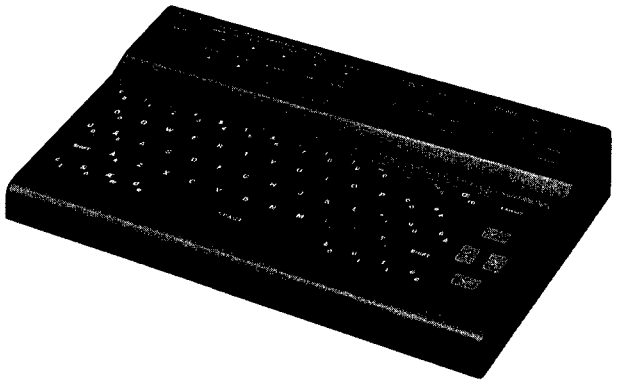
JVC

SERVICE MANUAL

PAL

JX-T88(E), (EB), (EK), (EG)

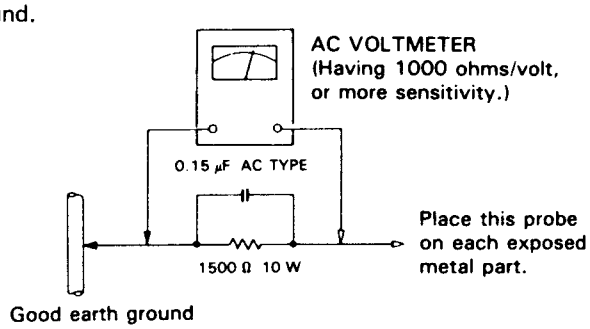


Contents

No. 70118
Oct. 1991

Safety Precautions

1. The design of this product contains special hardware and many circuits and components specially for safety purposes. For continued protection, no changes should be made to the original design unless authorized in writing by the manufacturer. Replacement parts must be identical to those used in the original circuits. Service should be performed by qualified personnel only.
2. Alterations of the design or circuitry of the product should not be made. Any design alterations of the product should not be made. Any design alterations or additions will void the manufacturer's warranty and will further relieve the manufacturer of responsibility for personal injury or property damage resulting therefrom.
3. Many electrical and mechanical parts in the product have special safety-related characteristics. These characteristics are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in the Parts List of Service Manual. Electrical components having such features are identified by shading on the schematics and by (⚠) on the Parts List in the Service Manual. The use of a substitute replacement which does not have the same safety characteristics as the recommended replacement part shown in the Parts List of Service Manual may create shock, fire, or other hazards.
4. The leads in the products are routed and dressed with ties, clamps, tubings, barriers and the like to be separated from live parts, high temperature parts, moving parts and/or sharp edges for the prevention of electric shock and fire hazard. When service is required, the original lead routing and dress should be observed, and it should be confirmed that they have been returned to normal, after re-assembling.
5. Leakage current check (Electrical shock hazard testing)
   After re-assembling the product, always perform an isolation check on the exposed metal parts of the product (antenna terminals, knobs, metal cabinet, screw heads, headphone jack, control shafts, etc.) to be sure the product is safe to operate without danger of electrical shock.
   Do not use a line isolation transformer during this check.
   - Plug the AC line cord directly into the AC outlet. Using a "Leakage Current Tester", measure the leakage current from each exposed metal part of the cabinet, particularly any exposed metal part having a return path to the chassis, to a known good earth ground. Any leakage current must not exceed 0.5 mA AC (r.m.s.).
   - Alternate check method
     Plug the AC line cord directly into the AC outlet. Use an AC voltmeter having 1,000 ohms per volt or more sensitivity in the following manner. Connect a 1,500 Ω 10 W resistor paralleled by a 0.15 μF AC-type capacitor between an exposed metal part and a known good earth ground.
     Measure the AC voltage across the resistor with the AC voltmeter.
     Move the resistor connection to each exposed metal part, particularly any exposed metal part having a return path to the chassis, and measure the AC voltage across the resistor. Now, reverse the plug in the AC outlet and repeat each measurement. Any voltage measured must not exceed 0.75 V AC (r.m.s.). This corresponds to 0.5 mA AC (r.m.s.).



1. Features

1. **Standard size full-keyboard design for ease of use**
2. **Compatible with Y/C-separated video signals:**
   Built-in Y/C separator and mixer circuits and independent S-Video terminals
3. **Entry of any alphanumeric character in upper and lower case:**
   Universal QWERTY keyboard with additional keys for German, French, Italian, Spanish, Swedish and Danish accented letters
4. **Buit-in Standard Signal Generator (SSG):**
   Allows creation of titles without input video signal
5. **10-page memory:**
   Up to 8 pages of still titles and 2 pages of scroll titles can be stored in memory
6. **Character variation function:**
   Outlined or boxed characters available in any of 8 colours
7. **Return monitor function**
8. **Title memory backup function**
9. **Variety of character colours and sizes:**
   8 colours available for characters and background, in 4 sizes (S,M, L and LL)

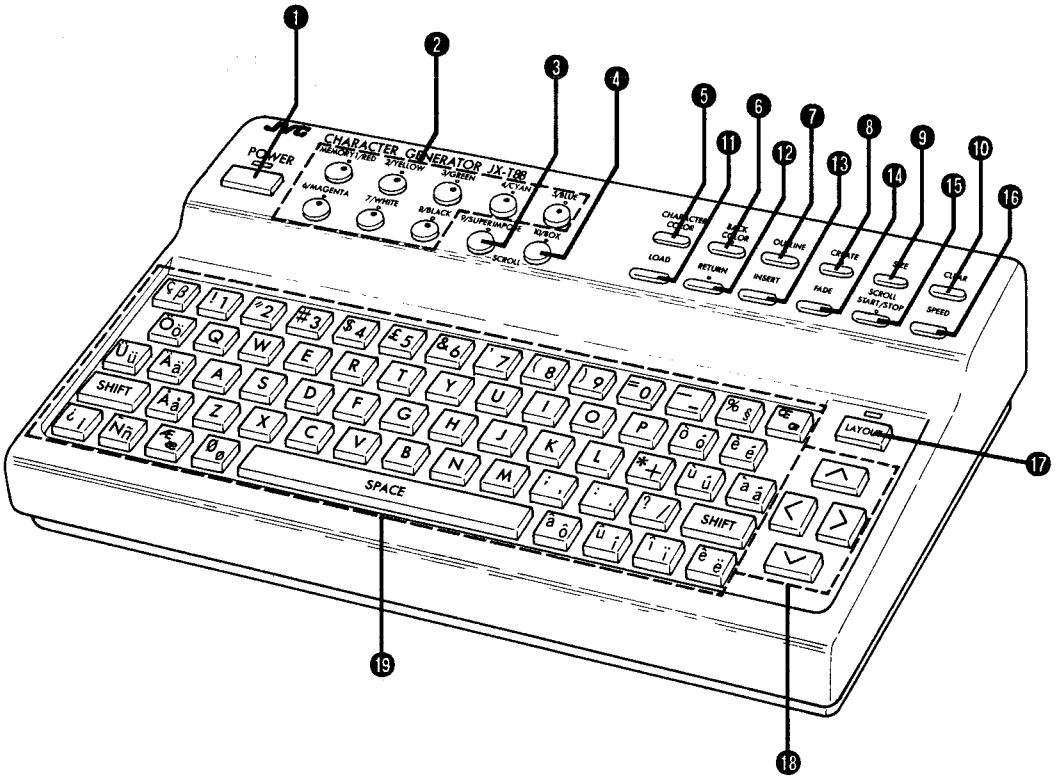
2. Specifications

Input terminals	: 21-pin connector, S-Video connector (with priority), Audio L/R jacks.
Output Terminals	
Monitor	: 2 lines 21-pin connector S-Video connector, Audio L/R jacks
Rec Out	: 1 line 21-pin connector
Reference video input	: 1.0 Vp-p/75 ohms, unbalanced
Max. allowable input	: 1.5 Vp-p
Video output	: 1.0 Vp-p/75 ohms, unbalanced (with reference input)
Frequency response	: 10 MHz −1 ±2 dB (S-Video IN/OUT)
Reference audio input	: −10 dBV (316 mV)/47 kohms
Max. allowable input	: +6 dBV (1 kHz, 1% distortion)
Audio output	: −10 dBV (316 mV)/1 kohms (with refereence input)
Frequency response	: 5 Hz ~ 20 kHz −2 ±2 dB (1 kHz = 0 dB)
Distortion	: 0.01% (with reference input, 1 kHz)
Power requirements	: 230 V AC ~, 50/60 Hz 240 V AC ~, 50 Hz (U.K. only)
Power consumption	: 12 W (power ON) 2 W (Power OFF)
Dimensions	: 326(W) × 70(H) × 210(D) mm
Weight	: 2.3 kg

Design and specifications subject to change without notice.

3. Description and Functions

Control Panel



❶ POWER button
Press this button to turn the power on.

❷ MEMORY 1-8/COLOR buttons
- To register a still title, press a MEMORY 1 - 8 button which will then correspond to the memory in which it is registered.
- Press one of buttons 1 - 8 to recall the registered title screen from memory.
- These buttons are also used to select the character colour, background colour, and box/outline colour.

❸ MEMORY 9/SUPERIMPOSE button
- Press this button to register a screen of scroll titles, and to recall registered scroll titles.
- To superimpose a title while you are creating it, set to the Background Colour mode and press this button.

❹ MEMORY 10/BOX button
- Press this button to register a screen of scroll titles, and to recall registered scroll titles.
- While the OUTLINE indicator is lit (Outline mode), press this button to enclose the characters on the line in a box.

❺ CHARACTER COLOR button
- Press this button to set to the Character Colour mode (the indicator lights).
- While the indicator is lit, select the character colour using the MEMORY 1-8/COLOR buttons ❷.

❻ BACK COLOR button
- Press this button to set to the Background Colour mode (the indicator lights).
- While the indicator is lit, select the background colour using the MEMORY 1-8/COLOR buttons ❷, or press the MEMORY 9/SUPERIMPOSE button ❸ for a "transparent" background.

❼ OUTLINE button
- Press this button to set to the Outline mode (the indicator lights).
- In the Outline mode, when this button is pressed while holding the SHIFT key depressed the characters are outlined. Pressing it again removes the outlines from the characters.
- In the Outline mode, when the MEMORY 10/BOX button ❹ is pressed, the characters are enclosed in a box. Pressing it again removes the box surrounding the characters on the line.

❽ CREATE button
Press this button to enter the Create mode.
The indicator above the button lights and the title create screen is displayed on the monitor TV.

❾ SIZE button
Press this button to select the size of the characters.
Four character sizes are available.

❿ CLEAR button
In the Create mode, when this button is held pressed, all the characters on the display will disappear, and small white "space" indications fill the screen.

⓫ LOAD button
To recall a title registered in the Create mode, press one of the MEMORY 1-10 buttons ❷ – ❶ with this button depressed.

⓬ RETURN button
Press this button to monitor the signal (the recorded signal) returned from the recording VCR.

⓭ INSERT button
- Press this button to display the registered title on the monitor screen or clear it.
- Press this button to clear the scroll title during scrolling.

⓮ FADE button
Press this button to fade in or out the registered title on the monitor screen.

⓯ SCROLL START/STOP button
- Press this button to start scrolling the title. To stop scrolling, press this button again.
- When the scroll title is selected, the indicator lights.

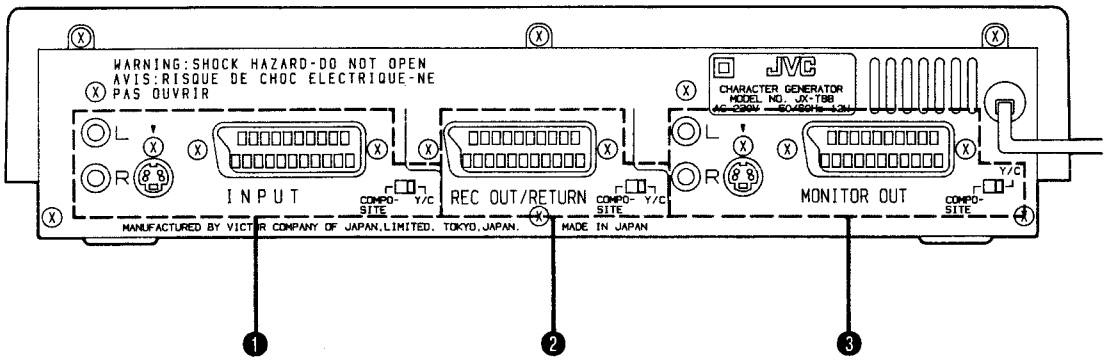
⓰ SPEED button
Press this button to vary the scroll speed.
The scroll speed can be varied in four steps.

⓱ LAYOUT key
Press this key to enter the Layout mode (the indicator lights).
While the indicator is lit, the entire title can be moved using the cursor keys ⓲.

⓲ Cursor keys
- When creating titles, use these keys to move the cursor indicating the position at which a character can be entered.
- When setting the layout, use these keys to move the entire title on the screen.
- While creating a title in the Character Colour mode, move the cursor using the "<" or ">" key with the SHIFT key depressed to change the character colour.
- While creating scroll titles in the Layout mode, press "∧" or "∨" with the SHIFT key depressed to shift the scrolling display area up or down.

⓳ Character input keypad
Use these keys to enter characters.
To enter a capital letter or the letter on the left (on the key top), press the key with the SHIFT key depressed.

Rear Panel



❶ INPUT connectors and signal select switch

- Connect the output terminals of the playback VCR to these connectors.
- Set the signal select switch to the COMPOSITE or Y/C position according to the input signal (composite video or Y/C-separated signal).
- When both the S-VIDEO and 21-pin AV connectors are used at the same time, the signals input to the S-VIDEO input and audio input (L/R) terminals have priority to those input via the 21-pin connector.

❷ REC OUT/RETURN connector and signal select switch

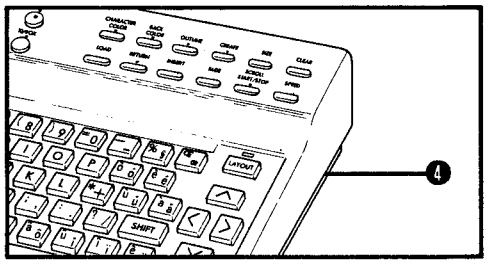
- Connect the IN/OUT connector of the recording VCR to this connector.
- When this connector is used as a "rec-out" terminal, set the signal select switch to the COMPOSITE or Y/C position according to the input setting of the recording VCR.
- When this connector is used as a "return input" terminal, set the signal select switch to the "COMPOSITE" or "Y/C" position according to the output setting of the recording VCR.

❸ MONITOR OUT connectors and signal select switch

- Connect the input terminals of a monitor TV to these connectors.
- Select the signal output from these connectors by setting the signal select switch to the COMPOSITE or Y/C position according to the monitor TV used.

❹ RESET switch

Press this switch using the tip of a ball-point pen, etc. if no character input is accepted while creating titles. When the RESET switch is pressed, the power of the JX-T88 will be turned OFF.



[S-VIDEO Terminal]

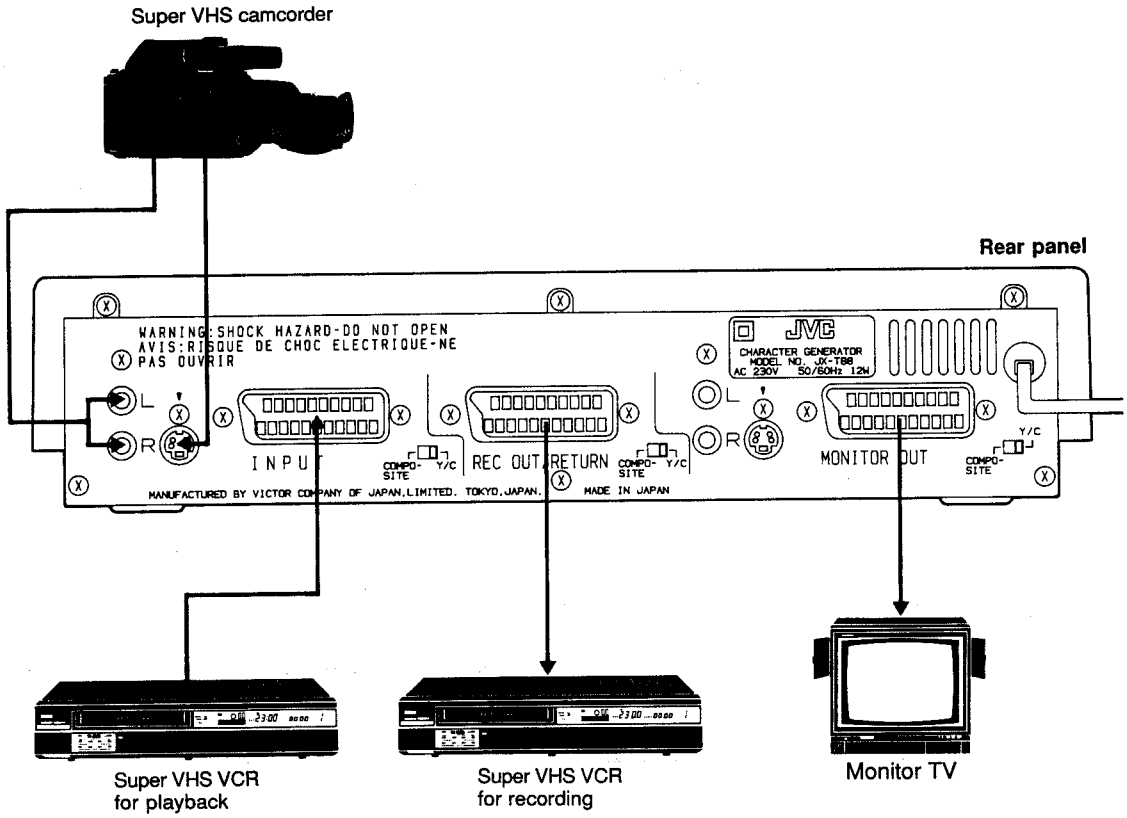
- The S-Video terminal can only be used for Y/C-separated video signals in which the Y (luminance) signal and the C (chrominance) signal are separated.
- When this terminal is connected to the S-Video terminal of a VCR or monitor TV, higher quality recording/playback and monitoring are made possible with less signal loss.

4. Operation Instructions

CONNECTIONS

- The following connection diagrams show examples of connection of the JX-T88 in an audio/video system. Read the instruction manuals of the components to be connected to the JX-T88.
- Before making connections, confirm that the power switches of all components are turned off.

System Connection Example



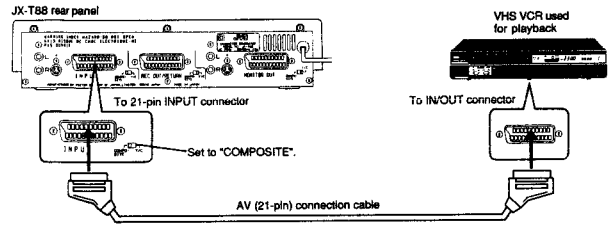
Notes:

- **When both the S-VIDEO connector and 21-pin AV connector are used at the same time:**
  As the video signal input to the S-Video terminal has priority, when using the video component connected to the AV (21-pin) connector, unplug the S-Video connector from the S-VIDEO INPUT terminal.
- **Video and audio signals are always output from the S-VIDEO + AUDIO (L/R) terminals and the AV (21-pin) connector at the same time.**

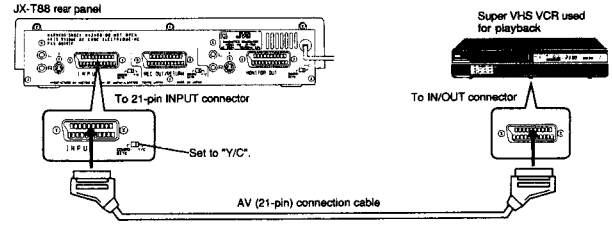
INPUT Connections

■ Connection to Playback VCR

When Using a Conventional VHS VCR

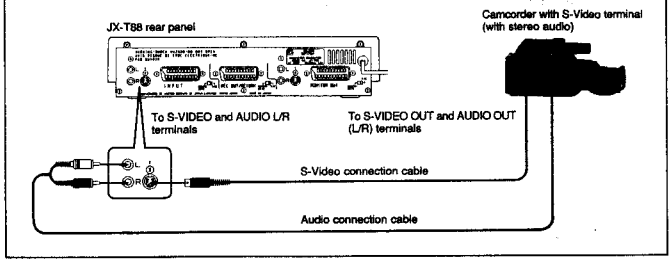


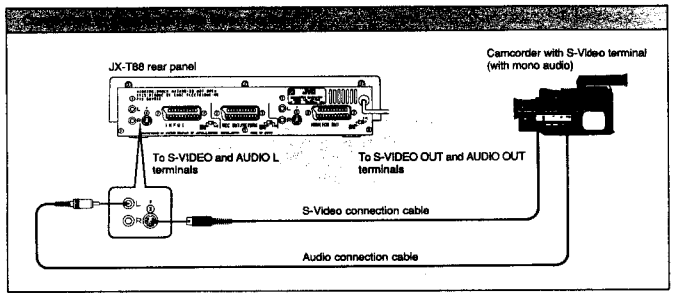
When Using a Super VHS VCR



- Set the VIDEO OUT switch on the Super VHS VCR used for playback to the "Y/C" position.
- When the S-VIDEO and AUDIO (L/R) INPUT terminals are connected to the S-VIDEO and AUDIO (L/R) OUTPUT terminals of the playback VCR, it is not necessary to change the setting of the Signal Select switch.

■ Connection to Camcorder





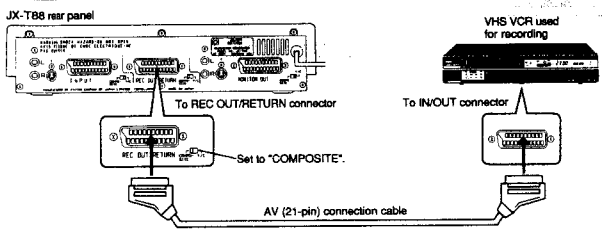
Notes:

- **When the S-VIDEO and AUDIO (L/R) INPUT terminals are connected to the S-VIDEO and AUDIO (L/R) OUTPUT terminals of the playback VCR, it is not necessary to change the setting of the Signal Select switch.**
- **When the signals output from a camcorder are input via the AV (21-pin) INPUT connector of the JX-T88, set the signal select switch to the "Y/C" position.**
- **To connect a component with a mono audio output: Plug in only the L-channel audio jack. When only the L-channel audio jack is used, the same audio input signal will be supplied to both the L- and R-channel audio outputs.**

REC OUT/RETURN Connections

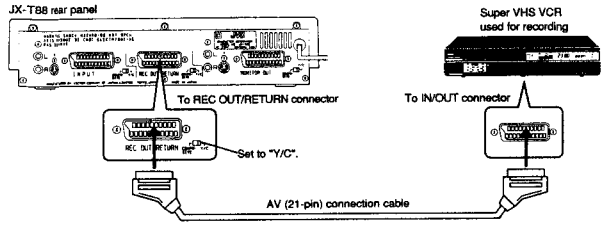
■ Connection to Recording VCR

When Using a Conventional VHS VCR



- Set the signal select switch of the JX-T88 to the "COMPOSITE" position.

When Using a Super VHS VCR



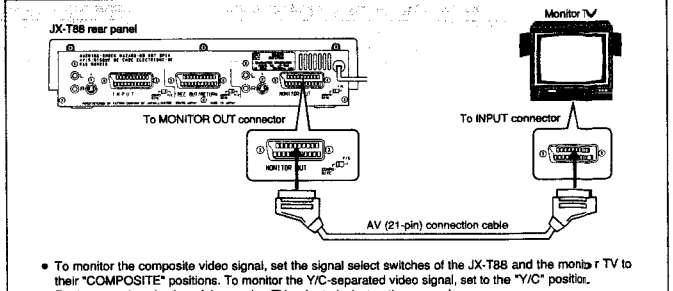
- Set the signal select switch of the JX-T88 to the "Y/C" position.
- When playing back the returned signal (Return Playback), set the VIDEO OUT switch of the recording VCR to the "Y/C" position.

Notes:

- **When recording a title you have created, set the AUX INPUT SELECT switch of the recording VCR to the "AV (IN/OUT connector)" position.**
- **To monitor the RETURN signal (recorded on the VCR), make sure that the signal select switch of the recording VCR matches the position of the input select switch of the monitor TV ("COMPOSITE" or "Y/C").**

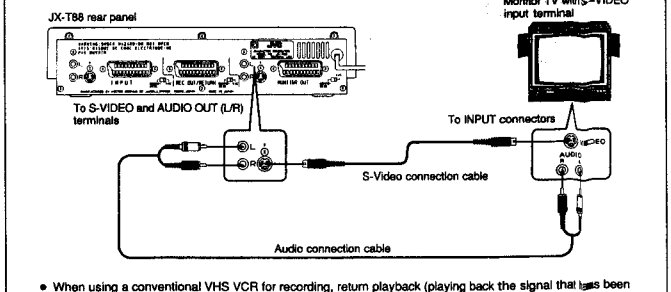
MONITOR OUT Connections

When Using a Conventional VHS VCR



- To monitor the composite video signal, set the signal select switches of the JX-T88 and the monitor TV to their "COMPOSITE" positions. To monitor the Y/C-separated video signal, set to the "Y/C" position.
- For input mode selection of the monitor TV, refer to its instruction manual.

When Using a Super VHS VCR



- When using a conventional VHS VCR for recording, return playback (playing back the signal that has been recorded) is impossible.
  In this case, use the AV (21-pin) connector described above for monitoring.

BEFORE OPERATING

- The flow of operations to use the Character Generator in the JX-T88 is shown below. When you begin operating for the first time, follow the chart below and learn how to operate.

■ Creating Titles

Set to the Create mode.

↓

Set the screen display to the "cleared" mode.

↓

Select the character size. (4 sizes are available.)

↓

Select the character colour. (8 colours are available.)

↓

Enter required characters.
(To enter a capital letter or the symbol on the left of a key top, press it while holding the SHIFT key depressed.)

↓

Add variations to characters.
(All the characters on the display will be outlined, and individual lines can be enclosed in boxes.)

↓

Select the background colour. (Select any of 8 colours, or the "transparent" mode.)

↓

Set the required title layout.

↓

Register the title. (The created title is displayed.)

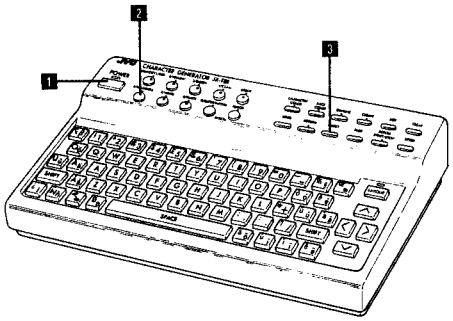
↓

Title creation complete.

- Read the instruction manuals of the components to be connected to the JX-T88 carefully.

To View Titles

- Before starting operations, connect a monitor TV with MONITOR OUT connectors referring to "MONITOR OUT Connectors" on page 11.
- The JX-T88 has a sample title registered in the memory corresponding to the "MEMORY 6" button before shipment and this can be used for user reference.
  We recommend you refer to this before creating your own titles.



1. Press the POWER button.
   The power indicator and the "MEMORY 6" indicator (where the sample title is stored) will light.
2. Press the MEMORY 6 button.
   The indicator will blink.
3. Press the INSERT button.
   The MEMORY 6 indicator will light and the sample title will be displayed on the monitor screen.
   When the INSERT button is pressed again, the sample title will go out.

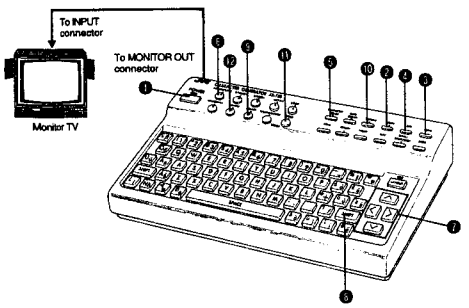
Caution

When the created title is registered in the memory corresponding to the MEMORY 6 button, the sample title memory will be erased. To recall the sample title again into MEMORY 6, in the Create mode, press and hold the CLEAR button while holding the SHIFT key depressed. (Only the MEMORY 6 indicator will light and the sample title will be registered in MEMORY 6 automatically.) Be careful, as all titles registered in MEMORY 1-10 apart from the sample title will also be cleared, at this time.

CREATING TITLES

Let's Try Creating

- Here, we describe creating the same title as the sample (still) title, for practice.



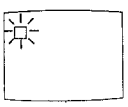
<sample title>

Preparation

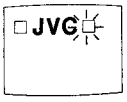
Connect the monitor TV referring to "MONITOR OUT Connectors" on page 11, and turn the power on.

To Create the Title

1. Press the POWER button ❶.
2. Press the CREATE button ❷ (to enter the Create mode).
3. Press the CLEAR button ❸.
   The character positions on the screen are filled with small white spaces ("cleared" screen).
4. Press the SIZE button ❹ three times to set the size of characters.
   The size of the spaces on the 1st line is set to LL (extra-large).
5. Select the character colour.
   (1) Press the CHARACTER COLOR button ❺ (to enter the Character Colour mode).
   (2) Press the MEMORY "1/RED" button ❻.
   The cursor turns red and blinks.

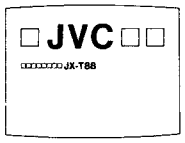


6. Enter "JVC" on the first line.
   (1) Move the cursor to the 2nd character of the 1st line using the ">" cursor key ❼ (to leave a one-character space).
   (2) While holding the SHIFT key ❽ depressed, press "J", "V" and "C" keys in order.
   The large characters "JVC" will be displayed on the monitor screen.



Then, enter the characters for the 3rd and subsequent lines.

7. Move the cursor to the 8th column of the 3rd line using the "^", "v", "<" and ">" cursor keys ❼.
8. Now, change the character colour.
   Press the MEMORY "8/BLACK" button ❽.
   The cursor turns black and blinks.
9. Enter "JX-T88".
   (1) While holding the SHIFT key depressed, press "J", "X", "-" and "T" keys in order.
   (2) Press the "8" key twice.
   The monitor screen now shows "JX-T88".



Enter the characters for the 4th and subsequent lines referring to 7, 8 and 9.

10. Enclose the characters in a box.
    (1) Press the OUTLINE button ❿ (to enter the Outline mode).
    (2) Move the cursor to the 1st line using the "^" cursor key ❼.
    (3) Press the MEMORY "10/BOX" button ⓫.
    The first line is enclosed.

JVC →

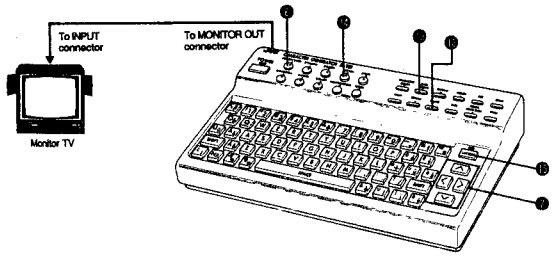
11. Add the edges (outline) to the characters.
    While holding the SHIFT key ❽ depressed, press the OUTLINE button ❿.

JX-T88 → **JX-T88**

12. Select the outline and box colour.
    Press the MEMORY "7/WHITE" button ⓬.

Notes:

- **If you enter the wrong characters:**
  Move the cursor to the position where the character should be corrected, then enter the correct character.
- **To delete an unnecessary character:**
  (1) Move the cursor to the position where the un-necessary character has been entered.
  (2) Press the SPACE key.
- **The box colour and the edge (outline) colour will be displayed in the same colour on the screen.**



■ Add the background colour.
(1) Press the BACK COLOR button ⑭ (to enter the Background Colour mode).
(2) Press the MEMORY "4/CYAN" button ⑫.

■ Set the title layout.
This is to adjust the position where title is displayed on the screen.
(1) Press the LAYOUT key ⑩.
The LAYOUT indicator lights and the unit enters the Layout mode.
(2) Using the ">" cursor key ⑬, move the entire title to the right.
Move so that the "V" of "JVC" is in the center of the screen, as a reference.
(3) Press the LAYOUT key ⑩ again to leave the Layout mode.
• If the title layout is changed in the Insert mode after it has been registered, the modified layout will be registered automatically.

■ Register the created title into "memory 1".
(1) Press the BACK COLOR button.
Check that the CHARACTER COLOR, BACK COLOR and OUTLINE indicators are not lit.
(2) Keep the MEMORY "1/RED" button ⑤ depressed.
The title created by the above procedure will be registered in the memory corresponding to the MEMORY "1/RED" button ⑤.
After title registration is completed, the CREATE indicator goes out, the MEMORY "1/RED" indicator blinks for a few times then lights steadily. The unit enters the Insert ON mode and the title without "spaces" is displayed.

■ Press the INSERT button ⑧.
Now, the title creation procedure is finished.
At this time, the MEMORY "1/RED" and MEMORY "6/MAGENTA" indicators light.
Pressing the INSERT button again will display the title on the screen once again.

Reference

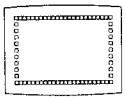
Repeating the following steps alternates between the sample title stored in MEMORY 6 and the newly-created title stored in MEMORY 1:

Press MEMORY 6
↓
Press the INSERT button.
(The sample title is displayed.)
↓
Press the INSERT button again.
(The sample title goes out.)
↓
Press the MEMORY 1 button.
↓
Press the INSERT button.
(The created title is displayed.)
↓
Press the INSERT button again.
(The created title goes out.)

To create a new title in the Create mode:

• Keep the CLEAR button depressed for about 2 seconds.
This will enter the "cleared" screen mode.

Clear screen mode



• Determine the position in which the first character is to be input using the cursor keys.
• Normally small letters are entered.
To input a capital letter, type it in while holding the SHIFT key depressed.

Example

A → a
SHIFT + A → A

To input a symbol or a character on the left of a key top, type in while holding the SHIFT key depressed.

Example To input "%":

SHIFT + [%] → %

• When a character is entered, the cursor moves to the next column automatically.
• When a character key is held depressed, the same character will be entered continuously.
• When a character is entered in the last position of a line, the cursor moves to the 1st position of the next line.
• To delete an unnecessary character, press the SPACE key to enter a "space" (white block).

Notes:

• **"Clear screen" display:**
This is the condition when white blocks the size of small characters fill the screen.

• **When the CREATE button is pressed after turning the power on, the JX-T88 enters the Create mode and the title that was displayed before turning the power off appears.**

■ Press the CREATE button (to enter the Create mode).
• On any page, two different character sizes can be used in two different sections (the 1st line and other lines), independently.

■ Move the cursor to the position where the character size is to be changed.

■ Press the SIZE button.
• Each time the SIZE button is pressed, the size of the character input at the position of the cursor varies in the order small (S), medium (M), large (L) and extra-large (LL).

Reference

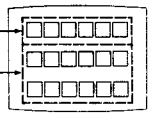
Enter characters referring to Table 1 below:
• The maximum number of characters on one line differs depending on the size of the characters selected.

Table 1: Relationship between Characters and No. of Lines displayed
(No. of characters x No. of lines)

B \ A		Size of characters on 1st line: Small (S)	Medium (M)	Large (L)	Extra-large (LL)
		24	12	8	1
Size of characters on 2nd and lower lines	Small (S)	24 × 11	24 × 11	24 × 11	24 × 10
	Medium (M)	13 × 5	13 × 5	13 × 5	13 × 5
	Large (L)	8 × 3	8 × 3	8 × 3	8 × 3
	Extra-large (LL)	6 × 2	6 × 2	6 × 2	1 × 2

A: Number of characters on the 1st line
B: Number of characters under the 1st line

Example of screen display



■ To Change the Character Colour

The character colour can be specified for each character independently.

■ Press the CHARACTER COLOR button (to enter the Character Colour mode).

■ Select the required colour with one of the eight MEMORY 1-8/COLOR buttons.
Character colours of red, yellow, green, cyan, blue, magenta, white or black are available. (There is a MEMORY 1-8/COLOR button corresponding to each of these.)

■ Enter the characters.
The characters entered are shown in the selected colour.

■ To Change the Character Colour without Changing the Entered Characters

Remaining in the Character Colour mode, perform in the following manner:

■ Select the required colour with one of the eight MEMORY 1-8/COLOR buttons.

■ Move the cursor to the position of the character whose colour is to be changed using the cursor keys.

Example To change the colour of "JX-T88"

(1) When the cursor is under the last character:

JX-T88 ← blinking cursor

While holding the SHIFT key, press the "<" key and hold it until the cursor reaches "J".

(2) When the cursor is under the first character:

blinking cursor → JX-T88

While holding the SHIFT key, press the ">" key and hold it until the cursor reaches the 2nd "8".

• The colour of "JX-T88" will be changed to the new colour.

■ After changing the character colour, press the CHARACTER COLOR button again to leave the Character Colour mode.

Notes:

• **In the Character Colour mode, when the cursor is moved to characters which have already been entered, the characters will blink in the new colour. But if no characters are input, the colour will not be changed.**
In this case, input the same character, or press the cursor "<" or ">" key while holding the SHIFT key.

• **The "space" indications (square blocks) are not registered.**

How to Add Variations to Characters

■ How To Add Variations In the Outline Mode

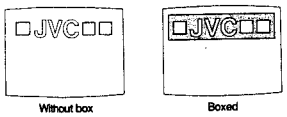
In the Outline mode, two variations are available; boxed and outlined characters.
Boxed characters can be specified for each individual line, while the outlined characters can be specified for all the characters on the same screen simultaneously.

There are two methods to enclose characters in a box: One encloses the area where characters are entered, and the other encloses an area that includes spaces as well as characters.

How To Enclose Characters

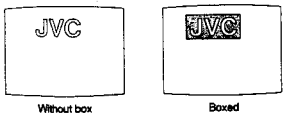
1. Press the OUTLINE button (to enter the Outline mode).
2. To enclose the area where characters are entered:
   (1) Move the cursor to the first line where there are characters to be enclosed in a box.
   (2) Press the MEMORY "10/BOX" button.
   (3) Select the required colour by pressing any of the eight MEMORY 1-8/COLOR buttons.

<Display in the Create mode>



Without box　　Boxed

<Display after registration>

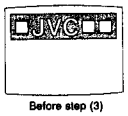


Without box　　Boxed

3. In step (3), pressing the "10/BOX" button alternates between boxed and normal characters.

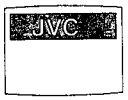
2. To enclose an area where there are spaces as well as characters:
   (1) Follow steps (1) through (3) in procedure 2 above.
   (2) Move the cursor to a position where there is no character (but on the same line) using the cursor keys.
   (3) While holding the SHIFT key, press the SPACE key.

<Display in Create mode>



Before step (3)

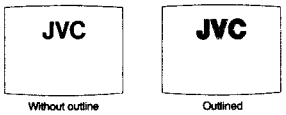
<Display in Create mode and after registration>



After step (3)

How To Add Edges (Outline)

1. Press the OUTLINE button (to enter the Outline mode).
2. While holding the SHIFT key, press the OUTLINE button again.
   All the characters on the screen will be outlined.
3. Select the required outline colour by pressing any of the eight MEMORY 1-8/COLOR buttons.



Without outline　　Outlined

4. Pressing the OUTLINE button while holding the SHIFT key depressed alternates between outlined and normal characters.

Notes:

- **When white is selected as the box colour, you will not be able to see the "space" indication as it is the same colour.**
  To check the space indication, change the character colour to a different one.
- **When the same colour as the character colour is selected for a box, characters will not be visible. Change either the character colour or the box colour.**

Note:

- **In one page of titles, only one colour can be used as the outline and box colour.**
  When the outline and box effects are used together, the box effect will have priority.

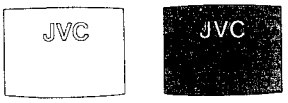
How to [illegible]

■ How To Add Background Colour

Titles can be inserted or scrolled with a coloured background, or superimposed on the input video picture: Selectable in the Background Colour mode.

[illegible]

1. Press the BACK COLOR button (to enter the Background Colour mode).
2. Select the desired colour with MEMORY 1-8/COLOR buttons.



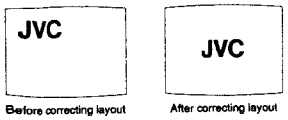
Without background　　With background

[illegible]

1. Press the MEMORY 9/SUPERIMPOSE button.
   Titles will be superimposed directly on the video picture.

■ How To Set Layout

1. Press the LAYOUT key (to enter the Layout mode).
2. Adjust the title display position using the "^", "v", "<" and ">" cursor keys.



Before correcting layout　　After correcting layout

3. After correcting the layout, press the LAYOUT key again to release the Layout mode.

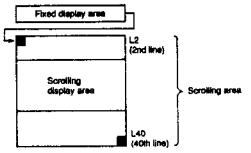
- The layout can also be adjusted while the title is displayed in the Insert mode.

Notes:

- **In the Create mode, when no background colour is specified, the title is superimposed directly over the video picture from the VCR or camcorder.**
- **When a VCR or camcorder is not connected to the INPUT connectors of the JX-T88, or when no video signal is input from them, the titles will be shown against a blue background supplied from the built-in SSG signal generator, but the resultant video signal will not include this blue background.**
  If you want a blue background, press the MEMORY 5/BLUE button.

Creating a Scroll Title

In the JX-T88, titles to be scrolled can be created and registered in the memories corresponding to the MEMORY 9 and MEMORY 10 buttons.
A scroll title consists of the two sections; a 1-line fixed display area and a scrolling area, as shown in the figure.



- Up to 40 lines of characters can be entered in one page of scroll title (including the fixed display area).

■ To create "WINTER HOLIDAY" (in the fixed display area), and "SKI" (to be scrolled) on a Scroll page:

* Here, the scroll title shown in the figure (on the right) will be created.

Character size: S

Character size: M

1. Press the POWER button.
2. Press the CREATE button (to enter the Create mode).
3. Enter the Scroll Title Create mode.
   - While pressing the LOAD button, press the MEMORY 9 or MEMORY 10 button.
   - The SCROLL START/STOP indicator will light together with the MEMORY 9 or MEMORY 10 indicator.
4. If the recalled memory is not a "clear screen", keep pressing the CLEAR button to set to a "clear screen".
5. Using the SIZE button, select the size of the characters to be entered in the fixed display area.
   - The number of characters in the headline is determined by the size of the characters selected.
6. Create the title.
   (1) Press the CHARACTER COLOR button and select the desired character colour using the MEMORY 1-8/COLOR buttons.
   (2) While holding the SHIFT key depressed, type in "WINTER HOLIDAY" for the fixed display area.
   (3) Move the cursor to the scroll area and type in "SKI" as shown in the figure.

(Continued to the next page.)

Note:

- **There is another way to enter the Create mode for scroll titles: Press either the MEMORY 9 or MEMORY 10 button, then press the CREATE button. However, in this case, a scroll title should have been registered in the memory corresponding to the MEMORY 9 or MEMORY 10 button pressed beforehand.**

Creating Scroll Titles

Add variations to characters

1. To enclose the characters in a box.
   (1) Press the OUTLINE button (to enter the Outline mode).
   (2) Move the cursor to the line to be enclosed in a box, and press the MEMORY 10/BOX button.
2. To add edges (outline) to characters.
   (1) In the Outline mode (see above), while pressing the SHIFT key, press the OUTLINE button.
   (2) Select the outline colour with the MEMORY 1-8/COLOR buttons.
3. To add a background colour.
   (1) Press the BACK COLOR button (to enter the Background Colour mode).
   (2) Select the background colour with the MEMORY 1-8/COLOR buttons. Or, press the MEMORY 9/SUPERIMPOSE button to select a "transparent" background (so that the title will be superimposed over the video picture).
4. To lay-out the title.
   (1) Press the LAYOUT button.
   The indicator above the button lights and the unit enters the Layout mode.
   (2) Adjust the position of the entire title using the cursor keys.
5. To set the scrolling speed.
   Each time the SPEED button is pressed, the scrolling speed is changed in 4 steps, in the order "1", "2", "3", "4" and back to "1" again. The higher the number, the faster the scrolling.
6. To register the title.
   (1) Release the Character Colour, Background Colour and the Outline modes.
   (2) Press either the MEMORY 9 or MEMORY 10 button and hold it. When registration of the title is completed, the CREATE indicator goes out, and the indicator of the button with which the title has been registered blinks a few times, then lights steadily.

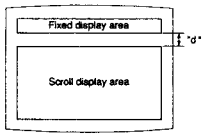
Caution

Laying out the created title can also be done in the Insert ON mode after registration. After setting the layout, this modification will be registered automatically.

To set the space "d" between the fixed display area and scrolling display area

This setting is only possible when creating scroll titles.

1. Press the LAYOUT key (to enter the Layout mode).
2. While pressing the SHIFT key, press the "^" or "v" cursor key to adjust space "d" between the fixed display area and the scrolling display area.



- The distance between the fixed display area and the scrolling display area differs depending on the size of the characters in the fixed display area (for headline).

Size of fixed-area characters	Scroll area position
Small (S)	3 lines are left below the fixed area
Medium (M)	2 lines are left below the fixed area
Large (L)	1 line is left below the fixed area
Extra large (LL)	No spacing

Notes:

- **When the SPEED button is pressed while creating scroll titles, the SCROLL SPEED will be displayed at the top right corner of the screen.**
- **While entering characters, when the cursor is moved to another line, the LINE number will be displayed at the top right corner of the screen.**
- **When the SCROLL SPEED or LINE number is displayed at the top right corner of the screen, the characters or space indications on the line will disappear.**

Registration of Titles

In the Create mode, the created titles can be stored in memory by the following operations.

To register titles

1. After a title has been created, press the MEMORY 1 - 10 button corresponding to the memory in which you want to register it until the indicator lights.
   - When the registration of the title is completed, the indicator of the button pressed will light and the registered title will be displayed on the monitor screen.
   When a scroll title is registered, the indicator of the button as well as the SCROLL START/STOP button will light.

To return to the Create mode after registration

1. Press the INSERT button.
   The displayed title will go out.
2. Press the CREATE button.
   The registered title will be displayed in the Create mode.

Notes:

- **When a newly-created title is registered using any of the MEMORY 1-10 buttons, the title which was previously registered using same button will be erased and replaced by the new title.**
- **"Still" titles can be registered using any of the MEMORY 1-8 buttons, and cannot be registered using the MEMORY 9 or MEMORY 10 button.**
- **"Scroll" titles can be registered using either the MEMORY 9 or MEMORY 10 button, and cannot be registered using the MEMORY 1-8 buttons.**

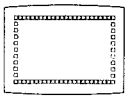
[illegible]

To Modify A Registered Titles

1. Press the CREATE button (to enter the Create mode).
2. Recall the title to be modified.
   - While pressing the LOAD button, press one of the MEMORY 1-10 buttons corresponding to the title to be modified.
   Another way is to press the MEMORY 1-10 button corresponding to the title to be modified, and then press the CREATE button.
3. Correct (or modify) the title by the same procedure as in "Let's Try Creating A Title" on page 14.
   (1) Select the size of characters.
   (2) Select the character colour.
   (3) Enter the characters.
   (4) Enclose the characters in a box, if required.
   (5) Add edges (outline) to the characters, if required.
   (6) Select the background colour.
   (7) Set the layout of the title.
   (8) Register the modified title again.

To Clear Current Characters and To Enter New Characters

1. Keep pressing the CLEAR button.
   All the characters currently displayed will be erased from the screen, and a "clear" screen with small-sized space indications will be displayed.



To D[illegible]

To Display Registered Titles

To Display A Still Title:

1. Press the MEMORY 1-8 button corresponding to the title to be displayed.
   The indicator of the button pressed will blink..
2. Press the INSERT button.
   The recalled (still) title will be displayed.
3. To erase the title from the screen, press the INSERT button again.

To Display A Scroll Title:

1. Press the MEMORY 9 or MEMORY 10 button corresponding to the title to be displayed.
   The indicator of the button pressed will blink.
2. Press the INSERT button.
   - When characters are entered in the fixed display area, they will be displayed and the specified background colour will also be displayed.

3. Press the SCROLL START/STOP button.
   - Characters entered in the scrolling display area will be scrolled from the bottom toward the top (while the characters in the fixed display area remain displayed).
   - At this time, pressing the SCROLL START/STOP button repeatedly stops and restarts scrolling.

4. To erase the (scroll) title from the screen, press the INSERT button again.

Note:

- **When displaying a scroll title, if the SCROLL START/STOP button is pressed before pressing the INSERT button, the operations described in [illegible] and [illegible] will be executed immediately.**

To Fade a Title In and Out

To Fade a Still Title In/Out:

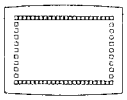
1. Press the MEMORY 1-8 button corresponding to the title to be displayed.
   The indicator of the button pressed will blink.
2. Press the FADE button.
   The recalled title will be faded in.
3. To fade out the title, press the FADE button again.

To Fade a Scroll Title In/Out:

1. Press the MEMORY 9 or MEMORY 10 button corresponding to the title to be displayed.
   The indicator of the button pressed will blink.
2. Press the FADE button.
   - When characters are entered in the fixed display area, they will be faded in and the specified background colour will also be faded in.
3. Press the SCROLL START/STOP button.
   - The scrolling area of the title will be scrolled from the bottom of the screen toward the top.
   - At this time, pressing the SCROLL START/STOP button repeatedly stops and restarts scrolling.
4. To fade out the scroll title, press the FADE button again.

D[illegible] T[illegible]

1. Press the CREATE button (to enter the Create mode).
   The create screen with the title displayed immediately before turning the power off, or the create screen with the last title registered will appear on the monitor.
2. Recall the title to be deleted.
   - While pressing the LOAD button, press one of the MEMORY 1-10 buttons.
   The title stored in memory corresponding to the button pressed will be displayed and the indicator of the button pressed will blink.
   When the scroll title is recalled, the SCROLL START/STOP indicator lights as well.
3. Keep pressing the CLEAR button.
   The title displayed will go out and the "space" indications will be shown.



4. Register the "cleared" screen.
   - Keep pressing the button used to register the recalled title (MEMORY 1-10).
   When deleting a title is completed, the indicator of the button pressed will blink for a few times then go out. The CREATE indicator also goes out.
   The screen will now shows the picture of the video signal input via the INPUT connectors of the JX-T88.
   When no video signal is input to the JX-T88, the screen becomes black.

Note:

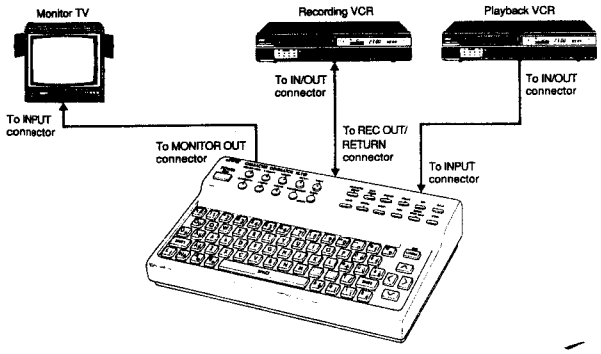
- **Instead of the operation of [illegible] and [illegible] you can recall the title to be deleted in the following manner.**
  (1) Press one of the MEMORY 1-10 buttons corresponding to the title to be deleted.
  (2) Press the CREATE button.
  The title recalled will be displayed on the create screen.

To Delete All The Registered Titles

1. Press the CREATE button (to enter the Create mode).
2. While pressing the SHIFT key, press and hold the CLEAR button.
   When deleting all titles is completed, the CREATE indicator and the MEMORY 6 indicator light.

The title registered on the MEMORY [illegible] button will be deleted and the sample title will be registered automatically.

VIDEO EDITING WITH TITLES



The above diagram shows an example of connections for video editing.
Make connections referring to "CONNECTIONS" on page 7 – 11.

Example

To Edit Video While Fading The Sample Title (Registered in MEMORY 6) In/Out Using Recording VCR

1. Check the sample title to be faded in/out.
   (1) Press the MEMORY 6 button.
   (2) Press the INSERT button.
   The recalled title will be displayed on the monitor screen.
   (3) Check the title displayed, and press the INSERT button again so that it disappears from the screen.
2. Run the playback VCR till the edit-start point and set the VCR to the pause/still mode.
3. Set the recording VCR to the record-pause mode.
4. Start playing the playback VCR and set the recording VCR to the record mode.
5. When the scene at which the title is to be inserted is reached, press the FADE button.
6. When the scene at which the title is to go out is reached, press the FADE button again.
7. After editing is completed, set the recording VCR to the record-pause mode.

To Monitor The Tape Edited With the Recording VCR

1. Press the RETURN button.
2. Rewind the tape to the point from which editing starts, and start playback.

Notes:

- **When recording onto the VCR used for recording, select the "AUX" or "EXT" input mode of the recording VCR using the input selector or channel up/down buttons.**
- **To monitor the RETURN signal (recorded on the VCR), make sure that the signal select switch of the recording VCR matches the position of the input select switch of the monitor TV ("COMPOSITE" or "Y/C").**

■ To Edit Video While a Scroll Title (Created in "Creating Scroll Titles") is Faded In/Out Using Recording VCR

Preparation

According to the procedure in "Creating Scroll Titles" on page 23 – 24, create the scroll title to be faded in/out.

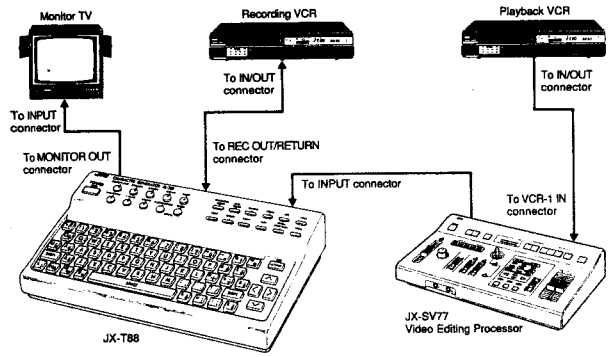
1. Check the scroll title.
   (1) Press the MEMORY 9 or MEMORY 10 button in which the scroll title to be faded in/out has been registered.
   (2) Press the SCROLL START/STOP button to start scrolling to check the contents.
   (3) After checking the scroll title, press the INSERT button so that it disappears out from the screen.
2. Run the playback VCR to the edit-start point and set the VCR to the pause/still mode.
3. Set the recording VCR to the record-pause mode.
4. Start playing the the playback VCR and set the recording VCR to the record mode.
5. When the scene at which the title is to be inserted is reached, press the FADE button.
   The fixed display area of the scroll title will be faded in.
6. Press the SCROLL START/STOP button.
   The scrolling section will be scrolled from the bottom of the screen to the top.
7. When the scene where the title is to fade out is reached, press the FADE button again.
8. After editing is completed, set the recording VCR to the record-pause mode.

Notes:

- **When fading a scroll title in/out by pressing the FADE button, if no characters have been input in the fixed display area, only the background colour or the input video picture will be displayed.**
- **When recording onto the VCR used for recording, select the "AUX" or "EXT" input mode of the recording VCR using the input selector or channel up/down buttons.**

VIDEO EDITING WITH VIDEO PROCESSOR

When JVC JX-SV77 Video Editing Processor is used together with the JX-T88, more versatile video editing procedures are possible, using user-created titles as well as multiple editing functions.



Preparation

Connect the components as shown in the above diagram, and set the switches of each component as follows:

1. Set the VIDEO OUT switch of the playback VCR and the SIGNAL SELECT switch for the VCR-1 INPUT connector of the JX-SV77 to either the "COMPOSITE" or "Y/C" position so that they are the same.
2. Set the SIGNAL SELECT switch for the MONITOR OUT connector of the JX-SV77 and the SIGNAL SELECT switch for the INPUT connector of the JX-T88 to their "Y/C" positions.
3. Set the AUX INPUT SELECT switch of the recording VCR to the "AV (IN/OUT connector)" position, and select the signal as either "COMPOSITE" or "Y/C" so that the VIDEO OUT switch of the recording VCR and the signal select switch of the REC OUT/RETURN connector of the JX-T88 are set to the same position.
4. Set the INPUT MODE select switch of the monitor TV and the SIGNAL SELECT switch for the MONITOR OUT connector of the JX-T88 to either the "COMPOSITE" or "Y/C" position so that they are the same.

Note:

- **When recording using the VCR used for recording, select the "AUX" or "EXT" input mode of the recording VCR using the input selector or channel up/down buttons.**

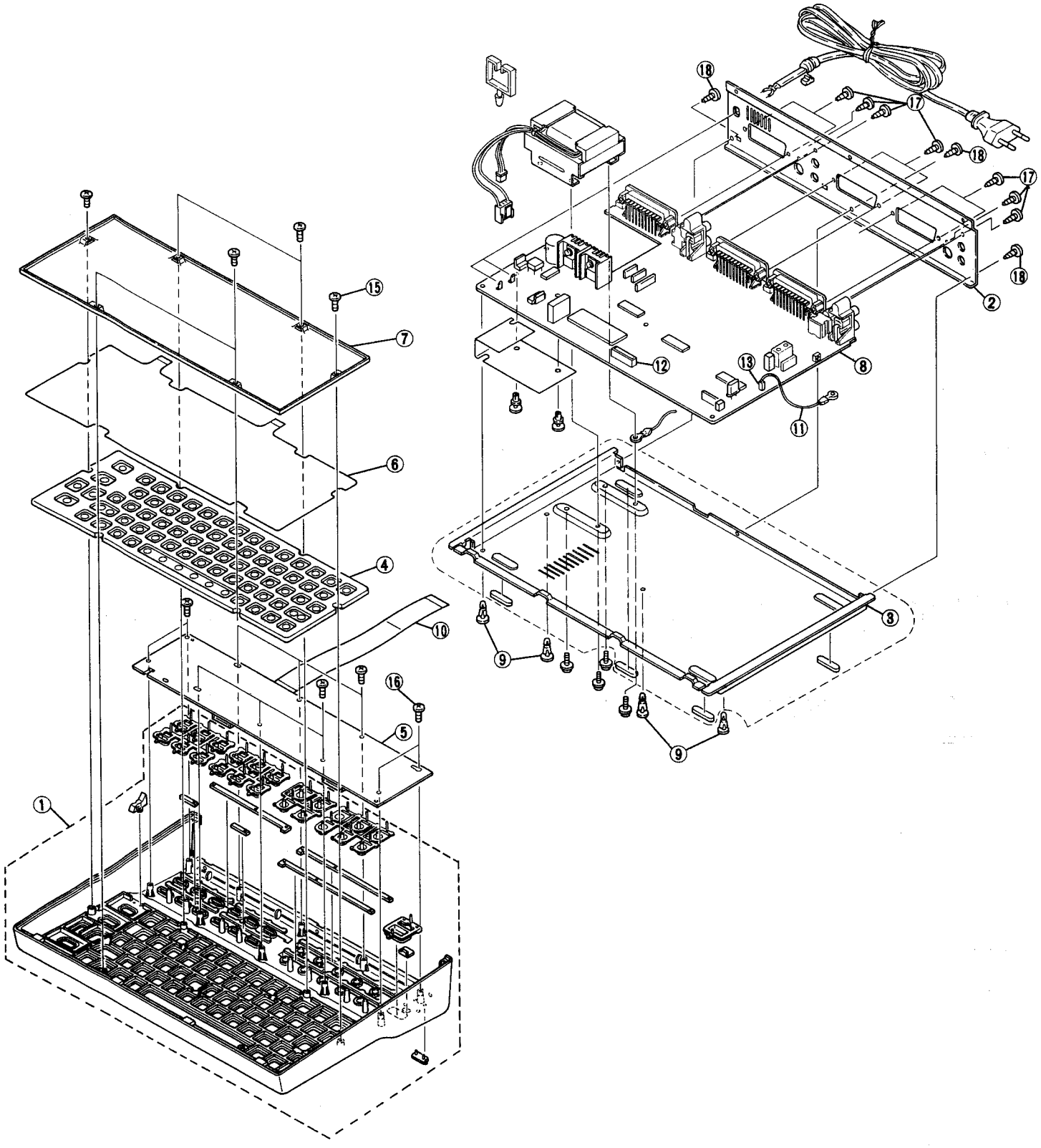
Turn on the power of each component and start editing:

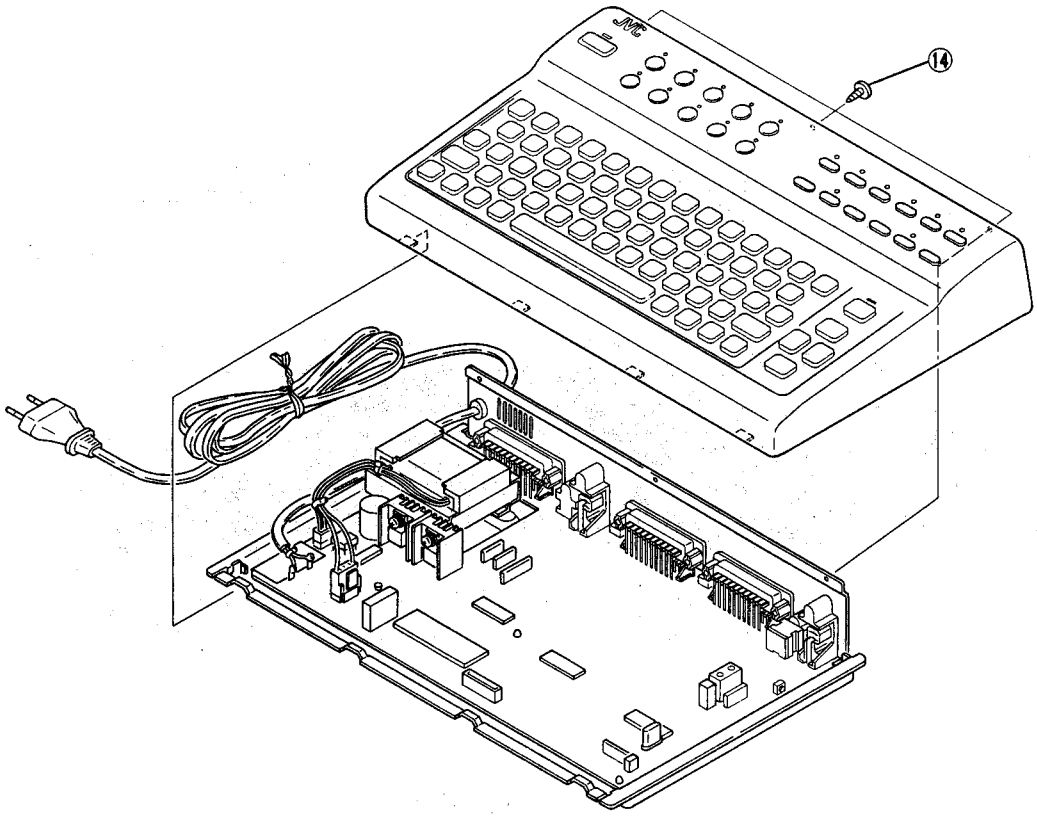
1. Press the SOURCE SELECT "1" button on the JX-SV77.
2. Press the "PROGRAM" button of the JX-SV77 to check the wipe functions, etc. to be used for editing.
3. According to the procedure in "VIDEO EDITING WITH TITLES" on page 28 – 29, start the playback VCR and recording VCR, and when the scene at which the title is to be inserted is reached, display the title registered in the JX-T88.
4. Use the wipe patterns, etc. provided on the JX-SV77 as required.

Features of the JX-SV77 Video Editing Processor

- **Multi-function video editing processor, fully compatible with Super VHS VCRs and camcorders**
- **Versatile wipe function with background colour generator**
- **Video/audio faders**
- **Character generator function**
- **Easy colour balancing with joystick controller**
- **Audio mixing function**
- **Image enhancement**
- **Colour level adjustment**
- **Editing control function for use with certain JVC VCRs**
- **Colour bar generator built-in**
- **Bypass switch provided**

5. Disassembly





Note: As for the position of the connector, see page 23.

■ How to Remove the Front Panel Ass'y ①

1) Remove the three screws ⑭ on the rear panel of the unit.
2) Remove the front panel ass'y ① slowly to the front side. At this time, dismount the wire ass'y ⑩ and ⑪ connected to the main P.C. board from the respective connectors ⑫ and ⑬. Then, the front panel ass'y ① will be separated from the chassis ass'y ③.

■ How to Remove the Keyboard ④ and Front P.C. Board Ass'y ⑤

1) Remove the six screws ⑮ fixing the frame ⑦.
2) Slowly dismount the frame ⑦.
3) Raise the FPC ⑥ and take out the keyboard ④.
4) Remove the ten screws ⑯ fixing the front P.C. board ass'y ⑤.
5) Slowly dismount the front P.C. board ass'y ⑤.

■ How to Remove the Main P.C. Board Ass'y ⑧

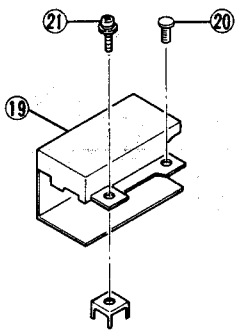
Remove this assembly after dismounting the front panel ass'y ①.

1) Remove the ten screws ⑰ for fixing the respective jacks on the rear panel ②.
2) Remove the three screws ⑱ fixing the chassis ③.
3) Remove the four claws for the locking card spacer ⑨, and slowly dismount the main P.C. board ass'y ⑧.

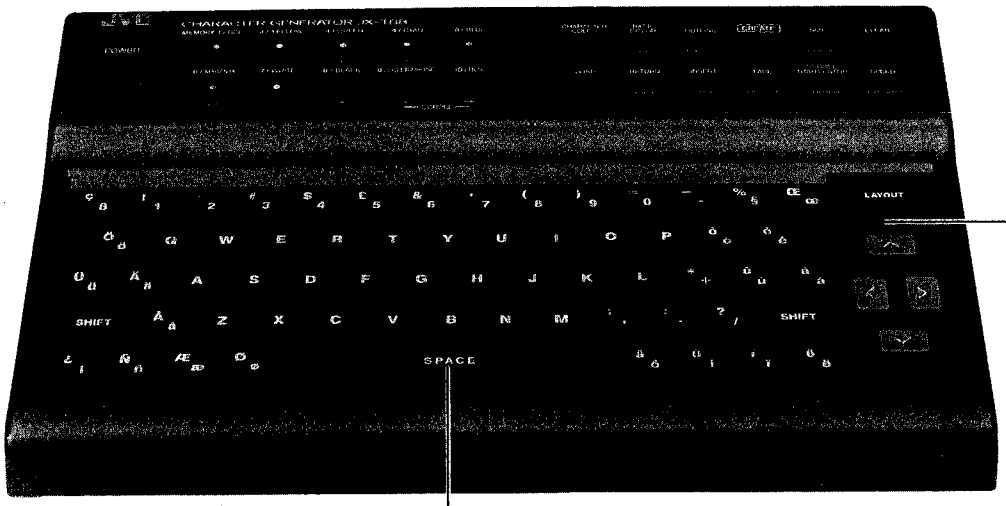
For (EG) models

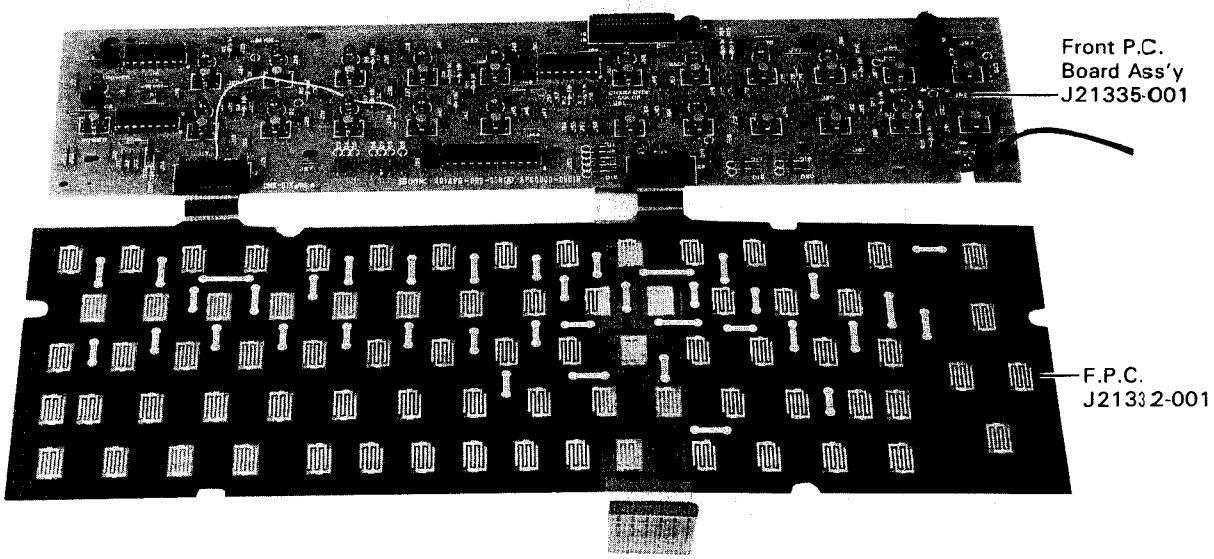
■ How to Remove the Insulation Sheet (B) ⑲

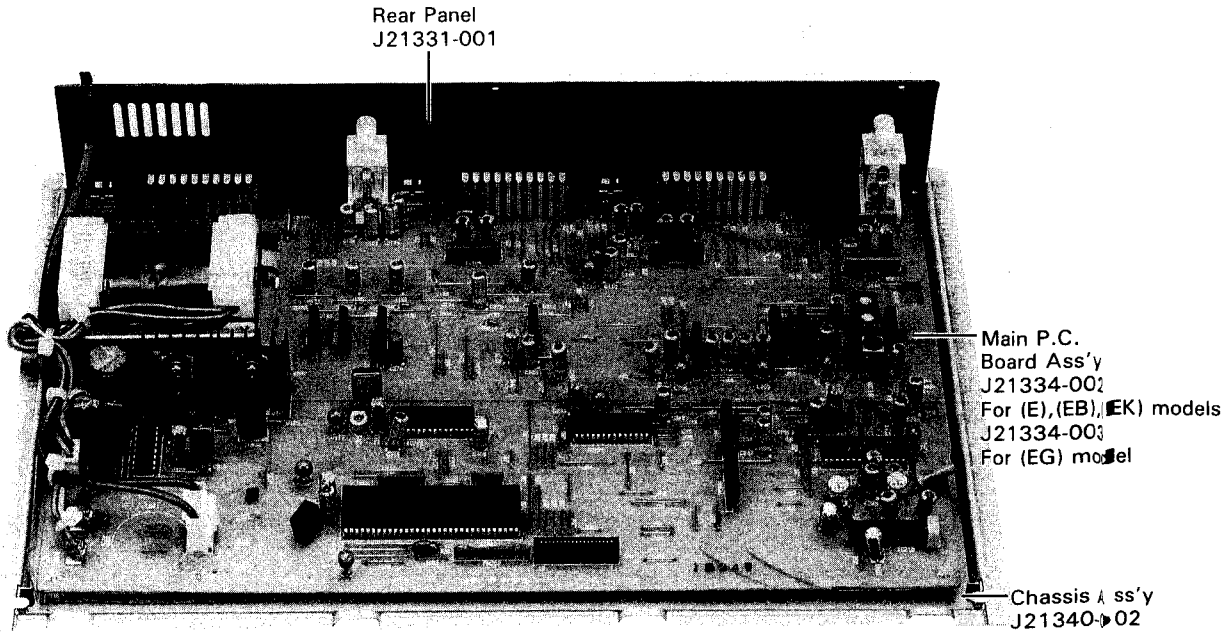
1) Remove the nylon revet ⑳ and screw ㉑, respectively.
2) Slowly dismount thee insulation sheet (B) ⑲.



6. Main Parts Locations



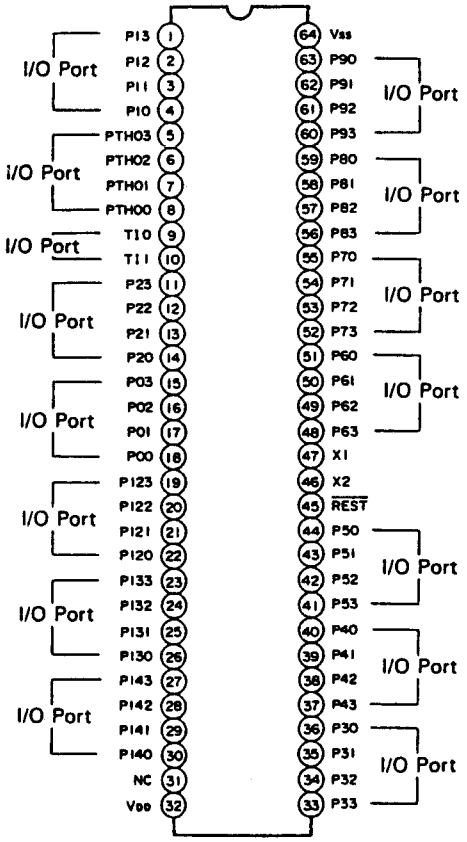




7. Description of Circuits

1 IC223 μPD75106CW-201

*μPD75106CW is a 4-bit microcomputer with program memory (ROM) of 6016 × 8-bit and data memory (RAM) of 320 × 4-bits.



1) Terminal names

VDD: Power supply teerminal +5.0 V connection
Vss: Grand terminal
RESET: Reset terminal
When the power is turned on, this terminal is retained in "L" (for about 40 ms) and reseet is performed.
X1, X2: Terminal for connection of system clock.
This unit is connected to a liquid crystal oscillator or a ceramic oscillator.
P1: Input port
P0, P2~P14: Input/output port
PTH, T1

2) Port allocation for IC223 μPD75106CW-201

Pin Name	Pin No.	Part Name	I/O	Function
P13	1	$\overline{\text{S. DET}}$	I	Decision whether there is any external signal or not.
P12	2		—	Connect to ground
P11	3			Connect to ground
P10	4	V. SYNC	I	Vertical synchronizing signal input
PTH03	5	K3		Key input for ü,ö, Q, W, E, R, T, H, Y, I, O, L, P, ó, é, á <, Power, Memory 6, 7, 8, 9, 10
PHT02	6	K2		Key input for ¡, Å, Ñ, æ, ϕ, X, C, V, SPACE, N, M, Ô, ., í, ï, ë, V, START/STOP, FADE, INSERT, RETURN, LOAD, SPEED
PTH01	7	K1		Key input for SHIFT, Ä, A, Z, S, D, F, G, B, J, K, ,, +, /, ú, >, Memory 1, 2, 3, 4, 5
PTH00	8	K0		Key input for ß, 1, 2, 3, 4, 5, 6, 7, U, 8, 9, 0, —, §, œ, LAYOUT, ∧, SIZE, CREATE, OUTLINE, BACK COLOR, CHARACTOR COLOR, CLEAR.
TI0	9		—	Connect to ground.
TI1	10	HD	I	Input of horizontal drive pulse.
P23	11	RAM Address A12	O	Address control of IC 225 (Memory IC LH5160N)
P22	12	$\overline{\text{CS}}$		Input to pin 7 ($\overline{\text{CS}}$) of IC222 (C.G. IC M50458)

Pin Name	Pin No.	Part Name		I/O	Function
P21	13	$\overline{WE}$		O	Input to IC225 (Memory IC) 27 pin ($\overline{WE}$)
P20	14	$\overline{CE}$			Input to IC225 (Memory IC) 20 pin ($\overline{CE}$)
P03	15	PAL/NTSC SW		I	Connect to ground
P02	16	SO		O	Input to IC222 (C.G. IC) 8 pin (SIN) Outputs serial data to control display.
P01	17	S.CLK			Input to IC222 (C.G. IC) 2 pin (SCK) Output clock to transfer serial data.
P00	18			1	Connect to ground
P123 ~ P120	19	RAM Data	D_0	I/O	Date input/output for IC225 (Memory IC)
	20		D_1		
	21		D_2		
	22		D_7		
P133 ~ P130	23		D_6		
	24		D_5		
	25		D_4		
	26		D_3		
P143	27			O	Selection of back color and non back color; "H" = OFF
P142	28	Back color B			Output signal of back color R, G and B Input to IC204 pin 6 (B), pin 5 (G) and pin 4 (R)
P141	29	Back color G			
P140	30	Back color R			
NC	31			—	Connect these pins to the 5 V line.
V_{DD}	32	V_{DD}		—	5 V
P33 ~ P30	33	RAM Address	A10	O	Address control of IC225 (Memory IC)
	34		A11		
	35		A9		
	36		A8		
R43 ~ O40	37		A0		
	38		A1		
	39		A2		
	40		A3		
P53 ~ P50	41		A4		
	42		A5		
	43		A6		
	44		A7		
Reset	45	RESET		I	Reset input.
X1	46			—	System clock oscillating terminal.
X2	47				
P63 ~ P60	48	S4		O	Strobe signal of IC1 at "L": Latching
	49	S3			Strobe signal of IC2 at "L": Latching
	50	S2			Strobe signal of IC3 at "L": Latching
	51	S1			Strobe signal of IC4 at "L": Latching
P73	52	RETURN		O	Return [ON/OFF] selection signal output; "H" = ON
P72	53	V. BLK		I	V. blanking input

Pin Name	Pin No.	Part Name	I/O	Function
P71	54			Not used
P72	55	Power	O	Output power ON/OFF signal, "L" = ON
P83 ~ P80	56 ~ 59	MSB ↑ FADER ↓ LSB	O	• Output fader control signal. The 8 bit digital data is converted to analog data by the resistor array RN202. • All ports will be converted to "H" when [INSERT] is ON.
P93 ~ P90	60 ~ 63			
Vss	64	Vss	—	Ground

2 IC222 M50458-066SP

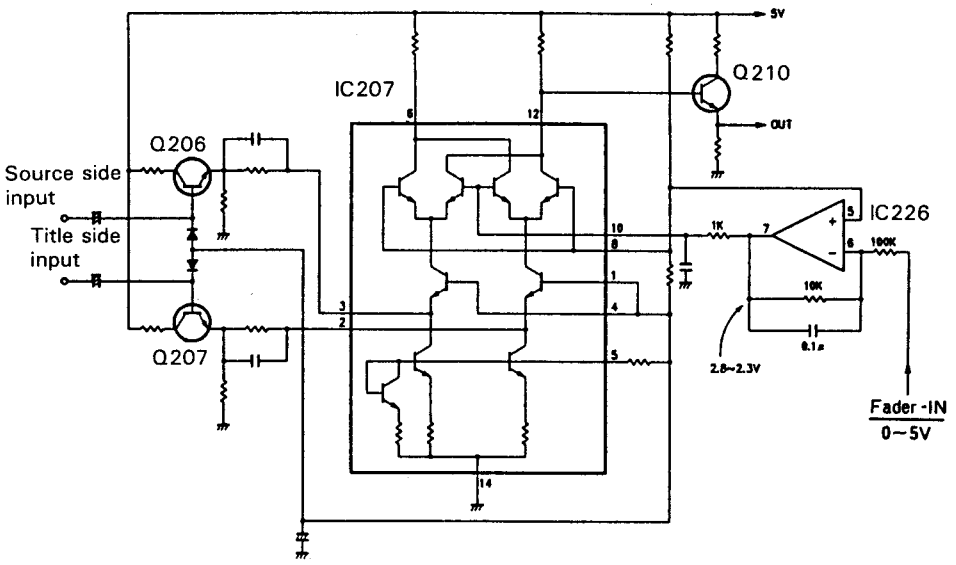
Display Controlleer IC connected to 4 bit microcomputer.

Pin No.	Part Name	Function
1	Vss	Ground
2	SCK	After initiation of SCK, the SIN serial data will be taken in.
3	AUT CLEAR input	The internal circuit of IC will be reset at the "L" state.
4 5	OSC 1 OSC 2	Terminal for external mounting of oscillator circuit for indication. Oscillation frequency: 7 MHz
6	NTSC/PAL selection input	Terminal for selecting NTSC and PAL system synchronized signal generation. "H" = NTSC, "L" = PAL
7	$\overline{CS}$	Chip seleect terminal. Set at low level when transterring serial date.
8	SIN	Serial data input terminal for display control.
9	SYEX	Not used
10	VIDEO	Composite video output terminal. (2 Vp-p) This video will be output in case there is no external input signal.
11	Vss	Ground
12	Y	Not used
13	White level	Input terminal for determining the "white" level of the character color in the composite video signal.
14	Black level	Input terminal for determining the "black" level of the character color and "blanking" level in the composite video signal.
15	RS IN	Connect this part to RS OUT (pin 16).
16	RS OUT	Connect this part to RS IN (pin 15).
17	C IN	Not used
18	V_{DD}	Connect this part to the +5 V line.
19~22		Not used.
23	Ys	Ys signal output terminal.

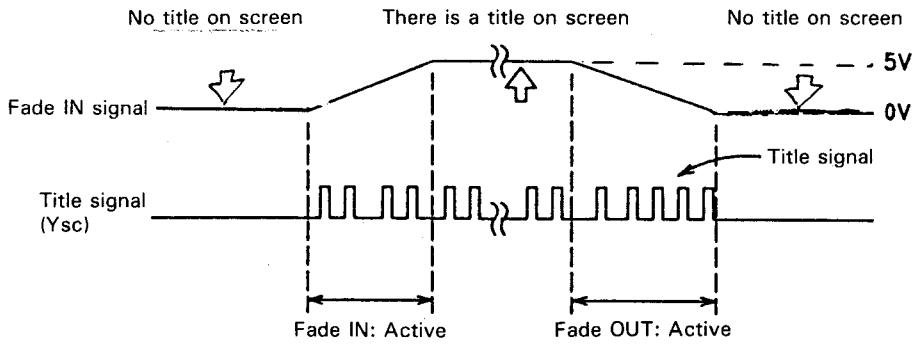
Pin No.	Part Name	Function
24	B out	Outputs character signal by controlling display memory color code.
25	G out	
26	R out	
27	—	Not used.
28	OSC IN	• Terminal for connecting the oscillator circuit for synchronizing signal generation.
29	OSC OUT	• 17.73 MHz will be input from the crystal oscillator.
30	HD	Input of horizontal drive pulse.
31	V SYNC	Input of vertical drive pulse.
32	V_{DD}	Connect this part to the +5 V line.

3 Action of IC NJM1496 (IC207 and 208) for Fade IN and OUT

These NJM1496 ICs are double-balanced modulation and demodulation ICs, and constitute gain adjustment circuits of video signal.



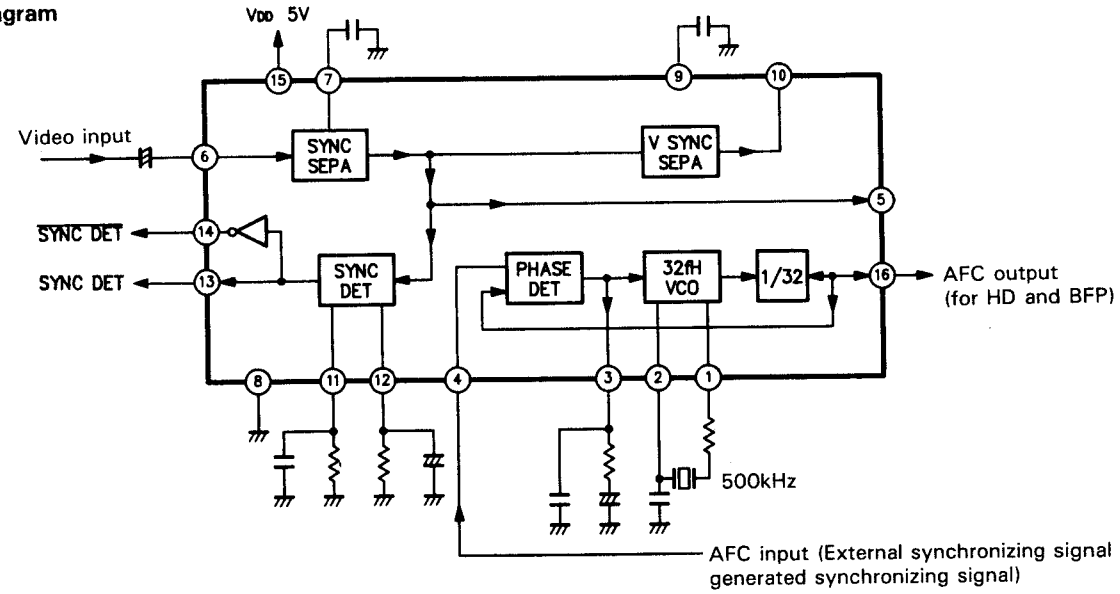
The above diagram indicates the fader circuit of the Y signal system of this device. When the fader control signal (Fade IN) is "L" (0 V), the source side signal will be output, but when the signal is "H" (approx. 5 V), the title side signal be output.



4 Action of IC NJM2229S (IC215) for Synchronizing Separation

This NJM2229S is designed to perform synchronizing separation of composite video signal and fetch horizontal and vertical synchronizing signals. Moreover, it will detect synchronizing signal and output the results of decision on whether there is any such signal.

Block diagram



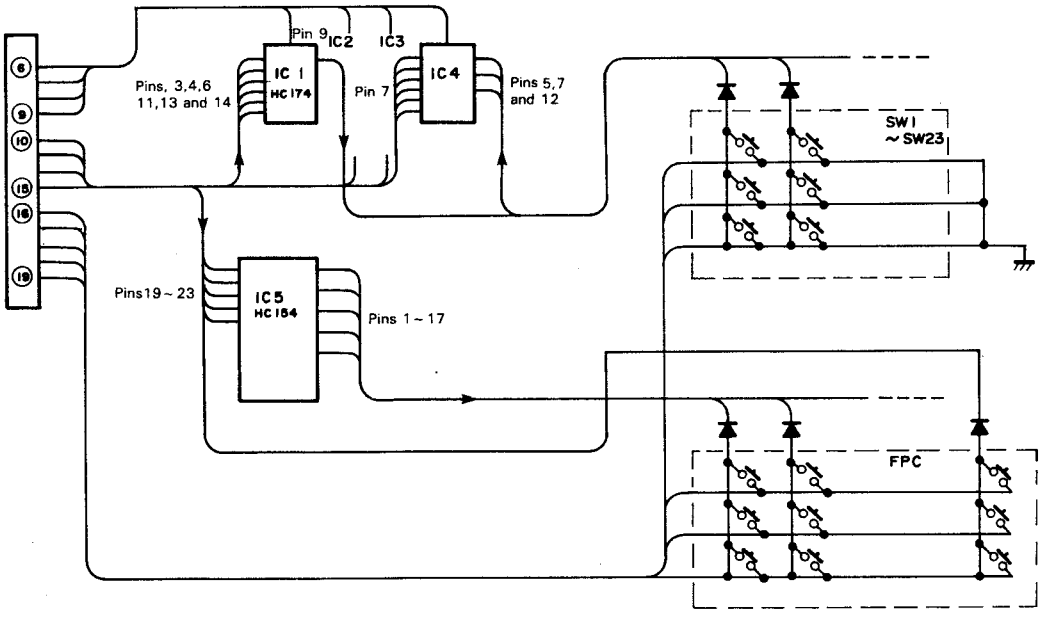
① The video signal selected by IC214 (TC 4W53) will be input to the pin 6, and a composite synchronizing signal be output from the pin 5.
→ External synchronizing signal

② The external synchronizing signal and inteernally generated synchronizing signal (IC203 M51279S pin 30) will be input to the pin 4, and the AFC output be obtained from the pin 16. The output will be converted to HD by IC216 (TC4SU69F).

③ The output of the pin 13 selects external input signal (source signal) and internally generated synchronizing signal. When there is any external input signal (source signal), it will be "H".

④ The output of the pin 14 selects external input signal (source signal) and internal synchronizing signal of microcomputer. When there is any external input signal (source signal), it will be "L".

5 Input Key Matrix Circuit



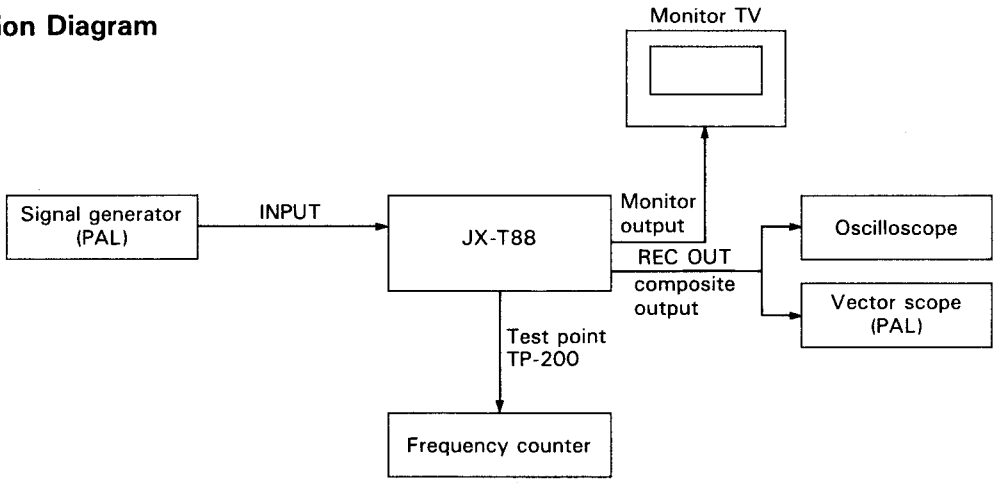
The output side and input side of key matrix from the data bus of the pins 10 ~ 15 of CN1 will be processed respectively by IC1 ~ 5 and IC223 through the CN1 pins 6 ~ 19.

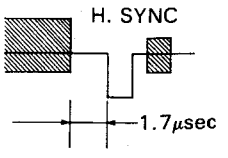
8. Adjustment Procedures

■ Instruments Necessary for Adjustment

1. Oscilloscope
2. TV signal generator (PAL)
3. Frequeency counter
4. Vector scope (PAL)
5. Monitor TV (PAL)

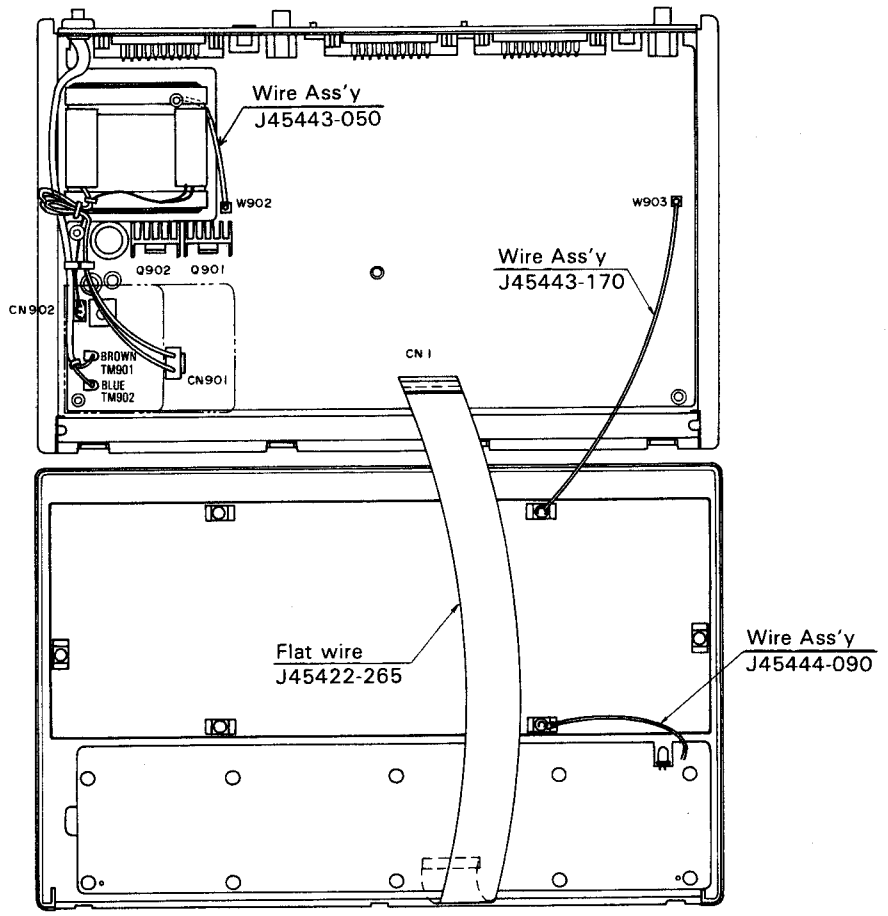
■ Connection Diagram



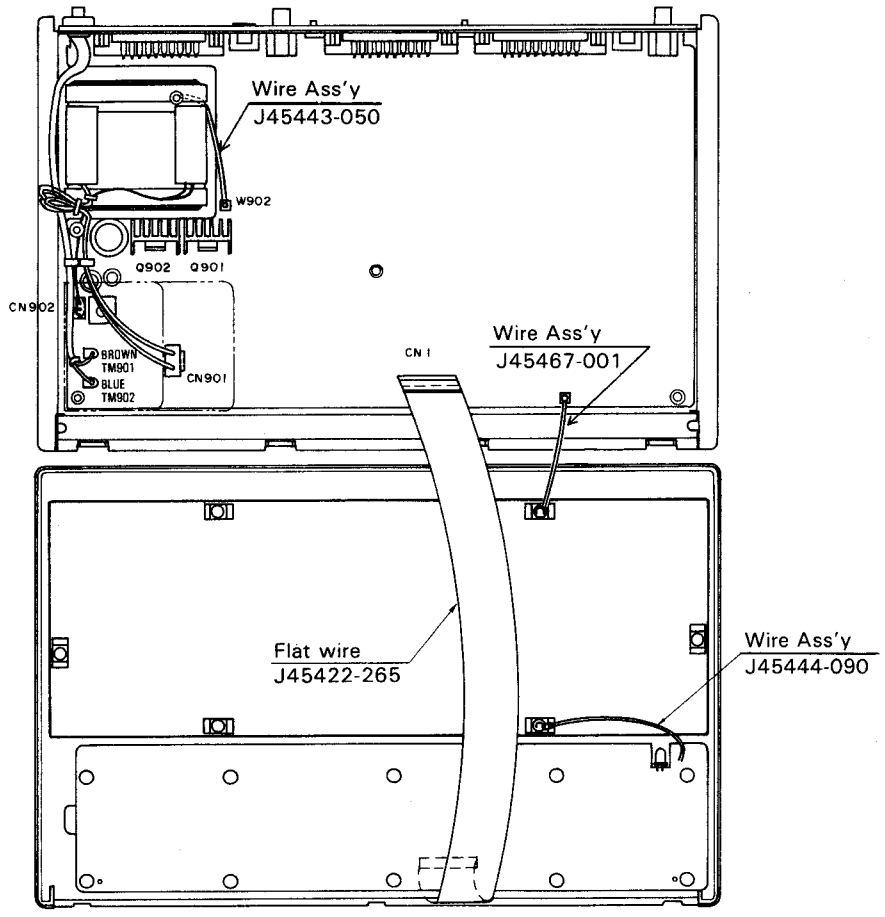
	Test point	Adjusting position	Adjustmeent items	Conditions	Measurement
1.	TP200	CV200	PLL free run frequency	Input signal ... White 100% No burst signal	With CV200, adjust the free run frequency so that the frequeency counter value beecomes 4.433619 MHz ± 10 Hz.
2.	TP200	CV201	Character generator fsc oscillation frequeency	Input signal ... None No Connection.	With CV201, adjust the fsc oscillation frequency so that thee frequency counter value becomes 4.433619 MHz ±10 Hz.
3.	REC OUT composite output	VR201	Character generator hue.	Input signal ... Non (No connection) [CREATE] key ... ON (Turn to blue back screen)	With VR201, adjust the hue so that the vector scope value becomes blue ±7°.
4.	REC OUT composite output	VR200	Color saturation degree	Input signal ... Color bar [CREATE] key ... OFF [INSERT] key ... OFF Turn to the output screen of only input signal.	With VR200 and oscilloscope, adjust the degree so that the chromatography level of the color bar output signals Cy and R become 0.664 Vp-p ±5 %.
5	REC OUT composite output	VR202	H. blanking width	Input signal ... Color bar [CREATE] key ... ON [BACK COLOR] key ... ON [color] key ... BLUE	With VR202, adjust the blanking width of the [BACK COLOR] front porch section to the width in the diagram below: 

9. Wiring Diagrams

For (E),(EB),(EK) models



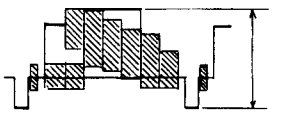
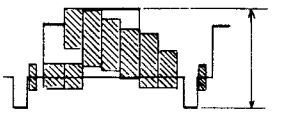
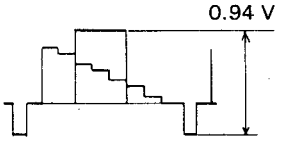
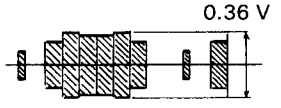
For (EG) model

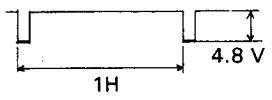
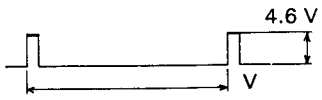
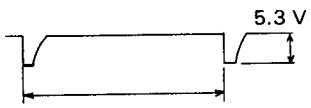
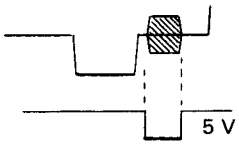
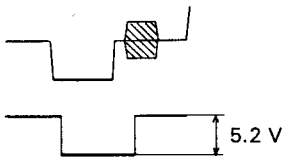
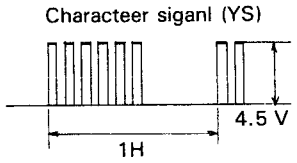
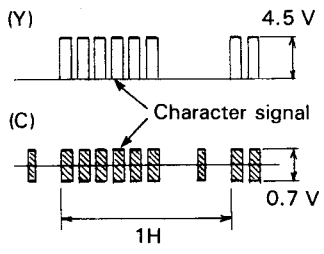


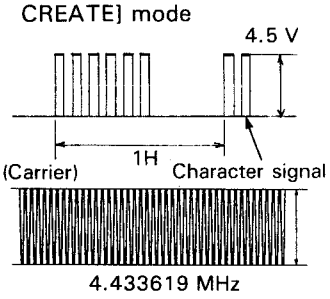
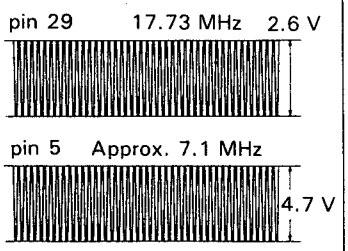
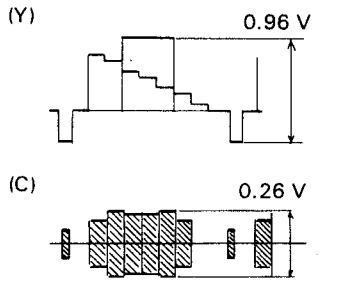
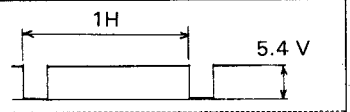
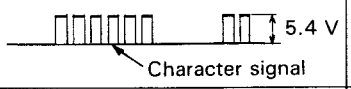
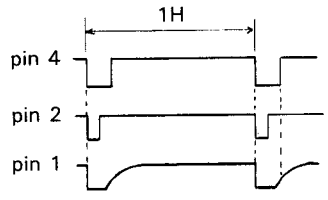
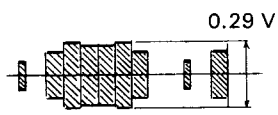
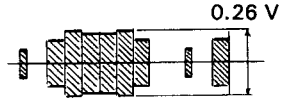
10. Troubleshooting

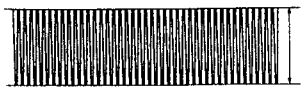
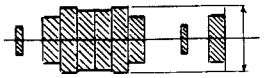
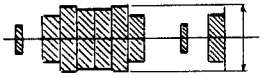
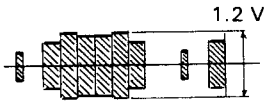
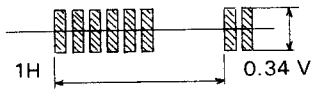
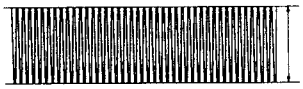
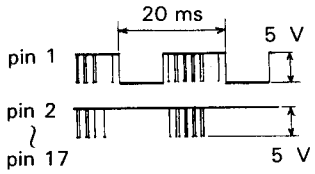
1. Instruments necessary for adjustment
   (1) Oscilloscope
   (2) TV signal generator (PAL)
   (3) Frequency counter
   (4) Vector scope
   (5) Audio oscillator
   (6) Tester
   (7) Level volume, etc.

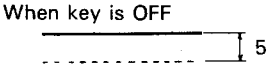
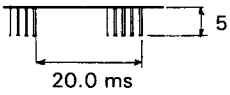
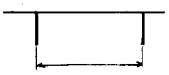
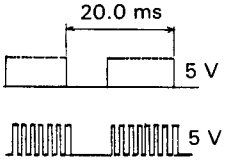
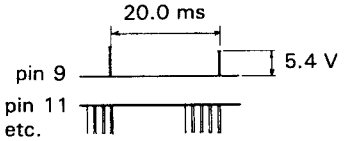
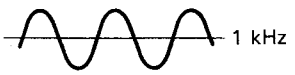
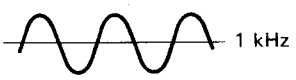
2. Input signal: Unless specified otherwise
   (1) Input terminal: Connector (CN100) of pin 21
   (2) Video signal : EIA color bar
   (3) Audio signal : 1 kHz – 10 dBV (316 Varms)
3. For furtheer details regarding the respective adjustment items in the following table, refer to the adjustment procedures on page 22.
4. Also reefer to the block diagram and circuit description.
5. NO → In case any normal voltage and waveform are not output; YES → Normal.

Symptom		Check Point	Normal Voltage & Waveform	Check position & defect position
1. The power source is not turned on (made).	①	Emitter of Q901 Emitter of Q902	DC +8.7 V DC –10.6 V	NO→ Check of disconnection of power cord and power transformer. Check the pattern near CN901 and CN902. YES→ Check of Item ② below.
	②	Collector of Q901 Collector of Q902 Pin 10 of IC901	DC +5.4 V DC –5.4 V DC +1.2 V	NO→ Check of voltage in the respective parts of IC901 Defect in IC901 Defect in Q903 YES→ Check of Item ③ below.
	③	Output pin of IC902 Pin 55 of IC223	DC +5.6 V Power ON DC 0 V Poweer OFF DC 0.8 V	NO→ Check of input voltage of IC902 Defect in IC902 YES→ By turning on and off the power source pushbutton switch, confirm that the pin 55 of IC223 becomes as indicated on the left side, and check the patterns of up to Q903.
2. Any source video is not output. (Input composite signal from the pins 21 connector) *Title screen and key operation are normal.	④	Pins 1 and 8 of IC200	 0.98 V	NO→ Check the pattern around the pin 21 connector (CN100) Check of pins 2 and 4 of IC200 (Reefer to the table in the block diagram S1) YES→ Check of Item ⑥ below.
	⑤	IC202 pin 6	 0.96 V	NO→ Cheeck of pin 1 of IC202 input. Check of D204, 205 and Q200 (Refer to the table in the block diagram [S2]) YES→ Check of Item ⑥ below.
	⑥	IC215 pin 13	DC 5 V	NO→ Check whether or not any source signal is input to the pin 6 of IC215. Check of input and output of IC214. (Refer to the table in the block diagram S3 Check of voltage and waveeform around IC215.
3. Both source and title screens are not output. *Key operation is normal	⑦	IC207 pin 12 (Y) IC208 pin 12 (C)	0.94 V  0.36 V  *The title screen output is off.	NO→ Check the voltage in the respective parts of IC207 and 208, or check whether or not any waveform is input to the respective pins 2 and 3. YES→ Check of Iteem ⑧ below.

Symptom		Check Point	Normal Voltage & Waveform	Check position & defect position
(Input composite signal from the pin 21 connector)	⑧	IC223 pin 52	DC 0 V *Turn off [REETURN].	NO→ Check pin 2 of IC209, pin 5 of IC213, pin 4 of IC210, and pin 5 of Q226, IC211 and IC212. YES→ Check of Item ⑨ below.
	⑨	IC203 pin 30 IC204 pin 11	Comp. SYNC 	NO→ Check whether or not any video is input to the pin 27 of IC203. If not, check the input and output waveform of IC200 (Refer to the tgable in the block diagram S1) YES→ Check of Item ⑩ below.
	⑩	IC223 pin 4	V-SYNC 	NO→ Check around IC Q235. Check around Q234.
		IC223 pin 31 IC217 pin 3		YES→ Check of Item ⑪ below.
	⑪	IC217 pin 4	$\overline{BFP}$ 	NO→ Check the voltage and waveform in the respective parts of IC217. Check of pins 16 and 4 of IC215. Check around IC216.
		IC222 pin 30	HD 	
4. Any title screen is not output. *The source output and key operation are normal.	⑫	IC205 and 206 pin 4 (Back color: OFF)	• Space mark when character signal is in [CRATE] mode 	NO→ Check of Item ⑰ and subsequent items. YES→ Check of Iteem ⑬ . (Refer to the table in the block diagram S4).
	⑬	IC204 pin 14 (Y) pin 13 (C) (Back color: OFF)	• Space mark (red) when character signal is in [CREATE] mode 	NO→ Check of Item ⑭ below. YES→ Check around IC205 and 206.

Symptom		Check Point	Normal Voltage & Waveform	Check position & defect position
	⑭	IC204 pin 1 (R) pin 2 (G) pin 3 (B) TP200 (Carrier)	• Space mark (red) when character signal is in CREATE] mode 	NO→ Check of Item ⑮ below. YES→ Check the voltage and waveform in the respective parts of IC204.
	⑮	IC222 pin 29 pin 5		NO→ Check around X'tal X202. Check according to [adjustment procedures] on Page 22. YES→ Check the voltage and waveform in the respective parts of IC222. Check of Item ⑯ below.
	⑯	IC203 pin 27 (Y) pin 5 (C) (Source input: ON)		NO→ Check the voltage and waveform in the respective parts of IC202. Check the voltage and waveform in the respective parts of Q201 through Q203.
	⑰	IC220 pin 6 Pin 7		NO→ Check of Item ⑱ below. YES→ Check around IC220 and 221. (Refer to the table in the block diagram S5)
		IC220 pin 7 IC220 pin 6		
	⑱	IC218 pin 4 (OUT) pin 1 (IN) pin 2 (IN)		NO→ Check around D224, 225 and 230. Check around IC218. Check around IC220 and 221. Check of D235.
5. Any color is not output on both source and title screens. (Input composite signal to pin 21 connectors)	⑲	IC201 pin 6		NO→ Check whether or not any composite signal is input to pin 6 of IC202. Check whether or not any color signal is input to the emitter of Q203. Check the action of SW2 of S input (CN102). YES→ Check of Item ⑳ .
	⑳	IC203 pin 3		NO→ Check of Item ㉖ . Check the voltage and waveform in the respective parts of IC203. YES→ Check of Item ㉑ .

Symptom		Check Point	Normal Voltage & Waveform	Check position & defect position
	(21)	IC204 pin 19 (TP200)	0.60 V  Adjust to 4.43361875 MHz ± 50 Hz	NO→ Adjust the frequency according to [Adjustment Procedures] on Page 22. YES→ Check of Item (22) below.
	(22)	IC208 pin 12	0.36 V 	NO→ Check the input and output waveform of IC206. Check pin 3 of IC208. YES→ Check of Item (23) below.
	(23)	Q217 collector (In chase there is no color in REC OUT).	1.1 V 	NO→ Check the voltage in the respective parts of Q216 and 217. YES→ Check of action of Q218. (Refer to the table in the block diagram [S11]) Check of Item (24) below.
	(24)	Q228 collector (In case theere is no color in MONITOR OUT)	1.2 V 	NO→ Check the input and output waveform of IC211. (Refer to the table in the block diagram [S8]) Check the voltage in the respeective parts of Q227 and 228. YES→ Check the action of Q229. (Refer to the table in the block diagram [S14]) Check of Item (25) below.
	(25)	Check the action of Y/C·COMPO. select switches SW102 and SW103.	When the center pin of each switch is at: "Y/C" : 5 V "COMP" : − 5 V	NO→ Check around the switches.
6. Any color is not output on the title screen. (The source color is normal) Check whether or not the external input signal is off.	(26)	IC206 pin 5	Color signal of character  1H 0.34 V (No back color)	NO→ Check of Item (27) below. YES→ Check of pin 7 of IC206. Check IC221. (Refer to the table in the block diagram [S4]).
	(27)	IC204 pin 6	 4.433619 MHz	NO→ Check the parts from pin 19 of IC203 through to pin 6 of IC204. YES→ Check the voltage and waveform in the respective parts of IC204.
7. Failure of the action of rubber key section	(28)	IC5 pins 1 ~ 17	Approx. waveform  20 ms 5 V pin 1 pin 2 pin 17 5 V	NO→ Check of Item (29) below. YES→ Check the systems Y0 ~ Y11 and D4 of the keys which area defective in action. Check around D3~9, D11~20. Check around CN2 and 3.

Symptom		Check Point	Normal Voltage & Waveform	Check position & defect position
	(29)	IC5 pins 20 ~ 23	Approx. waveform of pins 20, 21 and 23  Approx. waveform of pin 22 	NO→ Check around CN1. Check pins 40 ~ 42, pins 50 and 51 of IC223 (Same waveform as that given on the left side). YES→ Check of Item (30) below.
	(30)	Pins 16 ~ 19 of CN1	When key is OFF  When key is ON (Same waveform as that of Item (28)) 	NO→ Check the flexible P.C. board. Ccheck the rubber key. YES→ Check around CN1.
8. Failure of the action of key section other rubber key	(31)	Cathodes of D1, 2, 10, 21 and 22		NO→ Check of Item (32) below. YES→ Check the key systems Z0 ~ Z5 defective in action. Check the actions of the respective switches.
	(32)	Pin 3,4,6,11,13 and 14 of IC1 ~ 4		NO→ Check of Item (30) above. YES→ Check of Item (33) below.
	(33)	Pin 9 of IC1 ~ 4		NO→ Check around pins 6 ~ 9 of CN1. Check around pins 48 ~ 51 of IC223. YES→ Check the action of SW1 ~ 23.
9. No sound output	(34)	IC102 pin 3 (R) pin 13 (L) (Input 1 kHz −10 dBV signal from pin 21 connector CN100)	AC −10 dBV (316 m VRMS) 	NO→ Check pins 1 and 5 (R) or pins 12 and 14 (L) of IC102. Check pin 5 (R) and pin 3 (L) of IC100. Check of Item (37) below. (Refer to the table in the block diagram [S15]). YES→ Check of Item (35) below.
	(35)	IC103 pin 3 (R) pin 13 (L)	AC −10 dBV (316 m VRMS) 	NO→ Check pin 15 (R) and pin 2 (L) of IC103. (Refer to the table in the block diagram [S16]). YES→ Check around CN104, 105 or 103.
	(36)	Q101 collector	• The collector is not connected to the RCA pin jack CN101. DC +5 V • The collector is connected to the RCA pin jack CN101. DC 0 V	NO→ Check the action of the switch SW3 of CN101.

11. Electric Parts List

⚠	Description No	Symbol No.	Parts No.	Parts Name	Q'ty	Remarks
		<Main PC Board>				
		ICs				
		IC200,201,210	TA8686S	IC	3	Toshiba
		IC202,209,211,212	TA8687S	IC	4	Toshiba
		IC203	M51279SP	IC	1	Mitsubishi
		IC204	V7040	IC	1	Sony
		IC205,206	NJM2249L	IC	2	JRC
		IC207,208	NJM1496M	IC	2	JRC
		IC213,214,220,221	TC4W53F	IC	4	Toshiba
		IC215	NJM2229S	IC	1	JRC
		IC216,219	TC4SU69F	IC	2	Toshiba
		IC217	TC74HC221AF-TP1	IC	1	Toshiba
		IC218	TC7S08F	IC	1	Toshiba
		IC222	M50458-066SP	IC	1	Mitsubishi
		IC223	UPD75106CW-201	IC	1	NEC
		IC224,904	M51951BSL	IC	2	Mitsubishi
		IC225	LH5160N-10L	IC	1	Sharp
		IC226,100,101,104	M5218AL	IC	4	Mitsubishi
		IC102,103	TC4052BF	IC	2	Toshiba
		IC901	M5290P	IC	1	Mitsubishi
		IC902	M5278D56	IC	1	Mitsubishi
		Transistors				
⚠		Q228	2SA1115(E,F)	Transistor	1	Mitsubishi
⚠		Q901	2SB1015	Transistor	1	Toshiba
⚠		Q902	2SD1406	Transistor	1	Mitsubishi
		Q903,201,206~212,215,216 219,223,224,227,231,233	2SC3052(E)	Chip Transistor	17	Mitsubishi
		Q236	2SC3326B	Chip Transistor	1	Toshiba
		Q101,202~205,232,213,214 217,222,225,237	2SA1235E	Chip Transistor	11	Mitsubishi
		Q238~241	DTA124EK	Digital Transistor	4	ROHM
		Q234	DTC115EK	Digital Transistor	1	ROHM
		Q200,220,226,230,235	DTC124EK	Digital Transistor	9	ROHM
		Q218,221,229	RN1441(A,B)	Digital Transistor	3	ROHM
		Diodes				
⚠		D901	2B4B41	Diode Bridge	1	Toshiba
		D214	HZS6A1L	Zenner Diode	1	Hitachi
		D200~203,211,216	HZS6A2L	Zenner Dide	6	Hitachi
		D212,218,220,222	HZS4BLL	Zenner Diode	4	Hitachi
		D233	HZS12A3L	Zenner Diode	1	Hitachi
		D207	RD3.0MB2	Zenner Diode	1	NEC
		D204~206,208~210,213 215,217,219,221,223~225 230~232,234,235,236	1SS332	Diode	19	ROHM
		D226,228	1SS357	Diode	2	Toshiba
		Capacitors				
		C208	QETB1HM-224	Electrolytic Capacitor	1	0.22μF/50V
		C278,221	QETB1HM-474N	Electrolytic Capacitor	2	0.47μF/50V
		C207,220,222,225,243,265 266,273,287,295,909	QETB1HM-105E	Electrolytic Capacitor	11	1μF/50V
		C104~107,118~123,130 131,252,253,332,333	QETB1HM-225N	Electrolytic Capacitor	16	2.2μF/50V

⚠	Description No	Symbol No.	Parts No.	Parts Name	Q'ty	Remarks
		C115,116,210~212,214,233 251,256,264,271,275,280 283,285,302,312,313,317	QETB1HM-106	Electrolytic Capacitor	19	100μF/6.3V
		C910~912	QETB0JM-108	Electrolytic Capacitor	3	1000μF/6.3V
		C908	QETB1CM-108	Electrolytic Capacitor	1	1000μF/16V
		C907	J45462-001	Electrolytic Capacitor	1	4700μF/16V
		C230,308	QETB1EM-476	Electrolytic Capacitor	2	47μF/25V
		C242,245,293,311	QETB1HM-106	Electrolytic Capacitor	4	10μF/50V
⚠		C902,903,904	QCZ9019-102A	Ceramic Capacitor	3	1000pF/400V For (EG) model
		C305	NCT21CH-100AY	Ceramic Capacitor	1	10pF/50V
		C254,255	NCT21CH-150AY	Ceramic Capacitor	2	15pF/50V
		C306,309,310	NCT21CH-180AY	Ceramic Capacitor	3	18pF/50V
		C108~111,132,133,261,262 223	NCT21CH-220AY	Ceramic Capacitor	9	22pF/50V
		C290	NCS21HJ-330AY	Ceramic Capacitor	1	33pF/50V
		C303,337	NCS21HJ-121AY	Ceramic Capacitor	2	120pF/50V
		C231	NCS21HJ-151AY	Ceramic Capacitor	1	150pF/50V
		C319~321,338	NCS21HJ-271AY	Ceramic Capacitor	4	270pF/50V
		C224,289,340~343	NCS21HJ-561AY	Ceramic Capacitor	6	560pF/50V
		C124,125,226,257,292,298 300,314,345	NCS21HJ-102AY	Ceramic Capacitor	9	1000pF/50V
		C291	NCB21HK-152AY	Ceramic Capacitor	1	1500pF/50V
		C326~331	NCB21HK-222AY	Ceramic Capacitor	6	2200pF/50V
		C294,322	NCB21HK-332AY	Ceramic Capacitor	2	3300pF/50V
		C216,217,229,234,235,905 906	NCB21EK-103AY	Ceramic Capacitor	7	0.01μF/25V
		C296	NCB21EK-223AY	Ceramic Capacitor	1	0.022μF/25V
		C112,113,134,205,206,209 215,232,236~241,246~249 258~260,269,274,279,281 282,284,286,288,299,307 315,316,318,323~325,335 336,339,913,228	NCB21EZ-104	Ceramic Capacitor	42	0.1μF/25V
		C200~204,227,244,270,272 276,277	NEF11AM-105LY	Tantalum Capacitor	11	1μF/10V
		C126,127,135,136	QFN81HJ-102	Myler Capacitor	4	1000pF/50V
		C100~103,128,129	QFN81HJ-682	Myler Capacitor	6	6800pF/50V
⚠		C901	QFZ9022-473M	Metalized Myler Capacitor	1	0.047μF/250V For (EG) model
		C219	QFV81HJ-473	T.F. Capacitor	1	0.047μF/50V
		C218	QFV81HJ-683	T.F. Capacitor	1	0.068μF/50V
		C334	J45445-001	Super Capacitor	1	0.047F/5.5 V
		VC200	J44141-300	Trimmer Capacitor	1	Max. 30pF/100V.D.C
		VC201	J45446-200	Trimmer Capacitor	1	Max. 20pF/100V.D.C
		Resistors				
		R217,281,295,316,331	NRSA02J-4R7	M.G. Resistor	5	4.7Ω 1/ 10W
		R203,207	NRSA02J-360	M.G. Resistor	2	36Ω 1/ 10W
		R202,206	NRSA02J-390	M.G. Resistor	2	39Ω 1/ 10W
		R279,293,314,321,329	NRSA02J-430	M.G. Resistor	5	43Ω 1/ 10W
		R201,205,210,213,223,228 243,245,246,251,253,255 262,263,271,273,275,276 278,284,290,291,298,301 306,309,310,313,319,320 326,328,334,335,348,377 378	NRSA02J-680N	M.G. Resistor	37	68Ω 1/ 10W

⚠	Description No	Symbol No.	Parts No.	Parts Name	Q'ty	Remarks	
		R200,204,285,307	NRSA02F-750N	M.G. Resistor	4	75Ω	1/10W
		R907	NRSA02J-820NY	M.G. Resistor	1	82Ω	1/10W
		R130~133,229,373,374,387	NRSA02J-101NY	M.G. Resistor	8	100Ω	1/10W
		R325	NRSA02J-121NY	M.G. Resistor	1	120Ω	1/10W
		R236,237,238,283,297,318	NRSA02J-151NY	M.G. Resistor	7	150Ω	1/10W
		333					
		R324	NRSA02J-161	M.G. Resistor	1	160 Ω	1/10W
		R282,296,317,332,349~351	NRSA02J-181NY	M.G. Resistor	7	180Ω	1/10W
		R244,257,393~396	NRSA02F-331NY	M.G. Resistor	6	330Ω	1/10W
		R342	NRSA02F-391NY	M.G. Resistor	1	390Ω	1/10W
		R908	NRSA02J-431NY	M.G. Resistor	1	430Ω	1/10W
		R219	NRSA02J-511NY	M.G. Resistor	1	510Ω	1/10W
		R110~113,118~123,126	NRSA02J-561NY	M.G. Resistor	23	560Ω	1/10W
		127,218,247,248,266,267					
		358~360,371,376,379					
		R256,270,280,294,315,322	NRSA02J-681NY	M.G. Resistor	7	680Ω	1/10W
		330					
		R268,269	NRSA02J-751	M.G. Resistor	2	750Ω	1/10W
		R208,209,214~216,220,221	NRSA02J-102NY	M.G. Resistor	28	1kΩ	1/10W
		224,254,259,274,292,299					
		300,311,339,372,388~392					
		397~402					
		R352~354,364~366	NRSA02J-122NY	M.G. Resistor	3	1.2kΩ	1/10W
		R227,234,249,250,258	NRSA02J-152NY	M.G. Resistor	5	1.5kΩ	1/10W
		R252	NRSA02J-162NY	M.G. Resistor	1	1.6kΩ	1/10W
		R272,337	NRSA02J-182NY	M.G. Resistor	2	1.8kΩ	1/10W
		R222,286,287,302,305,345	NRSA02J-222NY	M.G. Resistor	10	2.2kΩ	1/10W
		356,357,380,385					
		R288,308	NRSA02J-2321	M.G. Resistor	2	2.32kΩ	1/10W
		R346	NRSA02J-332NY	M.G. Resistor	1	3.3kΩ	1/10W
		R343,211,212,277,312,327	NRSA02J-392NY	M.G. Resistor	6	3.9kΩ	1/10W
		R239,240,241,242,327,386	NRSA02J-472NY	M.G. Resistor	8	4.7kΩ	1/10W
		903,904					
		R235,260,264,265,289,304	NRSA02J-103NY	M.G. Resistor	13	10kΩ	1/10W
		336,340,355,361~363					
		382					
		R231,232,381,367	NRSA02J-203NY	M.G. Resistor	4	20kΩ	1/10W
		R369,370,375,905,906,134	NRSA02J-223NY	M.G. Resistor	7	22kΩ	1/10W
		135					
		R233	NRSA02J-303NY	M.G. Resistor	1	30kΩ	1/10W
		R341,347,384	NRSA02J-333NY	M.G. Resistor	3	33kΩ	1/10W
		R105~108,114,116,117,124	NRSA02J-473NY	M.G. Resistor	12	47kΩ	1/10W
		125,128,129,403					
		R101,383	NRSA02J-563NY	M.G. Resistor	2	56kΩ	1/10W
		R261	NRSA02J-104NY	M.G. Resistor	1	100kΩ	1/10W
		R226	NRSA02J-154NY	M.G. Resistor	1	150kΩ	1/10W
		R109,115	NRSA02J-224NY	M.G. Resistor	2	220kΩ	1/10W
		R225,338	NRSA02J-394NY	M.G. Resistor	2	390kΩ	1/10W
		R230	NRSA02J-474NY	M.G. Resistor	1	470kΩ	1/10W
		R103	NRSA02J-225NY	M.G. Resistor	1	2.2MΩ	1/10W
		RN200	QRB059J-223	NETW. Resistor	1	22kΩ	
		RN201	QRB089J-223	NETW. Resistor	1	22kΩ	
		RN202	QRB165G-103	NETW. Resistor	1	10kΩ	
		VR200,201	QVZ3518-473Z	Trim. Resistor	2	47kΩ	
		VR202	QVZ3518-103Z	Trim. Resistor	1	10kΩ	

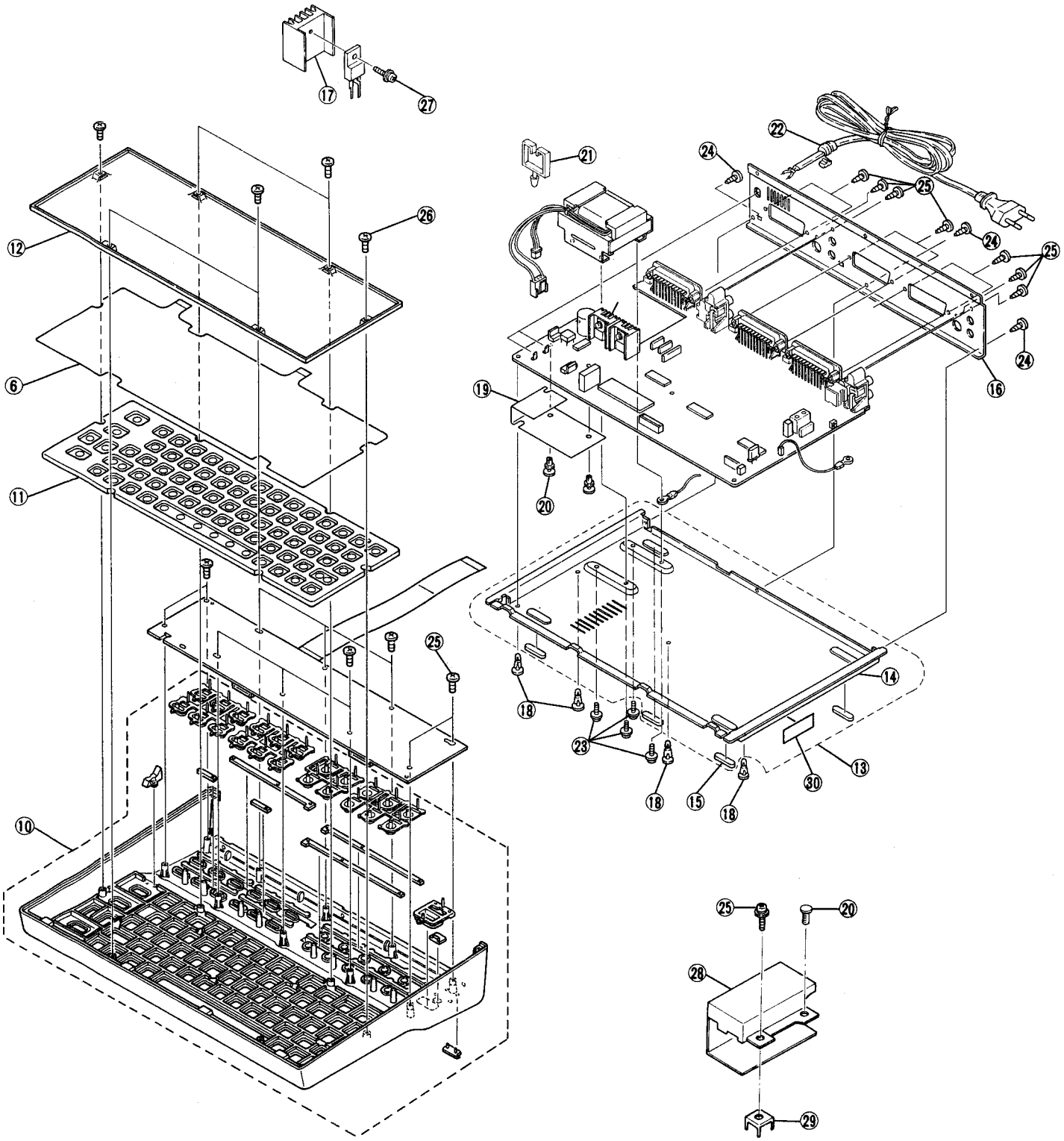
⚠	Description No	Symbol No.	Parts No.	Parts Name	Q'ty	Remarks
		Others				
⚠		L901	J43536-001	Line Filter	1	1.5mH
		L100~102,104~106	J45013-100	Chip Coil	11	10μH
		108~110,216,217				
		L203,210,214	J45013-220	Chip Coil	3	22μH
		L209	J45013-270	Chip Coil	1	27μH
		L112,113,200,202,204~206	J42574-100	Peaking Coil	11	10μH
		211~213,215				
		DL200	J44751-001	Delay Line	1	
		BPF200	J43411-001	B.P.F.	1	
		X200,202	J44700-001	Crystal	2	17.7344 MHz
		X201	CSB500F9	Ceralock	1	500kHz
		X203	J45020-001	Ceralock	1	4.19MHz
		SW100	J45457-001	Tact Switch	1	Reset Switch
		SW101~103	J45458-001	Slide Switch	3	
⚠		CN901	J45111-001	Connector	1	For Power Transformer 2P
		CN902	J45442-001	Connector	1	For Power Transformer 3P
		CN1	J45441-001	Connector	1	Flat Wire 19P
		CN100,104,105	J44343-001	21-Pin Jack	3	
		CN101,103	J45440-001	Pin Jack	2	Audio L/R
		CN102,106	J45439-001	S Terminal	2	
⚠		TM901,902	J45084-001	Terminal	2	For AC Power Cord
		TM903	J45460-001	Terminal	1	For (EG) model
		W901~903,TP200	J45344-001	Pin	4	
⚠			QMP3900-200H	AC Power Cord	1	For (E),(EB) models
⚠			QMP9017-008BS	AC Power Cord	1	For (EK) model
⚠			J42667-001	AC Power Cord	1	For (EG) model
⚠			J45423-001	Power Transformer	1	For (E),(EB),(EG) models
⚠			J45424-001	Power Transformer		For (EK) model
			J45422-265	Flat Wire	1	19P
			J45443-050	Wire Ass'y	1	5 cm with lag terminal
			J45443-170	Wire Ass'y	1	17 cm with lag terminal
			J45444-090	Wire Ass'y	1	9 cm for with lag terminal
			J45467-001	Wire Ass'y	1	for (EG) model
			J21334-002	Main P.C.B. Ass'y	1	For (E),(EB),(EK) models
			J21334-003	Main P.C.B. Ass'y	1	For (EG) model The parts will not be supplied as an assembly

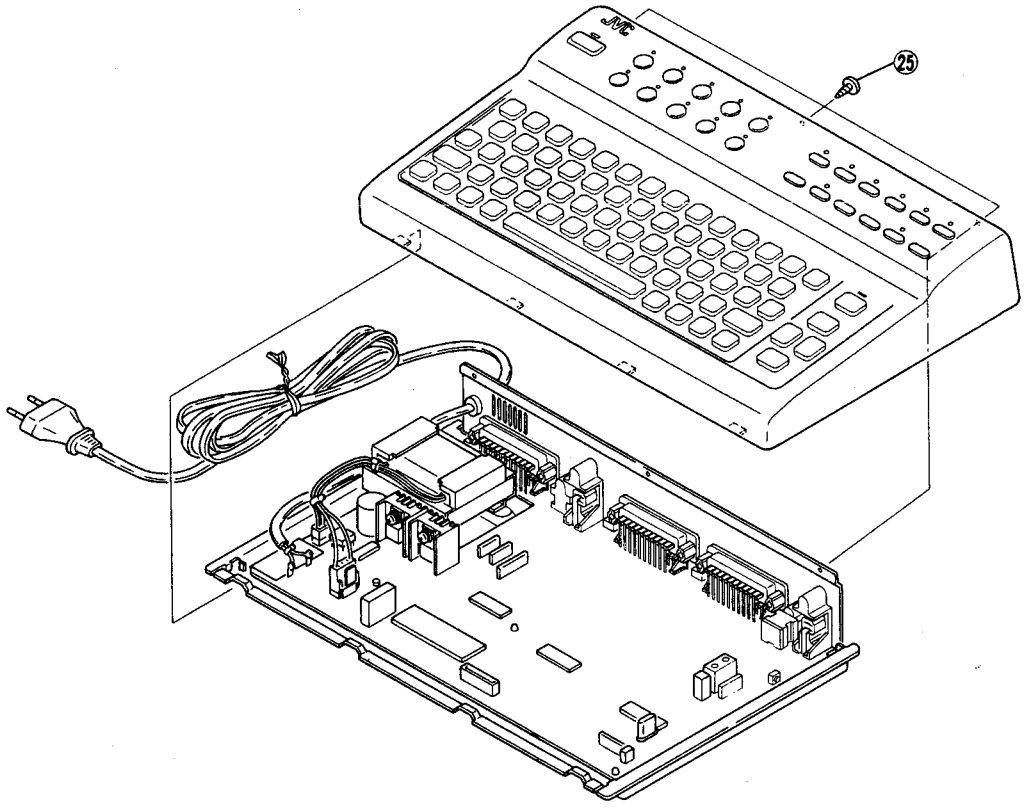
* Parts marked (⚠) are safety parts. When replacing, be sure to use the specified one.

⚠	Description No	Symbol No.	Parts No.	Parts Name	Q'ty	Remarks
		<Front P.C. Board> **ICs** IC1~4 IC5	 HD74HC174P HD74HC154P	 IC IC	 4 1	 Hitachi Hitachi
		Transistor Q1	DTC124TS	Digital Transistor	1	ROHM
		Diodes D1~23 L2~18 L1	 1S1588 SEL4414E SEL4214R	 Diode LED LED	 23 17 1	 Toshiba Sanken (Green) Sanaken (Red)
		Capacitors C4 C1~3,5,6 C7~10	 QER50JM-107E QCC21EM-104 QCS21HJ-561	 Electrolytic Capacitor Ceramic Capacitor Ceramic Capacitor	 1 5 4	 100μF/6.3V 0.1μF/25V 560pF
		Resistor R1~18	QRD141J-331	Resistor	18	330Ω 1/4W
		Others SW1~23 CN1 CN2 CN3	 J45444-090 J45463-001 J45441-001 J45464-001 J45465-001	 Wire Ass'y Tact Switch Connector Connector Connector	 1 23 1 1 1	 For Flat Wire 19P 12P 10P
			J21332-001 J21335-001	FPC Front PCB Ass'y	1	The parts will not be suppled as an assembly.

* Parts marked (⚠) are safety parts. When replacing, be sure to use the specified one.

12. Exploded View





13. Mechanical Parts List

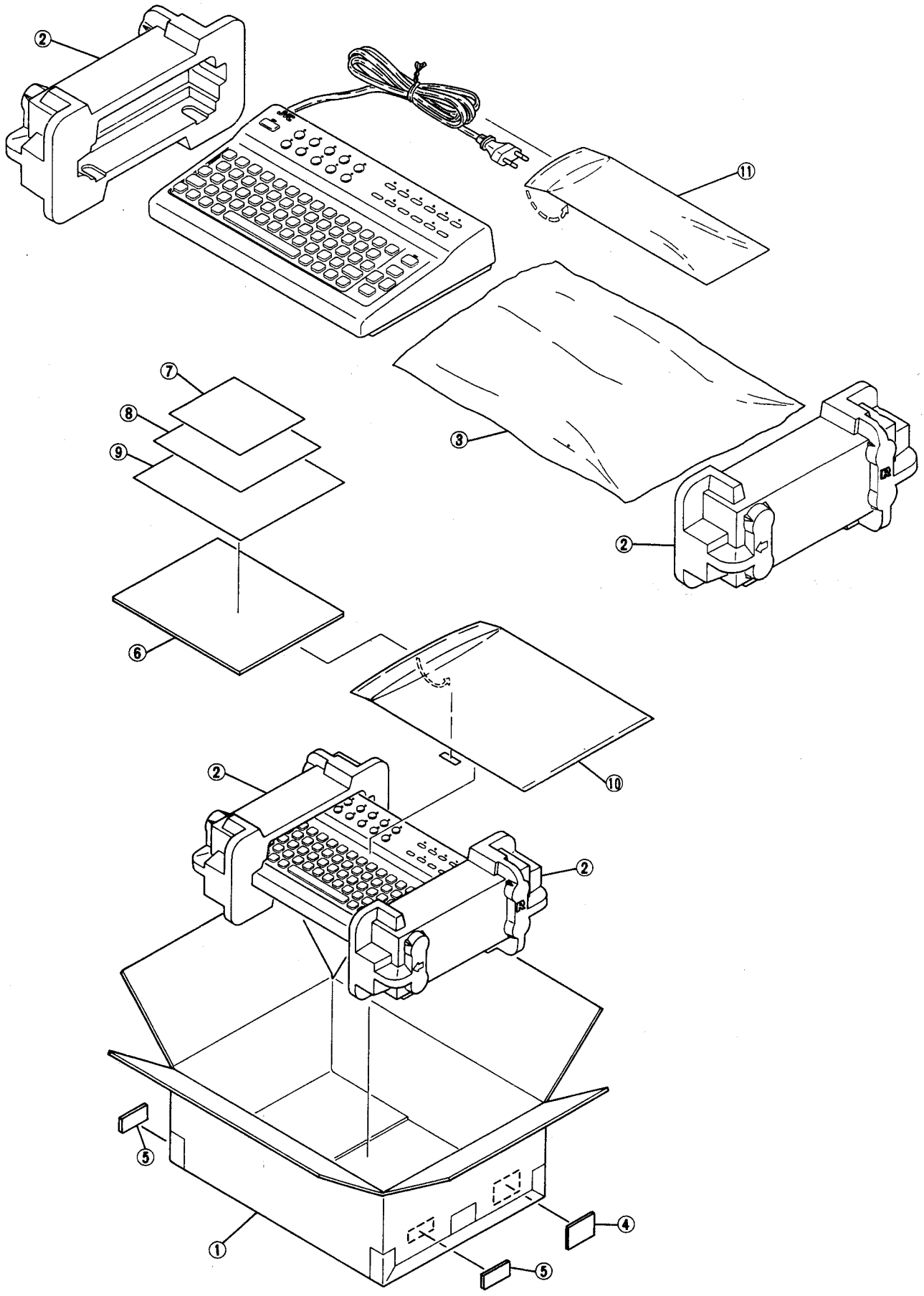
⚠	Item No.	Parts No.	Parts Name	Q'ty	Remarks
	10	J21337-001	Front Panel Ass'y	1	Including the POWER button, respective select button and LED lens.
	11	J21338-001	Keyboard	1	
	12	J32232-001	Frame	1	
	13	J21339-002	Chassis Ass'y	1	
	14	J21340-001	Chassis	1	
	15	J45427-001	Foot	4	
	30	J45434-001	Reset Label	1	
	16	J21336-001	Rear Panel	1	For (E),(EB),(EG) models
		J21336-002	Rear Panel	1	For (EK) model
	17	J45428-001	Heat sink	2	
	18	J45429-001	Locking Card Spacer	4	
⚠	19	J45431-001	Insulation Sheet (A)	1	For (E),(EB),(EK) models
	20	J45432-001	Nyron Revet	2	For (E),(EB),(EK) models
	21	J45466-001	Wire Clamp	1	
⚠	22	QHS3876-162	Cord Stopper	1	SR-4N-4
	23	GPST3008M	Screw	4	For transformer
	24	SXST3006M	Screw	3	For rear panel
	25	SDSG3008M	Screw	23	For front P.C. Board and rear jack
	26	SDSF3006Z	Screw	6	For frame
	27	GPST3008Z	Screw	2	For heat sink
		J43109-001	Serial Label	1	

*Parts marked (⚠) are safety parts. When replacing, be sure to use the specified one.

For (EG) models

⚠					
	28	J45435-001	Insulation Sheet (B)	1	For (EG) model
	20	J45432-001	Nyron Revet	1	For (EG) model
	29	J45436-001	GND Terminal	1	For (EG) Model
	25	SDSG3008N	Screw	1	For (EG) model

14. Packing Materials and Parts Numbers



Packing Materials and Parts Numbers

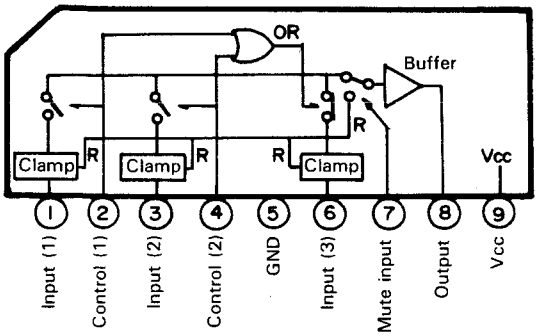
⚠	Item No.	Parts No.	Parts Name	Q'ty	Remarks
	1	PK-JXT88E	Packing Case	1	J11171-001 For (E) model with POS label ④
		PK-JXT88EB	Packing Case	1	J11171-001 (EB) model with POS label ④
		PK-JXT88EG	Packing Case	1	J11171-002 For (EG) model with POS label ④
		PK-JXT88EK	Packing Case	1	J11171-003 For (EK) model with POS label ④
	2	NZ-JXT88	Packing Pad	1 Set	J21333-001
	3	J45433-001	Envelope	1	For main unit
	5	J45460-001	Serial Label	2	

Accessories List

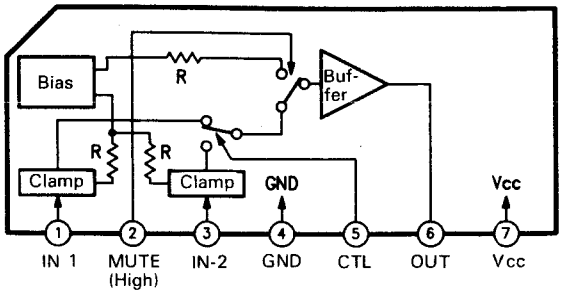
⚠	Item No.	Parts No.	Parts Name	Q'ty	Remarks
	6	J5500-053A	Instructions	1	
	7	BT20060	Warranty Card	1	For (EK) models
		BT20114	Warranty Card	1	For (EG) models
	8	BT20066A	EEC Agency	1	
	9	QZL1008-001	FTZ Information Sheet	1	For (EG) models
		E43486-340A	BS SAFETY SHEET	1	For (EK) models
	10	QPGA025-03505	Envelope	1	For Printed Materials, for (E),(EB),(EG) models
		E300196-010B	Envelope	1	For Printed Materials, for (EK) models
	11	QPGA010-02505	Envelope	1	For Power Cord

15. Block View Inside IC

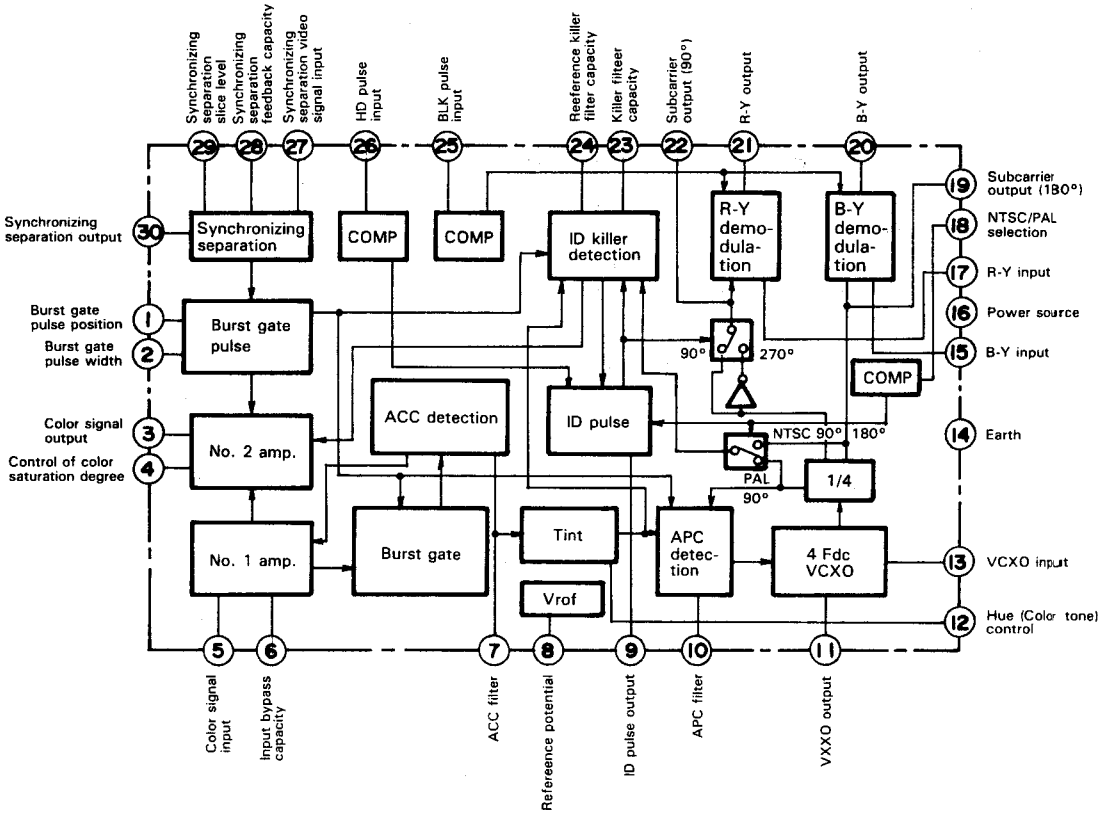
IC200,201,210
TA8686S



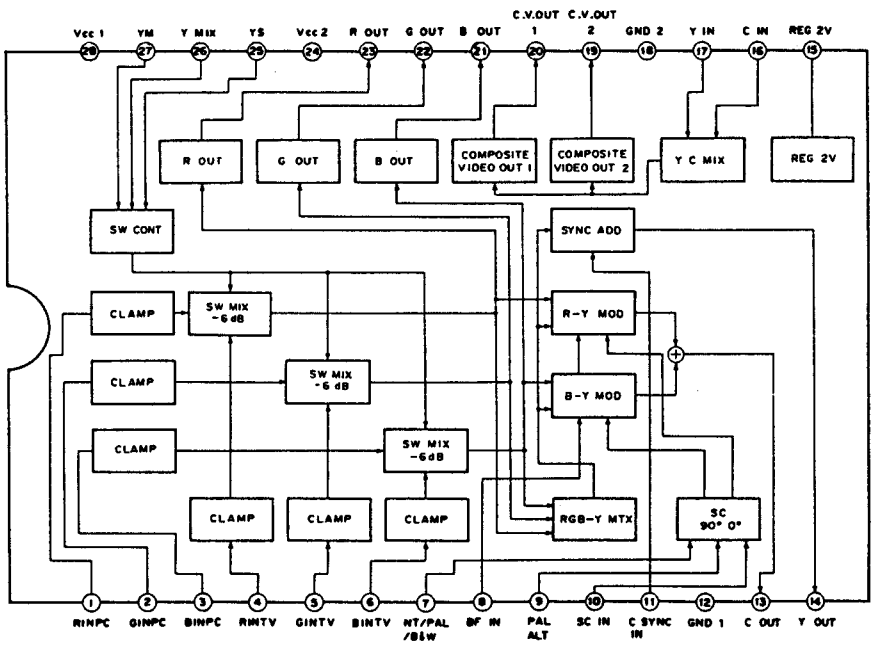
IC202,209,211,212
TA8687S



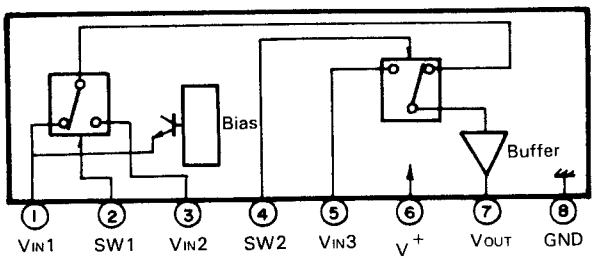
IC203
M51279SP



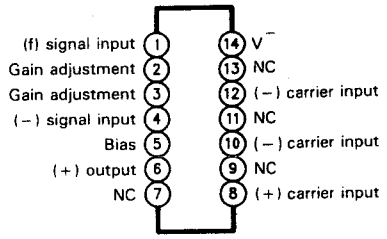
IC204
V704D



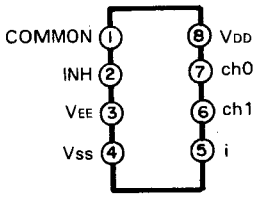
IC205,206
NJM2249L



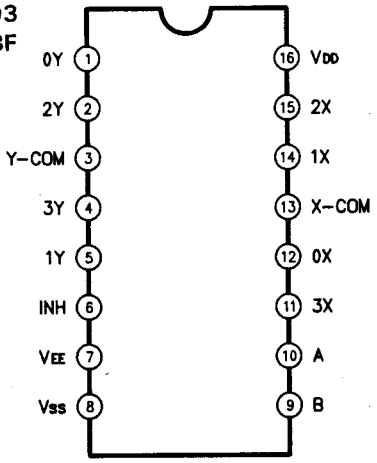
IC207,208
NJM1496M



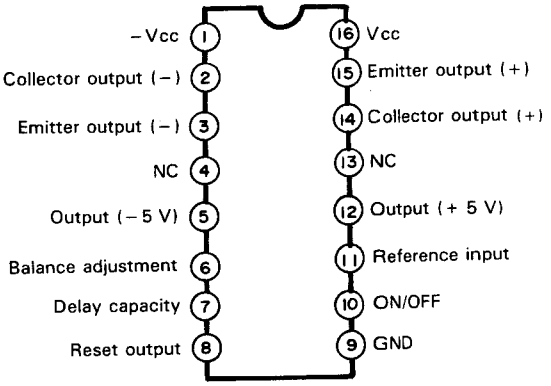
IC213,214,220,221
TC4W53F



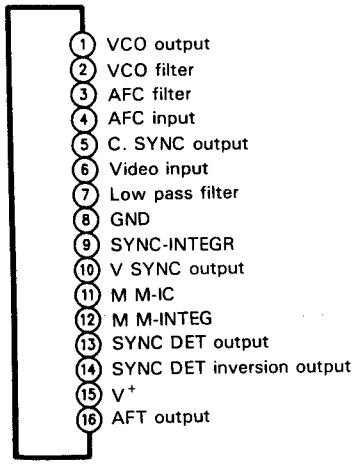
IC102,103
TC4052BF



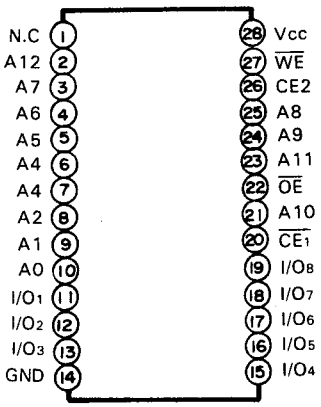
IC901
M5290P



IC215
NJM2229S

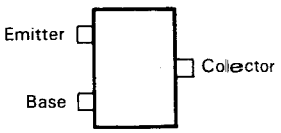


IC225
LH5160N-10L

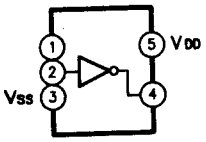


Q101,202~205,223
213,214,217,222,225
2SA1235E

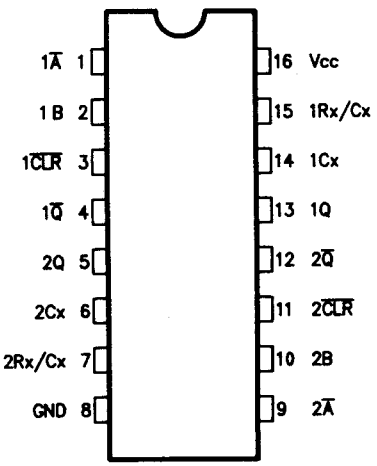
Q903,201,206~212
215,216,219,223
224,227,231,233
2SC3052E



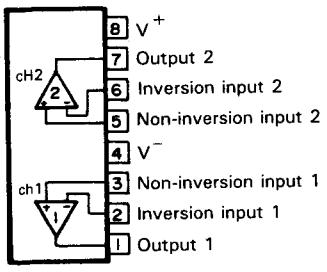
IC216,219
TC4SU69F



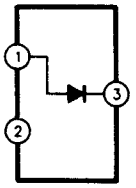
IC217
TC74HC221AF



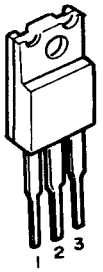
IC100,101,104,226
M5218AL



D207
RD3.0MB2

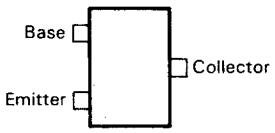


Q901
2SB1015
Q902
2SD1406

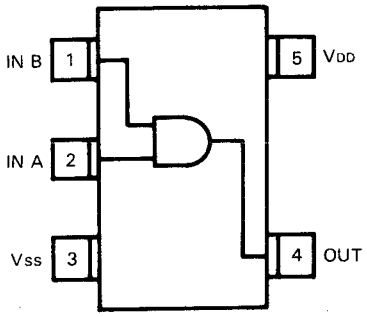


PIN
1. Base
2. Collector
3. Emitter

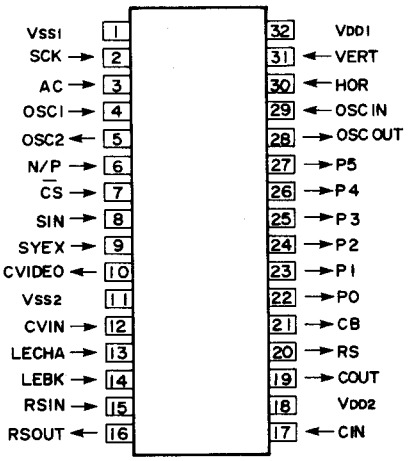
Q236
2SC3326B
Q238~241
DTA124EK
Q200,220,226,230
235,238~241
DTC124EK
Q218,221,229
RN1441A



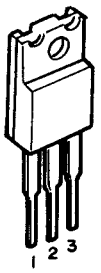
IC218
TC7S08F



IC222
M50458

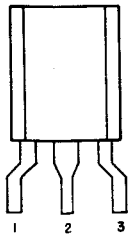


IC902
M5278D56



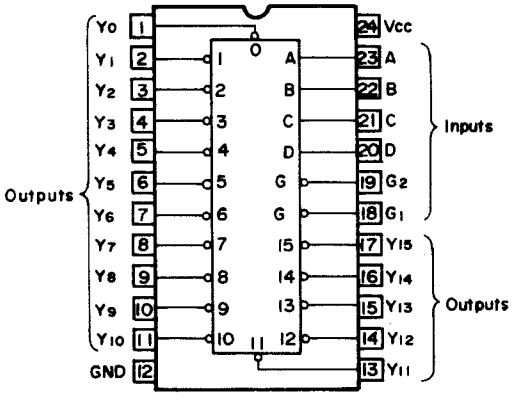
Pin
1. IN
2. GND
3. OUT

IC224
M51951BSL

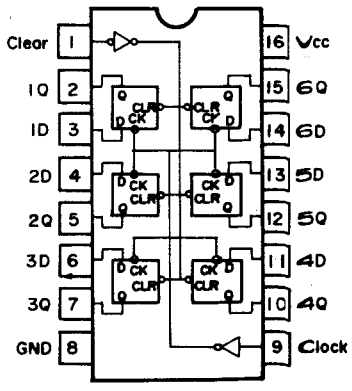


PIN
1. POWER
2. GND
3. OUT

IC1~4 for Front P.C. board
HD74HC154P



IC5 for Front P.C. board
HD74HC174P

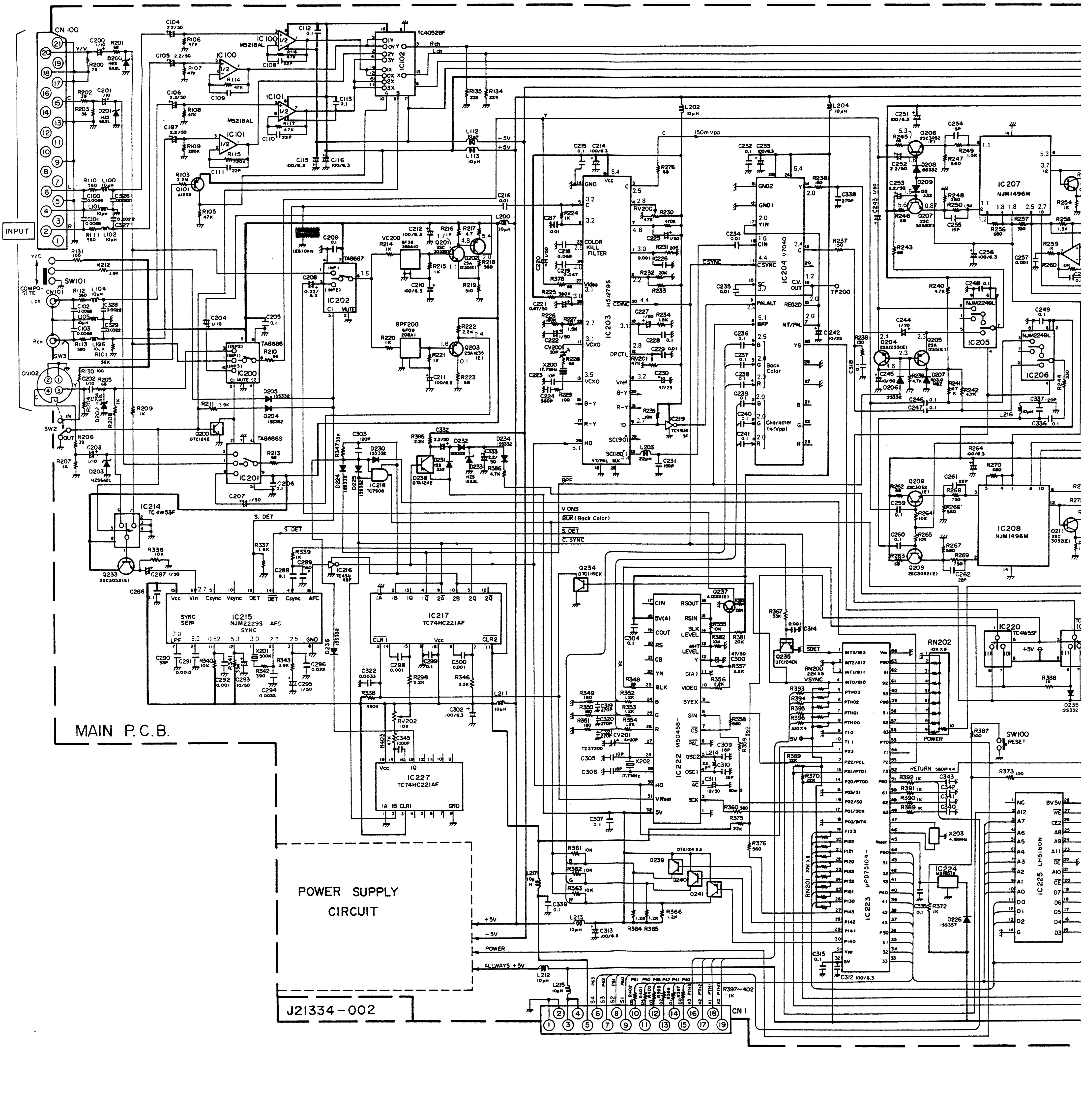


16. Schematic Diagram (Main Circuit)

● **Use of Schematic Diagra**

Notes:

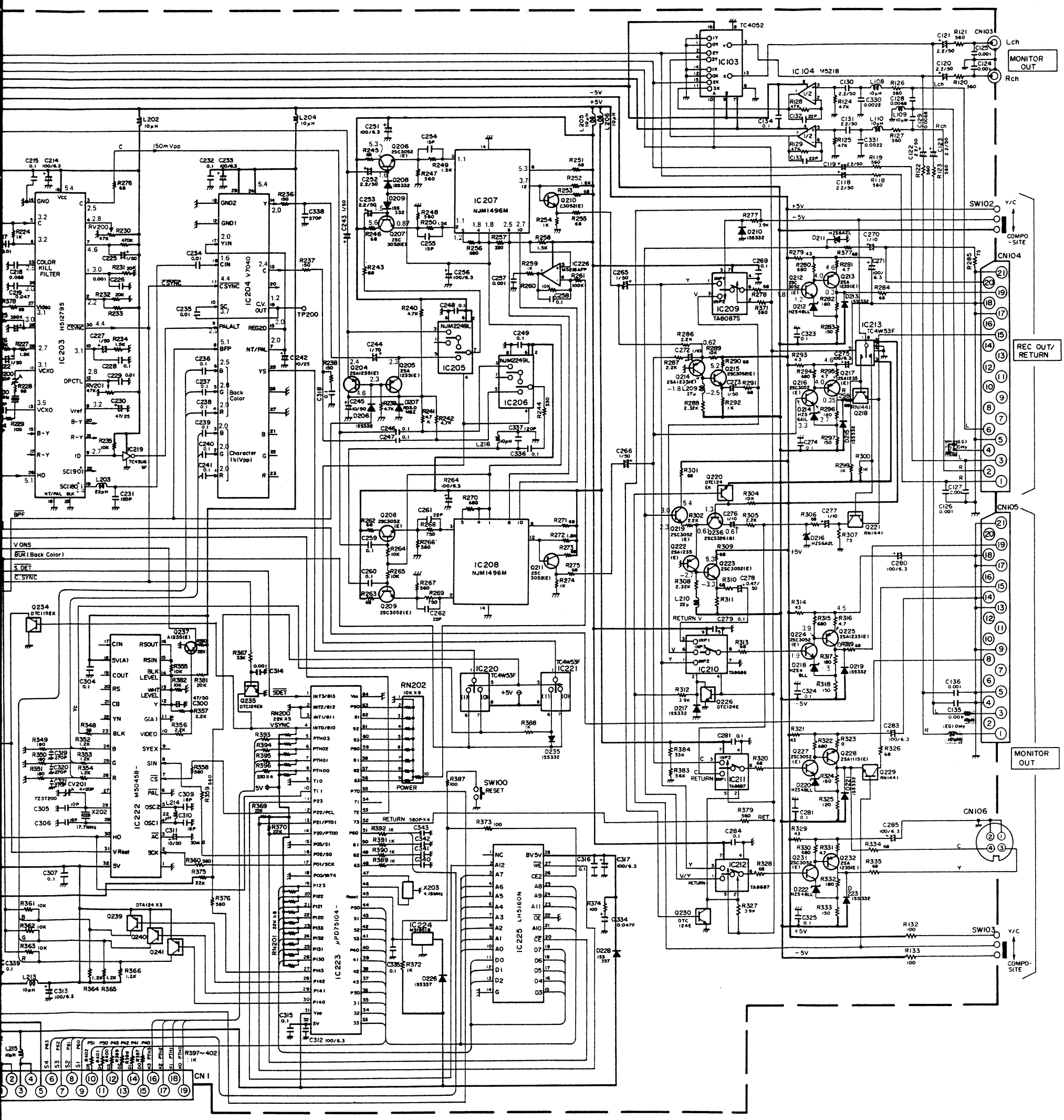
1. ———— shows the +5V p
2. ———— shows the −5V p
3. Values printed in red show th circuits as measured by a tes of 20 kohms/V), with the po



● Use of Schematic Diagram

Notes:

1. ———— shows the +5V power supply.
2. ———— shows the −5V power supply.
3. Values printed in red show the voltage of each section of the circuits as measured by a tester (having an internal resistance of 20 kohms/V), with the power switch turned ON.
4. Parts marked with ⚠ (in the shaded areas ▨) are safety parts. When replacing these, be sure to use only the designated parts to ensure safety.
5. This is a standard circuit diagram.
   Design and contents are subject to change without notice.

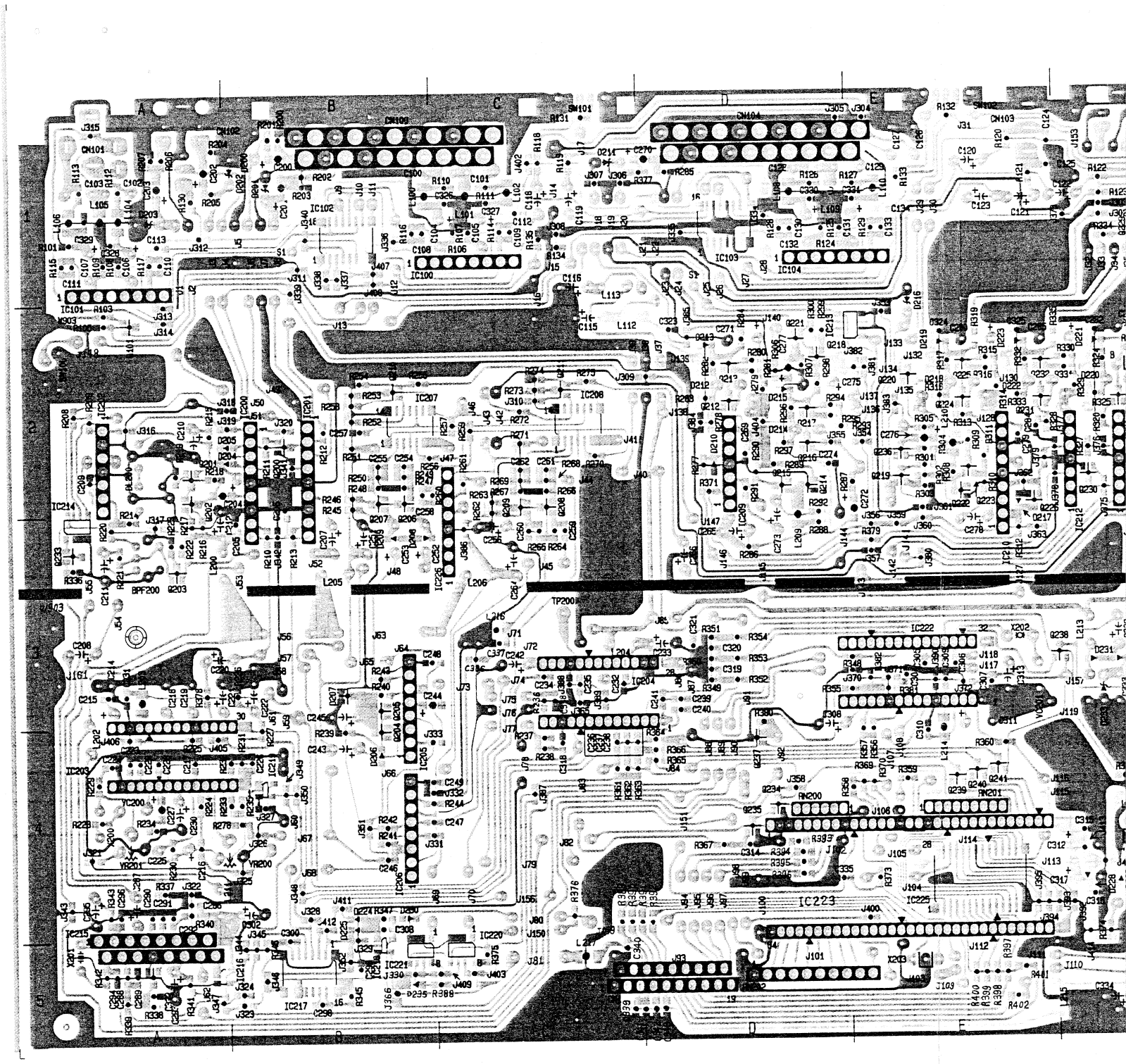


(No. 70118)

17. Printed Circuit Board (Full Scall)

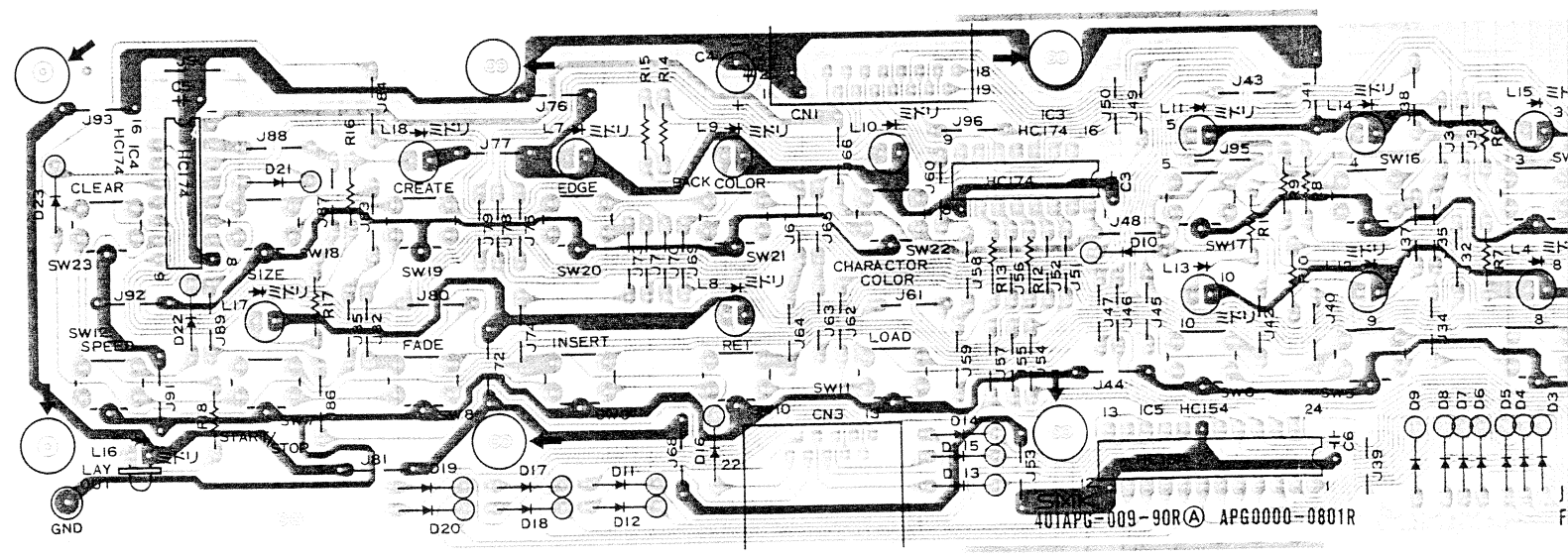
■ Main P.C. Board

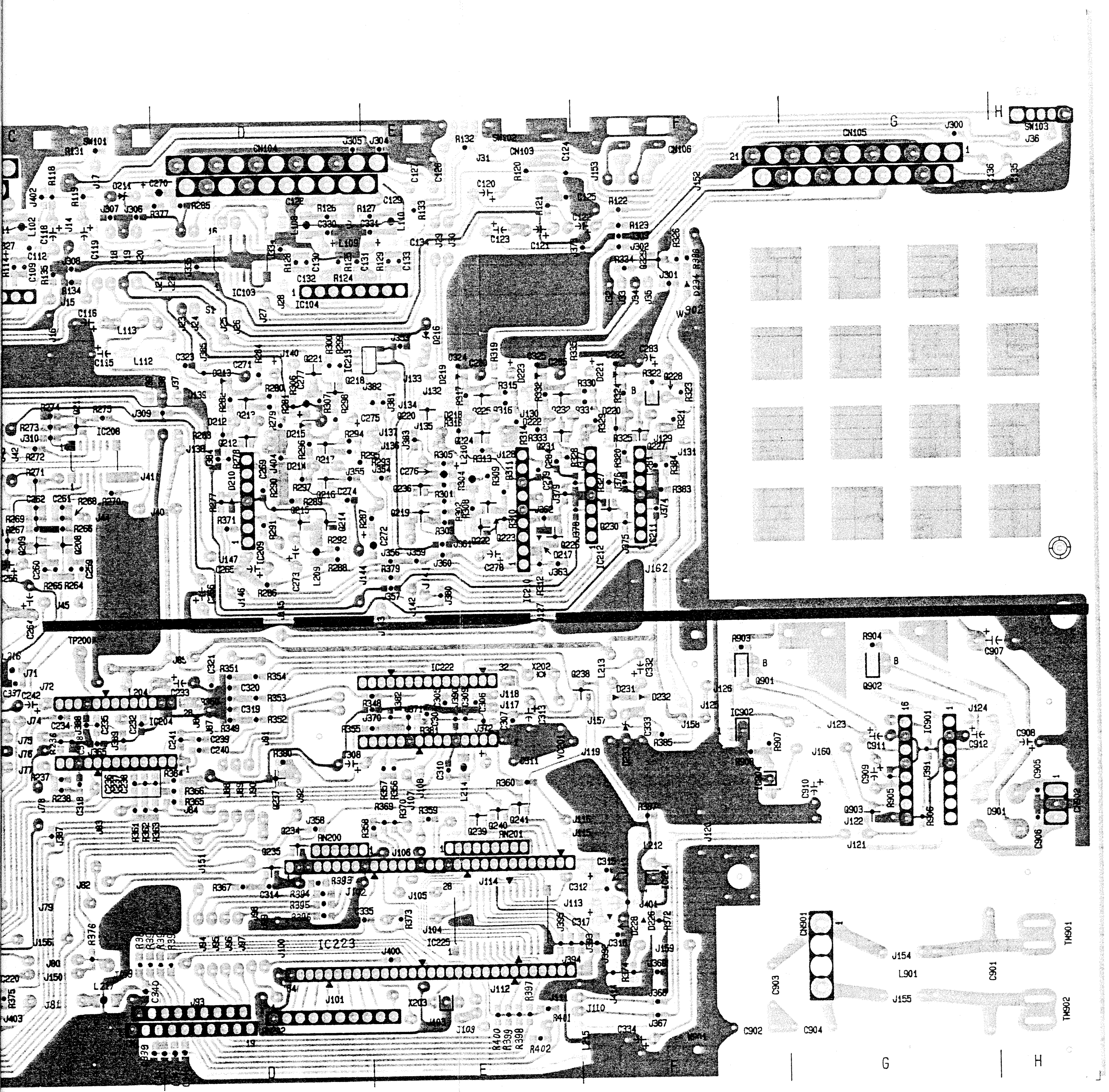
part is +5V power source.
part is Allways +5V power source
part is −5V power source.
part is earth.
parts are others.

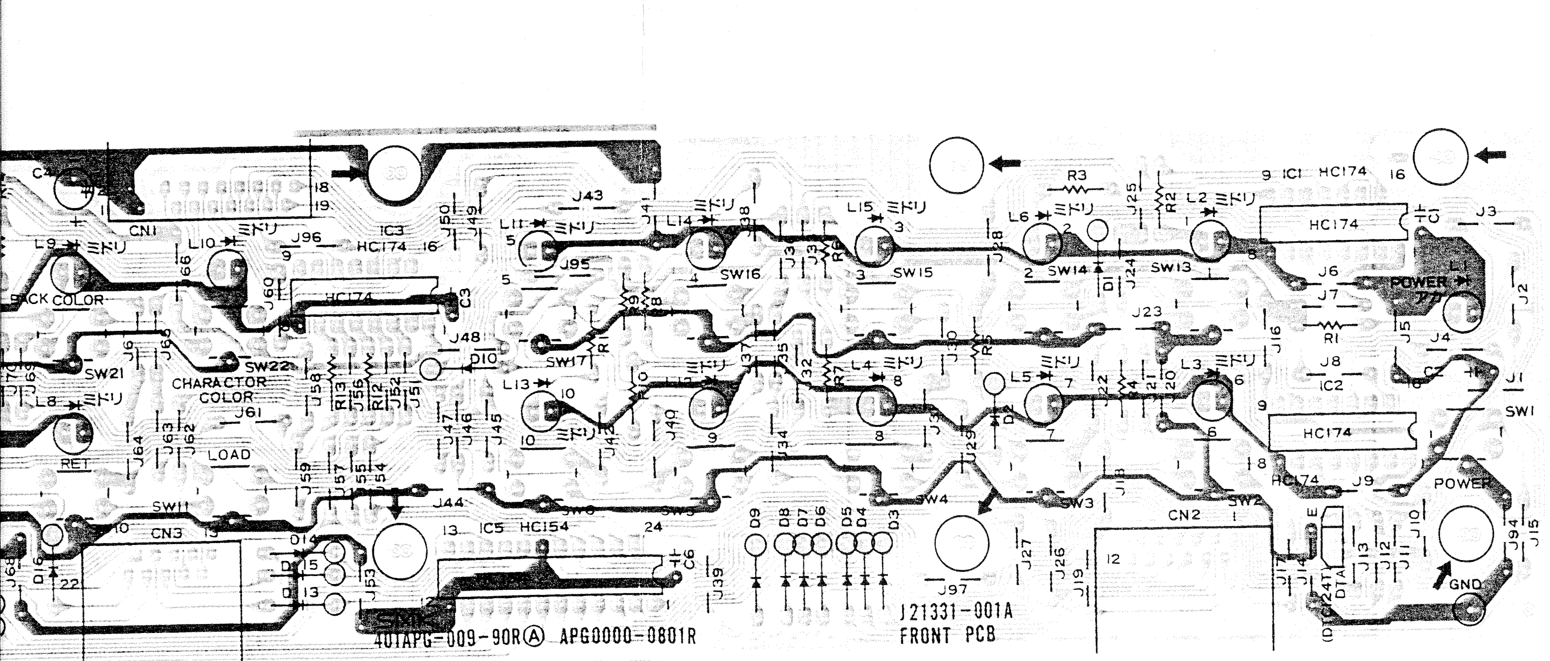


■ Front P.C. Board

part is +5V power source.
part is Allways +5V power source.
part is earth.
parts are others.




CN104
CN103
CN105
CN106
SW101
SW102
SW103
IC103
IC104
IC208
IC209
IC210
IC212
IC213
IC222
IC223
IC225
IC204
IC901
IC902
CN901
RN200
RN201
TP200
TW901
TW902
L901
C901
C902
C903
C904
J154
J155
C
D
E
F
G
H

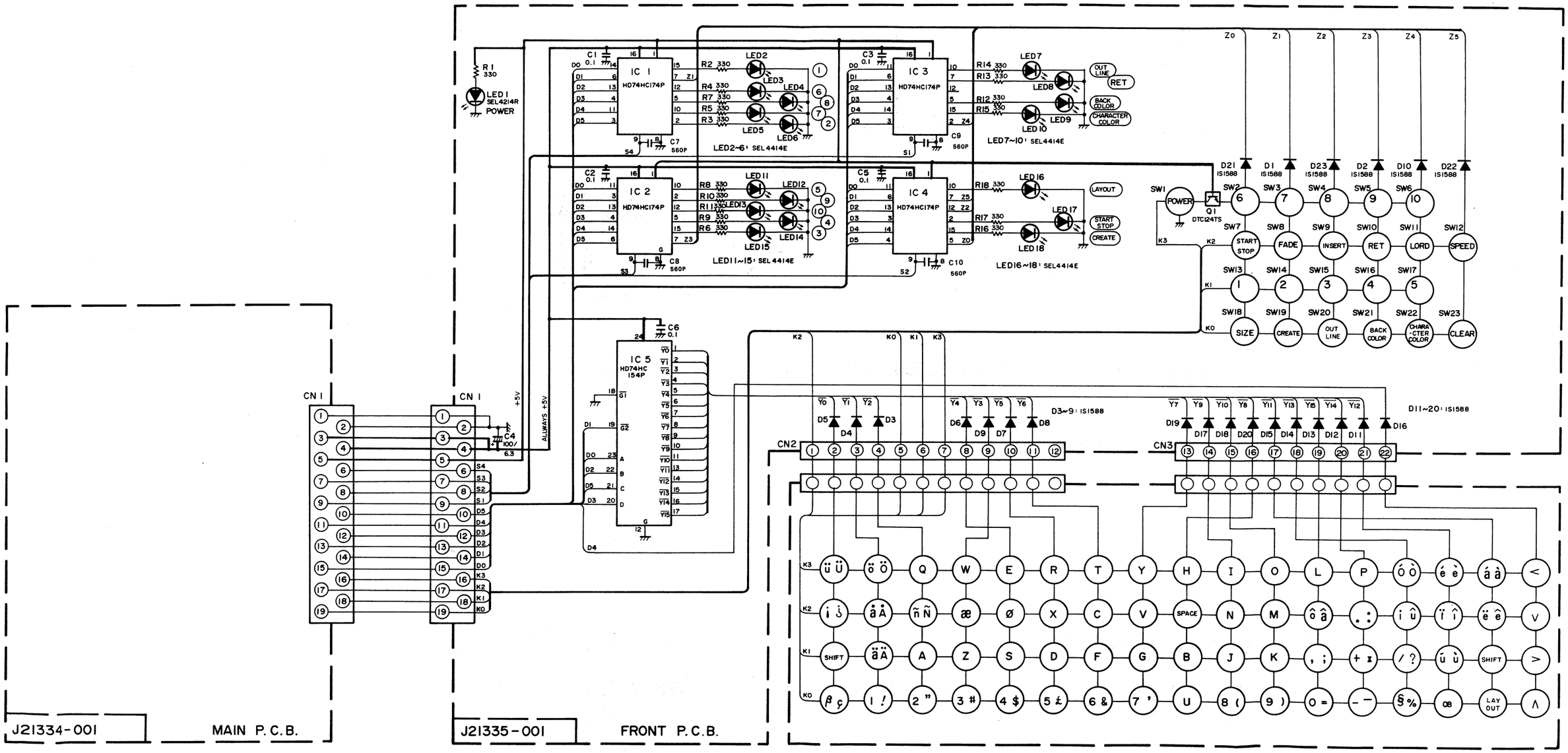

CN1
CN2
CN3
IC1 HC174
IC2
IC3 HC174
IC5 HC154
HC174
BACK COLOR
CHARACTOR COLOR
LOAD
RET
POWER
GND
SW1
SW2
SW3
SW4
SW11
SW13
SW14
SW15
SW16
SW17
SW21
SW22
401APG-009-90RⒶ APG0000-0801R
J21331-001A
FRONT PCB

Schematic Diagram (Front Circuit)

● **Use of Schematic Diagram**

Notes:

1. ——— shows the +5V or Allways +5V power supply.
2. - - - - shows the −5V power supply.
3. Values printed in red show the voltage of each section of the circuits as measured by a tester (having an internal resistance of 20 kohms/V), with the power switch turned ON.
4. Parts marked with ⚠ (in the shaded areas ▩) are safety parts. When replacing these, be sure to use only the designated parts to ensure safety.
5. This is a standard circuit diagram.
   Design and contents are subject to change without notice.

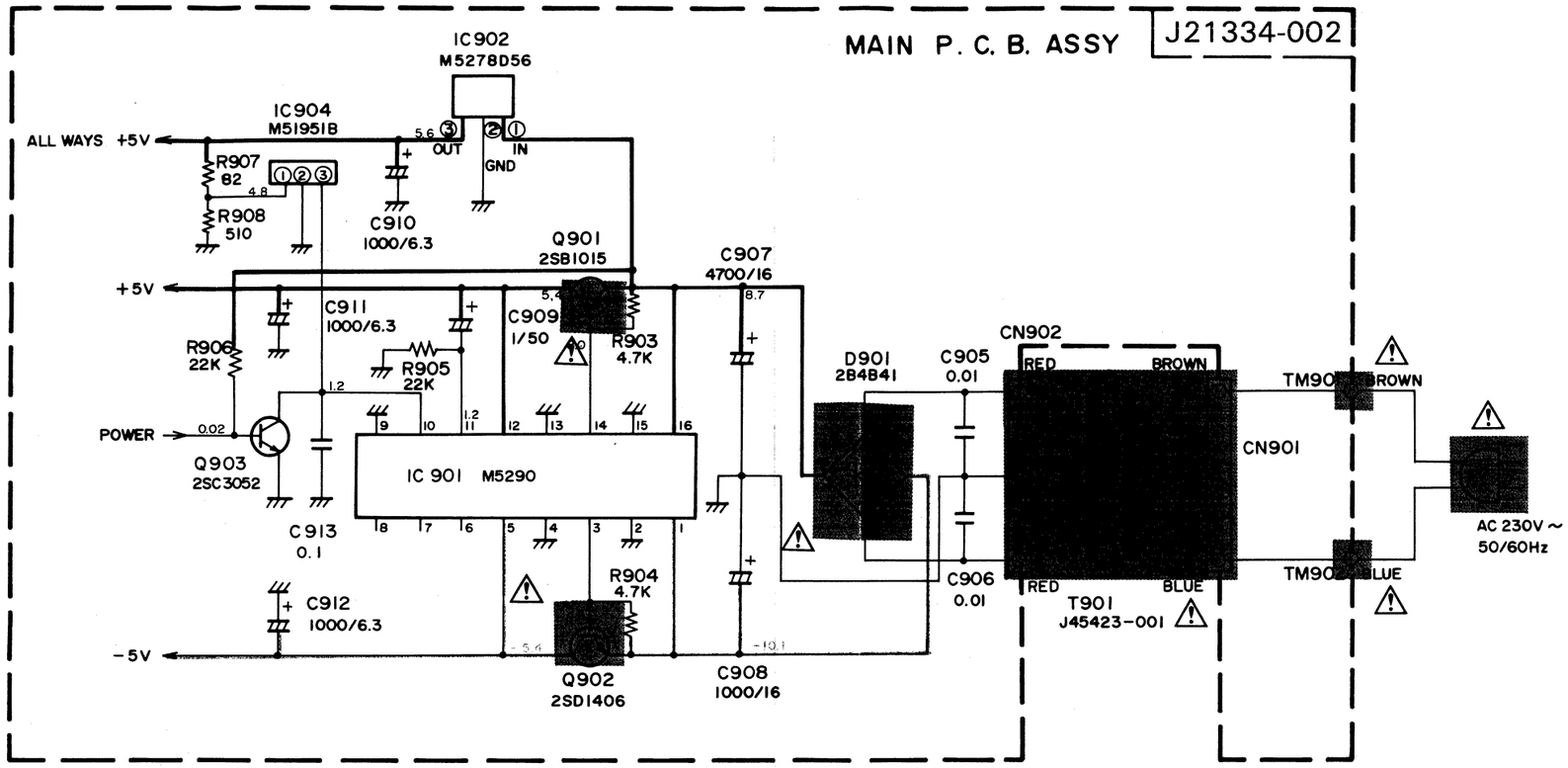


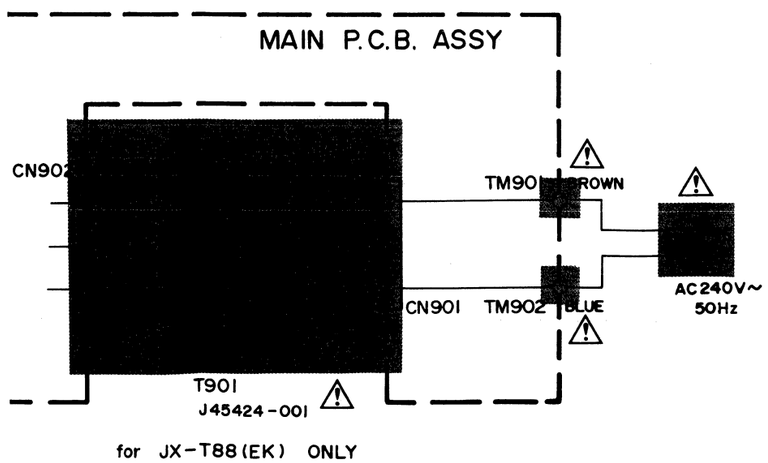
Schematic Diagram (Power Supply)

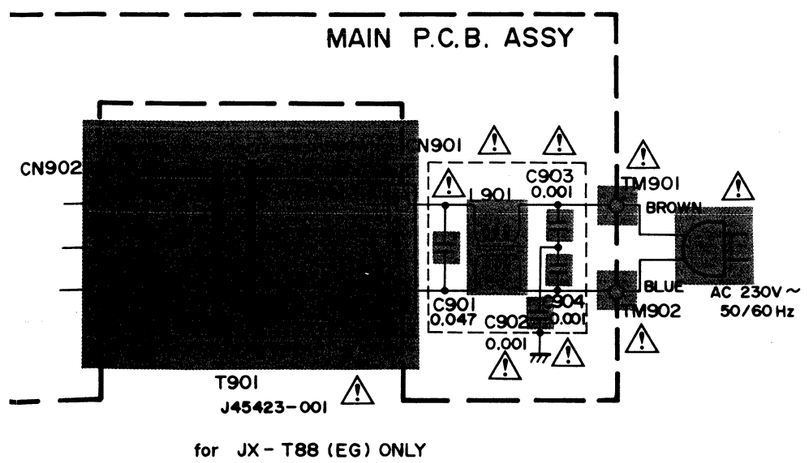
● **Use of Schematic Diagram**

Notes:

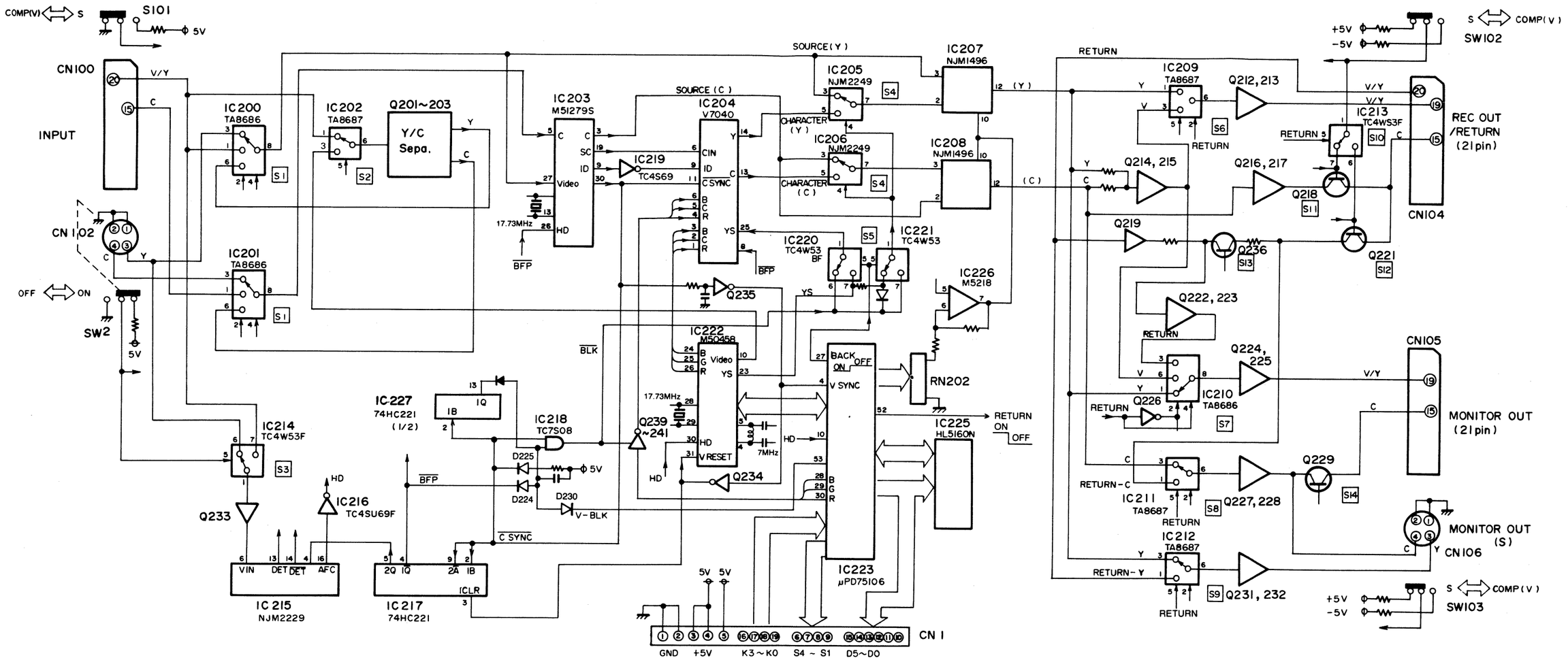
1. ——— shows the +5V power supply.
2. ——— shows the −5V power supply.
3. Values printed in red show the voltage of each section of the circuits as measured by a tester (having an internal resistance of 20 kohms/V), with the power switch turned ON.
4. Parts marked with ⚠ (in the shaded areas ▩) are safety parts. When replacing these, be sure to use only the designated parts to ensure safety.
5. This is a standard circuit diagram. Design and contents are subject to change without notice.







18. Block Diagram (VIDEO)



S1 IC200, 201 8 pin signal out

SOURCE / SW 101 / SW2	Signal ON		Signal OFF	
	V	S	V	S
OFF	0V	5V	0V	5V
OFF	CN100-V (0.0)	CN100-S (1.0)	Internal-V (0.0)	Internal-V (0.0)
ON	CN102 (0.1)	CN102 (0.1)	Internal-V (0.0)	Internal-V (0.0)
5V				

IC200,201 (2 pin · 4 pin)

S2 IC202 6 pin signal out

SOURCE	OUT
ON	CN100-V (1)
OFF	Internal-V (0)

IC202 (5 pin)

S3 IC214 1 pin signal out

SW2	OUT
OFF 0V	CN100 (0)
ON 5V	CN102 (1)

IC214 (5 pin)

S4 IC205, 206 7 pin signal out

Character Signal	OUT
H 5V	Character
L 0V	Source

IC205, 206 (4 pin)

S6 IC209 6 pin Signal out

RETURN / SW 102	ON 5V	OFF 0V
V 0V	OFF (1.0)	V (0.0)
S 5V	OFF (1.1)	Y (0.1)

IC209 (2 pin · 5 pin)

S7 IC210 8 pin Signal out

RETURN / SW 103	ON 5V	OFF 0V
V 0V	Return (0.1)	V (0.0)
S 5V	Return (0.1)	Y (1.0)

IC210 (2 pin · 4 pin)

S8 IC211 6 pin Signal out

RETURN / SW 102	ON 5V	OFF 0V
V 0V	OFF (1.1)	C (0.0)
S 5V	Return-C (0.1)	C (0.0)

IC211 (2 pin · 5 pin)

S9 IC212 6 pin Signal out

RETURN / SW 102	ON 5V	OFF 0V
V 0V	OFF (1.1)	Y (0.0)
S 5V	Return-Y (0.1)	Y (0.0)

IC212 (2 pin · 5 pin)

S5 IC220, 221 1 pin signal out

OUT / Back color	IC220 1 pin	IC221 1 pin
OFF	BLK	Character
ON	Character	BLK

S10 IC213 6, 7 pin

OUT / RETURN	6 pin	7 pin
ON 5V	ON (1)	OFF (1)
OFF 0V	OFF (0)	ON (0)

IC213 (5 pin)

S11 Q218

RETURN / SW 102	ON 5V	OFF 0V
V −5V	OFF (−5V)	OFF (−5V)
S 5V	OFF (−5V)	ON (+5V)

Q218 (Base)

S12 Q221

RETURN / SW 102	ON 5V	OFF 0V
V −5V	OFF (−5V)	OFF (−5V)
S 5V	ON (5V)	OFF (−5V)

Q221 (Base)

S13 Q236

SW103	OUT
V −5V	ON (+5V)
S 5V	OFF (−5V)

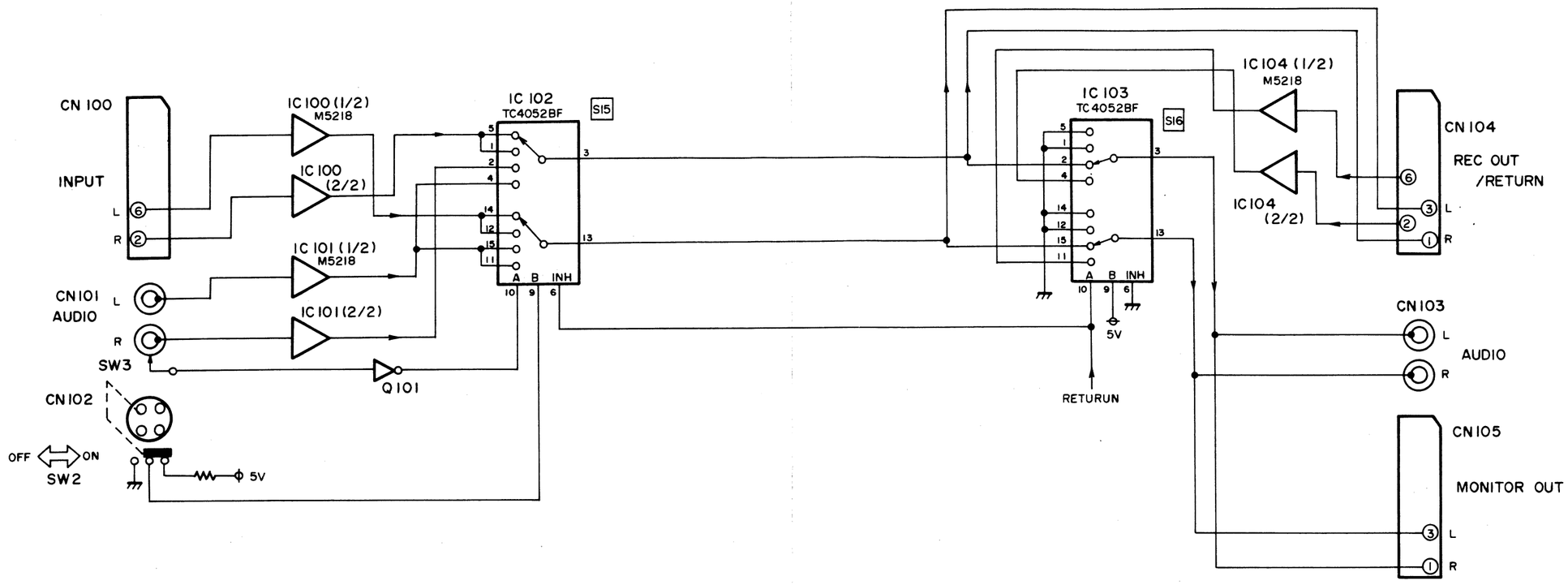
Q236 (Base)

S14 Q229

SW103	OUT
V −5V	OFF (−5V)
S 5V	ON (+5V)

Q229 (Base)

Block Diagram



S15 IC102 3, 13 pin signal out

SOURCE / SW3 \ SW 2	OFF (6 pin 0V)		ON (6 pin 5V)	
	ON 5V	OFF 0V	ON 5V	OFF 6V
ON 5V	CN101 L/R (1.0)	CN100 L/R (0.0)	OFF (1.0)	OFF (0.0)
OFF 0V	CN101 L/L (1.1)	CN100 L/R (0.1)	OFF (1.1)	OFF (0.1)

IC102 (9 pin · 10 pin)

S16 IC103 3, 13 pin signal out

RETURN	Out Put
OFF	Out Put Signal (1.0)
ON	Return Signal (1.1)

IC103 (9 pin · 10 pin)