ICF-M33RDS

SERVICE MANUAL

AEP Model
UK Model

Ver 1.0 1999. 01

SPECIFICATIONS

Time display:
24-hour system

Frequency range:

Band	Frequency range	Channel step
FM	87.5 - 108 MHz	0.05*MHz(fixed)
AM	531 - 1,602 kHz	9 kHz(fixed)
LW	153 - 279 kHz	9 kHz(fixed)

* The frequency readout in the display is rounded to the nearest 0.1 MHz. (Example: The frequency of 88.05 MHz appears as "88.0" MHz.)

Indication of AM : French model
Indication of LW : AEP, UK models

Power output: 90 mW (at 10% harmonic distortion)
Output: (earphone) jack (minijack)
Power requirements:
3 V DC, two R6 (size AA) batteries
DC IN 3 V jack accepts: Sony AC-E30HG AC power adaptor (not supplied)
Dimensions: Approx. 165 x 82 x 36.7 mm (w/h/d) (Approx. 6½ ×3¼ × 1½ inches) not incl. projecting parts and controls
Mass: Approx. 400 g (14.3 oz) incl. batteries

Design and specifications are subject to change without notice.

FM/AM (LW) RDS RADIO

MICROFILM

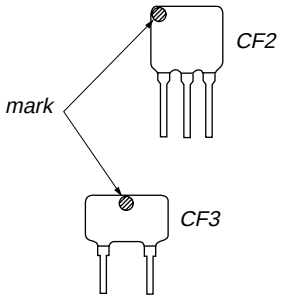
SONY®

TABLE OF CONTENTS

SERVICING NOTES

HOW TO CHANGED THE CERAMIC FILTERS

This model is used two ceramic filters of CF2 and CF3.
You must used same type of color marked ceramic filters in order to meet same specifications.
Therefore, the ceramic filter must changed two pieces together since it's supply two pieces in one package as a spare parts.

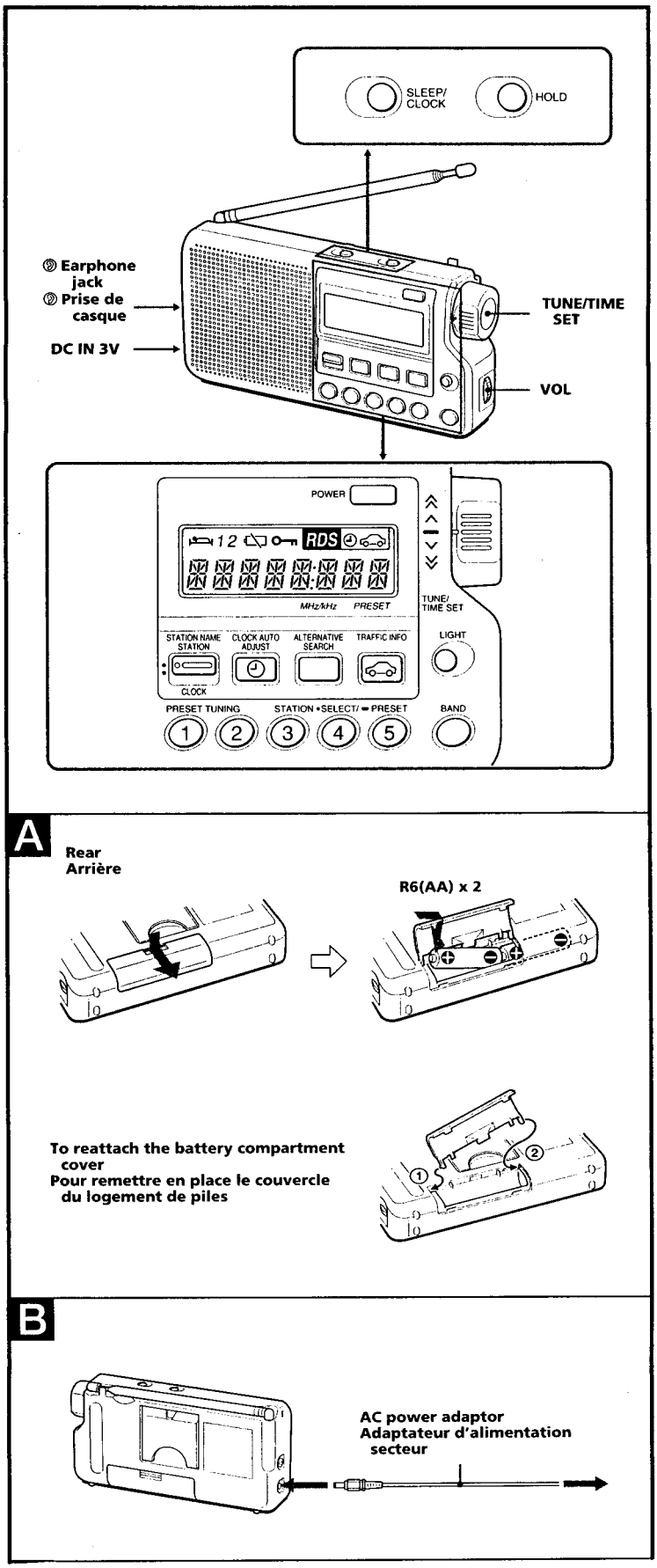


Mark	Center frequency
red	10.70 MHz
blue	10.67 MHz
orange	10.73 MHz
black	10.64 MHz
white	10.76 MHz

Notes on chip component replacement

- Never reuse a disconnected chip component.
- Notice that the minus side of a tantalum capacitor may be damaged by heat.

This section is extracted from instruction manual.



Features

What is RDS ?

The Radio Data System (RDS) is a digital information system developed for radio by the European Broadcasting Union (EBU), and was introduced in 1987. Using the 57 kHz sub-carrier for FM broadcasting, RDS enables you to receive a variety of information, such as station names and traffic information.
The availability of RDS data depends on your location. Hence, there may be areas where you cannot benefit from some of the following features:

RDS Features

SONY RDS	SONY Features
Conventional RDS Function	
CLOCK AUTO ADJUSTMENT	• Automatic current-time synchronization. • Auto-adjustment for daylight-saving time.
CT (Clock Time) - Automatic current-time synchronization.	
STATION NAME DISPLAY	• For checking the name of the tuned-in station. • For locating a station when its frequency is not known.
PS (Programme Service) - Displays station names in up to 8 letters.	
TRAFFIC INFORMATION	• Search and standby modes for receiving traffic information. • Automatic switch from regular radio broadcast to traffic information provided by the EON network. Regular broadcast resumes after the interception.
TA (Traffic Announcement) via EON (Enhanced Other Networks) - Automatic selection and switch to traffic information.	
ALTERNATIVE SEARCH	• Automatic search and switch to a frequency with a relatively stronger signal for a station broadcasting on multiple frequencies.
AF (Alternative Frequencies) - Automatic selection of a relatively stronger signal.	

Other Features

- Quartz-controlled PLL (Phase Locked Loop) synthesizer system using a microcomputer for easy pinpoint tuning.
- Preset function for up to 10 stations in FM and 5 stations in AM/LW.
- Jog tuning and digital radio frequency display for quick and precise tuning.

Choosing the Power Source

Installing the Batteries

(See Fig. A)

1 Open the lid at the rear of the radio.
2 Install two R6 (size AA) batteries (not supplied) with correct polarity.
3 Close the lid.

Battery Life using Sony R6 (AA) batteries

Band	(Approx. hours)
FM	20
AM/LW	35

Knowing When to Replace the Batteries

- When the batteries are weak, the sound becomes weak and distorted. When the batteries are completely exhausted, the radio is inoperative and "☜" appears in the display. Replace the batteries with new ones.
- Once "☜" comes on in the display, it remains even after new batteries are installed. To remove "☜" from the display, press **POWER**.
- Before replacing the batteries, make sure the radio is turned off. Replace the batteries within one minute. Otherwise, the clock setting and preset stations could be erased. In this case, set the clock and preset the stations again.

Note

- When the unit is not being used for an extended period, remove the batteries to avoid damage from battery leakage and corrosion.

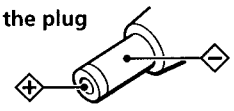
Using House Current (See Fig. B)

Connect the AC power adaptor AC-E30HG (not supplied) to the DC IN 3 V jack, and plug it into a wall outlet.

Notes on the AC power adaptor

- When the AC power adaptor is not used, be sure to unplug it both from the DC IN 3 V jack and from the wall outlet.
- Use only the AC adaptor AC-E30HG (not supplied). Do not use any other AC power adaptor.

Polarity of the plug

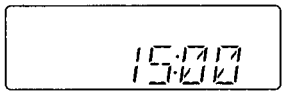


Setting the Clock

When batteries are first installed in the unit, "0:00" flashes in the display.
To set the clock, the radio should be turned off.

1 Press **SLEEP/CLOCK** to stop "0:00" flashing in the display.
2 While holding down **SLEEP/CLOCK**, turn **TUNE/TIME SET** to set the clock to the current time.
When you turn **TUNE/TIME SET** to ^ or v, the time readout in the display increases or decreases, respectively, in one-second steps. Turning it to ^^ or vv causes the readout to rapidly increase or decrease, respectively.
When you release **SLEEP/CLOCK**, the clock starts operating and ":" begins to flash.

- To check the current time while listening to the radio, switch **STATION NAME** to **CLOCK**. The current time appears in the display.



- You can also set the current time through automatic synchronization with RDS data using the CT function. (See "Setting the Clock with the CT Function".)

Operating the Radio

Manual Tuning

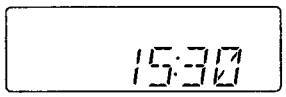
1 Press **POWER**.
2 Adjust **VOL** (volume).
3 Press **BAND** to select the band.
Repeated pressing of **BAND** changes the band in the following order:

FM1* ⟶ FM2* ⟶ AM/LW

* Both FM1 and FM2 refer to the same FM waveband and are differentiated solely to enable more than one station to be assigned to a preset button. (See "Preset Tuning".)

4 Turn **TUNE/TIME SET** upward or downward until you locate the frequency of your desired station.
When you turn **TUNE/TIME SET** to ^ or v, the frequency readout in the display increases or decreases, respectively. Turning it to ^^ or vv causes the readout to rapidly increase or decrease, respectively.

- To turn off the radio, press **POWER**. The display shows the current time even when the radio is turned off.



- To improve radio reception
  FM: Extend the telescopic antenna.
  AM/LW: Rotate the unit horizontally for optimum reception. A ferrite bar antenna is built in the unit.
- When you tune in to an FM station, the display may change from the frequency readout to the name of the station. This happens particularly for FM stations that carry RDS data in their frequencies. (See "Displaying the Station Name".)

Changing the Display Mode

You can change the display mode by setting the **STATION NAME** switch to either **CLOCK** or **STATION**.

STATION NAME switch set to **CLOCK**:

- When you turn on the power, the display shows the tuned-in frequency for a few seconds, and then switches to the current time while the radio is on. To check the radio frequency or station name, switch **STATION NAME** to **STATION**.
- You can tune in to a station by turning **TUNE/TIME SET** to the desired frequency. The display shows the frequency for a few seconds before reverting to the current time.
- When the unit is receiving RDS traffic information (see "Receiving Traffic Information"), the display shows the name of the broadcasting station for a few seconds before reverting to the current time.

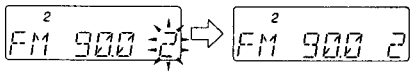
Preset Tuning

You can preset up to 10 stations in FM (5 stations in FM1, 5 stations in FM2), and 5 stations in AM /LW.

Presetting a Station

Example: To preset a station on the FM 90 MHz frequency onto preset button 2 of FM2.

1 Press **POWER**.
2 Press **BAND** to select FM2.
3 Tune in to the FM 90 MHz frequency.
Press and hold down the desired preset button. (2, in this case.)
"2", the preset button number, flashes in the display. A beep sounds, and "2" stops flashing and remains in the display to indicate the presetting is successful.



- To preset other stations, repeat the above steps.
- To replace the station assigned to a preset button, follow the above steps and, in step 3, press the preset button you wish to reset.

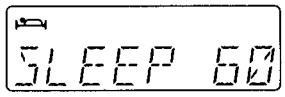
Tuning in to a Preset Station

1 Press **POWER**.
2 Press **BAND** to select the band.
3 Press the desired preset button.
4 Adjust **VOL** (volume).

Setting the Sleep Timer

By using the sleep timer function, you can fall asleep to the sound of the radio. The function, when activated, turns the radio off after 60 minutes.

1 Press **POWER**.
2 Press **BAND** to select the band.
3 Tune in to the desired station.
4 Adjust **VOL** (volume).
5 Press **SLEEP/CLOCK**.
A beep sounds, and "SLEEP 60" and "🛏" appear in the display to indicate the setting is successful.



- When you release **SLEEP/CLOCK**, the previous display comes on again.
- To turn off the sleep timer before the end of the timer duration, press **POWER**.
- When you press **SLEEP/CLOCK** while the timer has been activated, the elapsed time will be erased and the timer duration will begin from the start.

Using the RDS Function

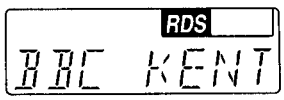
In this radio, the following functions are available for receiving RDS data:

Displaying the Station Name

You can set the unit to display the name of the tuned-in station.

1 Press **BAND** to select the FM band. (You can select either FM1 or FM2.)
2 Tune in to the desired station.

When the radio is receiving RDS data, "RDS" and the name of the station transmitting the data appear in the display. If no RDS data is received, "RDS" automatically goes off.



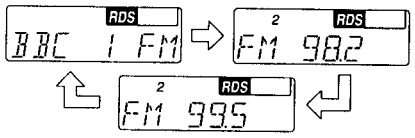
Notes

- RDS data can only be received on the FM band.
- The RDS function of this radio will not be activated if the tuned-in FM station does not transmit RDS data.
The function may also not work properly in areas where RDS transmissions are in an experimental stage.

Locating Better Reception

Some broadcasters, such as the BBC, broadcast on several frequencies. The **ALTERNATIVE SEARCH** function enables the unit, through AF (List of Alternative Frequencies) data, to locate another frequency with a stronger signal, and to automatically switch to that frequency.

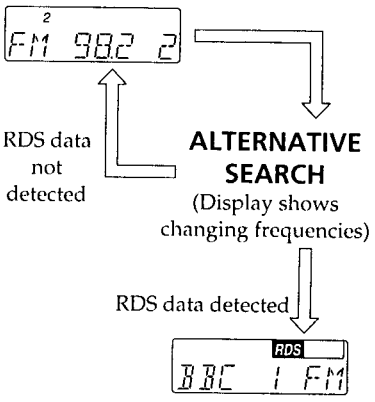
1 Press and hold down **ALTERNATIVE SEARCH** until the unit locates a better reception.



If no alternative frequency is found, "NO AF" appears in the display.

Note

- When a station that transmits RDS data is preset, its AF data is recorded in the memory of the unit. Hence, when the preset station is tuned in and no RDS data is received, the **ALTERNATIVE SEARCH** function automatically scans for RDS data among the other frequencies of the station through the AF data. The display of the unit will show the rapidly changing frequencies during the search. If a frequency with RDS data is detected, the unit switches to that frequency. If RDS data is not detected, the unit reverts to the frequency initially tuned in.

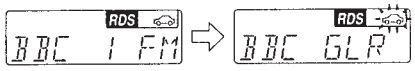


Receiving Traffic Information

The **TRAFFIC INFO** function searches and places the unit on a standby mode to receive traffic information facilitated by the EON* network, through detecting the TP (Traffic Program) and TA (Traffic Announcement) signals in the RDS data.
When traffic information is received, the unit automatically switches from the regular radio broadcast of the tuned-in station to the incoming traffic message. After the message, the unit switches back to the regular radio broadcast.

1 Press **BAND** to select the FM band. (You can select either FM 1 or FM 2). If the station selected transmits RDS data, "RDS " lights up.
2 Press **TRAFFIC INFO** for " 🚗 " to light up along with "RDS". The unit is now on standby to receive traffic information.

- When traffic information is received, " 🚗 " starts to flash, and the unit switches over to the traffic information.



- To stop the reception of traffic information and to return to your tuned-in station, press **TRAFFIC INFO**.

Notes

- If the tuned-in station is not a traffic information station nor a station in an EON network, a beep sounds.
- Switching the band from FM to AM while " 🚗 " is lit in the display causes " 🚗 " to disappear. " 🚗 " does not come back on when the band is switched back to FM or if the unit is turned off and then on again.
- When **POWER** is turned off, traffic information will not be received.

*Enhanced Other Networks–EON

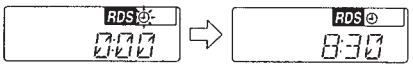
An EON network consists of a group of stations whereby a listener, who is tuned in to a participating station using a RDS compatible radio, can automatically receive RDS data transmitted by other stations in the network.

This unit is equipped to receive RDS traffic information provided by EON networks.

Setting the Clock Using the CT Function

The CT function of the RDS enables the built-in clock of the unit to automatically synchronize with CT data being transmitted.

1 Switch **STATION NAME** to **CLOCK** when "RDS" is lit in the display. The current time appears in the display.
2 Press **CLOCK AUTO ADJUST**. This activates the CT function and " 🕘 " starts to flash in the display. When the current time is synchronized, " 🕘 " stops flashing and remains in the display.



To cancel the function, press **CLOCK AUTO ADJUST**. " 🕘 "disappears in the display.

Notes

- If the unit does not receive CT data after 2 minutes, "NO CT" appears in the display. The function is then automatically cancelled.
- The current time on your unit, set through this mode, will be as accurate as that of the CT data received.
- The CT function may not work in some areas or on certain frequencies. In such a case, " 🕘 " does not come on in the display.

Using Other Functions

LIGHT Function

To view the display in the dark:

1 Press **LIGHT**. The light on the unit comes on for 10 seconds.

When you operate your unit while the light is on, the light stays on for longer than 10 seconds.

HOLD Function

To prevent accidental operation of the unit:

1 Press **HOLD**. "🔑" appears in the display to indicate all the function buttons are locked and inoperative.

To cancel the function, press **HOLD** again. "🔑" disappears in the display.

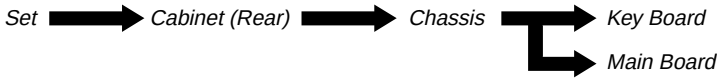
Precautions

- Do not open the unit. Refer servicing to qualified personnel only.
- Operate the unit using only the power sources given in "Specifications".
- For AC operation, use the AC power adaptor recommended for this unit; do not use any other type.
- Avoid exposure to temperature extremes, direct sunlight, moisture, sand, dust, or mechanical shock. Never leave the unit in a car parked in the sun.
- The name plate indicating operating voltage, etc., is located at the rear.
- Should any solid object or liquid fall into the unit, disconnect the AC power adaptor or remove the batteries, and have the unit checked by qualified personnel before operating it any further.
- Since a strong magnet is used for the speaker, keep personal credit cards using magnetic coding or spring-wound watches away from the unit to prevent possible damage from the magnet.
- When the casing becomes soiled, clean it with a soft cloth dampened with mild detergent solution. Never use abrasive cleansers or chemical solvents, as they may mar the casing.
- In vehicles or buildings, radio reception may be difficult or noisy. Try listening near a window.

If you have any questions or problem concerning your unit, please consult the nearest Sony dealer.

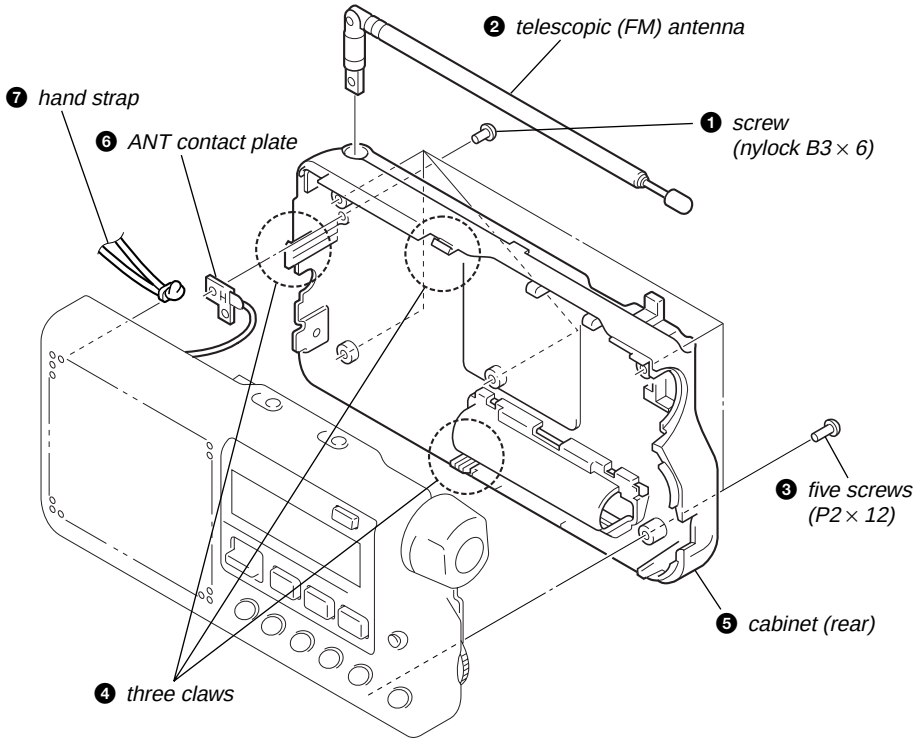
SECTION 2
DISASSEMBLY

• This set can be disassembled in the order shown below.

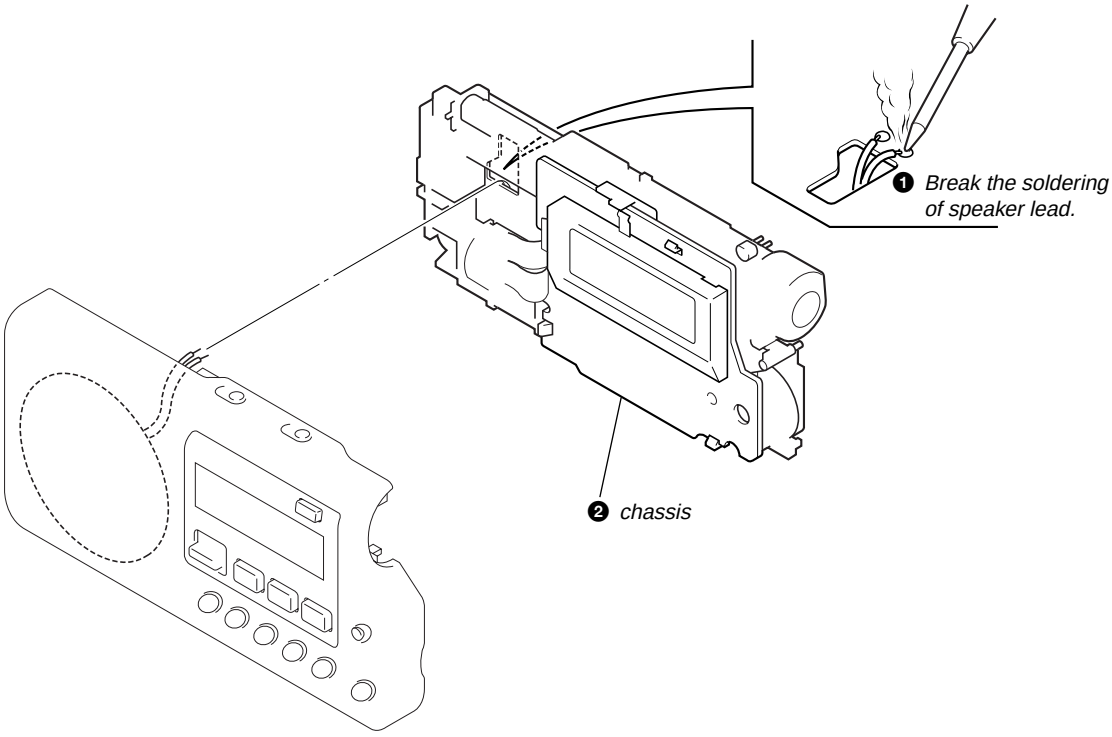


Note: Follow the disassembly procedure in the numerical order given.

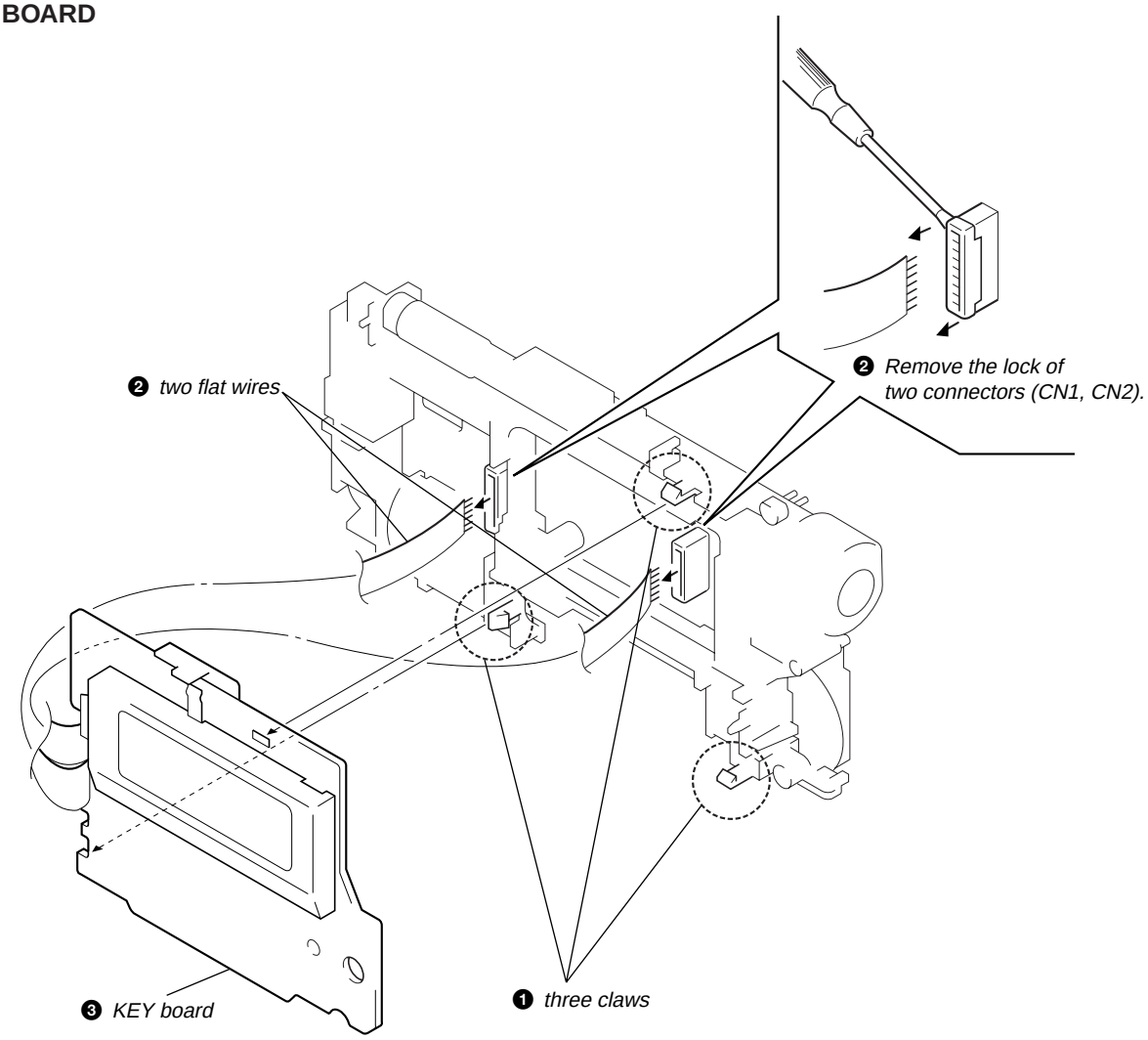
CABINET (REAR)



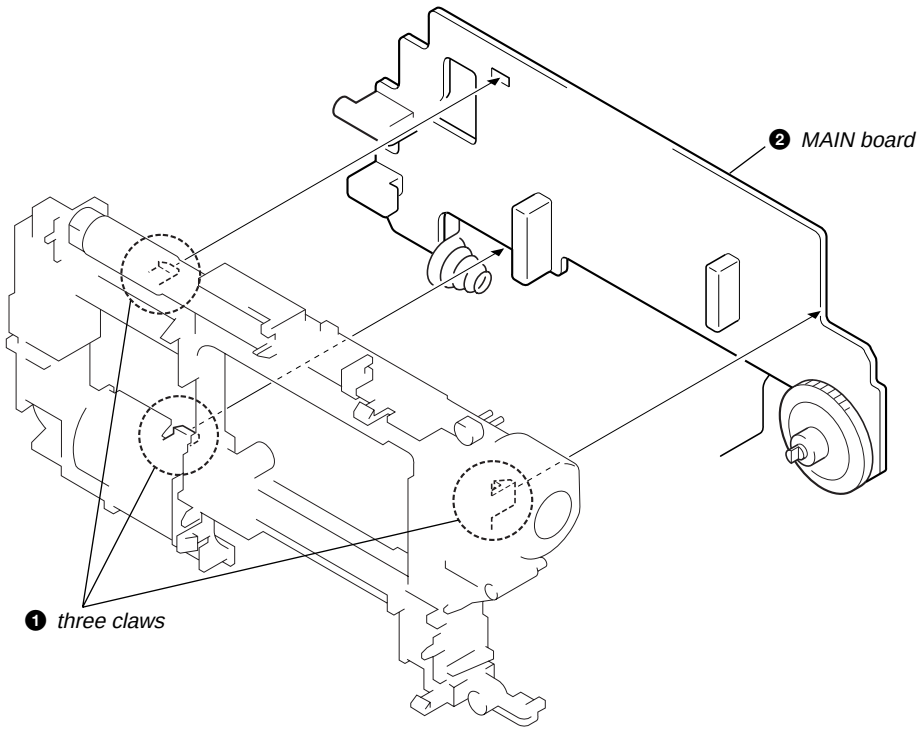
CHASSIS



KEY BOARD



MAIN BOARD



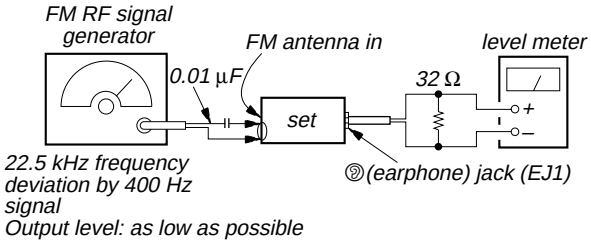
SECTION 3
ELECTRICAL ADJUSTMENTS

0 dB = 1µV

[FM]

Setting:

Band switch: FM

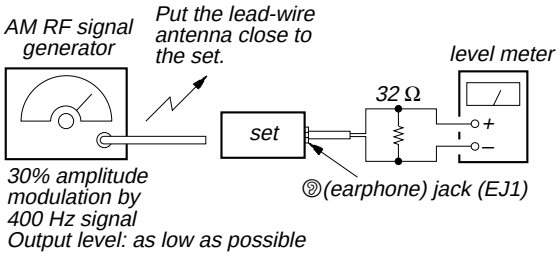


[AM (LW)*]

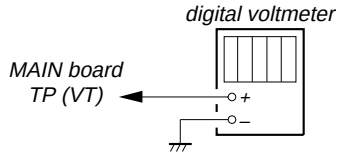
* AM : French model
  LW : AEP, UK models

Setting:

Band switch: AM (LW)



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



Adjustment Location: Main Board (See page 10)

FM VCO VOLTAGE ADJUSTMENT		
Adjustment Part	Frequency Display	Reading On Digital voltmeter
L 4	87.5 MHz	2.5 V ± 0.1 V
confirmation	108.0 MHz	Less than 10.7 V

FM TRACKING ADJUSTMENT	
Adjust for a maximum reading on level meter.	
L3	87.5 MHz
CT2	108 MHz

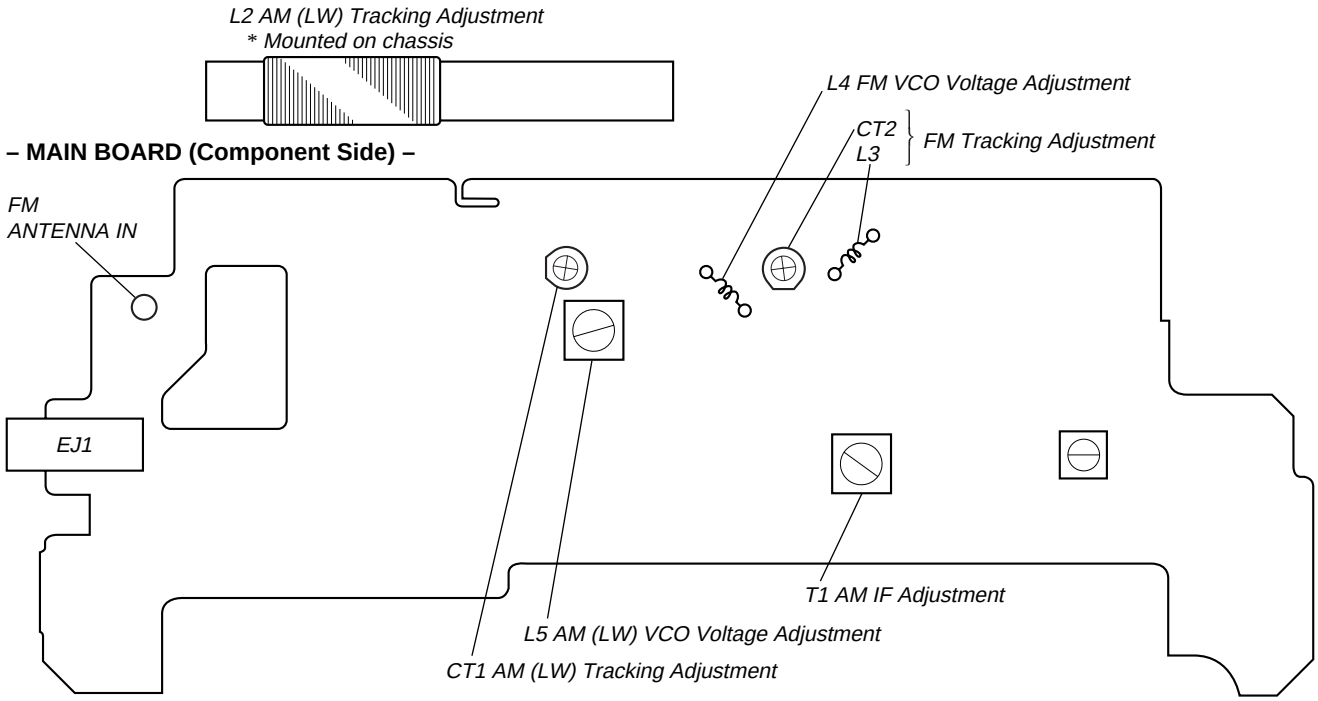
AM (LW) VCO VOLTAGE ADJUSTMENT		
Adjustment Part	Frequency Display	Reading On Digital voltmeter
L 5	531 kHz (153 kHz)	2.7 V ± 0.1 V (3.3 V ± 0.1V)
confirmation	1,602 kHz (279 kHz)	Less than 9.5 V (7.5 V)

AM (LW) TRACKING ADJUSTMENT	
Adjust for a maximum reading on level meter.	
L2	621 kHz (162 kHz)
CT1	1,404 kHz (243 kHz)

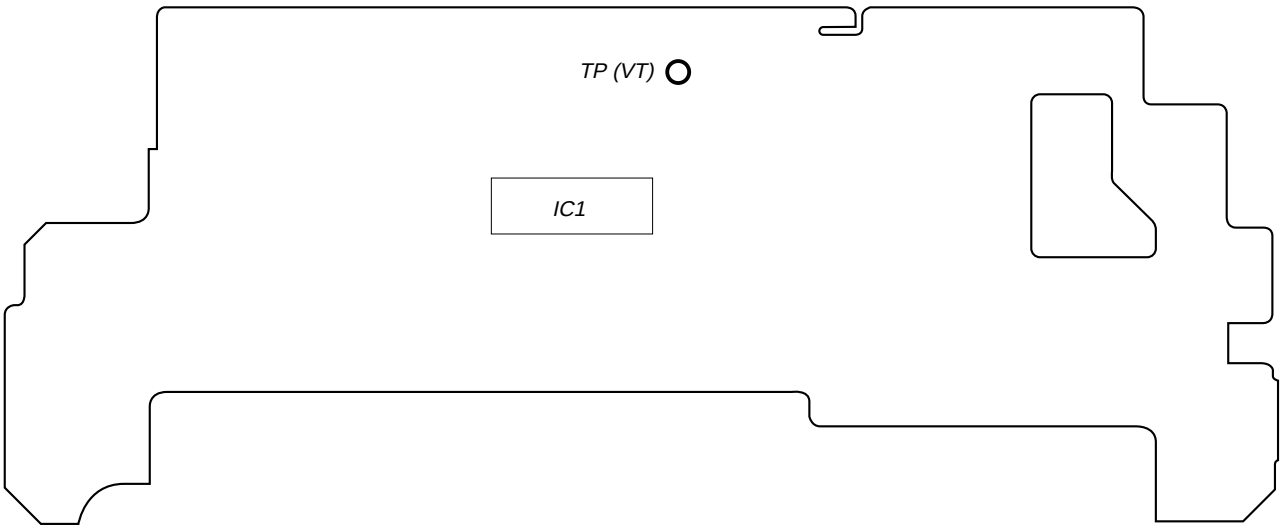
AM IF ADJUSTMENT	
Adjust for a maximum reading on level meter.	
T1	450 kHz

( ): AEP, UK models

Adjustment Location:

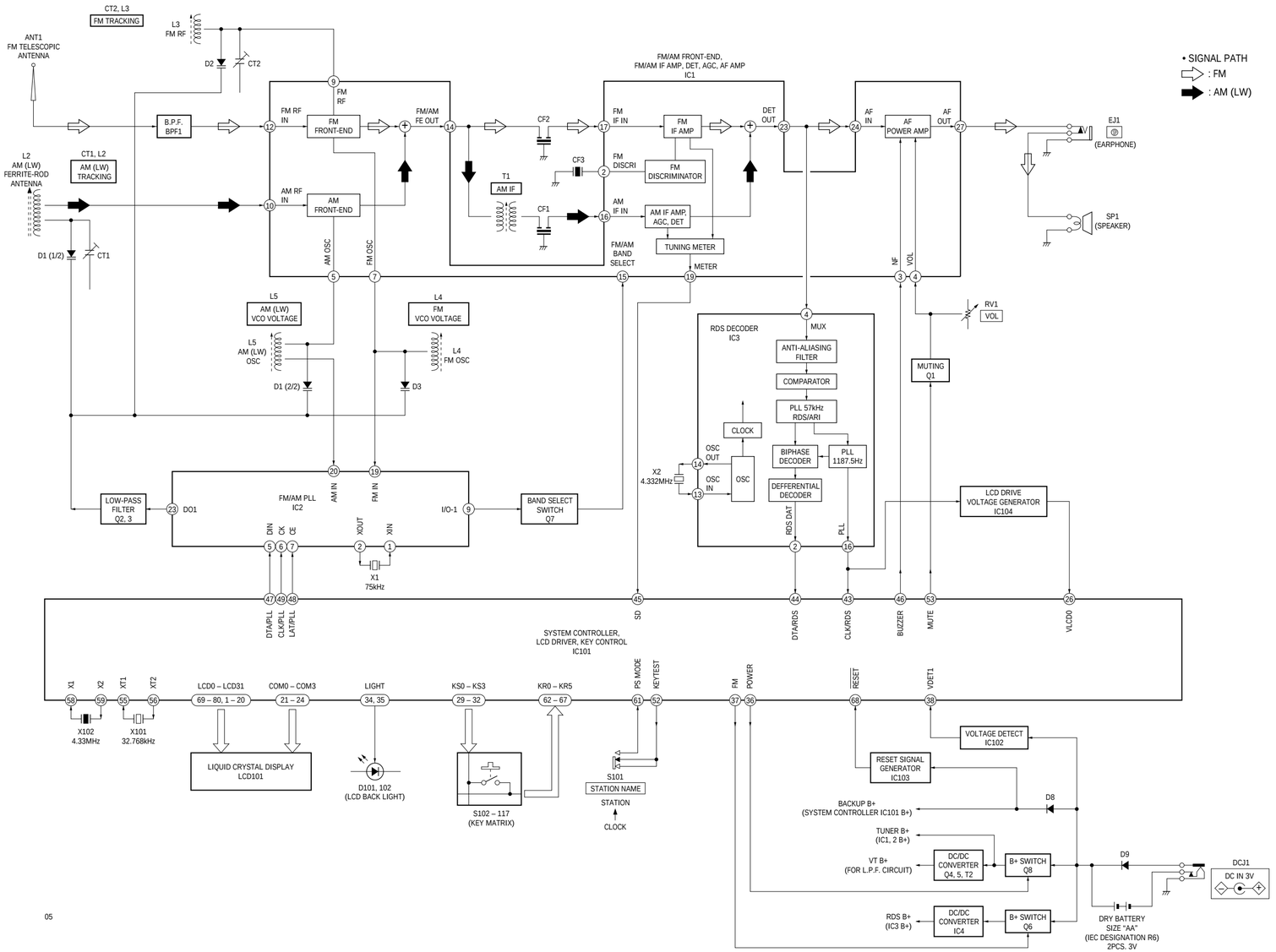


– MAIN BOARD (Conductor Side) –



SECTION 4
DIAGRAMS

4-1. BLOCK DIAGRAM



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4-2. NOTE FOR PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS

Note on Printed Wiring Board:

- ○——— : parts extracted from the component side.
- ——— : parts extracted from the conductor side.
- ⬚← : indicates side identified with part number.
- ● : Through hole.
- △ : internal component.
- ▒▒▒ : Pattern from the side which enables seeing.

(The other layers' patterns are not indicated.)

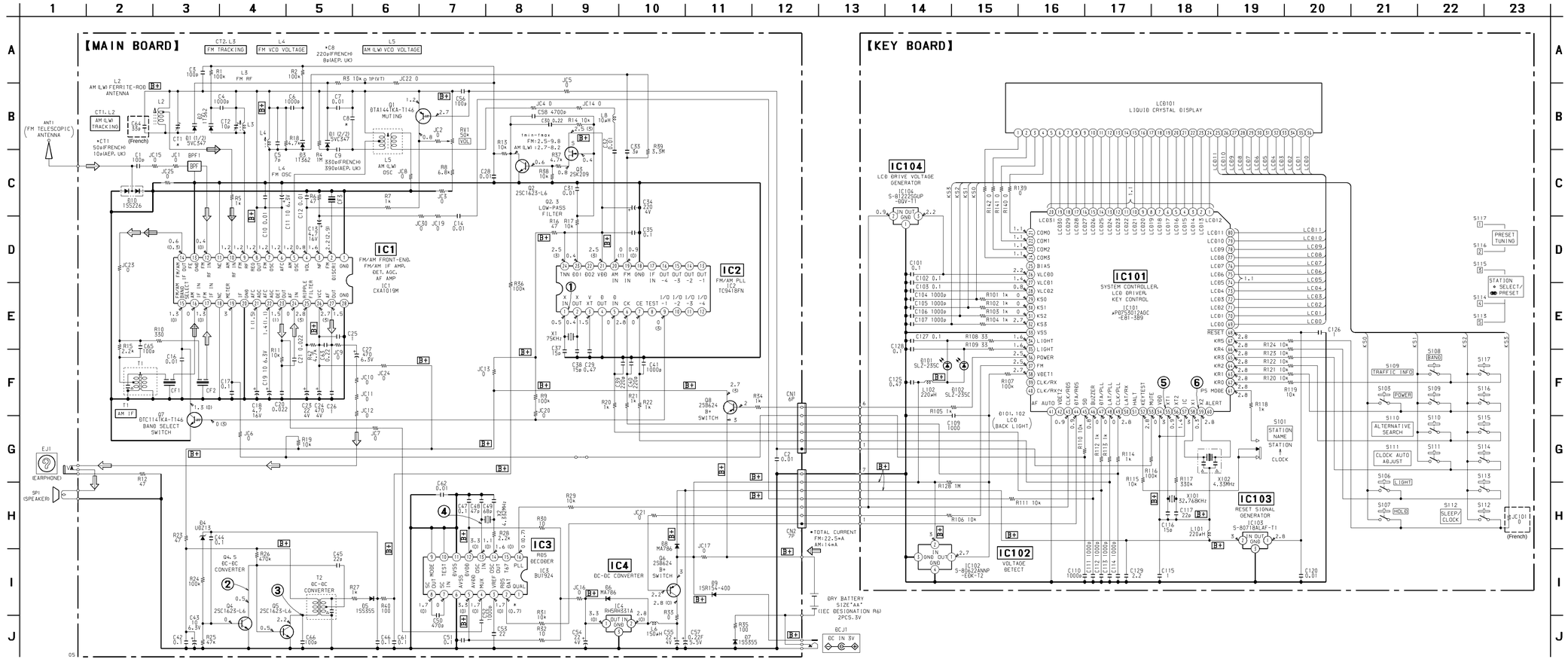
Caution:

Pattern face side: (Conductor Side)	Parts on the pattern face side seen from the pattern face are indicated.
Parts face side: (Component Side)	Parts on the parts face side seen from the parts face are indicated.

Note on Schematic Diagram:

- All capacitors are in µF unless otherwise noted. pF: µµF
  50 WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in Ω and 1/4 W or less unless otherwise specified.
- △ : internal component.
- ▭ : panel designation.
- B+ : B+ Line.
- ▬ : adjustment for repair.
- Power voltage is dc 3 V and fed with regulated dc power supply from battery terminal.
- Voltages and waveforms are dc with respect to ground under no-signal (detuned) conditions.
  no mark : FM
  ( ) : AM (LW)
  ✻ : Impossible to measure
- Voltages are taken with a VOM (Input impedance 10 MΩ). Voltage variations may be noted due to normal production tolerances.
- Waveforms are taken with a oscilloscope.
  Voltage variations may be noted due to normal production tolerances.
- Circled numbers refer to waveforms.
- Signal path.
  ⇨ : FM
  ➡ : AM (LW)

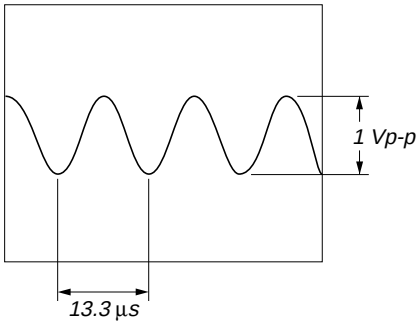
4-5. SCHEMATIC DIAGRAM • See page 25 for Waveforms. • See page 26 for IC Block Diagrams.



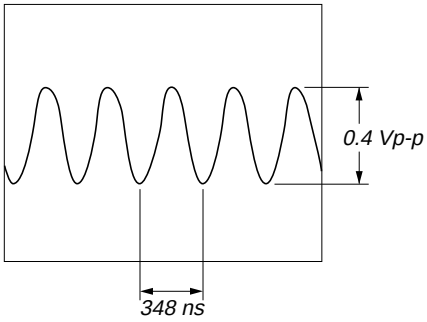
• **Waveforms**

– MAIN Board –

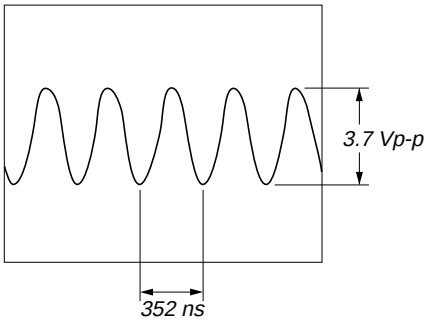
❶ IC2 ① (X IN)
400 mV/DIV, 5 µs/DIV



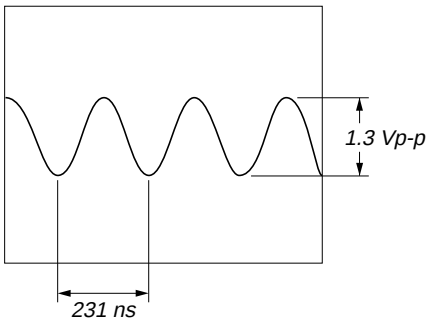
❷ Q4 (COLLECTOR)
100 mV/DIV, 200 ns/DIV



❸ Q5 (COLLECTOR)
1 V/DIV, 200 ns/DIV

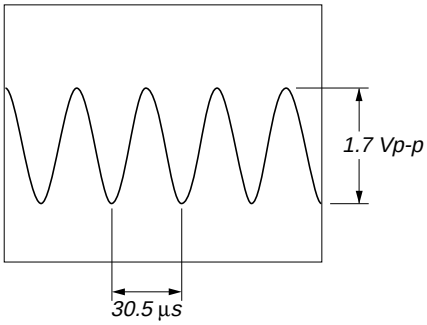


❹ IC3 ⑬ (OSC IN)
400 mV/DIV, 100 ns/DIV

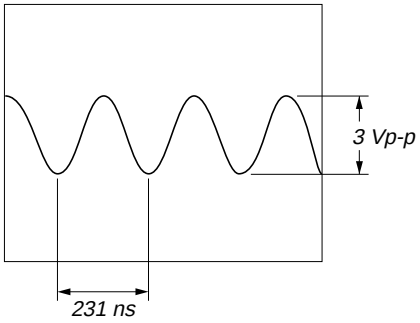


– KEY Board –

❺ IC101 ㊺ (XT1)
500 mV/DIV, 20 µs/DIV

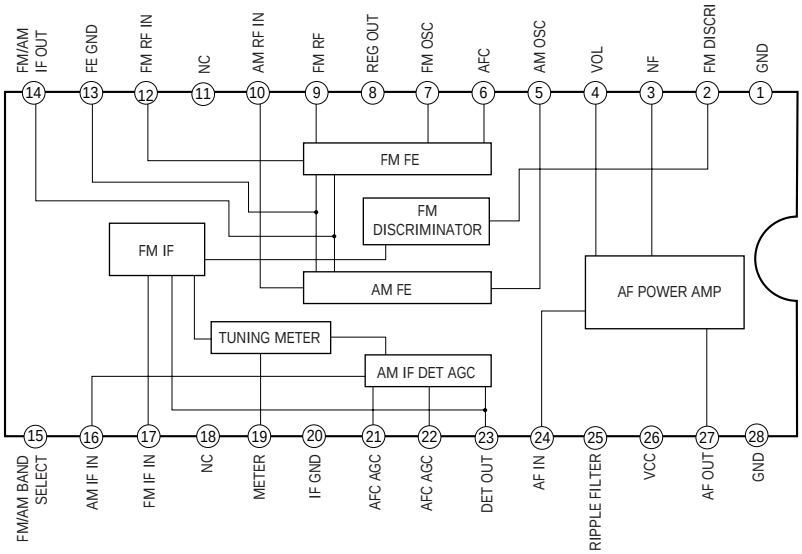


❻ IC101 ㊾ (X2)
1 V/DIV, 100 ns/DIV

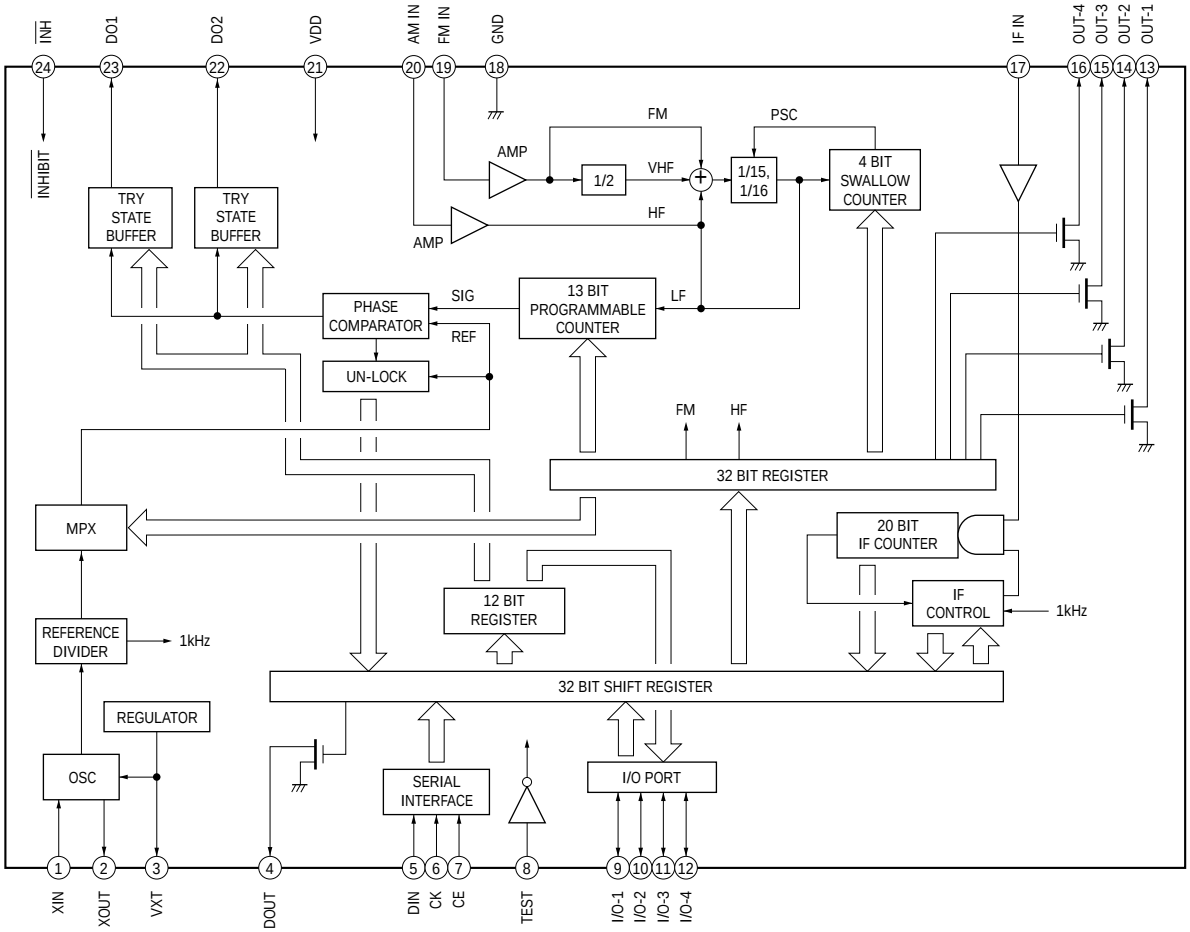


• IC Block Diagrams
– MAIN Board –

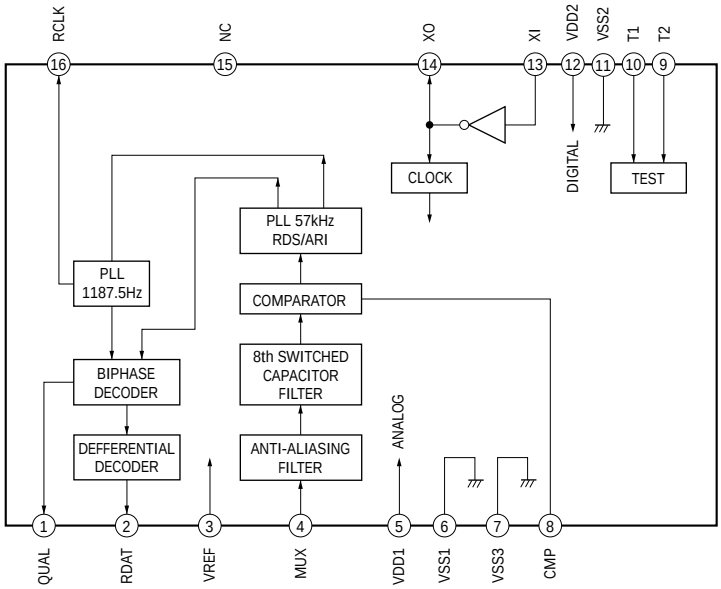
IC1 CXA1019M-T6



IC2 TC9418FN-EL



IC3 BU1924F


RCLK
NC
XO
XI
VDD2
VSS2
T1
T2
16
15
14
13
12
11
10
9
CLOCK
DIGITAL
TEST
PLL 57kHz RDS/ARI
PLL 1187.5Hz
COMPARATOR
BIPHASE DECODER
8th SWITCHED CAPACITOR FILTER
DEFFERENTIAL DECODER
ANTI-ALIASING FILTER
ANALOG
1
2
3
4
5
6
7
8
QUAL
RDAT
VREF
MUX
VDD1
VSS1
VSS3
CMP

4-6. IC PIN FUNCTION DESCRIPTION

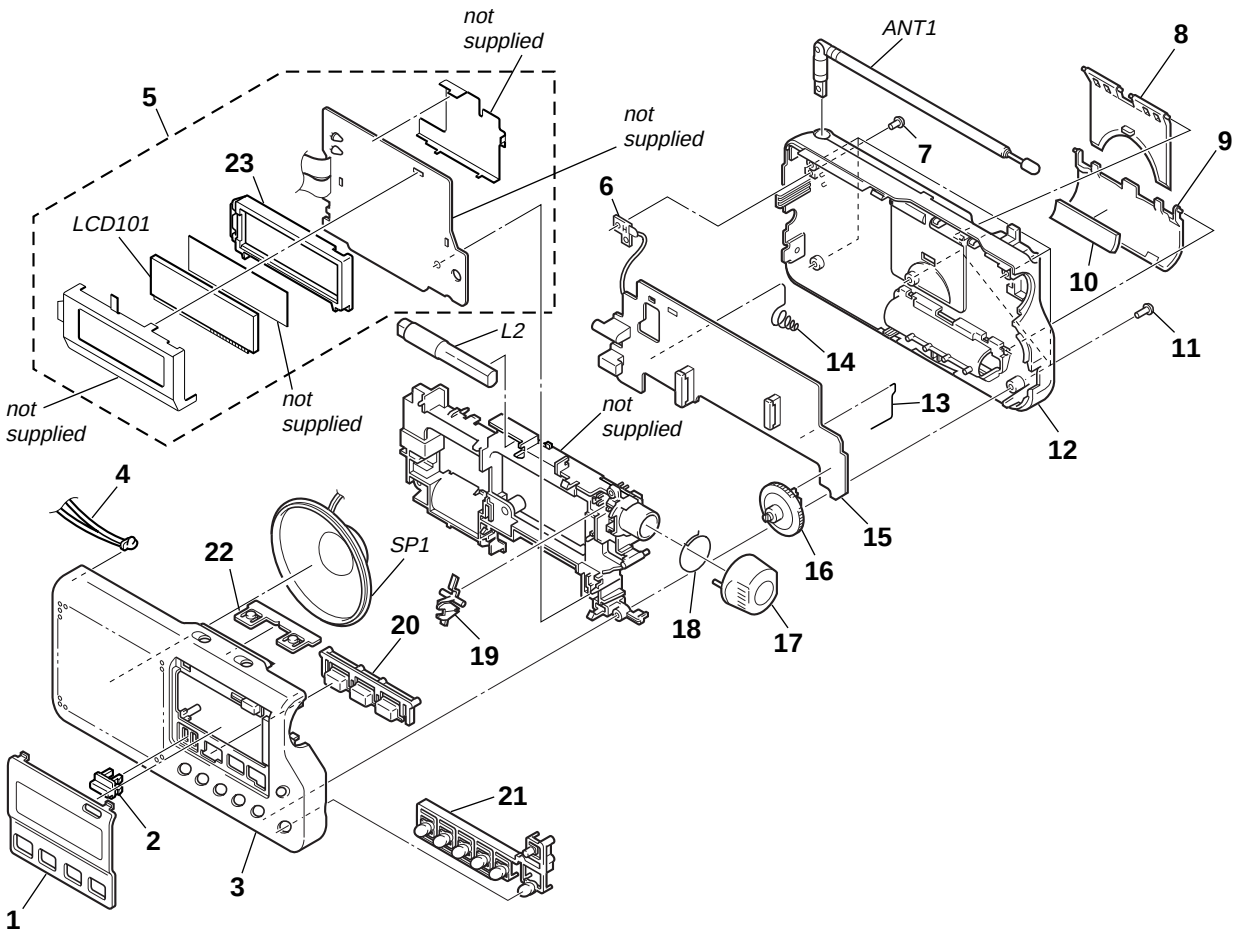
• KEY BOARD IC101 μPD753012AGC-E81-3B9 (SYSTEM CONTROLLER, LCD DRIVER, KEY CONTROL)

Pin No.	Pin Name	I/O	Description
1 to 20	LCD12 to LCD31	O	Segment drive signal output to the liquid crystal display (LCD101)
21 to 24	COM0 to COM3	O	Common drive signal output to the liquid crystal display (LCD101)
25	BIAS	O	Liquid crystal display drive bias control output terminal Not used (open)
26	VLCD0	I	Develop liquid crystal display drive voltage input terminal
27, 28	VLCD1, VLCD2	I	Terminal for doubler circuit capacitor connection to develop liquid crystal display drive voltage
29 to 32	KS0 to KS3	O	Key scan signal output of the key matrix (S102 to S117)
33	VSS	—	Ground terminal
34, 35	LIGHT	O	Liquid crystal display back light LED drive signal output terminal "L": back light on
36	POWER	O	PLL low-pass filter power supply on/off control signal output terminal "L": power on
37	FM	O	RDS decode circuit power supply on/off control signal output terminal "L": power on
38	VDET1	I	Battery voltage detect signal input terminal "L" is input at low voltage
39	CLK/RX	O	Clock signal output for the receive level control Not used (open)
40	DTA/RX	O	Data output for the receive level control Not used (open)
41	AF AUTO	I	AF mode selection signal input terminal "L": manual mode, "H": auto mode Fixed at "L" in this set
42	TEST	I	Test mode input terminal "L": test mode Not used (open)
43	CLK/RDS	I	Serial data transfer clock signal input from the RDS decoder (IC3)
44	DTA/RDS	I	Serial data input from the RDS decoder (IC3)
45	SD	I	Station detector detect input from the CXA1019M (IC1) Stop level for SEEK, BTM, etc. is determined SD is present at input of "L"
46	BUZZER	O	Beep sound drive signal output to the CXA1019M (IC1)
47	DTA/PLL	O	Serial data output to the FM/AM PLL (IC2)
48	LAT/PLL	O	Serial data latch pulse signal output to the FM/AM PLL (IC2)
49	CLK/PLL	O	Serial data transfer clock signal output to the FM/AM PLL (IC2)
50	LAT/RX	O	Latch signal output for the receive level control Not used (open)
51	HALT	O	"H" is output at halt mode Not used (open)
52	KEYTEST	O	"L" is output at test mode
53	MUTE	O	Muting on/off control signal output terminal "L": muting on
54	VDD	—	Power supply terminal (+3V)
55	XT1	I	Main system clock input terminal (4.332 MHz)
56	XT2	O	Main system clock output terminal (4.332 MHz)
57	IC	—	Connected to power supply (+3V)
58	X1	I	Sub system clock input terminal (32.768 kHz)
59	X2	O	Sub system clock output terminal (32.768 kHz)
60	SFT CLK	O	Alert signal output for the shift clock circuit "L": on, "H": off Not used (open)
61	PS MODE	I	Station name switch (S101) input terminal "L": station, "H": clock
62 to 67	KR0 to KR5	I	Key return signal input of the key matrix (S102 to S117)
68	$\overline{\text{RESET}}$	I	System reset signal input from the reset signal generator (IC103) "L": reset "L" is input for several 100 msec after power on, then it changes to "H"
69 to 80	LCD0 to LCD11	O	Segment drive signal output to the liquid crystal display (LCD101)

SECTION 5
EXPLODED VIEW

NOTE:

- -XX and -X mean standardized parts, so they may have some difference from the original one.
- Color Indication of Appearance Parts
  Example:
  KNOB, BALANCE (WHITE) . . . (RED)
  ↑ ↑
  Parts Color Cabinet's Color
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The mechanical parts with no reference number in the exploded views are not supplied.
- Accessories and packing materials are given in the last of the electrical parts list.



Ref. No.	Part No.	Description	Remark
1	3-027-772-01	PANEL, FRONT	
2	3-027-774-01	KNOB (RDS)	
3	3-027-770-01	CABINET (FRONT)(AEP, UK)	
3	3-027-770-11	CABINET (FRONT)(French)	
4	3-923-688-01	STRAP, HAND	
* 5	A-3683-020-A	KEY PC BOARD ASSY (French)	
* 5	A-3683-021-A	KEY PC BOARD ASSY (AEP, UK)	
6	3-027-790-01	PLATE, ANT CONTACT	
7	3-370-475-01	SCREW (NYLOCK +B 3X6)	
8	3-380-918-21	STAND	
9	3-027-784-01	LID, BATTERY CASE	
10	3-028-720-01	CUSHION (BATTERY CASELID)	
11	7-685-107-19	SCREW +P 2X12 TYPE2 NON-SLIT	
12	3-027-771-01	CABINET (REAR)	
13	3-027-788-01	TERMINAL (+), BATTERY	
14	3-027-789-01	TERMINAL (-), BATTERY	
* 15	A-3663-149-A	MAIN BOARD, COMPLETE (French)	

Ref. No.	Part No.	Description	Remark
* 15	A-3663-154-A	MAIN BOARD, COMPLETE (AEP, UK)	
16	3-027-778-01	KNOB (VOL)	
17	3-027-777-01	KNOB (JOG)	
18	3-027-787-01	SPRING, RING	
19	3-027-780-01	ARM (JOG)	
20	3-027-773-01	BUTTON (RDS)	
21	3-027-775-01	BUTTON (PRESET)	
22	3-027-776-01	BUTTON (HOLD)	
23	3-027-781-01	PLATE, LIGHT GUIDE	
ANT1	1-501-362-11	ANTENNA, TELESCOPIC (FM)	
L2	1-754-030-11	ANTENNA, FERRITE-ROD (LW)(AEP, UK)	
L2	1-754-031-11	ANTENNA, FERRITE-ROD (AM)(French)	
LCD101	1-803-331-11	DISPLAY PANEL, LIQUID CRYSTAL	
SP1	1-504-748-21	SPEAKER (6.6CM)	

MAIN

SECTION 6
ELECTRICAL PARTS LIST

NOTE:
- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- -XX and -X mean standardized parts, so they may have some difference from the original one.
- RESISTORS
  All resistors are in ohms.
  METAL: Metal-film resistor.
  METAL OXIDE: Metal oxide-film resistor.
  F: nonflammable
- Items marked "*" are not stocked since they are seldom required for routine service.
  Some delay should be anticipated when ordering these items.
- SEMICONDUCTORS
  In each case, u: µ, for example:
  uA. . : µA. . uPA. . : µPA. .
  uPB. . : µPB. . uPC. . : µPC. .
  uPD. . : µPD. .
- CAPACITORS
  uF: µF
- COILS
  uH: µH

When indicating parts by reference number, please include the board.

Ref. No.	Part No.	Description			Remark
*	A-3663-149-A	MAIN BOARD, COMPLETE (French)			
*	A-3663-154-A	MAIN BOARD, COMPLETE (AEP, UK)			
		**********			
		< BAND PASS FILTER >			
BPF1	1-236-711-21	FILTER, BAND PASS			
		< CAPACITOR >			
C1	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C2	1-163-021-91	CERAMIC CHIP	0.01uF	10%	50V
C3	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C4	1-163-141-00	CERAMIC CHIP	0.001uF	5%	50V
C5	1-163-224-11	CERAMIC CHIP	7PF	0.25PF	50V
C6	1-163-141-00	CERAMIC CHIP	0.001uF	5%	50V
C7	1-163-021-91	CERAMIC CHIP	0.01uF	10%	50V
C8	1-163-125-00	CERAMIC CHIP	220PF	5%	50V
					(French)
C8	1-163-091-00	CERAMIC CHIP	8PF (AEP, UK)		
C9	1-163-129-00	CERAMIC CHIP	330PF	5%	50V
					(French)
C9	1-163-131-00	CERAMIC CHIP	390PF	5%	50V
					(AEP, UK)
C10	1-163-059-91	CERAMIC CHIP	0.01uF	10%	50V
C11	1-126-157-11	ELECT	10uF	20%	16V
C12	1-163-021-11	CERAMIC CHIP	0.01uF	10%	50V
C13	1-124-259-11	ELECT	4.7uF	20%	16V
C14	1-163-021-11	CERAMIC CHIP	0.01uF	10%	50V
C16	1-163-021-11	CERAMIC CHIP	0.01uF	10%	50V
C17	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C18	1-124-259-11	ELECT	4.7uF	20%	16V
C19	1-126-157-11	ELECT	10uF	20%	16V
C20	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C21	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C23	1-124-430-00	ELECT	22uF	20%	4V
C24	1-126-518-11	ELECT	470uF	20%	4V
C25	1-164-346-11	CERAMIC CHIP	1uF		16V
C26	1-164-346-11	CERAMIC CHIP	1uF		16V
C27	1-126-935-11	ELECT	470uF	20%	6.3V
C28	1-163-021-11	CERAMIC CHIP	0.01uF	10%	50V
C29	1-164-005-11	CERAMIC CHIP	0.47uF		25V
C30	1-164-489-11	CERAMIC CHIP	0.22uF	10%	16V
C31	1-163-021-11	CERAMIC CHIP	0.01uF	10%	50V
C32	1-163-021-11	CERAMIC CHIP	0.01uF	10%	50V
C33	1-163-220-11	CERAMIC CHIP	3PF	0.25PF	50V
C34	1-124-434-00	ELECT	220uF	20%	4V
C35	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C37	1-163-231-11	CERAMIC CHIP	15PF	5%	50V
C38	1-163-231-11	CERAMIC CHIP	15PF	5%	50V
C39	1-163-125-00	CERAMIC CHIP	220PF	5%	50V
C40	1-163-125-00	CERAMIC CHIP	220PF	5%	50V
C41	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C42	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C43	1-126-157-11	ELECT	10uF	20%	16V
C44	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C45	1-163-235-11	CERAMIC CHIP	22PF	5%	50V
C46	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C47	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C48	1-163-243-11	CERAMIC CHIP	47PF	5%	50V
C49	1-163-113-00	CERAMIC CHIP	68PF	5%	50V
C50	1-163-133-00	CERAMIC CHIP	470PF	5%	50V
C51	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C52	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C53	1-164-505-11	CERAMIC CHIP	2.2uF		16V
C54	1-104-847-11	TANTAL. CHIP	22uF	20%	4V
C55	1-124-430-00	ELECT	22uF	20%	4V
C56	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C57	1-104-905-11	CAPACITOR	0.22F		5.5V
C58	1-163-017-00	CERAMIC CHIP	0.0047uF	5%	50V
C61	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C62	1-163-021-11	CERAMIC CHIP	0.01uF	10%	50V
C63	1-164-489-11	CERAMIC CHIP	0.22uF	10%	16V
C64	1-163-239-11	CERAMIC CHIP	33PF	5%	50V
					(French)
C65	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C66	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
		< FILTER >			
CF1	1-578-677-21	FILTER, CRYSTAL (French)			
* CF1	1-577-319-11	FILTER, CERAMIC (AEP, UK)			
CF2	1-579-632-41	FILTER, CERAMIC			
CF3	1-579-632-41	FILTER, CERAMIC			
		< CONNECTOR >			
* CN1	1-568-272-11	SOCKET, CONNECTOR 6P			
* CN2	1-568-273-11	SOCKET, CONNECTOR 7P			

Ref. No.	Part No.	Description	Remark
		< TRIMMER >	
CT1	1-141-444-11	CAP, CERAMIC TRIMMER 50PF (French)	
CT1	1-141-304-21	CAP, TRIMMER 10PF (AEP, UK)	
CT2	1-141-304-21	CAP, TRIMMER 10PF	
		< DIODE >	
D1	8-719-072-59	DIODE SVC347S-TL	
D2	8-713-100-11	DIODE 1T362-04-T8B	
D3	8-713-100-11	DIODE 1T362-04-T8B	
D4	8-719-977-40	DIODE UDZ-TE-17-13B	
D5	8-719-988-61	DIODE 1SS355TE-17	
D6	8-719-026-23	DIODE MA786-TX	
D7	8-719-988-61	DIODE 1SS355TE-17	
D8	8-719-026-23	DIODE MA786-TX	
D9	8-719-053-18	DIODE 1SR154-400TE-25	
D10	8-719-800-76	DIODE 1SS226-TE85L	
		< JACK >	
DCJ1	1-764-799-11	JACK, EXTERNAL POWER (DC IN 3V)	
EJ1	1-563-836-21	JACK (ⓖ)	
		< IC >	
IC1	8-752-050-16	IC CXA1019M-T6	
IC2	8-759-362-24	IC TC9418FN-EL	
IC3	8-759-560-51	IC BU1924F	
IC4	8-759-434-03	IC RH5RH331A-T1	
		< SHORT >	
JC1	1-216-296-00	SHORT 0	
JC2	1-216-295-00	SHORT 0	
JC3	1-216-296-00	SHORT 0	
JC4	1-216-296-00	SHORT 0	
JC5	1-216-296-00	SHORT 0	
JC6	1-216-295-00	SHORT 0	
JC7	1-216-296-00	SHORT 0	
JC8	1-216-295-00	SHORT 0	
JC9	1-216-296-00	SHORT 0	
JC10	1-216-296-00	SHORT 0	
JC11	1-216-296-00	SHORT 0	
JC12	1-216-296-00	SHORT 0	
JC13	1-216-295-00	SHORT 0	
JC14	1-216-296-00	SHORT 0	
JC15	1-216-296-00	SHORT 0	
JC16	1-216-296-00	SHORT 0	
JC17	1-216-296-00	SHORT 0	
JC19	1-216-296-00	SHORT 0	
JC20	1-216-296-00	SHORT 0	
JC21	1-216-295-00	SHORT 0	
JC22	1-216-296-00	SHORT 0	
JC23	1-216-295-00	SHORT 0	
JC24	1-216-295-00	SHORT 0	
JC30	1-216-295-00	SHORT 0	
		< COIL >	
L2	1-754-030-11	ANTENNA, FERRITE-ROD (LW) (AEP, UK)	
L2	1-754-031-11	ANTENNA, FERRITE-ROD (AM) (French)	
L3	1-406-545-11	COIL, AIR-CORE	
L4	1-406-546-11	COIL, AIR-CORE	
L5	1-415-930-11	COIL(OSC) (French)	
L5	1-406-485-11	COIL(OSC) (AEP, UK)	
L6	1-414-405-11	INDUCTOR 150uH	
L8	1-412-006-31	INDUCTOR CHIP 10uH	
		< TRANSISTOR >	
Q1	8-729-027-39	TRANSISTOR DTA144TKA-T146	
Q2	8-729-120-28	TRANSISTOR 2SC1623-T1L6	
Q3	8-729-220-93	FET 2SK209G-TE85L	
Q4	8-729-120-28	TRANSISTOR 2SC1623-T1L6	
Q5	8-729-120-28	TRANSISTOR 2SC1623-T1L6	
Q6	8-729-141-48	TRANSISTOR 2SB624-T1BV4	
Q7	8-729-027-44	TRANSISTOR DTC114TKA-T146	
Q8	8-729-141-48	TRANSISTOR 2SB624-T1BV4	
		< RESISTOR >	
R1	1-216-097-00	RES,CHIP 100K 5% 1/10W	
R2	1-216-097-00	RES,CHIP 100K 5% 1/10W	
R3	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R4	1-216-121-00	RES,CHIP 1M 5% 1/10W	
R5	1-216-049-11	RES,CHIP 1K 5% 1/10W	
R6	1-216-017-00	RES,CHIP 47 5% 1/10W	
R7	1-216-198-00	RES,CHIP 1K 5% 1/8W	
R8	1-216-069-00	METAL CHIP 6.8K 5% 1/10W	
R9	1-216-097-00	RES,CHIP 100K 5% 1/10W	
R10	1-216-037-00	METAL CHIP 330 5% 1/10W	
R11	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R12	1-216-017-00	RES,CHIP 47 5% 1/10W	
R13	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R14	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R15	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	
R16	1-216-017-00	RES,CHIP 47 5% 1/10W	
R17	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R18	1-216-065-00	RES,CHIP 4.7K 5% 1/10W	
R19	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R20	1-216-049-91	RES,CHIP 1K 5% 1/10W	
R21	1-216-049-11	RES,CHIP 1K 5% 1/10W	
R22	1-216-198-00	RES,CHIP 1K 5% 1/8W	
R23	1-216-043-91	RES,CHIP 560 5% 1/10W	
R24	1-216-097-00	RES,CHIP 100K 5% 1/10W	
R25	1-216-089-00	RES,CHIP 47K 5% 1/10W	
R26	1-216-113-00	METAL CHIP 470K 5% 1/10W	
R27	1-216-049-11	RES,CHIP 1K 5% 1/10W	
R28	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	
R29	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R30	1-216-001-00	METAL CHIP 10 5% 1/10W	
R31	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R32	1-216-001-00	METAL CHIP 10 5% 1/10W	
R33	1-216-295-00	SHORT 0	
R34	1-216-049-11	RES,CHIP 1K 5% 1/10W	
R35	1-216-025-00	RES,CHIP 100 5% 1/10W	
R36	1-216-097-00	RES,CHIP 100K 5% 1/10W	
R37	1-216-065-00	RES,CHIP 4.7K 5% 1/10W	
R38	1-216-073-00	METAL CHIP 10K 5% 1/10W	
R39	1-216-133-00	METAL CHIP 3.3M 5% 1/10W	
R40	1-216-025-00	RES,CHIP 100 5% 1/10W	
R42	1-216-065-00	RES,CHIP 4.7K 5% 1/10W	

MAIN **KEY**

Ref. No.	Part No.	Description			Remark
		< VARIABLE RESISTOR >			
RV1	1-225-441-41	RES, VAR, CARBON 50K			
		< TRANSFORMER >			
T1	1-404-790-11	TRANSFORMER, IF			
T2	1-449-138-11	TRANSFORMER, DC-DC CONVERTER			
		< VIBRATOR >			
X1	1-767-517-11	VIBRATOR, CRYSTAL (75kHz)			
X2	1-579-900-21	VIBRATOR, CRYSTAL (4.332MHz)			
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*	A-3683-020-A	KEY BOARD, COMPLETE (French)			
*	A-3683-021-A	KEY BOARD, COMPLETE (AEP, UK)			
		**********			
	3-027-781-01	PLATE,LIGHT GUID			
		< CAPACITOR >			
C101	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C102	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C103	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C104	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C105	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C106	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C107	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C109	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C110	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C111	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C112	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C113	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C114	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C115	1-164-346-11	CERAMIC CHIP	1uF		16V
C116	1-163-231-11	CERAMIC CHIP	15PF	5%	50V
C117	1-163-235-11	CERAMIC CHIP	22PF	5%	50V
C120	1-163-021-91	CERAMIC CHIP	0.01uF	10%	50V
C125	1-164-005-11	CERAMIC CHIP	0.47uF		25V
C126	1-164-346-11	CERAMIC CHIP	1uF		16V
C127	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C128	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C129	1-164-505-11	CERAMIC CHIP	2.2uF		16V
		< DIODE >			
D101	8-719-047-42	LED SLZ-235C-16-T1 (LCD BACK LIGHT)			
D102	8-719-047-42	LED SLZ-235C-16-T1 (LCD BACK LIGHT)			
		< IC >			
IC101	8-759-564-81	IC uPD753012AGC-E81-3B9			
IC102	8-759-575-75	IC S-80822ANNP-EDK-T2			
IC103	8-759-521-02	IC S-80718AL-AF-T1			
IC104	8-759-449-90	IC S-81222SGUP-DQV-T1			
		< SHORT >			
JC101	1-216-864-11	METAL CHIP	0	5%	1/16W (French)

Ref. No.	Part No.	Description			Remark
		< COIL >			
L101	1-414-406-11	INDUCTOR	220uH		
L102	1-414-406-11	INDUCTOR	220uH		
		< LIQUID CRYSTAL DISPLAY >			
LCD101	1-803-331-11	DISPLAY PANEL, LIQUID CRYSTAL			
		< RESISTOR >			
R101	1-216-821-11	METAL CHIP	1K	5%	1/16W
R102	1-216-821-11	METAL CHIP	1K	5%	1/16W
R103	1-216-821-11	METAL CHIP	1K	5%	1/16W
R104	1-216-821-11	METAL CHIP	1K	5%	1/16W
R105	1-216-049-11	RES,CHIP	1K	5%	1/10W
R106	1-216-073-00	METAL CHIP	10K	5%	1/10W
R107	1-216-097-00	RES,CHIP	100K	5%	1/10W
R108	1-216-013-00	METAL CHIP	33	5%	1/10W
R109	1-216-013-00	METAL CHIP	33	5%	1/10W
R110	1-216-833-11	METAL CHIP	10K	5%	1/16W
R111	1-216-833-11	METAL CHIP	10K	5%	1/16W
R112	1-216-821-11	METAL CHIP	1K	5%	1/16W
R113	1-216-821-11	METAL CHIP	1K	5%	1/16W
R114	1-216-821-11	METAL CHIP	1K	5%	1/16W
R115	1-216-833-11	METAL CHIP	10K	5%	1/16W
R116	1-216-845-11	METAL CHIP	100K	5%	1/16W
R117	1-216-851-11	METAL CHIP	330K	5%	1/16W
R118	1-216-821-11	METAL CHIP	1K	5%	1/16W
R119	1-216-833-11	METAL CHIP	10K	5%	1/16W
R120	1-216-833-11	METAL CHIP	10K	5%	1/16W
R121	1-216-833-11	METAL CHIP	10K	5%	1/16W
R122	1-216-833-11	METAL CHIP	10K	5%	1/16W
R123	1-216-833-11	METAL CHIP	10K	5%	1/16W
R124	1-216-833-11	METAL CHIP	10K	5%	1/16W
R128	1-216-121-00	RES,CHIP	1M	5%	1/10W
R139	1-216-295-00	SHORT	0		
R140	1-216-295-00	SHORT	0		
R141	1-216-295-00	SHORT	0		
R142	1-216-295-91	SHORT	0		
		< SWITCH >			
S101	1-553-510-00	SWITCH, SLIDE (STATION NAME)			
S103	1-762-233-11	SWITCH, KEYBOARD (POWER)			
S106	1-762-233-11	SWITCH, KEYBOARD (LIGHT)			
S107	1-572-499-11	SWITCH, TACTIL (HOLD)			
S108	1-762-233-11	SWITCH, KEYBOARD (BAND)			
S109	1-762-233-11	SWITCH, KEYBOARD (TRAFFIC INFO)			
S110	1-762-233-11	SWITCH, KEYBOARD (ALTERNATIVE SEARCH)			
S111	1-762-233-11	SWITCH, KEYBOARD (CLOCK AUTO ADJUST)			
S112	1-572-499-11	SWITCH, TACTIL (SLEEP/CLOCK)			
S113	1-762-233-11	SWITCH, KEYBOARD (5)			
S114	1-762-233-11	SWITCH, KEYBOARD (4)			
S115	1-762-233-11	SWITCH, KEYBOARD (3)			
S116	1-762-233-11	SWITCH, KEYBOARD (2)			
S117	1-762-233-11	SWITCH, KEYBOARD (1)			
		< VIBRATOR >			
X101	1-567-098-41	VIBRATOR, CRYSTAL (32.768kHz)			

Ref. No.	Part No.	Description	Remark
X102	1-781-363-21	VIBRATOR, CERAMIC (4.33MHz)	

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ACCESSORIES & PACKING MATERIALS

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	3-864-831-11	MANUAL,INSTRUCTION (ENGLISH,FRENCH,GERMAN,DUTCH)
	3-864-831-21	MANUAL,INSTRUCTION (ITALIAN,SPANISH,PORTGUESE,SWEDISH)
	3-864-831-31	MANUAL,INSTRUCTION (FINNISH,DANISH)