

# DENON

Hi-Fi Component

## SERVICE MANUAL

STEREO CD PLAYER

MODEL DCD-1800R



**NIPPON COLUMBIA CO., LTD.**

**TABLE OF CONTENTS**

FEATURES ..... 2  
SPECIFICATIONS ..... 3  
WARNING ..... 3  
CONTROLS AND THEIR DESCRIPTION ..... 4 ~ 6  
NOTE FOR HANDLING OF LASER PICK-UP ..... 7 ~ 8  
DISASSEMBLY ..... 9 ~ 12  
ADJUSTMENT OF MECHANISM UNIT ..... 13 ~ 15  
ADJUSTMENT OF PICK-UP SERVO SYSTEM ..... 16 ~ 21  
PARTS LIST OF P.W. BOARD ..... 22 ~ 25  
PARTS LIST OF EXPLODED VIEW ..... 26  
EXPLODED VIEW OF CABINET ..... 27  
PARTS LIST OF MECHANISM UNIT ..... 28  
EXPLODED VIEW OF MECHANISM UNIT ..... 29  
P.W. BOARD ..... 30 ~ 32  
FUNCTION TABLE OF CPU TERMINAL ..... 33 ~ 34  
SEMICONDUCTORS ..... 35  
WIRING DIAGRAM ..... 36  
SCHEMATIC DIAGRAM ..... 37 ~ 39

**FEATURES**

The DCD-1800R employs a DENON Super Linear Converter to prevent degradation of sound quality in the PCM playback system, assuring accurate reproduction of recorded sound. The CD player is capable of reproducing the actual musical scene as it is in conjunction with carefully selected parts.

## SPECIFICATIONS

### AUDIO

No. of channels:	2 channels
Frequency response:	5 ~ 20,000 Hz $\pm$ 0.5 dB
Dynamic range:	95 dB
Signal-to-noise ratio:	96 dB
Harmonic distortion:	0.003% (1 kHz)
Channel separation:	94 dB (1 kHz)
Wow and flutter:	Less than measuring limit
Output voltage:	2.0 V r.m.s.

### DISCS FOR USE

Playing time:	Compact disc
Diameter:	60 min./side (Max. 79.8 min./side) 120 mm

### SIGNAL FORMAT

Sampling frequency:	44.1 kHz
Quantization:	16-bit linear/channel
Transmission bit rate:	4.3218 M bits/sec.

### PICKUP

System:	Objective lens driving system laser pickup
Lens drive system:	Two-dimensional parallel driving
Light source:	Semiconductor laser
Wavelength:	800 nm

### GENERAL CHARACTERISTICS

Power supply:	50/60 Hz, Voltage is shown on rating label.
Power consumption:	32 W
Dimensions:	434 (width) x 110 (height) x 372 (depth) mm 464 (width) x 110 (height) x 372 (depth) mm (with decorative wood board)
Weight:	8.9 kg 9.5 kg (with decorative wood board)

### FUNCTIONS AND DISPLAY

Functions:	Direct selection, quick selection, selection by programming, repeat performance, A - B repeat, pause, skip monitor, index search, and intro search
Display:	Cut no., index, time, and program
Other functions:	Headphone jack, level (headphone level control), timer switch

ACCESSORIES:	Connecting pin cord
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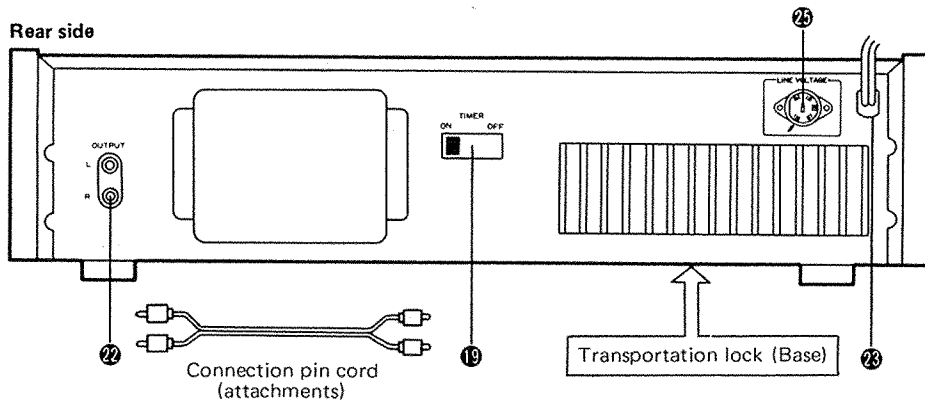
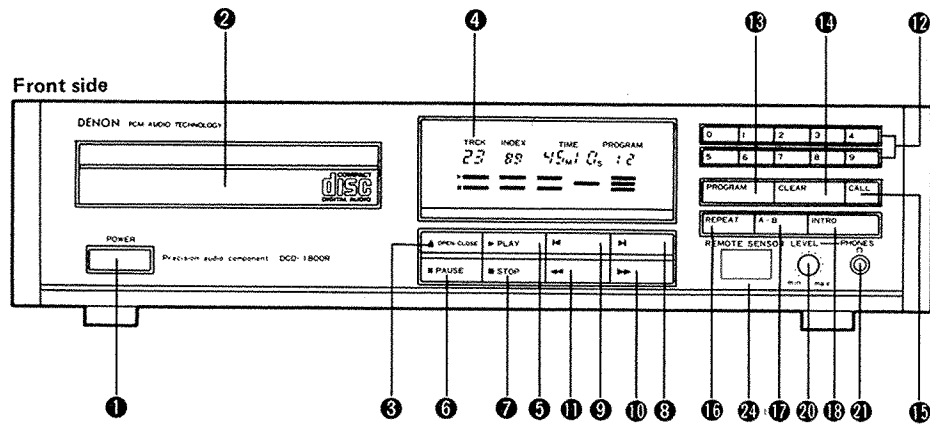
\* Design and specifications are subject to change without notice.

## WARNING:

Although the laser beam from the object lens is not visible, it can be harmful to human body depending on the optical output.

- While the laser diode is turning on do not look inside the lens with or without a magnifying lens.
- Use the laser power meter for checking laser output.
- Use infrared rays viewers or infrared ITV cameras to observe the laser beam.

# CONTROLS AND THEIR DESCRIPTION



## ① Power Switch (POWER)

- Press the switch and the power is turned ON.
- When the power is turned ON, TRACK, INDEX, TIME and PROGRAM on the indicators ④ light up, and (-----) also lights up in the display.
- If a disc is loaded at this time, (00 00 00 00 01) lights up in the display, and **DISC SET** and **NEXT NO** located on the lower side of the indicator light up.

## ② Disc Holder

- The disc is loaded in this disc holder.
- By pressing the disc holder open/close button (▲ OPEN/CLOSE) ③, the disc holder can be opened.
- To close the disc holder, press the disc holder open/close button ③.
- The disc holder can be closed also by pressing the play button (▶ PLAY) ⑤.

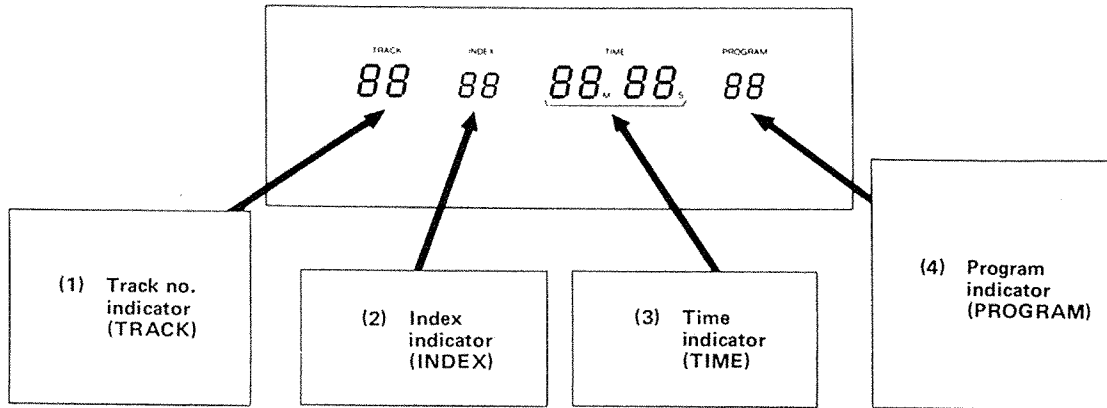
## ③ Disc Holder Open/Close Button (▲ OPEN/CLOSE)

- Press this button when the disc holder ② is to be opened/closed.
- When the button is pressed once, the disc holder ② is ejected. It is closed by pressing it again.
- If a disc is set, the disc rotates for several seconds after the disc holder is closed, and then stops. At this time, **DISC SET** on the indicator ④ lights up.



#### 4 Indicators

- For description of the display, refer to the following figure:



##### (1) Track No. Indicator (TRACK)

- The track no. being played is indicated.
- When the contents programmed by the call button are to be confirmed, the programmed track count is indicated sequentially.

##### (2) Index Indicator (INDEX)

Index no. of the track being played is indicated.

##### (3) Time Indicator (TIME)

Performance time or performance lapsed time is indicated in minutes (M) and seconds (S).

##### (4) Program Indicator (PROGRAM)

- The track no. to be played next is indicated.
- The number selected by the track no. button (0 ~ 9) is indicated.
- When the contents programmed by the call button are to be confirmed, track nos. are indicated sequentially.

#### 5 Play Button (▶ PLAY)

- Pressed this button when the disc is to be played.
- When the button is pressed, the ▶ **PLAY** indicator lights up, and track no. being played, its index no. and performance lapsed time (TIME) are indicated.
- Upon completion of playback of the final track, ▶ **PLAY** goes out, and the unit stops.
- Pressing the play button (▶ **PLAY**) after the disc is set in the disc holder closes the disc holder and plays the first track.

#### 6 Pause Button (⏸ PAUSE)

- Press this button when playback is to be temporarily halted.
- If the pause button is pressed during playback, playback is suspended and ▶ **PLAY** goes out. **PAUSE** lights up instead.
- To reset the pause status, press the play button 5

#### 7 Stop Button (■ STOP)

- Press this button when playback is to be stopped.
- The rotation of the disc is stopped and the numeral on the indicators is changed to (00 00 00 00 01).

#### 8 Fast Forward Button (▶|)

- Press this button when the pickup is to be forwarded to the head of a desired track quickly.
- The head of the track is forwarded according to the operation count of this button during playback or pause.

#### 9 Fast Reverse Button (◀|)

- Press this button when the pickup is to be moved back to the head of a desired track quickly.
- The head of the track is moved back according to the operation count of this button during playback or pause.

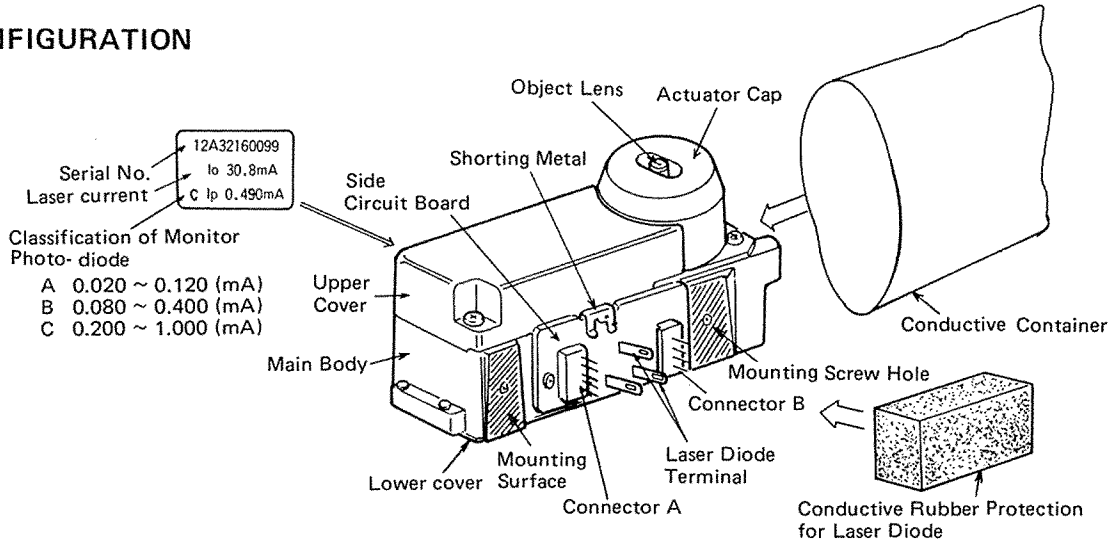
#### 10 Fast forward skip button (▶▶)

- Press this button when playback is to be fast forwarded.
- If ▶ **PLAY** is lit, the disc is fast forwarded and sound is audible while the button is pressed.
- If **PAUSE** is lit, no sound is generated when the disc is fast forwarded.

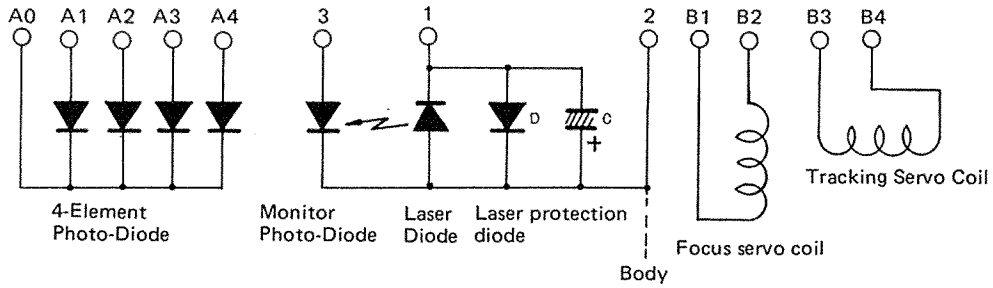
- 11 Fast reverse skip button ( ◀◀ )**
- Press this button when fast reverse is desired.
  - If ▶ **PLAY** is lit, the disc is fast reversed and sound is audible while the button is pressed.
  - If **PAUSE** is lit, no sound is generated when the pickup is fast reversed.
- 12 Track No. Button (0 ~ 9)**
- Press this button when playback is to be programmed, or a track no. is to be selected for start from the head.
- 13 Program Buttons (PROGRAM)**
- Press this button when playback is to be programmed.
  - Track nos. selected by the track no. buttons are stored (up to 15).
- 14 Clear Button (CLEAR)**
- Press this button when a programmed track no. is to be corrected, or reset.
  - If this button is pressed immediately after PROGRAM button operation, only the immediately preceding track is cleared.
  - By pressing the CLEAR button twice, all the programmed tracks will be cleared.
- 15 Call Button (CALL)**
- Press this button when a programmed track no. is to be confirmed.
- 16 Repeat Button (REPEAT)**
- Press this button when playback is to be repeated.
- 17 A – B Button (inter-point repeating performance)**
- Use this button when a desired music between two optional points is to be played repeatedly.
  - By pressing the button once, point A is stored, and by pressing it again, point B is stored. Desired music between points A and B will be played repeatedly.
  - Pressing the button for the third time resets the points.
- 18 Intro Button (INTRO)**
- Press this button when the start of each track recorded on the disc is to be played sequentially for 10 seconds each.
  - Pressing the button again resets this performance mode.
- 19 Timer Switch (TIMER)**
- Use when first track is to be played according to a timer setting. (For using the timer, refer to TIMER CONTROLLED PLAYBACK.)
- 20 Volume control (LEVEL)**
- Use when the output level (volume) of the headphone jack is to be adjusted.
- 21 Headphone Jack (PHONES)**
- When a headphone is used, listen at the desired volume. (Headphone is not supplied.)
- 22 Output Terminal (OUTPUT)**
- Connect the output terminal to the input terminal of the amplifier. (For connection, refer to CONNECTION TO AMPLIFIER.)
- 23 Power Cord**
- Connect the power cord to the auxiliary plug socket of the amplifier, or to the AC outlet.
- 24 Remote-control Photosensor**
- This is the photosensor for wireless remote control.
  - Aim the wireless remote control unit (RC-1800) at the photosensor when using remote control.
- 25 Voltage Selector Knob (for 120/220/240 voltage model only)**
- Set to the supply voltage.

# NOTE FOR HANDLING OF LASER PICK-UP

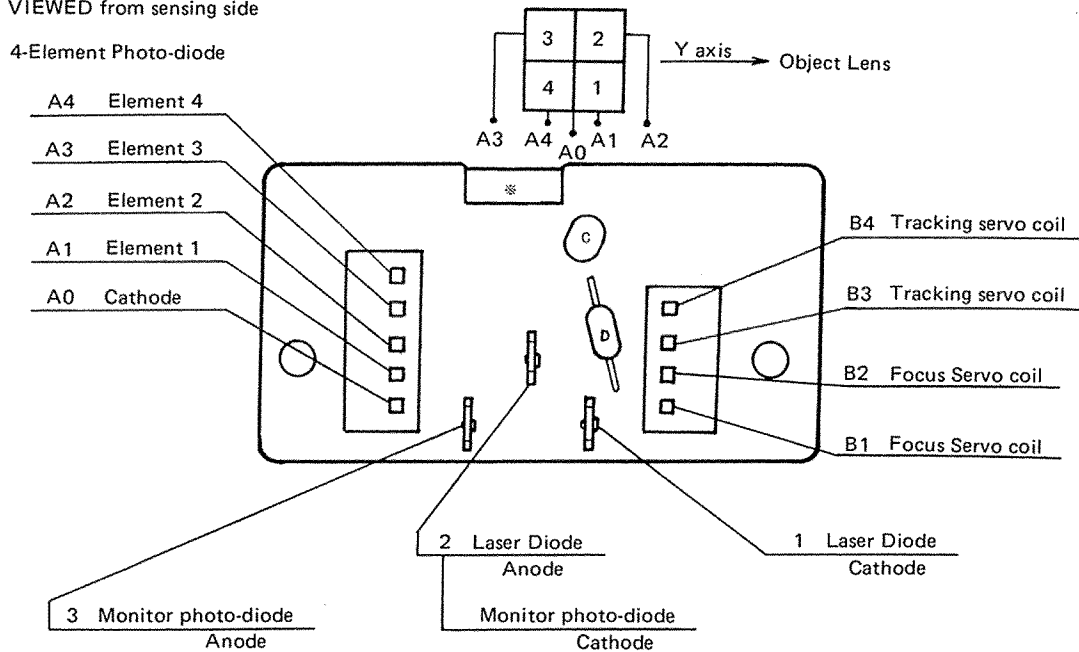
## CONFIGURATION



## CONNECTIONS



ARRANGEMENT OF 4-ELEMENT PHOTO-DIODE VIEWED from sensing side



## 1. PROTECTION OF LASER DIODES

Laser diodes are so sensitive to such pulsive electrical noises as static voltage or surge current that their reliability may be decreased or completely destroyed.

Take intensive precautions against all kinds of static voltage problems as well as the following examples.

- Electrically ground workbenches, measuring instruments, jigs, tools, etc. at the same potential as the ground line of the power supply.
- Use wrist straps for grounding workers' bodies as well as using non-leakage soldering iron with grounding for tip. It should be especially noted when wearing a synthetic dress or the air is dry.
- Do not attempt checking simply with circuit tester or oscilloscope probes on the laser terminals. Do not apply voltage with poorly made voltage source or with temporary contact pins or clips.
- Although a shorting metal is provided in contact with the laser diode leads on the pattern side of the circuit board in the event of unit shipment, this shorting metal can lose its conductivity due to vibrations during transportation or oxidation. Take sufficient precautions even when the shorting metal is on. For dismounting the laser diode, turn off the power after turning down the optical output (work current), short the laser diode leads with the shorting metal or by soldering the leads, and then remove connections. For mounting, make connections, remove the short circuit, turn on the power and then adjust the optical output.
- Make sure that the unit is not handled with the shorting metal removed nor left near the appliances that emit high frequency surge voltages. For storing the unit, be sure to short the laser diode leads with the shorting metal or by soldering the leads and put in a conductive container.
- The optical output should not exceed (even momentarily) the maximum ratings of  
0.35mW at 45°C, or  
0.7mW at 20°C.

## 2. HANDLING OF ACTUATOR

The actuator precisely controls the object lens.

For maintaining this precision, each part is finished, assembled and adjusted with the highest care.

Do not attempt careless disassembly, especially do not take apart the actuator assembly.

- The object lens is supported by a precision spring. Be careful not to apply mechanical stresses such as by excessive vibrations or dropping the unit.
- Inside the actuator cap covering around the object lens, there is a strong permanent magnet. Handle with care so that any foreign object (especially metals) will not get inside, or the unit will not be placed near magnetic substances.

## 3. CLEANING OF LENS

If the object lens is stained or tarnished, the specified characteristics including the emitting power may be deteriorated.

- Stain on the lens should be cleaned with raveling-free cotton swabs or lens cleaning paper for cameras moistened with a mixture of alcohol/ether (3/7) or cleaning solution for cameras. Wipe the lens gently so that the supporting spring will not be deformed.
- Do not handle or store the lens in places subject to oil stain or dew formation, but handle or store it in dust-free places with little change of temperature.

## DISASSEMBLY

### 1. How to remove "TOP COVER" and FRONT PANEL. (Fig. 1)

- (1) Remove 4 screws (A) at both sides and remove the WOOD BOARDS and TOP COVER.
- (2) Remove 2 signal processing wiring board fixing screws (B) and pull out the wiring board. Remove connectors leading from the FRONT PANEL to the wiring board and to other wiring boards.
- (3) Remove 6 front panel fixing screws (C) and take out the FRONT PANEL.

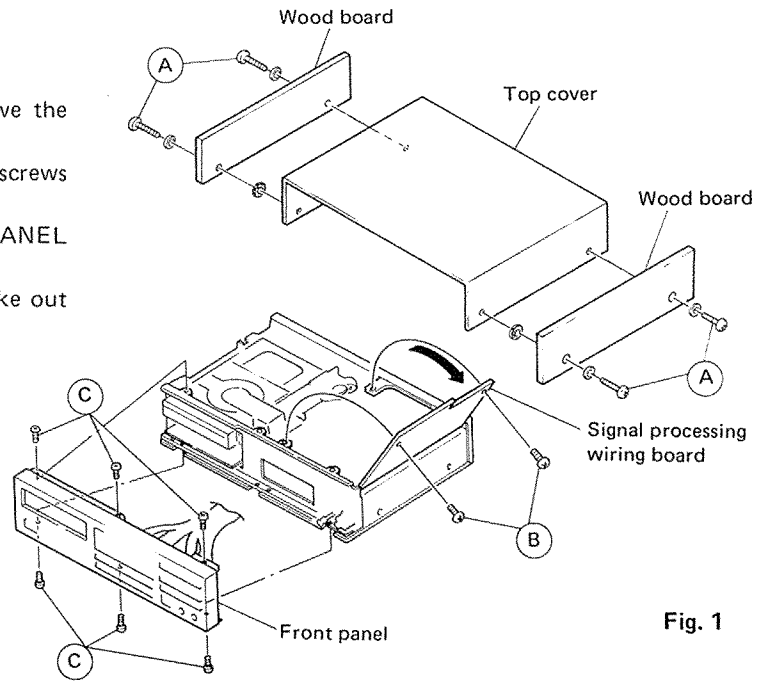


Fig. 1

### 2. How to remove PICK-UP MECHANISM UNIT.

- (1) Remove the TOP COVER.
- (2) Remove screw (D) and detach the CLAMPER. (Fig. 2)

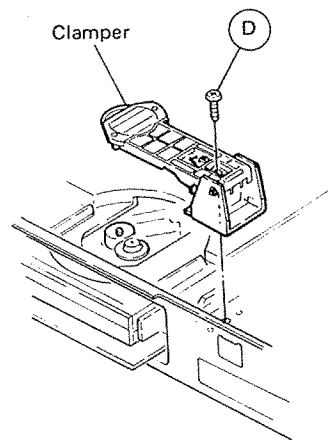


Fig. 2

- (3) Remove 11 screws (G), remove 4 wiring board supports (H1) and take out the BOTTOM COVER without removing the support (H2). (Fig. 3)

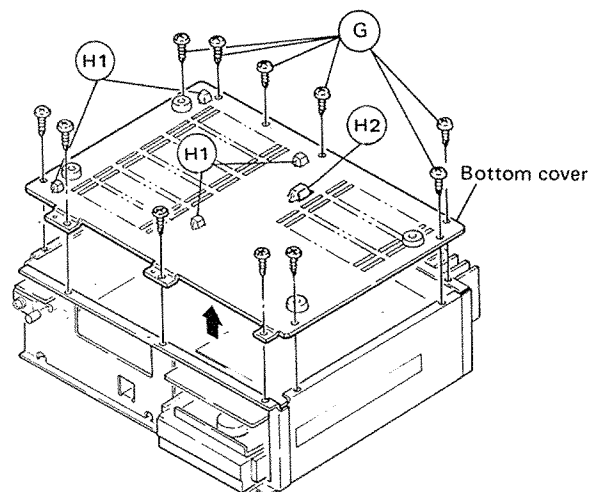


Fig. 3

- (4) Remove 4 screws ① and disassemble PICK-UP MECHANISM UNIT. (Fig. 4)

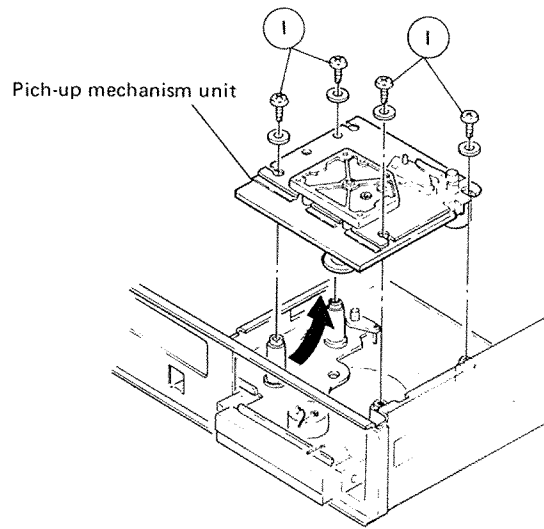


Fig. 4

### 3. How to disassemble LOADING UNIT.

- (1) Remove the TOP COVER.
- (2) Remove 2 screws ② and take off the 2 STOPPERS L. (Fig. 5)
- (3) Remove 2 screws ③ and detach the 2 RETAINER STOPPERS L and R. (Fig. 5)

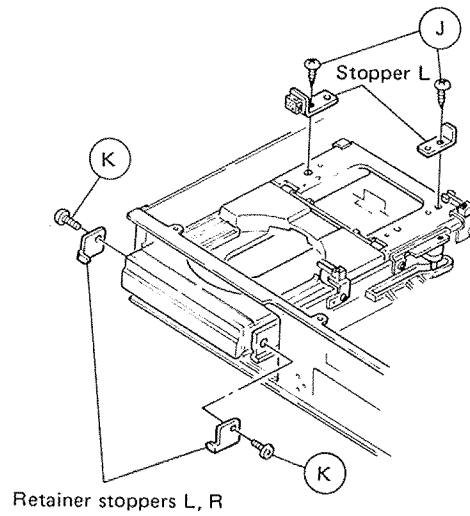


Fig. 5

- (4) Pull out the LOADING UNIT (tray) in the arrow direction.  
Be careful 2 CROSSED ROLLERS will come out at this time also. (Fig. 6)

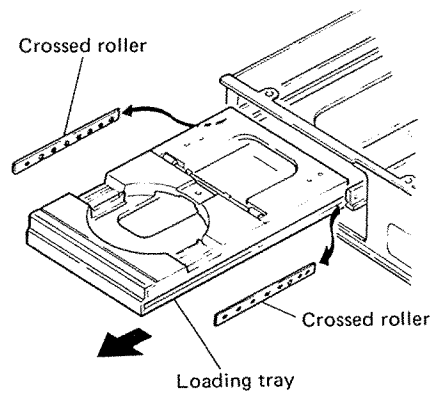


Fig. 6

**4. How to remove and place CROSSED ROLLERS**

**(For replacing CROSSED ROLLERS ONLY).**

**4-1 How to remove CROSSED ROLLERS. (Fig. 7)**

- (1) Pull out the LOADING TRAY about a half way.
- (2) Remove screw (M), release screw (L) and widen a span between 2 GUIDE RAILS.
- (3) Take out the left and right CROSSED ROLLERS from the rear.  
(Be careful in handling as each roller can become loose.)

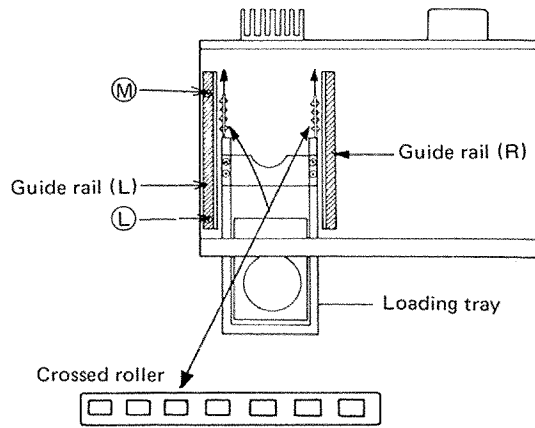


Fig. 7

**4-2 How to place CROSSED ROLLERS. (Fig. 8)**

- (1) Slide the CROSSED ROLLER in the right side V-shape guide as indicated arrow. (Be careful as roller easily becomes loose.)
- (2) Slide the CROSSED ROLLER in the left side.
- (3) Pre-fix screw (M) at the rear of the GUIDE RAIL (L). After adjusting the play of the LOADING TRAY, tighten screws (L) and (M)

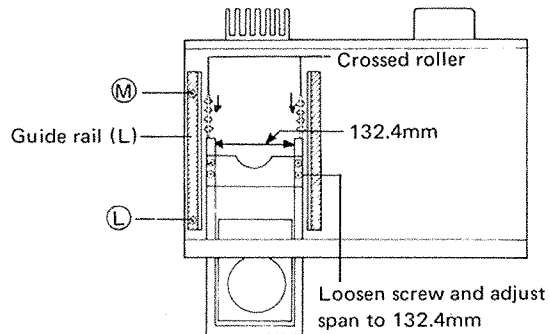


Fig. 8

**5. How to mount LOCK ARM. (Fig. 9, 10, 11)**

Mount and adjust the LOCK ARM while the LOADING TRAY is closed.

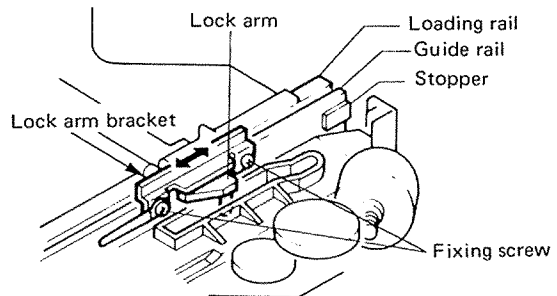


Fig. 9

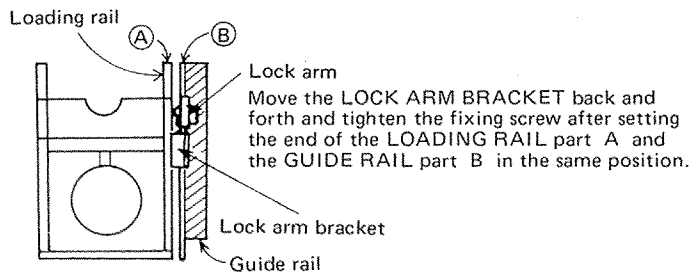


Fig. 10

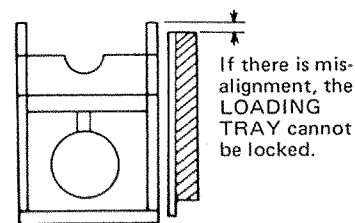


Fig. 11

## 6. Dismounting of PICK-UP and SLIDE MOTOR UNIT. (Fig. 12)

- (1) Remove the connector from the PICK-UP. (In this state loading unit is mounted on the chassis.)
- (2) Unfasten 3 screws (Q) and remove the ARM STOPPER and the FLAT SPRING.
- (3) By shifting the SLIDE MOTOR UNIT in the arrow direction, pull up the PICK-UP ARM off the shaft.
- (4) Remove 3 screws (R) and dismount the PICK-UP SUPPORT from the PICK-UP ARM.
- (5) Loosen screw (T), remove 2 screws (S) and detach the PICK-UP SUPPORT from the PICK-UP.

**WARNING:** DO NOT TOUCH the pick-up INPUT and OUTPUT TERMINALS by hand. Static voltage may damage the LASER DIODES.

- (6) The SLIDE MOTOR UNIT can be pulled out after removing the 3E-RING and SPRING.

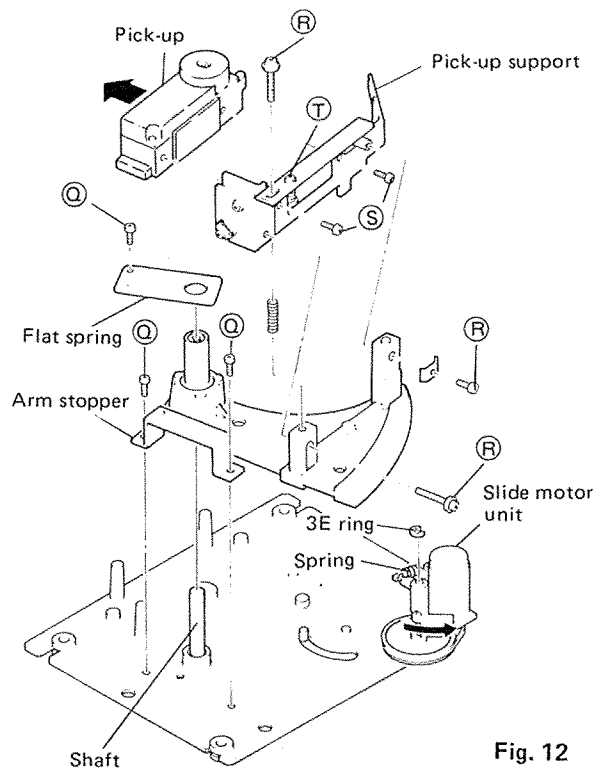


Fig. 12

## 7. Moutning of PICK-UP.

Follow procedures in item 6 reversely from (6) to (1).

## 8. Disassembling and assembling of SLIDE MOTOR section. (Fig. 13)

- (1) Remove the BELT and the PULLEY.
- (2) Remove the screw and take off the SLIDE MOTOR.

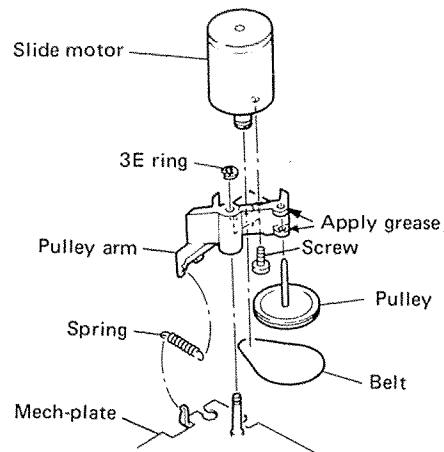


Fig. 13

## 9. Dismounting of POWER SUPPLY WIRING BOARD. (Fig. 14)

- (1) Remove the TOP COVER.
- (2) Pull out the connector from the POWER SUPPLY WIRING BOARD.
- (3) Unfasten 2 screw (U) and draw out the BOARD to rear side by holding the RADIATOR.

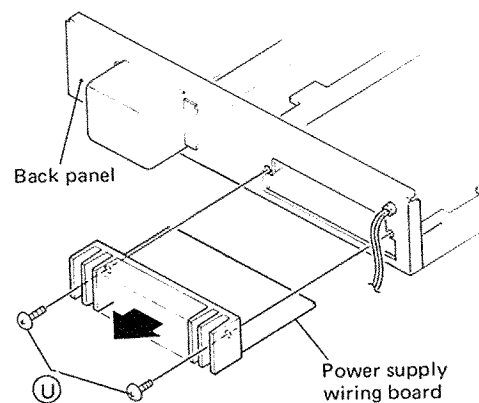


Fig. 14



## ADJUSTMENT OF MECHANISM UNIT

### 1. Preparation. (Fig. 15, 16)

- (1) Instruments: Adjustment adaptor  
Adjustment disc (90mm diam.)  
Oscilloscope
- (2) Keep the power "off".
- (3) Remove the top cover.
- (4) If readjustment of laser power is needed in such cases when the pick-up is replaced, be sure to turn VR102 on the motor wiring board KU-5130 fully clockwise. VR102 becomes accessible from side by removing the top cover.
- Note that the VR102 has two types of power control due to the motor/power wiring board change. Refer to Fig. 15 for difference. VR102 to turn clockwise decreases power for Part No. 2228587400 and to turn counterclockwise decreases power for Part No. 2228587507 wiring board. Also the shape of cut transistor wiring board is different.
- (5) Turn off the power and connect the adjustment adaptor to TP301 on the servo wiring board with all the switches on the adaptor OFF. When the adjustment is made without the adaptor, remove CC308 from the CB308 on the servo wiring board.

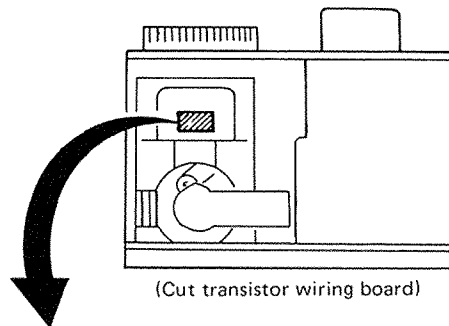
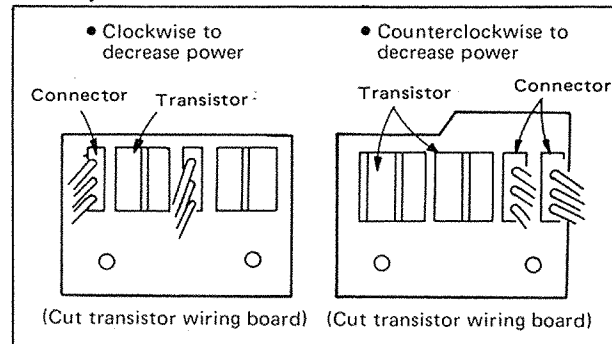


Fig. 15



### ADJUSTMENT ADAPTOR

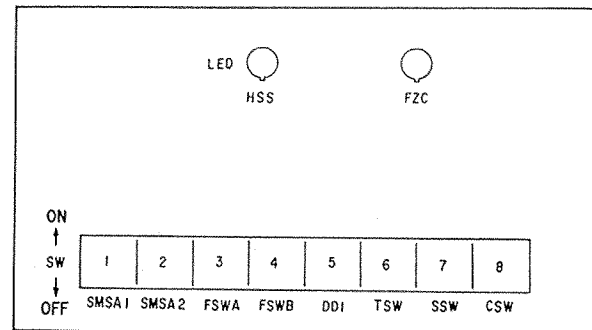


Fig. 16

### 2. Adjustment of motor amp. off-set voltage. (Fig. 17)

- (1) Connect an oscilloscope to the test point TP101 (Pin ① → ch1, Pin ② → ch2, Pin ③ → GND) on the motor wiring board.
- (2) Remove CC131 from connector CB311 on the servo wiring board.
- (3) Turn on the power. Set the oscilloscope at the "Chop" tracing mode.
- (4) Select the oscilloscope input to GND position and set the vertical calibration 0 level at center. Set it to DC mode after calibration.
- (5) Set the oscilloscope voltage range to 0.1V or less. By adjusting VR105, VR106 obtain 2 horizontal lines come to the center 0 level position.

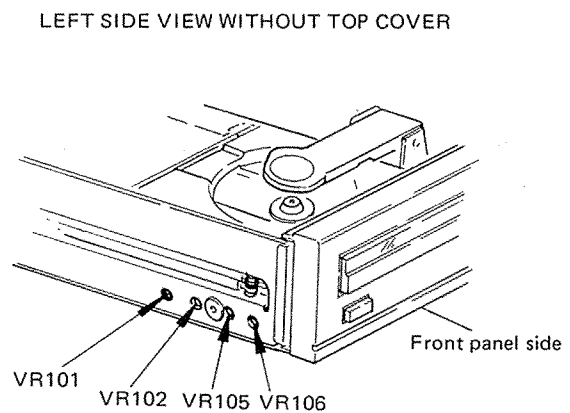


Fig. 17

### 3. Adjustment of motor amp. gain. (Fig. 18, 19)

- (1) Remove the front panel.
- (2) Remove CC131 from CB311 and CC308 from CB308 on the servo wiring board.
- (3) Connect a 100-ohm resistor in series to Pin ⑨ of CC131, and apply a DC voltage of  $-0.5V$  between Pin ⑨ and Pin ⑩ (GND).
- (4) Adjust VR103 and VR104 so that the amplitude of both driving waveforms on the oscilloscope becomes 6 Vp-p (peak to peak).
- (5) Since this gain adjustment may shift the off-set voltages of motor amps, re-adjust VR105 and VR106 if necessary. (Refer to 2(5).)

FRONT VIEW WITHOUT FRONT PANEL

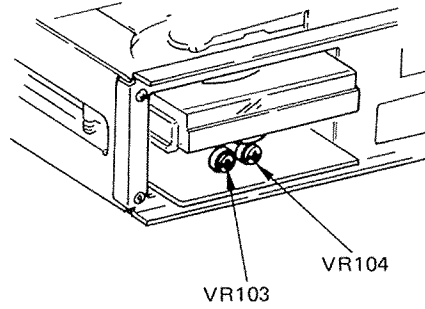


Fig. 18

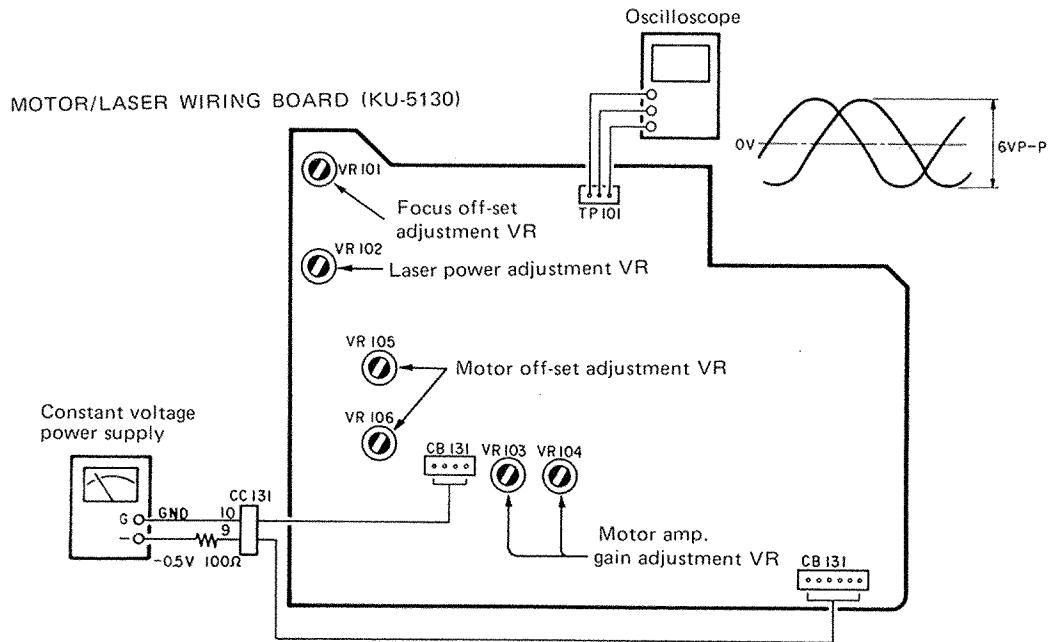


Fig. 19

### 4. Adjustment of laser power. (Fig. 19, 20)

- (1) Turn the power on, the laser beam is emitted. Be careful not to receive the laser beam directly in your eyes.  
Place the sensor part of the laser power meter in contact with the pick-up lens.  
Adjust VR102 on the motor wiring board so that the laser output becomes  $0.3mW \pm 0.01mW$ .

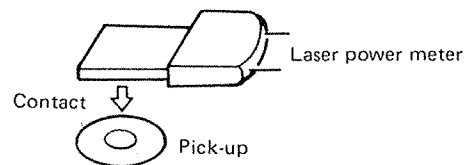


Fig. 20

## 5. Adjustment of the Stopper. (Fig. 21, 22)

- (1) Remove the clamber assembly when the clamber is in down condition.
- (2) Remove CC131 from CB311 and CC308 from CB308 on the servo wiring board. Connect the oscilloscope or a DC voltmeter to Pin 8 (ISW) of CC131.
- (3) Check voltage change from high to low when the shutter passes across the photo-interrupter by moving the pick-up from outer side to inner side by hand. (Adjustment not required, check only.)
- (4) Load the transparent disc on the spindle motor, and manually move the pick-up to bring the center of the lens at guide circle  $\phi 47 \pm 0.1$  mm diam. (Be careful not to touch the laser terminals of pick-up to avoid static voltage application.)
- (5) Adjust the stopper position to hit the metal plate and tighten the fixing screw.
- (6) Put back the clamber assembly and connectors as before.

PHOTO-INTERRUPTER ON MOTOR WIRING BOARD

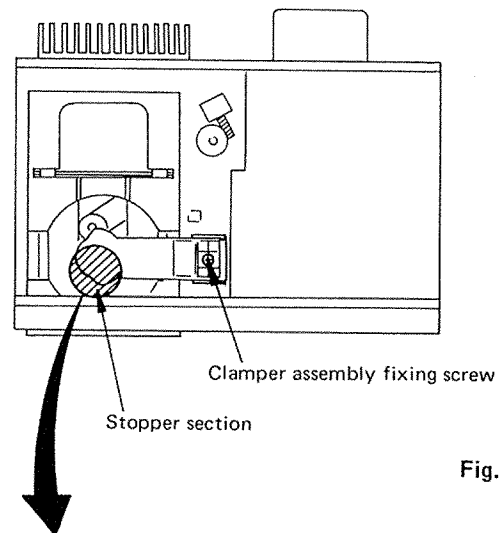


Fig. 21

ENLARGED STOPPER SECTION

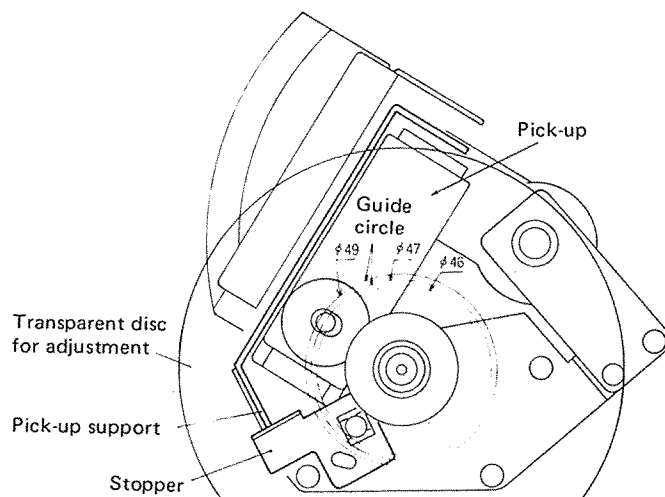
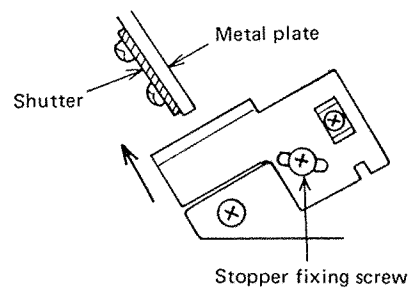


Fig. 22

# ADJUSTMENT OF PICK-UP SERVO SYSTEM

## Preparation. (Fig. 23)

Instrument: Adjustment adaptor  
 Adjustment disc (90mm diam.)  
 Oscilloscope  
 Audio oscillator

### 1. Preadjustments — to obtain working mode

- (1) Turn off the power. Unload the transparent disc and load the adjustment disc (90mm dia.)
- (2) Connect the oscilloscope to YPHF (HOT), YP522 (GND) on the signal processing wiring board.
- (3) Turn on the power.
- (4) Turn on switches SMSA-1 (Full torque) and SMSA-2 (Constant speed) on the adjustment adaptor consecutively. When the disc making revolution turn off SMSA-1.
- (5) Adjust the pick-up height adjustment screw to obtain a HF (High Frequency) waveform. (Fig. 24)
- (6) Set VR101 on the motor wiring board at mechanical center. (Fig. 23-2)
- (7) Turn on switch DDI on the adjustment adaptor. Then turn on switches FSW-A FSW-B, CSW consecutively and then turn off switch SMSA-2. Make sure LED for FZC and HSS light. If they do not light, readjust from (5).
- (8) Adjust VR101 on the motor wiring board to obtain the highest HF waveform output. (Fig. 23-2)
- (9) Adjust the jitter direction adjustment screw on the pick-up to obtain maximum amplitude of the HF waveform. (Fig. 24)
- (10) Adjust the radial direction adjustment screw to obtain maximum amplitude of the HF waveform. (Fig. 24)
- (11) Turn on switch TSW on the adjustment adaptor, then turn on switches SSW and CSW consecutively. Check on the oscilloscope that an eye pattern (EFM signal) can be observed. (Fig. 23-3)
- (12) Adjust VR101 on the motor wiring board to obtain the clearest eye pattern. (Fig. 23-3)  
 If there is a considerable amount of jitter along the time axis, readjust from (9).

SIGNAL PROCESSING WIRING BOARD (KU-5560)

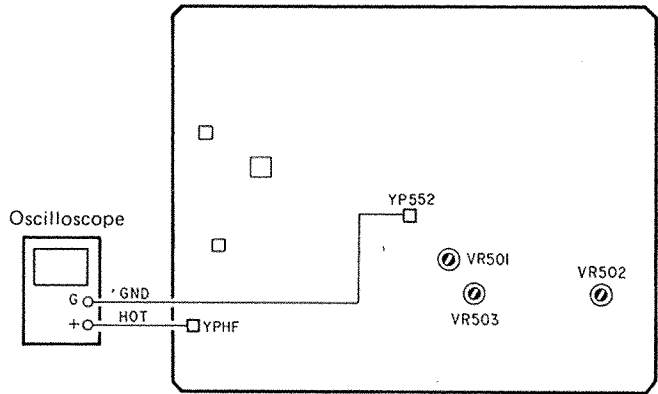


Fig. 23-1

MOTOR/LASER WIRING BOARD (KU-5130)

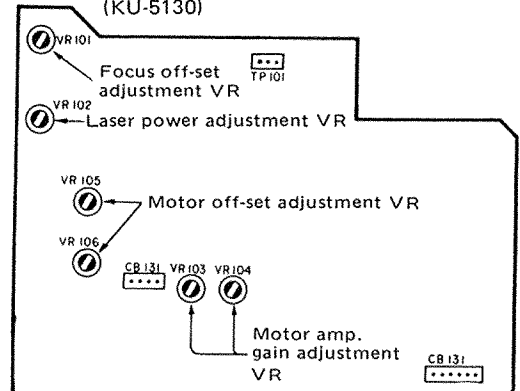
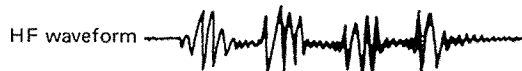
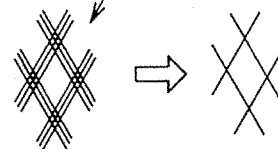
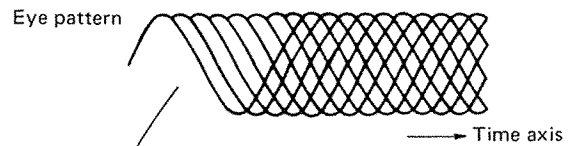


Fig. 23-2

WAVEFORM FOR (5)



EYE PATTERN FOR (11)



Adjust the line of center rhombic from for thinner and clearest

ADJUSTMENT POINT

Fig. 23-3

## 2. Jitter direction fine adjustment. (Fig. 24)

- (1) After the preadjustment, adjust the jitter direction adjustment screw to obtain the clearest eye pattern. Since adjustment range becomes broad, set at the center in the range where the eye pattern is stable.
- (2) Tighten the jitter direction fixing screw taking care that the eye pattern is not deteriorated.

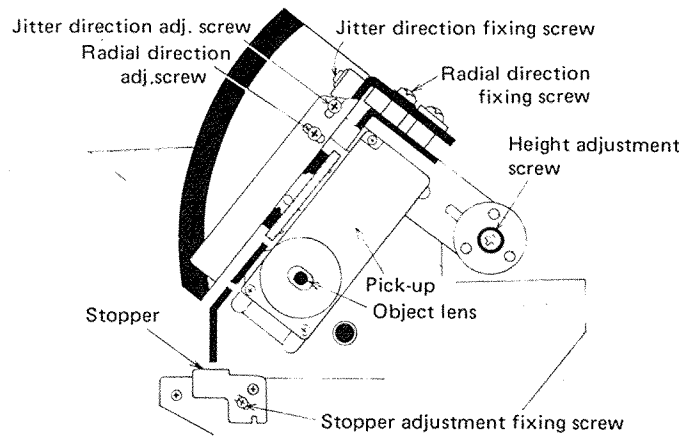
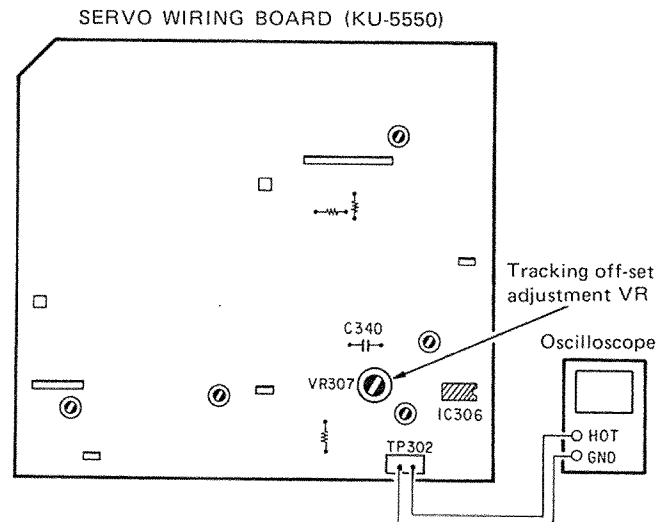


Fig. 24

## 3. Radial direction fine adjustment. (Fig. 25)

- (1) Turn off Switches TSW and SSW on the adjustment adaptor and connect the oscilloscope to TP302 on the servo wiring board.
- (2) Observe the oscilloscope and adjust the radial direction so that the noise amplitude becomes equal at the higher and lower sides. If the noise level is so small that it is difficult to adjust, disconnect C340 (180pF) on the servo wiring board to increase the noise level for performing the adjustment easier. Be sure to return C340 after adjustment.
- (3) Tighten the radial direction fixing screw.



## 4. Adjustment of tracking amp off-set voltage. (Fig. 25)

- (1) Short-circuit Pins ③ and ④ on the servo wiring board.
- (2) Turn on Switch TSW (SW 3 to 8 are all on) on the adaptor and adjust VR307 so that the slide motor will not drift in either direction.
- (3) Remove shorting jumper for Pins ③ and ④ after the adjustment is over.

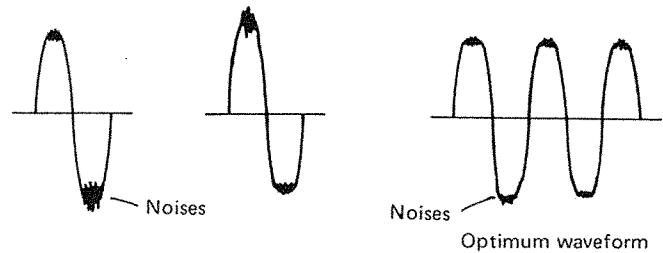


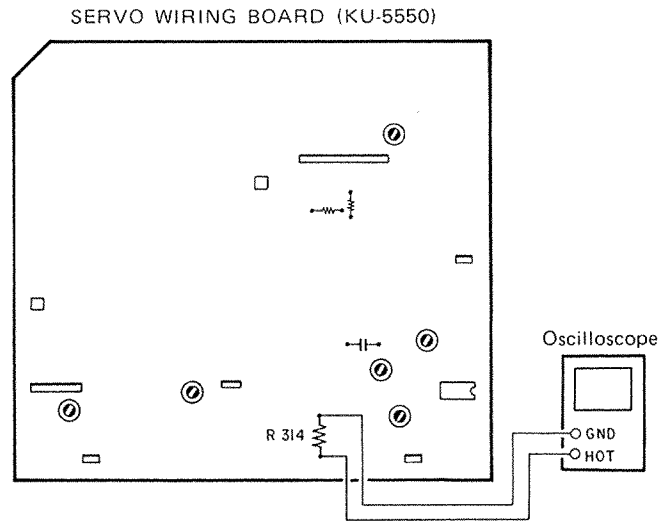
Fig. 25

## 5. Adjustment of focus amp off-set voltage. (Fig. 19, 23-1)

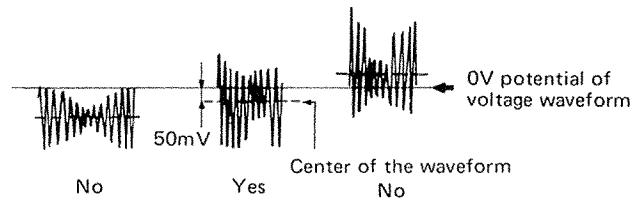
- (1) Connect the oscilloscope to YPHF (hot side), YP552 (GND) on the signal processing wiring board.
- (2) Turn on Switch TSW (SWs 3 to 8 are all on) on the adjustment adaptor.
- (3) Adjust VR101 on the motor wiring board to obtain the clearest eye pattern.

**6. Adjustment of pick-up height and confirmation of the mounting angle.**  
(Fig. 24, 26)

- (1) Connect the oscilloscope across the R314 on the servo wiring board.
- (2) Move the pick-up manually to bring the center of the pick-up lens at around innermost side of the 90mm disc edge.
- (3) Adjust the height adjustment screw so that the center of voltage waveform becomes  $-50\text{mV} \pm 10\text{mV}$  on the oscilloscope.
- (4) After finishing the Adjustment of focus servo gain (Item 8), load the test disc Denon Technical CD 138C39-7147C, and confirm the pick-up height by observing the paragraph (3) voltage becomes  $-50\text{mV} \pm 10\text{mV}$ .
- (5) Make sure that the shift of the center level is less than 120 mV while the pick-up is moved from inside to outside.  
(If the shift of the center is more than 120mV, following causes can be presumed.)
  - Spindle motor is tilting.
  - The height of the mounting boss on mech base ass'y is incorrect.
  - The shaft of rotor ass'y is tilting.



WAVEFORM FOR DC COUPLED OSCILLOSCOPE



WAVEFORM FOR AC COUPLED OSCILLOSCOPE

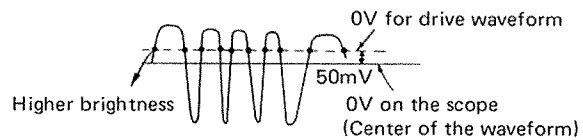


Fig. 26

**7. Adjustment of HF level.**  
(Fig. 27)

- (1) Connect the oscilloscope to TP305 HF and GND terminals.
- (2) Adjust VR303 on the servo wiring board so that the HF level becomes 2.5Vp-p.

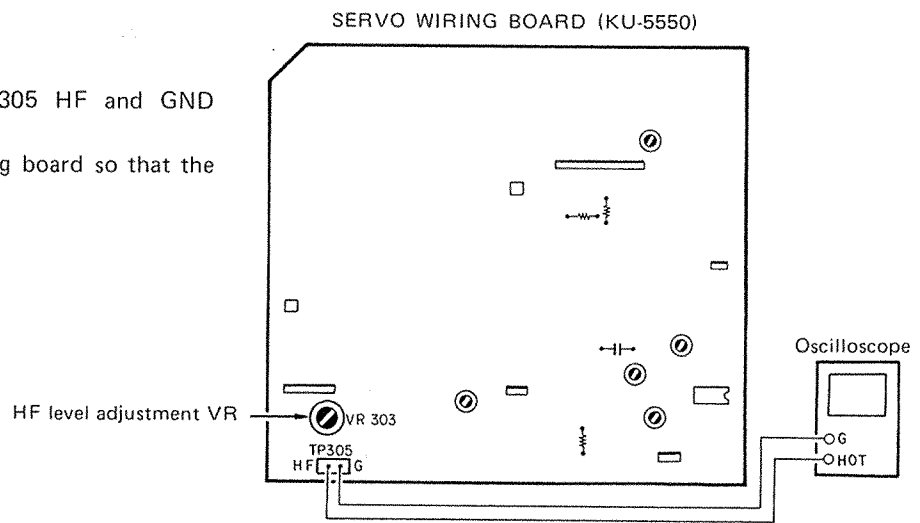


Fig. 27

**8. Adjustment of focus servo gain.**  
**(Turn on switches 3 to 8.) (Fig. 28)**

- (1) Connect the oscilloscope (X and Y inputs – Lissajous mode) to Pins ② and ④ of TP303 (Pin ① is GND) on the servo wiring board.
- (2) Connect the audio oscillator to Pin ② of TP303 and apply 1.7 kHz, 30mVp-p sine wave.
- (3) Turn on switch TSW on the adjustment adaptor (SWs 3 to 8: ON).
- (4) Adjust VR301 so that the X-Y display (Lissajous display) becomes symmetrical in respect to both X and Y axis.

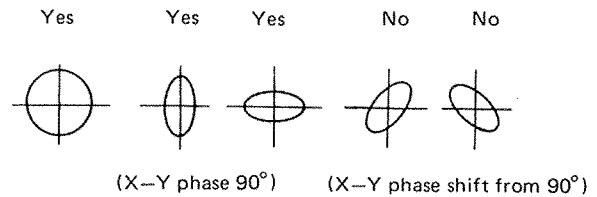
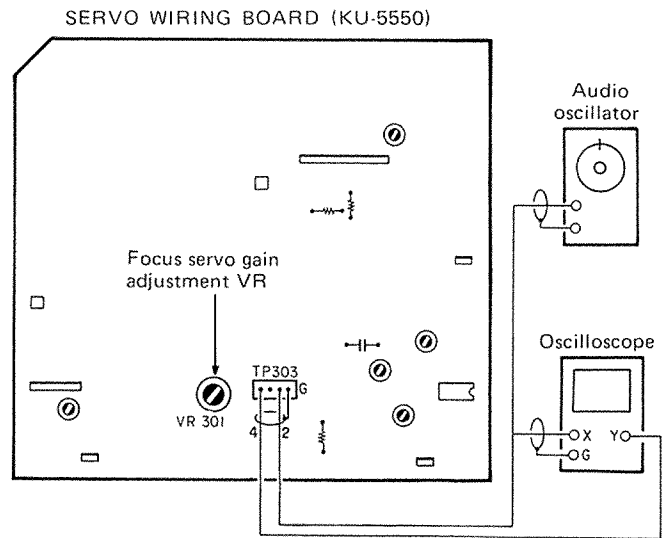


Fig. 28

**9. Adjustment of tracking servo gain.**  
**(Turn on switches 3 to 8.) (Fig. 29)**

- (1) Connect the oscilloscope (X and Y inputs – Lissajous mode) to Pins ① and ⑤ of TP302 on the servo wiring board. (Pin ③ is GND)
- (2) Connect the audio oscillator to Pin ① of TP302 and apply 1.89 kHz, 0.2 Vp-p sine wave.
- (3) Adjust VR302 so that the Lissajous display becomes symmetrical in respect to both X and Y axis.

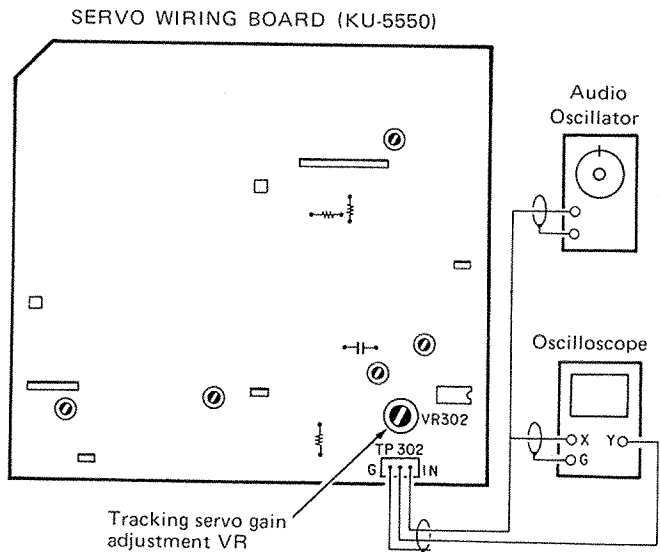


Fig. 29

**10. Adjustment of the "kick voltage".**  
(Fig. 30, 31)

- (1) Turn off the main switch and remove the adjustment adaptor.
- (2) Connect ch1 (AC mode) of the oscilloscope to TP306 on the servo wiring board.
- (3) Connect ch2 (DC mode) of the oscilloscope to the cross point of R365 and R366.
- (4) Set the oscilloscope trigger mode at ch2.
- (5) Play the middle of the program area of the adjustment disc and pause.  
Press the fast reverse button and adjust VR305 so that the HF envelope waveform becomes symmetrical.
- (6) Press the fast forward button and adjust VR305 again so that the HF envelope waveform becomes symmetrical. (Fig. 31-1)

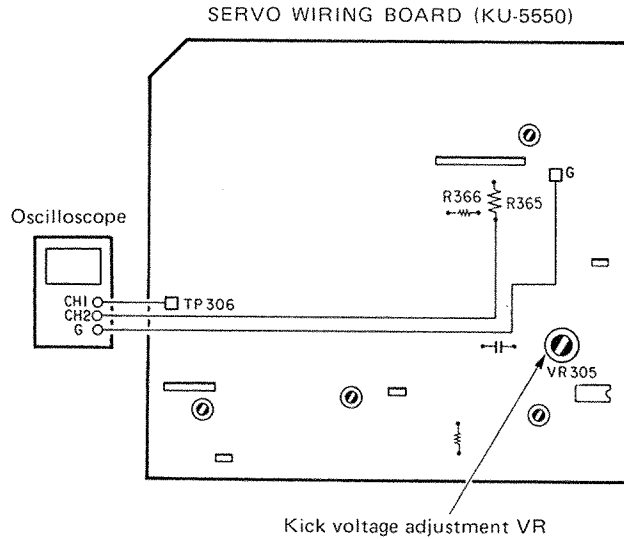


Fig. 30

- (7) If the optimum points for fast reverse and fast rewind do not coincide, set VR305 at the middle position.
- NOTE:** Trigger polarity should be changed for observing fast reverse and fast forward waveform. (Fig. 31-2)

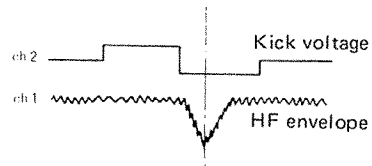


Fig. 31-1

• WAVEFORM EXAMPLES

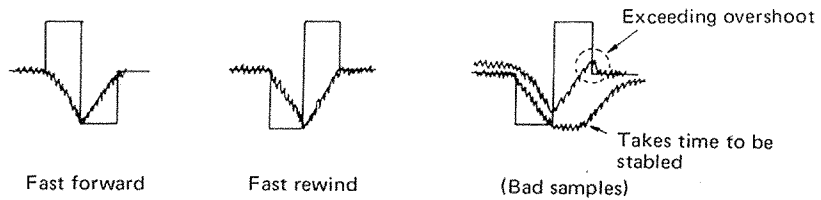


Fig. 31-2

**11. Adjustment of MCES. (Fig. 32)**

- (1) Connect the oscilloscope to TP307 on the servo wiring board.
- (2) Move the pick-up in the middle of the program area (40 to 45 mm radius) and adjust VR306 so that the MCES waveform duty becomes 50%.

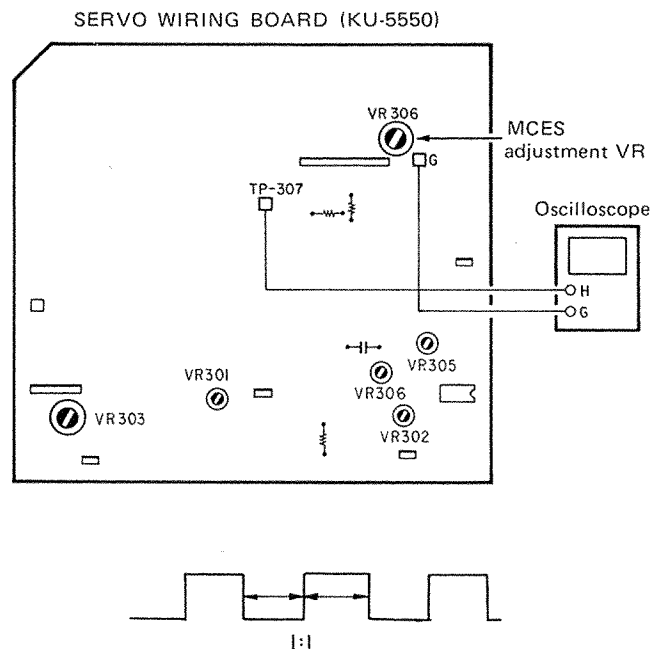


Fig. 32



## ADJUSTMENT OF SIGNAL PROCESSING CIRCUIT.

### 1. Adjustment of VCO oscillating frequency. (Fig. 32, 33)

- (1) Check that the HF level observed 2.5Vp-p at the test point YPHF on the signal processing wiring board. If not, adjust VR303 on the servo wiring board. Then connect a frequency counter to TP-A on the signal processing wiring board.
- (2) Unload the disc.
- (3) Connect TP-B to YP522 (GND).
- (4) Adjust L505 on the signal processing wiring board so that the frequency becomes  $4.3218 \text{ MHz} \pm 0.01 \text{ kHz}$  on the counter.

**NOTE:** Frequency may vary slightly at a time of adjustment if a hex. wrench made of magnetic material is used. For this case, obtain the value by keeping the hex. wrench away from L505.

Be sure to unload the disc before performing paragraph (3) or the disc may sometimes revolute very fast when disc is set in PLAY mode.

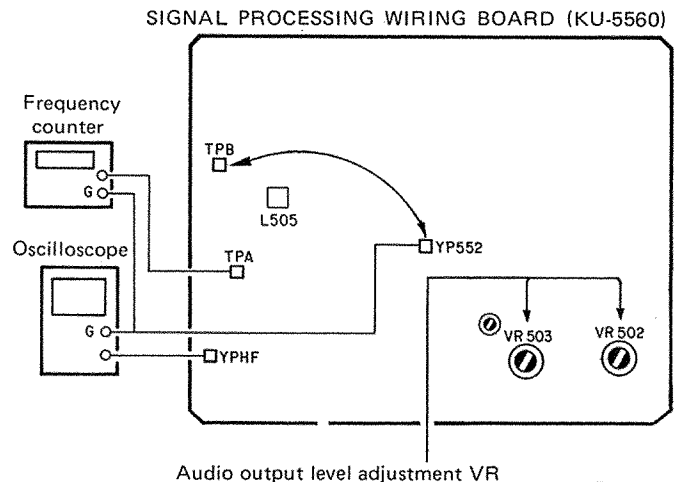


Fig. 33

### 2. Adjustment of audio output level. (Fig. 33)

- (1) Connect a 47k-ohm load resistor across the audio output terminals paralleled with an electronic volt meter.
- (2) Use the audio test disc Denon Technical CD138C39-7147 and playback 1kHz, 0dB signal.
- (3) Adjust VR502 for L-ch and VR503 for R-ch so that the audio output level becomes  $2\text{V} \pm 0.3\text{V}$ .

PARTS LIST OF P.W. BOARD

KU-5550 SERVO UNIT

Ref. No.	Part No.	Part Name	Remarks	Ref. No.	Part No.	Part Name	Remarks
<b>SEMICONDUCTOR GROUP</b>							
IC301	2620507017	HD6805V1-M-B15P		C305,307, 332,334, 335,348, 351, 356~359, 363,365, 374~376, 400,402, 404,406, 407	2531025002	CK45F1H223Z	0.022 $\mu$ F 50V
IC302	2620518019	HD6805V1-S-B14P		C311	2533643000	CC45SL1H471J	470pF 50V
IC303,304	2620326007	BA6109		C315~319, 352,354	2533619005	CC45SL1H470J	47pF 50V
IC305	2620597001	HD14161BP		C322,323, 336,380, 386,393, 398,409, 410,415, 416	2531024003	CK45F1H103Z	0.01 $\mu$ F 50V
IC306	2620506005	HD74LS122P		C337	2531027000	CK45F1H104Z	0.1 $\mu$ F 50V
IC307	2630076004	HA17901P		C340	2533633007	CC45SL1H181J	180pF 50V
IC308,313, 315,318, 322,325	2630280007	$\mu$ PC4559C		C344	2533603008	CC45SL1H100D	10pF 50V
IC309,317, 319	2630219007	TL082CP		C367	2533635005	CC45SL1H221J	220pF 50V
IC310,311	2630292008	NE5534N		C372	2533615009	CC45SL1H330J	33pF 50V
IC312,314, 316	2620395009	TC4066BP		C373	2533645008	CC45SL1H561J	560pF 50V Electrolytic 1 $\mu$ F 50V
IC321	2620327006	HD74LS00P		C304,306, 362,364, 395	2544146004	CE04W1H010=	
IC323	2620497004	TC40H004P		C308~310, 331,333, 341,342, 347,350, 408	2544139008	CE04W1E101=	100 $\mu$ F 25V
IC324,326	2620419008	HD14053BP		C327,328, 391,392	2544132005	CE04W1C100=	10 $\mu$ F 16V
TR301	2730201009	2SC2236(Y)		C345,346	2544172007	CE04W1H0R1	0.1 $\mu$ F 50V
TR302	2710105002	2SA966(Y)		C378,379	2544140000	CE04W1V4R7=	4.7 $\mu$ F 35V
TR303, 304	2710173005	2SA781K		C384,397	2544130007	CE04W1A101=	100 $\mu$ F 10V
TR305, 310	2730177007	2SC1626(Y)		C385	2549030005	CE04W=1E100M	10 $\mu$ F 25V
TR306, 311	2710088006	2SA816(Y)		C389	2544066003	CE04W1H2R2=	2.2 $\mu$ F 50V
TR307, 309, 313~316, 318,320	2710102005	2SA1015(Y)		C399,401	2544131006	CE04W1A221=	220 $\mu$ F 10V
TR308, 312,317, 324	2730198002	2SC1815(Y)		C403,405	2544164031	CE04W1E221M	220 $\mu$ F 25V Film
D301~304	2760049008	1S2076		C302	2551121096	CQ93M1H393J	0.039 $\mu$ F 50V
D305,306, 308~315	2760370007	1S5106		C303,382	2551121054	CQ93M1H183J	0.018 $\mu$ F 50V
DZ301	2760255038	HZ12C2		C312~314, 368	2551122040	CQ93M1H104J	0.1 $\mu$ F 50V
DZ302	2760173042	HZ6B1		C320,321	2556099000	CQ09S1H102J	0.001 $\mu$ F 50V
<b>RESISTOR GROUP</b>				C324,329	2551122066	CQ93M1H154J	0.15 $\mu$ F 50V
R314,364	2440014010	RS14B3A5R6JNBF	5.6 $\Omega$ 1W	C325	2551121009	CQ93M1H682J	0.0068 $\mu$ F 50V
R336,373	2442028004	RS14B2E150JNRF	15 $\Omega$ 1/4W	C326	2551120084	CQ93M1H472J	0.0047 $\mu$ F 50V
R395	2440017020	RS14B3A100JNBF	10 $\Omega$ 1W	C330	2551123023	CQ93M1H474J	0.47 $\mu$ F 50V
R492,493	2410137011	RD14B2H100JF	10 $\Omega$ 1/2W	C338	2551123010	CQ93M1H394J	0.39 $\mu$ F 50V
VR301, 306,307	EP-5462H13	SOLID VR (103)	10k $\Omega$ B	C339,361	2551121041	CQ93M1H153J	0.015 $\mu$ F 50V
VR302	EP-5462H9	SOLID VR (222)	2.2k $\Omega$ B	C343	2551122037	CQ93M1H823J	0.082 $\mu$ F 50V
VR303	EP-5462H7	SOLID VR (102)	1k $\Omega$ B				
VR305	EP-5462H11	SOLID VR (472)	4.7k $\Omega$ B				
<b>CAPACITOR GROUP</b>							
C301,353, 355,360, 387,388, 394,396	2533627000	CC45SL1H101J	Ceramic 100pF 50V				

## KU-5130 MOTOR & LASER UNIT

Ref. No.	Part No.	Part Name	Remarks
C349	2551120097	CQ93M1H562J	0.0056 $\mu$ F 50V
C366	2551120000	CQ93M1H102J	0.001 $\mu$ F 50V
C369,383	2551122082	CQ93M1H224J	0.22 $\mu$ F 50V
C370	2551120026	CQ93M1H152J	0.0015 $\mu$ F 50V
C371	2551121083	CQ93M1H333J	0.033 $\mu$ F 50V
C381	2551122024	CQ93M1H683J	0.068 $\mu$ F 50V
<b>OTHER PARTS GROUP</b>			
X300,301	3990016017	FCR4.0M	
TP301	2050192089	18P NH CON. BASE	
TP302, 305	2050190036	3P NH CON. BASE	
TP303	2050190049	4P NH CON. BASE	
TP310	2050190036	3P NH CON. BASE	
CB301	2050190049	4P NH CON. BASE	
CB302 ~308	2050190036	3P NH CON. BASE	
CB311	2050190007	10P NH CON. BASE	
CB321, 392	2050190036	3P NH CON. BASE	
CB352	2050190078	7P NH CON. BASE	
CB381	2050192047	14P NH CON. BASE	
CB382	2050190049	4P NH CON. BASE	
CB391	2050190065	6P NH CON. BASE	

Ref. No.	Part No.	Part Name	Remarks
<b>SEMICONDUCTOR GROUP</b>			
IC101	2630275009	HA12050	
IC102	2630109007	TL-081-CP	
IC103	2630280007	$\mu$ PC4559C	
TR101	2730198002	2SC1815(Y)	
TR102	2710102005	2SA1015(Y)	
TR103	2710105002	2SA966(Y)	
TR104, 106	2740091005	2SD721	
TR105, 107	2720068003	2SB711	
Z101~103	2760051012	HZ-7B	
H101~102	2760376001	HW-300C(Q)	
PC101	2690011009	ON1112	
<b>RESISTOR GROUP</b>			
R109	2440031022	RS14B3A151JNBF	150 $\Omega$ 1W
R110	2440086006	RS14B3D101JNB	100 $\Omega$ 2W
R132	2440032021	RS14B3A181JNBF	180 $\Omega$ 1W
VR101	2116003083	V10QB222	2.2k $\Omega$ B
VR102	2116001027	V10QB103	10k $\Omega$ B
VR103, 104	2116003067	V10QB102	1k $\Omega$ B
V105,106	2116001069	V10QB473	47k $\Omega$ B
<b>CAPACITOR GROUP</b>			
C101	2533635005	CC45SL1H221J	Ceramic 220pF 50V
C104	2533633007	CC45SL1H181J	180pF 50V
C141,173, 174	2531027000	CK45F1H104Z	0.1 $\mu$ F 50V
C145,146	2531025002	CK45F1H223Z	0.022 $\mu$ F 50V Electrolytic
C102,103	2544147003	CE04W1H2R2=	2.2 $\mu$ F 50V
C105	2544009002	CE04W1A470=	47 $\mu$ F 10V
C106,107, 110,143, 172	2544146004	CE04W1H010=	1 $\mu$ F 50V
C108,111	2544130007	CE04W1A101=	100 $\mu$ F 10V
C171	2544172049	CE04W1H010MF	1 $\mu$ F 50V Film
C109,112, 121	2551121025	CQ93M1H103J	0.01 $\mu$ F 50V
<b>OTHER PARTS GROUP</b>			
CB121	3468156014	COIL	
CB121	2050190049	4P NH CON. BASE	
CB121	2050190094	9P NH CON. BASE	
CB131-2	2050233045	4P EH CON. BASE	
CB131-1	2050233061	6P EH CON. BASE	
CB191			

• The carbon resistors rated at  $\frac{1}{4}$ W are not listed herein.

• The carbon resistors rated at  $\frac{1}{4}$ W are not listed herein.

**KU-5281/5282/5283 POWER SOURCE UNIT**

Ref. No.	Part No.	Part Name	Remarks
<b>SEMICONDUCTOR GROUP</b>			
Q901	2630286001	HA-178-05	
Q902	2630160004	μPC7905H	
Q903,905	2630288009	HA-178-15	
Q904,906	2630200003	μPC7915H	
Q907	2720053005	2SB647A(C)	
D901,903,907	2760152005	1D2Z-1	
D902,904,908	2760151006	1D2C-1	
D905,906	2760162024	1S1886	
D909	2760303003	HZ6C2	
D910	2760314005	HZ-27-3	
<b>RESISTOR GROUP</b>			
VR901	2118067001	V1620V30KA103	VR10kΩA
<b>CAPACITOR GROUP</b>			
C905,906,912,913,922,923	2531025002	CK45F1H223Z	Ceramic 0.022μF 50V
C928	2531027000	CK45F1H104Z	0.1μF 50V
C931	2538010007	CK45-2GAC103P	0.01μF 400VAC
C903	2544202003	CE04W1C682M	Electrolytic 6800μF 16V
C904	2544163032	CE04W1C102M	1000μF 16V
C907,908,914,915,924,925	2544150003	CE04W1H100=	10μF 50V
C910	2544164060	CE04W1E332=	3300μF 25V
C911	2544086009	CE04W1E222M	2200μF 25V
C916	2544089022	CE04W1H101=	100μF 50V
C917	2544166000	CE04W1H221M	220μF 50V
C920,921	2544079016	CE04W1E222=	2200μF 25V
<b>OTHER PARTS GROUP</b>			
SW902	2129230005	SLIDE SWITCH	
LF	2398019002	LINE FILTER COIL	
F901	EP-5870	FUSE HOLDER	E1, E3
F901	FEP1287	FUSE HOLDER	E2, EA
F901	2061022012	FUSE 0.63A	E1, E3
F901	2061015045	FUSE 0.315A	E2, EA
	4121767202	TR SUPPORT BK	
	4150302007	SPACER	
	4170243104	POWER RADIATOR	
CB911 931,951, 981	2050190065	6P NH CONNE BASE	

Note. KU-5281 . . . . E2, EA  
 KU-5282 . . . . E3  
 KU-5283 . . . . E1

**KU-5540 KEY DISPLAY UNIT**

Ref. No.	Part No.	Part Name	Remarks
<b>SEMICONDUCTOR GROUP</b>			
IC801	2620512002	HD74LS154P	
IC802,804	2620516008	MSL-915RS	
IC803	2620517007	MSL-917RS	
D801~806	2760370007	1SS106	
<b>OTHER PARTS GROUP</b>			
S801,802 807,808, 813,814, 819,820	2124407008	TACT SWITCH	
S803~806, 809~812, 815~818, 821~824	2123333005	TACT SWITCH	
F801	3934012006	12BT02ZT	
	4690026005	SPACER	
	4990040008	RM557	
CB801	2050190007	10P NH CON. BASE	
CB802	2050190036	3P NH CON. BASE	
CB831	2050192047	14P NH CON. BASE	
CB832	2050190049	4P NH CON. BASE	
CB891	2050190065	6P NH CON. BASE	

• The carbon resistors rated at ¼W are not listed herein.

**KU-5570 REMOCON DEC. UNIT**

Ref. No.	Part No.	Part Name	Remarks
<b>SEMICONDUCTOR GROUP</b>			
IC1	2620589006	LR3712	
IC2	2620591007	HD74HC00P	
IC3	2620497004	TC-40H-004P	
IC4~8	2620592006	MN6631A	
X1	2610037005	CSB455E	
<b>CAPACITOR GROUP</b>			
C1	2531027000	CK45F1H104Z	Ceramic 0.1μF 50V
C2,3	2533627000	CC45SL1H101J	100pF 50V
<b>OTHER PARTS GROUP</b>			
CB31	2048123002	2P RCA PIN JACK	
CB81	2050190049	4P NH CON. BASE	
CB82	2050190007	10P NH CON. BASE	
CB82	2050190036	3P NH CON. BASE	

• The carbon resistors rated at ¼W are not listed herein.

KU-5560 SIG. PROC. AUDIO UNIT

Ref. No.	Part No.	Part Name	Remarks
<b>SEMICONDUCTOR GROUP</b>			
IC501	2620515009	PCM-53JP-V	
IC502,503	2630285002	LF-356N	
IC504,505	2630291009	L.P.F	
IC506,507	2630118001	NJM4560D	
IC508	2630295005	HA17903PS	
IC509,510	2630189001	M5218L	
IC511,512	2620419008	HD14053BP	
IC513	2620536004	TL7705CP-B	
IC514	2620490001	SAA-7020	
IC515	2620491000	SAA-7000	
IC516	2620554002	HM-6116P-4	
IC517	2620514000	HD-74LS-74AP	
IC518	2630129003	$\mu$ PC78L12H	
IC519	2620513001	HD-74LS-107AP	
IC520,522	2628016005	HD74LS04P	
IC521	2620588007	LZ91B14	
IC523	2630279005	SA-7011	
TR501, 502	2710102034	2SA1015(GR/Y)	
TR503	2730198015	2SC1815(BL)	
D501,502	2760218017	HZ-9A-2	
D503,504, 508, 510~513	2760049008	1S2076	
D505,506	2760302004	SV321SP-D2	
D507	2760236031	HZ5C-1	
<b>RESISTOR GROUP</b>			
R506,507	2440034016	RS14B3A271JNBF	270 $\Omega$ 1W
R579,580	2442028033	RS14B2E101JFRF	100 $\Omega$ 1/4W
VR501	EP-5462H1	SOLID VR (101)	100 $\Omega$ B
VR502, 503	EP-5462H7	SOLID VR (102)	1k $\Omega$ B
<b>CAPACITOR GROUP</b>			
C502,504, 509,511, 513,528, 530,536, 538,548, 550,553, 555, 590~592, 597, 604~609, 612~615, 618,621	2531025002	CK45F1H223Z	Ceramic 0.022 F 50V
C588,589, 623	2531027000	CK45F1H104Z	0.1 $\mu$ F 50V
C601,602	2531008003	CK45B1H472K	0.0047 $\mu$ F 50V
C603	2531055027	CK45B1H821K	820pF 50V
C610,611	2533613001	CC45SL1H270J	27pF 50V
C501,503	2544027000	CE04W1E470=	Electrolytic 47 $\mu$ F 25V

Ref. No.	Part No.	Part Name	Remarks
C505,507, 622	2544131006	CE04W1A221=	220 $\mu$ F 10V
C517,519, 521,523	2544201004	CE04W1E330=	33 $\mu$ F 25V
C531,533	2544044009	CE04W1H010=	1 $\mu$ F 50V
C535,537, 552,554	2544200005	CE04W1H010=(SL)	1 $\mu$ F 50V
C543,560, 580,581	2544211007	CE04W1A101M	100 $\mu$ F 10V
C565,598, 617,619	2544128006	CE04W1A220=	22 $\mu$ F 10V
C571,573	2544080005	CE04=1E102M	1000 $\mu$ F 25V
C575	2544201020	CE04W1E102=(SL)	1000 $\mu$ F 25V
C616	2544133004	CE04W1C220=	22 $\mu$ F 16V
C620	2544129005	CE04W1A470=	47 $\mu$ F 10V Film
C526,547	2551120026	CQ93M1H152J	0.0015 $\mu$ F 50V
C539,556	2556161019	CQ09S1H470J	47pF 50V
C542,559	2556103006	CQ09S1H152J	0.0015 $\mu$ F 50V
C582,583	2556111001	CQ09S1H332J	0.0033 $\mu$ F 50V
C584,585	2554193005	CQ93P1H104J	0.1 $\mu$ F 50V
C593,594	2551122040	CQ93M1H104J	0.1 $\mu$ F 50V
C595,600	2551120042	CQ93M1H222J	0.0022 $\mu$ F 50V
C596,599	2551121067	CQ93M1H223J	0.022 $\mu$ F 50V
C651	2551123010	CQ93M1H394J	0.39 $\mu$ F 50V Metalized
C586,587	2561026000	CF93A2B105K	1 $\mu$ F 125V
<b>OTHER PARTS GROUP</b>			
X501	3998049002	X'TAL 4.2336MHz	
L501~504	2310828006	INDUCTOR	
RE501, 502	2148004005	L22M	
SW501	2123337001	SLIDE SWITCH	
	4121580201	SHIELD COVER	
TP501	2050190023	2P NH CON. BASE	
CB531	2050190036	3P NH CON. BASE	
CB532	2050190078	7P NH CON. BASE	
CB551	2050190049	4P NH CON. BASE	
CB591	2050190065	6P NH CON. BASE	
CB592	2050190081	8P NH CON. BASE	

**WARNING:**

Parts marked with  $\Delta$  and/or shading have special characteristics important to safety. Be sure to use the specified parts for replacement.

## PARTS LIST OF EXPLODED VIEW

Ref. No.	Part No.	Part Name	Remarks
1	1050644004	BACK PANEL	E1
	1050642103	BACK PANEL	E2, EA
	1050643209	BACK PANEL	E3
△ 2	2006031026	AC CORD	E1
	2062002031	AC CORD	E2
	2062019008	AC CORD	E3
	2006019310	AC CORD	EA
△ 3	MD-3802	CORD BUSH	E3
	MD-2982H	CORD BUSH	EA
	4450020005	CORD BUSH	E1, E2
4	KU-5570-2	REMOCON DEC UNIT	
5	4121750109	SLIDE SW BRACKET (R)	
△ 6	2334093105	POWER TRANS	E1
	2334092203	POWER TRANS	E2, EA
	2334091000	POWER TRANS	E3
7	KU-5283-3	POWER SOURCE UNIT	E1
	KU-5281-3	POWER SOURCE UNIT	E2, EA
	KU-5282-3	POWER SOURCE UNIT	E3
8	4121757102	SIDE CHASSIS (L)	
9	4121758204	CENTER CHASSIS	
10	4121493314	SIDE CHASSIS (R)	
11	1050637008	BOTTOM COVER	
12	4439004000	PWB HOLDER	
13	1040109007	FOOT	
14	4121488206	POWER SW BRACKET	
△ 15	2123336002	POWER SW	
△ 16	2538004000	CK45-2BAC102P	E3
17	4170243104	POWER RADIATOR	
18	4630401004	FLOATING SPRING (F)	
19	4630402003	FLOATING SPRING (B)	
20	KU-5283	POWER SOURCE UNIT	E1
	KU-5281	POWER SOURCE UNIT	E2, EA
	KU-5282	POWER SOURCE UNIT	E3
21	KU-5550	SERVO UNIT	
22	KU-5283-2	POWER SOURCE UNIT	E1
	KU-5281-2	POWER SOURCE UNIT	E2, EA
	KU-5282-2	POWER SOURCE UNIT	E3
23	4150261009	PCB HINGE	
24	KU-5560	SIG. PROC. AUDIO UNIT	
25	4618109014	CUSHION (B)	
26	4610243004	CUSHION (C)	
27	4121775003	FRONT CHASSIS	
28	4121495008	H/P BRACKET	
29	1441314215	FRONT PANEL ASS'Y	
30	1140092113	KNOB BASE ASS'Y	
31	1130496211	POWER KNOB CAP	
32	4630363003	POWER SW SPRING	
33	1460736007	KNOB FRAME ASS'Y	
34	1460634303	DISPLAY PANEL	
35	1430341008	FILTER	
36	KU-5540	KEY DISPLAY UNIT	

Ref. No.	Part No.	Part Name	Remarks
37	KU-5570	REMOCON DEC. UNIT	
38	4121782009	P.C. SUPPORT	
39	1460628212	LOADING PLATE	
40	1120434018	KNOB	
41	4350091008	CONNECTING ROD	
42	4690025006	POWER SW CONNECTOR	
43	4121767202	TR SUPPORT BRACKET	
44	4150302007	SPACER	
45	1240032015	FELT SHEET	E3
46	4121801003	TRANSPORT BRACKET	
47	1020171222	TOP COVER	
48	1220064045	SPACER	
49	1011685002	WOOD BORAD (R)	E1, E3, EA
50	1011686001	WOOD BOARD (L)	E1, E3, EA
51	4458019034	CORD CLAMP	
△ 52	2123315023	VOLTAGE SELECTOR	E1
61	4770064107	FIXING SCREW	
62	4737007000	4x8 CBTS(S)B	
63	4713201024	2.6x4 CBS	
64	4770052012	FIXING SCREW	
65	4737513002	3x6 CTBS (C)	
66	4700009006	3x6 CPS (SW)	
67	SC-1082-2	NUT-W	
68	4730305013	3x10 CBRTS(1)	
69	4751006016	5W (BKNI)	E3
70	4737007039	4x20 CBTS(S)	E3
71	4770201009	3x4 T.T SCREW	
72	4737007071	4x12 CBTS(S)	
73	4730306012	3x12 CBRTS(1)	
74	4713303016	3x6 CBS	
75	4713816008	LOCK SCREW	
76	4713202023	2.6x5 CBS	E1
100		MECH UNIT	

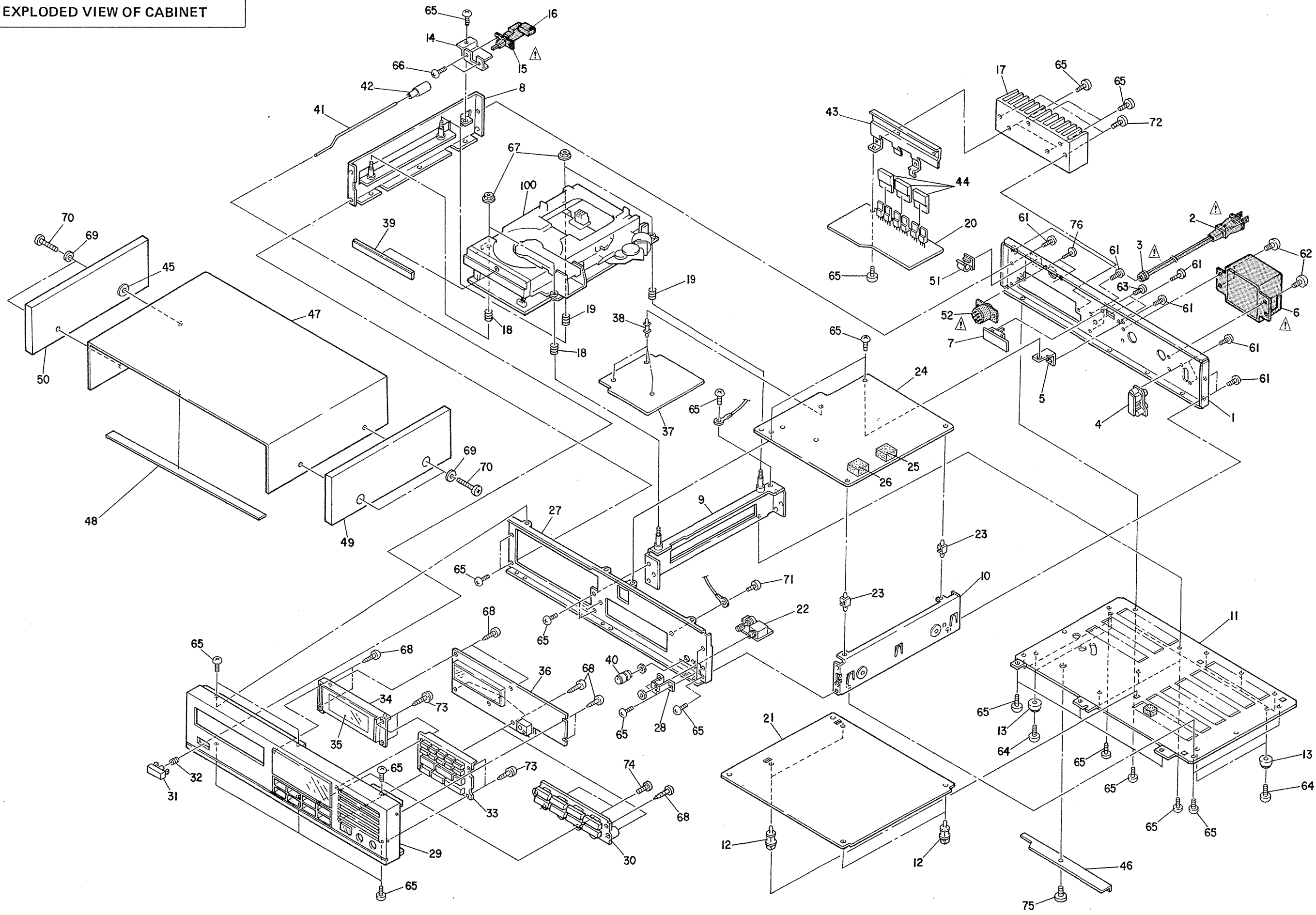
Remarks symbols in the parts list refer to the following countries and areas.

- EA: Australia
- E1: Multiple voltage model
- E2: European continent
- E3: North America

### WARNING:

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EXPLODED VIEW OF CABINET



PARTS LIST OF MECHANISM UNIT

Ref. No.	Part No.	Part Name	Remarks	Ref. No.	Part No.	Part Name	Remarks
101	4121762207	BASE CHASSIS ASS'Y		148	4338278102	LOCK LEVER ASS'Y	
102	4310156006	GUIDE RAIL (R)		149	4638830101	TWIST SPRING	
103	4121752000	MICRO SW BRACKET (B)		150	4468115119	MECH BASE ASS'Y	
104	4121748001	MICRO SW BRACKET (A)		151	4158054409	SHEET	
105	4610206009	RUBBER SHEET		152	4258052000	THRUST WASHER	
106	4310154105	RACK (A)		153	KU-5130	MOTOR & LASER UNIT	
107	4310133016	RACK SUPPORT		154	4438785207	MOTOR HOUSING ASS'Y	
108	4430371004	RACK (A) COLLAR		155	4218388002	ROTOR ASS'Y	
109	4121746003	LOCK SUPPORT ASS'Y		156	4638632008	SPRING	
110	4200067001	LOCK ARM ASS'Y		157	4210291003	CENTER CAP	
111	4761001001	2E RING		158	4210289109	TURNTABLE	
112	4330393108	ARM BRACKET ASS'Y		159	4751121108	SLIT WASHER	
113	4761003009	3E RING		160	4438158041	COLLAR	
114	4121472102	MOTOR BRACKET (A) ASS'Y		161	4618142107	FLAT SPRING	
115	4240070100	GEAR (A)		162	4428161006	STOPPER (1)	
116	4240072108	WORM WHEEL		163	4338264608	PULLY ARM	
117	4761004008	4E RING		164	2178093002	DC MICRO MOTOR	
118	2170117009	DC MOTOR		165	4218393107	PULLY ASS'Y	
119	4248049007	WORM ASS'Y		166	4238027000	BELT	
120	2170120106	MOTOR (B) ASS'Y		167	4428115405	PU SUPPORT (A) ASS'Y	
121	4121751001	LOADING MOTOR BRACKET		168	4148199002	SHUTTER	
122	4240071109	GEAR (B)		169	4428117209	PU SUPPORT (B) ASS'Y	
123	4238033007	LOADING BELT NO.2		170	4638827004	SPRING PLATE	
124	4620057002	RUBBER BUSH		171	4751106042	WASHER	
125	4121750109	SLIDE SW BRACKET (R)		172	4751006003	5W	
126	2123335003	MICRO-SW		173	4990039006	OPTICAL PICK UP	
127	4310158101	LOADER		174	4338262406	PU ARM ASS'Y	
128	4200066002	DISC UP SHAFT ASS'Y		175	4428150004	STOPPER	
129	4330399005	DISC UP CONNECTOR		176	4258051001	THRUST SCREW	
130	4630400102	DISC UP SPRING (B)		177	4128836000	LOCK PLATE	
131	4330398200	DISC UP (R)		178	4428112000	ARM STOPPER	
132	4330397201	DISC UP (L)		179	4638254004	SPRING	
133	4121777001	DISC UP BRACKET		180	4121749000	ROD GUIDE BRACKET	
134	4310155104	LOADING RAIL		181	4210301100	CLAMPER GEN ASS'Y	
135	4310136110	RACK (B)		182	4210290004	CLAMP SHAFT	
136	4121460004	STOPPER (L)		183	4630405000	CLAMP SHAFT SPRING	
137	4610206012	RUBBER SHEET		184	4121747206	CLAMP BRACKET ASS'Y	
138	1441313119	LOADING PANEL		185	4220308009	CLAMP SHAFT	
139	4310157005	GUIDE RAIL (L)		186	4630403109	CLAMP SPRING	
140	4310140106	ROLLER ASS'Y		187	EP-6214	CORD HOLDER	
141	4121489001	RETAINER STOPPER (L)		188	EP-4772	CORD HOLDER	
142	4121490003	RETAINER STOPPER (R)		189	4258011009	STEEL BALL D3	
143	2124531000	LEAF SW		190	4638633007	SPRING	
144	4428113313	MECH PLATE ASS'Y		191	4751113103	4.1 WASHER	
145	4338277307	LOCK ARM ASS'Y		201	4713301018	3x4 CBS	
146	4330372103	LOCK ARM PLATE		202	4713304015	3x8 CBS	
147	4770240015	WASHER		203	4700001004	2.6x4 CPS SW	
				204	4737513002	3x6 CBTS (C)	
				205	4770116039	2.6x10 TT	
				206	4730303015	3x6 CBRTS(1)	

PACKING & ACCESSORIES GROUP

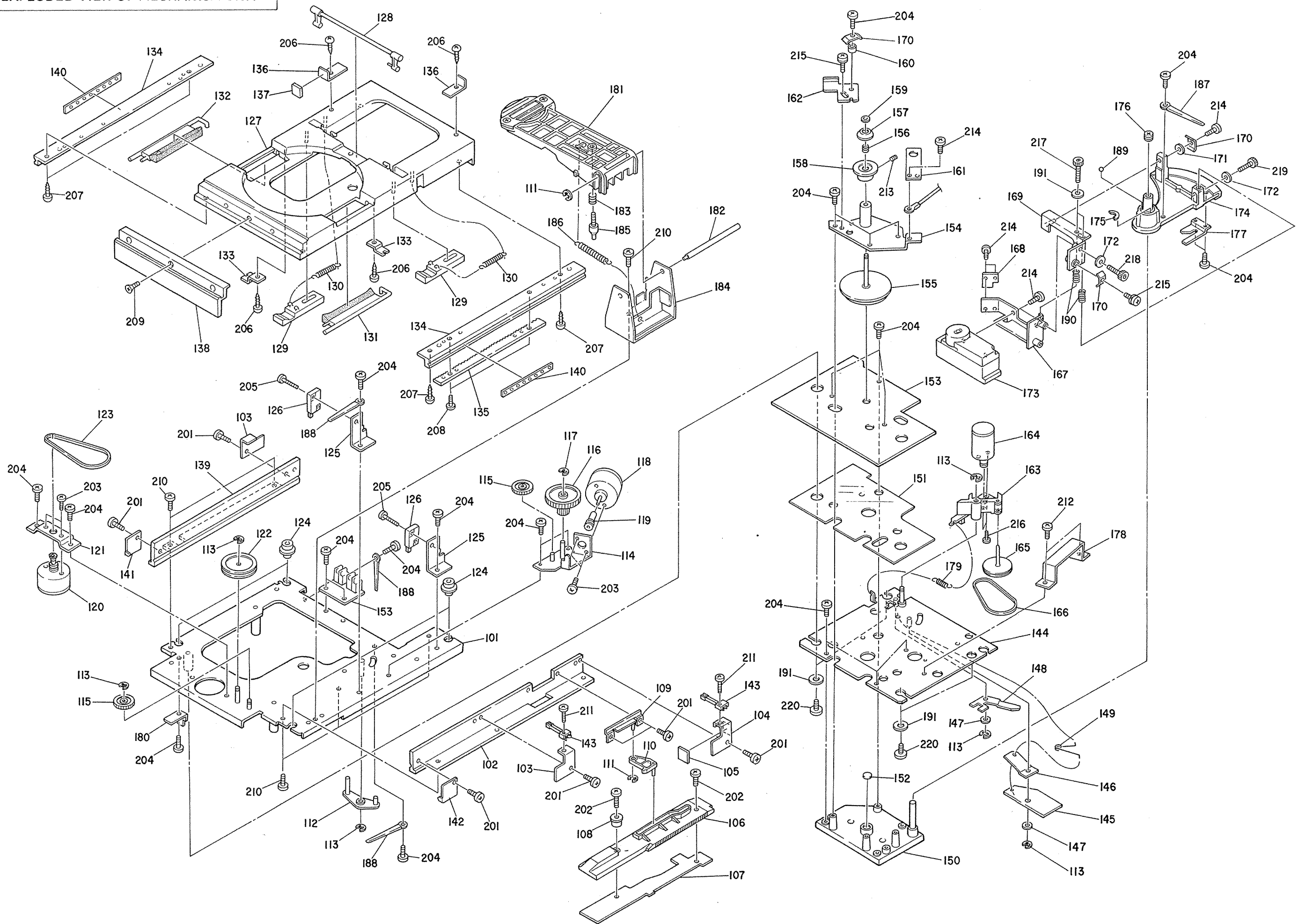
Ref. No.	Part No.	Part Name	Remarks	Ref. No.	Part No.	Part Name	Remarks
207	4734305022	3x10 CTTS(1)			5018341028	CARTON CASE	E1, E2, EA
208	4220272009	RACK SCREW			5018341031	CARTON CASE	E3
209	4732304025	3x8 CFTS(1)			5038059109	CUSHION ASS'Y	E2
210	4713302017	3x5 CBS			5030416203	CUSHION ASS'Y	E1, E3, EA
211	4711103014	2x6 CPS			5018359010	OUTER CASE	
212	4737002005	3x6 CBTS(S)			5030245005	CORNER PAD	
213	4770032003	3x6 SS			5050061007	ENVELOPE	
214	4713303016	3x6 CBS			5111299006	INST. MANUAL	
215	4700009019	3x6 CPSW			2048121004	2P PIN CORD	
216	4711102015	3x5 CPS			2033667007	PLUG ADAPTER	E1
217	4755100138	3x20 HSHB					
218	4755100112	3x6 HSHB					
219	4755100125	3x12 HSHB					
220	4713403055	4x6 CBS					

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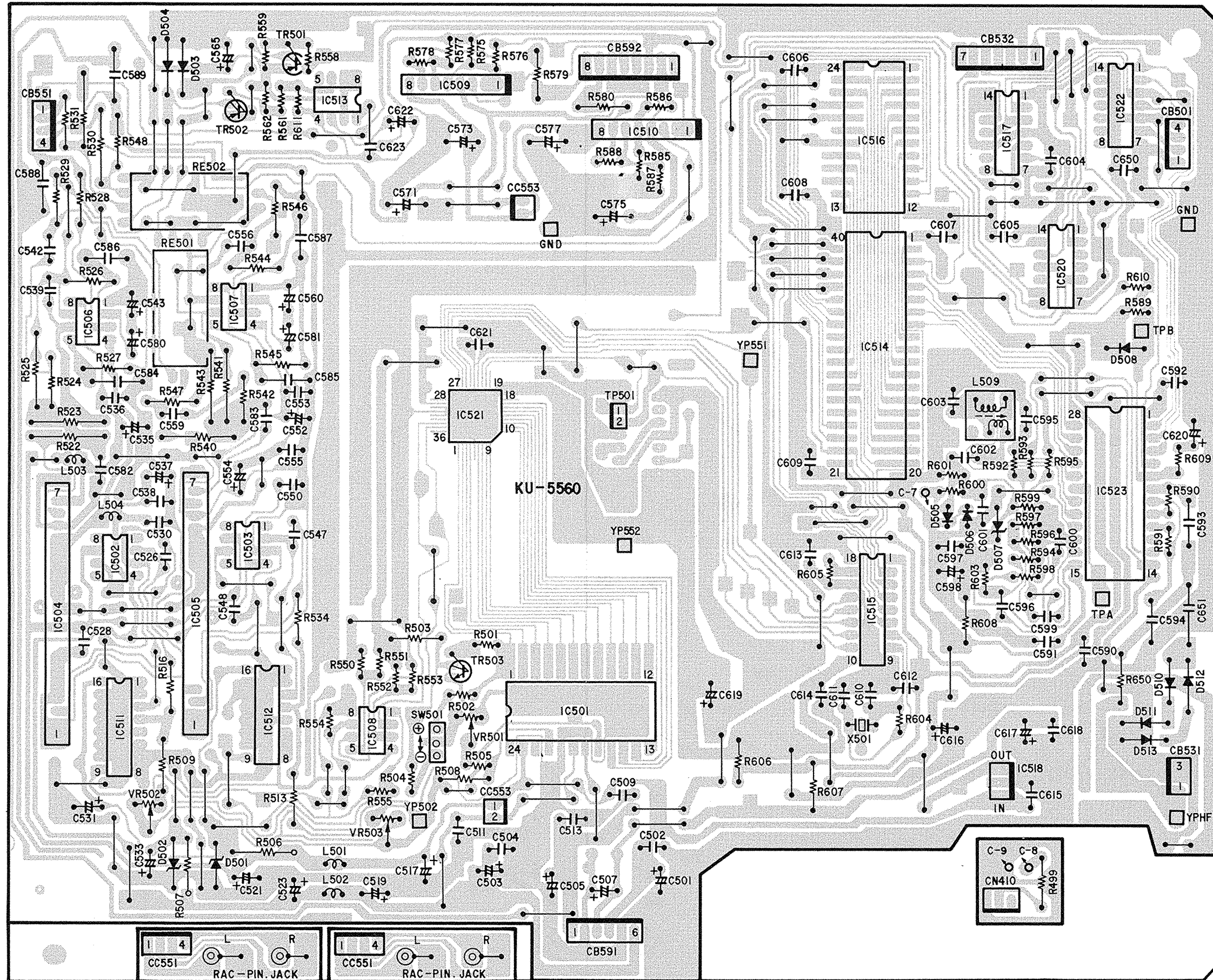


EXPLODED VIEW OF MECHANISM UNIT



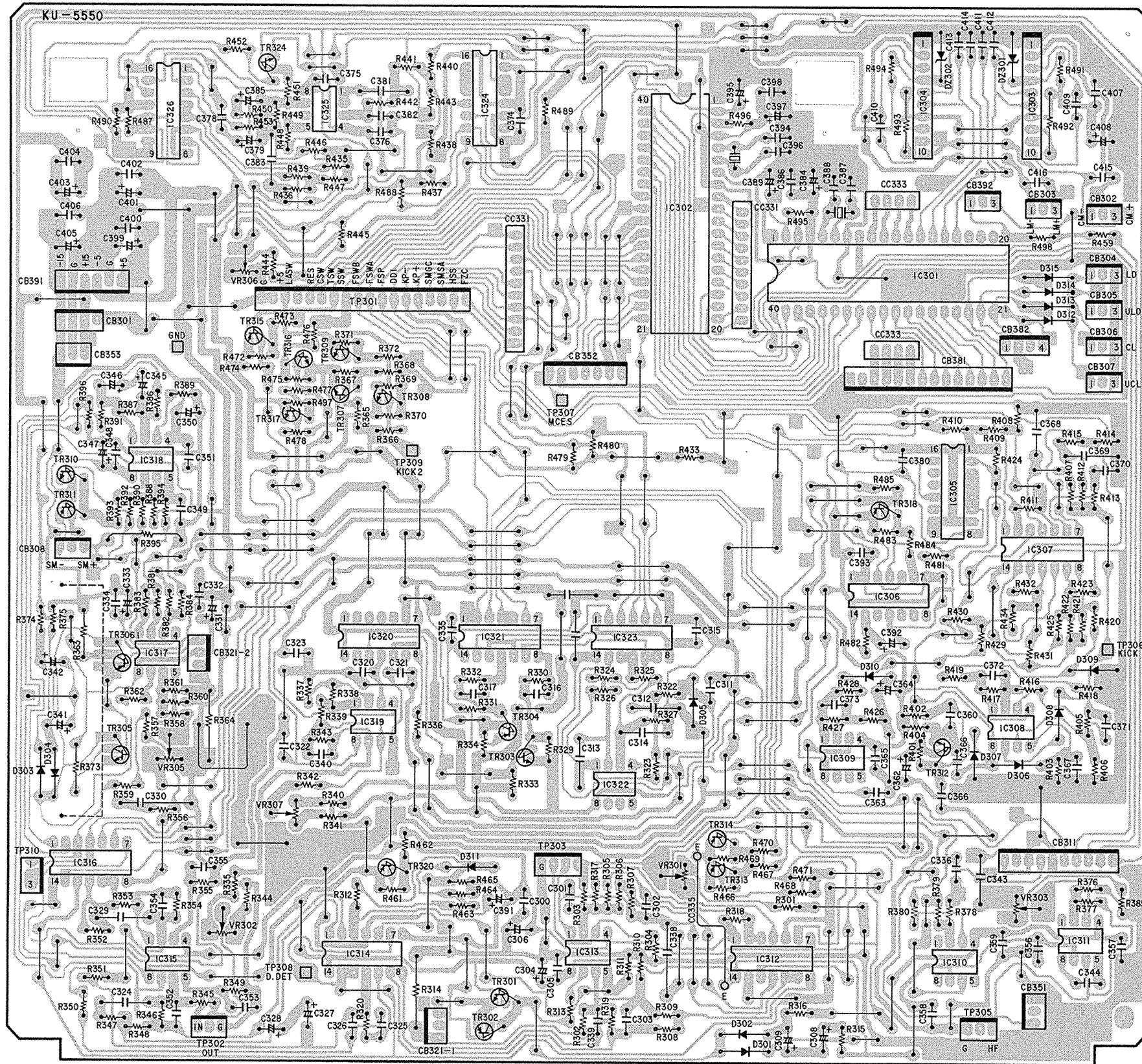
P.W. BOARD

KU-5560 SIG. PROCESSING AUDIO UNIT

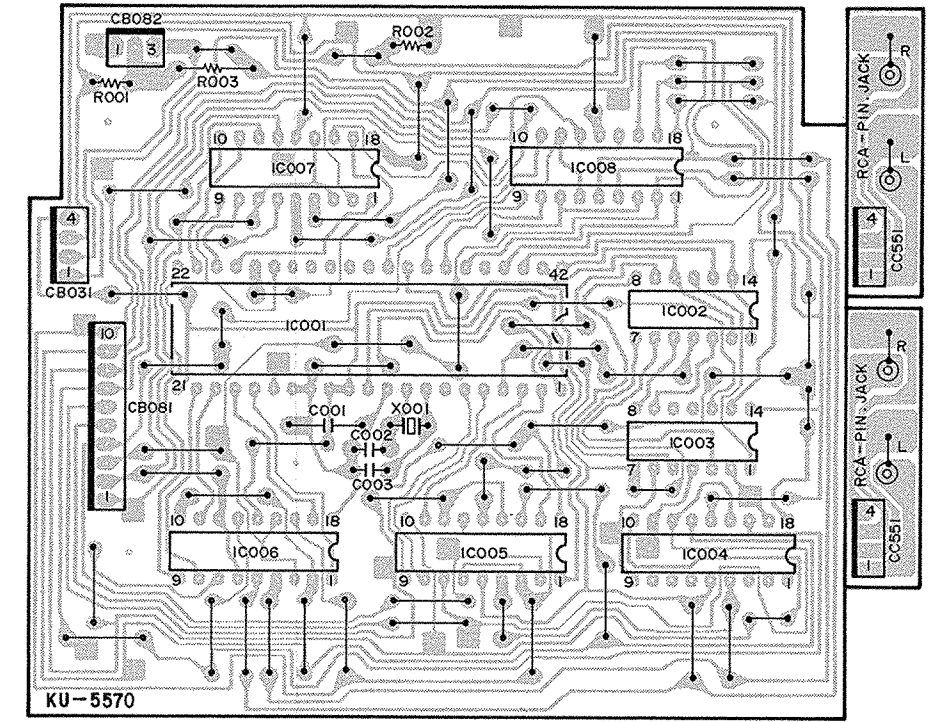




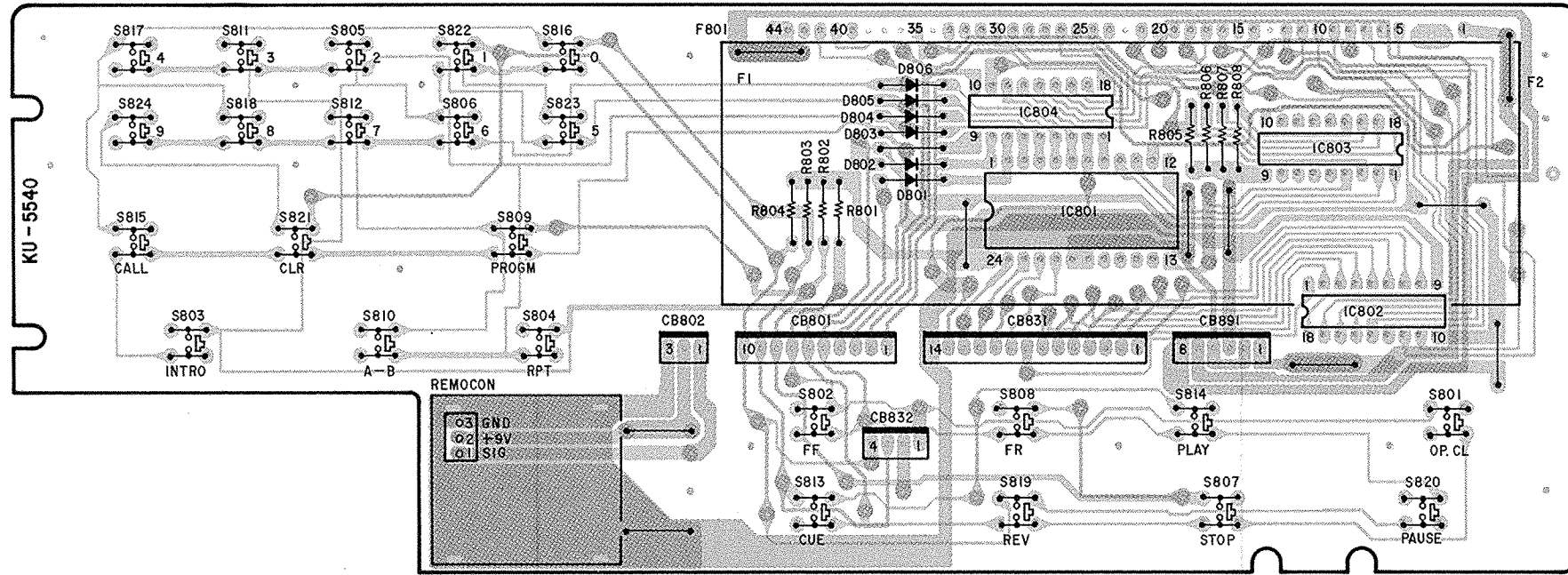
KU-5550 SERVO UNIT



KU-5570 REMOCON DEC. UNIT

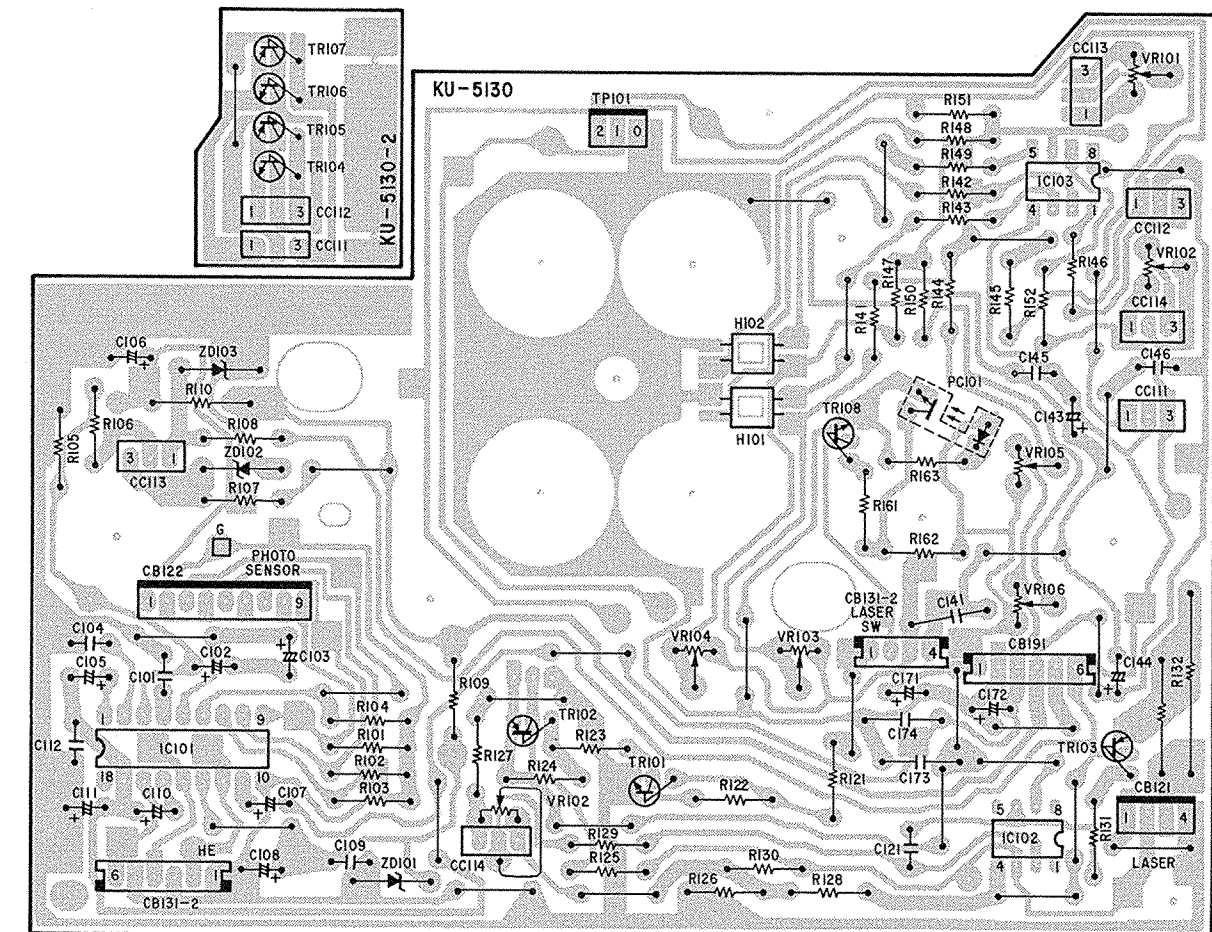
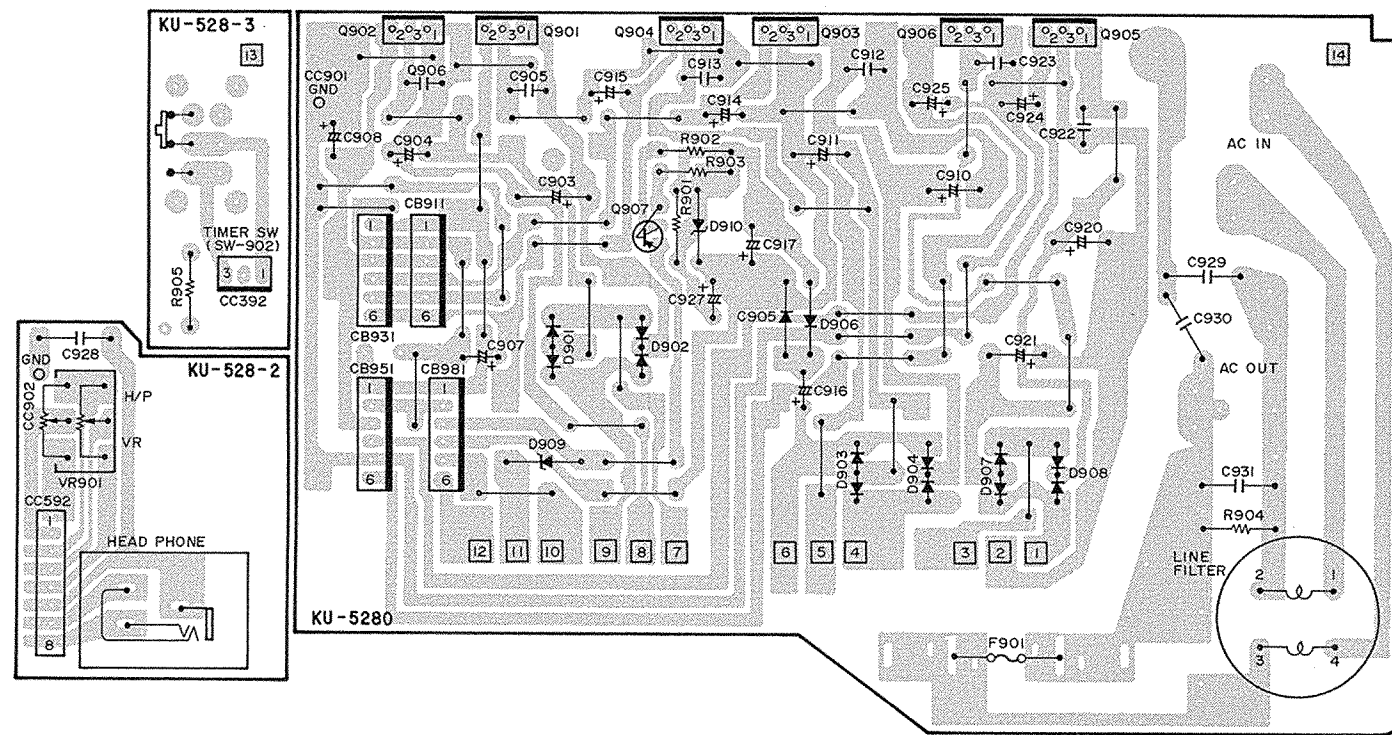


KU-5540 KEY DISPLAY UNIT



KU-5130 MOTOR & LASER UNIT

KU-5281/5282/5283 POWER SOURCE UNIT

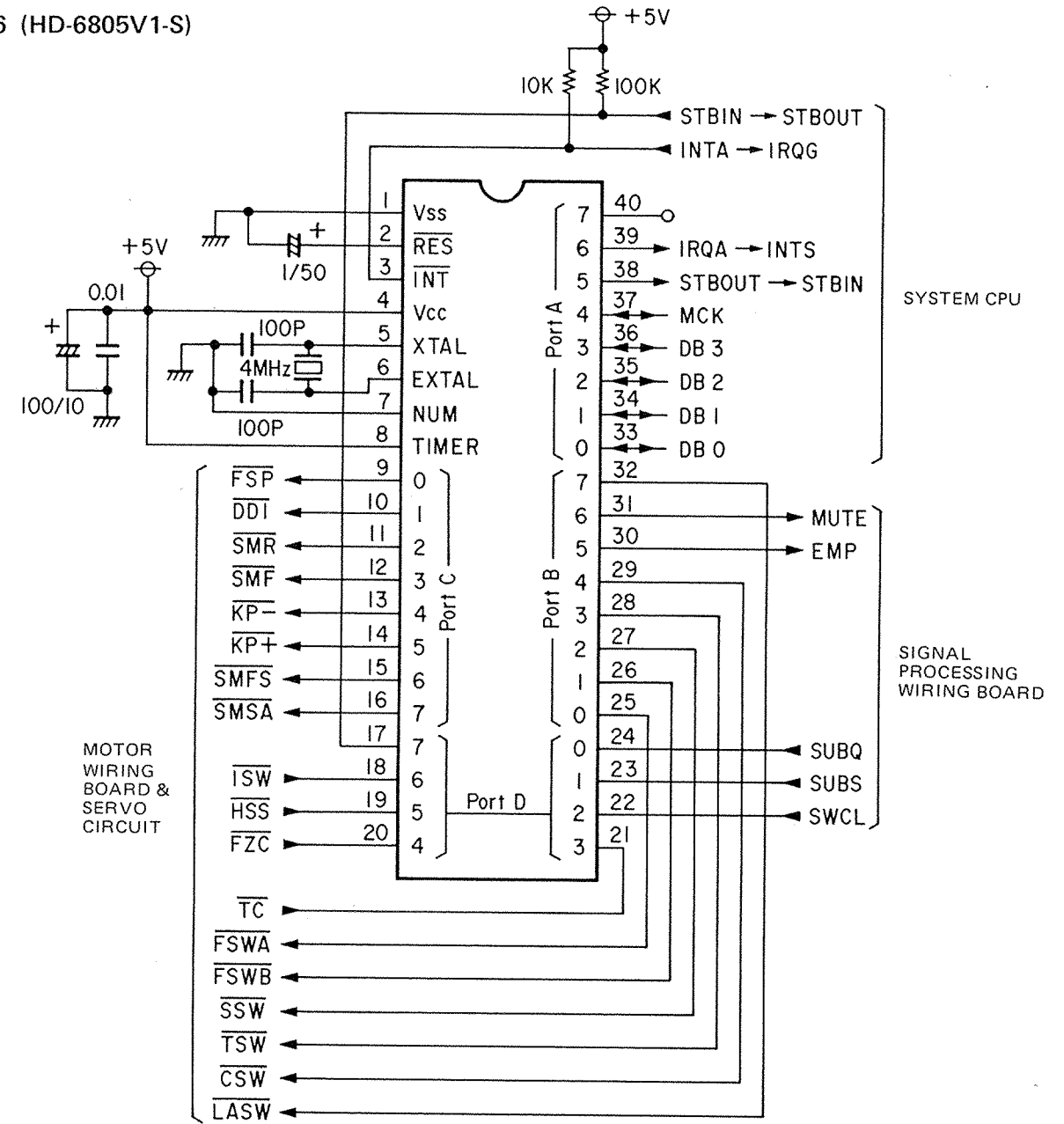


FUNCTION TABLE OF CPU TERMINAL

SERVO CPU IC-16 (HD6805V1-S)

PIN NO.	PORT	SYMBOL	IN/OUT	FUNCTION
1		Vss		Power source ground
2		RES		Reset
3		INT		EXTERNAL INTERRUPT
4		Vcc		Power source positive
5		XTAL	IN	Crystal oscillation
6		EXTAL	OUT	Crystal oscillation
7		NUM		Timer
8		TIMER		
9	PC0	FSP	OUT	Focus search pulse
10	PC1	DDI	OUT	Defect detector inhibit
11	PC2	SMR	OUT	Slide motor reverse
12	PC3	SMF	OUT	Slide motor forward
13	PC4	KP-	OUT	Kick pulse negative
14	PC5	KP+	OUT	Kick pulse positive
15	PC6	SMFS	OUT	Slide motor fast status (H: slow, L: fast)
16	PC7	SMSA	OUT	Spindle motor start (L: full torque, PWM: CLV)
17	PD7	STBIN	IN	Standby (acknowledge) in
18	PD6	ISW	IN	Inmost switch
19	PD5	HSS	IN	HF signal status
20	PD4	FZC	IN	Focus zero cross
21	PD3	TC	IN	Track cross
22	PD2	SWCL	IN	Sub-words (S,Q) clock
23	PD1	SUBS	IN	Sub sync data
24	PD0	SUBQ	IN	Sub Q data
25	PB0	FSWA	OUT	Focus servo switch A
26	PB1	FSWB	OUT	Focus servo switch B
27	PB2	SSW	OUT	Slide motor servo switch
28	PB3	TSW	OUT	Tracking servo switch
29	PB4	CSW	OUT	CLV servo switch
30	PB5	EMP	OUT	De-emphasis (H: off, L: on)
31	PB6	MUTE	OUT	Mute (H: on, L: off)
32	PB7	LASW	OUT	Laser switch
33	PA0	DB0	IN/OUT	Data bus bit 0
34	PA1	DB1	IN/OUT	Data bus bit 1
35	PA2	DB2	IN/OUT	Data bus bit 2
36	PA3	DB3	IN/OUT	Data bus bit 3
37	PA4	MCK	IN/OUT	Move (data transfer) clock
38	PA5	STBOUT	OUT	Standby (acknowledge) out
39	PA6	IRQA	OUT	Interrupt request
40	PA7			

SERVO CPU  
IC-16 (HD-6805V1-S)

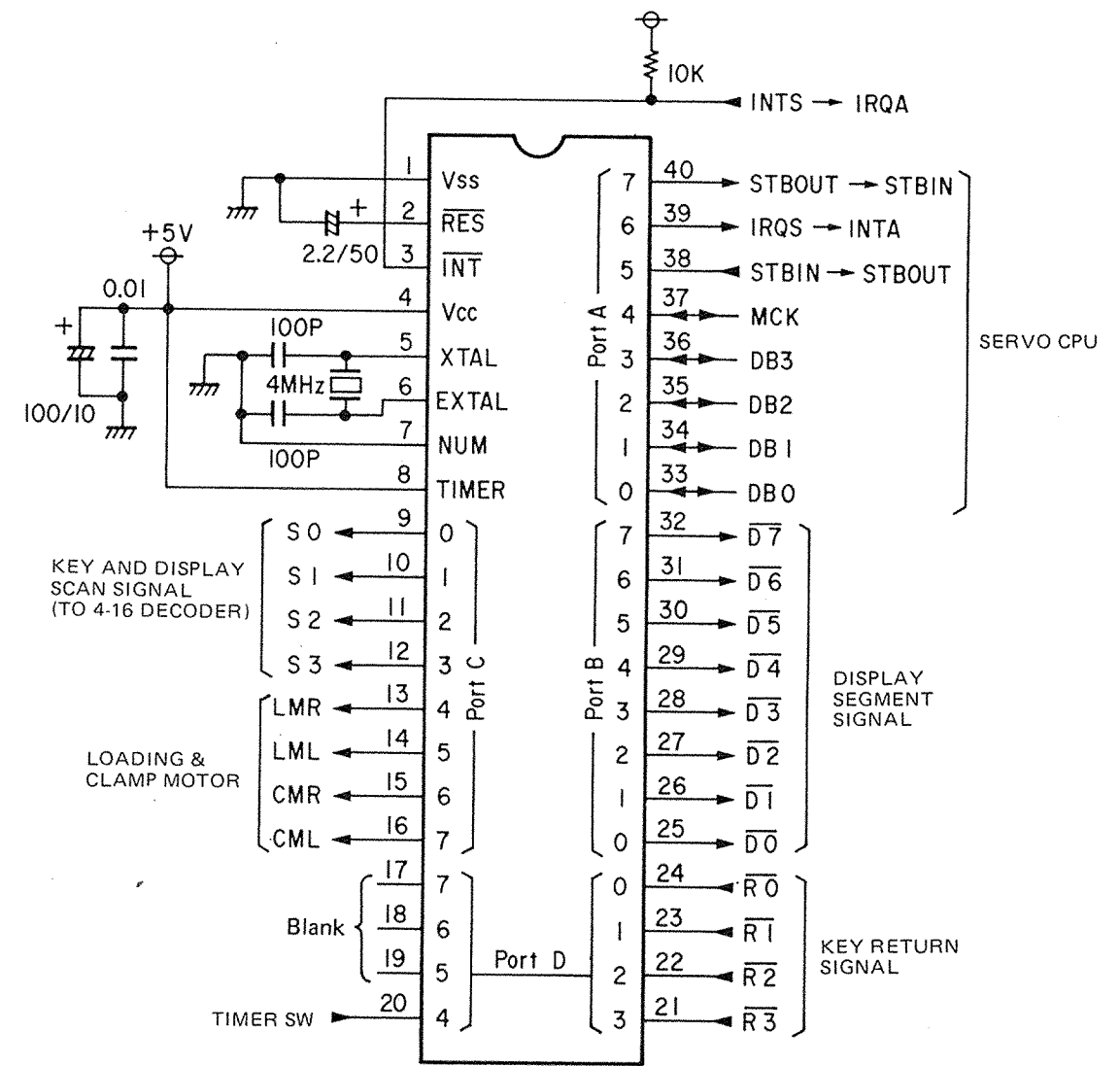




SYSTEM CPU IC801 (HD-6805V1-M)

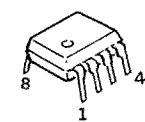
PIN NO.	PORT	SYMBOL	IN/OUT	FUNCTION
1		Vss		Power source ground
2		RES		Reset
3		INT		EXTERNAL INTERRUPT
4		Vcc		Power source positive
5		XTAL	IN	Crystal oscillator
6		EXTAL	OUT	Crystal oscillator
7		NUM		
8		TIMER		Timer
9	PC0	S0	OUT	Key and display scan bit 0
10	PC1	S1	OUT	Key and display scan bit 1
11	PC2	S2	OUT	Key and display scan bit 2
12	PC3	S3	OUT	Key and display scan bit 3
13	PC4	LMR	OUT	Loading motor R (open)
14	PC5	LML	OUT	Loading motor L (close)
15	PC6	CMR	OUT	Clamp motor R (up)
16	PC7	CML	OUT	Clamp motor L (down)
17	PD7			
18	PD6			
19	PD5			
20	PD4	TSW	IN	Timer switch input
21	PD3	R3	IN	Key return bit 3
22	PD2	R2	IN	Key return bit 2
23	PD1	R1	IN	Key return bit 1
24	PD0	R0	IN	Key return bit 0
25	PB0	D0(a)	OUT	Display segment data bit 0
26	PB1	D1(b)	OUT	Display segment data bit 1
27	PB2	D2(c)	OUT	Display segment data bit 2
28	PB3	D3(d)	OUT	Display segment data bit 3
29	PB4	D4(e)	OUT	Display segment data bit 4
30	PB5	D5(f)	OUT	Display segment data bit 5
31	PB6	D6(g)	OUT	Display segment data bit 6
32	PB7	D7(h)	OUT	Display segment data bit 7
33	PA0	DB0	IN/OUT	Data bus bit 0
34	PA1	DB1	IN/OUT	Data bus bit 1
35	PA2	DB2	IN/OUT	Data bus bit 2
36	PA3	DB3	IN/OUT	Data bus bit 3
37	PA4	MCK	IN/OUT	Move (data transfer) clock
38	PA5	STBIN	IN	Standby (acknowledge) in
39	PA6	IRQS	OUT	Interrupt request
40	PA7	STBOUT	OUT	Standby (acknowledge) out

SYSTEM CPU  
IC801 (HD6805V1-M)

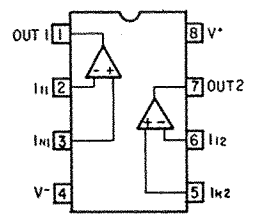


SEMICONDUCTORS

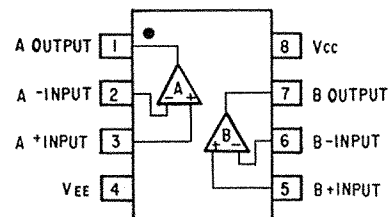
IC



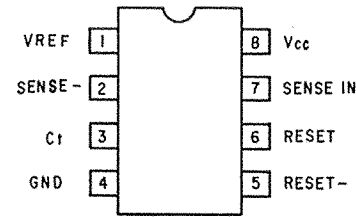
μPC4559-C  
TL082-CP  
NE5534N  
NJM-4560D  
HA17903PS  
TL081-CP  
LF356N



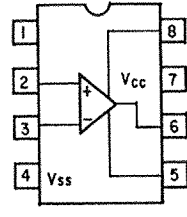
μPC4559-C  
TL082-CP



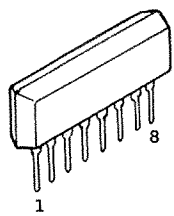
NJM-4560D  
HA17903PS



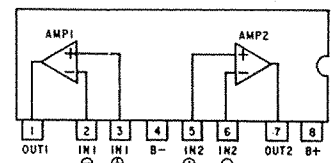
TL7705CP-B



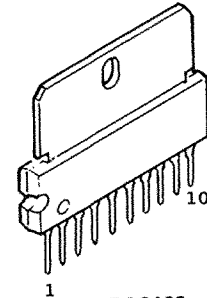
TL081-CP  
LF356N  
NE5534N



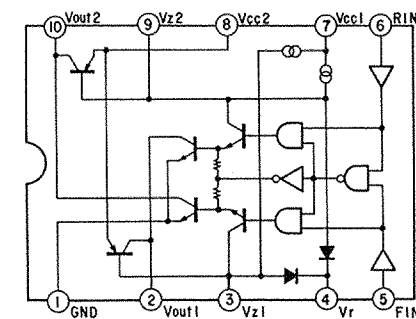
M5218L



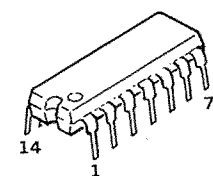
M5218L



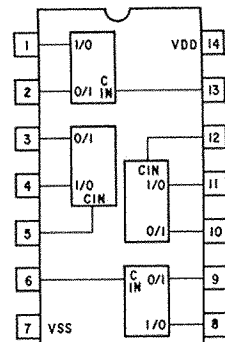
BA6109



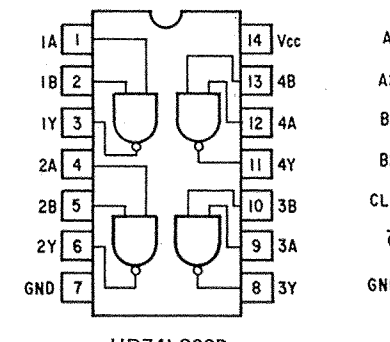
BA6109



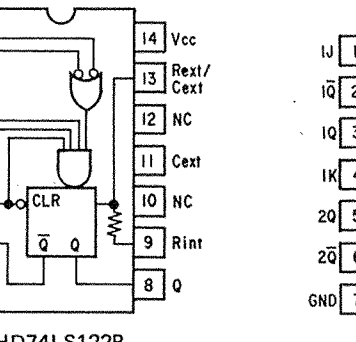
TC4066BP  
HD74LS00P  
HD74LS122P  
TC40H-004P  
HA17901P  
HD74LS04P  
HD74LS74AP  
HD74LS107AP  
HD14011BP  
HD74HC00P



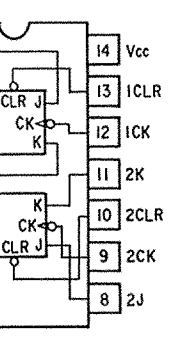
TC4066BP



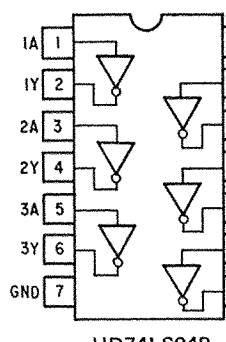
HD74LS00P  
HD74HC00P



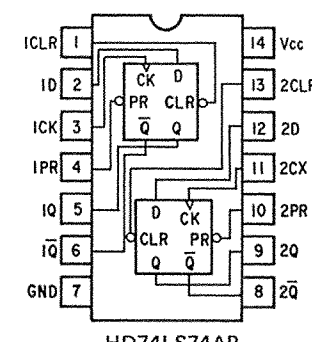
HD74LS122P



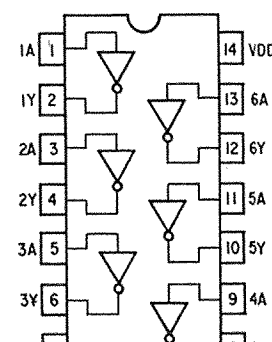
HD74LS107AP



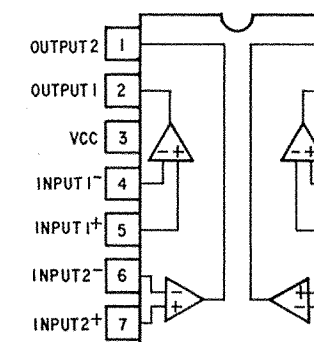
HD74LS04P



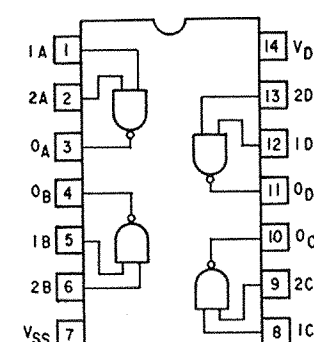
HD74LS74AP



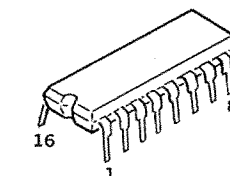
TC40H-004P



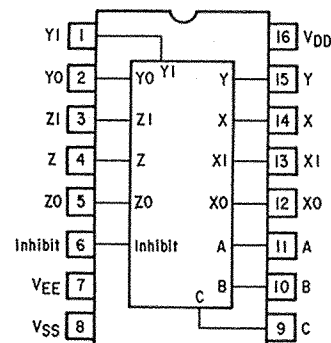
HA17901P



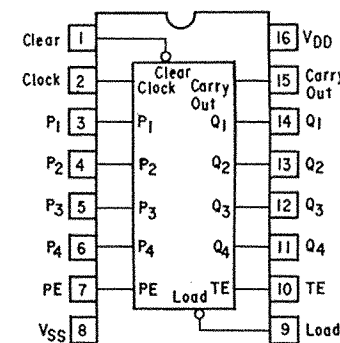
HD14011BP



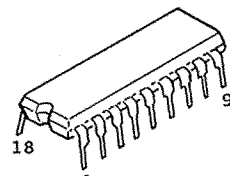
HD14053BP  
HD14161BP



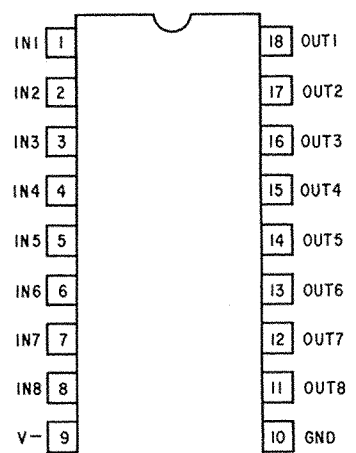
HD14053BP



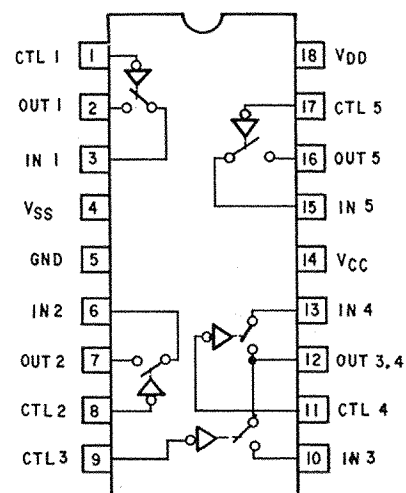
HD14161BP



SAA-7000 (M4300)  
MSL915RS  
MSL917RS  
MN6631A

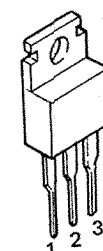


MSL915RS  
MSL917RS



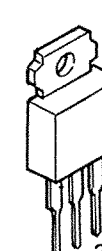
MN6631A

TRANSISTORS



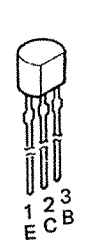
1: INPUT  
2: COMMON  
3: OUTPUT

HA178-05  
HA178-15



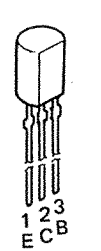
1: GND  
2: OUTPUT  
3: INPUT

μPC7905H  
μPC7915H



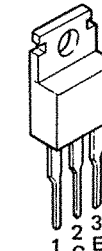
1 2 3  
E C B

2SA781K  
2SA1015Y  
2SC1815Y



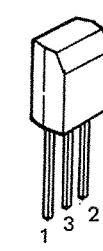
1 2 3  
E C B

2SA966 (Y)  
2SB647A  
2SC2236 (Y)



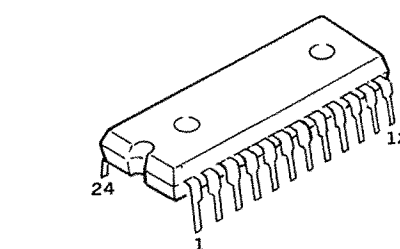
1 2 3  
B C E

2SA816Y  
2SC1626Y  
2SB711  
2SD721

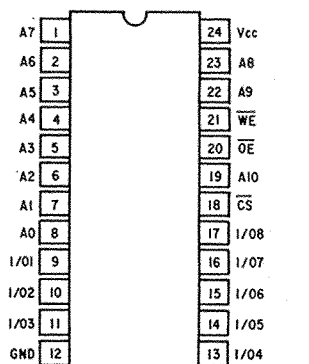


1 3 2

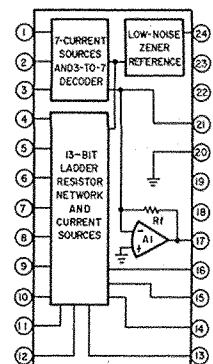
μPC78L12H



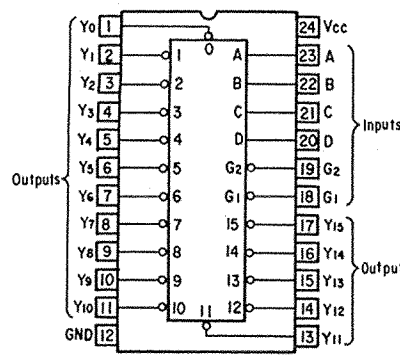
HM6116P-4  
PCM53JP-V  
HD74LS154P



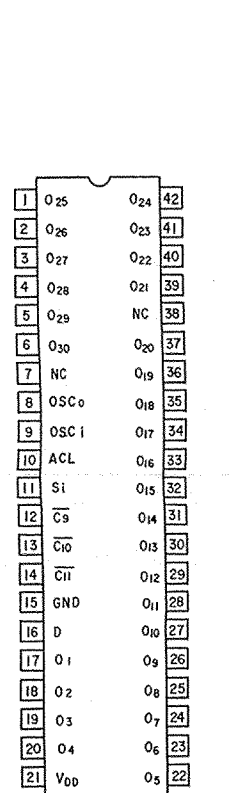
HM6116P-4



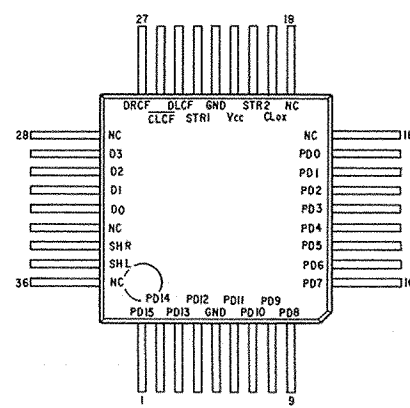
PCM53JP-V



HD74LS154P

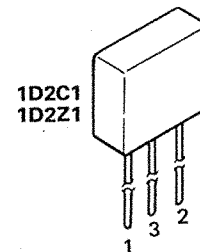


LR3712



LZ91B14

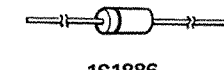
DIODES



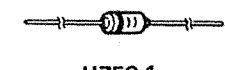
1D2C1  
1D2Z1



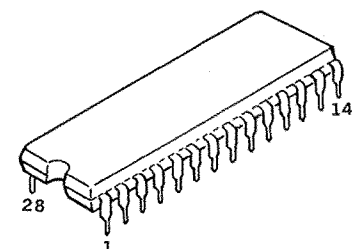
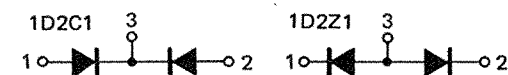
SVC321SP-D2



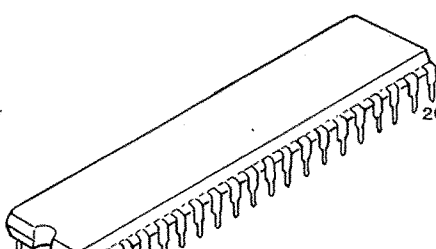
1S1886



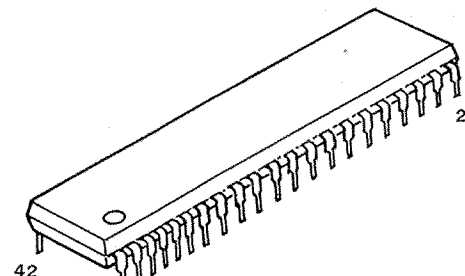
HZ5C-1  
HZ6C-2  
HZ7B  
HZ9A-2  
HZ12C-2  
HZ27-3  
1SS106  
1S2076  
HZ6B-1



SAA7011 (M4290A)

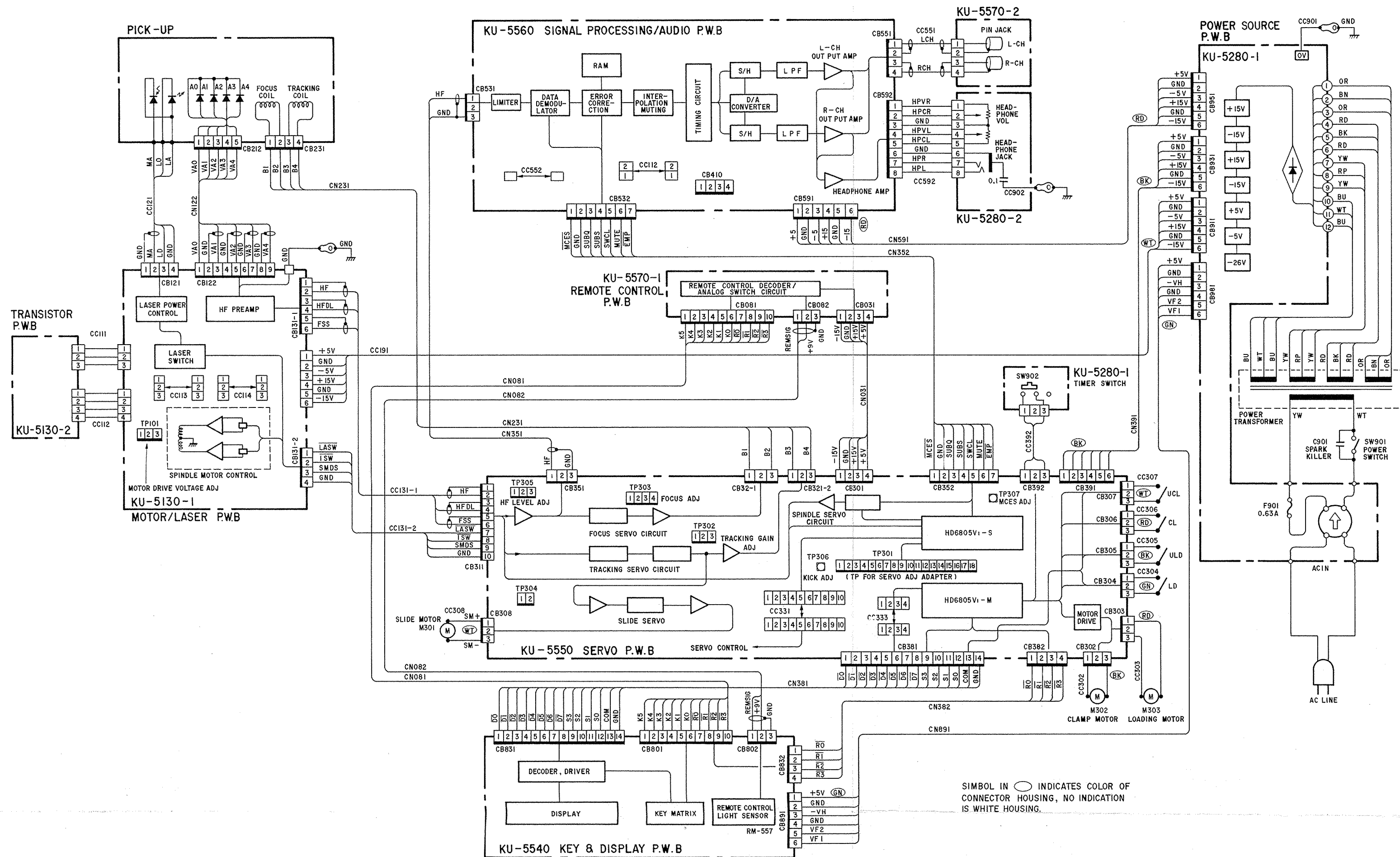


HD6805V1  
SAA7020 (M4281)



LR3712

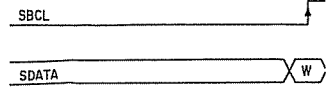
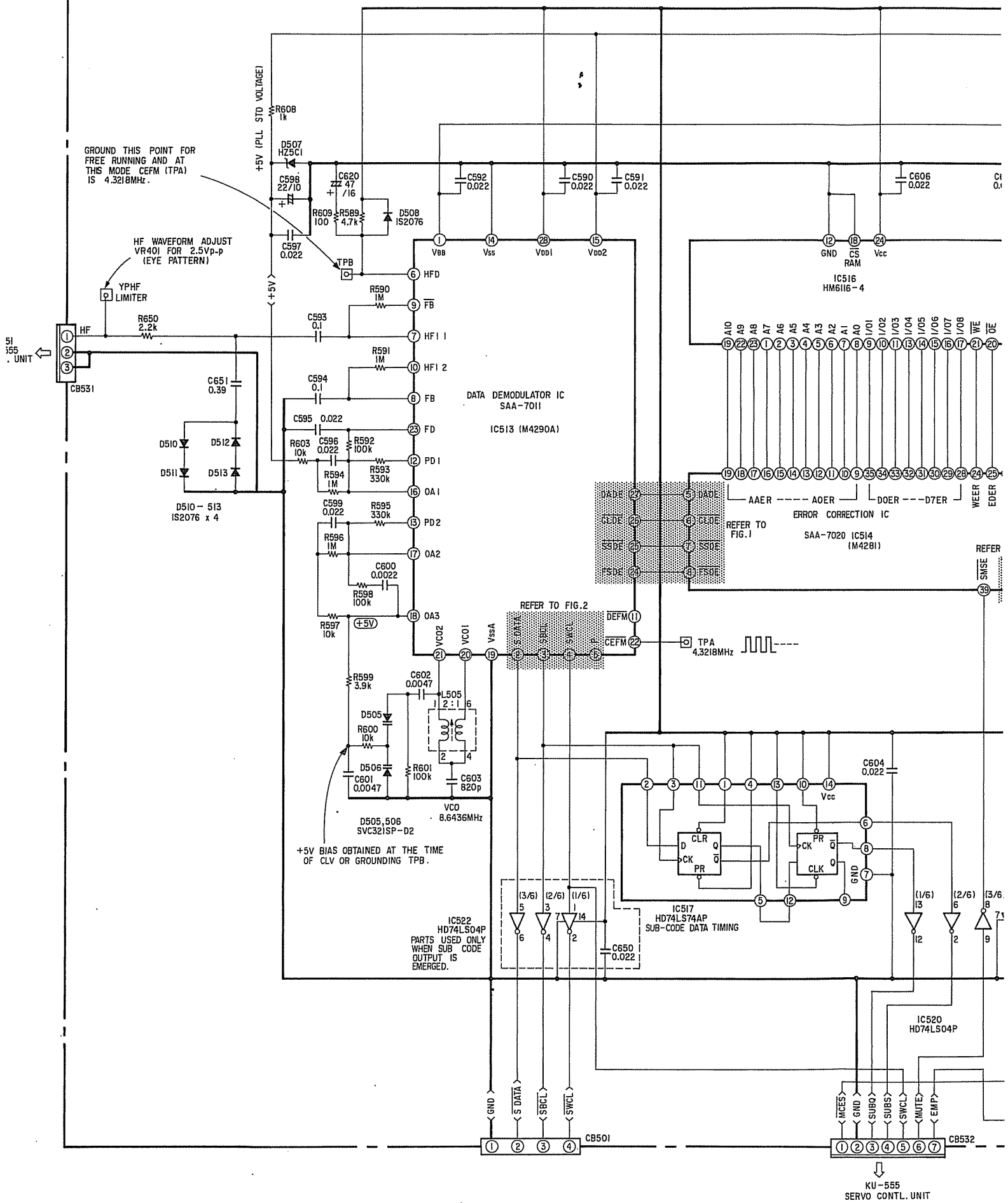
WIRING DIAGRAM

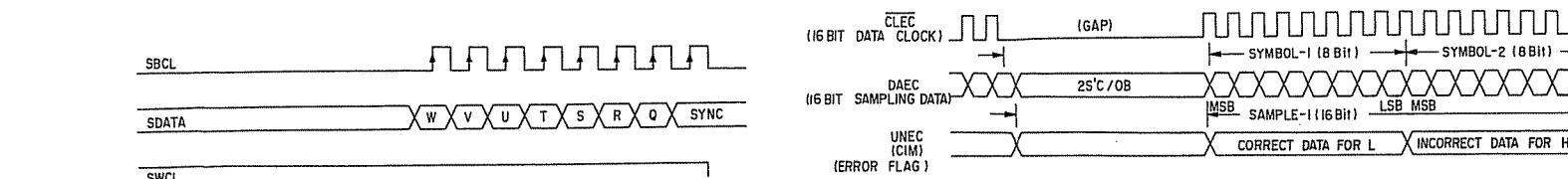
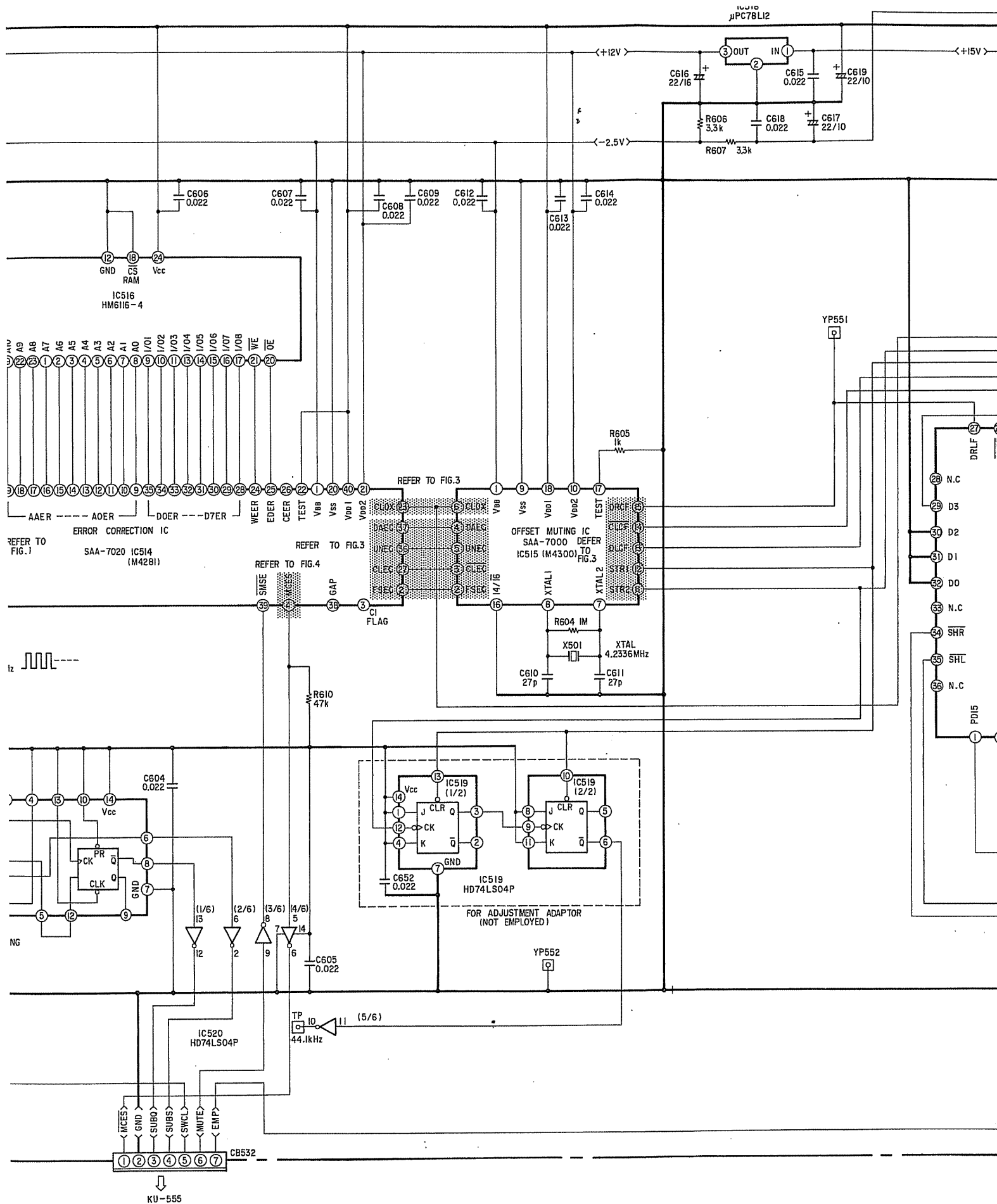


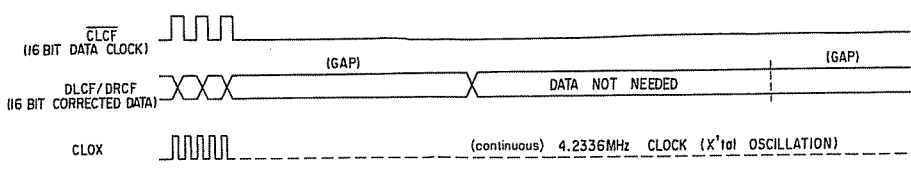
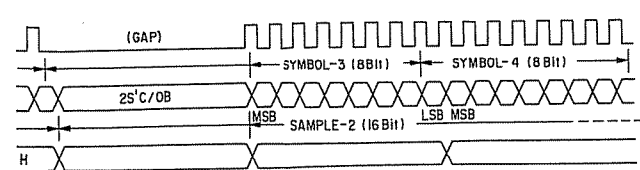
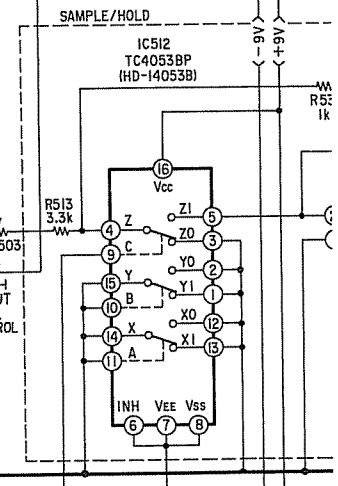
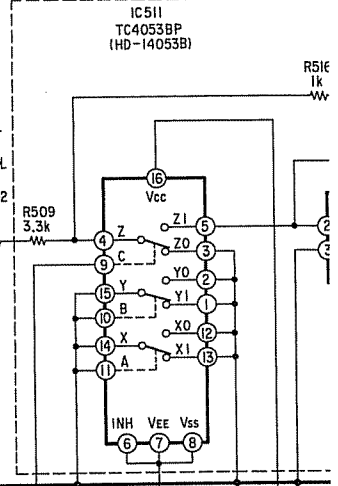
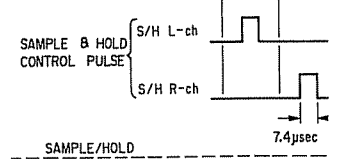
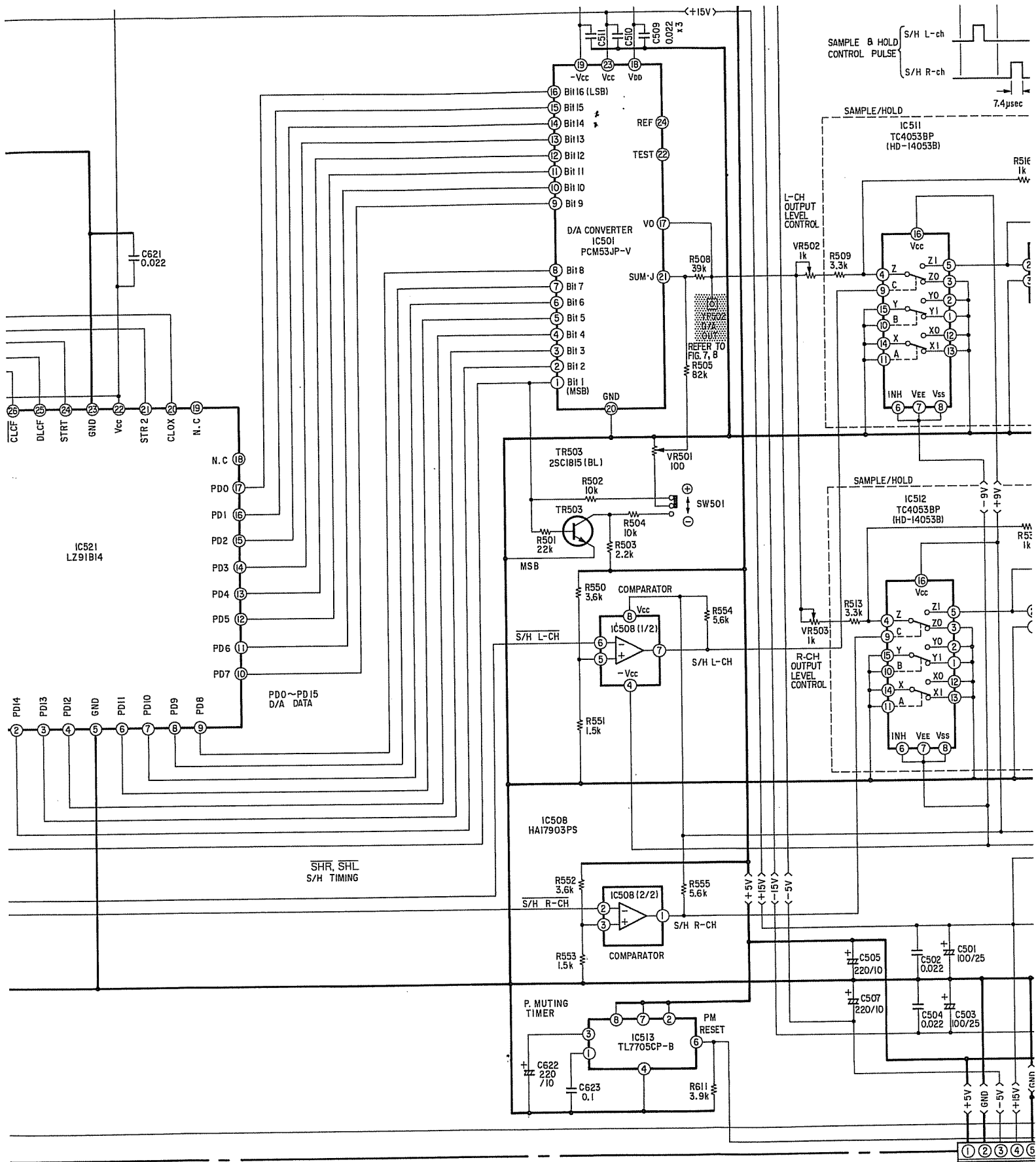
SIMBOL IN ○ INDICATES COLOR OF CONNECTOR HOUSING, NO INDICATION IS WHITE HOUSING.

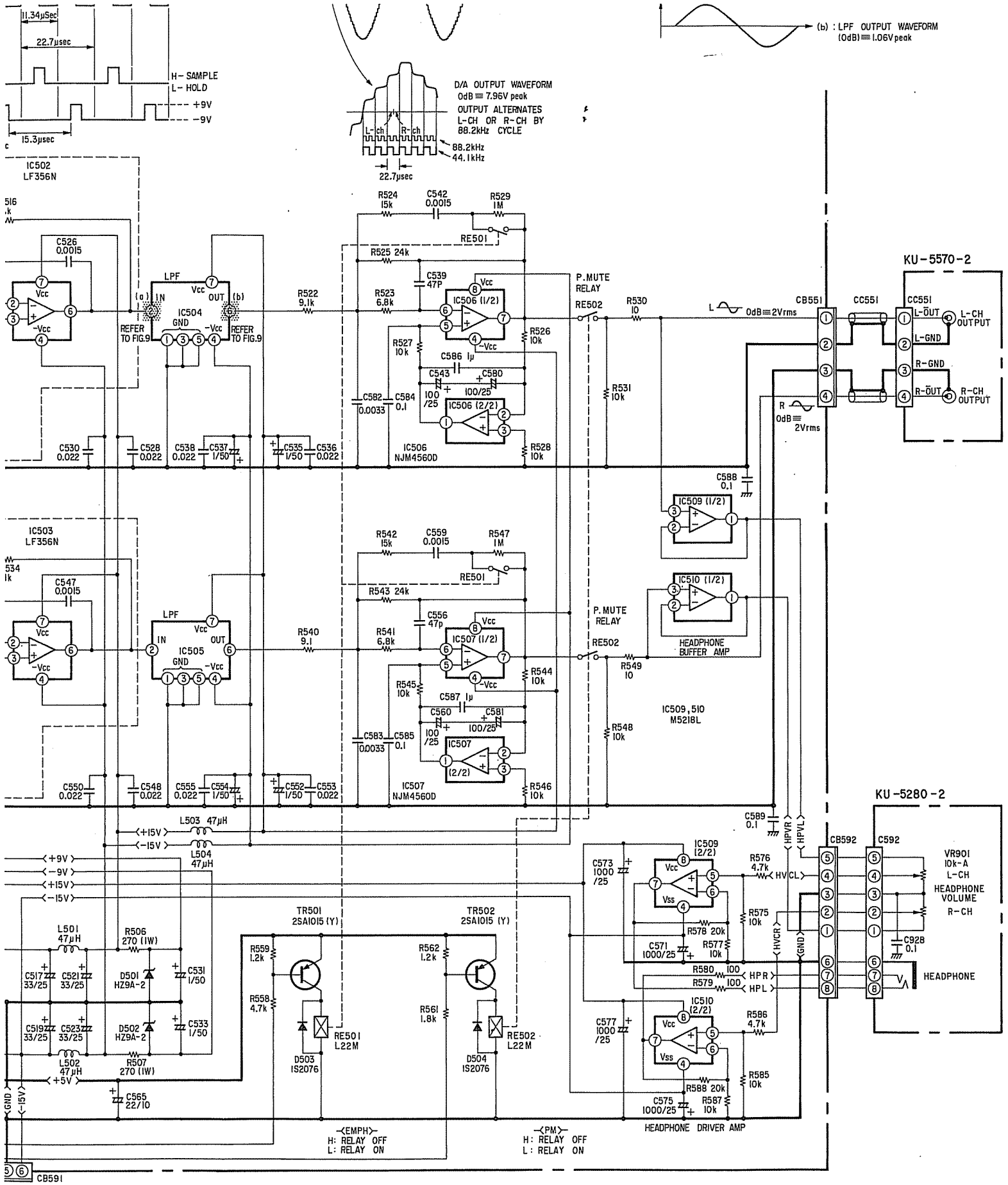


# KU-5560 SIGNAL PROCESSING UNIT

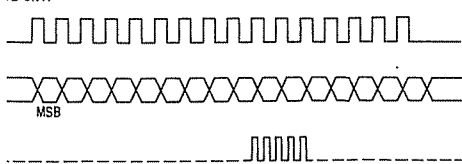






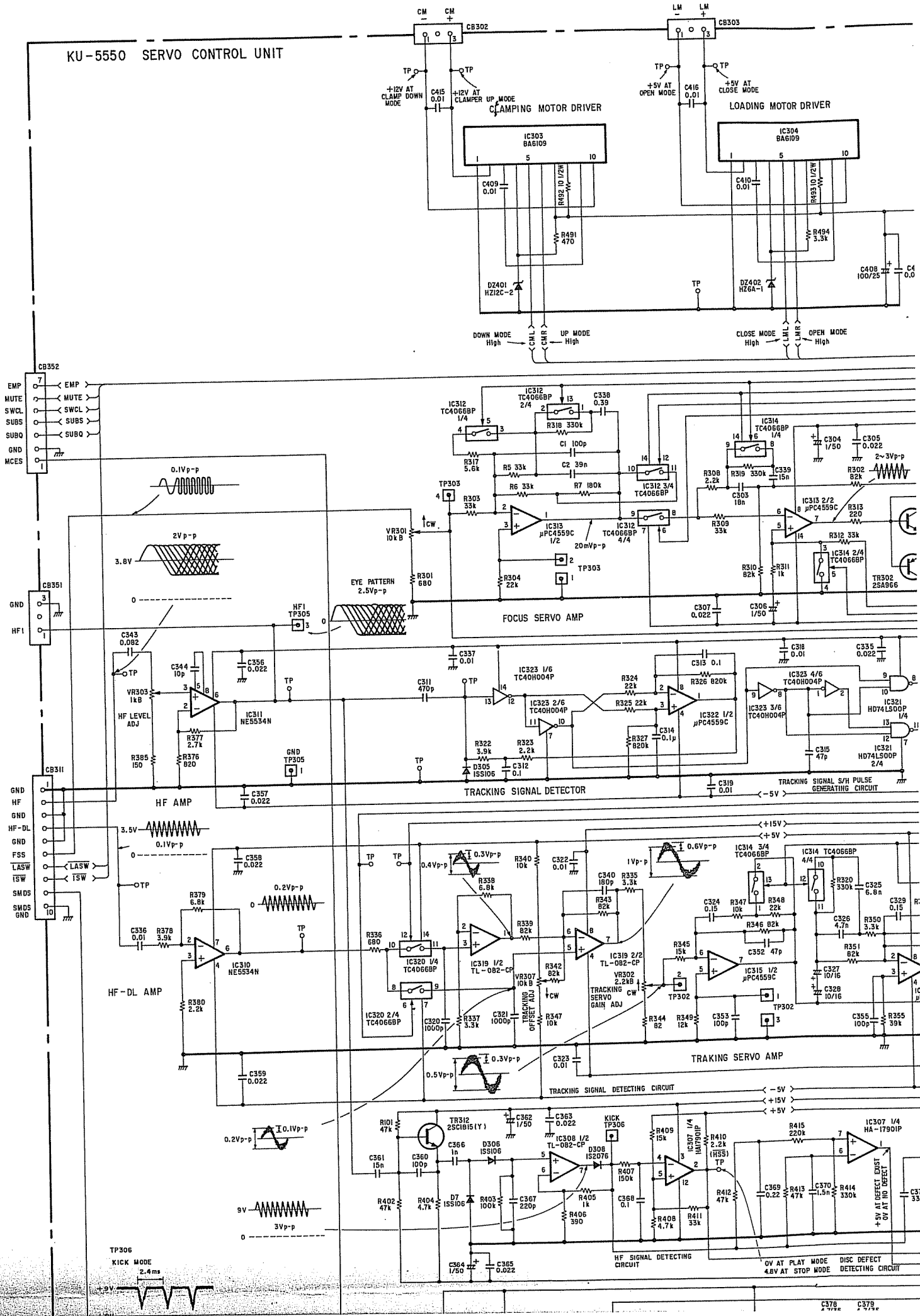


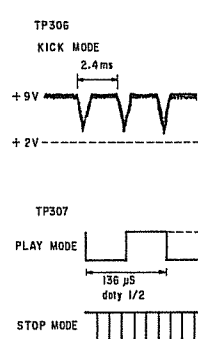
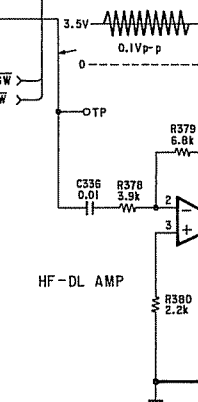
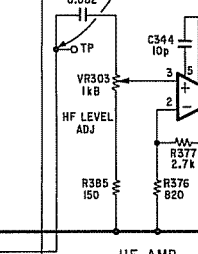
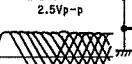
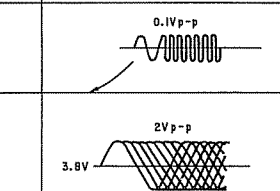
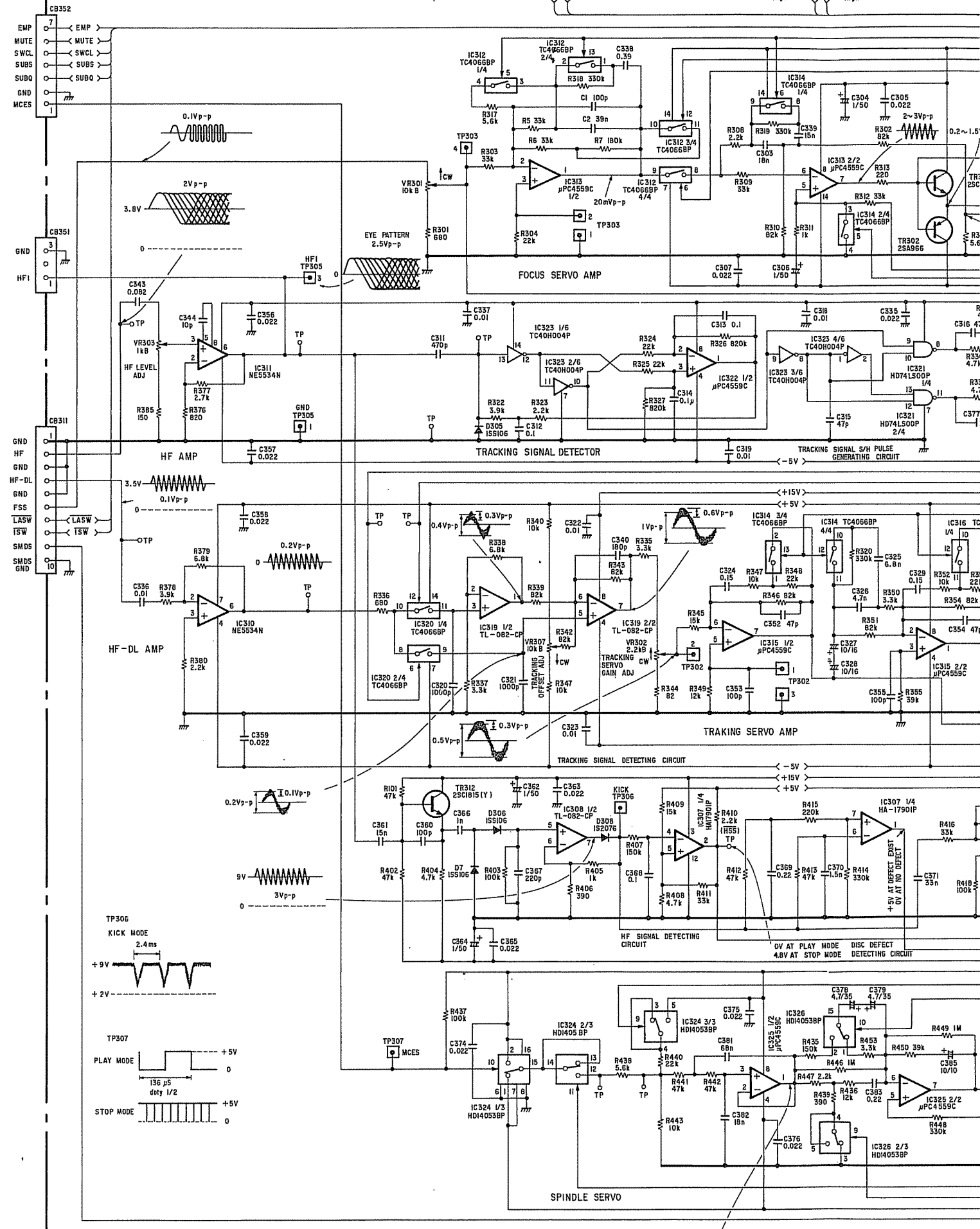
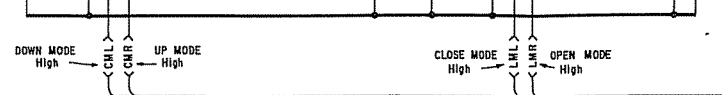
LE UNIT



NOTE  
 1. UNLESS OTHERWISE SPECIFIED, ALL RESISTOR VALUES IN OHMS, 1/4 WATT.  
 2. UNLESS OTHERWISE SPECIFIED, ALL CAPACITANCE VALUES ARE IN  $\mu$ F, P=PF  
 3. THIS SCHEMATIC DIAGRAM IS BASIC CIRCUITRY AND SUBJECT TO CHANGE.  
 WITHOUT NOTICE FOR FURTHER IMPROVEMENT.

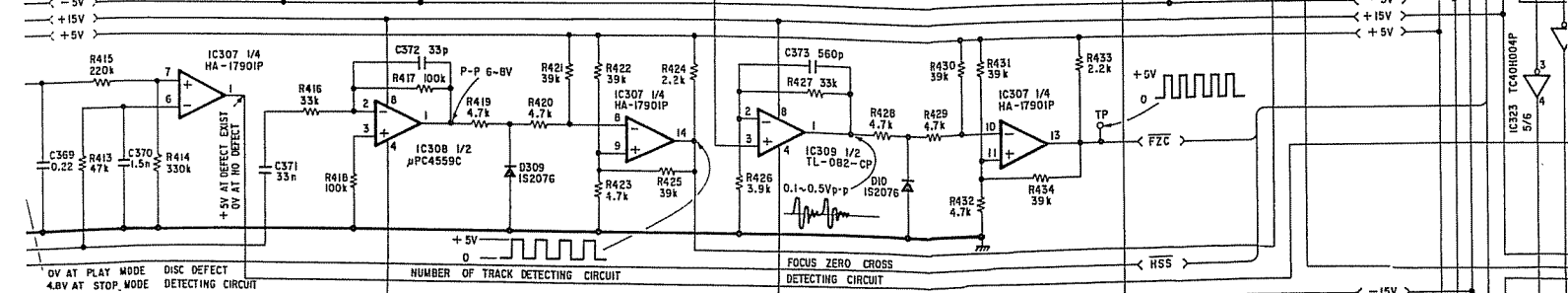
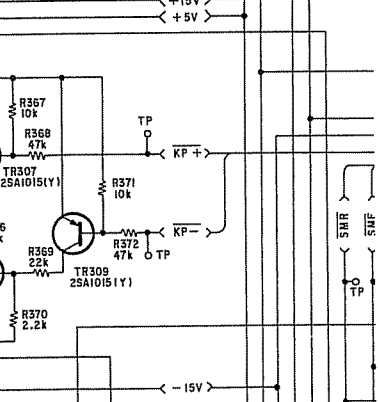
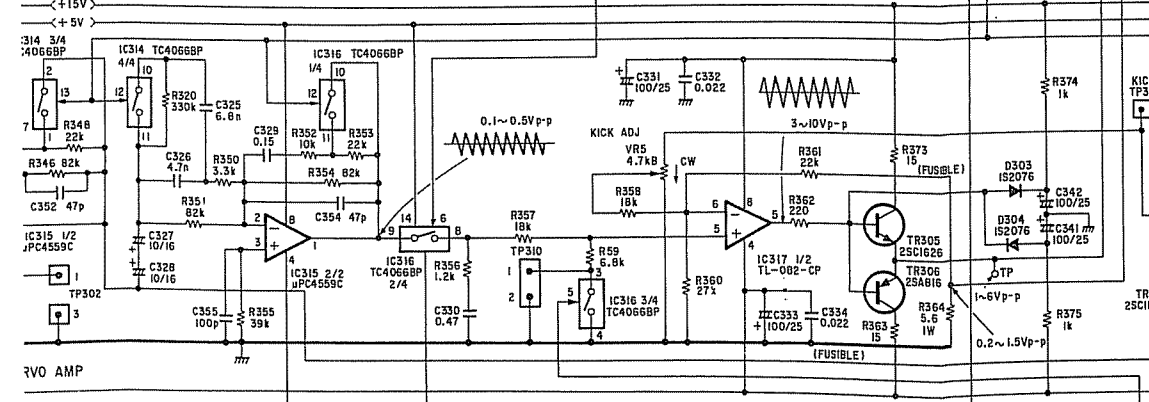
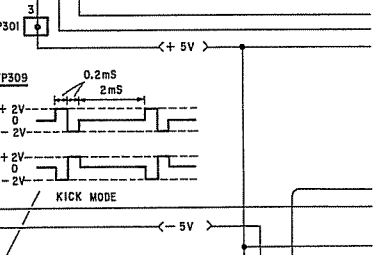
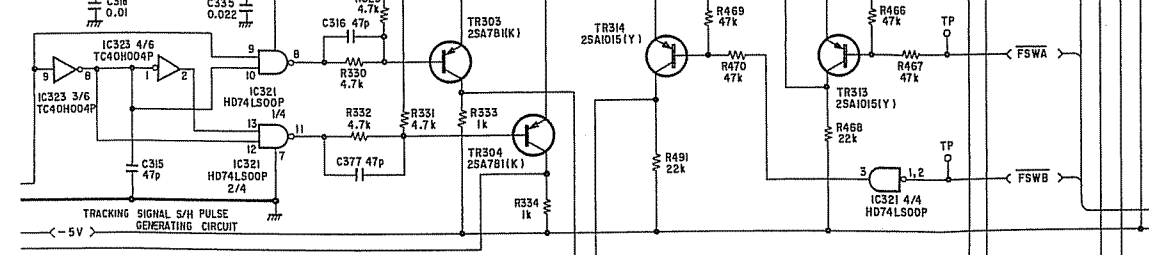
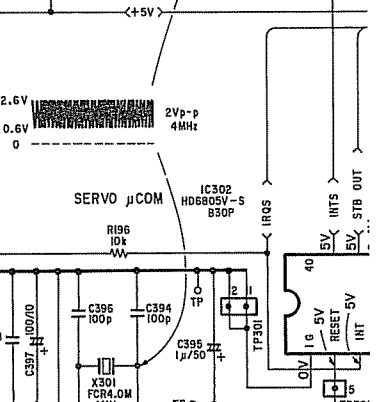
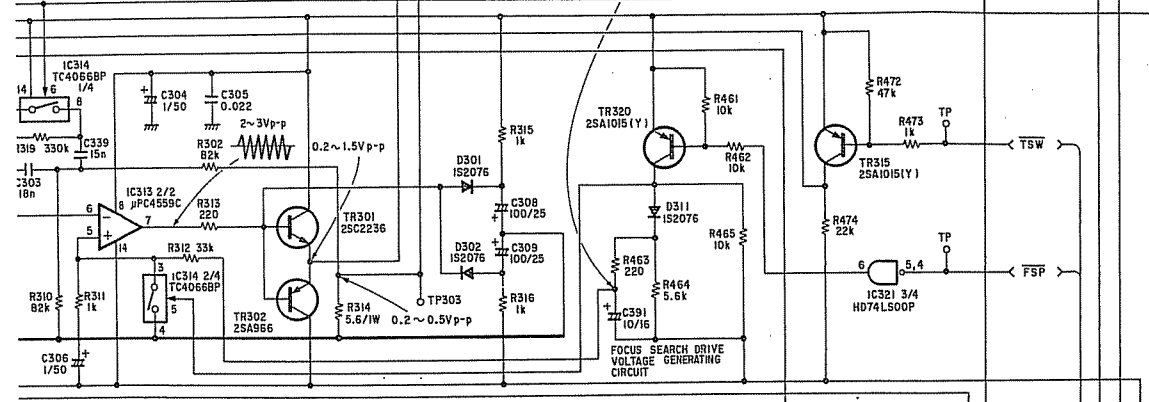
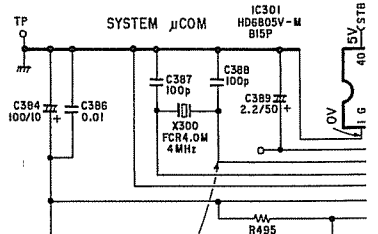
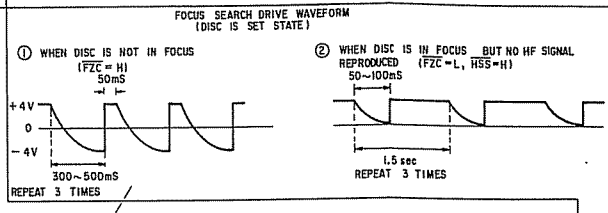
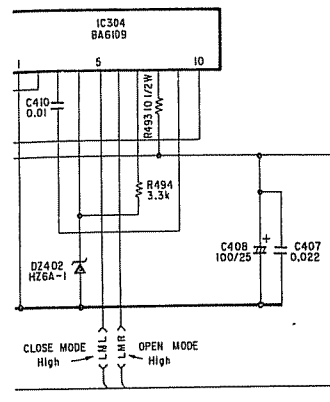
# KU-5550 SERVO CONTROL UNIT



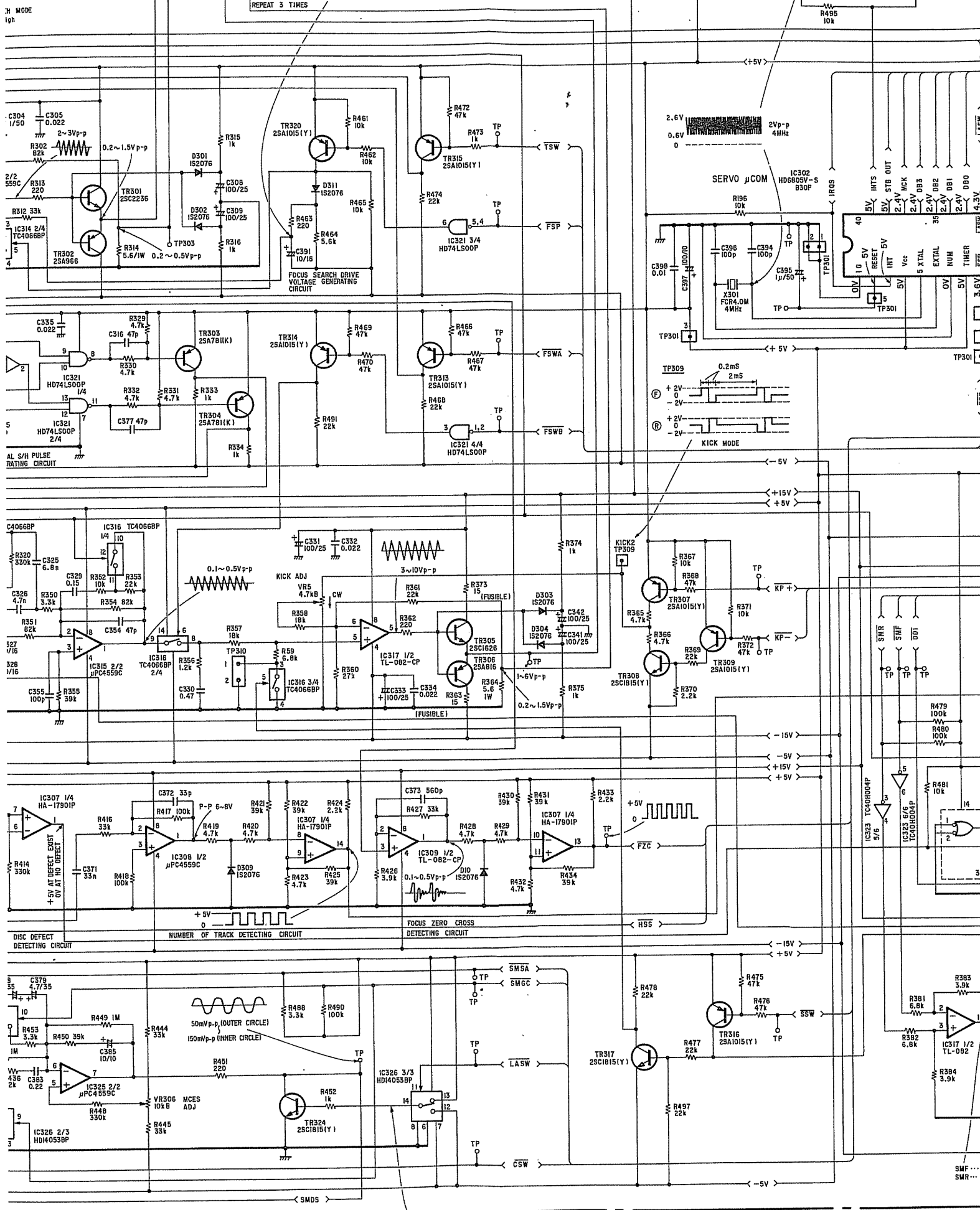


0.2Vp-p (OUTER CIRCLE)  
1.5Vp-p (INNER CIRCLE)

+5V AT 3SE MODE  
LOADING MOTOR DRIVER

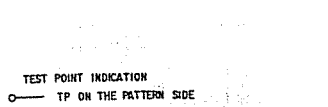
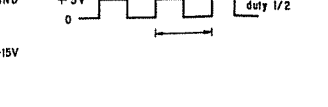
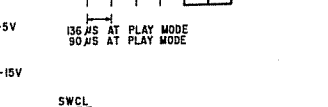
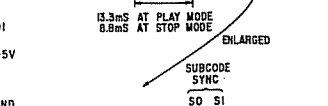
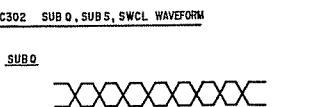
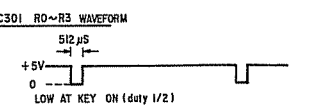
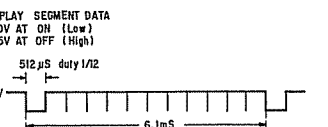
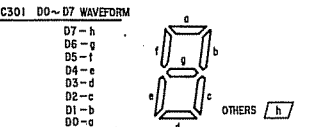
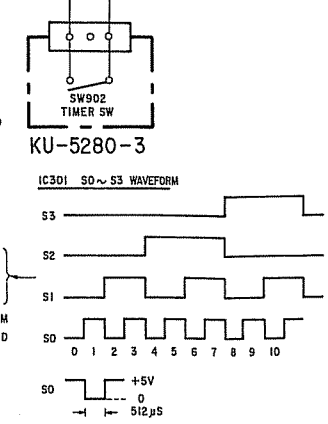
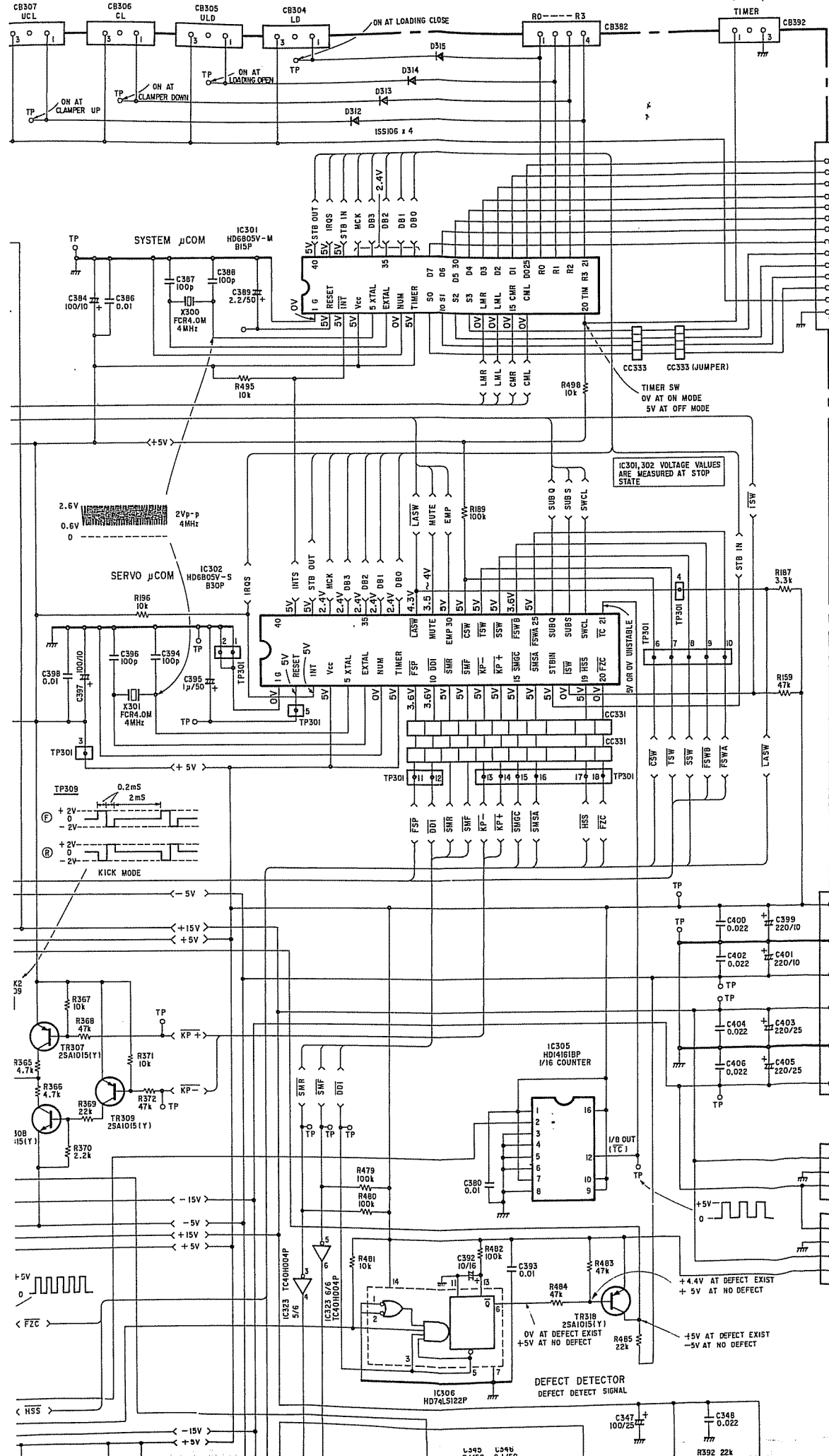


30V-DUMMS REPEAT 3 TIMES



-5V AT PLAY MODE TR324 OFF  
+5V AT STOP MODE TR324 ON

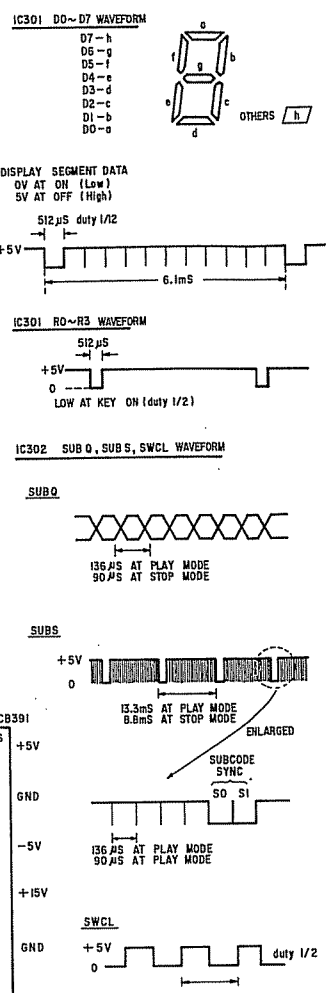
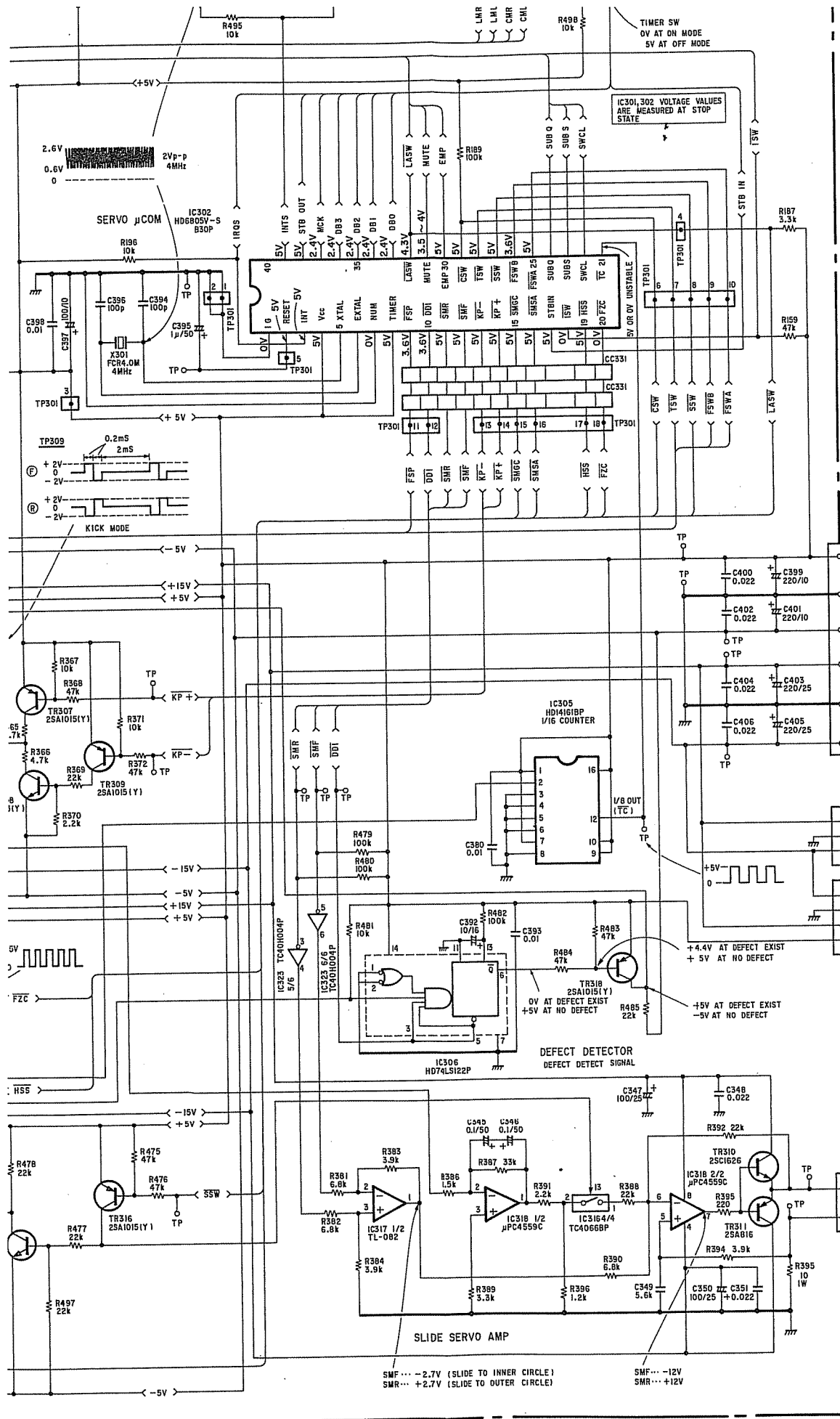




**TEST POINT INDICATION**

TP ON THE PATTERN SIDE

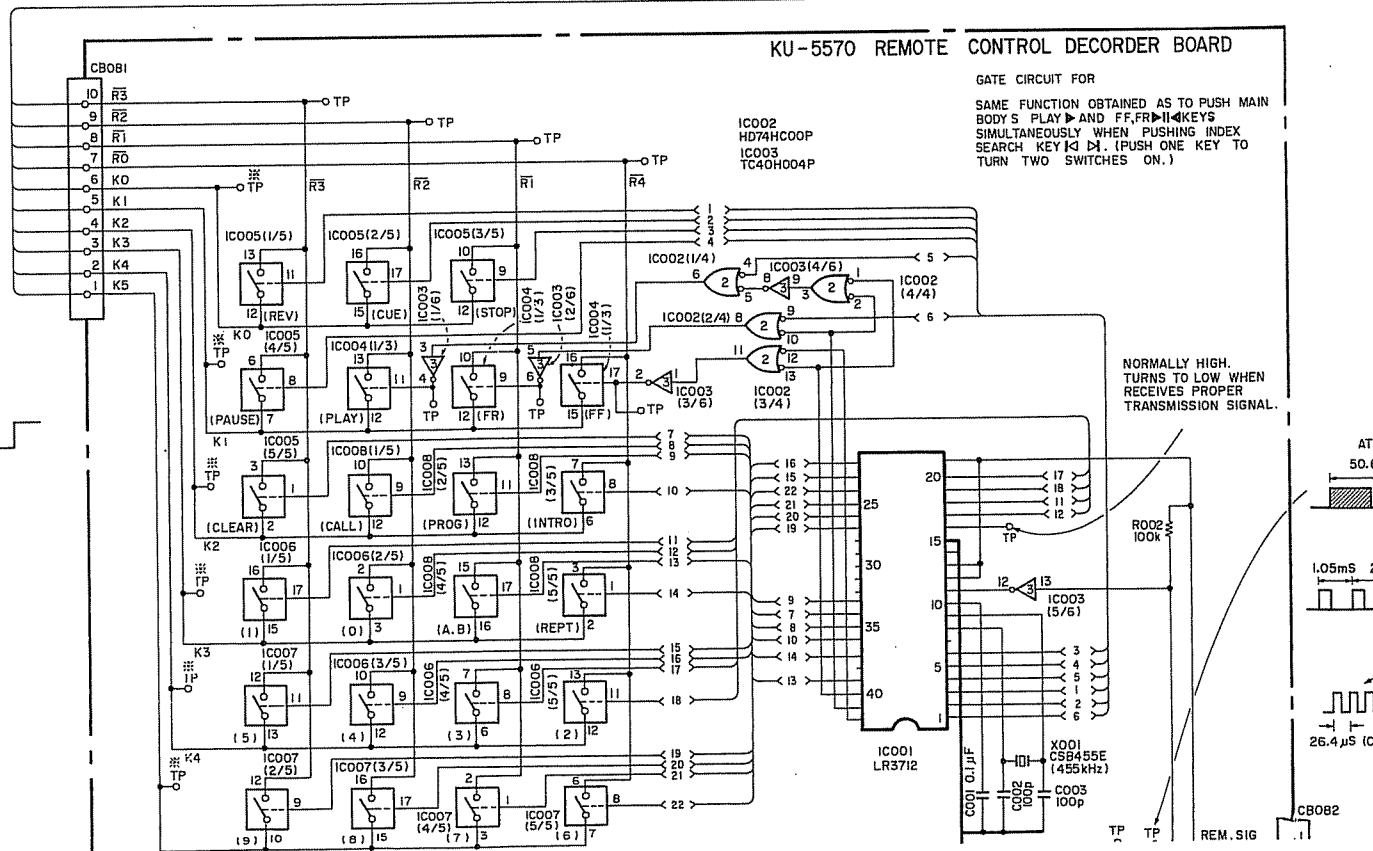
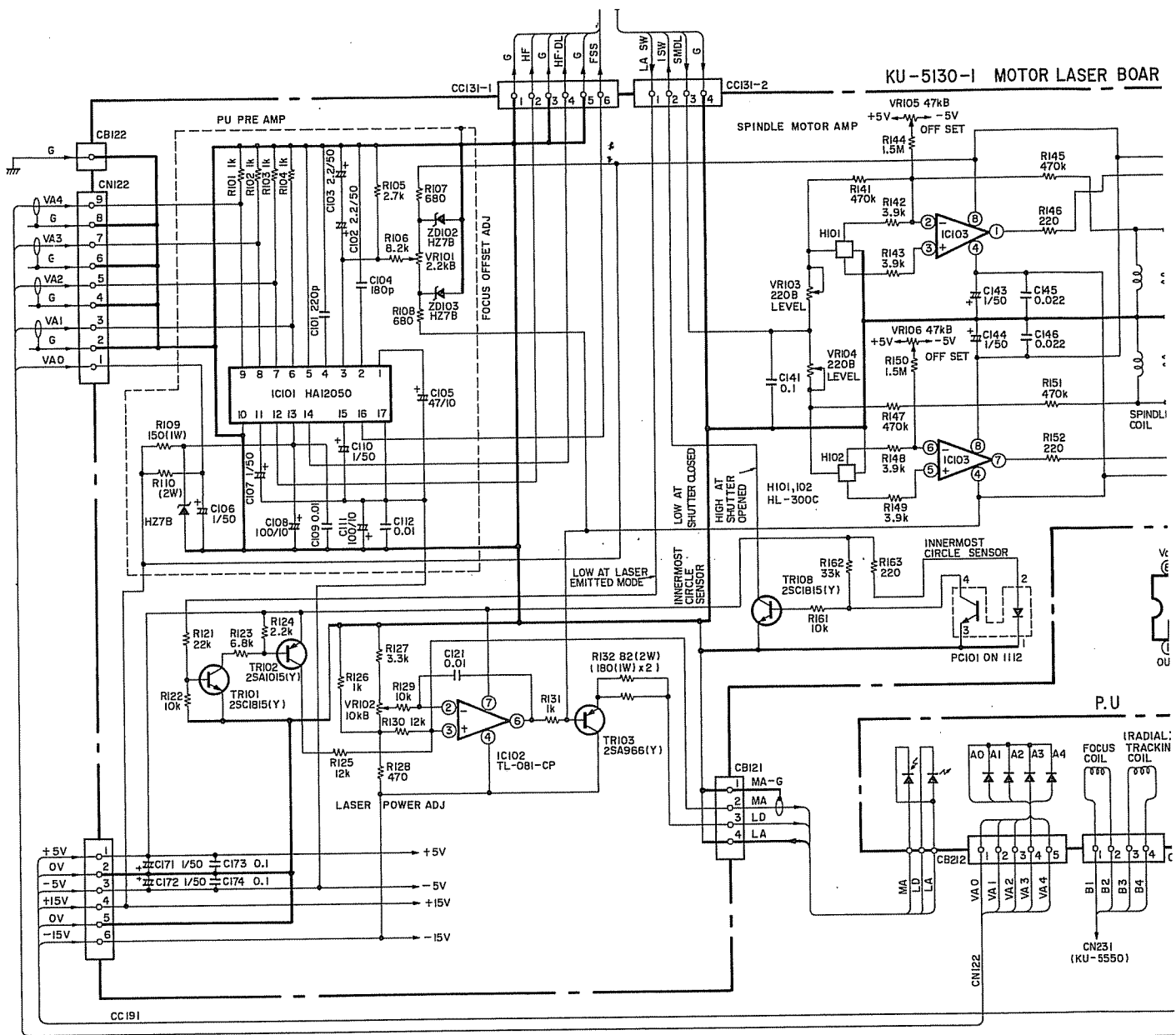
TP TERMINAL ON PARTS SIDE (TP NO. & PIN NO. INDICATED)

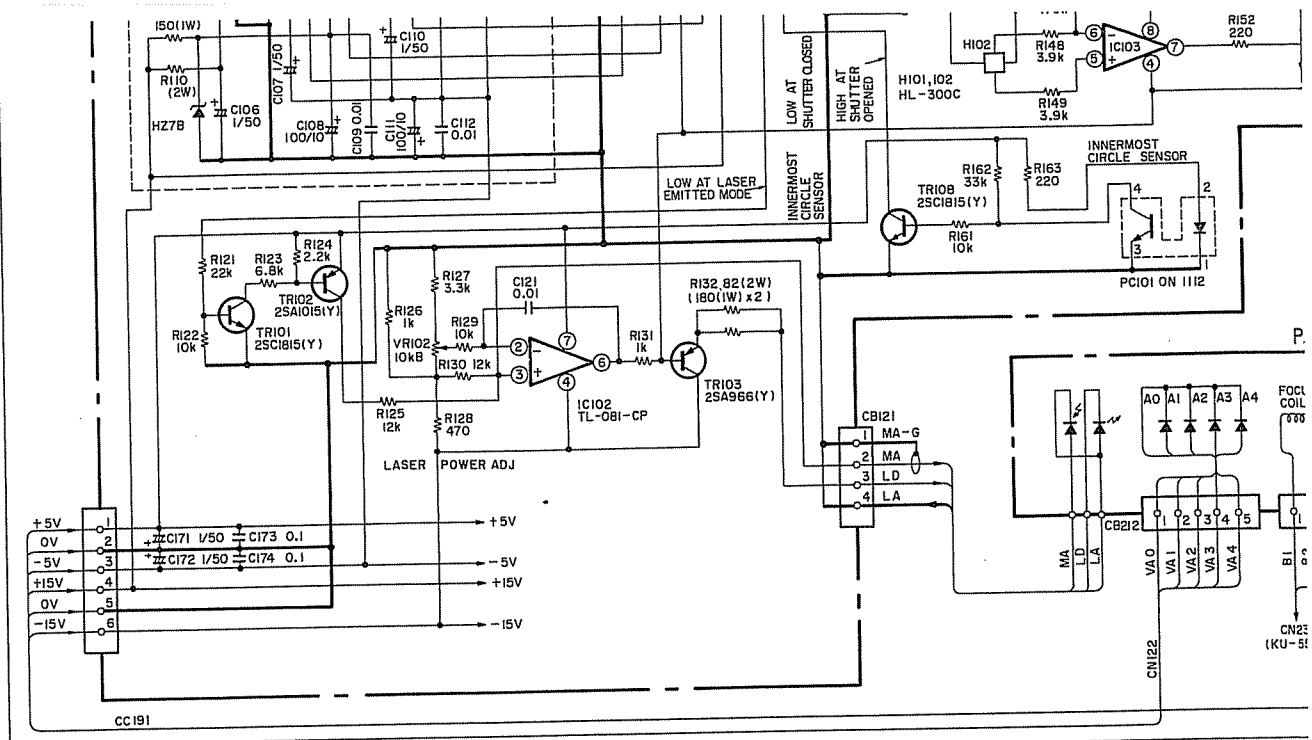


TEST POINT INDICATION  
○ TP ON THE PATTERN SIDE  
□ TP TERMINAL ON PARTS SIDE (TP NO. & PIN NO. INDICATED)

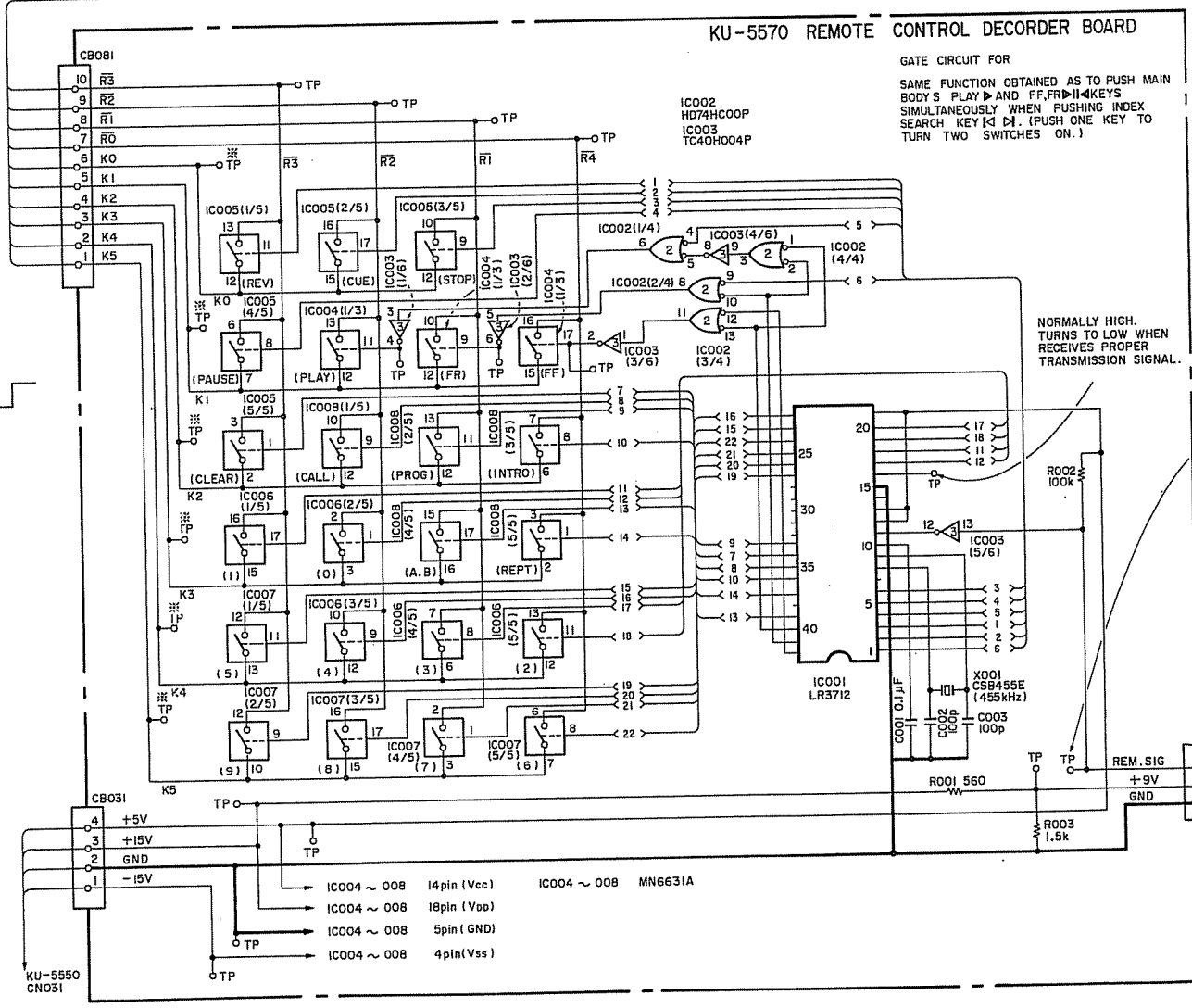
CB308  
SM- 2Vp-p AT PLAY MODE  
SM+ 6.3Vp-p AT PLAY MODE  
SLIDE MOTOR

NOTE : 1. UNLESS OTHERWISE SPECIFIED, ALL RESISTOR VALUES ARE IN OHMS, 1/4 W.  
2. UNLESS OTHERWISE SPECIFIED, ALL CAPACITANCE VALUES ARE IN μF, P=PF.  
3. THIS SCHEMATIC DIAGRAM IS BASIC CIRCUITRY AND SUBJECT TO CHANGE FOR FURTHER IMPROVEMENT.





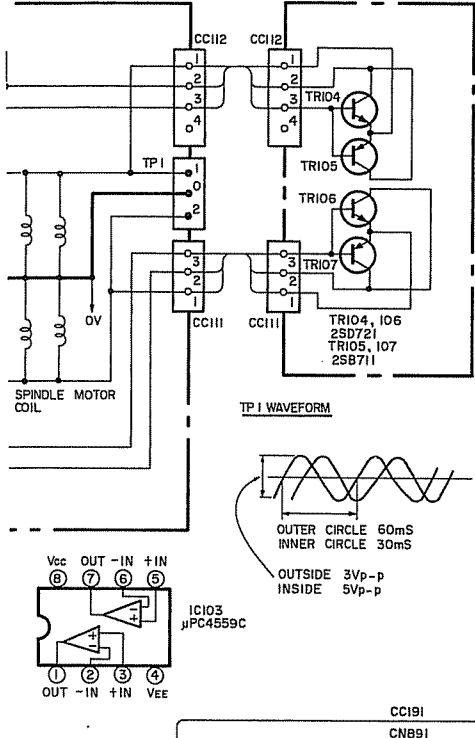
CC191



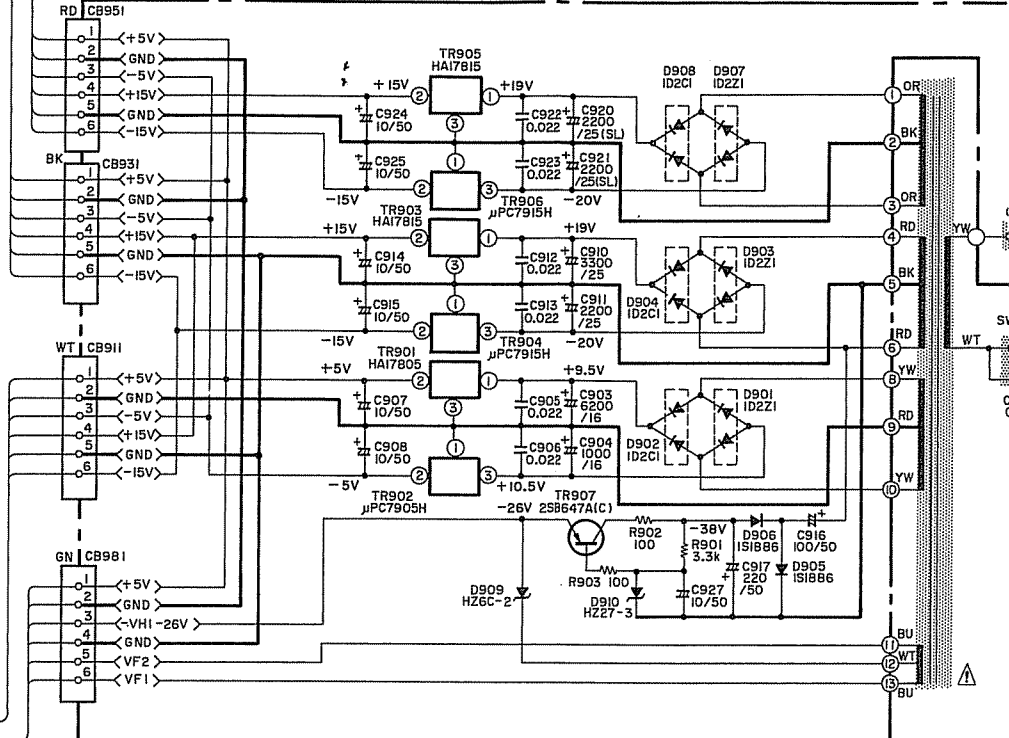
BOARD

KU-5130-2

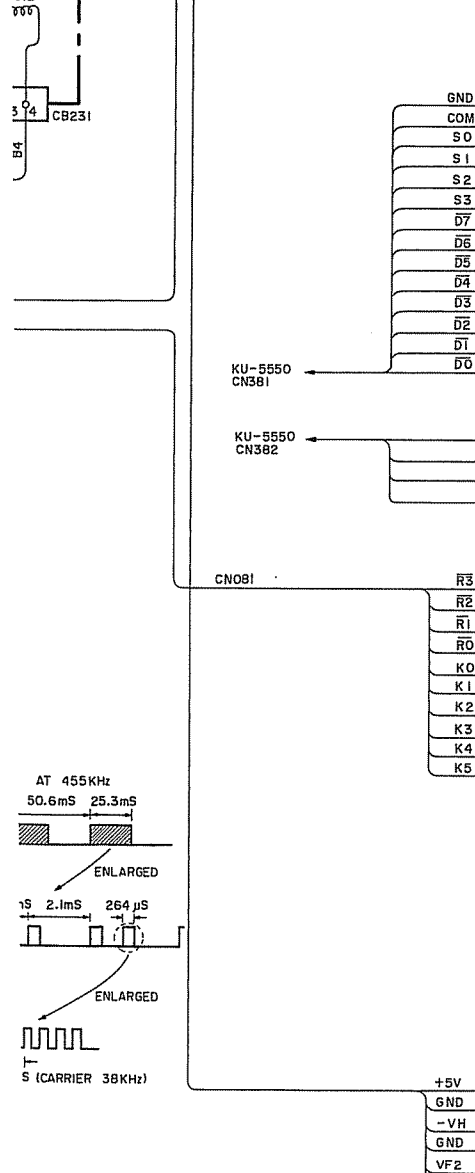
KU-5281/5282/5283 POWER SOURCE BOARD



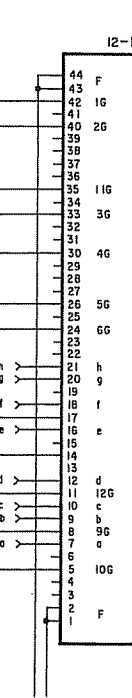
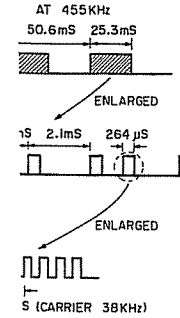
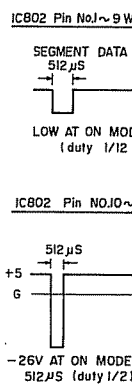
KU-5550 CN391 KU-5560 CN591

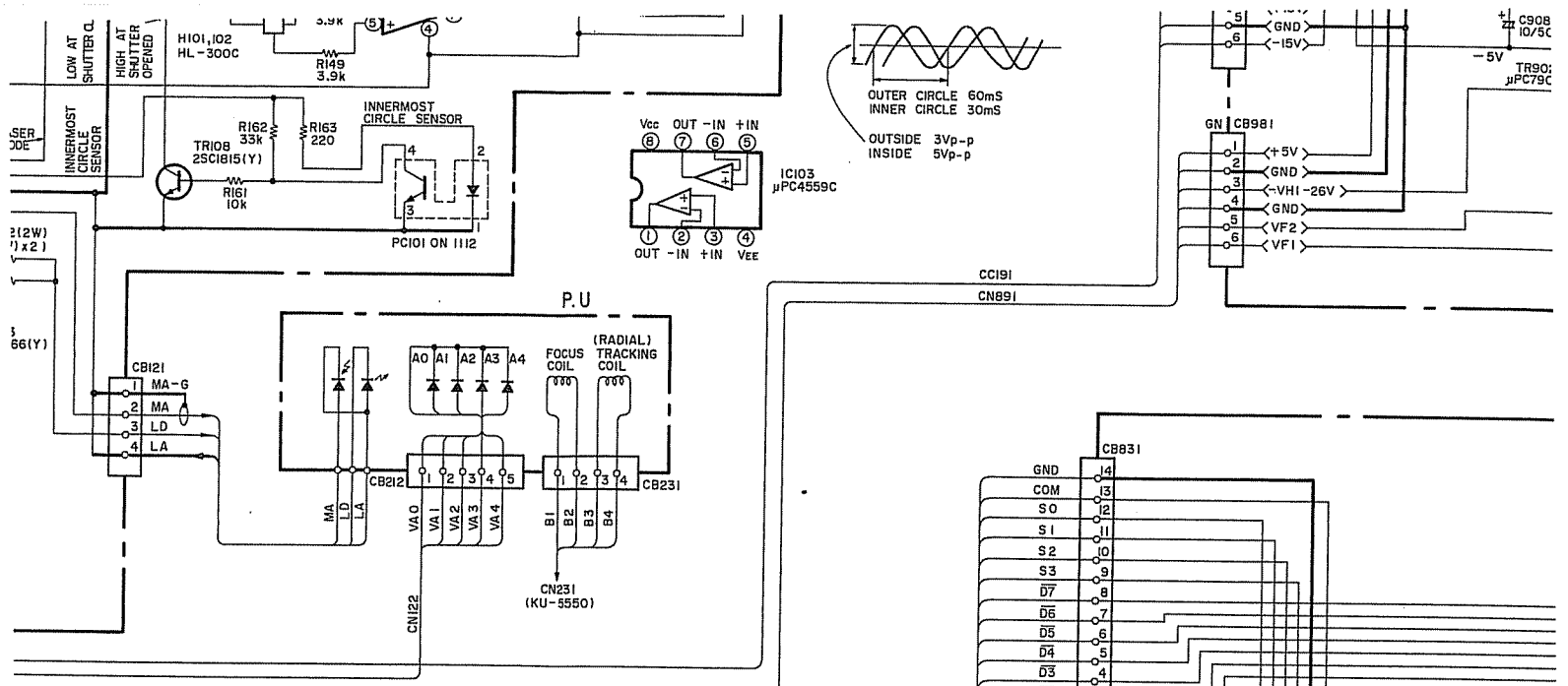


RADIAL RACKING DIL



KU-5540 KEY DISPL

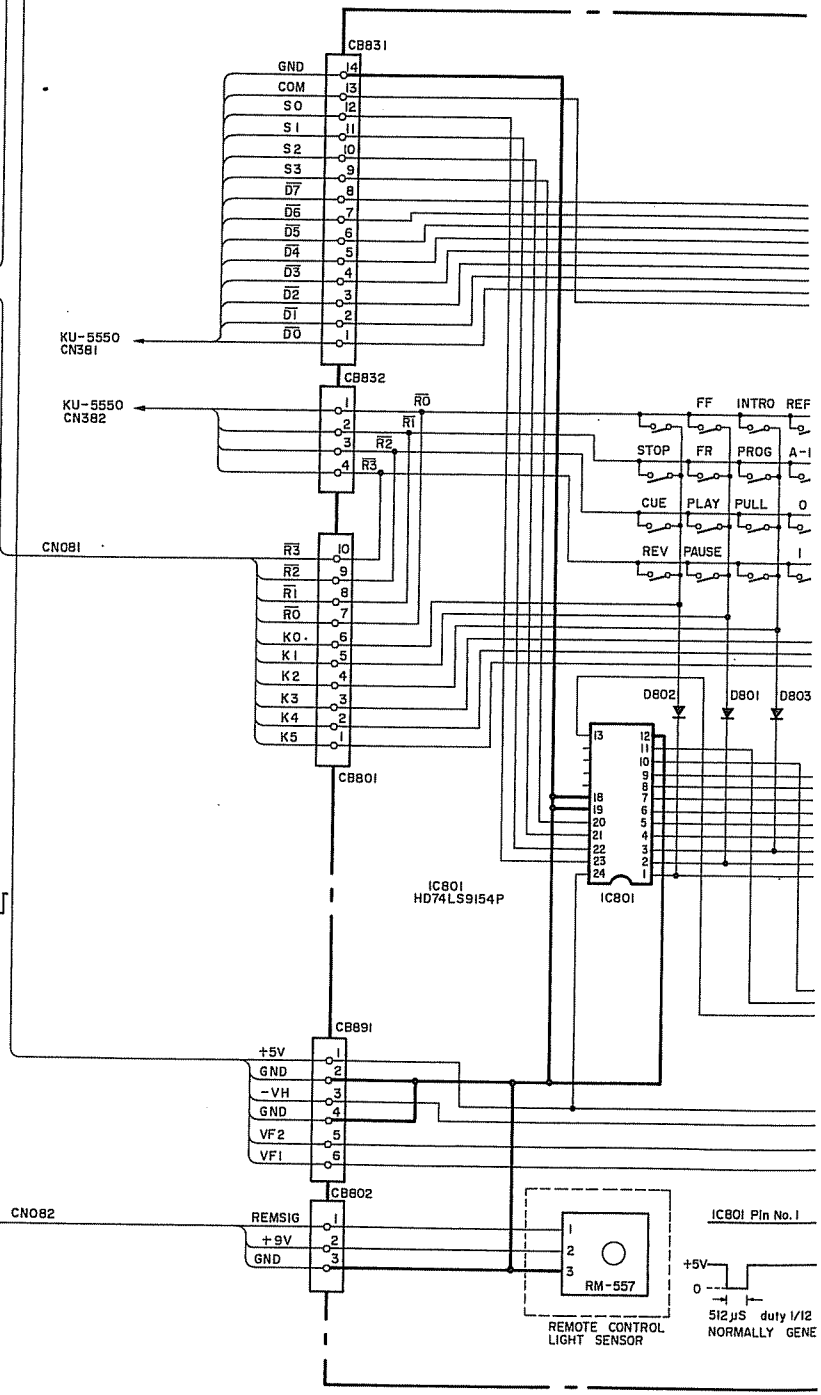
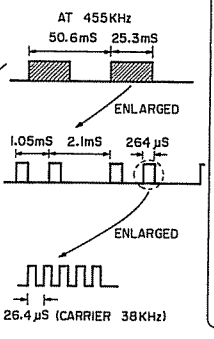
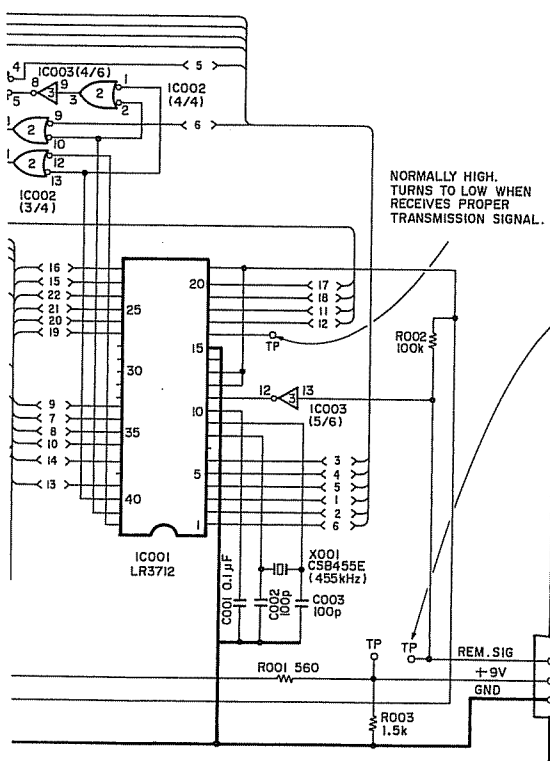




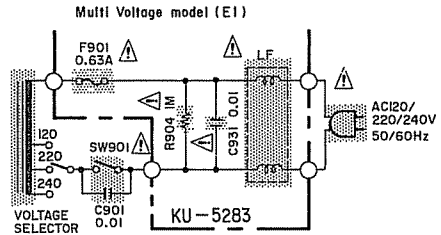
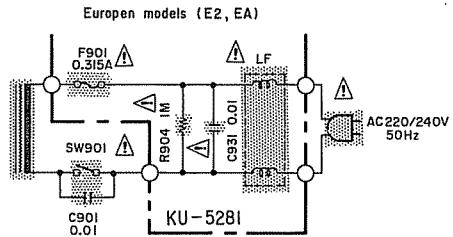
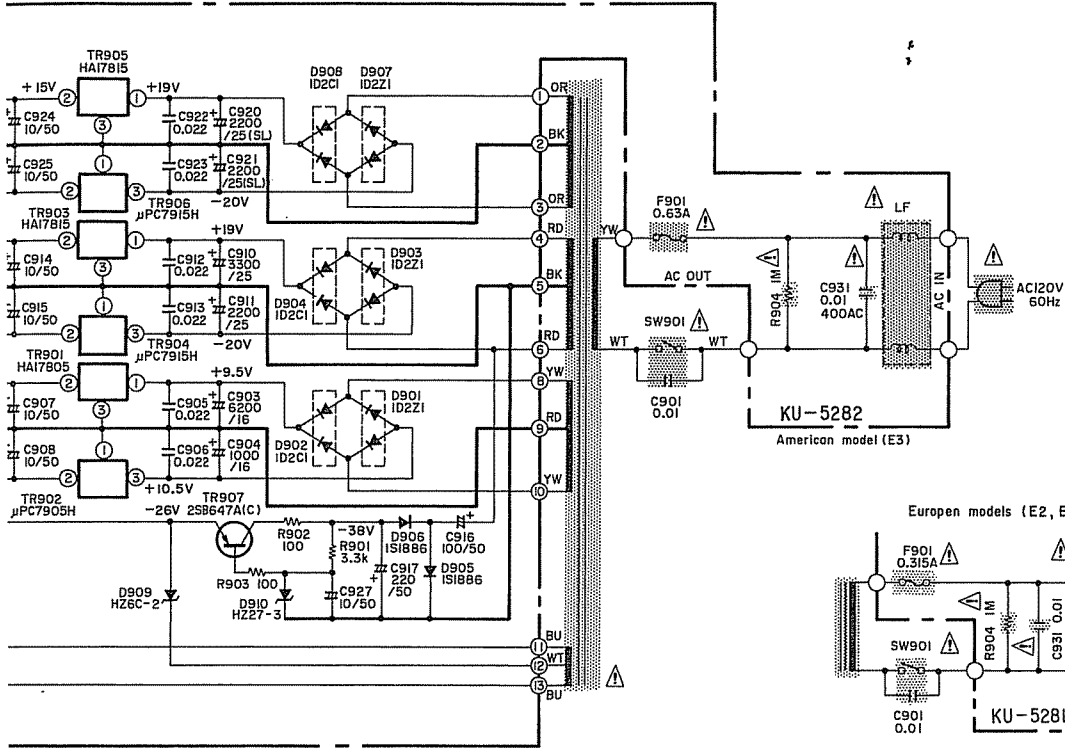
**KU-5570 REMOTE CONTROL DECODER BOARD**

GATE CIRCUIT FOR  
 SAME FUNCTION OBTAINED AS TO PUSH MAIN BODY'S PLAY AND FF, FR KEYS SIMULTANEOUSLY WHEN PUSHING INDEX SEARCH KEY K1. (PUSH ONE KEY TO TURN TWO SWITCHES ON.)

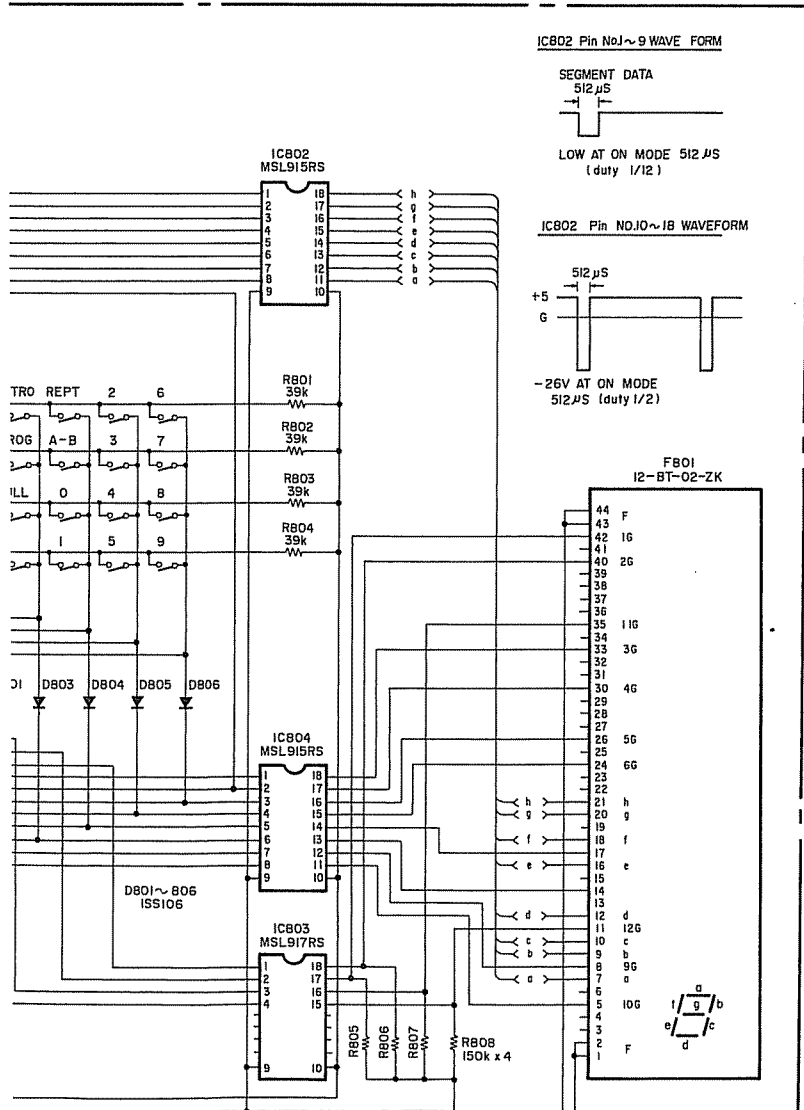
- IC002 HD74HC00P
- IC003 TC40H004P

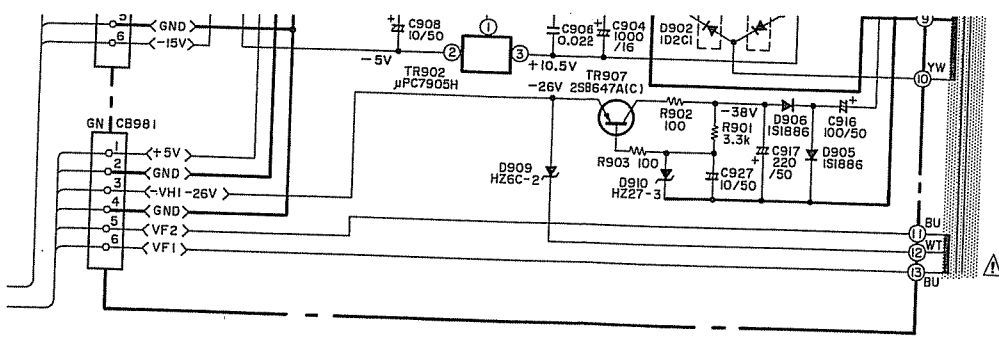


KU-5281/5282/5283 POWER SOURCE BOARD

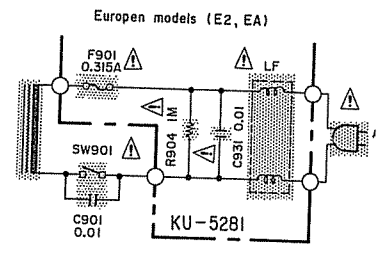


KU-5540 KEY DISPLAY BOARD

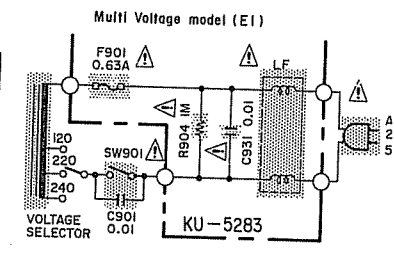




American model (E3)

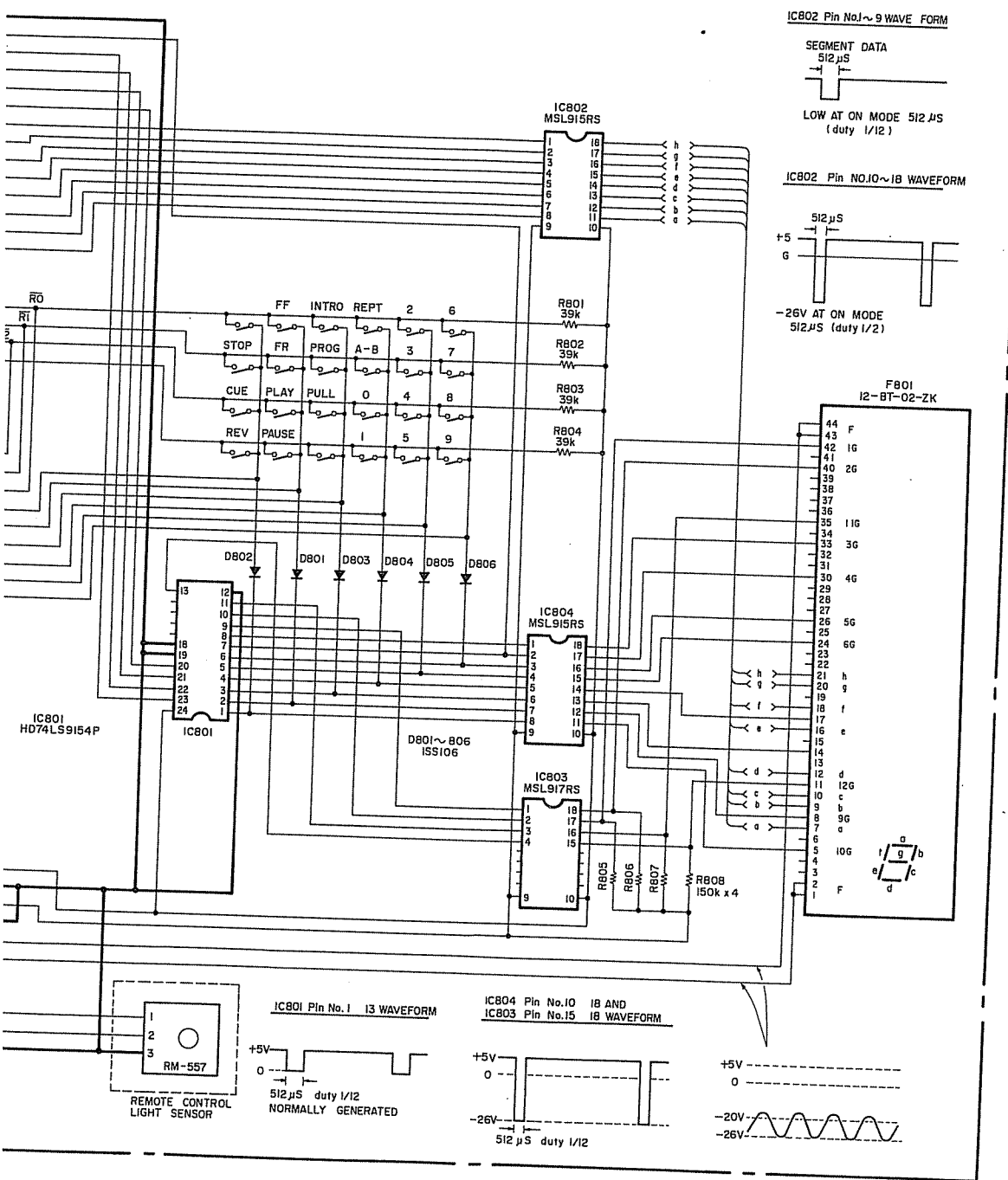


European models (E2, EA)

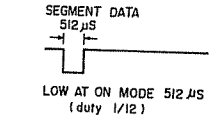


Multi Voltage model (E1)

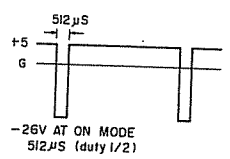
KU-5540 KEY DISPLAY BOARD



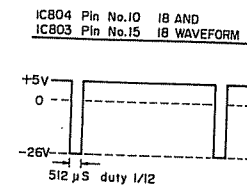
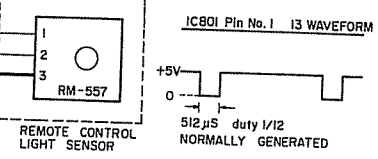
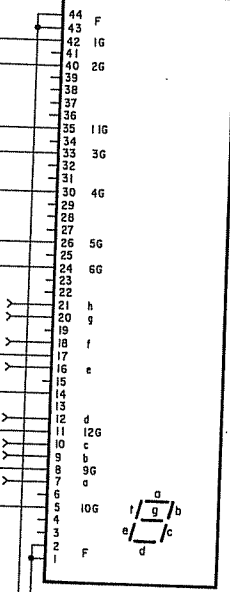
IC802 Pin No.1~9 WAVE FORM



IC802 Pin No.10~18 WAVEFORM



F801 12-BT-02-ZK



NOTE : 1. UNLESS OTHERWISE SPECIFIED, ALL RESISTOR VALUES ARE IN OHMS, 1/4 WATT.  
 2. UNLESS OTHERWISE SPECIFIED, ALL CAPACITANCE VALUES ARE IN μF, P=PF.  
 3. PARTS INDICATED WITH Δ MARKS ARE IMPORTANT DUE TO MAINTAINING SAFETY AND MUST BE REPLACED WITH SPECIFIED ONES.  
 4. THIS SCHEMATIC DIAGRAM IS BASIC CIRCUITRY AND SUBJECT TO CHANGE WITHOUT NOTICE FOR FURTHER IMPROVEMENT.