ICF-6700W

Canadian Model
US Model
AEP Model
UK Model
E Model

FM/AM MULTI BAND RECEIVER

SPECIFICATIONS

Power Requirements: 110, 120, 220 or 240V ac adjustable, 50/60Hz
9V dc, six batteries size D
(IEC designation R20)
12V car battery with optional
Sony Car Battery Cord DCC-130

Power Consumption: 7W ac

Dimensions: Approx. 453(w)x184(h)x227(d)mm
$17^{7}/_{8}$ (w) x 7¼ (h) x 9(d) inches
including projecting parts and controls

Weight: Approx. 5.5kg, 12 lb 2 oz including batteries

Circuit system: FM/MW: Superheterodyne
SW: Dual conversion superheterodyne

Frequency range: FM: 87.5–108 MHz
SW_1: 1.6–10 MHz (187.5–30 m)
SW_2: 11.5–20 MHz (26.1–15 m)
SW_3: 20–29.5 MHz (15–10.2 m)
MW: 530–1,605 kHz (566–187 m)

Antennas: FM: Telescopic antenna
SW: Telescopic antenna, External antenna terminals (50–75 Ω)
MW: Built-in ferrite rod antenna
External antenna terminals (low impedance)

Speaker: Approx. 10 cm (4 inches) dia.

Power output: 900 mW (at 10% harmonic distortion) at dc operation

Input: Timer input jack (minijack)

Outputs: Recording output jack (minijack)
output level 0.8 mV (–60 dB)
output impedance 1 kΩ
Earphone jack (minijack)
for 8Ω earphone
Multiplex output jack (minijack)
Headphones jack (stereo binaural type jack)
for 8Ω impedance stereo or monaural headphones

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY SHADING AND MARK ⚠ ON THE SCHEMATIC DIAGRAMS, EXPLODED VIEWS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

ATTENTION AU COMPOSANT AYANT RAPPORT À LA SÉCURITÉ !

LES COMPOSANTS IDENTIFIÉS PAR UN TRAMÉ ET UNE MARQUE ⚠ SUR LES DIAGRAMMES SCHÉMATIQUES, LES VUES EXPLOSÉES ET LA LISTE DES PIÈCES SONT CRITIQUES POUR LA SÉCURITÉ DE FONCTIONNEMENT. NE REMPLACER CES COMPOSANTS QUE PAR DES PIÈCES SONY DONT LES NUMÉROS SONT DONNÉS DANS CE MANUEL OU DES SUPPLÉMENTS PUBLIÉS PAR SONY.

SONY®
SERVICE MANUAL

MODEL IDENTIFICATION

– Specification Label –

US, Canadian model

SONY® MODEL NO. ICF-6700W
FM/MW/SW1/SW2/SW3 5 BAND RECEIVER
FREQ RANGE : FM 87.5–108MHz MW 530–1605kHz
SW1 1.6–10MHz SW2 11.5–20MHz
SW3 20–29.5MHz
DC : 1.5V x 6 USE R20(D) STANDARD FLASHLIGHT BATT OR EQUIV
AC: 110/120/220/240 7W 50/60Hz
CARTIFICATION: COMPLYING WITH F.C.C. RULES PART 15
MADE IN JAPAN

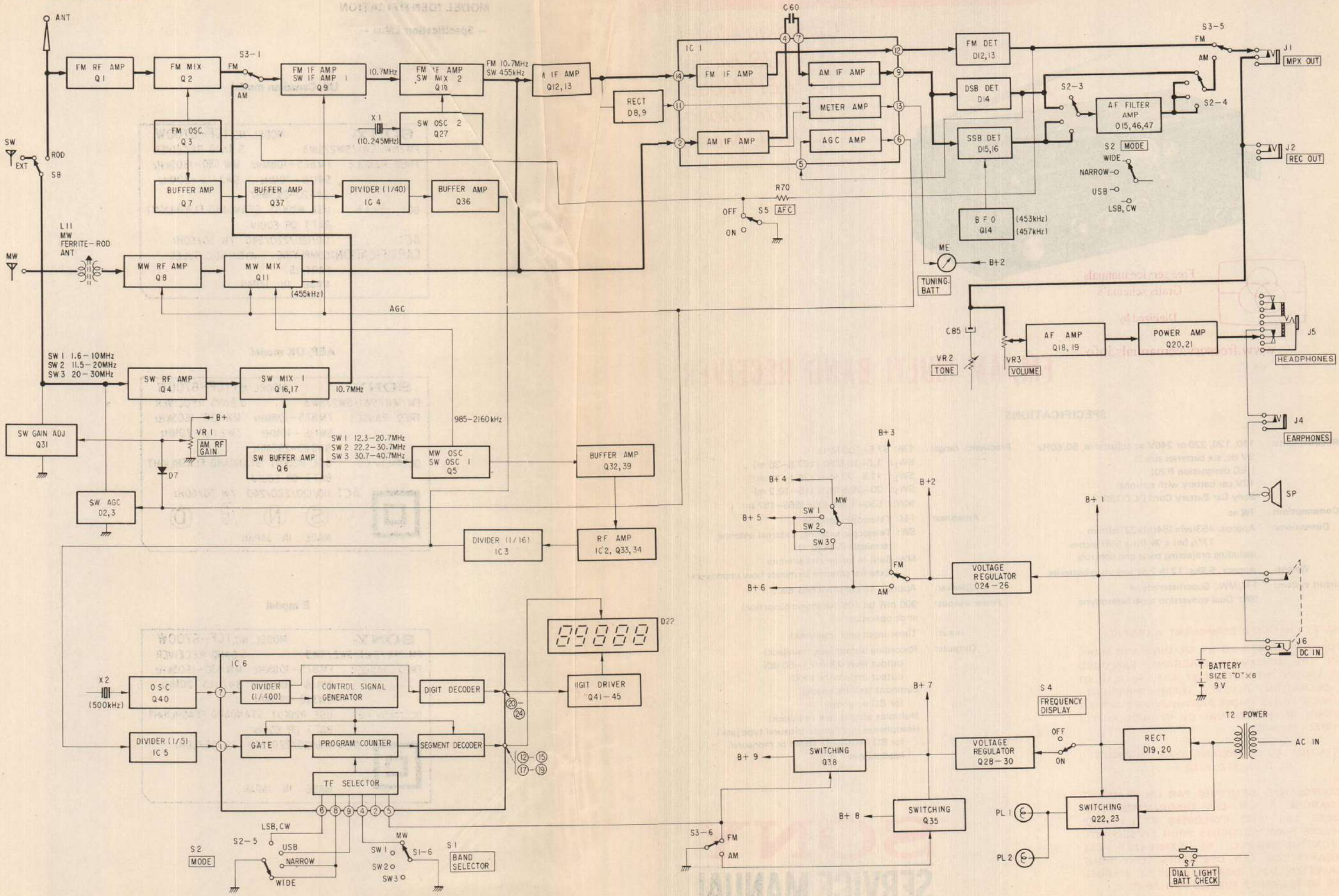
AEP, UK model

SONY® MODEL NO. ICF-6700W
FM/MW/SW1/SW2/SW3 5 BAND RECEIVER
FREQ RANGE : FM 87.5–108MHz MW 530–1605kHz
SW1 1.6–10MHz SW2 11.5–20MHz
SW3 20–29.5MHz
DC : ⎓ 1.5V x 6 USE R20(D) STANDARD FLASHLIGHT BATT OR EQUIV
AC: 110/120/220/240 7W 50/60Hz
Ⓢ Ⓝ Ⓢ⁺ Ⓓ
MADE IN JAPAN

E model

SONY® MODEL NO. ICF-6700W
FM/MW/SW1/SW2/SW3 5 BAND RECEIVER
FREQ RANGE : FM 87.5–108MHz MW 530–1605kHz
SW1 1.6–10MHz SW2 11.5–20MHz
SW3 20–29.5MHz
DC : ⎓ 1.5V x 6 USE R20(D) STANDARD FLASHLIGHT BATT OR EQUIV
AC: 110/120/220/240 7W 50/60Hz
MADE IN JAPAN

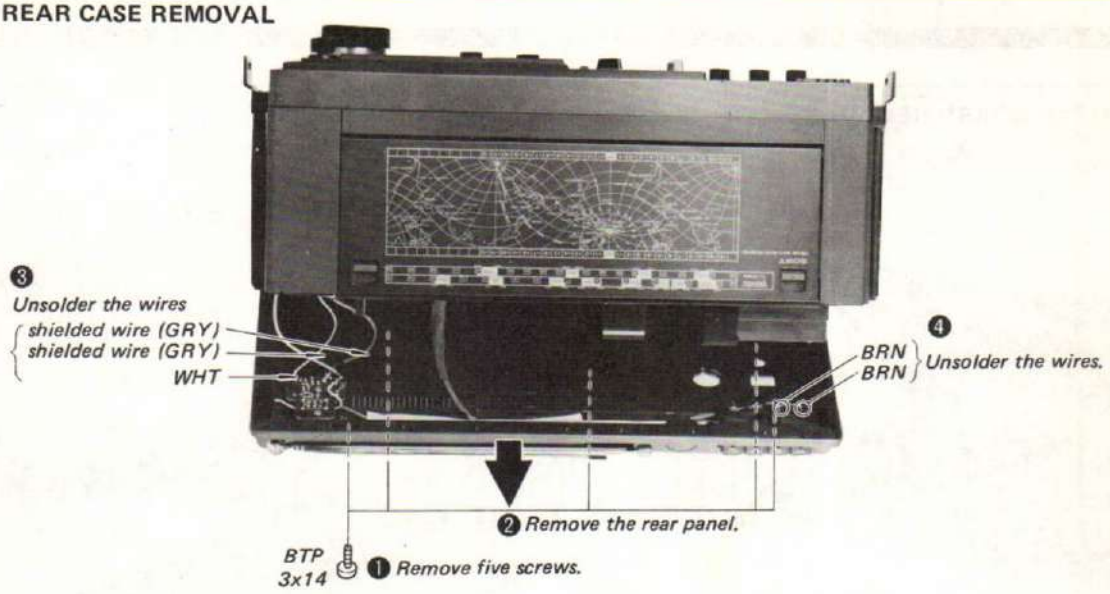
1-1. BLOCK DIAGRAM



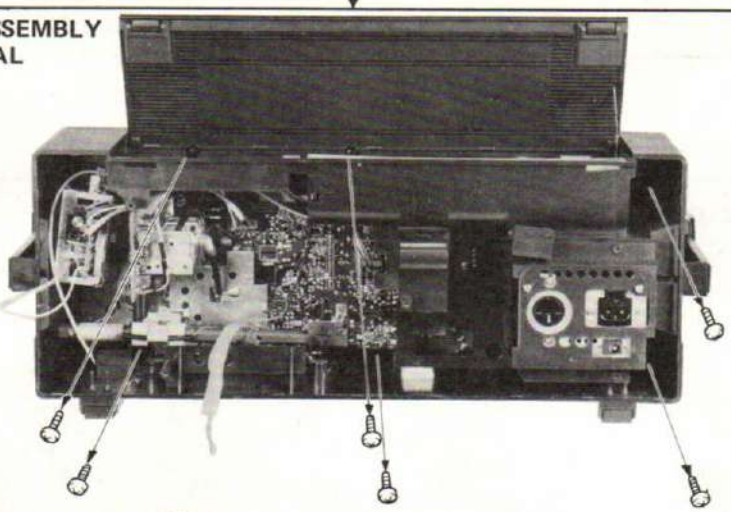
2-1. REMOVAL

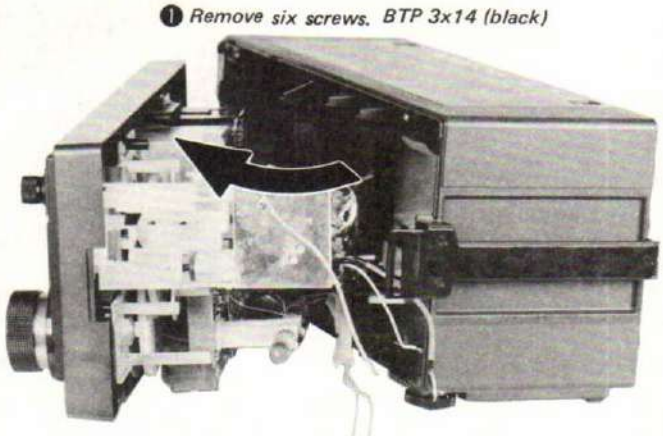
- Follow the disassembly procedure in the numerical order given.

REAR CASE REMOVAL



CASE ASSEMBLY REMOVAL



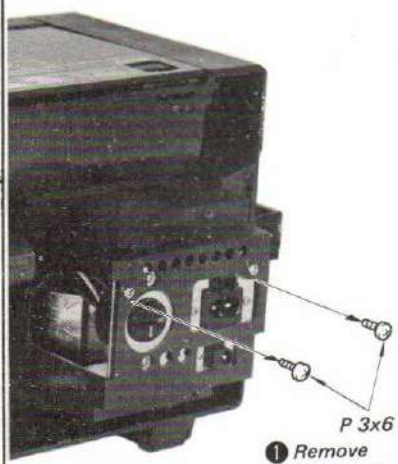


CONTROL BOARD REMOVAL

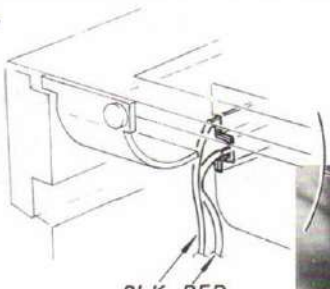
❶ Remove the knobs.

PTP 3x8
❷ Remove the screw.
❸ Remove the control board.
Be careful not to hitch the capacitor.

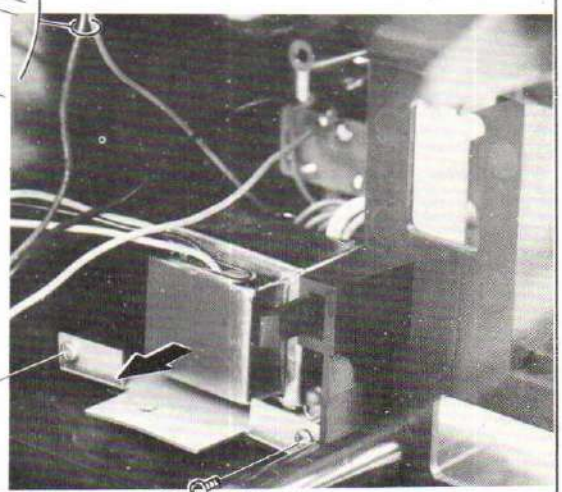
POWER SUPPLY BLOCK REMOVAL



P 3x6
❶ Remove two screws.

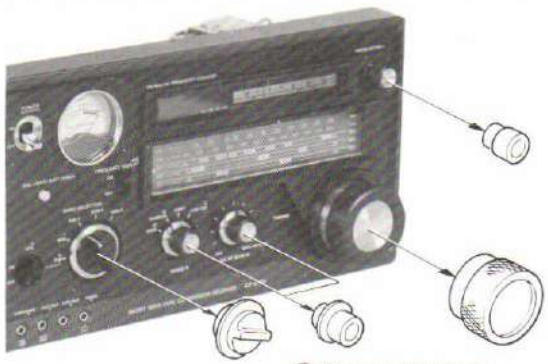


BLK RED
❷ Unsolder the wires.

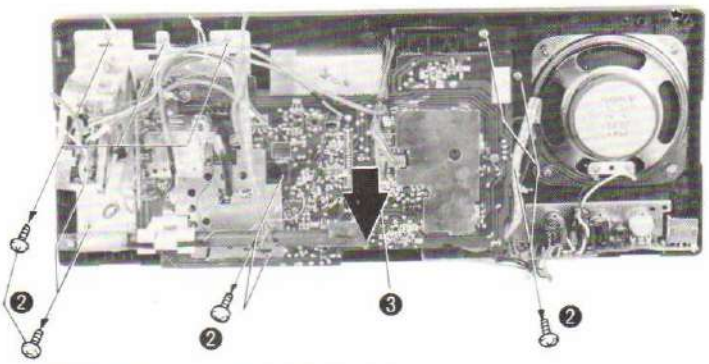


PTP 3x8
❸ Remove two screws.
PTP 3x8
❹ Remove the power supply block in the direction shown by the arrow.

FRONT PANEL REMOVAL



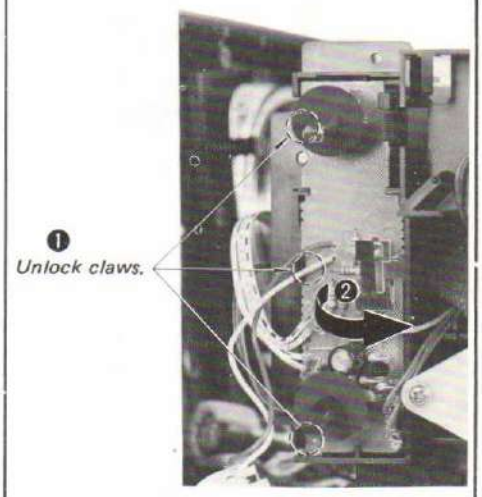
❶ Remove the knobs.



❷ Remove ten screws (BTB 3 x 10)

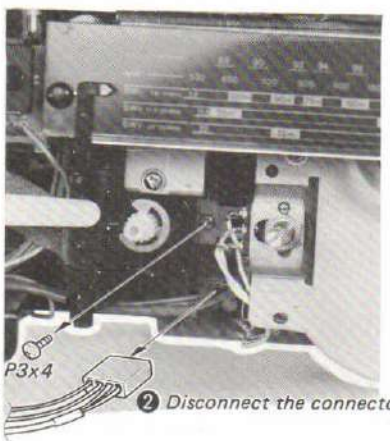
❸ Remove the chassis in the direction shown by the arrow.

LAMP BOARD REMOVAL



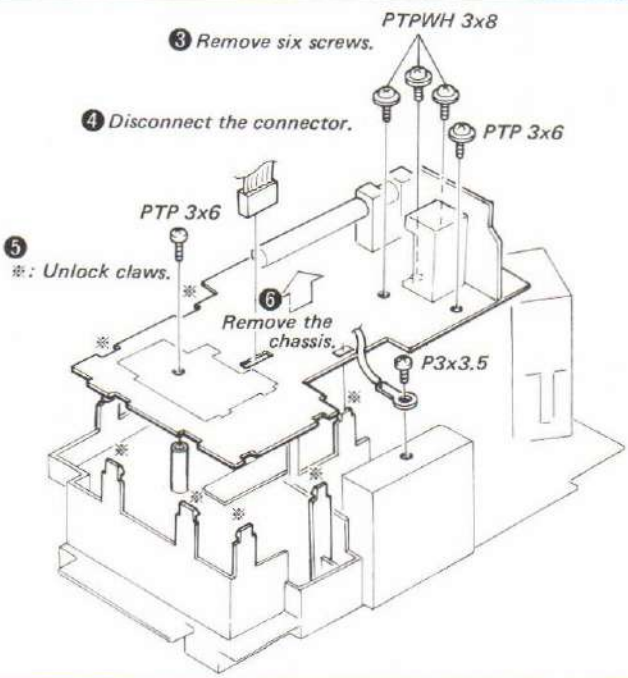
❶ Unlock claws.

MAIN BOARD REMOVAL



❶ Remove the screw. P3x4

❷ Disconnect the connector.



❸ Remove six screws. PTPWH 3x8

❹ Disconnect the connector.

PTP 3x6

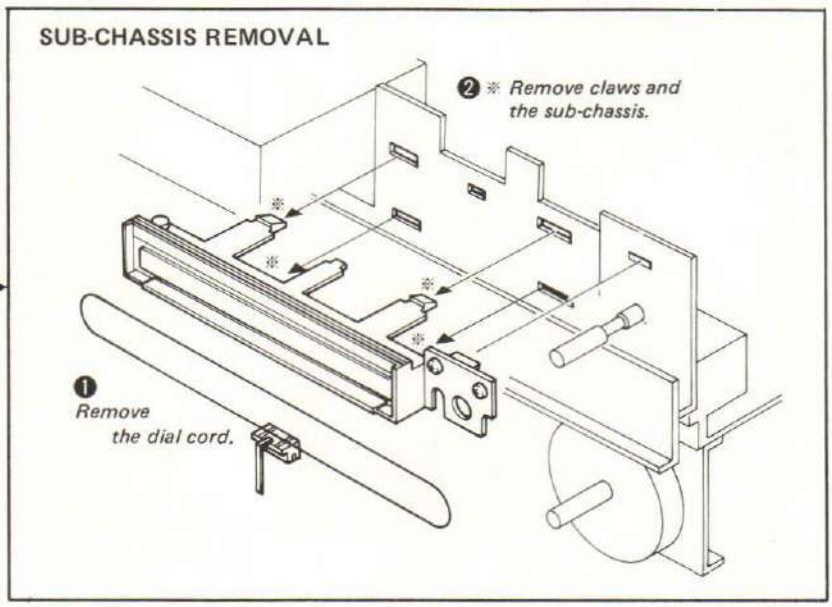
PTP 3x6

❺ ※: Unlock claws.

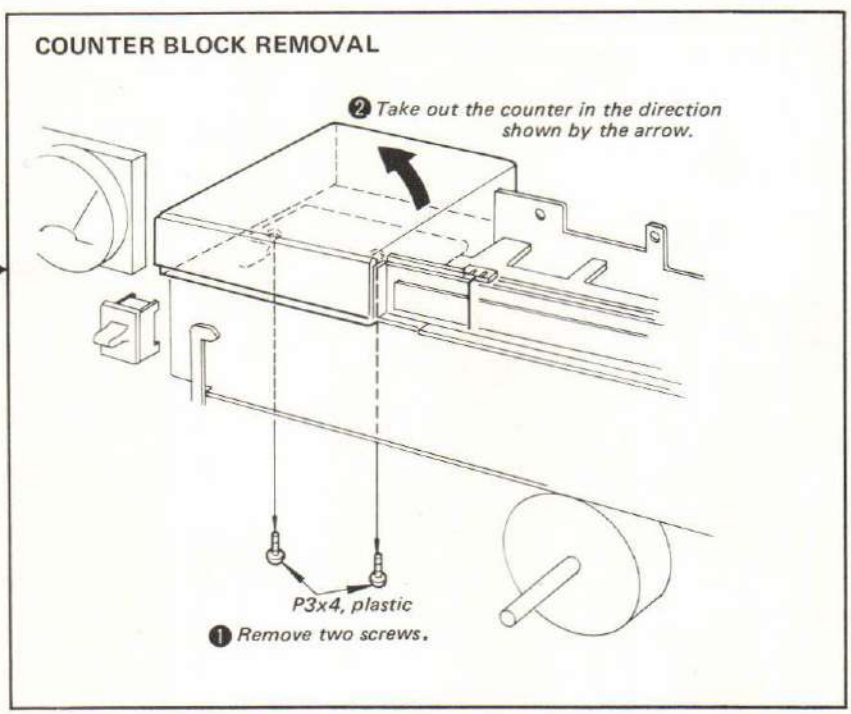
❻ Remove the chassis.

P3x3.5

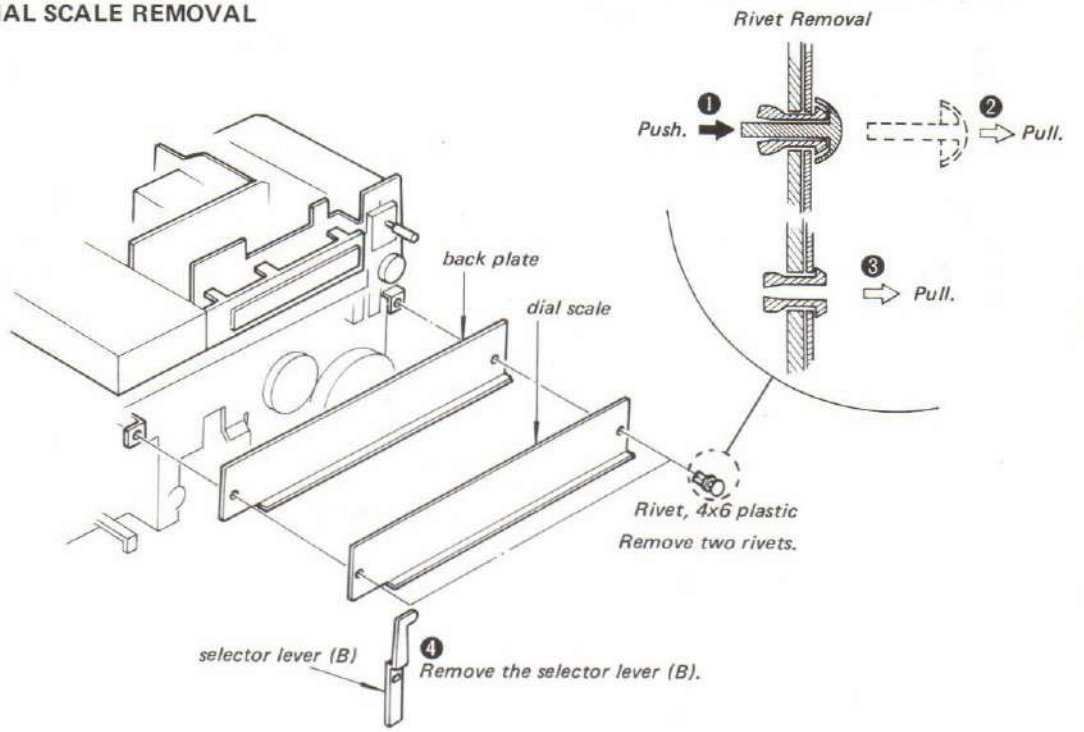
SUB-CHASSIS REMOVAL



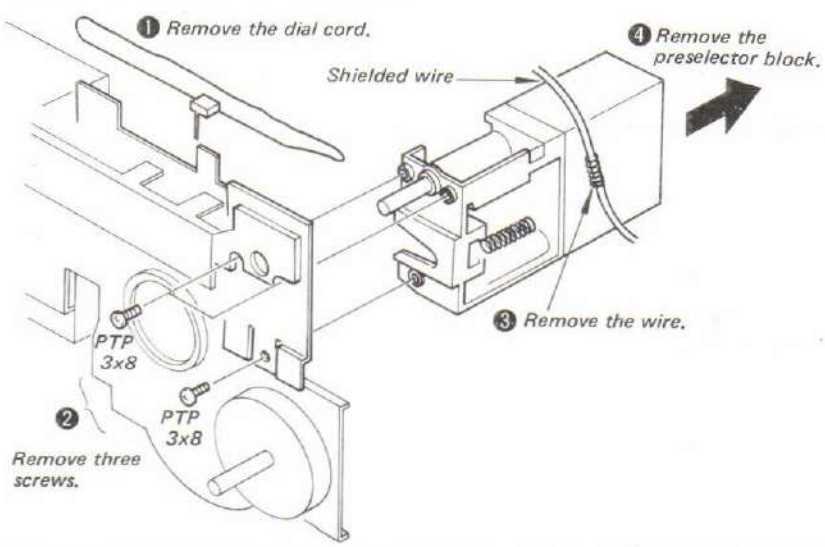
COUNTER BLOCK REMOVAL



DIAL SCALE REMOVAL

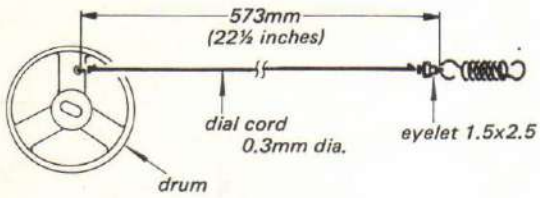


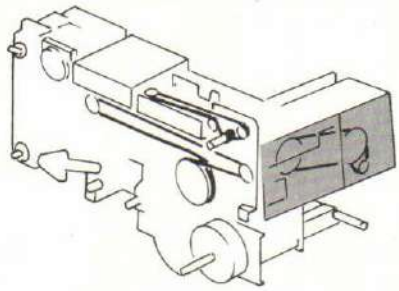
PRESELECTOR BLOCK REMOVAL



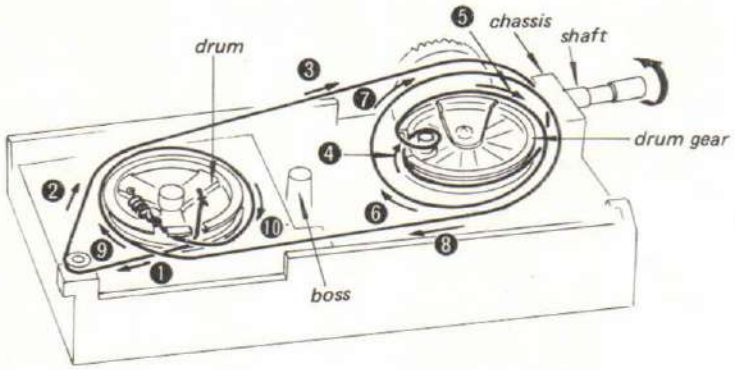
2-2. CORD STRINGING OF PRESELECTOR DRUM

1. Cord Preparation



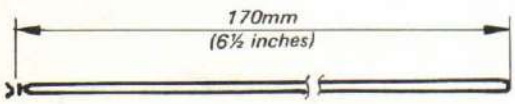


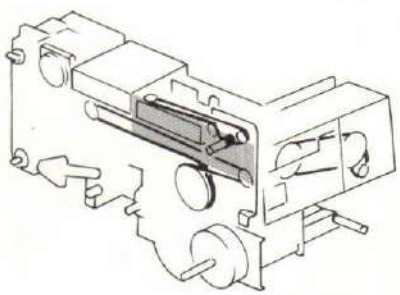
2. Dial Cord Stringing
Proceed in the numerical order given, after turning the shaft and the drum fully clockwise.



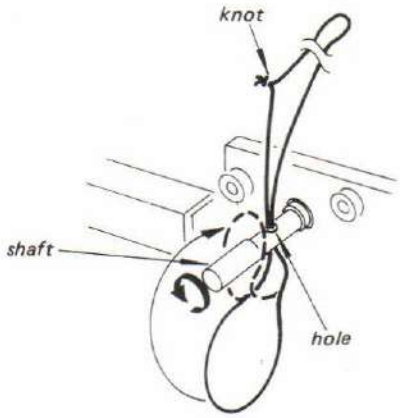
2-3. DIAL CORD STRINGING OF PRESELECTOR

1. Dial Cord Preparation

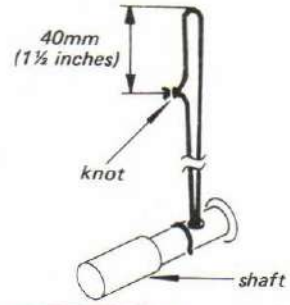




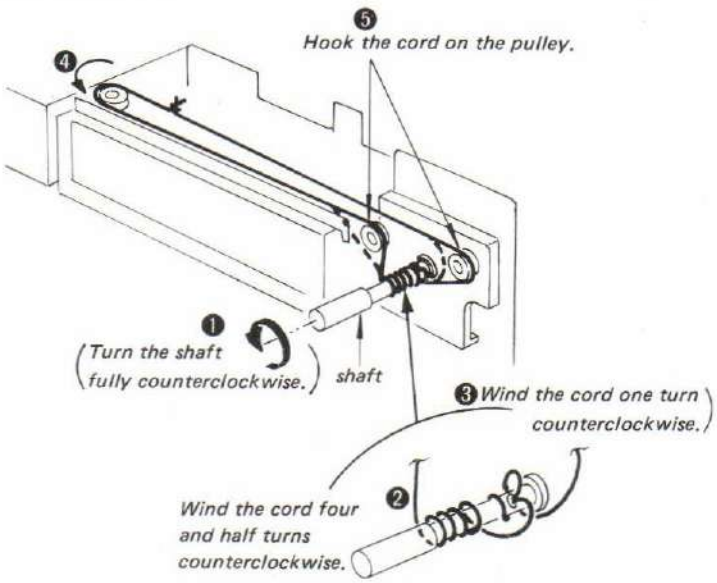
2. Turn the shaft fully counterclockwise and thread the dial cord in the hole of the shaft as shown below.



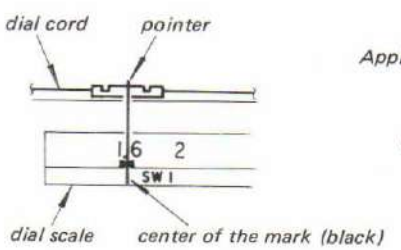
3. Set the knot of the dial cord as shown below.

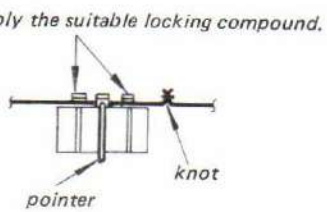


4. Proceed in the numerical order given.



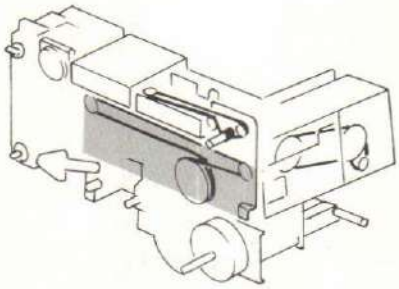
5. Install the pointer at the position as shown below, after turning the shaft fully clockwise.



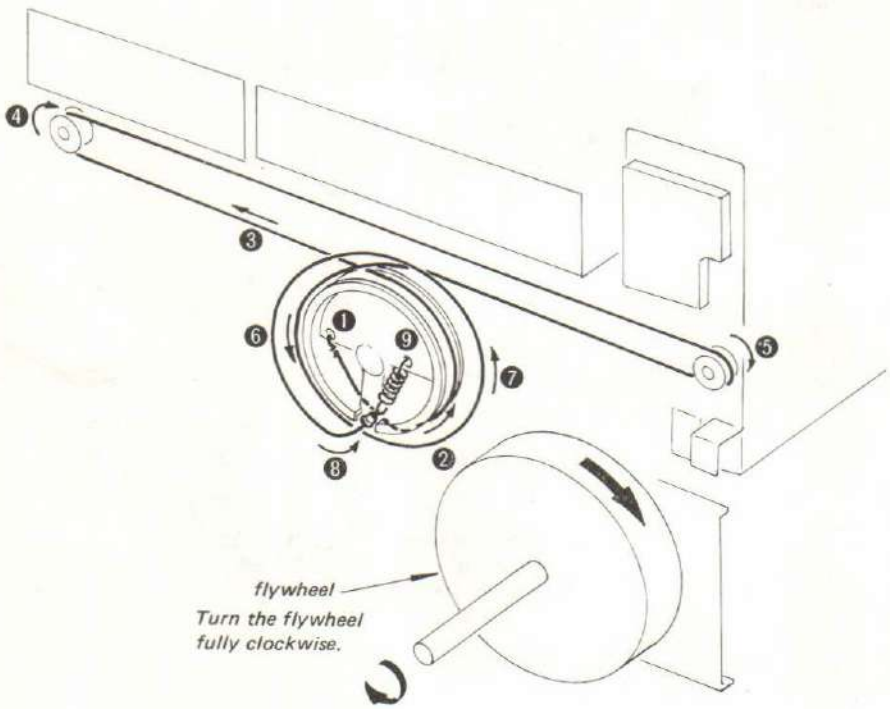


2-4. MAIN DIAL CORD STRINGING

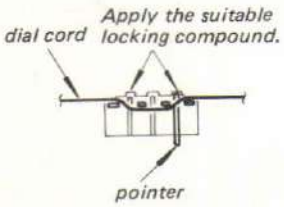
1. Dial Cord Preparation

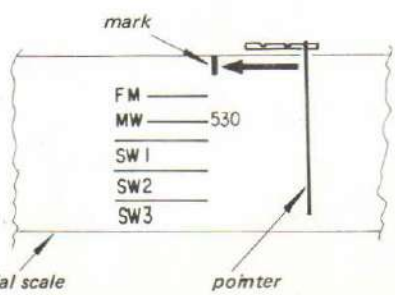


2. Proceed in the numerical order given.



3. Pointer Installation

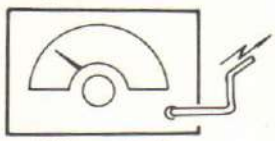


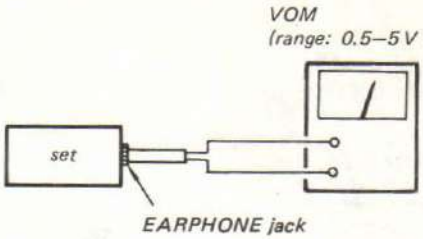


SECTION 3
ADJUSTMENTS

MW SECTION

Setting:
BAND SELECTOR Switch; MW

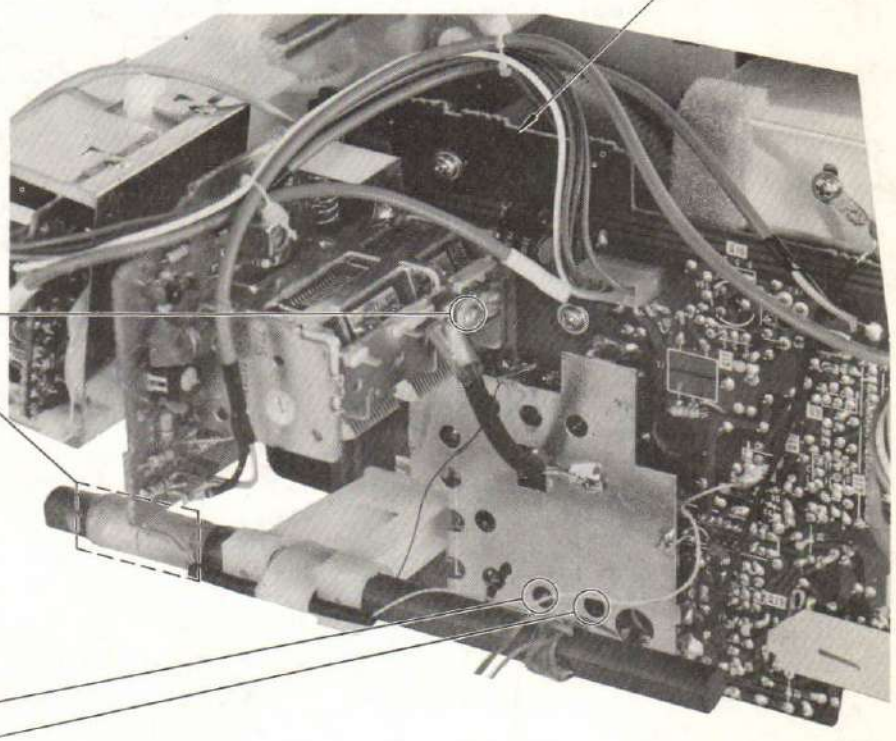


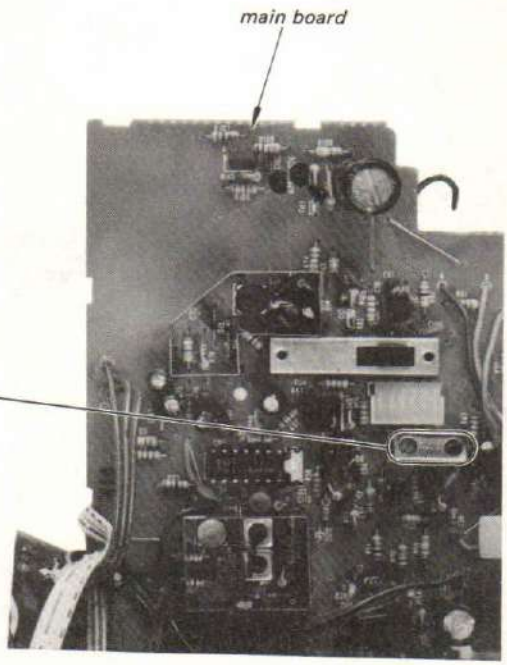


MW TRACKING ADJUSTMENT	
Adjust for maximum reading on VOM.	
1,400 kHz	CT 9
620 kHz	L11

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

MW FREQUENCY COVERAGE ADJUSTMENT	
Adjust for maximum reading on VTVM	
520 kHz	L 7
1,680 kHz	CT 5



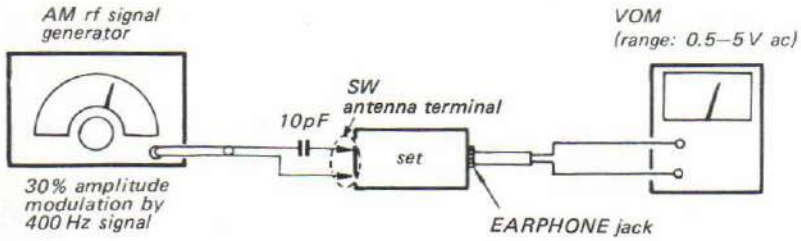


MW IF ALIGNMENT	
Adjust for maximum reading on VOM.	
455 kHz (468 kHz)	CFT

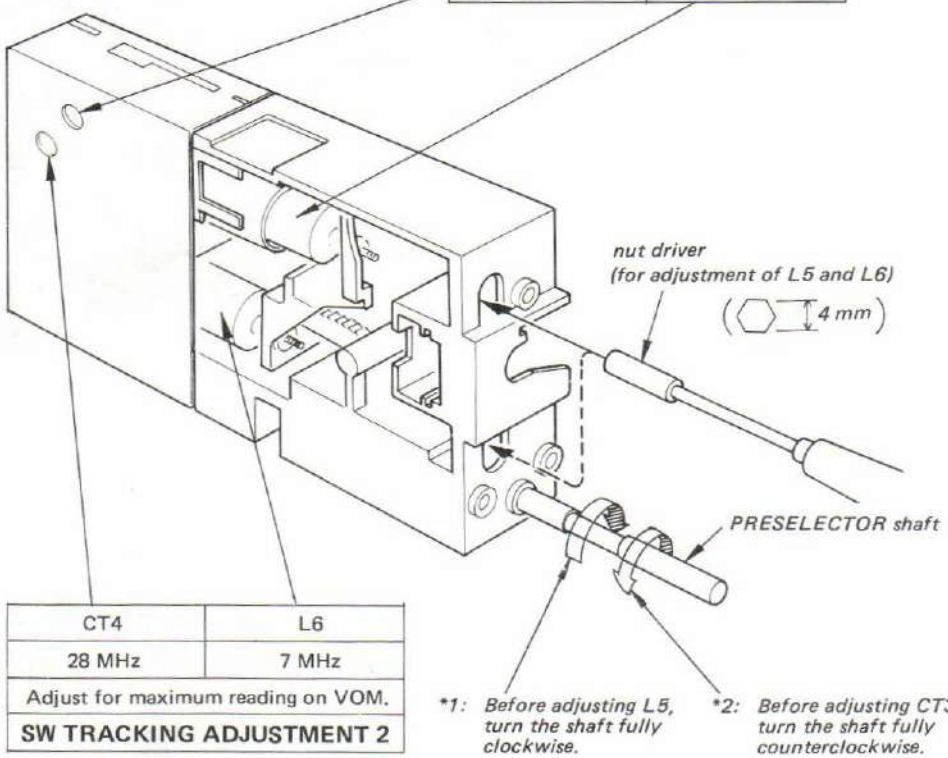
( ): UK model

SW SECTION

Setting:
BAND SELECTOR Switch: SW
SW ANTENNA Switch: EXT



SW TRACKING ADJUSTMENT 1	
Adjust for maximum reading on VOM.	
30 MHz	1.6 MHz
*2 CT3	*1 L5

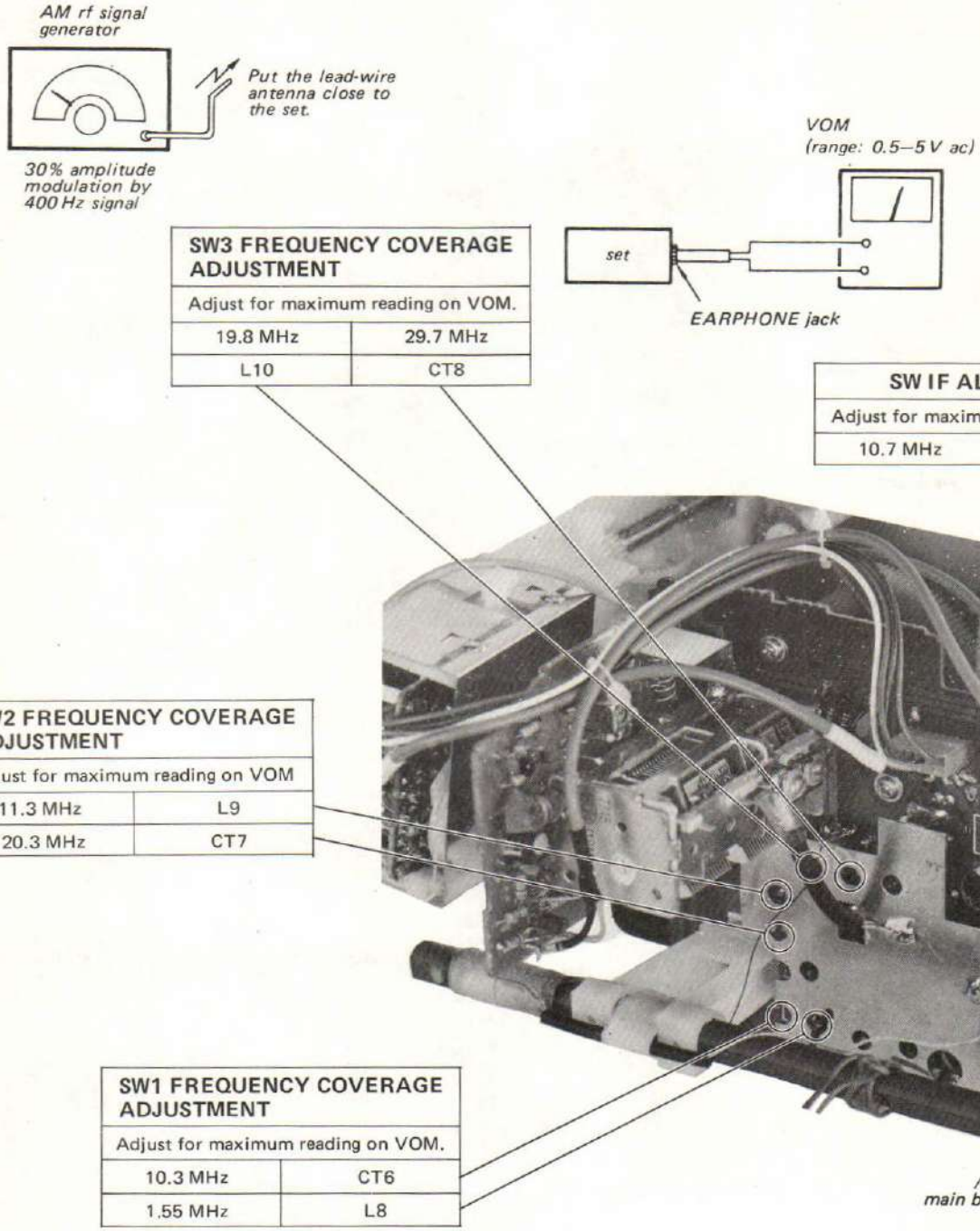


CT4	L6
28 MHz	7 MHz
Adjust for maximum reading on VOM.	
SW TRACKING ADJUSTMENT 2	

*1: Before adjusting L5, turn the shaft fully clockwise.

*2: Before adjusting CT3, turn the shaft fully counterclockwise.

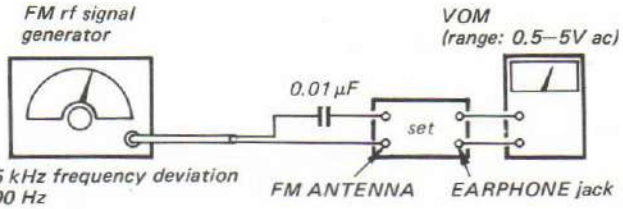
Setting:
BAND SELECTOR Switch: SW
SW ANTENNA Switch: ROD

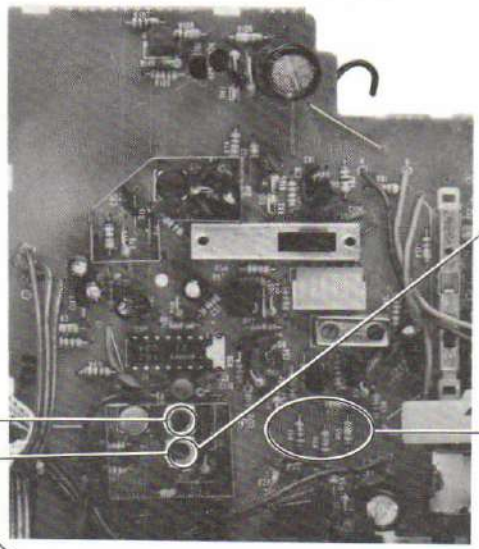


- Repeat the procedures in each adjustment several times, and the frequency coverage and tracking adjustments should be finally done by the trimmer capacitors.

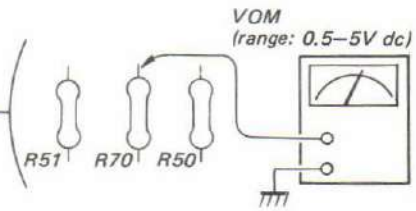
FM SECTION

Setting:
BAND SELECTOR Switch: FM

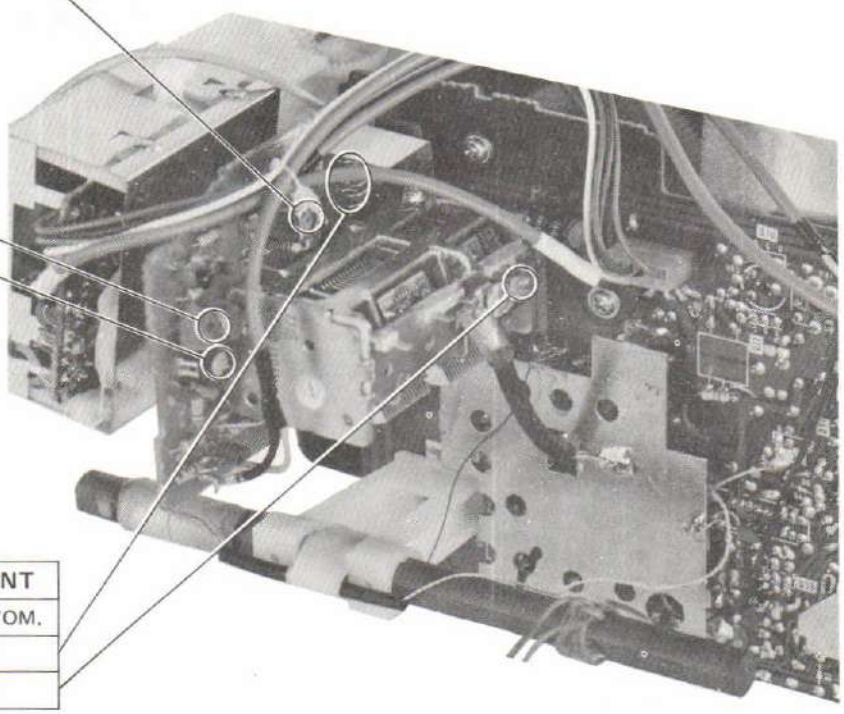




FM IF ALIGNMENT 2
Turn off the modulation. Connect VOM as shown below.
IFT F3
Adjust for 0V DC reading on VOM .



FM IF ALIGNMENT 1	
10.7 MHz	IFT F2
	IFT F3
	IFT F1
Adjust for maximum reading on VOM.	



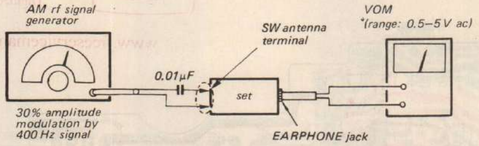
FM FREQUENCY COVERAGE ADJUSTMENT	
Adjust for maximum reading on VOM.	
86.5(82.5) MHz	L3
109.5(108) MHz	CT2

( ): AEP model

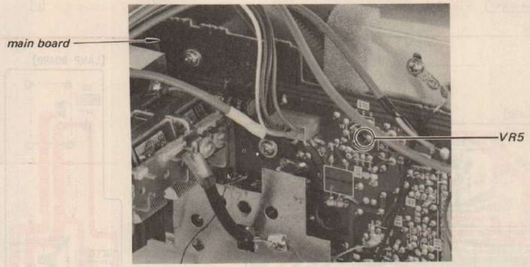
FM TRACKING ADJUSTMENT	
Adjust for maximum reading on VOM.	
86.5(82.5) MHz	L2
109.5(108) MHz	CT1

SW 1ST MIXER BALANCE ADJUSTMENT

Setting:
BAND SELECTOR Switch: SW
SW ANTENNA Switch: EXT



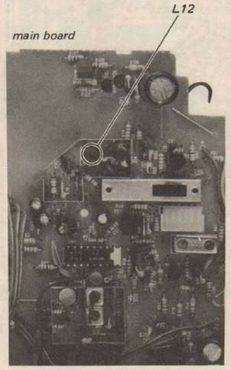
1. Set AM rf signal generator to 10.7 MHz.
2. Tune the set for maximum reading on VOM.
3. Adjust VR5 for minimum reading on VOM.



BFO ADJUSTMENT

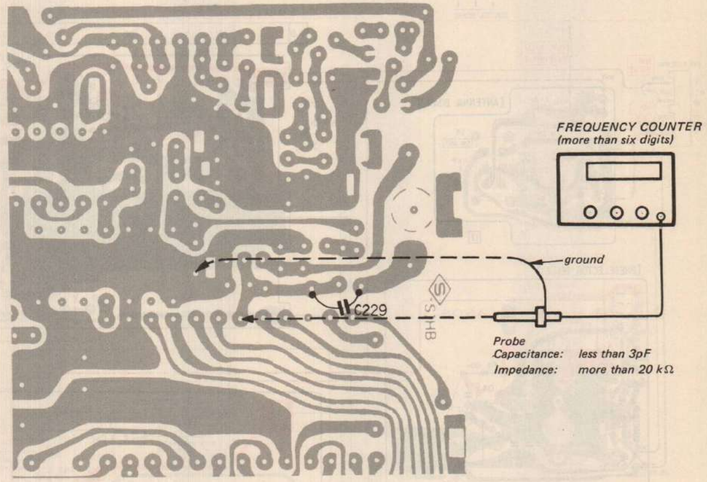
Setting: the same as the above.

1. Tune the set at mode of NARROW or WIDE and turn off the modulation.
2. Adjust L12 so that the sound level becomes equal at USB mode and LSB mode.



500 kHz OSCILLATOR ADJUSTMENT

[COUNTER BOARD]

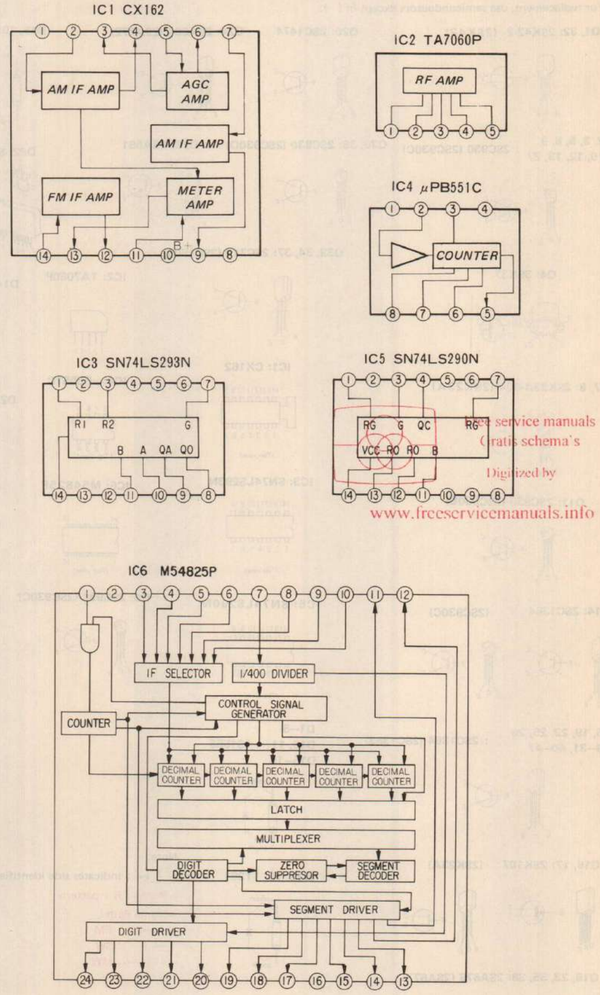


Setting:
FREQUENCY DISPLAY Switch: ON

Connect the frequency counter to pin 7 of IC6 and solder C229 as shown above.
The value of C229 is determined by the counter reading listed below.

counter reading	value of C229
499993–500006 Hz	none
500007–500018 Hz	10 pF
500019–500031 Hz	33 pF
500032–500044 Hz	68 pF

IC BLOCK DIAGRAM



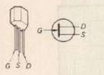
SECTION 4
DIAGRAMS

4-1. MOUNTING DIAGRAM
– Conductor Side –

Replacement Semiconductors
For replacement, use semiconductors except in ( ).

IC Block Diagram is listed on page 19.

Q1, 32: 2SK42-2 (2SK42)

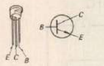


Q20: 2SC1474

Q24: 2SA684 (2SA772)

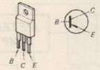
D19, 20: 10E2

Q2, 3, 5, 6, 9
Q10, 12, 13, 27 : 2SC930 (2SC930C)

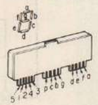


Q36, 39: 2SC930 (2SC930D)

Q28: 2SA861

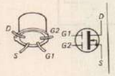


D22: SL1512



Q33, 34, 37: 2SC710 (2SC1908)

Q4: 3SK37



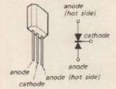
IC2: TA7060P

D14, 23: IT22AM (IT23)

IC1: CX162

IC4: μPB551C

D21: IS2139C (SD115)



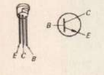
Q7, 8: 2SK23A-824 (2SK23A)

IC3: SN74LS293N

IC6: M54825P

VDR1: VD1220

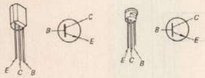
Q11: 2SC930 (2SC930E)



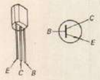
IC5: SN74LS290N

D9: 2SC930 (2SC930C)

Q14: 2SC1364 (2SC930C)

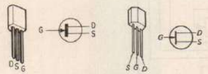


Q15, 19, 22, 25, 26
Q29–31, 40–47 : 2SC1364 (2SC1363)



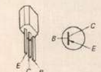
D1–8
D10, 11 : 1S1555
D15–18

Q16, 17: 2SK107 (2SK23A)

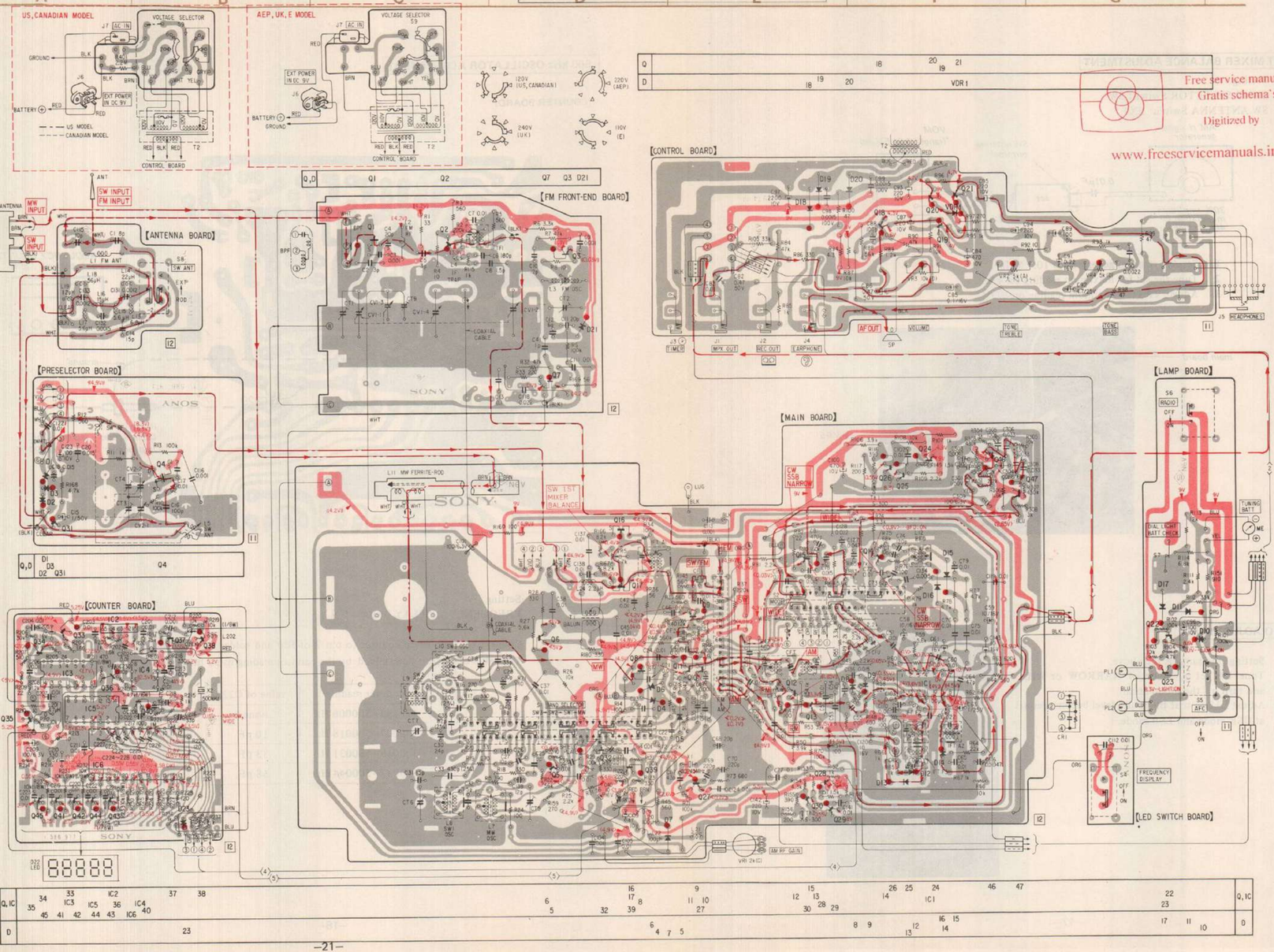


D12, 13: 1T261

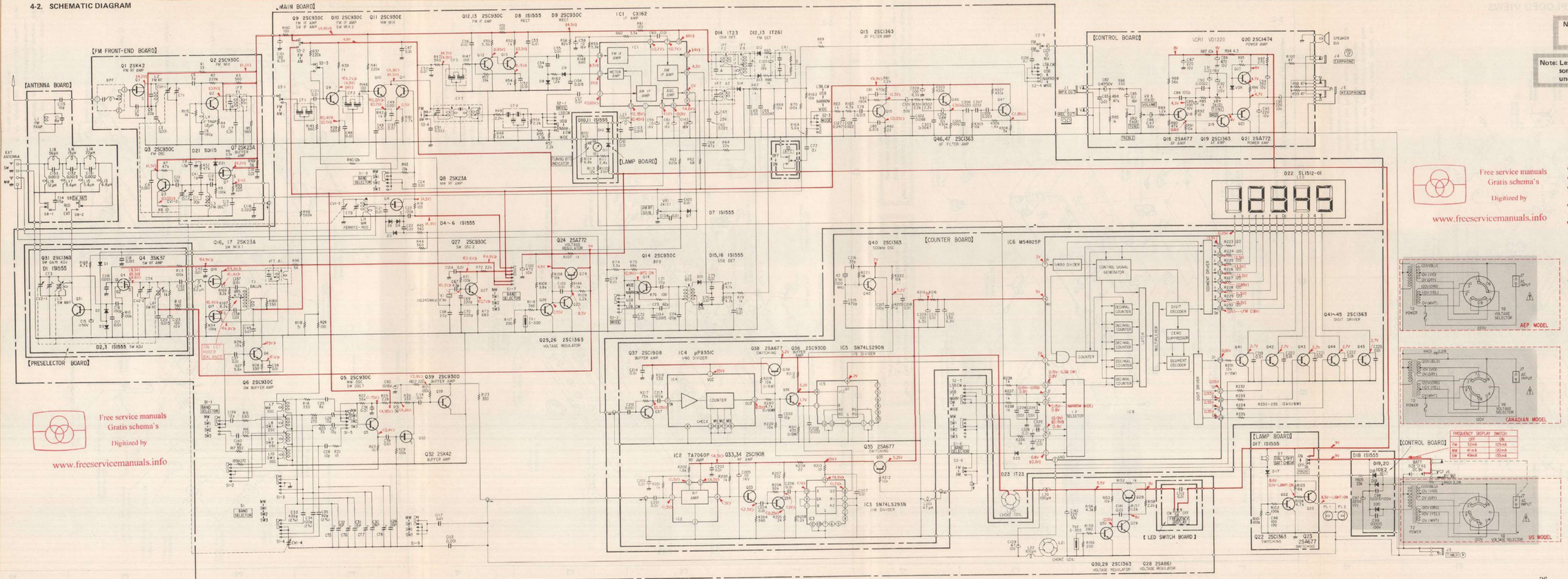
Q18, 23, 35, 38: 2SA678 (2SA677)



Note:
- [+] : indicates side identified with part number.
- ▬ : B + pattern
- Signal Path
  - ——— : FM
  - – – – : SW
  - ——— : MW



4-2. SCHEMATIC DIAGRAM



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Gratis schema's
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www.freeservicemanuals.info

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

Note: Les composants identifiés par un tramé et une marque ⚠ sont critiques pour la securité. Ne les remplacer que par une piece portant le numéro specifié.

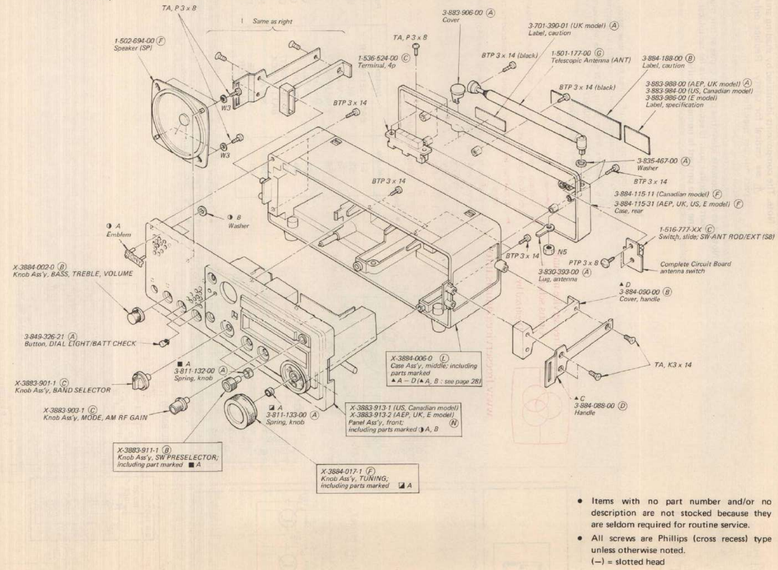
Note:

- All capacitors are in μF unless otherwise noted. pF: μμF
  50 WV or less are not indicated except for electrolytics.
- All resistors are in ohms, ¼W unless otherwise noted.
  kΩ : 1000Ω;MΩ : 1000kΩ
- ▭ : panel designation.
- ▭ : adjustment for repair.
- ▬▬ : B + bus.
- Voltage variations may be noted due to normal production tolerances.
- Transistor base-emitter voltages are measured on the 2.5V range.
- Readings are taken under no-signal (detuned) conditions with a VOM (20 kΩ/V).
- < > : SW
- < > : AM
- ( ) : MW
- (( )) : FM
- [ ] : When receiving 12,345 kHz signal.
- Switch

Ref. No.	Switch	Position
S1	BAND SELECTOR	MW
S2	MODE	WIDE
S3	FM-AM	FM
S4	FREQUENCY DISPLAY	ON
S5	AFC	OFF
S6	RADIO	OFF
S7	DIAL LIGHT/ BATT CHECK	OFF
S8	SW ANT	ROD
S9	VOLTAGE SELECTOR	120V

- Transistor is used for D9.
- Δ: internal component.
- 2% indicates component tolerances.

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

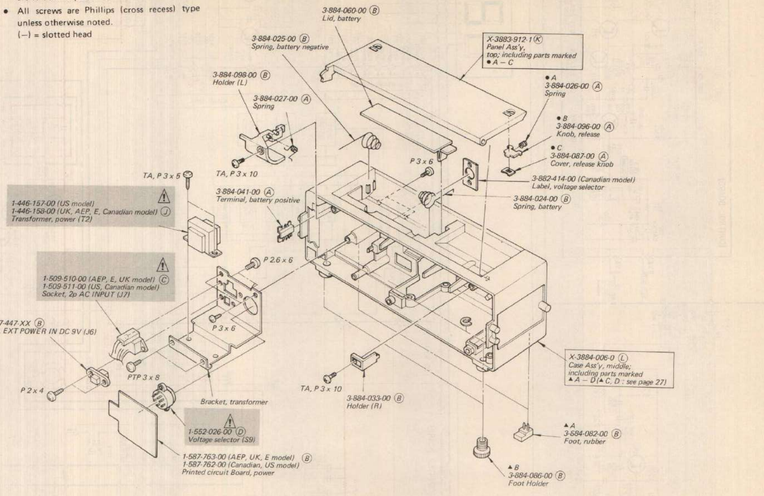


- Items with no part number and/or no description are not stocked because they are seldom required for routine service.
- All screws are Phillips (cross recess) type unless otherwise noted.
  (–) = slotted head

- 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

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

5-2.

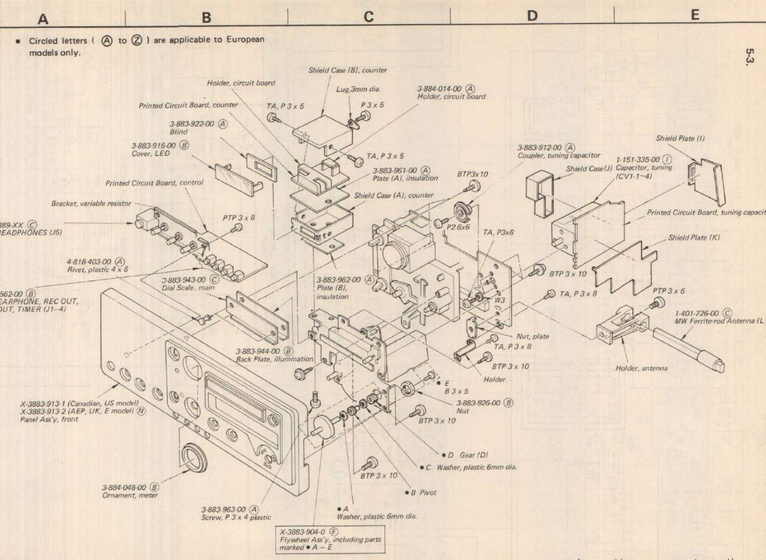


Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

Note: Les composants identifiés par un trame et une marque ⚠ sont critiques pour la securité. Ne les remplacer que par une piece portant le numéro spécifie.

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

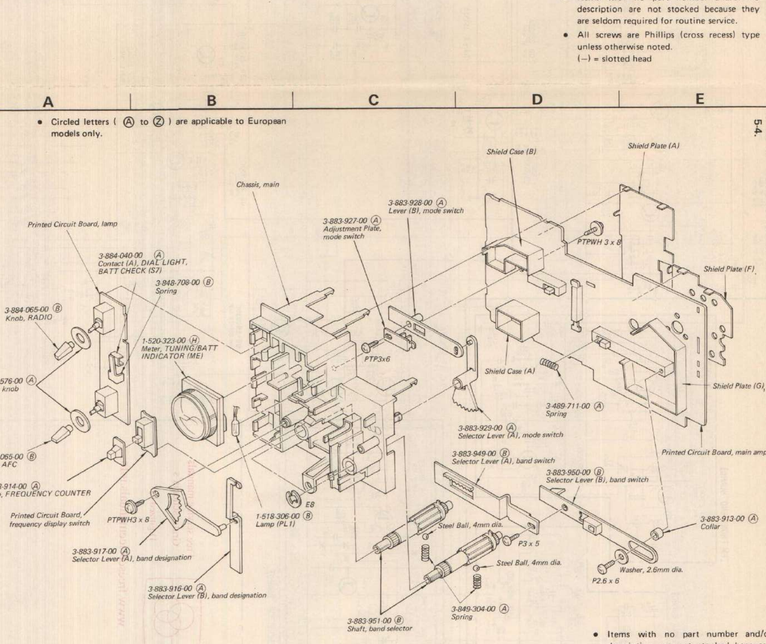
5-3.



- 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

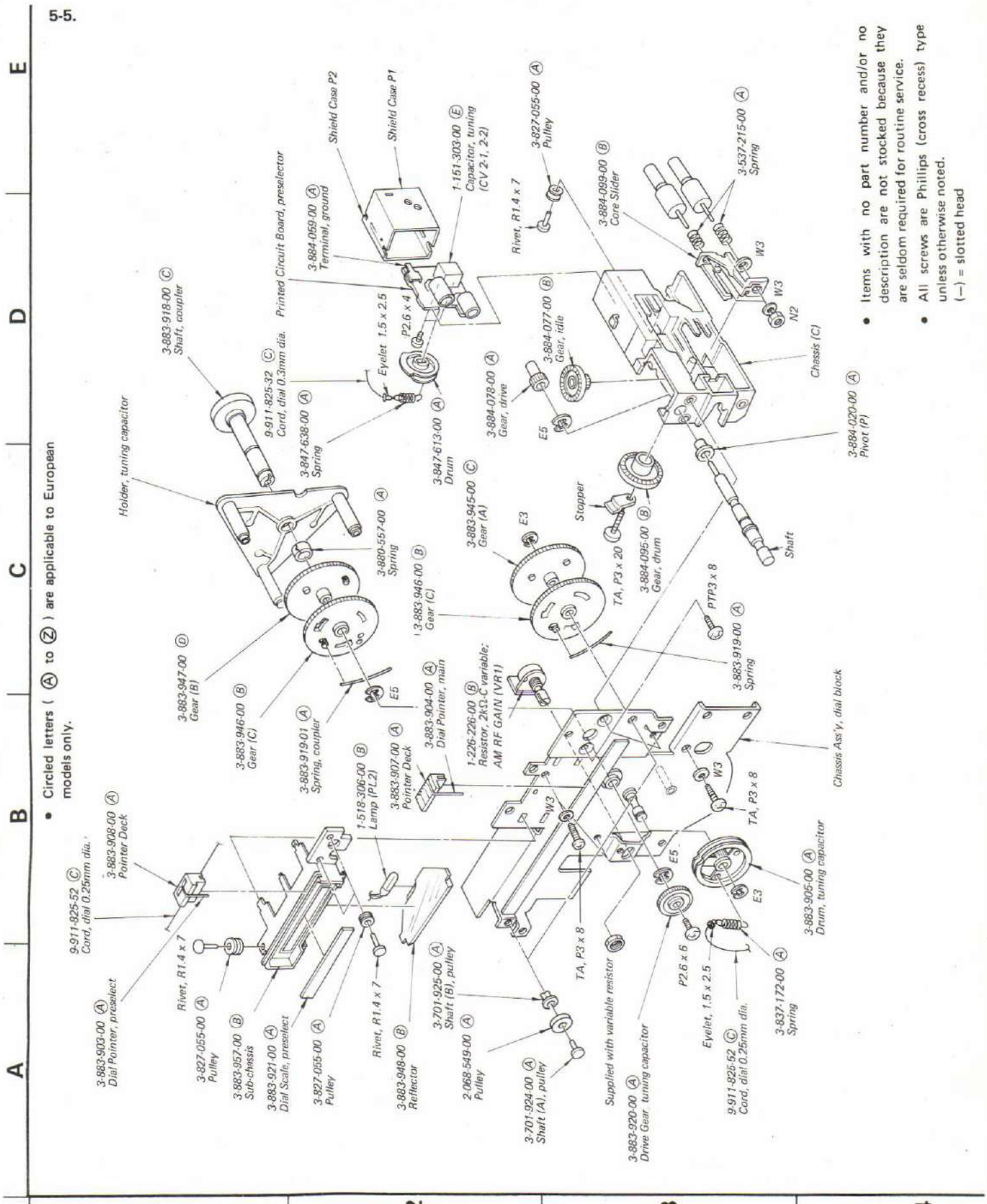
- Circled letters (Ⓐ to Ⓩ) are applicable to European models only.

5-4.



- 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

5-5.



SECTION 6
ELECTRICAL PARTS LIST

Ref. No.	Part No.	Description
		SEMICONDUCTORS
		Transistors
⇒Q1	8-727-312-00 Ⓒ	2SK 42-2
⇒Q2, 3	8-729-803-04 Ⓑ	2SC930
Q4	8-722-762-00 Ⓓ	3SK37
⇒Q5, 6	8-729-803-04 Ⓑ	2SC930
⇒Q7, 8	8-722-382-04 Ⓓ	2SK23A-824
⇒Q9–13	8-729-803-04 Ⓑ	2SC930
⇒Q14, 15	8-729-663-47 Ⓑ	2SC1364
⇒Q16, 17	8-769-010-35 Ⓑ	2SK107
⇒Q18	8-727-788-00 Ⓑ	2SA678
⇒Q19	8-729-663-47 Ⓑ	2SC1364
Q20	8-760-335-10 Ⓑ	2SC1474
⇒Q21	8-729-468-43 Ⓑ	2SA684
⇒Q22	8-729-663-47 Ⓑ	2SC1364
⇒Q23	8-727-788-00 Ⓑ	2SA678
⇒Q24	8-729-468-43 Ⓑ	2SA684
⇒Q25, 26	8-729-663-47 Ⓑ	2SC1364
⇒Q27	8-729-803-04 Ⓑ	2SC930
Q28	8-763-213-00 Ⓒ	2SA861
⇒Q29–31	8-729-663-47 Ⓑ	2SC1364
⇒Q32	8-727-312-00 Ⓒ	2SK42-2
⇒Q33, 34	8-729-671-13 Ⓑ	2SC710
⇒Q35	8-727-788-00 Ⓑ	2SA678
⇒Q36	8-729-803-04 Ⓑ	2SC930
⇒Q37	8-729-671-13 Ⓑ	2SC710
⇒Q38	8-727-788-00 Ⓑ	2SA678
⇒Q39	8-729-803-04 Ⓑ	2SC930
⇒Q40–47	8-729-663-47 Ⓑ	2SC1364
		ICs
IC1	8-751-620-00 Ⓕ	CX-162
IC2	8-759-270-60 Ⓒ	TA7060P
⇒IC3	8-759-902-93 Ⓕ	SN74LS293N
IC4	8-759-155-10 Ⓙ	μPB551C
IC5	8-759-902-90 Ⓕ	SN74LS290N
IC6	8-759-648-25 Ⓝ	M54825P

Ref. No.	Part No.	Description
		Diodes
D1–8	8-719-815-55 Ⓐ	1S1555
⇒D9	8-729-803-04 Ⓑ	2SC930
D10, 11	8-719-815-55 Ⓐ	1S1555
D12, 13	8-719-026-11 Ⓐ	1T261
⇒D14	8-719-422-21 Ⓐ	1T22AM
D15–18	8-719-815-55 Ⓐ	1S1555
D19, 20	⚠8-719-200-02 Ⓑ	10E2
⇒D21	8-719-713-93 Ⓑ	1S2139C
D22	8-719-905-12 Ⓛ	SL1512
⇒D23	8-719-422-21 Ⓐ	1T22AM
VDR1	8-719-122-00 Ⓑ	VD1220
		Thermistors
Th1, 2	1-800-007-00 Ⓑ	S-300
		COILS
L1	1-401-456-00 Ⓑ	FM ANT
L2	1-420-859-00 Ⓐ	FM RF
L3	1-405-642-00 Ⓐ	FM Osc
L4	1-407-181-XX Ⓐ	IF TRAP
L5	1-401-715-00 Ⓔ	SW ANT
L6	1-401-716-00 Ⓔ	SW RF
L7	1-405-787-00 Ⓑ	MW Osc
L8	1-405-788-00 Ⓑ	SW1 Osc
L9	1-405-789-00 Ⓑ	SW2 Osc
L10	1-405-790-00 Ⓑ	SW3 Osc
L11	1-401-726-00 Ⓒ	MW Ferrite-rod Antenna
L13	1-407-188-XX Ⓐ	Microinductor, 6.8μH
L14	1-407-161-XX Ⓐ	Microinduetor, 22μH
L15	1-407-187-XX Ⓐ	Microinductor, 5.6μH
L16	1-407-159-XX Ⓐ	Microinductor, 15μH
L17	1-407-187-XX Ⓐ	Microinductor, 5.6μH
L18	1-407-166-XX Ⓐ	Microinductor, 56μH
L19	1-407-158-XX Ⓐ	Microinductor, 12μH
L20	1-407-169-XX Ⓐ	Microinductor, 100μH
L21	1-407-856-00 Ⓒ	Choke
L22, 23	1-407-169-XX Ⓐ	Microinductor, 100μH

- ⇒: Due to standardization, interchangeable replacements may be substituted for parts specified in the diagrams.
- Circled letters (Ⓐ to Ⓩ) are applicable to European models only.

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

Note: Les composants identifiés par un tramé et une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

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

Ref. No.	Part No.	Description		
L24	1-407-182-XX Ⓐ	Microinductor, 2.2μH		
L201	1-407-165-XX Ⓐ	Microinductor, 47μH		
L202	1-407-856-00 Ⓒ	Choke		

TRANSFORMERS

T1	1-417-064-00 Ⓑ	Balun		
T2	⚠ 1-446-157-00	Power		(US model)
T2	⚠ 1-446-158-00 Ⓙ	Power		(AEP, UK, E, Canadian model)
IFT A1	1-404-021-00 Ⓑ	AM IFT		
IFT A2	1-404-100-00 Ⓑ	AM IFT		
IFT F1	1-403-872-00 Ⓑ	FM IFT		
IFT F2	1-403-959-00 Ⓑ	FM Discriminator		
IFT F3	1-403-953-00 Ⓑ	FM Discriminator		

CAPACITORS

All capacitors are in μF and ceramic unless otherwise noted.
50WV or less are not indicated except for electrolytics and tantalum.
pF: μμF, elect: electrolytic

C1	1-102-945-11 Ⓐ	8p		
C2	1-102-936-11 Ⓐ	3p		
C3	1-102-074-11 Ⓐ	0.001		
C4	1-102-958-11 Ⓐ	20p		
C5	1-102-936-11 Ⓐ	3p		
C6	1-102-976-11 Ⓐ	180p		
C7	1-101-923-11 Ⓐ	0.01		
C8	1-161-249-11 Ⓐ	1.5p		
C9	1-102-074-11 Ⓐ	0.001		
C10	1-102-949-11 Ⓐ	12p		
C11	1-102-958-11 Ⓐ	20p		
C12	1-102-943-11 Ⓐ	6p		
C13	1-101-797-11 Ⓐ	0.1		(semiconductor)
C14	1-102-951-11 Ⓐ	15p		
C15	1-121-391-11 Ⓐ	1	50V	elect
C16	1-161-271-11 Ⓐ	100p		
C17	1-101-923-11 Ⓐ	0.01		
C18	1-161-033-11 Ⓐ	0.015		(semiconductor)
C20	1-161-033-11 Ⓐ	0.015		(semiconductor)
C21	1-161-379-11 Ⓐ	0.01		
C22	1-101-923-11 Ⓐ	0.01		
C23	1-102-973-11 Ⓐ	100p		
C24	1-161-379-11 Ⓐ	0.01		
C25	1-102-945-11 Ⓐ	8p		
C26–28	1-102-947-11 Ⓐ	10p		
C29	1-102-724-11 Ⓐ	33p		
C30	1-102-802-11 Ⓐ	24p		
C31	1-102-880-11 Ⓐ	15p		
C32	1-102-280-11 Ⓐ	5p		
C33	1-107-269-11 Ⓐ	430p		silvered mica
C34	1-107-262-11 Ⓑ	120p		silvered mica
C35	1-107-260-11 Ⓑ	82p		silvered mica
C36–38	1-161-379-11 Ⓐ	0.01		
C39	1-101-923-11 Ⓐ	0.01		
C40	1-121-651-11 Ⓐ	10	16V	elect
C41	1-102-934-11 Ⓐ	1p		
C42	1-101-923-11 Ⓐ	0.01		
C45	1-161-379-11 Ⓐ	0.01		
C46	1-101-923-11 Ⓐ	0.01		
C47	1-161-032-11 Ⓐ	0.01		(semiconductor)
C48	1-161-379-11 Ⓐ	0.01		
C49	1-102-074-11 Ⓐ	0.001		
C50	1-161-379-11 Ⓐ	0.01		
C51	1-101-924-11 Ⓐ	0.022		
C52, 53	1-161-379-11 Ⓐ	0.01		
C54	1-102-947-11 Ⓐ	10p		
C55	1-101-923-11 Ⓐ	0.01		
C56	1-161-379-11 Ⓐ	0.01		
C57	1-161-379-11 Ⓐ	0.01		
C58, 59	1-121-651-11 Ⓐ	10	16V	elect
C60	1-101-923-11 Ⓐ	0.01		
C61	1-121-651-11 Ⓐ	10	10V	elect
C62	1-161-034-11 Ⓐ	0.022		(semiconductor)
C63	1-131-236-11 Ⓑ	1	50V	tantalum
C64	1-101-880-11 Ⓐ	47p		
C65	1-161-032-11 Ⓐ	0.01		(semiconductor)
C66	1-161-030-11 Ⓐ	0.0047		(semiconductor)
C67	1-102-966-11 Ⓐ	43p		
C68	1-102-958-11 Ⓐ	20p		
C69, 70	1-102-110-11 Ⓐ	220p		

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

Note: Les composants identifiés par un tramé et une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

1/4 WATT CARBON RESISTORS Ⓐ

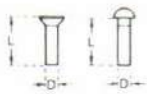
Note: Circled letter Ⓐ is applicable to European models only.

Ω	Part No.	Ω	Part No.	Ω	Part No.	Ω	Part No.	Ω	Part No.	Ω	Part No.	Ω	Part No.
1.0	1-244-601-11	10	1-244-625-11	100	1-244-649-11	1.0k	1-244-673-11	10k	1-244-697-11	100k	1-244-721-11	1.0M	1-244-745-11
1.1	1-244-602-11	11	1-244-626-11	110	1-244-650-11	1.1k	1-244-674-11	11k	1-244-698-11	110k	1-244-722-11	1.1M	1-244-746-11
1.2	1-244-603-11	12	1-244-627-11	120	1-244-651-11	1.2k	1-244-675-11	12k	1-244-699-11	120k	1-244-723-11	1.2M	1-244-747-11
1.3	1-244-604-11	13	1-244-628-11	130	1-244-652-11	1.3k	1-244-676-11	13k	1-244-700-11	130k	1-244-724-11	1.3M	1-244-748-11
1.5	1-244-605-11	15	1-244-629-11	150	1-244-653-11	1.5k	1-244-677-11	15k	1-244-701-11	150k	1-244-725-11	1.5M	1-244-749-11
1.6	1-244-606-11	16	1-244-630-11	160	1-244-654-11	1.6k	1-244-678-11	16k	1-244-702-11	160k	1-244-726-11	1.6M	1-244-750-11
1.8	1-244-607-11	18	1-244-631-11	180	1-244-655-11	1.8k	1-244-679-11	18k	1-244-703-11	180k	1-244-737-11	1.8M	1-244-751-11
2.0	1-244-608-11	20	1-244-632-11	200	1-244-656-11	2.0k	1-244-680-11	20k	1-244-704-11	200k	1-244-728-11	2.0M	1-244-752-11
2.2	1-244-609-11	22	1-244-633-11	220	1-244-657-11	2.2k	1-244-681-11	22k	1-244-705-11	220k	1-244-729-11	2.2M	1-244-753-11
2.4	1-244-610-11	24	1-244-634-11	240	1-244-658-11	2.4k	1-244-682-11	24k	1-244-706-11	240k	1-244-730-11	2.4M	1-244-754-11
2.7	1-244-611-11	27	1-244-635-11	270	1-244-659-11	2.7k	1-244-683-11	27k	1-244-707-11	270k	1-244-731-11	2.7M	1-244-755-11
3.0	1-244-612-11	30	1-244-636-11	300	1-244-660-11	3.0k	1-244-684-11	30k	1-244-708-11	300k	1-244-732-11	3.0M	1-244-756-11
3.3	1-244-613-11	33	1-244-637-11	330	1-244-661-11	3.3k	1-244-685-11	33k	1-244-709-11	330k	1-244-733-11	3.3M	1-244-757-11
3.6	1-244-614-11	36	1-244-638-11	360	1-244-662-11	3.6k	1-244-686-11	36k	1-244-710-11	360k	1-244-734-11	3.6M	1-244-758-11
3.9	1-244-615-11	39	1-244-639-11	390	1-244-663-11	3.9k	1-244-687-11	39k	1-244-711-11	390k	1-244-735-11	3.9M	1-244-759-11
4.3	1-244-616-11	43	1-244-640-11	430	1-244-664-11	4.3k	1-244-688-11	43k	1-244-712-11	430k	1-244-736-11	4.3M	1-244-760-11
4.7	1-244-617-11	47	1-244-641-11	470	1-244-665-11	4.7k	1-244-689-11	47k	1-244-713-11	470k	1-244-737-11	4.7M	1-244-761-11
5.1	1-244-618-11	51	1-244-642-11	510	1-244-666-11	5.1k	1-244-690-11	51k	1-244-714-11	510k	1-244-738-11	5.1M	1-244-762-11
5.6	1-244-619-11	56	1-244-643-11	560	1-244-667-11	5.6k	1-244-691-11	56k	1-244-715-11	560k	1-244-739-11		
6.2	1-244-620-11	62	1-244-644-11	620	1-244-668-11	6.2k	1-244-692-11	62k	1-244-716-11	620k	1-244-740-11		
6.8	1-244-621-11	68	1-244-645-11	680	1-244-669-11	6.8k	1-244-693-11	68k	1-244-717-11	680k	1-244-741-11		
7.5	1-244-622-11	75	1-244-646-11	750	1-244-670-11	7.5k	1-244-694-11	75k	1-244-718-11	750k	1-244-742-11		
8.2	1-244-623-11	82	1-244-647-11	820	1-244-671-11	8.2k	1-244-695-11	82k	1-244-719-11	820k	1-244-743-11		
9.1	1-244-624-11	91	1-244-648-11	910	1-244-672-11	9.1k	1-244-696-11	91k	1-244-720-11	910k	1-244-744-11		

HARDWARE NOMENCLATURE

Screw:

– P 3 x 10
- L: Length in mm
- D: Diameter in mm
- Type of head
- Indicated slotted-head only. Unless otherwise indicated, it means cross-recessed head (Phillips type).



Nut, Washer, Retaining ring:

N 3
- Diameter of usable screw or shaft
- Reference designation

Reference Designation	Shape	Description	Remarks
SCREWS			
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 PSP		pan-head screw with spring washer	binding-head (B) screw and spring washer for replacement
PSW PSPW		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	
RK		oval-countersunk-head screw	
B		binding-head screw	
T		truss-head screw	binding-head (B) screw for replacement
F		flat-fillister-head screw	
RF		fillister-head screw	
BV		braizer-head screw	

Reference Designation	Shape	Description	Remarks
SELF-TAPPING SCREWS			
TA		self-tapping screw	ex: TA, P 3 x 10
PTP		pan-head self-tapping screw	binding-head self-tapping (TA, B) screw for replacement
PTPWH		pan-head self-tapping screw with washer face	binding-head self tapping (TA, B) screw and flat washer for replacement
PTTWH		pan-head thread-rolling screw with washer face	binding-head (B) screw and flat washer for replacement
SET SCREWS			
SC		set screw	
SC		hexagon-socket set screw	ex: SC 2.6 x 4, hexagon socket
NUT			
N		nut	
WASHERS			
W		flat washer	
SW		spring washer	
LW		internal-tooth lock washer	ex: LW3, internal
LW		external-tooth lock washer	ex: LW3, external
RETAINING RINGS			
E		retaining ring	
G		grip-type retaining ring	

Sony Corporation

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

Ref. No.	Part No.	Description		
C71	1-102-947-11 Ⓐ	10p		
C72	1-101-923-11 Ⓐ	0.01		
C73	1-102-650-11 Ⓐ	62p		
C74	1-102-656-11 Ⓐ	120p		
C75, 76	1-161-379-11 Ⓐ	0.01		
C77	1-101-797-11 Ⓐ	0.1		(semiconductor)
C78	1-161-033-11 Ⓐ	0.015		(semiconductor)
C79	1-101-923-11 Ⓐ	0.01		
C80	1-161-033-11 Ⓐ	0.015		(semiconductor)
C81	1-102-114-11 Ⓐ	470p		
C82	1-121-726-11 Ⓐ	0.47	50V	elect
C83	1-161-032-11 Ⓐ	0.01		(boundary layer)
C84	1-121-938-11 Ⓑ	470	10V	elect
C85	1-127-019-11 Ⓐ	0.1	16V	elect
C86	1-121-726-11 Ⓐ	0.47	50V	elect
C87	1-123-072-11 Ⓐ	220	10V	elect
C88	1-102-973-11 Ⓐ	100p		
C89	1-121-414-11 Ⓐ	100	10V	elect
C90	1-102-121-11 Ⓐ	0.0022		
C91	1-127-020-11 Ⓐ	0.22	16V	elect
C92	1-121-395-11 Ⓐ	4.7	25V	elect
C93–95	1-123-072-11 Ⓐ	220	10V	elect
C96	1-121-414-11 Ⓐ	100	10V	elect
C97	⚠1-123-074-11 Ⓑ	2200	10V	elect
C98, 99	⚠1-108-647-12 Ⓐ	0.0015	100V	mylar
C100	1-121-938-11 Ⓐ	470	10V	elect
C101	1-121-413-11 Ⓐ	100	6.3V	elect
C102	1-101-923-11 Ⓐ	0.01		
C103	1-161-033-11 Ⓐ	0.015		(semiconductor)
C104, 105	1-101-923-11 Ⓐ	0.01		
C106	1-101-797-11 Ⓐ	0.1		(semiconductor)
C107	1-121-651-11 Ⓐ	10	10V	elect
C109	1-121-352-11 Ⓐ	47	10V	elect
C110	1-161-032-11 Ⓐ	0.01		(semiconductor)
C111	1-161-379-11 Ⓐ	0.01		
C112	1-101-923-11 Ⓐ	0.01		
C113	1-102-074-11 Ⓐ	0.001		
C114	1-101-923-11 Ⓐ	0.01		
C115	1-102-947-11 Ⓐ	10p		
C116	1-102-074-11 Ⓐ	0.001		

Ref. No.	Part No.	Description		
C117	1-161-032-11 Ⓐ	0.01		(semiconductor)
C118	1-161-034-11 Ⓐ	0.022		(semiconductor)
C119	1-101-923-11 Ⓐ	0.01		
C120	1-121-651-11 Ⓐ	10	16V	elect
C121, 122	1-101-923-11 Ⓐ	0.01		
C123	1-121-414-11 Ⓐ	100	10V	elect
C124	1-101-923-11 Ⓐ	0.01		
C127	1-161-036-11 Ⓐ	0.047		(semiconductor)
C128	1-161-034-11 Ⓐ	0.022		(semiconductor)
C131	1-161-002-11 Ⓐ	0.0012		(semiconductor)
C132	1-161-003-11 Ⓐ	0.0015		(semiconductor)
C133	1-161-002-11 Ⓐ	0.0012		(semiconductor)
C134	1-161-027-11 Ⓐ	0.0015		(semiconductor)
C135	1-161-379-11 Ⓐ	0.01		
C136	1-161-033-11 Ⓐ	0.015		(semiconductor)
C137	1-161-379-11 Ⓐ	0.01		
C138	1-101-923-11 Ⓐ	0.01		
C139	1-102-949-11 Ⓐ	12p		
C140	1-102-953-11 Ⓐ	18p		
C141	1-101-923-11 Ⓐ	0.01		
C142	1-123-072-11 Ⓐ	220	10V	elect
C143	1-121-651-11 Ⓐ	10	10V	elect
C201–204	1-101-923-11 Ⓐ	0.01		
C205	1-121-651-11 Ⓐ	10	16V	elect
C206, 207	1-101-923-11 Ⓐ	0.01		
C208	1-101-924-11 Ⓐ	0.022		
C209	1-121-413-11 Ⓐ	100	6.3V	elect
C210	1-121-751-11 Ⓑ	330	6.3V	elect
C211	1-101-923-11 Ⓐ	0.01		
C212	1-102-074-11 Ⓐ	0.001		
C213	1-102-106-11 Ⓐ	100p		
C214	1-101-923-11 Ⓐ	0.01		
C215	1-102-114-11 Ⓐ	470p		
C216	1-102-963-11 Ⓐ	33p		
C217	1-102-973-11 Ⓐ	100p		
C218–224	1-101-923-11 Ⓐ	0.01		
C225, 226	1-161-032-11 Ⓐ	0.01		(semiconductor)
C227, 228	1-101-923-11 Ⓐ	0.01		
C230	1-102-947-11 Ⓐ	10p		

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

Note: Les composants identifiés par un tramé et une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

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

Ref. No.	Part No.	Description		
C301	1-121-391-11 Ⓐ	1	50V	elect
C302	1-161-037-11 Ⓐ	0.068		(semiconductor)
C303	1-161-030-11 Ⓐ	0.0047		(semiconductor)
C304	1-127-378-11 Ⓑ	0.68		elect
C305	1-102-973-11 Ⓐ	100p		
C306–308	1-161-035-11 Ⓐ	0.033		(semiconductor)
C309	1-121-413-11 Ⓐ	100	6.3V	elect
CT1, 2	1-141-138-XX Ⓑ	Trimmer		
CT5	1-141-140-XX Ⓑ	Trimmer		
CT6–8	1-141-171-00 Ⓑ	Trimmer		
CV1-1~1-4	1-151-335-00 Ⓘ	Tuning		
CV2-1, 2-2	1-151-303-00 Ⓔ	Tuning		

RESISTORS

All resistors are in ohms. Common ¼W carbon resistors are omitted.

Refer to the list on page 36 for their part numbers.

R401	⚠1-202-723-21	2.2M	½W	composition (US, Canadian model)
VR1	1-226-226-00 Ⓑ	2k-C,	variable;	AM RF GAIN
VR2	1-226-162-00 Ⓑ	5k-A,	variable;	TREBLE
VR3	1-226-161-00 Ⓑ	10k-D,	variable;	VOLUME
VR4	1-226-163-00 Ⓑ	5k-D,	variable;	BASS
VR5	1-224-251-XX Ⓑ	4.7k-B,	adjustable;	SW MIX

JACKS

J1–4	1-507-562-00 Ⓑ	MPX OUT, REC OUT, TIMER, EARPHONE
J5	1-507-389-XX Ⓒ	HEADPHONES
J6	1-507-447-XX Ⓑ	EXT POWER IN, DC 9V
J7	⚠1-509-511-00	Socket, AC INPUT (US, Canadian model)
J7	⚠1-509-510-00 Ⓒ	Socket, AC INPUT (AEP, UK, E model)

SWITCHES

S1	1-514-316-00 Ⓓ	Slide, BAND SELECTOR
S2	1-513-281-00 Ⓒ	Slide, MODE
S3	1-514-861-XX Ⓒ	Slide, AM-FM
S4	1-552-327-00 Ⓑ	Slide, FREQUENCY DISPLAY
S5	1-552-127-00 Ⓑ	Lever-slide, AFC
S6	1-552-127-00 Ⓑ	Lever-slide, RADIO
S7	3-848-708-00 Ⓑ	Spring
	3-884-040-00 Ⓐ	Contact (A) DIAL LIGHT, BATT CHECK
S8	1-516-777-XX Ⓒ	Slide, SW-ANT ROD/EXT
S9	⚠1-552-026-00 Ⓓ	Voltage Selector

Ref. No.	Part No.	Description

MISCELLANEOUS

ANT	1-501-177-00 Ⓖ	Telescopic Antenna
BPF	1-231-392-00 Ⓑ	Bandpass Filter
CF1–3	1-527-184-XX Ⓑ	Ceramic Filter, 10.7 MHz
CFT	1-403-164-00 Ⓒ	Ceramic Filter, tripple tune
CFU	1-527-319-00 Ⓓ	Ceramic Filter
CR1	1-231-202-00 Ⓑ	Encapsulated Component
ME	1-520-323-00 Ⓗ	Meter, TUNING/BATT INDICATOR
PL1, 2	1-518-306-00 Ⓑ	Lamp, 8V 30mA
SP	1-502-694-00 Ⓕ	Speaker
X1	1-527-339-00 Ⓓ	Crystal, 10.245 MHz
X2	1-527-269-11 Ⓛ	Crystal, 500 kHz
	1-536-524-00 Ⓒ	Terminal, 4p; SW, MW
	⚠1-534-840-XX Ⓔ	Cord, power; DK-38 (AEP model)
	⚠1-551-218-00 Ⓔ	Cord, power; DK-50 (UK model)
	⚠1-551-235-00	Cord, power; DK-51 (E model)
	⚠1-551-504-00	Cord, power; (US, Canadian model)
	⚠1-551-521-00	Cord, power; (E model)

ACCESSORIES AND PACKING MATERIALS

Part No.	Description	
3-883-994-00 Ⓓ	Carton	
3-993-171-11 Ⓑ	Pin, antenna terminal	
3-995-831-11 Ⓒ	Manual, instruction	(AEP, UK, E model)
3-995-831-21	Manual, instruction	(Canadian model)
3-993-172-31	Manual, instruction; French	(Canadian model)
3-995-831-21	Manual, instruction	(US model)
3-794-233-21	Leaflet	(US model)
3-701-616-00 Ⓐ	Bag, plastic	
3-701-627-00 Ⓐ	Bag, plastic; manual	
3-884-120-00 Ⓒ	Cushion (R)	
3-884-119-00 Ⓒ	Cushion (L)	
3-551-895-00 Ⓑ	Bag, set protection	

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

Note: Les composants identifiés par un tramé et une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

/AM MULTI BAND RECEIVER ICF-6700W

Canadian Model
US Model
AEP Model
UK Model
E Model

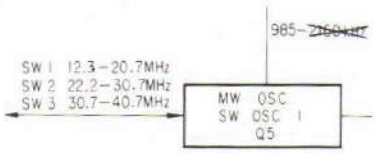
CORRECTION

– File this correction with service manual –

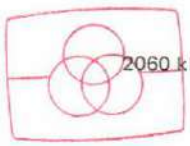
No. 1
August, 1978

PAGE 3

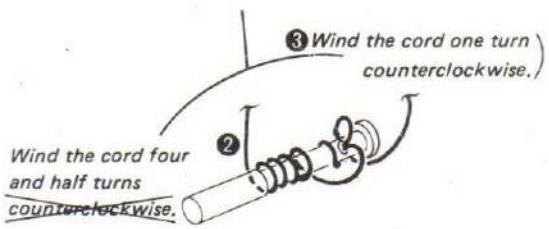
INCORRECT (✕)



CORRECT



PAGE 11



clockwise

PAGE 16

FM FREQUENCY COVERAGE ADJUSTMENT	
Adjust for maximum reading on VOM.	
86.5(~~88~~) MHz	L3
109.5(108) MHz	CT2

87.5 MHz

( ): AEP model

FM TRACKING ADJUSTMENT	
Adjust for maximum reading on VOM.	
86.5(~~88~~) MHz	L2
109.5(108) MHz	CT1

87.5 MHz

PAGE 13

MW IF ALIGNMENT	
Adjust for maximum reading on VOM.	
455 kHz	CFT

Delete ~~(459 kHz)~~ : UK model

SONY SERVICE MANUAL

Sony Corporation

50-434-91

78H02108-1
Printed in Japan

ICF-6700W

FM/AM MULTI BAND RECEIVER

Canadian Model
US Model
AEP Model
UK Model
E Model

SUPPLEMENT

File this supplement with the service manual.

No. 1
December, 1978

I. RECEPTION CIRCUIT

Fig. 1 is a block diagram of the equipment. Only the main parts are indicated to clearly illustrate the operation of the system. The basic system is the same as that of Sony's other medium-priced sets, except for the digital display of the received frequency. Consequently, it is very different from others like the ICF-6800W with synthesizers. It consists of advanced circuits giving high efficiency. These include a double super heterodyne circuit with I-Fs at 10.7 MHz and 455 kHz, a balanced type first frequency mixer, a preselector with high gain over a wide frequency range, a low frequency filter to enable easy listening to SSB, an FET RF amplifier that withstands noise and even an FET RF stage in the MW band.

Below is a brief explanation of how these circuits process the received signals.

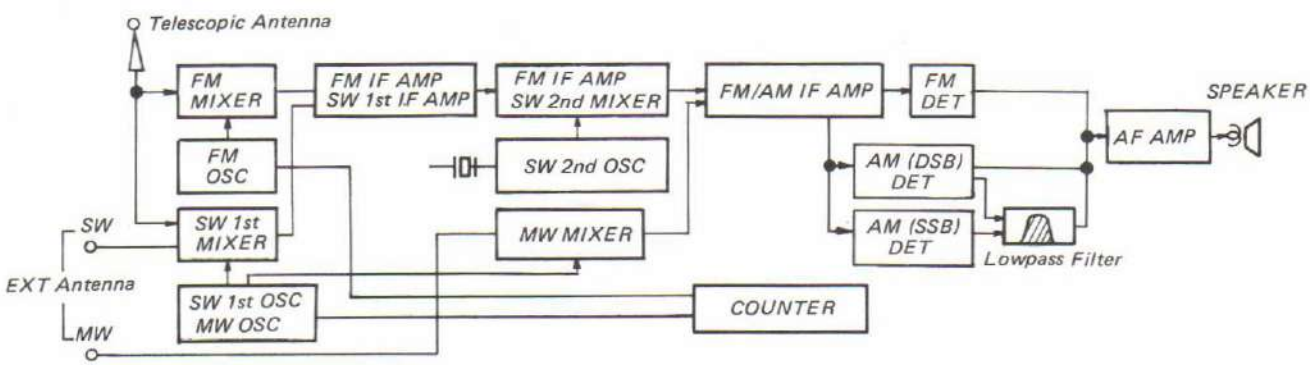


Fig. 1

SONY
SERVICE MANUAL

1. SW bandpass filter

A bandpass filter is installed in the SW external antenna terminal input circuit. This filter prevents large-amplitude signals of unwanted frequencies from getting into the high-frequency amplifier. The filter is not installed at the rod antenna, however, because the impedance of the rod antenna is high enough to reject undesired large-amplitude signals. In addition, the filter would be less effective because of the high and frequency-dependent impedance of the rod antenna.

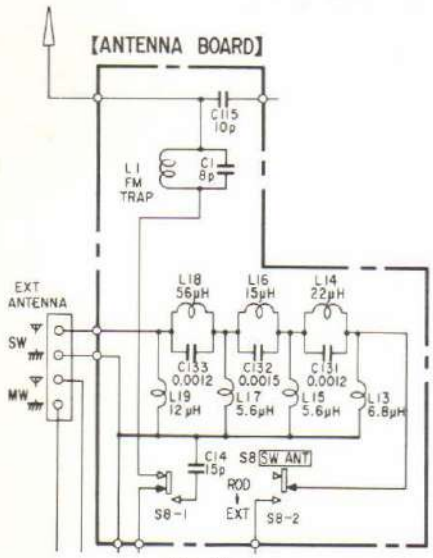


Fig. 2

2. Preselector

Preselectors are installed at both the input and output sides of RF amplifier Q4 and are synchronized. These are the same as the RF amplification circuits of regular type of receivers, but in order to maintain high efficiency over a wide range of frequencies and also to simplify the system, they are designed to be operated separately from the main dial. Moreover, L and C are set to be variable since a wide range of frequencies are to be covered.

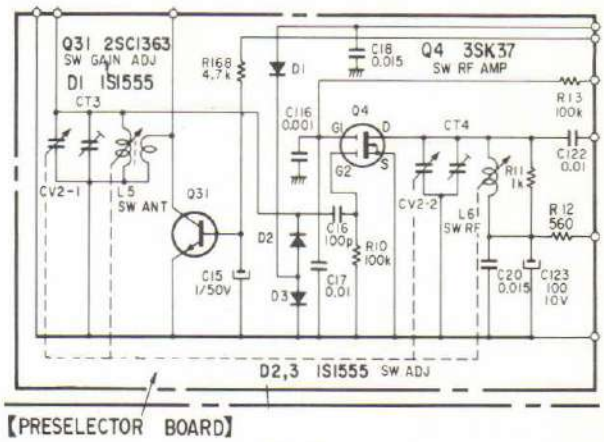


Fig. 3

3. High frequency gain adjustment See Fig. 3 and 4.

RV1 controls the impedances of Q31, D2 and D3 which are also the input impedance of RF amplifier Q4. It also controls impedances D4, D6 of the antenna circuit in the MW band and results in varying the RF gain in the MW band as well. When RV1 is at the maximum gain position, AGC voltage is applied to D2, D3, D4 and D6.

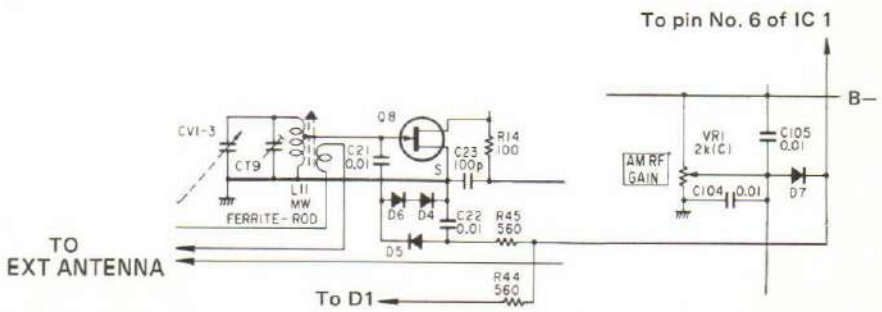


Fig. 4

4. SW primary frequency mixer (Q16, 17)

This balanced type frequency mixer consists of two 2SK23As. A characteristic of this type of frequency mixer is that signals entering from the balanced side are not, as a rule, transmitted to the output side. The received signal amplified by Q4 enters the balanced side. Applying the received signal to the balanced side makes it low in noise even when spurious waves of different frequencies are brought into the frequency mixer. This becomes quite effective for spurious waves which are the same as the first I-F 10.7 MHz. A variable resistor is installed in the source circuit so that the gains of Q16 and Q17 are simulaneously adjusted for the best balance. Local oscillation output is transmitted to the source. This frequency mixer transfers the received frequency to 10.7 MHz to enter the FM 1-F amplifier. Setting the first I-F at 10.7 MHz means that the circuit can be used for FM and, since the frequency is high, an outstanding image rejection rate is obtained.

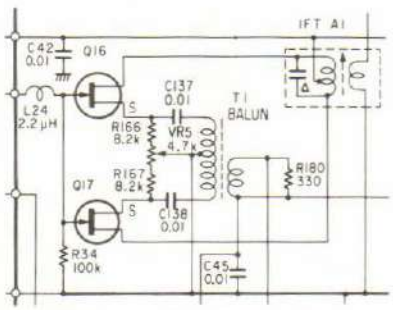


Fig. 5

5. SW second frequency mixer (Q10)

This frequency mixer also operates as an FM I-F amplifier. For SW, by changing the bias it can be used as a second frequency mixer. This also transfers 10.7 MHz to the second I-F of 455 kHz. A local oscillator signal of high stability from a crystal oscillator is put into the emitter. The frequency of the local oscillator is fixed at 10.245 MHz. The output of the second frequency mixer enters IC1 by way of CFT and CFU to be amplified.

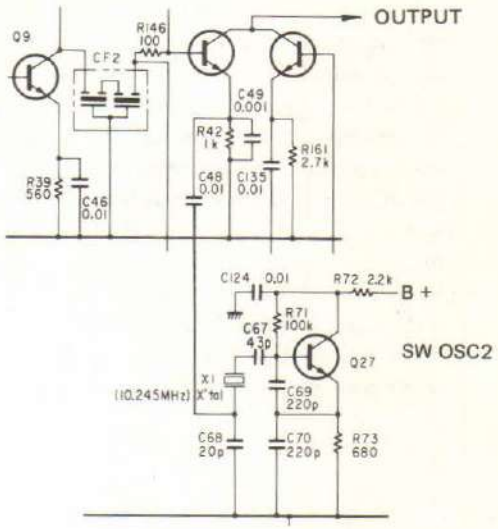


Fig. 6

6. SW second 1-F amplifier (IC1)

This IC contains not only an AM I-F amplifier but also an FM I-F amplifier, an AGC circuit, a meter circuit, etc.

7. Wave detector (D14–D16)

D14 and D15, D16 are wave detector diodes for DSB and SSB respectively. The detector for SSB is an ordinary balanced product detector. LSB and USB are selected by using S2-2 and C134 to shift the frequency by 2 kHz. This is performed by adjusting the core of L12 so that reproduced frequencies of LSB and USB become identical after receiving non-modulated waves accurately at the DSB position. The wave detector for DSB is a conventional type.

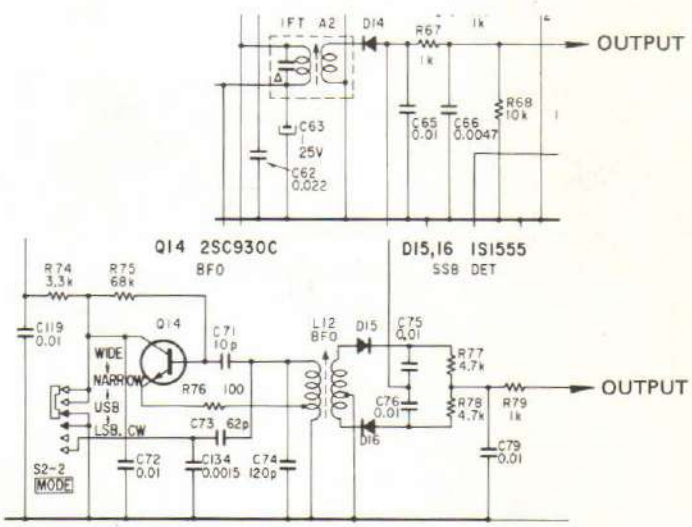


Fig. 7

8. Low-frequency filter (Q15, Q46, Q47)

It is more important for SSB receivers to reproduce sound easy to understand, rather than high fidelity sound, for this reason after the signal is detected it is passed through the bandpass filter to cut off unwanted frequencies and noise. The dedector output in SSB operation is usually lower than that of DSB, and thus the filter produces some gain. Even for DSB, this filter cuts off the high and low range of frequencies so that the sound is easy to understand. This filter has a peak at approximately 1 kHz and is approximately −20 dB at 150 Hz and 2 kHz. After this filter, the signal is amplified by the AF amplifier and is sent to the speakers.

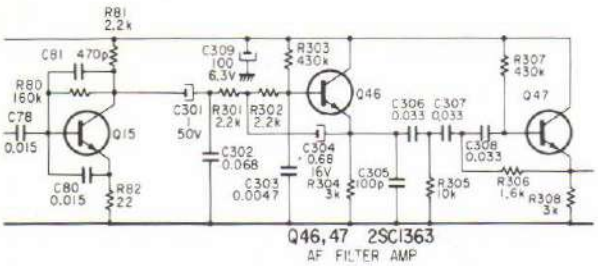


Fig. 8

II. DISPLAY CIRCUIT OF RECEIVED FREQUENCY

The block diagram of the display circuit is shown in Fig. 9.

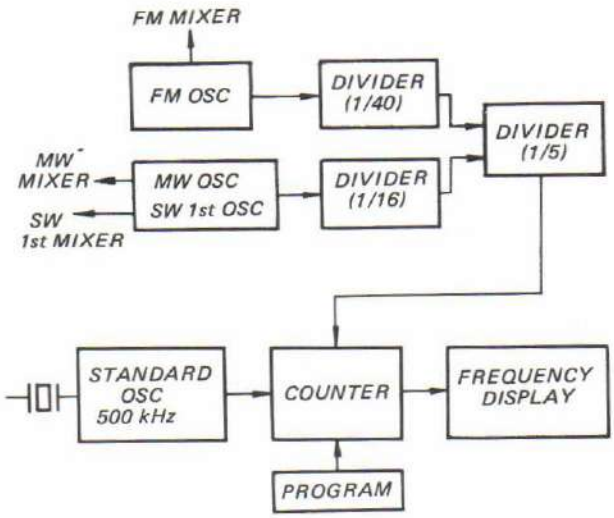


Fig. 9

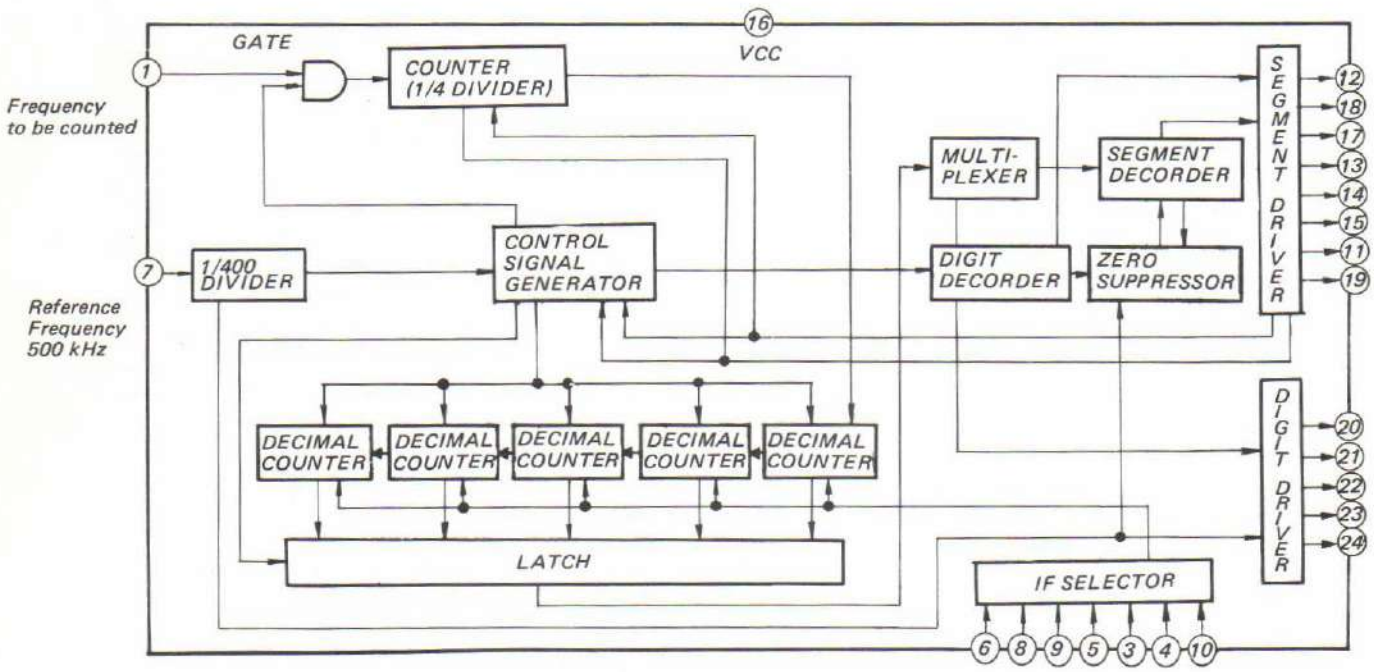


Fig. 10 BLOCK DIAGRAM OF IC 6

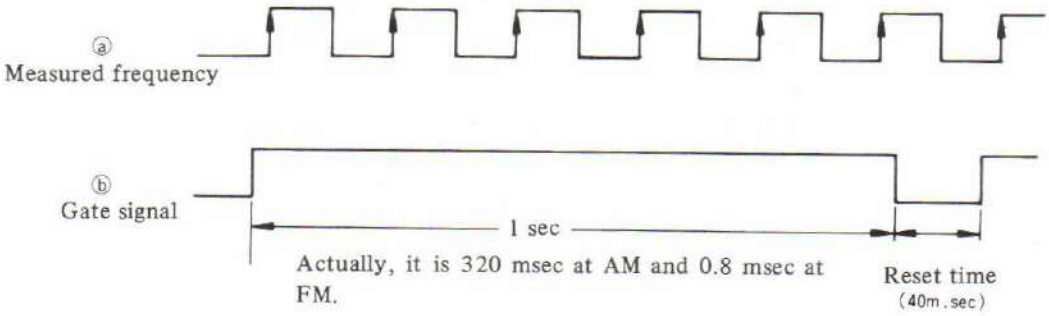


Fig. 11

Basic Operation of IC6 Counter

When a signal whose frequency is to be measured is applied to terminal 1, this signal enters the gate circuit. A reference frequency of 500 kHz is generated at terminal 7, and this signal is applied to the control-signal generator through the divider.

This signal is divided further in the control-signal generator so that a pulse lasts for a second as shown in Fig. 11. Actually, a display down to 1 kHz in AM and 100 kHz in FM is sufficient. Thus, pulses in AM and in FM are set to be 320 msec and 0.8 msec respectively. This signal from the control-signal generator, is applied to the gate circuit (this signal is referred to as the gate signal). The gate circuit acts as an AND circuit, and an output signal appears when both ⓐ and ⓑ are at the same level. This output signal is divided and counted by the decimal counter.

As shwon in Fig. 11, 6 pulses counted for a duration of 1 second make up the frequency 6 Hz.

Actually, high frequencies on the order of 10 MHz are received. Since the gate signal lasts for a second, the decimal counter must count pulses on the order of 10^5. Therefore, an extremely high speed counter is essential. The gate signal and the frequency to be measured are divided at the same proportion and counted. This method is called "Prescaling".

Decimal Counter

The signal generated above is applied to the decimal counter and its frequency is counted. The decimal counter returns to 0 after counting from 0 to 9, and 1 is displayed at the next counter.

Explanation of the operation of the decimal counter will be given using an example of a decimal counter in the Master-Slave system (negative-going trigger).

In this method as shown in Fig.12, the counter reads in the signal while the input signal is at a higher level, as indicated by the heavy line, and generates signals according to the truth table in Fig.13 when the input signal changes from the higher to the lower level as indicated by the arrow.

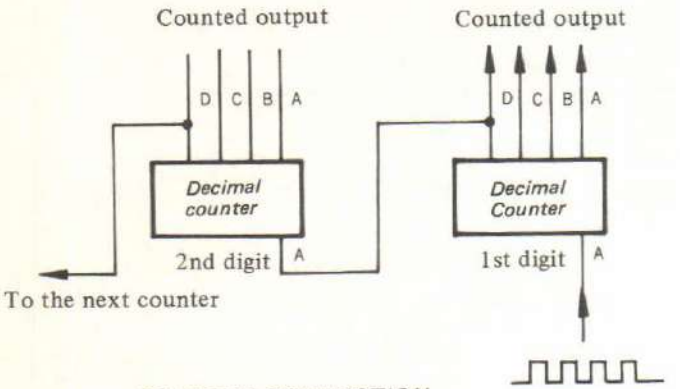
Fig. 12

Truth Table

Count	D	C	B	A
0	0	0	0	0
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1
8	1	0	0	0
9	1	0	0	1

Return from 9 to 0.

Fig. 13



COUNTER CONNECTION
Fig. 14

The frequency to be measured is applied to input A. Output D is connected input A of the next counter, and the next counter displays 1 when the count changes from 9 to 10.

Output D becomes 1 at 8 in the table, but the next counter does not display 1. The reason for this is that the signal to input A of the next counter is at a high level for both 8 and 9 and only goes low when the signal changes to a low level after 9.

The frequency is measured by using this technique.

The signals (outputs from A, B, C, D mentioned above) from the decimal counters are simultaneously sent to the latch circuit.

When the gate signal goes off, the decimal counter is reset to 0 for the next counter.

Latch Circuit

The result of the decimal count is put in the memory of the latch circuit when the gate signal is terminated. The purpose of the latch circuit is to keep certain information for a certain period of time.

In general, the latch circuit is made up of D type flip-flops.

Without the latch circuit, the display of the counter changes constantly as the counter counts pulses while the gate is open. The display becomes fixed and readable only when the gate is closed. The display returns to 0 when a reset signal is received and starts counting as the gate opens. This operation is repeated.

Therefore, with the latch circuit the display is fixed when the counting is over and continues to be so even when the reset signal is received. The display changes to show the results of the next count only when the next count is finished.

Multiplexer

The signal from the latch circuit is then sent to the multiplexer. This IC controls the LED display unit by a method called "dynamic drive", the generation of pulses to illuminate the digits of the LED in order from the 1st to the 5th digit.

Each digit of the LED is lit in sequence at a fast rate, but appears to the human eye to be lit continuously due to the "persistence of vision" effect.

This operation is performed through the multi-

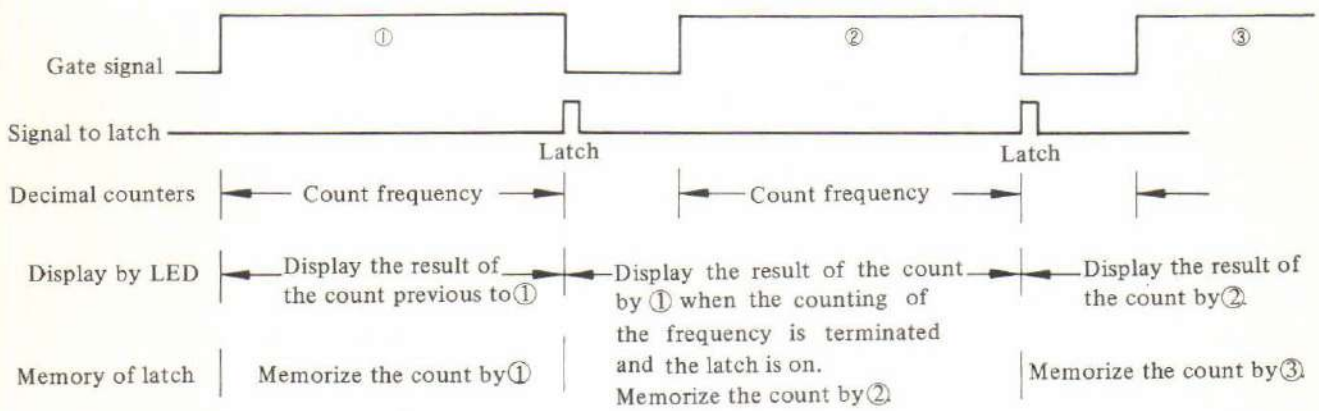
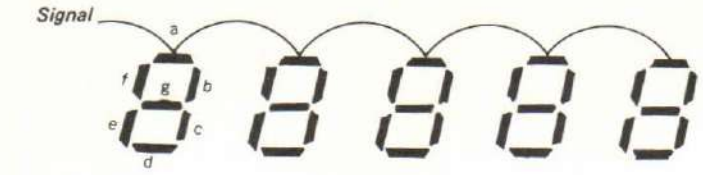
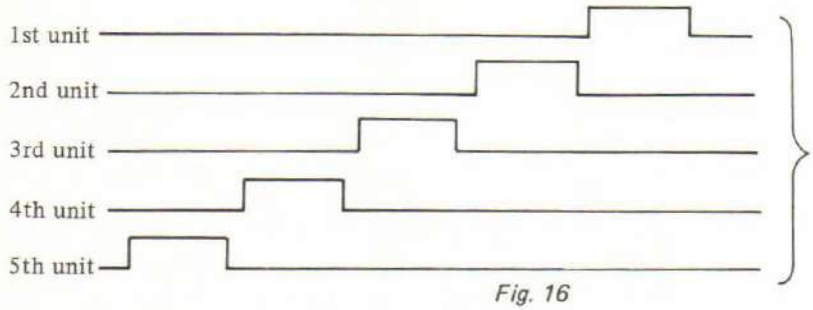


Fig. 15



The same segment in each unit is connected in parallel.



Apply a pulse so that each unit lights up in sequence.

Fig. 16

Segment Decoder

The purpose of the segment decoder is to change the output signals of the decimal counter to signals that illuminate the corresponding segment (a–g) of the LED.

The segment decoder operates as shown below. When the figure "2" is desplayed, for example, the signals shown in Fig. 8 are sent as output signals from the segment decoder.

Display of figure "2"

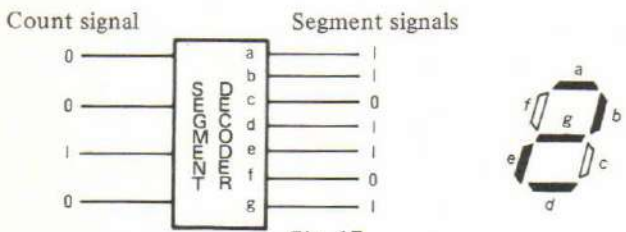


Fig. 17

Conversion Table

Figure	Count signal	Segment signal						
		a	b	c	d	e	f	g
0	0 0 0 0	1	1	1	1	1	1	0
1	0 0 0 1	0	1	1	0	0	0	0
2	0 0 1 0	1	1	0	1	1	0	1
3	0 0 1 1	1	1	1	1	0	0	1
4	0 1 0 0	0	1	1	0	0	1	1
5	0 1 0 1	1	0	1	1	0	1	1
6	0 1 1 0	1	0	1	1	1	1	1
7	0 1 1 1	1	1	1	0	0	1	0
8	1 0 0 0	1	1	1	1	1	1	1
9	1 0 0 1	1	1	1	1	0	1	1

Segment Driver

This amplifies signals generated by the segment decoder to the level required to operate the LED segments.

Digit Decoder

This generates signals for the multiplexer and the digit driver simultaneously.

Digit Driver

As previously mentioned in the explanation of the multiplexer, this IC provides the "dynamic drive" for the LED display.

This illuminates the 1st to the 5th digits in order. Q41–45 control the on-off operations of each digit of the LED. On-off signals are sent to Q41–45 by the digit driver.

Zero Suppress

Zero suppress is the circuit which terminates the display of zeroes preceding the significant figure.

Example: 00100 kHz
└─These 00 figures are not displayed.

Dynamic chart of each signal

An output dynamic chart for 12345 is given below as an example.

When both digit and segment outputs are at High level, the output is on.

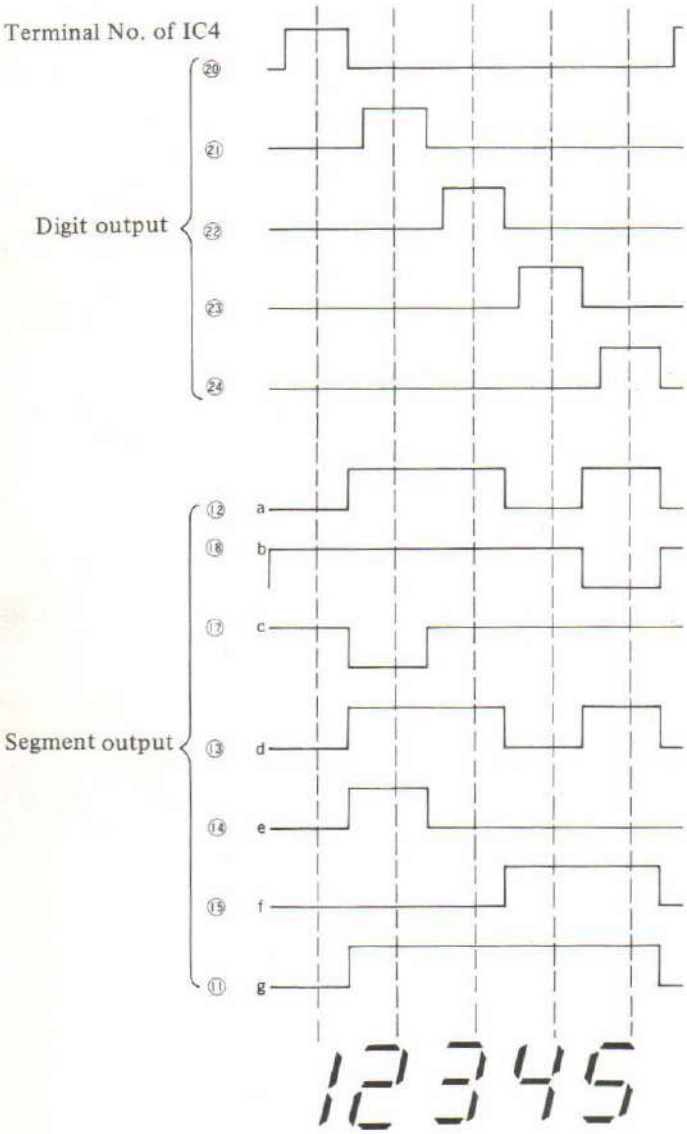


Fig. 18

I-F Selector

Since the frequency of the first local oscillator is 20.7 MHz, the counter would indicate 20.7 MHz if counted as it is, even if one wishes to display 10 MHz when receiving SW.

In order to get a display of 10 MHz a certain frequency must first be subtracted from the local-oscillator frequency. The I-F selector performs this subtraction. The counter has a display of five digits. If 0000 is set to be displayed when 10.700 is applied, 00001 kHz is displayed when 10.701 MHz is measured.

In order to get this performance, 10700 should be subtracted from the decimal counter before the next count.

These figures are calculated as follows.

100000 – 10700 = 89200

6 units

The figures 89200 should be set in the counter before counting a given frequency.

When 10.700 is counted, the display of the counters becomes 0, since 10700 + 89200 = 100000.

1 in the sixth digit is not displayed, since only 5 figures are displayed.

The I-F selector selects the figures to set in the counter before counting. The following figures are set by the I-F selector in this system.

FM	89200	
MW	99545	
SW	89200	(WIDE, NARROW)
	89198	(USB)
	89202	(LSB)

For SSB receivers, the received frequency is set at the carrier position. However, the oscillation frequency of transmitter is 2 kHz above or below the carrier frequency, and thus the I-F selector adds or subtracts 2 kHz before counting.

Timing chart of each signal

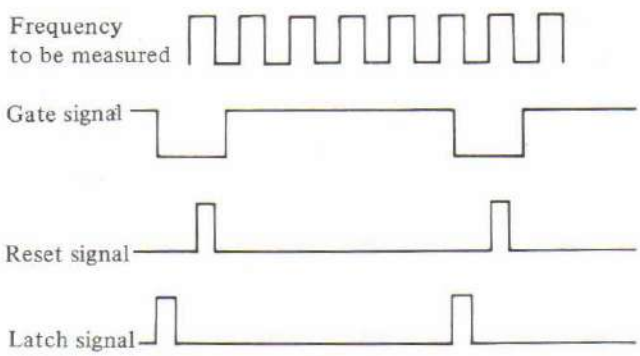


Fig. 19

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