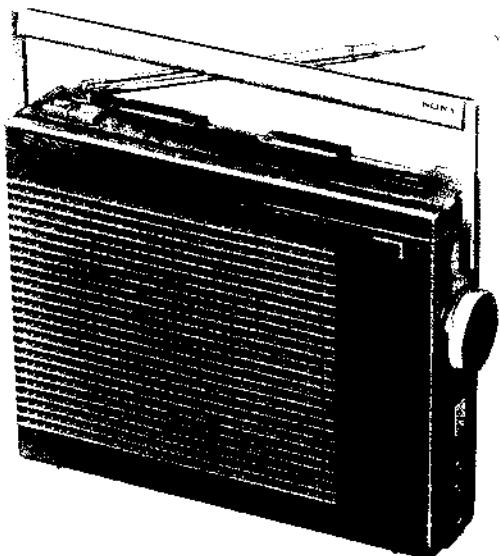


# ICF-P2L

AEP Model  
UK Model



## FM/SW/MW/LW 4-BAND RECEIVER

### SPECIFICATIONS

<b>Power Requirements:</b>	3 V dc, two batteries size "D" (IEC designation R20) 240 V ac, 50 Hz with optional Sony AC Power Adaptor AC-35 (UK model) 220 V ac, 50 Hz with optional Sony AC Power Adaptor AC-35 (AEP model) 12 V car battery with optional Sony Car Battery Cord DCC-127A	<b>Power Output:</b> 220 mW (at 10 % harmonic distortion) with POWER SAVE switch OFF 80 mW (at 10 % harmonic distortion) with POWER SAVE switch ON
<b>Antennas:</b>	FM/SW: Telescopic antenna MW/LW: Built-in ferrite-rod antenna	<b>Output:</b> Earphone jack (minijack) Multiplex output jack (minijack)
<b>Frequency Range:</b>	FM: 87.5–108 MHz SW: 5.9–18 MHz (51–17 m) MW: 530–1,605 kHz (566–187 m) LW: 150–285 kHz (2,000–1,053 m)	<b>Speaker:</b> Approx. 10 cm (4 inches) dia.
		<b>Dimensions:</b> Approx. 200 (w) x 160 (h) x 46 (d) mm 77 $\frac{1}{2}$ (w) x 6 $\frac{1}{4}$ (h) x 1 $\frac{3}{4}$ (d) inches including projecting parts and controls not including handle
		<b>Weight:</b> Approx. 1.3 kg (2 lb 14 oz) including batteries

**SONY®**  
**SERVICE MANUAL**

# SECTION 1

## OUTLINE

### 1-1. CIRCUIT DESCRIPTION

#### TIMER Switch (See Fig. 1)

This unit is equipped with a timer function in which pressing the TIMER SET switch while the POWER switch is off, the receiver turns on and after about one hour it is off automatically. The operation of this circuit is described below.

##### ● When the POWER Switch is ON

The receiver operates since the ground circuit of the receiver is connected to the minus side of batteries through S1-1.

##### ● When the POWER Switch is OFF

When the POWER switch is turned from ON to OFF, since the switches have been designed to short all three terminals momentarily, the capacitor C46 is discharged through C46 → S1-2 → S1-1 for a short period until the switch S1 is in the OFF position completely.

After C46 is discharged, the gate G of PUT\* becomes 0 V and the PUT is turned on. This removes the bias voltage of Q11, turning Q11 and Q10 off. Therefore, the receiver does not operate.

Next, when the TIMER SET switch S5 is turned on, the B+ voltage is applied to the gate G of PUT through R44 and S5, reverse-biasing the PUT, so that the PUT is turned off. Consequently, Q11 and Q10 conduct and the receiver operate. At the same time, because of turning S5 on, C46 is charged through R44 → S5 → S1-2 → C46.

When S5 is turned off, the charge in C46 is discharged through R45 and the gate voltage of PUT starts decreasing with a time constant determined

by C46 and R45. When this voltage falls below a certain value, the PUT conducts, turning off Q11 and Q10 where upon the receiver stops operating.

The time setting of the timer has been adjusted to about one hour by selecting the values of C46 and C45. To inactivate the timer while using, it is sufficient to press the TIMER OFF switch S6 which forcibly discharges C46.

#### \* Programmable Unijunction Transistor (PUT)

The PUT is a switching element made up of an NPN and a PNP transistor on the same silicon wafer. (See Fig. 2)

Stable ON and OFF states can be obtained in this device depending on the bias between A and K and the switching can be controlled either by an external resistor connected to or a voltage applied to the gate G. This is actually a reverse blocking triode N-Gate thyristor. (The A-K junction is turned on, when the voltage of G becomes 0.3 – 0.4 V less than that of A).

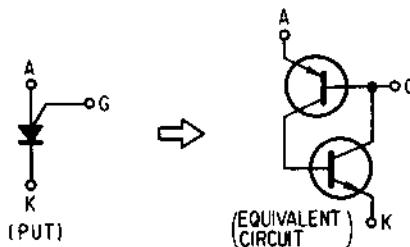


Fig. 2

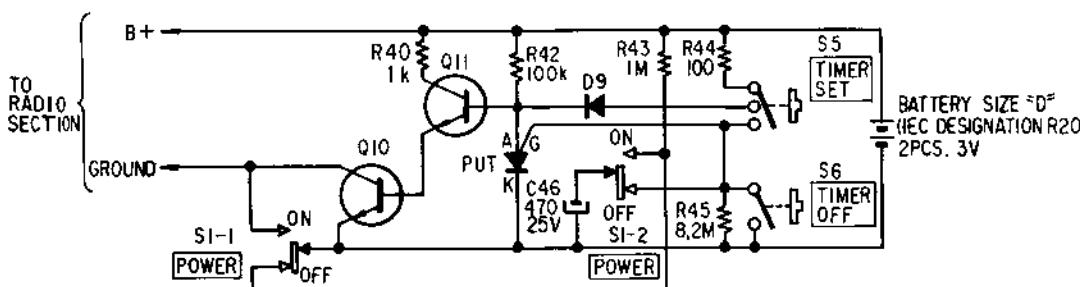


Fig. 1

### POWER SAVE Switch (See Fig. 3)

This unit is provided with the POWER SAVE switch which conserves the battery duration.

When the switch is kept ON, the power saving circuit comes into operation conserving the battery duration by 1.6 times compared to when the switch is OFF at the same listening level.

The battery life when using the SONY dry batteries Super SUM-1S are

POWER SAVE switch OFF: about 85 hours

POWER SAVE switch ON: about 140 hours

The operation of the POWER SAVE switch is described below.

#### • S3-1

The secondary side tap of the output transformer T2 is changed to about 1/3 of the normal value. The load impedance of the output stage is in-

creased by about nine times ( $=3^2$ ), thereby improving the efficiency. Thus the current drain at the same output is decreased.

#### • S3-2

- 1) Since the maximum output of the power amplifier (Q8, 9) becomes lower, the output of the driving amplifier also can be decreased.
- 2) Since the load impedance becomes higher by turning ON S3-1, the crossover distortion will be less. Accordingly, the idling current drain can be decreased to that extent.
- 3) Because the load impedance increases, the overall gain of the amplifier increases, increasing the negative feedback as well as making it less stable. For this reason, the emitter resistance value is increased to reduce the overall gain.

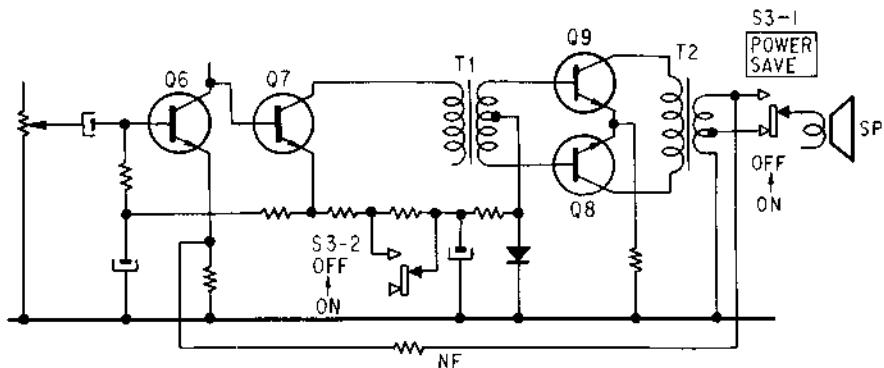
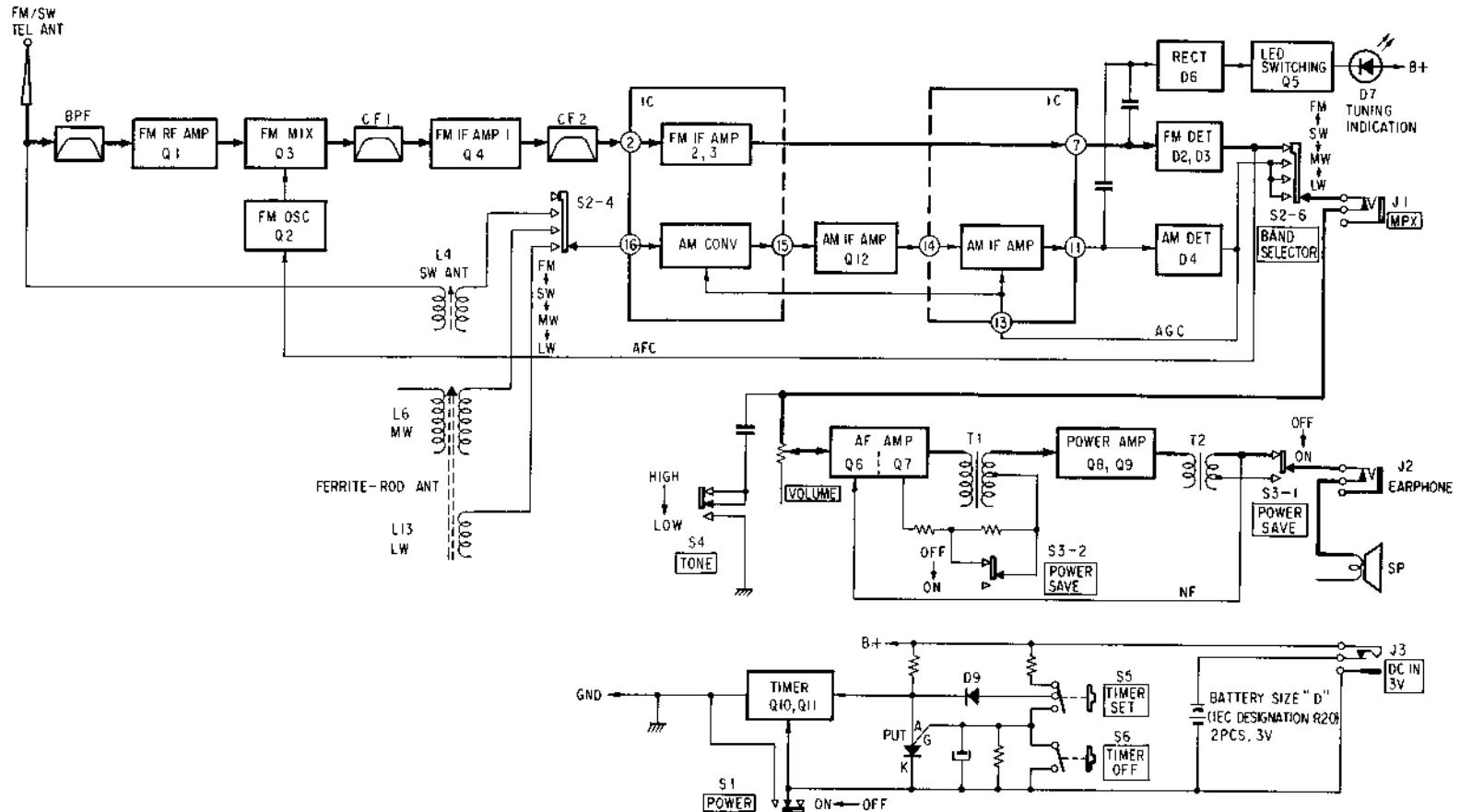


Fig. 3

## 1.2. BLOCK DIAGRAM

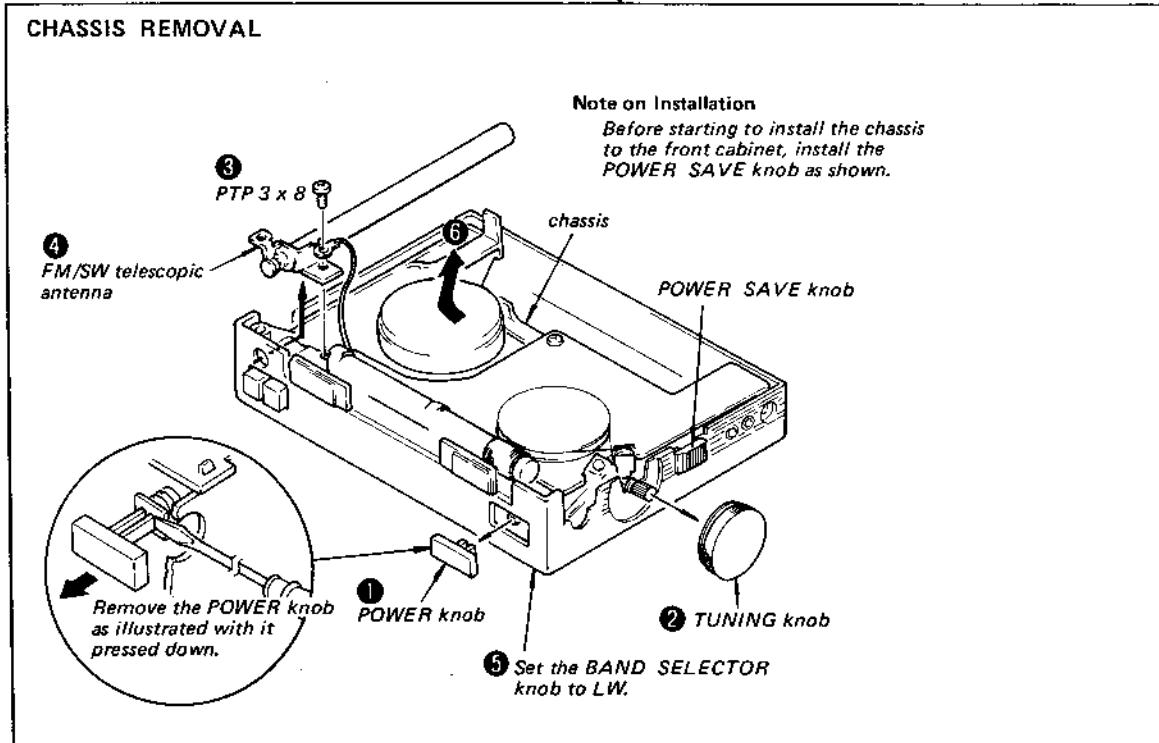
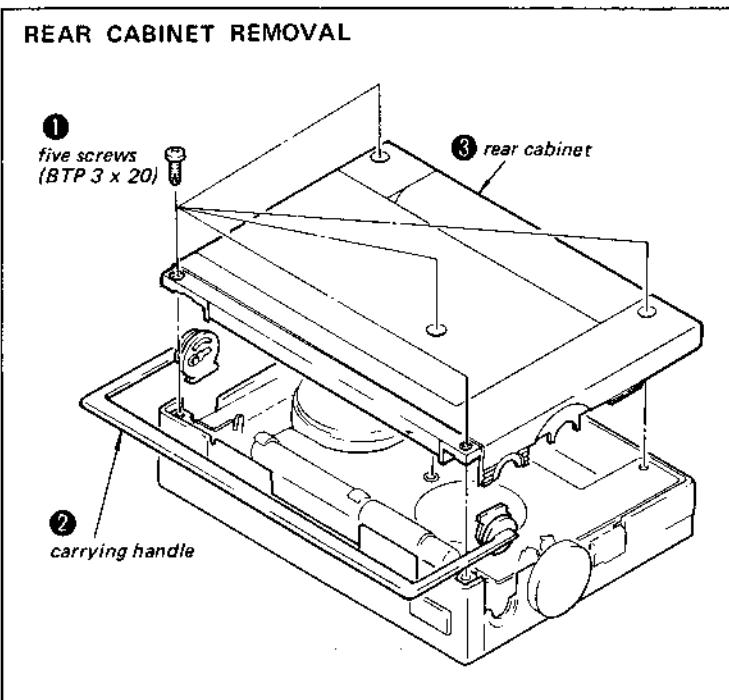


## SECTION 2

### DISASSEMBLY

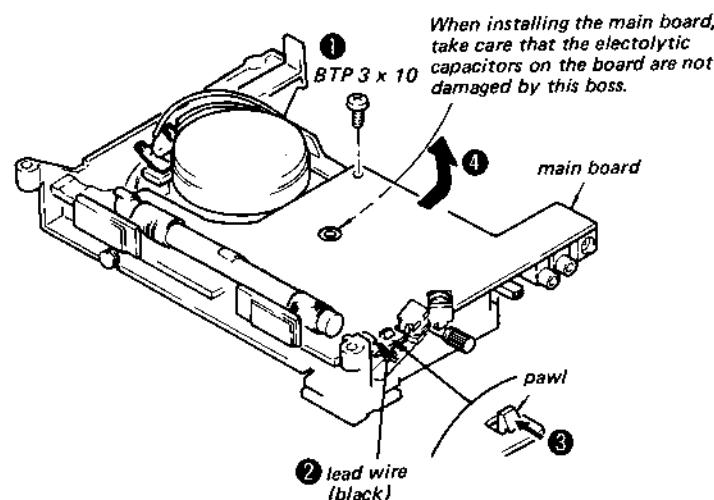
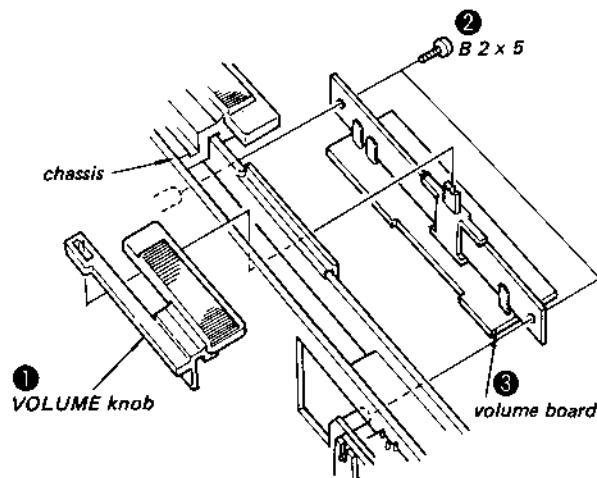
#### 2-1. REMOVAL

- Follow the disassembly procedure in the numerical order given.



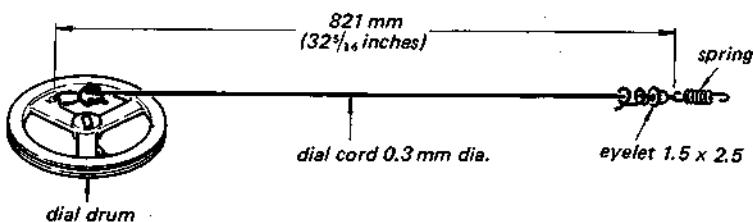
**Remove the Dial Cord.**

Referring to the next page, perform the procedures in the reversed order.

**MAIN BOARD REMOVAL****VOLUME BOARD REMOVAL**

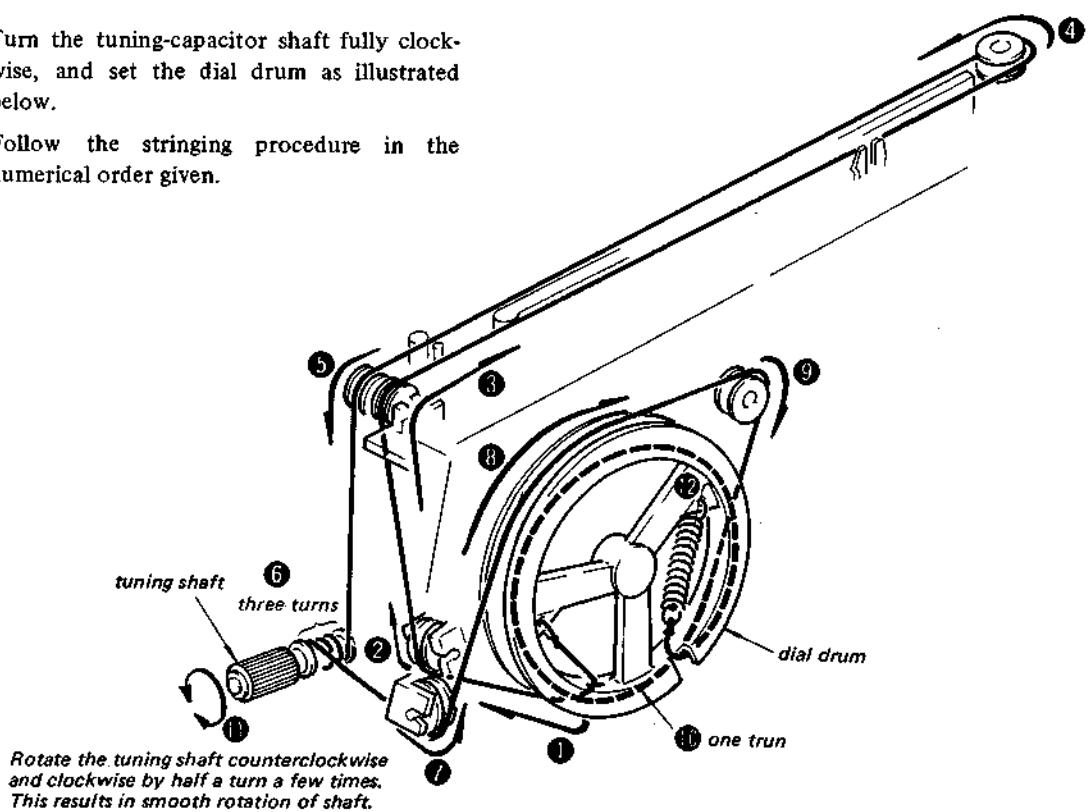
## 2-2. DIAL CORD STRINGING

### 1. Preparation



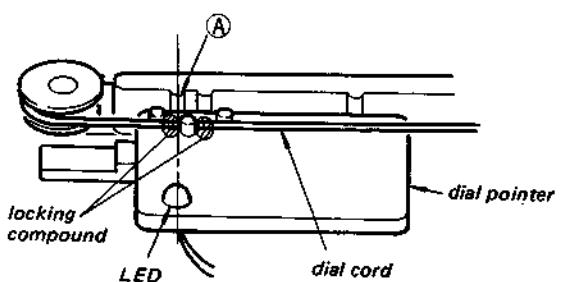
### 2. Stringing

- 1) Turn the tuning-capacitor shaft fully clockwise, and set the dial drum as illustrated below.
- 2) Follow the stringing procedure in the numerical order given.



### 3. Dial Pointer Installation

Turn the tuning shaft fully counter-clockwise, place the LED and the portion "A" in a line and apply suitable locking compound to the dial cord as shown.



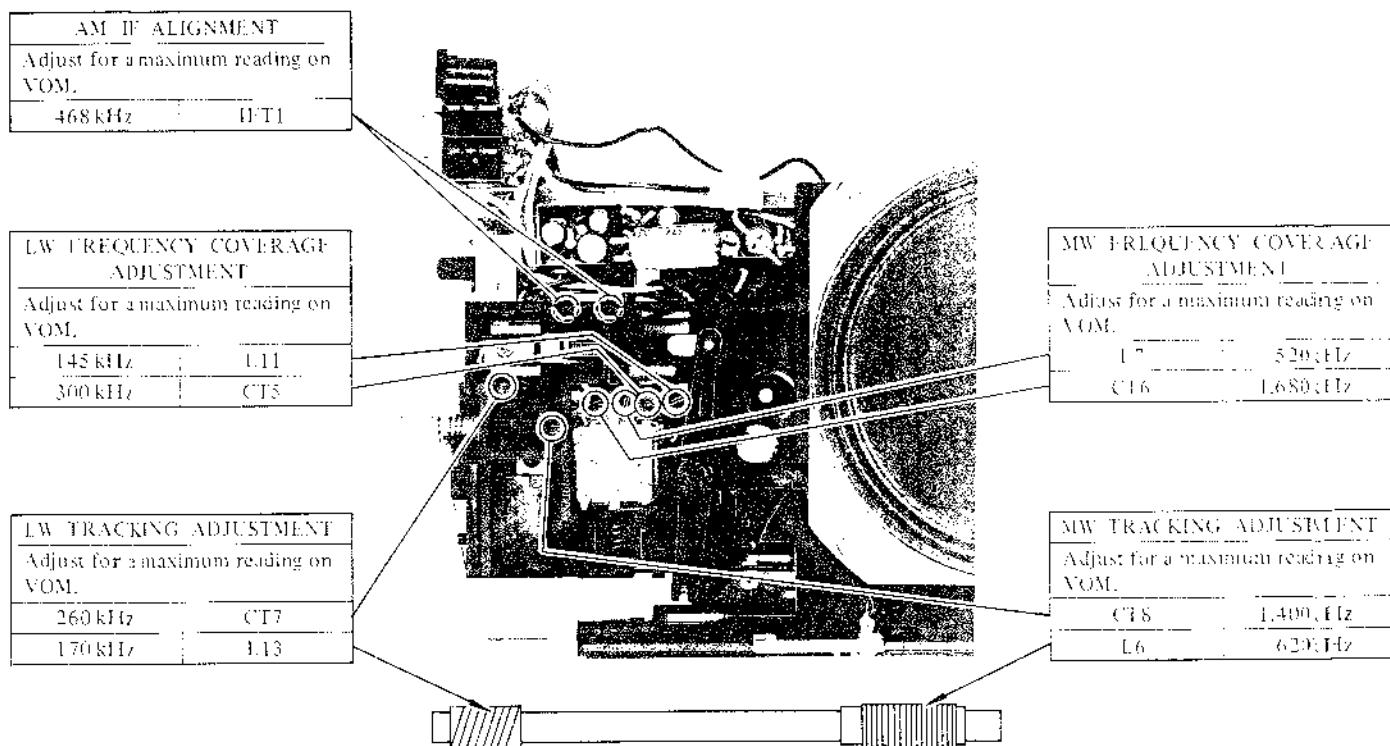
## SECTION 3

### ADJUSTMENTS

#### 3-1. MW/LW SECTION



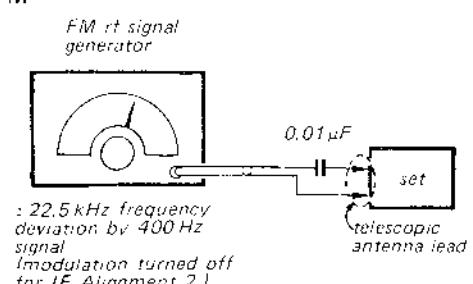
- Repeat the procedures in each adjustment several times, and the frequency coverage and tracking adjustments should be finally done by the trimmer capacitors.



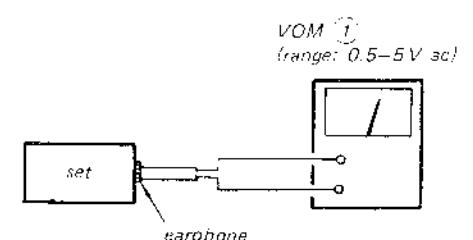
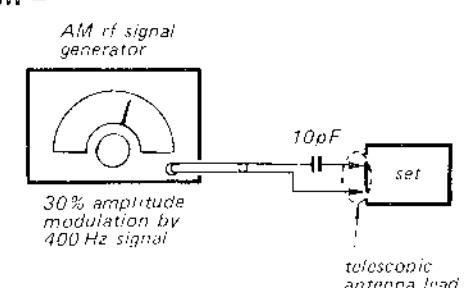
| 4 WATT CARBON RESISTORS A Note: Circled letter A is applicable to European models only.

## 3-2. FM/SW SECTION

## - FM -



## - SW -



- Repeat the procedures in each adjustment several times, and the frequency coverage and tracking adjustments should be finally done by the trimmer capacitors.

**FM IF ALIGNMENT 1**  
Adjust for a maximum reading on  
VOM ①.  
10.7 MHz with IFT3  
modulation IFT2

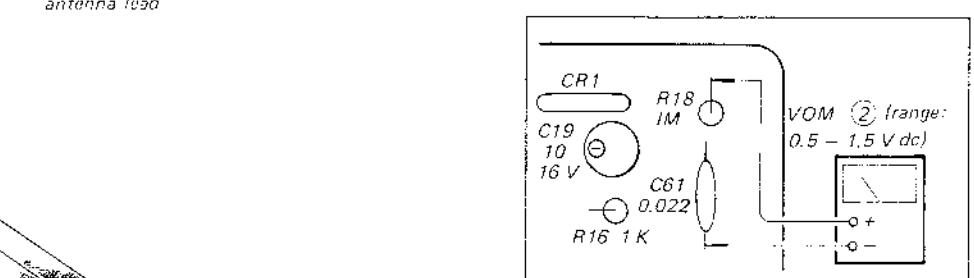
**FM IF ALIGNMENT 2**  
Adjust for 0V reading on  
VOM ②.  
10.7 MHz with  
no modulation IFT3

**SW FREQUENCY COVERAGE  
ADJUSTMENT**

Adjust for a maximum reading on  
VOM ①.  
18.4 MHz CT1  
5.8 MHz L5

**SW TRACKING ADJUSTMENT**

Adjust for a maximum reading on  
VOM ①.  
18.4 MHz CT2  
5.8 MHz L4

**FM FREQUENCY COVERAGE  
ADJUSTMENT**

Adjust for a maximum reading on  
VOM ①.

CT3	109.5 MHz (108.5 MHz)
L3	86.5 MHz (87.1 MHz)

**FM TRACKING ADJUSTMENT**

Adjust for a maximum reading on  
VOM ①.

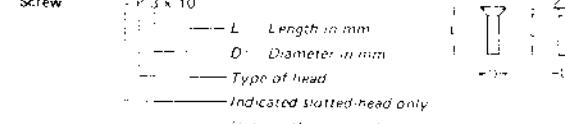
L2	86.5 MHz (87.1 MHz)
CT4	109.5 MHz (108.5 MHz)

( ) in West Germany

#	Part No.	Part No.						
1.0	1-246 401 00	10	1-246 425 00	100	1-246 449 00	1.3K	1-246 473 00	10%
1.1	1-246 402 00	11	1-246 426 00	110	1-246 456 00	1.1K	1-246 474 00	11%
1.2	1-246 403 00	12	1-246 427 00	120	1-246 451 00	1.2K	1-246 475 00	12%
1.3	1-246 404 00	13	1-246 428 00	130	1-246 452 00	1.3K	1-246 476 00	13%
1.5	1-246 405 00	15	1-246 429 00	150	1-246 453 00	1.5K	1-246 477 00	15%
1.6	1-246 406 00	16	1-246 430 00	160	1-246 454 00	1.6K	1-246 478 00	16%
1.8	1-246 407 00	18	1-246 431 00	180	1-246 455 00	1.8K	1-246 479 00	18%
2.0	1-246 408 00	20	1-246 432 00	200	1-246 456 00	2.0K	1-246 480 00	20%
2.2	1-246 409 00	22	1-246 433 00	220	1-246 457 00	2.2K	1-246 481 00	22%
2.4	1-246 410 00	24	1-246 434 00	240	1-246 458 00	2.4K	1-246 482 00	24%
2.7	1-246 411 00	27	1-246 435 00	250	1-246 459 00	2.7K	1-246 483 00	27%
3.0	1-246 412 00	30	1-246 436 00	260	1-246 460 00	3.0K	1-246 484 00	30%
3.3	1-246 413 00	33	1-246 437 00	270	1-246 461 00	3.3K	1-246 485 00	33%
3.5	1-246 414 00	35	1-246 438 00	280	1-246 462 00	3.5K	1-246 486 00	35%
3.8	1-246 415 00	38	1-246 439 00	290	1-246 463 00	3.8K	1-246 487 00	38%
4.3	1-246 416 00	43	1-246 440 00	300	1-246 464 00	4.3K	1-246 488 00	43%
4.7	1-246 417 00	47	1-246 441 00	310	1-246 465 00	4.7K	1-246 489 00	47%
5.1	1-246 418 00	51	1-246 442 00	310	1-246 466 00	5.1K	1-246 490 00	51%
5.6	1-246 419 00	56	1-246 443 00	560	1-246 467 00	5.6K	1-246 491 00	56%
6.2	1-246 420 00	62	1-246 444 00	620	1-246 468 00	6.2K	1-246 492 00	62%
6.8	1-246 421 00	68	1-246 445 00	680	1-246 469 00	6.8K	1-246 493 00	68%
7.5	1-246 422 00	75	1-246 448 00	750	1-246 470 00	7.5K	1-246 494 00	75%
8.2	1-246 423 00	82	1-246 447 00	820	1-246 471 00	8.2K	1-246 495 00	82%
9.1	1-246 424 00	91	1-246 448 00	910	1-246 472 00	9.1K	1-246 496 00	91%

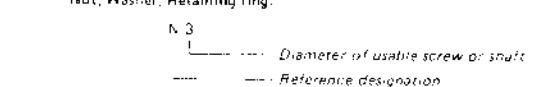
**HARDWARE NOMENCLATURE**

## Screw



Unless otherwise indicated, it means cross-recessed head (Philips type).

## Nut, Washer, Retaining ring:



Reference Designation	Shape	Description	Remarks
<b>SCREWS</b>			
P	pan-head screw	binding-head (B) screw for replacement	
PWH	pan-head screw with washer face	binding-head (B) screw and flat washer for replacement	
PS	pan-head screw with spring washer	binding-head (B) screw and spring washer for replacement	
PSW	pan-head screw with spring and flat washers	binding-head (B) screw and spring and flat washers for replacement	
R	round-head screw	binding-head (B) screw for replacement	
K	flat-countersunk head screw		
PK	oval-countersunk head screw		
B	binding-head screw		
T	truss-head screw	binding-head (B) screw for replacement	
F	flat-filister head screw		
RF	filister head screw		
BV	brazer head screw		

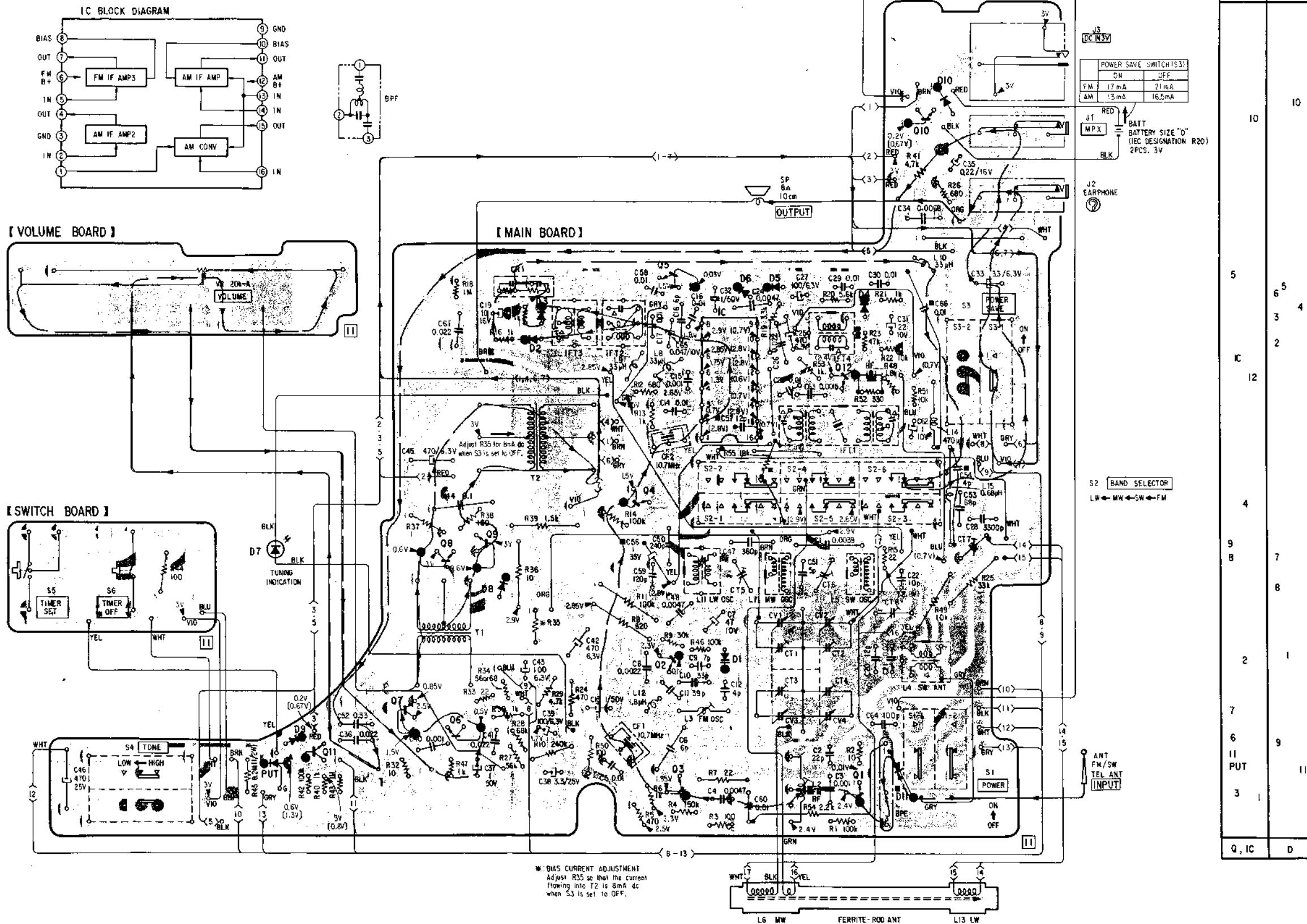
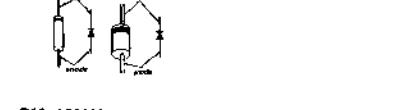
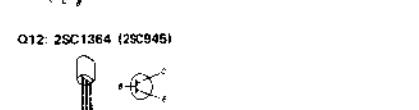
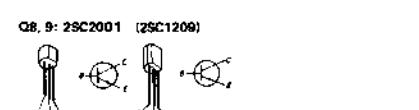
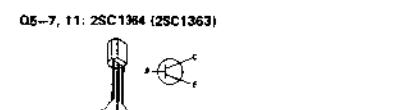
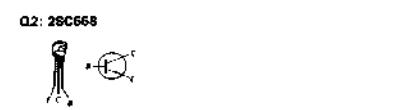
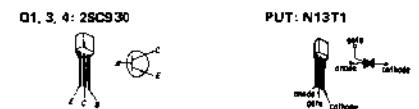
Reference Designation	Shape	Description	Remarks
<b>SELF-TAPPING SCREWS</b>			
TA	pan-head screw	binding-head (A) screw	ex. TA 3 x 10
PTP	pan-head self-tapping screw	binding-head (A) self-tapping screw	PTP 3 x 10
PTPWH	pan-head self-tapping screw with washer face	binding-head (A) self-tapping screw with washer face	PTPWH 3 x 10
PTTWH	pan-head thread rolling screw with washer face	binding-head (A) thread rolling screw with washer face	PTTWH 3 x 10
<b>SET SCREWS</b>			
SC	set screw	hexagon socket set screw	ex. SC 2.5 x 4 hexagon socket
SC	set screw	hexagon socket set screw	ex. SC 2.5 x 4 hexagon socket
<b>NUT</b>			
<b>WASHERS</b>			
W	flat washer	flat washer	
SW	spring washer	spring washer	
LW	internal tooth lock washer	internal tooth lock washer	ex. LW3, internal
LW	external tooth lock washer	external tooth lock washer	ex. LW3, external
<b>RETAINING RINGS</b>			
C	retaining ring	retaining ring	
G	grip-type retaining ring	grip-type retaining ring	

## SECTION 4 DIAGRAMS

### 4-1. MOUNTING DIAGRAM

#### • Replacement Semiconductors

For replacement, use semiconductors  
except in ( ).



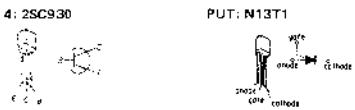
## SECTION 4 DIAGRAMS

### 4-1. MOUNTING DIAGRAM

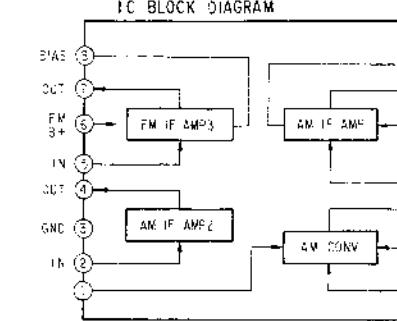
- Replacement Semiconductors

For replacement, use semiconductors  
except in ( ).

Q1, 3, 4: 2SC930



PUT: N13T1



Q2: 2SC688



Q5-7, 11: 2SC1364 (2SC1363)



Q8, 9: 2SC2001 (2SC1209)



Q10: 2SC1474



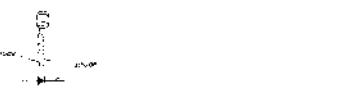
Q12: 2SC1364 (2SC945)



IC: μPC1018C

D1: 1S2139C (SD116)  
D2, 3, 5, 6: 1T261  
D4: 1T22AM (1T23A)

D7: SLP114B



D8, 9: VD1121



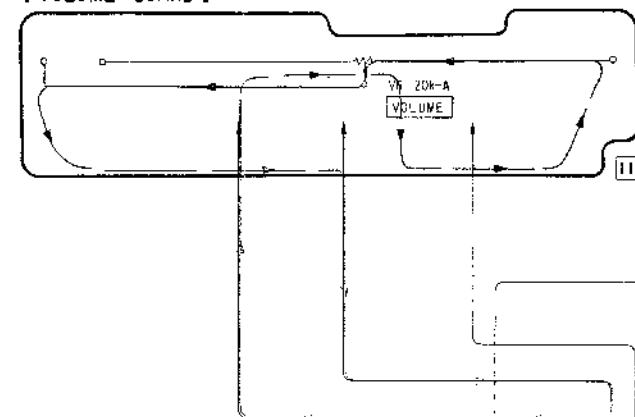
D10: 10E2 (IGP08B)



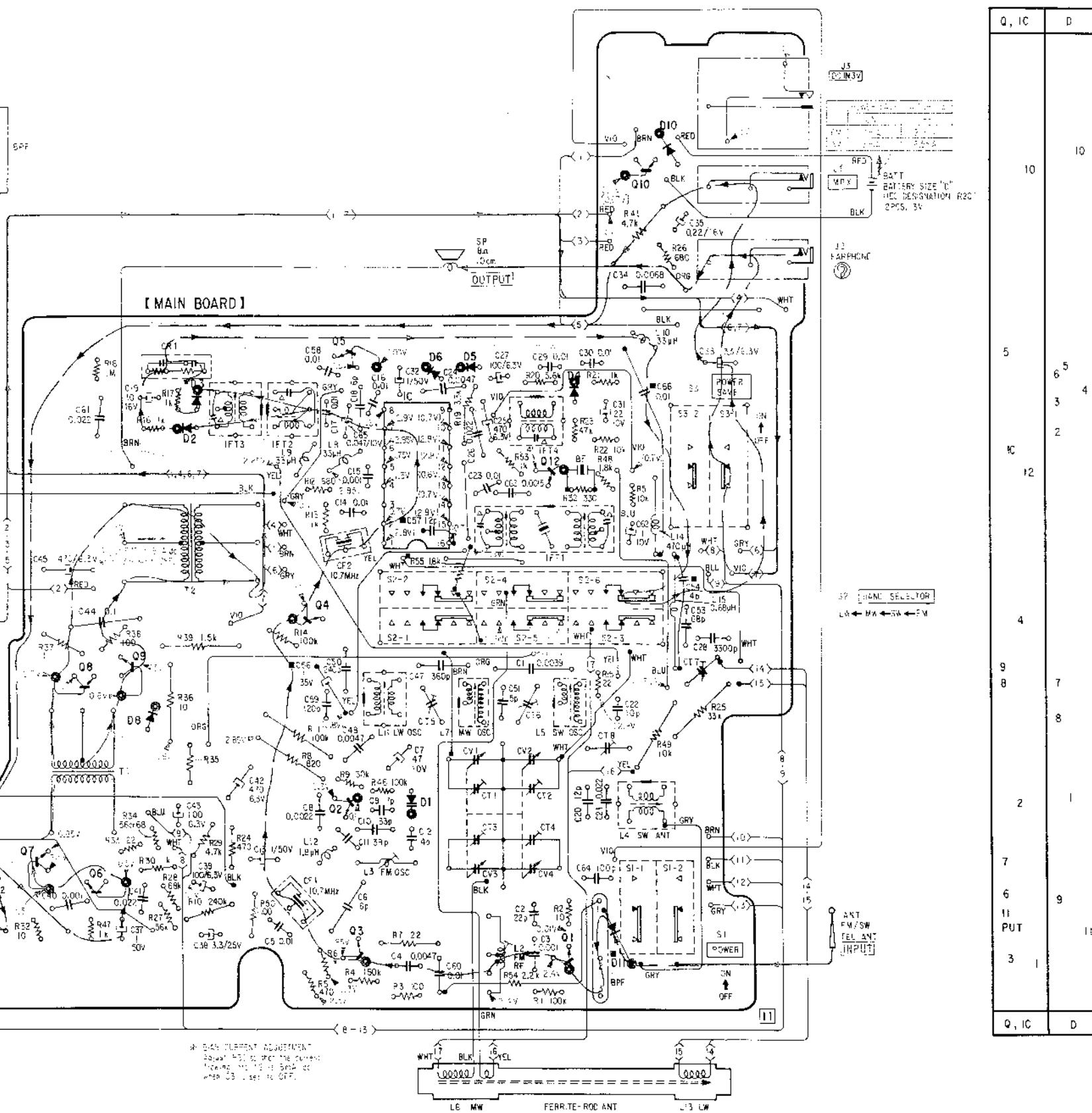
D11: 1S2222



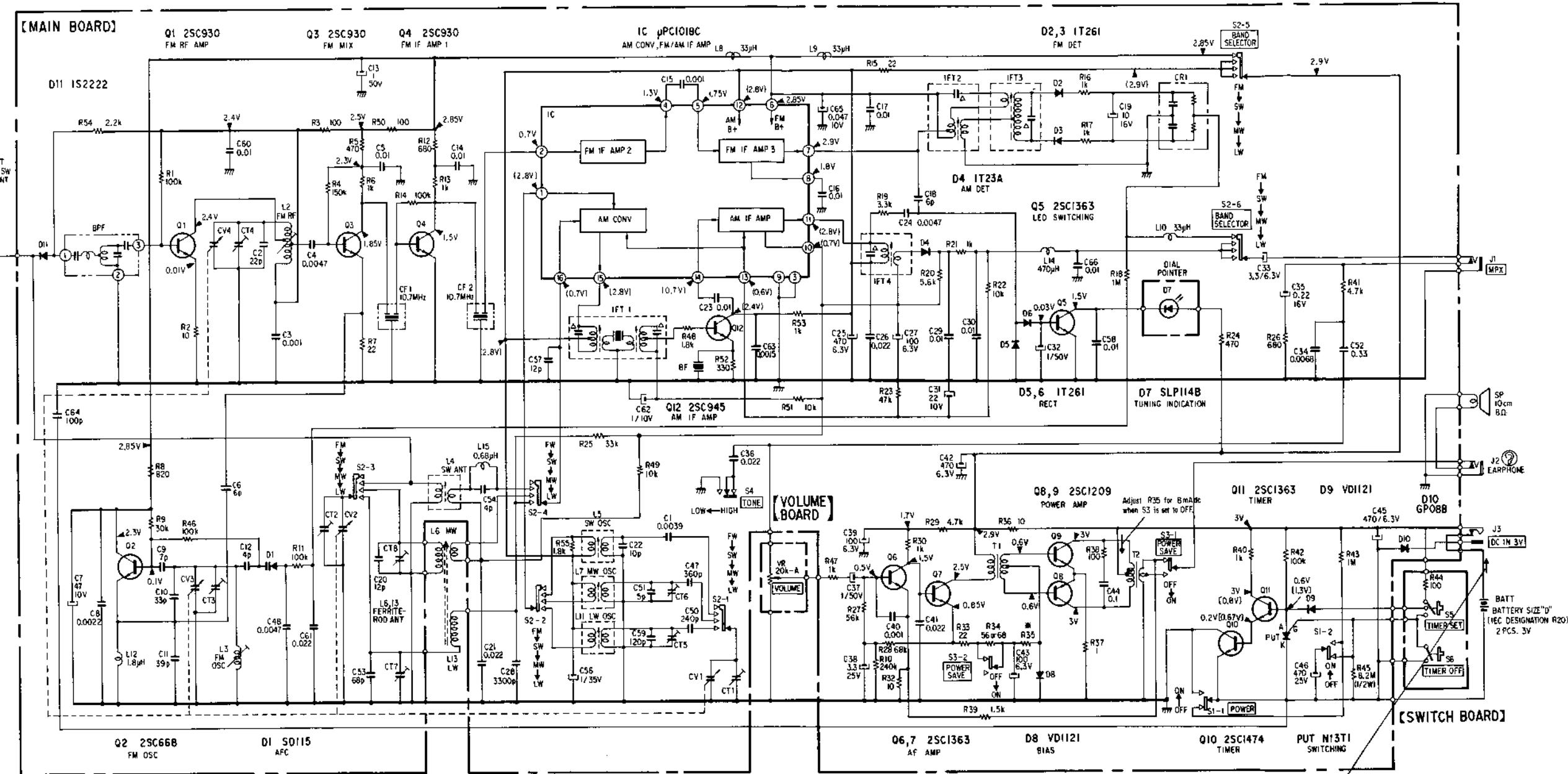
[ VOLUME BOARD ]



[ MAIN BOARD ]



## 4-2. SCHEMATIC DIAGRAM

**Note: — For Mounting Diagram —**

- : parts extracted from the component side.
- : parts extracted from the conductor side.
- : part mounted on the conductor side.
- : indicates side identified with part number.
- : B+ pattern.
- : signal path.

**Note: — For Schematic Diagram —**

- All capacitors are in  $\mu\text{F}$  unless otherwise noted.  $\text{pF}$  :  $\mu\mu\text{F}$  50 WV or less are not indicated except for electrolytics.
- All resistors are in ohms,  $\frac{1}{2}\text{W}$  unless otherwise noted.  $\text{k}\Omega$  : 1000  $\Omega$ ,  $\text{M}\Omega$  : 1000 k $\Omega$ .
- $\triangle$  : internal component.
- : B+ bus.
- : panel designation.
- Voltages are dc with respect to ground unless otherwise noted.

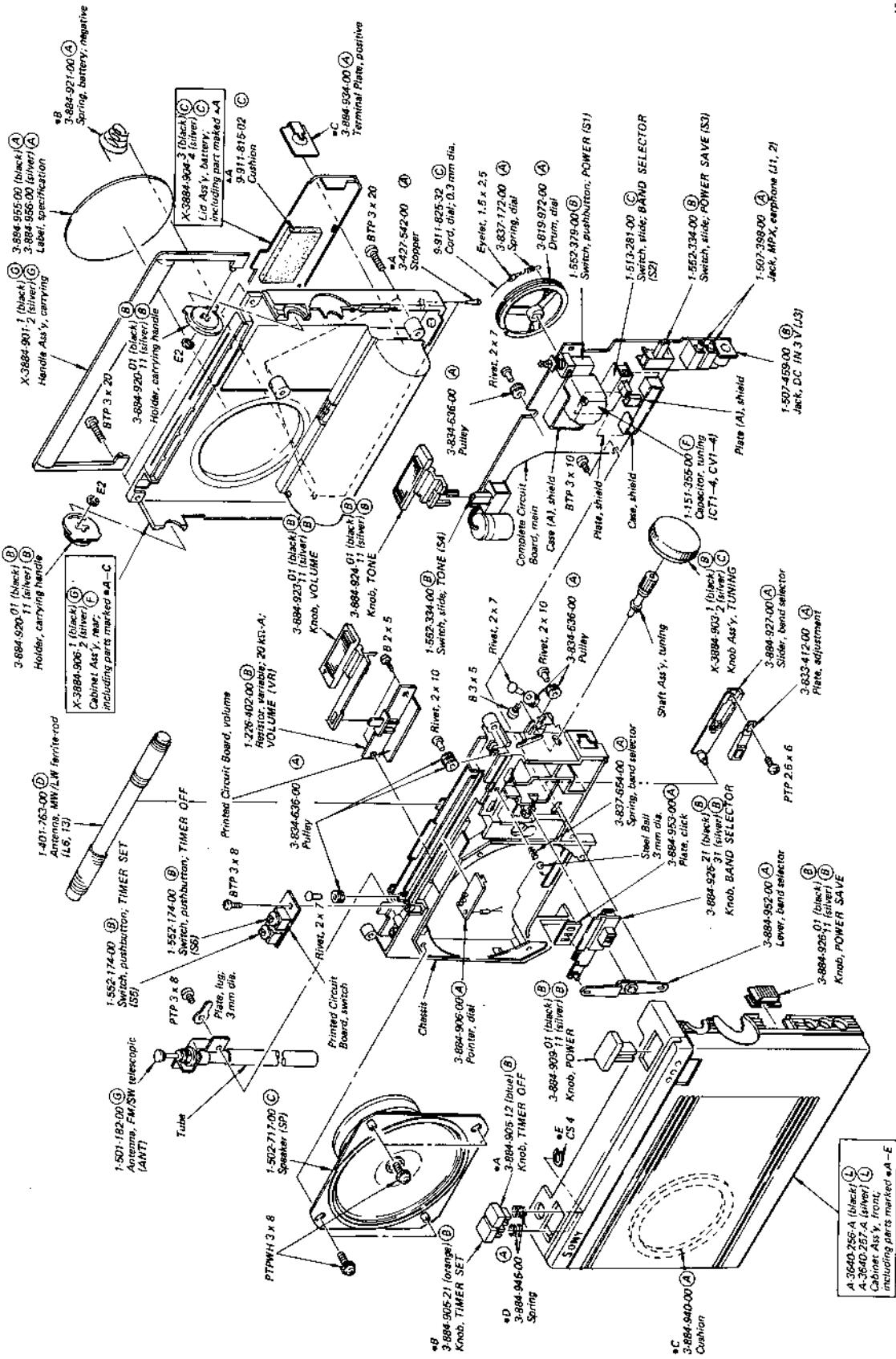
- Readings are taken under no signal (detuned) conditions with a VOM (20 k $\Omega$ /V).
- ( ) : AM
- [ ] : When the set operates with the TIMER SET switch turned on:  
no mark: FM or common
- Voltage variations may be noted due to normal production tolerances.

**• Switch**

Ref. No.	Switch	Position
S1-1, 2	POWER	OFF
S2-1 to 6	BAND SELECTOR	FM
S3-1, 2	POWER SAVE	OFF
S4	TONE	HIGH
S5	TIMER SET	OFF
S6	TIMER OFF	OFF

SECTION 5

## **EXPLODED VIEW**



Note:  
Circ  
to E

- Circled letters ( **(A)** to **(Z)** ) are applicable to European models only.
  - Items with no part number and/or no description are not stocked because they are seldom required for routine service.
  - All screws are Phillips (cross recess) type unless otherwise noted.  
(-) = slotted head

SECTION 6

## ELECTRICAL PARTS LIST

- Circled letters ( A to Z ) are applicable to European models only.

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>	<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
<b>SEMICONDUCTORS</b>			<b>TRANSFORMERS</b>		
<b>Transistors</b>			<b>CAPACITORS</b>		
Q1	8-729-803-04	(B) 2SC930	IFT1	1-403-828-00	(D) AM IFT
Q2	8-729-866-83	(B) 2SC668	IFT2	1-404-144-00	(B) FM Discriminator
Q3, 4	8-729-803-04	(B) 2SC930	IFT3	1-403-953-00	(B) FM Discriminator
Q5-7	8-729-663-47	(C) 2SC1364	IFT4	1-404-100-00	(B) AM IFT
Q8, 9	8-729-100-13	(B) 2SC2001	T1	1-423-159-XX	(D) Driver
Q10	8-760-335-10	(B) 2SC1474	T2	1-427-439-00	(D) Output
Q11, 12	8-729-663-47	(C) 2SC1364	All capacitors are in $\mu\text{F}$ and ceramic unless otherwise noted. 50 WV or less are not indicated except for electrolytics. p : $\mu\text{F}$ , elect : electrolytic		
<b>IC</b>			C1	1-161-180-00	(A) 0.0039
IC	8-759-110-18	(E) $\mu\text{PC}1018\text{C}$	C2	1-102-959-00	(A) 22 p
<b>Diodes</b>			C3	1-102-074-00	(A) 0.001
D1	8-719-713-93	(B) 1S2139C	C4	1-101-922-00	(A) 0.0047
D2, 3	8-719-026-11	(A) 1T261	C5	1-161-032-00	(A) 0.01
D4	8-719-422-21	(B) 1T22AM	C6	1-102-808-00	(A) 6 p
D5, 6	8-719-026-11	(A) 1T261	C7	1-121-352-00	(A) 47
D7	8-719-991-14	(B) SLP114B	C8	1-102-121-00	(A) 0.0022
D8, 9	8-719-112-11	(A) VD1121	C9	1-102-944-00	(A) 7 p
D10	8-719-200-02	(B) 10E2	C10	1-102-724-00	(A) 33 p
D11	8-719-100-02	(B) 1S2222	C11	1-102-726-00	(A) 39 p
PUT	8-729-101-31	(B) N13T1	C12	1-102-937-00	(A) 4 p
<b>COILS</b>			C13	1-121-391-00	(A) 1
L3	1-405-738-00	(B) FM OSC	C14	1-161-032-00	(A) 0.01
L4	1-401-762-00	(B) SW ANT	C15	1-102-074-00	(A) 0.001
L5	1-405-843-00	(B) SW OSC	C16, 17	1-161-032-00	(A) 0.01
L6, 13	1-401-763-00	(D) Antenna, MW/LW ferrite-rod	C18	1-102-943-00	(A) 6 p
L7	1-405-844-00	(B) MW OSC	C19	1-121-651-00	(A) 10
L8-10	1-407-163-XX	(A) $33 \mu\text{H}$ , microinductor	C20	1-102-945-00	(A) 8 p
L11	1-405-842-00	(B) LW OSC	C21	1-161-034-00	(A) 0.022
L12	1-407-181-XX	(A) $1.8 \mu\text{H}$ , microinductor	C22	1-102-285-00	(A) 10 p
L14	1-407-177-XX	(A) $470 \mu\text{H}$ , microinductor			
L15	1-408-030-11	(A) $0.68 \mu\text{H}$ , microinductor			

⇒ Due to standardization, interchangeable replacements may be substituted for parts specified in the diagrams.

• Circled letters ( A to Z ) are applicable to European models only.

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>	
C23	1-161-032-00	(A) 0.01	semiconductor ceramic
C24	1-161-030-00	(A) 0.0047	semiconductor ceramic
C25	1-121-424-00	(B) 470	6.3 V elect
C26	1-161-034-00	(A) 0.022	semiconductor ceramic
C27	1-123-295-00	(A) 100	6.3 V elect
C28	1-161-029-00	(A) 3300 p	semiconductor ceramic
C29, 30	1-161-032-00	(A) 0.01	semiconductor ceramic
C31	1-121-479-00	(A) 22	16 V elect
C32	1-121-391-00	(A) 1	50 V elect
C33	1-131-422-00	(B) 3.3	6.3 V tantalum
C34	1-161-031-00	(A) 0.0068	semiconductor ceramic
C35	1-131-453-00	(A) 0.22	16 V tantalum
C36	1-161-034-00	(A) 0.022	semiconductor ceramic
C37	1-121-391-00	(A) 1	50 V elect
C38	1-121-392-00	(A) 3.3	25 V elect
C39	1-123-295-00	(A) 100	6.3 V elect
C40	1-102-074-00	(A) 0.001	
C41	1-161-034-00	(A) 0.022	semiconductor ceramic
C42	1-121-424-00	(B) 470	6.3 V elect
C43	1-123-295-00	(A) 100	6.3 V elect
C44	1-161-025-00	(A) 0.1	semiconductor ceramic
C45	1-121-424-00	(B) 470	6.3 V elect
C46	1-123-394-00	(B) 470	25 V elect
C48	1-161-030-00	(A) 0.0047	semiconductor ceramic
C51	1-102-998-00	(A) 5 p	
C52	1-161-035-00	(A) 0.033	semiconductor ceramic
C53	1-101-888-00	(A) 68 p	
C54	1-102-937-00	(A) 4 p	
C56	1-131-347-00	(B) 1	16 V tantalum
C57	1-102-949-00	(A) 12 p	
C58	1-161-032-00	(A) 0.01	semiconductor ceramic
C59	1-107-262-00	(B) 120 p	silvered mica

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>	
C60	1-161-032-00	(A) 0.01	semiconductor ceramic
C61	1-101-924-00	(A) 0.022	
C62	1-131-347-00	(B) 1	16 V tantalum
C63	1-102-119-00	(A) 0.0015	
C64	1-102-973-00	(A) 100 p	
C65	1-131-400-00	(B) 0.047	16 V tantalum
C66	1-161-032-00	(A) 0.01	semiconductor ceramic
CT1-4	1-151-355-00	(E) Tuning	
CV1-4	1-141-203-00	(B) Trimmer	
CT5-8			

#### RESISTORS

All resistors are in ohms. Common  $\frac{1}{4}$  W carbon resistors are omitted. Refer to the list on page 10 for their part numbers.

R45	1-202-667-00	(B) 8.2 M	$\frac{1}{4}$ W composition
VR	1-226-402-00	(B) 20 k-A, variable;	VOLUME

#### SWITCHES

S1	1-552-379-00	(B) Pushbutton, POWER
S2	1-513-281-00	(C) Slide, BAND SELECTOR
S3, 4	1-552-334-00	(B) Slide, POWER SAVE, TONE
S5, 6	1-552-174-00	(B) Pushbutton, TIMER SET, TIMER OFF

#### MISCELLANEOUS

ANT	1-501-182-00	(G) Antenna, FM/SW telescopic
BF	1-403-997-00	(B) Ceramic Filter
BPF	1-231-417-00	(B) Band-pass Filter
CF1, 2	1-527-184-XX	(B) Ceramic Filter, 10.7 MHz
CR1	1-231-202-00	(A) Encapsulated Component

J1, 2	1-507-398-00	(A) Jack, MPX, earphone
J3	1-507-459-00	(B) Jack, DC IN 3 V
SP	1-502-717-00	(C) Speaker

#### ACCESSORIES & PACKING MATERIALS

<u>Part No.</u>	<u>Description</u>
1-504-059-11	(C) Earphone, ME-20H
3-880-122-00	(B) Bag, protection
3-884-943-00	(B) Cushion, right
3-884-944-00	(B) Cushion, left
3-884-957-00	(A) Spacer
3-884-959-00	(C) Carton
3-995-812-11	(B) Manual, instruction