

**SERVICE
MANUAL** **ST600**

marantz

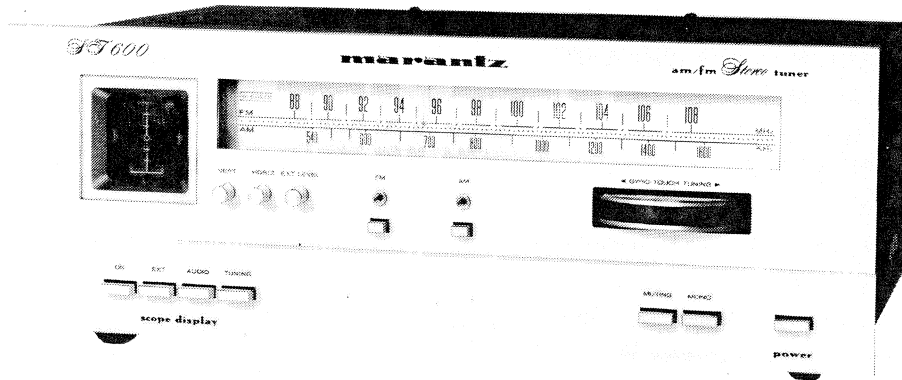
model ST600

Stereophonic Tuner

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MODEL ST600 AM/FM STEREOPHONIC TUNER



INTRODUCTION

This service manual was prepared for use by Authorized Warranty Stations and contains service information for Marantz Model ST600 AM/FM Stereophonic Tuner.

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

The parts list furnishes information by which replacement parts may be ordered from the Marantz Company. A simple description is included for parts which can usually be obtained through local suppliers.

1. P.W. BOARDS

As can be seen from the circuit diagram, the chassis of Model ST600 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 P200
2. Power Supply mounted on P.W. Board P800
3. Dial Lamp mounted on P.W. Board PZ01
4. Function Indicator mounted on P.W. Board PY00
5. Scope Amp mounted on P.W. Board P900
6. Scope Display Switches mounted on P.W. Board PR00
7. Function Switches mounted on P.W. Board PS00
8. Mode Switches mounted on P.W. Board PT00

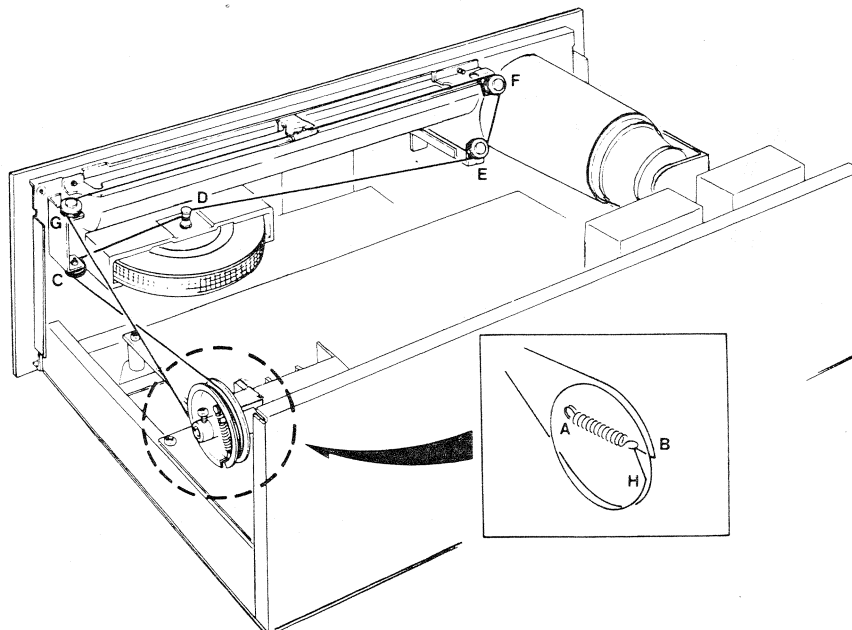


Figure 1. Dial Stringing

2. TEST EQUIPMENT REQUIRED FOR SERVICING

This table lists the test equipment required for servicing the Model ST600 Tuner.

Item	Manufacturer and Model No.	Use
AM Signal Generator		Signal source for AM alignment
Test Loop		Use with AM Signal Generator
FM Signal Generator MPX Signal Generator	Sound Technology Model 1000A	Signal source for FM alignment Stereo separation alignment and trouble shooting
Distortion Analyzer Audio Oscillator AC VTVM	Sound Technology Model 1700A	Distortion measurements Sinewave and squarewave signal source Voltage measurements (AC)
Oscilloscope	Tektronix Model T932 Philips Model 3232	Waveform analysis and trouble shooting
Frequency Counter	Fluke Model 1900A	MPX Oscillator adjustment (VCO)
Circuit Tester		Trouble shooting
DC VTVM	Fluke Model 8000 "Digital" Simpson Model 313, Triplet Model 801	Voltage measurements (DC)
AC Wattmeter	Simpson Model 1379	Monitors primary power to tuner
Line Voltmeter	Simpson Model 1359	Monitors potential of primary power to tuner
Variable Autotransformer	Superior Electronic Co., Powerstat Model 116B-10A	Adjusts level of primary power to tuner

3. SCOPE DISPLAY ADJUSTMENT

1. Set the EXT LEVEL control to its fully counterclockwise position.
2. Depress the SCOPE DISPLAY ON and AUDIO push-switches in.
3. Adjust the HORIZ and VERT controls to center the dot in the small circle in the center of the scope display.
4. Adjust the BRIGHT control (R001) on the rear panel until the brightness becomes dark a little.
5. Adjust the FOCUS control (R002) so that the spot may become smaller and circular.
6. Turn the EXT LEVEL control to its fully clockwise position.
7. Connect a 150 mV, 1 kHz signal to the SCOPE INPUTS R jack and adjust R928 (H. GAIN) until the horizontal deflection is around 3 cm.
8. In turn, connect the same signal to the L jack and similarly, adjust R927 (V. GAIN) until the vertical deflection is around 3 cm.
9. Set the HORIZ and VERT controls to the 12-o'clock position and adjust R925 (H. CENTER) until the spot comes in the horizontal deflection center.
10. Similarly, adjust R926 (V. CENTER) until the spot comes in the vertical deflection center.

3.1 AM Tuning Display Adjustment

1. Depress the SCOPE DISPLAY ON and TUNING push-switches.
2. Depress the AM pushswitch.
3. Adjust R931 until the spot comes in the center below the base line without tuning into a station.

4. AM ALIGNMENT PROCEDURES

4.1 AM IF Alignment

1. Connect a sweep generator to the TC3 and an alignment scope to the R155.
2. Rotate each core of IF transformers L152 and L151 for the maximum height and flat top symmetrical response.

4.2 AM Frequency Range and Tracking Alignment

1. Set AM signal generator to 520 kHz. Turn the tuning capacitor fully closed (place the tuning pointer at the low end) and adjust the oscillator coil L153 for maximum audio output.
2. Set the signal generator to 1630 kHz. Place the tuning pointer in the high frequency end and adjust the oscillator trimmer on the oscillator tuning capacitor for maximum audio output.
3. Repeat steps 1 and 2 until no further adjustment is necessary.
4. Set the generator to 600 kHz, tune the tuner to the same frequency and adjust a slug core of AM ferrite-rod antenna L001 for maximum output.
5. Set the generator to 1400 kHz and tune the tuner to the same frequency and adjust the trimming capacitor on the antenna tuning capacitor for maximum output.
6. Repeat procedures 4 and 5 until no further adjustment is necessary.

NOTE: During tracking alignment reduce the signal generator output as necessary to avoid AGC action.

5. FM ALIGNMENT PROCEDURES

5.1 FM Frequency Range and Tracking Alignment

1. Connect an FM signal generator to the FM antenna terminals and an oscilloscope and an audio distortion analyzer to the OUTPUT jacks on the rear panel.
2. Set the generator to 87.4 MHz and provide about 3 to 5 μ V. Place the tuning pointer at the low frequency end by rotating the tuning knob and adjust the pitch of oscillator coil L105 to obtain maximum audio output.
3. Set the generator to 108.12 MHz and provide about 3 to 5 μ V. Rotate the tuning knob and place the tuning pointer at the high frequency end and adjust the trimming capacitor C121 for maximum output.
4. Repeat steps 2 and 3 until no further adjustment is necessary.
5. Set the generator to 90 MHz and tune the tuner to the same frequency. Decrease signal generator output until the audio output level decreases with the decreasing generator output. Adjust the pitch of antenna coil L101 and RF coil L102 for maximum output.
6. Set the generator to 106 MHz and tune the tuner to the same frequency. Decrease the signal generator output until the audio output level decreases with the decreasing generator output. Adjust the trimming capacitors of antenna and RF tuning circuits for maximum output.
7. Repeat steps 5 and 6 until no further adjustment is necessary.
8. Connect the center tuning meter to the test points J136 and J137. Adjust the L201 so that the tuning meter pointer indicates its center. Depress the SCOPE DISPLAY TUNING pushswitch. Adjust the R227 until the tuning bar is located the center of the oscilloscope. Set the FM signal generator to 60 dB at 98 MHz and tune the tuner to the same frequency in the vertical trace of the oscilloscope. Adjust the L202 for minimum distortion.

5.2 Stereo Separation Alignment

1. Set the FM signal generator to provide 1 μ V at 98 MHz. Tune the tuner to the same frequency so that the tuning bar is located the center of the oscilloscope. Then turn off the modulation of the generator, connect a frequency counter to test point J138 and adjust R304 so that the frequency counter may precisely read 76 kHz.
2. Modulate the generator with stereo composite signal consisting of only L or R channel (of course a pilot signal must be included).
3. Adjust the trimming resistor R336 for maximum and same separation in both channels.

5.3 Muting Threshold Adjustment

1. Set the FM signal generator output to provide 12.5 μ V at 98 MHz and tune tuner to the same frequency. Adjust the trimming resistor R212 for the threshold level of 12.5 μ V. (During this adjustment turn the FM MUTING pushswitch "on").

5.4 Output Level Adjustment

1. Set the FM signal generator to provide a 1000 Hz, 40k DEVIATION 98 MHz mono signal, at 1 μ V output. Precisely tune the tuner to 98 MHz and adjust R216 until the outputs of both channels are 560 mV.

6. VOLTAGE CONVERSION

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. DO NOT DISASSEMBLE THE VOLTAGE SELECTOR ABSOLUTELY.

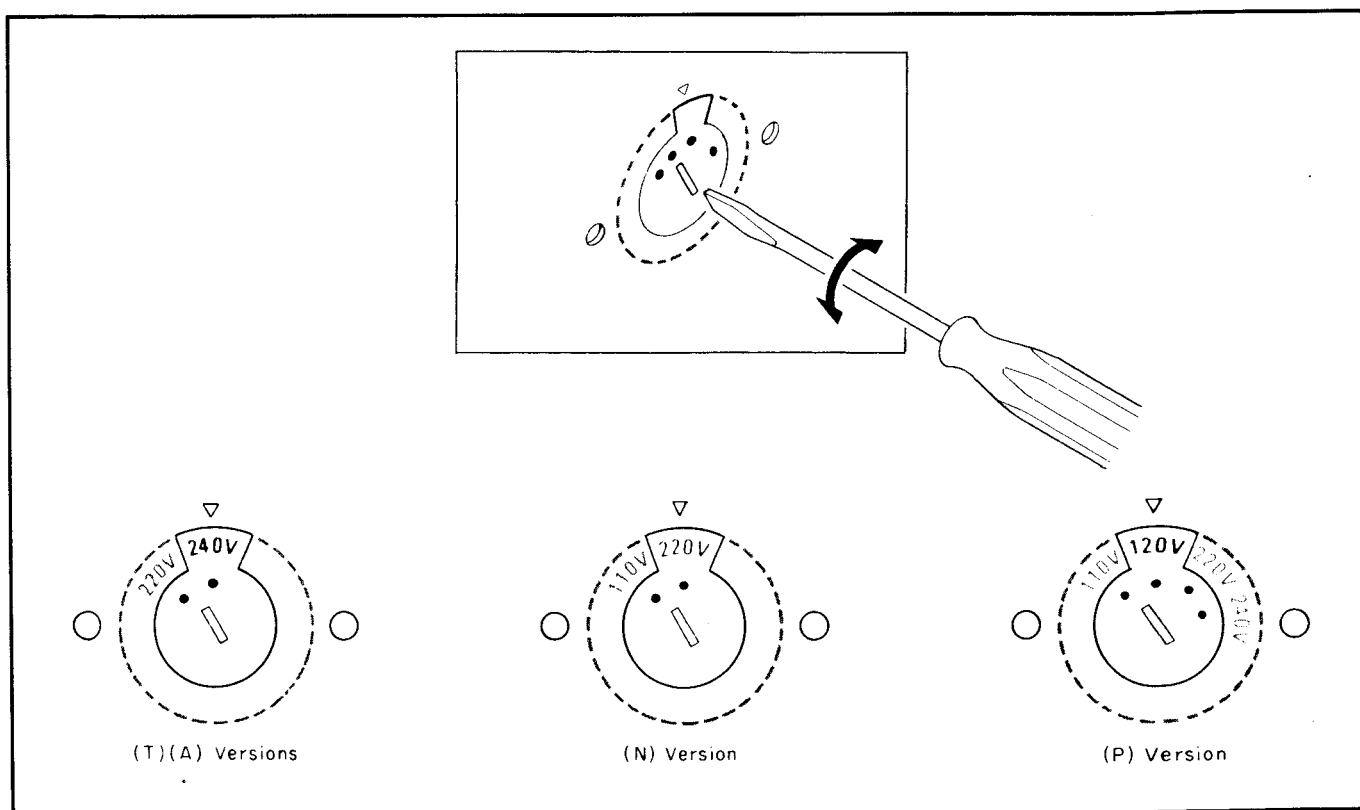


Figure 2. Voltage Conversion Chart

NOTE ON SAFETY:

THE PARTS MARKED WITH $\triangle$ ARE IMPORTANT PARTS ON THE SAFETY.
PLEASE USE THE PARTS HAVING THE DESIGNATED PARTS NUMBERS WITHOUT FAIL.

FTZ REGULATION

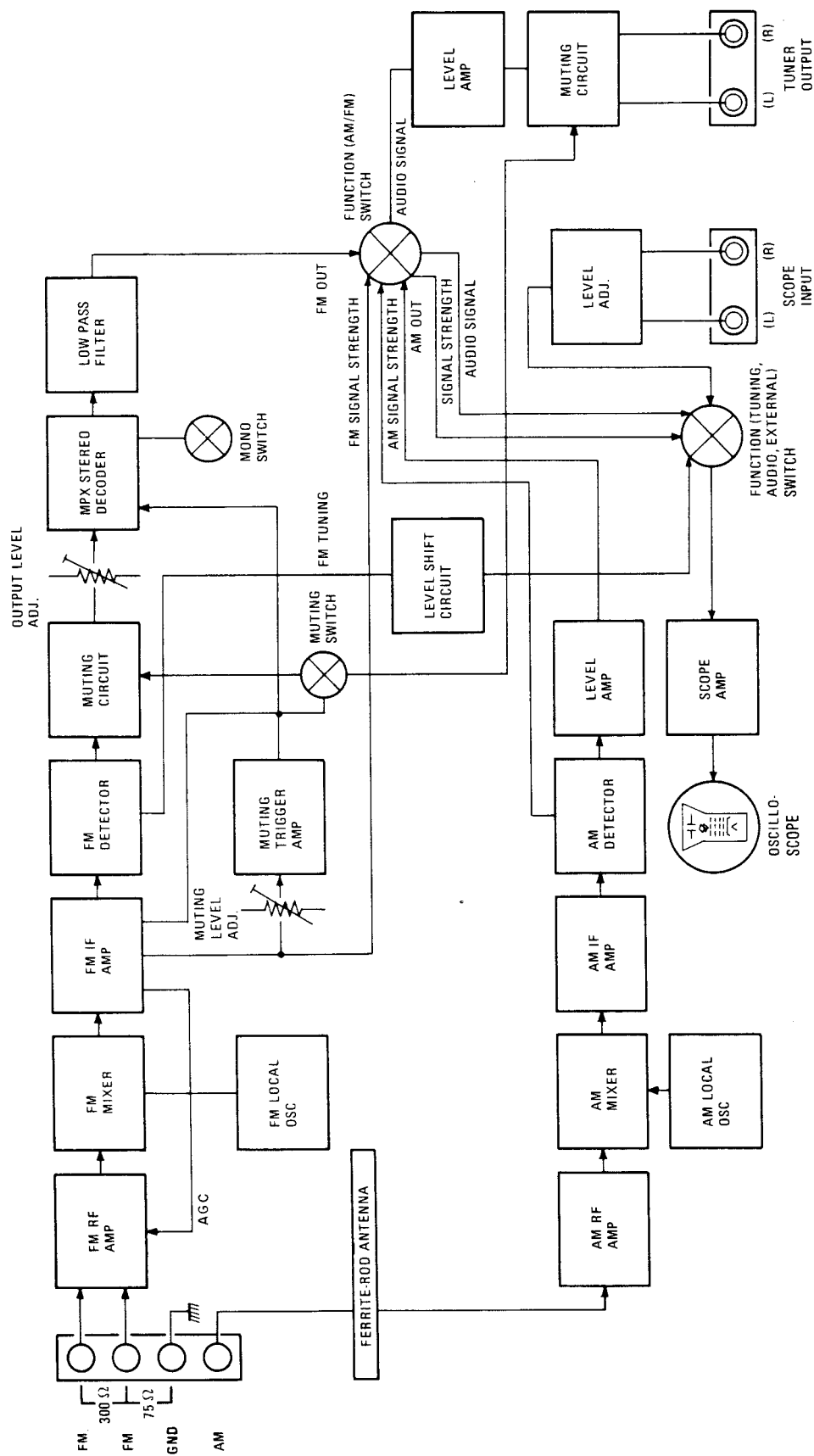
Instruction for the use in the range other than specified in FTZ codes.

Achtung für die Leute, die in dem Gebiet wohnen, wo die FTZ-Bestimmungen vorherrschend sind.

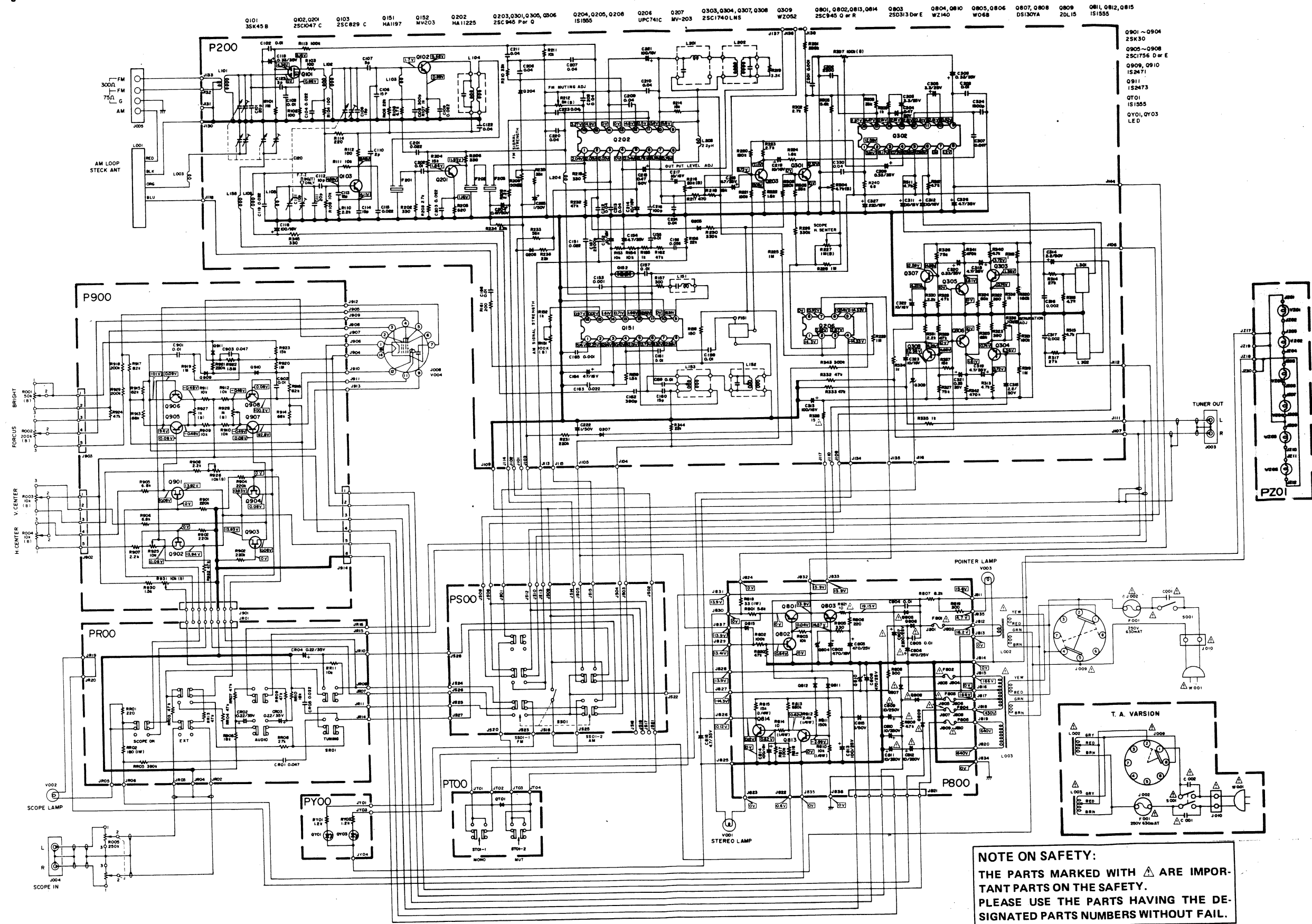
Sollte das Gerät auch für Frequenzen ausserhalb des in den FTZ-Bestimmungen angegebenen Bereiches empfangsbereit sein, bitten wir, den Bereich durch Nachstellen des Kernes in der Oszillatorschule (in der Abbildung mit "FTZ" gekennzeichnet) so zu korrigieren, dass er den Bestimmungen entspricht.

6. DIAGRAMS AND COMPONENT LOCATIONS

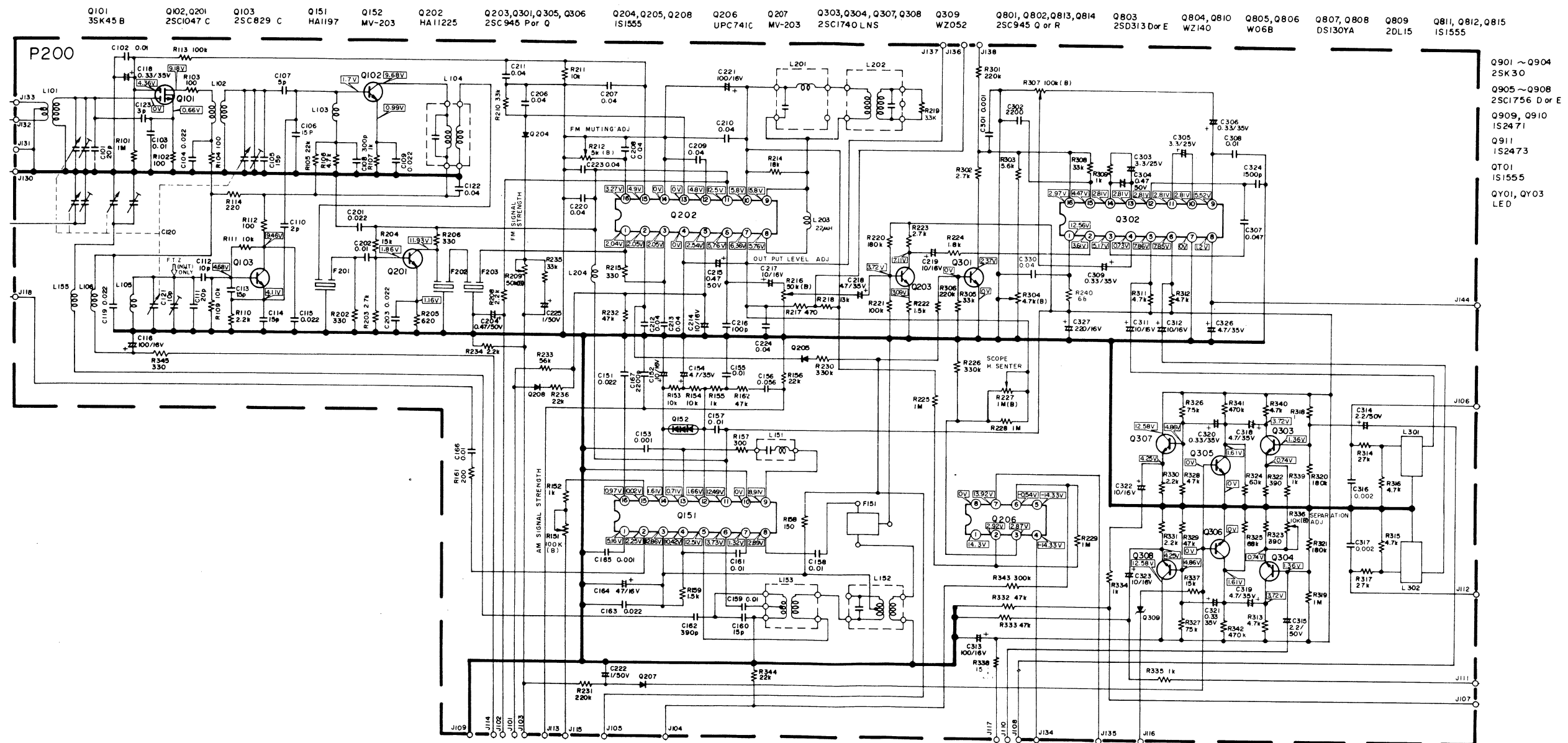
6.1 Block Diagram

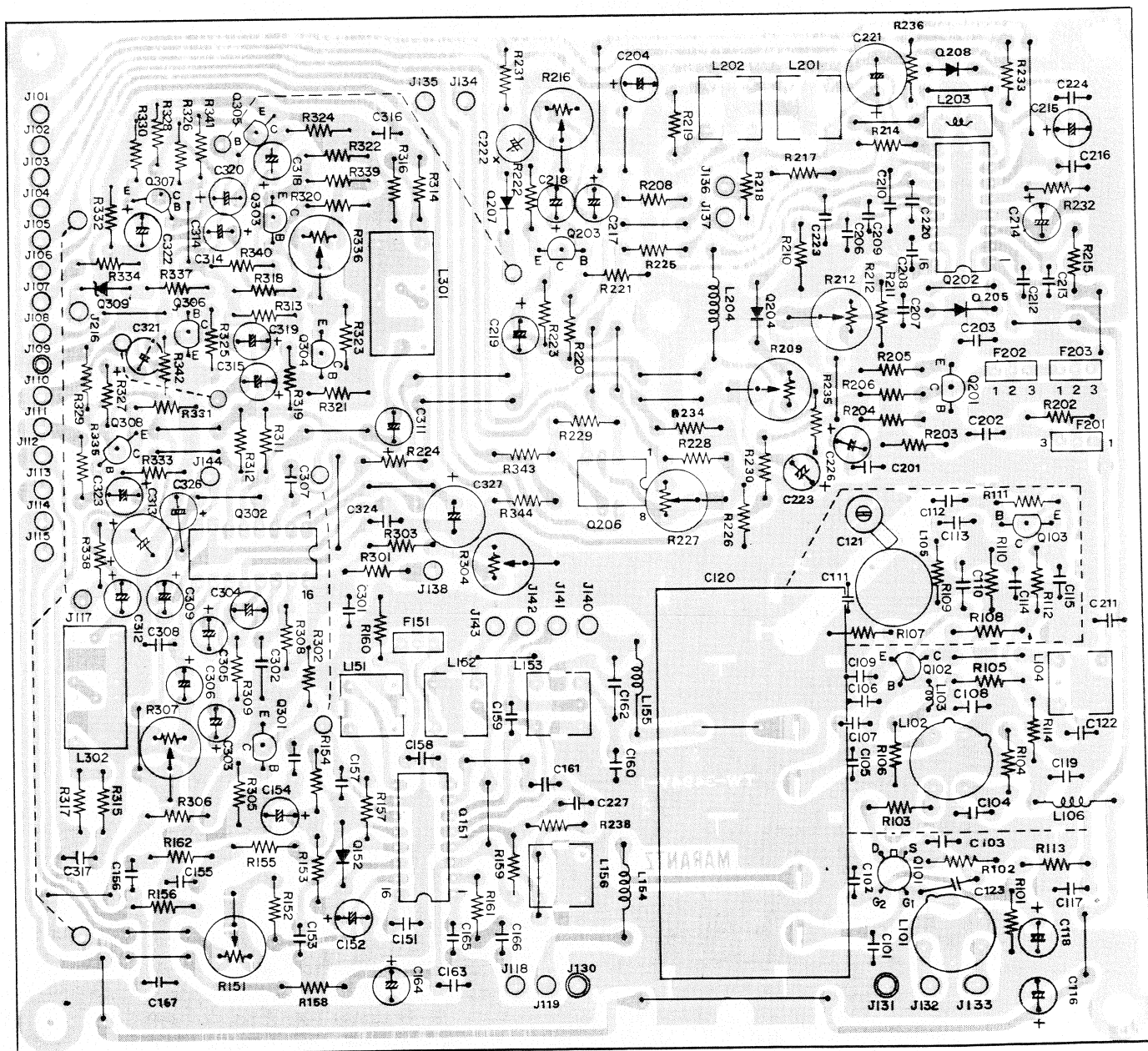


6.2 Schematic Diagram

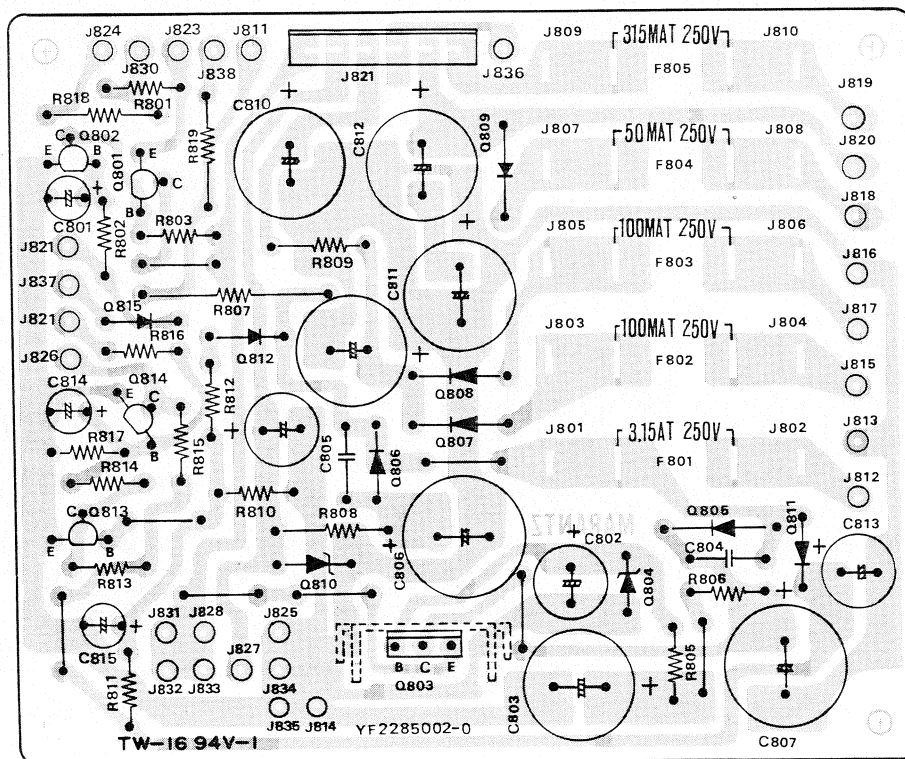


6.3 Tuner Board Schematic Diagram and Component Locations - P200

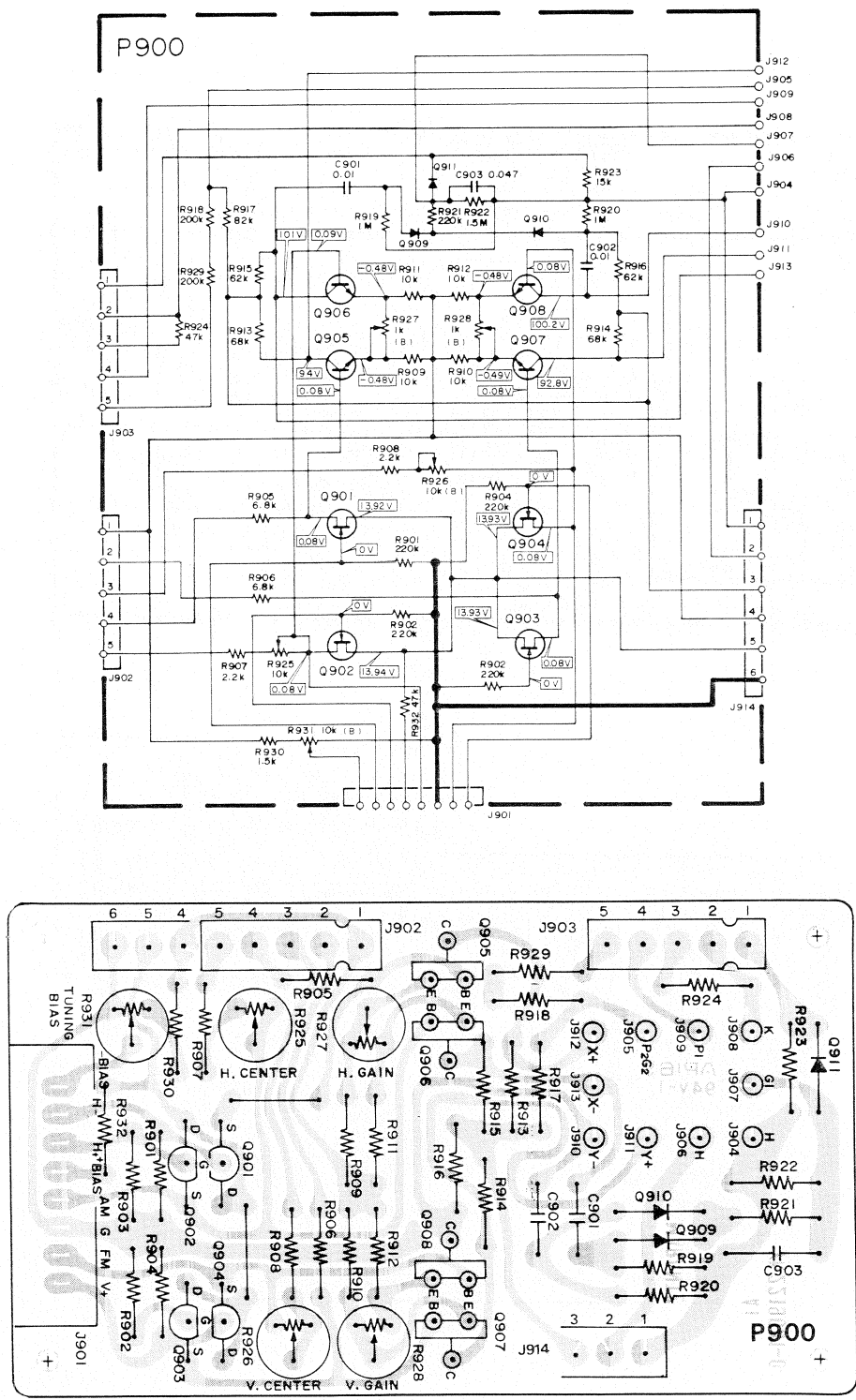




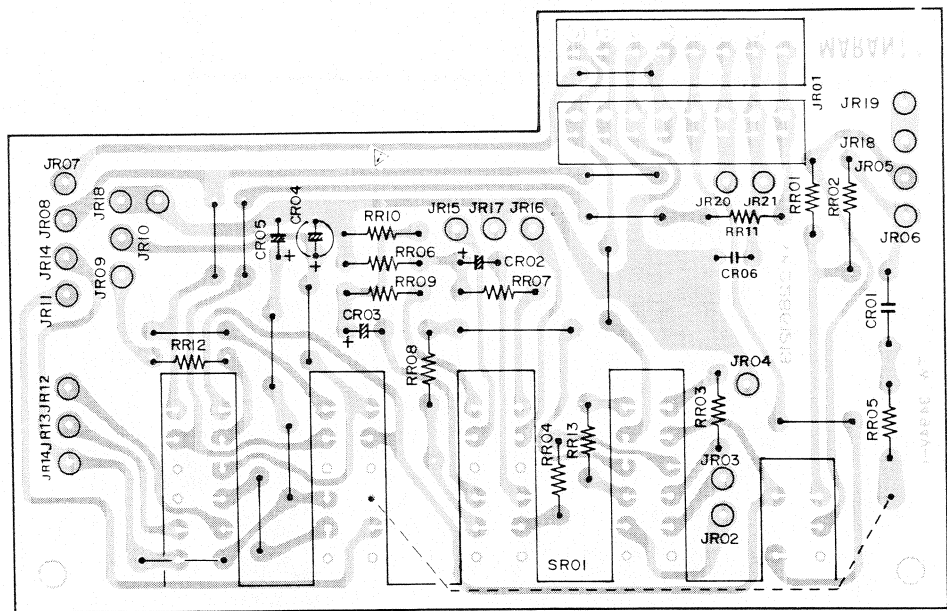
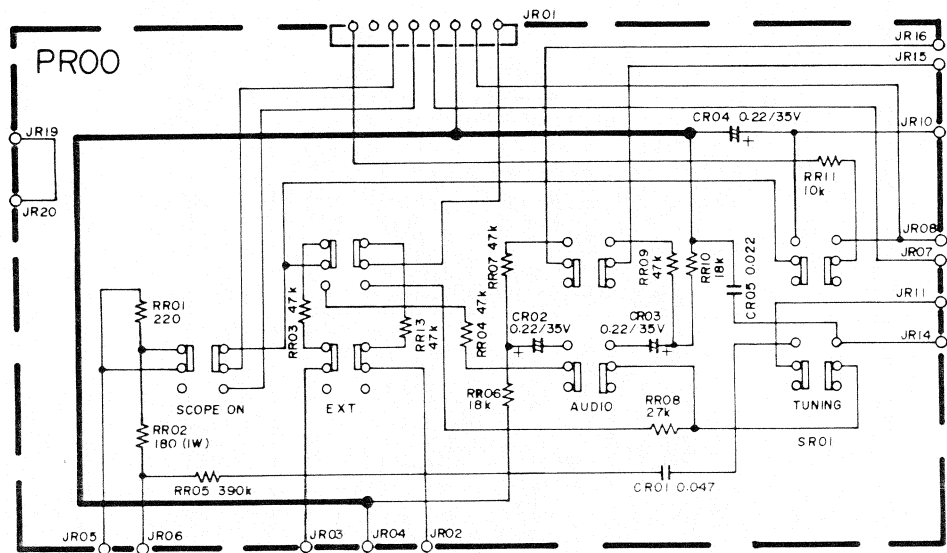
6.4 Power Supply Board Schematic Diagram and Component Locations - P800



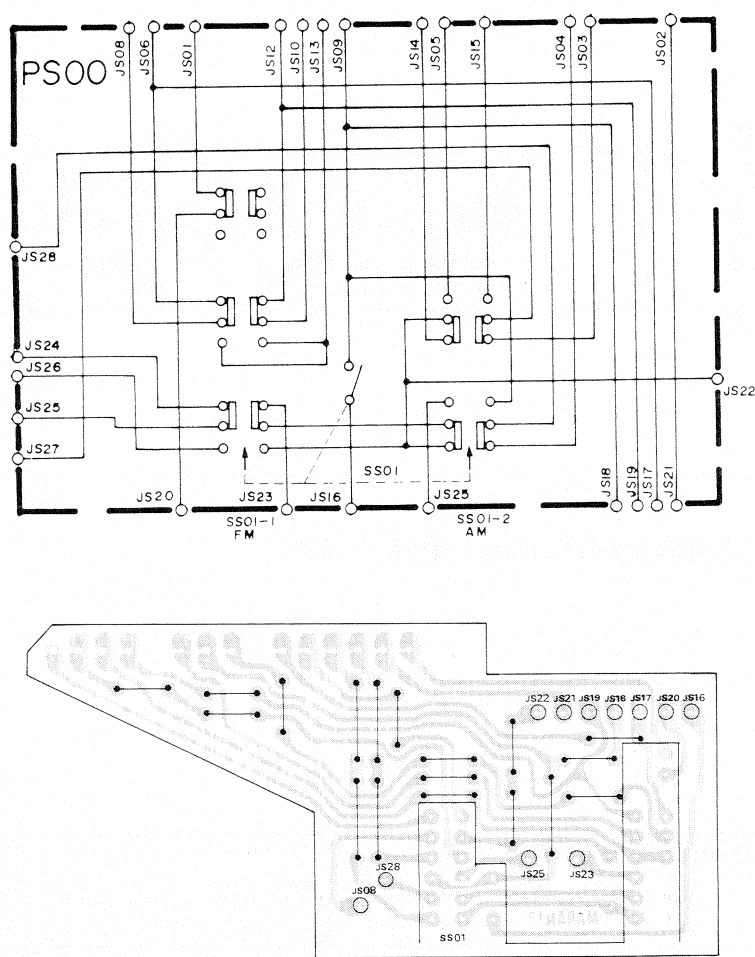
6.5 Scope Amp Board Schematic Diagram and Component Locations - P900



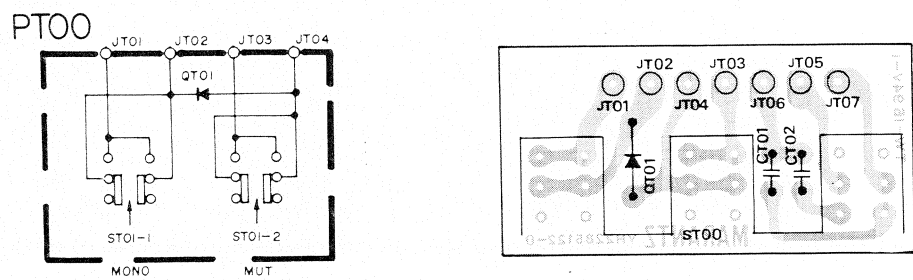
6.6 Scope Display Switches Board Schematic Diagram and Component Locations - PR00



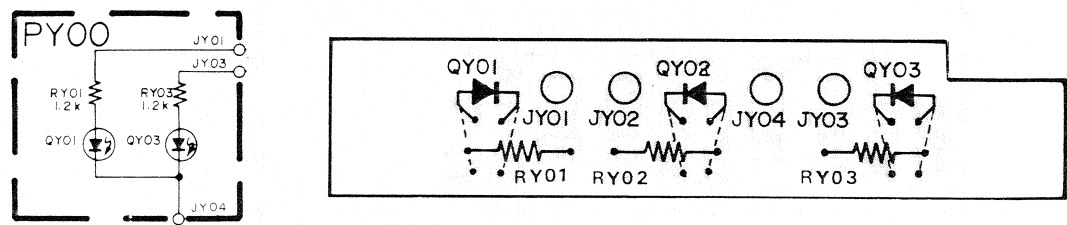
6.7 Function Switches Board Schematic Diagram and Component Locations - PS00



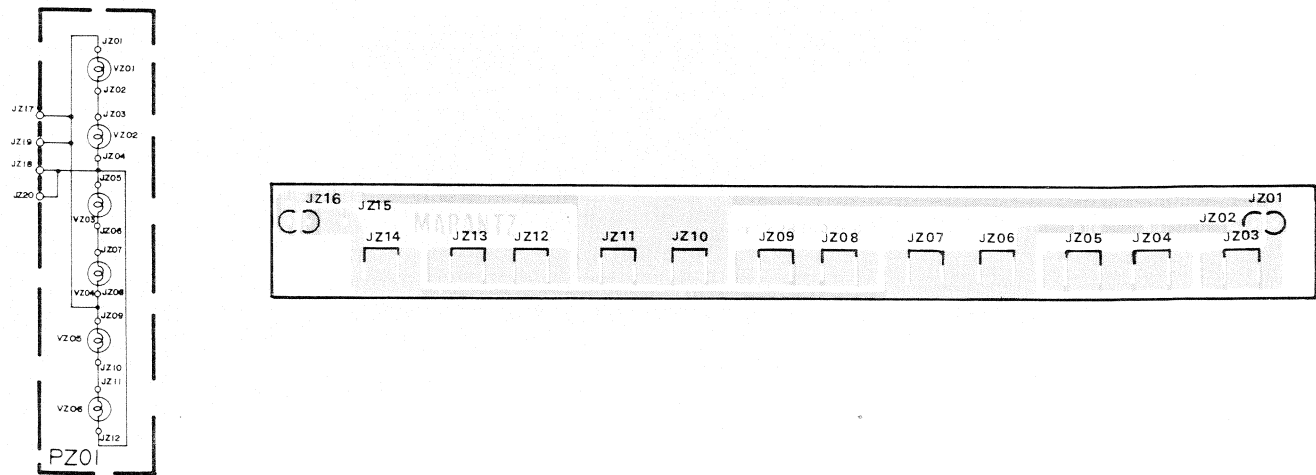
6.8 Mode Switches Board Schematic Diagram and Component Locations - PT00



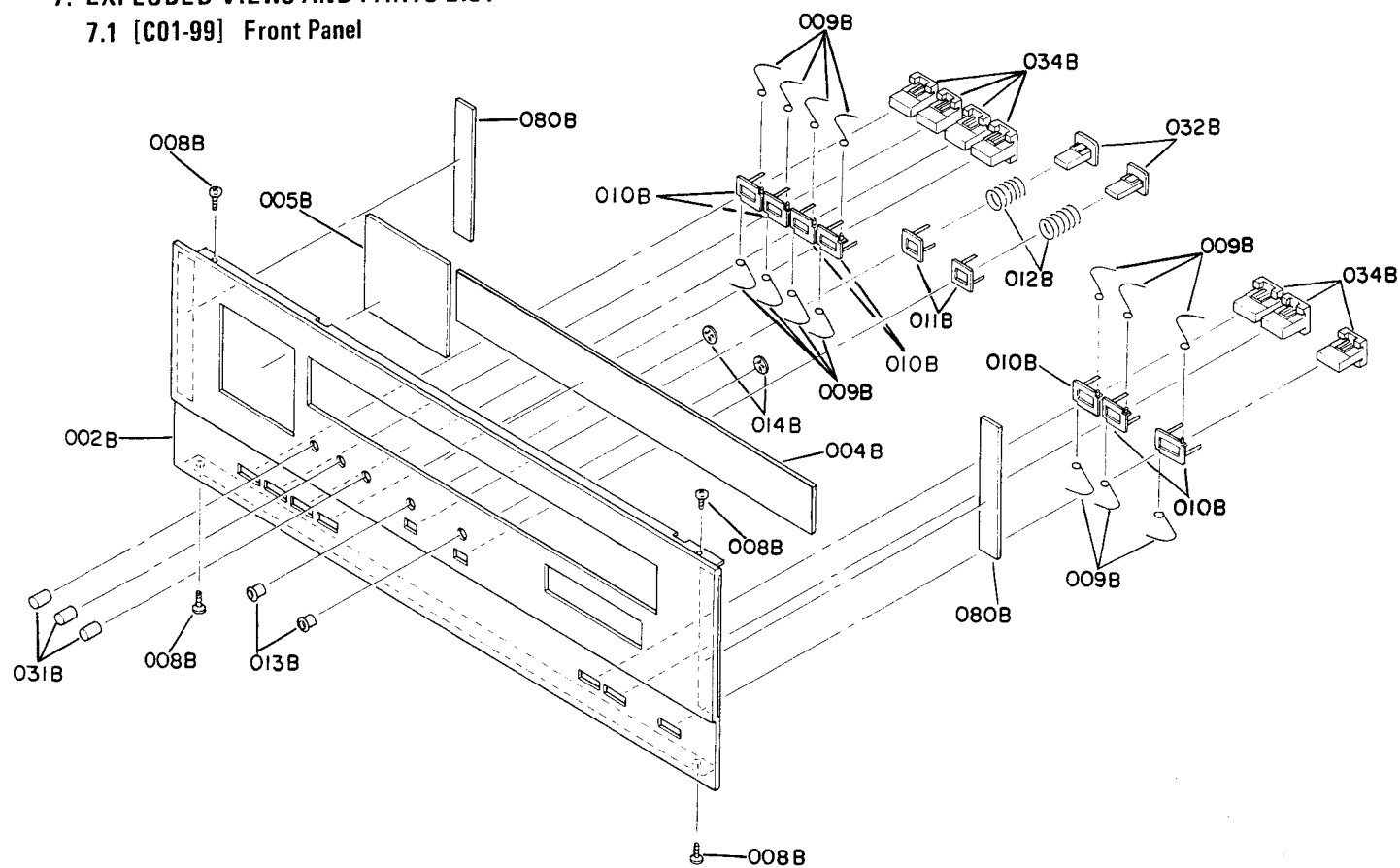
6.9 Function Indicator Board Schematic Diagram and Component Locations - PY00



6.10 Dial Lamp Board Schematic Diagram and Component Locations - PZ01



7. EXPLODED VIEWS AND PARTS LIST
7.1 [C01-99] Front Panel

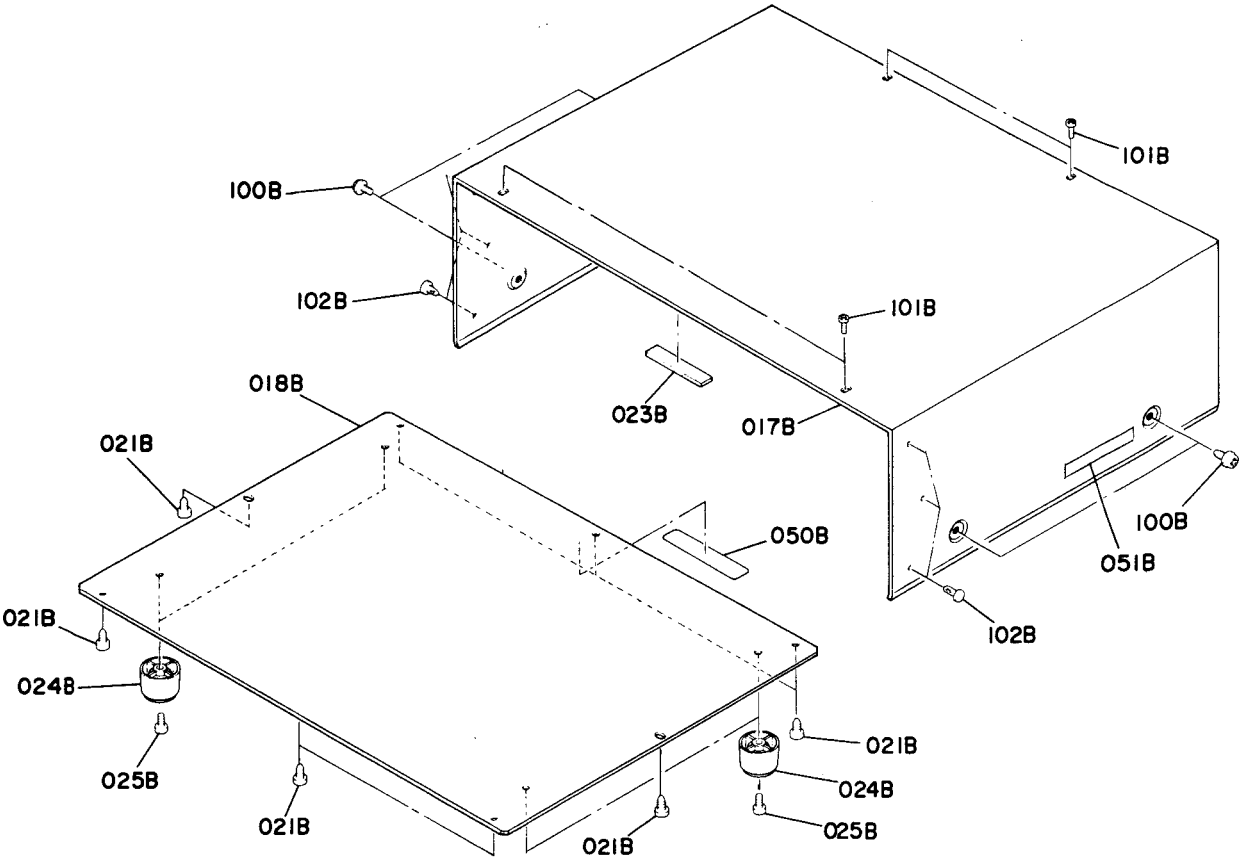


● (A) : for Australia
● (N) : for Europe

REF. DESIG.	Q'TY		PART NO.	DESCRIPTION
	A	N		
A	1	1	2131063400	Front Panel Assembly
002B	1	1	2131063010	Escutcheon
004B	1	1	2286158120	Window
005B	1	1	2286158110	Window
010B	7	7	2127259010	Bushing
011B	2	2	2112259030	Bushing
013B	2	2	2979259020	Bushing
014B	2	2	64020600Q0	RG Ring CS
080B	2	2	2128118010	Spacer

REF. DESIG.	Q'TY		PART NO.	DESCRIPTION
	A	N		
008B	4	4	51340306B0	F.H. TAP. Screw F3 x 6
009B	14	14	2127115010	Spring
012B	2	2	2112115010	Spring
031B	3	3	2131154010	Knob
032B	2	2	2112154010	Knob
034B	7	7	2127154010	Knob

7.2 [C02-99] Top and Bottom Cover

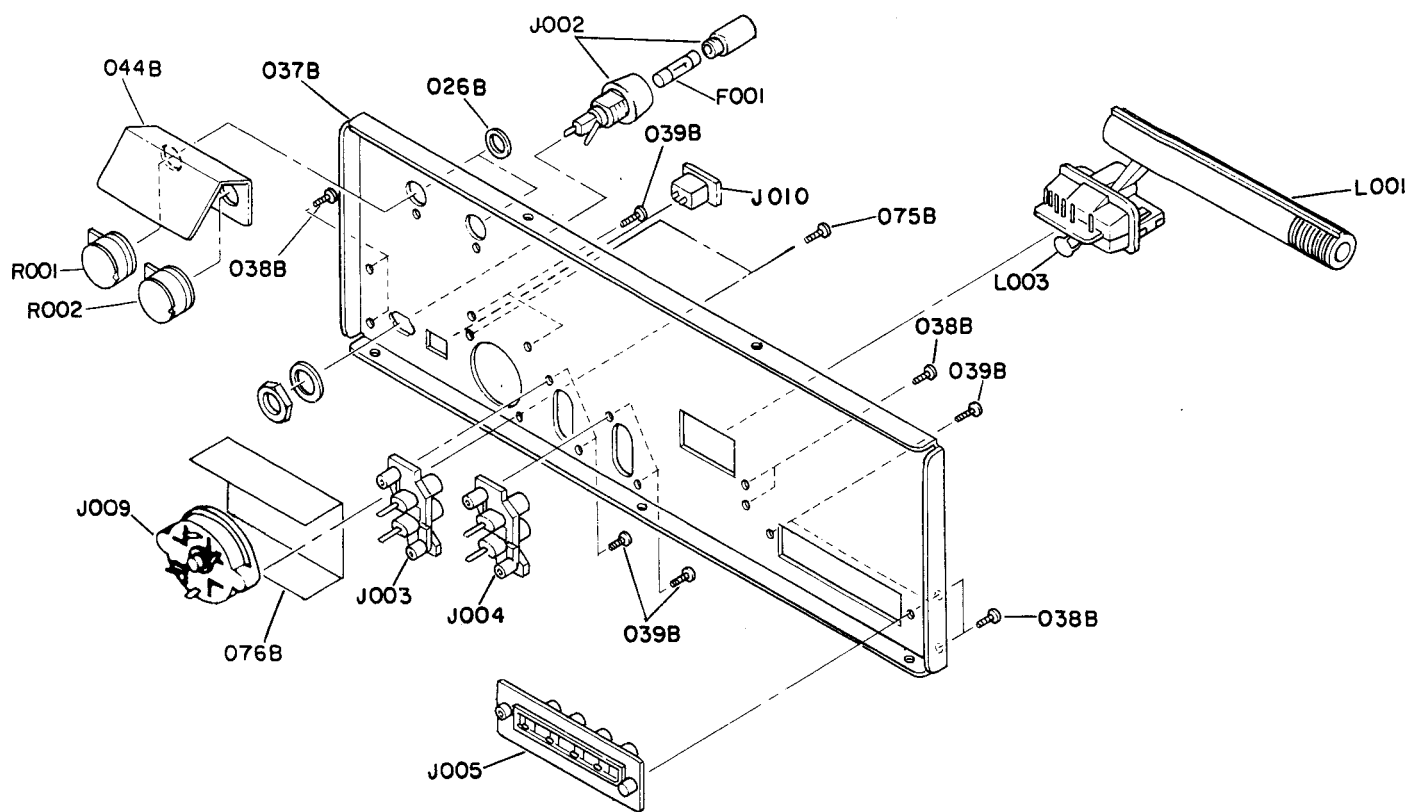


● (A) : for Australia
● (N) : for Europe

REF. DESIG.	Q'TY		PART NO.	DESCRIPTION	
	A	N			
				TOP COVER	
017B	1	1	2216257110	Lid	
023B	1	1	2965118010	Spacer	
051B	1	1	2932861010	Label	
100B	4	4	51480406S9	F. Washer Screw	F4 x 6
101B	4	4	51280306U0	B.H. TAP. Screw	B3 x 6
102B	6	6	2991259010	Bushing	

REF. DESIG.	Q'TY		PART NO.	DESCRIPTION
	A	N		
BOTTOM COVER				
018B	1	1	2216257020	Lid
021B	8	8	51280410U0	B.H. TAP. Screw B4 x 10
024B	4	4	2932057010	Leg
025B	4	4	51570410S0	P. TAP. Screw P4 x 10
050B	1	1	2578861010	Label

7.3 [C03-99] Rear Panel

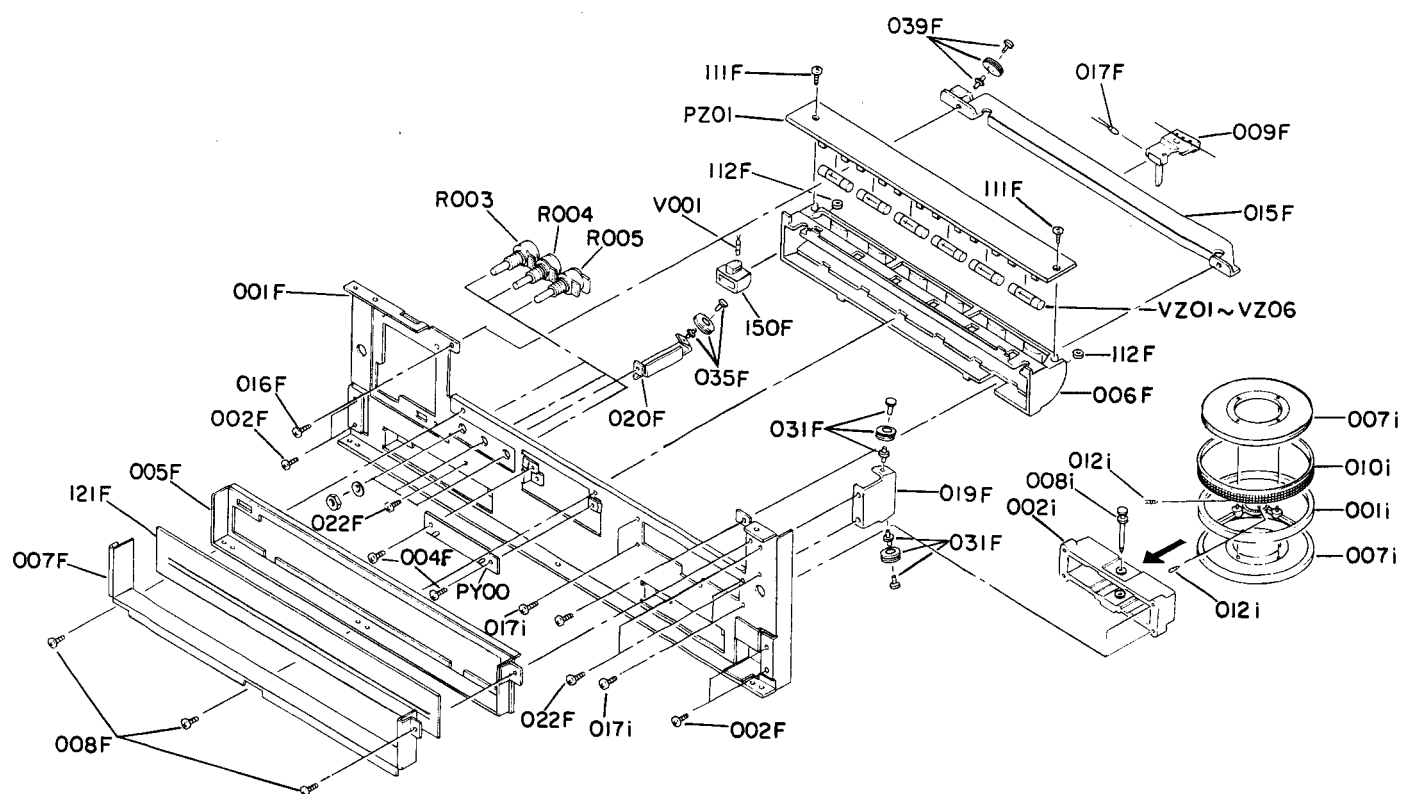


● (A) : for Australia
● (N) : for Europe

REF. DESIG.	Q'TY		PART NO.	DESCRIPTION
	A	N		
026B	2	2	53228059E0	S.C. Nut
037B	1	1	2131160220	Bracket
038B	6	6	51280308U0	B.H. TAP. Screw B3 x 8
039B	8	8	51280308U0	B.H. TAP. Screw B3 x 8
044B	1	1	2286120020	Insulator
075B	2	2	51280308U0	B.H. TAP. Screw B3 x 8
076B		1	2131120010	Insulator

REF. DESIG.	Q'TY		PART NO.	DESCRIPTION
	A	N		
△ F001	1	1	FS10063800	Fuse 630mAT 250V
J002	1	1	YJ08000290	Jack Fuse Holder
J003	1	1	YJ02020140	Terminal Output
J004	1	1	YJ02020140	Terminal Scope In
J005	1	1	YJ01040180	Terminal Ant.
△ J009	1	1	BY05060010	Plug Voltage Selector
△ J010	1	1	YP04000580	Plug AC Inlet
L001	1	1	LF11200620	Ant. Coil
L003	1	1	LC13320050	Choke Coil
R001	1	1	RA05030180	Trimming Resistor 50kΩ (B)
R002	1	1	RK02040060	Variable Resistor 200kΩ (B)

7.4 [P01-99] Front Chassis and General Parts

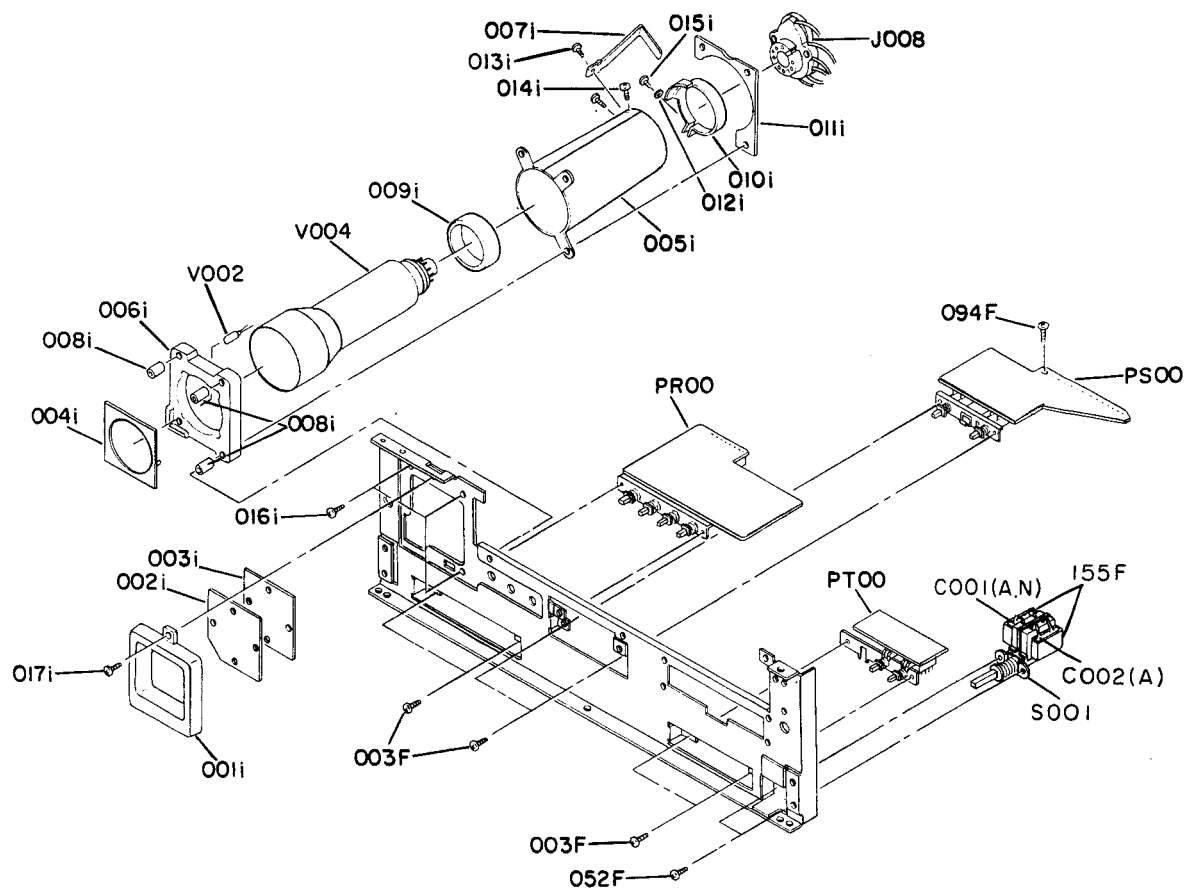


● (A) : for Australia
● (N) : for Europe

REF. DESIG.	QTY		PART NO.	DESCRIPTION
	A	N		
B	1	1	2219273410	Flywheel Assembly
001i	1	1	2219273010	Flywheel
007i	2	2	2219063030	Escutcheon
010i	1	1	2215353010	Ring
012i	2	2	51690306Q9	Socket Screw, HP 3 x 6
002i	1	1	2219104500	Retainer
008i	1	1	2219112010	Shaft
017i	4	4	51280308B0	B.H. TAP. Screw B3 x 8
001F	1	1	2131160010	Bracket
002F	4	4	51280308B0	B.H. TAP. Screw B3 x 8
004F	2	2	51280306B0	B.H. TAP. Screw B3 x 6
005F	1	1	2218271110	Dial Holder
006F	1	1	2218274010	Dial Reflector
007F	1	1	2219053020	Dial Cover
008F	3	3	51280306B0	B.H. TAP. Screw B3 x 6
009F	1	1	2991103500	Dial Pointer (K)
015F	1	1	2286051010	Guide
016F	3	3	51280306B0	B.H. TAP. Screw B3 x 6
017F	1	1	IN10080410	Lamp
019F	1	1	2285271010	Pulley Holder
020F	1	1	2131271010	Pulley Holder
022F	3	3	51100306A9	B.H.M. Screw B3 x 6

REF. DESIG.	QTY		PART NO.	DESCRIPTION
	A	N		
031F	2	2	2286262500	Pulley (K)
035F	1	1	2286262500	Pulley (K)
039F	1	1	2286262500	Pulley (K)
111F	2	2	51100308A9	B.H.M. Screw
112F	2	2	53110303E9	Hexagon Nut
113F	2	2	51480308A9	F. Washer Screw F3 x 8
121F	1	1	2285302010	Dial
150F	1	1	2218274030	Reflector
R003	1	1	RB01030240	Variable Resistor 10kΩ (B)
R004	1	1	RB01030240	Variable Resistor 10kΩ (B)
R005	1	1	RM02540440	Variable Resistor 250kΩ
V001	1	1	IN10080340	Lamp, Stereo 60mA 8V
VZ01				
VZ06	6	6	IN10080070	Dial Lamp 0.2A 8V
PY00	1	1	YK22861220	P.W. Board L.E.D.
	1	1	ZZ22861220	P.W. Board Assembly
PZ01	1	1	YF22860020	P.W. Board Dial Illuminator
	1	1	ZZ22860020	P.W. Board Assembly

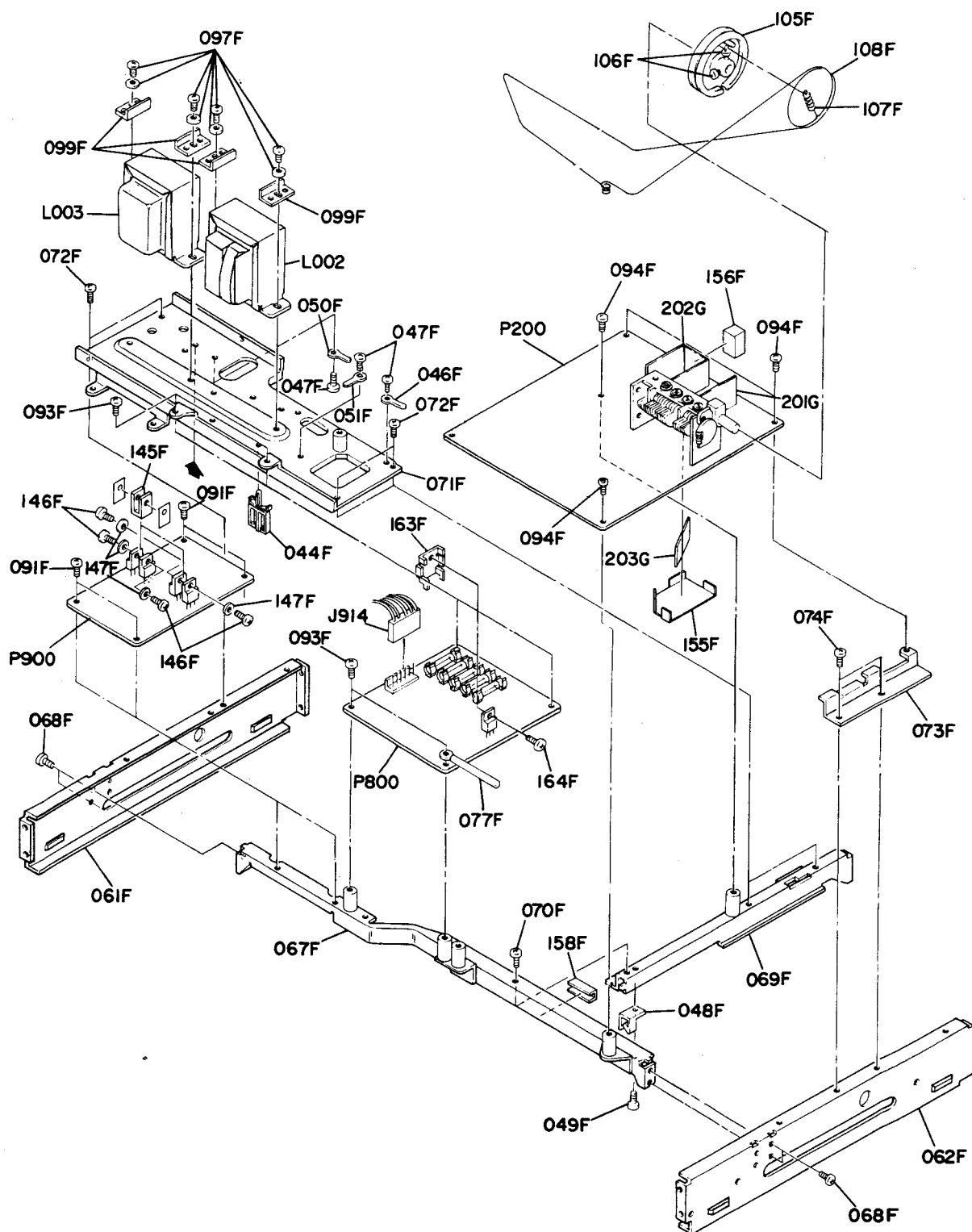
7.5 [P02-99] Scope Dial Assembly and P.W. Boards



● (A) : for Australia
 ● (N) : for Europe

REF. DESIG.	Q'TY		PART NO.	DESCRIPTION
	A	N		
001i	1	1	2286401010	Frame
002i	1	1	2286302030	Dial
003i	1	1	2286303010	Mask
004i	1	1	2286053040	Cover
005i	1	1	2219109010	Shield
006i	1	1	2219357010	Rod Scope Pad
007i	1	1	2286005010	Clamper
008i	3	3	2219055020	Collar
009i	1	1	2904056020	Buffer
010i	1	1	2904005030	Clamper
011i	1	1	2207005010	Clamper
012i	1	1	54020301S0	Flat Washer, P
013i	1	1	51100308S9	B.H.M. Screw B3 x 8
014i	1	1	51100304S9	B.H.M. Screw B3 x 4
015i	1	1	51100305S9	B.H.M. Screw B3 x 5
016i	3	3	51100316S9	B.H.M. Screw B3 x 16
017i	1	1	51280306B0	B.H. TAP. Screw B3 x 6
J008	1	1	YJ05000180	Jack CRT Socket
V002	1	1	IN10080340	Lamp 60mA 8V
V004	1	1	VB00235010	Picture Tube
003F	6	6	51100306A9	B.H.M. TAP. Screw B3 x 6
052F	2	2	51100306A9	B.H.M. TAP. Screw B3 x 6
094F	1	1	51280308B0	B.H. TAP. Screw B3 x 8
I55F	2	2	2219120010	Insulator
△ C001	1	1	DF17223800	Film Cap. 0.022μF 1000V
△ C002	1	1	DF17223800	Film Cap. 0.022μF 1000V
△ S001	1	1	SP02010330	Push Switch Power
PR00	1	1	YK22861213	P.W. Board Scope SW
	1	1	ZZ22852210	P.W. Board Assembly
PS00	1	1	YH22851212	P.W. Board Function SW
	1	1	ZZ21318210	P.W. Board Assembly
PT00	1	1	YH22851220	P.W. Board Mode SW
	1	1	ZZ22858220	P.W. Board Assembly

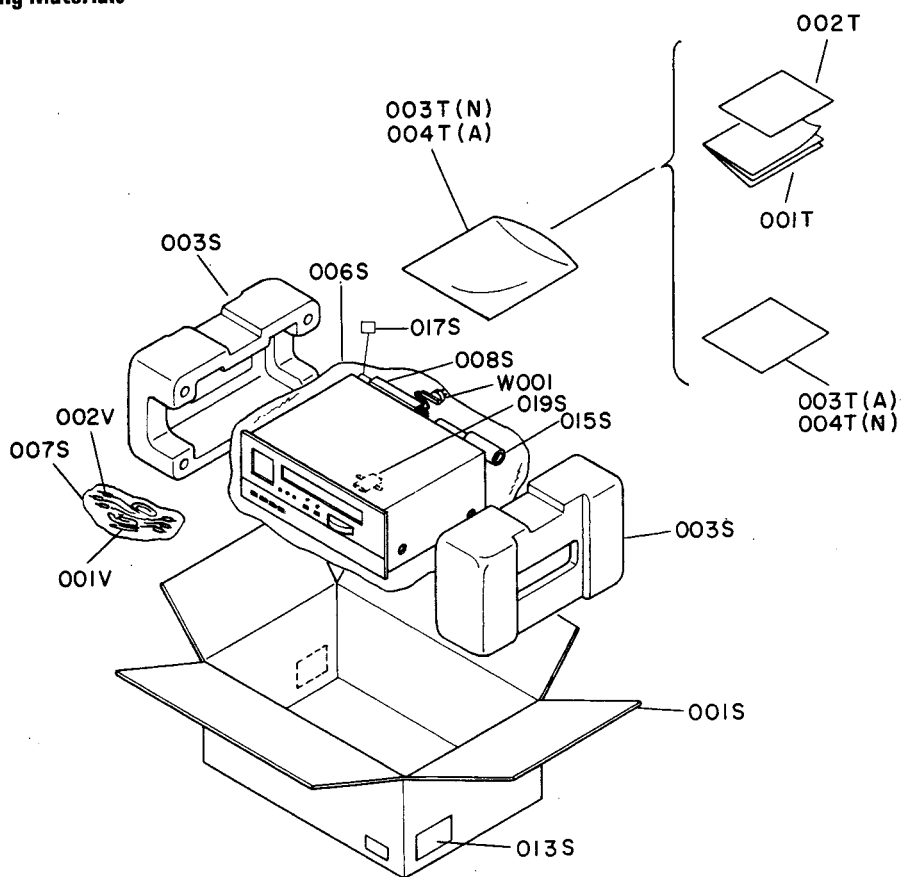
7.6 [P03-99] Main Chassis and P.W. Board



- (A) : for Australia
- (N) : for Europe

REF. DESIG.	Q'TY		PART NO.	DESCRIPTION	REF DESIG.	Q'TY		PART NO.	DESCRIPTION
	A	N				A	N		
044F	1	1	2886005040	Clamper	201G	1	1	2259109040	Shield
046F	1	1	62030049W0	Lug	202G	1	1	2259109050	Shield
047F	3	3	51280306B0	B.H. TAP. Screw B3 x 6	203G	1	1	2259109060	Shield
048F	1	1	2887005010	Clamper					
049F	1	1	51280306B0	B.H. TAP. Screw B3 x 6	J914	1	1	YJ06001310	Jack (6P)
050F	1	1	62030049W0	Lug					
051F	1	1	62030049W0	Lug	△ L002	1		TS15713110	Power Transformer
061F	1	1	2216105020	Chassis (L)	△ L002		1	TS15713090	Power Transformer
062F	1	1	2216105030	Chassis (R)	△ L003	1		TS15713120	Power Transformer
067F	1	1	2285126010	Stay Front	△ L003		1	TS15713100	Power Transformer
068F	4	4	51280306B0	B.H. TAP. Screw B3 x 6					
069F	1	1	2285126030	Stay Main	P200	1	1	YG22850010	P.W. Board Tuner MPX
070F	1	1	51280306B0	B.H. TAP. Screw B3 x 6		1	1	ZZ21318010	P.W. Board Assembly
071F	1	1	2285105010	Chassis Main					
072F	4	4	51280306B0	B.H. TAP. Screw B3 x 6	P800	1	1	YF22850020	P.W. Board Power Supply
073F	1	1	2285126020	Stay Side		1	1	ZZ22858020	P.W. Board Assembly
074F	2	2	51280308B0	B.H. TAP. Screw B3 x 8					
077F	1	1	2871005010	Clamper					
078F	1	1	51100305A9	B.H.M. SCrew B3 x 5	P900	1	1	YK22190310	P.W. Board Scope Amp.
091F	4	4	51280306B0	B.H. TAP. Screw B3 x 6		1	1	ZZ22860310	P.W. Board Assembly
093F	4	4	51280308B0	B.H. TAP. Screw B3 x 8					
094F	4	4	51280306B0	B.H. TAP. Screw B3 x 6					
097F	4	4	51470408A9	L. Washer Screw L4 x 8					
099F	4	4	2896104010	Retainer					
105F	1	1	2219159010	Drum					
106F	2	2	51064019A9	P.H.M. Screw					
107F	1	1	71101689L0	Spring					
108F	1	1	72071605A0	String (150)					
145F	2	2	2219267040	Heatsink					
146F	4	4	50060305B9	Screw 3 x 5					
147F	4	4	54040302A0	Spring Washer					
155F	1	1	2285109050	Shield					
156F	1	1	3918104010	Retainer					
158F	1	1	4640259010	Bushing					
163F	1	1	2963267020	Heatsink					
164F	1	1	51280306B0	B.H. TAP. Screw B3 x 6					
170F	1	1	2887005010	Clamper					

7.7 [H01-99] Packing Materials



- (A) : for Australia
- (N) : for Europe

REF. DESIG.	QTY		PART NO.	DESCRIPTION
	A	N		
001S	1	1	2131801010	Packing Case
003S	2	2	2965809010	Cushion
006S	1		9090909040	Polyethy Sheet
006S		1	9014335330	Polyethy Bag
007S	1	1	9011325010	Polyethy Bag
008S	1	1	2864804010	Sleeve
010S	1	1	2918107170	Sheet
013S	1		9526019030	Serial No. Card
013S		1	9526019060	Serial No. Card
015S	1	1	2819056010	Buffer
017S	1	1	9560000040	Hang Tag
019S		1	2731821010	Silicagel

REF. DESIG.	Q'TY		PART NO.	DESCRIPTION
	A	N		
001T	1	1	2131851310	Instructions
002T	1	1	2131851030	Instructions
003T	1		9631000090	Guarantee Card
003T		1	9013025010	Polyethy Bag
004T	1		9013025010	Polyethy Bag
004T		1	2131856010	Circuit Diagram
001V	1	1	ZA02000070	EXT. Ant. FM
002V	1	1	ZD01500160	Connective Cord
△ W001	1	1	ZC02006020	AC Power Cord

7.8 Electrical Parts List

- (A) : for Australia
- (N) : for Europe

REF DESIG.	Q'TY		PART NO.	DESCRIPTION			REF. DESIG.	Q'TY		PART NO.	DESCRIPTION		
	A	N						A	N				
P200	1	1	YG22850010 ZZ21318010	P200-TUNER MPX CIRCUIT BOARD P.W. Board, Tuner MPX P.W. Board Assembly			C213	1	1	DK18403320	Ceramic	0.04μF	+ 80% — 20%
	1	1					C214	1	1	EA10601690	Elect	10μF	16V
							C215	1	1	EA47405090	Elect	0.47μF	50V
							C216	1	1	DD15101370	Ceramic	100pF	±5%
							C217	1	1	EA10601690	Elect	10μF	16V
							C218	1	1	EA47503590	Elect	4.7μF	35V
							C219	1	1	EA10601690	Elect	10μF	16V
							C220	1	1	DK18403320	Ceramic	0.04μF	+ 100% — 0
							C221	1	1	EA10701690	Elect	100μF	16V
							C222	1	1	EA10505090	Elect	1μF	50V
							C223	1	1	DK18403320	Ceramic	0.04μF	+ 100% — 0
							C224	1	1	DK18403320	Ceramic	0.04μF	+ 100% — 0
							C225	1	1	EA10505090	Elect	1μF	50V
							C301	1	1	DF55102090	Film	0.001μF	±5%
							C302	1	1	DF16222300	Film	2200pF	±10%
							C303	1	1	EA33502590	Elect	3.3μF	25V
							C304	1	1	EQ47405010	Elect	0.47μF	50V
							C305	1	1	EA33502590	Elect	3.2μF	25V
							C306	1	1	EV33403560	Elect	0.33μF	35V
							C307	1	1	DF17473010	Film	0.047μF	±20%
							C308	1	1	DF15103300	Film	0.01μF	±5%
							C309	1	1	EV33403560	Elect	0.33μF	35V
							C311	1	1	EA10601690	Elect	10μF	16V
							C312	1	1	EA10601690	Elect	10μF	16V
							C313	1	1	EA10701690	Elect	100μF	16V
							C314	1	1	EA22505090	Elect	2.2μF	50V
							C315	1	1	EA22505090	Elect	2.2μF	50V
							C316	1	1	DF15102300	Film	1000pF	±5%
							C316	1	1	DF15202300	Film	0.002μF	±5%
							C317	1	1	DF15002300	Film	0.002μF	±5%
							C318	1	1	EA47503590	Elect	4.7μF	35V
							C319	1	1	EA47503590	Elect	4.7μF	35V
							C320	1	1	EV33403560	Elect	0.33μF	35V
							C321	1	1	EV33403560	Elect	0.33μF	35V
							C322	1	1	EA10601690	Elect	10μF	16V
							C323	1	1	EA10601690	Elect	10μF	16V
							C324	1	1	DF15152300	Film	1500pF	±5%
							C326	1	1	EA47503590	Elect	4.7μF	35V
							C327	1	1	EA22701690	Elect	220μF	16V
							C330	1	1	DK18403320	Ceramic	0.04μF	+ 80% — 20%

- (A) : for Australia
- (N) : for Europe

REF. DESIG.	Q'TY		PART NO.	DESCRIPTION	REF. DESIG.	Q'TY		PART NO.	DESCRIPTION
	A	N				A	N		
				P200-RESISTORS (All Resistors are $\pm 5\%$ and 1/4W)					
R101	1	1	GD05105140	1M Ω	R304	1	1	RA04720050	Trimming 4.7k Ω (B)
R102	1	1	GD05101140	100 Ω	R305	1	1	GD05333140	33k Ω
R103	1	1	GD05101140	100 Ω	R306	1	1	GD05224140	220k Ω
R104	1	1	GD05101140	100 Ω	R307	1	1	RA01040110	Trimming 100k Ω (B)
R105	1	1	GD05223140	22k Ω	R308	1	1	GD05333140	33k Ω
R106	1	1	GD05472140	4.7k Ω	R309	1	1	GD05102140	1k Ω
R107	1	1	GD05102140	1k Ω	R311	1	1	GD05472140	4.7k Ω
R109	1	1	GD05103140	10k Ω	R312	1	1	GD05472140	4.7k Ω
R110	1	1	GD05222140	2.2k Ω	R313	1	1	GD05472140	4.7k Ω
R111	1	1	GD05103140	10k Ω	R314	1	1	GD05273140	27k Ω
R112	1	1	GD05101140	100 Ω	R315	1	1	GD05472140	4.7k Ω
R113	1	1	GD05104140	100k Ω	R316	1	1	GD05472140	4.7k Ω
R114	1	1	GD05221140	220 Ω	R317	1	1	GD05273140	27k Ω
R151	1	1	RA01040110	Trimming 100k Ω (B)	R318	1	1	GD05105140	1M Ω
R152	1	1	GD05102140	1k Ω	R319	1	1	GD05105140	1M Ω
R153	1	1	GD05103140	10k Ω	R320	1	1	GD05154140	150k Ω
R154	1	1	GD05103140	10k Ω	R321	1	1	GD05154140	150k Ω
R155	1	1	GD05102140	1k Ω	R322	1	1	GD05391140	390 Ω
R156	1	1	GD05223140	22k Ω	R323	1	1	GD05391140	390 Ω
R157	1	1	GD05301140	300 Ω	R324	1	1	GD05683140	68k Ω
R158	1	1	GD05151140	150 Ω	R325	1	1	GD05683140	68k Ω
R159	1	1	GD05152140	1.5k Ω	R326	1	1	GD05753140	75k Ω
R161	1	1	GD05201140	200 Ω	R327	1	1	GD05753140	75k Ω
R162	1	1	GD05473140	47k Ω	R328	1	1	GD05473140	47k Ω
R202	1	1	GD05331140	330 Ω	R329	1	1	GD05473140	47k Ω
R203	1	1	GD05272140	2.7k Ω	R330	1	1	GD05222140	2.2k Ω
R204	1	1	GD05153140	15k Ω	R331	1	1	GD05222140	2.2k Ω
R205	1	1	GD05391140	390 Ω	R332	1	1	GD05473140	47k Ω
R206	1	1	GD05331140	330 Ω	R333	1	1	GD05473140	47k Ω
R208	1	1	GD05222140	2.2k Ω	R334	1	1	GD05102140	1k Ω
R209	1	1	RA05030090	Trimming 50k Ω (B)	R335	1	1	GD05102140	1k Ω
R210	1	1	GD05333140	33k Ω	R336	1	1	RA02030060	Trimming 20k Ω (B)
R211	1	1	GD05103140	10k Ω	R337	1	1	GD05222140	2.2k Ω
R212	1	1	RA05020160	Trimming 5k Ω	△R338	1	1	GG05150140	15 Ω
R214	1	1	GD05183140	18k Ω	R339	1	1	GD05102140	1k Ω
R215	1	1	GD05331140	330 Ω	R340	1	1	GD05472140	4.7k Ω
R216	1	1	RA05030090	Trimming 50k Ω (B)	R341	1	1	GD05474140	470k Ω
R217	1	1	GD05471140	470 Ω	R342	1	1	GD05474140	470k Ω
R218	1	1	GD05133140	13k Ω	R343	1	1	GD05304140	300k Ω
R219	1	1	GD05332140	3.3k Ω	R344	1	1	GD05223140	22k Ω
R220	1	1	GD05184140	180k Ω	R345	1	1	GD05331140	330 Ω
R221	1	1	GD05104140	100k Ω					
R222	1	1	GD05152140	1.5k Ω					
R223	1	1	GD05272140	2.7k Ω					
R224	1	1	GD05182140	1.8k Ω					
R225	1	1	GD05105140	1M Ω					
R226	1	1	GD05334140	330k Ω					
R227	1	1	RA01050090	Trimming 1M Ω (B) •					
R228	1	1	GD05105140	1M Ω					
R229	1	1	GD05105140	1M Ω					
R230	1	1	GD05334140	330k Ω					
R231	1	1	GD05224140	220k Ω					
R232	1	1	GD05473140	47k Ω					
R233	1	1	GD05563140	56k Ω					
R235	1	1	GD05333140	33k Ω					
R236	1	1	GD05223140	22k Ω					
R240	1	1	GD05680140	68 Ω					
R301	1	1	GD05224140	220k Ω					
R302	1	1	GD05272140	2.7k Ω					
R303	1	1	GD05562140	5.6k Ω					

● (A) : for Australia
● (N) : for Europe

REF. DESIG.	Q'TY		PART NO.	DESCRIPTION	
	A	N			
P200-SEMICONDUCTORS					
Q101	1	1	HF400451B0	F.E.T.	3SK45B
Q102	1	1	HT310471C0	Transistor	2SC047 (C)
Q103	1	1	HT308291C0	Transistor	2SC829 (C)
Q151	1	1	HC10019010	IC	HA1197
Q152	1	1	HV00006120	Varistor	MV-203
Q201	1	1	HT310471C0	Transistor	2SC1047C
Q202	1	1	HC10033010	IC	HA11225
Q203	1	1	HT309452A0	Transistor	2SC945 (P or Q)
Q204	1	1	HD20011050	Diode	1S1555
Q205	1	1	HD20011050	Diode	1S1555
Q206	1	1	HC10019060	IC	μPC741C
Q207	1	1	HV00006120	Varistor	MV-203
Q208	1	1	HD20011050	Diode	1S1555
Q301	1	1	HT309452A0	Transistor	2SC945 (P or Q)
Q302	1	1	HC10029010	IC	HA11223
Q303	1	1	HT317400S0	Transistor	2SC1740LN (S)
Q304	1	1	HT317400S0	Transistor	2SC1740LN (S)
Q305	1	1	HT309452A0	Transistor	2SC945 (P or Q)
Q306	1	1	HT309452A0	Transistor	2SC945 (P or Q)
Q307	1	1	HT317400S0	Transistor	2SC1740LN (S)
Q308	1	1	HT317400S0	Transistor	2SC1740LN (S)
Q309	1	1	HD30033090	Zener	WZ052
P200-FILTERS					
F151	1	1	FF10045220	Ceramic	450kHz
F201	1	1	FF11070050	Ceramic Filter	10.7MS3G
F202	1	1	FF11070130	Ceramic Filter	10.7MS3G
F203	1	1	FF11070130	Ceramic Filter	10.7MS3G
P200-COILS					
L101	1	1	LA12026170	Ant Coil	FM
L102	1	1	LA12026180	Ant Coil	FM
L103	1	1	LC17510010	Choke Coil	0.75μF
L104	1	1	LI10016010	I.F.T.	FM
L105	1	1	LO12046010	OSC Coil	FM
L106	1	1	LC13320020	Choke Coil	3.3μH
L151	1	1	LI10015060	I.F.T.	AM
L152	1	1	LI10010720	I.F.T.	AM
L153	1	1	LO10010480	OSC Coil	AM
L155	1	1	LC13320050	Choke Coil	3.3μH
L201	1	1	LI10156240	I.F.T.	FM
L202	1	1	LI10156230	I.F.T.	FM
L203	1	1	LC12230050	Choke Coil	22μH
L204	1	1	LC13320050	Choke Coil	3.3μH
L301	1	1	LS20013010	M.P.X. Coil	
L302	1	1	LS20013010	M.P.X. Coil	

REF. DESIG.	Q'TY		PART NO.	DESCRIPTION	
	A	N			
P800	1	1	YF22850020	P800-POWER SUPPLY CIRCUIT BOARD	
	1	1	ZZ22858020	P.W. Board, Power Supply P.W. Board Assembly	
P800-CAPACITORS					
C802	1	1	EA47701690	Elect	470 μ F 16V
C803	1	1	EA47702590	Elect	470 μ F 25V
C804	1	1	DK18103510	Ceramic	0.01 μ F
C805	1	1	DK18103510	Ceramic	0.01 μ F
△ C806	1	1	EA47702590	Elect	470 μ F 25V
△ C807	1	1	EA22802590	Elect	2200 μ F 25V
C808	1	1	EA47702590	Elect	470 μ F 25V
△ C809	1	1	EA10625010	Elect	10 μ F 250V
C810	1	1	EA10625010	Elect	10 μ F 250V
△ C811	1	1	EA10635010	Elect	10 μ F 350V
△ C812	1	1	EA10635010	Elect	10 μ F 350V
C813	1	1	EA10702590	Elect	100 μ F 25V
C814	1	1	EA10701690	Elect	100 μ F 16V
C815	1	1	EQ10505010	Elect	1 μ F 50V
C816	1	1	EA47503590	Elect	4.7 μ F 35V
P800-RESISTORS (All Resistors are $\pm 5\%$ and 1/4W)					
R801	1	1	GD05562140		5.6k Ω
R802	1	1	GD05104140		100k Ω
R803	1	1	GD05103140		10k Ω
R805	1	1	GG05331140		330 Ω
R806	1	1	GG05221140		220 Ω
R807	1	1	GW10822030		8.2k Ω $\pm 10\%$ 3W
R808	1	1	GG05301120		300 Ω
△ R809	1	1	GG05472140		4.7k Ω
R810	1	1	GD05103140		10k Ω
R811	1	1	GD05154140		150k Ω
R812	1	1	GD05123140		12k Ω
R813	1	1	GD05684140		680k Ω
R814	1	1	GD05100140		10 Ω
R815	1	1	GD05153140		15k Ω
R816	1	1	GD05102140		1k Ω
R817	1	1	GD05104140		100k Ω
R818	1	1	GA05330010		33 Ω 1W
R819	1	1	GA05301010		300 Ω 1W
R820	1	1	GD05473140		47k Ω
△ R821		1	RF05100140	Fusible	10 Ω

● (A) : for Australia
● (N) : for Europe

REF. DESIG.	Q'TY		PART NO.	DESCRIPTION	REF. DESIG.	Q'TY		PART NO.	DESCRIPTION
	A	N				A	N		
				P800-SEMICONDUCTORS	R911	1	1	RT05103140	10kΩ
Q801	1	1	HT309452A0	Transistor 2SC945 (Q or R)	R912	1	1	RT05103140	10kΩ
Q802	1	1	HT309452A0	Transistor 2SC945 (Q or R)	R913	1	1	RT05683140	68kΩ
Q803	1	1	HT403132A0	Transistor 2SD313 (D or E)	R914	1	1	RT05683140	68kΩ
Q804	1	1	HD30027090	Zener WZ140	R915	1	1	RT05623140	62kΩ
△ Q805	1	1	HD20005010	Diode W06B	R916	1	1	RT05623140	62kΩ
△ Q806	1	1	HD20005010	Diode W06B	R917	1	1	RT05823140	82kΩ
△ Q807	1	1	HD20014030	Diode DS130YA	R918	1	1	RT05204140	200kΩ
△ Q808	1	1	HD20014030	Diode DS130YA	R919	1	1	RT05105140	1MΩ
△ Q809	1	1	HD20021100	Diode 2DL15	R920	1	1	RT05105140	1MΩ
Q810	1	1	HD30027090	Zener WZ140					
Q811	1	1	HD20011050	Diode 1S1555	R921	1	1	RT05224140	220kΩ
Q812	1	1	HD20011050	Diode 1S1555	R922	1	1	RT05155140	1.5MΩ
Q813	1	1	HT309452A0	Transistor 2SC945 (Q or R)	R923	1	1	GG05153140	15kΩ
Q814	1	1	HT309452A0	Transistor 2SC945 (Q or R)	R924	1	1	RT05473140	47kΩ
Q815	1	1	HD20011050	Diode 1S1555	R925	1	1	RA01030250	Trimming 10kΩ
				P800-MISCELLANEOUS	R926	1	1	RA01030250	Trimming 10kΩ
△ F801	1	1	FS10125800	Fuse 1.25A	R927	1	1	RA01020150	Trimming 1kΩ
△ F802	1	1	FS30500010	Fuse 50mAT	R928	1	1	RA01020150	Trimming 1kΩ
△ F803	1	1	FS30500010	Fuse 50mAT	R929	1	1	RT05204140	200kΩ
△ F804	1	1	FS30500010	Fuse 50mAT	R930	1	1	RT05152140	1.5kΩ
△ F805	1	1	FS10031800	Fuse 315mAT					
J801					R931	1	1	RA01030070	Trimming 10kΩ
J810	10	10	YJ08000270	Jack, Fuse Holder	R932	1	1	RT05473140	47kΩ
J821	1	1	YP06001310	Plug (6P)					
				P900-SCOPE AMP. CIRCUIT BOARD					P900-SEMICONDUCTORS
P900	1	1	YK22190310	P.W. Board, Scope Amp.	Q901	1	1	HF200304A0	F.E.T. 2SK30A
	1	1	ZZ22860310	P.W. Board Assembly	Q902	1	1	HF200304A0	F.E.T. 2SK30A
				P900-CAPACITORS	Q903	1	1	HF200304A0	F.E.T. 2SK30A
C901	1	1	DK18103820	Ceramic 0.01μF 1kV	Q904	1	1	HF200304A0	F.E.T. 2SK30A
C902	1	1	DK18103820	Ceramic 0.01μF 1kV	Q905	1	1	HT317562B0	Transistor 2SC1756 D or E
C903	1	1	DF17473520	Film 0.047μF ±20% 200V	Q906	1	1	HT317562B0	Transistor 2SC1756 D or E
				P900-RESISTORS	Q907	1	1	HT317562B0	Transistor 2SC1756 D or E
				(All Resistors are ±5% and 1/4W)	Q908	1	1	HT317562B0	Transistor 2SC1756 D or E
R901	1	1	RT05224140	220kΩ	Q909	1	1	HD20003210	Diode 1S2471
R902	1	1	RT05224140	220kΩ	Q910	1	1	HD20003210	Diode 1S2471
R903	1	1	RT05224140	220kΩ					
R904	1	1	RT05224140	220kΩ	Q911	1	1	HD20001210	Diode 1S2473
R905	1	1	RT05682140	6.8kΩ					P900-MISCELLANEOUS
R906	1	1	RT05682140	6.8kΩ	J901	1	1	YP06001630	Plug (8P)
R907	1	1	RT05222140	2.2kΩ	J902	1	1	YP06001050	Plug (5P)
R908	1	1	RT05222140	2.2kΩ	J903	1	1	YP06001050	Plug (5P)
R909	1	1	RT05103140	10kΩ	J904	1	1	YB00140030	Connective Cord
R910	1	1	RT05103140	10kΩ	J905	1	1	YB00180010	Connective Cord
					J906	1	1	YB00140030	Connective Cord
					J907	1	1	YB00120010	Connective Cord
					J908	1	1	YB00140040	Connective Cord
					J909	1	1	YB00150010	Connective Cord
					J910	1	1	YB00180020	Connective Cord
					J911	1	1	YB00200290	Connective Cord
					J912	1	1	YB00180030	Connective Cord
					J913	1	1	YB00210010	Connective Cord
					J914	1	1	YJ06001310	Jack (6P)

● (A) : for Australia
● (N) : for Europe

REF. DESIG.	Q'TY		PART NO.	DESCRIPTION
	A	N		
PR00	1	1	YK22861210	PR00-SCOPE SWITCH CIRCUIT BOARD P.W. Board, Scope Switch
	1	1	ZZ22852210	P.W. Board Assembly
CR01	1	1	DF17473050	PR00-CAPACITORS Film 0.047 μ F $\pm$ 20%
CR02	1	1	EV22403560	Elect 0.22 μ F 35V
CR03	1	1	EV22403560	Elect 0.22 μ F 35V
CR04	1	1	EV22403560	Elect 0.22 μ F 35V
CR05	1	1	DK18223320	Ceramic 0.022 μ F +100% -0
RR01	1	1	GG05221140	PR00-RESISTORS (All Resistors are $\pm$ 5% and 1/4W) 220 Ω
RR02	1	1	GA05181010	180 Ω 1W
RR03	1	1	GD05473140	47k Ω
RR04	1	1	GD05473140	47k Ω
RR05	1	1	GD05394140	390k Ω
RR06	1	1	GD05183140	18k Ω
RR07	1	1	GD05473140	47k Ω
RR08	1	1	GD05273140	27k Ω
RR09	1	1	GD05473140	47k Ω
RR10	1	1	GD05183140	18k Ω
RR11	1	1	GD05103140	10k Ω
RR13	1	1	GD05473140	47k Ω
JR01	1	1	YJ06001330	PR00-MISCELLANEOUS Jack, (8P)
SR01	1	1	SP04040200	Push Switch, Scope
PS00	1	1	YH22851210	PS00-FUNCTION SWITCH CIRCUIT BOARD P.W. Board, Function Switch
	1	1	ZZ21318210	P.W. Board Assembly
SS01	1	1	SP06020150	Push Switch, Function
PT00	1	1	YH22851220	PT00-MODE SWITCH CIRCUIT BOARD P.W. Board, Mode Switch
	1	1	ZZ22858220	P.W. Board Assembly
QT01	1	1	HD20011050	PT00-SEMICONDUCTOR Diode 1S1555
ST00	1	1	SP02020433	PT00-SWITCH Push Switch, Mode
PY00	1	1	YK22861220	PY00-LED CIRCUIT BOARD P.W. Board, LED
	1	1	ZZ22861220	P.W. Board Assembly
RY01	1	1	GD05122140	PY00-RESISTORS 1.2k Ω $\pm$ 5% 1/4W
RY03	1	1	GD05122140	1.2k Ω $\pm$ 5% 1/4W

REF. DESIG.	Q'TY		PART NO.	DESCRIPTION
	A	N		
QY01	1	1	HI10004030	PY00-SEMICONDUCTORS L.E.D.
QY03	1	1	HI10004030	L.E.D.
PZ01	1	1	YF22860020	PZ01-DIAL ILLUMINATOR CIRCUIT BOARD P.W. Board, Dial Illuminator
	1	1	ZZ22861020	P.W. Board Assembly
JZ03				
JZ14	12	12	YJ08000170	Jack, Lamp Holder
VZ01				
VZ06	6	6	IN10080070	Dial Lamp 0.2A 8V

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

8. TECHNICAL SPECIFICATIONS

FM TUNER SECTION

Frequency Range	87.4~108.2 MHz
Usable Sensitivity 40 kHz Deviation, 98 MHz	
Mono, S/N 26 dB	1.4 μ V
Stereo, S/N 46 dB	45 μ V
Alternate Channel Selectivity, 98 MHz $\pm$ 300 kHz	75 dB
Image Response Rejection, 98 MHz	60 dB
IF Rejection, 98 MHz	98 dB
Spurious Response Rejection, 98 MHz	98 dB
AM Suppression, 98 MHz	59 dB
Signal-to-Noise Ratio, 98 MHz	
Unweighted: Mono	65 dB
Stereo	60 dB
Weighted: Mono	68 dB
Stereo	64 dB
Pilot Signal & Subcarrier Rejection	
19 kHz	68 dB
38 kHz	74 dB
Total Harmonic Distortion, 98 MHz	
Mono	0.06%
Stereo	0.17%
Frequency Response	
30 Hz~15 kHz	+0, -0.4 dB
Separation	
Stereo	55 dB
Channel Balance	0.3 dB
Output Voltage, 1 kHz	560 mV
Output Impedance, 1 kHz	1.0 kohms
Acceptable Load Impedance, 1 kHz	10 kohms
Antenna Terminals	
Balanced	300 ohms
Unbalanced	75 ohms

AM TUNER SECTION

Frequency Range	520~1630 kHz
Usable Sensitivity (26 dB S/N 30% Mod., 1 MHz)	25 μ V
Selectivity, 1 MHz $\pm$ 9 kHz	46 dB
Image Rejection, 1 MHz	50 dB
IF Rejection, 1 MHz	40 dB
Spurious Response Rejection, 1 MHz	105 dB
Signal-to-Noise Ratio, 1 MHz	60 dB
Frequency Response, 1 MHz $\pm$ 3 dB	40 Hz~2.6 kHz
Total Harmonic Distortion, 1 MHz	0.5%

GENERAL

Power Requirements	220 V AC, 50 Hz
(N version is featuring an external voltage selector for use on 110/220V. Other versions can be converted by qualified technician to operate on 220/240V.)	
Power Consumption	30 W
Semiconductor Complement	
Integrated Circuits	4
Transistors	20
Diodes	19
Field Effect Transistors	5
Dimensions	
Panel Width	416 mm (16-3/8")
Panel Height	146 mm (5-3/4")
Depth	302 mm (11-51/64")
Weight	
Unit alone	8 kg (17.6 lbs)
Packed for shipment	9 kg (19.8 lbs)