

# CRF-330K

US Model  
Canadian Model  
E Model  
AEP Model



## FM/SW/MW/LW 33-BAND RADIO RECEIVER

### SPECIFICATIONS

#### GENERAL

**Power Requirements:**  
Radio, Recorder: 120 V ac (adjustable to 100, 220, or 240 V)  
12 V dc, eight size-D (IEC designation R20) batteries  
12 V car battery with Sony Car Battery Cord  
DCC-9 (optional)

**Clock:** 1.5 V dc, one size-D battery

**Power Consumption:** SW: 10W ac, FM/MW/LW: 6.5W ac,  
in radio operation  
SW: 12.5W ac, FM/MW/LW: 9W ac,  
in radio and recorder operation

**Speaker:** 12 cm (4 $\frac{3}{4}$  inches)

**Clock:** QUARTZ clock

**Input:** AUX IN (mini jack) . . . . . 1  
Maximum sensitivity 4.4mV (-45 dB)  
at 50mW output  
Input impedance 5 k $\Omega$

**Outputs:** Earphone (mini jack) . . . . . 1  
For 8  $\Omega$  earphone  
HEADPHONES (phone jack) . . . . . 1  
For 8  $\Omega$  headphones  
Recording (mini jack) . . . . . 1  
Output level 0.8 mV (-60 dB)  
Output impedance 1 k $\Omega$

**Control Jack:** TIMER OUT (mini jack) . . . . . 1

**Dimensions:** Approx. 451 (w) x 349 (h) x 207 (d) mm  
17 $\frac{3}{4}$  (w) x 13 $\frac{3}{4}$  (h) x 8 $\frac{1}{4}$  (d) inches  
(including projecting parts and controls with  
the recorder retracted to the set)

**Weight:** Approx. 15.4 kg, 33 lb 15 oz  
(including batteries)

#### RADIO SECTION

**Frequency Range:** FM<sub>2</sub>: 87.5 - 108 MHz (3.43 - 2.78 m)  
FM<sub>1</sub>: 76 - 90 MHz (3.95 - 3.33 m)  
SW: 1.6 - 30 MHz (187 - 10 m)  
MW: 530 - 1,605 kHz (566 - 187 m)  
LW: 150 - 400 kHz (2,000 - 750 m)

**Intermediate Frequency:** FM: 10.7 MHz  
SW-1st: 45,145 MHz  
SW-2nd: 455 kHz  
MW/LW: 455 kHz

**Sensitivity:** FM: 1.8  $\mu$ V (5 dB), S/N = 30 dB  
SW: 0.7  $\mu$ V (-3 dB), S/N = 6 dB, at 10 MHz  
MW: 32  $\mu$ V/m (30 dB/m), S/N = 6 dB,  
built-in ferrite-rod antenna  
LW: 57  $\mu$ V/m (35 dB/m), S/N = 6 dB,  
built-in ferrite-rod antenna

- continued on next page -

#### SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY SHADING ON THE SCHEMATIC DIAGRAMS 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.

# SONY<sup>®</sup>

## SERVICE MANUAL

**Image Rejection:** FM<sub>2</sub>: 65 dB, at 108 MHz  
FM<sub>1</sub>: 65 dB, at 90 MHz  
SW-1st: 90 dB  
SW-2nd: 65 dB, at 10 MHz  
MW: 55 dB, at 1,605 kHz  
LW: 80 dB, at 360 kHz

**Selectivity:** FM: Better than 70 dB  
(± 400 kHz off resonance)  
SW/MW/LW:  
- 60 dB at NORMAL  
(± 8 kHz off resonance)  
- 60 dB at NARROW  
(± 6 kHz off resonance)

**Antennas:** FM: Telescopic antenna, external antenna  
terminals (75 ohms)  
SW: Telescopic antenna, external antenna  
terminals (50 - 75 ohms)  
MW/LW:  
Built-in ferrite-rod antenna, external  
antenna terminals (high impedance)

**TAPE RECORDER SECTION**

**Recording System:** 2-track 1-channel monaural

**Fast Winding Time:** Approx. 1 min. 50 sec. with Sony Cassette  
C-60

**Frequency Response:** 90 - 10,000 Hz



SECTION 1  
OUTLINE1-1. TAPE RECORDER TIMER STAND BY  
MECHANISM

This set is equipped with a **TIMER STAND BY** mechanism in the tape recorder section for an automatic recording during absence of the operator. This mechanism is intended to prevent the pinch roller and recording tape from deforming when the pinch roller is left pressed against the capstan and does not rotate for a long time in the stand-by mode.

Fig. 1 shows the mechanism condition when **TIMER STAND BY** is set up. In this condition and when the power supply is applied by **TIMER**, the motor starts to rotate and the shut-off lever moves in the direction (A). Accordingly, the lever moves in the direction (B) and it pushes the trigger plate in the

direction (C). The trigger plate's protrusion now pushes the lock plate in the direction (D) and the lock plate releases the actuator which is locked at position (E). Now the actuator moves in the direction (F) and the reset arm positions as shown in Fig. 2. In this condition, the lever moves in the direction (B)', but it does not affect to the actuator.

If **TIMER STAND BY** is set up when the lever is positioned as shown in Fig. 3, the lever once moves in the direction (B)'' after the time set by **TIMER SET**, and the lever locks the reset arm and releases the **STAND BY** condition.

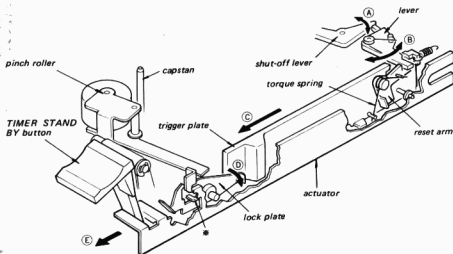


Fig. 1.

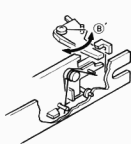


Fig. 2.

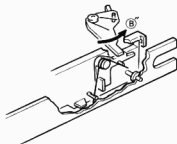


Fig. 3.

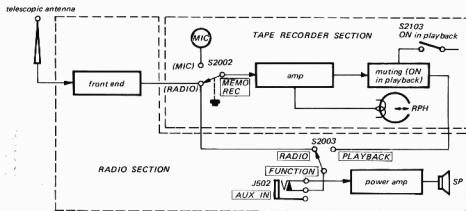


## 1-2. CIRCUIT DESCRIPTION

### 1) CONNECTION OF TAPE RECORDER AND RADIO

This set is a combination of CRF-320 radio receiver and a cassette tape recorder. With the tape recorder provision, receiving signals can easily be recorded. This set also provides a STAND BY facility combined with a timer clock, and recordings during absence of the operator can be made with ease.

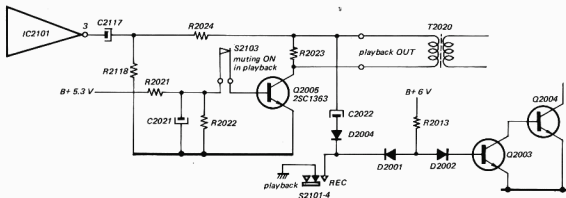
The following diagram shows a simplified signal flow. The recording from the built-in microphone can only be made when MEMO REC switch button is pressed in MIC position. And recording from AUX IN jack J502 cannot be made.



### 2) RECORD MUTING CIRCUIT

A muting circuit is provided in the output circuit of the tape recorder in the record mode to prevent a hawling from occurring during a record with microphone. The following diagram is the muting circuit of the tape recorder. Except in the playback mode, the muting switch S2103 is in the off position and Q2005 is also in the off state. Accordingly, no signal flows in the transformer T2020 and the output circuit is muted.

When the muting switch S2103 turns on in the playback mode, the output signal from IC2101 flows in the transformer T2020 and the signal passes to the power amplifier of the radio section. To ensure the muting operation in the record mode, the signal line is grounded through C2022, D2004 and S2101-4.

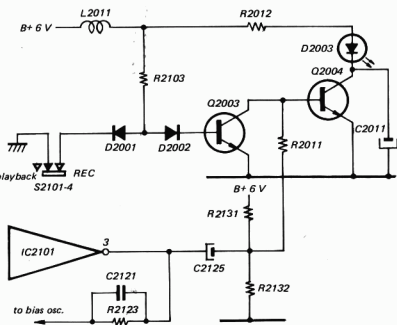


**3) LED AMPLIFIER CIRCUIT**

In the record mode, a part of the output signal from IC2101 goes through C2125 and R2011 to Q2004. Q2004 amplifies the signal, and the collector current of Q2004 turns D2003 (REC INDICATOR) on and the record mode is visually identified.

In the playback mode, this LED amplifier is muted because of unnecessary of the LED indication. In the playback mode, the bias is applied to Q2003 through R2103 and D2002 to turn on Q2003. Accordingly, the base of Q2004 is grounded and D2003 turns off.

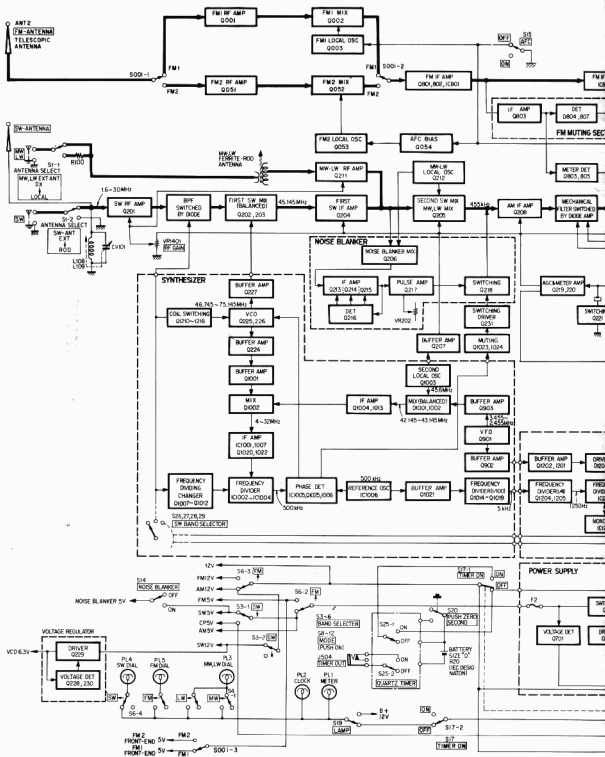
In the record mode, the bias circuit of Q2003 is routed to the ground through D2001 and S2101-4, and Q2003 turns off. Consequently, Q2004 turns on. Q2004 is operating in class B, and D2003 lights up only when audio signals are applied to the base of Q2004 to indicate the record mode.

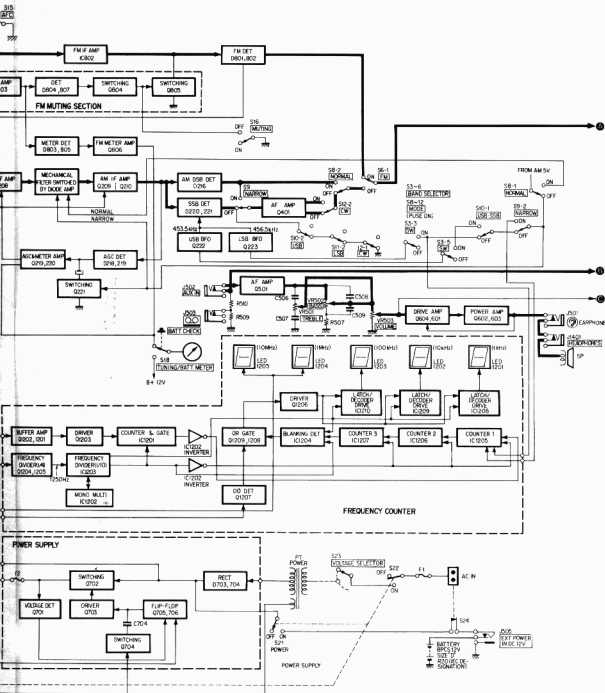


# 1-2. BLOCK DIAGRAM

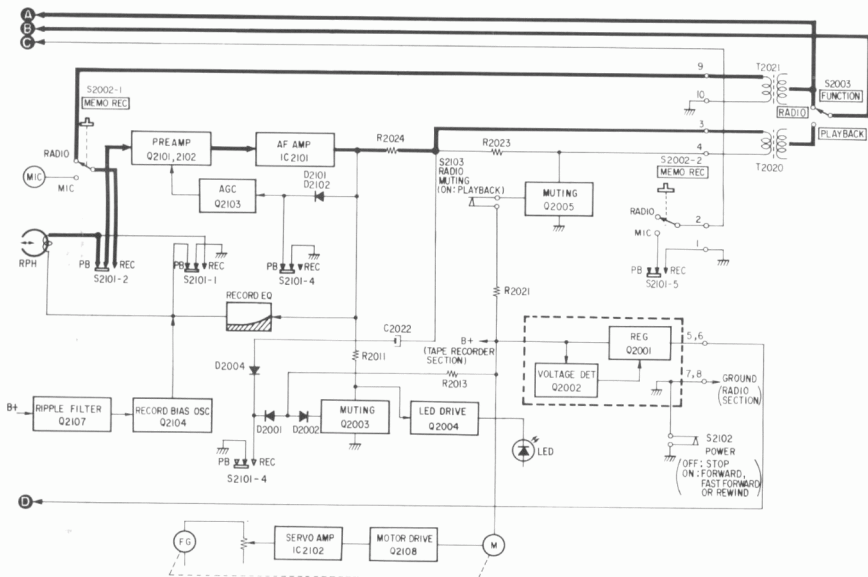
## 1) Radio Section

**CRF-330K CRF-33**





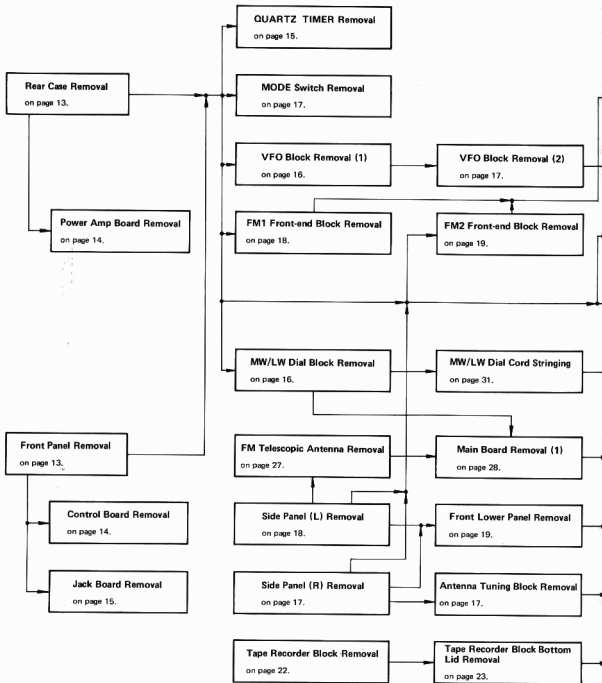
## 2) Tape Recorder Section

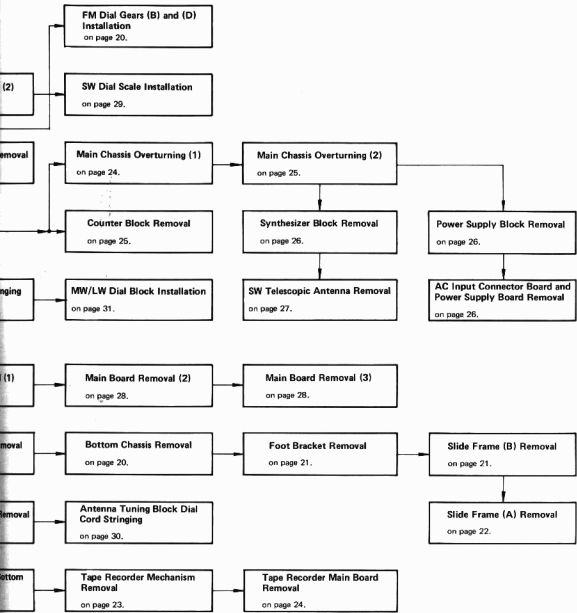




## SECTION 2 DISASSEMBLY

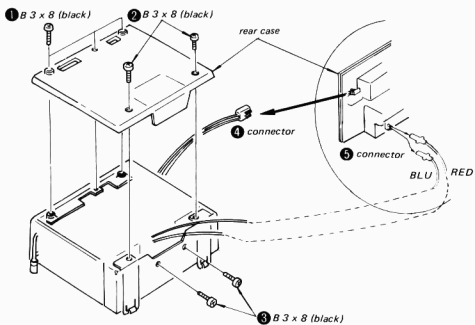
2-1. DISASSEMBLY FLOW CHART



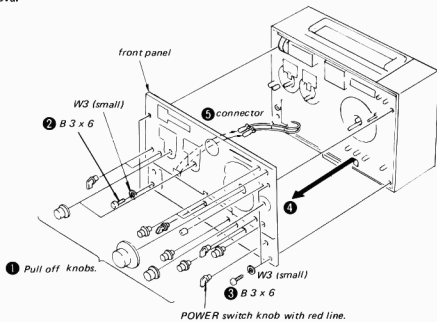




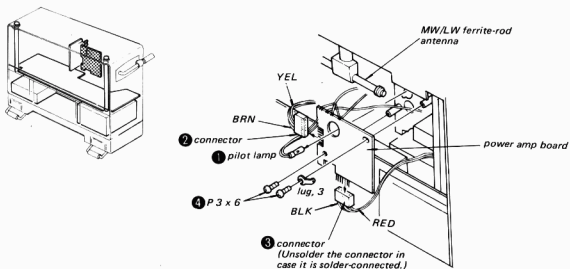
## Rear Case Removal



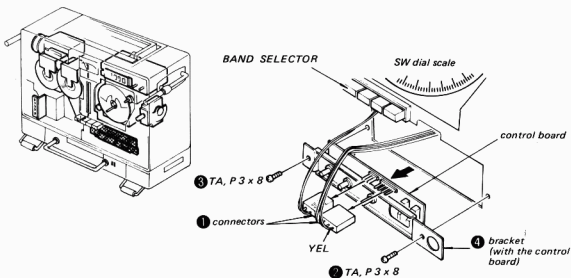
## Front Panel Removal



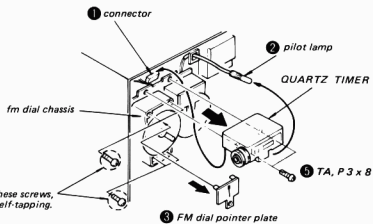
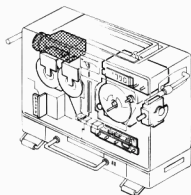
Power Amp Board Removal



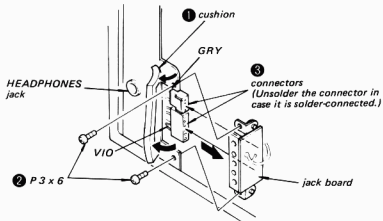
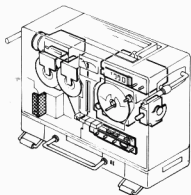
Control Board Removal



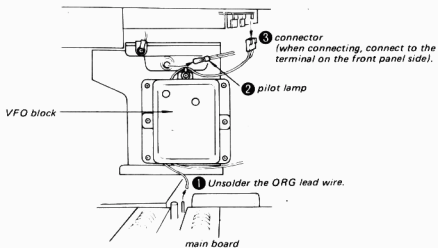
## QUARTZ TIMER Removal



## Jack Board Removal



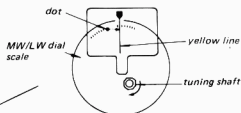
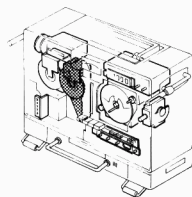
**VFO Block Removal (1)**



**Main Board Removal**

on page 28.

**MW/LW Dial Block Removal**



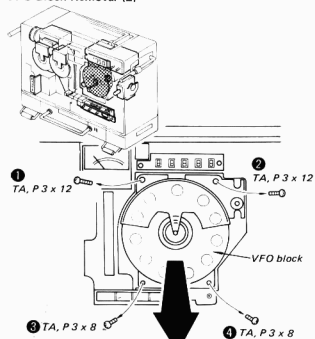
**Note:** After installing the MW/LW dial scale, be sure to coincide the yellow line with the dot by turning the MW/LW dial scale.

- 
- 3 TA, P 3 x 8
  - 4 P 2.6 x 5
  - 2 MW/LW dial scale
  - 1 MW/LW dial pointer plate

**MW/LW Dial Cord Stringing**

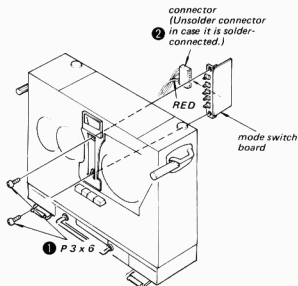
on page 31.

VFO Block Removal (2)

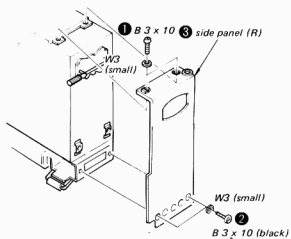


SW Dial Scale Installation  
on page 29.

MODE Switch Board Removal

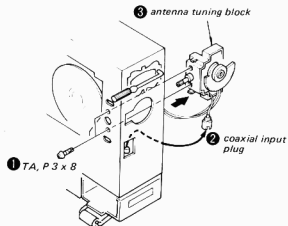


Side Panel (R) Removal



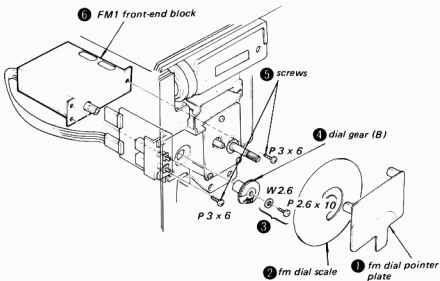
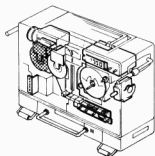
Main Chassis Overturning (1)  
on page 24.

Antenna Tuning Block Removal



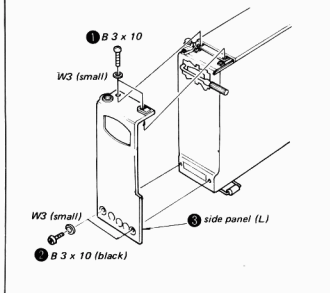
Antenna Tuning Block Dial Cord  
Stringing on page 30.

**FM1 Front-end Block Removal**



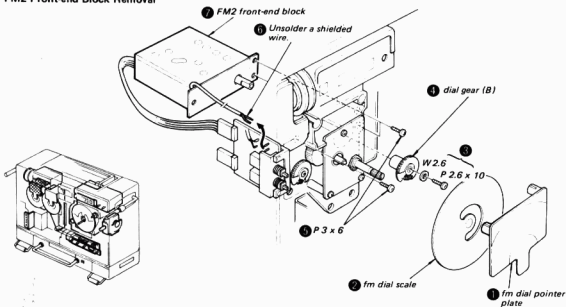
**FM Telescopic Antenna Removal**  
on page 27.

**Side Panel (L) Removal**

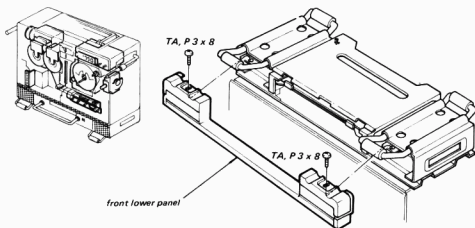


**Side Panel (R) Removal**  
on page 17.

## FM2 Front-end Block Removal



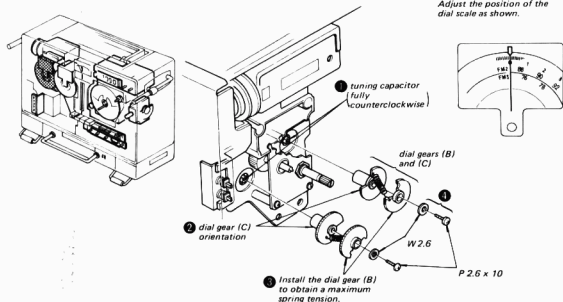
## Front Lower Panel Removal



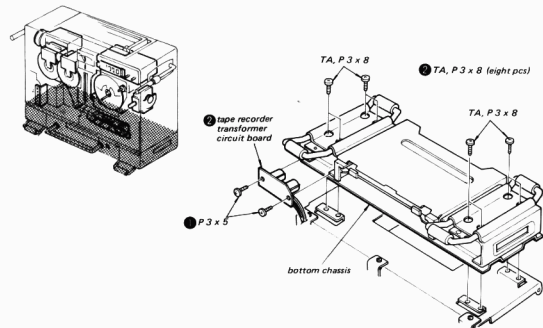
Main Chassis Overturning (1)  
on page 24.

Counter Block Removal  
on page 25.

FM Dial Gears (B) and (D) Installation

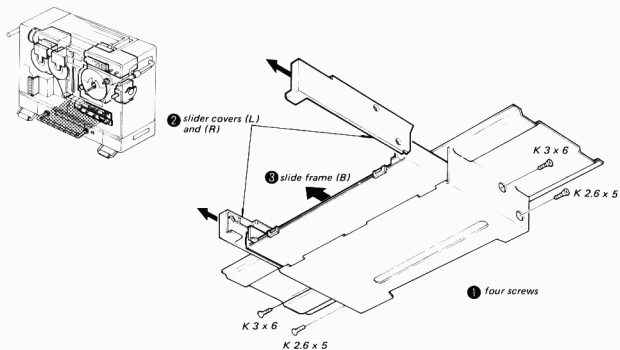


Bottom Chassis Removal

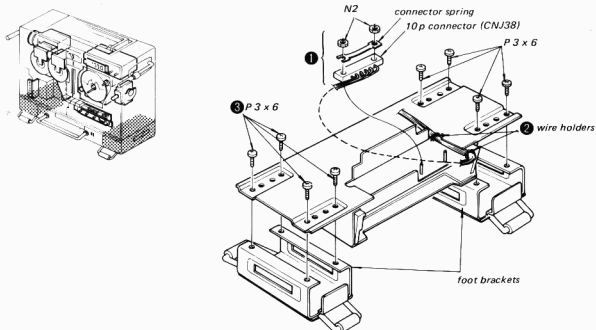




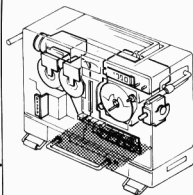
## Slide Frame (B) Removal



## Foot Bracket Removal

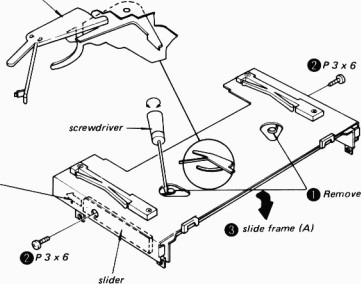


**Slide Frame (A) Removal**



stopper (A)

When reattaching the slide frame (A), place the stopper (A) as shown.



Note: Move the slider a little for an easy slide frame (A) removal.

2 P 3 x 6

screwdriver

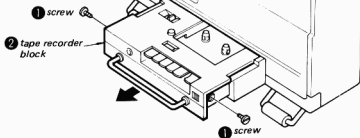
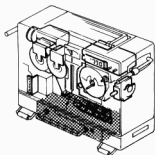
1 Remove springs.

3 slide frame (A)

2 P 3 x 6

slider

**Tape Recorder Block Removal**

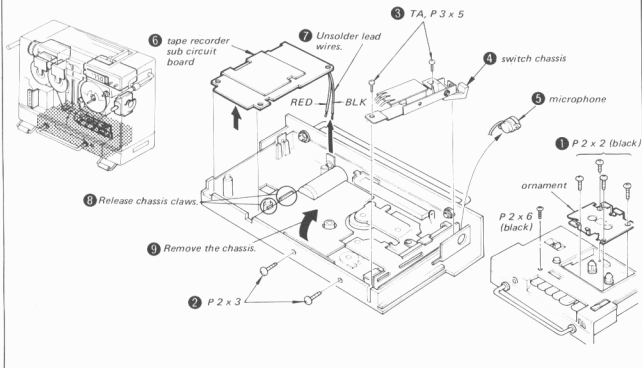


1 screw

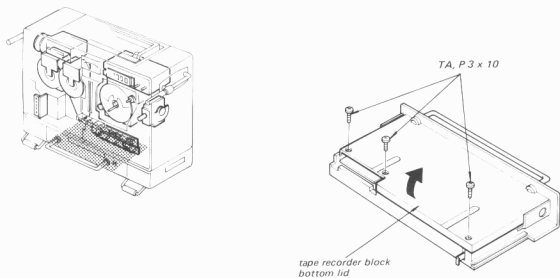
2 tape recorder block

1 screw

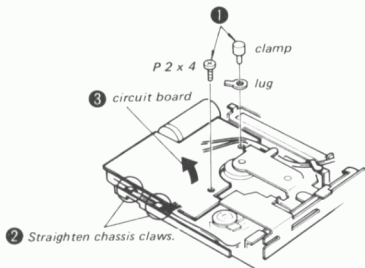
## Tape Recorder Mechanism Removal



## Tape Recorder Block Bottom Lid Removal

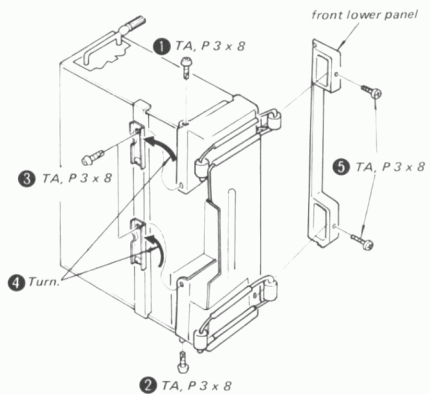


Tape Recorder Main Board Removal

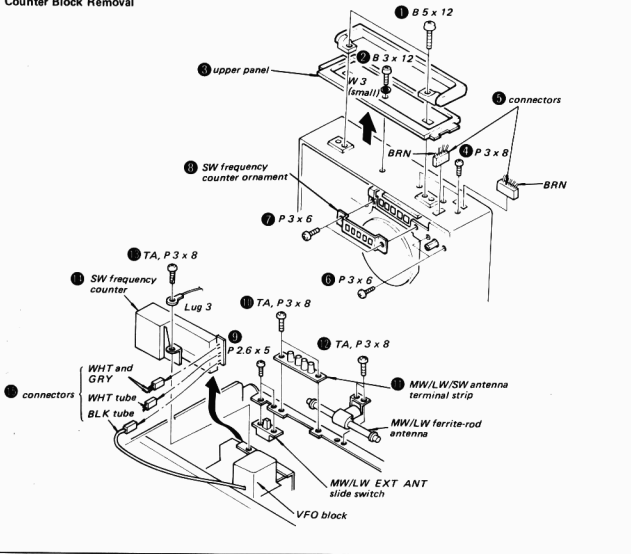


- Rear Case Removal  
on page 13.
- Front Panel Removal  
on page 13.
- Side Panel (R) Removal  
on page 17.
- Side Panel (L) Removal  
on page 18.

Main Chassis Overturning (1)

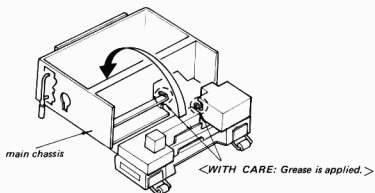


Counter Block Removal

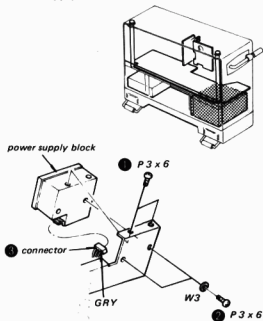


Main Chassis Overturning (2)

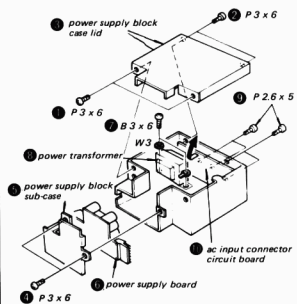
The set can be overturned as shown below.



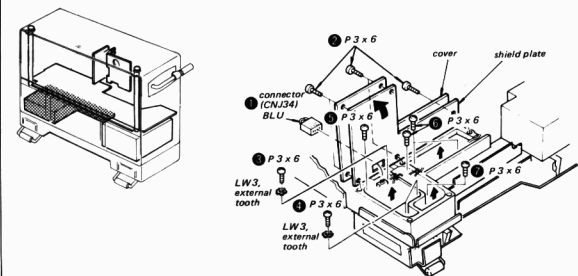
Power Supply Block Removal



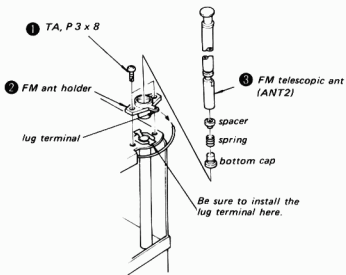
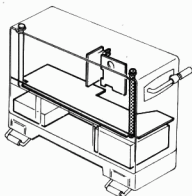
AC Input Connector Board and Power Supply Board Removal



Synthesizer Block Removal

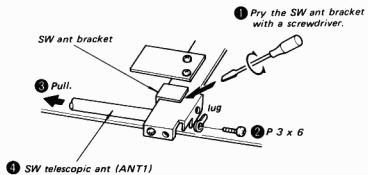
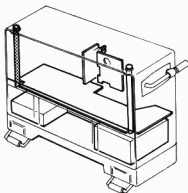


## FM Telescopic Antenna Removal

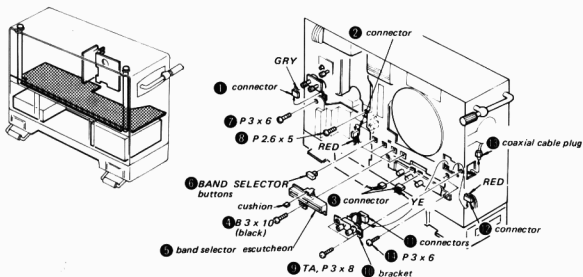


Side Panel (L) Removal  
on page 18.

## SW Telescopic Antenna Removal

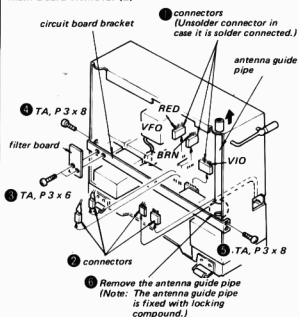


## Main Board Removal (1)

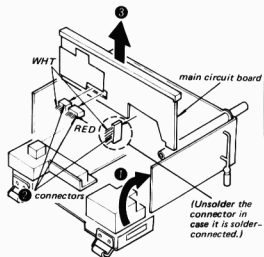


MW/LW Dial Block Removal  
on page 16.

## Main Board Removal (2)



## Main Board Removal (3)

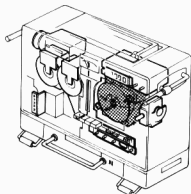




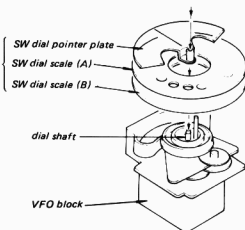
## VFO Block Removal (2)

on page 17.

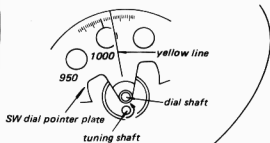
## SW Dial Scale Installation



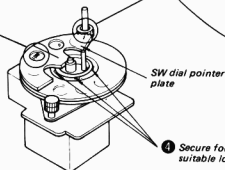
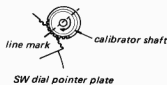
- 1 Install them slightly to the dial shaft.



- 3 Turn the tuning shaft fully counterclockwise. Install the two kinds of dial scale and dial pointer plate so that the yellow line on the dial pointer plate points to "1010".



- 2 After turning the calibrator shaft fully clockwise, gear the SW dial pointer plate into the calibrator shaft on line mark.

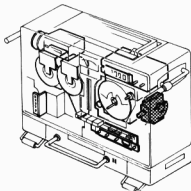


- 4 Secure four grooves with a suitable locking compound.

## Antenna Tuning Block Removal

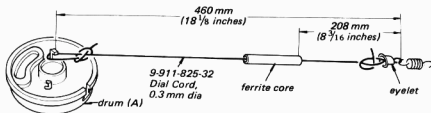
on page 17.

## Antenna Tuning Block Dial Cord Stringing

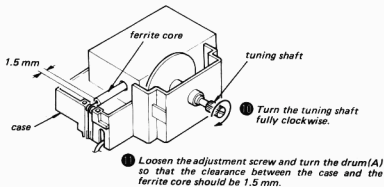
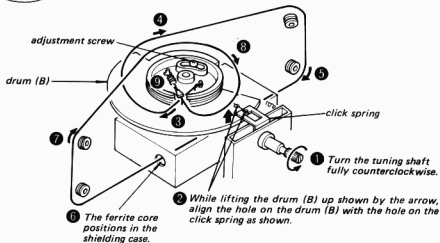


### 1. Dial Cord Preparation

- Crimp the eyelet.
- Secure the ties, eyelet and ferrite core with a suitable locking compound.



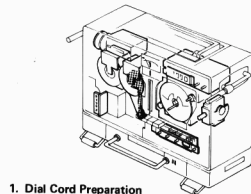
### 2. Dial Cord Stringing



## MW/LW Dial Block Removal

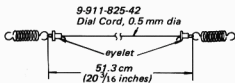
on page 16.

## MW/LW Dial Cord Stringing



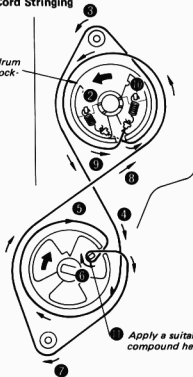
## 1. Dial Cord Preparation

- Crimp the eyelets.
- Secure the dial cord and eyelets with a suitable locking compound.

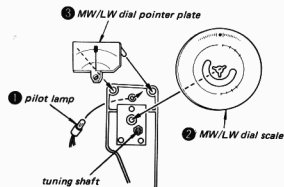


## 2. Dial Cord Stringing

- 1 Turn this dial drum fully counterclockwise.



## MW/LW Dial Block Installation



- 4 Turn the tuning shaft fully clockwise and then coincide the yellow line with the dot by turning the MW/LW dial scale.

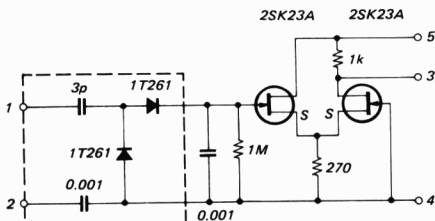


## SECTION 3 ADJUSTMENTS

### 3-1. RADIO SECTION

#### Test Equipment Required:

- FM rf signal generator
- AM rf signal generator
- FM sweep generator
- AM sweep generator
- marker generator
- frequency counter  
(100 MHz, resolution  $\pm 1$  Hz)
- ac/dc VTVM
- rf VTVM
- oscilloscope
- detector (shown below)



*Wire this section shortest possible and connect capacitor leads directly to the test points shown in setup diagrams.*

- **Note:** 1. Adjustments to the VFO can not be made by using generally available test equipment. When trouble is encountered to the VFO, replace the VFO Block.  
Part No.: **A-3624-020-B**
- 2. Overturn the main chassis before the adjustments. Refer to pages 24 and 25.

## 3-1. +5 V VOLTAGE ADJUSTMENT

## Setting:

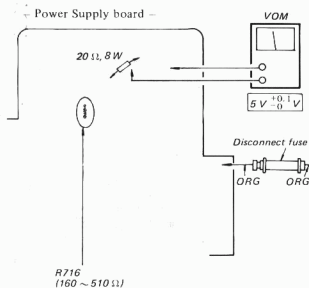
BAND SELECTOR switch: SW

## Procedure:

1. Disconnect the fuse F2.
2. Install a  $20\ \Omega$ , 8 W resistor on the conductor side as shown.
3. Adjust the value of R716 to obtain the specified voltage. Perform this adjustment on the conductor side.

**Note:** When the patterns are heated by a soldering iron, thermistor warms up. Cool off the components and circuit board at a time in selecting resistor.

4. Install the selected resistor on the component side.
5. Remove  $20\ \Omega$ , 8 W resistor and reconnect the fuse.



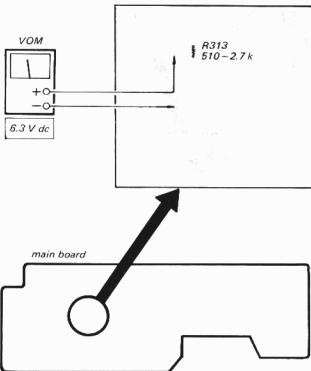
## 3-2. VCO POWER SUPPLY VOLTAGE ADJUSTMENT

## Setting:

BAND SELECTOR switch: SW

## Procedure:

Adjust the value of R313 ( $510\ \Omega - 2.7\ k\Omega$ ) for the indicated VOM reading.



3-3. AM IF AND BFO ADJUSTMENTS

Setting:

BAND SELECTOR switch:

MODE switch:

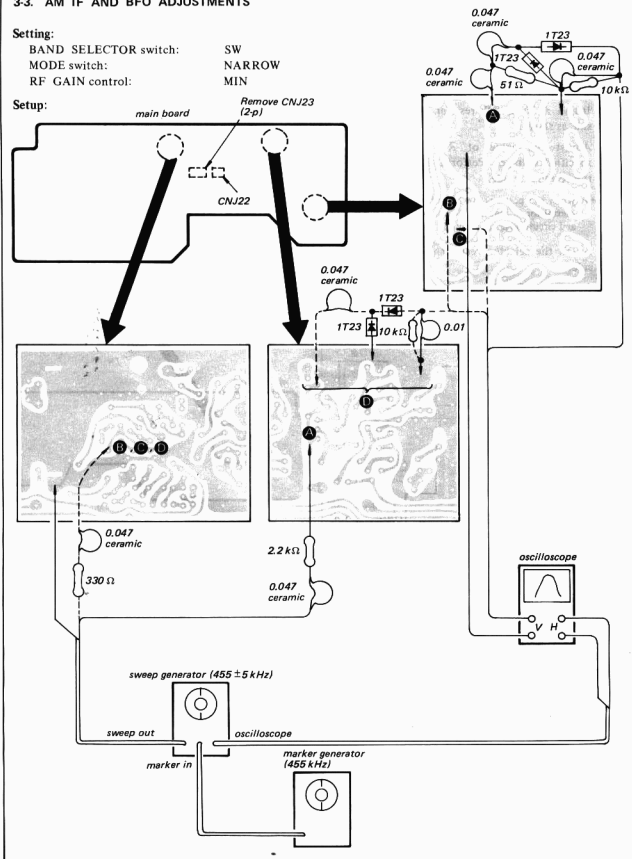
RF GAIN control:

SW




NARROW

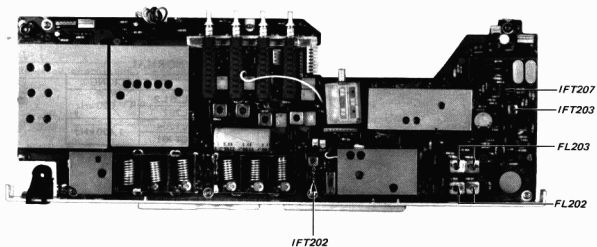
MIN

Setup:



## Procedure:

Adjust	Obtain
FL203 (Connect oscilloscope and sweep out to <b>A</b> .) (MODE switch: NORMAL) FL202 (MODE switch: NARROW)	Highest and widest waveform 
IFT202, IFT203 (Connect oscilloscope and sweep out to <b>B</b> .) (MODE switch: NORMAL)	Highest waveform 
IFT207 (MODE switch: LSB Connect oscilloscope to <b>C</b> .) Check: MODE switch: USB	A beat spike on the above waveform. Set the core at the center of rotation in which a spike appears on the waveform.  Beat spike should move to the opposite slope and stays stably.
IFT202 (Connect oscilloscope and sweep out to <b>D</b> .) (MODE switch: NARROW)	Highest waveform 



**3-4. LW/MW FREQUENCY COVERAGE AND TRACKING ADJUSTMENTS**

Setup:

AM rf signal generator  
(400 Hz, 30% modulation)



VOM range:  
0.5 ~ 1.5 V ac

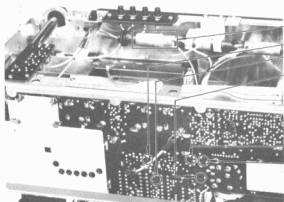


Adjust for maximum VOM reading.

A) LW

Setting:

BAND SELECTOR switch: LW  
 MODE switch: NORMAL  
 VOLUME control: MAX  
 TONE controls: MAX  
 RF GAIN control: MAX/NORMAL



LW TRACKING	
L 261-1	200 kHz
L 263	
CT203	
CT202	380 kHz

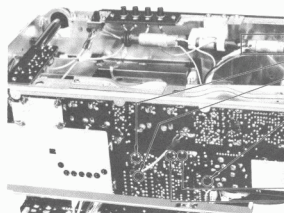
Fix L 261-1 with wax after the adjustment.

LW FREQUENCY COVERAGE	
L 265	146 kHz
CT205	407 kHz

B) MW

Setting:

BAND SELECT switch: MW  
 MODE switch: NORMAL  
 VOLUME control: MAX  
 TONE controls: MAX  
 RF GAIN control: MAX/NORMAL



MW TRACKING	
L 261-2	620 kHz
L 262	
CT204	1,400 kHz
CT201	

Fix L 261-2 with wax after the adjustment.

MW FREQUENCY COVERAGE	
L 264	520 kHz
CT206	1,680 kHz



## 3-5. FM IF ALIGNMENT

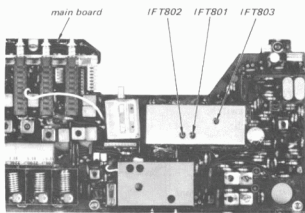
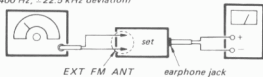
## Setting:

BAND SELECTOR switch:	FM
VOLUME control:	MAX
TONE controls:	MAX
MUTING switch:	OFF
AFC switch:	OFF

## Setup:

FM rf signal generator  
(400 Hz,  $\pm 2.5$  kHz deviation)

VOM ①  
range: 0.5 – 1.5 V ac



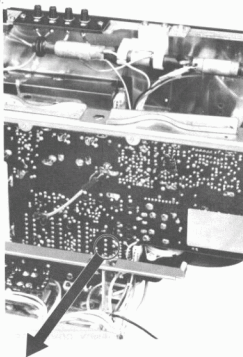
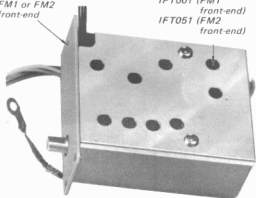
## Procedure:

Remove the FM front-ends (Refer to pages 18 and 19).

Signal Generator Frequency	Adjust	Obtain
10.7 MHz	IFT001 IFT051 IFT801 IFT802	Maximum VOM ① reading.
10.7 MHz	IFT802	0 V VOM ② reading.
FM1: 75.0 – 91.5 MHz FM2: 86.5 – 109.5 MHz (Tune the receiver in.)	IFT803	Maximum TUNING meter reading.

FM1 or FM2  
front-end

IFT001 (FM1  
front-end)  
IFT051 (FM2  
front-end)



VOM ②



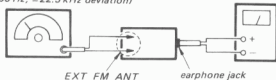
**3-6. FM1 FREQUENCY COVERAGE AND TRACKING ADJUSTMENTS**
**Setting:**

BAND SELECTOR switch: FM1  
 VOLUME control: MAX  
 TONE controls: MAX  
 MUTING switch: OFF  
 AFC switch: OFF

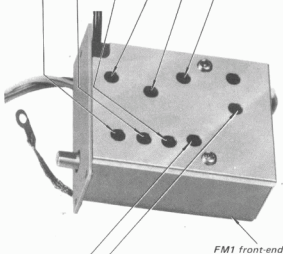
**Setup:**

FM rf signal generator  
 (400 Hz,  $\pm 22.5$  kHz deviation)

VOM range:  
 0.5 ~ 1.5 V ac



FM1 TRACKING					
75 MHz			91.5 MHz		
CT001	CT002	CT003	L001	L002	L003



FM1 front-end

FM1 FREQUENCY COVERAGE	
L004	(75 MHz)
CT004	(91.5 MHz)

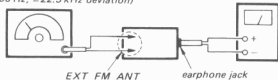
**3-7. FM2 FREQUENCY COVERAGE AND TRACKING ADJUSTMENTS**
**Setting:**

BAND SELECTOR switch: FM2  
 VOLUME control: MAX  
 TONE controls: MAX  
 MUTING switch: OFF  
 AFC switch: OFF

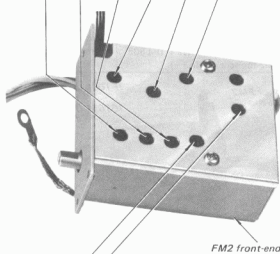
**Setup:**

FM rf signal generator  
 (400 Hz,  $\pm 22.5$  kHz deviation)

VOM range:  
 0.5 ~ 1.5 V ac



FM2 TRACKING					
109.5 MHz			86.5 MHz		
CT051	CT052	CT053	L051	L052	L053



FM2 front-end

FM2 FREQUENCY COVERAGE	
L054	(86.5 MHz)
CT054	(109.5 MHz)

## 3-8. SW 1st IF ADJUSTMENT

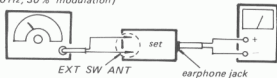
**Setting:**

BAND SELECTOR switch:	SW
MODE switch:	NORMAL
VOLUME control:	center of rotation
TONE control:	center of rotation
NOISE BLANKER switch:	OFF

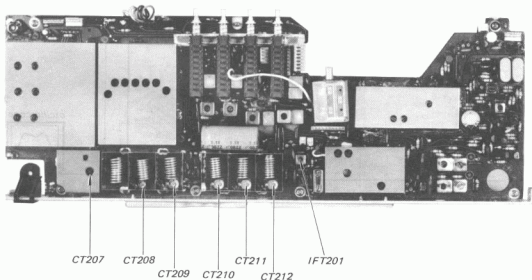
**Setup:**

AM rf signal generator  
(400 Hz, 30% modulation)

VOM range:  
0.5 ~ 1.5 V ac

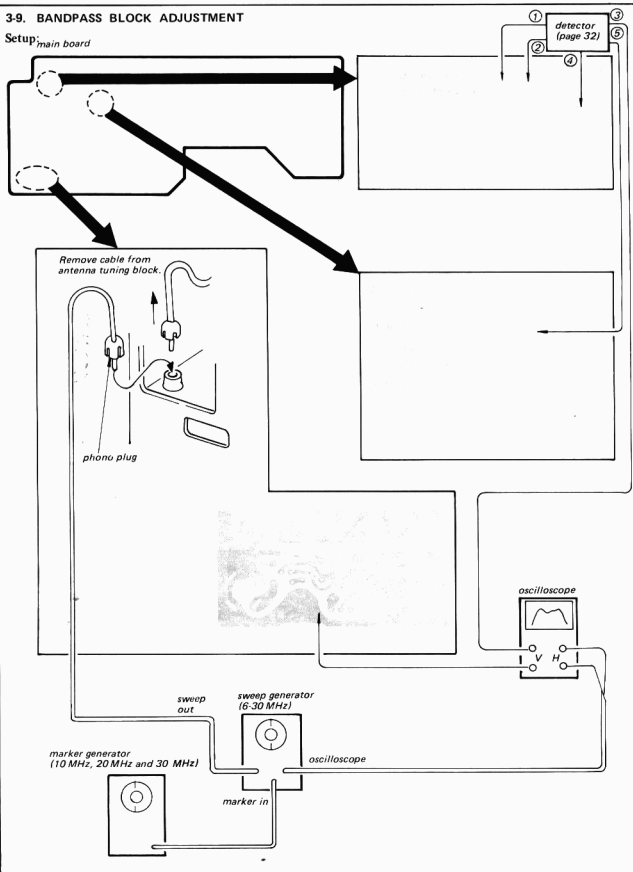
**Procedure:**

1. Set the AM rf signal generator to an appropriate frequency between 1.6 MHz and 30 MHz.
2. Tune the set in to the frequency set in step 1.
3. Adjust CTs 207, 208, 209, 210, 211 and 212, and IFT201 for maximum VOM reading.



3-9. BANDPASS BLOCK ADJUSTMENT

Setup: main board

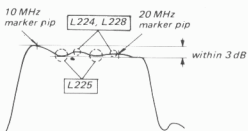


**Setting:**

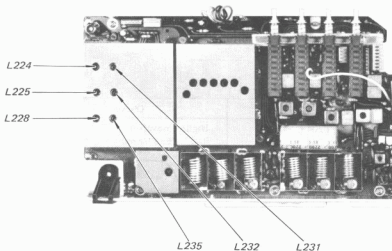
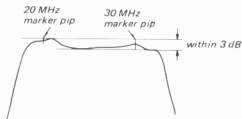
BAND SELECTOR switch: SW  
 VOLUME control: center of rotation  
 TONE controls: center of rotation  
 Marker Generator Frequencies: 10, 20 and 30 MHz

**Procedure:**

1. SW BAND SELECTOR switch: 10 MHz  
 Sweep Generator Frequency: 6-30 MHz
2. Adjust L224, 225 and 228 to obtain a waveform shown below.



3. SW BAND SELECTOR switch: 20 MHz  
 Sweep Generator Frequency: 15-35 MHz
4. Adjust L231, 232 and 235 to obtain a waveform shown below.

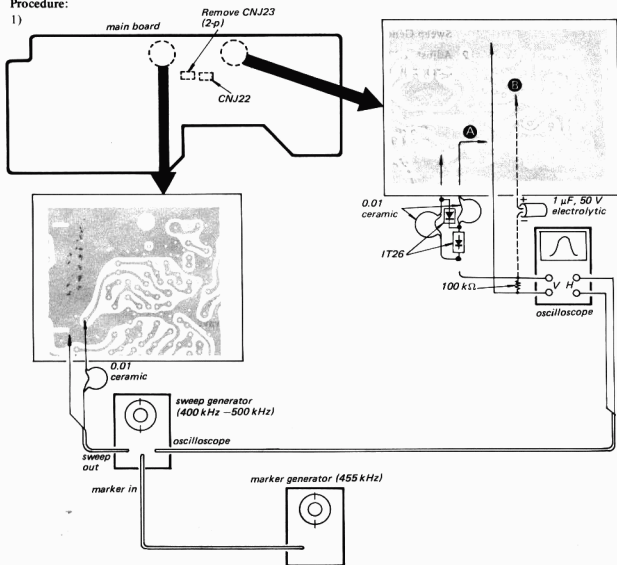


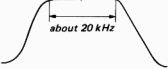
**3-10. NOISE BLANKER ADJUSTMENT**
**Setting:**

BAND SELECTOR switch: SW  
 NOISE BLANKER switch: ON

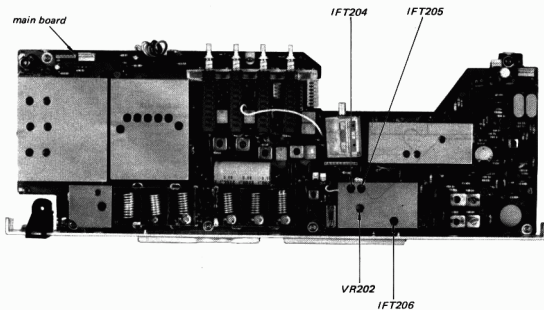
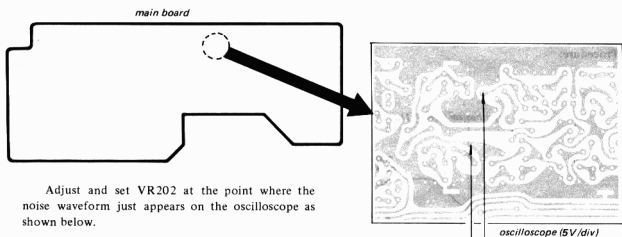
**Procedure:**

1)


**RF GAIN control: MIN**

Adjust	Obtain
IFT204 IFT205 (Connect oscilloscope to <b>A</b> .)	Highest waveform 455 kHz marker pip  about 20 kHz
IFT206 (Connect oscilloscope to <b>B</b> .)	

## 2) RF GAIN control: MAX/NORMAL



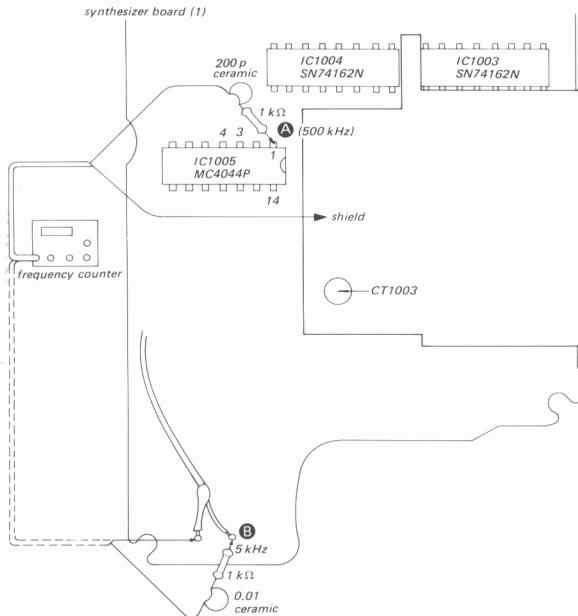
**3-11. 500 kHz REFERENCE OSCILLATOR ADJUSTMENT**

**Setting:**

BAND SELECTOR switch: SW

**Procedure:**

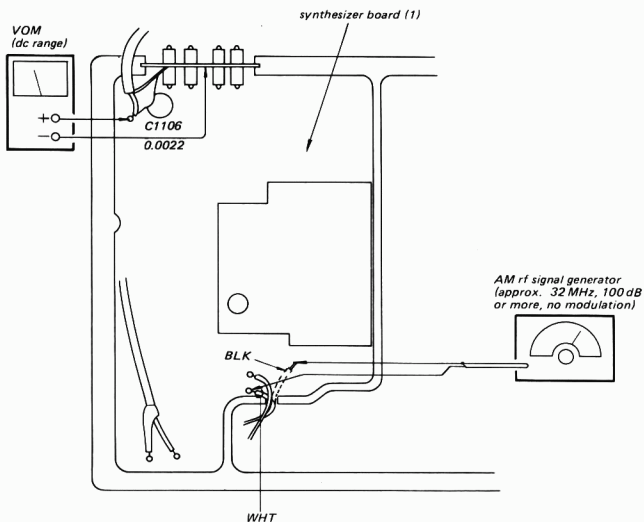
1)



Adjust	Connect Frequency Counter to	Frequency Counter Reading
CT1003	<b>A</b>	500,000 Hz $\pm$ 1 Hz
(Check)	<b>B</b>	5,000 Hz



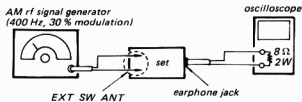
- 2) SW BAND SELECTOR switch: 29 MHz  
 Unsolder a white wire.



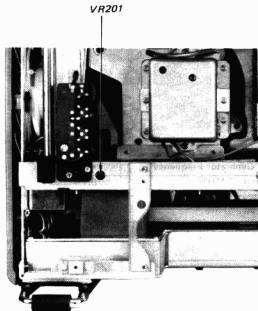
Adjust AM Rf Signal Generator Frequency	VOM Reading
around 32 MHz	0.7 V
below the frequency obtained above	6.3 V

**3-12. SW 1st MIXER BALANCE ADJUSTMENT**
**Setting:**

BAND SELECTOR switch: SW  
 SW BAND SELECTOR switch: 22 MHz  
 VOLUME control: center of rotation  
 TONE controls: center of rotation  
 MODE switch: AM NORMAL

**Setup:**


AM Rf Signal Generator Frequency	Tune the Set to	Adjust
22.57 MHz 70 dB	around 22.8 MHz to obtain a maximum waveform	VR201 to obtain a minimum waveform

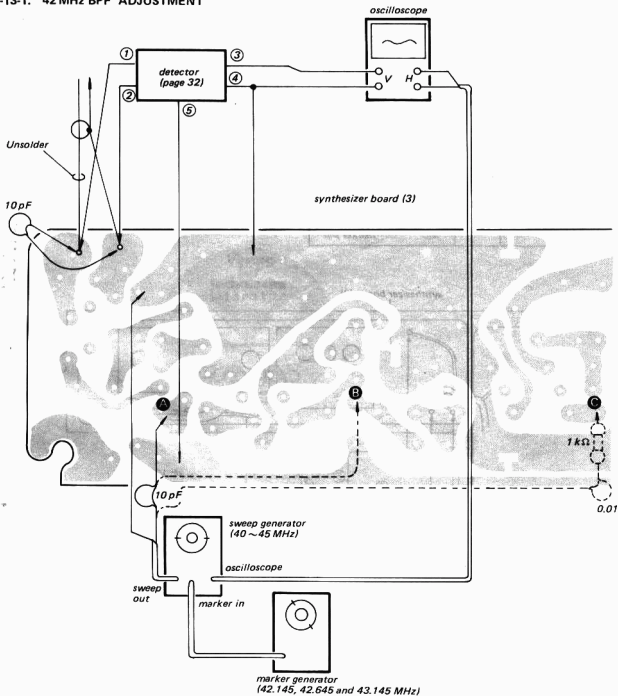


## 3-13. SYNTHESIZER SECTION ADJUSTMENTS

Setting:



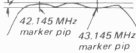
BAND SELECTOR switch: SW

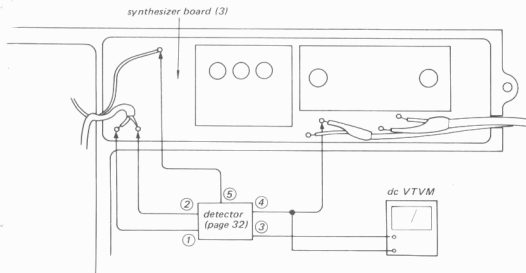
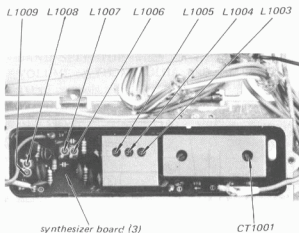
## 3-13-1. 42 MHz BPF ADJUSTMENT



**Procedure:**

1. Turn CT1001 and stop the oscillation of 45.6 MHz. The 45.6 MHz pip disappears from the waveform on the oscilloscope.
2. Turn the cores, of L1003 through L1006 counterclockwise until they place on top of the coils.

Connect Sweep Out to	Adjust	Obtain
<b>A</b>	L1008 L1009	Maximum double-humped waveform 42.645 MHz marker pip
<b>B</b>	L1006 L1007	
<b>C</b>	L1003 L1004 L1005	
<b>C</b> (Reduce sweep out level)	L1003 through L1009 (fine adjust)	Symmetrical waveform within 3 dB 



4. Turn the tuning dial throughout the range and confirm that the VTVM reading variation is within 3 dB. If not, perform steps 1 through 3.
5. Turn CT1001 and oscillate 45.6 MHz. 45.6 MHz pip appears on the waveform again.

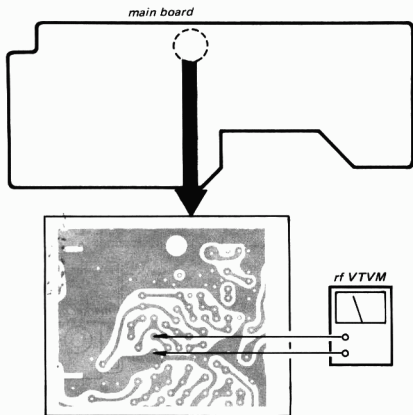


**3-13-3. SW 2nd LOCAL OSCILLATOR  
ADJUSTMENT**

**Setting:**

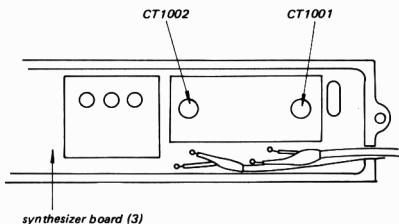
BAND SELECTOR switch: SW

**Setup:**



**Procedure:**

Adjust	Obtain
CT1001	Setting position.  VTVM reading 2 dB setting position CT1001 rotation
CT1002	Minimum VTVM reading.

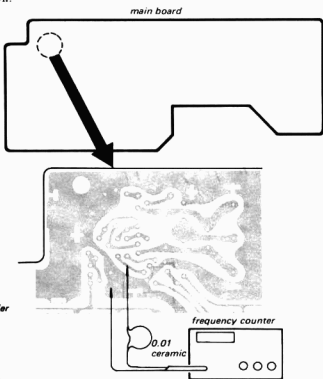
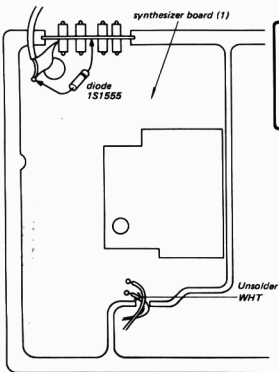


## 3-134. VCO ADJUSTMENT

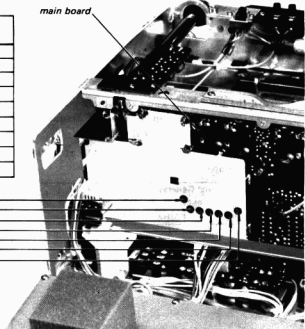
## Setting:

BAND SELECTOR switch: SW

Unsolder white wire and install a diode as shown.  
Remove diode when instructed to do so.



Step	SW BAND SELECTOR	Adjust	Frequency Counter Reading
1	2 MHz	L268	44.0 MHz
2	Remove diode 1S1555.		
3	3 MHz	L274	52.3 MHz
4	6 MHz	L269	56.1 MHz
5	10 MHz	L270	61.6 MHz
6	15 MHz	L273	66.4 MHz
7	20 MHz	L271	71.7 MHz
8	25 MHz	L272	76.8 MHz
9	Fix all coils with wax after the adjustment.		



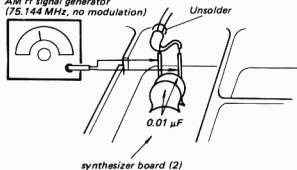
3-13-5. SYNTHESIZER SECTION CHECKOUT

Setting:

BAND SELECTOR switch: SW  
 SW BAND SELECTOR switch: 29 MHz

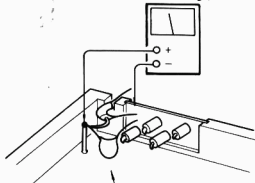
Setup:

AM rf signal generator  
 (75.144 MHz, no modulation)



synthesizer board (2)

VOM (dc range)



synthesizer board (1)

Procedure:

1. Turn the SW tuning knob and obtain a 29 MHz 999 kHz indication on the digital frequency indicator on the front panel.
2. Fine adjust the frequency of AM rf signal generator around 75.14 MHz.

AM Rf Signal Generator Frequency	VOM Indication
above 75.144 MHz	0.7 V
below 75.144 MHz	6.3 V

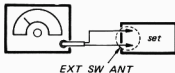
3-13-6. SW SPURIOUS BEAT ADJUSTMENT

Setting:

BAND SELECTOR switch: SW  
 SW BAND SELECTOR switch: 29 MHz  
 VOLUME control: MAX  
 TONE controls: MAX  
 RF GAIN control: MAX/NORMAL

Setup:

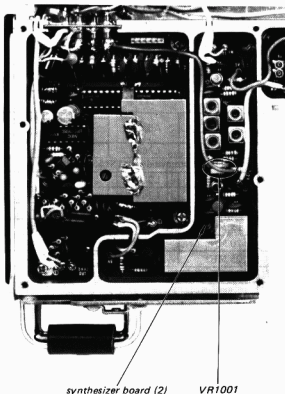
AM rf signal generator  
 (no modulation)



EXT SW ANT

Procedure:

AM Rf Signal Generator Frequency	Adjust
approximately 29.352 MHz or 29.852 MHz	VR1001 for a minimum beat note



synthesizer board (2)

VR1001



## 3.2. TAPE RECORDER SECTION

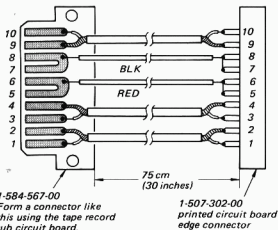
## PRECAUTION

- Clean the following parts with a denatured-alcohol-moistened swab:
 

record/playback head	pinch roller
erase head	rubber belts
capstan	idlers
- Demagnetize the record/playback head with a head demagnetizer. (Do not bring the head demagnetizer close to the erase head.)
- Do not use a magnetized screwdriver for the adjustments.
- After the adjustments, apply a suitable locking compound to the parts adjusted.
- The adjustments should be performed with the rated power supply voltage unless otherwise noted.

## Preparation of Extension Cable

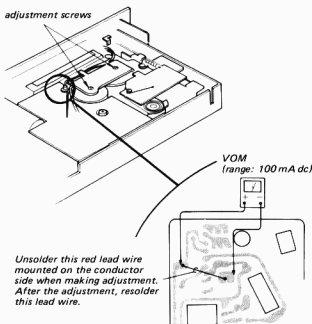
Make an extension cable as shown below and connect it between the radio and tape recorder sections.



## Flywheel Thrust Play Adjustment

## Procedure:

- Mode: playback



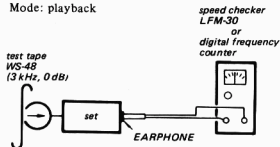
- Turn the adjustment screws counterclockwise until the screw tip is detached from the flywheel shafts.
- Gradually turn either of the adjustment screws clockwise to the position where the motor current suddenly increases.
- Then, turn the screw counterclockwise about  $\frac{1}{4}$  turn from the position obtained in step 3.
- Perform steps 3 and 4 for the another adjustment screw.
- After the adjustment, apply a suitable locking compound to the screws.

**Tape Speed Adjustment**
**Setting:**

VOLUME control: mechanical mid

**Procedure:**

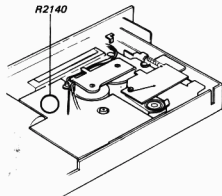
Mode: playback


**Specification:**

Speed Checker	Digital Frequency Counter
-0.5 — -1.5 %	2985 — 2955 Hz

**Adjustment Location:**

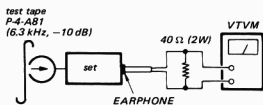
— record/playback board —


**Record/playback Head Azimuth Adjustment**
**Setting:**

VOLUME control: mechanical mid

**Procedure:**

1. Mode: playback

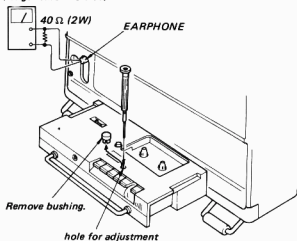


2. Turn the adjustment screw for the highest VTVM reading.

**Note:** Several peaks may appear, take the highest.

**Adjustment Location:**

VOM  
(range: 0.25 — 5 V ac)



**Record Bias Adjustment**

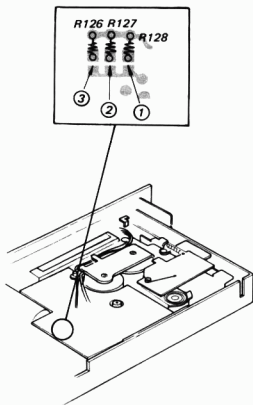
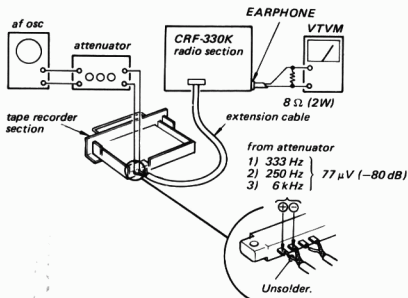
**Adjustment Location:**

– record/playback board –

**Setting:**

TONE controls: mechanical mid

**Procedure:**



**1. FUNCTION: RADIO**

Mode: record

**2. Mode: playback**

Playback 333 Hz. Adjust VOLUME control for 0.25 V (-10 dB) VTVM reading.

**3. Repeating the above steps, adjust as follows:**

Playback	Adjust pattern connection	Level difference
250 Hz 6 kHz	①, ②, ③	within 18 dB

Pattern connection	6 kHz VTVM reading
①	down ↑ up
②	
③	

**4. If necessary, repeat above steps.**



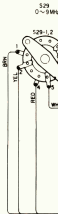
**4-1. MOUNTING DIAGRAM – Rac**  
*– Conductor Side –*



# SECTION 4 DIAGRAMS

## 4-1. MOUNTING DIAGRAM – Radio Section – – Conductor Side –

Q	
IC	
D	



6

7

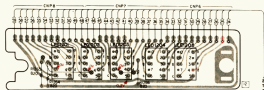
8

9

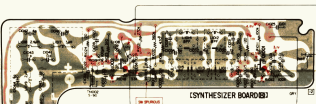
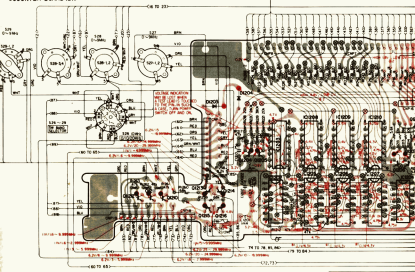
CRF -



	1212	121	1210	1213	1214	IC1203 IC1202	IC1208 IC1205	IC1209 IC1204	IC1210 IC1207	IC1206, IC1205 IC1207, IC1204
IC101	K002			1215	1216	1003		1019	1008	
				1203	1204					



[COUNTER BOARD (B)]



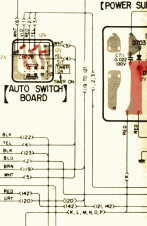
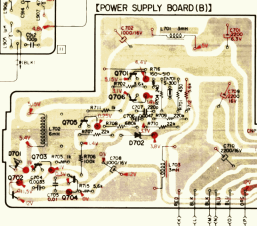
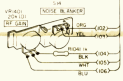
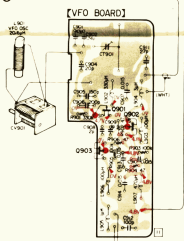
[SYNTHESIZER BOARD (B)]









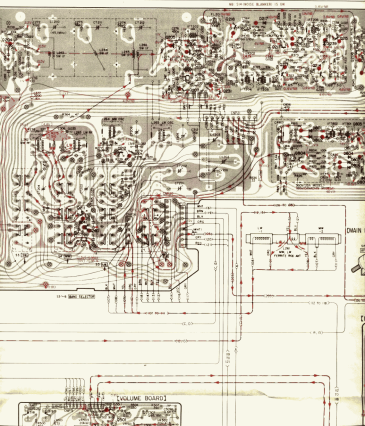


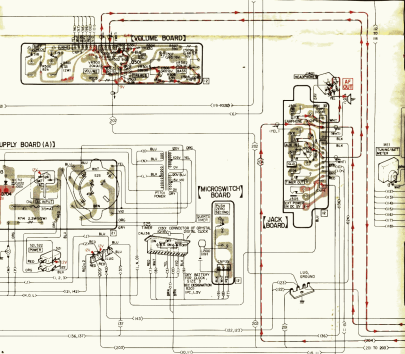
- A Note:**
- All capacitors are in  $\mu\text{F}$  unless otherwise noted.  $\text{pF} = \mu\mu\text{F}$  50 WV or less are not indicated except for electrolytics.
  - All resistors are in ohms,  $\frac{1}{2}\text{W}$  unless otherwise noted.  $\text{k}\Omega = 1000 \Omega$ ,  $\text{M}\Omega = 1000 \text{k}\Omega$
  - : fusible resistor.
  - $\Delta$  : internal component.
  - : panel designation.
  - : adjustment for repair.
  - Transistor base-emitter voltages are measured on the 2.5 V range.
  - Transistor is used for D701.



- B**
- : B+ bus.
  - : B+ bus when S3 (BAND SELECTOR, SW) is on.
  - : B+ bus at 3.501 MHz.
- C**
- Voltages are DC with respect to ground unless otherwise noted.
  - Readings are taken under SW detuned conditions with a VOM (20  $\text{k}\Omega/\text{V}$ ), setting VR501 (TREBLE) to minimum position, VR502 (BASS) to minimum position and VR503 (VOLUME) to mechanical mid position.
- D**
- : FM1 .... S15 (AFC): ON, S16 (MUTING): OFF, tuning dial: minimum frequency
  - : FM2 .... S15 (AFC): ON, S16 (MUTING): OFF, tuning dial: minimum frequency
  - : FM .... S15 (AFC): OFF, S16 (MUTING): ON, tuning dial: minimum frequency
  - : LW .... VR1401 (RF GAIN): MAX/NORMAL, MODE: NORMAL, tuning dial: minimum frequency
  - : MW .... VR1401 (RF GAIN): MAX/NORMAL, MODE: NORMAL, tuning dial: minimum frequency

204	21	212	205	206	231	218	217	216	214	20	208
		501		207			213	804			805
0 704	241						217	801	239		804
	240							802			807
											808





- MAX: ..... VR1401 (HF GAIN): MAX/NORMAL  
 MIN: ..... VR1401 (RF GAIN): MIN  
 S1: ..... S10 (MODE, USB-SSB): ON  
 S2: ..... S11 (MODE, LSB-SSB): ON  
 S3: ..... S10 (MODE, USB-SSB) or S11 (MODE, LSB-SSB): ON  
 S4: ..... S12 (CW): ON  
 S5: ..... S14 (NOISE BLANKER): ON  
 S6: ..... When 1MHz signal is received.

Relation of the LED indication (decimal value) and inputs to the LED are as follows:

LED Indication	LED Input Terminal					
	a	b	c	d	e	f
0	1	1	1	1	1	0
1	0	1	1	0	0	0
2	1	1	0	1	1	0
3	1	1	1	1	0	0
4	0	1	1	0	0	1
5	1	0	1	1	0	1
6	0	0	1	1	1	1
7	1	1	1	0	0	0
8	1	1	1	1	1	1
9	1	1	1	1	0	1

0 : low level  
1 : high level

Relation of the LED indication (decimal value) and BCD (binary-coded decimal) value are as follows:

LED Indication	BCD code			
	A	B	C	D
0	0	0	0	0
1	1	0	0	0
2	0	1	0	0
3	1	1	0	0
4	0	0	1	0
5	1	0	1	0
6	0	1	1	0
7	1	1	1	0
8	0	0	0	1
9	1	0	0	1

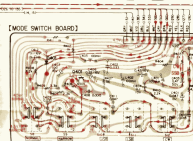
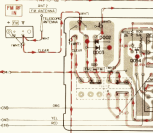
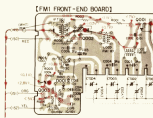
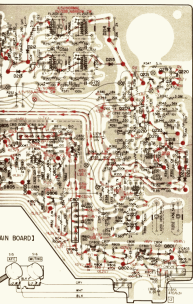
0 : low level  
1 : high level

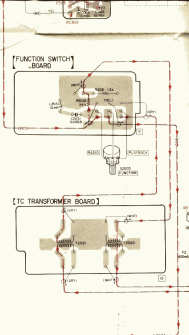
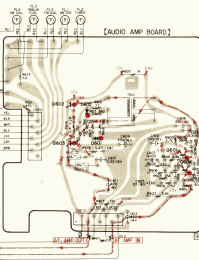
Relation of the SW BAND and IC1000:

SW BAND	IC1000		
	①	②	③
1MHz BAND	1	1	1
2	0	1	1
3	1	0	1
4	0	0	1
5	1	1	1
6	0	1	1
7	1	0	1
8	0	0	0
9	1	0	0
10	0	0	0
11	1	1	1
12	0	1	1
13	1	0	1
14	0	0	0
15	1	1	1
16	0	1	1
17	1	0	1



08 1C802 1C803 003 002 001  
 805 806 401 003 002 004 004  
 208 209 221 219 200  
 200 200 801 604  
 200 223  
 212 214 216 218 200 221  
 213 203 401 602 20 216 218 200 221  
 805 803 401 602 20 216 218 200 221  
 001 003 005  
 004 005





IC TERMINAL	
IC1003	IC1004
(1)	(2)
1	0
0	1
1	0
1	0
0	0
0	0
0	0
0	0
0	1
1	0
1	0
1	0
0	0
0	0
0	0
0	0

SW BAND	IC TERMINAL					
	IC1003 (1)	IC1003 (2)	IC1003 (3)	IC1003 (4)	IC1004 (1)	IC1004 (2)
10 MHz BAND	0	0	0	0	0	1
19	1	0	0	1	1	0
20	0	0	0	1	1	0
21	1	1	1	0	1	0
22	0	1	1	0	1	0
23	1	0	1	0	1	0
24	0	0	1	0	1	0
26	1	1	0	0	1	0
36	0	1	0	0	1	0
37	1	0	0	0	1	0
38	0	0	0	0	1	0
29	1	0	0	1	0	0

Switch

Ref. No.	Switch	Position
S001	FM FM1 - FM2	FM1
S1-1	ANT SELECT	LOCAL
S1-2	MW, LW-EXT ANT	ROD
	ANT SELECT	
	SW-ANT	
S2	ROD-EXT	L106
	SW ANT COIL SELECT	
S31-34	L108, L109	
S41-44	BAND SELECTOR, SW	ON
S45-46	BAND SELECTOR, MW	OFF
S51-54	BAND SELECTOR, LW	OFF
S61-64	BAND SELECTOR, FM	OFF
S8	MODE, NORMAL	ON
S9	MODE, NARROW	OFF
S10	MODE, USB-SSB	OFF
S11	MODE, LSB-SSB	OFF
S12	MODE, CW	OFF
S14	NOISE BLANKER	OFF
S15	AFC	OFF
S16	MUTING	OFF
S17	TIMER ON	OFF
S18	BATT CHECK	OFF
S19	LIGHT	OFF
S20	ZERO SECOND	OFF

Ref. No.	Position
S21	FM1
S22	LOCAL
S23	V1
S24	ROD
S25	OFF
S26	OFF
S27 to 29	SW
S30	ON
S31	OFF
S32	OFF
S33	OFF
S34	OFF
S35	OFF
S36	OFF
S37	ON
S38	OFF
S39	OFF
S40	OFF
S41	ON
S42	OFF
S43	OFF
S44	OFF
S45	OFF
S46	OFF
S47	OFF
S48	OFF
S49	OFF
S50	OFF
S51	OFF
S52	OFF
S53	OFF
S54	OFF
S55	OFF
S56	OFF
S57	OFF
S58	OFF
S59	OFF
S60	OFF
S61	OFF
S62	OFF
S63	OFF
S64	OFF
S65	OFF
S66	OFF
S67	OFF
S68	OFF
S69	OFF
S70	OFF
S71	OFF
S72	OFF
S73	OFF
S74	OFF
S75	OFF
S76	OFF
S77	OFF
S78	OFF
S79	OFF
S80	OFF
S81	OFF
S82	OFF
S83	OFF
S84	OFF
S85	OFF
S86	OFF
S87	OFF
S88	OFF
S89	OFF
S90	OFF
S91	OFF
S92	OFF
S93	OFF
S94	OFF
S95	OFF
S96	OFF
S97	OFF
S98	OFF
S99	OFF
S100	OFF

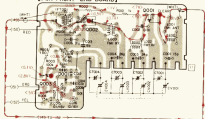
K

L

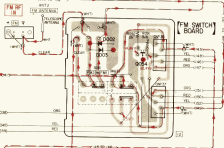
M

20	221	219	220		005	002	001	00	0
20	801	603	604		053	052	054	051	IC
219	225	218			001	002			D
216	220	223			051	005			

[FM1 FRONT-END BOARD]

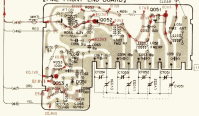


FM RF IN

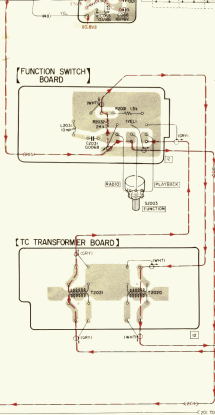


[FM SWITCH BOARD]

[FM2 FRONT-END BOARD]



[FUNCTION SWITCH BOARD]







Switch

TERMINAL			
IC1004			
③	⑥	③	④
0	0	0	1
0	1	1	0
0	1	1	0
1	0	1	0
1	0	1	0
1	0	1	0
1	0	1	0
1	0	1	0
0	0	1	0
0	0	1	0
0	0	1	0
0	1	0	0

Ref. No.	Switch	Position
S001	FM FM1 - FM2	FM1
S1-1	ANT SELECT	LOCAL
	MW, LWEXT ANT	
S1-2	ANT SELECT	ROD
	SW-ANT	
	ROD-EXT	
S2	SW ANT COIL SELECT	L10B
	L10B-L10B	
S3-1 - 3-6	BAND SELECTOR, SW	ON
S4-1 - 4-6	BAND SELECTOR, MW	OFF
S5-1 - 5-6	BAND SELECTOR, LW	OFF
S6-1 - 6-4	BAND SELECTOR, FM	OFF
S8	MODE, NORMAL	ON
S9	MODE, NARROW	OFF
S10	MODE, USB-SB8	OFF
S11	MODE, LSB-SB8	OFF
S12	MODE, CW	OFF
S14	NOISE BLANKER	OFF
S15	AFC	OFF
S16	MUTING	OFF
S17	TIMER ON	OFF
S18	BATT CHECK	OFF
S19	LIGHT	OFF
S20	ZERO SECOND	OFF

Ref. No.	Switch	Position
S21	POWER	OFF
S22	OFF-ON-TIMER ON	OFF
S23	VOLTAGE SELECT	100V
S24	BATT/AC	BATT
S25	QUARTZ TIMER	OFF
S26	SW BAND SELECTOR	0
	10MHz STEP	
	0 - 10MHz - 20	
S27 to 29	SW BAND SELECTOR	9
	1MHz STEP	
	0 - 1MHz - 2 - 3 - 4 - 5	
	- 6 - 7 - 8 - 9	
S2003	FUNCTION	RADIO
	RADIO-PLAYBACK	

Note:

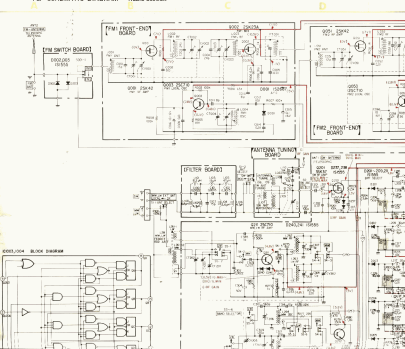
- All capacitors are in  $\mu\text{F}$  unless otherwise noted.  $50\text{WV}$  or less are not indicated except for electrolytic.
- All resistors are in ohms,  $\text{k}\Omega$  unless otherwise noted.  $\text{k}\Omega - 1000\Omega$ ,  $\text{M}\Omega - 1000\text{k}\Omega$ .
-  : fusible resistor.
-  : internal component.
-  : panel designation.
-  : adjustment for repair.
- Transistor test-resistor voltages are measured on the range.
- Transistor is used for D701.

- Color code of sleeving over the end of the jacket.



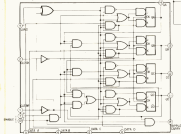
-  : B+ pattern
-  : signal path
-  : component side pattern
-  : through hole

#### 4.2. SCHEMATIC DIAGRAM - Radio Section -



3

0002J004 BLOCK DIAGRAM

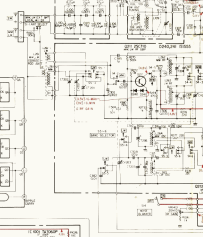
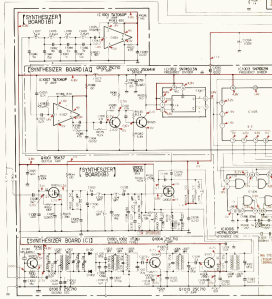


4

5

6

7



A

C

D

values are in  $\mu\text{F}$  unless otherwise noted.  $\mu\text{F} = \mu\text{F}$   
 values are not indicated except for electrolytics.  
 values are in ohms,  $\text{k}\Omega$  unless otherwise noted.  
 (G, M) = 1000(s)

variable resistor.

terminal component.

and designations.

Equipment for repair.

meter voltages are measured on the 2.5 V

is used for D304.

bleeding over the end of the jacket.

- B1 pattern
- signal path

component side pattern



- B1 bus.
- B1 bus when S3 (BAND SELECTOR, SW) is on.
- B1 bus at 3.501 MHz.

• Voltages are DC with respect to ground unless otherwise noted.

• Readings are taken under SW detuned conditions with a VOM (20  $\text{mV}$ ), setting VR501 (TREBLE) to minimum position, VR502 (BASS) to minimum position and VR503 (VOLUME) to mechanical mid position.

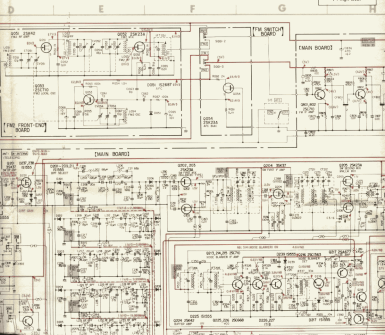
- < >: FM1 ..... S15 (AFC): ON, S16 (MUTING): OFF, tuning dial: minimum frequency  
 S15 (AFC): ON, S16 (MUTING): OFF, tuning dial: minimum frequency
- || : FM2 ..... S15 (AFC): ON, S16 (MUTING): OFF, tuning dial: minimum frequency  
 S15 (AFC): OFF, S16 (MUTING): ON, tuning dial: minimum frequency
- | | : LW ..... VR1401 (RF GAIN): MAX/NORMAL, MODE: NORMAL, tuning dial: minimum frequency
- | | : MW ..... VR1401 (RF GAIN): MAX/NORMAL, MODE: NORMAL, tuning dial: minimum frequency

- /G MAX: ..... VR1401 (RF GAIN): MAX
- /G MIN: ..... VR1401 (RF GAIN): MIN
- /LSB: ..... S10 (MODE, LSB-558): ON
- /LSB: ..... S11 (MODE, LSB-558): OFF
- /SSB: ..... S10 (MODE, LSB-558) or LSB-558: ON
- /CW: ..... S12 (CW): ON
- /NB: ..... S14 (MODE BLANKER): ON
- /CMHz: ..... When CMHz signal is received

• #11 Relations of the LED indication (decimals) (binary-coded decimal) value are as follows:

LED Indication	BCD code			
	A	B	C	D
0	0	0	0	0
1	1	0	0	0
2	0	1	0	0
3	1	1	0	0
4	0	0	1	0
5	1	0	1	0
6	0	1	1	0
7	1	1	1	0
8	0	0	0	1
9	1	0	0	1

0 : low level  
 1 : high level







UNNORMAL  
ON  
IN  
MODE,  
ON  
level,  
and BCD

• • 2 Relation of the LED indication (decimal value) and inputs to the LED are as follows:

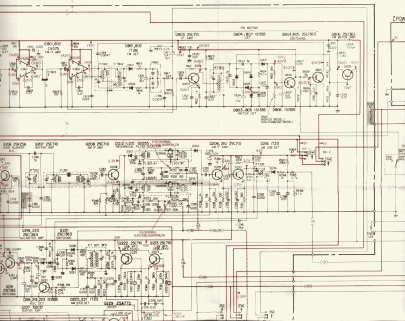
LED Indication	LED Input Terminal						
	a	b	c	d	e	f	g
0	1	1	1	1	1	1	0
1	0	1	1	0	0	0	0
2	1	1	0	1	1	0	1
3	1	1	1	1	0	0	1
4	0	1	1	0	0	1	1
5	1	0	1	1	0	1	1
6	0	0	1	1	1	1	1
7	1	1	1	0	0	0	0
8	1	1	1	1	1	1	1
9	1	1	1	1	0	1	1

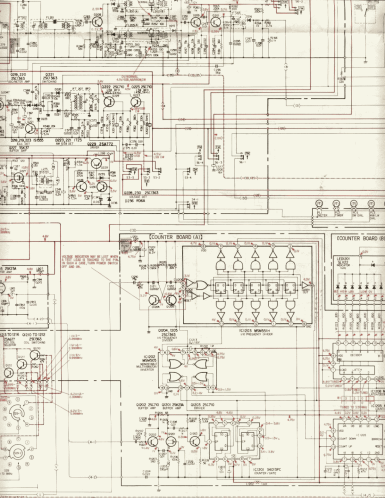
0 : low level  
1 : high level

• • 0 : 0 V  
1 : 4.5 V

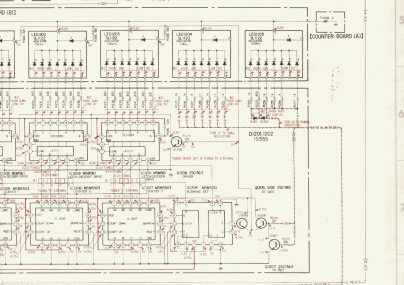
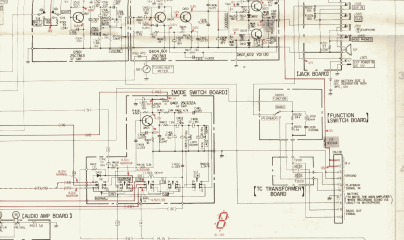
SW BAND	IC TERMINAL					
	IC1003			IC1004		
	②	④	⑤	⑥	③	①
1 MHz BAND	1	1	1	0	1	1
2	0	1	1	0	1	1
3	1	0	1	0	1	1
4	0	0	1	0	1	1
5	1	1	0	0	1	1
6	0	1	0	0	1	1
7	1	0	0	0	1	1
8	0	0	0	0	1	1
9	1	0	0	1	0	1
10	0	0	0	1	0	1
11	1	1	1	0	0	1
12	0	1	1	0	0	1
13	1	0	1	0	0	1
14	0	0	1	0	0	1
15	1	1	0	0	0	1
16	0	1	0	0	0	1
17	1	0	0	0	0	1

SW BAND
18 MHz BAND
19
20
21
22
23
24
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28
29

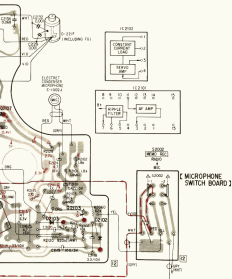












7	2103
2105	2102

D2108: 25C1474



IC2101: CX170



IC2102: 8K295

D2001, 2002  
D2004, 2101 - 2105 } : 151555

D2002: TLN100

TCT BOARD (B)  
CRY-330K

B

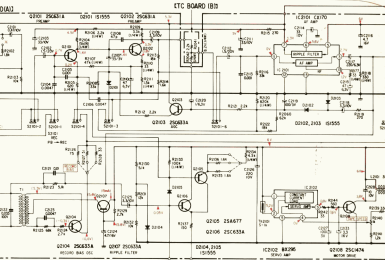
C

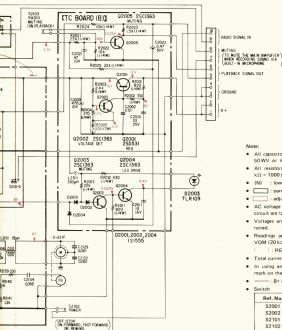
D

E

TYPE SYMBOL  
 RESISTOR □  
 CAPACITOR ○  
 DIODE ▽  
 TRANSFORMER □

MICROPHONE SWITCH BOARD





#### Note:

- All capacitor are in  $\mu\text{F}$  unless otherwise noted.  $\mu\text{F}$  =  $\mu\text{F}$  50WV or less are not indicated except for electrolytic.
- All resistors are in ohms,  $\frac{1}{2}\text{W}$  unless otherwise noted.  $\text{k}\Omega$  = 1000  $\Omega$ ,  $\text{M}\Omega$  = 1000  $\text{k}\Omega$ .
- IND = low-noise resistor.
- = panel designation.
- ◻ = adjustment for repair.
- AC voltage readings indicated by  $\nabla$  in the bias oscillator circuit are taken with a VTVM.
- Voltages are dc with respect to ground unless otherwise noted.
- Readings are taken under no signal conditions with a VOM (20  $\text{k}\Omega/\text{V}$ ).
- RECORD < > PLAYBACK
- Total current is measured with no cassette installed.
- In using an electric condenser microphone with a red mark on the side of the case, connect R2102 shown by  $\nabla$ .
- = B+ bus.
- Switch

Ref. No.	Switch	Position
S2001	ISS	3
S2002	MEMO REC	RADIO
S2101	REC/PS	PS
S2102	POWER	OFF
S2103	RADIO MUTING	ON

#### Note:

- Color code of sleeving over the end of the jacket.



- = B+ pattern
- = signal path







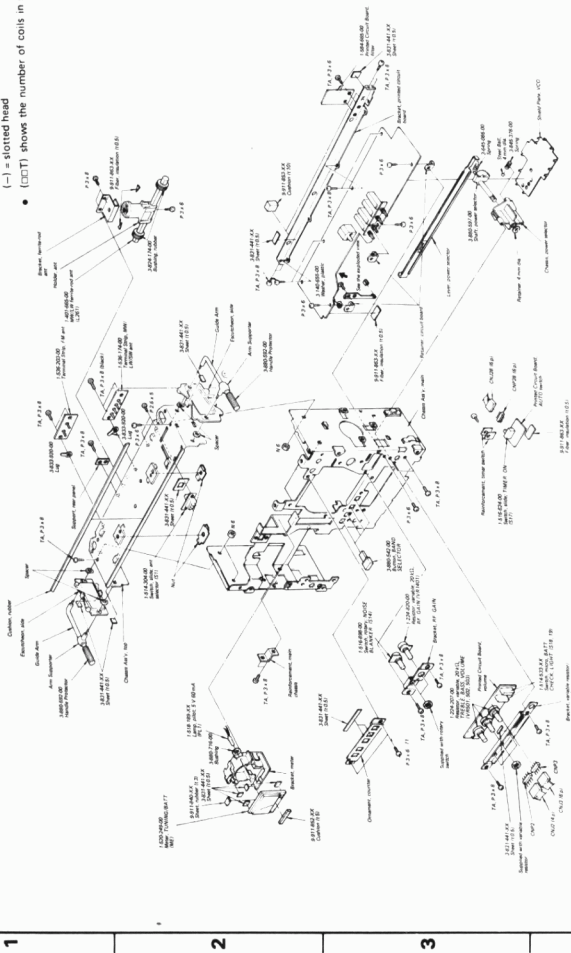


A B C D E

(4)

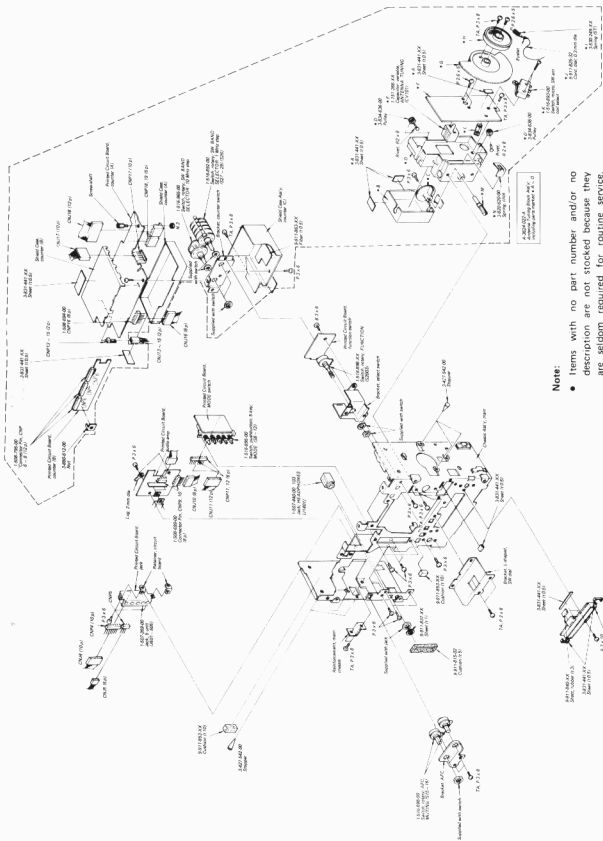
Note:

- 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
- (DOT) shows the number of coils in spring.



A B C D E

(5)



A

B

C

(6)

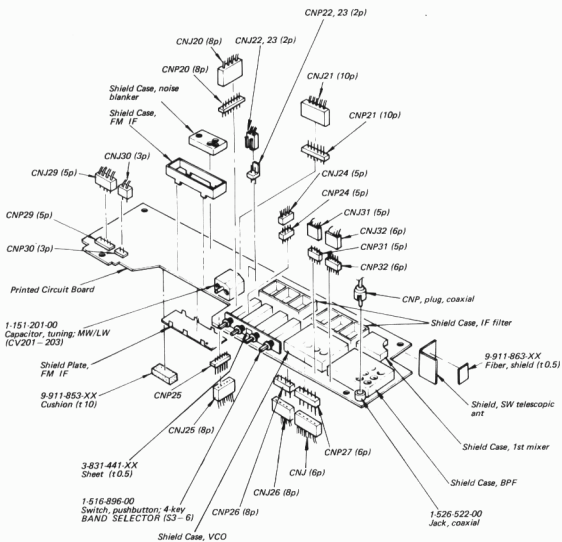
1

2

3

4

5



**Note:**

- 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
- (□T) shows the number of coils in spring.













## SECTION 6

### ELECTRICAL PARTS LIST

<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>Transistors</b>					
Q001		2SK42-1	Q805, 806		2SC1364
Q002		2SK23A-840	Q901,		2SK42-1
Q003		2SC710	Q902, 903		2SK23A-824
Q051		2SK42-1	Q1001, 1002		3SK37
Q052		2SK23A-840	Q1003, 1004		2SC710
Q053		2SC710	Q1006		2SK23A-825
Q054		2SK23A-860			
Q201		3SK37	Q1007-1012		2SC634A
Q202, 203		2SK23A-840	Q1013-1018		2SC710
Q204		3SK37	Q1019, 1020		2SC641K
Q205, 206		2SK23A-840	Q1021, 1022		2SC710
Q207-209		2SC710	Q1023, 1024		2SC634A
Q210, 211		2SC710-14	Q1025, 1201		2SK23A-824
Q212		2SC710-15	Q1202, 1203		2SC710
Q213, 214		2SC710	Q1204-1212		2SC1364
Q216		2SC634A	Q1213-1216		2SA678
Q217		2SA678	Q2001		2SD1061
Q218-221		2SC634A	Q2002-2005		2SC634A
Q222		2SC710-14	Q2101, 2102		2SC632A
Q223		2SC710	Q2103, 2104		2SC634A
Q224		2SK42-1	Q2105		2SA678
Q225, 226		2SC1129	Q2106, 2107		2SC634A
Q227		3SK37	Q2108		2SC1474
Q228		2SA634A			
Q229		2SA684			
Q230		2SC634A			
Q231		2SA678			
Q401		2SC632A			
Q501		2SC634A			
Q601		2SC634A			
Q602, 603		2SC1429-□5			
Q604		2SC634A			
Q701		2SA678			
Q702		2SA684			
Q703-706		2SC634A			
Q801-803		2SC710-14			
Q804		2SC634A			
					<b>ICs</b>
			IC801, 802		CX075B
			IC1001		TA7060P
			IC1002		SN74S113DC
			IC1003, 1004		SN74162N
			IC1005		μPC1008C
			IC1006		HD74LS00P
			IC1007		TA7060P
			IC1201		34013PC
			IC1202		MSM505
			IC1203		MSM551H
			IC1204		MSM530
			IC1205-1207		MSM5503
			IC1208-1210		MSM561
			IC2101		CX170
			IC2102		BX295A

<i>Ref. No.</i>	<i>Part No.</i>	<i>Description</i>
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**Diodes**

D001, 051		IS2687S-2
D201 - 209		IS1555
D211 - 215 <sup>1)</sup>		
D216	1T23S	
D217 - 219	IS1555	
D220, 221	1T23S	
D223, 225		IS1555
D226, 227		1T18-0
D228 - 234		IS2222
D235		1T261
D236		RD6A
D237 - 241 <sup>1)</sup>		IS1555
D401		
D601, 602		VD1120
D701		2SB324
D702		RD5A
<b>D703, 704</b>		<b>10E2</b>
D801, 802		1T261
D803 - 807		IS1555
D1001, 1002		1T261
D1003, 1004		IS1555
D1201 - 1204 <sup>1)</sup>		
D2001, 2002		IS1555
D2003		TLR109 (LED)
D2004		IS1555
D2101 - 2105 <sup>1)</sup>		

**Thermistor**

Th701	1-800-071-XX	S-300
Th1001	1-800-198-XX	S-1K
Th1002	1-800-194-00	S-90
Th2101	1-800-198-00	S-1K

**COILS**

L001	1-425-909-00	FM Antenna
L002	1-425-910-00	FM RF
L003	1-425-909-00	FM Antenna
L004	1-405-750-00	FM Osc

<i>Ref. No.</i>	<i>Part No.</i>	<i>Description</i>
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L051	1-425-929-00	Coil
L052	1-425-930-00	Coil
L053	1-425-929-00	Coil
L054	1-405-527-21	FM Osc
L201	1-407-178-XX	Microinductor, 1 $\mu$ H
L210, 215	1-407-741-00	Microinductor, 18 $\mu$ H
L224	1-407-864-00	RF BPF
L225	1-407-865-00	RF BPF
L228	1-407-864-00	RF BPF
L231	1-407-862-00	RF BPF
L232	1-407-863-00	RF BPF
L235	1-407-862-00	RF BPF
L261	1-401-665-00	MW/LW Ferrite-rod Antenna
L262	1-425-911-00	MW RF
L263	1-425-444-00	LW RF
L264	1-405-717-00	MW Osc
L265	1-405-716-00	LW Osc
L266	1-417-053-00	VCO Matching Transformer
L267	1-407-178-XX	Microinductor, 1 $\mu$ H
L268	1-433-184-00	VCO (1)
L269	1-433-185-00	VCO (3)
L270	1-433-188-00	VCO (4)
L271	1-433-189-00	VCO (6)
L272	1-433-190-00	VCO (7)
L273	1-433-186-00	VCO (5)
L274	1-433-187-00	VCO (2)
L275	1-425-912-00	Mixing
L282, 283	1-407-661-XX	Microinductor, 470 $\mu$ H
L287, 288	1-407-157-XX	Microinductor, 10 $\mu$ H
L289	1-407-661-XX	Microinductor, 470 $\mu$ H
L290	1-407-178-XX	Microinductor, 1 $\mu$ H
L401 - 403	1-407-883-00	Microinductor, 100 mH
L701	1-407-857-00	Choke, 3 mH
L702	1-407-884-00	Choke, 6 mH
L703	1-407-857-00	Choke, 3 mH
L804	1-407-169-XX	Microinductor, 100 $\mu$ H
L1010	1-407-178-XX	Microinductor, 1 $\mu$ H
L1016	1-407-169-XX	Microinductor, 100 $\mu$ H

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



<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>		<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>	
C219	1-107-086-11	110 p	silvered mica	C267	1-107-078-11	51 p	silvered mica
C220	1-107-072-11	30 p	silvered mica	C268	1-102-074-11	0.001	
C221	1-107-086-11	110 p	silvered mica	C272	1-107-078-11	51 p	silvered mica
C222	1-107-075-11	39 p	silvered mica	C273, 274	1-107-079-11	56 p	silvered mica
				C276	1-107-233-11	430 p	silvered mica
C223	1-121-651-11	10	16 V elect	C277	1-102-125-11	0.0047	
C224	1-107-078-11	51 p	silvered mica	C278	1-107-078-11	51 p	silvered mica
C225	1-161-013-11	0.01	(boundary layer)	C280	1-102-944-11	7 p	
C226	1-107-074-11	36 p	silvered mica	C281 - 290	1-101-924-11	0.022	
C227	1-161-013-11	0.01	(boundary layer)	C284	1-108-239-12	0.01	mylar
C228	1-107-067-11	18 p	silvered mica	C294	1-108-242-12	0.022	mylar
C229	1-107-081-11	68 p	silvered mica	C295	1-101-924-11	0.022	
C230	1-107-066-11	16 p	silvered mica	C296	1-107-079-11	56 p	silvered mica
C231	1-107-081-11	68 p	silvered mica	C297, 298	1-108-239-12	0.01	mylar
C232	1-107-067-11	18 p	silvered mica	C299	1-107-235-11	510 p	silvered mica
C233	1-107-071-11	27 p	silvered mica	C302	1-108-563-12	0.0022	mylar
C234	1-121-651-11	10	16 V elect	C303	1-101-924-11	0.022	
C235	1-161-013-11	0.01	(boundary layer)	C304	1-121-391-11	1	50 V elect
C236	1-102-507-11	9 p		C305, 306	1-108-244-12	0.033	mylar
C237	1-161-013-11	0.01	(boundary layer)	C307	1-102-942-11	5 p	
C238	1-102-511-11	13 p		C308	1-102-949-11	12 p	
C239	1-102-516-11	27 p		C309	1-102-679-11	120 p	
C240	1-102-510-11	12 p		C310	1-103-714-11	360 p	50 V polystyrol
C241	1-102-516-11	27 p		C312	1-102-964-11	36 p	
C242	1-102-511-11	13 p		C313, 314	1-102-947-11	10 p	
C243	1-102-501-11	1 p		C315	1-108-242-12	0.022	mylar
C244	1-121-651-11	10	16 V elect	C318	1-121-414-11	100	6.3 V elect
C245	1-161-013-11	0.01	(boundary layer)	C319	1-102-125-11	0.0047	
C246	1-102-505-11	6 p		C321	1-102-504-11	4 p	
C247	1-161-013-11	0.01	(boundary layer)	C322	1-102-751-11	22 p	
C248	1-102-864-11	5 p		C323	1-102-526-11	75 p	
C249	1-102-514-11	22 p		C324	1-101-999-11	10 p	
C250	1-102-504-11	4 p		C325	1-102-755-11	43 p	
C251	1-102-514-11 <sup>1</sup>	22 p		C326	1-102-743-11	3 p	
C252	1-102-864-11	5 p		C328	1-102-112-11	330 p	
C254	1-121-651-11	10	16 V elect	C329 - 335	1-102-125-11	0.0047	
C255	1-161-013-11	0.01	(boundary layer)	C337	1-102-505-11	6 p	
C264	1-107-077-11	47 p	silvered mica	C338	1-102-074-11	0.001	
C265	1-102-125-11	0.0047		C340	1-102-074-11	0.001	
C266	1-107-079-11	56 p	silvered mica				

<i>Ref. No.</i>	<i>Part No.</i>	<i>Description</i>		<i>Ref. No.</i>	<i>Part No.</i>	<i>Description</i>	
C341	1-121-413-11	100	6.3 V	elect	C411	1-161-021-11	0.47 (boundary layer)
C345	1-101-924-11	0.022			C412	1-127-019-11	0.1 10 V solid aluminum
C346	1-107-235-11	510p		silvered mica	C501	1-127-377-11	0.22 16 V solid aluminum
C350	1-107-071-11	27 p		silvered mica	C502	1-101-918-11	0.001
C351	1-101-924-11	0.022			C504	1-121-415-11	100 16 V elect
C353	1-108-242-12	0.022		mylar	C505	1-127-377-11	0.22 16 V solid aluminum
C356, 357	1-108-242-12	0.022		mylar	C506	1-127-018-11	0.0047 10 V solid aluminum
C358	1-101-924-11	0.022			C507	1-127-378-11	0.68 10 V solid aluminum
C359	1-121-651-11	10	16 V	elect	C509	1-127-378-11	0.68 10 V solid aluminum
C360, 361	1-101-924-11	0.022			C601	1-121-415-11	100 16 V elect
C362	1-102-832-11	330p			C602	1-127-377-11	0.22 16 V solid aluminum
C363	1-121-651-11	10	16 V	elect	C603	1-102-975-11	100p
C364	1-102-114-11	470p			C604	1-102-074-11	0.001
C365	1-127-022-11	0.47	16 V	solid aluminum	C605	1-121-479-11	22 16 V elect
C367	1-127-023-11	1	10 V	solid aluminum	C606	1-161-015-11	0.015 (boundary layer)
C368	1-107-102-11	5 p		silvered mica	C607	1-161-019-11	0.033 (boundary layer)
C371	1-108-239-12	0.01		mylar	C608, 609	1-121-521-11	330 16 V elect
C372	1-108-242-12	0.022		mylar	C610	1-127-203-11	0.33 16 V solid aluminum
C373	1-101-924-11	0.022			C611, 612	1-121-939-11	470 16 V elect
C374	1-107-085-11	100p		silvered mica	C613	1-102-123-11	0.0033
C377	1-123-070-11	2200	16 V	elect	C614	1-102-119-11	0.0015
C378	1-121-943-11	1000	10 V	elect	C701	1-123-078-11	2200 6.3 V elect
C380	1-108-234-12	0.0047		mylar	C702	1-121-944-11	1000 16 V elect
C383, 384	1-101-924-11	0.022			C704	1-108-232-12	0.0033 mylar
C385	1-102-934-11	1 p			C705	1-101-923-11	0.01
C386	1-102-935-11	2 p			C706	1-108-234-12	0.0047 mylar
C387	1-161-013-11	0.01		(boundary layer)	C707	1-107-093-11	220 p silvered mica
C390	1-127-023-11	1	10 V	solid aluminum	C708	1-121-944-11	1000 16 V elect
C401	1-127-018-11	0.047	10 V	solid aluminum	C709, 710	1-121-660-11	2200 16 V elect
C402	1-108-244-12	0.033		mylar	C711, 712	1-108-381-12	0.022 100 V mylar
C403	1-121-951-11	0.47	50 V	elect	C805	1-121-413-11	100 6.3 V elect
C404	1-127-019-11	0.1	10 V	solid aluminum	C810	1-101-924-11	0.022
C405	1-127-022-11	0.47	10 V	solid aluminum	C812	1-102-964-11	36 p
C406	1-127-020-11	0.22	10 V	solid aluminum	C813	1-101-924-11	0.022
C407	1-121-415-11	100	16 V	elect	C814	1-108-234-12	0.0047 mylar
C408	1-102-099-11	0.0015			C815	1-121-651-11	10 16 V elect
C409	1-108-244-12	0.033		mylar	C816	1-108-228-12	0.0015
C410	1-161-015-11	0.015		(boundary layer)			

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



<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>		<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>	
C817	1-127-022-11	0.47	16 V solid aluminum	C1033	1-102-503-11	3 p	
C819	1-102-962-11	30 p		C1034	1-102-505-11	6 p	
C823	1-102-940-11	3 p		C1035 - )	1-101-923-11	0.01	
C824	1-131-196-11	2.2	20 V tantalum	1037			
C825	1-102-940-11	3 p		C1038, 1039	1-101-924-11	0.022	
C829	1-127-019-11	0.1	16 V solid aluminum	C1040	1-102-864-11	5 p	
C832	1-101-924-11	0.022		C1041	1-102-951-11	15 p	
C835	1-121-982-11	470	6.3 V elect	C1042	1-102-504-11	4 p	
C836	1-121-426-11	470	16 V elect	C1043	1-102-948-11	11 p	
C901	1-102-648-11	43 p		C1044	1-102-943-11	6 p	
C902	1-102-672-11	24 p		C1045	1-102-949-11	12 p	
C904	1-107-068-11	20 p	silvered mica	C1046	1-102-503-11	3 p	
C905	1-107-089-11	150 p	silvered mica	C1047	1-161-013-11	0.01	(boundary layer)
C906	1-107-092-11	200 p	silvered mica	C1049	1-101-924-11	0.022	
C907	1-108-279-12	0.015	mylar	C1055	1-101-923-11	0.01	
C908	1-107-099-11	2 p	silvered mica	C1059	1-102-121-11	0.0022	
C909	1-107-098-11	1 p	silvered mica	C1060 - )	1-101-923-11	0.01	
C910	1-108-279-12	0.015	mylar	1065			
C911	1-107-071-11	27 p	silvered mica	C1066	1-102-977-11	200 p	
C912	1-107-085-11	100 p	silvered mica	C1067	1-102-973-11	100 p	
C913, 914	1-108-279-12	0.015	mylar	C1068	1-161-021-11	0.0047	(boundary layer)
C1002	1-102-953-11	18 p		C1069	1-107-070-11	24 p	silvered mica
C1004, 1005	1-107-087-11	120 p	silvered mica	C1070	1-102-409-11	30 p	
C1007 - )	1-107-097-11	330 p	silvered mica	C1071, 1072	1-102-121-11	0.0022	
1009				C1073	1-121-413-11	100	6.3 V elect
C1010 - )	1-107-087-11	120 p	silvered mica	C1074	1-121-352-11	47	10 V elect
1012				C1075, 1076	1-131-236-11	1	25 V tantalum
C1013	1-102-949-11	12 p		C1077	1-102-121-11	0.0022	
C1016, 1017	1-107-087-11	120 p	silvered mica	C1078	1-101-880-11	47 p	
C1018	1-102-949-11	12 p		C1079, 1080	1-107-093-11	220 p	silvered mica
C1021, 1022	1-107-087-11	120 p	silvered mica	C1081	1-102-963-11	33 p	
C1024	1-161-013-XX	0.01	(boundary layer)	C1082, 1083	1-103-714-11	360 p	polystyrol
C1025, 1026	1-101-923-11	0.01		C1084	1-102-963-11	33 p	
C1028	1-101-923-11	0.01		C1085, 1086	1-108-555-12	0.001	mylar
C1029	1-101-924-11	0.022		C1090 - )	1-102-043-11	0.001	500 V feed-through
C1030	1-102-506-11	7 p		1092			
C1031	1-102-503-11	3 p		C1094	1-121-391-11	1	50 V elect
C1032	1-102-512-11	16 p		C1095	1-101-880-11	47 p	

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>	
C1096, 1097	1-121-414-11	100	10 V elect
C1098	1-107-061-11	10 p	silvered mica
C1099	1-161-013-11	0.01	(boundary layer)
C1100, 1101	1-102-961-11	27 p	
C1102	1-102-977-11	200 p	
C1103	1-101-923-11	0.01	
C1104	1-101-924-11	0.022	
C1105	1-127-019-11	0.1	10 V solid aluminum
C1106	1-101-919-11	0.0022	
C1107	1-102-043-11	0.001	500 V feed-through
C1108	1-102-934-11	1 p	
C1201	1-121-424-11	470	6.3 V elect
C1203	1-131-193-11	10	10 V tantalum
C1207	1-131-392-11	33	3.15 V tantalum
C1210	1-101-890-11	75 p	
C1211, 1212	1-108-563-12	0.0022	mylar
C1213	1-127-019-11	0.1	10 V solid aluminum
C1301	1-121-651-11	10	16 V elect
C2001	1-121-963-11	33	25 V elect
C2021	1-121-352-11	47	10 V elect
C2022	1-121-726-11	0.47	50 V elect
C2031	1-108-575-12	0.0068	mylar
C2051	1-108-234-12	0.0047	mylar
C2052	1-108-227-12	0.001	mylar
C2110	1-131-387-11	47	6.3 V tantalum
C2101	1-131-169-11	0.47	10 V tantalum
C2102	1-131-202-11	1.5	20 V tantalum
C2103	1-131-380-11	33	10 V tantalum
C2104	1-105-669-12	0.0047	mylar
C2105	1-161-190-11	0.001	(boundary layer)
C2106	1-105-669-12	0.0047	mylar
C2108	1-107-123-11	47 p	silvered mica
C2109	1-131-170-11	3.3	10 V tantalum
C2111	1-131-173-11	33	10 V tantalum
C2112	1-131-202-11	1.5	20 V tantalum
C2113	1-161-190-11	0.001	(boundary layer)
C2114	1-131-380-11	33	10 V tantalum
C2115	1-131-387-11	47	6.3 V tantalum

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>	
C2116	1-131-375-11	4.7	10 V tantalum
C2117	1-121-419-11	220	6.3 V elect
C2118	1-131-368-11	3.3	16 V tantalum
C2119	1-131-177-11	100	3 V tantalum
C2120	1-131-244-11	1	6.3 V tantalum
C2121	1-105-673-12	0.01	mylar
C2122	1-105-719-12	0.033	mylar
C2123	1-105-669-12	0.0047	mylar
C2124	1-131-375-11	4.7	10 V tantalum
C2125	1-131-170-11	3.3	10 V tantalum
C2126	1-121-420-11	220	10 V elect
C2127	1-131-395-11	100	3 V tantalum
C2128	1-131-377-11	33	10 V tantalum
C2129	1-161-190-11	0.001	(boundary layer)
C2132	1-161-190-11	0.001	(boundary layer)
C2133	1-131-368-11	3.3	16 V tantalum
C2134	1-108-249-12	0.068	mylar
	1-161-001-11	0.001	(boundary layer)

CT1001 - 1003	1-141-171-11	Trimmer
CT201 - 206	1-141-171-XX	Trimmer
CT207	1-141-138-XX	Trimmer
CT208	1-141-174-00	Trimmer
CT209 - 212	1-141-138-XX	Trimmer

CT901	1-141-175-00	Trimmer
CV001 - 004	1-151-223-XX	Tuning
CV051 - 054	1-151-223-11	Tuning
CV101	1-151-266-XX	Tuning
CV201 - 203	1-151-201-00	Tuning

**RESISTORS**

All resistors are in ohms. Common ¼ W carbon resistors are omitted. Check schematic diagram for values.

R210, 214	1-212-879-11	82	fusible
R218, 222			
R226			
R235, 239	1-212-881-11	100	fusible
R244, 321			

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

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
R363	1-212-857-11	10 fusible
R501	1-206-475-11	33 2W metal-oxide
R511	1-244-837-11	33 1/2 W carbon
R610	1-212-869-11	33 1/2 W fusible
R618, 619	1-207-459-11	0.47 1/2 W wirewound
R620	1-212-857-11	10 fusible
R714	1-202-723-11	2.2M 1/2 W composition
R836	1-212-869-11	33 fusible
R1267	1-212-941-11	2 1/2 W fusible
R2005	1-212-857-11	10 fusible
R2101, 2102	1-209-878-11	1.8 k 1/16 W carbon
R2103	1-209-781-11	10 1/16 W carbon
R2108	1-210-381-11	33 1/16 W carbon
R2112	1-209-768-11	2.2 k 1/16 W carbon
R2113	1-210-113-11	18 k 1/16 W carbon
R2114	1-210-371-11	1.6 k 1/16 W carbon
R2115	1-210-363-11	270 1/16 W carbon
R2116	1-210-381-11	33 k 1/16 W carbon
R2119	1-210-363-11	270 1/16 W carbon
R2121	1-209-768-11	2.2 k 1/16 W carbon
R2122	1-209-113-11	18 k 1/16 W carbon
R2123	1-209-774-11	5.1 k 1/16 W carbon
R2124	1-209-770-11	2.7 k 1/16 W carbon
R2125	1-210-388-11	68 k 1/16 W carbon
R2126	1-210-392-11	75 1/16 W carbon
R2127	1-210-101-11	51 1/16 W carbon
R2128	1-210-846-11	33 1/16 W carbon
R2129	1-209-770-11	2.7 k 1/16 W carbon
R2130	1-209-774-11	5.1 k 1/16 W carbon
R2131	1-210-111-11	12 k 1/16 W carbon
R2132	1-209-781-11	10 k 1/16 W carbon
R2135, 2136	1-210-371-11	1.6 k 1/16 W carbon
R2137	1-210-102-11	150 1/16 W carbon
R2142		1.2 k 1/16 W carbon
R2144	1-210-105-11	560 1/16 W carbon
VR201	1-224-642-XX	1 k, adjustable; first mixer balance
VR202	1-224-644-XX	4.7 k, adjustable; blank level
VR501 503	1-224-207-00	20 k, variable; TREBLE, BASS, VOLUME

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
VR1001	1-224-649-XX	200 k, adjustable; SW spurious beat
VR1401	1-224-820-00	20 k, variable; RF GAIN
<b>SWITCHES</b>		
S1	1-514-304-00	Slide, antenna selector
S2	1-516-893-00	Micro, SW antenna coil select
S3 - 6	1-516-896-00	Pushbutton, 4-key; BAND SEJECTOR
S8 - 12	1-516-895-00	Pushbutton, 5-key; MODE
S14 - 16	1-516-898-00	Rotary, NOISE BLANKER, AFC, MUTING
S17	1-516-624-00	Slide, TIMER ON
S18 - 20	1-514-533-XX	Micro, BATT CHECK, LIGHT, ZERO SECOND
S21, 22	1-514-864-XX	Micro, POWER
S23	1-516-267-00	Voltage Select
S26	1-516-965-00	Rotary, SW BAND SELECTOR
S27 - 29	1-516-892-00	Rotary, SW BAND SELECTOR
S001	1-552-053-00	Pushbutton, 2-key, FM
S2001	1-516-873-00	Slide, ISS
S2002	1-516-624-00	Slide, MEMO REC
S2003	1-516-898-XX	Rotary, FUNCTION
S2101	1-513-323-00	Slide, REC/PB
S2102	1-514-346-00	Leaf, POWER
S2103	1-552-052-00	Leaf, MUTING
<b>JACKS</b>		
J501 - 505	1-507-369-00	Jack, 5-unit; earphone, AUX IN
J1401	1-507-440-00	Jack, HEADPHONES
<b>FUSES</b>		
F1	1-532-400-XX	315 mA
F2	1-532-448-XX	400 mA
<b>MISCELLANEOUS</b>		
ANT1	1-501-104-00	SW Telescopic Antenna
ANT2	1-501-103-00	FM Telescopic Antenna

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

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
CF801 - 803	1-527-184-XX	Filter, ceramic (10.7 MHz)
CNJ1	1-509-511-00	Connector, 2-p, AC IN; including S24
CNJ38	1-507-302-00	Connector, 10 p
CNP5	1-508-743-00	Connector Pin
CNP6 - 8	1-508-795-00	Connector Pin, 12 p
CNP9, 10	1-508-699-00	Connector Pin, 8 p
CNP16	1-508-694-00	Connector Pin, 8 p
CNP28	1-508-698-00	Connector, 6 p
CR801	1-231-202-00	Encapsulated Component
EH	8-825-566-00	Head, erase; EBF-5-02B
M	8-834-221-00	Motor, D-221F
ME	1-520-249-00	Meter, TUNING/BATT
MIC	8-814-191-10	Microphone, C-1002J
PL1	1-518-138-XX	Lamp, pilot; 5 V 60 mA; meter, timer
PL2, 3	1-518-189-XX	Lamp, pilot; 5 V 60 mA; meter, timer
PL4 - 5	1-518-138-XX	Lamp, pilot; 5 V 60 mA; meter, timer
PT701	1-442-863-00	Transformer, power
RPH	8-829-336-07	Head, record/playback; PP134-36G
SP	1-502-592-00	Speaker
X201	1-527-270-00	Crystal
X202	1-527-271-00	Crystal
X1002	1-527-269-00	Crystal

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
	1-407-856-00	Choke Coil, power
	1-423-230-00	Transformer, output
	1-526-522-00	Jack, coaxial connector
	1-533-102-00	Holder, fuse
	1-536-174-00	Terminal Strip, MW/LW/SW antenna
	1-536-203-00	Terminal Strip, FM antenna
	1-536-401-XX	Terminal Strip, 2L1
	1-548-082-00	QUARTZ TIMER

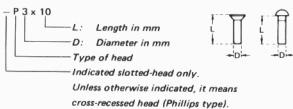
**ACCESSORIES & PACKING MATERIALS**

<u>Part No.</u>	<u>Description</u>
1-504-059-00	Earphone, EM-20H
1-534-867-00	Cord, power; DK-35 (US model)
1-551-002-XX	Cord, power; (Canadian model)
3-701-632-00	Bag, plastic
3-793-956-31	Card, warranty (Canadian model)
3-880-697-00	Bag, plastic
3-882-401-00	Cushion, protection
3-882-410-00	Carton
3-993-063-14	Book, SHORT WAVE GUIDE
3-995-735-21	Manual, instruction
3-995-763-21	Manual, instruction

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

## HARDWARE NOMENCLATURE

Screw:



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 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		brazer-head screw	

Reference Designation	Shape	Description	Remarks
<b>SELF-TAPPING SCREWS</b>			
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
<b>SET SCREWS</b>			
SC		set screw	
SC		hexagon-socket set screw	ex: SC 2.6 x 4, hexagon socket
<b>NUT</b>			
N		nut	
<b>WASHERS</b>			
W		flat washer	
SW		spring washer	
LW		internal-tooth lock washer	ex: LW3, internal
LW		external-tooth lock washer	ex: LW3, external
<b>RETAINING RINGS</b>			
E		retaining ring	
G		grip-type retaining ring	



# **K4XL's** **BAMA**

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