CCD-V50E

SERVICE MANUAL

AEP Model
UK Model
E Model

Handycam DIGITAL
Video 8

This manual contains the SUPPLEMENT-1.

SPECIFICATIONS

System

Video recording system	Rotary two heads, Helical scanning FM system
Audio recording system	Rotary head, FM system
Video signal	PAL colour, CCIR standards
Usable cassette	8 mm video format cassette
Tape speed	SP: Approx. 20.051 mm/sec. LP: Approx. 10.058 mm/sec.
Recording or playback time	SP: 90 min. (P5–90) LP: 180 min. (P5–90)
Fast forward time	Approx. 6 min. 15 sec. (P5–90)
Image device	CCD (Charge Coupled Device)
Viewfinder	VF-240/241 electronic viewfinder (0.7″ black and white)
Lens	Combined 6 × power zoom lens f = 12–72 mm, F1.6 with macro Filter diameter: 46 mm
Auto focus system	TCL
Colour temperature	Preset values: ☼ 5,800K ⁘ 3,200K Auto: From the light at a tungsten lamp to the light on a slightly overcast day.
Minimum illumination	13 lux
Illumination range	13 lux–100,000 lux (1.1–9,294 footcandles)
Recommended illumination	More than 300 lux (28 footcandles)
Aperture correction	Automatic

Input and output connector

Video output	Phono jack, 1 Vp-p, 75 ohms unbalanced sync negative
Audio output	Phono jack, −10dBs, at output impedance less than 2.2 kilohms
RFU DC OUT	Special minijack, 5V DC, for the RFU-88E/AS only
MIC jack	Minijack, −66 dBs, low impedance With 2.5–3 V DC output, impedance 6.8 kilohms
Microphone power output jack	Special minijack, 5 V DC

Display in the viewfinder

Mode and caution indicators
Mode: REC/STBY
INDOOR/OUTDOOR
BACK LIGHT
Caution: BATTERY
DEW
TAPE END
CASSETTE
LOW LIGHT
CAUTION
Time/date indication
Title colour indication

Continued on next Page

MICROFILM

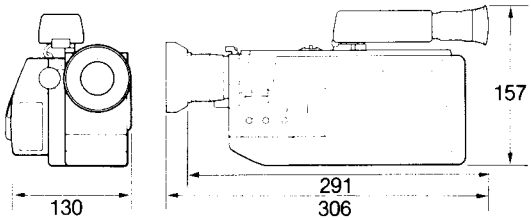
8 VIDEO CAMERA RECORDER

SONY®

VIDEO

General

Power requirements	Battery compartment 6 V/8.5 V
Power consumption	7.3 W (camera recording) including the viewfinder
Installation	Vertically
Operating temperature	0°C to 40°C (32°F to 104°F)
Storage temperature	−20°C to +60°C (−4°F to +140°F)
Dimensions	Approx. 130 × 157 × 291 mm (w/h/d) (5 1/8 × 6 1/4 × 11 1/2 in.)



Weight	Approx. 1.5 kg (3 lb 5 oz) excluding the battery and cassette
Microphone	Electret condenser microphone, omni-directional monaural type
Supplied accessories	Lithium battery (1) Shoulder strap (1)

Optional accessories

Carrying case LCH-V50, BP-400
Battery pack NP-22, NP-4000, BP-400
DC pack DCP-80
Car battery cord DCC-16AE
External microphone ECM-Z200, ECM-K120
External microphone shoe SAD-100
Connecting cable VMC-710M/720M (2 phono to 2 phono), VMC-262M (2 phono to 6-pin), VMC-2104M (4 phono to 21-pin)

Design and specifications are subject to change without notice.

Your dealer may not handle some of the above listed optional accessories. Please ask the dealer for detailed information about the optional accessories available in your country.

Note

This appliance conforms with EEC Directives 76/889 and 82/499 regarding interference suppression.

SAFETY CHECK-OUT

After correcting the original service problem, perform the following safety checks before releasing the set to the customer:

1. Check the area of your repair for unsoldered or poorly-soldered connections. Check the entire board surface for solder splashes and bridges.
2. Check the interboard wiring to ensure that no wires are "pinched" or contact high-wattage resistors.
3. Look for unauthorized replacement parts, particularly transistors, that were installed during a previous repair. Point them out to the customer and recommend their replacement.
4. Look for parts which, though functioning, show obvious signs of deterioration. Point them out to the customer and recommend their replacement.
5. Check the B+ voltage to see it is at the values specified.

SAFETY-RELATED COMPONENT WARNING !!

COMPONENTS IDENTIFIED BY SHADING AND MARK ⚠ ON THE SCHEMATIC DIAGRAMS, EXPLODED VIEWS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY. CIRCUIT ADJUSTMENTS THAT ARE CRITICAL TO SAFE OPERATION ARE IDENTIFIED IN THIS MANUAL. FOLLOW THESE PROCEDURES WHENEVER CRITICAL COMPONENTS ARE REPLACED OR IMPROPER OPERATION IS SUSPECTED.

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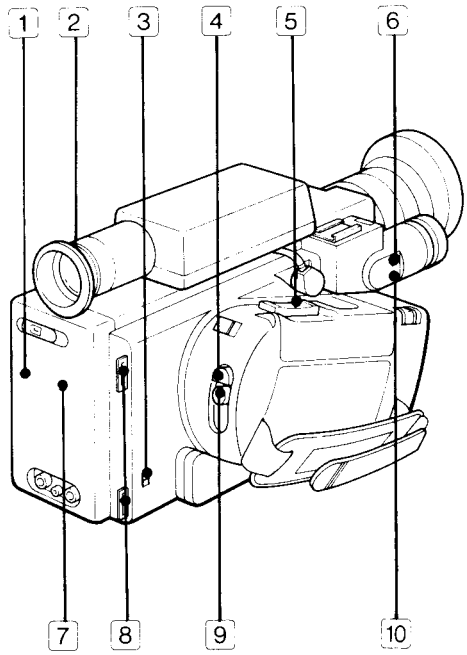
SECTION 1
GENERAL

1-1. LOCATION AND FUNCTION OF PARTS AND CONTROLS

A-1



For details on the use of each control, refer to the pages indicated in the circle.

A-1

1 BATTERY/CAUTION lamp
Blinks when the battery is exhausted, and lights up when the unit cannot record normally.

2 Viewfinder lens adjustment ring ⑮
Adjust to your eyesight to assure good focus. Be sure to adjust this knob when shooting for the first time.

3 REC MODE (recording mode)/EDIT switch

Switch it depending on the operating mode.

Mode	Recording	Playback	Editing
Setting	SP / LP	EDIT	EDIT
Function	REC MODE switch	EDIT switch	

4 STANDBY switch ⑮
Slide up to set the unit to recording pause mode.

5 Power zoom button ㉒

6 MIC (external microphone) jack

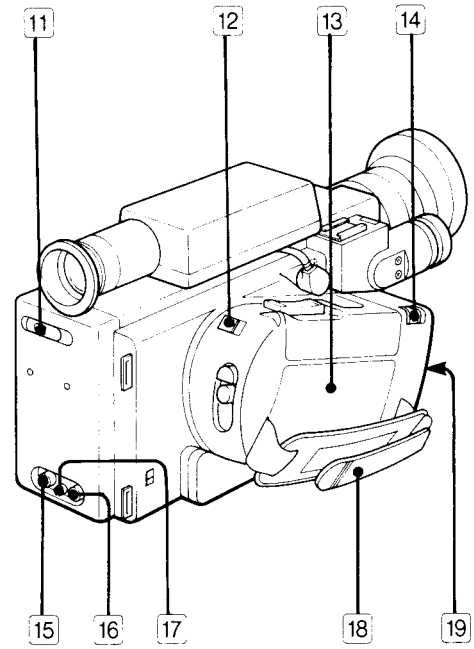
7 DEW lamp
Lights up when moisture has condensed inside the unit.

8 Hooks for shoulder strap
Attach a shoulder strap.

9 START/STOP button ⑯
Press to start and stop camera recording.

10 DC OUT (DC output) jack

A-2



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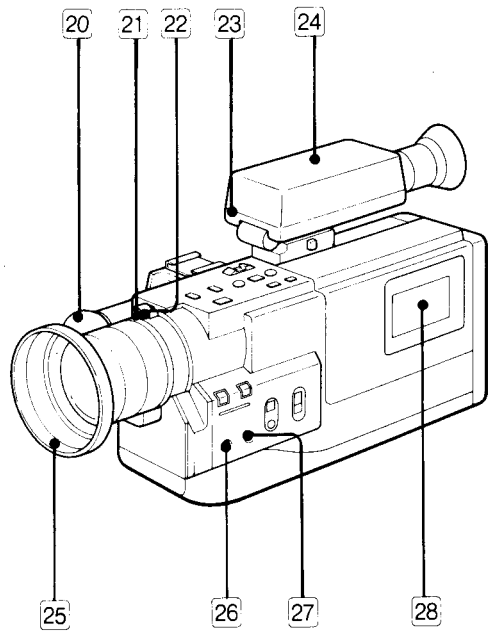


A-2

11 **Cassette eject button**

12 **GRIP RELEASE switch** ⑩

13 **Grip**

14 **BATT EJECT (battery eject) switch** ⑫

15 **VIDEO OUT (video output) jack** (phono jack)

16 **AUDIO OUT (audio output) jack** (phono jack)

17 **RFU DC OUT (RFU adaptor DC output) jack**
(special minijack)
Supplies power to the RFU-88E/AS RFU adaptor.

18 **Grip strap** ⑩

19 **Battery compartment** ⑫

A-3

20 **Built-in microphone** (monaural)

21 **Zoom lever** ㉒

22 **Macro set button** ㉓

23 **Camera recording/battery lamp**
Lights during camera recording. It blinks when the battery is exhausted.

24 **Viewfinder** ⑨⑰
The picture being recorded or played back can be monitored in monochrome here. Also, data such as caution indicators and function mode are displayed on the viewfinder screen.

On the bottom of the viewfinder
☼ : **Brightness control screw**
⊠ : **Focus control screw**
Normally, there is no need to adjust these screws. Adjust only when the picture is not displayed clearly.

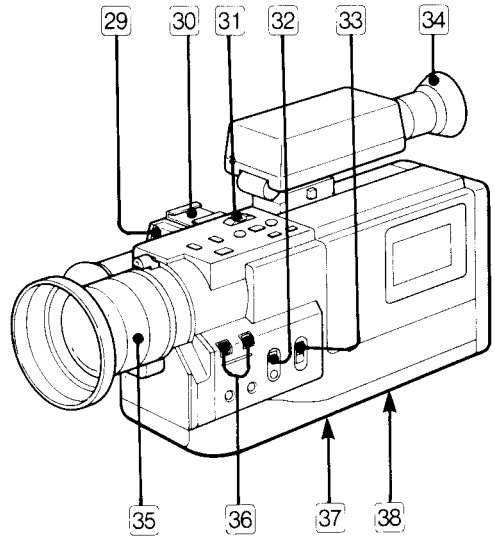
25 **Lens hood**

26 **BACK LIGHT button** ㉑

27 **REC REVIEW (recording review) button** ⑯

28 **Cassette holder**

A-4



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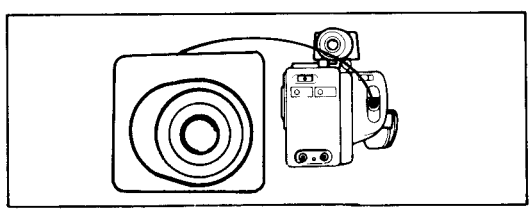

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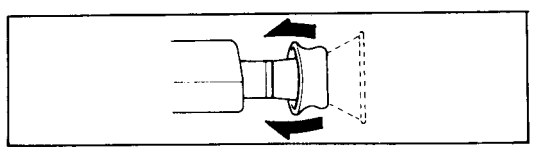
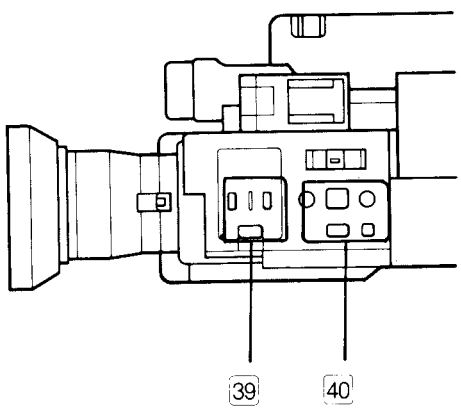


A-7



A-4

29 **White balance sensor**
This is the sensor for auto white balance adjustment.

30 **Accessory shoe**
Attach an optional external microphone or video light here.

31 **POWER switch**
CAMERA: For camera recording
PLAYER: For playing back or editing tapes
OFF: Power off

32 **FOCUS switch**
Normally set to AUTO for auto focusing. To focus manually, set to MAN (manual). To activate the auto focusing function briefly when the switch is set to MAN, hold down the PUSH AUTO button.

33 **WHITE BAL (white balance) switch**
Normally set to AUTO for auto white balance adjustment.
Set it to ☼ (outdoors), or ⁘ (indoors) for manual adjustment.

34 **Eyecup**
The eyecup is attached for the right eye. For the left eye, detach the rubber eyecup and attach it as illustrated. A-5
To view while wearing glasses, fold out the eyecup as illustrated. A-6

35 **Focus ring**

36 **DATE and TIME SET buttons** ㉔
Press to display or turn off the date or time. Keep these buttons depressed simultaneously for more than 3 seconds to enter date and time setting mode.
In the setting mode, the DATE SET button functions as the + button and the TIME SET button functions as the NEXT button.

37 **Tripod receptacle**

38 **Lithium battery compartment** ⑭

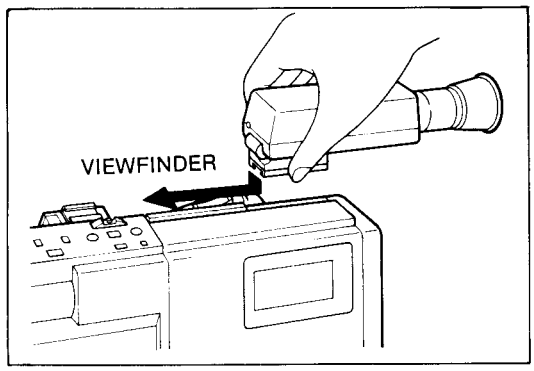
A-7

39 **SUPERIMPOSE buttons** ㉖
MEM (memory) button
COLOR button
ON/OFF button

40 **Tape transport buttons** ㉙
◀ (playback)
◀◀ FF (fast forward)
▶▶ REW (rewind)
■ (stop)
❚❚ (pause)

1-2. HOW TO ATTACH THE VIEWFINDER

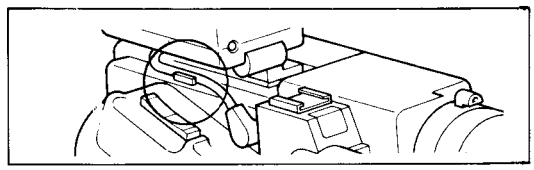
B-1



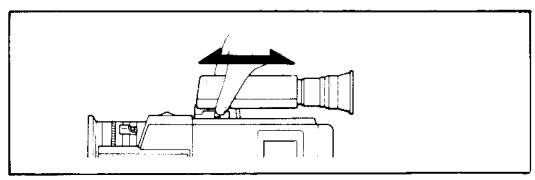
1 Slide the viewfinder onto the viewfinder shoe, while pressing the lock/release button on the side of the viewfinder. B-1
2 Slide the viewfinder all the way forward and release the lock/release button.
3 Move the viewfinder back and forth until it locks.
4 Plug the connecting cord into the VIEWFINDER jack and fix the cord. B-2

For the easiest shooting
The viewfinder can be locked in 3 positions. Select the most comfortable position while pressing the lock/release button. B-3
When shooting from a low angle, you can raise the viewfinder up to 90°. B-4

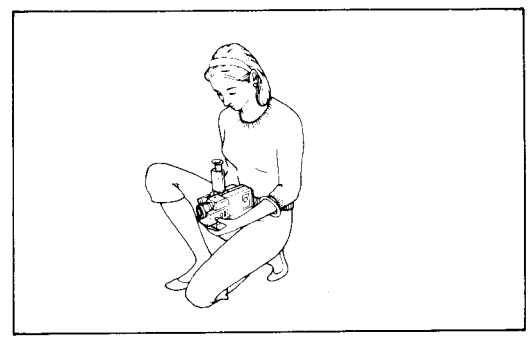
B-2



B-3

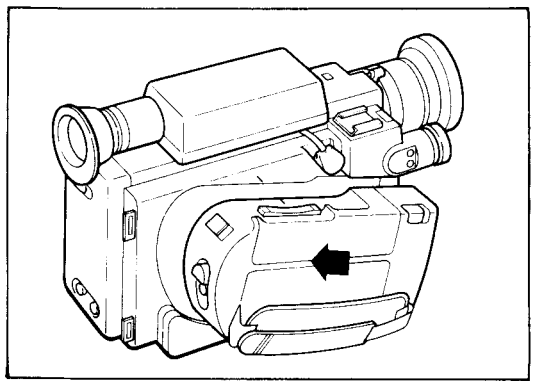


B-4



1-3. HOW TO ATTACH THE GRIP

C-1

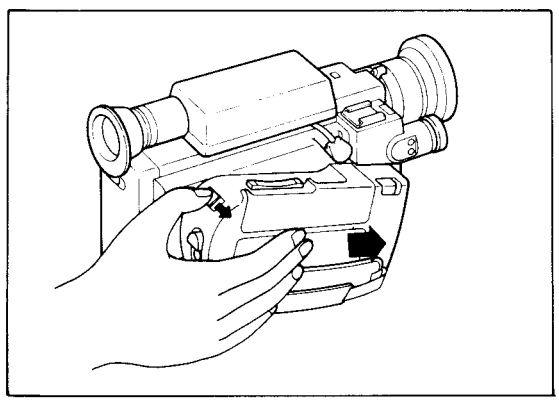


To attach the grip C-1
1 Align the marks.
2 Pull the grip until it locks.

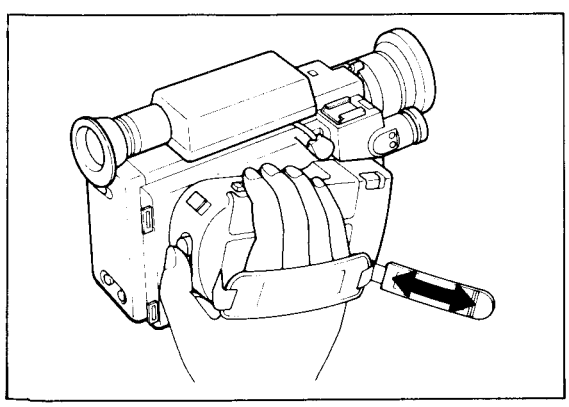
To detach the grip C-2
Slide the grip off while sliding the GRIP RELEASE switch on it.

To adjust the length of the grip strap C-3
Adjust the length so that your thumb can easily manipulate the START/STOP button.

C-2



C-3



1-4. POWER SOURCES

SELECTION OF POWER SOURCES

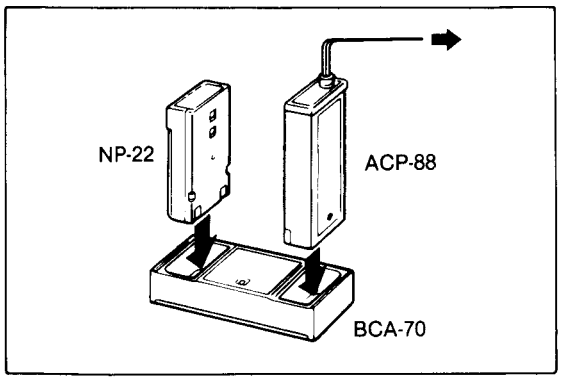
Operate the unit on one of the following power sources.

Place	Power source	Accessory to be used
Outdoors	Battery pack	**NP-22 battery pack** (page 11)
		NP-4000 battery pack and DCP-80 DC pack (page 12)
Indoors	House current	**ACP-88 AC pack** (page 13)
In cars	12 V or 24 V car battery	**DCP-80 DC pack and DCC-16AE car battery cord** (page 13)

Note on power source
Do not disconnect the power source or remove the battery pack during recording or playback, because it may damage the inserted cassette tape. If disconnected accidentally, supply the power again immediately.

FOR OUTDOOR USE — battery pack

D-1



How to charge D-1
Use the ACP-88 AC pack and the BCA-70 battery charge adaptor.

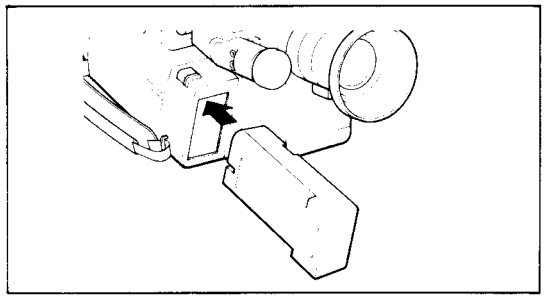
The charging time is about 1.5 hours using the ACP-88.

1 Insert the NP-22 and the ACP-88 with the metal contacts facing inside.
2 Connect the AC power cord of the ACP-88 to a wall outlet.
The charging will stop automatically when the battery is fully charged, and the CHARGE lamp of the BCA-70 will go out.

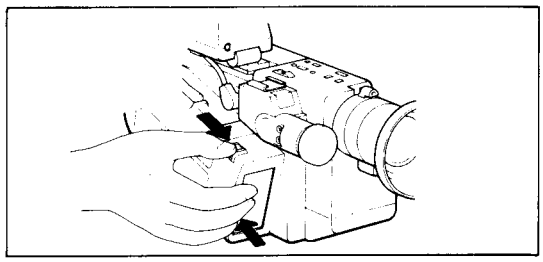
Battery life
A fully-charged battery provides approximately 1 hour of continuous operation at normal temperatures.
When the battery is exhausted, the BATTERY lamp outside the unit and the BATTERY indicator inside the viewfinder screen blink and the power will be turned off automatically in one minute or so. Replace the battery pack with a charged one.

NOTES
- The video camera recorder consumes power even in the recording pause mode. Therefore, for every hour's worth of tape you plan to shoot, expect to use 2 to 3 hours' worth of battery power.
- If the battery pack is not fully charged or if it is used in a cold place, its operating time is also shortened.
- After each use, be sure to recharge the battery pack.

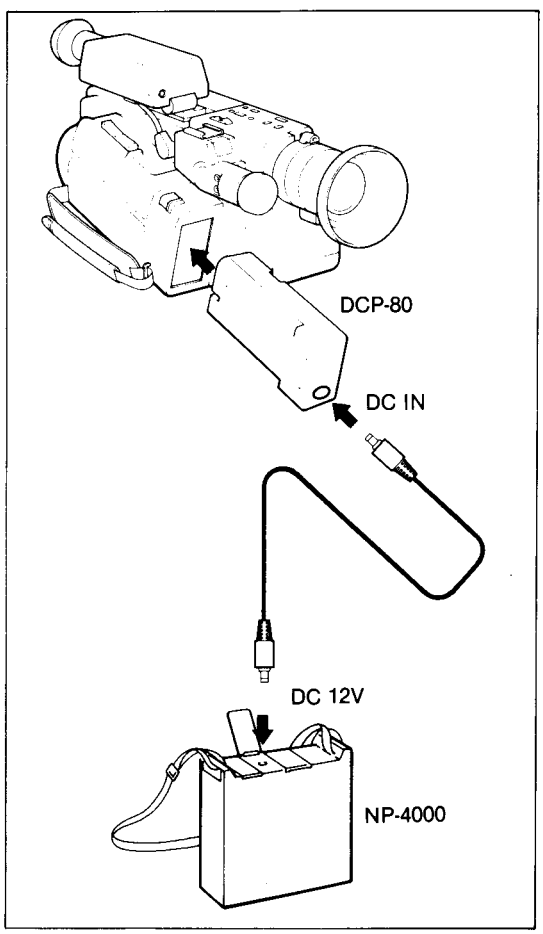
D-2



D-3



D-4



To insert the battery pack D-2
Insert the battery pack with the metal contacts facing inside.

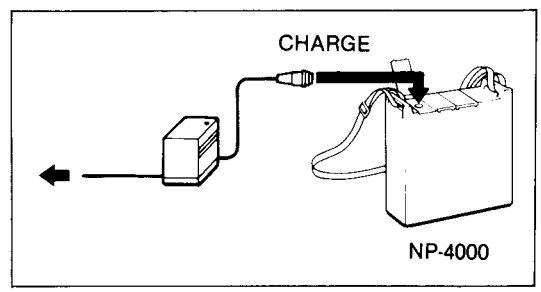
To remove the battery pack D-3
Slide the BATT EJECT switch while pushing the battery pack.

NP-4000 and DCP-80 D-4
A fully-charged NP-4000 (optional) battery pack provides approximately 5 times longer operation than an NP-22.
When using the NP-4000, an optional DCP-80 DC pack is required.
First insert the DCP-80 into the battery compartment of the video camera recorder and then connect it to the NP-4000.

To remove the DC pack, slide the BATT EJECT switch while pushing the DC pack.

When charging the NP-4000, use the battery charger supplied with the NP-4000. The charging time is about 10 hours. D-5

D-5



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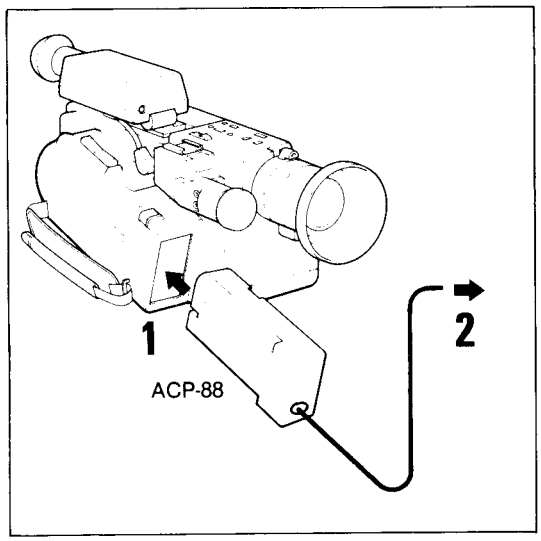
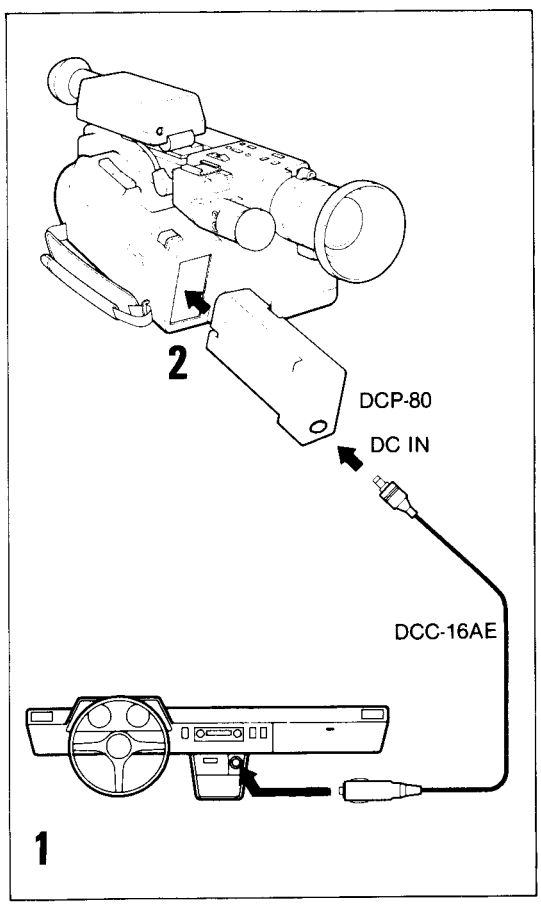


F



FOR INDOOR USE — AC pack

Connection E

1 Insert the ACP-88 AC pack with the metal contacts facing inside.
2 Connect the AC power cord of the ACP-88 to a wall outlet.

To remove the AC pack, slide the BATT EJECT switch while pushing the AC pack.

FOR USE IN CARS

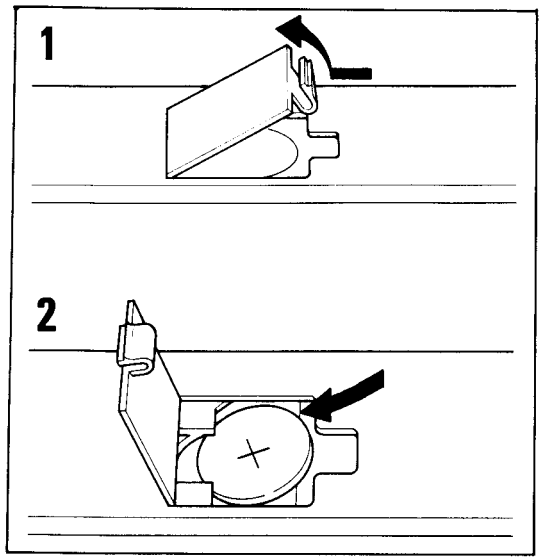
Connection F

Use the DCP-80 DC pack and the DCC-16AE car battery cord.

1 Connect the DCC-16AE to the DC IN jack of the DCP-80 and to the cigarette lighter socket of the car.
2 Insert the DCP-80 into the battery compartment of the video camera recorder.

To remove the DC pack, slide the BATT EJECT switch while pushing the DC pack.

G



LITHIUM BATTERY G

This unit uses a lithium battery to activate the clock and to keep a title in memory. Before operating the unit for the first time, install the supplied lithium battery:

1 Open the cover of the lithium battery compartment.
2 Install the supplied CR2025 lithium battery with the ⊕ side facing out.
3 Close the cover.

LITHIUM BATTERY LIFE

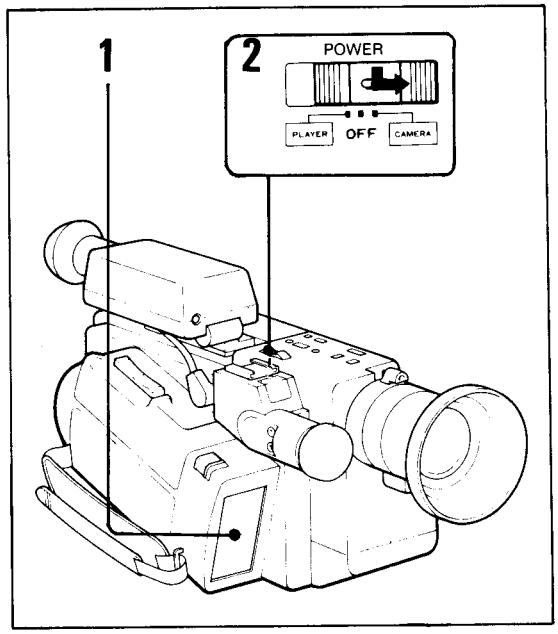
Approximately 1 year in normal operation.
When the lithium battery becomes weak, the time indication will blink on the viewfinder screen for about 7 seconds. When the battery is completely exhausted, "0:00:00" will blink for about 7 seconds and then go off. If your press the DATE or TIME button after that, "1.1.1987" or "0:00:00" will blink. Replace the battery with a new Sony CR2025 lithium battery in good time.

NOTES ON LITHIUM BATTERY

- Keep the lithium battery out of the reach of children. Should the battery be swallowed, immediately consult a doctor.
- Wipe the battery with a dry cloth to assure a good contact.
- Be sure to observe the correct polarity when installing the battery.
- Do not hold the battery with metallic tweezers, otherwise a short-circuit may occur.
- Do not break up the battery nor throw it into a fire, which might cause it to explode. Carefully dispose of the used batteries.

1-5. PREPARATION FOR CAMERA RECORDING

I-1



[1] Connect a power source, and set the POWER switch to CAMERA. I-1

[2] Adjust the position of the viewfinder lens. I-2

The position of the viewfinder lens for optimum vision varies depending on the person.

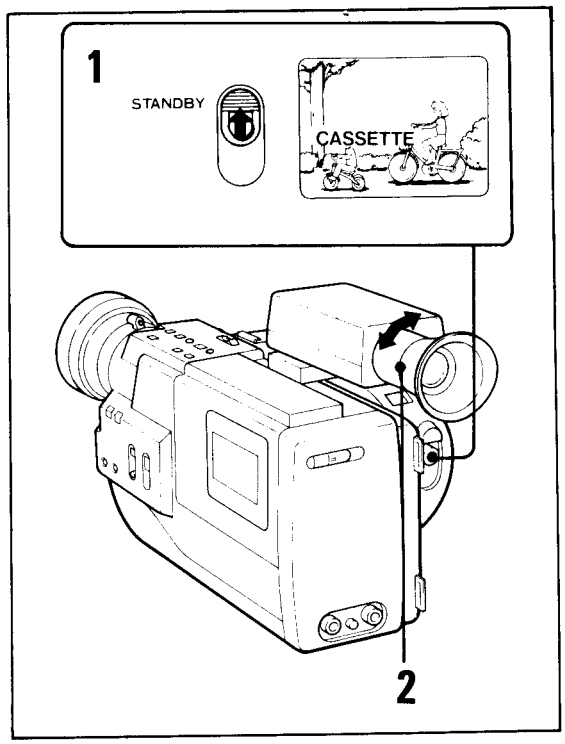
Remove the lens cap.

1 Slide the STANDBY switch up.
2 Turn the viewfinder lens adjustment ring so that the indicator displayed on the viewfinder screen come into sharp focus.

Adjustment of the position of the viewfinder lens is necessary only for your initial use, or for use after someone else.

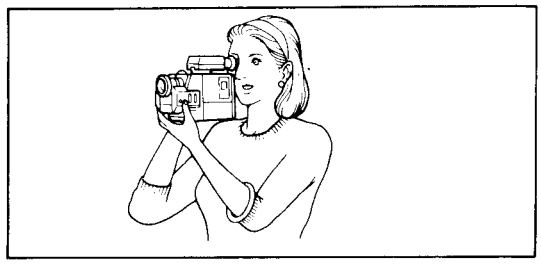
NOTE
If you leave the unit in the recording pause mode for 7 minutes or more, the unit will be automatically turned off. To resume recording pause mode, slide the STANDBY switch down once and slide it up again.

I-2

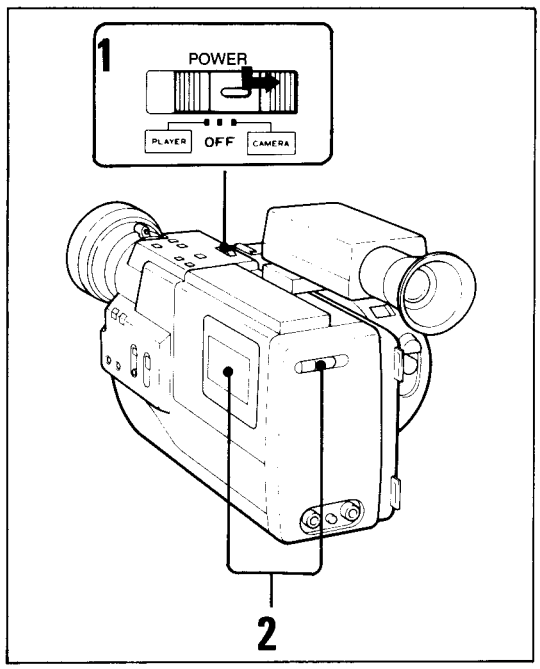


1-6. EASY CAMERA RECORDING WITH AUTOMATIC ADJUSTMENT

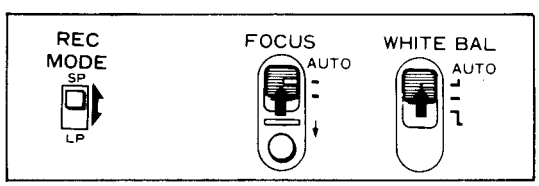
J-1



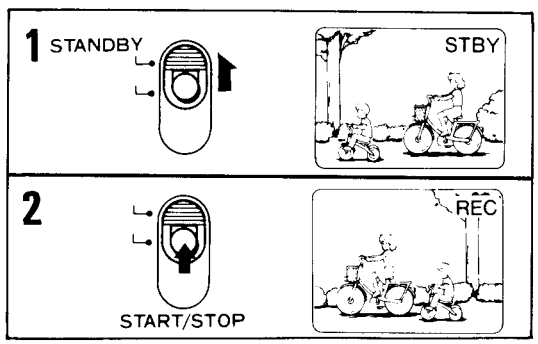
J-2



J-3 J-4



J-5



HOW TO RECORD

Hold the camera recorder as in the illustration. J-1

[1] Set the POWER switch to CAMERA, and insert a cassette. J-2

[2] Set the REC MODE switch to LP or SP, according to the length of the programme to be recorded. J-3

The recording time of a cassette in the LP mode is twice as long as that in the SP mode.

[3] Set the following switches to the standard position for automatic adjustment. J-4

- FOCUS switch → AUTO (auto focusing)
- WHITE BAL switch → AUTO (linear auto white balance adjustment)

[4] Start recording. J-5

1 Slide the STANDBY switch up.
The unit will enter the recording pause mode.

2 Press the START/STOP button.
Recording will start.

Check on the viewfinder screen

STBY: Displayed during recording pause mode.
REC: Displayed during recording.

To stop recording

Press the START/STOP button again.
The unit will enter the recording pause mode.

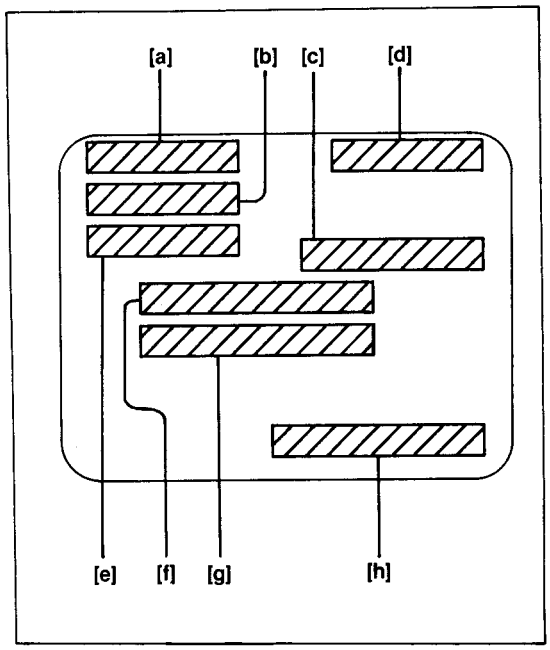
To check the last portion of the previous recording

Press the REC REVIEW button.
The last few seconds of the recorded portion are rewound and then the recorded picture is monitored on the viewfinder screen. The unit then enters the recording pause mode.

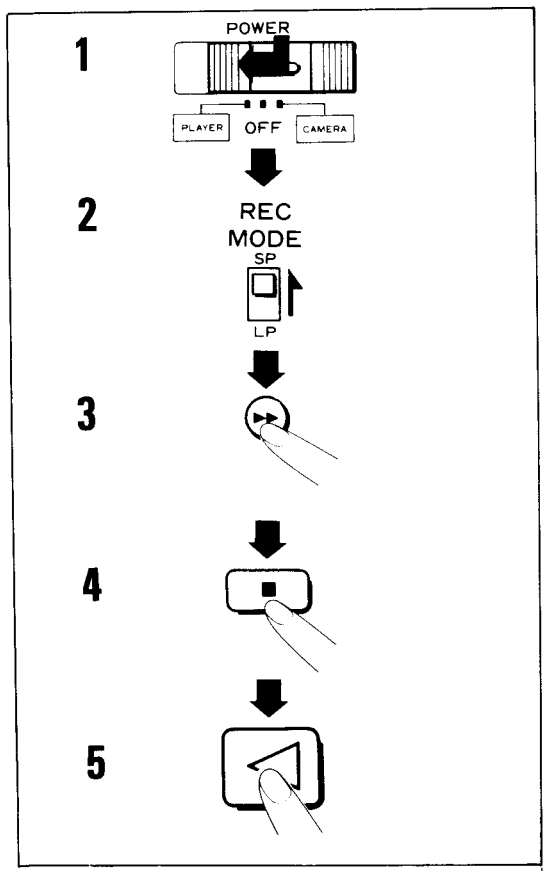
After using

Slide the STANDBY switch down and set the POWER switch to OFF. (You need not press the center button when setting the switch to OFF).

K



L



INDICATIONS INSIDE THE VIEWFINDER K

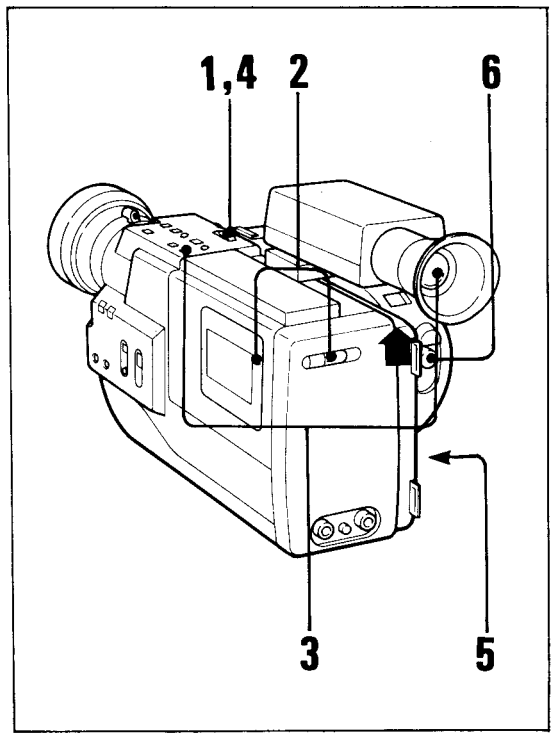
[a] OUTDOOR
The WHITE BAL switch is set to ☼.
INDOOR
The WHITE BAL switch is set to ⁘.
[b] BACK LIGHT
The BACK LIGHT button has been pressed (see page 21).
[c] Title colour (see page 26).
[d] STBY
Recording is momentarily stopped (recording pause mode).
REC
Recording is going on.
[e] LOW LIGHT
Insufficient light.
[f] BATTERY
Weak battery.
CAUTION
The unit cannot function normally.
DEW
Moisture condensation inside the unit
[g] CASSETTE
No cassette has been inserted or the safety tab of the inserted cassette is slid out.
TAPE END
The tape is at its end.
[h] Date or time (see page 24).

INSTANT PLAYBACK ON THE SPOT L

1 **Set the POWER switch to PLAYER.**
2 **Set the REC MODE/EDIT switch in the upper position.**
3 **Rewind the tape with the ▶▶ button.**
4 **Stop the tape with the ■ button.**
5 **Start playback with the ◁ button.**
The playback picture will appear on the viewfinder screen.

To resume recording in the LP mode, slide the REC MODE/EDIT switch down.

M



SMOOTH RECORDING M

A smooth transition between scenes can be made after the recording is stopped or the unit is turned off, provided that the cassette isn't removed.

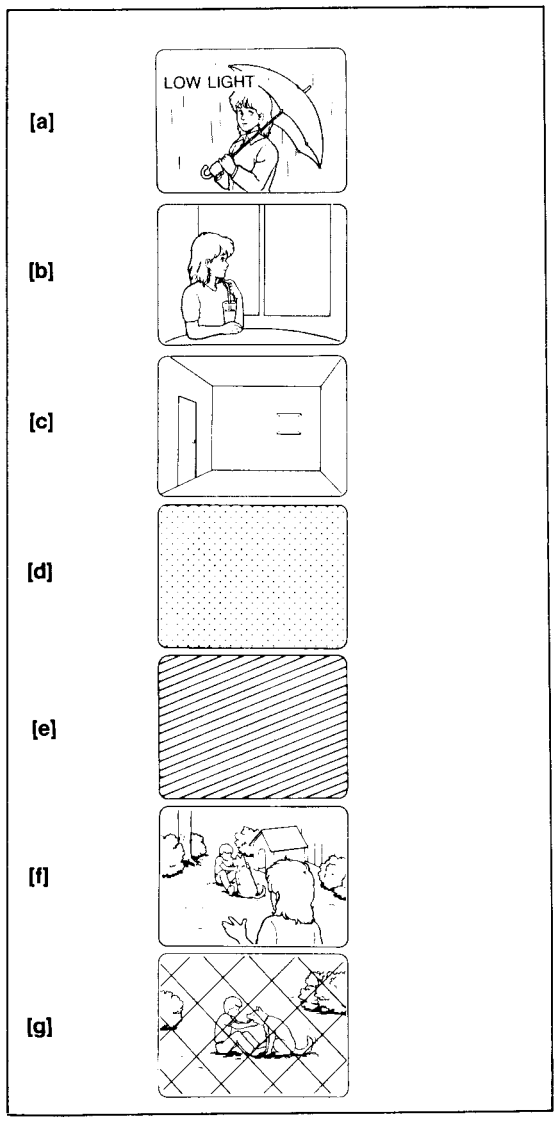
To record smoothly after having removed the cassette, proceed as follows.

1 **Set the POWER switch to PLAYER.**
2 **Insert the cassette.**
3 **Looking at the playback picture on the viewfinder screen, press the ❚❚ button where you want to restart recording.**
4 **Set the POWER switch to CAMERA.**
5 **Select the same recording mode with the REC MODE/EDIT switch as was used for the already recorded portion.**
6 **Slide the STANDBY switch up, and press the START/STOP button.**
Recording will start.

It is helpful to note on the cassette the mode, SP or LP, in which it was recorded.

1-7. MANUAL FOCUSING

N-5



POOR CONDITIONS FOR AUTO FOCUSING N-5

[a] Insufficient light
[b] Too much bright light behind the subject
[c] Subjects with flat colours and less contrast—wall, sky, etc.
[d] Finely detailed repetitive patterns
[e] Slant stripes
[f] When the distance between subjects at the center is extreme (e.g. one subject is close, the other is away)
[g] Subjects beyond screens, nets, etc. or when another subject passes across the camera

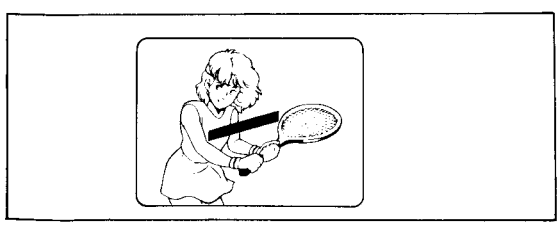
OTHER USES OF MANUAL FOCUSING

- When using special effects lenses or filters
- When shooting still subjects on a tripod
- To save battery wear
  (When the FOCUS switch is set to AUTO, the auto focusing operates to move the focus ring automatically even in recording pause mode. This causes the battery to wear continuously.)
- For focusing in close-up shooting, see page 23.

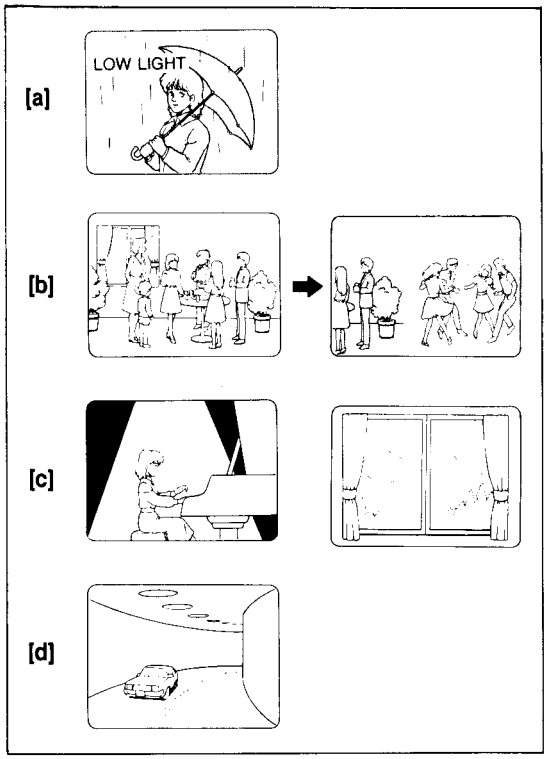
TCL AUTO FOCUSING SYSTEM
The TCL (Through Camera Lens) auto focusing system incorporated in this unit utilizes high-precision sensors to determine picture contrast at the center of the viewfinder screen (the portion marked with the blue bar in the illustration) and adjust focus accordingly for automatic, highly accurate focusing. N-6

NOTE
It may take several seconds to get focus when the camera is rapidly panned from a near subject to a distant subject with less contrast.

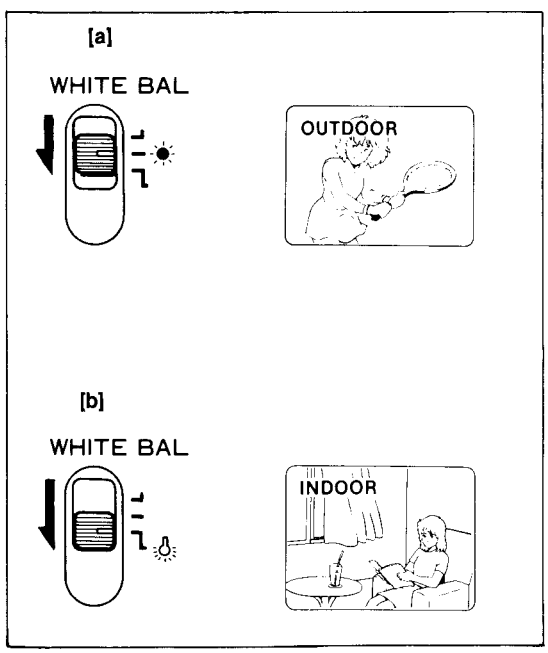
N-6



O-1



O-2



1-8. WHITE BALANCE ADJUSTMENT

Adjustment of white balance is for recording the picture with natural colour tone without reference to the condition of the light source.

Set the position of the WHITE BAL switch manually when shooting under certain conditions (listed below).

POOR CONDITIONS FOR LINEAR AUTO WHITE BALANCE ADJUSTMENT O-1

[a] Insufficient light
[b] When lighting conditions change quickly
[c] When the light condition for the subject is different from that for the unit
e.g. when the subject is in a spotlight
when the subject is outdoors but the camera is indoors
[d] Special light sources such as natrium lamp, etc.

HOW TO SET THE WHITE BAL SELECTOR O-2

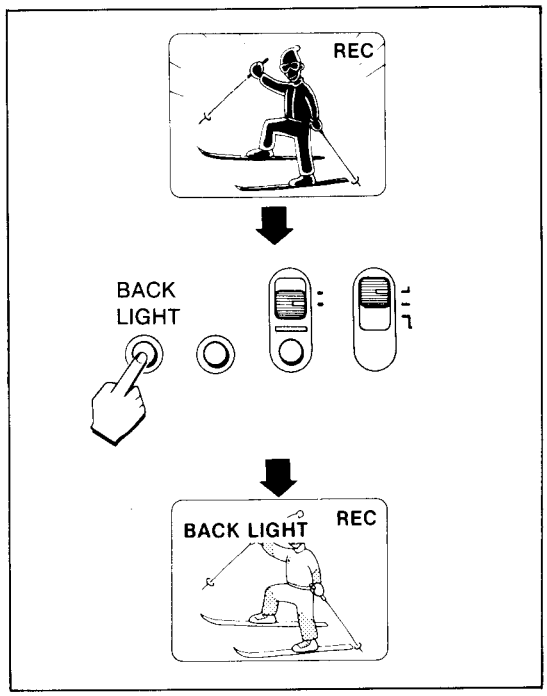
[a] Recording outdoors—Set to ☼ (5800K).
(OUTDOOR indicator appears on the viewfinder screen.)
[b] Recording indoors—Set to ⁘ (3200K).
(INDOOR indicator appears on the viewfinder screen.)

Recommended settings for various subjects
☼: sunset, fireworks, subjects beside a sunny window, etc.
⁘ : candle flames in darkness, subjects in the spotlight, scenes before sunrise, subjects in a tunnel (illuminated by natruim lamps), neonlights, etc.

LINEAR AUTO WHITE BALANCE SYSTEM OF THIS CAMERA RECORDER
Utilizes a white balance sensor to determine the colour temperature of the ambient light and adjust the white balance accordingly. As the sensor is built in the unit, however, optimum white balance adjustment cannot be obtained if the subject and this unit are under different lighting conditions.

1-9. BACK LIGHT ADJUSTMENT

P



This unit adjusts the iris automatically. However, when shooting a subject that is backlit, press the BACK LIGHT button.

(The BACK LIGHT Indicator appears when the BACK LIGHT button has been pressed.)

After shooting that particular scene, press the BACK LIGHT button again to release it.

(The BACK LIGHT indicator goes out.)

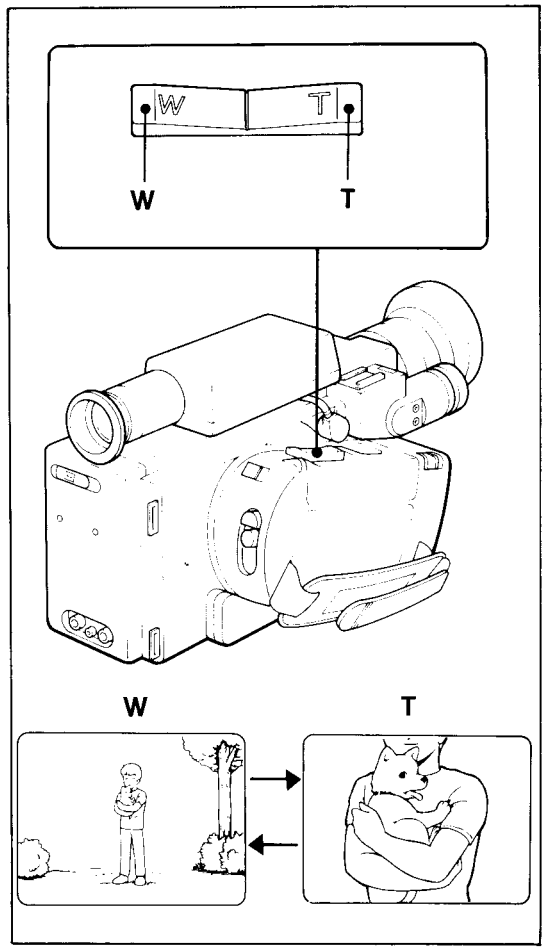
NOTE

Be sure to release the back light adjustment function when it becomes unnecessary. Otherwise the recorded picture will be too bright.

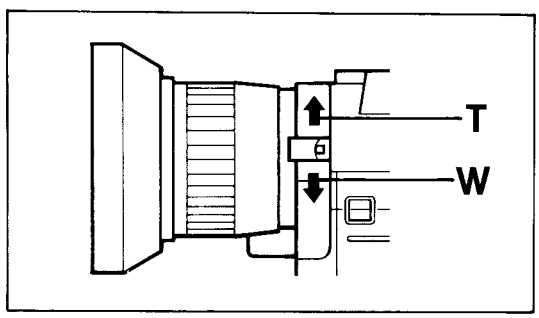
(The function will be released once the POWER switch is set to OFF.)

1-10. ZOOMING

Q-1



Q-2



The size of the subject in the scene can be changed.

POWER ZOOM Q-1

—for smooth and constant zooming

Press the T side of the power zoom button for telephoto and the W side for wide-angle.
The zoom ring will move automatically.

MANUAL ZOOM Q-2

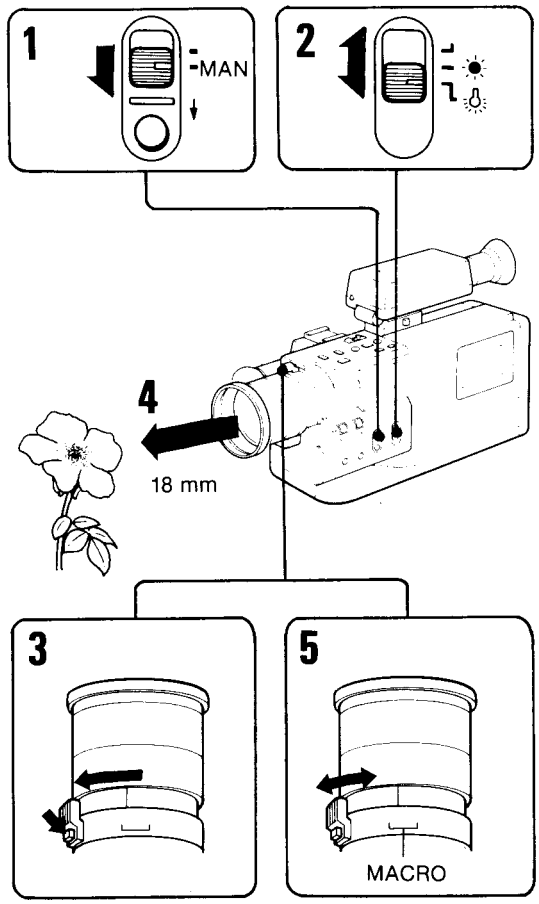
—to create a dramatic effect

Turn the manual zoom lever upward for telephoto and downward for wide-angle.

For more zooming effect
Use an optional conversion lens (VCL-1546A or VCL-0746A).
Auto focus, however, will not function in that case.

1-11. CLOSE-UPS(MACRO)

R



Even tiny objects can literally fill the screen for dramatic close-up effects.
(Remove the lens hood before operation.)

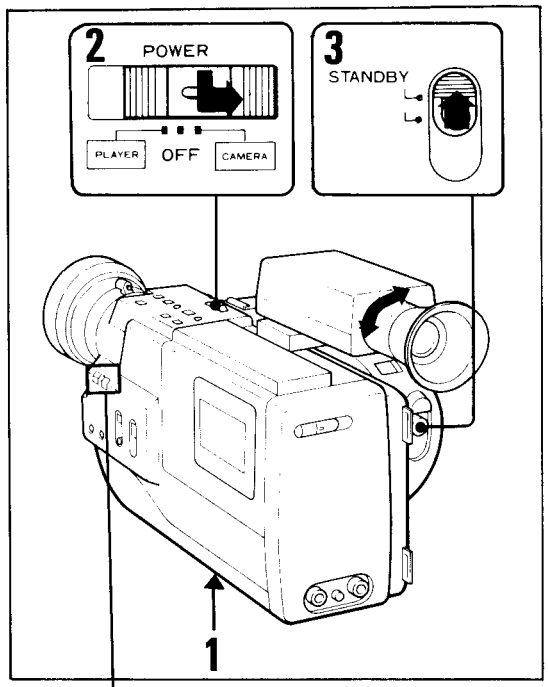
1 Set the FOCUS switch to MAN.
2 Set the WHITE BAL switch to ☼ or ☼ .
3 Turn the zoom lever to the left for MACRO position, holding down the green macro set button.
4 Bring the recorder as close as necessary to obtain the desired subject size.
The subject can be as close as approximately 18 mm (¾ in.) from the lens surface.
5 Turn the zoom lever within the MACRO range to focus sharply.

NOTES

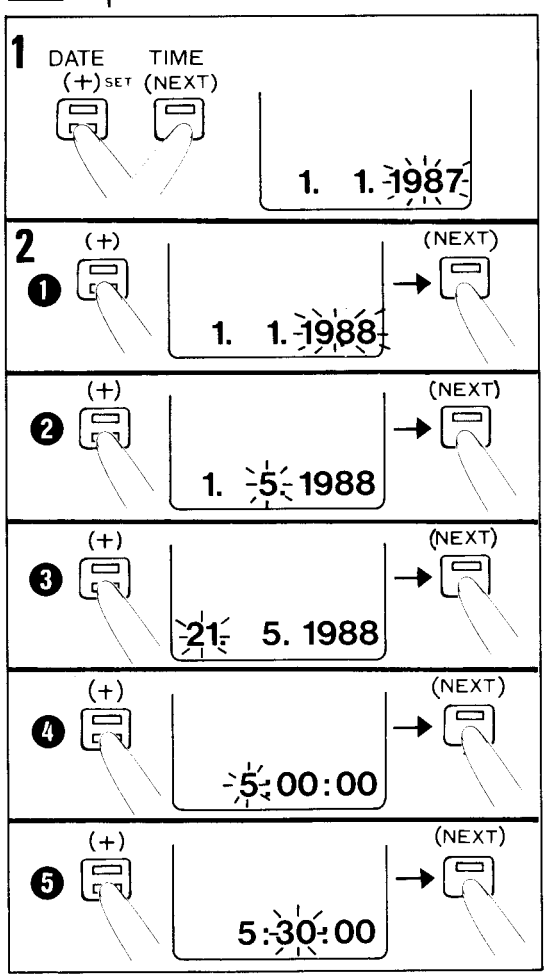
- Auto focusing and linear auto white balance adjustment do not function properly in macro shooting.
- If the subject is closer than 18 mm, it cannot be brought into focus.
- When shooting in macro, the depth of field is very shallow, so pay attention to focus. To keep the subject in focus, use a tripod or monopod.
- Zooming is not possible during macro recording. To change the size of the subject, move the camera recorder closer or further away.

1-12. RECORDING DATE OR TIME

S-1



S-2



Once the date and the current time are adjusted, the date or time can be recorded together with the picture.

Before setting the date and time S-1

1 Make sure that the lithium battery is installed. See page 11.
2 Set the POWER switch to CAMERA.
3 Slide up the STANDBY switch to set the unit in the recording pause mode.

TO SET DATE AND TIME S-2

1 Press the DATE and TIME SET buttons simultaneously **for more than 3 seconds.** The date indication will appear on the viewfinder screen (date/time setting mode). The DATE button now functions as the + button and the TIME button functions as the NEXT button.
2 Adjust the year, month, day hour and minute in sequence, following the illustration. First adjust the blinking digits with the + button, and then press the NEXT button.
❶ Year ❷ Month ❸ Day ❹ Hour ❺ Minute
After adjusting the minute digits, press the NEXT button at the same time with an announced time signal.

The clock starts operating. There is no need to readjust the date and time as long as the lithium battery remains.

To clear the time indication from the display
Press the TIME SET (NEXT) button again.

THE + BUTTON CAN BE PRESSED IN TWO WAYS
- When you keep the button pressed, the digits will advance continuously.
- When you press and immediately release the button, the digits will advance by one.

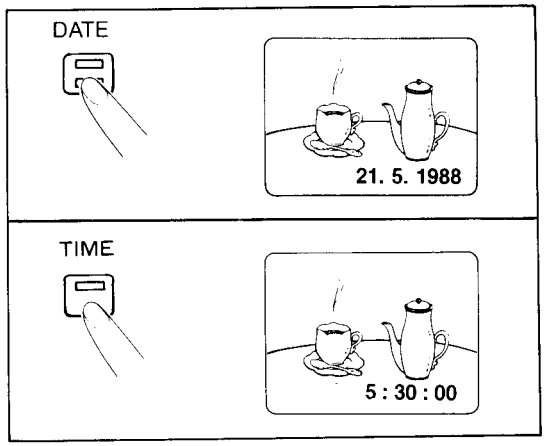
NOTE
The year indication will return to "1987" when it exceeds "2015".

To check the preset date and time
Press the DATE or TIME SET button. When the same button is pressed again, the indication goes off.

To readjust an incorrect date or time
Set the unit to date/time setting mode and press the NEXT button repeatedly until the incorrect digit blinks. Correct it with the + button and press the NEXT button. After adjusting the minute digits, press the NEXT button at the same time with an anounced time signal.

1-13. TO RECORD THE DATE OR TIME S-3

S-3



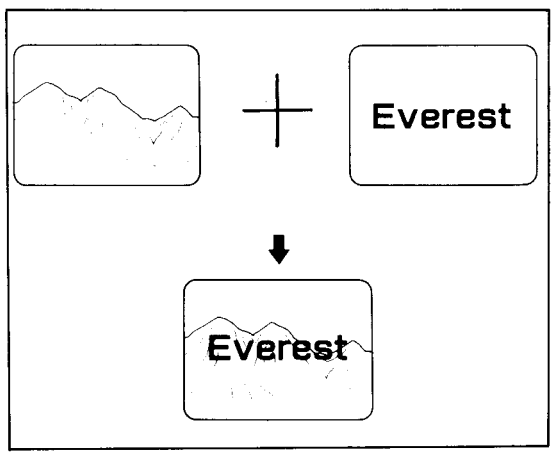
TO RECORD THE DATE OR TIME S-3

During camera recording or in recording pause mode, press the DATE or TIME SET button to display the date or time on the viewfinder screen.
If the unit is set to recording mode, the date or time being displayed will be recorded together with the picture.

To stop recording the date or time, press the DATE or TIME SET button again. The picture recording will continue.

1-14. RECORDING A TITLE

T



A title or a figure can be memorized and recorded together with the picture.
The memorized title with a selected colour (8 colours available) is superimposed onto the picture being recorded. T

PREPARATIONS

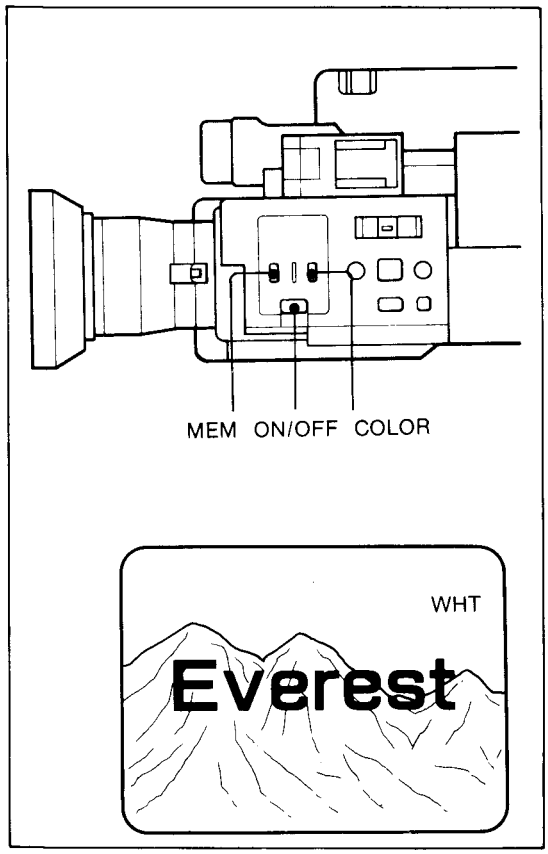
The recommended position of the title card is about 212 (8⅜ inches) mm apart from the ϕ mark on the camera.

To make a desired title card
Use a white and plane card and draw the title on it with a deep colour (black is recommended for the best result) in thick letters.

Before memorizing the title
1 Make sure that the lithium battery is installed. See page 14.
2 Set the POWER switch to CAMERA.
3 Slide up the STANDBY switch to set the unit in the recording pause mode.

NOTE
The title in the peripheral area of the screen cannot be memorized. Especially, when a white title with the black background covering the entire screen is memorized, a white frame may appear.
When deciding the title size, check the effective picture size on your video monitor.

U



TO MEMORIZE THE TITLE U

1 Set the zoom lever to the MACRO position. Point the camera to the title card and adjust the focus.
2 Press the MEM button to memorize the title.
3 Select the title colour while observing the colour indication in the viewfinder. Each push on the COLOR button cyclically changes the colour, as follows:

WHT (white) → BLUE → GRN (green) → CYAN
↑ ↓
BLK (black)←YEL (yellow)←VIO (violet)←RED

4 Press the SUPERIMPOSE ON/OFF button to turn off the title.

NOTES
- The colour indication in the viewfinder is not recorded on the tapes.
- You can change the title colour even after starting the recording.
- To memorize a title, use of an appropriate light is recommended for a better result.

To check the title
To check the memorized title, press the SUPERIMPOSE ON/OFF button. To turn off the title, press the button again.

TO RECORD THE TITLE

During camera recording, press the SUPERIMPOSE ON/OFF button at the point from which the title is to be inserted.
The memorized title will be recorded together with the picture.

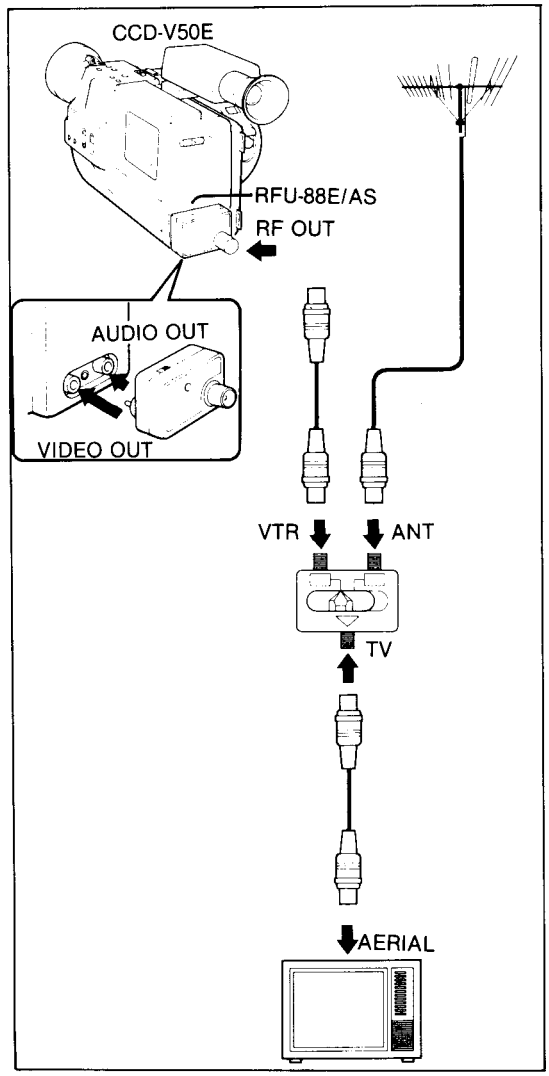
To record the title from the beginning
Before starting the recording, press the SUPERIMPOSE ON/OFF button.

To stop recording the title, press the SUPERIMPOSE ON/OFF button again. The picture recording will continue.

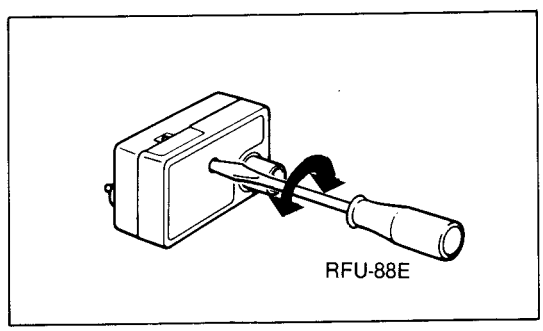
For recording the title several times
By repeating the above procedure, you can record the title as many times as desired.

1-15. PREPARATION FOR PLAYBACK
—connecting a TV set

W-1



W-2



[1] Connecting a TV without audio/video input jacks W-1

Connect the RFU-88E/AS RFU adaptor to the CCD-V50E.

1 Connect the aerial, RFU-88E/AS, and TV to the aerial selector (supplied with the RFU-88E/AS) using the supplied 75-ohm coaxial cables.
2 Set the I/G selector on the RFU-88E according to the TV system of your country.
3 Adjust one of the TV programme position to receive the signal from the video camera recorder. See "Adjusting the TV" below.
4 Set the selector switch on the aerial selector to VTR for viewing a playback picture.
5 Select the same channel on the TV as that selected in adjusting the TV.

Adjusting the TV with the RFU-88E

1 Turn on the TV and select a programme position which is not being used to receive a TV station.
2 Set the POWER switch of the CCD-V50E to CAMERA and slide the STANDBY switch up.
3 Set the selector switch of the aerial selector to VTR.
4 Tune the TV until you see the picture and hear the sound from the CCD-V50E.

If the playback picture is not free of disturbance

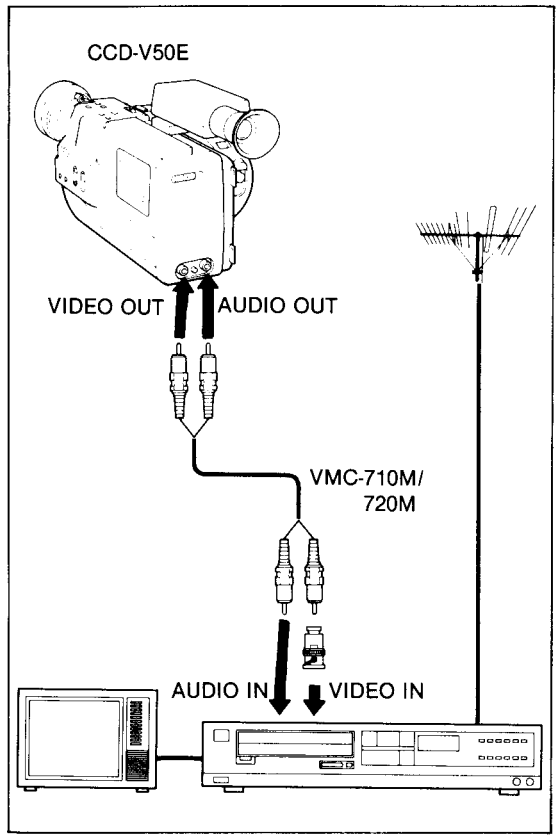
1 Set the selector switch of the aerial selector to ANT.
2 Adjust the programme position of the TV to a channel between UHF channels 30 and 39 with the tuning control or the fine tuning control on the TV, so that the TV screen shows no picture and so that a steady rustling sound or no sound is heard.
3 Set the selector switch of the aerial selector to VTR.
4 Slowly turn the RF channel screw of the RFU-88E with the supplied screwdriver, until the picture from the CCD-V50E becomes clear. W-2

Now the TV adjustment is complete.

Adjusting the TV with the RFU-88AS

Select the CHANNEL selector on the RFU-88AS to 0 CH or 1 CH, whichever is not active in your area, and select the same channel on the TV.

W-3



[2] Connecting a TV connected to another VTR with an input selector W-3

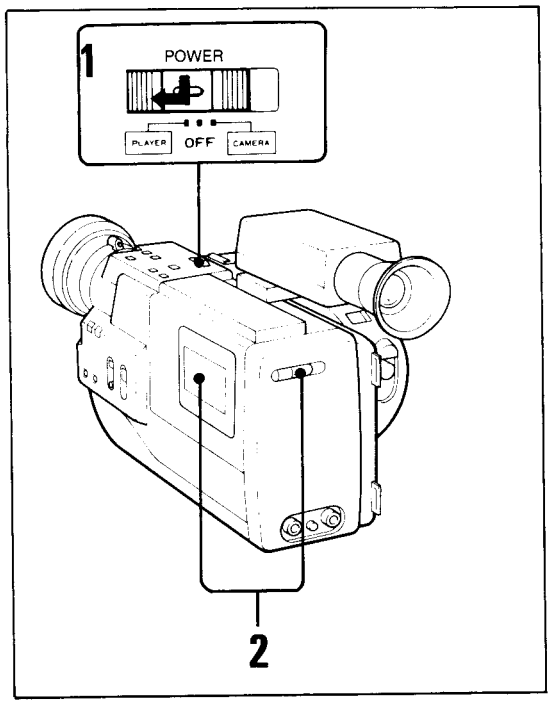
Use the optional connecting cord VMC-710M/720M.

Set the selectors on the VTR as follows:
Input selector → LINE
TV/VTR selector → VTR

NOTE
When the VTR to be connected has stereo audio inputs, use the optional VMC-910MS/920MS connecting cord.

1-16. PLAYBACK

X-1



Turn on the TV (or colour monitor), and select the channel for viewing a playback picture (or set the TV/VIDEO selector to VIDEO).

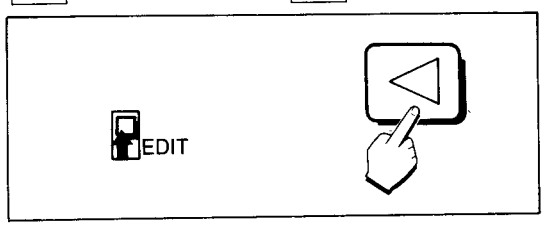
1 Set the POWER switch to PLAYER, and insert a cassette. X-1
2 Set the REC MODE/EDIT switch in the upper position. X-2
The unit detects the recorded mode of the tape, and adjust the tape speed automatically.
3 Press the ◁ button. X-3
Playback will start.

To stop the tape, press the ■ button.

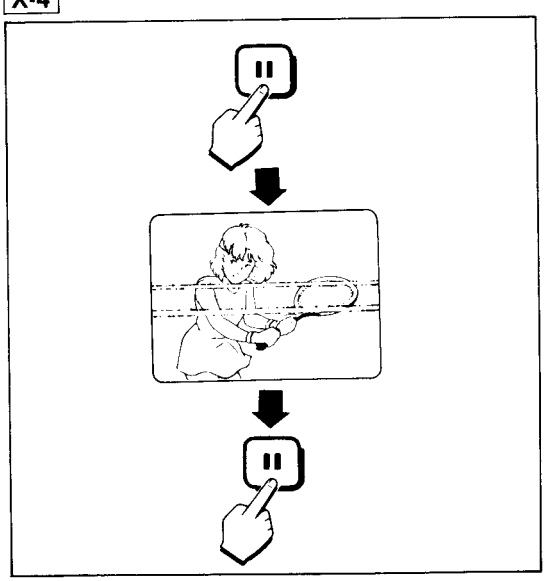
After using, be sure to set the POWER switch of the recorder to OFF.

To get a still picture X-4
Press the ❚❚ button during playback. To resume playback, press the ❚❚ button again or press the ◁ button.

X-2 X-3



X-4



MONITORING A HIGH-SPEED PICTURE

— To skip over or repeat a certain portion

1 In the playback mode, press the ◀◀ or ▶▶ button.
The picture will be monitored at high speed as long as it is kept pressed.
2 Release the ◀◀ or ▶▶ button at the desired point.
Normal playback will resume.

NOTES

- If you move the position of the POWER switch during playback, the tape will stop. When you move the POWER switch to CAMERA in the playback pause mode, however, the unit will enter recording pause mode.
- When the pause mode lasts for 7 minutes or more, the unit will automatically enter the stop mode.
- Streaks will appear and the sound will be muted in the still picture and the high-speed picture.
- When a tape is recorded in SP mode, a still picture and high-speed picture may be noisy with many streaks and become black and white. Streaks will be wider than those of an LP-recorded tape.

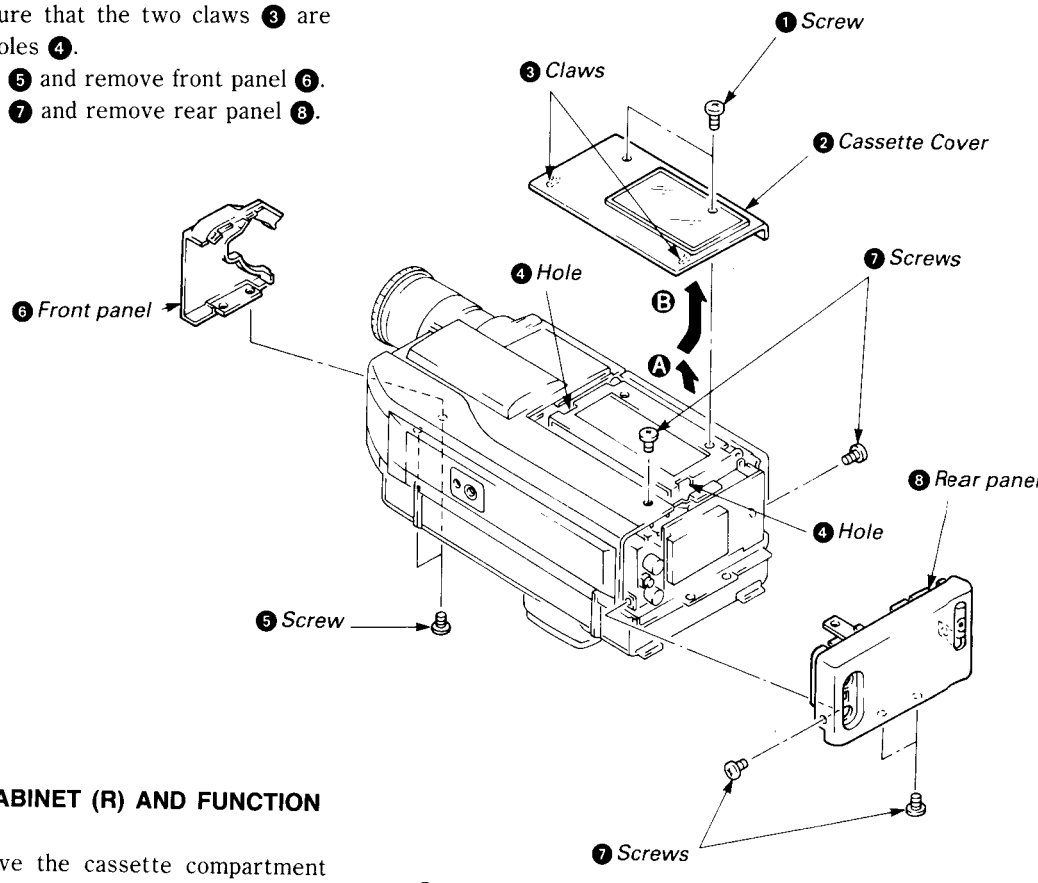
SECTION 2
DISASSEMBLY

2-1. REMOVAL OF THE FRONT AND REAR PANELS OF THE CASSETTE COMPARTMENT

1) Remove the two screws ❶.
2) Lift cassette cover ❷ in the direction of arrow Ⓐ and remove in the direction of arrow Ⓑ.

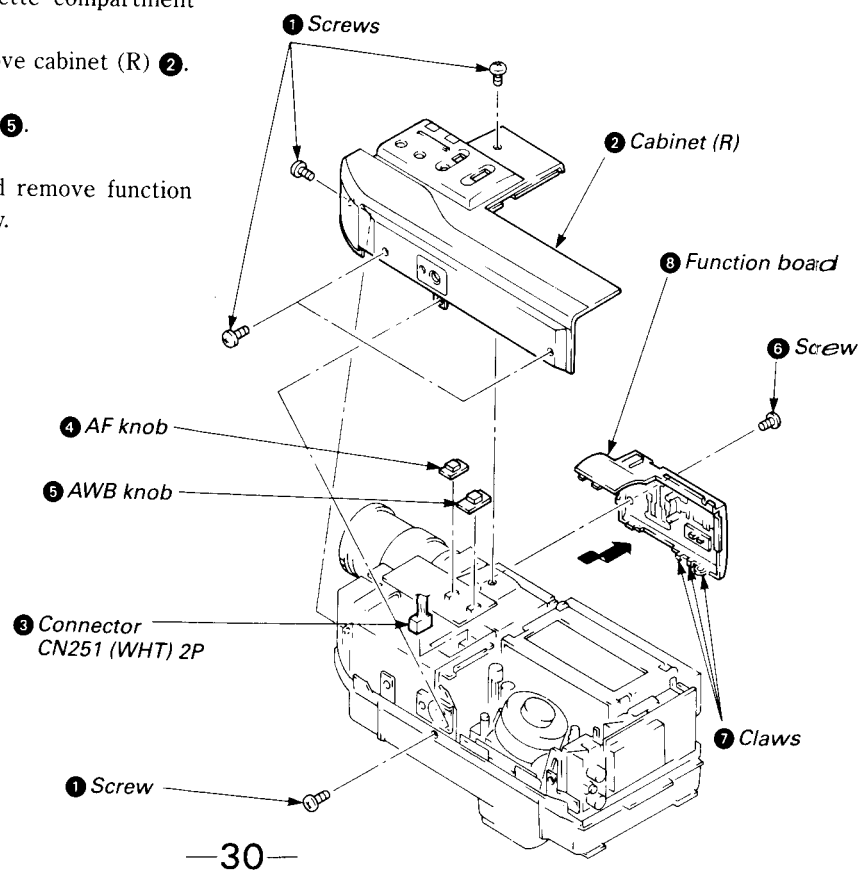
Note: When mounting, ensure that the two claws ❸ are inserted in the two holes ❹.

3) Remove the two screws ❺ and remove front panel ❻.
4) Remove the five screws ❼ and remove rear panel ❽.



2-2. REMOVAL OF THE CABINET (R) AND FUNCTION BOARD

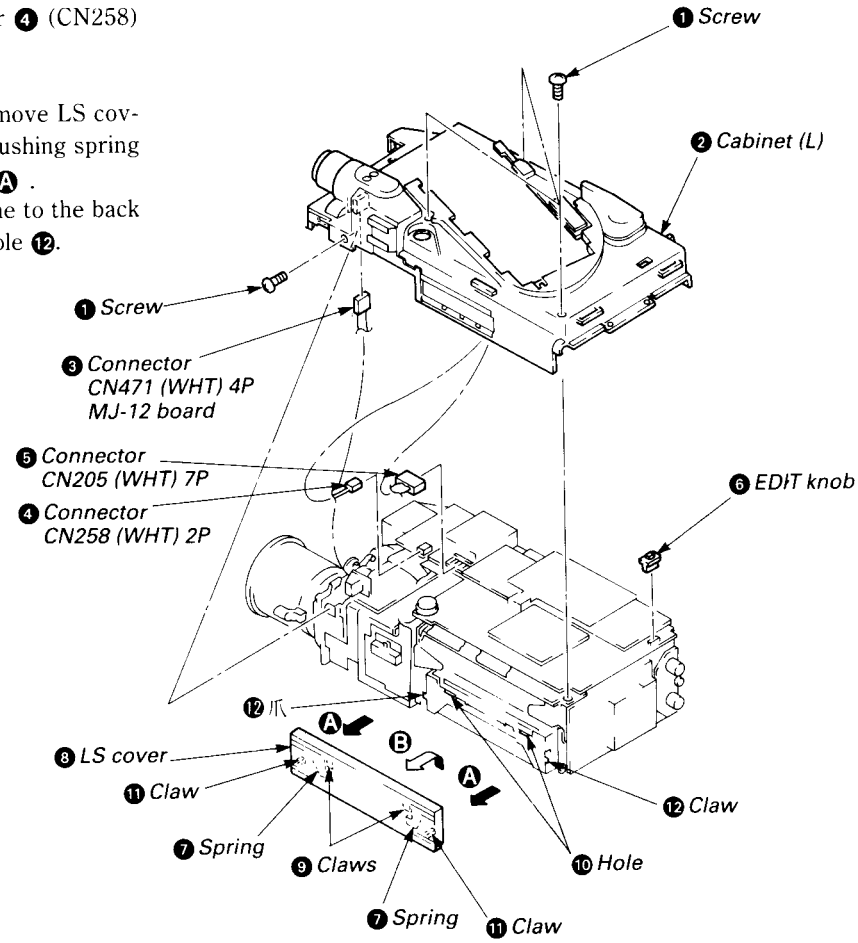
1) Refer to 2-1 and remove the cassette compartment cover, front panel and rear panel.
2) Remove the five screws ❶ and remove cabinet (R) ❷.
3) Remove connector ❸ (CN251).
4) Remove AF knob ❹ and AWB knob ❺.
5) Remove screw ❻.
6) Remove claw ❼ in three places and remove function board ❽ in the direction of the arrow.



2-3. REMOVAL OF THE CABINET (L) AND LS COVER

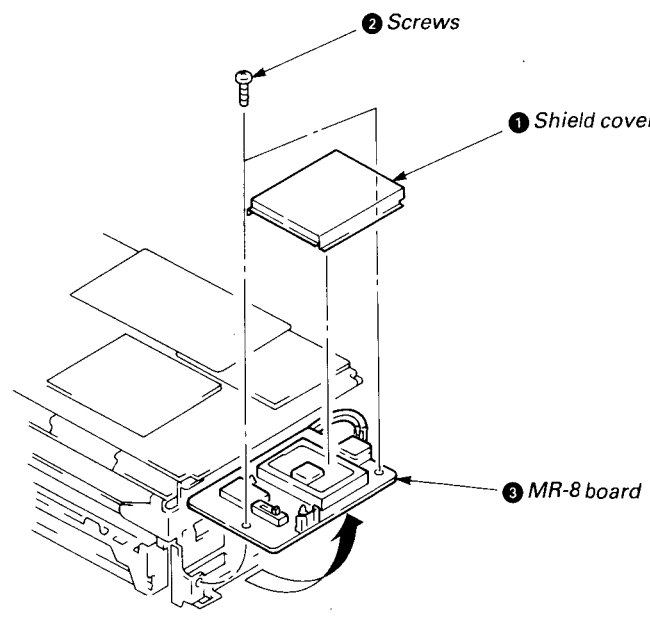
1) Remove cabinet (R) and the function board according to 2-2.
2) Remove four screws ❶ and cabinet (L) ❷.
3) Remove connector ❸ (CN471), connector ❹ (CN258) and connector ❺ (CN205).
4) Remove EDIT knob ❻.
5) Insert a slim standard screwdriver and remove LS cover ❽ in the direction of arrow Ⓑ while pushing spring ❼ (two places) in the direction of arrow Ⓐ .

Note: When mounting, set so claw ❾ will come to the back of hole ❿ and claw ⓫ to the back of hole ⓬.



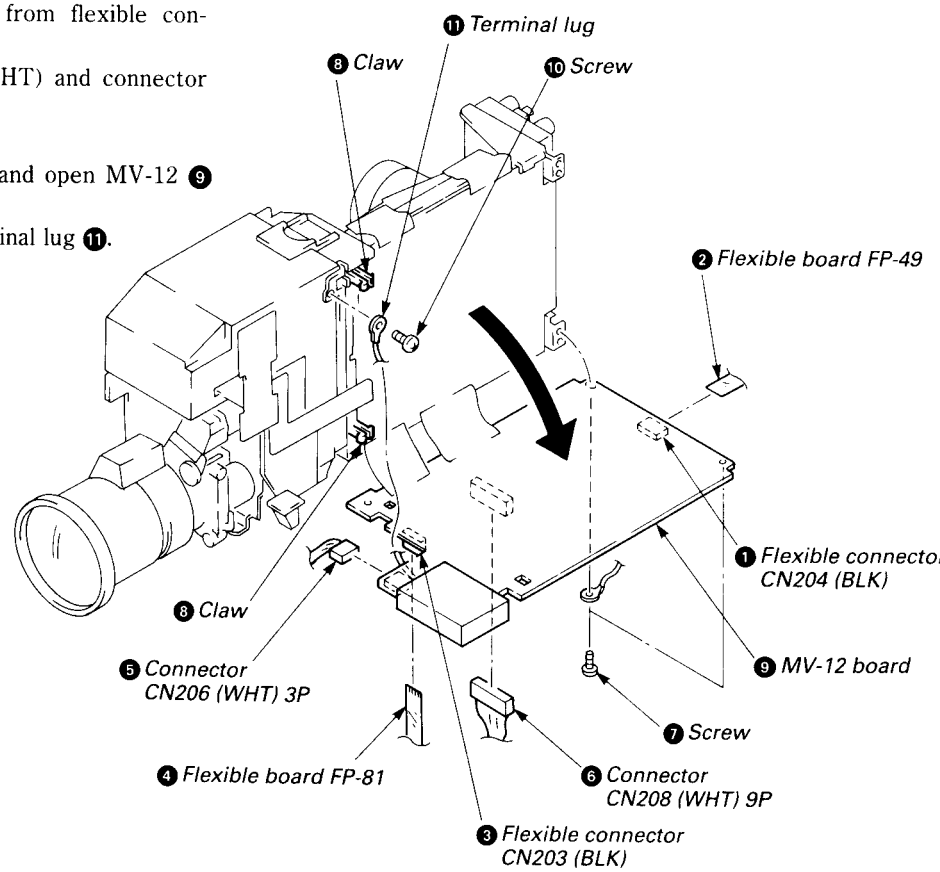
2-4. OPENING THE MR-8 BOARD

1) Remove shield cover ❶.
2) Remove screw ❷ (two places) and remove MR-8 board ❸ in the direction of the arrow.



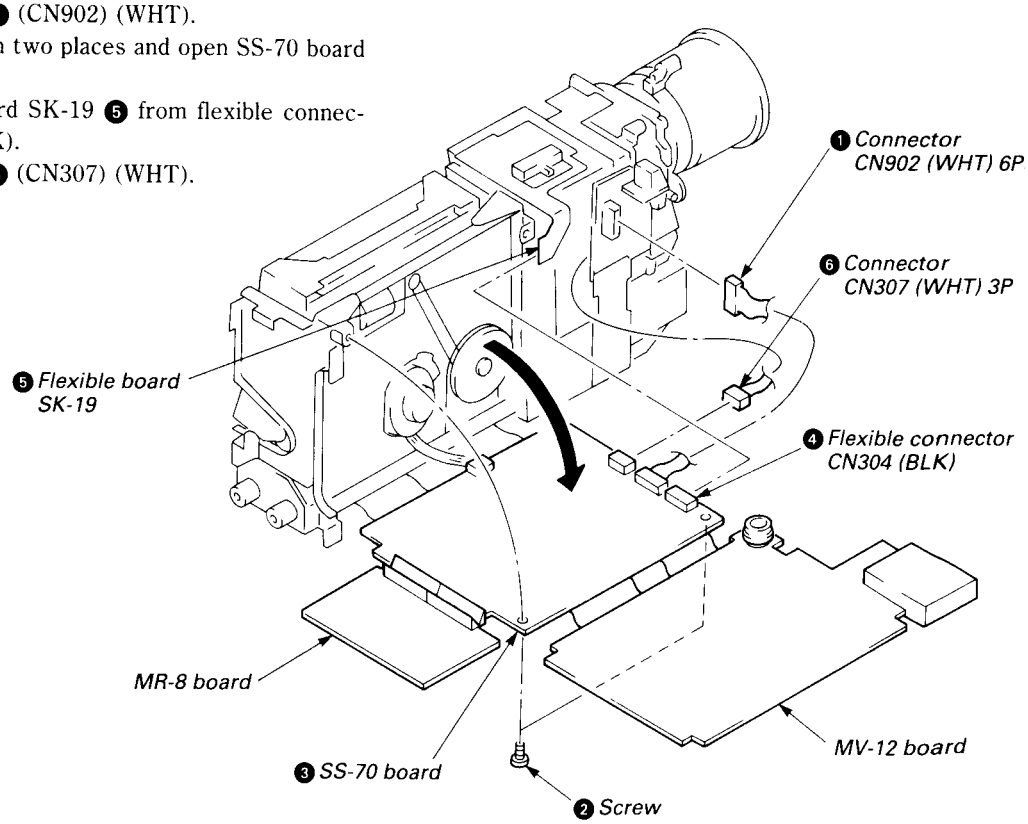
2-5. OPENING THE MV-12 BOARD

1) Remove flexible board FP-49 ❷ from flexible connector ❶ (CN204) (BLK).
2) Remove flexible board FP-81 ❹ from flexible connector ❸ (CN203) (BLK).
3) Remove connector ❺ (CN206) (WHT) and connector ❻ (CN208) (WHT).
4) Remove two screws ❼.
5) Remove Claw ❽ from two places and open MV-12 ❾ Board.
6) Remove screw ❿ and remove terminal lug ⓫.



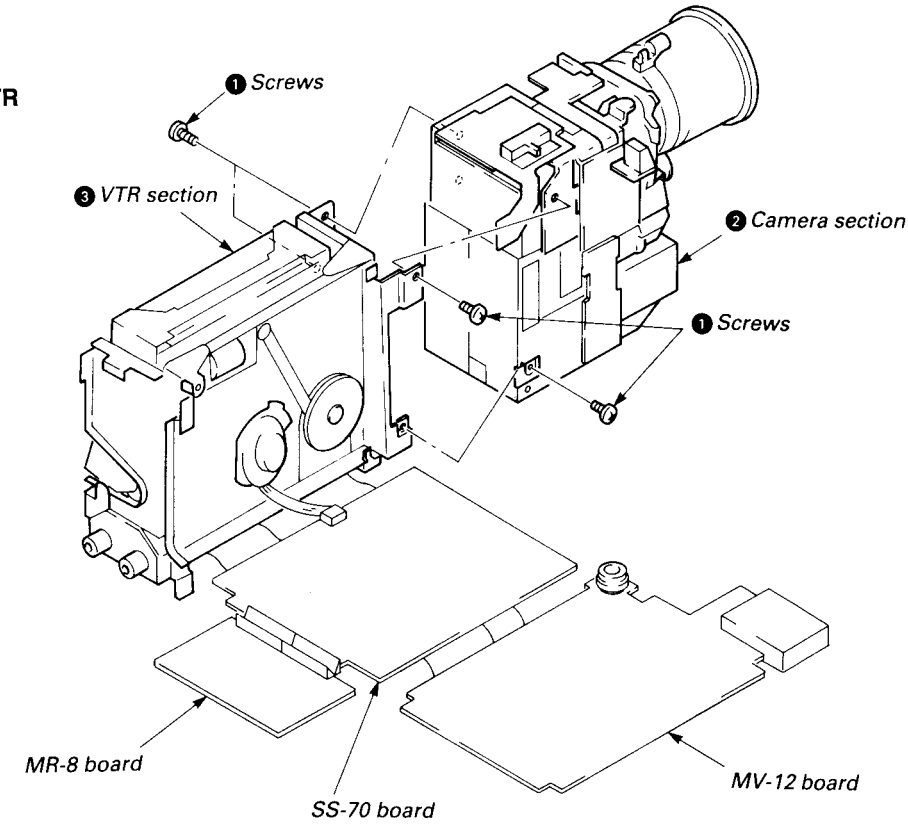
2-6. OPENING THE SS-70 BOARD

1) Open MR-8 board according to 2-4.
2) Open MV-12 Board according to 2-5.
3) Remove connector ❶ (CN902) (WHT).
4) Remove screws ❷ in two places and open SS-70 board ❸.
5) Remove flexible board SK-19 ❺ from flexible connector ❹ (CN304) (BLK).
6) Remove connector ❻ (CN307) (WHT).



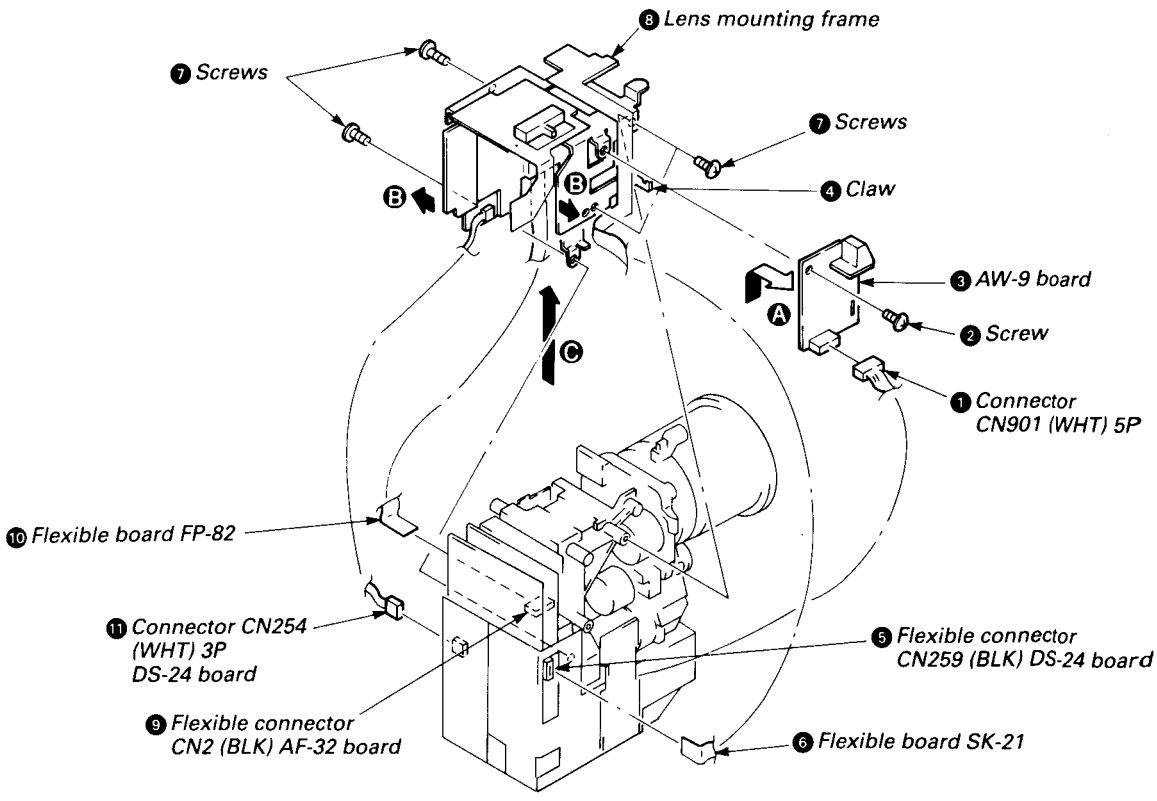
2-7. SEPARATING THE CAMERA AND VTR SECTIONS

1) Open the SS-70 board according to 2-6.
2) Remove the four screws ❶.
3) Separate the camera section ❷ and the VTR section ❸.



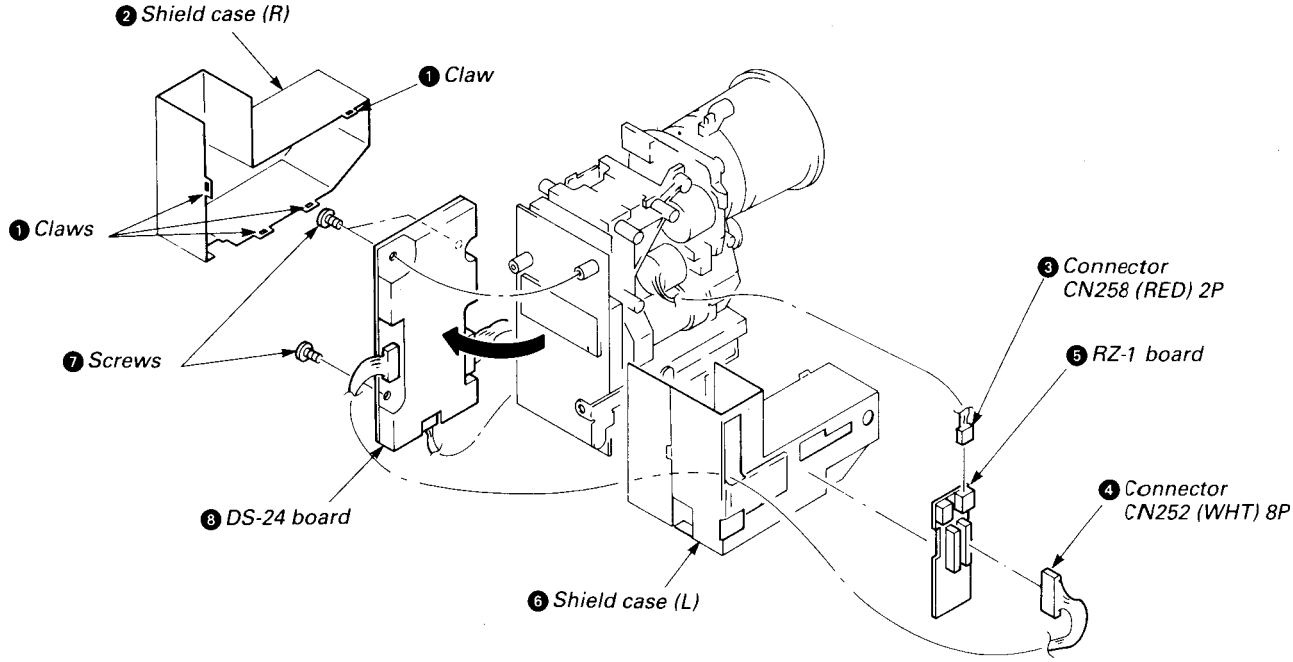
2-8. REMOVAL OF THE AW-9 BOARD AND THE LENS MOUNTING FRAME

1) Separate the camera and VTR sections according to 2-7.
2) Remove connector ❶ (CN901) (WHT).
3) Remove screw ❷ and remove AW-9 board ❸ in the direction of arrow Ⓐ while being careful of claw ❹.
4) Remove flexible board SK-21 ❻ from flexible connector ❺ (CN259) (BLK).
5) Remove the four screws ❼.
6) Remove lens mounting frame ❽ by spreading both sides in the direction of arrow Ⓑ and pulling in the direction of arrow Ⓒ.
7) Remove flexible board FP-82 ❿ from flexible connector ❾ (CN2) (BLK).
8) Remove connector ⓫ (CN254) (WHT).



2-9. OPENING THE DS-24 BOARD

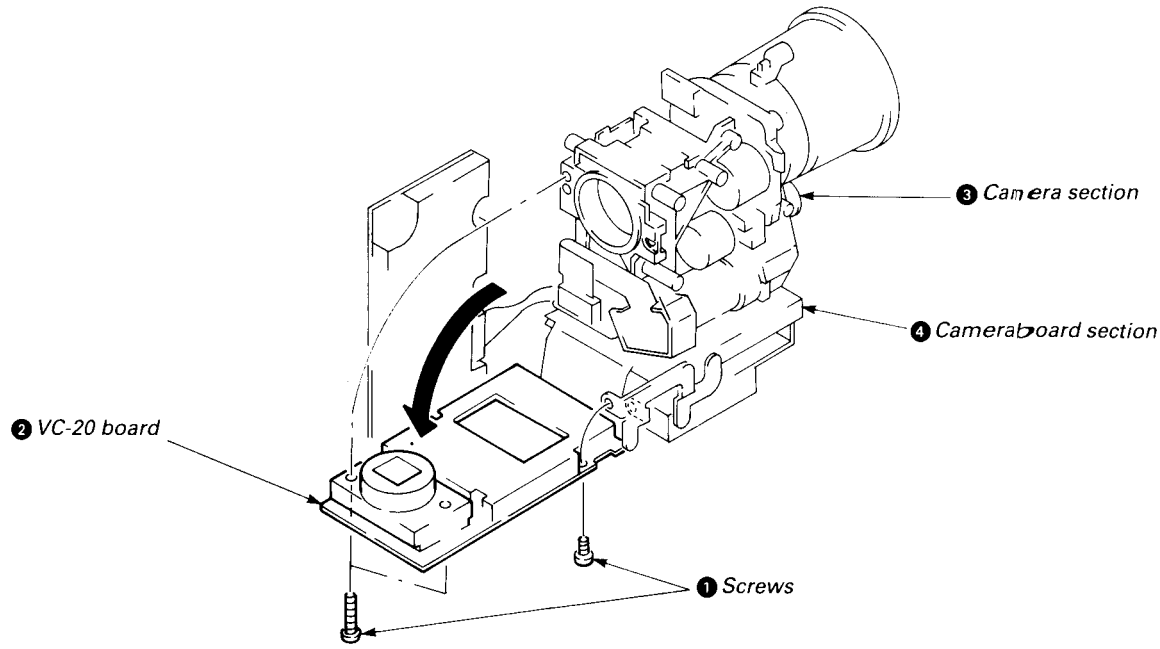
1) Remove the lens mounting frame according to 2-8.
2) Remove claw ❶ in four places and remove shield case (R) ❷.
3) Remove connector ❸ (CN258) (RED) and connector ❹ (CN252) (WHT).
4) Remove RZ-1 Board ❺.
5) Remove shield case (L) ❻.
6) Remove three screws ❼ and open DS-24 board ❽.



2-10. OPENING THE VC-20 BOARD

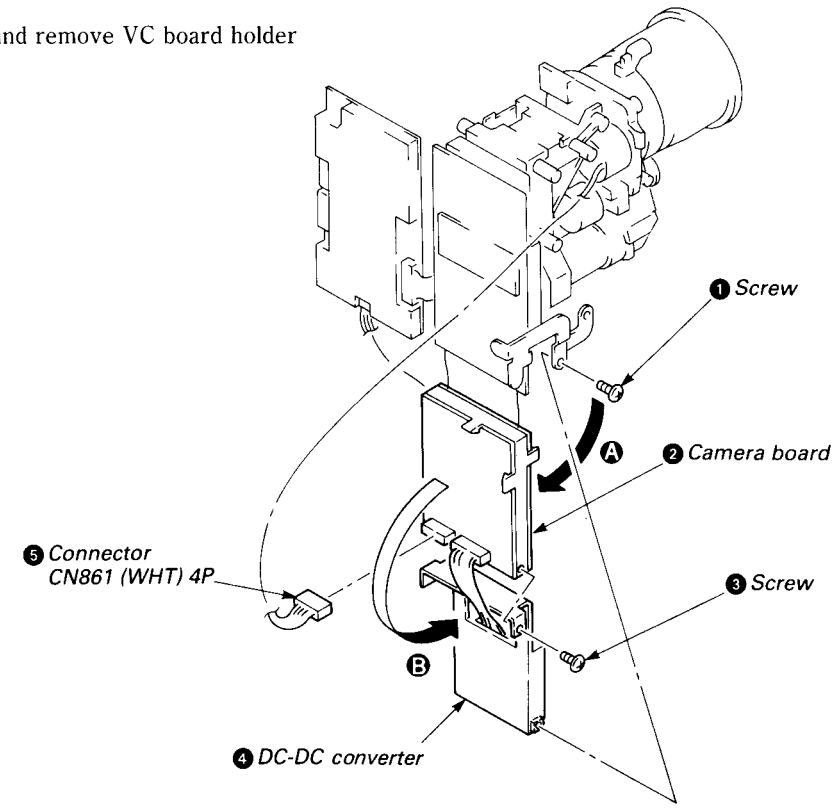
1) Open DS-24 board according to 2-9.
2) Remove three screws ❶ and open VC-20 board ❷.

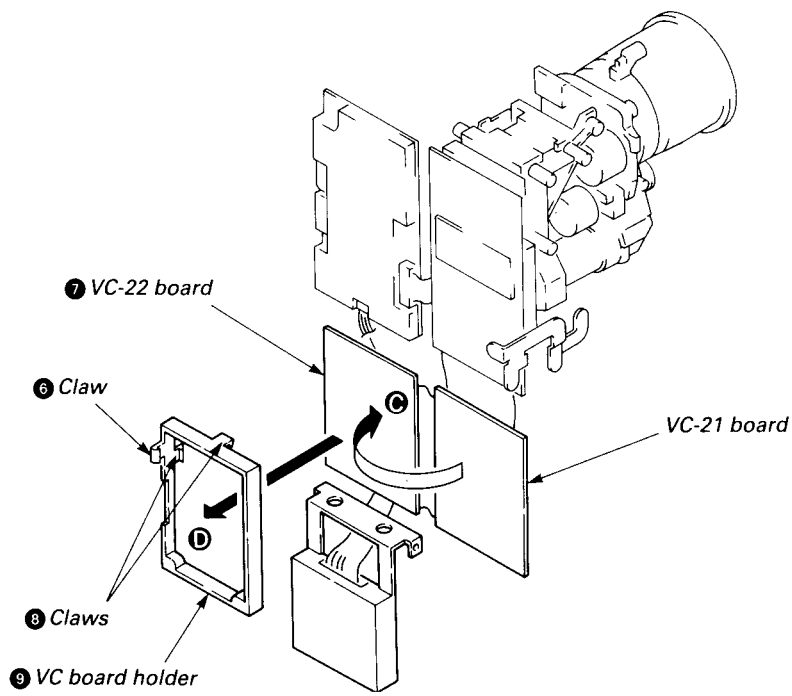
Note: When VC-20 board ❷ is opened, camera section ❸ and camera board assembly section ❹ will come apart.



2-11. OPENING THE CAMERA BOARD

1) Open DS-24 board according to 2-9.
2) Remove screw ❶ and open camera board ❷ in the direction of arrow Ⓐ .
3) Remove screw ❸ and open DC-DC converter ❹ in the direction of arrow Ⓑ .
4) Remove connector ❺ (CN861) (WHT).
5) Remove claw ❻ and open VC-22 board ❼ in the direction of arrow Ⓒ .
6) Remove the two claws ❽ and remove VC board holder ❾.

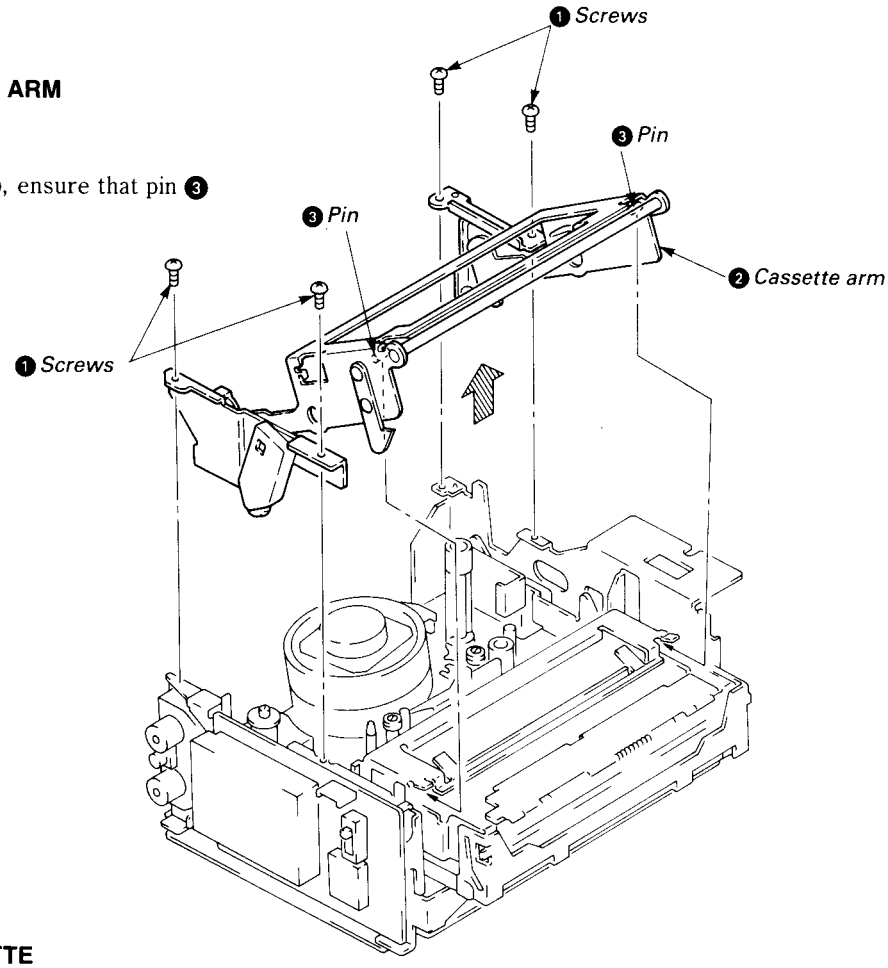




2-12. REMOVAL OF THE CASSETTE ARM

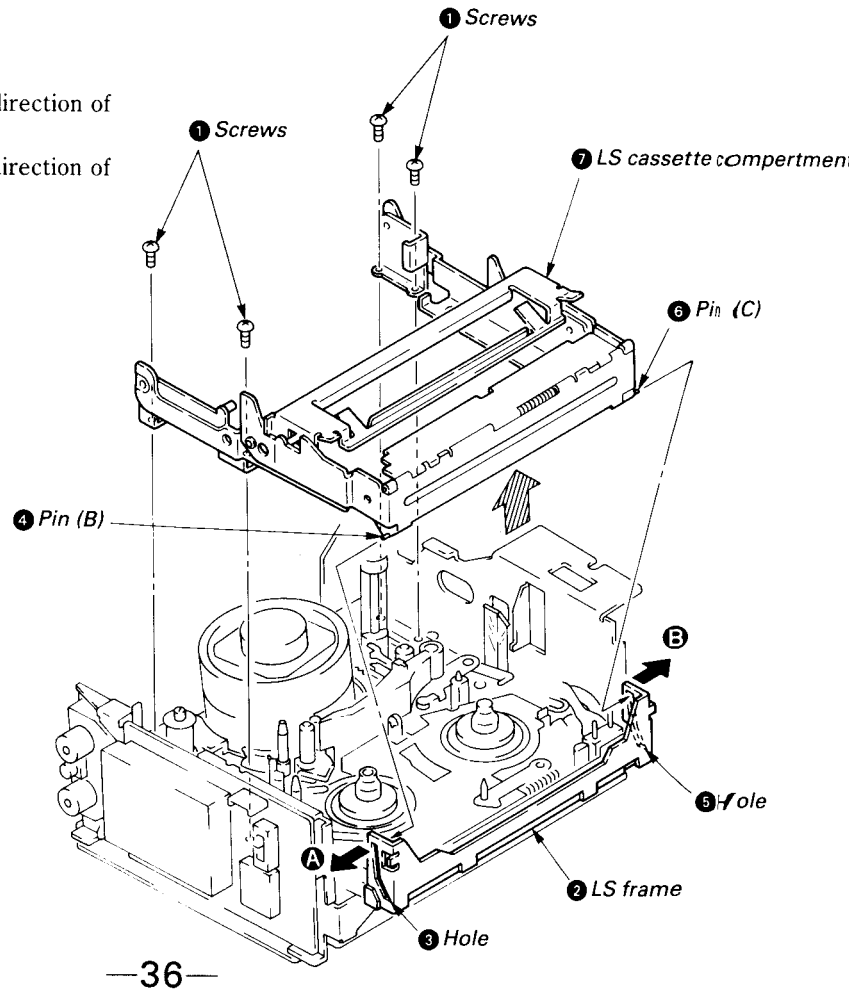
1) Remove the four screws ❶.
2) Remove cassette arm ❷.

Note: When mounting casseette arm ❷, ensure that pin ❸ is in its prescribed position.

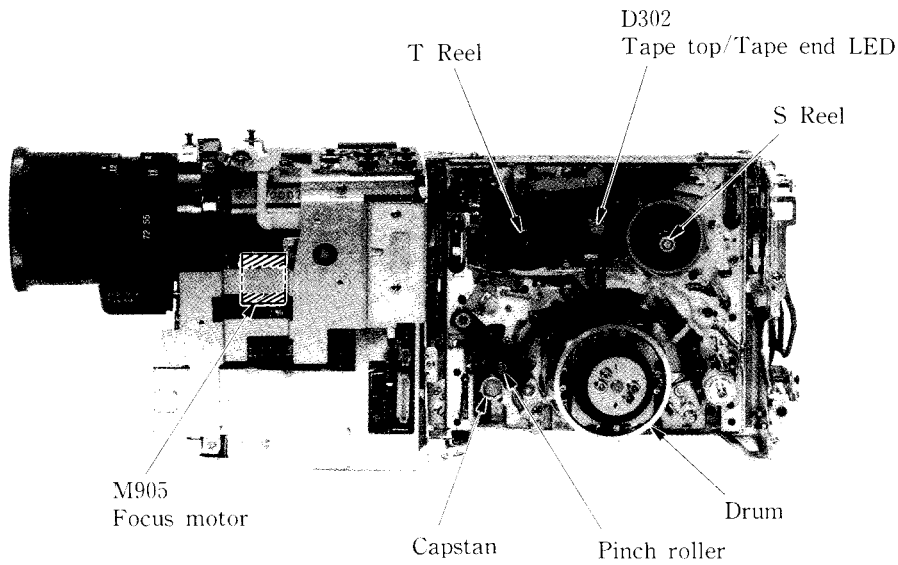


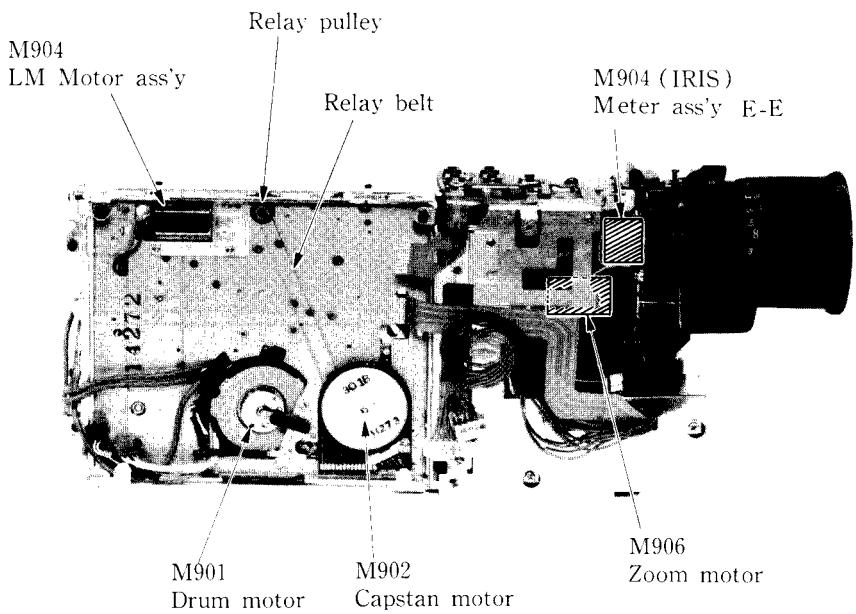
2-13. REMOVAL OF THE LS CASSETTE COMPARTMENT

1) Remove the cassette arm according to 2-12.
2) Remove the four screws ❶.
3) Bend hole ❸ of LS frame ❷ slightly in the direction of arrow Ⓐ and remove pin (B) ❹.
4) Bend hole ❺ of LS frame ❷ slightly in the direction of arrow Ⓑ and remove pin (C) ❻.
5) Remove LS cassette compartment ❼.



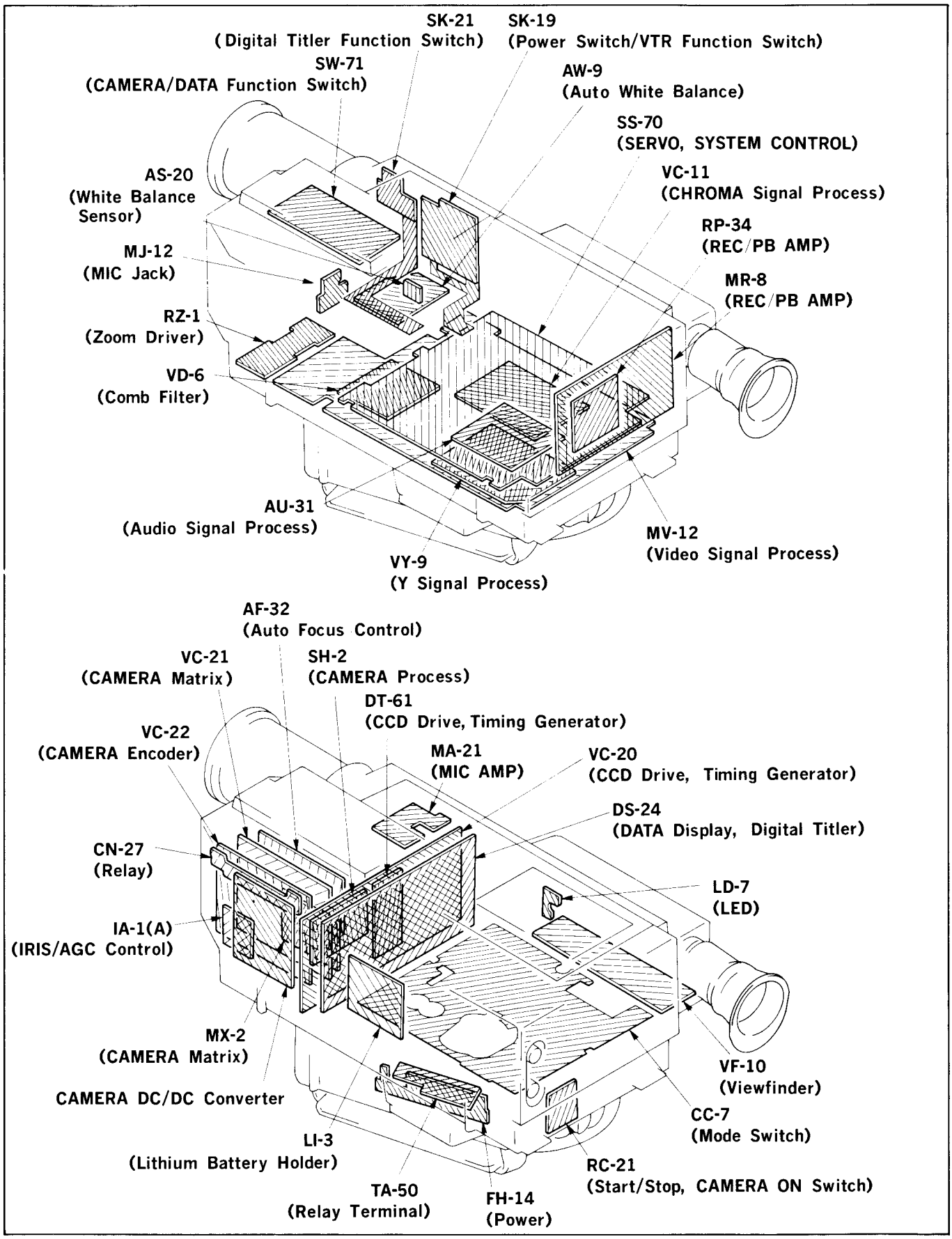
2-14. INTERNAL VIEWS



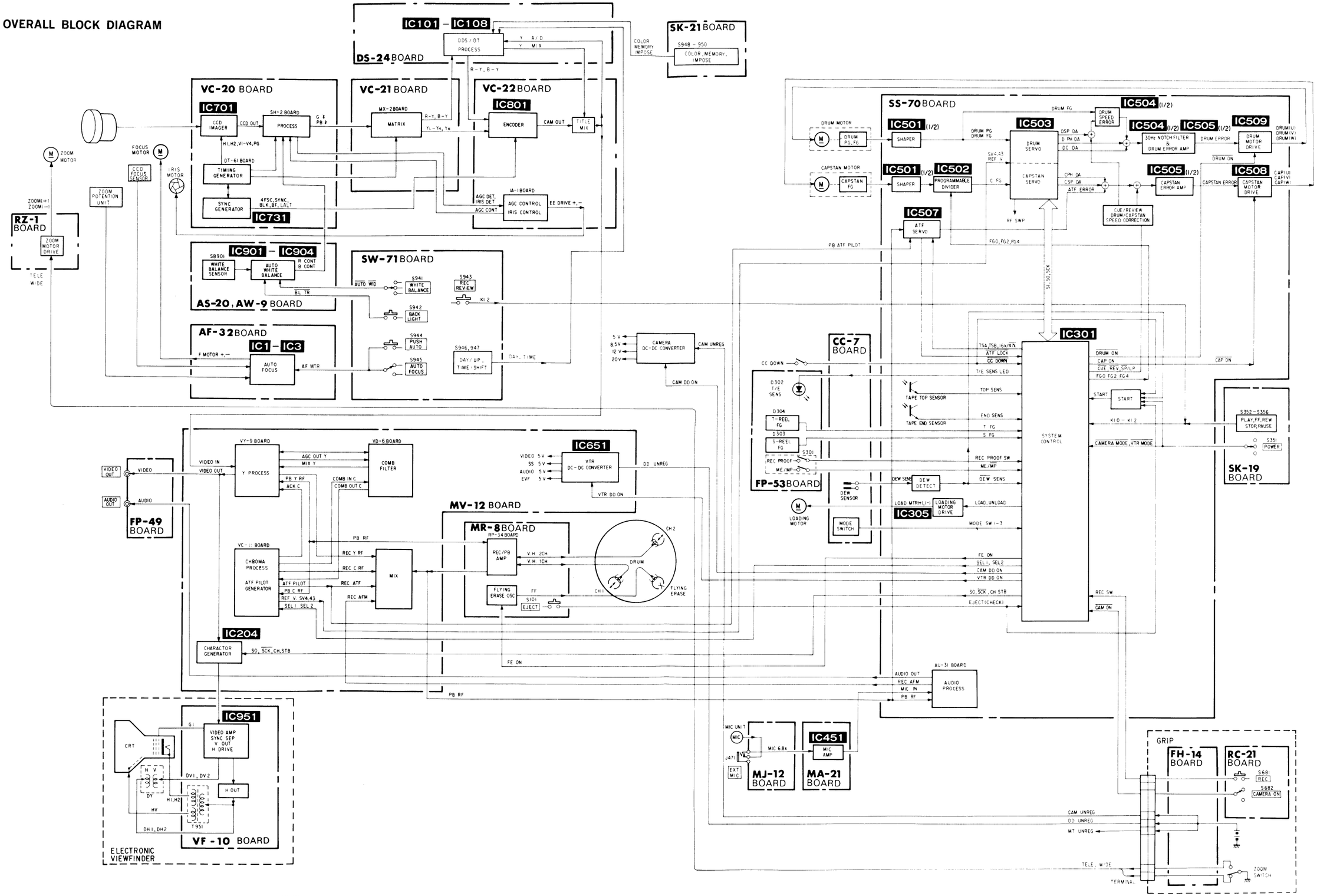


SECTION 3
DIAGRAMS

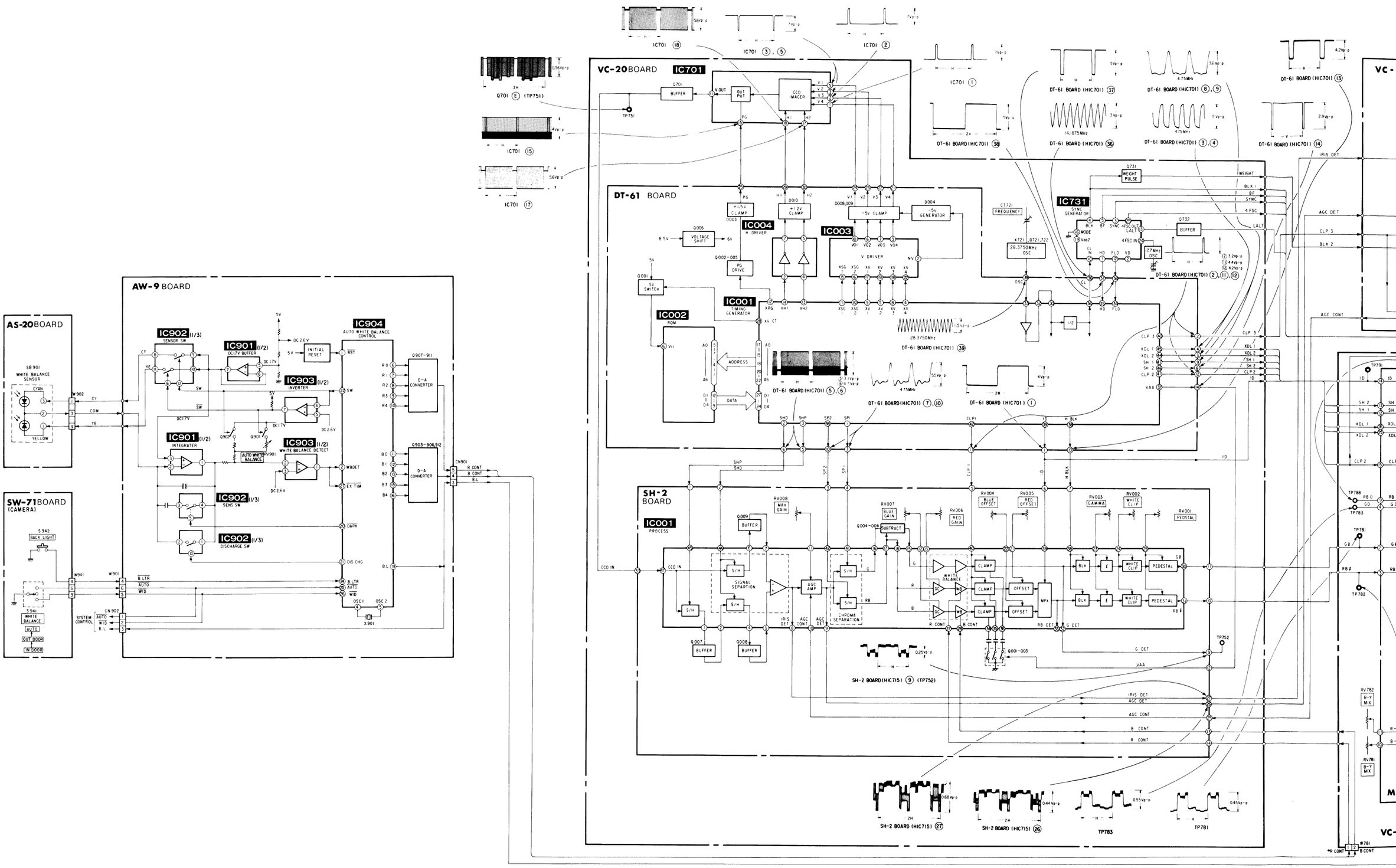
3-1. CIRCUIT BOARDS LOCATION

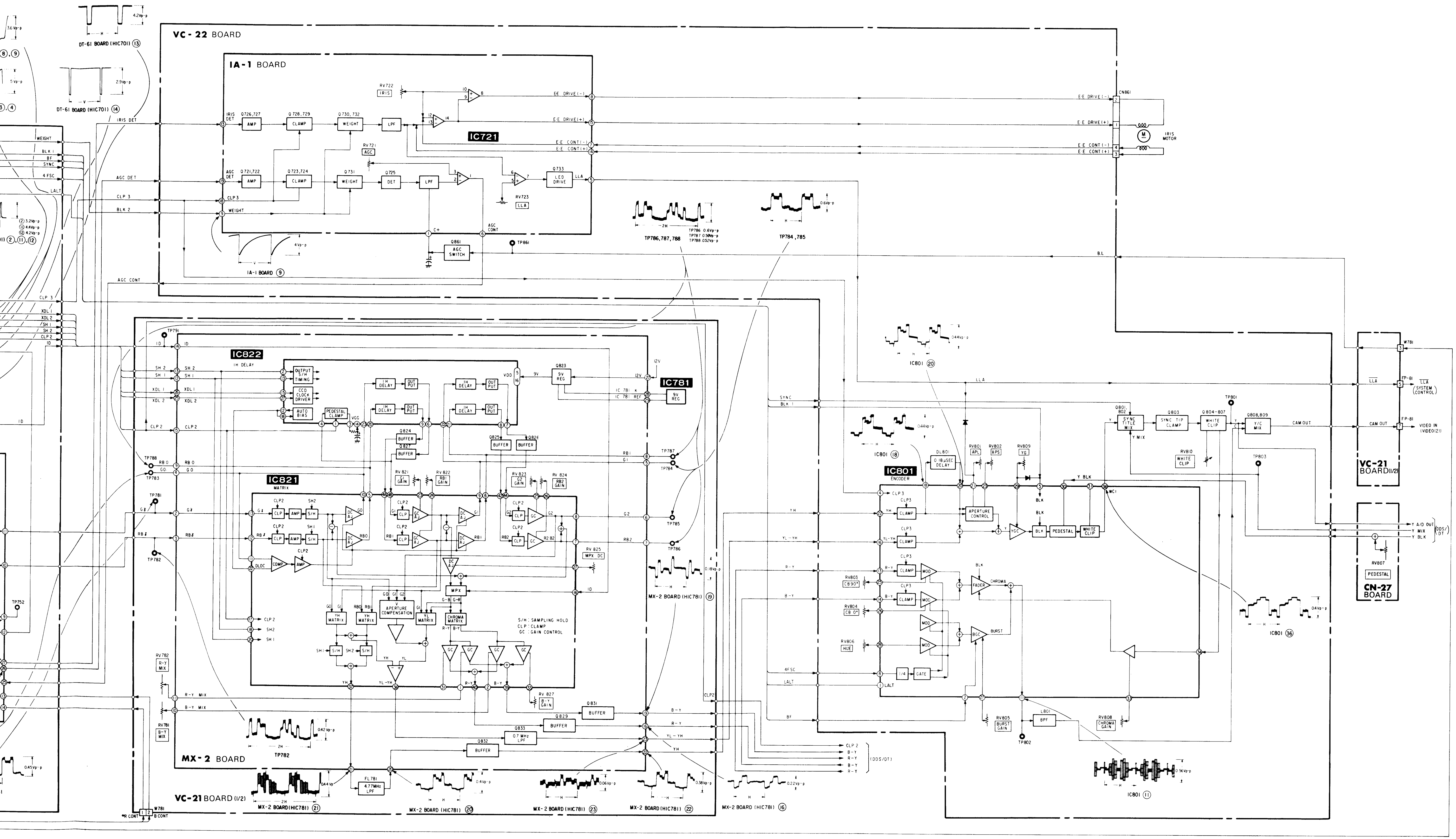


3-2. OVERALL BLOCK DIAGRAM



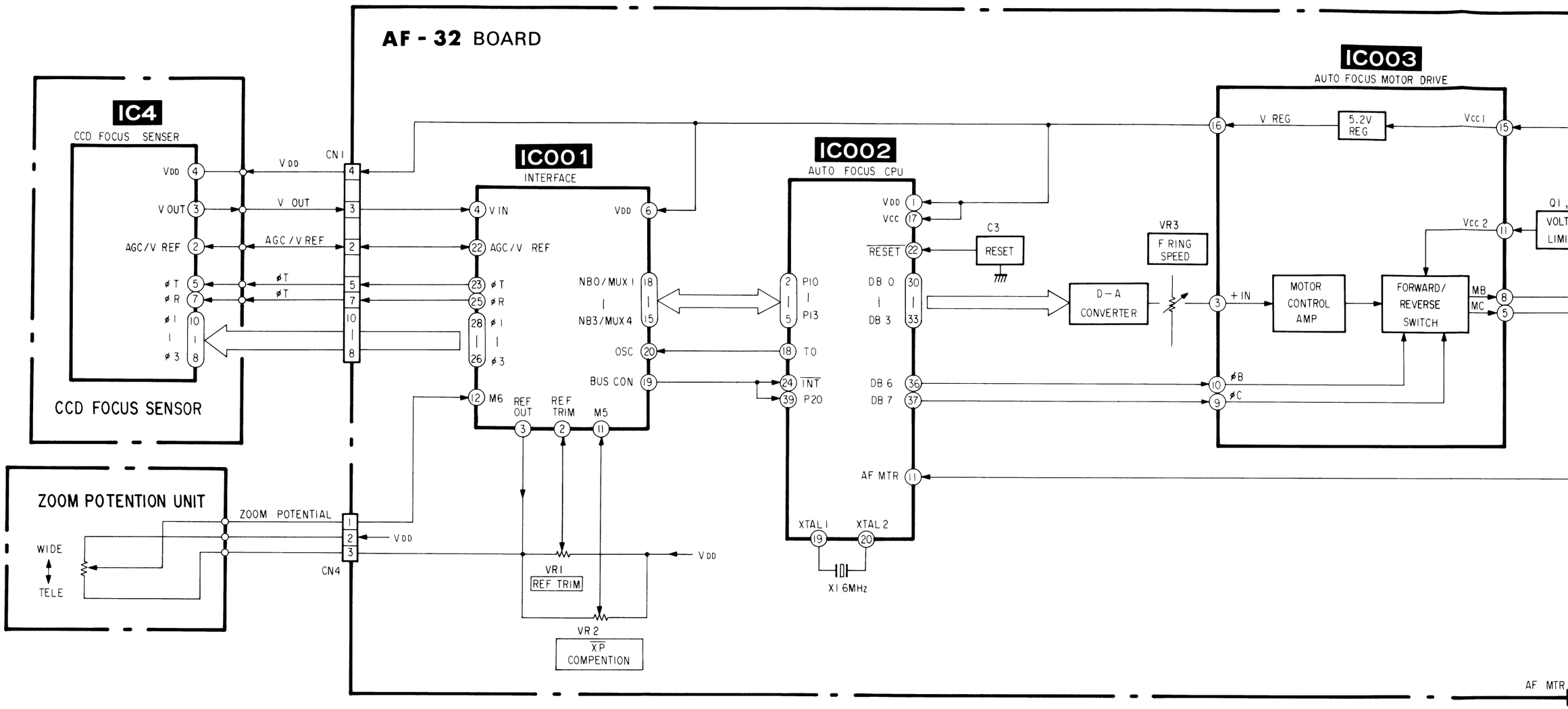
3-3. CAMERA BLOCK DIAGRAM

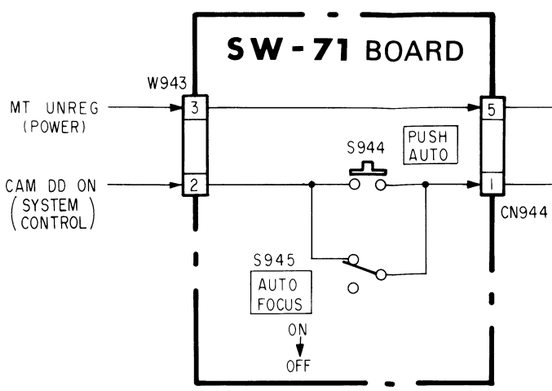




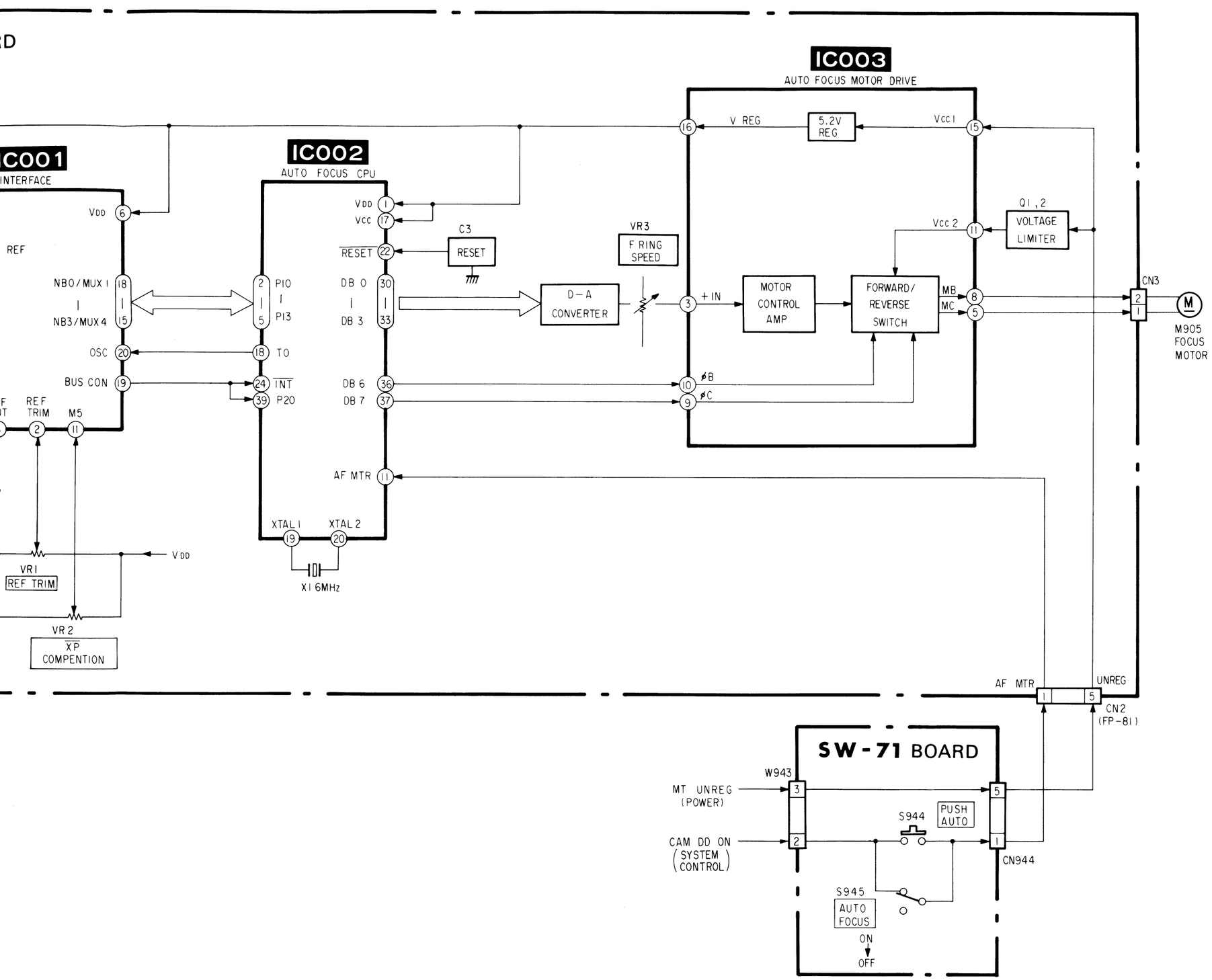
VC-22 BOARD
IA-1 BOARD
IC721
IC822
IC781
IC821
IC801
MX-2 BOARD
VC-21 BOARD (1/2)
VC-21 BOARD(1/2)
CN-27 BOARD

3-4. AUTO FOCUS BLOCK DIAGRAM

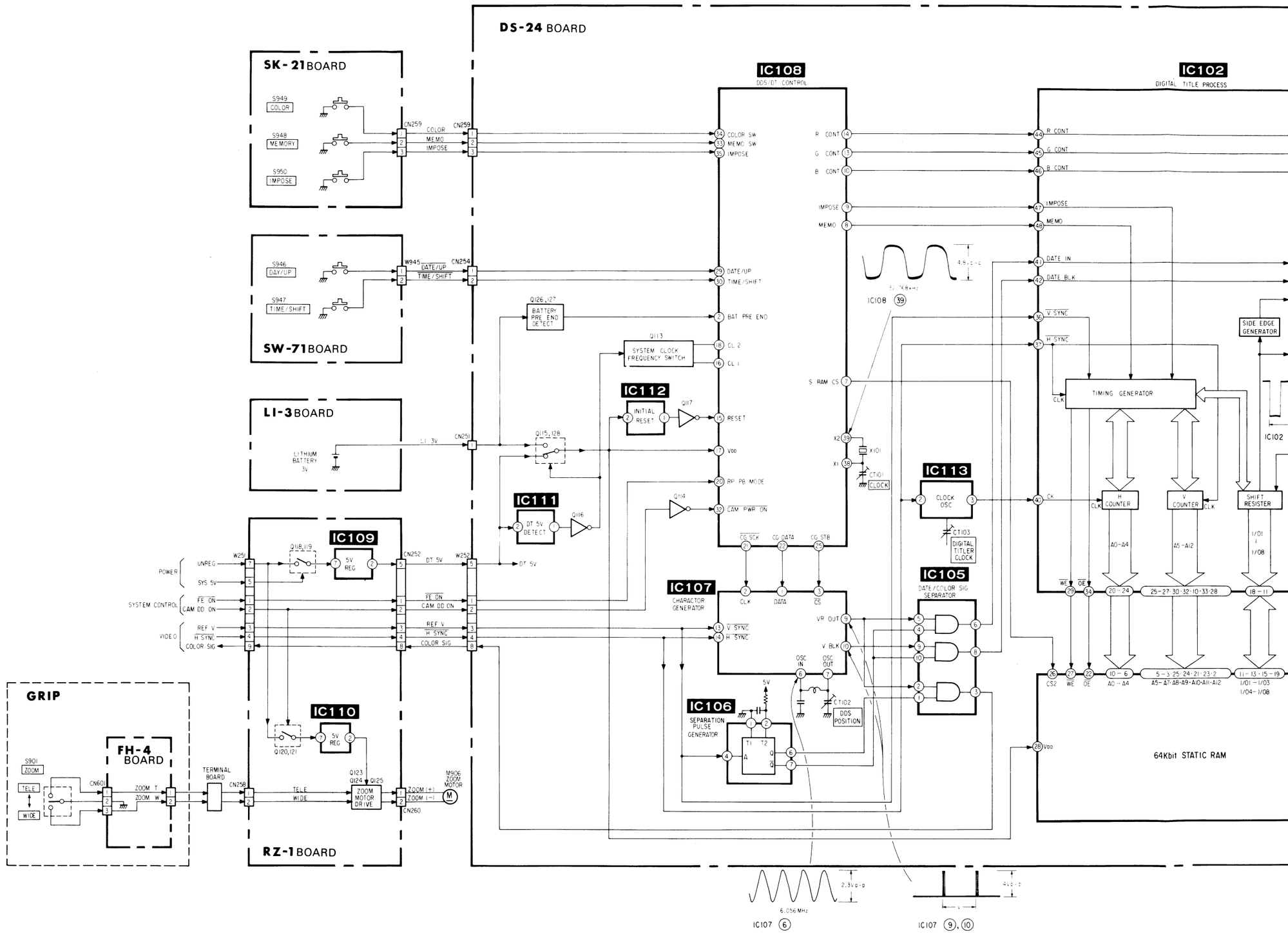




RD


IC003
AUTO FOCUS MOTOR DRIVE
V REG
5.2V REG
Vcc 1
Q1, 2
VOLTAGE LIMITER
Vcc 2
IC001
INTERFACE
IC002
AUTO FOCUS CPU
VDD
REF
C3
RESET
VR3
F RING SPEED
NB0/MUX 1
NB3/MUX 4
PI0
PI3
DB 0
DB 3
D-A CONVERTER
+IN
MOTOR CONTROL AMP
FORWARD/ REVERSE SWITCH
MB
MC
CN3
M905 FOCUS MOTOR
OSC
TO
BUS CON
INT
P20
DB 6
DB 7
ØB
ØC
REF TRIM
M5
VR1
REF TRIM
VR2
XP
COMPENTION
AF MTR
XTAL 1
XTAL 2
X1 6MHz
AF MTR
UNREG
CN2
(FP-81)
SW-71 BOARD
W943
MT UNREG (POWER)
CAM DD ON (SYSTEM CONTROL)
S944
PUSH AUTO
CN944
S945
AUTO FOCUS
ON
OFF

3-5. DATA DISPLAY, DIGITAL TITLER BLOCK DIAGRAM



DS-24 BOARD

IC108 DDS/DT CONTROL

IC102 DIGITAL TITLE PROCESS

IC112

IC111

IC109

IC110

IC113

IC107 CHARACTOR GENERATOR

IC105 DATE/COLOR SIG SEPARATOR

IC106 SEPARATION PULSE GENERATOR

IC103 TITLE MEMORY

64Kbit STATIC RAM

IC104 A-D CONVERTER

IC101 BLANKING CLAMP

COLOR SYNTHESIS

TIMING GENERATOR

SIDE EDGE GENERATOR

H COUNTER

H COUNTER

SHIFT RESISTER

Y MATRIX

Y MATRIX

TITLE (R-Y) MIX

TITLE (B-Y) MIX

0.5MHz LPF

0.5MHz LPF

SYNC-TIP CLAMP

LPF

BLANKING

CLAMP

BLANKING

CLAMP

CHROMA BLANKING LEVEL

A-D CONVERTER LEVEL

BATTERY PRE-END DETECT

SYSTEM CLOCK FREQUENCY SWITCH

INITIAL RESET

DT 5V DETECT

5V REG

5V REG

ZOOM MOTOR DRIVE

CLOCK OSC

DIGITAL TITLER CLOCK

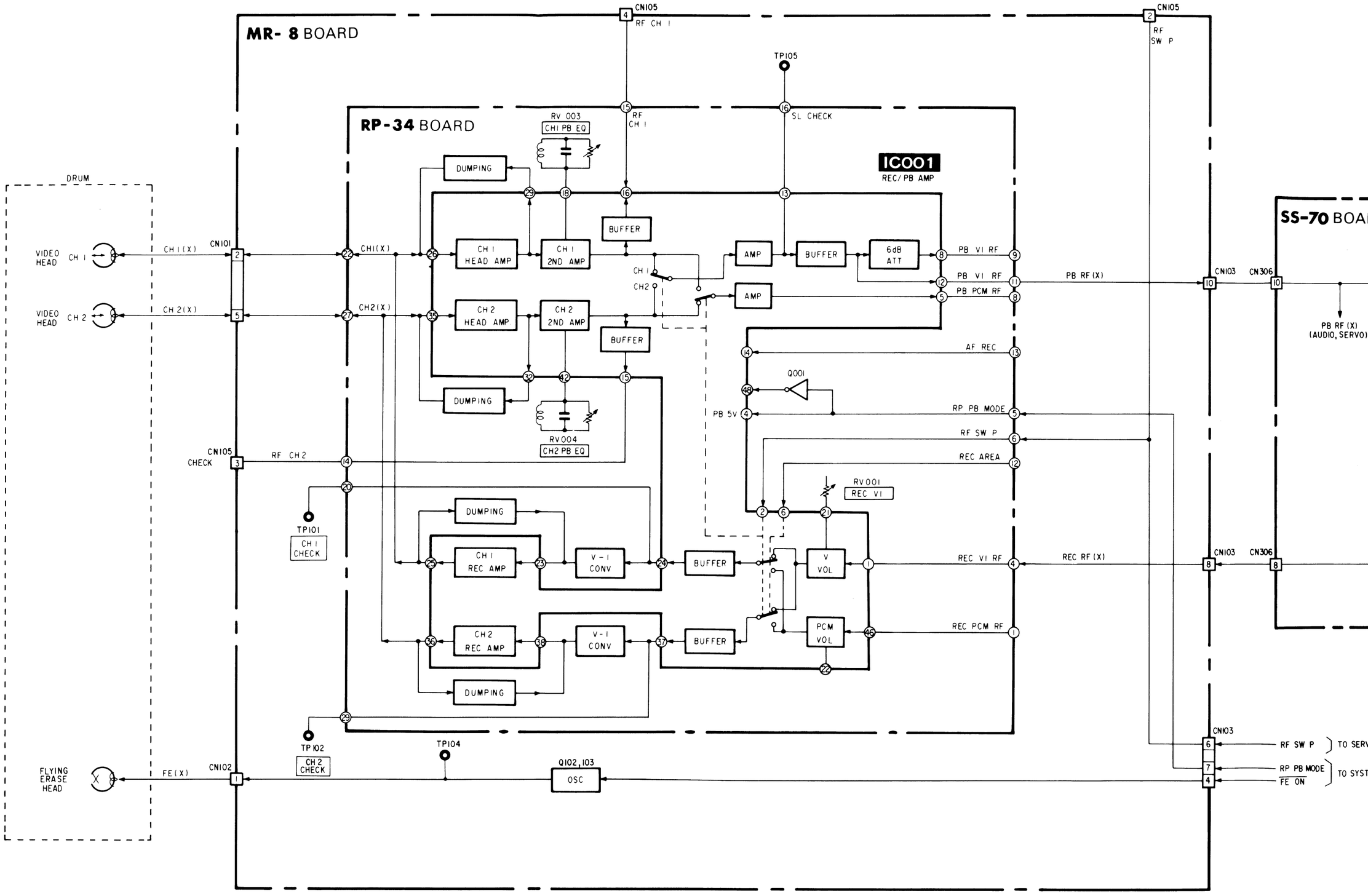
DDS POSITION

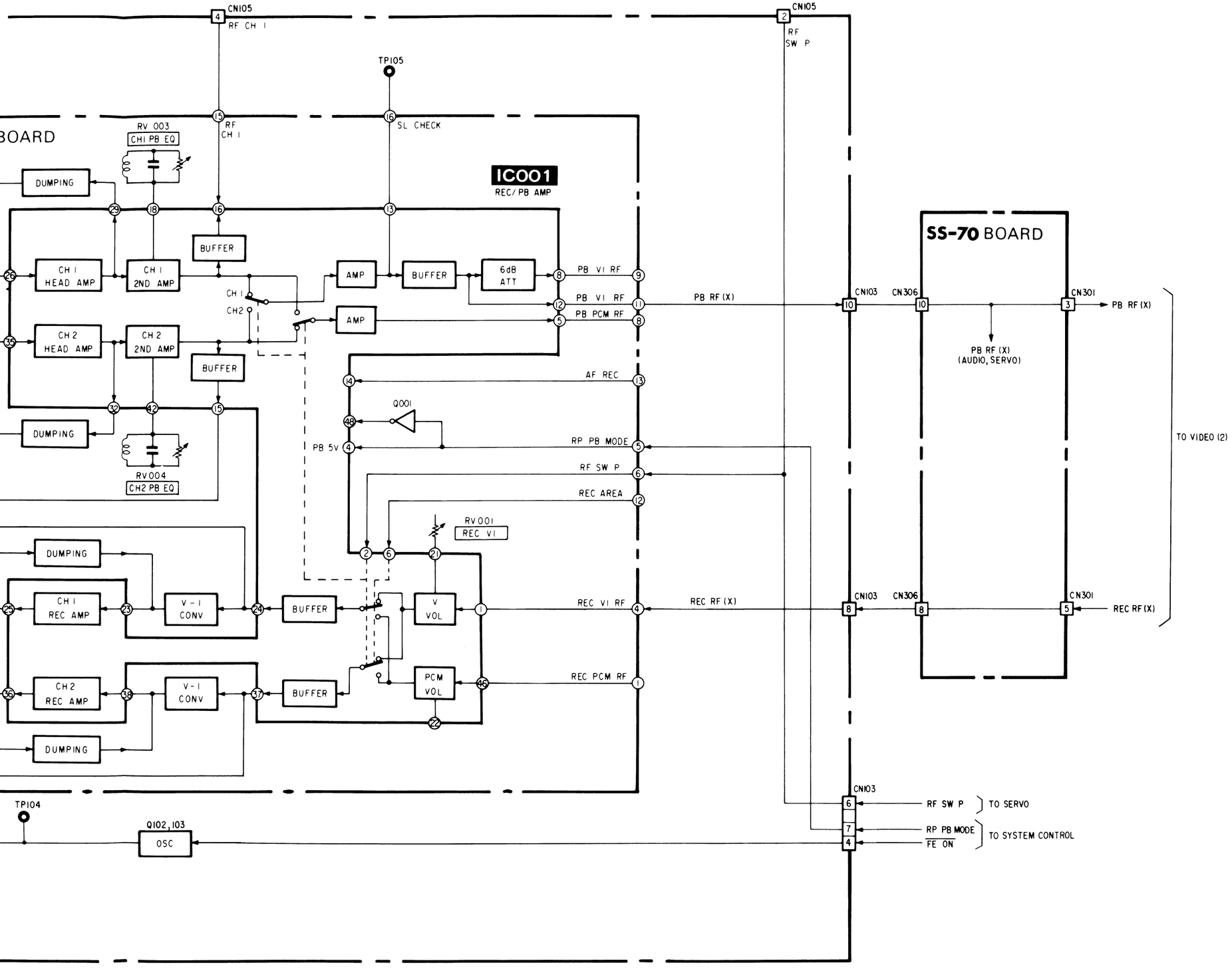
CAMERA

—49—

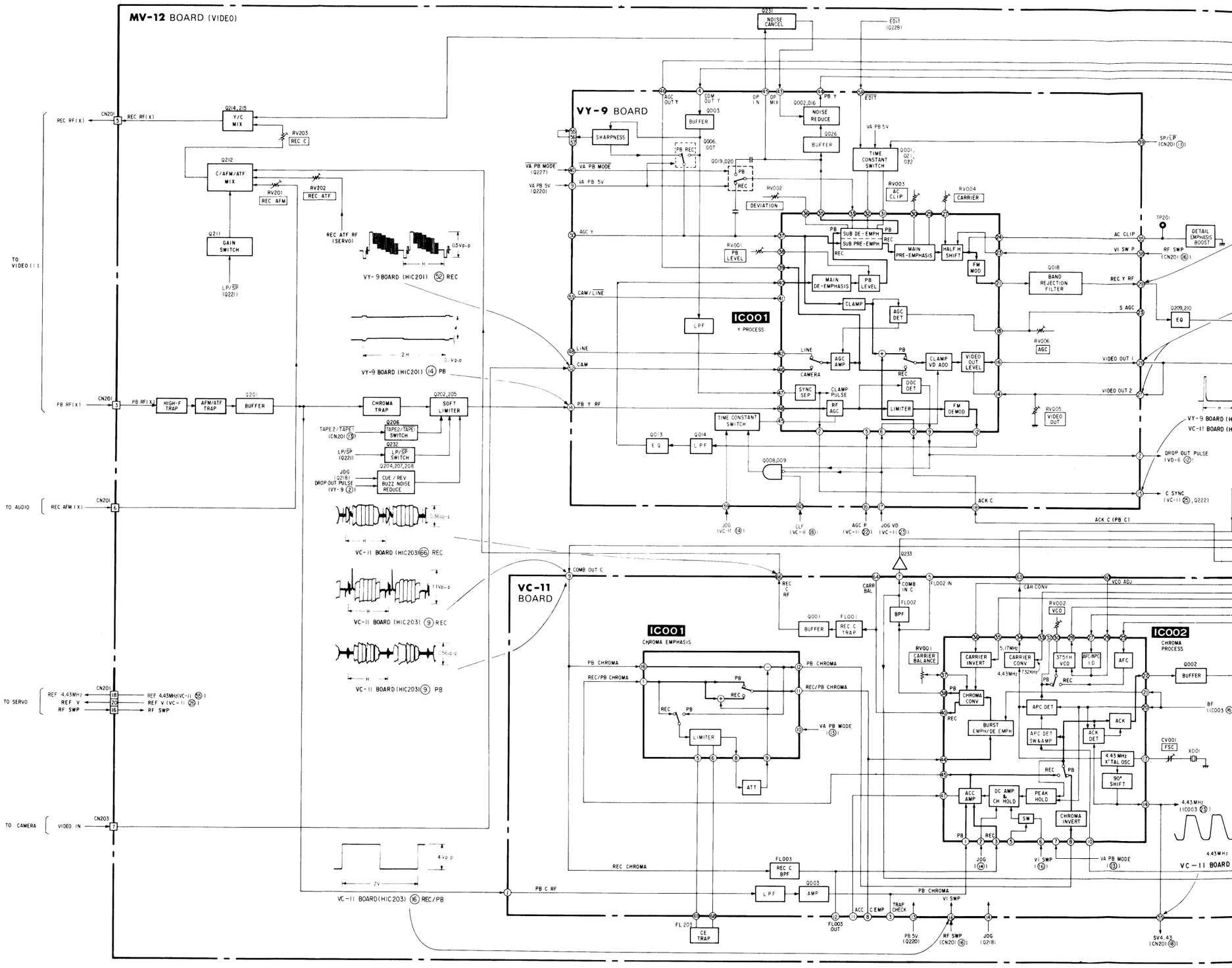
—50—

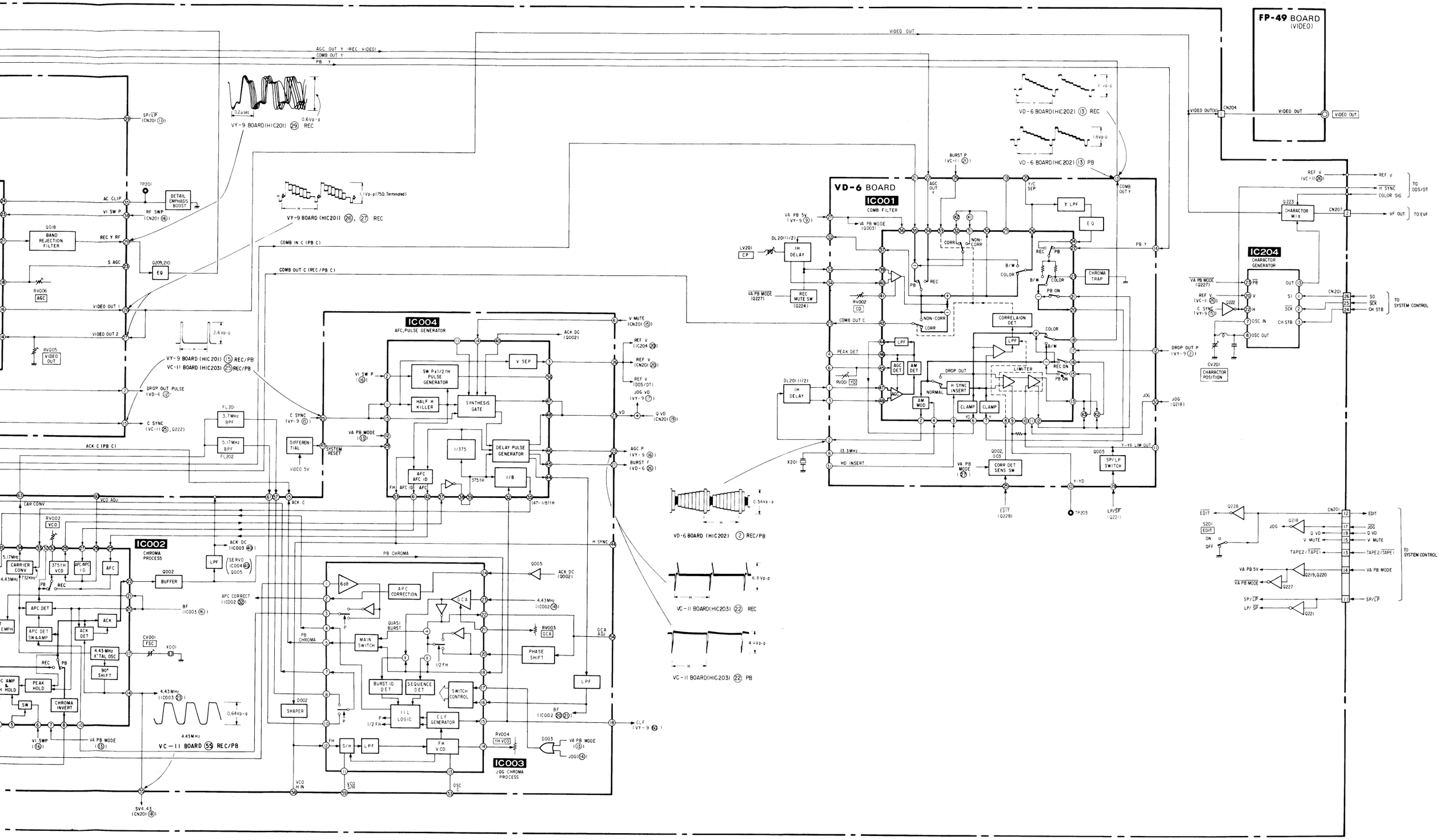
3-6. VIDEO(1) BLOCK DIAGRAM



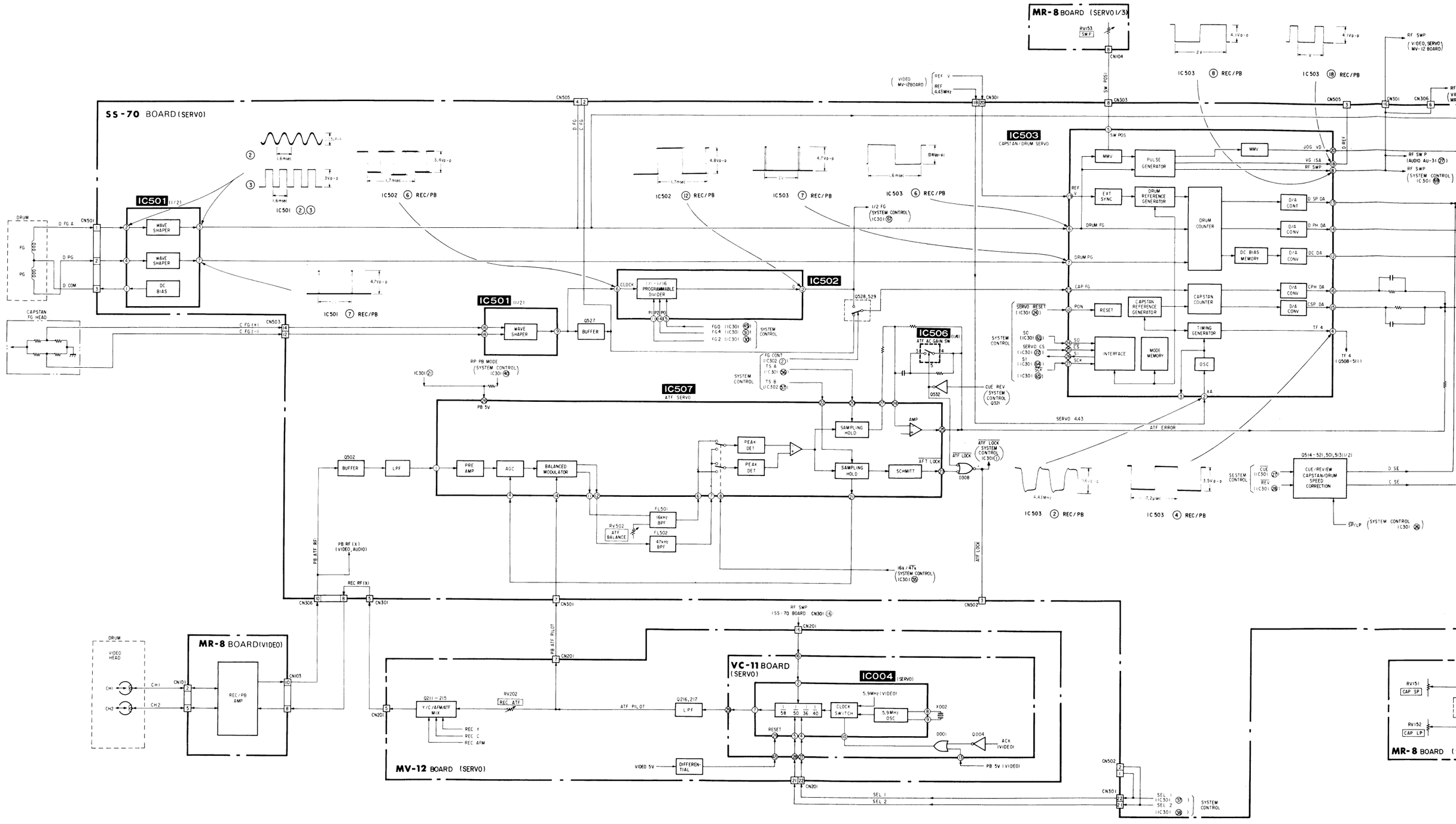

CN105
4
RF CH 1
CN105
2
RF
SW P
TP105
15
RF
CH 1
16
SL CHECK
BOARD
RV 003
CH1 PB EQ
DUMPING
IC001
REC/PB AMP
29
18
16
13
BUFFER
CH 1
HEAD AMP
CH 1
2ND AMP
AMP
BUFFER
6dB
ATT
8
PB V1 RF
9
12
PB V1 RF
11
PB RF (X)
CH 1
CH2
AMP
5
PB PCM RF
8
CH 2
HEAD AMP
CH 2
2ND AMP
BUFFER
14
AF REC
13
Q001
48
PB 5V
4
RP PB MODE
5
RF SW P
6
REC AREA
12
DUMPING
RV004
CH2 PB EQ
RV001
REC V1
2
6
21
DUMPING
CH 1
REC AMP
V - I
CONV
24
BUFFER
V
VOL
1
REC V1 RF
4
REC RF (X)
CH 2
REC AMP
V - I
CONV
37
BUFFER
PCM
VOL
46
REC PCM RF
1
22
DUMPING
CN103
10
CN306
10
CN301
3
PB RF (X)
PB RF (X)
(AUDIO, SERVO)
SS-70 BOARD
TO VIDEO (2)
CN103
8
CN306
8
CN301
5
REC RF (X)
CN103
6
RF SW P
TO SERVO
7
RP PB MODE
4
FE ON
TO SYSTEM CONTROL
TP104
Q102, 103
OSC

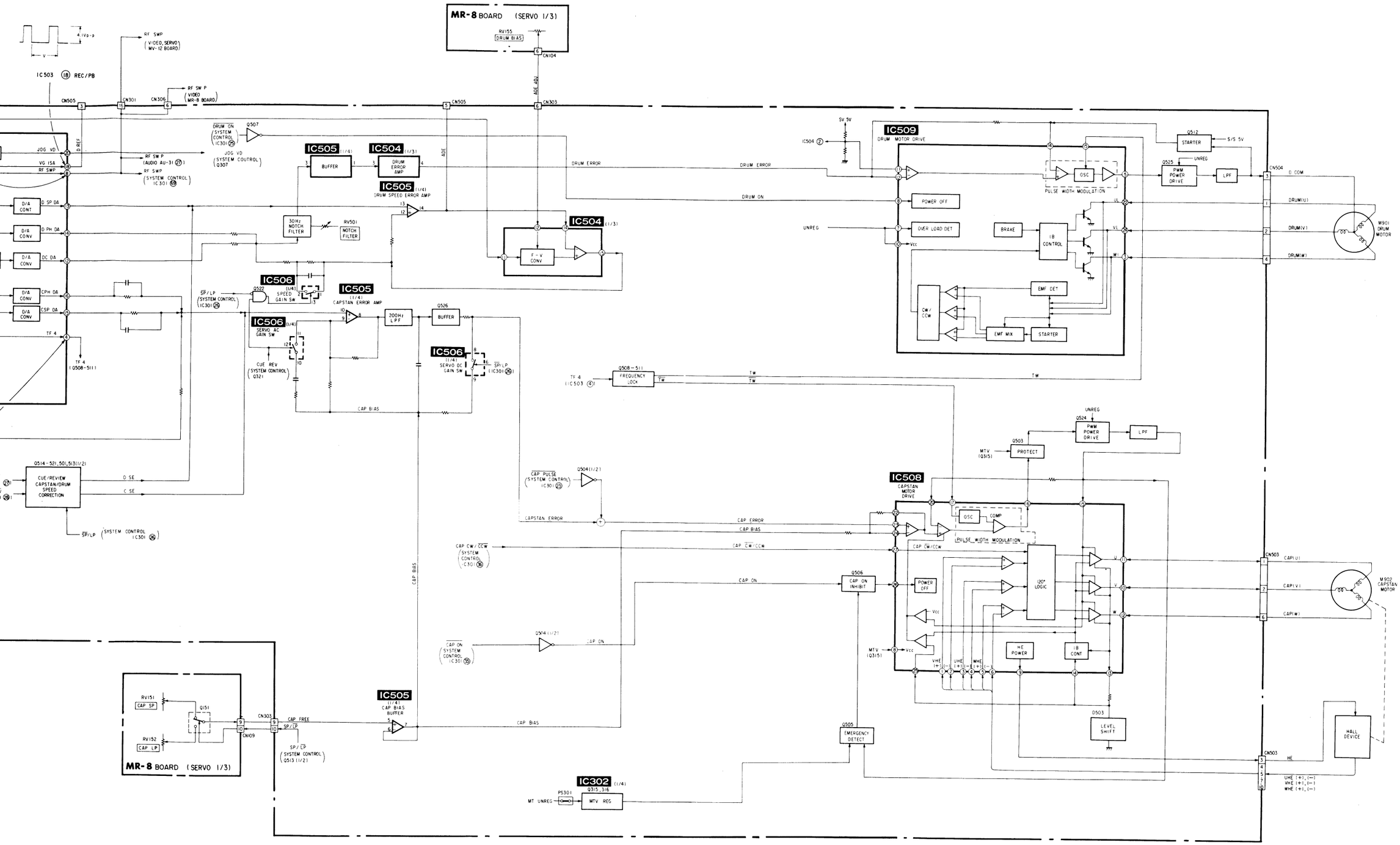
3-7. VIDEO(2) BLOCK DIAGRAM



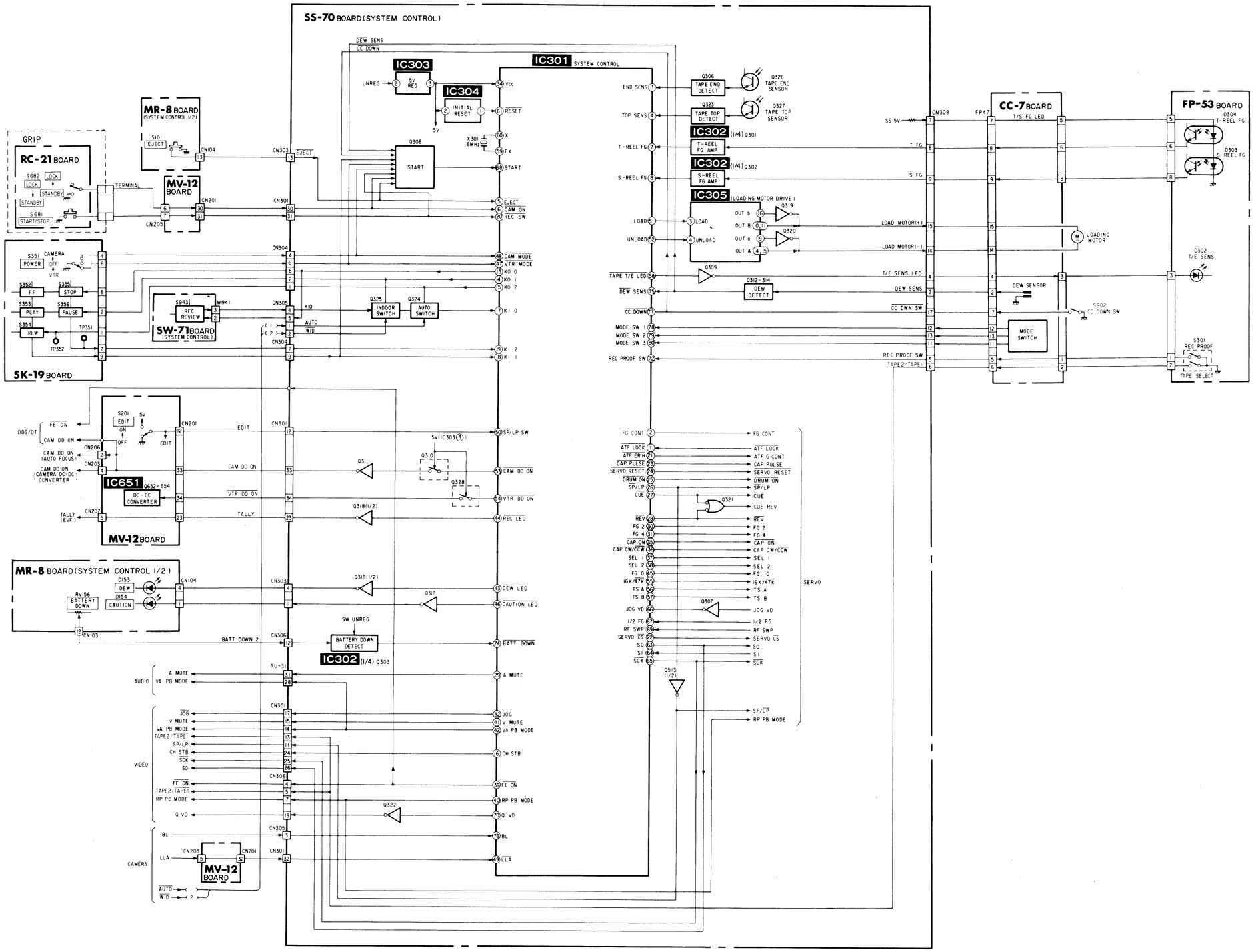

FP-49 BOARD (VIDEO)
VIDEO OUT
VD-6 BOARD
IC001 COMB FILTER
IC002 CHROMA PROCESS
IC003 JOG CHROMA PROCESS
IC004 AFC,PULSE GENERATOR
IC204 CHARACTOR GENERATOR
AGC OUT Y (REC VIDEO)
COMB OUT Y
PB Y
COMB IN C (PB C)
COMB OUT C (REC/PB C)
ACK C (PB C)
VIDEO OUT 1
VIDEO OUT 2
DROP OUT PULSE (VD-6 (2))
C SYNC (VC-11 (25), Q222)
VY-9 BOARD(HIC201) (29) REC
VY-9 BOARD (HIC201) (25), (27) REC
VY-9 BOARD (HIC201) (15) REC/PB
VC-11 BOARD (HIC203) (25) REC/PB
VC-11 BOARD (55) REC/PB
VD-6 BOARD(HIC202) (3) REC
VD-6 BOARD(HIC202) (13) PB
VD-6 BOARD(HIC202) (2) REC/PB
VC-11 BOARD(HIC203) (22) REC
VC-11 BOARD(HIC203) (22) PB
BURST P (VC-11 (21))
DROP OUT P (VY-9 (2))
JOG (Q218)
SP/LP (CN201 (1))
TP201
DETAIL EMPHASIS BOOST
RF SW P (CN201 (16))
Q018 BAND REJECTION FILTER
Q209,210 EQ
RV006 AGC
RV005 VIDEO OUT
AC CLIP
VI SW P
REC Y RF
S AGC
2.6Vp-p
0.2μsec
0.6Vp-p
1.1Vp-p(75Ω Terminated)
1Vp-p
1.8Vp-p
0.54Vp-p
6.8Vp-p
4.4Vp-p
0.64Vp-p
FL201 3.7MHz BPF
FL202 5.17MHz BPF
DIFFEREN-TIAL
SYSTEM RESET
VIDEO 5V
V MUTE (CN201 (5))
REF V (IC204 (29))
REF V (CN201 (29))
REF V (DDS/DT)
JOG VD (VY-9 (7))
VD
Q VD (CN201 (9))
AGC P (VY-9 (18))
BURST F (VD-6 (26))
H SYNC
ACK DC (Q002)
SW P(1/2 H PULSE GENERATOR
V SEP
HALF H KILLER
SYNTHESIS GATE
1/375
1/8
DELAY PULSE GENERATOR
AFC AFC ID
375 FH
(47-1/8)1H
VCO ADJ
CAR CONV
RV002 VCO
5.17MHz
CARRIER CONV
4.43MHz
4.732KHz
375 1H VCO
APC/ACC ID
AFC
PB
REC
APC DET
APC DET SW & AMP
ACK
ACK DET
BUFFER
Q002
APC CORRECT (IC002 (52))
BF (IC003 (16))
CV001 FSC
X001
4.43 MHz X'TAL OSC
90° SHIFT
PEAK HOLD
CHROMA INVERT
SW
4.43MHz (IC003 (23))
D002 SHAPER
ACK DC (IC003 (34))
LPF
(SERVO IC004 (43) Q005)
6dB
APC CORRECTION
GCA
4.43MHz (IC002 (4))
RV003 GCA
GCA ADJ
PB CHROMA
QUASI BURST
MAIN SWITCH
PHASE SHIFT
1/2 FH
BURST ID DET
SEQUENCE DET
SWITCH CONTROL
III LOGIC
CLF GENERATOR
BF (IC002 (20) (21))
CLF (VY-9 (3))
FH AFC ID AFC
S/H
FH VCO
RV004 1H VCO
D003
VA PB MODE (IC003 (4))
JOG (IC003 (4))
VCO H IN
VCO S/H
OSC C
SV4.43 (CN201 (18))
VA PB 5V (VY-9 (3))
VA PB MODE (Q003)
LV201 CP
DL201(1/2) 1H DELAY
VA PB MODE (Q227)
REC MUTE SW (Q224)
RV002 CD
COMB OUT C
PEAK DET
RV001 YD
DL201(1/2) 1H DELAY
AGC DET
AM DET
AGC
AM MOD
DROP OUT
NORMAL
H SYNC INSERT
CLAMP
CLAMP
LIMITER
REC ON
PB ON
13.3MHz
HD INSERT
X201
VA PB MODE (Q227)
CORR DET SENS SW
Q002, 003
EDIT (Q228)
Y-YD
TP203
LP/SP (Q221)
Y-YD LIM OUT
SP/LP SWITCH
Y/C SEP
AGC OUT Y
COMB OUT Y
Y LPF
E Q
CORR
NON-CORR
REC
PB
B/W
COLOR
CHROMA TRAP
CORRELAION DET
REC ON
PB ON
VIDEO OUT(X)
CN204
REF V (VC-11 (29))
H SYNC
COLOR SIG
TO DDS/DT
Q223 CHARACTOR MIX
CN207
VF OUT
TO EVF
VA PB MODE (Q227)
REF V (VC-11 (26))
C SYNC (VY-9 (5))
Q222
OSC IN
OSC OUT
CV201 CHARACTOR POSITION
OUT
SI
SCK
CH STB
CN201
SO
SCK
CH STB
TO SYSTEM CONTROL
EDIT
S201 EDIT ON OFF
Q228
Q218
JOG
V MUTE
TAPE2/TAPE1
VA PB 5V
VA PB MODE
Q219,Q220
Q227
SP/LP
LP/SP
Q221
CN201
TO SYSTEM CONTROL

3-8. SERVO BLOCK DIAGRAM




MR-8 BOARD (SERVO 1/3)
RV155 DRUM BIAS
CN104
ADJ
CN505
CN303
CN301
CN306
RF SWP (VIDEO, SERVO) MV-12 BOARD
RF SW P (VIDEO MR-8 BOARD)
IC503 (18) REC/PB
4.1Vp-p
V
JOG VD
VG 15A
RF SWP
D REF
RF SW P (AUDIO AU-31 (27))
RF SWP (SYSTEM CONTROL IC301 (28))
DRUM ON (SYSTEM CONTROL IC301 (29))
Q507
JOG VD (SYSTEM COUTROL Q307)
IC505 (1/4) BUFFER
IC504 (1/3) DRUM ERROR AMP
IC505 (1/4) DRUM SPEED ERROR AMP
ADJ
DRUM ERROR
D/A CONT
D/A CONV
D SP DA
D PH DA
DC DA
CPH DA
CSP DA
TF 4
TF 4 (Q508-511)
30Hz NOTCH FILTER
RV501 NOTCH FILTER
IC504 (1/3) F-V CONV
IC506 (1/4) SPEED GAIN SW
SP/LP (SYSTEM CONTROL IC301 (26))
Q522
IC505 (1/4) CAPSTAN ERROR AMP
IC506 (1/4) SERVO AC GAIN SW
200Hz LPF
Q526
BUFFER
IC506 (1/4) SERVO DC GAIN SW
SP/LP (IC301 (26))
CUE REV (SYSTEM CONTROL Q321)
CAP BIAS
Q514-521, 501, 513 (1/2)
CUE/REVIEW CAPSTAN/DRUM SPEED CORRECTION
D SE
C SE
SP/LP (SYSTEM CONTROL IC301 (26))
CAP PULSE (SYSTEM CONTROL IC301 (23))
Q504 (1/2)
CAPSTAN ERROR
CAP ERROR
CAP BIAS
CAP CW/CCW (SYSTEM CONTROL IC301 (30))
CAP CW/CCW
CAP ON
Q506 CAP ON INHIBIT
CAP ON (SYSTEM CONTROL IC301 (32))
Q504 (1/2)
CAP ON
IC505 (1/4) CAP BIAS BUFFER
RV151 CAP SP
RV152 CAP LP
Q151
CN109
CAP FREE
SP/LP
SP/LP (SYSTEM CONTROL Q513 (1/2))
MR-8 BOARD (SERVO 1/3)
IC302 (1/4) Q315, 316 MTV REG
PS301
MT UNREG
Q505 EMERGENCY DETECT
IC509 DRUM MOTOR DRIVE
IC504 (2)
5V 5V
DRUM ERROR
DRUM ON
UNREG
POWER OFF
OVER LOAD DET
Vcc
BRAKE
IB CONTROL
OSC
PULSE WIDTH MODULATION
EMF DET
CW/CCW
EMF MIX
STARTER
Q512 STARTER
S/S 5V
Q525 PWM POWER DRIVE
LPF
UNREG
CN504
D COM
DRUM(U)
DRUM(V)
DRUM(W)
M901 DRUM MOTOR
TF 4 (IC503 (4))
Q508-511 FREQUENCY LOCK
TW
Q524 PWM POWER DRIVE
Q503 PROTECT
MTV (Q315)
IC508 CAPSTAN MOTOR DRIVE
OSC
COMP
PULSE WIDTH MODULATION
CAP CW/CCW
POWER OFF
120° LOGIC
Vcc
HE POWER
IB CONT
VHE (+), (−)
UHE (+), (−)
WHE (+), (−)
D503 LEVEL SHIFT
CN503
CAP(U)
CAP(V)
CAP(W)
M902 CAPSTAN MOTOR
HALL DEVICE
HE
UHE (+), (−)
VHE (+), (−)
WHE (+), (−)

3-9. SYSTEM CONTROL BLOCK DIAGRAM



3-10. PIN FUNC
(IC301 ON

Pin No.	Signa
1	ATF L
2	FG CO
3	END S
4	TOP S
5	EJECT
6	CAM C
7	T REE
8	S REE
9	TEST
10	A V_{SS}
11	A VR(
12	A V_{CC}
13	KO 0
14	KO 1
15	KO 2
16	CH ST
17	KI 0
18	KI 1
19	KI 2
20	REC S
21	ATF EI
22	SERVO
23	CAP P
24	SERVO R
25	DRUM

3-10. PIN FUNCTIONS OF SYSTEM CONTROL CPU (IC301 ON SS-70 BOARD:MB-88551)

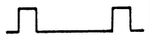
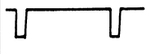
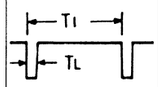
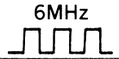
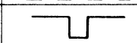
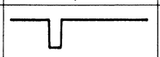
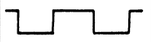
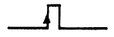
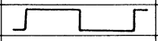
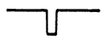
Pin No.	Signal Name	I/O	Signal Shape	Function	STOP	FF	REW	CUE	REV	PB	FR SEARCH FF	FR SEARCH REW	PB PAUSE	REC	REC PAUSE	REC REV
1	$\overline{\text{ATF LOCK}}$	I	Logic state	"Low" when the ATF phase servo is in the normal phase lock state during playback	H	H	H	L	L	L	L	L	L	L	L	L
2	FG CONT	I	Logic state	CAP FG dividing switching signal "Low" during CUE, REV, and UNLOAD.												
3	$\overline{\text{END SENS}}$	I	⊓	Syncronizes with the rise of $\overline{\text{TAPE T/E LED}}$ to detect this level. "Low" for tape end.												
4	$\overline{\text{TOP SENS}}$	I	⊓	Syncronizes with the fall of $\overline{\text{TAPE T/E LED}}$ to detect this level. "Low" for tape top.												
5	$\overline{\text{EJECT}}$	I	⊓	EJECT key input. Goes "Low" when the EJECT key is pressed.												
6	$\overline{\text{CAM ON}}$	I	Logic state	CAMERA POWER switch input. Turns on when the slide cover of REC button is lifted, going "Low".	H	H	H	H	H	H	H	H	H	L	L	L
7	T REEL FG	I	⊓⊓	T-reel rotation detection signal input. Compared with 1/2 FG signal to detect tape slack.												
8	S REEL FG	I	⊓⊓	S-reel rotation detection signal input. Compared with 1/2 FG signal to detect tape slack.												
9	TEST	I	—	Normally open. For IC check.												
10	A V_{ss}		—	Connected to GND.												
11	A VR(−)		—	Connected to GND.												
12	A V_{cc}		—	Connected to EVER 5 V.												
13	KO 0	O	⊓	Key matrix output. Reads out input levels of KI0 to KI2 when "Low" is output.												
14	KO 1	O	⊓													
15	KO 2	O	⊓													
16	CH STB	O	1μsec or more	STROBE signal to the character generator (IC204 on MV-12 board). Strobe at rising edge (↑), data and adress increment at falling edge (↓).												
17	KI 0	I		Key matrix input. When key is pressed, the pulse "Low"level of KO0 to KO2 is input.												
18	KI 1	I														
19	KI 2	I														
20	$\overline{\text{REC SW}}$	I	Logic state	REC START /STOP switch input. "Low" When this button is pressed.												
21	$\overline{\text{ATF ER H}}$	O	Logic state	Maintained at "Low" level at UNLOAD or STANDBY(REC PAUSE), improves capstan motor rising.	H	H	H	H	H	H	H	H	H	H	L	H
22	SERVO $\overline{\text{CS}}$	O	⊓	Communication chip select signal to servo IC(IC503, CX20035). "Low" When sending serial data.												
23	$\overline{\text{CAP PULSE}}$	O	Logic state	"Low" level at FF or REW to apply full voltage to the capstan motor. CAP ON signal is PWM drive for smooth rise up. "Low" pulse is output at capstan PWM sensing.	H	L	L	L→H rising	L→H rising	L→H rising	L→H rising	L→H rising	L→H rising	L→H rising	L→H rising	L→H rising
24	SERVO RESET	O	⊓	Initial reset pulse to servo IC (IC503, CX20035).												
25	$\overline{\text{DRUM ON}}$	O	Logic state	Drum motor ON/OFF signal. Drum motor ON at "Low" level.	H	L→H rising	L→H rising	L→H rising	L→H rising	L→H rising	L→H rising	L→H rising	L→H rising	L→H rising	L→H rising	L→H rising

Pin No.	Signal Name	I/O	Signal Shape	Function	STOP	FF	REW	CUE	REV	PB	FR SEARCH FF	FR SEARCH REW	PB PAUSE	REC	REC PAUSE	REC REV
26	$\overline{SP}$/LP	O	Logic state	"Low" : SP mode "High" : LP mode	L	L	L	※1 H/L	※1 H/L	※1 H/L	※1 H/L	※1 H/L	L	L	L	L
27	$\overline{CUE}$	O	Logic state	"Low" during cue	H	H	H	L	H	H	L	H	H	H	H	H
28	$\overline{REV}$	O	Logic state	"Low" during review	H	H	H	H	L	H	H	L	H	H	H	H
29	A MUTE	O	Logic state	"High" during voice mute	H	H	H	H	H	L	H	H	H	L	L	H
30	FG2	O	Logic state	Signal which changes the divide ratio of the capstan FG divider (IC502).	L	L	L	H	H	L	H	H	L	L	L	L
31	FG4	O	Logic state		L	L	L	H	H	L	H	H	L	L	L	L
32	$\overline{JOG}$	O	Logic state	Video circuit normal/variable-speed playback switching signal. "Low" during PB pause, cue or review.	H	H	H	L	L	H	L	L	H	H	H	L
33	N.C	O	——													
34	V_{CC}	O	——	Connected to EVER 5 V.												
35	$\overline{CAP\ ON}$	O	Logic state	Capstan motor ON/OFF signal. Capstan motor ON at "Low" level.	H	rising L→H	rising L→H	H	H	rising L→H	H	H	H	rising L→H	H	rising L→H
36	CAP CW/$\overline{CCW}$	O	Logic state	Capstan motor rotation direction switching signal. "Low" at FWD rotation.	L	L	H	L	H	L	L	H	L	L	L	H
37	SEL1	O	Logic state	Controls the frequency of ATF REF PILOT signal.												
38	SEL2	O	Logic state													

ATF REF PILOT	f1	f2	f3	f4
SEL1	H	L	H	L
SEL2	H	H	L	L

Pin No.	Signal Name	I/O	Signal Shape	Function	STOP	FF	REW	CUE	REV	PB	FR SEARCH FF	FR SEARCH REW	PB PAUSE	REC	REC PAUSE	REC REV
39	$\overline{FE\ ON}$	O	Logic state	Flying erase oscillation ON/OFF signal. "Low" during playback.	H	H	H	H	H	H	H	H	H	L	H	H
40	RP PB MODE	O	Logic state	REC/PB AMP REC/PB switching signal. "High" during playback.	H	H	H	H	H	H	H	H	H	L	L	H
41	V MUTE	O	Logic state	Video mute signal. "High" during mute."	H	H	H	L	L	L	L	L	L	L	L	L
42	VA PB MODE	O	Logic state	Video audio circuit REC/PB swtching signal. "High" during playback.	H	H	H	H	H	H	H	H	H	L	L	H
43	$\overline{DEW\ LED}$	O	Logic state	Dew condensation warning LED ON/OFF signal. "Low" during condensation.												
44	$\overline{REC\ LED}$	O	Logic state	REC (tally) LED ON/OFF signal. "Low" during recording.	H	H	H	H	H	H	H	H	H	L	H	H
45	FG0	O	Logic state	Signal which changes the divide ratio of the capstan FG divider (IC502) . See FG2 and FG4 signals.	H	H	H	L	L	H	L	L	H	H	H	H
46	$\overline{CAUTION\ LED}$	O	Logic state	Abnormal condition warning LED ON/OFF signal. On at "Low". Flickers during 4 Hz at clogging or battery down.												
47	$\overline{VTR\ MODE}$	I	Logic state	Power mode switch input. "Low" in VCR mode.	L	L	L	L	L	L	L	L	L	H	H	H
48	$\overline{CAM\ MODE}$	I	Logic state	Power mode switch input. "Low" in camera mode.	H	H	H	H	H	H	H	H	H	L	L	L
49	$\overline{LLA}$	I	Logic state	Insufficient light alarm signal input. "Low" during insufficient light.												
50	$\overline{SP}$/LP SW	I	Logic state	SP/LP mode switching input. "High" in LP mode.												

※1 Dependent upon recording mode (SP/LP) of playback tape.

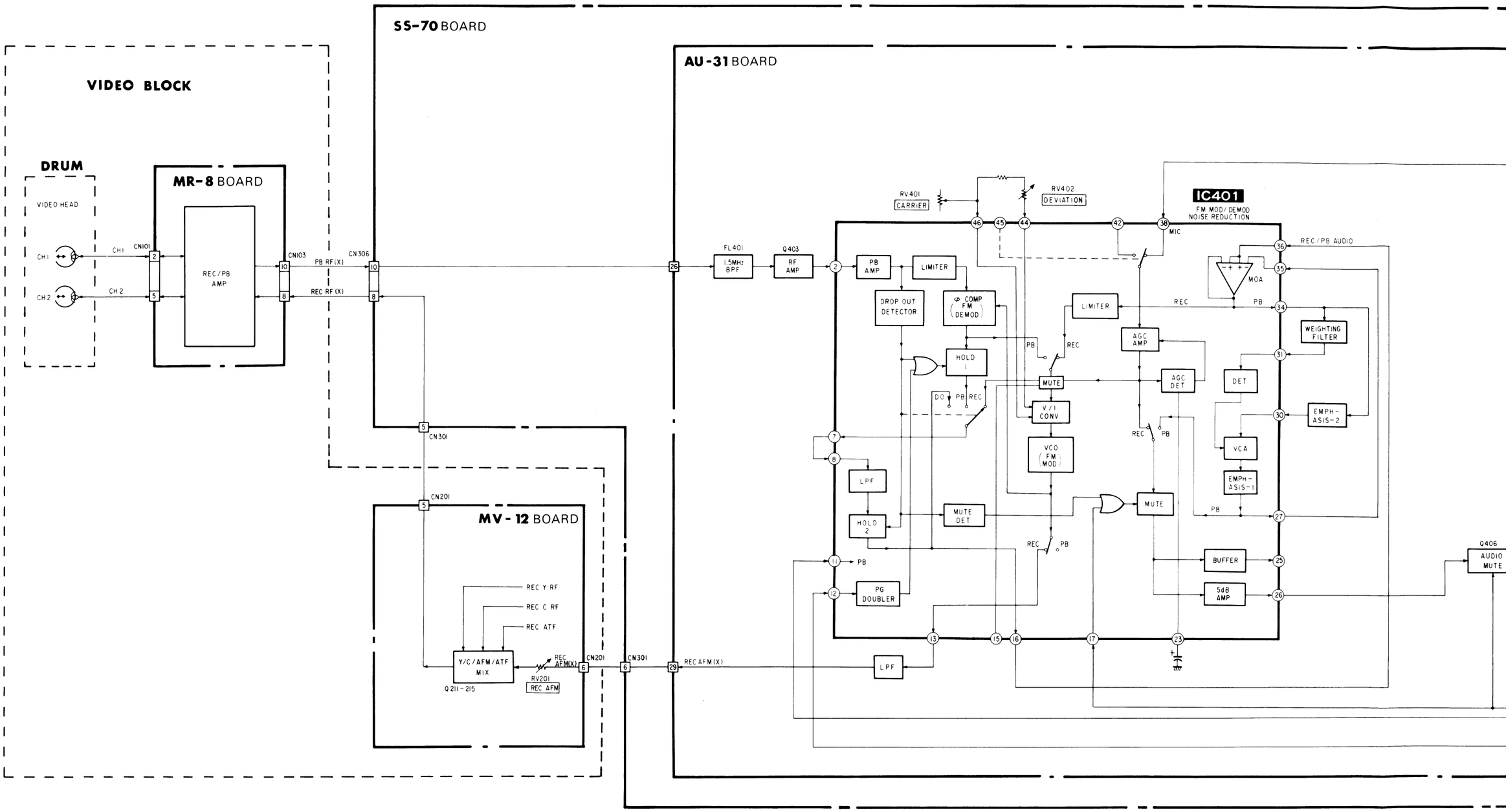
Pin No.	Signal Name	I/O	Signal Shape	Function	STOP	FF	REW	CUE	REV	PB	FR SEARCH FF	FR SEARCH REW	PB PAUSE	REC	REC PAUSE	REC REV
51	LOAD	O	Logic state	Loading motor control signal.												
52	UNLOAD	O	Logic state	Operation / Signal name: LOAD: LOAD H, UNLOAD L, BRAKE H; UNLOAD: LOAD L, UNLOAD H, BRAKE H												
53	$\overline{\text{CAM DD ON}}$	O	Logic state	Camera power supply control. On at "Low".	H	H	H	H	H	H	H	H	H	L	L	L
54	$\overline{\text{VTR DD ON}}$	O	Logic state	VTR power supply control. On at "Low".	L	L	L	L	L	L	L	L	L	H	H	H
55	16K/$\overline{47K}$	O	Logic state	ATF/BPF switching signal. "Low" at detection of ATF error on f_1 and f_2 tracks. "High" during detection of ATF error on f_2 and f_4 tracks.												
56	TS A	O		ATF error sampling hold signal. "Low" during sampling. "High" during hold.												
57	TS B	O		ATF lock sampling hold signal. "Low" during sampling. "High" during hold.												
58	$\overline{\text{TAPE T/E LED}}$	O		Tape top/end detection LED ON/OFF signal.												
59	EX	I	6MHz 	6.0MHz crystal oscillation connecting pin.												
60	X	I														
61	$\overline{\text{RESET}}$	I		Reset at "Low".												
62	NC															
63	SO	O	Serial signal (pulse)	Serial communication output to servo IC (IC503 CX20035), character generator (IC204 on MV-12 board, μPD6105G) .												
64	SI	I	Serial signal (pulse)	Serial communication input from servo IC (IC503, CX20035) .												
65	$\overline{\text{SCK}}$	O	Clock pulse	Serial communication clock pulse output.												
66	JOG VD	I		Q VD signal producing generation timing pulse from servo IC.												
67	1/2FG	I		The signal obtained by capstan FG divided by 1/2. Counts tape running distance at edit recording.												
68	START	I		Releases CPU sleep mode at the rise ($\int$) of pulse input.	L	L	L	H	H	L	H	H	L	L	L	H
69	RF SW PULSE	I		RF switch pulse input.												
70	Q VD	O		Outputs the quasi VD signal to be inserted in the video signal during variable-speed playback.	H/L	H/L	H/L	H/L	H/L	H/L	H/L	H/L	H/L	H	H	H
71	V_{SS}	—	——	Connected to GND.	H	H	H	H	H	H	H	H	H	H	H	H
72	REC PROOF SW	I	Logic state	"Low" when cassette's error erasure prevention switch is set to the erasure prevention side.	H	H	H	H	H	H	H	H	H	H	H	H

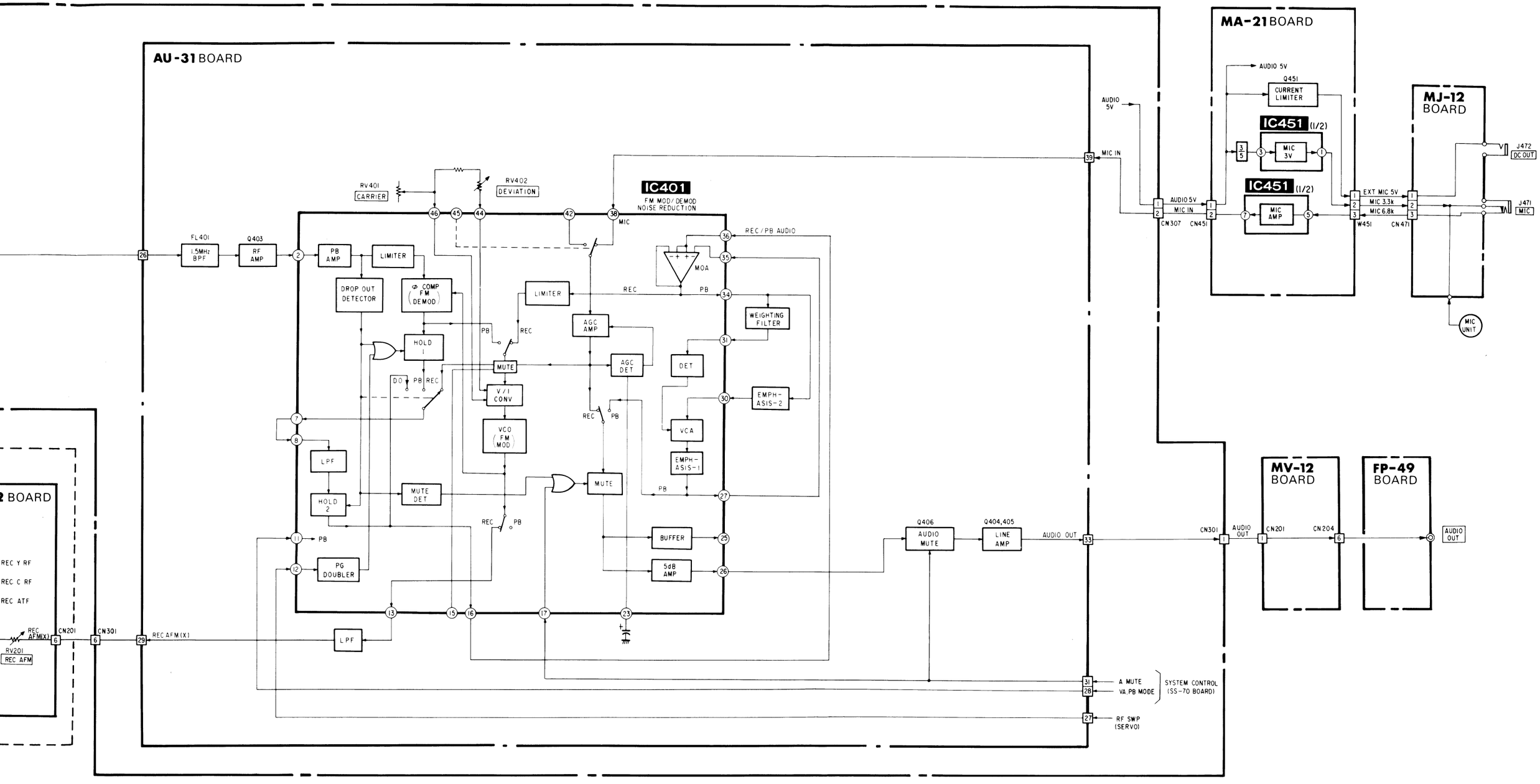
Mode	REC/PB	CUE/REV	FF/REW
T_I	100	14	2
T_L	1	1	1

(Unit:msec)

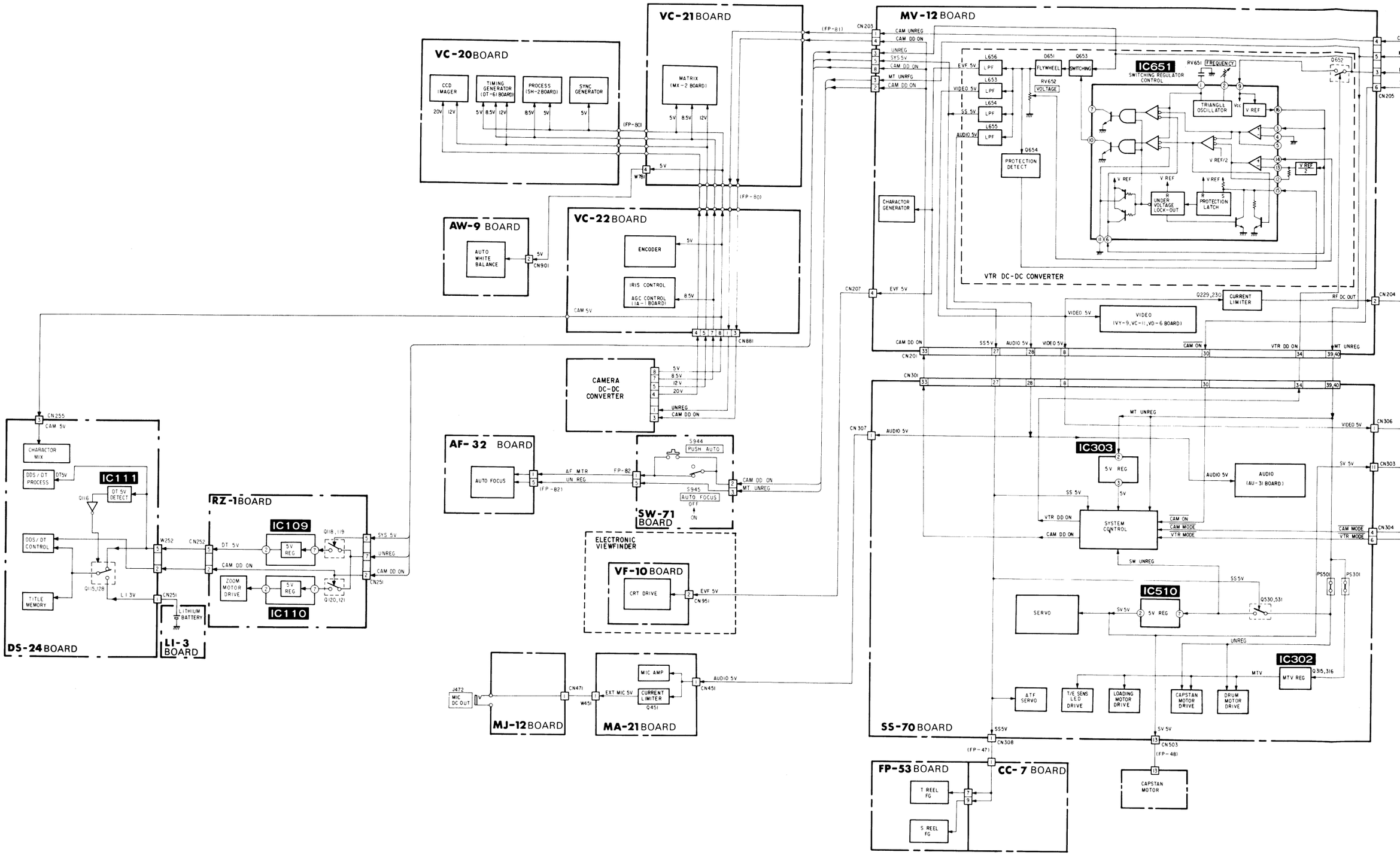
Pin No.	Signal Name	I/O	Signal Shape	Function	STOP	FF	REW	CUE	REV	PB	FR SEARCH FF	FR SEARCH REW	PB PAUSE	REC	REC PAUSE	REC REV
73	N.C			Open												
74	BAT DOWN	I	Logic state	"Low" during low battery voltage.												
75	$\overline{\text{DEW SENS}}$	I	Logic state	"Low" during condensation (dew) .												
76	BL	I	Logic state	BACK LIGHT (back light correction) switch input for EVF display. "Low" during back light correction.												
77	$\overline{\text{CC DOWN}}$	I	Logic state	Cassette compartment down switch input. "High" during cassette compartment is up;"Low" during cassette compartment down.	L	L	L	L	L	L	L	L	L	L	L	L
78	MODE SW1	I	Logic state	Mechanical mode switch input (3-bit configuration, for mechanical position detection) .												
79	MODE SW2	I	Logic state													
80	MODE SW3	I	Logic state													

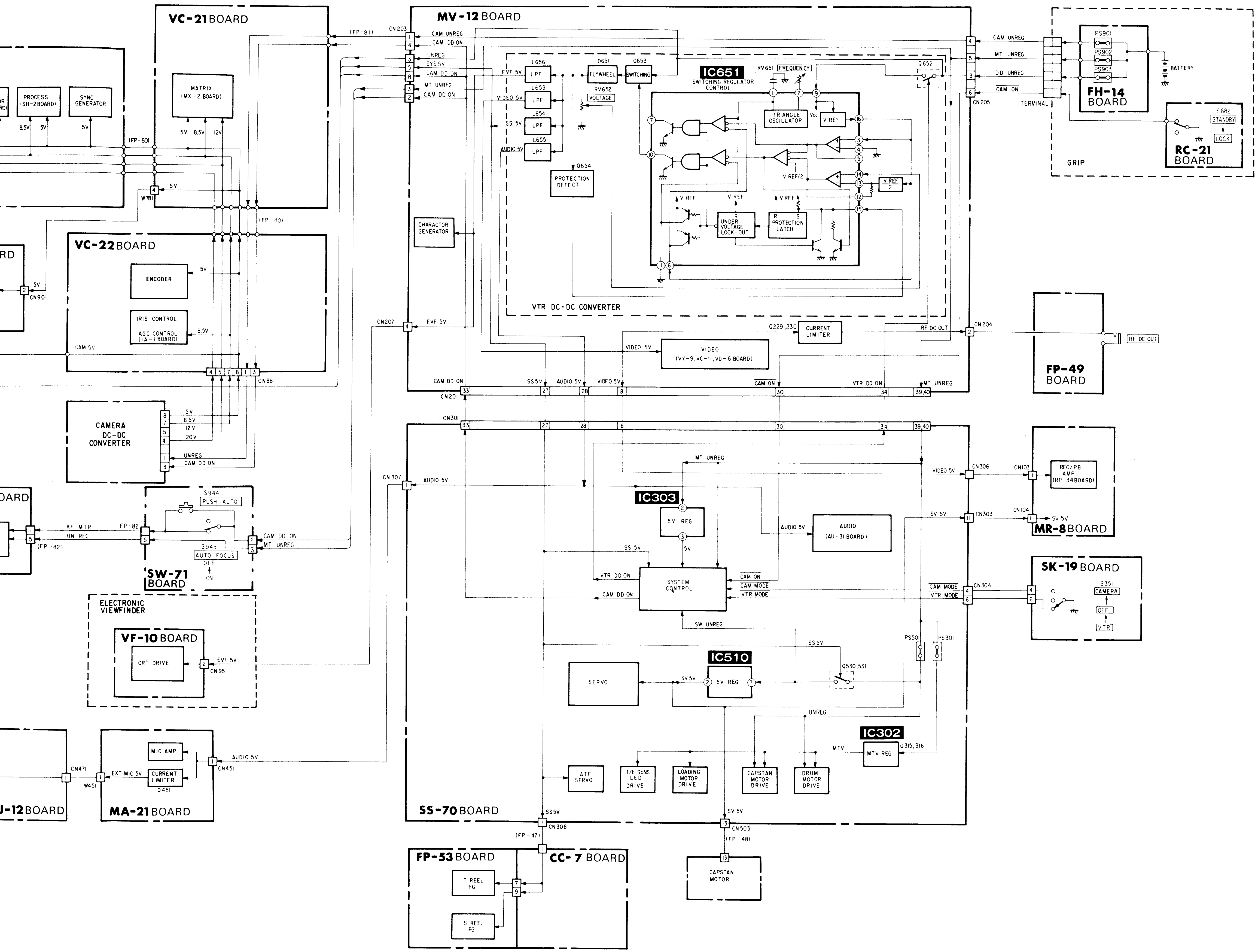
3-11. AUDIO BLOCK DIAGRAM



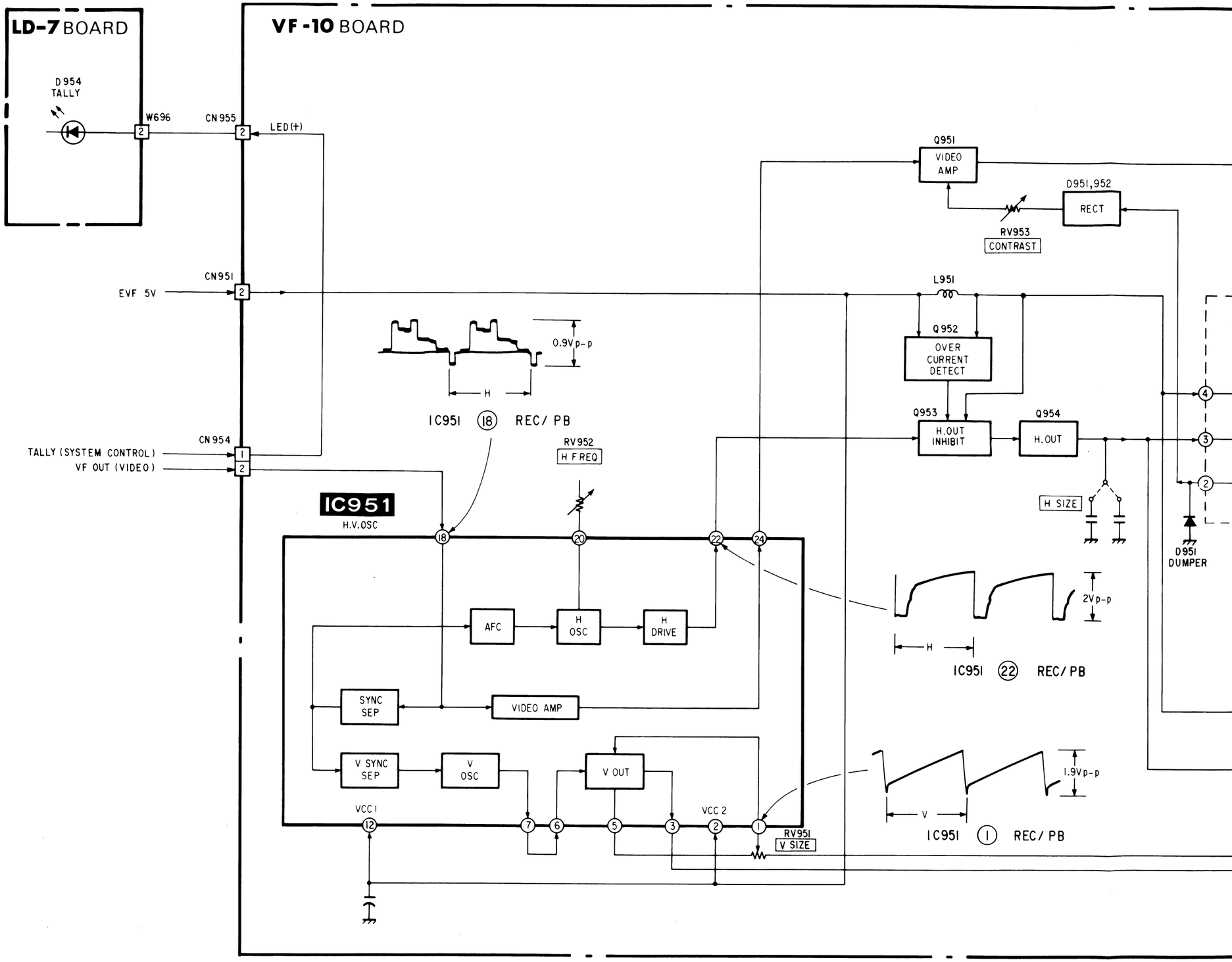


3-12. POWER BLOCK DIAGRAM

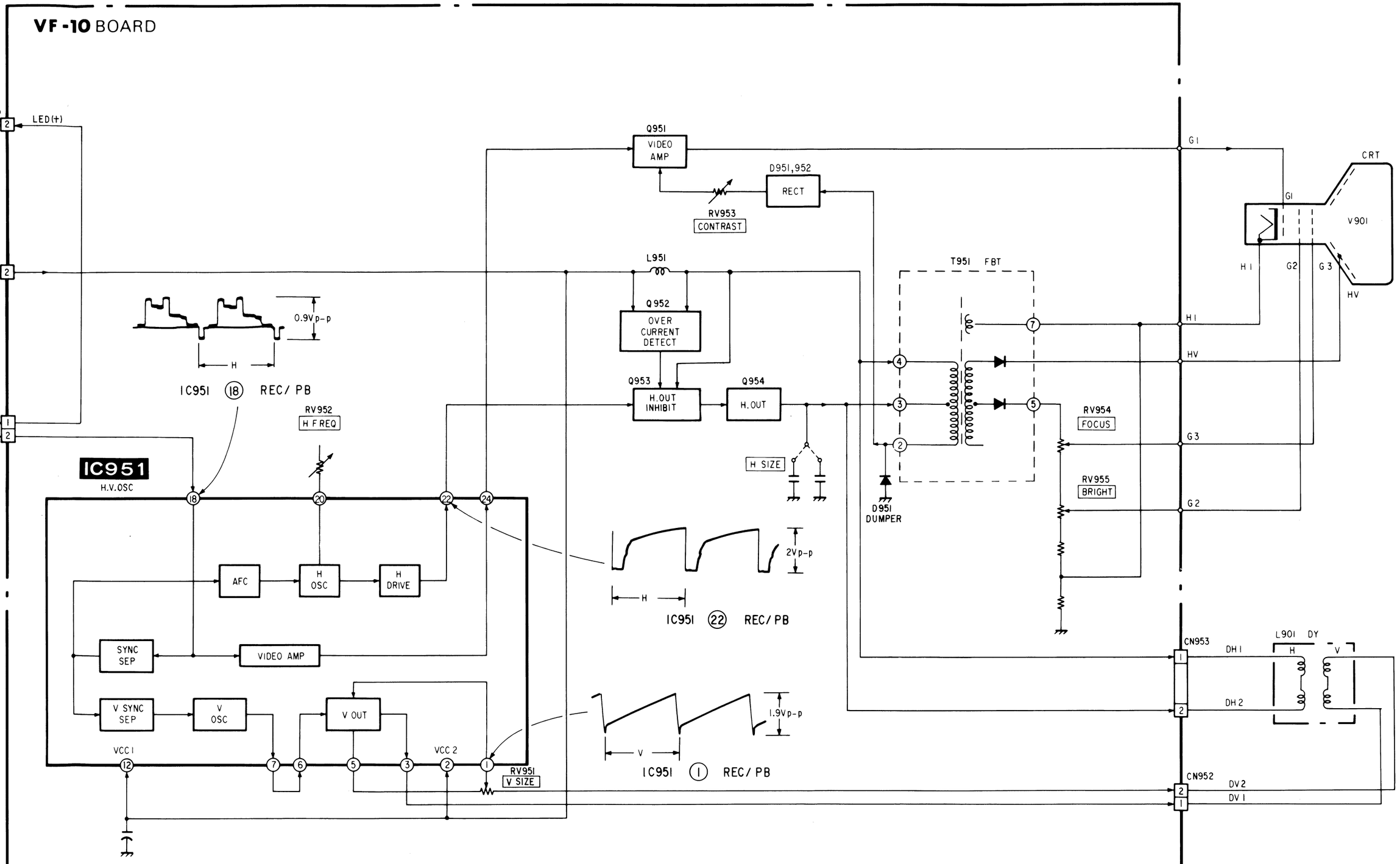



VC-21 BOARD
MATRIX (MX-2 BOARD)
PROCESS (SH-2 BOARD)
SYNC GENERATOR
VC-22 BOARD
ENCODER
IRIS CONTROL
AGC CONTROL (IA-1 BOARD)
CAMERA DC-DC CONVERTER
SW-71 BOARD
S944 PUSH AUTO
S945 AUTO FOCUS
ELECTRONIC VIEWFINDER
VF-10 BOARD
CRT DRIVE
MA-21 BOARD
MIC AMP
CURRENT LIMITER
MV-12 BOARD
IC651
SWITCHING REGULATOR CONTROL
TRIANGLE OSCILLATOR
V REF
UNDER VOLTAGE LOCK-OUT
PROTECTION LATCH
FLYWHEEL
SWITCHING
LPF
PROTECTION DETECT
CHARACTOR GENERATOR
VTR DC-DC CONVERTER
CURRENT LIMITER
VIDEO (VY-9, VC-11, VD-6 BOARD)
FH-14 BOARD
BATTERY
TERMINAL
RC-21 BOARD
GRIP
FP-49 BOARD
RF DC OUT
SS-70 BOARD
IC303
5V REG
AUDIO (AU-31 BOARD)
SYSTEM CONTROL
IC510
SERVO
IC302
MTV REG
ATF SERVO
T/E SENS LED DRIVE
LOADING MOTOR DRIVE
CAPSTAN MOTOR DRIVE
DRUM MOTOR DRIVE
REC/PB AMP (RP-34 BOARD)
MR-8 BOARD
SK-19 BOARD
S351 CAMERA OFF VTR
FP-53 BOARD
T REEL FG
S REEL FG
CC-7 BOARD
CAPSTAN MOTOR

3-13. VIEWFINDER BLOCK DIAGRAM



VF-10 BOARD


LED(+)
Q951
VIDEO AMP
D951,952
RECT
RV953
CONTRAST
G1
CRT
G1
V901
H1
G2
G3
HV
L951
T951 FBT
Q952
OVER CURRENT DETECT
Q953
H.OUT INHIBIT
Q954
H.OUT
H SIZE
RV954
FOCUS
G3
RV955
BRIGHT
G2
D951
DUMPER
0.9Vp-p
H
IC951 (18) REC/PB
RV952
H FREQ
IC951
H.V.OSC
AFC
H OSC
H DRIVE
SYNC SEP
VIDEO AMP
V SYNC SEP
V OSC
V OUT
VCC1
VCC2
RV951
V SIZE
2Vp-p
H
IC951 (22) REC/PB
1.9Vp-p
V
IC951 (1) REC/PB
CN953
DH1
DH2
L901 DY
H
V
CN952
DV2
DV1

SECTION 4
PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAM

4-1. FRAME SCHEMATIC DIAGRAM

FRAME FRAME

SS-70 BOARD
MV-12 BOARD
AU-31 BOARD
MR-8 BOARD
CC-7 BOARD
RP-34 BOARD (HIC)
FP-53 BOARD (FLEXIBLE)
SK-19 BOARD (FLEXIBLE)
VF-10 BOARD
LD-7 BOARD
VC-11 BOARD (HIC)
VY-9 BOARD (HIC)
VD-6 BOARD (HIC)
TA-50 BOARD
FH-14 BOARD
RC-21 BOARD
FP-49 BOARD (FLEXIBLE)
DT-61 BOARD (HIC)
SH-2 BOARD (HIC)
VC-20 BOARD
VC-21 BOARD
MX-2 BOARD (HIC)
AW-9 BOARD
AS-20 BOARD
SW-7 BOARD

9 10 11 12 13 14 15 16 17 18 19 20 21 22 23

A B C D E F G H I J

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

SK-19 BOARD (FLEXIBLE)

VF-10 BOARD

LD-7 BOARD

MV-12 BOARD

VC-11 BOARD (HIC)

VY-9 BOARD (HIC)

VD-6 BOARD (HIC)

DT-61 BOARD (HIC)

SH-2 BOARD (HIC)

VC-20 BOARD

FP-49 BOARD (FLEXIBLE)

VC-21 BOARD

MX-2 BOARD (HIC)

VC-22 BOARD

MA-21 BOARD

MJ-12 BOARD

LI-3 BOARD

SK-21 BOARD (FLEXIBLE)

DS-24 BOARD

CN-27 BOARD

IA-1 BOARD (HIC)

RZ-1 BOARD

AF-32 BOARD

SW-71 BOARD

AW-9 BOARD

AS-20 BOARD

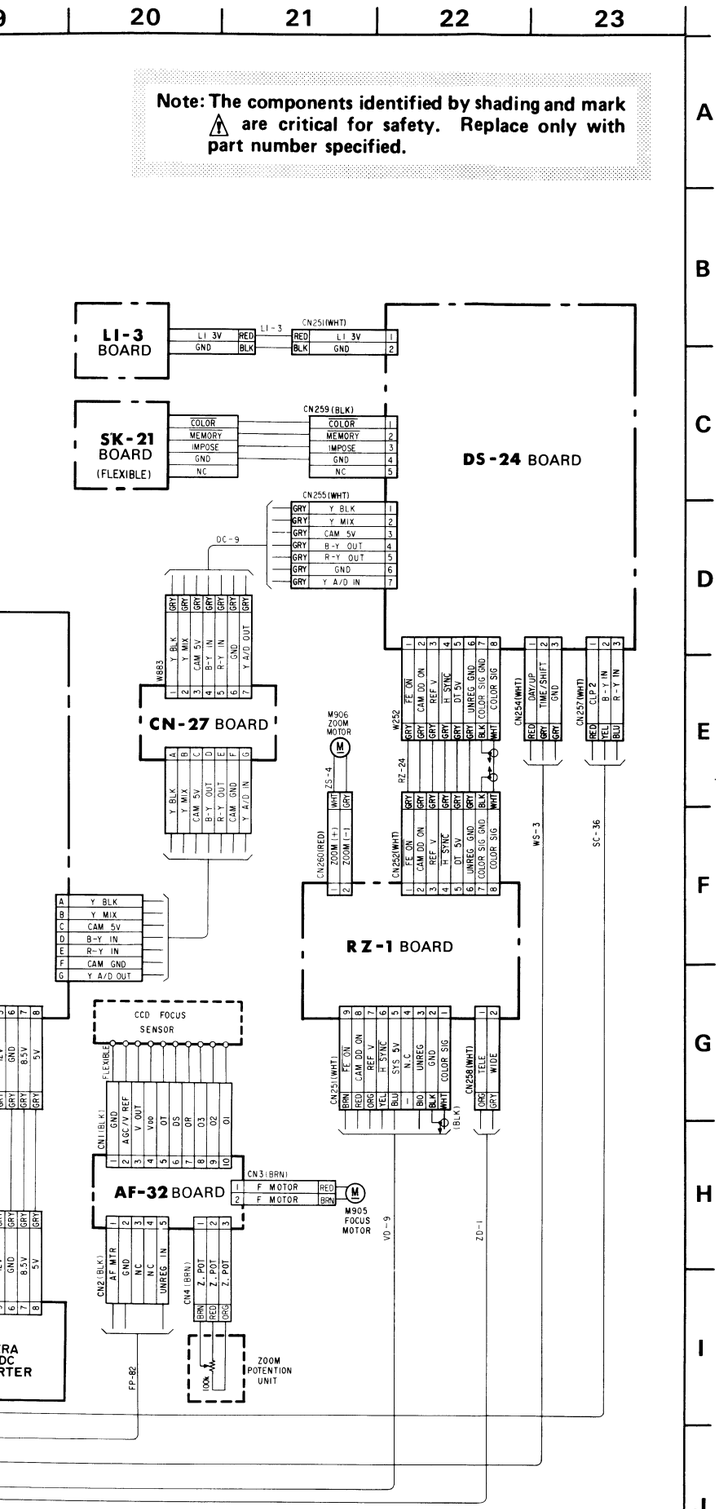
TA-50 BOARD

FH-14 BOARD

RC-21 BOARD

CAMERA DC/DC CONVERTER

ZOOM POTENTION UNIT



—85—

Precantions for replacement of CCD imager block.

- With a pair of IC701 (CCD imager) on the VC-20 complete board and IC002 (corrector ROM) on the DT-61 complete board, it is used a repair part of the CCD imager block.
  Since corrector ROM IC is manufactured to match the CCD imager, replacement of a single unit of the CCD imager corrector ROM cannot be allowed.
- When both a CCD imager and the corrector ROM, replace both the CCD imager and the corrector ROM, when a corrector ROM is not mounted on the service set, install a corrector ROM which is supplied anew.
- IC701 (CCD imager) is not mounted on the VC-20 complete board to be supplied as a repair part, and IC002 (corrector ROM) is not mounted on the DT-61 complete board to be supplied as a repair part. When the respective boards are replaced, remove the respective ICs from the old boards and install them to the new ones respectively.
- After the CCD imager block has been replaced, perform the entire adjustments of the camera section.
- CCD imager is structurally in case of being broken down by static electricity. For this reason, take care to handle it as well as MOS IC. Moreover, care should be taken for dust not to be stuck on the light reseiving section and for strong light not to get into there.

—86—

—87—

4-2. PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAM

VC-20(CCD DRIVE, TIMING GENERATOR), VC-21(CAMERA MATRIX), VC-22(CAMERA ENCODER) PRINTED WIRING BOARDS

—Ref. No.VC-20, VC-21 and VC-22 BOARDS: 1,000 Series—

Note:

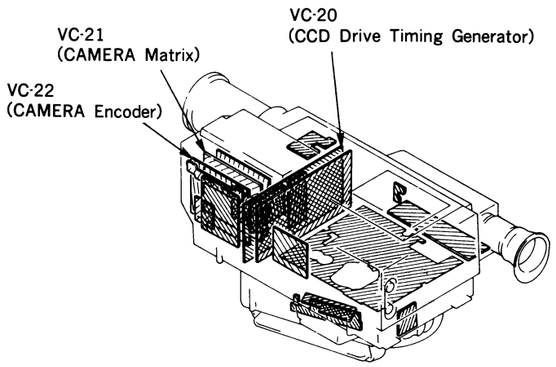
- ○— : indicates a lead wire mounted on the component side.
- ●— : indicates a lead wire mounted on the printed side.
- ⊗ : Through hole.
- ▩ : Pattern from the side which enables seeing.
- ▩ : Pattern from the side which enables seeing.
- ▩ : B+ pattern from the side which enables seeing.

Caution:

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

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

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



CT721 H-1

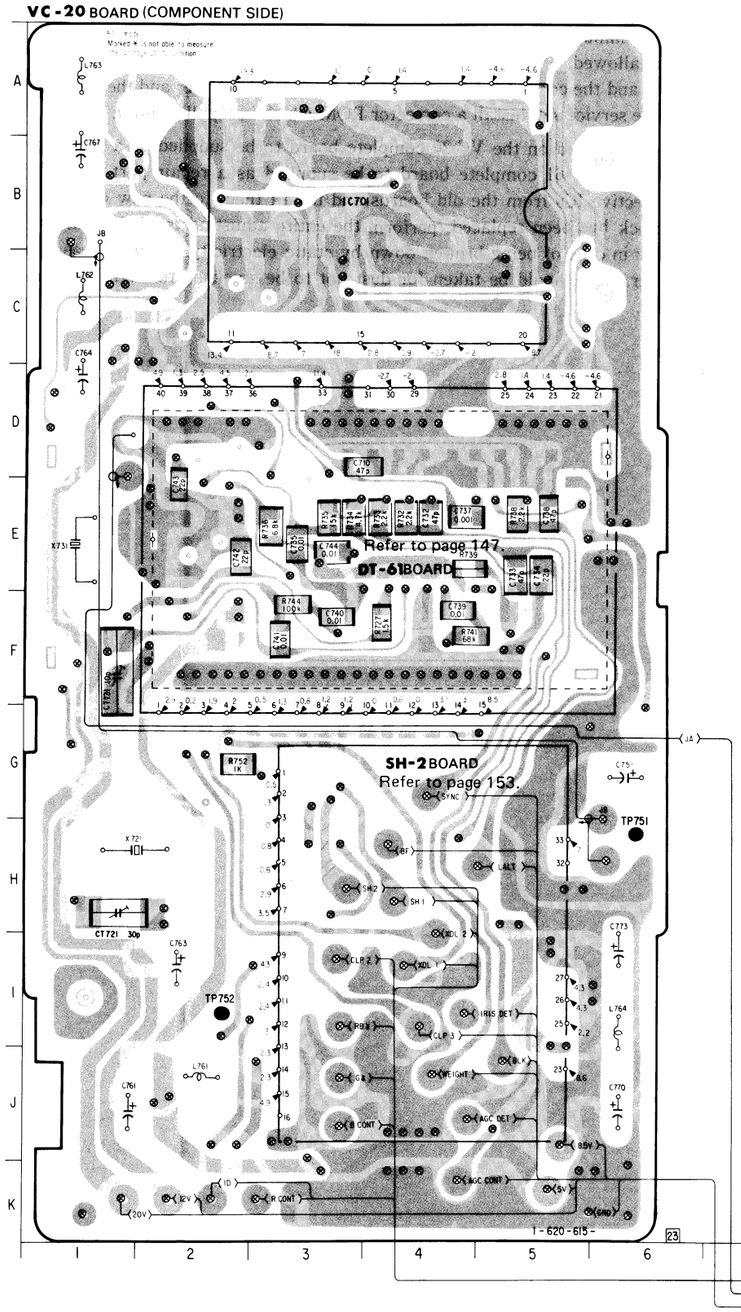
D701 C-11

IC701 B-4
IC731 E-9

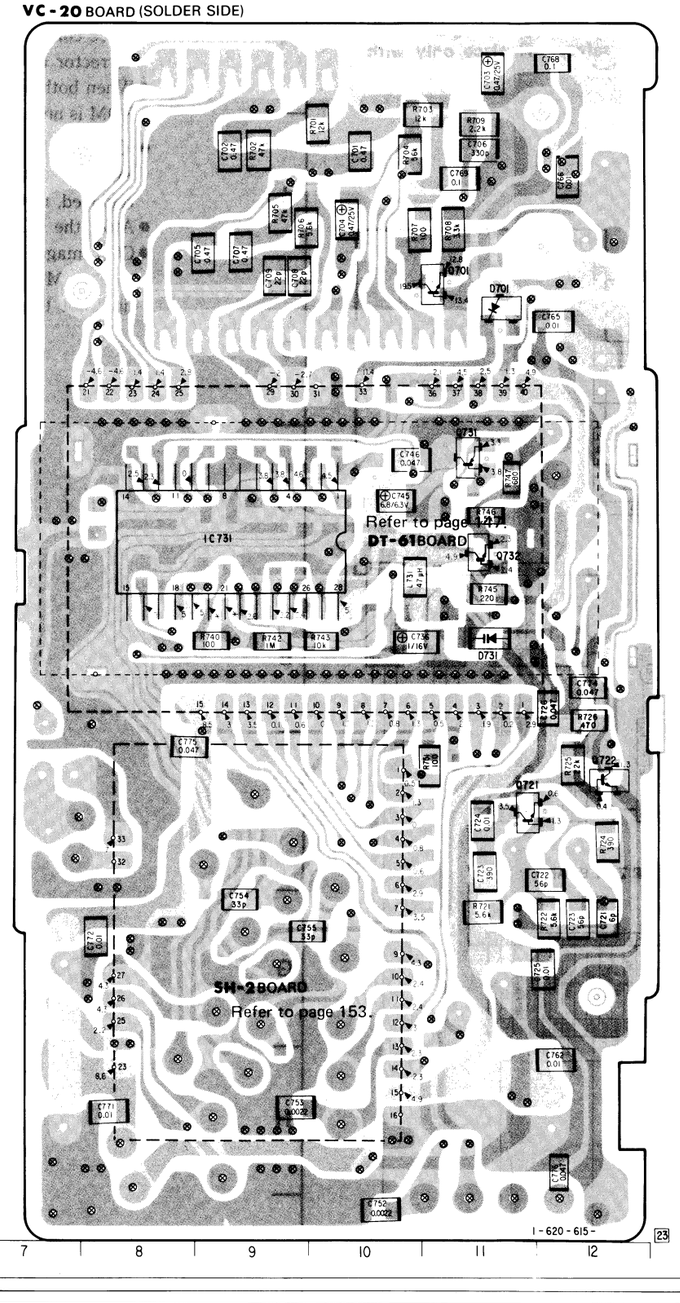
Q701 C-11
Q721 G-11
Q722 G-12
Q731 D-11
Q732 E-11

TP751 H-6
TP752 I-2

VC-20 BOARD (COMPONENT SIDE)



VC-20 BOARD (SOLDER SIDE)

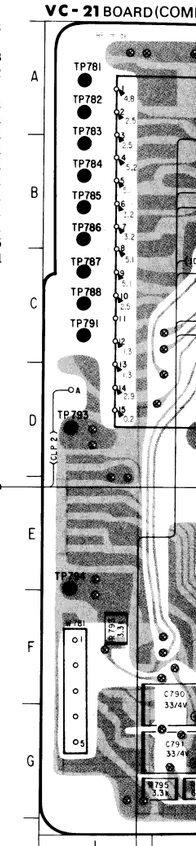


IC781 F-3

RV781 E-3
RV782 E-2

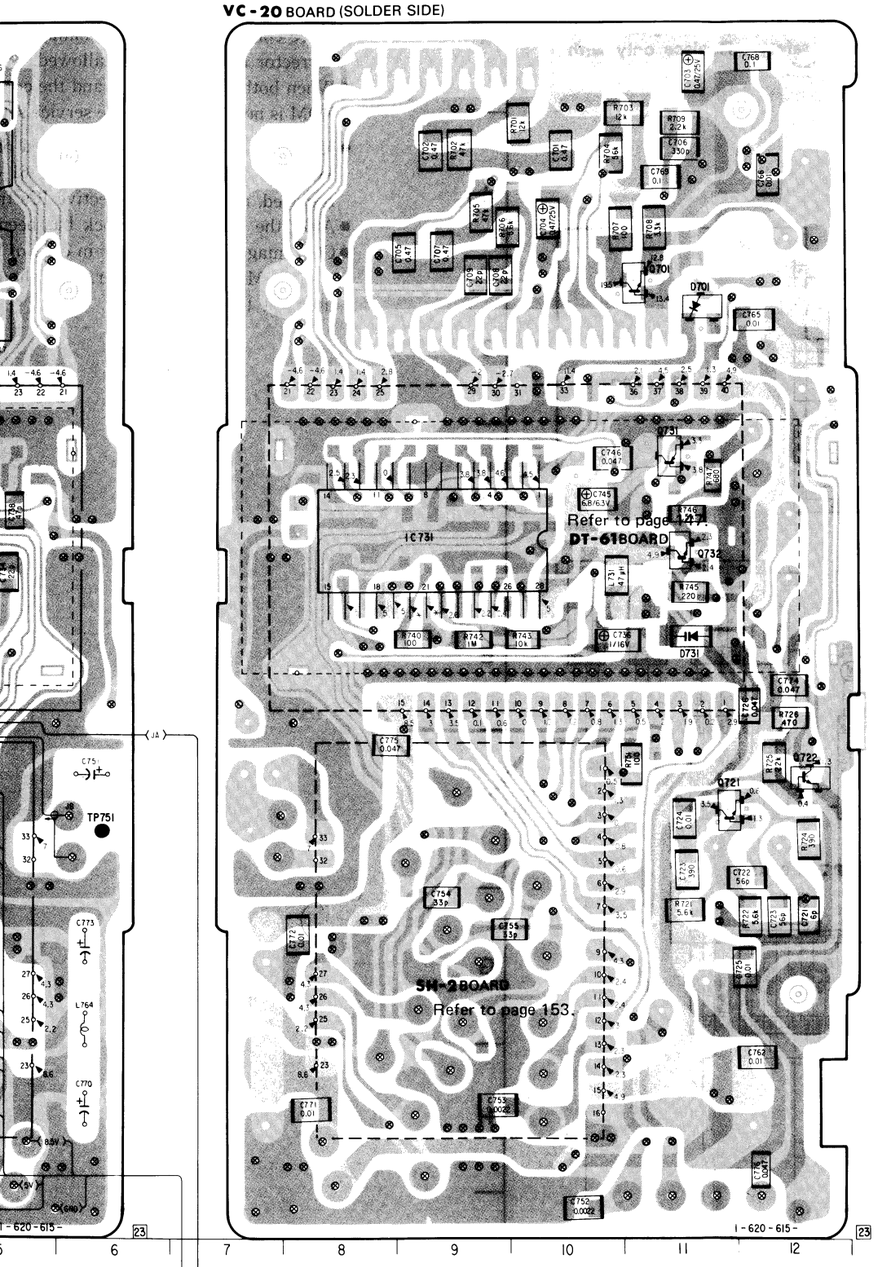
TP781 A-1
TP782 A-1
TP783 B-1
TP784 B-1
TP785 B-1
TP786 B-1
TP787 C-1
TP788 C-1
TP791 C-1
TP792 A-6
TP793 D-1
TP794 E-1

VC-21 BOARD (COMP



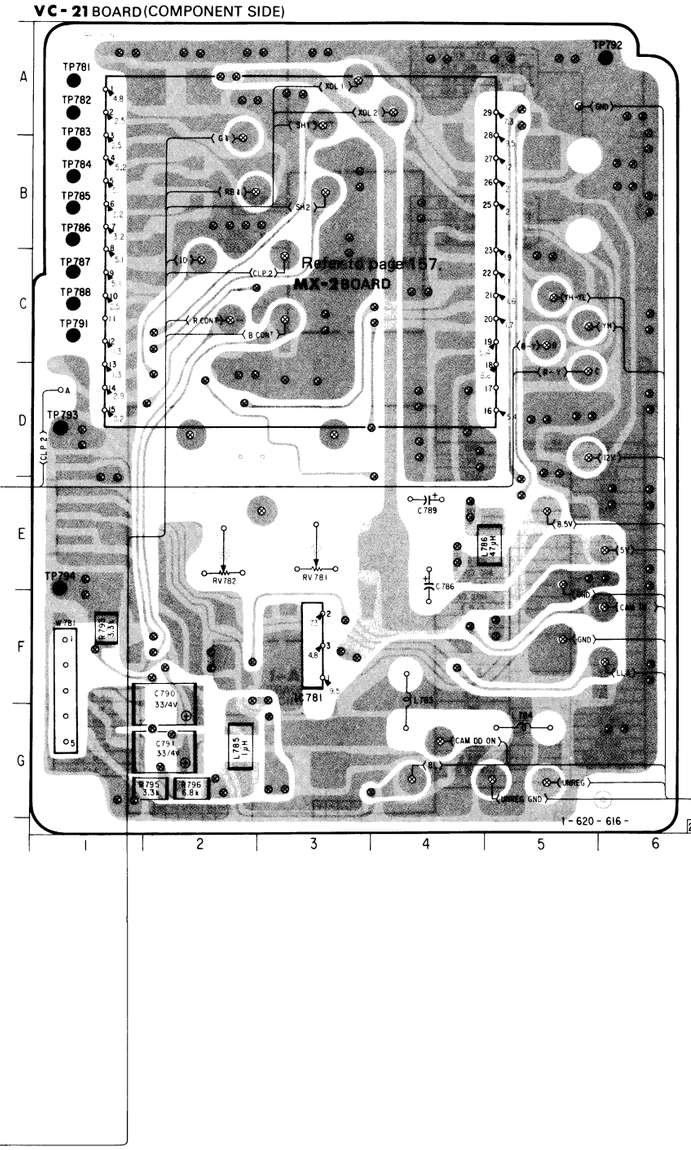
Be sure to always read "Note on replacing the CCD imager block" in page 86 when replacing the VC-20 complete board. DT-61 complete board, and CCD imager block (IC701 on the VC-20 board and IC002 on the DT-61 board).

VC-20 BOARD (SOLDER SIDE)

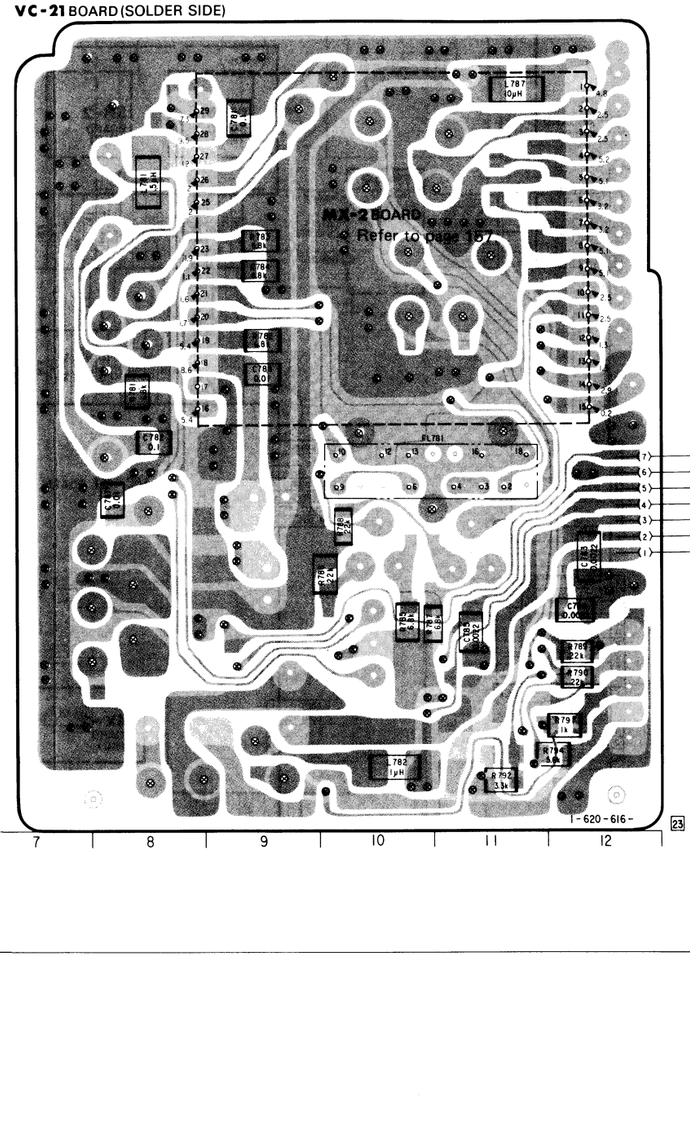


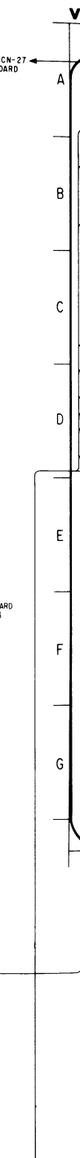
VC-21 BOARD (COMPONENT SIDE)

IC781	F-3
RV781	E-3
RV782	E-2
TP781	A-1
TP782	A-1
TP783	B-1
TP784	B-1
TP785	B-1
TP786	B-1
TP787	C-1
TP788	C-1
TP791	C-1
TP792	A-6
TP793	D-1
TP794	E-1



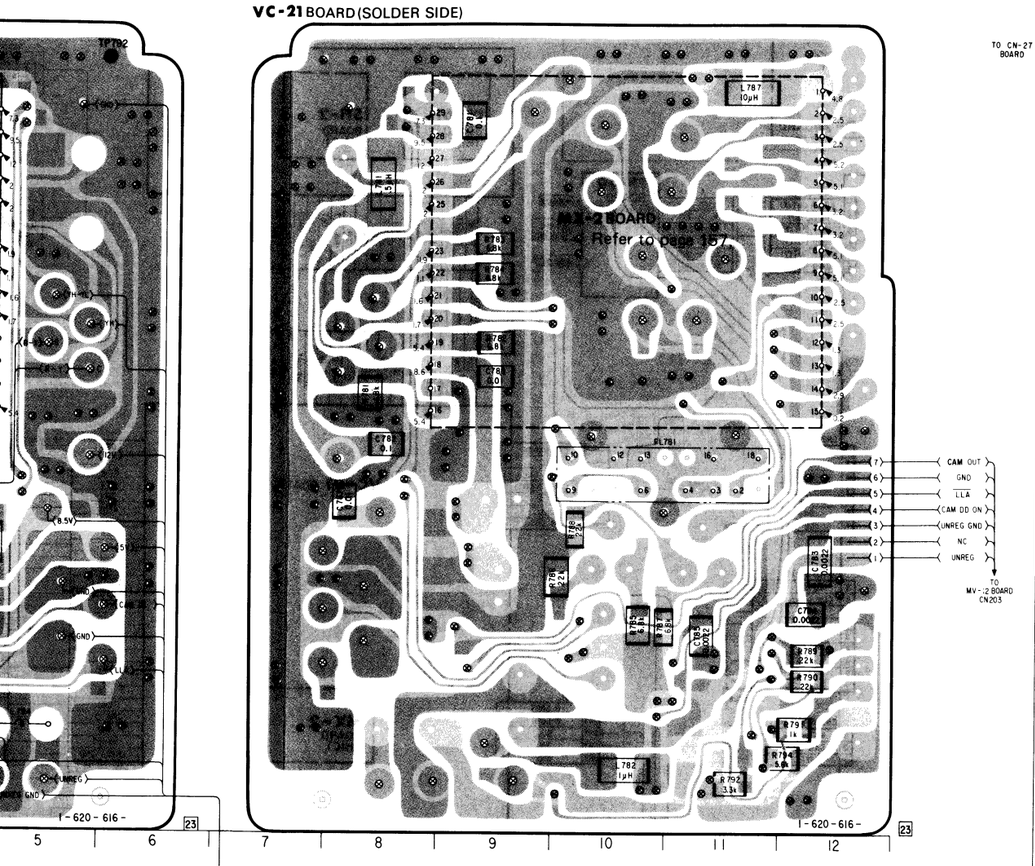
VC-21 BOARD (SOLDER SIDE)



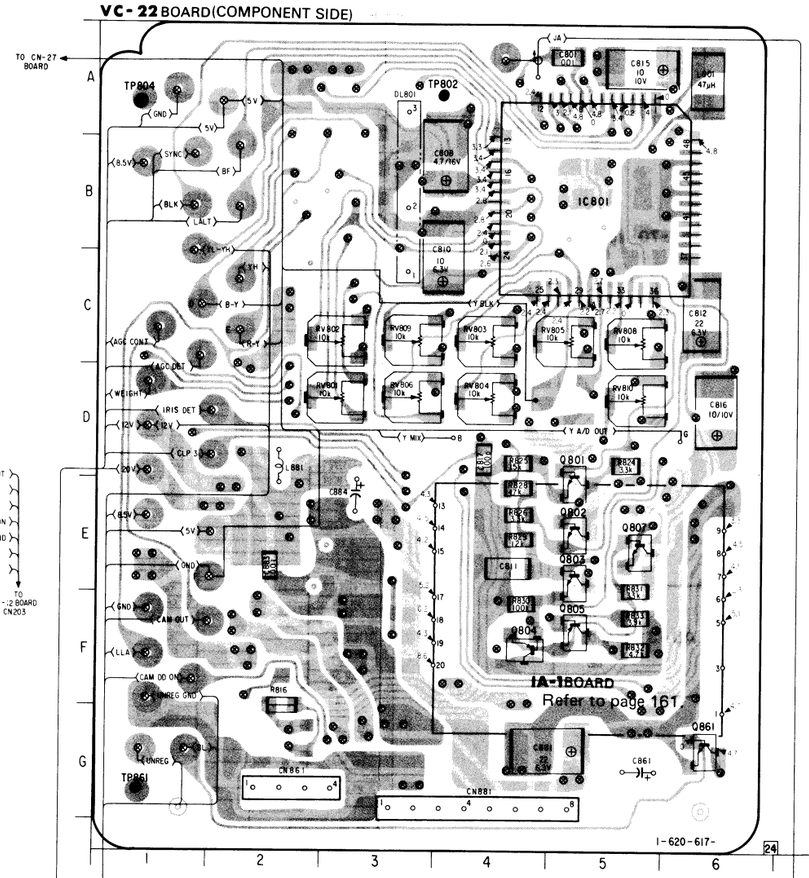


ger block" in page 86 when
ard, and CCD imager block
).

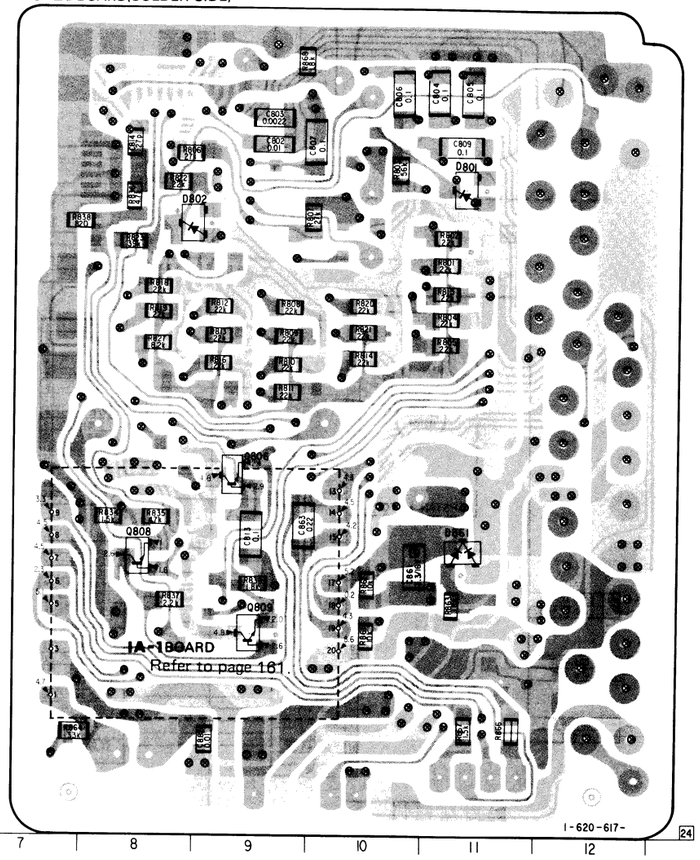
VC-21 BOARD(SOLDER SIDE)

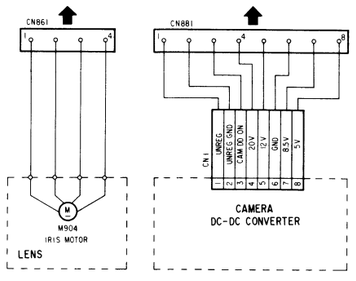


VC-22 BOARD(COMPONENT SIDE)



VC-22 BOARD(SOLDER SIDE)





D801	B·11	Q861	G·6
D802	B·8		
D861	E·11	RV801	D·3
		RV802	C·3
IC801	B·5	RV803	C·4
		RV804	D·4
Q801	E·5	RV805	C·5
Q802	E·5	RV806	D·3
Q803	E·5	RV808	C·5
Q804	F·4	RV809	C·3
Q805	F·5	RV810	D·5
Q806	E·9		
Q807	E·5	TP802	A·4
Q808	E·8	TP804	A·1
Q809	F·9	TP861	G·1

VC-20(CCD DRIVE, TIMING GENERATOR), VC-21(CAMERA MATRIX), VC-22(CAMERA ENCODER) SCHEMATIC DIAGRAM

—Ref. No. VC-20, VC-21 and VC-22 BOARDS: 1,000 Series—

Be sure to always read "Note on replacing the CCD imager block" in page 86 when replacing the VC-20 complete board, DT-61 complete board, and CCD imager block (IC701 on the VC-20 board and IC002 on the DT-61 board).

- **Signal path**
  - : REC Y Signal
  - : REC CHROMA Signal
  - : REC Y/CHROMA Signal

VC-20 BOARD

IC701 IU021-CK-AA CCD IMAGER

DT-61 BOARD Refer to page 149

SH-2 BOARD Refer to page 155.

VC-22 BOARD

IA-1 BOARD Refer to page 162.

IC731 CXD1030M SYNC

IC801 CX20055 ENCODER

VC-21 BOARD

MX-2 BOARD Refer to page 158

IC781 TL431CLPB 9V REG

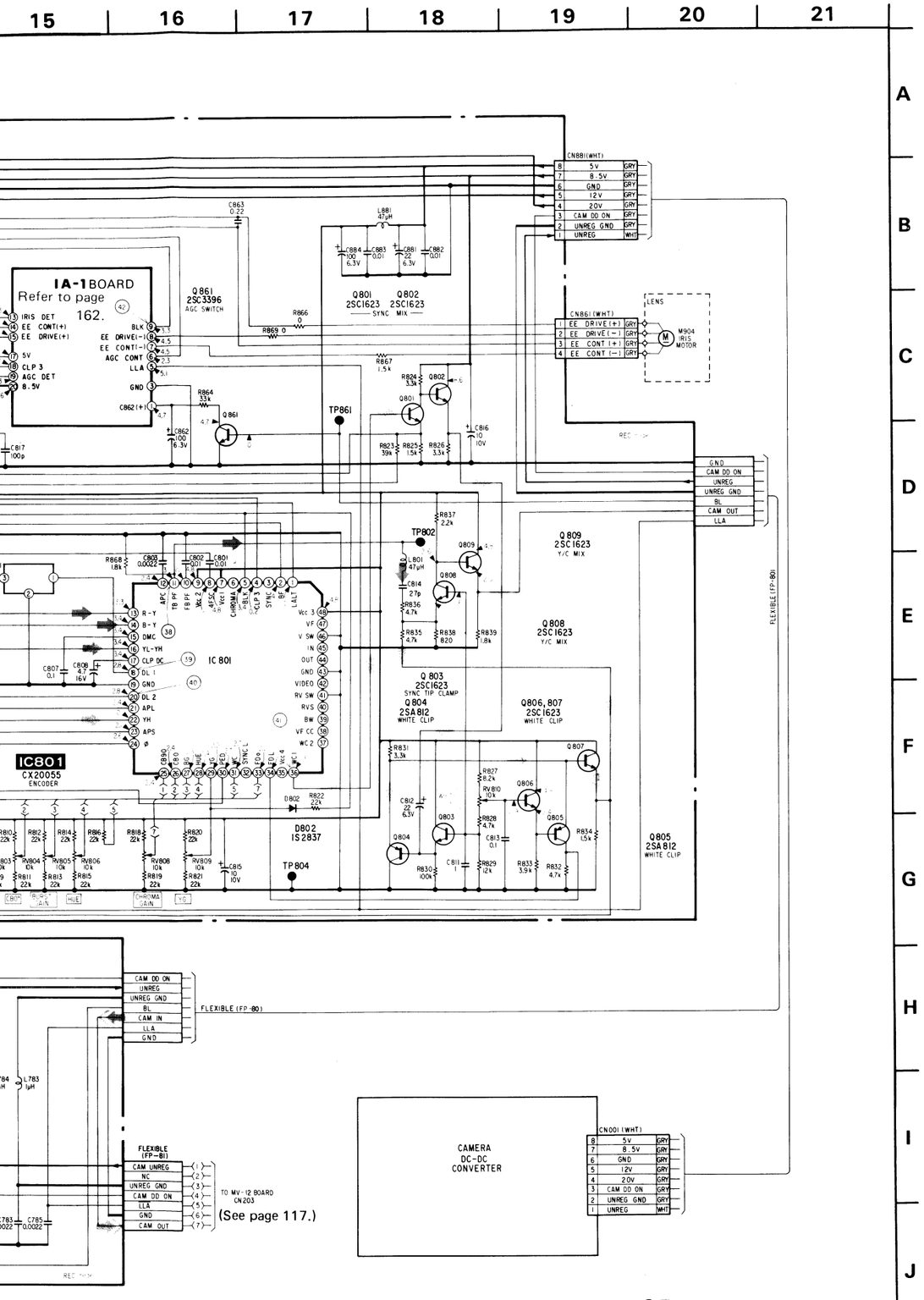
(See page 104.)

(See page 111.)

(See page 112.)

(See page 11

REC mode Marked ✱ is not able to measure the voltage of its position.

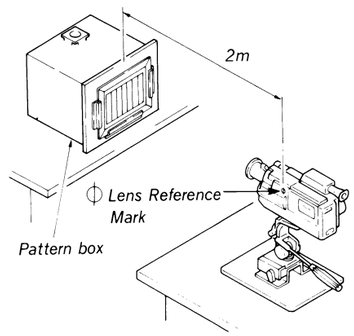


(See page 117.)

Note:

- Caution when replacing chip parts.
  New parts must be attached after removal of chip.
  Be careful not to heat the minus side of tantalum capacitor, because it is damaged by the head.
- All resistors are in ohms, 1/10W unless otherwise noted.
- All capacitors are in μF (p:pF) unless otherwise noted.
  50V or less are not indicated except for electrolytic capacitors.
- All variable and semi fixed resistors have characteristic curve B, unless otherwise noted.
- ▭ : panel designation.
- ⏦ : Nonflammable resistor
- ——— : B+ bus.
- ▭ : adjustment for repair.
- Voltage and waveform measuring conditions:
  (1) Sample object: Pattern box colour bars.
  (2) Voltage values: Relative to ground, measured with a DC digital multimeter (impedance 10M-ohm or more).

1. Connection



2. Adjust the zooming of camera and the tripod so that the output waveform of Fig. a and the picture of Fig. b can be obtain.

Fig.a Camera output waveform of No.⑦ terminal of FP-81 flexible board.

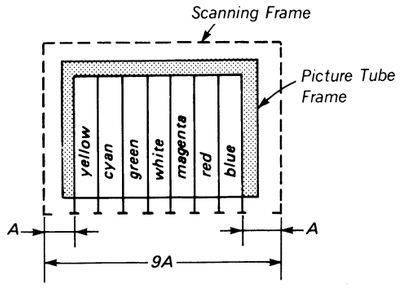
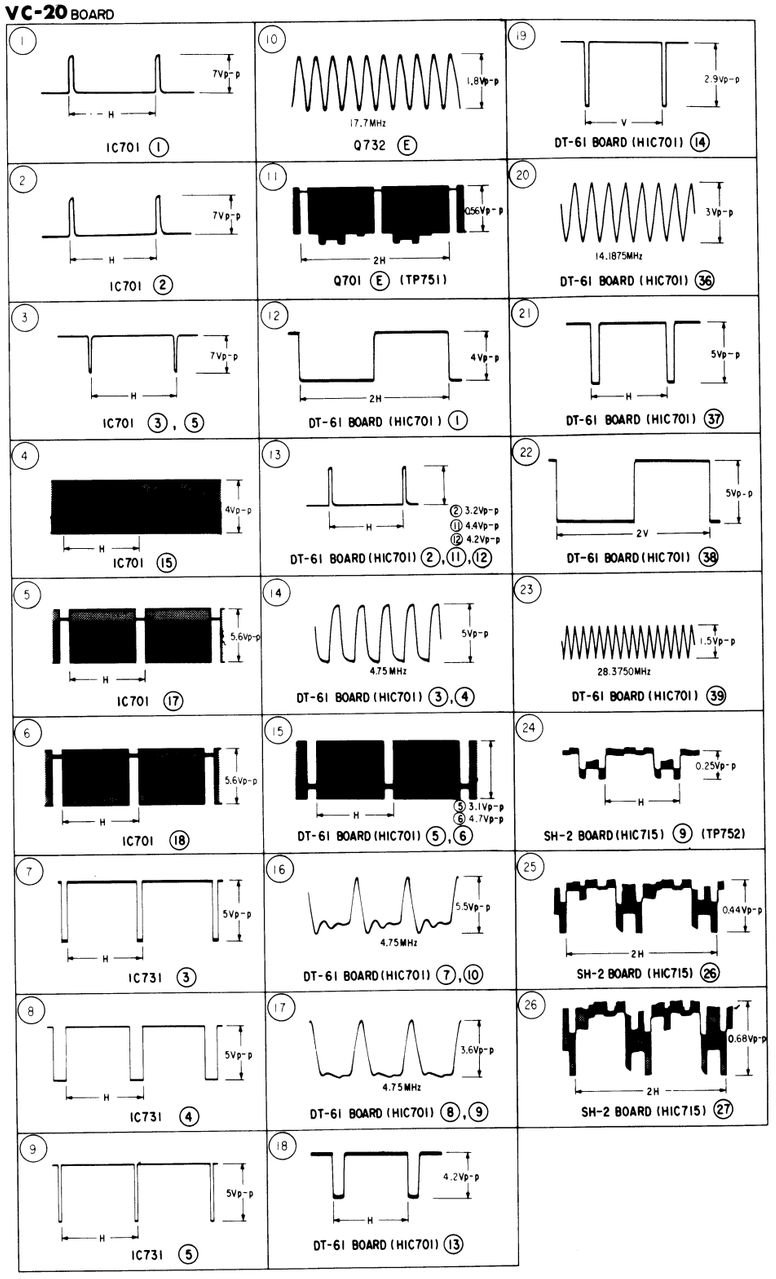
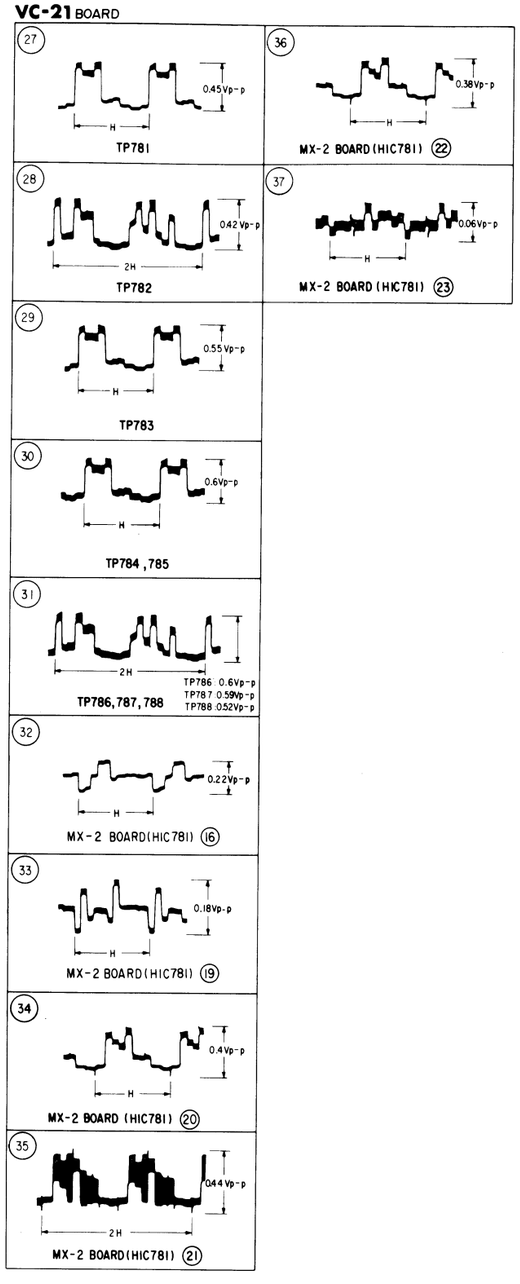


Fig. b Picture of TV monitor screen

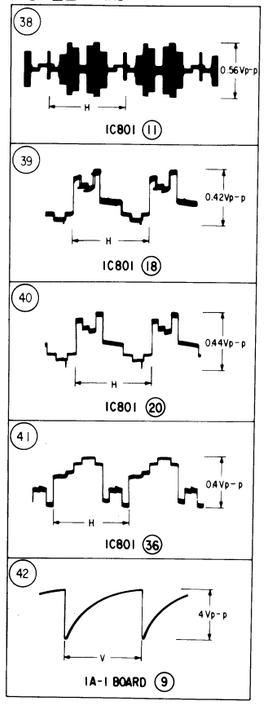
VC-20 BOARD



VC-21 BOARD



VC-22 BOARD



Note:

- ○— : indicates a lead wire mounted on the component side.
- ●— : indicates a lead wire mounted on the printed side.
- ⊗ : Through hole.
- ▒ : Pattern from the side which enables seeing.
- ▒ : Pattern of the rear side.
- ▒ : B+ pattern from the side which enables seeing.
- Digital transistor (AW-9: Q901, 902) transistor with resistor. Refer to the AW-9 board schematic diagram for digital transistor.

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

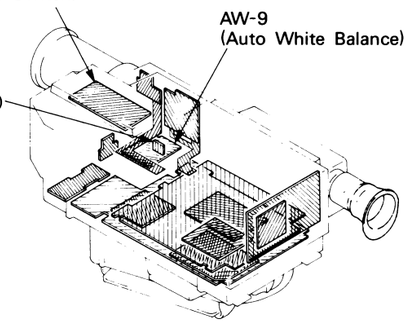
When indicating parts by reference number, please include the board name.

IC1	A-3
IC2	F-3
IC3	B-1
Q1	F-1
Q2	F-2
VR1	B-4
VR2	B-5
VR3	B-2

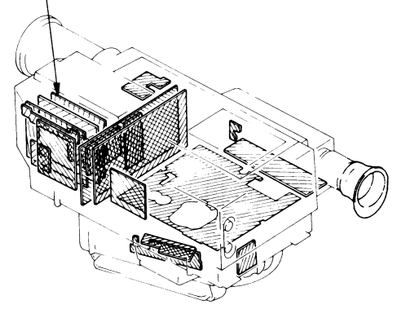
SW-71
(CAMERA/DATA Function Switch)

AW-9
(Auto White Balance)

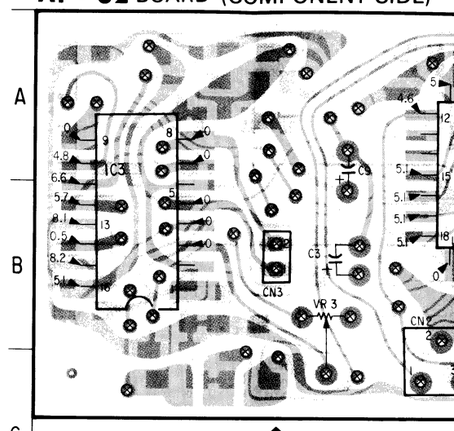
AS-20
(White Balance Sensor)



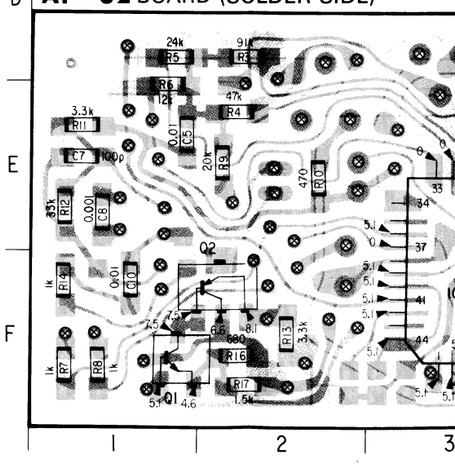
AF-32
(Auto Focus Control)



AF-32 BOARD (COMPONENT SIDE)

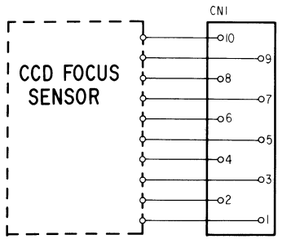


AF-32 BOARD (SOLDER SIDE)

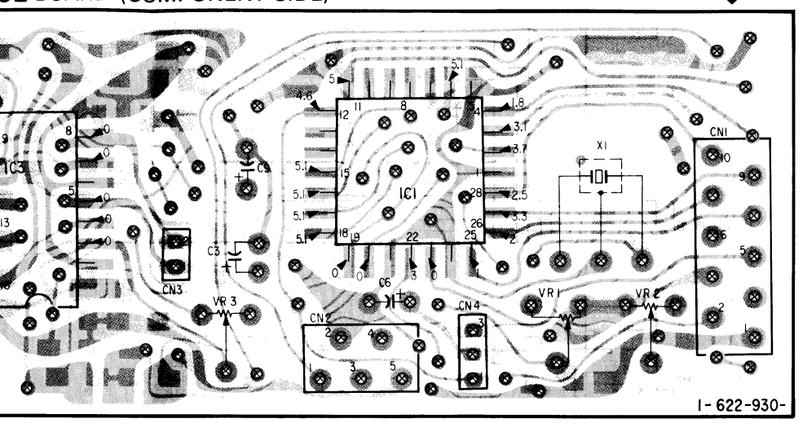


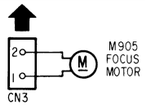
S CONTROL), AW-9(AUTO WHITE BALANCE), SW-71(CAMERA/DATA FUNCTION SWITCH), AS-20(WHITE BALANCE SENSOR) PRINTED WIRING BOARDS

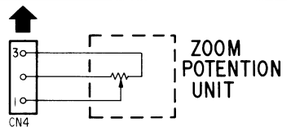
-9 and SW-71 BOARDS: 2,000 Series—



32 BOARD (COMPONENT SIDE)

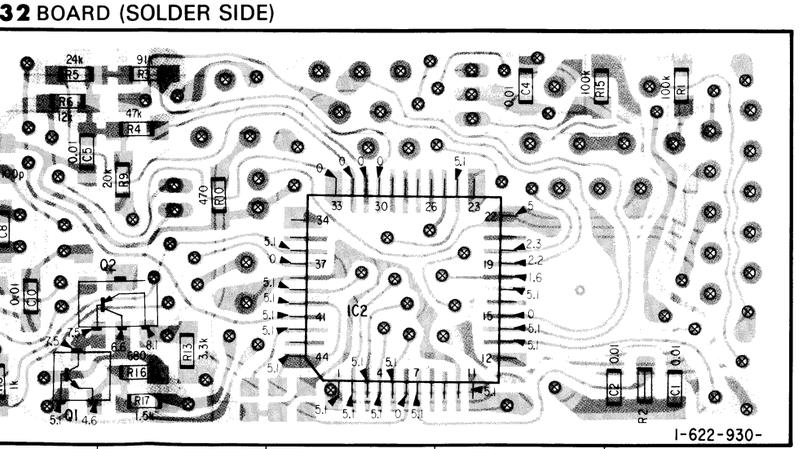






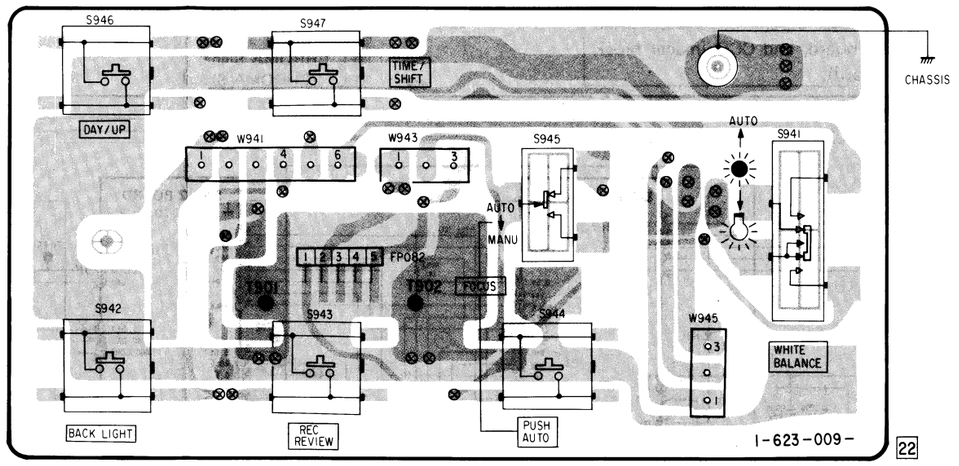
no mark : REC mode

32 BOARD (SOLDER SIDE)

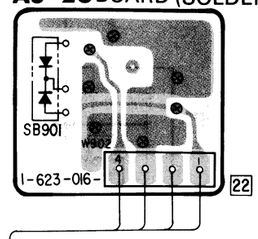


1 2 3 4 5

SW-71 BOARD (COMPONENT SIDE)

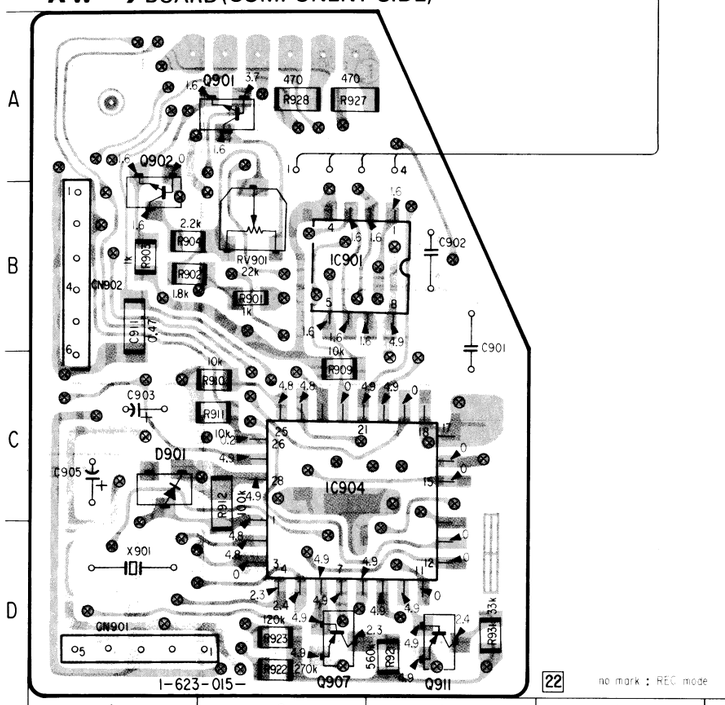


AS-20 BOARD (SOLDER SIDE)



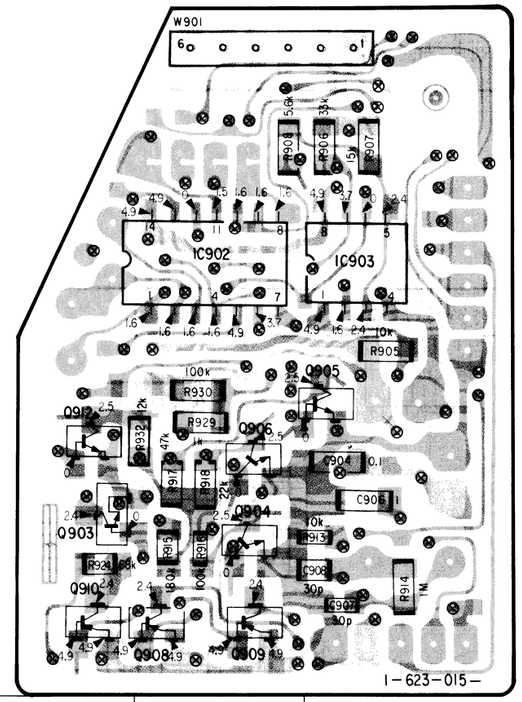
D901	C-1
IC901	B-3
IC902	B-6
IC903	B-7
IC904	C-2
Q901	A-2
Q902	B-1
Q903	D-5
Q904	D-6
Q905	C-7
Q906	C-6
Q907	D-2
Q908	D-6
R909	D-6
Q910	D-5
Q911	D-3
Q912	C-5
RV901	B-2

AW-9 BOARD (COMPONENT SIDE)



no mark : REC mode

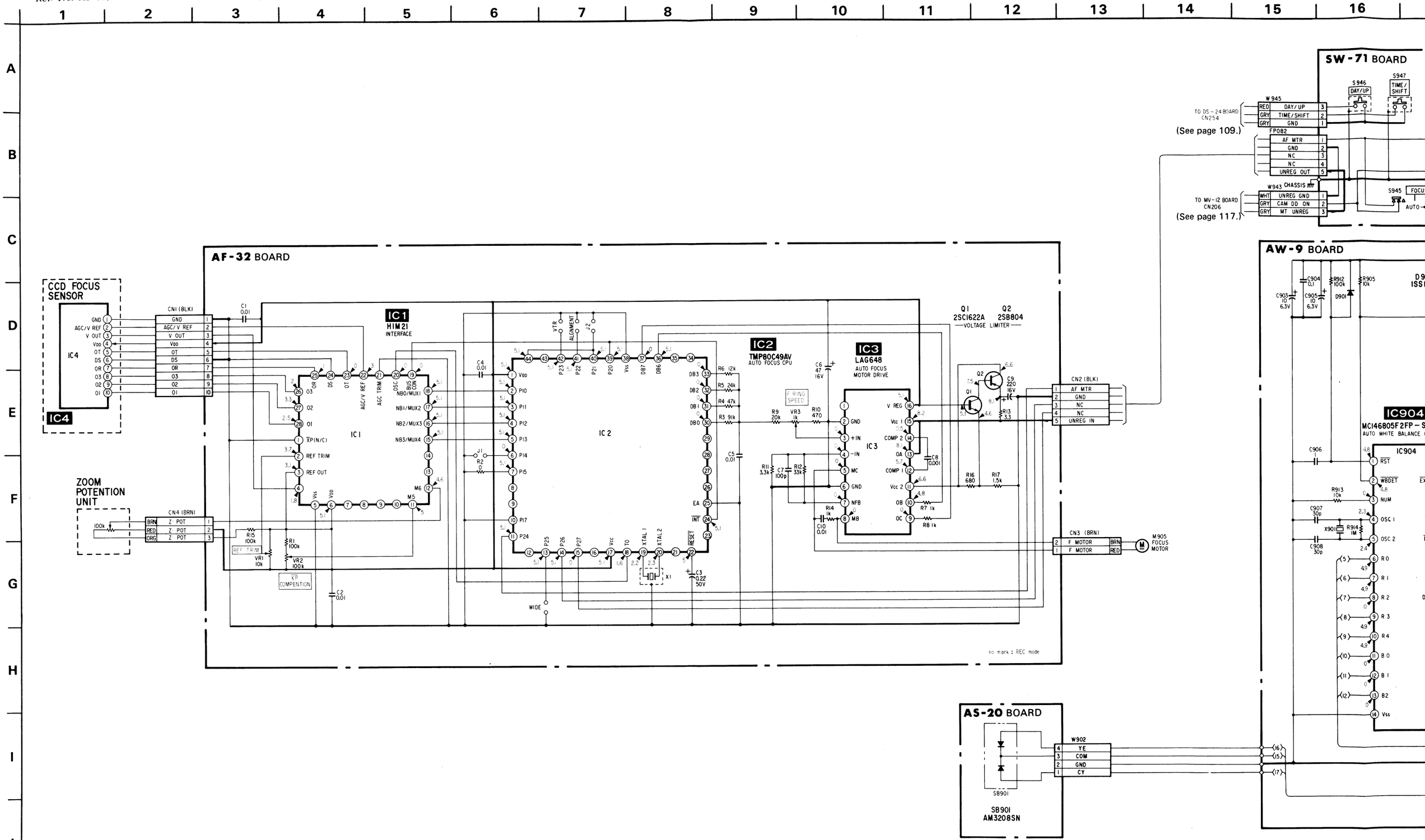
AW-9 BOARD (SOLDER SIDE)

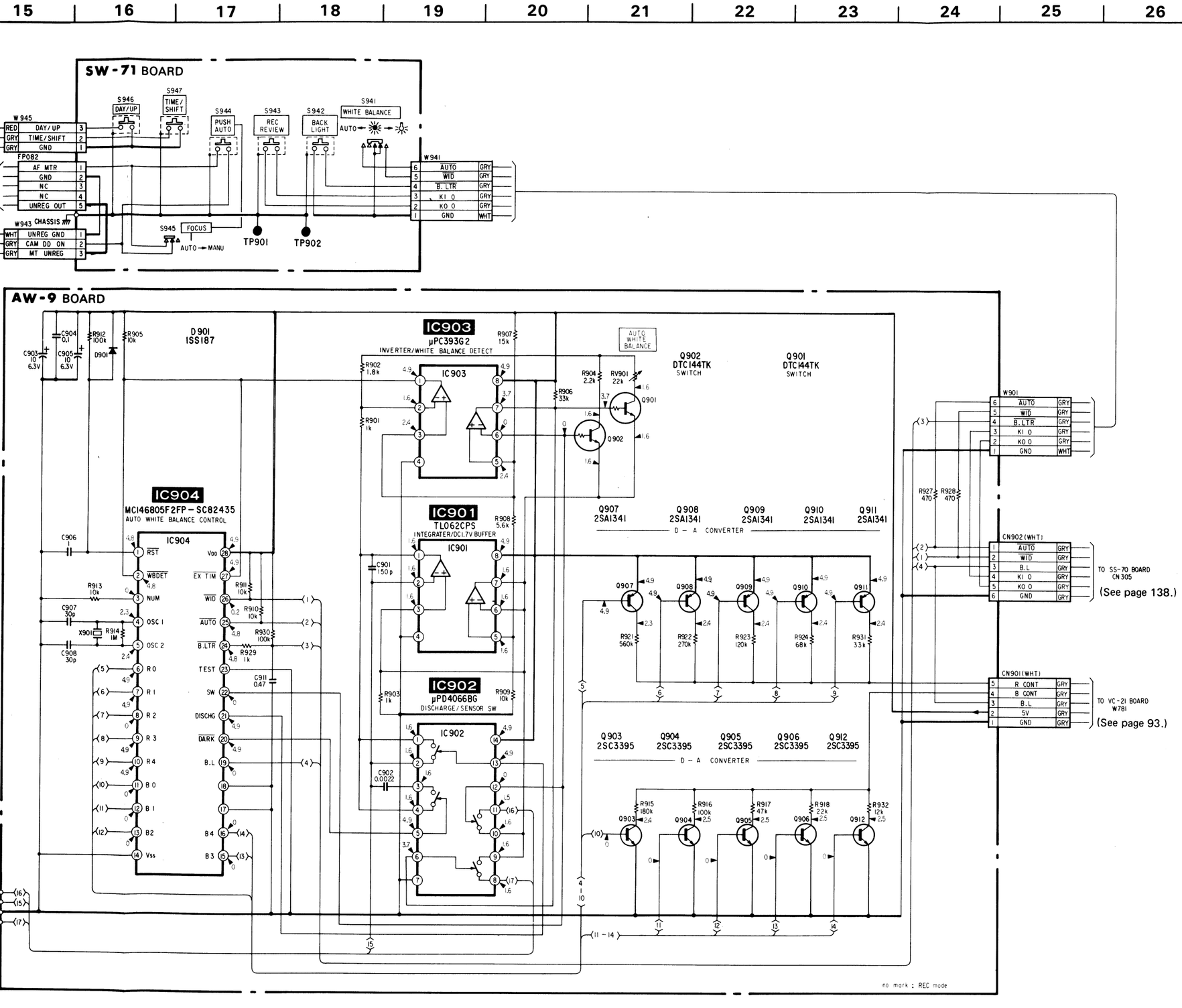


1 2 3 4 5 6 7

AF-32(AUTO FOCUS CONTROL), AW-9(AUTO WHITE BALANCE), SW-71(CAMERA/DATA FUNCTION SWITCH), AS-20(WHITE BALANCE SENSOR) SCHEMATIC DIAGRAM

—Ref: No. AF-32, AW-9 and SW-71 BOARDS: 2,000 Series—

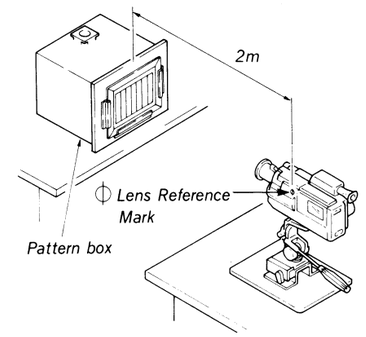




Note:

- Caution when replacing chip parts.
  New parts must be attached after removal of chip.
  Be careful not to heat the minus side of tantalum capacitor, because it is damaged by the head.
- All resistors are in ohms, 1/10W unless otherwise noted.
- All capacitors are in μF (p:pF) unless otherwise noted.
  50V or less are not indicated except for electrolytic capacitors.
- All variable and semi fixed resistors have characteristic curve B, unless otherwise noted.
- ▭ : panel designation.
- ⏦ : Nonflammable resistor
- ——— : B+ bus.
- ▭ : adjustment for repair.
- Voltage and waveform measuring conditions:
  (1) Sample object: Pattern box colour bars.
  (2) Voltage values: Relative to ground, measured with a DC digital multimeter (impedance 10M-ohm or more).

1. Connection



2. Adjust the zooming of camera and the tripod so that the output waveform of Fig. a and the picture of Fig. b can be obtain.

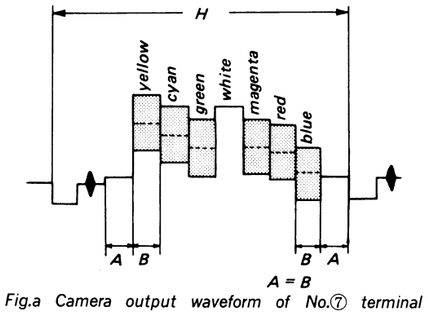


Fig.a Camera output waveform of No.⑦ terminal of FP-81 flexible board.

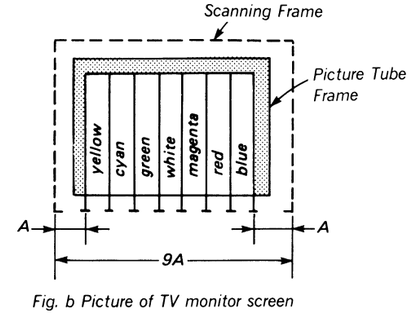


Fig. b Picture of TV monitor screen

DATA DISPLAY, DIGITAL TITLER

DS-24 (DATA DISPLAY, DIGITAL TITLER), RZ-1 (ZOOM DRIVER), CN-27 (RELAY), SK-21 (DIGITAL TITLER FUNCTION SWITCH),

—Ref. No. DS-24, CN-27 and SK-21 BOARDS: 3,000 Series, RZ-1 BOARD : 4,000 Series—

Note:

- ○— : indicates a lead wire mounted on the component side.
- ●— : indicates a lead wire mounted on the printed side.
- ⊗ : Through hole.
- ▩ : Pattern from the side which enables seeing.
- ▩ : Pattern of the rear side.
- ▩ : B+ pattern from the side which enables seeing.
- **Digital transistor (DS-24: Q113, Q114, Q116, Q117, RZ-1: Q119, Q121, Q123) transistor with resistor. Refer to the DS-24 and RZ-1 boards schematic diagram for digital transistor.**

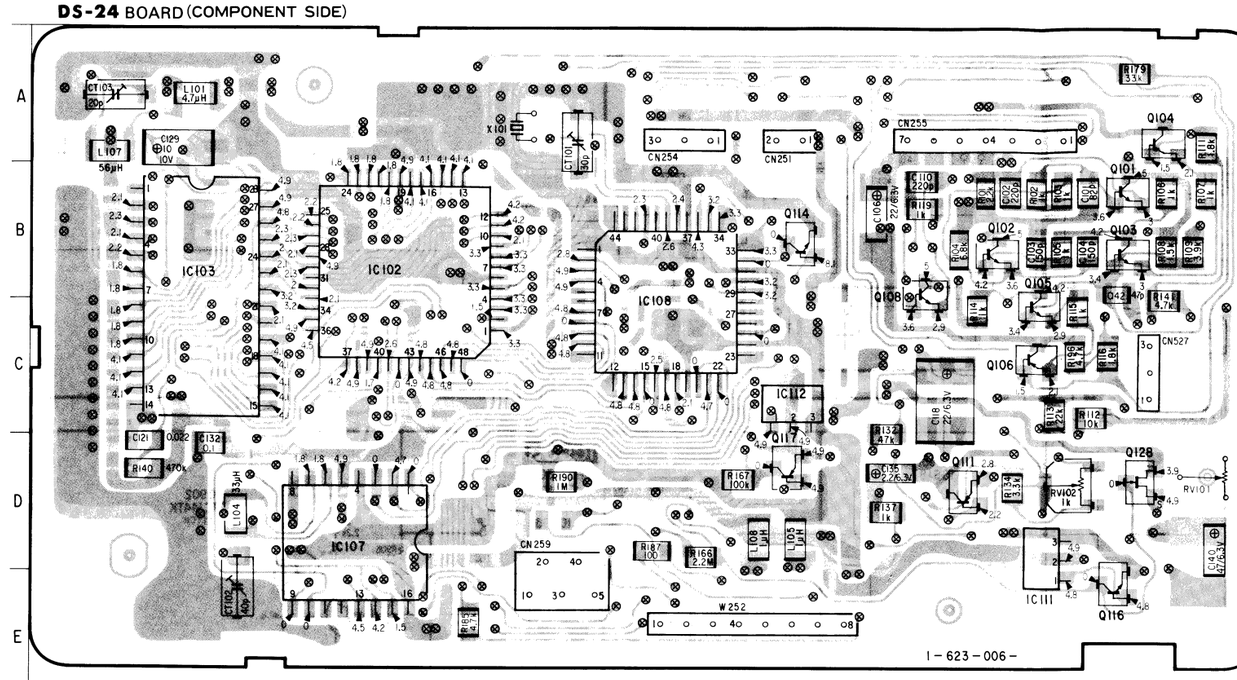
Caution:	
Pattern face side: (Solder Side)	Parts on the pattern face side seen from the pattern face are indicated.
Parts face side: (Component Side)	Parts on the parts face side seen from the parts face are indicated.

Measure the voltage and waveform of the DS-24 board by superimposing and turning the screen totally white.

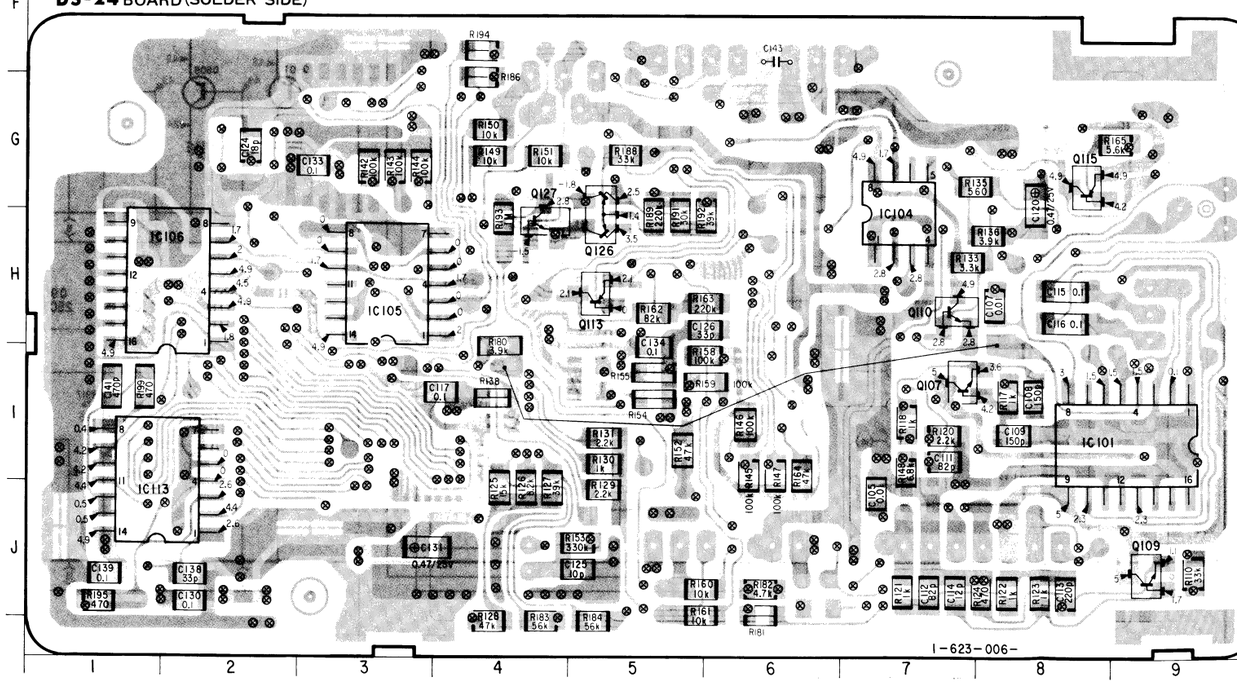
When indicating parts by reference number, please include the board name.

CT101	A-5
CT102	E-2
CT103	A-1
IC101	I-9
IC102	B-3
IC103	B-2
IC104	G-7
IC105	H-3
IC106	H-1
IC107	D-3
IC108	B-5
IC111	D-8
IC112	C-6
IC113	I-1
Q101	B-9
Q102	B-8
Q103	B-9
Q104	A-9
Q105	B-8
Q106	C-8
Q107	I-7
Q108	B-7
Q109	J-9
Q110	H-7
Q111	D-7
Q113	H-5
Q114	B-6
Q115	G-8
Q116	D-9
Q117	D-6
Q126	G-5
Q127	H-4
Q128	D-9
RV101	D-9
RV102	D-8

DS-24 BOARD (COMPONENT SIDE)

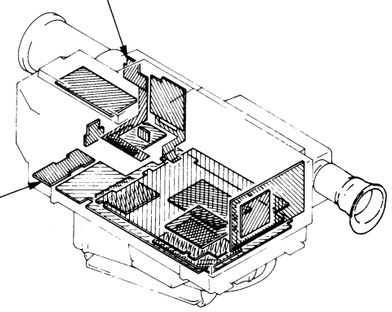


DS-24 BOARD (SOLDER SIDE)



SK-21
(Digital Titler Function Switch)

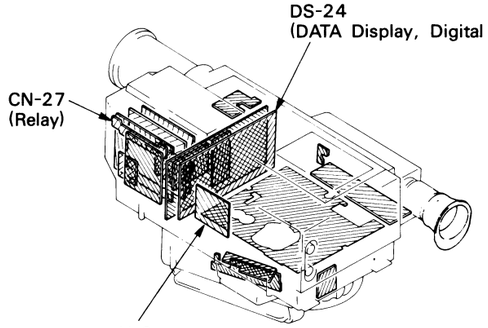
RZ-1
(Zoom Driver)



DS-24
(DATA Display, Digital Titler)

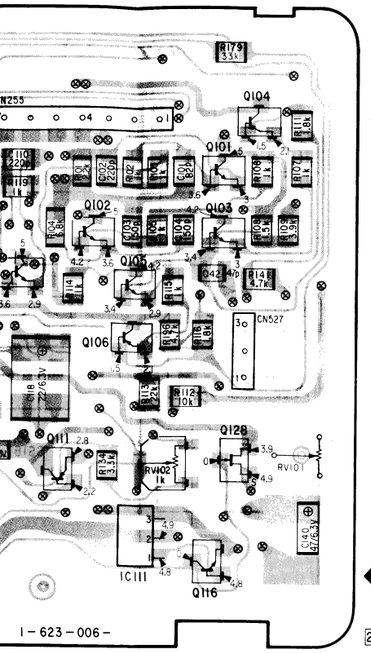
CN-27
(Relay)

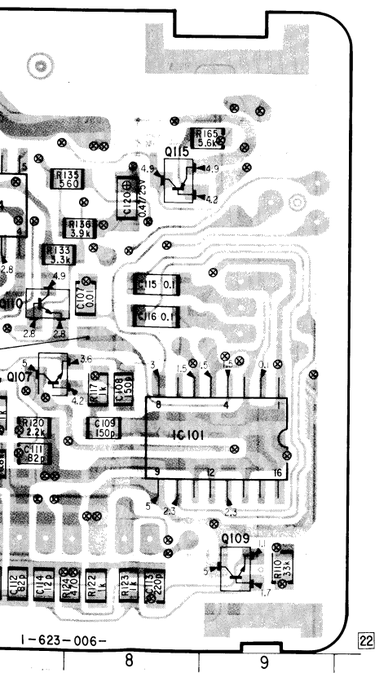
LI-3
(Lithium Battery Holder)



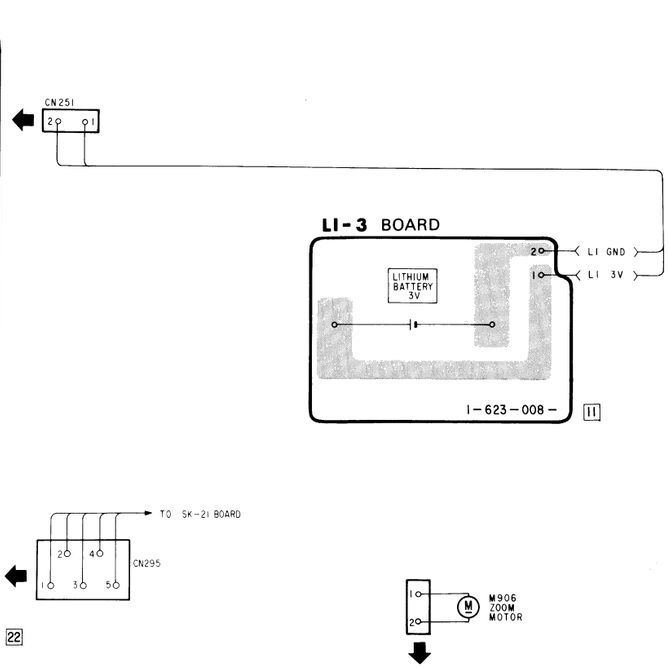
DATA DISPLAY, DIGITAL TITLER

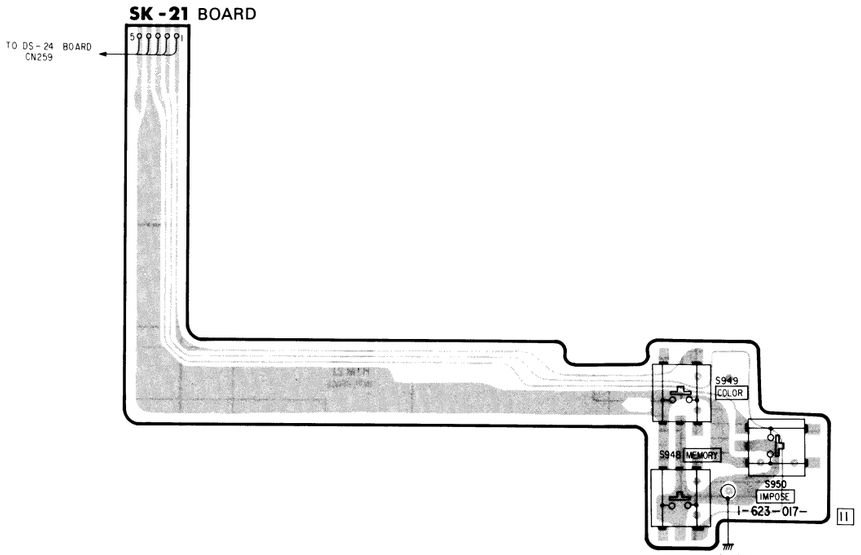
ITAL TITLER FUNCTION SWITCH), LI-3(LITHIUM BATTERY HOLDER) PRINTED WIRING BOARDS

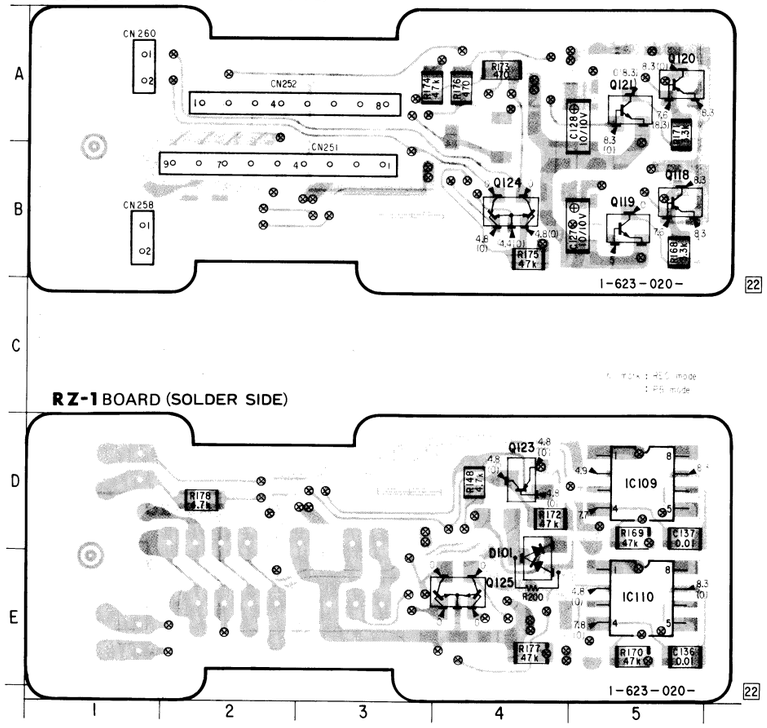


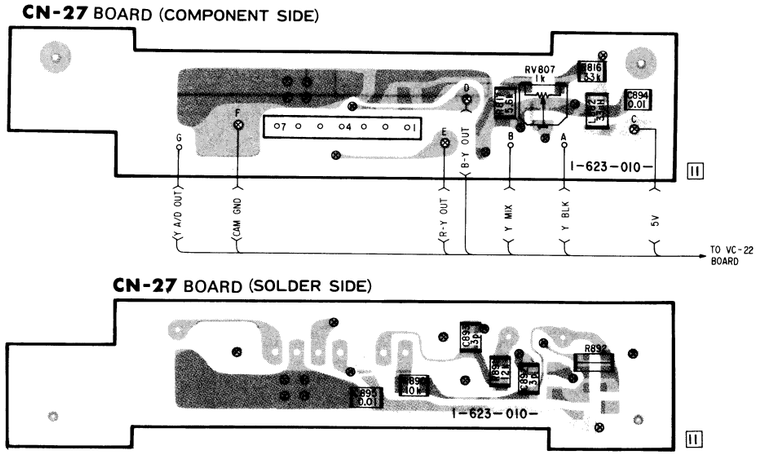


D101	E-4
IC109	D-5
IC110	E-5
Q118	B-5
Q119	B-5
Q120	A-5
Q121	A-5
Q123	D-4
Q124	B-4
Q125	E-4





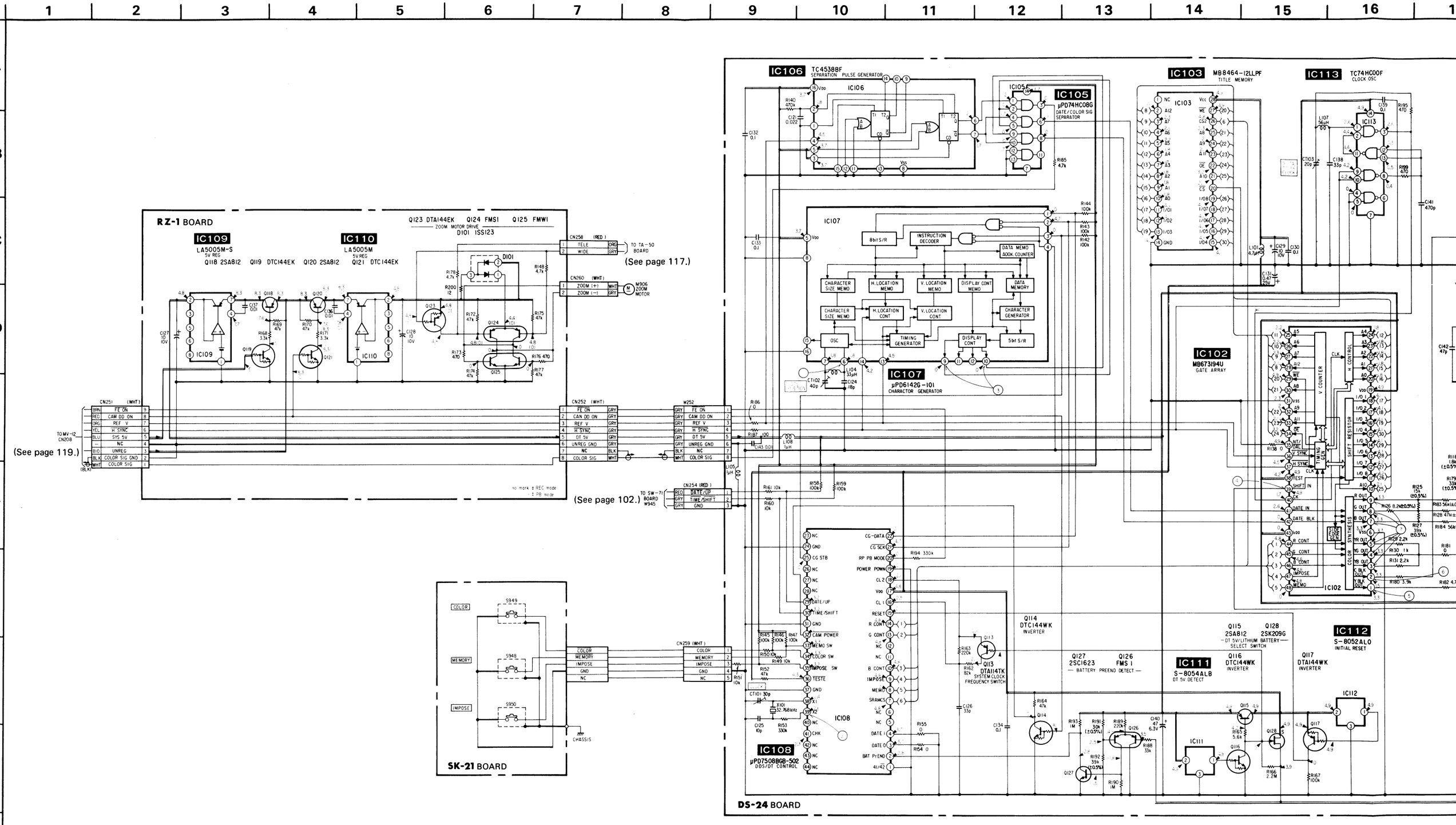


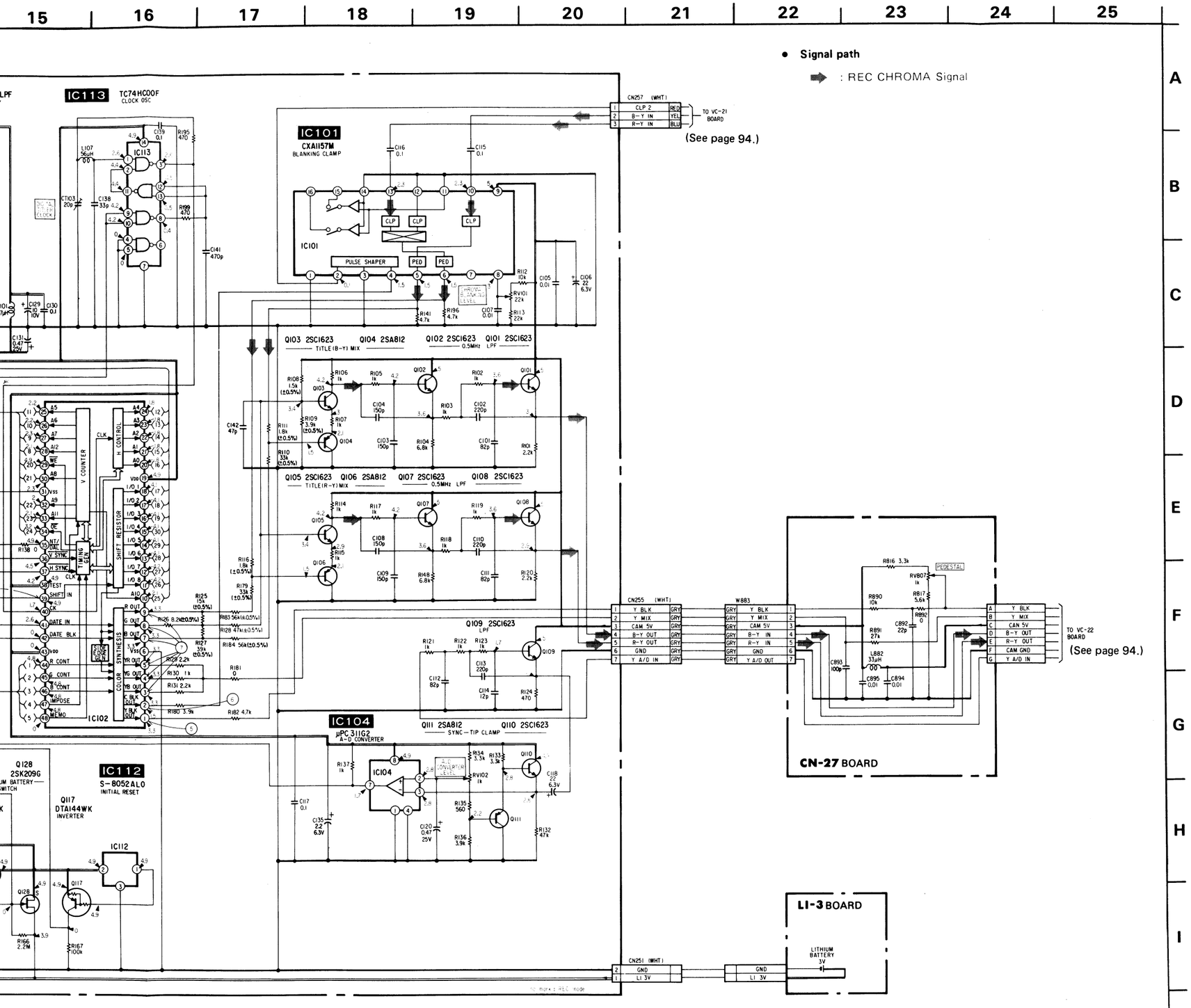


DATA DISPLAY, DIGITAL TITLER

DS-24(DATA DISPLAY, DIGITAL TITLER), RZ-1 (ZOOM DRIVER), CN-27(RELAY), SK-21 (DIGITAL TITLER FUNCTION SWITCH), LI-3(LITHIUM BATTERY HOLDER) SCHEMATIC DIAGRAM

—Ref. No. DS-24, CN-27 and SK-21 BOARDS: 3,000 Series, RZ-1 BOARD : 4,000 Series—

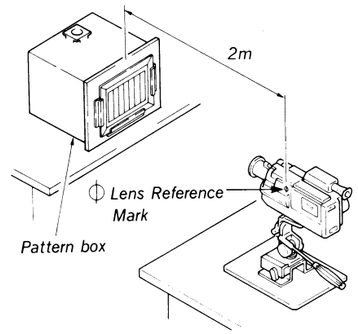




Note:

- Caution when replacing chip parts.
  New parts must be attached after removal of chip.
  Be careful not to heat the minus side of tantalum capacitor, because it is damaged by the head.
- All resistors are in ohms, 1/10W unless otherwise noted.
- All capacitors are in μF (p:pF) unless otherwise noted.
  50V or less are not indicated except for electrolytic capacitors.
- All variable and semi fixed resistors have characteristic curve B, unless otherwise noted.
- ▭ : panel designation.
- ▭ : Nonflammable resistor
- ——— : B+ bus.
- ▭ : adjustment for repair.
- Measure the voltage and waveform of the DS-24 board by superimposing and turning the screen totally white.
- Voltage and waveform measuring conditions:
  (1) Sample object: Pattern box colour bars.
  (2) Voltage values: Relative to ground, measured with a DC digital multimeter (impedance 10M-ohm or more).

1. Connection



2. Adjust the zooming of camera and the tripod so that the output waveform of Fig. a and the picture of Fig. b can be obtain.

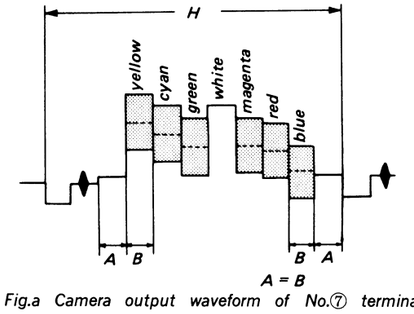


Fig.a Camera output waveform of No.⑦ terminal of FP-81 flexible board.

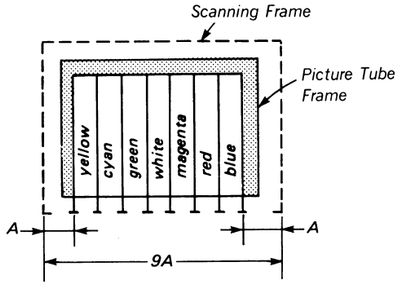
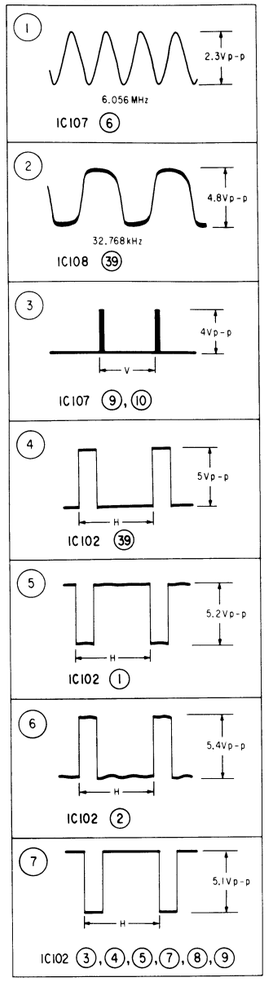


Fig. b Picture of TV monitor screen

DS-24 BOARD



MV-12 (VIDEO SIGNAL PROCESS), MR-8(REC/PB AMP), TA-50(RELAY TERMINAL), RC-21(START/STOP CAMERA ON SWITCH), FH-14(POWER), FP-49(OUTPUT JACK

—Ref. No. MV-12, MR-8, TA-50, RC-21, FH-14 and FP-49 BOARDS : 5,000 series—

Note:

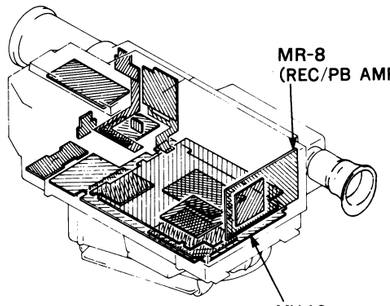
- ○— : indicates a lead wire mounted on the component side.
- ●— : indicates a lead wire mounted on the printed side.
- ⊗ : Through hole.
- ▩ : Pattern from the side which enables seeing.
- ▩ : Pattern of the rear side.
- ▩ : B+ pattern from the side which enables seeing.
- **Digital transistor (MR-8: Q151) transistor with resistor. Refer to the MR-8 board schematic diagram for digital transistor.**

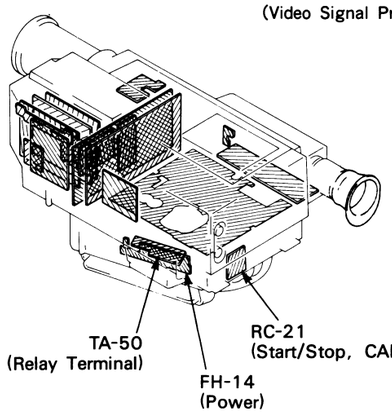
Caution:

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

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

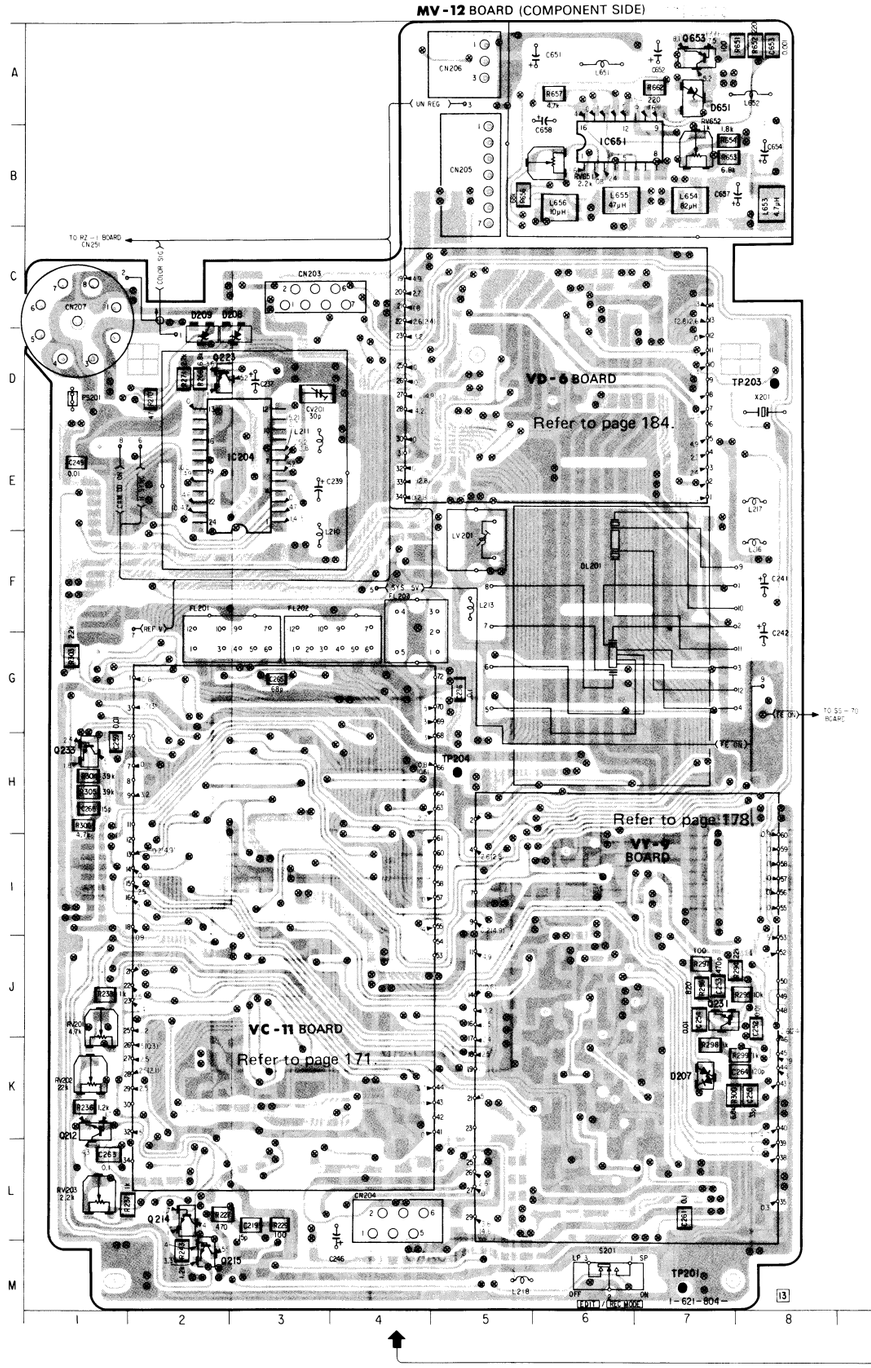
When indicating parts by reference number, please include the board name.



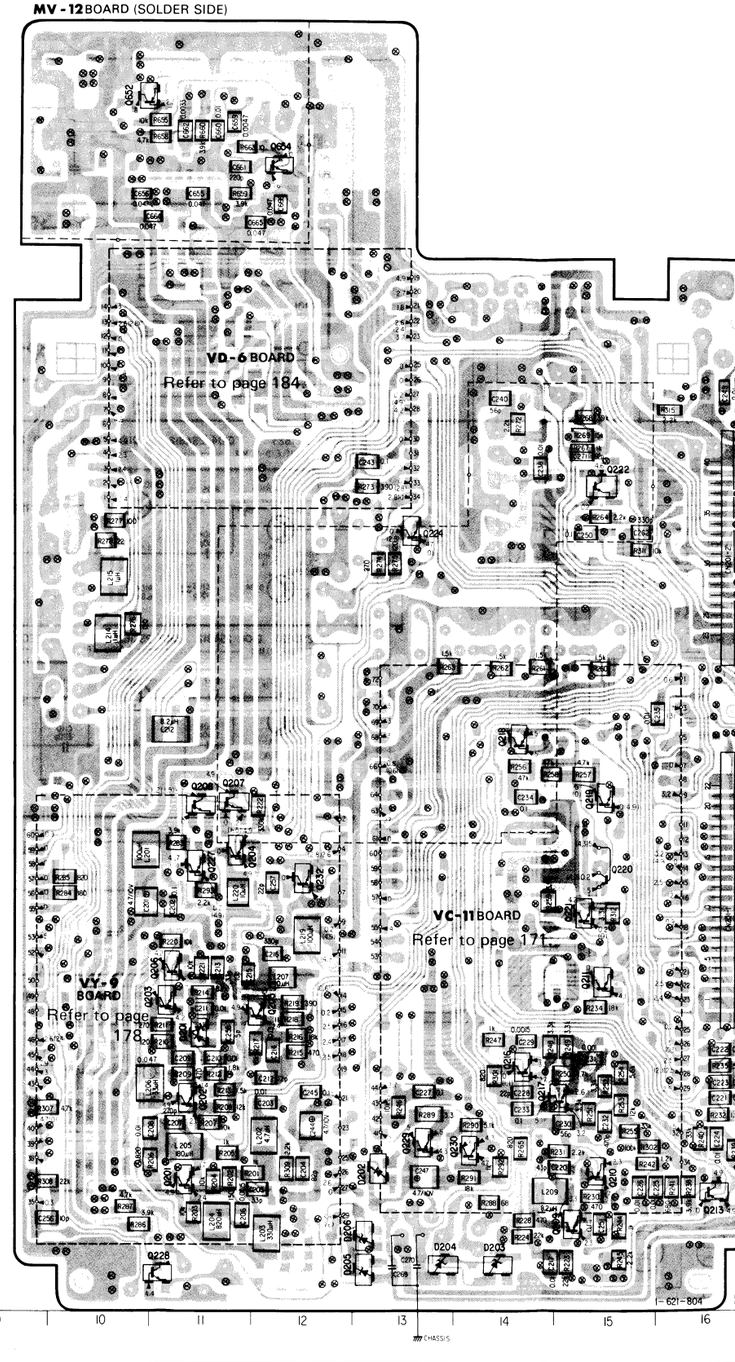


CV201	D-3
D201	J-11
D202	L-13
D203	M-14
D204	M-13
D205	M-13
D206	L-13
D207	K-7
D208	D-2
D209	D-2
D651	A-7
IC204	E-3
IC651	B-6
LV201	F-5
Q201	L-11
Q202	K-11
Q203	J-11
Q204	I-11
Q205	J-12
Q206	J-11
Q207	H-11
Q208	H-11
Q209	L-15
Q210	L-15
Q211	J-15
Q212	K-1
Q213	L-16
Q214	L-2
Q215	M-2
Q216	K-14
Q217	K-15
Q218	H-14
Q219	H-15
Q220	I-15
Q221	I-15
Q222	E-15
Q223	D-2
Q224	F-13
Q227	I-11
Q228	M-11
Q229	L-13
Q230	L-14
Q231	J-7
Q232	I-12
Q233	H-1
Q652	A-10
Q653	A-7
Q654	B-12
RV201	J-1
RV202	K-1
RV203	L-1
RV651	B-6
RV652	B-7
TP201	M-7
TP203	D-8
TP204	H-5

MV-12 BOARD (COMPONENT SIDE)



MV-12 BOARD (SOLDER SIDE)



FH-14(POWER), FP-49(OUTPUT JACK) PRINTED WIRING BOARDS

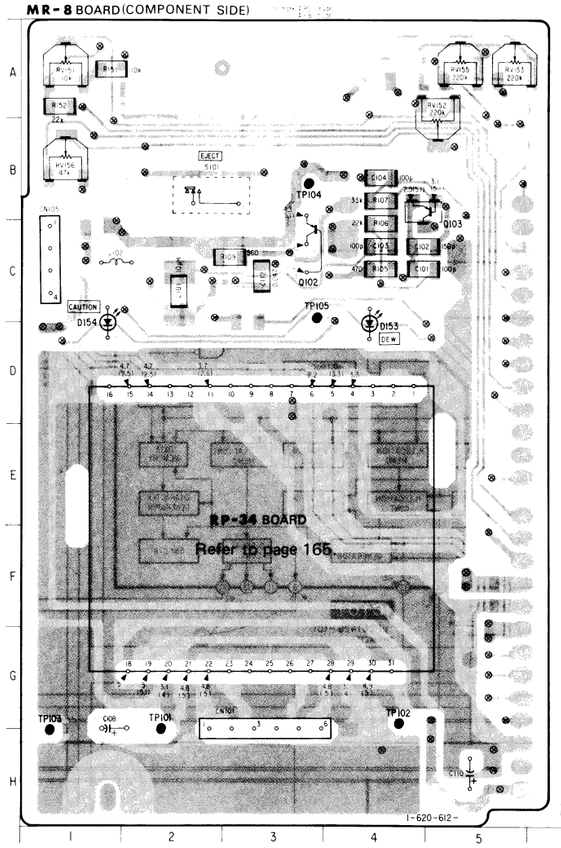
D153 D-4
D154 D-1

Q101 C-10
Q102 C-3
Q103 B-5
Q151 A-7

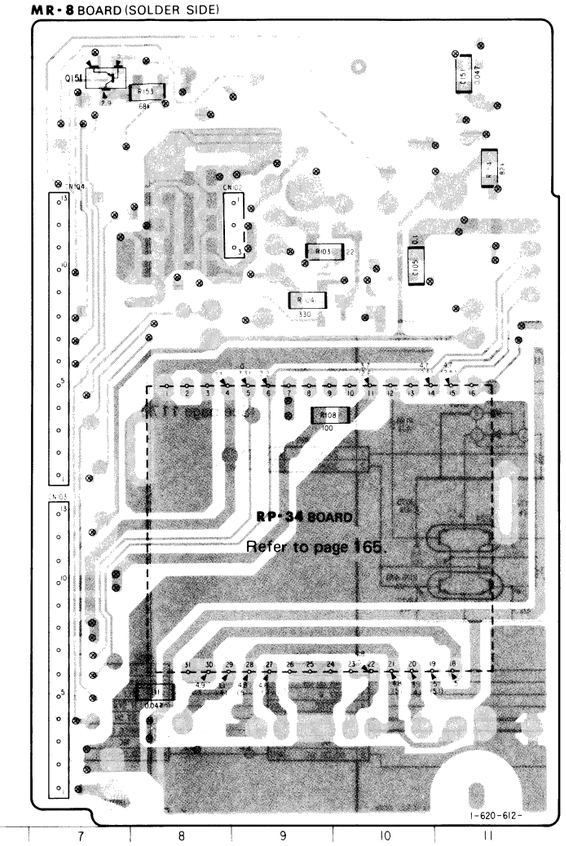
RV151 A-1
RV152 A-5
RV153 A-5
RV155 A-5
RV156 B-1

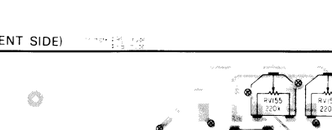
TP101 H-2
TP102 G-4
TP103 H-1
TP104 B-3
TP105 C-3

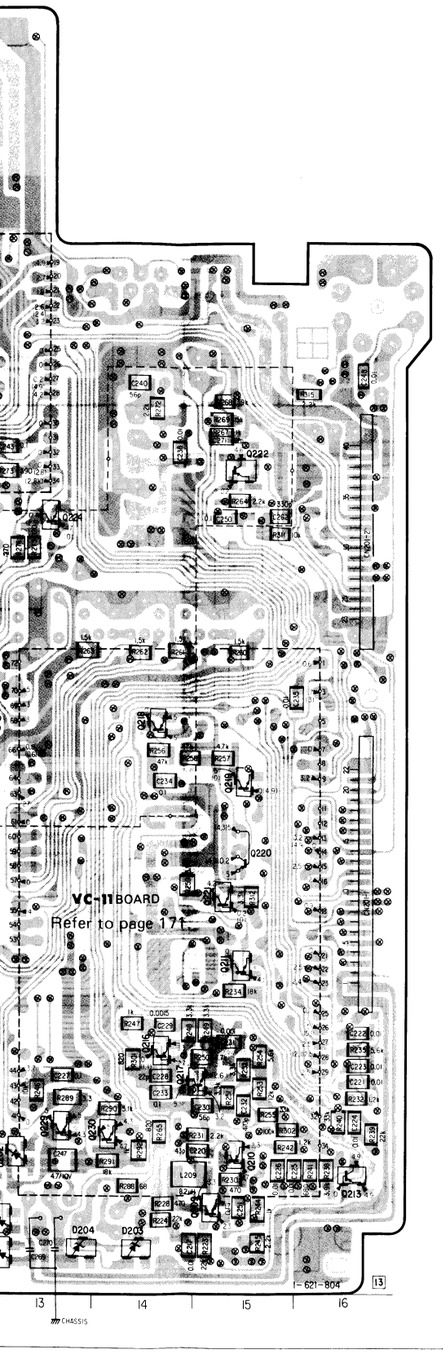
MR-8 BOARD (COMPONENT SIDE)

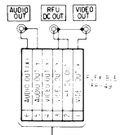


MR-8 BOARD (SOLDER SIDE)



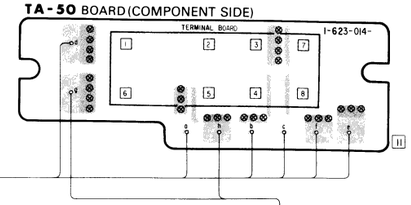




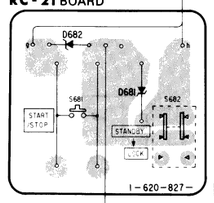


GRIP

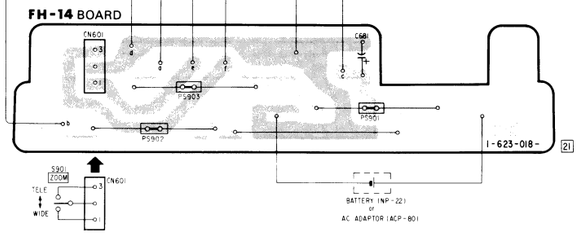
TA-50 BOARD (COMPONENT SIDE)



RC-21 BOARD



FH-14 BOARD



MV-12 (VIDEO SIGNAL PROCESS), MR-8(REC/PB AMP), TA-50(RELAY TERMINAL), RC-21(START/STOP CAMERA ON SWITCH), FH-14(POWER), FP-49(OUTPUT JACK) SCHEMATIC DIAGRAM

—Ref. No. MV-12, MR-8, TA-50, RC-21, FH-14 and FP-49 BOARDS : 5,000 series—

GRIP

RC-21 BOARD

S681 START/STOP

S682 LOCK ↔ STANDBY

D681 HZ13EB2 D682 HZ13EB2

g REC SW BLU
h CAM ON WHT

SW GND BLK

SW GND BLK

PS903 1.25A
PS902 1.6A
PS901 1.25A

BATTERY INP-221 OR AC ADAPTOR (ACP-180)

RED BATT (+)
BLK BATT (-)

C681 220 16V

e DD UNREG RED
f MT UNREG YEL
c CAM UNREG ORG
d UNREG GND BLK

S901 ZOOM TELE ↑ WIDE ↓

CN601
BRN ZOOM TELE 1
RED GND 2
ORG ZOOM WIDE 3

FH-14 BOARD

TA-50 BOARD

TERMINAL

RED DD UNREG 9
YEL MT UNREG 5
ORG CAM UNREG 1
BLK UNREG GND 4
ORG ZOOM TELE 7
GRY ZOOM WIDE 8
BLU REC SW 6
WHT CAM ON 2

TERMINAL

UNREG GND BLK
REC SW BLU
DD UNREG RED
CAM ON WHT
CAM UNREG ORG
MT UNREG YEL
ZOOM TELE ORG
ZOOM WIDE GRY

TO R2-1 BOARD CN258

CN205
BLU REC SW 7
WHT CAM ON 6
YEL MT UNREG 5
ORG CAM UNREG 4
RED DD UNREG 3
BLK UNREG GND 2
BLK UNREG GND 1

(See page 109.)

CN206
TO SW-71 BOARD W943
GRY MT UNREG 3
GRY CAM DD ON 2
WHT UNREG GND 1

(See page 102.)

CN203
CAM UNREG 1
LLA 2
UNREG GND 3
CAN DD ON 4
LLA 5
GND 6
CAM IN (1X) 7

TO VC-21 BOARD

(See page 95.)

MV-12 BOARD

Q209 2SC1623 EQ
Q210 2SA1122 EQ
Q211 2SC3395 ATF
Q212 2SC3053 CAMERA/ATF MIX
Q213 2SA1341 GAIN SWITCH
Q214 2SC3053 Y/C MIX
Q215 2SC3053 Y/C MIX

Q216 2SA1122C LPF
Q217 2SC1623 LPF
Q218 2SA1341 INVERTER
Q219 2SC3396 PB 5V SWITCH
Q220 2SA1175 PB 5V SWITCH
Q233 2SC1623 PB C AMP

VY-9 BOARD

Refer to page 181.

Refer to page 175.

VC-11 BOARD

TP201

D207 1SS123

Q231 2SC1623 RF AMP
Q227 2SC3395 INVERTER

Q204 2SA1341 CLIP/REC MUTE NOISE REDUCE

Q201 2SC1623 BUFFER

Q207 2SC1623 JOG NOISE SWITCH

Q208

Q652 2SA1342 INVERTER
Q653 2SB1121 DC-DC CONVERTER
D651 E100S03
Q202 2SC1623 SOFT LIMIT
Q203 2SC3395 INVERTER
D201 1SS123
Q205 2SC1623 SOFT LIMITER
Q232 2SC3395 INVERTER
Q206 2SC3395 TAPE2/TAPE1 SWITCH
Q208 2SC3395 JOG NOISE SWITCH

IC651 TL1451ACNS DC-DC CONVERTER

Q654 2SC3396 INVERTER

IC651

DC-DC CONVERTER FREQUENCY

Q224 2SC3395 INVERTER

VD-6 BOARD

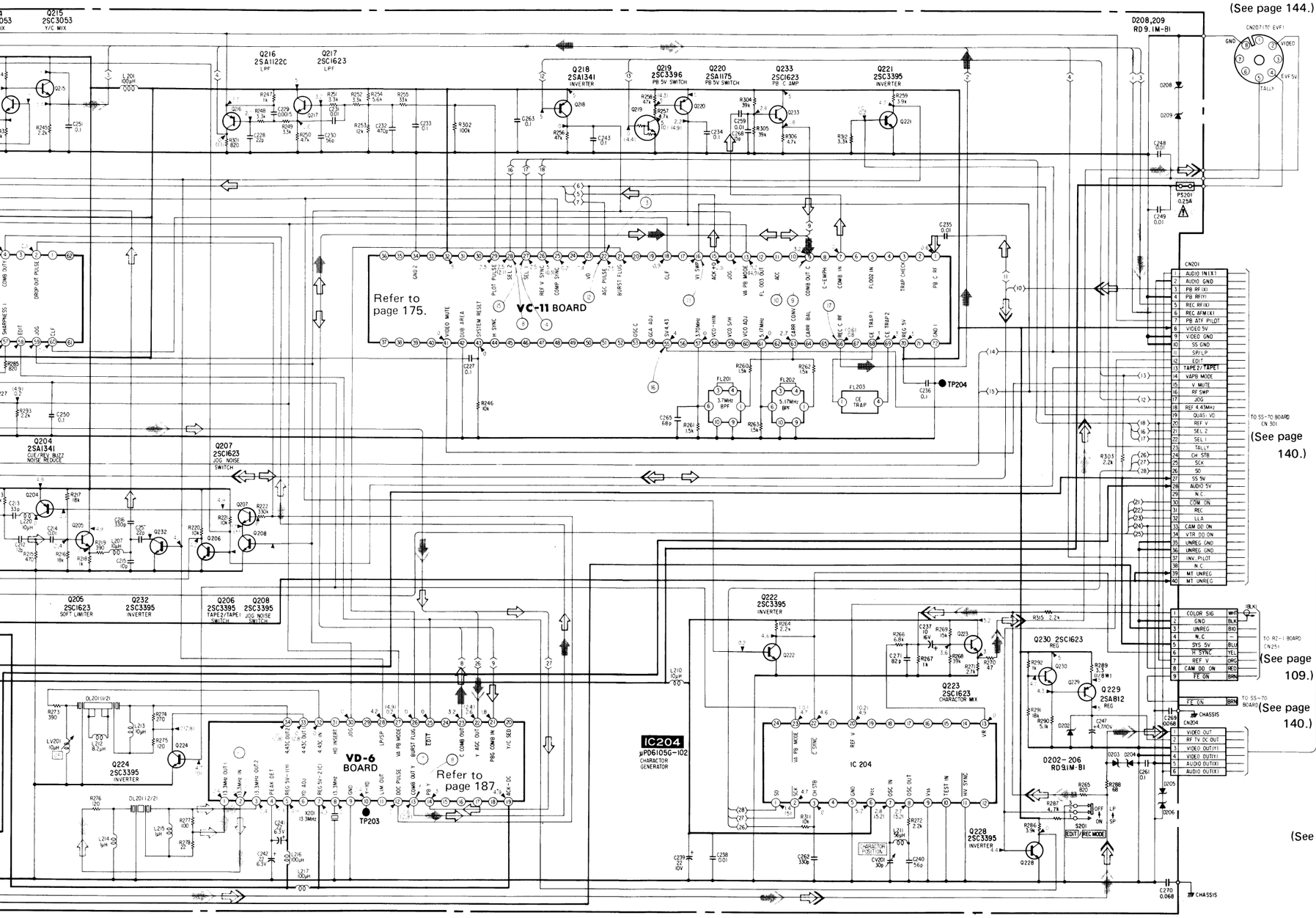
Refer to page 187.

TP203

IC204 μPD6105G-102 CHARACTOR GENERATOR

Q222 2SC3395 INVERTER

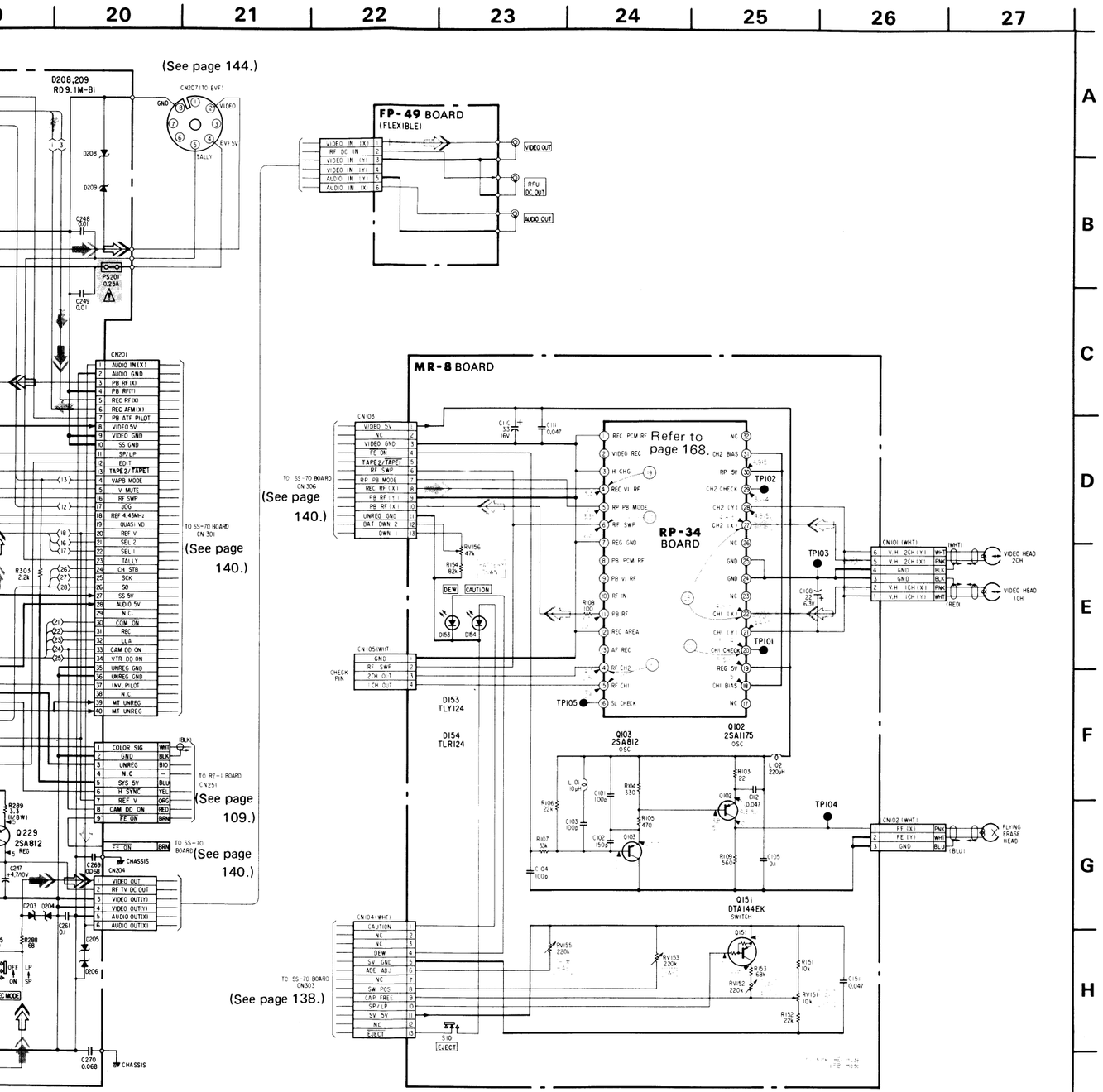
10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26



- **Signal path**
  - REC Y Signal
  - PB Y Signal
  - : REC CHROMA Signal
  - : PB CHROMA Signal
  - REC Y/CHROMA Signal
  - PB Y/CHROMA Signal

Note: The components identified by ⚠ are critical for safety. R part number specified.

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

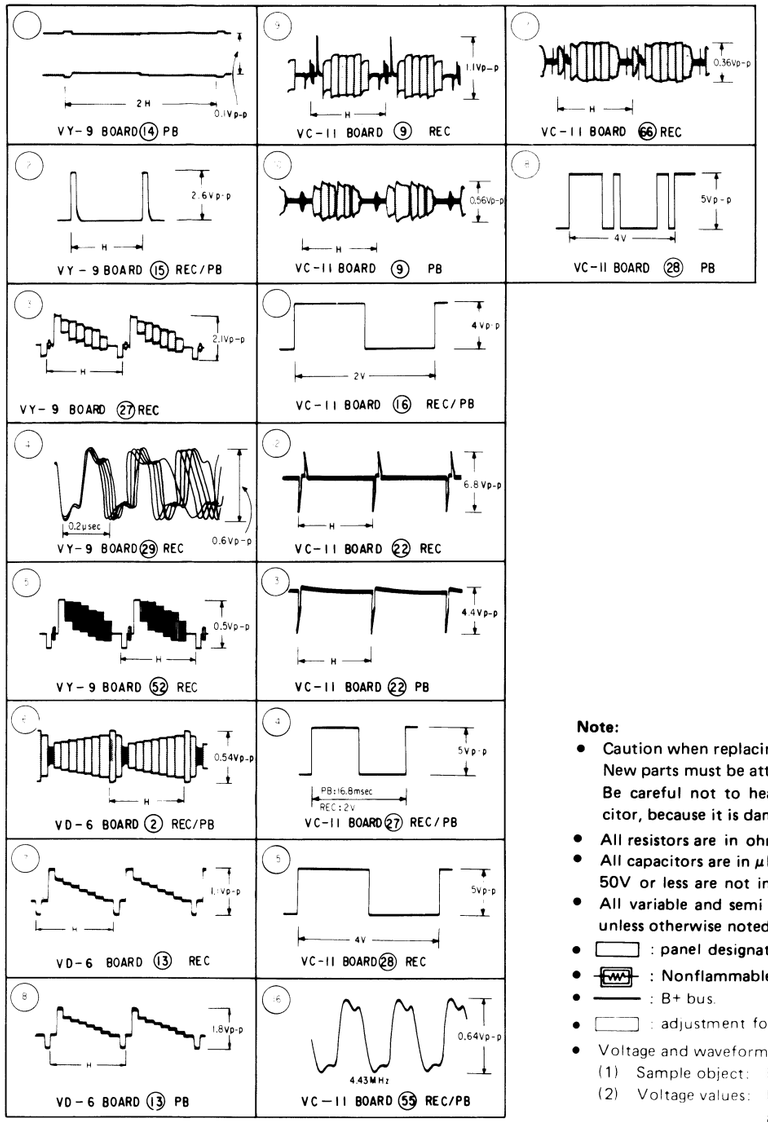


- **Signal path**
  - : REC Y Signal
  - : PB Y Signal
  - : REC CHROMA Signal
  - : PB CHROMA Signal
  - : REC Y/CHROMA Signal
  - : PB Y/CHROMA Signal

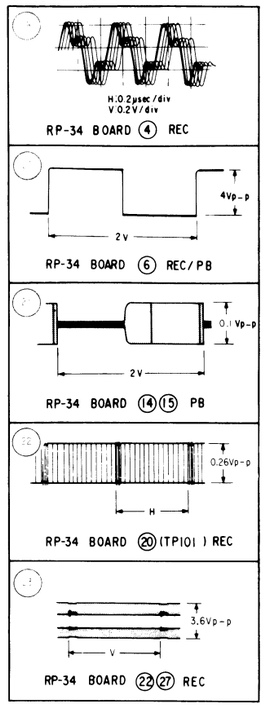
Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

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

MV-12 BOARD (VIDEO)



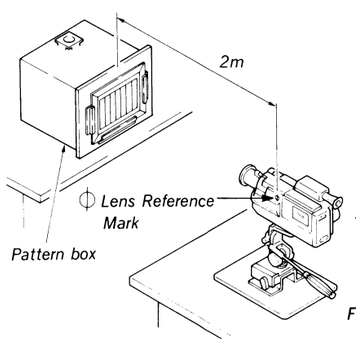
MR-8 BOARD (VIDEO)



Note:

- Caution when replacing chip parts.
  New parts must be attached after removal of chip.
  Be careful not to heat the minus side of tantalum capacitor, because it is damaged by the head.
- All resistors are in ohms, 1/10W unless otherwise noted.
- All capacitors are in μF (p:pF) unless otherwise noted.
  50V or less are not indicated except for electrolytic capacitors.
- All variable and semi fixed resistors have characteristic curve B, unless otherwise noted.
- : panel designation.
- : Nonflammable resistor
- : B+ bus.
- : adjustment for repair.
- Voltage and waveform measuring conditions:
  (1) Sample object: Pattern box colour bars.
  (2) Voltage values: Relative to ground, measured with a DC digital multimeter (impedance 10M-ohm or more).

1. Connection



2. Adjust the zooming of camera and the tripod so that the output waveform of Fig. a and the picture of Fig. b can be obtain.

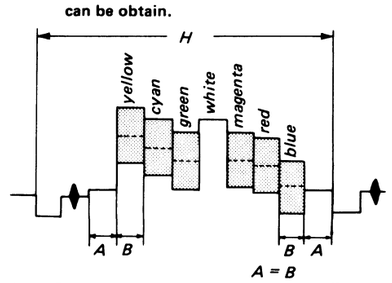


Fig.a Camera output waveform of No.⑦ terminal of FP-81 flexible board.

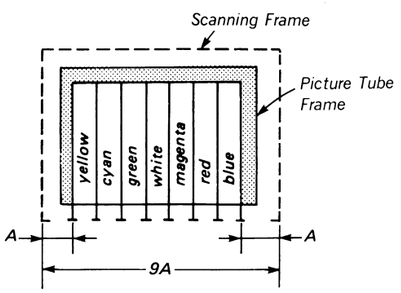


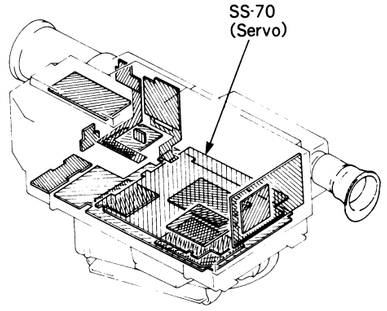
Fig. b Picture of TV monitor screen

Note:

- ○— : indicates a lead wire mounted on the component side.
- ●— : indicates a lead wire mounted on the printed side.
- ⊗ : Through hole.
- ▩ : Pattern from the side which enables seeing.
- ▩ : B+ pattern from the side which enables seeing.
- **Digital transistor (SS-70: Q307, Q309, Q310, Q311, Q317, Q318, Q321, Q322, Q324, Q325, Q328, Q501, Q504, Q506, Q507, Q513, Q514, Q515, Q522, Q528, Q529, Q529, Q531, Q532) transistor with resistor.**
  Refer to the SS-70 board schematic diagram for digital transistor.

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

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

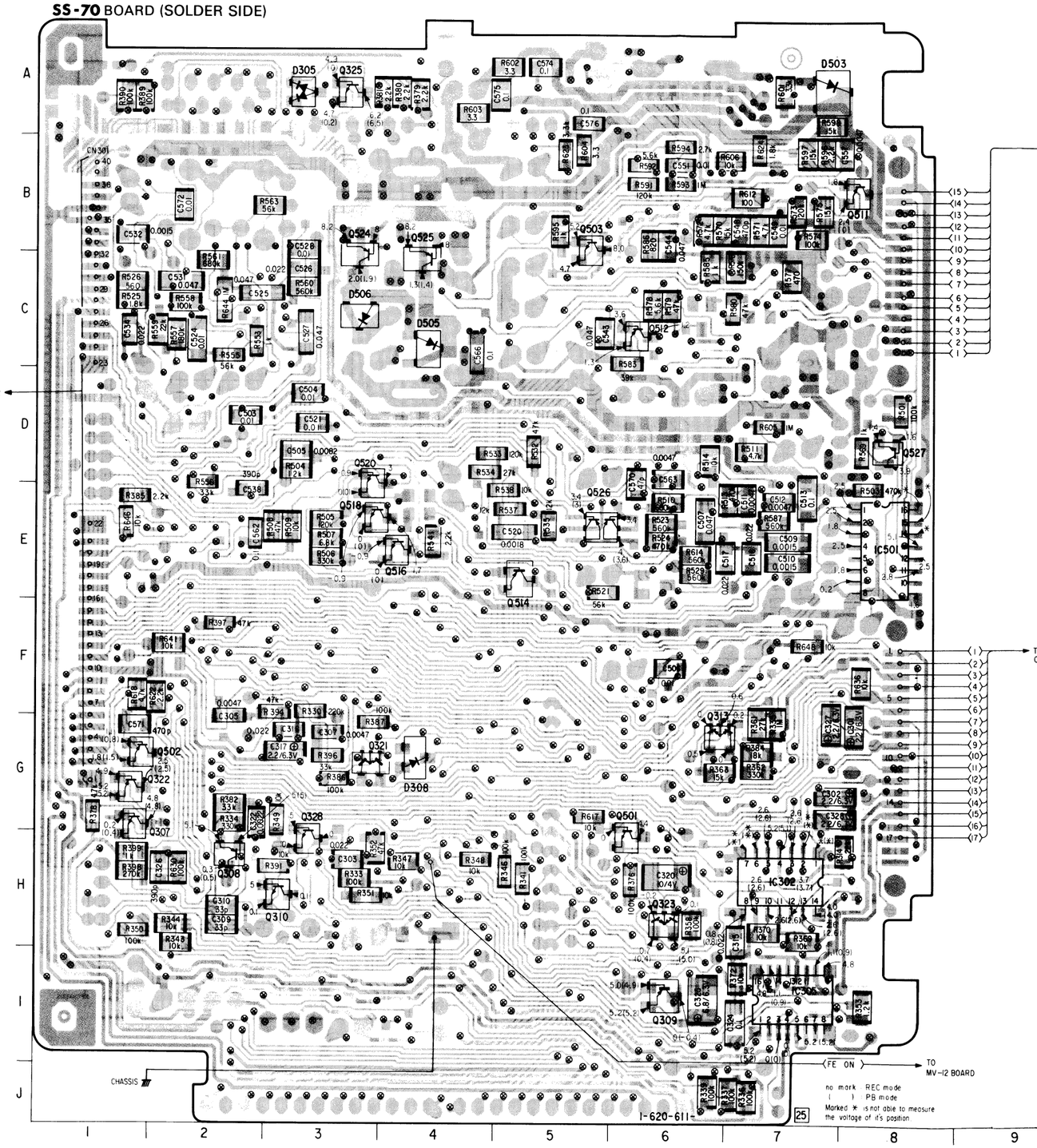


SS-70(SERVO) PRINTED WIRING BOARD

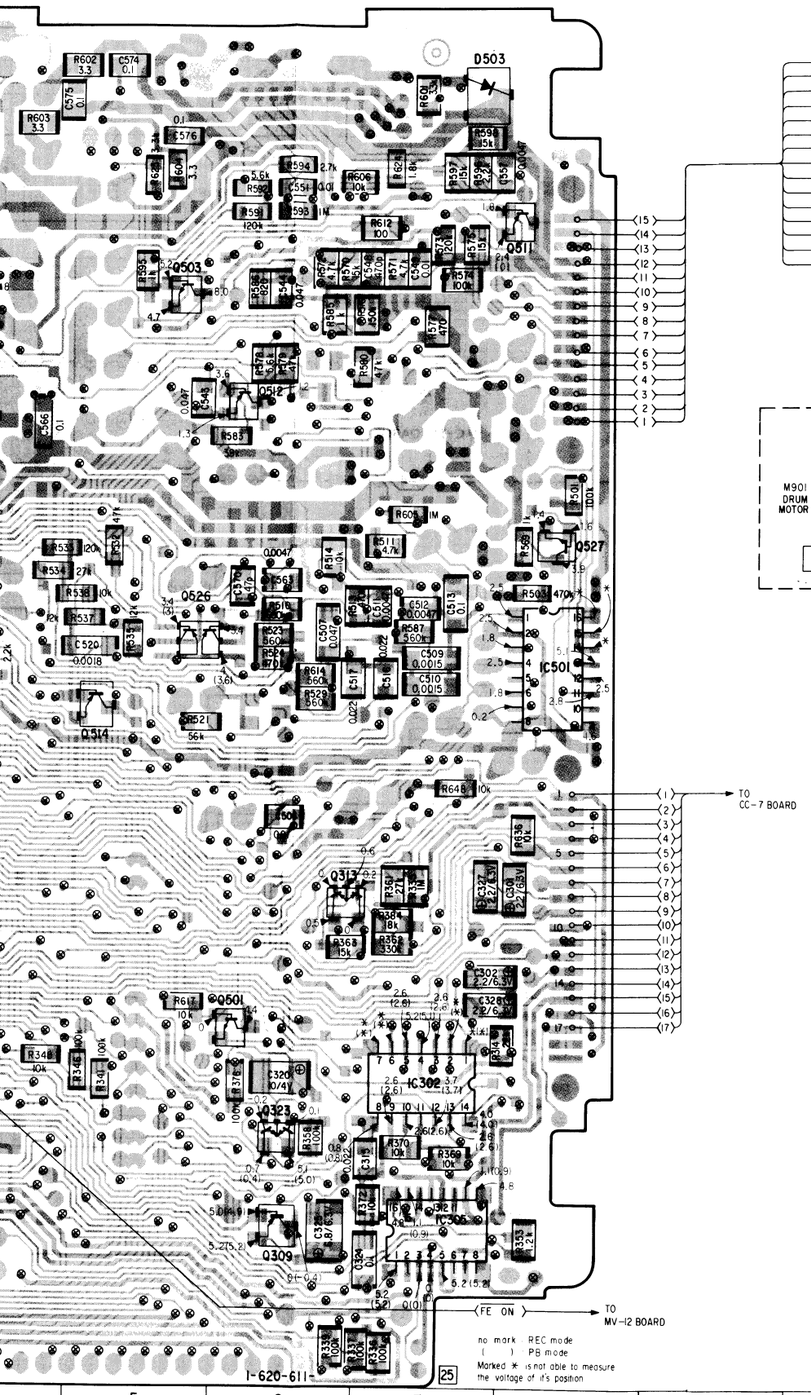
—Ref. No. SS-70 BOARD: 6,000 Series—

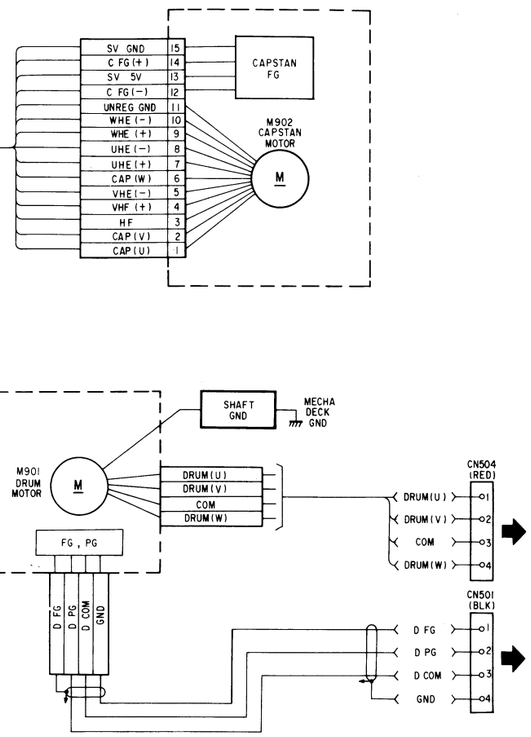
SS-70 BOARD (SOLDER SIDE)

D305	A-3
D308	G-4
D503	A-7
D505	C-4
D506	C-3
IC302	H-7
IC305	I-7
IC501	E-8
Q307	G-1
Q308	H-2
Q309	I-6
Q310	H-3
Q313	G-6
Q321	G-3
Q322	G-1
Q323	H-6
Q325	A-3
Q328	H-3
Q501	G-6
Q502	G-1
Q503	C-5
Q511	B-8
Q512	C-6
Q514	E-5
Q516	E-4
Q518	E-4
Q520	E-4
Q524	C-3
Q525	C-4
Q526	E-6
Q527	D-8

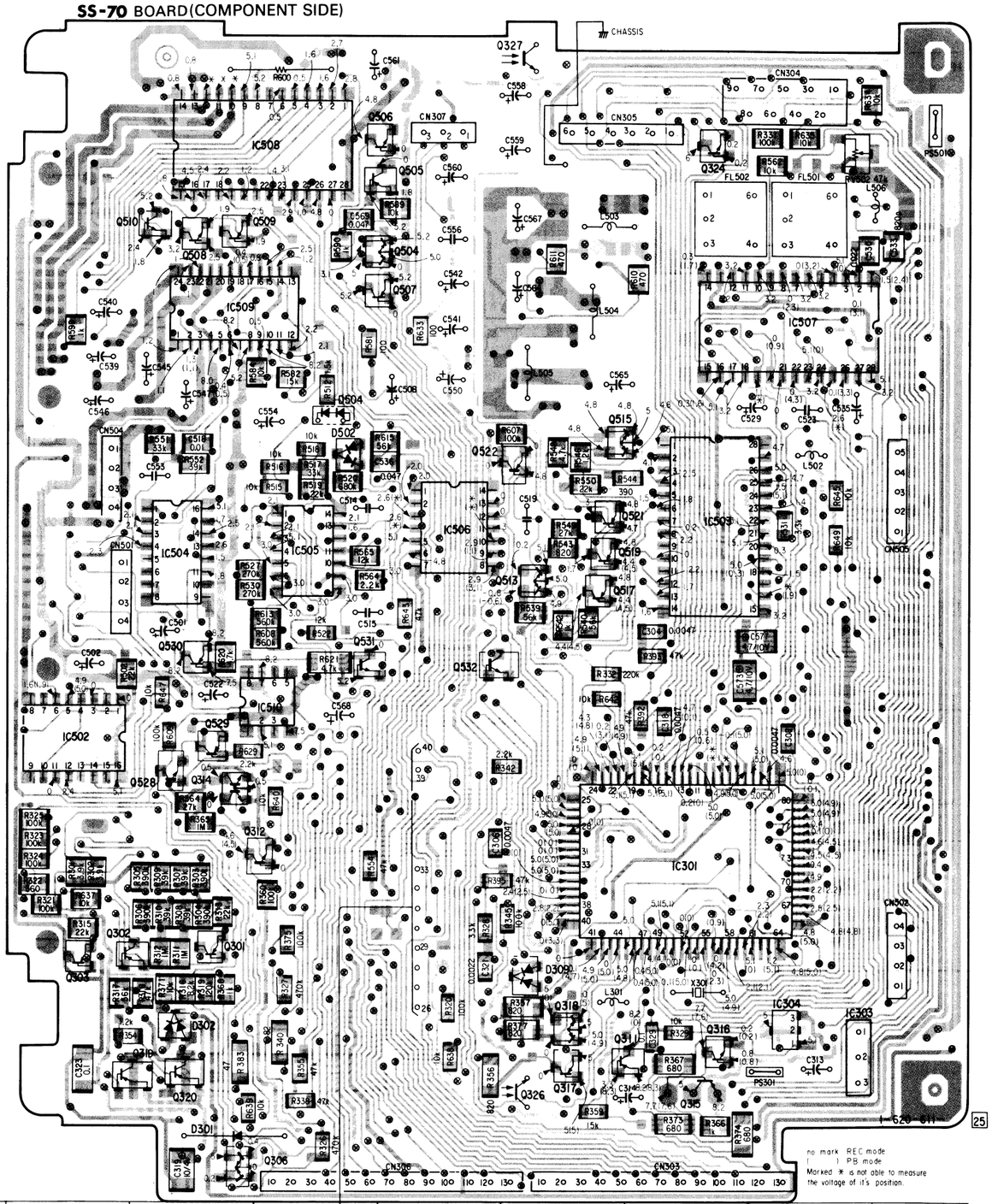


SS-70 BOARD(COMPONENT SIDE)





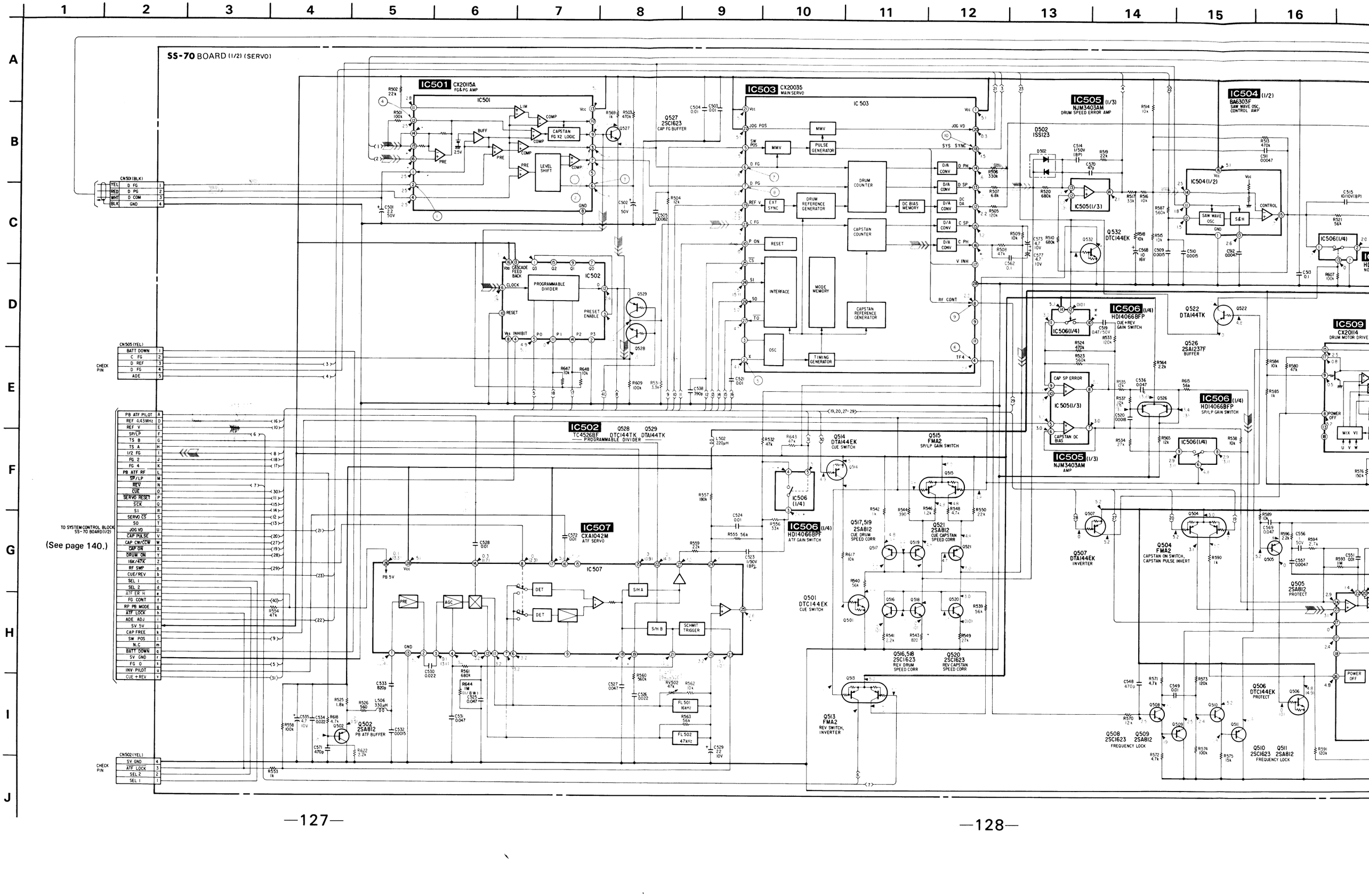
D301	J-15	Q317	I-18
D302	I-15	Q318	I-18
D309	H-18	Q319	I-15
D502	D-16	Q320	I-15
D504	D-16	Q324	B-19
		Q326	I-18
IC301	G-19	Q327	A-18
IC303	I-20	Q504	B-17
IC304	I-20	Q505	B-17
IC502	F-14	Q506	A-17
IC503	E-19	Q507	C-17
IC504	E-15	Q508	B-15
IC505	E-16	Q509	B-15
IC506	E-17	Q510	B-15
IC507	C-20	Q513	E-18
IC508	B-15	Q515	D-18
IC509	C-15	Q517	E-18
IC510	F-16	Q519	E-18
		Q521	D-18
Q301	H-15	Q522	D-18
Q302	H-14	Q528	F-15
Q303	H-14	Q529	F-15
Q306	J-15	Q530	F-15
Q311	I-19	Q531	F-16
Q312	G-16	Q532	F-17
Q314	G-15		
Q315	I-19	RV502	B-20
Q316	I-19		



5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21

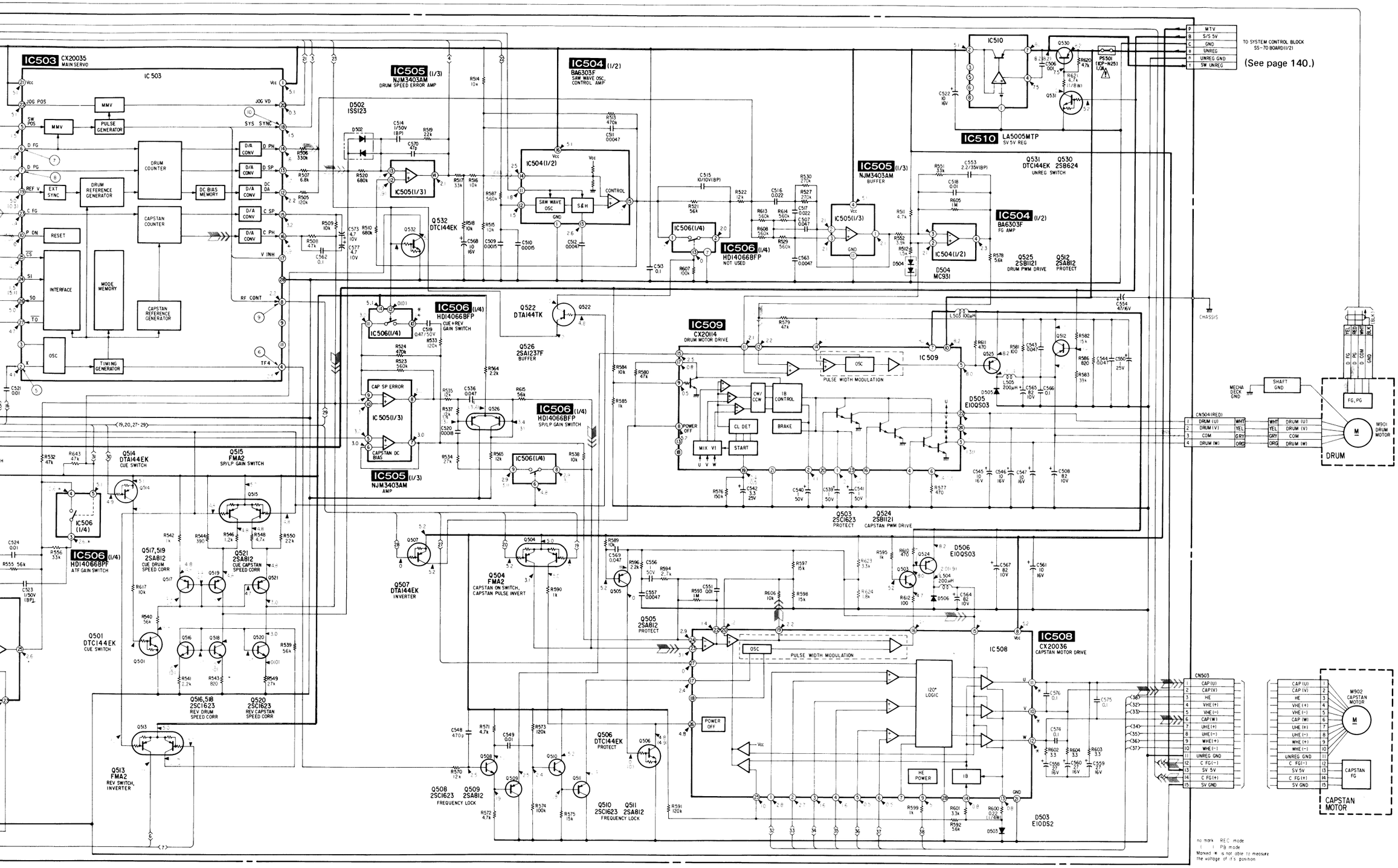
SS-70(SERVO) SCHEMATIC DIAGRAM

—Ref. No. SS-70 BOARD: 6,000 Series—



10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

A B C D E F G H I J



Note:

- Caution when
  New parts mu
  Be careful no
  citor, because
- All resistors ar
- All capacitors
  50V or less ar
- All variable ar
  unless otherwi
- ▭ : panel
- ▭ : Nonfl
- ——— : B+ bu
- ▭ : adjust
- Voltage and w
  (1) Sample o
  (2) Voltage v

1. Connection

Pattern

2. Adjust the z
the output w
can be obtain

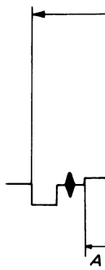
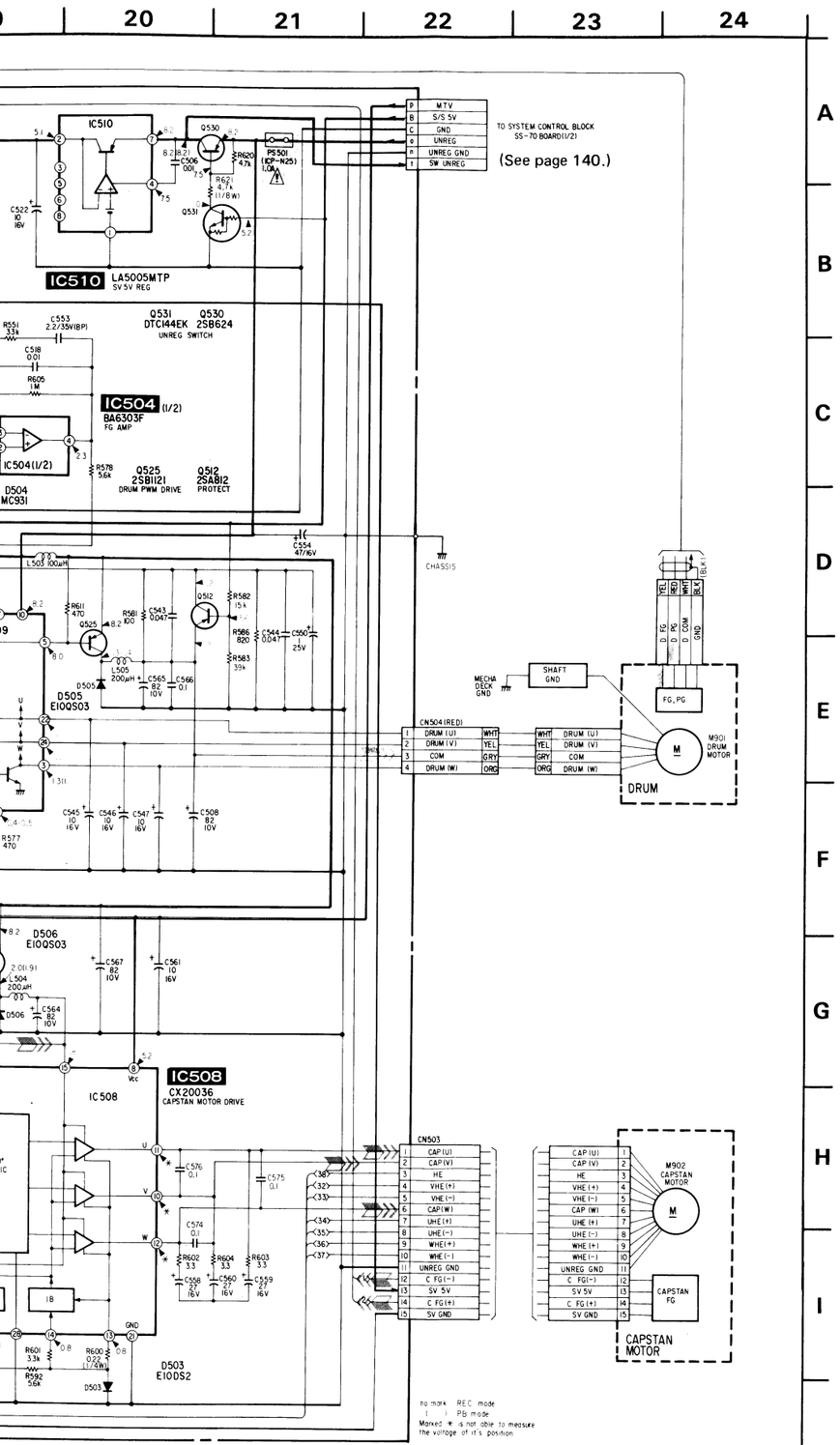


Fig.a Camera
FP-81 fl

A

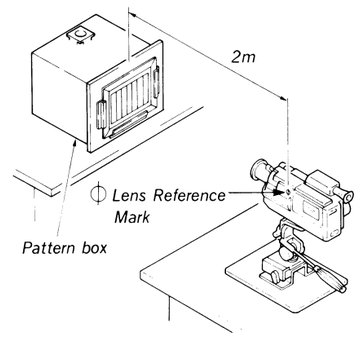
Fig



Note:

- Caution when replacing chip parts.
  New parts must be attached after removal of chip.
  Be careful not to heat the minus side of tantalum capacitor, because it is damaged by the head.
- All resistors are in ohms, 1/10W unless otherwise noted.
- All capacitors are in μF (p:pF) unless otherwise noted.
  50V or less are not indicated except for electrolytic capacitors.
- All variable and semi fixed resistors have characteristic curve B, unless otherwise noted.
- ▭ : panel designation.
- ⏦ : Nonflammable resistor
- ——— : B+ bus.
- ▭ : adjustment for repair.
- Voltage and waveform measuring conditions:
  (1) Sample object: Pattern box colour bars.
  (2) Voltage values: Relative to ground, measured with a DC digital multimeter (impedance 10M-ohm or more).

1. Connection



2. Adjust the zooming of camera and the tripod so that the output waveform of Fig. a and the picture of Fig. b can be obtain.

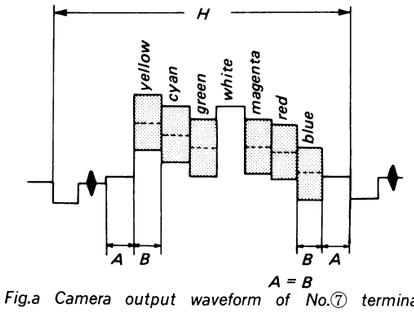


Fig.a Camera output waveform of No.⑦ terminal of FP-81 flexible board.

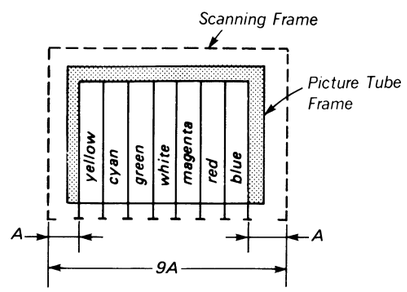


Fig. b Picture of TV monitor screen

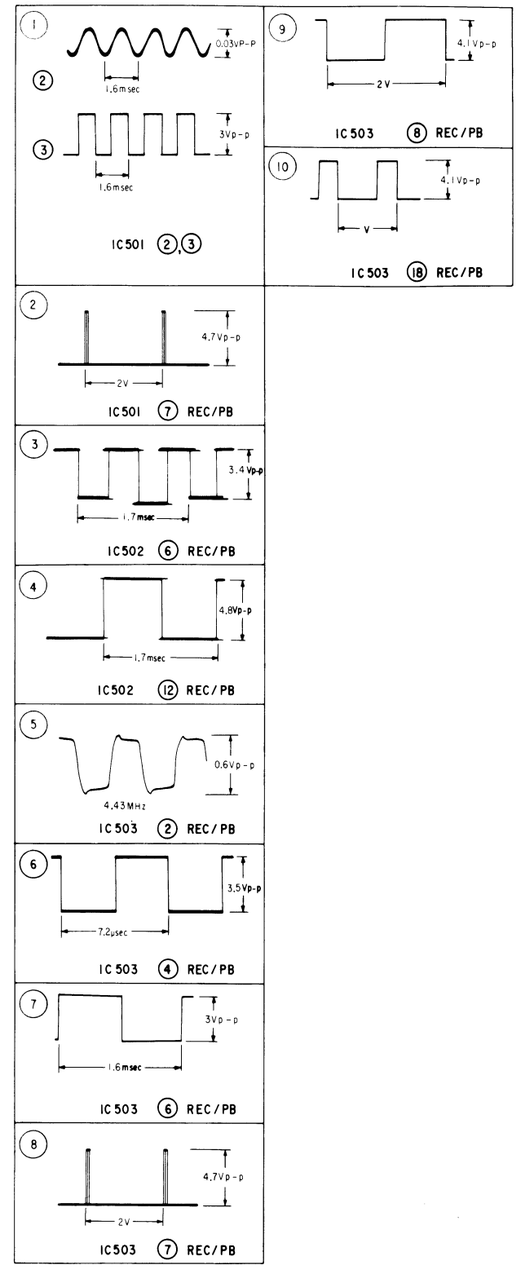
Signal path

	REC	REC/PB	PB
Drum speed servo			
Drum phase servo			
Drum servo (speed and phase)			
Capstan speed servo			
Capstan phase servo			
Capstan servo (speed and phase)			

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

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

SS-70 BOARD



SYSTEM CONTROL, AUDIO

SS-70(SYSTEM CONTROL, AUDIO), AU-31(AUDIO SIGNAL PROCESS), SK-19(POWER SWITCH/VTR FUNCTION SWITCH), MA-21(MIC AMP), MJ-12(MIC JACK), CC-7(MODE SWITCH), FP-53(

—Ref. No. SS-70, SK-19, AU-31, MA-21, MJ-12 and FP-53 BOARDS : 6, 000 series—

Note:

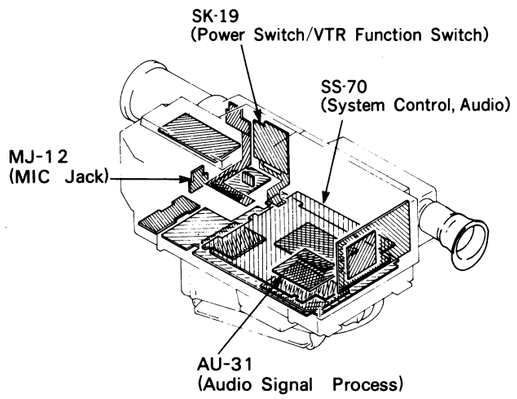
- ○— : indicates a lead wire mounted on the component side.
- ●— : indicates a lead wire mounted on the printed side.
- ⊗ : Through hole.
- ▩ : Pattern from the side which enables seeing.
- Pattern from the side which enables seeing.
- : B+ pattern from the side which enables seeing.
- Digital transistor (SS-70: Q307, Q309, Q310, Q311, Q317, Q318, Q321, Q322, Q324, Q325, Q328, Q501, Q504, Q506, Q507, Q513, Q514, Q515, Q522, Q528, Q529, Q531, Q532) transistor with resistor.
  Refer to the SS-70 board schematic diagram for digital transistor.

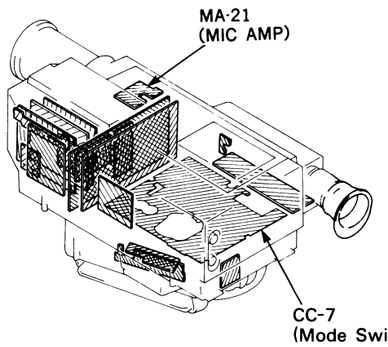
Caution:

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

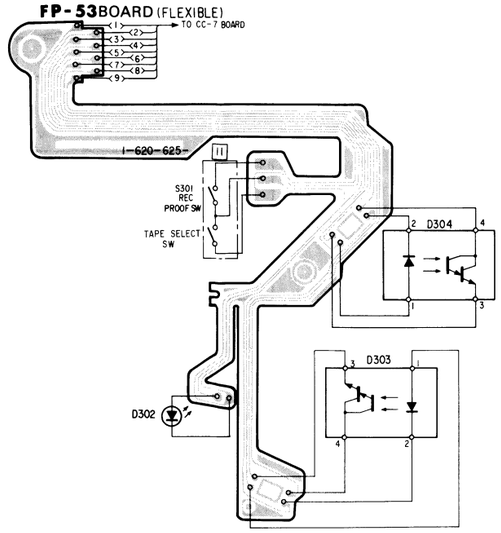
Parts face side: (Component Side) Parts on the parts face side seen from the parts face are indicated.

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

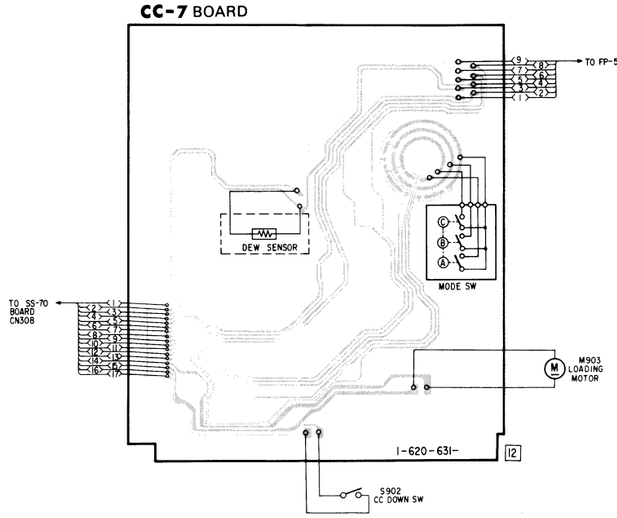




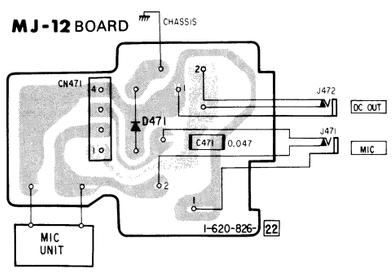
FP-53 BOARD (FLEXIBLE)



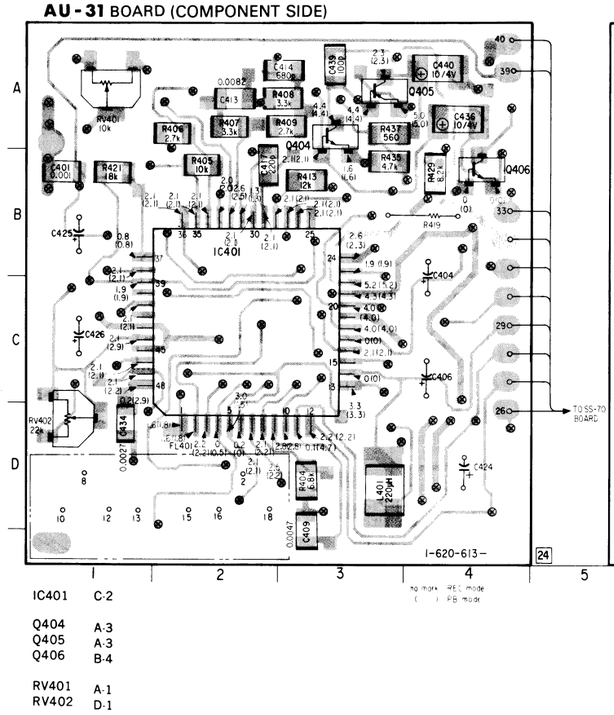
CC-7 BOARD



MJ-12 BOARD



AU-31 BOARD (COMPONENT SIDE)

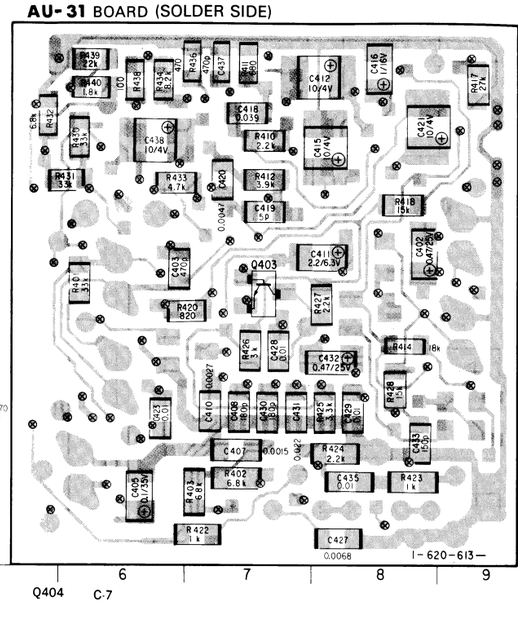


IC401 C-2

Q404 A-3
Q405 A-3
Q406 B-4

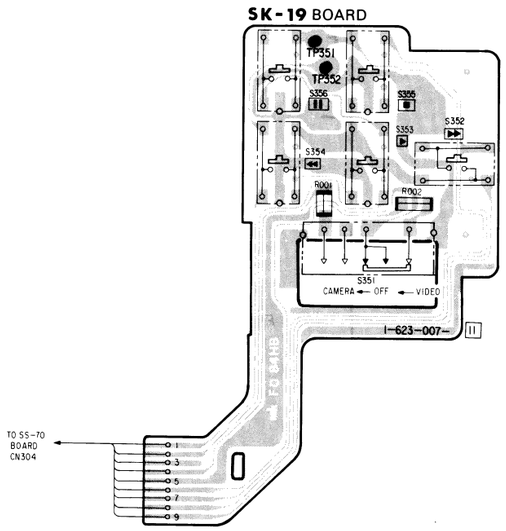
RV401 A-1
RV402 D-1

AU-31 BOARD (SOLDER SIDE)

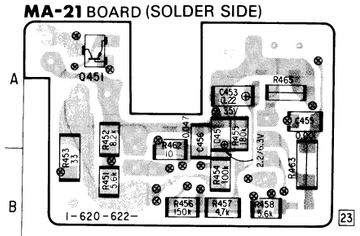


Q404 C-7

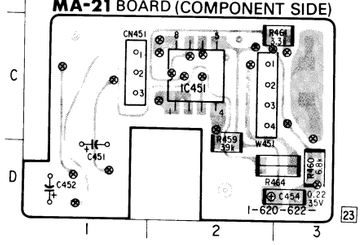
SK-19 BOARD

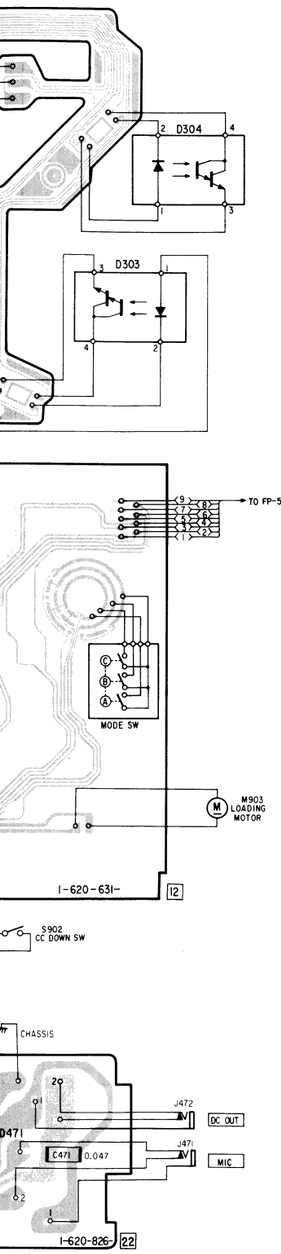


MA-21 BOARD (SOLDER SIDE)

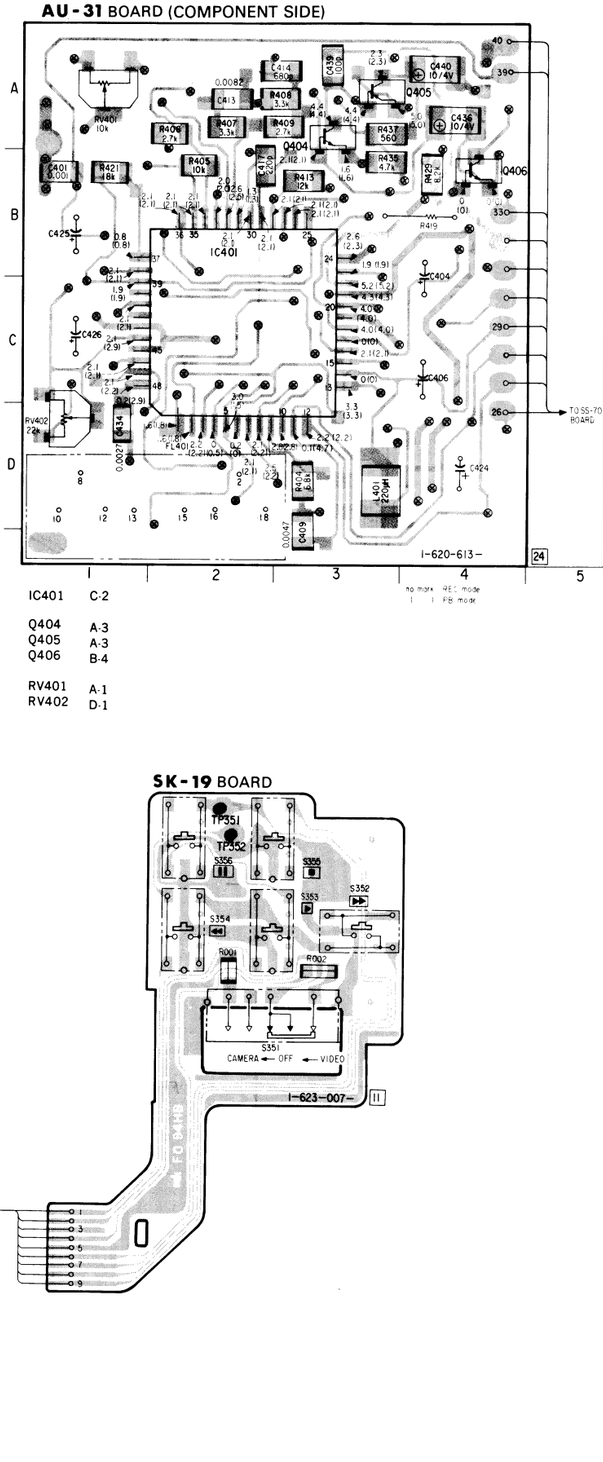


MA-21 BOARD (COMPONENT SIDE)





AU-31 BOARD (COMPONENT SIDE)

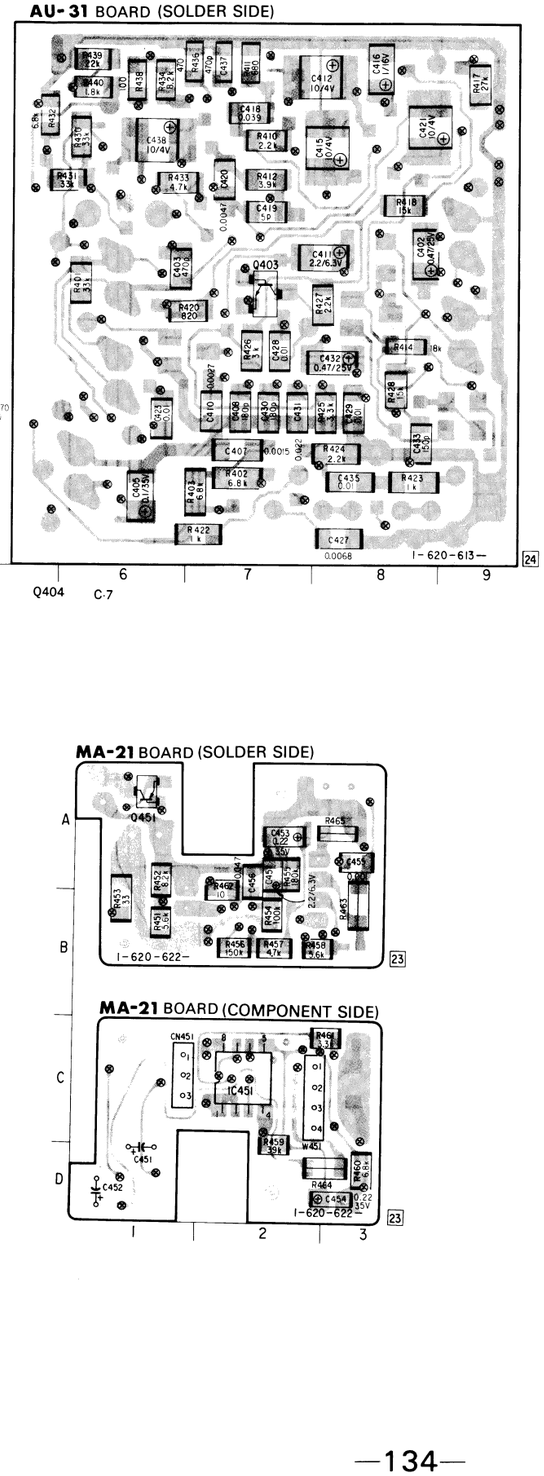


IC401 C-2

Q404 A-3
Q405 A-3
Q406 B-4

RV401 A-1
RV402 D-1

AU-31 BOARD (SOLDER SIDE)



Q404 C-7

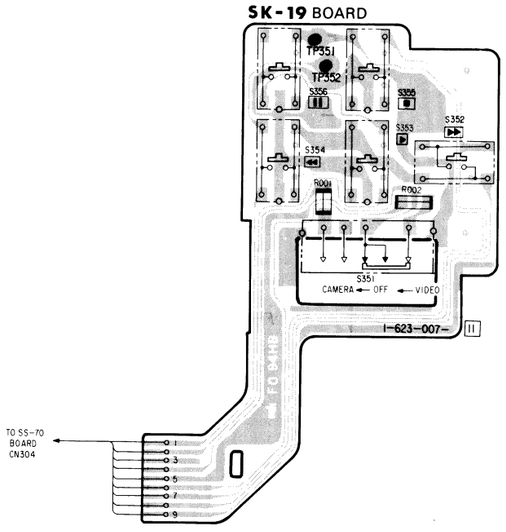
SS-70 BOARD (SOLDER SIDE)

D305 A-3
D308 G-4
D503 A-7
D505 C-4
D506 C-3

IC302 H-7
IC305 I-7
IC501 E-8

Q307 G-1
Q308 H-2
Q309 I-6
Q310 H-3
Q313 G-6
Q321 G-3
Q322 G-1
Q323 H-6
Q325 A-3
Q328 H-3
Q501 G-6
Q502 G-1
Q503 C-5
Q511 B-8
Q512 C-6
Q514 E-5
Q516 E-4
Q518 E-4
Q520 E-4
Q524 C-3
Q525 C-4
Q526 E-6
Q527 D-8

SK-19 BOARD

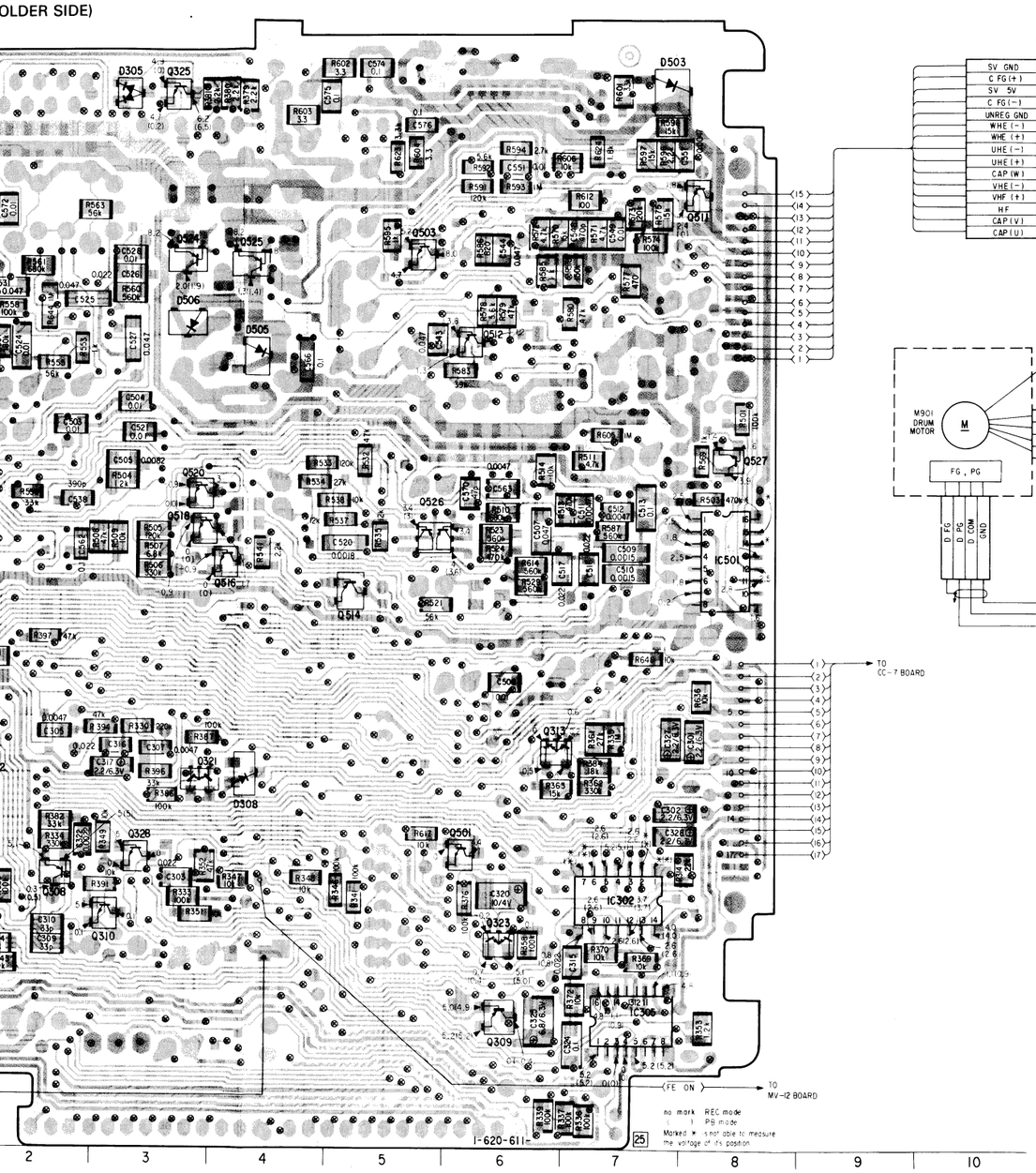


MA-21 BOARD (SOLDER SIDE)

MA-21 BOARD (COMPONENT SIDE)

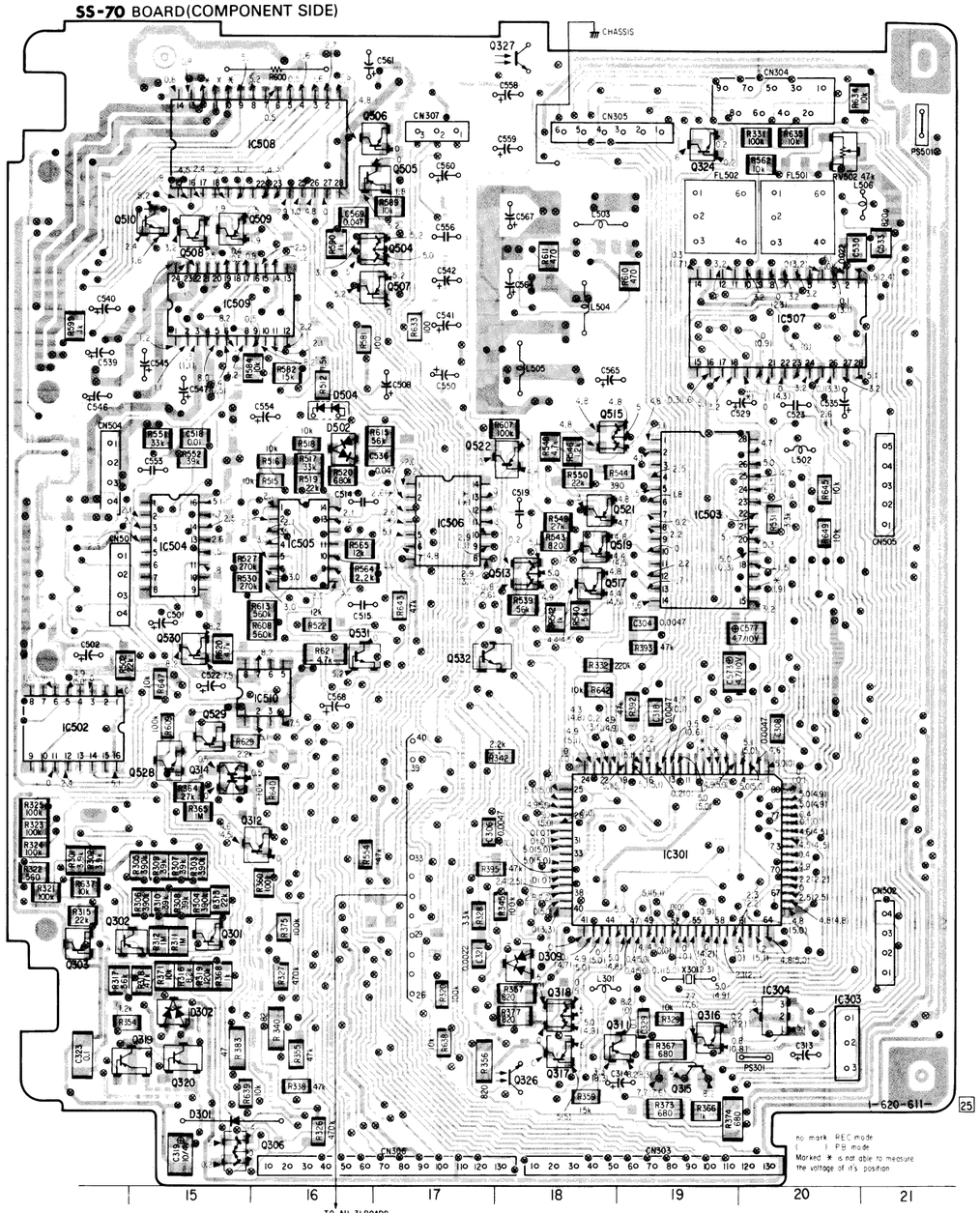
TED WIRING BOARDS

OLDER SIDE)



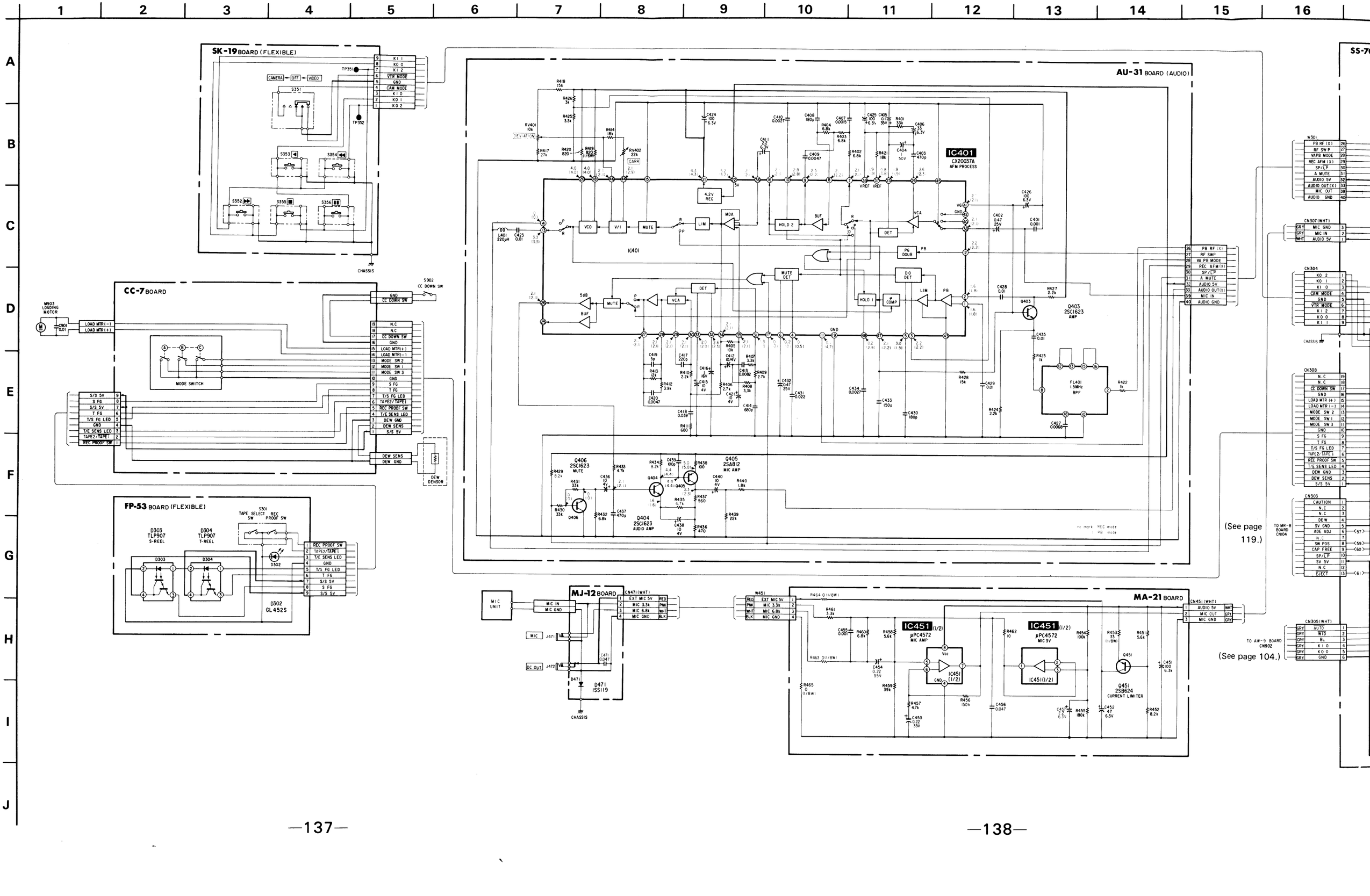
D301	J-15	Q317	I-18
D302	I-15	Q318	I-18
D309	H-18	Q319	I-15
D502	D-16	Q320	I-15
D504	D-16	Q324	B-19
		Q326	I-18
IC301	G-19	Q327	A-18
IC303	I-20	Q504	B-17
IC304	I-20	Q505	B-17
IC502	F-14	Q506	A-17
IC503	E-19	Q507	C-17
IC504	E-15	Q508	B-15
IC505	E-16	Q509	B-15
IC506	E-17	Q510	B-15
IC507	C-20	Q513	E-18
IC508	B-15	Q515	D-18
IC509	C-15	Q517	E-18
IC510	F-16	Q519	E-18
		Q521	D-18
Q301	H-15	Q522	D-18
Q302	H-14	Q528	F-15
Q303	H-14	Q529	F-15
Q306	J-15	Q530	F-15
Q311	I-19	Q531	F-16
Q312	G-16	Q532	F-17
Q314	G-15		
Q315	I-19	RV502	B-20
Q316	I-19		

SS-70 BOARD(COMPONENT SIDE)



SS-70(SYSTEM CONTROL, AUDIO), AU-31(AUDIO SIGNAL PROCESS), SK-19(POWER SWITCH/VTR FUNCTION SWITCH), MA-21(MIC AMP), MJ-12(MIC JACK), CC-7(MODE SWITCH), FP-53(TAPE SELECT/REC PROOF) SCHEMATIC DIAGRAM

—Ref. No. SS-70, SK-19, AU-31, MA-21, MJ-12 and FP-53 BOARDS : 6, 000 series—



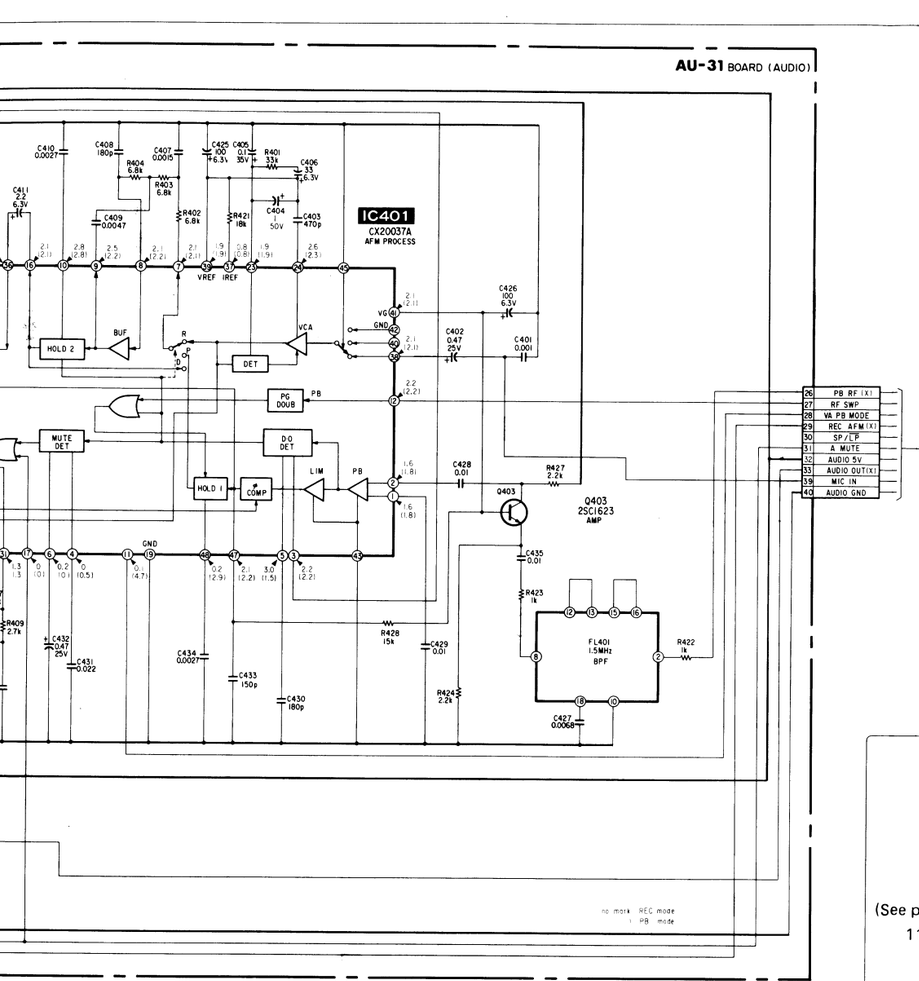
M CONTROL, AUDIO

P), MJ-12(MIC JACK), CC-7(MODE SWITCH), FP-53(TAPE SELECT/REC PROOF) SCHEMATIC DIAGRAM

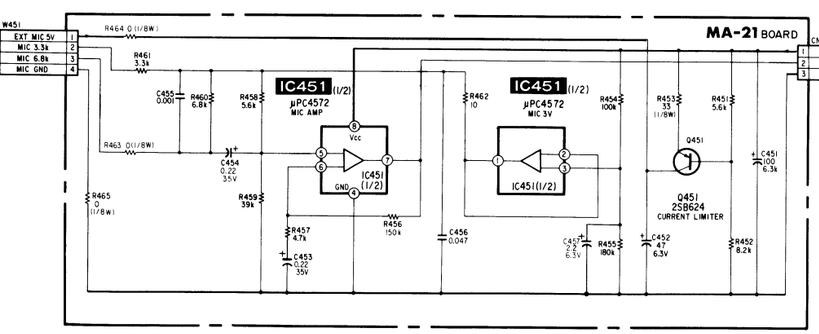
10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26

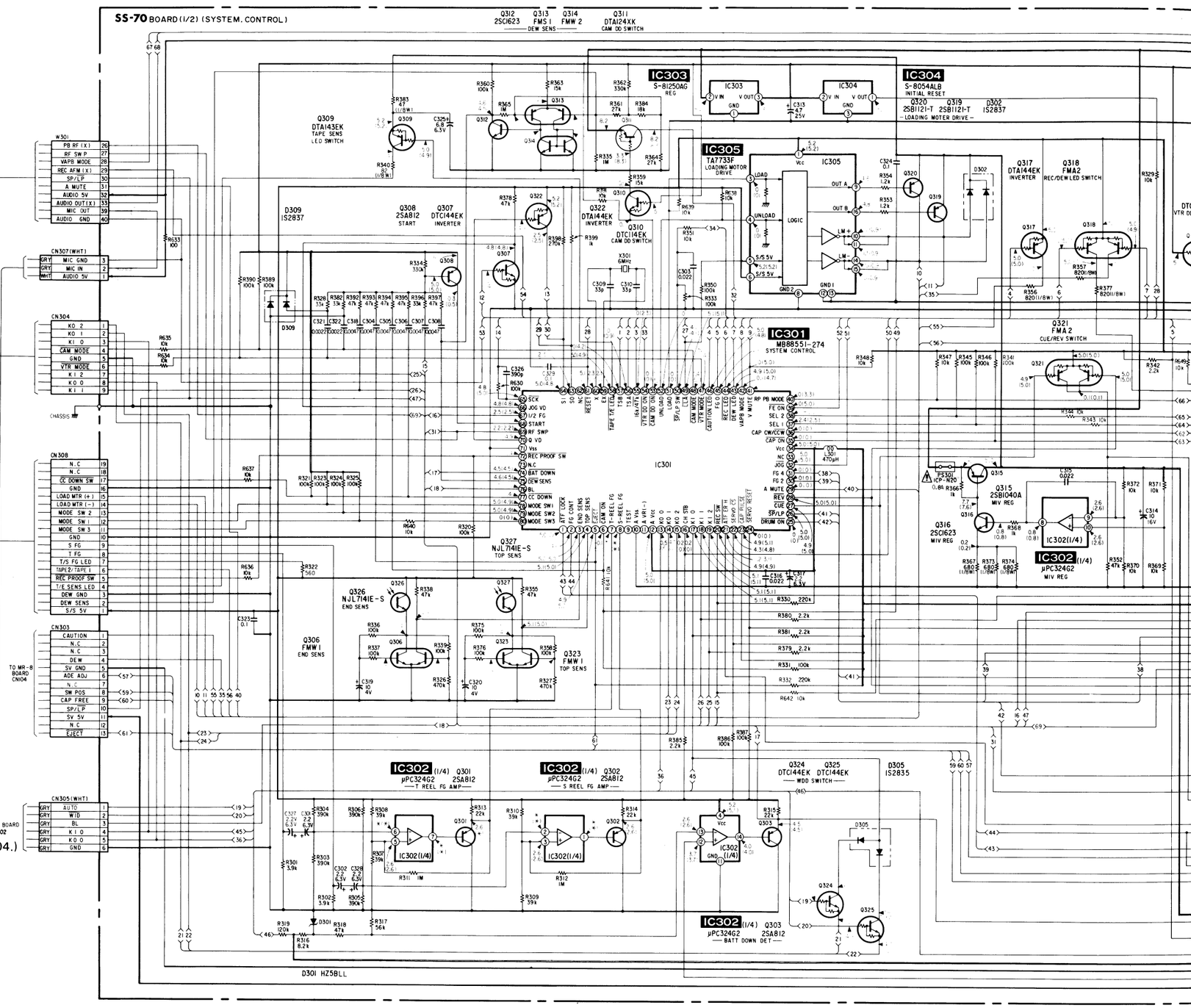
AU-31 BOARD (AUDIO)

SS-70 BOARD (1/2) (SYSTEM. CONTROL)



(See page 119.)



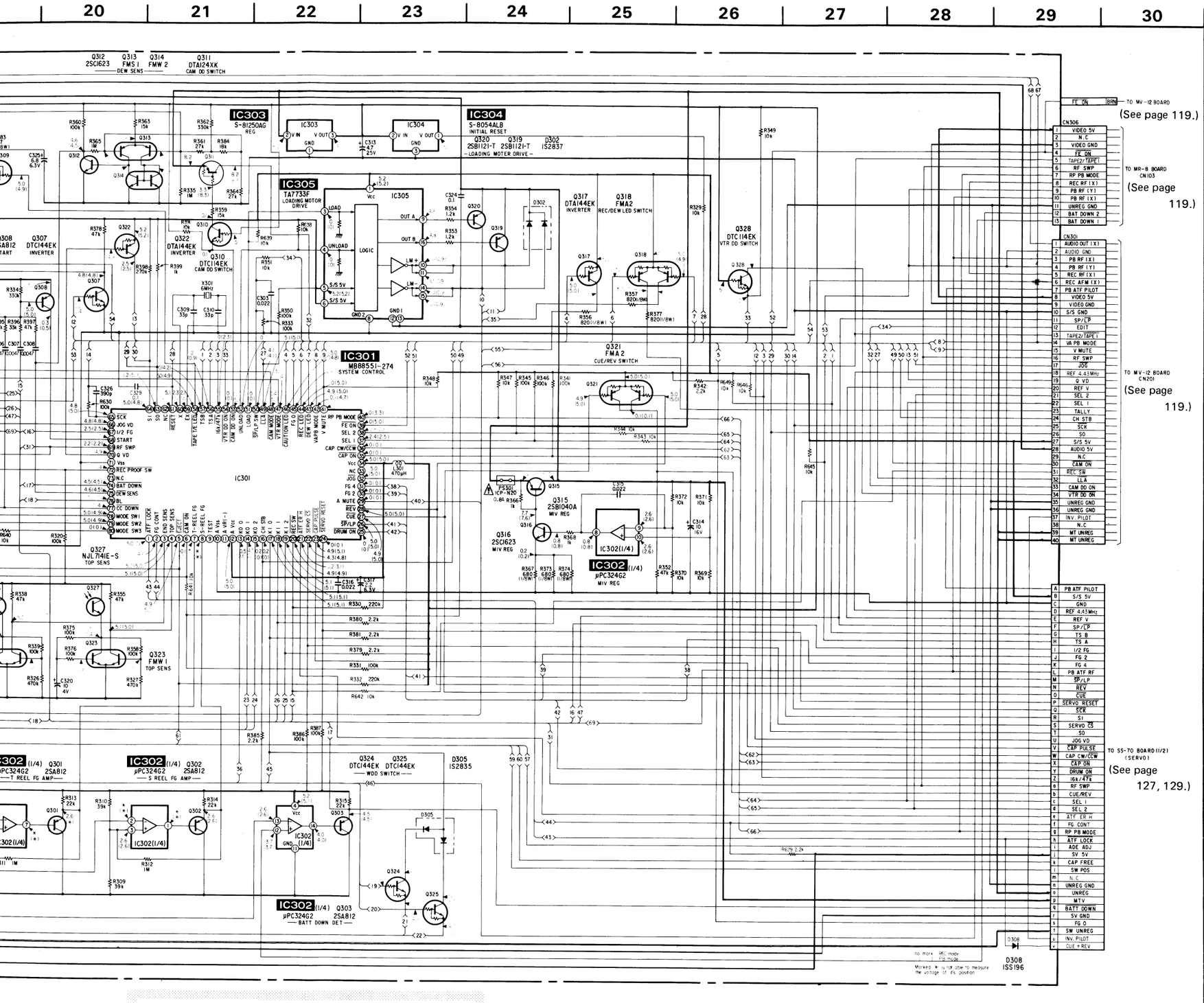


(See page 104.)

• Signal path

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

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



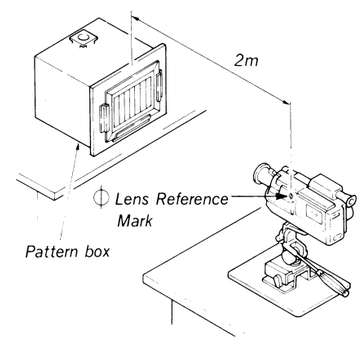
Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

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

Note:

- Caution when replacing chip parts.
  New parts must be attached after removal of chip.
  Be careful not to heat the minus side of tantalum capacitor, because it is damaged by the head.
- All resistors are in ohms, 1/10W unless otherwise noted.
- All capacitors are in µF (p:pF) unless otherwise noted.
  50V or less are not indicated except for electrolytic capacitors.
- All variable and semi fixed resistors have characteristic curve B, unless otherwise noted.
- ▭ : panel designation.
- ⏦ : Nonflammable resistor
- ——— : B+ bus.
- ▯ : adjustment for repair.
- Voltage and waveform measuring conditions:
  (1) Sample object: Pattern box colour bars.
  (2) Voltage values: Relative to ground, measured with a DC digital multimeter (impedance 10M-ohm or more).

1. Connection



2. Adjust the zooming of camera and the tripod so that the output waveform of Fig. a and the picture of Fig. b can be obtain.

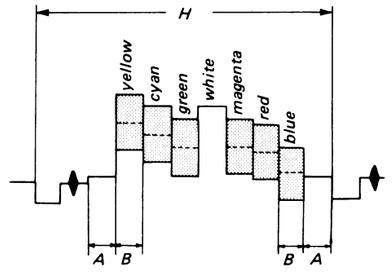


Fig.a Camera output waveform of No.⑦ terminal of FP-81 flexible board.

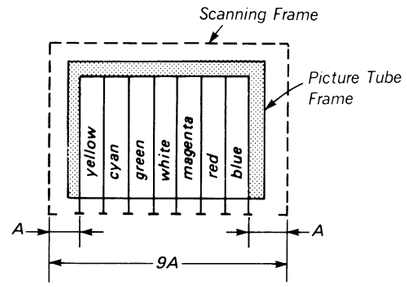


Fig. b Picture of TV monitor screen

VF-10(VIEWFINDER), LD-7(LED) PRINTED WIRING BOARDS

—Ref. No. VF-10 and LD-7 BOARDS : 7,000 series—

Note:

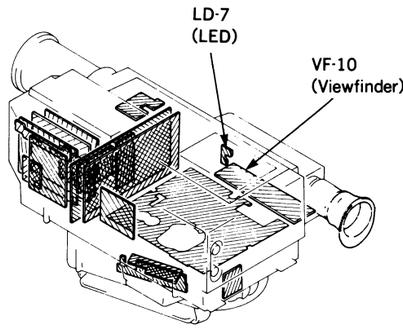
- ○— : indicates a lead wire mounted on the component side.
- ●— : indicates a lead wire mounted on the printed side.
- ⊗ : Through hole.
- ▒ : Pattern from the side which enables seeing.
- : B+ pattern from the side which enables seeing.

Caution:

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

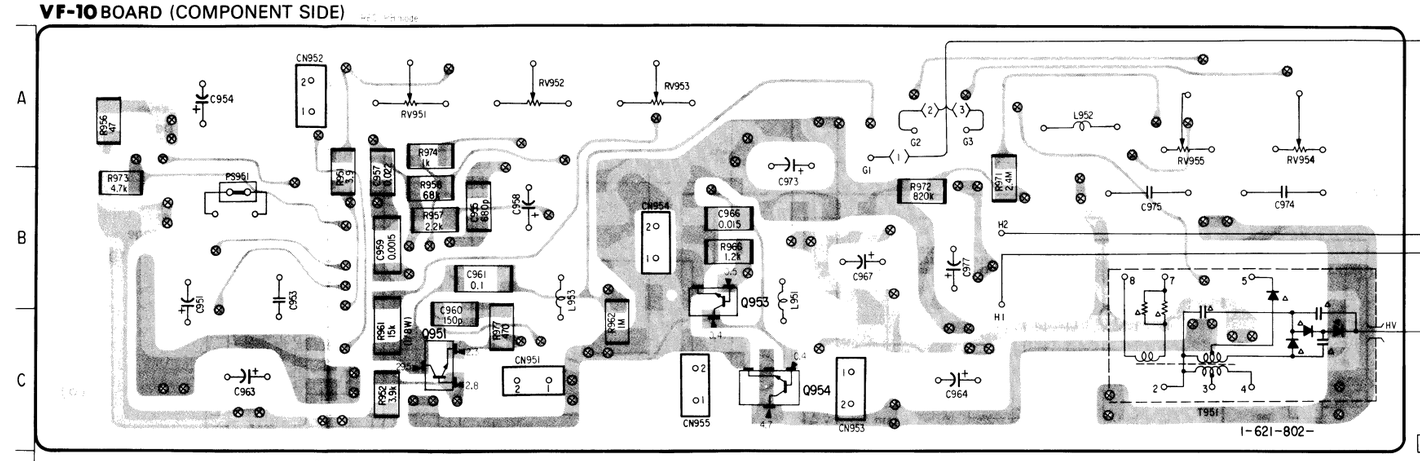
Parts face side: (Component Side) Parts on the parts face side seen from the parts face are indicated.

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

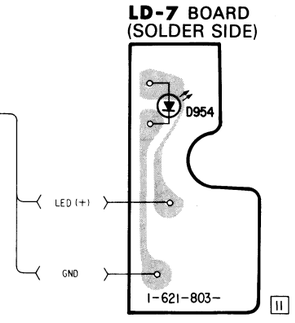


D951	H-6
D952	H-6
D953	F-5
IC951	F-3
Q951	C-3
Q952	F-6
Q953	B-5
Q954	C-6
RV951	A-3
RV952	A-4
RV953	A-5
RV954	A-9
RV955	A-9

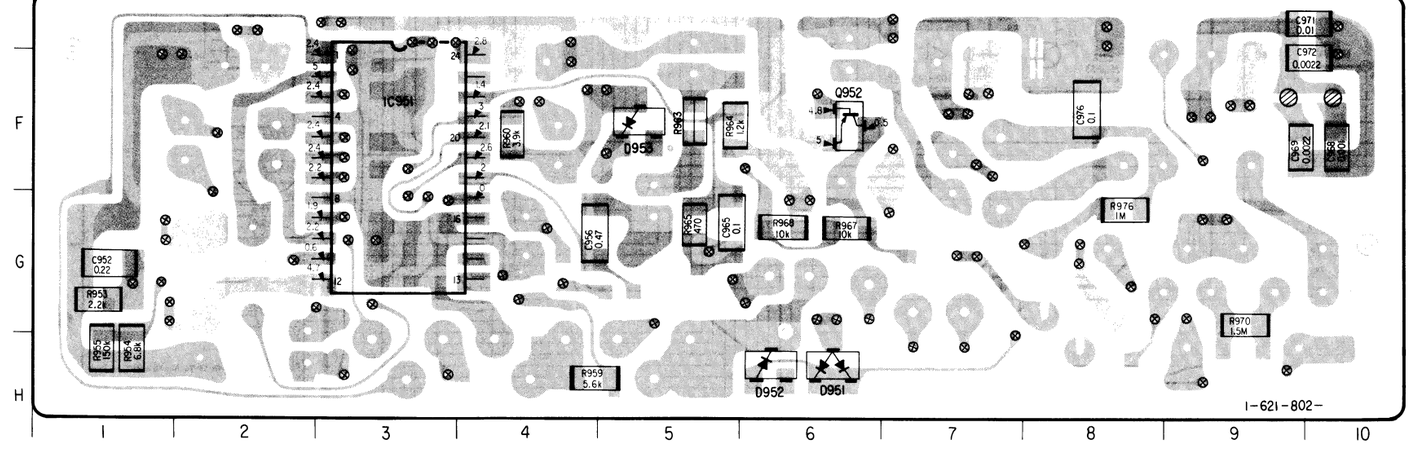
VF-10 BOARD (COMPONENT SIDE)

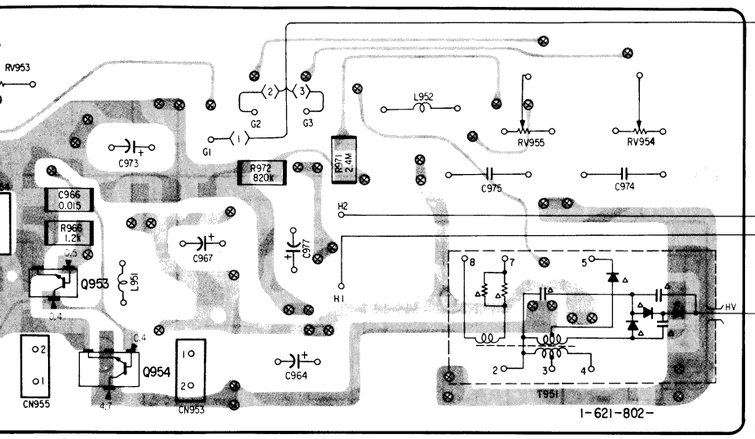


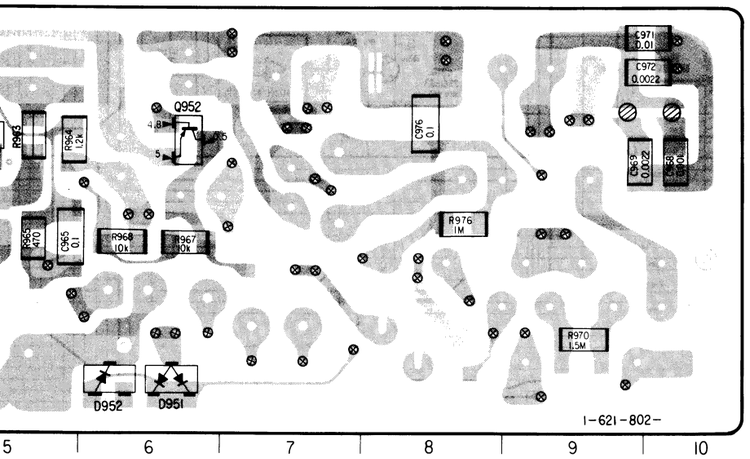
LD-7 BOARD (SOLDER SIDE)

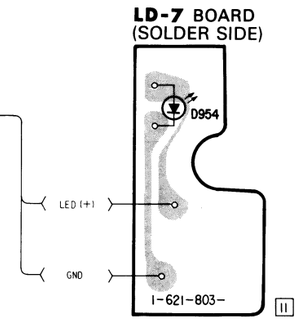


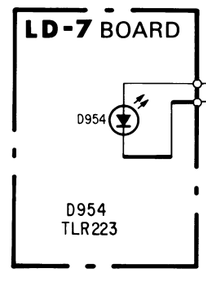
VF-10 BOARD (SOLDER SIDE)

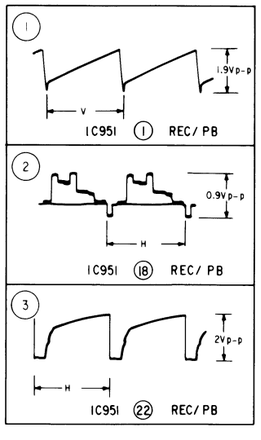


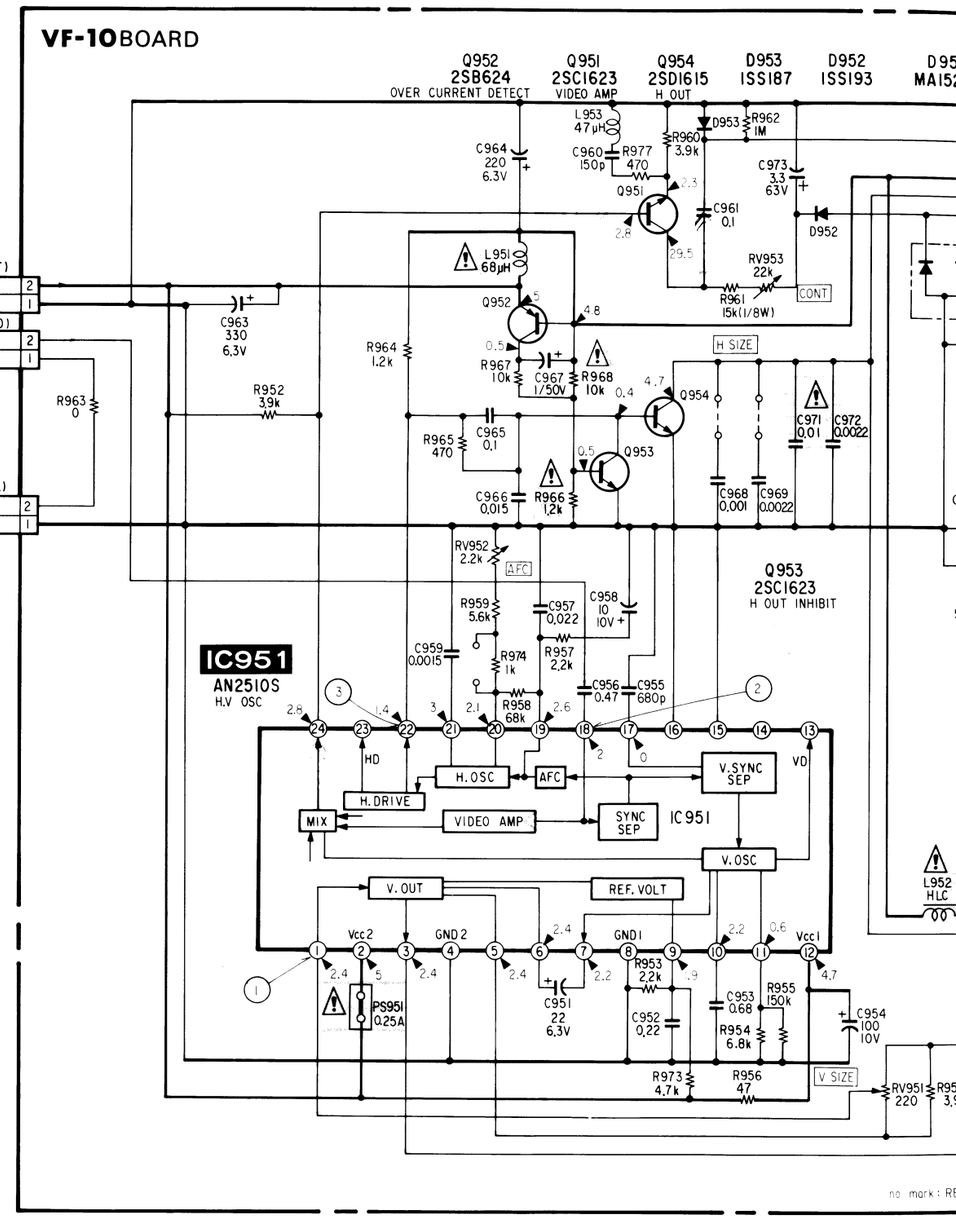

RV953
C973
R972 820k
R971 2.4M
C966 0.015
R966 1.2k
Q953
L951
C967
C971
H2
H1
G2
G3
G1
L952
RV955
RV954
C975
C974
C964
Q954
C4
CN955
CN953
T951
V901
CRT
M01JPG5WB
HV
1-621-802-


CN953
CN955
LED (+)
GND
Q952
R965 470
R966 1.2k
R968 10k
R967 10k
C965 0.1
C976 0.1
R976 1M
C971 0.01
C972 0.0022
C963 0.0022
C962 0.01
R970 1.5M
D952
D951
1-621-802-


LD-7 BOARD
(SOLDER SIDE)
D954
LED (+)
GND
1-621-803-


LD-7 BOARD
D954
TLR223

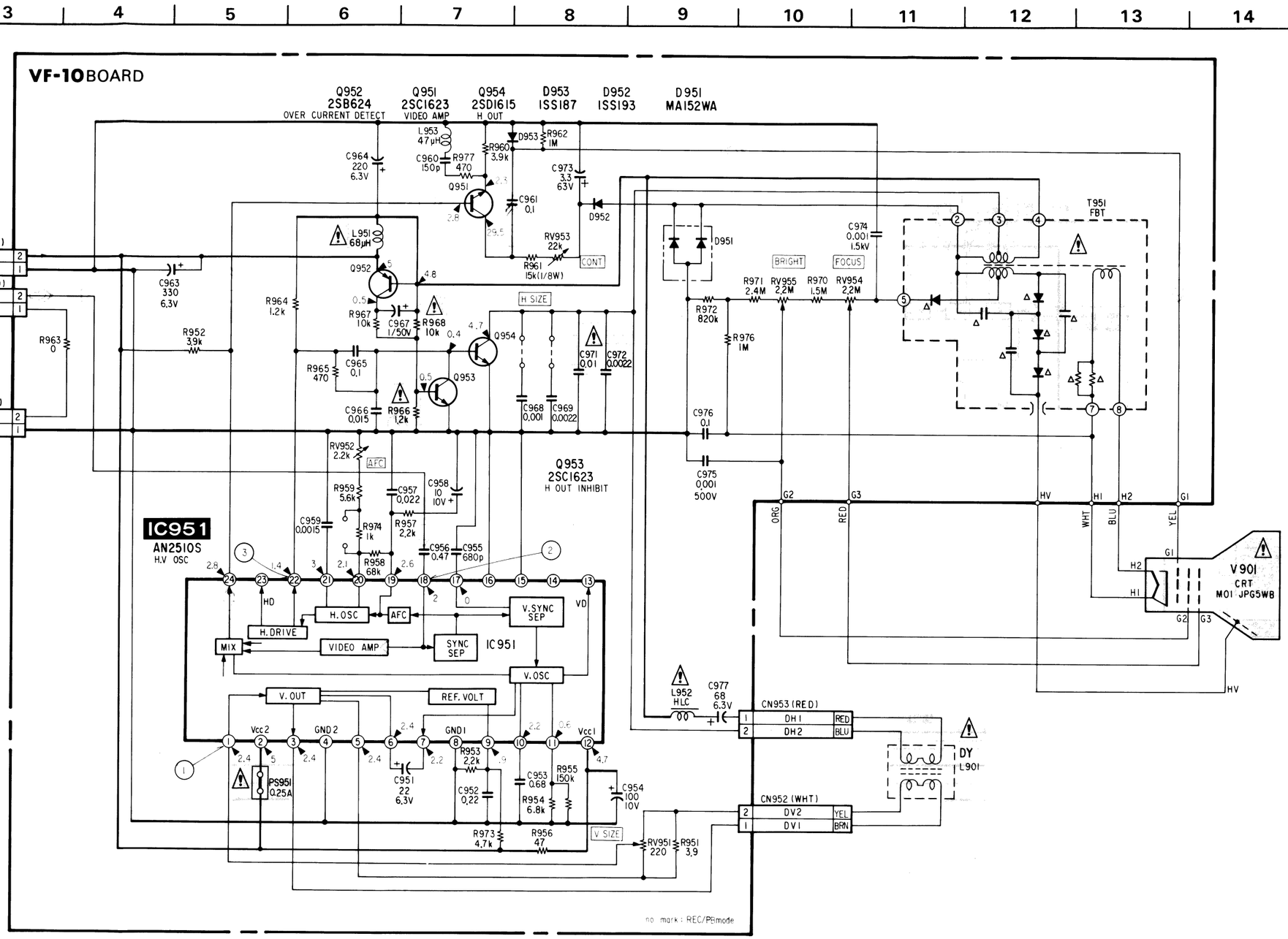

VF-10 BOARD
1
1.9Vp-p
V
IC951 (1) REC/PB
2
0.9Vp-p
H
IC951 (18) REC/PB
3
2Vp-p
H
IC951 (22) REC/PB


VF-10 BOARD
Q952 2SB624 OVER CURRENT DETECT
Q951 2SC1623 VIDEO AMP
Q954 2SD1615 H OUT
D953 1SS187
D952 1SS193
CN951(WHT)
WHT EVF 5V 2
BRN GND 1
CN954(RED)
RED VF IN 2
BLU TALLY 1
(See page 119.)
TO MV-12 BOARD CN207
CN955(YEL)
RED LED (+) 2
WHT GND 1
IC951
AN2510S
H.V OSC
H.OSC
AFC
H.DRIVE
MIX
VIDEO AMP
SYNC SEP
V.SYNC SEP
V.OSC
V.OUT
REF.VOLT
HD
VD
H SIZE
V SIZE
CONT
AFC
PS951 0.25A
L951 68µH
L952 HLC
L953 47µH
RV951 220
RV952 2.2k
RV953 22k
R961 15k(1/8W)
R962 1M
R963 0
R964 1.2k
R965 470
R966 1.2k
R967 10k
R968 10k
R973 4.7k
R974 1k
C951 22 6.3V
C952 0.22
C953 0.68
C954 100 10V
C955 680p
C956 0.47
C957 0.022
C958 10 10V
C959 0.0015
C960 150p
C961 0.1
C963 330 6.3V
C964 220 6.3V
C965 0.1
C966 0.015
C967 1/50V
C968 0.001
C969 0.0022
C971 0.01
C972 0.0022
C973 3.3 63V
Vcc2
GND2
GND1
Vcc1

• Signal path

D) SCHEMATIC DIAGRAM

DS : 7, 000 series—



- Signal path

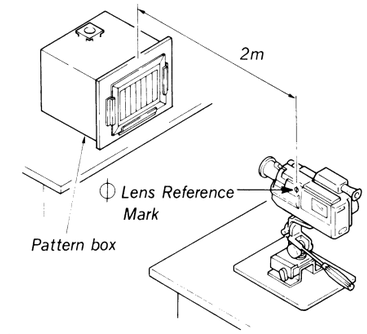
Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

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

Note:

- Caution when replacing chip parts.
  New parts must be attached after removal of chip.
  Be careful not to heat the minus side of tantalum capacitor, because it is damaged by the head.
- All resistors are in ohms, 1/10W unless otherwise noted.
- All capacitors are in μF (p:pF) unless otherwise noted.
  50V or less are not indicated except for electrolytic capacitors.
- All variable and semi fixed resistors have characteristic curve B, unless otherwise noted.
- ▭ : panel designation.
- ⊟ : Nonflammable resistor
- ——— : B+ bus.
- ▭ : adjustment for repair.
- Voltage and waveform measuring conditions:
  (1) Sample object: Pattern box colour bars.
  (2) Voltage values: Relative to ground, measured with a DC digital multimeter (impedance 10M-ohm or more).

1. Connection



2. Adjust the zooming of camera and the tripod so that the output waveform of Fig. a and the picture of Fig. b can be obtain.

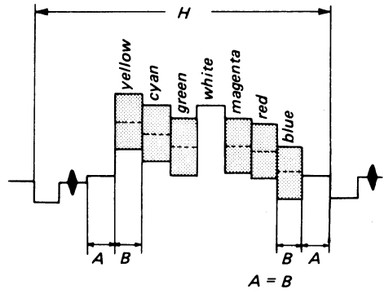


Fig.a Camera output waveform of No.⑦ terminal of FP-81 flexible board.

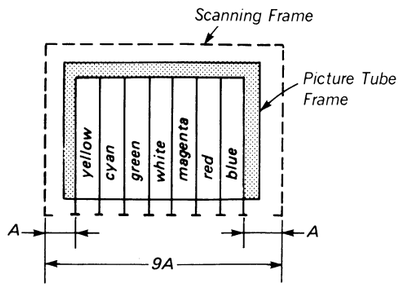
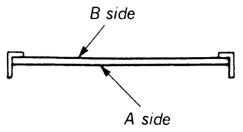


Fig. b Picture of TV monitor screen

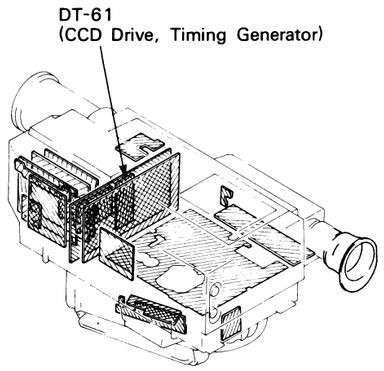
DT-61(CCD DRIVE, TIMING GENERATOR) PRINTED WIRING BOARDS

Note:

- : indicates a lead wire mounted on the component side.
- : indicates a lead wire mounted on the printed side.
- : Through hole.
- : Pattern from the side which enables seeing.
- : B+ pattern from the side which enables seeing.
- : Printed resistor.



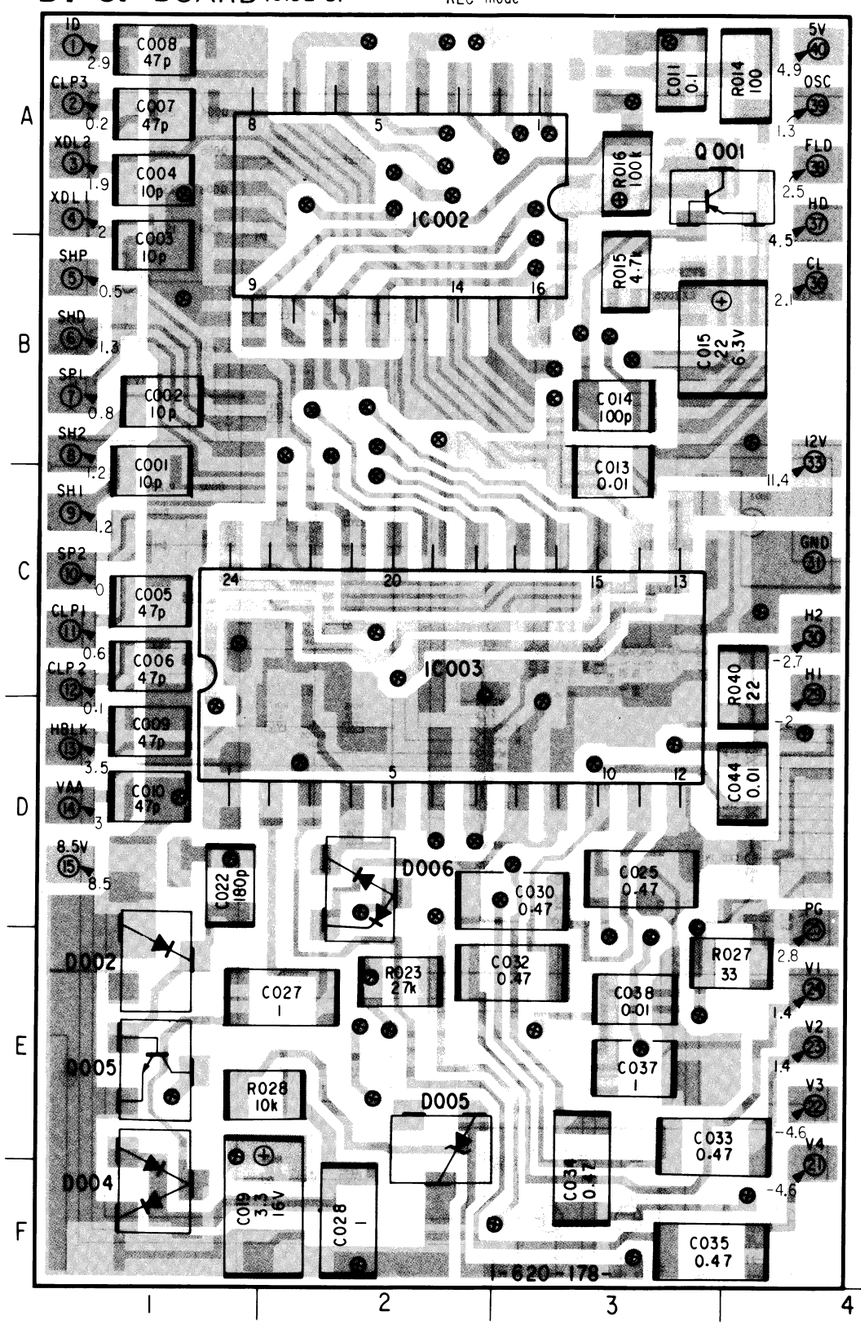
Note
Soldering side (SIDE A) : Parts on the soldering side being seen from the soldering are stated.
Component side (SIDE B) : Parts on the component side being seen from the component are stated.
Regarding color indication of patterns
- Patterns being seen in the state from the surface side are indicated in gray pattern and red pattern (B+ pattern).
- Pattern being seen in the state of the rear surface side is indicated in green pattern.



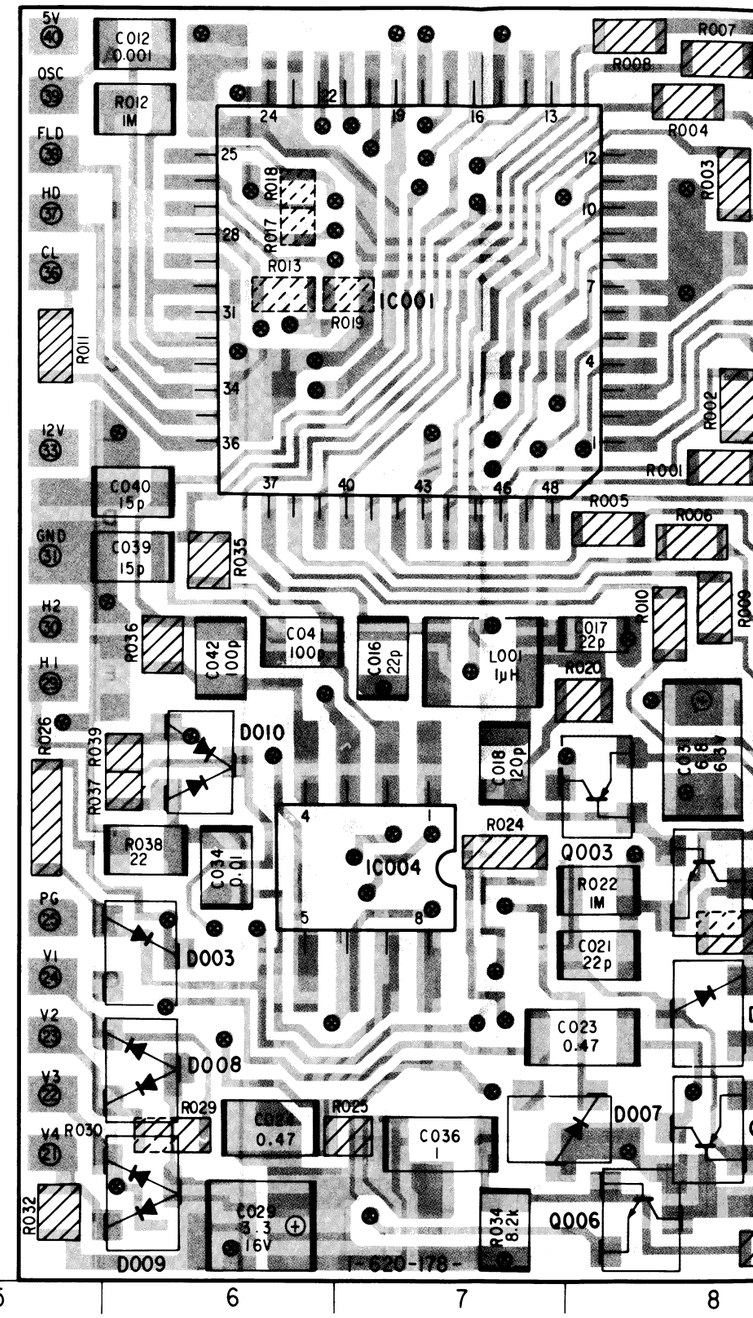
Be sure to always read "Note on replacing the CCD imager block" in page 86 when replacing the VC-20 complete board. DT-61 complete board and CCD imager block (IC701 on the VC-20 board and IC002 on the DT-61 board).

DT-61 BOARD (SIDE B)

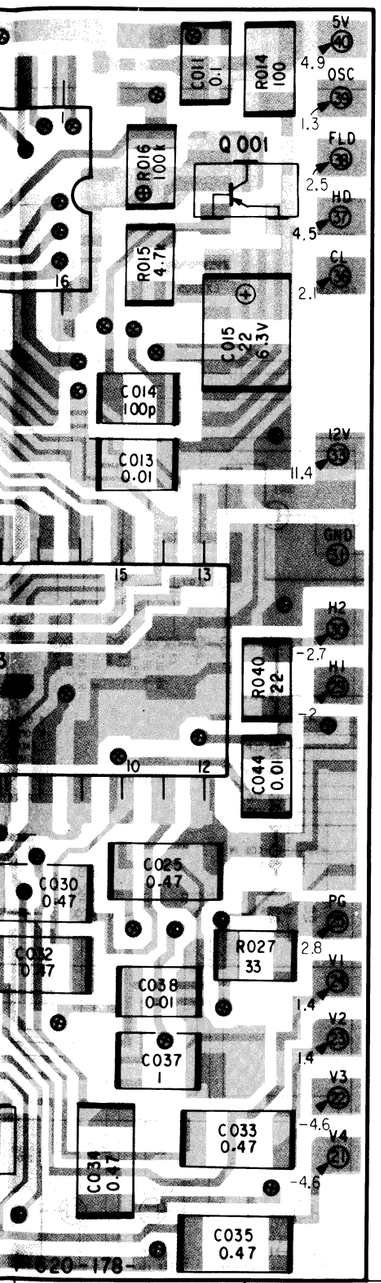
REC mode



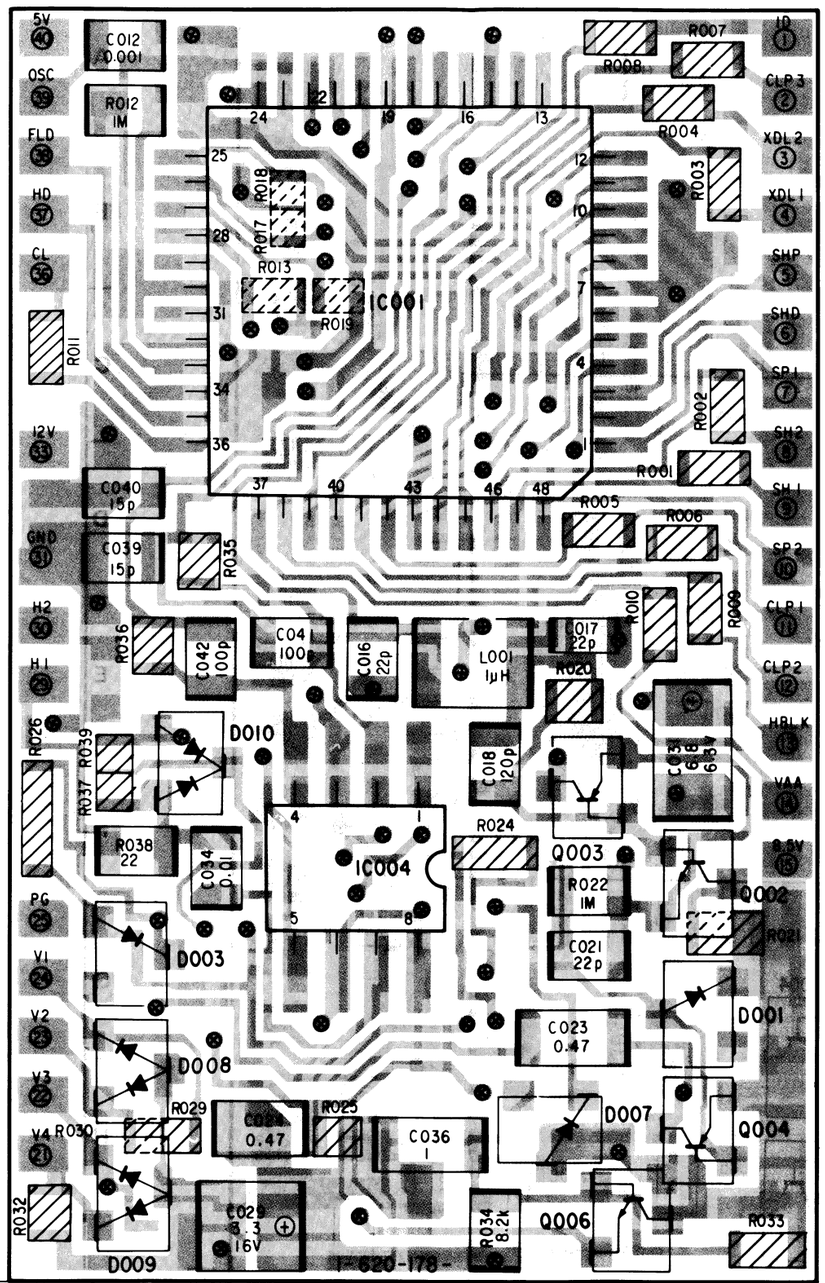
DT-61 BOARD (SIDE A)



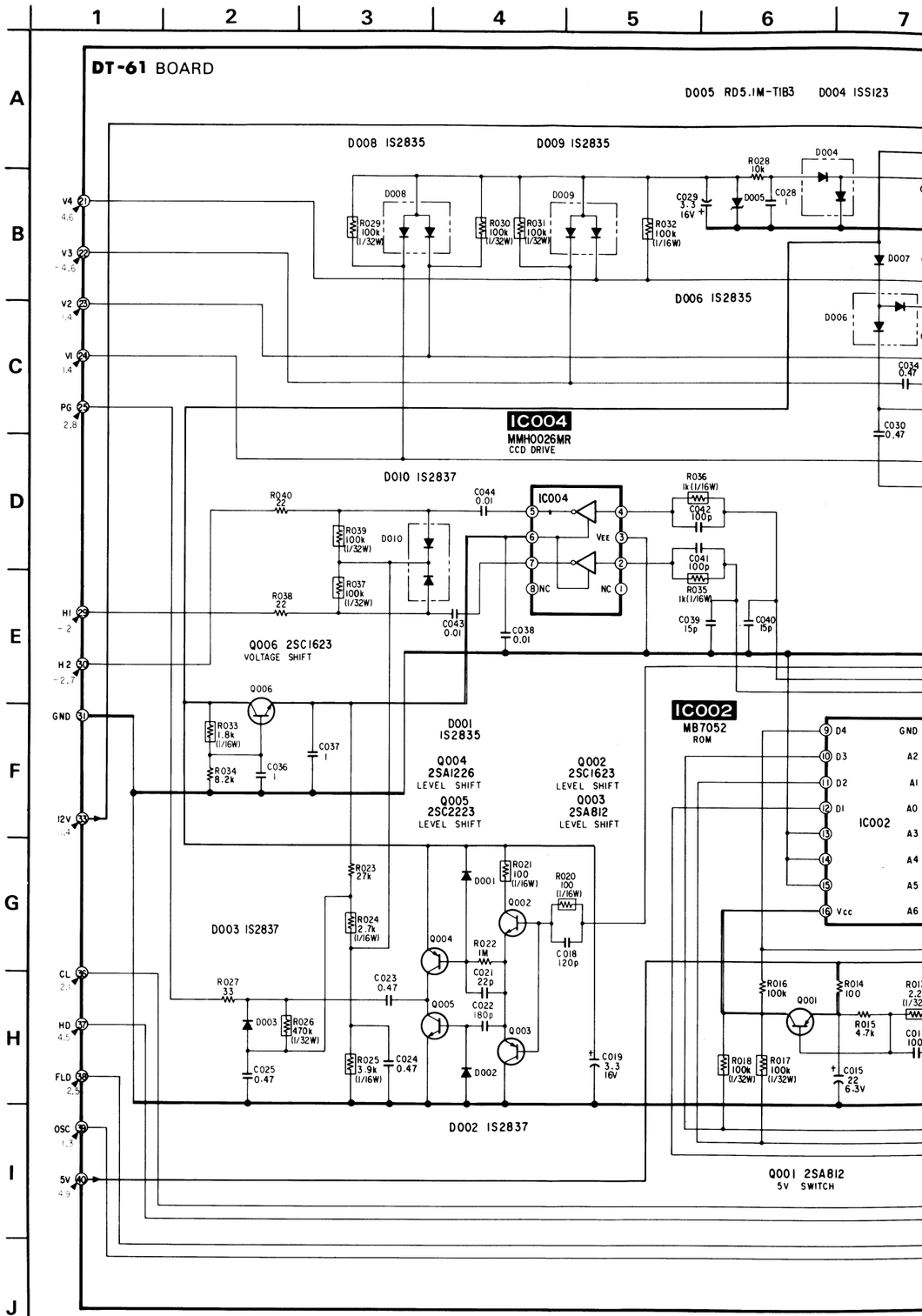
mode



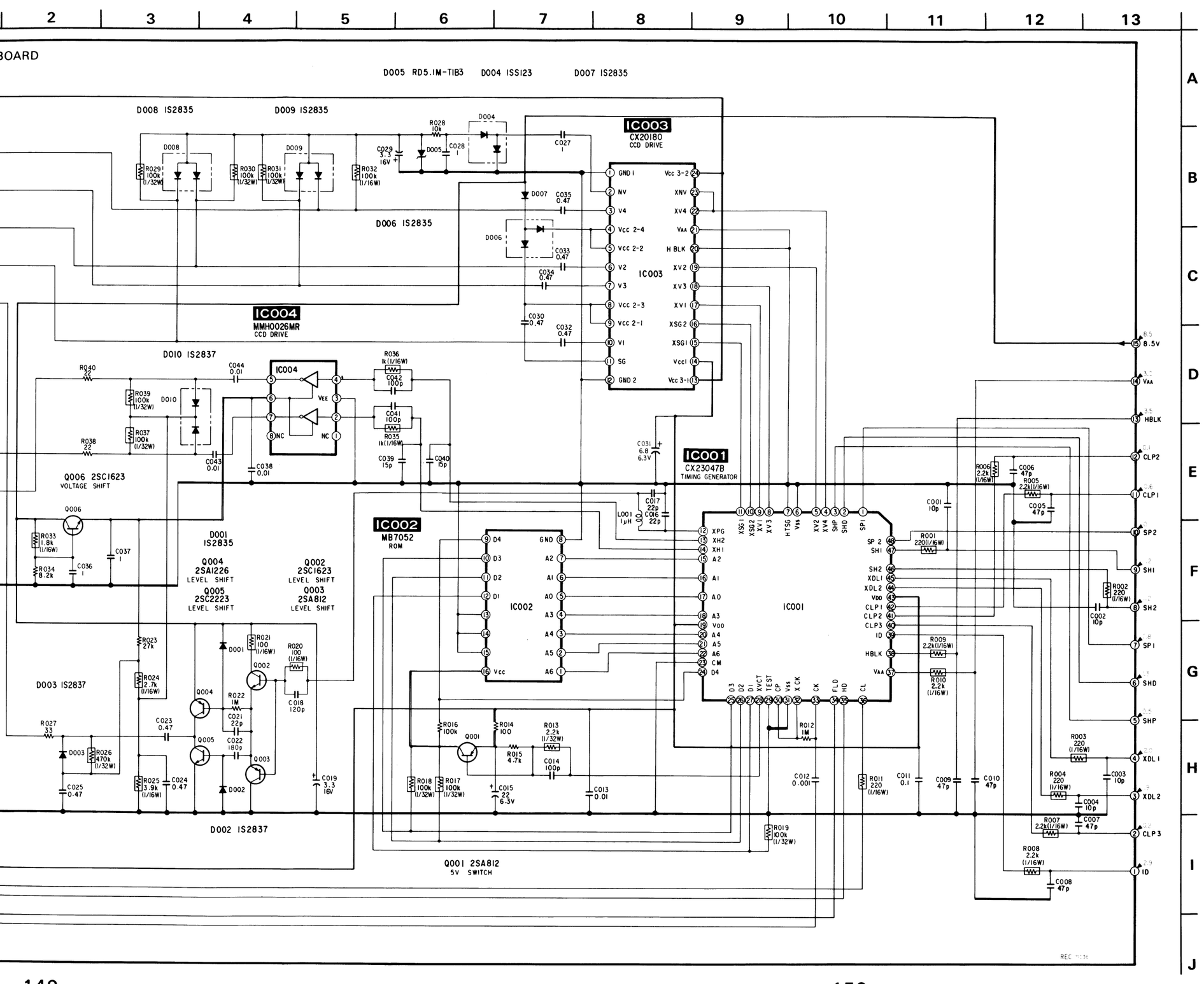
DT-61 BOARD (SIDE A)



DT-61(CCD DRIVE, TIMING GENERATOR) SCHEMATIC DIAGRAM



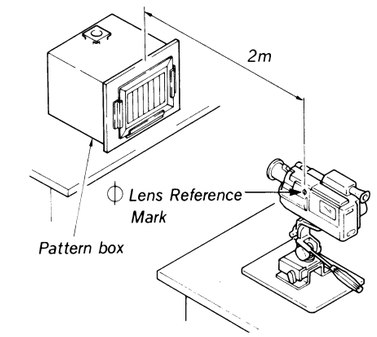
IVE, TIMING GENERATOR) SCHEMATIC DIAGRAM



Note:

- Caution when replacing chip parts.
  New parts must be attached after removal of chip.
  Be careful not to heat the minus side of tantalum capacitor, because it is damaged by the head.
- All resistors are in ohms, 1/10W unless otherwise noted.
- All capacitors are in μF (p:pF) unless otherwise noted.
  50V or less are not indicated except for electrolytic capacitors.
- All variable and semi fixed resistors have characteristic curve B, unless otherwise noted.
- ▭ : panel designation.
- ▭ : Nonflammable resistor
- ▭ : printed resistor.
- ——— : B+ bus.
- ▭ : adjustment for repair.
- Voltage and waveform measuring conditions:
  (1) Sample object: Pattern box colour bars.
  (2) Voltage values: Relative to ground, measured with a DC digital multimeter (impedance 10M-ohm or more).

1. Connection



2. Adjust the zooming of camera and the tripod so that the output waveform of Fig. a and the picture of Fig. b can be obtain,

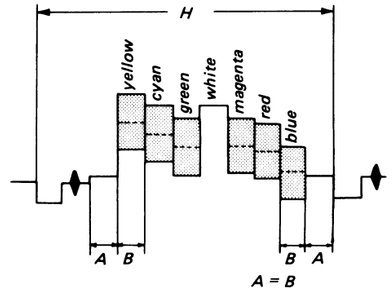


Fig.a Camera output waveform of No.⑦ terminal of FP-81 flexible board.

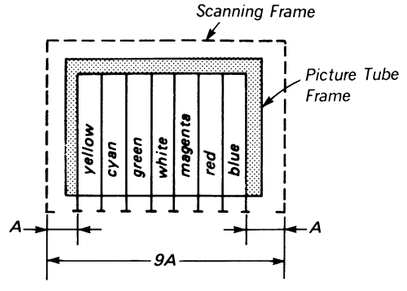
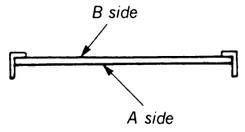


Fig. b Picture of TV monitor screen

Note:

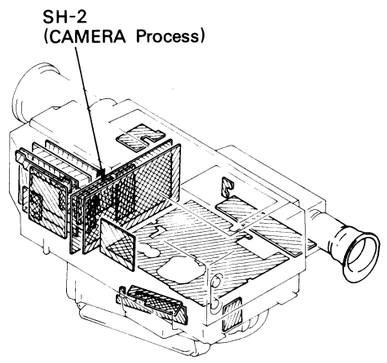
- ○— : indicates a lead wire mounted on the component side.
- ●— : indicates a lead wire mounted on the printed side.
- ⊗ : Through hole.
- : Pattern from the side which enables seeing.
- : B+ pattern from the side which enables seeing.
- : Printed resistor.



Note	
Soldering side (SIDE A)	: Parts on the soldering side being seen from the soldering are stated.
Component side (SIDE B)	: Parts on the component side being seen from the component are stated.

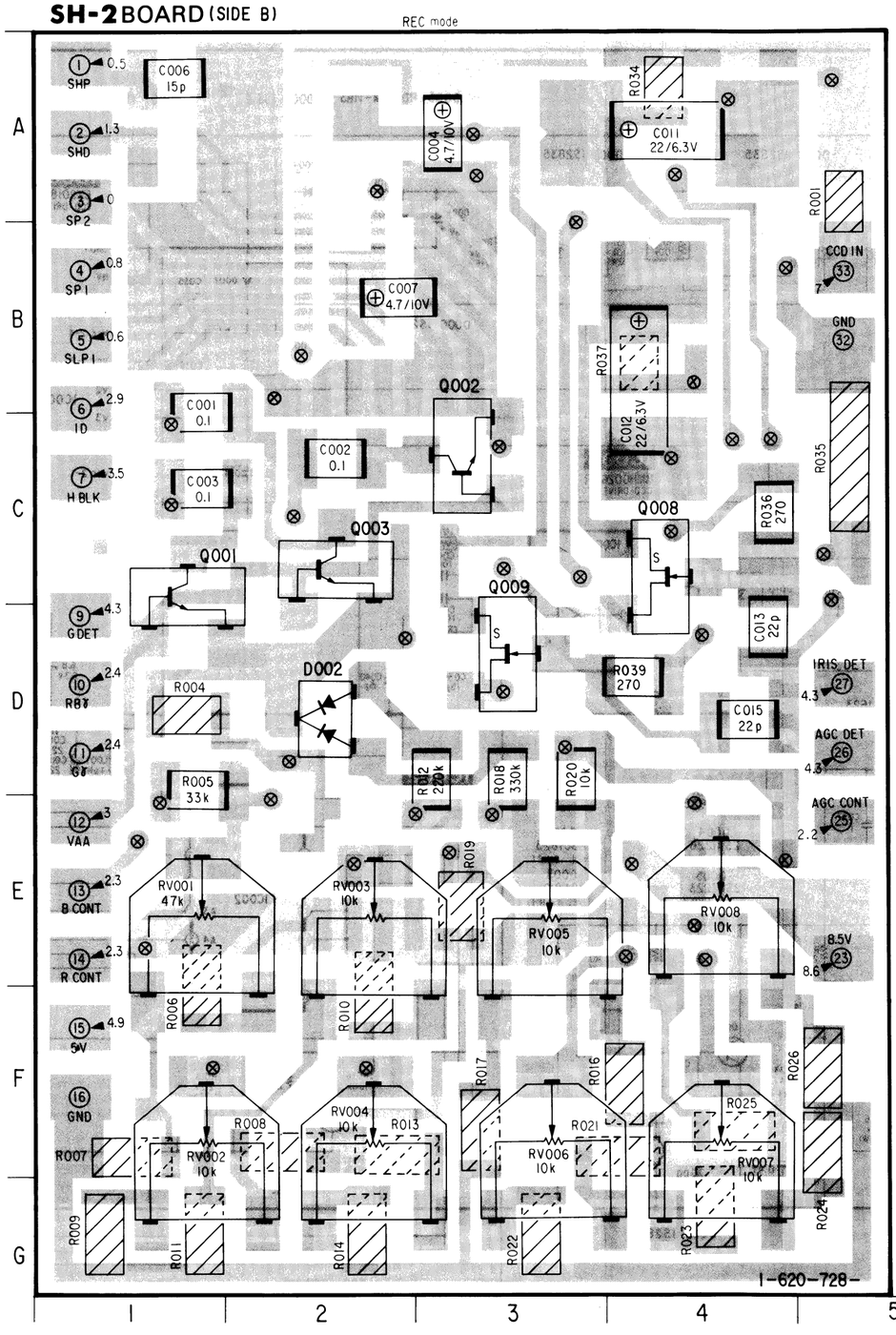
Regarding color indication of patterns

- Patterns being seen in the state from the surface side are indicated in gray pattern and red pattern (B+ pattern).
- Pattern being seen in the state of the rear surface side is indicated in green pattern.



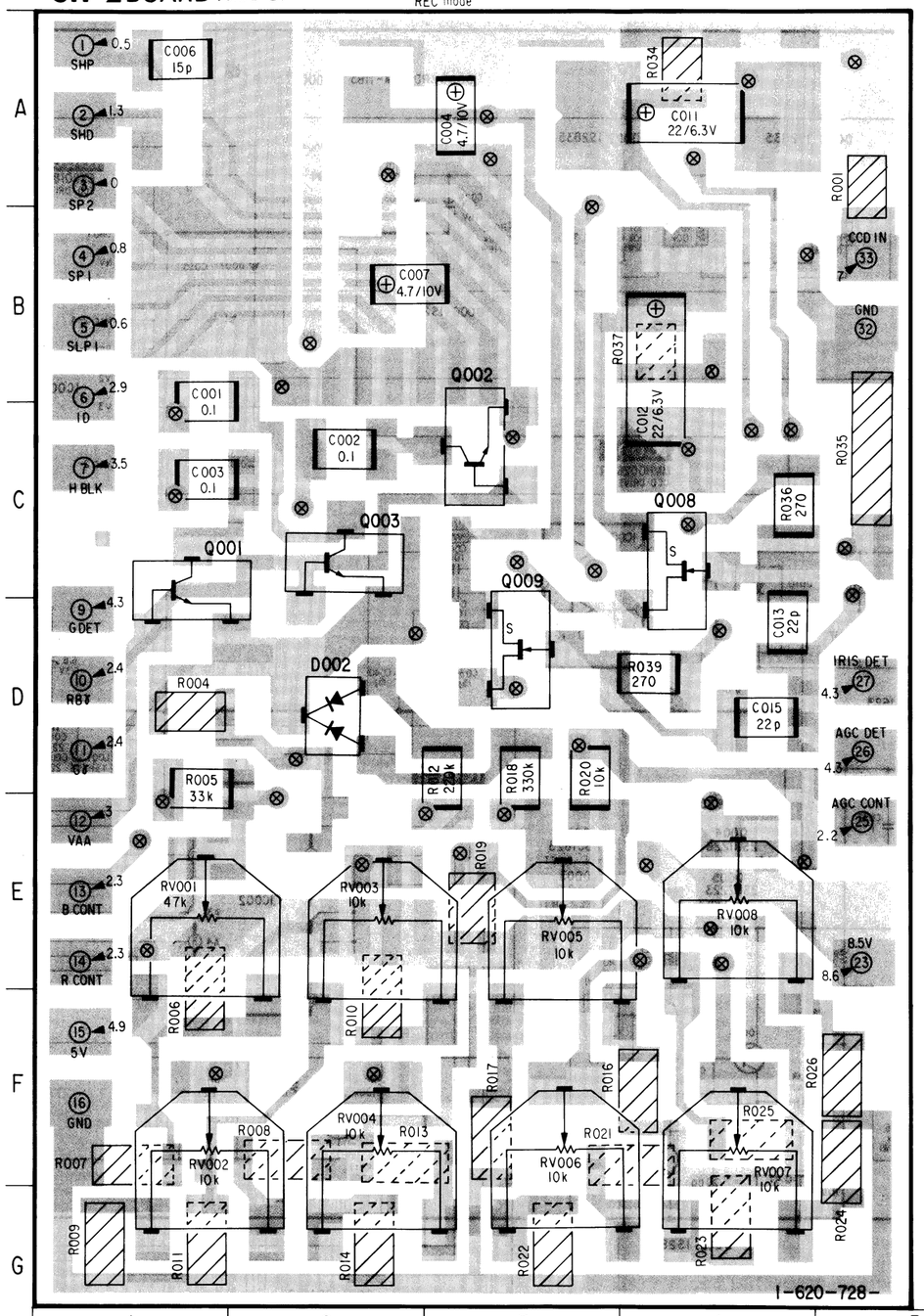
SH-2(CAMERA PROCESS)PRINTED WIRING BOARD

SH-2 BOARD (SIDE B)

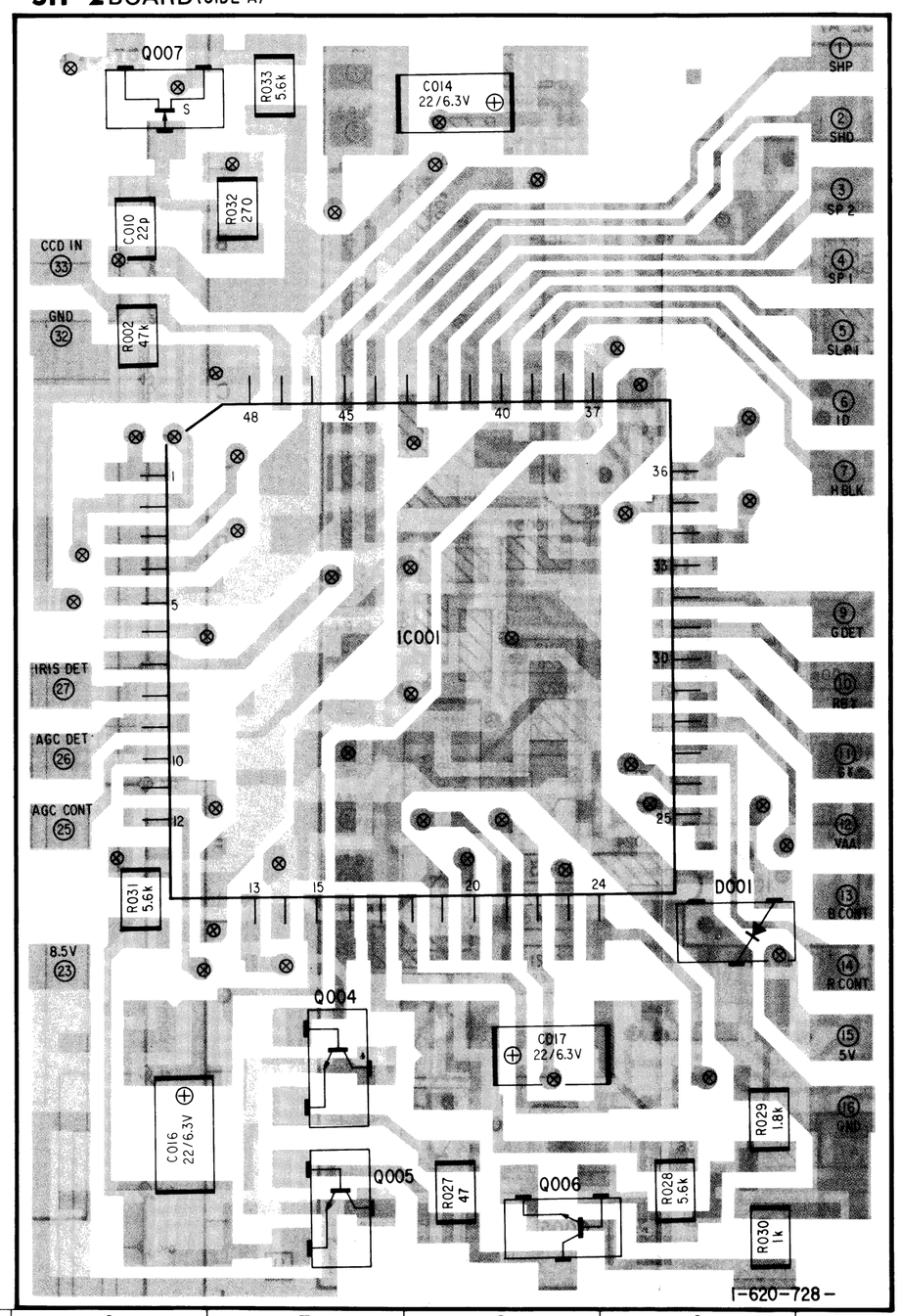


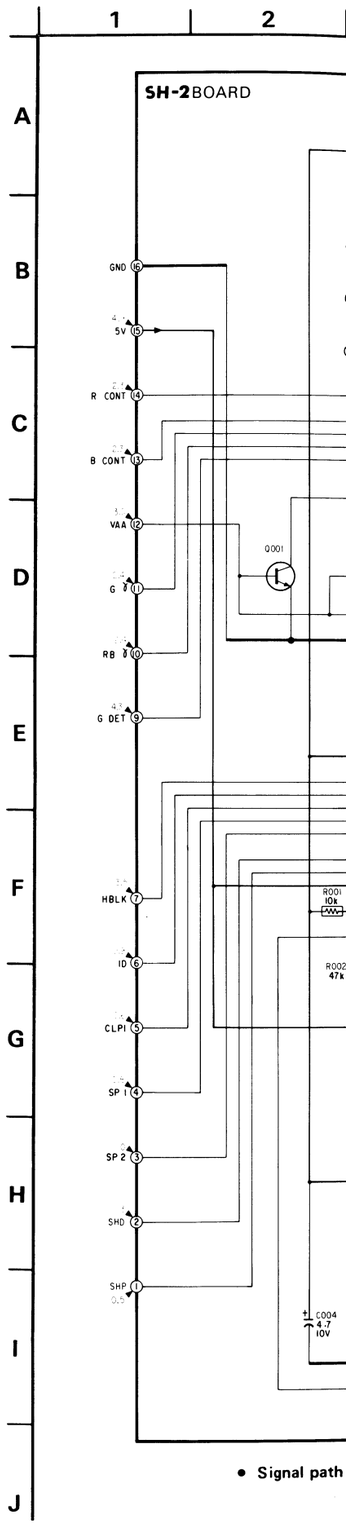
SH-2 BOARD (SIDE B)

REC mode



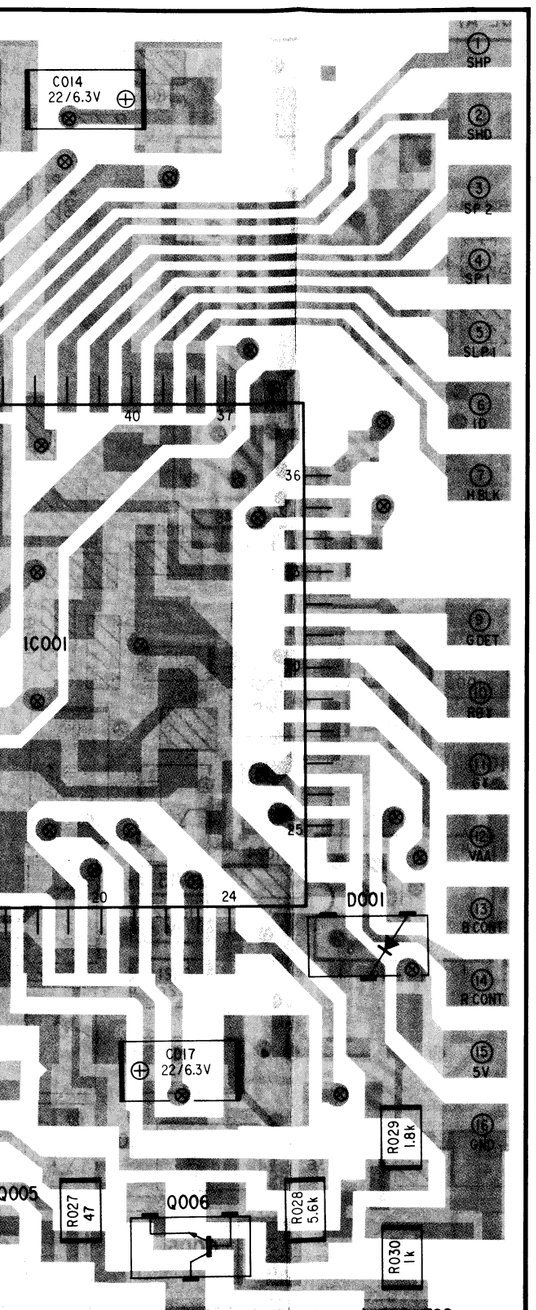
SH-2 BOARD (SIDE A)

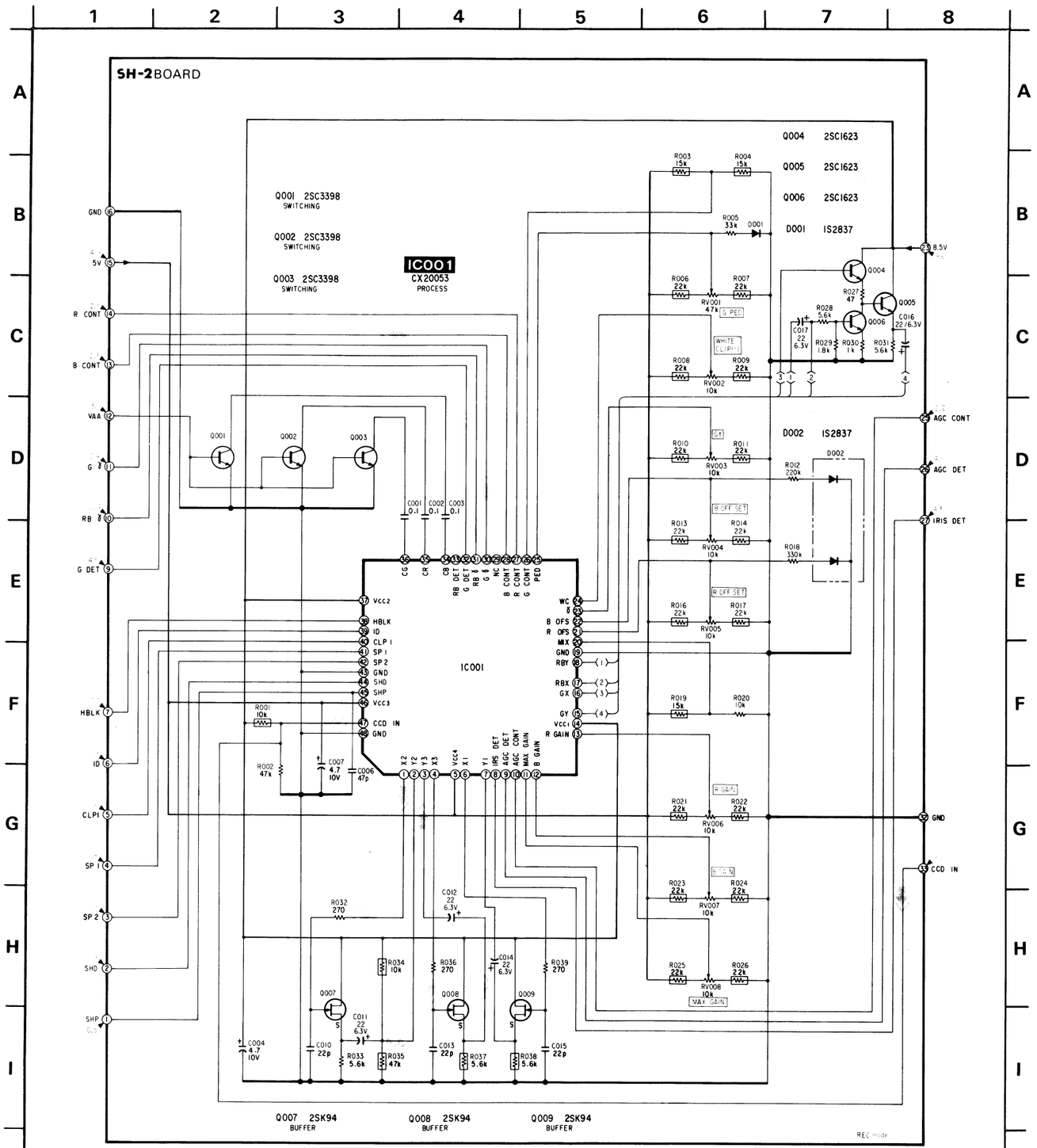




• Signal path

SH-2(CAMERA PROCESS) SCHEMATIC DIAGRAM



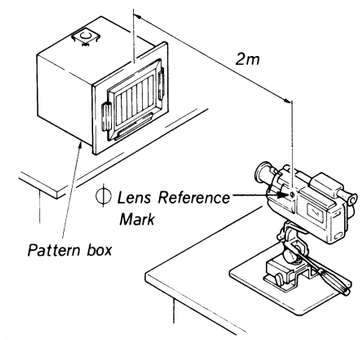


- Signal path

Note:

- Caution when replacing chip parts.
  New parts must be attached after removal of chip.
  Be careful not to heat the minus side of tantalum capacitor, because it is damaged by the head.
- All resistors are in ohms, 1/10W unless otherwise noted.
- All capacitors are in μF (p:pF) unless otherwise noted.
  50V or less are not indicated except for electrolytic capacitors.
- All variable and semi fixed resistors have characteristic curve B, unless otherwise noted.
- ▭ : panel designation.
- ▭ : Nonflammable resistor
- ▭ : printed resistor.
- ——— : B+ bus.
- ▭ : adjustment for repair.
- Voltage and waveform measuring conditions:
  (1) Sample object: Pattern box colour bars.
  (2) Voltage values: Relative to ground, measured with a DC digital multimeter (impedance 10M-ohm or more).

1. Connection



2. Adjust the zooming of camera and the tripod so that the output waveform of Fig. a and the picture of Fig. b can be obtain.

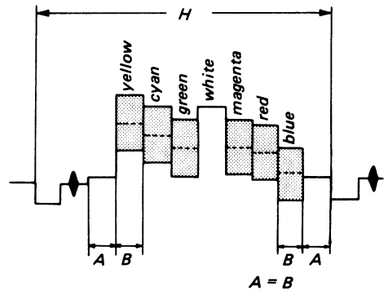


Fig.a Camera output waveform of No.⑦ terminal of FP-81 flexible board.

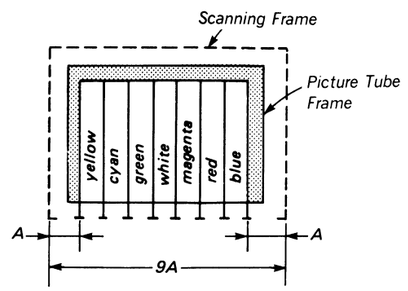
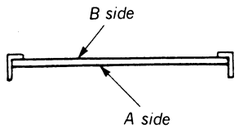


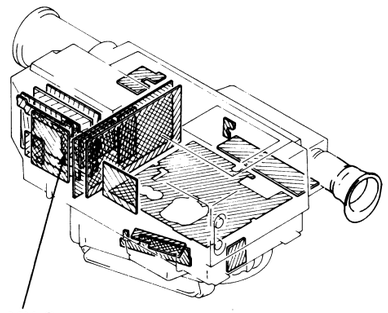
Fig. b Picture of TV monitor screen

Note:

- ○— : indicates a lead wire mounted on the component side.
- ●— : indicates a lead wire mounted on the printed side.
- ⊗ : Through hole.
- ▩ : Pattern from the side which enables seeing.
- Pattern of the rear side.
- : B+ pattern from the side which enables seeing.



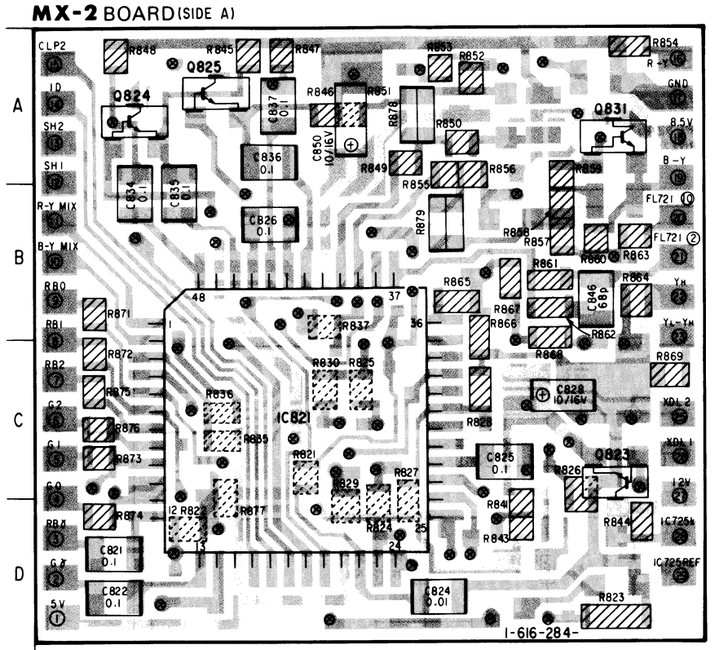
Note
Soldering side (SIDE A) : Parts on the soldering side being seen from the soldering are stated.
Component side (SIDE B) : Parts on the component side being seen from the component are stated.
Regarding color indication of patterns
- Patterns being seen in the state from the surface side are indicated in gray pattern and red pattern (B+ pattern).
- Pattern being seen in the state of the rear surface side is indicated in green pattern.



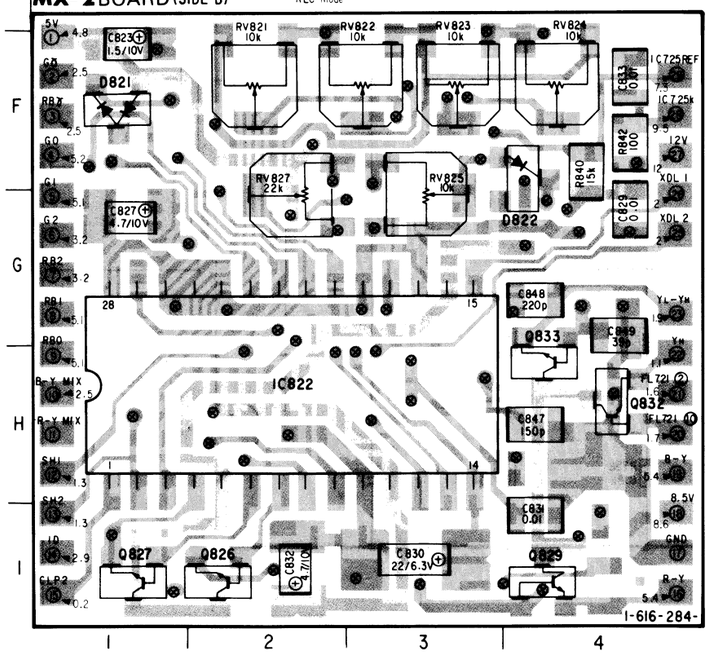
MX-2
(CAMERA Matrix)

MX-2(CAMERA MATRIX) PRINTED WIRING BOARD

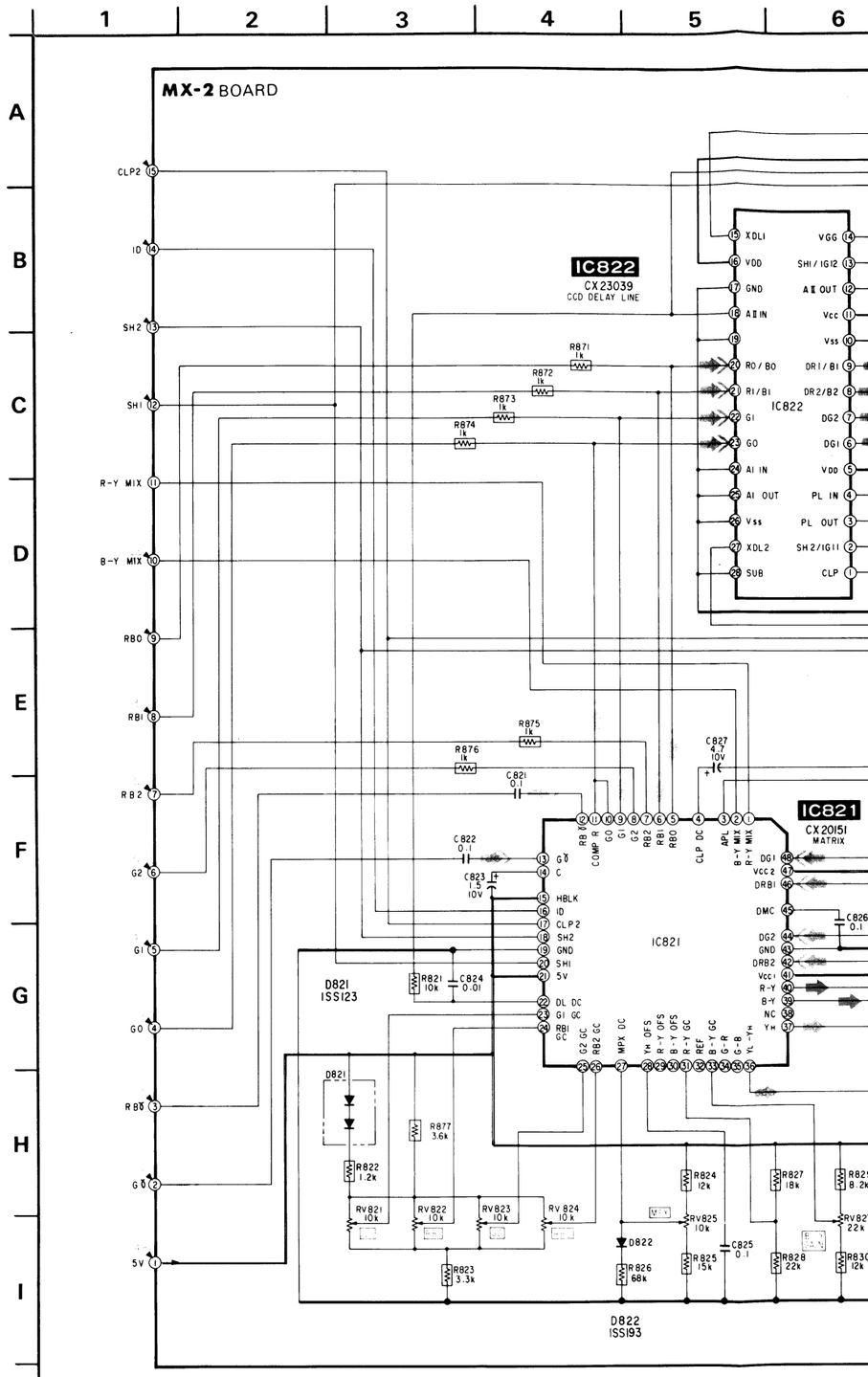
MX-2 BOARD (SIDE A)

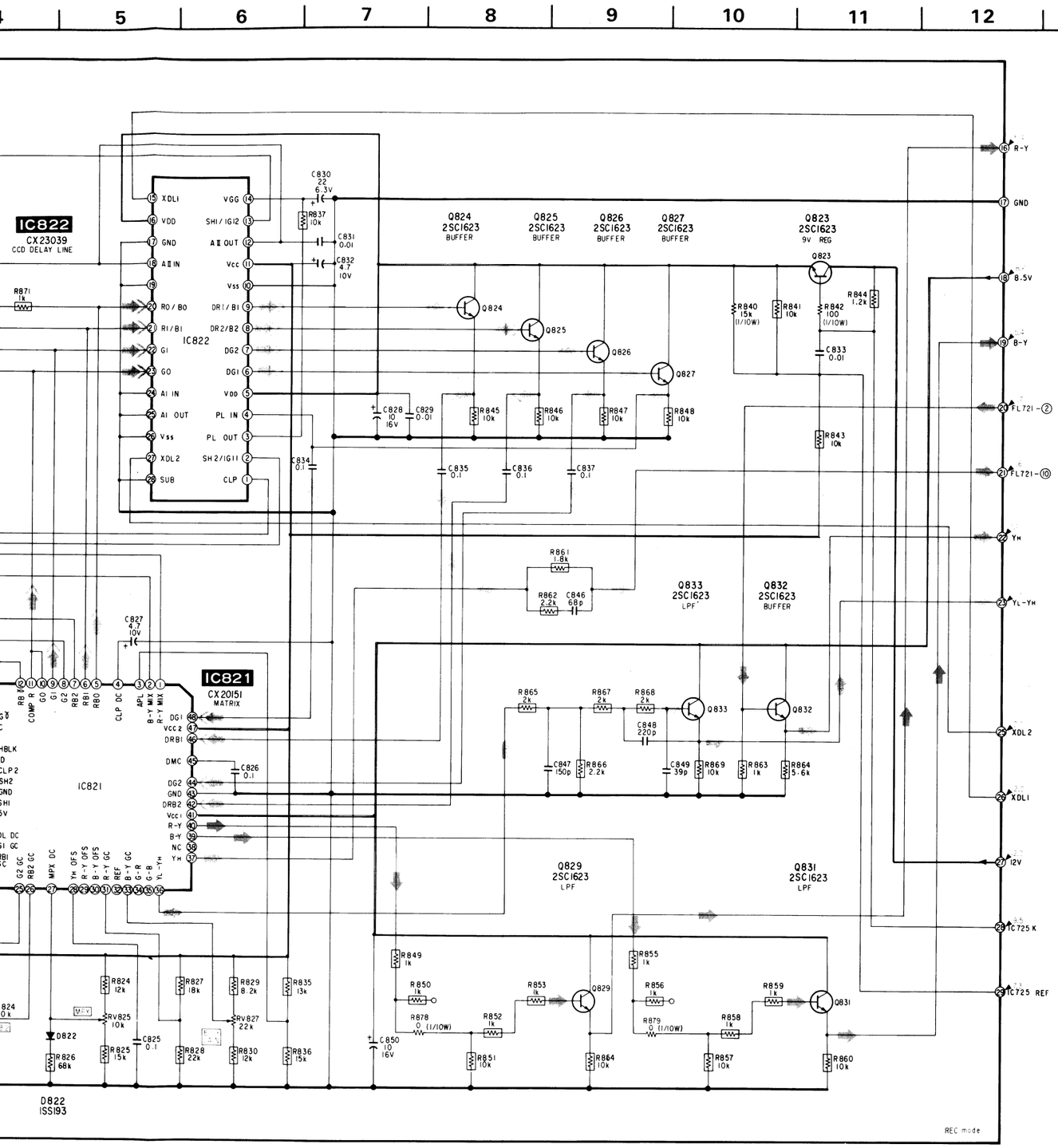


MX-2 BOARD (SIDE B) REC mode



MX-2(CAMERA MATRIX) SCHEMATIC DIAGRAM



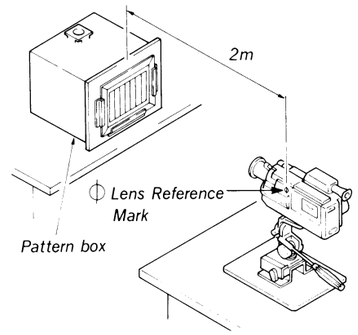


- **Signal path**
  - : REC Y Signal
  - : REC CHROMA Signal
  - : REC Y CHROMA Signal

Note:

- Caution when replacing chip parts.
  New parts must be attached after removal of chip.
  Be careful not to heat the minus side of tantalum capacitor, because it is damaged by the head.
- All resistors are in ohms, 1/10W unless otherwise noted.
- All capacitors are in μF (p:pF) unless otherwise noted.
  50V or less are not indicated except for electrolytic capacitors.
- All variable and semi fixed resistors have characteristic curve B, unless otherwise noted.
- : panel designation.
- : Nonflammable resistor
- : printed resistor.
- : B+ bus.
- : adjustment for repair.
- Voltage and waveform measuring conditions:
  (1) Sample object: Pattern box colour bars.
  (2) Voltage values: Relative to ground, measured with a DC digital multimeter (impedance 10M-ohm or more).

1. Connection



2. Adjust the zooming of camera and the tripod so that the output waveform of Fig. a and the picture of Fig. b can be obtain.

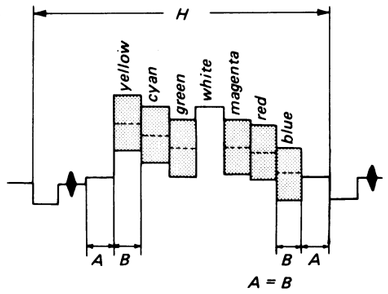


Fig.a Camera output waveform of No.⑦ terminal of FP-81 flexible board.

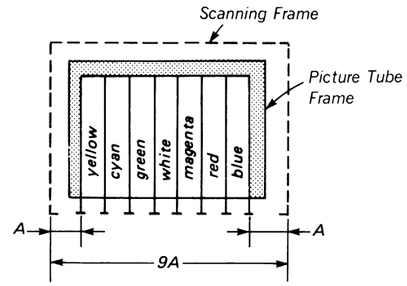
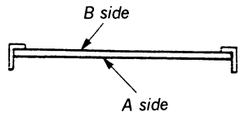


Fig. b Picture of TV monitor screen

Note:

- ○— : indicates a lead wire mounted on the component side.
- ●— : indicates a lead wire mounted on the printed side.
- ⊗ : Through hole.
- : Pattern from the side which enables seeing.
- : Pattern of the rear side
- : B+ pattern from the side which enables seeing.
- : Printed resistor.



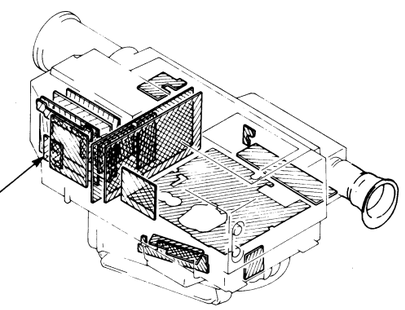
Note

Soldering side (SIDE A) : Parts on the soldering side being seen from the soldering are stated.

Component side (SIDE B) : Parts on the component side being seen from the component are stated.

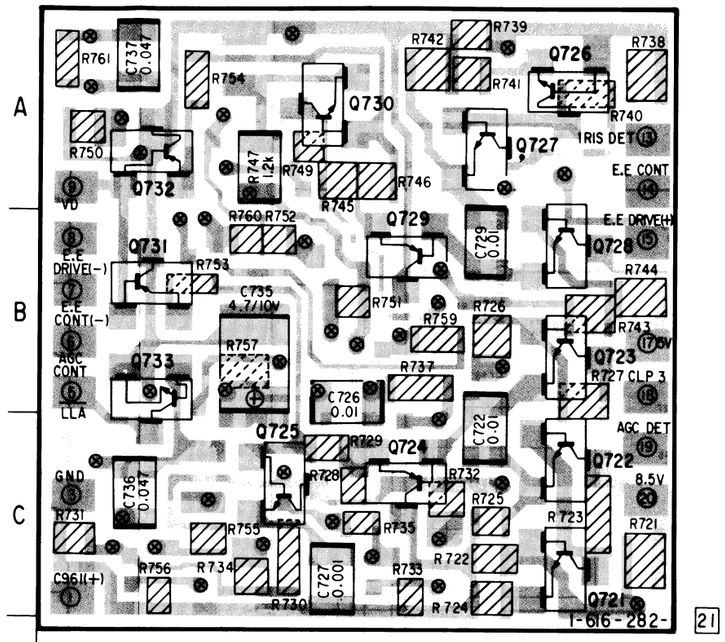
Regarding color indication of patterns

- Patterns being seen in the state from the surface side are indicated in gray pattern and red pattern (B+pattern).
- Pattern being seen in the state of the rear surface side is indicated in green pattern.



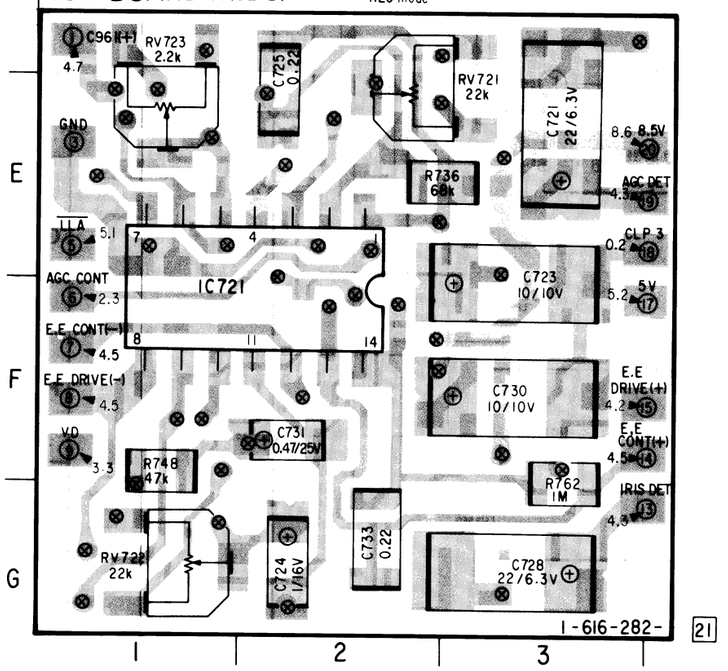
IA-1(IRIS/AGC CONTROL) PRINTED WIRING BOARD

IA-1 BOARD (SIDE A)

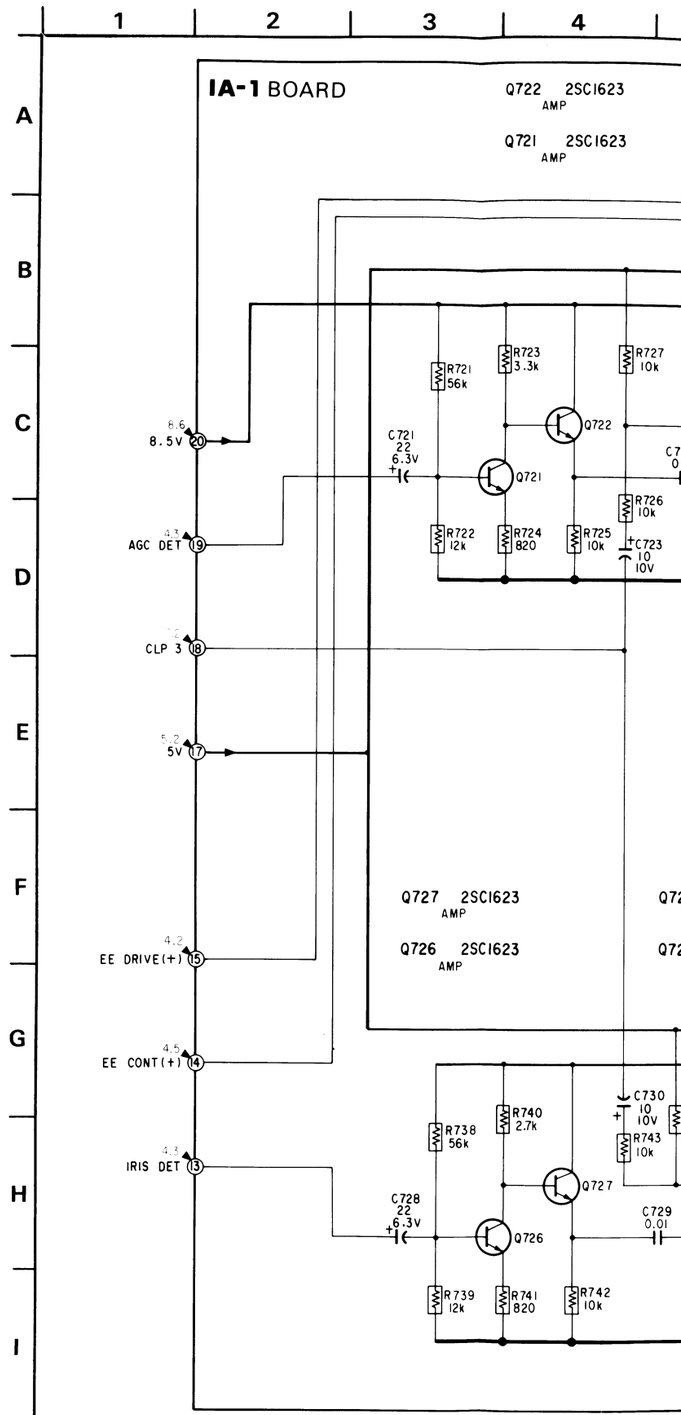


IA-1 BOARD (SIDE B)

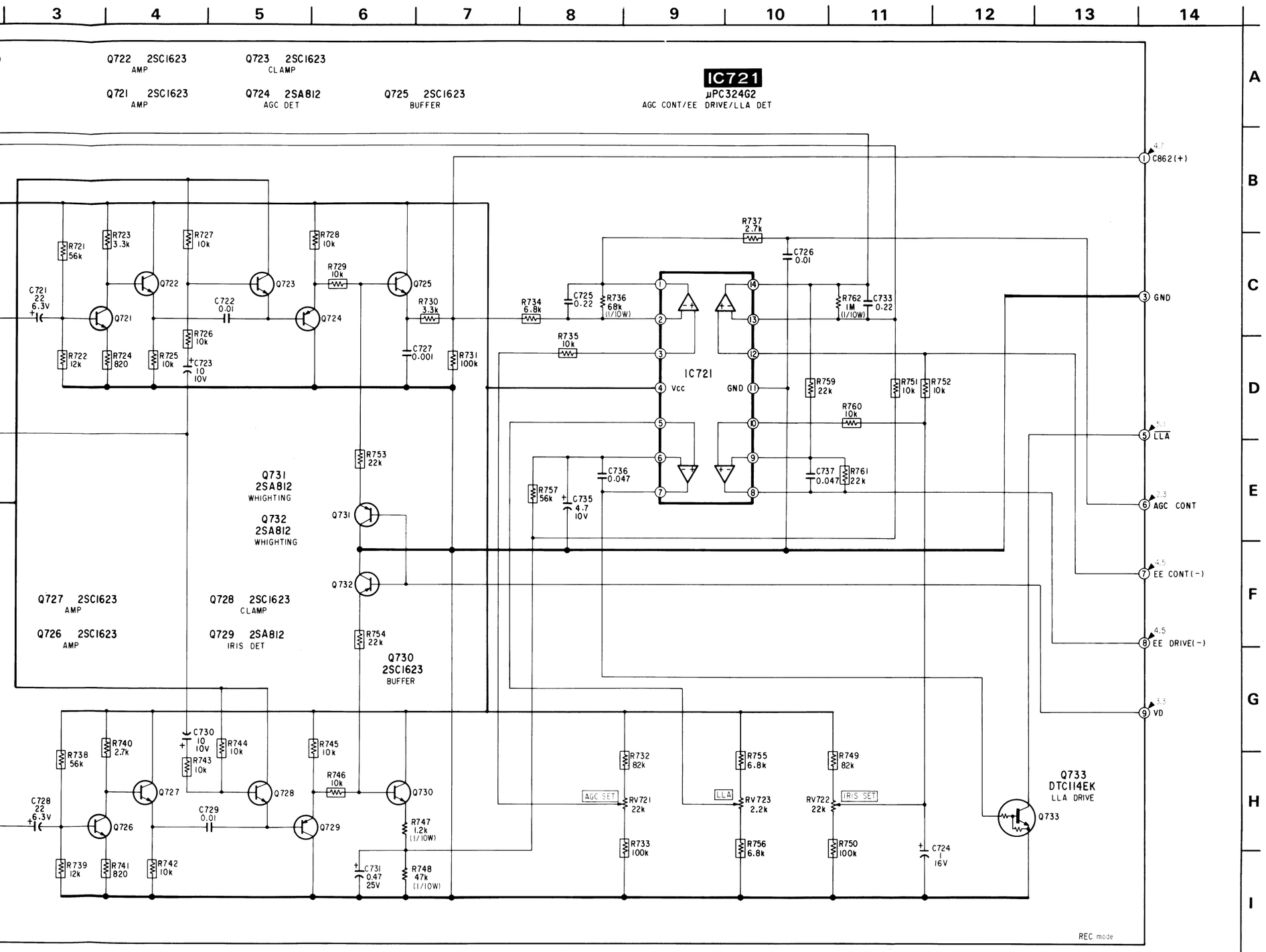
REC mode



IA-1(IRIS/AGC CONTROL) SCHEMATIC DIAGRAM



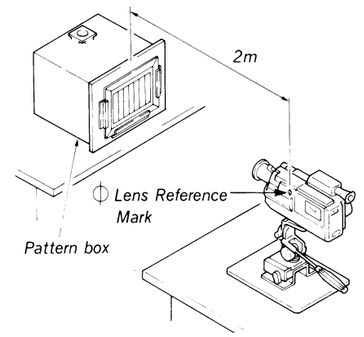
EMATIC DIAGRAM



Note:

- Caution when replacing chip parts.
  New parts must be attached after removal of chip.
  Be careful not to heat the minus side of tantalum capacitor, because it is damaged by the head.
- All resistors are in ohms, 1/10W unless otherwise noted.
- All capacitors are in μF (p:pF) unless otherwise noted.
  50V or less are not indicated except for electrolytic capacitors.
- All variable and semi fixed resistors have characteristic curve B, unless otherwise noted.
- ▭ : panel designation.
- ▭ : Nonflammable resistor
- ▭ : printed resistor.
- ——— : B+ bus.
- ▭ : adjustment for repair.
- Voltage and waveform measuring conditions:
  (1) Sample object: Pattern box colour bars.
  (2) Voltage values: Relative to ground, measured with a DC digital multimeter (impedance 10M-ohm or more).

1. Connection



2. Adjust the zooming of camera and the tripod so that the output waveform of Fig. a and the picture of Fig. b can be obtain.

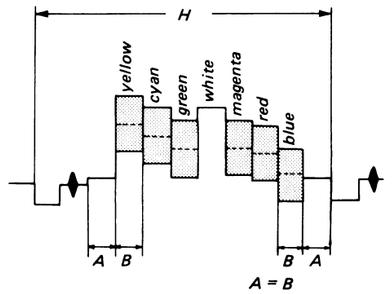


Fig.a Camera output waveform of No.⑦ terminal of FP-81 flexible board.

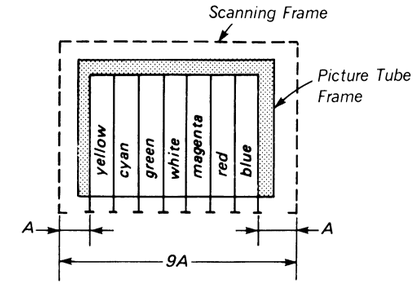
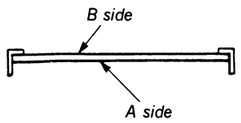


Fig. b Picture of TV monitor screen

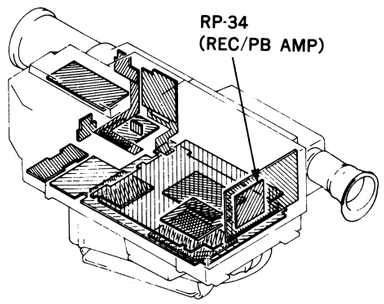
RP-34(REC/PB AMP) PRINTED WIRING BOARD

Note:

- ○— : indicates a lead wire mounted on the component side.
- ●— : indicates a lead wire mounted on the printed side.
- ⊗ : Through hole.
- ▩ : Pattern from the side which enables seeing.
- ▩ : Pattern of the rear side.
- ▩ : B+ pattern from the side which enables seeing.

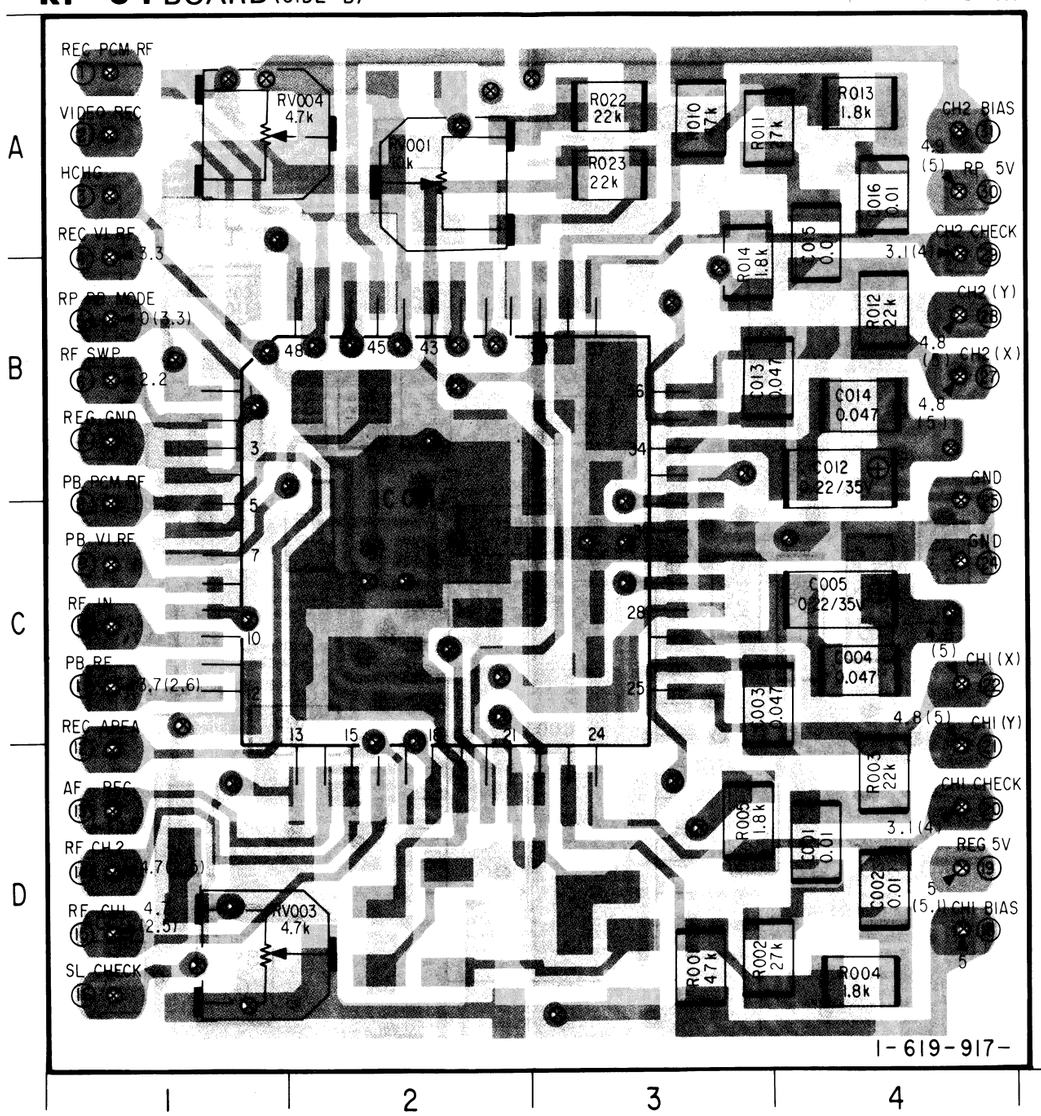


Note
Soldering side (SIDE A) : Parts on the soldering side being seen from the soldering are stated.
Component side (SIDE B) : Parts on the component side being seen from the component are stated.
Regarding color indication of patterns
- Patterns being seen in the state from the surface side are indicated in gray pattern and red pattern (B+pattern).
- Pattern being seen in the state of the rear surface side is indicated in green pattern.

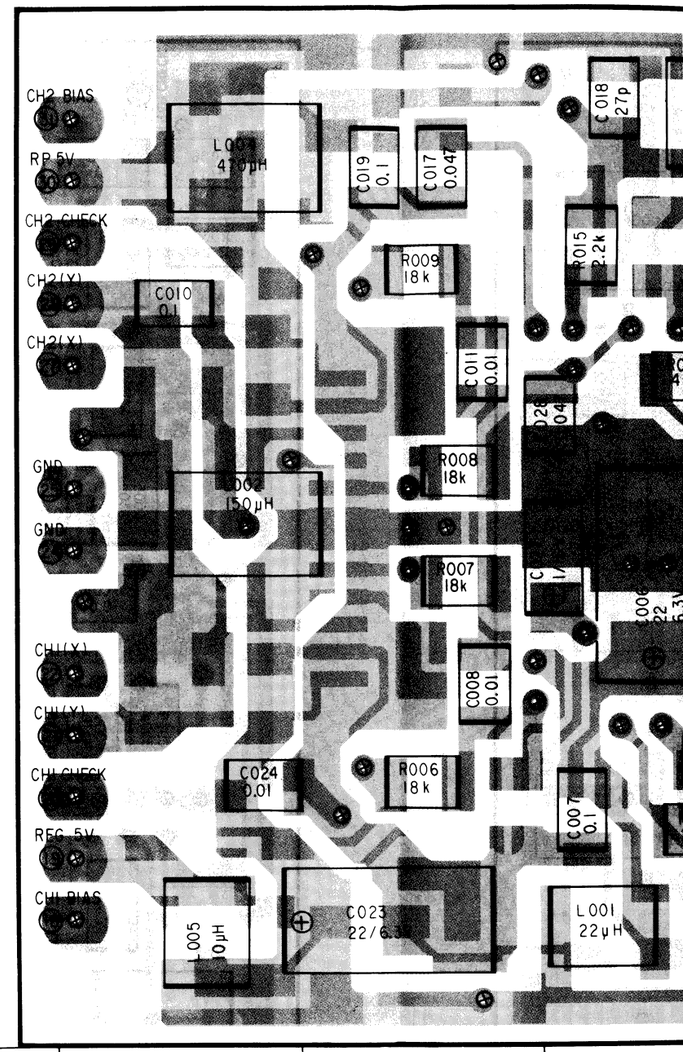


RP-34 BOARD (SIDE B)

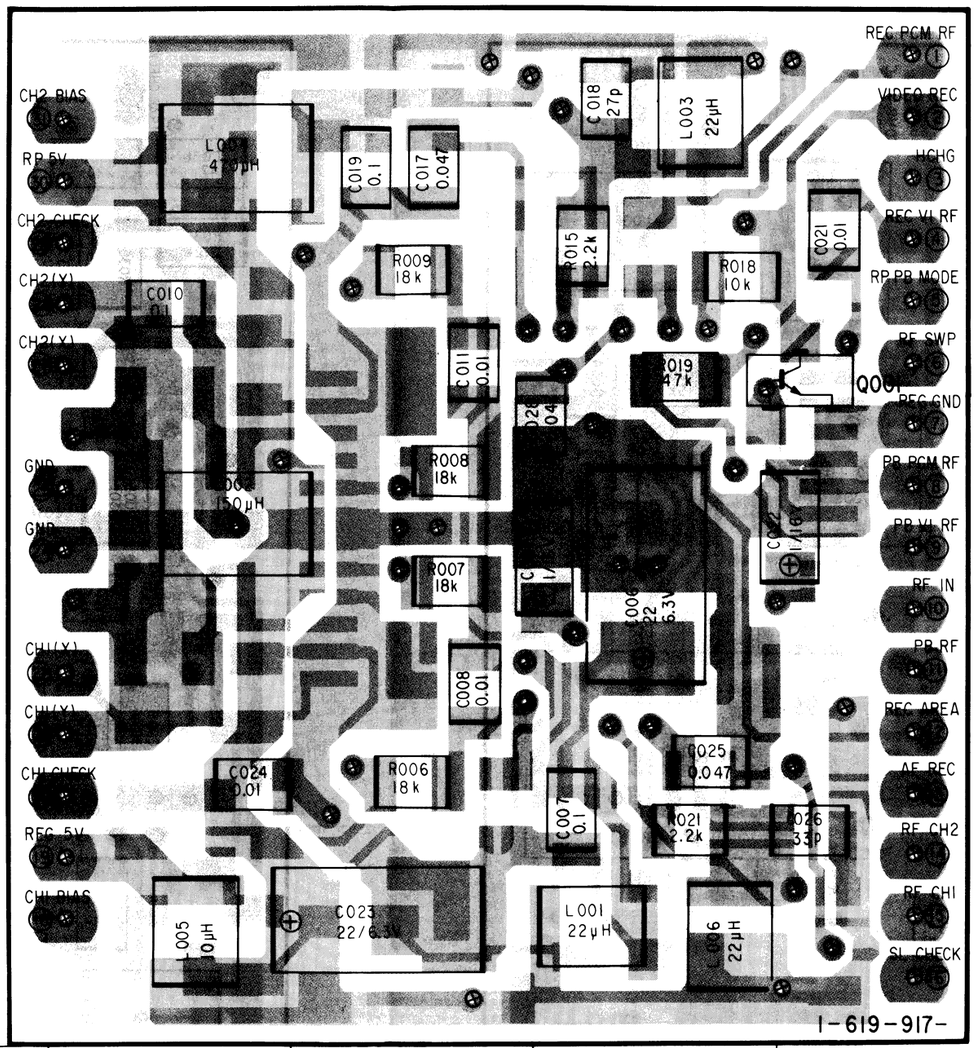
no mark : REC mode
( ) : PB mode



RP-34 BOARD (SIDE A)

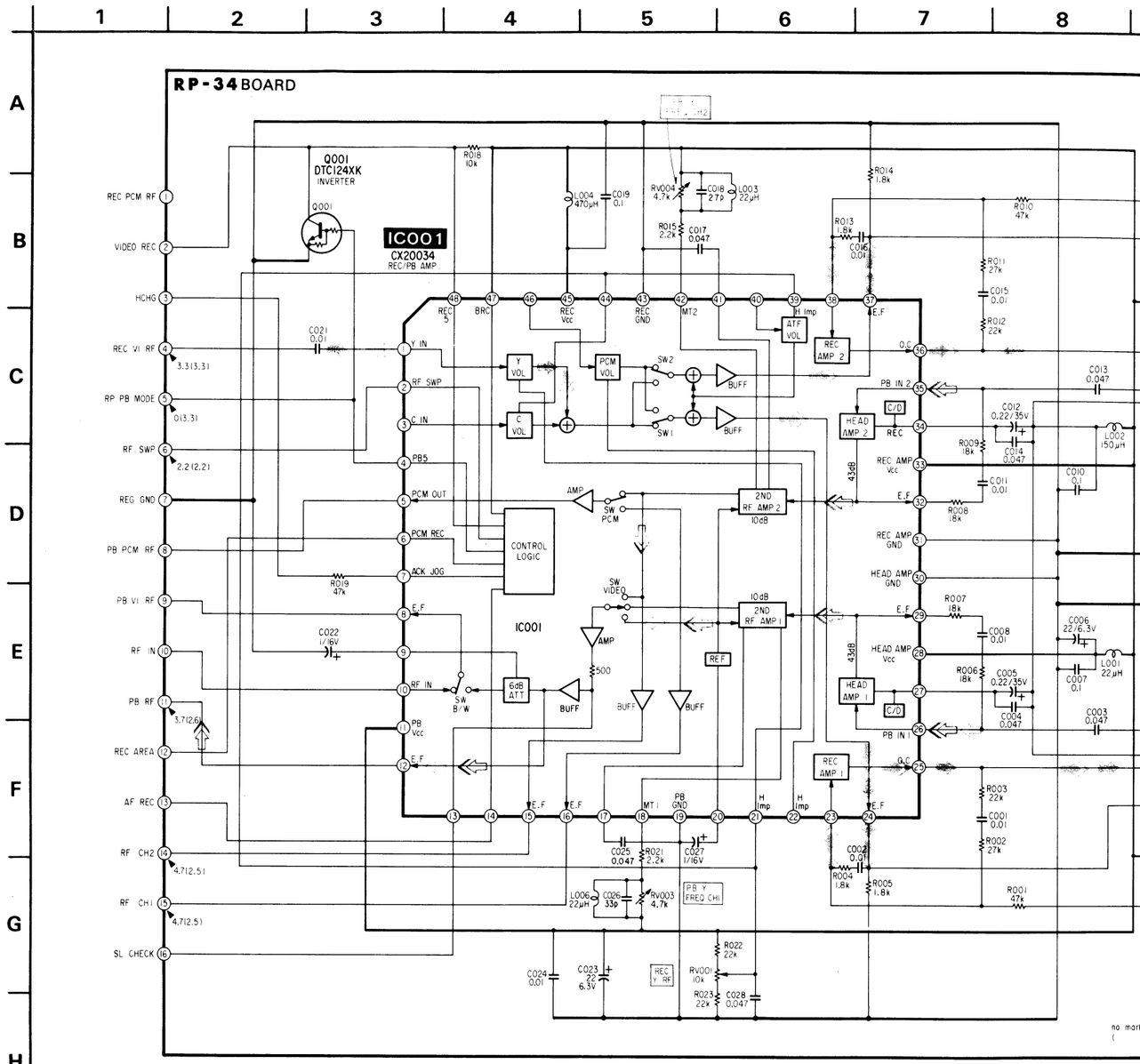


RP-34 BOARD (SIDE A)



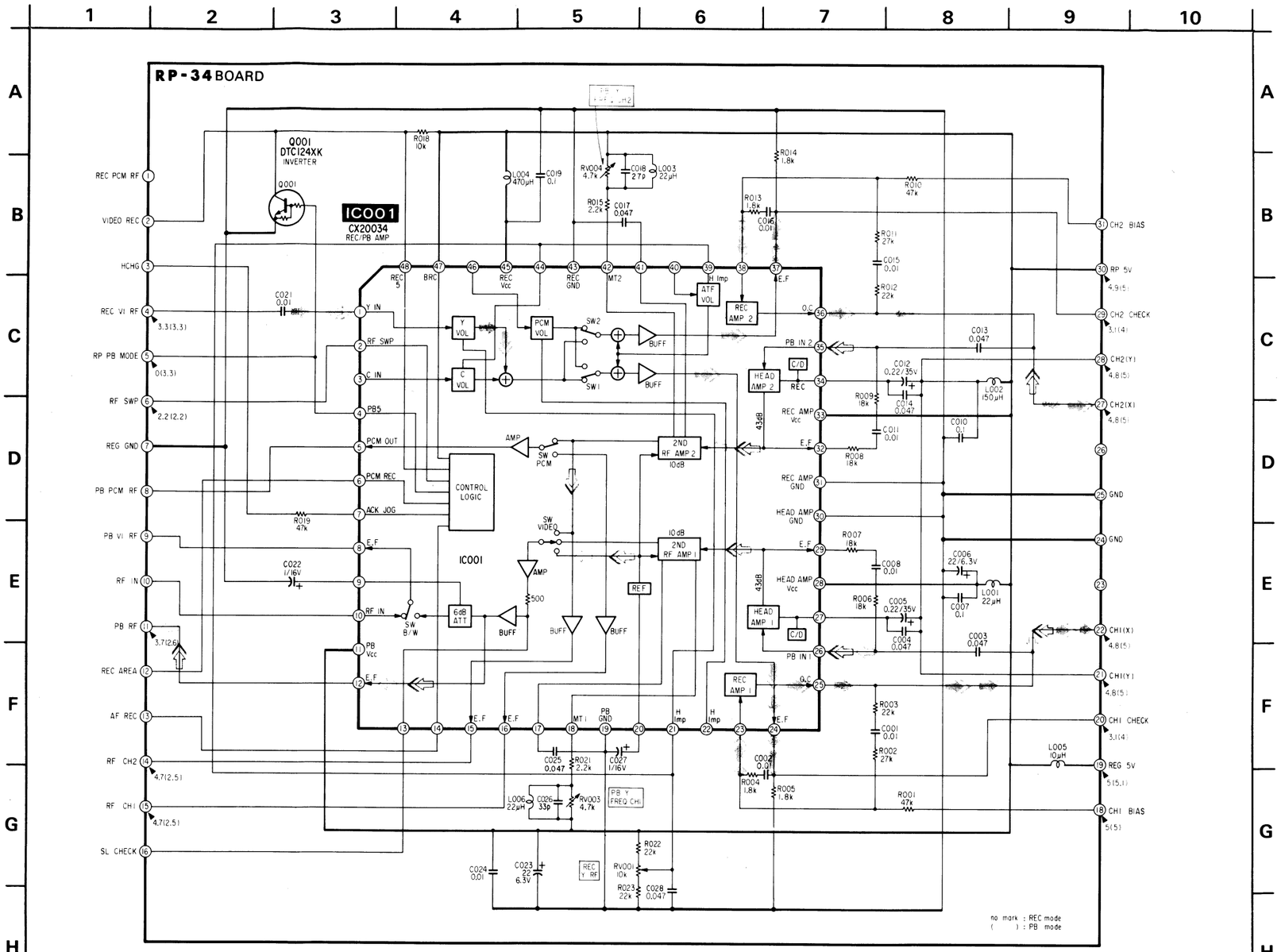
5 6 7 8 9

RP-34(REC/PB AMP) SCHEMATIC DIAGRAM



- **Signal path**
  - REC Y/CHROMA Signal
  - PB Y/CHROMA Signal

RP-34(REC/PB AMP) SCHEMATIC DIAGRAM



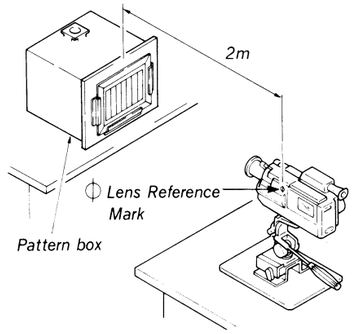
- **Signal path**

  REC Y/CHROMA Signal
  PB Y/CHROMA Signal

Note:

- Caution when replacing chip parts.
  New parts must be attached after removal of chip.
  Be careful not to heat the minus side of tantalum capacitor, because it is damaged by the head.
- All resistors are in ohms, 1/10W unless otherwise noted.
- All capacitors are in μF (p:pF) unless otherwise noted.
  50V or less are not indicated except for electrolytic capacitors.
- All variable and semi fixed resistors have characteristic curve B, unless otherwise noted.
- ▭ : panel designation.
- ▭ : Nonflammable resistor
- ——— : B+ bus.
- ▭ : adjustment for repair.
- Voltage and waveform measuring conditions:
  (1) Sample object: Pattern box colour bars.
  (2) Voltage values: Relative to ground, measured with a DC digital multimeter (impedance 10M-ohm or more).

1. Connection



2. Adjust the zooming of camera and the tripod so that the output waveform of Fig. a and the picture of Fig. b can be obtain.

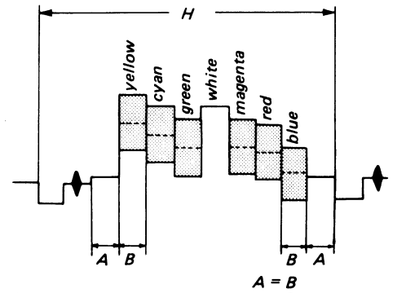


Fig.a Camera output waveform of No.⑦ terminal of FP-81 flexible board.

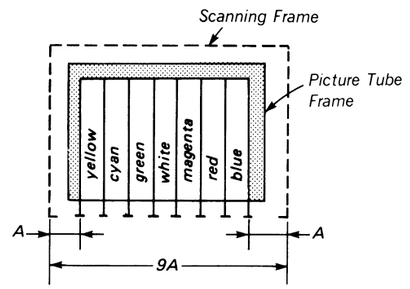
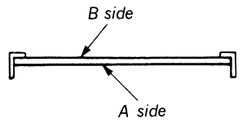


Fig. b Picture of TV monitor screen

Note:

- ○— : indicates a lead wire mounted on the component side.
- ●— : indicates a lead wire mounted on the printed side.
- ⊗ : Through hole.
- ▒ : Pattern from the side which enables seeing.
- : B+ pattern from the side which enables seeing.



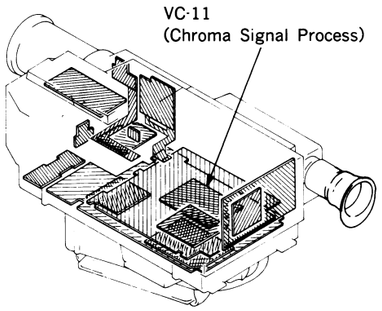
Note

Soldering side (SIDE A) : Parts on the soldering side being seen from the soldering are stated.

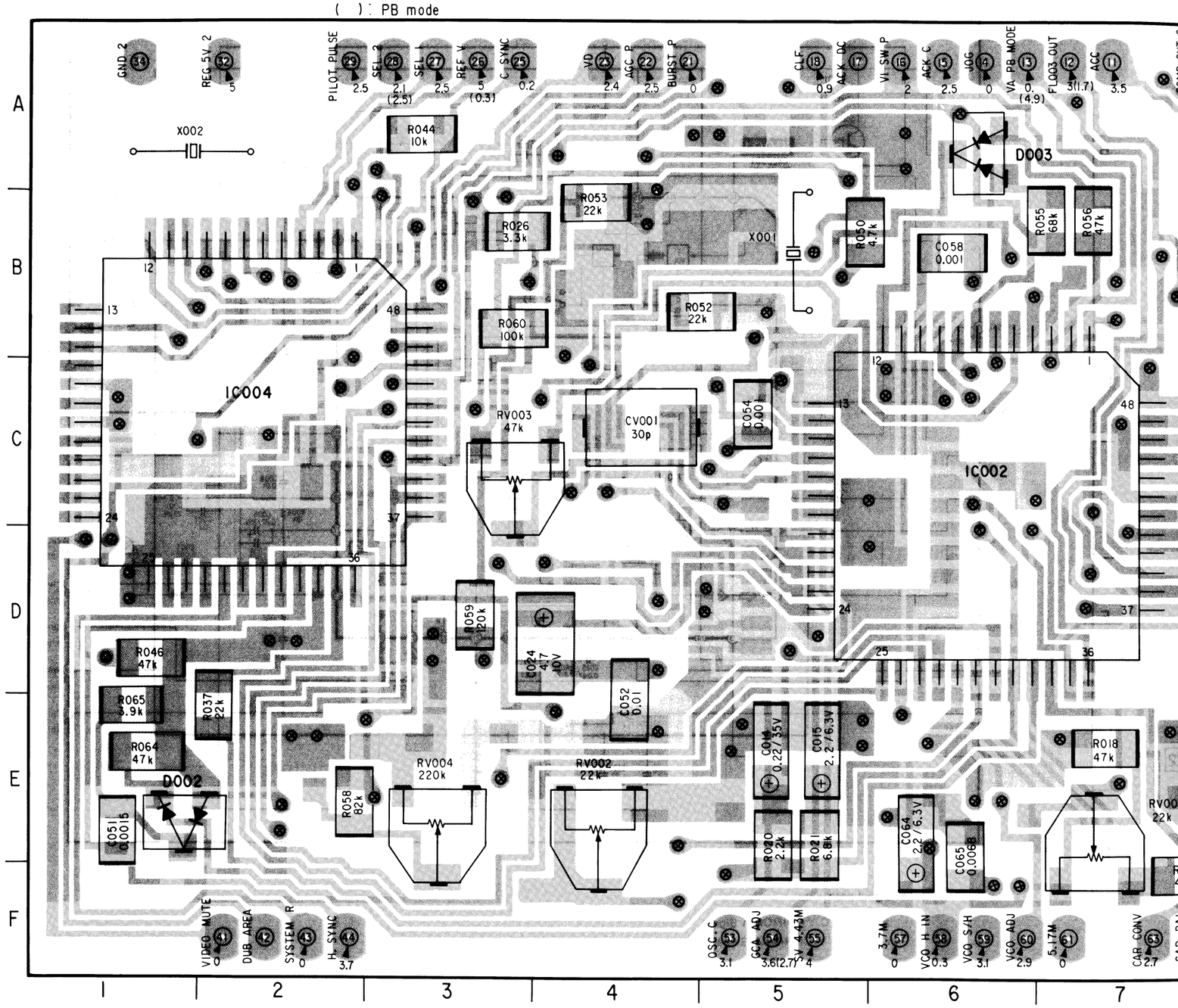
Component side (SIDE B) : Parts on the component side being seen from the component are stated.

Regarding color indication of patterns

- Patterns being seen in the state from the surface side are indicated in gray pattern and red pattern (B+ pattern).
- Pattern being seen in the state of the rear surface side is indicated in green pattern.

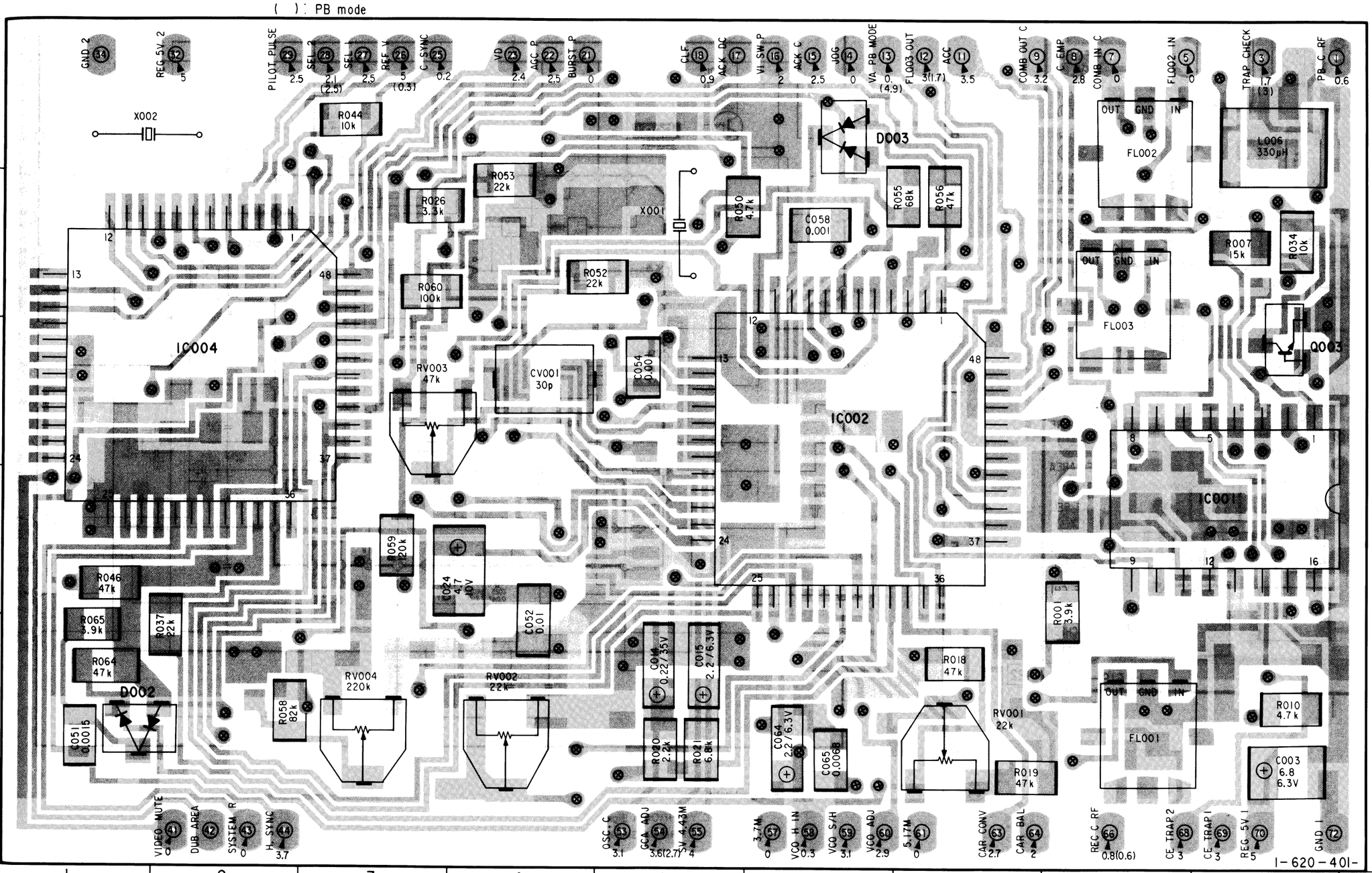


VC-11 BOARD (SIDE B) no mark : REC mode ( ) : PB mode



VC-11 BOARD (SIDE B)

no mark : REC mode
( ) : PB mode

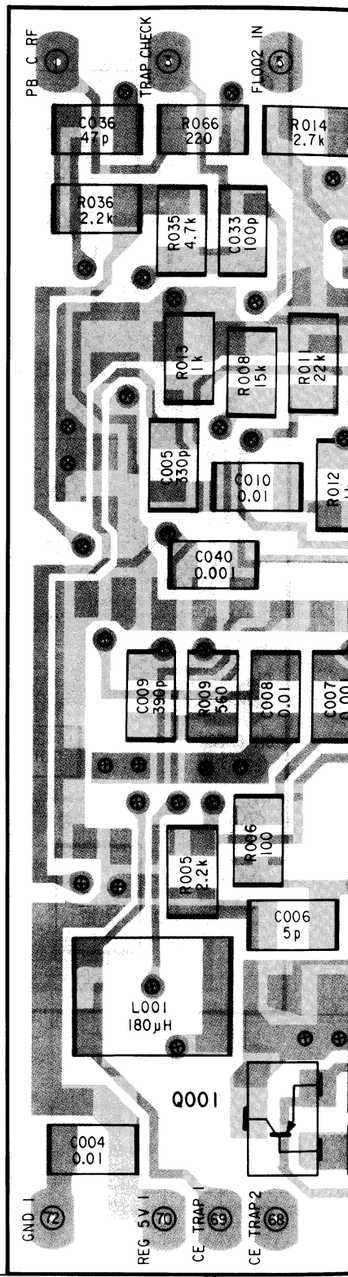


1 2 3 4 5 6 7 8 9 10

—171—

—172—

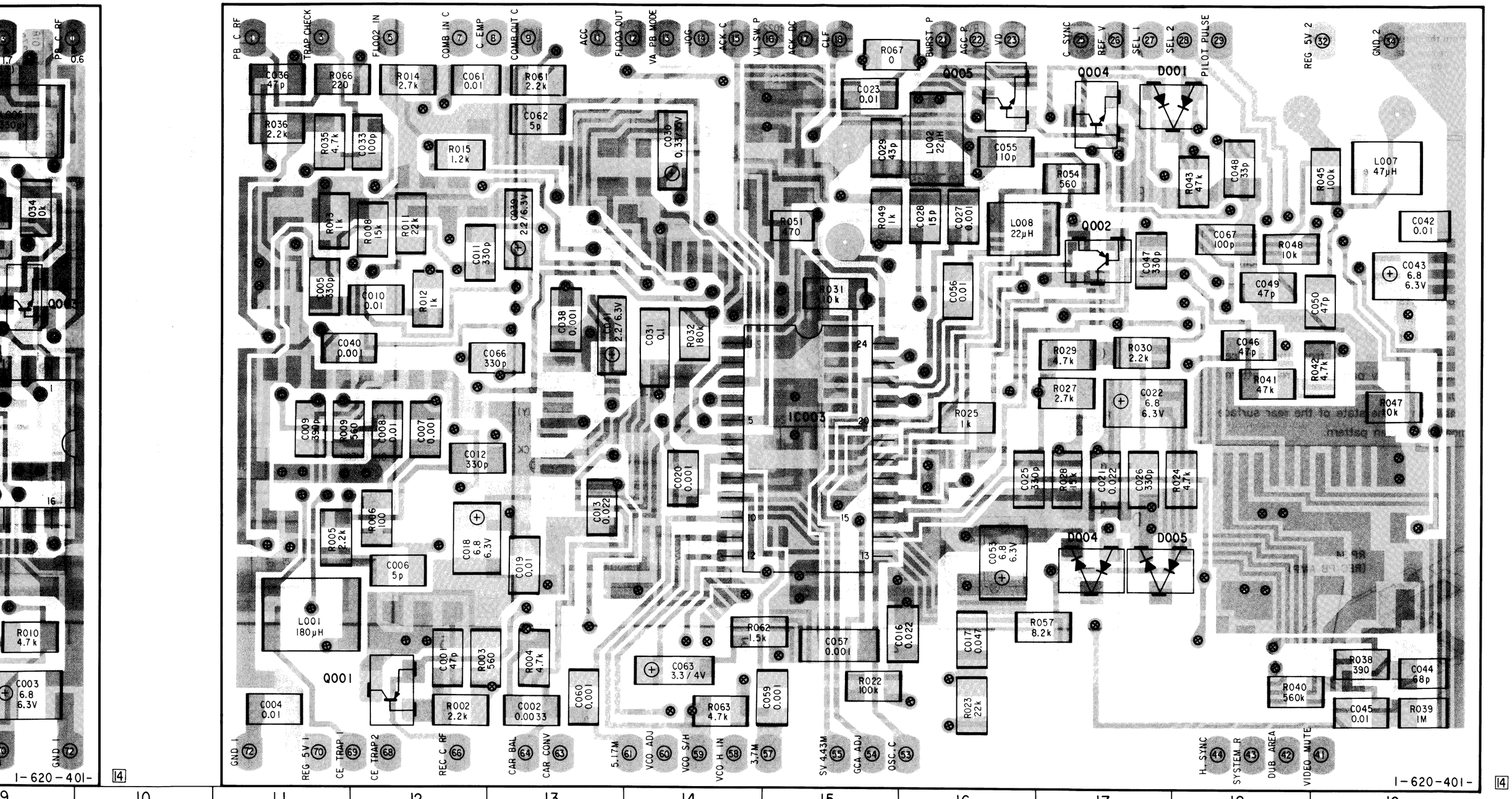
VC-11 BOARD (SIDE A



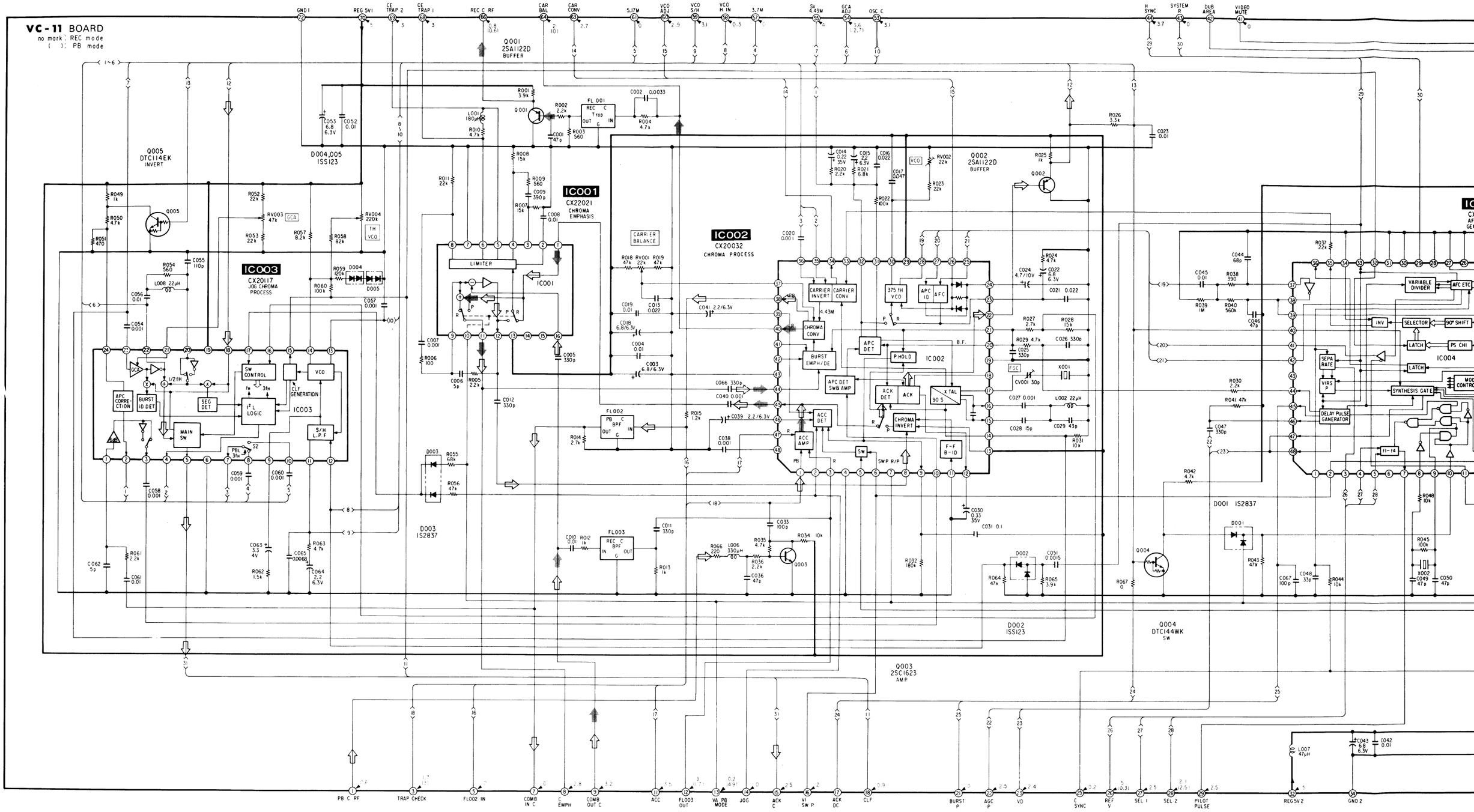
11 12

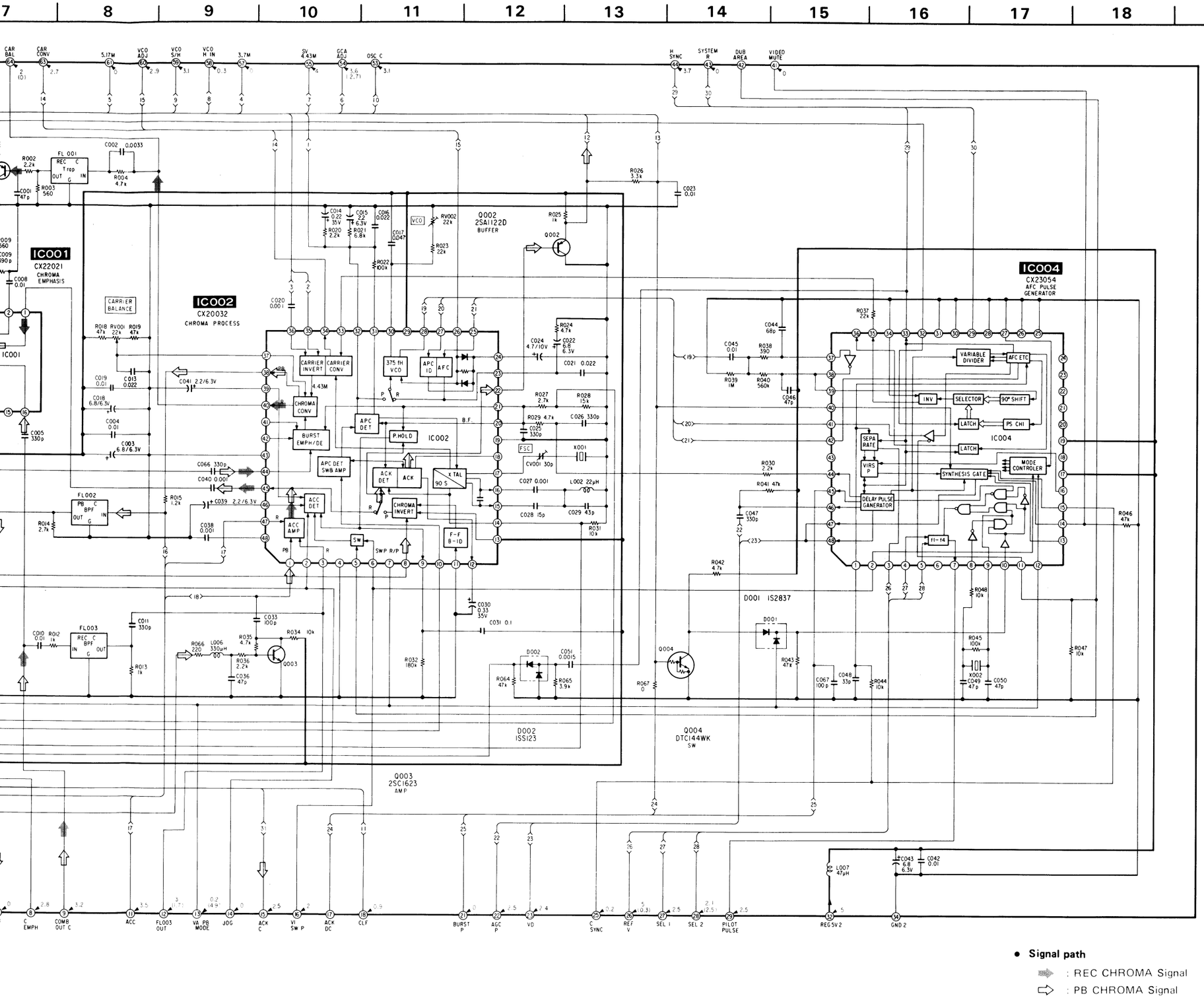
—17

VC-11 BOARD (SIDE A)



VC-11(CHROMA SIGNAL PROCESS) SCHEMATIC DIAGRAM



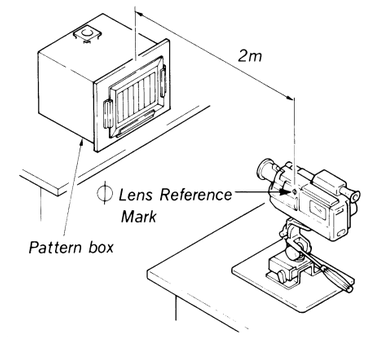


- **Signal path**
  - : REC CHROMA Signal
  - : PB CHROMA Signal

Note:

- Caution when replacing chip parts.
  New parts must be attached after removal of chip.
  Be careful not to heat the minus side of tantalum capacitor, because it is damaged by the head.
- All resistors are in ohms, 1/10W unless otherwise noted.
- All capacitors are in μF (p:pF) unless otherwise noted.
  50V or less are not indicated except for electrolytic capacitors.
- All variable and semi fixed resistors have characteristic curve B, unless otherwise noted.
- ▭ : panel designation.
- ▭ : Nonflammable resistor
- ——— : B+ bus.
- ▭ : adjustment for repair.
- Voltage and waveform measuring conditions:
  (1) Sample object: Pattern box colour bars.
  (2) Voltage values: Relative to ground, measured with a DC digital multimeter (impedance 10M-ohm or more).

1. Connection



2. Adjust the zooming of camera and the tripod so that the output waveform of Fig. a and the picture of Fig. b can be obtain.

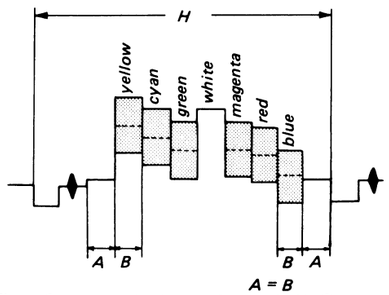


Fig.a Camera output waveform of No.⑦ terminal of FP-81 flexible board.

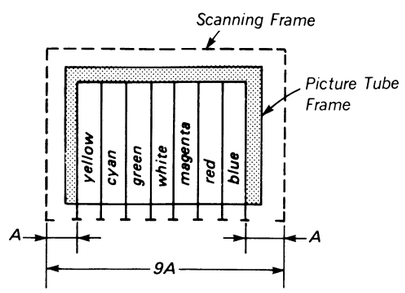
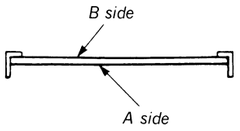


Fig. b Picture of TV monitor screen

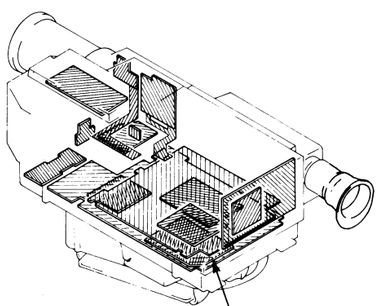
VY-9(Y SIGNAL PROCESS) PRINTED WIRING BOARD

Note:

- ○— : indicates a lead wire mounted on the component side.
- ●— : indicates a lead wire mounted on the printed side.
- ⊗ : Through hole.
- ▒ : Pattern from the side which enables seeing.
- : B+ pattern from the side which enables seeing.



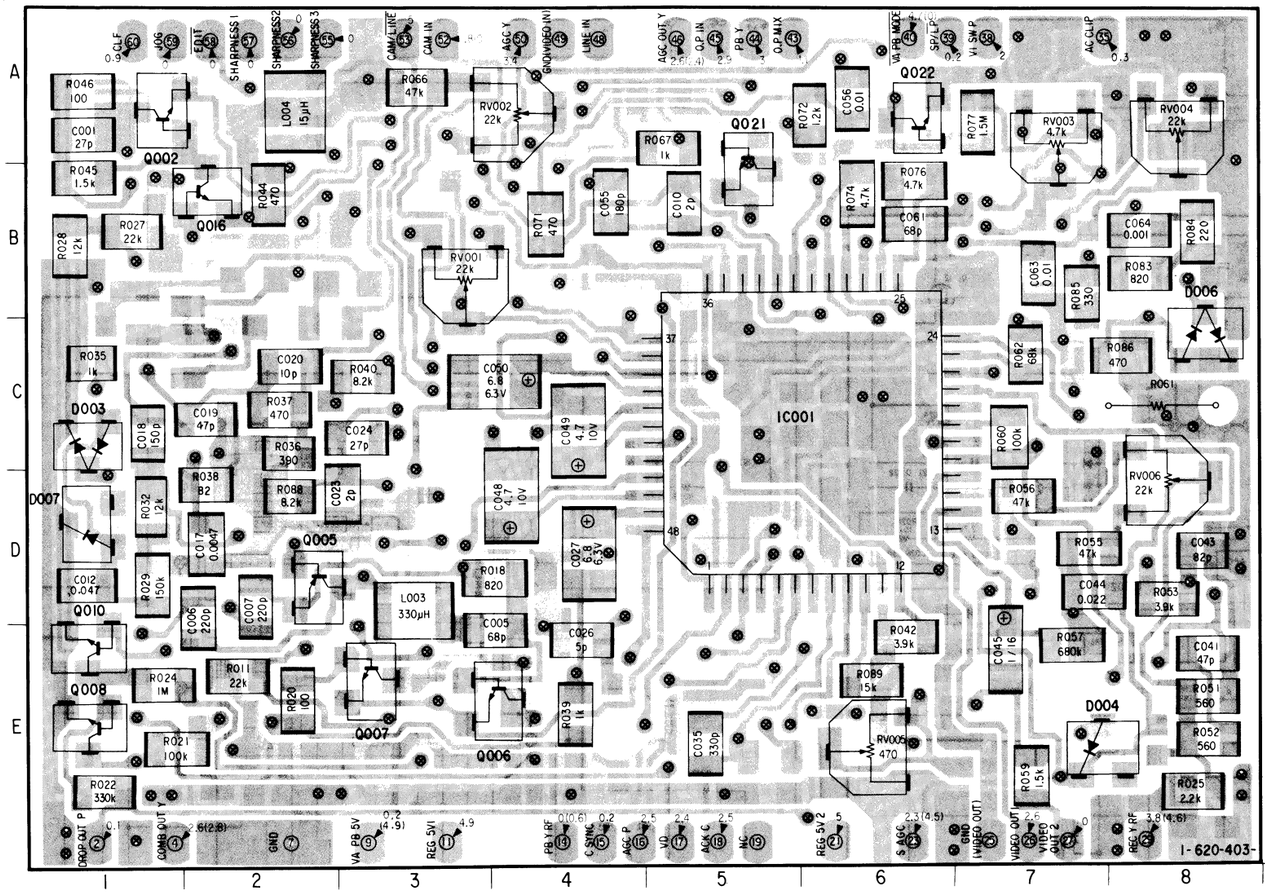
Note
Soldering side (SIDE A) : Parts on the soldering side being seen from the soldering are stated.
Component side (SIDE B) : Parts on the component side being seen from the component are stated.
Regarding color indication of patterns
- Patterns being seen in the state from the surface side are indicated in gray pattern and red pattern (B+pattern).
- Pattern being seen in the state of the rear surface side is indicated in green pattern.



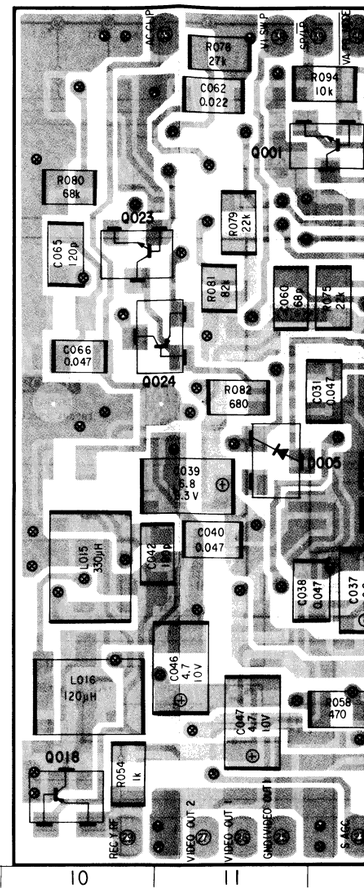
VY-9
(Y Signal Process)

VY-9 BOARD (SIDE B)

no mark : REC mode
( ) : PB mode



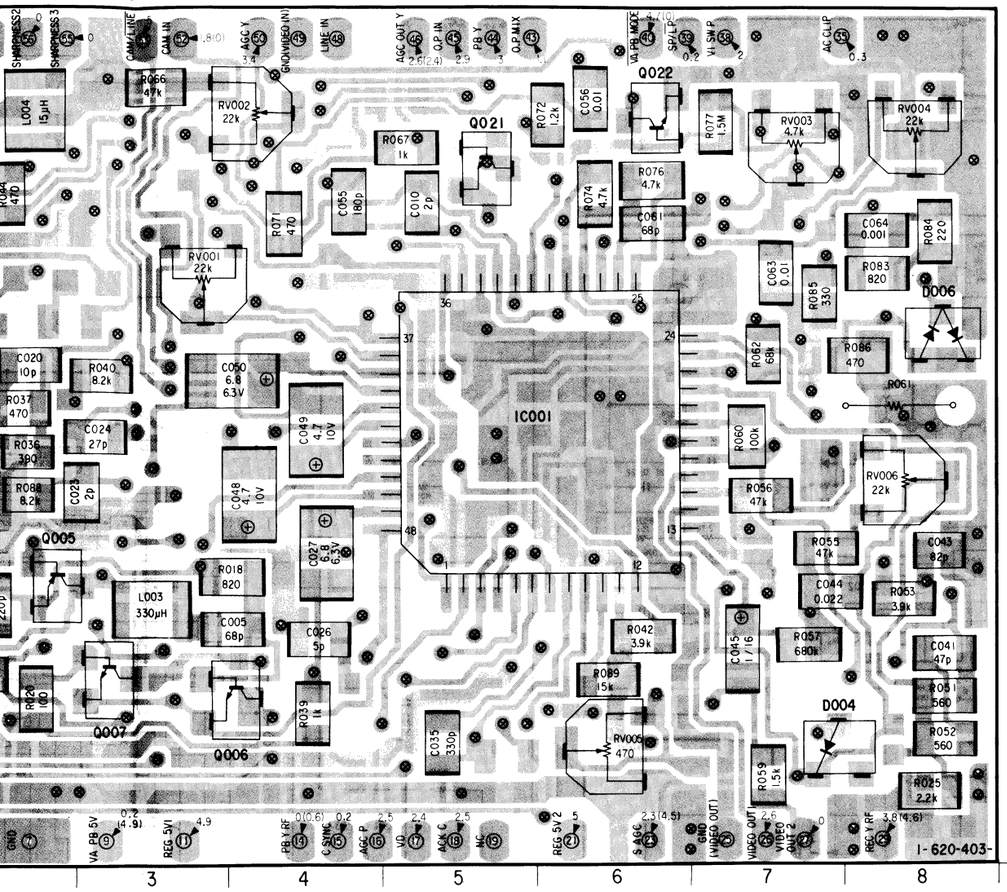
VY-9 BOARD (SIDE A)

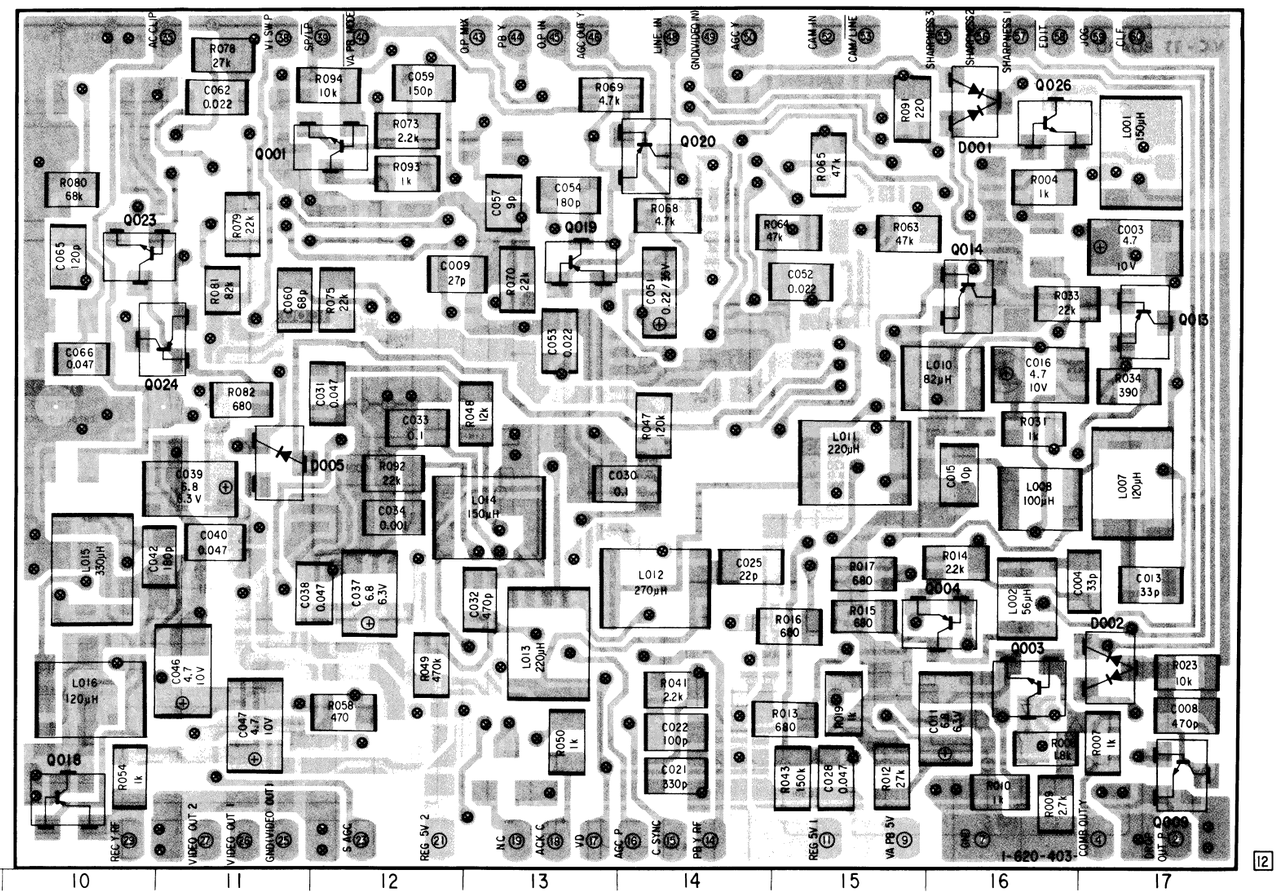


) PRINTED WIRING BOARD

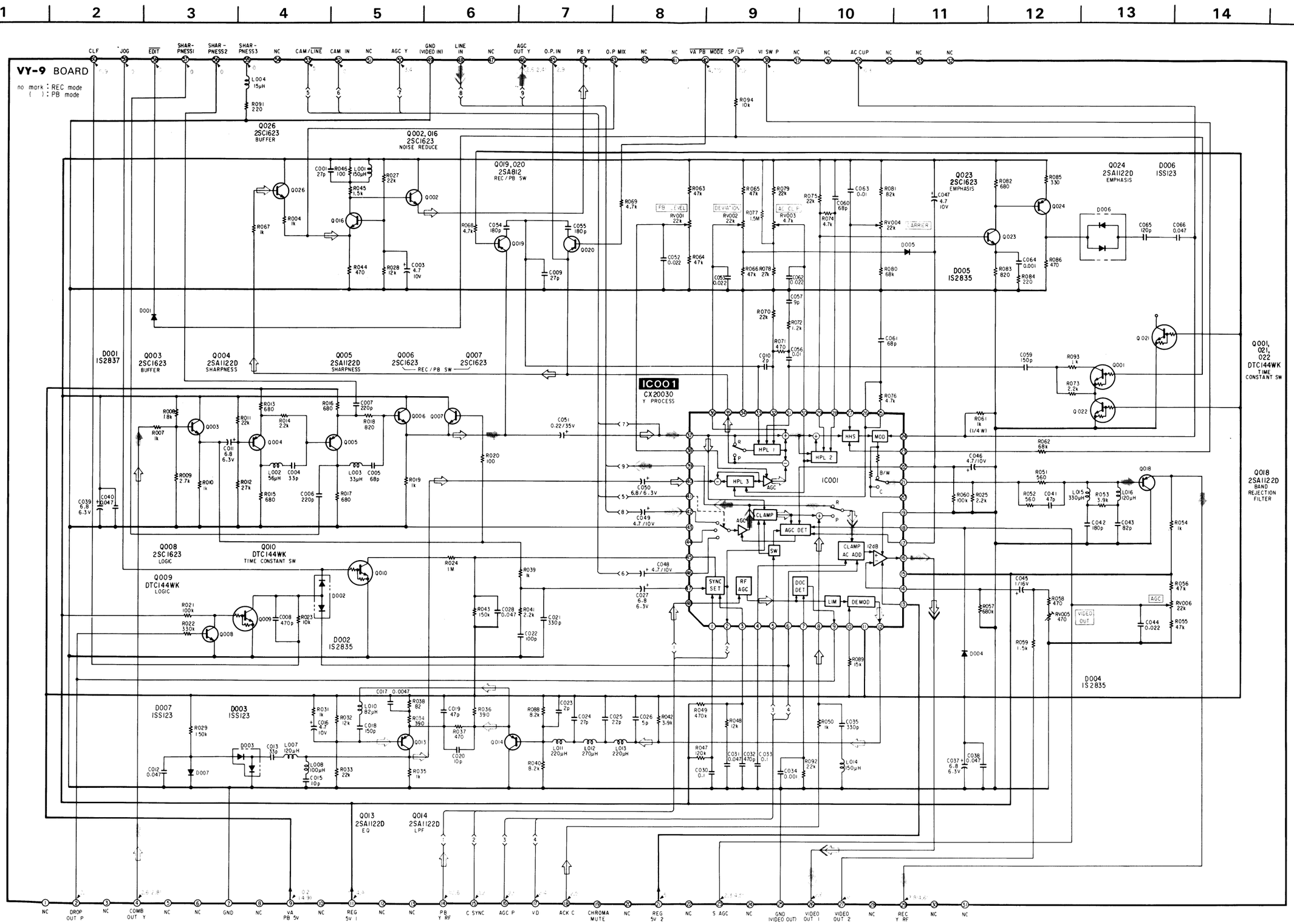
no mark : REC mode
( ) : PB mode

VY-9 BOARD (SIDE A)





VY-9(Y SIGNAL PROCESS) SCHEMATIC DIAGRAM



Note:

- Caution wh
  New parts m
  Be careful
  citor, becau
- All resistors
- All capacito
  50V or less
- All variable
  unless other
- ▭ : pan
- ▭ : Non
- ——— : B+ l
- ▭ : adju
- Voltage and
  (1) Sample
  (2) Voltag

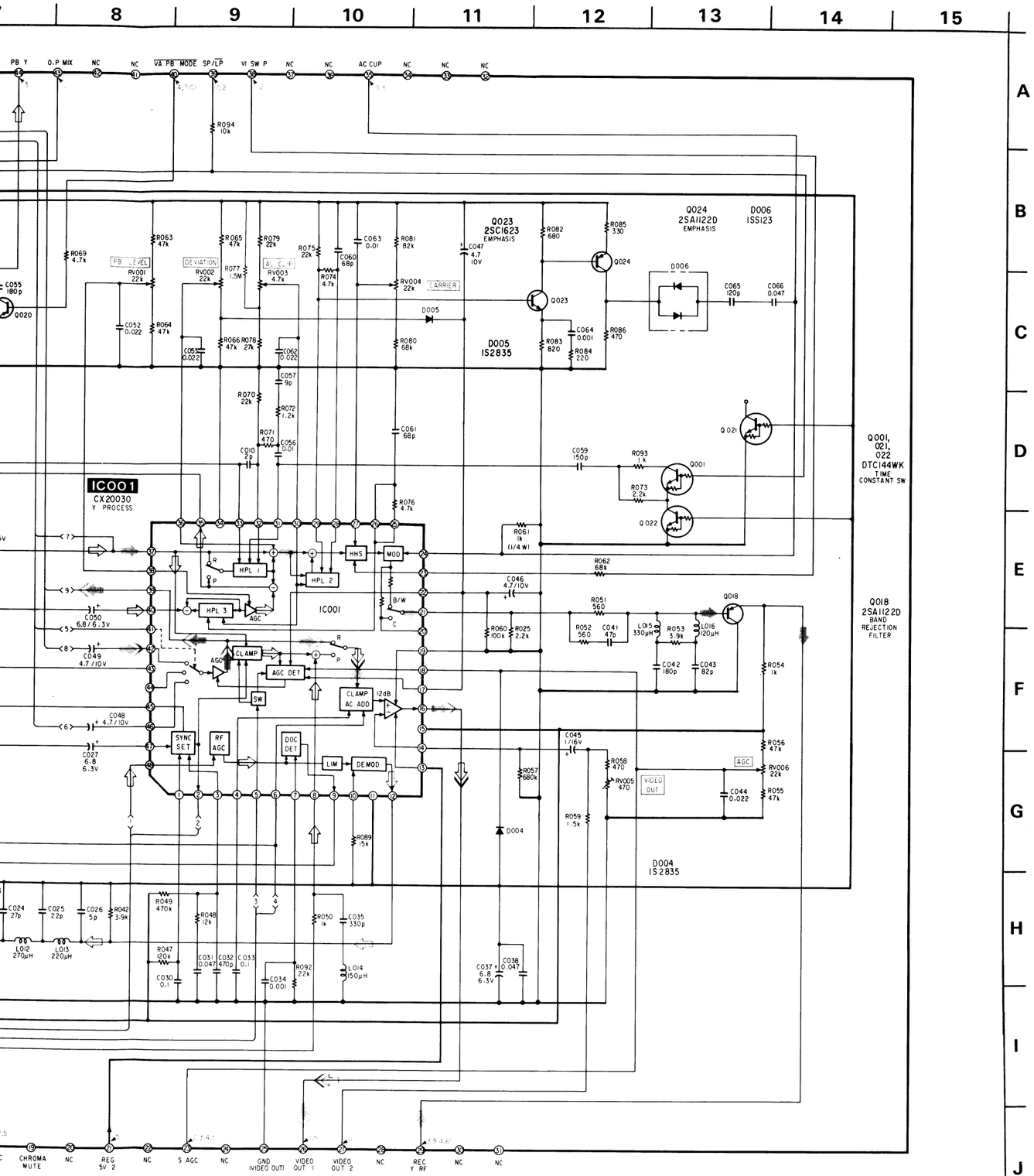
1. Connection

Patter

2. Adjust the
the output
can be obta

Fig.a Can
FP-

A

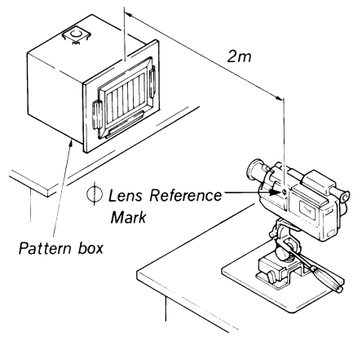


Note:

- Caution when replacing chip parts.
  New parts must be attached after removal of chip.
  Be careful not to heat the minus side of tantalum capacitor, because it is damaged by the head.
- All resistors are in ohms, 1/10W unless otherwise noted.
- All capacitors are in μF (p:pF) unless otherwise noted.
  50V or less are not indicated except for electrolytic capacitors.
- All variable and semi fixed resistors have characteristic curve B, unless otherwise noted.
- ▭ : panel designation.
- ▭ : Nonflammable resistor
- ——— : B+ bus.
- ▭ : adjustment for repair.
- Voltage and waveform measuring conditions:
  (1) Sample object: Pattern box colour bars.
  (2) Voltage values: Relative to ground, measured with a DC digital multimeter (impedance 10M-ohm or more).

- **Signal path**
  - : REC Y Signal
  - : PB Y Signal
  - ⇨ : PB CHROMA Signal
  - : REC Y/CHROMA Signal
  - ⇨ : PB Y/CHROMA Signal

1. Connection



2. Adjust the zooming of camera and the tripod so that the output waveform of Fig. a and the picture of Fig. b can be obtain.

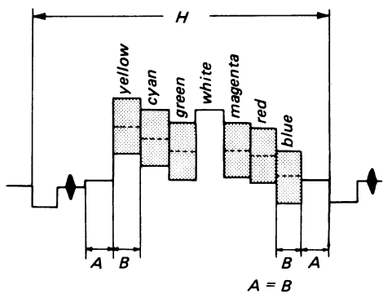


Fig.a Camera output waveform of No.⑦ terminal of FP-81 flexible board.

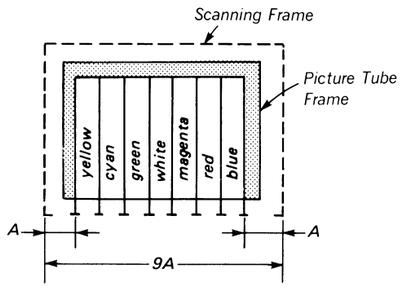
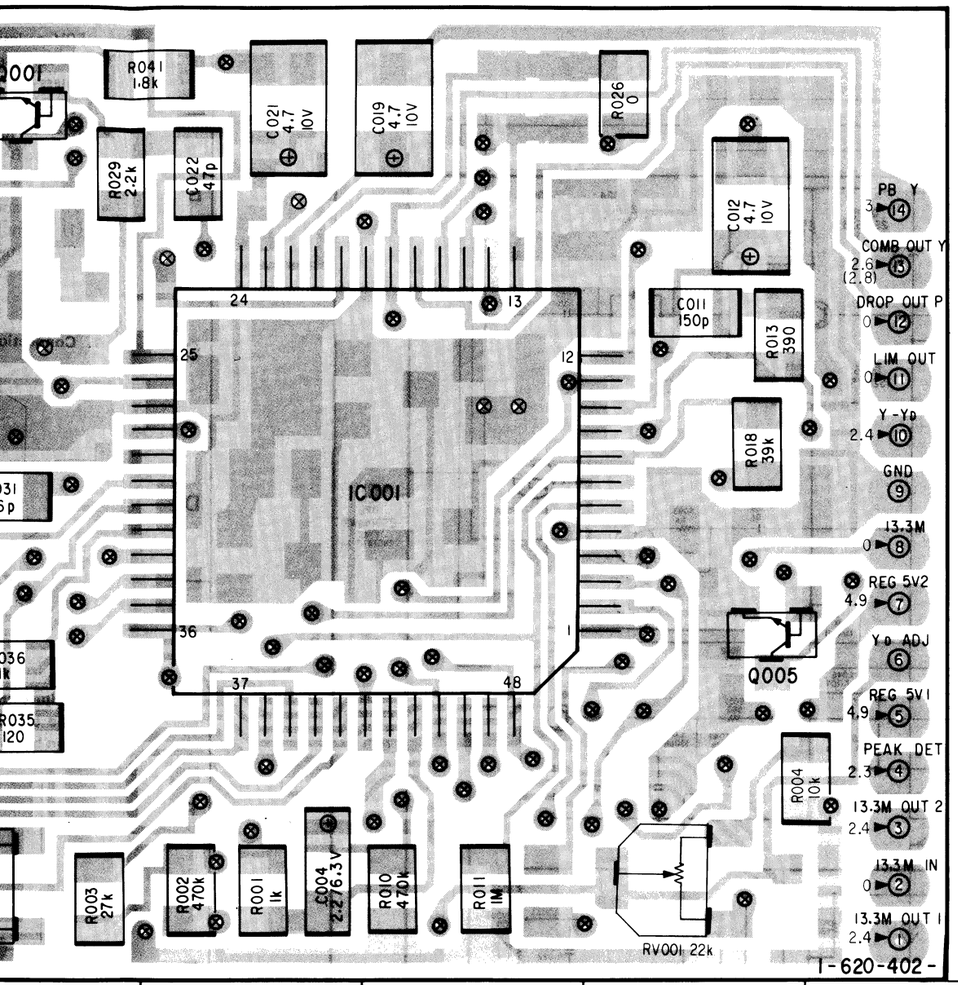


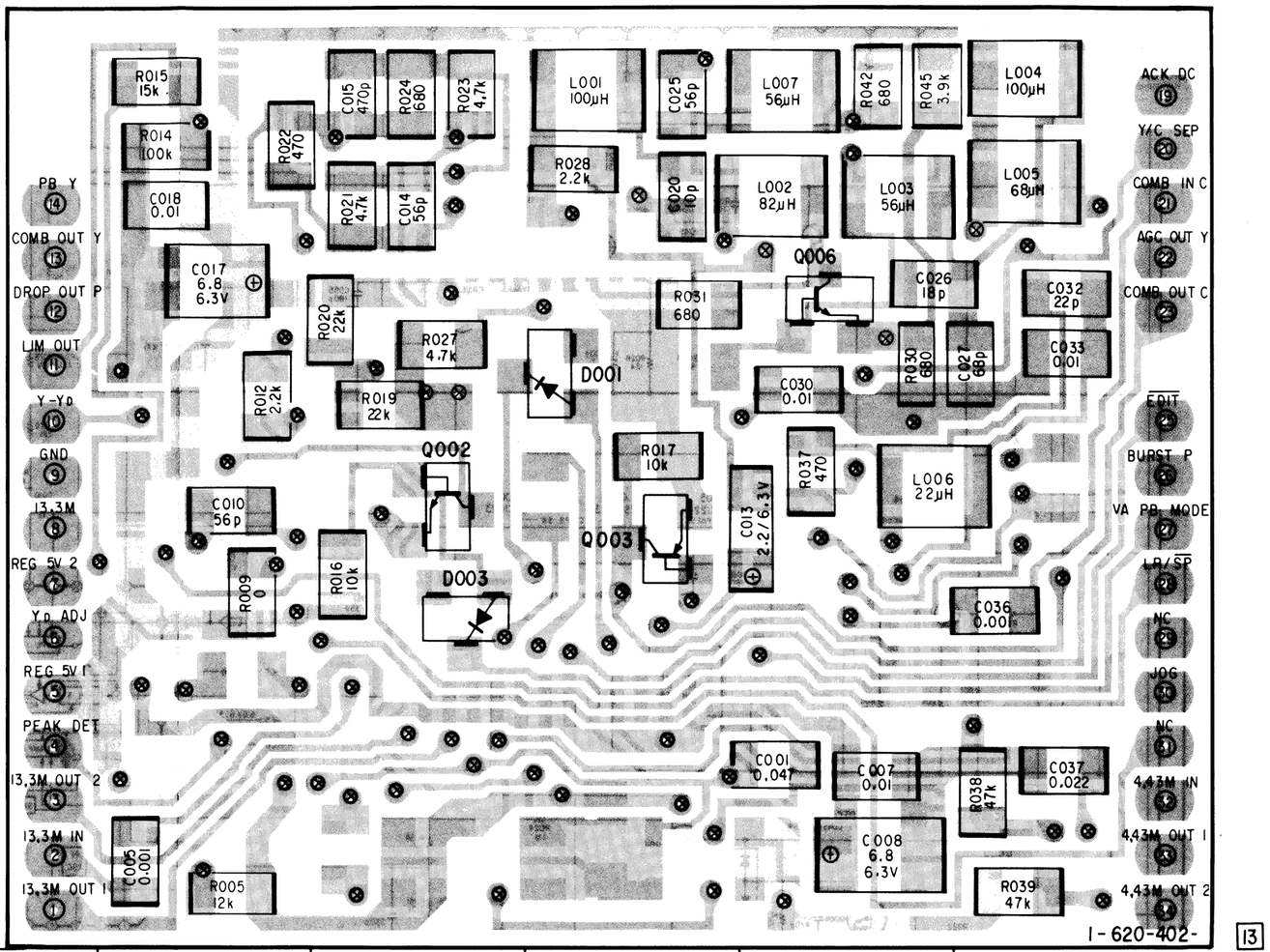
Fig. b Picture of TV monitor screen

NG BOARD

no mark : REC mode
B) ( ) : PB mode



VD-6 BOARD (SIDE A)

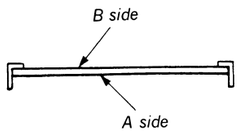


2 3 4 5 6 7 8 9 10 11 12

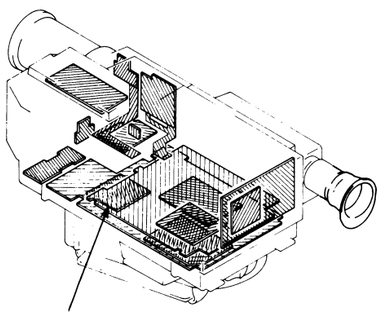
VD-6(COMB FILTER) PRINTED WIRING BOARD

Note:

- ○— : indicates a lead wire mounted on the component side.
- ●— : indicates a lead wire mounted on the printed side.
- ⊗ : Through hole.
- ▒ : Pattern from the side which enables seeing.
- ▒ : B+ pattern from the side which enables seeing.



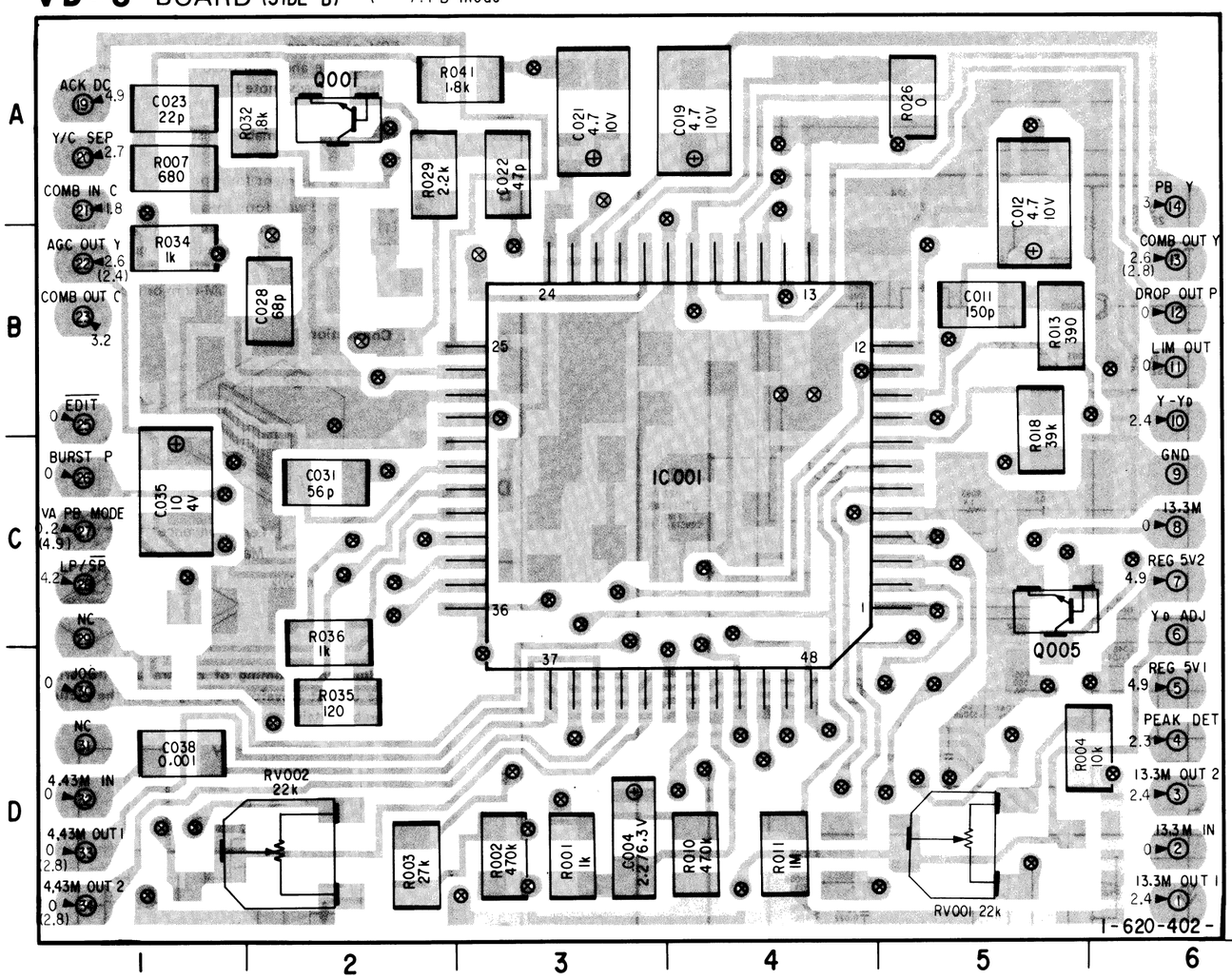
Note
Soldering side (SIDE A) : Parts on the soldering side being seen from the soldering are stated.
Component side (SIDE B) : Parts on the component side being seen from the component are stated.
Regarding color indication of patterns
- Patterns being seen in the state from the surface side are indicated in gray pattern and red pattern (B+pattern).
- Pattern being seen in the state of the rear surface side is indicated in green pattern.



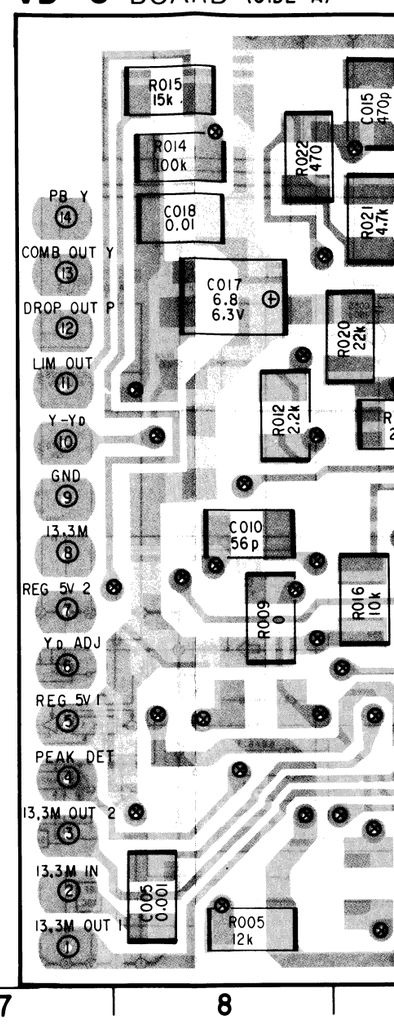
VD-6
(Comb Filter)

VD-6 BOARD (SIDE B)

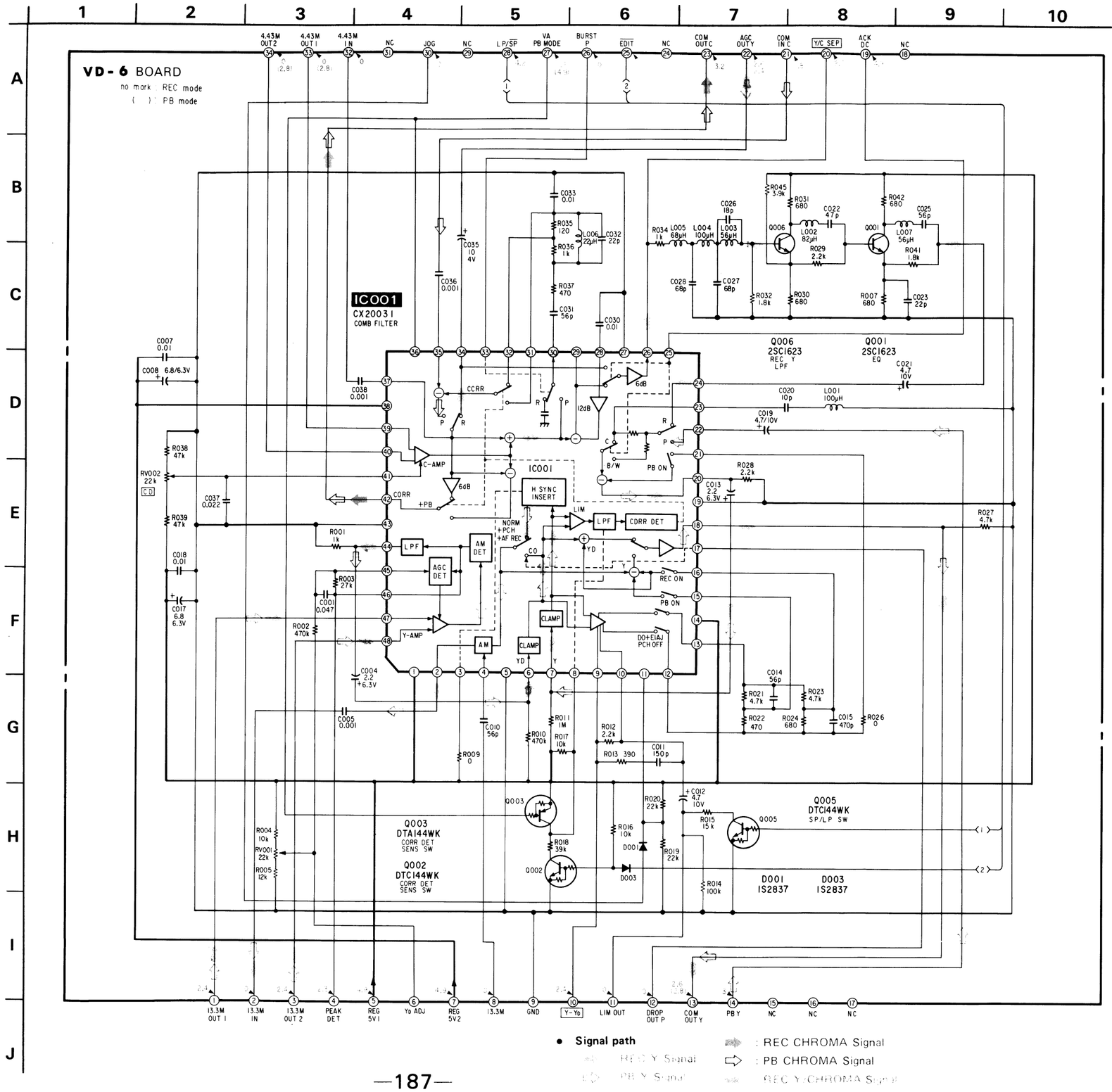
no mark : REC mode
( ) : PB mode



VD-6 BOARD (SIDE A)



VD-6(COMB FILTER) SCHEMATIC DIAGRAM

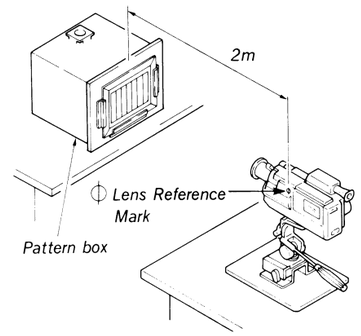


- **Signal path**
  - : REC Y Signal
  - : PB Y Signal
  - : REC CHROMA Signal
  - : PB CHROMA Signal
  - : REC Y/CHROMA Signal

Note:

- Caution when replacing chip parts.
  New parts must be attached after removal of chip.
  Be careful not to heat the minus side of tantalum capacitor, because it is damaged by the head.
- All resistors are in ohms, 1/10W unless otherwise noted.
- All capacitors are in μF (p:pF) unless otherwise noted.
  50V or less are not indicated except for electrolytic capacitors.
- All variable and semi fixed resistors have characteristic curve B, unless otherwise noted.
- : panel designation.
- : Nonflammable resistor
- : B+ bus.
- : adjustment for repair.
- Voltage and waveform measuring conditions:
  (1) Sample object: Pattern box colour bars.
  (2) Voltage values: Relative to ground, measured with a DC digital multimeter (impedance 10M-ohm or more)

1. Connection



2. Adjust the zooming of camera and the tripod so that the output waveform of Fig. a and the picture of Fig. b can be obtain.

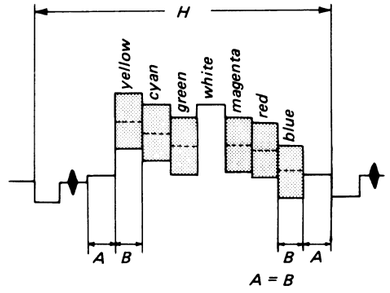


Fig.a Camera output waveform of No.⑦ terminal of FP-81 flexible board.

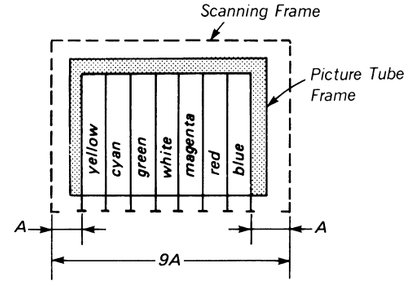
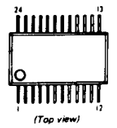


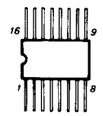
Fig. b Picture of TV monitor screen

4-3. SEMICONDUCTORS

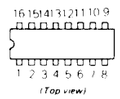
AN2510S



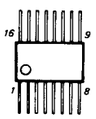
BA6303F
CX20115
CX22021
MC14526BF
TA7733F
TC4526BF
TC4538BF



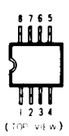
CXA1042M



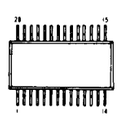
CXA1157M
TL1451ACNS
μPD6142G-101



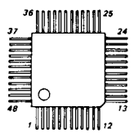
CXB0026M
TL062CPS
μPC393G2



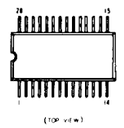
CXD1030M



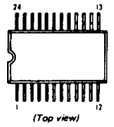
CX20030
CX20031
CX20032
CX20034
CX20037-A
CX20053
CX20054
CX20055
CX20151
CX23054
CX23047B
MB673194U



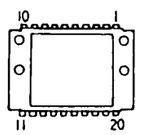
CX20035
CX20036
CX20039



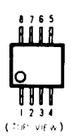
CX20114
CX20117
CX20180



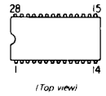
IU021K
IU021CK



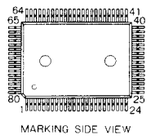
LA5005MTP
μPC4572G2
μPD4066BG



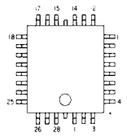
MB8464-12LLPF
MB8464-15LP



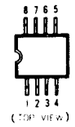
MB88551



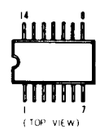
MC146805F2FP-SC82435



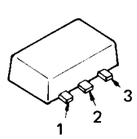
MMH0026D



NJM3403AM
TC4066BF
TC74H00F
μPC324G2

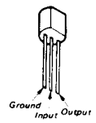


S-8052AL0-LG
S-8054ALB

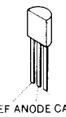


1. OUT
2. IN
3. GND

S-81250AG

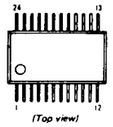


TL431CLPB

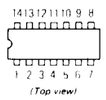


μPC311G2

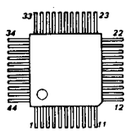
μPD6105G102



μPD74HC08G

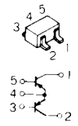


μPD7508BGB-502

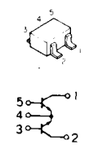


DTA114TK
DTA124EK
DTA143EK
DTA144EK
DTA144TK
DTA144WK
DTC114EK
DTC124EK
DTC124XK
DTC144EK
DTC144TK
DTC144WK
2SA812
2SA1037
2SA1122
2SA1162
2SA1179
2SA1226
2SB624
2SB624-BV4
2SB815-B6
2SC1623
2SC1623-L7
2SC2223
2SC2412K
2SC2712
2SC2757
2SC2812L5
2SC3052
2SC3053-C

FMA2
FMS1

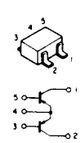


FMW1
FMW2

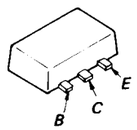


NJL7141E-S

FMS-1

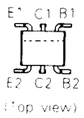


SB054ALB
2SB1121
2SD1615



2SA1175

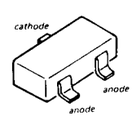
2SA1237



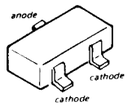
2SB1040A-5

2SK160-K6
2SK303-TB
2SK209
2SK94

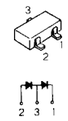
DAN202K
1S2837
MA151WK



DAP202K
MA151WA
MA152WA
1S2835

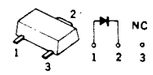


DA204K
MA153
1SS123

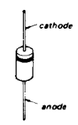


EE-L106
GL452S

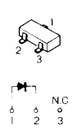
E10DS2
E10QS03
E10QS04



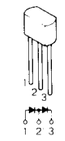
HZ13EB2
HZ5BLL
RD13EB2



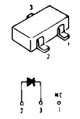
MA151WA
1SS187
1SS222



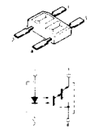
MC931



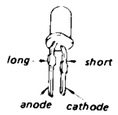
RD5.1M-B3
RD9.1M-B1
1SS193
1SS220



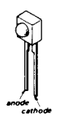
TLP907-0



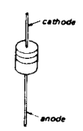
TLR124
TLY124



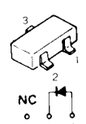
TLR223



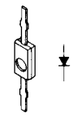
1SS119
1SS133
1SS148



1SS196



1T32



SECTION 5
EXPLODED VIEWS

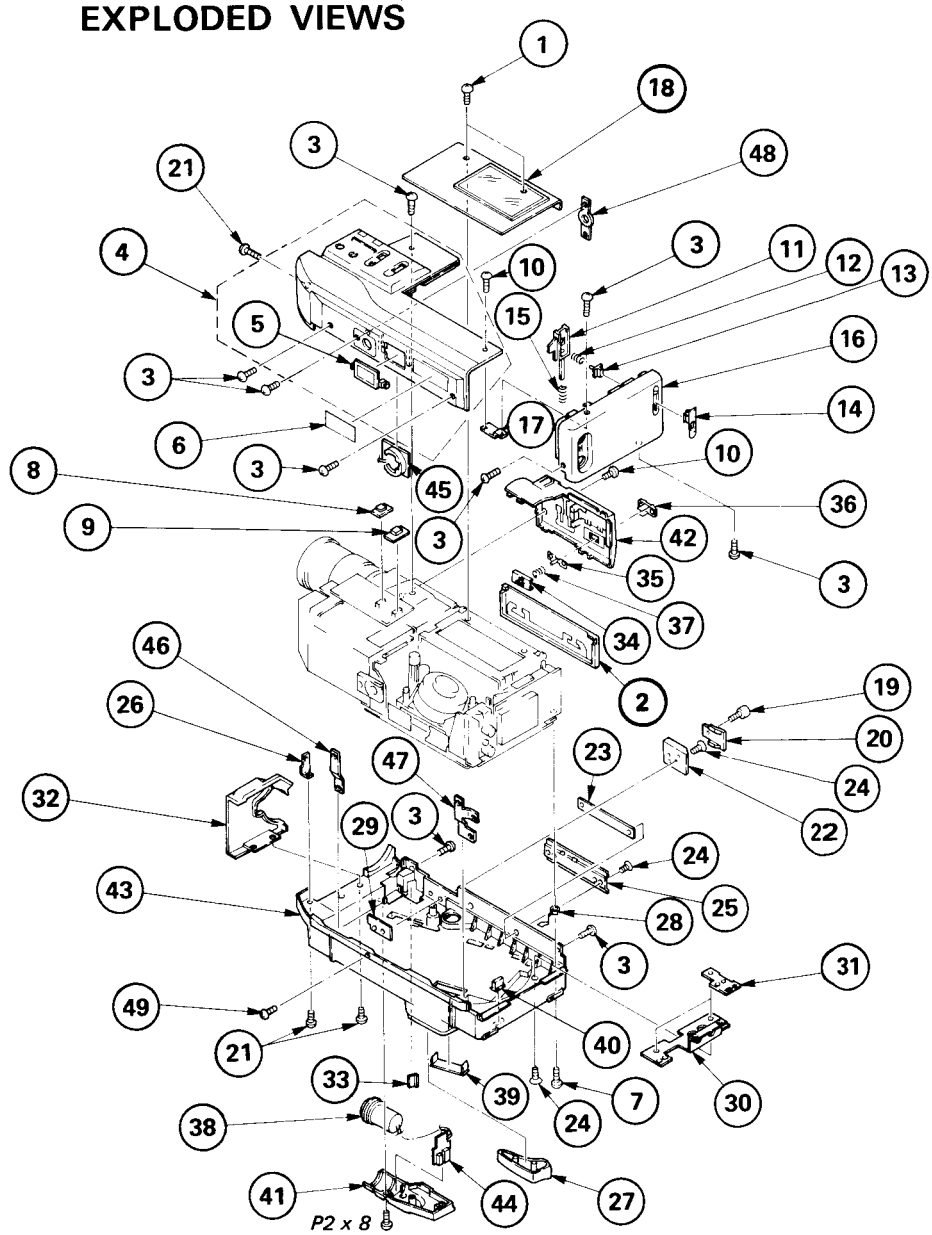
NOTE:

pated when ordering these items.

- The mechanical parts with no reference number in the exploded views are not supplied.
- The construction parts of an assembled part are indicated with a collation number in the remark column.
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be antici-

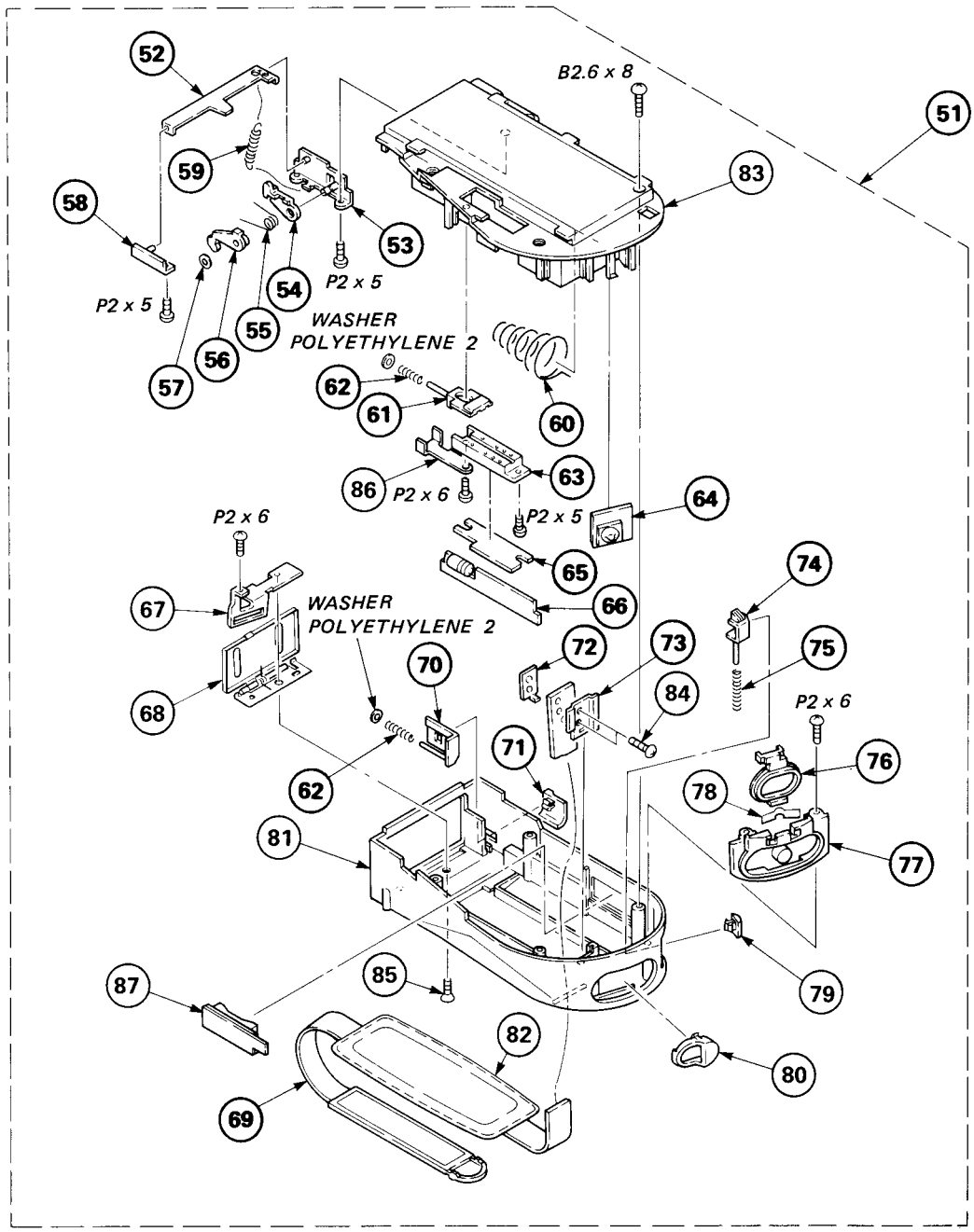
The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

5-1. CABINET ASSEMBLY



No.	Part No.	Description	Remark
1	3-713-791-01	SCREW (M1.7X5), TAPPING, P2	
2	X-3712-046-1	LID ASSY, LS CASSETTE	
3	3-713-912-01	SCREW (M2X10)	
4	X-3713-705-1	CABINET (R) ASSY	5
5	3-719-364-01	LID, BATTERY CASE, LITHIUM	
6	*3-719-384-01	LABEL, MODEL NUMBER (UK/E/SWITZERLAND MODEL)	
	*3-719-385-01	LABEL, MODEL NUMBER (AEP) (AEP MODEL)	
7	3-713-786-01	SCREW (M2X4)	
8	3-712-188-01	KNOB, AF	
9	3-712-187-01	KNOB, AWB	
10	3-713-786-31	SCREW (M2X6)	
11	3-713-747-01	KNOB (B), EJECT	
12	3-699-532-02	SPRING, COMPRESSION	
13	3-699-534-01	KNOB, LOCK	
14	3-699-537-01	KNOB, EJECT	
15	3-713-905-01	SPRING, COMPRESSION	
16	X-3713-704-1	PANEL ASSY, REAR	
17	3-712-193-01	JOINT, CABINET	
18	X-3713-732-1	LID ASSY, CASSETTE	
19	3-678-103-11	SCREW, EVF STOPPER	
20	3-688-940-01	SPRING, LEAF	
21	3-713-786-21	SCREW (M2X3)	
22	3-688-985-01	SHOE, ACCESSORY	
23	3-713-914-01	BRACKET, EVF SHOE	
24	3-713-788-01	SCREW (M2X5)	
25	3-713-782-01	RAIL, GUIDE	
26	*3-719-355-01	JOINT, CABINET (LEFT) (RIGHT)	
27	3-719-361-01	HAND REST	
28	*3-713-965-01	PLATE (C), GROUND	
29	3-713-715-01	BRACKET, SHOE	
30	3-713-774-01	JOINT, REAR	
31	3-713-713-01	BRACKET, STRAP	
32	X-3712-169-1	PANEL ASSY, FRONT	
33	3-719-352-01	WINDOW, AW SENSOR	
34	3-719-360-01	PLATE, LOCK	
35	3-719-359-01	BUTTON, LOCK	
36	3-718-226-01	BUTTON, POWER	
37	3-303-973-00	SPRING, TENSION	
38	1-542-091-21	MICROPHONE, ELECTRET CONDENSER	
39	1-559-324-21	SOCKET (TERMINAL BOARD (B))	
40	3-713-714-01	KNOB, EDIT	
41	3-719-371-11	HOUSING, MICROPHONE	
42	X-3713-703-1	BOARD ASSY, FUNCTION	
43	*A-7080-377-A	CABINET (LEFT) BLOCK ASSY 19-31 , 46, 47	
44	*A-7070-500-A	MJ-12 BOARD, COMPLETE	
45	*A-7070-499-A	LI-3 BOARD, COMPLETE	
46	*3-719-356-01	JOINT, LR	
47	*3-719-357-01	JOINT, LRR	
48	3-719-353-01	SCREW, TRIPOD	
49	3-719-381-01	SCREW (M2X4)	

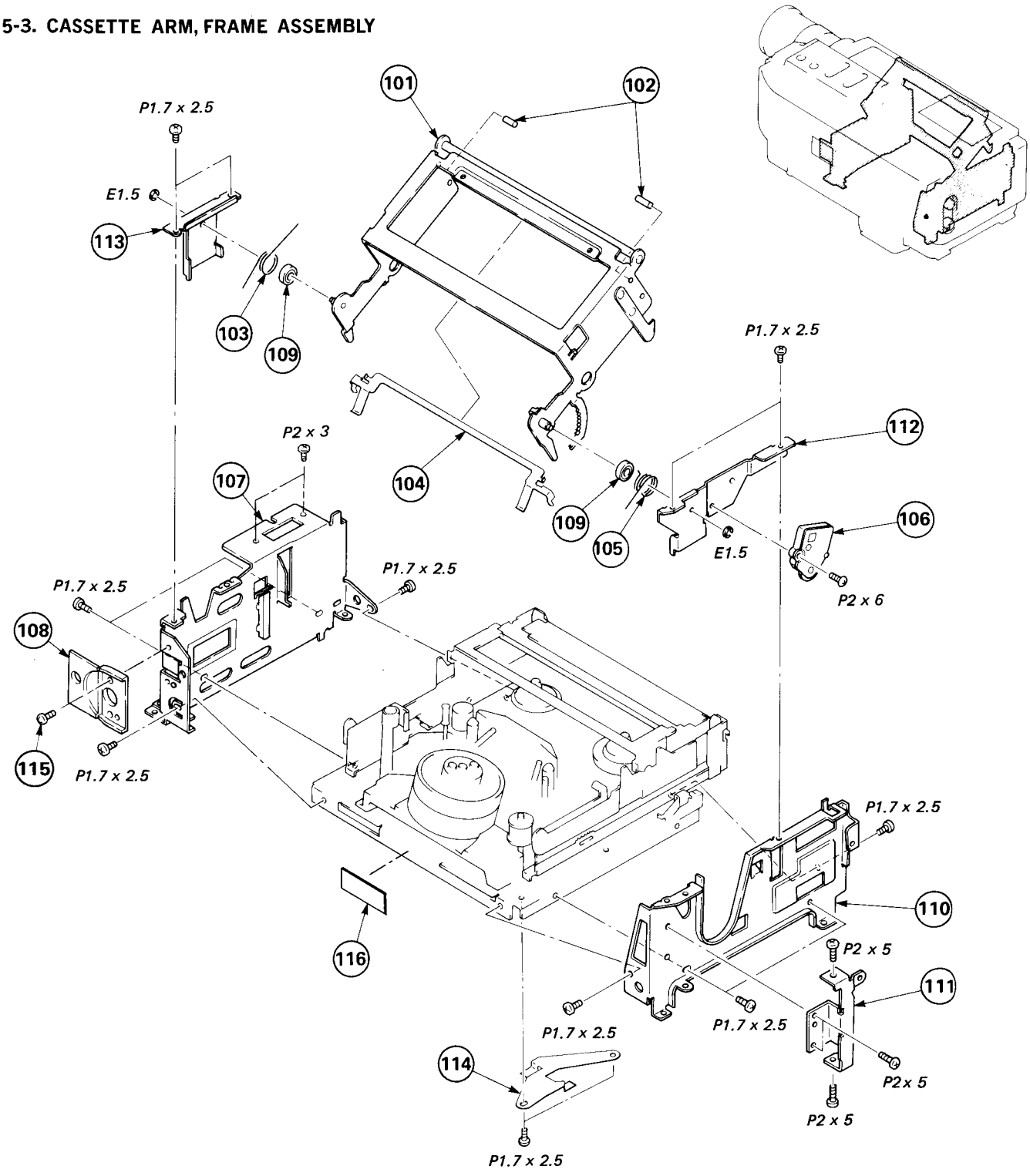
5-2. GRIP ASSEMBLY



No.	Part No.	Description	Remark
51	A-7080-379-A	GRIP BLOCK ASSY	52-87
52	3-712-198-01	PLATE, LOCK, B	
53	X-3712-055-1	SUPPORT (UPPER) ASSY, B LOCK	
54	3-713-750-01	RETAINER, LOCK PLATE	
55	3-713-704-01	SPRING, TORSION	
56	3-713-751-01	LEVER, RELEASE, B	
57	3-321-813-11	WASHER, COTTER POLYETHYLENE	
58	X-3712-056-1	SUPPORT (LOWER) ASSY, B LOCK	
59	3-305-914-00	SPRING, TENSION	
60	3-713-935-01	SPRING	
61	3-713-708-01	COVER, TERMINAL	
62	3-564-951-00	SPRING, COMPRESSION	
63	1-566-607-11	PLUG (TERMINAL BOARD (A))	
64	*A-7070-502-A	RC-21 BOARD, COMPLETE	
65	*1-623-014-11	TA-50 BOARD	
66	*1-623-018-11	FH-14 BOARD	
67	3-712-516-01	BRACKET (B), BELT	
68	X-3712-010-1	LID ASSY, BATTERY	
69	3-713-796-01	BELT, GRIP	

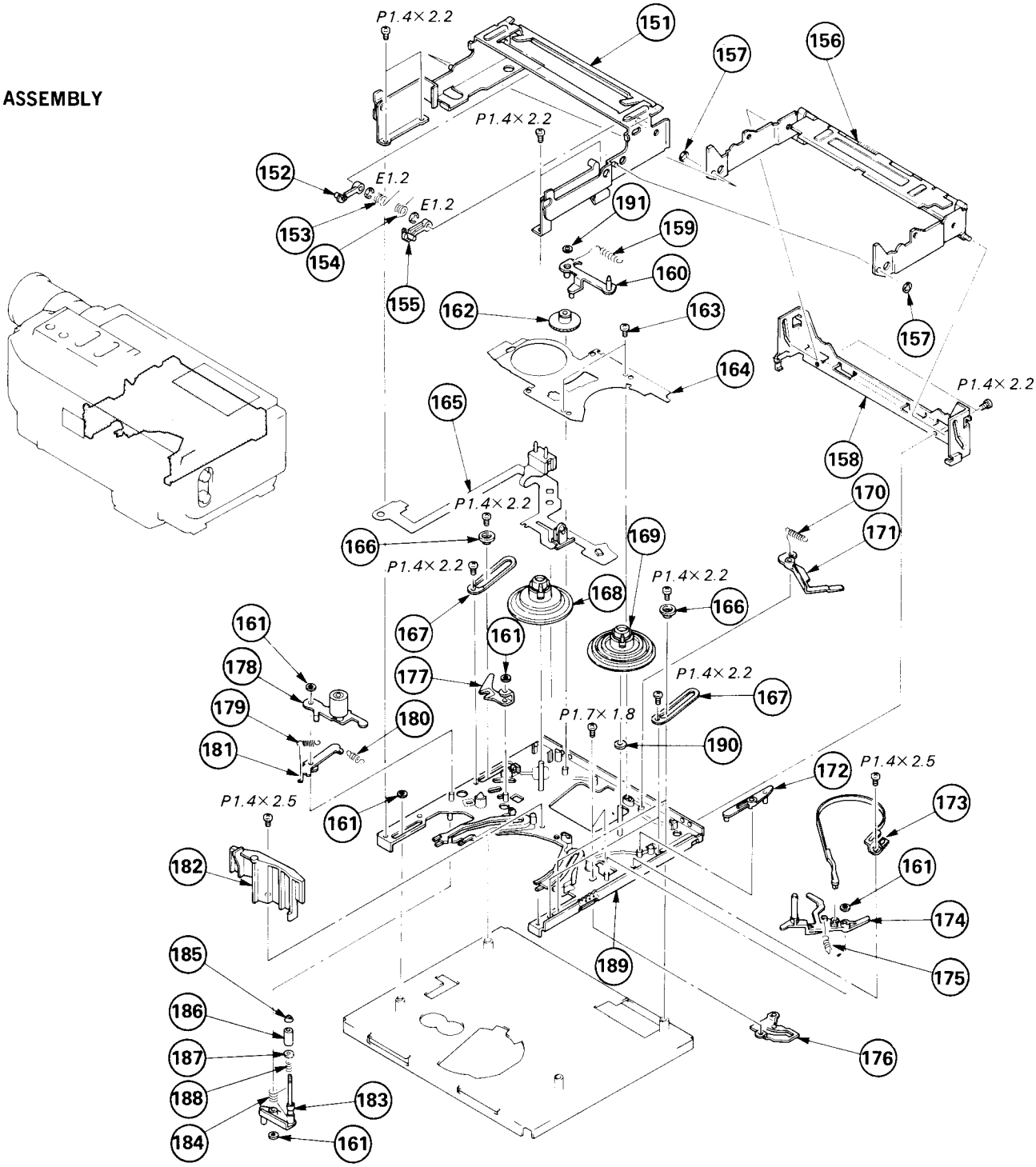
No.	Part No.	Description	Remark
70	3-713-703-01	CLAW, B RELEASE	
71	3-713-749-01	KNOB, B RELEASE	
72	3-713-711-01	BRACKET (C), BELT	
73	3-713-710-01	BRACKET (A), BELT	
74	3-713-707-01	LEVER, RELEASE, G	
75	3-465-047-00	SPRING, COMPRESSION	
76	3-713-753-01	HOLDER, PS KEY TOP	
77	X-3712-045-1	HOLDER ASSY, REC BUTTON	
78	3-713-709-01	SPRING	
79	3-713-706-01	KNOB, G RELEASE	
80	3-713-723-01	KEY TOP, PS	
81	X-3713-702-1	CABINET (L) ASSY, GRIP	
82	3-712-061-01	PAD, GRIP	
83	X-3712-164-1	CABINET (R) ASSY, GRIP	
84	3-712-069-01	SCREW (M2X5)	
85	3-713-787-01	SCREW (M2X4)	
86	*3-713-938-01	RETAINER, TERMINAL COVER	
87	1-554-944-41	SWITCH, PUSH (ZOOM)	

5-3. CASSETTE ARM, FRAME ASSEMBLY



No.	Part No.	Description	Remark
101	X-3712-034-1	ARM ASSY (2), CASSETTE	102, 104
102	3-695-602-01	SHAFT, RIVETING, CASSETTE ARM	
103	3-695-582-01	SPRING, TORSION	
104	3-695-580-01	RETAINER, CASSETTE COMPARTMENT	
105	3-695-581-01	SPRING, TORSION	
106	3-681-528-11	DAMPER	
107	*X-3712-167-1	FRAME ASSY (3)	
108	3-719-358-01	COVER, TRIPOD SCREW	
109	3-695-512-02	COLLAR, CASSETTE ARM	
110	*X-3712-026-2	FRAME (B) ASSY (2)	
111	*3-712-197-01	BRACKET, JACK	
112	3-695-641-01	PLATE (S2), SIDE	
113	3-695-603-01	PLATE (T2), SIDE	
114	3-716-455-01	CLAMP, DH	
115	3-713-786-01	SCREW (M2X4)	
116	3-831-441-XX	CUSHION	

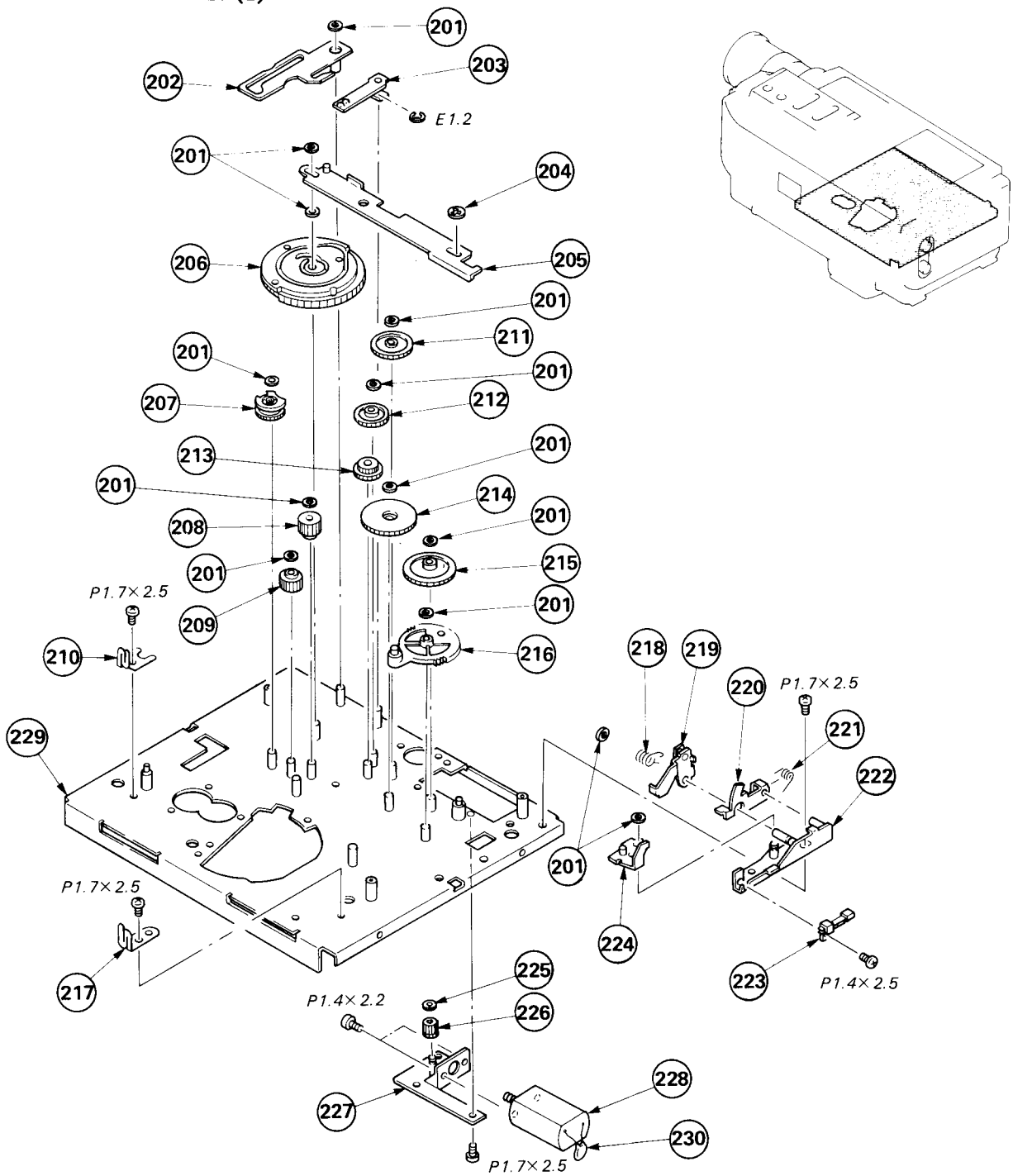
5-4. LS ASSEMBLY



No.	Part No.	Description	Remark
151	X-3695-447-4	COMPARTMENT ASSY, CASSETTE, LS	
152	3-695-595-01	RETAINER (T), CASSETTE	
153	3-695-605-01	SPRING, TORSION	
154	3-695-604-01	SPRING, TORSION	
155	3-695-594-01	RETAINER (S), CASSETTE	
156	X-3695-448-3	ARM ASSY, BLIND	
157	3-669-465-00	WASHER (1.5), STOPPER	
158	3-695-646-01	ARM, LS	
159	3-695-718-01	SPRING, TENSION	
160	X-3712-037-1	LEVER (A) ASSY (2)	
161	3-315-384-31	WASHER, STOPPER	
162	X-3712-025-1	GEAR ASSY, TS	
163	3-699-402-01	SCREW (M1.3X5.5), TAPPING	
164	3-712-165-01	PLATE (2), STOPPER	
165	A-7060-693-A	FP-53 BOARD, COMPLETE	
166	3-695-698-01	GUIDE, LS	
167	3-695-697-01	SPRING, LEAF, LS	
168	X-3695-436-1	TABLE ASSY, REEL, TAKE-UP	
169	X-3712-038-1	TABLE ASSY (2), REEL, SUPPLY	190
170	3-542-475-00	SPRING, TENSION	
171	3-712-151-01	BRAKE (2), SOFT	

No.	Part No.	Description	Remark
172	3-695-735-01	ARM, TG1 RELEASE	
173	X-3695-432-1	BAND ASSY, TG1	
174	X-3712-019-1	ARM ASSY (2), TG1	
175	3-695-591-01	SPRING, TENSION	
176	3-695-733-01	PLATE, CAM, LS	
177	X-3712-022-1	ARM (B) ASSY (2), PINCH	
178	X-3712-032-2	ARM (C) ASSY (2), PINCH	
179	3-695-622-01	SPRING, TENSION	
180	3-695-719-01	SPRING, TENSION	
181	X-3695-415-1	PINCH LEVER ASSY	
182	3-695-624-01	BASE, PROTECT	
183	X-3712-027-1	ARM ASSY (2), TG7	
184	3-695-541-01	SPRING	
185	3-712-158-01	FLANGE, UPPER, TG7	
186	3-712-160-01	SLEEVE (2), TG7	
187	3-712-159-01	FLANGE, LOWER, TG7	
188	3-712-157-01	SPRING, COMPRESSION	
189	X-3712-035-1	CHASSIS ASSY (2), LS	
190	3-701-444-01	WASHER, 6	
191	3-321-393-01	WASHER, STOPPER	

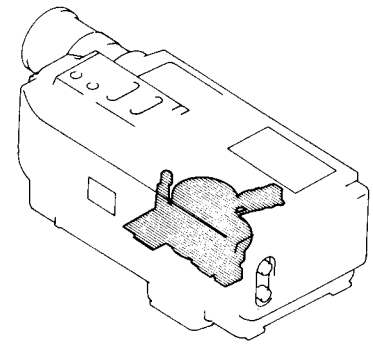
5-5. CHASSIS ASSEMBLY (1)

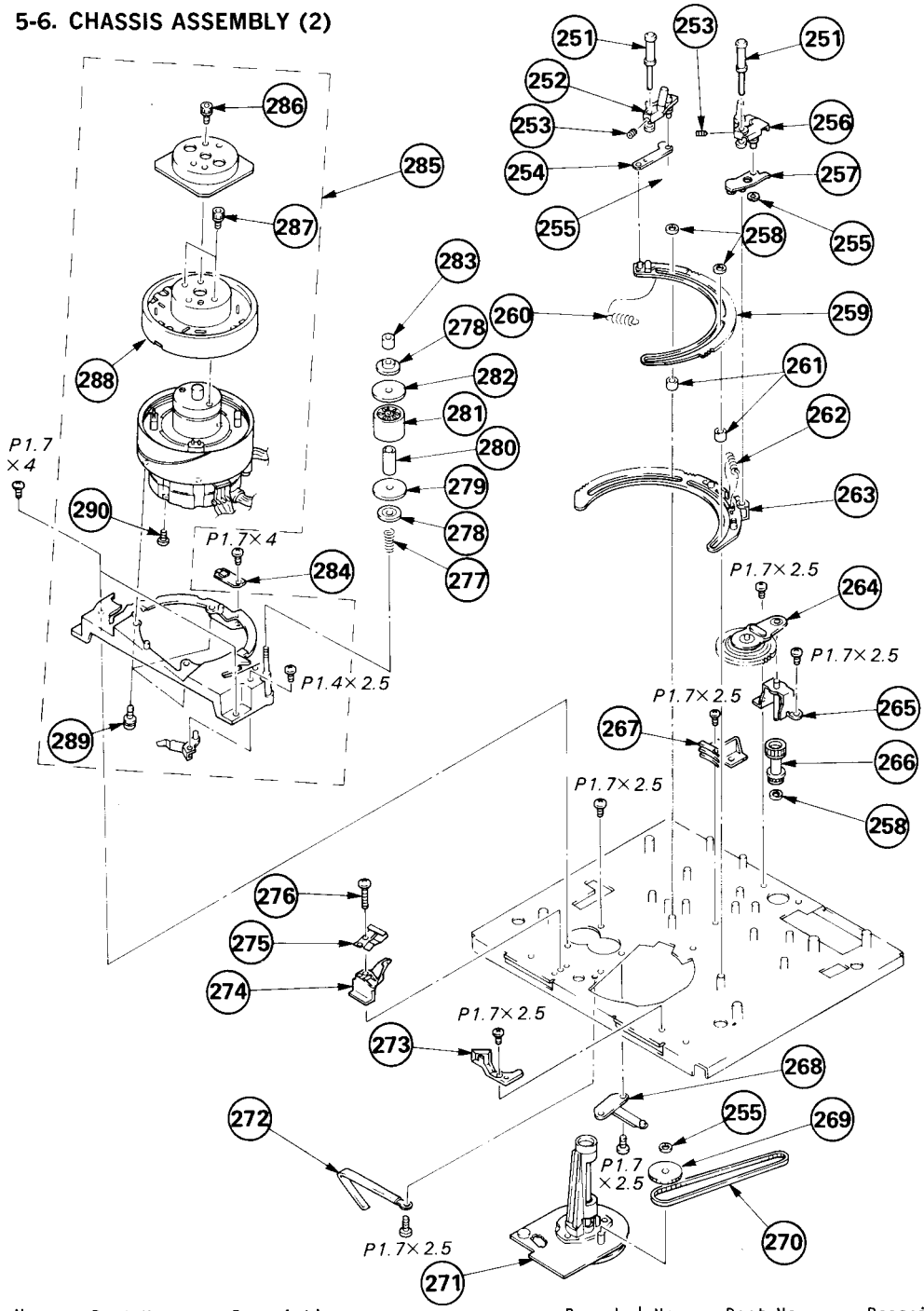


No.	Part No.	Description	Remark
201	3-315-384-31	WASHER, STOPPER	
202	X-3712-023-1	ARM (A) ASSY (2), PINCH	
203	3-695-589-01	LEVER (B), REEL LOCK	
204	3-669-465-00	WASHER (1.5), STOPPER	
205	X-3695-439-1	SLIDER ASSY, M	
206	X-3712-031-1	CAM ASSY (2)	
207	3-712-156-01	GEAR (M) (2), THREADING	
208	3-695-537-01	GEAR (T), THREADING	
209	3-695-536-01	GEAR (S), THREADING	
210	*3-695-706-01	SPRING (T)	
211	3-695-559-01	GEAR (B), THREADING	
212	3-695-724-01	GEAR (D), THREADING	
213	3-712-162-02	GEAR (C) (2), THREADING	
214	3-695-714-01	GEAR (A), LS	
215	3-695-563-04	GEAR (B), LS	

No.	Part No.	Description	Remark
216	X-3695-417-1	GEAR (C) ASSY, LS	
217	*3-695-705-01	SPRING (S)	
218	3-713-937-01	SPRING (A) (2)	
219	X-3695-418-1	ARM ASSY, LOCK	
220	3-695-574-01	ARM, RETURN PREVENTION	
221	3-695-579-01	SPRING (B), TORSION	
222	X-3712-018-1	BASE ASSY (2), LOCK	
223	1-553-226-00	SWITCH, LEAF (CCD SW) S902	
224	X-3695-438-1	ARM ASSY, EJECT	
225	3-321-393-01	WASHER, STOPPER	
226	3-712-150-01	WHEEL, WORM	
227	X-3712-017-1	HOLDER ASSY, MOTOR	
228	1-541-508-11	MOTOR, DC LA14-323F (LOADING) M903	
229	X-3712-036-1	CHASSIS ASSY (2), MECHANICAL	
230	1-161-032-00	CAP, CERAMIC 0.01MF	

5-6. CHASSIS ASSEMBLY (2)

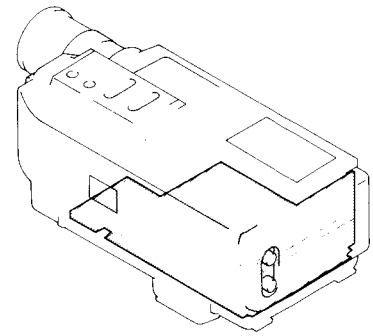


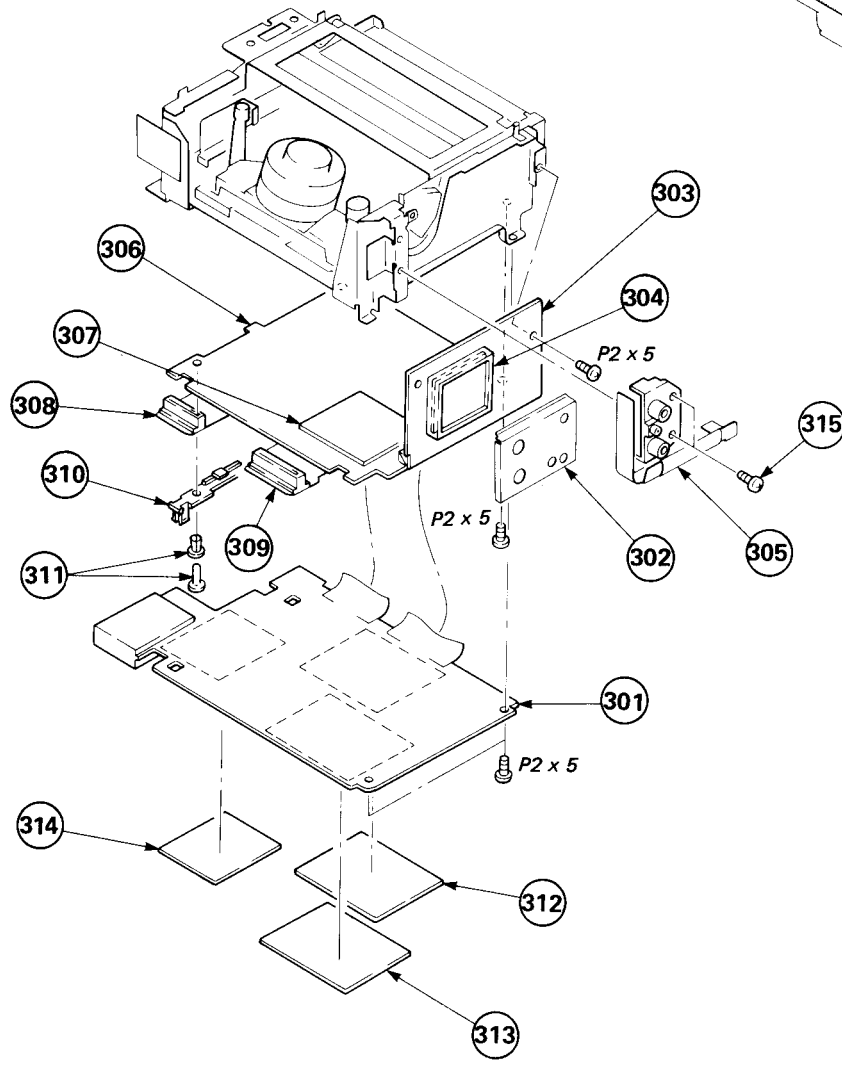


No.	Part No.	Description	Remark
251	X-3712-029-1	ROLLER ASSY (2), GUIDE	
252	X-3712-030-1	BASE ASSY (2), TG5	
253	3-695-770-01	SCREW, GR LOCK	
254	3-695-545-01	JOINT, T	
255	3-321-393-01	WASHER, STOPPER	
256	X-3712-028-1	BASE ASSY (2), TG4	
257	X-3695-429-1	JOINT ASSY, S	
258	3-315-384-31	WASHER, STOPPER	
259	X-3695-414-1	SLIDER (T) ASSY, THREADING	
260	3-695-773-01	SPRING, TENSION	
261	3-695-544-01	ROLLER, GUIDE	
262	3-695-772-01	SPRING, TENSION	
263	X-3695-428-1	SLIDER (S) ASSY, THREADING	
264	X-3712-024-1	ARM ASSY (2), GEAR	
265	X-3712-020-1	BASE ASSY (2), MIDWAY PULLEY	
266	X-3712-021-1	PULLEY ASSY (2), MIDWAY	
267	3-712-163-01	SUPPORT (2), SLIDER	
268	1-535-574-11	TERMINAL, SHAFT GROUND	
269	X-3695-413-1	GEAR ASSY, CHANGE	
270	3-695-637-01	BELT, RELAY	

No.	Part No.	Description	Remark
271	8-835-223-01	MOTOR, DC BHF-3301B (CAPSTAN) M902	
272	3-712-161-01	CLAMP	
273	3-695-627-01	STOPPER, SLIDER, S	
274	3-695-628-01	STOPPER, SLIDER, T	
275	3-695-677-01	SPRING (T), LEAF	
276	3-695-519-01	SCREW, FITTING, LEAF SPRING(T)	
277	3-695-532-01	SPRING, COMPRESSION	
278	3-695-727-01	RETAINER, FLANGE, UPPER	
279	3-695-794-01	FLANGE, LOWER, TG2	
280	3-695-530-01	SLEEVE, TG2	
281	3-712-164-01	ROLLER (2), TG2	
282	3-695-528-01	FLANGE, TG2	
283	3-695-529-01	NUT, TG2	
284	1-807-238-11	SENSOR, DEW CONDENSATION	
285	A-7048-081-A	DRUM ASSY (DGU-19A-R)	286-290
286	3-686-422-01	WASHER (2X2.7), BOLT, HOLE	
287	3-686-403-01	SCREW (2X5), BOLT WASHER	
288	A-7049-107-A	DRUM ASSY, UPPER (DGR-19-R)	
289	3-686-444-02	SCREW +P 2X5.5	
290	3-686-458-01	SCREW (P1.4X2.5), TAPPING	

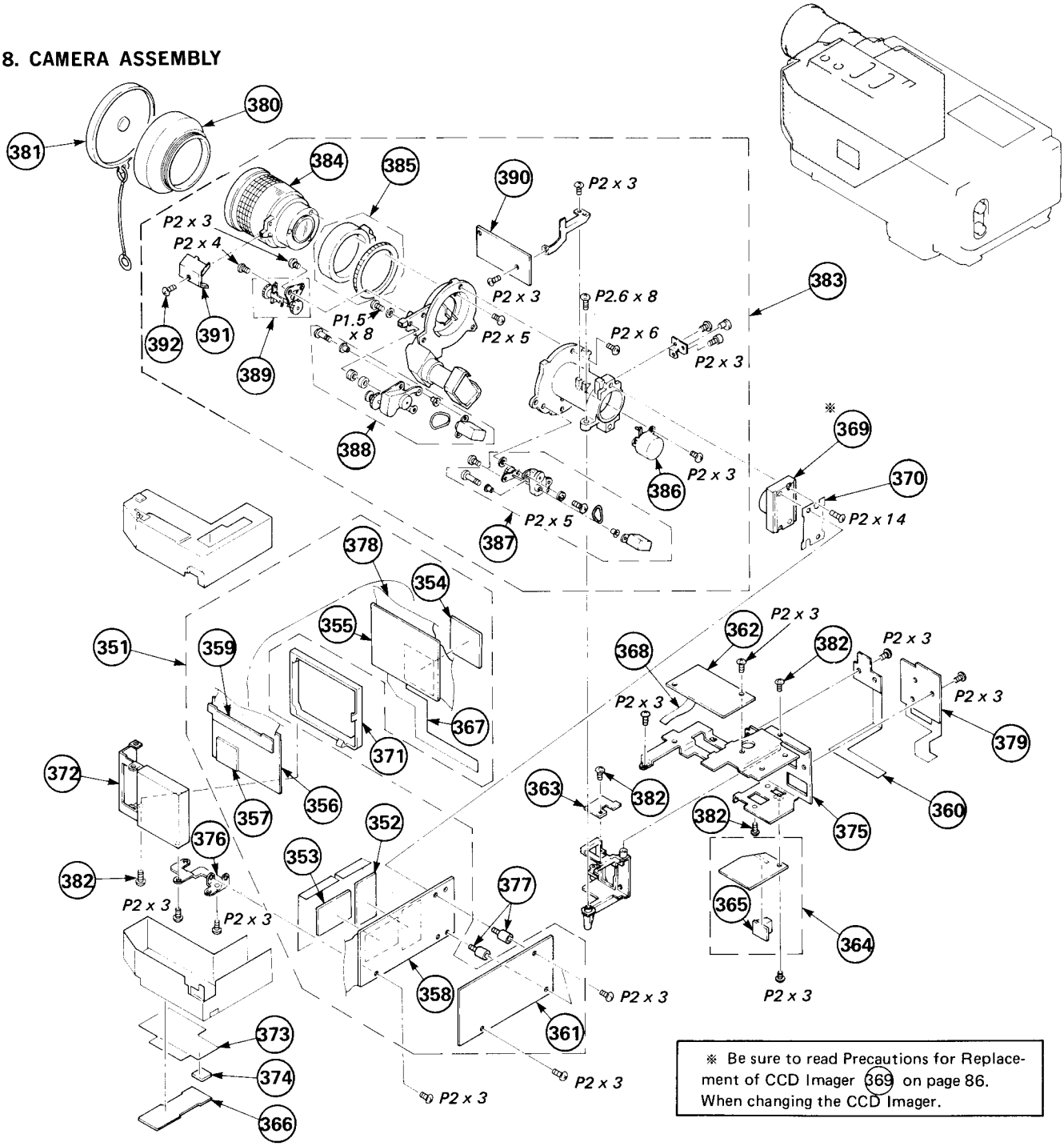
5-7. MAIN BOARD ASSEMBLY





No.	Part No.	Description	Remark
301	*A-7060-878-A	MV-12 BOARD, COMPLETE	312-314
302	*3-713-990-01	CASE (UPPER), SHIELD, RP	
303	*A-7060-772-A	MR-8 BOARD, COMPLETE	304
304	*A-7068-074-A	RP-34 BOARD, COMPLETE	
305	*A-7070-508-A	FP-49 BOARD, COMPLETE	
306	*A-7060-790-A	SS-70 BOARD, COMPLETE	307-309
307	*A-7060-771-A	AU-31 BOARD, COMPLETE	
308	A-7090-594-A	CONNECTOR BLOCK ASSY (A)	
309	A-7090-595-A	CONNECTOR BLOCK ASSY (B)	
310	3-713-761-01	HOLDER, MV PC BOARD	
311	3-531-576-11	RIVET	
312	A-7068-070-A	VC-11 BOARD, COMPLETE (HIC)	
313	A-7068-071-A	VY-9 BOARD, COMPLETE (HIC)	
314	A-7068-072-A	VD-6 BOARD, COMPLETE (HIC)	
315	3-686-999-41	SCREW (2.6X5) (C LOCK), (+) B	

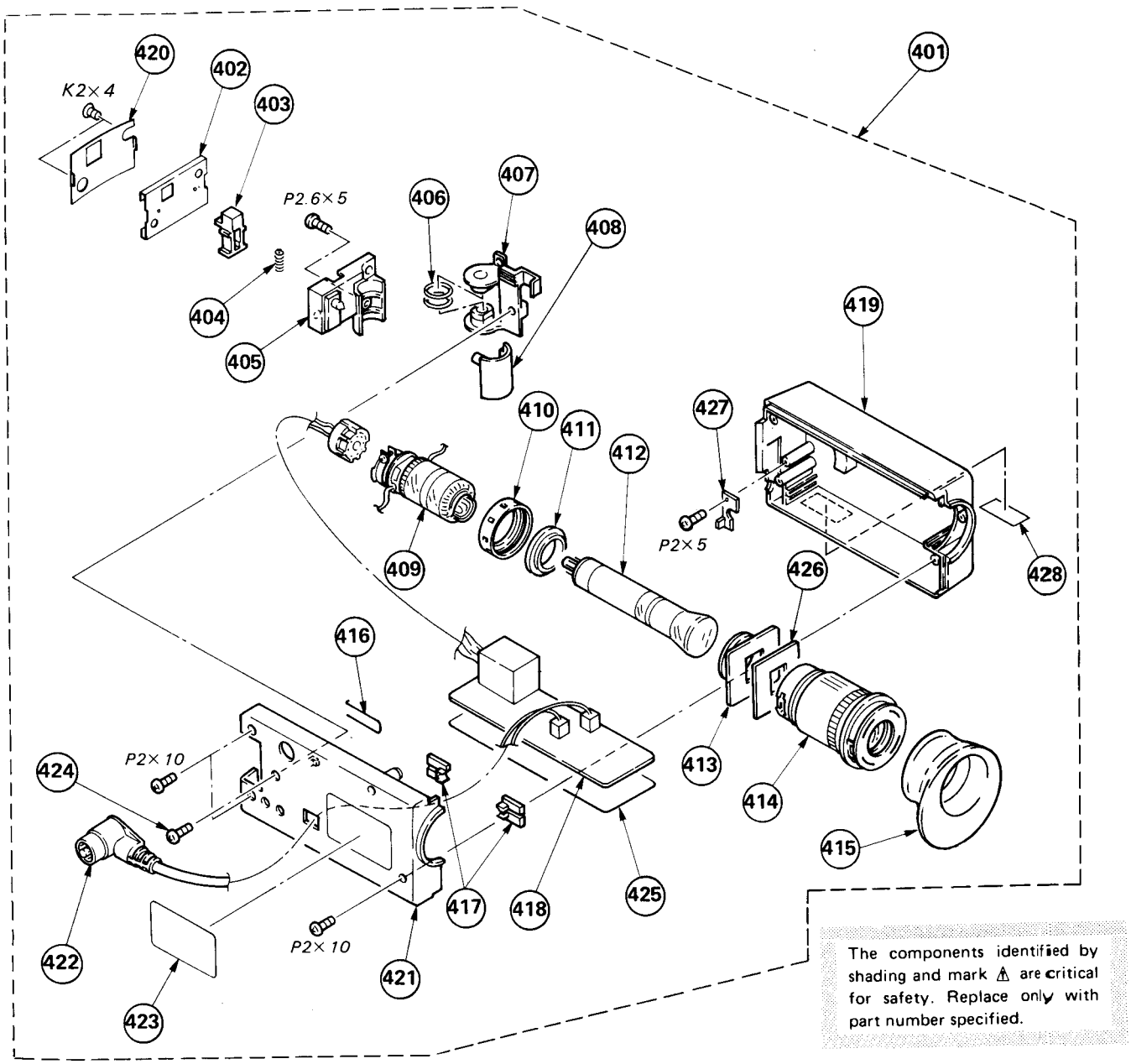
5-8. CAMERA ASSEMBLY



※ Be sure to read Precautions for Replacement of CCD Imager (369) on page 86. When changing the CCD Imager.

No.	Part No.	Description	Remark
351	*A-7030-065-A	CAM BOARD, ASSY	352-368, 378
352	A-7068-056-A	DT-61 BOARD, COMPLETE (HIC)	
353	*A-7068-088-A	SH-2 BOARD, COMPLETE	
354	A-7060-835-A	MX-2 BOARD, COMPLETE	
355	*A-7060-880-A	VC-21 BOARD, COMPLETE	354
356	*A-7060-881-A	VC-22 BOARD, COMPLETE	357, 359
357	*A-7060-888-A	IA-1 (B) BOARD, COMPLETE	
358	*A-7060-882-A	VC-20 BOARD, COMPLETE	352, 353
359	*A-7070-467-A	CN-27 BOARD, COMPLETE	
360	A-7070-469-A	SK-21 BOARD, COMPLETE	
361	*A-7060-884-A	DS-24 BOARD, COMPLETE	
362	*A-7070-495-A	SW-71 BOARD, COMPLETE	
363	*A-7070-494-A	MA-21 BOARD, COMPLETE	
364	*A-7085-009-A	AW-AS BOARD, COMPLETE	365
365	*A-7070-498-A	AS-20 BOARD, COMPLETE	
366	*A-7070-496-A	RZ-1 BOARD, COMPLETE	
367	1-623-013-11	FP-81 BOARD	
368	1-623-019-11	FP-82 FLEXIBLE BOARD	
※369	8-750-010-33	IU021CK-AA (CCD IMAGER)	
370	*3-690-235-01	SHEET, INSULATING, CCD	
371	*3-713-726-01	HOLDER (UPPER), VC PC BOARD	
372	1-464-824-11	CONVERTER UNIT, DC/DC	
373	*3-713-721-01	SHEET (L), INSULATING, CAMERA	
374	3-713-907-01	SPACER, CAM	
375	X-3712-179-1	FRAME ASSY, LENS FITTING	
376	*3-719-351-01	BRACKET, VC PC BOARD	
377	*3-719-362-01	SPACER, DS PC BOARD FITTING	
378	1-623-012-11	FP-80 FLEXIBLE BOARD	
379	*A-7070-462-A	SK-19 BOARD, COMPLETE	
380	3-718-235-01	HOOD, LENS	
381	3-719-348-01	CAP, HOOD	
382	3-713-790-01	SCREW (M2X5), TAPPING, P3	
383	1-547-242-11	LENS, ZOOM (VCL-1206YH)	384 - 392
384	3-707-368-01	RUBEER, FOCUS	
385	3-707-371-01	RING ASSY, ZOOM	
386	3-707-369-01	METER ASSY, EE	
387	1-541-537-11	MOTOR, DC (GM-1674)	
388	1-541-536-11	MOTOR, DC (GM-1673)	
389	3-707-370-01	GEAR ASSY, AF DRIVE	
390	A-7060-961-A	AF-32 BOARD, COMPLETE	
391	*3-719-687-01	COVER, GEAR	
392	3-719-845-01	SCREW (B2X4) TAPPING	

5-9. EVF ASSEMBLY



No.	Part No.	Description	Remark
401	A-7019-051-A	EVF ASSY (AEP/E MODEL)	402-427
	A-7019-054-A	EVF ASSY (UK MODEL)	402-428
402	3-713-550-01	LINING, EVF	
403	3-713-742-01	BUTTON, LOCK	
404	3-480-102-00	SPRING, COMPRESSION	
405	X-3686-905-1	HINGE (A) ASSY, EVF	
406	3-146-316-11	RING, RUBBER	
407	3-713-741-01	BASE, HINGE	
408	3-713-556-01	HINGE (B), EVF	
409	⚠1-451-296-21	DEFLECTION YOKE (BLACK & WHITE)	
410	3-713-534-01	RETAINER, CRT	
411	*3-712-660-01	RING, RUBBER	
412	⚠1-546-061-11	CATHODE-RAY TUBE, B/W	
413	3-712-183-01	COVER, CRT	

No.	Part No.	Description	Remark
414	A-7080-263-A	FINDER BLOCK ASSY	
415	3-713-548-01	CUP, EYE	
416	3-713-533-01	SHAFT, HINGE LOCK	
417	3-712-184-01	RETAINER, CORD	
418	*A-7060-777-A	VF-10 BOARD, COMPLETE	427
419	X-3712-052-1	CABINET (UPPER) ASSY, EVF	
420	3-713-781-01	LINING, SPRING	
421	X-3712-053-2	CABINET (LOWER) ASSY, EVF	
422	1-556-824-61	CORD, CONNECTION (WITH PLUG) 8P	
423	*3-713-519-01	LABEL, MODEL NUMBER, EVF AEP MODEL	
	*3-713-518-01	LABEL, MODEL NUMBER, EVF UK MODEL	
424	3-713-559-01	SCREW (2X6)	
425	*3-714-005-01	SHEET, INSULATING	
426	3-713-985-01	PLATE, CRT	
427	*1-621-803-11	LD-7 BOARD	
428	*3-704-235-01	LABEL, CAUTION (UK MODEL)	

5-10. HARDWEAR LIST

SCREW

7-621-255-45	SCREW +P 2X6
7-621-255-85	SCREW +P 2X14
7-621-284-10	SCREW +P 2.6X5
7-621-591-00	SCREW +K 2X4
7-627-553-67	SCREW, PRECISION +P 2X5
7-627-850-17	SCREW, PRECISION +P 1.4X2.5
7-627-552-07	SCREW, PRECISION +P 1.7X2.5
7-627-852-18	SCREW, PRECISION +P 1.7X4 TYPE3
7-627-852-38	SCREW, PRECISION +P1.7X1.8TYPE3
7-627-553-37	PRECISION SCREW +P 2X3 TYPE 3
7-627-853-58	SCREW, PRECISION +P 2X5 TYPE3
7-685-103-19	SCREW +P 2X5 TYPE2 NON-SLIT
7-685-104-19	SCREW +P 2X6 TYPE2 NON-SLIT
7-685-105-19	SCREW +P 2X8 TYPE2 NON-SLIT
7-685-106-19	SCREW +P 2X10 TYPE2 NON-SLIT
7-685-134-19	SCREW +P 2.6X8 TYPE2 NON-SLIT
7-685-134-19	SCREW +BTP 2.6X8 TYPE2 N-S

NUT

7-622-205-05	NUT M2 TYPE2

WASHER

7-623-922-01	WASHER 2.0, NYLONE

STOP RING

7-624-101-01	STOP RING 1.2 (E TYPE)
7-624-102-04	STOP RING 1.5, TYPE -E

SECTION 6
ELECTRICAL PARTS LIST

CAMERA BOARD ASSY

VC-20 | **DT-61** | **SH-2**

NOTE:

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

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

- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.

RESISTORS

- All resistors are in ohms
- F : nonflammable

- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

CAPACITORS

- MF : μF, PF : μμF

COILS

- MMH : mH, UH : μH

Ref.No	Part No.	Description		Remark
	*A-7030-065-A	CAM BOARD ASSY ********** (Including the VC-20, VC-21, VC-22, CN-27, MA-21, DS-24, SW-71, AW-9, AS-20, SK-21, and RZ-1 Board)		
	1-623-012-11	FP-80 FLEXIBLE BOARD		
	1-623-013-12	FP-81 FLEXIBLE BOARD		
	1-623-019-11	FP-82 FLEXIBLE BOARD		
	*A-7060-882-A	VC-20 BOARD, COMPLETE **********		
	A-7068-056-A	DT-61 BOARD (HIC), COMPLETE		
	*A-7068-088-A	SH-2 BOARD (HIC), COMPLETE		
		CAPACITOR		
C701	1-162-637-11	CERAMIC CHIP 0.47MF		16V
C702	1-162-637-11	CERAMIC CHIP 0.47MF		16V
C703	1-135-083-00	TANTAL. CHIP 0.47MF	20%	25V
C704	1-135-083-00	TANTAL. CHIP 0.47MF	20%	25V
C705	1-162-637-11	CERAMIC CHIP 0.47MF		16V
C706	1-163-129-00	CERAMIC CHIP 330PF	5%	50V
C707	1-162-637-11	CERAMIC CHIP 0.47MF		16V
C708	1-163-101-00	CERAMIC CHIP 22PF	5%	50V
C709	1-163-101-00	CERAMIC CHIP 22PF	5%	50V
C710	1-163-109-00	CERAMIC CHIP 47PF	5%	50V
C721	1-163-089-00	CERAMIC CHIP 6PF	0.5PF	50V
C722	1-163-111-00	CERAMIC CHIP 56PF	5%	50V
C723	1-163-111-00	CERAMIC CHIP 56PF	5%	50V
C724	1-163-021-00	CERAMIC CHIP 0.01MF	10%	50V
C725	1-163-021-00	CERAMIC CHIP 0.01MF	10%	50V
C726	1-163-035-00	CERAMIC CHIP 0.047MF	10%	25V
C732	1-163-109-00	CERAMIC CHIP 47PF	5%	50V
C733	1-163-109-00	CERAMIC CHIP 47PF	5%	50V
C734	1-163-101-00	CERAMIC CHIP 22PF	5%	50V
C735	1-163-021-00	CERAMIC CHIP 0.01MF	10%	50V
C736	1-135-091-00	TANTAL. CHIP 1MF	20%	16V
C737	1-163-141-00	CERAMIC CHIP 0.001MF	10%	50V
C738	1-163-109-00	CERAMIC CHIP 47PF	5%	50V
C739	1-163-021-00	CERAMIC CHIP 0.01MF	10%	50V
C740	1-163-021-00	CERAMIC CHIP 0.01MF	10%	50V
C741	1-163-021-00	CERAMIC CHIP 0.01MF	10%	50V
C742	1-163-101-00	CERAMIC CHIP 22PF	5%	50V
C743	1-163-101-00	CERAMIC CHIP 22PF	5%	50V
C744	1-163-021-00	CERAMIC CHIP 0.01MF	10%	50V
C745	1-135-100-21	TANTAL. CHIP 6.8MF	20%	6.3V
C746	1-163-035-00	CERAMIC CHIP 0.047MF	10%	25V
C751	1-124-229-00	ELECT 33MF	20%	10V
C752	1-163-013-00	CERAMIC CHIP 0.0022MF	10%	50V
C753	1-163-013-00	CERAMIC CHIP 0.0022MF	10%	50V
C754	1-163-105-00	CERAMIC CHIP 33PF	5%	50V
C755	1-163-105-00	CERAMIC CHIP 33PF	5%	50V

Ref.No	Part No.	Description			Remark
C761	1-124-222-00	ELECT	22MF	20%	6.3V
C762	1-163-021-00	CERAMIC CHIP	0.01MF	10%	50V
C763	1-131-387-00	TANTALUM	47MF	10%	6.3V
C764	1-124-234-00	ELECT	22MF	20%	16V
C765	1-163-021-00	CERAMIC CHIP	0.01MF	10%	50V
C766	1-163-021-00	CERAMIC CHIP	0.01MF	10%	50V
C767	1-124-234-00	ELECT	22MF	20%	16V
C768	1-163-077-00	CERAMIC CHIP	0.1MF		50V
C769	1-163-077-00	CERAMIC CHIP	0.1MF		50V
C770	1-124-234-00	ELECT	22MF	20%	16V
C771	1-163-021-00	CERAMIC CHIP	0.01MF	10%	50V
C772	1-163-021-00	CERAMIC CHIP	0.01MF	10%	50V
C773	1-124-234-00	ELECT	22MF	20%	16V
C774	1-163-035-00	CERAMIC CHIP	0.047MF	10%	25V
C775	1-163-035-00	CERAMIC CHIP	0.047MF	10%	25V
C776	1-163-035-00	CERAMIC CHIP	0.047MF		50V
		TRIMMER			
CT721	1-141-331-11	CAP, VAR, TRIMMER (CHIP)	30P		
CT731	1-141-329-11	CAP, VAR, TRIMMER (CHIP)	10P		
		DIODE			
D701	8-719-801-45	DIODE 1SS187			
D731	8-713-200-00	DIODE 1T32-2			
		IC			
※IC701	8-750-010-33	IC IU021CK-AA			
IC731	8-752-321-16	IC CXD1030M			
		COIL			
L731	1-410-389-11	INDUCTOR CHIP	47UH		
L761	1-407-165-XX	MICRO INDUCTOR	47UH		
L762	1-408-960-21	MICRO INDUCTOR	1.5UH		
L763	1-408-960-21	MICRO INDUCTOR	1.5UH		
L764	1-407-165-XX	MICRO INDUCTOR	47UH		
		TRANSISTOR			
Q701	8-729-100-67	TRANSISTOR 2SC1623-L7			
Q721	8-729-175-73	TRANSISTOR 2SC2757			
Q722	8-729-175-72	TRANSISTOR 2SC2757-T34			
Q731	8-729-100-76	TRANSISTOR 2SA812			
Q732	8-729-100-67	TRANSISTOR 2SC1623-L7			
		RESISTOR			
R701	1-216-075-00	METAL CHIP	12K	5%	1/10W
R702	1-216-089-00	METAL CHIP	47K	5%	1/10W
R703	1-216-075-00	METAL CHIP	12K	5%	1/10W
R704	1-216-091-00	METAL CHIP	56K	5%	1/10W
R705	1-216-089-00	METAL CHIP	47K	5%	1/10W
R706	1-216-067-00	METAL CHIP	5.6K	5%	1/10W
R707	1-216-025-00	METAL CHIP	100	5%	1/10W
R708	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R709	1-216-057-00	METAL CHIP	2.2K	5%	1/10W

※ The IC701 and IC002 have not been mounted on the already mounted VC-20 board and DT-61 board respectively.
Be sure to read "Precautions for Replacement of CCD Imager" on page 86. When changing the mounted VC-20 board and CCD Imager.

VC-20 VC-21 MX-2 VC-22 IA-1

Ref.No	Part No.	Description				Remark
R721	1-216-067-00	METAL CHIP	5.6K	5%	1/10W	
R722	1-216-067-00	METAL CHIP	5.6K	5%	1/10W	
R723	1-216-039-00	METAL CHIP	390	5%	1/10W	
R724	1-216-039-00	METAL CHIP	390	5%	1/10W	
R725	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R726	1-216-041-00	METAL CHIP	470	5%	1/10W	
R727	1-216-053-00	METAL CHIP	1.5K	5%	1/10W	
R732	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R733	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R734	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	
R735	1-216-077-00	METAL CHIP	15K	5%	1/10W	
R736	1-216-069-00	METAL CHIP	6.8K	5%	1/10W	
R738	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R739	1-216-295-00	METAL CHIP	0	5%	1/10W	
R740	1-216-025-00	METAL CHIP	100	5%	1/10W	
R741	1-216-093-00	METAL CHIP	68K	5%	1/10W	
R742	1-216-121-00	METAL CHIP	1M	5%	1/10W	
R743	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R744	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R745	1-216-033-00	METAL CHIP	220	5%	1/10W	
R746	1-216-053-00	METAL CHIP	1.5K	5%	1/10W	
R747	1-216-045-00	METAL CHIP	680	5%	1/10W	
R751	1-216-025-00	METAL CHIP	100	5%	1/10W	
R752	1-216-049-00	METAL CHIP	1K	5%	1/10W	
		CRYSTAL				
X721	1-567-732-12	VIBRATOR, CRYSTAL 28.3750MHz				
X731	1-567-733-11	VIBRATOR, CRYSTAL 17.7MHz				

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*A-7060-880-A VC-21 BOARD, COMPLETE
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A-7060-835-A MX-2 BOARD (HIC), COMPLETE

		CAPACITOR			
C781	1-163-077-00	CERAMIC CHIP 0.1MF			50V
C782	1-163-077-00	CERAMIC CHIP 0.1MF			50V
C783	1-163-213-00	CERAMIC CHIP 0.0022MF		10%	50V
C784	1-163-213-00	CERAMIC CHIP 0.0022MF		10%	50V
C785	1-163-213-00	CERAMIC CHIP 0.0022MF		10%	50V
C786	1-124-234-00	ELECT	22MF	20%	10V
C787	1-163-021-00	CERAMIC CHIP 0.01MF		10%	50V
C788	1-163-021-00	CERAMIC CHIP 0.01MF		10%	50V
C789	1-124-584-00	ELECT	100MF	20%	10V
C790	1-135-105-00	TANTAL. CHIP 33MF		20%	4V
C791	1-135-105-00	TANTAL. CHIP 33MF		20%	4V
		FILTER			
FL781	1-235-442-11	FILTER, LOW PASS (YH)			

Ref.No	Part No.	Description				Remark
		IC				
IC781	8-759-914-44	IC TL431CLPB				
		COIL				
L781	1-408-767-21	INDUCTOR CHIP	1.5UH			
L782	1-410-369-11	INDUCTOR CHIP	1UH			
L783	1-410-337-11	MICRO INDUCTOR	1UH			
L784	1-410-337-11	MICRO INDUCTOR	1UH			
L785	1-410-369-11	INDUCTOR CHIP	1UH			
L786	1-408-785-21	INDUCTOR CHIP	47UH			
L787	1-408-777-00	INDUCTOR CHIP	10UH			
		RESISTOR				
R781	1-216-069-00	METAL CHIP	6.8K	5%	1/10W	
R782	1-216-069-00	METAL CHIP	6.8K	5%	1/10W	
R783	1-216-069-00	METAL CHIP	6.8K	5%	1/10W	
R784	1-216-069-00	METAL CHIP	6.8K	5%	1/10W	
R785	1-216-069-00	METAL CHIP	6.8K	5%	1/10W	
R786	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R787	1-216-069-00	METAL CHIP	6.8K	5%	1/10W	
R788	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R789	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R790	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R791	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R792	1-216-061-00	METAL CHIP	3.3K	5%	1/10W	
R793	1-216-061-00	METAL CHIP	3.3K	5%	1/10W	
R794	1-216-067-00	METAL CHIP	5.6K	5%	1/10W	
R795	1-216-061-00	METAL CHIP	3.3K	5%	1/10W	
R796	1-216-069-00	METAL CHIP	6.8K	5%	1/10W	
		VARIABLE RESISTOR				
RV781	1-230-523-11	RES, ADJ, METAL GLAZE 10K				
RV782	1-230-523-11	RES, ADJ, METAL GLAZE 10K				

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*A-7060-881-A VC-22 BOARD, COMPLETE
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*A-7060-888-A IA-1 BOARD (HIC), COMPLETE

		CAPACITOR			
C801	1-163-021-00	CERAMIC CHIP 0.01MF		10%	50V
C802	1-163-021-00	CERAMIC CHIP 0.01MF		10%	50V
C803	1-163-013-00	CERAMIC CHIP 0.0022MF		10%	50V
C804	1-163-077-00	CERAMIC CHIP 0.1MF			50V
C805	1-163-077-00	CERAMIC CHIP 0.1MF			50V
C806	1-163-077-00	CERAMIC CHIP 0.1MF			50V
C807	1-163-077-00	CERAMIC CHIP 0.1MF			50V
C808	1-135-085-21	TANTAL. CHIP 4.7MF		20%	16V
C809	1-163-077-00	CERAMIC CHIP 0.1MF			50V
C810	1-135-093-21	TANTAL. CHIP 10MF		20%	6.3V

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

Ref.No	Part No.	Description		Remark
C811	1-162-638-11	CERAMIC CHIP 1MF		16V
C812	1-135-101-21	TANTAL. CHIP 22MF	20%	6.3V
C813	1-163-077-00	CERAMIC CHIP 0.1MF		50V
C814	1-163-103-00	CERAMIC CHIP 27PF	5%	50V
C815	1-135-093-21	TANTAL. CHIP 10MF	20%	10V
C816	1-135-093-21	TANTAL. CHIP 10MF	20%	10V
C817	1-163-117-00	CERAMIC CHIP 100PF	5%	50V
C861	1-135-092-21	TANTAL. CHIP 3.3MF	20%	16V
C862	1-124-225-00	ELECT 100MF	20%	6.3V
C863	1-163-081-00	CERAMIC CHIP 0.22MF		25V
C881	1-135-101-21	TANTAL. CHIP 22MF	20%	6.3V
C882	1-163-021-00	CERAMIC CHIP 0.01MF	10%	50V
C883	1-163-021-00	CERAMIC CHIP 0.01MF	10%	50V
C884	1-124-225-00	ELECT 100MF	20%	6.3V

DIODE

D801	8-719-801-45	DIODE 1SS187
D802	8-719-100-05	DIODE 1S2837
D861	8-719-100-05	DIODE 1S2837

IC

IC801	8-759-908-11	IC CX20055

COIL

L801	1-408-785-21	INDUCTOR CHIP 47UH
L881	1-407-165-XX	MICRO INDUCTOR 47UH

TRANSISTOR

Q801	8-729-100-67	TRANSISTOR 2SC1623-L7
Q802	8-729-100-67	TRANSISTOR 2SC1623-L7
Q803	8-729-100-67	TRANSISTOR 2SC1623-L7
Q804	8-729-100-66	TRANSISTOR 2SA812
Q805	8-729-100-66	TRANSISTOR 2SA812
Q806	8-729-100-67	TRANSISTOR 2SC1623-L7
Q807	8-729-100-67	TRANSISTOR 2SC1623-L7
Q808	8-729-100-67	TRANSISTOR 2SC1623-L7
Q809	8-729-100-67	TRANSISTOR 2SC1623-L7
Q861	8-729-805-43	TRANSISTOR 2SC3396

RESISTOR

R801	1-216-081-00	METAL CHIP	22K	5%	1/10W
R802	1-216-081-00	METAL CHIP	22K	5%	1/10W
R803	1-216-091-00	METAL CHIP	56K	5%	1/10W
R804	1-216-081-00	METAL CHIP	22K	5%	1/10W
R805	1-216-081-00	METAL CHIP	22K	5%	1/10W
R806	1-216-083-00	METAL CHIP	27K	5%	1/10W
R807	1-216-083-00	METAL CHIP	27K	5%	1/10W
R808	1-216-081-00	METAL CHIP	22K	5%	1/10W
R809	1-216-081-00	METAL CHIP	22K	5%	1/10W
R810	1-216-081-00	METAL CHIP	22K	5%	1/10W
R811	1-216-081-00	METAL CHIP	22K	5%	1/10W
R812	1-216-081-00	METAL CHIP	22K	5%	1/10W
R813	1-216-081-00	METAL CHIP	22K	5%	1/10W

Ref.No	Part No.	Description			Remark
R814	1-216-081-00	METAL CHIP	22K	5%	1/10W
R815	1-216-081-00	METAL CHIP	22K	5%	1/10W
R816	1-216-081-00	METAL CHIP	22K	5%	1/10W
R818	1-216-081-00	METAL CHIP	22K	5%	1/10W
R819	1-216-081-00	METAL CHIP	22K	5%	1/10W
R820	1-216-081-00	METAL CHIP	22K	5%	1/10W
R821	1-216-081-00	METAL CHIP	22K	5%	1/10W
R822	1-216-081-00	METAL CHIP	22K	5%	1/10W
R823	1-216-748-11	METAL CHIP	39K	5%	1/10W
R824	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R825	1-216-053-00	METAL CHIP	1.5K	5%	1/10W
R826	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R827	1-216-071-00	METAL CHIP	8.2K	5%	1/10W
R828	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R829	1-216-075-00	METAL CHIP	12K	5%	1/10W
R830	1-216-097-00	METAL CHIP	100K	5%	1/10W
R831	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R832	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R833	1-216-063-00	METAL CHIP	3.9K	5%	1/10W
R834	1-216-053-00	METAL CHIP	1.5K	5%	1/10W
R835	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R836	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R837	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R838	1-249-429-11	**********	10K	5%	1/32W
R838	1-216-047-00	METAL CHIP	820	5%	1/10W
R839	1-249-430-11	**********	12K	5%	1/32W
R839	1-216-055-00	METAL CHIP	1.8K	5%	1/10W
R861	1-216-073-00	METAL CHIP	10K	5%	1/10W
R862	1-216-073-00	METAL CHIP	10K	5%	1/10W
R863	1-216-079-00	METAL CHIP	18K	5%	1/10W
R864	1-216-085-00	METAL CHIP	33K	5%	1/10W
R866	1-216-295-00	METAL CHIP	0	5%	1/10W
R867	1-216-053-00	METAL CHIP	1.5K	5%	1/10W
R868	1-216-055-00	METAL CHIP	1.8K	5%	1/10W
R869	1-216-295-00	METAL CHIP	0	5%	1/10W

VARIABLE RESISTOR

RV801	1-230-870-11	RES, ADJ, METAL GLAZE 10K
RV802	1-230-870-11	RES, ADJ, METAL GLAZE 10K
RV803	1-230-870-11	RES, ADJ, METAL GLAZE 10K
RV804	1-230-870-11	RES, ADJ, METAL GLAZE 10K
RV805	1-230-870-11	RES, ADJ, METAL GLAZE 10K
RV806	1-230-870-11	RES, ADJ, METAL GLAZE 10K
RV808	1-230-870-11	RES, ADJ, METAL GLAZE 10K
RV809	1-230-870-11	RES, ADJ, METAL GLAZE 10K
RV810	1-230-870-11	RES, ADJ, METAL GLAZE 10K

****

A-7060-961-A AF-32 BOARD, COMPLETE
****

CAPACITOR

C001	1-163-021-00	CERAMIC CHIP 0.01MF		10%	50V

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

AF-32 AW-9

Ref.No	Part No.	Description			Remark
C002	1-163-021-00	CERAMIC CHIP 0.01MF	10%	50V	
C003	1-124-464-11	ELECT 0.22MF	20%	50V	
C004	1-163-021-00	CERAMIC CHIP 0.01MF	10%	50V	
C005	1-163-021-00	CERAMIC CHIP 0.01MF	10%	50V	
C006	1-123-622-00	ELECT 22MF	20%	16V	
C007	1-163-117-00	CERAMIC CHIP 0.0001MF	5%	50V	
C008	1-163-141-00	CERAMIC CHIP 0.001MF	5%	50V	
C009	1-123-321-00	ELECT 220MF	20%	16V	
C010	1-163-021-00	CERAMIC CHIP 0.01MF	10%	50V	
		CONNECTOR			
CN001	1-563-587-11	CONNECTOR, FLEXIBLE 10P			
CN002	1-563-108-11	CONNECTOR, FLEXIBLE 5P			
CN003	1-566-936-11	PIN, CONNECTOR 2P			
CN004	1-566-937-11	PIN, CONNECTOR 3P			
		IC			
IC001	9-990-857-01	IC HIM21			
IC002	9-992-551-01	IC 80C 49AU-6691			
IC003	9-990-855-01	IC LAG648			
		TRANSISTOR			
Q001	8-729-103-16	TRANSISTOR 2SC1622A			
Q002	8-729-101-07	TRANSISTOR 2SB798			
		RESISTOR			
R001	1-216-097-00	METAL CHIP 100K	5%	1/10W	
R002	1-216-295-00	METAL CHIP 0	5%	1/10W	
R003	1-216-096-00	METAL CHIP 91K	5%	1/10W	
R004	1-216-089-00	METAL CHIP 47K	5%	1/10W	
R005	1-216-082-00	METAL CHIP 24K	5%	1/10W	
R006	1-216-075-00	METAL CHIP 12K	5%	1/10W	
R007	1-216-049-00	METAL CHIP 1K	5%	1/10W	
R008	1-216-049-00	METAL CHIP 1K	5%	1/10W	
R009	1-216-080-00	METAL CHIP 20K	5%	1/10W	
R010	1-216-041-00	METAL CHIP 470	5%	1/10W	
R011	1-216-061-00	METAL CHIP 3.3K	5%	1/10W	
R012	1-216-082-00	METAL CHIP 24K	5%	1/10W	
R013	1-216-304-11	METAL CHIP 3.3	5%	1/10W	
R014	1-216-049-00	METAL CHIP 1K	5%	1/10W	
R015	1-216-097-00	METAL CHIP 100K	5%	1/10W	
R016	1-216-045-00	METAL CHIP 680	5%	1/10W	
R017	1-216-053-00	METAL CHIP 1.5K	5%	1/10W	
		VARIABLE RESISTOR			
VR001	1-230-287-00	RES, ADJ, METAL GLAZE 10K			
VR002	1-237-485-00	RES, ADJ, METAL GLAZE 220K			
VR003	1-237-579-00	RES, ADJ, METAL GLAZE 1K			
		VIBRATOR			
X001	1-567-470-11	VIBRATOR, CERAMIC 6MHZ			

Ref.No	Part No.	Description			Remark
	*A-7070-497-A	AW-9 BOARD, COMPLETE **********			
		CAPACITOR			
C901	1-109-539-00	MICA 150PF	5%	100V	
C902	1-130-475-00	MYLAR 0.0022MF	5%	50V	
C903	1-124-462-00	ELECT 10MF	20%	6.3V	
C904	1-163-077-00	CERAMIC CHIP 0.1MF		50V	
C905	1-124-462-00	ELECT 10MF	20%	6.3V	
C906	1-162-638-11	CERAMIC CHIP 1MF		16V	
C907	1-163-104-00	CERAMIC CHIP 30PF	5%	50V	
C908	1-163-104-00	CERAMIC CHIP 30PF	5%	50V	
C911	1-162-637-11	CERAMIC CHIP 0.47MF		16V	
		CONNECTOR			
CN901	*1-564-004-00	PIN, CONNECTOR 5P			
CN902	*1-564-005-00	PIN, CONNECTOR 6P			
		DIODE			
D901	8-719-100-03	DIODE 1S2835			
		IC			
IC901	8-759-906-53	IC TL062CPS			
IC902	8-759-106-23	IC UPD4066BG			
IC903	8-759-100-93	IC UPC393G2			
IC904	8-759-011-87	IC MC146805F2FP-SC82435			
		TRANSISTOR			
Q901	8-729-903-30	TRANSISTOR DTC144TK			
Q902	8-729-903-30	TRANSISTOR DTC144TK			
Q903	8-729-805-45	TRANSISTOR 2SC3395			
Q904	8-729-805-45	TRANSISTOR 2SC3395			
Q905	8-729-805-45	TRANSISTOR 2SC3395			
Q906	8-729-805-45	TRANSISTOR 2SC3395			
Q907	8-729-805-69	TRANSISTOR 2SA1341			
Q908	8-729-805-69	TRANSISTOR 2SA1341			
Q909	8-729-805-69	TRANSISTOR 2SA1341			
Q910	8-729-805-69	TRANSISTOR 2SA1341			
Q911	8-729-805-69	TRANSISTOR 2SA1341			
Q912	8-729-805-45	TRANSISTOR 2SC3395			
		RESISTOR			
R901	1-216-049-00	METAL CHIP 1K	5%	1/10W	
R902	1-216-055-00	METAL CHIP 1.8K	5%	1/10W	
R903	1-216-049-00	METAL CHIP 1K	5%	1/10W	
R904	1-216-057-00	METAL CHIP 2.2K	5%	1/10W	
R905	1-216-073-00	METAL CHIP 10K	5%	1/10W	
R906	1-216-085-00	METAL CHIP 33K	5%	1/10W	
R907	1-216-077-00	METAL CHIP 15K	5%	1/10W	
R908	1-216-067-00	METAL CHIP 5.6K	5%	1/10W	
R909	1-216-073-00	METAL CHIP 10K	5%	1/10W	
R910	1-216-073-00	METAL CHIP 10K	5%	1/10W	

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

Ref.No	Part No.	Description				Remark
R911	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R912	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R913	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R914	1-216-121-00	METAL CHIP	1M	5%	1/10W	
R915	1-216-103-00	METAL CHIP	180K	5%	1/10W	
R916	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R917	1-216-089-00	METAL CHIP	47K	5%	1/10W	
R918	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R921	1-216-115-00	METAL CHIP	560K	5%	1/10W	
R922	1-216-107-00	METAL CHIP	270K	5%	1/10W	
R923	1-216-099-00	METAL CHIP	120K	5%	1/10W	
R924	1-216-093-00	METAL CHIP	68K	5%	1/10W	
R927	1-216-041-00	METAL CHIP	470	5%	1/10W	
R928	1-216-041-00	METAL CHIP	470	5%	1/10W	
R929	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R930	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R931	1-216-085-00	METAL CHIP	33K	5%	1/10W	
R932	1-216-075-00	METAL CHIP	12K	5%	1/10W	
		VARIABLE RESISTOR				
RV901	1-230-871-11	RES, ADJ, METAL GLAZE 22K				
		CRYSTAL				
X901	1-567-192-11	OSCILLATOR, CERAMIC				
**********						
	*1-623-016-22	AS-20 BOARD **********				
	3-713-724-01	HOLDER, AS SENSOR				
		BALANCE SENSOR				
SB901	1-807-684-11	SENSOR, WHITE BALANCE AM3208SN				
		CONNECTOR				
W902	*1-506-592-11	PIN, BOARD TO BOARD 4P				
**********						
	*1-623-009-22	SW-71 BOARD **********				
	9-911-839-XX	SPACER, BUTTON				
		SWITCH				
S941	1-570-871-11	SWITCH, SLIDE				
S942	1-570-910-21	SWITCH, TACTIL (REFLOW TYPE)				
S943	1-570-909-21	SWITCH, TACTIL (REFLOW TYPE)				
S944	1-570-910-21	SWITCH, TACTIL (REFLOW TYPE)				
S945	1-570-870-11	SWITCH, SLIDE				
S946	1-570-910-21	SWITCH, TACTIL (REFLOW TYPE)				
S947	1-570-910-21	SWITCH, TACTIL (REFLOW TYPE)				

Ref.No	Part No.	Description				Remark
	*A-7070-496-A	RZ-1 BOARD, COMPLETE **********				
		CAPACITOR				
C127	1-135-115-91	TANTAL. CHIP 10MF		20%	10V	
C128	1-135-115-91	TANTAL. CHIP 10MF		20%	10V	
C136	1-163-021-00	CERAMIC CHIP 0.01MF			50V	
C137	1-163-021-00	CERAMIC CHIP 0.01MF			50V	
		CONNECTOR				
CN251	*1-564-008-11	PIN, CONNECTOR 9P				
CN252	*1-564-007-00	PIN, CONNECTOR 8P				
CN258	*1-564-012-31	PIN, CONNECTOR 2P				
CN260	*1-564-012-00	PIN, CONNECTOR 2P				
		DIODE				
D101	8-719-101-23	DIODE 1SS123				
		IC				
IC109	8-759-803-47	IC LA5005M				
IC110	8-759-803-47	IC LA5005M				
		TRANSISTOR				
Q118	8-729-100-76	TRANSISTOR 2SA812				
Q119	8-729-901-01	TRANSISTOR DTC144EK				
Q120	8-729-100-76	TRANSISTOR 2SA812				
Q121	8-729-901-01	TRANSISTOR DTC144EK				
Q123	8-729-901-06	TRANSISTOR DTA144EK				
Q124	8-729-902-96	TRANSISTOR FMS1				
Q125	8-729-903-10	TRANSISTOR FMW1				
		RESISTOR				
R148	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	
R168	1-216-061-00	METAL CHIP	3.3K	5%	1/10W	
R169	1-216-089-00	METAL CHIP	47K	5%	1/10W	
R170	1-216-089-00	METAL CHIP	47K	5%	1/10W	
R171	1-216-061-00	METAL CHIP	3.3K	5%	1/10W	
R172	1-216-089-00	METAL CHIP	47K	5%	1/10W	
R173	1-216-041-00	METAL CHIP	470	5%	1/10W	
R174	1-216-089-00	METAL CHIP	47K	5%	1/10W	
R175	1-216-089-00	METAL CHIP	47K	5%	1/10W	
R176	1-216-041-00	METAL CHIP	470	5%	1/10W	
R177	1-216-089-00	METAL CHIP	47K	5%	1/10W	
R178	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	
R200	1-216-003-11	METAL CHIP	12	5%	1/10W	
**********						
	*A-7060-884-A	DS-24 BOARD, COMPLETE **********				
		CAPACITOR				
C101	1-163-115-00	CERAMIC CHIP 82PF		5%	50V	

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

DS-24

Ref.No	Part No.	Description		Remark
C102	1-163-125-00	CERAMIC CHIP 220PF	5%	50V
C103	1-163-121-00	CERAMIC CHIP 150PF	5%	50V
C104	1-163-121-00	CERAMIC CHIP 150PF	5%	50V
C105	1-163-021-00	CERAMIC CHIP 0.01MF		50V
C106	1-135-101-21	TANTAL. CHIP 22MF	20%	6.3V
C107	1-163-021-00	CERAMIC CHIP 0.01MF		50V
C108	1-163-121-00	CERAMIC CHIP 150PF	5%	50V
C109	1-163-121-00	CERAMIC CHIP 150PF	5%	50V
C110	1-163-125-00	CERAMIC CHIP 220PF	5%	50V
C111	1-163-115-00	CERAMIC CHIP 82PF	5%	50V
C112	1-163-115-00	CERAMIC CHIP 82PF	5%	50V
C113	1-163-125-00	CERAMIC CHIP 220PF	5%	50V
C114	1-163-095-00	CERAMIC CHIP 12PF	5%	50V
C115	1-163-077-00	CERAMIC CHIP 0.1MF		50V
C116	1-163-077-00	CERAMIC CHIP 0.1MF		50V
C117	1-163-038-00	CERAMIC CHIP 0.1MF		25V
C118	1-135-101-21	TANTAL. CHIP 22MF	20%	6.3V
C120	1-135-083-00	TANTAL. CHIP 0.47MF	20%	25V
C121	1-163-033-00	CERAMIC CHIP 0.022MF	10%	25V
C124	1-163-099-00	CERAMIC CHIP 18PF	5%	50V
C125	1-163-093-00	CERAMIC CHIP 10PF	5%	50V
C126	1-163-105-00	CERAMIC CHIP 33PF	5%	50V
C129	1-135-115-91	TANTAL. CHIP 10MF	20%	10V
C130	1-163-038-00	CERAMIC CHIP 0.1MF		25V
C131	1-135-083-00	TANTAL. CHIP 0.47MF	20%	25V
C132	1-163-038-00	CERAMIC CHIP 0.1MF		25V
C133	1-163-038-00	CERAMIC CHIP 0.1MF		25V
C134	1-163-038-00	CERAMIC CHIP 0.1MF		25V
C135	1-135-099-00	TANTAL. CHIP 2.2MF	20%	6.3V
C138	1-163-105-00	CERAMIC CHIP 33PF	5%	50V
C139	1-163-038-00	CERAMIC CHIP 0.1MF		25V
C140	1-135-098-21	TANTAL. CHIP 47MF	20%	6.3V
C141	1-163-133-00	CERAMIC CHIP 470PF	5%	50V
C142	1-163-109-00	CERAMIC CHIP 47PF	5%	50V
C143	1-161-013-11	CERAMIC 0.01MF		

CONNECTOR

CN251	*1-564-012-00	PIN, CONNECTOR 2P
CN254	*1-564-013-00	PIN, CONNECTOR 3P
CN255	*1-564-017-00	PIN, CONNECTOR 7P
CN257	*1-564-013-00	PIN, CONNECTOR 3P
CN259	*1-563-608-11	CONNECTOR, FLEXIBLE 5P
CN861	*1-564-003-00	PIN, CONNECTOR 4P
CN881	*1-564-007-00	PIN, CONNECTOR 8P

TRIMMER

CT101	1-141-331-21	CAP, VAR, TRIMMER (CHIP) 30P
CT102	1-141-359-51	CAP, VAR, TRIMMER (CHIP) 40P
CT103	1-141-296-21	CAP, VAR, TRIMMER (CHIP) 20P

DELAY LINE

DL801	1-415-448-21	DELAY LINE

Ref.No	Part No.	Description	Remark

IC

IC101	8-752-032-48	IC CXA1157M
IC102	8-759-945-24	IC MB673194U
IC103	8-759-945-09	IC MB8464-12LLPF
IC104	8-759-101-12	IC UPC311G2
IC105	8-759-106-66	IC UPD74HC08G
IC106	8-759-200-90	IC TC4538BF
IC107	8-759-112-72	IC UPD6142G-101
IC108	8-759-113-45	IC UPD7508BGB-502
IC111	8-759-937-56	IC S-8054ALB-LM-S
IC112	8-759-940-33	IC S-8052ALO-LG-S
IC113	8-759-204-94	IC TC74HC00F

COIL

L101	1-410-377-11	INDUCTOR CHIP	4.7UH
L104	1-410-387-11	INDUCTOR CHIP	33UH
L105	1-410-369-11	INDUCTOR CHIP	1UH
L107	1-410-390-11	INDUCTOR CHIP	56UH
L108	1-410-369-11	INDUCTOR CHIP	1UH

TRANSISTOR

Q101	8-729-100-67	TRANSISTOR 2SC1623-L7
Q102	8-729-100-67	TRANSISTOR 2SC1623-L7
Q103	8-729-100-67	TRANSISTOR 2SC1623-L7
Q104	8-729-100-76	TRANSISTOR 2SA812
Q105	8-729-100-67	TRANSISTOR 2SC1623-L7
Q106	8-729-100-76	TRANSISTOR 2SA812
Q107	8-729-100-67	TRANSISTOR 2SC1623-L7
Q108	8-729-100-67	TRANSISTOR 2SC1623-L7
Q109	8-729-100-67	TRANSISTOR 2SC1623-L7
Q110	8-729-100-67	TRANSISTOR 2SC1623-L7
Q111	8-729-100-76	TRANSISTOR 2SA812
Q113	8-729-900-51	TRANSISTOR DTA114TK
Q114	8-729-901-03	TRANSISTOR DTC144WK
Q115	8-729-100-76	TRANSISTOR 2SA812
Q116	8-729-901-03	TRANSISTOR DTC144WK
Q117	8-729-900-99	TRANSISTOR DTA144WK
Q126	8-729-902-96	TRANSISTOR FMS1
Q127	8-729-100-67	TRANSISTOR 2SC1623-L7
Q128	8-729-109-42	TRANSISTOR 2SK94-X2

RESISTOR

R101	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R102	1-216-049-00	METAL CHIP	1K	5%	1/10W
R103	1-216-049-00	METAL CHIP	1K	5%	1/10W
R104	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R105	1-216-049-00	METAL CHIP	1K	5%	1/10W
R106	1-216-049-00	METAL CHIP	1K	5%	1/10W
R107	1-216-049-00	METAL CHIP	1K	5%	1/10W
R108	1-216-655-11	METAL CHIP	1.5K	0.50%	1/10W
R109	1-216-665-11	METAL CHIP	3.9K	0.50%	1/10W
R110	1-216-687-11	METAL CHIP	33K	0.50%	1/10W

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

Ref.No	Part No.	Description				Remark
R111	1-216-657-11	METAL CHIP	1.8K	0.50%	1/10W	
R112	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R113	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R114	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R115	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R116	1-216-657-11	METAL CHIP	1.8K	0.50%	1/10W	
R117	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R118	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R119	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R120	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R121	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R122	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R123	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R124	1-216-041-00	METAL CHIP	470	5%	1/10W	
R125	1-216-679-81	METAL CHIP	15K	0.50%	1/10W	
R126	1-216-673-11	METAL CHIP	8.2K	0.50%	1/10W	
R127	1-216-689-11	METAL CHIP	39K	0.50%	1/10W	
R128	1-216-691-91	METAL CHIP	47K	0.50%	1/10W	
R129	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R130	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R131	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R132	1-216-089-00	METAL CHIP	47K	5%	1/10W	
R133	1-216-061-00	METAL CHIP	3.3K	5%	1/10W	
R134	1-216-061-00	METAL CHIP	3.3K	5%	1/10W	
R135	1-216-043-00	METAL CHIP	560	5%	1/10W	
R136	1-216-063-00	METAL CHIP	3.9K	5%	1/10W	
R137	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R138	1-216-295-00	METAL CHIP	0	5%	1/10W	
R140	1-216-113-00	METAL CHIP	470K	5%	1/10W	
R141	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	
R142	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R143	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R144	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R145	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R146	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R147	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R148	1-216-069-00	METAL CHIP	6.8K	5%	1/10W	
R149	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R150	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R151	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R152	1-216-089-00	METAL CHIP	47K	5%	1/10W	
R153	1-216-109-00	METAL CHIP	330K	5%	1/10W	
R154	1-216-295-00	METAL CHIP	0	5%	1/10W	
R155	1-216-295-00	METAL CHIP	0	5%	1/10W	
R158	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R159	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R160	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R161	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R162	1-216-095-00	METAL CHIP	82K	5%	1/10W	
R163	1-216-105-00	METAL CHIP	220K	5%	1/10W	
R164	1-216-089-00	METAL CHIP	47K	5%	1/10W	
R165	1-216-067-00	METAL CHIP	5.6K	5%	1/10W	
R166	1-216-129-00	METAL CHIP	2.2M	5%	1/10W	
R167	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R179	1-216-687-11	METAL CHIP	33K	0.50%	1/10W	
R180	1-216-063-00	METAL CHIP	3.9K	5%	1/10W	
R181	1-216-295-00	METAL CHIP	0	5%	1/10W	
R182	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	
R183	1-216-693-91	METAL CHIP	56K	0.50%	1/10W	
R184	1-216-693-91	METAL CHIP	56K	0.50%	1/10W	
R185	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	
R186	1-216-295-00	METAL CHIP	0	5%	1/10W	
R187	1-216-025-00	METAL CHIP	100	5%	1/10W	
R188	1-216-085-00	METAL CHIP	33K	5%	1/10W	
R189	1-216-105-00	METAL CHIP	220K	5%	1/10W	
R190	1-216-121-00	METAL CHIP	1M	5%	1/10W	
R191	1-216-686-11	METAL CHIP	30K	0.50%	1/10W	
R192	1-216-689-11	METAL CHIP	39K	0.50%	1/10W	
R193	1-216-121-00	METAL CHIP	1M	5%	1/10W	
R194	1-216-295-00	METAL CHIP	0	5%	1/10W	
R195	1-216-041-00	METAL CHIP	470	5%	1/10W	
R196	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	
R199	1-216-041-00	METAL CHIP	470	5%	1/10W	
		VARIABLE RESISTOR				
RV101	1-230-524-11	RES, ADJ, METAL GLAZE 22K				
RV102	1-230-867-11	RES, ADJ, METAL GLAZE 1K				
		CRYSTAL				
X101	1-527-997-00	VIBRATOR, CRYSTAL 32.768KHz				
**********						
	*A-7070-469-A	SK-21 FLEXIBLE BOARD, COMPLETE				
		**********				
		SWITCH				
S948	1-554-371-31	SWITCH, TACT				
S949	1-554-371-31	SWITCH, TACT				
S950	1-554-371-31	SWITCH, TACT				
**********						
	*A-7070-467-A	CN-27 BOARD, COMPLETE				
		**********				
		CAPACITOR				
C892	1-163-101-00	CERAMIC CHIP 22PF		5%	50V	
C893	1-163-117-00	CERAMIC CHIP 100PF		5%	50V	
C894	1-163-021-00	CERAMIC CHIP 0.01MF		10%	50V	
C895	1-163-021-00	CERAMIC CHIP 0.01MF		10%	50V	
		COIL				
L882	1-410-387-11	INDUCTOR CHIP 33UH				
		RESISTOR				
R816	1-216-061-00	METAL CHIP	3.3K	5%	1/10W	

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

CN-27 | LI-3 | MV-12 | VC-11 | VD-6 | VY-9

Ref.No	Part No.	Description				Remark
R817	1-216-067-00	METAL CHIP	5.6K	5%	1/10W	
R890	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R891	1-216-083-00	METAL CHIP	27K	5%	1/10W	
R892	1-216-295-00	METAL CHIP	0	5%	1/10W	
		VARIABLE RESISTOR				
RV807	1-230-867-11	RES, ADJ, METAL GLAZE 1K				
**********						
	*1-623-008-11	LI-3 BOARD				
		**********				
	1-550-104-11	HOLDER, BATTERY				
**********						
	*A-7060-945-A	MV-12 BOARD, COMPLETE				
		**********				
	A-7068-070-A	VC-11 BOARD (HIC), COMPLETE				
	A-7068-072-A	VD-6 BOARD (HIC), COMPLETE				
	A-7068-095-A	VY-9 BOARD (HIC), COMPLETE				
	1-558-895-11	WIRE, FLAT TYPE 18P				
	1-558-896-11	WIRE, FLAT TYPE 22P				
		CAPACITOR				
C201	1-135-096-21	TANTAL. CHIP	4.7MF	10%	10V	
C202	1-163-038-00	CERAMIC CHIP	0.1MF		25V	
C203	1-163-021-00	CERAMIC CHIP	0.01MF	10%	50V	
C204	1-163-115-00	CERAMIC CHIP	82PF	5%	50V	
C205	1-163-105-00	CERAMIC CHIP	33PF	5%	50V	
C206	1-163-145-00	CERAMIC CHIP	0.0015MF	5%	50V	
C207	1-163-127-00	CERAMIC CHIP	270PF	5%	50V	
C208	1-163-021-00	CERAMIC CHIP	0.01MF	10%	50V	
C209	1-163-035-00	CERAMIC CHIP	0.047MF	10%	25V	
C210	1-163-021-00	CERAMIC CHIP	0.01MF	10%	50V	
C211	1-163-021-00	CERAMIC CHIP	0.01MF	10%	50V	
C212	1-163-095-00	CERAMIC CHIP	12PF	5%	50V	
C213	1-163-105-00	CERAMIC CHIP	33PF	5%	50V	
C214	1-163-021-00	CERAMIC CHIP	0.01MF	10%	50V	
C215	1-163-093-00	CERAMIC CHIP	10PF	5%	50V	
C216	1-163-129-00	CERAMIC CHIP	330PF	5%	50V	
C217	1-163-021-00	CERAMIC CHIP	0.01MF	10%	50V	
C219	1-163-097-00	CERAMIC CHIP	15PF	5%	50V	
C220	1-163-108-00	CERAMIC CHIP	43PF	5%	50V	
C221	1-163-021-00	CERAMIC CHIP	0.01MF	10%	50V	
C222	1-163-021-00	CERAMIC CHIP	0.01MF	10%	50V	
C223	1-163-021-00	CERAMIC CHIP	0.01MF	10%	50V	
C224	1-163-021-00	CERAMIC CHIP	0.01MF	10%	50V	
C225	1-163-021-00	CERAMIC CHIP	0.01MF	10%	50V	
C226	1-163-021-00	CERAMIC CHIP	0.01MF	10%	50V	
C227	1-163-038-00	CERAMIC CHIP	0.1MF		25V	

Ref.No	Part No.	Description			Remark
C228	1-163-101-00	CERAMIC CHIP	22PF	5%	50V
C229	1-163-145-00	CERAMIC CHIP	0.0015MF	5%	50V
C230	1-163-111-00	CERAMIC CHIP	56PF	5%	50V
C231	1-163-141-00	CERAMIC CHIP	0.001MF	5%	50V
C232	1-163-133-00	CERAMIC CHIP	470PF	5%	50V
C233	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C234	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C235	1-163-021-00	CERAMIC CHIP	0.01MF	10%	50V
C236	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C237	1-124-462-00	ELECT	10MF	20%	16V
C238	1-163-021-00	CERAMIC CHIP	0.01MF	10%	50V
C239	1-131-379-00	TANTALUM	22MF	10%	10V
C240	1-163-111-00	CERAMIC CHIP	56PF	5%	50V
C241	1-124-222-00	ELECT	22MF	20%	6.3V
C242	1-124-222-00	ELECT	22MF	20%	6.3V
C243	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C244	1-135-096-21	TANTAL. CHIP	4.7MF	10%	10V
C245	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C246	1-124-442-00	ELECT	330MF	20%	6.3V
C247	1-135-096-21	TANTAL. CHIP	4.7MF	10%	10V
C248	1-163-021-00	CERAMIC CHIP	0.01MF	10%	50V
C249	1-163-021-00	CERAMIC CHIP	0.01MF	10%	50V
C250	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C251	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C252	1-163-021-00	CERAMIC CHIP	0.01MF	10%	50V
C253	1-163-133-00	CERAMIC CHIP	470PF	5%	50V
C254	1-163-021-00	CERAMIC CHIP	0.01MF	10%	50V
C255	1-163-105-00	CERAMIC CHIP	33PF	5%	50V
C256	1-163-093-00	CERAMIC CHIP	10PF	5%	50V
C257	1-163-101-00	CERAMIC CHIP	22PF	5%	50V
C258	1-163-088-00	CERAMIC CHIP	5PF	0.25PF	50V
C259	1-163-021-00	CERAMIC CHIP	0.01MF	10%	50V
C261	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C262	1-163-129-00	CERAMIC CHIP	330PF	5%	50V
C263	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C264	1-163-119-00	CERAMIC CHIP	120PF	5%	50V
C265	1-163-113-00	CERAMIC CHIP	68PF	5%	50V
C268	1-163-097-00	CERAMIC CHIP	15PF	5%	50V
C269	1-161-061-00	CERAMIC	0.068MF	10%	50V
C270	1-161-061-00	CERAMIC	0.068MF	10%	50V
C271	1-163-115-00	CERAMIC CHIP	82PF	5%	50V
C651	1-124-236-00	ELECT	47MF	20%	16V
C652	1-127-496-00	ELECT(SOLID)	6.8MF	20%	16V
C653	1-163-141-00	CERAMIC CHIP	0.001MF	5%	50V
C654	1-127-489-00	ELECT(SOLID)	10MF	20%	10V
C655	1-163-035-00	CERAMIC CHIP	0.047MF	10%	25V
C656	1-163-035-00	CERAMIC CHIP	0.047MF	10%	25V
C657	1-127-487-00	ELECT(SOLID)	4.7MF	20%	10V
C658	1-127-504-00	ELECT(SOLID)	0.47MF	20%	25V
C659	1-163-017-00	CERAMIC CHIP	0.0047MF	10%	50V
C660	1-163-021-00	CERAMIC CHIP	0.01MF	10%	50V
C661	1-163-125-00	CERAMIC CHIP	220PF	5%	50V
C662	1-163-015-00	CERAMIC CHIP	0.0033MF	10%	50V

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

Ref.No	Part No.	Description		Remark
C664	1-163-035-00	CERAMIC CHIP 0.047MF	10% 25V	
C665	1-163-035-00	CERAMIC CHIP 0.047MF	10% 25V	
C666	1-163-035-00	CERAMIC CHIP 0.047MF	10% 25V	
		CONNECTOR		
CN203	*1-563-584-11	CONNECTOR, FLEXIBLE 7P		
CN204	*1-563-609-11	CONNECTOR, FLEXIBLE 6P		
CN205	*1-564-017-00	PIN, CONNECTOR 7P		
CN206	*1-564-013-00	PIN, CONNECTOR 3P		
CN207	1-562-183-00	SOCKET 8P		
		TRIMMER		
CV201	1-141-331-11	CAP, VAR, TRIMMER (CHIP) 30P		
		DIODE		
D201	8-719-101-23	DIODE 1SS123		
D202	8-719-106-44	DIODE RD9.1M-B2		
D203	8-719-106-44	DIODE RD9.1M-B2		
D204	8-719-106-44	DIODE RD9.1M-B2		
D205	8-719-106-44	DIODE RD9.1M-B2		
D206	8-719-106-44	DIODE RD9.1M-B2		
D207	8-719-101-23	DIODE 1SS123		
D208	8-719-106-44	DIODE RD9.1M-B2		
D209	8-719-106-44	DIODE RD9.1M-B2		
D651	8-719-200-36	DIODE E10QS04		
		DELAY LINE		
DL201	1-415-517-21	DELAY LINE, DUAL 1H-2H		
		FILTER		
FL201	1-235-632-11	BPF		
FL202	1-235-633-11	BPF		
FL203	1-409-394-11	TRAP, CHROMA EMPHASIS		
		IC		
IC204	8-759-107-89	IC UPD6105G-102		
IC651	8-759-937-36	IC TL1451ACNS		
		COIL		
L201	1-408-789-21	INDUCTOR CHIP 100UH		
L202	1-408-773-31	INDUCTOR CHIP 4.7UH		
L203	1-408-795-21	INDUCTOR CHIP 330UH		
L204	1-410-167-31	INDUCTOR CHIP 820UH		
L206	1-408-783-00	INDUCTOR CHIP 33UH		
L207	1-410-381-11	INDUCTOR CHIP 10UH		
L210	1-408-970-21	MICRO INDUCTOR 10UH		
L211	1-407-166-XX	MICRO INDUCTOR 56UH		
L213	1-408-970-21	MICRO INDUCTOR 10UH		
L214	1-408-765-21	INDUCTOR CHIP 1UH		
L215	1-408-765-21	INDUCTOR CHIP 1UH		
L216	1-408-982-11	MICRO INDUCTOR 100UH		
L217	1-408-982-11	MICRO INDUCTOR 100UH		
L218	1-408-982-11	MICRO INDUCTOR 100UH		

Ref.No	Part No.	Description	Remark
L219	1-408-789-21	INDUCTOR CHIP 100UH	
L220	1-410-381-11	INDUCTOR CHIP 10UH	
L651	1-421-918-11	COIL, CHOKE 10UH	
L652	1-410-690-11	COIL, CHOKE 22UH	
L653	1-408-773-31	INDUCTOR CHIP 4.7UH	
L654	1-408-788-21	INDUCTOR CHIP 82UH	
L655	1-408-785-21	INDUCTOR CHIP 47UH	
L656	1-408-777-00	INDUCTOR CHIP 10UH	
		VARIABLE COIL	
LV201	1-404-594-11	COIL, VARIABLE 10UH	
		IC LINK	
PS201⚠	1-532-727-11	LINK, IC ICP-N5 0.25A	
		TRANSISTOR	
Q201	8-729-100-67	TRANSISTOR 2SC1623-L7	
Q202	8-729-100-67	TRANSISTOR 2SC1623-L7	
Q203	8-729-805-45	TRANSISTOR 2SC3395	
Q204	8-729-805-69	TRANSISTOR 2SA1341	
Q205	8-729-100-67	TRANSISTOR 2SC1623-L7	
Q206	8-729-805-45	TRANSISTOR 2SC3395	
Q207	8-729-100-67	TRANSISTOR 2SC1623-L7	
Q208	8-729-805-45	TRANSISTOR 2SC3395	
Q209	8-729-100-67	TRANSISTOR 2SC1623-L7	
Q210	8-729-312-22	TRANSISTOR 2SA1122	
Q211	8-729-805-45	TRANSISTOR 2SC3395	
Q212	8-729-601-58	TRANSISTOR 2SC3053	
Q213	8-729-805-69	TRANSISTOR 2SA1341	
Q214	8-729-601-58	TRANSISTOR 2SC3053	
Q215	8-729-601-58	TRANSISTOR 2SC3053	
Q216	8-729-312-22	TRANSISTOR 2SA1122	
Q217	8-729-100-67	TRANSISTOR 2SC1623-L7	
Q218	8-729-805-69	TRANSISTOR 2SA1341	
Q219	8-729-805-43	TRANSISTOR 2SC3396	
Q220	8-729-117-54	TRANSISTOR 2SA1175	
Q221	8-729-805-45	TRANSISTOR 2SC3395	
Q222	8-729-805-45	TRANSISTOR 2SC3395	
Q223	8-729-100-67	TRANSISTOR 2SC1623-L7	
Q224	8-729-805-45	TRANSISTOR 2SC3395	
Q227	8-729-805-45	TRANSISTOR 2SC3395	
Q228	8-729-805-45	TRANSISTOR 2SC3395	
Q229	8-729-100-76	TRANSISTOR 2SA812	
Q230	8-729-100-67	TRANSISTOR 2SC1623-L7	
Q231	8-729-100-67	TRANSISTOR 2SC1623-L7	
Q232	8-729-805-45	TRANSISTOR 2SC3395	
Q233	8-729-100-67	TRANSISTOR 2SC1623-L7	
Q652	8-729-805-67	TRANSISTOR 2SA1342	
Q653	8-729-805-25	TRANSISTOR 2SB1121	
Q654	8-729-805-43	TRANSISTOR 2SC3396	

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

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

MV-12

RESISTOR

Ref.No	Part No.	Description				Remark
R201	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R202	1-216-029-00	METAL CHIP	150	5%	1/10W	
R203	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R204	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R205	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R206	1-216-047-00	METAL CHIP	820	5%	1/10W	
R207	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R208	1-216-075-00	METAL CHIP	12K	5%	1/10W	
R209	1-216-041-00	METAL CHIP	470	5%	1/10W	
R210	1-216-027-00	METAL CHIP	120	5%	1/10W	
R211	1-216-035-00	METAL CHIP	270	5%	1/10W	
R212	1-216-055-00	METAL CHIP	1.8K	5%	1/10W	
R213	1-216-053-00	METAL CHIP	1.5K	5%	1/10W	
R214	1-216-071-00	METAL CHIP	8.2K	5%	1/10W	
R215	1-216-041-00	METAL CHIP	470	5%	1/10W	
R216	1-216-079-00	METAL CHIP	18K	5%	1/10W	
R217	1-216-079-00	METAL CHIP	18K	5%	1/10W	
R218	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R219	1-216-039-00	METAL CHIP	390	5%	1/10W	
R220	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R221	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R222	1-216-109-00	METAL CHIP	330K	5%	1/10W	
R223	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R224	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R227	1-216-041-00	METAL CHIP	470	5%	1/10W	
R228	1-216-041-00	METAL CHIP	470	5%	1/10W	
R229	1-216-025-00	METAL CHIP	100	5%	1/10W	
R230	1-216-041-00	METAL CHIP	470	5%	1/10W	
R231	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R232	1-216-051-00	METAL CHIP	1.2K	5%	1/10W	
R233	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R234	1-216-079-00	METAL CHIP	18K	5%	1/10W	
R235	1-216-067-00	METAL CHIP	5.6K	5%	1/10W	
R236	1-216-051-00	METAL CHIP	1.2K	5%	1/10W	
R237	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R238	1-216-063-00	METAL CHIP	3.9K	5%	1/10W	
R239	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R240	1-216-085-00	METAL CHIP	33K	5%	1/10W	
R241	1-216-045-00	METAL CHIP	680	5%	1/10W	
R242	1-216-051-00	METAL CHIP	1.2K	5%	1/10W	
R243	1-216-051-00	METAL CHIP	1.2K	5%	1/10W	
R244	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R245	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R246	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R247	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R248	1-216-061-00	METAL CHIP	3.3K	5%	1/10W	
R249	1-216-061-00	METAL CHIP	3.3K	5%	1/10W	
R250	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	
R251	1-216-061-00	METAL CHIP	3.3K	5%	1/10W	
R252	1-216-061-00	METAL CHIP	3.3K	5%	1/10W	
R253	1-216-075-00	METAL CHIP	12K	5%	1/10W	
R254	1-216-067-00	METAL CHIP	5.6K	5%	1/10W	
R255	1-216-085-00	METAL CHIP	33K	5%	1/10W	
R256	1-216-089-00	METAL CHIP	47K	5%	1/10W	
R257	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	
R258	1-216-089-00	METAL CHIP	47K	5%	1/10W	
R259	1-216-063-00	METAL CHIP	3.9K	5%	1/10W	
R260	1-216-053-00	METAL CHIP	1.5K	5%	1/10W	
R261	1-216-053-00	METAL CHIP	1.5K	5%	1/10W	
R262	1-216-053-00	METAL CHIP	1.5K	5%	1/10W	
R263	1-216-053-00	METAL CHIP	1.5K	5%	1/10W	
R264	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R265	1-216-047-00	METAL CHIP	820	5%	1/10W	
R266	1-216-069-00	METAL CHIP	6.8K	5%	1/10W	
R267	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R268	1-216-748-11	METAL CHIP	39K	5%	1/10W	
R269	1-216-077-00	METAL CHIP	15K	5%	1/10W	
R270	1-216-017-00	METAL CHIP	47	5%	1/10W	
R271	1-216-059-00	METAL CHIP	2.7K	5%	1/10W	
R272	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R273	1-216-039-00	METAL CHIP	390	5%	1/10W	
R274	1-216-035-00	METAL CHIP	270	5%	1/10W	
R275	1-216-027-00	METAL CHIP	120	5%	1/10W	
R276	1-216-027-00	METAL CHIP	120	5%	1/10W	
R277	1-216-025-00	METAL CHIP	100	5%	1/10W	
R278	1-216-009-00	METAL CHIP	22	5%	1/10W	
R283	1-216-063-00	METAL CHIP	3.9K	5%	1/10W	
R284	1-216-031-00	METAL CHIP	180	5%	1/10W	
R285	1-216-047-00	METAL CHIP	820	5%	1/10W	
R286	1-216-063-00	METAL CHIP	3.9K	5%	1/10W	
R287	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	
R288	1-216-021-00	METAL CHIP	68	5%	1/10W	
R289	1-216-138-00	METAL CHIP	3.3	5%	1/8W	
R290	1-216-066-00	METAL CHIP	5.1K	5%	1/10W	
R291	1-216-079-00	METAL CHIP	18K	5%	1/10W	
R292	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R293	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R294	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R295	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R296	1-216-047-00	METAL CHIP	820	5%	1/10W	
R297	1-216-025-00	METAL CHIP	100	5%	1/10W	
R298	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R299	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R300	1-216-069-00	METAL CHIP	6.8K	5%	1/10W	
R301	1-216-047-00	METAL CHIP	820	5%	1/10W	
R302	1-216-063-00	METAL CHIP	3.9K	5%	1/10W	
R302	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R303	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R304	1-216-748-11	METAL CHIP	39K	5%	1/10W	
R305	1-216-748-11	METAL CHIP	39K	5%	1/10W	
R305	1-216-111-00	METAL CHIP	390K	5%	1/10W	
R306	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	
R307	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	
R308	1-216-081-00	METAL CHIP	22K	5%	1/10W	

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

Ref.No	Part No.	Description				Remark
R308	1-216-748-11	METAL CHIP	39K	5%	1/10W	
R309	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R311	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R312	1-216-061-00	METAL CHIP	3.3K	5%	1/10W	
R315	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R651	1-216-025-00	METAL CHIP	100	5%	1/10W	
R652	1-216-033-00	METAL CHIP	220	5%	1/10W	
R653	1-216-069-00	METAL CHIP	6.8K	5%	1/10W	
R654	1-216-055-00	METAL CHIP	1.8K	5%	1/10W	
R655	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R656	1-216-093-00	METAL CHIP	68K	5%	1/10W	
R657	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	
R658	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	
R659	1-216-063-00	METAL CHIP	3.9K	5%	1/10W	
R660	1-216-063-00	METAL CHIP	3.9K	5%	1/10W	
R662	1-216-033-00	METAL CHIP	220	5%	1/10W	
R663	1-216-001-00	METAL CHIP	10	5%	1/10W	
		VARIABLE RESISTOR				
RV201	1-230-869-11	RES, ADJ, METAL GLAZE 4.7K				
RV202	1-230-871-11	RES, ADJ, METAL GLAZE 22K				
RV203	1-230-868-11	RES, ADJ, METAL GLAZE 2.2K				
RV651	1-230-868-11	RES, ADJ, METAL GLAZE 2.2K				
RV652	1-230-867-11	RES, ADJ, METAL GLAZE 1K				
		SWITCH				
S201	1-553-977-00	SWITCH, SLIDE				
		CRYSTAL				
X201	1-567-347-11	OSCILLATOR, CERAMIC 13.3MHz				

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*A-7060-948-A MR-8 BOARD, COMPLETE
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*A-7060-096-A RP-34 BOARD (HIC), COMPLETE

		CAPASITOR			
C101	1-163-117-00	CERAMIC CHIP	100PF	5%	50V
C102	1-163-121-00	CERAMIC CHIP	150PF	5%	50V
C103	1-163-117-00	CERAMIC CHIP	100PF	5%	50V
C104	1-163-117-00	CERAMIC CHIP	100PF	5%	50V
C105	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C108	1-124-222-00	ELECT	22MF	20%	6.3V
C110	1-127-494-00	ELECT(SOLID)	3.3MF	20%	16V
C111	1-163-035-00	CERAMIC CHIP	0.047MF	10%	25V
C112	1-163-035-00	CERAMIC CHIP	0.047MF	10%	25V
C151	1-163-035-00	CERAMIC CHIP	0.047MF	10%	25V
		CONNECTOR			
CN101	*1-564-016-00	PIN, CONNECTOR 6P			
CN102	*1-564-013-00	PIN, CONNECTOR 3P			
CN105	*1-564-003-00	PIN, CONNECTOR 4P			

Ref.No	Part No.	Description				Remark
		DIODE				
D153	8-719-812-44	DIODE TLY124				
D154	8-719-812-41	DIODE TLR124				
		COIL				
L101	1-408-777-00	INDUCTOR CHIP 10UH				
L102	1-408-948-00	MICRO INDUCTOR 220UH				
		TRANSISTOR				
Q102	8-729-117-54	TRANSISTOR 2SA1175				
Q103	8-729-100-76	TRANSISTOR 2SA812				
Q151	8-729-805-69	TRANSISTOR 2SA1341				
		RESISTOR				
R103	1-216-009-00	METAL CHIP	22	5%	1/10W	
R104	1-216-037-00	METAL CHIP	330	5%	1/10W	
R105	1-216-041-00	METAL CHIP	470	5%	1/10W	
R106	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R107	1-216-085-00	METAL CHIP	33K	5%	1/10W	
R108	1-216-025-00	METAL CHIP	100	5%	1/10W	
R109	1-216-043-00	METAL CHIP	560	5%	1/10W	
R151	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R152	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R153	1-216-093-00	METAL CHIP	68K	5%	1/10W	
R154	1-216-095-00	METAL CHIP	82K	5%	1/10W	
		VARIABLE RESISTOR				
RV151	1-230-870-11	RES, ADJ, METAL GLAZE 10K				
RV152	1-230-875-21	RES, ADJ, METAL GLAZE 220K				
RV153	1-230-875-21	RES, ADJ, METAL GLAZE 220K				
RV155	1-230-875-21	RES, ADJ, METAL GLAZE 220K				
RV156	1-230-873-11	RES, ADJ, METAL GLAZE 47K				
		SWITCH				
S101	1-554-364-00	SWITCH, SLIDE				

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1-620-629-11 FP-49 FLEXIBLE BOARD
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1-537-005-21 JACK BOARD

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*A-7070-502-A RC-21 BOARD, COMPLETE
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		DIODE				
D681	8-719-100-68	DIODE RD13EB2				
D682	8-719-100-68	DIODE RD13EB2				

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

RC-21 TA-50 FH-14 SS-70

Ref.No	Part No.	Description			Remark
		SWITCH			
S681	1-570-689-11	SWITCH, KEY BOARD			
S682	1-553-977-41	SWITCH, SLIDE			
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	*1-623-014-11	TA-50 BOARD **********			
	1-566-607-11	PLUG (TERMINAL BOARD (A))			
**********					
	*1-623-018-21	FH-14 BOARD **********			
		CAPACITOR			
C681	1-123-321-00	ELECT	220MF	20%	16V
		CONNECTOR			
CN601	*1-564-002-00	PIN, CONNECTOR 3P			
		FUSE			
PS901⚠	1-532-840-21	LINK, IC 1.25A			
PS902⚠	1-532-841-11	LINK, IC 1.6A			
PS903⚠	1-532-840-21	LINK, IC 1.25A			
**********					
	*A-7060-790-A	SS-70 BOARD, COMPLETE **********			
	1-562-879-11	CONNECTOR, CARD EDGE 19P			
	1-562-880-11	CONNECTOR, CARD EDGE 15P			
	*3-674-372-00	HOLDER (A), LED			
	3-713-725-01	HOLDER, TOP END SENSOR			
		CAPACITOR			
C301	1-135-099-00	TANTAL. CHIP	2.2MF	10%	6.3V
C302	1-135-099-00	TANTAL. CHIP	2.2MF	10%	6.3V
C303	1-163-033-00	CERAMIC CHIP	0.022MF	10%	25V
C304	1-163-017-00	CERAMIC CHIP	0.0047MF	10%	50V
C305	1-163-017-00	CERAMIC CHIP	0.0047MF	10%	50V
C306	1-163-017-00	CERAMIC CHIP	0.0047MF	10%	50V
C307	1-163-017-00	CERAMIC CHIP	0.0047MF	10%	50V
C308	1-163-017-00	CERAMIC CHIP	0.0047MF	10%	50V
C309	1-163-105-00	CERAMIC CHIP	33PF	5%	50V
C310	1-163-105-00	CERAMIC CHIP	33PF	5%	50V
C313	1-124-245-00	ELECT	4.7MF	20%	25V
C314	1-123-617-00	ELECT	10MF	20%	16V
C315	1-163-033-00	CERAMIC CHIP	0.022MF	10%	25V
C316	1-163-033-00	CERAMIC CHIP	0.022MF	10%	25V
C317	1-135-099-00	TANTAL. CHIP	2.2MF	10%	6.3V
C318	1-163-017-00	CERAMIC CHIP	0.0047MF	10%	50V
C319	1-135-104-00	TANTAL. CHIP	10MF	10%	4V
C320	1-135-104-00	TANTAL. CHIP	10MF	10%	4V
C321	1-163-013-00	CERAMIC CHIP	0.0022MF	10%	50V
C322	1-163-013-00	CERAMIC CHIP	0.0022MF	10%	50V
C323	1-163-077-00	CERAMIC CHIP	0.1MF		50V
C324	1-163-077-00	CERAMIC CHIP	0.1MF		50V
C325	1-135-100-21	TANTAL. CHIP	6.8MF	10%	6.3V
C326	1-163-131-00	CERAMIC CHIP	390PF	5%	50V
C327	1-135-099-00	TANTAL. CHIP	2.2MF	10%	6.3V
C328	1-135-099-00	TANTAL. CHIP	2.2MF	10%	6.3V
C329	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C501	1-124-257-00	ELECT	2.2MF	20%	50V
C502	1-123-611-00	ELECT	1MF	20%	50V
C503	1-163-021-00	CERAMIC CHIP	0.01MF	10%	50V
C504	1-163-021-00	CERAMIC CHIP	0.01MF	10%	50V
C505	1-163-020-00	CERAMIC CHIP	0.0082MF	10%	50V
C506	1-163-021-00	CERAMIC CHIP	0.01MF	10%	50V
C507	1-163-075-00	CERAMIC CHIP	0.047MF	10%	25V
C508	1-124-577-11	ELECT	82MF	20%	10V
C509	1-163-209-00	CERAMIC CHIP	0.0015MF	5%	50V
C510	1-163-209-00	CERAMIC CHIP	0.0015MF	5%	50V
C511	1-163-017-00	CERAMIC CHIP	0.0047MF	10%	50V
C512	1-163-017-00	CERAMIC CHIP	0.0047MF	10%	50V
C513	1-163-077-00	CERAMIC CHIP	0.1MF		50V
C514	1-124-499-11	ELECT	1MF	20%	50V
C515	1-124-287-00	ELECT	10MF	20%	10V
C516	1-163-033-00	CERAMIC CHIP	0.022MF	10%	25V
C517	1-163-033-00	CERAMIC CHIP	0.022MF	10%	25V
C518	1-163-021-00	CERAMIC CHIP	0.01MF	10%	50V
C519	1-124-270-11	ELECT	0.47MF	20%	50V
C520	1-163-211-00	CERAMIC CHIP	0.0018MF	5%	50V
C521	1-163-021-00	CERAMIC CHIP	0.01MF	10%	50V
C522	1-123-617-00	ELECT	10MF	20%	16V
C523	1-124-499-11	ELECT	1MF	20%	50V
C524	1-163-059-00	CERAMIC CHIP	0.01MF	10%	50V
C525	1-163-075-00	CERAMIC CHIP	0.047MF	10%	25V
C526	1-163-033-00	CERAMIC CHIP	0.022MF	10%	25V
C527	1-163-075-00	CERAMIC CHIP	0.047MF	10%	25V
C528	1-163-021-00	CERAMIC CHIP	0.01MF	10%	50V
C529	1-124-638-11	ELECT	22MF	20%	10V
C530	1-163-033-00	CERAMIC CHIP	0.022MF	10%	25V
C531	1-163-075-00	CERAMIC CHIP	0.047MF	10%	25V
C532	1-163-145-00	CERAMIC CHIP	0.0015MF	5%	50V
C533	1-163-139-00	CERAMIC CHIP	820PF	5%	50V
C534	1-163-033-00	CERAMIC CHIP	0.022MF	10%	25V
C535	1-127-487-00	ELECT(SOLID)	4.7MF	20%	10V
C536	1-163-035-00	CERAMIC CHIP	0.047MF	10%	25V
C538	1-163-131-00	CERAMIC CHIP	390PF	5%	50V
C539	1-124-255-00	ELECT	1MF	20%	50V
C540	1-124-255-00	ELECT	1MF	20%	50V
C541	1-124-255-00	ELECT	1MF	20%	50V
C542	1-124-258-00	ELECT	3.3MF	20%	25V
C543	1-163-035-00	CERAMIC CHIP	0.047MF	10%	25V
C544	1-163-035-00	CERAMIC CHIP	0.047MF	10%	25V

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

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

Ref.No	Part No.	Description			Remark
C545	1-124-462-00	ELECT	10MF	20%	16V
C546	1-124-462-00	ELECT	10MF	20%	16V
C547	1-124-462-00	ELECT	10MF	20%	16V
C548	1-163-133-00	CERAMIC CHIP	470PF	5%	50V
C549	1-163-021-00	CERAMIC CHIP	0.01MF	10%	50V
C550	1-127-506-00	ELECT(SOLID)	1MF	20%	25V
C551	1-163-021-00	CERAMIC CHIP	0.01MF	10%	50V
C553	1-126-099-11	ELECT	2.2MF	20%	35V
C554	1-124-236-00	ELECT	47MF	20%	16V
C556	1-124-499-11	ELECT	1MF	20%	50V
C557	1-163-017-00	CERAMIC CHIP	0.0047MF	10%	50V
C558	1-124-596-11	ELECT	27MF	20%	16V
C559	1-124-596-11	ELECT	27MF	20%	16V
C560	1-124-596-11	ELECT	27MF	20%	16V
C561	1-123-617-00	ELECT	10MF	20%	16V
C562	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C563	1-163-017-00	CERAMIC CHIP	0.0047MF	10%	50V
C564	1-124-577-11	ELECT	82MF	20%	10V
C565	1-124-577-11	ELECT	82MF	20%	10V
C566	1-163-077-00	CERAMIC CHIP	0.1MF		50V
C567	1-124-577-11	ELECT	82MF	20%	10V
C568	1-123-617-00	ELECT	10MF	20%	16V
C569	1-163-035-00	CERAMIC CHIP	0.047MF	10%	25V
C570	1-163-109-00	CERAMIC CHIP	47PF	5%	50V
C571	1-163-133-00	CERAMIC CHIP	470PF	5%	50V
C572	1-163-021-00	CERAMIC CHIP	0.01MF	10%	50V
C573	1-135-096-21	TANTAL. CHIP	4.7MF	20%	10V
C574	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C575	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C576	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C577	1-135-096-21	TANTAL. CHIP	4.7MF	20%	10V

CONNECTOR

CN303	*1-506-979-21	CONNECTOR, BOARD TO BOARD 13P
CN304	*1-563-612-11	CONNECTOR, FLEXIBLE 9P
CN305	*1-564-016-00	PIN, CONNECTOR 6P
CN306	*1-506-979-21	CONNECTOR, BOARD TO BOARD 13P
CN307	*1-564-013-00	PIN, CONNECTOR 3P
CN501	*1-564-014-00	PIN, CONNECTOR 4P
CN502	*1-564-014-00	PIN, CONNECTOR 4P
CN504	*1-564-014-00	PIN, CONNECTOR 4P
CN505	*1-564-015-00	PIN, CONNECTOR 5P

DIODE

D301	8-719-951-12	DIODE HZ5BLL
D302	8-719-100-05	DIODE 1S2837
D305	8-719-100-03	DIODE 1S2835
D308	8-719-100-05	DIODE 1S2837
D309	8-719-100-05	DIODE 1S2837
D502	8-719-101-23	DIODE 1SS123
D503	8-719-200-27	DIODE E10DS2
D504	8-719-000-12	DIODE MC931
D505	8-719-200-36	DIODE E10QS04
D506	8-719-200-36	DIODE E10QS04

FILTER

FL501	1-235-612-21	BPF 16KHz
FL502	1-235-611-21	BPF 47KHz

IC

IC301	8-759-970-70	IC MB88551-274
IC302	8-759-100-95	IC UPC324G2
IC303	8-759-922-54	IC S-81250AG
IC304	8-759-937-56	IC S-8054ALB-LM-TS
IC305	8-759-207-00	IC TA7733F
IC501	8-759-107-68	IC CX20115A
IC502	8-759-201-80	IC TC4526BF
IC503	8-752-003-50	IC CX20035
IC504	8-759-925-66	IC BA6303F
IC505	8-759-701-36	IC NJM3403AM
IC506	8-759-300-72	IC HD14066BFP
IC507	8-759-928-56	IC CXA1042M
IC508	8-752-003-60	IC CX20036
IC509	8-759-202-45	IC CX20114
IC510	8-759-803-47	IC LA5005M

COIL

L301	1-407-177-XX	MICRO INDUCTOR 470UH
L502	1-408-948-00	MICRO INDUCTOR 220UH
L503	1-410-627-11	COIL, CHOKE 100UH
L504	1-410-628-11	COIL, CHOKE 200UH
L505	1-410-628-11	COIL, CHOKE 200UH
L505	1-410-628-11	COIL, CHOKE 200UH
L506	1-408-987-21	MICRO INDUCTOR 330UH

IC LINK

PS301⚠	1-532-685-00	LINK, IC ICP-N20 0.8A
PS501⚠	1-532-637-00	LINK, IC ICP-N25 1.0A

TRANSISTOR

Q301	8-729-100-76	TRANSISTOR 2SA812
Q302	8-729-100-76	TRANSISTOR 2SA812
Q303	8-729-100-76	TRANSISTOR 2SA812
Q306	8-729-903-10	TRANSISTOR FMW1
Q307	8-729-805-45	TRANSISTOR 2SC3395
Q308	8-729-100-76	TRANSISTOR 2SA812
Q309	8-729-901-47	TRANSISTOR DTA143EK
Q310	8-729-805-41	TRANSISTOR 2SC3398
Q311	8-729-901-07	TRANSISTOR DTA124XK
Q312	8-729-100-67	TRANSISTOR 2SC1623-L7
Q313	8-729-902-96	TRANSISTOR FMS1
Q314	8-729-903-82	TRANSISTOR FMW2
Q315	8-729-104-95	TRANSISTOR 2SB1040A-5
Q316	8-729-100-67	TRANSISTOR 2SC1623-L7
Q317	8-729-805-69	TRANSISTOR 2SA1341

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

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

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Ref.No	Part No.	Description	Remark
Q318	8-729-904-20	TRANSISTOR FMA2	
Q319	8-729-805-25	TRANSISTOR 2SB1121	
Q320	8-729-805-25	TRANSISTOR 2SB1121	
Q321	8-729-904-20	TRANSISTOR FMA2	
Q322	8-729-805-69	TRANSISTOR 2SA1341	
Q323	8-729-903-10	TRANSISTOR FMW1	
Q324	8-729-805-45	TRANSISTOR 2SC3395	
Q325	8-729-901-21	TRANSISTOR 2SC3395	
Q326	8-729-700-10	NJL7141E-S	
Q327	8-729-700-10	NJL7141E-S	
Q328	8-729-805-41	TRANSISTOR 2SC3398	
Q501	8-729-901-01	TRANSISTOR DTC144EK	
Q502	8-729-100-76	TRANSISTOR 2SA812	
Q503	8-729-100-67	TRANSISTOR 2SC1623-L7	
Q504	8-729-904-20	TRANSISTOR FMA2	
Q505	8-729-100-76	TRANSISTOR 2SA812	
Q506	8-729-805-45	TRANSISTOR 2SC3395	
Q507	8-729-805-69	TRANSISTOR 2SA1341	
Q508	8-729-100-67	TRANSISTOR 2SC1623-L7	
Q509	8-729-100-76	TRANSISTOR 2SA812	
Q510	8-729-100-67	TRANSISTOR 2SC1623-L7	
Q511	8-729-100-76	TRANSISTOR 2SA812	
Q512	8-729-100-76	TRANSISTOR 2SA812	
Q513	8-729-904-20	TRANSISTOR FMA2	
Q514	8-729-805-69	TRANSISTOR 2SA1341	
Q515	8-729-904-20	TRANSISTOR FMA2	
Q516	8-729-100-66	TRANSISTOR 2SC1623	
Q517	8-729-100-76	TRANSISTOR 2SA812	
Q518	8-729-100-66	TRANSISTOR 2SC1623	
Q519	8-729-100-76	TRANSISTOR 2SA812	
Q520	8-729-100-66	TRANSISTOR 2SC1623	
Q521	8-729-100-76	TRANSISTOR 2SA812	
Q522	8-729-903-29	TRANSISTOR DTA144TK	
Q524	8-729-805-25	TRANSISTOR 2SB1121	
Q525	8-729-805-25	TRANSISTOR 2SB1121	
Q526	8-729-803-37	TRANSISTOR 2SA1237	
Q527	8-729-100-67	TRANSISTOR 2SC1623-L7	
Q528	8-729-903-30	TRANSISTOR DTC144TK	
Q529	8-729-903-29	TRANSISTOR DTA144TK	
Q530	8-729-162-44	TRANSISTOR 2SB624-BV4	
Q531	8-729-805-45	TRANSISTOR 2SC3395	
Q532	8-729-901-01	TRANSISTOR DTC144EK	

RESISTOR

Ref.No	Part No.	Description				Remark
R301	1-216-063-00	METAL CHIP	3.9K	5%	1/10W	
R303	1-216-111-00	METAL CHIP	390K	5%	1/10W	
R304	1-216-111-00	METAL CHIP	390K	5%	1/10W	
R306	1-216-111-00	METAL CHIP	390K	5%	1/10W	
R307	1-216-748-11	METAL CHIP	39K	5%	1/10W	
R309	1-216-748-11	METAL CHIP	39K	5%	1/10W	
R310	1-216-748-11	METAL CHIP	39K	5%	1/10W	
R311	1-216-121-00	METAL CHIP	1M	5%	1/10W	
R312	1-216-121-00	METAL CHIP	1M	5%	1/10W	
R313	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R314	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R315	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R316	1-216-071-00	METAL CHIP	8.2K	5%	1/10W	
R317	1-216-091-00	METAL CHIP	56K	5%	1/10W	
R318	1-216-089-00	METAL CHIP	47K	5%	1/10W	
R319	1-216-099-00	METAL CHIP	120K	5%	1/10W	
R320	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R321	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R322	1-216-043-00	METAL CHIP	560	5%	1/10W	
R323	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R324	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R325	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R326	1-216-113-00	METAL CHIP	470K	5%	1/10W	
R327	1-216-113-00	METAL CHIP	470K	5%	1/10W	
R328	1-216-085-00	METAL CHIP	33K	5%	1/10W	
R329	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R330	1-216-105-00	METAL CHIP	220K	5%	1/10W	
R331	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R332	1-216-105-00	METAL CHIP	220K	5%	1/10W	
R333	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R334	1-216-109-00	METAL CHIP	330K	5%	1/10W	
R335	1-216-121-00	METAL CHIP	1M	5%	1/10W	
R336	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R337	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R338	1-216-089-00	METAL CHIP	47K	5%	1/10W	
R339	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R340	1-216-172-00	METAL CHIP	82	5%	1/8W	
R341	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R342	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R343	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R344	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R345	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R346	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R347	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R348	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R349	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R350	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R351	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R352	1-216-089-00	METAL CHIP	47K	5%	1/10W	
R353	1-216-051-00	METAL CHIP	1.2K	5%	1/10W	
R354	1-216-051-00	METAL CHIP	1.2K	5%	1/10W	
R355	1-216-089-00	METAL CHIP	47K	5%	1/10W	
R356	1-216-196-00	METAL CHIP	820	5%	1/8W	
R357	1-216-196-00	METAL CHIP	820	5%	1/8W	
R358	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R359	1-216-077-00	METAL CHIP	15K	5%	1/10W	
R360	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R361	1-216-083-00	METAL CHIP	27K	5%	1/10W	
R362	1-216-109-00	METAL CHIP	330K	5%	1/10W	
R363	1-216-077-00	METAL CHIP	15K	5%	1/10W	
R364	1-216-083-00	METAL CHIP	27K	5%	1/10W	
R365	1-216-121-00	METAL CHIP	1M	5%	1/10W	

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

Ref.No	Part No.	Description				Remark
R366	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R367	1-216-194-00	METAL CHIP	680	5%	1/8W	
R368	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R369	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R370	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R371	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R372	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R373	1-216-194-00	METAL CHIP	680	5%	1/8W	
R374	1-216-194-00	METAL CHIP	680	5%	1/8W	
R375	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R376	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R377	1-216-196-00	METAL CHIP	820	5%	1/8W	
R378	1-216-089-00	METAL CHIP	47K	5%	1/10W	
R379	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R380	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R381	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R382	1-216-085-00	METAL CHIP	33K	5%	1/10W	
R383	1-216-166-00	METAL CHIP	47	5%	1/8W	
R384	1-216-079-00	METAL CHIP	18K	5%	1/10W	
R385	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R386	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R387	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R389	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R390	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R391	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R392	1-216-089-00	METAL CHIP	47K	5%	1/10W	
R393	1-216-089-00	METAL CHIP	47K	5%	1/10W	
R394	1-216-089-00	METAL CHIP	47K	5%	1/10W	
R395	1-216-089-00	METAL CHIP	47K	5%	1/10W	
R396	1-216-085-00	METAL CHIP	33K	5%	1/10W	
R397	1-216-089-00	METAL CHIP	47K	5%	1/10W	
R398	1-216-107-00	METAL CHIP	270K	5%	1/10W	
R399	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R501	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R502	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R503	1-216-113-00	METAL CHIP	470K	5%	1/10W	
R504	1-216-075-00	METAL CHIP	12K	5%	1/10W	
R505	1-216-099-00	METAL CHIP	120K	5%	1/10W	
R506	1-216-109-00	METAL CHIP	330K	5%	1/10W	
R507	1-216-069-00	METAL CHIP	6.8K	5%	1/10W	
R508	1-216-089-00	METAL CHIP	47K	5%	1/10W	
R509	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R510	1-216-117-00	METAL CHIP	680K	5%	1/10W	
R511	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	
R512	1-216-053-00	METAL CHIP	1.5K	5%	1/10W	
R513	1-216-113-00	METAL CHIP	470K	5%	1/10W	
R514	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R515	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R516	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R517	1-216-085-00	METAL CHIP	33K	5%	1/10W	
R518	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R519	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R520	1-216-117-00	METAL CHIP	680K	5%	1/10W	

Ref.No	Part No.	Description				Remark
R521	1-216-091-00	METAL CHIP	56K	5%	1/10W	
R522	1-216-075-00	METAL CHIP	12K	5%	1/10W	
R523	1-216-115-00	METAL CHIP	560K	5%	1/10W	
R524	1-216-113-00	METAL CHIP	470K	5%	1/10W	
R525	1-216-055-00	METAL CHIP	1.8K	5%	1/10W	
R526	1-216-043-00	METAL CHIP	560	5%	1/10W	
R527	1-216-107-00	METAL CHIP	270K	5%	1/10W	
R529	1-216-115-00	METAL CHIP	560K	5%	1/10W	
R530	1-216-107-00	METAL CHIP	270K	5%	1/10W	
R531	1-216-061-00	METAL CHIP	3.3K	5%	1/10W	
R532	1-216-089-00	METAL CHIP	47K	5%	1/10W	
R533	1-216-099-00	METAL CHIP	120K	5%	1/10W	
R534	1-216-083-00	METAL CHIP	27K	5%	1/10W	
R535	1-216-075-00	METAL CHIP	12K	5%	1/10W	
R537	1-216-075-00	METAL CHIP	12K	5%	1/10W	
R538	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R539	1-216-091-00	METAL CHIP	56K	5%	1/10W	
R540	1-216-091-00	METAL CHIP	56K	5%	1/10W	
R541	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R542	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R543	1-216-047-00	METAL CHIP	820	5%	1/10W	
R544	1-216-039-00	METAL CHIP	390	5%	1/10W	
R546	1-216-051-00	METAL CHIP	1.2K	5%	1/10W	
R548	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	
R549	1-216-083-00	METAL CHIP	27K	5%	1/10W	
R550	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R551	1-216-085-00	METAL CHIP	33K	5%	1/10W	
R552	1-216-748-11	METAL CHIP	39K	5%	1/10W	
R553	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R554	1-216-089-00	METAL CHIP	47K	5%	1/10W	
R555	1-216-091-00	METAL CHIP	56K	5%	1/10W	
R556	1-216-085-00	METAL CHIP	33K	5%	1/10W	
R557	1-216-103-00	METAL CHIP	180K	5%	1/10W	
R558	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R559	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R560	1-216-115-00	METAL CHIP	560K	5%	1/10W	
R561	1-216-117-00	METAL CHIP	680K	5%	1/10W	
R562	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R563	1-216-091-00	METAL CHIP	56K	5%	1/10W	
R564	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R565	1-216-075-00	METAL CHIP	12K	5%	1/10W	
R569	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R570	1-216-075-00	METAL CHIP	12K	5%	1/10W	
R571	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	
R572	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	
R573	1-216-099-00	METAL CHIP	120K	5%	1/10W	
R574	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R575	1-216-077-00	METAL CHIP	15K	5%	1/10W	
R576	1-216-101-00	METAL CHIP	150K	5%	1/10W	
R577	1-216-041-00	METAL CHIP	470	5%	1/10W	
R578	1-216-067-00	METAL CHIP	5.6K	5%	1/10W	
R579	1-216-089-00	METAL CHIP	47K	5%	1/10W	
R580	1-216-089-00	METAL CHIP	47K	5%	1/10W	

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

Ref.No	Part No.	Description				Remark
R581	1-216-025-00	METAL CHIP	100	5%	1/10W	
R582	1-216-077-00	METAL CHIP	15K	5%	1/10W	
R583	1-216-748-11	METAL CHIP	39K	5%	1/10W	
R584	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R585	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R586	1-216-047-00	METAL CHIP	820	5%	1/10W	
R587	1-216-115-00	METAL CHIP	560K	5%	1/10W	
R589	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R590	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R591	1-216-099-00	METAL CHIP	120K	5%	1/10W	
R592	1-216-067-00	METAL CHIP	5.6K	5%	1/10W	
R593	1-216-121-00	METAL CHIP	1M	5%	1/10W	
R594	1-216-059-00	METAL CHIP	2.7K	5%	1/10W	
R595	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R596	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R597	1-216-077-00	METAL CHIP	15K	5%	1/10W	
R598	1-216-077-00	METAL CHIP	15K	5%	1/10W	
R599	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R600	1-214-972-00	METAL	0.22	5%	1/4W	
R601	1-216-061-00	METAL CHIP	3.3K	5%	1/10W	
R602	1-216-304-11	METAL CHIP	3.3	5%	1/10W	
R603	1-216-304-11	METAL CHIP	3.3	5%	1/10W	
R604	1-216-304-11	METAL CHIP	3.3	5%	1/10W	
R605	1-216-121-00	METAL CHIP	1M	5%	1/10W	
R606	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R607	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R608	1-216-115-00	METAL CHIP	560K	5%	1/10W	
R609	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R610	1-216-041-00	METAL CHIP	470	5%	1/10W	
R611	1-216-041-00	METAL CHIP	470	5%	1/10W	
R612	1-216-025-00	METAL CHIP	100	5%	1/10W	
R613	1-216-115-00	METAL CHIP	560K	5%	1/10W	
R614	1-216-115-00	METAL CHIP	560K	5%	1/10W	
R615	1-216-091-00	METAL CHIP	56K	5%	1/10W	
R617	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R618	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	
R620	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	
R621	1-216-214-00	METAL CHIP	4.7K	5%	1/8W	
R622	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R623	1-216-061-00	METAL CHIP	3.3K	5%	1/10W	
R624	1-216-055-00	METAL CHIP	1.8K	5%	1/10W	
R629	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R630	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R633	1-216-025-00	METAL CHIP	100	5%	1/10W	
R634	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R635	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R636	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R637	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R638	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R639	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R640	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R641	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R642	1-216-073-00	METAL CHIP	10K	5%	1/10W	

Ref.No	Part No.	Description				Remark
R643	1-216-089-00	METAL CHIP	47K	5%	1/10W	
R644	1-216-270-00	METAL CHIP	1M	5%	1/8W	
R645	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R646	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R647	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R648	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R649	1-216-073-00	METAL CHIP	10K	5%	1/10W	
		VARIABLE RESISTOR				
RV502	1-230-873-11	RES, ADJ, METAL GLAZE 47K				
		JUMPER WIRE				
W301	1-535-639-11	WIRE, JUMPER (10 CORE)				
		CRYSTAL				
X301	1-567-143-00	OSCILLATOR, CERAMIC 6MHz				
**********						
	*A-7060-771-A	AU-31 BOARD, COMPLETE				
		**********				
		CAPACITOR				
C401	1-163-141-00	CERAMIC CHIP	0.001MF	10%	50V	
C402	1-135-083-00	TANTAL. CHIP	0.47MF	20%	25V	
C403	1-163-133-00	CERAMIC CHIP	470PF	5%	50V	
C404	1-124-255-00	ELECT	1MF	20%	50V	
C405	1-135-070-00	TANTAL. CHIP	0.1MF	20%	35V	
C406	1-124-229-00	ELECT	33MF	20%	6.3V	
C407	1-163-145-00	CERAMIC CHIP	0.0015MF	10%	50V	
C408	1-163-123-00	CERAMIC CHIP	180PF	5%	50V	
C409	1-163-017-00	CERAMIC CHIP	0.0047MF	10%	50V	
C410	1-163-014-00	CERAMIC CHIP	0.0027MF	10%	50V	
C411	1-135-099-00	TANTAL. CHIP	2.2MF	20%	6.3V	
C412	1-135-104-00	TANTAL. CHIP	10MF	20%	4V	
C413	1-163-020-00	CERAMIC CHIP	0.0082MF	10%	50V	
C414	1-163-137-00	CERAMIC CHIP	680PF	5%	50V	
C415	1-135-104-00	TANTAL. CHIP	10MF	20%	4V	
C416	1-135-091-00	TANTAL. CHIP	1MF	20%	16V	
C417	1-163-125-00	CERAMIC CHIP	220PF	10%	50V	
C418	1-162-587-91	CERAMIC CHIP	0.039MF	10%	25V	
C419	1-163-088-00	CERAMIC CHIP	5PF	0.25PF	50V	
C420	1-163-017-00	CERAMIC CHIP	0.0047MF	10%	50V	
C421	1-135-104-00	TANTAL. CHIP	10MF	20%	4V	
C423	1-163-021-00	CERAMIC CHIP	0.01MF	10%	50V	
C424	1-124-225-00	ELECT	100MF	20%	6.3V	
C425	1-124-225-00	ELECT	100MF	20%	6.3V	
C426	1-124-225-00	ELECT	100MF	20%	6.3V	
C427	1-163-019-00	CERAMIC CHIP	0.0068MF	10%	50V	
C428	1-163-021-00	CERAMIC CHIP	0.01MF	10%	50V	
C429	1-163-021-00	CERAMIC CHIP	0.01MF	10%	50V	
C430	1-163-123-00	CERAMIC CHIP	180PF	5%	50V	
C431	1-163-033-00	CERAMIC CHIP	0.022MF	10%	25V	

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

Ref.No	Part No.	Description			Remark
C432	1-135-083-00	TANTAL. CHIP 0.47MF	20%	25V	
C433	1-163-121-00	CERAMIC CHIP 150PF	5%	50V	
C434	1-163-014-00	CERAMIC CHIP 0.0027MF	10%	50V	
C435	1-163-021-00	CERAMIC CHIP 0.01MF	10%	50V	
C436	1-135-104-00	TANTAL. CHIP 10MF	20%	4V	
C437	1-163-133-00	CERAMIC CHIP 470PF	10%	50V	
C438	1-135-104-00	TANTAL. CHIP 10MF	20%	4V	
C439	1-163-117-00	CERAMIC CHIP 100PF	5%	50V	
C440	1-135-104-00	TANTAL. CHIP 10MF	20%	4V	
		FILTER			
FL401	1-235-398-11	BPF 1.5MHz			
		IC			
IC401	8-752-003-79	IC CX20037A			
		COIL			
L401	1-408-793-21	INDUCTOR CHIP 220UH			
		TRANSISTOR			
Q403	8-729-100-67	TRANSISTOR 2SC1623-L7			
Q404	8-729-100-67	TRANSISTOR 2SC1623-L7			
Q405	8-729-100-76	TRANSISTOR 2SA812			
Q406	8-729-100-67	TRANSISTOR 2SC1623-L7			
		RESISTOR			
R401	1-216-085-00	METAL CHIP 33K	5%	1/10W	
R402	1-216-069-00	METAL CHIP 6.8K	5%	1/10W	
R403	1-216-069-00	METAL CHIP 6.8K	5%	1/10W	
R404	1-216-069-00	METAL CHIP 6.8K	5%	1/10W	
R405	1-216-073-00	METAL CHIP 10K	5%	1/10W	
R406	1-216-059-00	METAL CHIP 2.7K	5%	1/10W	
R407	1-216-061-00	METAL CHIP 3.3K	5%	1/10W	
R408	1-216-061-00	METAL CHIP 3.3K	5%	1/10W	
R409	1-216-059-00	METAL CHIP 2.7K	5%	1/10W	
R410	1-216-057-00	METAL CHIP 2.2K	5%	1/10W	
R411	1-216-045-00	METAL CHIP 680	5%	1/10W	
R412	1-216-063-00	METAL CHIP 3.9K	5%	1/10W	
R413	1-216-075-00	METAL CHIP 12K	5%	1/10W	
R414	1-216-079-00	METAL CHIP 18K	5%	1/10W	
R417	1-216-083-00	METAL CHIP 27K	5%	1/10W	
R418	1-216-077-00	METAL CHIP 15K	5%	1/10W	
R419	1-249-416-11	CARBON 820	5%	1/4W	
R420	1-216-047-00	METAL CHIP 820	5%	1/10W	
R421	1-216-079-00	METAL CHIP 18K	5%	1/10W	
R422	1-216-049-00	METAL CHIP 1K	5%	1/10W	
R423	1-216-049-00	METAL CHIP 1K	5%	1/10W	
R424	1-216-057-00	METAL CHIP 2.2K	5%	1/10W	
R425	1-216-061-00	METAL CHIP 3.3K	5%	1/10W	
R426	1-216-060-00	METAL CHIP 3K	5%	1/10W	
R427	1-216-057-00	METAL CHIP 2.2K	5%	1/10W	
R428	1-216-077-00	METAL CHIP 15K	5%	1/10W	

Ref.No	Part No.	Description			Remark
R429	1-216-071-00	METAL CHIP 8.2K	5%	1/10W	
R430	1-216-085-00	METAL CHIP 33K	5%	1/10W	
R431	1-216-085-00	METAL CHIP 33K	5%	1/10W	
R432	1-216-069-00	METAL CHIP 6.8K	5%	1/10W	
R433	1-216-065-00	METAL CHIP 4.7K	5%	1/10W	
R434	1-216-071-00	METAL CHIP 8.2K	5%	1/10W	
R435	1-216-065-00	METAL CHIP 4.7K	5%	1/10W	
R436	1-216-041-00	METAL CHIP 470	5%	1/10W	
R437	1-216-043-00	METAL CHIP 560	5%	1/10W	
R438	1-216-025-00	METAL CHIP 100	5%	1/10W	
R439	1-216-081-00	METAL CHIP 22K	5%	1/10W	
R440	1-216-055-00	METAL CHIP 1.8K	5%	1/10W	
		VARIABLE RESISTOR			
RV401	1-230-870-11	RES, ADJ, METAL GLAZE 10K			
RV402	1-230-871-11	RES, ADJ, METAL GLAZE 22K			

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1-623-007-11 SK-19 FLEXIBLE BOARD
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		RESISTOR			
R001	1-216-296-00	METAL CHIP 0	5%	1/8W	
R002	1-216-296-00	METAL CHIP 0	5%	1/8W	
		SWITCH			
S351	1-570-773-21	SWITCH, SLIDER			
S352	1-554-371-31	SWITCH, TACT			
S353	1-554-371-31	SWITCH, TACT			
S354	1-554-371-31	SWITCH, TACT			
S355	1-554-371-31	SWITCH, TACT			
S356	1-554-371-31	SWITCH, TACT			

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*A-7070-494-A MA-21 BOARD, COMPLETE
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		CAPACITOR			
C451	1-124-225-00	ELECT 100MF	20%	6.3V	
C452	1-124-224-00	ELECT 47MF	20%	6.3V	
C453	1-135-072-21	TANTAL. CHIP 0.22MF	20%	35V	
C454	1-135-072-81	TANTAL. CHIP 0.22MF	20%	35V	
C455	1-163-141-00	CERAMIC CHIP 0.001MF	10%	50V	
C456	1-163-035-00	CERAMIC CHIP 0.047MF	10%	25V	
C457	1-135-099-00	TANTAL. CHIP 2.2MF	20%	6.3V	
		CONNECTOR			
CN451	*1-564-013-00	PIN, CONNECTOR 3P			
		IC			
IC451	8-759-111-56	IC UPC4572G2			

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

MA-21 MJ-12 FP-53 VF-10

Ref.No	Part No.	Description				Remark
		TRANSISTOR				
Q451	8-729-162-44	TRANSISTOR 2SB624-T1BV4				
		RESISTOR				
R451	1-216-067-00	METAL CHIP	5.6K	5%	1/10W	
R452	1-216-071-00	METAL CHIP	8.2K	5%	1/10W	
R453	1-216-162-00	METAL CHIP	33	5%	1/8W	
R454	1-216-097-00	METAL CHIP	100K	5%	1/10W	
R455	1-216-103-00	METAL CHIP	180K	5%	1/10W	
R456	1-216-101-00	METAL CHIP	150K	5%	1/10W	
R457	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	
R458	1-216-067-00	METAL CHIP	5.6K	5%	1/10W	
R459	1-216-748-11	METAL CHIP	39K	5%	1/10W	
R460	1-216-069-00	METAL CHIP	6.8K	5%	1/10W	
R461	1-216-061-00	METAL CHIP	3.3K	5%	1/10W	
R462	1-216-001-00	METAL CHIP	10	5%	1/10W	
R463	1-216-296-00	METAL CHIP	0	5%	1/8W	
R464	1-216-296-00	METAL CHIP	0	5%	1/8W	
R465	1-216-296-00	METAL CHIP	0	5%	1/8W	
**********						
	*1-620-826-22	MJ-12 BOARD **********				
		CAPACITOR				
C471	1-163-035-00	CERAMIC CHIP 0.047MF				50V
		CONNECTOR				
CN471	*1-564-014-00	PIN, CONNECTOR 4P				
		DIODE				
D471	8-719-911-19	DIODE 1SS119				
		JACK				
J471	1-507-921-00	JACK				
J472	1-563-454-11	JACK, MINIATURE				
**********						
	A-7060-693-A	FP-53 BOARD, COMPLETE **********				
	3-713-904-01	HOLDER (2), LED				
		DIODE				
D302	8-719-940-81	DIODE GL452S				
D303	8-719-801-55	TLP907-O				
D304	8-719-801-55	TLP907-O				
		SWITCH				
S301	1-570-869-11	SWITCH, PUSH (2 KEY)				

Ref.No	Part No.	Description				Remark
	*A-7060-777-A	VF-10 BOARD, COMPLETE **********				
	1-526-926-21	SOCKET ASSY, CRT				
		CAPACITOR				
C951	1-124-222-00	ELECT	22MF	20%	6.3V	
C952	1-163-081-00	CERAMIC CHIP	0.22MF		25V	
C953	1-136-175-00	FILM	0.68MF	5%	50V	
C954	1-124-584-00	ELECT	100MF	20%	10V	
C955	1-163-137-00	CERAMIC CHIP	680PF	10%	50V	
C956	1-162-637-11	CERAMIC CHIP	0.47MF		16V	
C957	1-163-033-00	CERAMIC CHIP	0.022MF	10%	25V	
C958	1-124-462-00	ELECT	10MF	20%	10V	
C959	1-163-209-00	CERAMIC CHIP	0.0015MF	5%	50V	
C960	1-163-121-00	CERAMIC CHIP	150PF	5%	50V	
C961	1-163-077-00	CERAMIC CHIP	0.1MF		50V	
C963	1-124-442-00	ELECT	330MF	20%	6.3V	
C964	1-124-587-11	ELECT	220MF	20%	6.3V	
C965	1-163-077-00	CERAMIC CHIP	0.1MF		50V	
C966	1-163-023-00	CERAMIC CHIP	0.015MF	10%	50V	
C967	1-124-255-00	ELECT	1MF	20%	50V	
C968	1-163-141-00	CERAMIC CHIP	0.001MF	10%	50V	
C969	1-163-013-00	CERAMIC CHIP	0.0022MF	10%	50V	
C971	⚠1-163-021-00	CERAMIC CHIP	0.01MF	10%	50V	
C972	⚠1-163-013-00	CERAMIC CHIP	0.0022MF	10%	50V	
C973	1-124-971-11	ELECT	3.3MF	20%	63V	
C974	1-162-697-11	CERAMIC	0.001MF	20%	1.5KV	
C975	1-102-038-00	CERAMIC	0.001MF	99%	500V	
C976	1-163-077-00	CERAMIC CHIP	0.1MF		50V	
C977	1-131-388-00	TANTALUM	68MF	10%	6.3V	
		CONNECTOR				
CN951	*1-566-164-11	PIN, CONNECTOR 2P				
CN952	*1-564-001-11	PIN, CONNECTOR 2P				
CN953	*1-564-001-11	PIN, CONNECTOR 2P				
CN954	*1-566-164-21	PIN, CONNECTOR 2P				
CN955	*1-564-001-11	PIN, CONNECTOR 2P				
		DIODE				
D951	8-719-400-20	DIODE MA152WA				
D952	8-719-801-48	DIODE 1SS193				
D953	8-719-801-45	DIODE 1SS187				
		IC				
IC951	8-759-403-49	IC AN2510S				
		COIL				
L951	⚠1-408-980-21	MICRO INDUCTOR 68UH				
L952	⚠1-459-683-11	COIL, FERRITE (HLC)				
L953	1-408-978-21	MICRO INDUCTOR 47UH				

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

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

Ref.No	Part No.	Description				Remark
		IC LINK				
PS951	⚠1-532-933-11	LINK, IC (0.25A)				
		TRANSISTOR				
Q951	8-729-100-67	TRANSISTOR 2SC1623-L7				
Q952	8-729-162-44	TRANSISTOR 2SB624-BV4				
Q953	8-729-100-67	TRANSISTOR 2SC1623-L7				
Q954	8-729-106-64	TRANSISTOR 2SD1615				
		RESISTOR				
R951	1-216-306-11	METAL CHIP	3.9	5%	1/10W	
R952	1-216-063-00	METAL CHIP	3.9K	5%	1/10W	
R953	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R954	1-216-671-11	METAL CHIP	6.8K	0.50%	1/10W	
R955	1-216-101-00	METAL CHIP	150K	5%	1/10W	
R956	1-216-017-00	METAL CHIP	47	5%	1/10W	
R957	1-216-057-00	METAL CHIP	2.2K	5%	1/10W	
R958	1-216-093-00	METAL CHIP	68K	5%	1/10W	
R959	1-216-067-00	METAL CHIP	5.6K	5%	1/10W	
R960	1-216-063-00	METAL CHIP	3.9K	5%	1/10W	
R961	1-216-226-00	METAL CHIP	15K	5%	1/8W	
R962	1-216-121-00	METAL CHIP	1M	5%	1/10W	
R963	1-216-295-00	METAL CHIP	0	5%	1/10W	
R964	1-216-051-00	METAL CHIP	1.2K	5%	1/10W	
R965	1-216-041-00	METAL CHIP	470	5%	1/10W	
R966	⚠1-216-051-00	METAL CHIP	1.2K	5%	1/10W	
R967	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R968	⚠1-216-073-00	METAL CHIP	10K	5%	1/10W	
R970	1-216-125-00	METAL CHIP	1.5M	5%	1/10W	
R971	1-216-130-11	METAL CHIP	2.4M	5%	1/10W	
R972	1-216-119-00	METAL CHIP	820K	5%	1/10W	
R973	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	
R974	1-216-049-00	METAL CHIP	1K	5%	1/10W	
R976	1-216-121-00	METAL CHIP	1M	5%	1/10W	
R977	1-216-041-00	METAL CHIP	470	5%	1/10W	
		VARIABLE RESISTOR				
RV951	1-237-431-11	RES, ADJ, CARBON 220				
RV952	1-228-920-00	RES, ADJ, CARBON 2.2K				
RV953	1-230-497-11	RES, ADJ, CARBON 22K				
RV954	1-230-203-00	RES, ADJ, METAL GLAZE 2.2M				
RV955	1-230-203-00	RES, ADJ, METAL GLAZE 2.2M				
		TRANSFORMER				
T951	⚠1-439-396-11	TRANSFORMER ASSY, FLYBACK				

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*1-621-803-11 LD-7 BOARD
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		DIODE				
D954	8-719-801-26	DIODE TLR223				

Ref.No	Part No.	Description	Remark
		MISCELLANEOUS	
	1-464-824-11	CONVERTER UNIT, DC/DC	
	1-535-574-11	TERMINAL, SHAFT GROUND	
	*1-536-947-21	TERMINAL BOARD (A)	
	1-542-091-21	MICROPHONE, ELECTRET CONDENSER	
	1-547-242-11	LENS, ZOOM (VCL-1206YH)	
	1-556-824-61	CORD, CONNECTION (WITH PLUG) 8P	
	1-559-324-21	SOCKET (TERMINAL BOARD (B))	
	1-807-238-11	SENSOR, DEW CONDENSATION	
C901	1-161-051-00	CAP, CERAMIC 0.01MF X	
L901	⚠1-451-296-21	DEFLECTION YOKE (BACK & WHITE)	
M902	8-835-223-01	MOTOR, DC BHF-3301B (CAPSTAN)	
M903	1-541-508-11	MOTOR, DC (LOADING)	
M904	3-707-369-01	METER ASSY, EE	
M905	1-541-536-11	MOTOR, AF	
M906	1-541-537-11	MOTOR, ZOOM	
S901	1-554-944-41	SWITCH, PUSH (ZOOM)	
S902	1-553-226-00	SWITCH, LEAF (CC DOWN)	
V901	⚠1-546-061-11	CATHODE-RAY TUBE, B/W	

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ACCESSORIES AND PACKING MATERIALS
****

Part No.	Description	Remark
3-712-595-11	BELT, SHOULDER	
*3-718-294-01	CUSHION (UPPER)	
*3-718-295-01	CUSHION (LOWER)	
*3-719-812-01	CARTON, OUTER	
*3-764-631-12	INSTRUCTION, DEW CONDENSATION	
3-769-231-11	MANUAL, INSTRUCTION (ENGLISH): AEP/E/UK MODEL	
3-769-231-41	MANUAL, INSTRUCTION (FRENCH, GERMAN, DUTCH): AEP/E MODEL	
3-769-231-51	MANUAL, INSTRUCTION (SPANISH, SWEDISH, ITALIAN): AEP/E MODEL	
3-769-231-71	MANUAL, INSTRUCTION (ARABIC): E MODEL	
	ACCESSORY KIT	
A-6767-226-A	MODULATOR ASSY (AEP/E MODEL)	
A-6767-227-A	MODULATOR ASSY (UK MODEL)	

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The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

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

SECTION 7
CAMERA SECTION ADJUSTMENT

During the adjustment see the parts location diagram relevant to the adjustment on page 240.

PREPARATION BEFORE ADJUSTMENT (CAMERA SECTION)

7-1. LIST OF SERVICING JIGS

●Oscilloscope ●AC pack ●Screwdriver ●L wrench ●Stop watch ●Color monitor TV ●Vectorscope

Ref No.		Name	Part Code	Use
J-1		Filter (C22)	J-6080-829-A	R gain and B gain adjustment
J-2		ND filter 0.4	J-6080-806-A	IRIS set adjustment, MAX gain adjustment, LLA adjustment
		ND filter 0.1	J-6080-807-A	IRIS set adjustment, LLA adjustment
		ND filter 0.9	J-6080-833-A	MAX gain adjustment, LLA adjustment (use 2 pc.)
J-3		Pattern box PTB-500*1	J-6029-140-A	
J-4		Pattern box color chart	J-6020-250-A	
J-5	a	Flat cable C (flexible cable of 7P)	J-6080-874-A	
	b	Extension board	J-6080-868-A	
J-6		Extension cable (7P)	J-6080-869-A	
		Extension cable (4P)	J-6080-871-A	
		Extension cable (3P)	J-6080-872-A	
J-7		Lens block fixing jig	J-6080-894-A	
J-8		Siemens-star	J-6080-875-A	Flange back adjustment

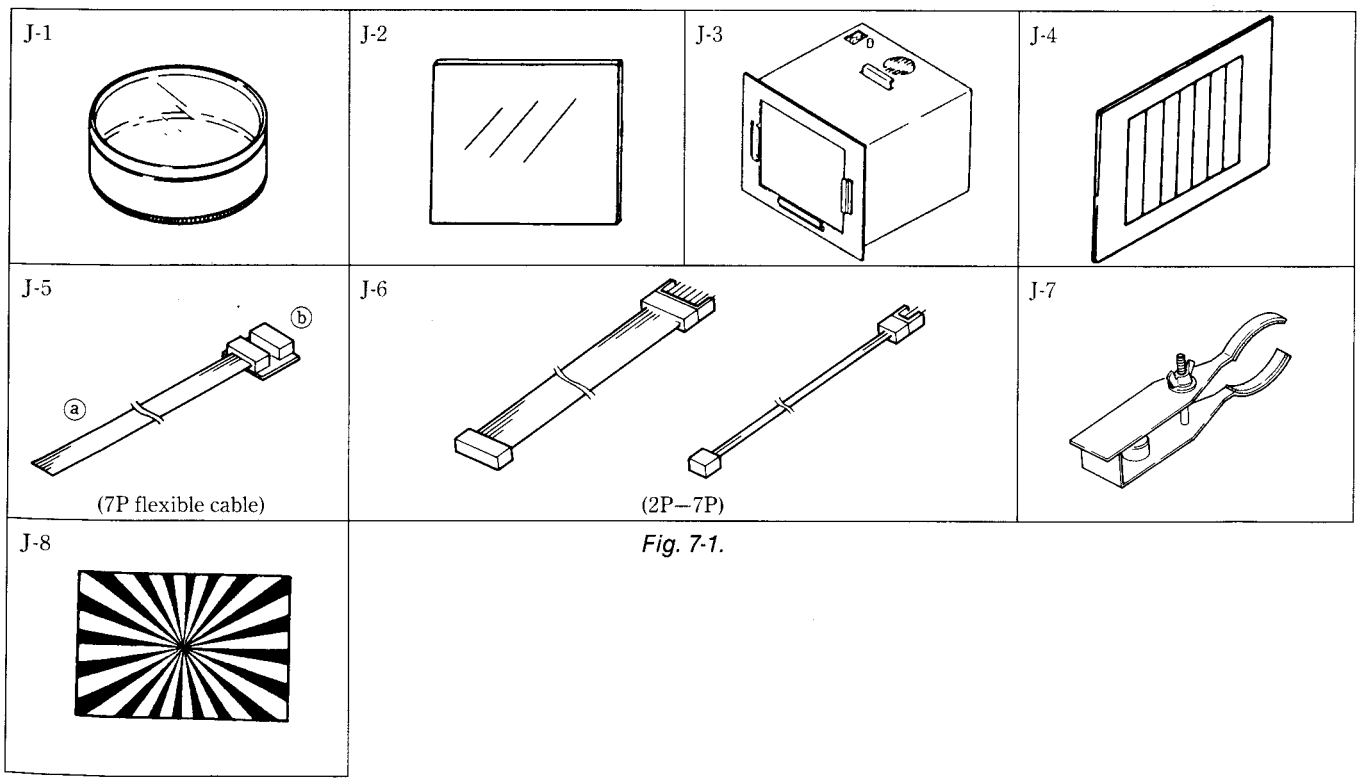


Fig. 7-1.

7-2. PREPARATION

Note:

Refer to SECTION 2. DISASSEMBLY as to details for remove the cabinets and boards.

1) Remove the front cabinet, rear cabinet, cabinet (R) and cabinet (L).
2) Separate the camera section and video section from each other.
3) Open the camera board in the manner mentioned in 2. DISASSEMBLY OPENING THE CAMERA BOARD.
4) Connect the extension cable as shown in Fig. 7-3.
5) Connect the EVF (Electronic View Finder) to CN207 of the MV-12 board because it is required for adjusting and checking the following parts:
   1) Camera DC-DC converter voltage check
   2) EVF section adjustment

   Adjustments and checks other than those above can be performed on the monitor screen.

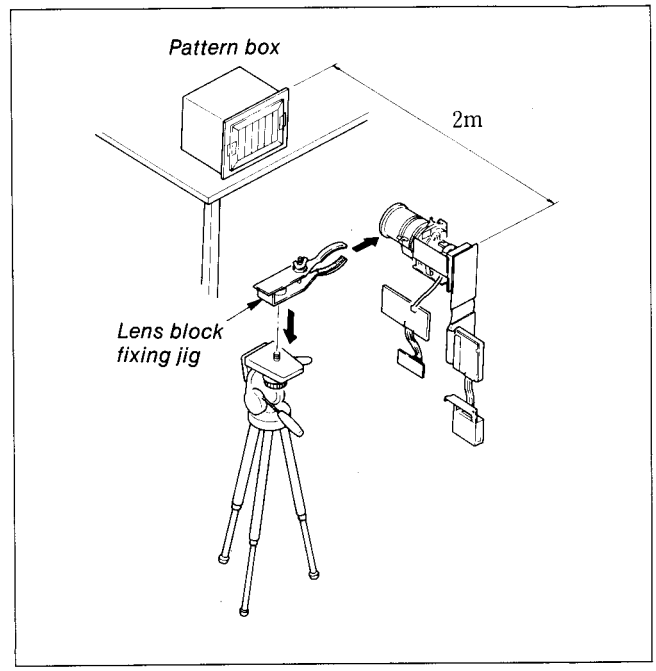


Fig. 7-2.

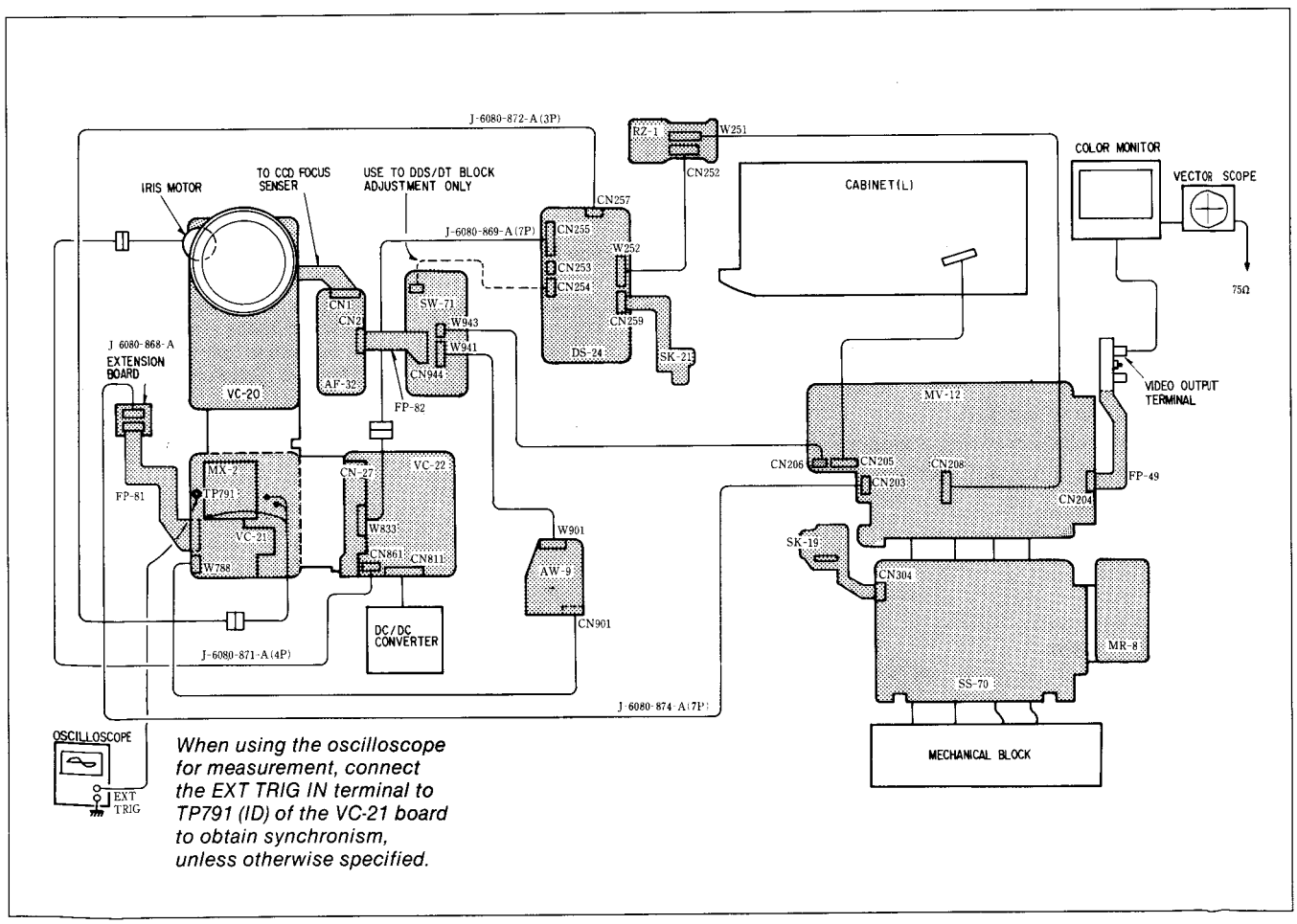


Fig. 7-3.

7-3. PRECAUTIONS

1) Setting the switches
   Adjust the switches to the following positions, when not specified:
   1. Set the FOCUS switch (SW-71 board, S945) to MANUAL
   2. Set the WHITE BALANCE switch (SW-71 board, S941) to INDOOR (☼)

2) Adjustment Procedure
   As a rule, adjust in a described order.

3) Subject
   1. Colour bar chart (standard picture frame)
      Adjust the picture frame as shown in Fig. 7-4. When using a colour chart for adjustment. (Standard picture frame).

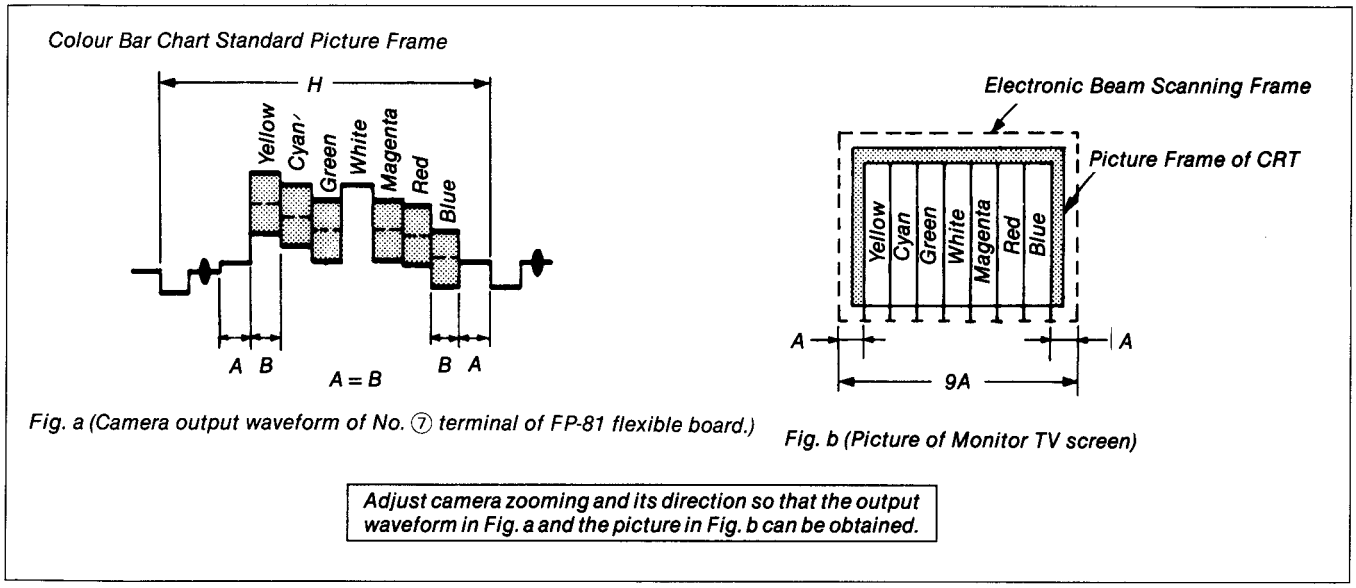


Fig. a (Camera output waveform of No. ⑦ terminal of FP-81 flexible board.)

Fig. b (Picture of Monitor TV screen)

Fig. 7-4.

2. Full white pattern
   Remove the colour bar chart from the pattern box and shift the zoom lever fully to the TELE (72mm) side.
3. High brightness pattern
   Create a high brightness pattern as shown in Fig. 7-5, and adjust the picture frame as shown in Fig. 7-6.
4. Siemens star (J-6080-875-A)
   Adjust a camera direction so that a siemens star center will coincide with a monitor screen center on the monitor TV screen.

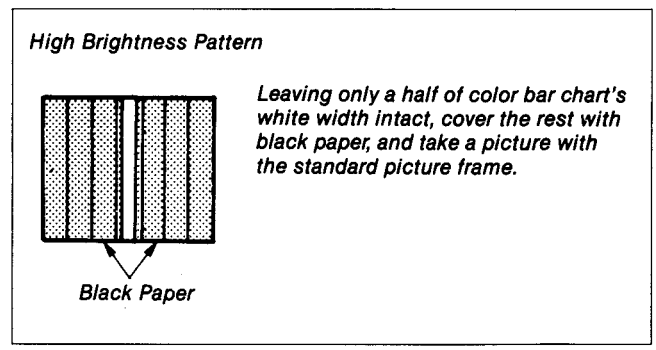


Fig. 7-5.

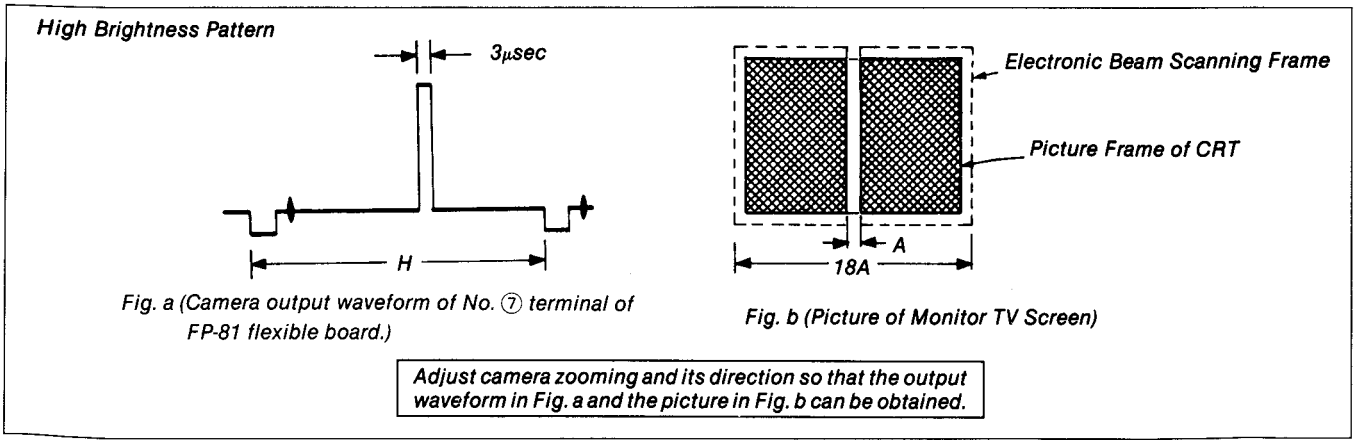


Fig. a (Camera output waveform of No. ⑦ terminal of FP-81 flexible board.)

Fig. b (Picture of Monitor TV Screen)

Fig. 7-6.

7-4. CAMERA SYSTEM ADJUSTMENT

7-4-1. Flange Back Adjustment

Subject	Siemens star at a distance of 2m in the front of a lens datum level (marked with ϕ)
Measurement point	Confirm with the monitor TV.
Measurement equipment	
Adjustment element	Flange back adjustment pin
Tools	L wrench (1.5mm), regular screwdriver

[Adjustment Method]

1) Set the FOCUS switch (SW-71 board, S945) to a MANUAL position.
2) Place the Siemens star at a distance of 2m in the front of the lens datum level (see Fig. 7-2).
3) Adjust the position of the camera section so that the center of the Siemens star displayed on the monitor screen will coincide with the center of the monitor screen.
4) Check that the lens zoom lever can be rotated fully to WIDE (12mm) and TELE (72mm), and rotate fully to the WIDE side. (Also check that the monitor screen is zooming.)
5) Push the BACK LIGHT button to set up BACK LIGHT mode and open iris.
6) Set the lens focus ring index to the center, "2".

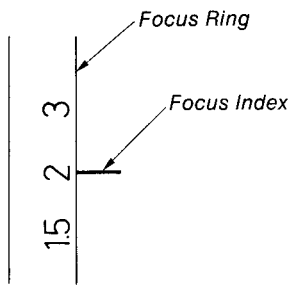


Fig. 7-7.

7) Loosen the hexagon socket head setscrew ❶. (See Fig. 7-9)
8) Viewing the monitor screen, turn the flange back adjustment pin ❷ to make clearest the wedge at the center of the Siemens star on the screen. (Confirm that it is clearest, by turning the pin 2 or 3 times to the right and left.)

   Note:
   Do not turn the adjustment pin too much in one direction.
9) Securely hold the flange back adjusting pin ❷ to prevent it from being rotated, tighten the hexagon socket head setscrew ❶.
10) Set the zoom lever fully to side and rotate the focus ring. Be sure that the position in which the wedge becomes most clear is within a range shown in Fig. 7-8.

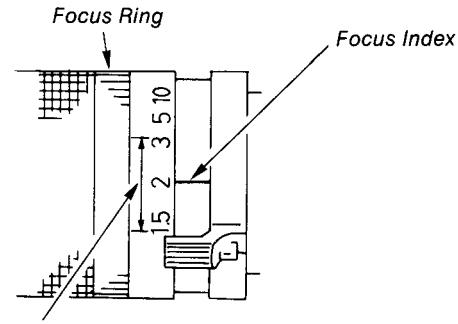


Fig. 7-8.

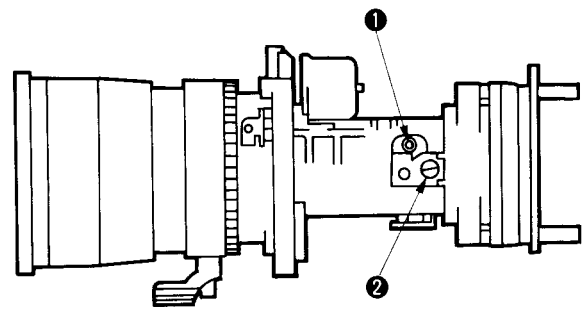


Fig. 7-9.

11) Set zoom lever to end of TELE.
12) Turn the focus ring and stop at the position where the wedge becomes most clear. Confirm then that the focus indicator is within ±1.5mm of "2".

7-4-2. Camera DC-DC Converter Voltage Check (VC-22 Board)

Measurement equipment	Digital voltmeter
5V check	
Specified value	5.05 ± 0.1V
Measurement Point	Pin ⑧ of CN881
8.5V check	
Specified value	8.5 ± 0.15V
Measurement Point	Pin ⑦ of CN881
12V check	
Specified value	12.0 ± 0.3V
Measurement Point	Pin ⑤ of CN881
20V check	
Specified value	20 ± 0.5V
Measurement Point	Pin ④ of CN881

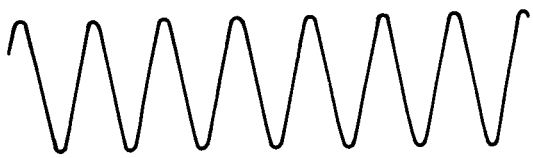
Note:
Check with the EVF section connected.

[Checking Method]
1) Each supply voltage should satisfy its specified value.

7-4-3. Clock Oscillation Frequency Adjustment (VC-20 and DT-61 Boards)

Measurement Point	Pin ㊱ (CL) of the DT-61 board
Measurement equipment	Frequency counter
Adjustment element	CT721 of VC-20 board
Specified value	14187500 ± 71Hz

[Adjustment Method]
1) Adjust to 14187500 ± 71Hz with CT721.



(14,187,500 ± 71Hz)

Fig. 7-10.

7-4-4. PLL Adjustment (VC20 Board)

Measurment Point	Pin ㉒ of IC731
Measuremnt Instrument	Digital voltmeter
Adjustment Element	CT731
Specified value	2.5 ± 0.2Vdc

[Adjusting Method]
1) Adjust to 2.5 ± 0.2Vdc with CT731.

7-4-5. Iris Set Adjustment (VC-20 and IA-1/VC-22 Boards)

Subject	Colour bar chart standard picture frame
Filter	ND filters 0.4 and 0.1
Measurement point	TP751 (CCD OUT) of the VC-20 board
Measurement equipment	Oscilloscope
Adjustment element	RV722 (IRIS SET) of the IA-1 board
Specified value	250 ± 5mV

[Adjustment Method]
1) With no ND filter attached, adjust a signal level to 250 ± 5mV using RV722 of the IA-1 board.
(Be sure to complete adjustment by turning RV722 in the direction which reduces the signal level.)
2) Attach the ND filter 0.5 (0.4 + 0.1) to the front of the lens, and confirm that the signal level changes smoothly.
3) Detach the ND filter, and confirm that the signal level is 250 ± 5mV.
4) When the specified value is not satisfied, repeat the above-mentioned steps 1) through 3).

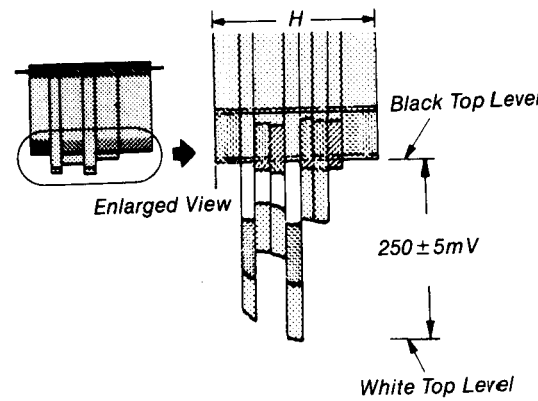


Fig. 7-11.

7-4-6. AGC Set Adjustment (SH-2/VC-20 and IA-1 Boards)

Subject	Colour bar chart standard picture frame
Measurement point	TP752 (G DET) of the VC-20 board
Measurement equipment	Oscilloscope (GND: TP753 of the VC-20 board)
Adjustment element	RV721 (AGC SET) of the IA-1 board
Specified value	250 ± 5mV

Note:
Set to the mechanical center the following 3 RVs of the SH-2 board:
1. RV006 (R GAIN)
2. RV007 (B GAIN)
3. RV008 (MAX GAIN)

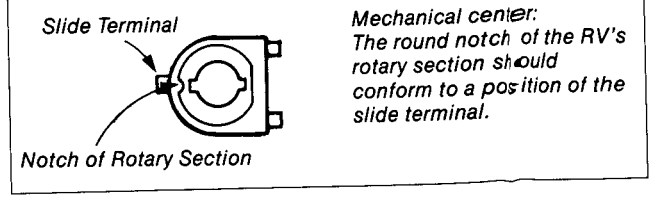


Fig. 7-12.

[Adjustment Method]

1) Adjust a signal level to 250±5mV with RV721 of the IA-1 board.

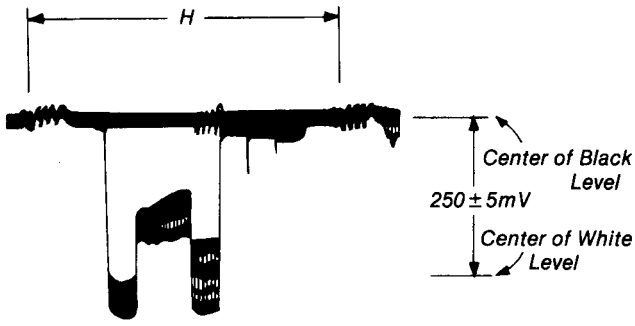


Fig. 7-13.

7-4-7. G Pedestal Adjustment (1) (VC-21, SH-2/VC-20 Boards)

Subject	All black (Cover a black cap on the lens.)
Measurement point	TP781 (G-γ) of the VC-21 board
Measurement equipment	Oscilloscope
Adjustment element	RV001 (G-PEDESTAL) of the SH-2 board
Specified value	50±5mV

Note:

Rotate fully the following 2 RVs of the SH-2 board in the clockwise direction:

1. RV002 (WHITE CLIP(I))
2. RV003 (GAMMA)

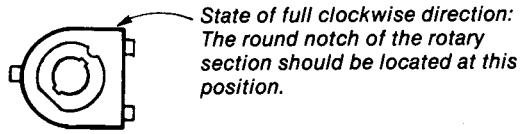


Fig. 7-14.

[Adjustment Method]

1) Adjust a pedestal level to 50±5mV with RV001 of the SH-2 board.

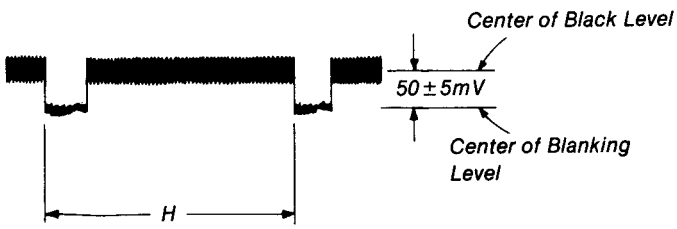


Fig. 7-15.

7-4-8. G-γ Adjustment (VC-21 and SH-2/VC-20 Boards)

Subject	Colour bar chart standard picture frame
Measurement point	TP781 (G-γ) of the VC-21 board
Measurement equipment	Oscilloscope
Adjustment element	RV003 of the SH-2 board
Specified value	380±10mV

[Adjustment Method]

1) Adjust to 380±10mV with RV003 of the SH-2 board.

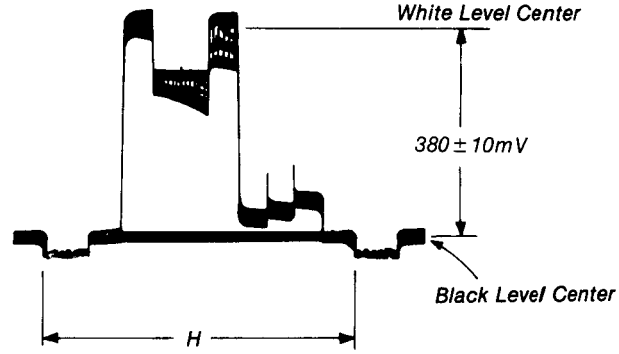


Fig. 7-16.

7-4-9. White Clip Adjustment (1) (VC-21 and SH-2/VC-20 Boards)

Subject	High brightness pattern
Measurement Point	TP781 (G-γ) of the VC-21 board
Measurement equipment	Oscilloscope
Adjustment element	RV002 (WHITE CLIP (1)) of the SH-2 board
Specified value	520±10mV

[Adjustment Method]

1) Adjust a white peak level to 520±10mV with RV002 of the SH-2 board.

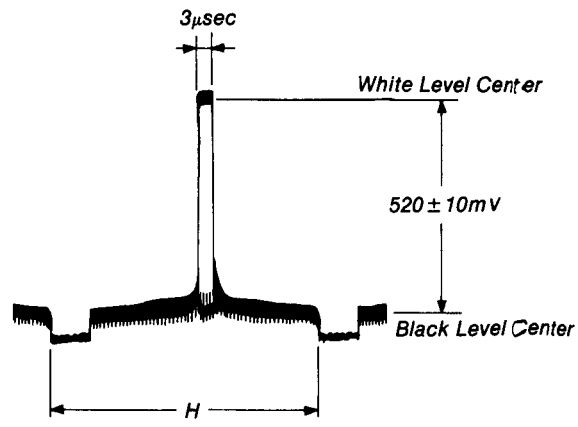


Fig. 7-17.

7-4-10. G Pedestal Adjustment (2) (VC-21 and SH-2/VC-20 Boards)

Subject	All black (Cover a black cap on a lens.)
Measurement point	TP781 (G − γ) of the VC-21 board
Measurement equipment	Oscilloscope
Adjustment element	RV001 of the SH-2 board
Specified value	25 ± 5mV

[Adjustment Method]

1) Adjust to 25 ± 5mV with RV001 of the SH-2 board.

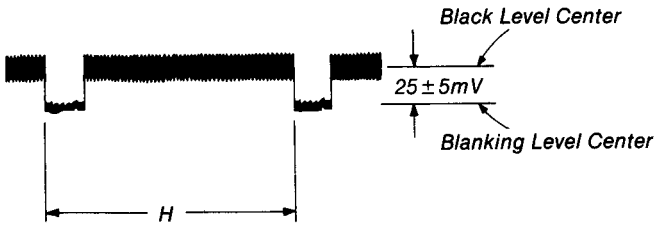


Fig. 7-18.

7-4-11. G-γ Level Check (VC-21 and SH-2/VC-20 Boards)

Subject	Colour bar chart standard picture frame
Measurement point	CH1: TP781 (G − γ) of the VC-21 board CH2: TP782 (RB − γ)
Measurement equipment	Oscilloscope
Adjustment element	RV002 of the SH-2 board
Specified value	370 ± 15mV

[Checking Method]

1) Check that the white level is 370 ± 15mV.
2) When the specified value is not, Use RV002 of the SH-2 board to meet it if the specified value is not satisfactory.

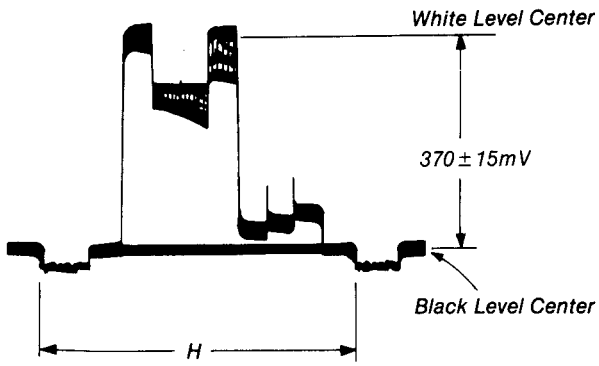


Fig. 7-19.

7-4-12. RB Offset Adjustment (VC-21 and SH-2/VC-20 Boards)

Subject	All black (Cover the lens with a black cap.)
Measurement point	CH1: TP781 (G-γ) of the VC-21 board CH2: TP782 (RB-γ) of the VC-21 board
Measurement equipment	Oscilloscope (Vertical mode: ADD CH2 polarity: INVERT)
Adjustment element	RV005 (R, OFF SET) of the SH-2 board RV004 (B, OFF SET) of the SH-2 board
Specified value	The blanking level should be at the center of a noise width.

[Adjustment Method]

1) Adjust the blanking level to the center of the noise width with RV005 and RV004 of the SH-2 board.

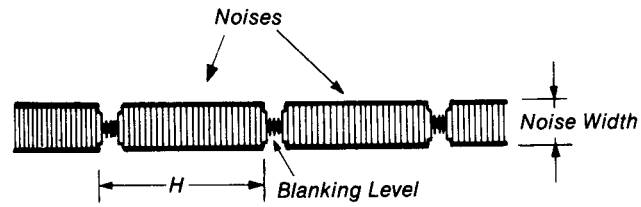


Fig. 7-20.

7-4-13. White Balance Adjustment (VC-21 and SH-2/VC-20 Boards)

Subject	Colour bar standard picture frame
Measurement point	CH1 (X): Pin ④ of CN255 (B-Y) on the DS-24 board CH2 (Y): Pin ⑤ of CN255 (R-Y) on the DS-24 board
Measurement equipment	Oscilloscope (X-Y mode) GND: Pin ⑥ of CN255 on the DS-24 board
Adjustment element	RV006 (R GAIN) and RV007 (B GAIN) of the SH-2 board
Specified value	The white and black bright points should coincide with each other in location.

[Adjustment Method]

1) By turning RV006 and RV007 of the SH-2 board have the white bright point coincide with the black bright point in location.

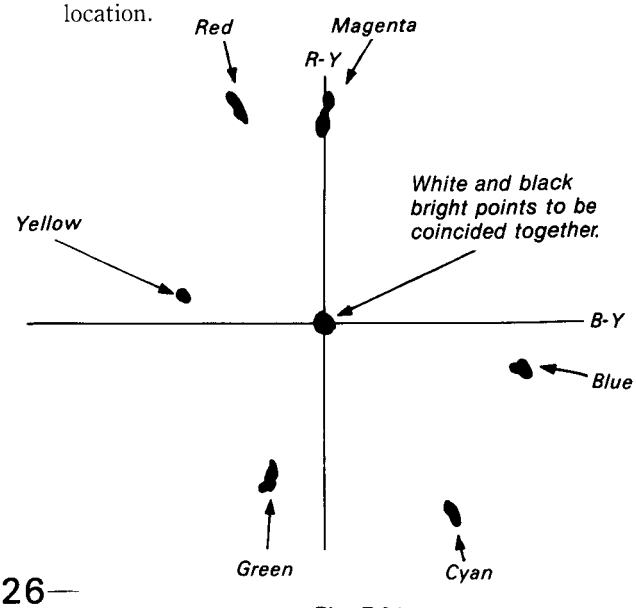


Fig. 7-21.

7-4-14. MPX Adjustment (MX-2/VC-21 Boards)

Subject	All black (Cover a black cap on the lens)
Measurement point	CH1 (X): Pin ④ of CN255 (B-Y) on the DS-24 board CH2 (Y): Pin ⑤ of CN255 (R-Y) on the DS-24 board
Measurement equipment	Oscilloscope (X-Y mode)
Adjustment element	RV825 of the MX-2 board
Specified value	There should be only one black bright point whose size is minimum.

[Adjustment Method]

1) Adjust the black spots to one with RV825 of the MX-2 board.

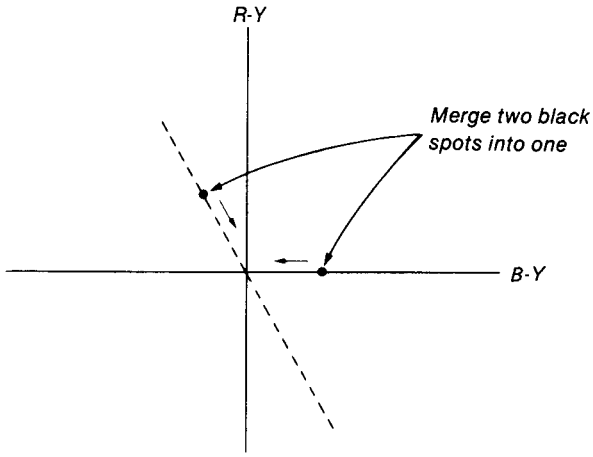


Fig. 7-22.

7-4-15. Carrier Balance Adjustment (VC-22 Board)

Subject	Colour bar chart standard picture frame
Measurement point	Pin ⑦ of FP-81 (CAM OUT)
Measurement equipment	Oscilloscope
Adjustment element	RV804 (CB0°), RV803 (CB90°)
Specified value	The 4.43MHz component of a black part should be minimum.

[Adjustment Method]

1) Minimize the amplitude of the black part with RV804 and RV803.

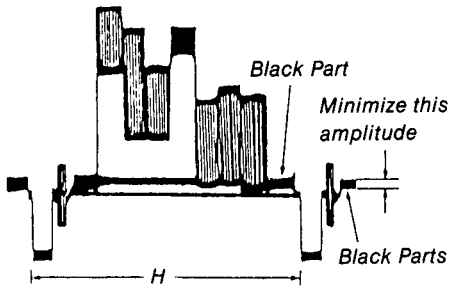


Fig. 7-23.

7-4-16. Matrix Gain Adjustment (MX-2/VC-21 Boards)

Subject	White pattern (Include a black frame. See Fig. 7-24.)
Measurement equipment	Oscilloscope Vertical mode: ADD CH2 polarity: INVERT
G1 gain adjustment	
Measurement point	CH1: TP783 (G0) of the VC-21 board CH2: TP784 (G1) of the VC-21 board
Adjustment element	RV821 (G1) of the MX-2 board
Specified value	There should be no difference in level between white and black parts.
G2 gain adjustment	
Measurement point	CH1: TP783 (G0) of the VC-21 board CH2: TP785 (G2) of the VC-21 board
Adjustment element	RV823 (G2) of the MX-2 board
Specified value	There should be no difference in level between white and black parts.
RB1 gain adjustment	
Measurement point	CH1: TP788 (RB0) of the VC-21 board CH2: TP787 (RB1) of the VC-21 board
Adjustment elements	RV822 (RB1) of the MX-2 board
Specified value	There should be no difference level between white and black parts.
RB2 gain adjustment	
Measurement point	CH1: TP788 (RB0) of the VC-21 board CH2: TP786 (RB2) of the VC-21 board
Adjustment element	RV824 (RB2) of the MX-2 board
Specified value	There should be no difference in level between white and black parts.

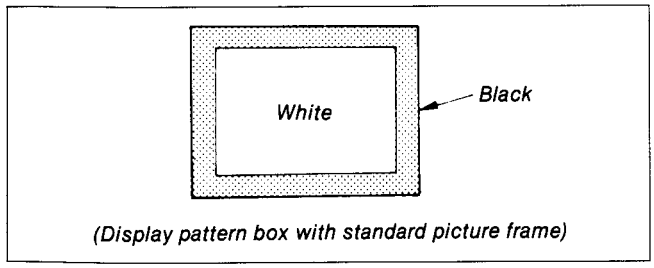


Fig. 7-24.

[Adjustment Method]

1) Eliminate differences in level between white and black parts with each RV.

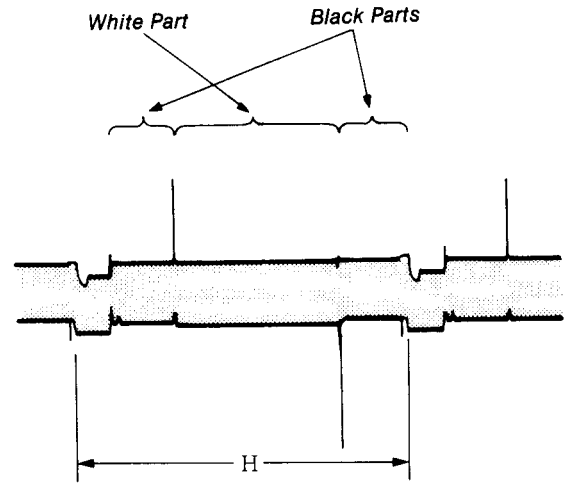


Fig. 7-25.

Note:

After adjustment, confirm the MPX adjustment and carrier balance adjustment. When each specified value is not met, make readjustment.

7-4-17. Set up Adjustment (VC-22, CN-27 Board)

Subject	All black (Cover a black cap on the lens)
Measurement point	Pin ⑦ of FP-81 (CAM OUT)
Measurement equipment	Oscilloscope
Adjustment element	RV807 (PED) on the CN-27 board
Specified value	25 ± 5mV

[Adjustment Method]

1) Adjust a setup level to 25 ± 5mV with RV807 on the CN-27 board.

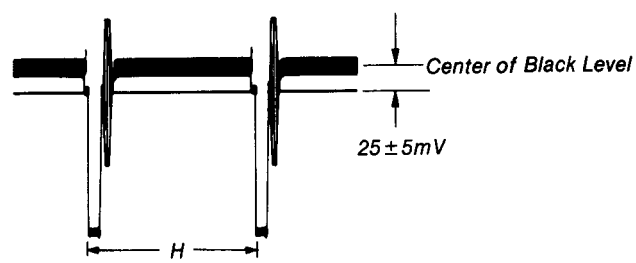


Fig. 7-26.

7-4-18. Y Level Adjustment (VC-22 Board)

Subject	Colour bar chart (Standard picture frame)
Measurement point	Pin ⑦ of FP-81 (CAM OUT)
Measurement equipment	Oscilloscope
Adjustment element	RV809 (YG)
Specified value	350 ± 10mV

Note:
Turn RV810 (WC2) fully in the clockwise direction to maximize the signal level of TP803.

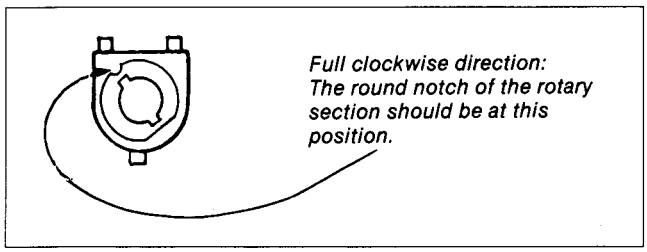


Fig. 7-27.

[Adjustment Method]
1) Adjust the Y level to 350 ± 10mV with RV809.

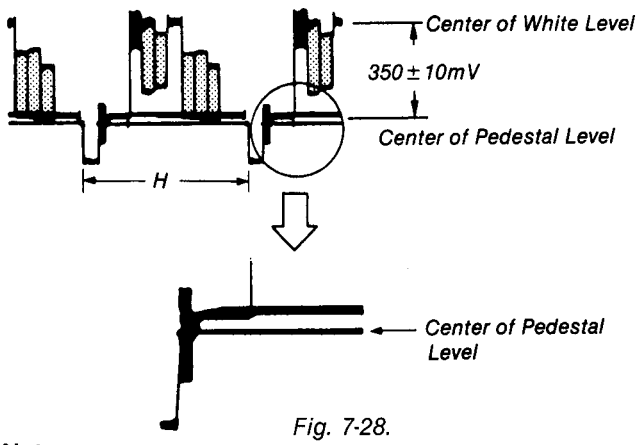


Fig. 7-28.

Note:
After adjustment, check the SETUP adjustment. When the specified value is not met, make readjustment.

7-4-19. Aperture Adjustment (VC-22 and IA-1/VC-22 Boards)

Subject	Colour bar chart standard picture frame
Measurement point	Pin ⑦ of FP-81 (CAM OUT)
Measurement equipment	Oscilloscope
Adjustment element	RV802 (APS) and RV801 (APL) of the VC-22 board
Specified value	RV802: Aperture level at 135 ± 5mVp-p RV801: Aperture level at 80 ± 5mVp-p

Note 1:
Preset the following RVs:
1. RV802 (APS) of the VC-22 board ... Mechanical center
2. RV801 (APL) of the VC-22 board ... Fully in the clockwise direction (↷).
3. RV810 (WHITE CLIP (2)) of the VC-22 board ... Fully in the clockwise direction (↷).
4. RV723 (LLA) of the IA-1 Board ... Fully in the counter clockwise direction (↶).

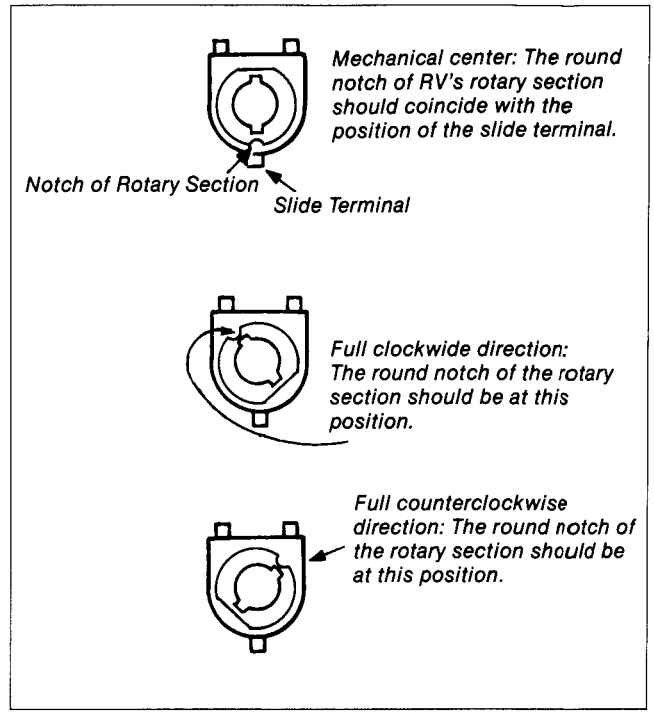


Fig. 7-29.

[Adjustment Method]
1) After focusing, swing the camera section slightly to the right and left and fix it at the point where an aperture level between white and magenta (see Fig. 7-30) is maximized.
2) Adjust the aperture level to 135 ± 5mV with RV802 of the VC-22 board.
3) Adjust the aperture level to 80 ± 5mV with RV801 of the VC-22 board.

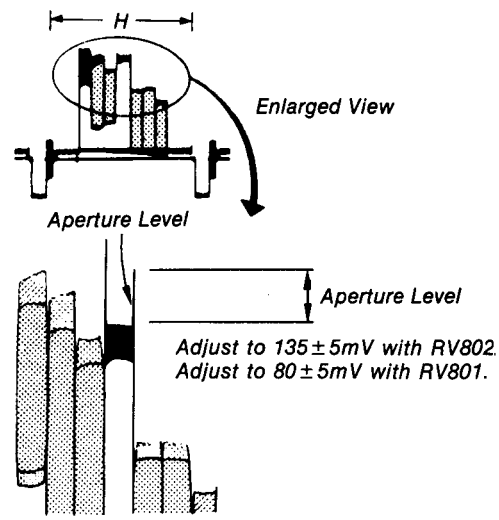


Fig. 7-30.

Note 2:
Re-adjust the RV810 and RV723 being preset in 'Note 1', following each item of adjustment.

7-4-20. White Clip Adjustment (2) (VC-22 Board)

Subject	High brightness pattern
Measurement point	Pin ⑦ of FP-81 (CAM OUT)
Measurement equipment	Oscilloscope
Adjustment element	RV810 (WHITE CLIP (2))
Specified value	420 ± 10mV

[Adjustment Method]

1) Adjust a signal level to 420 ± 10mV with RV810.

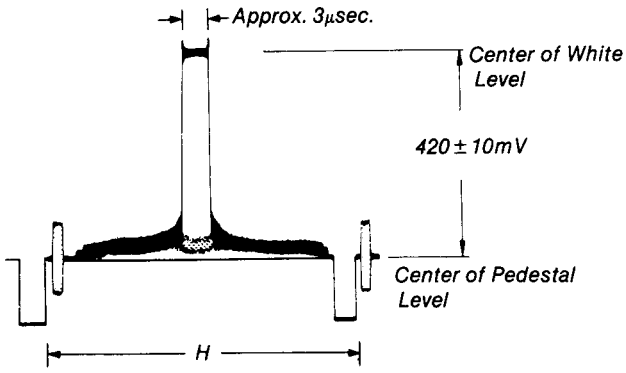


Fig. 7-31.

7-4-21. Max. Gain Adjustment (VC-22 and SH-2/VC-20 Boards)

Subject	Colour bar chart standard picture frame
Filter	ND filter 0.9, 0.4... 2 pcs.
Measurement point	Pin ⑦ of FP-81 (CAM OUT)
Measurement equipment	Oscilloscope
Adjustment element	RV008 (MAX GAIN) of the SH-2 board
Specified value	180 ± 5mV

[Adjustment Method]

1) Cover an ND filter 1.7 (0.9 + 0.4 + 0.4) in front of the lens.
2) Adjust to 180 ± 5mV with RV008 of the SH-2 board.

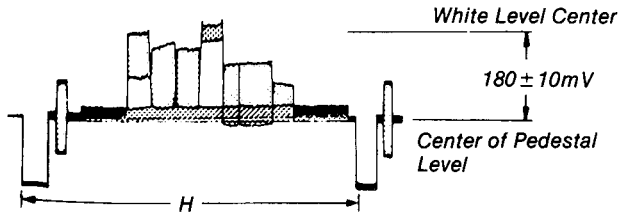


Fig. 7-32.

7-4-22. AGC Set Confirmation/Adjustment (VC-20 and IA-1/VC-22 Boards)

Subject	Colour bar chart standard picture frame
Measurement point	TP752 (G DET) of the VC-20 board
Measurement equipment	Oscilloscope (GND: TP753 of the VC-20 board)
Adjustment element	RV721 (AGC SET) of the IA-1 board
Specified value	250 ± 15mV

[Confirmation Method]

1) Check that a signal level is 250 ± 15mV.
2) When the specified value is not met, adjust to 250 ± 15mV with RV721 of the IA-1 board.

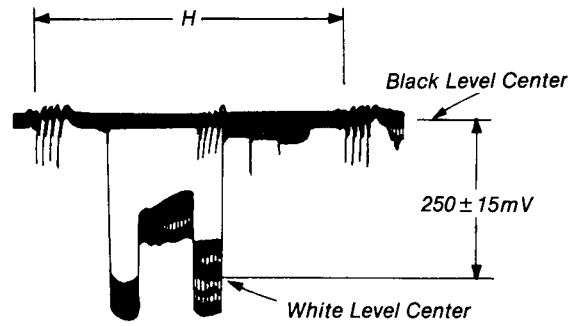


Fig. 7-33.

Note:

After adjustment, check the White Balance adjustment. If each specified value is not met, make readjustment.

7-4-23. Burst Phase and Burst Level Adjustment (VC-22 Board)

Subject	Colour bar chart standard picture frame
Measurement point	Pin ⑦ of FP-81 (CAM OUT)
Measurement equipment	Oscilloscope Trigger slope: +
Adjustment element	RV806 (HUE) and RV805 (BURST GAIN) of the VC-22 board
Specified value	(Burst phase) should become a single line. (Burst level) 150 ± 5mVp-p

Note: When performing colour reproductivity adjustment with a vectorscope, this adjustment becomes unnecessary.

[Adjusting Method]

1) Make burst waveform into a single line with RV806. There are 2 points in the rotating range of RV806 in which the waveform becomes a single line. Select the one in which the colour is reproduced correctly on the monitor screen.
2) Turn RV805 so that the burst amplitude becomes 150 ± 5mVp-p.

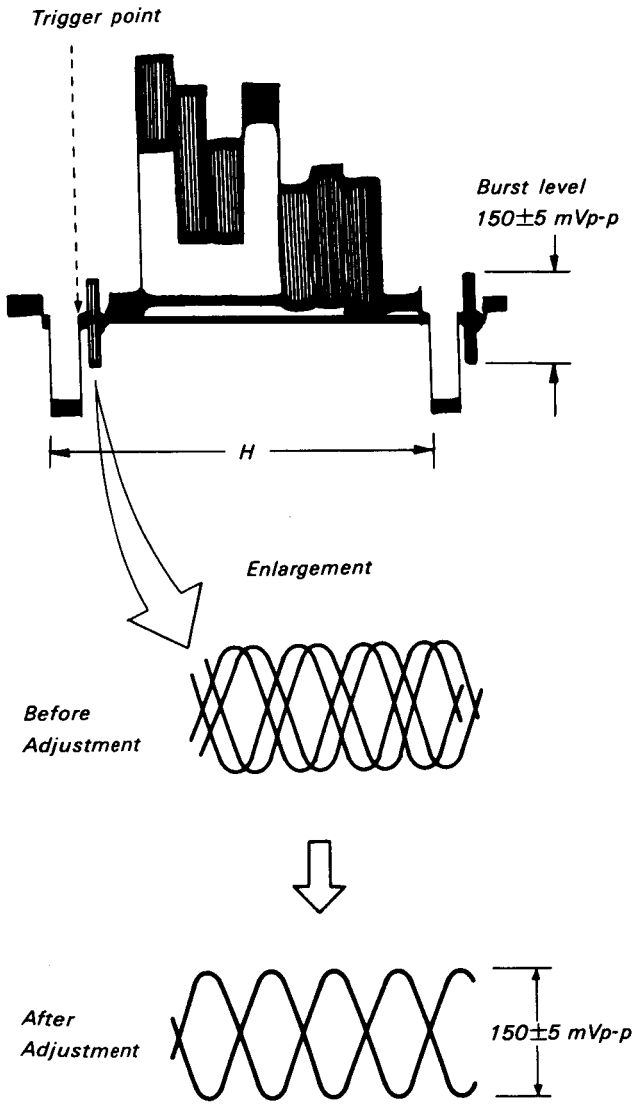


Fig. 7-34.

7-4-24. Colour Reproducibility Adjustment (Use a Vectorscope) (MX-2/VC-21 and VC-22 Boards)

Subject	Colour bar chart standard picture frame
Measurement point	VIDEO OUT terminal
Measurement equipment	Vectorscope *Paste a colour reproduction frame for vectorscope
Adjustment element	RV827 of the MX-2 board (B-Y GAIN) RV781 of the VC-21 board (B-Y MIX) RV782 of the VC-21 board (R-Y MIX) RV808 of the VC-22 board (CHROMA GAIN) RV806 of the VC-22 board (HUE) RV805 of the VC-22 board (BURST GAIN)
Specified value	Each colour bright point should be within a colour reproduction frame. (See Fig. 7-35)

Note:

Before this adjustment confirm that a burst bright point is at a specified position, and that a white bright point coincides with an origin. (When the white bright point and the origin do not coincide with each other, carry out white balance adjustment (RV006 and RV007 of the SH-2 board) and carrier balance adjustment (RV803 and RV804 of the VC-22 board).)

[Adjustment Method]

1) Turn RV806 and RV805 of the VC-22 board and mutch the burst bright spot at the specified location (135°, 75%) on the vector scope.
2) Place a "red" bright point within the colour reproduction frame with RV808 of the VC-22 board and RV782 of the VC-21 board.
3) Place a "yellow" bright point within the colour reproduction frame with RV827 of the MX-2 board and RV781 of the VC-21 board.
4) Place each colour bright point within the colour reproduction frame, repeating the above-mentioned steps 2) and 3).
5) Place the white balance switch (S941 of the SW-55 board) outside (☼).
6) Check that the 'white' brightness point moves into the outside colour reproduction frame. (See Fig. 7-35)

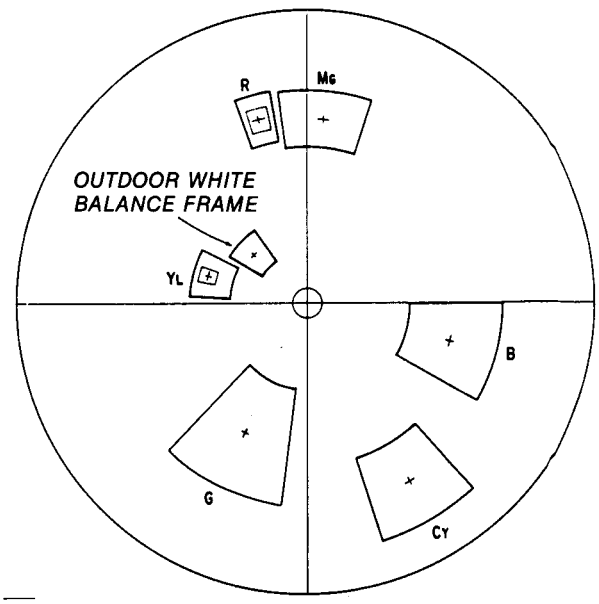


Fig. 7-35.

7-4-25. Colour Reproducibility Adjustment (Use a Oscilloscope)

A. Gain Adjustment (MX-2/VC-21 and VC-22 Boards)

Subject	Colour bar chart standard picture frame
Measurement point	Pin ⑦ of FP-81 (CAM OUT)
Measurement equipment	Oscilloscope
Adjustment element	RV827 (B-Y GAIN) of the MX-2 board RV808 (CHROMA GAIN) of the VC-22 board
Specified value	"Magenta" level: 235±5mVp-p "Yellow" level: 131±5mVp-p

[Adjustment Method]

1) Set RV781 (B-Y MIX) and RV782 (R-Y MIX) of the VC-21 board to the mechanical center.
2) Adjust an amplitude of "magenta" to 235±5mVp-p with RV808 of the VC-22 board. (See Fig. 7-36 ①)
3) Adjust an amplitude of "yellow" to 131±5mVp-p with RV827 of the MX-2 board. (See Fig. 7-36 ②)

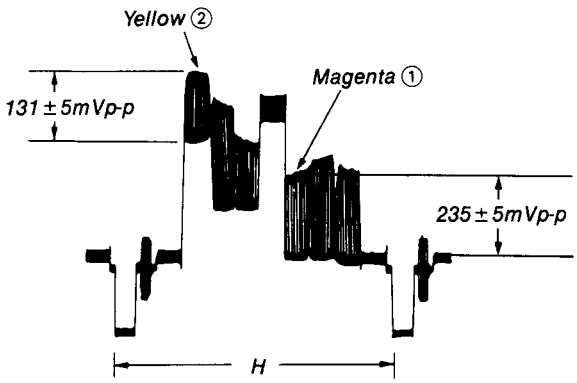
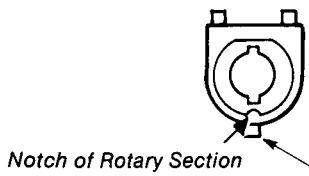


Fig. 7-36.



Mechanical center: The round notch of the RV's rotary section should coincide with the position of the slide terminal.

Fig.7-37.

B. Hue Adjustment (VC-21 and SH-2/VC-20 Boards)

Subject	Colour bar chart standard picture frame
Measurement point	CH1 (X): Pin ④ of CN255 (B-Y) on the DS-24 board CH2 (Y): Pin ⑤ of CN255 (R-Y) on the DS-24 board
Measurement equipment	Oscilloscope (X-Y mode) GND: Pin ⑥ of CN255 on the DS-24 board *Paste a color reproduction frame for oscilloscope.
Adjustment element	RV781 (B-Y MIX) of the VC-21 board RV782 (R-Y) of the VC-21 board
Specified value	Each colour bright point should be within the colour reproduction frame. (See Fig. 7-38)

[Adjustment Method]

1) Coincide a "black" spot on the oscilloscope with the origin of the colour reproduction frame.
2) Check that a "white" bright point and a "black" bright point coincide with each other. (If they are not coincident, make white balance adjustment (RV006 and RV007 of the SH-2 board).)
3) Place a "red" bright point and a "yellow" bright point within the colour reproduction frame with RV781 and RV782 of the VC-21 board. (Check that each of other colour bright points is located within the colour reproduction frame.)
   Set RV806 of the VC-22 board to the mechanical center (see Fig. 1-39).
4) Confirm colours reproduced on the monitor screen.
   Notes: "Magenta" is reproduced reddish.
5) Place the white balance switch (S941 of SW-71 board) outdoor (☼).
6) Check that the white brightness point moves to the place between 'red' and 'yellow' standard frame.

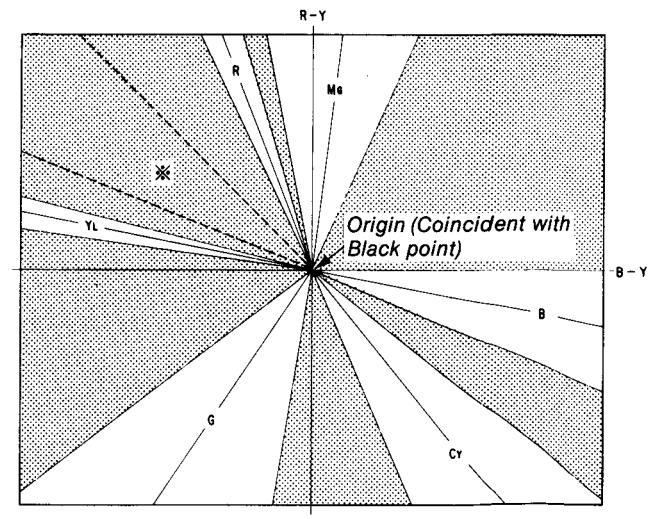


Fig. 7-38.

: Movable range of the white bright point under the condition that the white balance switch is turned into 'Outdoor' position.

7-4-26. LLA Adjustment (IA-1/VC-22 Board)

Subject	Colour bar chart standard picture frame
Filter	ND filter 0.9 . . . 1 pc. ND filter 1.0 . . . 1 pc. ND filter 0.4 . . . 1 pc.
Measurement point	Pin ⑤ of IA-1 board ($\overline{LLA}$)
Measurement equipment	Oscilloscope (DC range)
Adjustment element	RV723 (LLA)
Specified value	"LOW LIGHT" should be displayed with the ND filter 1.4, and "LOW LIGHT" not displayed with the ND filter 1.3.

[Adjustment Method]

1) Attach the ND filter 1.4 (0.9+0.4+0.1) to the lens.
2) Turn RV723 and set Pin ⑤ level of the IA-1 board to "H" (5V).
3) Turn RV723 slowly and stop when it become "L" (0V).
4) Remove only ND filter of 0.1.
5) Confirm that the Pin ⑤ level of the IA-1 board becomes "H". (Response will take about 10 seconds.)
6) When it is still in "L" level, repeat steps 1) to 5).

7-4-27. Auto-following white balance adjustment (AW-9 Board)

Subject	White pattern *Note 1)
Measurement point	CH1: Pin ⑤ of CN901 (R CONT) CH1: Pin ④ of CN901 (B CONT)
Measurement equipment	Oscilloscope (DC range)
Adjustment element	RV901

Note 1:

Make white-balance sensor (AW-9 board SB901) incident by light through white-dispersing plate which can be applied with the conventional white-lens cap of camera.

Note 2:

No exact adjustment is made by the incident light except pattern-box to the white-balance box.

It is desirable to make adjustment in a dark room, but if it is impossible, make adjustment after taking the following procedures.

1. Place the camera on black paper.
   (This procedure is necessary for the adjustment in a dark room.)
2. Approach the distance between camera and pattern box to less than 0.5m.
3. Cover a black paper on white-balance sensor for preventing the incident light except pattern box to the white-balance sensor.

[Connection]

Make the following connection for setting test-mode.

1. Connect W901 ⑥ pin with GND by jamper wire.
2. Confirm the position of white-balance SW (SW-71 board S941) at indoor " ".

[Adjustment Method]

1) Turn RV901, and confirm that CH1 takes 2 values of "L" (2.5Vdc) and "H" (2.7Vdc), also that CH2 takes 2 values of "L" (2.0Vdc) and "H" (2.6Vdc).
2) Turn RV901 slowly, and stop it when CH1 shows the position of "H" (2.7Vdc) and CH2 shows the position of "L" (2.0Vdc).

7-4-28. Operation check for auto-following white balance

Subject	White pattern * Note
Filter	Filter C22 for correcting the colour temperature
Measurement point	Check on monitor-TV
Measurement equipment	

Note:
See the previous item, Note 2.

[Checking Method]
1) Set the white-balance SW to 「AUTO」-position. (SW-71 board 941)
2) By covering the camera with a black paper, prevent the incident light except pattern-box to white-balance sensor (AW-9 board SB901).
3) Confirm no-colour on the monitor-screen.
4) Cover the filter C22 for correcting the temperature compensation on white-balance sensor. (Prevent the other incident light than the filter by using a black paper.)
5) Confirm the orange-like colour of monitor-screen display. (The response needs 1 or 2 seconds.)
6) Return the position of SW to indoor "☼".

7-4-29. Check for backlight compensation (VC-22 board)

Subject	Colour bar chart standard image frame
Measurement point	Pin ⑦ of FP-81 (CAM OUT)
Measurement equipment	Oscilloscope

[Checking Method]
1) Push the button for backlight compensation (SW-71 board S942).
2) Confirm that higher level of Y-signal induces higher chroma-level of "red" and "mazenta" and "blue".
3) Confirm no-colour on white-part in monitor-TV screen.

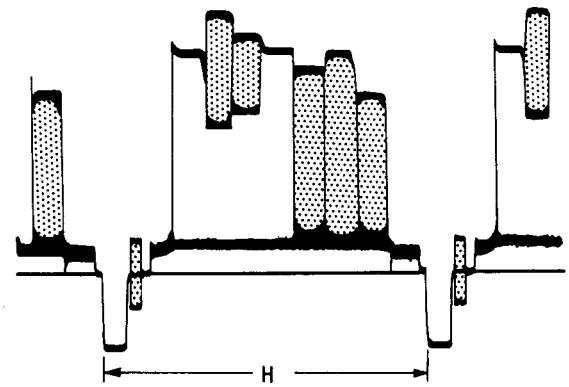


Fig. 7-39.

7-5. AUTO FOCUS SYSTEM ADJUSTMENT

Place sign chart in a position 2m from the lens standard picture as shown in Fig. 7-40. and perform adjustment. As to lighting, make the brightness (200 lux) so that "LOW LIGHT" is not displayed within the EVF.

Unless otherwise specified, perform adjustment by setting the focus switch (S945 on SW-71 board) in the position of "AUTO".

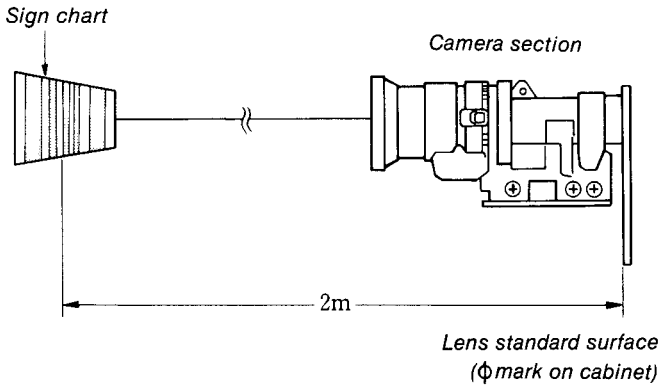


Fig. 7-40.

7-5-1. AD Converter Standard Voltage Adjustment (AF-32 Board)

Subject	Arbitrary
Measurement Point	Both ends of VR1 (Refer to Fig. 7-42)
Measurement equipment	Digital voltmeter
Adjustment element	VR1
Specified value	2.04±0.05Vdc

[Adjustment Method]

1) Set focus switch (S945 on SW-71 board) to "auto" position.
2) Adjust to 2.04±0.05Vdc with VR1.

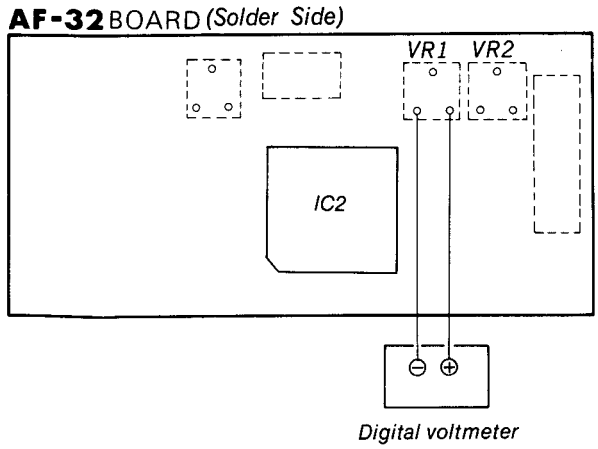


Fig. 7-41.

7-5-2. $\overline{Xp}$ Adjustment (AF-32 Board)

Subject	Sign chart (Position of 2.0m forward of lens standard surface (ϕmark))
Measurement point	CH1: Pin ③ of CN2 CH2: Pin ④ of CN2
Measurement equipment	Oscilloscope (DC range)
Adjustment element	VR2
Specified value	Pulse should be output alternately from CH1 and CH2

[Connection]

1) Connect ALIGNMENT land (Pin ㊶ of IC2) and GND for an instant and set to adjustment mode. (Refer to Fig. 7-42.)

Note: When the focus switch (S945 on SW-71 board) is once set to the "manual" position and then set to the "auto" position, it returns to its original position.

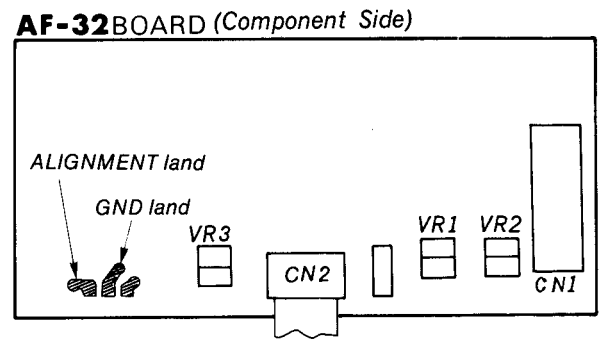


Fig. 7-42.

[Setting of switches]

1) Focus switch (S945 on SW-71 board)...Auto
2) Zoom lever...In the vicinity of 40mm

[Adjustment Method]

1) Turn focus ring and set focus indicator to the center of "2".
2) Set with VR2 so that the pulse is output alternately from CH1 and CH2.

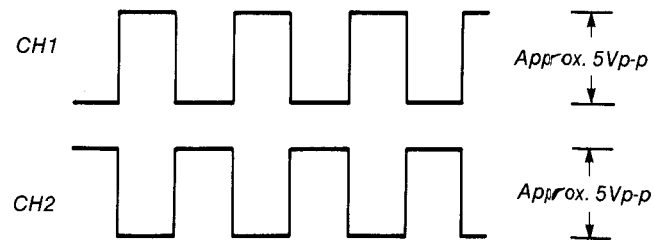


Fig. 7-43.

7-5-3. Z axis Adjustment

Subject	Sign chart (Position of 2.0m forward of lens standard surface (ϕ mark))
Specified value	TELE side: ±1.3mm WIDE side: ±10mm

[Adjustment Method]

1) Set focus switch (S945 on SW-71 board) to "auto" position.
2) By refering 7-5-2, set to adjustment mode.
3) Set zoom lever to TELE end (72mm).
4) Loosen Z frame securing screw ❶. (Fig. 7-45)
5) Move the Z frame forward and backward (A ↔ B direction) with the Z frame securing screw so that the focus ring stops at the center of indicator "2". (Figs. 7-44 and 7-45)
6) Tighten Z frame securing screw ❶. (Fig. 7-45)
7) Set zoom Lever to WIDE end (12mm).
8) Turn focus ring to the position of 1.2m.
9) Confirm that the stopping position of the indicator of focus ring is within range of ±10mm from the center of "2". (Fig. 7-44)
10) Turn focus ring to the position of ∞.
11) Confirm that the stopping position of the focus ring is within the same range.
12) If specified value is not satisfied, repeat steps 2) to 11).

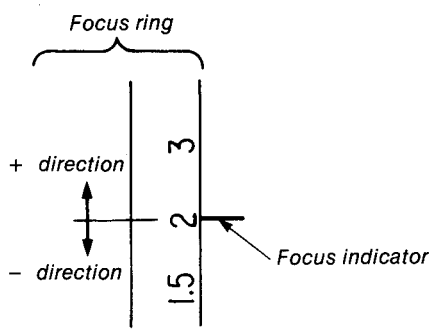


Fig. 7-44.

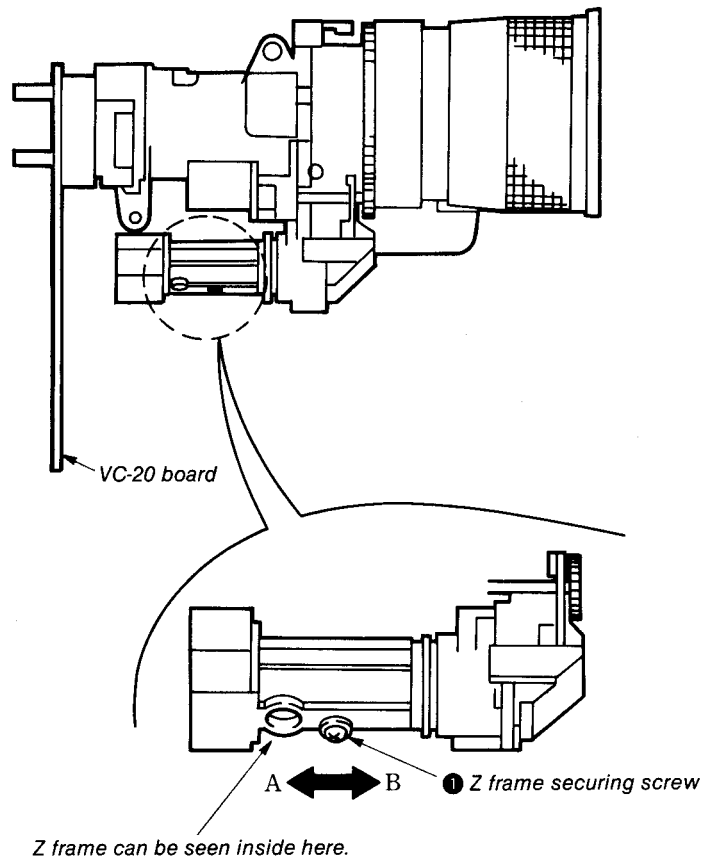


Fig. 7-45.

7-5-4. Motor Voltage Adjustment (AF-32 Board)

Subject	Sign chart (Position of 0.9m forward of lens standard surface (ϕmark))
Measurement equipment	Stop watch
Adjustment element	VR3
Specified value	2.5±0.5 seconds

Setting of switches

1) Focus switch (S945 on SW-71 board)... MANUAL
2) Zoom lever...In the vicinity of 20mm

[Adjustment Method]

1) Set focus ring to infinity bar end (∞ side).
2) Prss the "pressing auto" button (S945 on SW-71 board).
3) Measure the time from the moment "pressing auto" button is pressed and focus ring rotates, to the moment it reaches short-distance end.
4) If the specifed value is not satisfied, turn VR3 and repeat steps 1) to 3).

7-5-5. Auto Focus Confirmation

Subject	Sign chart (Position of 2.0m forward of lens standard surface (ϕmark))
Specified value	TELE side: within ±1.5mm against just focus point during manual WIDE side: within ±15mm against just focus point of TELE

[Confirmation Method]

1) Set the focus switch (S945 on SW-71 board) to the position of "manual".
2) Set the zoom lever to TELE end (72mm).
3) Turn focus ring so that it becomes into focus. Confirm at this time that the focus indicator is within the specified position as shown in Fig. 7-46. In addition, memorize the position of the focus indicator. (If the specifications are not satisfied, perform flange back adjustment.)

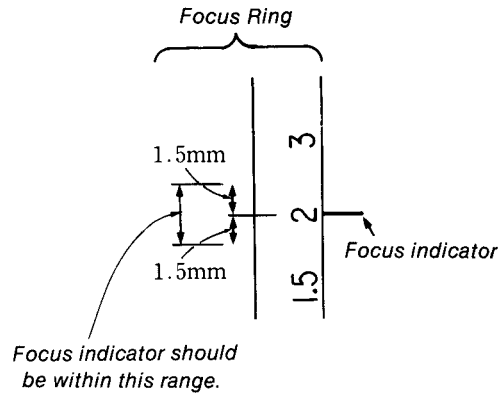


Fig. 7-46.

4) Set the focus switch to the "auto" position.
5) By refering 7-5-2, set to adjustment mode.
6) Turn the focus ring to the position of ∞.
7) Confirm that the stopping position of the focus ring is within ±1.5mm against the in-focus position (position of focus indicator memorized in step 3).
8) Turn focus ring to the position of 1.2m.
9) Confirm that the stopping position of the focus ring is within ±1.5mm against the position of in-focus during manual.
10) Secure zoom lever to WIDE end (12mm).
11) Repeat steps 6) to 8). However, the in-focus specifications of WIDE end should be within ±15mm against in-focus of TELE side.

7-6. DIGITAL DISPLAY/DIGITAL TITLER BLOCK ADJUSTMENT

7-6-1. Clock Precision Adjustment (DS-24 Board)

Mode	CAMERA POWER OFF, INstall the lithium battery
Subject	Arbitary
Measurement point	Pin ㊶ of IC108
Measurement instrument	Frequency counter
Adjustment element	CT101
Specified value	8192 ± 0.05Hz

[Connection]

Connect Pin ㊱ of IC108 ($\overline{TEST}$) and GND with jumper wire and set to test mode.

[Adjustment Method]

1) Adjust to 8192 ± 0.05Hz with CT101.

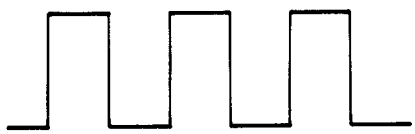


Fig. 7-47.

7-6-2. AD Converter Level Adjustment (DS-24 Board)

Mode	Camera standby
Subject	All black (Cover lens with black cap)
Measurement point	⊕ probe: Pin ② of IC104 ⊖ probe: Pin ③ of IC104
Measurement equipment	Digital voltmeter
Adjustment element	RV102
Specified value	+0.35 ± 0.01Vdc

[Adjustment Method]

Adjust to 0.35 ± 0.01Vdc with RV102.

7-6-3. Chroma Blanking Level Adjustment (DS-24 Board)

Mode	Camera standby
Subject	All black (Cover lens with black cap)
Measuring point	Image output terminal
Adjusting element	Oscilloscope
Adjusting element	RV101
Specified value	Colour should not appear at superimposed section.

[Adjustment Method]

1) After removing battery (or AC pack) from the grip section, insert again.
2) Set to camera standby mode.
3) Press "MEMORY" button (S948 on SK-21 board) and memorize "all black".
4) Minimize 3.58MHz component with RV101.

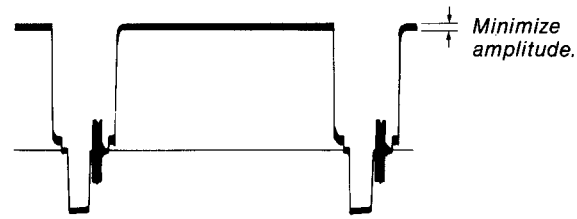


Fig. 7-48.

7-6-4. Digital-Titler Clock Adjustment (DS-24 Board)

Mode	Camera standby
Subject	All black (Cover lens with black cap)
Measurement point	Image output terminal
Measurement equipment	Oscilloscope
Adjusting element	CT103
Specified value	1.5 ± 0.1μsec

[Adjustment Method]

1) Press "MEMORY" button (S948 on SK-21 board) and memorize "all black".
2) Press "COLOR" button (S949 on SK-21 board) and make so that "white" in superimposed.
3) Adjust to 1.5 ± 0.1μsec with CT103.

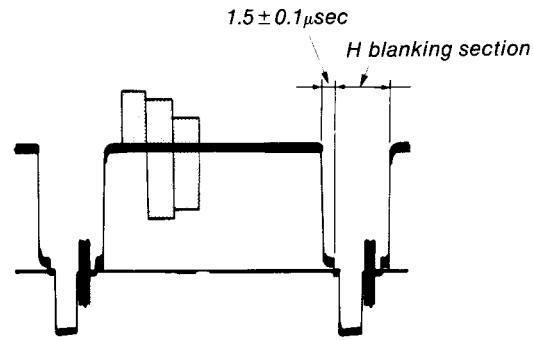
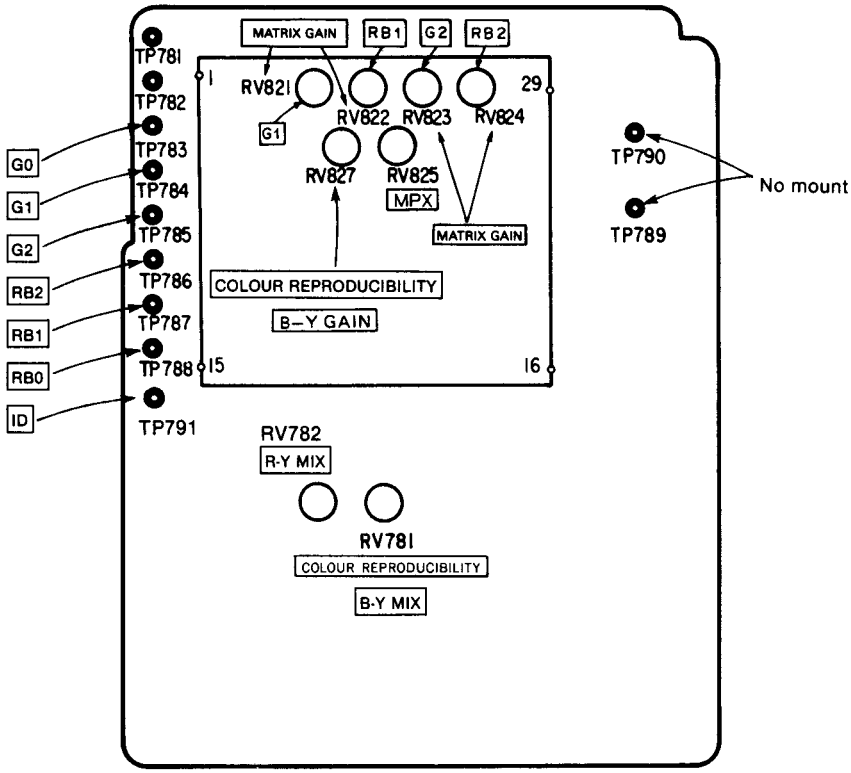
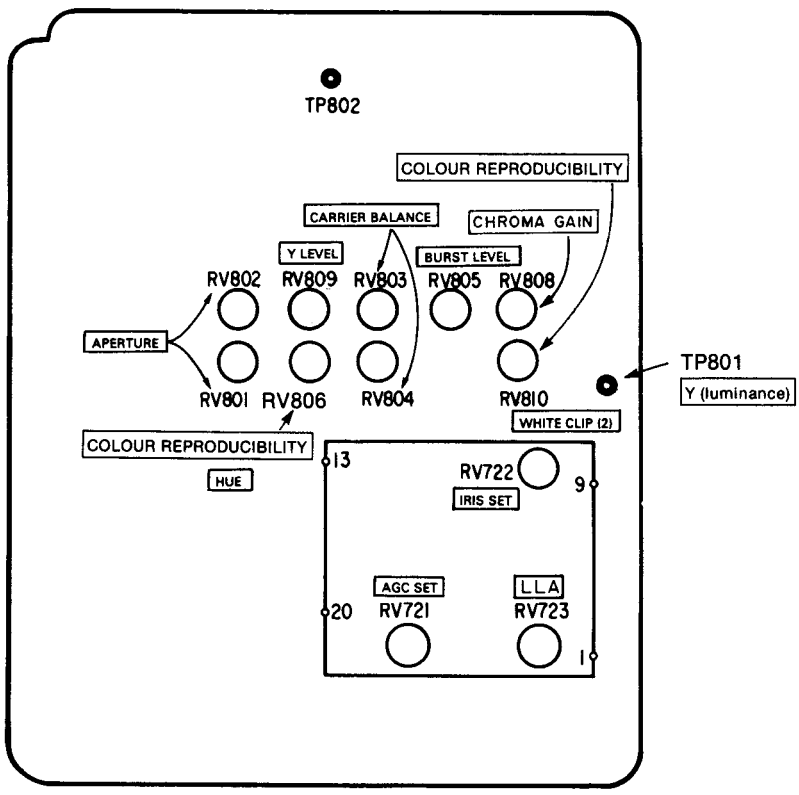


Fig. 7-49.

VC-21 BOARD (COMPONENT SIDE)



VC-22 BOARD (COMPONENT SIDE)



SECTION 8
MECHANICAL ADJUSTMENT (VIDEO SECTION)

8-1. PREPARATION FOR CHECK, ADJUSTMENT AND REPLACEMENT OF THE MECHANICAL SECTIONS

With regard to removal of the cabinet, board, etc. see **"SECTION 2 DISASSEMBLY"**
Adjustment of mechanism section is performed in the EJECT state. (In order to make into EJECT state, refer to "8-1-5, Handling of Mode Selector.")

8-1-1. Cassette Arm Assembly (See Fig. 8-1)

1. Removal

1) Remove screws ❶, ❷, ❸ and ❹.
2) Remove cassette arm assembly ❺.

2. Installation

1) Install cassette arm assembly ❺ to the main body so that the two positions of pins ❻ enter the predetermined positions.
2) Put the dowel ❽ of the frame assembly into the reference hole ❼ of the cassette arm, and tighten the screws ❶ and ❷ in that order.
3) Install screw ❸ loosely and tighten in the order of screw ❹ and screw ❸.

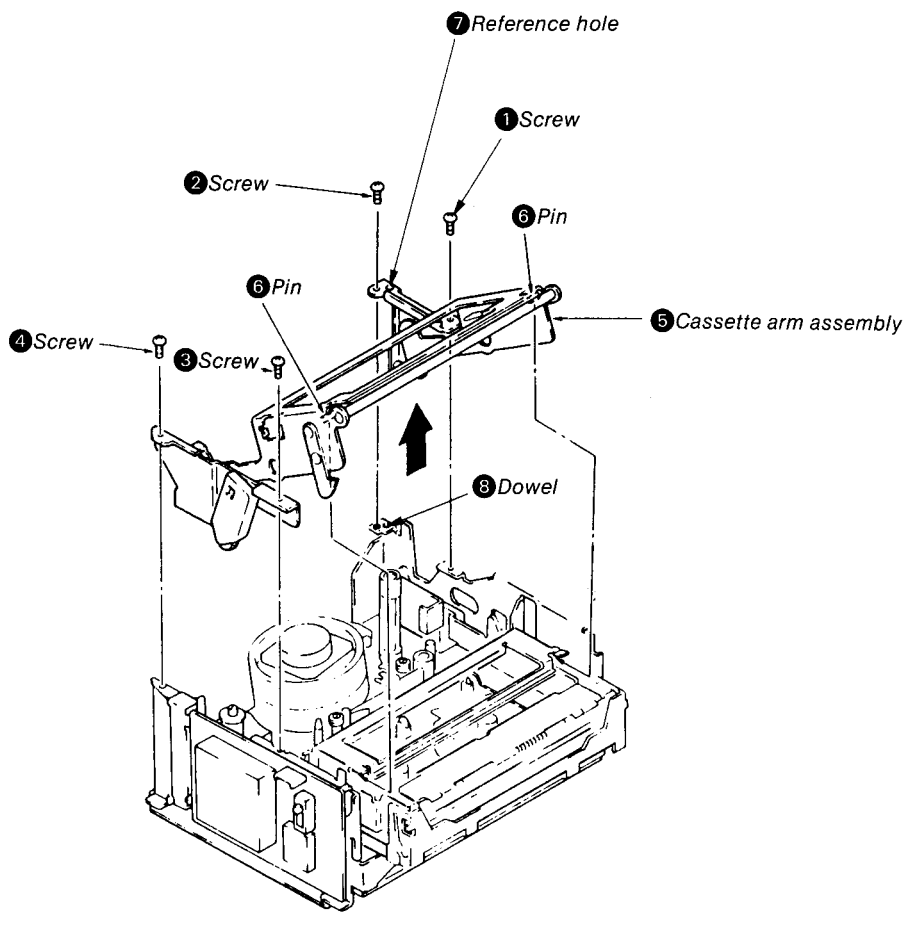


Fig. 8-1.

8-1-2. LS cassette Compartment Assembly (See Fig. 8-2)

1. Removal

1) Remove screws ❶, ❷, ❸ and ❹.
2) Push two positions of the slot ❽ of LS frame ❻ in the direction of arrow Ⓐ, and remove two positions of pin ❺ and ❾. (Since the pin (C) ❺ is longer, remove the pin (B) ❾ first.)
3) Remove LS cassette compartment assembly ❼.

2. Installation

1) Install LS cassette compartment assembly ❼ to the main body.
2) Push the two positions of slot ❽ of LS frame in the direction of arrow Ⓐ, and insert pins ❺ and ❾ at two positions. (Since the pin (C) ❺ is longer, insert this pin first.)
3) Install screws ❸ and ❹ loosely and tighten in the order of screws ❶, ❷, ❸ and ❹.

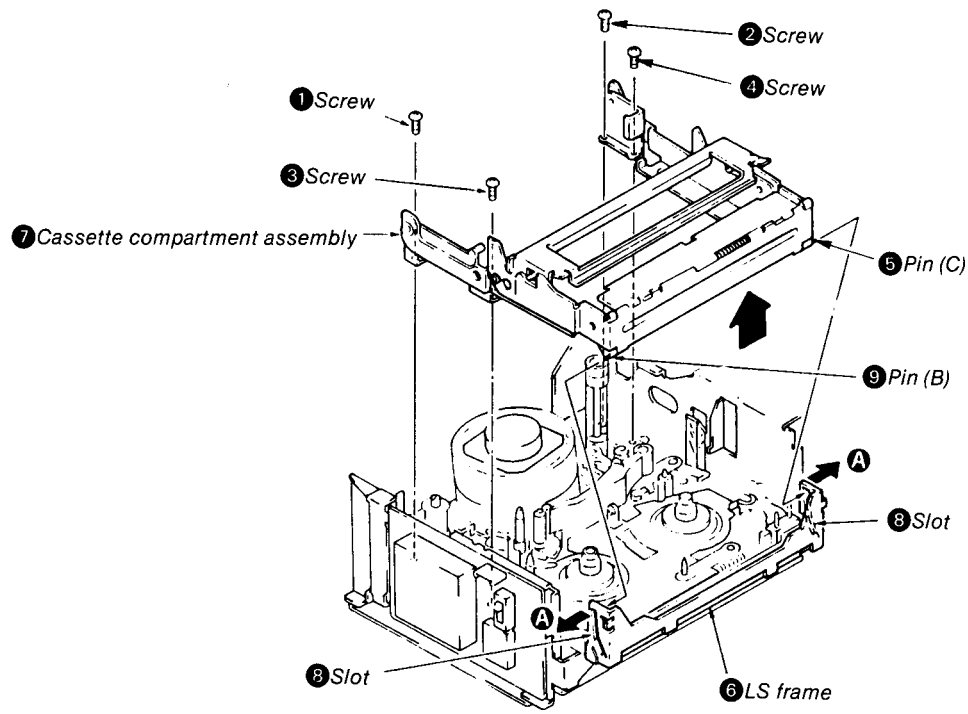


Fig. 8-2.

8-1-3. Extracting Method with the Cassette Loading End State

1) By referring, Section 2 Disassembly 2-6, set SS-70 board up to be able to open.
2) By referring 8-1-5, connect the mode selector.
   Note:
   The mode indicated by ▭ is set by pushing the buttons of the mode selector.
3) Set up [GUIDE LOAD] mode, and move each tape guide from the position shown in Fig. 8-4 to the position shown in Fig. 8-5.
4) Open SS-70 board ❶ and wind up tape into cassette by rotating the rotor ❷ in the direction of arrow. (See Fig. 8-3)
   Note:
   Though in [GUIDE LOAD] mode, cannot wind up tape when each guide is not positioned as shown in Fig. 8-5, close to the casseette.
5) Be sure to wind up tape completely, and set up [EJECT] mode, then take out the cassette.

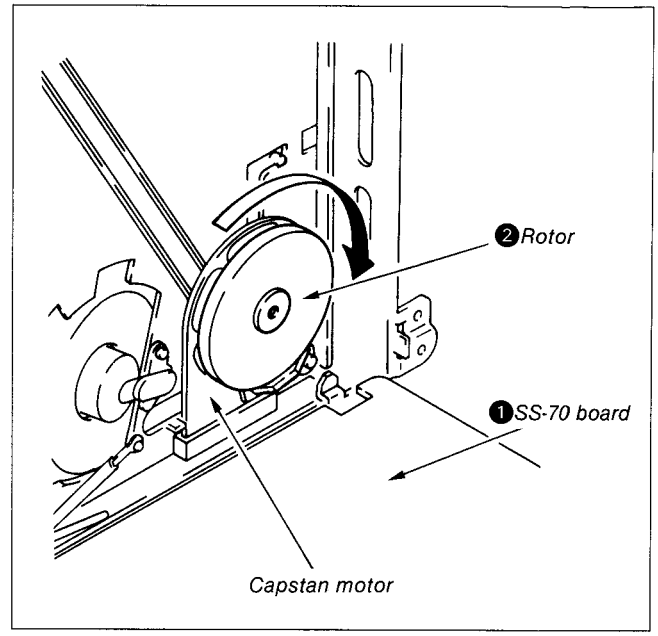


Fig. 8-3

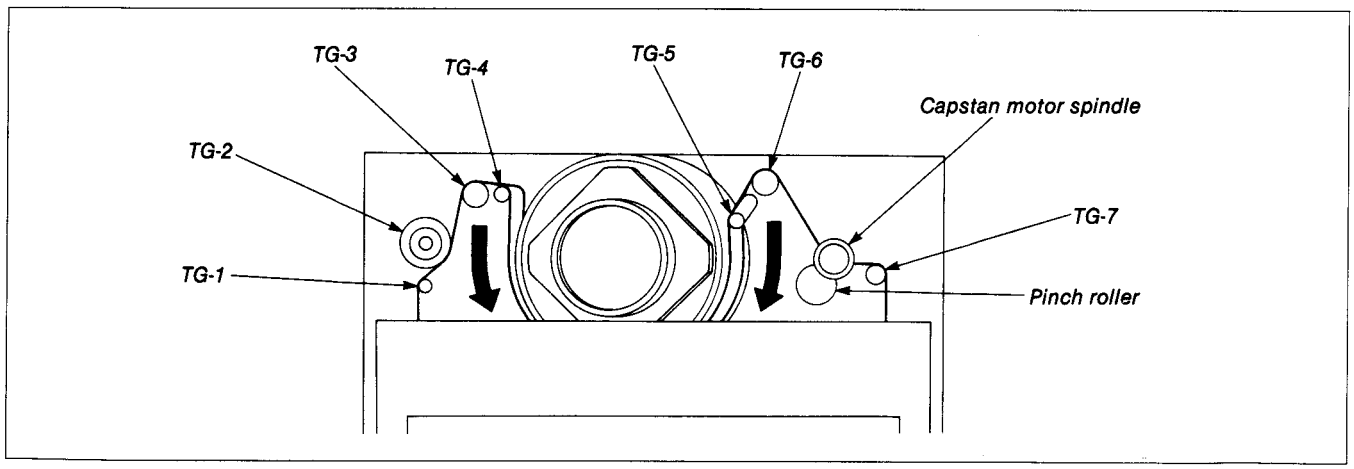


Fig. 8-4.

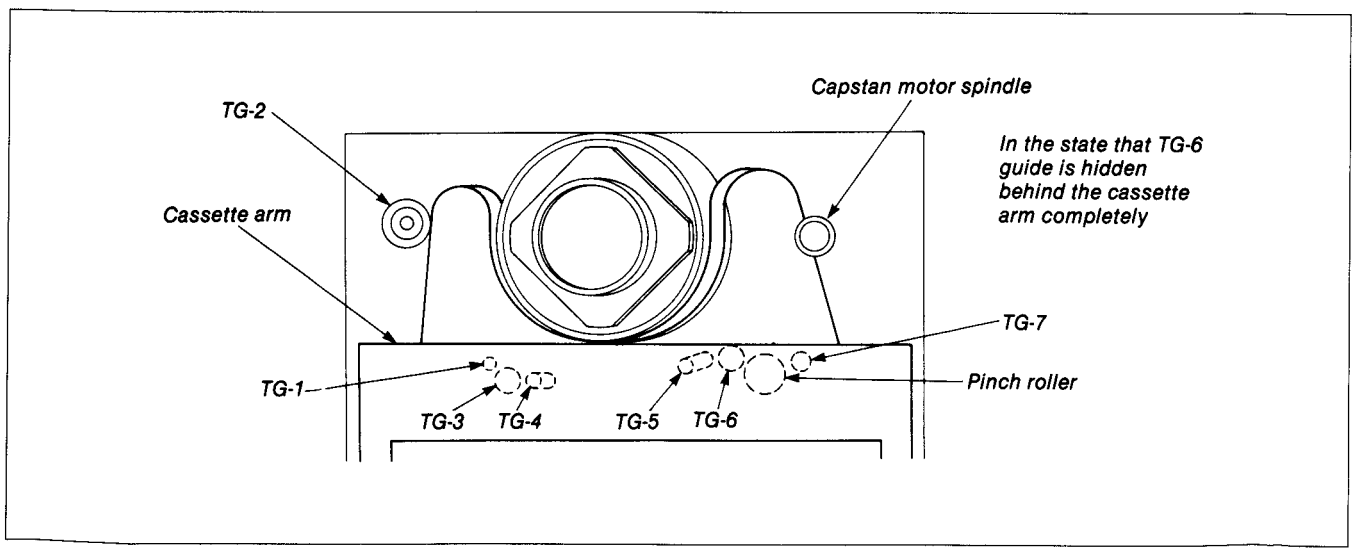


Fig. 8-5.

8-1-4. Cassette and Cassette Arm Assembly, and a Method to Operate the Set in the State of the LS Cassette Compartment Assembly being Removed

Note: The set may not operate if there is an intense light source near the set.

1. Method to load a cassette. (See Fig. 2-6.)

1) Set the battery pack on the battery holder assembly ❶.
2) Set the battery holder assembly ❶ into the cabinet (L) ❷.
3) Set the connector ❸ which comes out from the cabinet (L) ❷ to pin ❹ of CN205 on the MV-12 board.
4) Cover the LED assembly.
5) Maintain the state in which the pin of push SW ❼ is being depressed (ON state) and secure it with adhesive tape ❽.
6) When pushing the return prevention arm ❾ is pushed into the direction of arrow Ⓐ, the set becomes into the loading state.

2. Method to set into the REC state

1) When step 1 has been completed, set power supply switch ❿ on the SK-19 board to the camera position.

3. Method to EJECT

1) Turn ON the EJECT SW ⓫.

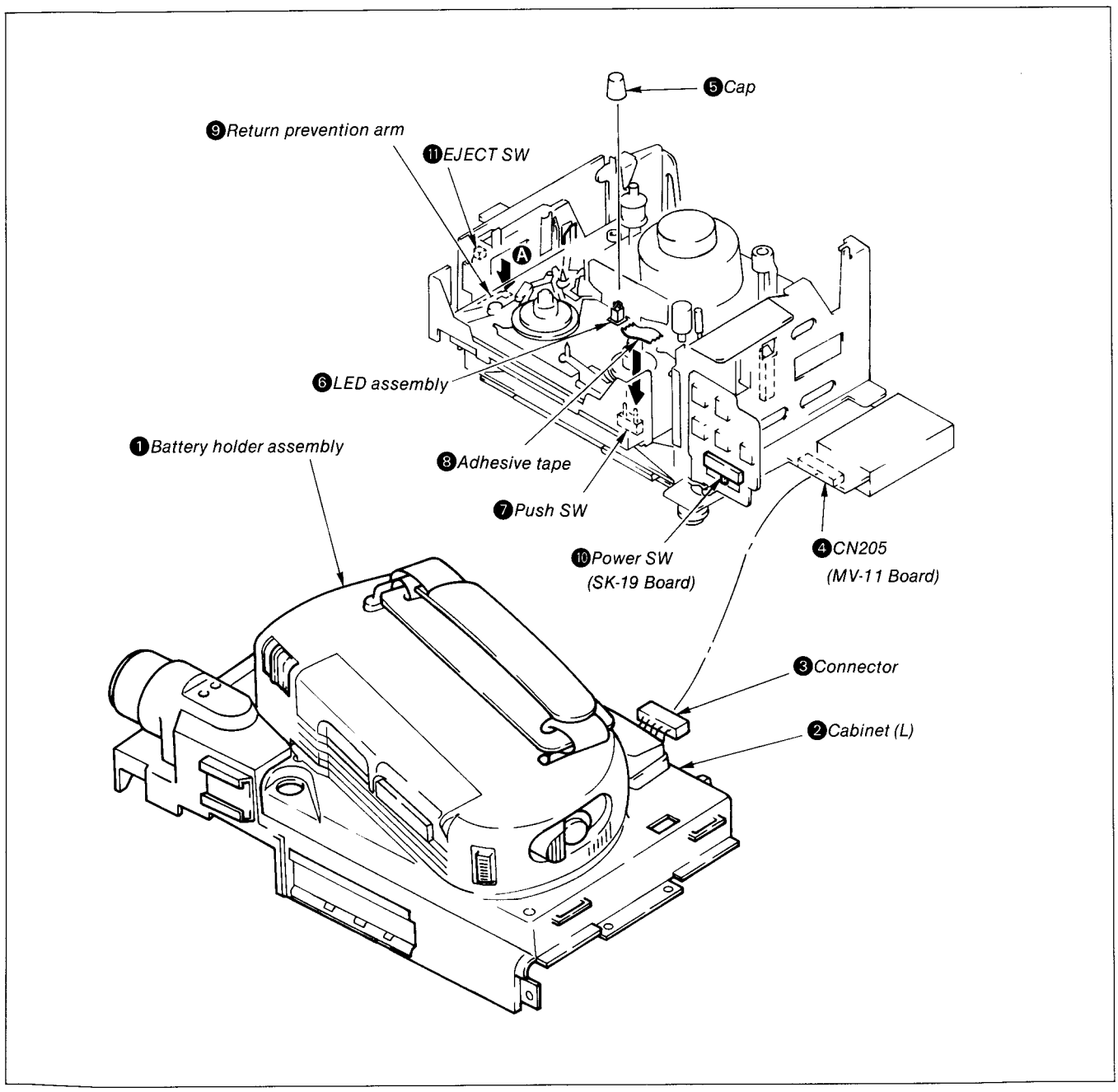


Fig. 8-6.

8-1-5. Handling of Mode Selector

•Install mode selector II panel (See Fig. 8-7)

1. Name of each section (See Fig. 8-8)

2. Connection (See Fig. 8-9.)

1) Remove connector of FP-47 flexible board with a flat-blade screwdriver, etc.
2) Insert mode selector II conversion II convertion connector.
3) Insert M-SW connector into mode selector II conversion connector.

3. Handling

1) Use only M mode selection button.
2) When selecting, if not in individual modes, "BLANK" is lit.
3) When right side of M mode selection button is pressed continuously, the lamps are lit in th order of EJECT → USE ← GUIDE LOAD → REC → READY.
4) When rendering into READY → EJECT, press the selection button on th left side to obtain the objective mode.

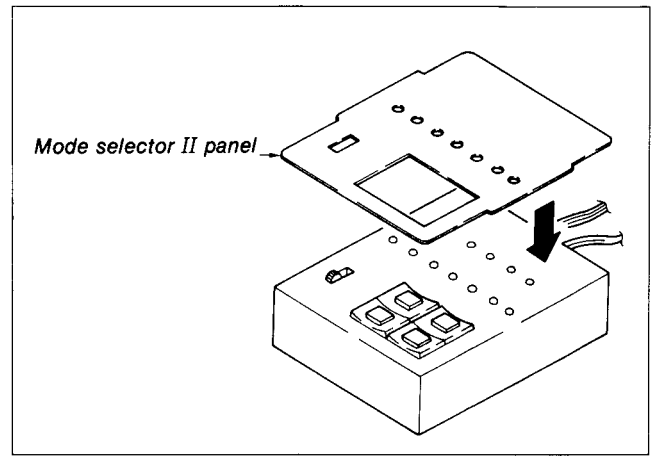


Fig. 8-7.

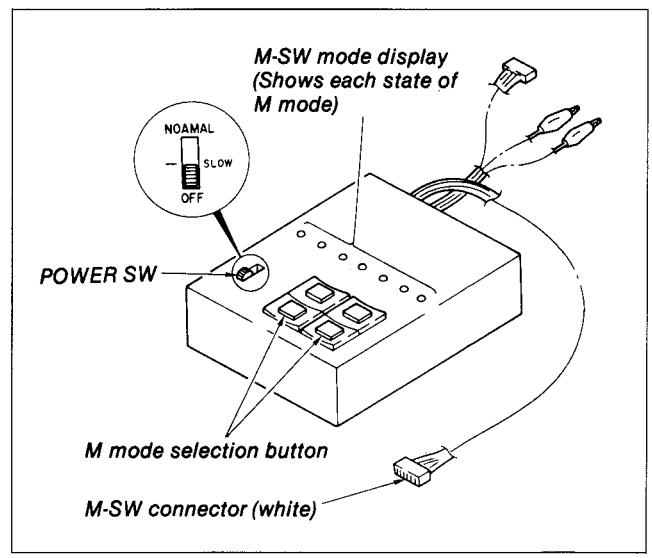


Fig. 8-8.

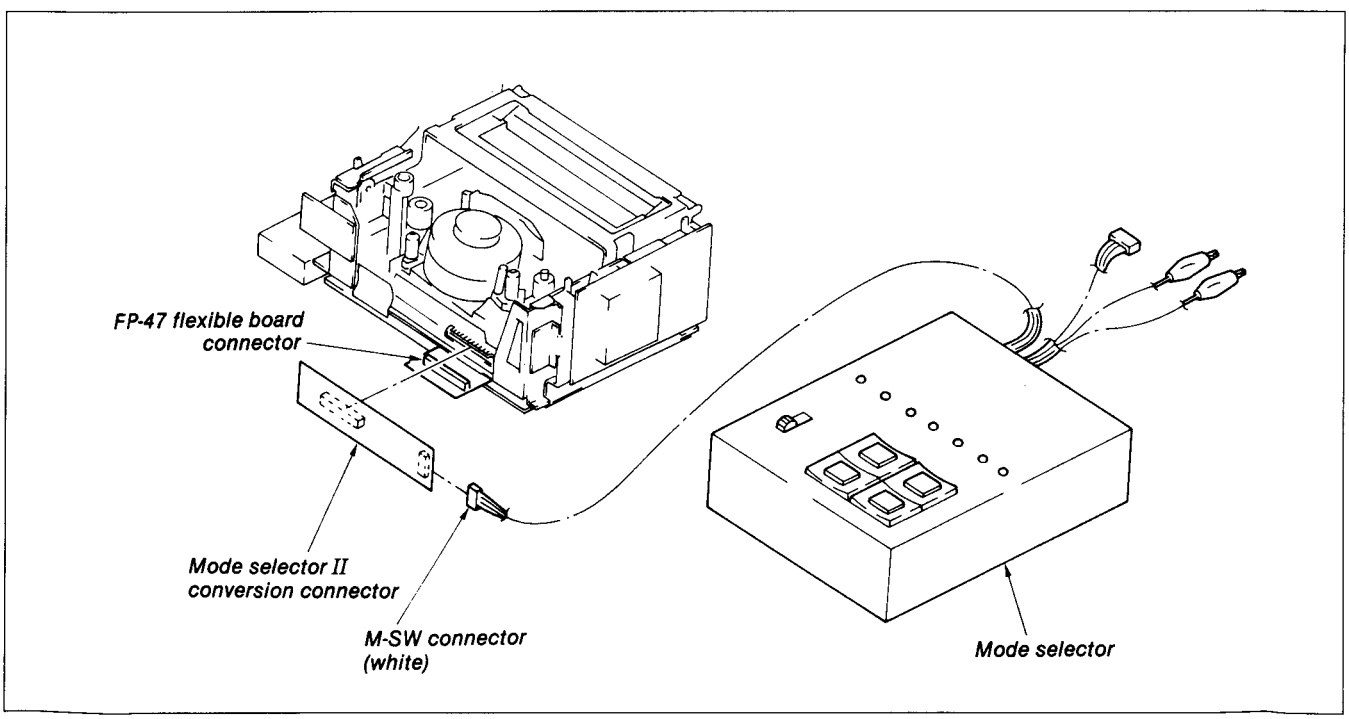
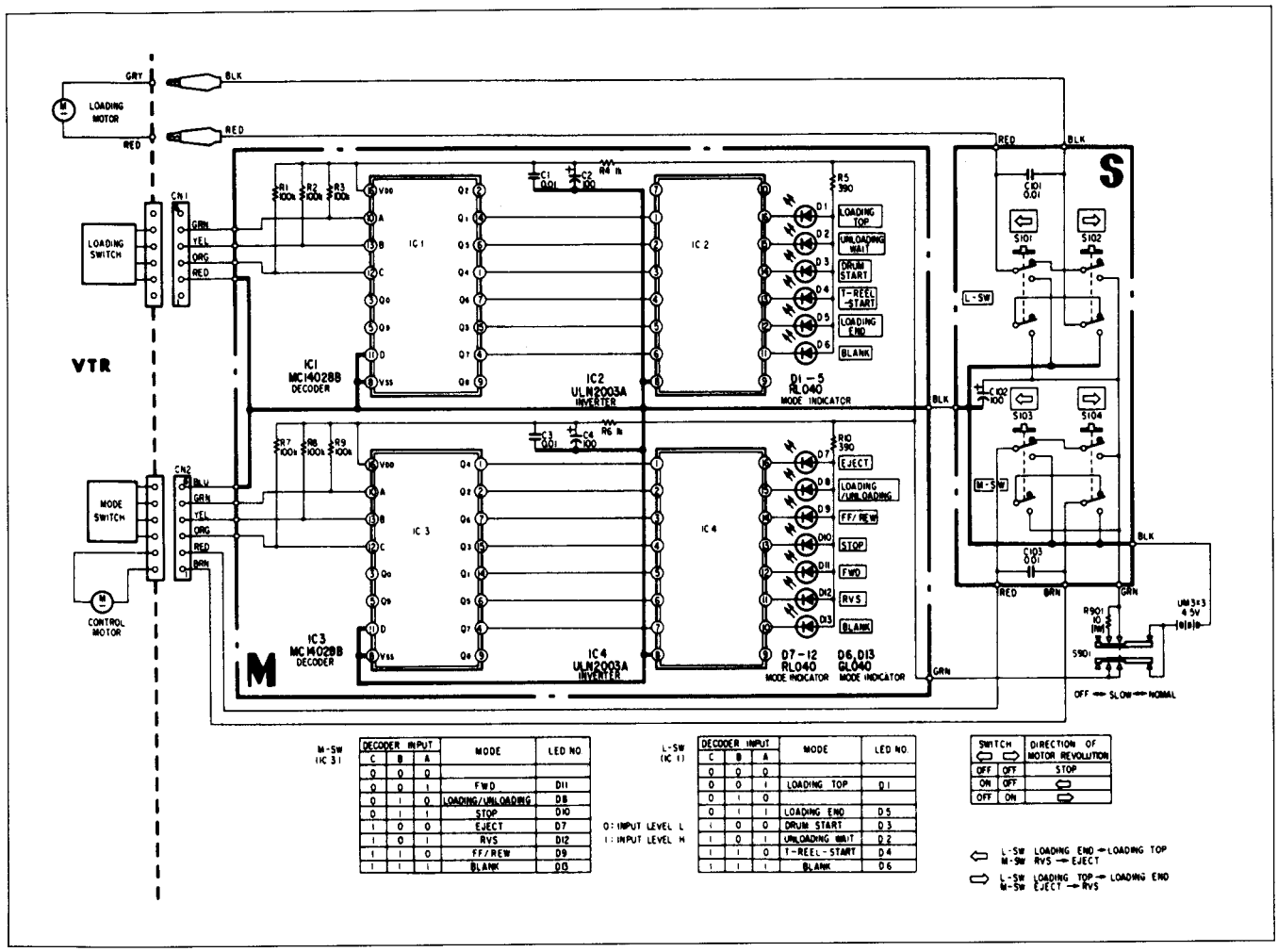


Fig. 8-9.

4. Mode selector schematic diagram



M-SW (IC 3) DECODER INPUT C	B	A	MODE	LED NO.
0	0	0		
0	0	1	FWD	D11
0	1	0	LOADING/UNLOADING	D8
0	1	1	STOP	D10
1	0	0	EJECT	D7
1	0	1	RVS	D12
1	1	0	FF/REW	D9
1	1	1	BLANK	D0

0: INPUT LEVEL L
1: INPUT LEVEL H

L-SW (IC 1) DECODER INPUT C	B	A	MODE	LED NO.
0	0	0		
0	0	1	LOADING TOP	D1
0	1	0		
0	1	1	LOADING END	D5
1	0	0	DRUM START	D3
1	0	1	UNLOADING WAIT	D2
1	1	0	T-REEL-START	D4
1	1	1	BLANK	D6

SWITCH ⇦	⇨	DIRECTION OF MOTOR REVOLUTION
OFF	OFF	STOP
ON	OFF	⇦
OFF	ON	⇨

⇦ L-SW LOADING END → LOADING TOP
M-SW RVS → EJECT
⇨ L-SW LOADING TOP → LOADING END
M-SW EJECT → RVS

5. Mode selector parts list

Ref. No	Part No.	Description		
		CAPACITOR		
C1	1-108-579-00	MILER	0.01μF	50V
C2	1-123-333-00	ELECT	100μF	24V
C3	1-108-579-00	MILER	0.01μF	50V
C4	1-123-333-00	ELECT	100μF	24V
C101	1-108-579-00	MILER	0.01μF	50V
C102	1-123-333-00	ELECT	100μF	24V
C103	1-108-579-00	MILER	0.01μF	50V
		DIODE		
D1	8-719-812-31	DIODE	TLR123	
D2	8-719-812-31	DIODE	TLR123	
D3	8-719-812-31	DIODE	TLR123	
D4	8-719-812-31	DIODE	TLR123	
D5	8-719-812-31	DIODE	TLR123	
D6	8-719-812-33	DIODE	TLG123A	
D7	8-719-812-31	DIODE	TLR123	
D8	8-719-812-31	DIODE	TLR123	
D9	8-719-812-31	DIODE	TLR123	
D10	8-719-812-31	DIODE	TLR123	
D11	8-719-812-31	DIODE	TLR123	
D12	8-719-812-31	DIODE	TLR123	
D13	8-719-812-33	DIODE	TLG123A	

Ref. No	Part No.	Description		
		IC		
IC1	8-759-240-28	IC	TC4028BP	
IC2	8-759-120-03	IC	μPA2003C	
IC3	8-759-240-28	IC	TC4028BP	
IC4	8-759-120-03	IC	μPA2003C	
		RESISTOR		
R1	1-247-179-00	CARBON	100K	1/4W
R2	1-247-179-00	CARBON	100K	1/4W
R3	1-247-179-00	CARBON	100K	1/4W
R4	1-247-131-00	CARBON	1K	1/4W
R5	1-247-121-00	CARBON	390	1/4W
R6	1-247-131-00	CARBON	1K	1/4W
R7	1-247-179-00	CARBON	100K	1/4W
R8	1-247-179-00	CARBON	100K	1/4W
R9	1-247-179-00	CARBON	100K	1/4W
R10	1-247-121-00	CARBON	390	1/4W
R901	1-214-594-00	METAL FILM	10	1W

8-2. PERIODIC CHECK AND MAINTENANCE

• In order to fully exhibit the functions and performance of the set, carry out the following maintenance and periodic checks for the equipment and tape. In addition, after repair, carry out the following itemized maintenance irrespective of the user's length of time of usage.

8-2-1. Cleaning of Rotary Drum Assembly

1) Press a chamois cloth (Ref. No.J-2) soaked in cleaning fluid (Ref. No.J-1) lightly against the rotary drum assembly, and slowly rotate the rotary upper drum assembly counter-clockwise by hand to clean.
Note:
Do not use the power supply to rotate the motor, and do not rotate the drum clockwise by hand. Also, there is the danger of damaging the head tip if the chamois cloth is moved vertically relative to the head tip, so follow the instruction above for cleaning.

8-2-2. Cleaning of Tape Path (See Fig. 8-10.)

1) Place the cassette compartment assembly in the EJECT state, and clean the tape path (TG-1, 2, 3, 4, 5, 6 and 7, pinch roller, and capstan shaft) with a chamois cloth soaked in cleaning fluid.
Note:
Be careful lest the chamois cloth should be stained with oil or grease of each link mechanism.

8-2-3. Cleaning of Drive System

1) Clean the drive system (relay belt and surface of reel tables) with a chamois cloth soaked in cleaning fluid.

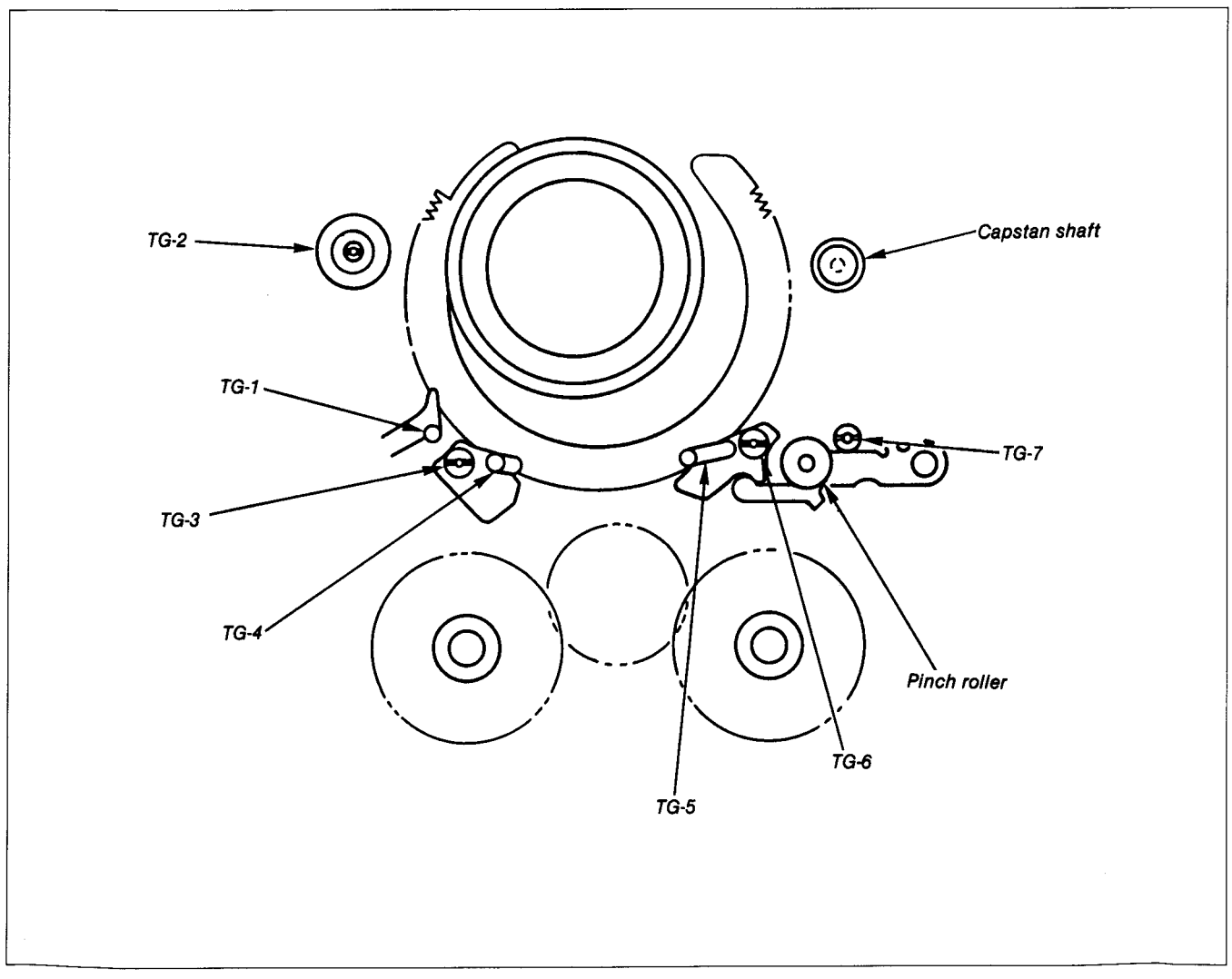


Fig. 8-10.

8-2-4. Periodic Check

	Location of Maintenance and check	Hours of Use (H)										Remarks
		500	1000	1500	2000	2500	3000	3500	4000	4500	5000	
	Cleaning of tape path surface	○	○	○	○	○	○	○	○	○	○	Be careful of oil
	Cleaning and degaussing of rotary assembly	○	○	○	○	○	○	○	○	○	○	Be careful of oil
	Relay belt	—	☆	—	☆	—	☆	—	☆	—	☆	3-695-637-01
	Capstan shaft	—	●	—	●	—	●	—	●	—	●	Be absolutely careful not to get oil on the tape path surface.
	Relay pulley shaft	—	●	—	●	—	●	—	●	—	●	
	Loading motor	—	☆	—	☆	—	☆	—	☆	—	☆	1-541-508-11
	Abnormal noise	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	
	Back tension measurement	—	☆	—	☆	—	☆	—	☆	—	☆	
	Brake system	—	☆	—	☆	—	☆	—	☆	—	☆	
	FWD. RVS torque measurement	—	☆	—	☆	—	☆	—	☆	—	☆	

○: Cleaning ●: Oil ☆: Confirmation

Tape Transportion System

Driving System

Performance Confirmation

Notes:

1) When performing overhaul, refer to the items above when replacing parts.
2) Oil
   - Be sure to use a oil authorized. (There is the danger of various troubles occuring if a different viscosity is used.)
     Oil: Parts No. 7-661-018-18 (MITSUBISHI Diamond Oil NT-68)
   - Be absolutely sure to use clean oil without any mixture of dust, etc. when lubricating the shaft bearing. (There is the danger of wear and burning if dirty oil is used with a mixture of dust, etc.)
   - One drop of oil means the amount which sticks to a 2mm diameter rod, as shown in figure. (See Fig. 8-11)

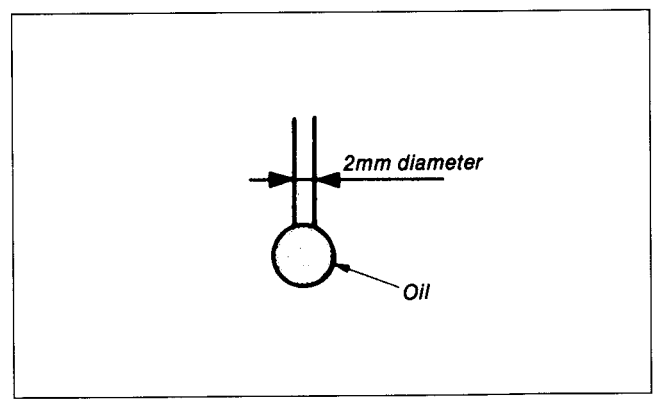
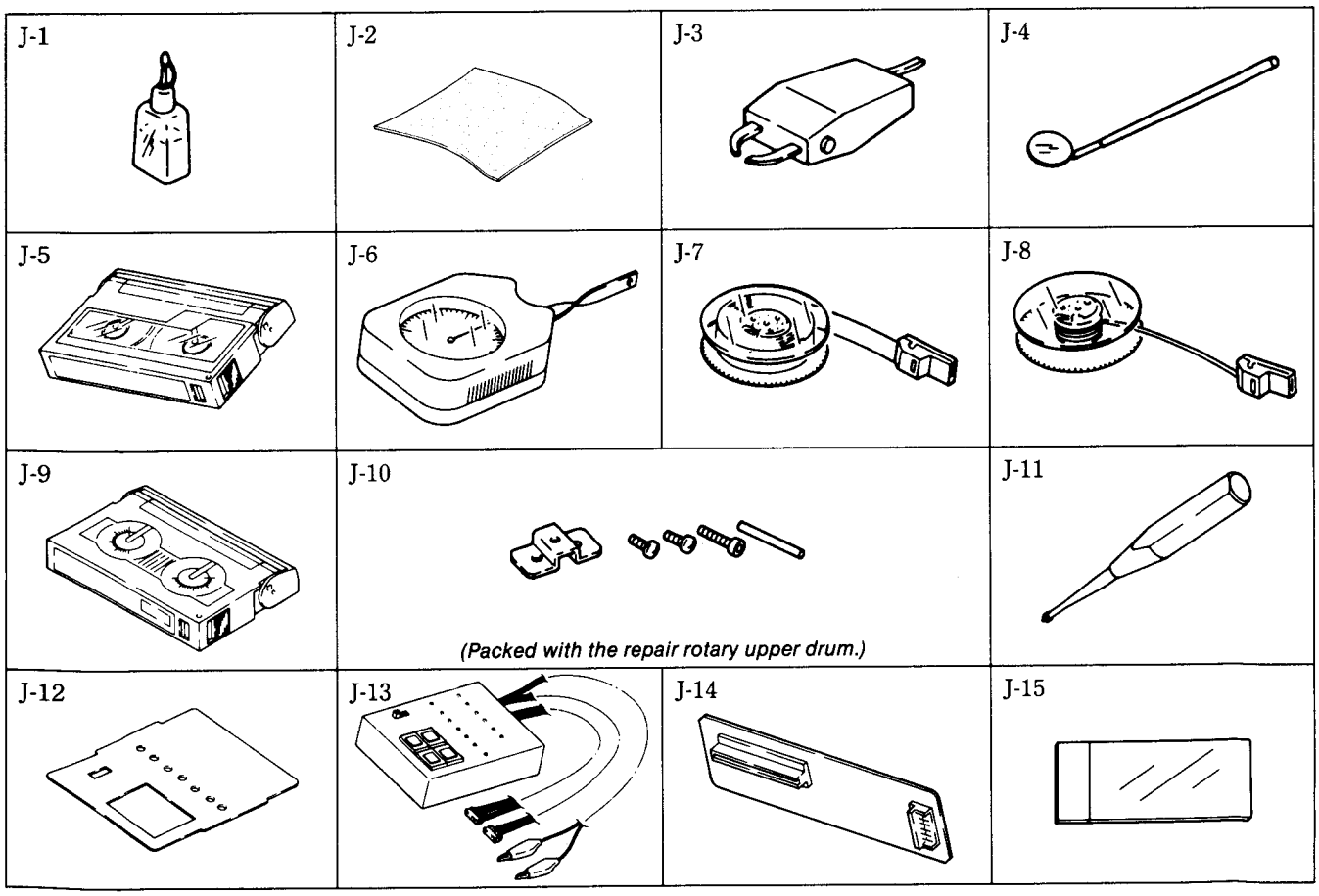


Fig. 8-11.

8-2-5. Service Jig Table

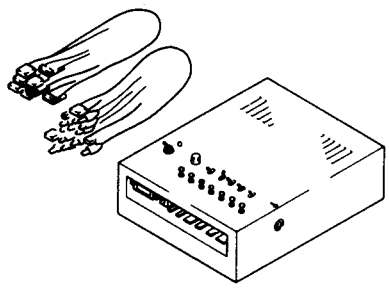
Ref No.	Name	Part No.	Fixture No.	Usage and Others
J-1	Cleaning fluid	Y-2031-001-0		
J-2	Chamois cloth	2-034-697-00		
J-3	Head degausser	Widely available		
J-4	Small mirror for adjustment Spare mirror	J-6080-029-A J-6080-030-1	SL5052	Tape path
J-5	Alignment tape (WR5-1C)	8-967-995-06		Tape path
J-6	Dial tension gauge	J-6080-827-A		Various torque measurement
J-7	Tension measurement reel	J-6080-831-A		With ϕ30 tape
J-8	Tension measurement reel	J-6080-832-A		With ϕ16 string
J-9	FWD and RVS winding torque cassette	J-6080-624-A	GD-2086	
J-10	Rotary drum jig	(Packed with the repair rotary upper drum)		
J-11	Screwdriver for tape path	J-6080-811-A		For tape guide adjustment
J-12	Mode selector II panel	J-6080-844-A		
J-13	Mode selector	J-6080-825-A		For all models
J-14	Mode selector II conversion connector	J-6080-845-A		
J-15	Tape end detecting filter	J-6080-848-A		Tape end detecting adjustment

Other equipment ●Oscilloscope
●Analog tester (20kΩ)

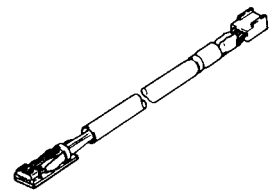


Ref No.	Name	Part No.	Usage and Others
J-16	TRACK SHIFT & MONITOR JIG	J-6080-843-A	Tape path
J-17	RF/SWP connector	J-6080-843-2	TRACK SHIFT & MONITOR JIG connection cable
	CTL connector	J-6080-843-2	
J-18	POWER SUPPLY connector	J-6080-843-1	

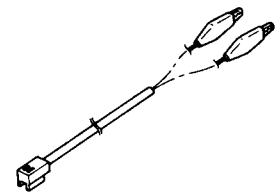
J-16



J-17



J-18



8-3. MECHANICAL CHECK, ADJUSTMENT AND REPLACEMENT

Note:

- Use the mode selector (Ref. No. J-13) for this mechanical check, adjustment and replacement.
- The mode inside the ▭ is the mode set by pressing the mode selector button.

8-3-1. Reel Lock Lever Assembly (See Fig. 8-12)

1. Removal

1) By referring to 8-1-1 and 8-1-2, remove cassette arm assembly and LS cassette compartment assembly.
2) Remove tension spring ❶ from notch ❷.
3) Remove stopper washer ❸ and remove reel lock lever assembly ❹ from claw ❸ and shaft ❺.

2. Installation

1) Install reel lock lever assembly ❹ to shaft ❺ and fixed it to stopper washer ❸.
2) Hook the tension coil spring ❶ to notch ❷.
3) By referring to 8-1-1 and 8-1-2, install the cassette arm assembly and LS cassette compartment.

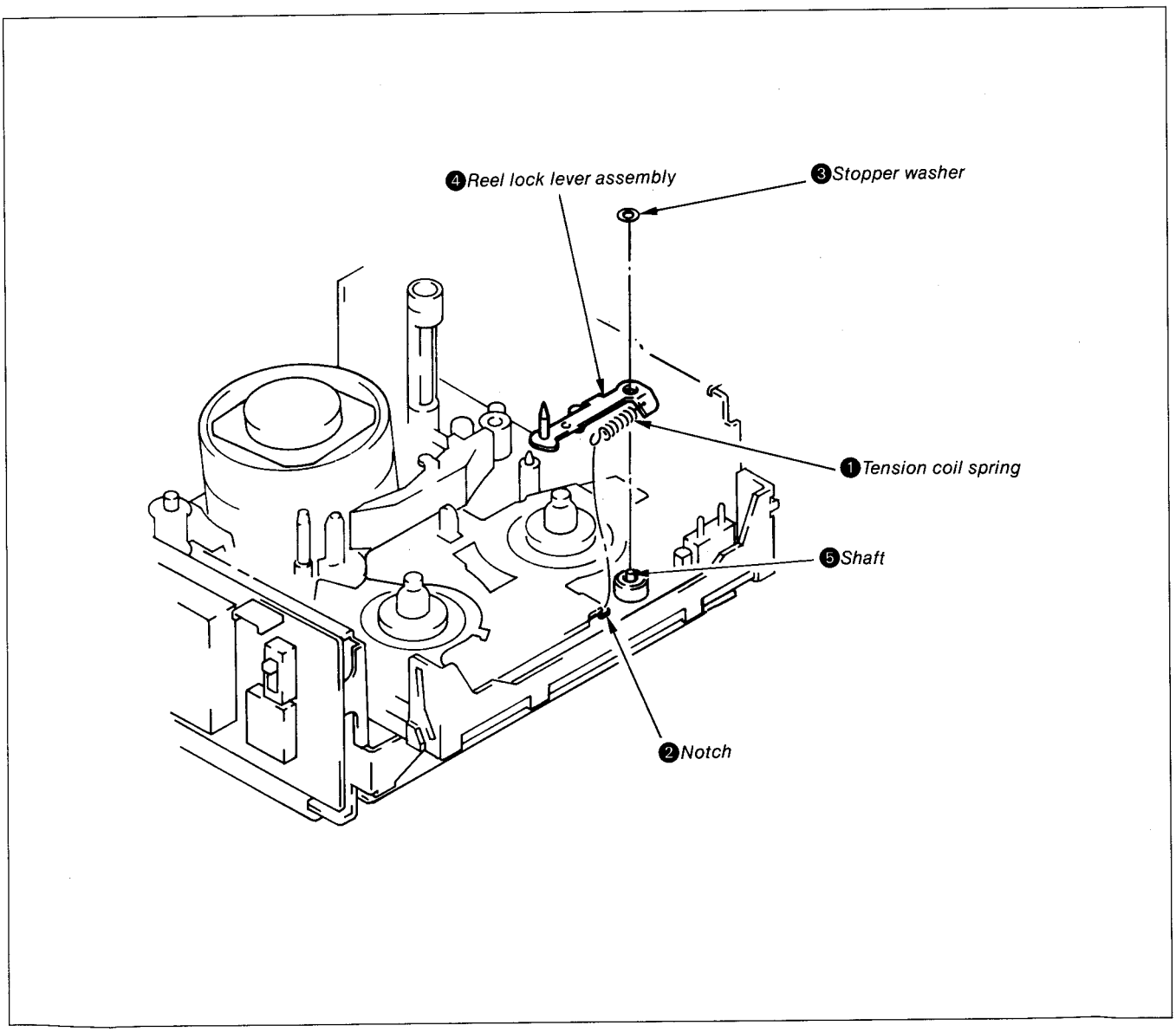


Fig. 8-12.

8-3-2 Pendulum Stopper Plate (See Fig. 8-13.)

1. Removal

1) By referring to 8-1-1 and 8-1-2, remove the cassette arm assembly and LS cassette compartment assembly.
2) By referring to 8-3-1, remove reel lock lever assembly.
3) Pushing the claw ❼ of the LED assembly ❶ in the direction of arrow Ⓐ, lift and remove the LED assembly ❶, and then, remove the claw ❷.
4) Remove two screws ❸ and ❹.
5) Remove pendulum stopper plate ❻ from the two positions of claws ❺.

Note:

Since the claw ❼ is easily deformed or broken by too strong pushing force, mount and dismount carefully.

2. Installation

1) Set in [READY] mode.
2) See to it that the LED assembly ❶ is mounted on the pendulum stopper plate ❻ and fasten to two positions of the claw ❺ and two positions of the dowels ❾.
3) Install two screws ❸ and ❹.
4) Hook claw ❷ of LED assembly ❶ and insert by pushing in the direction of arrow Ⓑ.
5) Set to [EJECT] mode.
6) By referring to 8-3-1, install the reel lock lever assembly.
7) By referring to 8-1-1 and 8-1-2, install the cassette arm assembly and LS cassette compartment assembly.

Note:

- Caution should be taken that the TG-1 band assembly ❽ is not clasped in when installing the pendulum stopper plate ❻.
- In other modes than [READY], the band becomes loose.

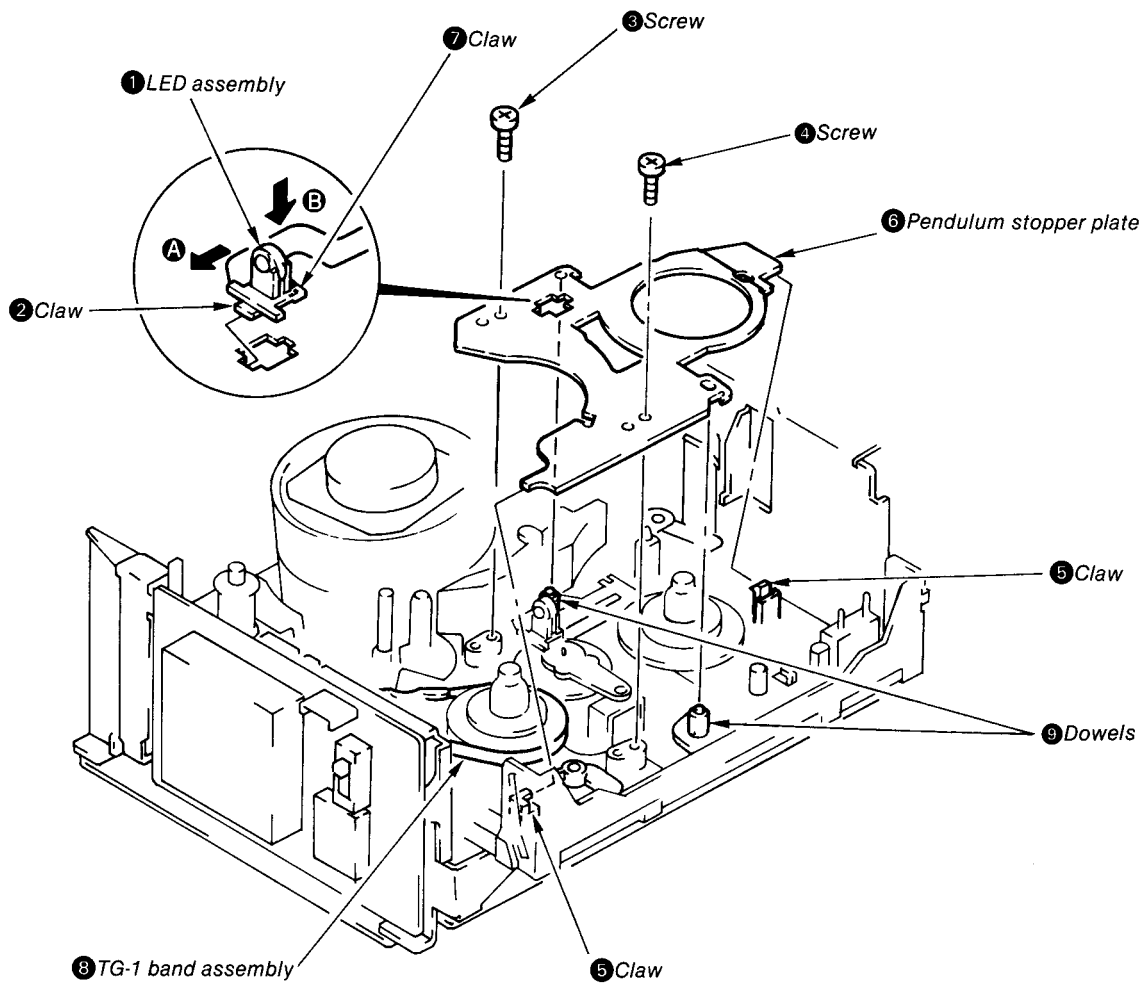


Fig. 8-13.

8-3-3. S Reel Table Assembly (See Fig. 8-14)

1. Removal

1) By referring to 8-1-1 and 8-1-2, remove cassette arm assembly and LS cassette compartment assembly.
2) By referring to 8-3-1, remove reel lock lever assembly.
3) By referring to 8-3-2, remove pendulum stopper plate.
4) Remove screw ❶, and remove one side of TG-1 band assembly ❷.
5) Move the soft brake ❸ in the direction of arrow Ⓐ.
6) Remove S reel table assembly ❹.

Note:

Perform removal of S reel table assembly ❹ by holding the * marked section of reel claw.

2. Installation

1) Apply over 1/3 drop and below 1/2 drop of oil to the arrow section of shaft ❺ as in Fig. A.
2) Move soft brake ❸ in the direction of arrow Ⓐ.
3) Install S reel table assembly ❹ to the shaft.
4) Install screw ❶ to TG-1 band assembly ❷.
5) By referring to 8-3-2, install pendulum stopper plate.
6) By referring to 8-3-1, install reel lock lever assembly.
7) By referring to 8-1-1, install cassette arm assembly and LS cassette compartment assembly.

Note:

1) By referring to 8-3-26, perform check of reel table height.
2) By referring to 8-3-28, perform position adjustment of tension regulator.
3) By referring to 8-3-29, perform adjustment of back tension.

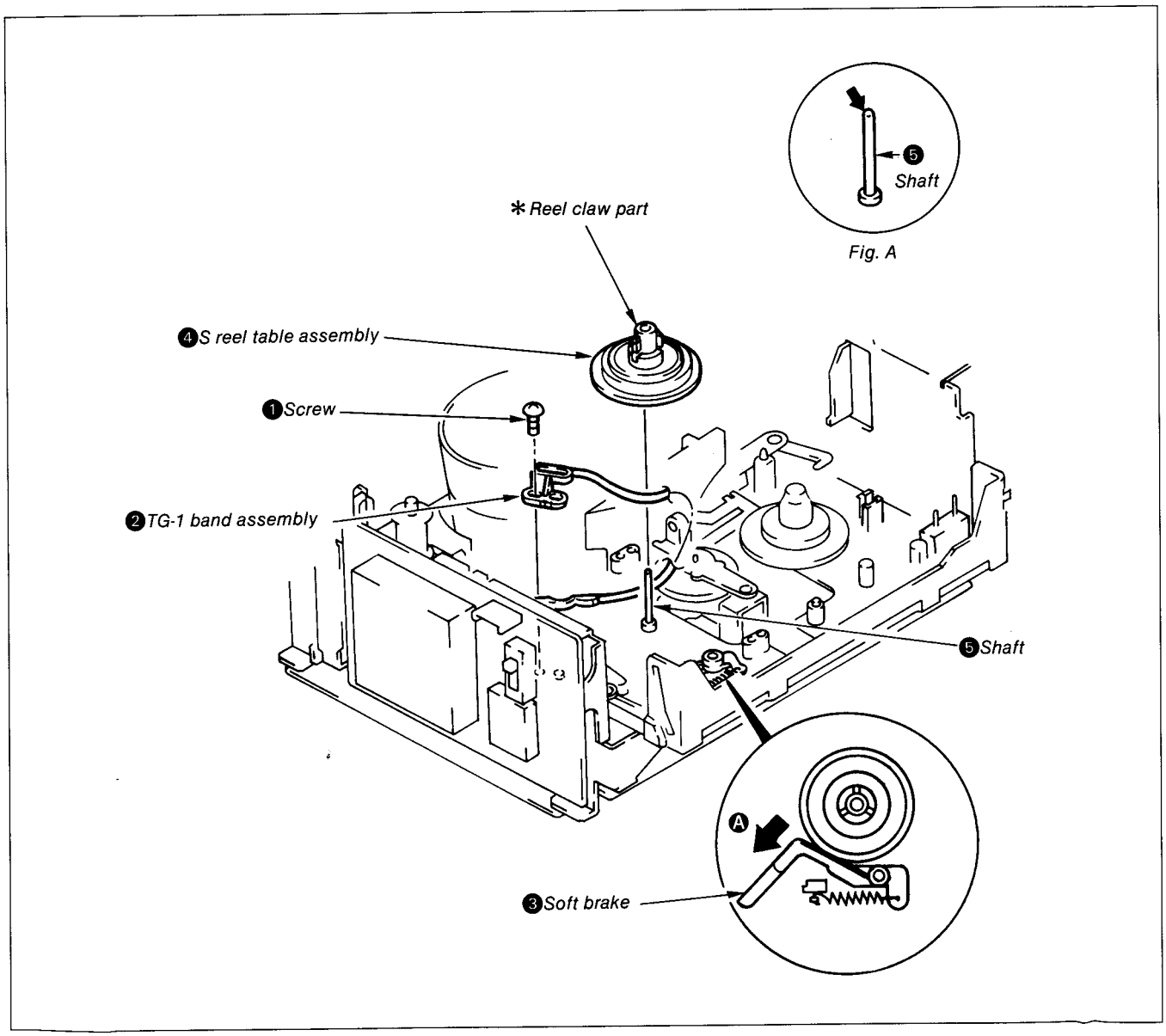


Fig. 8-14.

8-3-4. T Reel Table Assembly (See Fig. 8-15)

1. Removal

1) By referring to 8-1-1 and 8-1-2, remove the cassette arm assembly and LS cassette compartment assembly.
2) By referring to 8-3-1, remove reel lock lever assembly.
3) By referring to 8-3-2, remove pendulum stopper plate.
4) Remove T reel table assembly ❶.

Note:

Perform removal of T reel table assembly ❶ by holding the reel claw section marked with ✻.

2. Installation

1) Apply over 1/3 drop and below 1/2 drop of oil to the arrow section of shaft ❷, as in Fig. A.
2) Install T reel table assembly ❶ to shaft ❷.
3) By referring to 8-3-2, install pendulum stopper plate.
4) By referring to 8-3-1, install reel lock lever assembly.
5) By referring to 8-1-1 and 8-1-2, install cassette arm assembly and LS cassette compartment assembly.

Note:

By referring to 8-3-26, perform check of reel table height.

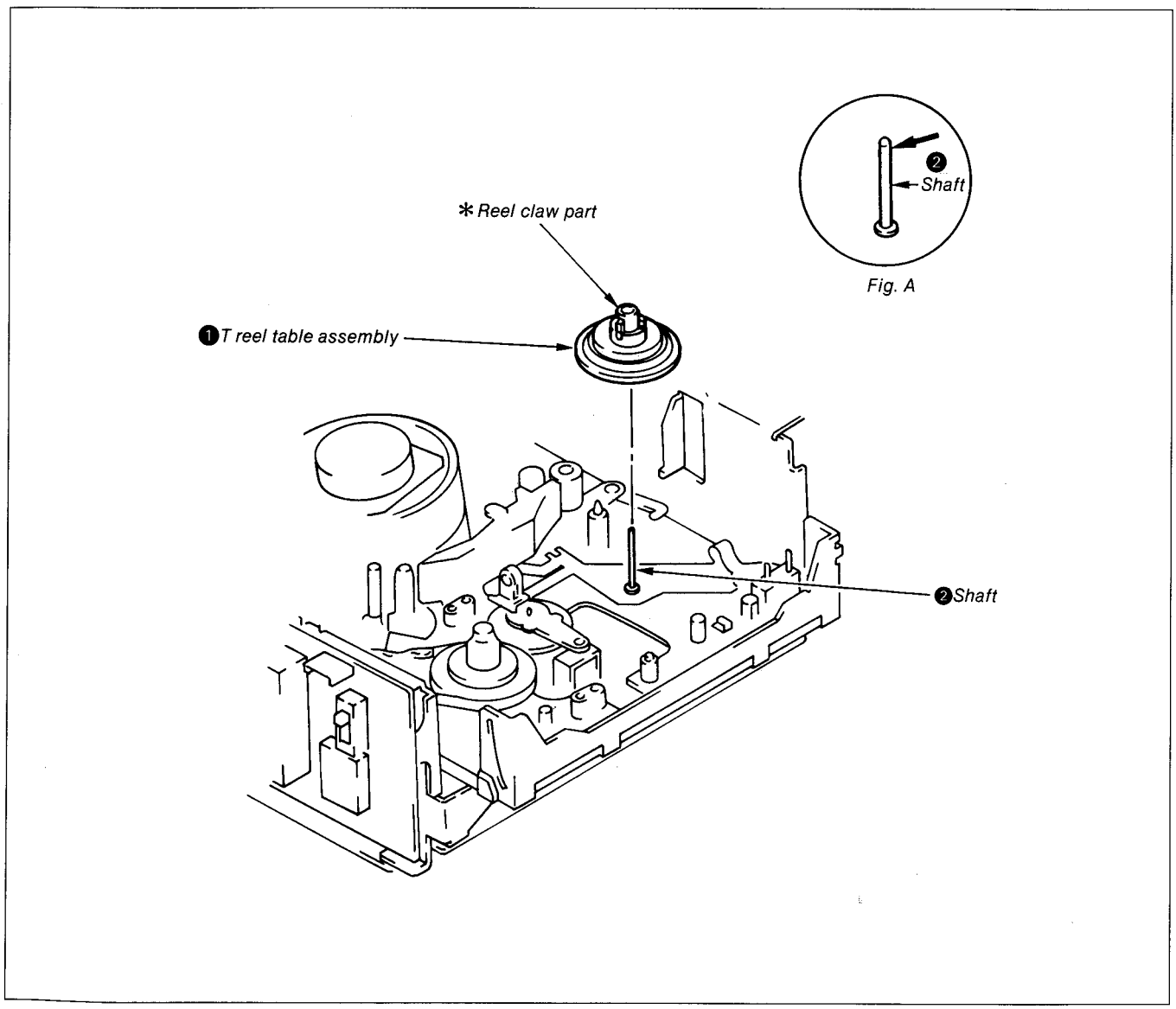


Fig. 8-15.

8-3-5. Pinch Arm B Assembly (See Fig. 8-16)

1. Removal

1) By referring to 8-1-1 and 8-1-2, remove cassette arm assembly, and LS cassette compartment.
2) By referring to 8-3-1, remove reel lock lever assembly.
3) By referring to 8-3-2, remove pendulum stopper plate.
4) By referring to 8-3-4, remove T reel table assembly.
5) Remove tension coil spring ❶ from claw ❷.
6) Remove stopper washer ❸, and remove pinch arm B assembly ❹.

2. Installation

1) Apply molten grease to the arrow section of pinch arm B assembly ❹, as shown in Fig. A.
2) Apply over 1/3 drop and below 1/2 drop of oil to the arrow section of shaft ❺, as shown in Fig. B.
3) See to it that pinch arm B assembly ❹ pin enters hole ❻ and pinch arm A ❼, and install to shaft ❺.
4) Install stopper washer ❸.
5) Hook the tension coil spring ❶ onto claw ❷.
6) By referring to 8-3-4, install T reel table assembly.
7) By referring to 8-3-2, install pendulum stopper plate.
8) By referring to 8-3-1, install reel lock lever assembly.
9) By referring to 8-1-1 and 8-1-2, install cassette arm assembly and LS cassette compartment assembly.

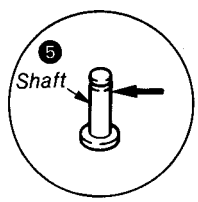


Fig. B

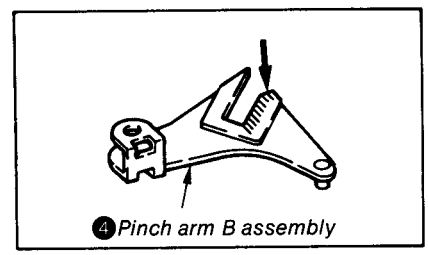
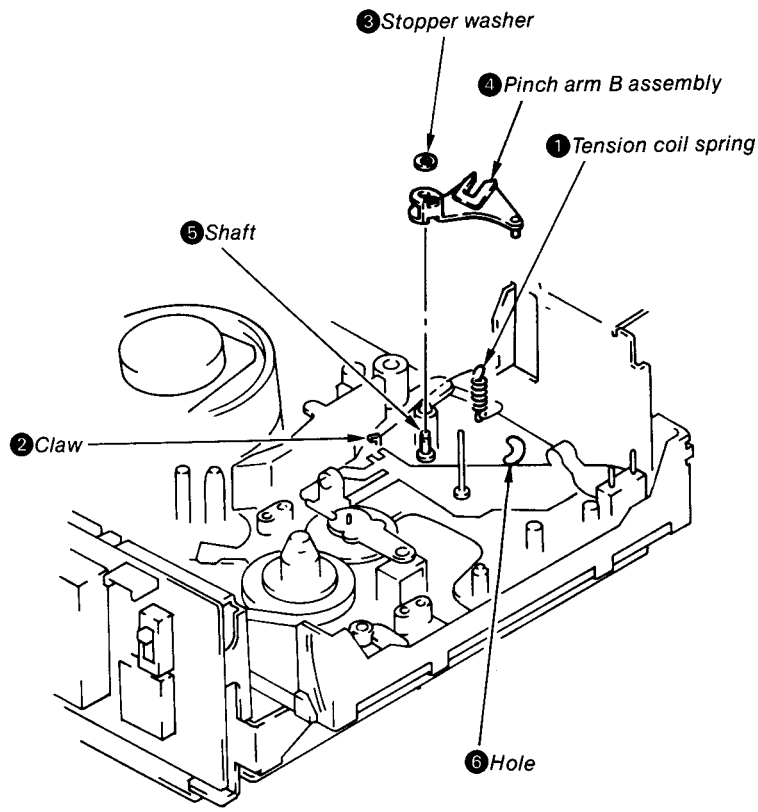


Fig. A



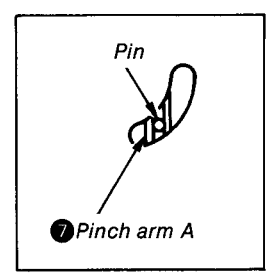


Fig. C

Fig. 8-16.

8-3-6. Pinch Arm C Assembly (See Fig. 8-17)

1. Removal

1) By referring to 8-1-1 and 8-1-2, remove cassette arm assembly and LS cassette compartment assembly.
2) By referring to 8-3-1, remove reel lock lever assembly.
3) By referring to 8-3-2, remove pendulum stopper plate.
4) Remove tension coil lever ❶ from claw ❷.
5) Remove stopper washer ❸, and remove pinch arm C assembly ❹ and pinch lever assembly ❺.
6) Remove tension coil spring ❻, and disassemble pinch arm C assembly ❹ and pinch lever assembly ❺.

Note:

Do not touch the roller section marked with ✻.

2. Installation

1) Apply over 1/3 drop and below 1/2 drop oil to the arrow section of shaft ❼, as shown in Fig. A.
2) Install pinch lever assembly ❺ to pin arm C assembly ❹, and hook on tension coil spring ❻.
3) Install pinch arm C assembly ❹ and pin lever assembly ❺ to shaft ❼.
4) Install stopper washer ❸.
5) Hook tension coil spring ❶ to claw ❷.
6) By referring to 8-3-2, install pendulum stopper plate.
7) By referring to 8-3-1, install reel lock lever assembly.
8) By referring to 8-1-1 and 8-1-2, install cassette arm assembly and LS cassette compartment assembly.

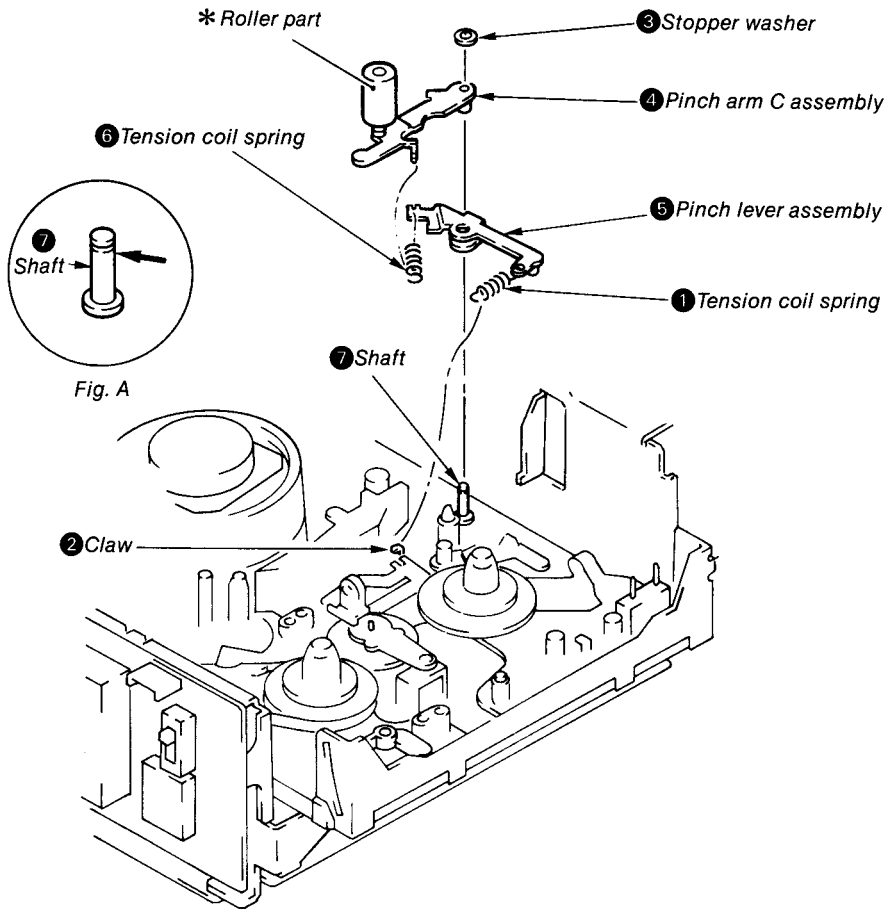


Fig. 8-17.

8-3-7. TG-1 Arm Assembly (See Fig. 8-18)

1. Removal

1) By referring to 8-1-1 and 8-1-2, remove cassette arm assembly and LS cassette compartment assembly.
2) By referring to 8-3-1, remove reel lock lever assembly.
3) By referring to 8-3-2, remove pendulum stopper plate.
4) Remove stopper washer ❶, and remove 1 screw ❷.
5) Remove tension coil spring ❸, and remove TG-1 arm assembly ❹.

Note:

Do not touch the shoe section marked with ✻, (see Fig. 8-19) and guide section marked with ✻.

2. Installation

1) Apply over 1/3 drop and below 1/2 drop of oil to the arrow section of shaft ❺, as shown in Fig. A.
2) Install TG-1 arm assembly ❹ to shaft ❺.
(Do not touch the guide section)
3) Wind the TG-1 band assembly ❼ around the outer circumference of S reel table assembly ❻, and install 1 screw ❷.
4) Install stopper washer ❶.
5) Hook tension coil spring ❸ onto the position indicated in Fig. B.
6) By referring to 8-3-2, install pendulum stopper plate.
7) By referring to 8-3-1, install reel lock lever assembly.
8) By referring to 8-1-1 and 8-1-2, install cassette arm assembly and LS cassette compartment assembly.

Notes:

1) Be careful so as not to have any curving in the TG-1 band assembly ❽.
2) By referring to 8-3-28, perform tension regulator position adjustment.
3) By referring to 8-3-29, perform FWD back tension adjustment.

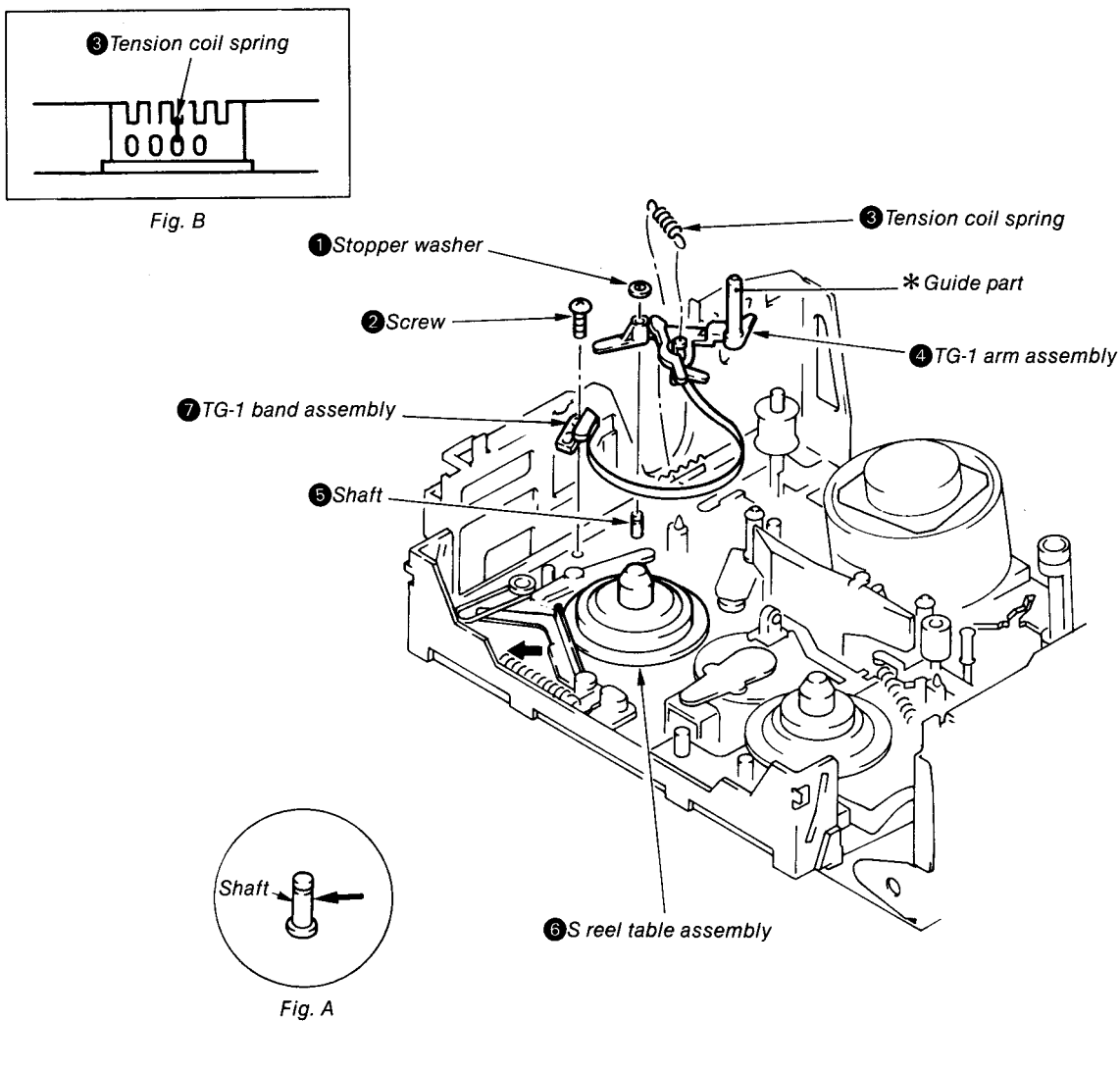


Fig. 8-18.

8-3-8. TG-1 Band Assembly (See Fig. 8-19)

1. Removal

1) By referring to 8-3-7, remove TG-1 arm assembly.
2) Remove claw ❷, of TG-1 band assembly from slot of TG-1 arm assembly ❸.

2. Installation

1) Install claw ❷ of TG-1 band assembly ❶ into hole of TG-1 arm assembly ❸.
2) Confirm that the TG-1 band assembly ❶ rotates smoothly centering around the hole of the TG-1 arm assembly ❸.
3) By referring to 8-3-7, install TG-1 arm assembly.

Notes:

1) Be careful so as not to have any curving in the TG-1 band assembly ❶.
2) Do not touch the shoe section marked with * and guide section marked with *.

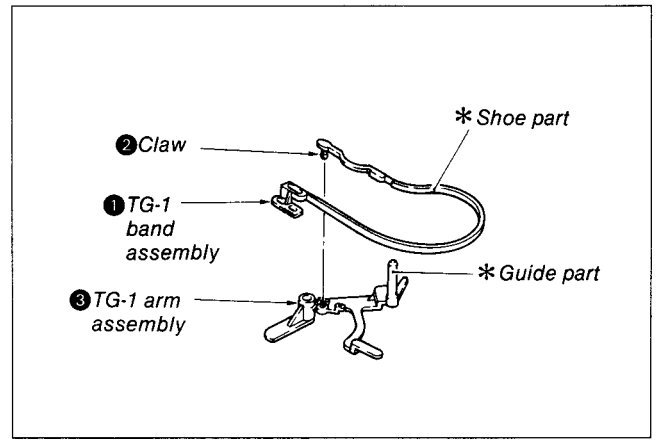


Fig. 8-19.

8-3-9. Soft Brake Assembly (See Fig. 8-20)

1. Removal

1) By referring to 8-1-1 and 8-1-2, remove cassette arm assembly and LS cassette compartment assembly.
2) By referring to 8-3-1, remove reel lock lever assembly.
3) By referring to 8-3-2, remove pendulum stopper plate.
4) Remove tension coil spring ❶ from claw ❷.
5) Remove soft brake assembly ❸. (See Fig. 8-20)

2. Installation

1) Install soft brake assembly. At this time place the Ⓐ section under the LS plate spring ❹.
2) Hook tension coil spring ❶ onto claw ❷.
3) By referring to 8-3-2, install reel lock lever assembly.
4) By referring to 8-3-1, install reel lock lever.
5) By referring to 8-1-1 and 8-1-2, install cassette arm assembly and LS cassette compartment assembly.

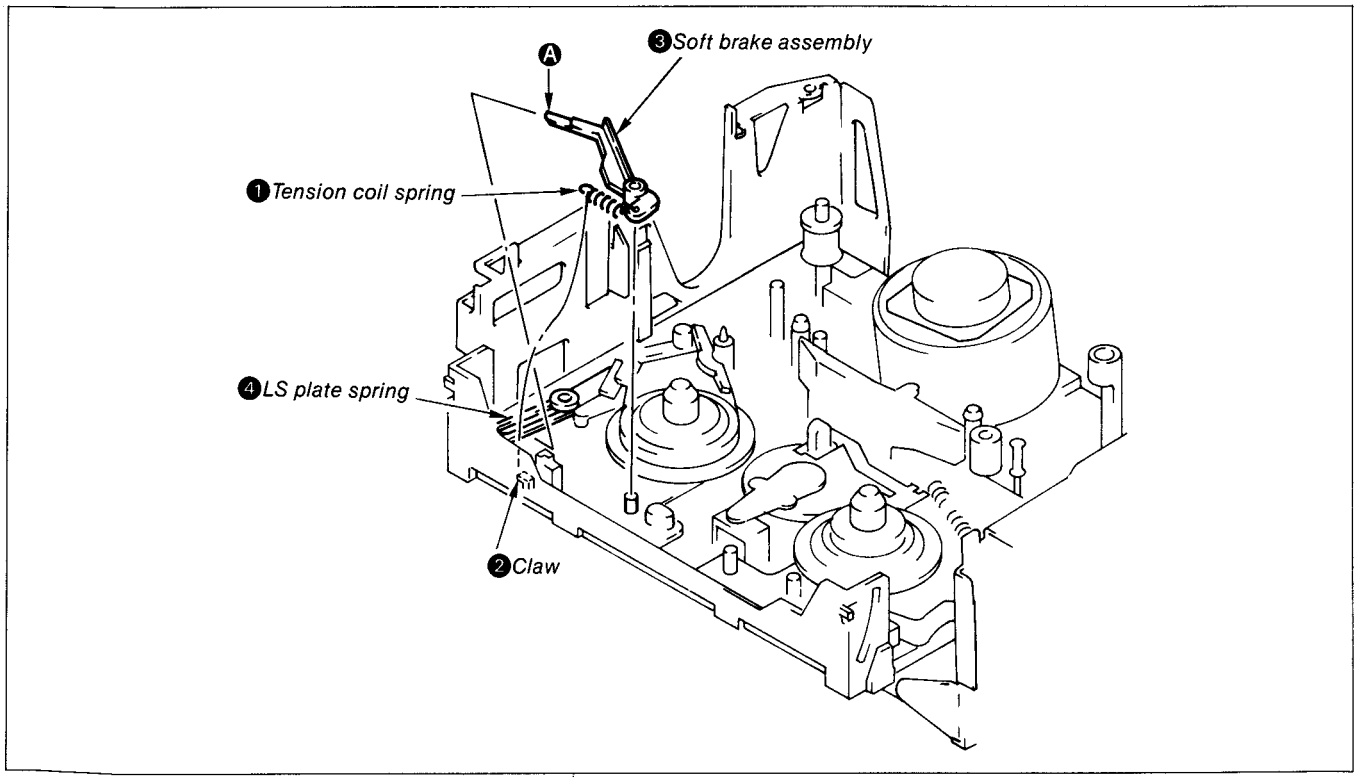


Fig. 8-20.

8-3-10. LS Chassis Assembly (See Fig. 8-21)

1. Removal

1) By referring to 8-1-1 and 8-1-2, remove cassette arm assembly and LS cassette compartment assembly.
2) Set to [GUIDE LOAD after BLANK].
3) Remove stopper washer ❶.
4) Remove three each of screws ❷ and LS guides ❸.
5) Remove LS chassis assembly ❹ in the direction of arrow Ⓐ.
6) Remove 7 sections of the soldered sections ❻ of FP-53 flexible board ❺ with a soldering iron, as shown in Fig. A. and remove FP-53 flexible board ❺ which is stuck to the mechanical chassis.

2. Installation

1) Peel off tape attached to the rear of FP-53 flexible board ❺, and stick on by matching the shaft of the mechanical chassis with the pattern.
2) Solder the sections of the FP-53 flexible board ❺, as shown in Fig. B.
3) Apply molten grease to the arrow section of LS chassis assembly ❹, as shown in Fig. C.
4) Move reel lock lever assembly ❻ in the direction of arrow Ⓔ, and install by matching the four positions of the attachment holes of LS chassis assembly ❹ with the shaft of the mechanical chassis.
5) Engage two positions of claw ❼ to drum base.
6) Move TG-7 arm assembly ❽ in the direction of arrow Ⓕ, (gently with tweezers, etc.), and insert into the hole of the mechanical chassis.
7) Insert pin ❿ of LS gear assembly to slot ❾ of LS cam plate, as shown in Fig. D.
8) Insert TS arm ⓫ into U groove of pinch arm A ⓬.
9) Confirm that the reel lock lever assembly ❻ is not run onto the reel lock lever B ⓭.
10) Confirm that the TG1 release arm ⓮ is not run onto the M slider ⓯.
11) Confirm that the pin of pendulum gear arm assembly ⓰ is peeping out of the hole of the pendulum stopper plate ⓱.

Note:

Confirm tht mechanical chassis assembly parts have been properly assembled.

12) Confirm that it is completely installed, and install three each of LS guides ❸ and screws ❷ respectively.
13) Install stopper washer ❶.
14) Use mode selector and confirm that loading and threading are being performed smoothly.
15) By referring to 8-1-1 and 8-1-2, install cassette arm assembly and LS cassette compartment assembly.

Note:

Perform the soldering rapidly.

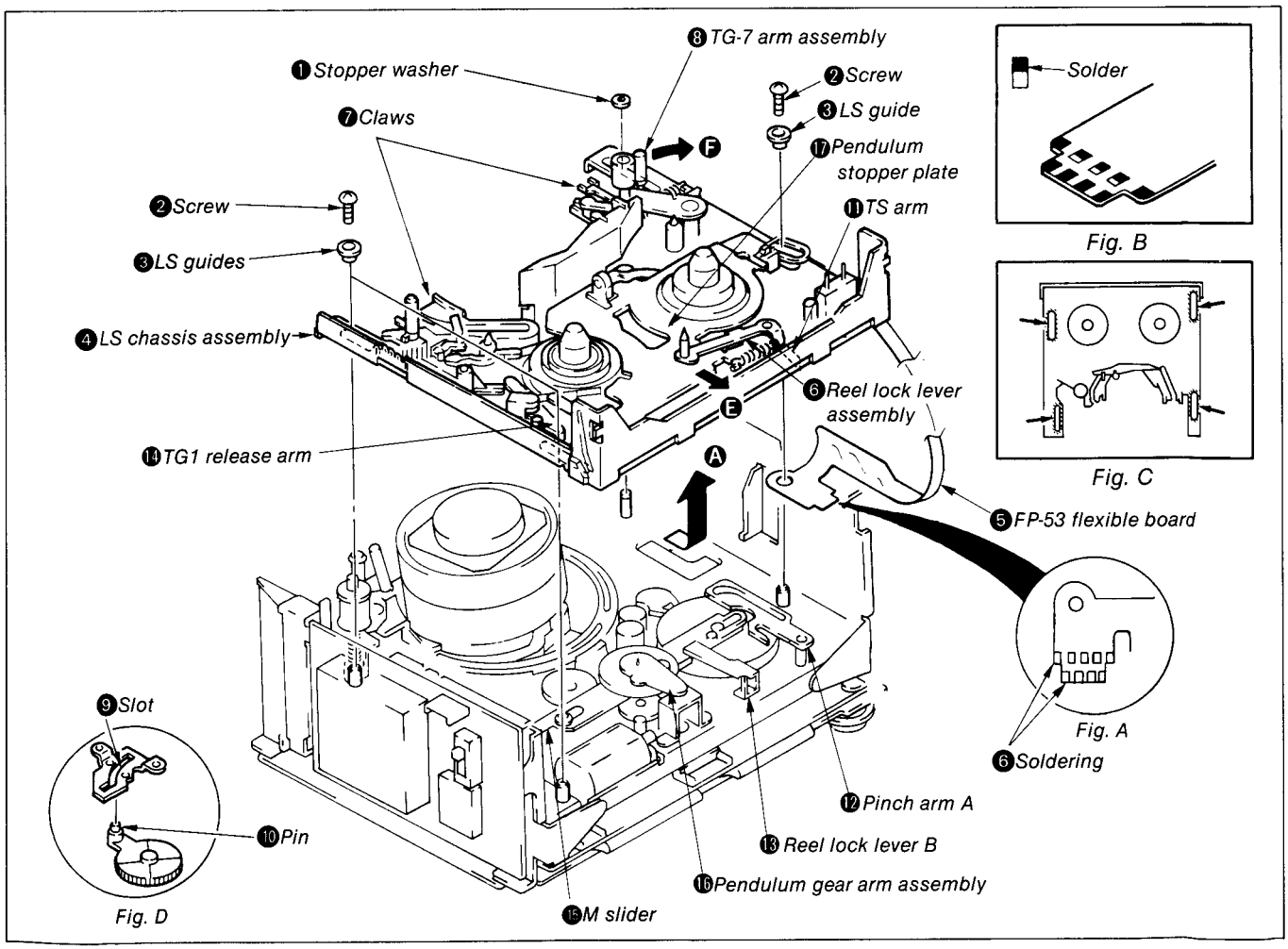


Fig. 8-21.

8-3-11. TG-7 Arm Assembly (See Fig. 8-22)

1. Removal

1) By referring to 8-1-1 and 8-1-2, remove cassette arm assembly and LS cassette compartment assembly.
2) By referring to 8-3-10, remove LS chassis assembly.
3) Turn over LS chassis assembly.
4) Remove stopper washer ❷ (t = 0.3mm).
5) Remove TG-7 spring ❷ from claw ❸, and remove TG-7 arm assembly ❹.

Note:

1) As the FP-53 flexible board * is connected to the mechanical chassis, caution should be taken that it is not broken off.
2) Be careful not to deform the TG-7 arm.

2. Installation

1) Apply over 1/3 drop and below 1/2 drop of oil to the arrow section of shaft, as shown in Fig. A.
2) Install TG-7 arm assembly ❹ by way of TG-7 spring ❷.
3) Hook TG-7 spring ❷ onto claw ❸.
4) Install stopper washer ❶.
5) By referring to 8-3-10, install LS chassis assembly.
6) By referring to 8-1-1 and 8-1-2, install cassette arm assembly and LS cassette compartment assembly.
7) Perform presetting of guide block height (Refer 8-4 TAPE PATH ADJUSTMENT).

Note:

Confirm that stopper washers ❶ is completely inserted into the notch of the shaft.

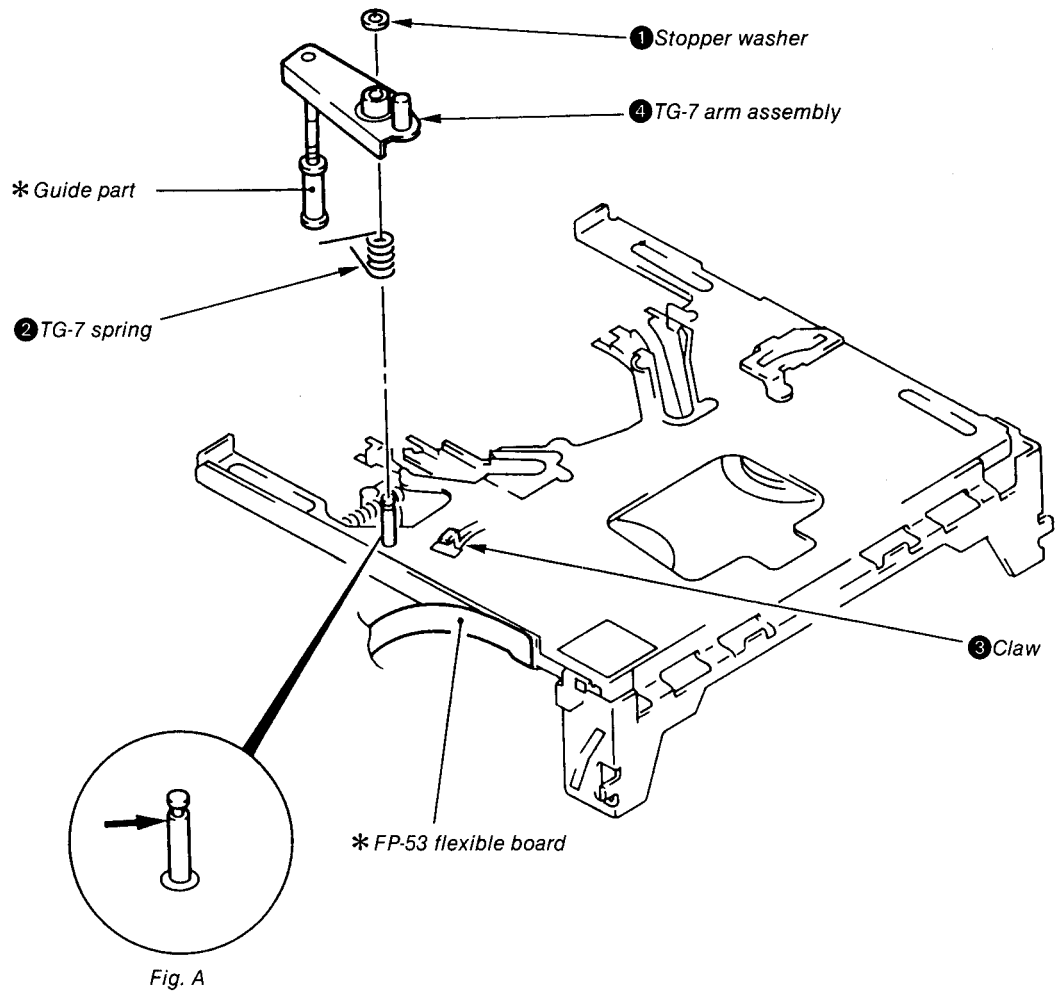


Fig. A

Fig. 8-22.

8-3-12. Pinch Arm A Assembly (See Fig. 8-23)

1. Removal

1) By referring to 8-1-1 and 8-1-2, remove cassette arm assembly and LS cassette compartment assembly.
2) By referring to 8-3-10, remove LS chassis assembly.
3) Remove stopper washer ❶.
4) Remove pinch arm A assembly ❷.

2. Installation

1) Apply over 1/3 drop and below 1/2 drop of oil to arrow section of shaft, as shown in Fig. A.
2) Apply molten grease to arrow section of pinch arm A assembly ❷, as shown in Fig. B.
3) Insert pin of pinch arm A assembly ❷ into outer notch of cam assembly ❸, and install to shaft.
4) Install stopper washer ❶.
5) By referring to 8-3-10, install LS chassis assembly.
6) By referring to 8-1-1 and 8-1-2, install cassette arm assembly and LS cassette compartment assembly.

Note:
Confirm that stopper washer ❶ is completely inserted into shaft.

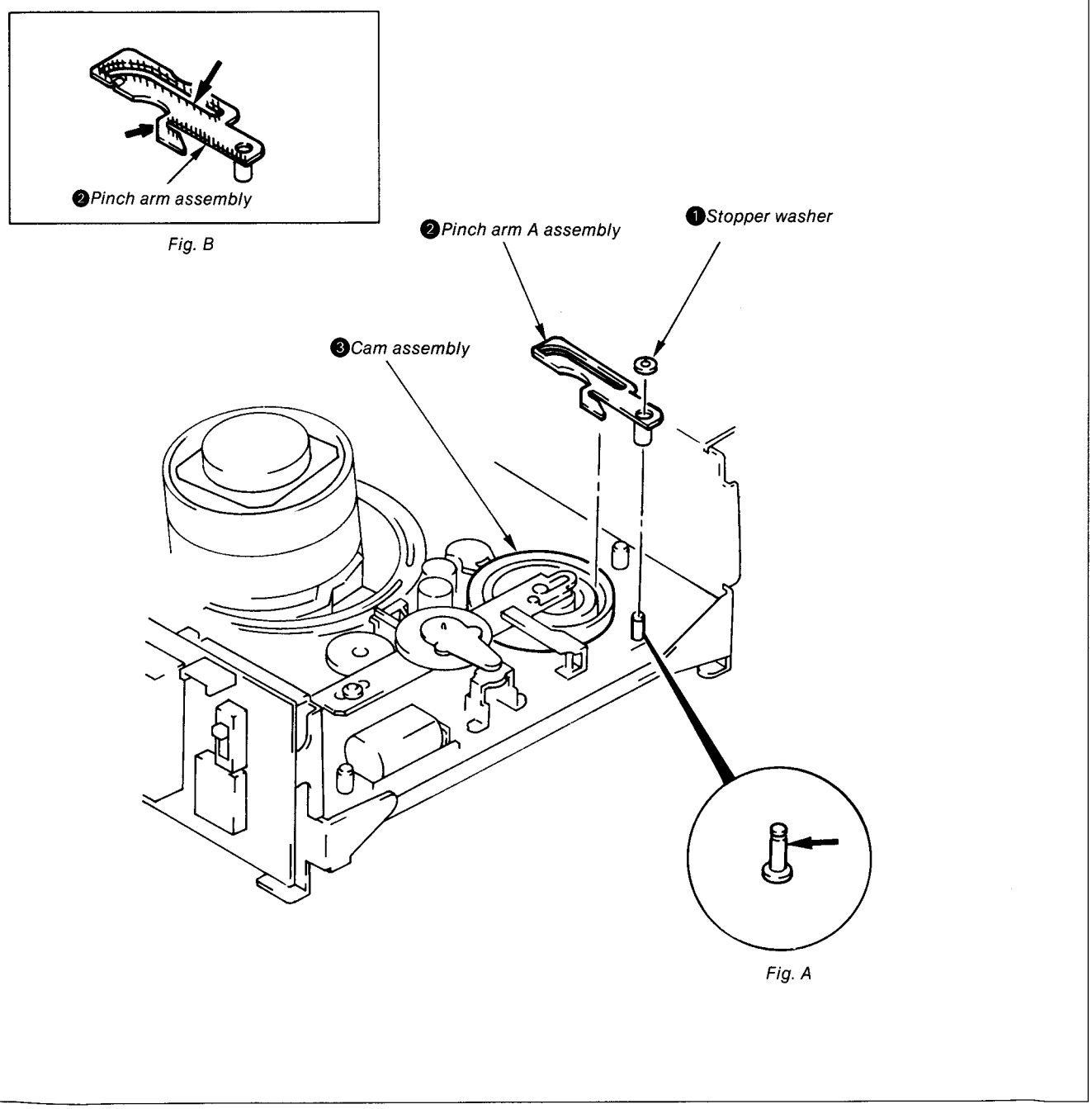


Fig. 8-23.

8-3-13. M Slider Assembly (See Fig. 8-24)

1. Removal

1) By referring to 8-1-1 and 8-1-2, remove the cassette arm assembly and LS cassette assembly.
2) By referring to 8-3-10, remove the LS chassis.
3) Remove pendulum gear arm.
4) Remove E ring ❷ and remove reel lock lever B ❸.
5) Remove stopper washer ❹.
6) Remove stopper washer ❺ and M slider assembly ❻.

2. Installation

1) Apply molten grease to the arrow marked point of M slider assembly ❻, as shown in Fig. A.
2) Insert pin of the M slider assembly ❻ into the inner notch of cam assembly ❼ and install.
3) Remove stopper washer ❺ and stopper washer ❹.
4) Apply molten grease to the arrow marked point of reel lock lever B ❸, as shown in Fig. B.
5) Apply over 1/3 drop and below 1/2 drop of oil to the arrow marked point on the shaft, as shown in Fig. C and E.
6) Install reel lock lever so as to be inserted in between the bent-up part and pin, as shown in Fig. D.
7) Install E ring ❷.
8) Apply over 1/3 drop and below 1/2 drop of oil to the shaft of relay base assembly ❽.
9) Install pendulum gear arm ❶.
10) By referring to 8-3-10, install LS chassis assembly.
11) By referring to 8-1-1 and 8-1-2, install cassette arm assembly and LS cassette compartment assembly.

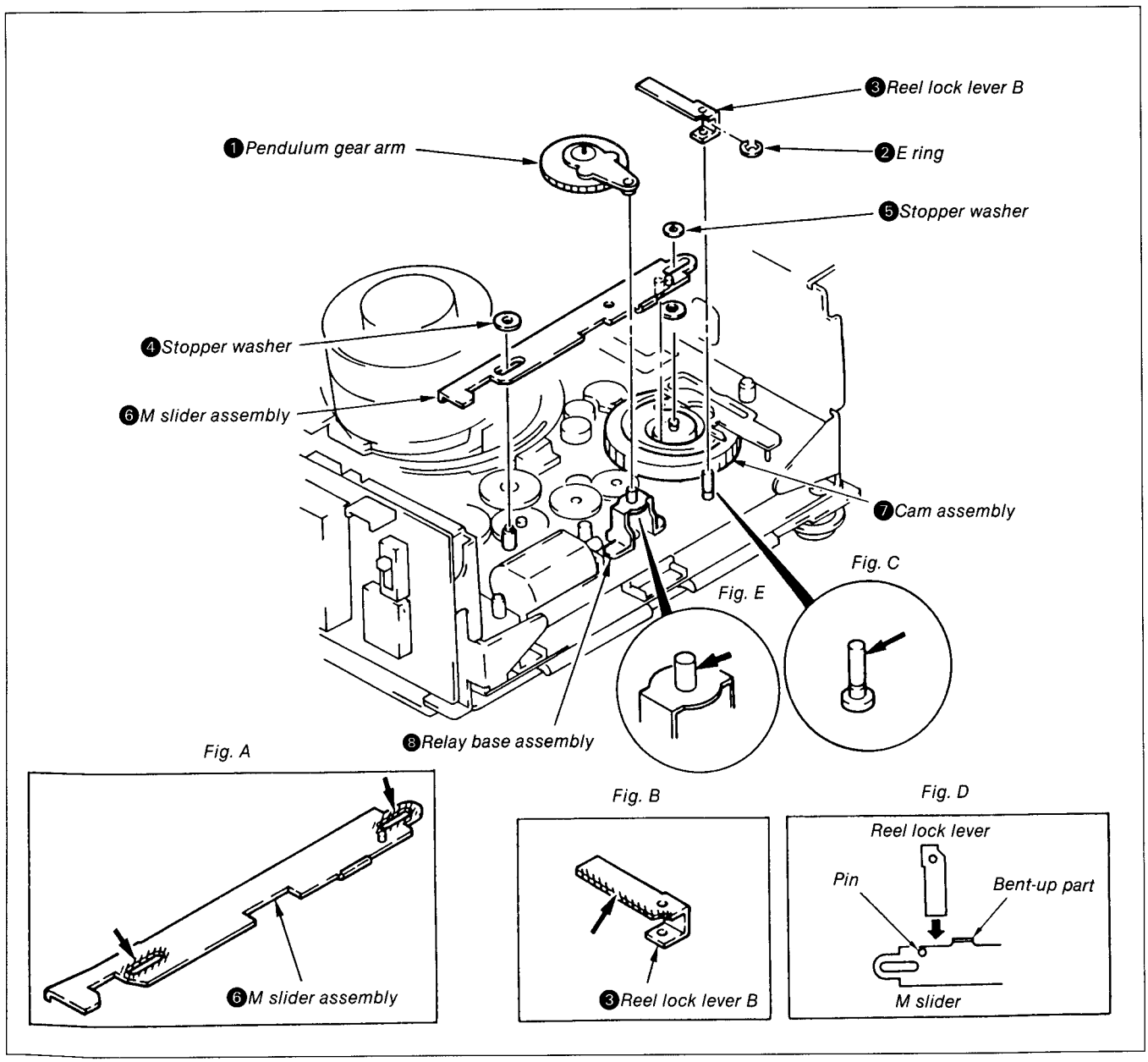


Fig. 8-24.

8-3-14. TG-4 Base Assembly and TG-5 Base Assembly

1. Removal

1) By referring to 8-1-1 and 8-1-2, remove cassette arm assembly and LS cassette compartment assembly.
2) By referring to 8-3-10, remove LS chassis assembly.
3) Set into GUIDE LOAD mode and remove TG-4 base assembly ❶ and TG-5 base assembly ❷ from the groove of the drum base.
4) Remove the TG-4 base assembly from the notch ❸ by turning around section the upper of pin ❺ in the direction of arrow Ⓐ by centering pin ❹ of the TG-4 base assembly ❶. (See Fig. 8-25.)
5) Remove pin ❺ from the hole of notch ❸.
6) Remove TG-5 base assembly ❷ from notch ❼ by moving it in the direction of arrow Ⓐ (See Fig. 8-26)
7) Remove TG-5 base assembly ❷ from pin ❻. (See Fig. 8-27)

Note:

Be sure not to contact with the guide section marked with ✻.

2. Installation

1) Insert pin ❻ into the hole of TG-5 base assembly ❷.
2) Insert TG-5 base assembly ❷ beneath notch ❼ by moving it in the direction of arrow B.
3) Insert pin ❺ of TG-5 base assembly ❶ into the hole of notch ❸.
4) Set pin ❹ of TG-4 base assembly ❶ into notch ❸ by turning it in the direction of arrow Ⓑ.
5) Confirm that the TG-4 base assembly ❶ and TG-5 base assembly ❷ have been installed in the states as shown in Fig. A and B respectively.
6) Set TG-4 base assembly ❶ and TG-5 base assembly ❷ into the groove of the drum base while slowly turning BLANK after GUIDE LOAD mode. If the position are not matched, the assembly is caught by the entrance of the groove and, accordingly, it may be unable to move. Therefore, be sure to set it into the groove while matching the positions very carefully.
7) By referring to 8-3-10, install LS chassis assembly.
8) By referring to 8-1-1 and 8-1-2, install cassette arm assembly and LS cassette compartment assembly.

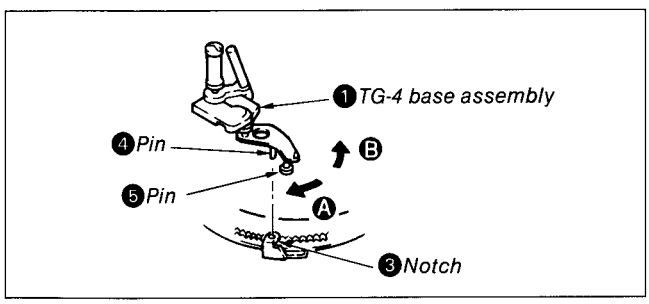


Fig. 8-25.

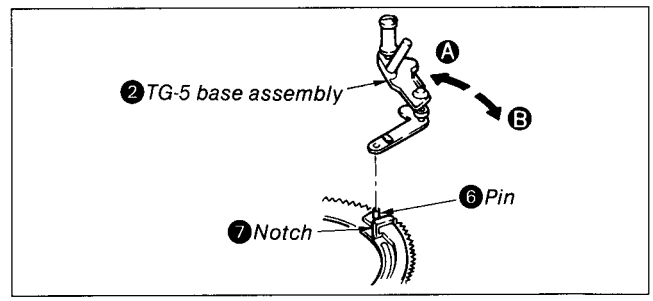


Fig. 8-26.

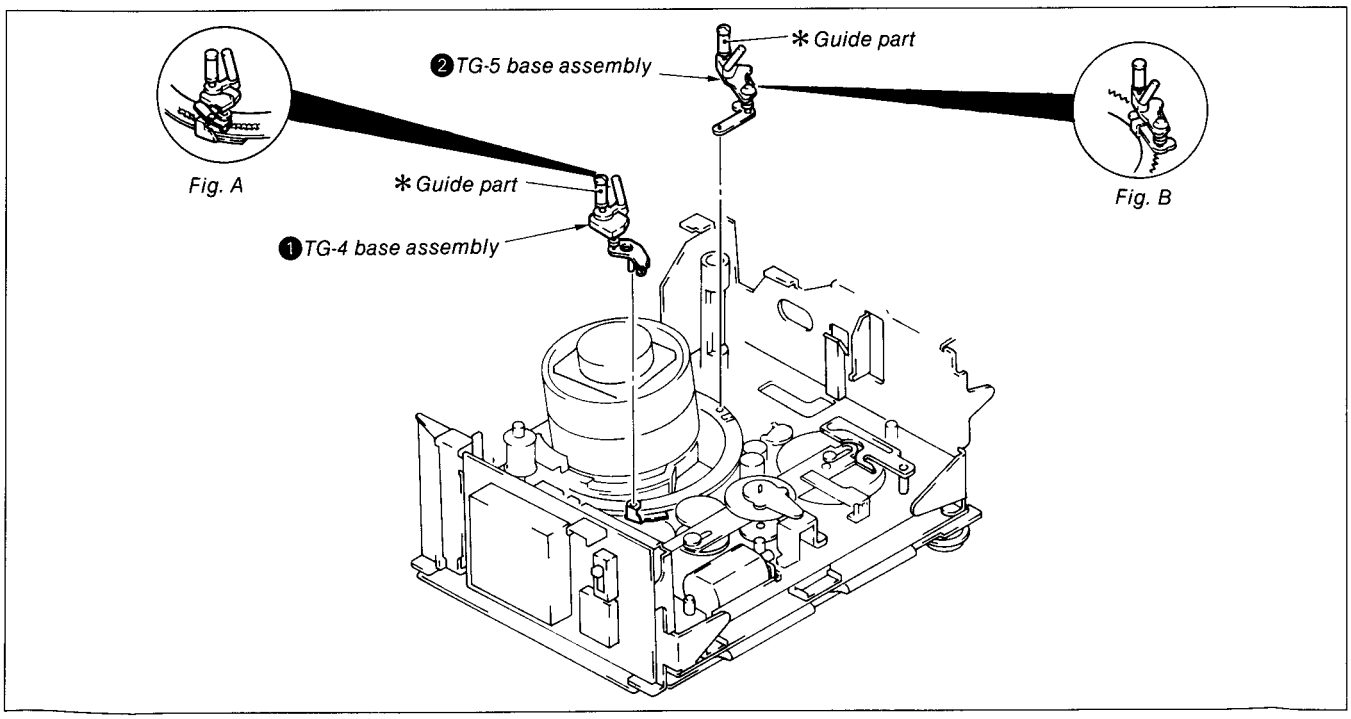


Fig. 8-27.

8-3-15. Loading Slider T Assembly (See Fig. 8-28)

1. Removal

1) By referring to 8-1-1 and 8-1-2, remove cassette arm assembly and LS cassette compartment assembly.
2) By referring to 8-3-10, remove LS chassis assembly.
3) By referring to 8-3-14, remove TG-4 base assembly and TG-5 base assembly.
4) By referring to 8-3-24, remove drum unit.
5) Remove screw ❶, and remove plate spring T ❷ and T slider stopper ❸.
6) Remove screw ❹ and remove slider supporter ❺.
7) Remove two lock washers ❻ and remove loading slider T assembly ❼.

2. Installation

1) Apply molten grease to the arrow marked point of plate spring T ❷, as shown in Fig. A.
2) Apply molten grease to the arrow marked point of loading slider T assembly ❼, as shown in Fig. B.
3) Install loading slider T assembly ❼ by matching hole ❽ of the loading slider T assembly to hole ❾ of the loading slider S assembly.
4) Install two locking washers ❻.
5) Install slider supporter ❺ with screw ❹.
6) Install T slider stopper ❸ and plate spring ❷ with screw ❶.
7) By referring to 8-3-24, install drum unit.
8) By referring to 8-3-14, install TG-4 base assembly and TG-5 base assembly.
9) By referring to 8-3-10, install LS chassis assembly.
10) By referring to 8-1-1 and 8-1-2, install cassette arm assembly and LS cassette compartment assembly.

Notes:

1) Be sure to confirm that lock washer ❷ has been engaged completely into the groove of the shaft.
2) By referring to 8-3-17, perform phase adjustment after loading slider T assembly ❼ is installed.

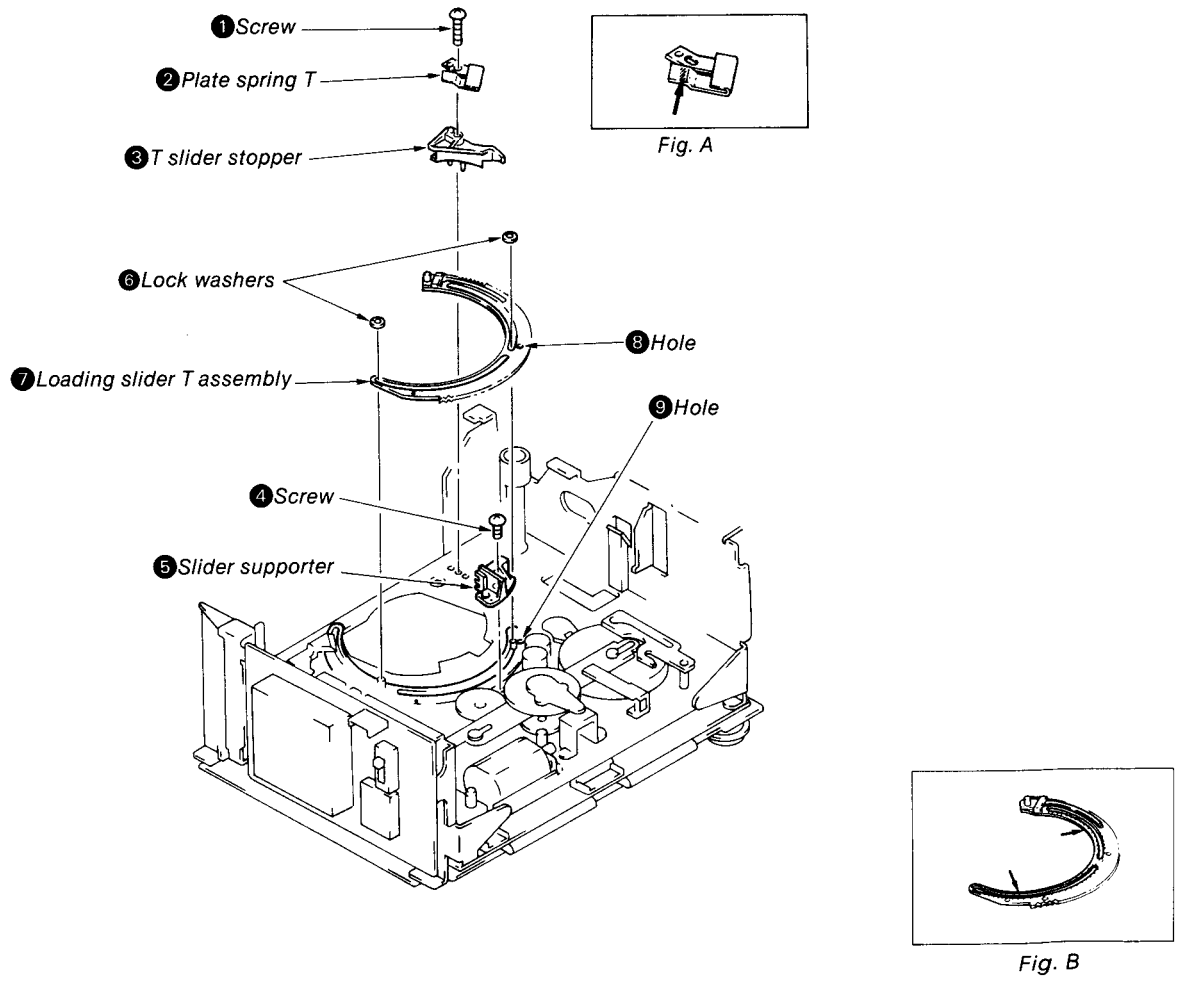


Fig. 8-28.

8-3-16. Loading Slider S Assembly (See Fig. 8-29)

1. Removal

1) By referring to 8-1-1 and 8-1-2, remove cassette arm assembly and LS cassette compartment assembly.
2) By referring to 8-3-10, remove LS chassis assembly.
3) By referring to 8-3-14, remove TG-4 base assembly and TG-5 base assembly.
4) By referring to 8-3-24, remove drum unit.
5) By referring to 8-3-15, remove loading slider T assembly.
6) Remove screw ❶ and remove S slider stopper ❷.
7) Remove two guide rollers ❸ and remove loading slider S assembly ❹.

2. Installation

1) Apply a little molten grease to the arrow marked two point of shaft ❺, as shown in Fig. A.
2) Apply molten grease to the arrow marked point of loading slider S assembly ❹, as shown in Fig. B.
3) Install loading slider S assembly ❹ by matching hole ❻ of loading slider S assembly to hole ❼ of the mechanical chassis.
4) Install two guide rollers ❸.
5) Install S slider stopper ❷ with screw ❶.
6) By referring to 8-3-15, install loading slider T assembly.
7) By referring to 8-3-24, install drum unit.
8) By referring to 8-3-14, install TG-4 base assembly and TG-5 base assembly.
9) By referring to 8-3-10, install cassette arm assembly and LS cassette compartment assembly.
10) By referring to 8-1-1 and 8-1-2, install cassette arm assembly and LS cassette compartment assembly.

Note:

By referring to 8-3-17, perform phase adjustment after loading slider T assembly has been installed.

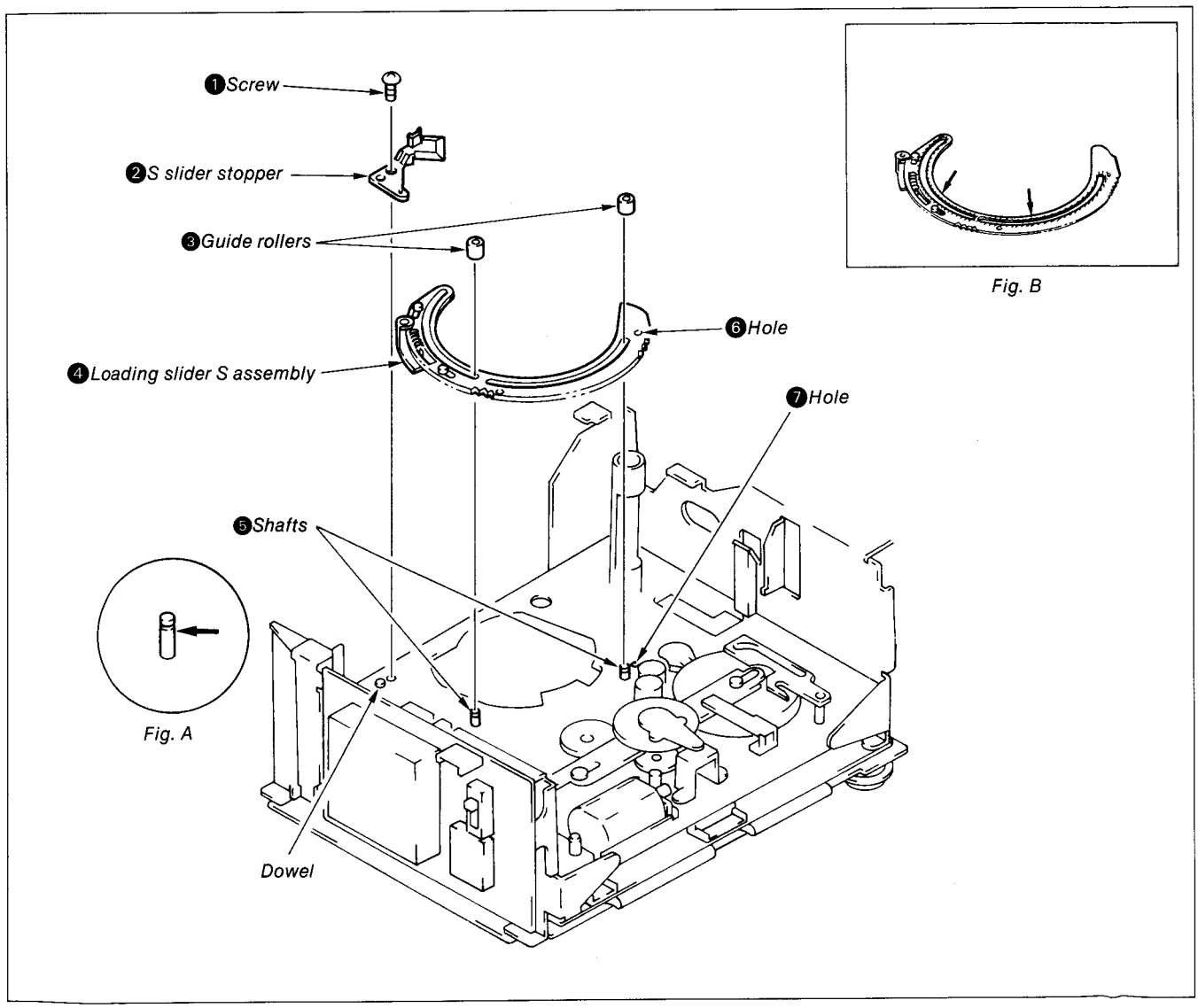


Fig. 8-29.

8-3-17. Phase Adjustment (See Fig. 8-30)

1. Removal

1) By referring to 8-1-1 and 8-1-2, remove cassette arm assembly and LS cassette compartment assembly.
2) By referring to 8-3-10, remove LS chassis.
3) By referring to 8-3-14, remove TG-4 base assembly and TG-5 base assembly.
4) By referring to 8-3-24, remove drum unit. (See Fig. 8-30)
5) Remove the stopper washer ❿ and then remove the loading gear S ❻.
6) Remove the stopper washer ❽ and the LS gear A ❼.

2. Adjustment

1) Confirm that it has been turned into BLANK after GUIDE LOAD mode.
2) Adjust the positions of the respective holes of loading slider T assembly ❷, loading slider S assembly ❸, and the mechanical chassis, and then insert a rods ❶ of approximately 1mm in diameter into the holes.
3) Adjust the position of the hole of LS gear C assembly and the position of the hole of the mechanical chassis, and insert rods ❶ of approximately 1mm in diameter into the holes.
4) Adjust by turning loading gear M ❺ so that the notch portion on it comes to the loading gear S ❻ side, as shown in Fig. A.
5) As shown in Fig. B, align the hole of the loading slider T assembly ❷ with that of the LS gear A ❼, and mount the LS gear A ❼.
6) Install stopper washer ❽.
7) Remount the loading gear S ❻, and then install, the stopper washer ❿.

Note:

Be sure to confirm that stopper washer ❽ and ❿ are set completely in the groove of the shaft.

3. Installation

1) Similarly to Fig. C, apply grease (one drop equivalent to a grain of rice) to the five positions on the internal grove of the cam assembly ❾.
2) By referring to 8-3-25, install drum unit.
3) By referring to 8-3-14, install TG-4 base assembly and TG-5 base assembly.
4) By referring to 8-3-10, install LS chassis assembly.
5) By referring to 8-1-1 and 8-1-2, install cassette arm assembly and LS cassette assembly.

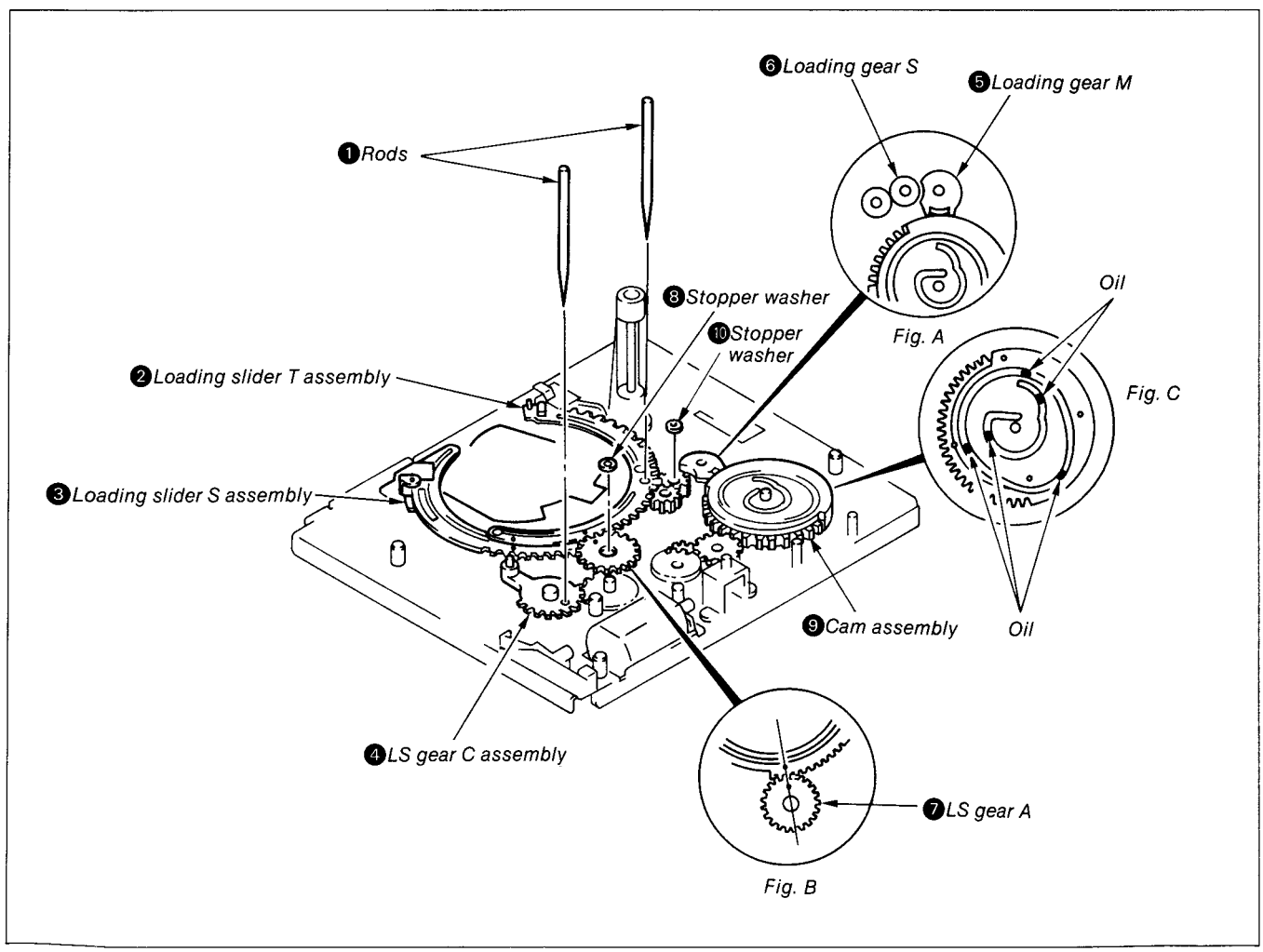


Fig. 8-30.

8-3-18. Gear Train Operation Check (See Fig. 8-31)

1. Removal

1) By referring to 8-1-1 and 8-1-2, remove cassette arm assembly and LS cassette compartment assembly.
2) By referring to 8-3-10, remove LS chassis assembly.
3) By referring to 8-3-14, remove TG-4 base assembly and TG-5 base assembly.
4) By referring to 8-3-24, remove drum unit.
5) By referring to 8-3-21, remove LM motor assembly.

2. Checking

1) Insert a point of tweezers into the hole of the cam assembly ❶.
2) Rotate the cam assembly ❶ once around in the direction of arrow Ⓐ, and then once around in the direction of arrow Ⓑ. Repeat the above three times.
3) At this point, confirm that the individual gears and sliders shown in Fig. are being operated smoothly, and there are no abnormal loading.

Note:

When making cam assembly ❶ to rotate with the point of tweezers, exercise cautions so as not to cause flaw to the mechanical chassis.

3. Installation

1) By referring to 8-3-21, install LM motor assembly.
2) By referring to 8-3-24, install drum unit.
3) By referring to 8-3-14, install TG-4 base assembly and TG-5 base assembly.
4) By referring to 8-3-10, install LS chassis assembly.
5) By referring to 8-1-1 and 8-1-2, install cassette arm assembly and LS cassette compartment assembly.

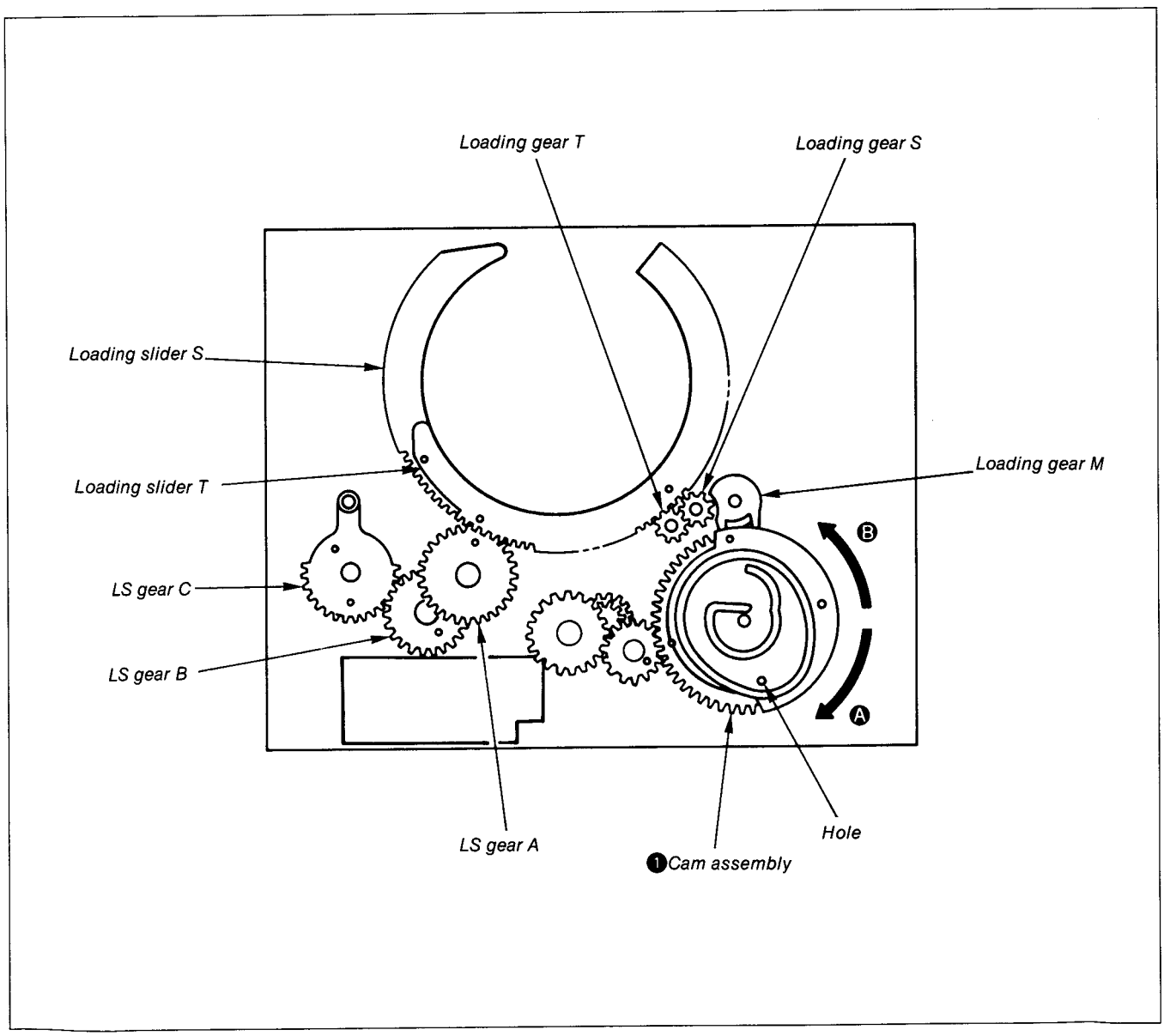


Fig. 8-31.

8-3-19. FP-53 Flexible Board (See Fig. 8-32)

1. Removal

1) By referring to 8-1-1 and 8-1-2, remove cassette arm assembly and LS cassette compartment assembly.
2) By referring to 8-3-10, remove LS chassis assembly.
3) By referring to 8-3-4, remove T reel table assembly.
4) By referring to 8-3-3, install S reel assembly.
5) Remove two claws ❶ and lift the push switch. Then, peel off the flexible board ❷ stuck to the LS chassis.

Note:

When peeling off FP-53 flexible board ❷, care must be taken so as not to tear it.

2. Installation

1) Clean the joint section of the LS chassis assembly and the FP-53 flexible board ❷ with a cleaning liquid.
2) Peel off the sheet covering of the adhesion tape on the rear side of a new FP-53 flexible board ❷ and match the shaft hole to shaft ❸ of the LS chassis and claw, and thus the tape is adhered.
3) Adjust dowel ❺ (two positions) and install it with claws ❶, and match hole of FP-53 flexible board ❷ to dowel ❻.
4) By referring to 8-2-3,
5) By referring to 8-3-4, install T reel table assembly.
6) By referring to 8-3-10, install LS chassis assembly.
7) By referring to 8-1-1 and 8-1-2, install cassette arm assembly and LS cassette compartment assembly.

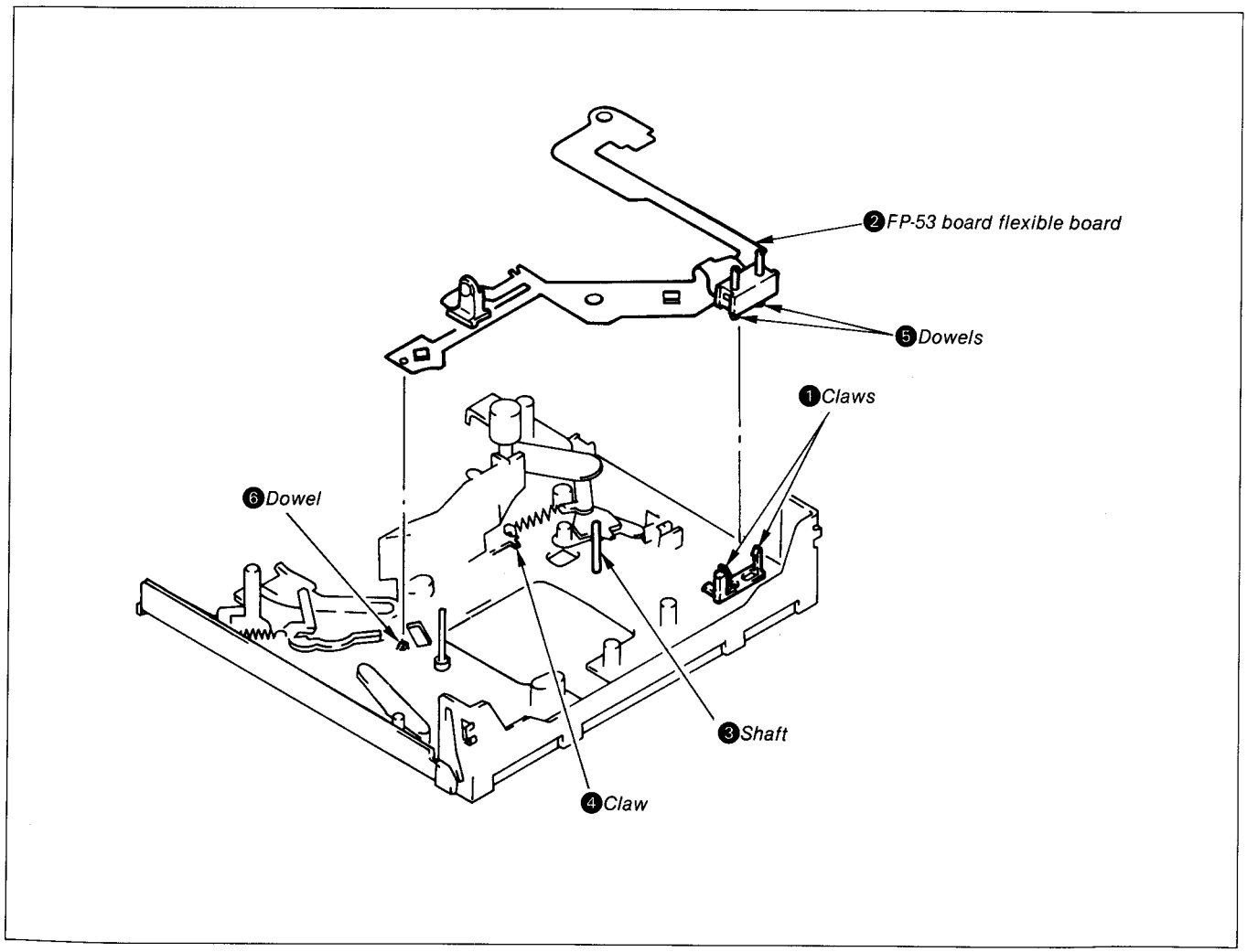


Fig. 8-32.

8-3-20. Cassette Compartment Lock Assembly (See Fig. 8-33)

1. Removal

1) By referring to 8-1-1 and 8-1-2, remove cassette arm assembly and LS cassette compartment assembly.
2) By referring to 8-3-10, remove LS chassis assembly.
3) Remove screw ❶ and screw ❷, and remove cassette compartment lock assembly ❸.
4) Remove screw ❹ and remove CCD switch ❺.

2. Installation

1) Install CCD switch ❺ with screw ❹.
2) Match cassette compartment lock assembly ❸ to dowel ❻, and install.
3) Install screw ❷ loosely and then tighten screw ❶ and screw ❷ successively in this order.
4) By referring to 8-3-10, install LS chassis assembly.
5) By referring to 8-1-1 and 8-1-2, install cassette arm assembly and LS cassette compartment assembly.

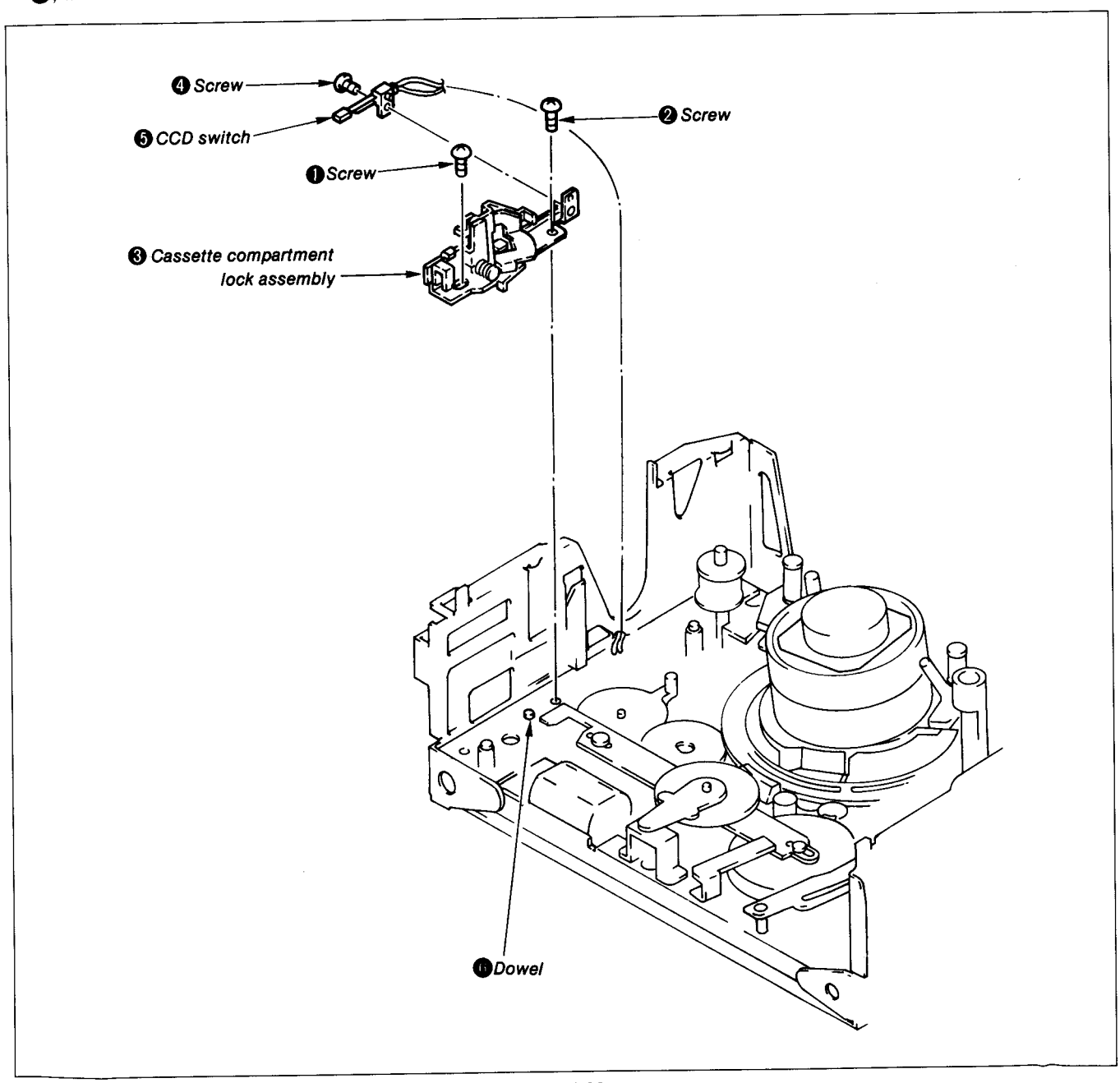


Fig. 8-33.

8-3-21. LM Motor Assembly (See Fig. 8-34)

1. Removal

1) By referring, Section 2 DISASSEMBLY, 2-6 Opening the SS-70 board.
2) Remove screws ❶, ❷ and ❸, and remove the LM motor assembly ❹ in the direction of arrow Ⓐ .
3) Remove two screws ❺ and disassemble motor holder assembly ❻ and DC motor ❼.
4) Remove stopper washer ⓭ and remove worm wheel ❿ from shaft ❽.
5) Remove the solder of the two cords ⓫ coming out from the DC motor ❼ and remove the DC motor ❼ from the mechanical chassis.

2. Installation

1) Solder the two cords coming out from the DC motor ❼ which is shown in Fig. A, to the two points as shown in Fig.
2) Apply 1/3 drop of oil onto shaft ❽ and install a worm wheel A ❿.
3) Apply a size of one rice grain of grease to worm ❾.
4) Install motor holder assembly ❻ and DC motor ❼.
5) Install motor holder assembly ❻ to pin ⓬ of the mechanical chassis by matching the hole of it.
6) Tighten the screws ❸, ❷ and ❶ in that order.

Note:

- Be sure to perform the soldering at 260°C within 5 seconds.
- Pull out the cord coming from the DC motor ❼ lest it should sag over the chassis.

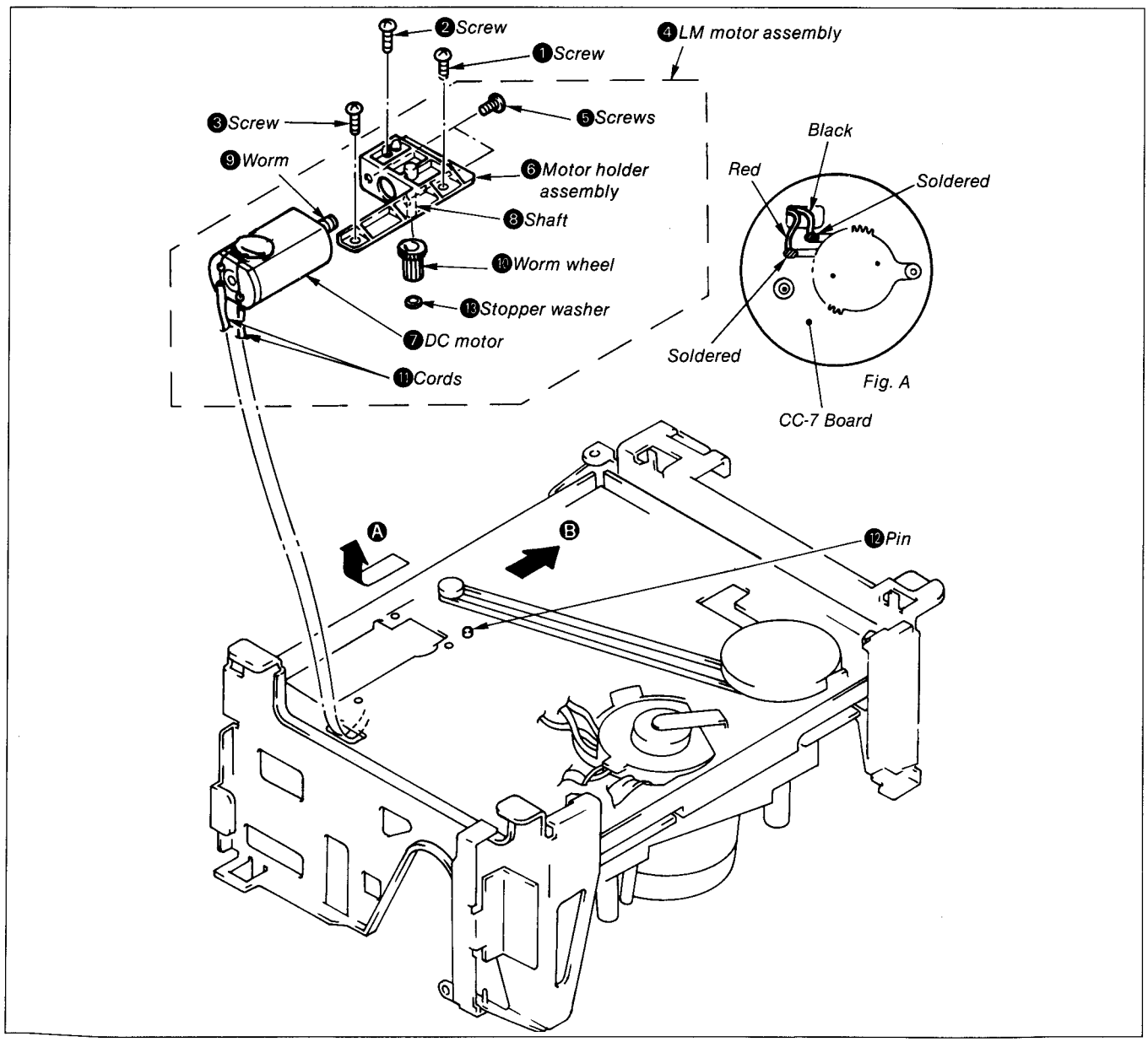


Fig. 8-34.

8-3-22. Capstan Motor Assembly (See Fig. 8-35)

1. Removal

1) By referring Section 2 DISASSEMBLY, 2-6 opening the SS-70 board.
2) Remove screws ❶ and ❷, and remove capstan motor assembly ❺.
3) Remove stopper washer ❻ and conversion gear assembly ❼, and remove relay belt ❸.

Note:

Do not touch the capstan motor shaft marked with * oil seal marked with * and rotor marked with *.

2. Installation

1) As shown in Fig. A. apply over 1/3 drop and below 1/2 drop of oil to the arrow marked point of shaft ❽.
2) Install conversion gear assembly ❼ to shaft ❽ while applying relay belt ③ to the assembly.
3) Install stopper washer ❻.
4) Install capstan motor assembly ❺ to mechanical chassis while applying relay belt ❸ to pulley ❹.
5) Be sure to confirm that the capstan motor and mechanical chassis become horizontal, and install them with screws ❶ and ❷ successively in that order.

Notes:

1) Be sure to confirm that stopper washer ❻ is being set completely into the groove of shaft ❽.
2) Care should be taken so as not to leave the relay belt ❸ in the stretched state.

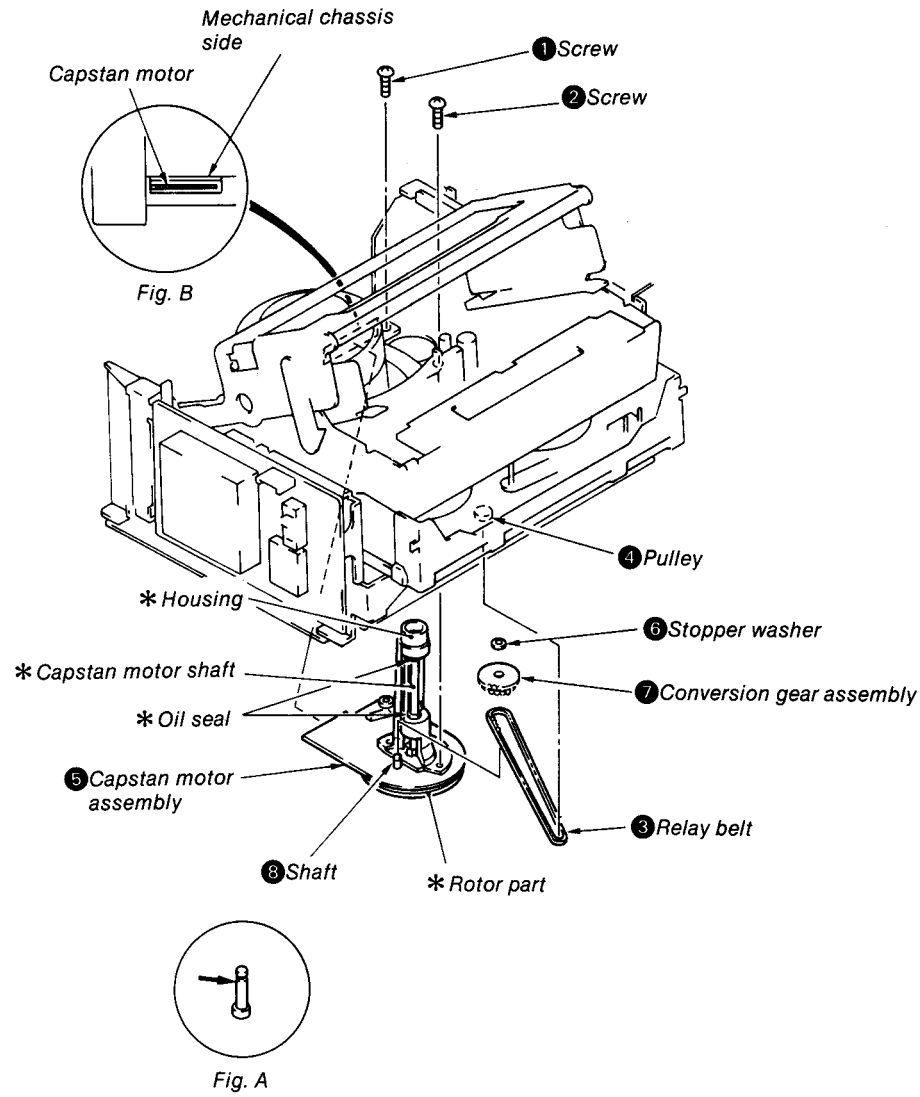


Fig. 8-35.

8-3-23. TG-2 (See Fig. 8-36)

1. Removal

1) Remove TG-2 nut ❶.
2) Remove upper flange receptacle ❷. TG-2 flange ❸. TG-2 roller ❹. TG-2 sleeve ❺. TG-2 flange ❻. TG-2 lower flange receptacle ❼ and pressure coil spring ❽.

Notes:

1) When removing TG-2 nut ❶, taken precautions not to scatter the parts which are being pressed by the pressure coil spring ❽.
2) Be sure to use gloves when installing and removing TG-2 flange ❸ and TG-2 roller ❹.

2. Installation

1) Install pressure coil spring ❽. Upper flange receptacle ❼, TG-2 lower flange ❻. TG-2 sleeve ❺. TG-2 roller ❹. TG-2 flange ❸ and upper flange receptacle ❷.
2) Install TG-2 nut ❶.
3) Perform TG-2 height preset.

3. TG-2 height preset

1) Push up upper flange receptacle ❾ in the direction of arrow as shown in Fig. A.
2) Screw TG-2 nut ❶ into TG-2 shaft ❿ until slit part heigh becomes the same level of the upper surface of TG-2 shaft ❿.
3) Rotate TG-2 nut ❶ 1/2 times in the direction of arrow as shown in Fig. B.

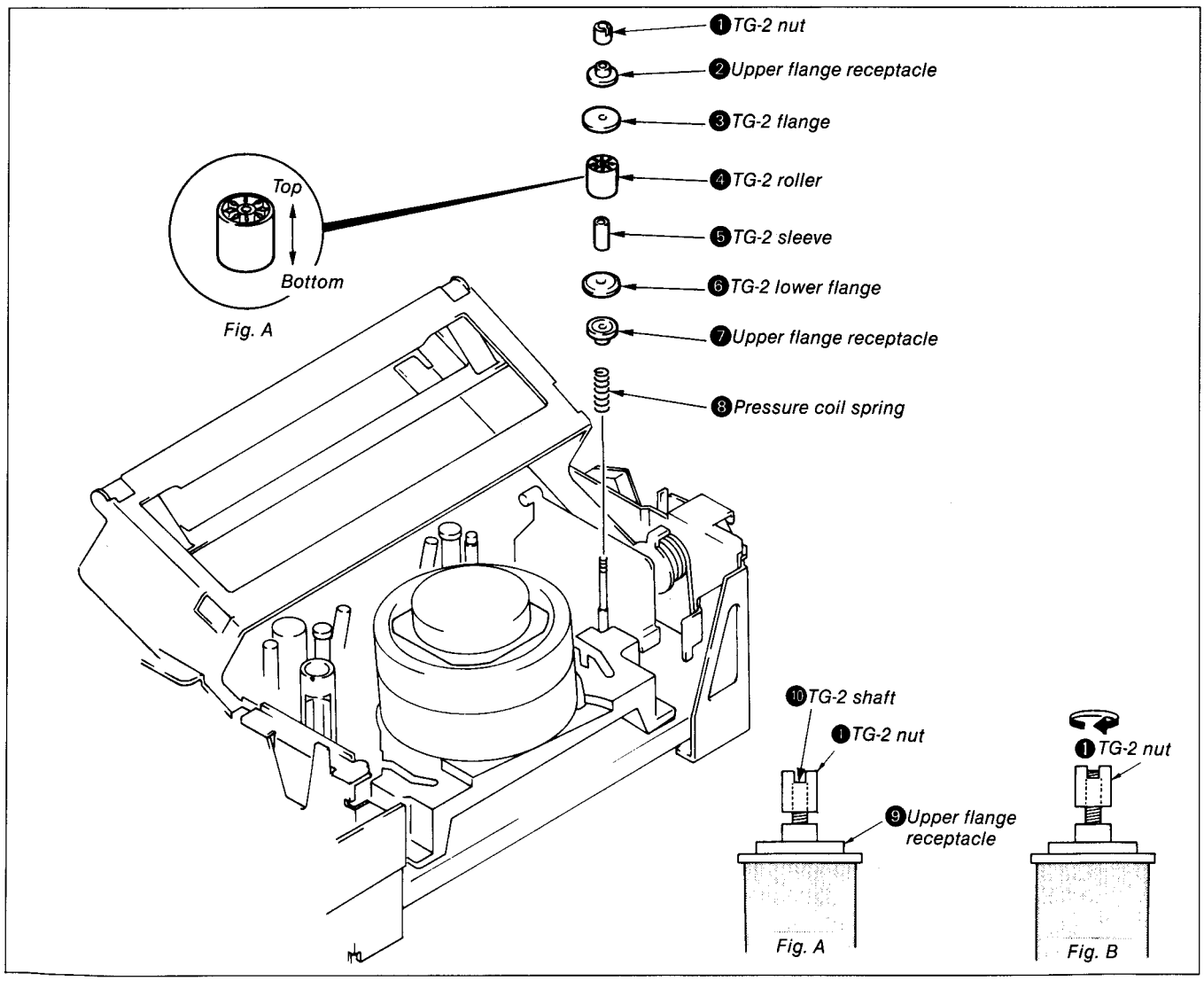


Fig. 8-36.

8-3-24. Drum Unit (See Fig. 8-37)

1. Removal

1) Turn into [EJECT] mode.
2) By referring, Section 2 DISASSEMBLY, 8-6 open SS-70 board and remove two connectors ❶.
3) Remove two connectors ❷ from MR-8 board.
4) Remove two screws ❸ and a screw ❹, and remove drum base ❺ and dew condensation sensor ❻.
5) Remove three screws ❻ and three washers ❼, and remove drum unit ❽.

2. Installation

1) Install drum unit ❽ to drum base ❺ and set three screws ❻.
2) Mount drum base ❺ on the mechanical chassis and secure it with two screws ❸.
3) Tighten dew condensation sensor ❻ and drum base ❺ with screw ❹.

   Note:

   Be sure not to use screws ❸ and ❹ again after they have once been loosened.
4) Apply molten grease to the arrow marked point, as shown in Fig. A.
5) Install two connectors ❶ to SS-70 board.
6) Install two connector ❷ to MR-8 board.
7) By referring, Section 2 DISASSEMBLY, 2-6, install SS-70 board.
8) Perform tape path adjustment in item 8-4.

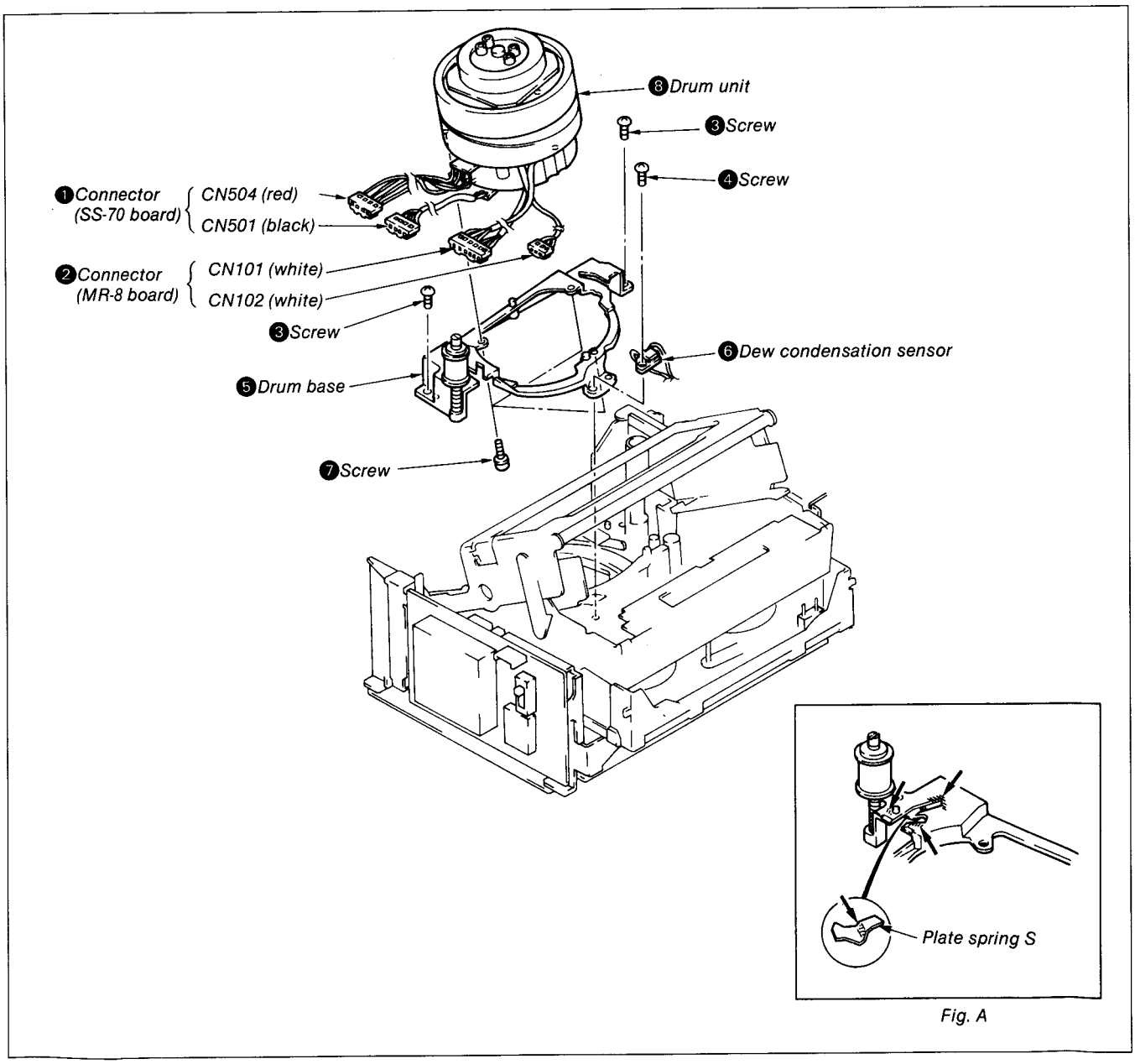


Fig. A

Fig. 8-37.

8-3-25. Replacement of Rotary Upper Drum

1. Removal

- If video recording is possible, make video recording prior to the removal.

1) Remove two hexagonal socket head cap screws ❶ and damper ❷.
2) Remove all the six points of soldering in ⓐ section, and confirm that the board and pins which are projected from the lower side of the board can be moved freely by touching with tweezers, etc.
3) Remove two hexagonal socket head cap screws ❸. (See Fig. 8-39)
4) Install jig ❻ (Ref No. J-10) with the attached two screws ❹ into the screw hole where the damper ❷ had been installed and twist the attached hexagonal socket head cap screw ❺ into jig ❻. By doing so, the rotary drum becomes floated to the top side and this acts to remove the rotary upper drum ❼. (See Fig. 8-38.)

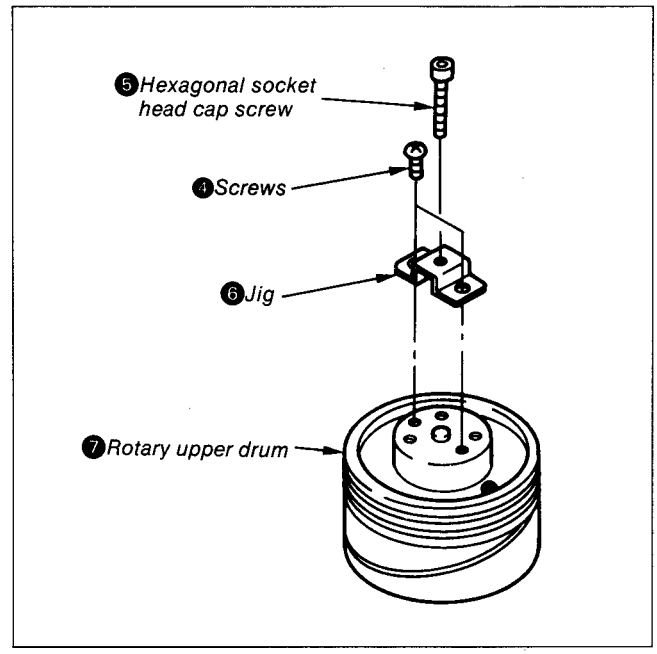


Fig. 8-38.

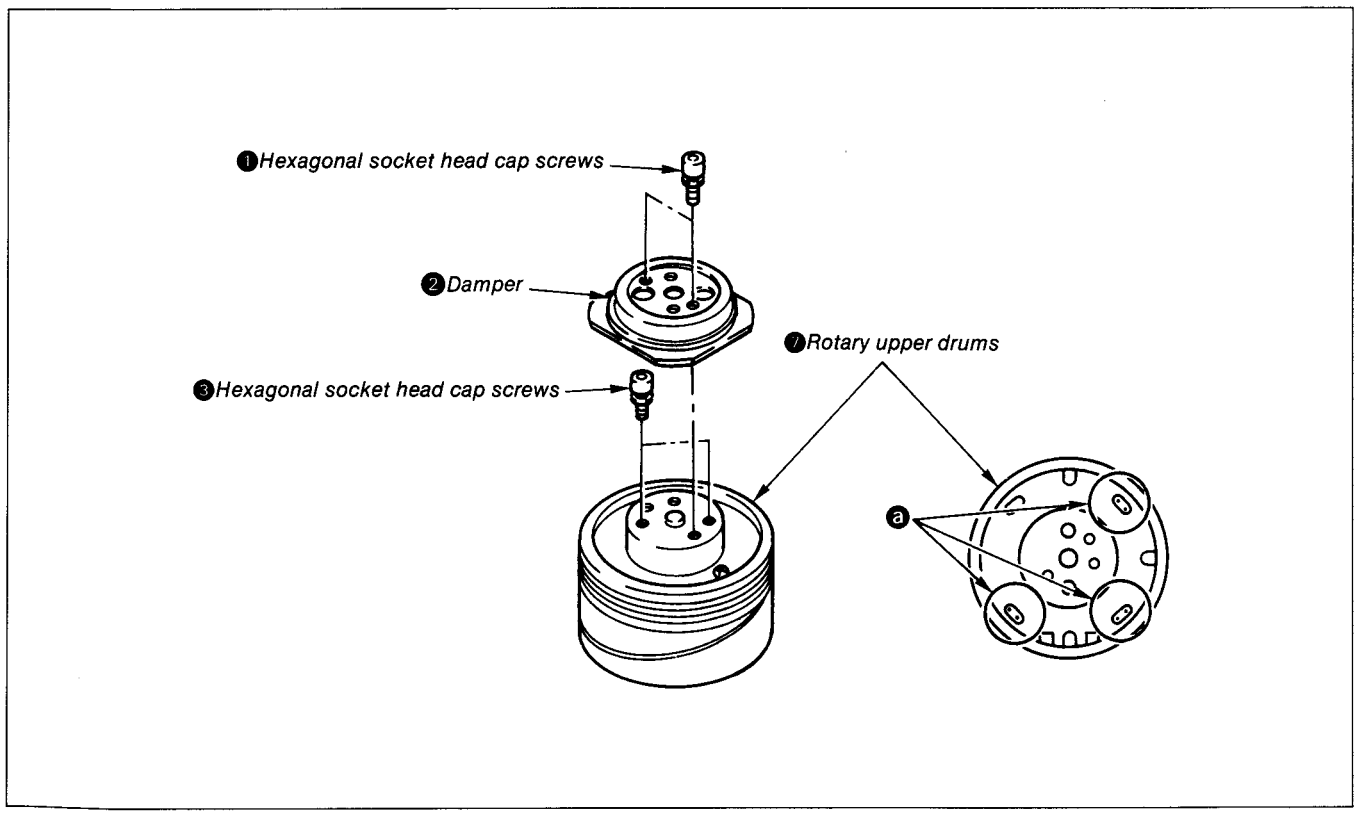


Fig. 8-39.

2. Installation

1) Perform cleaning of flange surface and rotary upper drum ❼ surface which are contacted to it, and confirm that there are no dust and flaws.
2) Insert jig ❾ (Ref No. J-10) of the rotary upper drum ❼ into the position determining hole and set it lightly to the rotary upper drum.

Note:

At this point, be sure to confirm that pin ❿ appears from the hole of the board on which the rotary upper drum is mounted. (Fig. 8-40).

3) Remove jig ❾ from upper rotary drum ❼ and push it gently into lower one manualy. However, when it cannot be inserted thoroughly, tighten two hexagonal socket head cap screws ❸ alternately to secure it temporarily.
4) Insert jig ❾ again into position determining holes ❽, and be sure to confirm that it can be inserted smoothly.
When it cannot be inserted, loosen 2 hexagonal socket head cap screws ❸, and by referring to Removal 3), set it again.
5) Tighten 2 hexagonal socket head cap screws ❸.
6) Solder pin ❿ of a section.

Note:

At this point, be sure not to let the soldering flow underneath the board.

7) Install damper ❷ with two hexagonal socket head cap screws ❶.

Notes:

1) Be sure not to tighten too strongly.
2) When performing installation, special care should be taken so as not to mistake the hexagonal socket head cap screws ❸ (2 × 5) with that of ❶ (2 × 2.7).
3) Be sure to perform 8-4 tape path adjustment after installation.

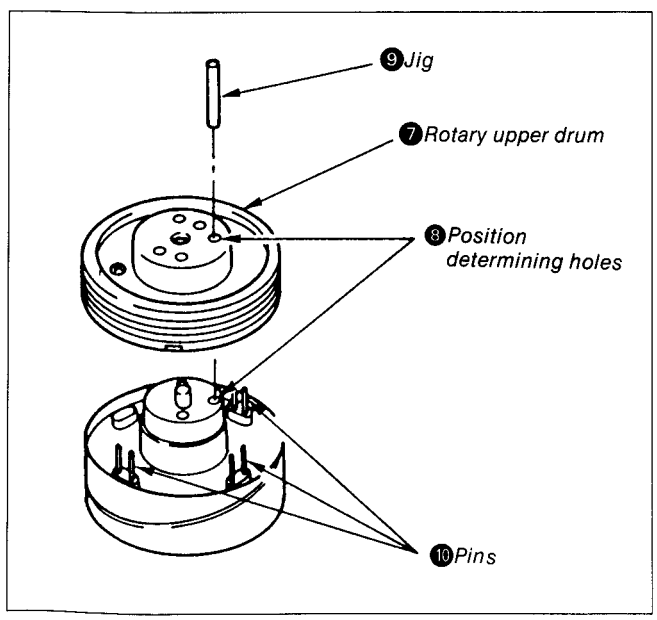


Fig. 8-40.

8-3-26. Reel Table Height Check (See Fig. 8-41)

1. Removal

1) By referring to 8-1-1 and 8-1-2, remove cassette arm assembly and LS cassette compartment assembly.
2) By referring to 8-3-1, remove reel lock lever.
3) By referring to 8-3-2, remove pendulum stopper plate.

2. Checking

1) Confirm by using calipers, etc., so that the heights from LS chassis ❶ to S reel table reel receptacle plate surface ❷ and from LS chassis to T reel table reel receptacle plate surface ❸ should respectively be 6.85 ± 0.15mm.

3. Installation

1) By referring to 8-3-2, install pendulum stopper plate.
2) By referring to 8-3-1, install reel lock lever assembly.
3) By referring to 8-1-1 and 8-1-2, install cassette arm assembly and LS cassette compartment assembly.

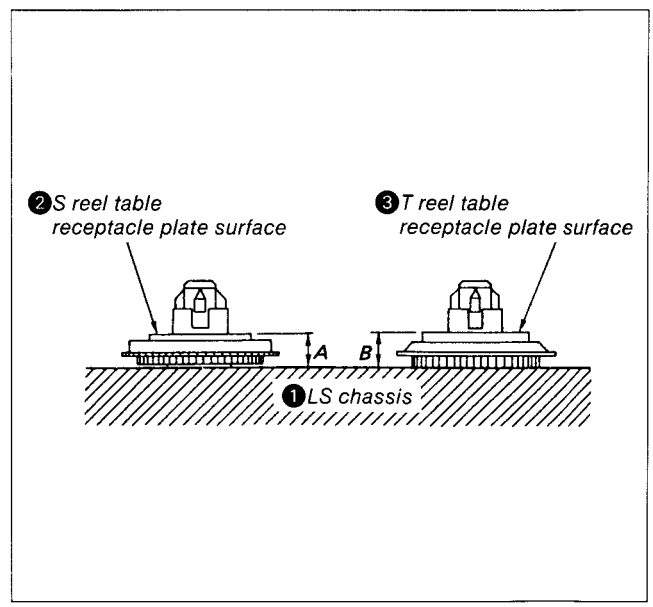


Fig. 8-41.

8-3-27 FWD/RVS Torque Check

1) Set the FWD and RVS take up torque cassette (Ref. No. J-9).
2) Turn into [FWD] mode, and confirm torque value at the T reel side becomes 11 gcm to 19 gcm.
3) Turn into [REC REVIEW] mode, and confirm torque value at the S reel side becomes 20 gcm to 32 gcm.
4) In the event the above-mentioned value are not indicated, be sure to replace the individual reel tables.

8-3-28 Tension Regulator Position Adjustment

1. Removal

1) By referring to 8-1-1 and 8-1-2, remove cassette arm assembly and LS cassette compartment assembly.

2. Adjustment

1) Set a cassette tape and turn into [REC] mode and run the tape. (See Fig. 8-1-4)
2) In tape running state, confirm whether the arrow marked Ⓐ point is positioned at the point (arrow mark Ⓑ) 1/3 within the thickness of LS guide ❷ or not. (See Fig. 8-42)
3) When it is not at the specified position, remove the cassette and perform the adjustments described in after step 4).
4) Loosen screw ❸.
5) If TG-1 arm assembly ❶ is within the inner side than the specified position, shift the tension regulating band plate ❹ slightly in the direction of arrow Ⓒ. If it is in the outer side, shift it slightly in the direction of arrow Ⓓ and secure it with screw ❸. (See Fig. 8-43)

Notes:

1) Use a cassette tape which has been forwarded to about the middle section.
2) Perform steps 4) and 5) after extracting cassette tape.

3. Installation

By referring to 8-1-1 and 8-1-2, install cassette arm assembly and LS cassette compartment assembly.

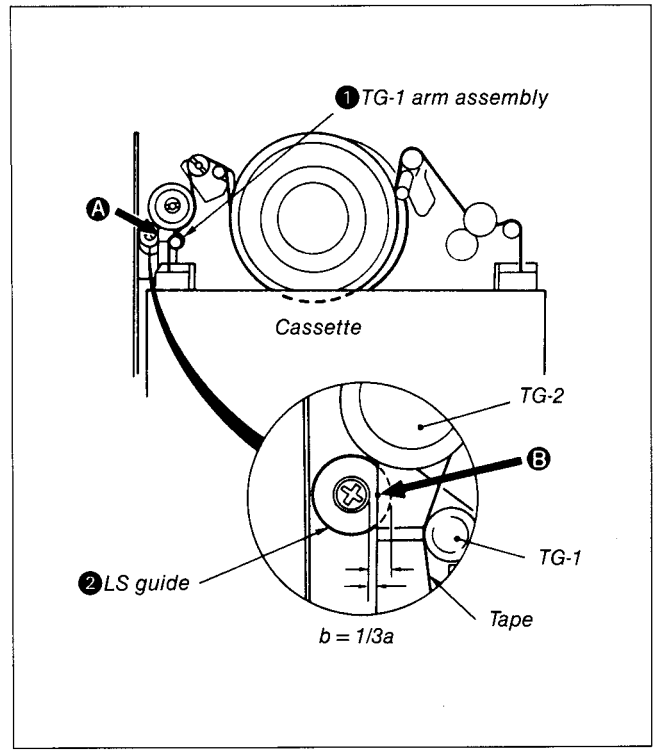


Fig. 8-42.

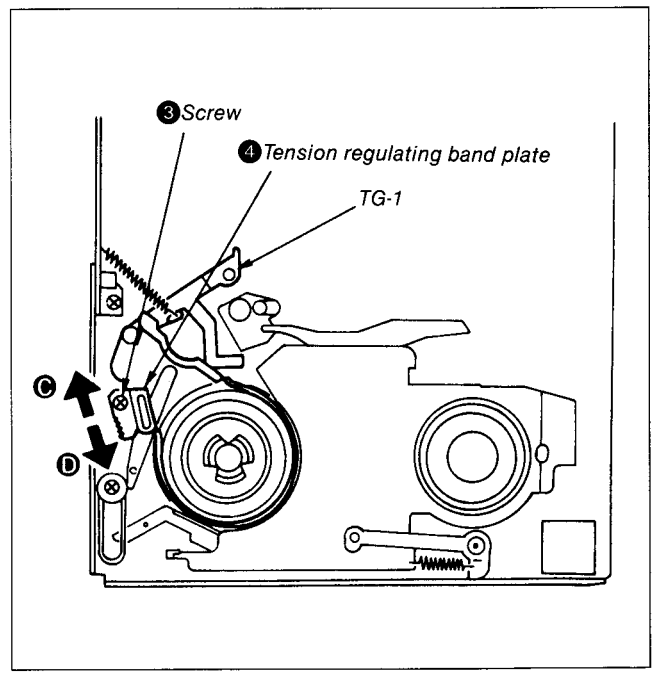


Fig. 8-43.

8-3-29. FWD Back Tension Adjustment

1. Removal

By referring to 8-1-1 and 8-1-2, remove cassette arm assembly.

2. Adjustment

1) Turn into [REC] mode.
2) Set the tension measuring exclusive reel (Ref. No. J-7) ❶.
3) Measure tape tension of the outgoing side by using dial tension gauge (Ref. No. J-6) ❷. At this point, the measurement should be conducted by pulling the tape at the speed of 14mm/sec. (See Fig. 8-44)
4) Move spring hooking position ❹ of tension regulating spring ❸ so that the tension applied becomes within the range of 6.9 to 7.9g. (See Fig. 8-45)

3. Installation

1) By referring to 8-1-1 and 8-1-2, install cassette arm assembly and LS cassette compartment assembly.

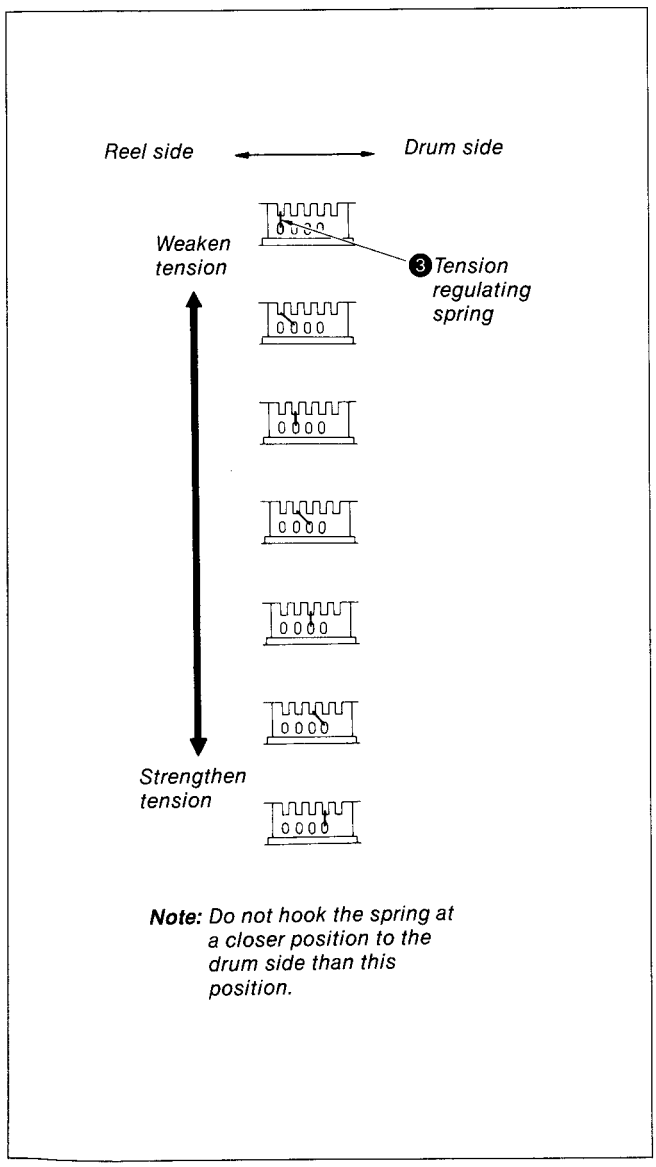


Fig. 8-44.

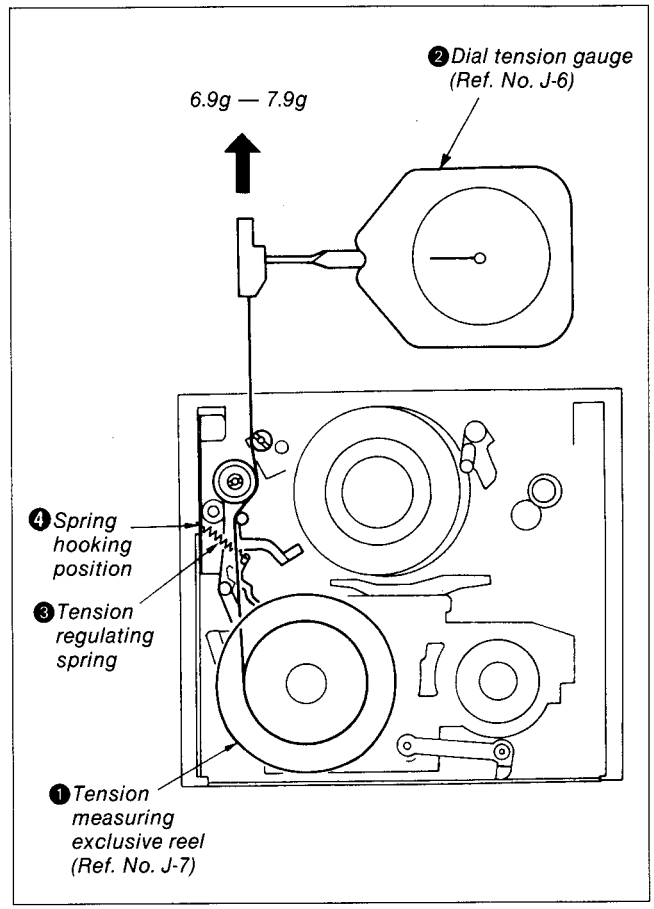


Fig. 8-45.

8-3-30. TS Gear Assembly (Refer to Fig. 8-46)

1. Removal

1) By referring to 8-1-1 and 8-1-2, remove cassette arm assembly and LS cassette compartment assembly.
2) By referring to 8-3-1, remove reel lock lever assembly.
3) By referring to 8-3-2, remove the pendulum stopper plate.
4) By referring to 8-3-4, remove the T reel table assembly.
5) Remove TS gear assembly ❶.

2. Installation

1) Install TS gear assembly ❶ to shaft ❷.
2) By referring to 8-3-4, install T reel table assembly.
3) By referring to 8-3-2, install pendulum stopper plate.
4) By referring to 8-3-1, install reel lock lever assembly.
5) By referring to 8-1-1 and 8-1-2, install cassette arm assembly and LS cassette compartment assembly.

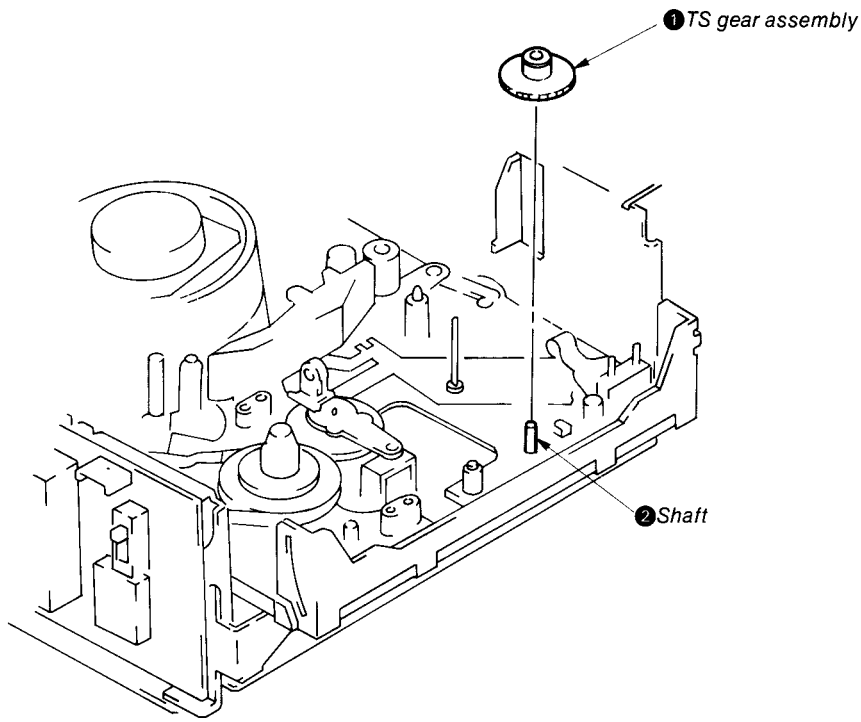


Fig. 8-46.

8-4. TAPE PATH ADJUSTMENT

- Perform this adjustment after comfirming that the electrical adjustment has been completed.

REGARDING TRACK SHIFT & MONITOR JIG

The video 8 system employs a high precision tracking ATF (automatic track finding) and instantaneously controls the tape running speed with the four kinds pilot signals. In this way, the tracking adjustment knob becomes unnecessary, and accurate tracing has become possible.
However, on the other hand, there has been difficulty in adjusting the tape path system with the ATF method. It was due to the fact that complete adjustment had been impossible to be performed because even when the tracing of the head had been a slightly off course, the ATF would perform correction automatically.
Because of this, adjustment is carried out to the tape path system by using the track shift & monitor jig (Ref. No J-6080-843-A). As the track shift and monitor jig forcibly releases the ATF and sets the tracking amount (track shift) manually, the adjustment of the tape path system can easily be carried out.

- Perform this adjustment after the Section 7, camera adjustments and Section 9, video adjustments have been completed.

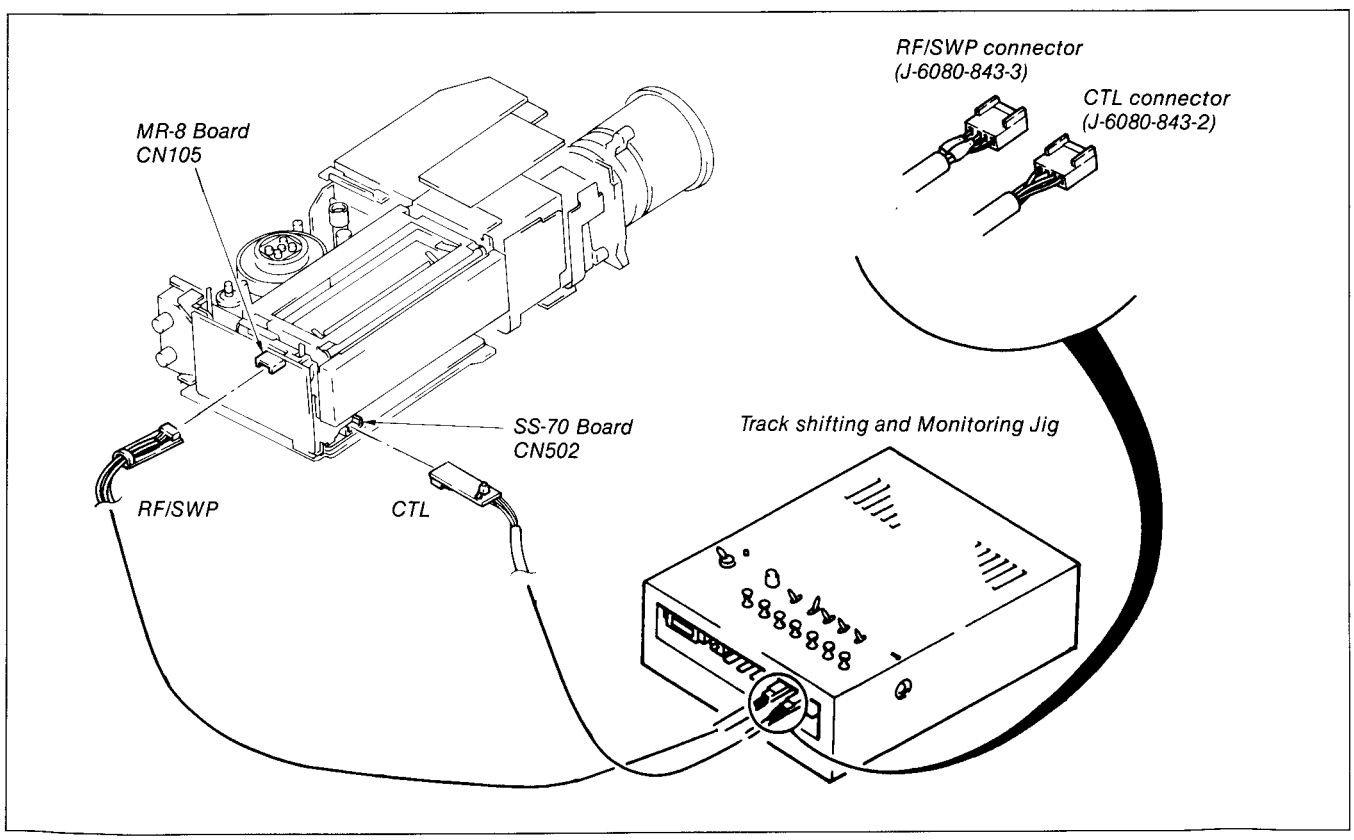


Fig. 8-50.

8-4-1. TRACK SHIFTING AND MONITORING JIG CONNECTING PROCEDURE

1) Supply power to Power Supply Connector (PS IN) as follows:
   SYSTEM CONN: Connect the AC-V8E/UB on that has been modified by paragraph 4) Modifying Procedure.
   AC ADP: Connect an AC adapter AC-M100E/AC-M110E/AC-M100UB for Beta movie.
   REG: Connect a commercially available 12V 3A regulated DC power supply on.
   Connect Blue Clip to its (+) positive end and Black Clip to its (−) negative end (GND), and operate it at about 8V. (Extention code: Ref No. J-18)

Note:

Priorities have been assigned to the three above connectors, where SYSTEM CONN carries the highest priority and REG the lowest.
Accordingly, even where they have been connected on together, power will be supplied to SYSTEM CONN.

2) Connection of the connector (See Fig. 8-50)

RF/SWP ....The connector which picks up the RF signals of the RF SW PULSE and CH1 and CH2 of the drum head, and it connects the RF/SWP and CN105 on the MR-8 board. (Ref No. J-17)

CTL .....The connector to supply the SEL and ATF LOCK signals and it connects the CTL and CN502 on the SS-70 board. (Ref No. J-17)

Other connectors than the above are not used in this set.

3) Setting of the individual switches

SEL .....Turn the SEL "ON" when performing track shift. When it is turned "OFF", it becomes the control on the set side being connected.

PATTERN...Set to the EV side.

ATF LOCK ..
Turn it "OFF".

Other switches than the above are not used in this set.

4) AC-V8E/UB (AC Adapter for CCD-V8E) Modifying Procedure
   i) Remove two screws ❶ and two screws ❷, and dismount Upper Housing (see Fig. 8-51)
   ii) Short pins ⑱ and ㉑ of IC5 on SB-F Board by soldering lead wire, etc. (See Fig. 8-52)
   iii) Mount Upper Housing back on, and tighten two screws ❶ and two screws ❷ (See Fig. 8-51).

Notes:

- When connecting AC-V8E/UB to Track Shifting and Monitoring Jig, be sure to modify it by the above steps in advance.
- When power is supplied with a modified AC-V8E/UB, a little pushing the AC-V8E/UB switch off.

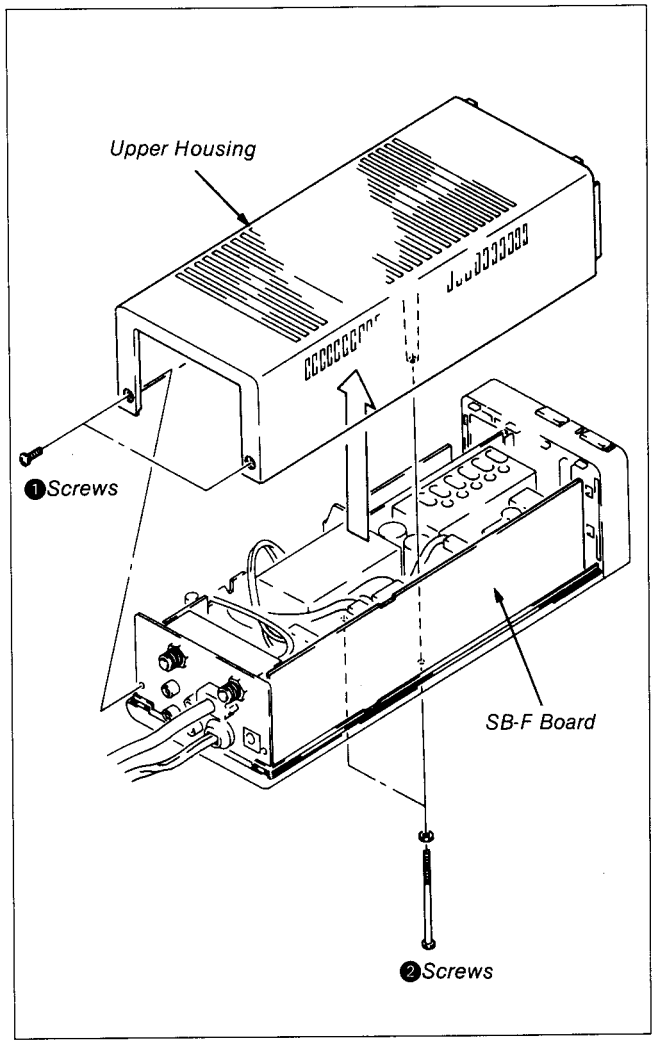


Fig. 8-51.

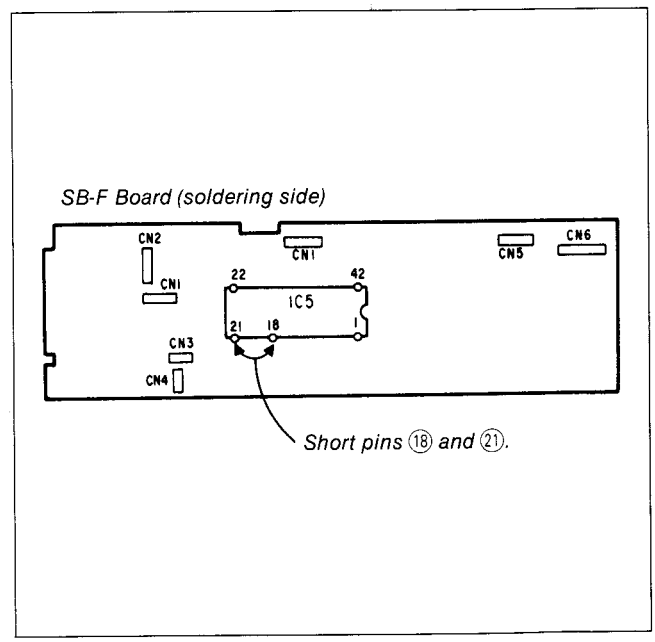


Fig. 8-52.

8-4-2. Preparation for Adjustment

1) Clean the tape running surfaces (tape guide, drum, capstan shaft, pinch roller).
2) Referring to 8-4-1 Connection Diagram of Track Shift & Monitor Jig, connect the track shift & monitor jig and set the jig switch.
3) Connect the oscilloscope.
   1CH: CN2 terminal of the track shift & monitor jig (output of the CH2 head)
   2CH: RF SWP terminal of the track shift & monitor jig (external trigger)
4) Playback the tracking alignment tape (WR5-1C)
5) Turn the track shift knob of the track shift & monitor jig to maximize the amplitude of a RF waveform. (Refer to Fig. 8-53.) When the RF waveform is unstable and difficult to adjust, made adjustment after turning on the ATF LOCK switch. Then, return it to "OFF" after adjustment.

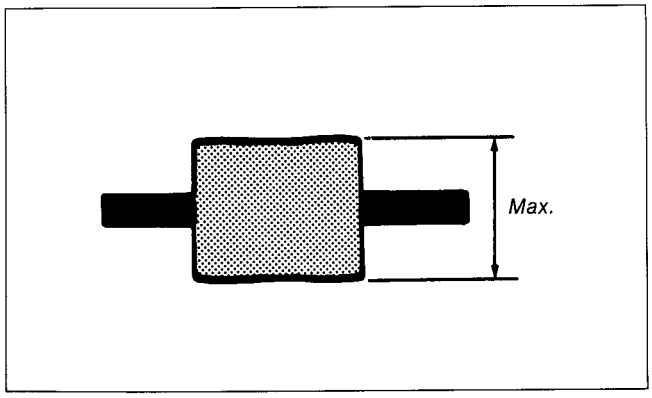


Fig. 8-53.

6) Confirm that the RF waveform of the oscilloscope is flat at both inlet and outlet sides. (Refer to Fig. 8-54ⓐ.) When it is not flat, adjust as follows:
   - When the RF waveform at the inlet/outlet side is not flat; (Refer to Fig. 8-54ⓑ or ⓒ.)
     After making tracking coarse adjustment in 8-4-3, make tracking fine adjustment in 8-4-4.

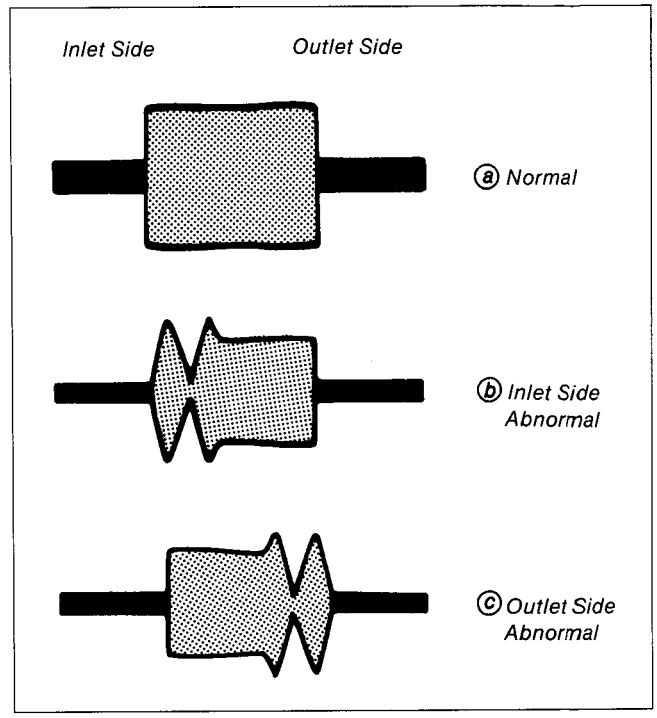


Fig. 8-54.

7) When the RF waveform is normal, proceed to 8-4-8 checks after Adjustment.

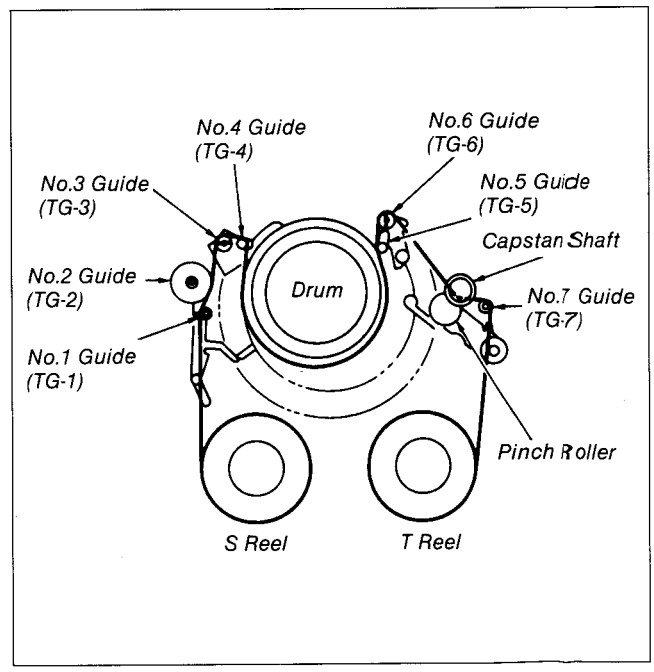


Fig. 8-55.

8-4-3. Tracking Coarse Adjustment

1) Playback the tracking alignment tape.
2) Turn the track shift knob of the track shift & monitor jig to maximize the amplitude of the RF waveform. (Refer to Fig. 8-53.)
3) Loosen the lock screw ❶ of the No. 3 guide (TG-3) and turn the No.3 guide to make flat the waveform at the inlet side. (Refer to Fig. 8-56.)
4) Loosen the lock screw ❷ of the No.6 guide (TG-6) and turn the No.6 guide to make flat the waveform at the outlet side. (Refer to Fig. 8-57.)

Note:

Be careful not to loosen the lock screw too much because the guide will be easily moved.

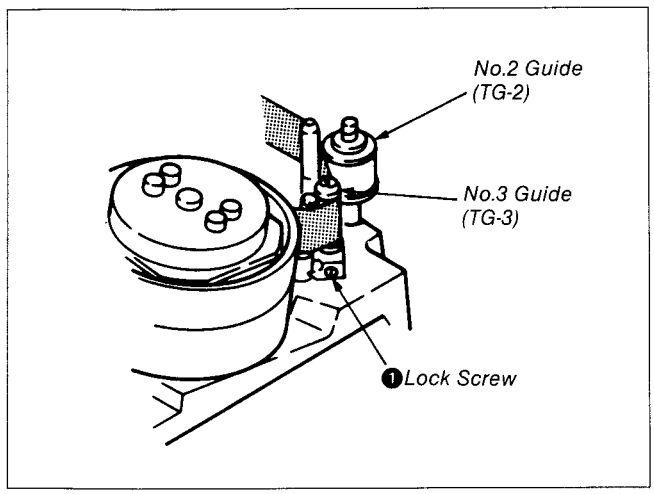


Fig. 8-56.

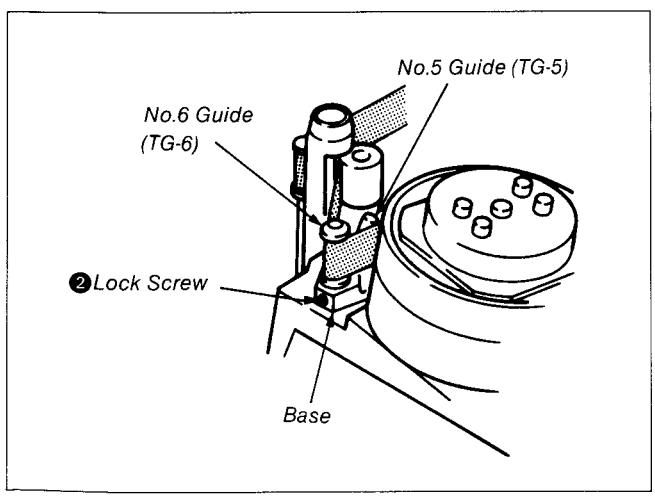


Fig. 8-57.

8-4-4. Tracking Fine Adjustment

1) Play back the tracking alignment tape, and turn the track shift knob of the track shift & monitor jig in the counter clockwise direction to adjust the amplitude of the RF waveform to two-thirds of its maximum. (Refer to Fig. 8-57.)

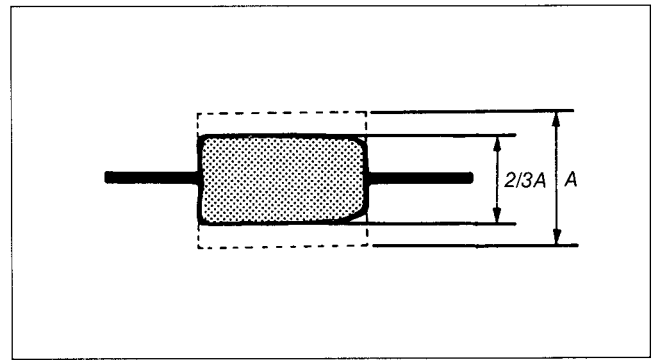


Fig. 8-58.

2) Confirm whether or not the waveform is flat. When it is not flat, turn the No.3 and No.6 guides (TG-3 and TG-6) to make it flat. (Refer to Fig. 8-56, 8-57)
3) Tighten the lock screw of the No.3 guide to lock it. When this is done, confirm that the waveform at the inlet side does not change.
4) Tighten the lock screw of the No.6 guide to lock it. When this is done, confirm that the waveform at the outlet side does not change.

Note:

When tightening the lock screw of the No.6 guide, turn the lock screw with the base gently held down lest the tip of the No.5 guide (TG-5) should touch the drum. (Refer to Fig. 8-57.)

8-4-5. No.2 Guide (TG-2) Adjustment

When the No.2 guide is turned or replaced, adjust it after presetting a height.

- No.2 guide height presetting

1) Screw in until the slit of the TG-2 nut comes as high as the top of the TG-2 shaft. (Fig. 8-59ⓐ)

Note:

Preset the height after completely removing screw lock.

2) Turn the TG-2 nut 1/2 times in the clockwise direction. (Fig. 8-59ⓑ)

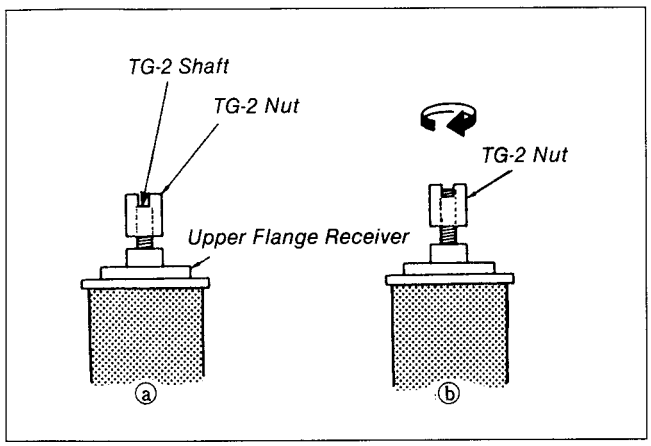


Fig. 8-59.

- No.2 guide (TG-2) adjustment

1) Play back the tracking alignment tape.
2) Turn off the SEL switch of the track shift & monitor jig.
3) Confirm the waveform in the REV mode. (Refer to Fig. 8-60.)

Note:

Make confirmation at the beginning of the alignment tape.

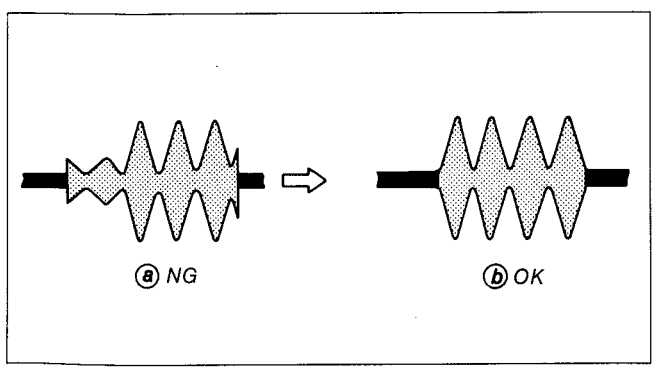


Fig. 8-60.

- When a normal waveform is not obtained (Fig. 8-60 a); Preset the No.2 guide height and go through the following adjustment:

4) Turn the TG-2 nut by 90° in the clockwise direction and take the step 3) again. Repeat the steps 3) and 4).
At this time, confirm that the tracking waveform (Fig. 8-58) has not changed. If changed, make tracking fine adjustment at the inlet side and take the step 3) again.
5) Tighten the lock screw of the No.3 guide (TG-3). When this is done, confirm that the waveform at the inlet side does not change.
6) Apply screw lock to the No.2 guide (TG-2).

8-4-6. No.7 Guide (TG-7) Adjustment

1) Play back the tracking alignment tape and select the REV mode.
2) Confirm that there is no tape deflection between the No.6 guide (TG-6) and capstan. (Refer to Fig. 8-61.) When the tape has a deflection, adjust to remove the deflection by turning the No.7 guide (TG-7).
3) Once again in the PLAYBACK mode, confirm that there is no tape deflection between the No.7 guide (TG-7) and capstan. (allowable tape deflection = less than 0.5mm)
When the tape has a deflection, adjust to remove the deflection by turning the No.7 guide (TG-7).

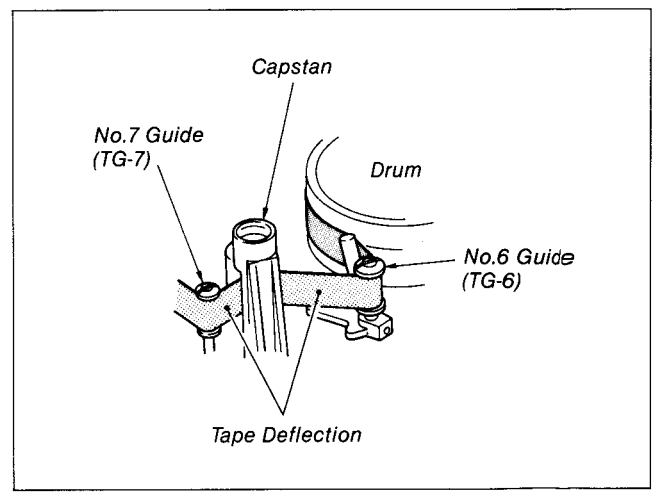


Fig. 8-61.

8-4-7. CUE and REV Waveform Confirmation

1) Playback the tracking alignment tape and select the REV mode. At this time, waveform peak pitches should be uniform. (Refer to Fig. 8-62ⓐ.)
   When they are not uniform, make tracking fine adjustment (8-4-4) and No.2 guide adjustment (8-4-5).
2) Select the CUE mode. At this time, waveform peak pitches should be uniform. (Refer to Fig. 8-62ⓑ.) When they are not uniform, make tracking fine adjustment (8-4-4).

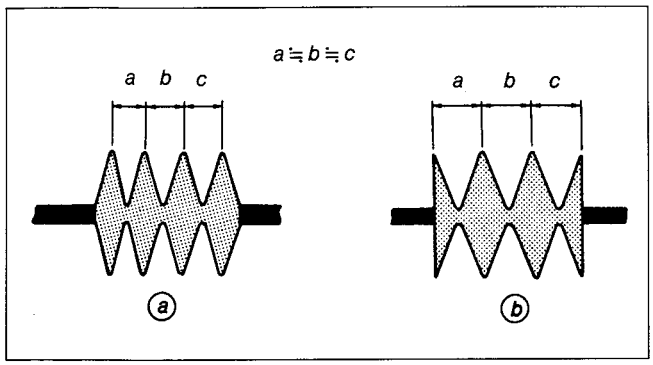


Fig. 8-62.

8-4-8 Checks after Adjustment

1. Tracking Check

1) Playback the tracking alignment tape. Turn the track shift knob of the track shift & monitor jig to adjust the amplitude of the RF waveform to two-thirds of its maximum. (Refer to Fig. 8-63.)
2) When this is done, confirm that an amplitude's minimum value (EMIN) is more than 80% of its maximum value (EMAX). (Refer to Fig. 8-64.)
3) Confirm that the waveform does not fluctuate greatly. (Refer to Fig. 8-65.)

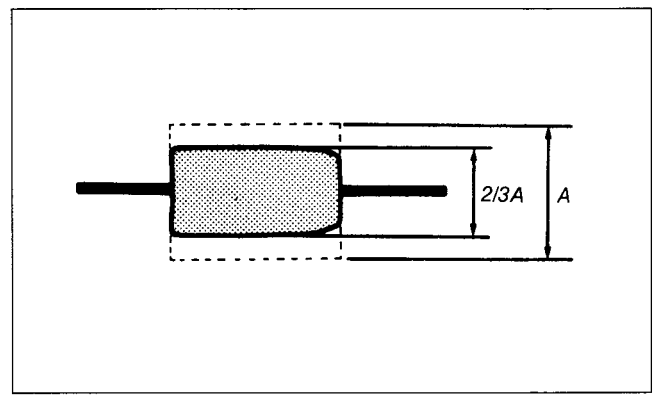


Fig. 8-63.

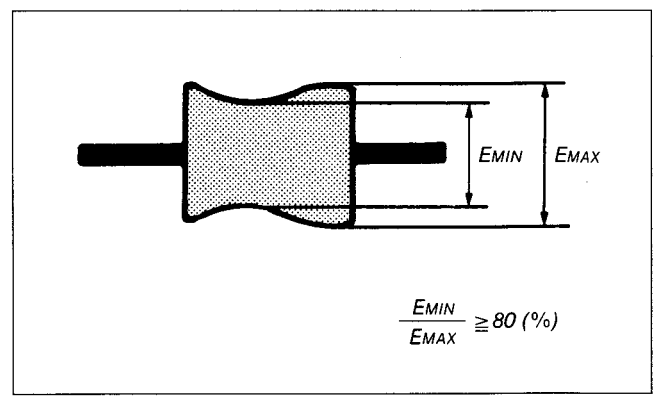


Fig. 8-64.

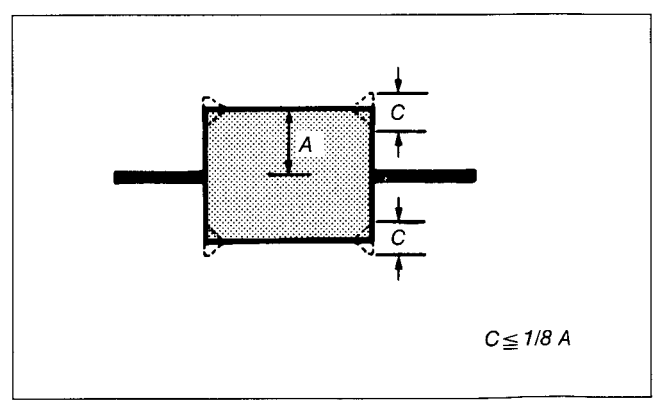


Fig. 8-65.

2. Rise Check

1) Playback the tracking alignment tape.
2) Turn the track shift knob of the track shift & monitor jig to maximize the amplitude of the RF waveform.
3) Eject the tape once, and then, load it again.
4) In the PLAYBACK mode, confirm that the RF waveform horizontally rises within 1 second. Confirm also at this time that there is no tape deflection around the pinch roller. (Refer to Fig. 8-66.)
5) Play back after CUE/REV and FF/REW, and confirm that the RF waveform horizontally rises within 1 second. Confirm also at this time that there is no tape deflection around the pinch roller.
6) Repeat the steps 3) through 5).

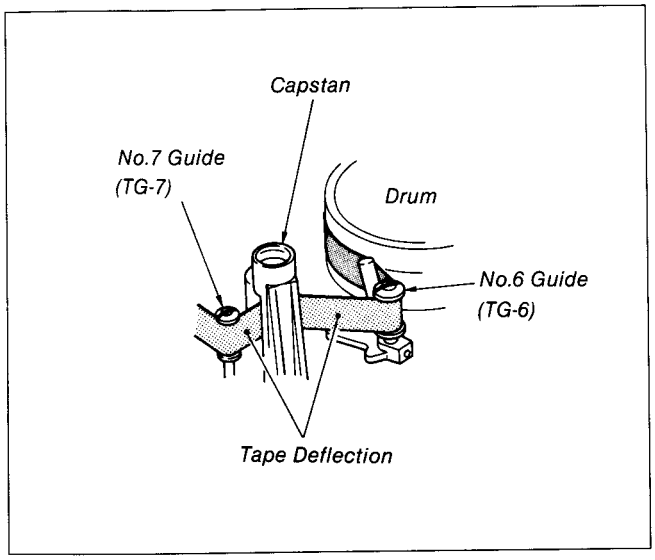


Fig. 8-66.

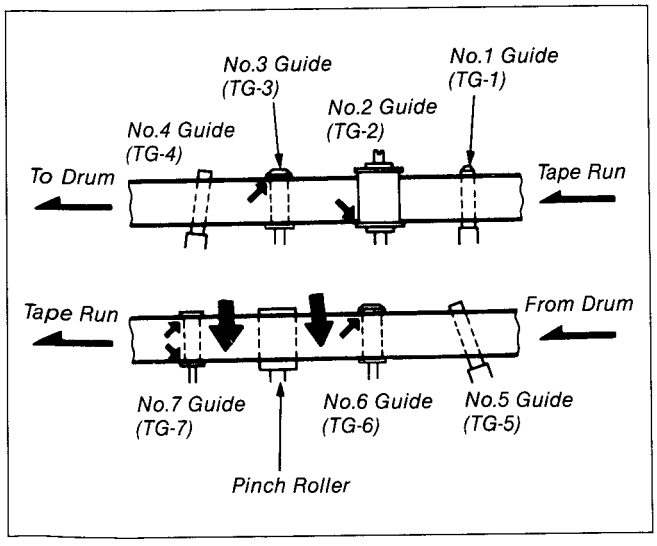


Fig. 8-67.

3. Tape Run Check

Select the PLAYBACK mode, and confirm that the No.2 guide lower flange, No.3 guide upper flange and No.6 guide upper flange have no clearance or large curl, and that the No.7 guide upper and lower flanges have no curl. (Refer to Fig. 8-67.)

SECTION 9
ELECTRICAL ADJUSTMENT (VIDEO SECTION)

During the adjustment see the parts location diagram relevant the adjustment on page 306.

The following measuring instruments are needed in adjusting the VTR section:

[Equipment Required]

1) Monitor TV
2) AC pack
3) Oscilloscope Dual-trace, Bandwidth more than 10MHz with delay mode (Use a probe of 10:1, unless otherwise specified.)
4) Frequency Counter
5) Pattern generator with video output terminal
6) Digital voltmeter
7) Audio generator
8) Audio level meter
9) Audio distortion meter
10) Audio attenuator
11) Regulated DC power supply unit
12) Alignment Tape
    Tracking adjustment (WR5-1C)
        Part code: 8-967-995-06
    Video frequency response adjustment (WR5-2C)
        Part code: 8-967-995-16
    Operation check (WR5-3CL)
        Part code: 8-967-995-36
    Operation checking (WR5-3CSP)
        Part code: 8-967-995-27

[Precautions for Adjustment]

The video section can be also adjusted with the camera section and EVF removed, excluding "Battery Failure Adjustment" in System Control Adjustment and "EVF display position adjustment" in Video System Adjustment. When removing the camera section and EVF section, disconnect the following 5 connectors:

1. MV-12 board: CN203 (black)
2. MV-12 board: CN206
3. MV-12 board: CN207 (EVF 8-pin socket)
4. RZ-1 board : CN251
5. SS-70 board : CN305 (white)

When the audio input section (MA-21 and MJ-12 boards) is unnecessary, remove the following connector:

1. SS-70 board: CN307 (white)

[Equipment Connection]

Unless otherwise specified, adjustment is made by connecting the measuring instruments as shown in the figure below.

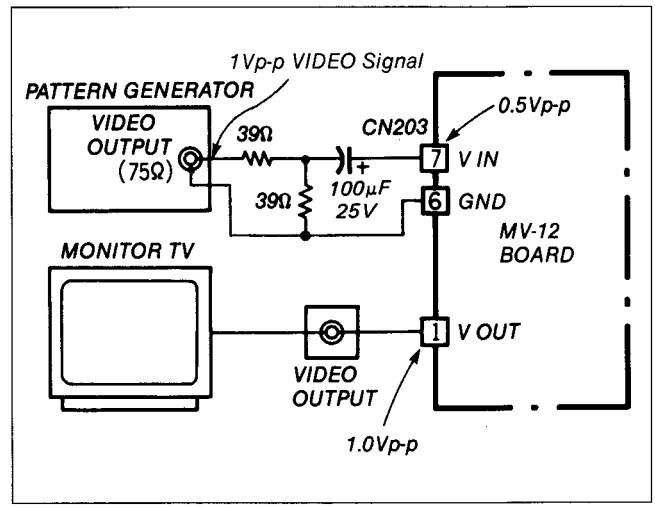


Fig. 9-1.

[Set-up during adjustment]

Since the video output signal obtained from the pattern generator is used as the adjusting signal of the VTR block adjustment, it is necessary that this video output signal has to be within the specification. Connect an oscilloscope to Pin ㊷ (CAM IN) of VY-9 Board on the MV-12 board and make sure that the amplitude of the video SYNC signal is approximately 0.15V, that the video block is approximately 0.35V, that the burst signal is 0.15V with flat characteristics, and the signal level ratio between the burst signal and "Red" signal is 0.30: 0.66.

The video signal (colour bar) used in the VTR block adjustment is an shown in Fig. 9-2.

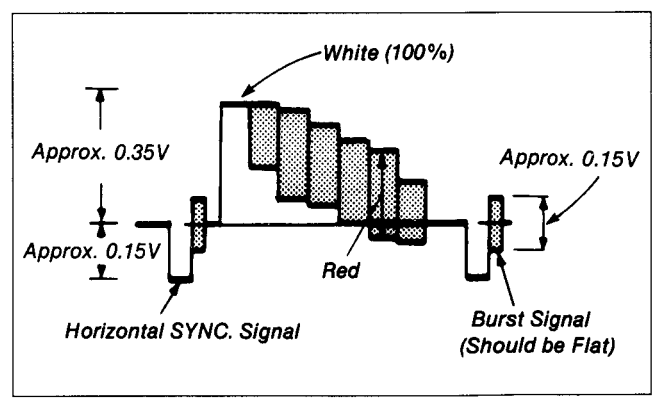
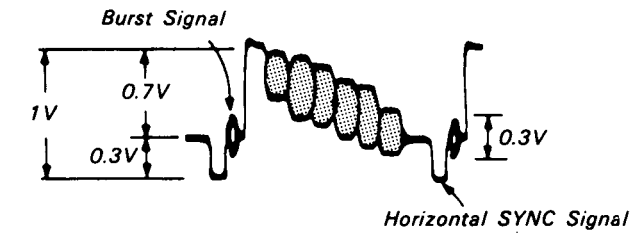
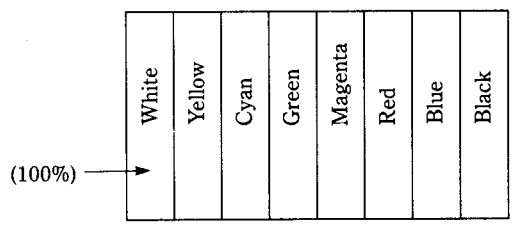


Fig. 9-2. Colour bar signal of pattern generator

[Alignment Tape]

Tape	Content	Use
Tracking (WR5-1C)	1. Recording area PCM — Video 2. Recording content: CH2: 1MHz linearity adjustment signal (CH1: 9MHz)	Drum linearity adjustment
Video frequency characteristic (WR5-2C)	1. Recording area Video 2. Recording content RF sweep 0 to 10MHz 3. Marker 1, 3.58, 5.5 and 7MHz	Frequency characteristic adjustment
Operation checking SP mode (WR5-3CSP) LP mode (WR5-3CL) Note: PCM area is not included in WR5-3CL.	1. Recording area Video 2. Recording content ■Video track ●Video signals Colour bar: 10 sec. / Monoscope: 8 sec. } Iterative (Colour bars)   ●Audio signal (AFM) 400Hz, 60% modulation ■PCM track (WR5-3CSP only) ●Audio signal (PCM) 1kHz, ...10 sec. 20Hz, ... 2 sec. 400Hz, ... 4 sec. 14kHz, ... 2 sec. } Iterative	Operation checking

[Input/output levels and impedance]

Video output Pin jack
  Output signal: 1 Vp-p, 75Ω unbalance, negative SYNC
Mic input Mini jack
  Input level: −66dBs, low impedance
Audio output Pin jack
  Specified output: −10dBs with 47kΩ load
  Loading impedance: Over 10kΩ

9-1. POWER SUPPLY ADJUSTMENT

Note:

Regarding power supply adjustment, perform adjustment by the following connector.

[Connection]

1) Remove AC pack or BATTERY from battery grip.
2) Connect regulated DC power supply's + side to Pin ③ of CN205 on the MV-12 board (DD UNREG) and − side to Pins ① and ② of CN205 (UNREG GND) and supply 6.3±0.1Vdc.
3) Connect Pin ㉞ of CN201 on the MV-12 board ($\overline{\text{VTR DD ON}}$) and GND with jumper wire.

9-1-1. DC/DC Converter Frequency Adjustment (MV-12 Board)

Measurement point	Q653 collector
Measurement equipment	Frequency counter
Adjustment element	RV651
Specified value	475±5kHz

[Adjustment Method]

1) Adjust the frequency to 475±5kHz with RV651.

9-1-2. DC/DC Converter Output Voltage Adjustment (MV-12 Board)

Measurement point	Pin ⑦⓪ of the VC-11 board
Measurement equipment	Digital voltmeter
Adjustment element	RV652
Specified value	5.10±0.05Vdc

[Adjustment Method]

1) Adjust the voltage to 5.10±0.05Vdc with RV652.

9-2. SYSTEM CONTROL ADJUSTMENT

9-2-1 Battery Failure Adjustment (MR-8 Board)

Note:

Remove the electronic view finder and turn the focus switch to manual position.

Mode	RECORD
Subject	Arbitrary
Measurement point	CN505 pin ① ($\overline{\text{BATT DOWN}}$) (SS-70 board)
Measurement equipment	Oscilloscope (DC range)
Adjustment element	RV156
Specified value	5.79±0.01Vdc

[Connection]

1) Remove the AC PACK or BATTERY from the battery grip.
2) Connect the regulated DC power supply as shown in Fig. 9-3.
3) Connect check land CL351 (Pin ⑦ of CN304) on the SK-19 board and CL352 (Pin ① of CN304) with diode (1SS119 or equivalent) and set to test mode. Refer to Fig. 9-4.

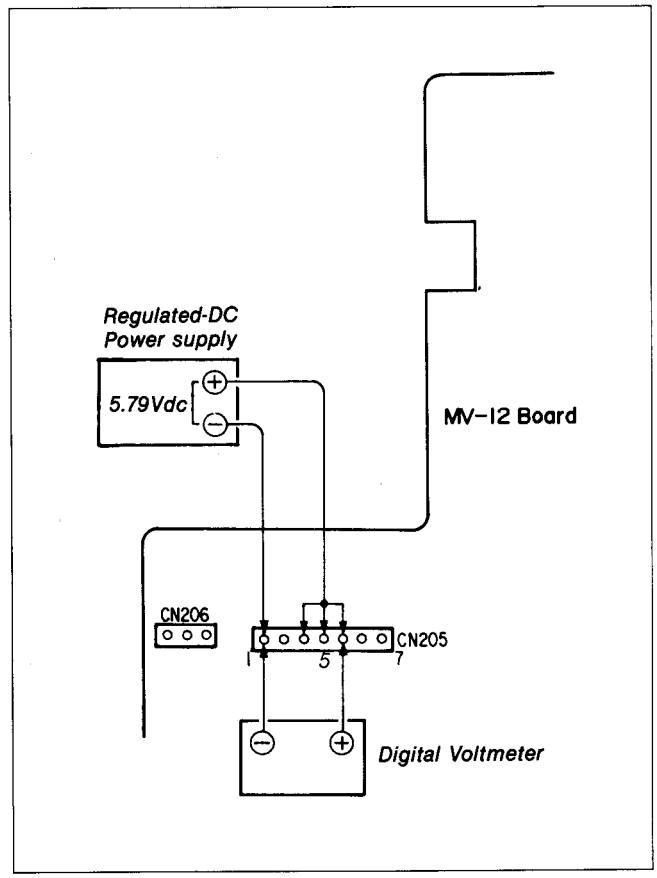


Fig. 9-3.

Note:

Install camera section and electronic view finder and perform adjustment and checking by making focus switch to "manual".

[Adjustment Method]

1) Adjust the output voltage of the regulated DC power supply unit so that the digital voltmeter will indicate 5.79±0.01 Vdc. (VTR in a recording state)
2) Rotate RV156 slowly and set to the point where the DC level of the CN505 pin ① of the SS-70 board is about to change from "H" to "L".

[Checking Method]

Check as follows, and make readjustment when its result is not satisfactory:

Note:

Mount the electronic view finder and turn the focus switch to manual position.

1) Remove the diode connected between CL351 and CL352 and release the test mode.
2) Adjust the output voltage of the regulated DC power supply unit so that the digital voltmeter will indicate 6.03±0.01 Vdc. (VTR in a recording state)
3) Check that characters "BATTERY" within the EVF are not lit up, and that the TALLY lamp is not blinking.
4) Lower the output voltage of the regulated DC power supply unit so that the digital voltmeter will indicate 5.75±0.01 Vdc.
5) Check that the characters "BATTERY" within the EVF and the TALLY lamp are blinking every other second.

9-3. SERVO SYSTEM ADJUSTMENT

9-3-1. Drum Free Speed Adjustment (MR-8 Board)

Mode	PLAYBACK
Signal	Any tape
Measurement point	CN505 pin ⑤ (ADE) (SS-70 board)
Measurement equipment	Digital voltmeter
Adjustment element	RV155
Specified value	2.1 ± 0.1Vdc

[Adjustment Method]

1) Adjust to 2.1 ± 0.1Vdc with RV155.

9-3-2. Capstan Free Speed Adjustment (MR-8 Board)

Mode	PLAYBACK
Signal	Any tape
Measurement point	CN505 pin ② (C FG) (SS-70 board)
Measurement equipment	Frequency counter
Adjustment element	SP mode: RV151 LP mode: RV152
Specified value	SP mode: 1,154.5 ± 2Hz LP mode: 578.5 ± 1.5Hz

[Connection]

1) Connect TP105 on the MR-8 board and GND with a 220μF/16V electrolytic capacitor. (GND to the negative pole side of the capacitor)
2) Connect the CL351 and CL352 of the SK-19 board with a diode (1SS119 or equivalent) for set up TEST mode as shown in Fig. 9-4.

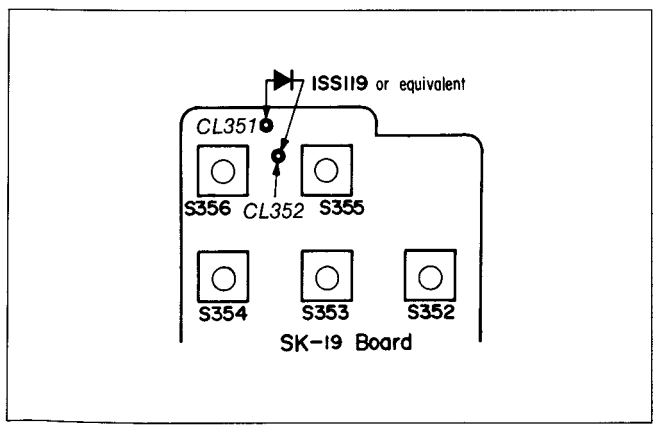


Fig. 9-4.

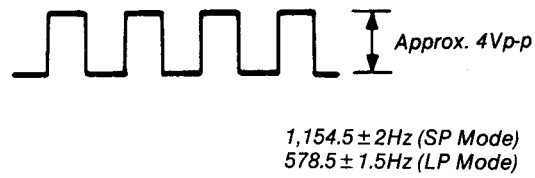
[Adjustment Method]

Adjustment for the LP mode is given in brackets [ ].

1) Set the SP/LP switch (S201 on the MV-12 board) to SP [LP] position.
2) In the PLAYBACK mode, adjust to 1,154.5 ± 2Hz [578.5 ± 1.5Hz] with RV151 [RV152].

Note:

Be sure to adjust SP mode in advance.



1,154.5 ± 2Hz (SP Mode)
578.5 ± 1.5Hz (LP Mode)

Fig. 9-5.

9-3-3. Switching Position Adjustment (MR-8 Board)

Mode	PLAYBACK
Signal	Alignment tape for operation checking (WR5-3CSP)
Measurement point	CH1: Video output terminal CH2: MR-8 board CN105 pin ② (RF SWP)
Measurement equipment	Oscilloscope
Adjustment element	RV153
Specified value	6.5 ± 0.3H (416 ± 20μsec)

[Adjustment Method]

1) Adjust to 6.5 ± 0.3H (416 ± 20μsec) with RV153.

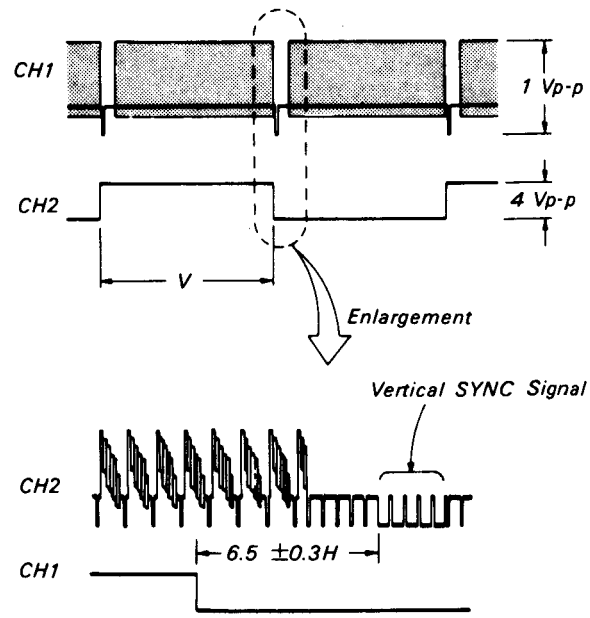


Fig. 9-6.

9-3-4. ATF BPF Balance Adjustment (SS-70 Board)

Mode	PLAYBACK (Self recorded tape by SP mode)
Signal	Any signal
Measurement point	Pin ⑪ and ⑫ of IC507 (FL501, FL502)
Measurement equipment	Oscilloscope, audio generator and frequency counter
Adjustment element	RV502
Specified value	A 16kHz signal level (IC507 pin ⑪) should be equal to a 47kHz signal level (IC507 pin ⑫).

[Adjustment Method]

1) Playback the recorded tape by SP mode.
2) Connect the oscilloscope to the IC507 pin ⑫ and read a 47kHz signal level (approx. 2Vp-p).
3) Connect the oscilloscope to the IC507 pin ⑪.
4) Make the 16kHz signal level equal to the 47kHz signal level with RV502.

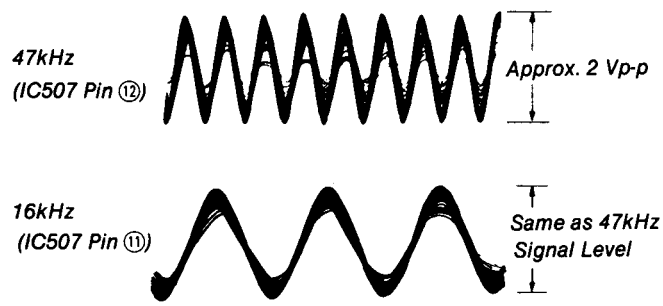


Fig. 9-8.

9-4. VIDEO SYSTEM ADJUSTMENT

In principle adjust the video system in the following procedure. Colour video signals fed by a pattern generator are utilized as video input signals for video system adjustment in the RECORD mode. Check that the SYNC and colour burst signals match the standard designated in Fig. 9-2.

[Adjustment Procedure]

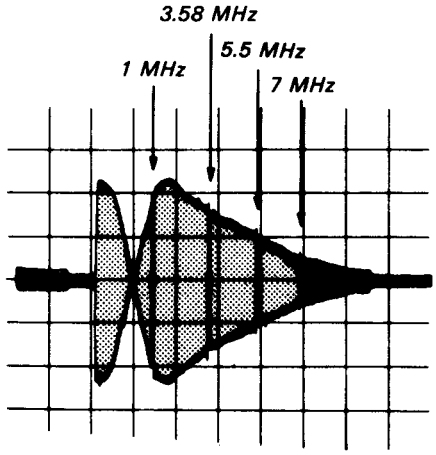
1) Playback frequency characteristic adjustment
2) Flying erase check
3) X'tal oscillator f_0 adjustment
4) Chroma comb filter adjustment
5) Y comb type filter adjustment
6) SYNC AGC adjustment
7) VIDEO OUT level adjustment
8) PB Y level adjustment
9) Y FM carrier frequency adjustment
10) Y FM deviation adjustment
11) AC clip adjustment
12) 375f_H VCO adjustment
13) Chroma emphasis f_0 adjustment
14) Carrier balance adjustment
15) GCA adjustment
16) f_H VCO adjustment
17) REC Y recording current adjustment
18) REC C recording current adjustment
19) REC AFM recording current adjustment
20) REC ATF recording current adjustment
21) EVF Internal display position adjustment

9-4-1. Playback Frequency Characteristic Adjustment (RP-34/MR-8 Boards)

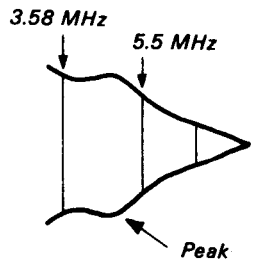
CH2 adjustment is shown in brackets [ ].

Mode	PLAYBACK
Signal	Alignment tape: Frequency characteristic adjustment (WR5-2C)
Measurement point	CN105 pin ④ [③] of MR-8 BOARD External trigger: CN105 pin ② of MR-8 BOARD Trigger slope: + [−]
Measurement equipment	Oscilloscope
Adjustment element	RV003 [RV004] of the RP-34 board
Specified value	3.58MHz level : 5.5MHz level = 4:3

a) RF waveform



b)



c)

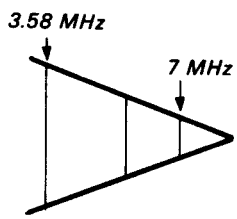


Fig. 9-9.

[Adjustment Method]

1) Adjust with RV003 [RV004] on the RP-34 board so that peak appears in the envelope of the RF waveform. (See Fig. 9-9. b))
2) Adjust with RV003 [RV004] on the RP-34 board so that the peak of the RF waveform envelope becomes small and the waveform from 3.58MHz to 7MHz section becomes almost a straight line. (See Fig. 9-9. c))
   At this point, be sure to confirm that the level difference ratio between 3.58MHz and 5.5MHz is approximately 4:3 [4:3].
3) Perform self recording and be sure to confirm that there are no occurrence of black noise and white noise due to over modulation.

9-4-2. Flying Erase Check (MR-8 Board)

Mode	RECORD
Signal	Arbitrary
Measurement point	TP104 (FE(X))
Measurement equipment	Oscilloscope and frequency counter
Specified value	Frequency: More than 7.4MHz Voltage: More than 7.0Vp-p

[Checking Method]

1) Check that an oscillation frequency is more than 7.4MHz and an oscillation voltage is more than 7.0Vp-p.

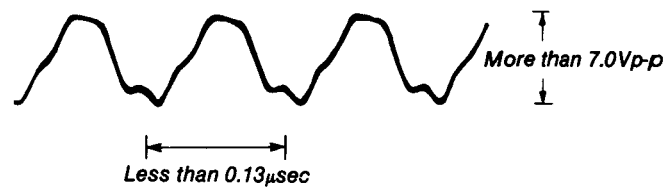


Fig. 9-10.

9-4-3. X'tal Oscillator fo Adjustment (VC-11/MV-12 Board)

Mode	PLAYBACK
Signal	Alignment tape for operation checking (WR5-3CSP)
Measurement point	Pin ⑭ of the VC-11 board (GCA GAIN)
Measurement equipment	Frequency counter
Adjustment element	CV001 of the VC-10 board
Specified value	4,433,619±50Hz

Note:
Connect the frequency counter through a buffer with high impedance (approx. 10MΩ) and low capacity (less than 10 pF).

[Adjustment Method]
1) Adjust to 4,433,619±50Hz with CV001 of the VC-11 board.

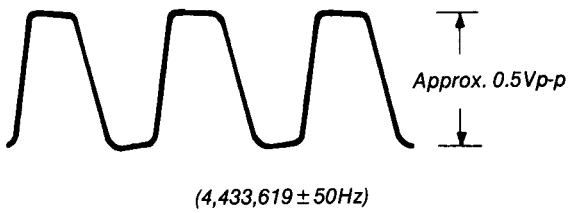


Fig. 9-11.

9-4-4. Chroma Comb Filter Adjustment (VD-6/MV-12 Boards)

Mode	CAMERA STANDBY
Signal	Colour bar
Measurement point	Pin ⑳ of the VD-6 board
Measurement equipment	Oscilloscope
Adjustment element	RV002 on VD-6 board and LV201 of the MV-12 board
Specified value	Minimum residual chroma component

[Connection]
1) Connect Pin ㊵ of VY-9 board to GND with a jumper wire.

[Adjustment Method]
1) Adjust with RV002 of the VD-6 board and LV201 of the MV-12 board alternately so that the residual chrome component becomes minimum.

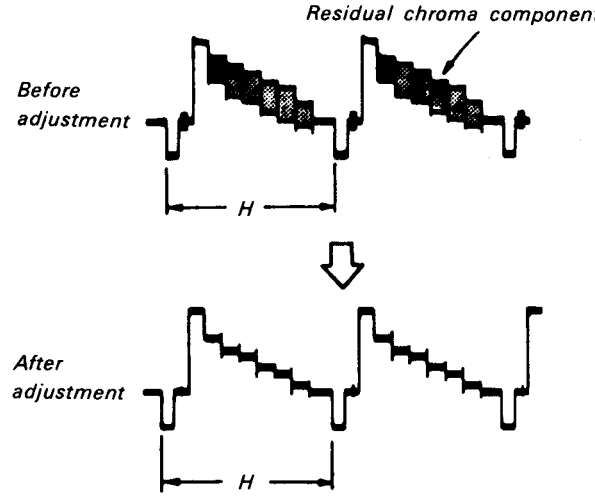


Fig. 9-12.

9-4-5. Y Comb Type Filter Adjustment (VD-6/MV-12 Boards)

Mode	CAMERA STANDBY
Signal	Colour bar
Measurement point	Pin ⑩ of the VD-6 board (TP203)
Measurement equipment	Oscilloscope
Adjustment element	RV001 of the VD-6 board
Specified value	The amplitude between the yellow level center and the pedestal is 50±25mVp-p.

Note:
Be sure to connect a 22kΩ of resistor in series between Pin ⑩ on the VD-6 board and 10:1 probe.

[Adjustment Method]
1) Adjust with RV001 of the VD-6 board so that the amplitude between the yellow level center and pedestal becomes 50±25mVp-p.
2) While playing back a tape in which dropouts are recorded, be sure to confirm that these dropouts are not discernible. In the event the dropouts become discernible, adjust with RV001 so that they become undiscernible.

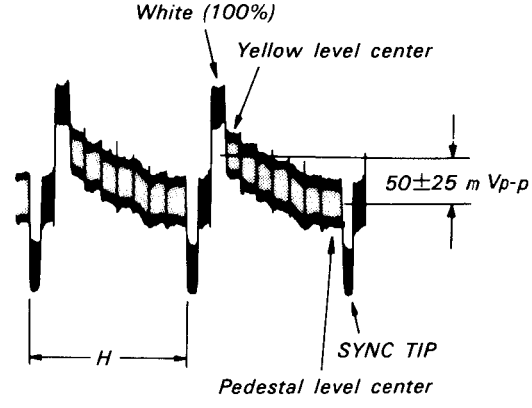


Fig. 9-13.

9-4-6. SYNC AGC Adjustment (VY-9/MV-12 Boards)

Mode	CAMERA STANDBY
Signal	Colour bar
Measurement point	Pin ⑤⓪ of the VY-9 board
Measurement equipment	Oscilloscope
Adjustment element	RV006 of the VY-9 board
Specified value	0.50 ± 0.05Vp-p

[Adjustment Method]

1) Adjust to 0.50 ± 0.05Vp-p with RV006 of the VY-9 board.

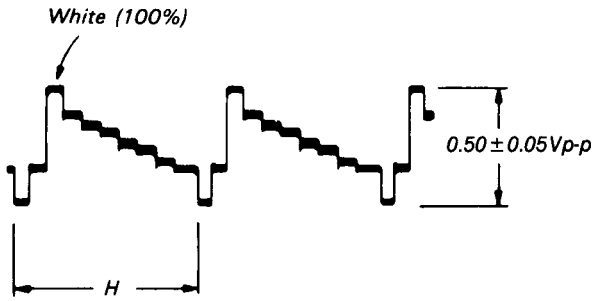


Fig. 9-14.

9-4-7. VIDEO OUT Level Adjustment (VY-9/MV-12 Boards)

Mode	CAMERA STANDBY
Signal	Colour bar
Measurement point	VIDEO OUT terminal of the FP-49 board
Measurement equipment	Oscilloscope
Adjustment element	RV005 of the VY-9 board
Specified value	1.00 ± 0.05Vp-p

Note:

Terminate the VIDEO OUT terminal with a 75Ω resistor.

[Adjustment Method]

1) Adjust to 1.00 ± 0.05 Vp-p with RV005 of the VY-9 board.

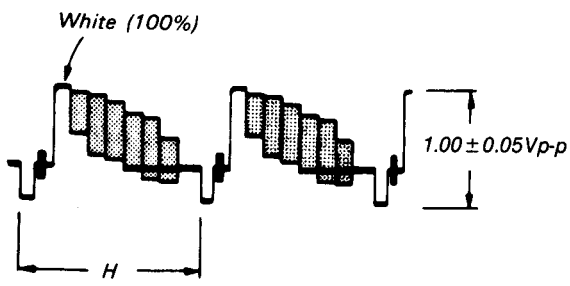


Fig. 9-15.

9-4-8. PB Y Level Adjustment (VY-9/MV-12 Boards)

Mode	PLAYBACK
Signal	Alignment tape for operation checking (WR5-3CSP), colour bar portion
Measurement point	VIDEO OUT terminal of the FP-49 board
Measurement equipment	Oscilloscope
Adjustment element	RV001 of the VY-9 board
Specified value	1.00 ± 0.05Vp-p

Notes:

1) Terminate the VIDEO OUT terminal with a 75Ω resistor.
2) The EDIT (SP/LP) switch (MV-12 board, S201) should be OFF (SP) position.

[Adjustment Method]

Adjust to 1.00 ± 0.05 with RV001 of the VY-9 board.

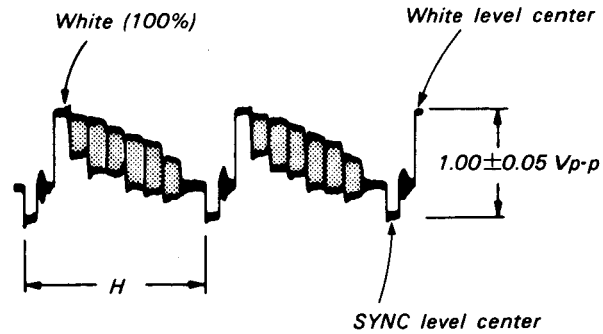


Fig. 9-16.

9-4-9. Y FM Carrier Frequency Adjustment (VY-9/MV-12 Boards)

Mode	CAMERA STANDBY
Signal	None
Measurement point	Pin ㉙ (REC Y RF) of the VY-9 board
Measurement equipment	Frequency counter
Adjustment element	RV004 of the VY-9 board
Specified value	4.20 ± 0.03MHz

[Adjustment Method]

1) Set RV003 (AC CLIP) of the VY-9 board to the mechanical center (slide terminal for RV003 being approx. 2.7Vdc).
2) Adjust to 4.20 ± 0.03MHz with RV004 of the VY-9 board.
3) Make "deviation adjustment" and "AC clip adjustment".

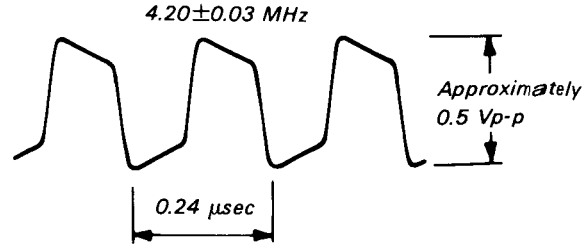


Fig. 9-17.

9-4-10. Y FM Deviation Adjustment (VY-9/MV-12 Boards)

Mode	RECORD and PLAYBACK
Signal	Colour bar
Measurement point	VIDEO OUT terminal of the FP-49 board
Measurement equipment	Oscilloscope
Adjustment element	RV002 of the VY-9 board
Specified value	Playback level at 1.00 ± 0.05Vp-p

Notes:

1) Terminate the VIDEO OUT terminal with a 75Ω resistor.
2) "VIDEO OUT level adjustment", "PB Y level adjustment" and "Y FM carrier frequency adjustment" should be already completed.
3) The EDIT (SP/LP) switch (MV-12 board, S201) should be OFF (SP) position.

[Adjustment Method]

1) Record colour bar signal.
2) Playback a recorded portion.
3) Confirm a playback output level.
   Standard: 1.00 ± 0.05Vp-p
4) When the standard is not met, repeat the above-mentioned steps 1) through 3) after turning RV002 of the VY-9 board as follows:

	RV002 Rotating Direction
Larger than specified value	Clockwise (↻)
Smaller than specified value	Counter-clockwise (↺)

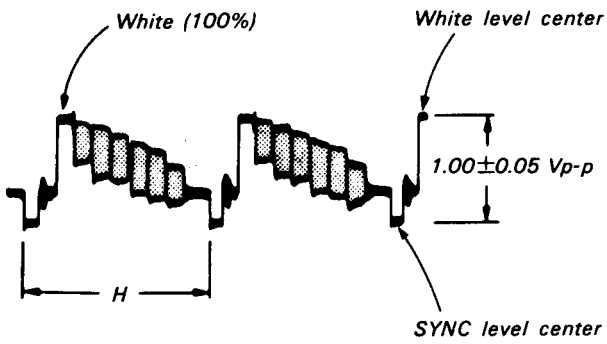


Fig. 9-18.

9-4-11. AC Clip Adjustment (VY-9/MV-12 Boards)

Mode	CAMERA STANDBY
Signal	Colour bar
Measurement point	Pin ㉟ of the VY-9 board
Measurement equipment	Oscilloscope
Adjustment element	RV003 of the VY-9 board
Specified value	235 ± 10%

[Adjustment Method]

1) Adjust the peak of white (100%) to 235 ± 10% with RV003 of the VY-9 board.

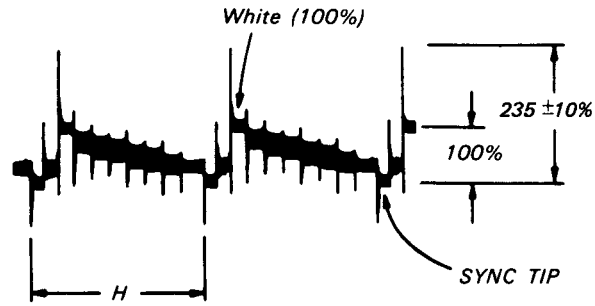


Fig. 9-19.

9-4-12. 375fH VCO Adjustment (VC-11/MV-12 Boards)

Mode	CAMERA STANDBY
Signal	Colour bar
Measurement point	Pin ㊿ of the VC-11 board
Measurement equipment	Digital voltmeter
Adjustment element	RV002 of the VC-11 board
Specified value	3.0 ± 0.4Vdc

[Adjustment Method]

1) Adjust to 3.0 ± 0.4Vdc with RV002 of the VC-11 board.

9-4-13. Chroma Emphasis fo Adjustment (MV-12 Board)

Mode	CAMERA STANDBY
Signal	Colour bar
Measurement point	Pin ⑧ of the VC-11 board
Mesurement equipment	Oscilloscope
Adjustment element	FL203 of the MV-12 board
Specified value	Be sure to confirm that the fo component is minimum and zero cross appears between green and magenta.

[Connection]

Connect the following two places of the VC-11 board with 47kΩ resistors.

1. ⑪ PIN (ACC) — ⑫ PIN (GND)
2. ⑪ PIN (ACC) — ⑩ PIN (REG 5V)

[Adjustment Method]

1) Adjust with FL203 of the MV-12 board so that the amplitude of the flat cyan section of the chroma signal becomes minimum.
   At this point, be sure to confirm that the zero cross appears between the green and magenta.

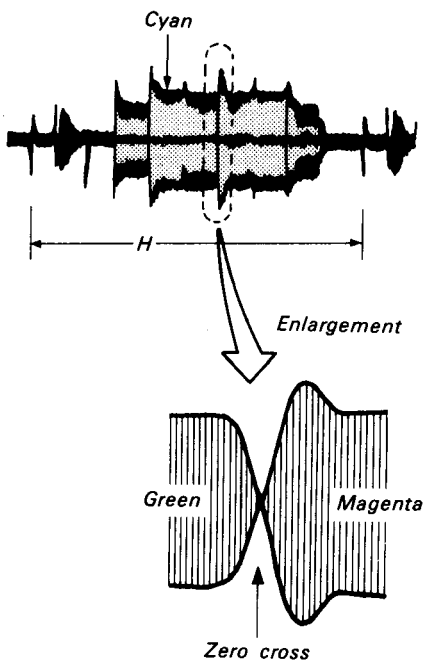


Fig. 9-20.

9-4-14. Carrier Balance Adjustment (VC-11/MV-12 Boards)

Mode	CAMERA STANDBY
Signal	Colour bar
Measurement point	Pin ⑭ of the VC-11 board
Measurement equipment	Oscilloscope
Adjustment element	RV001 of the VC-11 board
Specified value	5.17MHz component at minimum

[Adjustment Method]

1) Minimize 5.17MHz component with RV001 of the VC-11 board.

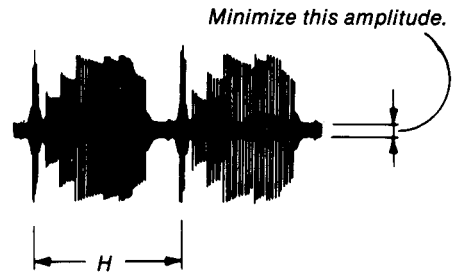


Fig. 9-21.

9-4-15. GCA Adjustment (VC-11/MV-12 Boards)

Mode	Playback
Signal	Arbitrary tape
Measurement point	Pin ⑭ of the VC-11 board
Measurement equipment	Oscilloscope
Adjustment element	RV003 of the VC-11 board
Specified value	520 ± 15mVp-p

[Adjustment Method]

1) Adjust with RV003 of the VC-11 board so that it becomes 520 ± 15mVp-p.
2) Set to either the STILL, CUE or REVIEW mode, and be sure to confirm that the thickness of the colour does not differ from that of the playback mode. If necessary, adjust with RV003. (Be sure to playback a tape of LP mode.)

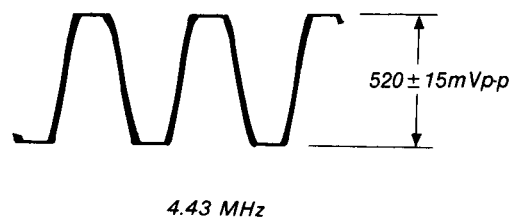


Fig. 9-22.

9-4-16. f_H VCO Adjustment (VC-11/MV-12 Boards)

Mode	CAMERA STANDBY
Signal	Colour bar
Measurement point	CH1: Pin ⑤③ of the VC-11 board CH2: VIDEO OUT terminal of the FP-49 board
Measurement equipment	Oscilloscope
Adjustment element	RV004 of the VC-11 board
Specified value	14.5 ± 0.2μsec

[Adjustment Method]

1) Adjust RV004 of the VC-11 board so that the T_R of CH1 is 14.5 ± 0.2μsec.
2) Confirm that the H (time) of CH1 and CH2 is stable.

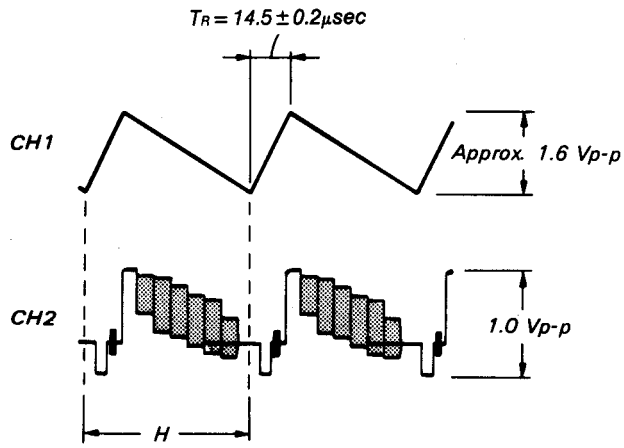


Fig. 9-23.

9-4-17. REC Y Recording Current Adjustment (RP-34/MR-8 Boards)

Mode	RECORD
Signal	None
Measurement point	TP101 (CH1 CHECK) of the MR-8 board
Measurement equipment	Oscilloscope
Adjustment element	RV001 of the RP-34 board
Specified value	205mVp-p

Note:

After REC Y recording current adjustment, be sure to carry out each of REC C, REC AFM and REC ATF recording current adjustments.

[Adjustment Method]

1) Adjust to 205mVp-p with RV001 of the RP-34 board.

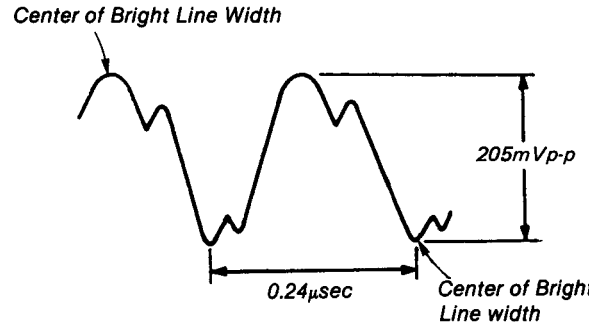


Fig. 9-24.

9-4-18. REC C Recording Current Adjustment (MV-12 Board)

Mode	RECORD
Signal	Color bar
Measurement point	TP101 (CH1 CHECK) of the MR-8 board
Measurement equipment	Oscilloscope
Adjustment element	RV203
Specified value	35.3mVp-p

Notes:

1) After REC C recording current adjustment, be sure to carry out each of REC AFM and REC ATF recording current adjustments.
2) Use MP type tape.

[Connection]

1) Connect the following two places of the MV-12 board with jumper wires:
   1. Pin ㉙ (REC Y RF) of the VY-9 board and GND
   2. CN201 pin ⑦ (PB ATF PILOT) and GND
2) Connect the following place of the AU-31 board with a jumper wire:
   1. Pin ㉙ (REC AFM) of the AU-31 board and GND.

[Adjustment Method]

1) Adjust to 35.3mVp-p with RV203.

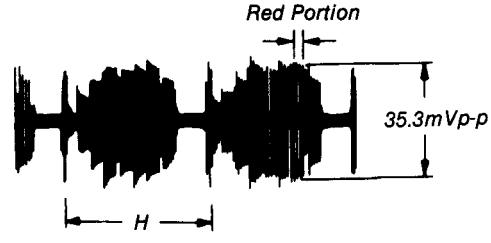


Fig. 9-25.

9-4-19. REC AFM Recording Current Adjustment (MV-12 board)

Mode	RECORD
Signal	None
Measurement point	TP101 (CH1 CHECK) of the MR-8 board
Measurement equipment	Oscilloscope
Adjustment element	RV201
Specified value	8.0mVp-p

Note:

1) Use MP type tape.
2) When a TP101 of the MR-8 board signal level is too low to read, connect directly through a 100Ω resistor as shown in the figure below instead of using a probe of 10:1.

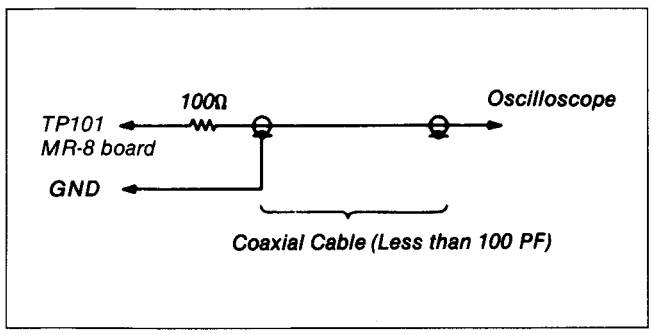


Fig. 9-26.

[Connection]

1) Connect the following two places in the MV-12 board with jumper wires:
   1. Pin ㉙ (REC Y RF) of the VY-9 board and GND
   2. CN201 pin ⑦ (PB ATF PILOT) and GND

[Adjustment Method]

1) Adjust to 8.0mVp-p with RV201 of the MV-12 board.

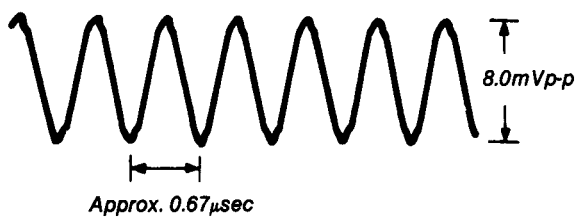


Fig. 9-27.

9-4-20. REC ATF Recording Current Adjustment (MV-12 Board)

Mode	RECORD
Signal	None
Measurement point	TP101 (CH1 CHECK) of the MR-8 board
Measurement equipment	Oscilloscope
Adjustment element	RV202
Specified value	7.0mVp-p

[Adjustment Method]

1) Set the SP/LP switch (S201 of the MV-12 board)
2) Use MP type tape.
3) When a TP101 of the MR-8 board signal level is too low to read, connect directly through a 100Ω resistor as shown in the figure below instead of using a probe of 10:1.

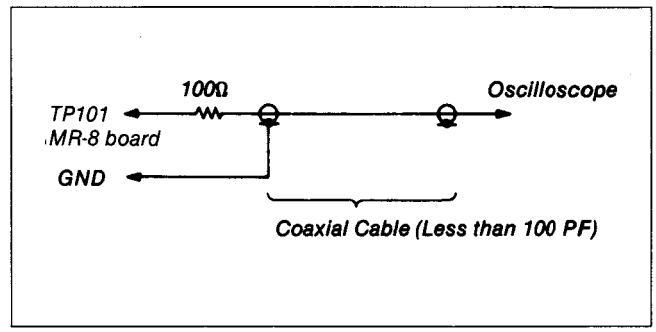


Fig. 9-28.

[Connection]

1) Connect the following place of the MV-12 board with a jumper wire:
   - Pin ㉙ (REC Y RF) of the VY-9 board and GND
2) Connect the following place of the AU-31 board with a jumper wire.
   - Pin ㉙ (REC AFM) of the AU-31 board and GND

[Adjustment Method]

1) Adjust to 7.0mVp-p with RV202.

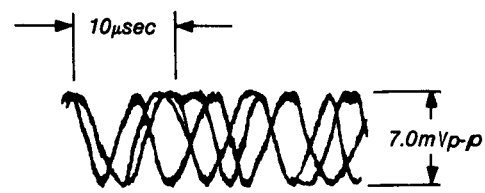


Fig. 9-29.

9-4-21. EVF Internal Display Position Adjustment (MV-12 Board)

Mode	CAMERA STANDBY
Subject	All black (Set the food cap)
Measurement point	Pin ② of CN207 (VF OUT)
Measurement equipment	Oscilloscope
Adjustment element	CV201
Specified value	8.5 ± 0.8μsec

[Adjustment Method]

1) Adjust to 8.5 ± 0.8μsec with CV201.

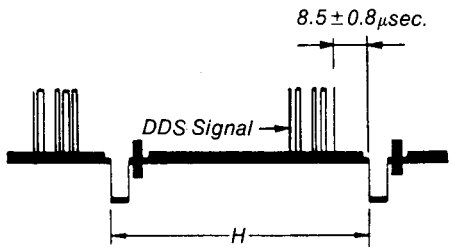


Fig. 9-30.

9-5. AUDIO SYSTEM ADJUSTMENT

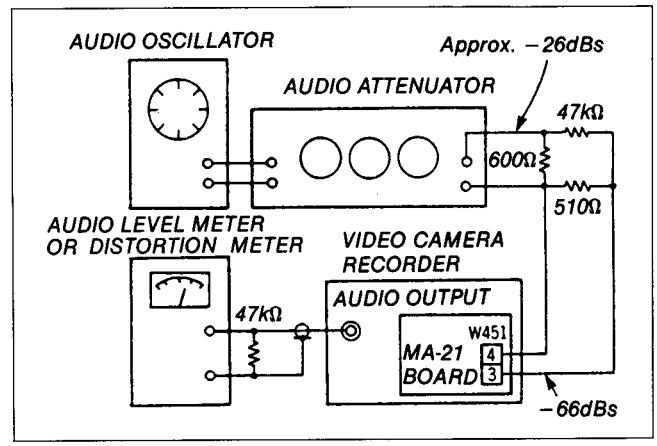


Fig. 9-31.

9-5-1. AFM Carrier Frequency Adjustment (AU-31 Board)

Mode	RECORD (SP mode)
Signal	None
Measurement point	Flat cable pin ㉙ (REC AFM) (IC401 pin ⑭)
Measurement equipment	Frequency counter
Adjustment element	RV401
Specified value	1.500 ± 0.002MHz

[Adjustment Method]

1) Adjust to 1.500 ± 0.002MHz with RV401

9-5-2. AFM Deviation Adjustment (AU-31 Board)

Mode	PLAYBACK
Signal	Alignment tape for operation checking (WR5-3CSP)
Measurement point	Audio output terminal
Measurement equipment	Audio level meter
Adjustment element	RV402
Specified value	−10 ± 0.2dBs

[Adjustment Method]

1) Adjust the audio output level to −10 ± 0.2dBs with RV402.

9-5-3. E-E Output Level Check

Mode	E-E
Signal	400Hz, −66dBs
Measurement point	See Fig. 9-31.
Measurement equipment	Audio level meter
Specified value	−10 ± 3dBs

[Checking Method]

1) Be sure the audio output level is −10 ± 3dBs.

9-5-4. Overall Level Characteristic Check

Mode	SELF RECORD & PLAYBACK
Signal	400Hz, −66dBs
Measurement point	See Fig. 9-31.
Measurement equipment	Audio level meter
Specified value	−10±3dBs

[Checking Method]

1) Record signals.
2) Playback recorded portions.
3) The audio output level should be −10±3dBs.

9-5-5. Overall Distortion Check

Mode	SELF RECORD & PLAYBACK
Signal	400Hz, −66dBs
Measurement point	See Fig. 9-31.
Measurement equipment	Distortion meter
Specified value	Less than 0.5%*1

[Checking Method]

1) Record signals.
2) Playback recorded portions.
3) A distortion should be less than 0.5%*1.

*1 This value applies when a distortion measuring filter (Fig. 9-32) is used (approx. 1.0% when the filter is not used).

Fig. 9-32.

9-5-6. Overall Noise Level Check

Mode	SELF RECORD & PLAYBACK
Signal	None Short-circuit with a jumper wire between W451 pins ③ and ④ (GND) of the MA-21 board.
Measurement point	See Fig. 9-31.
Measurement equipment	Audio level meter
Specified value	Less than −56dBs*2

[Checking Method]

1) Record signals.
2) Playback recorded portions.
3) A noise level should be less than −56dBs.*2

*2 This value applies when an IHF-A auditory correction filter is used.

9-6. ELECTRONIC VIEW FINDER SYSTEM ADJUSTMENT

9-6-1. Horizontal Slant Adjustment

Mode	PLAYBACK
Signal	Alignment tape for operation checking (WR5-3CSP), monoscope portion
Specified value	See Fig. 9-33.

[Adjustment Method]

1) Adjust RV955 (BRIGHT) to provide easy-to-view brightness for the CRT.
2) Loosen the DY (Deflection Yoke) fastening band.
3) Rotate the DY to make a picture horizontal.
4) Adjust to 53.3±0.3mm a distance between the CRT surface and the rear end of the DY.
5) Tighten the DY fastening band. (Do not tighten too much.)

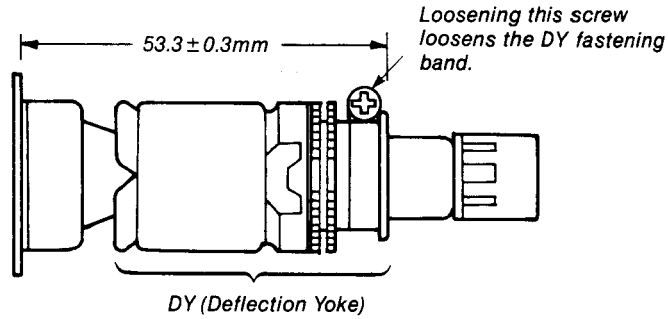
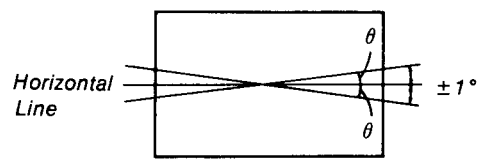


Fig. 9-33.



Specified value: A picture should be within ±1° of the horizontal line.

Fig. 9-34.

9-6-2. Centering Adjustment

Mode	PLAYBACK
Signal	Alignment tape for operation checking (WR5-3CSP), monoscope portion
Specified value	See Fig. 9-36.

[Adjustment Method]

1) Adjust the screen uniformly in both vertical and horizontal directions with the centering magnet.

Note:

Since a centering position changes due to an effect of terrestrial magnetism, rotate 360° in the horizontal direction and adjust at the center of displacement.

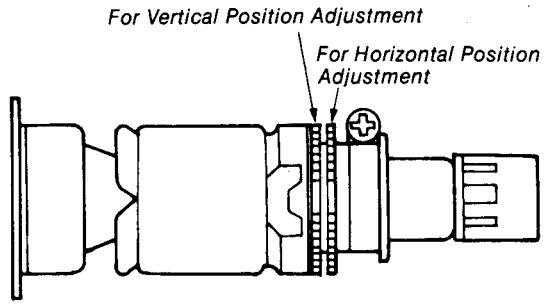


Fig. 9-35.

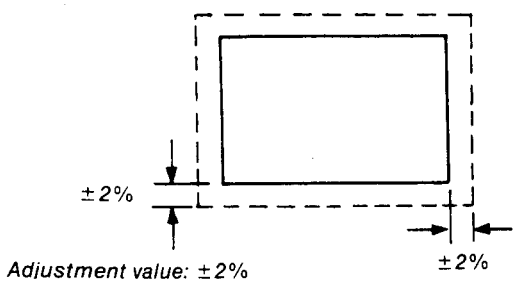


Fig. 9-36.

9-6-3. AFC Adjustment (VF-10 Board)

Mode	PLAYBACK
Signal	Alignment tape for operation checking (WR5-3CSP)
Measurement point	Pin ⑲ of IC951
Measurement equipment	Digital voltmeter or oscilloscope (DC range)
Adjustment element	RV952
Specified value	2.65 ± 0.1Vdc

[Adjustment Method]

1) Adjust to 2.65 ± 0.1Vdc with RV952.

9-6-4. Horizontal Amplitude Adjustment (VF-10 Board)

Mode	PLAYBACK
Signal	Alignment tape for operation checking (WR5-3CSP), monoscope portion
Adjustment element	C968, 969
Specified value	6 ± 3%

[Adjustment Method]

1) Adjust a focus with RV954.
2) Turn RV951, and conform the top and bottom of a monoscope picture to the top and bottom edges of the screen.
3) Turn RV955 to obtain a normal level of brightness.
4) Short or open the patterns (A, B) of the H-size adjusting capacitors (C968 and C969) sequentially to adjust horizontal overscanning to 6 ± 3% (each of right and left). (See Fig. 9-37)

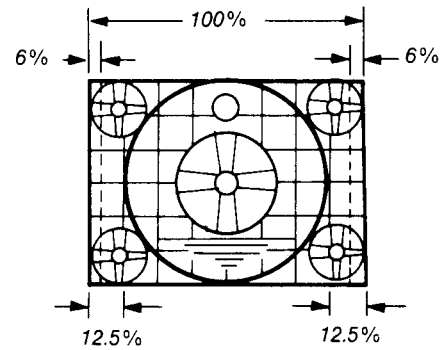
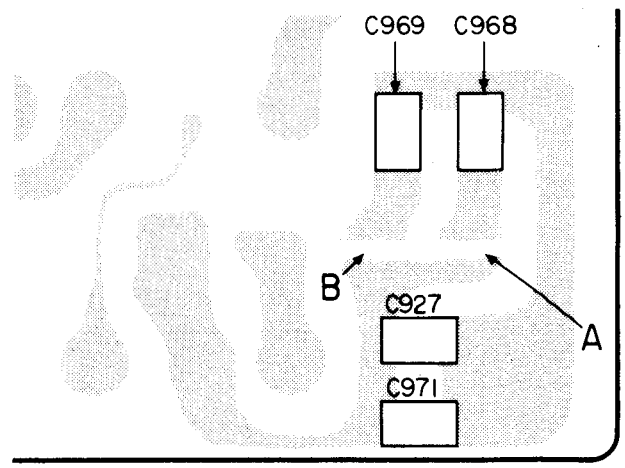


Fig. 9-37.



A	B	H Size
Open	Open	Small
Short	Open	
Open	Short	
Short	Short	Large

Fig. 9-38.

9-6-5. Vertical Amplitude Adjustment (VF-10 Board)

Mode	PLAYBACK
Signal	Alignment tape for operation checking (WR5-3CSP), monoscope portion
Adjustment element	RV951
Specified value	6±3%

[Adjustment Method]

1) Adjust vertical overscanning to 6±3% (each of top and bottom) with RV951.

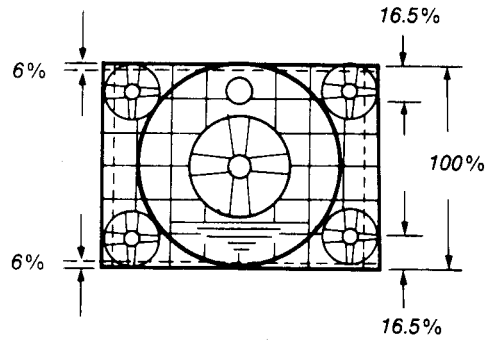


Fig. 9-39.

9-6-6. Brightness and Contrast Adjustment (VF-10 Board)

Mode	PLAYBACK
Signal	Alignment tape for operation checking (WR5-3CSP), monoscope portion
Adjustment element	Brightness: RV955 Contrast: RV953

[Adjustment Method]

1) Adjust RV955 and RV953 alternately so that the light and shade of the gray scale will be correctly displayed. (The light area should not be so bright that the cross hatch inside the monoscope circle becomes dim. The shade area should not be so dark that the darkest and second darkest parts of the gray scale cannot be distinguished from each other.)

9-6-7. Focus Adjustment (VF-10 Board)

Mode	PLAYBACK
Signal	Alignment tape for operation checking (WR5-3CSP), monoscope portion
Adjustment element	RV954

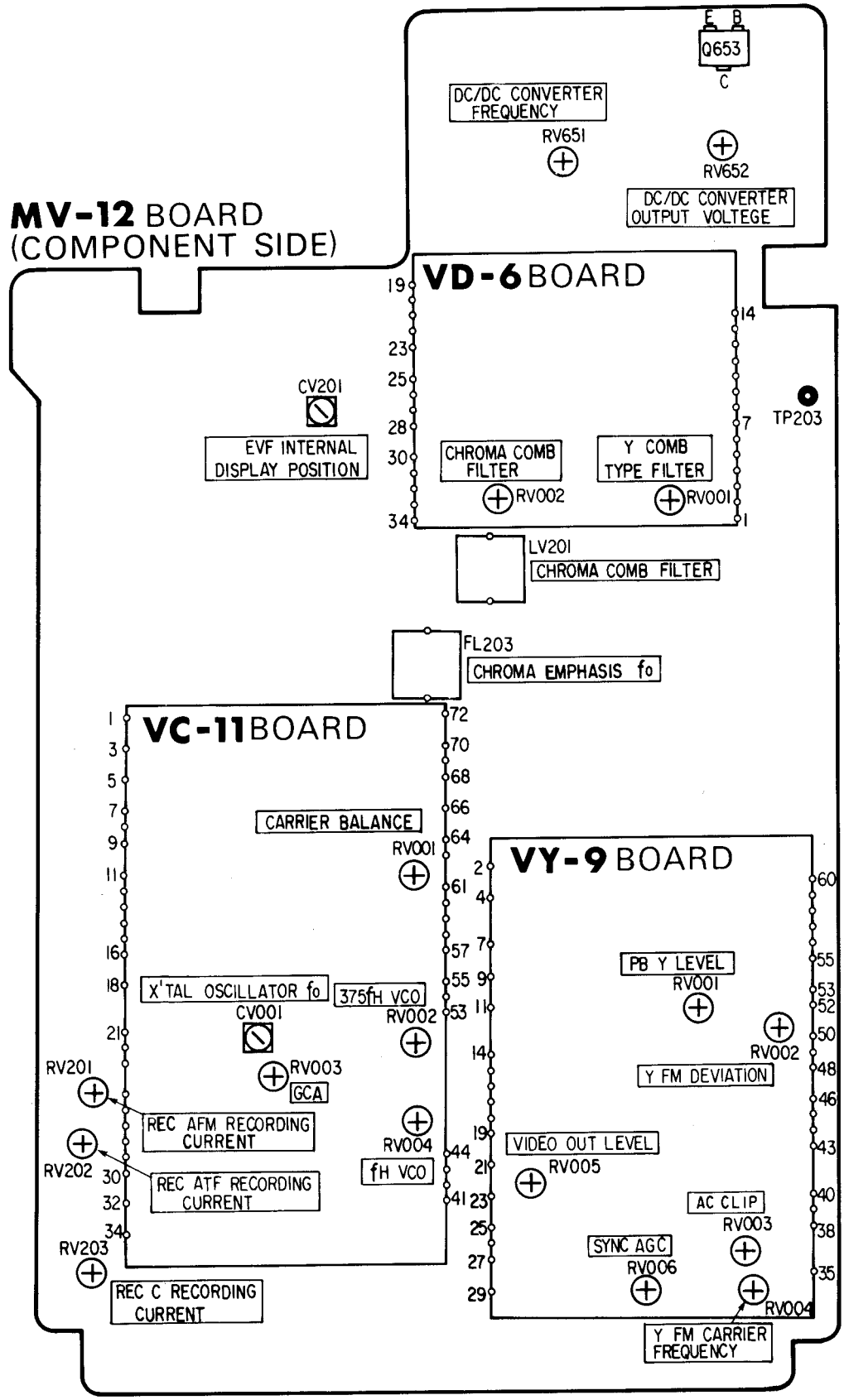
[Adjustment Method]

1) Adjust to the best focus point with RV954.

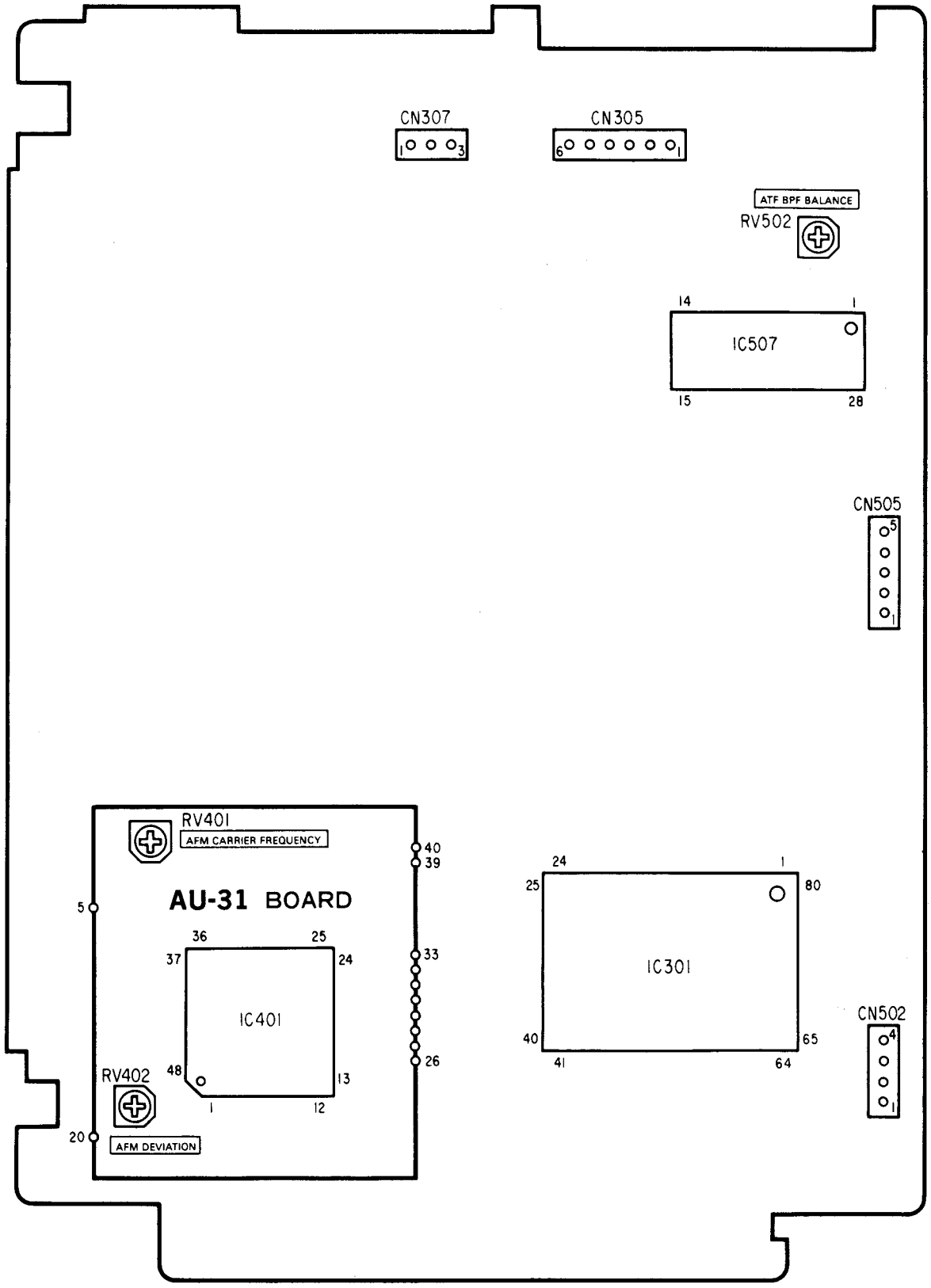
9-6-8. Horizontal and Vertical Amplitude Confirmation

Results of horizontal amplitude adjustment in 9-6-4 and vertical amplitude adjustment in 9-6-5 should meet their specified values, respectively. If not met, make readjustments. In this case, carry out both brightness and contrast adjustment in 9-6-6 and focus adjustment in 9-6-7 again.

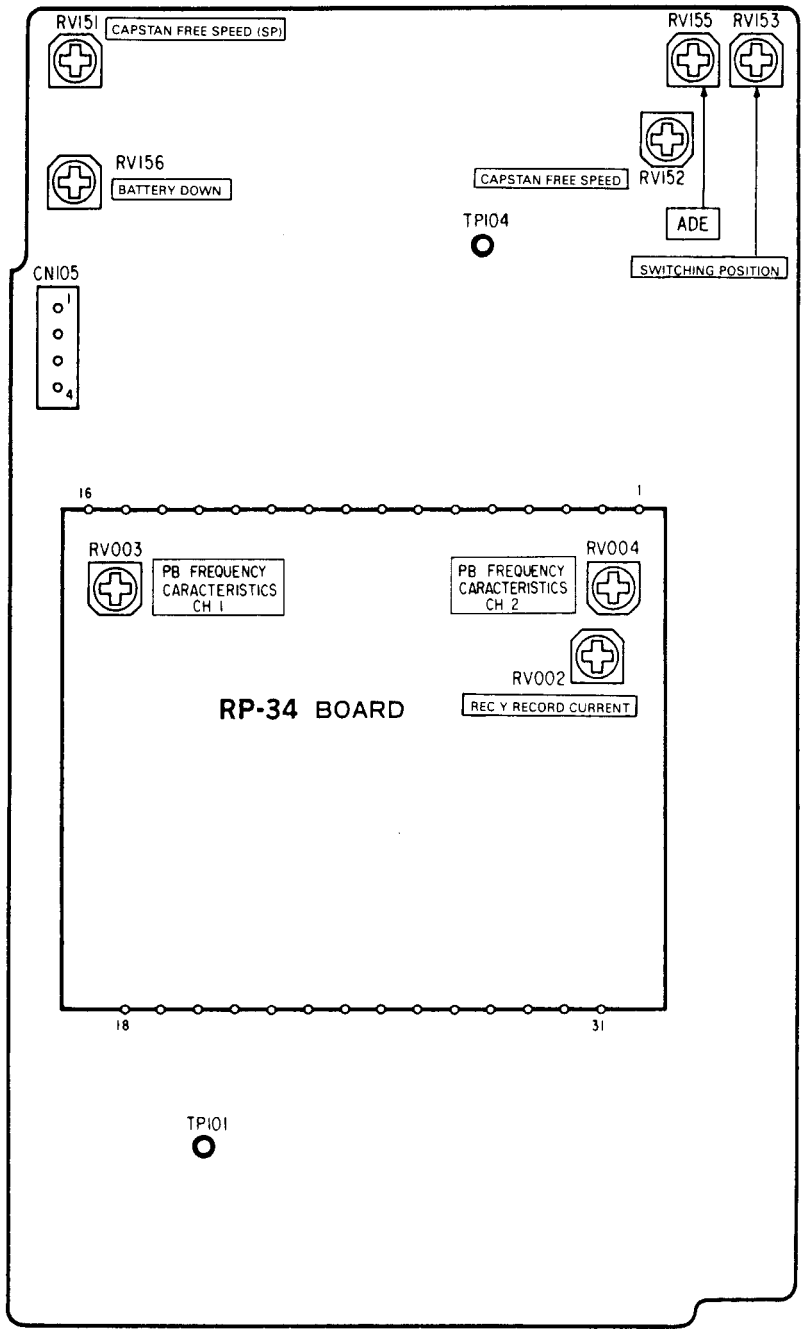
9-7. ADJUSTMENT ELEMENT LOCATION



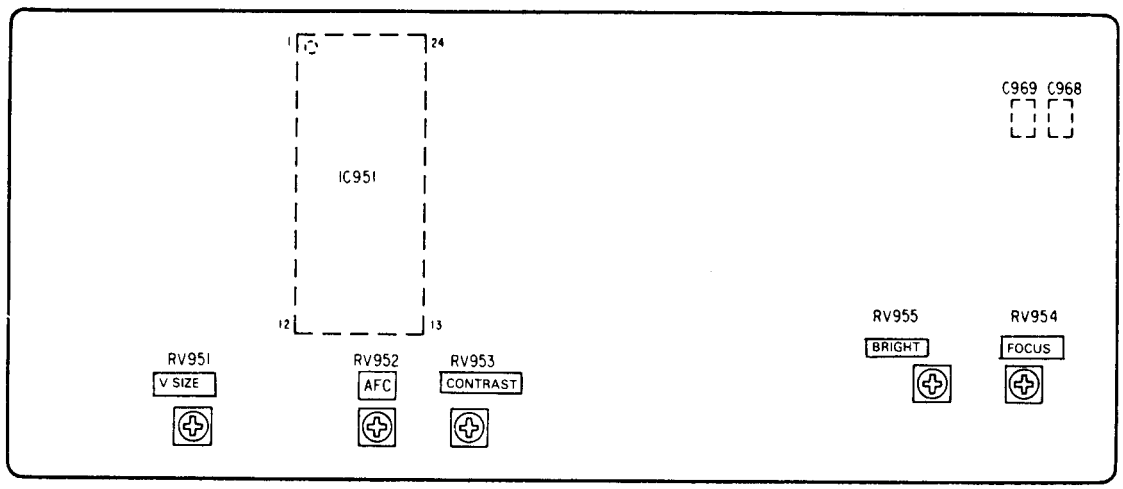
SS-70 BOARD (COMPONENT SIDE)



MR-8 BOARD (COMPONENT SIDE)



VF-10 BOARD (COMPONENT SIDE)



SONY

SERVICE MANUAL

AEP Model
UK Model
E Model

SUPPLEMENT-1

Subject : Australian model is now available and partial change of parts of AEP model.

File this supplement with the service manual.

- In the AEP model, parts to sets after serial No. 400,001 have been changed.

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	No.	Part No.	Description	Remark
	4	X-3713-705-1	CABINET (R) ASSY	5
Changed: ☛		X-3713-796-1	CABINET (R) ASSY (WEST GERMANY MODEL)	
	6	⋆3-719-384-01	LABEL, MODEL NUMBER (UK/E/SWITZERLAND/AS MODEL)	
		⋆3-720-504-01	LABEL, MODEL NUMBER (AEB): Serial No. 400,001 and later	

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ACCESSORIES AND PACKING MATERIALS
⋆⋆⋆⋆⋆⋆⋆⋆⋆⋆⋆⋆⋆⋆⋆⋆⋆⋆⋆

Part No.	Description	Remark
⋆3-719-812-01	CARTON, OUTER (AEP/E/UK MODEL)	
⋆3-719-812-31	CARTON, OUTER (AS MODEL)	
⋆3-719-812-41	CARTON, OUTER (WEST GERMANY MODEL)	
3-769-231-11	MANUAL, INSTRUCTION (ENGLISH): AEP/E/UK/AS MODEL	
3-769-231-81	MANUAL, INSTRUCTION (GERMAN): WEST GERMANY MODEL/Serial No. 400,001 and later	
1-558-975-21	CORD, CONNECTION	
1-570-730-11	SWITCH, ANTENNA (ANS-37)	
3-712-673-01	SCREW DRIVER	
⋆3-720-523-01	CUSHION (UPPER)	Serial No. 400,001 and later
⋆3-720-524-01	CUSHION (LOWER)	
⋆3-720-525-01	CARTON, OUTER	

ACCESSORY KIT

A-6767-226-A	MODULATOR ASSY (AEP/E MODEL)
A-6767-227-A	MODULATOR ASSY (UK MODEL)
A-6767-348-A	MODULATOR ASSY (AS MODEL)

NOTE:

- Items marked "⋆" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.