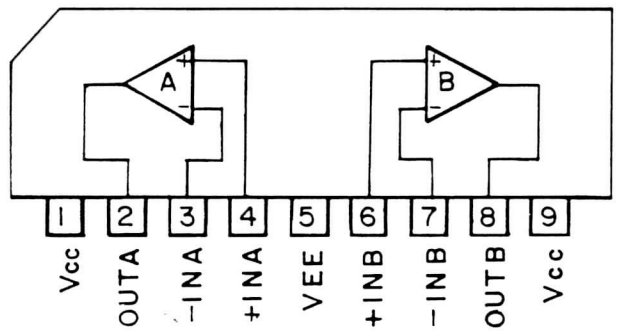
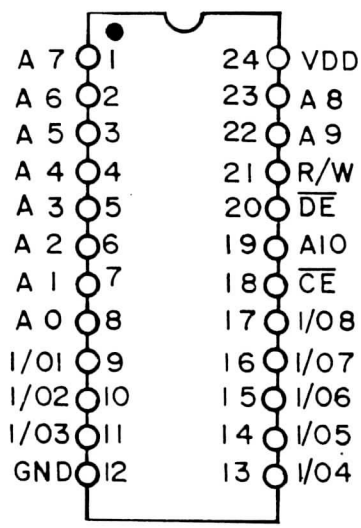
2-8. OPERATIONAL AMPLIFIER COMPARATOR

NJM 2068S
TA 75393S



2-9. 2K S-RAM

TC-5517



SECTION 3 ADJUSTMENT PROCEDURES

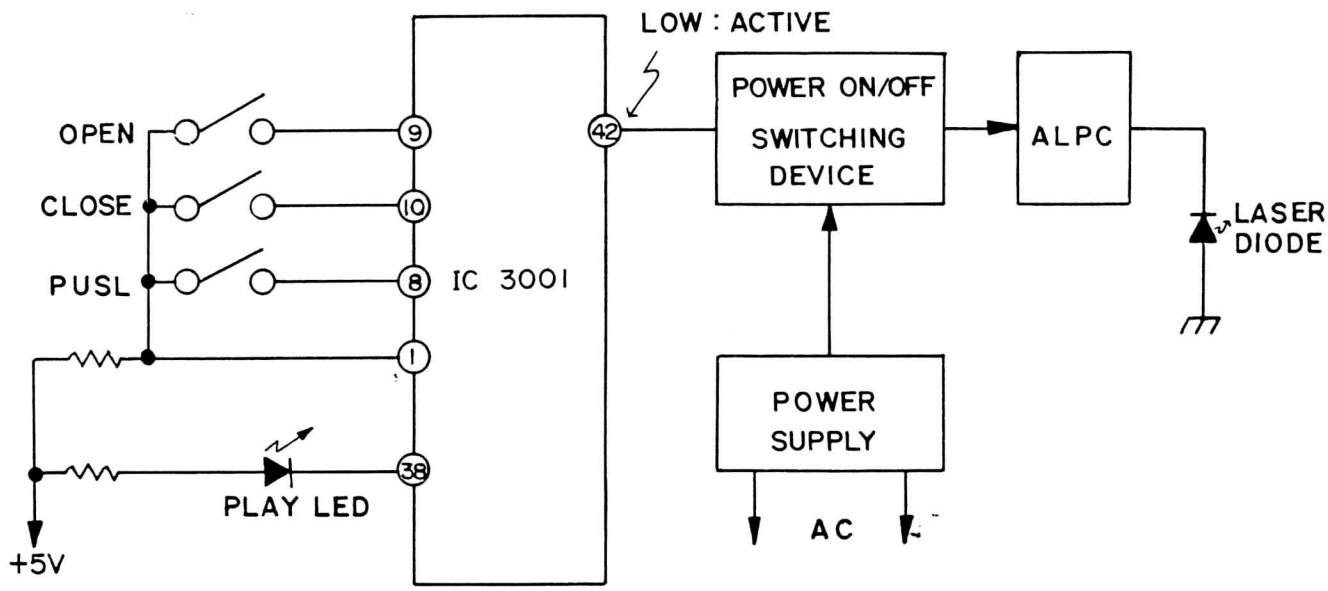
BE SURE TO FOLLOW CAREFULLY THE INSTRUCTION BELOW BEFORE SERVICING AND ADJUSTMENT.

– SAFETY INTERLOCK –

The compact disc player reads the disc signal by detecting the laser beam. It must be avoided for the human body to be exposed to the laser beam. Especially the human eyes can be badly affected by the laser beam. Therefore, the unit is equipped to prevent the unnecessary laser putput. The laser beam outputs are controlled by the pin 42 of IC3001 (one chip microcomputer). When the pin 42 is. Low, the laser diode emits the laser beam. On the contrary, when the pin 42 is HIGH, the laser diode does not emit the beam. After the unit is powered, the unitial state of pin 42 is HIGH.
The laser diode emits the beam when the following conditions are met.

1) The Disc tray is perfectly closed (The leaf switch of the close sensor is short).
2) The optical pick up is located at the vicinity of the disc driving motor (The leaf switch of the pick-up slide limite (PUSL) sensor is short).

It the disc is not found, it does not emit the laser beam. But if the DISC is loaded in the set, the set reads the directory of the disc with laser beam. When PLAY key is pressed, the laserdiode emits the beam again.



1. CONFIRMING LASER OUTPUT

1) Make the LASER output section visible by removing the flap disc clamp.
2) Switch on the power and press PLAY key once to get the LASER output. Applying the sensor of optical power meter to the objective lens, make sure that the output is in the range of 0.25mW and 0.5mW.
3) Reinstall the flap disc clamp.

2. PLL FREE RUN FREQUENCY ADJUSTMENT

1) Short between test pin TP. EFMI of IC 102 (or any lead of R214) and GND, power on and set the unit to STOP mode.
2) Connect a DC voltmeter between center lead of D201 (SVC-211) and GND, and check that voltage is 2.4V to 2.6V.
3) Connect a frequency counter between test pin TP. 7 and GND, and rotate the core of the PLL OSC coil (L104) with a plastic screwdriver so that frequency is 4.320 MHz to 4.330MHz.

3. FOCUS OFFSET ADJUSTMENT

1) Power on and set the unit to STOP mode.
2) Connect a DC voltmeter and oscilloscope between test pin TP. F and GND.
3) Adjust VR401 so that the indication of DC voltmeter and oscilloscope is ± 10mV.

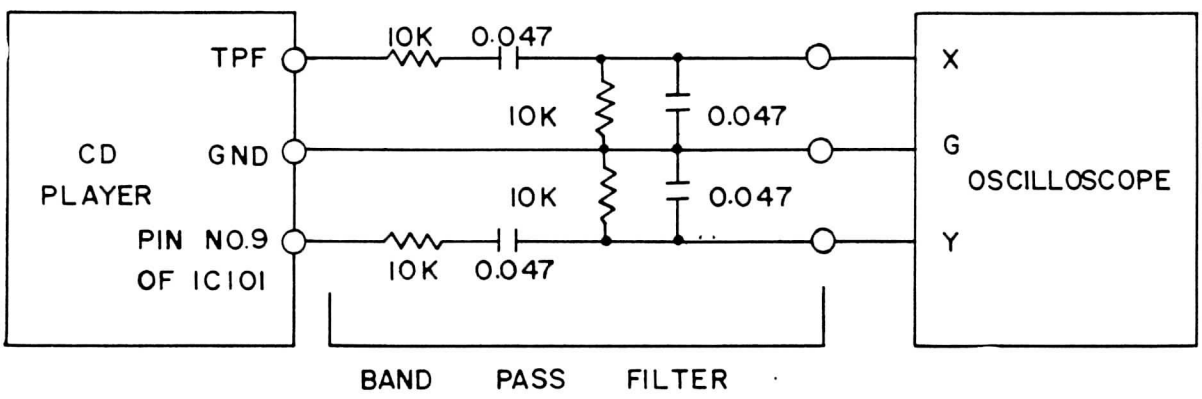
4. TRACK OFFSET ADJUSTMENT

1) Power on and set the unit to STOP mode.
2) Connect a DC voltmeter and oscilloscope between test pin TP. T and GND.
3) Adjust VR301 so that the indication of DC voltmeter and oscilloscope is ± 10mV.

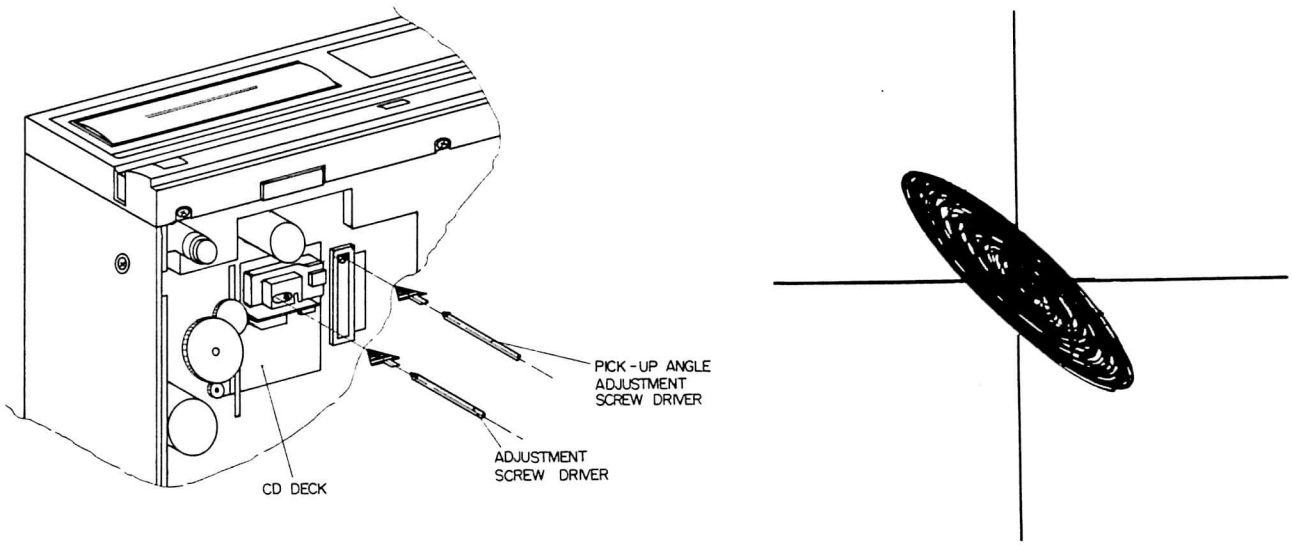
5. DIFFRACTION GRID ADJUSTMENT

This is a precise adjustment and must be made carefully.

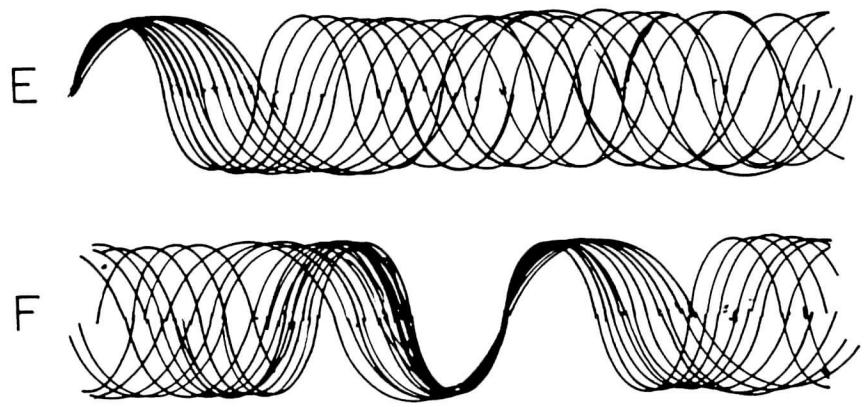
1) Connect AC voltmeter between test pin TP.TEO and GND.
2) Turn the power on, load a disc and set the unit to STOP mode.
3) Press PLAY/PAUSE key.
4) PLAY LED will flash. Short between pin No. 4 of IC 109 and GND.
5) Connect the set and oscilloscope according to the picture below.



6) Observe the resurge waveform of the waveform indicated on the oscilloscope and insert the adjustment jig into the diffraction grid and set phase difference at 180°, so that indication on Ac voltmeter is maximum. (see figure 1).
7) Even if the phase difference is 180° in the above step, the E and F subbeams may be mistakenly on the different track. Be sure that the E and F subbeams are on the same track.
8) Remove the short between pin No. 4 of IC 109 and GND.
9) Observe the waveform of the signal between test pin F and pin No. 9 EFB (E) of IC101 using dualtrace oscilloscope (Monitored in ALT mode). Beam E and beam F are in the same track if triggering of waveform F is approximately 36.7 μs behind the point (position where waveform hollows out) where waveform E is triggered (see figure 2).
10) When the beams are not on the same track return to step 3), and rotate the adjustment jig at the 180° point. Repeat steps 3) to 9) until confirned.



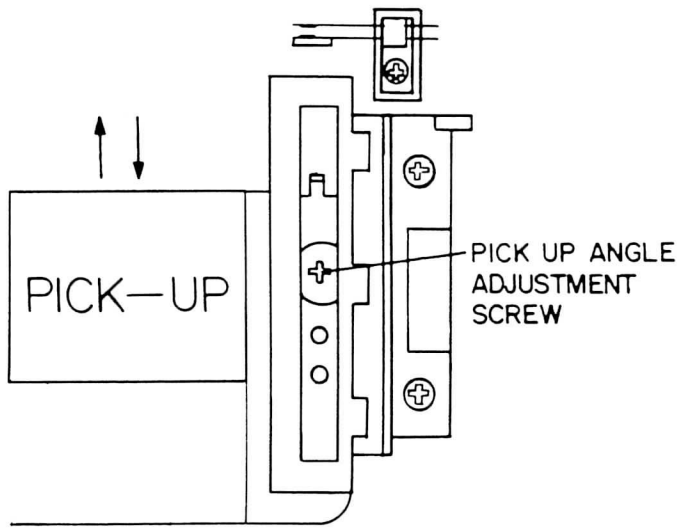
(FIGURE 1)



(FIGURE 2)

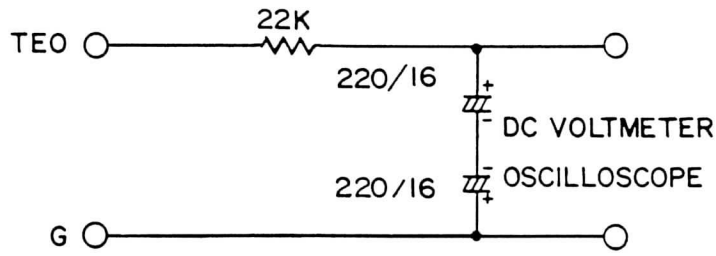
6. ADJUSTMENT OF PICK UP ANGLE

1) Turn the power on, load a disc and select a track that is in the middle position of disc.
2) Connect the oscilloscope or jitter counter between test pin TP HF and GND.
3) Play a selection and monitor the waveform of TP HF and rotate the angle adjustment screw so that the waveform is at its maximum.



7. E-F BALANCE ADJUSTMENT

1) Turn the power on, load a disc and set the unit to STOP mode.
2) Short between pin No. 9 of IC 101 and GND.
3) Connect a DC Voltmeter and oscilloscope to TP TEO through low pass filter shown below.
4) Set the unit to PLAY mode, adjust VR101 so that the DC voltmeter and oscilloscope is 0V ~ −15mV.

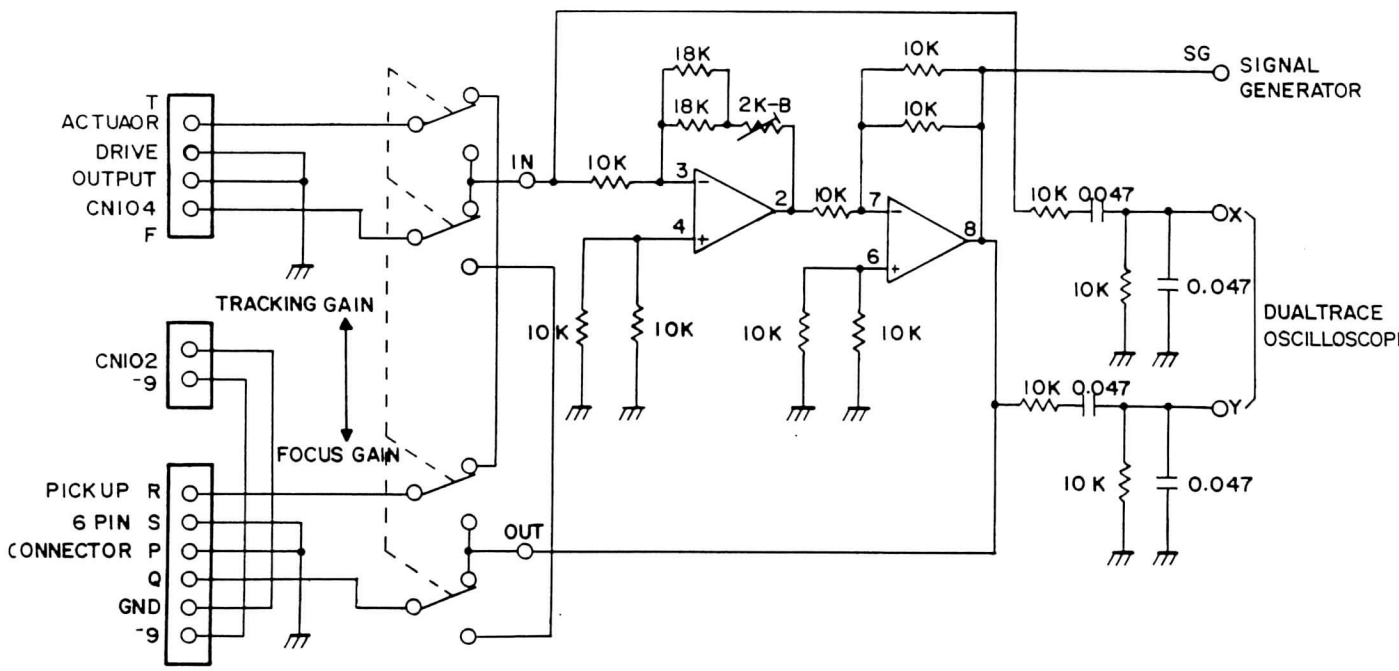


8. ADJUSTMENT OF FOCUS/TRACKING GAIN

The measurement circuit shown below is necessary for accurate adjustment of the focus and tracking gain.

- Focus gain adjustment
  1) Connect the measurement circuit shown below, turn the power on, load a disc and set the unit to PLAY mode.
  2) Apply a 900Hz, 0.5Vp-p signal from signal generator.
  3) Observe the resurge wave forms on the oscilloscope, and adjust VR402 so that the phase difference of output of X and Y from the measurement circuit is 90°.

- Tracking gain adjustment.
  1) Adjustment is made in the same manner as for focus gain.
     The input from the frequency generator is set to 1800Hz 0.5Vp-p, and VR302 is adjusted so that the phase difference is 90°



SECTION 4 SERVO

4 – 1 OUTLINE

CD-17 has four servo circuits.

1. TRACKING SERVO

Controls the objective lens in the pit track direction, and keeps the laser on the pit track:

2. FOCUS SERVO.

Controls the vertical movement of the optical system's objective lens for correct focusing on the compact disc.

3. DISC MOTOR SERVO.

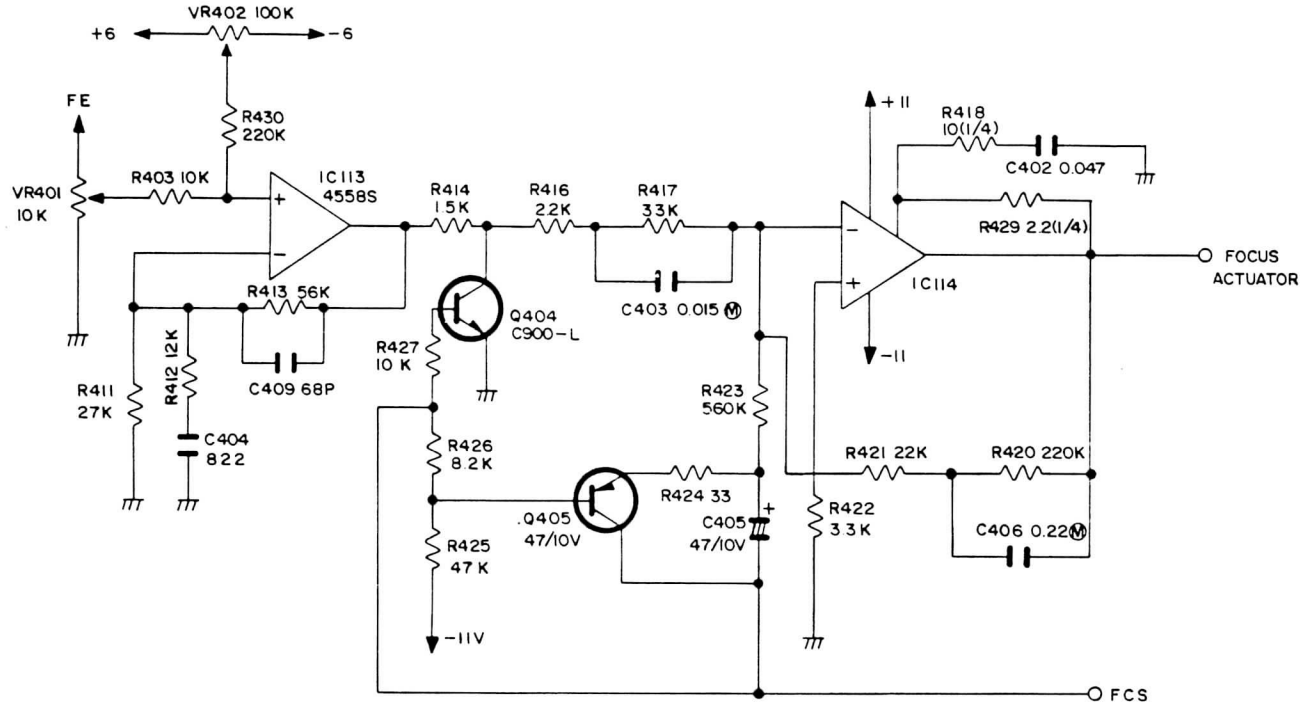
To keep a speed of the disc constantly, it is controlled by CLV (CONSTANT LINEAR VELOCITY) servo.

4. FEED MOTOR SERVO.

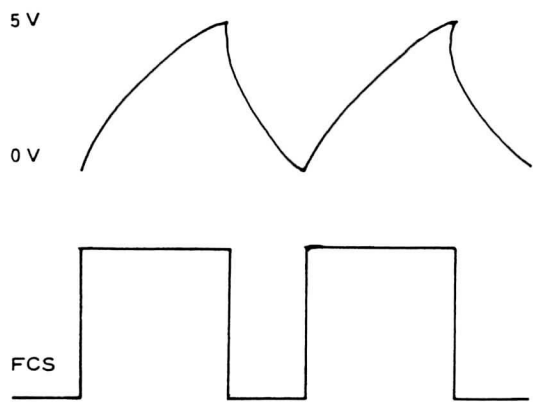
The feed motor moves the optical system between the inside and outside circumferences of the disc. By applying servo, the objective lens deviation in the tracking direction is controlled as nearly as possible to mechanical center, so that tracking servo works stably.

4-2. FOCUS SERVO

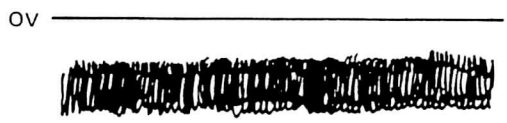
When the disc is loaded in the set, first focus search is performed and focus servo is applied.
Main detector is devided into four parts of A,B,C and D. We obtain (A + C) and (B + D) by using the output of the main detector and it is used in Forus servo.
Exact fous detection is performed by the focus OK circuit and focus zero cross detection circuit. Focus servo amplifies detected signal from photo detector of pick up at the CX-20109 and makes a signal at focus trough subtracting process (differential AMP). This error signal is amplified after lead, lag compensation and applied to focus actuator coil of the pick up. Then objective les starts tracing.



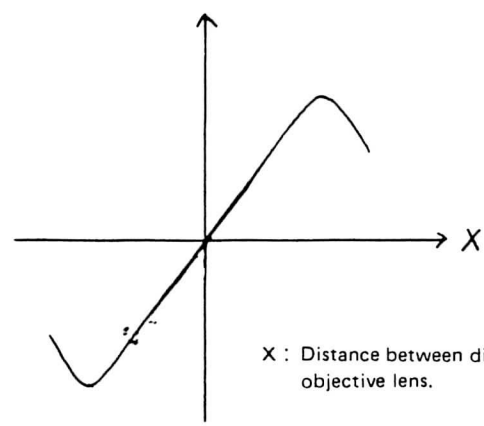
The waveform of the point 1 when focus starts



AUTO FOCUSING TPF waveform (for playing)



Output of the FE

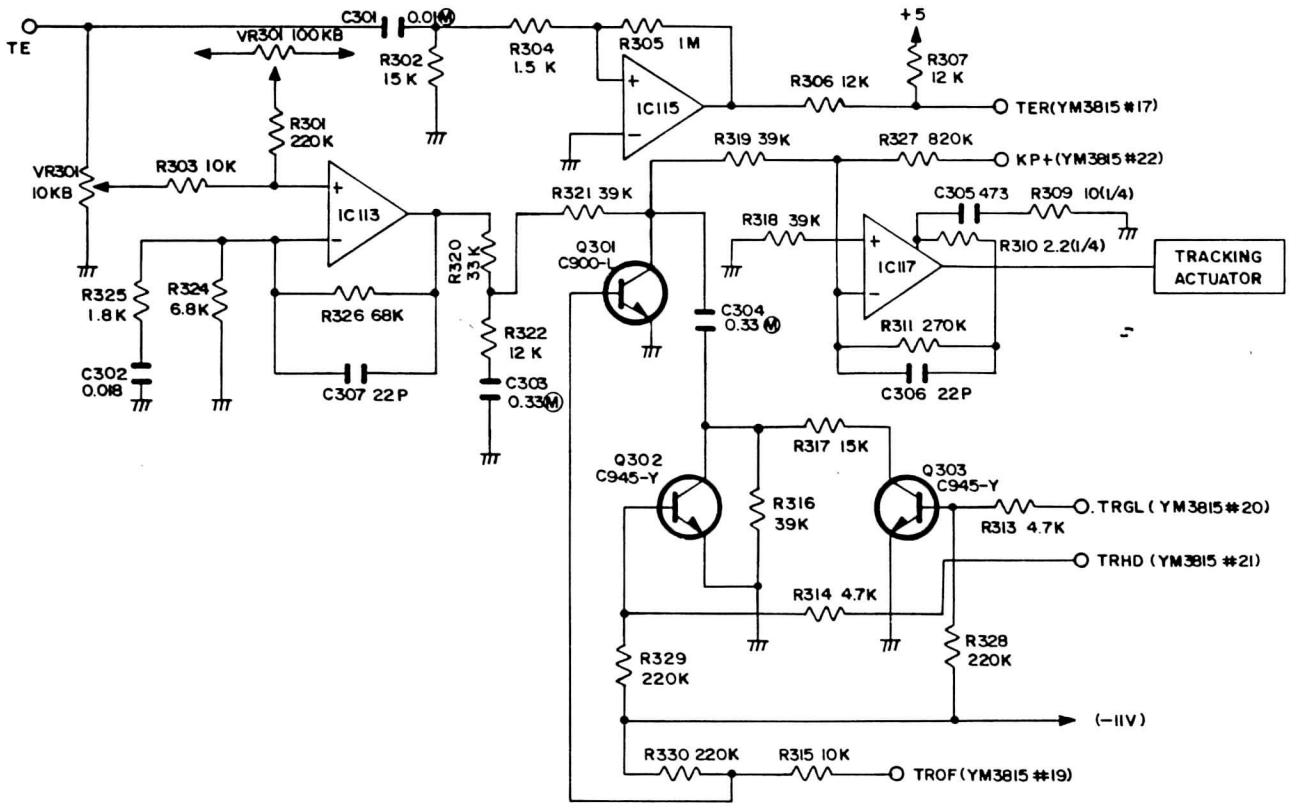


X : Distance between disc and objective lens.

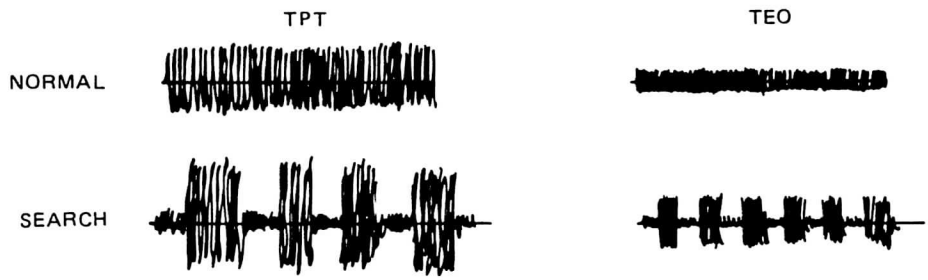
Focus error waveform according to distance

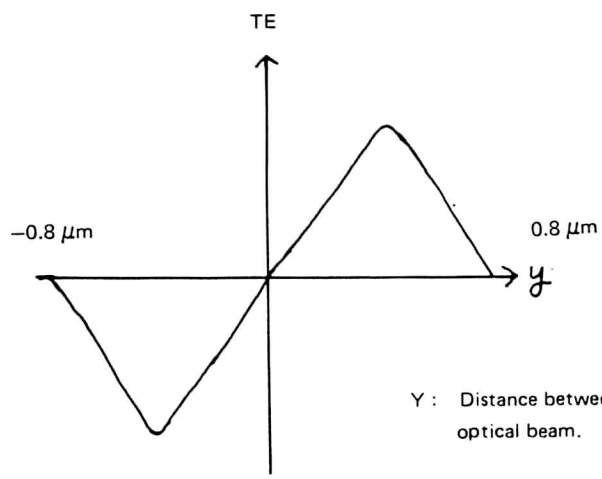
4-3. TRACKING SERVO

The signal detected from E and F (photo detector) of the pick up is amplified at CX20109.
After making tracking-error signal through subtraction process, this error signal is amplified after lead and lag compensation.
The objective lens traces a track of the disc by driving the tracking-actuator of the pick up.



(TRACKING SERVO CIRCUIT)





Y : Distance between center of a track and center of a optical beam.

SECTION 5 DIAGRAM

5-1. PCB PATTERN & MARKING

1. MAIN