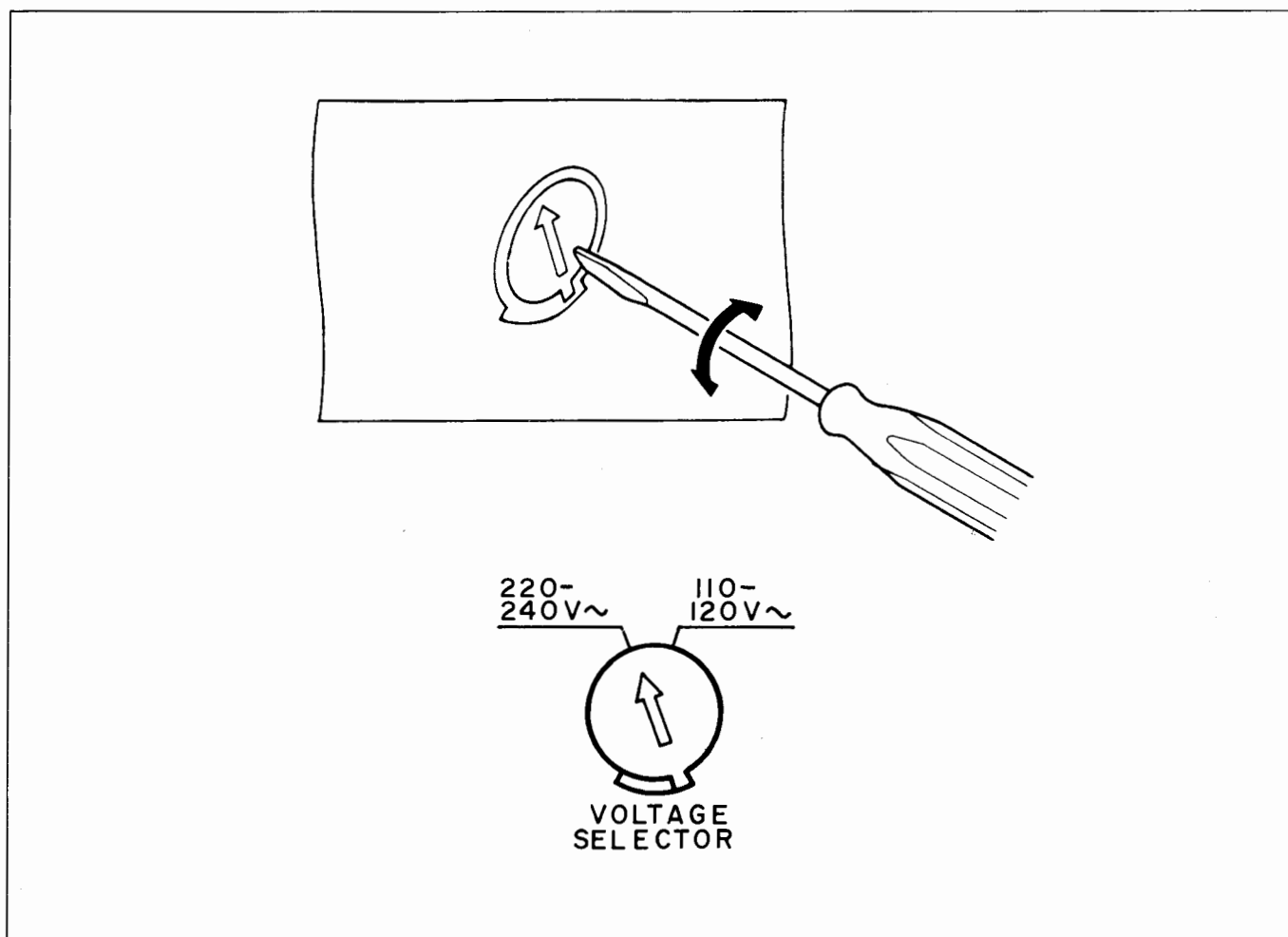
7. VOLTAGE CONVERSION

• EUROPEAN MODEL ONLY

To convert the unit to a different power source voltage, change the position as illustrated in the drawing below.

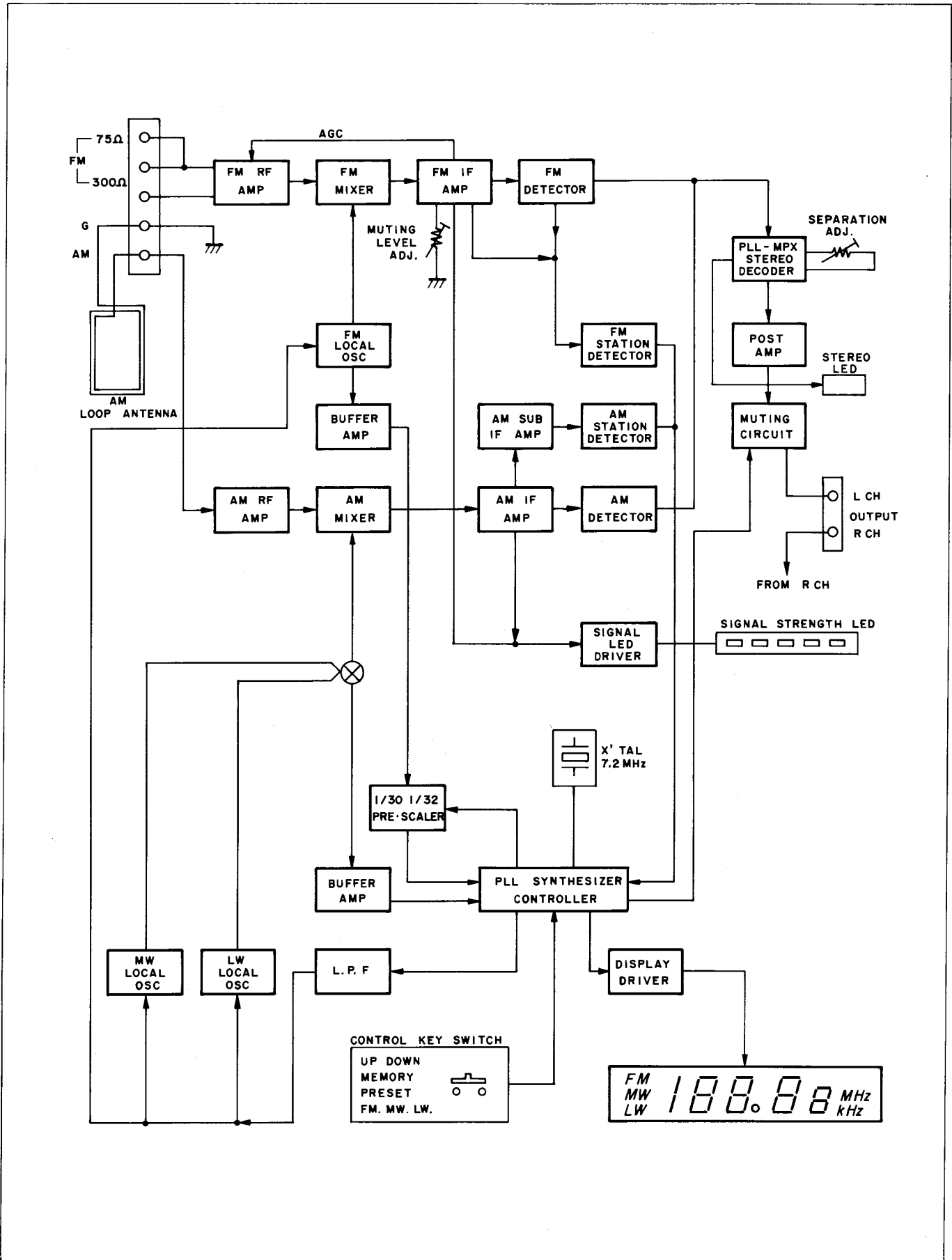
CAUTION
DISCONNECT POWER SUPPLY CORD FROM AC
OUTLET BEFORE CONVERTING VOLTAGE.

Voltage Conversion Chart



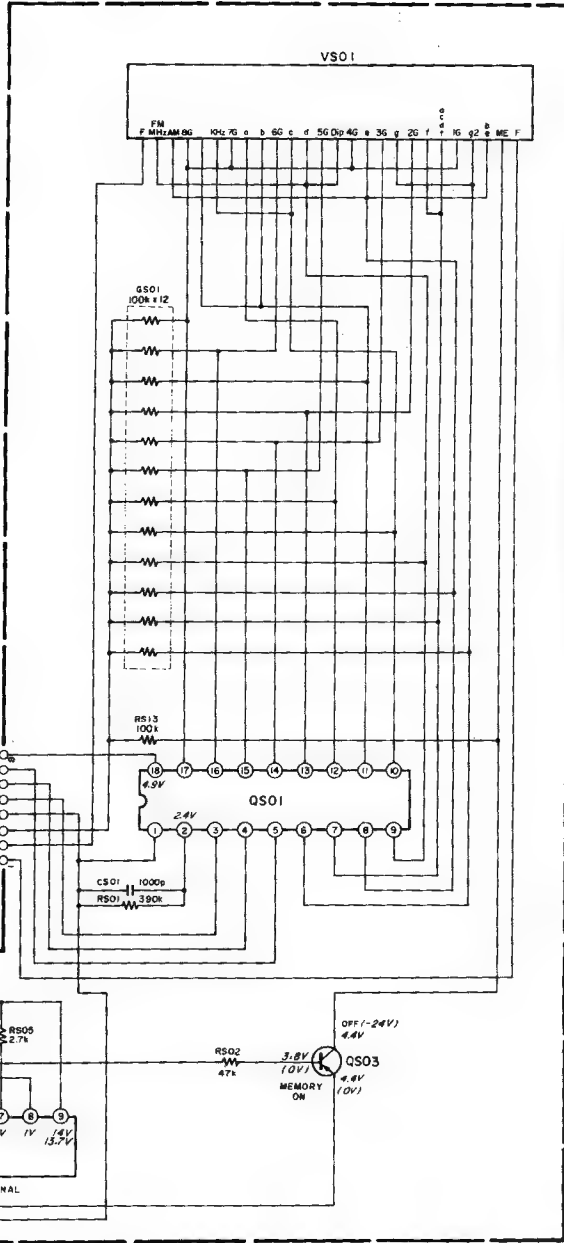
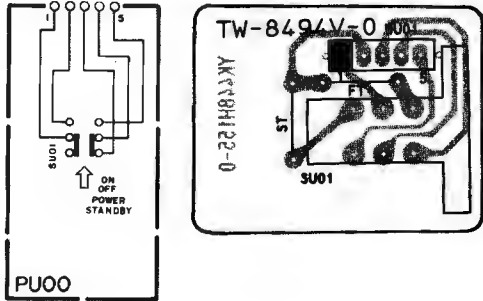
Note on safety: Symbol \triangle Fire or electrical shock hazard. Only original parts should be used to replace any part marked with symbol \triangle . Any other component substitution (other than original type), may increase risk of fire or electrical shock hazard.

8. BLOCK DIAGRAM

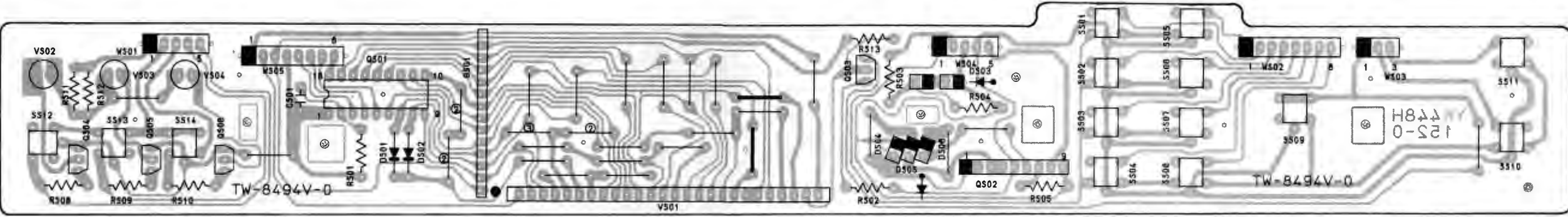
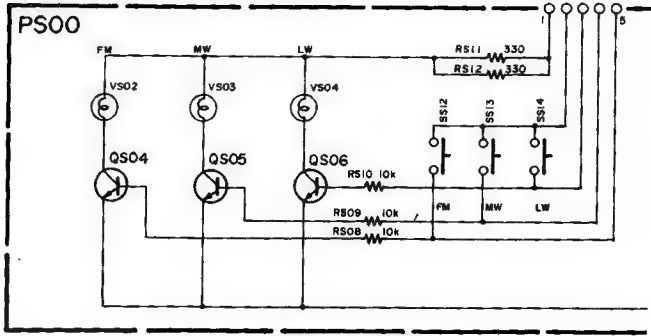
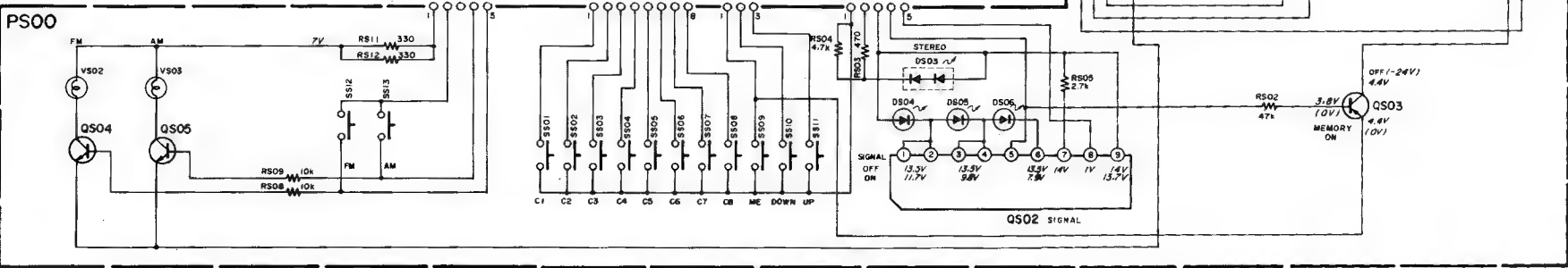


C DIAGRAM AND COMPONENT LOCATIONS

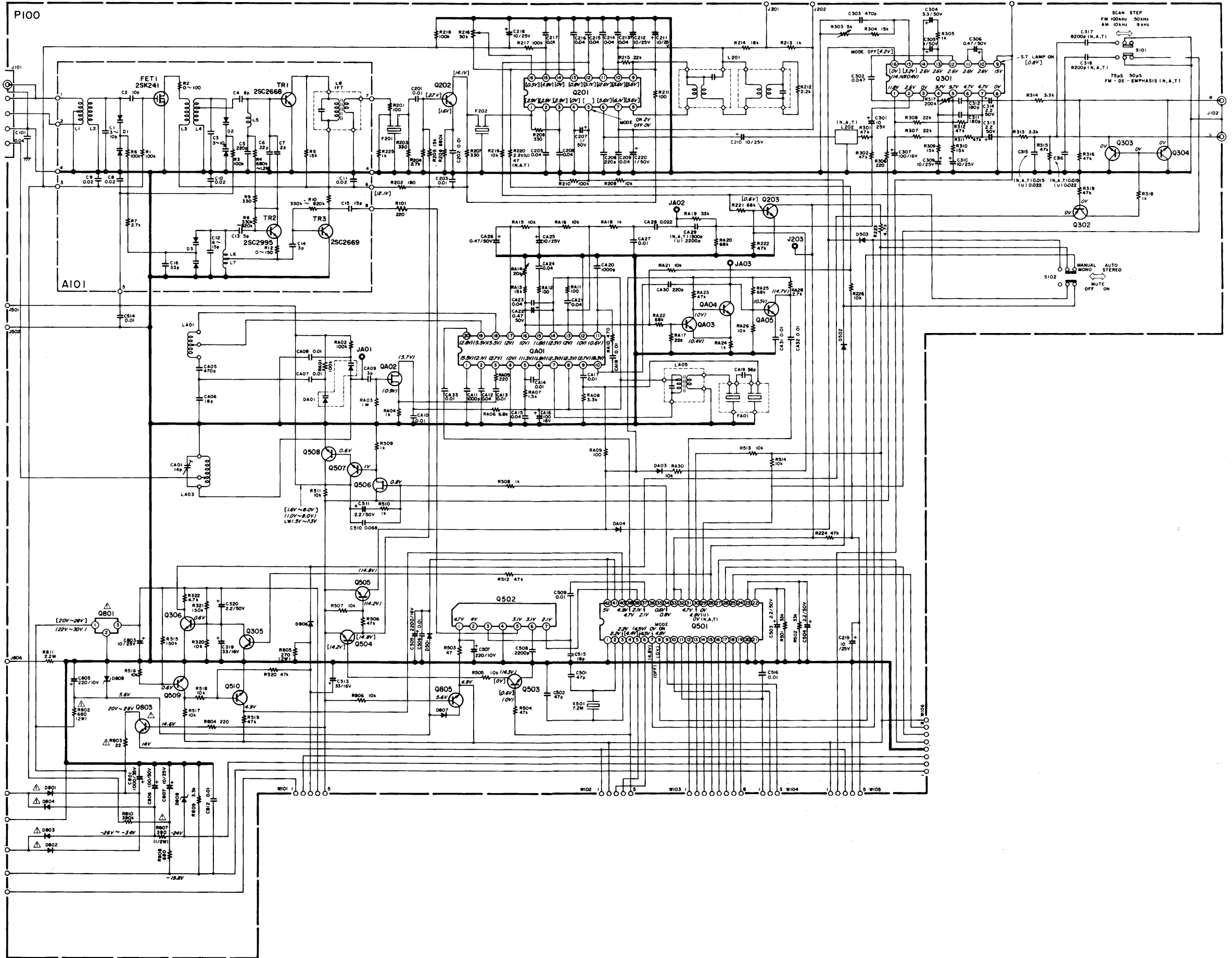
9.1 Power Switch Assembly (PU00)
Schematic Diagram and Component Locations

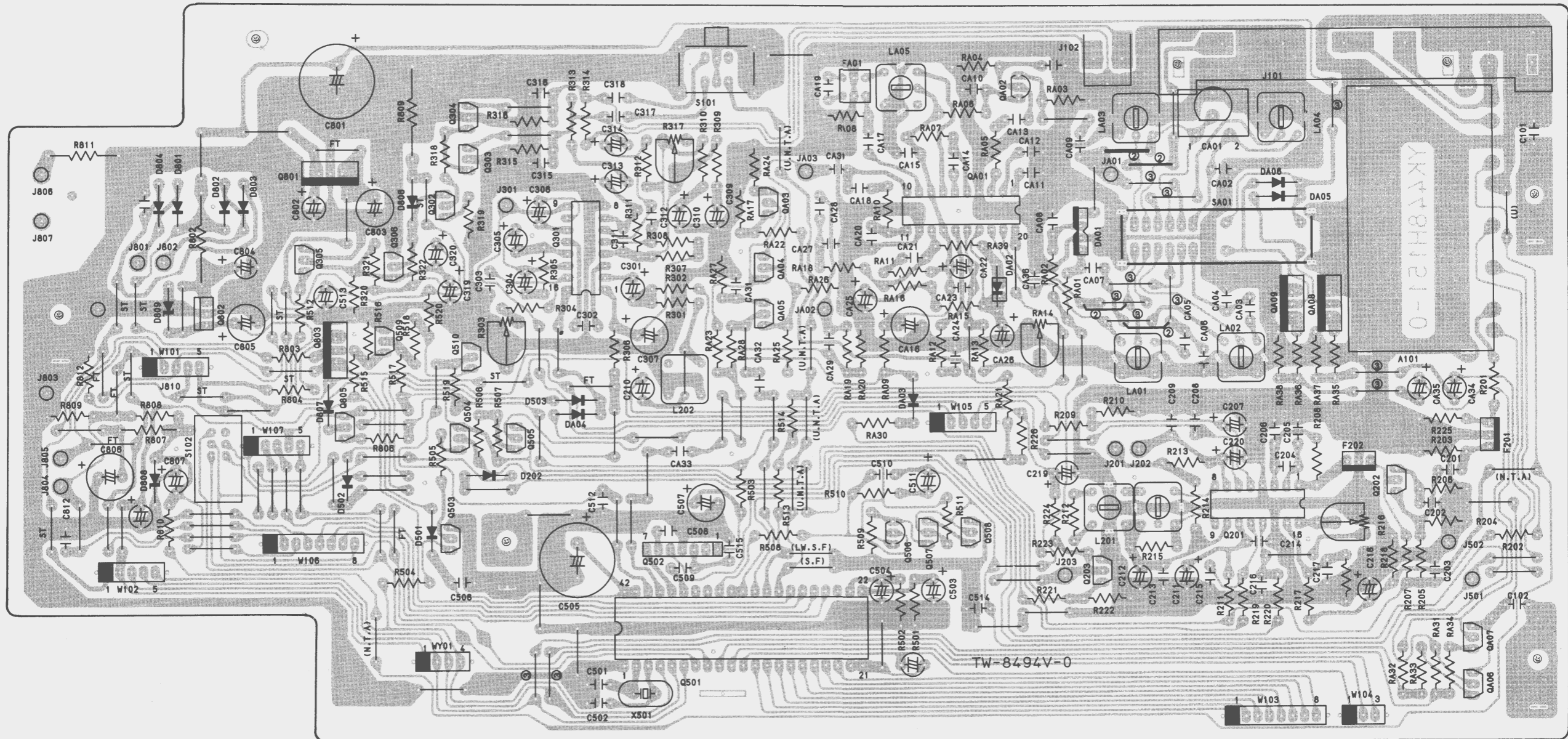


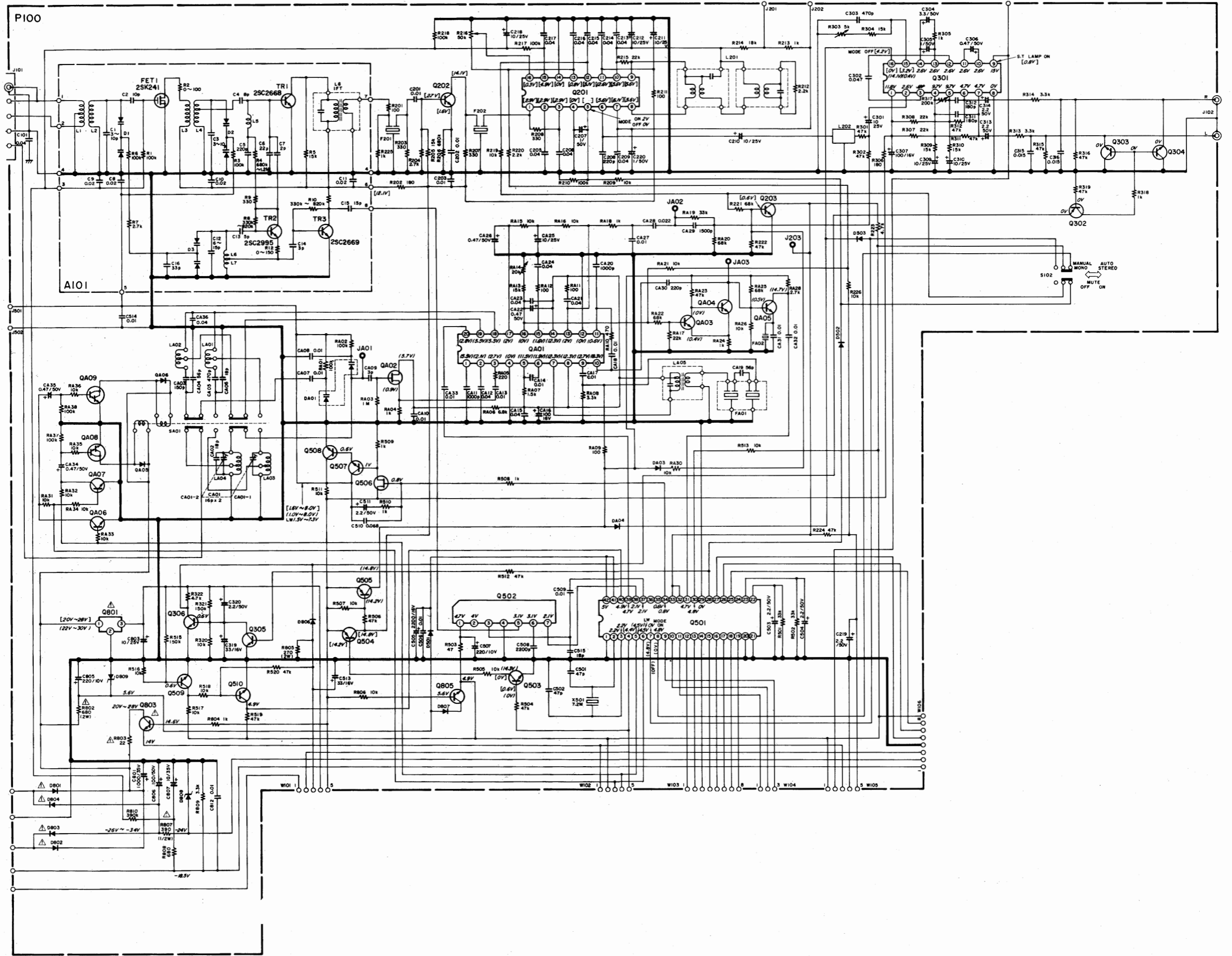
9.2 Preset Key Switch Assembly (PS00) Schematic Diagram and Component Locations



9.3 Tuner Assembly (P100) Schematic Diagram and Component Locations

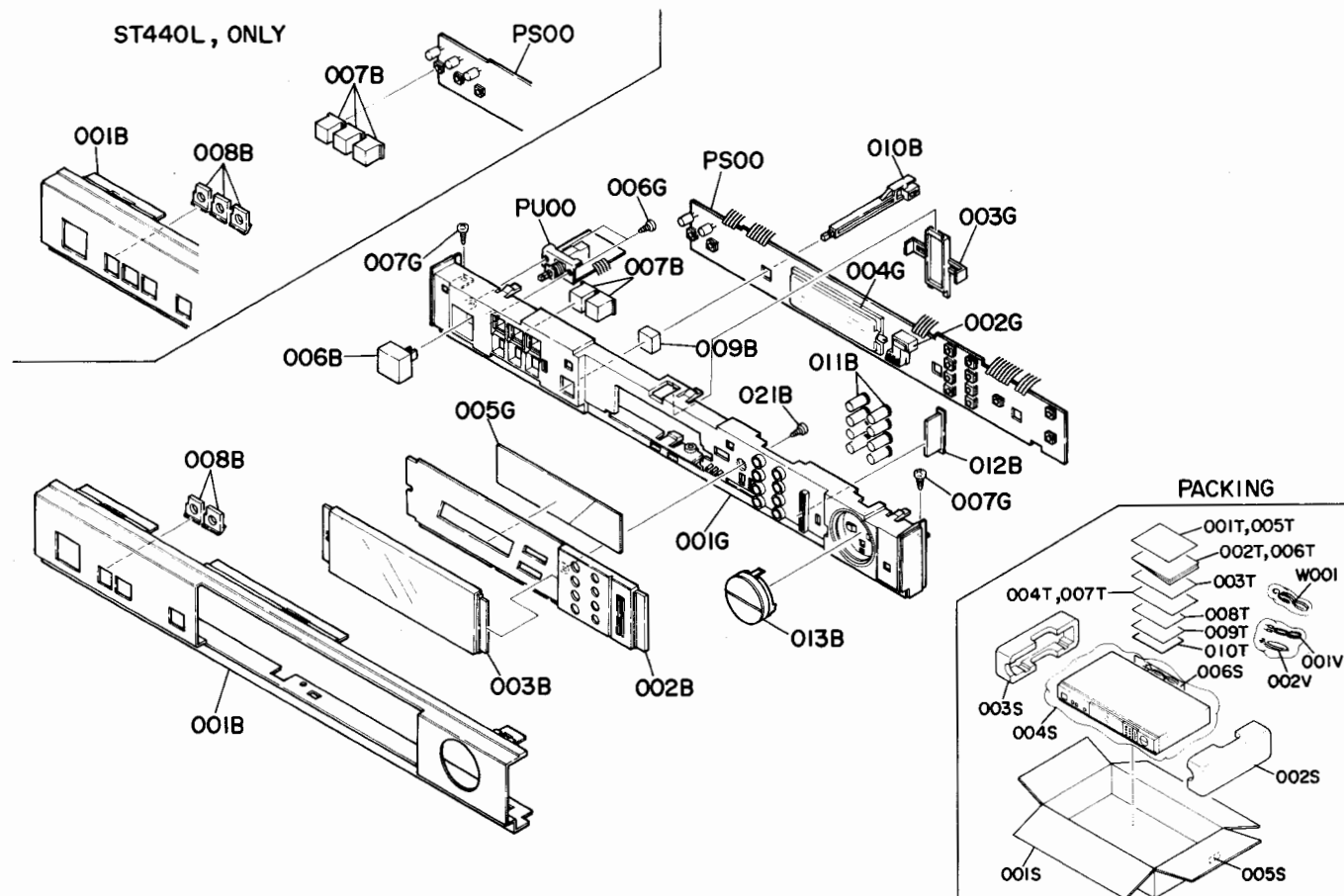






10. EXPLODED VIEW AND PARTS LIST

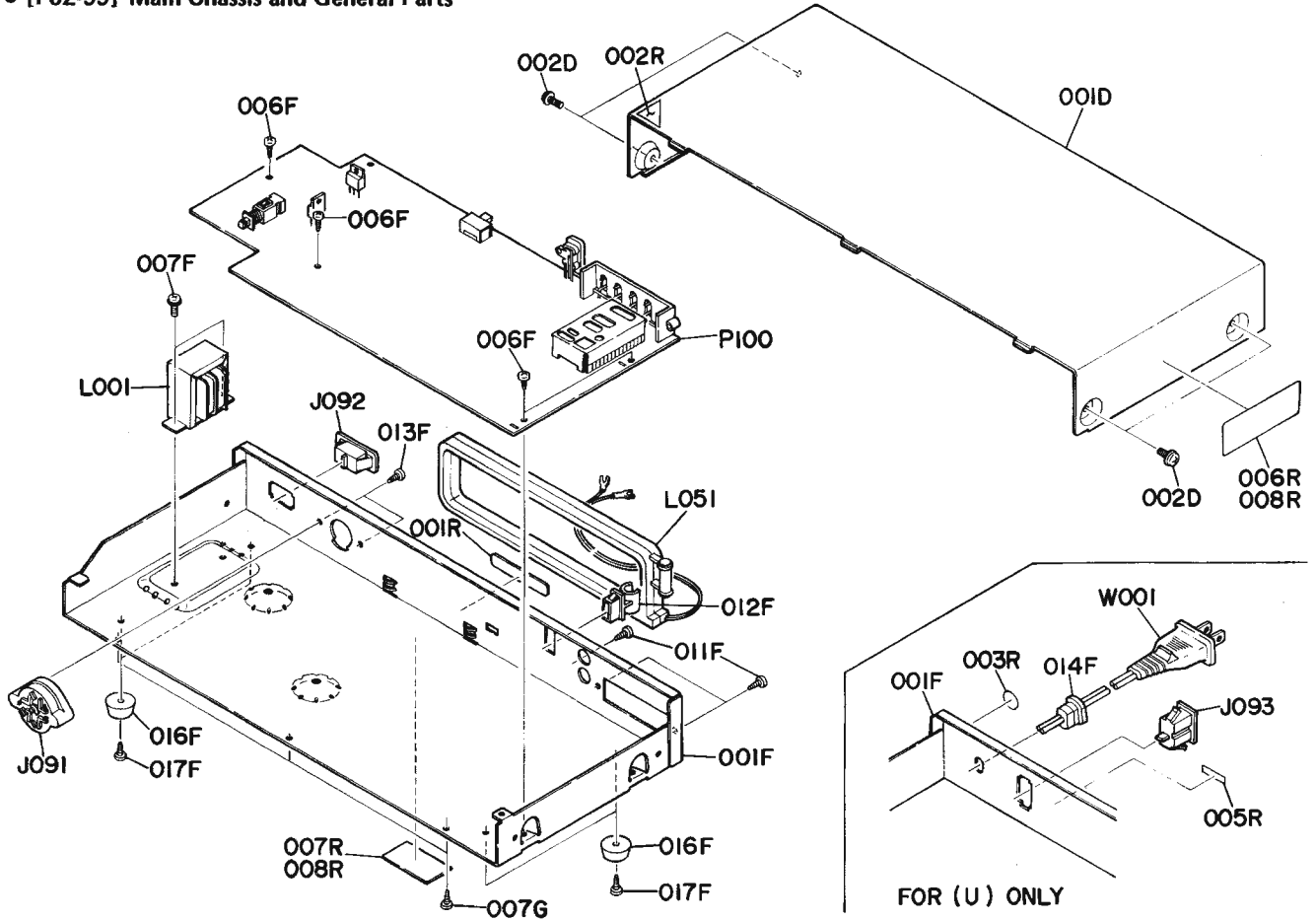
● [P01-99] Front Panel/Chassis and Packing Materials



REF. DESIG.	Q'TY			PART NO.	DESCRIPTION
	U	N	A		
A	1	1	1	448H248400	Front Panel Assembly [ST440]
A1		1		449H248400	Front Panel Assembly [ST440L]
001B	1	1	1	448H248010	Front Panel [ST440]
001B		1		449H248010	Front Panel [ST440L]
002B	1	1	1	448H063020	Escutcheon
003B	1	1	1	448H158010	Window
008B	2	2	2	158T355010	Lens, Band Select [ST440]
008B		3		158T355010	Lens, Band Select [ST440L]
006B	1	1	1	158T270010	Button, Power Standby
007B	2	2	2	448H270010	Button, Band Select [ST440]
007B		3		448H270010	Button, Band Select [ST440L]
009B	1	1	1	242H270020	Button, Scan/Mode
010B	1	1	1	448H125010	Joint
011B	8	8	8	448H270020	Button, Memo 1 ~ 10
012B	1	1	1	448H270030	Button, Memory
013B	1	1	1	448H127510	Control Board, Tuning UP/Down
021B	1	1	1	51280306B0	B.H. Tapped Screw B3 x 6
001G	1	1	1	448H105010	Chassis, Front
002G	1	1	1	448H118010	Spacer, LED
003G	1	1	1	448H258010	Hook, Disitron
004G	1	1	1	448H056010	Buffer, Disitron
005G	1	1	1	448H303010	Mask, Disitron
006G	2	2	2	51280308B0	B.H. Tapped Screw B3 x 8
007G	2	2	2	51280308B0	B.H. Tapped Screw B3 x 8

REF. DESIG.	Q'TY			PART NO.	DESCRIPTION
	U	N	A		
001S	1			448H801020	Packing Case [ST440]
001S		1	1	448H801010	Packing Case [ST440]
001S		1		449H801010	Packing Case [ST440L]
002S	1	1	1	417H809010	Cushion, R
003S	1	1	1	417H809020	Cushion, L
004S	1	1	1	9090808030	Polyethylene Sheet
005S	2			9526019010	Serial No. Card [ST440]
005S		4		9526019060	Serial No. Card
005S		4		9526019030	Serial No. Card [ST440]
006S	1			2918107390	Sheet, AC Cord
001T		1	1	448H851310	User Manual
002T		1	1	448H851320	User Manual, Spec.
003T		1		448H856010	Circuit Diagram [ST440]
003T		1		449H856010	Circuit Diagram [ST440L]
004T		1		9631000090	Warranty Card [ST440]
005T	1			448H851210	User Manual [ST440]
006T	1			448H851220	User Manual, Spec. [ST440]
007T	1			103H854010	Warranty Card [ST440]
008T	1			2225813010	Envelope [ST440]
009T	1			9650000050	S. Station Card [ST440]
010T	1			101K854210	Warranty [ST440]
001V	1	1	1	ZA02000070	EXT. Antenna
002V	1	1	1	ZD01000170	Connective Cord
▲ W001		1		ZC01805010	A.C. Power Cord
▲ W001		1		ZC01604010	A.C. Power Cord [ST440]

• [P02-99] Main Chassis and General Parts



REF. DESIG.	Q'TY			PART NO.	DESCRIPTION
	U	N	A		
001D	1	1	1	417H257110	Lid, Top Cover
002D	4	4	4	51280408U0	B.H. Tapped Screw B4 x 8
001F	1			448H105020	Chassis, Main [ST440]
001F	1	1		448H105030	Chassis, Main [ST440]
001F	1			449H105010	Chassis, Main [ST440L]
006F	4	4	4	51280308B0	B.H. Tapped Screw B3 x 8
007F	2	2	2	51260308B0	B.T. Screw B3 x 8
011F	3	3	3	51280308B0	B.H. Tapped Screw B3 x 8
012F	1	1	1	417H271020	Holder, Loop Antenna
013F	2	2		51280308B0	B.H. Tapped Screw B3 x 8 [ST440]
014F	1			1455259030	Bushing, AC Cord [ST440]
016F	4	4	4	415H057010	Leg
017F	4	4	4	51280406B0	B.H. Tapped Screw B4 x 6
007G	3	3	3	51280308B0	B.H. Tapped Screw B3 x 8

REF. DESIG.	Q'TY			PART NO.	DESCRIPTION
	U	N	A		
001R	1			2112265010	Indicator, Serial No. [ST440]
001R		1	1	2112265110	Indicator, Serial No.
002R	1			105H861010	Label, 2 Year
003R	1			9511101070	Label, UL [ST440]
005R	1			2457861040	Label, CSA [ST440]
006R	1	1		2911861020	Label
007R	1	1		2911861110	Label
008R	2			117H861010	Label [ST440]
△ J091		1	1	BY05060060	Voltage Selector [ST440]
△ J092		1	1	YP04000580	Plug, AC Inlet
△ J093	1			YJ04000910	Jack, AC Outlet [ST440]
△ L001	1			TS14138010	Power Transformer [ST440]
△ L001	1	1		TS14138020	Power Transformer [ST440]
△ L001	1			TS14138030	Power Transformer [ST440L]
L051	1	1	1	LA00035010	Coil, Loop Antenna
△ W001	1			YC01900070	A.C. Power Cord [ST440]

11. ELECTRICAL PARTS LIST

REF. DESIG.	Q'TY			PART NO.	DESCRIPTION
	U	N	A		
P100	1	1	1	YK448H1510	P100-TUNER CIRCUIT BOARD
	1			ZZ448H1510	P.W. Board, Tuner
		1	1	ZZ448H8510	P.W. Board Assembly [ST440]
		1		ZZ449H8510	P.W. Board Assembly [ST440L]
P100-CAPACITORS					
CA01	1	1	1	CT12000090	Trimming 16pF [ST440]
CA01		1		CT21400010	Trimming 14pF [ST440L]
CA02	1			DD15180370	Ceramic 18pF $\pm 5\%$ [ST440L]
CA03	1			DF15151550	Film 150pF $\pm 5\%$ [ST440L]
CA04	1			DD15560370	Ceramic 56pF $\pm 5\%$ [ST440L]
CA05	1	1	1	DF15471550	Film 470pF $\pm 5\%$
CA06	1	1	1	DD15180370	Ceramic 18pF $\pm 5\%$
CA07	1	1	1	DK18103310	Ceramic 0.01 μ F
CA08	1	1	1	DK18103310	Ceramic 0.01 μ F
CA09	1	1	1	DD10030370	Ceramic 3pF ± 0.25 pF
CA10	1	1	1	DK18103310	Ceramic 0.01 μ F
CA11	1	1	1	DK18102300	Ceramic 1000pF
CA12	1	1	1	DK18403320	Ceramic 0.04 μ F
CA13	1	1	1	DK18103310	Ceramic 0.01 μ F
CA14	1	1	1	DK18103310	Ceramic 0.01 μ F
CA15	1	1	1	DK18403320	Ceramic 0.04 μ F
CA16	1	1	1	EA10701630	Elect 100 μ F 16V
CA17	1	1	1	DK18103310	Ceramic 0.01 μ F
CA18	1	1	1	DK18103310	Ceramic 0.01 μ F
CA19	1	1	1	DD15560370	Ceramic 56pF $\pm 5\%$
CA20	1	1	1	DK18102300	Ceramic 1000pF
CA21	1	1	1	DK18403320	Ceramic 0.04 μ F
CA22	1	1	1	EA47405030	Elect 0.47 μ F 50V
CA23	1	1	1	DK18403320	Ceramic 0.04 μ F
CA24	1	1	1	DK18403320	Ceramic 0.04 μ F
CA25	1	1	1	EA10602530	Elect 10 μ F 25V
CA26	1	1	1	EA47405030	Elect 0.47 μ F 50V
CA27	1	1	1	DF15103310	Film 0.01 μ F $\pm 5\%$
CA28	1	1	1	DF15223310	Film 0.022 μ F $\pm 5\%$
CA29	1			DF15222310	Film 2200pF $\pm 5\%$ [ST440]
CA29		1	1	DF15152310	Film 1500pF $\pm 5\%$
CA30	1	1	1	DD15221370	Ceramic 220pF $\pm 5\%$
CA31	1	1	1	DK18103310	Ceramic 0.01 μ F
CA32	1	1	1	DK18103310	Ceramic 0.01 μ F
CA33	1	1	1	DK18103310	Ceramic 0.01 μ F
CA34	1			EA47405030	Elect 0.47 μ F 50V[ST440L]
CA35	1			EA47405030	Elect 0.47 μ F 50V[ST440L]
CA36	1	1	1	DK18403320	Ceramic 0.04 μ F
C101	1	1	1	DK18403320	Ceramic 0.04 μ F
C201	1	1	1	DK18103310	Ceramic 0.01 μ F
C202	1	1	1	DK18103310	Ceramic 0.01 μ F
C203	1	1	1	DK18103310	Ceramic 0.01 μ F
C205	1	1	1	DK18403320	Ceramic 0.04 μ F
C206	1	1	1	DK18403320	Ceramic 0.04 μ F
C207	1	1	1	EA10505030	Elect 1 μ F 50V
C208	1	1	1	DD15221370	Ceramic 220pF $\pm 5\%$
C209	1	1	1	DK18403320	Ceramic 0.04 μ F
C210	1	1	1	EA10602530	Elect 10 μ F 25V
C211	1	1	1	EA10602530	Elect 10 μ F 25V

REF. DESIG.	Q'TY			PART NO.	DESCRIPTION
	U	N	A		
C212	1	1	1	EA10602530	Elect 10 μ F 25V
C213	1	1	1	DK18403320	Ceramic 0.04 μ F
C214	1	1	1	DK18403320	Ceramic 0.04 μ F
C215	1	1	1	DK18403320	Ceramic 0.04 μ F
C216	1	1	1	DK18403320	Ceramic 0.04 μ F
C217	1	1	1	DK18403320	Ceramic 0.04 μ F
C218	1	1	1	EA10602530	Elect 10 μ F 25V
C219	1	1	1	EA22505030	Elect 2.2 μ F 50V
C220	1	1	1	EA10505030	Elect 1 μ F 50V
C301	1	1	1	EA10602530	Elect 10 μ F 25V
C302	1	1	1	DF15473310	Film 0.047 μ F $\pm 5\%$
C303	1	1	1	DF15471550	Film 470pF $\pm 5\%$
C304	1	1	1	EA33505030	Elect 3.3 μ F 50V
C305	1	1	1	EA10505030	Elect 1 μ F 50V
C306	1	1	1	EA47405030	Elect 0.47 μ F 50V
C307	1	1	1	EA10701630	Elect 100 μ F 16V
C309	1	1	1	EA10602530	Elect 10 μ F 25V
C310	1	1	1	EA10602530	Elect 10 μ F 25V
C311	1	1	1	DD15181370	Ceramic 180pF $\pm 5\%$
C312	1	1	1	DD15181370	Ceramic 180pF $\pm 5\%$
C313	1	1	1	EA22505030	Elect 2.2 μ F 50V
C314	1	1	1	EA22505030	Elect 2.2 μ F 50V
C315	1			DF15223310	Film 0.022 μ F $\pm 5\%$ [ST440]
C315		1	1	DF15153310	Film 0.015 μ F $\pm 5\%$
C316	1			DF15223310	Film 0.022 μ F $\pm 5\%$ [ST440]
C316		1	1	DF15153310	Film 0.015 μ F $\pm 5\%$
C317		1	1	DF15822310	Film 8200pF $\pm 5\%$ [ST440]
C318		1	1	DF15822310	Film 8200pF $\pm 5\%$ [ST440]
C319	1	1	1	EA33601630	Elect 33 μ F 16V
C320	1	1	1	EA22505030	Elect 2.2 μ F 50V
C501	1	1	1	DD15470300	Ceramic 47pF $\pm 5\%$
C502	1	1	1	DD15470300	Ceramic 47pF $\pm 5\%$
C503	1	1	1	EA22505030	Elect 2.2 μ F 50V
C504	1	1	1	EA22505030	Elect 2.2 μ F 50V
C505	1	1	1	EA22801630	Elect 2200 μ F 16V
C506	1	1	1	DK18103310	Ceramic 0.01 μ F
C507	1	1	1	EA22701030	Elect 220 μ F 10V
C508	1	1	1	DK18222300	Ceramic 2200pF
C509	1	1	1	DK18103310	Ceramic 0.01 μ F
C510	1	1	1	DF15683310	Film 0.068 μ F $\pm 5\%$
C511	1	1	1	EA22505030	Elect 2.2 μ F 50V
C512	1	1	1	DK18103310	Ceramic 0.01 μ F
C513	1	1	1	EA33601630	Elect 33 μ F 16V
C514	1	1	1	DK18103310	Ceramic 0.01 μ F
C515	1	1	1	DD15180370	Ceramic 18pF $\pm 5\%$
C801	1	1	1	EA10803530	Elect 1000 μ F 35V
C803	1	1	1	EA10602530	Elect 10 μ F 25V
C805	1	1	1	EA22701030	Elect 220 μ F 10V
C806	1	1	1	EA10705030	Elect 100 μ F 50V
C807	1	1	1	EA10603530	Elect 10 μ F 35V
C812	1	1	1	DK18103310	Ceramic 0.01 μ F
P100-RESISTORS					
(All Resistors are $\pm 5\%$ and $\frac{1}{4}W$)					
RA01	1	1	1	GD05104140	100K Ω
RA02	1	1	1	GD05104140	100K Ω
RA03	1	1	1	GD05105140	1M Ω
RA04	1	1	1	GD05102140	1K Ω
RA05	1	1	1	GD05221140	220 Ω
RA06	1	1	1	GD05682140	6.8K Ω

REF. DESIG.	Q'TY			PART NO.	DESCRIPTION
	U	N	A		
RA07	1	1	1	GD05152140	1.5K Ω
RA08	1	1	1	GD05332140	3.3K Ω
RA09	1	1	1	GD05101140	100 Ω
RA10	1	1	1	GD05471140	470 Ω
RA11	1	1	1	GD05101140	100 Ω
RA12	1	1	1	GD05101140	100 Ω
RA13	1	1	1	GD05153140	15K Ω
RA14	1	1	1	RA02230600	22K Ω , Trimming
RA15	1	1	1	GD05103140	10K Ω
RA16	1	1	1	GD05103140	10K Ω
RA17	1	1	1	GD05223140	22K Ω
RA18	1	1	1	GD05102140	1K Ω
RA19	1	1	1	GD05333140	33K Ω
RA20	1	1	1	GD05683140	68K Ω
RA21	1	1	1	GD05103140	10K Ω
RA22	1	1	1	GD05683140	68K Ω
RA23	1	1	1	GD05473140	47K Ω
RA24	1	1	1	GD05102140	1K Ω
RA25	1	1	1	GD05683140	68K Ω
RA26	1	1	1	GD05103140	10K Ω
RA27	1	1	1	GD05102140	1K Ω
RA28	1	1	1	GD05272140	2.7K Ω
RA30	1	1	1	GD05103140	10K Ω
RA31	1	1	1	GD05103140	10K Ω [ST440L]
RA32	1	1	1	GD05103140	10K Ω [ST440L]
RA33	1	1	1	GD05103140	10K Ω [ST440L]
RA34	1	1	1	GD05103140	10K Ω [ST440L]
RA35	1	1	1	GD05103140	10K Ω [ST440L]
RA36	1	1	1	GD05103140	10K Ω [ST440L]
RA37	1	1	1	GD05104140	100K Ω [ST440L]
RA38	1	1	1	GD05104140	100K Ω [ST440L]
R201	1	1	1	GD05101140	100 Ω
R202	1	1	1	GD05181140	180 Ω
R203	1	1	1	GD05331140	330 Ω
R204	1	1	1	GD05272140	2.7K Ω
R205	1	1	1	GD05153140	15K Ω
R206	1	1	1	GD05681140	680 Ω
R207	1	1	1	GD05331140	330 Ω
R208	1	1	1	GD05331140	330 Ω
R209	1	1	1	GD05103140	10K Ω
R210	1	1	1	GD05104140	100K Ω
R211	1	1	1	GD05101140	100 Ω
R212	1	1	1	GD05222140	2.2K Ω
R213	1	1	1	GD05102140	1K Ω
R214	1	1	1	GD05183140	18K Ω
R215	1	1	1	GD05223140	22K Ω
R216	1	1	1	RA04730600	47K Ω , Trimming
R217	1	1	1	GD05104140	100K Ω
R218	1	1	1	GD05104140	100K Ω
R219	1	1	1	GD05103140	10K Ω
R220	1	1	1	GD05222140	2.2K Ω
R221	1	1	1	GD05683140	68K Ω
R222	1	1	1	GD05473140	47K Ω
R223	1	1	1	GD05472140	4.7K Ω
R224	1	1	1	GD05473140	47K Ω
R225	1	1	1	GD05102140	1K Ω
R226	1	1	1	GD05103140	10K Ω

REF. DESIG.	Q'TY			PART NO.	DESCRIPTION
	U	N	A		
R301	1	1	1	GD05473140	47K Ω
R302	1	1	1	GD05473140	47K Ω
R303	1	1	1	RA04720600	4.7K Ω , Trimming
R304	1	1	1	GD05153140	15K Ω
R305	1	1	1	GD05102140	1K Ω
R306	1	1	1	GD05181140	180 Ω
R307	1	1	1	GD05223140	22K Ω
R308	1	1	1	GD05223140	22K Ω
R309	1	1	1	GD05153140	15K Ω
R310	1	1	1	GD05153140	15K Ω
R311	1	1	1	GD05473140	47K Ω
R312	1	1	1	GD05473140	47K Ω
R313	1	1	1	GD05332140	3.3K Ω
R314	1	1	1	GD05332140	3.3K Ω
R315	1	1	1	GD05473140	47K Ω
R316	1	1	1	GD05473140	47K Ω
R317	1	1	1	RA02240600	220K Ω , Trimming
R318	1	1	1	GD05102140	1K Ω
R319	1	1	1	GD05473140	47K Ω
R320	1	1	1	GD05103140	10K Ω
R321	1	1	1	GD05154140	150K Ω
R322	1	1	1	GD05472140	4.7K Ω
R501	1	1	1	GD05333140	33K Ω
R502	1	1	1	GD05333140	33K Ω
R503	1	1	1	GD05470140	47 Ω
R504	1	1	1	GD05470140	47 Ω
R505	1	1	1	GD05103140	10K Ω
R506	1	1	1	GD05473140	47K Ω
R507	1	1	1	GD05103140	10K Ω
R508	1	1	1	GD05102140	1K Ω
R509	1	1	1	GD05102140	1K Ω
R510	1	1	1	GD05102140	1K Ω
R511	1	1	1	GD05103140	10K Ω
R512	1	1	1	GD05473140	47K Ω
R513	1	1	1	GD05103140	10K Ω
R514	1	1	1	GD05103140	10K Ω [ST440]
R515	1	1	1	GD05154140	150K Ω
R516	1	1	1	GD05103140	10K Ω
R517	1	1	1	GD05103140	10K Ω
R518	1	1	1	GD05103140	10K Ω
R519	1	1	1	GD05473140	47K Ω
R520	1	1	1	GD05473140	47K Ω
Δ R802	1	1	1	GA05681020	680 Ω 2W
Δ R803	1	1	1	NH05220140	22 Ω
R804	1	1	1	GD05102140	1K Ω
R805	1	1	1	GA05271020	270 Ω 2W
R806	1	1	1	GD05103140	10K Ω
Δ R807	1	1	1	GG05391120	390 Ω 1/2W
R808	1	1	1	GD05681140	680 Ω
R809	1	1	1	GD05332140	3.3K Ω
R810	1	1	1	GD05394140	390K Ω
R811	1	1	1	RC10225920	2.2M Ω \pm 10% 1/2W

REF. DESIG.	Q'TY			PART NO.	DESCRIPTION
	U	N	A		
P100-SEMICONDUCTORS					
DA01	1	1	1	HD40003420	Varicap KV1236Z
DA03	1	1	1	HD20001000	Diode 1S1555
DA04	1	1	1	HD20001000	Diode 1S1555
DA05	1	1	1	HD20022030	Diode DSF10C [ST440L]
DA06	1	1	1	HD20022030	Diode DSF10C [ST440L]
D202	1	1	1	HD20001000	Diode 1S1555
D501	1	1	1	HD20001000	Diode 1S1555
D502	1	1	1	HD20001000	Diode 1S1555
D503	1	1	1	HD20001000	Diode 1S1555
D504	1	1	1	HD20001000	Diode 1S1555
△D801	1	1	1	HD20022030	Diode DSF10C
△D802	1	1	1	HD20022030	Diode DSF10C
△D803	1	1	1	HD20022030	Diode DSF10C
△D804	1	1	1	HD20022030	Diode DSF10C
D806	1	1	1	HD20001000	Diode 1S1555
D807	1	1	1	HD20001000	Diode 1S1555
D808	1	1	1	HD30015020	Zener MA1240
D809	1	1	1	HD30005020	Zener MA1056
QA01	1	1	1	HC10058030	IC LA1245
QA02	1	1	1	HF200551D0	F.E.T. 2SK55D
QA03	1	1	1	HT327852D0	Transistor 2SC2785(EF,FF)
QA04	1	1	1	HT327852D0	Transistor 2SC2785(EF,FF)
QA05	1	1	1	HT327852D0	Transistor 2SC2785(EF,FF)
QA06	1	1	1	HT327852D0	Transistor 2SC2785(EF,FF) [ST440L]
QA07	1	1	1	HT327852D0	Transistor 2SC2785(EF,FF) [ST440L]
QA08	1	1	1	HT409852B0	Transistor 2SD985(L, K) [ST440L]
QA09	1	1	1	HT409852B0	Transistor 2SD985(L, K) [ST440L]
Q201	1	1	1	HC10028030	IC LA1231N
Q202	1	1	1	HT327852D0	Transistor 2SC2785(EF,FF)
Q203	1	1	1	HT327852D0	Transistor 2SC2785(EF,FF)
Q301	1	1	1	HC10046020	IC AN7470
Q302	1	1	1	HT111752D0	Transistor 2SA1175(EF, EE)
Q303	1	1	1	HT327852D0	Transistor 2SC2785(EF, EE)
Q304	1	1	1	HT327852D0	Transistor 2SC2785(EF, EE)
Q305	1	1	1	HT327852D0	Transistor 2SC2785(EF, EE)
Q306	1	1	1	HT327852D0	Transistor 2SC2785(EF, EE)
Q501	1	1	1	HC10096050	IC TC9157P
Q502	1	1	1	HC10072050	IC TD6104P
Q503	1	1	1	HT327852D0	Transistor 2SC2785(EF,FF)
Q504	1	1	1	HT111752D0	Transistor 2SA1175(EF,FF)
Q505	1	1	1	HT111752D0	Transistor 2SA1175(EF,FF)
Q506	1	1	1	HF200300B0	F.E.T. 2SK30A
Q507	1	1	1	HT327852D0	Transistor 2SC2785(EF,FF)
Q508	1	1	1	HT327852D0	Transistor 2SC2785(EF,FF)
Q509	1	1	1	HT327852D0	Transistor 2SC2785(EF,FF)
Q510	1	1	1	HT327852D0	Transistor 2SC2785(EF,FF)
Q801	1	1	1	HC10077030	IC L78M15
Q803	1	1	1	HT403131D0	Transistor 2SD313(D)
Q805	1	1	1	HT327852D0	Transistor 2SC2785(EF,FF)

REF. DESIG.	Q'TY			PART NO.	DESCRIPTION
	U	N	A		
P100-MISCELLANEOUS					
A101	1	1	1	AV01202130	V.H.F. Tuner, FE306-A14
FA01	1	1	1	FF10045320	Ceramic Filter, SFZ450F3L
FA02	1	1	1	FF10045320	Ceramic Filter, SFZ450F3L
F201	1	1	1	FF11070620	Ceramic Filter, SFE10.7MS3-A
F202	1	1	1	FF11070610	Ceramic Filter, SFE10.7MS8-A [ST440]
F202	1	1	1	FF11070620	Ceramic Filter, SFE10.7MS3-A
J101	1	1	1	YT01040290	Terminal, Ant; 4P [ST440]
J101	1	1	1	YT01050040	Terminal, Ant; 5P
J102	1	1	1	YT02020280	Terminal, Output; 2P
LA01	1	1	1	LO10013170	OSC Coil, AM
LA02	1	1	1	LO10013180	OSC Coil, LW [ST440L]
LA03	1	1	1	LA10295070	Ant. Coil, AM
LA04	1	1	1	LA10295080	Ant. Coil, LW
LA05	1	1	1	LI10013210	I.F.T. Coil, AM
L201	1	1	1	LI20029040	I.F.T. Coil, FM Det.
L202	1	1	1	LS10295030	M.P.X. Coil
SA01	1	1	1	SZ04240010	Solenoid Switch, MW/LW [ST440L]
S101	1	1	1	SS02020730	Slide Switch, Scan/Step [ST440]
S102	1	1	1	SP02010630	Push Switch, Scan/mode
W101	1	1	1	YU05160260	Jumper Lead, 5P
W102	1	1	1	YU05120260	Jumper Lead, 5P
W103	1	1	1	YU08120260	Jumper Lead, 8P
W104	1	1	1	YU03120260	Jumper Lead, 3P
W105	1	1	1	YU05160260	Jumper Lead, 5P
W106	1	1	1	YU08140260	Jumper Lead, 8P
X501	1	1	1	XB115001 L2	Crystal, 7.2MHz
PS00-PRESET KEY SWITCH CIRCUIT BOARD					
PS00	1	1	1	YK448H1520	P.W. Board, Preset Key Switch
	1	1	1	ZZ448H1520	P.W. Board Assembly [ST440]
	1	1	1	ZZ449H8520	P.W. Board Assembly [ST440L]
PS00-CAPACITOR					
CS01	1	1	1	DF15102310	Film 1800pF ±5%
PS00-RESISTORS (All Resistors are ±5% and ¼W)					
RS01	1	1	1	GD05394140	390KΩ
RS02	1	1	1	GD05473140	47KΩ
RS03	1	1	1	GD05471140	470Ω
RS04	1	1	1	GD05472140	4.7KΩ
RS05	1	1	1	GD05272140	2.7KΩ
RS08	1	1	1	GD05103140	10KΩ
RS09	1	1	1	GD05103140	10KΩ
RS10	1	1	1	GD05103140	10KΩ [ST440L]
RS11	1	1	1	GD05331140	330Ω
RS12	1	1	1	GD05331140	330Ω
RS13	1	1	1	GD05104140	100KΩ
GS01	1	1	1	BW05104020	100KΩ x 12 1/8W, Compo.

REF. DESIG.	Q'TY			PART NO.	DESCRIPTION
	U	N	A		
PS00-SEMICONDUCTORS					
DS01	1			HD20001000	Diode 1S1555 [ST440L]
DS02	1			HD20001000	Diode 1S1555 [ST440L]
DS03	1	1	1	HI10037320	L.E.D. LT9200N
DS04	1	1	1	HI10059020	L.E.D. LN342GP-(LS)
DS05	1	1	1	HI10059020	L.E.D. LN342GP-(LS)
DS06	1	1	1	HI10059020	L.E.D. LN342GP-(LS)
QS01	1	1	1	HC10108050	IC TC9158P
QS02	1	1	1	HC10062020	IC AN6876
QS03	1	1	1	HI111752D0	Transistor 2SA1175(EF,FF)
QS04	1	1	1	HT327852D0	Transistor 2SC2785(EF,FF)
QS05	1	1	1	HT327852D0	Transistor 2SC2785(EF,FF)
QS06	1	1	1	HT327852D0	Transistor 2SC2785(EF,FF) [ST440L]
SS01	1	1	1	SP01010570	Push Switch, 1
SS02	1	1	1	SP01010570	Push Switch, 2
SS03	1	1	1	SP01010570	Push Switch, 3
SS04	1	1	1	SP01010570	Push Switch, 4
SS05	1	1	1	SP01010570	Push Switch, 5
SS06	1	1	1	SP01010570	Push Switch, 6
SS07	1	1	1	SP01010570	Push Switch, 7
SS08	1	1	1	SP01010570	Push Switch, 8
SS09	1	1	1	SP01010570	Push Switch, Memory
SS10	1	1	1	SP01010570	Push Switch, Down
SS11	1	1	1	SP01010570	Push Switch, UP
SS12	1	1	1	SP01010570	Push Switch, FM
SS13	1	1	1	SP01010570	Push Switch, AM [ST440]
SS13	1	1	1	SP01010570	Push Switch, MW [ST440L]
SS14	1	1	1	SP01010570	Push Switch, LW [ST440L]
VS01	1	1	1	HQ30703060	Display Unit [ST440]
VS01	1	1	1	HQ30704060	Display Unit [ST440L]
VS02	1	1	1	IN10080620	Lamp, FM Band
VS03	1	1	1	IN10080620	Lamp, AM Band [ST440]
VS03	1	1	1	IN10080620	Lamp, MW Band [ST440L]
VS04	1	1	1	IN10080620	Lamp, LW Band [ST440L]

REF. DESIG.	Q'TY			PART NO.	DESCRIPTION
	U	N	A		
PU00-POWER SWITCH CIRCUIT BOARD					
PU00	1	1	1	YK448H1550	P.W. Board, Power Switch
	1	1	1	ZZ448H1550	P.W. Board Assembly
△SU01	1	1	1	PS02011000	Push Switch, Power

(W01-99)	Assembly and Wiring
(T01-99)	Adjustment
(X01-00)	Correction

NOTE ON SAFETY :

Symbol △ Fire or electrical shock hazard. Only original parts should be used to replace any part marked with symbol △. Any other component substitution (other than original type), may increase risk of fire or electrical shock hazard.

12. TECHNICAL SPECIFICATIONS

FM TUNER SECTION

Frequency Range	87.5 ~108 MHz
Usable Sensitivity	
Mono (S/N 26 dB, 75 ohms)	0.7 μ V
Stereo (S/N 46 dB, 75 ohms)	25 μ V
Alternate Channel Selectivity 98 MHz	65 dB
Image Response Rejection	50 dB
IF Rejection	75 dB
Spurious Response Rejection	75 dB
AM Suppression	55 dB
Signal-to-Noise Ratio	
Unweighted	
Mono	73 dB
Stereo	63 dB
Weighted	
Mono	76 dB
Stereo	68 dB
Pilot Signal & Subcarrier Rejection	
19 kHz	35 dB
38 kHz	45 dB
Total Harmonic Distortion	
Mono	0.1%
Stereo	0.2%
Frequency Response	
30 Hz ~15 kHz	+0.5 dB, -1.5 dB
Separation	
Stereo	45 dB
Channel Balance	0.2 dB

MW TUNER SECTION

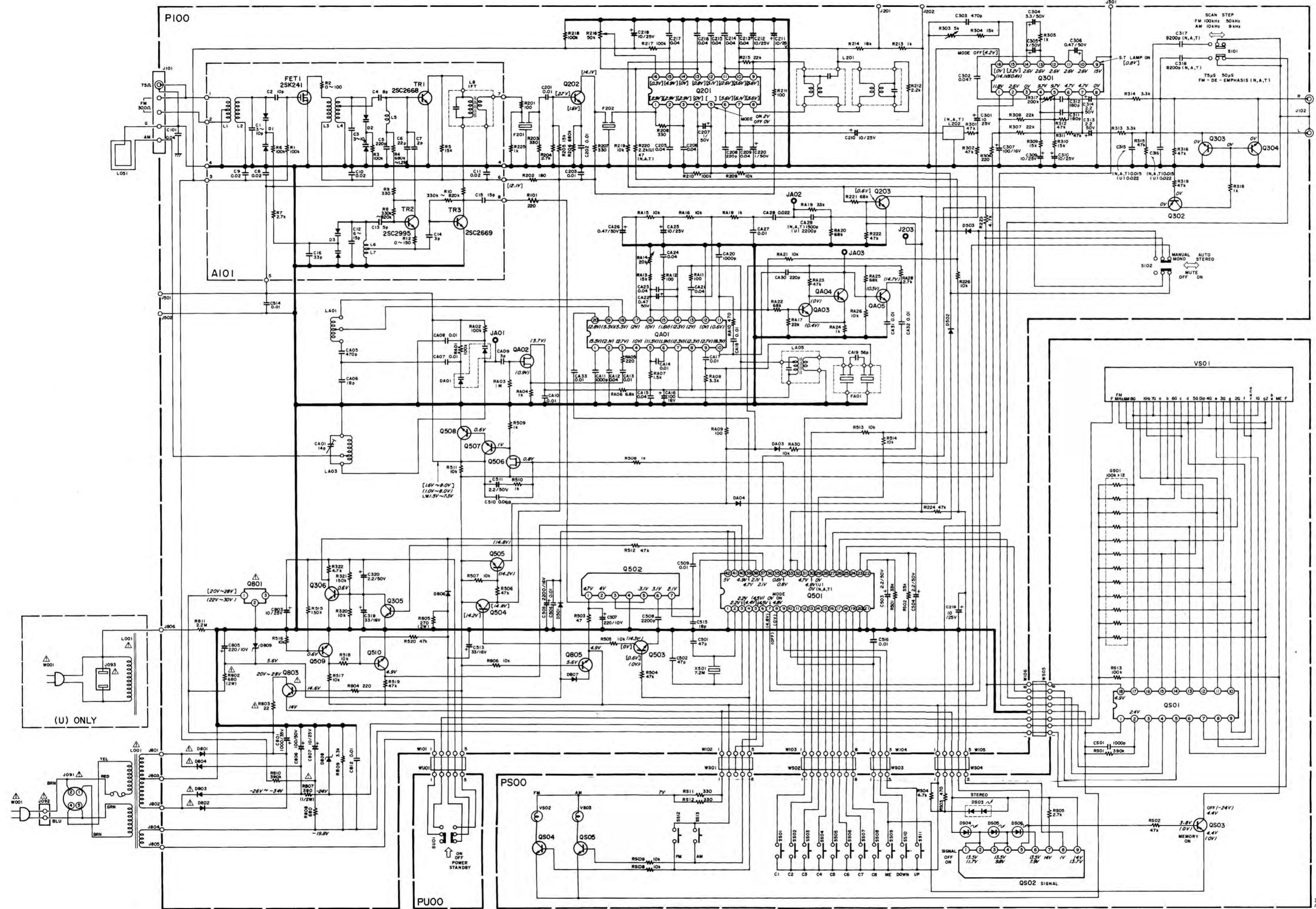
Frequency Range	531 ~1602 kHz
Usable Sensitivity 20 dB S/N 30% Mod., 999 kHz	400 μ V/m
Selectivity 999 kHz, \pm 9 kHz	30 dB
Image Rejection, 999 kHz	40 dB
IF Rejection, 999 kHz	60 dB
Signal-to-Noise Ratio, 999 kHz	54 dB
Total Harmonic Distortion, 999 kHz	0.3%

LW TUNER SECTION

Frequency Range	153 ~281 kHz
Usable Sensitivity 20 dB S/N 30% Mod., 250 kHz	800 μ V/m
Image Rejection, 250 kHz	50 dB
IF Rejection, 250 kHz	70 dB
Signal-to-Noise Ratio, 250 kHz	50 dB

GENERAL

Power Requirements (ST440)	110-120/220-240V AC, 50/60 Hz
(ST440L)	220-240V AC, 50/60 Hz
Power Consumption	10 W
Dimensions	
Panel Width	416 mm
Panel Height	55 mm
Depth	190 mm
Weight	
Unit Alone	2.1 kg

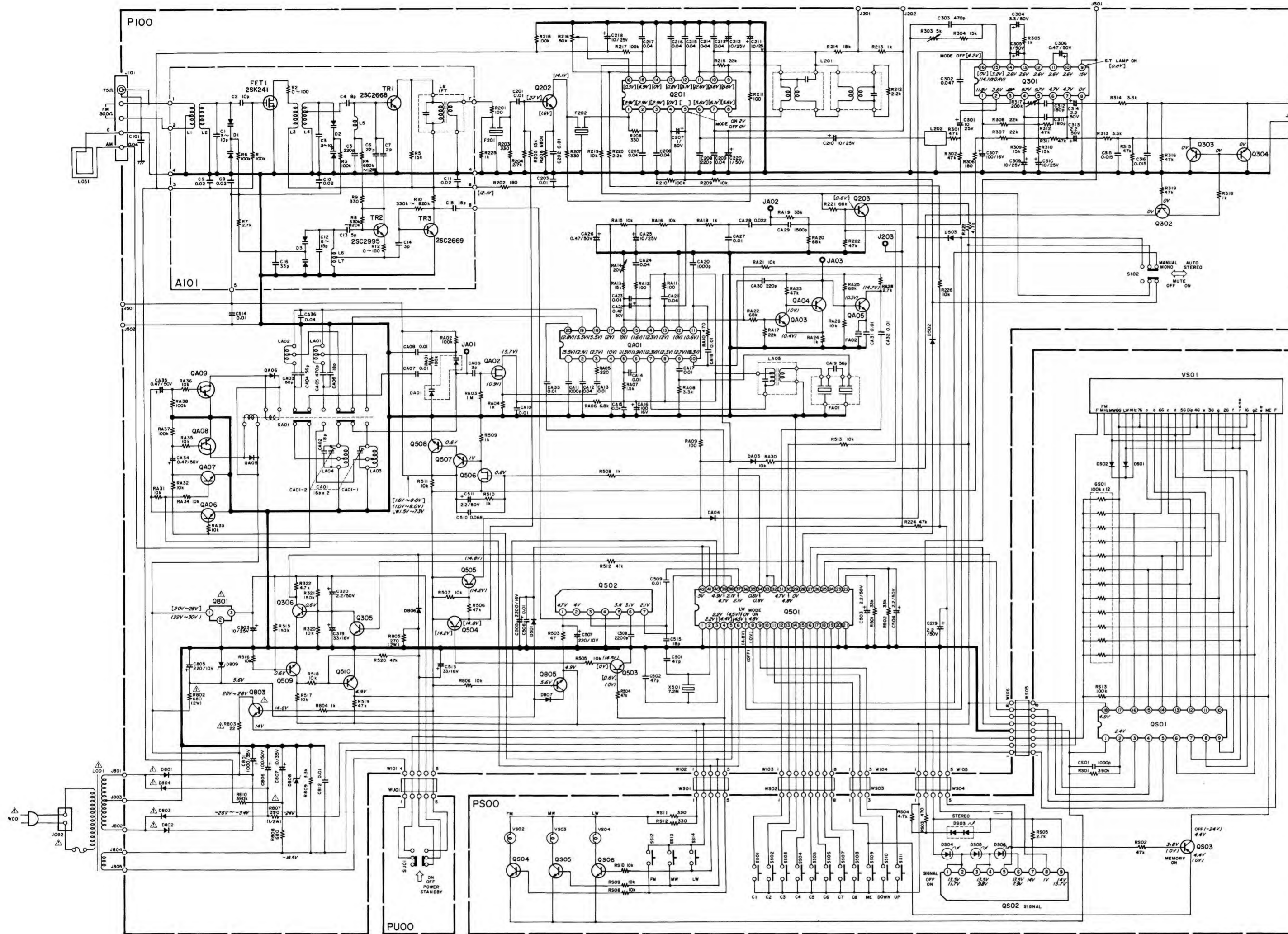


- QA01
HC1005803-0
LA1245
- QA02
HF2005510-0
2SK55D
- QA03,QA04,QA05,QS04
QS05,QS06,Q202
Q203,Q303,Q304
Q305,Q306,Q303,Q510
Q507,Q508,Q505,Q509
HT3278520-0
2SC2785EE,FF
- QA06,QA09
HT409852B-0
2SD980L,K
- Q501
HC1010805-0
TC9158P
- Q502
HC1006202-0
AN6876
- Q503
Q302,Q504,Q505
HT111752D-0
2SA1175EE,FF
- Q201
HC1002803-0
LA1231N
- Q301
HC1004602-0
AN7470
- Q501
HC1009605-0
TC9157P
- Q502
HC1007205-0
TD6104P
- Q506
HF2003008-0
2SK30AY1
- Q801
HC1007703-0
L78M15
- Q803
HT4031310-0
2SD313D
- D202,DA03,DA04
D501,D502,D503
D504,D806,D807
HD2000100-0
1S1555,1S2473,DS448
MA150 ETC.
- DA01
HD4000342-0
KV1236Z
- DB01,DB02
DB03,DB04
HD2002203-0
DSF10C
- DB09
HD3000502-0
MA1056
- Q501
TC9157P
- QA01
LA1245

NOTE ON SAFETY :
 Symbol Δ Fire or electrical shock hazard. Only original parts should be used to replace any part marked with symbol Δ . Any other component substitution (other than original type), may increase risk of fire or electrical shock hazard.

Components and wiring are subject to change for modification without notice.

Model ST440L



- QAO1
HC1005803-0
LA1245
- QAO2
HF200551D-0
25K55D
- QAO3, QAO4, QAO5
QAO6, QAO7, QAO4
Q505, Q506, Q202
Q203, Q303, Q304
Q505, Q306, Q503, Q510
Q507, Q508, Q805, Q509
HT327852D-0
25C2785EE, FF
Q508, Q805, Q509, Q510
- QAO8, QAO9
HT409852B-0
25D985L, K
- QSO1
HC1010805-0
TC9158P
- QSO2
HC1006202-0
AN6876
- QSO3
Q302, Q504, Q505
HT111752D-0
25A1175EE, FF
- Q201
HC1002803-0
LA1231N
- Q301
HC1004602-0
AN7470
- Q501
HC1009605-0
TC9157P
- Q502
HC1007205-0
TD6104P
- Q506
HF200300B-0
25K30AY1
- Q801
HC1007703-0
L78M15
- Q803
HT403131D-0
25D313D
- D202, DA03, DA04
D501, D502, D503
D504, D806, D807
HD200100-0
IS1555, IS2473, DS448
MA150, ETC.
- DA01
HD4000342-0
KV1236Z
- D801, D802
D803, D804
HD2002203-0
DSF10C
- D809
HD3000502-0
MA1056
- TD6104P
Q502
- AN6876
Q502
- TOP VIEW
AN7470
LA1231N
Q501
Q201
- TOP VIEW
TC9158P
Q501
- TOP VIEW
TC9157P
Q501
- TOP VIEW
LA1245
QAO1

NOTE ON SAFETY :
 Symbol Fire or electrical shock hazard. Only original parts should be used to replace any part marked with symbol . Any other component substitution (other than original type), may increase risk of fire or electrical shock hazard.

Components and wiring are subject to change for modification without notice.