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DENON

Hi-Fi Component

SERVICE MANUAL

STEREO CD PLAYER

MODEL DCD-1800R



NIPPON COLUMBIA CO., LTD.

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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 |
|--------------|---------------------|

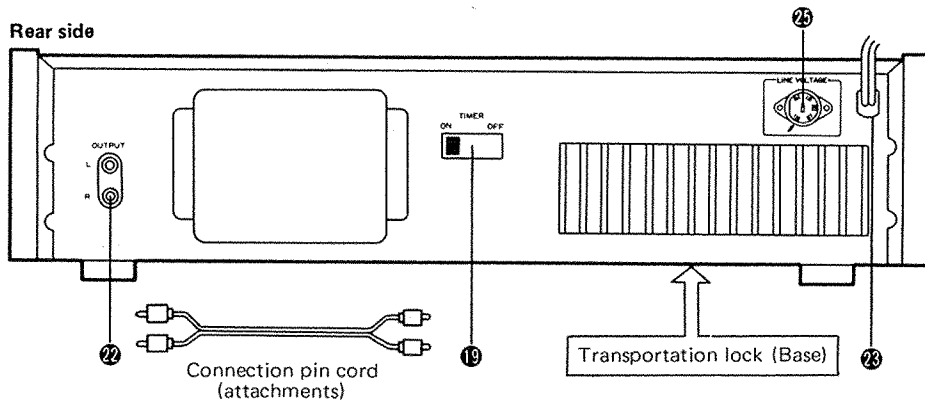
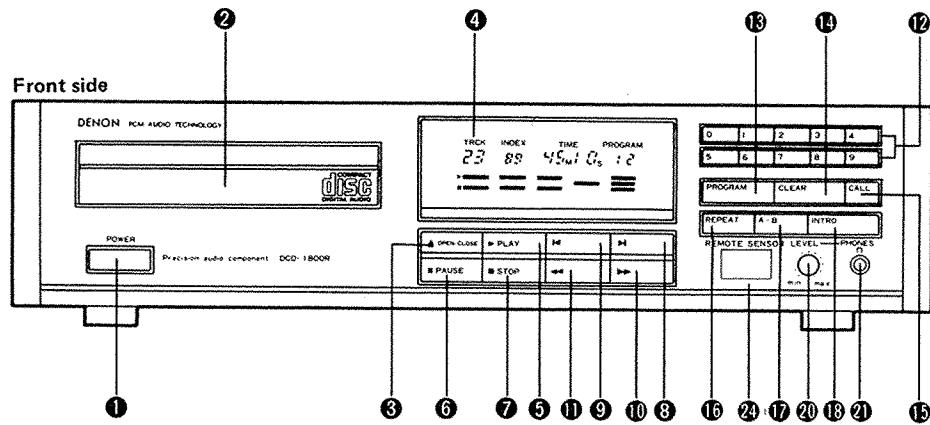
* Design and specifications are subject to change without notice.

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

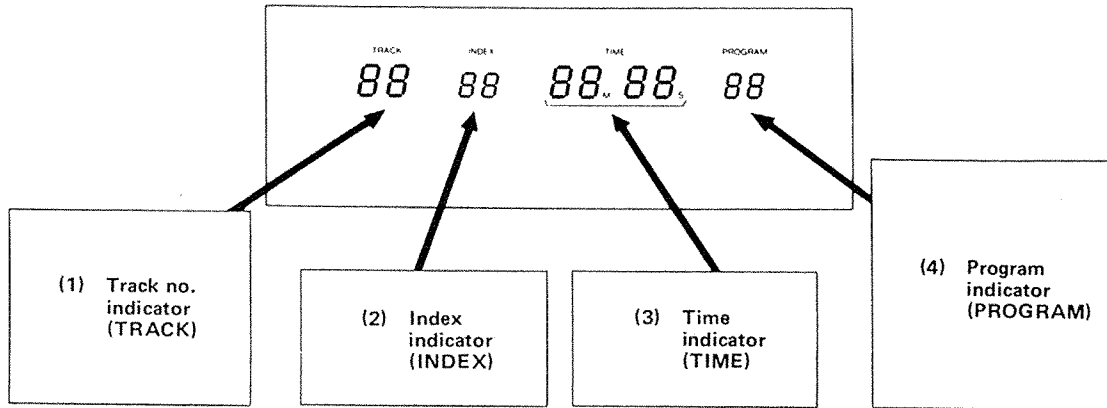
- The disc is loaded in this disc holder.
- By pressing the disc holder open/close button (▲ OPEN/CLOSE) ③, the disc holder can be opened.
- To close the disc holder, press the disc holder open/close button ③.
- The disc holder can be closed also by pressing the play button (▶ PLAY) ⑤.

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.

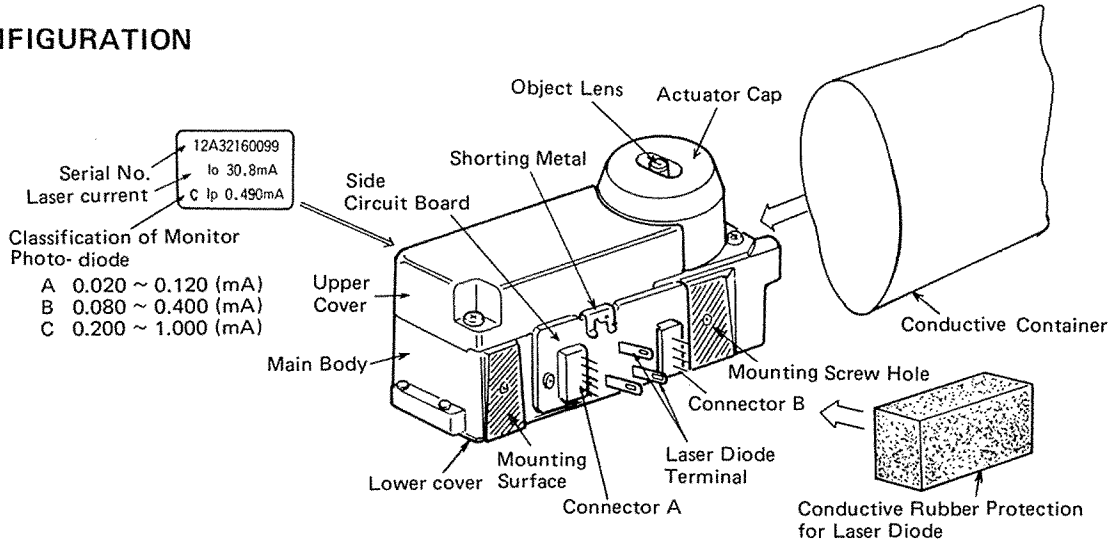
10 Fast forward skip button (▶▶▶)

- 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.

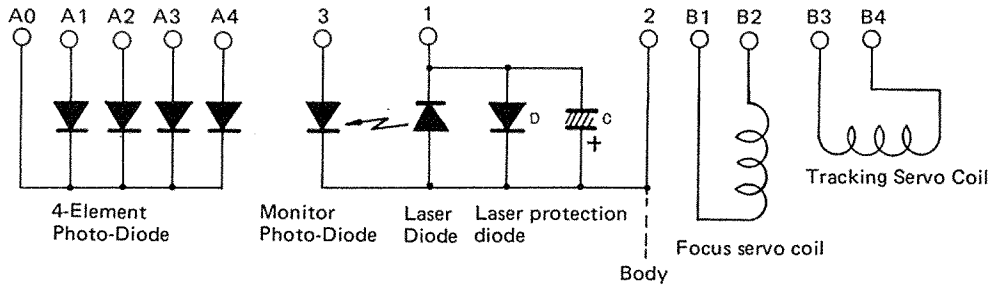
- 11 Fast reverse skip button (◀◀)**
- Press this button when fast reverse is desired.
 - If ▶ **PLAY** is lit, the disc is fast reversed and sound is audible while the button is pressed.
 - If **PAUSE** is lit, no sound is generated when the pickup is fast reversed.
- 12 Track No. Button (0 ~ 9)**
- 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

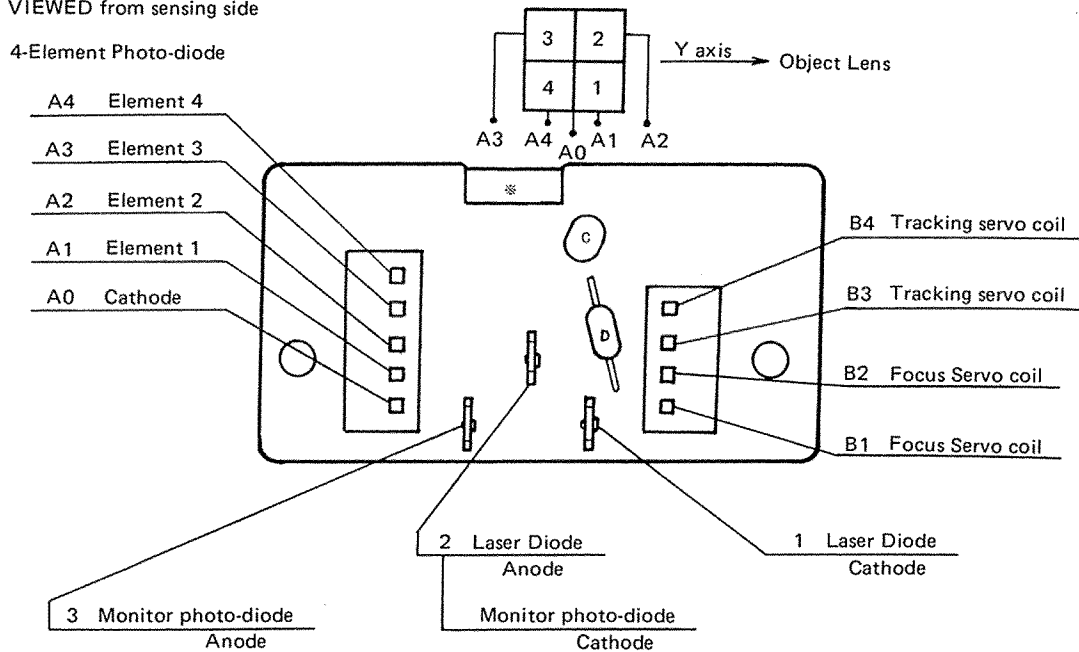
CONFIGURATION



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.

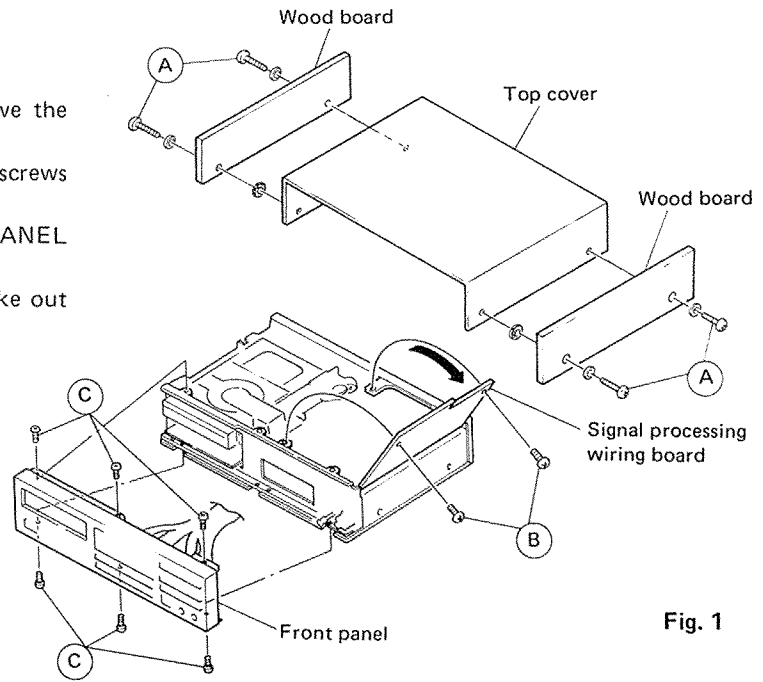


Fig. 1

2. How to remove PICK-UP MECHANISM UNIT.

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

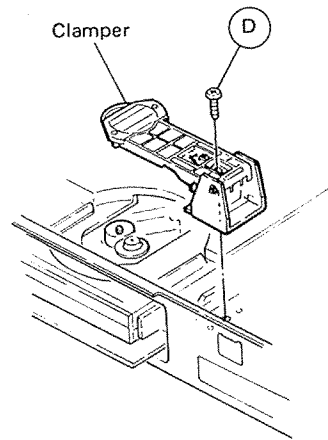


Fig. 2

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

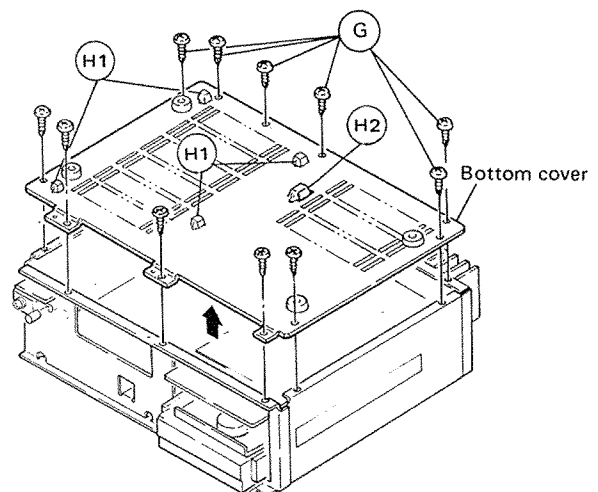


Fig. 3

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

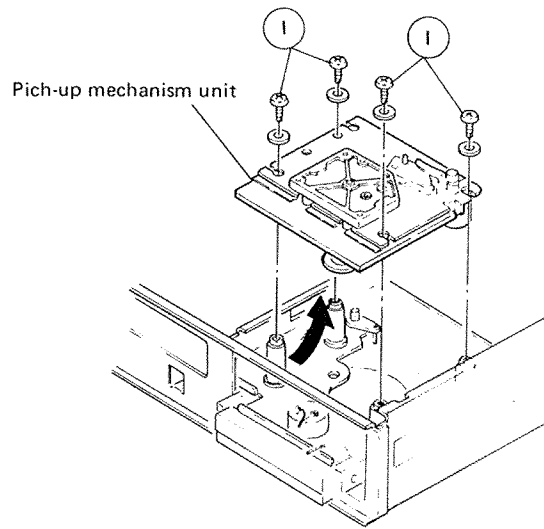


Fig. 4

3. How to disassemble LOADING UNIT.

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

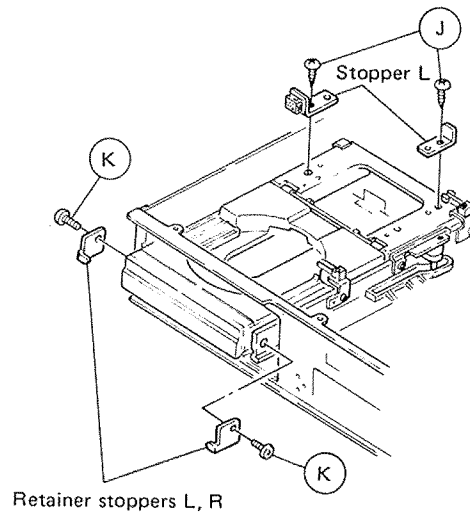


Fig. 5

- (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)

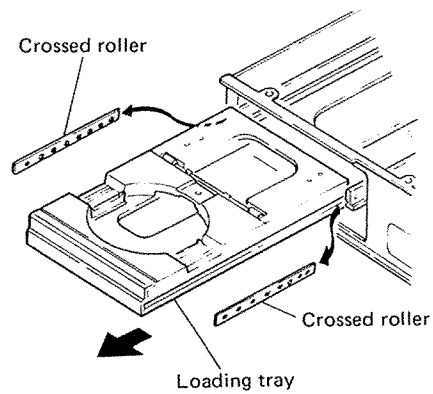


Fig. 6

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.)

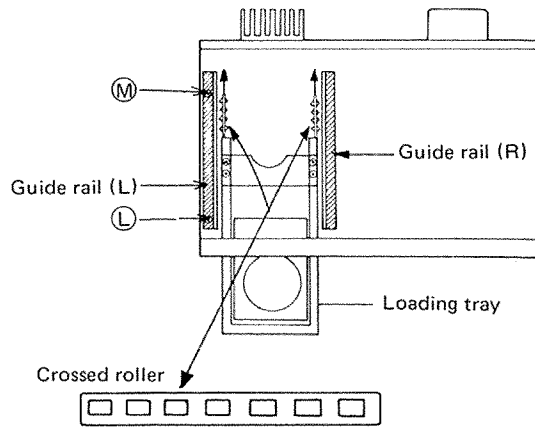


Fig. 7

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)

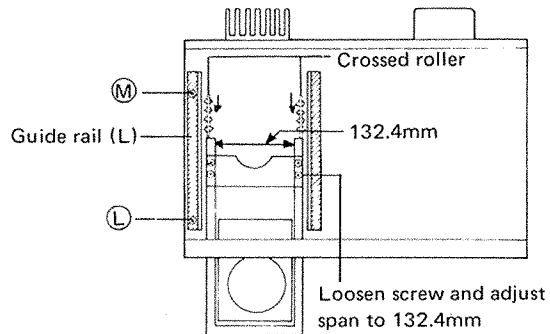


Fig. 8

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

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

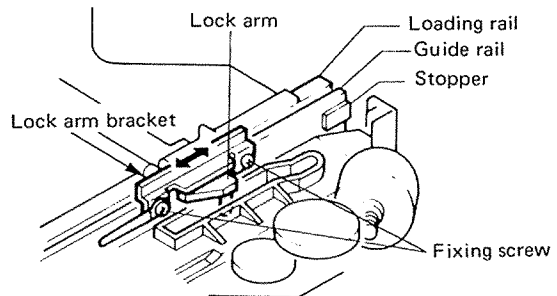


Fig. 9

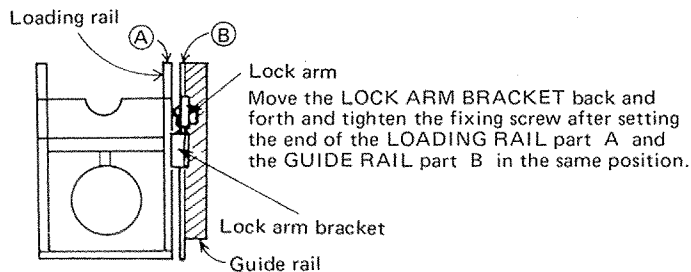


Fig. 10

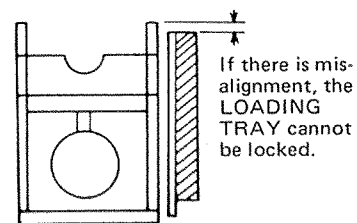


Fig. 11

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.

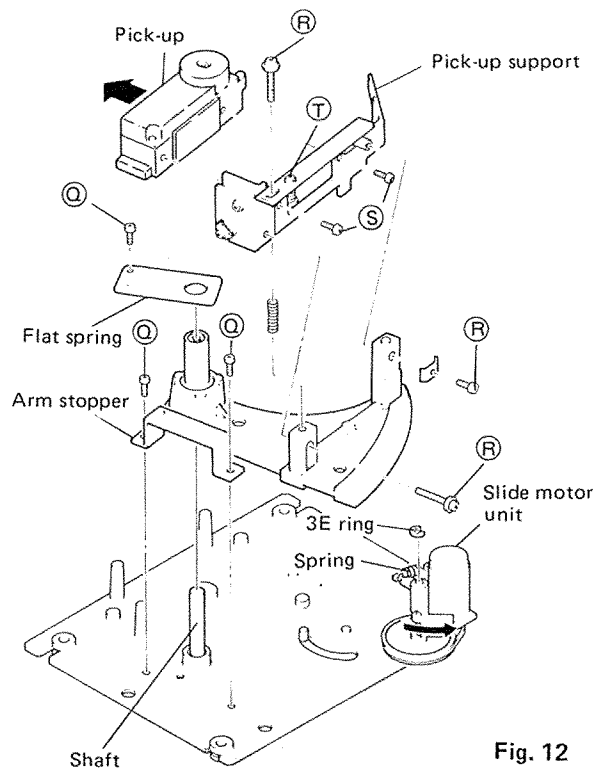


Fig. 12

7. Mounting 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.

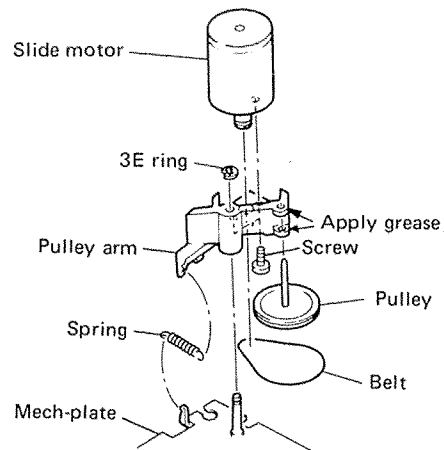


Fig. 13

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.

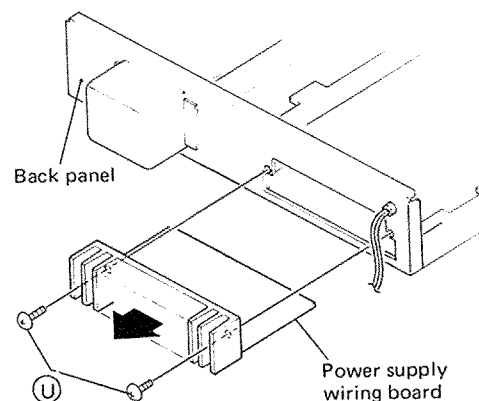


Fig. 14

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.

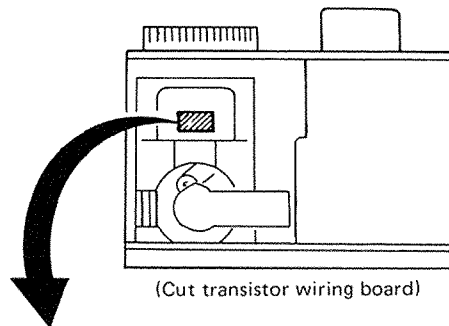
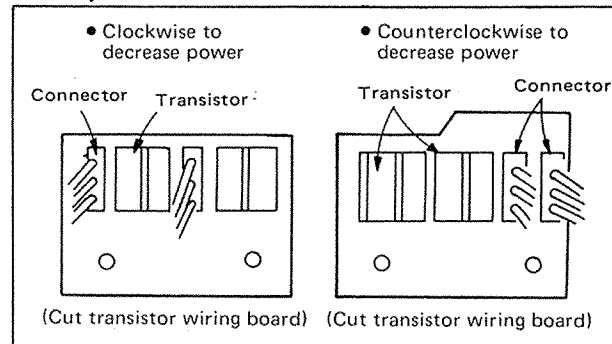


Fig. 15



ADJUSTMENT ADAPTOR

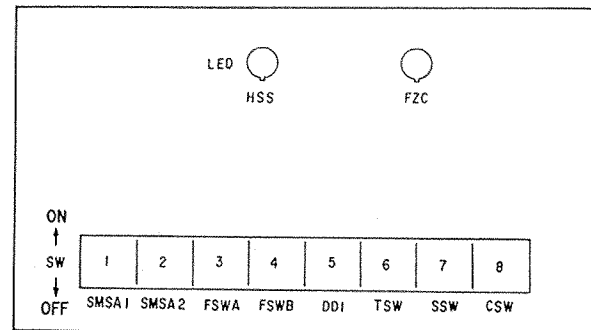


Fig. 16

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.

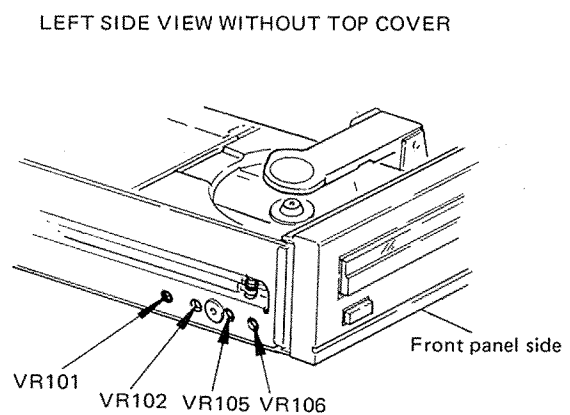


Fig. 17

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

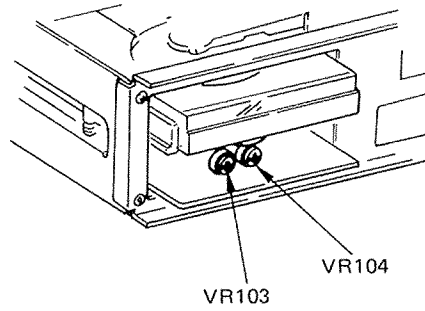


Fig. 18

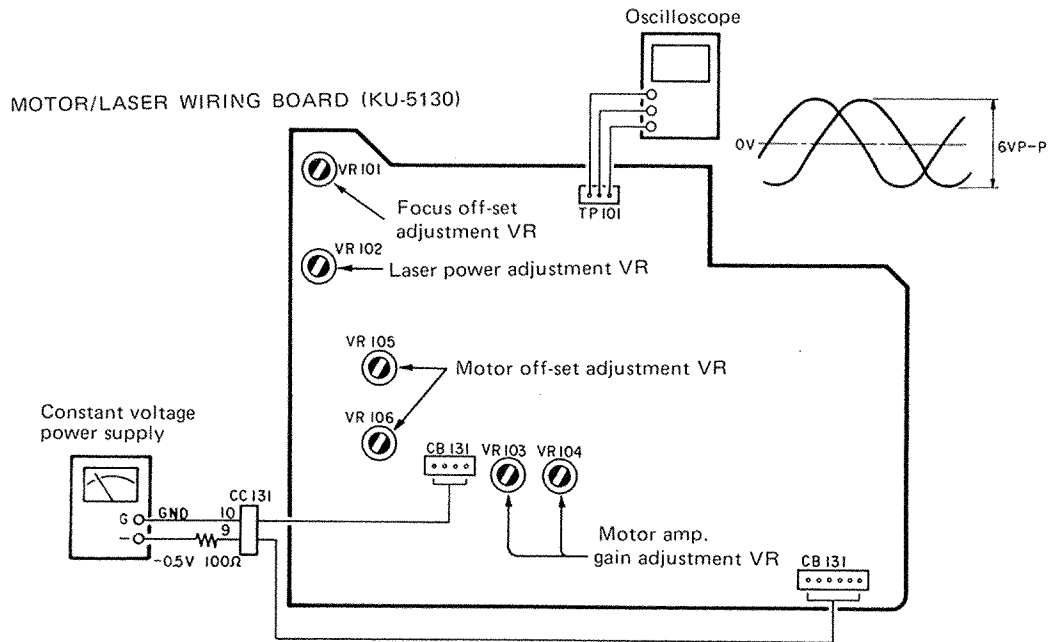


Fig. 19

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 $0.3mW \pm 0.01mW$.

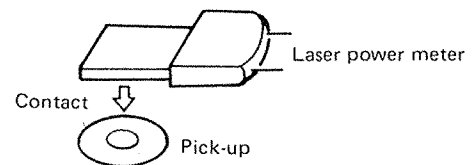


Fig. 20

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

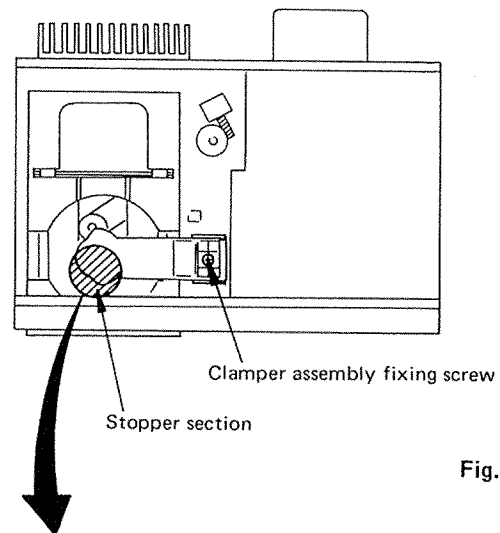


Fig. 21

ENLARGED STOPPER SECTION

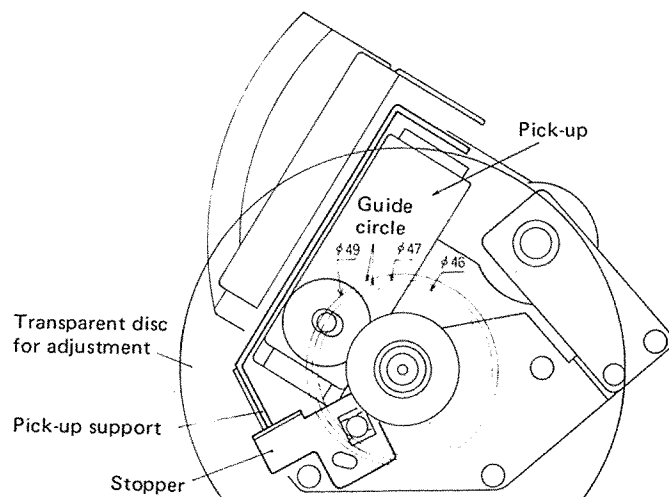
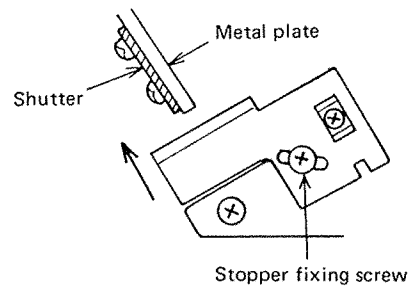


Fig. 22

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)

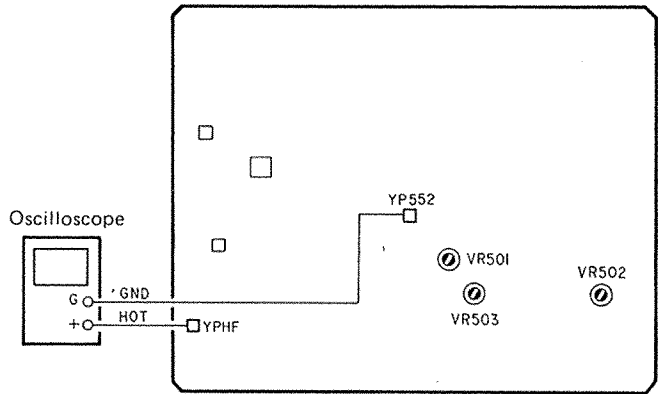


Fig. 23-1

MOTOR/LASER WIRING BOARD (KU-5130)

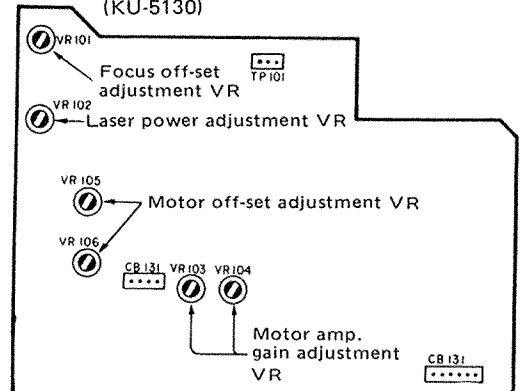
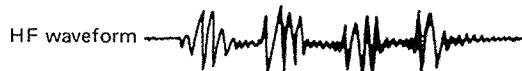
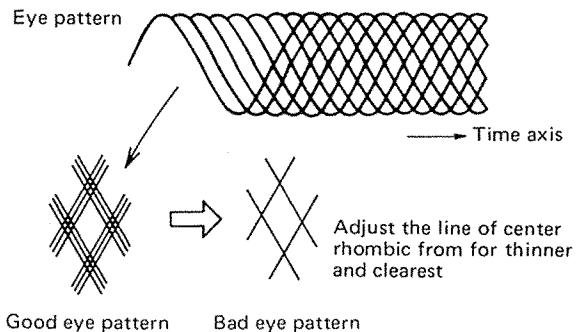


Fig. 23-2

WAVEFORM FOR (5)



EYE PATTERN FOR (11)



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.

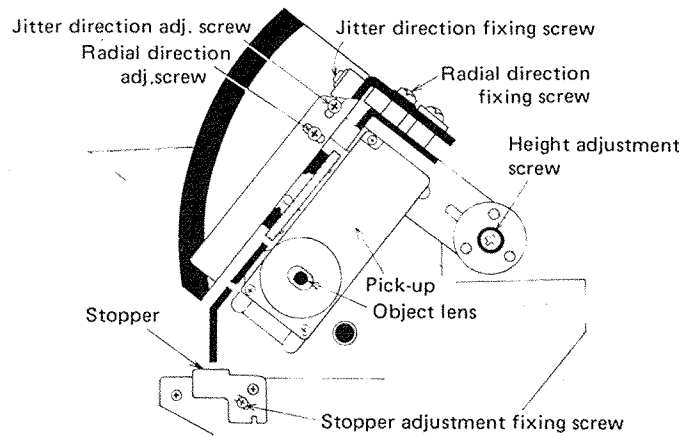
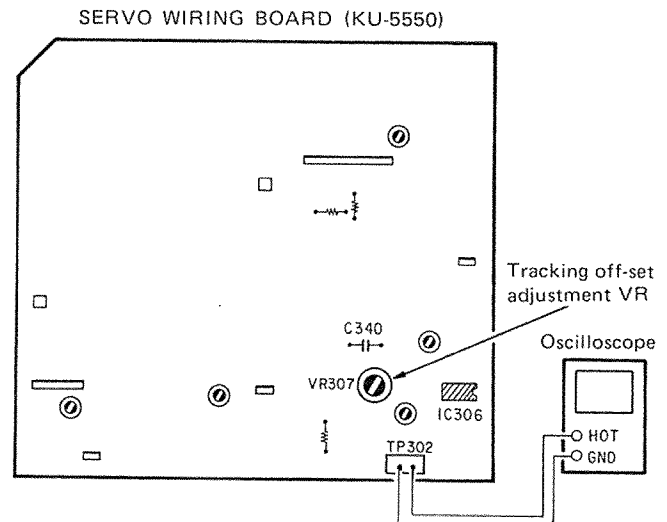


Fig. 24

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.

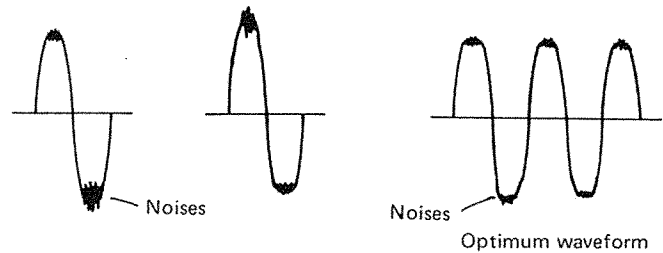


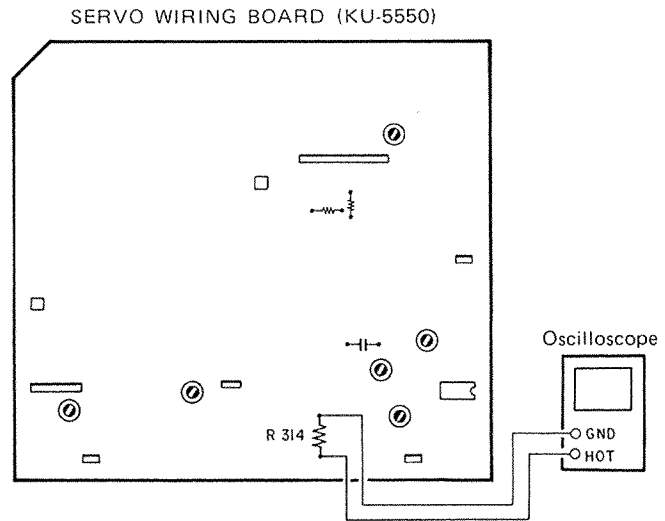
Fig. 25

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

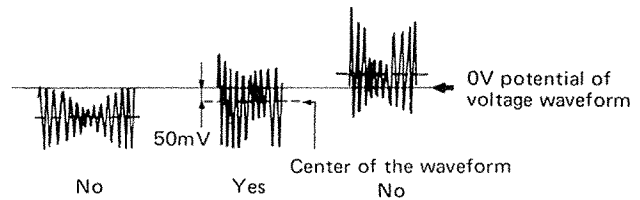
- (1) Connect the oscilloscope to YPHF (hot side), YP552 (GND) on the signal processing wiring board.
- (2) Turn on Switch TSW (SWs 3 to 8 are all on) on the adjustment adaptor.
- (3) Adjust VR101 on the motor wiring board to obtain the clearest eye pattern.

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

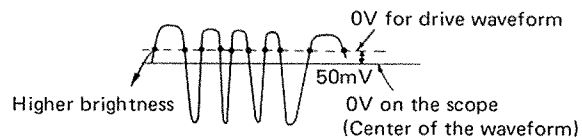


Fig. 26

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.

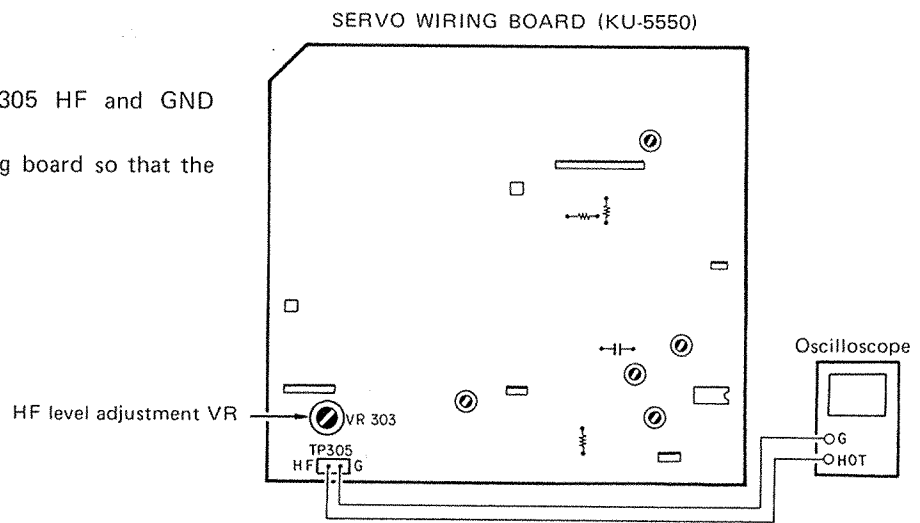


Fig. 27

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.

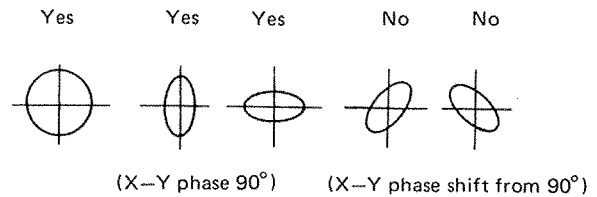
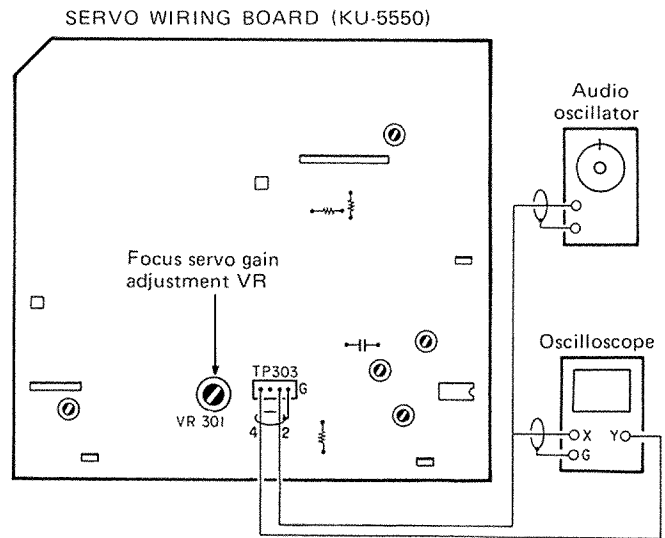


Fig. 28

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.

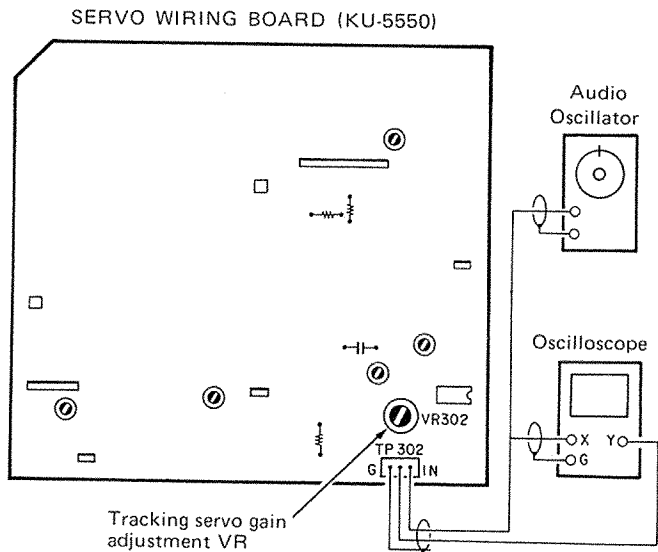


Fig. 29

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)

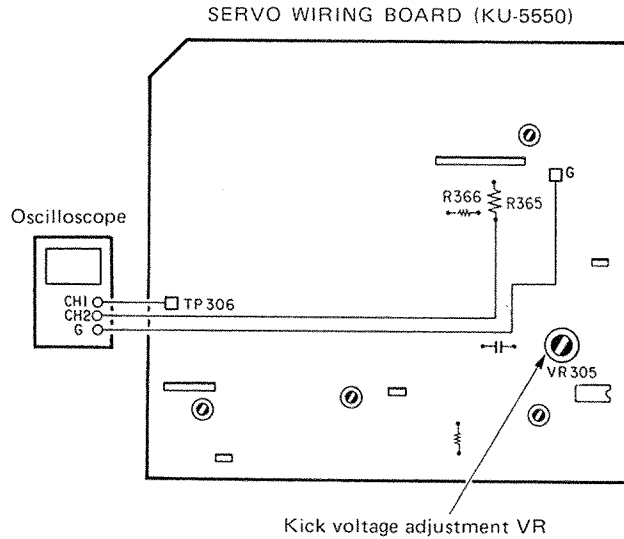


Fig. 30

- (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)

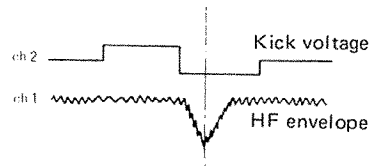


Fig. 31-1

• WAVEFORM EXAMPLES

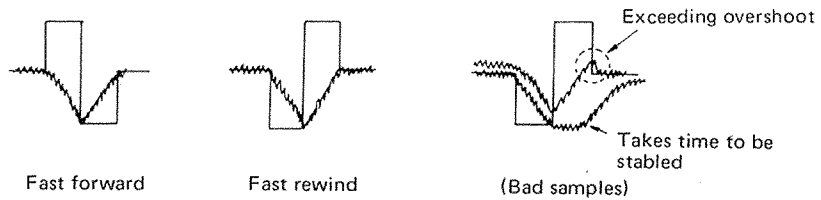


Fig. 31-2

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%.

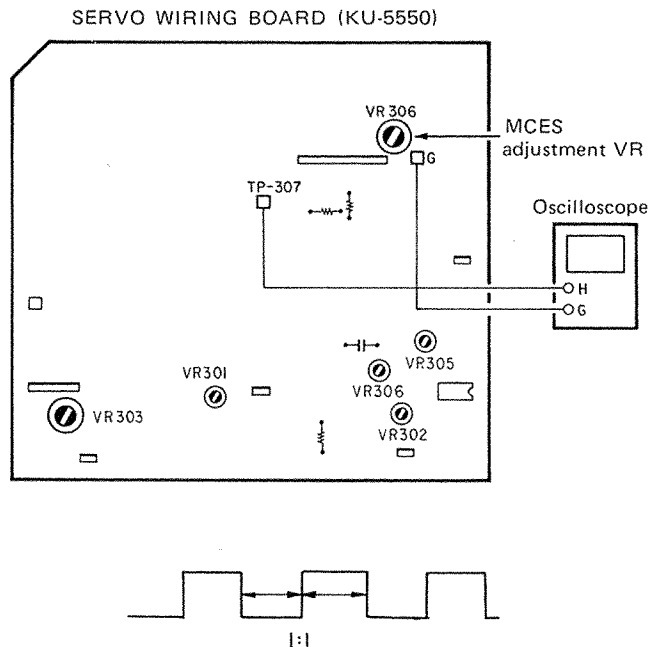


Fig. 32

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.

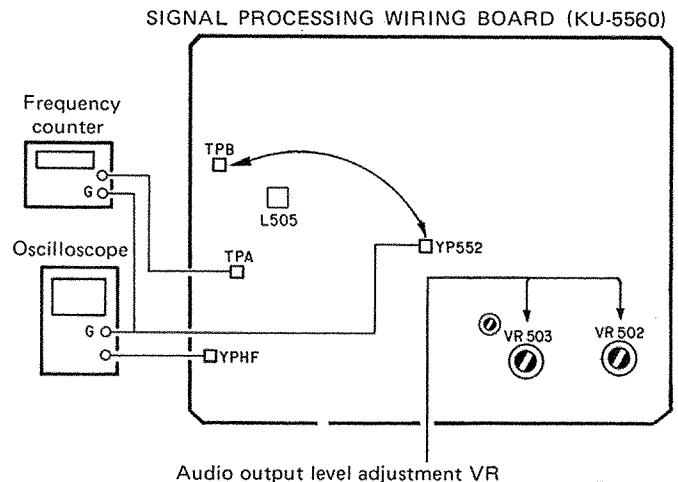


Fig. 33

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 |
|--|--------------------------|------------------------|----------------------|--|------------|--------------|--|
| SEMICONDUCTOR GROUP | | | | | | | |
| 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 μ 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 μ F 50V |
| IC306 | 2620506005 | HD74LS122P | | C337 | 2531027000 | CK45F1H104Z | 0.1 μ F 50V |
| IC307 | 2630076004 | HA17901P | | C340 | 2533633007 | CC45SL1H181J | 180pF 50V |
| IC308,313, 315,318, 322,325 | 2630280007 | μ 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 μ 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 μ F 25V |
| IC324,326 | 2620419008 2620300007 | HD14053BP HD14011BP | | C327,328, 391,392 | 2544132005 | CE04W1C100= | 10 μ F 16V |
| TR301 | 2730201009 | 2SC2236(Y) | | C345,346 | 2544172007 | CE04W1H0R1 | 0.1 μ F 50V |
| TR302 | 2710105002 | 2SA966(Y) | | C378,379 | 2544140000 | CE04W1V4R7= | 4.7 μ F 35V |
| TR303, 304 | 2710173005 | 2SA781K | | C384,397 | 2544130007 | CE04W1A101= | 100 μ F 10V |
| TR305, 310 | 2730177007 | 2SC1626(Y) | | C385 | 2549030005 | CE04W=1E100M | 10 μ F 25V |
| TR306, 311 | 2710088006 | 2SA816(Y) | | C389 | 2544066003 | CE04W1H2R2= | 2.2 μ F 50V |
| TR307, 309, 313~316, 318,320 | 2710102005 | 2SA1015(Y) | | C399,401 | 2544131006 | CE04W1A221= | 220 μ F 10V |
| TR308, 312,317, 324 | 2730198002 | 2SC1815(Y) | | C403,405 | 2544164031 | CE04W1E221M | 220 μ F 25V Film |
| D301~304 | 2760049008 | 1S2076 | | C302 | 2551121096 | CQ93M1H393J | 0.039 μ F 50V |
| D305,306, 308~315 | 2760370007 | 1SS106 | | C303,382 | 2551121054 | CQ93M1H183J | 0.018 μ F 50V |
| DZ301 | 2760255038 | HZ12C2 | | C312~314, 368 | 2551122040 | CQ93M1H104J | 0.1 μ F 50V |
| DZ302 | 2760173042 | HZ6B1 | | C320,321 | 2556099000 | CQ09S1H102J | 0.001 μ F 50V |
| RESISTOR GROUP | | | | C324,329 | 2551122066 | CQ93M1H154J | 0.15 μ F 50V |
| R314,364 | 2440014010 | RS14B3A5R6JNBF | 5.6 Ω 1W | C325 | 2551121009 | CQ93M1H682J | 0.0068 μ F 50V |
| R336,373 | 2442028004 | RS14B2E150JNRF | 15 Ω 1/4W | C326 | 2551120084 | CQ93M1H472J | 0.0047 μ F 50V |
| R395 | 2440017020 | RS14B3A100JNBF | 10 Ω 1W | C330 | 2551123023 | CQ93M1H474J | 0.47 μ F 50V |
| R492,493 | 2410137011 | RD14B2H100JF | 10 Ω 1/2W | C338 | 2551123010 | CQ93M1H394J | 0.39 μ F 50V |
| VR301, 306,307 | EP-5462H13 | SOLID VR (103) | 10k Ω B | C339,361 | 2551121041 | CQ93M1H153J | 0.015 μ F 50V |
| VR302 | EP-5462H9 | SOLID VR (222) | 2.2k Ω B | C343 | 2551122037 | CQ93M1H823J | 0.082 μ F 50V |
| VR303 | EP-5462H7 | SOLID VR (102) | 1k Ω B | | | | |
| VR305 | EP-5462H11 | SOLID VR (472) | 4.7k Ω B | | | | |
| CAPACITOR GROUP | | | | | | | |
| 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 μ F 50V |
| C366 | 2551120000 | CQ93M1H102J | 0.001 μ F 50V |
| C369,383 | 2551122082 | CQ93M1H224J | 0.22 μ F 50V |
| C370 | 2551120026 | CQ93M1H152J | 0.0015 μ F 50V |
| C371 | 2551121083 | CQ93M1H333J | 0.033 μ F 50V |
| C381 | 2551122024 | CQ93M1H683J | 0.068 μ F 50V |
| OTHER PARTS GROUP | | | |
| 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 |
|------------------------------|------------|-----------------|-----------------------------------|
| SEMICONDUCTOR GROUP | | | |
| IC101 | 2630275009 | HA12050 | |
| IC102 | 2630109007 | TL-081-CP | |
| IC103 | 2630280007 | μ 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 | |
| RESISTOR GROUP | | | |
| R109 | 2440031022 | RS14B3A151JNBF | 150 Ω 1W |
| R110 | 2440086006 | RS14B3D101JNB | 100 Ω 2W |
| R132 | 2440032021 | RS14B3A181JNBF | 180 Ω 1W |
| VR101 | 2116003083 | V10QB222 | 2.2k Ω B |
| VR102 | 2116001027 | V10QB103 | 10k Ω B |
| VR103, 104 | 2116003067 | V10QB102 | 1k Ω B |
| V105,106 | 2116001069 | V10QB473 | 47k Ω B |
| CAPACITOR GROUP | | | |
| C101 | 2533635005 | CC45SL1H221J | Ceramic 220pF 50V |
| C104 | 2533633007 | CC45SL1H181J | 180pF 50V |
| C141,173, 174 | 2531027000 | CK45F1H104Z | 0.1 μ F 50V |
| C145,146 | 2531025002 | CK45F1H223Z | 0.022 μ F 50V Electrolytic |
| C102,103 | 2544147003 | CE04W1H2R2= | 2.2 μ F 50V |
| C105 | 2544009002 | CE04W1A470= | 47 μ F 10V |
| C106,107, 110,143, 172 | 2544146004 | CE04W1H010= | 1 μ F 50V |
| C108,111 | 2544130007 | CE04W1A101= | 100 μ F 10V |
| C171 | 2544172049 | CE04W1H010MF | 1 μ F 50V Film |
| C109,112, 121 | 2551121025 | CQ93M1H103J | 0.01 μ F 50V |
| OTHER PARTS GROUP | | | |
| 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 |
|----------------------------|------------|---------------------|----------------------------|
| SEMICONDUCTOR GROUP | | | |
| 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 | |
| RESISTOR GROUP | | | |
| VR901 | 2118067001 | V1620V30KA103 | VR10kΩA |
| CAPACITOR GROUP | | | |
| 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 |
| OTHER PARTS GROUP | | | |
| 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 | 2050190065 | 6P NH CONNE BASE | |
| 931,951,981 | | | |

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

KU-5540 KEY DISPLAY UNIT

| Ref. No. | Part No. | Part Name | Remarks |
|----------------------------------|------------|------------------|---------|
| SEMICONDUCTOR GROUP | | | |
| IC801 | 2620512002 | HD74LS154P | |
| IC802,804 | 2620516008 | MSL-915RS | |
| IC803 | 2620517007 | MSL-917RS | |
| D801~806 | 2760370007 | 1SS106 | |
| OTHER PARTS GROUP | | | |
| 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 |
|----------------------------|------------|------------------|----------------------|
| SEMICONDUCTOR GROUP | | | |
| IC1 | 2620589006 | LR3712 | |
| IC2 | 2620591007 | HD74HC00P | |
| IC3 | 2620497004 | TC-40H-004P | |
| IC4~8 | 2620592006 | MN6631A | |
| X1 | 2610037005 | CSB455E | |
| CAPACITOR GROUP | | | |
| C1 | 2531027000 | CK45F1H104Z | Ceramic 0.1μF 50V |
| C2,3 | 2533627000 | CC45SL1H101J | 100pF 50V |
| OTHER PARTS GROUP | | | |
| 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 |
|--|------------|----------------|--------------------------------|
| SEMICONDUCTOR GROUP | | | |
| 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 | μ 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 | |
| RESISTOR GROUP | | | |
| R506,507 | 2440034016 | RS14B3A271JNBF | 270 Ω 1W |
| R579,580 | 2442028033 | RS14B2E101JFRF | 100 Ω 1/4W |
| VR501 | EP-5462H1 | SOLID VR (101) | 100 Ω B |
| VR502, 503 | EP-5462H7 | SOLID VR (102) | 1k Ω B |
| CAPACITOR GROUP | | | |
| 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 μ F 50V |
| C601,602 | 2531008003 | CK45B1H472K | 0.0047 μ F 50V |
| C603 | 2531055027 | CK45B1H821K | 820pF 50V |
| C610,611 | 2533613001 | CC45SL1H270J | 27pF 50V |
| C501,503 | 2544027000 | CE04W1E470= | Electrolytic 47 μ F 25V |

| Ref. No. | Part No. | Part Name | Remarks |
|--------------------------|------------|-----------------|-------------------------------|
| C505,507, 622 | 2544131006 | CE04W1A221= | 220 μ F 10V |
| C517,519, 521,523 | 2544201004 | CE04W1E330= | 33 μ F 25V |
| C531,533 | 2544044009 | CE04W1H010= | 1 μ F 50V |
| C535,537, 552,554 | 2544200005 | CE04W1H010=(SL) | 1 μ F 50V |
| C543,560, 580,581 | 2544211007 | CE04W1A101M | 100 μ F 10V |
| C565,598, 617,619 | 2544128006 | CE04W1A220= | 22 μ F 10V |
| C571,573 | 2544080005 | CE04=1E102M | 1000 μ F 25V |
| C575 | 2544201020 | CE04W1E102=(SL) | 1000 μ F 25V |
| C616 | 2544133004 | CE04W1C220= | 22 μ F 16V |
| C620 | 2544129005 | CE04W1A470= | 47 μ F 10V Film |
| C526,547 | 2551120026 | CQ93M1H152J | 0.0015 μ F 50V |
| C539,556 | 2556161019 | CQ09S1H470J | 47pF 50V |
| C542,559 | 2556103006 | CQ09S1H152J | 0.0015 μ F 50V |
| C582,583 | 2556111001 | CQ09S1H332J | 0.0033 μ F 50V |
| C584,585 | 2554193005 | CQ93P1H104J | 0.1 μ F 50V |
| C593,594 | 2551122040 | CQ93M1H104J | 0.1 μ F 50V |
| C595,600 | 2551120042 | CQ93M1H222J | 0.0022 μ F 50V |
| C596,599 | 2551121067 | CQ93M1H223J | 0.022 μ F 50V |
| C651 | 2551123010 | CQ93M1H394J | 0.39 μ F 50V Metalized |
| C586,587 | 2561026000 | CF93A2B105K | 1 μ F 125V |
| OTHER PARTS GROUP | | | |
| 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 Δ 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 | |

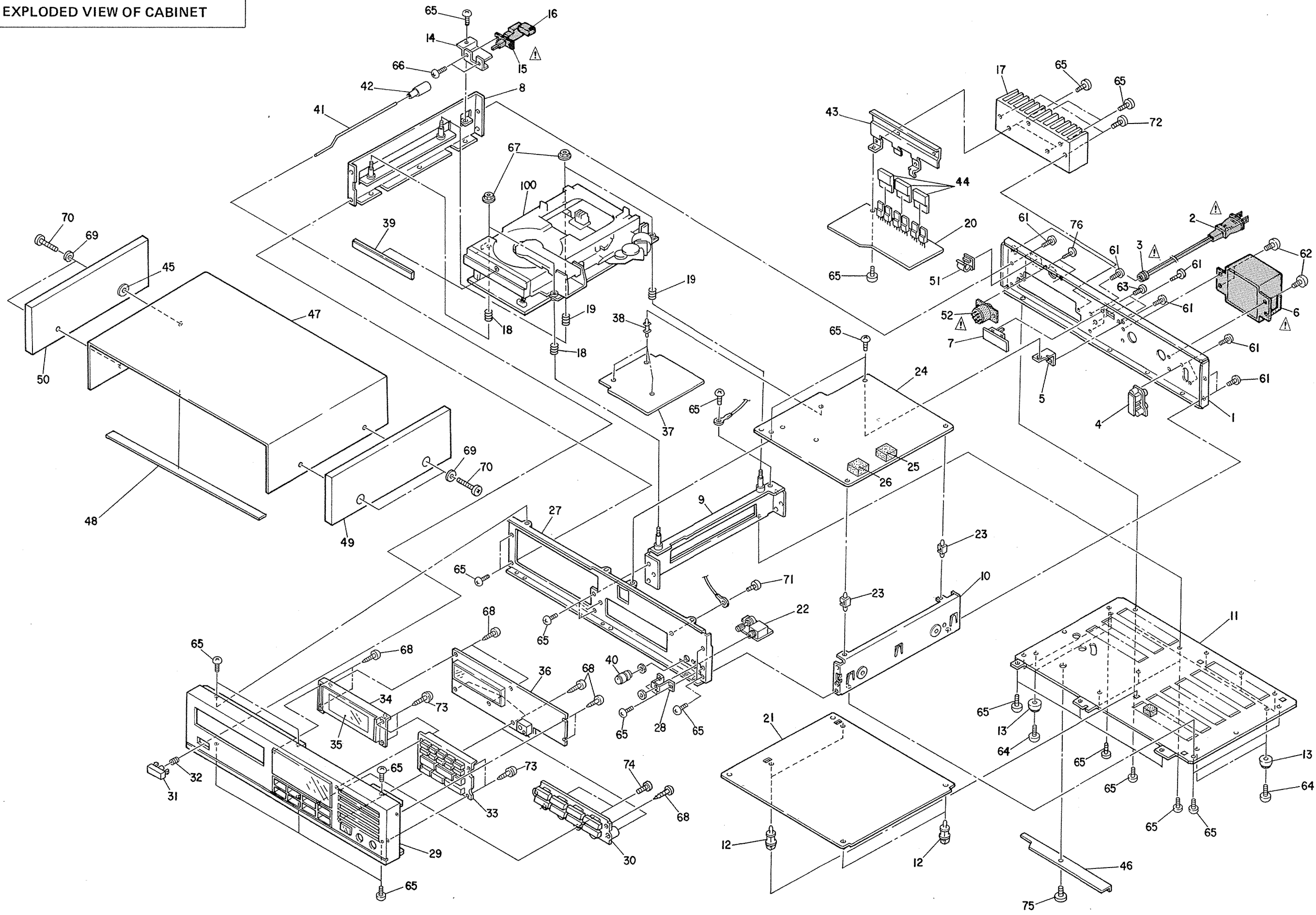
Remarks symbols in the parts list refer to the following countries and areas.

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

WARNING:

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

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) | |

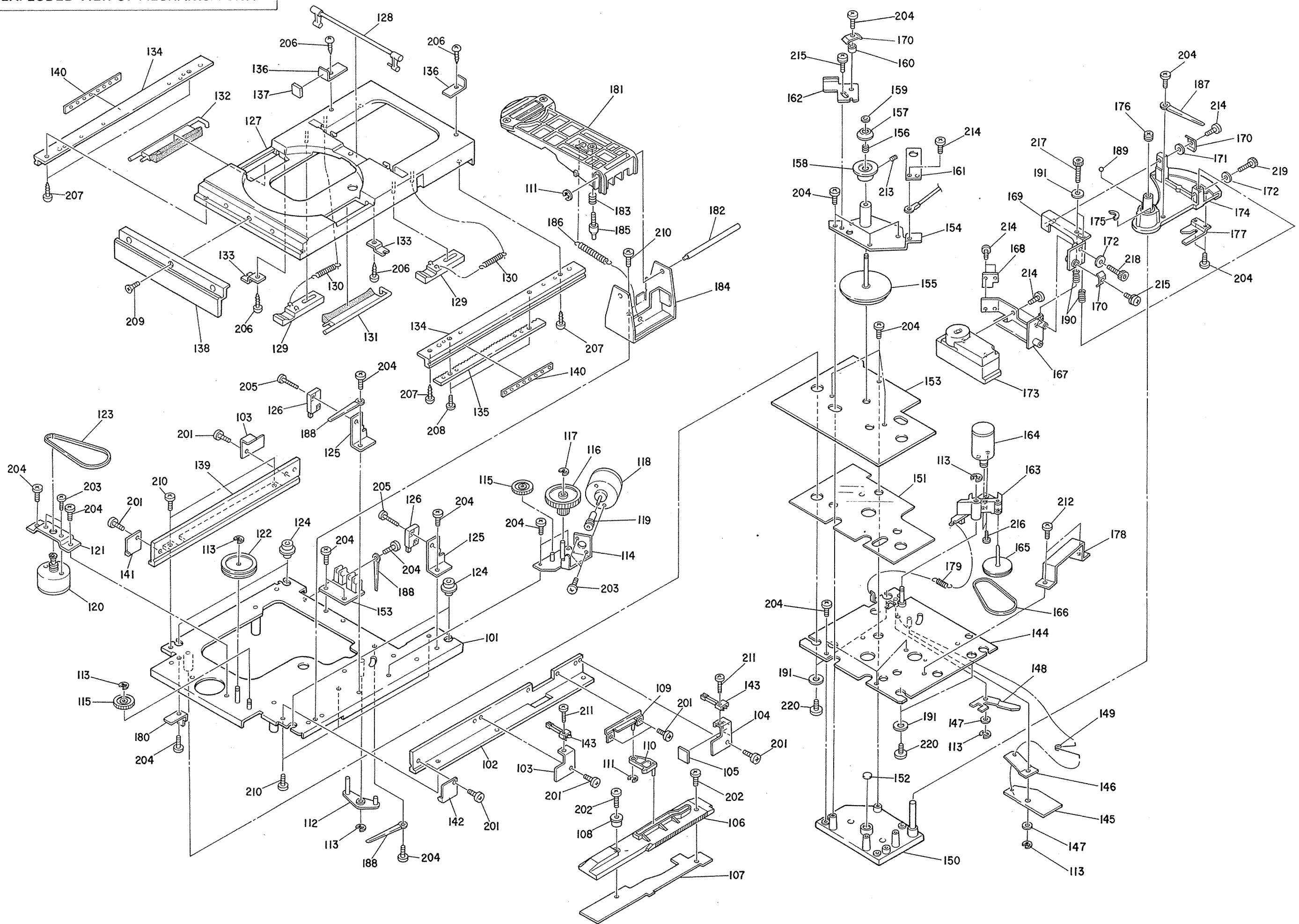
PACKING & ACCESSORIES GROUP

| 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 | | | | | |

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

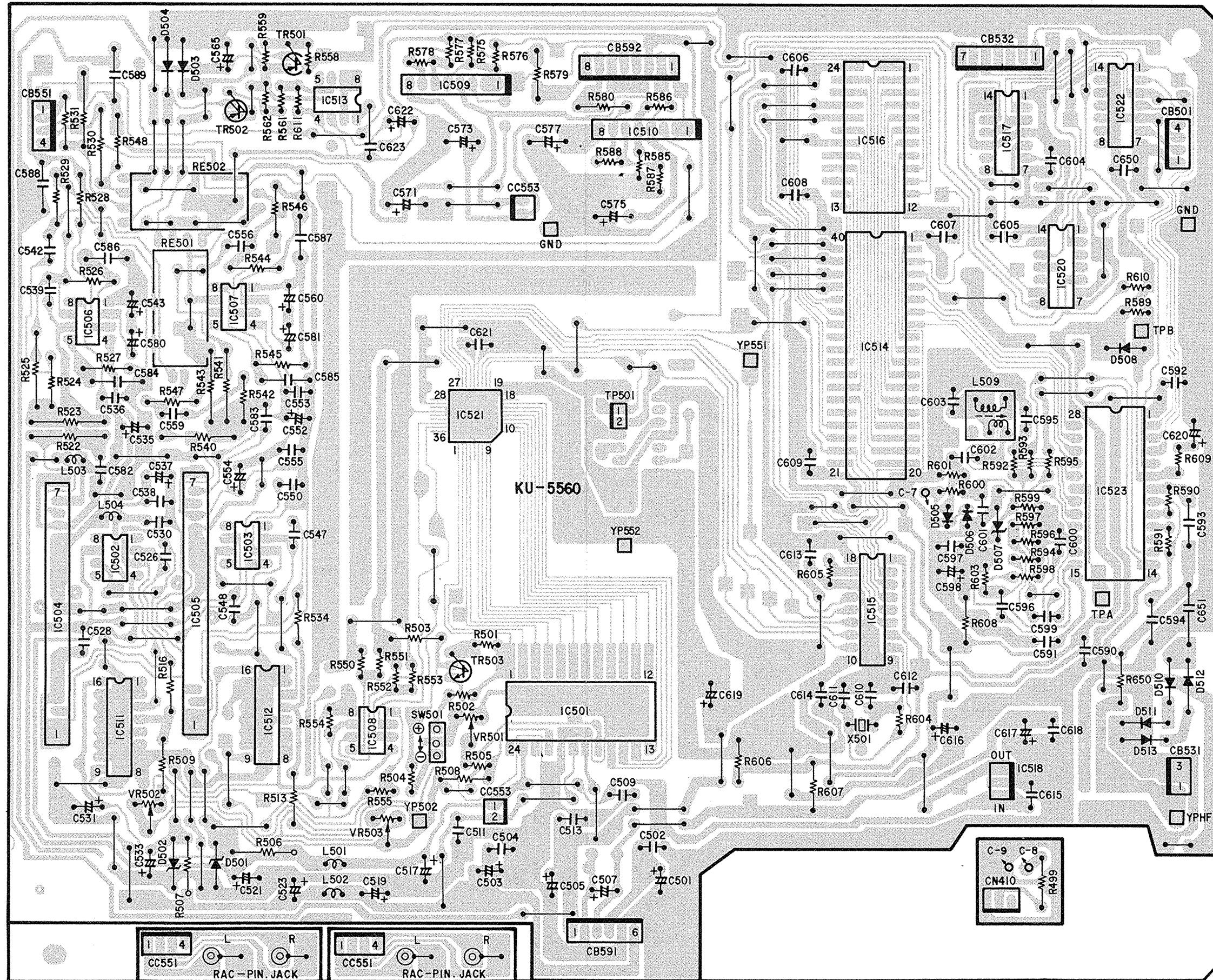
- EA: Australia
- E1: Multiple voltage model
- E2: European continent
- E3: North America

EXPLODED VIEW OF MECHANISM UNIT

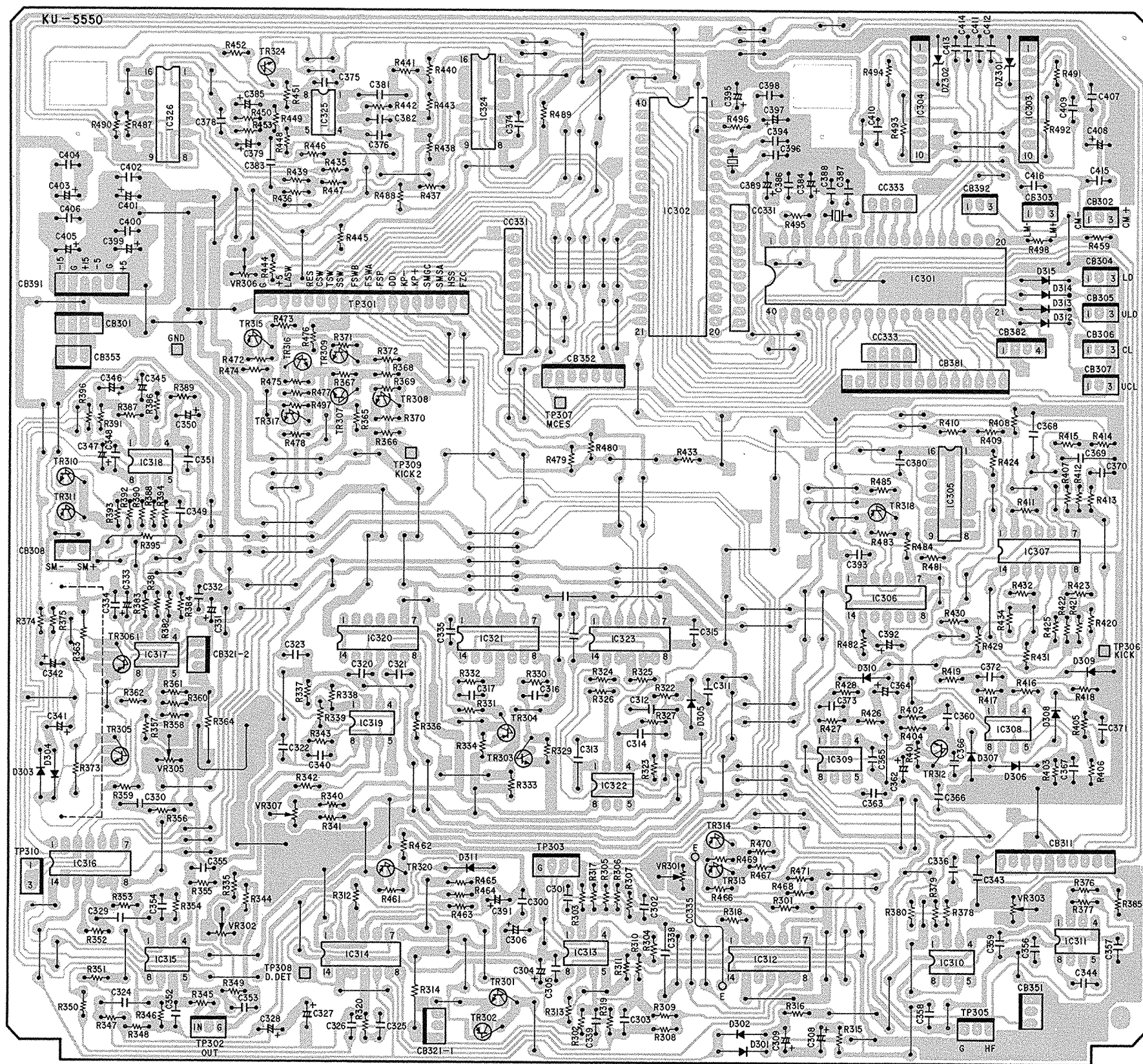


P.W. BOARD

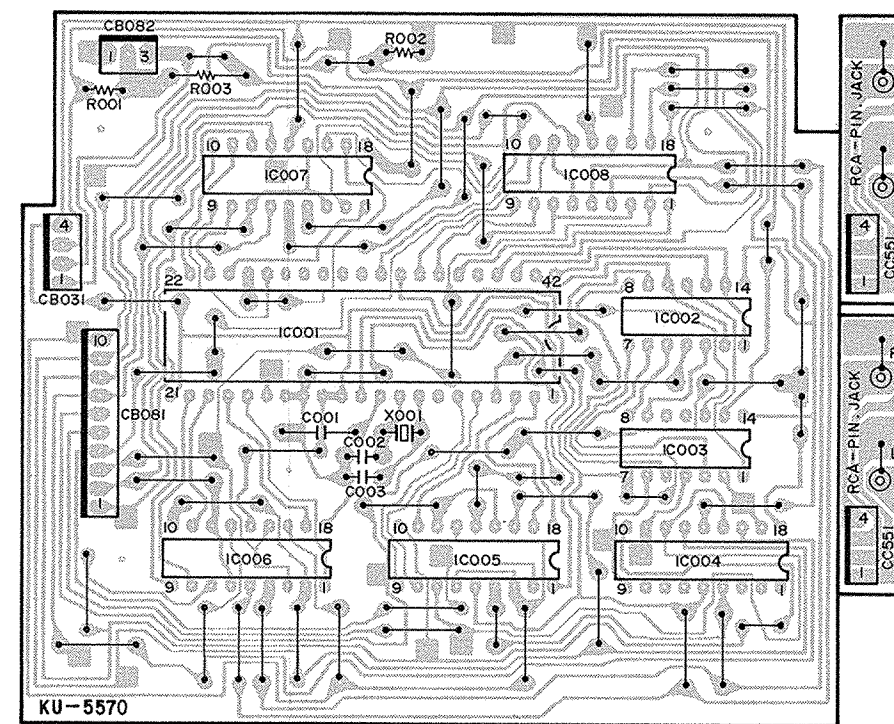
KU-5560 SIG. PROCESSING AUDIO UNIT



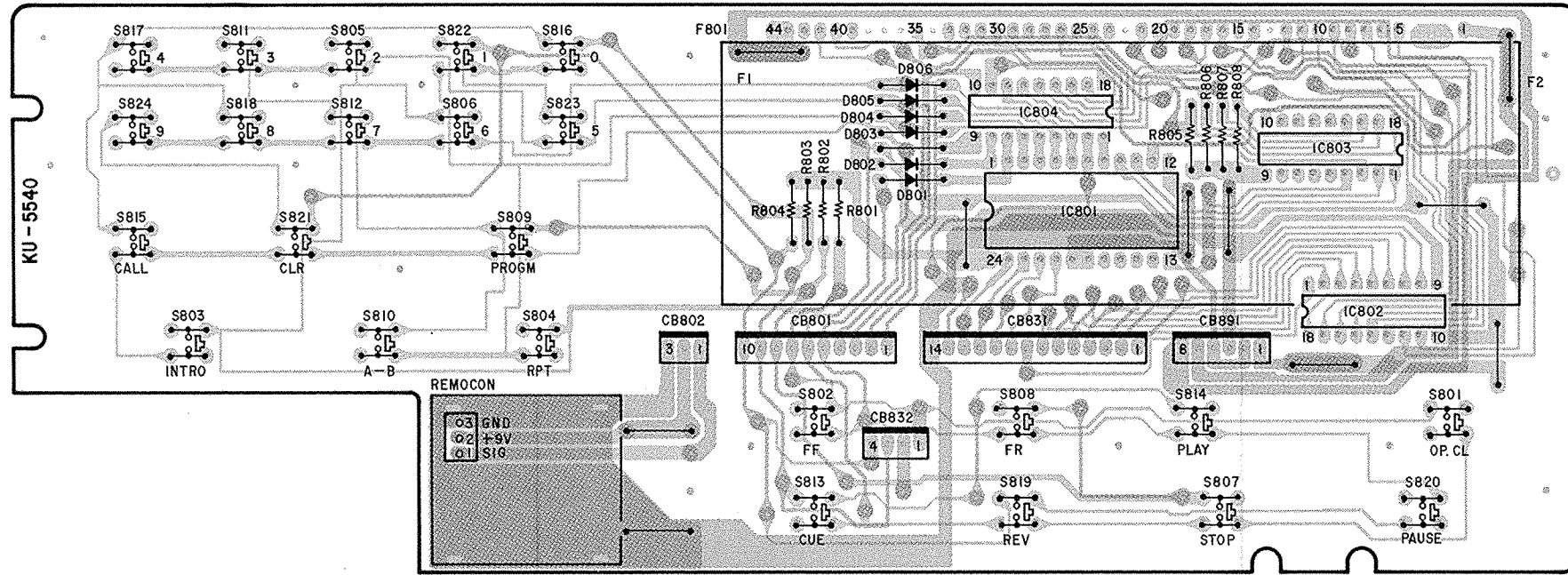
KU-5550 SERVO UNIT



KU-5570 REMOCON DEC. UNIT

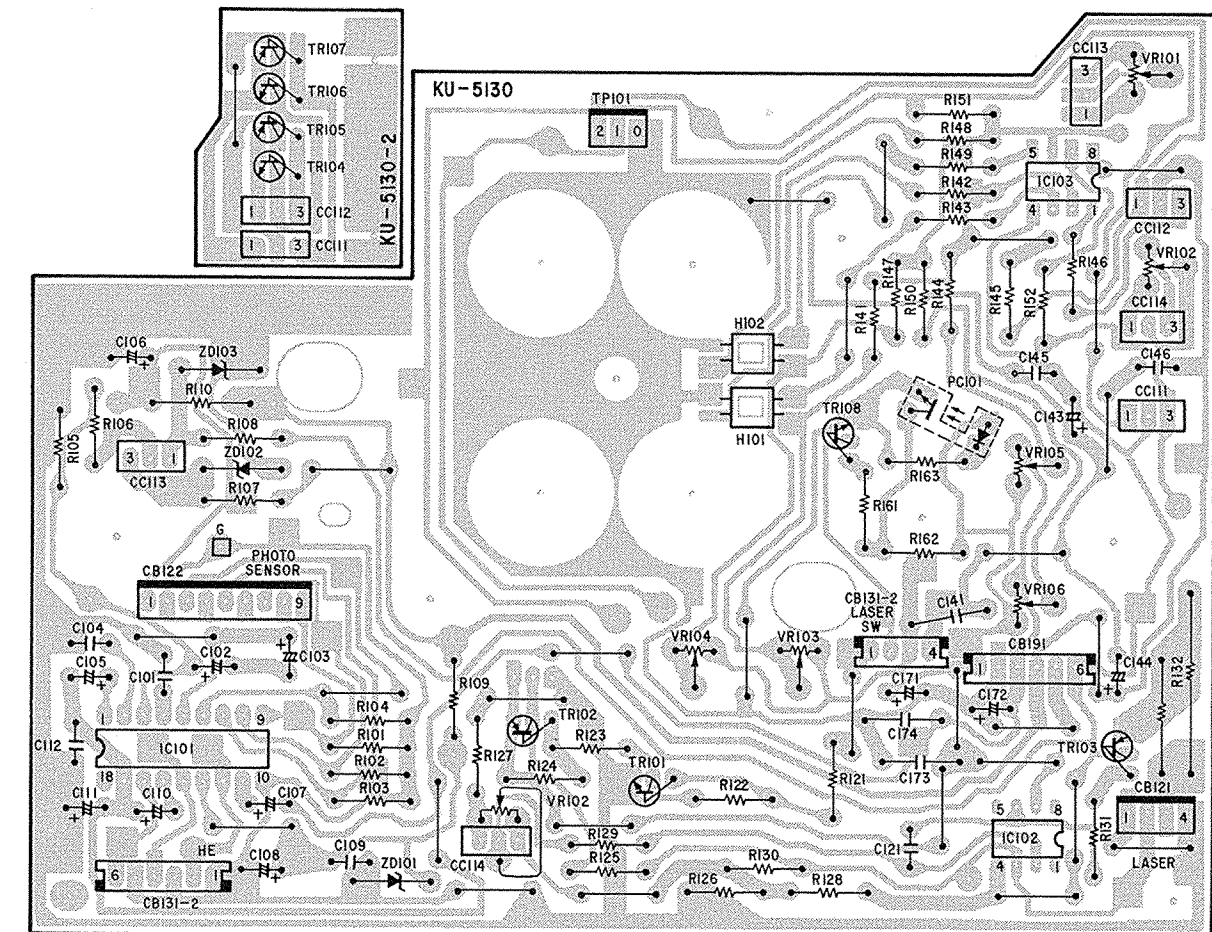
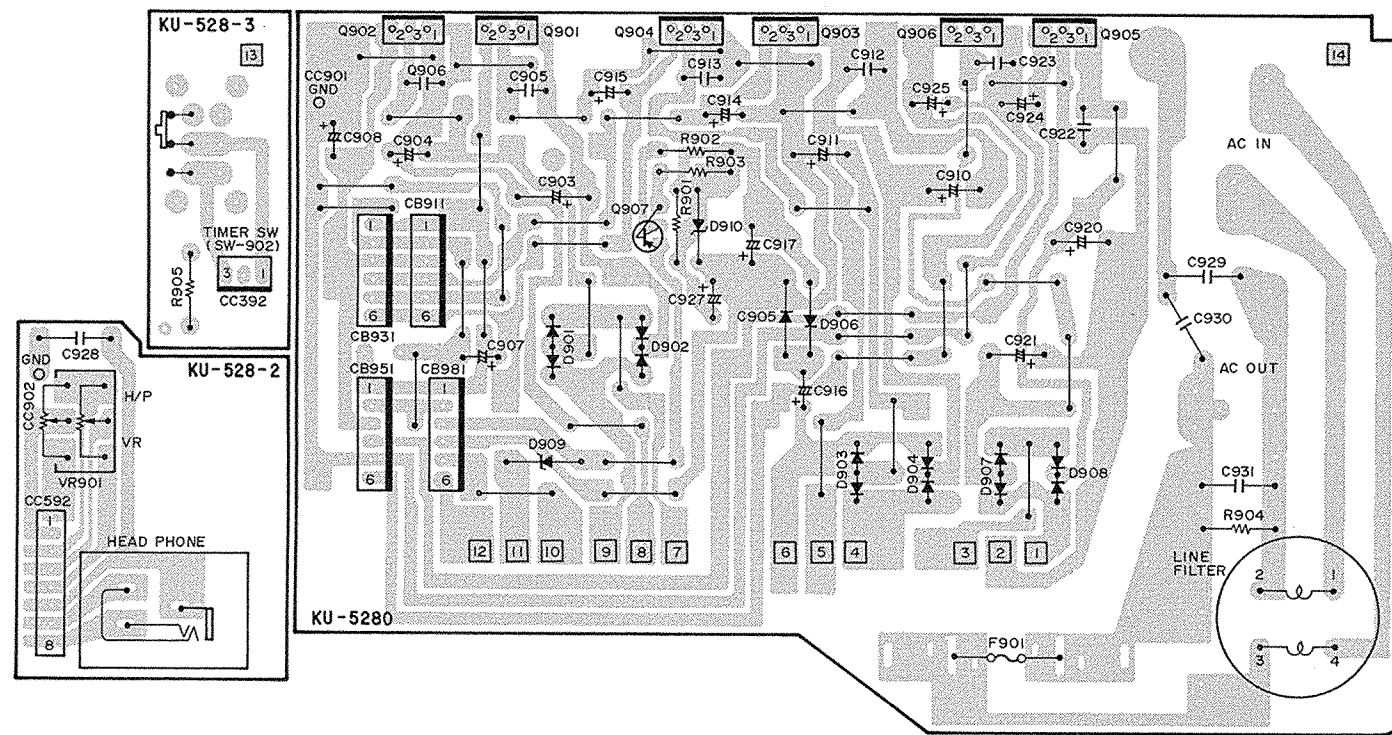


KU-5540 KEY DISPLAY UNIT



KU-5130 MOTOR & LASER UNIT

KU-5281/5282/5283 POWER SOURCE UNIT

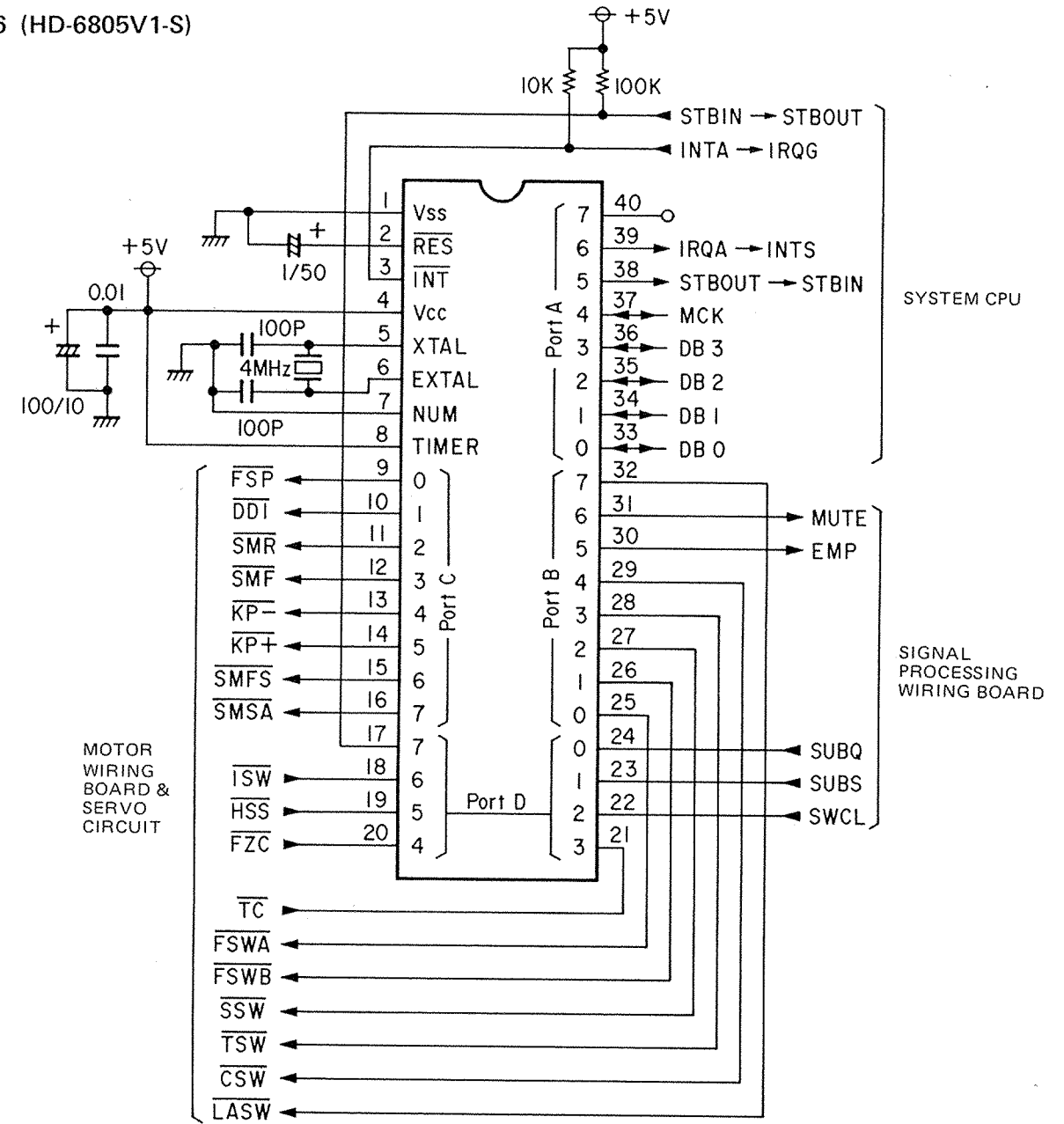


FUNCTION TABLE OF CPU TERMINAL

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 | | | |

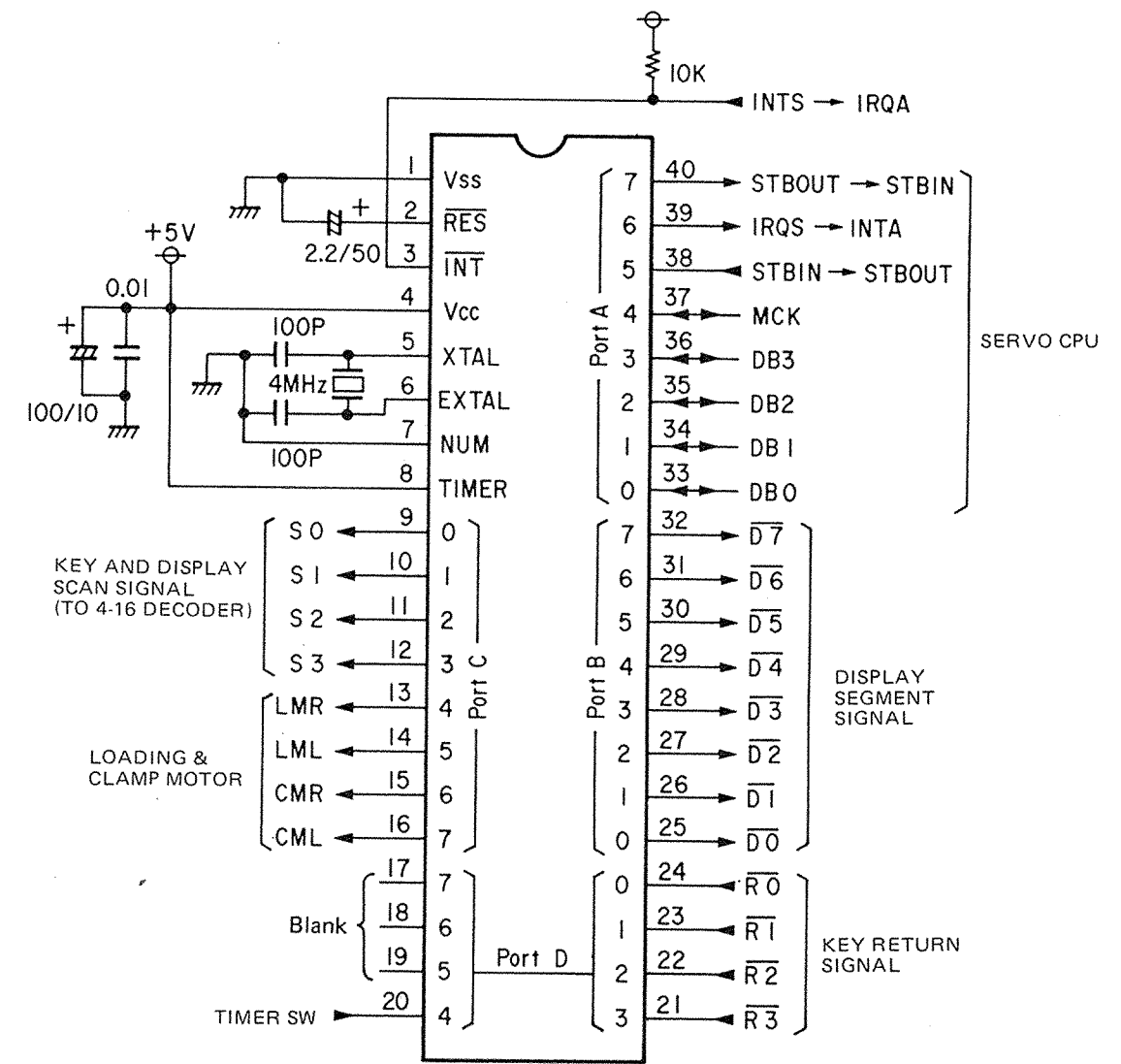
SERVO CPU
IC-16 (HD-6805V1-S)



SYSTEM CPU IC801 (HD-6805V1-M)

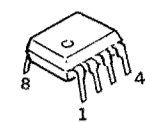
| PIN NO. | PORT | SYMBOL | IN/OUT | FUNCTION |
|---------|------|--------|--------|----------------------------|
| 1 | | Vss | | Power source ground |
| 2 | | RES | | Reset |
| 3 | | INT | | EXTERNAL INTERRUPT |
| 4 | | Vcc | | Power source positive |
| 5 | | XTAL | IN | Crystal oscillator |
| 6 | | 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)

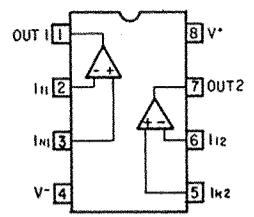


SEMICONDUCTORS

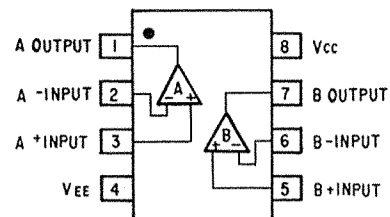
IC



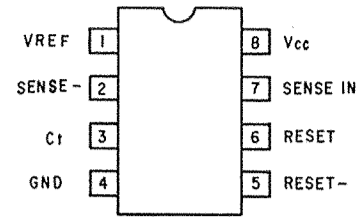
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TL082-CP
NE5534N
NJM-4560D
HA17903PS
TL081-CP
LF356N



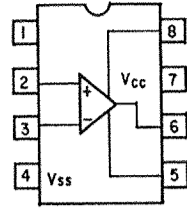
μPC4559-C
TL082-CP



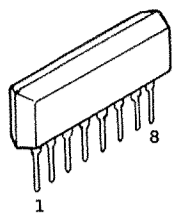
NJM-4560D
HA17903PS



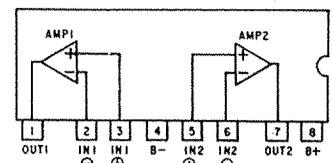
TL7705CP-B



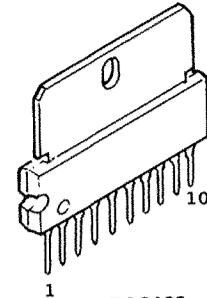
TL081-CP
LF356N
NE5534N



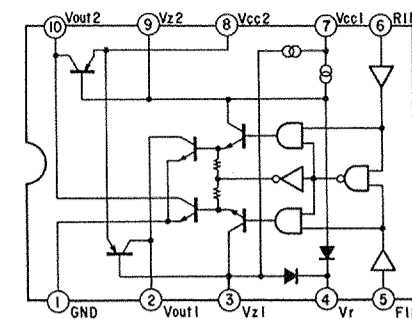
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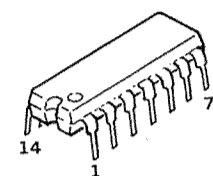
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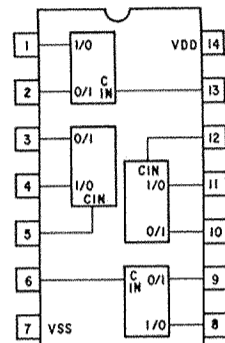
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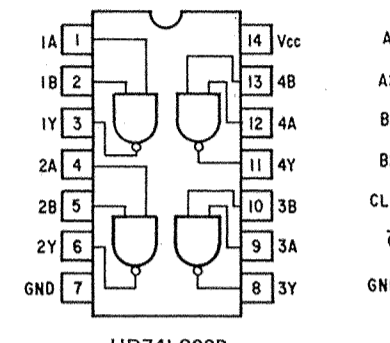
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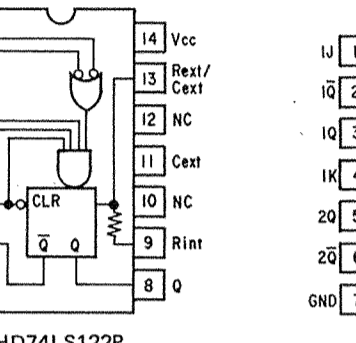
TC4066BP
HD74LS00P
HD74LS122P
TC40H-004P
HA17901P
HD74LS04P
HD74LS74AP
HD74LS107AP
HD14011BP
HD74HC00P



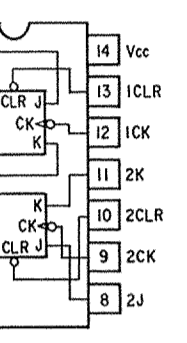
TC4066BP



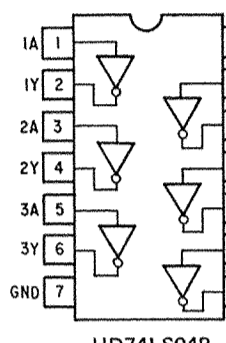
HD74LS00P
HD74HC00P



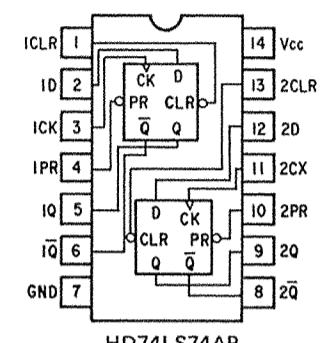
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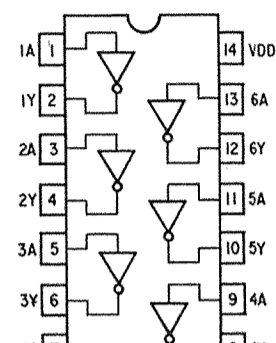
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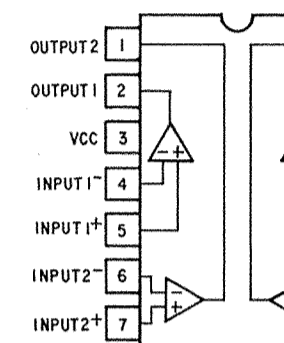
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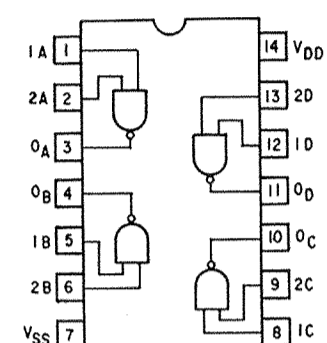
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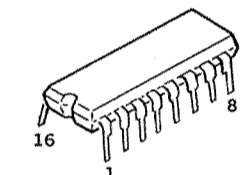
TC40H-004P



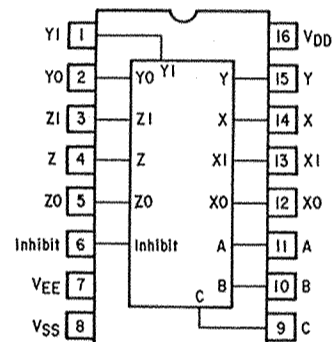
HA17901P



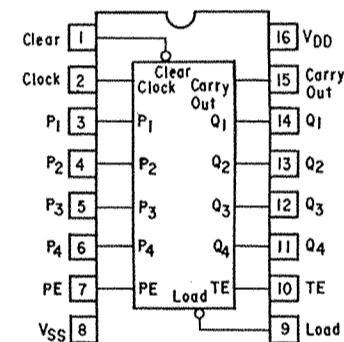
HD14011BP



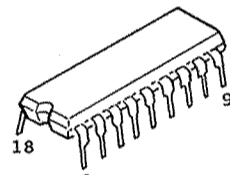
HD14053BP
HD14161BP



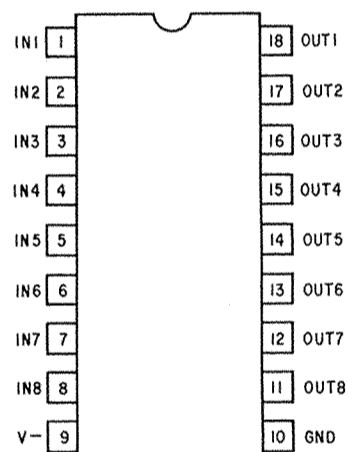
HD14053BP



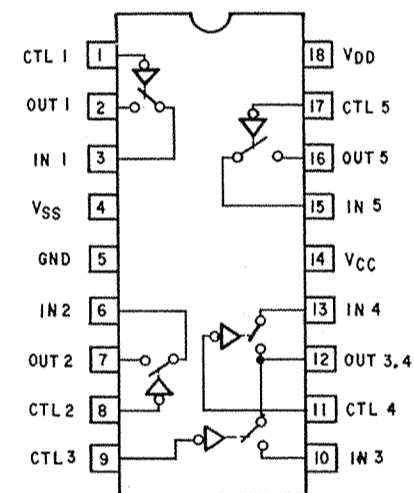
HD14161BP



SAA-7000 (M4300)
MSL915RS
MSL917RS
MN6631A

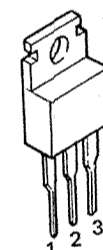


MSL915RS
MSL917RS



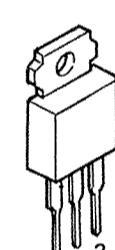
MN6631A

TRANSISTORS



1: INPUT
2: COMMON
3: OUTPUT

HA178-05
HA178-15



1: GND
2: OUTPUT
3: INPUT

μPC7905H
μPC7915H



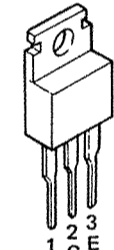
1 2 3
E C B

2SA781K
2SA1015Y
2SC1815Y



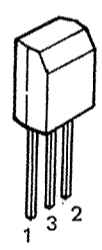
1 2 3
E C B

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



1 2 3
B C E

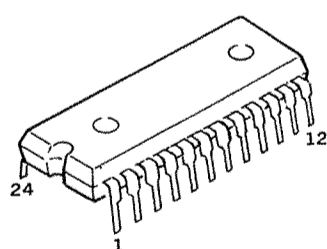
2SA816Y
2SC1626Y
2SB711
2SD721



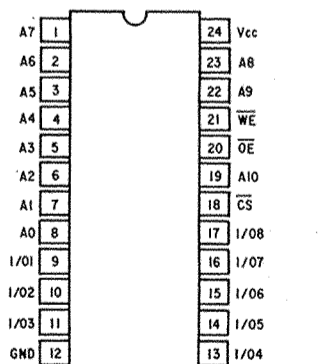
1 3 2

1: INPUT
2: OUTPUT
3: GND

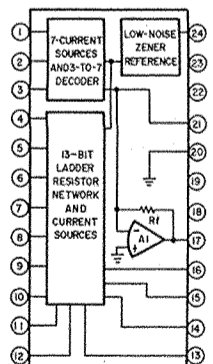
μPC78L12H



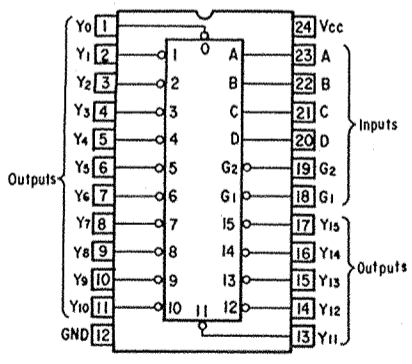
HM6116P-4
PCM53JP-V
HD74LS154P



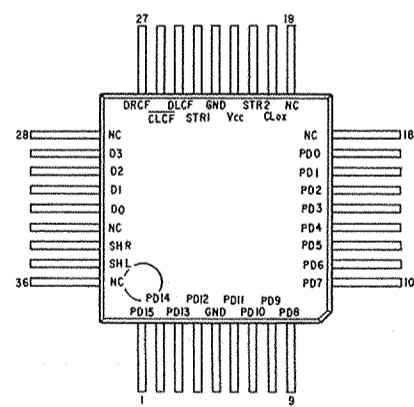
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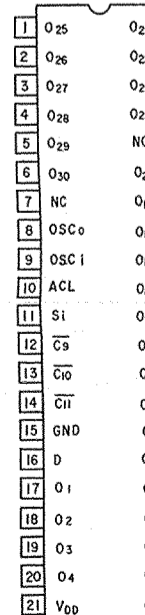
PCM53JP-V



HD74LS154P

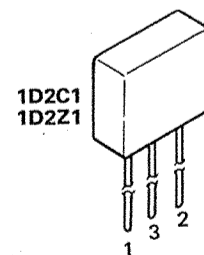


LZ91B14



LR3712

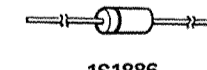
DIODES



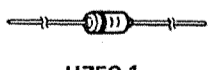
1D2C1
1D2Z1



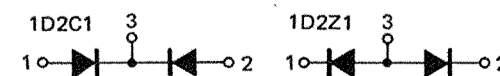
SVC321SP-D2



1S1886

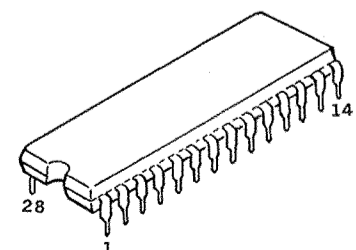


HZ5C-1
HZ6C-2
HZ7B
HZ9A-2
HZ12C-2
HZ27-3
1SS106
1S2076
HZ6B-1

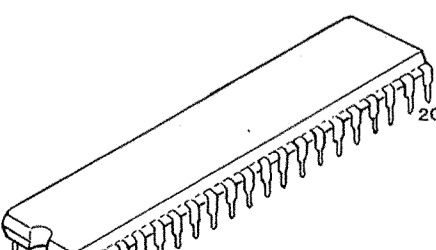


1D2C1

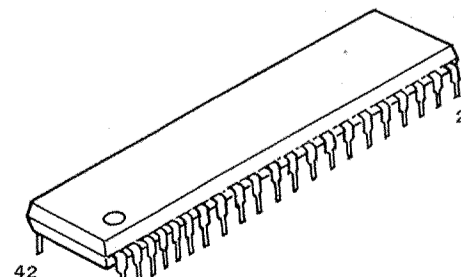
1D2Z1



SAA7011 (M4290A)

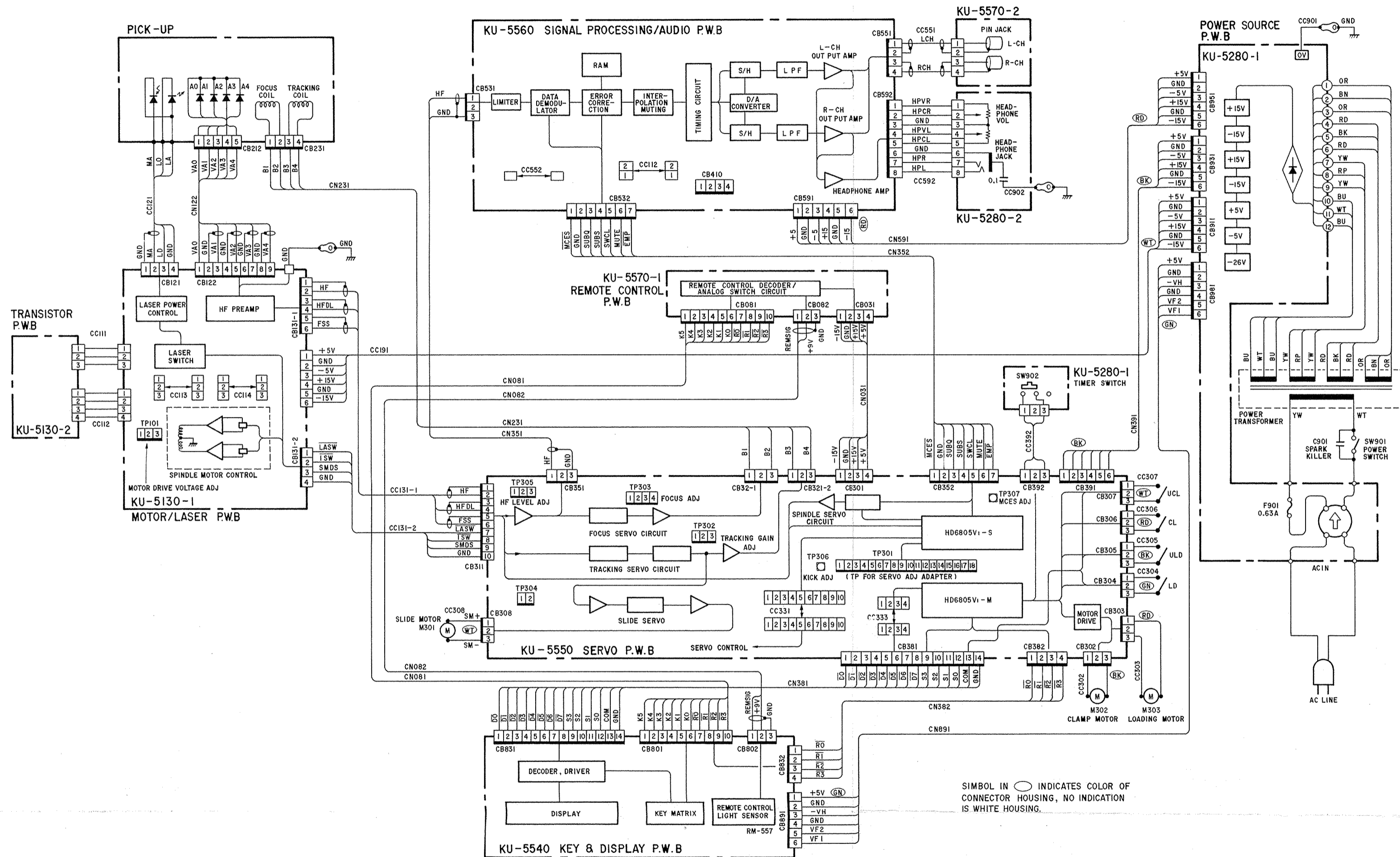


HD6805V1
SAA7020 (M4281)

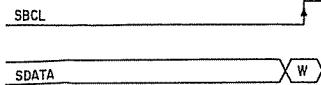
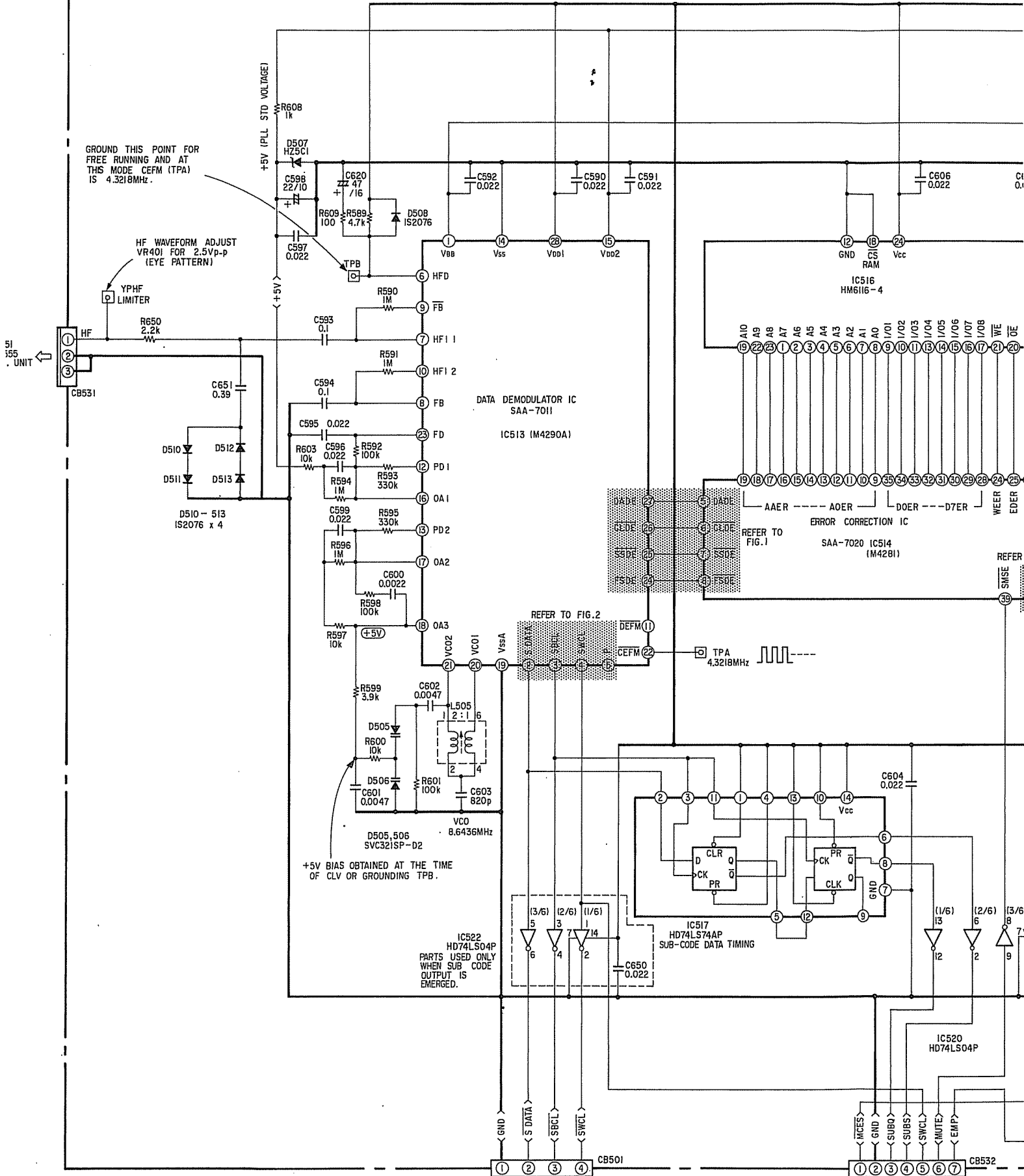


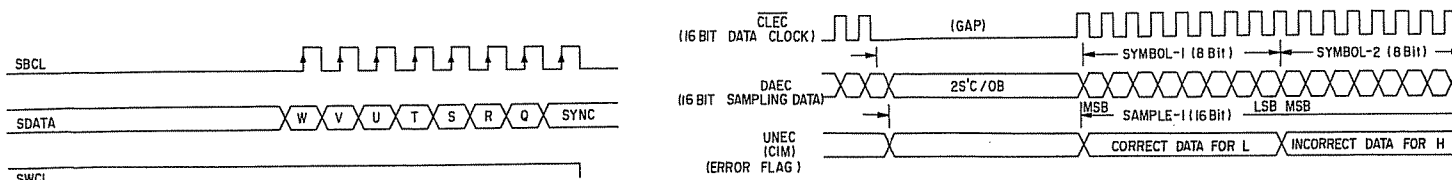
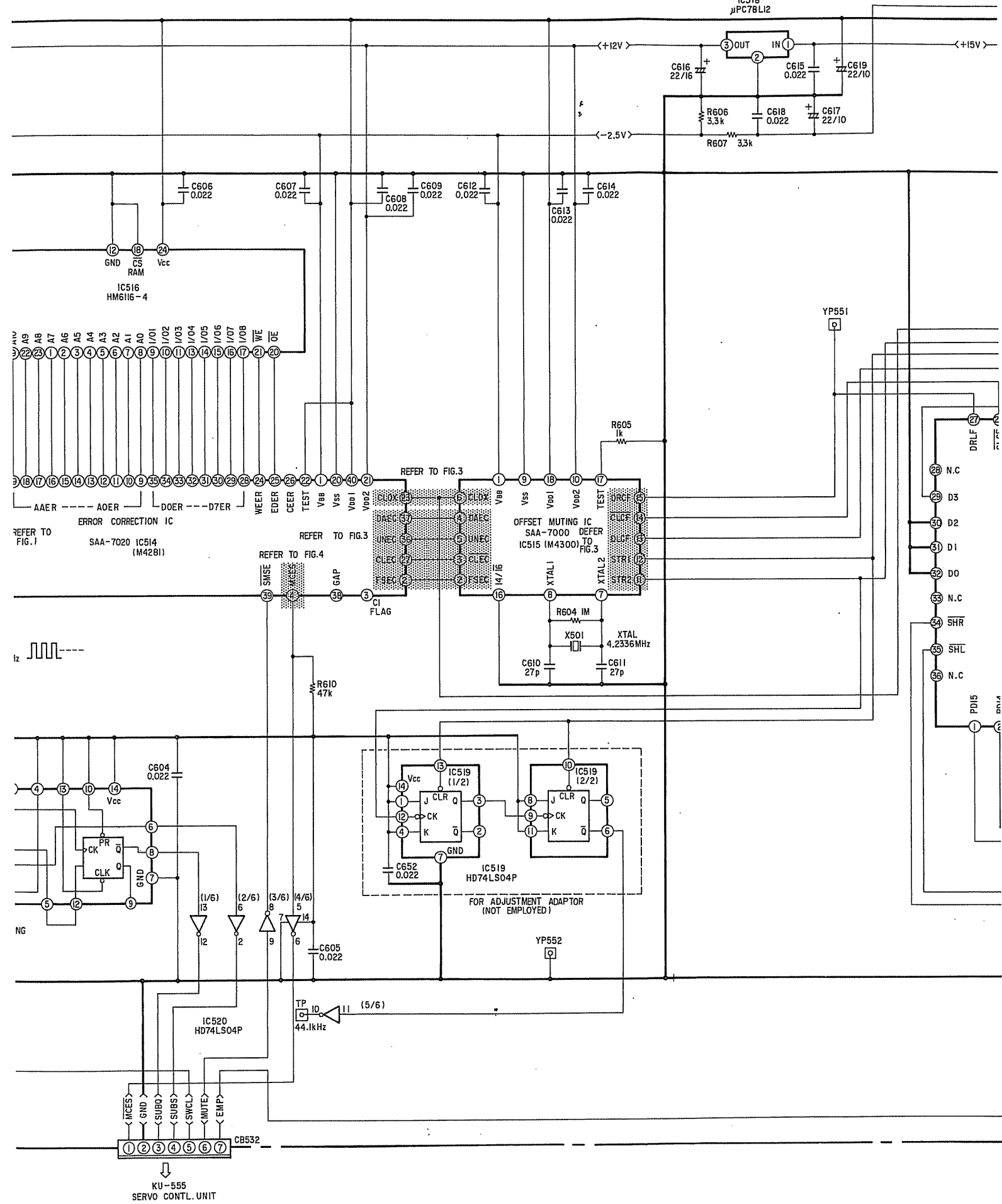
LR3712

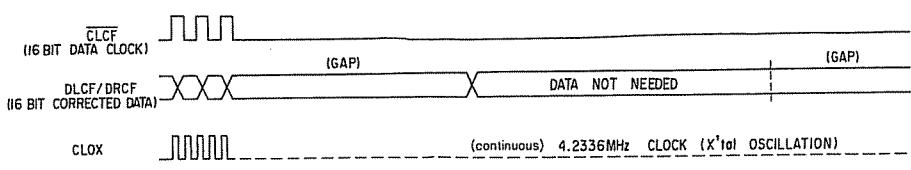
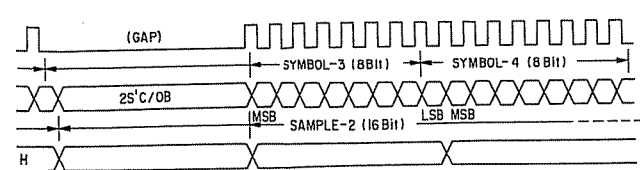
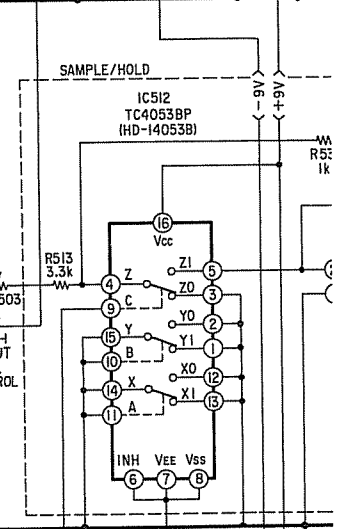
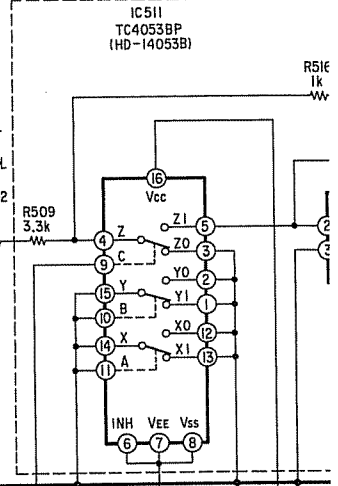
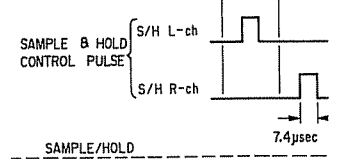
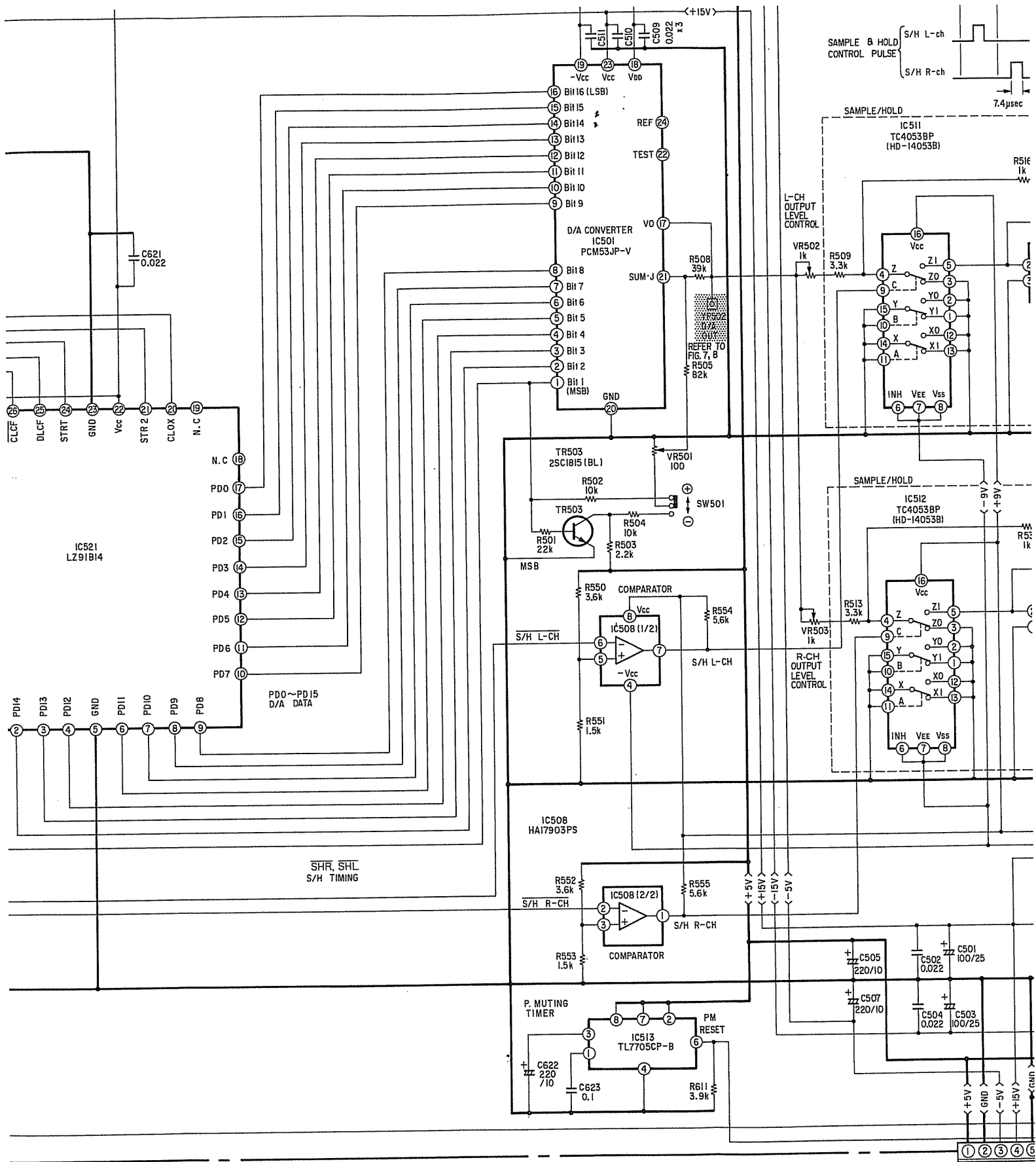
WIRING DIAGRAM

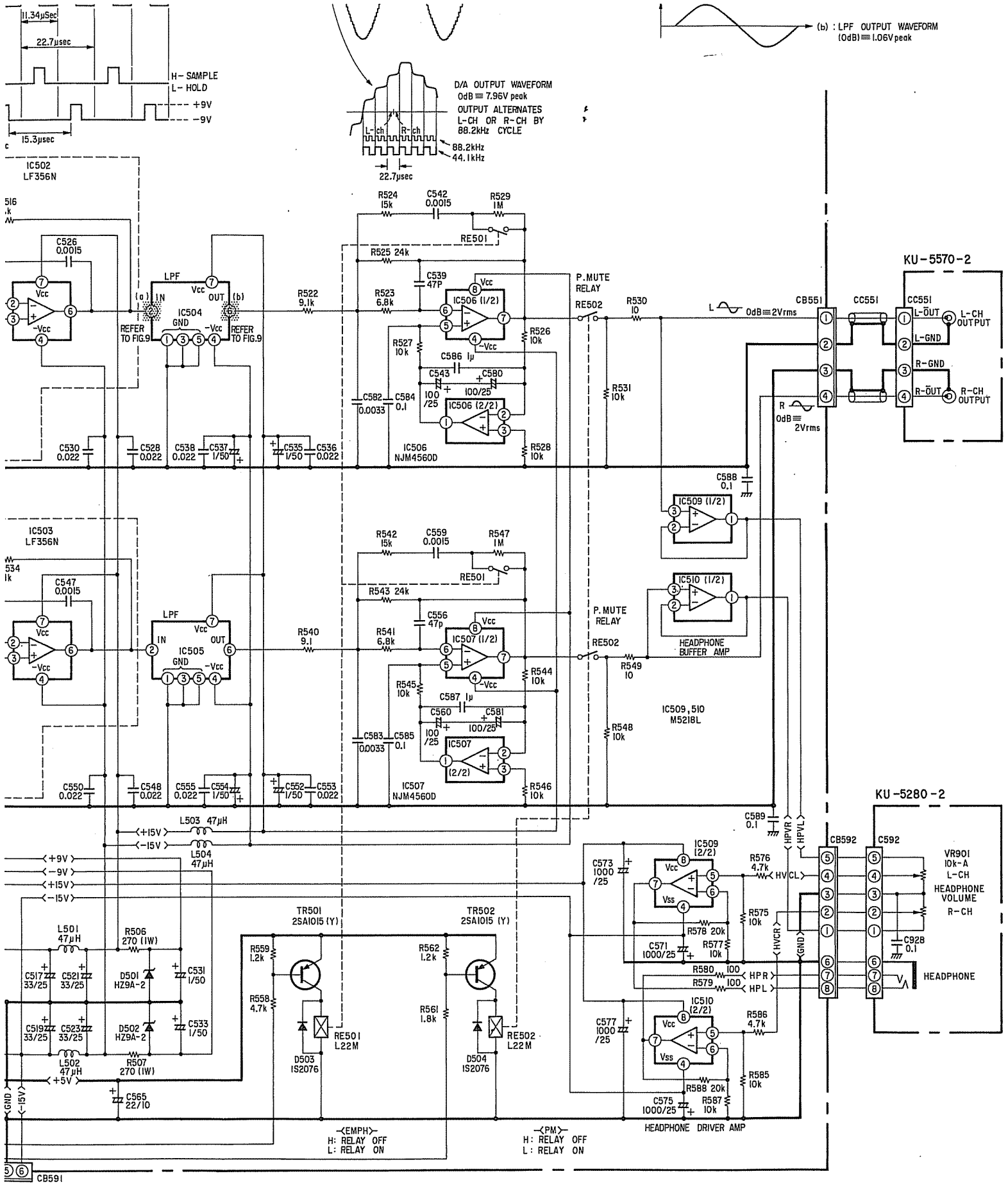


KU-5560 SIGNAL PROCESSING UNIT

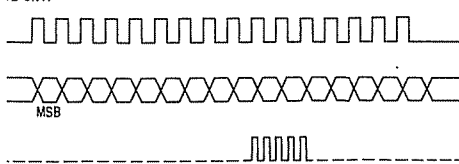






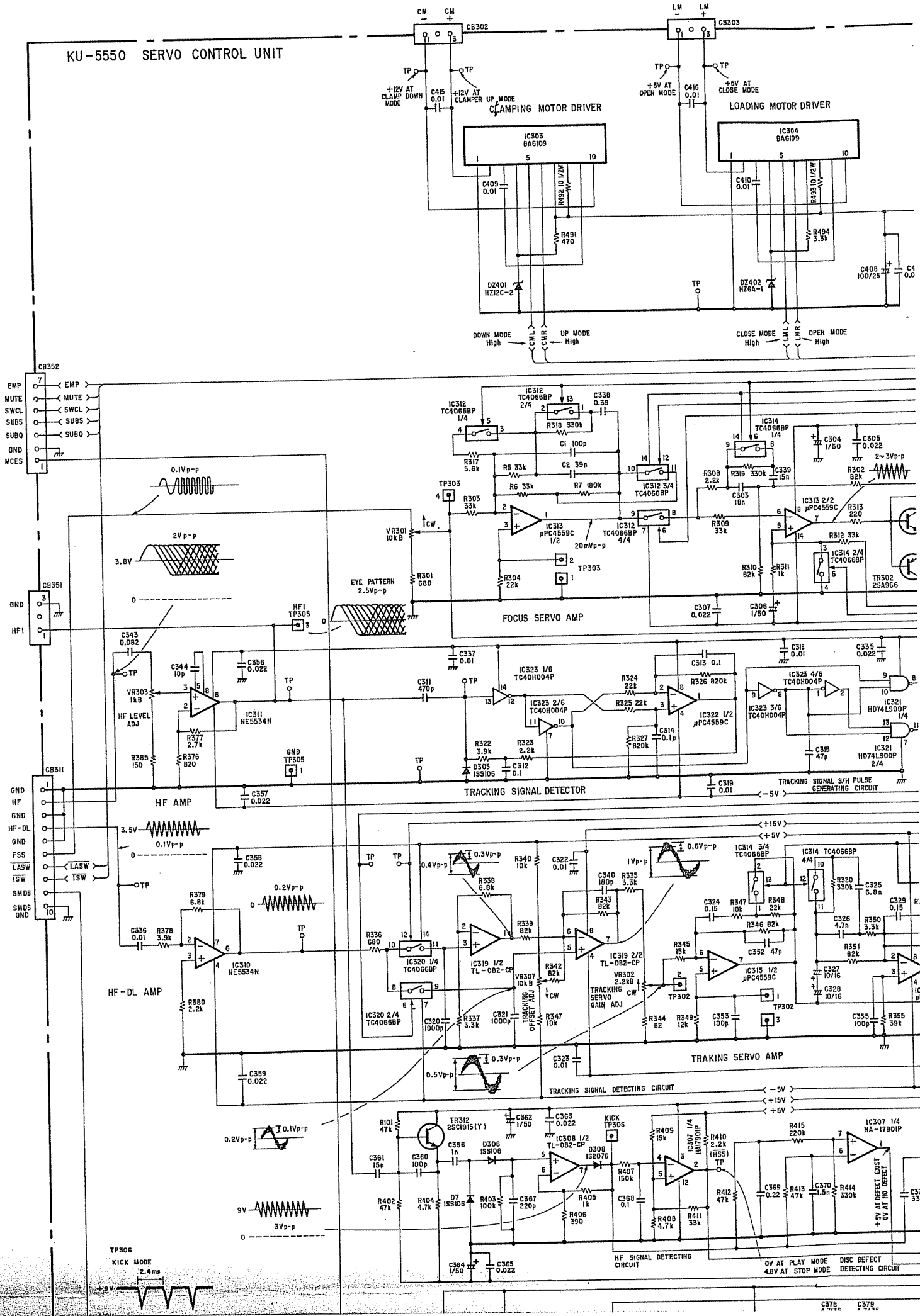


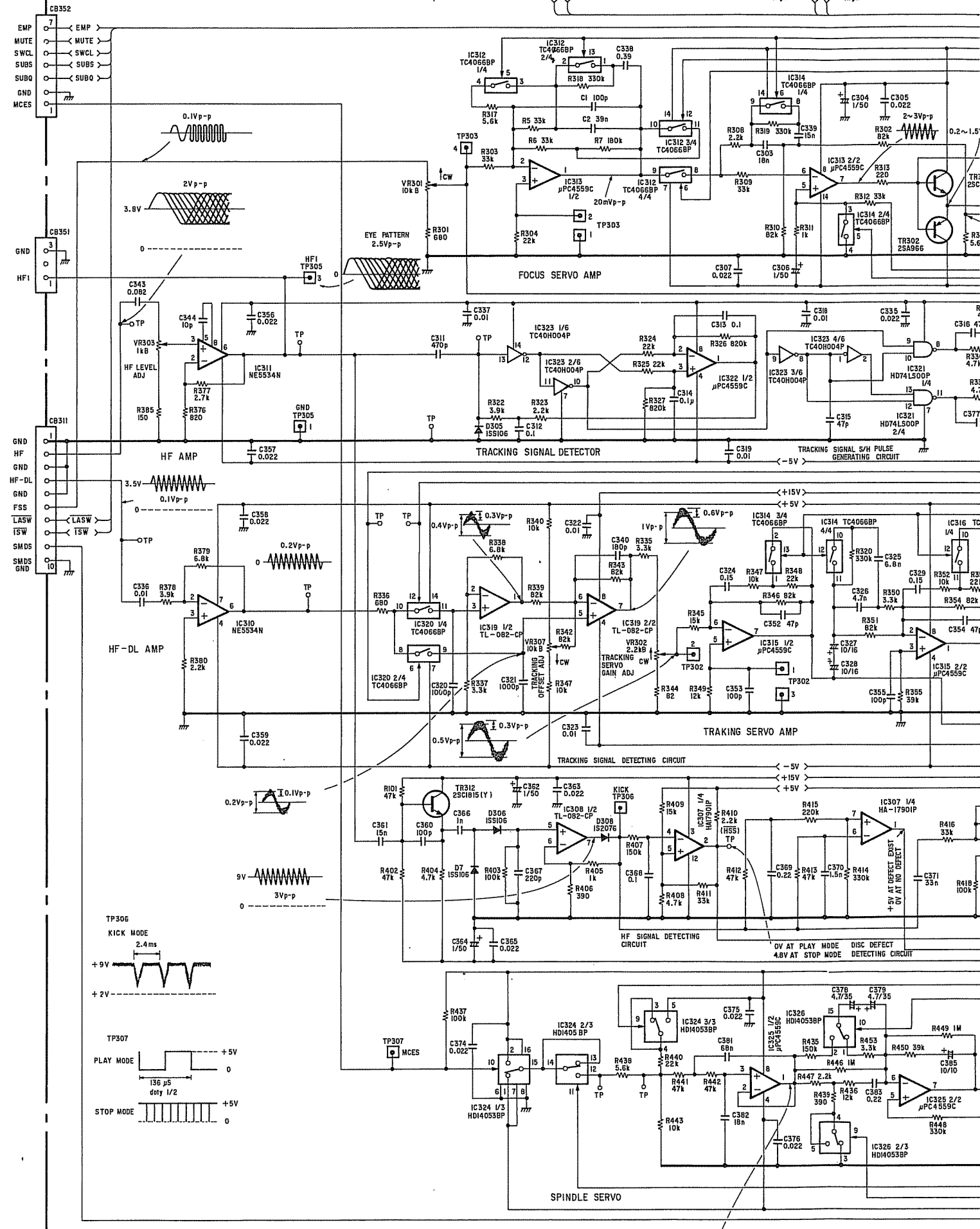
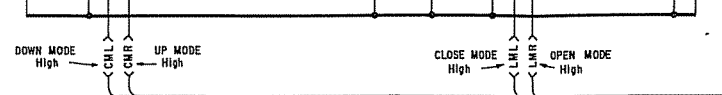
IE UNIT



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

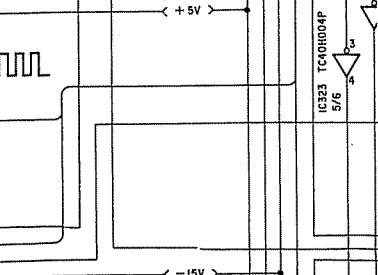
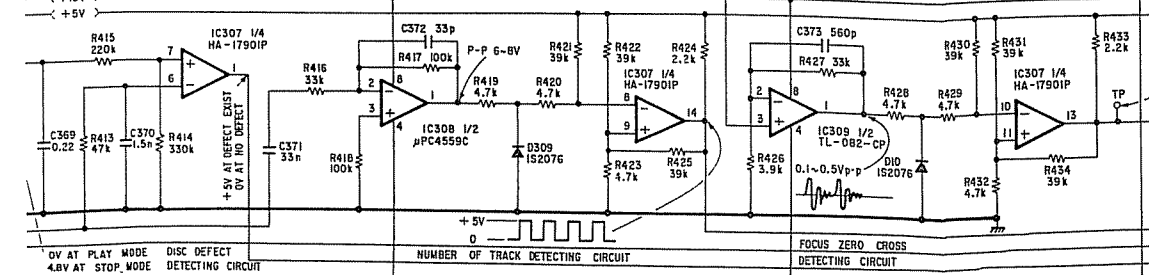
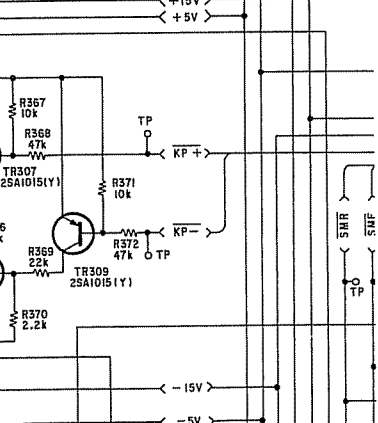
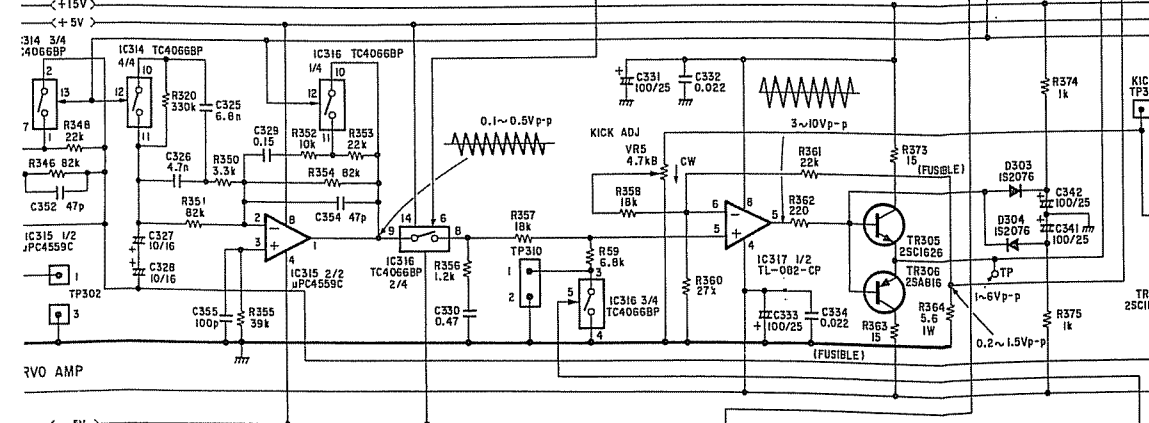
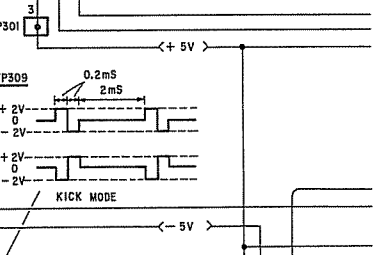
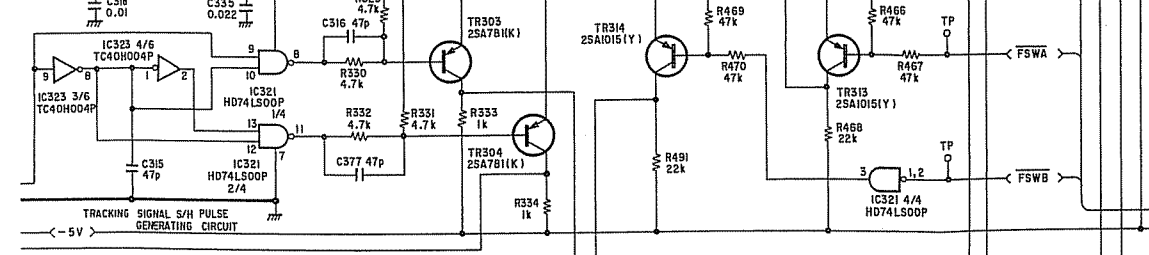
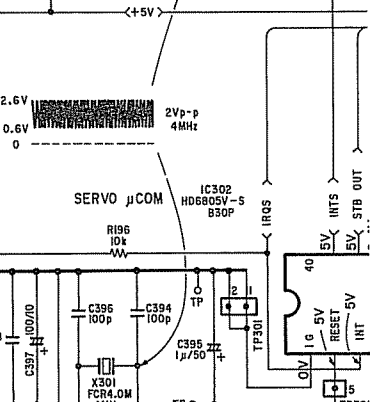
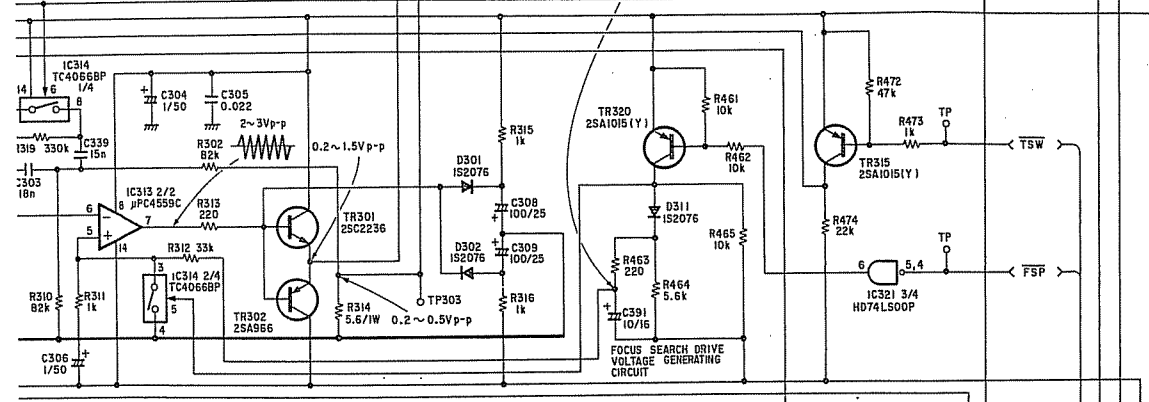
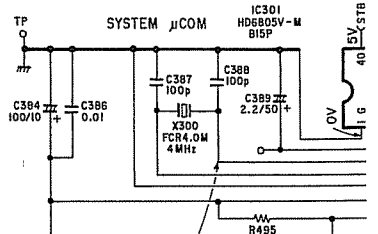
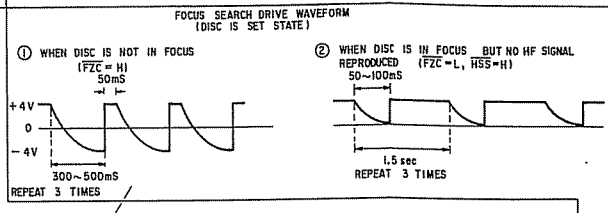
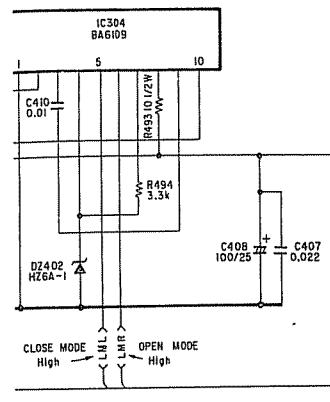
KU-5550 SERVO CONTROL UNIT



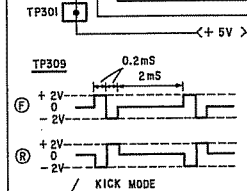
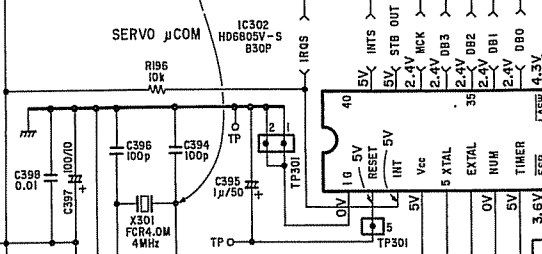
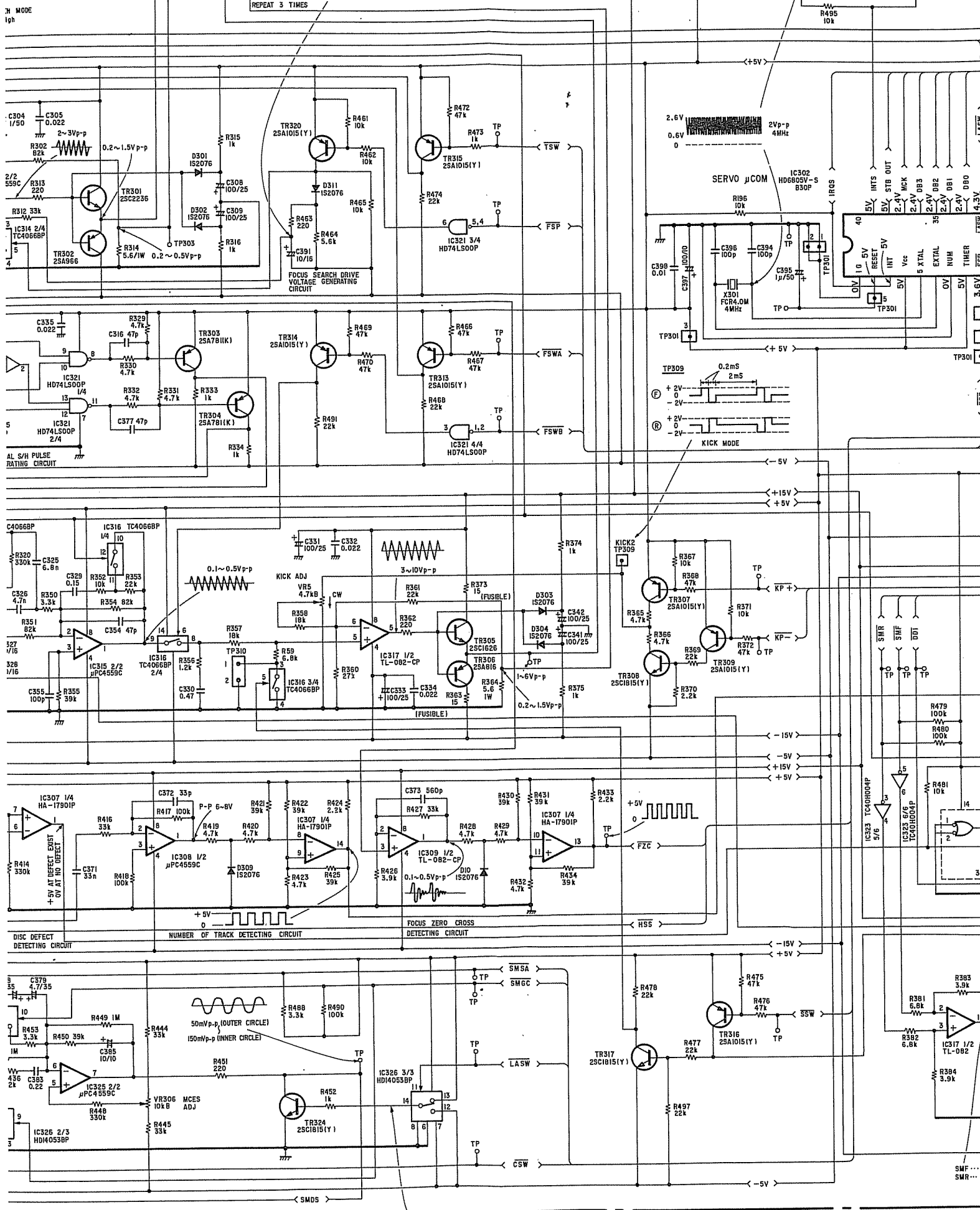


0.2Vp-p (OUTER CIRCLE)
1.5Vp-p (INNER CIRCLE)

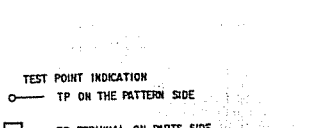
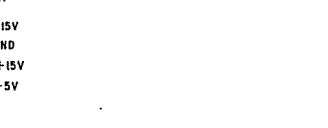
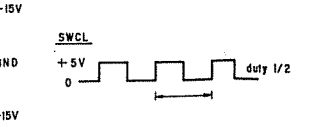
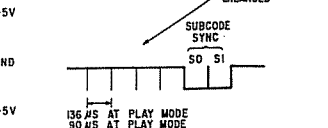
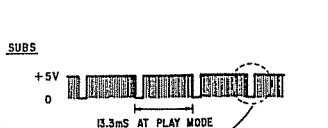
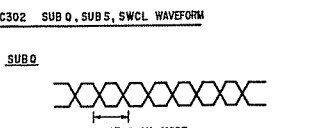
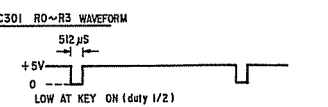
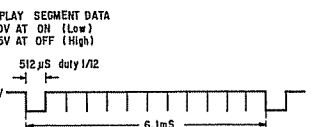
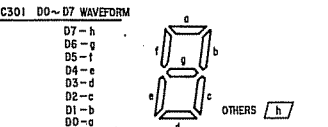
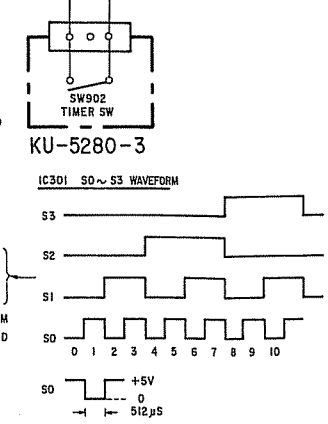
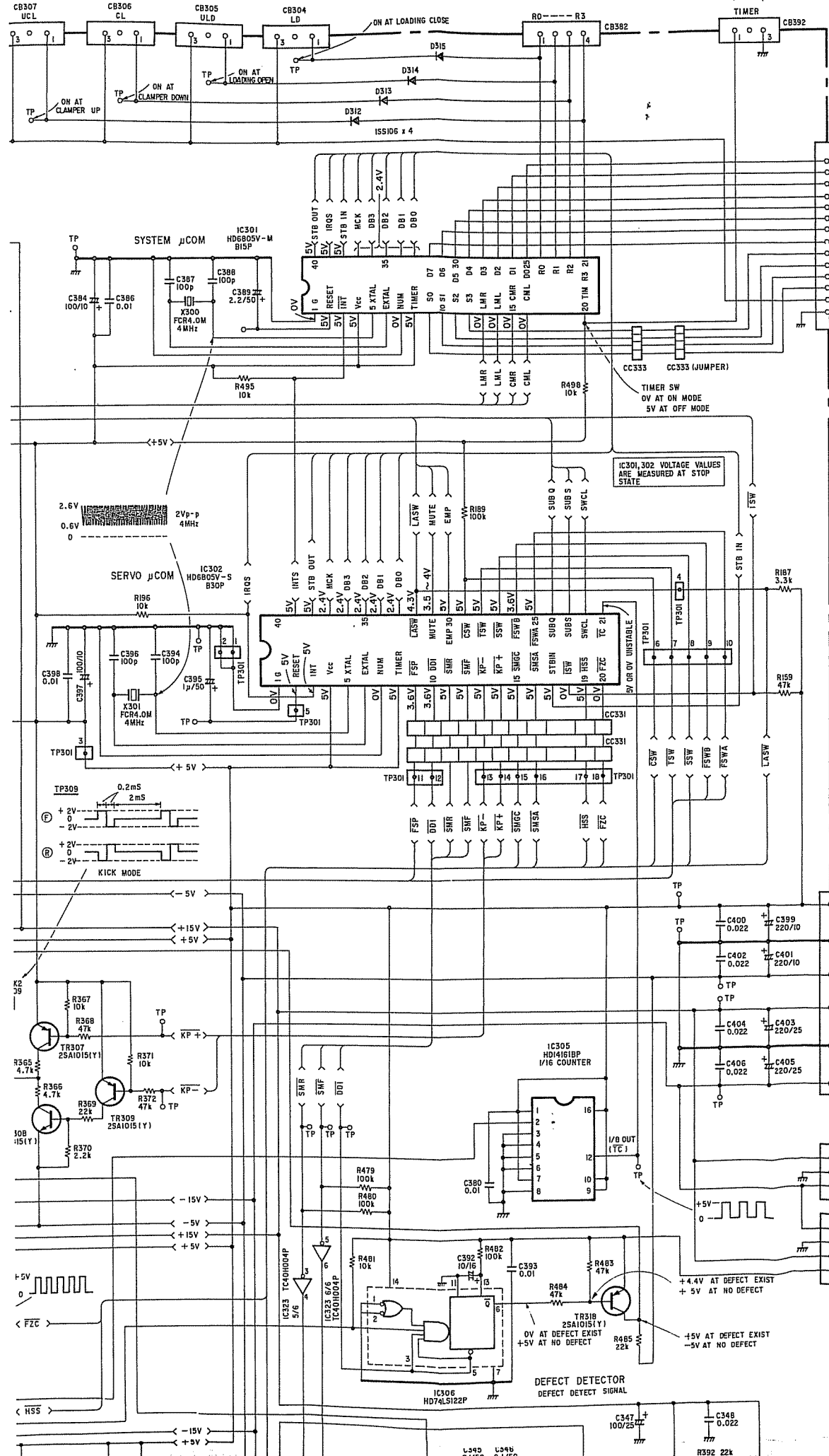
LOADING MOTOR DRIVER



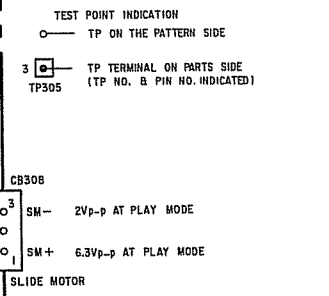
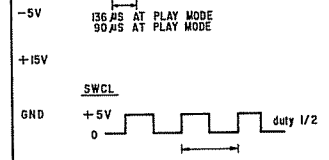
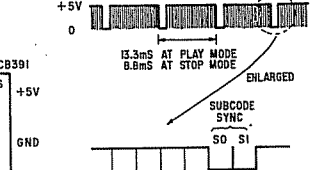
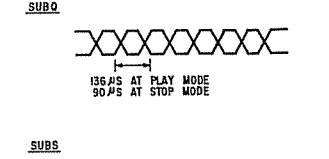
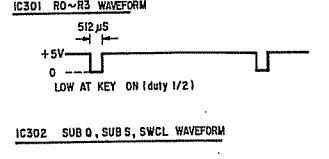
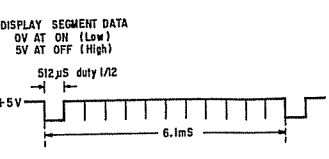
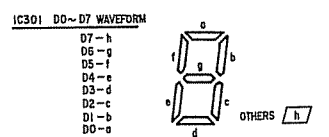
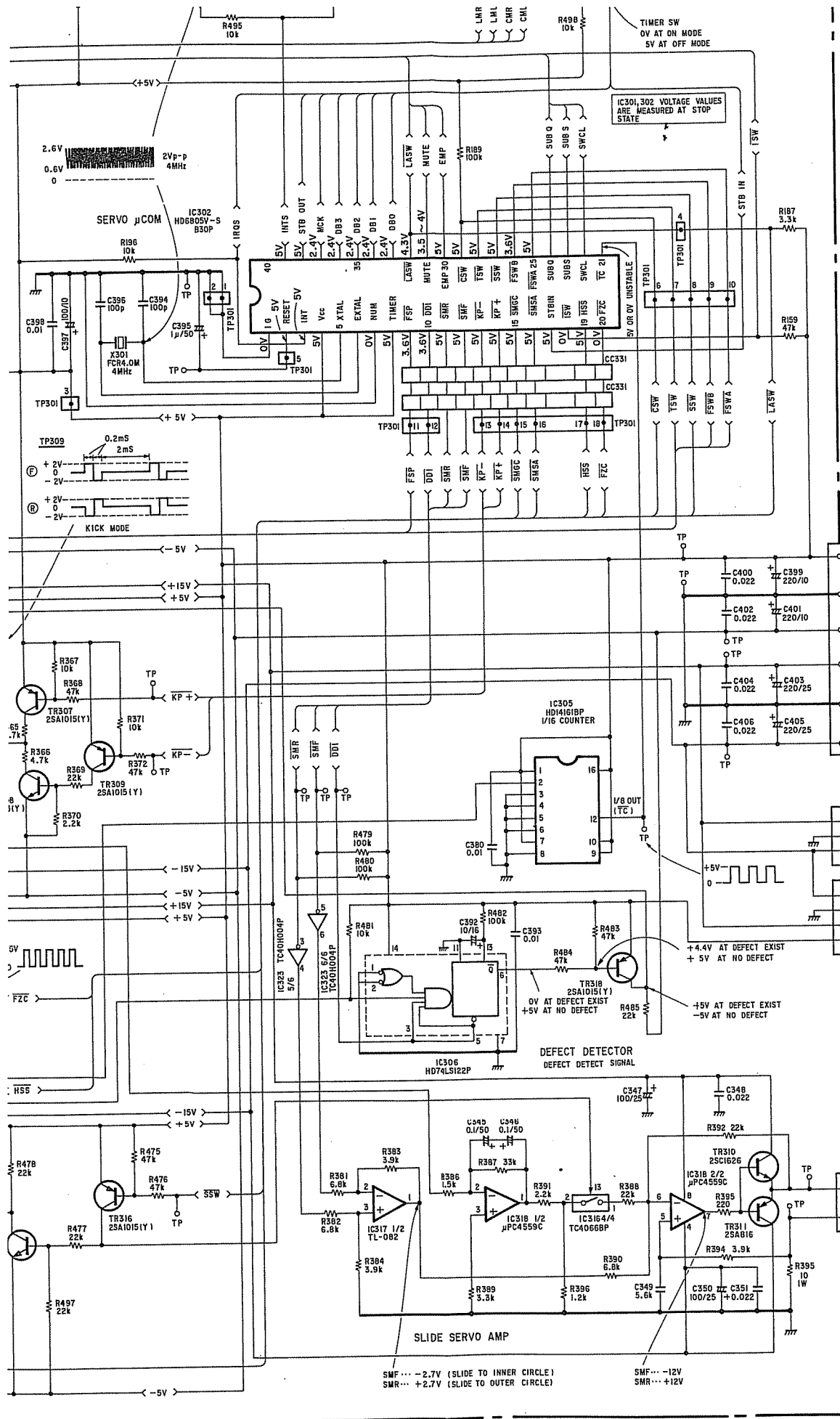
30V-DUMMS REPEAT 3 TIMES



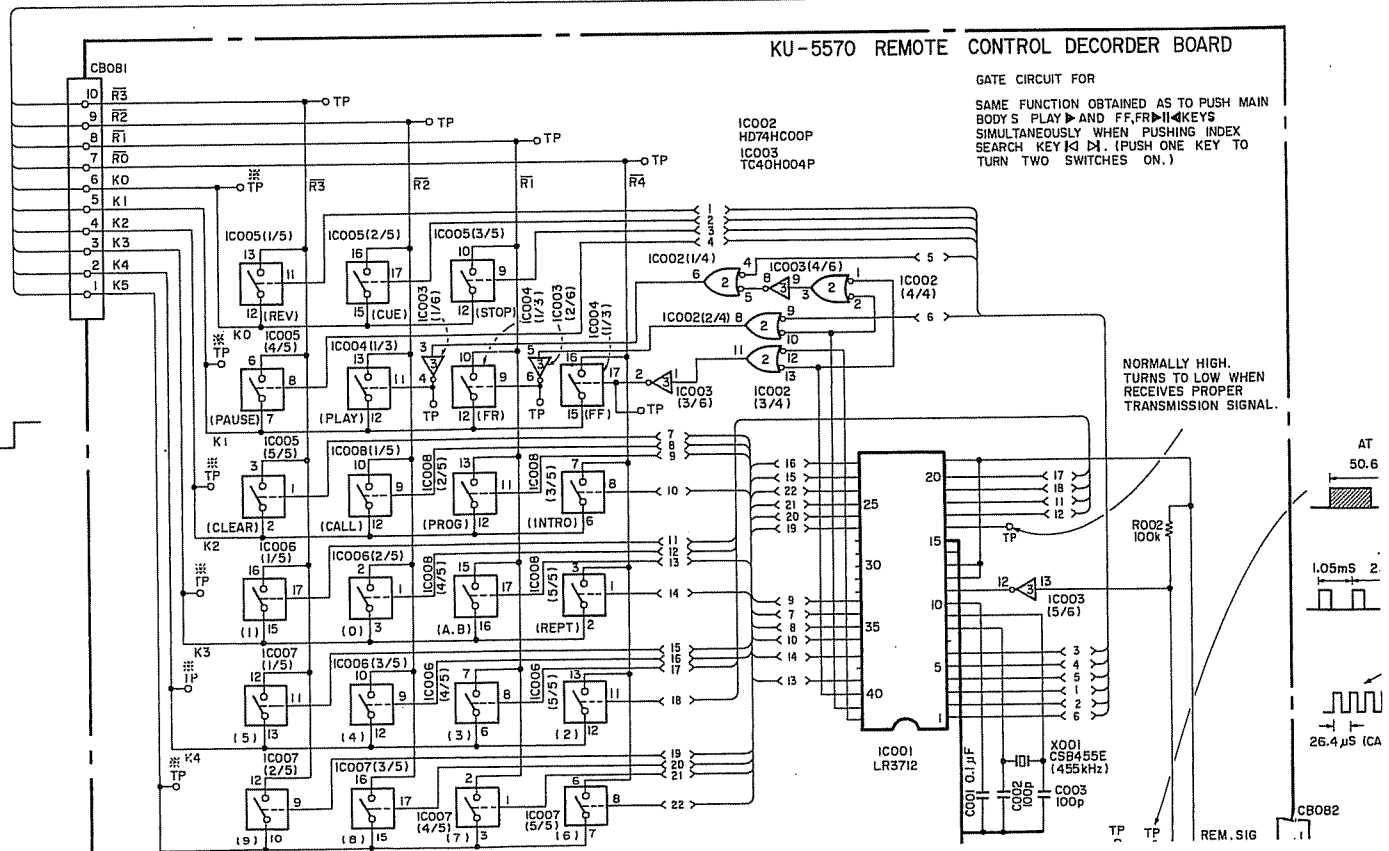
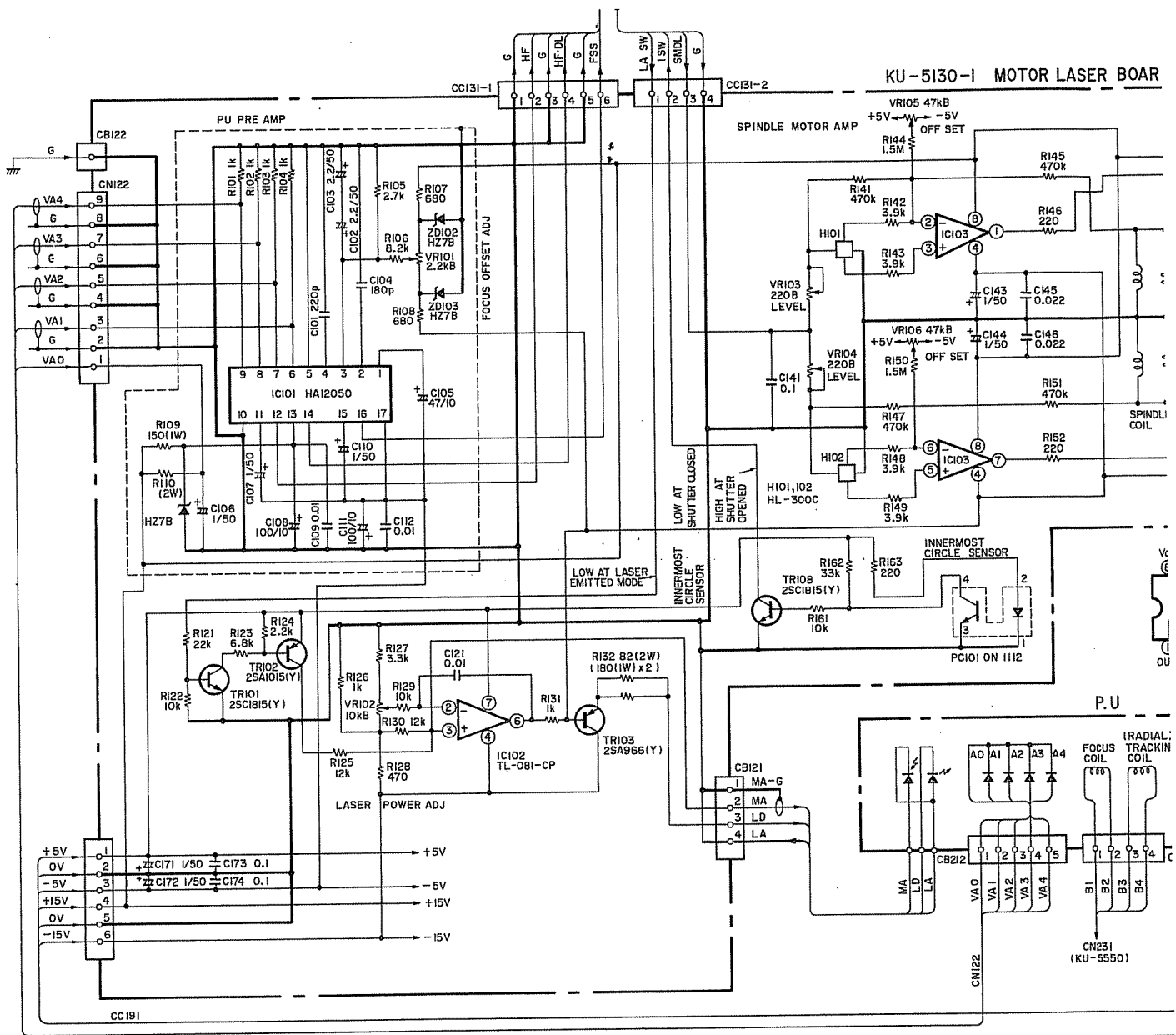
-5V AT PLAY MODE TR324 OFF
 +5V AT STOP MODE TR324 ON

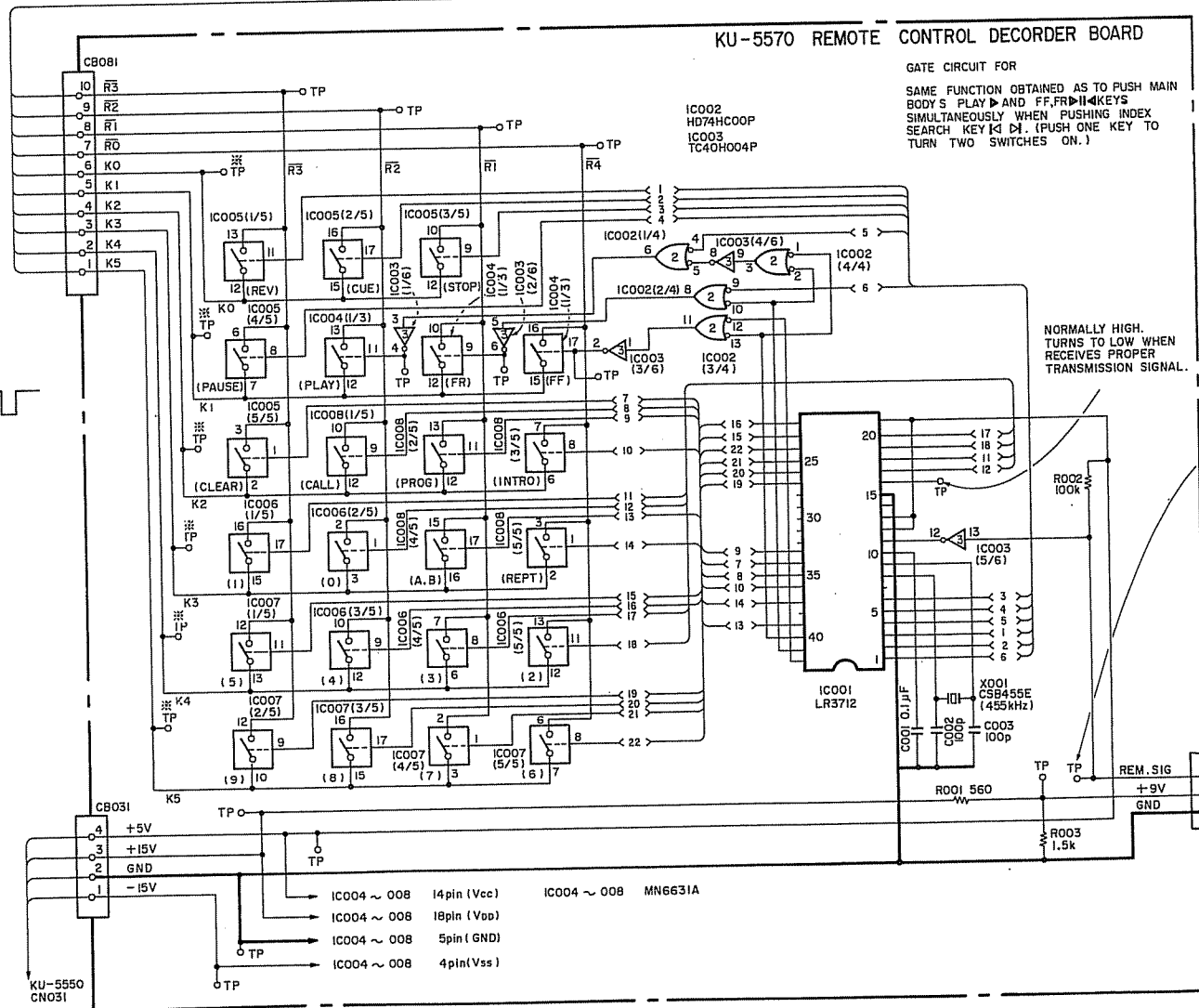
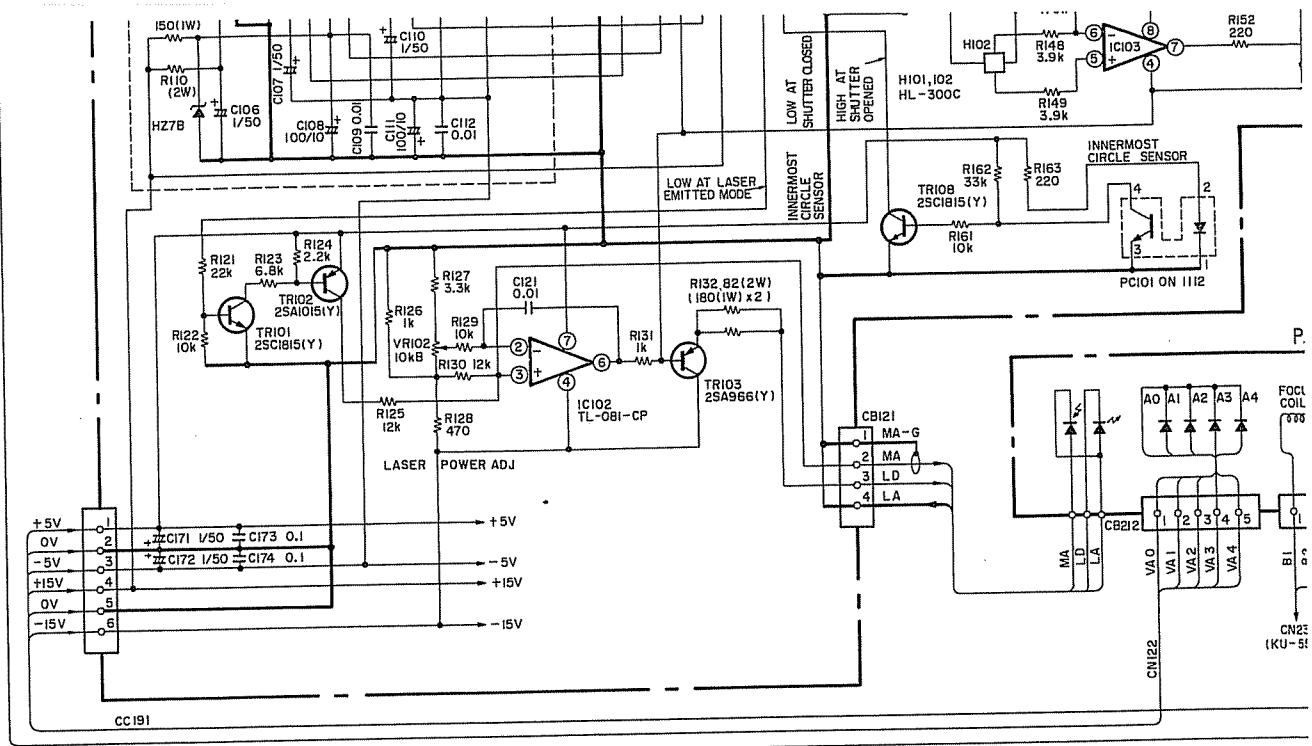


TEST POINT INDICATION
 TP ON THE PATTERN SIDE
 TP TERMINAL ON PARTS SIDE (TP NO. & PIN NO. INDICATED)



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.

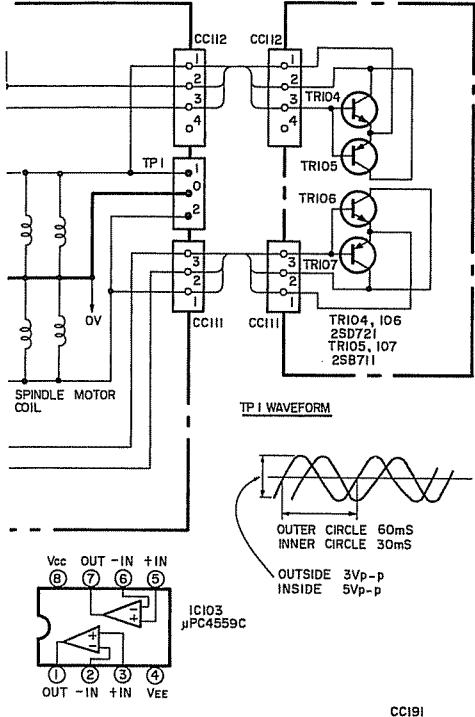




BOARD

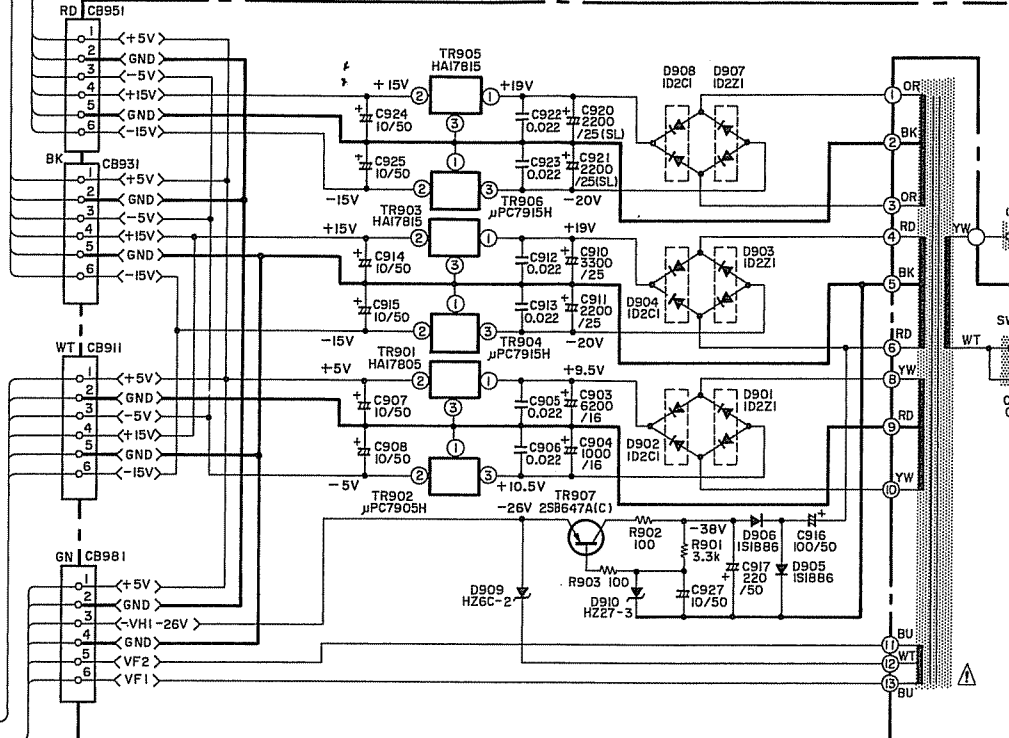
KU-5130-2

KU-5281/5282/5283 POWER SOURCE BOARD

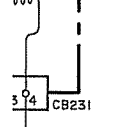


KU-5550 CN391

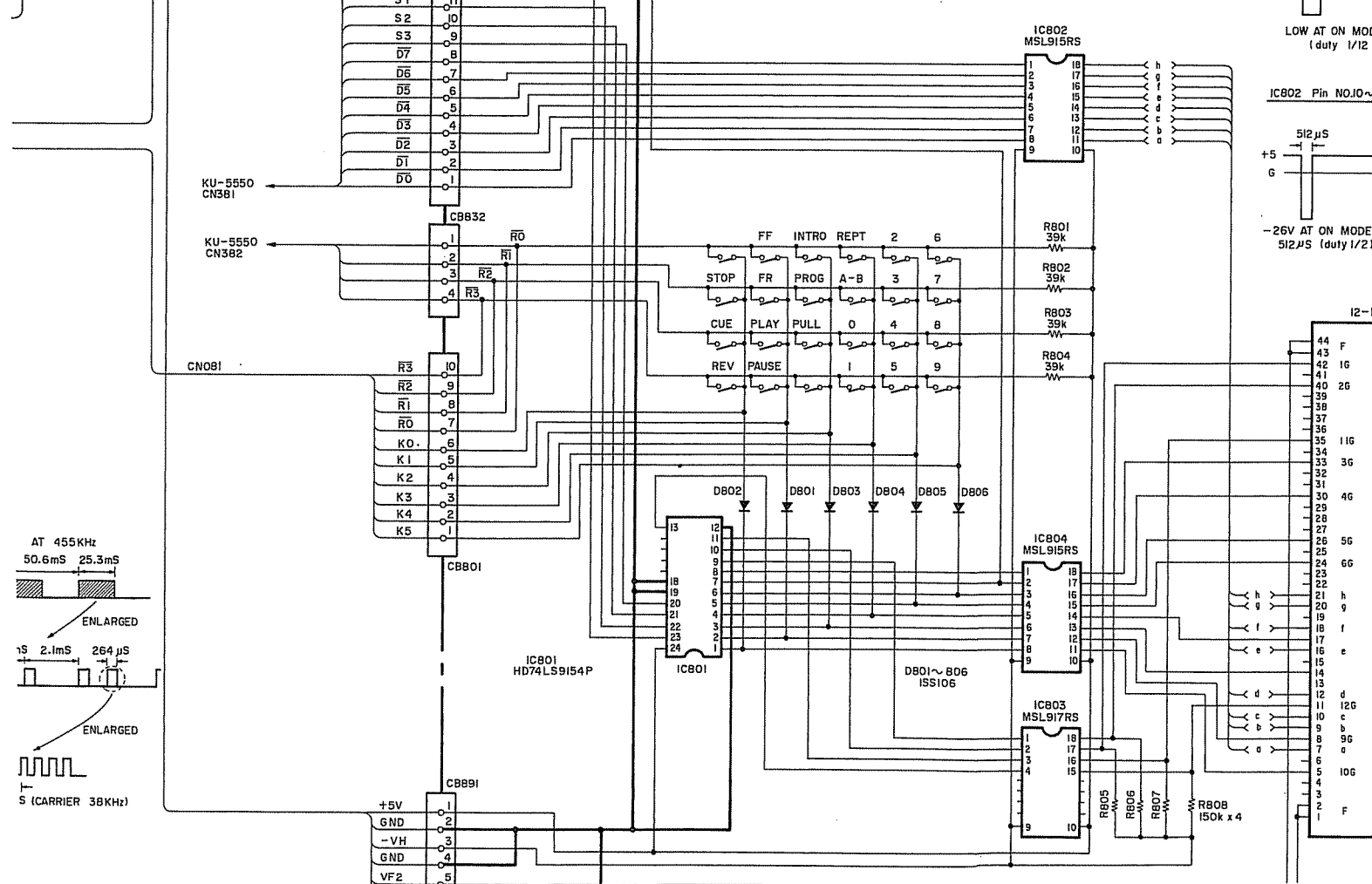
KU-5560 CN591

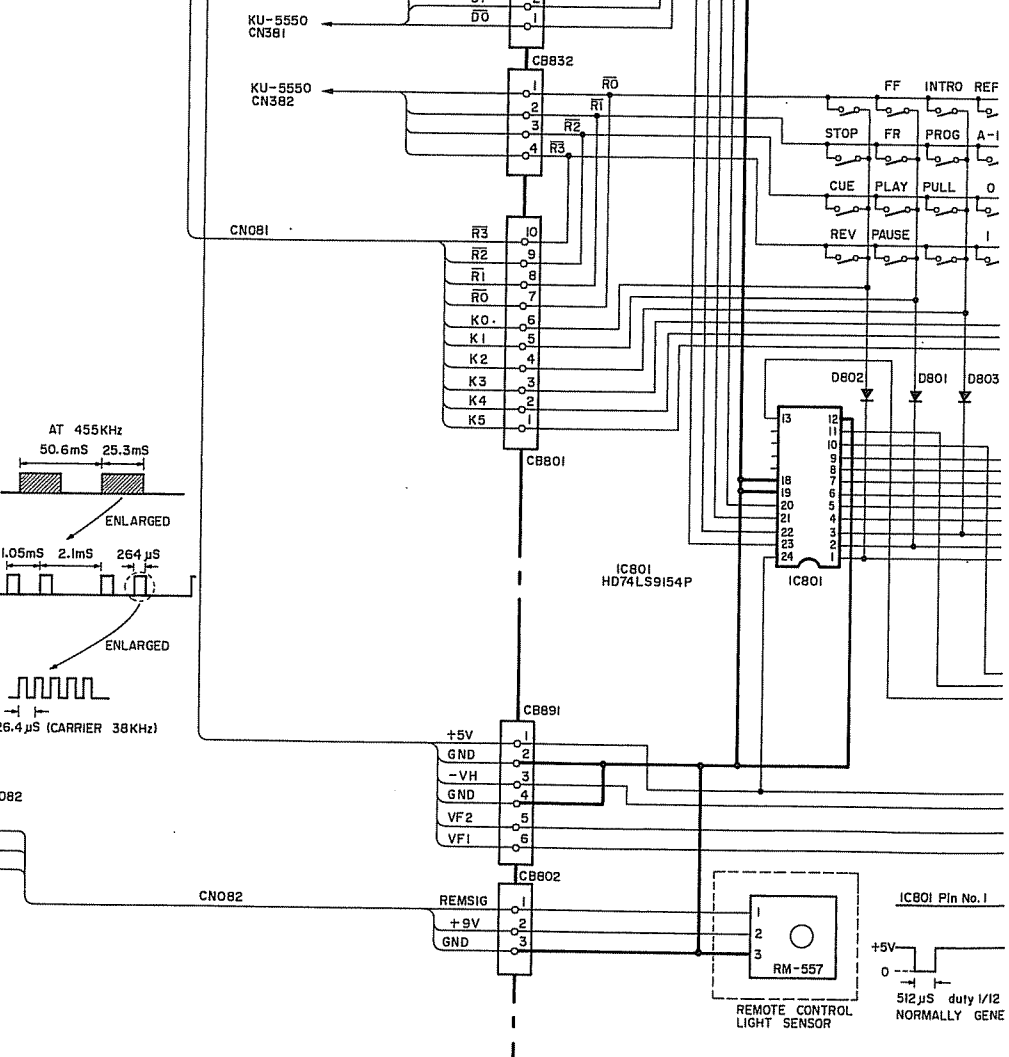
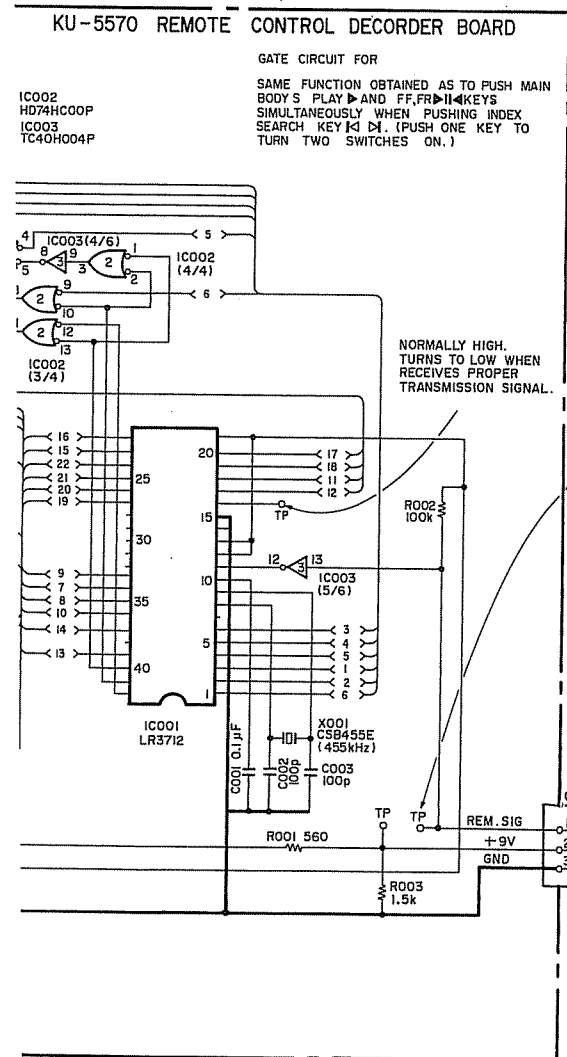
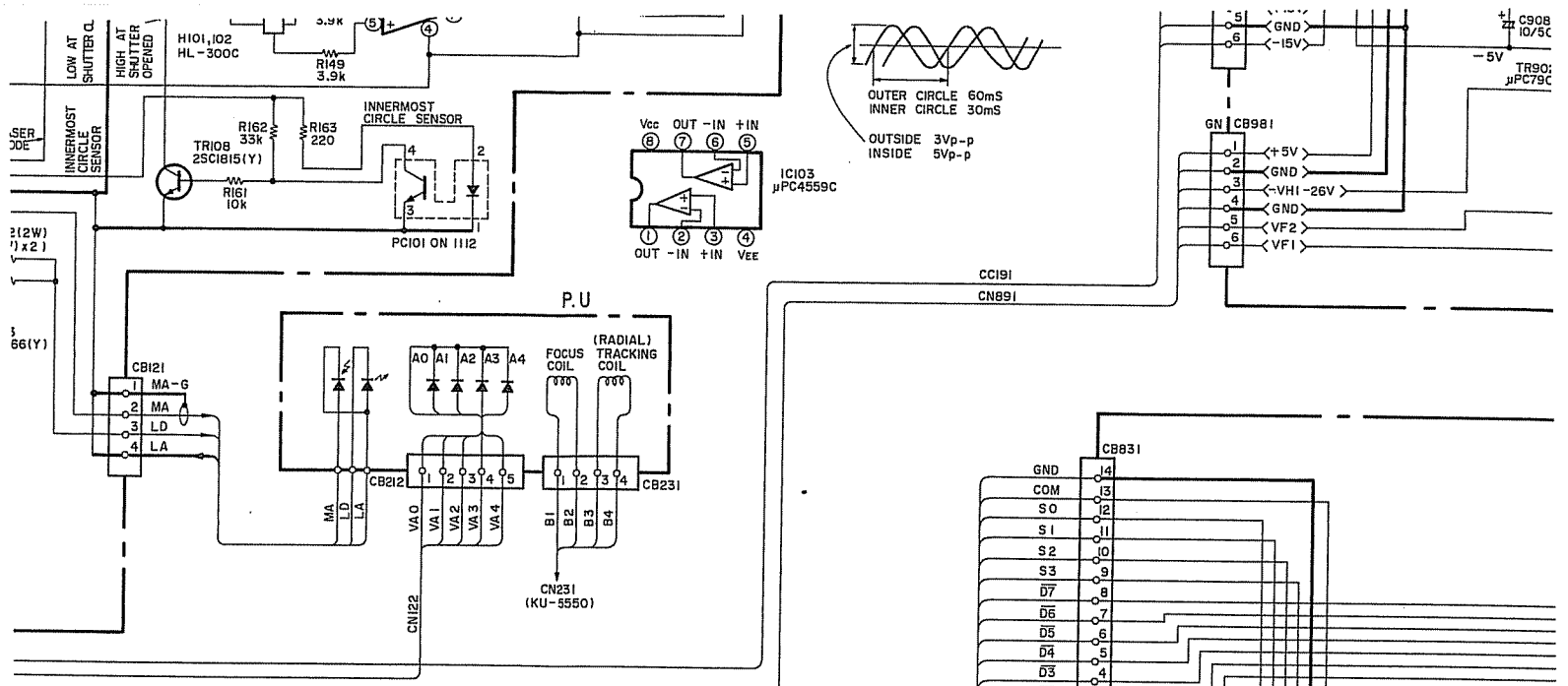


RADIAL RACKING DIL

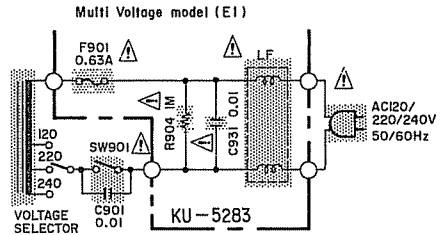
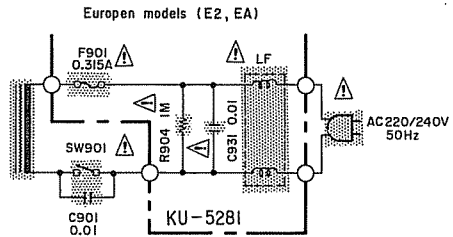
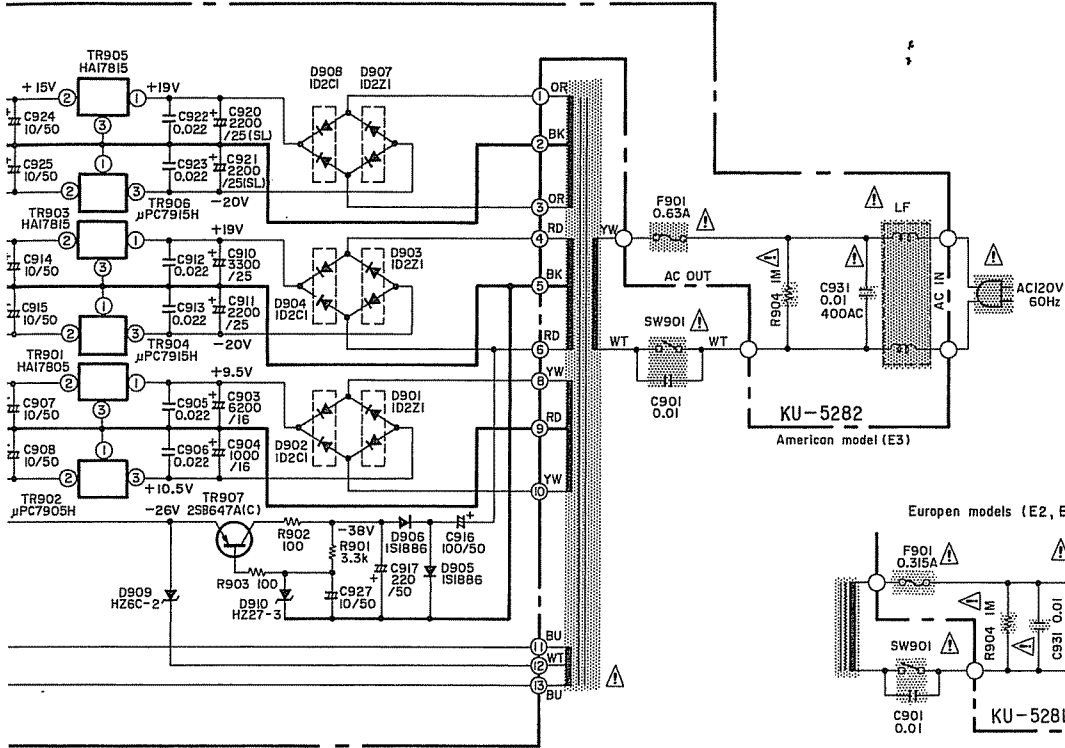


KU-5540 KEY DISPL

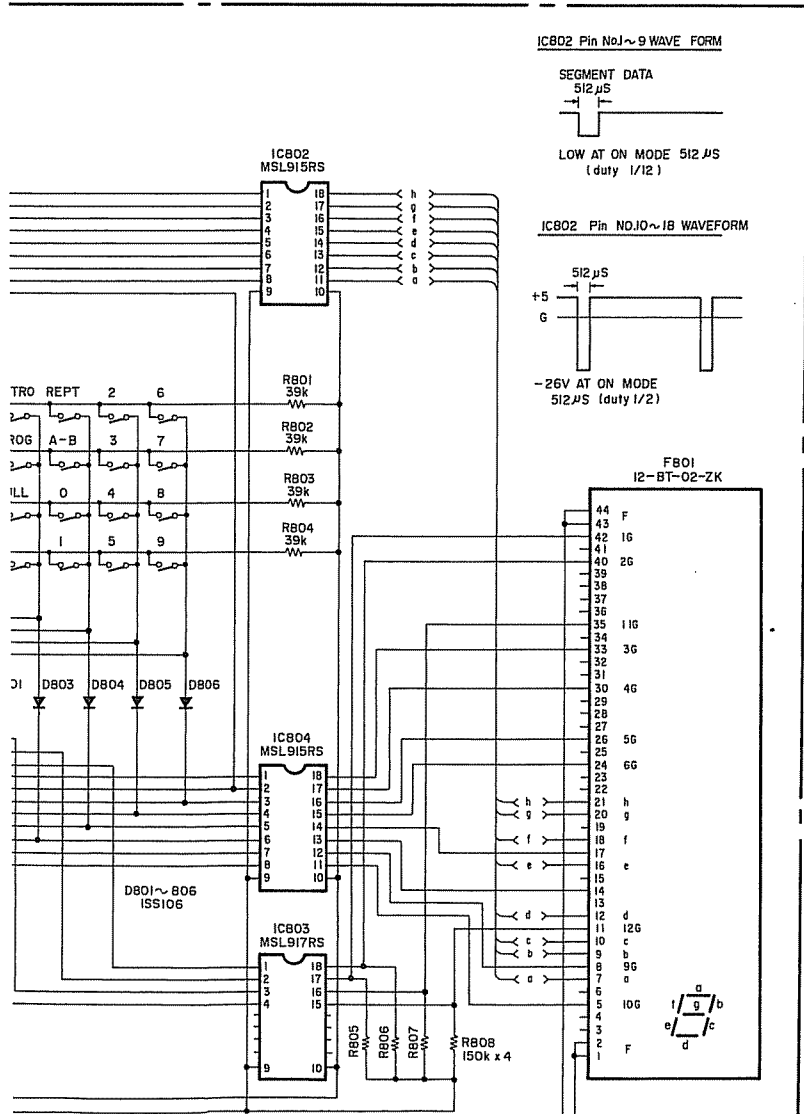


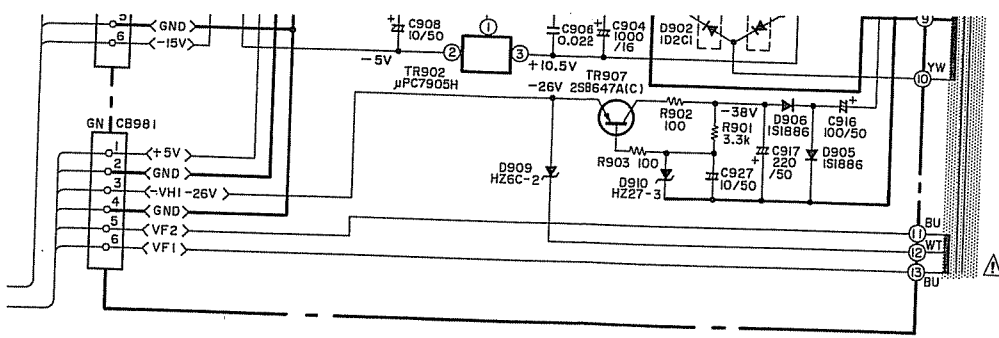


KU-5281/5282/5283 POWER SOURCE BOARD

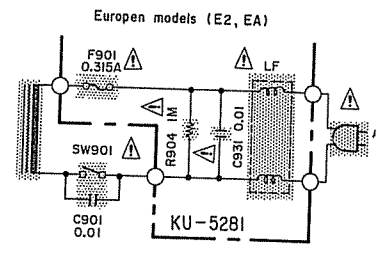


KU-5540 KEY DISPLAY BOARD



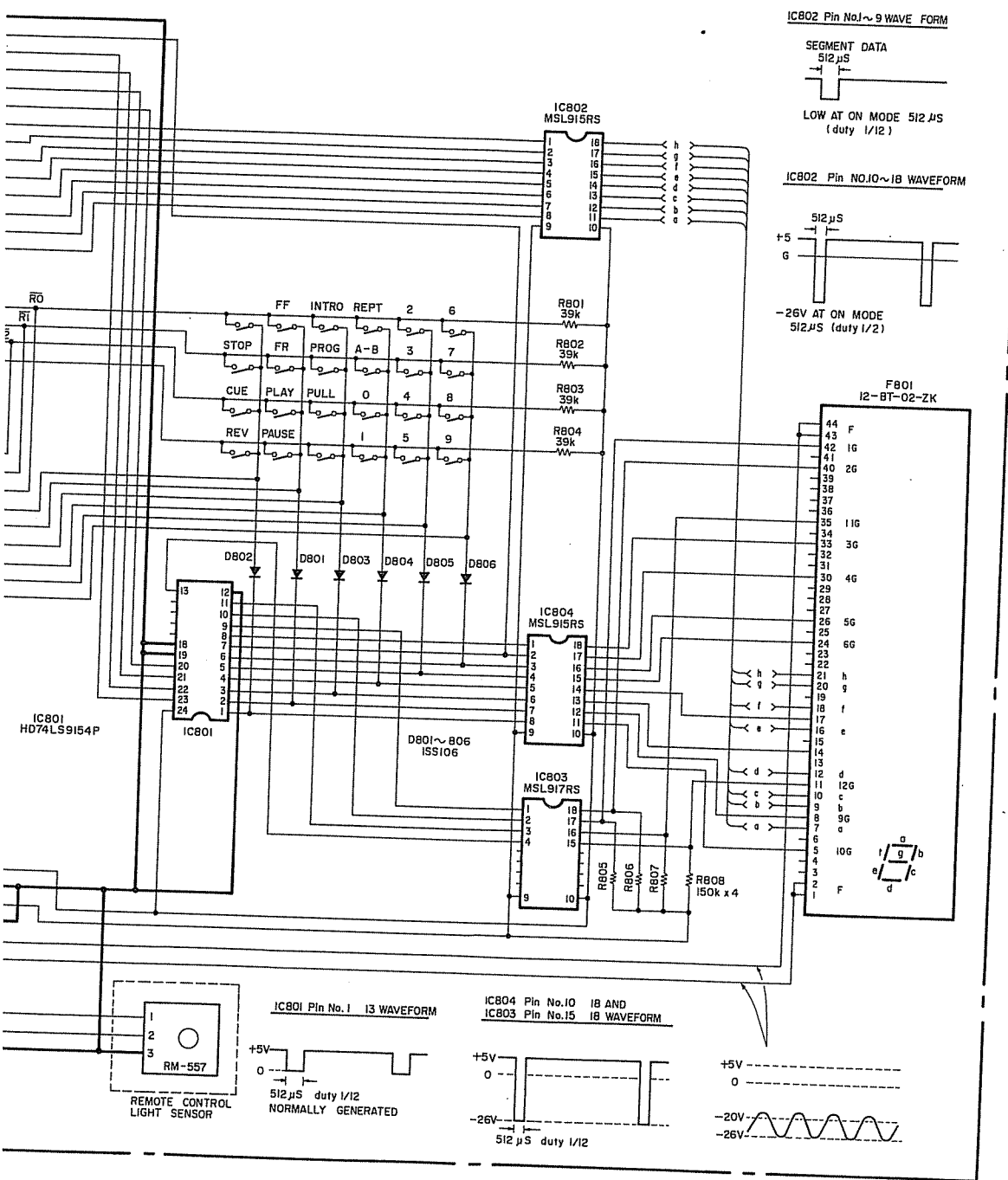


American model (E3)

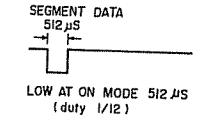


European models (E2, EA)

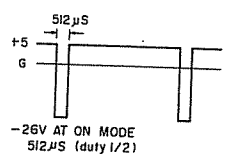
KU-5540 KEY DISPLAY BOARD



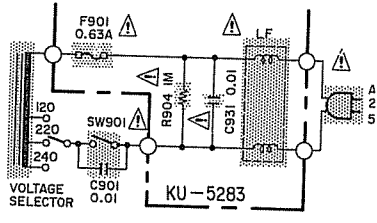
IC802 Pin No.1~9 WAVE FORM



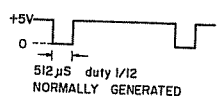
IC802 Pin No.10~18 WAVEFORM



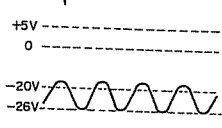
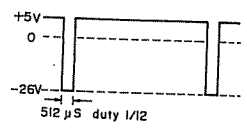
Multi Voltage model (E1)



IC801 Pin No.1 I3 WAVEFORM



IC804 Pin No.10 18 AND IC803 Pin No.15 18 WAVEFORM



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 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.