ICF-110W

Set using ISO screws

General Export Model

SPECIFICATIONS

Circuit System: 10-transistor 1-FET 1-IC 6-diode superheterodyne

Frequency Coverage:
FM 87.5~108 MHz (3.43~2.8 m)
SW 3.9~12 MHz (77 m~25 m)
MW 530~1,605 kHz (566~187 m)

Intermediate Frequency:
FM 10.7 MHz
SW/MW 455 kHz

Antenna System:
FM/SW built-in telescopic antenna
MW built-in ferrite bar antenna

Sensitivity
at 50 mW output:
FM 2.5 μV (8 dB) at S/N 30 dB
SW 1 μV (0 dB)
MW 32 μV/m (30 dB/m)

Selectivity
at ±10 kHz off-resonance: 35 dB at 1,400 kHz

Power output
at 10% distortion: 700 mW
maximum: 1.1 W

Current Drain
at zero signal: FM 30 mA, SW/MW 25 mA
at 10% distortion: 370 mA

Power Requirement: Three "C" size flashlight batteries 4.5 V in total

Speaker: 9.2 cm (3½") dia. PM dynamic, 8Ω

Dimensions: 188 mm (W) x 136 mm (H) x 62 mm (D) (7 3/8" x 5 3/8" x 2 1/16")

Weight: 1 kg (2 lb 3 oz)

SONY®
SERVICE MANUAL

ICF-110W

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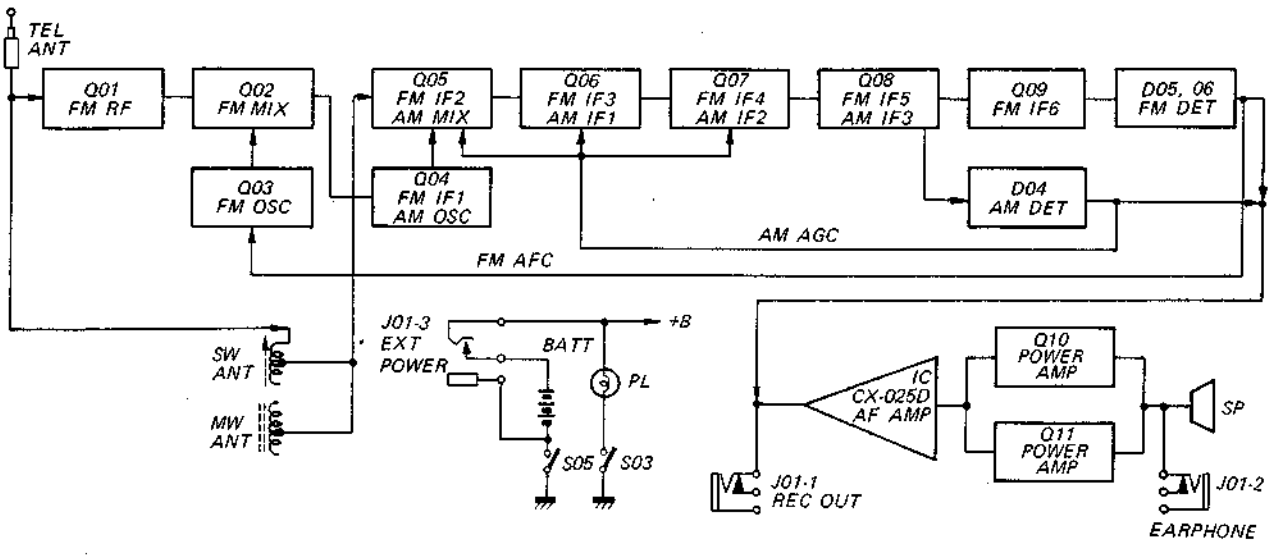
BLOCK DIAGRAM



SECTION 1
DISASSEMBLY

1-1. REAR CABINET REMOVAL

1. Remove the two screws shown in Fig. 1-1.
2. Remove the rear cabinet.

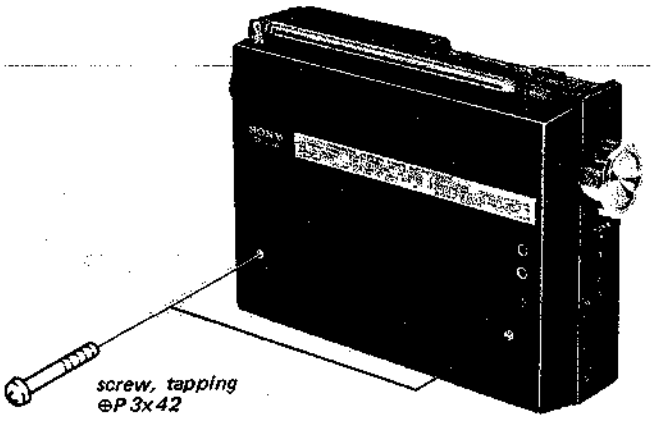


Fig. 1-1.

1-2. CHASSIS REMOVAL

1. Remove the screw shown in Fig. 1-2.
2. Lift up the chassis as shown by the arrow.

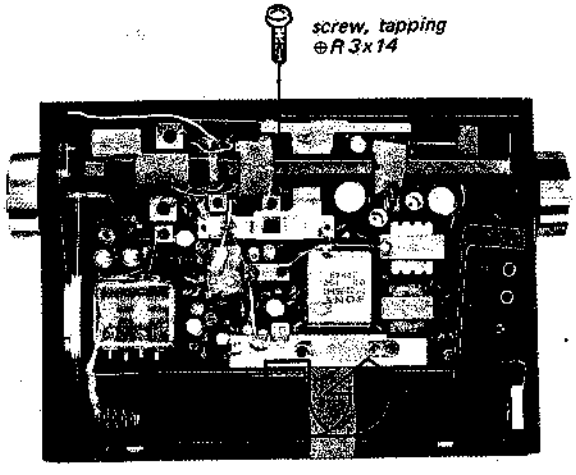


Fig. 1-2.

1-3. SUB-CHASSIS REMOVAL

1. Remove the chassis.
2. Unsolder the four wires shown in Fig. 1-3.
3. Unsolder the four wires shown in Fig. 1-4.
4. Remove the AFC switch and the screw shown in Fig. 1-4.

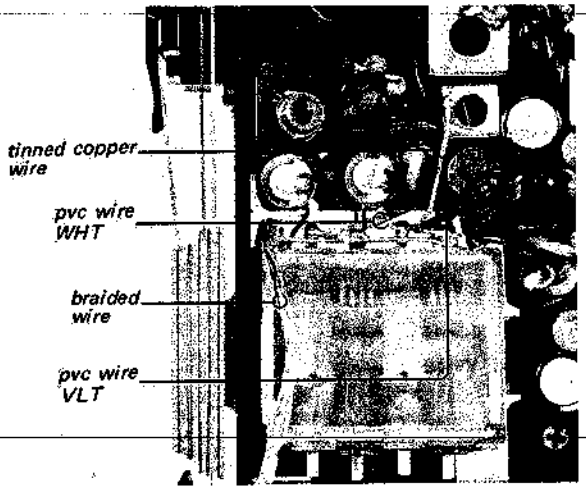


Fig. 1-3.

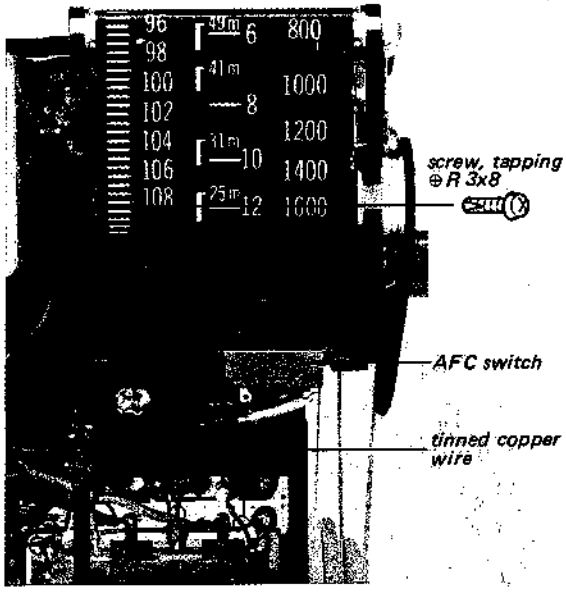


Fig. 1-4.

1-4. CIRCUIT BOARD REMOVAL

1. Remove the chassis.
2. Unsolder the three wires shown in Fig. 1-5.

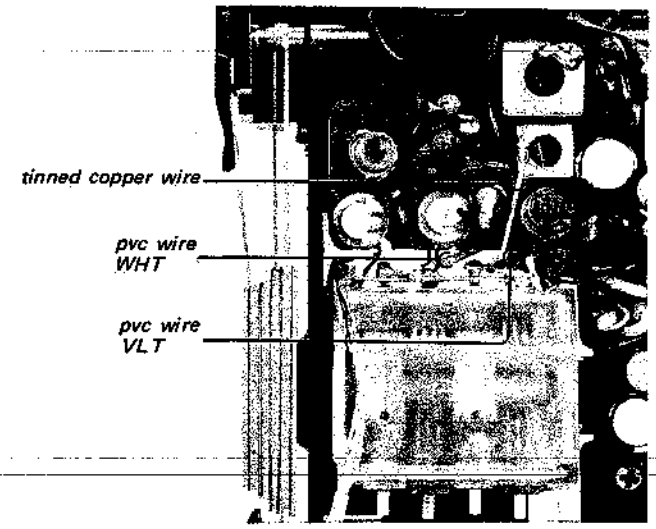


Fig. 1-5.

3. Unsolder the four wires shown in Fig. 1-6.
4. Remove the three screws and unsolder the two portions marked ★ in Fig. 1-7.
5. Unsolder the six wires shown in Fig. 1-8.
6. Push down the circuit board by squeezing the bar antenna holder.

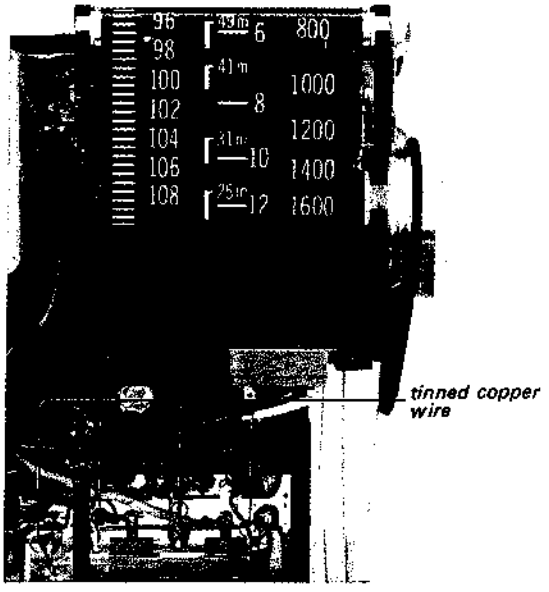


Fig. 1-6.

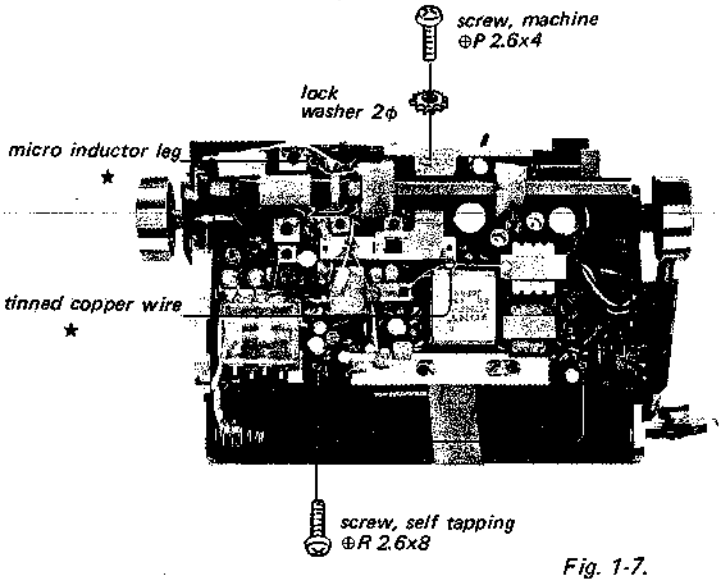


Fig. 1-7.

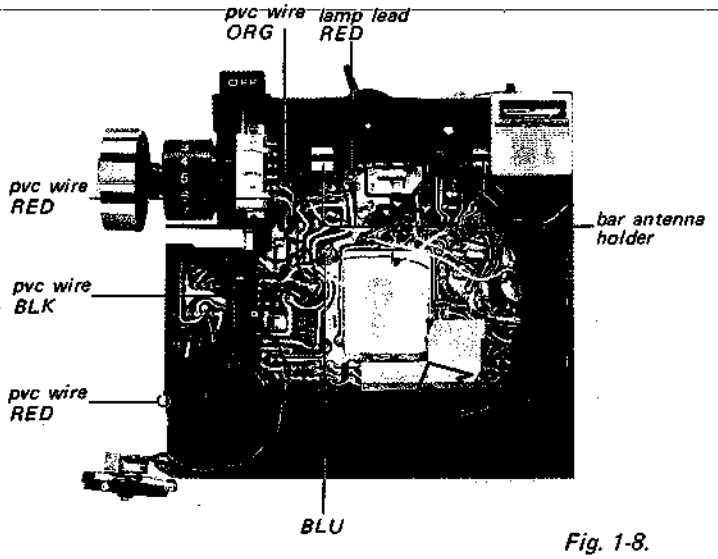


Fig. 1-8.

1-5. DIAL CORD STRINGING

1. Dial Cord A

1. Remove the spring of lever with pulley from the sub-chassis.
2. Rotate the double-drum fully clockwise.
3. Wind the dial cord A 3½ turns on the tuning shaft.
4. String the dial cord in the numerical order from step (2) to step (6).
5. Wind 1 turn the dial cord about the protrusion (step (7)) and bind it with the cord from step (1) (step (8)). Be sure that the cord has a tension.
6. Hook the spring to the sub-chassis.

2. Dial Cord B

1. String the dial cord A.
2. Keep the tuning shaft and the double-drum in fully clockwise position.
3. Be sure that the dial film is wound fully upward with the tension of spring. If not, rotate clockwise 3 or 4 turns the tension lever shown in Fig. 1-10.
4. Set the dial cord B on the film-drum with the eyelet.
5. Rotate the film-drum counterclockwise and adjust the film setting mark of the film to the mark on the sub-chassis.
6. Keep the film with your finger as shown in Fig. 1-10.
7. String the cord B.

Note:
1. When removing the dial film, hold the film with your finger and slowly rotate the tension lever counterclockwise. If you remove the film-drum instantly, the film will be wound upward and damaged.
2. After stringing, adjust the screw A to correct the dial film setting position.
3. Adjust the screw B to correct the twist of the film.

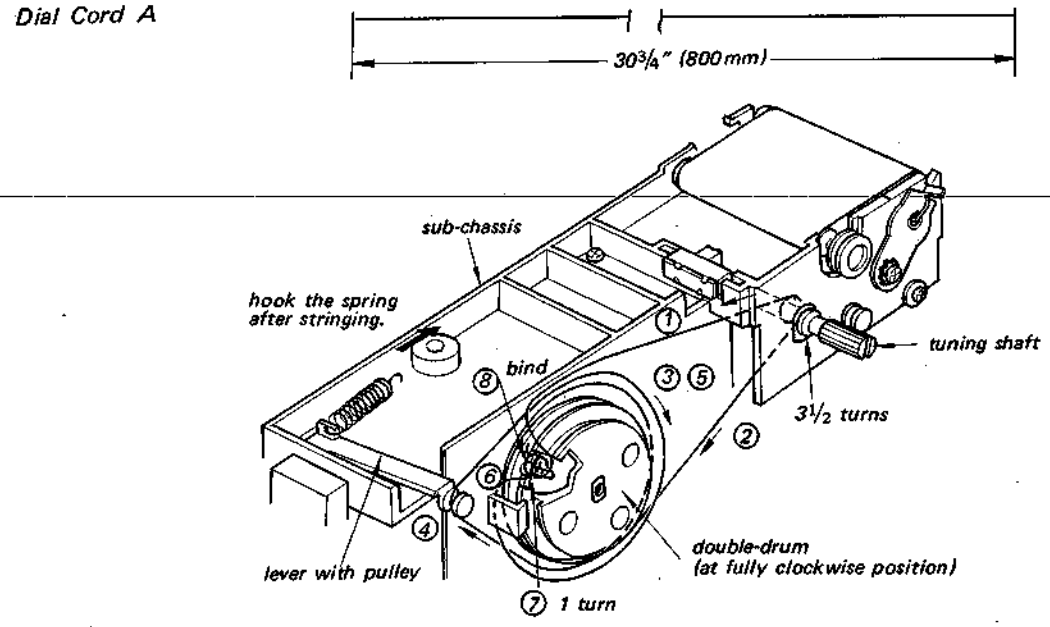


Fig. 1-9.

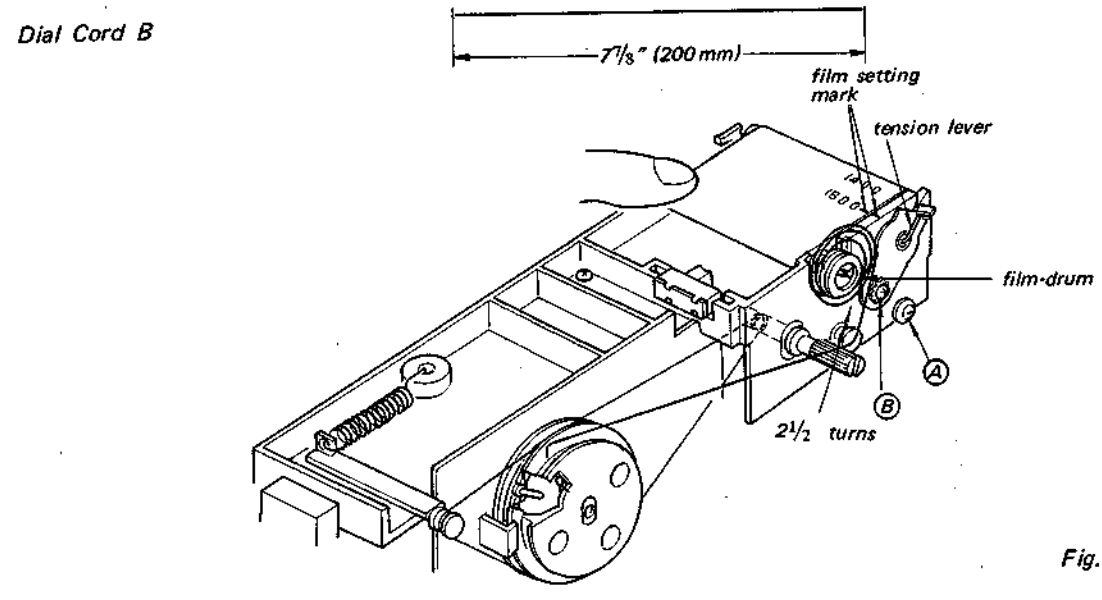


Fig. 1-10.

SECTION 2
CIRCUIT ADJUSTMENTS

2-1. FM IF ALIGNMENT

Test Equipments/Tools Required:

* 10.7 MHz sweep/marker generator
* Oscilloscope
* 0.01 μF ceramic capacitor
* Screwdriver for alignment

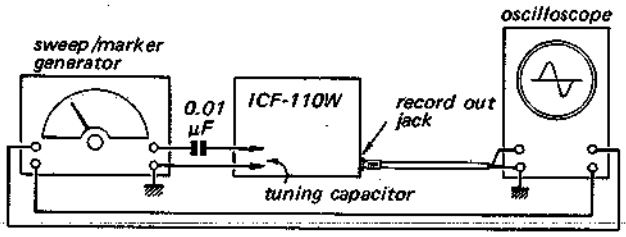


Fig. 2-2. Fm i-f alignment setup

Preparation:

1. Sweep/marker Generator Connection:
   Across the tuning capacitor as shown in Fig. 2-1.
2. Oscilloscope Connection: Record out jack.
3. Sweep Generator Center Frequency: 10.7 MHz
4. Marker Generator Frequency: 10.7 MHz
5. Band Selector: FM
6. Volume Control: maximum
7. Tone Control: H
8. AFC Switch: OFF

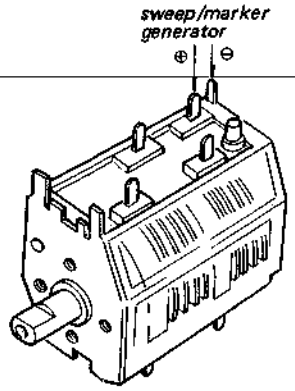


Fig. 2-1. Sweep/marker generator connection

Procedure:

1. Turn the core of discriminator transformer (IFT F5) fully counterclockwise.
2. Turn the core of fm i-f transformer (IFT F1, IFT F2, IFT F3) and discriminator transformer (IFT F4) to obtain the maximum amplitude response curve shown in Fig. 2-3.
3. Turn the core of discriminator transformer (IFT F5) to obtain the S curve response shown in Fig. 2-4.

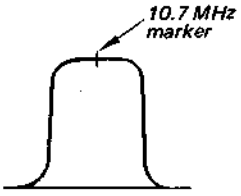


Fig. 2-3. Response curve

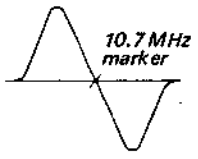


Fig. 2-4. "S" curve

Sweep/Marker Generator Coupling	Sweep/Marker Generator Frequency	Oscilloscope Connection	Adjust	Remarks
Across the tuning capacitor (See Fig. 2-1)	10.7 MHz	Record out jack	IFT F1 IFT F2 IFT F3 IFT F4 IFT F5	Band selector: FM AFC switch: OFF Adjust for maximum amplitude and symmetrical S curve on the scope.

2-2. AM IF ALIGNMENT

Test Equipments/Tools Required:

* Rf signal generator (for a-m)
* VTVM
* Loop antenna
* 8 Ω resistor
* Screwdriver for alignment

Preparation:

1. Band Selector: MW
2. Tone Control: H
3. Volume Control: maximum
4. Tuning Knob: Fully clockwise (highest frequency on dial)

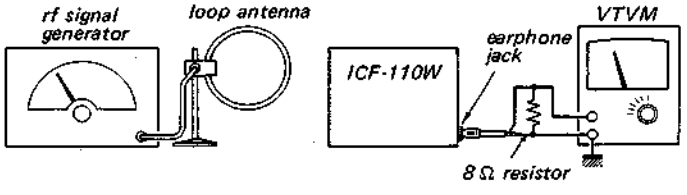


Fig. 2-5. A-m i-f alignment, frequency coverage and tracking adjustment setup

Rf Signal Generator Coupling	Rf Signal Generator Frequency	VTVM Connection	Adjust	Remarks
Loop antenna (See Fig. 2-5)	455 kHz 1 kHz 30% a-m)	Earphone jack with 8Ω load resistor in parallel.	IFT A1 CFT A1	Band selector: MW Volume control: maximum Tone control: H Tuning knob: fully clockwise position Adjust for maximum meter reading.

2-3. FREQUENCY COVERAGE AND TRACKING ADJUSTMENT

Test Equipments/Tools Required:

* Rf signal generator (for fm and a-m)
* Loop antenna
* VTVM
* 8Ω resistor
* Screwdriver for alignment

Preparation:

VTVM Connection: To earphone jack with 8Ω resistor in parallel.

Modulation: FM ... 400-Hz ±22.5-kHz frequency-modulated signal
AM ... 1-kHz 30-% amplitude-modulated signal

Volume Control Setting: maximum
Tone Control Setting: H
AFC Switch: OFF

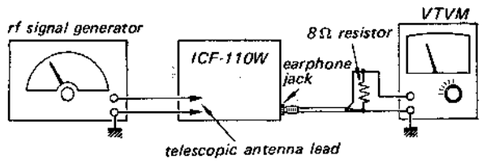


Fig. 2-6. Fm frequency coverage and tracking adjustment setup

Adjustment	RF Signal Generator Coupling	RF Signal Generator Frequency	Receiver Tuning Knob Setting	Adjust	Remarks
FM Frequency Coverage	Direct connection to telescopic antenna lead.	86.5 MHz	Fully counterclockwise	FM osc coil L04	Band Selector: FM Adjust for maximum meter reading.
		109 MHz	Fully clockwise	FM osc trimmer CT02	
FM Tracking		86.5 MHz	Tune to 86.5-MHz signal	FM rf coil L03	
		109 MHz	Tune to 109-MHz signal	FM rf trimmer CT01	
MW Frequency Coverage	Loop antenna	520 kHz	Fully counterclockwise	MW osc coil L10	Band Selector: MW Adjust for maximum meter reading.
		1,680 kHz	Fully clockwise	MW osc trimmer CT04-2	
MW Tracking		620 kHz	Tune to 620-kHz signal	MW ant coil L06	
		1,400 kHz	Tune to 1,400-kHz signal	MW ant trimmer CT03-2	

Adjustment	RF Signal Generator Coupling	RF Signal Generator Frequency	Receiver Tuning knob Setting	Adjust	Remarks
SW Frequency Coverage	Direct connection to telescopic antenna lead.	3.9 MHz	Fully counterclockwise	SW osc coil L09	Band Selector: SW Adjust for maximum meter reading.
		12.6 MHz	Fully clockwise	SW osc trimmer CT04-1	
SW Tracking		3.8 MHz	Tune to 3.8-MHz signal	SW ant coil L05	
		12.6 MHz	Tune to 12.6-MHz signal	SW ant trimmer CT03-1	

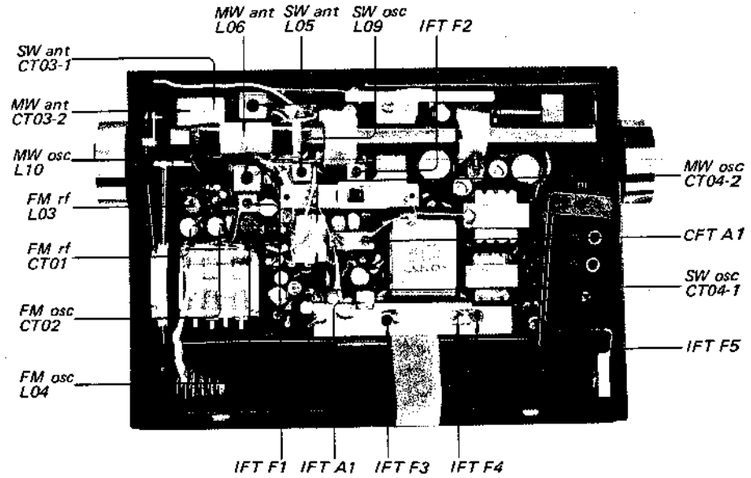


Fig. 2-7. Adjusting parts locations

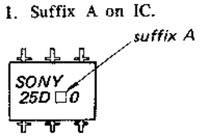
2-4. CURRENT ADJUSTMENT

R58 is selected in value in accordance with the suffix of the marking on IC and hfe rank of power transistor Q10, and Q11.

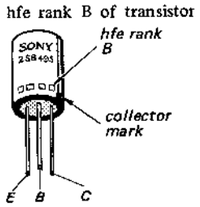
Suffix A on IC	hfe rank B of power transistor	R58
1	3	1.5 kΩ
	4	910Ω
2	3	910Ω
	4	560Ω

Note:

1. Suffix A on IC.

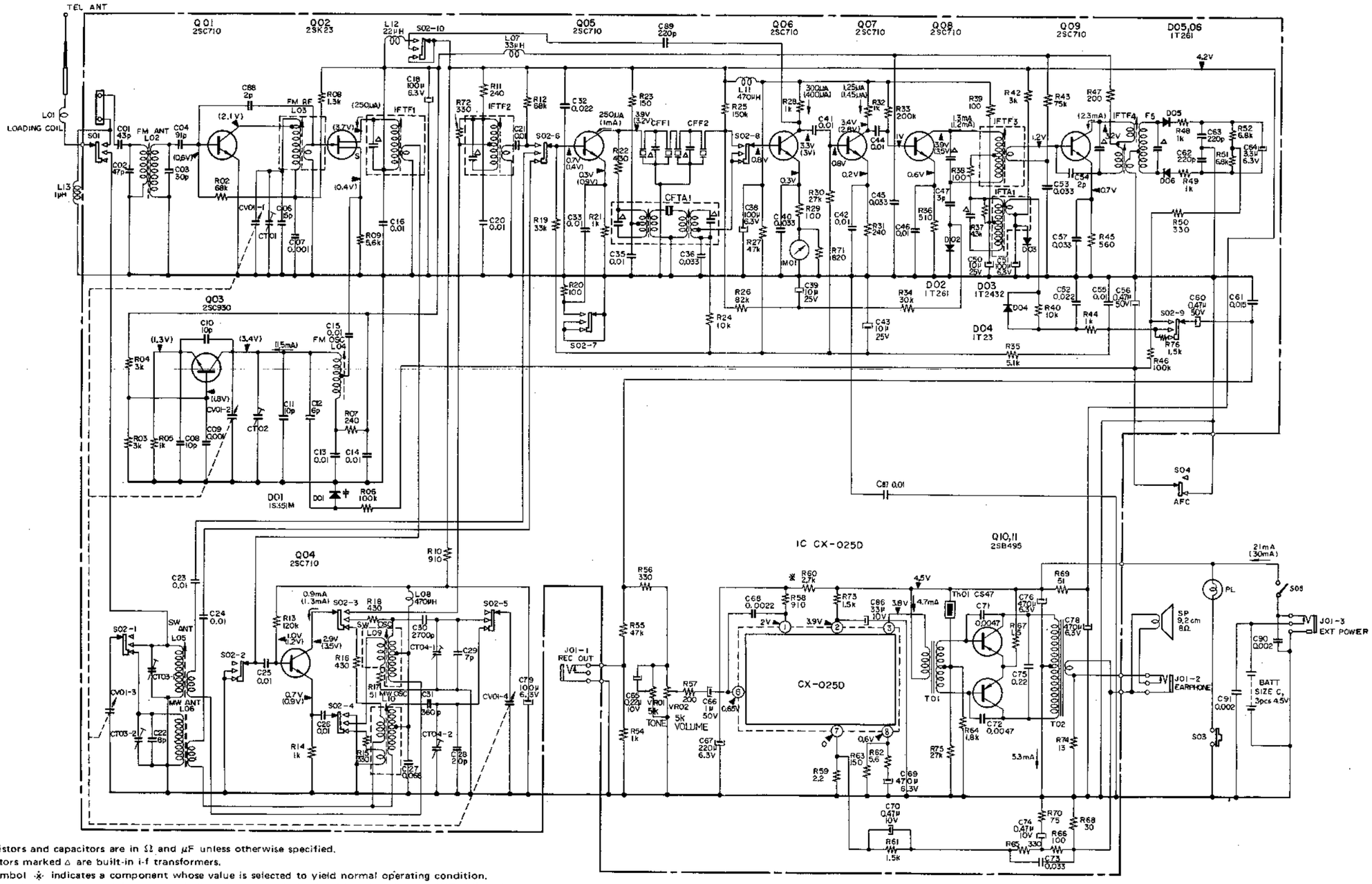


2. hfe rank B of transistor



SECTION 3
SCHEMATIC AND MOUNTING DIAGRAMS

3-1. SCHEMATIC DIAGRAM

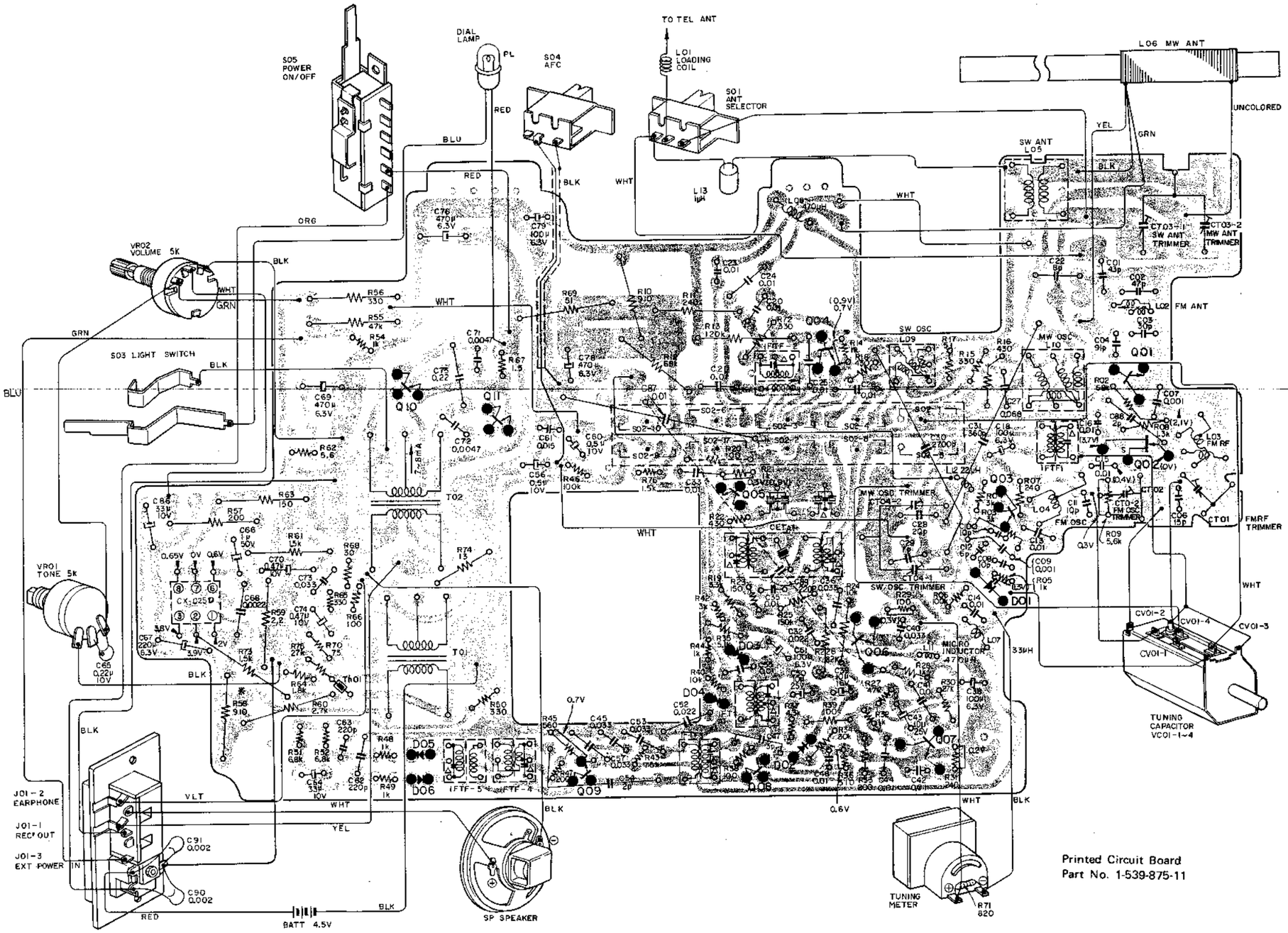


Note:

1. All resistors and capacitors are in Ω and μF unless otherwise specified.
2. Capacitors marked △ are built-in i-f transformers.
3. The symbol ※ indicates a component whose value is selected to yield normal operating condition.
4. Voltage values are measured from point indicated to ground circuit with a dc voltmeter (VTVM) and current values are measured with a dc ammeter. Voltage and current are measured with no radio signal received. Variations may be noted due to normal production tolerances. The values in ( ) are measured with band selector FM.

3-2. MOUNTING DIAGRAM

– Conductor Side –

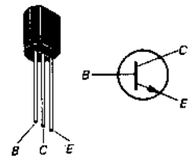


Printed Circuit Board
Part No. 1-539-875-11

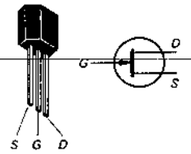
3-3. MOUNTING DIAGRAM

– Component Side –

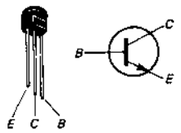
Q01, Q04~Q09: 2SC710



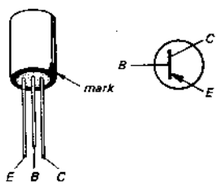
Q02: 2SK23

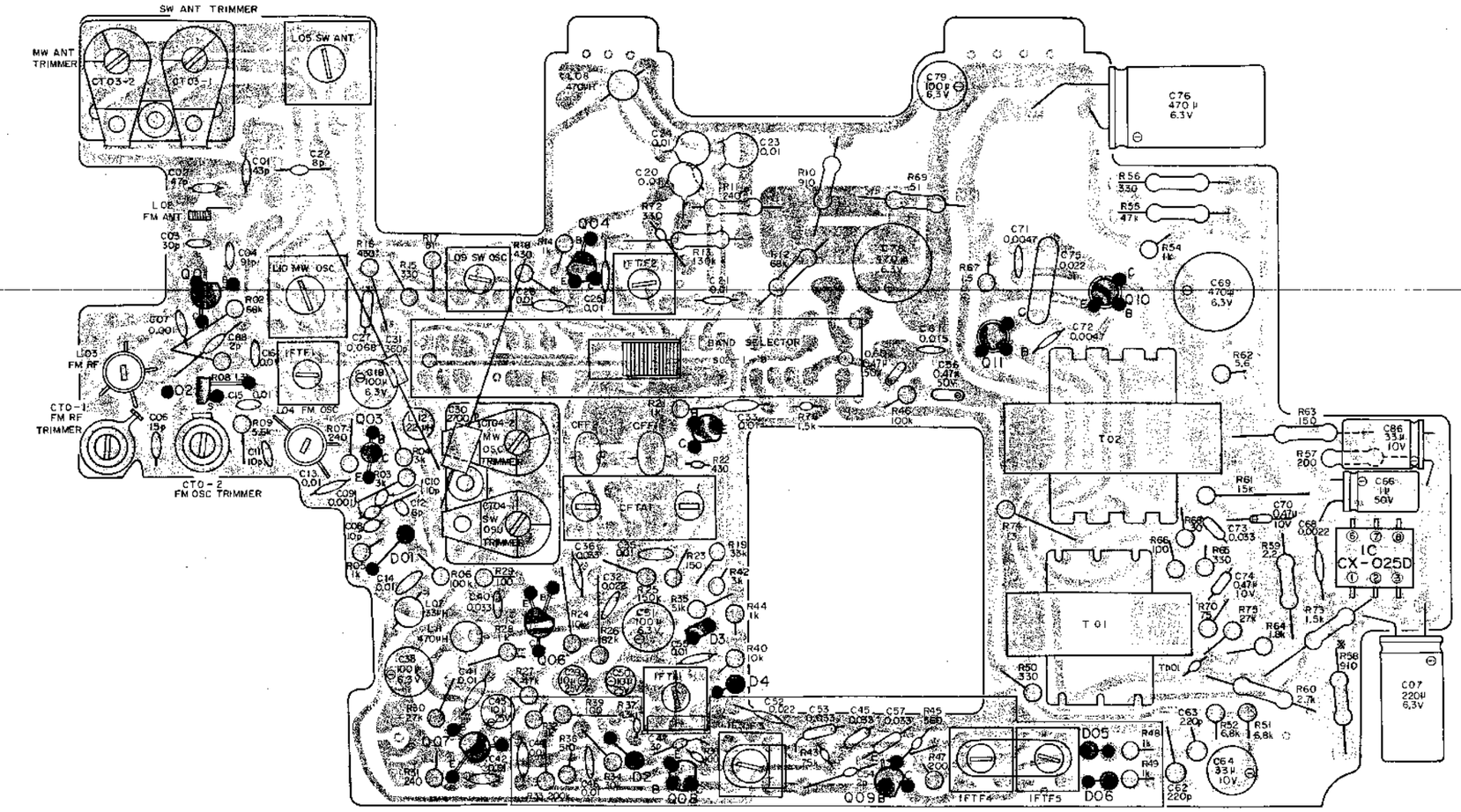


Q03: 2SC930



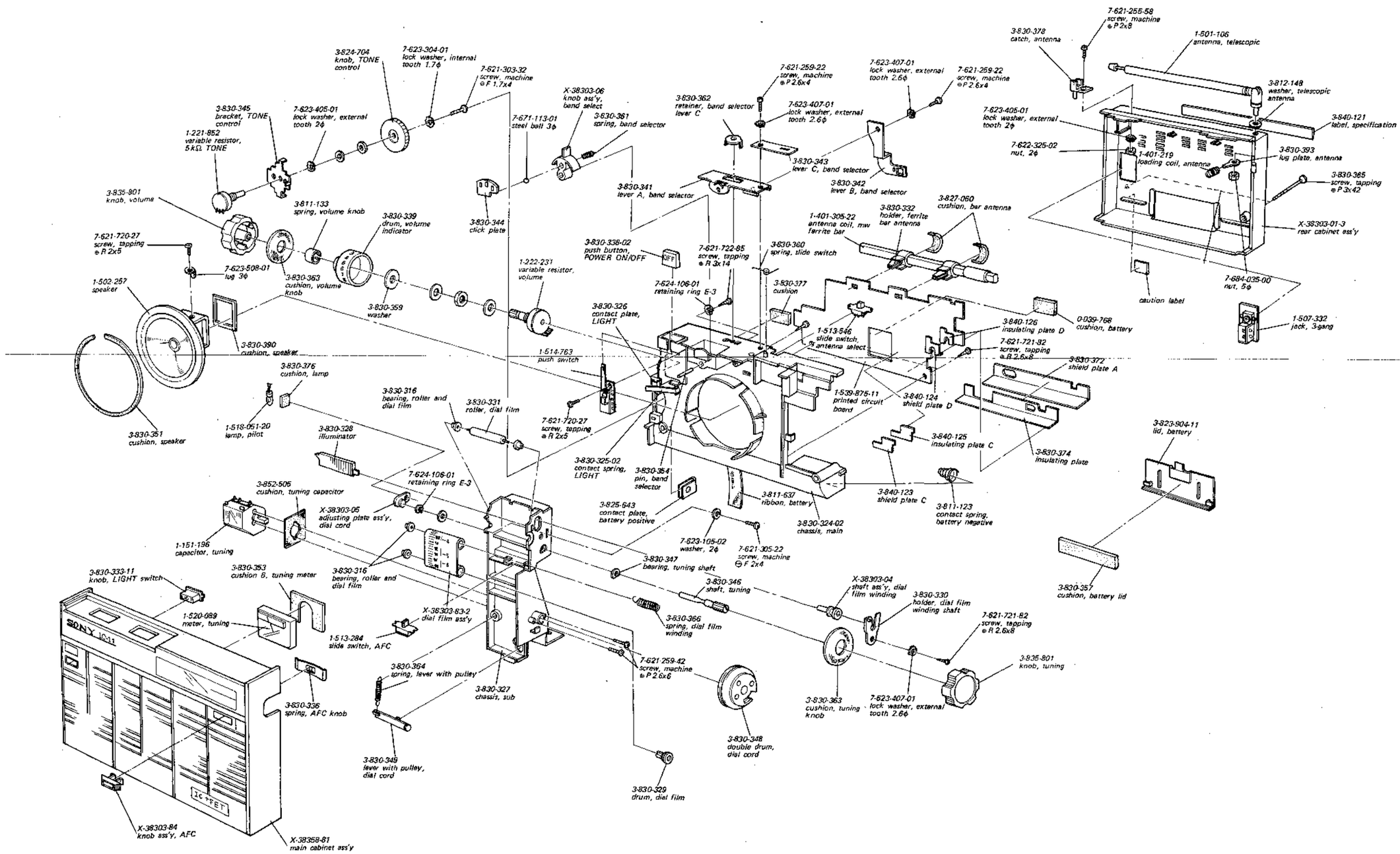
Q10, Q11: 2SB495



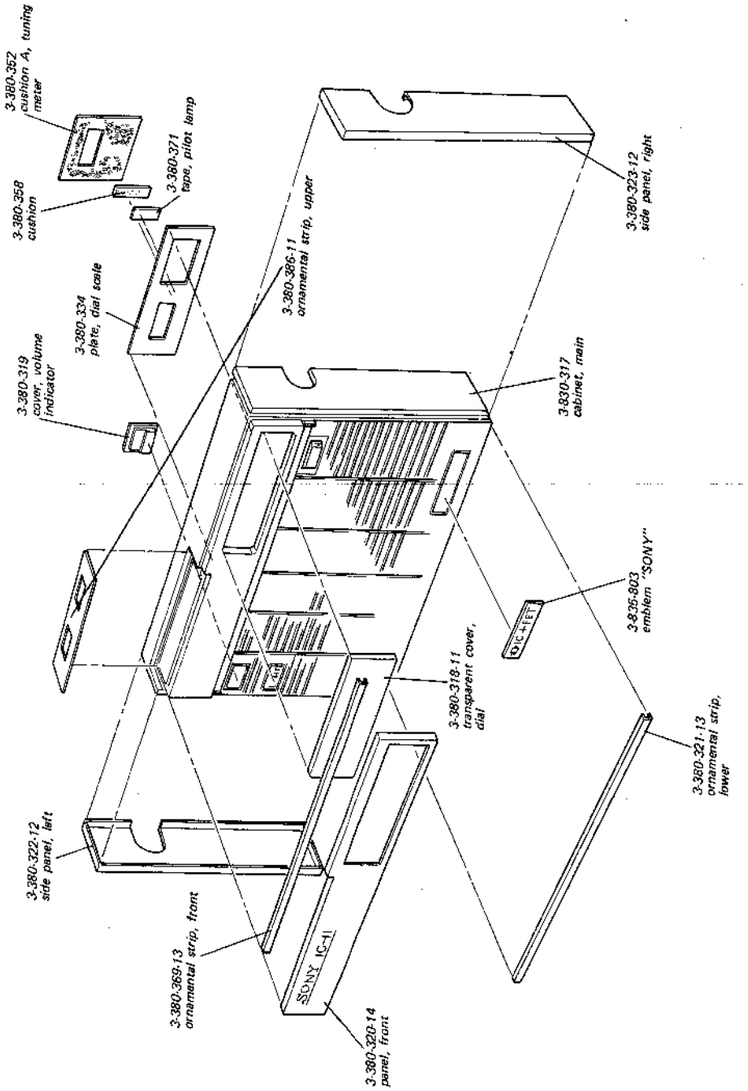


SECTION 4
EXPLODED VIEW AND PACKING

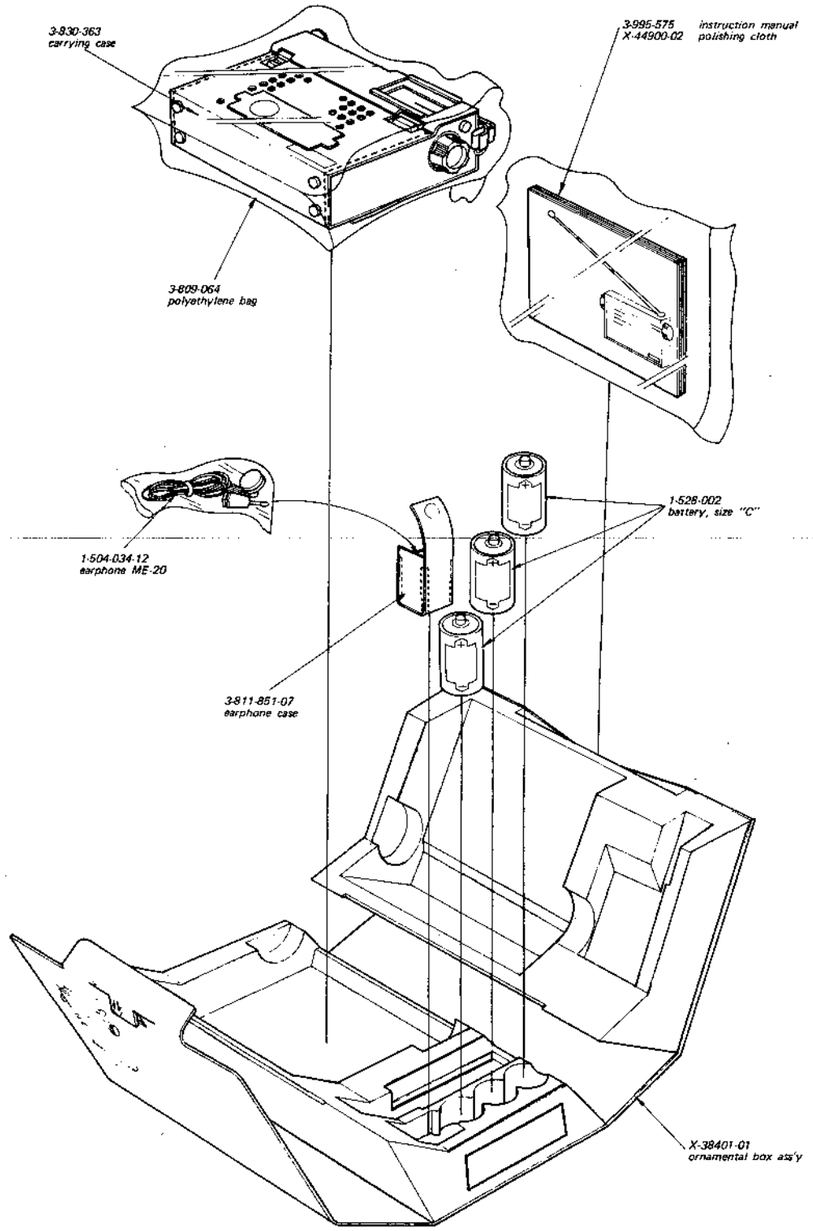
4-1. EXPLODED VIEW (1)



4-2. EXPLODED VIEW (2)



4-3. PACKING



SECTION 5
ELECTRICAL PARTS LIST

Ref. No.	Part No.	Description
	SEMICONDUCTORS	
Q01		transistor 2SC710
Q02		transistor (FET) 2SK23
Q03		transistor 2SC930
Q04		transistor 2SC710
Q05		transistor 2SC710
Q06		transistor 2SC710
Q07		transistor 2SC710
Q08		transistor 2SC710
Q09		transistor 2SC710
Q10		transistor 2SB495
Q11		transistor 2SB495
D01		diode 1S351M
D02		diode 1T261
D03		diode 1T243-2
D04		diode 1T23
D05		diode 1T261
D06		diode 1T261
IC	8-750-253-20 8-750-253-10	integrated circuit CX-025D
Th01	8-691-002-11	thermistor CS-47
	COILS AND TRANSFORMERS	
L01	1-401-219	loading coil, antenna
L02	1-425-449	ant coil, fm
L03	1-425-667	rf coil, fm
L04	1-405-476	osc coil, fm
L05	1-401-257	ant coil, sw
L06	1-401-305-22	ant coil, mw ferrite bar
L07	1-407-163	33μH, micro inductor
L08	1-407-177	470μH, micro inductor
L09	1-405-121-15	osc coil, sw
L10	1-405-301-01	osc coil, mw
L11	1-407-177	470μH, micro inductor
L12	1-407-161	22μH, micro inductor
IFT F1	1-403-243-31	transformer, fm i-f
IFT F2	1-403-231-31	transformer, fm i-f
IFT F3	1-403-243-31	transformer, fm i-f
IFT F4	1-403-272-31	transformer, fm discriminator
IFT F5	1-403-273-31	transformer, fm discriminator
IFT A1	1-403-126	transformer, a-m i-f
CFT A1	1-403-165-14	ceramic filter, a-m i-f
CF F1	1-527-501	ceramic filter, fm i-f
CF F2	1-527-501	ceramic filter, fm i-f
T01	1-423-064	transformer, driver
T02	1-427-251	transformer, output

Ref. No.	Part No.	Description		
	CAPACITORS			
CV01	1-151-196	capacitor, tuning		
CT01	1-141-022	capacitor, trimmer		
CT02	1-141-022	capacitor, trimmer		
CT03	1-141-011	capacitor, 2-gang trimmer		
CT04	1-141-011	capacitor, 2-gang trimmer		
C01	1-102-966	43pF		ceramic
C02	1-102-971	82pF		ceramic
C03	1-102-962	30pF		ceramic
C04	1-102-972	91pF		ceramic
C05		– discarded –		
C06	1-102-951	15pF		ceramic
C07	1-101-918	0.001μF		ceramic
C08	1-102-947	10pF		ceramic
C09	1-101-918	0.001μF		ceramic
C10	1-102-947	10pF		ceramic
C11	1-102-947	10pF		ceramic
C12	1-102-943	6pF		ceramic
C13	1-105-833-12	0.01μF		mylar
C14	1-101-923	0.01μF		ceramic
C15	1-101-923	0.01μF		ceramic
C16	1-105-833-12	0.01μF		mylar
C17		– discarded –		
C18	1-121-491	100μF	6.3V	electrolytic
C19		– discarded –		
C20	1-101-923	0.01μF		ceramic
C21	1-101-923	0.01μF		ceramic
C22	1-102-945	8pF		ceramic
C23	1-101-923	0.01μF		ceramic
C24	1-101-923	0.01μF		ceramic
C25	1-101-923	0.01μF		ceramic
C26	1-101-923	0.01μF		ceramic
C27	1-105-416-12	0.068μF		mylar
C28	1-102-958	20pF		ceramic
C29	1-102-944	7pF		ceramic
C30	1-103-635	2,700pF		styrol
C31	1-103-614	360pF		styrol
C32	1-105-413-12	0.022μF		mylar
C33	1-101-923	0.01μF		ceramic
C34		– discarded –		
C35	1-105-833-12	0.01μF		mylar
C36	1-105-414-12	0.033μF		
C37		– discarded –		
C38	1-121-491	100μF	6.3V	electrolytic
C39	1-121-472	10μF	25V	electrolytic
C40	1-105-414-12	0.033μF		
C41	1-101-923	0.01μF		ceramic
C42	1-105-833-12	0.01μF		mylar
C43	1-121-472	10μF	25V	electrolytic
C44	1-101-923	0.01μF		ceramic
C45	1-105-414-12	0.033μF		
C46	1-105-833-12	0.01μF		mylar

Ref. No.	Part No.	Description
C47	1-102-940	3pF ceramic
C48		– discarded –
C49		– discarded –
C50	1-121-472	10μF 25V electrolytic
C51	1-121-491	100μF 6.3V electrolytic
C52	1-105-413-12	0.022μF mylar
C53	1-105-414-12	0.033μF mylar
C54	1-102-939	2pF ceramic
C55	1-105-833-12	0.01μF mylar
C56	1-121-434	0.47μF 50V electrolytic
C57	1-105-414-12	0.033μF mylar
C58		– discarded –
C59		– discarded –
C60	1-121-434	0.47μF 50V electrolytic
C61	1-105-675-12	0.015μF mylar
C62	1-103-659	220pF styrol
C63	1-103-659	220pF styrol
C64	1-121-483	33μF 10V electrolytic
C65	1-127-020	0.22μF 10V electrolytic (alox)
C66	1-121-391	1μF 50V electrolytic
C67	1-121-420	220μF 10V electrolytic
C68	1-105-825-12	0.0022μF mylar
C69	1-121-342	470μF 6,3V electrolytic
C70	1-127-022	0.47μF 10V electrolytic (alox)
C71	1-105-829-12	0.0047μF mylar
C72	1-105-829-12	0.0047μF mylar
C73	1-105-414-12	0.033μF mylar
C74	1-127-022	0.47μF 10V electrolytic (alox)
C75	1-105-419-12	0.22μF mylar
C76	1-121-342	470μF 6.3V electrolytic
C77		– discarded –
C78	1-121-342	470μF 6.3V electrolytic
C79	1-121-491	100μF 6.3V electrolytic
C80		– discarded –
C81		– discarded –
C82		– discarded –
C83		– discarded –
C84		– discarded –
C85		– discarded –
C86	1-121-483	33μF 10V electrolytic
C87		– discarded –
C88	1-102-939	2pF ceramic
C89	1-103-659	220pF styrol
C90	1-101-919	0.002μF
C91	1-101-919	0.002μF

RESISTORS

All resistors are 1/8W, ±5% carbon type, unless otherwise specified.

VR01	1-221-852	variable resistor, 5kΩ (C) TONE
VR02	1-222-231	variable resistor, 5kΩ VOLUME

Ref. No.	Part No.	Description
R01		– discarded –
R02	1-244-717	68kΩ 1/4W
R03	1-240-484	3kΩ
R04	1-240-484	3kΩ
R05	1-240-473	1kΩ
R06	1-240-521	100kΩ
R07	1-240-458	240Ω
R08	1-240-476	1.3kΩ
R09	1-240-491	5.6kΩ
R10	1-244-672	910Ω 1/4W
R11	1-244-658	240Ω 1/4W
R12	1-244-717	68kΩ 1/4W
R13	1-244-728	200kΩ 1/4W
R14	1-240-473	1kΩ
R15	1-240-461	330Ω
R16	1-240-464	430Ω
R17	1-240-442	51Ω
R18	1-240-464	430Ω
R19	1-240-509	33kΩ
R20	1-244-649	100Ω 1/4W
R21	1-240-473	1kΩ
R22	1-240-464	430Ω
R23	1-240-453	150Ω
R24	1-240-497	10kΩ
R25	1-240-525	150kΩ
R26	1-240-519	82kΩ
R27	1-240-513	47kΩ
R28	1-240-473	1kΩ
R29	1-240-449	100Ω
R30	1-240-507	27kΩ
R31	1-240-458	240Ω
R32	1-240-473	1kΩ
R33	1-240-528	200kΩ
R34	1-240-508	30kΩ
R35	1-240-490	5.1kΩ
R36	1-240-466	510Ω
R37	1-240-488	4.3kΩ
R38	1-240-449	100Ω
R39	1-240-449	100Ω
R40	1-240-497	10kΩ
R41	1-240-473	1kΩ
R42	1-240-484	3kΩ
R43	1-240-518	75kΩ
R44	1-240-473	1kΩ
R45	1-240-467	560Ω
R46	1-240-521	100kΩ
R47	1-240-456	200Ω
R48	1-240-473	1kΩ
R49	1-240-473	1kΩ
R50	1-240-461	330Ω
R51	1-240-493	6.8kΩ
R52	1-240-493	6.8kΩ
R53		– discarded –

Ref. No.	Part No.		Description
R54	1-240-473	1 kΩ	
R55	1-240-513	47 kΩ	
R56	1-244-661	330 Ω	1/4 W
R57	1-244-656	200 Ω	1/4 W
R58	1-244-672	910 Ω	1/4 W
R59	1-244-609	2.2 Ω	1/4 W
R60	1-240-483	2.7 kΩ	
R61	1-244-677	1.5 kΩ	1/4 W
R62	1-240-419	5.6 Ω	
R63	1-244-653	150 Ω	1/4 W
R64	1-240-479	1.8 kΩ	
R65	1-240-461	330 Ω	
R66	1-240-449	100 Ω	
R67	1-244-605	1.5 Ω	1/4 W
R68	1-240-436	30 Ω	
R69	1-244-642	51 Ω	1/4 W
R70	1-240-446	75 Ω	
R71	1-244-671	820 Ω	
R72	1-209-763	330 Ω	1/16 W
R73	1-244-677	1.5 kΩ	1/4 W
R74	1-244-628	13 Ω	1/4 W
R75	1-244-707	27 kΩ	1/4 W
R76	1-209-766	1.5 kΩ	1/16 W

MISCELLANEOUS

TEL ANT	1-501-106	antenna, telescopic
SP	1-502-257	speaker
	1-507-332	jack, 3-gang
S01	1-513-546	slide switch, antenna select
S02	1-513-279	slide switch, band selector
S04	1-513-284	slide switch, AFC
S05	1-514-763	push switch, POWER
PL	1-518-094-20	lamp, pilot
M01	1-520-089	meter, tuning
	1-539-875-11	printed circuit board

– Hardware Nomenclature –

P – Pan Head Screw

PS – Pan Head Screw with Spring Washer

K – Flat Countersunk Head Screw

B – Binding Head Screw

RK – Oval Countersunk Head Screw

T – Truss Head Screw

R – Round Head Screw

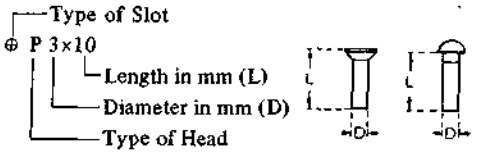
F – Flat Fillister Head Screw

SC – Set Screw

E – Retaining Ring (E Washer)

W – Washer
SW – Spring Washer
LW – Lock Washer
N – Nut

– Example –



When ordering replacement parts you should use PART NUMBER listed on the Parts List or shown in the Exploded View. The reference number should not be used for ordering purposes.