SERIAL NO. 3304

# ONKYO® SERVICE MANUAL

## COMPACT DISC PLAYER
## MODEL DX-G10

Black model

| | |
|---|---|
| BUDN, BUD | 120V AC, 60 Hz |
| BUG | 220V AC, 50Hz |
| BUU, BUUX | 110~120/220~240V AC, 50/60Hz |
| BUQA, BUQB | 240V AC, 50 Hz |

### SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK ⚠ ON THE SCHEMATIC DIAGRAM AND IN THE PARTS LIST ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE THESE COMPONENTS WITH ONKYO PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL.

MAKE LEAKAGE-CURRENT OR RESISTANCE MEASUREMENTS TO DETERMINE THAT EXPOSED PARTS ARE ACCEPTABLY INSULATED FROM THE SUPPLY CIRCUIT BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.

## SPECIFICATIONS

| | |
|---|---|
| Signal readout system: | Optical non-contact |
| Reading rotation: | About 500~200 r.p.m. (constant linear velocity) |
| Linear velocity: | 1.2~1.4m/s |
| Error correction system: | Cross interleave readsolomon code |
| Decoded bits: | 18 bits linear |
| Sampling frequency: | 352.8kHz (8 times oversampling) |
| Number of channels: | 2 (stereo) |
| Frequency response: | 2Hz~20kHz |
| Total harmonic distortion: | 0.0015% (at 1kHz) |
| Dynamic range: | 103dB |
| Signal to noise ratio: | 110dB |
| Channel separation: | 103dB (at 1kHz) |
| Wow and Flutter: | Below threshold of measurability |
| Power comsumption: | 24 watts |
| Output level. | 2 volts r.m.s. |
| Dimensions (W x H x D): | 477 x 142 x 427mm<br>18-3/4" x 5-9/16" x 16-13/16" |
| Weight: | 27kg, 59.5 lbs. |

Specifications are subject to change without notice.

ONKYO
AUDIO COMPONENTS

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# SERVICE PROCEDURES

**1. How to Release the Transport Lock**

To protect the optical assembly including the laser pickup from vibration related damage during shipping, this unit is equipped with a transport lock lever located on the base.

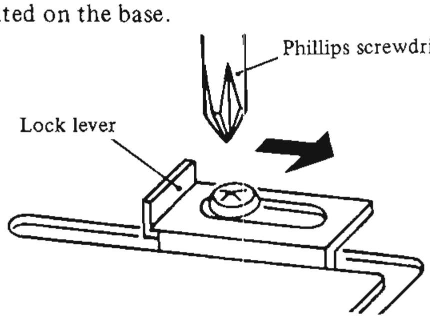



Fig. 1

1. Loosen the screws with a Phillips screwdriver.
2. Move the lock lever in the direction of the arrow as far as it will go.
3. Tighten the screw to secure the lock lever.
   - For shipping, restore the lock lever to its position in the opposite direction from the arrow, then tighten down the screw to secure the lock lever in that position.

**2. Procedures for replacement of flat packaged ICs**

**1. Tools to be used:**

**(1) Soldering iron** . . . . Grounded soldering iron or soldering iron with leak resistance of 10 Mohms or more.

Form of soldering iron's tip:

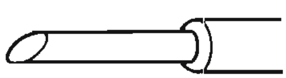


Fig. 2

**(2) Magnifying glass** . . . for checking of finished works

**(3) Tweezers** . . . . . . . . for handling of IC and forming of leads

**(4) Grounding ring** . . . . Countermeasure for electrostatic breakdown

**(5) Nipper** . . . . . . . . . for removing defective IC

**(6) Small brush** . . . . . . for application of flux

**(7) Enamel line**

**2. Work Procedures:**

**(1) Remove the defective IC**

Cut all leads of the defective IC one by one using a nipper and remove the IC.

1. An enamel line has been pierced between the legs of the flat package IC.
2. Use a soldering iron to unsolder the legs one at a time.
3. Repeat the procedure of 1 and 2 above for the 3 sides only.

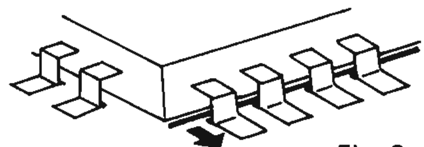


Fig. 3

While holding the soldering against the enamel line, pull in the direction of the arrow.

**(2) Clean the pattern surface of the PC board.**

Get rid of the remaining leads and solder.

(3) Check and from the leads of the new flat packaged IC to be installed.

From every lead on the new IC using a pair of tweezers, so that all of them are aligned neatly without being risen, twisted or inclined toward one side. Especially the rising portion of every lead must be formed with greatest care.

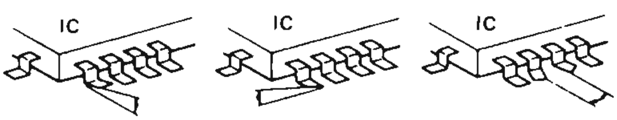



Fig. 4

**(4) Apply flux to the PC board.**

Apply flux to the pattern surface of the PC board which has been cleaned, as shown in the illustration. The area to be applied with flux is the portion of about 2.5mm in width where the IC's leads are to be soldered.

Be careful to apply minimum amount of flux required so as not to smear it on unwanted areas.

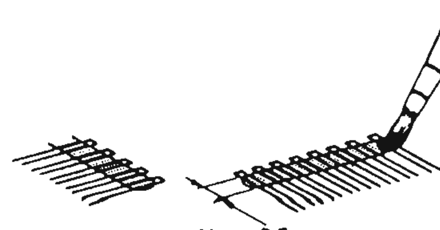



Fig. 5

(5) **Temporarily tighten the IC**
Carefully align the pattern and IC's leads, so that the IC will be temporarily tightened to the pattern on the four leads at the corners. At this time, soldering is required, but no need to apply soldering material.

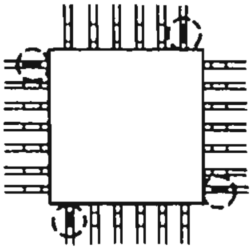


Fig. 6

(6) **Apply flux to IC's leads**
Apply flux to the areas of IC's leads where soldering is to be performed. Be careful not to smear flux on the root portion of any lead or the body of IC.

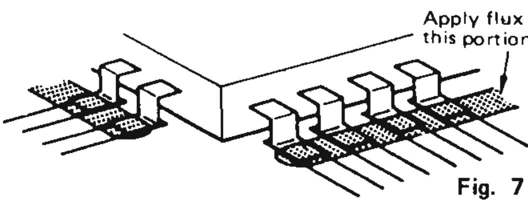



Fig. 7

3. **Voltage Selector (Rear Panel)**
Worldwide models are equipped with a voltage selector to conform with local power supplies. Be sure to set this switch to match the voltage of the power supply in your area before turning the power switch on. Voltage is changed by sliding the groove in the switch with a screwdriver to the right or left. Confirm that the switch has been moved all the way to the right or left before turning the power switch on. Models without a voltage selector can only be used in areas where the power supply is the same as that of the unit.

(7) **Soldering**
While attaching the tip of the soldering iron to the soldering point as shown in the illustration, feed 2–5mm of soldering wire. Then, slowly move the iron in the direction indicated by the arrow in the illustration, so that the leads will be soldered to the pattern. Move the iron in the rate of approximately 1cm in 5sec. Proceed with your work while confirming a clean fillet of solder is formed on each lead, subsequent to the melting of flux.

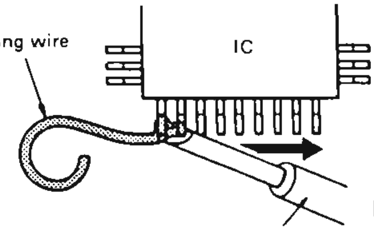



Fig. 8

CAUTION
1) If you move the iron too quickly, loose soldering is likely to result.
2) Be especially careful when soldering the first lead where loose soldering is most liable to be formed.

(8) **Check the results**
When soldering of all leads is finished, check the soldered portion on every lead with a magnifying glass. A tester must not be used or checking of any soldered position

4. **Safety-check out**
After correcting the original service problem, perform the following safety check before releasing the set to the customer:
Connect the insulating-resistance tester between the plug of power supply cable and chassis.
Specifications: more than 10Mohm at 500V.

# CAUTION ON REPLACEMENT OF PICK-UP

The laser diode in the optical pick-up block is so sensitive to static electricity, surge current and etc. that the components are liable to be broken down or its reliability remarkably deteriorated.

During repair, carefulley take the following precautions. (The following precautions are included in the service parts).

## PRECAUTIONS

1. **Ground for the work-desk.**
Place a conductive sheet such as a sheet of copper (with impedance lower than $10^6 \Omega$) on the work-desk and place the set on the conductive sheet so that the chassis.
2. **Grounding for the test equipment and tools.**
Test equipments and toolings should be grounded in order that their ground level is the same the ground of the power source.
3. **Grounding for the human body.**
Be sure to put on a wrist-strap for grounding whose other end is grounded.
Be particularly careful when the workers wear synthetic fiber clothes, or air is dry.
4. **Select a soldering iron that permits no leakage and have the tip of the iron well-grounded.**
5. **Do not check the laser diode terminals with the probe of a circuit tester or oscilloscope.**

# PROTECTION OF EYES FROM LASER BEAM DURING SERVICING

This set employs a laser. Therefore, be sure to follow carefully the instructions below when servicing.

**WARNING!!**

WHEN SERVICING, DO NOT APPROACH THE LASER EXIT WITH THE EYE TOO CLOSELY. IN CASE IT IS NECESSARY TO CONFIRM LASER BEAM EMMISION, BE SURE TO OBSERVE FROM A DISTANCE OF MORE THAN 30cm FROM THE SURFACE OF THE OBJECTIVE LENS ON THE OPTICAL PICK-UP BLOCK.

**Laser Diode Properties**

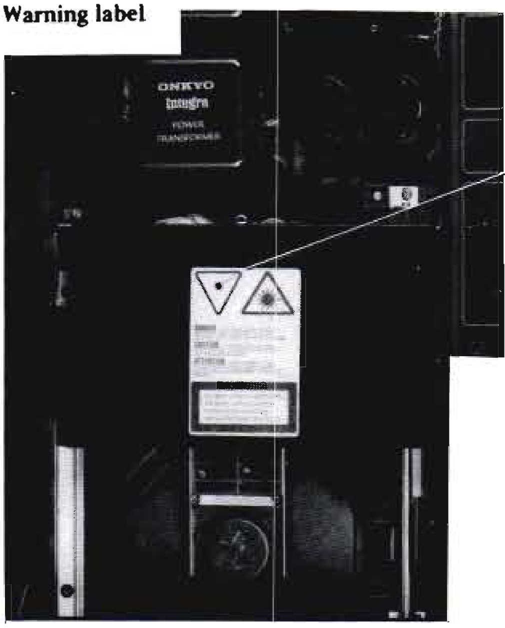
- Material: GaAS/GaAlAs
- Wavelength: 780nm
- Emission Duration: continuous
- Laser output: max. 0.5mW*

  *This output is the value measured at a distance about 1.8mm from the objective lens surface on the Optical Pick-up Block.

# LASER WARNING LABEL

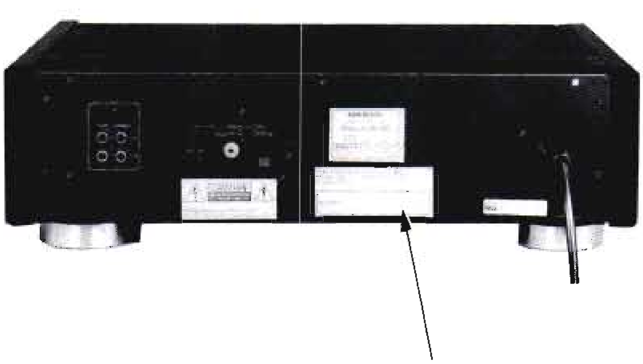
The label shown below are affixed.

1. **Warning label**




2. **Certification label (UD: 120V model)**

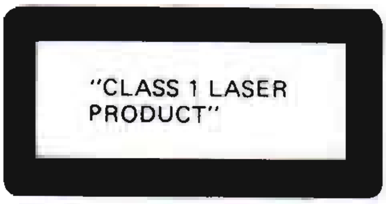
This label is located on the back panel.



3. **Class 1 label (Other models)**

This label is located on the back panel.

## ADVARSEL




Denne mærkning er anbragt på apparatets højre side og indikerer, at apparatet arbejder med laserstråler af klasse 1, hvilket betyder, at der anvendes laserstråler af svageste klasse, og at man ikke på apparatets yderside kan blive udsat for utilladelig kraftig stråling.

APPARATET BØR KUN ÅBNES AF FAGFOLK MED SÆRLIGT KENDSKAB TIL APPARATER MED LASERSTRÅLER!

Indvendigt i apparatet er anbragt den her gengivne advarselsmærkning, som advarer imod at foretage sådanne indgreb i apparatet, at man kan komme til at udsætte sig for laserstråling.


VAROITUS! Laite sisältää laserdiodin, joka lähettää (näkymätöntä) silmille vaarallista lasersäteilyä.

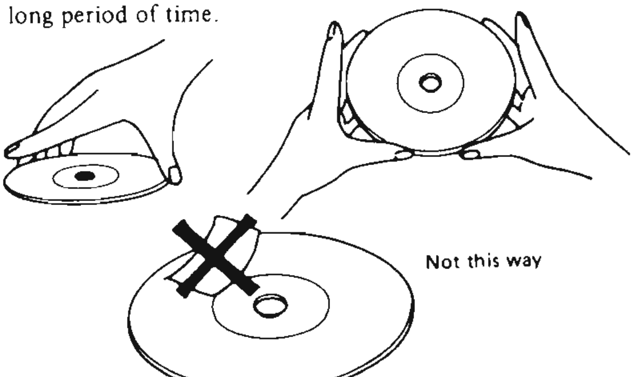
# NOTE ON COMPACT DISC

- **Holding Compact Discs**

Hold Compact Discs by the edges so that you do not touch the surface of disc. Remember that the side of the disc with the "rainbow" reflection is the side containing the audio information.
Do not attach tape or paper to the label side of the disc and always be careful not to leave fingerprints on the side that is played.

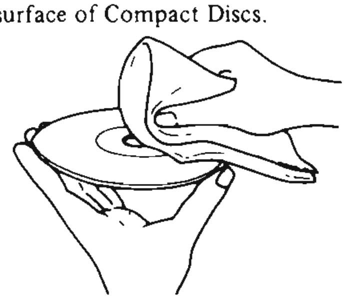
- **Storing Compact Discs**

Store Compact Discs in a location protected from direct sunlight, high heat and humidity and extremely high and low temperatures. Discs should never be left in the trunk or interior of an automobile in the sun since the temperature can become very high in such a closed environment.
Always store Compact Discs in the holders in which they were sold. Never leave a disc in the player's disc holder for a long period of time.




- **Cleaning Compact Discs**

Before playing a disc wipe off the playing surface with a soft cloth to remove dust and other soil. Wipe the surface in straight lines from the center of the disc outward, not in a circular motion as you would with a phonograph record.
Do not use benzene, chemical cleansers or phonograph record cleaning solutions to clean Compact Discs. Also avoid static electricity prevention solutions since they can damage the surface of Compact Discs.



**Problems Caused by Dew**

Dew can form inside a Compact player when it is brought from a cold environment into a warm room, when a room is rapidly heated and if a player is left in a humid environment.
This dew can prevent the laser pickup from reading the data contained in the pits in the disc surface. If the player does not operate properly because of dew, remove the disc and leave the player's power switch on for about one hour to remove all moisture.

# DISASSEMBLING PROCEDURES

**1. Top panel removal**

Remove the four screws holding the side panels and side brackets.
Remove the four screws holding the top panel F (A302:Front side) and side brackets.
Remove the three screws holding the top panel B (A301:Back side) and back panel.

**2. Analog circuit pc board ass'y removal (NAAF-3166-3)**

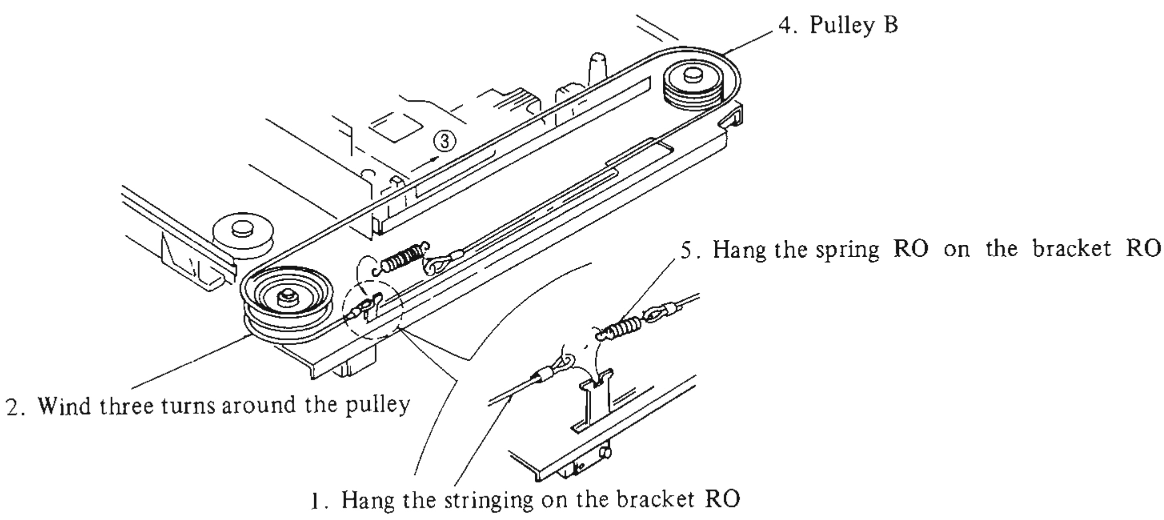
Remove the top covers F and B.
Remove the four screws holding holder lid (A012) and Analog pcb ass'y.
Disconnect the five fiber cables on the Analog pcb ass'y.
Remove the two screws holding back panel and shielded plate (A008) on the Output terminal pcb ass'y. (NAAF-3167-2)
Remove the shielded plate (A026) on the mechanism CD. (Two screws)
Disconnect the three sockets (JL212, JL502 and P542) on the Analog pcb ass'y.
Remove the bracket PC (A011). (Two screws)
Remove the bracket B (A014). (Two screws)
Remove the analog circuit pcb ass'y.
CAUTION:Put the analog pcb on the insulated sheet.

**3. Digital circuit pc board ass'y removal**

Remove the analog circuit pcb ass'y.
Remove the shielded plate (A015). (Two screws)
Remove the digital circuit pc board ass'y. (Four screws)

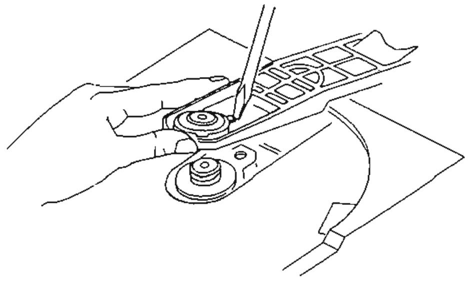
**4. Stringing diagram of loading section**

Thread the stringing from 1 to 5.

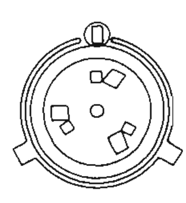



**5. Disc pulley removal**

With the disc table in the closed position and no disc loaded, manually lift the chucking arm.
Remove the disc pulley by inserting a screwdriver under the small tab.



Remove from the small tab.



6. **CD drive unit removal**

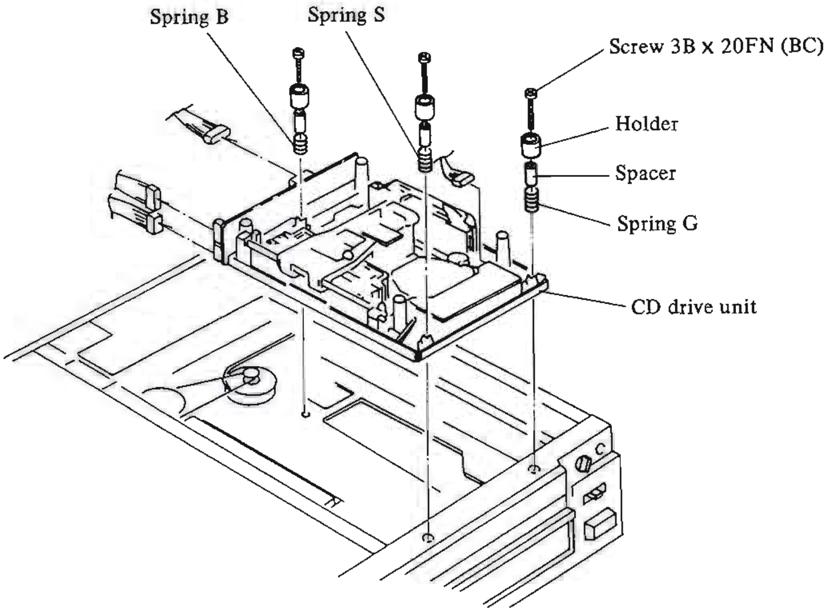
After removing the loading section of the mechanism the CD drive unit can be removed by unscrewing the three screws which float the chassis assembly.

**Note 1**: Take care not to expose the unit to static electricity when changing the chassis assembly. (See cautions regarding handling of the laser pickup.)

**Note 2**: The tensions of the three spring on which the assembly rests are different, so take care not to mix them up.

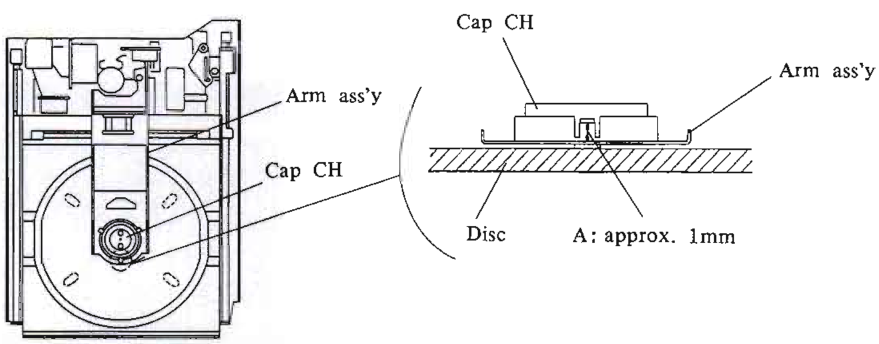
**Note 3**: The drive unit (BU-1) is treated as a single assembly. Consequently, parts such as the RF circuit board cannot be replaced singly.

| Spring | Colour |
|---|---|
| B | Black |
| S | White |
| G | Silver |




7. **Chucking arm height**

With a disc loaded and the disc tray closed, adjust the height of the portion marked "A" in the figure below to 1mm. After adjusting, perform the loading operation a few times to confirm that the arm and the cap do not touch.



# CIRCUIT DESCRIPTIONS

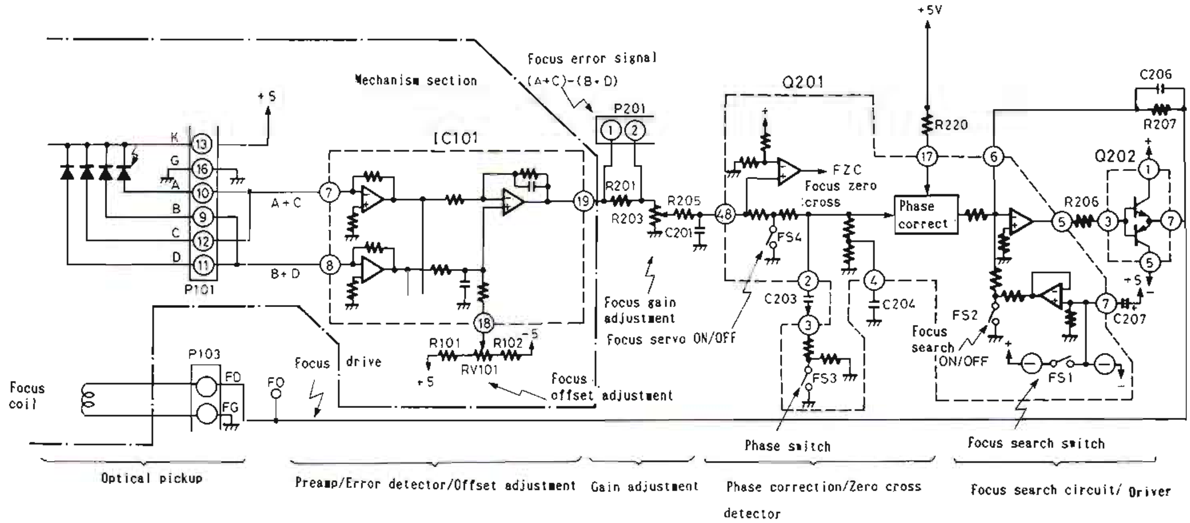



Fig. 1 Focus servo circuit

## 1. Focus servo circuit

From the optical pickup objective lens, the emitted laser beam is focused on the disc reflecting surface, an this circuit controls the movement of the lens up and down.

### 1-1. Error detecting circuit

The error is detected by means of the astigmatic aberration method and obtains its focus error signal from the optical pickup output signal (A+C)–(B+D).

The individual signals (A+C) and (B+D) input to pins 7 and 8 of IC101 are subtracted by means of the IC internal op amp, and from pin 19, the F.E. signal is output. Also, in order to eliminate the focus error, offset adjustment is carried out by the semi-fixed resistor RV101of pin 18 of IC101.

### 1-2. Phase correction and driver circuit

By means of the semi-fixed resistor R203, the gain adjusted F.E. signal passes by way of the phase correction circuit from pin 48 of Q201, and from pin 5 of Q201 to the driver Q202, and is feedback to the coil used for driving the optical pickup objective lens. In addition, there are the FS 4 servo ON/OFF switch and FS3 phase characteristic selector switch.

### 1-3. Focus zero cross circuit and focus search circuit

In order to have mandatory drive of the objective lens in the capture range of only 10$\mu$m at the focus point it is necessary to turn off the above mentioned FS4 and close the servo loop. The timing diagram for that operation is shown in Fig. 2.

The triangular wave generated by means of the focus search circuit internal to Q201 shifts the objective lens up/down direction, and at the correct focus point, the fall of F.E. signal is detected by the focus zero cross (FZC) circuit to close the servo loop. At this time, it is necessary that the focus OK (FOK) signal be in the high level. In Fig. 2, the dotted line is the waveform of the focus capture failure.

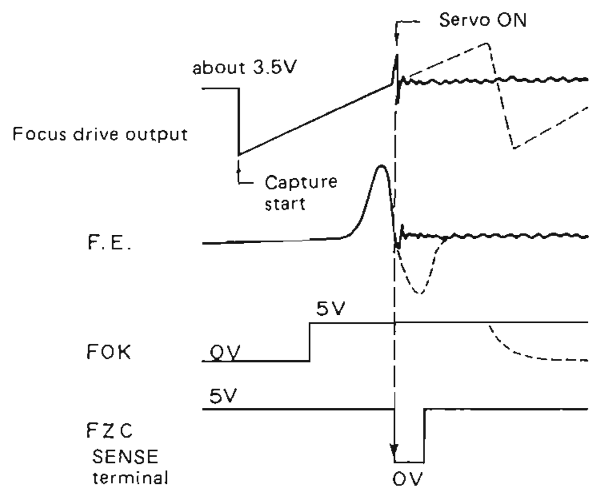
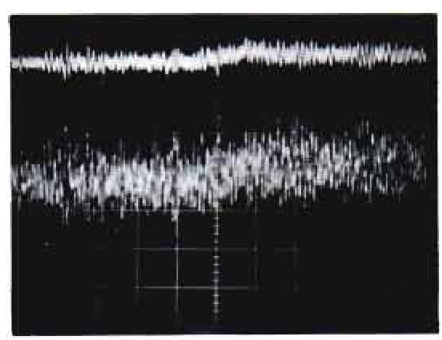



Fig. 2 Capture operation of focus



Focus signal
Upper P201
Lower FO(TP)
Vertical:0.2V/div.
Holizontal:5ms/div.

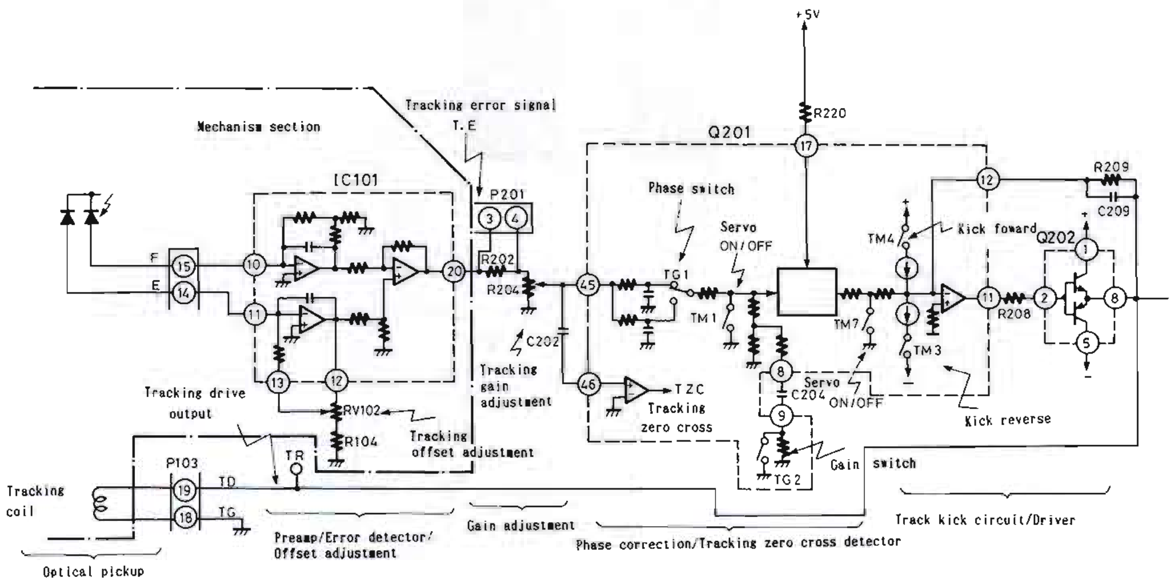



**Fig. 3 Tracking servo circuit**

## 2. Tracking servo circuit

On the disc at a pitch of 1.6$\mu$m, the laser beam accurately traces the center of the pits cut into the disc, and this is the control circuit that shifts the objective lens in the radial direction.

### 2-1. Error detection circuit

The F-E is obtained from the tracking error (T.E.) signal by means of a 3 beam method. The F.E. signal input to pins 10 and 11 of IC101 is subtracted internally, and is output as the T.E. signal from pin 20. RV102 is the semi-fixed resistor control for tracking offset.

### 2-2. Phase correction and driver circuit

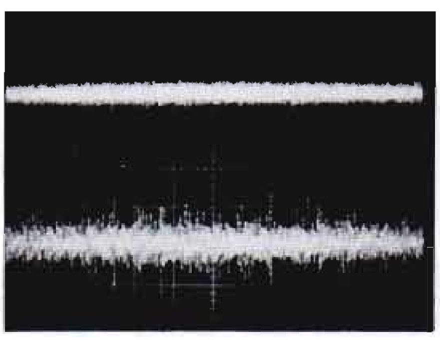
The T.E. signal adjusted for gain by means of the semi-fixed resistor R204 passes through the phase correction circuit from pin 45 of Q201, and from pin 11 by way of driver Q202 objective lens. TM1 and TM7 are used as the tracking servo ON/OFF switches, and TG1 and TG2 respectively are used as the phase selector and gain selector switches.

### 2-3. Tracking zero cross and track kick circuit

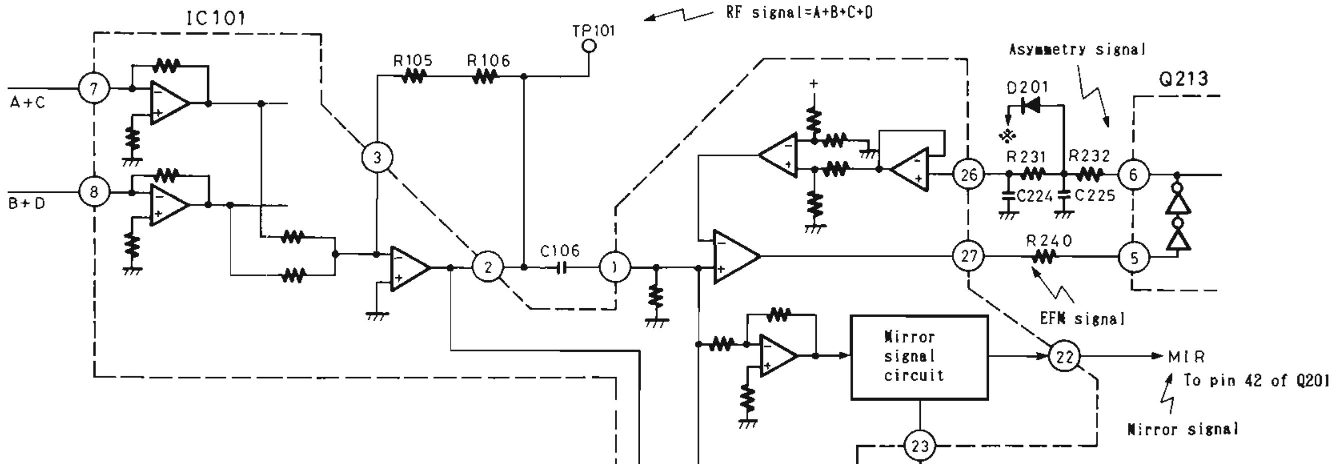
At the time the head comes out and when there is manual fast forward, in the event that is it necessary to skip over the track being traced, the T.E. signal receives a kick pulse, and by means of this, shifting of the objective lens can be achieved.

TM3 and TM4 respectively are the switches for providing the forward and reverse direction kick pulses. Also, the tracking zero cross (TZC) circuit counts the number of tracks skipped over and produces the signal in order to determine the timing of the servo ON/OFF.

The ON/OFF command for these switches is output from the microprocessor.



Tracking signal
Upper P201
Lower tr (TP)
Vertical: 1V/div.
Holizontal: 5ms/div.



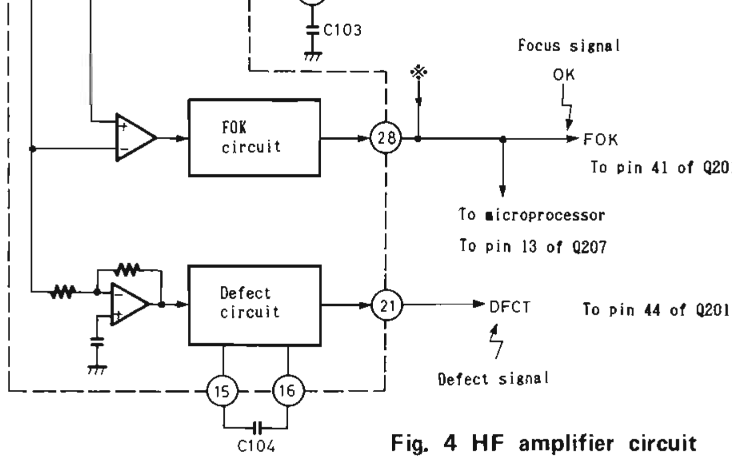




Fig. 4 HF amplifier circuit

## 3. HF (RF) amplifier

This circuit feeds the A+B+C+D to the amplifying and form processing circuit together with the data HF (RF) signals due to the pits cut into the disc, checks the servo condition, and transmits that data to the microprocessor.

### 3-1. HF amplifier, waveform shaping circuit

The A+C and B+D signals input to pins 7 and 8 of IC101 added by the op amp, and the HF signal (eye pattern) A+B+C+D is output from pin 2. The HF signal then passes through C106 entering at pin1, is shaped by means of the comparator, and becomes the EFM signal which is output from pin 27.

In the comparator threshold value, the EFM signal low region component ASY (asymmetry) is input from pin 26, and control is achieved by this means.

### 3-2. MIR circuit, FOK circuit, and DFCT circuit

After the HF signal is processed the detection, shaping, etc, respectively the MIR, FOK, and DFCT signals are output from pins 22, 28, and 21.

#### 3-2-1. MIR (mirror) signal

When the head is extended, at the time the signal becomes high at the disc track and between tracks, the number of tracks is counted, and this is used for determining the timing for the ON/OFF of the servo.

#### 3-2-2. FOK (focus OK) signal

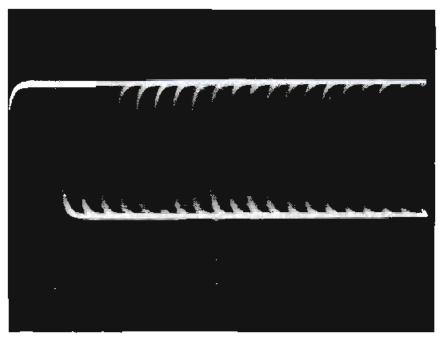
This signal goes high at the time the focus servo is required. (Refer to 1–3)

#### 3-2-3. DFCT (defect) signal

If there is a defect (scratch, dirt, etc.) in the disc, this signal goes high, the servo and gain are controlled, and the circuit prevents a sound outburst.

## 4. CLV servo circuit

In the compact disc there is a CLV system (constant linear velocity), and at the replay position, because the disc rotary speed varies, the clock is taken out of the HF signal, and the PLL circuit and its clock must be synchronized to control the spindle motor.



EFM output signal
Vertical: 1V/div.
Holizontal: 5ms/div.
Insert the resistor 2.2kohm between probe of oscilloscope and test point.

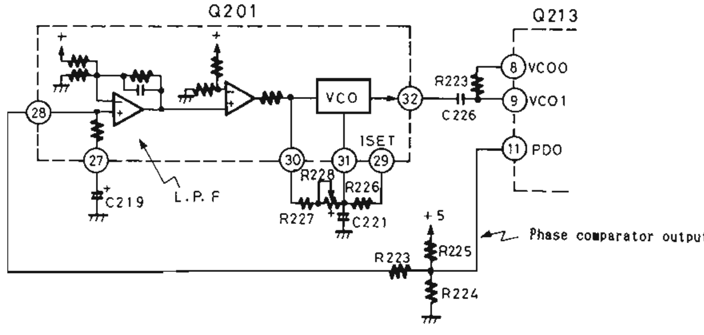



Fig. 5 PLL circuit

### 4-1. PLL circuit

As shown in Fig. 5, for the phase comparator, in Q213 the LPF and VCO are each built into Q201. The semi-fixed resistor R228 is the control for adjusting the 4.3225 MHz free run frequency (WFCK = 7.35 KHz).

### 4-2. Spindle motor control circuit

The output of the phase comparator (MDP) and frequency comparator (MDS) from pins 3 and 4 of Q213 is fed to pins 34 and 36 of Q201. Also, the spindle motor ON/OFF signal (MON) from pin 2 of Q213, and the phase selector signal (FSW) from pin 1, are output and fed to pin 36 of Q201. After these signals are processed in Q201, they are passed from pin 39 through the driver IC151, and are supplied to the spindle motor.

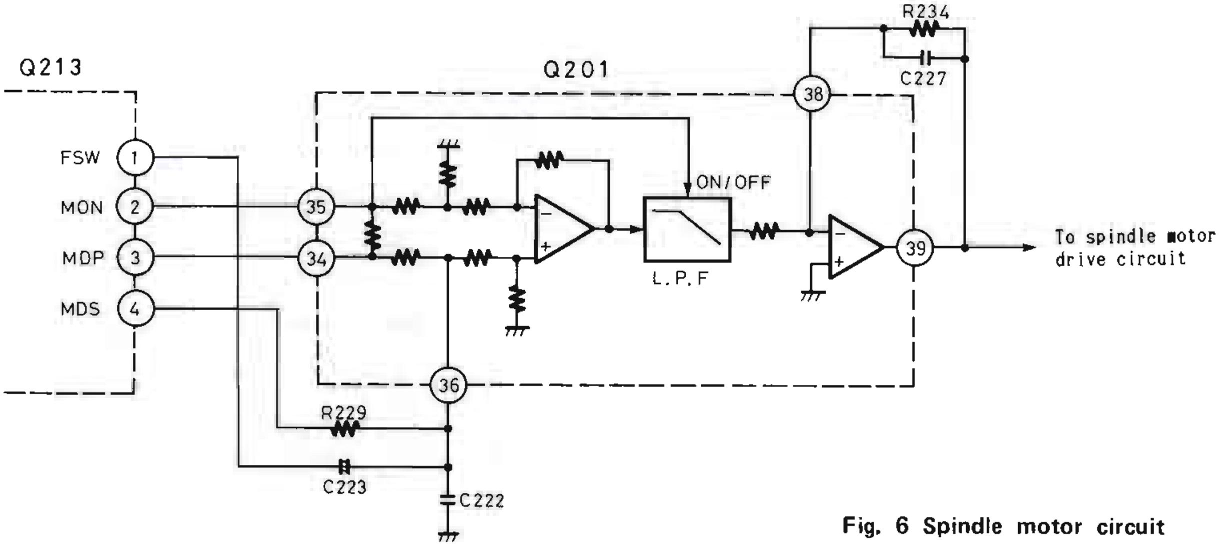



Fig. 6 Spindle motor circuit

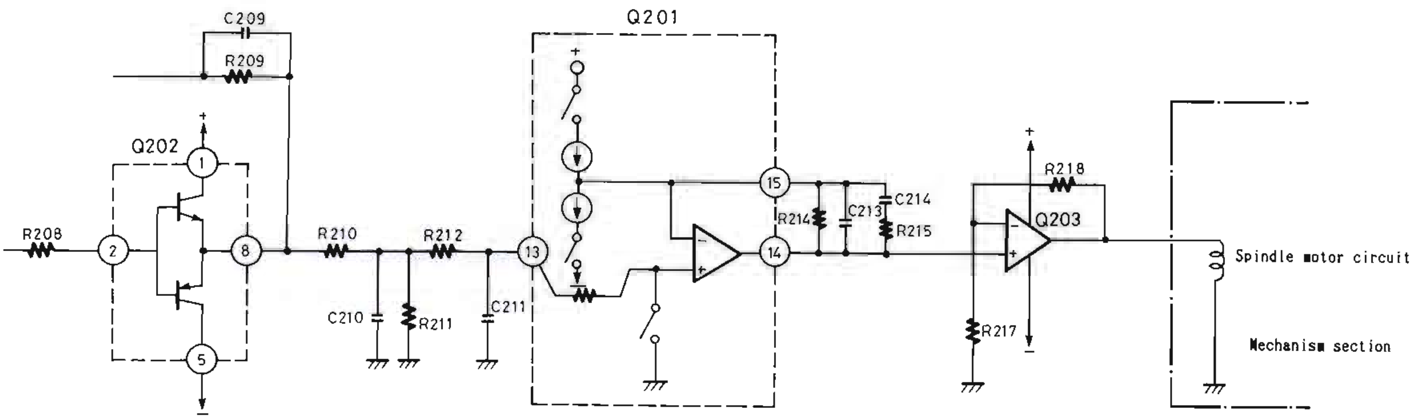
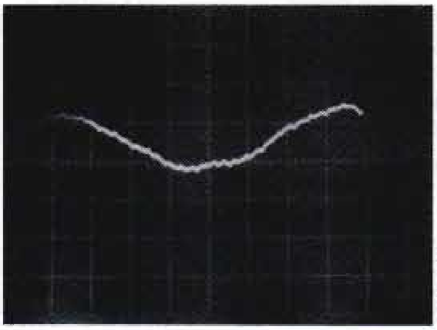



Fig. 7 slide motor circuit

### 5. Slide motor circuit

This circuit controls the slide motor which is used for moving the optical pickup from inside the disc to the outside. In the normal playback time, the low region component of the tracking driver output is amplified and fed to the motor, but when the head is extended, switches TM5 and TM6 internal to Q201 control the ON/OFF.



SLD signal(T.P)
Vertical:1V/div.
Holizontal:20ms/div.

6. **Digital filter and interface**

The digital signal processor output signal (Q213) and the control signals are input into a digital filter (Q302). Here they undergo 8-times oversampling and are output at an 8-times higher rate. These signals pass through the interface circuitry (Q303 – Q305) where they are converted into signals to drive the 18-bit DAC unit.

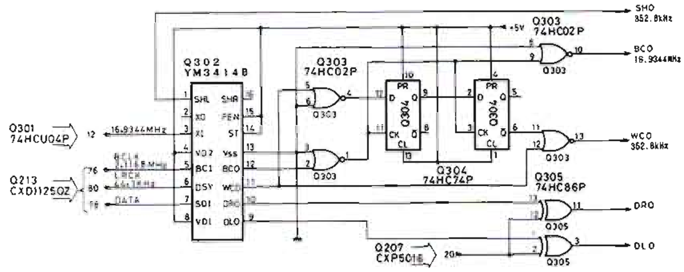



**Fig. 8 Digital filter and interface circuit**

7. **Optical data transfer transmitter drive**

The circuitry illustrated in Fig. 9 superimposes the WCO signal on the emphasis signal and drives the optical circuitry. WCO is a repeating 352.8kHz signal. EMPHA is a "high" or "low" DC signal. When EMPHA is high (emphasis on), Q309 is conductive and the bias of Q308 is determined by division of R314 and R313. On the other hand, if EMPHA is low (emphasis off), Q309 is non-conductive, so the bias of Q308 is determined by division of R313, R312 and R314. The WCO signal is blocked by C310 and R313 in order to prevent it from changing the bias. The voltage changes which occur during emphasis operation are illustrated in Table 1.

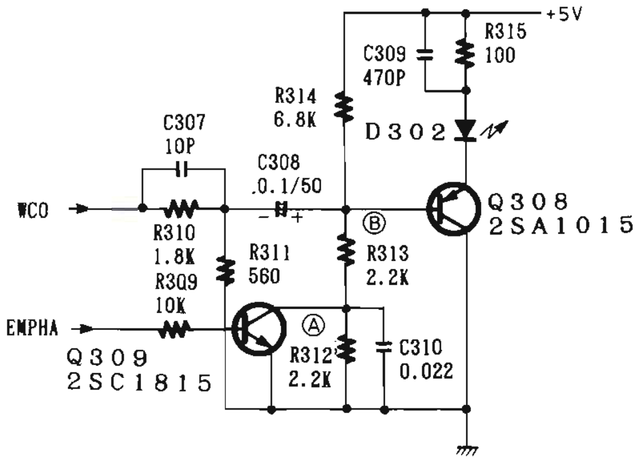



**Fig. 9 Opto. transfer circuit drive circuit**

| Operation \ Voltage (V) | A | B | C |
|---|---|---|---|
| Emphasis ON | 0 | 1.3 | 3.7 |
| Emphasis OFF | 1.0 | 2 | 4.3 |

**Table 1**

8. **Optical data transfer receiver preamplifier**

The superimposed WCO and EMPHA signals are transmitted via an optical fiber cable and received by D402 where they are converted into an electrical signal. The WCO signal is input into Q402 pin 1. R414 is the load resistance. After being amplified by Q402, it is output from pin 5. Next, after passing through waveform shaping circuit Q407, it is used as the D/A converter word clock signal.

The optimum operation point varies due to inconsistencies in the sensitivity of the optical transmitter and receiver outputs (D302 and D402).

Therefore, semi-fixed resistor R411 is provided for adjustment.

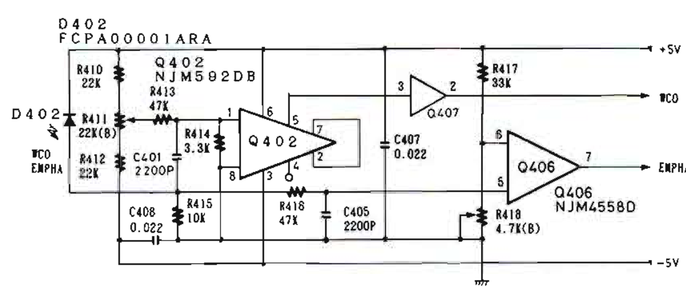



**Fig. 10 Optical data transfer receiver preamplifier circuitry**

The WCO signal is removed from the EMPHA signal by a filter consisting of C405 and R416. Only the DC signal elements are input into Q406 pin 5. R415 is the load resistance. The emphasis on and off center voltages are set with semi-fixed resistor R418.

9. **Serial-parallel interface**

The data signal, after demodulation in the optical receiver preamplifier, is converted into a parallel signal in the interface circuitry illustrated in Fig. 11.
The converted signal is then input into the parallel-input 18-bit D/A converter.
The 18 data bits (DAL) are assigned to the registers (Q409, Q411 and Q413) using the 18-bit bit clock signal. The 19th bit of the bit clock signal activates the word clock (WCO) and the values of each of the registers are output. This output is held until the next 18 bits of data are collected.

**(Reference)**

If a sine wave is input (track 2 on test disc YEDS 18), the B1 (MSB) waveform will be a short wave with a duty ratio of 50%.

**(Reference) 8-times oversampling**

In an 8-times oversampling digital filter, the data is sampled at 8-times the usual sampling frequency. At the normal 44.1kHz sampling rate, noise elements are generated at a frequency 20kHz below the sampling frequency, or 24.1kHz. In order to prevent this noise from passing through the analog filter, a very steep (300dB/oct.) filter must be used. A steep filter of this sort has a deleterious effect on the playback sound. The 8-times oversampling digital filter raises the sampling frequency to 352.8kHz. This, in turn, raises the frequency at which noise begins to 332.8 kHz, so an analog filter with a more gentle attenuation slope (18dB/oct.) can be used. The adverse effects on the playback sound typical of steep filters are eliminated. Waveforms following D/A conversion at the conventional sampling frequency and with 8-times oversampling are given in Figs. 12 and 13.

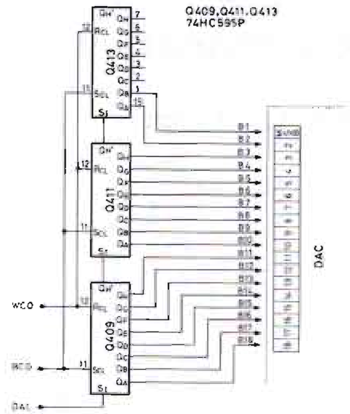



Fig. 11

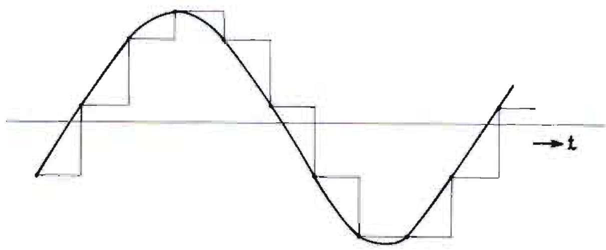



**Fig. 12 Waveform following D/A conversion at conventional sampling frequency(Fs= 44.1kHz)**

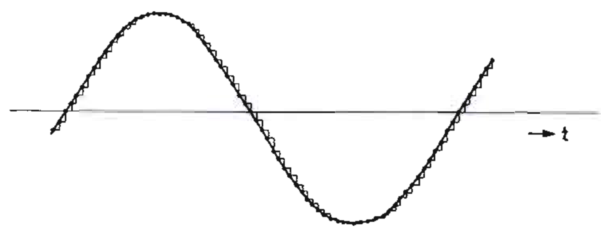



**Fig. 13 Waveform following D/A conversion with 8-times oversampling (Fs = 352.8kHz)**

Fig. 14 and 15 show the difference between the waveforms in Figs. 12 and 13 above on the frequency spectrum.

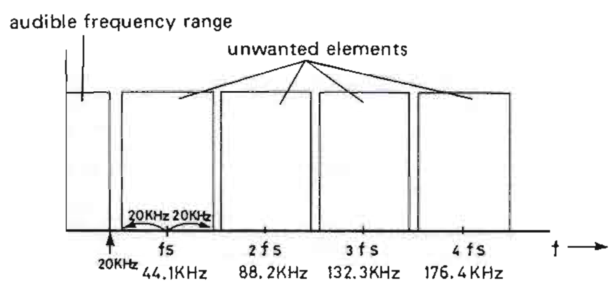



**Fig. 14 Fs = 44.1kHz**

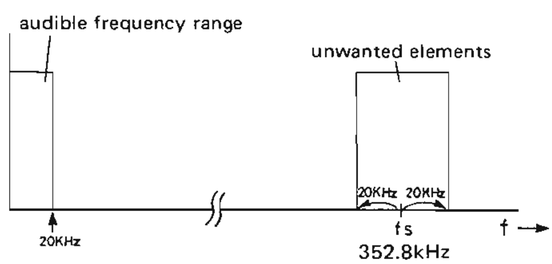
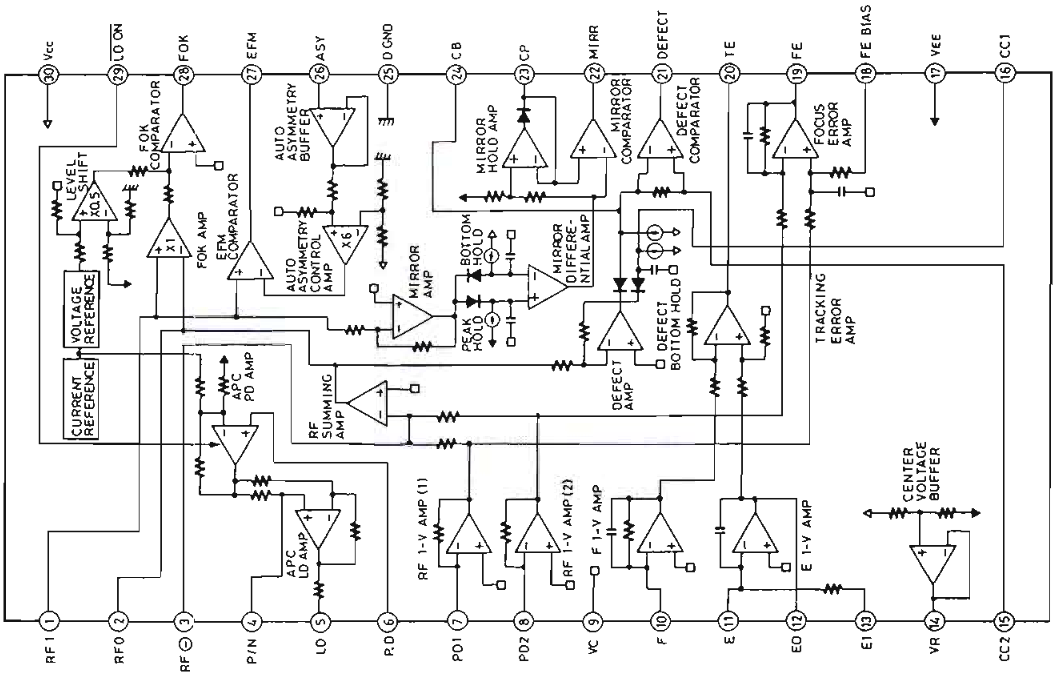



**Fig. 15 Fs = 352.8kHz**

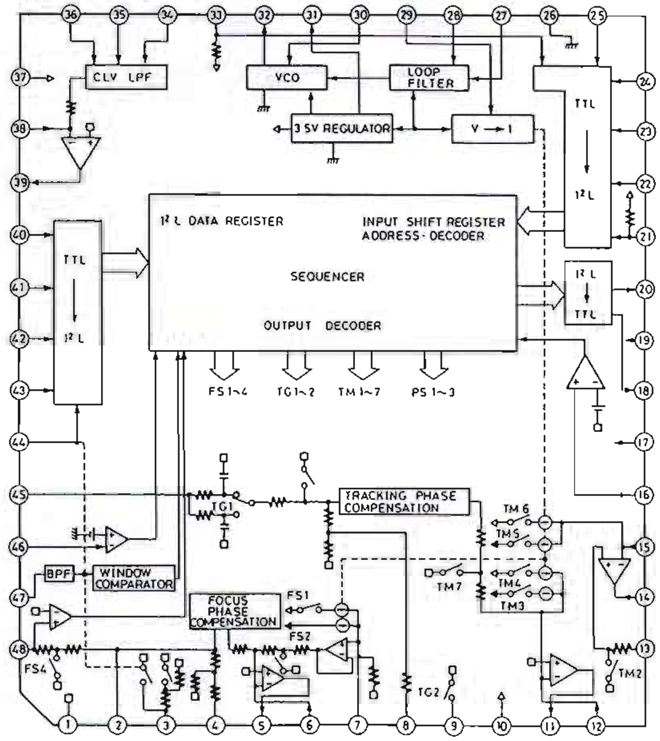
# IC BLOCK DIAGRAM AND DESCRIPTIONS

## CXA1081M (RF Amp)




| Pin No. | Symbol | Function | Pin No. | Symbol | Function |
|---|---|---|---|---|---|
| 1 | RF I | Input terminal of output signal of RF summing amplifier via the coupling capacitor | 16 | CC1 | Defect bottom hold output terminal |
| 2 | RFO | Output terminal of RF summing amplifier | 17 | $V_{EE}$ | Negative power supply terminal |
| 3 | RF– | Input terminal of RF summing amplifier feedback | 18 | FE BIAS | Non-inversion bias terminal of focus error amplifier CMR adjustment of focus error amplifier |
| 4 | P/N | Switching terminal of P-SUB/N-SUB of LD (laser diode) | 19 | FE | Output terminal of focus error amplifier |
| 5 | LD | Output terminal of APC LD amplifier | 20 | TE | Output terminal of tracking error amplifier |
| 6 | PD | Input terminal of APC PD (Pin diode) amplifier | 21 | DEFECT | Output terminal of defect comparator |
| 7 | PD1 | Inversion input terminal of RF I-V amplifier (1) Connect to A+C of PIN diodes. | 22 | MIRR | Output terminal of mirror comparator |
| 8 | PD2 | Inversion input terminal of RF I-V amplifier (2) Connect to B+D of PIN diodes. | 23 | CP | Connection terminal of capacitor for mirror hold Non-inversion input of mirror comparator |
| 9 | VC | Connect to GND. | 24 | CB | Connection terminal of capacitor for defect bottom hold |
| 10 | F | Inversion input terminal of F I-V amplifier Connect to F of PIN diode. | 25 | DGND | Connect to GND |
| 11 | E | Inversion input terminal of E I-V amplifier Connect to E of PIN diode. | 26 | ASY | Auto asymmetry control input terminal |
| 12 | E0 | Output terminal of E I-V amplifier | 27 | EFM | Output terminal of EFM comparator |
| 13 | E1 | Feedback input terminal of E I-V amplifier Gain adjustment of E I-V amplifier | 28 | FOK | Output terminal of FOK comparator |
| 14 | VR | DC voltage output terminal of ($V_{cc}$ + $V_{EE}$)/2 | 29 | LD ON | ON/OFF switching terminal of laser diode |
| 15 | CC2 | Input terminal from defect bottom hold output signal via the coupling capacitor | 30 | Vcc | Positive power supply |

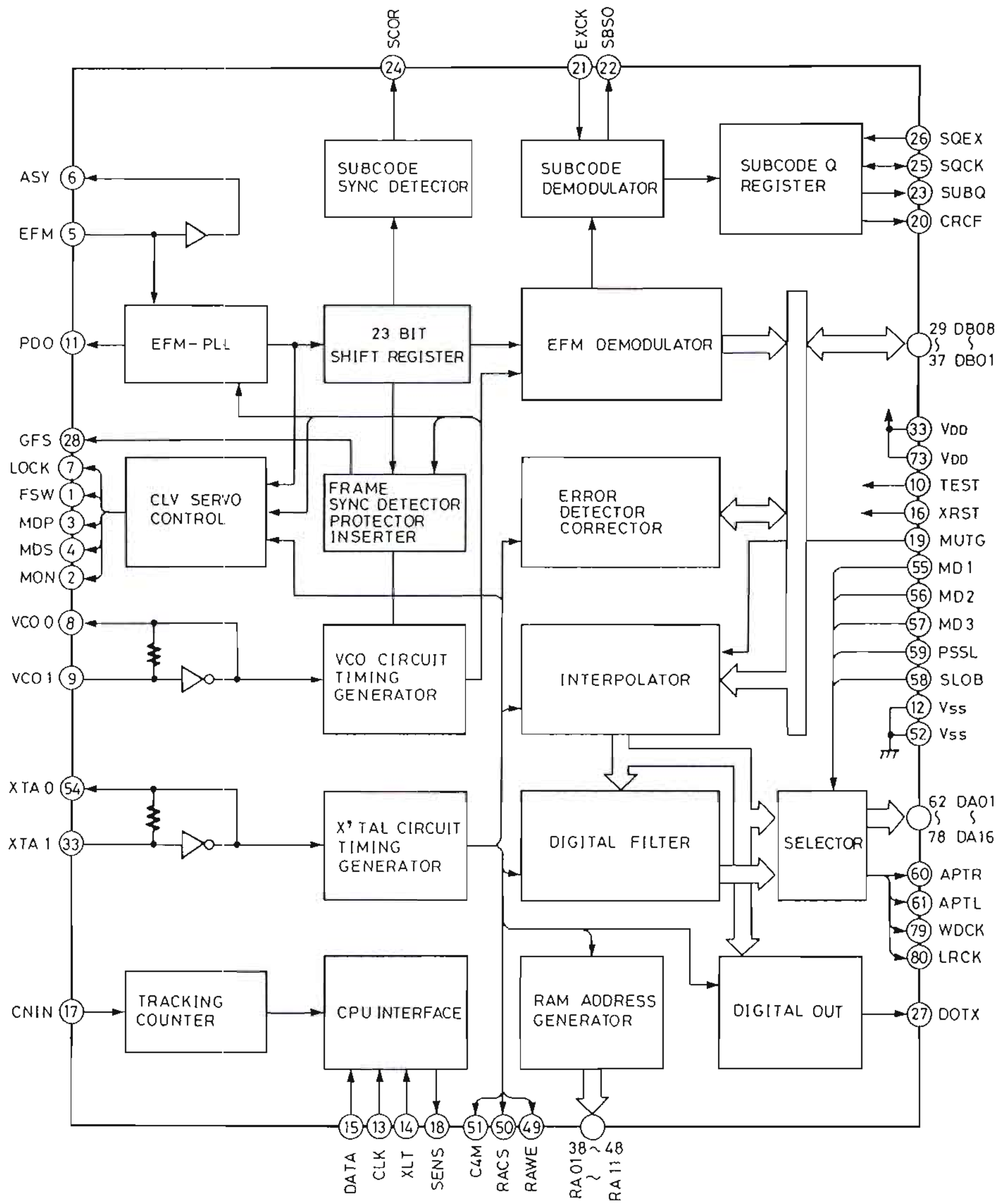
## CXA1082AQ (Servo Signal Processor)



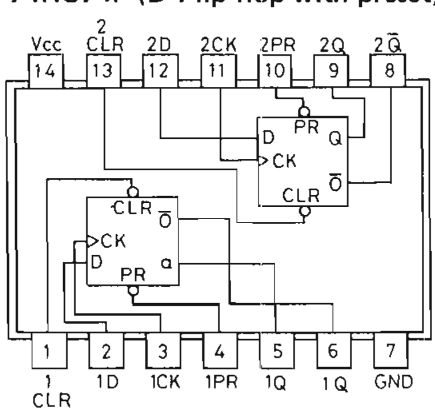

| Pin No. | Symbol | Function |
|---|---|---|
| 2 | FGD | Insert the capacitor between this terminal and pin 3 when drop the high frequency gain of focus servo |
| 3 | FS3 | Switching terminal of high frequency gain of focus servo |
| 4 | FLB | Time constant switching terminal when raise the low frequency gain of focus servo |
| 5<br>11<br>14<br>39 | FEO<br>TAO<br>SLO<br>SPDLO | Operation amplifier output terminals for power transistor drive |
| 6 | FE– | Inversion input terminal of focus amplifier |
| 7 | SRCH | Time constant terminal to make the focus search waveform |
| 8 | TGU | Time constant terminal for high frequency gain switching of tracking |
| 9 | TG2 | Time constant terminal for high frequency gain switching of tracking |
| 12 | TA– | Inversion input terminal of tracking amplifier |
| 13 | SL+ | Non-inversion input terminal of sled amplifier |
| 15 | SL– | Inversion input terminal of sled amplifier |
| 16 | SSTOP | Limit switch ON/OFF detector signal terminal for disc innermost position detector |
| 17 | FSET | Terminal of peak of phase compensation of focus tracking and of setting of LPF |
| 18<br>20 | SENS<br>C.OUT | Output terminals for microcomputer and interface |
| 27 | BW | Time constant terminal of loop filter |

| Pin No. | Symbol | Function |
|---|---|---|
| 28 | PDI | Input terminal of phase comparator output PDO |
| 21<br>22<br>23<br>24<br>25<br>33 | DIRCT<br>XRST<br>DATA<br>XTL<br>CLK<br>LOCK | Input terminals for microcomputer and interface |
| 29 | ISET | Flow the current to decide the focus search, track jump, and kick height |
| 30 | VCOP | VCO free run frequency is proportion to resistor value between pins 30 and 31 |
| 32 | C864 | VCO (8.64MHz) output terminal |
| 34 | MDP | Connection terminal to terminal MDP of CXD1125QZ |
| 35 | MON | Connection terminal to terminal MON of CXD1125QZ |
| 36 | FSW | LPF time constant terminal of CLV servo error signal |
| 38 | SPDL– | Inversion input terminal of spindle drive amplifier |
| 40<br>41<br>42<br>44 | WDCK<br>FOK<br>MIRR<br>DFCT | Input terminals for microcomputer and interface |
| 45 | TE | Tracking error signal input terminal |
| 46 | TZC | Tracking zero cross comparator input terminal |
| 47 | ATSC | Window comparator input terminal for ATSC detection |
| 48 | FE | Focus error signal input terminal |

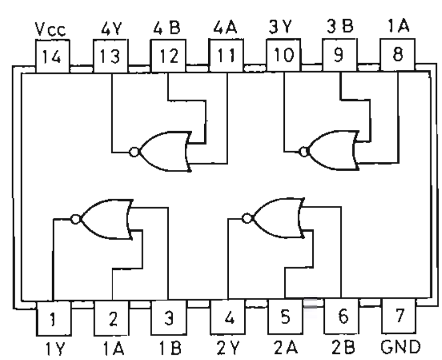
## CXD1125QZ (Digital Signal Processor)




## 74HC74P (D Flip-flop with preset)

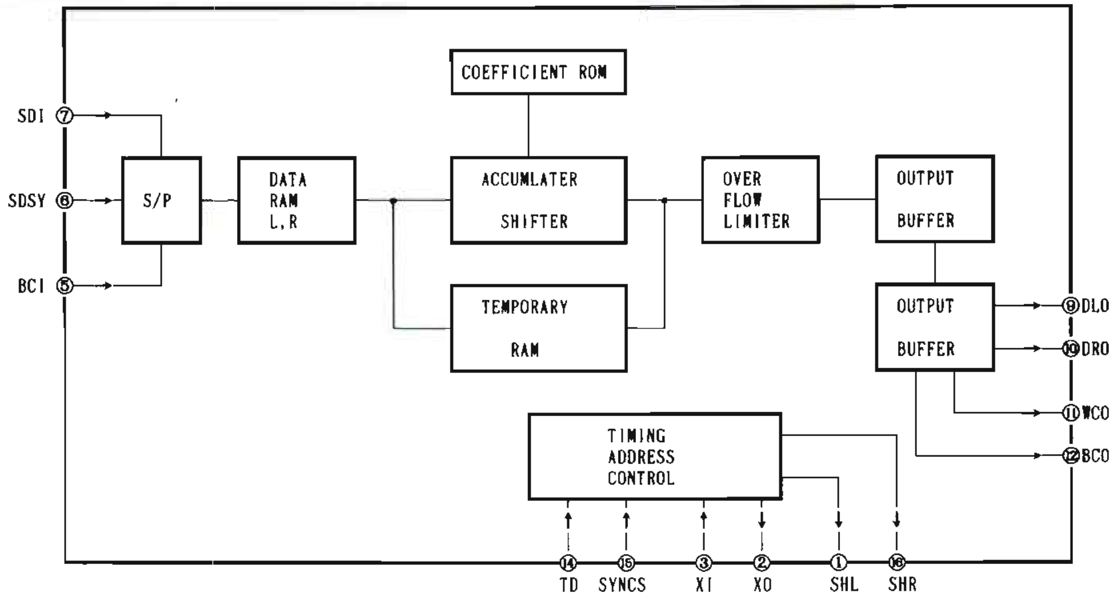



## 74HC02 (NOR gates)



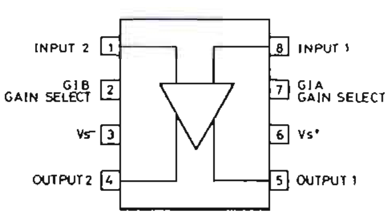
| Pin No. | Symbol | Function |
|---|---|---|
| 1 | FSW | Time constant switching output terminal of output filter of spindle motor |
| 2 | MON | ON/OFF control output terminal of spindle motor |
| 3 | MDP | Drive output terminal of spindle motor. Rough control when mode CLV-S and phase control when mode CLV-P |
| 4 | MDS | Drive output terminal of spindle motor. Speed control when mode CLV-P |
| 5 | EFM | EFM signal input terminal from RF amplifier |
| 6 | ASY | Output terminal to control the slice level of EFM signal |
| 7 | LOCK | GFS sampling terminal |
| 8 | VCOO | VCO output terminal. 8.6436MHz when lock to EFM signal |
| 9 | VCOI | VCO input terminal |
| 10 | TEST | 0V |
| 11 | PDO | Phase comparator output terminal of EFM signal and VCO/2 |
| 12 | Vss | Ground |
| 13 | CLK | Serial data transmitter clock input terminal from microcomputer |
| 14 | XLT | Latch input terminal from microcomputer |
| 15 | DATA | Serial data input terminal from microcomputer |
| 16 | XRST | System rest input terminal. Reset at low level. |
| 17 | CNIN | Tracking pulse input terminal |
| 18 | SENS | Inner condition output terminal correspond to address |
| 19 | MUTG | Muting input terminal |
| 20 | CRCF | CRC check output terminal of subcode Q |
| 21 | EXCK | Clock input terminal for serial output of subcode |
| 22 | SBSO | Serial output terminal of subcode |
| 23 | SUBQ | Subcode Q output terminal |
| 24 | SCOR | Subcode sink S0 + S1 output terminal |
| 25 | SQCK | Clock terminal to read the subcode Q |
| 26 | SQEX | Selector input terminal of SQCK |
| 27 | DOTX | Digital output terminal |
| 28 | GFS | Indicator output of lock condition of frame sync |
| 29 ~ 32 | DB08 ~ DB05 | Data terminals of external RAM |
| 33 | $V_{DD}$ | +5V |
| 34 ~ 37 | DB04 ~ DB01 | Data terminals of external RAM |
| 38 ~ 48 | RA01 ~ RA11 | Address output terminals of external RAM |
| 49 | RAWE | Write enable signal output to external RAM |
| 50 | RACS | Chip selector signal output to external RAM |
| 51 | C4M | Divider output of crystal. f=4.2336MHz |
| 52 | Vss | Ground |
| 53 | XTAI | Input terminal of crystal oscillator |
| 54 | XTAO | Output terminal of crystal oscillator |
| 55 ~ 57 | MD1 ~ MD3 | Mode switching input terminals |
| 58 | SLOB | Code switching input of audio data output. |
| 59 | PSSL | Mode switching input of audio data output. Serial output at low level. Parallel output at high level |
| 60 | APTR | Control output for aperture correction. High level when Rch. |
| 61 | APTL | Control output for aperture correction. High level when Lch. |
| 62 | DA01 | DA01 (LSB of parallel sound output) output when PSSL = H. C1F1 output when PSSL = L |
| 63 | DA02 | DA02 output when PSSL = H. C1F2 output when PSSL = L. |
| 64 | DA03 | DA03 output when PSSL = H. C2F1 output when PSSL = L. |
| 65 | DA04 | DA04 output when PSSL = H. C2F2 output when PSSL = L. |
| 66 | DA05 | DA05 output when PSSL = H. C2FL output when PSSL = L. |
| 67 | DA06 | DA06 output when PSSL = H. C2PO output when PSSL = L. |
| 68 | DA07 | DA07 output when PSSL = H. RFCK output when PSSL = L. |
| 69 | DA08 | DA08 output when PSSL = H. WFCK output when PSSL = L. |
| 70 | DA09 | DA09 output when PSSL = H. PLCK output when PSSL = L. |
| 71 | DA10 | DA10 output when PSSL = H. UGFS output when PSSL = L. |
| 72 | DA11 | DA11 output when PSSL = H. GTOP output when PSSL = L. |
| 73 | $V_{DD}$ | Power supply (5V) |
| 74 | DA12 | DA12 output when PSSL = H. RAOV output when PSSL = L. |
| 75 | DA13 | DA13 output when PSSL = H. C4LR output when PSSL = L. |
| 76 | DA14 | DA14 output when PSSL = H. C210 output when PSSL = L. |
| 77 | DA15 | DA15 output when PSSL = H. C210 output when PSSL = L. |
| 78 | DA16 | DA16 (MSB of parallel sound output) output when PSSL = H. DATA output when PSSL=L |
| 79 | WDCK | Strobe signal output. 176.4kHz when DF is on. 88.2kHz when DF is off. |
| 80 | LRCK | Strobe signal output. 88.2kHz when DF is on. 44.1kHz when DF is off. |

## YM3414 (Eight times over sampling digital filter)

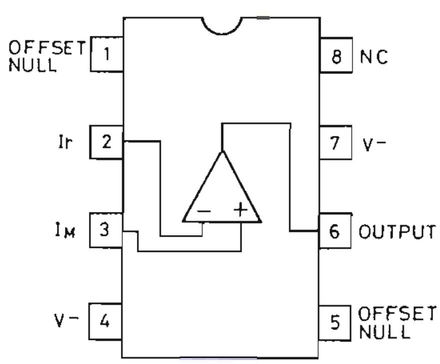



| PIN NO. | TERMINAL | I/O | DESCRIPTION |
|---|---|---|---|
| 1 | SHL | O | When one DAC(TD=L):Deglitching signal of left channel (when four times) When two DAC(TD=H):Deglitching signal of left and right channels(when eight times) |
| 2<br>3 | XO<br>XI | O<br>I | Connect the x'tal oscillator between XI and XO.<br>The clock frequency is 384×Fs. |
| 4 | VDD2 | | +5V:Power supply terminal for x'tal oscillator and deglitching signal. |
| 5<br>6<br>7 | BCI<br>SDSY<br>SDI | I<br>I<br>I | Bit clock input terminal.<br>Clock shown L/Rch division of input data and input timing.<br>16 bits serial data input terminal. |
| 8 | VDDI | | +5V:Power supply terminal for digital signal. |
| 9 | DLO | O | When one DAC(TD=L):Output terminal for L/R channel data (When four times) When two DAC(TD=H):Output terminal for L channel data (when eight times) |
| 10<br>11<br>12 | DRO<br>WCO<br>BCO | O<br>O<br>O | R channel data output terminal.<br>Word clock of output data DLO/DRO.<br>Bit clock of output data. |
| 13 | VSS | | Ground terminal |
| 14 | TD | I | 1DAC/2DAC selector terminal: 1DAC at low. 2DAC at high. |
| 15 | SYNCS | I | Asynchronous input jitter absorption synchronous signal.<br>Synchronous input at high level. SDSY inhibiting at low level. |
| 16 | SHR | O | R channel deglitching signal when one DAC. |

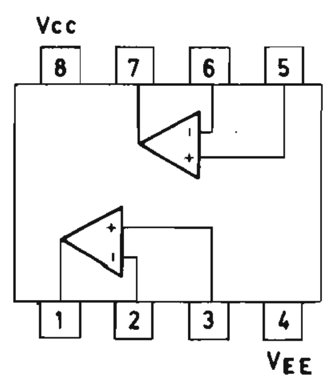
## NJM592D8 (Operation amp)



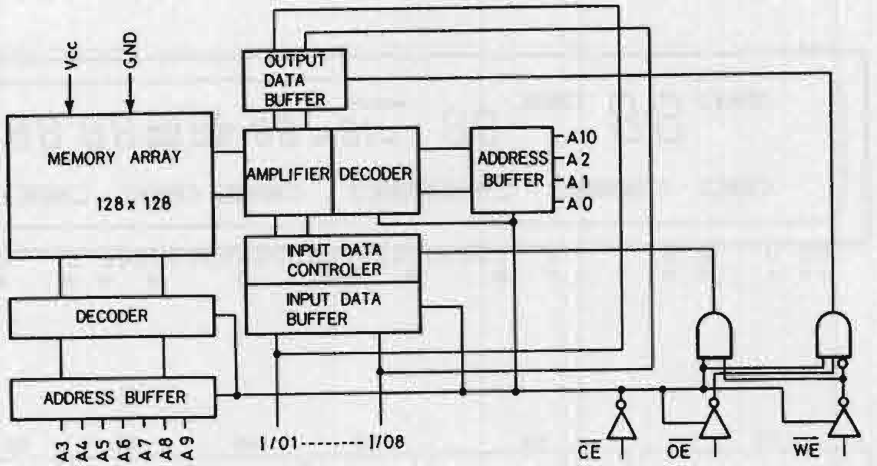

## μPC813C (Operation amp)

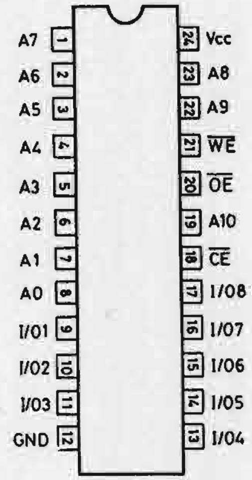



## NJM5532DD (Operation amp)

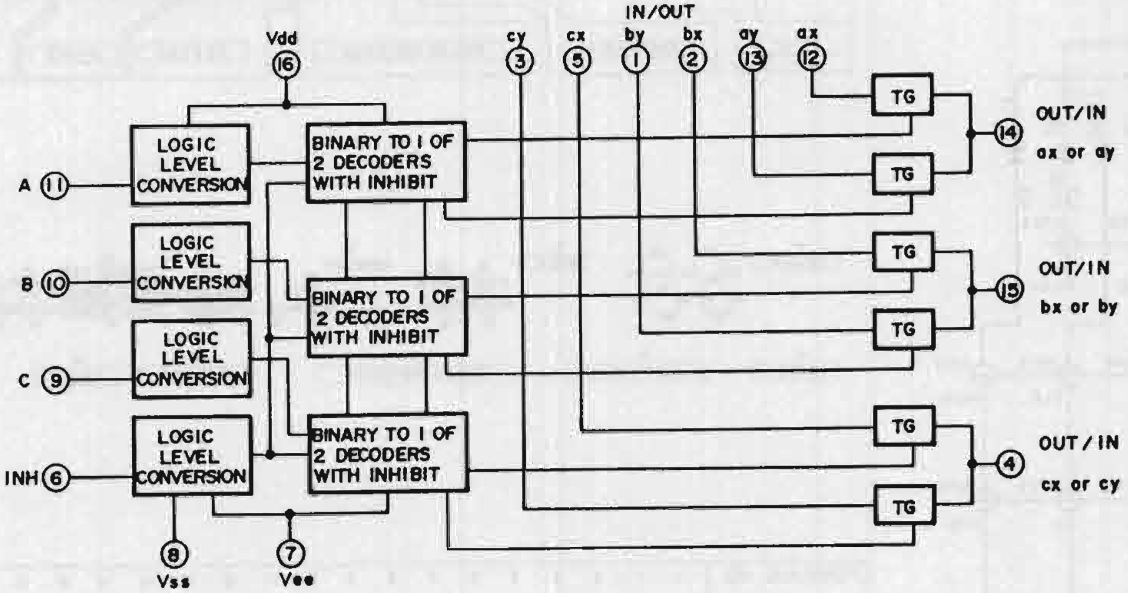


## LC3517AS-15 (Static RAM)

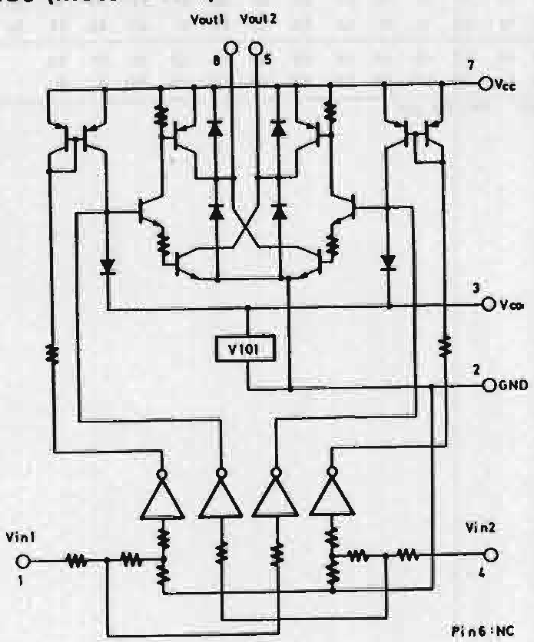


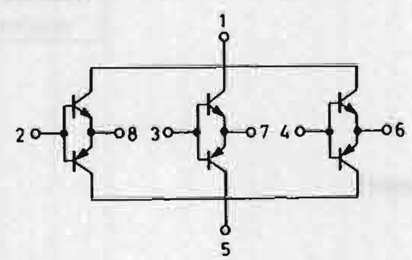

## µPD4053BC (Analog Switch)



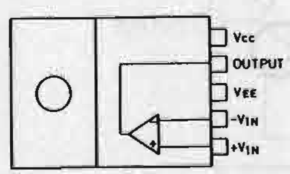

## LB1630 (Motor Drive)




## STA341M (Transistor Array)

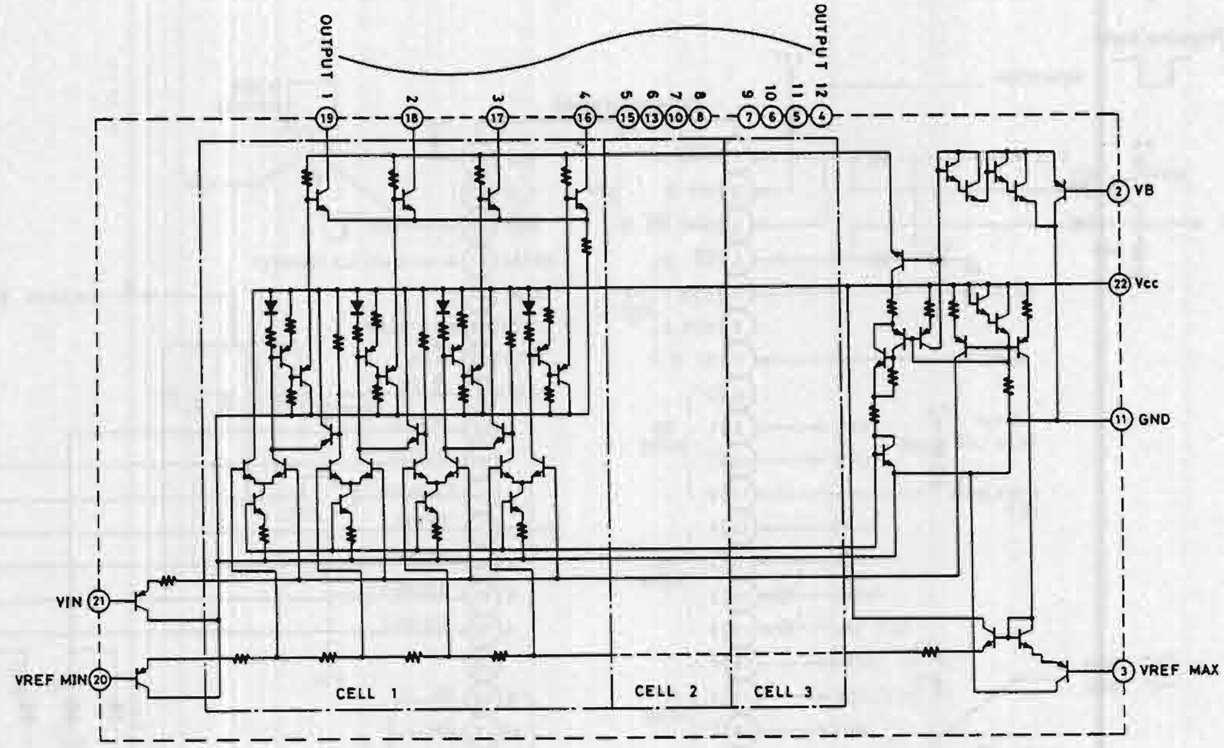



## LA6500 (Power OP Amp)

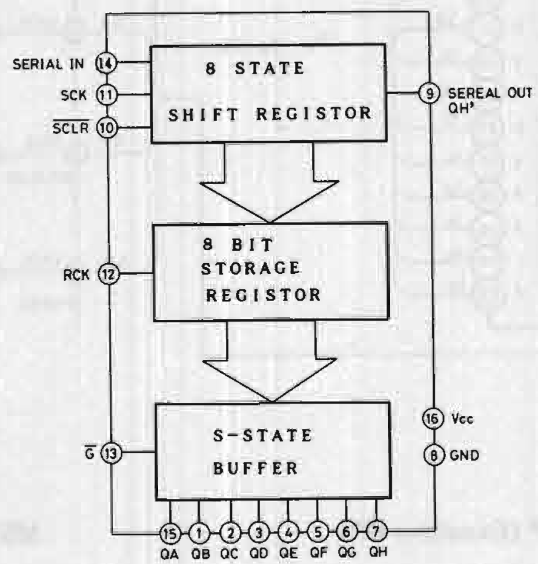





## IR2406 (LED driver)




## 74HC595P (8 bits shift resistor)

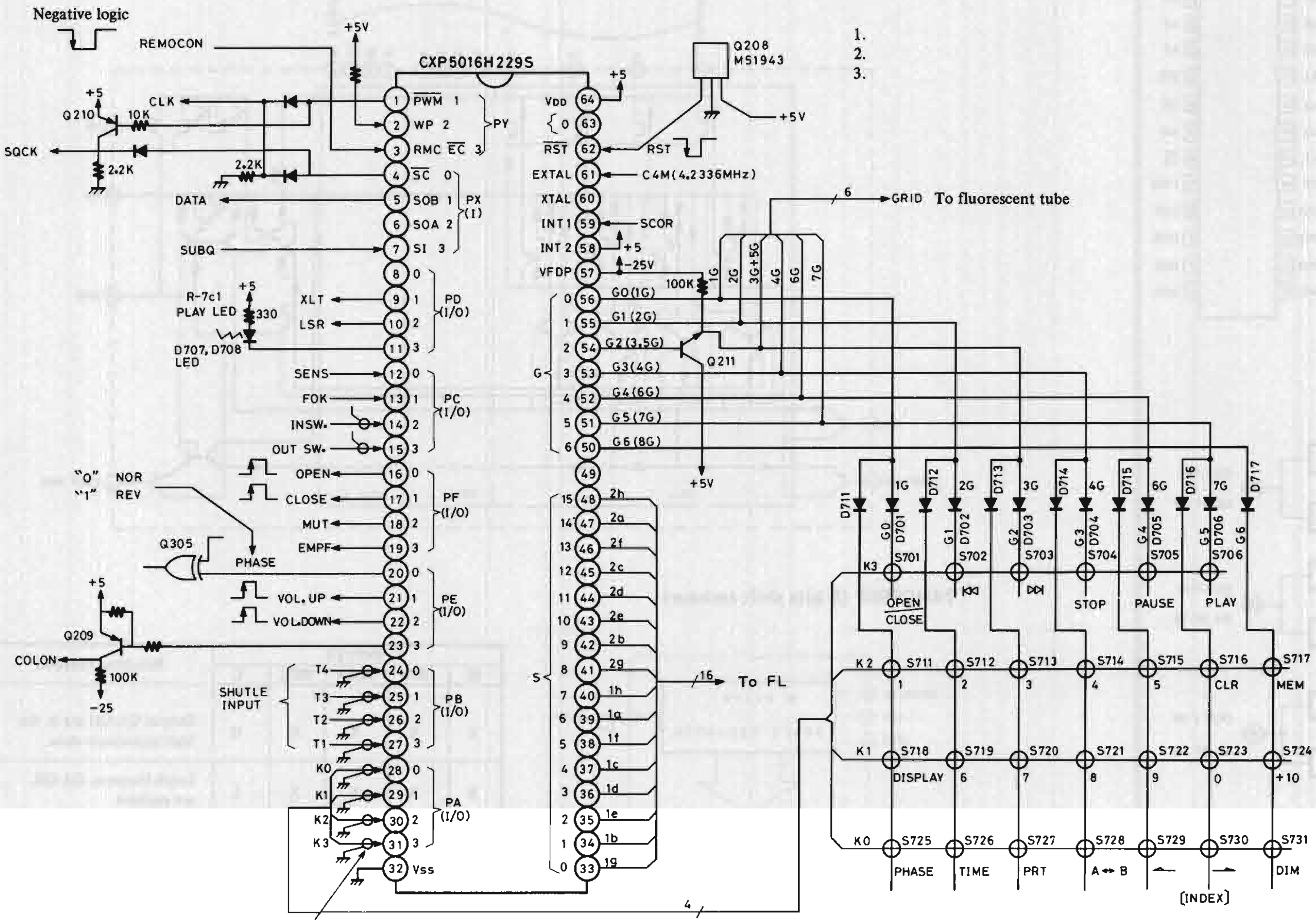



| INPUTS | | | | | Resulting function |
|---|---|---|---|---|---|
| SI | SCK | SCLR | RCK | G | |
| X | X | X | X | H | Output QA-QH are in the high impedance state. |
| X | X | X | X | L | Latch Outputs, QA-QH, are enabled. |
| X | X | L | X | X | Shift registor contents are cleared. |
| L | ↑ | H | X | X | A low logic level is shifted into the shift registor. |
| H | ↓ | H | X | X | A high logic level is shifted into the shift registor. |
| X | ↓ | H | X | X | Shift registor remains unchanged. |
| X | X | X | ↑ | X | Shift registor data stored in the 8-bit storage resistor. |
| X | X | X | ↓ | X | Storage registor remains unchanged. |

X:Don't Care

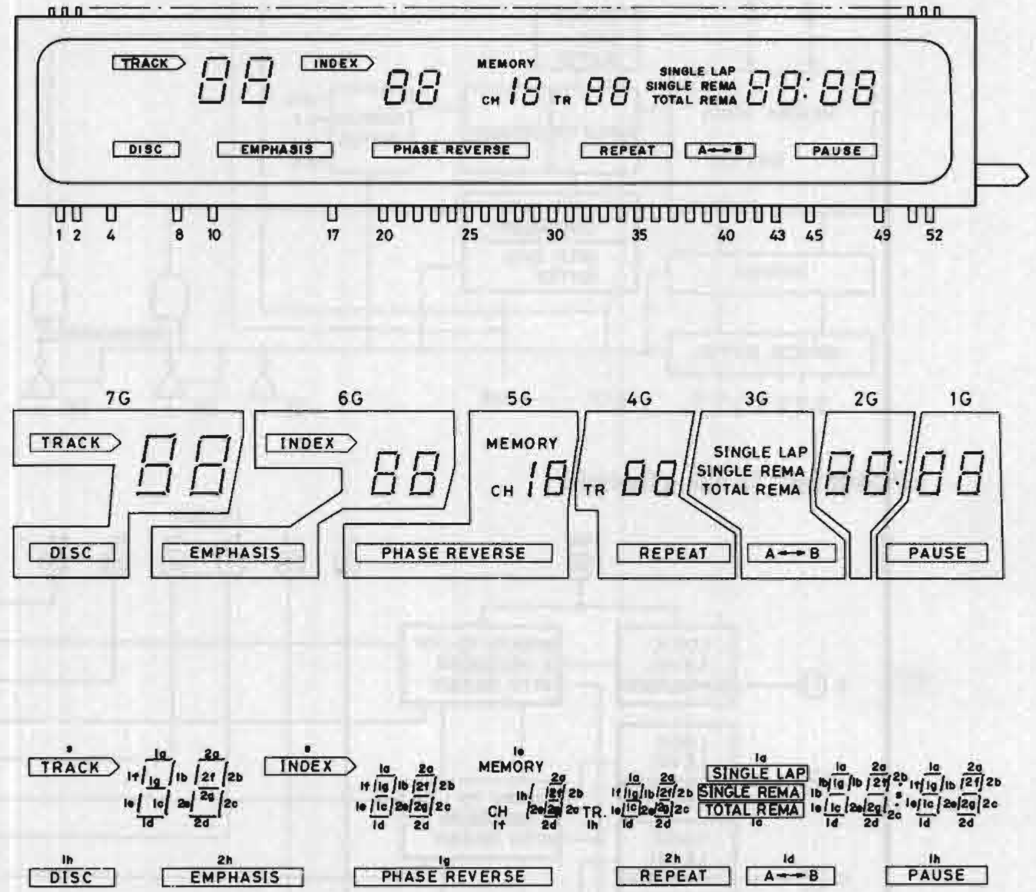
1. Output disable (QA-QH)
2. Output enable (QA-QH)
3. Clear the shift registor

## CXP5016H-229S (Microprocessor)




1.
2.
3.

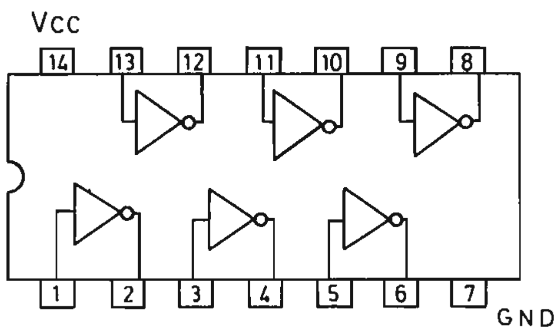
## FIP13JM (Fluorescent tudbe)



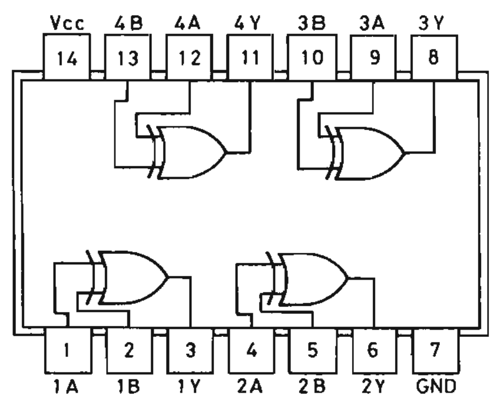

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TERMINAL NO. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| ELECTRODE | F | F | NP | 7G | NP | NP | NP | 7G | NP | 6G | NP | NP | NP | NP | NP | NP | 6G | NP |
| TERMINAL NO. | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 |
| ELECTRODE | NP | 5G | 1g | 1b | 1e | 1d | 1c | 1f | 1a | 5G | 1h | 2h | S | 4G | 2a | 2f | 2c | 2d |
| TERMINAL NO. | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | | |
| ELECTRODE | 4G | 3G | 2e | 2b | 2g | 3G | 2G | NP | 1G | NP | NP | NP | 1G | NP | F | F | | |

NOtes F: Filament NP: No pin
G: Grid

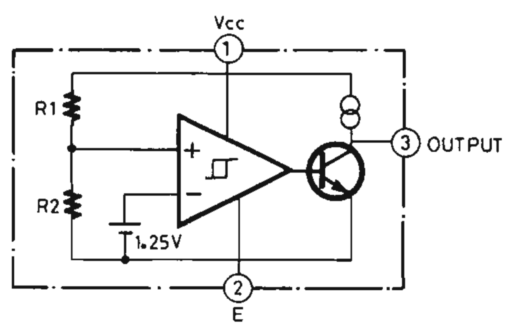
## 74HC04P (Hex inverter)




## 74HC86P (Exclusive 0R)




## M51943ASL (System reset)



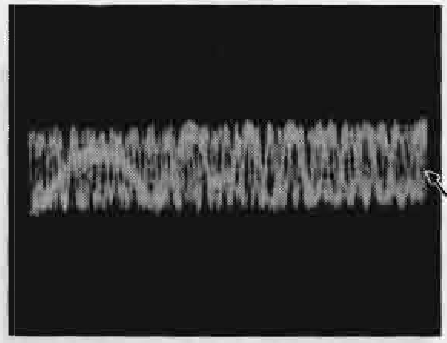
# ADJUSTMENT PROCEDURES

**Instruments required:** Dual trace oscilloscope (Use the high impedance probe: 10:1), Frequency counter, AF oscillator, AC voltmeter, Distortion analyzer, Insulated adjustment bar
Test disc (SONY : YEDS18), 4P socket P201 (Part No. 25050138)

**Servo circuit adjustment**
Preparation: Disconnect the five opto. fiber cabels and Analog circuit pc board ass'y. (Refer page 6)

**1.VCO frequency adjustment**
Connect the frequency counter to test point PLCK.
Turn the power switch to ON (No load the disc).
Adjust R228 until the frequency counter reading becomes 4.32±0.01MHz.
After adjustment, disconnect the frequency counter.

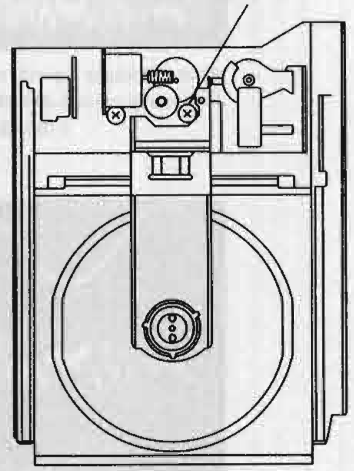
**2.Tracking offset adjustment**
Playback the track 2 of test disc.
Turn R204 to the minimum position (counterclockwise).
Connect the oscilloscope to pin 4 of plug P201.
Adjust RV102 until the center of tracking error signal on the oscillo scope becomes GND (Ground) level.
Turn R204 to the mechanical center.
After adjustment, disconnect the oscilloscope.



GND level

Photo 1
Range: Vertical: 0.5V/div.
Holizontal: 0.5mS/div.

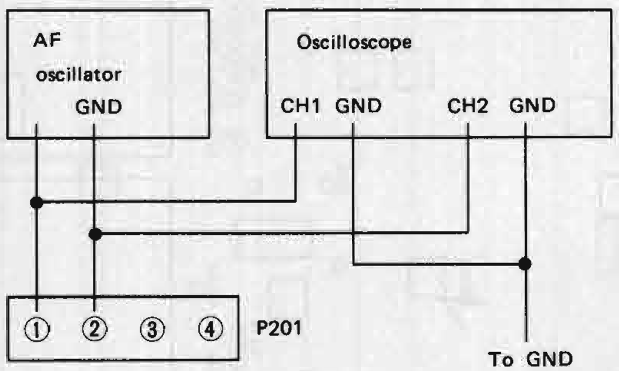
RV102



Note: The pickup moves to the outer edge of the disc and stops at 15second intervals. When this happens, press the PLAY button again.

**3.Focus gain adjustment**
Set the output of AF oscillator to 800Hz, 1~1.5Vp-p.
Playback the track 2 of test disc.
Connect the oscilloscope and the AF oscillator as shown below.
Adjust R203 until the 800Hz components of channel 1 and 2 become the same level.
After adjustment, disconnect the oscilloscope and AF oscillator.

Photo 2
Range: Vertical: 0.2V/div.
Holizontal: 0.5mS/div.






**4.Tracking gain adjustment**
Set the output of AF oscillator to 1.2kHz, 1~1.5Vp-p.
Playback the track 2 of test disc.
Connect the oscilloscope and the AF oscillator as shown below.
Adjust R204 until the 1.2kHz components of channel 1 and 2 become the same level.
After adjustment, disconnect the oscilloscope and AF oscillator.

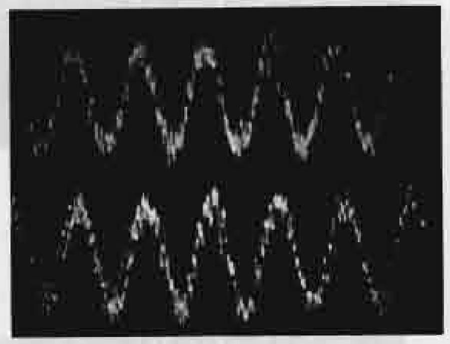
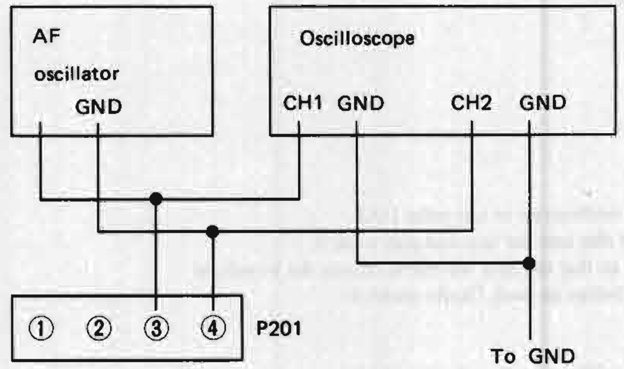
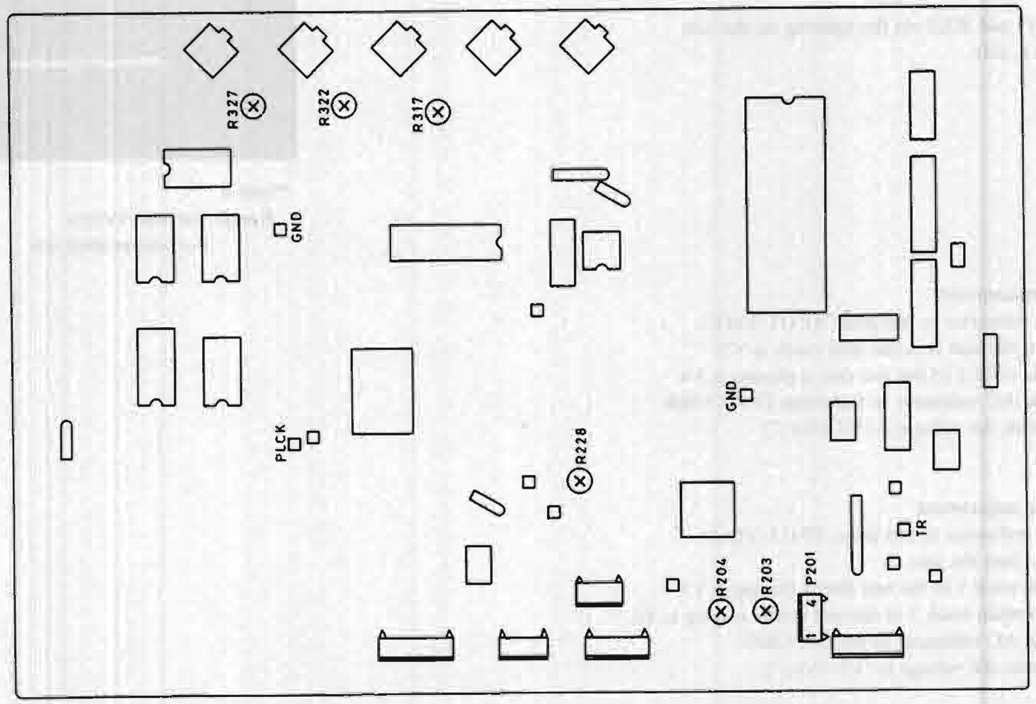


Photo 3
Range: Vertical: 0.2V/div.
Holizontal: 0.5mS/div




NOTE: After adjustment of servo circuit, connect the five opto. fiver cables and Analog circuit pc board ass'y.




**2.Opto. transmitter circuit adjustment**
Adjust after switching on more than 2 minutes.

**2-1 Bit clock adjustment**
Connect the oscilloscope to test point BCK.
Adjust R327 so that the duty ratio of the waveform is 4.5:5.5.
NOTE: Adjust R327 via the opening on the side bracket L side.

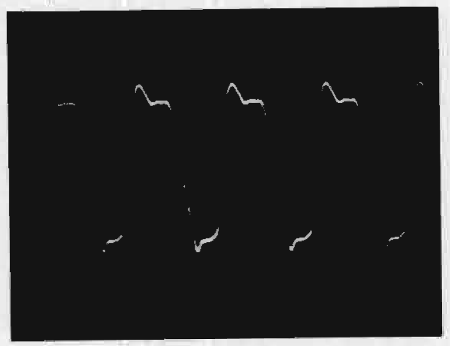
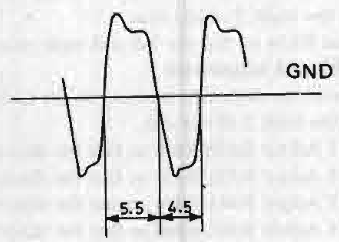


Photo 4
Range: Vertical: 1V/div.
Holizontal: 50nS/div.




Duty ratio

**2-2 Word clock (WCK) adjustment**
Put the unit into the stop mode.
Connect the oscilloscope to test points WCK and BCK.
Adjust R411 so that there is a 50ns gap between the leading edge of WCK and that of BCK. (The BCK leading edge should come 50ns after the leading edge of WCK.)
(Refer photo 5)

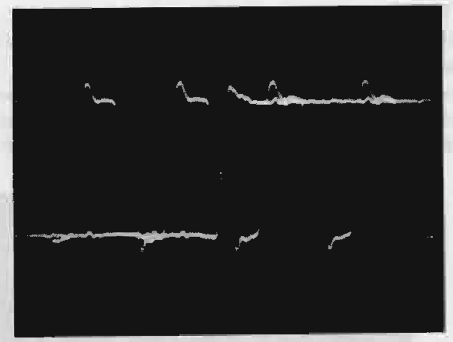


Photo 5
Range: Vertical: 1V/div.
Holizontal: 50nS/div.
Synchronize with WCK.

Connect the oscilloscope to test point DAL.
Load the test disc into the unit and play track 2.
Adjust R317 so that the data waveform crosses the waveform immediately before its peak. (Refer photo 6)

Connect the oscilloscope to test point DAR.
Load the test disc into the unit and play track 2.
As above, adjust R322 so that the data waveform crosses the waveform immediately before its peak. (Refer photo 6)

Note: Adjust R317 and R322 via the opening on the side bracket L side.

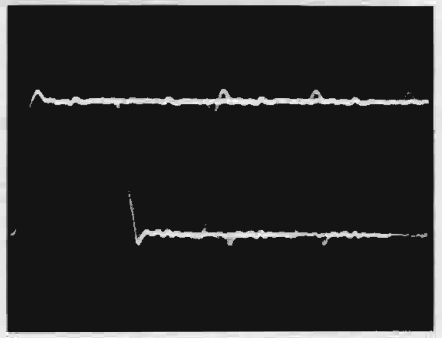


Photo 6
Range: Vertical: 1V/div.
Holizontal: 50nS/div.

**3. Muting level adjustment**
Connect the AC voltmeter to test point TP411 (VMU).
The voltage when the unit is in the stop mode is V3.
The voltage while track 1 of the test disc is playing is V4.
Next, connect the AC voltmeter to test point TP412 VMR.
Adjust R409 so that the voltage is (V3+V4)/2

**4. Emphasis level adjustment**
Connect the AC voltmeter to test point TP413 (VEM).
Load the test disc into the unit.
The voltage while track 1 of the test disc is playing is V5.
Next, the voltage while track 2 of the test disc is playing is V6.
Next, connect the AC voltmeter to pin 6 of Q407.
Adjust R418 so that the voltage is (V5+V6)/2.

**5. D/A converter adjustment**
**5-1. Audio output level adjustment**
Connect the AC voltmeter to test point TP403.
Adjust R433 so that the voltage is 10.00±0.03V.
Connect a 2needle AC voltmeter to the audio output (FIXED) terminals.
Play the track 2 of test disc.
Adjust R434 so that the left and right channel output levels are the same.
**5-2. B1~B4 adjustment**
Connect the distortion analyzer to the audio output (FIXED) terminals.
Play the track 2 of test disc.
Step 1 Adjust R439/R440 so that the distortion analyzer reading is minimum. (Refer photo 7)
Step 2 Adjust R435/R436 so that the distortion analyzer reading is minimum. (Refer photo 8)
Step 3 Adjust R443/R444 so that the distortion analyzer reading is minimum. (Refer photo 9)
Step 4 Adjust R447/R448 so that the distortion analyzer reading is minimum. (Refer photo 10)



Step 5 Repeat the steps 1,2,3 and 4 until no further adjustment is necessary.

Note 1: Synchronizing the distortion waveform with the signal on the oscilloscope makes it easier to observe.
2: Turn both 400Hz HPF and 30kHz LPF on the distortion analyzer ON.

Reference: The audio output offset voltage (voltage at R511, R512 adjustment point arrows) in the stop mode should be less than 10mV.

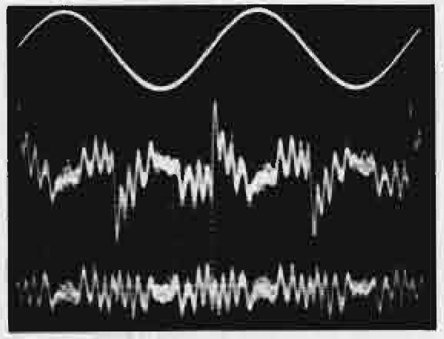


Photo 7 Output waveform
Distrotion ratio: 0.00668%
0.00324%

Photo 8 Output waveform
Distrotion ratio: 0.00435%
0.00213%

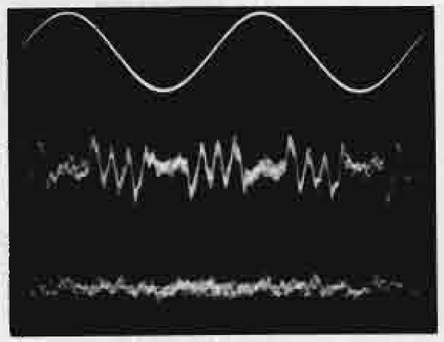


Photo 9 Output waveform
Distrotion ratio: 0.00362%
0.00186%

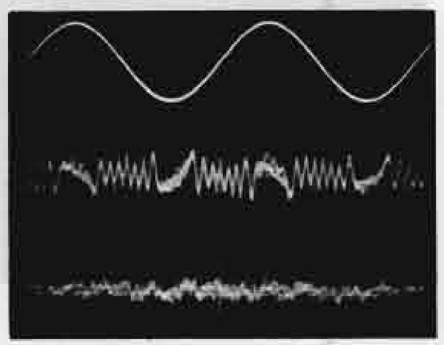
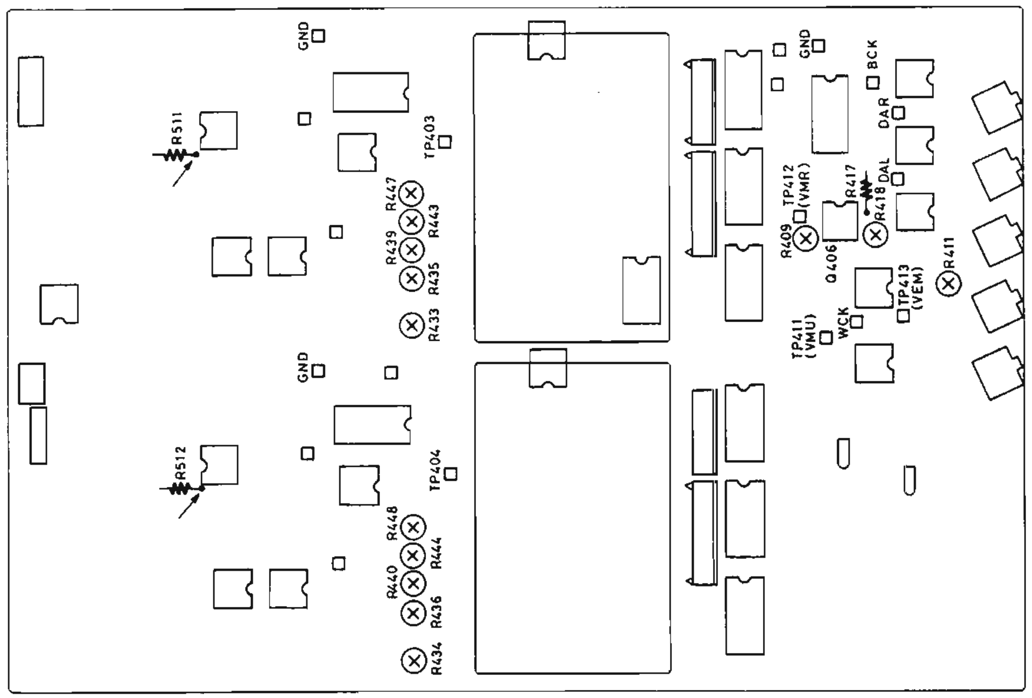
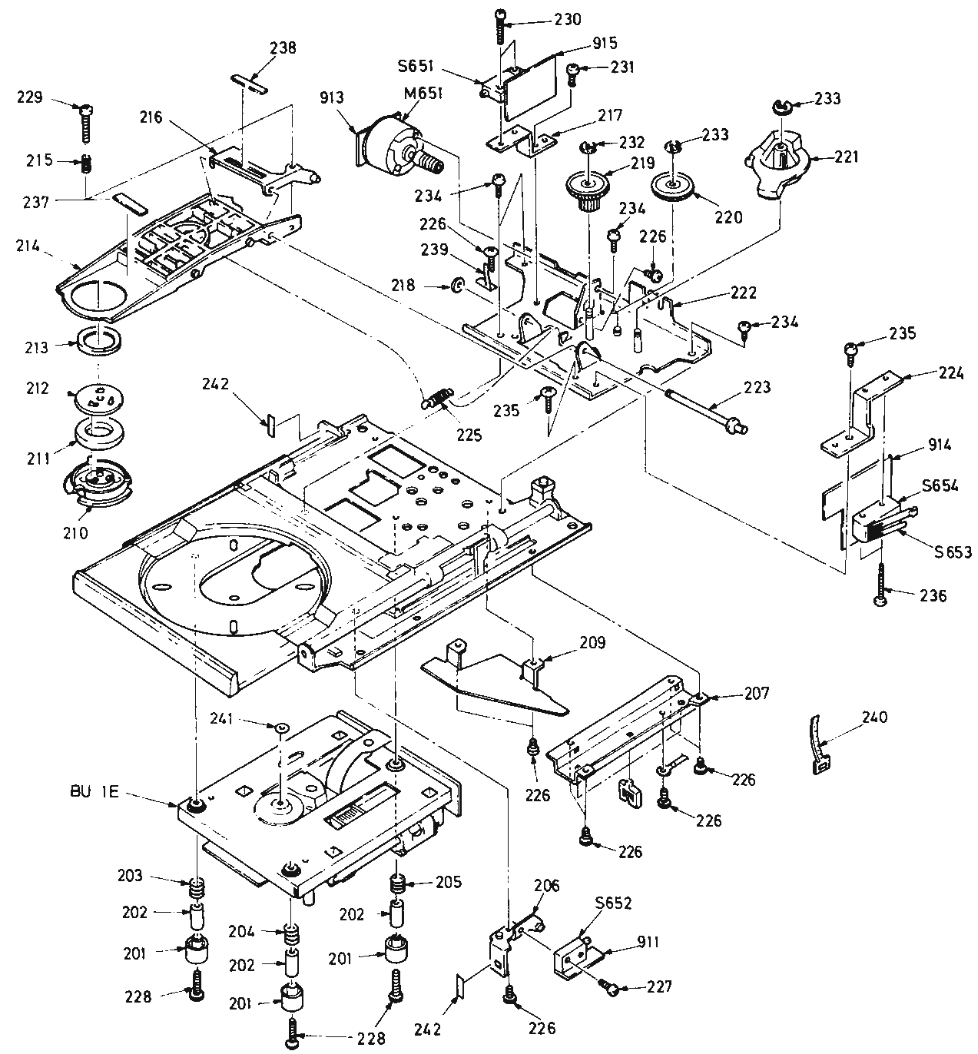
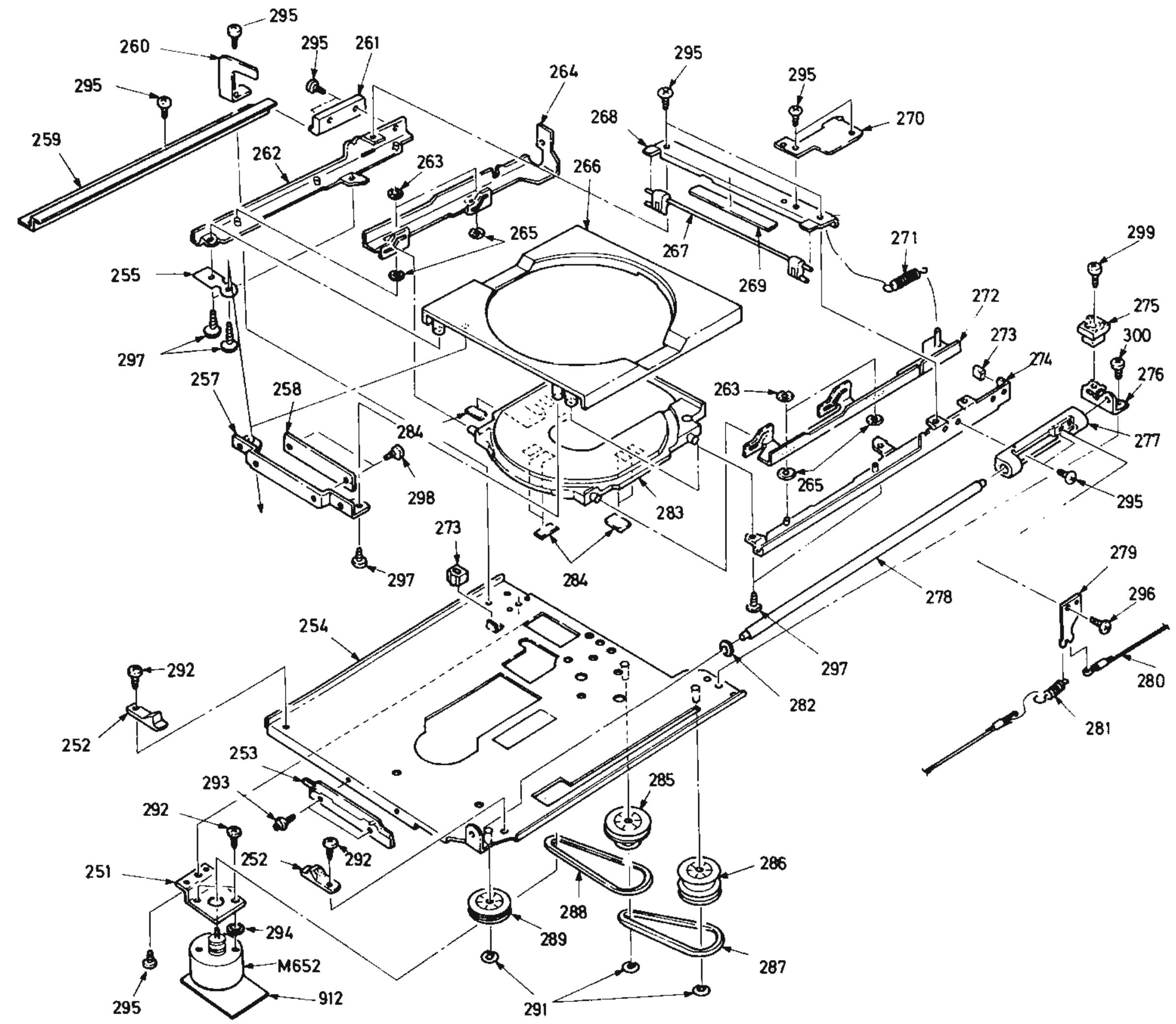


Photo 10 Output waveform
Distrotion ratio: 0.00335%
0.00166%



# MECHANISM EXPLODED VIEW





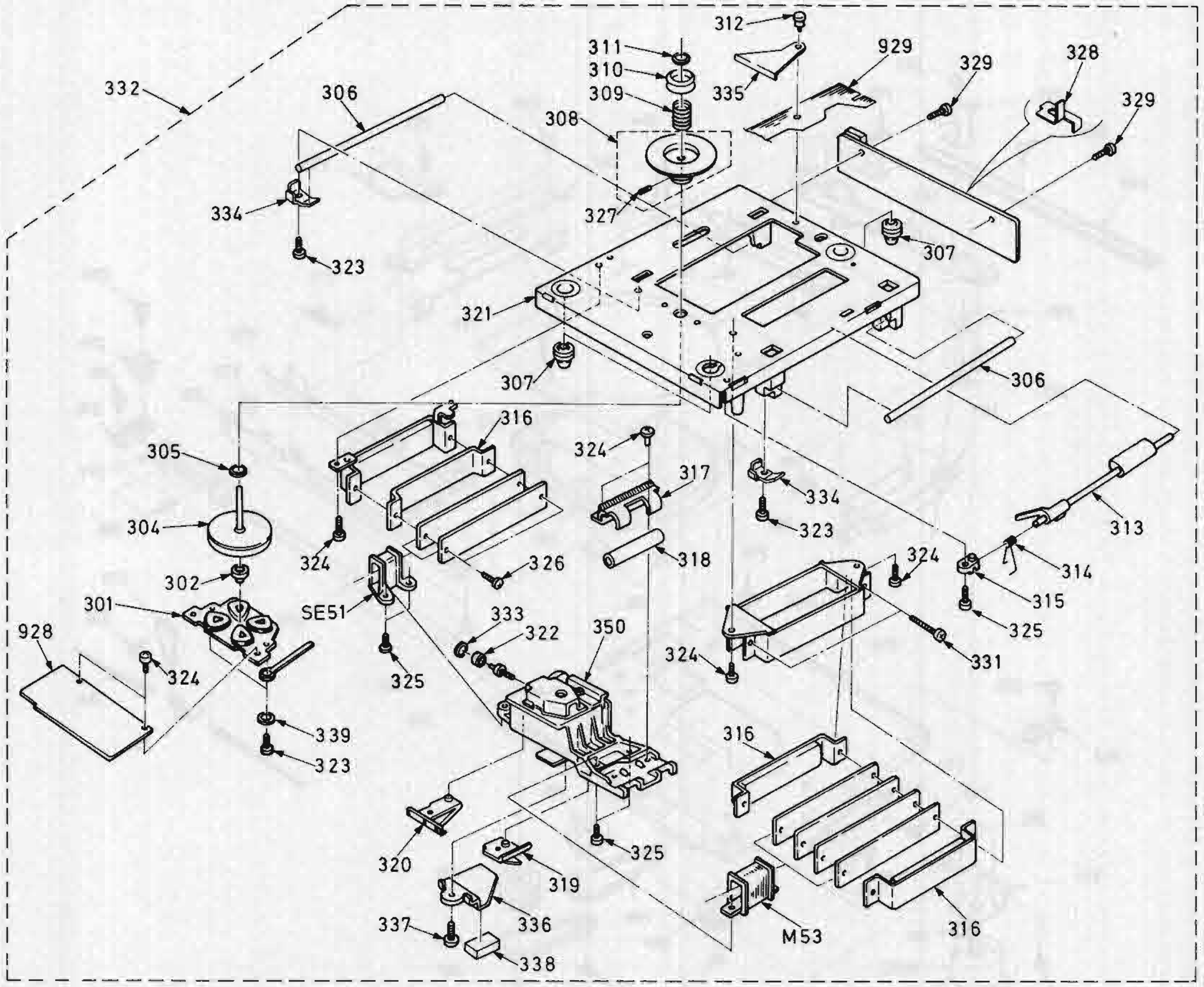
| REF.NO. | PART NO. | DESCRIPTION |
|---|---|---|
| 201 | 27190580 | Holder |
| 202 | 27270225 | Spacer |
| 203 | 27180367 | Spring G |
| 204 | 27180368 | Spring S |
| 205 | 27180369 | Spring B |
| 206 | 27141170 | Bracket, switch C |
| 207 | 27130509 | Bracket RO |
| 209 | 27141171 | Bracket, belt |
| 210 | 27301041 | Cap CH |
| 211 | 27301042 | Magnet |
| 212 | 27301043 | York |
| 214 | 27301044 | Arm ass'y |
| 215 | 27180370 | Spring |
| 216 | 27301045 | Adjustment plate |
| 217 | 27141172 | Bracket, switch D |
| 218 | 27270227 | Washer |
| 219 | 27301046 | Gear A |
| 220 | 27301047 | Gear B |
| 221 | 27301048 | Cam gear |
| 222 | 27100148 | Sub-chassis |
| 223 | 27260238 | Shaft arm |
| 224 | 27141192 | Bracket, switch C |
| 225 | 27180371 | Spring arm |
| 226 | 82542603 | 2.6B+3F(BC), Binding screw |
| 227 | 82112608 | 2.6P+8F, Pan head screw |

| REF.NO. | PART NO. | DESCRIPTION |
|---|---|---|
| 228 | 82543020 | 3B+20FN(BC), Binding screw |
| 229 | 82542616 | 2.6B+16F(BC), Binding screw |
| 230 | 834126107 | 2.6TTS+10S, Tapping screw |
| 231 | 801393 | 3SMPSW+5FN, Sems screw |
| 232 | 8930502 | E-5, Circlip |
| 233 | 8930301S | ES-3S, Circlip |
| 234 | 834130057 | 3TTS+5S, Tapping screw |
| 235 | 82543003 | 3B+3FN(BC), Binding screw |
| 236 | 82112314 | 2.3P+14F,Pan head screw |
| 237 | 27301061 | Sheet C |
| 238 | 27301062 | Sheet B |
| 239 | 27180372 | Spring, ground |
| 240 | 260208 | Binder |
| 241 | 27270226 | Spacer D |
| 242 | 28140783 | Cushion |
| 911 | 25133171 | NCSW-3171, Pc board |
| 913 | 25133173 | NCETC-3173, Pc board |
| 914 | 25133174 | NCSW-3174, Pc board |
| 915 | 25133175 | NCSW-3175, Pc board |
| M651 | 24502223 | Motor ass'y |
| S651 | 25065329 | NMS-1216, Microswitch |
| S652 | 25065329 | NMS-1216, Microswitch |
| S653 | 25065330 | NMS-1217, Microswitch |
| S654 | 25065331 | NMS-1218, Microswitch |



| REF.NO. | PART NO. | DESCRIPTION |
|---|---|---|
| 251 | 27141173 | Bracket, motor |
| 252 | 27267524 | Guide |
| 253 | 27141193 | Holding bracket ass'y |
| 254 | 27100149 | Chassis |
| 255 | 27141174 | Bracket, ground |
| 257 | 27141175 | Bracket L |
| 258 | 27262465 | Plate |
| 259 | 27141176 | Bracket, guide |
| 260 | 27141177 | Bracket, holder |
| 261 | 27267526 | Guide S |
| 262 | 27141194 | Mounting bracket L ass'y |
| 263 | 27270227 | Washer |
| 264 | 27301049 | Cam plate L |
| 265 | 27270229 | Poly washer |
| 266 | 27301051 | Disc table |
| 267 | 27301052 | Lever |
| 268 | 27141178 | Bracket,table |
| 269 | 27301063 | Sheet S |
| 270 | 27141179 | Bracket W |
| 271 | 27180373 | Spring D |
| 272 | 27301050 | Cam plate R |
| 273 | 27301066 | Cushion rubber |
| 274 | 27141180 | Bracket R |
| 275 | 27301053 | Stopper T |
| 276 | 27141181 | Bracket, shaft |

| REF.NO. | PART NO. | DESCRIPTION |
|---|---|---|
| 277 | 27267525 | Guide, shaft |
| 278 | 27260239 | Shaft |
| 279 | 27141182 | Bracket RO |
| 280 | 273907 | Rope |
| 281 | 27180374 | Spring RO |
| 282 | 28140784 | Cushion A |
| 283 | 27301054 | Disc holder ass'y |
| 284 | 27301064 | Sheet |
| 285 | 27301055 | Pulley A |
| 286 | 27301056 | Pulley C |
| 287 | 27301067 | Belt A |
| 288 | 27301068 | Belt B |
| 289 | 27301057 | Pulley B |
| 291 | 8930301S | Circlip |
| 292 | 82542603 | Screw |
| 293 | 801394 | +PSW2.6 x 8, Special screw |
| 295 | 834130057 | 3TTS+5S, Tapping screw |
| 296 | 83812055 | 2.6STB+5B, Tapping screw |
| 297 | 838130082 | 3STB+8BQ, Tapping screw |
| 298 | 838126057 | 2.6TTB+5S, Tapping screw |
| 299 | 838130167 | 3TTB+16S,Tapping screw |
| 300 | 801393 | 3SMPSW+5FN, Sems screw |
| 912 | 25133172 | NCETC-3172, Pc board |
| M652 | 24502224 | Motor ass'y |




| REF.NO. | PART NO. | DESCRIPTION |
|---|---|---|
| BU-1 | 24506746 | CD drive unit |
| 301 | 27141183 | Bracket M |
| 302 | 27301058 | Thrust holder |
| 304 | 27301059 | Rotor ass'y |
| 305 | 27270228 | 3,Poly washer |
| 306 | 27260240 | Shaft PU |
| 307 | 27301069 | Cushion rubber |
| 308 | 27301060 | Turntable |
| 309 | 27180375 | Spring |
| 310 | 27301065 | Center ring cap |
| 311 | 27270227 | Washer |
| 312 | 880016 | NRP-335, Rivert |
| 313 | 27301070 | Locking lever |
| 314 | 27180376 | Spring RL |
| 315 | 27190586 | Holder ROD |
| 316 | 27301071 | Liner york ass'y |
| 317 | 27190581 | Holder BR |
| 318 | 27301072 | Bearing |
| 319 | 27301073 | Lead wire holder A |
| 320 | 27301074 | Lead wire holder B |
| 321 | 27100150 | Chassis PU |
| 322 | 27301075 | Ball bearing |
| 323 | 833426082 | 2.6STP+8BQ, Tapping screw |
| 324 | 82542604 | 2.6B+4F(BC), Binding screw |
| 325 | 82542605 | 2.6B+5F(BC), Binding screw |
| 326 | 838126087 | 2.6TTB+8S,Tapping screw |
| 327 | 801395 | 2.6×3WP,Screw |
| 329 | 838126107 | 2.6TTB+10S, Tapping screw |
| 331 | 838126167 | 2.6TTB+16S, Tapping screw |
| 333 | 8930232 | E-2.3Zn, Circlip |
| 334 | 27141184 | Bracket SL |
| 335 | 27301076 | Holder PB |
| 336 | 27141185 | Bracket PB |
| 337 | 82543006 | 3B+6FN(BC), Binding screw |
| 338 | 28140785 | Cushion PB |
| 339 | 870142 | W2.6×7F, Washer |
| 928 | 25133176 | NCETC-3176, Pc board |
| 929 | 25133177 | NCETC-3177A,Flexible pc board |
| M53 | 24502225 | Coil D |
| SE51 | 24502226 | Coil S |



# CHASSIS- PARTS LIST

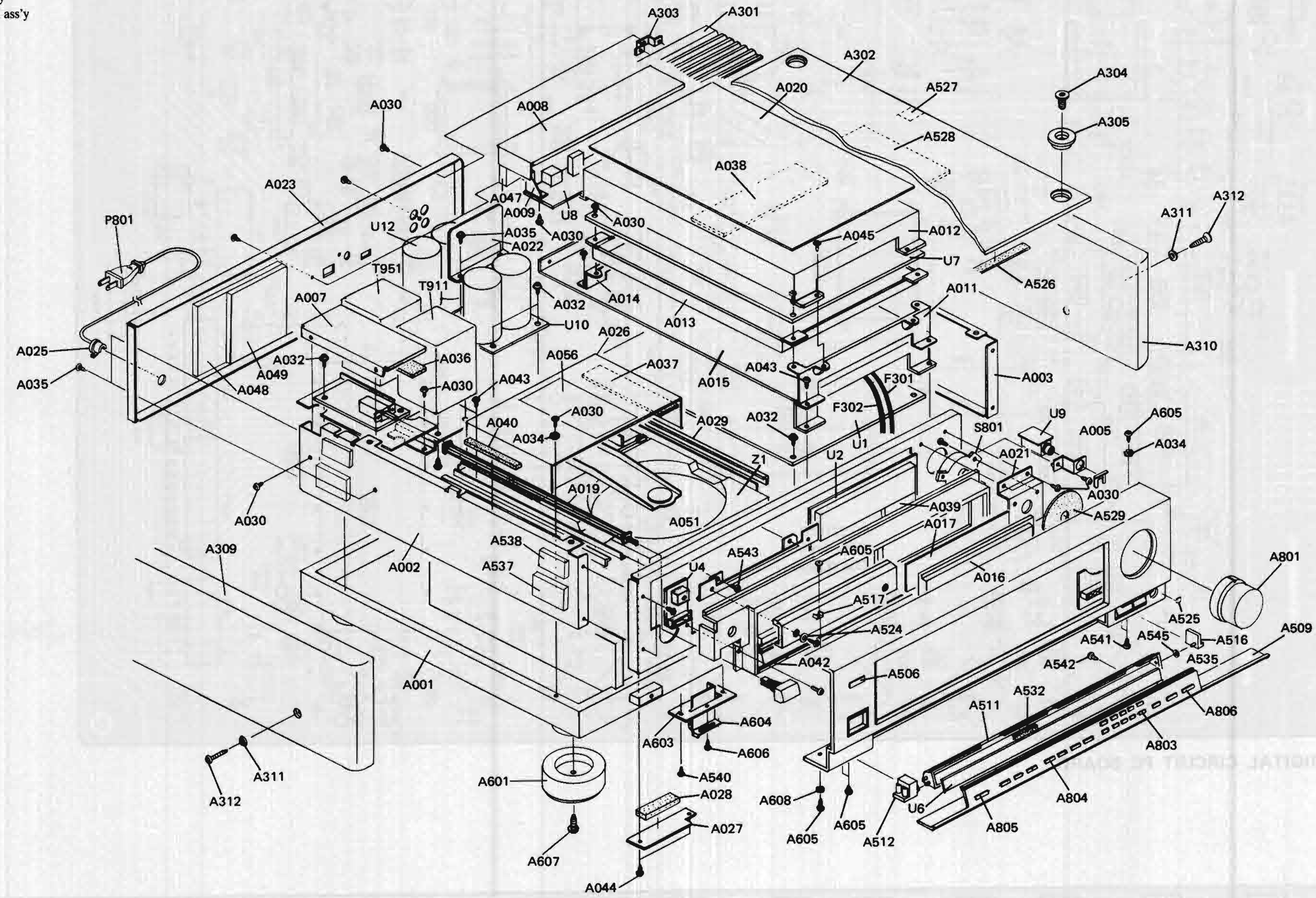
| REF.NO. | PART NO. | DESCRIPTION |
|---|---|---|
| A001 | 27100147A | Chassis |
| A002 | 27115231B | Side bracket L |
| A003 | 27115232B | Side bracket R |
| A004 | 27110385A | Front bracket |
| A005 | 27141165 | Bracket,headphone |
| A006 | 27130505A | Bracket,power transformer |
| A007 | 27150255 | Shielded plate,power |
| A008 | 27150242 | Shielded plate |
| A009 | 27140881-1 | Bracket S |
| A010 | 27190648 | Holder ass'y ⟨D/W/PX⟩ |
| | 27190652 | Holder ass'y ⟨G⟩ |
| A011 | 27130510 | Bracket,pc board |
| A012 | 27190588 | Holder,lid |
| A013 | 27190589 | Holder,bottom |
| A014 | 27130525 | Bracket B |
| A015 | 27150246 | Shielded plate |
| A016 | 28191442 | Clear plate |
| A017 | 28133201 | Back plate |
| A019 | 27273065 | Joint |
| A020 | 27262470 | Plate |
| A021 | 27141236A | Bracket SH |
| A022 | 27150249 | Shielded plate |
| A023 | 27121140 | Back panel ⟨D⟩ |
| | 27121141 | Back panel ⟨G⟩ |
| | 27121143A | Back panel ⟨W/PX⟩ |
| A025 | 27300750 | ⚠ Strainrelief |
| A026 | 27150247 | Shielded plate CD |
| A027 | 27141228 | Bracket CD |
| A028 | 28140793 | Cushion |
| A029 | 27270243 | Spacer |
| A030 | 834430068 | 3TTS+6B(BC),Tapping screw |
| A032 | 831130088 | 3TTW+8B,Tapping screw |
| A033 | 830440089 | 4TTC+8C(BC),Tapping screw |
| A034 | 87313006 | M-3B,Toothed washer |
| A035 | 801230 | 3STS+8BQ(BC),Tapping screw |
| A036 | 28140814 | t1.5×55×30,Cushion |
| A037 | 28140815 | t1.5×100×30,Cushion |
| A038 | 28140816 | t1.5×160×80,Cushion |
| A039 | 28140853 | Cushion |
| A040 | 28140817 | t4.5×55×10,Cushion |
| A041 | 28175149 | Insulated plate |
| A042 | 29110050 | 12×340,Aluminium tape |
| A043 | 834430088 | 3TTS+8B(BC),Tapping screw |
| A044 | 838426088 | 2.6TTB+8B(BC),Tapping screw |
| A045 | 831430088 | 3TTW+8B(BC),Tapping screw |
| A046 | 880011 | NRP-355,Rivert |
| A047 | 28140897 | t12×35×180, Cushion |
| A048 | 28140898 | t1.5×140×70,Cushion |
| A049 | 28140899 | t8×70×70,Cushion |
| A051 | 28140820 | Cushion |
| A052 | 28140821 | Cushion,disc |
| A055 | 29355142 | Caution label |
| A056 | 29360911 | Label,LASER 3 |
| A301 | 28145124 | Top panel B |
| A302 | 28145125A | Top panel F |
| A303 | 27141153A | Bracket T |
| A304 | 801403 | 5×12(BC),Special screw |
| A305 | 27265159 | Decoration ring F |
| A306 | 834430068 | 3TTS+6B(BC),Tapping screw |
| A308 | 28140812 | t5×25×300,Cushion |
| A309 | 1H046602 | Side panel L ass'y |
| A310 | 1H046603 | Side panel R ass'y |
| A311 | 870086 | 4×12(BC),Special washer |
| A312 | 836440303 | 4STV+30CQ(BC),Special screw |
| A313 | 87314006 | M-4B,Toothed washer |
| A501 | 1H046121UD | Front panel ass'y ⟨D/W/PX⟩ |
| | 1H046121UG | Front panel ass'y ⟨G⟩ |
| A506 | 28135125 | Badge |
| A509 | 27210971 | Tray panel ⟨D/W/PX⟩ |
| | 27210972 | Tray panel ⟨G⟩ |
| A510 | 27267521 | Guide,knob |
| A511 | 28400361A | Lid |
| A512 | 1H031702 | Bearing L ass'y |
| A516 | 27301040A | Bearing R |
| A517 | 27141268A | Bracket,ground |
| A519 | 27210974 | Front panel,door ⟨D/W/PX⟩ |
| | 27210907 | Front panel,door ⟨G⟩ |
| A520 | 27141169A | Bracket,door |
| A524 | 27270254 | Spacer |
| A525 | 28140804 | Cushion |
| A526 | 28140755 | t0.5×6×165,Cushion |
| A527 | 28140756 | t0.5×30×30,Cushion |
| A528 | 28140672A | t1.5×158×190,Cushion |
| A529 | 28140126 | t0.5×53, Cushion |
| A532 | 28140827 | t6×10×40, Cushion |
| A533 | 28140828 | t1×4×10,Cushion |
| A534 | 28140829 | t1×5×40,Cushion |
| A535 | 29110075 | Copper tape |
| A536 | 28140900 | t0.5×6×15, Cushion |
| A537 | 27270260 | t4×15×15,Spacer |
| A538 | 27270261 | t5.5×15×15,Spacer |
| A540 | 834430068 | 3TTS+6B(BC),Tapping screw |
| A541 | 835430065 | 3STF+6B(BC),Flat head tapping screw |
| A542 | 833430080 | 3TTP+8P(BC),Tapping screw |
| A543 | 82142604 | 2.6P+4F(BC),Pan head screw |
| A544 | 84643008 | 3HSB×8FN(BC),Hexagonal head bolt |
| A545 | 870071 | WW6,Wave washer |
| A601 | 27175171A | Leg |
| A603 | 27141168 | Bracket D |
| A604 | 27141167 | Bracket ST |
| A605 | 834430068 | 3TTS+6B(BC),Tapping screw |
| A606 | 834230108 | 3TTS+10B(Ni),Nickel screw |
| A607 | 834440168 | 4TTS+16B(BC),Tapping screw |
| A608 | 87314006 | M-4B,Toothed washer |
| A801 | 28323185A | Knob SH |
| A802 | 28323186A | Knob POWER |
| A803 | 28323393 | Knob TEN ⟨D/W/PX⟩ |
| | 28323187 | Knob TEN ⟨G⟩ |
| A804 | 28323394 | Knob PE ⟨D/W/PX⟩ |
| | 28323188-1 | Knob PE ⟨G⟩ |
| A805 | 28323188-2 | Knob D |
| A806 | 28323188-3 | Knob S |
| F301-F305 | 241058 | FCPA00001AF,Photo coupler |
| P801 | 253112A | ⚠ AS-UC-4#18,Power supply cord ⟨D/PX⟩ |
| | 253148 or 253150 | ⚠ AS-CEE,Power supply cord ⟨G/W⟩ |
| S801 | 25000004 | SRGP-S-001,Encoder |
| S902 | 25065195 | ⚠ NSS-1288P,Voltage selector switch ⟨W⟩ |
| SC151 | 2000766A | NSAS-4P722,Socket |
| SC651 | 2000767A | NSAS-7P723,Socket |
| T911 | 2300295 | ⚠ NPT-981D,Power transformer ⟨D⟩ |
| | 2300296 | ⚠ NPT-981G,Power transformer ⟨G⟩ |
| | 2300375 | ⚠ NPT-981AG,Power transformer ⟨W/PX⟩ |
| T951 | 2300299 | ⚠ NPT-982D,Power transformer ⟨D⟩ |
| | 2300300 | ⚠ NPT-982G,Power transformer ⟨G⟩ |
| | 2300374 | ⚠ NPT-982AG,Power transformer ⟨W/PX⟩ |
| U1 | 1H046560-3 | NADG-3160-3,Digital circuit pc board ass'y ⟨D/W/PX⟩ |
| | 1H046560-3A | NADG-3160-3a,Digital circuit pc board ass'y ⟨G⟩ |
| U2 | 1H046561-2 | NADIS-3161-2,FL tube circuit pc board ass'y |
| U3 | 1H046530-2 | NADIS-3230-2,Level indicator pc board ass'y |

# CHASSIS-EXPLODED VIEW

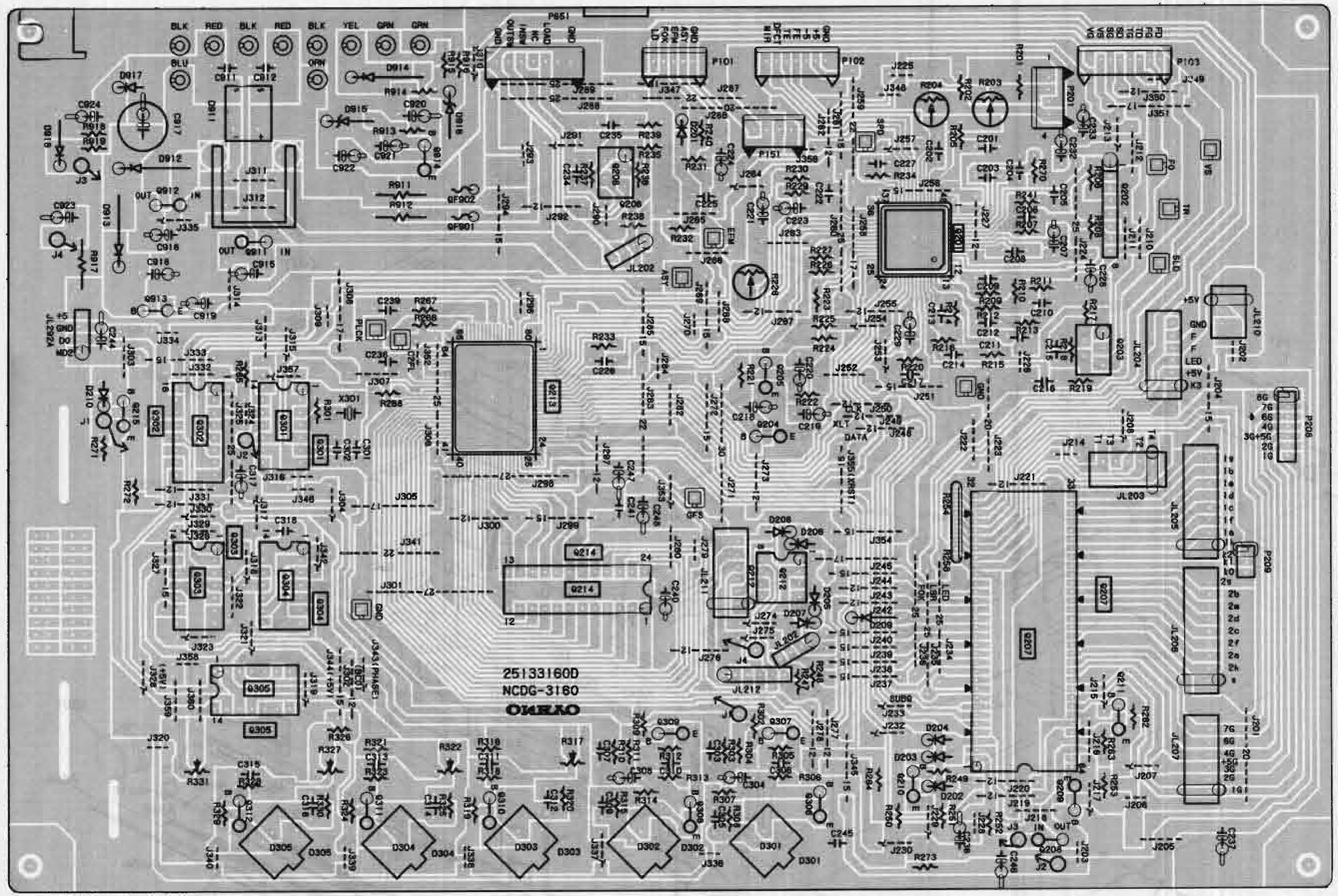
| REF.NO. | PART NO. | DESCRIPTION |
|---|---|---|
| U4 | 1H046563-2 | NADIS-3163-2,Remote control pc board ass'y |
| U5 | 1H046564-2 | NAPS-3164-2,Power supply circuit pc board ass'y |
| U6 | 1H046565-2 | NASW-3165-2,Operation switch pc board ass'y |
| U7 | 1H046566-3 | NAAF-3166-3,Analog circuit pc board ass'y |
| U8 | 1H046567-2 | NAAF-3167-2,Output terminal pc board ass'y |
| U9 | 1H046568-2 | NAAF-3168-2,Headphone terminal pc board ass'y |
| U10 | 1H046570-2 | NAAF-3170-2,Power supply pc board ass'y |
| U12 | 1H046506-2 | NAAF-3206-2,Power supply pc board ass'y |
| W1 | 260208 | Binder |
| Z1 | 24506735 | CD mechanism ass'y |

NOTE: THE COMPONENTS IDENTIFIED BY MARK ⚠ ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE ONLY WITH PART NUMBER SPECIFIED.

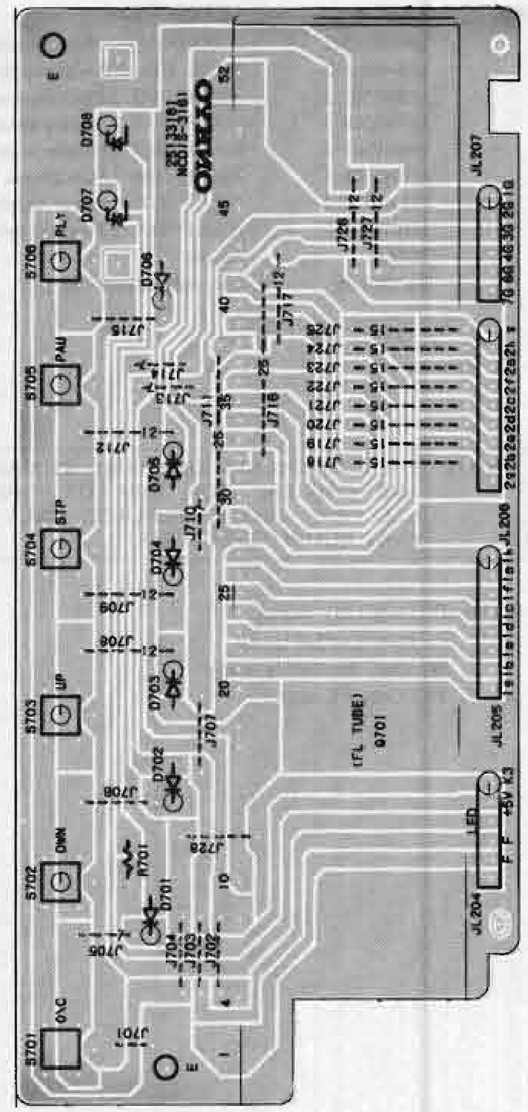
NOTE: ⟨D⟩:Only 120V model
⟨G⟩:Only 220/240 model
⟨W⟩:Only Worldwide model
⟨PX⟩:Only PX model



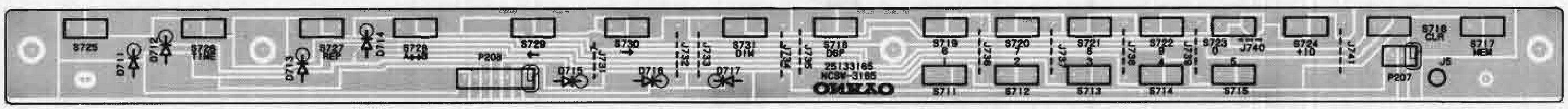
# PRINTED CIRCUIT BOARD VIEW FROM BOTTOM SIDE




DIGITAL CIRCUIT PC BOARD




FL TUBE CIRCUIT PC BOARD




OPERATION SWITCH PC BOARD

# PRINTED CIRCUIT BOARD – PARTS LIST

## DIGITAL CIRCUIT PC BOARD(NADG-3160-3A)

| CIRCUIT NO. | PART NO. | DESCRIPTION |
|---|---|---|
| | ICs | |
| Q201 | 22240030 | CXA1082AQ |
| Q202 | 22240036 | STA341M |
| Q203,Q206 | 22240033 | LA6500 |
| Q207 | 22240110 | CXP5016H-229S |
| Q208 | 22240018 | M51943ASL |
| Q212 | 222963 | LB1630 |
| Q213 | 22240129 | CXD1125QZ |
| Q214 | 22240118 | LC3517AS-15 |
| Q215 | 221282 | DTC144ES |
| Q301 | 222755 | 74HCU04P |
| Q302 | 22240176 | YM3414 |
| Q303 | 222740025 | 74HC02P |
| Q304 | 222740745 | 74HC74P |
| Q305 | 222740865 | 74HC86P |
| Q911 | 222780052 | 78M05 |
| Q912 | 222790053 | 79L05 |
| Q913 | 222780123 | 78L12 |
| | Transistors | |
| Q209 | 2212600 | DTA124ES |
| Q210 | 2211454 or | 2SA1015-Y or |
| | 2211455 | 2SA1015-GR |
| Q211 | 2211254 or | 2SC1815-Y or |
| | 2211255 | 2SC1815-GR |
| Q306,Q308 | 2211455 | 2SA1015-GR |
| Q307 | 2211255 | 2SC1815-GR |
| Q309-Q312 | 2211255 | 2SC1815-GR |
| Q914 | 2211643 or | 2SA965-O or |
| | 2211644 | 2SA965-Y |
| | Diodes | |
| D201-D208 | 223163 | 1SS133 |
| D209,D211 | 223150 or | US1040 or |
| | 223145 | 1S2076 |
| D210 | 223163 | 1SS133 |
| D911 | 22380018 | DB103 |
| D912-D914 | 223880 or | GP101N4003 or |
| | 223896 | 1N4003 |
| D915 | 224652702 | HZ27E-B2 |
| D916,D918 | 224650511 | HZ5.1E-B1 |
| D917 | 223163 | 1SS133 |
| | Photo couplers | |
| D301-D305 | 24120013 | FCPA00002AT |
| | X'tal | |
| X301 | 3010112 | KD6586FFB |
| | Capacitors | |
| C207,C219 | 354780479 | 4.7μF,50V,Elect. |
| C221 | 354742209 | 22μF,16V,Elect. |
| C223,C224 | 354784799 | 0.47μF,50V,Elect. |
| C228,C229 | 354742209 | 22μF,16V,Elect. |
| C232,C233 | 354744709 | 47μF,16V,Elect. |
| C236 | 354742209 | 22μF,16V,Elect. |
| C237 | 354762209 | 22μF,35V,Elect. |
| C240,C248 | 354744709 | 47μF,16V,Elect. |
| C244 | 354742209 | 22μF,16V,Elect. |
| C246 | 354741009 | 10μF,16V,Elect. |
| C308 | 354781099 | 0.1μF,50V,Elect. |
| C317 | 354744709 | 47μF,16V,Elect. |
| C915,C916 | 354744709 | 47μF,16V,Elect. |
| C917,C918 | 354754719 | 470μF,25V,Elect. |
| C919,C923 | 354742209 | 22μF,16V,Elect. |
| C920 | 354761019 | 100μF,35V,Elect. |
| C921,C922 | 354761009 | 10μF,35V,Elect. |
| C924 | 354744709 | 47μF,16V,Elect. |

| CIRCUIT NO. | PART NO. | DESCRIPTION |
|---|---|---|
| | Resistors | |
| R203,R204 | 5210066 | N06HR22KBD,Semi-fixed |
| R228 | 5210060 | N06HR2.2KBD,Semi-fixed |
| R254-R261 | 49163472408 | 4.7K×8,1/8W,Network |
| R317,R322 | 5210135 | N06HR2.2KBE,Semi-fixed |
| R327 | 5210135 | N06HR2.2KBE,Semi-fixed |
| R911,R912 | 442521004 | 10ohm,1/2W,Metal oxide film |
| R917 | 441520474 | 4.7ohm,1/2W,Metal oxide film |
| | Plugs | |
| P101 | 25055149 | NPLG-5P133 |
| P102 | 25055151 | NPLG-7P135 |
| P103 | 25055152 | NPLG-8P136 |
| P151,P201 | 25055045 | NPLG-4P33 |
| P651 | 25055137 | NPLG-7P21 |
| | Sockets | |
| JL203,JL204 | 25050269 | NSCT-5P97 |
| JL205 | 25050272 | NSCT-8P100 |
| JL206 | 25050273 | NSCT-9P101 |
| JL207 | 25050270 | NSCT-6P98 |
| SC208b | 2000791A | NSAS-7P747 |
| SC209b | 2000790A | NSAS-3P746 |
| JL210 | 25050267 | NSCT-3P95 |
| JL211 | 25050270 | NSCT-6P98 |
| | Radiator | |
| | 27160029-1 | RAD-07B |
| | Screw | |
| | 82143006 | 3P+6FN(BC),Pan head screw |
| | Bracket | |
| | 27141059 | Ground |
| | Fuses | |
| QF901,QF902 | 252112 | ICPN15,IC protector ‹G› |

NOTE: ‹G›:Only 220V model

## OPERATION SWITCH PC BOARD(NASW-3165-2)

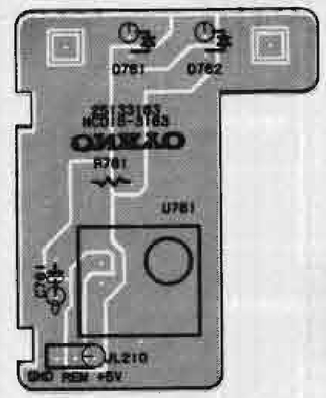
| CIRCUIT NO. | PART NO. | DESCRIPTION |
|---|---|---|
| D711-D717 | 223163 | 1SS133,Diodes |
| S711-S731 | 25035570 | NPS-111-S532,Push switches |
| SC209a | 2000770A | NSAS-3P726,Socket |
| SC208a | 2000771A | NSAS-7P727,Socket |

## FL TUBE CIRCUIT PC BOARD(NADIS-3161-2)

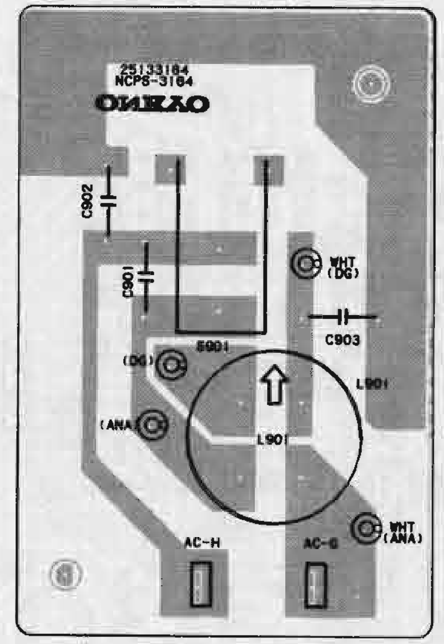
| CIRCUIT NO. | PART NO. | DESCRIPTION |
|---|---|---|
| | Fluorescent tube | |
| Q701 | 212051 | FIP13JM7 |
| | Diodes | |
| D701-D706 | 223163 | 1SS133 |
| | L.E.Ds | |
| D707,D708 | 225141 | SEL2213C |
| | Switches | |
| S701-S706 | 25035548 | NPS-111-S510 |
| | Holder | |
| | 27190454A | L.E.D |
| | Cushion | |
| | 28140780 | |



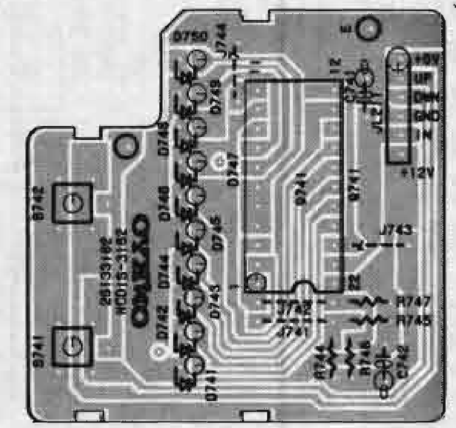
# PRINTED CIRCUIT BOARD VIEW FROM BOTTOM SIDE



REMOTE CONTROL CIRCUIT PC BOARD



POWER SUPPLY CIRCUIT PC BOARD



LEVEL INDICATOR CIRCUIT PC BOARD

## REMOTE CONTROL CIRCUIT PC BOARD(NADIS-3163-2)

| CIRCUIT NO. | PART NO. | DESCRIPTION |
|---|---|---|
| U701 | 241068 | BX1407,IC |
| D761,D762 | 225142 | SEL2913K,L.E.Ds |
| C761 | 355742209 | 22μF,16V,Elect. capacitor |
| | 27190454A | Holder,L.E.D |

## POWER SUPPLY CIRCUIT PC BOARD(NAPS-3164-2)

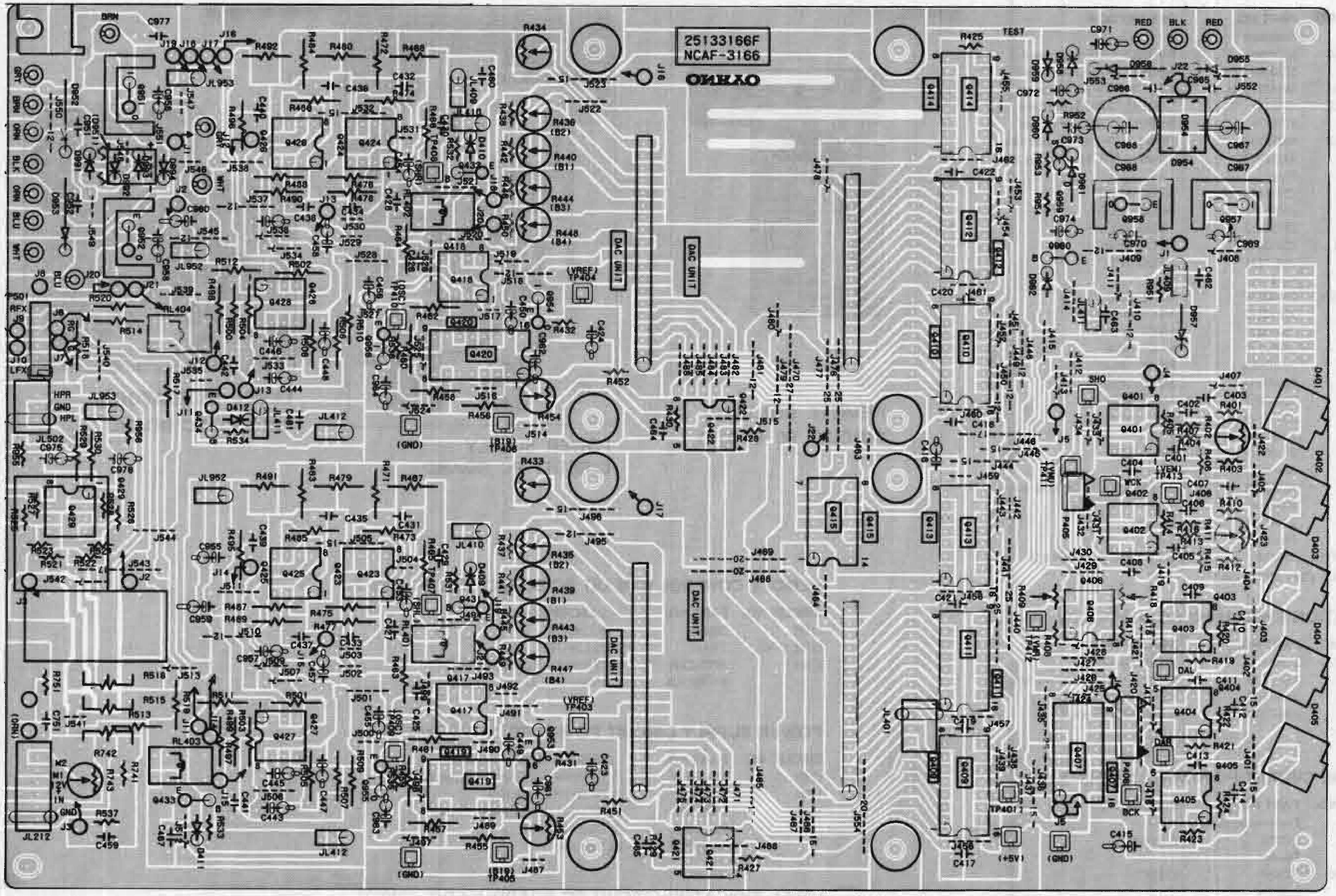
| CIRCUIT NO. | PART NO. | DESCRIPTION |
|---|---|---|
| C901 | 3500065A | ⚠ DE7150F103PCSA,Capacitor IS |
| L901 | 231051 | ⚠ NCH-1092,Line filter |
| S901 | 25035550 | ⚠ NPS-111-L512P,Power switch |
| | 27300601 | ⚠ Cover for C901 |
| | 25060092 | ⚠ Terminal |

## LEVEL INDICATOR CIRCUIT PC BOARD(NADIS-3230-2)

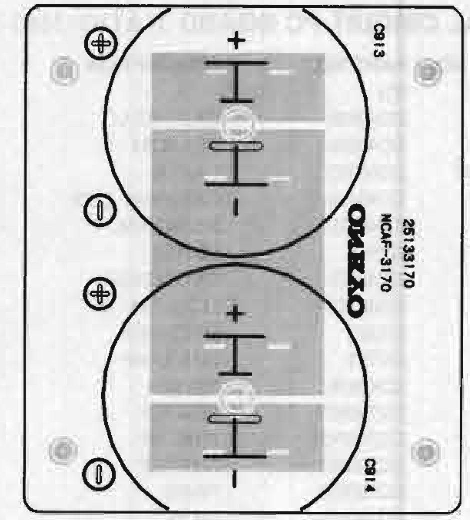
| CIRCUIT NO. | PART NO. | DESCRIPTION |
|---|---|---|
| | IC | |
| Q741 | 22240122 | IR2406G |
| | L.E.Ds | |
| D741-D750 | 225141 | SEL2213C |
| | Capacitor | |
| C742 | 354742209 | 22μF,16V,Elect. |
| | Switch | |
| S741,S742 | 25035548 | NPS-111-S510,Push |
| | Holder | |
| | 27190579 | L.E.D |

NOTE: THE COMPONENTS IDENTIFIED BY MARK ⚠ ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE ONLY WITH PART NUMBER SPECIFIED.

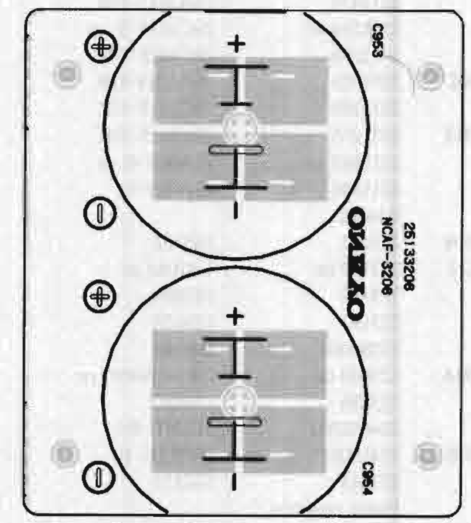
# PRINTED CIRCUIT BOARD VIEW FROM BOTTOM SIDE



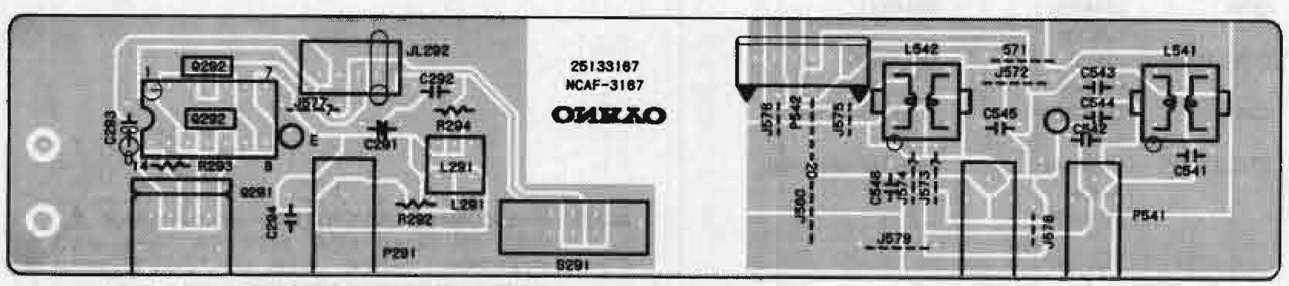

ANALOG CIRCUIT PC BOARD




POWER SUPPLY CIRCUIT PC BOARD




POWER SUPPLY CIRCUIT PC BOARD




OUTPUT TEMINAL PC BOARD


HEADPHONE TERMINAL PC BOARD

# PRINTED CIRCUIT BOARD – PARTS LIST

## ANALOG CIRCUIT PC BOARD(NAAF-3166-3)

| CIRCUIT NO. | PART NO. | DESCRIPTION |
|---|---|---|
| | DAC ass'y | |
| | 1H046700 | NAHC-3169 |
| | ICs | |
| Q402-Q405 | 22240035 | NJM592D8 |
| Q406 | 222465 | NJM4558D |
| Q407 | 22240119 | 74HC4050P |
| Q409-Q414 | 222745955 | 74HC595P |
| Q415 | 222755 | 74HCU04P |
| Q417,Q418 | 22240120 | μPC813C |
| Q419,Q420 | 222717 | μPD4053BC |
| Q421,Q422 | 226027 | HCPL-2601 |
| Q425-Q428 | 222902 | NJM5532D-D |
| Q429 | 222654 | NJM4556D |
| Q951 | 222780155MIT | M5F78M15L |
| Q952 | 222790155MIT | M5F79M15L |
| Q953,Q954 | 222780053 | 78L05 |
| Q955,Q956 | 222790053 | 79L05 |
| Q957 | 222780055MIT | M5F78M05L |
| Q958 | 222790055MIT | M5F79M05L |
| | Transistors | |
| Q431-Q434 | 2211255 | 2SC1815-GR |
| Q959 | 2211945 | 2SK246-GR |
| Q960 | 221282 | DTC144ES |
| | Photo couplers | |
| D401-D405 | 2410571 | FCPA00001ARA |
| | Diodes | |
| D409-D412 | 223163 | 1SS133 |
| D951,D954 | 22380013 | RDF02M |
| D957 | 224650511 | HZ5.1EB1 |
| D958-D960 | 223163 | 1SS133 |
| D961 | 22460822 or | HZ8.2EB2 or |
| | 2243192 | MTZ8.2B |
| D962 | 223163 | 1SS133 |
| | Capacitors | |
| C415,C416 | 354744709 | 47μF,16V,Elect. |
| C425,C426 | 372123314 | 330pF ±5%,50V,Styrole |
| C427,C428 | 372123324 | 3300pF±5%,50V,Styrole |
| C429,C430 | 372122224 | 2200pF±5%,50V,Styrole |
| C435-C440 | 372122224 | 2200pF±5%,50V,Styrole |
| C441,C442 | 372123314 | 330pF ±5%,50V,Styrole |
| C443-C450 | 391242207 | 22μF,16V,Elect. |
| C453-C456 | 391262217 | 220μF,35V,Elect. |
| C951,C952 | 379121045 | 0.1μF±10%,50V,Plastic |
| C955,C957 | 391242207 | 22μF,16V,Elect. |
| C956,C958 | 391262217 | 220μF,35V,Elect. |
| C961-C964 | 391242207 | 220μF,16V,Elect. |
| C967 | 354743329 | 3300μF,16V,Elect. |
| C968 | 354742229 | 2200μF,16V,Elect. |
| C969,C970 | 354742209 | 22μF,16V,Elect. |
| C971,C972 | 354780479 | 4.7μF,50V,Elect. |
| C973 | 354784799 | 0.47μF,50V.Elect. |
| C974 | 354742209 | 22μF,16V,Elect. |
| C976 | 354742219 | 220μF,16V,Elect. |
| C978 | 375104745 | 0.47μF±10%,125V.Plastic |
| C979 | 379121525 | 1500pF±10%,50V,Plastic |
| | Resistors | |
| R409,R418 | 5210062 | N06HR4.7KBD,Semi-fixed |
| R411 | 5210066 | N06HR22KBD,Semi-fixed |
| R433,R434 | 5210064 | N06HR10KBD,Semi-fixed |
| R435,R436 | 5210070 | N06HR100KBD,Semi-fixed |
| R439,R440 | 5210070 | N06HR100KBD,Semi-fixed |
| R443,R444 | 5210070 | N06HR100KBD,Semi-fixed |
| R447,R448 | 5210070 | N06HR100KBD,Semi-fixed |
| R515,R516 | 5104218 | N16RTL20KA10M,Variable resistor |
| | Relaies | |
| RL401-RL404 | 25065327 | NRL-1P0.5A-DC05-044 |
| | Sockets | |
| JL401 | 25050267 | NSCT-3P95 |
| SC501 | 2000772A | NSAS-6P728 |
| JL502 | 25050267 | NSCT-3P95 |
| JL212 | 25050269 | NSCT-5P97 |
| | Radiators | |
| | 27160145 | RAD-51 |
| | Screws | |
| | 82143006 | 3P+6FN(BC),Pan head |

## OUTPUT TERMINAL PC BOARD(NAAF-3167-2)

| CIRCUIT NO. | PART NO. | DESCRIPTION |
|---|---|---|
| Q291 | 24120019 | TOTX-175,Opto. module |
| Q292 | 222755 | 74HCU04P,IC |
| L291 | 232143 | NSRF-2047,RF coil |
| C291 | 352942206 | 22μF,16V,Non-polar elect.capacitor |
| C293 | 354744709 | 47μF,16V,Elect.capacitor |
| C541,C542 | 372522214 | 220pF ±5%,50V,Styrole capacitors |
| C545,C546 | 372521514 | 150pF ±5%,50V,Styrole capacitors |
| P291 | 25045220 | NPJ-1PDOR97,Digital output terminal |
| P541 | 25045236 | NPJ-4PDBL110,Audio output terminal |
| JL292 | 25050268 | NSCT-4P96,Socket |
| P542 | 25055037 | NPLG-6P28,Plug |
| S291 | 25065286 | NSS-22112,Slide switch |

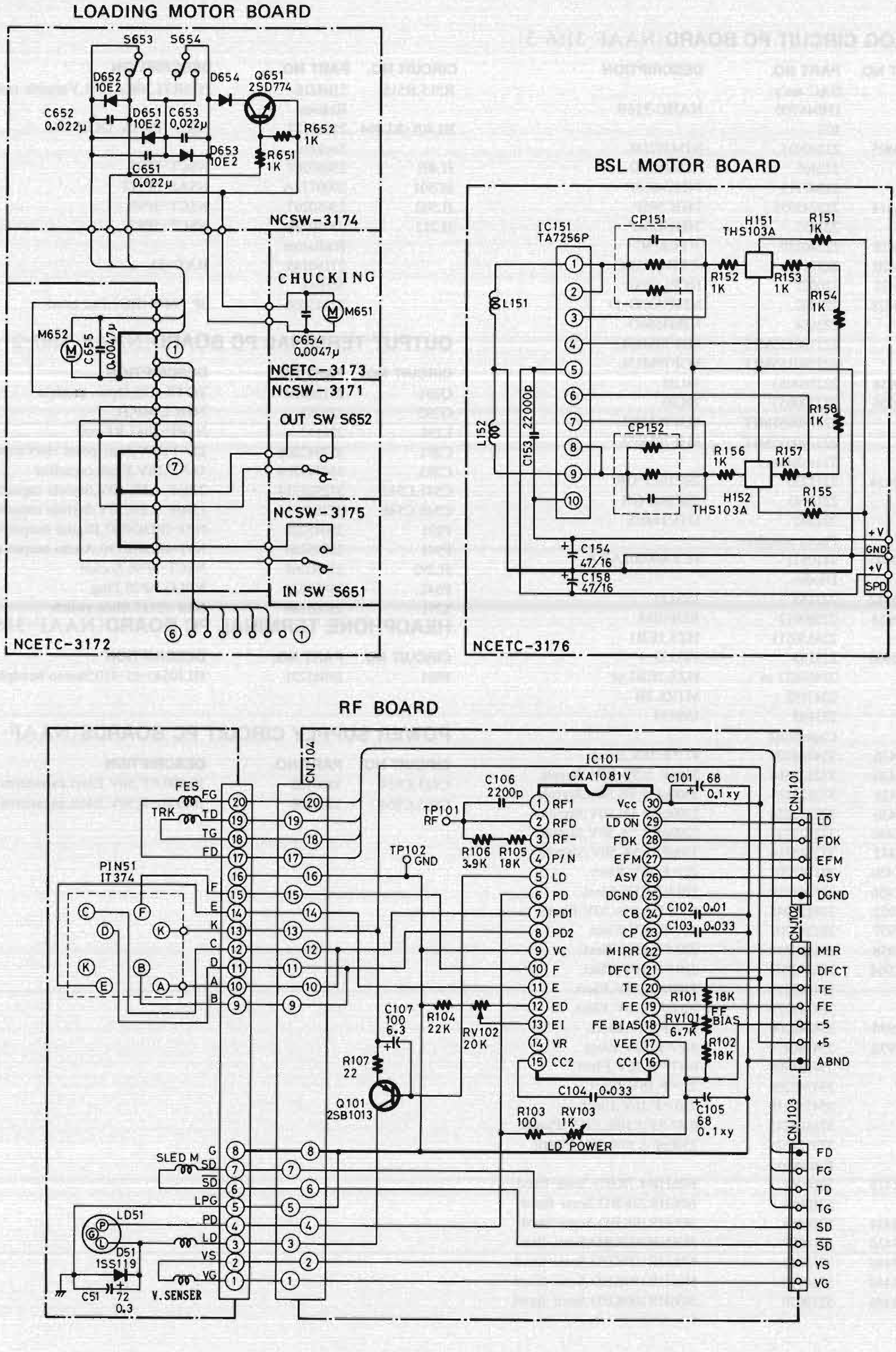
## HEADPHONE TERMINAL PC BOARD(NAAF-3168-1)

| CIRCUIT NO. | PART NO. | DESCRIPTION |
|---|---|---|
| P491 | 25045221 | HLJ0540-01-410,Stereo headphone terminal |

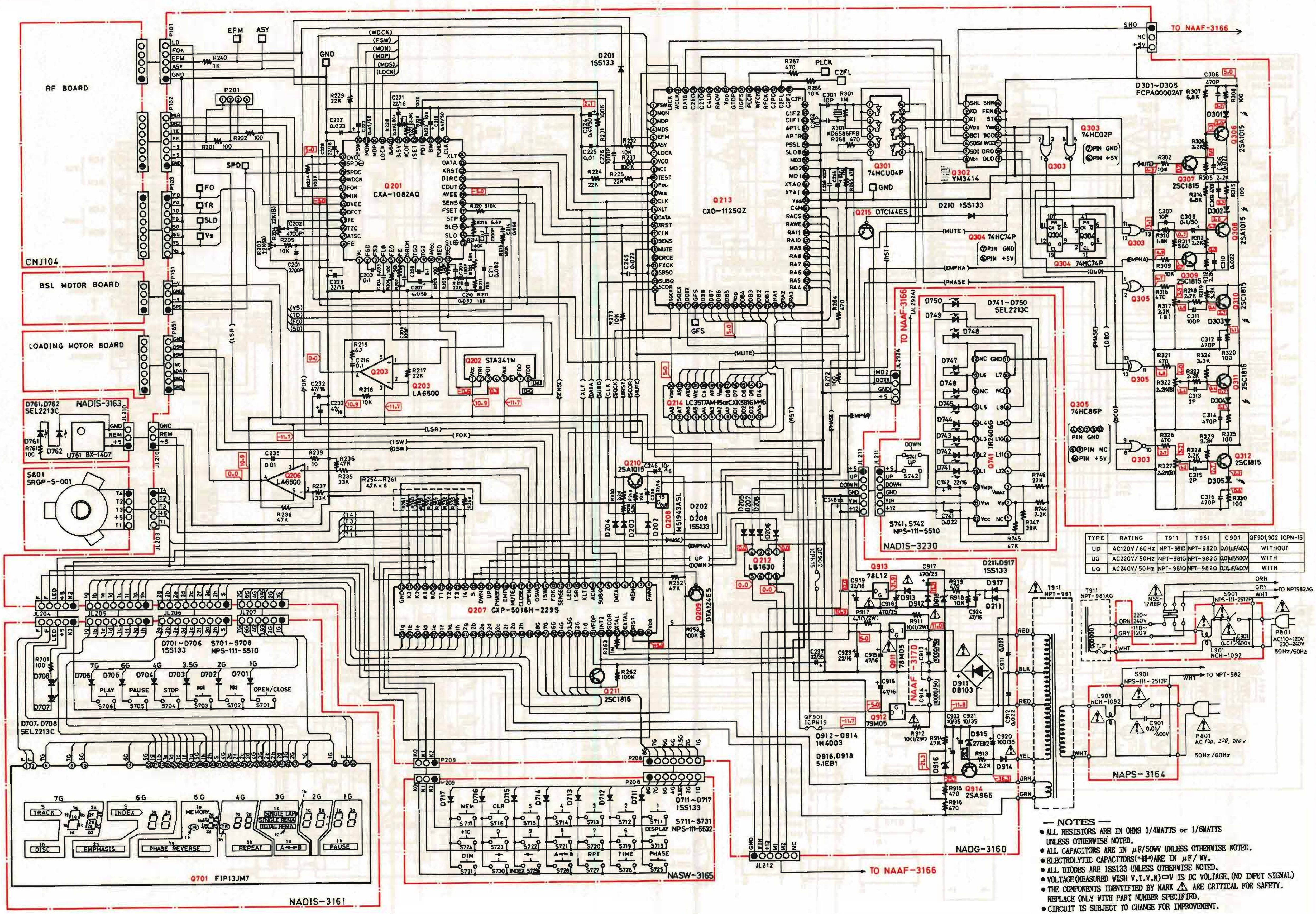
## POWER SUPPLY CIRCUIT PC BOARDS(NAAF-3170-2/3206-2)

| CIRCUIT NO. | PART NO. | DESCRIPTION |
|---|---|---|
| C913,C914 | 3500102 | 10,000μF,50V,Elect.capacitors |
| C953,C954 | 3500102 | 10,000μF,50V,Elect.capacitors |

# SCHEMATIC DIAGRAM



# SCHEMATIC DIAGRAM



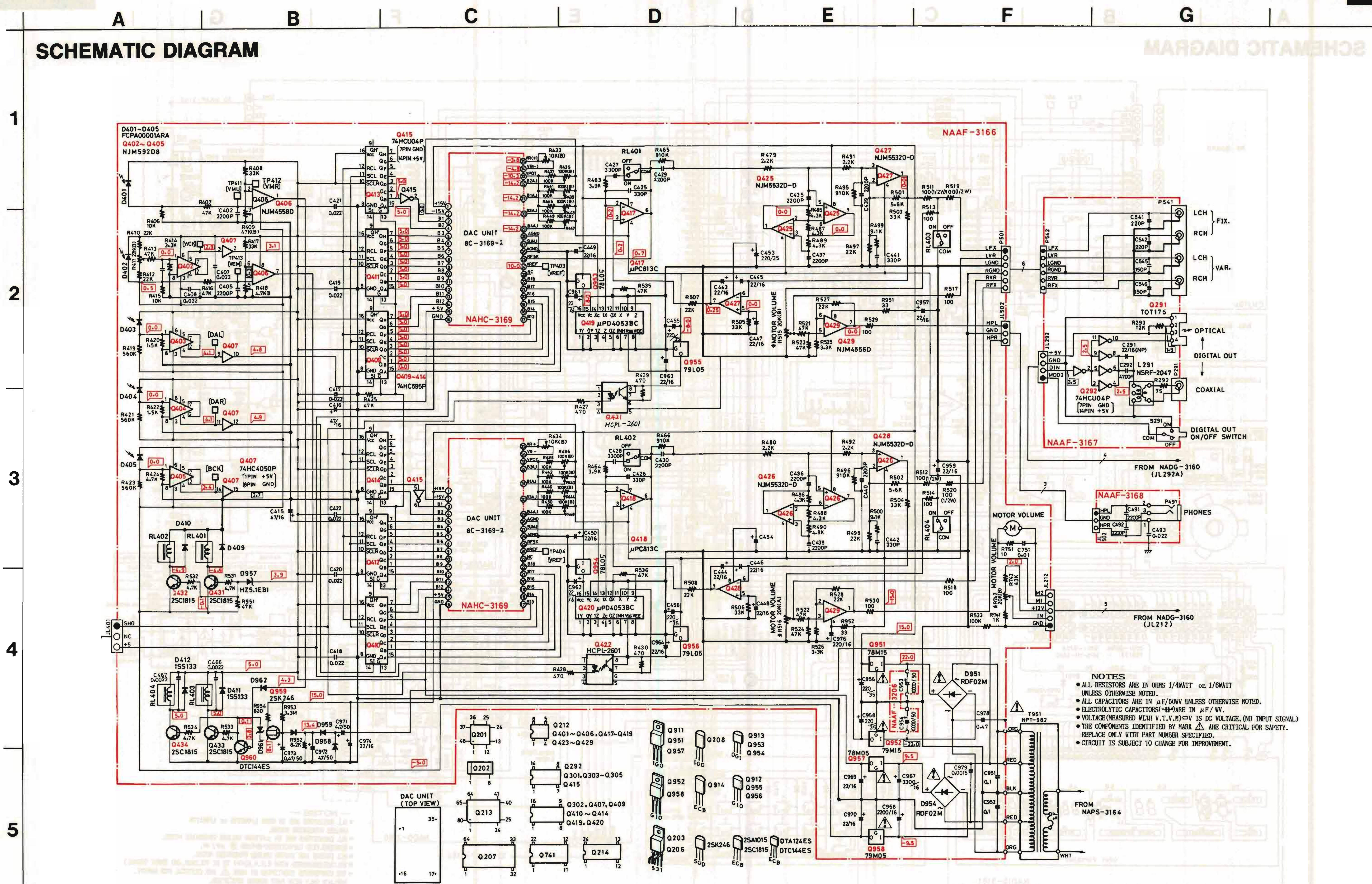

| TYPE | RATING | T911 | T951 | C901 | QF901,902 ICPN-15 |
|---|---|---|---|---|---|
| UD | AC120V / 60Hz | NPT-981D | NPT-982D | 0.01μF/400V | WITHOUT |
| UG | AC220V / 50Hz | NPT-981G | NPT-982G | 0.01μF/400V | WITH |
| UQ | AC240V / 50Hz | NPT-981Q | NPT-982Q | 0.01μF/400V | WITH |

— NOTES —

- ALL RESISTORS ARE IN OHMS 1/4WATTS or 1/6WATTS UNLESS OTHERWISE NOTED.
- ALL CAPACITORS ARE IN μF/50WV UNLESS OTHERWISE NOTED.
- ELECTROLYTIC CAPACITORS(⊣⊢)ARE IN μF / WV.
- ALL DIODES ARE 1SS133 UNLESS OTHERWISE NOTED.
- VOLTAGE(MEASURED WISH V.T.V.M)▭V IS DC VOLTAGE.(NO INPUT SIGNAL)
- THE COMPONENTS IDENTIFIED BY MARK ⚠ ARE CRITICAL FOR SAFETY. REPLACE ONLY WITH PART NUMBER SPECIFIED.
- CIRCUIT IS SUBJECT TO CHANGE FOR IMPROVEMENT.

ONKYO CORPORATION

# SCHEMATIC DIAGRAM



# WAVEFORM OF EACH SECTION

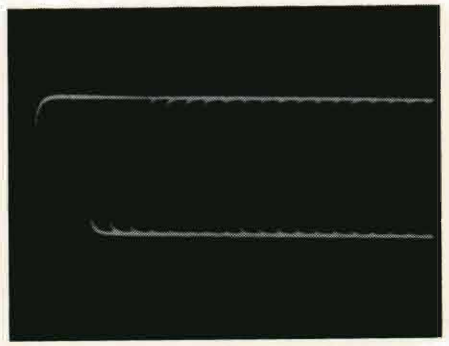


Photo 1
EFM signal
Vertical:1V/div.
Holizontal:5 μs/div.
Insert the resistor 2.2kohm between probe of oscilloscope and test point.

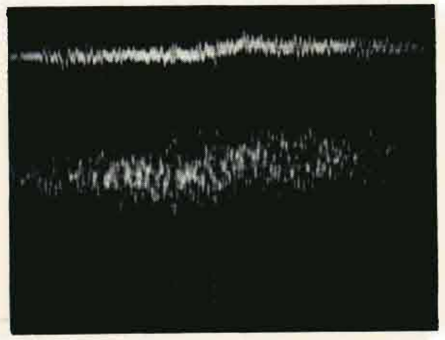


Photo 2
Focus signal
Upper P201
Lower FO(T.P)
Vertical:0.2V/div.
Holizontal:5ms/div.

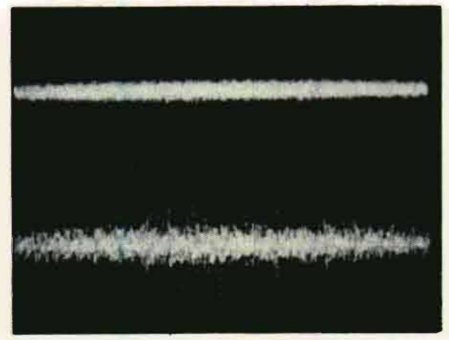


Photo 3
Tracking signal
Upper P201
Lower TR(T.P)
Vertical:1V/div.
Holizontal:5ms/div.

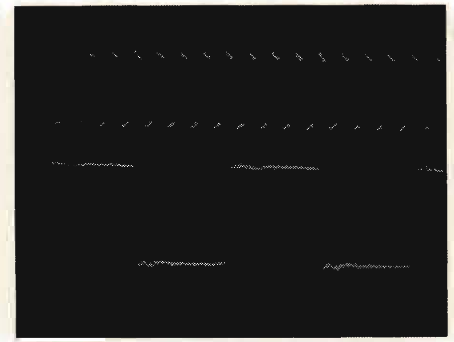


Photo 4
Upper OSC output Pin 3 of Q302
Lower BCLK signal Pin 5 of Q302
Vertical:2V/div.
Holizontal:0.1 μs/div.

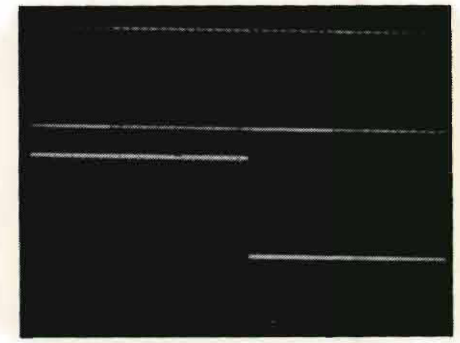


Photo 5
Upper DATA signal Pin 7 of Q302
Lower LRCK signal Pin 5 of Q302
Vertical:2V/div.
Holizontal:5 μs/div.

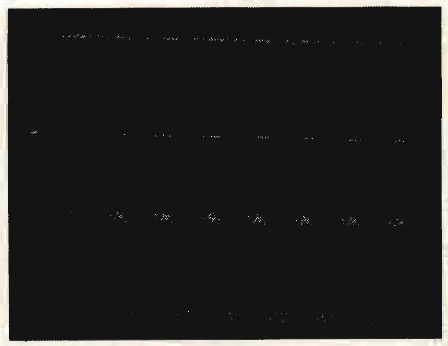


Photo 6
Upper DLO signal Pin 3 of Q305
Lower DCO signal Pin 10 of Q303
Vertical:2V/div.
Holizontal:0.1 μs/div.

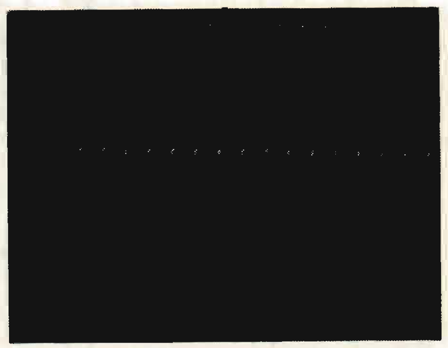


Photo 7
X'tal osc. output Pin 1 of Q301
Vertical:1V/div.
Holizontal:0.1 μs/div.

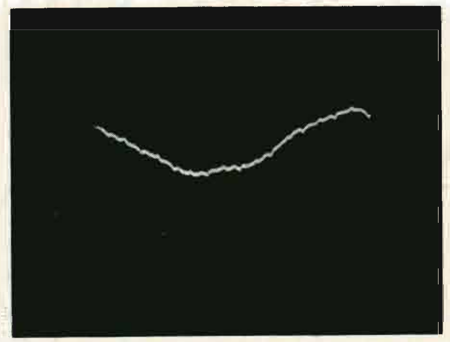


Photo 8
SLD signal(T.P) When play
Vertical:1V/div.
Holizontal:20ms/div.

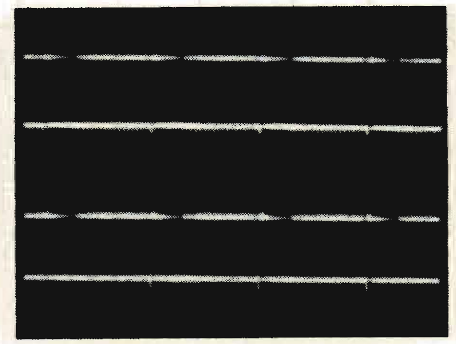


Photo 9
Upper DAL signal(T.P)
Lower DAR signal(T.P)
Vertical:2V/div.
Holizontal:2 μs/div.

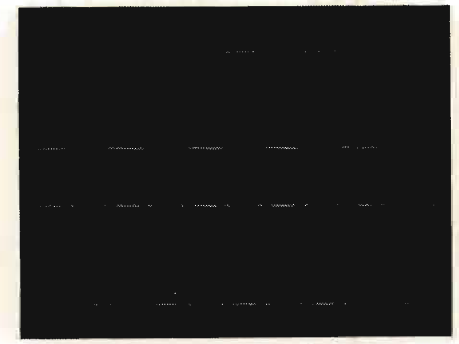


Photo 10
Serial/Parallel change
Pins 1 & 15 of Q413
Vertical:2V/div.
Holizontal:0.5ms/div.

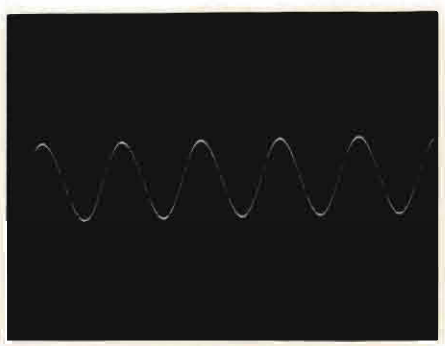


Photo 11
Audio output
Pins 6 of Q417 & Q418
Vertical:5V/div.
Holizontal:0.5ms/div.

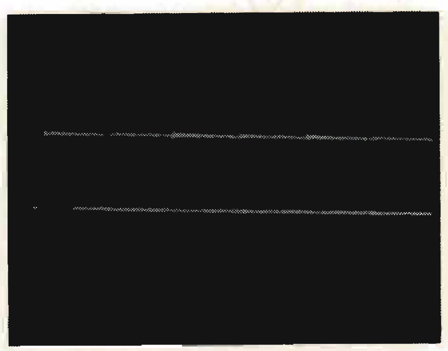


Photo 12
Digital output
Vertical:20mV/div.
Holizontal:0.2 μs/div.

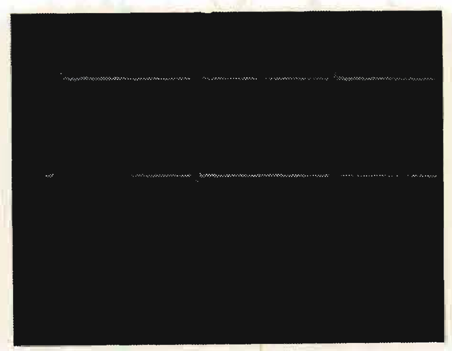


Photo 13
Digital opto. output
Vertical:2V/div.
Holizontal:0.1 μs/div.

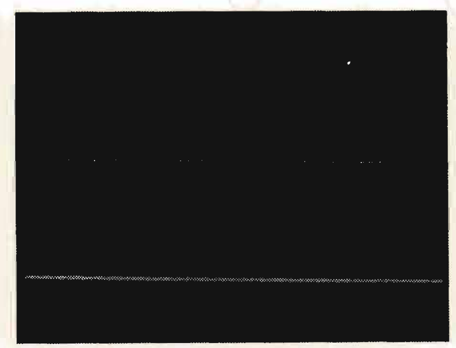
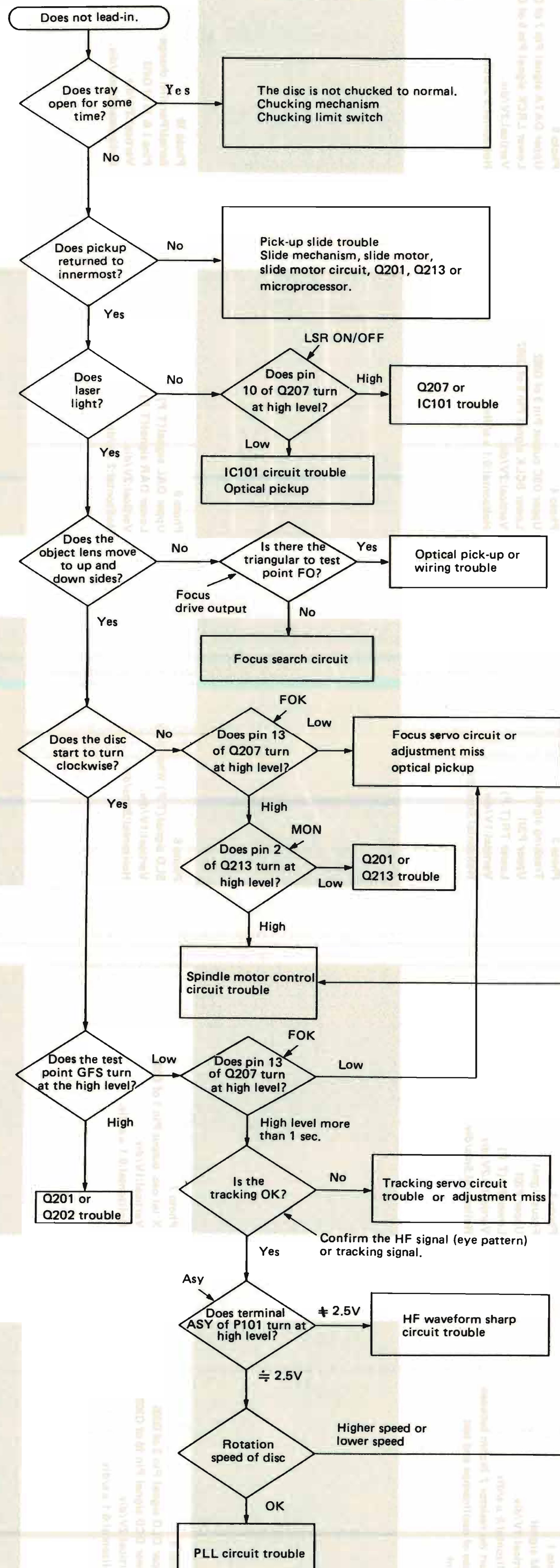


Photo 14
Grid signal of FL tube(Pin 50 of Q207)
Vertical:10mV/div.
Holizontal:1ms/div.

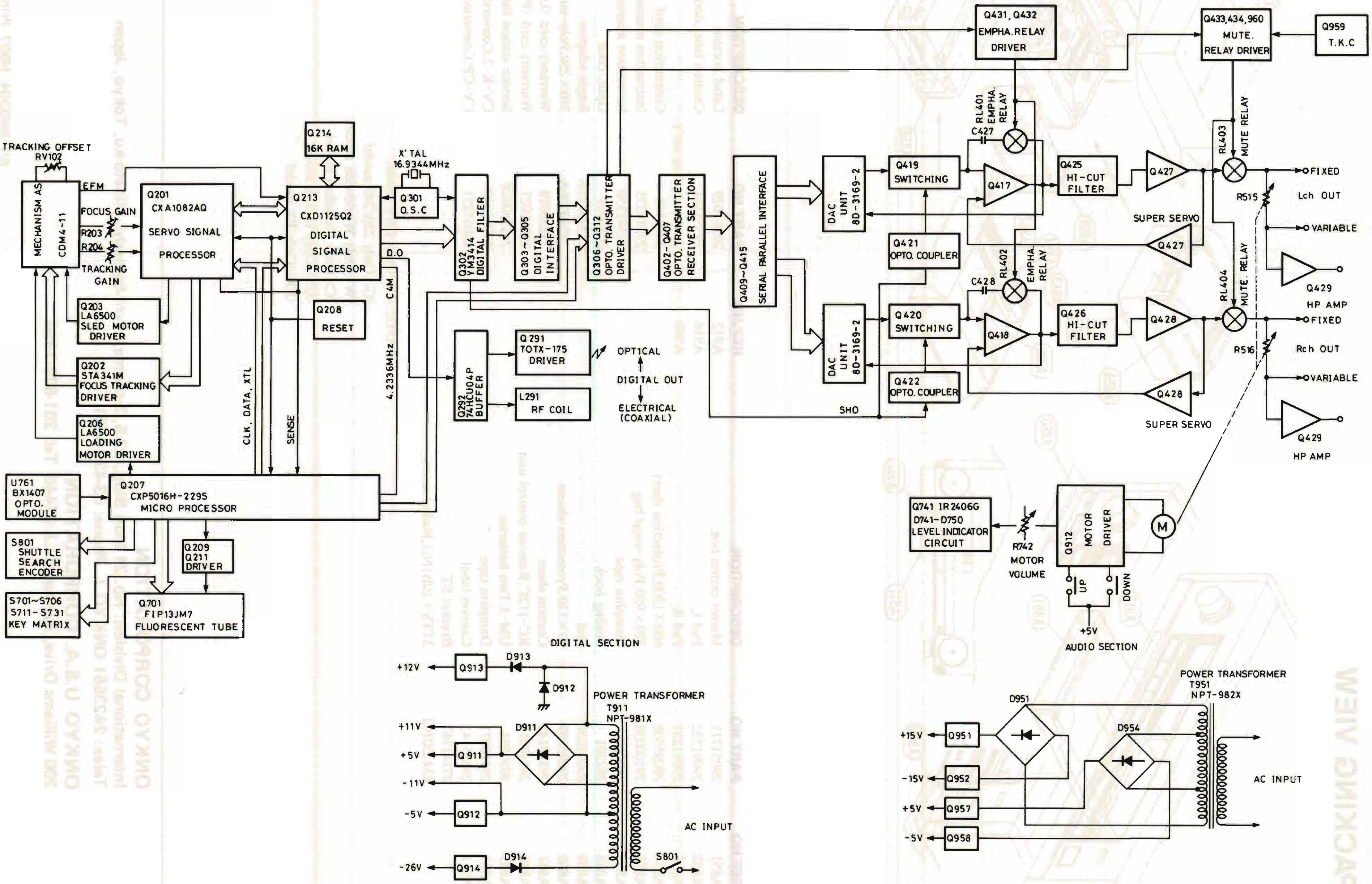
NOTE:Play the track 2 of test disc.(YEDS–18)

# TROUBLESHOOTING GUIDE

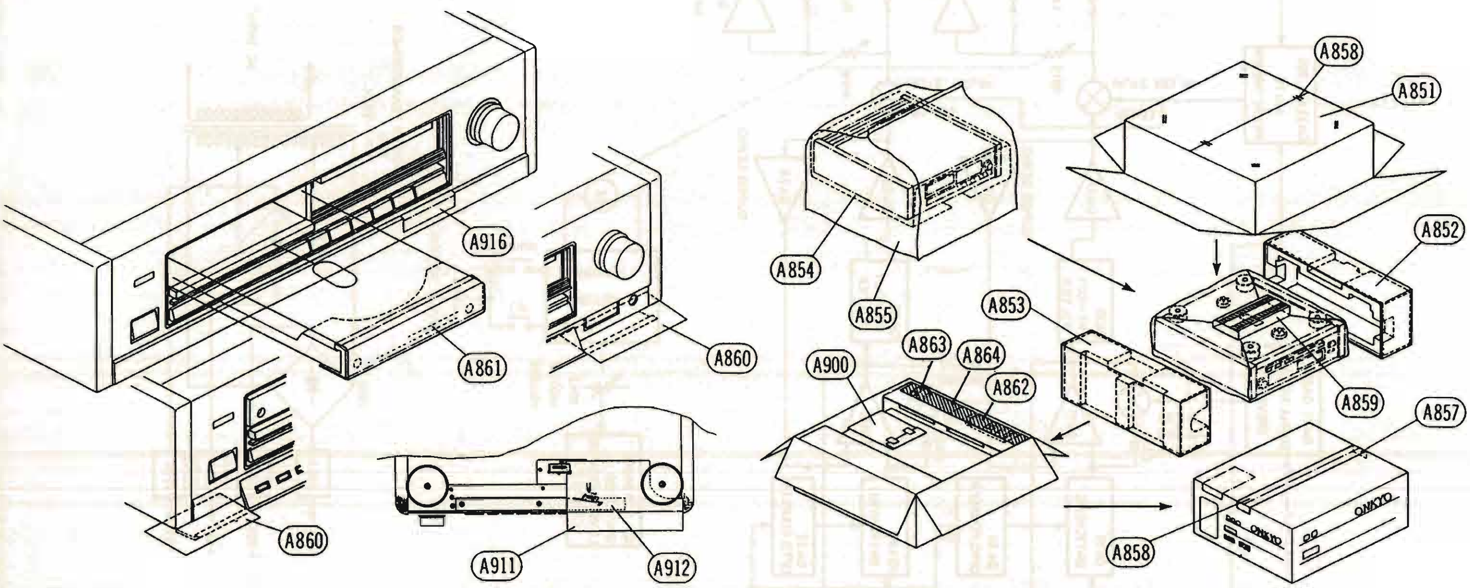
Load the disc on the tray, press OPEN/CLOSE key and close the tray. But, the total time and total number of tunes are not indicated on the fluorescent indicator tube.



# BLOCK DIAGRAM



# PACKING VIEW




| REF.NO. | PART NO. | DESCRIPTION |
|---|---|---|
| A851 | 29051711 | Master carton box |
| A852 | 29091232 | Pad L |
| A853 | 29091231 | Pad R |
| A854 | 29095508 | 600×1300,Protection sheet |
| A855 | 29100038A | 720×950,Poly-vinyl bag |
| A857 | 260012 | Damplon tape |
| A858 | 282301 | Sealing hook |
| A859 | 29091230 | Pad |
| A860 | 29095509 | 70×120,Protection sheets |
| A861 | 29355142 | Caution sheet |
| A862 | 24140015 | RC-112C,Remote control unit |
| A863 | 3010054 | UM-3,Two batteries |
| A864 | 29110071 | Damplon tape |
| A911 | 29355143 | Caution label |
| | 27141167 | Bracket ST |
| | 834230102 | 3TTS+10B(Ni),Nickel screw |

| REF.NO. | PART NO. | DESCRIPTION |
|---|---|---|
| A912 | 29361029 | Label,bottom |
| A916 | 29355144 | Caution label,door |
| A900 | Accessary bag ass'y | |
| | 2010166 | Connection cord |
| | 29341275 | Instruction manual ⟨D/PX⟩ |
| | 29341350 | Instruction manual ⟨C/G/W⟩ |
| | 2050005 | Opto. code |
| | 24509395A | Single adaptor |
| | 29100006A | 350×250,Poly-vinyl bag |
| | 29365019 | Warranty card ⟨US⟩ |
| | 29365021 | Warranty card ⟨PX⟩ |
| | 29358002F | Service station list ⟨US/PX⟩ |
| | 25055040 | CV-K-2,Conversion plug ⟨W⟩ |
| | 25055251 | CV-CP,Conversion plug ⟨PX⟩ |

NOTE: ⟨D⟩:Only 120V model
⟨G⟩:Only 220/240 model
⟨W⟩:Only Worldwide model
⟨C⟩:Only Canadian model
⟨US⟩:Only U.S.A model
⟨PX⟩:Only PX model

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