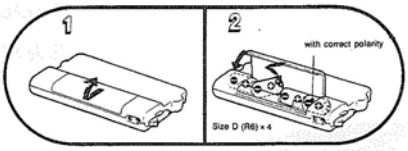
SECTION 1
GENERAL

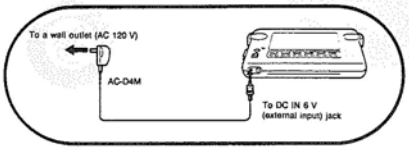
To insert the batteries



- Use 4 pieces of size D (R6) batteries (not supplied).
- When the batteries become weak, the picture will become dark and unclear, the sound will become weak, or the picture may not appear on the display. Replace the batteries with new ones.
- When replacing the batteries, replace all the batteries with the same kind of batteries.
- Do not recharge the dry cell batteries.
- When the unit will not be used for a long period of time, remove the batteries to avoid damage caused by battery leakage and corrosion.

To operate the unit on AC power

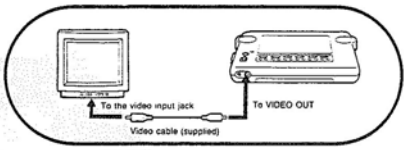
Use the AC-D4M AC power adaptor (not supplied).
To order the AC-D4M, fill in the supplied order form and mail it out.



If the unit is left for five minutes with POWER set to ON
The buzzer beeps.
To turn the buzzer off, touch the pad with the drawing tool or turn POWER off.

To connect to a TV set

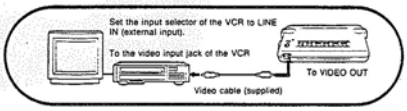
Connect the unit to the video input jack of your TV set.
If your TV set has no video input jacks, it is impossible to connect the unit to it.*



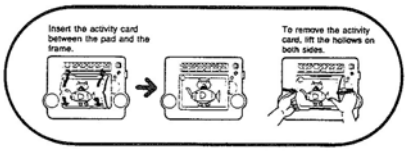
* Use an RF modulator (not supplied) if your TV set has no video input jacks.

To record your sketch on a VCR tape

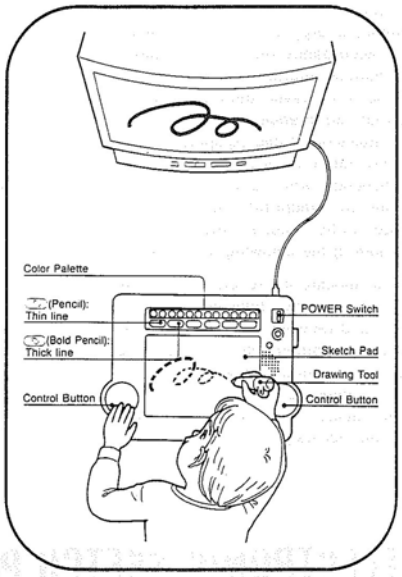
When the unit is connected to the video input jack of a VCR, you can record the process and the result of your sketch.



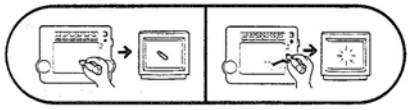
To attach the activity card



To make a sketch



1. **Turn POWER on. The drawing demonstration starts.**
   - The drawing demonstration shows an example of a sketch using the most of the functions of this product, and it gives useful hints for making a sketch.
   - To start making a sketch, touch the pad with the drawing tool. You can interrupt the drawing demonstration and start drawing.
2. **Choose a line by pressing either of (Pencil) or (Bold Pencil) with the drawing tool.**
3. **Choose a color by pressing the desired color palette with the drawing tool.**
4. **Press the point of the drawing tool on the pad.**
   The mark of pencil appears on the TV screen.
   When the point of the drawing tool is off the pad, this mark disappears.

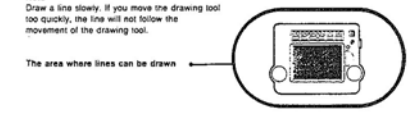


5. **While the control button (either the one on the right or left) is pressed, draw a line by moving the point of the drawing tool on the pad.**
   When drawing a line, be sure to keep pressing both the control button and the point of the drawing tool on the pad.

Repeat the steps 4 and 5 to make a sketch.

Do not press the pad with your hands while making a sketch, or the lines will not follow the movement of the drawing tool.

Note
Draw a line slowly. If you move the drawing tool too quickly, the line will not follow the movement of the drawing tool.



Scanner by abuur, converted to PDF by HansO, 2009

To erase the lines, painting or stamps

To erase a portion

1 Press (Eraser) with the drawing tool.

2 Move the eraser to the position you want to erase on the screen by pressing the point of the drawing tool on the sketch pad.

3 Press the control button while pressing the point of the drawing tool on the pad.

To erase the entire screen
Press the CLEAR button.

To undo the last operation such as drawing, painting or stamping

Press (Undo).

The erased portion can also be called back on the display using this button.

To paint an area

Paint the area you want to paint.

1 Press (Paint Brush) with the drawing tool.

2 Choose a color by pressing the desired color palette.

3 Move the paint brush to the area you want to paint.

4 Press the control button. As long as the point of the drawing tool is pressed on the pad, painting will be continued.

To use the stamps

28 stamps are available.

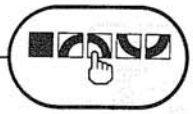
1 Press (Stamp Pad) with the point of the drawing tool. A hand and the first set of stamps (14) appear on the screen. To locate other stamps, press (Stamp Pad) again.

2 Choose a color by pressing the desired color palette.

3 Move the hand to the desired stamp and press the control button.
The stamp you chose appears on the screen.

4 Move the stamp to the position you like and press the control button.

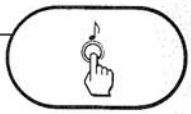
To use other stamps
Repeat steps 1 through 4.



Note
If you press the drawing tool on the positions of the pad one after another too quickly, the stamps may not appear on the screen.

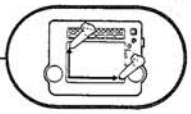
To turn on the sound

Press the button. When the drawing tool is pressed on the pad, the sound will be heard.



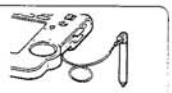
When the drawing tool is moved toward the right side, the sound will be loud.
When the drawing tool is moved toward the upper side, the tone will be high.

To turn off the sound
Press the button.



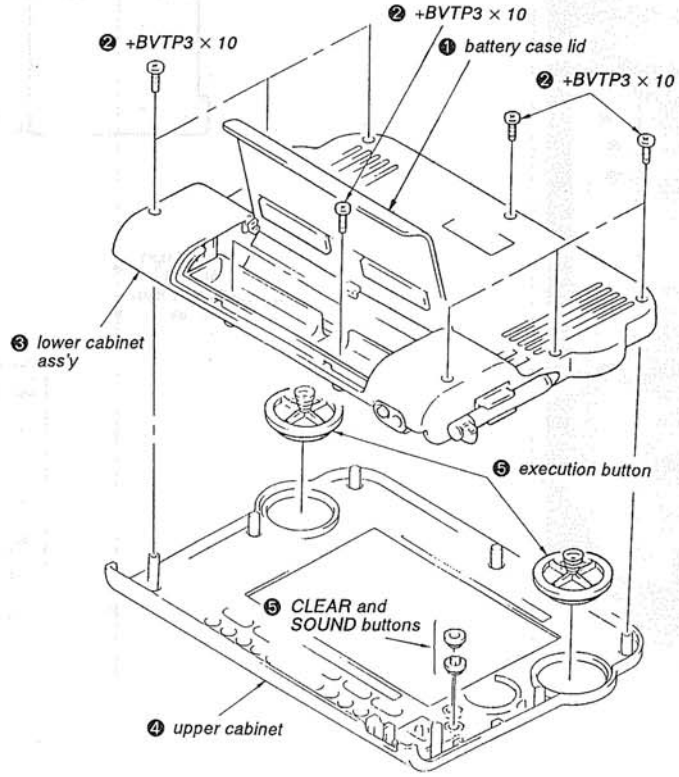
To attach the drawing tool
Tie the drawing tool to the electronic sketch pad with any string to avoid losing the drawing tool.

Use the supplied drawing tool only. If other drawing tools are used, the pad may be damaged.



SECTION 2
DISASSEMBLY

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



SECTION 3
CIRCUIT DESCRIPTION, CHECKING PROCEDURE

[Description of operation, checking methods]

1. Turn the power ON.
2. The CPU (IC3) intializes the CPU internal register and the HIC (IC1) register.
3. Demonstration begins (constantly observing the pad input).
4. Goes to input standby state.
5. When there is input of some sort on the pad.

5-1. The HIC carries out pre-processing of input from the pad and sends input data to the A/D conversion section inside the CPU.

5-2. The input signals are converted to X and Y coordinates inside the CPU.

5-3. Carries out the following based on the X and Y coordinates that are obtained.

5-3-1. When a sound key is pressed.
Outputs a pitch and volume to the speaker aqreeing with the position of the X and Y coordinates.

5-3-2. When a sound hey is not pressed:
Nothing happens and the unit proceeds to the next step (5-3-3).

5-3-3. When the execution key is not pressed, the unit accesses to VDP (IC3) as shown below.
(1) Section indicating color? → Changes to the color of the pattern that is displayed.
(2) Fine pen? → Changes to fine pen.
(3) Thick pen? → Changes to thick pen.
(4) Paint over? → Changes to the brush pattern.
(5) Eraser? → Changes to the eraser pattern.
(6) Stamp Pattern? → Changes to the stamp pattern (changing among 12 types).
(7) UNDO (return one step backward)? → Displays the screen just prior to the present screen.
(8) Input screen? → Displays patterns (2) to (6).

5-3-4. When the execution key is pressed, the unit accesses to VDP (IC8) as shown below. The X and Y coordinnates are as follows.
(1) Section indicating color? → Changes to the color of the pattern that is displayed.
(2) Fine pen? → Changes to fine pen.
(3) Thick pen? → Changes to thick pen.
(4) Paint over? → Changes to the brush pattern.
(5) Eraser? → Changes to the eraser pattern.
(6) Stamp pattern? → Changes to the stamp pattern (changing among 12 types).
(7) UNDO (return one step backward) ? → Displays the screen just prior to the present screen.
(8) Input screen? → Displays patterns (2) to (6).

5-4. Returns to state in item 4.

6. When the CLEAR key is pressed:

6-1. Accesses to VDP (IC8) in order to erase the screen.

6-2. Returns to state in item 4.

[Description of operation, checking methods for IC1 (HIX-048)]

Operation

When the power is turned ON, IC1 sets XY1, XY2, CC1 and CC2 as follows according to the register set.

XY1 ..... "L"
XY2 ..... "L"
CC1 ..... "L"
CC2 ..... "H"

If there is input from the pens or other areas to the pad in this state, a fixed current flows from XC (terminal ⑰) of the electrode drive section of IC1 to YC (terminal ⑭). PT (terminal ⑪) changes from "L" to "H", thus informing that there has been input to the CPU.

In addition, there is voltage generated to the XL ⑲, XR ⑱, YU ⑮ and YD ⑯ terminals that is proportionate to the resistance value of the input position. This voltage is detected in the X coordinate detection section and the Y coordinate detection section, is amplified and then input to the A/D conversion section via the XRA ③, XLA ②, YDA ④ and YUA ⑤ terminals.

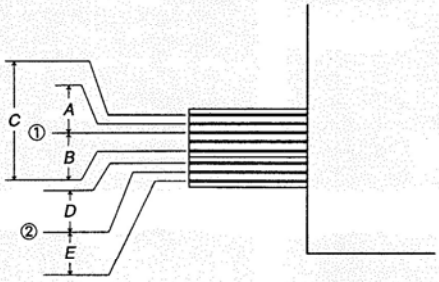
The A/D conversion section changes the input voltage to a digital value based on the standard voltage of the VRF ⑩ terminal and thus obtains the coordinate values.

The speaker volume control section, in order to chage the volume in a left and right direction of the voltage obtained at the X coordinate detection section, transforms the voltage and outputs it from SP1 ⑫ to the speaker drive section.

Checking methods

1. Checking at the PT ⑪ terminal.
When there is no input from the pad, the PT ⑪ is "L".
If PT ⑪ is "H" in this state, either there is poor insulation on the pad or the IC1 itself is faulty.
When there is input from the pad, PT ⑪ is "H".
If PT ⑪ is "L" in this state, either there is faulty current in the pad or the connector contact on CN1 is faulty or the IC1 itself is faulty.
2. The normal value for VRF ⑩ is between 3.4 and 4V.
3. Even when there is input left/right or up/down on the pad, the edge of the screen cannot be input. Either the contact on CN1 is faulty or the pad or IC1 are faulty.

[Methods of checking the pad (reinforcement plate)]



1.

	A	B	C	D	E
Resistance value (kΩ)	2.1 to 2.9	1.05 to 1.45	B ≦ C>2	2.1 to 3.1	2.1 to 3.1

Check that the resistance values are as shown in the chart.

2. Measure the current of ① and ② in the tester resistance range.
   When there is current: The pad is faulty.
   When there is no current: The pad is normal.
3. While measuring the current of ① and ② in the tester resistance range, push the input surface of the pad with the end of the pen on the pen assembly.
   If there is no current or the resistance is 7 kΩ or more: Pad is faulty.
   If the resistance value is 7 kΩ or less: Pad is normal.

SECTION 4
DIAGRAMS

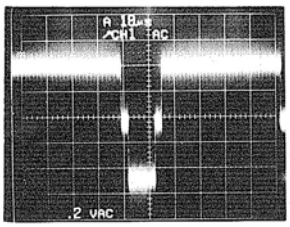
Note on Schematic Diagram:

- 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 ¼ W or less unless otherwise specified.
- Power voltage is dc 6 V and fed with regulated dc power supply from external power jack. When turning power on, the set starts demonstrating. At this time touching somewhere on the pad with the assorted pen, the set goes to the condition waiting for the input. The voltage value is measured in its condition.
- Voltages and waveforms are dc with respect to ground under no-signal (detuned) conditions.
- Voltages are taken with a VOM (10MΩ/V).
  Voltage variations may be noted due to normal production tolerances.
- Wavefroms are taken with a oscilloscope.
  Voltage variations may be noted due to normal production tolerances.
- Circled numbers refer to wavefroms.

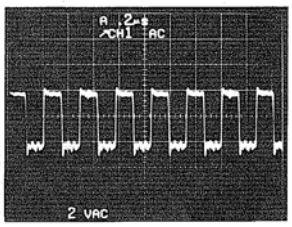
Note on Printed Wiring Board:

- •——— : parts extracted from the conductor side.
- ■ : parts mounted on the conductor side.
- ● : Through hole.
- ▒▒▒ : Pattern on the side which is seen.
- ▒▒▒ : Pattern of the rear side.

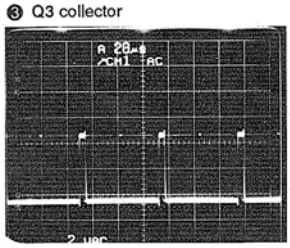
❷ IC2 Pins ②, ③, ④



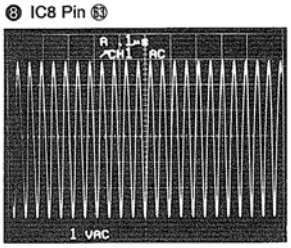
❼ IC8 Pin ⑧



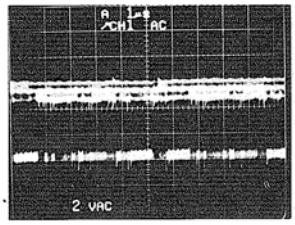
❸ Q3 collector



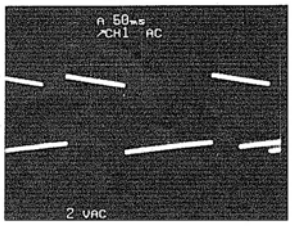
❽ IC8 Pin ⑬



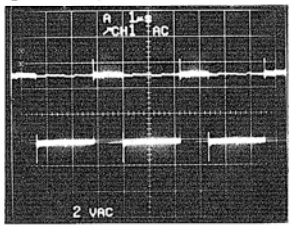
❹ IC8 Pins ㊾ to ㊻



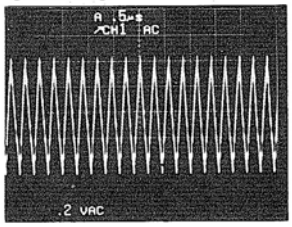
❾ IC1 Pins ⑥, ⑦



❺ IC8 Pin ㉜

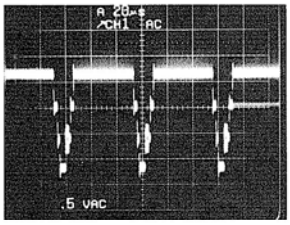


❿ IC2 Pin ⑥

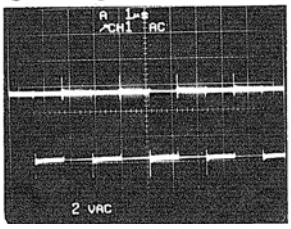


• Waveform

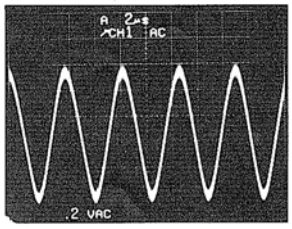
❶ IC2 Pin ⑳



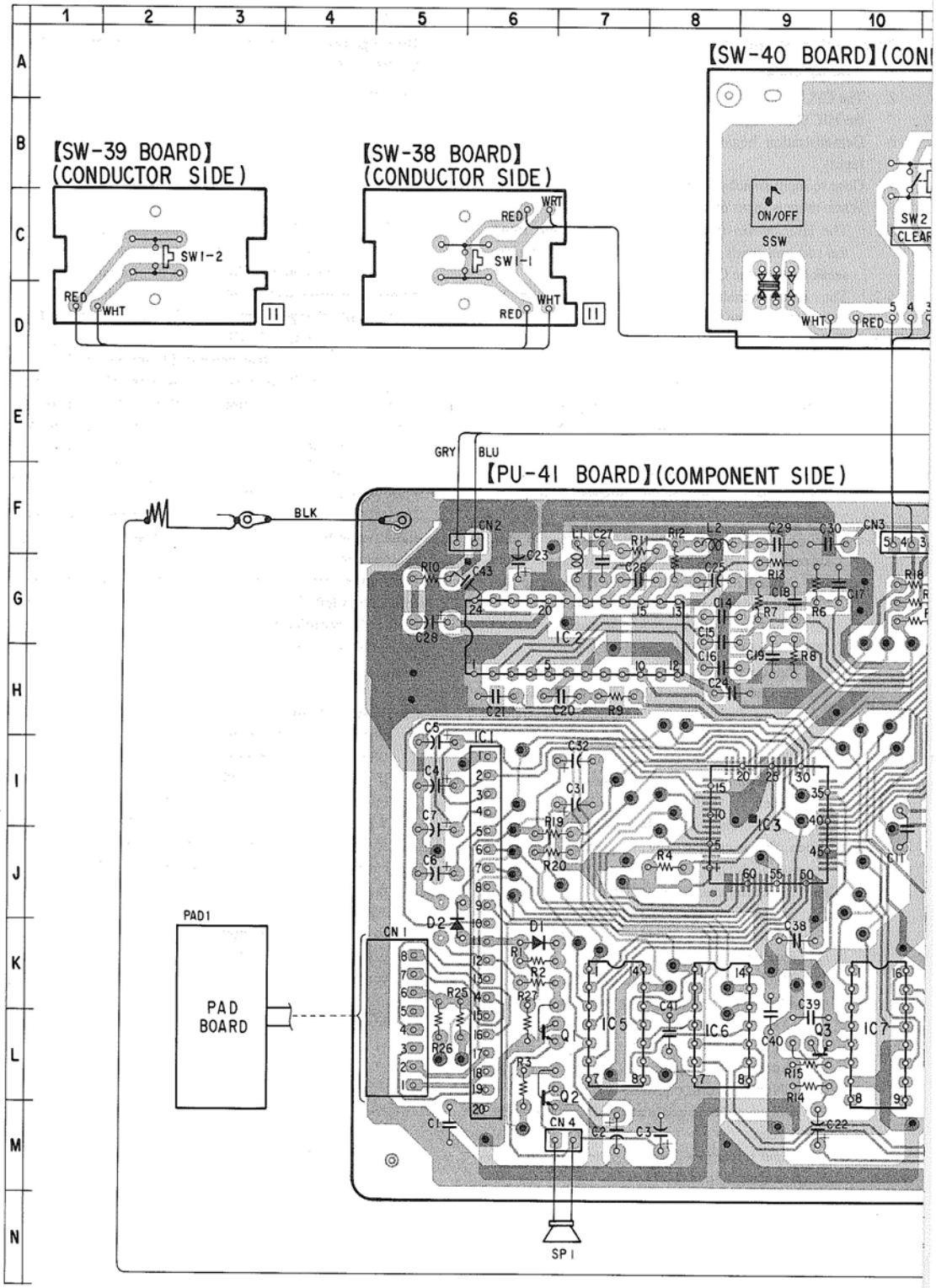
❻ IC8 Pin ㉙

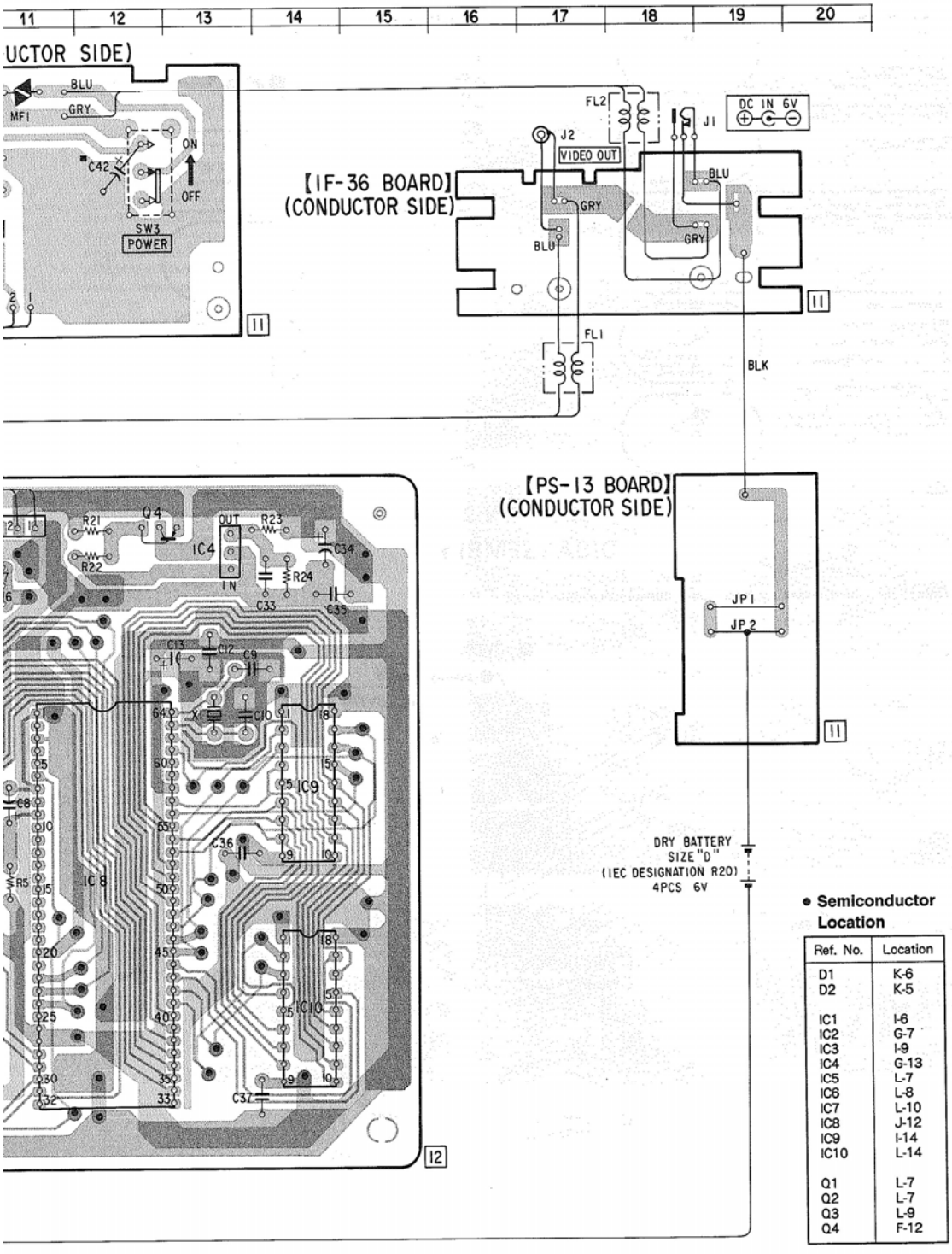


⓫ IC1 Pin ⑬



4-1. PRINTED WIRING BOARDS

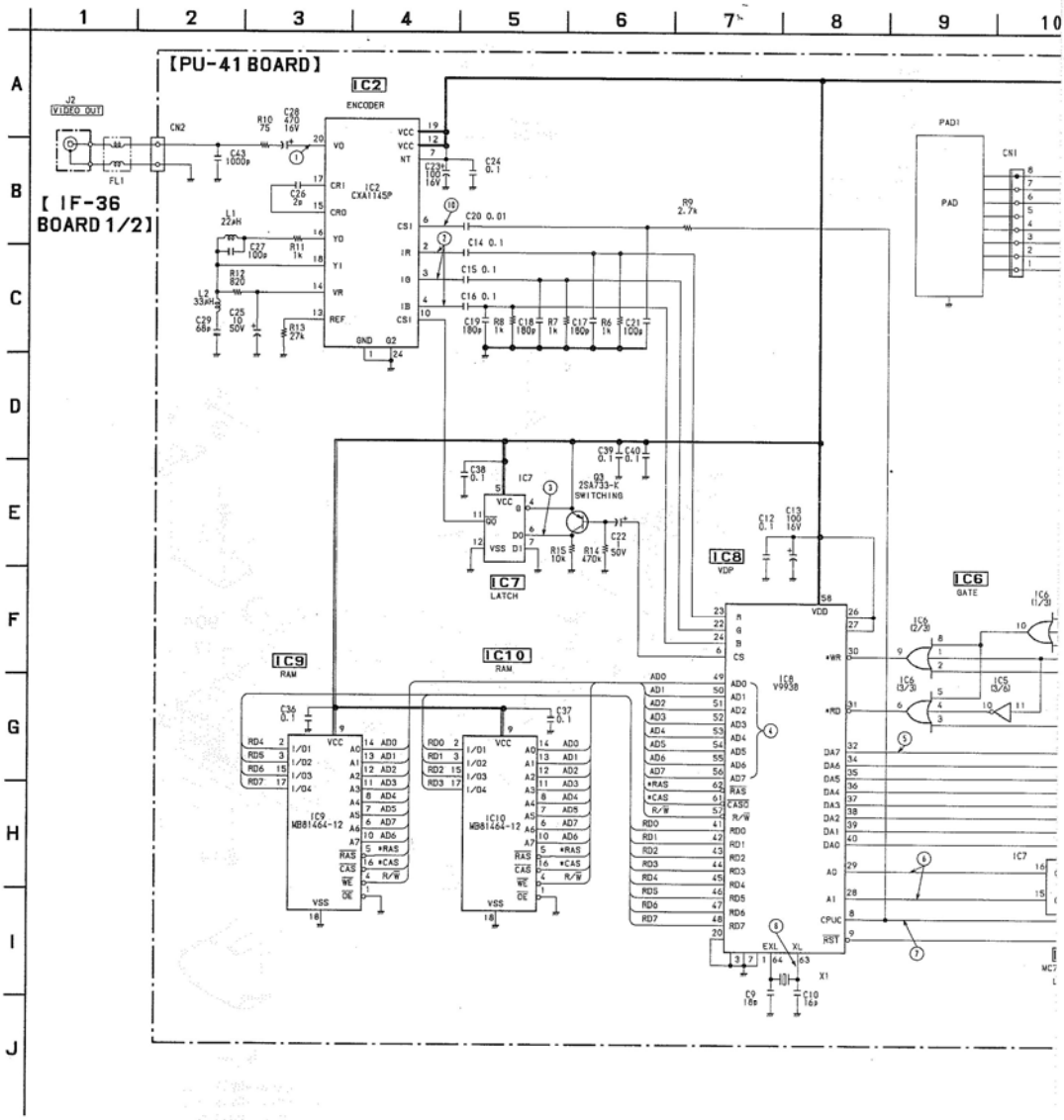




- **Semiconductor Location**

Ref. No.	Location
D1	K-6
D2	K-5
IC1	I-6
IC2	G-7
IC3	I-9
IC4	G-13
IC5	L-7
IC6	L-8
IC7	L-10
IC8	J-12
IC9	I-14
IC10	L-14
Q1	L-7
Q2	L-7
Q3	L-9
Q4	F-12

4-2. SCHEMATIC DIAGRAM

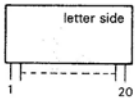


- **Semiconductor Lead Layouts**

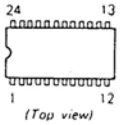
2SC2785-HFE

2SA733-K
2SB985-T

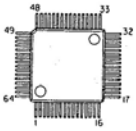
HIX-048



CX1145P

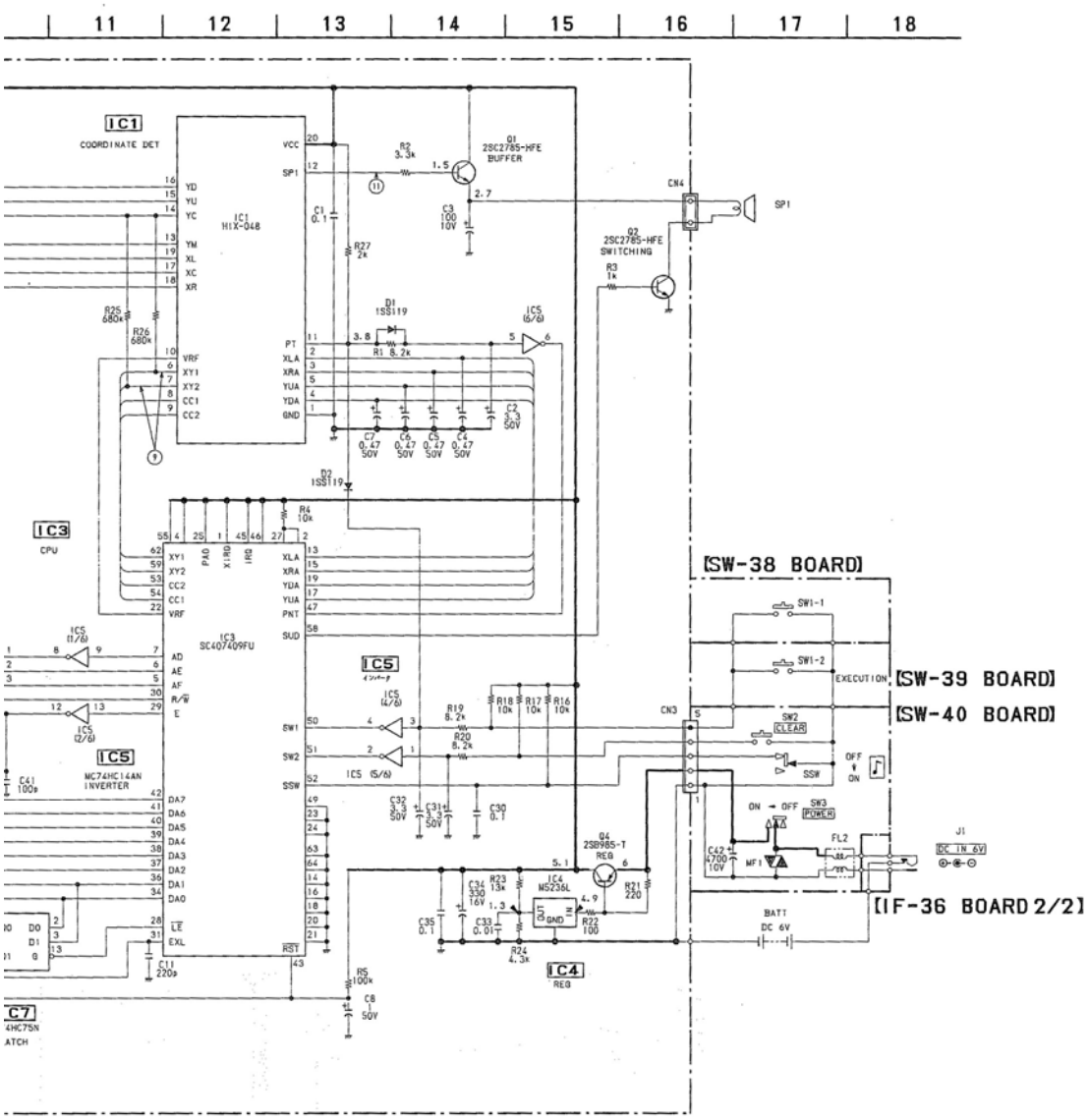


SC407409FU



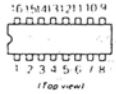
M5236

MC74
TC74

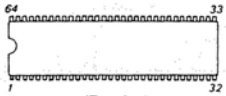


HC14AN
HC075P

MC74HC75N

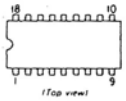


V9938



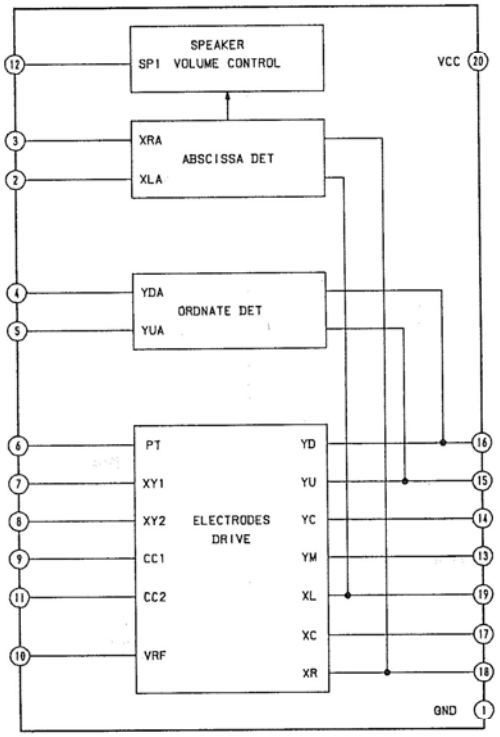
(Top view)

MB81464-12

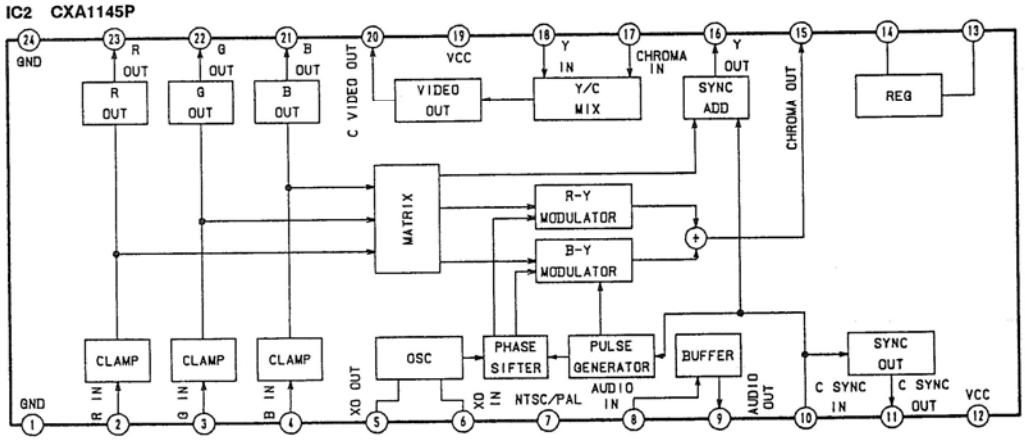


• IC Block Diagrams

IC1 HIX-048



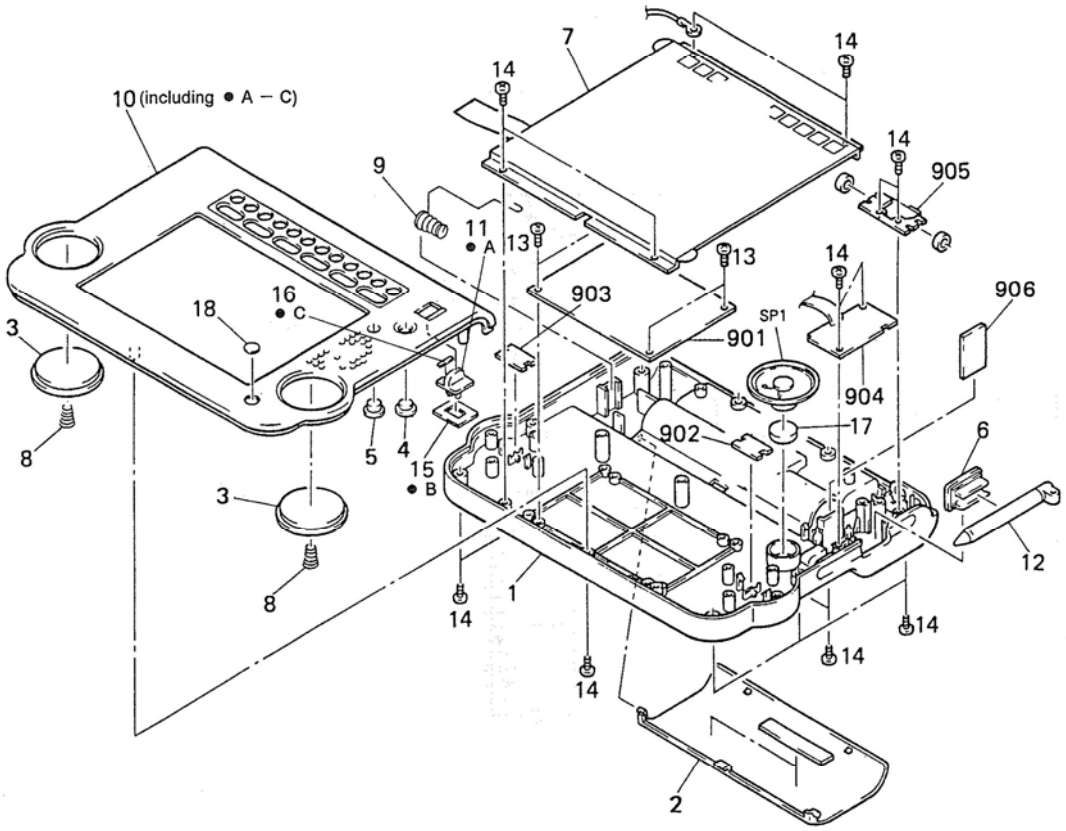
IC2 CXA1145P



SECTION 5
EXPLODED VIEW

NOTE:

- The mechanical parts with no reference number in the exploded views are not supplied.
- The construction parts of an assembled part are indicated with a collation number in the remark column.
- Items marked "★" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- Due to standardization, parts with part number suffix -XX and -X may be different from the parts specified in the components used on the set.
- Color Indication of Appearance Parts
  Example:
  (RED) . . . KNOB, BALANCE (WHITE)
  ↑ ↑
  Cabinet's Color Parts' Color



No.	Part No.	Description	Remarks
1	4-617-708-21	CABINET (LOWER)	
2	4-617-710-11	LID, BATTERY CASE	
3	4-617-711-01	BUTTON (EXECUTION)	
4	4-617-712-01	BUTTON (CLEAR)	
5	4-617-713-01	BUTTON (SOUND)	
6	4-617-714-01	HOLDER, PEN	
7	1-550-583-11	PAD	
8	4-617-724-01	SPRING	
9	4-617-725-01	SPRING	
10	X-4617-704-1	CABINET (UPPER) ASSY	
11	4-617-721-01	BUTTON (POWER)	
12	X-4617-701-1	PEN ASSY	
13	7-685-646-79	SCREW +BVTP 3X8 TYPE2 N-S	
14	7-685-647-79	SCREW +BVTP 3X10 TYPE2 N-S	
15	4-617-720-01	GUIDE, BUTTON	
16	4-617-722-01	INDICATOR	
17	4-617-723-01	CUSHION	
18	3-342-822-01	EMBLEM	
901	*A-8080-507-A	MOUNTED PCB, PU-41	
902	*1-632-853-11	PC BOARD, SW-38	
903	*1-632-854-11	PC BOARD, SW-39	
904	*1-632-857-11	PC BOARD, SW-40	
906	*1-632-855-11	PC BOARD, PS-13	
905	*1-632-856-11	PC BOARD, IF-36	

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.
- Items marked "★" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- If there are two or more same circuits in a set such as a stereophonic machine, only typical circuit parts may be indicated and capacitors and resistors in other same circuits may be omitted.

CAPACITORS:
MF: μF, PF: μμF.

RESISTORS
- All resistors are in ohms.
- F: nonflammable

COILS
- MMH: mH, UH: μH

SEMICONDUCTORS
In each case, U: μ, for example:
UA...: μA..., UPA...: μPA..., UPC...: μPC, UPD...: μPD...

Ref.No.	Part No.	Description			
901	*A-8080-507-A	MOUNTED PCB, PU-41			
902	*1-632-853-11	PC BOARD, SW-38			
903	*1-632-854-11	PC BOARD, SW-39			
904	*1-632-857-11	PC BOARD, SW-40			
906	*1-632-855-11	PC BOARD, PS-13			
905	*1-632-856-11	PC BOARD, IF-36			
C1	1-162-851-11	CERAMIC	0.1MF		16V
C2	1-123-382-00	ELECT	3.3MF	20%	50V
C3	1-126-101-11	ELECT	100MF	20%	16V
C4	1-124-902-00	ELECT	0.47MF	20%	50V
C5	1-124-902-00	ELECT	0.47MF	20%	50V
C6	1-124-902-00	ELECT	0.47MF	20%	50V
C7	1-124-902-00	ELECT	0.47MF	20%	50V
C8	1-124-791-11	ELECT	1MF	20%	50V
C9	1-102-953-00	CERAMIC	18PF	5%	50V
C10	1-102-952-00	CERAMIC	16PF	5%	50V
C11	1-102-978-00	CERAMIC	220PF	5%	50V
C12	1-162-851-11	CERAMIC	0.1MF		16V
C13	1-126-101-11	ELECT	100MF	20%	16V
C14	1-162-851-11	CERAMIC	0.1MF		16V
C15	1-162-851-11	CERAMIC	0.1MF		16V
C16	1-162-851-11	CERAMIC	0.1MF		16V
C17	1-102-976-00	CERAMIC	180PF	5%	50V
C18	1-102-976-00	CERAMIC	180PF	5%	50V
C19	1-102-976-00	CERAMIC	180PF	5%	50V
C20	1-102-129-00	CERAMIC	0.01MF	10%	50V
C21	1-102-973-00	CERAMIC	100PF	5%	50V
C22	1-124-791-11	ELECT	1MF	20%	50V
C23	1-126-101-11	ELECT	100MF	20%	16V
C24	1-162-851-11	CERAMIC	0.1MF		16V
C25	1-123-875-11	ELECT	10MF	20%	50V
C26	1-102-935-00	CERAMIC	2PF	0.25PF	50V
C27	1-102-973-00	CERAMIC	100PF	5%	50V
C28	1-126-103-11	ELECT	470MF	20%	16V
C29	1-101-888-00	CERAMIC	68PF	5%	50V
C30	1-162-851-11	CERAMIC	0.1MF		16V
C31	1-123-382-00	ELECT	3.3MF	20%	50V
C32	1-123-382-00	ELECT	3.3MF	20%	50V
C33	1-102-129-00	CERAMIC	0.01MF	10%	50V
C34	1-124-119-00	ELECT	330MF	20%	16V
C35	1-162-851-11	CERAMIC	0.1MF		16V
C36	1-162-851-11	CERAMIC	0.1MF		16V
C37	1-162-851-11	CERAMIC	0.1MF		16V
C38	1-162-851-11	CERAMIC	0.1MF		16V
C39	1-162-851-11	CERAMIC	0.1MF		16V

Ref.No.	Part No.	Description			
C40	1-162-851-11	CERAMIC	0.1MF		16V
C41	1-102-973-00	CERAMIC	100PF	5%	50V
C42	1-124-762-00	CAP,ELECT	4700MF	20%	10V
C43	1-102-074-00	CAP,CERAMIC	1000P		50V
CN1	*1-569-276-11	CONNECTOR (FLAT CABLE) 8P			
CN2	*1-564-505-11	PLUG, CONNECTOR 2P			
CN3	*1-569-277-11	CONNECTOR (PC BOARD) 5P			
CN4	*1-564-505-11	PLUG, CONNECTOR 2P			
D1	8-719-911-19	DIODE 1SS119			
D2	8-719-911-19	DIODE 1SS119			
FL1	1-424-326-11	FILTER, EMI			
FL2	1-424-327-11	FILTER, EMI			
IC1	8-749-921-66	IC HIX-048			
IC2	8-759-605-84	IC CXA1145P			
IC3	8-759-734-83	IC SC407409FU			
IC4	8-759-602-78	IC M5236L			
IC5	8-759-032-79	IC MC74HC14AN			
IC6	8-759-203-75	IC MC74HC4075N			
IC7	8-759-001-08	IC MC74HC75N			
IC8	8-759-922-51	IC V9938			
IC9	8-759-922-42	IC MB81464-12			
IC10	8-759-922-42	IC MB81464-12			
J1	1-507-563-00	JACK, DC			
J2	1-563-866-51	JACK, PIN 1P			
L1	1-410-513-11	INDUCTOR	22UH		
L2	1-410-331-11	INDUCTOR	33UH		
MF1	1-808-935-11	VARISTOR			
Q1	8-729-119-78	TRANSISTOR 2SC2785-HFE			
Q2	8-729-119-78	TRANSISTOR 2SC2785-HFE			
Q3	8-729-173-38	TRANSISTOR 2SA733-K			
Q4	8-729-804-25	TRANSISTOR 2SB985-T			
R1	1-249-428-11	CARBON	8.2K	5%	1/4W
R2	1-249-423-11	CARBON	3.3K	5%	1/4W
R3	1-249-417-11	CARBON	1K	5%	1/4W
R4	1-249-429-11	CARBON	10K	5%	1/4W
R5	1-249-441-11	CARBON	100K	5%	1/4W
R6	1-215-421-00	METAL	1K	1%	1/6W
R7	1-215-421-00	METAL	1K	1%	1/6W
R8	1-215-421-00	METAL	1K	1%	1/6W
R9	1-215-431-00	METAL	2.7K	1%	1/6W
R10	1-215-394-00	METAL	75	1%	1/6W
R11	1-215-421-00	METAL	1K	1%	1/6W
R12	1-215-419-00	METAL	820	1%	1/6W
R13	1-215-455-00	METAL	27K	1%	1/6W
R14	1-247-895-00	CARBON	470K	5%	1/4W
R15	1-249-429-11	CARBON	10K	5%	1/4W

Ref.No.	Part No.	Description			
R16	1-249-429-11	CARBON	10K	5%	1/4W
R17	1-249-429-11	CARBON	10K	5%	1/4W
R18	1-249-429-11	CARBON	10K	5%	1/4W
R19	1-249-428-11	CARBON	8.2K	5%	1/4W
R20	1-249-428-11	CARBON	8.2K	5%	1/4W
R21	1-249-409-11	CARBON	220	5%	1/4W
R22	1-249-405-11	CARBON	100	5%	1/4W
R23	1-215-448-00	METAL	13K	1%	1/6W
R24	1-215-436-00	METAL	4.3K	1%	1/6W
R25	1-247-899-11	CARBON	680K	5%	1/4W
R26	1-247-899-11	CARBON	680K	5%	1/4W
R27	1-247-838-00	CARBON	2K	5%	1/4W
SW2	1-554-937-11	SWITCH, KEY BOARD (CLEAR)			
SW3	1-571-616-11	SWITCH, SLIDE (POWER)			
SSW	1-572-215-11	SWITCH, PUSH (♪)			
X1	1-577-217-11	VIBRATOR, CRYSTAL			

ACCESSORY & PACKING MATERIAL

1-575-339-11	CABLE, PIN PLUG
3-751-057-21	MANUAL, INSTRUCTION
4-617-705-21	CARD (2), PLAY
4-617-706-21	CARD (1), PLAY
4-617-707-21	CARD (3), PLAY
*4-617-701-01	CUSHION (UPPER)
*4-617-702-01	CUSHION (LOWER)
*4-617-726-01	INDIVIDUAL CARTON
X-4617-701-1	PEN ASSY

9-974-234-11

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