

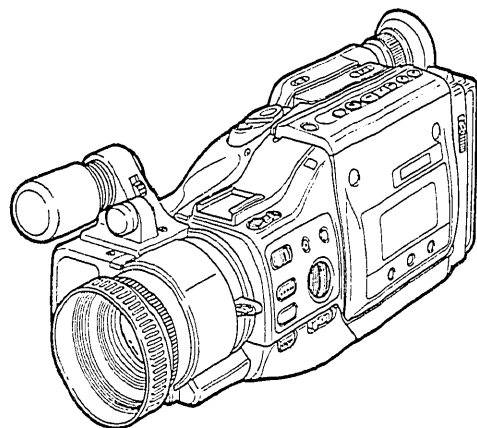
HITACHI

SERVICE MANUAL

TK

No. 3375E

VM-E15A(U,C)



Technical Data

MANUAL RELATED TO THE VM-E15A

TITLE	MODEL	MANUAL No.
Technical Information	VM-E15A	No. 3375E
RF UNIT	VM-RF85A	No. —
POWER ADAPTER /CHARGER	VM-AC80A	No. 3311E

Troubleshooting Guide VM-E15A No. 3546E


SPECIFICATIONS

■ General	
Power requirements	6V DC
Power consumption	6.4 watts (When "FULL AUTO" switch to "OFF" and "FOCUS" switch to "MAN".)
Dimensions	4"(W) x 4-5/16"(H) x 11-15/16"(D) 101(W) x 110(H) x 303(D) mm
Weight	2.3 lbs (1.0 kg)
Operating temperature	32°F - 104°F
Storage temperature	-4°F - 140°F
■ Video Recorder Section	
Format	8mm
Record/playback system	Two video record/playback heads
Video signal	EIA standard NTSC color
Tape speed	14.3 mm/sec
Video input	1.0 V _{p-p} , 75 ohm
Video output	1.0 V _{p-p} , 75 ohm
Audio input	-7.8 dBs (316 m Vrms)
Audio output	-7.8 dBs (316 m Vrms)
Fast forward/rewind time	Less than 8 minutes with P6-120 cassette
■ Camera Section	
Scanning	525 lines/60 fields/30 frames
Required minimum illumination	2 lux
Pickup device	1/2" C.C.D
Lens diameter	46 mm

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SAFETY PRECAUTIONS

The following precautions should be observed when servicing.

- Since many parts in the unit have special safety-related characteristics, always use genuine Hitachi replacement parts. Especially critical parts in the power circuit block should not be replaced with other makers'. Critical parts are marked with  in the schematic diagram.
- Before returning a repaired unit to the customer, the service technician must thoroughly test the unit to ascertain that it is completely safety operate without danger of electrical shock.

X-ray radiation

The primary source of X-ray radiation in this viewfinder is the picture tube. The tube used in this viewfinder is especially constructed to limit X-ray radiation emission. For continued X-ray radiation protection, the replacement tube must be the same type as the original, Hitachi approved one.

SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT

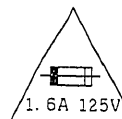
8mm VIDEO CAMERA/RECORDER

December

1990

TOKAI WORKS

CAUTION AGAINST FUSE REPLACEMENT



CAUTION: FOR CONTINUED PROTECTION AGAINST RISK OF FIRE, REPLACE ONLY WITH SAME TYPE 1.6A, 125V FUSE.
ATTENTION: AFIN D'ASSURER UNE PROTECTION PERMANENTE CONTRE LES RISQUES D'INCENDIE, REMPLACER UNIQUEMENT PAR UN FUSIBLE DE MEME TYPE ET DE 1.6A, 125V.

This symbol indicates Fast Operating Type Fuse.

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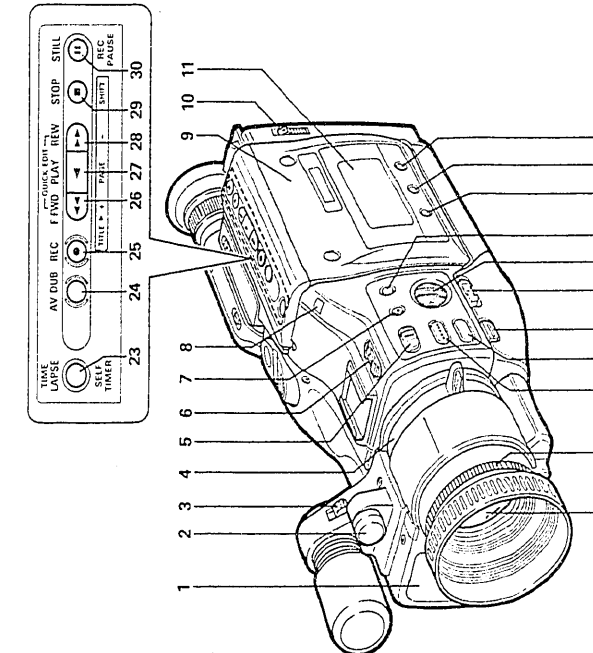
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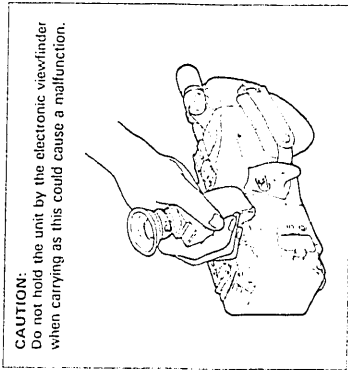
CHAPTER 1 IDENTIFICATION AND OPERATION OF CONTROLS

- 
1. **Auto Focus Window**
To automatically focus the camera lens, this window transmits and receives infrared light which is reflected off the object. Make sure you don't obstruct this window when recording.
2. **Infrared ray receiving section**
Receives infrared rays from the remote control unit.
3. **"MIC WIND/NORM" Switch**
This switch is used to reduce noise that occurs due to wind. Place the switch in the NORM position for normal use.
4. **Zoom Ring (Manual Zooming)**
Use to control the zoom setting. For a given camera-subject distance, the subject will appear 8X larger at the tele position than at the wide position. Just rotate the zoom ring for a tele angle (T) or wide angle (W) picture. Macro close-up, as close as 1 cm from object, is feasible.
5. **"FULL AUTO" Switch**
When this switch is set to "ON", the focus, shutter speed, iris and white balance are adjusted automatically. To adjust these functions manually, set this switch to "OFF" and adjust the corresponding buttons and switches.
6. **"POWER" Switch**
This turns the camera/recorder on and off and also switches between the camera and VCR modes. Set the switch to "CAM" to turn the camera's power on and to "VCR" to turn the camera's power off. Press and hold the small red button in the switch to switch it.
7. **"DATE" Button**
Press this button to display the date and clock in the viewfinder. Whenever the date and clock appear in the viewfinder, they will be recorded on the tape.
8. **Record Indicator**
Flashes for about 10 seconds when the "TIME LAPSE/SELF TIMER" button is pressed during record/pause (stand-by) mode and stays on to indicate recording starts.
9. **Cassette Holder**
Press "EJECT" button to open the cassette holder. Be aware of the cassette direction when inserting.
NOTE: Power source must be connected to open the cassette holder.
10. **"BATTERY" Release Lever**
Releases the battery, AC adapter/charger or battery housing attached to the camera/recorder.
11. **LCD Panel**
When the power is turned on, the LCD panel displays various modes.
12. **"TITLE" Button**
Press this button to create and record personalized titles on your videos with the camera/recorder's built-in titler.
13. **"RESET" Button**
When the linear time counter is displayed in the viewfinder, pressing this button resets the counter to "0:00:00".
14. **"DISPLAY" Button**
When this button is pressed, the displays in the viewfinder and LCD panel will change in sequence.
15. **"REVIEW" Button**
Used to review the last few seconds of the recorded segment in the record/pause mode.
16. **"IRIS" Control**
With this control in the center click position, or when the "FULL AUTO" switch is set to "ON", the camera/recorder automatically adjusts the lens opening for the best picture in normal conditions. The auto iris system can also be adjusted to compensate for unusual lighting. When the subject is in bright light and the background is dark, set the "FULL AUTO" switch to "OFF" and then turn this control counterclockwise to close the lens iris opening. When the background is in bright light and the subject appears too dark, turn the control clockwise to open the lens iris.
17. **"FOCUS" Switch**
Set this switch to the "AUTO" position for automatic focusing, and to the "MAN" position for focusing with the focus ring. Auto focusing can also be performed during the manual focus mode by pressing and moving this switch to the left.
18. **"FADE" Button**
During recording you can add a professional touch to your recordings by fading in and out of scenes. NOTE: When you use "FADE" button to fade in and out, the sound will also fade in and out with the picture.
19. **"WHITE BAL" Button**
When the "FULL AUTO" switch is set to "ON", the color balance is set automatically. Set the "FULL AUTO" switch to "OFF", and then press this button to adjust the color balance to suit your personal preference.
20. **"SHUTTER" Speed Control Button**
Used to control the shutter speed during recording and/or record/pause (stand-by) mode.
21. **Focus Ring**
Do not attempt to manually turn the focus ring when the camera/recorder is in the auto focus mode.
22. **Lens**
F1.4 (8.7 - 70 mm) 8:1 power zoom lens features auto focus and auto iris functions.
23. **"TIME LAPSE/SELF TIMER" Button**
This button is used when performing self-timer, time lapse and one-shot recording.
24. **"AV DUB" Button**
This button is used to record new audio and video in place of existing audio and video.
25. **"REC" Button**
Use this button to record pictures from an external input connected to the "AV IN/OUT" jack. This can be used as a record button only when the "POWER" switch is set to "VCR".
26. **"F.FWD" Button**
Press this button during stop or rewind mode, and fast-forwarding starts. "FAST FWD" indication appears in the viewfinder whenever the tape counter or time remaining is present. Press the button during playback of tape, and the tape is played back in the forward direction approximately 9 times faster than the normal speed to confirm the recorded content. Press "PLAY" button to return to normal playback mode or press "STOP" button to stop tape movement.
NOTE: You can also visually scan forward when the camera/recorder is record/pause (stand-by) mode by pressing and holding this button.

44. **"PHONE" Jack**
Sound being recorded by the microphone or played back may be monitored by attaching earphone (not supplied) to this jack.

45. **"NEG/POS" Switch**
• Normally set to "POS".
• Set to "NEG" for special effects as in a negative film.

46. **Clock Battery Compartment**
Pull the tab to open the cover and install the clock battery (provided).



33. **"EVF RELEASE" Button**
Press and hold this button to release or to set the EVF (Electronic Viewfinder) back to its original position.

34. **Power Zoom Switch**
This switch performs zooming electrically.
"W": Picture becomes wider gradually.
"T": Picture becomes telescopic gradually.

35. **Accessory Shoe**
Used to attach the lightweight video accessory.

36. **"MIC" Jack**
Connect an external microphone here to record sound from the external microphone.
NOTE: Connecting an external microphone automatically switches off the built-in microphone.

37. **Microphone**
Sensitive to source coming from the direction in which the camera is pointed.

38. **Lens Cap Tab**
Place the lens cap on this tab when you are ready to record a scene. The tab also prevents the lens cap from swinging around on its cord.

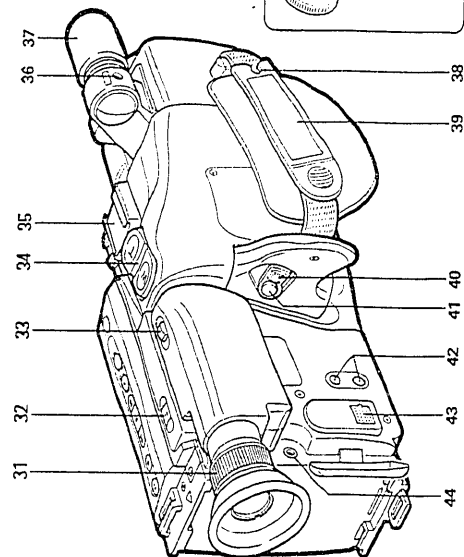
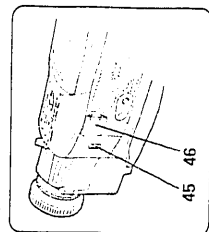
39. **Hand Strap**
Adjust to best fit to your hand.

40. **Power Save Lever**
When the "POWER" switch is set to "CAM", this lever turns the camera's power on and off. This is convenient during camera recording because it is not necessary to set the "POWER" switch to "OFF" when you want to turn camera's power off and then on again.

41. **"REC START/STOP" Button**
This button is used to control the camera/recorder. When this button is pressed with the camera/recorder set to the recording mode, the tape runs to start recording. "REC" appears in the viewfinder.
When this button is pressed again, "PAUSE" appears instead of "REC" and the tape stops and the camera/recorder enters the record/pause (stand-by) mode.

42. **"DATE/TIME" Set Buttons**
These buttons are used to set the clock (time and date) in your camera/recorder so it can be recorded on your tapes for future reference. (See page 20.)

43. **"AV IN/OUT" Jack**
Use the RF output adapter (Accessory No. 4) or the AV output cord (Optional accessory) to connect this jack to a TV to view the pictures played back by the camera/recorder.
Use the AV input cord (Accessory No. 1) to connect this jack to a TV or VCR to record pictures from the VCR or TV.



27. **"PLAY" Button**
Used for playback of tape.
NOTE: When the camera/recorder is record/pause (stand-by) mode, pressing and holding this button will play the tape at normal speed.

28. **"REW" Button**
Press this button during stop or fast forward mode, and fast-rewinding starts. "REWIND" indication appears in the viewfinder whenever the tape counter or time remaining is present. Press the button during playback of tape, and the tape is played back in the rewind direction approximately 7 times faster than the normal speed to confirm the recorded contents.
Press "PLAY" button to return to normal playback mode or press "STOP" button to stop tape movement.

31. **Diopter Control**
To use the electronic viewfinder without eyeglasses on, turn this control ring for your optimum focus adjustment.

32. **"EJECT" Button**
Operates with "POWER" either on or off, if a power source is connected to the camera/recorder.

29. **"STOP" Button**
The "STOP" button is used to stop playback, rewind, and fast forward operations. The "STOP" button has no effect during camera record operation.

30. **"STILL (REC/PAUSE)" Button**
When this button is pressed during recording, the tape stops and the camera/recorder enters the record/pause (stand-by) mode. When this button is pressed again, the tape runs to resume recording. This button may be also used to display a still picture during playback mode.

CHAPTER 2 DISASSEMBLY

Note: Set the unit to the EJECT state before taking the tape transport system apart. The cassette lid can easily be removed in this state.

1. CASE REMOVAL

1-1. Cassette Lid, Cassette Lid Display

(1) Cassette Lid

- 1) Remove two (2) screw covers. (See Fig. 2-1)
- 2) Remove two (2) screws holding the cassette lid.
- 3) Remove the cassette lid in the direction of the arrow.
- 4) Disconnect flat cable CN920.

(2) Cassette Lid Display

- 1) Remove two (2) screws holding the cassette lid display. (See Fig. 2-1)

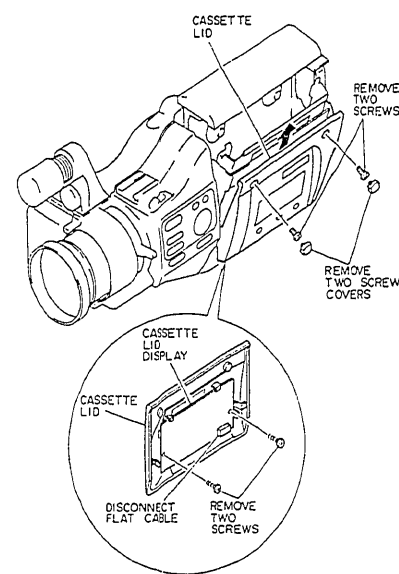


Fig. 2-1

1-2. Accessory Shoe Spring, Accessory Shoe, Right Case, Microphone (MIC), Grip Cover

(1) Accessory Shoe Spring

- 1) Insert a flat-bladed screwdriver, etc. into the hole in the accessory shoe spring and remove the accessory shoe spring in the direction of arrow (A). (See Fig. 2-2)

(2) Accessory Shoe

- 2) Remove two (2) screws and remove the accessory shoe in the direction of arrow (B). (See Fig. 2-2)

(3) Right Case

- 2) Remove one (1) screw holding the accessory shoe and right case. (See Fig. 2-2)
- 3) Remove three (3) screws holding the right case.
- 4) Remove one (1) screw holding the left case.

- 5) Remove six (6) screws holding the right case. (See Fig. 2-3)
- 6) Open the right case in the direction of the arrow.
- 7) Disconnect three (3) connectors (CN1801, CN1328, CN1329) on the process circuit board. (See Fig. 2-4)
- (4) Microphone (MIC)
- 8) Remove one (1) screw holding the microphone. (See Fig. 2-2)
- 9) Disconnect connector CN910 on the microphone.
- 10) Disconnect connector CN1861 on the back-up circuit board. (See Fig. 2-4)
- (5) Grip Cover
- 1) Remove one (1) screw holding the grip cover. (See Fig. 2-3)

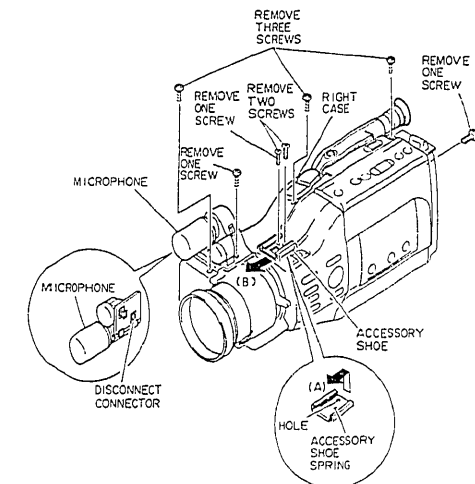


Fig. 2-2

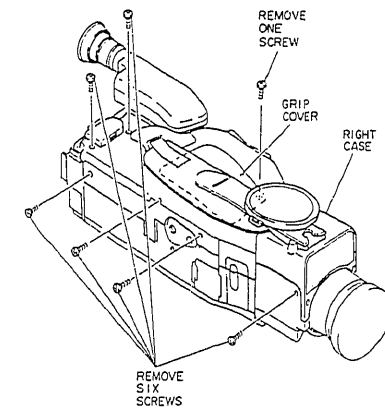


Fig. 2-3

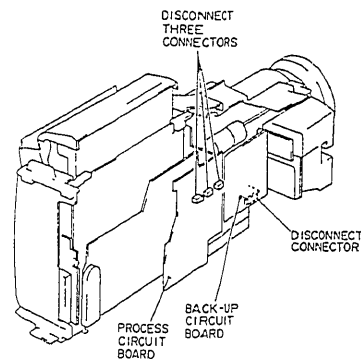


Fig. 2-4

1-3. Electronic Viewfinder (EVF)

ORDER FOR REMOVING PARTS	ITEM No.
Accessory Shoe Spring, Right Case	1-2

- 1) While push the EVF lock button, move the EVF in the direction of arrow (A). (See Fig. 2-5)
- 2) Remove one (1) screw holding the EVF.
- 3) While push the EVF lock button, move the EVF in the direction of arrow (B).
- 4) While push the EVF lock button, remove the EVF in the direction of arrow (C).

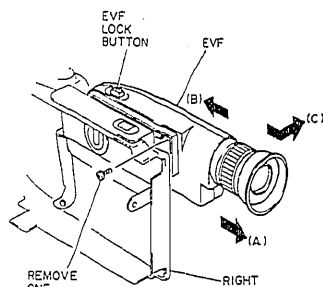


Fig. 2-5

1-4. Zoom Switch

ORDER FOR REMOVING PARTS	ITEM No.
Accessory Shoe Spring, Right Case	1-2

- 1) Release four (4) tabs and remove the zoom switch in the direction of the arrow. (See Fig. 2-6)

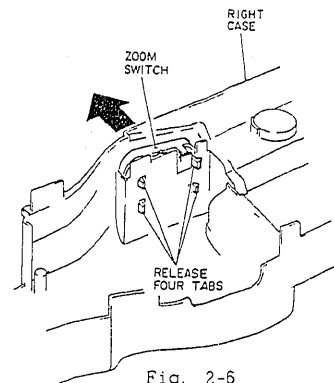


Fig. 2-6

1-5. Left Case

ORDER FOR REMOVING PARTS	ITEM No.
Cassette Lid	1-1
Accessory Shoe Spring, Right Case, Microphone	1-2

- 1) Remove one (1) screw holding the tripod mount. (See Fig. 2-7)
- 2) Disconnect CN552 on the regulator block.
- 3) Remove six (6) screws and remove the left case in the direction of the arrow.

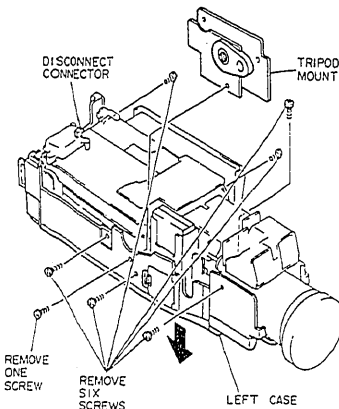


Fig. 2-7

2. CIRCUIT BOARD AND TAPE TRANSPORT MECHANISM REMOVAL

2-1. Luminance/Chroma (Luma/Chroma) Circuit Board

Note: Remove the right case and left case as previously given.

- 1) Remove the luma/chroma circuit board in the direction of the arrow separating from the main circuit board. (The luma/chroma and main circuit boards are connected via board-in type connectors.) (See Fig. 2-8)
- 2) Disconnect flat cable CN222 on the luma/chroma circuit board.

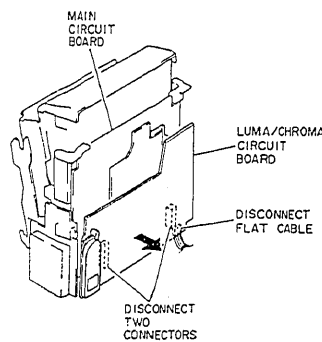


Fig. 2-8

2-2. Regulator Block

Note: Remove the right case and left case as previously given.

- 1) Disconnect connector CN526 on the process circuit board. (See Fig. 2-9)
- 2) Remove one (1) screw holding the regulator block.
- 3) Remove the regulator block in the direction of the arrow separating from the main circuit board. (The regulator block and main circuit board are connected via board-in type connector.)

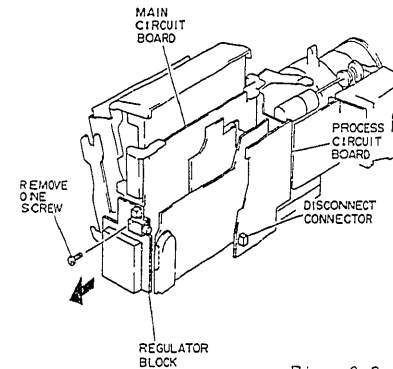


Fig. 2-9

2-3. Main Circuit Board, Tape Transport Mechanism

Note: Remove the right case and left case as previously given.

ORDER FOR REMOVING PARTS	ITEM No.
Luma/Chroma Circuit Board	2-1
Regulator Block	2-2

- 1) Disconnect two (2) connectors (CN212, CN904) on the main circuit board. (See Fig. 2-10)
- 2) Disconnect seven (7) flat cables (CN211, CN613, CN903, CN905, CN907, CN909, CN921) on the main circuit board.
- 3) Release two (2) tabs and open the main circuit board.
- 4) Disconnect three (3) flat cables (CN612, CN614, CN906) on the main circuit board and remove the main circuit board from the tape transport mechanism. (See Fig. 2-11)

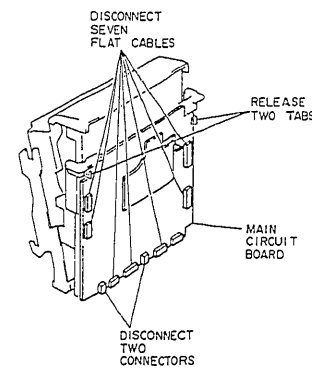


Fig. 2-10

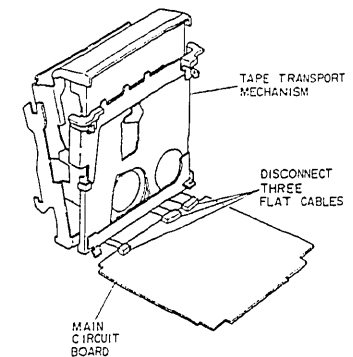


Fig. 2-11

2-4. Process Circuit Board

Note: Remove the right case as previously given.

- 1) Disconnect four (4) connectors (CN526, CN1327, CN1328, CN1331) on the process circuit board. (See Fig. 2-12)
- 2) Disconnect two (2) flat cables (CN921, CN222) on the process circuit board.
- 3) Release one (1) tab and remove the process circuit board in the direction of the arrow separating from the sensor circuit board. (The process and sensor circuit boards are connected via board-in type connectors.)

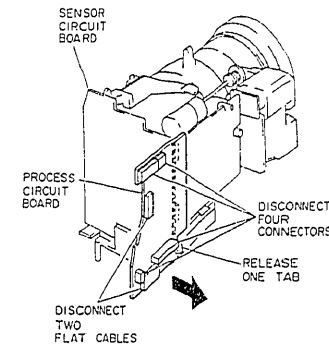


Fig. 2-12

2-5. Autofocus Circuit Board

Note: Remove the right case as previously given.

- 1) Remove one (1) screw holding the autofocus circuit board. (See Fig. 2-13)
- 2) Open the autofocus circuit board in the direction of the arrow.
- 3) Disconnect four (4) connectors (CN1AF, CN2AF, CN3AF, CN4AF) on the autofocus circuit board.
- 4) Unsolder two (2) connectors (CN5AF, CN6AF) on the main circuit board.

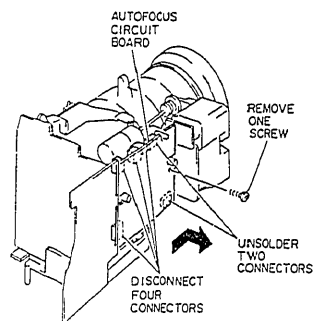


Fig. 2-13

2-6. DC-DC Converter

Note: Remove the right case as previously given.

- 1) Disconnect connector (CN1327) on the process circuit board. (See Fig. 2-14)
- 2) Release one (1) tab and pull out the DC-DC converter from the its holder in the direction of the arrow.

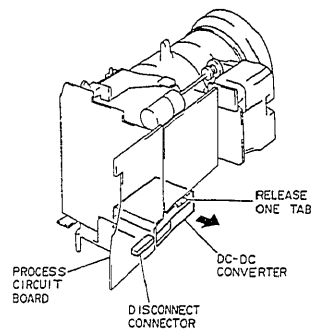


Fig. 2-14

2-7. Control Circuit Board, Back-up Circuit Board

Note: Remove the right case and left case as previously given.

- 1) Disconnect flat cable (CN903) on the control circuit board. (See Fig. 2-15)
- 2) Release three (3) tabs and remove the control circuit board in the direction of arrow (A).
- 3) Remove the back-up circuit board in the direction of arrow (B) separating from the sensor circuit board. (The back-up and sensor circuit boards are connected via board-in type connector.)

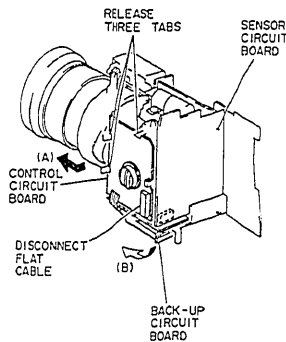


Fig. 2-15

2-8. Sensor Circuit Board

Note: Remove the right case and left case as previously given.

ORDER FOR REMOVING PARTS	ITEM No.
Process Circuit Board	2-4
Control Circuit Board,	2-7
Back-up Circuit Board	

- 1) Remove two (2) screws holding the sensor circuit board. (See Fig. 2-16)

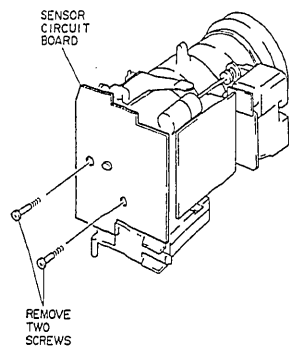


Fig. 2-16

3. MAIN MECHANICAL COMPONENTS IDENTIFICATION

3-1. Sub Chassis Assembly

1. Take-up Guide Roller Rail
2. Take-up Guide Arm
3. Pressure Roller
4. Take-up Guide Roller Base
5. Take-up Reel Disk
6. Safety Tab/Tape Select Switch
7. Take-up Reel Brake
8. Reel Drive Idler
9. Supply Reel Disk
10. Supply Reel Brake
11. Tape Thickness Switch
12. Tension Control Arm
13. Tension Relay Arm
14. Supply Guide Roller Base
15. Tension Arm
16. Supply Guide Roller (3)
17. Supply Guide Roller Rail

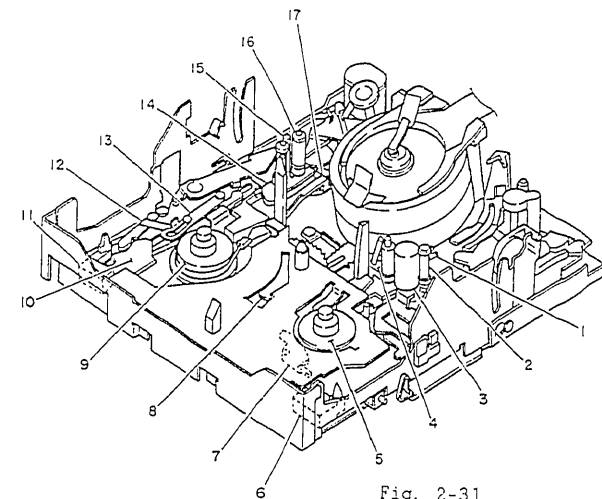


Fig. 2-31

3-2. Main Chassis Assembly

1. Cylinder
2. Take-up Guide Post
3. Capstan Motor
4. Center Relay Gear
5. Reel Drive Belt
6. Pressure Roller Drive Arm
7. Take-up Loading Cam Gear
8. Eject Arm
9. Cassette Holder Switch
10. Center Gear
11. Supply Cam Gear Holder
12. Sub Chassis Slide Arm
13. Supply Loading Cam Gear
14. Supply Brake Gear
15. Slide Gear
16. Mechanism State Switch
17. Loading Gear (3)
18. Loading Gear (2)
19. Loading Gear (1)
20. Loading Motor
21. Supply Guide Roller (2)
22. Cylinder Base

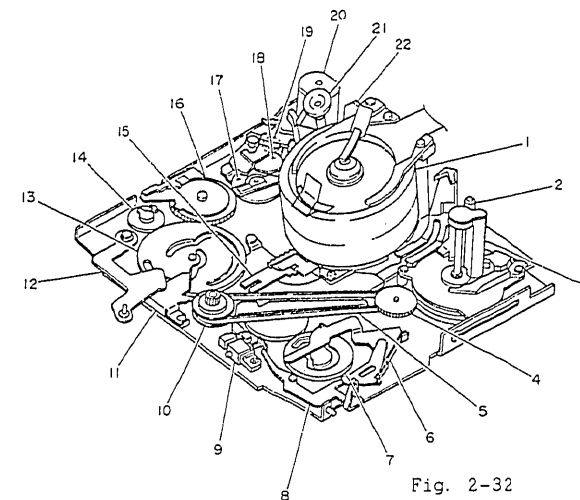


Fig. 2-32

4. SUB CHASSIS ASSEMBLY REMOVAL

ORDER FOR REMOVING PARTS	ITEM No.
Main Circuit Board, Tape Transport Mechanism	2-3

Note: Set the unit to the eject state. Apply DC 3V to pin 1 of CN904 (loading motor) to set the unit to eject state with the tape transport mechanism removed (use CN904 pin 2 as ground).

4-1. Main Chassis Bracket (1), (2)

Note: Lower the cassette holder to lock it when removing main chassis bracket (1) and (2).

- 1) Remove three (3) screws holding the main chassis bracket (1). (See Fig. 2-33)
- 2) Remove five (5) screws holding the main chassis bracket (2).

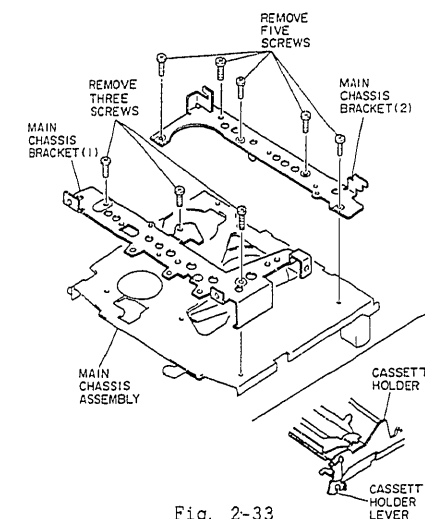


Fig. 2-33

4-2. Cassette Holder

- 1) Remove two (2) screws and remove the cassette holder in the direction of the arrow. (See Fig. 2-34)

Note: Take care of the following when reinstalling the cassette holder in the main chassis. (See Figs. 2-34, 2-35)

- ① Section (A) of the cassette holder should be inserted into section (B) (recess) of the main chassis.
- ② Section (D) of the cassette holder should be inserted into section (C) of the sub chassis. Section (D) is between the cassette holder and cassette holder slide chassis.
- ③ Section (F) of the cassette holder should be inserted into section (E) of the sub chassis. Section (F) is between the cassette holder and cassette holder slide chassis.

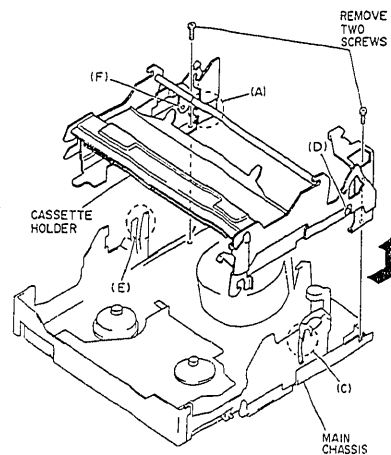


Fig. 2-34

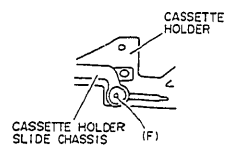
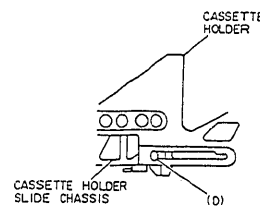
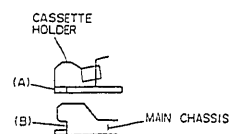


Fig. 2-35

4-3. Sub Chassis Cover

ORDER FOR REMOVING PARTS	ITEM No.
- Cassette Holder	4-2

- 1) Remove three (3) screws holding the sub chassis cover. (See Fig. 2-36)
- 2) Release one (1) tab and remove the end LED from the sub chassis cover.

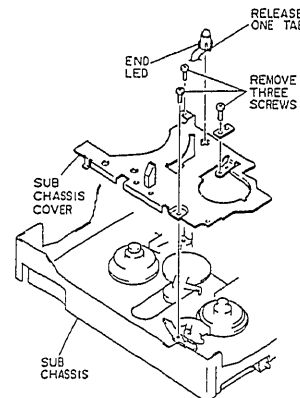


Fig. 2-36

4-4. Reel Drive Idler, Supply Reel Brake, Tension Relay Arm, Tension Control Arm

ORDER FOR REMOVING PARTS	ITEM No.
- Cassette Holder	4-2
- Sub Chassis Cover	4-3

(1) Reel Drive Idler

- 1) Remove one (1) washer and pull out the reel drive idler from the main chassis. (See Fig. 2-37)

(2) Supply Reel Brake, Tension Relay Arm, Tension Control Arm

- 1) Remove one (1) washer and pull out the supply reel brake from the sub chassis. (See Fig. 2-37)
- 2) Remove one (1) washer holding the tension relay arm
- 3) Remove one (1) washer holding the tension control arm.
- 4) Pull out the tension relay arm and tension control arm from the sub chassis.

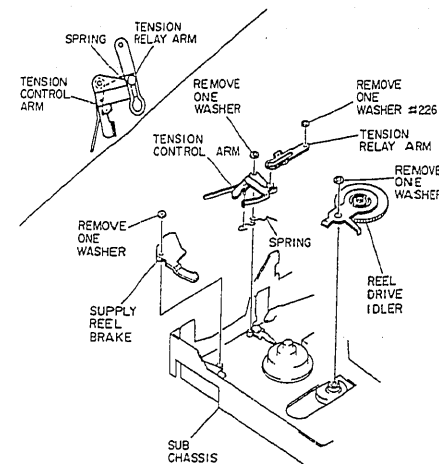


Fig. 2-37

4-5. Pressure Roller, Take-up Guide Arm, Middle Pole

ORDER FOR REMOVING PARTS	ITEM No.
- Cassette Holder	4-2
- Sub Chassis Cover	4-3

- 1) Release the spring between the pressure roller and sub chassis. (See Fig. 2-38)
- 2) Move the pressure roller in the direction of the arrow and pull out the pressure roller from the sub chassis.
- 3) Pull out the take-up guide arm from the sub chassis. (See Fig. 2-39)
- 4) Remove one (1) washer from the middle pole shaft and pull out the middle pole from the main chassis.

Note: Adjust as follows after installing the take-up guide arm.

- CHAPTER 3
- 4-5. TAKE-UP GUIDE POLE/TAKE-UP GUIDE POST HEIGHT ADJUSTMENT.

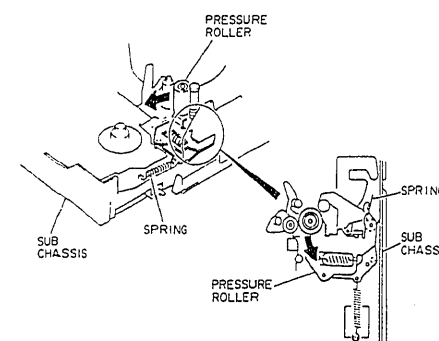


Fig. 2-38

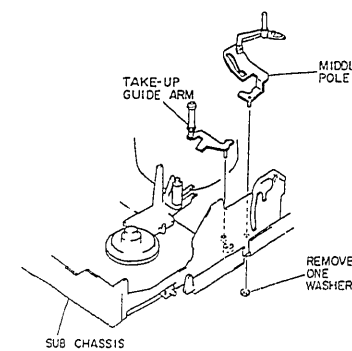


Fig. 2-39

4-6. Sub Chassis Assembly

ORDER FOR REMOVING PARTS	ITEM No.
- Cassette Holder	4-2
- Sub Chassis Cover	4-3
- Reel drive Idler, Supply Reel Brake, Tension Relay Arm, Tension Control Arm	4-4
- Pressure Roller, Take-up Guide Arm, Middle Pole	4-5

- 1) Remove three (3) screws holding the sub chassis assembly. (See Fig. 2-40)
- 2) Remove the sub chassis assembly in the direction of the arrow from the main chassis assembly

Note: Adjust as follows after installing the sub chassis assembly.

- CHAPTER 3
- 3. SUB CHASSIS SLIDE AMOUNT ADJUSTMENT.

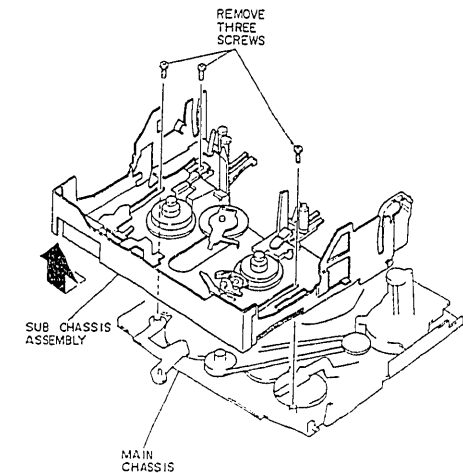


Fig. 2-40

5. MAIN MECHANICAL COMPONENTS ON THE SUB CHASSIS REMOVAL

ORDER FOR REMOVING PARTS	ITEM No.
- Zoom Switch, Tape Transport Mechanism	3-6
- Cassette Holder	4-2

5-1. Cassette Holder Damper

- 1) Remove one (1) E-ring and remove the cassette holder damper from the sub chassis. (See Fig. 2-41)

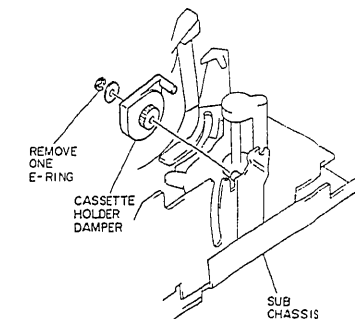


Fig. 2-41

5-2. Sub Chassis Slide Stopper

ORDER FOR REMOVING PARTS	ITEM No.
- Sub Chassis Cover	4-3

- 1) Remove two (2) screws holding the sub chassis slide stopper. (See Fig. 2-42)

Note: Adjust as follows after installing the sub chassis slide stopper.

CHAPTER 3
3. SUB CHASSIS SLIDE AMOUNT ADJUSTMENT.

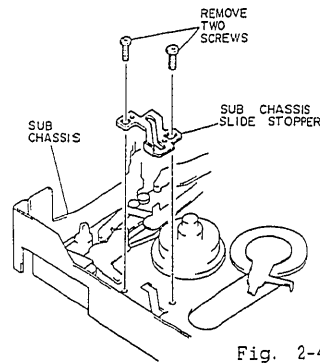


Fig. 2-42

5-3. Tension Arm, Supply Guide Roller (3), Tension Band, Guide Roller Spring

ORDER FOR REMOVING PARTS	ITEM No.
Sub Chassis Cover	4-3
Supply Reel Brake, Tension Relay Arm, Tension Control Arm	4-4

- 1) Remove one (1) screw holding the tension band. (See Fig. 2-43)
- 2) Release the tension spring between the sub chassis and tension arm.
- 3) Remove one (1) washer holding the tension arm and supply guide roller (3)
- 4) Pull out the tension arm, supply guide roller (3) and tension band from the sub chassis.
- 5) Release (2) tabs and remove the tension band from the tension arm.
- 6) Remove one (1) washer holding the guide roller spring.

Note: Adjust as follows after installing the tension arm and tension band.

CHAPTER 3
4-2. TENSION POLE POSITION ADJUSTMENT.
4-3. TENSION ADJUSTMENT.

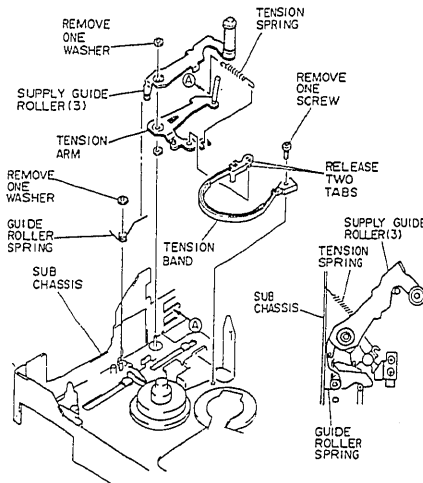


Fig. 2-43

5-4. Take-up Brake Control Arm, Take-up Brake Drive Arm, Take-up Reel Brake, Take-up Reel Disk

ORDER FOR REMOVING PARTS	ITEM No.
Sub Chassis Cover	4-3

- 1) Pull out the take-up brake control arm from the sub chassis. (See Fig. 2-44)
- 2) Release the spring between the take-up brake drive arm and sub chassis.
- 3) Remove one (1) washer and pull out the take-up brake drive arm from the sub chassis.
- 4) Remove one (1) washer and pull out the take-up reel brake from the sub chassis.
- 5) Pull out the take-up reel disk from the sub chassis.

Note: Adjust as follows after installing the take-up reel disk.

CHAPTER 3
4-1. REEL DISK HEIGHT ADJUSTMENT.

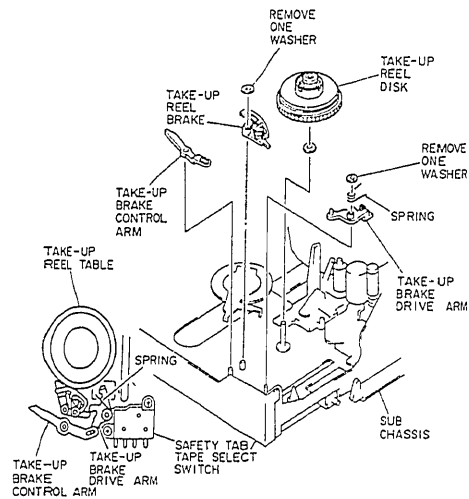


Fig. 2-44

5-5. Take-up Guide Roller Base, Supply Guide Roller Base

ORDER FOR REMOVING PARTS	ITEM No.
Sub Chassis Cover	4-3
Reel Drive Idler, Supply Reel Brake, Tension Relay Arm, Tension Control Arm	4-4
Pressure Roller, Take-up Guide Arm, Middle Pole	4-5
Sub Chassis Assembly	4-6

- (1) Take-up Guide Roller Base
- 1) Turn the take-up loading link gear in the direction of arrow (A) to release the engagement with the sub chassis. (See Fig. 2-45)
- (2) Supply Guide Roller Base
- 1) Turn the supply loading link gear in the direction of arrow (B) to release the engagement with the sub chassis. (See Fig. 2-45)

Note: Adjust as follows after installing the take-up guide roller base or supply guide roller base.

CHAPTER 3
4-6. SUPPLY GUIDE ROLLER (1)/ TAKE-UP GUIDE ROLLER HEIGHT ADJUSTMENT.

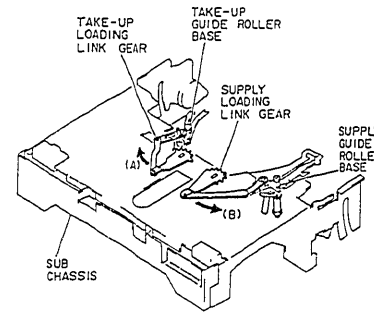


Fig. 2-45

5-6. Take-up Guide Roller Rail, Supply Guide Roller Rail, Supply Reel Disk

ORDER FOR REMOVING PARTS	ITEM No.
Sub Chassis Cover	4-3
Reel Drive Idler, Supply Reel Brake, Tension Relay Arm, Tension Control Arm	4-4
Pressure Roller, Take-up Guide Arm, Middle Pole	4-5
Sub Chassis Assembly	4-6

- (1) Take-up Guide Roller Rail
- 1) Remove the take-up guide roller base. (See Fig. 2-45)
 - 2) Remove one (1) screw holding the take-up guide roller rail. (See Fig. 2-46)
- (2) Supply Guide Roller Rail, Supply Reel Disk
- 1) Remove the supply guide roller base. (See Fig. 2-45)
 - 2) Remove two (2) screws holding the tension band holder and supply guide roller rail. (See Fig. 2-46)
 - 3) Pull out the supply reel disk from the sub chassis.

Note: Adjust as follows after installing the supply reel disk.

CHAPTER 3
4-1. REEL DISK HEIGHT ADJUSTMENT.

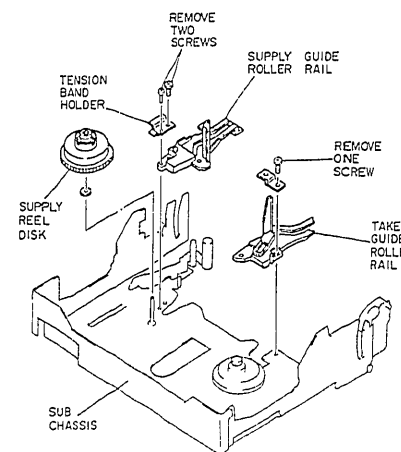


Fig. 2-46

5-7. Trouble Sensor Assembly (Supply End Sensor, Take-up End Sensor, Reel Sensor, End LED, Safety Tab/Tape Select Switch, Tape Thickness Switch)

ORDER FOR REMOVING PARTS	ITEM No.
Sub Chassis Cover	4-3
Reel drive Idler, Supply Reel Brake, Tension Relay Arm, Tension Control Arm	4-4
Pressure Roller, Take-up Guide Arm, Middle Pole	4-5
Sub Chassis Assembly	4-6
Take-up Guide Roller Base	5-5
Take-up Guide Roller Rail	5-6

- 1) Remove one (1) screw holding the safety tab/tape select switch. (See Fig. 2-47)
- 2) Remove one (1) screw holding the tape thickness switch
- 3) Remove one (1) screw holding the take-up end sensor. (See Fig. 2-48)
- 4) Remove one (1) screw holding the supply end sensor.
- 5) Peel out the trouble sensor assembly from the sub chassis.

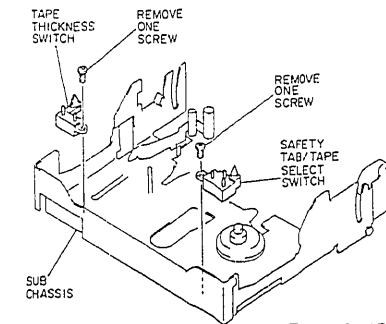


Fig. 2-47

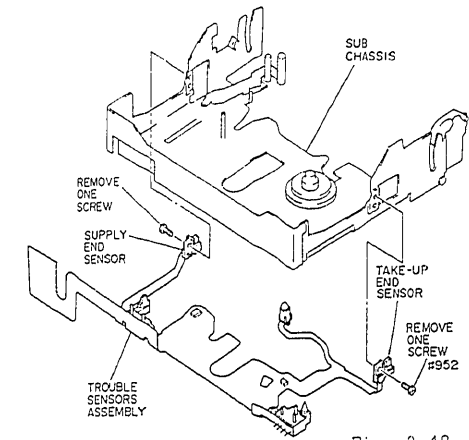


Fig. 2-48

6. MAIN MECHANICAL COMPONENTS ON THE MAIN CHASSIS REMOVAL

ORDER FOR REMOVING PARTS	ITEM No.
Main Circuit Board, Tape Transport Mechanism	2-3
Cassette Holder	4-2

6-1. Sub Chassis Slide Arm, Supply Brake Gear

ORDER FOR REMOVING PARTS	ITEM No.
- Sub Chassis Cover	4-3
- Reel Drive Idler, Supply Reel Brake, Tension Relay Arm, Tension Control Arm	4-4
- Pressure Roller, Take-up Guide Arm, Middle Pole	4-5
- Sub Chassis Assembly	4-6

- (1) Sub Chassis Slide Arm
1) Pull out the sub chassis slide arm and spacer from the main chassis. (See Fig. 2-49)
- (2) Supply Brake Gear
1) Pull out the supply brake gear from the main chassis (See Fig. 2-49)

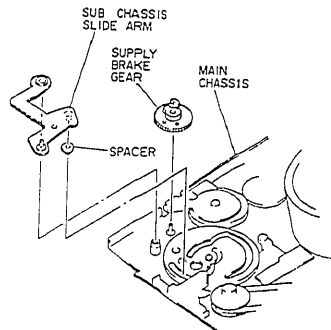


Fig. 2-49

6-2. Cylinder Assembly

- 1) Remove three (3) screws holding the cylinder assembly. (See Fig. 2-50)
Note: Be careful that your fingers or tools do not touch the video head tips during work.
Attach the cylinder after reinstalling all other components. Adjust as follows after installing the cylinder assembly.
- CHAPTER 3
5. ADJUSTMENTS AFTER REPLACING CYLINDER.

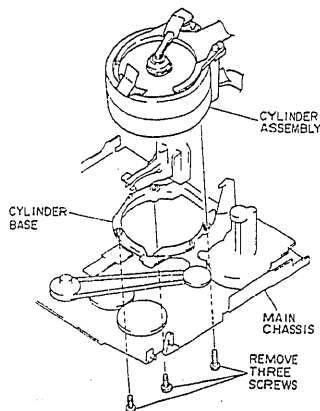


Fig. 2-50

6-3. Capstan Motor, Guide Roller Relay Rail (1)

- (1) Capstan Motor
1) Remove three (3) screws and remove the capstan motor from the main chassis. (See Fig. 2-51)
- (2) Guide Roller Relay Rail (1)
2) Pull out guide roller relay rail (1) from the main chassis. (See Fig. 2-51)
Note: Adjust as follows after installing the capstan motor.
- CHAPTER 3
4-5. TAKE-UP GUIDE POLE/TAKE-UP POST HEIGHT ADJUSTMENT.

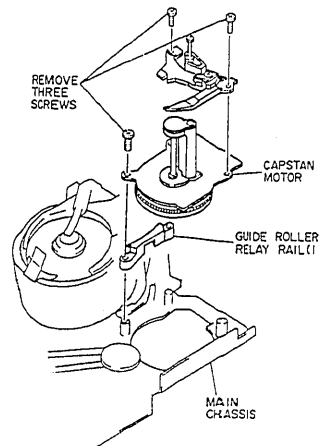


Fig. 2-51

6-4. Supply Guide Roller (2), Supply Tape Guide, Loading Motor

- (1) Supply Guide Roller (2), Supply Tape Guide
1) Remove one (1) washer holding the supply guide roller (2). (See Fig. 2-52)
2) Remove two (2) screws holding the supply tape guide.
3) Remove the supply guide roller (2) and supply tape guide from the main chassis.
- (2) Loading Motor
4) Remove one (1) screw and remove the loading motor from the main chassis. (See Fig. 2-52)
Note: Adjust as follows after installing the loading motor.
- CHAPTER 3
4-3. SUPPLY GUIDE ROLLER (2) HEIGHT ADJUSTMENT.
Adjust as follows after installing the supply guide roller (2).
- CHAPTER 3
4-4. SUPPLY GUIDE ROLLER (2) HEIGHT ADJUSTMENT.

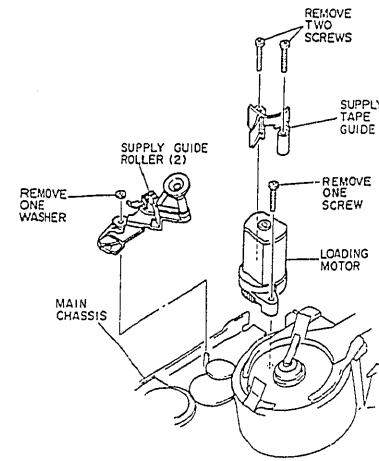


Fig. 2-52

6-5. Loading Gears (1), (2), (3), Mechanism State Switch, Support Plate

Note: Remove the sub chassis assembly from the main chassis as previously given.
- CHAPTER 3

ORDER FOR REMOVING PARTS	ITEM No.
- Main Chassis Bracket (1), (2)	4-1
- Supply Guide Roller (2), Supply Tape Guide, Loading Motor	6-4

- (1) Loading Gear (2)
1) Remove one (1) washer and pull out loading gear (2) from the main chassis. (See Fig. 2-53)
- (2) Loading Gear (1)
2) Remove one (1) washer and pull out loading gear (1) from the main chassis. (See Fig. 2-53)
- (3) Loading Gear (3), Mechanism State Switch, Support Plate
2) Remove one (1) screw holding the loading gear holder. (See Fig. 2-53)
3) Pull out loading gear (3) and mechanism state switch from the main chassis.
4) Remove two (2) screws holding the support plate. (See Fig. 2-54)
5) Peel out the flat cable of the mechanism state switch from the main chassis.

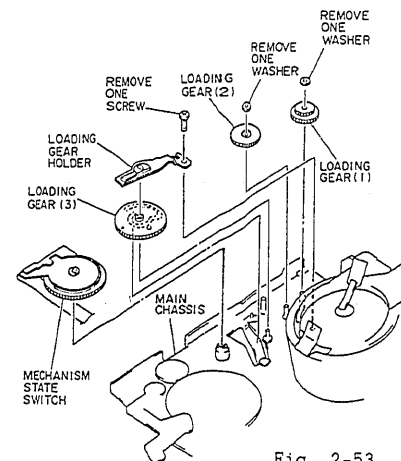


Fig. 2-53

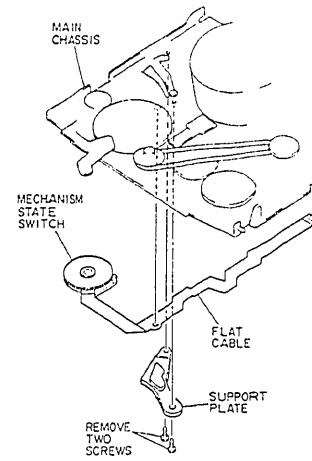


Fig. 2-54

- Note: Adjust as follows after installing the loading gears (1), (2), (3) and mechanism state switch.
- CHAPTER 3
2. PHASE MATCHING IN ASSEMBLY.

6-6. Supply Loading Cam Gear

- Note: Remove the sub chassis assembly from the main chassis as previously given.
- | ORDER FOR REMOVING PARTS | ITEM No. |
|--------------------------|----------|
| - Sub Chassis Slide Arm | 6-1 |
- 1) Remove two (2) screws holding the supply loading cam gear holder.
2) Remove one (1) screw and remove the supply loading cam gear from the main chassis.
Note: Adjust as follows after installing the supply loading cam gear.
- CHAPTER 3
2. PHASE MATCHING IN ASSEMBLY.

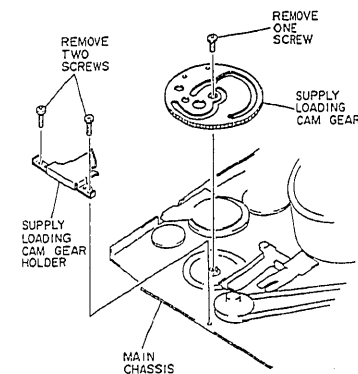


Fig. 2-55

6-7. Center Gear, Center Relay Gear, Reel Drive Belt
 Note: Remove the sub chassis assembly from the main chassis as previously given.

ORDER FOR REMOVING PARTS	ITEM No.
• Capstan Motor	6-3

- 1) Remove the oil seal of the center gear. (See Fig. 2-56)
- 2) Remove one (1) washer holding the center relay gear.
- 3) Pull out the center gear and center relay gear with the reel drive belt.

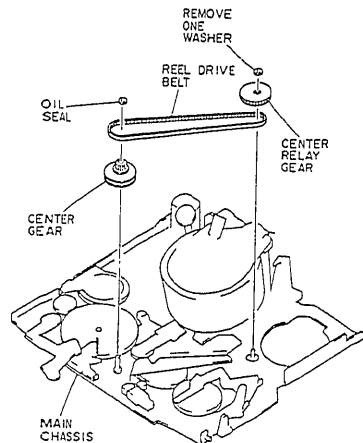


Fig. 2-56

6-8. Pressure Roller Drive Arm, Eject Arm, Take-up Loading Cam Gear
 Note: Remove the sub chassis assembly from the main chassis as previously given.

- (1) Pressure Roller Drive Arm
 1) Remove one (1) screw and remove the pressure roller drive arm from the main chassis. (See Fig. 2-57)
- (2) Eject Arm
 2) Remove one (1) screw and remove the eject arm from the main chassis. (See Fig. 2-57)
- (3) Take-up Loading Cam Gear
 2) Remove one (1) screw and remove the take-up loading cam gear from the main chassis. (See Fig. 2-57)

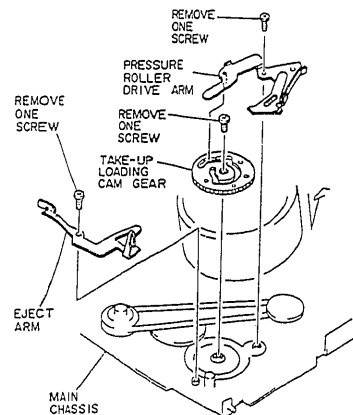


Fig. 2-57

Note: Adjust as follows after installing the take-up loading cam gear.
 • CHAPTER 3
 2. PHASE MATCHING IN ASSEMBLY.

6-9. Cylinder Base, Guide Roller Relay Rail (2), Slide Gear
 Note: Remove the sub chassis assembly from the main chassis as previously given.

ORDER FOR REMOVING PARTS	ITEM No.
• Cylinder Assembly	6-2
• Supply Guide Roller (2), Supply Tape Guide, Loading Motor	6-4

Note: Never remove the catcher block from the cylinder base. The catcher blocks and cylinder base are supplied in the assembled state as a service part.

- (1) Cylinder Base
 1) Remove two (2) screws and remove the cylinder base and slide gear plate from the main chassis. (See Fig. 2-58)
- (2) Guide Roller Relay Rail (2)
 2) Remove one (1) screw and remove the guide roller relay rail (2) from the main chassis. (See Fig. 2-58)
- (3) Slide Gear
 2) Remove the slide gear in the direction of the arrow from the main chassis. (See Fig. 2-58)

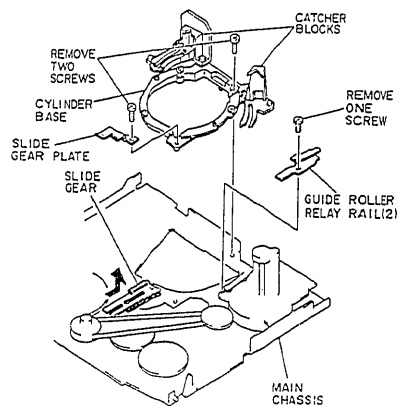


Fig. 2-58

6-10. Reel Drive Belt Cover
 Note: Remove the sub chassis assembly from the main chassis as previously given.

ORDER FOR REMOVING PARTS	ITEM No.
• Cylinder Assembly	6-2
• Capstan Motor	6-3
• Center Gear, Center Relay Gear, Reel Drive Belt	6-7
• Cylinder Base, Slide Gear	6-9

- 1) Remove two (2) screws and remove the reel drive belt cover from the main chassis. (See Fig. 2-59)

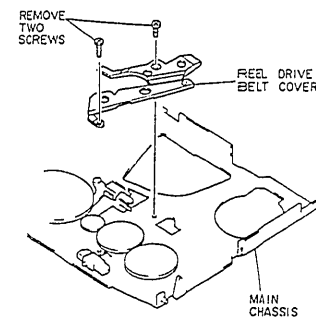


Fig. 2-59

6-11. Cassette Holder Switch/Dew Sensor
 Note: Remove the sub chassis assembly from the main chassis as previously given.

ORDER FOR REMOVING PARTS	ITEM No.
• Main Chassis Bracket (1), (2)	4-1
• Cylinder Assembly	6-2
• Supply Guide Roller (2), Supply Tape Guide, Loading Motor	6-4
• Loading Gear (2), (3), Mechanism State Switch, Support Plate	6-5
• Cylinder Base	6-9

- 1) Remove one (1) screw holding the cassette holder switch. (See Fig. 2-60)
- 2) Peel out the cassette holder switch/dew sensor from the main chassis. (See Fig. 2-61)

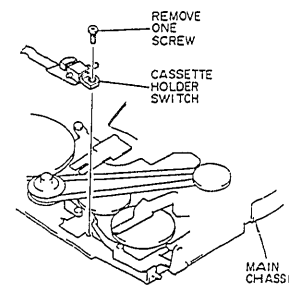


Fig. 2-60

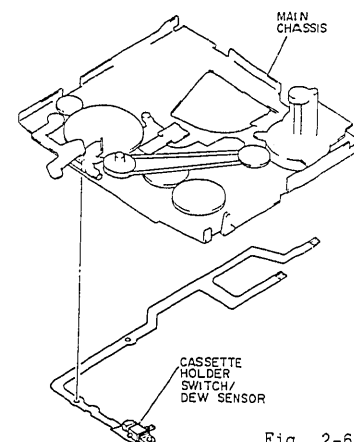


Fig. 2-61

7. LENS BLOCK REMOVAL
 Note: Remove the right case and left case as previously given.

ORDER FOR REMOVING PARTS	ITEM No.
• Process Circuit Board	2-4
• Autofocus Circuit Board	2-5
• DC-DC Converter	2-6
• Control Circuit Board, Back-up Circuit Board	2-7
• Sensor Circuit Board	2-8

- 7-1. Lens Block
 1) Remove three (3) screws holding the circuit board holder. (See Fig. 7-1)

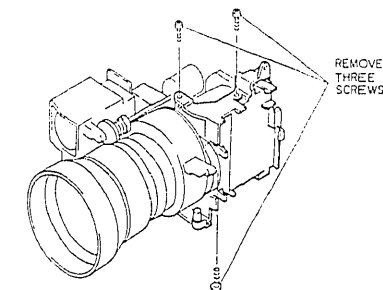


Fig. 2-101

7-2. Focus Motor
 Note: Remove the sub chassis assembly from the main chassis as previously given.

- 1) Remove one (1) screw holding the focus motor. (See Fig. 2-102)
- 2) Remove the focus motor in the direction of the arrow.

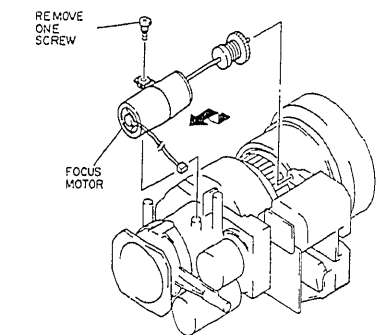


Fig. 2-102

7-3. Zoom Motor
 Note: Remove the sub chassis assembly from the main chassis as previously given.

- 1) Remove one (1) screw holding the zoom motor. (See Fig. 2-102)
- 2) Remove the zoom motor in the direction of the arrow.

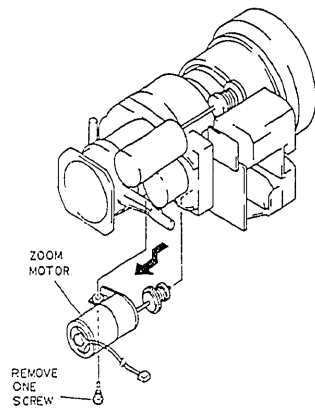


Fig. 2-103

7-4. Iris Block

ORDER FOR REMOVING PARTS	ITEM No.
Lens Block	7-1

- 1) Remove one (1) screw holding the iris block. (See Fig. 2-104)
- 2) Remove the iris block in the direction of the arrow.

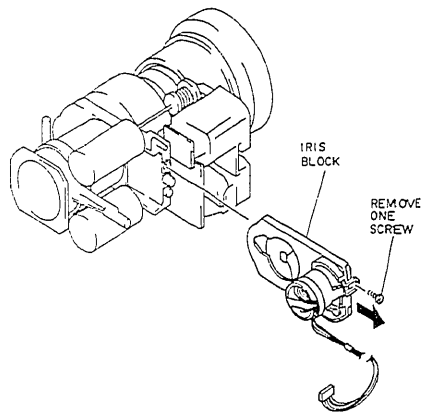


Fig. 2-104

8. ELECTRONIC VIEWFINDER (EVF) BLOCK REMOVAL

ORDER FOR REMOVING PARTS	ITEM No.
Electronic ViewFinder (EVF)	1-3

8-1. Top Case

- 1) Remove two (2) screws holding the top case. (See Fig. 2-151)
- 2) Remove the top case in the direction of the arrow.

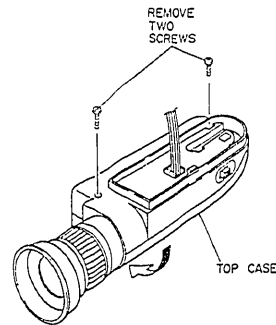


Fig. 2-151

8-2. Electronic Viewfinder (EVF) Circuit Board

ORDER FOR REMOVING PARTS	ITEM No.
Top Case	8-1

- 1) Remove the EVF circuit board and CRT in the direction of the arrow from the bottom case. (See Fig. 2-152)
- 2) Disconnect connector CN801 on the EVF circuit board. (See Fig. 2-153)
- 3) Disconnect CRT socket from the CRT.

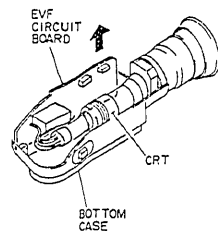


Fig. 2-152

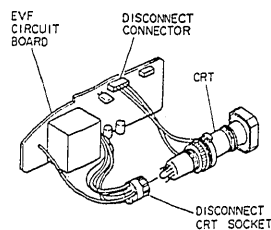


Fig. 2-153

JIG AND TAPES FOR ADJUSTMENT

1. ALIGNMENT TAPE COLOR BAR/400Hz (20HSC-2) No. 7099231	2. CASSETTE TORQUE METER SRK-8T-132: No. 7099235 SRK-8T-112: No. 7099385	3. MASTER PLANE No. 7099237	4. REEL DISK HEIGHT JIG No. 7099238
5. SPECIAL DRIVER No. 7099239	6. 0.7mm HEXAGONAL WRENCH No. 7099316	7. ATF ADJ. JIG No. 7099386	8. BACKFOCUS ADJ. DRIVER No. 7099205
9. LIGHT BALANCING FILTER C12,C2(46mmφ) C12 : No. 7099369 C2 : No. 7099376	10. 2-PIN EXTENSION CABLE No. 7099283	11. 16-PIN EXTENSION CABLE No. 7099390	12. 15--16PIN EXTENSION CABLE No. 7099393
13. 22-PIN EXTENSION CABLE No. 7099389	14. 20-PIN EXTENSION CABLE No. 7099394	15. 10-PIN EXTENSION CABLE No. 7099391	16. 6-PIN EXTENSION CABLE No. 7099395
17. 3-PIN SHORT CONNECTOR No. 7099398			

HOW TO USE THE NEW JIGS AND TOOLS

No.	NAME OF JIG & TOOLS	PARTS No.	HOW TO USE (PURPOSE OF USE)
12	15--16-PIN EXTENSION EXTENSION CABLE	7099393	<ul style="list-style-type: none"> • Installed between the main circuit board and control circuit board. • Used when the camera and VCR blocks are separated to adjust, etc.
13	22-PIN EXTENSION CABLE	7099389	<ul style="list-style-type: none"> • Installed between the main circuit board and luminance/chroma circuit board. • Used when the luminance/chroma circuit board is removed from the main circuit board to adjust, etc.
14	20-PIN EXTENSION CABLE	7099394	<ul style="list-style-type: none"> • Installed between the main circuit board and process circuit board. • Used when the camera and VCR blocks are separated to adjust, etc.
16	6-PIN EXTENSION CABLE	7099395	<ul style="list-style-type: none"> • Installed between the luminance/chroma circuit board and process circuit board. • Used when the camera and VCR blocks are separated to adjust, etc.
17	3-PIN SHORT CONNECTOR	7099398	<ul style="list-style-type: none"> • Use this when removing the right case (power save switch) from the process circuit board. • When this connector is plugged in, power save mode is released.

CHAPTER 3 MECHANISM ADJUSTMENT

1. BEFORE STARTING ADJUSTMENT

- Remove the components shown in the table below beforehand, referring to the CHAPTER 2 DISASSEMBLY.

ORDER FOR REMOVING PARTS	ITEM No.
Cassette Lid	1-1
Accessory Shoe Spring, Right Case, MIC	1-2
Left Case	1-5

- To set the unit to the play mode without loading a cassette, shut off the light from the END LED on the sub chassis completely and press the PLAY button on the function switch.
- Connect the ATF jig to CN617 on the main circuit board to set the camera/recorder to the test mode.

To operate the unit in the test mode, supply power by the following procedure.

- Set the POWER switch to the "VCR" position.
- Connect the ATF jig to CN617 on the main circuit board. (Set SW1 on the ATF jig to "OFF" position.)
- Supply power while depressing the F.FWD (fast forward) button on the function switch.
- Press the STOP button on the function switch.

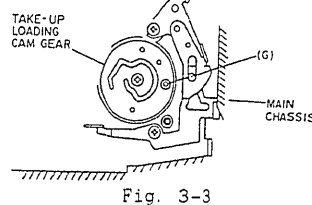
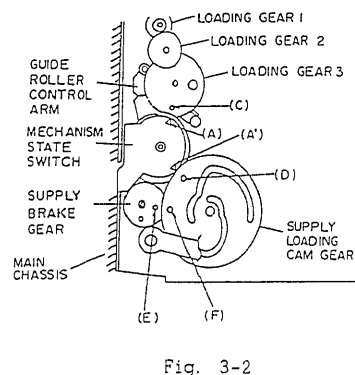
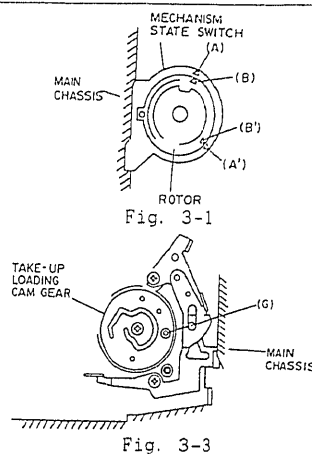
2. PHASE MATCHING IN ASSEMBLY (Figs. 3-1, 3-2, 3-3)

Be sure to match the phases when reinstalling the loading motor, mechanism state switch, loading gear (1), (2) and (3), supply brake gear, supply loading cam gear and take-up loading cam gear.

Note: Set the 8mm camera/recorder to the eject state for phase matching in assembly. Do not reuse the washers which were removed.

REINSTALLING PROCEDURE:

- Align marks (A) and (A') on the mechanism state switch and marks (B) and (B') on the rotor. (See Fig. 3-1)
- Reinstall the components into the main chassis in the condition after step 1). Align mark (C) of the loading gear (3) and mark (A) on the mechanism state switch at this time. (See Fig. 3-2)
- Reinstall the supply loading cam gear into the main chassis so that mark (E) on the supply brake gear and mark (F) on the supply loading cam gear are aligned. (See Fig. 3-2)
Check that mark (A') on the mechanism state switch and mark (D) on the supply loading cam gear are aligned.
- Reinstall the take-up loading cam gear so that hole (G) in the gear is aligned with the hole in the main chassis. (See Fig. 3-3)



3. SUB CHASSIS SLIDE AMOUNT ADJUSTMENT (Figs. 3-4, 3-5, 3-6, 3-7)

Be sure to perform this adjustment when attaching the sub chassis to the main chassis.

PURPOSE :		FAULT DUE TO INCOMPLETE ADJUSTMENT:	
To set the amount by which the sub chassis slides.		Tape is not loaded normally.	
TEST EQUIPMENT/JIG	STATE OF VCR	TEST POINT	ADJUSTMENT POINT
	Shut off the light to the END LED to set the unit to the play mode without loading a cassette.		Sub chassis slide stopper.

ADJUSTMENT PROCEDURE:

- Loosen two (2) screws holding the sub chassis slide stopper. (See Fig. 3-4)
- Push in the sub chassis in the direction of the cylinder. (See Fig. 3-5)
- Push in both ends of the sub chassis simultaneously with even force.
 - When viewed from the top of the cylinder, the right screw holding the sub chassis slide stopper should be aligned with the top of the hole in the stopper.
 - The left screw holding the sub chassis slider stopper should be set to the center of the hole in the stopper.
- Tighten two (2) screws holding the sub chassis slide stopper in the condition after step 3).

Note: After adjustment is completed, check the following.

- Check that the gap between the take-up guide roller rail and guide roller relay rail (1) is within 0.3mm. (Use the 0.25mm washer used in the mechanical block to make checking easier.) (See Fig. 3-6)
- Press the eject button to set the unit to eject and check that the distance between the screw (holding the sub chassis) on the shaft of the mechanism state switch and the end of the sub chassis is within 1.5mm. (See Fig. 3-7)

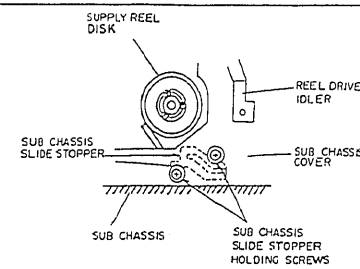


Fig. 3-4

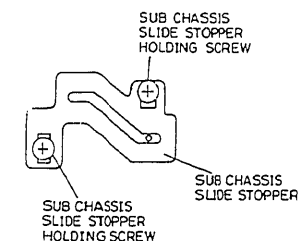


Fig. 3-5

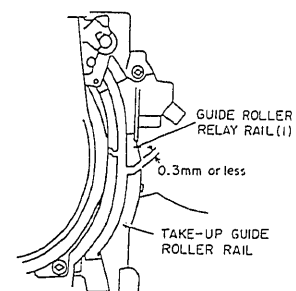


Fig. 3-6

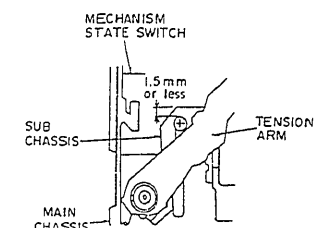


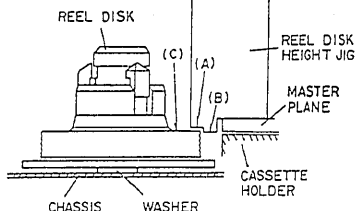
Fig. 3-7

4. TAPE TRANSPORT SYSTEM CHECK/ADJUSTMENT

The tape transport system is the path from the supply reel disk to the take-up reel disk via the cylinder. The tape transport components, especially the components which come into direct contact with the tape, should be kept clean without damage, dust and oil, etc. adhering to the contact surfaces. The tape transport system is adjusted before shipment from the factory, so perform adjustments only when the transport are replaced or transport system adjustments have drifted. Do not reuse washers which have been removed.

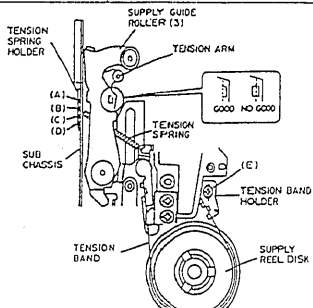
4-1. REEL DISK HEIGHT ADJUSTMENT (Fig. 3-8)

Be sure to perform this adjustment after reinstalling the supply or take-up reel disk.

PURPOSE : To set the reel disk height to the specified value.		FAULT DUE TO INCOMPLETE ADJUSTMENT: Tape is not loaded normally.	
TEST EQUIPMENT/JIG	STATE OF VCR	TEST POINT	ADJUSTMENT POINT
- Master Plane - Reel Disk Height Jig	- Shut off the light from the END LED. - Mount the master plane, set the unit to the play mode and then the stop mode.		
ADJUSTMENT PROCEDURE: Note: Use the same procedure for the supply and take-up sides. 1) Fit the reel disk height jig to the reel disk as shown in Fig. 3-8. 2) Adjust the washer (thickness: 0.25mm) at the bottom of the reel disk so that (C) of the reel disk is between (A) and (B) of the reel disk height jig.			
 <p>Fig. 3-8</p>			

4-2. TENSION POLE POSITION ADJUSTMENT (Fig. 3-9)

Be sure to perform this adjustment after reinstalling the tension arm, tension band and supply.

PURPOSE : To set the tape tension to the specified value.		FAULT DUE TO INCOMPLETE ADJUSTMENT: Tape is not loaded normally.	
TEST EQUIPMENT/JIG	STATE OF VCR	TEST POINT	ADJUSTMENT POINT
	Shut off the light from the end LED and set the play mode without loading a cassette.		
ADJUSTMENT PROCEDURE: 1) Set the tension spring to position (C) on the tension spring holder. 2) After loading is completed, loosen screw (E) holding the tension band holder. 3) Adjust the position of the tension band holder so the left of the hole in supply guide roller (3) is aligned with the inner flange of the tension arm. 4) After adjustment is completed, tighten screw (E).			
 <p>Fig. 3-9</p>			

4-3. TENSION ADJUSTMENT (Fig. 3-9)

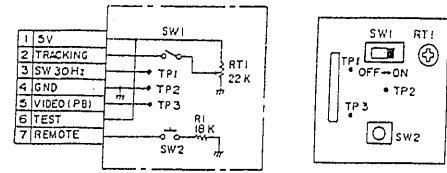
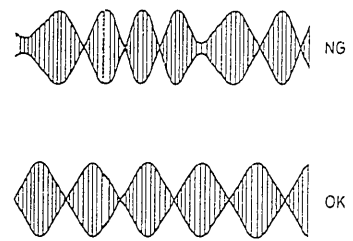
Be sure to perform this adjustment after reinstalling the tension arm, tension band and supply reel disk.

PURPOSE : To set the tape tension to the specified value.		FAULT DUE TO INCOMPLETE ADJUSTMENT: Tape is not loaded normally.	
TEST EQUIPMENT/JIG	STATE OF VCR	TEST POINT	ADJUSTMENT POINT
- Cassette Torque Meter (SRK-8T-112)			
ADJUSTMENT PROCEDURE: 1) Set the tension spring to section (C) of the tension spring holder. (See Fig. 3-9) 2) Load the cassette torque meter and set the unit to the play mode. 3) Adjust the position of the tension spring so the tension on the supply side is 3.5 ~ 4.5 g-cm. ⓐ If the tension is higher than 4.5 g-cm, hook the tension spring to section (B) or (A) of the tension spring holder. ⓑ If the tension is lower than 3.5 g-cm, hook the tension spring to section (D) of the tension spring holder. Note: If the tension is changed greatly (2 g-cm or more) in this adjustment, readjust the tension pole position and tension. (If the above specifications are not satisfied, the tension band or tension spring is faulty.)			

4-4. SUPPLY GUIDE ROLLER (2) HEIGHT ADJUSTMENT (Figs. 3-10, 3-11, 3-12)

Be sure to check and adjust the height of supply guide roller (2) after reinstalling it.

Note: The supply guide roller (2) is specified as a service part while assembled with the guide roller base. Since it is coarsely adjusted before the unit is shipped from the factory, do not adjust its height unnecessarily.

PURPOSE : To set height relative to the cylinder.		FAULT DUE TO INCOMPLETE ADJUSTMENT: The play back picture distorted.	
TEST EQUIPMENT/JIG	STATE OF VCR	TEST POINT	ADJUSTMENT POINT
- Blank Tape - Alignment Tape - Oscilloscope - ATF Jig	Connect the ATF jig to CN617 on the main circuit board. (SW1:OFF)	TP1 (SW30) ATF TP2 (GND) ATF TP3 (FM OUT) ATF CN617 MAIN	
ADJUSTMENT PROCEDURE: 1) Load a blank tape and set the unit to the play mode. 2) Check that no curling or creasing of tape occurs around supply guide roller (2). If curling or creasing occurs, turn the top of supply guide roller (2) using a flat-bladed screwdriver, etc. to fine adjust its height. (Fig. 3-12) 3) Connect an oscilloscope to TP3 on the ATF jig. (Fig. 3-10) 4) Trigger the oscilloscope with TP1 (SW30) on the ATF jig. 5) Load the alignment tape which has been fully rewound and set the unit to the forward search mode. 6) Turn the top of supply guide roller (2) using a flat-bladed screwdriver, etc. to lower it until the rhombic FM waveform is not flat. (Fig. 3-11) 7) Turn the top of supply guide roller (2) in the opposite direction to that in step 6) so the rhombic FM waveform is flat.		 <p>Fig. 3-10</p>	
		 <p>Fig. 3-11</p>	

4-5. TAKE-UP GUIDE POLE/TAKE-UP GUIDE POST HEIGHT ADJUSTMENT (Figs. 3-12, 3-13)

Be sure to perform this adjustment after reinstalling the take-up guide pole and capstan motor.

Note: The take-up guide post is specified as a service part while it is assembly with the capstan motor. Since it is coarsely adjusted before the unit is shipped from the factory, do not adjust its height unnecessarily.

PURPOSE :		FAULT DUE TO INCOMPLETE ADJUSTMENT:	
To set height relative to the cylinder.		The play back picture distorted.	
TEST EQUIPMENT/JIG	STATE OF VCR	TEST POINT	ADJUSTMENT POINT
- Blank Tape			
ADJUSTMENT PROCEDURE:			
<ol style="list-style-type: none"> 1) Load a blank tape and set the unit to the play mode. 2) Adjust screw (A) on the capstan motor so the tape runs at the center of the middle pole. Check that no curling or creasing occurs around the take-up guide post. If curling or creasing occurs, turn the top of the take-up guide post using a special driver to fine adjust its height. (Figs. 3-12, 3-13) 3) Turn the top of the take-up guide pole using a special driver to adjust its height so the tape runs at the center of the take-up guide pole. 4) Repeat reverse search and play and turn screw (B) on the capstan motor to adjust the inclination of the capstan motor so the variations in the height of tape are within the upper and lower flanges of the take-up guide pole. 5) Adjust screw (A) on the capstan motor so the tape runs at the center of the middle pole during play. Be careful that the tension of tape between the take-up guide roller and middle pole is not too great (the tape should be slightly slack). 6) Turn the top of the take-up guide pole using a special driver to adjust its height so the tape runs at the center of the take-up guide pole during play. 7) Load a blank tape which has been fully rewound and set the unit to the play mode. Turn the top of the take-up guide post using a special driver to lower it so that curling occurs at the lower flange of the take-up guide post. 8) Turn the top of the take-up guide post in the opposite direction to that in step 7) so that no curling occurs. 			
<p style="text-align: center;">Fig. 3-12</p>			
<p style="text-align: center;">Fig. 3-13</p>			

4-6. SUPPLY GUIDE ROLLER (1)/TAKE-UP GUIDE ROLLER HEIGHT ADJUSTMENT (Figs. 3-10, 3-12, 3-14)

Be sure to perform this adjustment after reinstalling the supply guide roller (1) and take-up guide roller.

Note: The supply guide roller (1) and take-up guide roller are specified as service parts while they are assembled with their guide roller bases. Since they are coarsely adjusted before the unit is shipped from the factory, do not adjust their heights unnecessarily.

PURPOSE :		FAULT DUE TO INCOMPLETE ADJUSTMENT:	
To set height relative to the cylinder.		The play back picture distorted.	
TEST EQUIPMENT/JIG	STATE OF VCR	TEST POINT	ADJUSTMENT POINT
<ul style="list-style-type: none"> Blank Tape Alignment Tape Oscilloscope ATF Jig 	Connect the ATF jig to CN617 on the main circuit board. (SW1: off, RT1: its mechanical center.)	<ul style="list-style-type: none"> TP1 (SW30) ATF TP2 (GND) ATF TP3 (FM OUT) ATF CN617 MAIN 	
ADJUSTMENT PROCEDURE:			
<ol style="list-style-type: none"> 1) Load a blank tape and set the unit to the play mode. 2) Check that no curling or creasing of tape occurs around supply guide roller (1) and the take-up guide roller. If curling or creasing occurs, turn the tops of supply guide roller (1) and the take-up guide roller using a special driver to fine adjust their heights. (Fig. 3-12) 3) Connect an oscilloscope to TP3 on the ATF jig. (Fig. 3-10) 4) Trigger the oscilloscope with TP1 (SW30) on the ATF jig. 5) Load the alignment tape which has been fully rewound and set the unit to the play mode. 6) Check that the FM output waveform at TP3 is flat. Set SW1 on the ATF jig to ON and turn RT1 to the left and right to check that the FM output level drops at an equal angle on the left and right. (Fig. 3-14) 7) If the specification in step 6) cannot be confirmed, turn the tops of supply guide roller (1) and the take-up guide roller using a special driver to adjust their heights so the specification in step 6) can be satisfied. 			
<p style="text-align: center;">Fig. 3-14</p>			

5. ADJUSTMENT AFTER REPLACING THE CYLINDER (Figs. 3-10, 3-15)

When the cylinder is replaced, the height relative to the guide roller drifts, therefore the tape transport system should be adjusted. Check and adjust in the following order.

PURPOSE :		FAULT DUE TO INCOMPLETE ADJUSTMENT:	
To set the relative height of the guide rollers.		The played back picture is distorted.	
TEST EQUIPMENT/JIG	STATE OF VCR	TEST POINT	ADJUSTMENT POINT
<ul style="list-style-type: none"> Blank Tape Alignment Tape Oscilloscope ATF Jig 	Connect the ATF jig to CN617 on the main circuit board. (SW1: off, RT1: its mechanical center.)	<ul style="list-style-type: none"> TP1 (SW30) ATF TP2 (GND) ATF TP3 (FM OUT) ATF CN617 Main 	

ADJUSTMENT PROCEDURE:

- 1) Load a blank tape and set the unit to the play mode.
- 2) Check that no curling or creasing of the tape occurs around the guide rollers. If curling or creasing of the tape occurs, fine adjust the height of the guide rollers by the following procedure.
- 3) Load an alignment tape and set the unit to the play mode.
- 4) Connect an oscilloscope to TP3 on the ATF jig.
- 5) Trigger the oscilloscope with TP1 (SW30) on the ATF jig.
- 6) Adjust voltage level control on the oscilloscope to set the maximum amplitude of the FM output to 4 graduations. (Fig. 3-15)
Check that the FM output is flat at this time. Set SW1 on the ATF jig to ON and adjust RT1 to set the maximum amplitude of the FM output to 3 graduations. Check that the minimum amplitude is set to 1.8 graduations or more.
- 7) If the specifications in step 6) cannot be confirmed, adjust the heights of the supply and take-up guide rollers so the specifications are satisfied.
- 8) Perform the following electrical adjustments referring to CHAPTER 4.
 - Setting the Head Switching Point
 - Playback Luminance Signal Level Adjustment
 - Record Luminance Signal Level Adjustment
 - Record Chroma Signal Level Adjustment

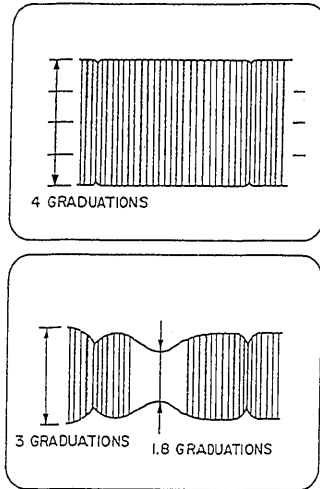


Fig. 3-15

6. CHECKING THE TORQUE

There are two (2) types of the cassette torque meter. Choose the one applicable for measurement to be performed.

- SRK-8T-112: Cannot measure only the tension torque.
- SRK-8T-132: Can measure only the tension and play torques.

ITEM	VCR MODE	MEASURED REEL DISK	TORQUE VALUE	TORQUE CASSETTE USED
Take-up Torque	Play	Take-up	7 ~ 11 g-cm	SRK-8T-112
Rewind Torque	Reverse search to stop	Supply	20 ~ 34 g-cm	SRK-8T-132
Take-up Brake Torque	Forward search to stop	Take-up	7 ~ 11 g-cm	SRK-8T-112

**CHAPTER 4
ELECTRICAL ADJUSTMENT**

1. CONNECTION FOR ADJUSTMENT

Remove the components, etc. listed below first, referring to CHAPTER 2 DISASSEMBLY. (See Fig. 4-1)

ORDER FOR REMOVING PARTS	ITEM No.
- Cassette Lid	1-1
- Accessory Shoe Spring, Right Case, Mic	1-2
- Left Case	1-5

Note 1: When the EVF is removed, no operation mode will be displayed on the monitor screen.

Note 2: Adjustments other than "subcarrier frequency confirmation", "sensor drive pulse lock voltage adjustment" and "backfocus adjustment" can be done without removing the left case.

Note 3: Connect the cassette lid display after disassembly.

Note 4: After the right case (power save/operate switch) has been removed from the process circuit board (PG1329), insert a 3 pin short connector into PG1329 to release the power save mode.

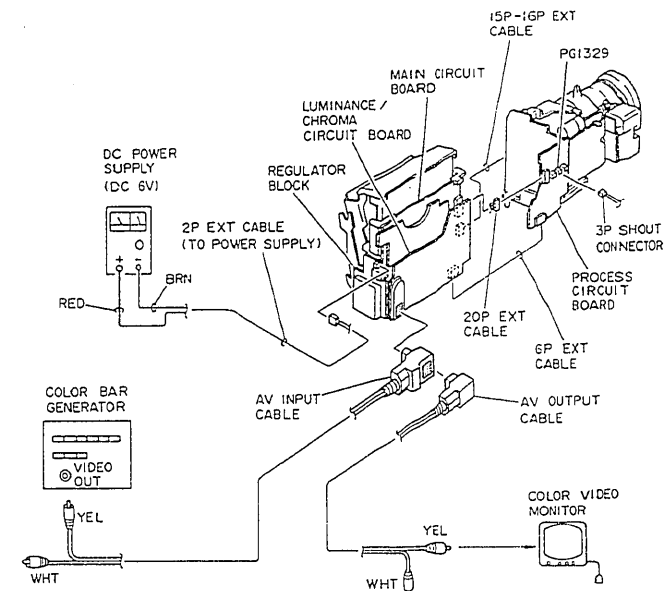


Fig. 4-1

2. CAMERA SECTION ADJUSTMENT

2-1. CIRCUIT BOARD LOCATIONS

1. Process Circuit Board
2. Sensor Circuit Board
3. DC-DC Converter
4. Autofocus Circuit Board
5. Back-up Circuit Board
6. Control Circuit Board

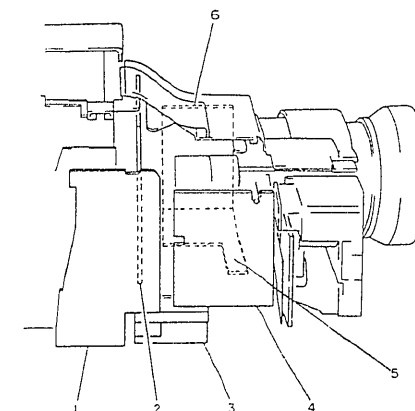


Fig. 4-2

2-2. TEST EQUIPMENT AND CHARTS NECESSARY FOR ADJUSTMENT

- Test Equipment
 - Oscilloscope (dual trace) (Vectorscope) (Waveform Monitor)
 - Digital Voltmeter (DVM)
 - Frequency Counter
 - Color Video Monitor
- Charts, etc.
 - Gray Scale Chart
 - Color Bar Chart
 - Resolution Chart
 - Backfocus Adjustment Chart
 - Light Box (3100°K)
 - Light Balancing Filter C14 (C14 = C12 + C2)
 - DC Power Supply (DC 6V)
 - DC Power Supply (DC 0 ~ 5V)
 - Backfocus Adjustment Driver

2-3. ADJUSTMENT CONDITION

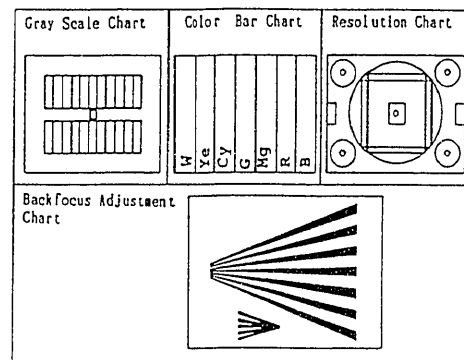
- 1) Check that the VCR section has been adjusted correctly before adjusting the camera section
- 2) Connect this unit, a power supply and a color video monitor as shown in Fig. 4-1.
- 3) Place the chart (light box) 2m away from the camera (lens surface) when otherwise not specified.
- 4) Point the camera at the chart to fill the video period when otherwise not specified.
- 5) Use the 10:1 probe of the oscilloscope when other not specified.
- 6) When "Trigger the oscilloscope internally" is specified, set the time base of the oscilloscope to 10μs/div.
- 7) When using TP251 (video out) to perform adjustment, be sure to terminate the AV OUT jack with 75 ohm.

2-4. PRESET POSITION OF SWITCHES AND CONTROLS DURING ADJUSTMENT

- POWER switch "CAMERA" position
- FULL AUTO switch "OFF" position
- SHUTTER SPEED "1/60"
- WHITE BALANCE "AUTO"
- IRIS control "AUTO" position
- FOCUS switch "MANUAL" position
- TITLE "OFF"
- NEGA/POSI switch "POSI" position

2-5. LIST OF CHARTS FOR CAMERA ADJUSTMENT

Table 4-1



2-6. ADJUSTMENTS AFTER REPLACING MAJOR COMPONENTS IN THE CAMERA BLOCK

After replacing major components, perform adjustments, referring to the table below. The following table shows the minimum adjustments required after major components are replaced. The table below may not apply when several components are replaced, depending on the symptom of the defect.

ITEM	NAME OF ADJUSTMENT	NAME OF MAJOR COMPONENTS					
		SENSOR P. C. B	PROCESS P. C. B	IC1001	IC1003	IC1004	IC1005
(1)	Sub Carrier Frequency Confirmation		•				
(2)	Sensor Drive Pulse Lock Voltage Adjustment	•	•		•		
(3)	Backfocus Adjustment	•		•			
(4)	Sensor Sub Voltage Adjustment	•	•	•			
(5)	Luminance Setup level Adjustment	•	•	•			•
(6)	AIC level Adjustment	•	•	•			•
(7)	Matrix Adjustment	•	•	•		•	•
(8)	White Balance Hold Voltage Setting	•	•	•		•	•
(9)	R-Y/B-Y Setup Adjustment	•	•	•		•	•
(10)	White Balance Adjustment	•	•	•		•	•
(11)	Chroma Level Adjustment	•	•	•		•	•
(12)	Program AE Adjustment	•	•				

ITEM	NAME OF ADJUSTMENT	NAME OF MAJOR COMPONENTS					
		IC1006	IC1007	IC1301 IC1308	IC1302	IC1303	IC1304 ~ IC1036
(1)	Sub Carrier Frequency Confirmation						
(2)	Sensor Drive Pulse Lock Voltage Adjustment						
(3)	Backfocus Adjustment						
(4)	Sensor Sub Voltage Adjustment						
(5)	Luminance Setup level Adjustment	•	•	•	•		
(6)	AIC level Adjustment		•	•	•	•	
(7)	Matrix Adjustment	•					
(8)	White Balance Hold Voltage Setting	•	•	•	•		
(9)	R-Y/B-Y Setup Adjustment	•	•	•	•		
(10)	White Balance Adjustment	•	•	•	•		
(11)	Chroma Level Adjustment	•	•	•	•	•	•
(12)	Program AE Adjustment						

2-7. CAMERA ADJUSTMENT

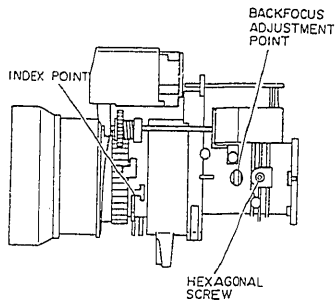
(1) Subcarrier Frequency Confirmation (Fig. 4-52)

PURPOSE		Confirm the subcarrier frequency before starting camera adjustment.			
TEST POINTS	ADJUST POINTS	CONDITION	EQUIPMENT/JIG	SPECIFICATION	
·IC1308-3 ·TP1301-1 (GND)	PC PC		·Frequency Counter	7.15909MHz ± 60Hz	
<p>Note: Basically, it is not necessary to adjust the subcarrier frequency. Be sure to check the frequency before adjustment, and adjust to only when it is drifted.</p> <p>1) Connect the frequency counter to IC1308-3. 2) Confirm that the frequency is 7.15909MHz ± 60Hz. If the frequency is drifted, adjust the trimmer capacitor on IC1308 for 7.15909MHz ± 60Hz.</p>					

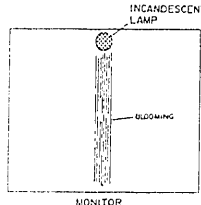
(2) Sensor Drive Pulse Lock Voltage Adjustment (Figs. 4-51, 4-52)

PURPOSE		This adjustment sets the sensor drive pulse lock voltage to the specified value.			
TEST POINTS	ADJUST POINTS	CONDITION	EQUIPMENT/JIG	SPECIFICATION	
·JL101 ·TP1301-1 (GND)	SP PC	·CT1001 (DRIVE PULSE LOCK VOLTAGE)	·DVM ·Non-Metallic Adj Driver	2.5V ± 0.1V	
<p>1) Connect the DVM to JL101. 2) Adjust CT1001 for 2.5V ± 0.1V. Note: Be careful when applying an adjustment driver to CT1001 because the stray capacitance the driver may vary.</p>					


(3) Backfocus Adjustment (Fig. 4-3)

PURPOSE		The purpose of this adjustment is to ensure proper focus tracking throughout the zoom range.			
TEST POINTS	ADJUST POINTS	CONDITION	EQUIPMENT/JIG	SPECIFICATION	
	Relay Lens	Position the camera section 2 meters from the backfocus chart and illuminated the object with approx. 100 lux.	·Backfocus Adj. Driver ·Backfocus Adj. Chart ·Color Video Monitor	Same value between real distance and index on the ring.	
<p>1) Set the zoom to wide-angle and set the index on the focus ring to two (2) meters. 2) Loosen the relay lens lock screw. 3) Insert the backfocus adjustment driver into the backfocus adjustment point and turn it to the left and right to optimize the focus. 4) Set the zoom to telephoto end and confirm that the chart is in focus. If it is not focused, set the zoom to wide-angle and readjust step 3. 5) Confirm that the chart is approximately in focus at the both the wide-angle and telephoto ends with the focus ring set to two (2) meters. Note: Adjust without assembling into the left case. After adjustment is completed, tighten the relay lens lock screw with the backfocus adjustment driver inserted into the adjustment point (holding the backfocus driver by hand) so that the adjusted position will not drift.</p>					
					
<p>Fig. 4-3</p>					


(4) Sensor Sub Voltage Adjustment (Figs. 4-4, 4-52)

PURPOSE		This adjustment prevents vertical blooming.			
TEST POINTS	ADJUST POINTS	CONDITION	EQUIPMENT/JIG	SPECIFICATION	
	·RT1314 (SENSOR SUB VOLTAGE)	PC	Point the camera at a 40W to 60W incandescent lamp 1 meter away.	·Color Video Monitor	
<p>1) Adjust RT1314 so that the band of blooming appearing in the vertical direction of the monitor screen just disappears. Note: Stop RT1314 where blooming disappears and be careful not to turn it too far. Check that no roughness is present in the very bright section of the lamp.</p>					
					
<p>Fig. 4-4</p>					

(5) Luminance Setup Level Adjustment (Figs. 4-5, 4-52, 4-151)

PURPOSE		This adjustment sets the brightness of the picture.			
TEST POINTS	ADJUST POINTS	CONDITION	EQUIPMENT/JIG	SPECIFICATION	
·TP251 (VIDEO OUT) ·TP260 (GND)	L/C L/C	·RT1305 (LUMA SETUP)	PC	Cap the lens Oscilloscope	40mV ± 10mVp-p (5.5 ± 1 IRE)
<p>1) Connect the oscilloscope to TP251 (video out). 2) Trigger the oscilloscope internally. 3) Adjust RT1305 for 40mV ± 10mVp-p from the blanking level to the center of the black level.</p>					
					
<p>Fig. 4-5</p>					

(6) AIC Level Adjustment (Figs. 4-6, 4-52, 4-151)

PURPOSE		This adjustment sets the balance point of the auto iris control.			
TEST POINTS	ADJUST POINTS	CONDITION	EQUIPMENT/JIG	SPECIFICATION	
·TP251 (VIDEO OUT) ·TP260 (GND)	L/C L/C	·RT1309 (AIC)	PC	Aim the gray scale chart. Oscilloscope	710mV ± 20mVp-p (100 ± 3 IRE)
<p>1) Connect the oscilloscope to TP251 (video out). 2) Trigger the oscilloscope internally. 3) Adjust RT1309 for 710mV ± 20mVp-p from the blanking level to the center of the white level on the gray scale.</p>					
					
<p>Fig. 4-6</p>					

(7) Matrix Adjustment (Figs. 4-7, 4-52)

PURPOSE		This adjustment corrects for unevenness in tint.				
TEST POINTS	ADJUST POINTS	CONDITION	EQUIPMENT/JIG	SPECIFICATION		
TP1301-3 TP1301-1 (GND)	PC PC (MATRIX)	Aim the color bar chart	Oscilloscope	Blue level become 70% ± 10% of the white level.		
<p>1) Connect the oscilloscope to TP1301-3. 2) Trigger the oscilloscope internally. 3) Adjust RT1308 so that the blue level becomes 70% ± 10% of the white level.</p>						
<p>WHITE BLUE</p> <p>100% 70%</p>						
Fig. 4-7						

(8) White Balance Hold Voltage Setting (Fig. 4-52)

TEST POINTS	ADJUST POINTS	CONDITION	EQUIPMENT/JIG	SPECIFICATION
TP1301-5 TP1301-1 (GND)	PC PC		DC Power Supply (3.3V ± 0.05V)	
<p>1) Connect the DC power supply (3.3V ± 0.05V) to TP1301-5. 2) Momentarily connect TP1301-5 to ground (TP1301-1) to preset the white balance circuit. Note: White balance hold voltage setting is required prior to performing R-Y/B-Y setup adjustment and white balance adjustment.</p>				

(9) R-Y/B-Y Setup Adjustment (Figs. 4-8, 4-52, 4-151)

PURPOSE		This adjustment sets the proper block balance of the picture.			
TEST POINTS	ADJUST POINTS	CONDITION	EQUIPMENT/JIG	SPECIFICATION	
TP251 (VIDEO OUT) TP260 (GND)	L/C L/C	RT1307 (R-Y SETUP) RT1306 (B-Y SETUP)	PC PC PC	Cap the lens Apply DC 3.3V to TP1301-5.	Oscilloscope Minimize carrier
<p>1) Connect the oscilloscope to TP251 (video out). 2) Trigger the oscilloscope internally. 3) Adjust RT1306 and RT1307 for minimum carrier in the waveform.</p>					
<p>MINIMIZE CARRIER</p>					
Fig. 4-8					

(10) White Balance Adjustment (Figs. 4-9, 4-52, 4-151)

PURPOSE		This procedure set the correct red and blue signal levels for proper white balance circuit operation.			
TEST POINTS	ADJUST POINTS	CONDITION	EQUIPMENT/JIG	SPECIFICATION	
TP251 (VIDEO OUT) TP260 (GND)	L/C L/C	RT1302 (BLU GAIN) RT1303 (RED GAIN)	PC PC	Attach the C14 filter Aim the gray scale chart. Apply DC 3.3V to TP1301-5.	Oscilloscope Minimize carrier.
<p>1) Connect the oscilloscope to TP251 (video out). 2) Trigger the oscilloscope internally. 3) Adjust RT1302 and RT1303 to minimize the carriers at each step of the waveform. 4) Remove the DC power supply (3.3V) from TP1301-5.</p>					
<p>MINIMIZE CARRIER</p>					
Fig. 4-9'ig. MINIMIZE CARRIER					

(11) Chroma Level Adjustment (Figs. 4-10, 4-52, 4-151)

PURPOSE		This adjustment sets the chroma level.			
TEST POINTS	ADJUST POINTS	CONDITION	EQUIPMENT/JIG	SPECIFICATION	
TP251 (VIDEO OUT) TP260 (GND)	L/C L/C	RT1301 (CHROMA LEVEL)	PC	Attach the C14 filter Aim the color bar chart.	Oscilloscope Red level is 460mV ± 50mV (64 ± 7 IRE)
<p>1) Connect the oscilloscope to TP251 (video out). 2) Trigger the oscilloscope internally. 3) Adjust RT1301 so that the red level of the waveform is 460mV ± 50mV. 4) Check that the tint of the chart and the tint of the picture are approximately matched at this time.</p>					
<p>RED</p> <p>460mV ± 50mVp-p</p>					
Fig. 4-10					

(12) Program AE Adjustment (Fig. 4-52)

PURPOSE		This adjustment sets the shutter speed switching point.			
TEST POINTS	ADJUST POINTS	CONDITION	EQUIPMENT/JIG	SPECIFICATION	
TP1301-6 TP1301-7 TP1301-10 TP1301-1 (GND)	PC PC PC PC	RT1310 (AE ADJ 1) RT1311 (AE ADJ 2)	PC PC	DVM DC Power Supply (5V)	
<p>1) Connect the DVM to TP1301-10. 2) Adjust RT1310 so the voltage at TP1301-10 is 200mV ± 50mV. 3) Connect the DVM to TP1301-7. 4) Connect the DC power supply (5V) to TP1301-6. 5) Adjust RT1311 so the voltage at TP1301-7 is 3.6V ± 0.1V. 6) Measure the voltage at TP1301-7 when DC 5V is applied to TP1301-6 and when it is connect the ground (TP1301-1), and adjust RT1310 so the difference is 2.6V ± 0.05V. 7) Apply DC 5V to TP1301-6. 8) Adjust RT1310 so the voltage at TP1301-7 is 3.6V ± 0.05V. 9) Remove the DC power supply from TP1301-6.</p>					

2-8. ELECTRONIC VIEWFINDER (EVF) ADJUSTMENT

(1) Deflection Yoke Position Adjustment (Fig. 4-11)

PURPOSE		This adjustment procedure eliminates picture tilt in the EVF display.			
TEST POINTS	ADJUST POINTS	CONDITION	EQUIPMENT/JIG	SPECIFICATION	
		DEFLECTION YOKE		Aim the resolution chart.	EVF Display
<p>1) Loosen the deflection yoke nut. 2) Turn the deflection yoke so that the EVF picture (chart) is horizontal, matching the edges of the CRT. Note: After adjustment is completed, tighten the deflection yoke nut.</p>					
<p>DEFLECTION YOKE NUT DEFLECTION YOKE CENTERING MAGNETS</p>					
Fig. 4-11					

(2) EVF Centering Adjustment (Fig. 4-11)

PURPOSE		This adjustment centers the image observed by the camera in the EVF display.			
TEST POINTS	ADJUST POINTS	CONDITION	EQUIPMENT/JIG	SPECIFICATION	
		CENTERING MAGNETS		Aim the resolution chart.	EVF Display
<p>1) Remove the locking paint from the centering magnet. 2) Adjust the centering magnets until the center of the picture viewed by the camera is positioned in the center of the EVF display.</p>					

(3) EVF Vertical Size Adjustment (Fig. 4-53)

PURPOSE	This adjustment determines the vertical size of the image appearing in the EVF display			
TEST POINTS	ADJUST POINTS	CONDITION	EQUIPMENT/JIG	SPECIFICATION
	·RT802 (V.SIZE)	EVF Aim the resolution chart.	·EVF Display	
1) Adjust RT802 so that the top and bottom edges of the chart match the top and edges of the CRT.				

(4) EVF Brightness Adjustment (Fig. 4-53)

PURPOSE	This adjustment sets the brightness of the picture in the EVF display.			
TEST POINTS	ADJUST POINTS	CONDITION	EQUIPMENT/JIG	SPECIFICATION
	·RT805 (BRIGHT)	EVF Aim the resolution chart.	·EVF Display	
1) Adjust RT805 to optimize the EVF picture.				

(5) EVF Focus Adjustment (Fig. 4-53)

PURPOSE	This control adjusts for optimum focus of the electronic viewfinder picture.			
TEST POINTS	ADJUST POINTS	CONDITION	EQUIPMENT/JIG	SPECIFICATION
	·RT803 (FOCUS)	EVF Aim the resolution chart.	·EVF Display	
1) Adjust RT803 so that the EVF picture is clear.				

2-9. AUTOFOCUS ADJUSTMENT

(1) Autofocus Offset Adjustment (Figs. 4-12, 4-54)

TEST POINTS	ADJUST POINTS	CONDITION	EQUIPMENT/JIG	SPECIFICATION
·TL1AF ·TL2AF ·TL3AF ·TL4AF (GND)	AF ·VR11AF (A-B OFFSET) AF ·VR12AF (A+B OFFSET)	·FOCUS switch: AUTO ·Cover the autofocus sensor with thick black paper.	·Oscilloscope	
1) Connect a jumper between TL3AF and ground (TL4AF). 2) Connect the channel-1 oscilloscope to TL2AF. 3) Connect the channel-2 oscilloscope to TP1AF. 4) Set the trigger mode of oscilloscope to CH-1 mode. 5) Adjust VR11AF and VR12AF so that the waveform for channel-2 is flat. 6) Disconnect a jumper.				

CH-1: 500mV/10ms, cm
CH-2: 100mV/10ms, cm

Fig. 4-12

(2) Autofocus Sensor Position Adjustment (Fig. 4-13)

TEST POINTS	ADJUST POINTS	CONDITION	EQUIPMENT/JIG	SPECIFICATION
	·SENSOR ADJUSTMENT SCREW	Aim the backfocus adjustment chart.	·Color Video Monitor	
Note: Perform this adjustment while all case assembled. 1) Remove the gum cap of the autofocus adjustment hole. 2) Place the FOCUS switch in the "AUTO" position. 3) Position the camera section two (2) meters from the backfocus adjustment chart and illuminate the object with approximately 100 lux. 4) Set the zoom ring to the telephoto position. 5) Turn the SENSOR ADJUSTMENT SCREW so that the index on the focus ring is two (2) meters. 6) Operate the autofocus from the near end to the infinity end and check that the chart is in focus with the index at two (2) meters. 7) Attach the gum cap to the autofocus adjustment hole.				

SENSOR ADJUSTMENT SCREW
AUTOFOCUS CAP

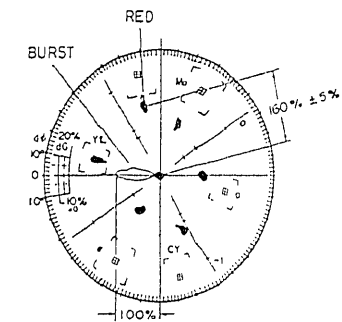
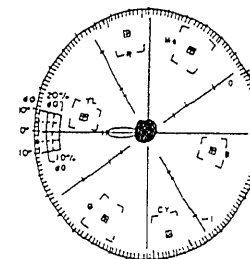
Fig. 4-13

2-10. ADJUSTMENTS WHICH CAN BE DONE USING A VECTORSCOPE

Note 1: Use the video output (AV output) as the test point for all adjustments and terminate the vectorscope with 75 ohms.

Note 2: Be sure to perform "(8) White Balance Hold Voltage Setting" before performing the adjustments in the table below.

ITEM No.	NAME OF ADJUSTMENT	SUBJECT	ADJUSTMENT POINT	PROCEDURE	Fig. No.
(9)	R-Y/B-Y Setup Adjustment	·Lens cap ·Apply DC 3.3V to TP1301-5.	RT1306 RT1307	1) Adjust RT1306 and RT1307 so that the bright spot is positioned at the center.	4-14
(10)	White Balance Adjustment	·Attach the C14 filter. ·Gray scale ·Apply DC 3.3V to TP1301-5.	RT1302 RT1303	1) Adjust RT1302 and RT1303 so that the bright spot is positioned at the center. 2) Remove the DC power supply (3.3V) from the TP1301-5.	4-14
(11)	Chroma Level Adjustment	·Attach the C14 filter. ·Color Bar	RT1301	1) Adjust RT1301 so that the red vector is 160% ± 5% when compared to the burst level. 2) Check that the tint of the chart and the tint of the picture are approximately matched at this time.	4-15



2-11. ADJUSTMENT COMPONENTS LOCATIONS

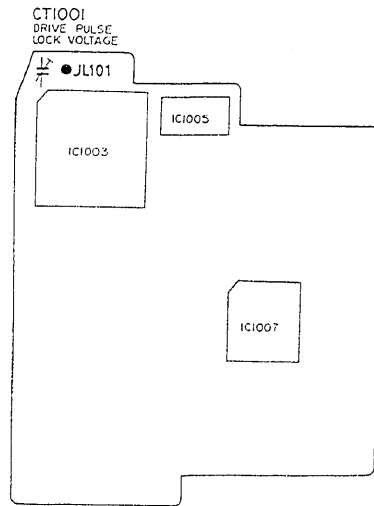


Fig. 4-51 Sensor (SP) Circuit Board (Side-A)

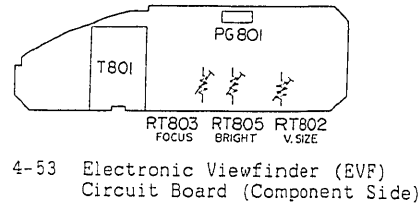


Fig. 4-53 Electronic Viewfinder (EVF) Circuit Board (Component Side)

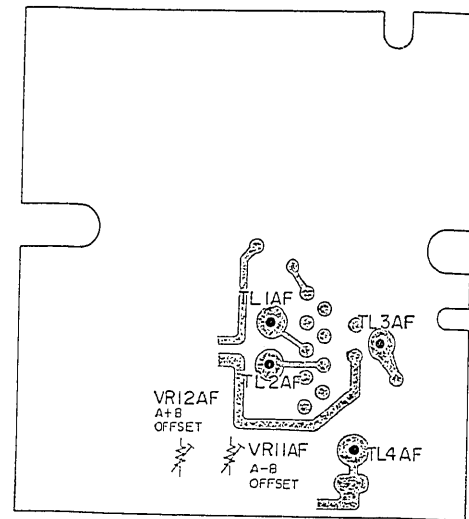


Fig. 4-54 Autofocus (AF) Circuit Board (Solder Side)

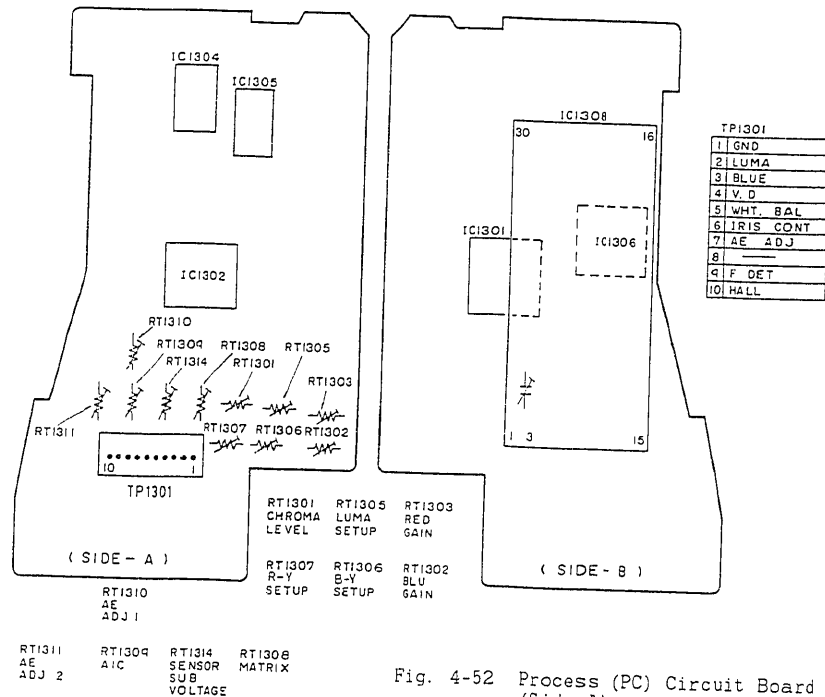


Fig. 4-52 Process (PC) Circuit Board (Side-A)

3. VCR SECTION ADJUSTMENT

3-1. CIRCUIT BOARD LOCATIONS AND SERVICING POSITION

- (1) Servicing Position - 1 (Adjustment)
1. Main Circuit Board
 2. Regulator Block
 3. Luminance/Chroma Circuit Board

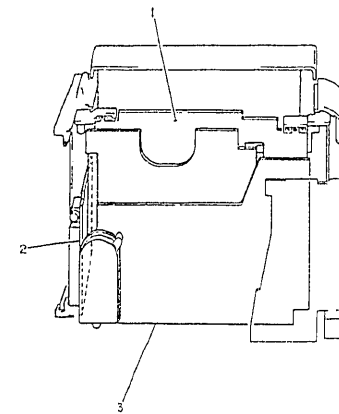


Fig. 4-101

(2) Servicing Position - 2

(When observing waveforms and voltages)
 Note: The single VCR block of this camera/recorder cannot be operated. Be sure to connect it to the camera block and set the POWER switch on the control circuit board to "VCR" position.

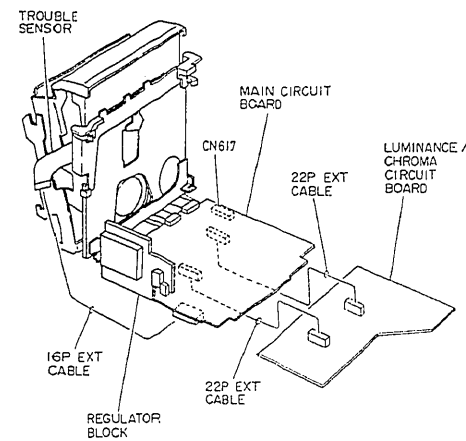


Fig. 4-102

(3) ATF JIG

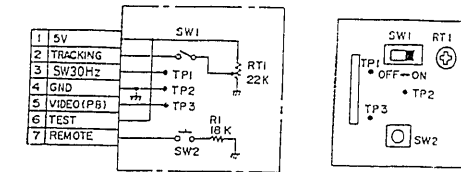


Fig. 4-103

3-2. TEST EQUIPMENT AND ALIGNMENT TAPES NECESSARY FOR ADJUSTMENT

- Test Equipment
 - Oscilloscope (dual trace)
 - Digital Voltmeter (DVM)
 - Frequency Counter
 - Color Video Monitor
 - Color Bar Generator
- Charts, etc.
 - Alignment Tape (20HSC-2)
 - Blank Tape
 - ATF Jig
 - DC Power Supply (DC 0~7V)
 - Capacitor (1μF)

3-3. ADJUSTMENT CONDITION

- 1) Check that the camera section has been adjusted correctly before adjusting the VCR section
- 2) Connect this unit, a power supply and a color video monitor as shown in Fig. 4-1.
- 3) After replacing the parts, check each adjustment. If you find th items necessary to be adjusted, remove the corresponding laser trimming resistor and replace and them with variable resistors for adjustment.
- 4) Use the 10:1 probe of the oscilloscope when other not specified.
- 5) When the "RECORD mode" is specified, load a blank tape, set the power switch "VCR" and press the REC button on the function switch.
- 6) Electrical adjustments of the VCR block cannot be done in the state that unit is shipped from the factory. Remove the laser trimming resistor on the circuit board and solder the specified semi-variable resistors. (See item 3-8).

3-4. PRESET POSITION OF SWITCHES AND CONTROLS DURING ADJUSTMENT

- POWER switch "VCR" position

3-5. ADJUSTMENTS AFTER REPLACING MAJOR COMPONENTS IN THE VCR BLOCK

After replacing major components, perform adjustments, referring to the table below. The following table shows the minimum adjustments required after major components are placed.

The table below may not apply when several components are replaced, depending on the symptom of the defect.

Note: After replacing the parts, check each adjustment. If you find the items necessary to be adjusted, remove the corresponding laser trimming resistors and replace and them with variable resistors for adjustment.

ITEM	NAME OF ADJUSTMENT	NAME OF MAJOR COMPONENTS					
		MAIN C. B. A	CYLINDER ASSEMBLY	IC901 IC902	IC251	IC253	IC252
MAIN CIRCUIT BOARD (SYSTEM CONTROL CIRCUIT AND SERVO CIRCUIT SECTION)							
(1)	Setting the Head Switching Point	•	•	•			
(2)	Setting the Power Shut Off Level	•	•	•	•	•	
LUMINANCE/CHROMA CIRCUIT BOARD							
(1)	AGC Adjustment				•		
(2)	Comb Filter Adjustment				•		
(3)	IR Adjustment				•		
(4)	Emphasis Input Level Adjustment				•		
(5)	Carrier Frequency Adjustment				•		
(6)	Deviation Adjustment				•		
(7)	Playback Luminance Signal Level Adjustment	•			•		•
(8)	Record Luminance Signal Level Adjustment	•			•		
(9)	Record Chroma Signal Level Adjustment	•					•

ITEM	NAME OF ADJUSTMENT	NAME OF MAJOR COMPONENTS					
		IC254					
MAIN CIRCUIT BOARD (SYSTEM CONTROL CIRCUIT AND SERVO CIRCUIT SECTION)							
(1)	Setting the Head Switching Point						
(2)	Setting the Power Shut Off Level						
LUMINANCE/CHROMA CIRCUIT BOARD							
(1)	AGC Adjustment						
(2)	Comb Filter Adjustment	•					
(3)	IR Adjustment						
(4)	Emphasis Input Level Adjustment	•					
(5)	Carrier Frequency Adjustment	•					
(6)	Deviation Adjustment	•					
(7)	Playback Luminance Signal Level Adjustment						
(8)	Record Luminance Signal Level Adjustment						
(9)	Record Chroma Signal Level Adjustment						

3-6. MAIN CIRCUIT BOARD (SYSTEM CONTROL CIRCUIT AND SERVO CIRCUIT SECTION)

(1) Setting the Head Switching Point (Figs. 4-104, 4-151, 4-152)

Note: Be sure to set the head switching point after replacing the cylinder and main circuit board (IC901 and IC902). The head switching point can be set automatically when the following steps performed.

TEST POINTS	ADJUST POINTS	CONDITION	EQUIPMENT/JIG	SPECIFICATION
TP1 (SW30)	ATF		ATF Jig	6H ± 0.5H
TP251 (VIDEO OUT)	L/C		Alignment Tape	
TP260 (GND)	L/C		Oscilloscope	
CN617	MAIN			

SETTING

- 1) Load an alignment tape. After checking that loading is complete, disconnect the power supply.
- 2) Connect the ATF jig to CN617 on the main circuit board.
- 3) Set the POWER switch to the "VCR" position.
- 4) Supply the power (DC 6~7V) while holding the PLAY button depressed.
- 5) Check that the camera/recorder enters the play mode automatically for several seconds and then the power is turned off automatically.
- 6) Disconnect the ATF jig from the CN617 and remove the power supply.

CONFIRMATION

- 1) Set the power switch to "VCR" position.
- 2) Connect the ATF jig to CN617 on the main circuit board. (Set SW1 on the ATF jig to "OFF" position.)
- 3) Supply power while holding the F.FWD (fast forward) button on the function switch depressed.
- 4) Press the STOP button on the function switch.
- 5) Load an alignment tape and place the instrument in the PLAY mode.
- 6) Connect the oscilloscope to TP251 (video out).
- 7) Trigger the oscilloscope at SW30Hz. (Use TP1 on the ATF jig.)
- 8) Set the oscilloscope to the (-) slope and confirm that the trailing edge of the SW30Hz signal is 6H ± 0.5H (horizontal) line before the start of channel-1 vertical sync.
- 9) Set the oscilloscope to the (+) slope and confirm that the leading edge of the SW30Hz signal is 6H ± 0.5H (horizontal) line before the start of channel-2 vertical sync.

Note: The waveform of channel-1 and channel-2 video signals in the diagram may be opposite depending on the alignment tape.

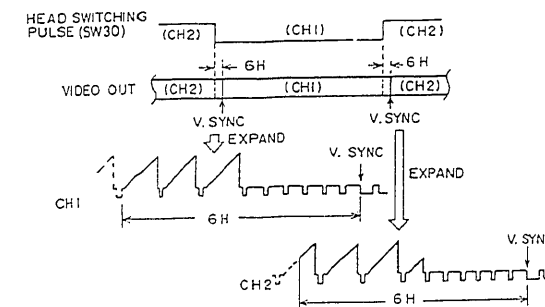


Fig. 4-104

(2) Setting the Power Shut Off Level (Figs. 4-152, 4-153)

Note: Be sure to set the power shut off level after replacing the cylinder assembly and main circuit board (IC901 and IC902).
The power shut off level can be set automatically by performing the following steps.

TEST POINTS	ADJUST POINTS	CONDITION	EQUIPMENT/JIG	SPECIFICATION
·CN617 ·PG552-1 ·PG552-2 (GND)	MAIN REG REG		·ATF Jig ·Blank Tape ·Color Video Monitor ·DC Power Supply (5~7V)	

SETTING

- Set the power switch to the CAM position.
- Loading a blank tape and set the camera/recorder to the RECORD mode.
- Connect the DVM to PG552-1 on the regulator block. (Use PG552-2 as ground.)
- Adjust the voltage control of DC power supply so the voltage at PG552-1 is $5.6V \pm 0.05V$.
- Set the camera/recorder to the POWER SAVE mode and then disconnect the power supply.
- Connect the ATF jig to CN617 on the main circuit board.
- Set the POWER switch to the VCR position.
- While holding the REWIND button depressed, supply the power with the voltage (PG552-1 is $5.6V \pm 0.05V$) set in step 3.
- Check that the camera/recorder enters record mode automatically for several seconds and then the power is turned off automatically.
Check that the power voltage in the record mode is $5.6V \pm 0.05V$.
If it is not $5.6V$, set it to $5.6V$ and then perform adjustment from step 4 again.
- Disconnect the ATF jig from CN617 and remove the power supply.

CONFIRMATION

- Set the power switch to CAM position.
- Load a blank tape and set the camera/recorder to the RECORD mode.
- Connect the DVM to PG552-1 on the regulator block. (Use PG552-2 as ground.)
- Check that the unit is shut off when the power voltage (PG552-1) is set to DC $5.6V$.

3-7. LUMINANCE/CHROMA CIRCUIT BOARD

(1) AGC Adjustment (Figs. 4-105, 4-151)

TEST POINTS	ADJUST POINTS	CONDITION	EQUIPMENT/JIG	SPECIFICATION
·TP251 (VIDEO OUT) ·TP260 (GND)	L/C L/C ·RT271 (AGC 1)	·Apply a color bar signal (1Vp-p) to the ·RECORD mode.	·Oscilloscope ·Color Bar Generator AV INPUT jack.	$1V \pm 0.02V_{p-p}$ ·Blank Tape

- Connect the oscilloscope to TP251 (video out).
- Adjust RT271 for $1V \pm 0.02V_{p-p}$.

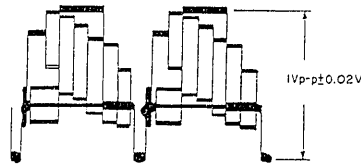


Fig. 4-105

(2) Comb Filter Adjustment (Figs. 4-106, 4-151)

TEST POINTS	ADJUST POINTS	CONDITION	EQUIPMENT/JIG	SPECIFICATION
·TP259 ·TP260 (GND)	L/C L/C ·RT280 (COMB FILTER PHASE 1) ·RT282 (COMB FILTER GAIN 1)	·Apply a color bar signal (1Vp-p) to the AV INPUT jack. ·RECORD mode.	·Oscilloscope ·Color Bar Generator ·Blank Tape	Minimize the residual chroma components.

- Connect the oscilloscope to TP259.
- Adjust RT280 and RT282 to minimize the residual chroma components.

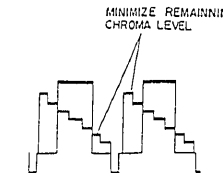


Fig. 4-106

(3) Trap Frequency Adjustment (Figs. 4-107, 4-151)

TEST POINTS	ADJUST POINTS	CONDITION	EQUIPMENT/JIG	SPECIFICATION
·TP257 ·TP263 ·TP260 (GND)	L/C L/C L/C ·RT278 (IR ADJ 1)	·Apply a color bar signal (1Vp-p) to the AV INPUT jack. ·RECORD mode.	·Oscilloscope ·Color Bar Generator ·Blank Tape	Minimize the residual chroma components.

- Connect the oscilloscope to TP257.
- Connect ground (TP260) to TP263.
- Adjust RT278 to minimize the residual chroma components.
- Remove the TP263 from the ground.

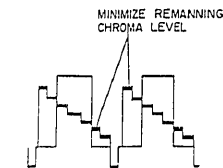


Fig. 4-107

(4) Emphasis Input Level Adjustment (Figs. 4-108, 4-151)

TEST POINTS	ADJUST POINTS	CONDITION	EQUIPMENT/JIG	SPECIFICATION
·TP256 ·TP260 (GND)	L/C L/C ·RT284 (EMPH. INPUT LEVEL)	·Apply a color bar signal (1Vp-p) to the AV INPUT jack. ·RECORD mode.	·Oscilloscope ·Color Bar Generator ·Blank Tape	$0.45V \pm$ $0.01V_{p-p}$

- Connect the oscilloscope to TP256.
- Adjust RT284 for $0.45V \pm 0.01V_{p-p}$.



Fig. 4-108

(5) Carrier Frequency Adjustment (Figs. 4-109, 4-151)

TEST POINTS	ADJUST POINTS	CONDITION	EQUIPMENT/JIG	SPECIFICATION
TP252 TP260 (GND)	L/C L/C RT275 (Fo ADJ 1)	L/C Apply a white (100%) signal to the AV INPUT jack. RECORD mode.	Oscilloscope Color Bar Generator Blank Tape	238nS ± 3nS

1) Connect the oscilloscope to TP252.
2) Adjust RT275 so the period of the widest pulse is 238nS ± 3nS.

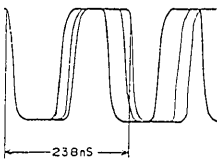


Fig. 4-109

(6) Deviation Adjustment (Figs. 4-110, 4-151)

TEST POINTS	ADJUST POINTS	CONDITION	EQUIPMENT/JIG	SPECIFICATION
TP252 TP260 (GND)	L/C L/C RT277 (DEV Fo ADJ)	L/C Apply a white (100%) signal to the AV INPUT jack. RECORD mode.	Oscilloscope Color Bar Generator Blank Tape	185nS ± 2nS

1) Connect the oscilloscope to TP252.
2) Adjust RT277 so the period of the narrowest pulse is 185nS ± 2nS.

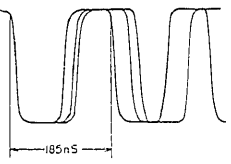


Fig. 4-110

(7) Playback Luminance Signal Level Adjustment (Figs. 4-111, 4-112, 4-151)

TEST POINTS	ADJUST POINTS	CONDITION	EQUIPMENT/JIG	SPECIFICATION
TP265 TP251 (VIDEO OUT) TP260 (GND)	L/C L/C RT273 (PB LUMA LEVEL A) L/C RT286 (PB LUMA LEVEL D)	L/C Playback the alignment tape	Oscilloscope Alignment Tape (20HSC-2)	0.5V ± 0.01Vp-p 1V ± 0.02Vp-p

1) Connect the oscilloscope to TP265.
2) Adjust RT273 so that the waveform of TP265 is 0.5V ± 0.01Vp-p. (Fig. 4-111)
3) Connect the oscilloscope to TP251 (video out).
4) Adjust RT286 so that the waveform of video out is 1V ± 0.02Vp-p. (Fig. 4-112)

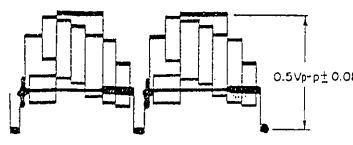


Fig. 4-111




Fig. 4-112

(8) Record Luminance Signal Level Adjustment (Figs. 4-113, 4-151)

TEST POINTS	ADJUST POINTS	CONDITION	EQUIPMENT/JIG	SPECIFICATION
TP254 TP260 (GND)	L/C L/C RT253 (REC LUMA LEVEL)	L/C Apply a color bar signal (1Vp-p) to the AV INPUT jack. RECORD mode.	Oscilloscope Color Bar Generator Blank Tape	250mV ± 10mVp-p

1) Connect the oscilloscope to TP254.
2) Adjust RT253 so that the record luminance level is 250mV ± 10mVp-p.

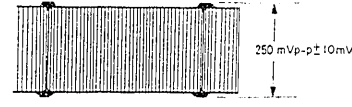


Fig. 4-113

(9) Record Chroma Signal Level Adjustment (Figs. 4-114, 4-151)

TEST POINTS	ADJUST POINTS	CONDITION	EQUIPMENT/JIG	SPECIFICATION
TP268 TP260 (GND)	L/C L/C RT266 (REC CHROMA LEVEL)	L/C Apply a color bar signal (1Vp-p) to the AV INPUT jack. RECORD PAUSE mode.	Oscilloscope Color Bar Generator Blank Tape	250mV ± 5mVp-p

1) Connect the oscilloscope to TP268.
2) Adjust RT266 so that the burst level on the record chroma level is 250mV ± 5mVp-p.

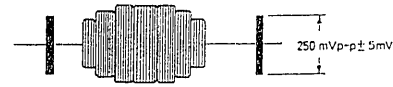


Fig. 4-114

3-8. ADJUSTMENT COMPONENTS LOCATIONS

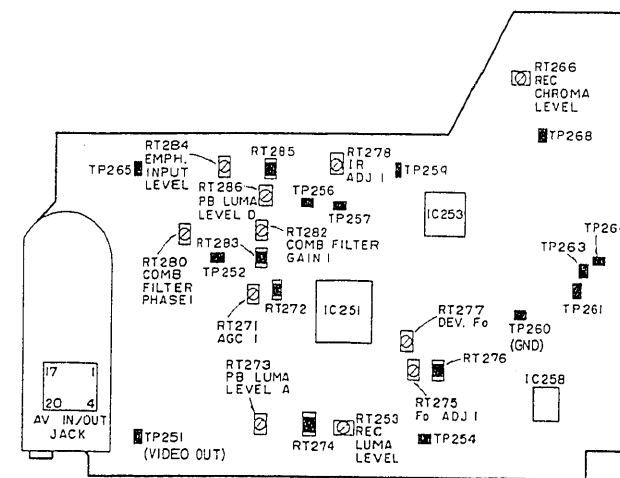


Fig. 4-151 Luminance/Chroma (L/C) Circuit Board (Side - A)

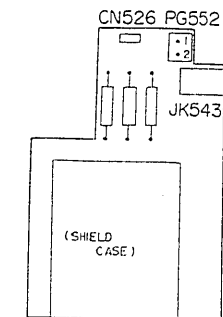


Fig. 4-153 Regulator Block (REG) (Component Side)

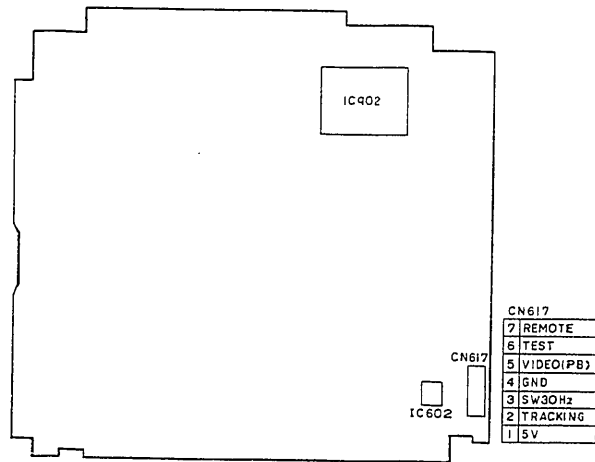


Fig. 4-152 Main Circuit Board (Side - A)

Note: Electrical adjustments of the VCR block cannot be done in the state that the unit is shipped from the factory. Unsolder the laser trimming resistors on the circuit board and solder the specified semi-variable resistors. (See the table below.)

ADJUST POINT	SEMI-VARIABLE RESISTOR (Ω)	C. B. A	NAME OF ADJUSTMENT
RT271	50 k	L/C	AGC 1
RT273	2 k	L/C	PB LUMA LEVEL A
RT275	10 k	L/C	Fo ADJ 1
RT277	5 k	L/C	DEV. Fo ADJ
RT278	10 k	L/C	IR ADJ 1
RT280	220 k	L/C	COMB FILTER PHASE 1
RT282	50 k	L/C	COMB FILTER GAIN 1
RT284	2 k	L/C	EMPH. INPUT LEVEL
RT286	2 k	L/C	PB LUMA LEVEL D

Note: Insulate the terminals shown in Fig. 4-154 when soldering. Adjust the semi-variable resistors within the range shown in Fig. 4-154.

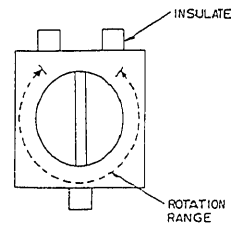


Fig. 4-154

CHAPTER 5 SCHEMATIC DIAGRAM AND CIRCUIT BOARD DIAGRAMS WHEN USING THIS SERVICE REFERENCE MATERIAL

1. Markings in Schematic and Circuit Board Diagrams
 - (1) Parts with marks "■" attached to circuit numbers in the schematic and circuit board diagrams are discrete components.
 - (2) Parts with marks "⊙" in the circuit board diagrams are leadless jumpers.

2. How to Read Abbreviations

Values, dielectric resistances (power capacitances), tolerances, grades of resistors (excluding variable resistors, etc.) and capacitors are indicated in the schematic diagrams using abbreviations. Collate these abbreviations and the following tables for reading abbreviations to replace parts correctly.

2-1. Resistors

Value	No indication	ohm
R210	No indication	150K
Tolerance	K	±5%
Power capacitance	No indication	1/8W
Type	RC	Carbon film fixed
	RW	Power-type wire-wound solid
	RS	Metal oxide film solid
	RN	Metal film solid

Example: R210 150K 150 kohm, carbon solid RC.1/2-K 1/2W, ±10%

2-2. Capacitors

Value	No indication	µF
C210	No indication <td>0.01/25</td>	0.01/25
Dielectric resistance	No indication <td>50WV</td>	50WV
Tolerances	J	±5%
	M	±20%
	C	±0.25PF
	Z	±80%/-20%
Type	MYL	Mylar (Polyester film)
	STY	Styrol
	TA	Tantalum
	KU	High stability electrolytic
	MP	Metalized paper

Example: C210 0.01/25 Mylar, 0.01µF, 25WV ±5%

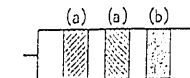
3. How to Read Capacitance of Resistance-Type Capacitors and Coils

3-1 Capacitors

Color	Related voltage
Pink	25V
Light-green	50V

Color	Capacitance (a)	Multiplier (b)	Tolerance (c)	Characteristics (d)
Black	0	10 ⁰	±20%	For temperature compensation
Brown	1	10 ¹		
Red	2	10 ²		
Orange	3	10 ³		
Yellow	4	10 ⁴		
Green	5	10 ⁵		
Blue	6	10 ⁶		
Purple	7			
Gray	8		±30%	High permittivity type
White	9			For temperature compensation
Gold			±5%	
Silver			±10%	

3-2 Coils



4. Cautions on Use of MOS ICs

- (1) MOS ICs are inserted in black foam for shipment. This foam is a conductor which short-circuits between the leads to prevent damage. Do not remove ICs from this foam during storage. Avoid removing ICs from this foam, placing them on plastic which is likely to be charged with static electricity or inserting them into styrol foam.
 - (2) High voltages may be applied during soldering caused by leakages from the soldering iron, so be sure to ground the tip of the soldering iron or use a low voltage soldering iron.
 - (3) The human body and clothes made of synthetic fibres or nylon gloves may be charged with several thousands volts of static electricity because of friction, so workers should be grounded.
 - (4) Be sure to ground measuring instruments such as oscilloscopes, VTVMs, etc. used for repairs.
5. Measure the voltages at each section with the negative side of power supply as a reference. The voltages in the camera section are measured with the VTR in the record mode, and those in the VTR section are measured in the record and playback modes.
- Voltages in () are in the record mode.
 - One voltage value is common for recording and playback.

LEADLESS COMPONENT IDENTIFICATION

1. Leadless Transistors

The leadless transistor number is indicated by a code on its surface, using one letter, two letters and one numeral, two numerals, two numerals and one letter, or three letters.

Letter	Transistor Number	Letter	Transistor Number
A	2SB709	H	2SA1036K
A (R)	2SB1218R (AR)	I	2SB792
A (S)	2SB766S (AS)	J	2SC2735
A (J)	2SB1000J (AJ)	K	2SA1036
B	2SC1621	K (P)	2SC2413P (KP)
B (J)	2SB1001J (BJ)	L	2SC2462
B (R)	2SC4081R (BR)	M	2SA1052
B (R)	2SC2412AR (BR)	N	2SC1653
B (S)	2SC2412KS (BS)	N (E)	2SD1306E (NE)
C	2SA1122	P	2SD814
C (L)	2SD999L (CL)	P (E)	2SA1171E (PE)
C (R)	2SB710R (CR)	Q	2SC2620
C (R)	2SC4097R (CR)	Q (O)	2SC2714O (QO)
C (R)	2SC2411R (CR)	R	2SC2618
C (Q)	2SC2411KQ (CQ)	S	2SA1121
D	2SC2463	S (Q)	2SC3082KQ (SQ)
D (L)	2SB798L (DL)	U	2SC2404
E	2SA1022	W	2SD602
F	2SC2619	Y	2SD601
F (S)	2SA1037KS (FS)	Y (R)	2SD1819R (YR)
F (R)	2SA1576R (FR)	Z	2SD874
AA (S)	2SD1757KS (AAS)	DB (R)	2SD1766R (DBR)
BC (R)	2SB1188R (BCR)	IR (D)	2SA1484D (IRD)
BF (R)	2SB1308R (BFR)		
1D (T)	2SD1328T (1DT)	1C (R)	2SB902R (1CR)
B (3)	2SC1621 (3) (B3)	L (6)	MMBC1623 (6) (L6)
C (7)	2SA811 (7) (C7)	L (6)	2SC1623 (6) (L6)
L (7)	2SC2812 (7) (L7)	F (2)	2SC1009 (2) (F2)
M (6)	2SA812 (6) (M6)	M (6)	2SA1179 (6) (M6)
N (4)	2SC1653 (4) (N4)		
D (16)	2SC1622A (16) (D16)	R (25)	2SC3356 (25) (R25)
R (35)	2SC3583 (35) (R35)	R (45)	2SC3585 (45) (R45)
Y (25)	NTM3906 (25) (Y25)		
1 (D)	2SC3127D (1D)		
S1	FMS1	S2	FMS2
T1	IMT1	W1	FMW1
W2	FMW2	W3	FMW3
X1	IMX1	Y1	FMY1
Y3	FMY3	Z1	IMZ1
Z2	IMZ2		
4R	XN1C301	5H	XN4501
5K	XN4401		
Digital Transistor			
04	DTC114TK	06	DTC144TK
13	DTA143EK	15	DTA124K
15 (s)	DTA124EU	16	DTA144EK
16 (s)	DTA144EU	23	DTC143EK
24	DTC114EK	24 (s)	DTC114EU
25	DTC124K	25 (s)	DTC124EU
26	DTC144K	26 (s)	DTC144EU
33	DTA143XK	43	DTC143XK
52	DTA123YK	64	DTC114YK
6B	UN5112	0B	UN5212
F52	DTB123	G21	DTD1132K
H03	DTC343TK	H27	DTC363EK
R31	FPL12Q		
A1	FMA1	A2	FMA2
B2	IMB2	C2	FMC2
D2	IMD2	G1	FMG1
G2	FMG2	G5	FMG5
H2	IMH2		

Letter	Transistor Number	Letter	Transistor Number
FET			
G	2SK302	J	2SK208
K	2SK160	W	2SK322
X	2SK157	X (4)	2SK94 (4) (X4)
X (17)	2SK425 (17) (X17)		
Y	2SK197	Z	2SK217
XA	2SK980		
3	2SK620	3 (O)	2SK621 (O) (3O)
1M	2SA1052	1F	2SK321
1K	2SK316	2B	2SK374

* "(s)" in the above table shows a component with smaller size.
* Codes on the digital transistors show only the transistor numbers.

- (1) Identification for two letters. Use this code and the following chart for component identification.

Example:

Code	Number
CD	2SA1122D
LD	2SC2462D

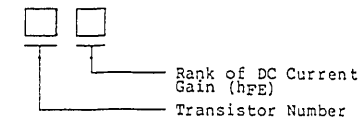


Fig. 5-1 Leadless Transistor Code

- (2) Identification for two types of one letter and one numeral. Use this code and the following chart for component identification.

Letter	Transistor Number
L	2SC1623

Example:

Code	Number
L5	2SC1623 (5)
L6	2SC1623 (6)

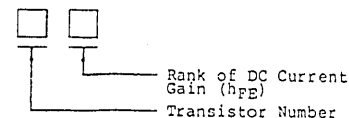
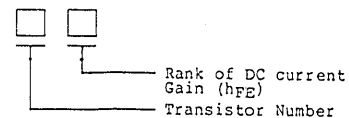


Fig. 5-2 Leadless Transistor Code

Example:

Code	Number
1D	2SC3127D



Note: Codes S1, S2, T1, W1, W2, W3, X1, Y1, Y3, Z1 and Z2 show only the transistor numbers.

Fig. 5-3 Leadless Transistor Code

- (3) Identification for one numeral and two letters. Use this code and the following chart for component identification.

Example:

Code	Number
1FQ	2SK321Q

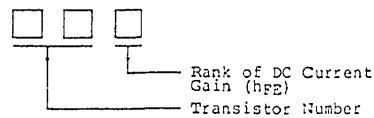


Fig. 5-4 Leadless Transistor Code

- (4) Identification for one letter and two numerals. Use this code and the following chart for component identification.

Example:

Code	Number
R25	2SC3356

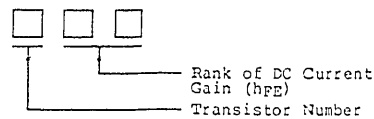


Fig. 5-5 Leadless Transistor Code

- (5) Identification for two letters and one numeral. Use this code and the following chart for component identification.

Example:

Code	Number
DV5	2SD596

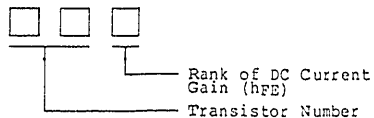


Fig. 5-6 Leadless Transistor Code

- (6) Identification for three letters. Use this code and the following chart for component identification.

Example:

Code	Number
AAS	2SD1757KS

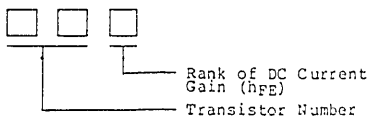


Fig. 5-7 Leadless Transistor Code

2. Leadless Diodes

Leadless diode numbers are indicated by a code on the surface, using one letter and one numeral, two letters, two numerals and one numeral, two numerals, two numerals and one letter, or three numerals. Use this code and the following chart for component identification.

Code	Diode Number	Code	Diode Number
BE	1SV172	MC (s)	MA143
MC	MA153	MH (s)	MA141K
MH	MA151K	MN (s)	MA141WA
MN	MA151WA	MT (s)	MA141WK
MO	MA152WA		
MT	MA151WK		
MU	MA152WK		
M1D	MA160	M1P	MA714
M2A	MA122	S1A	1SR143
N	DAH202K	Z	DA106K
A3	1S2835	A5	1S2837
CL	HSM88S	C2	HSM276S
1A	MA110		
3.0L	MAJ030L	4.3L	MAJ043L
4.7M	MAJ047M	5.1M	MAJ051M
5.1L	MAJ051L	5.6M	MAJ056M
6.2L	MAJ062L	6.8M	MAJ068
6.8M	MAJ068M	7.5M	MAJ075M
7.5L	MAJ075L	8.2M	MAJ082M
9.1M	MAJ091	9.1M	MAJ091M
10L	MAJ100L	56M	MAJ056M
75L	MAJ075L	82M	MAJ082M
91M	MAJ091M		
20	HSM6-B	27	RD2.7M-B
30	RD3.0M-B	51	RD5.1M-B2
56	RD5.6M-B	91	RD9.1M-B
102	RD10M-B2	122	RD12M-B2
163	RD16M-B3	182	RD18M-B2
271	RD2.7M-B	272	RD2.7M-B2
301	RD3.0M-B	362	RD3.6M-B2
391	RD3.9M-B1	512	RD5.1M-B2
561	RD5.6M-B	621	RD6.2M-B1
681	RD6.8M-B	683	RD6.8M-B3
911	RD9.1M-D		

* "(s)" in the above table shows a component with smaller size.

3. Leadless Resistors

The resistor value is indicated on the surface of the component, using a three-digit numbers, or one letter and one numeral.

- (1) Identification for three digit numbers. Read this code following the same procedure as when reading the color code on discrete resistors.

Example:

Code	Value
330	$33 \times 10^0 = 33 \text{ ohms}$
561	$56 \times 10^1 = 560 \text{ ohms}$
123	$12 \times 10^3 = 12K \text{ ohms}$
1R2	$1 + 0.2 = 1.2 \text{ ohms}$
	(R: Decimal point)

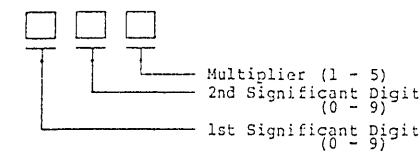


Fig. 5-8 Leadless Resistor Code

- (2) Identification for one letter and one numeral. Use this code and the following chart for component identification.

Letter	Value	Letter	Value	Letter	Value
A	1	J	2.2	S	4.7
C	1.2	L	2.7	U	5.6
E	1.5	N	3.3	W	6.8
G	1.8	Q	3.9	Y	8.2

Example:
Code

Code	Value
A1	$1 \times 10^1 = 10$ ohms
G2	$1.8 \times 10^2 = 180$ ohms
L3	$2.7 \times 10^3 = 2700$ ohms
S4	$4.7 \times 10^4 = 47K$ ohms
W5	$6.8 \times 10^5 = 680K$ ohms

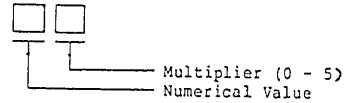
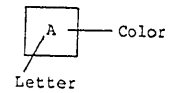


Fig. 5-9 Leadless Resistor Code

4. Leadless Capacitors

The capacitance value is indicated on the surface of the component, using body color and one letter, or one letter and one numeral.

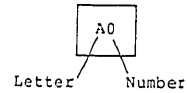
(1) Identification for body color and one letter.



Body Color	Letter	Value	Body Color	Letter	Value	
Red	A	1(PF)	Blue	A	100(PF)	
	C	2		C	120	
	E	3		E	150	
	G	4		G	180	
	J	5		J	220	
	L	6		L	270	
	N	7		N	330	
	Q	8		Q	390	
	S	9		S	470	
Black	A	10(PF)	White	U	560	
	C	12		W	680	
	E	15		Y	820	
	G	18		A	0.001(μF)	
	J	22		E	0.0015	
	L	27		J	0.0022	
	N	33		L	0.0027	
	Q	39		N	0.0033	
	S	47		S	0.0047	
Black	U	56	W	0.0068		
	W	68	Green	A	0.01(μF)	
	Y	82		E	0.015	
	Black				J	0.022
					N	0.033
					S	0.047
					U	0.056
					W	0.068
					Y	0.082
Yellow					A	0.1(μF)

Example:
Color Code Value
Red A 1PF
Black A 10PF

(2) Identification for one letter and one numeral.

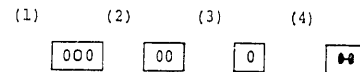


Letter /Number	Value	Letter /Number	Value		
A0	1(PF)	A2	100(PF)		
H0	2	C2	120		
M0	3	E2	150		
d0	4	G2	180		
f0	5	J2	220		
m0	6	L2	270		
n0	7	N2	330		
t0	8	Q2	390		
y0	9	S2	470		
A1	10(PF)	U2	560		
		W2	680		
		Y2	820		
		A3	0.001(μF)		
		E3	0.0015		
		J3	0.0022		
		N3	0.0033		
		S3	0.0047		
		W3	0.0068		
W1	68	A4	0.01(μF)		
		E4	0.015		
		J4	0.022		
		N4	0.033		
		S4	0.047		
		U4	0.056		
		W4	0.068		
		Y1	82	A5	0.1

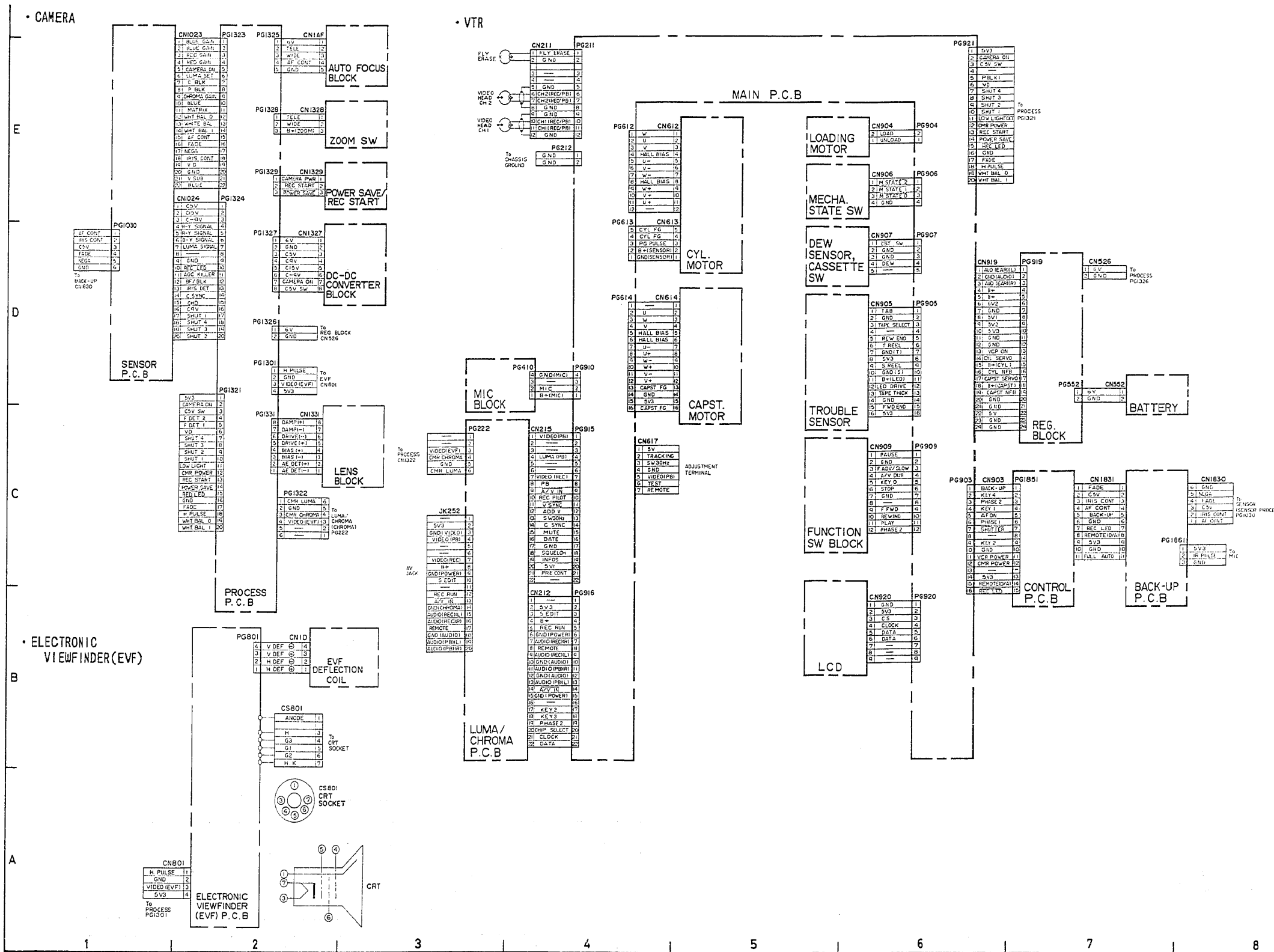
Example:
Letter /Number Value
A0 1PF
A1 10PF

5. Leadless Jumper

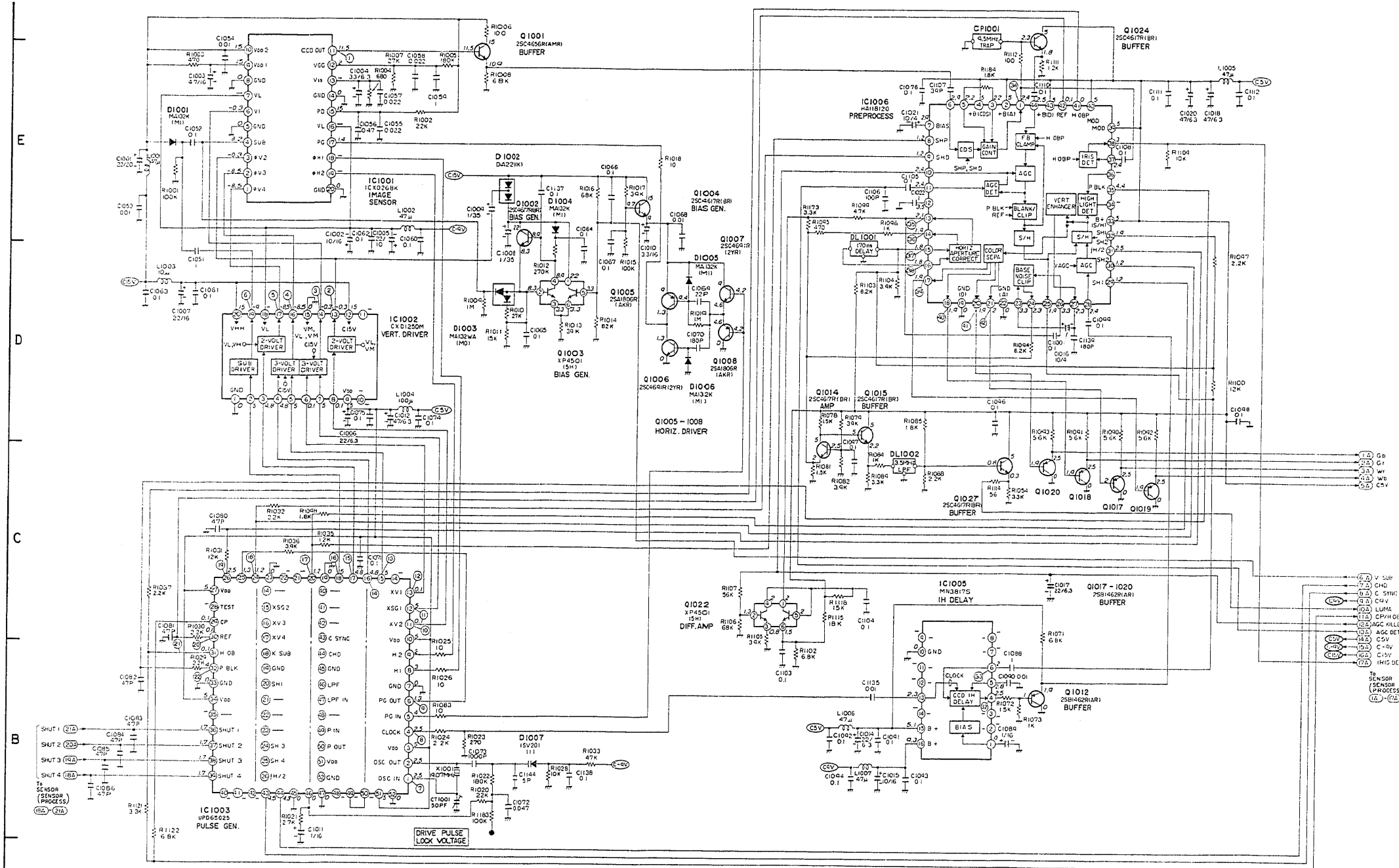
The leadless jumper is indicated as shown below.



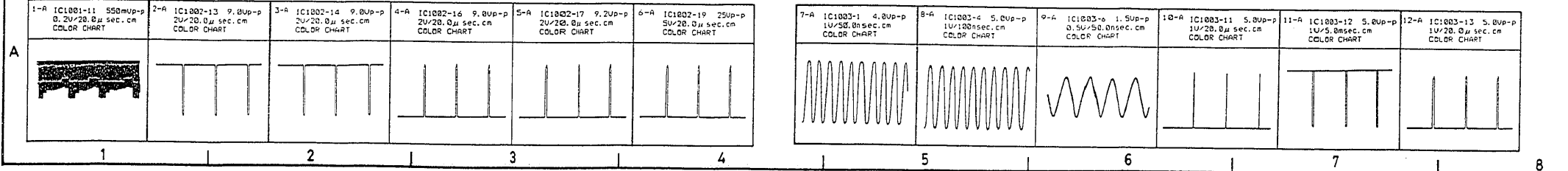
CIRCUIT BOARD CONNECTION DIAGRAMS



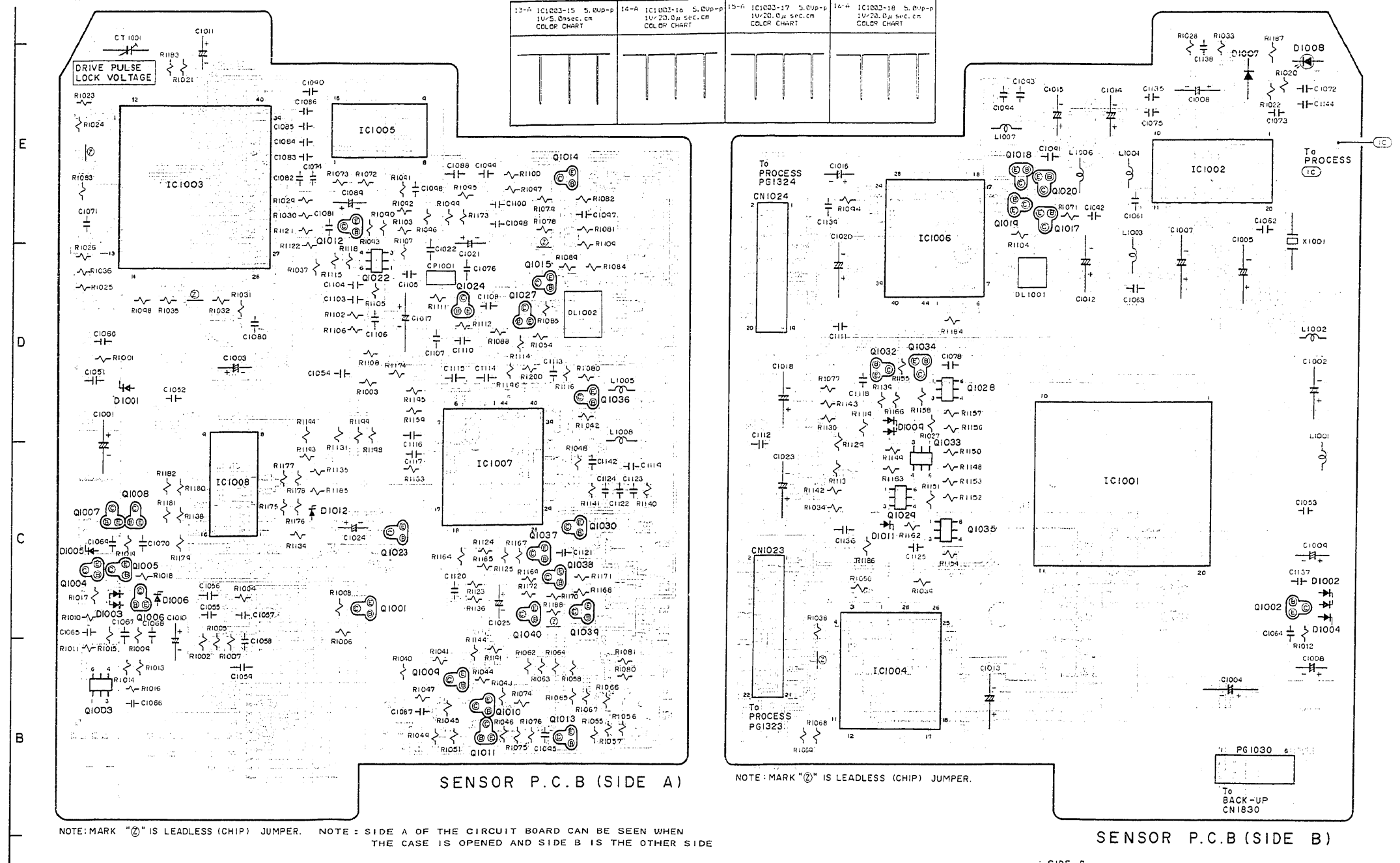
SENSOR(SENSOR DRIVE SECTION) SCHEMATIC



SENSOR(SENSOR DRIVE SECTION) P.C.B

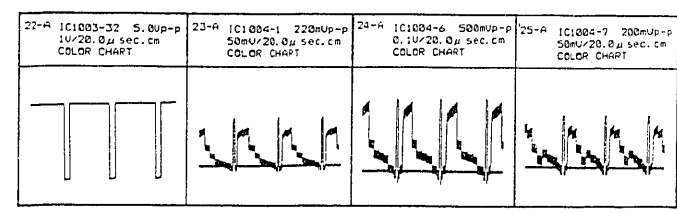
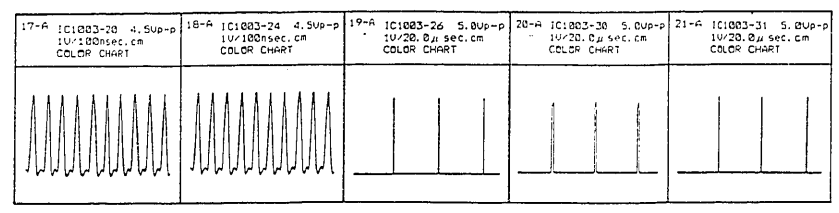


SENSOR CIRCUIT BOARD

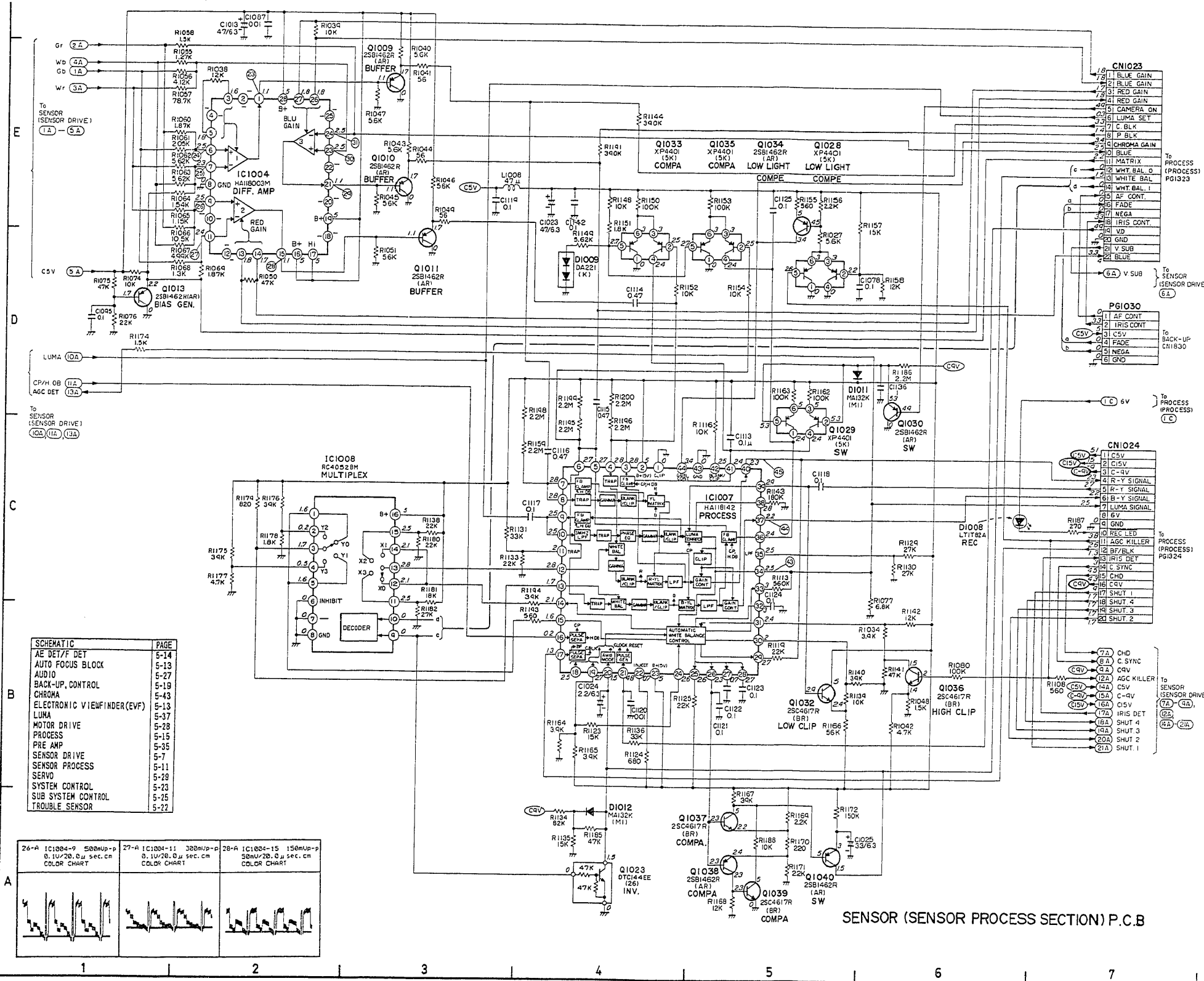


NOTE: MARK "⊗" IS LEADLESS (CHIP) JUMPER. NOTE: SIDE A OF THE CIRCUIT BOARD CAN BE SEEN WHEN THE CASE IS OPENED AND SIDE B IS THE OTHER SIDE

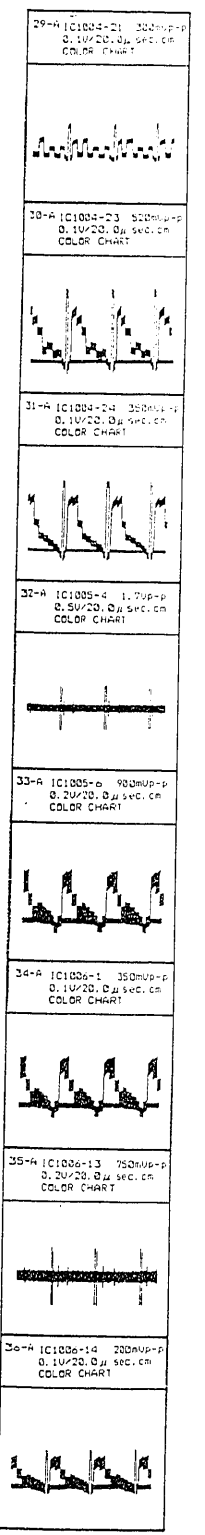
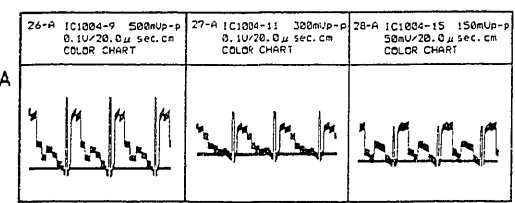
SCHEMATIC	PAGE	SCHEMATIC	PAGE
AE DET/F DET	5-14	PROCESS	5-15
AUTO FOCUS BLOCK	5-13	PRE AMP	5-35
AUDIO	5-27	SENSOR DRIVE	5-7
BACK-UP, CONTROL	5-19	SENSOR PROCESS	5-11
CHROMA	5-43	SERVO	5-29
ELECTRONIC VIEWFINDER(EVF)	5-13	SYSTEM CONTROL	5-23
LUMA	5-37	SUB SYSTEM CONTROL	5-25
MOTOR DRIVE	5-28	TROUBLE SENSOR	5-22



SENSOR (SENSOR PROCESS SECTION) SCHEMATIC

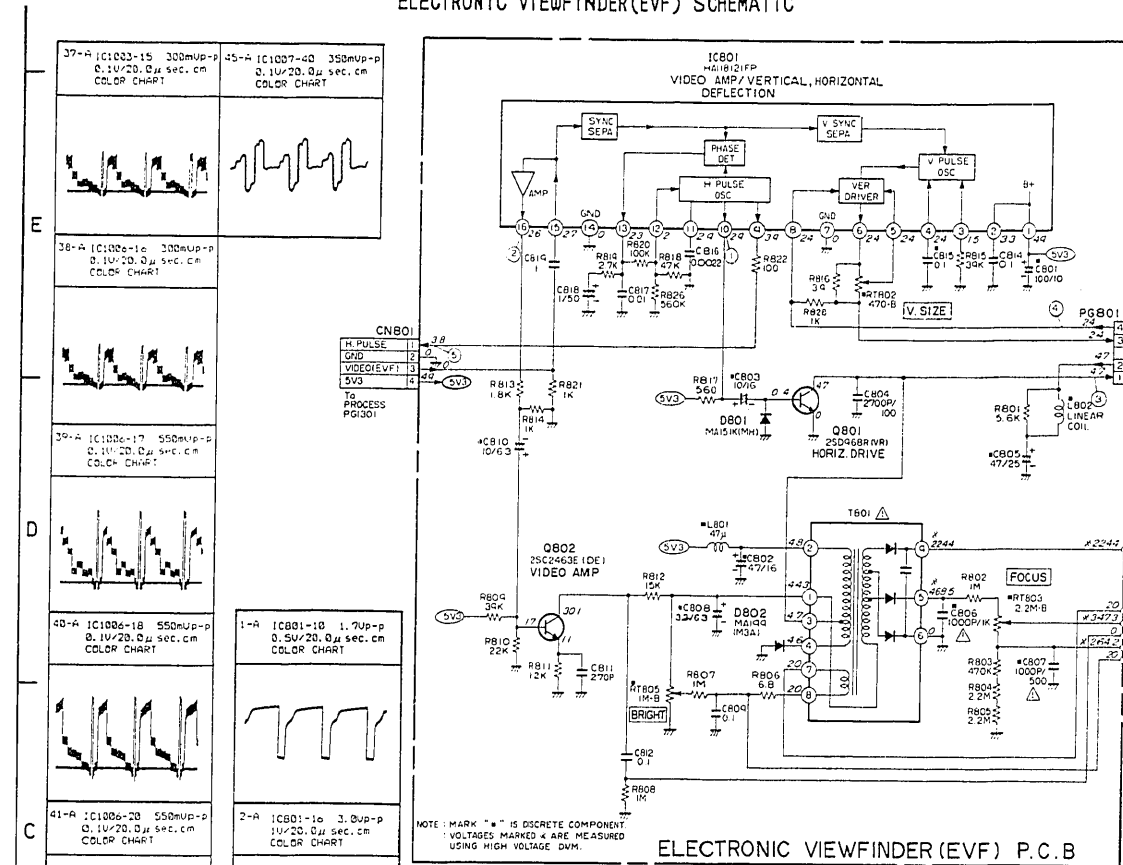


SCHEMATIC	PAGE
AE DET/F DET	5-14
AUTO FOCUS BLOCK	5-13
AUDIO	5-27
BACK-UP, CONTROL	5-19
CHROMA	5-43
ELECTRONIC VIEWFINDER (EVF)	5-13
LUMA	5-37
MOTOR DRIVE	5-28
PROCESS	5-15
PRE AMP	5-35
SENSOR DRIVE	5-7
SENSOR PROCESS	5-11
SERVO	5-29
SYSTEM CONTROL	5-23
SUB SYSTEM CONTROL	5-25
TROUBLE SENSOR	5-22



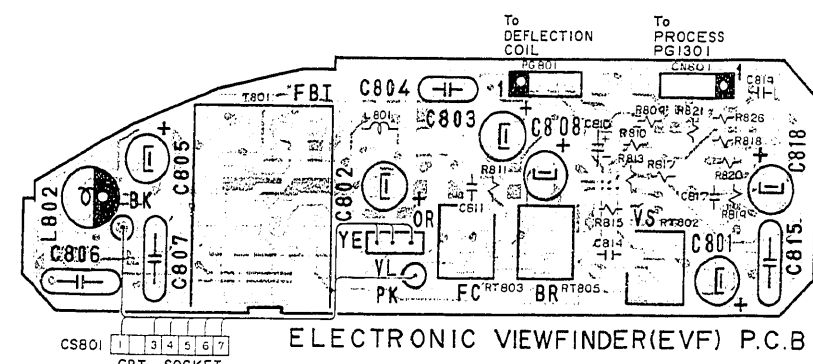
SENSOR (SENSOR PROCESS SECTION) P.C.B

ELECTRONIC VIEWFINDER(EVF) SCHEMATIC



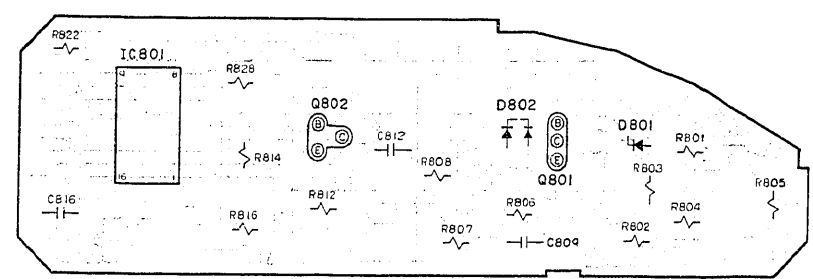
ELECTRONIC VIEWFINDER (EVF) P.C.B

ELECTRONIC VIEWFINDER(EVF) CIRCUIT BOARD



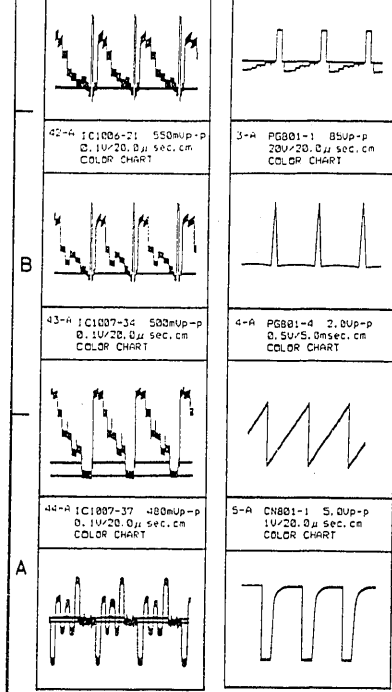
ELECTRONIC VIEWFINDER(EVF) P.C.B

: Soldered side
: Parts side

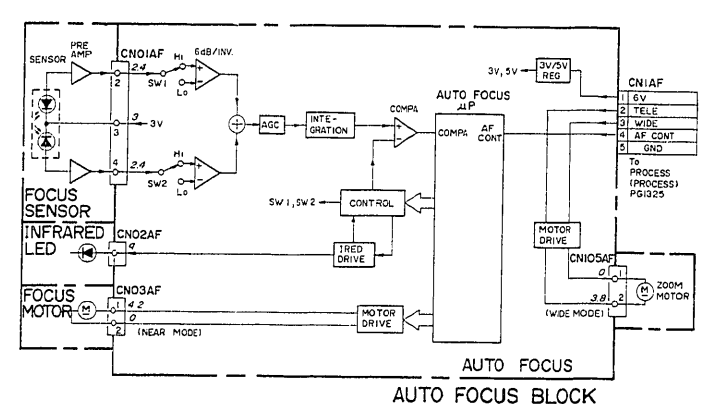


ELECTRONIC VIEWFINDER (EVF) P.C.B

: Soldered side

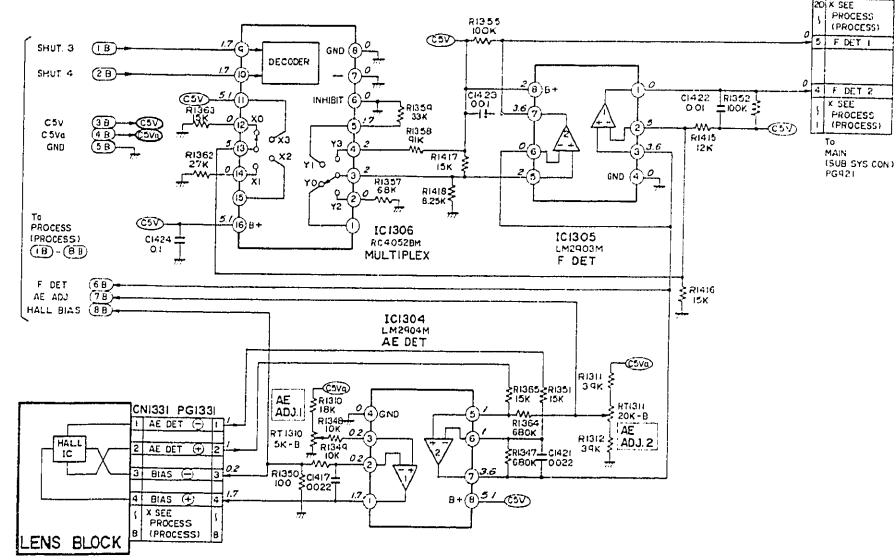


AUTO FOCUS BLOCK



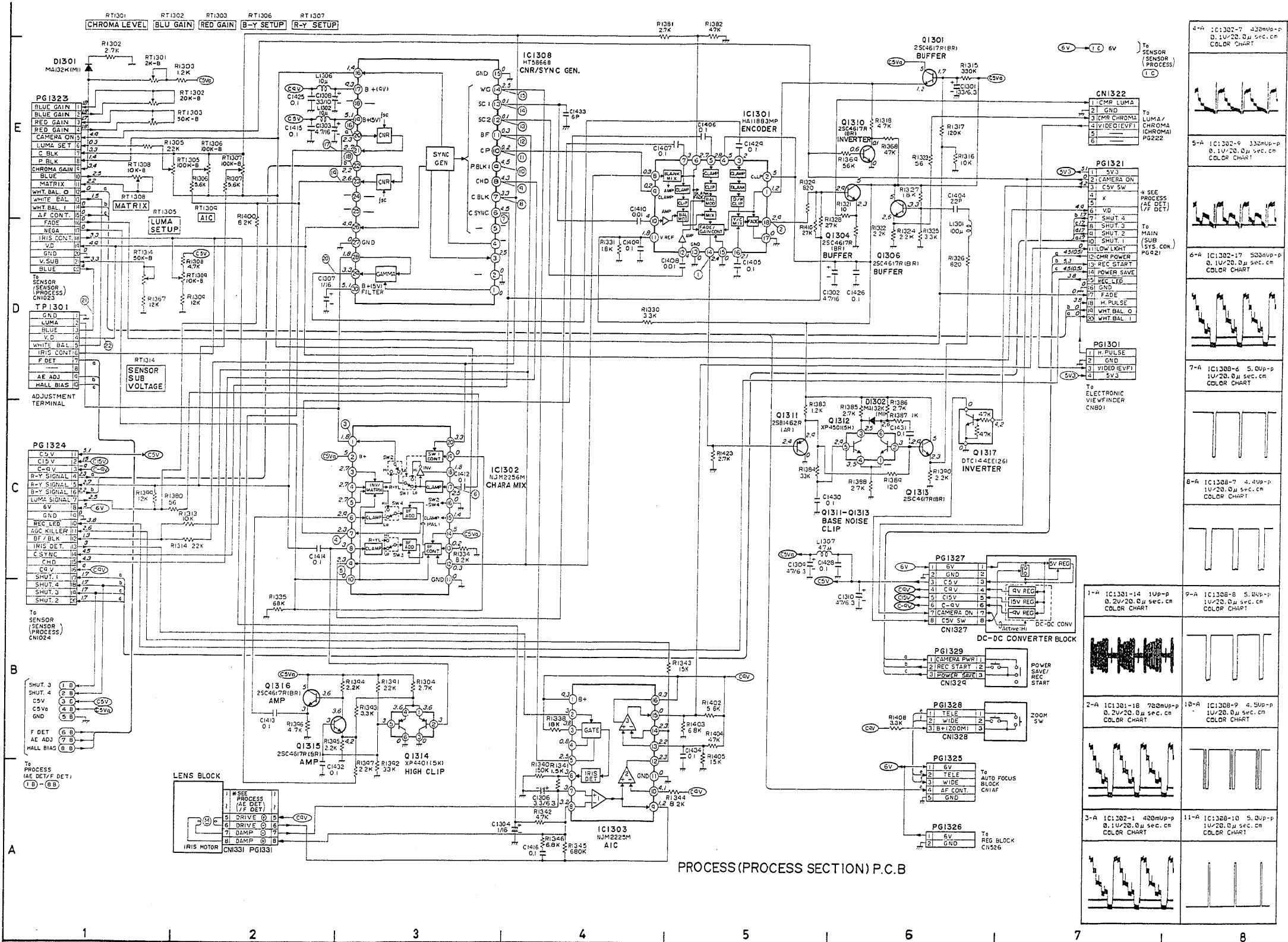
AUTO FOCUS BLOCK

PROCESS(AE DET/F DET SECTION) SCHEMATIC



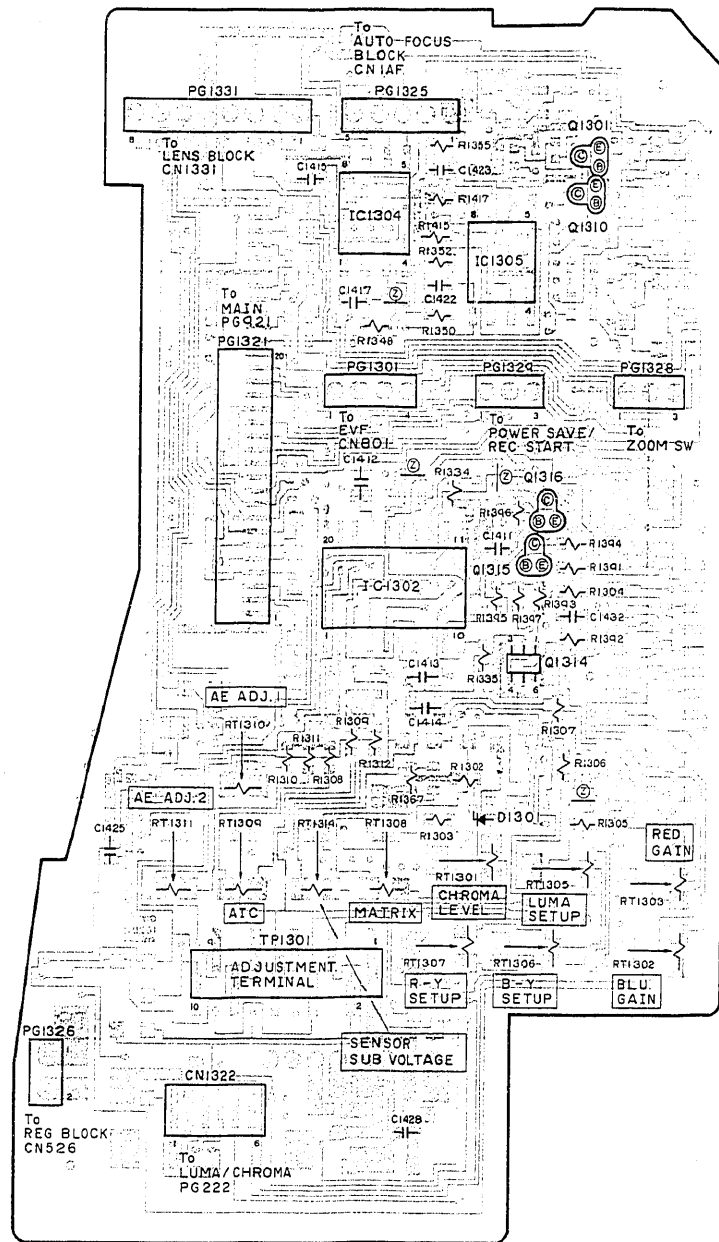
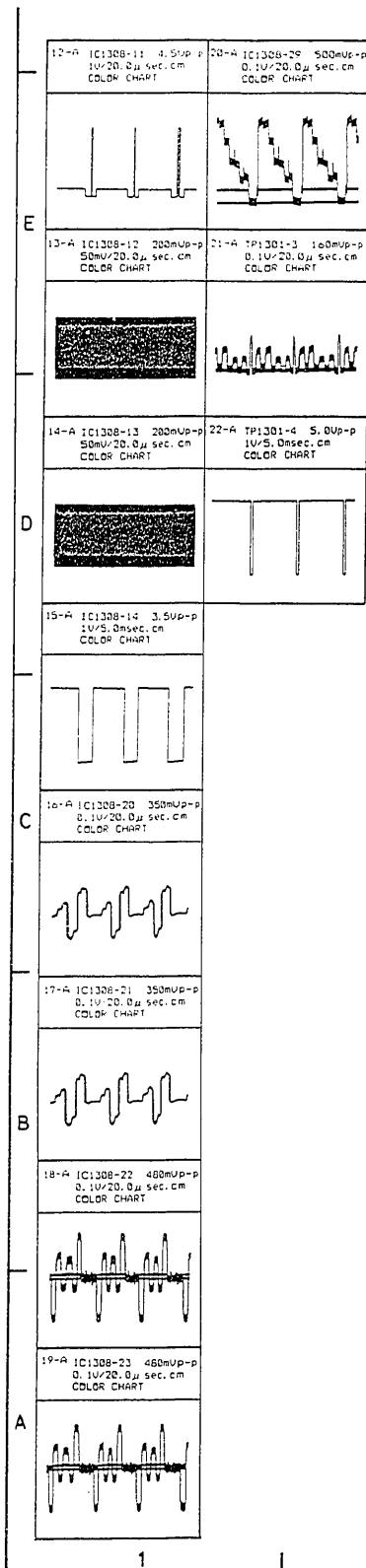
PROCESS (AE DET/ F DET SECTION) P.C.B

PROCESS (PROCESS SECTION) SCHEMATIC



PROCESS (PROCESS SECTION) P.C.B.

PROCESS CIRCUIT BOARD



NOTE: MARK "Q" IS LEADLESS (CHIP) JUMPER.

PROCESS P.C.B (SIDE A)

NOTE: SIDE A OF THE CIRCUIT BOARD CAN BE SEEN WHEN THE CASE IS OPENED AND SIDE B IS THE OTHER SIDE

⊙ : SIDE A

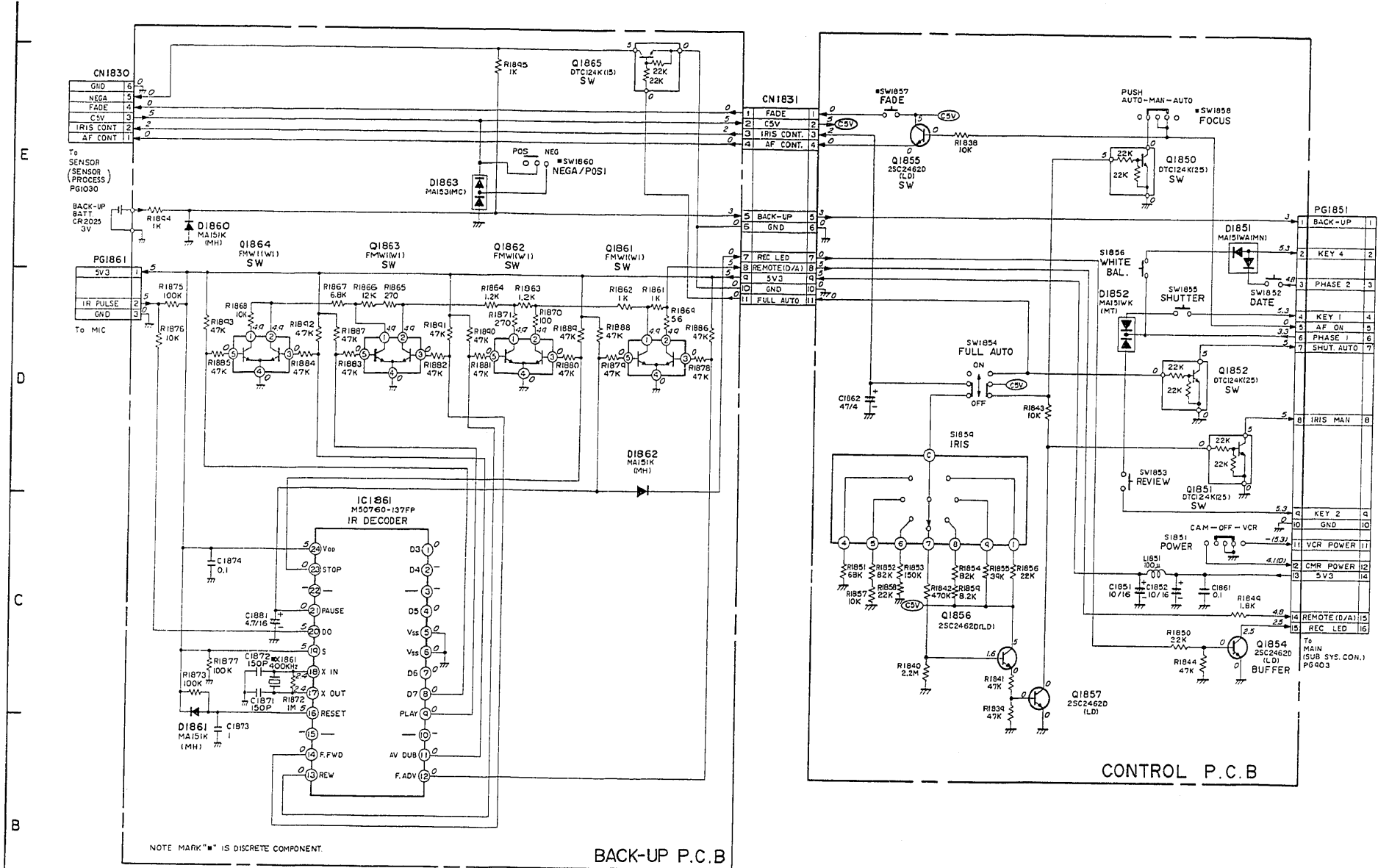
NOTE: MARK "Q" IS LEADLESS (CHIP) JUMPER.

PROCESS P.C.B (SIDE B)

⊙ : SIDE B

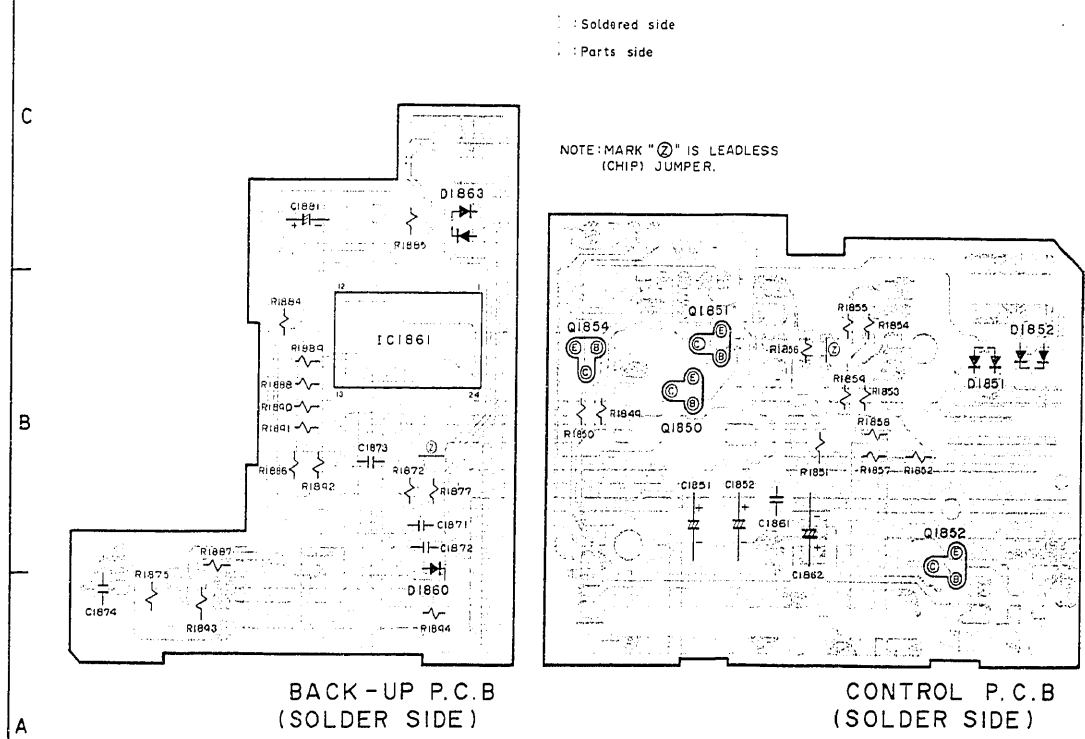
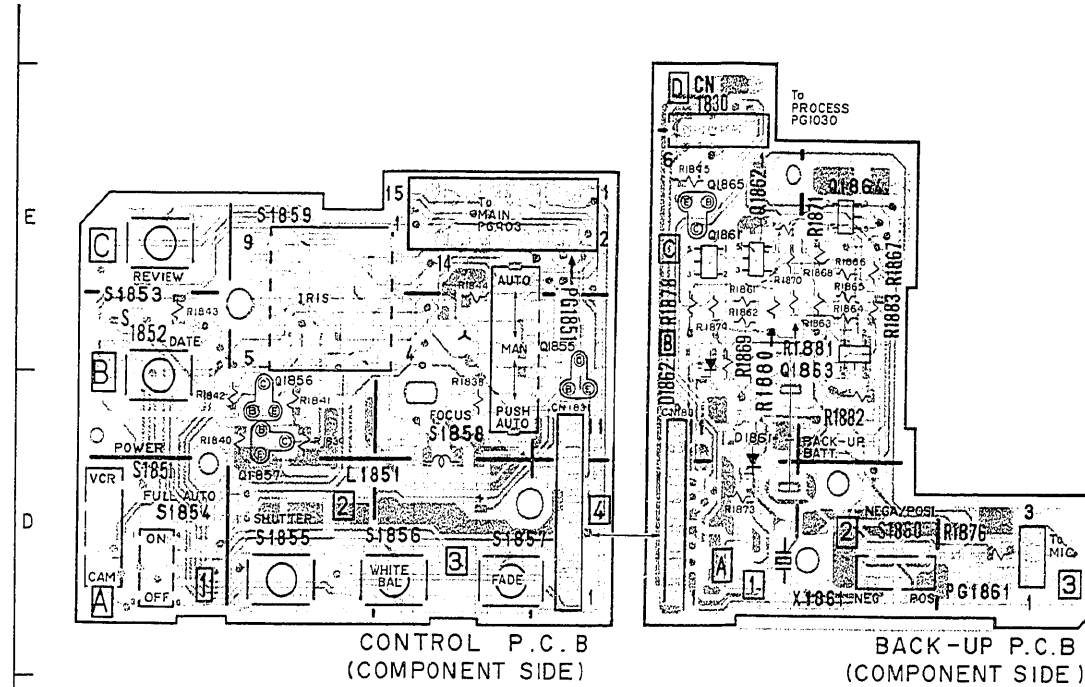
SCHEMATIC	PAGE	SCHEMATIC	PAGE
AE DET/F DET	5-14	PROCESS	5-15
AUTO FOCUS BLOCK	5-13	PRE AMP	5-35
AUDIO	5-27	SENSOR DRIVE	5-7
BACK-UP CONTROL	5-19	SENSOR PROCESS	5-11
CHROMA	5-43	SERVO	5-28
ELECTRONIC VIEWFINDER (EVF)	5-13	SYSTEM CONTROL	5-23
LUMA	5-37	SUB SYSTEM CONTROL	5-25
MOTOR DRIVE	5-28	TROUBLE SENSOR	5-22

BACK-UP, CONTROL SCHEMATIC

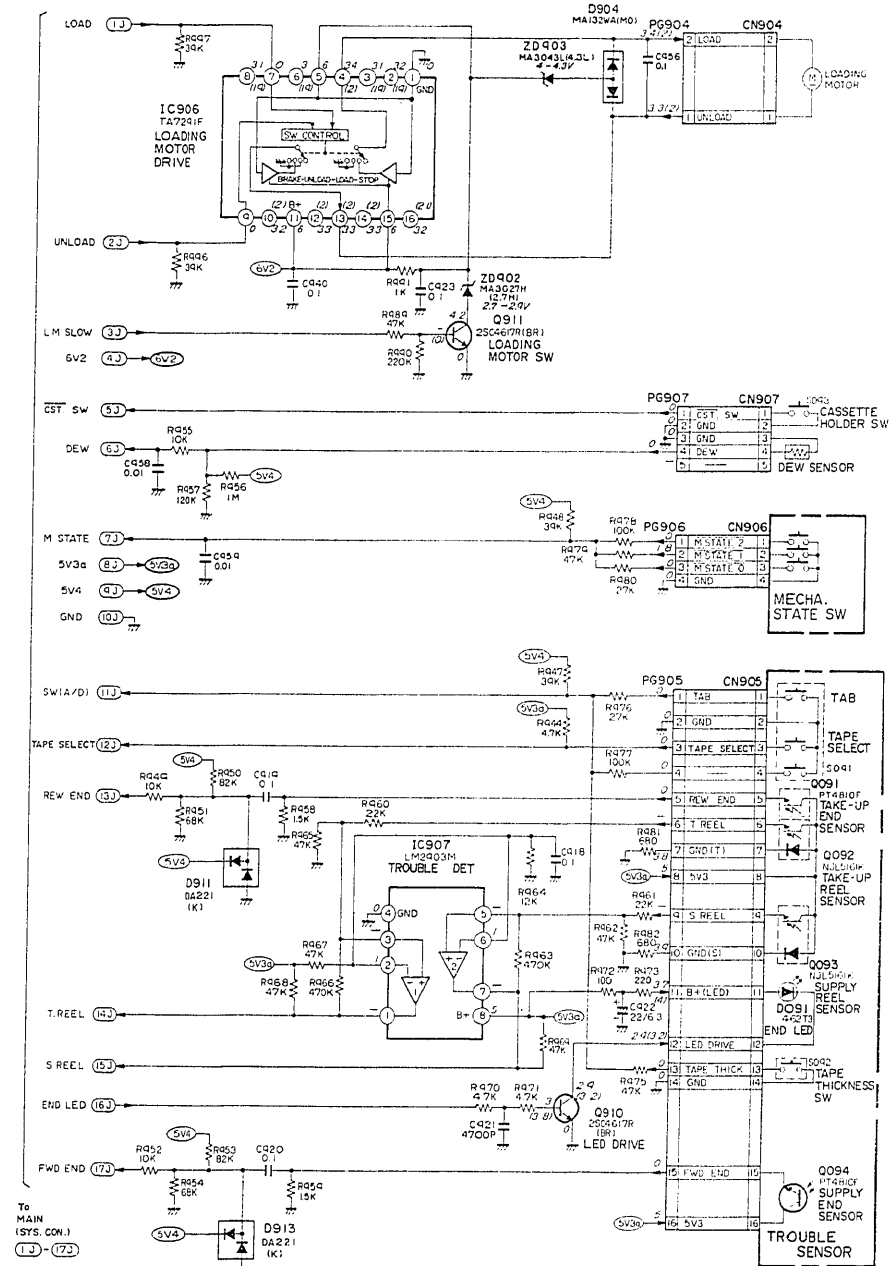


SCHEMATIC	PAGE
AE DET./F DET	5-14
AUTO FOCUS BLOCK	5-13
AUDIO	5-27
BACK-UP, CONTROL	5-19
CHROMA	5-43
ELECTRONIC VIEWFINDER (EVF)	5-13
LUMA	5-37
MOTOR DRIVE	5-28
PROCESS	5-15
PRE AMP	5-35
SENSOR DRIVE	5-7
SENSOR PROCESS	5-11
SERVO	5-29
SYSTEM CONTROL	5-23
SUB SYSTEM CONTROL	5-25
TROUBLE SENSOR	5-22

BACK-UP, CONTROL CIRCUIT BOARD



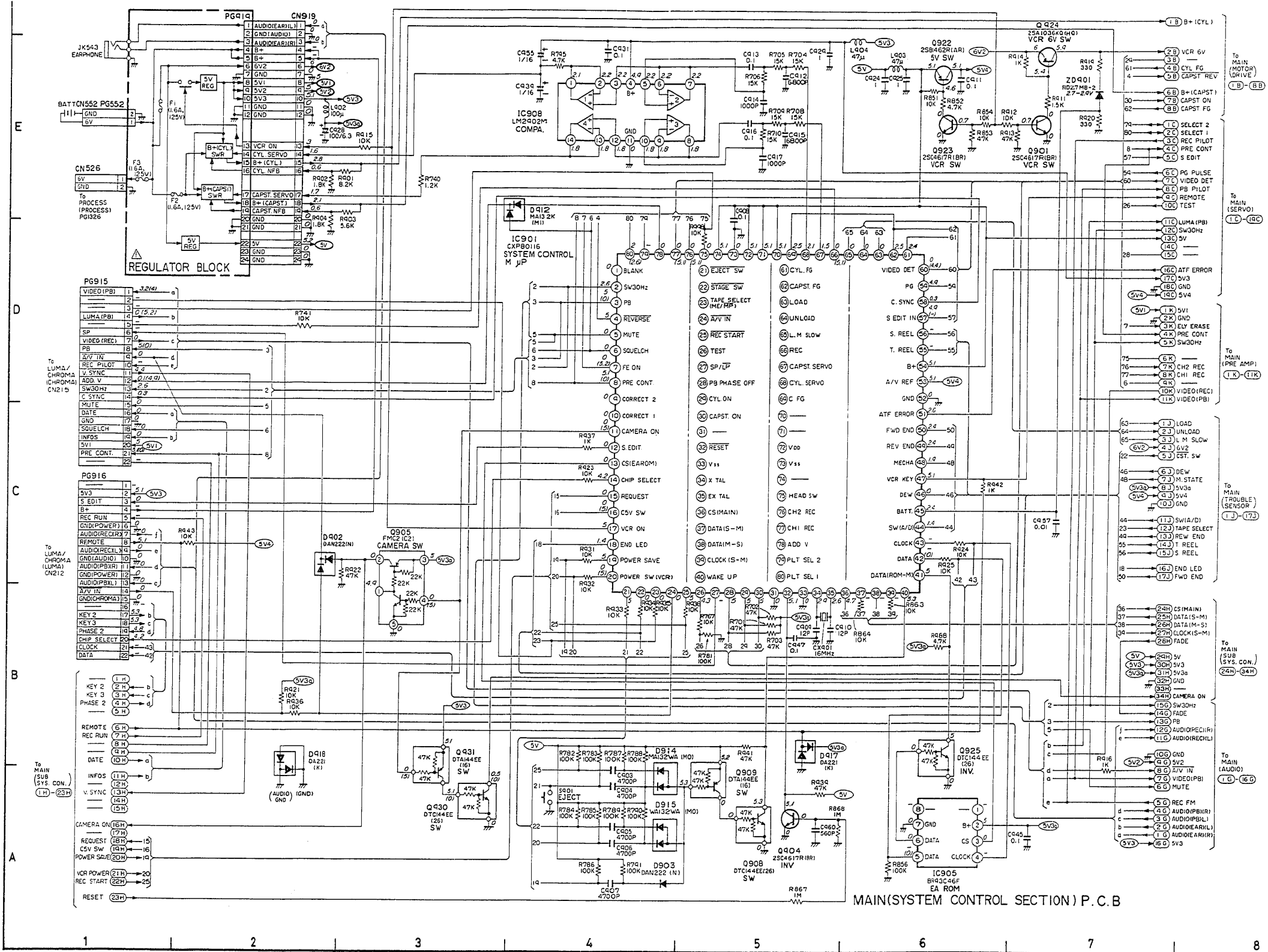
MAIN (TROUBLE SENSOR SECTION) SCHEMATIC



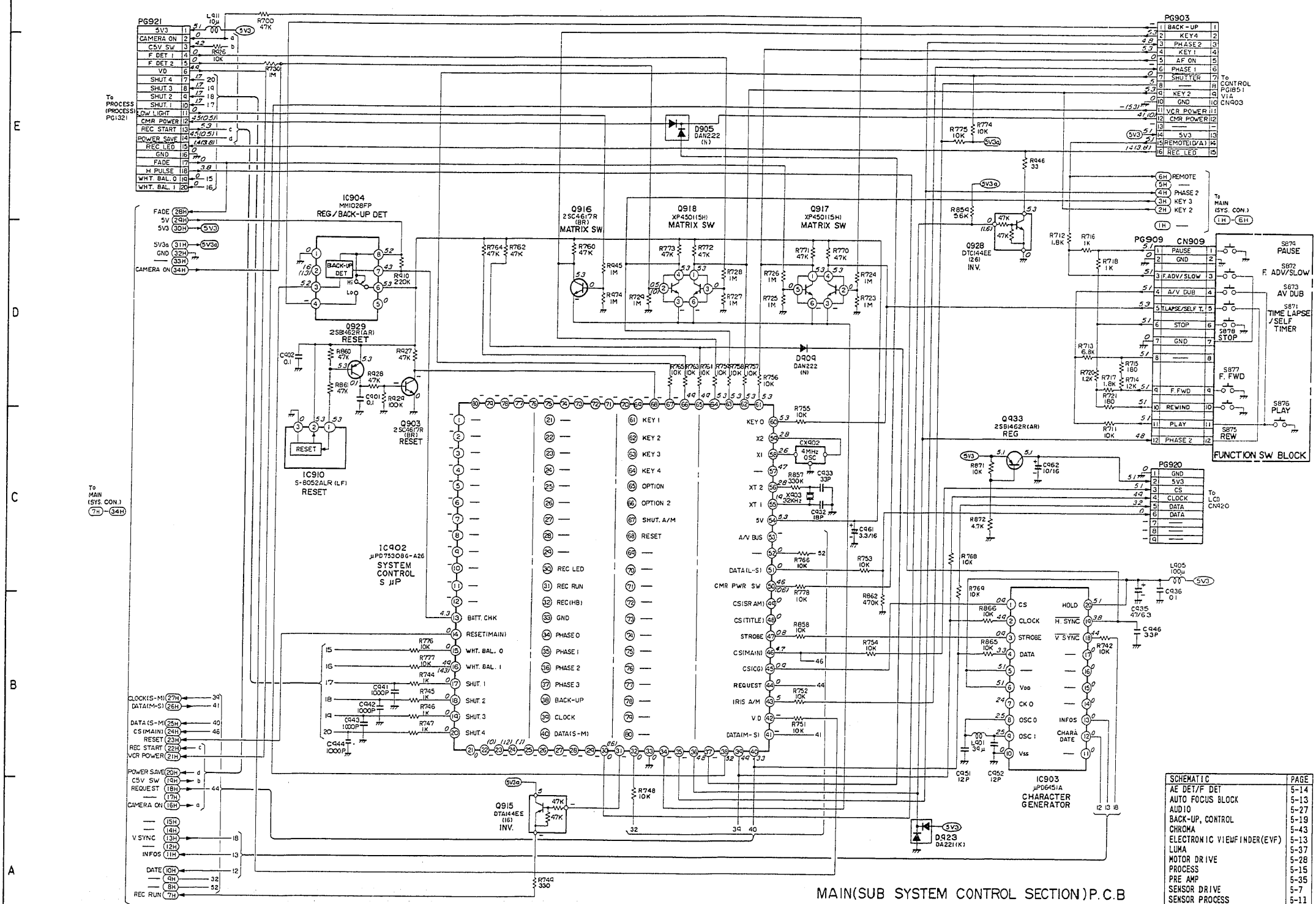
MAIN (TROUBLE SENSOR SECTION) P.C.B

SCHEMATIC	PAGE	SCHEMATIC	PAGE
AE DET/F DET	5-14	PROCESS	5-15
AUTO FOCUS BLOCK	5-13	PRE AMP	5-35
AUDIO	5-27	SENSOR DRIVE	5-7
BACK-UP, CONTROL	5-19	SENSOR PROCESS	5-11
CHROMA	5-43	SERVO	5-29
ELECTRONIC VIEWFINDER (EVF)	5-13	SYSTEM CONTROL	5-23
LUMA	5-37	SUB SYSTEM CONTROL	5-25
MOTOR DRIVE	5-28	TROUBLE SENSOR	5-22

MAIN(SYSTEM CONTROL SECTION) SCHEMATIC



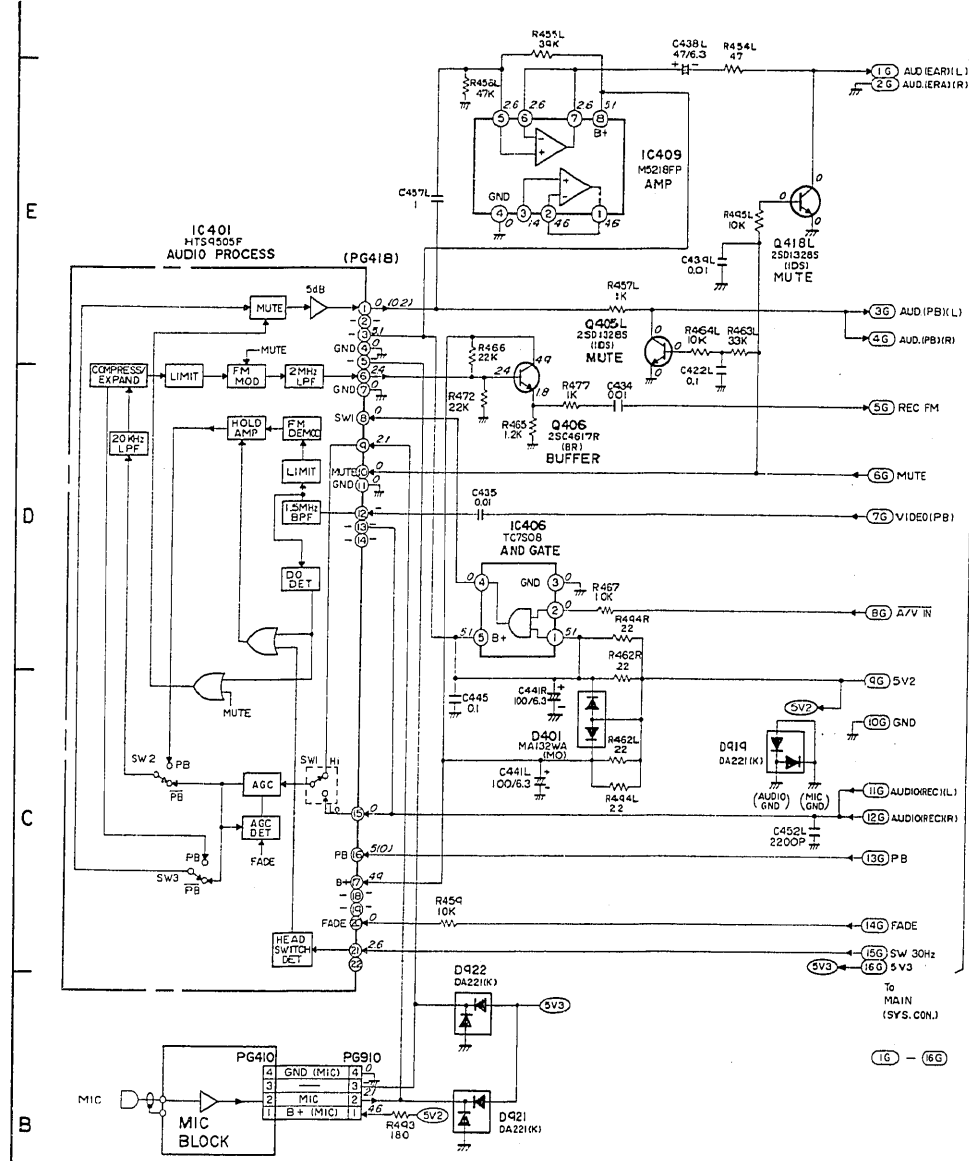
MAIN(SUB SYSTEM CONTROL SECTION) SCHEMATIC



MAIN(SUB SYSTEM CONTROL SECTION) P.C.B

SCHEMATIC	PAGE
AE DET/F DET	5-14
AUTO FOCUS BLOCK	5-13
AUDIO	5-19
BACK-UP, CONTROL	5-27
CHRONA	5-43
ELECTRONIC VIEWFINDER(EVF)	5-13
LUMA	5-37
MOTOR DRIVE	5-28
PROCESS	5-15
PRE AMP	5-35
SENSOR DRIVE	5-7
SENSOR PROCESS	5-11
SERVO	5-29
SYSTEM CONTROL	5-23
SUB SYSTEM CONTROL	5-25
TROUBLE SENSOR	5-22

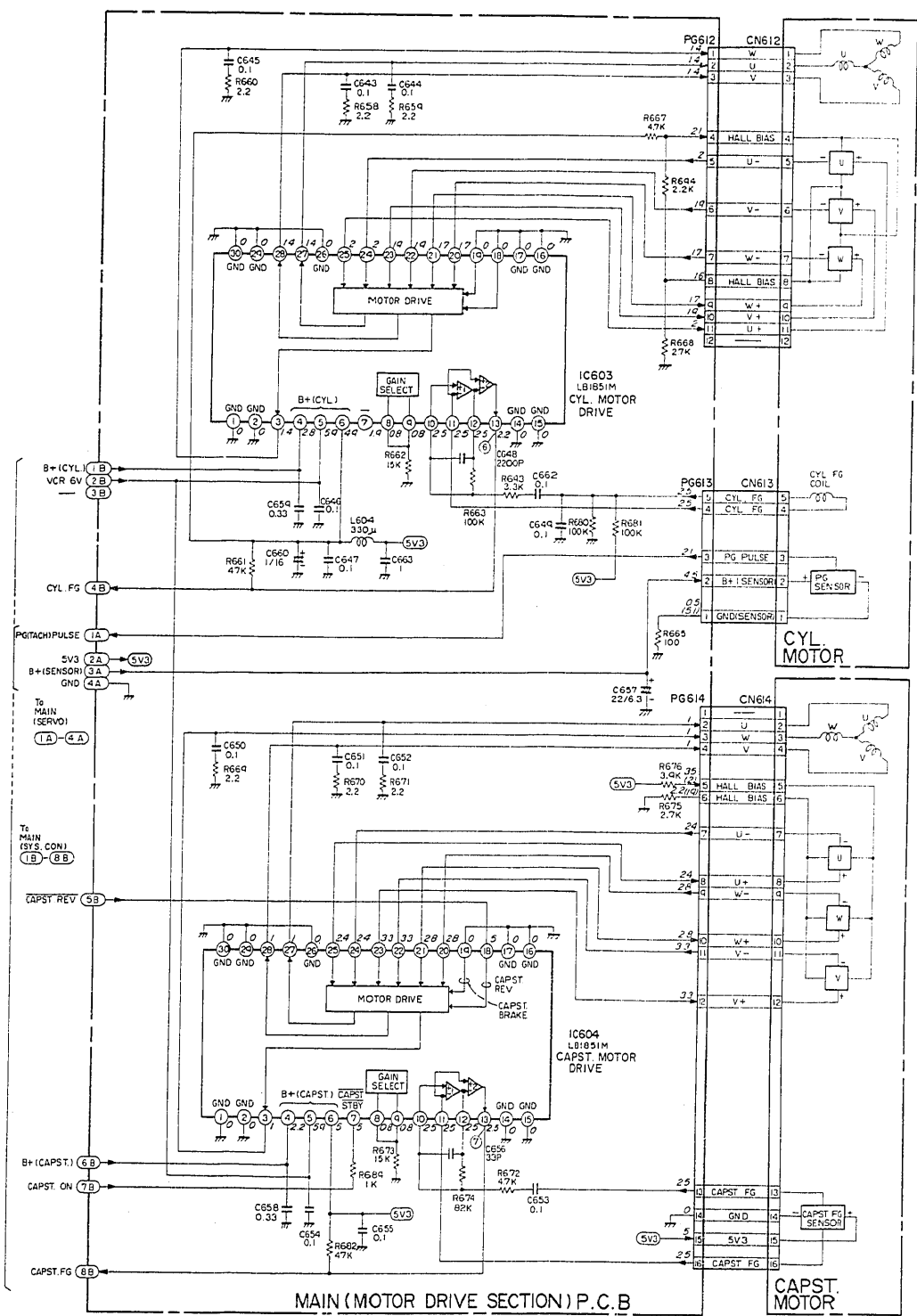
MAIN(AUDIO SECTION) SCHEMATIC



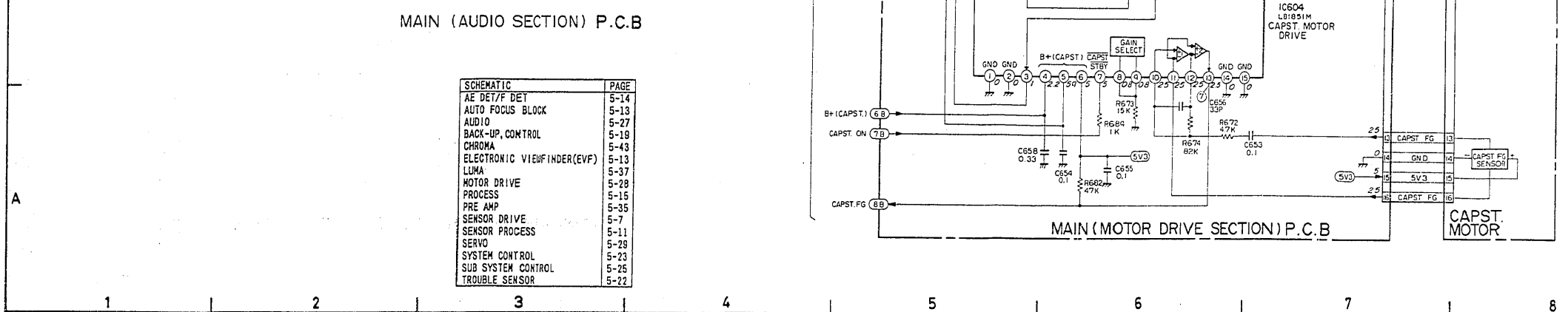
MAIN (AUDIO SECTION) P.C.B

SCHEMATIC	PAGE
AE DET/F DET	5-14
AUTO FOCUS BLOCK	5-13
AUDIO	5-27
BACK-UP, CONTROL	5-18
CHROMA	5-43
ELECTRONIC VIEWFINDER(EVF)	5-13
LUMA	5-37
MOTOR DRIVE	5-28
PROCESS	5-15
PRE AMP	5-35
SENSOR DRIVE	5-7
SENSOR PROCESS	5-11
SERVO	5-29
SYSTEM CONTROL	5-23
SUB SYSTEM CONTROL	5-25
TROUBLE SENSOR	5-22

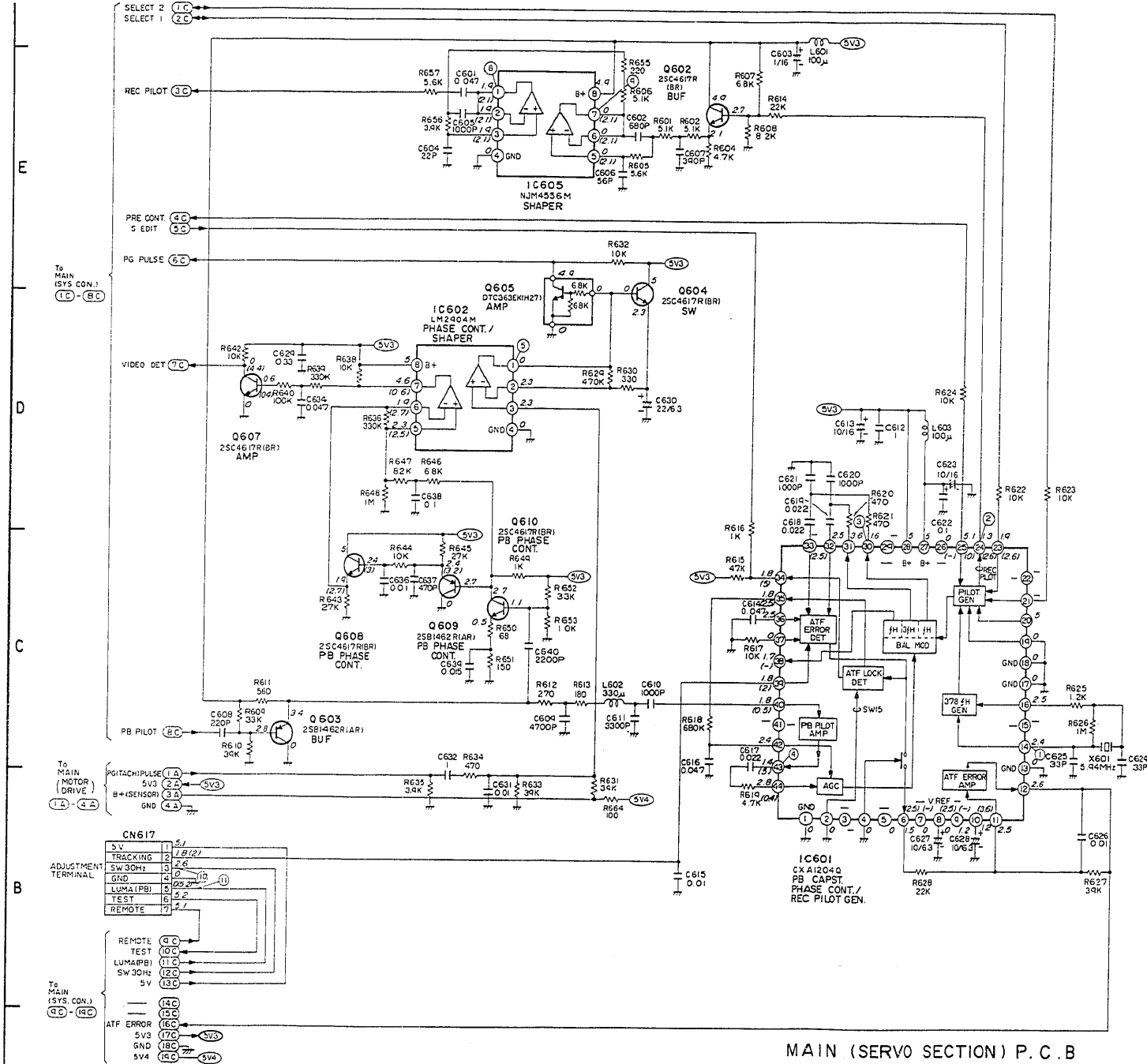
MAIN(MOTOR DRIVE SECTION) SCHEMATIC



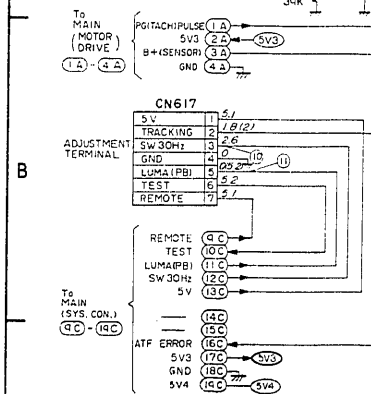
MAIN (MOTOR DRIVE SECTION) P.C.B



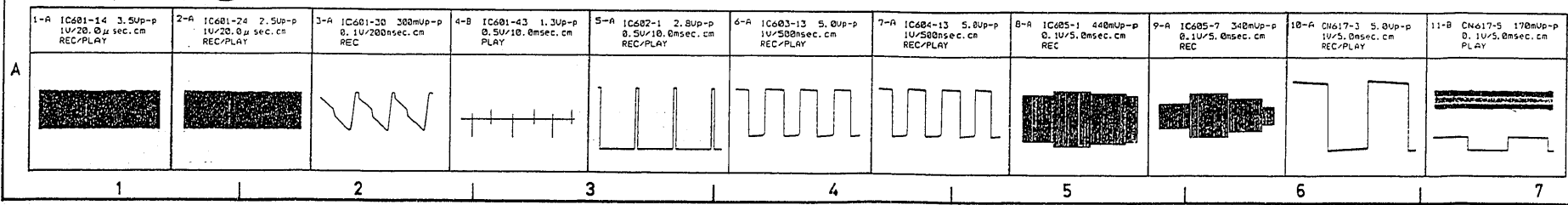
MAIN(SERVO SECTION) SCHEMATIC



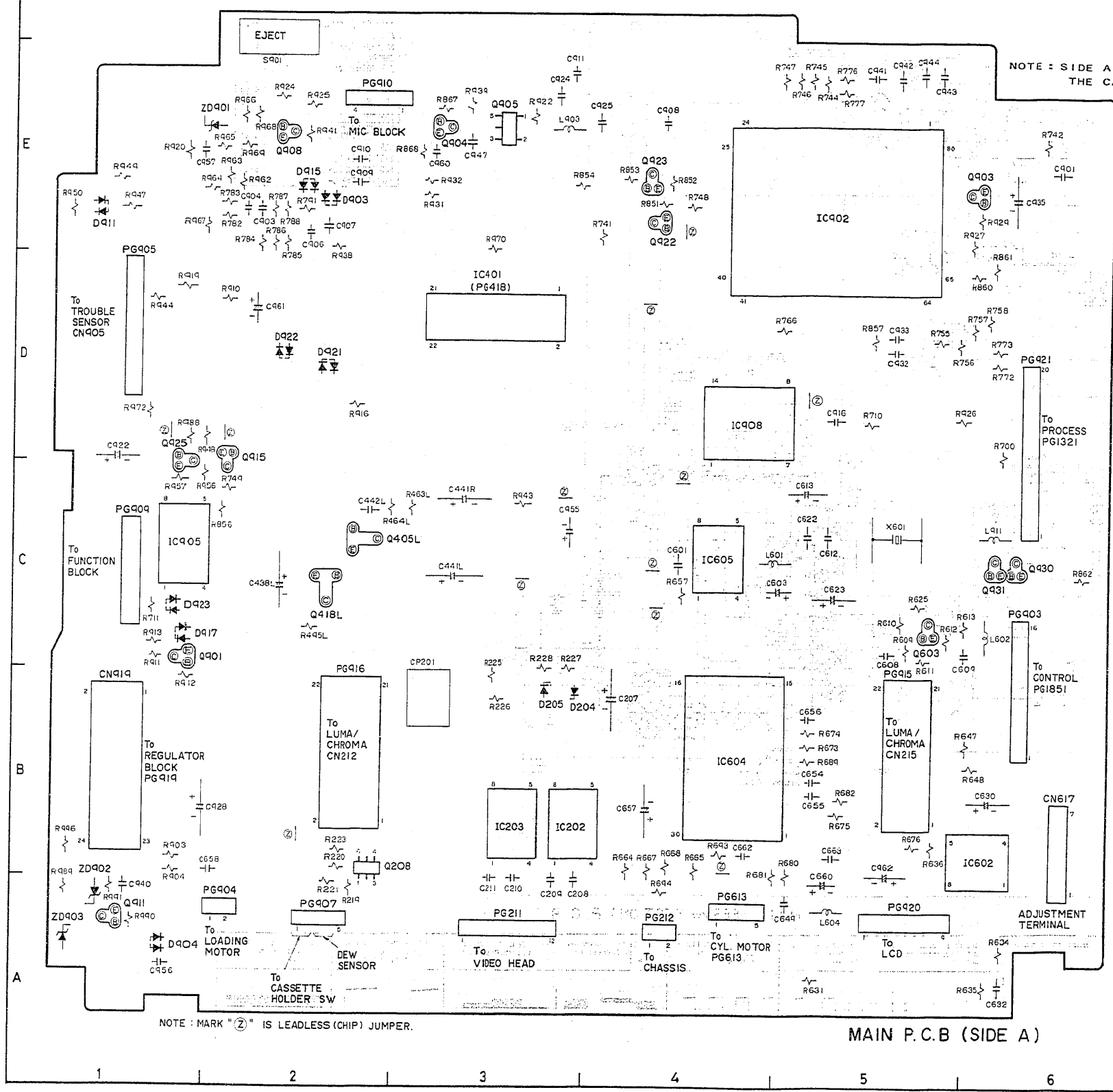
SCHEMATIC	PAGE
AE DET/F DET	5-14
AUTO FOCUS BLOCK	5-13
AUDIO	5-27
BACK-UP, CONTROL	5-19
CHROMA	5-43
ELECTRONIC VIEWFINDER(EVF)	5-13
LUMA	5-37
MOTOR DRIVE	5-28
PROCESS	5-15
PRE AMP	5-35
SENSOR DRIVE	5-7
SENSOR PROCESS	5-11
SERVO	5-29
SYSTEM CONTROL	5-23
SUB SYSTEM CONTROL	5-25
TROUBLE SENSOR	5-22



MAIN (SERVO SECTION) P. C. B



MAIN CIRCUIT BOARD (SIDE A)



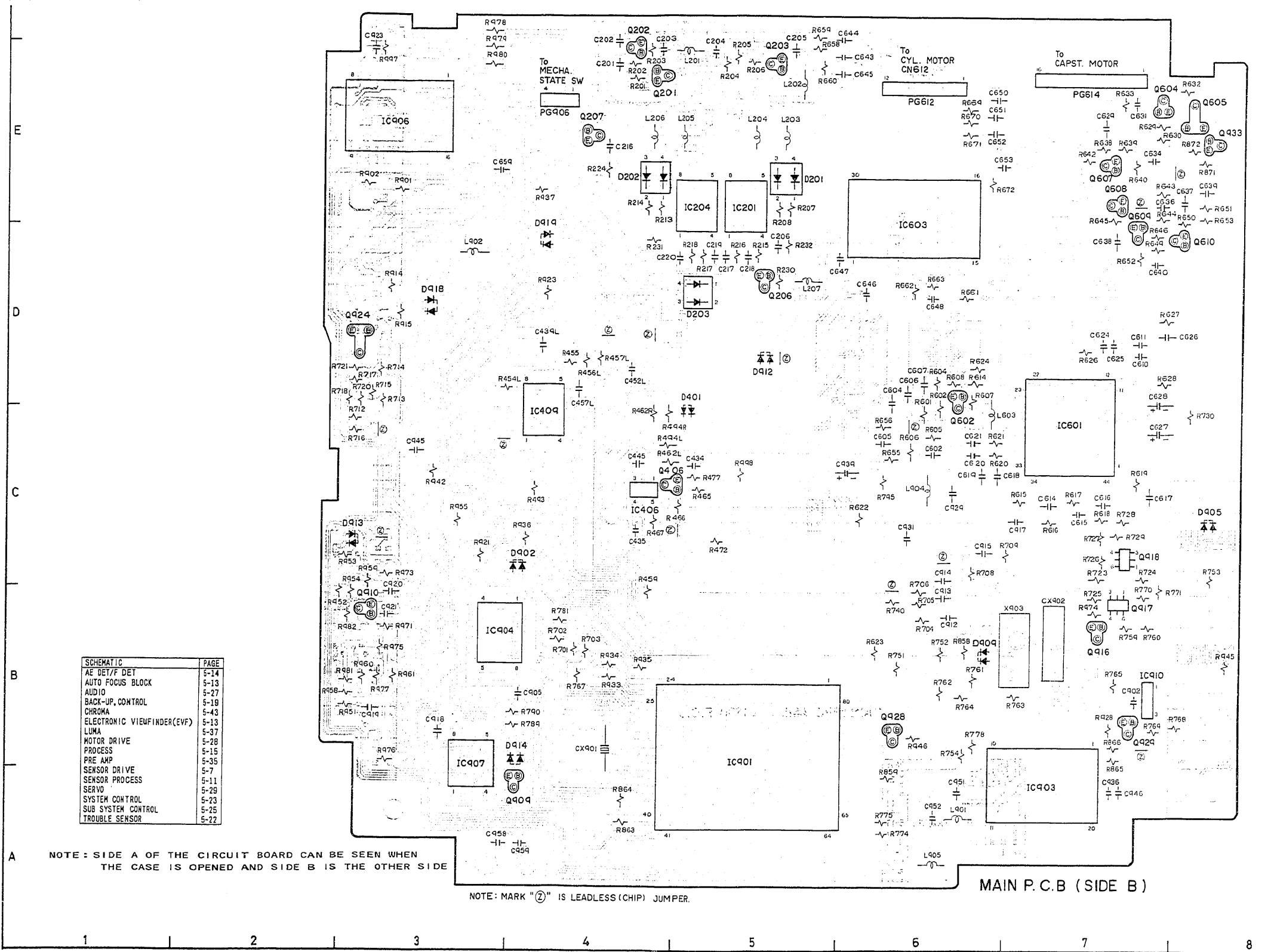
NOTE: SIDE A OF THE CIRCUIT BOARD CAN BE SEEN WHEN THE CASE IS OPENED AND SIDE B IS THE OTHER SIDE

NOTE: MARK "Z" IS LEADLESS (CHIP) JUMPER.

MAIN P.C.B (SIDE A)

SCHEMATIC	PAGE
AE DET/F DET	5-14
AUTO FOCUS BLOCK	5-13
AUDIO	5-27
BACK-UP, CONTROL	5-19
CHROMA	5-43
ELECTRONIC VIEWFINDER (EVF)	5-13
LUMA	5-37
MOTOR DRIVE	5-28
PROCESS	5-15
PRE AMP	5-35
SENSOR DRIVE	5-7
SENSOR PROCESS	5-11
SERVO	5-29
SYSTEM CONTROL	5-23
SUB SYSTEM CONTROL	5-25
TROUBLE SENSOR	5-22

MAIN CIRCUIT BOARD (SIDE B)



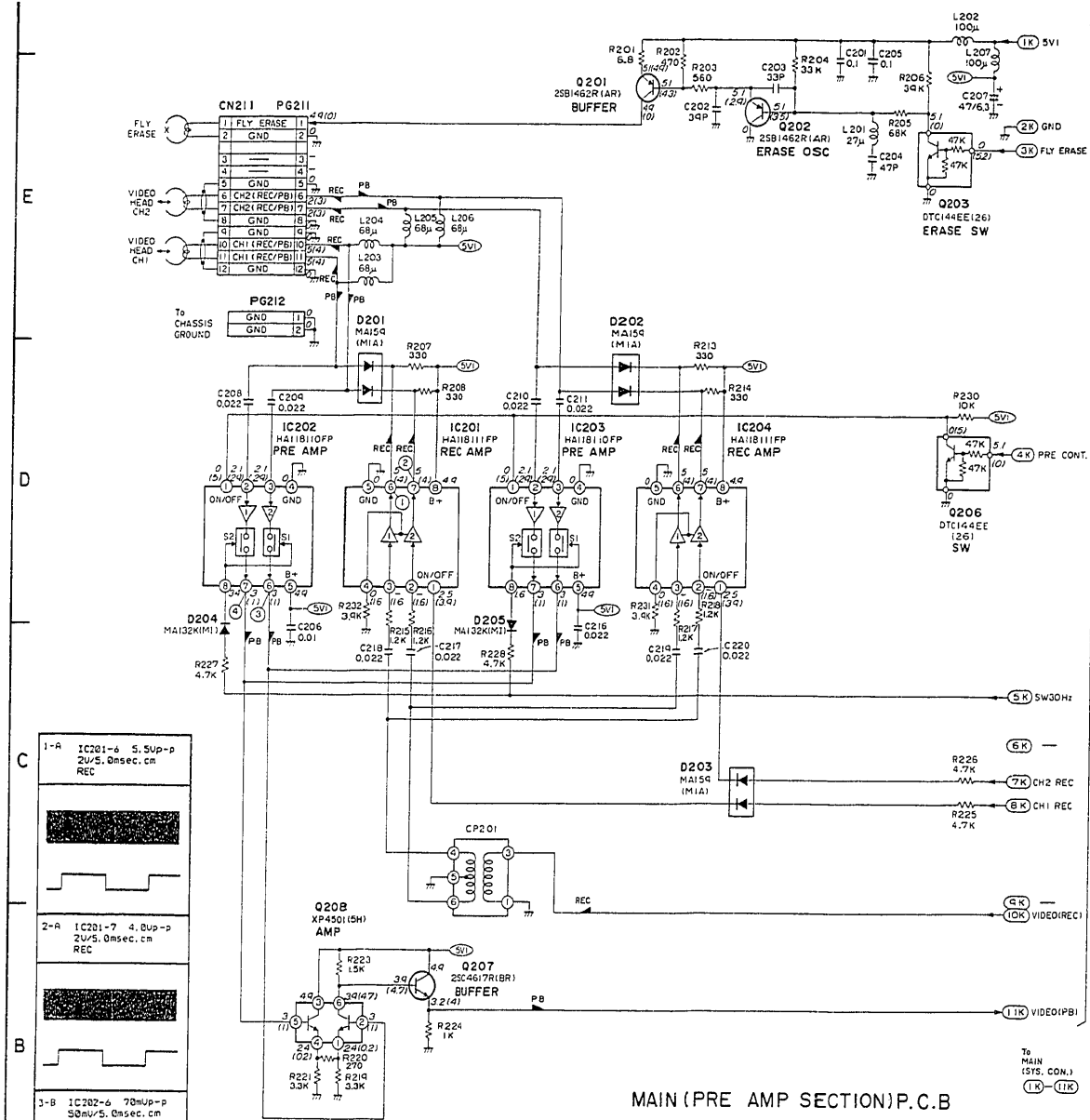
SCHEMATIC	PAGE
AE DET/F DET	5-14
AUTO FOCUS BLOCK	5-13
AUDIO	5-27
BACK-UP, CONTROL	5-19
CHROMA	5-43
ELECTRONIC VIEWFINDER(EVF)	5-13
LUMA	5-37
MOTOR DRIVE	5-28
PROCESS	5-15
PRE AMP	5-35
SENSOR DRIVE	5-7
SENSOR PROCESS	5-11
SERVO	5-29
SYSTEM CONTROL	5-23
SUB SYSTEM CONTROL	5-25
TROUBLE SENSOR	5-22

NOTE: SIDE A OF THE CIRCUIT BOARD CAN BE SEEN WHEN THE CASE IS OPENED AND SIDE B IS THE OTHER SIDE

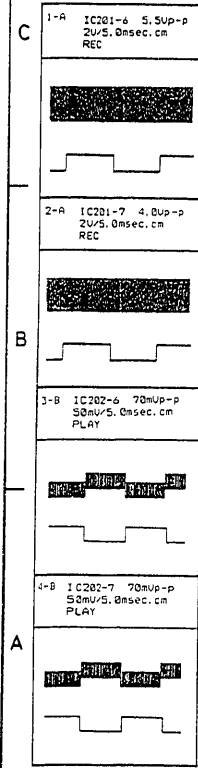
NOTE: MARK "②" IS LEADLESS (CHIP) JUMPER.

MAIN P.C.B (SIDE B)

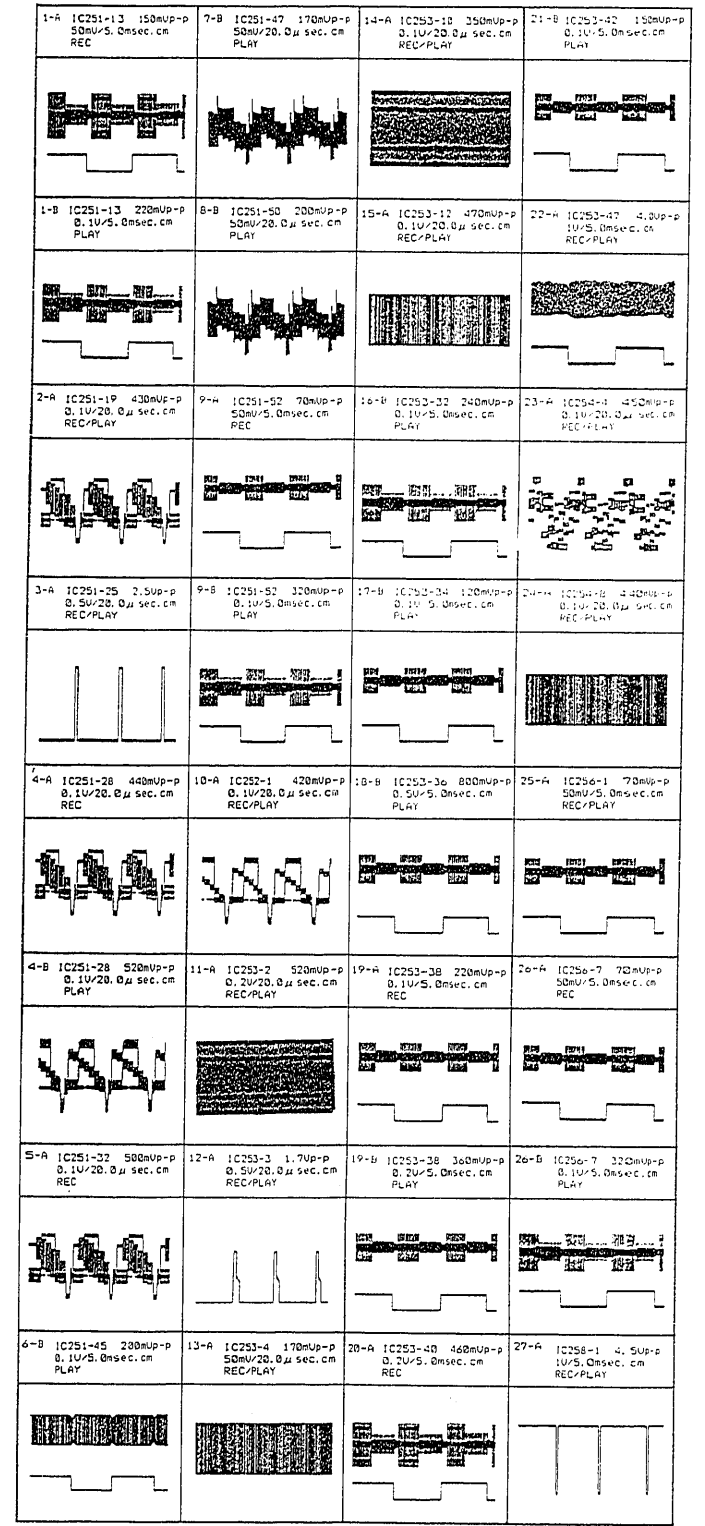
MAIN(PRE AMP SECTION) SCHEMATIC



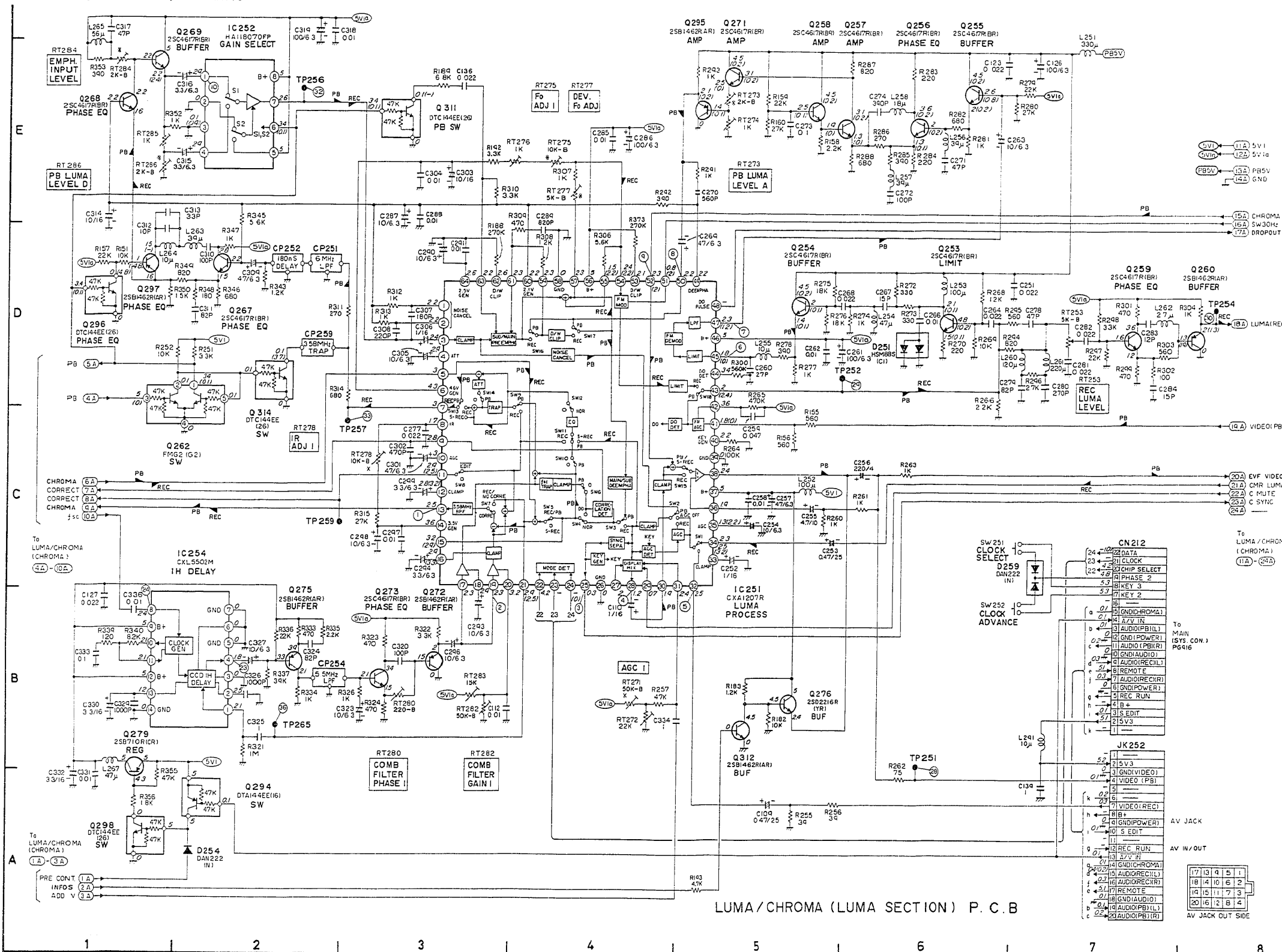
MAIN (PRE AMP SECTION) P.C.B



SCHEMATIC	PAGE
AE DET/F DET	5-14
AUTO FOCUS BLOCK	5-13
AUDIO	5-27
BACK-UP CONTROL	5-19
CHROMA	5-43
ELECTRONIC VIEWFINDER(EVF)	5-13
LUMA	5-37
MOTOR DRIVE	5-28
PROCESS	5-15
PRE AMP	5-35
SENSOR DRIVE	5-7
SENSOR PROCESS	5-11
SERVO	5-29
SYSTEM CONTROL	5-23
SUB SYSTEM CONTROL	5-25
TROUBLE SENSOR	5-22



LUMA/CHROMA(LUMA SECTION) SCHEMATIC



LUMA/CHROMA (LUMA SECTION) P. C. B

(11A) 5V1
 (12A) 5V1d
 (13A) PB5V
 (14A) GND

(15A) CHROMA
 (16A) SW30Hz
 (17A) DROPOUT

(18A) LUMA(REC)
 (19A) VIDEO(PB)

(20A) EVF VIDEO
 (21A) CMR LUMA
 (22A) C MUTE
 (23A) C SYNC

To LUMA/CHROMA (CHROMA)
 (24) - (102)

To MAIN (SYS. CON.) PGG16
 (1) - (16)

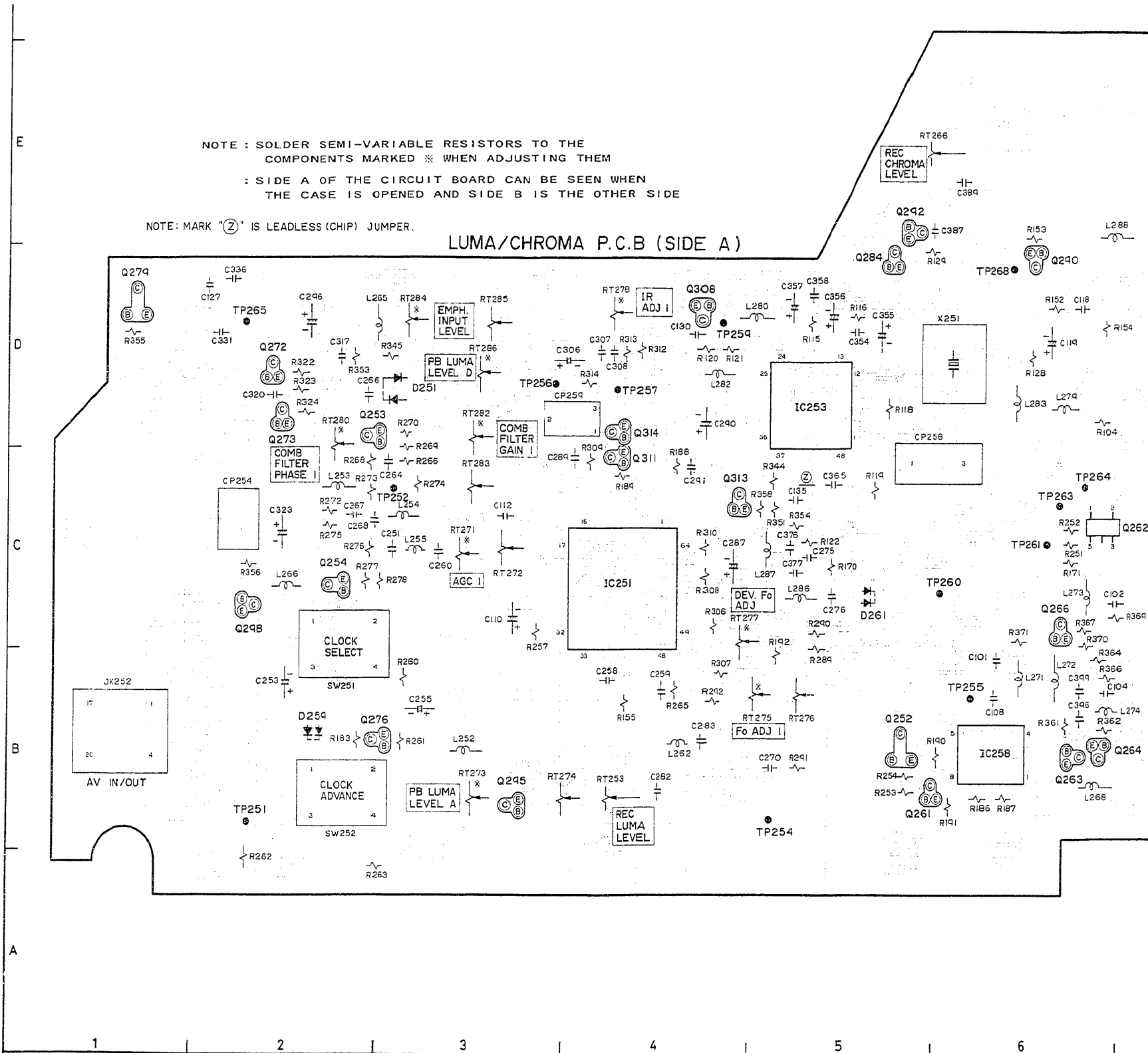
To LUMA/CHROMA (CHROMA)
 (11A) - (17A)

AV JACK
 AV IN/OUT

17	13	9	5	1
18	14	10	6	2
19	15	11	7	3
20	16	12	8	4

AV JACK OUT SIDE

LUMA/CHROMA CIRCUIT BOARD (SIDE A)



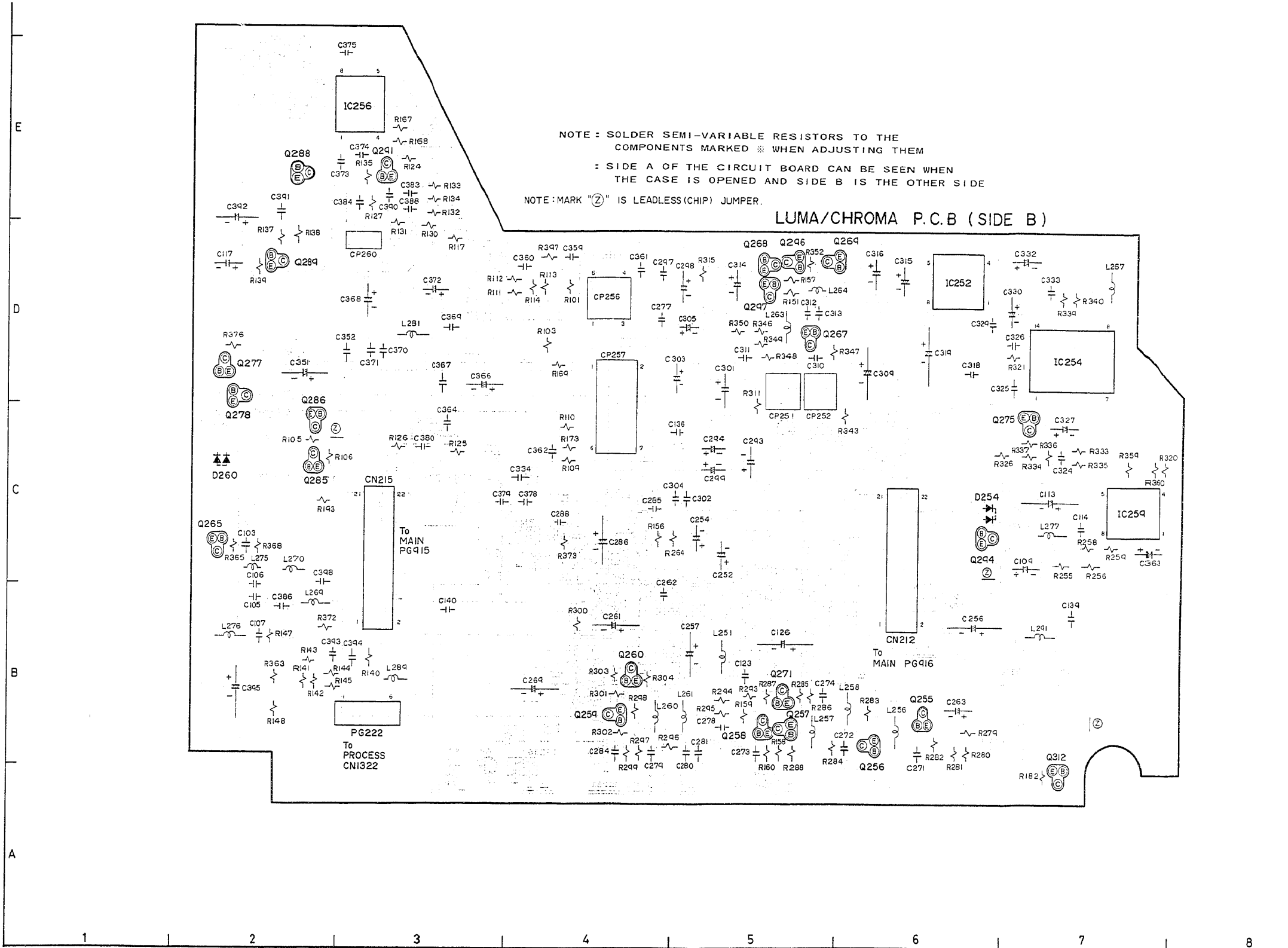
NOTE: SOLDER SEMI-VARIABLE RESISTORS TO THE COMPONENTS MARKED * WHEN ADJUSTING THEM
 : SIDE A OF THE CIRCUIT BOARD CAN BE SEEN WHEN THE CASE IS OPENED AND SIDE B IS THE OTHER SIDE

NOTE: MARK "Z" IS LEADLESS (CHIP) JUMPER.

LUMA/CHROMA P.C.B (SIDE A)

28-4 TP251 500mV-p-p 0.2u/20.0u sec. cm REC-PLAY	28-4 TP261 5.00V-p-p 10u/0.0msec. cm MEMORY
29-4 TP252 500mV-p-p 0.2u/20.0msec. cm REC	29-4 TP262 500mV-p-p 0.2u/20.0msec. cm REC
29-4 TP253 500mV-p-p 0.2u/20.0msec. cm PLAY	29-4 TP263 500mV-p-p 0.2u/20.0msec. cm REC-PLAY
30-4 TP254 500mV-p-p 0.2u/20.0msec. cm REC	30-4 TP264 500mV-p-p 0.2u/20.0msec. cm REC
31-4 TP255 500mV-p-p 0.2u/20.0msec. cm PLAY	31-4 TP265 500mV-p-p 0.2u/20.0msec. cm PLAY
32-4 TP256 500mV-p-p 0.2u/20.0msec. cm PLAY	32-4 TP266 500mV-p-p 0.2u/20.0msec. cm PLAY
33-4 TP257 500mV-p-p 0.2u/20.0msec. cm REC-PLAY	33-4 TP267 500mV-p-p 0.2u/20.0msec. cm REC-PLAY

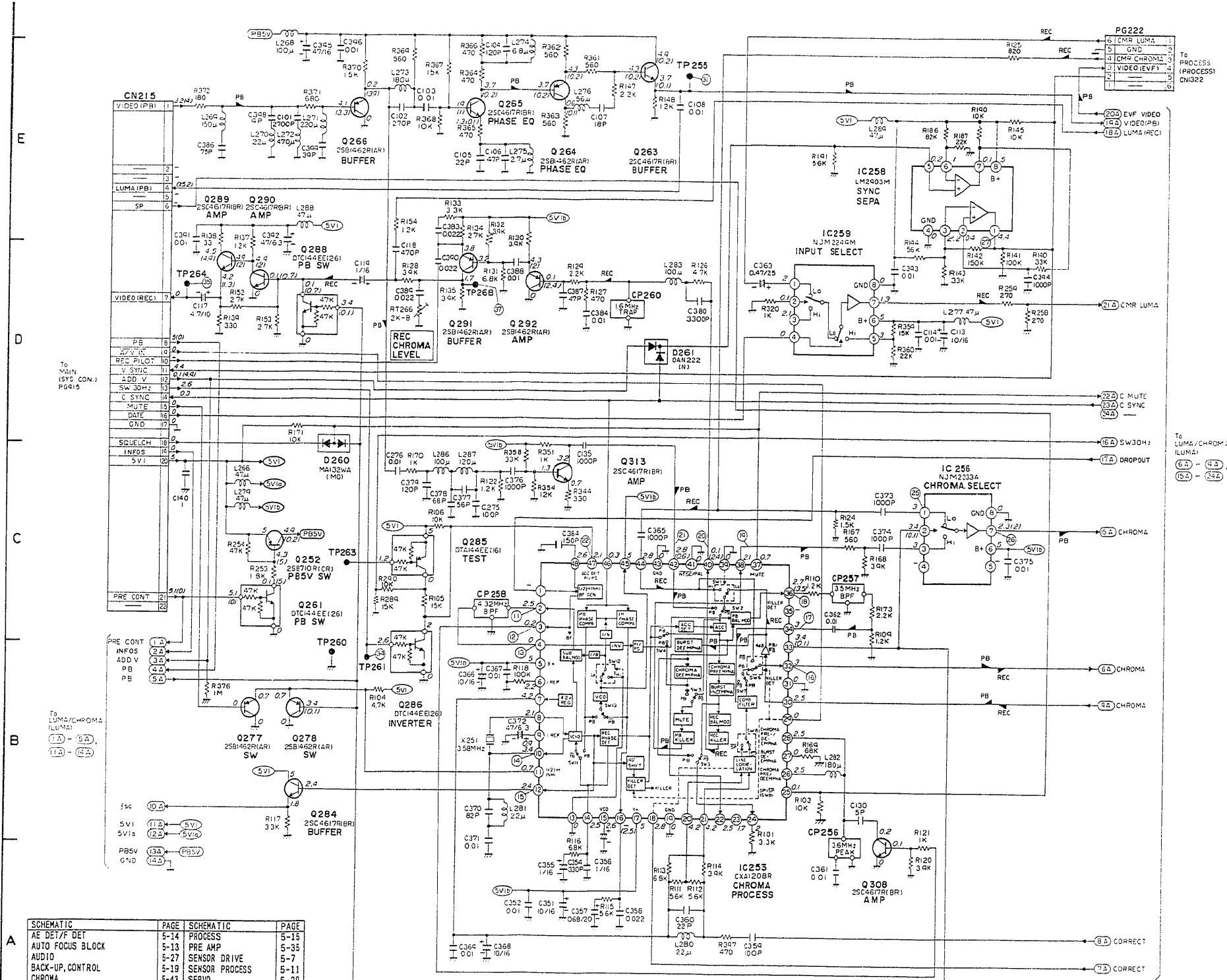
LUMA/CHROMA CIRCUIT BOARD (SIDE B)



NOTE : SOLDER SEMI-VARIABLE RESISTORS TO THE COMPONENTS MARKED * WHEN ADJUSTING THEM
 : SIDE A OF THE CIRCUIT BOARD CAN BE SEEN WHEN THE CASE IS OPENED AND SIDE B IS THE OTHER SIDE
 NOTE : MARK "Z" IS LEADLESS (CHIP) JUMPER.

LUMA/CHROMA P.C.B (SIDE B)

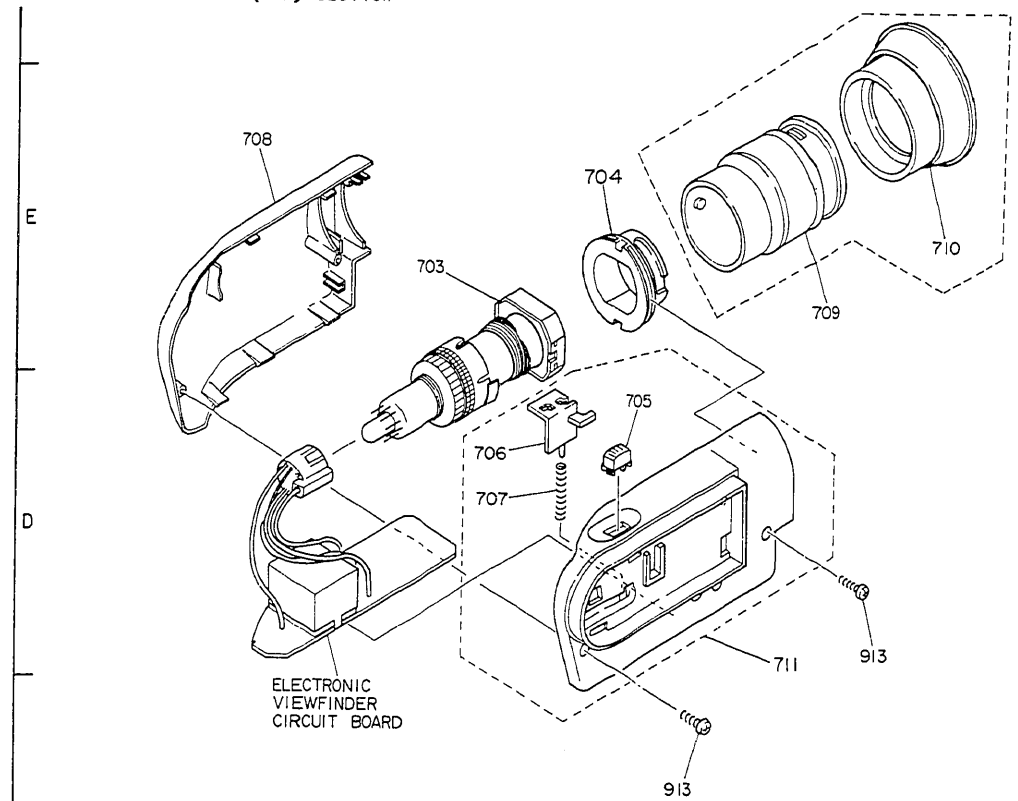
LUMA/CHROMA (CHROMA SECTION) SCHEMATIC



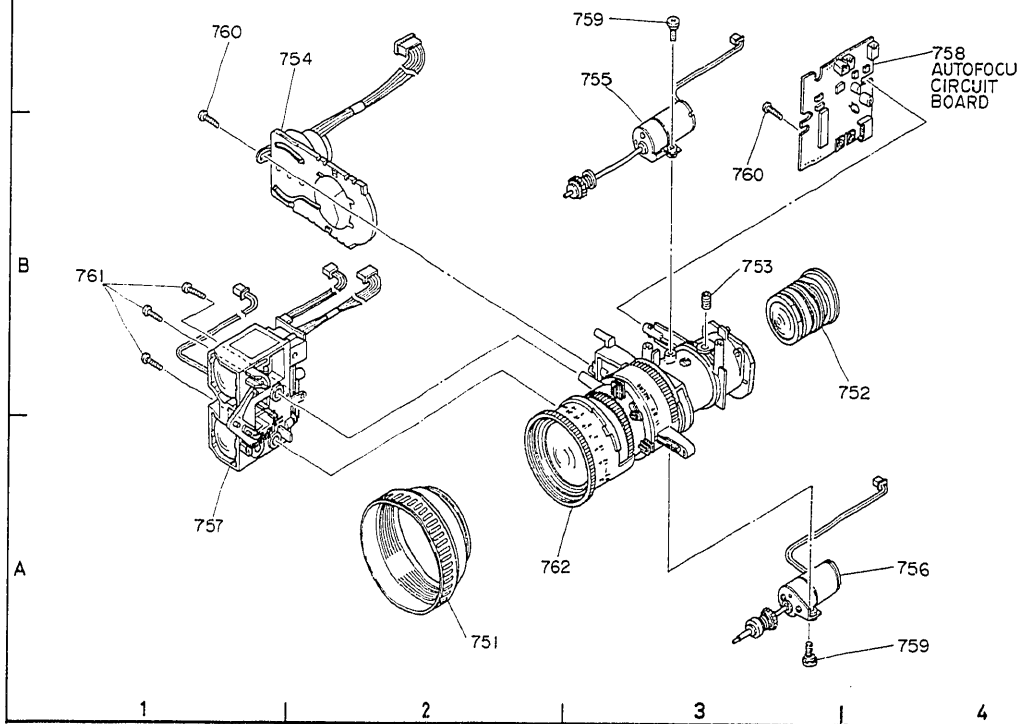
SCHEMATIC	PAGE	SCHEMATIC	PAGE
AE DET/F DET	5-14	PROCESS	5-15
AUTO FOCUS BLOCK	5-13	PRE AMP	5-35
AUDIO	5-27	SENSOR DRIVE	5-7
BACK-UP, CONTROL	5-19	SENSOR PROCESS	5-11
CHROMA	5-43	SERVO	5-28
ELECTRONIC VIEWFINDER (EVF)	5-13	SYSTEM CONTROL	5-23
LUMA	5-37	SUB SYSTEM CONTROL	5-25
MOTOR DRIVE	5-28	TROUBLE SENSOR	5-22

LUMA/CHROMA (CHROMA SECTION) P.C.B

ELECTRONIC VIEWFINDER (EVF) SECTION



LENS SECTION



SCREWS USED

SYMBOL No.	CONFIGURATION (COLOUR)	DIMENSION (mm)
242	(BLACK)	P 2 × 1.4
762	(BLACK)	PT 3 × 1.6
763	(SILVER)	SPECIAL
764	(BLACK)	PT 4 × 1.6
765	(BLACK)	PT 4 × 1.6
766	(BLACK)	SPECIAL
767	(BLACK)	SPECIAL
901	(BLACK)	BT 2 × 6
902	(BLACK)	B 2 × 3
903	(BLACK)	FT 2 × 6
904	(SILVER)	BT 2 × 6
905	(BLACK)	B 2 × 7
906	(SILVER)	BT 2 × 14
907		SPECIAL
908	(BLACK)	BT 1.7 × 5
951	(SILVER)	P 1.4 × 2
952	(BLACK)	P 1.4 × 1.6
954	(SILVER)	P 1.4 × 6
955		P 1.4 × 12
956		P 1.7 × 12
957		P 1.4 × 2.5
958	(SILVER)	P 2 × 3
959	(SILVER)	P 2 × 4
961	(BLACK)	F 1.4 × 2.2
965		SPECIAL (2 × 4)

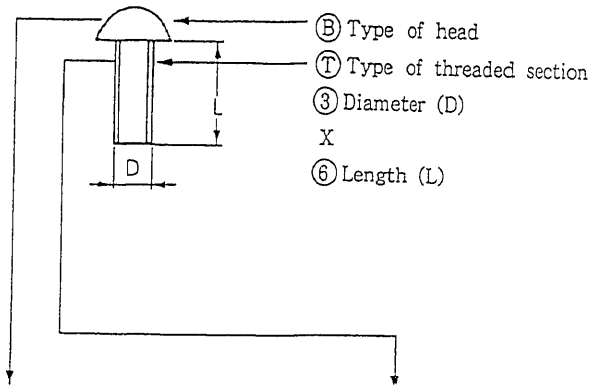
SYMBOL No.	CONFIGURATION (COLOUR)	DIMENSION (mm)
966	(BLACK)	P 1.7 × 4
967	(BLACK)	P 2 × 4

WASHERS USED

SYMBOL No.	CONFIGURATION	DIMENSION (mm)
206		O.D. : 3.0 I.D. : 1.2 t : 0.25
208		O.D. : 3.6 I.D. : 1.2 t : 0.25
225		O.D. : 3.2 I.D. : 1.35 t : 0.13
226		O.D. : 3.2 I.D. : 1.2 t : 0.25
238		O.D. : 3.6 I.D. : 1.2 t : 0.13
240		O.D. : 4.0 I.D. : 1.7 t : 0.25
241		O.D. : 2.5 I.D. : 0.8 t : 0.13
247		O.D. : 3.6 I.D. : 1.0 t : 0.25
248		O.D. : 1.8 I.D. : 0.8 t : 0.13
249		O.D. : 2.5 I.D. : 1.0 t : 0.25
257		O.D. : 2.5 I.D. : 0.8 t : 0.25
262		O.D. : 5.0 I.D. : 2.35 t : 0.25
293		O.D. : 3.6 I.D. : 1.4 t : 0.25

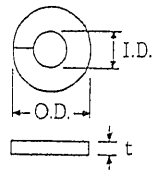
SCREW CLASSIFICATION

Example : BT3 x 6



Abbreviation	Name	Shape	Abbreviation	Name	Shape
No symbol	Brazier head		No symbol	Machine (clamps without tapping)	
P	Pan head		t	Tapping (clamps with tapping) Type 1	
B	Binding head		T	Tapping (clamps with tapping) Type 2	
O	Oval countersunk head		f	Forming tight (for metal)	
F	Flat countersunk head		Note Since the forming tight screw tightens while self tapping machine screws can be replaced by tapping screws.		

WASHER CLASSIFICATION



LUBRICATION

Lubrication points are shown in the exploded view diagrams by marks (S), (F).

Lubricants shown in the diagram are as follows.

- (S) Sonic slider oil (#1600)
- (F) Froil (G31-SAY)

CHAPTER 7 REPLACEMENT PARTS LIST

SYMBOL-NO	P-NO	DISCRIPTION	SYMBOL-NO	P-NO	DISCRIPTION
MECHANISM SECTION					
101	5422462	MICROPHONE	206	7786213	WASHER
102	6489282	LID	207	6347862	GEAR
104	6598792	CAP, AUTO FOCUS	208	7784687	WASHER
105	6442881	CAP, HOOD	209	6916383	GEAR
106	6443191	HOLDER	210	7472721	HOLDER, GEAR
107	4711196	CASE (R)	211	6347873	GEAR
108	4741581	BUTTON, TRIGER	212	6347881	GEAR
109	4750824	KNOB, TRIGGER	213	7471993	ARM
110	6528752	SPRING	214	7472024	LUCK
111	6811193	HOLDER	215	7474792	PLATE
112	4750691	KNOB, IRIS	216	7472007	ARM, OPERATION
113	6539925	SPRING	217	5610861	SWITCH, MODE
114	6594253	CAP, LID	218	5579301	MOTOR, LOADING
115	4711232	COVER, GRIP	219	6822651	GUIDE
116	7408701	NUT	220	7471973	SLIDER
117	4340821	SPACER	221	4522771	ROLLER
118	6443205	COVER, FRNOT	222	7472608	ARM
119	6443211	BASE, FRONT	223	7472733	STOPPER, BAND
120	6809251	PIECE, FIXED	224	7472513	ARM
121	6809261	PIECE, HOLD	225	4340244	WASHER
122	6811361	HOLDER	226	7787571	WASHER
123	6811173	SLIDER, EVF	227	7472893	ARM
124	7797264	SHOE	228	6552663	SPRING
125	5601913	SWITCH, ZOOM	229	6556433	SPRING
127	1379197	PFB ASSY HTS9505F	230	6556444	SPRING
128	4711921	CASE, BOTTOM	231	7472686	ARM
129	5601931	PSW UNIT	232	6440371	CAM, BRAKE
130	6523025	SPRING	233	6821272	BRAKE
131	7408712	PLATE	234	7472711	BAND, TENTION
132	7408723	PLATE	235	7139022	CHASSIS, SUB
133	4750433	KNOB, EJECT	236	7774942	E RING
134	7408732	PLATE	237	6526581	SPRING
135	4750444	SLIDER	238	4340248	WASHER
136	4750451	KNOB, POWER	239	7787575	POLYSLIDER WASHER
137	6443171	BASE, POWER	240	4340249	WASHER
138	6305731	SPRING	241	4340245	WASHER
139	6443182	LEVER, EJECT	242	4523783	SCREW
140	6443161	BASE, EJECT	243	6440362	GEAR
141	6529111	SPRING	244	6440341	GEAR
142	6487791	CAVER, BATTERY	245	6359041	BELT
144	7797081	BARCKET, SHOULDER	246	7795524	IDLER
145	4341491	SHEET	247	4340243	WASHER
146	7796454	SHOW, ACCESSARY	248	4340242	WASHER
147	4893984	HOLDER, SHOE	249	7787573	WASHER
148	4894442	BRACKET, FRONT	250	6821183	ARM
149	6811141	HOLDER, CBA	251	6552652	SPRING
150	6811131	HOLDER, CBA	252	6821263	ARM
151	6407882	HOLDER	253	7474816	BRACKET
152	5601952	SWITCH	254	7474971	BRACKET
153	6810901	HOLDER, FLEXIBLE	255	4580081	STOPPER
154	5274241	REGULATOR BLOCK	256	6821233	ARM
155	5316502	LCD UNIT	257	4340241	WASHER
156	4750423	KNOB, NEGA-POSI	258	6821285	DUMPER
157	6443312	COVER, FRONT	260	6416326	REEL, SUPPLY
158	4894961	PLATE	261	6416323	REEL, TAKE-UP
159	4341871	SHEET	262	7786621	POLYSLIDER WASHER
160	6443441	PLASTIC PIECE	263	6528982	PLATE
161	7406541	PLATE	264	6821333	RAIL, GUIDE
162	4342103	SPACER	265	7473363	HOLDER, ARM
202	7473853	HOLDER	266	6916691	BASE, GUIDE ROLLER (I)
203	7473861	BRACKET	267	4580121	SPACER
204	7473873	BRACKET	268	6916621	ARM
205	6347851	GEAR	269	4580301	HOLDER, REEL
			270	6524081	SPRING
			275	6916701	BASE, GUIDE ROLLER (O)

SYMBOL-NO	P-NO	DISCRIPTION
277	6821076	PLATE, GUIDE
278	6821094	RAIL
279	6821104	RAIL
280	6821111	COVER, BELT
281	7472212	ARM
285	6552625	SPRING
286	7472241	ARM
288	7472975	PRESSER ROLLER
289	6556731	SPRING
290	6822901	BASE OPERATION
291	5571861	MOTOR, CAPSTAN
292	6916641	BASE, CYLINDER
295	4342072	SHEET
296	4341772	HOLDER
298	7679783	WASHER
401	7473076	CASSETTE HOLDER ASSY
501	5436475	CYLINDER ASSY
504	5793831	BRUSH
601	6960561	LENS, ZOOM
602	6407891	HOLDER
603	5783131	FILTER
604	5318282	IC ICX026BK
605	6811062	LID, SENSOR
606	6597701	RUBBER
607	6811071	HOLDER, SENSOR
608	4892683	PLATE
610	6811162	FRAM
611	5274164	DC-DC CONVERTER
701	7056985	EVF ASSY
703	5319041	CRT
704	6810931	HOLDER, NECK
705	4741591	BUTTON
706	6811184	HOLDER
707	6523024	SPRING
708	4711505	CASE, UPPER
709	4711156	LENS, EVF
710	6443301	CAP, EYE
711	4711514	CASE, UPPER
751	6960921	HOOD
752	6960613	LENS, REAR
753	6954706	SCREW(3X6)
754	6960614	IRIS BLOCK
755	6960616	MOTOR, AUTO FOCUS
756	6960617	MOTOR, ZOOM
757	6960923	AUTO FOCUS BLOCK
758	1620321	PWB ASSY AUTO FOCUS
759	6960619	SCREW
760	6960622	SCREW(2X3)
761	6960624	SCREW(2X4.5)
901	7775946	SCREW(2X6)
902	7775963	SCREW(2X3)
903	8724105	SCREW(2X5)
904	7775892	SCREW
905	7784011	SCREW, 2X6
906	8612114	SCREW(2X14)
907	7775881	SCREW(2X5)
908	8639110	SCREW
909	8691108	SCREW(2X8)
910	7775944	SCREW(2X5)
911	8691106	SCREW(2X6)
912	8741104	SCREW(2X4)
913	8619003	SCREW 1.7X5
914	7775946	SCREW(2X6)
915	8691110	SCREW(2X4)
951	7775921	SCREW(1.4X2)

SYMBOL-NO	P-NO	DISCRIPTION
952	7775912	SCREW(1.4X1.6)
954	8712974	SCREW(1.4X6)
955	7773531	SCREW
956	7773541	SCREW
957	7775922	SCREW(1.4X2.5)
958	8700268	SCREW(1.7X3)
959	8711104	SCREW 2X4
967	7783153	SCREW(2X4)
ACCESSORIES		
4702601		OPERATING GUIDE
5699441		AC PLUG ADAPTER
4130965		AC, ADAPTOR
4131501		POWER CONNECTOR
4131013		STRAP
4131694		RF CONVERTER
5857961		COAXIAL RF CABLE
5687872		TRANSFORMER(300-TO-75 OHM)
5860791		AUDIO/VIDEO INPUT CABLE
4131663		SHOULDER STRAP
5615222		REMOTE HAND SET
VTR SECTION		
C 101	0202115	CERAMIC CHIP 2700PF+-10% 50V
C 102	0202059	CERAMIC CHIP 2700PF+-5% 50V
C 103	0202127	CERAMIC CHIP 0.01UF+80-20% 50V
C 104	0202055	CERAMIC CHIP 120PF+-5% 50V
C 105	0202045	CERAMIC DISC 22PF+-5% 50V
C 106	0202049	CERAMIC DISC 47PF+-5% 50V
C 107	0202044	CERAMIC CHIP 18PF+-5% 50V
C 108	0202127	CERAMIC CHIP 0.01UF+80-20% 50V
C 112	0202127	CERAMIC CHIP 0.01UF+80-20% 50V
C 114	0202127	CERAMIC CHIP 0.01UF+80-20% 50V
C 118	0202105	CERAMIC CHIP 470PF+-10% 50V
C 123	0202129	CERAMIC CHIP 0.022UF+80-20% 25V
C 127	0202129	CERAMIC CHIP 0.022UF+80-20% 25V
C 130	0202035	CERAMIC CHIP 5PF+-0.25% 50V
C 135	0202109	CERAMIC CHIP 1000PF+-10% 50V
C 136	0202129	CERAMIC CHIP 0.022UF+80-20% 25V
C 139	0202146	CERAMIC CHIP 1.0UF+80-20% 16V
C 140	0202146	CERAMIC CHIP 1.0UF+80-20% 16V
C 201	0202098	CERAMIC CHIP 0.1UF+80-20% 16V
C 202	0202048	CERAMIC DISC 39PF+-5% 50V
C 203	0202047	CERAMIC CHIP 33PF+-5% 50V
C 204	0202049	CERAMIC DISC 47PF+-5% 50V
C 205	0202098	CERAMIC CHIP 0.1UF+80-20% 16V
C 206	0202127	CERAMIC CHIP 0.01UF+80-20% 50V
C 208	0202129	CERAMIC CHIP 0.022UF+80-20% 25V
C 209	0202129	CERAMIC CHIP 0.022UF+80-20% 25V
C 210	0202129	CERAMIC CHIP 0.022UF+80-20% 25V
C 211	0202129	CERAMIC CHIP 0.022UF+80-20% 25V
C 216	0202129	CERAMIC CHIP 0.022UF+80-20% 25V
C 217	0202129	CERAMIC CHIP 0.022UF+80-20% 25V
C 218	0202129	CERAMIC CHIP 0.022UF+80-20% 25V
C 219	0202129	CERAMIC CHIP 0.022UF+80-20% 25V
C 220	0202129	CERAMIC CHIP 0.022UF+80-20% 25V
C 251	0202129	CERAMIC CHIP 0.022UF+80-20% 25V
C 258	0202127	CERAMIC CHIP 0.01UF+80-20% 50V
C 259	0202096	CERAMIC CHIP 0.047UF+80-20% 16V
C 260	0202046	CERAMIC CHIP 27PF+-5% 50V
C 262	0202127	CERAMIC CHIP 0.01UF+80-20% 50V
C 264	0202129	CERAMIC CHIP 0.022UF+80-20% 25V
C 266	0202127	CERAMIC CHIP 0.01UF+80-20% 50V
C 267	0202043	CERAMIC DISC 15PF+-5% 50V
C 268	0202129	CERAMIC CHIP 0.022UF+80-20% 25V

SYMBOL-NO	P-NO	DISCRIPTION
C 270	0202106	CERAMIC CHIP 560PF+-10% 50V
C 271	0202049	CERAMIC DISC 47PF+-5% 50V
C 272	0202054	CERAMIC CHIP 100PF+-5% 50V
C 273	0202098	CERAMIC CHIP 0.1UF+80-20% 16V
C 274	0202104	CERAMIC CHIP 390PF+-10% 50V
C 275	0202054	CERAMIC CHIP 100PF+-5% 50V
C 276	0202127	CERAMIC CHIP 0.01UF+80-20% 50V
C 277	0202129	CERAMIC CHIP 0.022UF+80-20% 25V
C 278	0202049	CERAMIC DISC 47PF+-5% 50V
C 279	0202053	CERAMIC DISC 82PF+-5% 50V
C 280	0202059	CERAMIC CHIP 270PF+-5% 50V
C 281	0202129	CERAMIC CHIP 0.022UF+80-20% 25V
C 282	0202129	CERAMIC CHIP 0.022UF+80-20% 25V
C 283	0202042	CERAMIC CHIP 12PF+-5% 50V
C 284	0202043	CERAMIC DISC 15PF+-5% 50V
C 285	0202127	CERAMIC CHIP 0.01UF+80-20% 50V
C 288	0202127	CERAMIC CHIP 0.01UF+80-20% 50V
C 289	0202166	CERAMIC CHIP 820PF+-5% 50V
C 291	0202127	CERAMIC CHIP 0.01UF+80-20% 50V
C 297	0202127	CERAMIC CHIP 0.01UF+80-20% 50V
C 302	0202105	CERAMIC CHIP 470PF+-10% 50V
C 304	0202127	CERAMIC CHIP 0.01UF+80-20% 50V
C 307	0202057	CERAMIC CHIP 180PF+-5% 50V
C 308	0202058	CERAMIC CHIP 220PF+-5% 50V
C 310	0202054	CERAMIC CHIP 100PF+-5% 50V
C 311	0202053	CERAMIC DISC 82PF+-5% 50V
C 312	0202041	CERAMIC CHIP 10PF+-5% 50V
C 313	0202047	CERAMIC CHIP 33PF+-5% 50V
C 317	0202049	CERAMIC DISC 47PF+-5% 50V
C 318	0202127	CERAMIC CHIP 0.01UF+80-20% 50V
C 320	0202054	CERAMIC CHIP 100PF+-5% 50V
C 324	0202053	CERAMIC DISC 82PF+-5% 50V
C 325	0202146	CERAMIC CHIP 1.0UF+80-20% 16V
C 326	0202109	CERAMIC CHIP 1000PF+-10% 50V
C 329	0202109	CERAMIC CHIP 1000PF+-10% 50V
C 331	0202127	CERAMIC CHIP 0.01UF+80-20% 50V
C 333	0202098	CERAMIC CHIP 0.1UF+80-20% 16V
C 334	0202146	CERAMIC CHIP 1.0UF+80-20% 16V
C 336	0202127	CERAMIC CHIP 0.01UF+80-20% 50V
C 352	0202127	CERAMIC CHIP 0.01UF+80-20% 50V
C 354	0202061	CERAMIC CHIP 330PF+-5% 50V
C 358	0202129	CERAMIC CHIP 0.022UF+80-20% 25V
C 359	0202054	CERAMIC CHIP 100PF+-5% 50V
C 360	0202045	CERAMIC DISC 22PF+-5% 50V
C 361	0202127	CERAMIC CHIP 0.01UF+80-20% 50V
C 362	0202127	CERAMIC CHIP 0.01UF+80-20% 50V
C 364	0201099	CERAMIC CHIP 150PF+-5% 50V
C 365	0202109	CERAMIC CHIP 1000PF+-10% 50V
C 367	0202127	CERAMIC CHIP 0.01UF+80-20% 50V
C 369	0202127	CERAMIC CHIP 0.01UF+80-20% 50V
C 370	0202053	CERAMIC DISC 82PF+-5% 50V
C 371	0202127	CERAMIC CHIP 0.01UF+80-20% 50V
C 373	0202109	CERAMIC CHIP 1000PF+-10% 50V
C 374	0202109	CERAMIC CHIP 1000PF+-10% 50V
C 375	0202127	CERAMIC CHIP 0.01UF+80-20% 50V
C 376	0202109	CERAMIC CHIP 1000PF+-10% 50V
C 377	0202051	CERAMIC CHIP 56PF+-5% 50V
C 378	0202052	CERAMIC DISC 68PF+-5% 50V
C 379	0202055	CERAMIC CHIP 120PF+-5% 50V
C 380	0202116	CERAMIC CHIP 3300PF+-10% 50V
C 383	0202129	CERAMIC CHIP 0.022UF+80-20% 25V
C 384	0202127	CERAMIC CHIP 0.01UF+80-20% 50V
C 386	0202158	CERAMIC DISC 75PF+-5% 50V
C 387	0202049	CERAMIC DISC 47PF+-5% 50V
C 388	0202127	CERAMIC CHIP 0.01UF+80-20% 50V

SYMBOL-NO	P-NO	DISCRIPTION
C 389	0202129	CERAMIC CHIP 0.022UF+80-20% 25V
C 390	0202129	CERAMIC CHIP 0.022UF+80-20% 25V
C 391	0202127	CERAMIC CHIP 0.01UF+80-20% 50V
C 393	0202127	CERAMIC CHIP 0.01UF+80-20% 50V
C 394	0202023	CERAMIC CHIP 1000PF+-2% 50V
C 396	0202127	CERAMIC CHIP 0.01UF+80-20% 50V
C 398	0202039	CERAMIC CHIP 9PF+-0.5% 50V
C 399	0202048	CERAMIC DISC 39PF+-5% 50V
C 434	0202127	CERAMIC CHIP 0.01UF+80-20% 50V
C 435	0202127	CERAMIC CHIP 0.01UF+80-20% 50V
C 439L	0209976	CERAMIC CHIP 0.01UF+80-20% 16V
C 442L	0202098	CERAMIC CHIP 0.1UF+80-20% 16V
C 445	0202098	CERAMIC CHIP 0.1UF+80-20% 16V
C 452L	0202114	CERAMIC CHIP 2200PF+-10% 50V
C 457L	0202146	CERAMIC CHIP 1.0UF+80-20% 16V
C 601	0201107	CERAMIC CHIP 0.047UF+-10% 25V
C 602	0202157	CERAMIC CHIP 680PF+-2% 50V
C 604	0202156	CERAMIC CHIP 22PF+-2% 50V
C 605	0202023	CERAMIC CHIP 1000PF+-2% 50V
C 606	0202022	CERAMIC CHIP 56PF+-2% 50V
C 607	0202015	CERAMIC CHIP 390PF+-2% 50V
C 608	0202058	CERAMIC CHIP 220PF+-5% 50V
C 609	0202118	CERAMIC CHIP 4700PF+-10% 25V
C 610	0202109	CERAMIC CHIP 1000PF+-10% 50V
C 611	0202116	CERAMIC CHIP 3300PF+-10% 50V
C 612	0202146	CERAMIC CHIP 1.0UF+80-20% 16V
C 614	0201107	CERAMIC CHIP 0.047UF+-10% 25V
C 615	0202127	CERAMIC CHIP 0.01UF+80-20% 50V
C 616	0201107	CERAMIC CHIP 0.047UF+-10% 25V
C 617	0201065	CERAMIC CHIP 0.022UF+-10% 25V
C 618	0201065	CERAMIC CHIP 0.022UF+-10% 25V
C 619	0201065	CERAMIC CHIP 0.047UF+-10% 25V
C 620	0202109	CERAMIC CHIP 1000PF+-10% 50V
C 621	0202109	CERAMIC CHIP 1000PF+-10% 50V
C 622	0201069	CERAMIC CHIP 0.1UF+80-20% 25V
C 624	0202089	CERAMIC CHIP 33PF+-5% 50V
C 625	0202089	CERAMIC CHIP 33PF+-5% 50V
C 626	0201007	CERAMIC CHIP 0.1UF+-20% 50V
C 629	0209964	CERAMIC CHIP 0.33UF+80-20% 16V
C 631	0202127	CERAMIC CHIP 0.01UF+80-20% 50V
C 632	0202146	CERAMIC CHIP 1.0UF+80-20% 16V
C 634	0201107	CERAMIC CHIP 0.047UF+-10% 25V
C 636	0202127	CERAMIC CHIP 0.01UF+80-20% 50V
C 637	0201039	CERAMIC CHIP 470PF+-5% 50V
C 638	0202141	CERAMIC CHIP 0.1UF+-10% 25V
C 639	0201008	CERAMIC CHIP 0.015UF+-20% 50V
C 640	0202114	CERAMIC CHIP 2200PF+-10% 50V
C 643	0202141	CERAMIC CHIP 0.1UF+-10% 25V
C 644	0202141	CERAMIC CHIP 0.1UF+-10% 25V
C 645	0202141	CERAMIC CHIP 0.1UF+-10% 25V
C 646	0202098	CERAMIC CHIP 0.1UF+80-20% 16V
C 647	0202098	CERAMIC CHIP 0.1UF+80-20% 16V
C 648	0202114	CERAMIC CHIP 2200PF+-10% 50V
C 649	0202098	CERAMIC CHIP 0.1UF+80-20% 16V
C 650	0202141	CERAMIC CHIP 0.1UF+-10% 25V
C 651	0202141	CERAMIC CHIP 0.1UF+-10% 25V
C 652	0202141	CERAMIC CHIP 0.1UF+-10% 25V
C 653	0202098	CERAMIC CHIP 0.1UF+80-20% 16V
C 654	0202098	CERAMIC CHIP 0.1UF+80-20% 16V
C 655	0202098	CERAMIC CHIP 0.1UF+80-20% 16V
C 656	0202047	CERAMIC CHIP 33PF+-5% 50V
C 658	0209964	CERAMIC CHIP 0.33UF+80-20% 16V
C 659	0209964	CERAMIC CHIP 0.33UF+80-20% 16V
C 662	0202098	CERAMIC CHIP 0.1UF+80-20% 16V
C 663	0202146	CERAMIC CHIP 1.0UF+80-20% 16V

SYMBOL-NO	P-NO	DISCRIPTION
RT 271	5040089	SEMI VARIABLE 50KOHM
RT 272	0104175	CHIP RESISTOR 22KOHM+-10% 1/8W
RT 273	5040084	SEMI VARIABLE 2KOHM
RT 274	0104157	CHIP RESISTOR 1KOHM+-10% 1/8W
RT 275	5040086	SEMI VARIABLE 10KOHM
RT 276	0104157	CHIP RESISTOR 1KOHM+-10% 1/8W
RT 277	5040085	SEMI VARIABLE 5KOHM
RT 278	5040086	SEMI VARIABLE 10KOHM
RT 280	5040081	SEMI VARIABLE 220 OHM
RT 282	5040089	SEMI VARIABLE 50KOHM
RT 283	0104173	CHIP RESISTOR 15KOHM+-10% 1/8W
RT 284	5040084	SEMI VARIABLE 2KOHM
RT 285	0104157	CHIP RESISTOR 1KOHM+-10% 1/8W
RT 286	5040084	SEMI VARIABLE 2KOHM
D 091	5382221	LED PLT-462T3
D 201	5337041	DIODE MA159
D 202	5337041	DIODE MA159
D 203	5337041	DIODE MA159
D 204	5337353	DIODE MA132K
D 205	5337353	DIODE MA132K
D 251	5339181	DIODE HSM88S
D 254	5337421	DIODE DAN222
D 259	5337421	DIODE DAN222
D 260	5337352	DIODE MA132WA
D 261	5337421	DIODE DAN222
D 401	5337352	DIODE MA132WA
D 902	5337421	DIODE DAN222
D 903	5337421	DIODE DAN222
D 904	5337352	DIODE MA132WA
D 905	5337421	DIODE DAN222
D 909	5337421	DIODE DAN222
D 911	5337422	DIODE DA221
D 912	5337353	DIODE MA132K
D 913	5337422	DIODE DA221
D 914	5337352	DIODE MA132WA
D 915	5337352	DIODE MA132WA
D 917	5337422	DIODE DA221
D 918	5337422	DIODE DA221
D 919	5337422	DIODE DA221
D 921	5337422	DIODE DA221
D 922	5337422	DIODE DA221
D 923	5337422	DIODE DA221
IC 201	1351221	IC HA11811FP
IC 202	1351211	IC HA11811OFF
IC 203	1351211	IC HA11811OFF
IC 204	1351221	IC HA11811FP
IC 251	1351971	IC CXA1207R
IC 252	1350041	IC HA118070
IC 253	1352001	IC CXA1208R
IC 254	1351942	IC CXL5502M
IC 256	1350063	IC NJM2233AM
IC 258	5352723	IC LM2903M
IC 259	1352031	IC NJM2249M
IC 401	1379197	IC FWB ASSY HTS9505F
IC 406	5305831	IC TCT508
IC 409	1351393	IC M5218FP
IC 601	1361811	IC CXA1204Q
IC 602	5355512	IC LM2904M
IC 603	5307052	IC LB1851
IC 604	5307052	IC LB1851M
IC 605	5355571	IC NJM4558M
IC 901	1355451	IC CXP80116Q-546Q
IC 902	1355433	IC UPD75308G-A26
IC 903	1352021	IC UPD6451A
IC 904	1351601	IC MM1028BF

SYMBOL-NO	P-NO	DISCRIPTION
IC 905	1354281	IC BR93C46F
IC 906	5304281	IC TA7291F
IC 907	5352723	IC LM2903M
IC 908	5300193	IC LM2902M
IC 910	5307001	IC S-8052ALR(CF)
Q 091	1322341	TRANSISTOR PT4810F
Q 092	5382141	PHOTO TRANSISTOR NJL5161K
Q 093	5382141	PHOTO TRANSISTOR NJL5161K
Q 094	1322341	TRANSISTOR PT4810F
Q 201	1323231	TRANSISTOR 2SB1462
Q 202	1323231	TRANSISTOR 2SB1462
Q 203	1323271	TRANSISTOR DTC144EE
Q 206	1323271	TRANSISTOR DTC144EE
Q 207	1323291	TRANSISTOR 2SC4617
Q 208	1323252	TRANSISTOR XP4501
Q 252	5328861	TRANSISTOR 2SB710R(CR)
Q 253	1323291	TRANSISTOR 2SC4617
Q 254	1323291	TRANSISTOR 2SC4617
Q 255	1323291	TRANSISTOR 2SC4617
Q 256	1323291	TRANSISTOR 2SC4617
Q 257	1323291	TRANSISTOR 2SC4617
Q 258	1323291	TRANSISTOR 2SC4617
Q 259	1323291	TRANSISTOR 2SC4617
Q 260	1323231	TRANSISTOR 2SB1462
Q 261	1323271	TRANSISTOR DTC144EE
Q 262	5328861	TRANSISTOR FMC2
Q 263	1323291	TRANSISTOR 2SC4617
Q 264	1323231	TRANSISTOR 2SB1462
Q 265	1323291	TRANSISTOR 2SC4617
Q 266	1323231	TRANSISTOR 2SB1462
Q 267	1323291	TRANSISTOR 2SC4617
Q 268	1323291	TRANSISTOR 2SC4617
Q 269	1323291	TRANSISTOR 2SC4617
Q 271	1323291	TRANSISTOR 2SC4617
Q 272	1323231	TRANSISTOR 2SB1462
Q 273	1323291	TRANSISTOR 2SC4617
Q 275	1323231	TRANSISTOR 2SB1462
Q 276	1323231	TRANSISTOR 2SD2216
Q 277	1323231	TRANSISTOR 2SB1462
Q 278	1323231	TRANSISTOR 2SB1462
Q 279	5328861	TRANSISTOR 2SB710R(CR)
Q 284	1323291	TRANSISTOR 2SC4617
Q 285	1323272	TRANSISTOR DTA144EE
Q 286	1323271	TRANSISTOR DTC144EE
Q 288	1323271	TRANSISTOR DTC144EE
Q 289	1323291	TRANSISTOR 2SC4617
Q 290	1323291	TRANSISTOR 2SC4617
Q 291	1323231	TRANSISTOR 2SB1462
Q 292	1323231	TRANSISTOR 2SB1462
Q 294	1323272	TRANSISTOR DTA144EE
Q 295	1323231	TRANSISTOR 2SB1462
Q 296	1323271	TRANSISTOR DTC144EE
Q 297	1323231	TRANSISTOR 2SB1462
Q 298	1323271	TRANSISTOR DTC144EE
Q 303	1323291	TRANSISTOR 2SC4617
Q 311	1323271	TRANSISTOR DTC144EE
Q 312	1323231	TRANSISTOR 2SB1462
Q 313	1323291	TRANSISTOR 2SC4617
Q 314	1323271	TRANSISTOR DTC144EE
Q 405L	5328721	TRANSISTOR 2SD1328
Q 406	1323291	TRANSISTOR 2SC4617
Q 418L	5328721	TRANSISTOR 2SD1328
Q 602	1323291	TRANSISTOR 2SC4617
Q 603	1323231	TRANSISTOR 2SB1462
Q 604	1323291	TRANSISTOR 2SC4617

SYMBOL-NO	P-NO	DISCRIPTION
Q 605	5326222	TRANSISTOR DTC363
Q 607	1323291	TRANSISTOR 2SC4617
Q 608	1323291	TRANSISTOR 2SC4617
Q 609	1323231	TRANSISTOR 2SB1462
Q 610	1323291	TRANSISTOR 2SC4617
Q 901	1323291	TRANSISTOR 2SC4617
Q 903	1323291	TRANSISTOR 2SC4617
Q 904	1323291	TRANSISTOR 2SC4617
Q 905	5326206	TRANSISTOR FMC2
Q 908	1323271	TRANSISTOR DTC144EE
Q 909	1323272	TRANSISTOR DTA144EE
Q 910	1323291	TRANSISTOR 2SC4617
Q 911	1323291	TRANSISTOR 2SC4617
Q 915	1323272	TRANSISTOR DTA144EE
Q 916	1323291	TRANSISTOR 2SC4617
Q 917	1323252	TRANSISTOR XP4501
Q 918	1323252	TRANSISTOR XP4501
Q 922	1323231	TRANSISTOR 2SB1462
Q 923	1323291	TRANSISTOR 2SC4617
Q 924	1323081	TRANSISTOR 2SA1036K
Q 925	1323271	TRANSISTOR DTC144EE
Q 928	1323271	TRANSISTOR DTC144EE
Q 929	1323231	TRANSISTOR 2SB1462
Q 930	1323271	TRANSISTOR DTC144EE
Q 931	1323272	TRANSISTOR DTA144EE
Q 933	1323231	TRANSISTOR 2SB1462
ZD 901	5339213	DIODE RD2.7MB2
ZD 902	5337247	DIODE MA3027H
ZD 903	5328667	DIODE MA3043L
L 201	5159251	CHOKE COIL 27UH+-10%
L 202	0773004	COIL 100UH
L 203	5129271	CHOKE COIL 68UH
L 204	5129271	CHOKE COIL 68UH
L 205	5129271	CHOKE COIL 68UH
L 206	5129271	CHOKE COIL 68UH
L 207	0773004	COIL 100UH
L 251	0773097	CHOKE COIL 330UH+-10%
L 252	0773094	CHOKE COIL 100UH+-10%
L 253	5159231	COIL 100UH+-10%
L 254	5159226	FILTER 47UH
L 255	0773062	CHOKE COIL 10UH
L 256	5159253	CHOKE COIL 39UH
L 257	5159253	CHOKE COIL 39UH
L 258	5159248	CHOKE COIL 18UH
L 260	5159254	COIL 120UH
L 261	5159257	CHOKE COIL 220UH
L 262	0773054	CHOKE COIL 2.7UH+-10%
L 263	5159253	CHOKE COIL 39UH
L 264	0773062	CHOKE COIL 10UH+-10%
L 265	5159227	COIL 56UH
L 266	0773003	COIL 47UH
L 267	0773003	COIL 47UH
L 268	0773094	CHOKE COIL 100UH+-10%
L 269	5159255	COIL 150UH+-10%
L 270	5159249	CHOKE COIL 22UH+-10%
L 271	5159257	CHOKE COIL 220UH
L 272	5159177	COIL 470UH
L 273	5159256	COIL 180UH
L 274	0773059	CHOKE COIL 6.8UH+-10%
L 275	0773054	CHOKE COIL 2.7UH+-10%
L 276	5159227	COIL 56UH
L 277	0773092	CHOKE COIL 47UH+-10%
L 279	0773003	COIL 47UH
L 280	5159249	CHOKE COIL 22UH+-10%
L 281	5159249	CHOKE COIL 22UH+-10%

SYMBOL-NO	P-NO	DISCRIPTION
L 282	5159256	COIL 180UH
L 283	5159231	COIL 100UH+-10%
L 286	5159231	COIL 100UH+-10%
L 287	5159254	COIL 120UH
L 288	0773092	CHOKE COIL 47UH+-10%
L 289	0773092	CHOKE COIL 47UH+-10%
L 291	0773087	CHOKE COIL 10UH+-10%
L 601	0773094	CHOKE COIL 100UH+-10%
L 602	0773097	CHOKE COIL 330UH+-10%
L 603	0773094	CHOKE COIL 100UH+-10%
L 604	0773097	CHOKE COIL 330UH+-10%
L 901	0773126	CHOKE COIL 39UH+-5%
L 902	5159231	COIL 100UH+-10%
L 903	5159226	FILTER 47UH
L 904	5159226	FILTER 47UH
L 905	5159231	COIL 100UH+-10%
L 911	0773087	CHOKE COIL 10UH+-10%
X 251	5778421	CRYSTAL
X 601	5778361	CRYSTAL
X 903	5778231	CRYSTAL
CP 201	5148231	CHOKE COIL
CP 251	5172522	FILTER, LOW PASS
CP 252	5172523	DELY LINE
CP 254	5172521	FILTER, LOW PASS
CP 256	5172512	FILTER, BAND PASS
CP 257	5172264	FILTER, BAND PASS
CP 258	5170131	FILTER, HIGH PASS
CP 259	5172474	TRAP, COIL
CP 260	5172493	TRAP, COIL
CX 901	5778351	CRYSTAL
CX 902	5778261	CRYSTAL
JK 252	5696162	PLATE, JACK
S 091	5635461	SWITCH
S 092	5635451	SWITCH
S 093	5635481	SWITCH
S 901	5635115	SWITCH
SW 251	5634861	SWITCH
SW 252	5634861	SWITCH
CT1001	5058576	CAPACITOR TRIMMER
CAMERA SECTION		
C1022	0202146	CERAMIC CHIP 1.0UF+80-20% 16V
C1051	0202146	CERAMIC CHIP 1.0UF+80-20% 16V
C1052	0202098	CERAMIC CHIP 0.1UF+80-20% 16V
C1053	0202127	CERAMIC CHIP 0.01UF+80-20% 50V
C1054	0202127	CERAMIC CHIP 0.01UF+80-20% 50V
C1055	0202129	CERAMIC CHIP 0.022UF+80-20% 25V
C1056	0202162	CERAMIC CHIP 0.47UF+80-20% 16V
C1057	0202129	CERAMIC CHIP 0.022UF+80-20% 25V
C1058	0202129	CERAMIC CHIP 0.022UF+80-20% 25V
C1059	0202146	CERAMIC CHIP 1.0UF+80-20% 16V
C1060	0202098	CERAMIC CHIP 0.1UF+80-20% 16V
C1061	0202098	CERAMIC CHIP 0.1UF+80-20% 16V
C1062	0202098	CERAMIC CHIP 0.1UF+80-20% 16V
C1063	0202098	CERAMIC CHIP 0.1UF+80-20% 16V
C1064	0202098	CERAMIC CHIP 0.1UF+80-20% 16V
C1065	0202098	CERAMIC CHIP 0.1UF+80-20% 16V
C1066	0202098	CERAMIC CHIP 0.1UF+80-20% 16V
C1067	0202098	CERAMIC CHIP 0.1UF+80-20% 16V
C1068	0202127	CERAMIC CHIP 0.01UF+80-20% 50V
C1069	0202087	CERAMIC CHIP 22PF+-5% 50V
C1070	0202057	CHIP CERAMIC 180PF+-5% 50V
C1071	0202098	CERAMIC CHIP 0.1UF+80-20% 16V
C1072	0202096	CERAMIC CHIP 0.047UF+80-20% 16V

SYMBOL-NO	P-NO	DISCRIPTION
DL1001	5172174	DELAY LINE
DL1002	5172043	FILTER, LOW PASS
S1851	5621821	SWITCH
S1852	5633911	SWITCH
S1853	5633911	SWITCH
S1854	5621851	SWITCH
S1855	5633911	SWITCH
S1856	5633911	SWITCH
S1857	5635471	SWITCH
S1858	5621831	SWITCH
S1859	5610841	SWITCH
S1860	5621631	SWITCH
ELECTRONIC VIEWFINDER SECTION		
C 801	0255022	ELECTROLYTIC 100PF+-20% 10V
C 802	0255134	ELECTROLYTIC 47PF+-20% 16V
C 803	0256155	ELECTROLYTIC 10UF 16V
C 804	0258459	CERAMIC DISC 2700PF+-5% 100V
C 805	0256871	ELECTROLYTIC 47UF 25V
C 806	0249655	CERAMIC DISC 1000PF+-10% 1KV
C 807	0249656	CERAMIC DISC 1000PF+-10% 500V
C 808	0256752	ELECTROLYTIC 3.3UF 63V
C 809	0201997	CERAMIC DISC 0.1UF+80-20% 50V
C 811	0201036	CERAMIC CHIP 270PF+-5% 50V
C 812	0201997	CERAMIC DISC 0.1UF+80-20% 50V
C 814	0201069	CERAMIC CHIP 0.1UF+80-20% 25V
C 815	0268521	CERAMIC DISC 0.1UF+-10% 50V
C 816	0202151	CERAMIC CHIP 2200PF+-5% 50V
C 817	0201007	CERAMIC CHIP 0.1UF+-20% 50V
C 818	0256151	ELECTROLYTIC 1UF 50V
C 819	0202146	CERAMIC CHIP 1.0UF+80-20% 16V
R 801	0103852	CHIP RESISTOR 5.6KOHM+-5% 0.1W
R 802	0103879	CHIP RESISTOR 1MOHM+-5% 0.1W
R 803	0103875	CHIP RESISTOR 470KOHM+-5% 0.1W
R 804	0103881	CHIP RESISTOR 2.2MOHM+-10% 0.1W
R 805	0103881	CHIP RESISTOR 2.2MOHM+-10% 0.1W
R 806	0103817	CHIP RESISTOR 6.8OHM+-10% 0.1W
R 807	0103879	CHIP RESISTOR 1MOHM+-5% 0.1W
R 808	0103879	CHIP RESISTOR 1MOHM+-5% 0.1W
R 809	0103862	CHIP RESISTOR 39KOHM+-5% 0.1W
R 810	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R 811	0103844	CHIP RESISTOR 1.2KOHM+-5% 0.1W
R 812	0103857	CHIP RESISTOR 15KOHM+-5% 0.1W
R 813	0103846	CHIP RESISTOR 1.8KOHM+-5% 0.1W
R 814	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R 815	0103862	CHIP RESISTOR 39KOHM+-5% 0.1W
R 816	0103814	CHIP RESISTOR 3.9OHM+-5% 0.1W
R 817	0103840	CHIP RESISTOR 560 OHM+-5% 0.1W
R 818	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W
R 819	0103848	CHIP RESISTOR 2.7KOHM+-5% 0.1W
R 820	0103867	CHIP RESISTOR 100KOHM+-5% 0.1W
R 821	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R 822	0103831	CHIP RESISTOR 100 OHM+-5% 0.1W
R 826	0103876	CHIP RESISTOR 560KOHM+-5% 0.1W
R 828	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
RT 802	5030193	SEMI VARIABLE 470 OHM
RT 803	5007793	SEMI VARIABLE 2.2MOHM
RT 805	5007468	SEMI VARIABLE 1MOHM
D 801	5328321	DIODE MA151K (MH)
D 802	5337321	DIODE MA199
IC 801	1351631	IC HA118121FP
Q 801	1323131	TRANSISTOR 2SD968A (R/S)
Q 802	5328241	TRANSISTOR 2SC2463E(DE)
T 801	5240484	TRANSFORMER, FLYBACK
L 801	0773003	COIL

SYMBOL-NO	P-NO	DISCRIPTION
L 802	5244012	COIL
CS 801	5886232	SOCKET, CRT



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VM-E15A(U,C)

TK

No. 3375E

TOKAI

HITACHI

SERVICE MANUAL

TK

No. 3376E

VM-E15A

Technical Information

MANUAL RELATED TO THE VM-E15A

MODEL/TITLE	Manual No.
VM-E15A Technical Data	3375E

The circuit configuration and operation of this model are similar to those in the current model. This Service Manual/Technical Information only describes the operation of circuits which are differed with circuits in the current model. Refer to the current model's Service Manual/Technical information for the other circuits.

CHAPTER 1 CAMERA

The differences compared with the current model are the circuit numbers and following circuit.

1. RELATED CIRCUITS (Fig. 1)

1-1. Zoom Motor Driver (Fig. 1)

The zoom motor is driven by two transistors (Q51AF, Q52AF: TELE/WIDE DRIVER) and two switches (Q53AF, Q54AF: WIDE/TELE SW).

The zoom direction is determined by pressing the telephoto or wide-angle switch. For example, when the telephoto switch is pressed, the C9V power source is supplied to Q51AF, and Q51AF turns on. By this, telephoto switch (Q54AF) turns on and the motor drive current flows through Q51AF, zoom motor and Q54AF to ground.

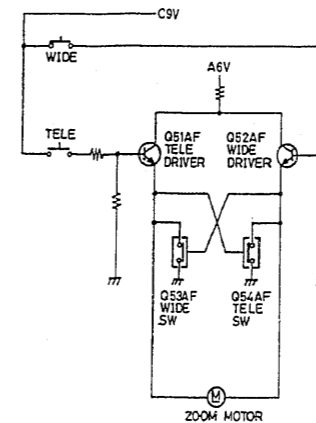


Fig. 1 Zoom Motor Driver

CHAPTER 2 VIDEO

The differences compared with the current model are the circuit numbers and the video signal input/output circuits.

1. VIDEO SIGNAL INPUT/OUTPUT CIRCUITS (Fig. 2)

The input signals of the video signal processing circuit are as follows.

- (1) Composite luma signal (LUMA) and 3.58MHz chroma signal (CHROMA) from camera,
 - (2) Composite video signal from AV connector
- The video signal input/output circuits control the input/output of the above signals.

1-1. Input Signal Selection Switches

1-1-1. SW1 in an Input Signal Selection Circuit (IC259: INPUT SELECT)

This is controlled by a voltage at pin 2, however in this model, pin 2 is grounded, therefore the camera luma signal is always selected.

1-1-2. SW1 in the Luma Signal Processing Circuit (IC251: LUMA PROCESS)

The mode is detected by a system control main microprocessor (IC901: M-μP) and transferred to a mode detector (MODE DET) in IC251. The mode detector changes SW1 depending on the transferred mode.

(1) During Camera Recording

SW1 is set to the "CAMERA" position, and the camera luma signal supplied to pin 34 is selected.

(2) During AV IN Recording

SW1 is set to the "AV IN" position, and the AV IN video signal supplied to pin 32 is selected.

1-1-3. SW1 in the Chroma Signal Processing Circuit (IC253: CHROMA PROCESS)

This is controlled by a voltage supplied to pin 39, however in this model, pin 39 is grounded. Therefore, SW1 is always set to the "Lo" position, and the chroma signal supplied to pin 30 is always selected.

1-1-4. SW6 in IC253

This is controlled by a voltage at pin 29. When the AV input adapter is connected to the AV connector, pin 13 is grounded.

(1) During Camera Recording

A voltage at pin 29 goes "Hi", SW6 is set to the "CAMERA REC" position, and the camera chroma signal supplied to pin 44 is selected.

(2) During AV IN Recording

The voltage at pin 29 goes "Lo", SW6 is set to the "PB/AV IN REC" position, and no signal is selected.

1-1-5. SW1 in an Input Selection Circuit (IC256: INPUT SELECT)

This is controlled by the PB signal supplied to pin 2.

(1) During Recording

SW1 is set to the "PB (Lo)" position, and the camera chroma signal supplied to pin 1 is selected.

SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FROM IMPROVEMENT

8mm VIDEO CAMERA

Oct. 1990

TOKAI WORKS

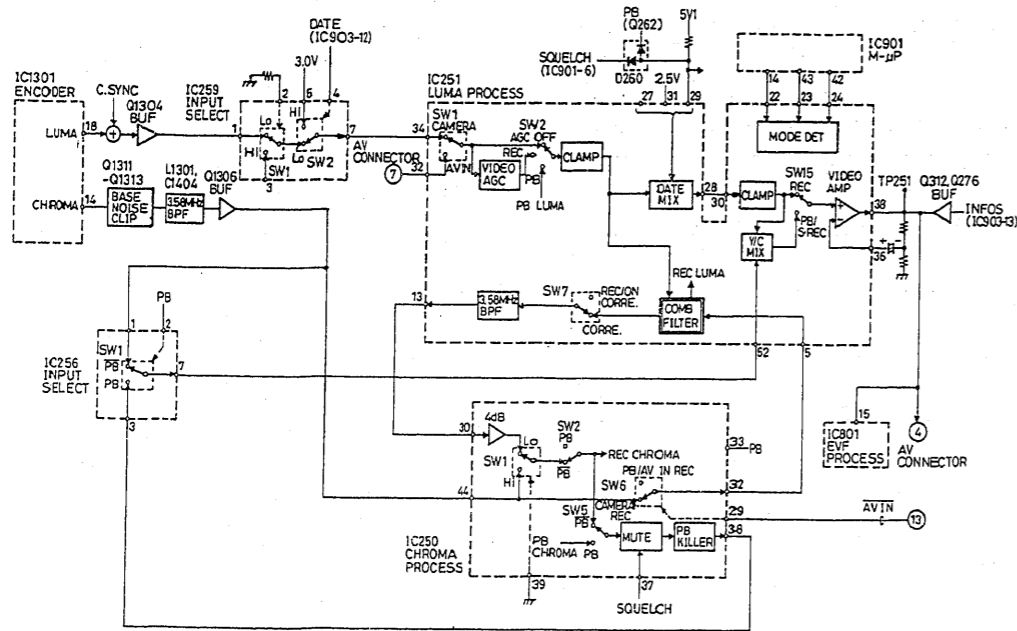


Fig. 2 Video Signal Input/Output Circuits

(2) During Playback

SW1 is set to the "PB" position, and the playback chroma signal supplied to pin 3 is selected.

1-2. Signal Route

1-2-1. During Camera Recording

(1) Luma Signal

The camera luma signal from a buffer (Q1304: BUF) is supplied through IC259, pin 34 of IC251, SW2 (AGC OFF) and clamping circuit (CLAMP) to the comb filter (COMB FILTER) which simply passes the luma signal in camera recording. The camera luma signal is then processed and recorded on a tape. An EE (Electric-to-Electric) luma signal, to which a display signal has been mixed, generated at pin 28 is supplied through pin 30 and clamping circuit (CLAMP) to the luma/chroma mixer (Y/C MIX) which mixes the chroma signal with the luma signal to generate a composite video signal. The composite video signal is supplied through SW15 (PB/S-REC), video amplifier (VIDEO AMP) and pin 38 to both pin 4 of the AV connector and EVF (IC801: EVF PROCESS).

(2) Chroma Signal

The camera chroma signal from a buffer (Q1306: BUF) is supplied through pin 44 of IC253. The camera chroma signal is supplied through SW6, pin 32 and pin 5 of IC251 to the comb filter (COMB FILTER) which simply passes the chroma signal during camera recording. The camera chroma signal is supplied through SW7, 3.58MHz bandpass filter (3.58MHz BPF) and pin 13 to pin 30 of IC253. The camera chroma signal is then recorded on the tape through amplifier (4dB), SW1 and SW2. The EE chroma signal from Q1306 is supplied to

pin 1 of IC256. During recording, the PB signal goes "Lo" and the camera chroma signal supplied to pin 1 is selected by SW1. This camera chroma signal is supplied through pin 7 to the luma/chroma mixer in IC251.

1-2-2. During AV IN Recording

The composite video signal from pin 7 of AV connector is supplied through pin 32 of IC251, SW1 (AV IN), video AGC circuit (VIDEO AGC) and SW2 (REC) to the clamping circuit. The clamped AV IN video signal is supplied to the comb filter which separates the luma and chroma signals from the AV IN video signal. The luma signal is then processed and recorded on the tape. The AV IN chroma signal is supplied through SW7, 3.58MHz bandpass filter and pin 13 to pin 30 of IC253 and recorded on the tape, the same as in camera recording. The EE video signal from the clamping circuit is supplied through the DATE mixer (DATE MIX), pins 28 and 30, clamping circuit, SW5 (REC), video amplifier and pin 38 to both the AV connector and EVF.

1-2-3. During Playback

(1) Luma Signal

The playback luma signal (PB LUMA) is supplied through SW2 (PB), clamping circuit, display mixer, pins 28 and 30 and clamping circuit to the luma/chroma mixer to generate the composite video signal. The composite video signal is supplied through SW15 (PB/S-REC), video amplifier and pin 38 to both the AV connector and EVF in the same way as in camera recording.

(2) Chroma Signal

The playback chroma signal (PB CHROMA) is supplied through a muting circuit (MUTE), playback killer (PB KILLER) and pin 38 to pin 3 of IC256. During playback,

the PB signal goes "Hi", and the playback chroma signal at pin 3 is selected by SW1 and supplied through pin 7 to the luma/chroma mixer in IC251.

1-2-4. Character Signal Mixer

(1) Date Character Signal Mixer (SW2 in IC259)

This mixes the DATE character signal supplied to pin 4 and generated by a character generator (IC903). When it goes "Hi", the "Hi" voltage of approx. 3.0V supplied to pin 5 is mixed with the luma signal.

(2) Information Character Signal Mixer (Q312, Q276: BUF)

This mixes the INFOS character signal generated by IC903 with the luma or video signal supplied to the EVF and AV connector.

1-2-5. Muting Circuits

There is two muting circuits and they are controlled by the SQUELCH signal generated by a diode (D260).

(1) DATE Mixer (DATE MIX) in IC251

When the SQUELCH signal goes "Hi" during playback, a voltage at pin 29 goes "Hi", and the playback luma signal is muted.

This also adds an artificial V.SYNC pulse generated by the system control circuit via pin 31.

(2) Muting Circuit (MUTE) in IC253

This also mutes the playback chroma signal when "Hi" SQUELCH signal is supplied to pin 37.

CHAPTER 3 AUDIO

1. DIFFERENCES COMPARED WITH THE CURRENT MODEL (Fig. 3)

The difference compared with the current model is only the audio signal processing circuit (IC401: AUDIO PROCESS, HTS9505G) which does not includes the muting circuit, buffer and the AND gate. These circuits are composed by discrete component (Q405, IC409 and IC406). However, it provides the external microphone jack (JK081) and buffer (Q406).

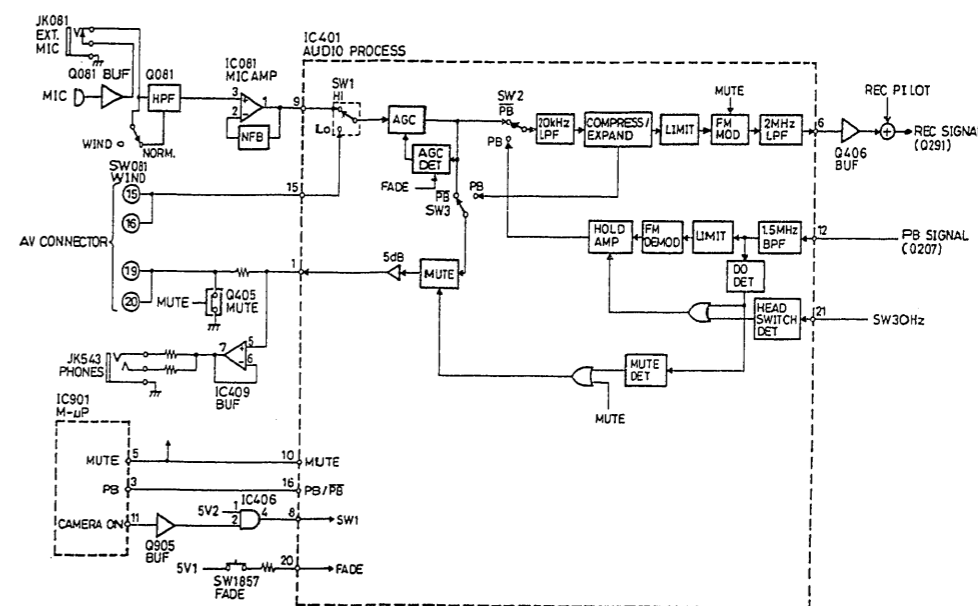


Fig. 3 Audio Signal Processing Circuit



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HITACHI

SERVICE MANUAL

TK

No. 3546E

VM-E10A(U,C)
VM-E15A(U,C)
VM-H18A(U,C)

Troubleshooting Guide

MANUAL RELATED TO TROUBLESHOOTING GUIDES

MODEL	TITLE	MANUAL No.
VM-E10A(U,C)	Technical Data	No. 3372E
VM-E15A(U,C)	Technical Data	No. 3375E
VM-H18A(U,C)	Technical Data	No. 3378E

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Hi 8

SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT

8mm VIDEO CAMERA/RECORDER

July

1991

TOKAI WORKS

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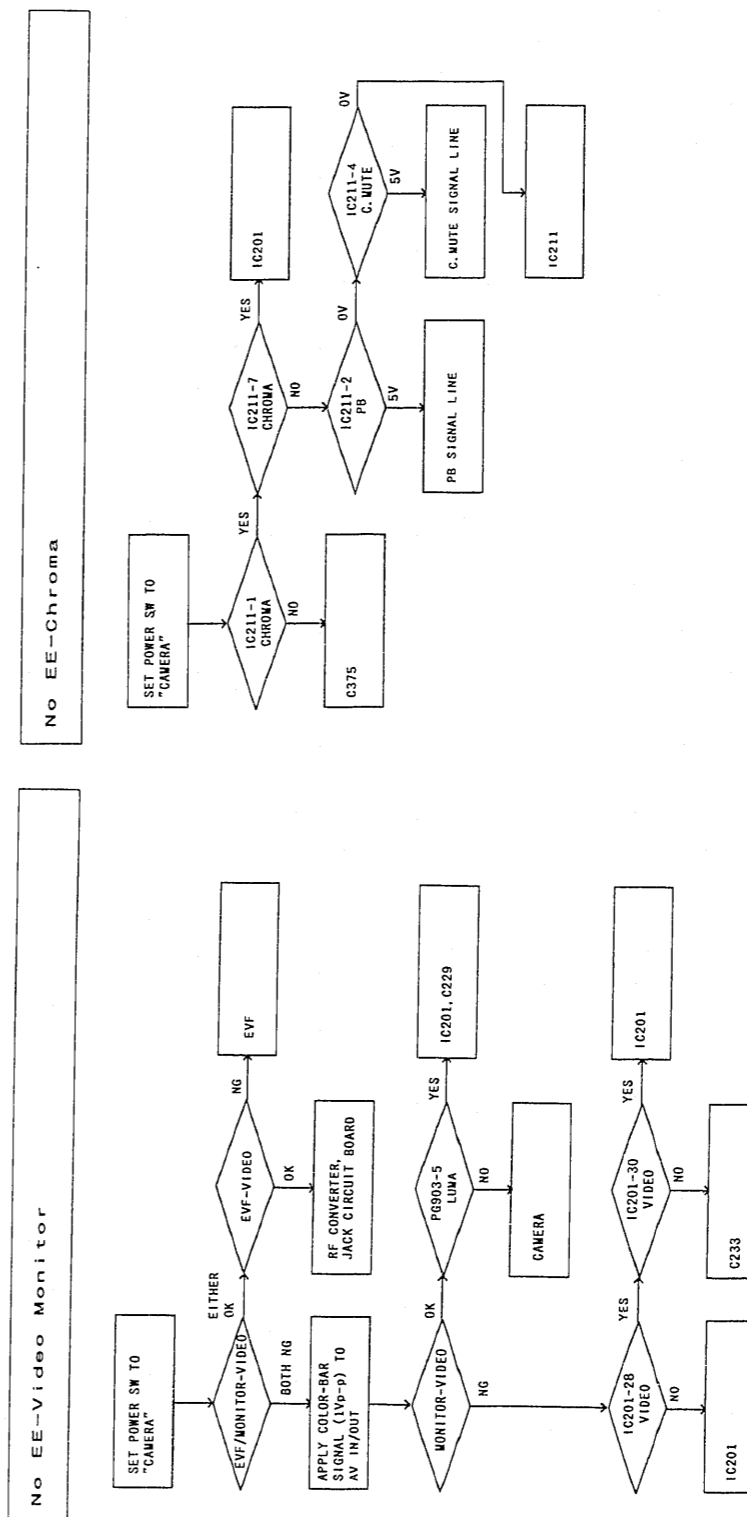
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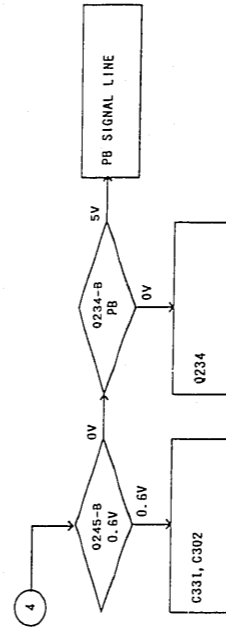
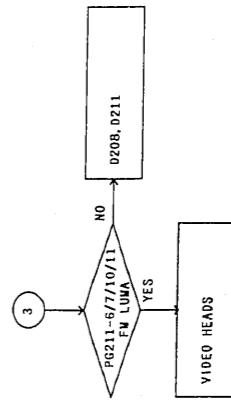
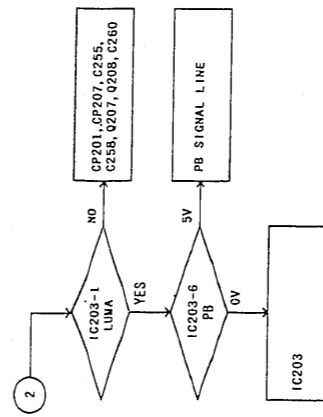
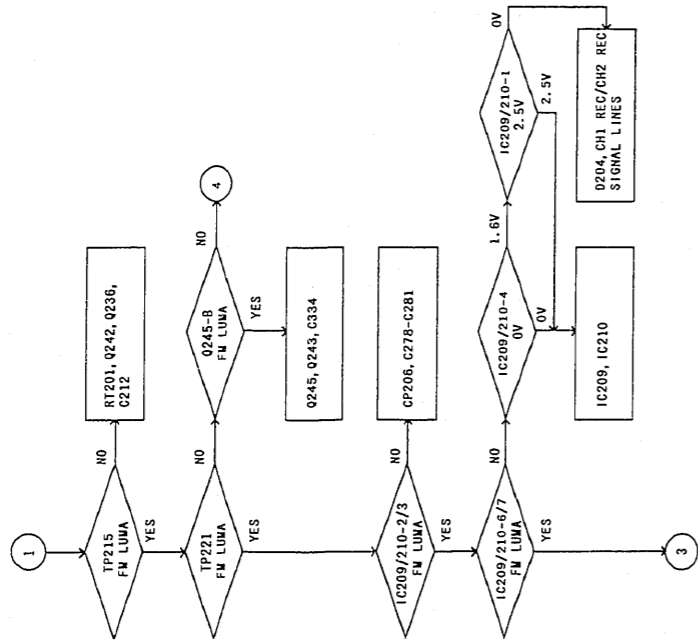
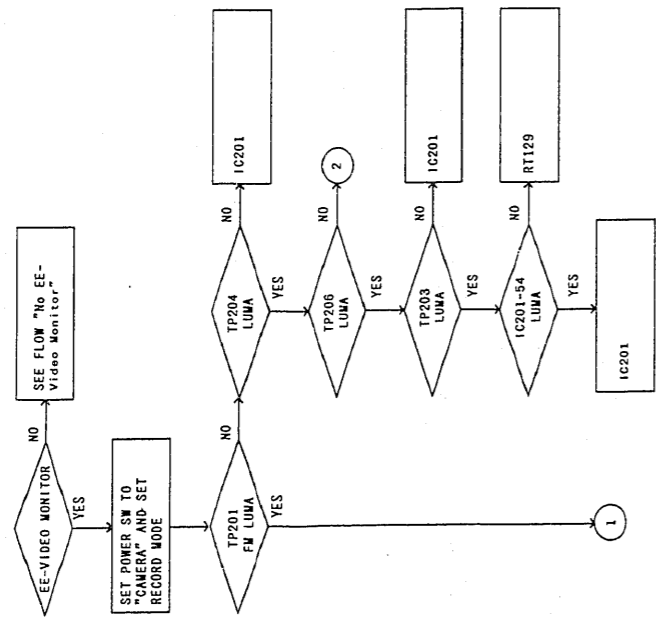
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CHAPTER 1 TROUBLESHOOTING GUIDE

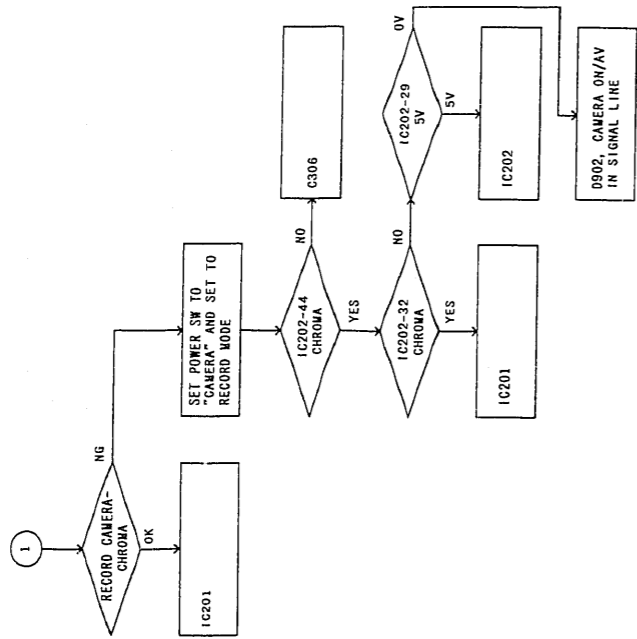
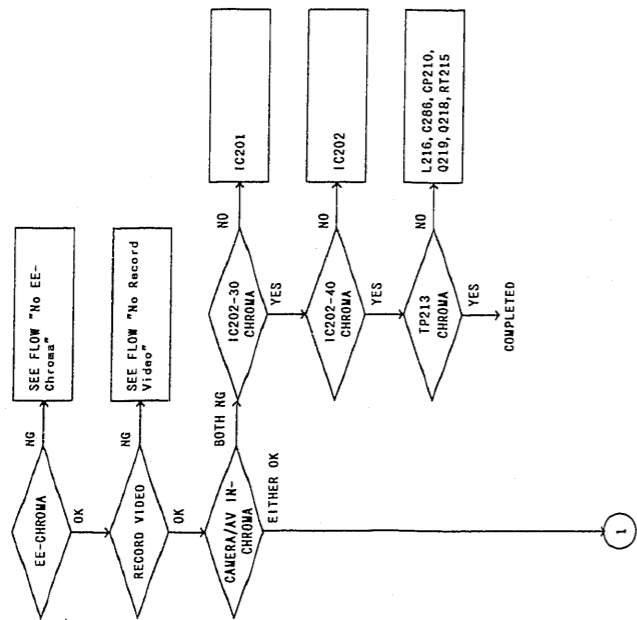
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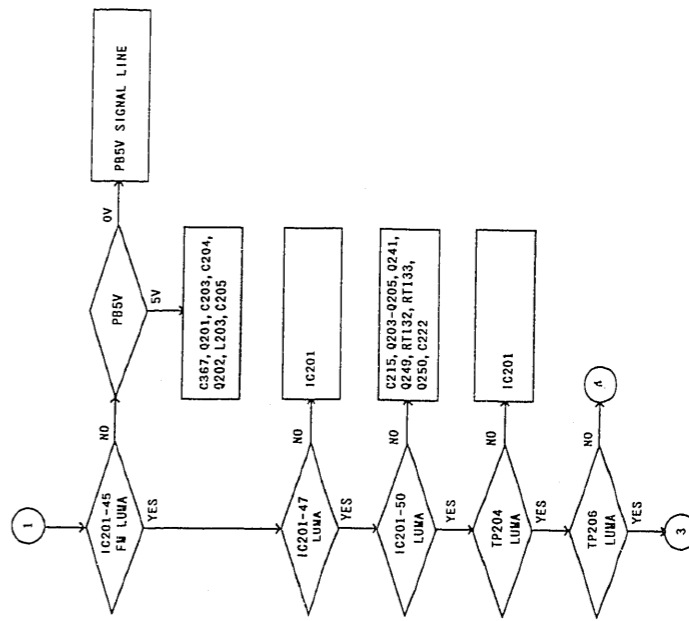
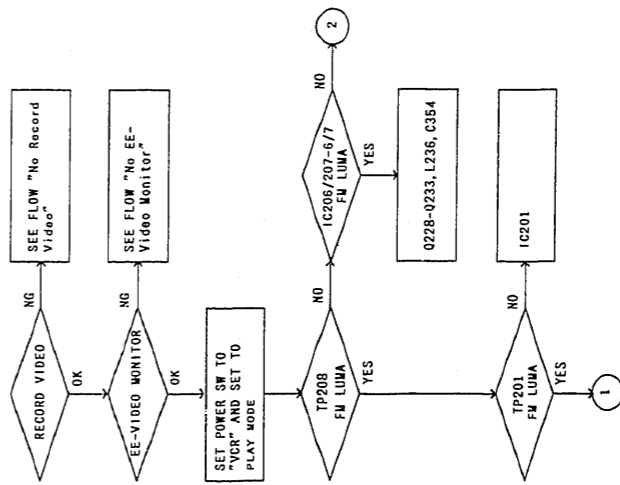
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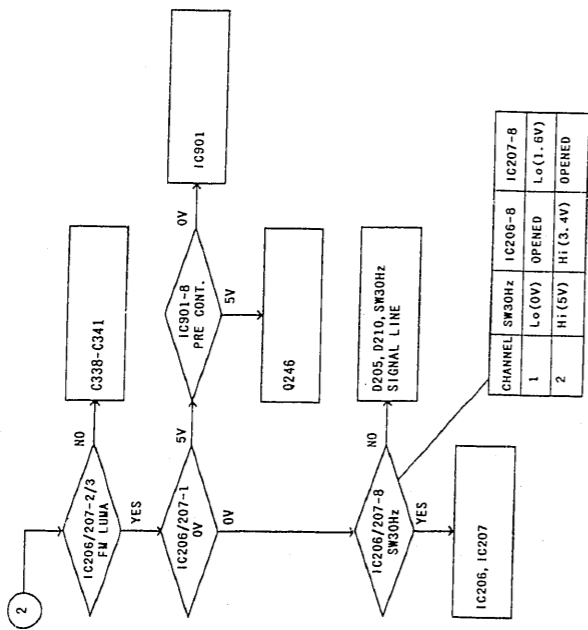
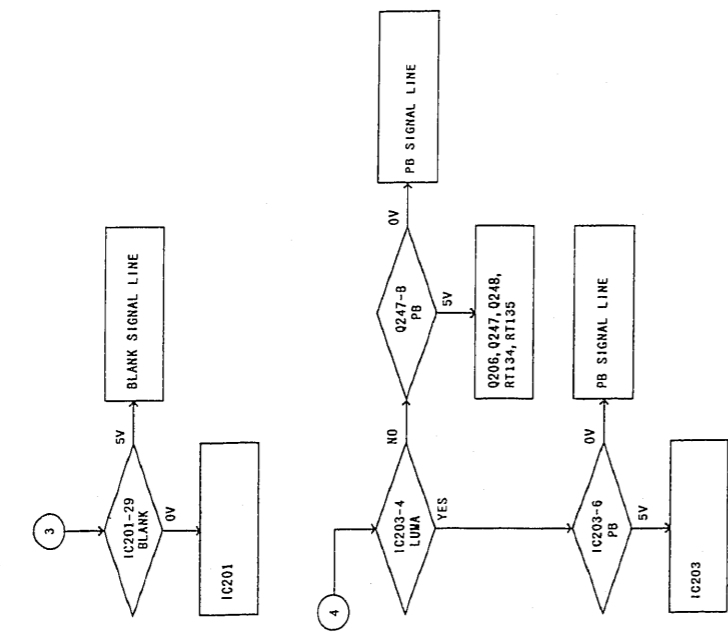


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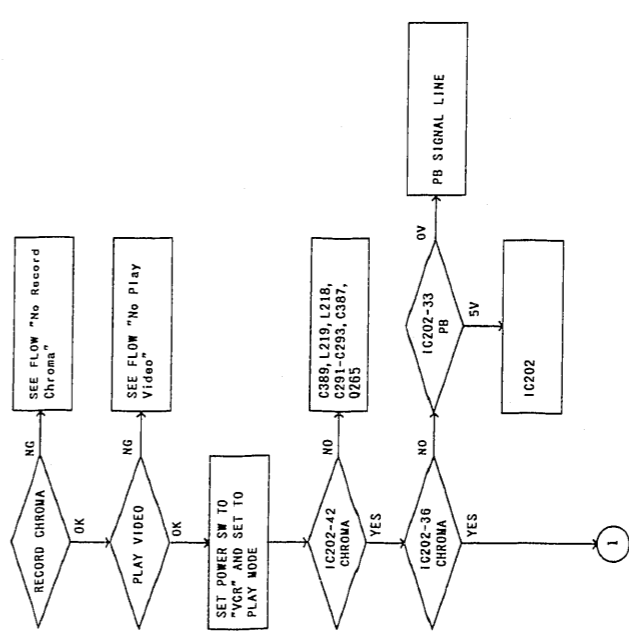
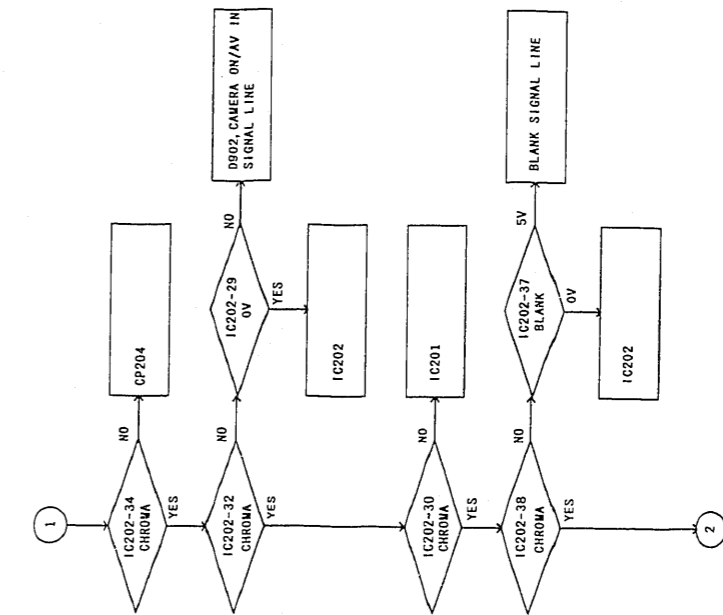
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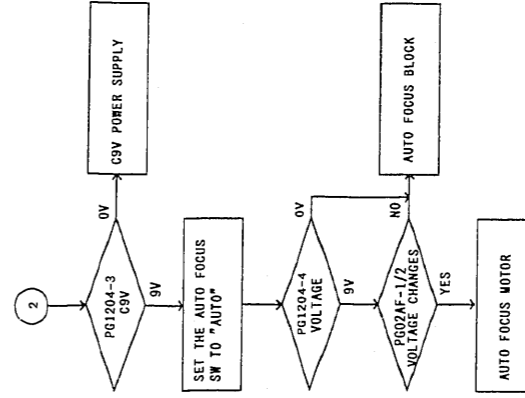
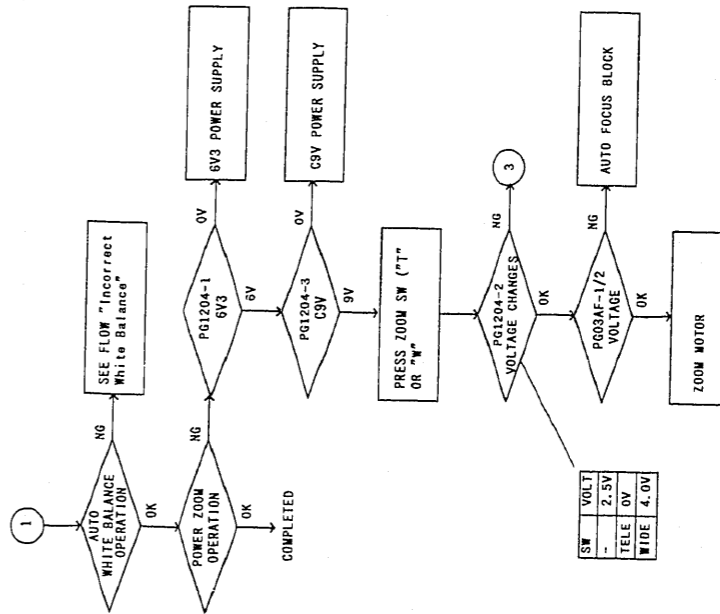
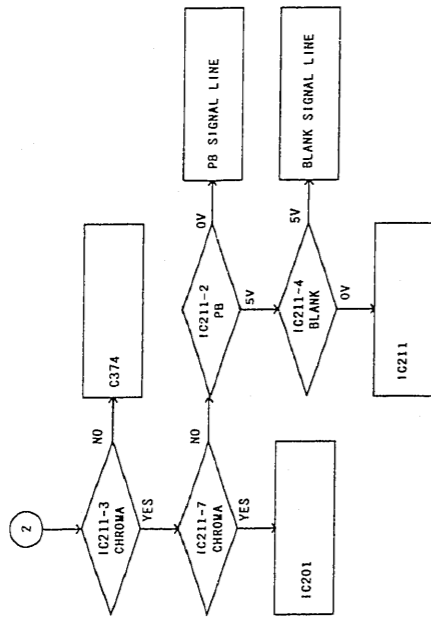
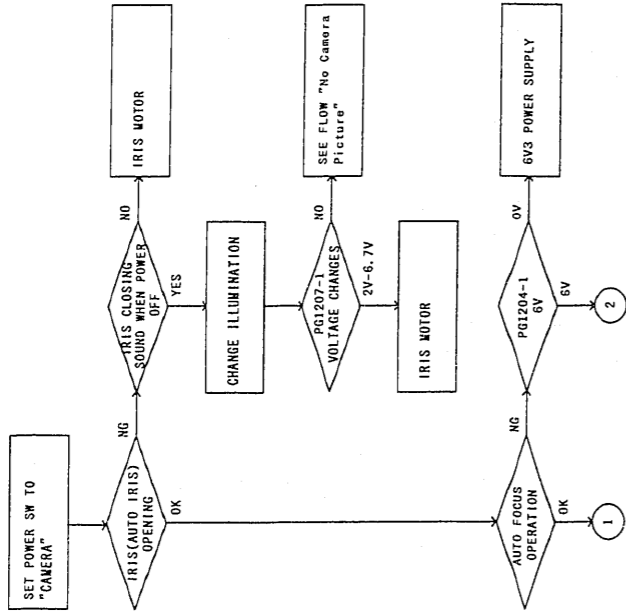


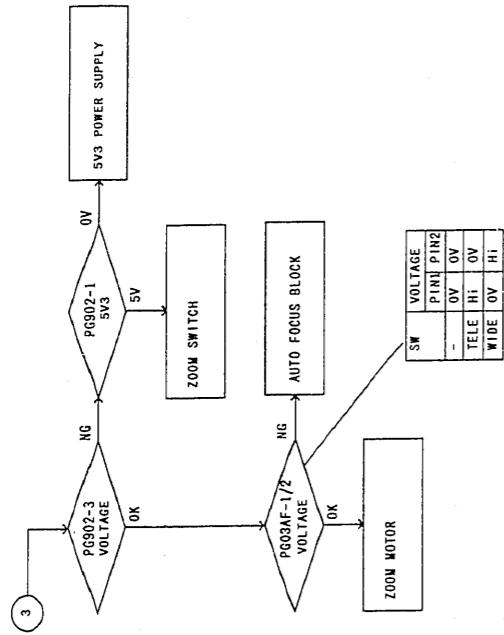
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2	Hi (5V)	HI (3.4V)	OPENED

No Play Chroma

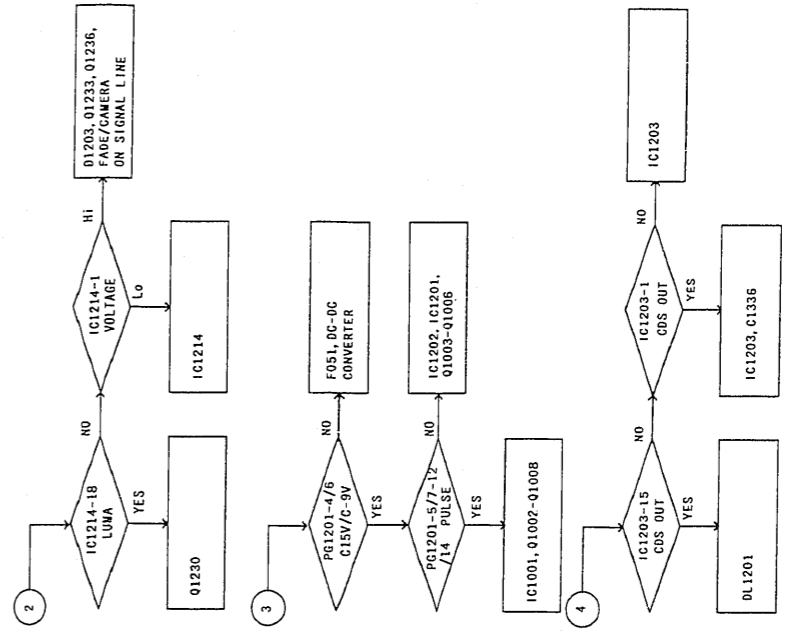
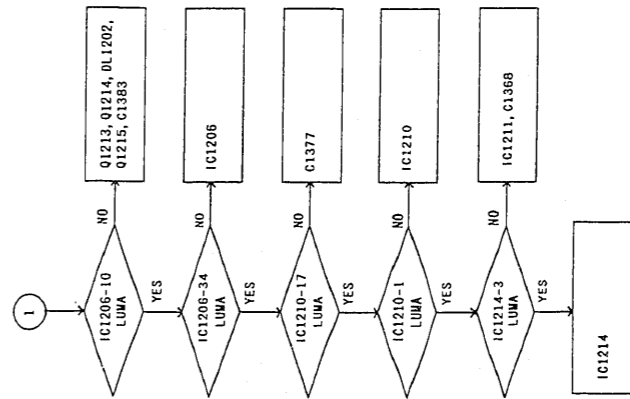
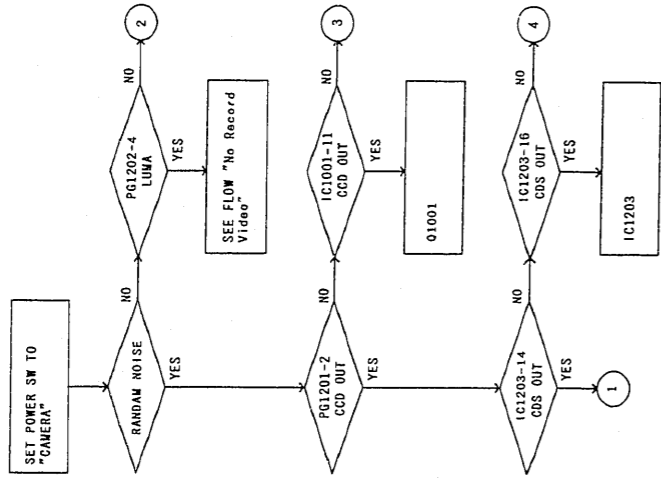


Does not operate Auto Iris/Auto Focus/Auto White Balance/Power Zoom

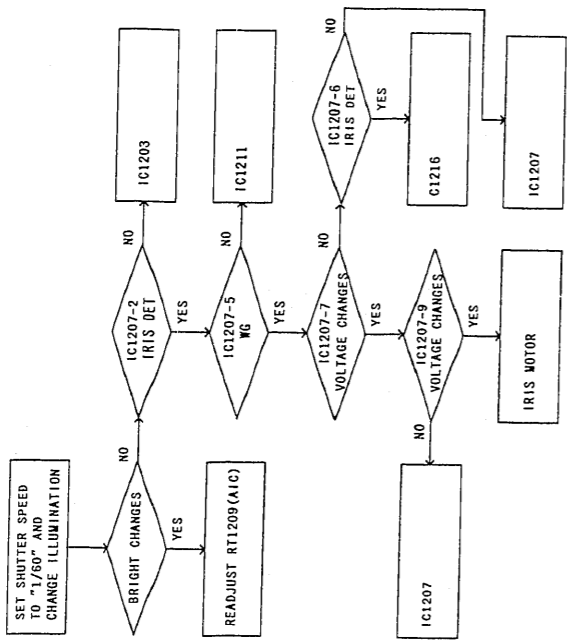




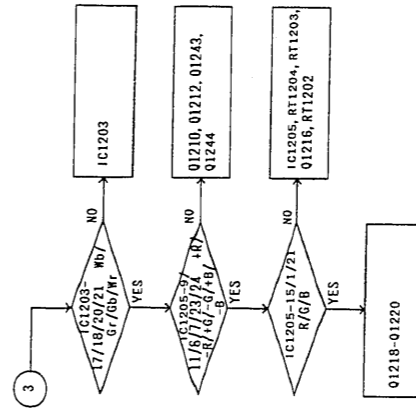
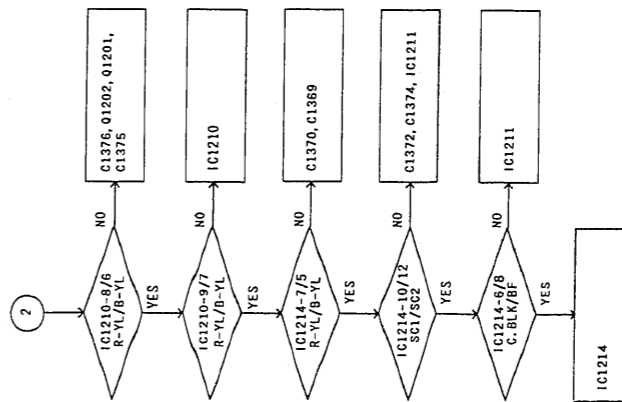
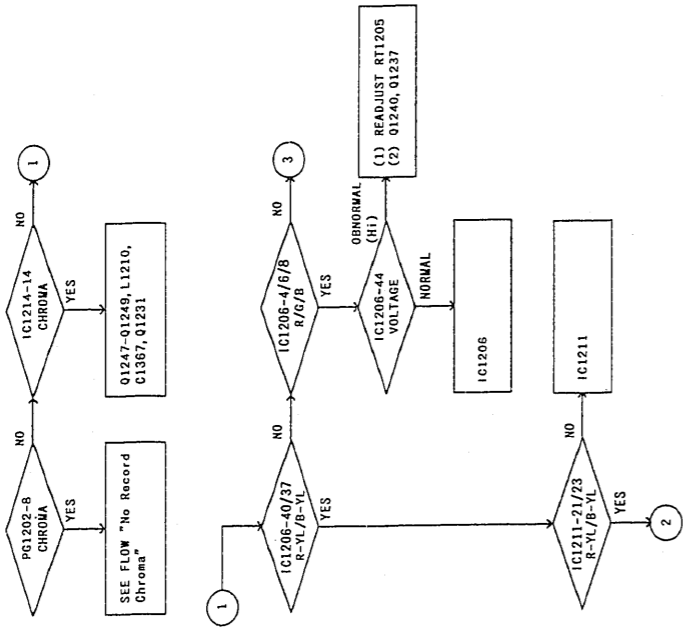
No Camera Picture



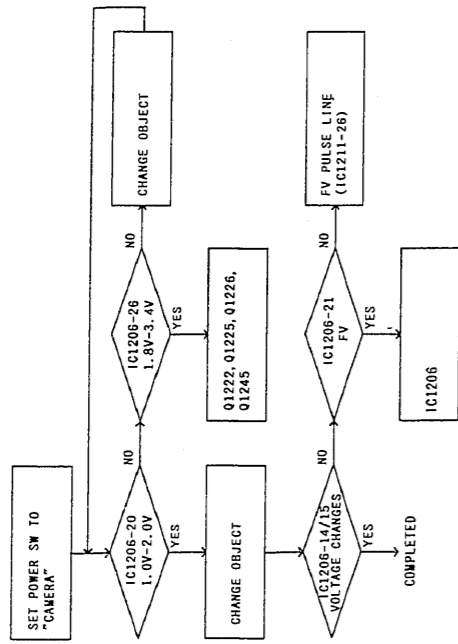
Video Level too High/Low



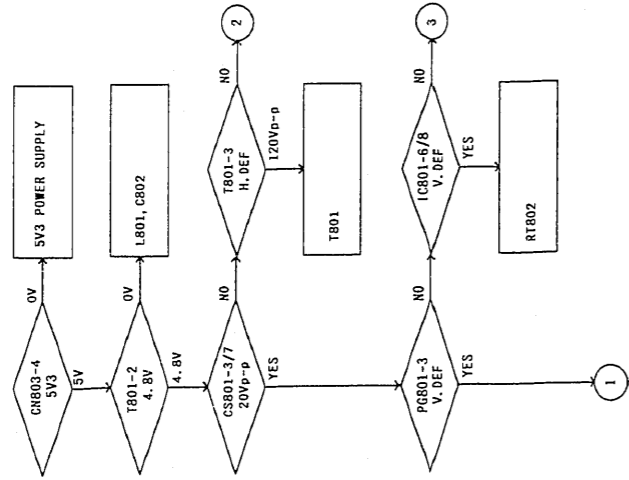
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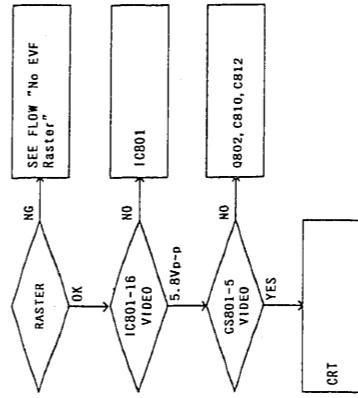
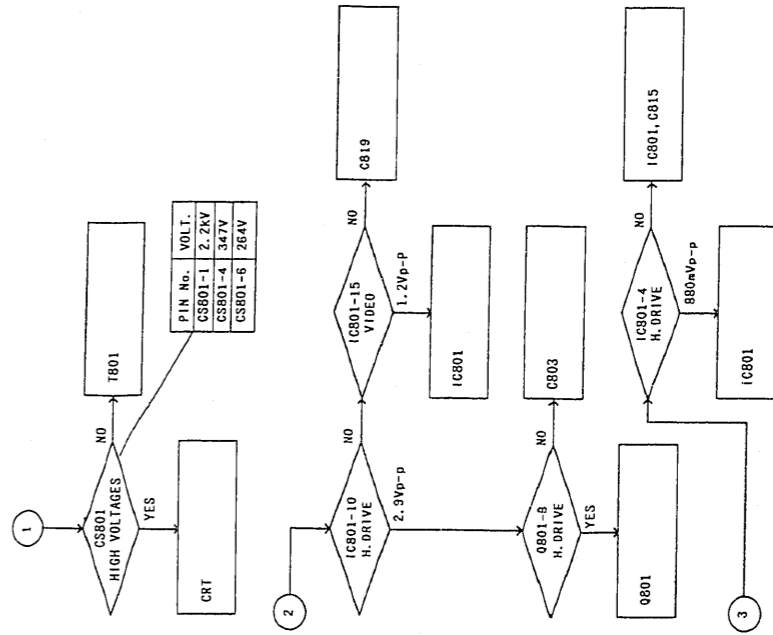
Incorrect White Balance



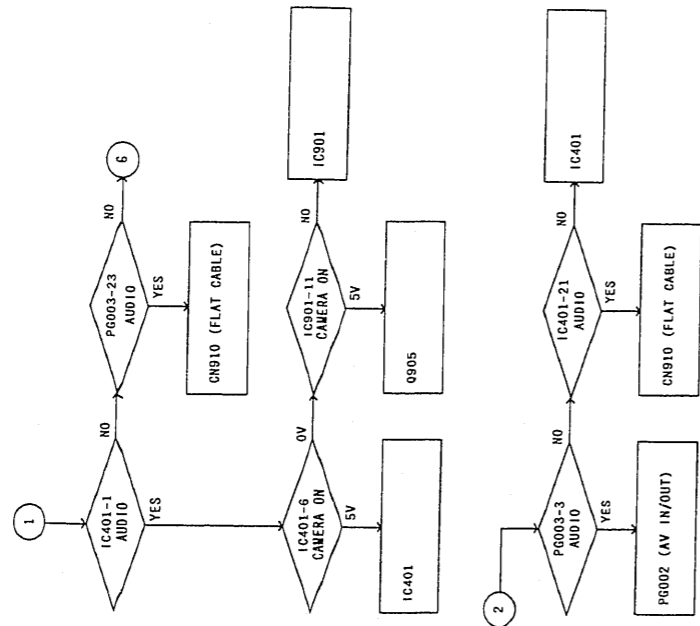
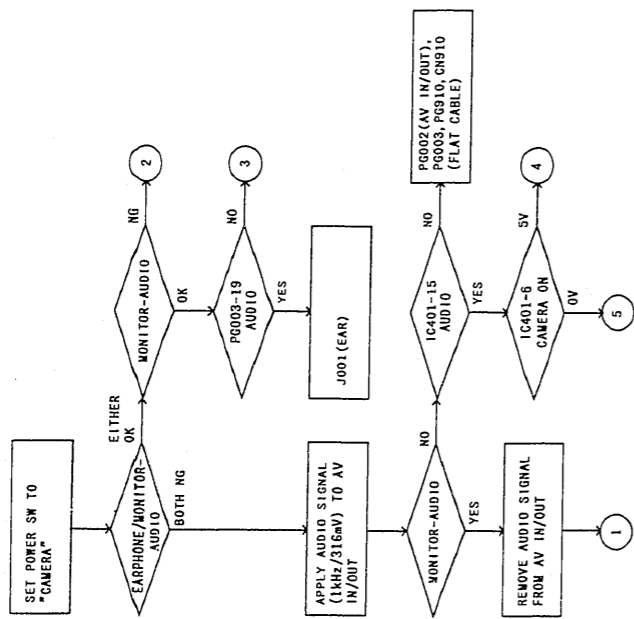
No EVF Raster



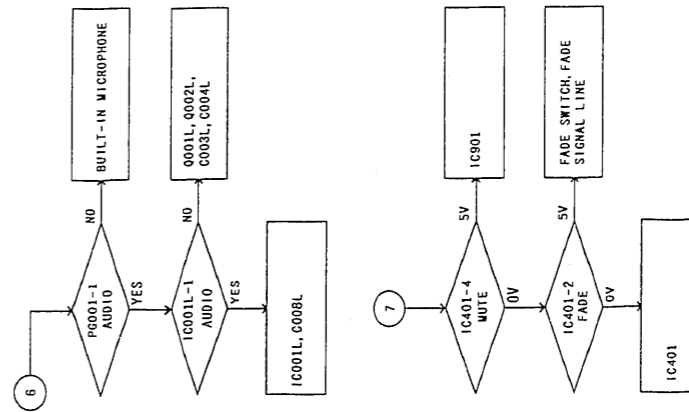
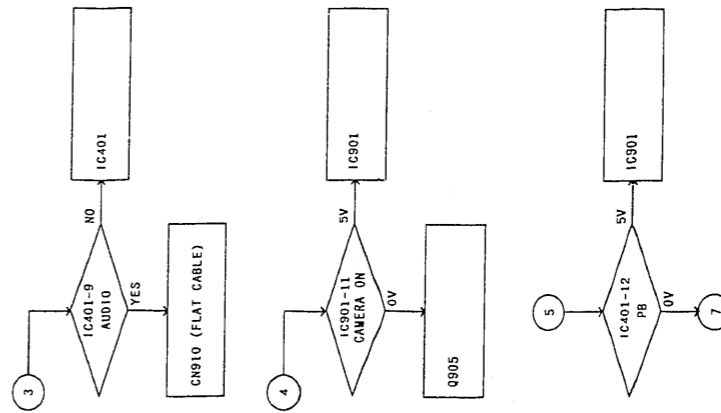
No Picture on EVF



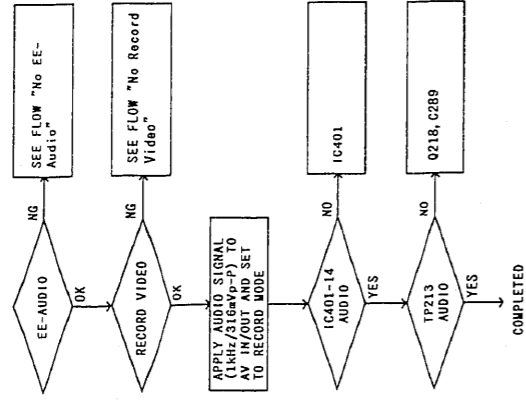
No EE-Audio



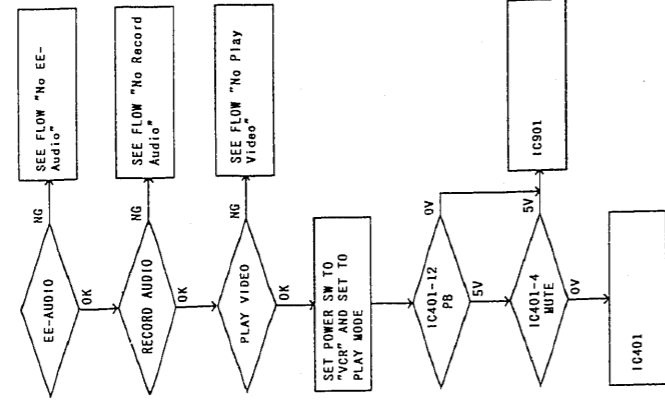
1 X
10000000



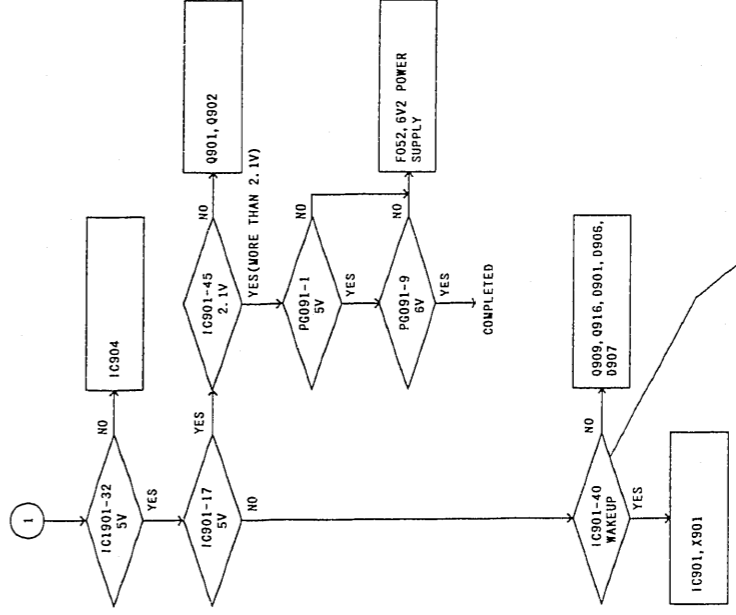
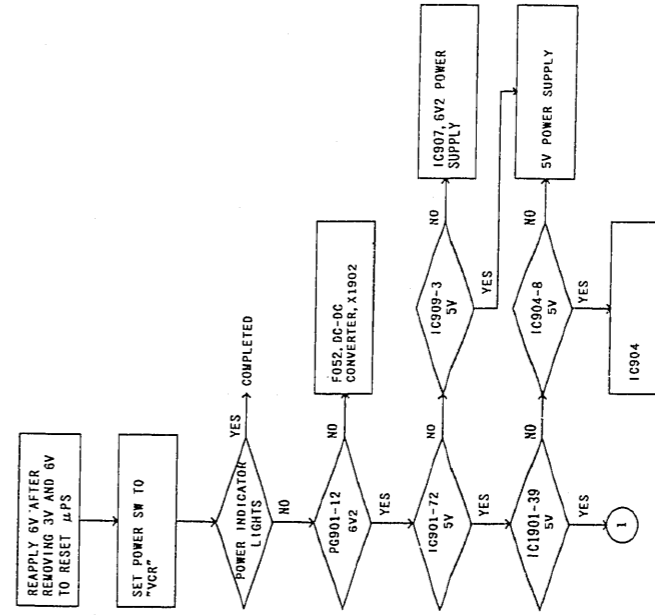
No Record Audio



No Play Audio

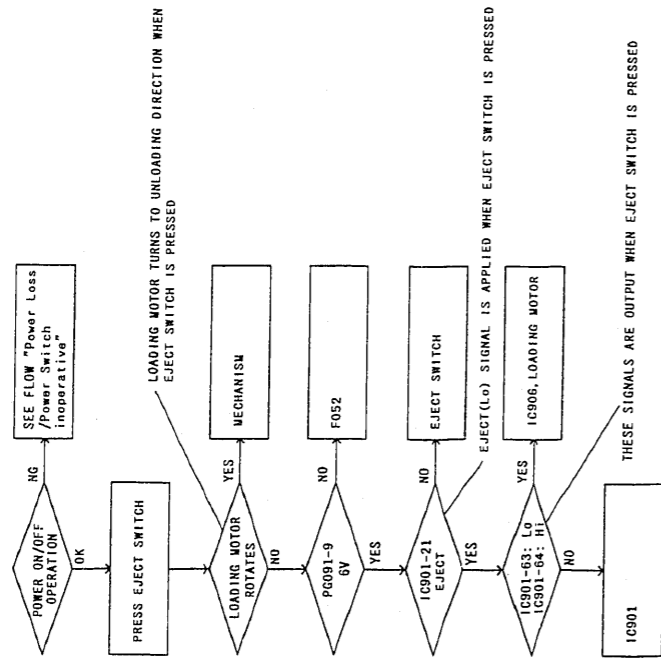


Power Loss/Power Switch inoperative

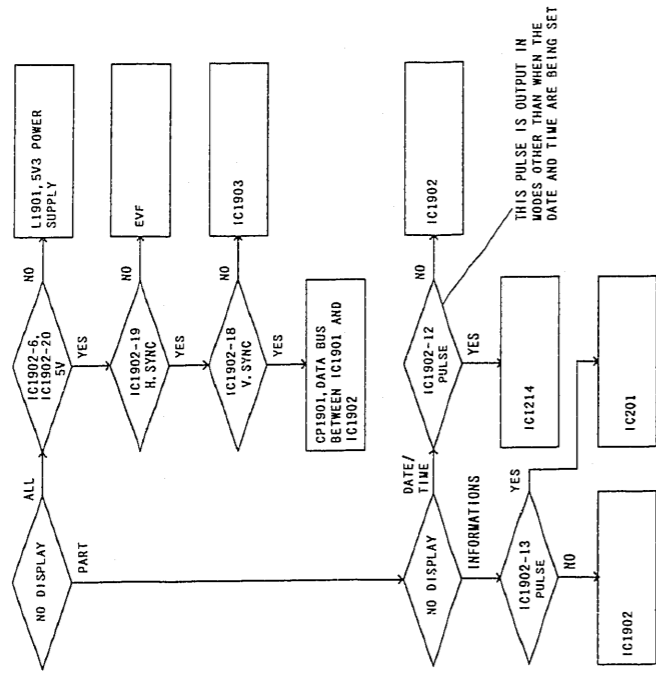


THE WAKEUP (Lo) PULSE IS APPLIED WHEN CASSETTE HOLDER IS CLOSED, WHEN RECORD START/STOP OR EJECT SWITCH IS PRESSED OR WHEN POWER SWITCH IS SET TO "CAMERA" OR "VCR".

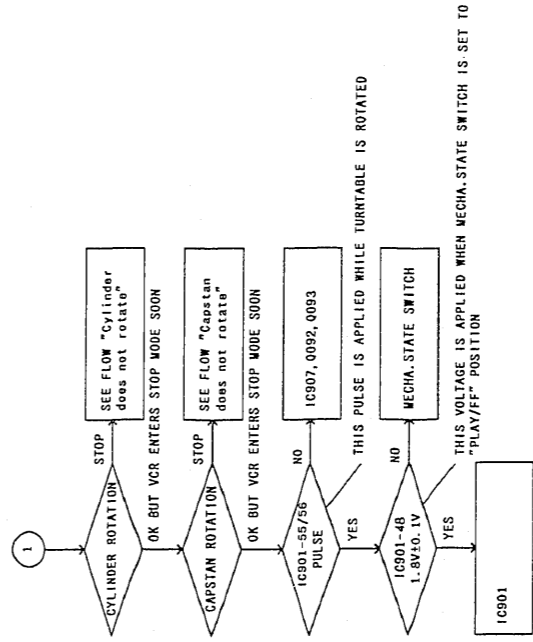
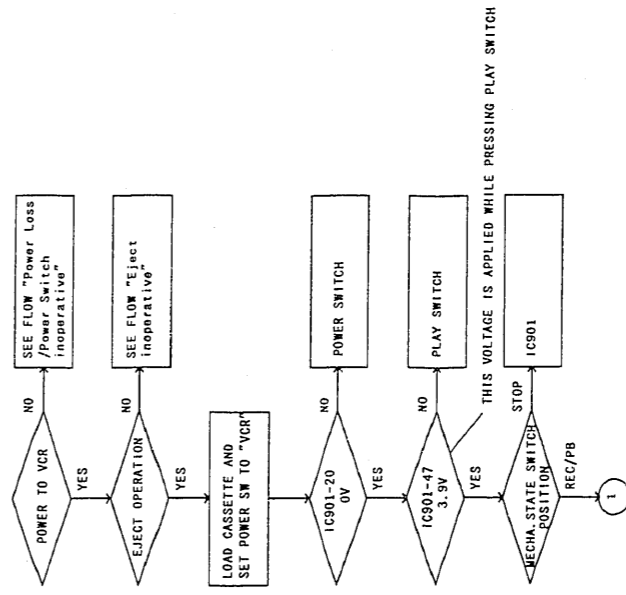
Eject inoperative



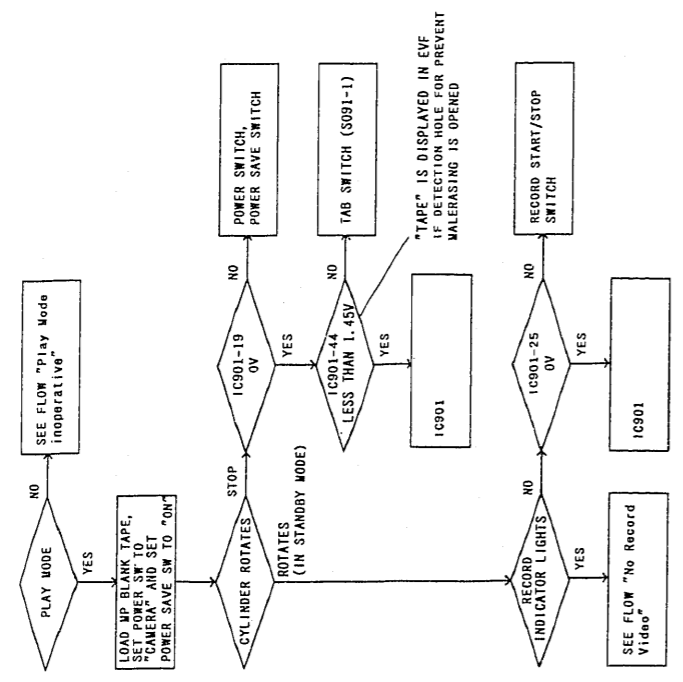
On Screen Display inoperative



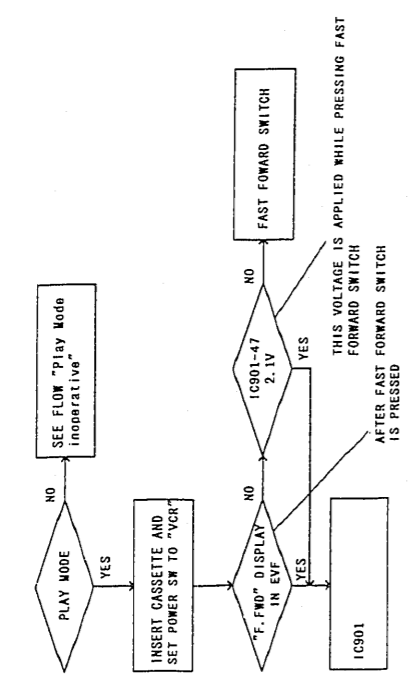
Play Mode inoperative



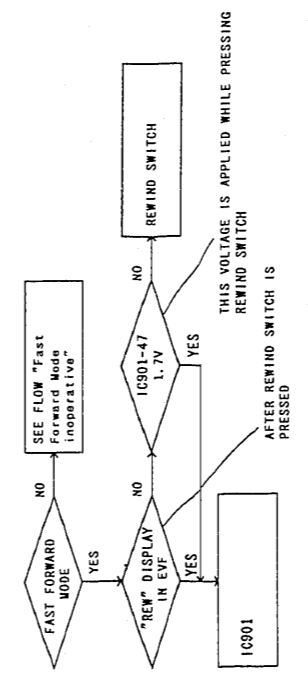
Record Mode inoperative



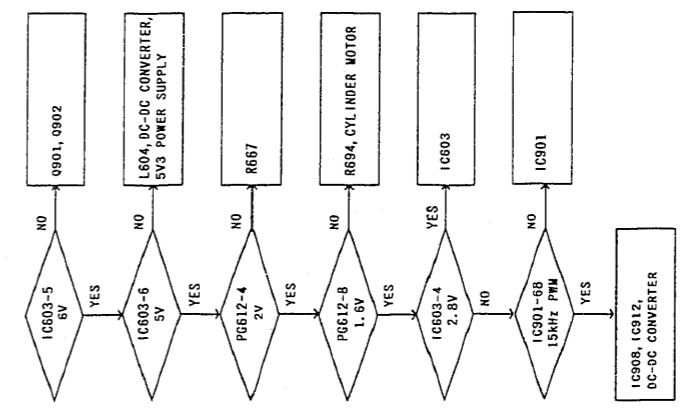
Fast Forward Mode inoperative



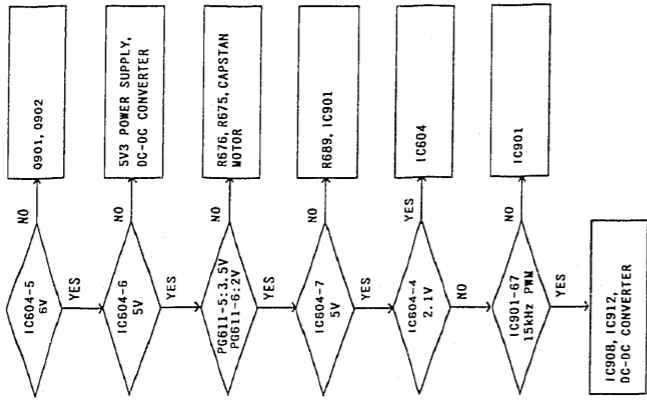
Rewind Mode inoperative



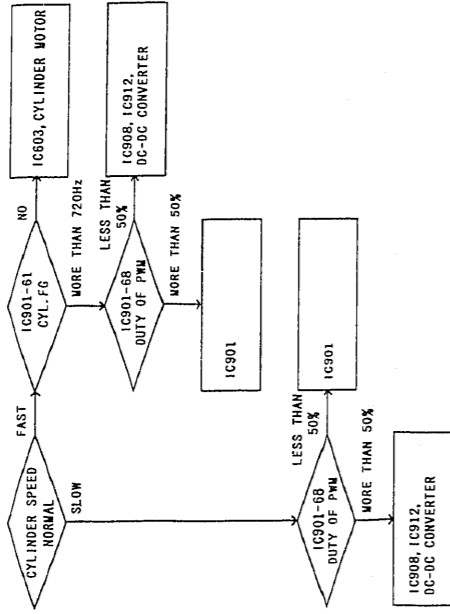
Cylinder does not rotate



Capstan does not rotate

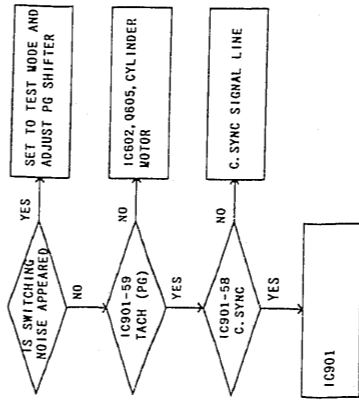


Horizontal Sync Loss/Noise Picture in Play Mode

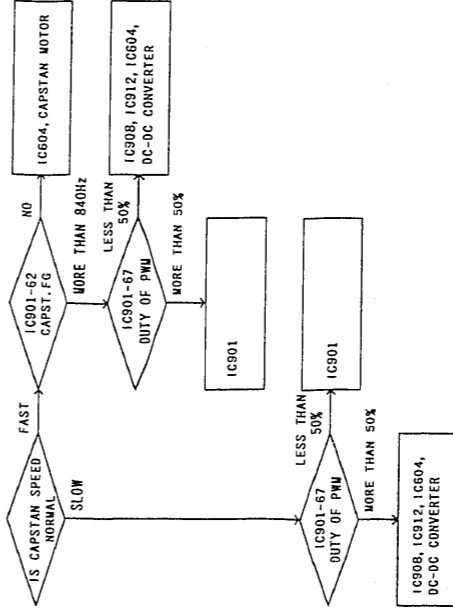


2-25

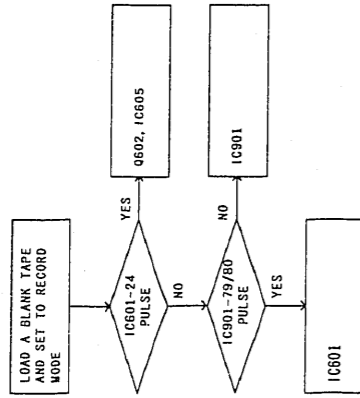
Horizontal Jitter/Noise Picture in Play Mode



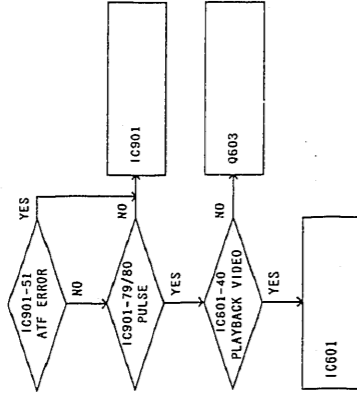
Noise Picture in Play Mode



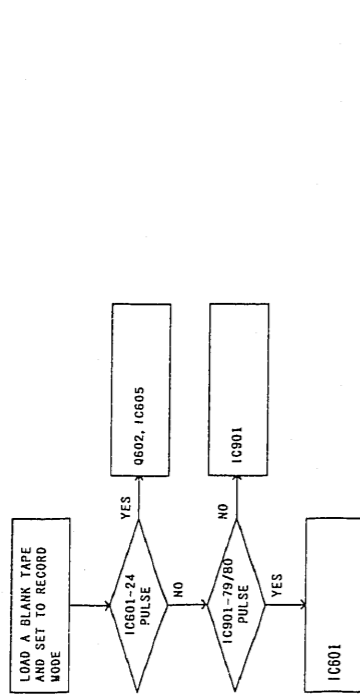
Vertical Jitter/Noise Picture in Play Mode



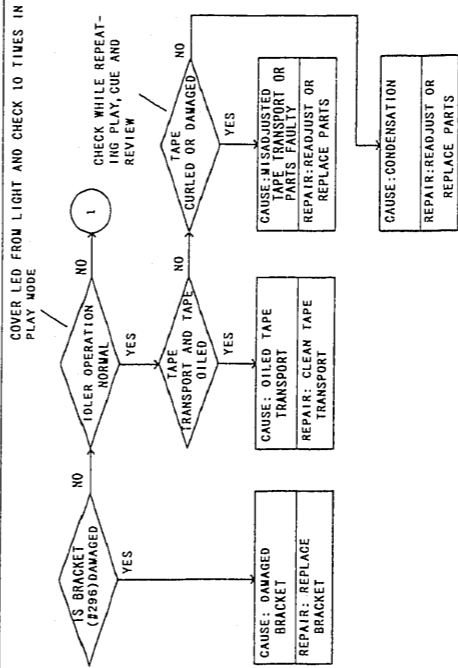
Noise Picture only when Prerecorded Tape is played back



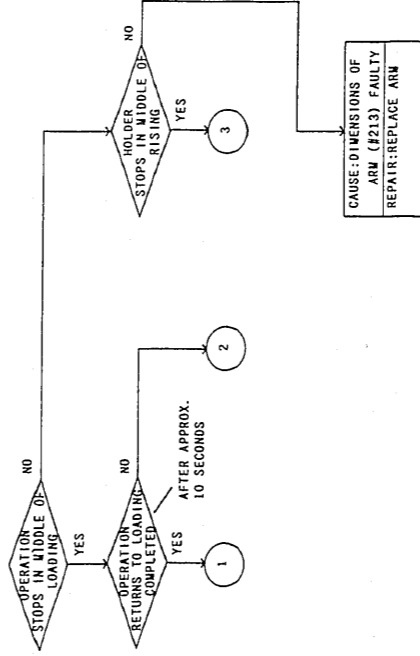
Vertical Jitter/Noise Picture in Play Mode



Tape entangled



Eject not possible



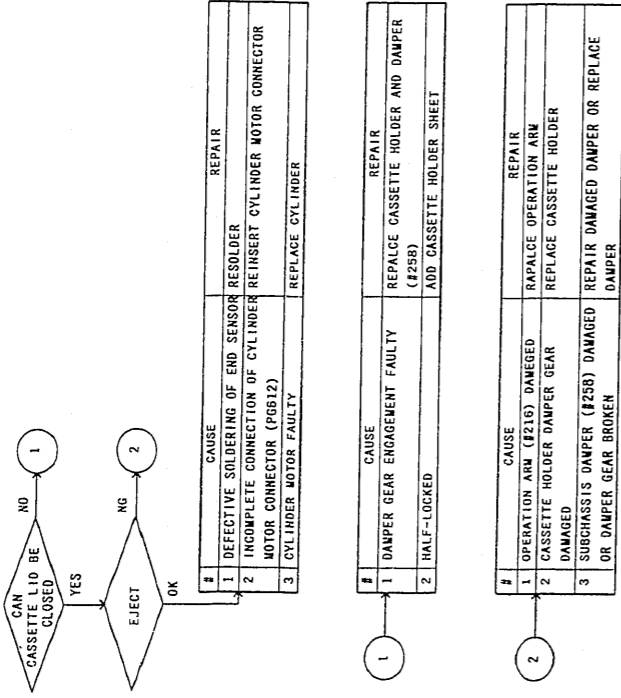
#	CAUSE	REPAIR
1	IDLER SHEET (#295) DAMAGED (CAUSED BY BURRS OF PLATE (#253))	REPLACE NEW TYPE IDLER (#246) AND PLATE (#253) (IDLER SHEET NOT USE)
2	IDLER SHEET COMES OFF (DEFECTIVE WORK OR PLATE FAULTY)	REPLACE NEW TYPE IDLER PLATE (IDLER SHEET NOT USE)
3	IDLER SHEET DIRTY	REPLACE NEW TYPE IDLER AND CLEAN PLATE (IDLER SHEET NOT USE)
4	DIMENSIONS OF PLATE FAULTY (FAULTY IN WARPING)	REPLACE PLATE

#	CAUSE	REPAIR
1	COMES OFF DUE TO FAULTY DIMENSION OF PRESSURE ROLLER (#288) ARM	REPLACE PRESSURE ROLLER AND MOUNT IT WITH E-RING
2	OPERATION ARM (#216) DAMAGED	REPLACE OPERATION ARM
3	ARM (#281), DAMAGED	REPLACE ARM AND MOUNT IT WITH E-RING

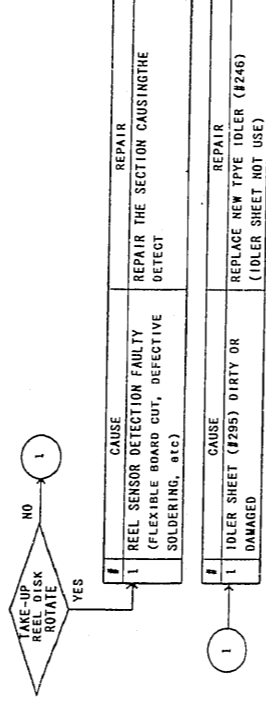
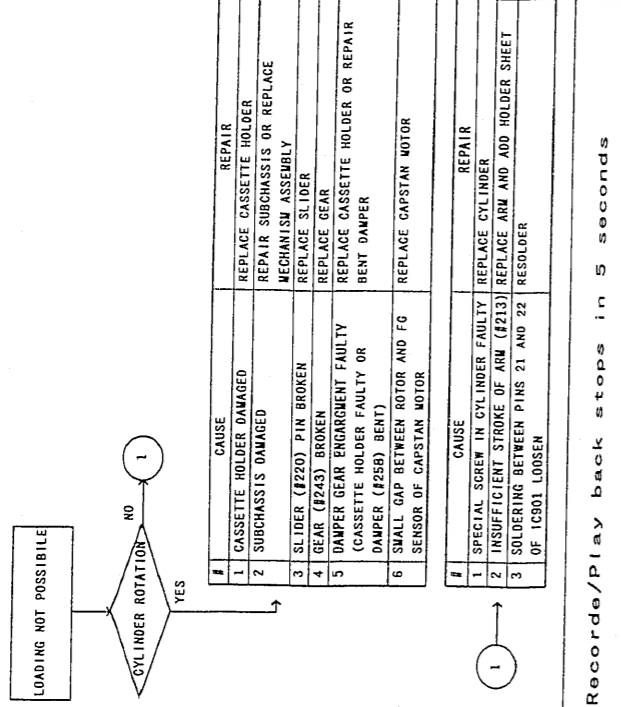
#	CAUSE	REPAIR
1	SLIDER (#220) FAULTY (DAMAGED, ETC.)	REPLACE SLIDER
2	BENT OF DAMPER (#258) OF SUBCHASSIS	REPAIR BENT AND REPLACE DAMPER
3	OPERATION ARM (#216) DAMAGED	REPLACE OPERATION ARM
4	PLATE SPRING OF ARM (#288) DAMAGED	REPLACE ARM
5	ARM (#281) DAMAGED	REPLACE ARM AND MOUNT IT WITH E-RING
6	RACK (#214) REMOVED	REPLACE NEW TYPE RACK

#	CAUSE	REPAIR
1	DAMPER GEAR (#258) BROKEN OR DAMPER SHAFT BENT	REPLACE DAMPER OR REPAIR BENT DAMPER
2	CASSETTE HOLDER DAMPER GEAR DAMAGED	REPLACE CASSETTE HOLDER

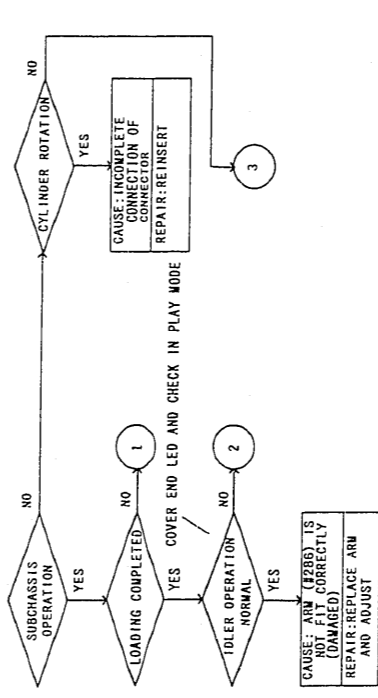
Cassette Lid cannot be opened and closed



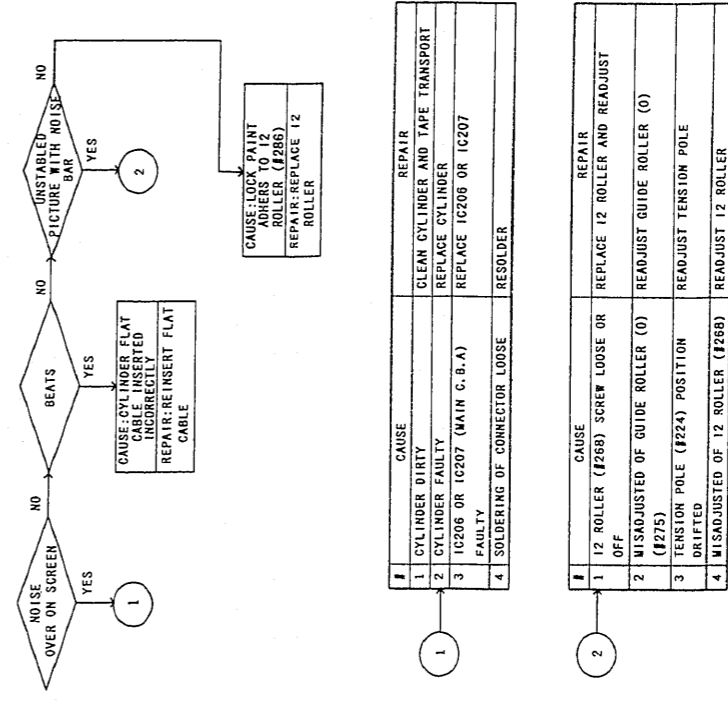
Cassette Tape cannot be loaded



Loading not possible/Tape not run

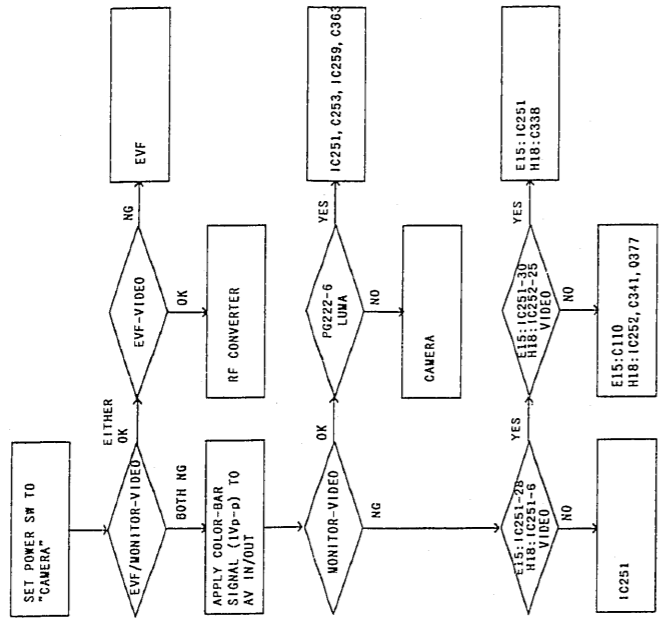


Played Back Picture is Abnormal

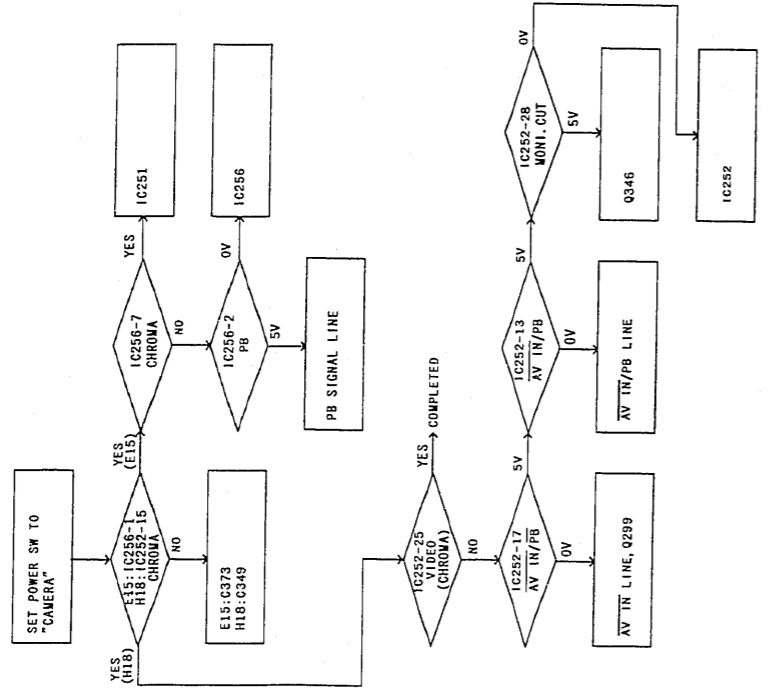


2. VM-E15A/VM-H18A TROUBLESHOOTING GUIDE

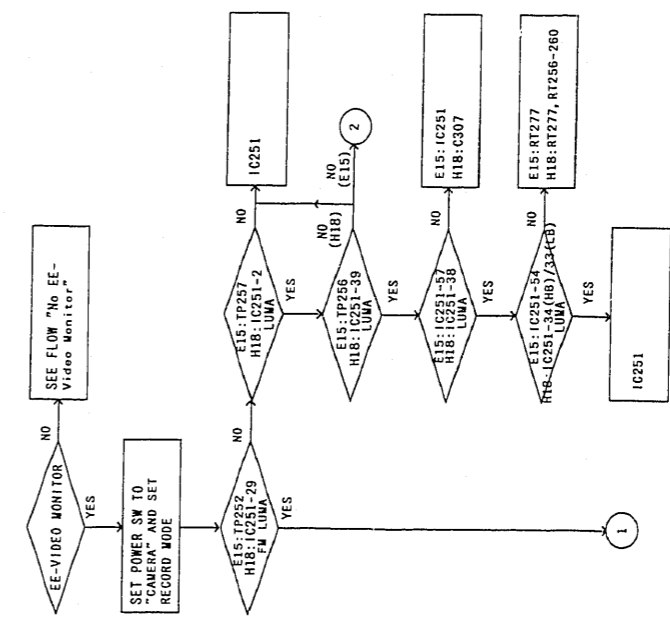
No EE-Video Monitor



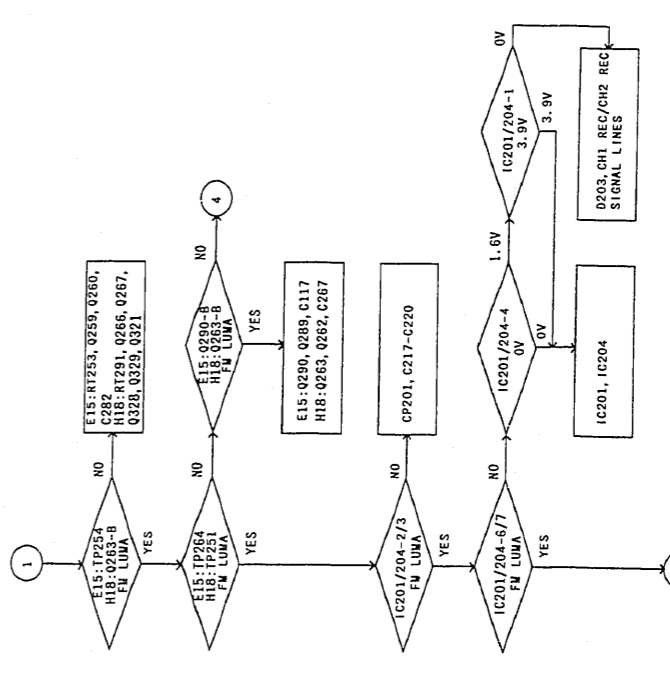
No EE-Chroma

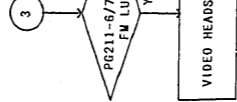
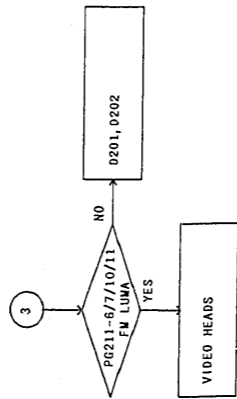
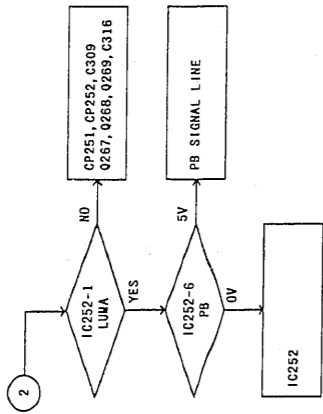
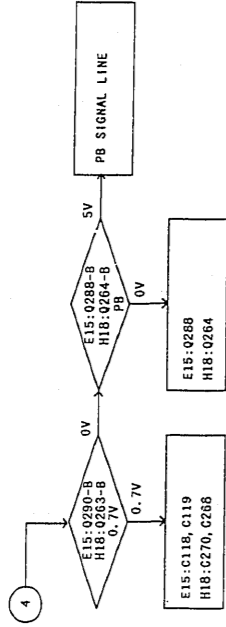


No Record Video



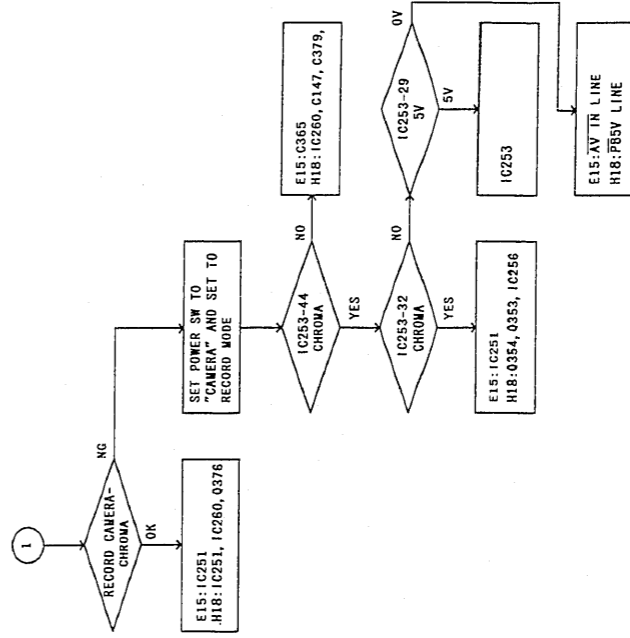
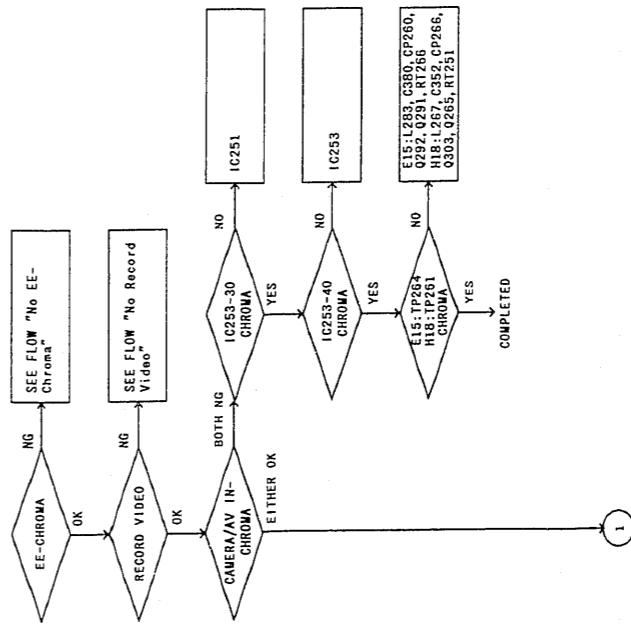
No Record Video



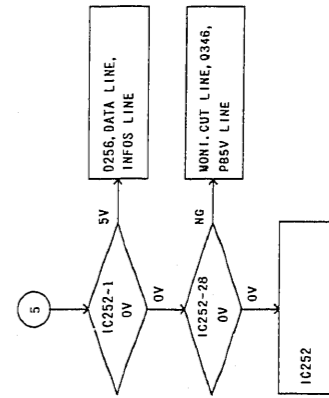
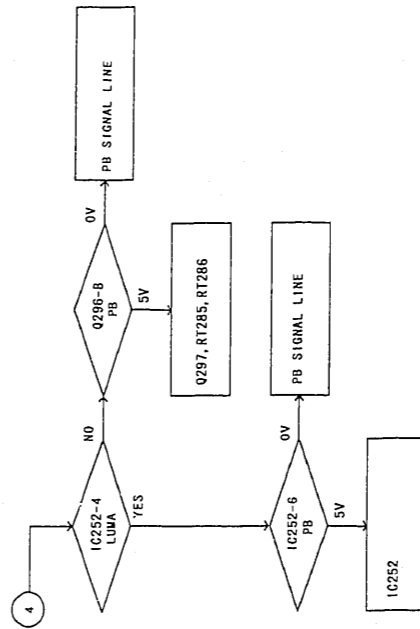
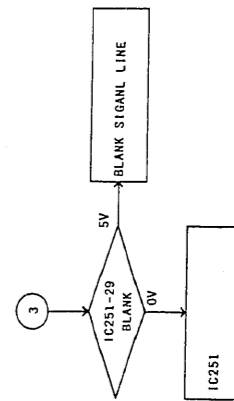
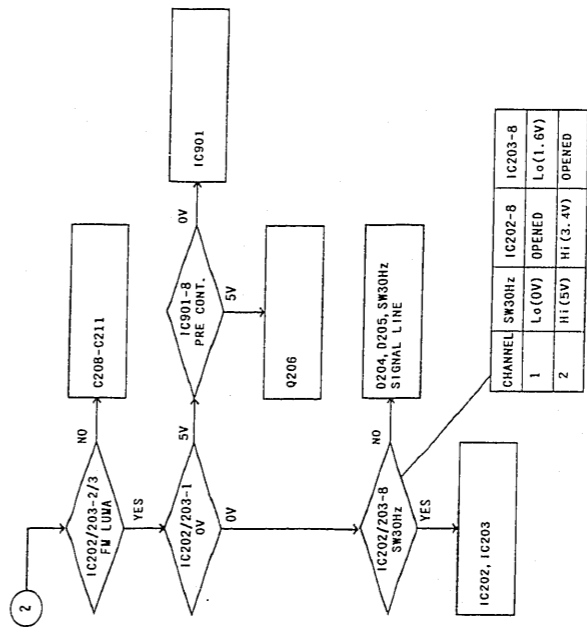
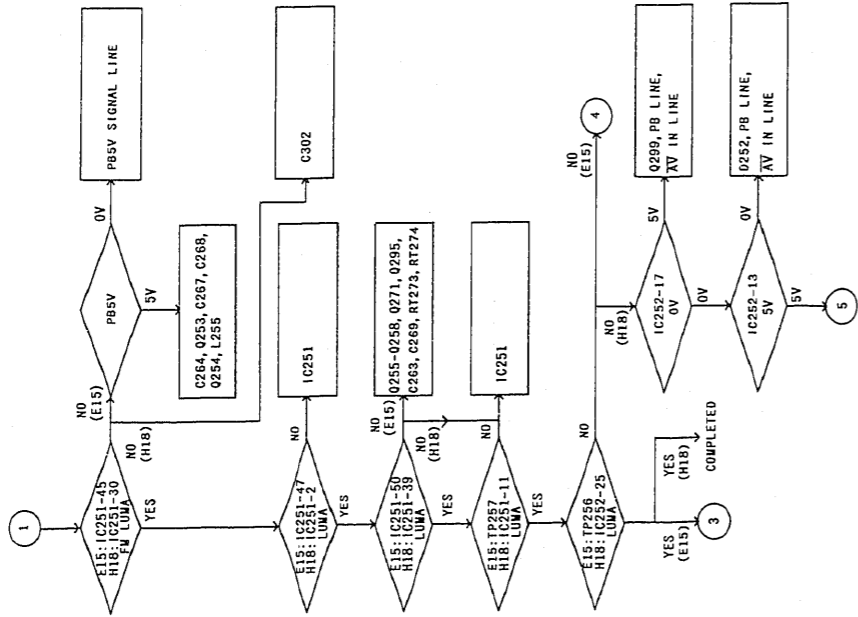
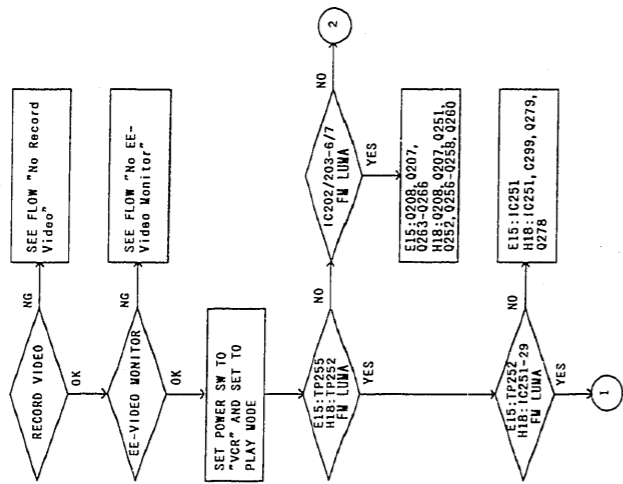


4986

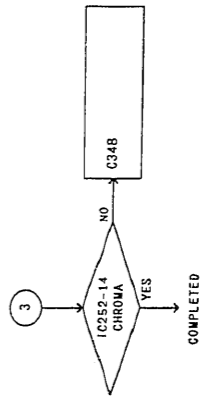
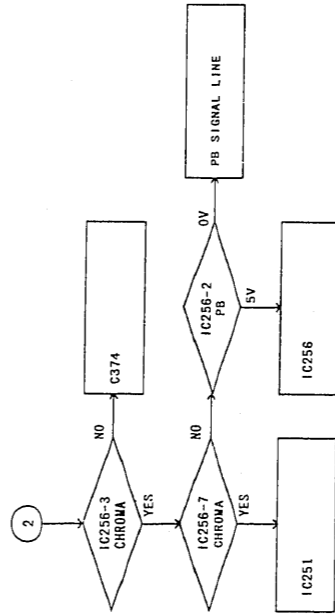
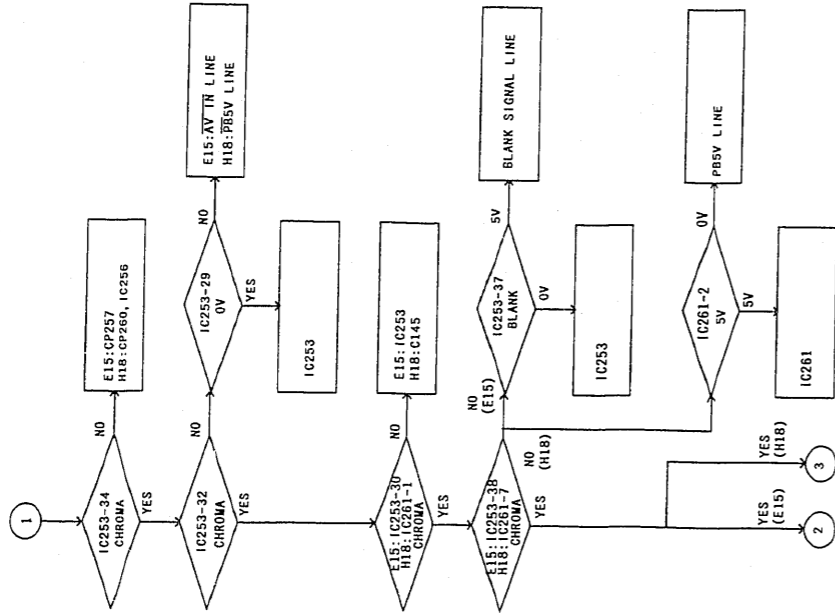
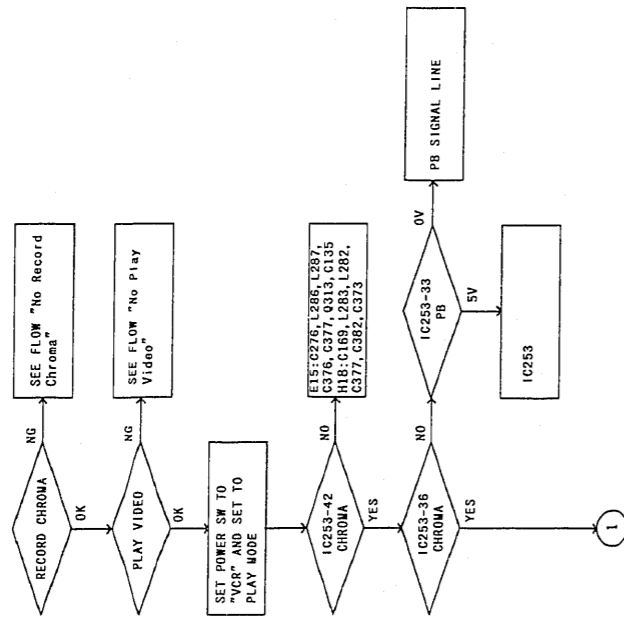
No Record Chroma



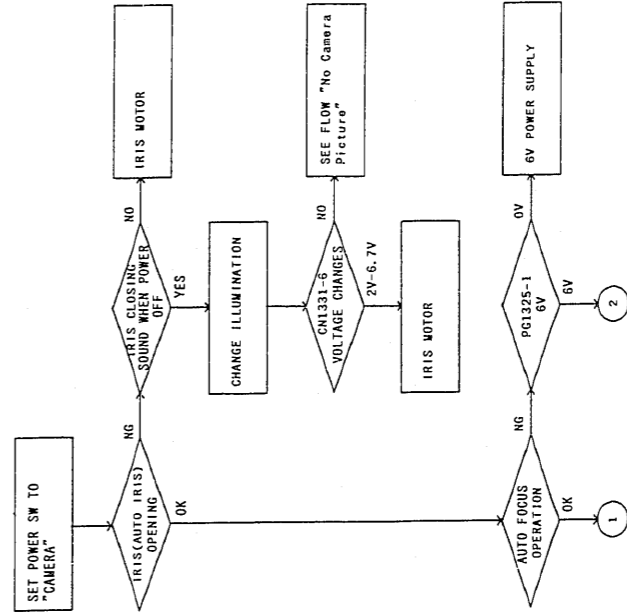
No Play Video

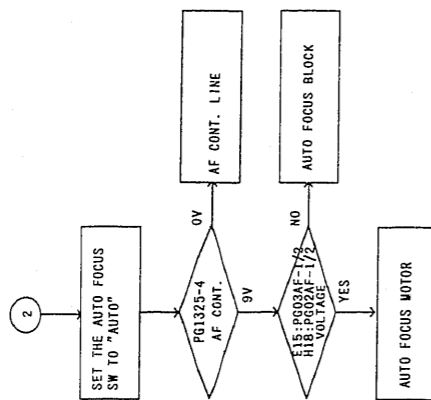
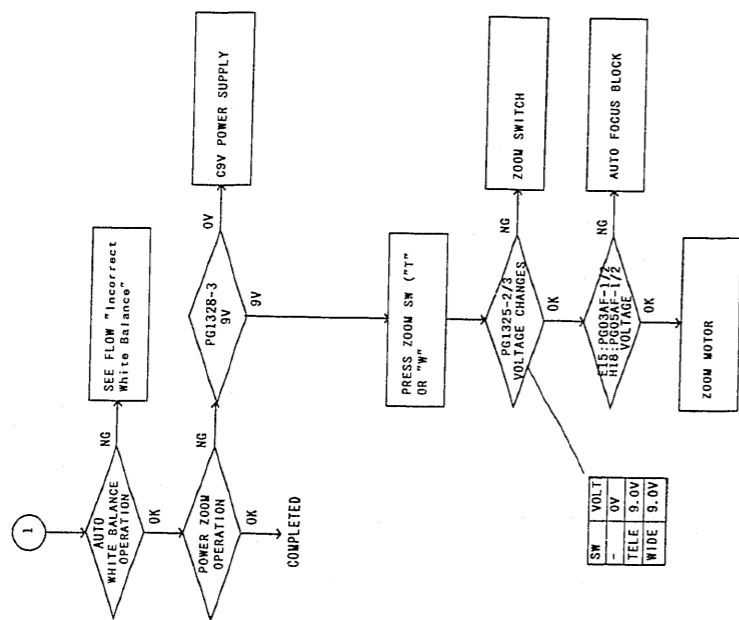


No Play Chroma

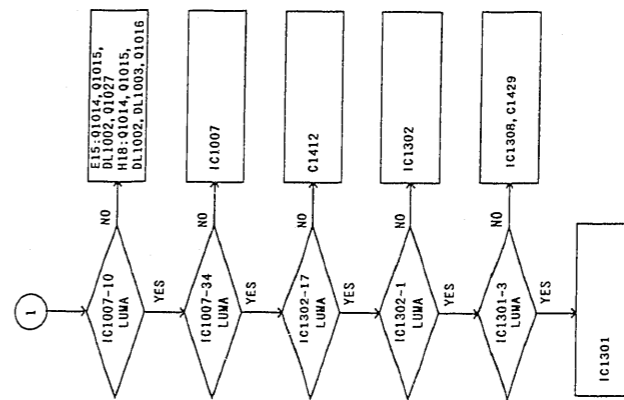
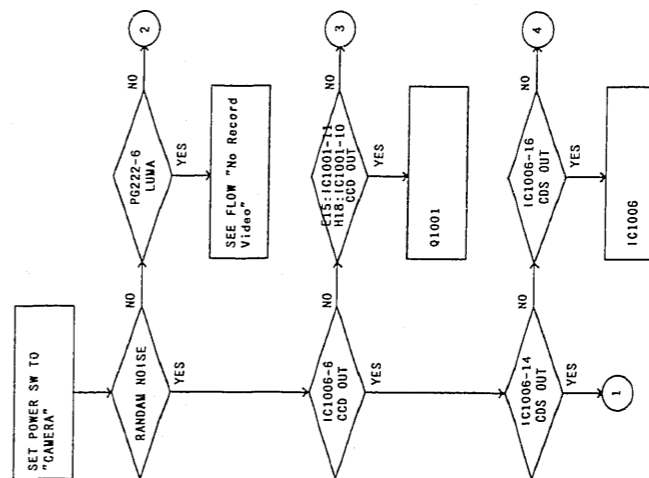


Does not operate Auto Iris/Auto Focus/Auto White Balance/Power Zoom

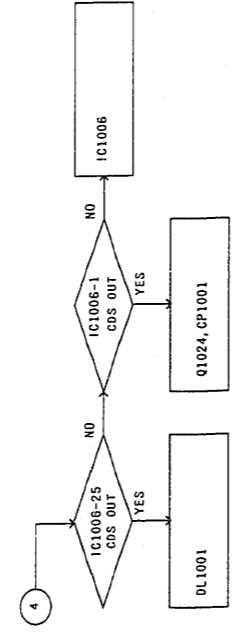
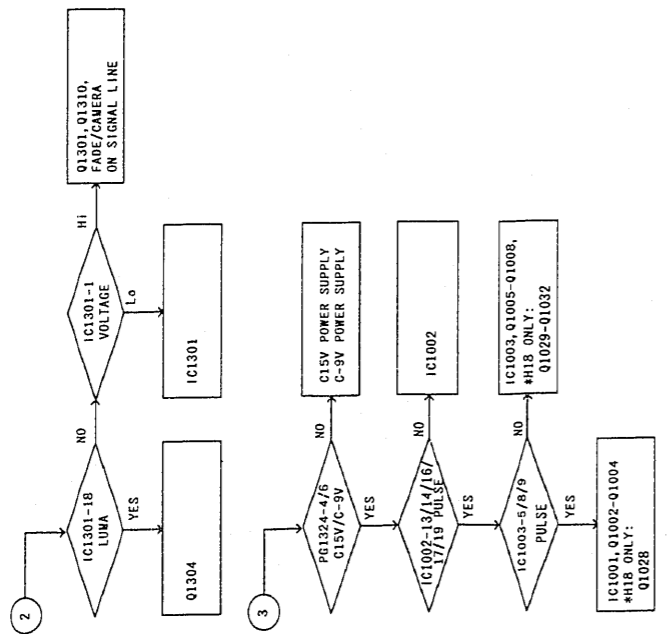
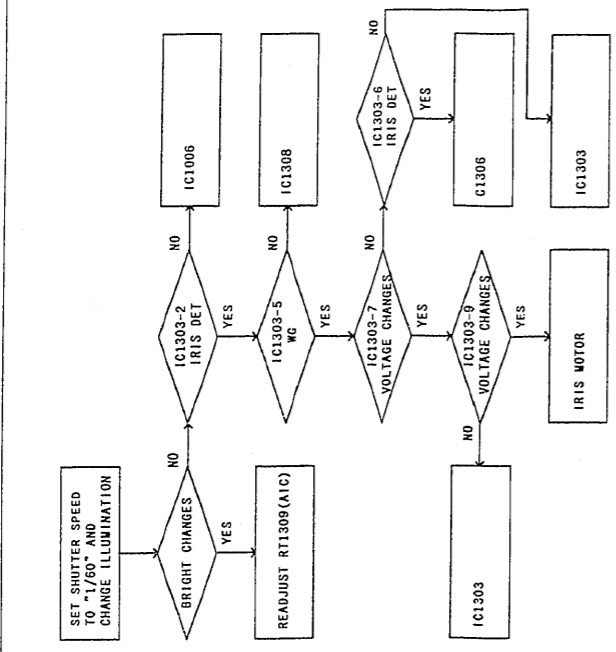




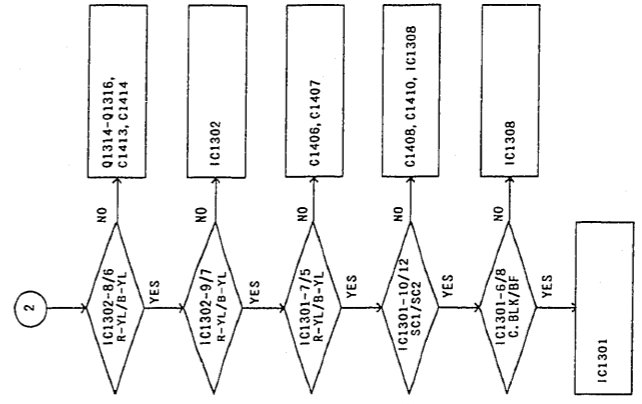
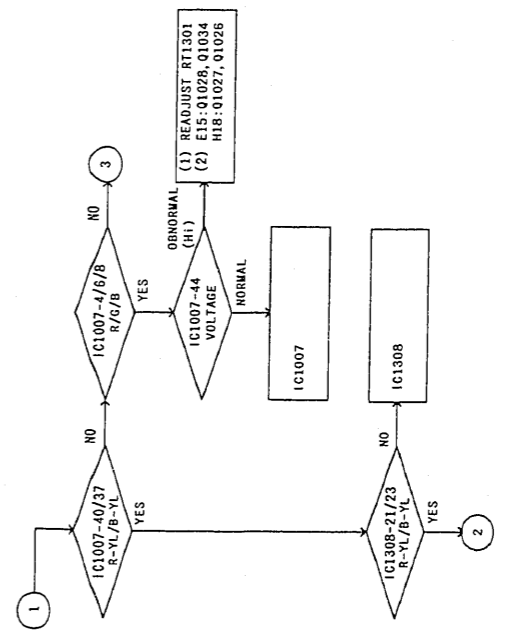
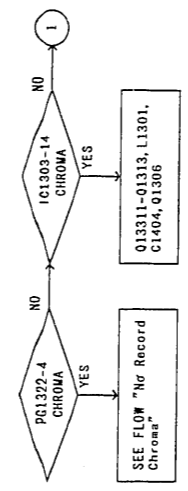
No Camera Picture



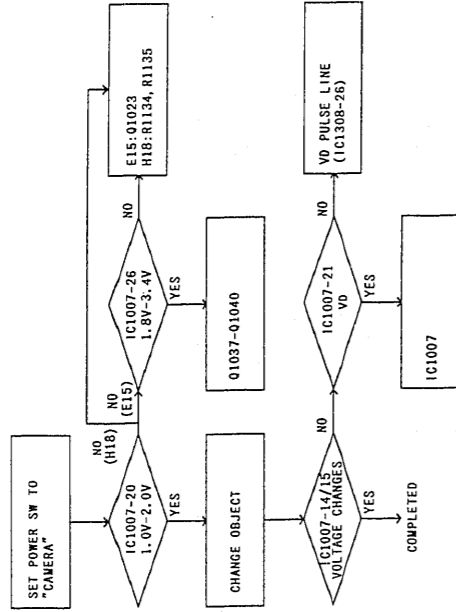
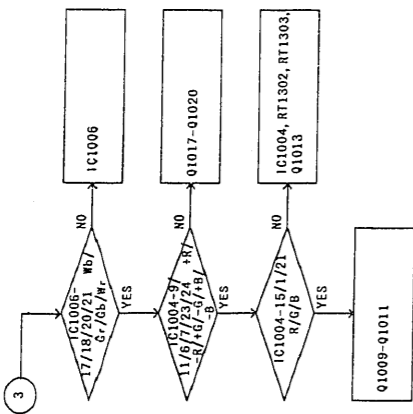
Video Level too High/Low



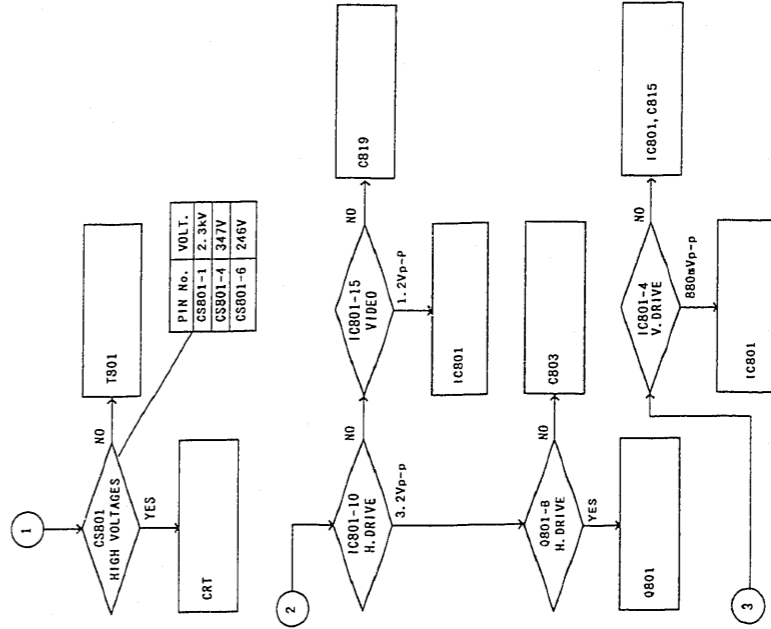
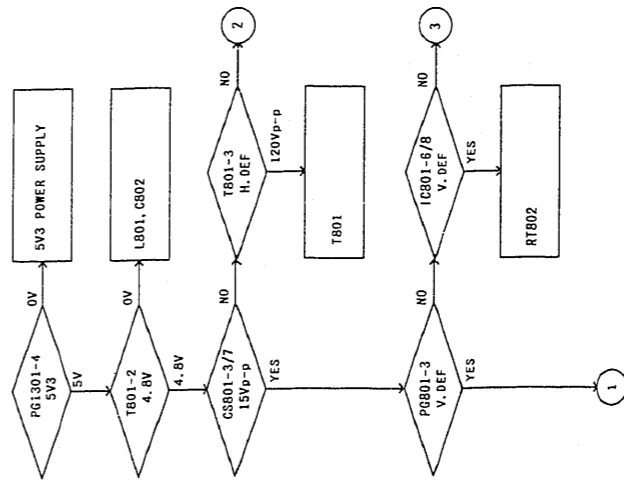
No Camera Color



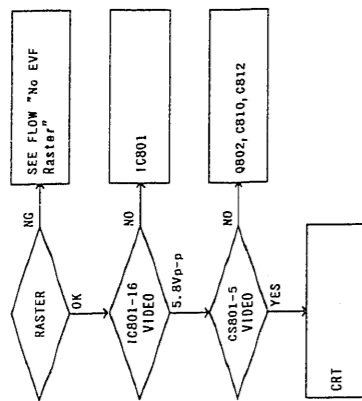
Incorrect White Balance



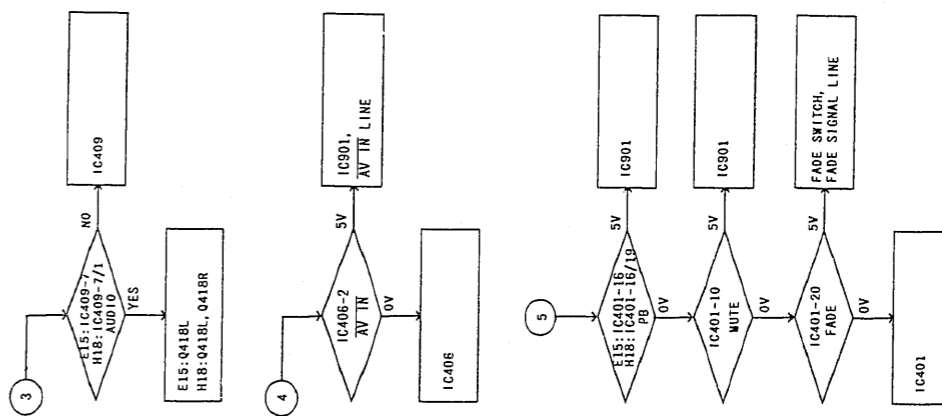
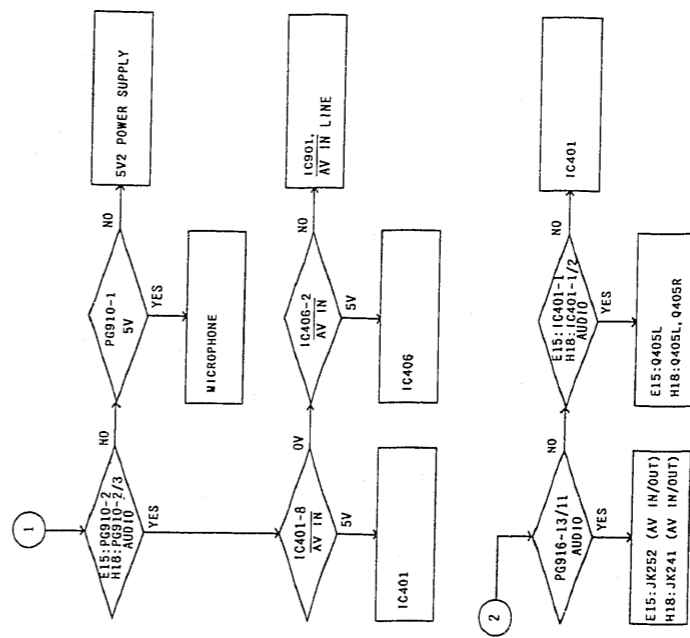
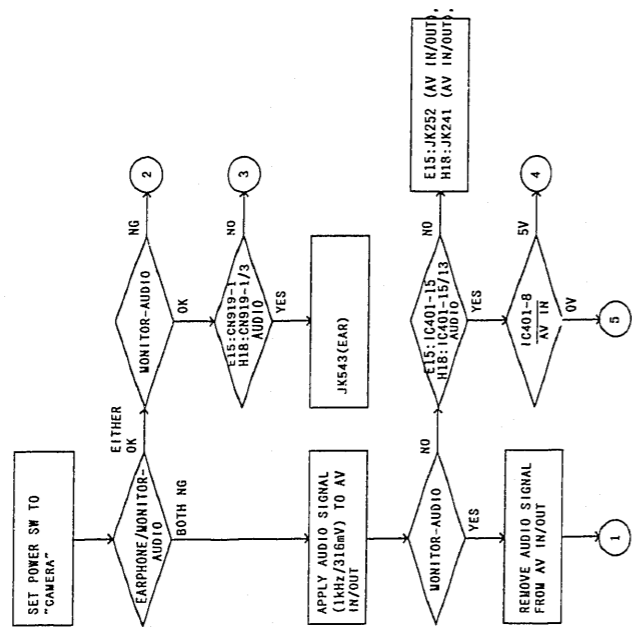
No EVF Rastor



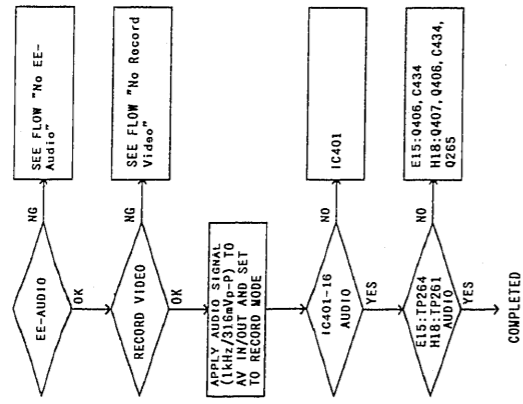
No Picture on EVF



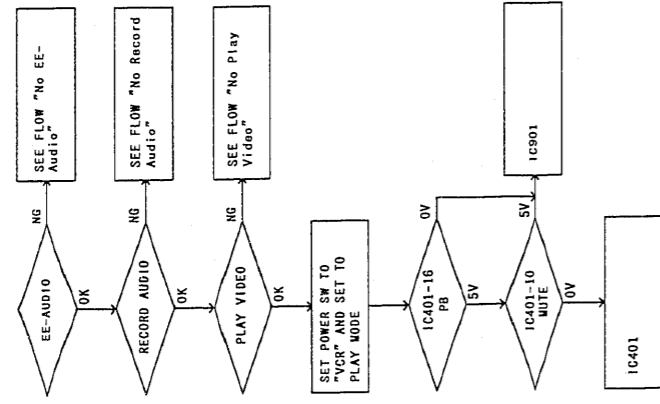
No EE-Audio



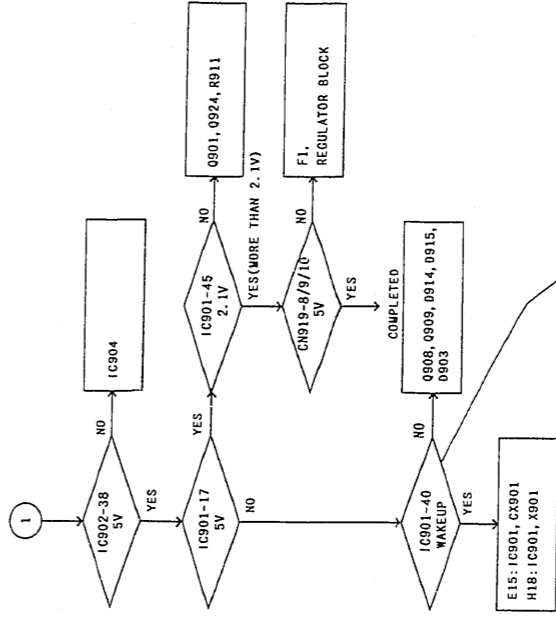
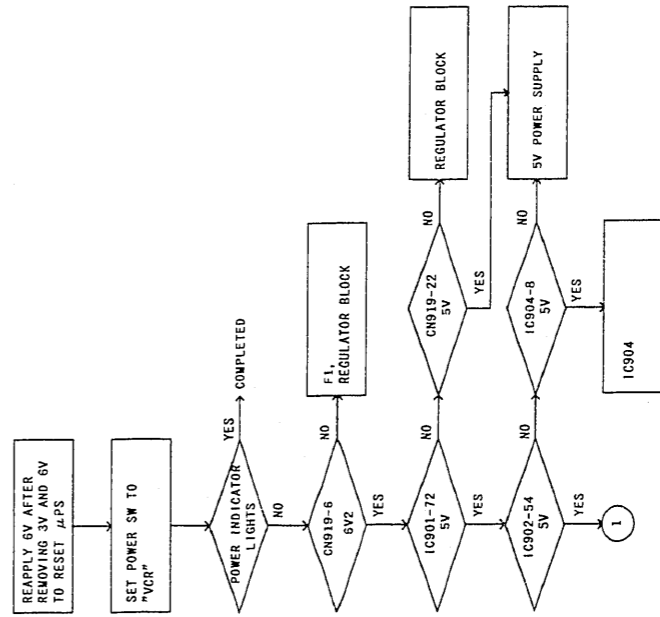
No Record Audio



No Play Audio

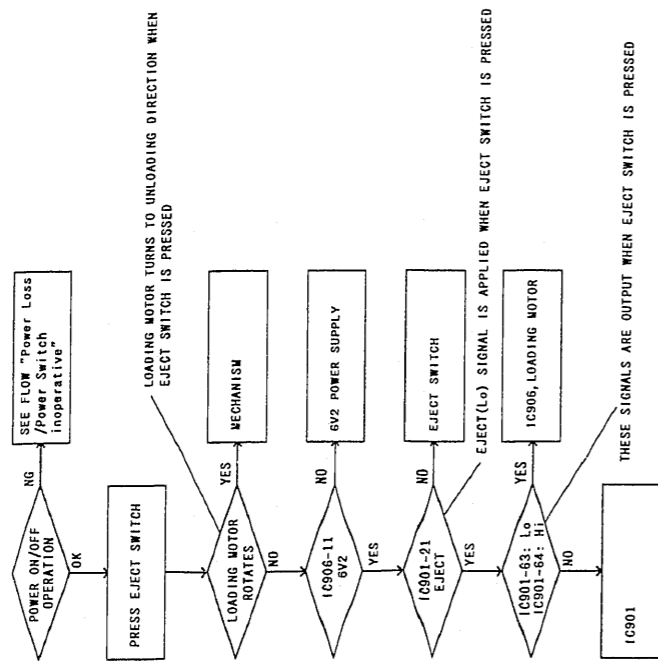


Power Loss/Power Switch inoperative

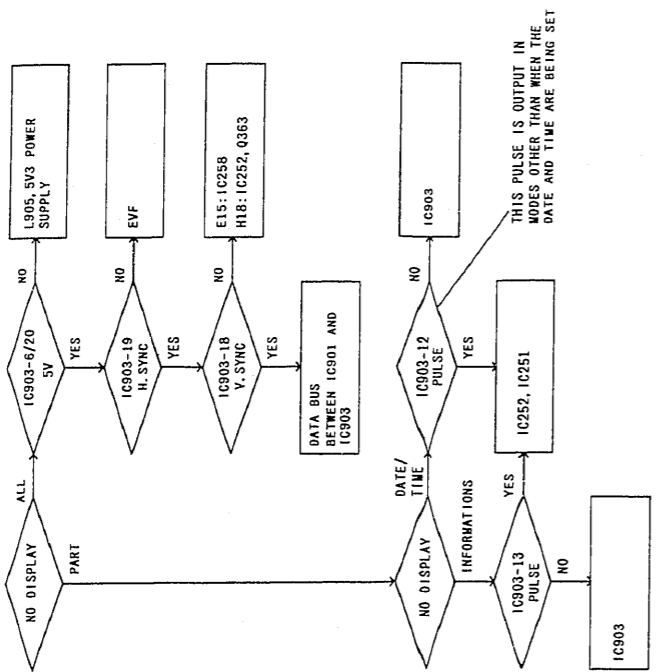


THE WAKEUP(Lo) PULSE IS APPLIED WHEN CASSETTE HOLDER IS CLOSED, WHEN RECORD START/STOP OR EJECT SWITCH IS PRESSED OR WHEN POWER SWITCH IS SET TO "CAMERA" OR "VCR".

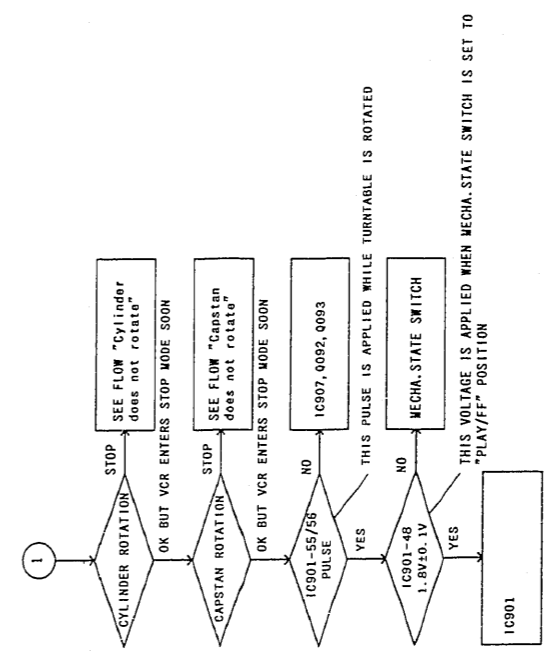
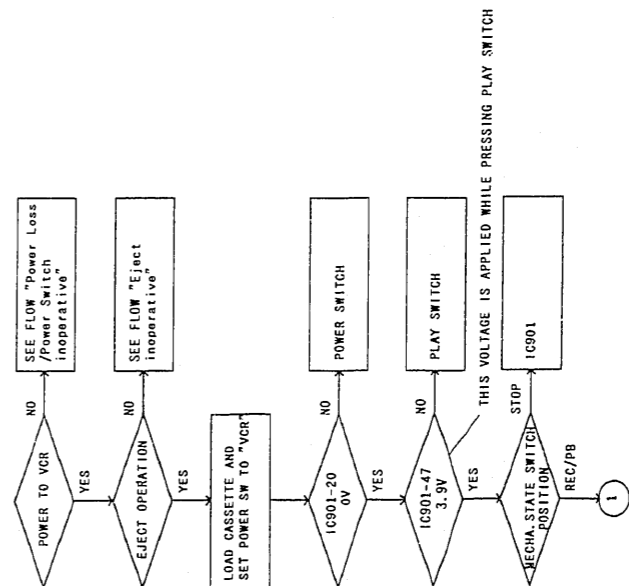
Eject inoperative



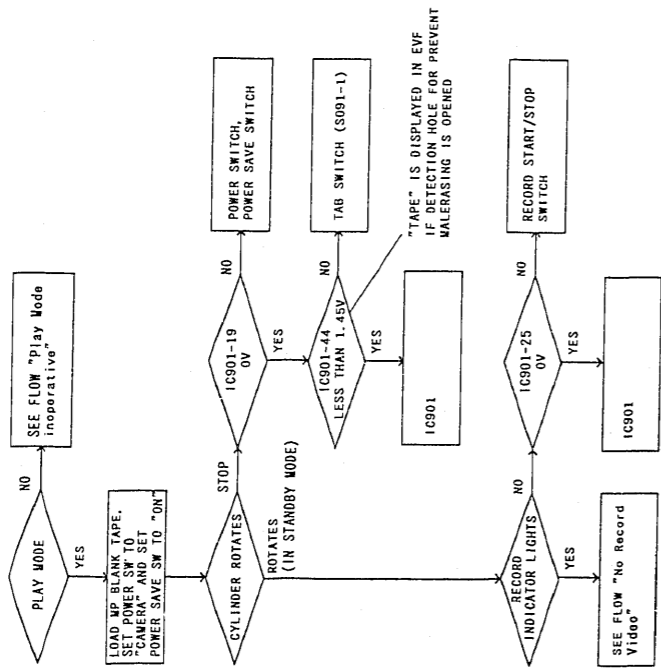
On Screen Display inoperative



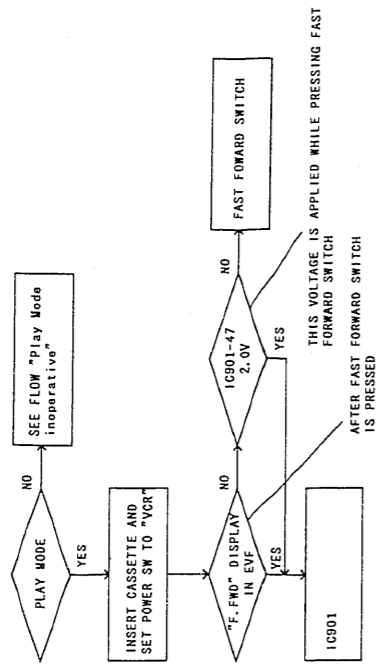
Play Mode inoperative



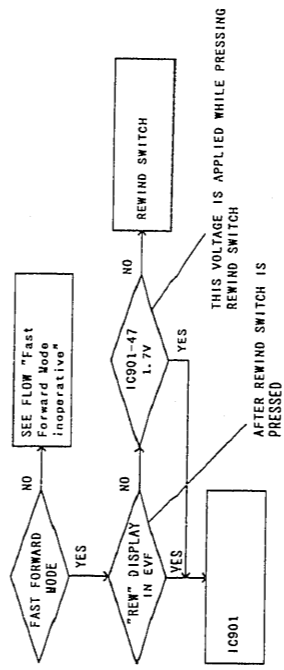
Record Mode inoperative



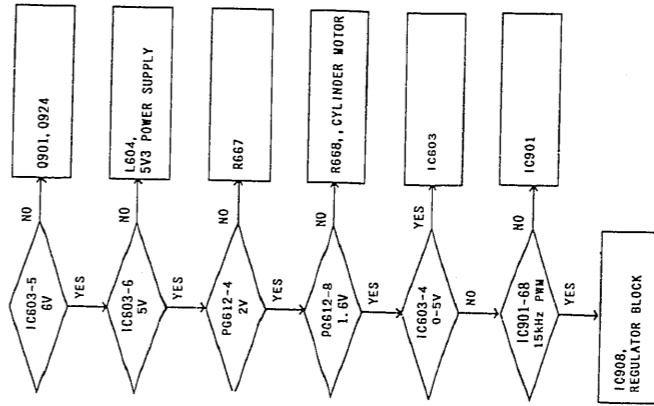
Fast Forward Mode inoperative



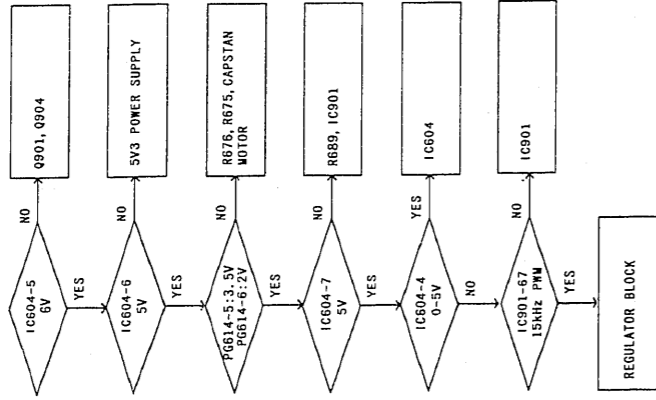
Rewind Mode inoperative



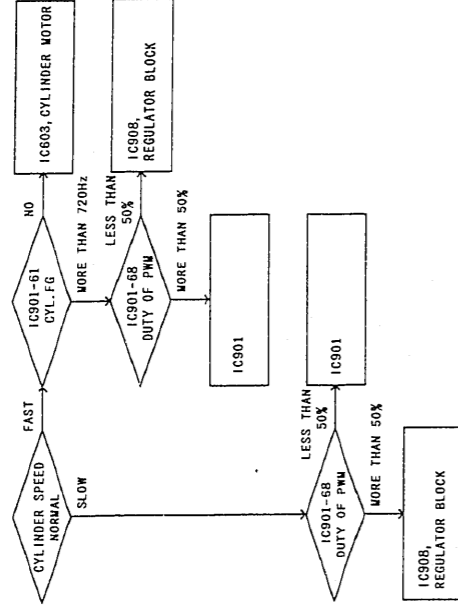
Cylinder does not rotate



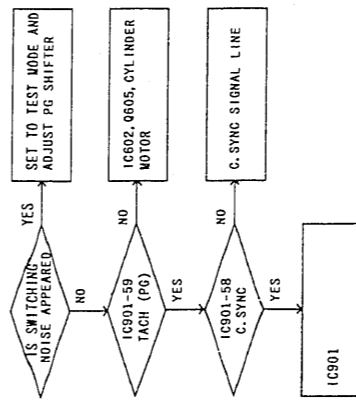
Capstan does not rotate



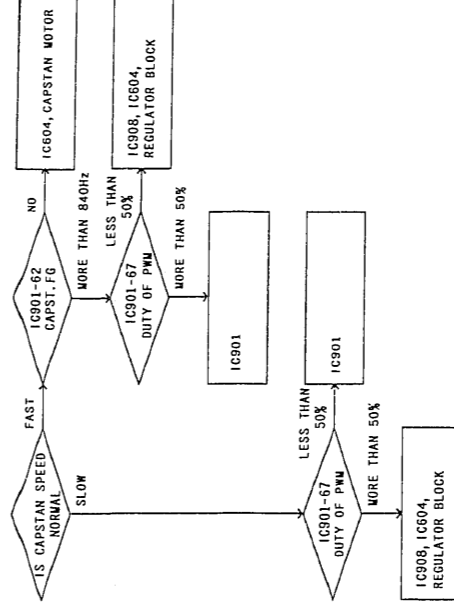
Horizontal Sync Loss/Noise Picture in Play Mode



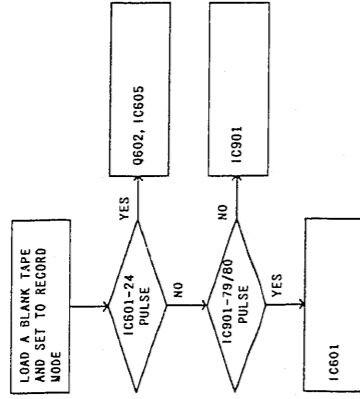
Horizontal Jitter/Noise Picture in Play Mode



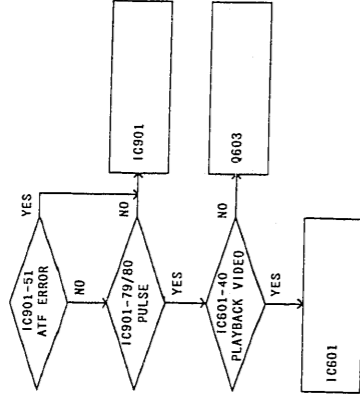
Noise Picture in Play Mode



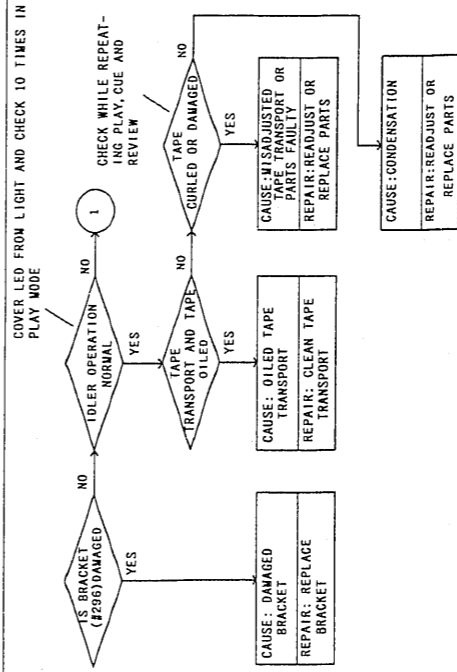
Vertical Jitter/Noise Picture in Play Mode



Noise Picture only when Prerecorded Tape is played back

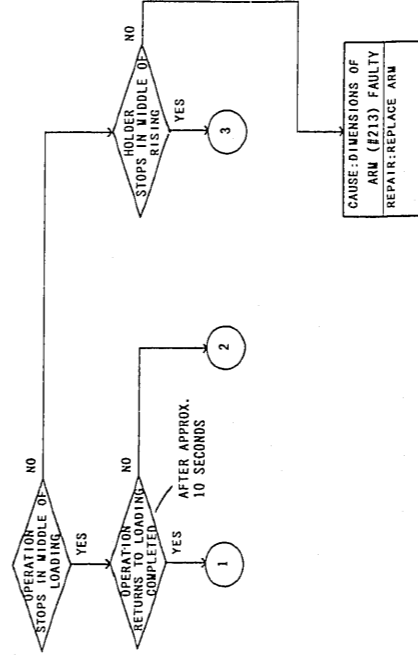


Tape entangled



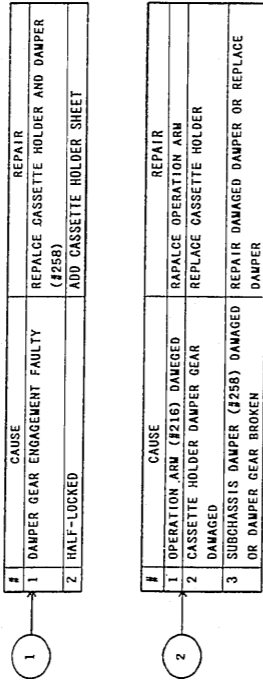
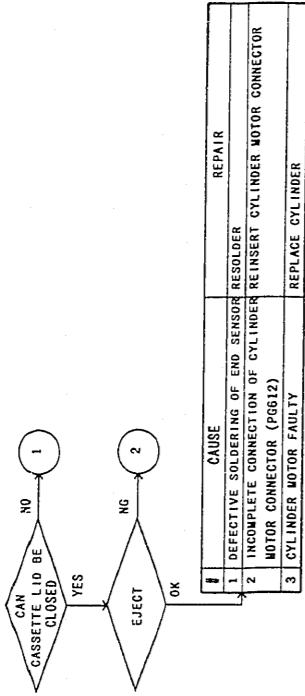
#	CAUSE	REPAIR
1	IDLER SHEET (#295) DAMAGED (CAUSED BY BURRS OF PLATE (#293))	REPLACE NEW TYPE IDLER (#246) AND PLATE (#253) (IDLER SHEET NOT USE)
2	IDLER SHEET COMES OFF (DEFECTIVE WORK OR PLATE FAULTY)	REPLACE NEW TYPE IDLER PLATE (IDLER SHEET NOT USE)
3	IDLER SHEET DIRTY	REPLACE NEW TYPE IDLER AND CLEAN PLATE (IDLER SHEET NOT USE)
4	DIMENSIONS OF PLATE FAULTY (FAULTY IN WARPING)	REPLACE PLATE

Eject not possible

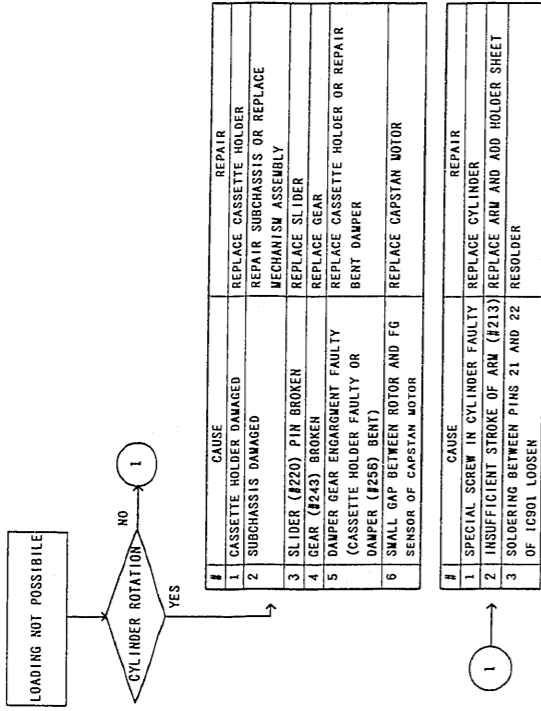


#	CAUSE	REPAIR
1	COMES OFF DUE TO FAULTY DIMENSION OF PRESSURE ROLLER (#288) ARM	REPLACE PRESSURE ROLLER AND MOUNT IT WITH E-RING
2	OPERATION ARM (#216) DAMAGED	REPLACE OPERATION ARM
3	ARM (#281) DAMAGED	REPLACE ARM AND MOUNT IT WITH E-RING
4	SLIDER (#220) FAULTY (DAMAGED, ETC.)	REPLACE SLIDER
5	BENT OF DAMPER (#258) OF SUBCHASSIS	REPAIR BENT AND REPLACE DAMPER
6	OPERATION ARM (#216) DAMAGED	REPLACE OPERATION ARM
7	PLATE SPRING OF ARM (#268) DAMAGED	REPLACE ARM
8	ARM (#281) DAMAGED	REPLACE ARM AND MOUNT IT WITH E-RING
9	RACK (#214) REMOVED	REPLACE NEW TYPE RACK
10	DAMPER GEAR (#256) BROKEN OR DAMPER SHAFT BENT	REPAIR
11	CASSETTE HOLDER DAMPER GEAR DAMAGED	REPLACE DAMPER OR REPAIR BENT DAMPER
12	CASSETTE HOLDER DAMPER GEAR DAMAGED	REPLACE CASSETTE HOLDER

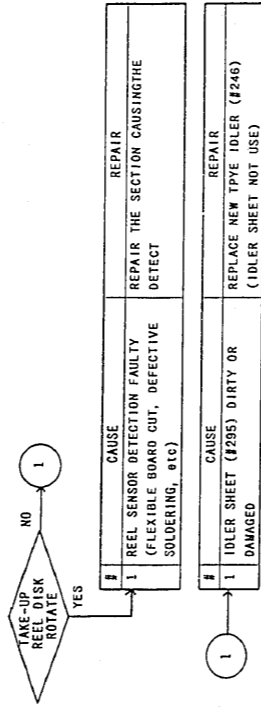
Cassette Lid cannot be opened and closed



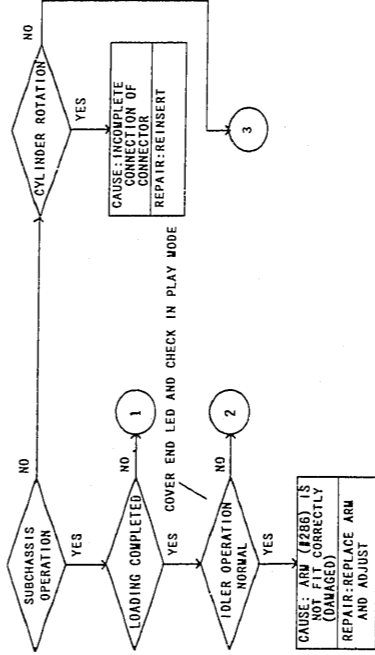
Cassette Tape cannot be loaded



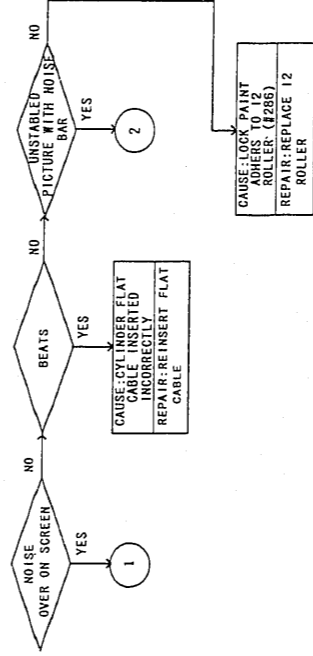
Record/Play back stops in 5 seconds



Loading not possible/Tape not run



Played Back Picture is Abnormal



CHAPTER 2 QUICK GUIDE TO TROUBLESHOOTING

Note: Numbers (#XXX) are index symbols in the exploded views and parts list.

Symptom	Power not turned on.		
Model	VM-E10A	VM-E15A	VM-H18A
1	Cause	DC-DC converter (#122) faulty.	DC-DC converter (#611) faulty.
	Remedy	Replace DC-DC converter (#122).	Replace DC-DC converter (#611).
2	Cause	Defective soldering of Q916 (main board).	Defective soldering of Q908 (main board).
	Remedy	Re-solder.	Re-solder.
3	Cause	Fuse (F501) blown due to defective DC-DC converter (#122).	Fuse (F1) blown due to defective DC-DC converter (#611).
	Remedy	(1) Replace fuse (F501). (2) Replace DC-DC converter (#122).	(1) Replace fuse (F1). (2) Replace DC-DC converter (#611).
4	Cause	Defective soldering of Q909 (main board)	
	Remedy	Re-solder.	
5	Cause	CN908 (power save switch) and PG908 (main board) not connected correctly.	CN1329 (power save switch) and PG1329 (main board) not connected correctly.
	Remedy	Connect CN908 and PG908 correctly.	
6	Cause	X901 (main board) faulty.	X901 (main board) faulty.
	Remedy	Replace X901.	Replace X901.
7	Cause	Gear (#211) lifts.	
	Remedy	Replace gear (#211).	
8	Cause	Defective soldering of PG051 (fuse board).	Defective soldering of PG552 (regulator block).
	Remedy	Re-solder.	
9	Cause	X1902 (process board) faulty.	X902 (main board) faulty.
	Remedy	Replace X1902.	Replace X902.

Symptom	Power turned off after operation is accepted.		
Model	VM-E10A	VM-E15A	VM-H18A
1	Cause	Arm (#222) is caught by arm (#268).	
	Remedy	Replace arm (#268).	

Symptom	No camera picture		
Model	VM-E10A	VM-E15A	VM-H18A
1	Cause	DC-DC converter (#122) faulty.	DC-DC converter (#611) faulty.
	Remedy	Replace DC-DC converter (#122).	Replace DC-DC converter (#611).
2	Cause	PG1207 (process board) and CN1207 (iris) not connected correctly.	PG1331 (process board) and CN1331 (iris) not connected correctly.
	Remedy	Connect PG1207 and CN1207 correctly.	Connect PG1331 and CN1331 correctly.
3	Cause	IC1211 (process board) faulty.	IC1308 (process board) faulty.
	Remedy	Replace IC1211.	Replace IC1308.
4	Cause	Iris (#756) not opened.	Iris (#754) not opened.
	Remedy	Replace iris (#756) and adjust.	Replace iris (#754) and adjust.
5	Cause	IC1206 (process board) faulty.	IC1007 (sensor board) faulty.
	Remedy	Replace IC1206 and adjust.	Replace IC1007 and adjust.
6	Cause	PG1201 (process board) and PG1001 (sensor board) not connected correctly.	PG1323/1324 (process board) and CN1023/1024 (sensor board) not connected correctly.
	Remedy	Connect PG1201 and PG1001 correctly.	Connect PG1323/1324 and CN1023/1024 correctly.
7	Cause	Fuse (F053) blown.	Fuse (F2) blown.
	Remedy	Replace fuse (F053).	Replace fuse (F2).

Symptom	Tape does not run.		
Model	VM-E10A	VM-E15A	VM-H18A
1	Cause	Wobbling of arm (#286) causes unstable tape running.	
	Remedy	Replace arm (#286).	

Symptom	No eject		
Model	VM-E10A	VM-E15A	VM-H18A
1	Cause	Arm (#268) comes off from the chassis.	
	Remedy	Replace arm (#268).	
2	Cause	Pressure roller (#288) wobbles and does not operate normally.	
	Remedy	Replace pressure roller (#288) and fix it with an E-ring.	
3	Cause	PG613 (main board) and CN613 (cylinder) not connected correctly.	
	Remedy	Connect PG613 and CN613 correctly.	
4	Cause	Defective soldering of take-up end sensor.	
	Remedy	Re-solder.	
5	Cause	Operation arm (#216) wobbles and rides over the base, deforming the leaf spring.	
	Remedy	Replace operation arm (#216).	
6	Cause	The Hall device's printed coil in cylinder (#501) is disconnected.	
	Remedy	Replace cylinder (#501).	
7	Cause	Defective soldering of PG611 (main board).	Defective soldering of PG614 (main board).
	Remedy	Re-solder.	Re-solder.
8	Cause	Arm (#286) hits arm (#281) and deforms it.	
	Remedy	Replace arm (#281).	
9	Cause	Pressure roller (#288) comes off from the chassis.	
	Remedy	Replace pressure roller (#288) and fix it with an E-ring.	
10	Cause	The damper (#258) attaching section is deformed and the gear is damaged.	
	Remedy	Correct the attaching section and then replace damper (#258).	
11	Cause	CN612 (flat cable) and cylinder (#501) not connected correctly.	
	Remedy	Replace cylinder (#501).	
12	Cause	Cassette holder (#401) is deformed which disables unlocking.	
	Remedy	Replace cassette holder (#401).	
13	Cause	Guide plate (#277) is caught by arm (#286).	
	Remedy	Replace guide plate (#277).	
14	Cause	Operation arm (#216) is deformed and pushes arm (#213).	
	Remedy	Replace operation arm (#216).	
15	Cause	Guide roller base I (#266) and O (#275) wobble and rack (#214) comes off.	
	Remedy	Replace rack (#214).	
16	Cause	Dew sensor faulty.	
	Remedy	Replace the dew sensor.	
17	Cause	PG904 (main board) and CN904 (loading motor) not connected correctly.	
	Remedy	Connect PG904 and CN904 correctly.	
18	Cause	Loading motor (#218) faulty.	
	Remedy	Replace loading motor (#218).	

Symptom	Tape is entangled		
Model	VM-E10A	VM-E15A	VM-H18A
1	Cause	The dimensions of pressure roller (#288) are defective and the height regulating guide position is not accurate.	
	Remedy	Replace pressure roller (#288) and then fix it with an E-ring.	
2	Cause	Plate (#253) has burrs. Sheet (#295) comes off and is caught by idler (#246), causing the idler to be inoperable.	
	Remedy	Replace plate (#253) and idler (#246) (sheet (#295) is not required).	
3	Cause	Idler (#246) is damaged.	
	Remedy	Replace idler (#246) (sheet (#295) is not required).	

Symptom	EVF faulty (1/2)		
Model	VM-E10A	VM-E15A	VM-H18A
1	Cause	RT805 (EVF board) faulty and no picture.	
	Remedy	Adjust RT805.	
2	Cause	CRT (#703) faulty and no picture.	
	Remedy	Replace CRT (#703) and then adjust.	

Symptom				EVF faulty (2/2)			
Model		VM-E10A	VM-E15A	VM-H18A			
3	Cause	Foreign matter in CRT (#703) shorts the electrodes.					
	Remedy	Replace CRT (#703) and adjust.					

Symptom				Noise is conspicuous in playback picture			
Model		VM-E10A	VM-E15A	VM-H18A			
1	Cause	Arm (#268) height adjustment faulty.					
	Remedy	Adjust the height of arm (#268).					

Symptom				No recording/playback			
Model		VM-E10A	VM-E15A	VM-H18A			
1	Cause	Guide (#219) damaged.					
	Remedy	Replace guide (#219).					
2	Cause	The nut comes off from arm (#268), causing noise at the start of playback.					
	Remedy	Replace arm (#268).					

Symptom				No output from one channel			
Model		VM-E10A	VM-E15A	VM-H18A			
1	Cause	PG211 (main board) and CN211 (head) not connected correctly.					
	Remedy	Connect PG211 and CN211 correctly.					

Symptom				Tape does not run during recording/playback			
Model		VM-E10A	VM-E15A	VM-H18A			
1	Cause	Arm (#286) fixing screw is loosened and the arm is not set into catcher (#290) on capstan motor (#291) correctly.					
	Remedy	Re-tighten the arm (#286) fixing screw.					

Symptom				Horizontal line noise during playback			
Model		VM-E10A	VM-E15A	VM-H18A			
1	Cause	Cylinder (#501) is dirty, demagnetizing part of tape.					
	Remedy	Clean cylinder (#501).					
2	Cause	Guide roller I (#266) height faulty.					
	Remedy	Adjust the height of guide roller I (#266).					

Symptom				Abnormal sound during cylinder rotation			
Model		VM-E10A	VM-E15A	VM-H18A			
1	Cause	Guide (#219) is damaged.					
	Remedy	Replace guide (#219).					
2	Cause	Abnormal sound from the inside of cylinder (#501).					
	Remedy	Replace cylinder (#501).					

Symptom				Monitoring sound enters microphone during camera recording.			
Model		VM-E10A	VM-E15A	VM-H18A			
1	Cause	Abnormal sound from the inside of cylinder (#501).					
	Remedy	Replace cylinder (#501).					

Symptom				Mechanical block stops operation instantaneously.			
Model		VM-E10A	VM-E15A	VM-H18A			
1	Cause	Sheet (#295) is folded.					
	Remedy	Replace idler (#246) (sheet (#295) is not necessary).					

Symptom				Audio noise during camera recording			
Model		VM-E10A	VM-E15A	VM-H18A			
1	Cause	Disconnection inside microphone.					
	Remedy	Replace microphone.					

Symptom				Noise bar moves or tape is damaged during search.			
Model		VM-E10A	VM-E15A	VM-H18A			
1	Cause	Arm (#286) wobbles.					
	Remedy	Replace arm (#286).					

Symptom				Incorrect tint of camera picture			
Model		VM-E10A	VM-E15A	VM-H18A			
1	Cause	Defective soldering of DL1202 (process board).	Defective soldering of DL1002 (sensor board).	Defective soldering of DL1002, DL1003 (sensor board).			
	Remedy	Re-solder.	Re-solder.	Re-solder.			
2	Cause	IC1203 (process board) faulty.	IC1006 (sensor board) faulty.				
	Remedy	Replace IC1203 and adjust.	Replace IC1006 and adjust.				
3	Cause	Defective soldering of IC1205 (process board).	Defective soldering of IC1004 (sensor board).				
	Remedy	Re-solder.	Re-solder.				

Symptom				Power zoom does not operate.			
Model		VM-E10A	VM-E15A	VM-H18A			
1	Cause	Autofocus board faulty.					
	Remedy	Replace the autofocus board.					
2	Cause	Abnormal sound occurs because the gear box of zoom motor (#754) is faulty.		Zoom motor (#756) faulty.			
	Remedy	Replace zoom motor (#754).		Replace zoom motor (#756).			

Symptom				Focus is not correct with autofocus			
Model		VM-E10A	VM-E15A	VM-H18A			
1	Cause	Autofocus sensor position faulty.					
	Remedy	Adjust the position of the autofocus sensor.					
2	Cause	Autofocus sensor or infrared emitter faulty.		Autofocus sensor or infrared emitter faulty.			
	Remedy	Replace AF block (#754).		Replace AF block (#757).			

Symptom				Cassette lid is not closed			
Model		VM-E10A	VM-E15A	VM-H18A			
1	Cause	PG612 (main board) and CN612 (cylinder) not connected correctly.					
	Remedy	Connect PG612 and CN612 correctly.					
2	Cause	Mode switch (#217) faulty.					
	Remedy	Replace mode switch (#217).					

Symptom				No video signal from AV output cable			
Model		VM-E10A	VM-E15A	VM-H18A			
1	Cause	R910 (main board) faulty.	R262 (Y/chroma board) faulty.	R370 (Y/chroma board) faulty.			
	Remedy	Replace R910.	Replace R262.	Replace R370.			

Symptom				Cassette holder does not lock			
Model		VM-E10A	VM-E15A	VM-H18A			
1	Cause	Cassette holder (#401) is deformed.					
	Remedy	Replace cassette holder (#401).					

Symptom		Camera picture becomes cyan		
Model	VM-E10A	VM-E15A	VM-H18A	
1	Cause	IC1206 (process board) faulty.	IC1007 (sensor board) faulty.	
	Remedy	Replace IC1206 and adjust.	Replace IC1007 and adjust.	

Symptom		Camera picture becomes pink		
Model	VM-E10A	VM-E15A	VM-H18A	
1	Cause	IC1205 (process board) faulty.	IC1004 (sensor board) faulty.	
	Remedy	Replace IC1205 and adjust.	Replace IC1004 and adjust.	

Symptom		Camera picture becomes green		
Model	VM-E10A	VM-E15A	VM-H18A	
1	Cause	IC1203 (process board) faulty.	IC1006 (sensor board) faulty.	
	Remedy	Replace IC1203 and adjust.	Replace IC1006 and adjust.	

Symptom		Camera picture becomes red		
Model	VM-E10A	VM-E15A	VM-H18A	
1	Cause	IC1203 (process board) faulty.	IC1006 (sensor board) faulty.	
	Remedy	Replace IC1203 and adjust.	Replace IC1006 and adjust.	
2	Cause	IC1205 (process board) faulty.	IC1004 (sensor board) faulty.	
	Remedy	Replace IC1205 and adjust.	Replace IC1004 and adjust.	

Symptom		Spots in camera picture		
Model	VM-E10A	VM-E15A	VM-H18A	
1	Cause	CCD image sensor has a white scratch.		
	Remedy	Replace CCD image sensor and adjust.		

Symptom		Camera picture is dark		
Model	VM-E10A	VM-E15A	VM-H18A	
1	Cause	IC1206 (process board) faulty.	IC1007 (sensor board) faulty.	
	Remedy	Replace IC1206 and adjust.	Replace IC1007 and adjust.	

Symptom		Autofocus does not operate		
Model	VM-E10A	VM-E15A	VM-H18A	
1	Cause	Autofocus board's plug and focus motor's connector not connected correctly.		
	Remedy	Connect them correctly.		

Symptom		Camera picture's sync distorted		
Model	VM-E10A	VM-E15A	VM-H18A	
1	Cause	IC1211 (process board) faulty.	IC1308 (process board) faulty.	
	Remedy	Replace IC1211 and adjust.	Replace IC1308 and adjust.	

Symptom		Battery cannot be removed		
Model	VM-E10A	VM-E15A	VM-H18A	
1	Cause	Lock holder (#134) comes off.	Eject lever (#139) comes off.	
	Remedy	Attach lock holder (#134) correctly.	Attach eject lever (#139) correctly.	

Symptom		Tape unloads during loading		
Model	VM-E10A	VM-E15A	VM-H18A	
1	Cause	Defective soldering of supply/take-up end sensors.		
	Remedy	Re-solder.		

Symptom		Camera picture distorted occasionally		
Model	VM-E10A	VM-E15A	VM-H18A	
1	Cause	Defective soldering of CN1001 (sensor board).	Defective soldering of CN1023, CN1024 (sensor board).	
	Remedy	Re-solder.	Re-solder.	

CHAPTER 3 DISASSEMBLY

1. VM-E10A DISASSEMBLY WHEN A TROUBLE OCCURS

If the VM-E10A does not enter the eject state when the power is supplied normally, perform the following procedure to set the VM-E10A to the eject state (disassembling). If the cassette cannot be removed, also perform the following procedure.

1-1. If the VM-E10A cannot be set to the eject state I

Remove the EVF

- (1) Move the EVF in the direction of arrow (A). (See Fig. 3-1)
- (2) Turn the EVF in the direction of arrow (B).
- (3) Remove one (1) screw and remove the EVF shoe in the direction of arrow (A).
- (4) Disconnect connector CN801. (See Fig. 3-2)

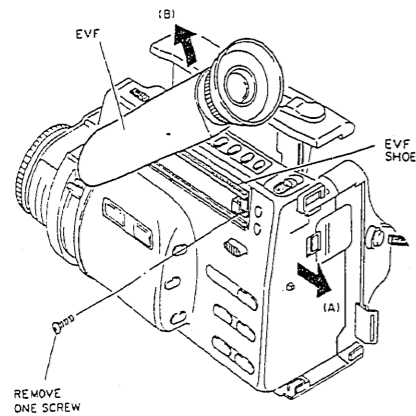


Fig. 3-1

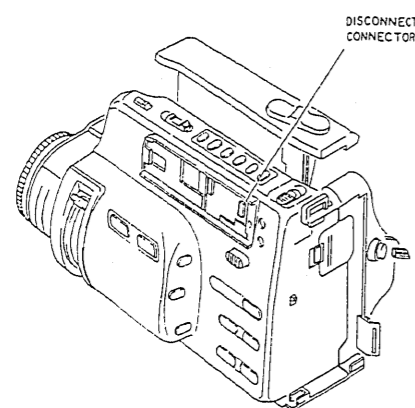


Fig. 3-2

Remove the microphone (MIC)

- (5) Remove one (1) screw holding the MIC. (See Fig. 3-3)
- (6) Remove the MIC in the direction of arrow (B) and disconnect connector CN001 on the jack circuit board.

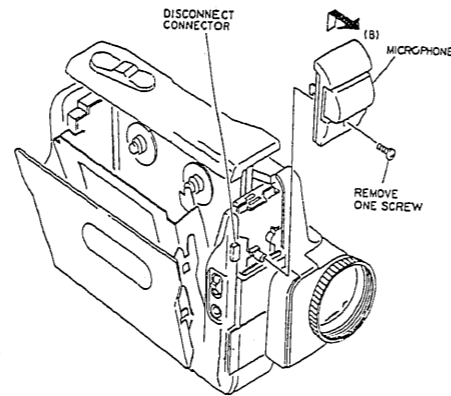


Fig. 3-3

Separating the Camera Section and VCR Section

- (7) Remove six (6) screws holding the camera section and VCR section. (See Fig. 3-4)
- (8) Disconnect four (4) connectors (CN093, CN903, CN051, CN001) on the DC-DC converter, process circuit board and fuse circuit board. (See Fig. 3-5)

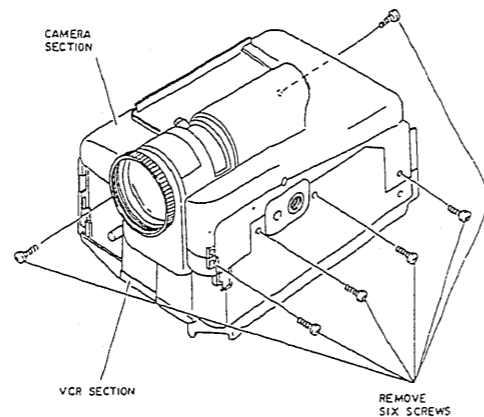


Fig. 3-4

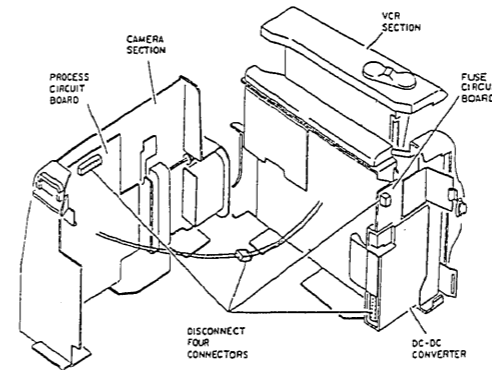


Fig. 3-5

- (9) Disconnect connector CN904 from the main circuit board. (See Fig. 3-6)
- (10) Apply DC3V to CN904 (loading motor).

	RED	BLK
LOADING	-	+
UNLOADING	+	-

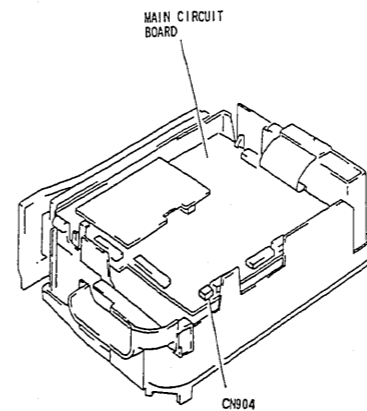


Fig. 3-6

- 1-2. If the VM-E10A cannot be set to the eject state II
- If the VM-E10A does not enter the eject state with the above procedure, remove the right case by performing steps (11)-(19) below.
- If the cassette cannot be removed, perform steps (11)-(19) below to eject the cassette.

- (11) Disconnect the DC3V power supply from CN904 (loading motor).

- (12) Insert a flat bladed screwdriver between the right case and cassette lid and push sections (A) and (B) of the cassette holder in the direction of the arrow (be careful) not to damage the case) to remove the cassette lid, then return section (A) and (B) to the original position. (See Fig. 3-7)
- (13) Lift the zoom switch and release two (2) tabs (see Fig. 3-8), then release two (2) tabs (see Fig. 3-9) and remove the zoom switch.
- (14) Remove three (3) screws holding the right case. (See Fig. 3-10)

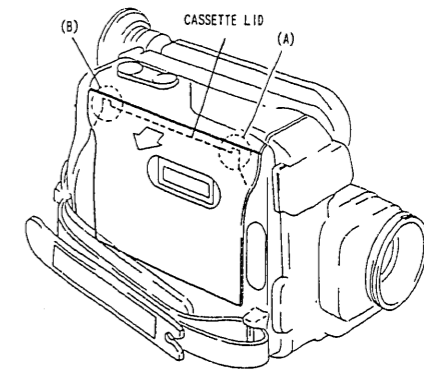


Fig. 3-7

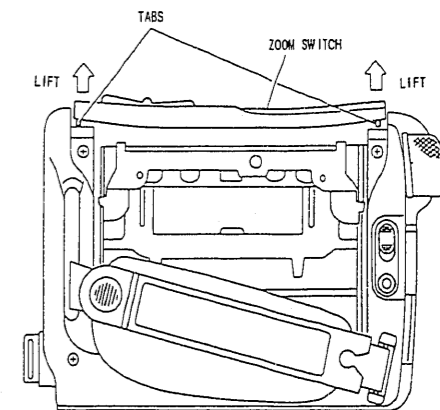


Fig. 3-8

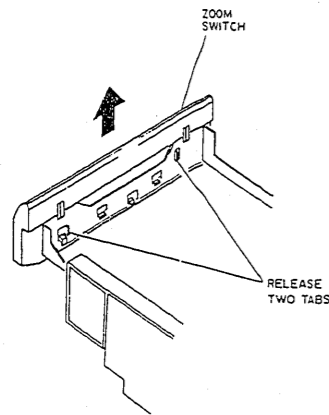


Fig. 3-9

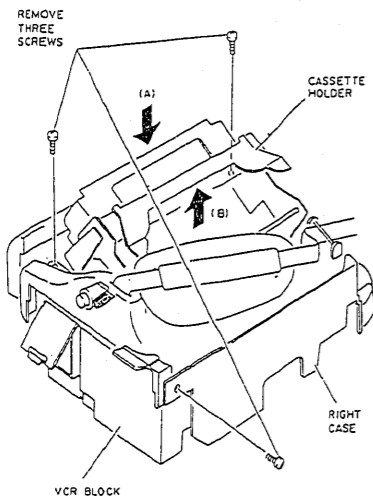


Fig. 3-10

Supply Guide Roller (2), Supply Tape Guide, Loading Motor Removal

- (15) Remove one (1) washer holding the supply guide roller (2).
 (See Fig. 3-11)
 (16) Remove two (2) screws holding the supply tape guide.

- (17) Remove the supply guide roller (2) and supply tape guide from the main chassis.
 (18) Remove one (1) screw and remove the loading motor from the main chassis.

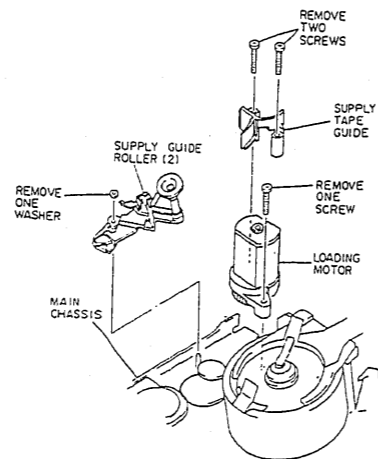


Fig. 3-11

- (19) Turn loading gear (1) in the direction of the arrow with your fingers to set the VM-E10A to the eject state. (See Fig. 3-12)

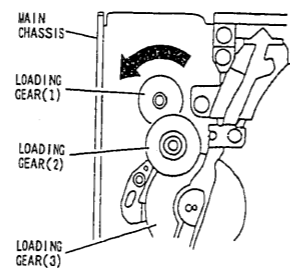


Fig. 3-12

2. PHOTO TO BE REFERRED WHEN ASSEMBLING THE MECHANISM BLOCK

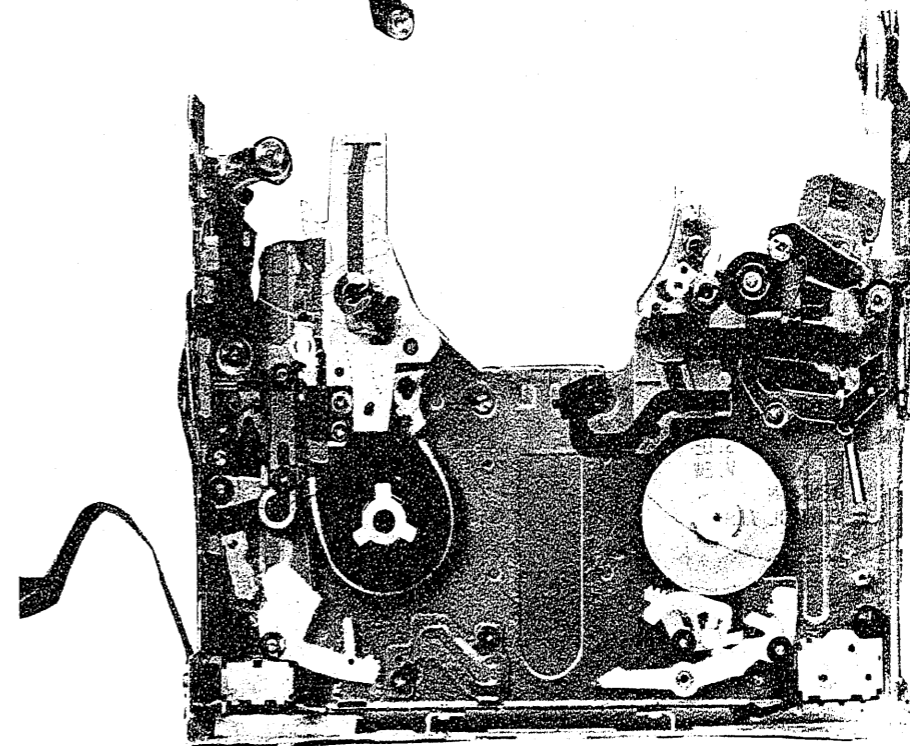
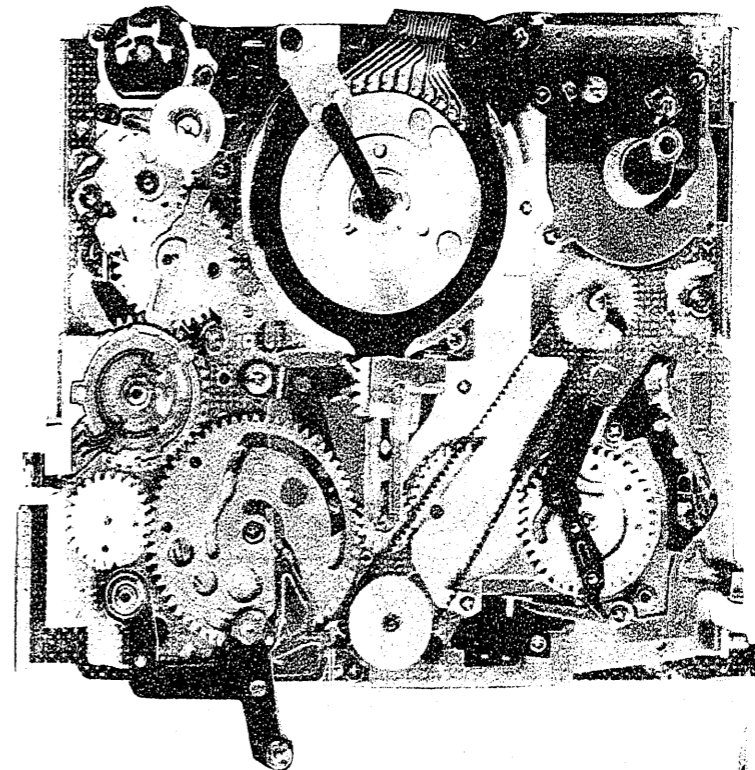


Fig. 3-51

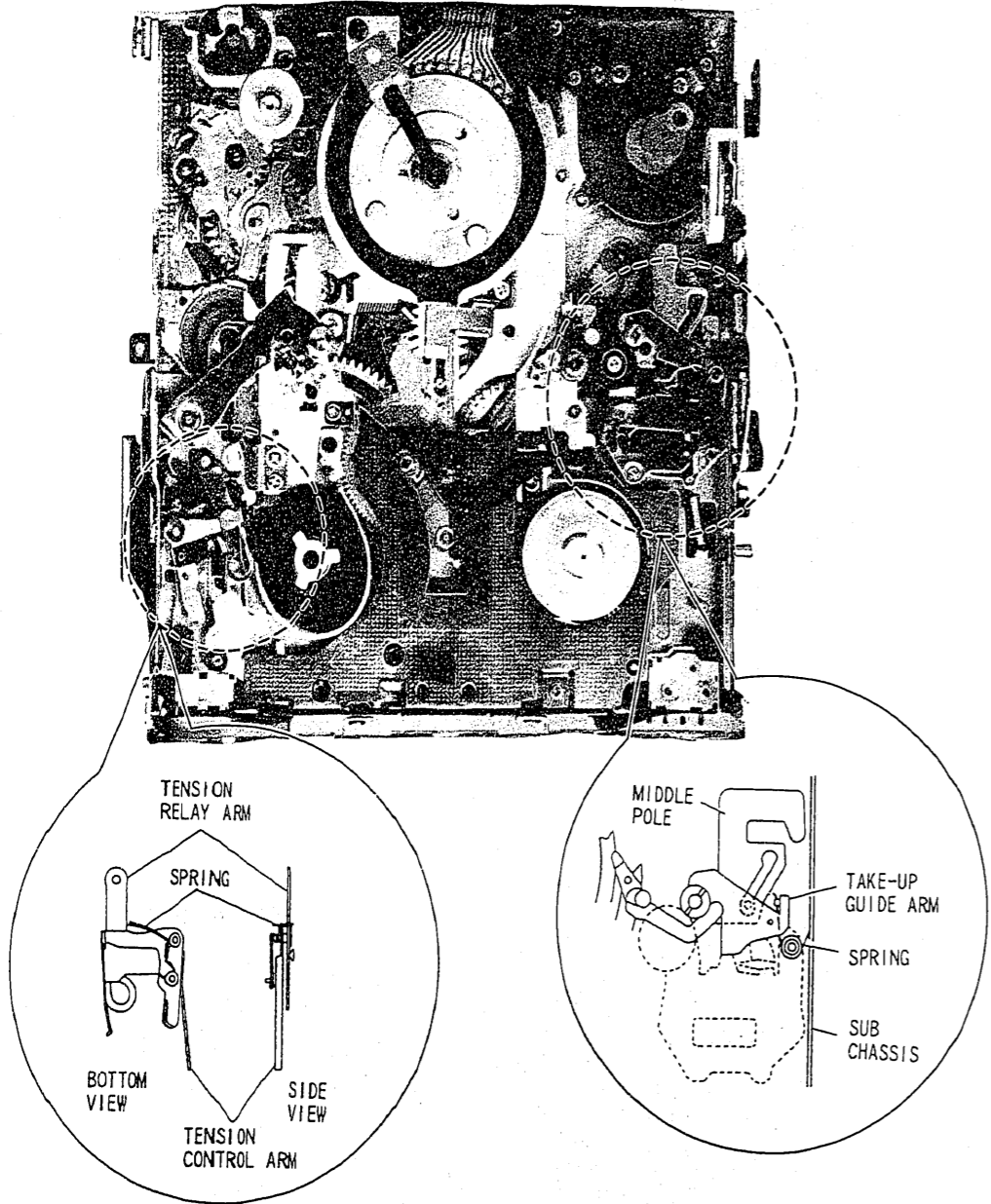


Fig. 3-52

CHAPTER 4 MAINTENANCE/INSPECTION PROCEDURE

1. REQUIRED MAINTENANCE

The mechanical block (tape transport system) in an 8mm video camera/recorder uses very precise components. If any of these components is worn or dirty, the symptoms will be the same as if the component is defective.

To ensure a good picture, the tape transport system must be cleaned and lubricated periodically, and worn-out components must be replaced. The tape transport system is a general term for the sections (components) with which the tape is in contact.

2. SCHEDULED MAINTENANCE

Schedules for maintenance and inspection are not fixed because they are greatly according to the way in which the customer uses the 8mm video camera/recorder and the environment in which it is used. But, in general home use, a good picture will be maintained if inspection and maintenance are done every 1,000 hours. Table 1 shows the relation between the time used and inspection period.

Table 1

Average hours	When inspection is necessary		
	About 1 year	About 18 months	About 3 years
One hour	[Bar chart showing inspection needed after 1 year]		
Two hours	[Bar chart showing inspection needed after 18 months]		
Three hours	[Bar chart showing inspection needed after 3 years]		

3. CHECK BEFORE STARTING REPAIRS

The following faults (see Table 2) during playback may be remedied when the tape transport system is cleaned and lubricated. Check the conditions of cleanliness in the unit and the need for lubrication.

If from that you determine that the unit is ready for inspection and maintenance, check the components in Table 2.

Table 2

Defective phenomenon during play	Inspection location
Poor picture S/N, No color	Dirt on video head or worn video head
Tape does not run or tape is slack	Dirt on pressure roller
Vertical jitter (shaking)	Dirt on video head or in tape transport system
Low volume or sound distorted	Dirt on video head or worn video head

4. TOOLS NEEDED FOR INSPECTION AND MAINTENANCE

- (1) Head cleaning kit
- (2) VCR oil kit
- (3) Ethyl alcohol (ethanol)
- (4) Gauze
- (5) Cleaning tape
NTSC: Maxell 8M-CL MCA (dry type)
PAL: Maxell 8M-CLX (dry type)

Table 3 Locations for Greasing and Lubricating using the Oil Kit

Name	Using locations
Sonic Slidas Oil (#1600)	Lubricates low-speed rotating sections
Froil (G31-SAY)	Grease metal components or molded sections subject to light load
Lock paint	Fix adjustment screws and nuts
Pan motor oil	Do not use.
Hitazol	Do not use.

The above VCR oil kit and head cleaning kit are those used conventionally (for VHS and VHS-C recorders). Always use these kits for maintenance.

5. MAINTENANCE PROCEDURES

5-1. Cleaning

(1) Cleaning video heads

First use a specified cleaning tape. Before using it, read its instruction sheet carefully.

If the dirt on the video heads is too stubborn to be removed by tape, use the head cleaning kit by the following procedure. (See Fig. 4-1)

- 1) Moisten the chamois leather on the cleaning stick with cleaning fluid.
- 2) Touch the head tip with the chamois leather on the cleaning stick and gently turn the upper cylinder to the left and right.

Caution: Do not move the cleaning stick vertically or and make sure that only the chamois leather on the cleaning stick comes into contact with the head tip. Otherwise, the head tip could be damaged.

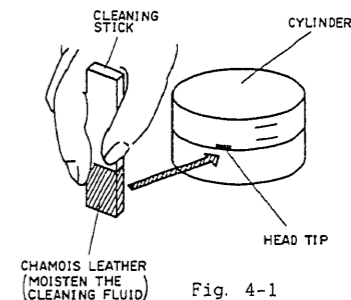


Fig. 4-1

- (2) Cleaning the tape transport system
Moisten gauze with ethyl alcohol and use it to wipe the surfaces of components which come into contact with the tape.

Caution: Be careful that the tape transport components are not damaged nor deformed by cleaning.

5-2. Lubricating Sonic Slidas Oil (#1600)

(1) Procedure

Use the oiler to apply one or two drop of Sonic Slidas oil to the specified sections. Refer to the exploded views in Technical Data manuals for lubricating locations.

Caution: Do not use too much oil because it may spill over or leak, coming into contact with rotating parts and causing slippage or other defects. If too much oil is applied, wipe clean using gauze moistened with ethyl alcohol.

(2) Periodic lubrication

Lubricate specified locations every 1,000 hours.

5-3. Greasing the Froil (G31-SAY)

(1) Procedure

Apply Froil with a stick or brush to the specified locations. Refer to the exploded views in Technical data manuals for the greasing locations.

Caution: Do not use excess Froil. It may come into contact with the tape transport parts and may cause defects. Wipe off any excess using gauze moistened with ethyl alcohol.

(2) Periodic greasing

Grease specified locations every 5,000 hours.



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