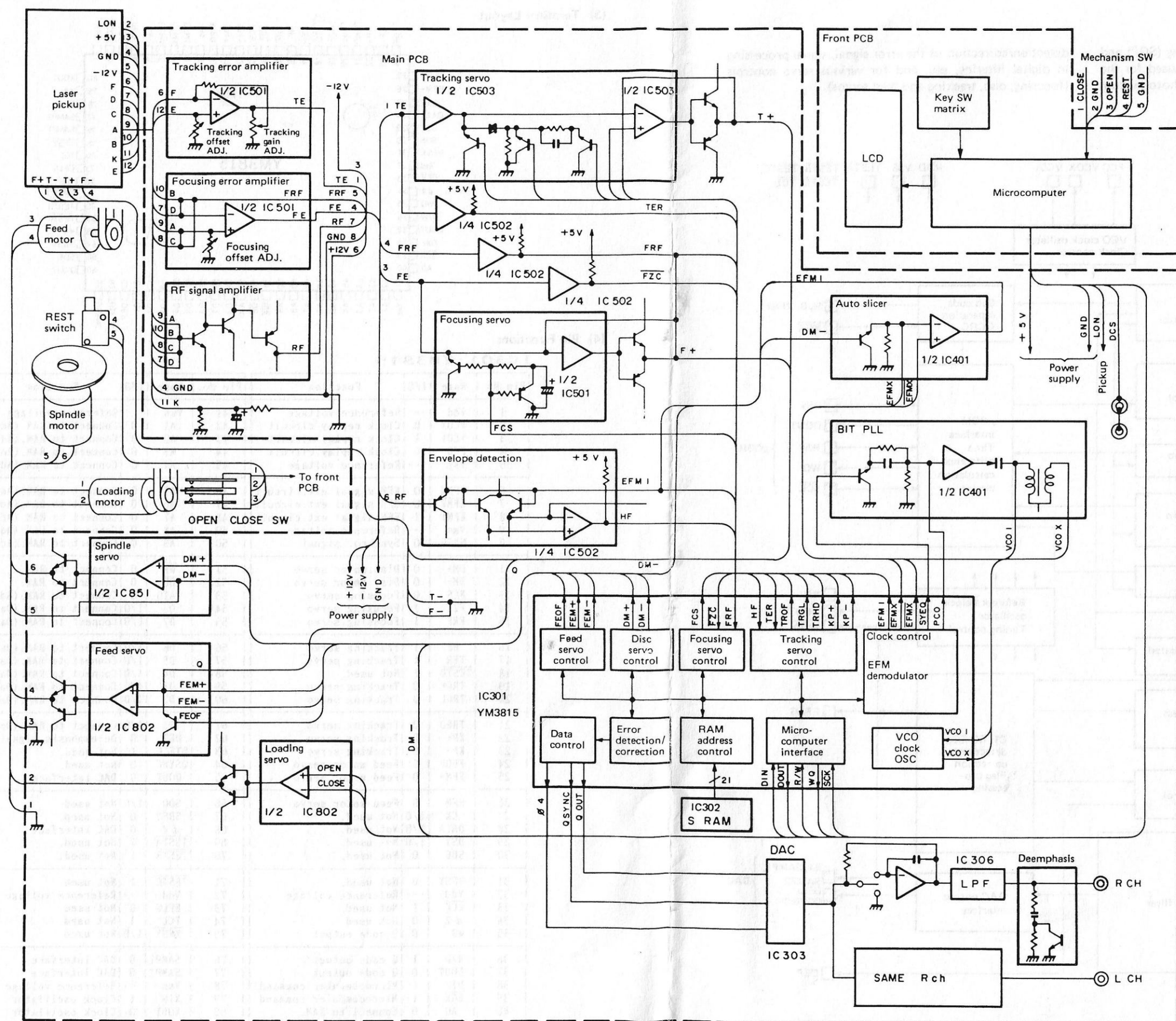
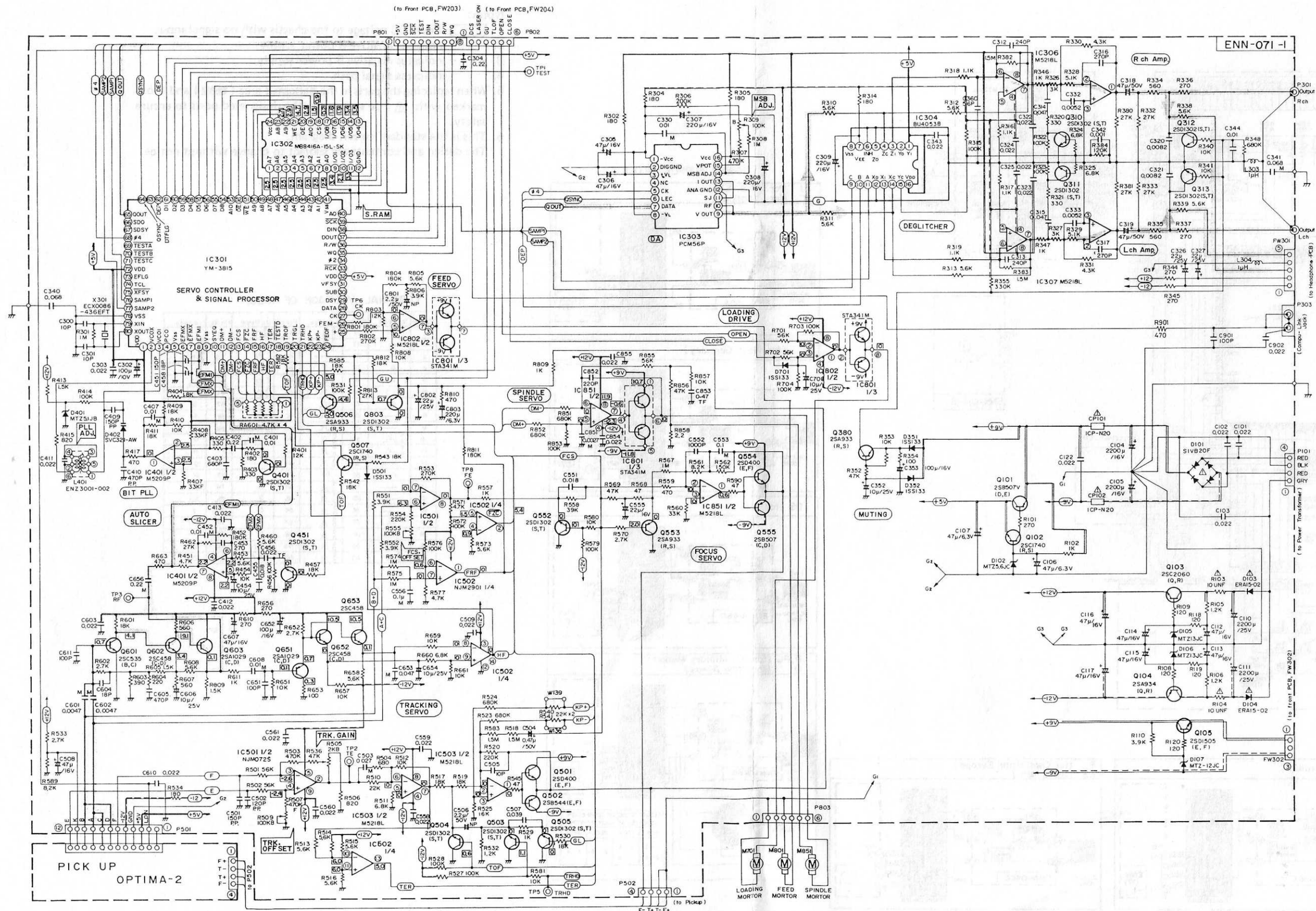


Block Diagram

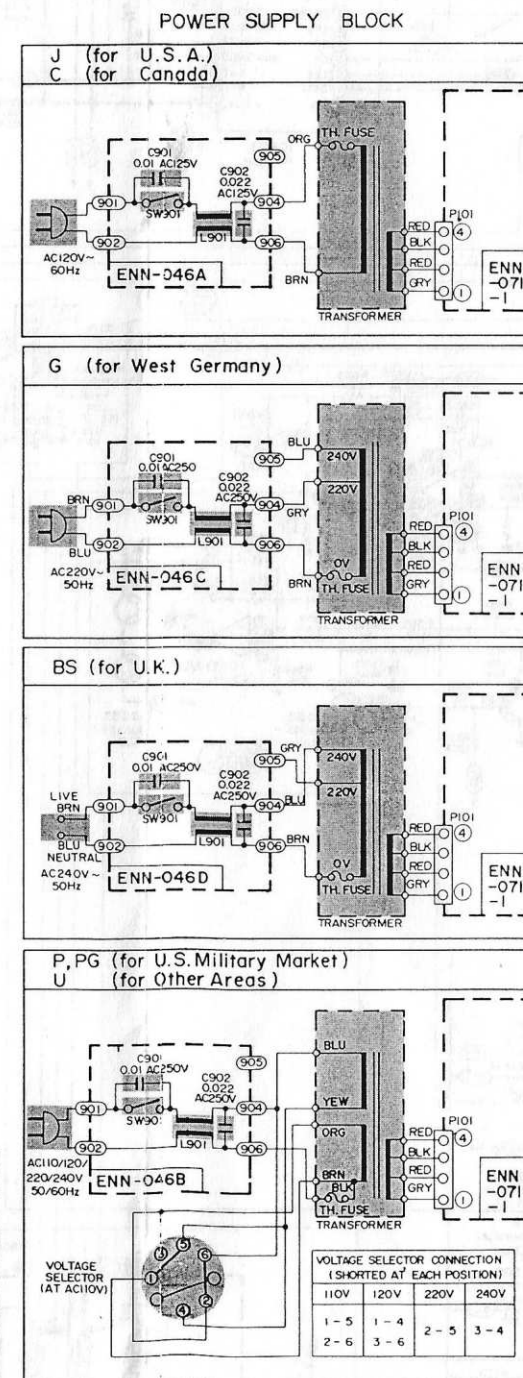
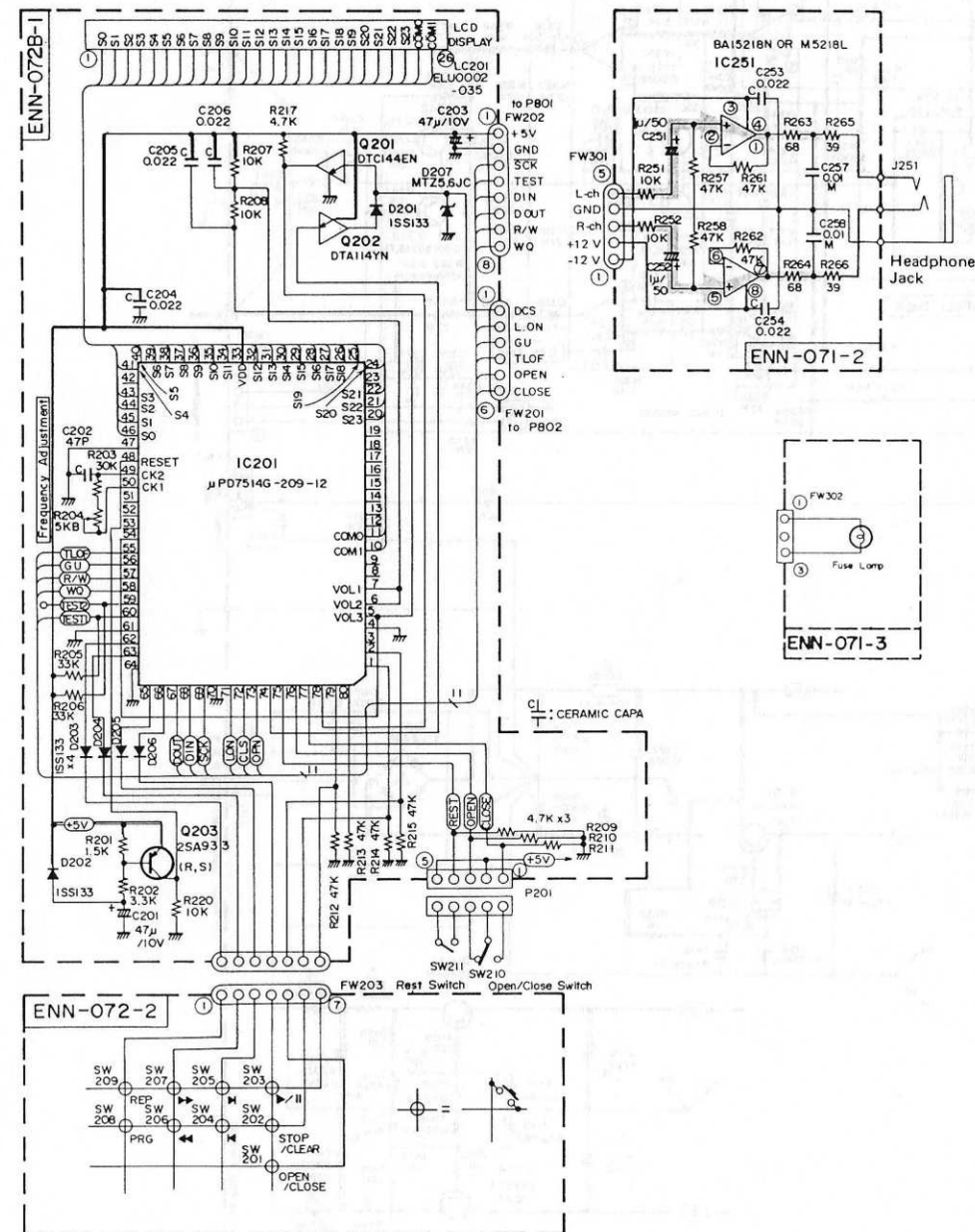


Schematic Diagrams

(1) Main Section



(2) Power Supply Section



Notes:

1. shows DC voltage to the chassis with no signal input.
2. indicates positive B power supply.
3. indicates negative B power supply.
4. indicates signal path.
5. When replacing the parts in the darkened area () and those marked with , be sure to use the designated parts to ensure safety.
6. This is the standard circuit diagram.
The design and contents are subject to change without notice.

TERMINAL VOLTAGE OF IC201

| Pin No. | Voltage | Pin No. | Voltage | Pin No. | Voltage | Pin No. | Voltage |
|---------|---------|---------|---------|---------|---------|---------|---------|
| 1 | 0 | 21 | 5.1 | 41 | 0 | 61 | 0 |
| 2 | 0 | 22 | 0 | 42 | 0 | 62 | 0 |
| 3 | 0 | 23 | 0 | 43 | 0 | 63 | 0 |
| 4 | 0 | 24 | 0 | 44 | 0 | 64 | 0 |
| 5 | 0 | 25 | 0 | 45 | 0 | 65 | 0 |
| 6 | 2.5 | 26 | 0 | 46 | 0 | 66 | 0 |
| 7 | 2.5 | 27 | 0 | 47 | 0 | 67 | 0 |
| 8 | 0 | 28 | 0 | 48 | 0 | 68 | 5.1 |
| 9 | 0 | 29 | 0 | 49 | 0 | 69 | 5.1 |
| 10 | 0 | 30 | 0 | 50 | 0 | 70 | 0 |
| 11 | 0 | 31 | 0 | 51 | 0 | 71 | 0 |
| 12 | 0 | 32 | 0 | 52 | 0 | 72 | 0 |
| 13 | 0 | 33 | 5.1 | 53 | 0 | 73 | 0 |
| 14 | 0 | 34 | 0 | 54 | 0 | 74 | 5.1 |
| 15 | 0 | 35 | 0 | 55 | 0 | 75 | 5.1 |
| 16 | 0 | 36 | 0 | 56 | 0 | 76 | 0 |
| 17 | 0 | 37 | 0 | 57 | 0 | 77 | 5.1 |
| 18 | 0 | 38 | 0 | 58 | 0 | 78 | 5.1 |
| 19 | 0 | 39 | 0 | 59 | 5.1 | 79 | 0 |
| 20 | 0 | 40 | 0 | 60 | 5.1 | 80 | 0 |

Description of Major LSI ICs

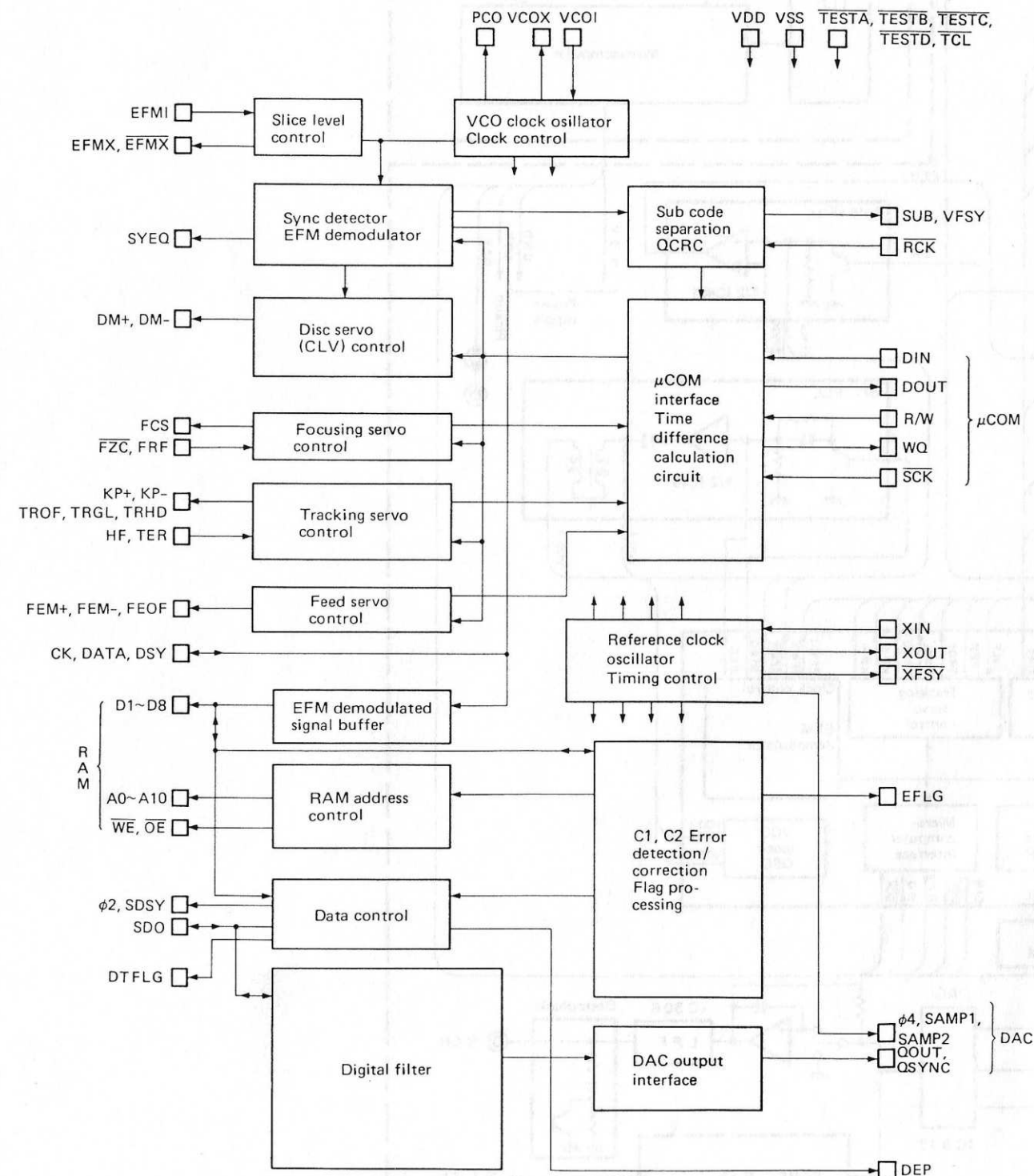
IC301: YM3815

(1) Outline:

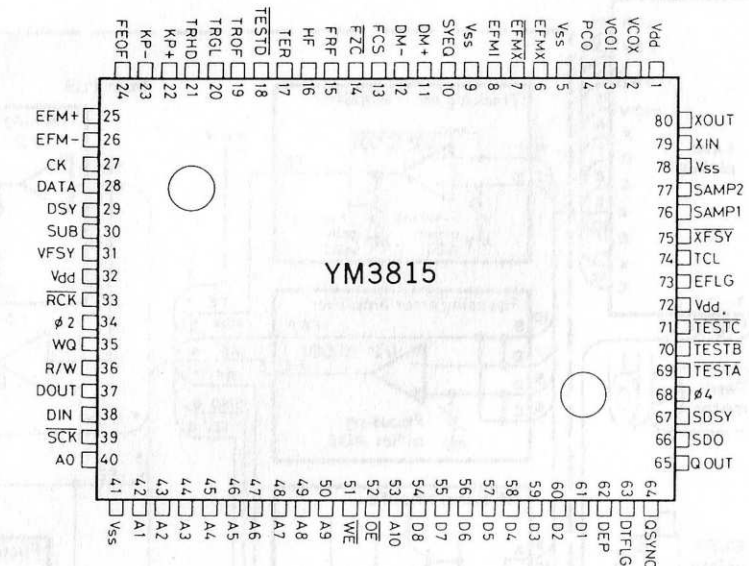
YM3815 is a C-MOS LSI for signal processing (SGP) and servo control (SVC) in a CD player. It is used for the demodulation of the EFM signal from the photo pickup,

detection/correction of the error signal, signal processing in digital filtering, etc. and for various servo controls (focusing, disc, tracking and feed servos).

(2) Internal block diagram



(3) Terminal Layout



(4) Pin Functions

IC301: YM3815

| Pin No. | Name | I/O | Function | Pin No. | Name | I/O | Function |
|---------|----------|-----|------------------------|---------|----------|-----|---------------------------|
| 1 | Vdd | --- | Reference voltage | 41 | Vss | --- | Reference voltage |
| 2 | VCOX | 0 | Clock replay circuit | 42 | A1 | 0 | Connect to RAM. (Address) |
| 3 | VCOI | 1 | Clock replay circuit | 43 | A2 | 0 | Connect to RAM. (Address) |
| 4 | PCO | 0 | Clock replay circuit | 44 | A3 | 0 | Connect to RAM. (Address) |
| 5 | Vss | --- | Reference voltage | 45 | A4 | 0 | Connect to RAM. (Address) |
| 6 | EFMX | 0 | EFM signal ext.circuit | 46 | A5 | 0 | Connect to RAM. (Address) |
| 7 | EFM+ | 0 | EFM signal ext.circuit | 47 | A6 | 0 | Connect to RAM. (Address) |
| 8 | EFM- | 1 | EFM signal ext.circuit | 48 | A7 | 0 | Connect to RAM. (Address) |
| 9 | Vss | --- | Reference voltage | 49 | A8 | 0 | Connect to RAM. (Address) |
| 10 | SYEQ | 0 | Synchro. signal | 50 | A9 | 0 | Connect to RAM. (Address) |
| 11 | DM+ | 0 | Disc motor servo | 51 | WE | 0 | Connect to RAM. |
| 12 | DM- | 0 | Disc motor servo | 52 | OE | 0 | Connect to RAM. |
| 13 | FCS | 0 | Focusing servo | 53 | A10 | 0 | Connect to RAM. (Address) |
| 14 | FZC | 1 | Focusing servo | 54 | D8 | 1/0 | Connect to RAM. (Data) |
| 15 | FRF | 1 | Focusing servo | 55 | D7 | 1/0 | Connect to RAM. (Data) |
| 16 | HF | 1 | Tracking servo | 56 | D6 | 1/0 | Connect to RAM. (Data) |
| 17 | TER | 1 | Tracking servo | 57 | D5 | 1/0 | Connect to RAM. (Data) |
| 18 | TESTD | 1 | Not used. | 58 | D4 | 1/0 | Connect to RAM. (Data) |
| 19 | TROF | 0 | Tracking servo | 59 | D3 | 1/0 | Connect to RAM. (Data) |
| 20 | TRGL | 0 | Tracking servo | 60 | D2 | 1/0 | Connect to RAM. (Data) |
| 21 | TRHD | 0 | Tracking servo | 61 | D1 | 1/0 | Connect to RAM. (Data) |
| 22 | KP+ | 0 | Tracking servo | 62 | DEP | 0 | De-emphasis signal |
| 23 | KP- | 0 | Tracking servo | 63 | DTFLG | 1 | Not used. |
| 24 | FEOF | 0 | Feed motor servo | 64 | QSYNC | 0 | Not used. |
| 25 | EFM+ | 0 | Feed motor servo | 65 | QOUT | 0 | DAC interface |
| 26 | EFM- | 0 | Feed motor servo | 66 | SDO | 1/0 | Not used. |
| 27 | CK | 1/0 | Not used. | 67 | SDSY | 0 | Not used. |
| 28 | DATA | 1/0 | Not used. | 68 | $\phi 4$ | 0 | DAC interface |
| 29 | DSY | 1/0 | Not used. | 69 | TESTA | 1 | Not used. |
| 30 | SUB | 0 | Not used. | 70 | TESTB | 1 | Not used. |
| 31 | VFSY | 0 | Not used. | 71 | TESTC | 1 | Not used. |
| 32 | Vdd | --- | Reference voltage | 72 | Vdd | --- | Reference voltage |
| 33 | RCK | 1 | Not used. | 73 | EFLG | 0 | Not used. |
| 34 | $\phi 2$ | 0 | Not used. | 74 | TCL | 1 | Not used. |
| 35 | WQ | 0 | Q code output | 75 | XFSY | 1/0 | Not used. |
| 36 | R/W | 1 | Q code output | 76 | SAMP1 | 0 | DAC interface |
| 37 | DOUT | 0 | Q code output | 77 | SAMP2 | 0 | DAC interface |
| 38 | DIN | 1 | Microcomputer command | 78 | Vss | --- | Reference voltage |
| 39 | SCK | 1 | Microcomputer command | 79 | XIN | 1 | Clock oscillator |
| 40 | A0 | 0 | Connect to RAM. | 80 | XOUT | 0 | Clock oscillator |

Maintenance of Laser Pickup

(1) Service life of the laser pickup

• When measuring with a laser power meter

1. Remove the flat wires from sockets P801 and P802 on the main PC board.
2. Connect the pin ② (LON) of P802 to +5 V line.
3. Turn the power on and measure the power of the pickup laser.

• When a laser power meter is not available

1. Turn the power on and load a disc.
 2. Press the PLAY button to start playing.
 3. Connect an oscilloscope to TP3 (RF), and measure the EFM output.
- When the measured value is as shown in the table below, replace the pickup because the service life of the laser diode is judged as having expired.

| Measurement value | Measurement instrument | Measured value |
|---------------------------------------|------------------------|------------------|
| Laser power | Laser power meter | Less than 0.1 mW |
| EFM output (Amplitude of eye pattern) | Oscilloscope | Less than 1.0 V |

(2) Semifixed resistor on the APC board

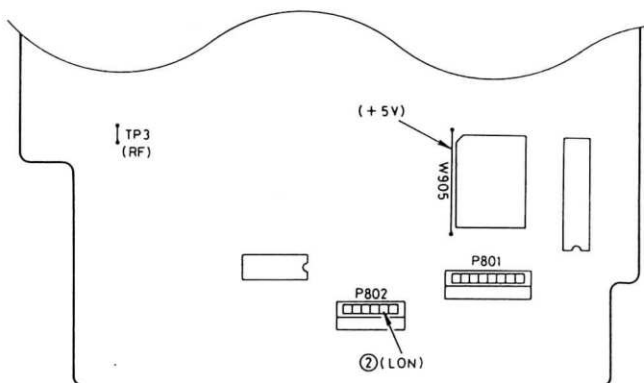
The semifixed resistor on the APC board installed with the pickup is used to adjust the laser power. Do not touch this semifixed resistor because this adjustment should be performed as part of a pair of adjustments to match the characteristics of the optical block.

If the laser power is too low, replace the pickup since the service life of the laser diode has expired. Turning the semifixed resistor with a normal pickup may damage the pickup because of overcurrent.

(3) Grating adjustment

Since all parts have been carefully adjusted in assembly, grating adjustment is not required.

As parts can become badly adjusted due to careless operation, the laser beams will mistrack and sound reproduction may become impossible.



— Continued from P1-17 (Adjustment Procedures) —

(7) Audio circuit adjustment (Zero-cross distortion)

1) Adjustment instruments

Oscilloscope, Test disc (CRG1106)

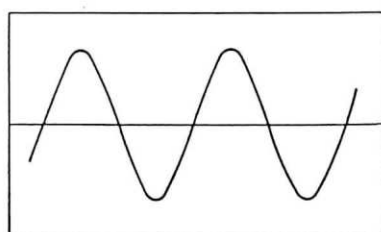
2) Adjustment procedure

1. Play the 9th track (1 kHz, -60 dB) of the test disc.
2. Adjust R309 so that the reproduced waveform becomes the specified sine wave. (Refer to the figure below.)

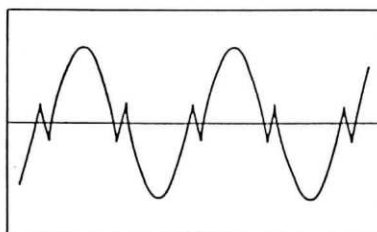
Note: This adjustment has been added during production of the player, to improve the characteristics such as the distortion rate, dynamic range and separation, etc.

Refer to the circuit diagram of the amplifier with a gain of 60 dB in the Service Manual of the XL-V1100BK (No. 2932) if necessary.

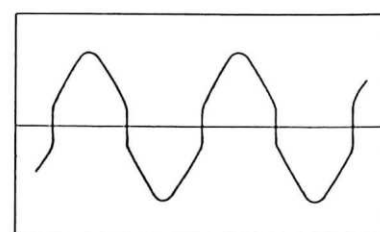
• Zero-cross distortion waveform



OK

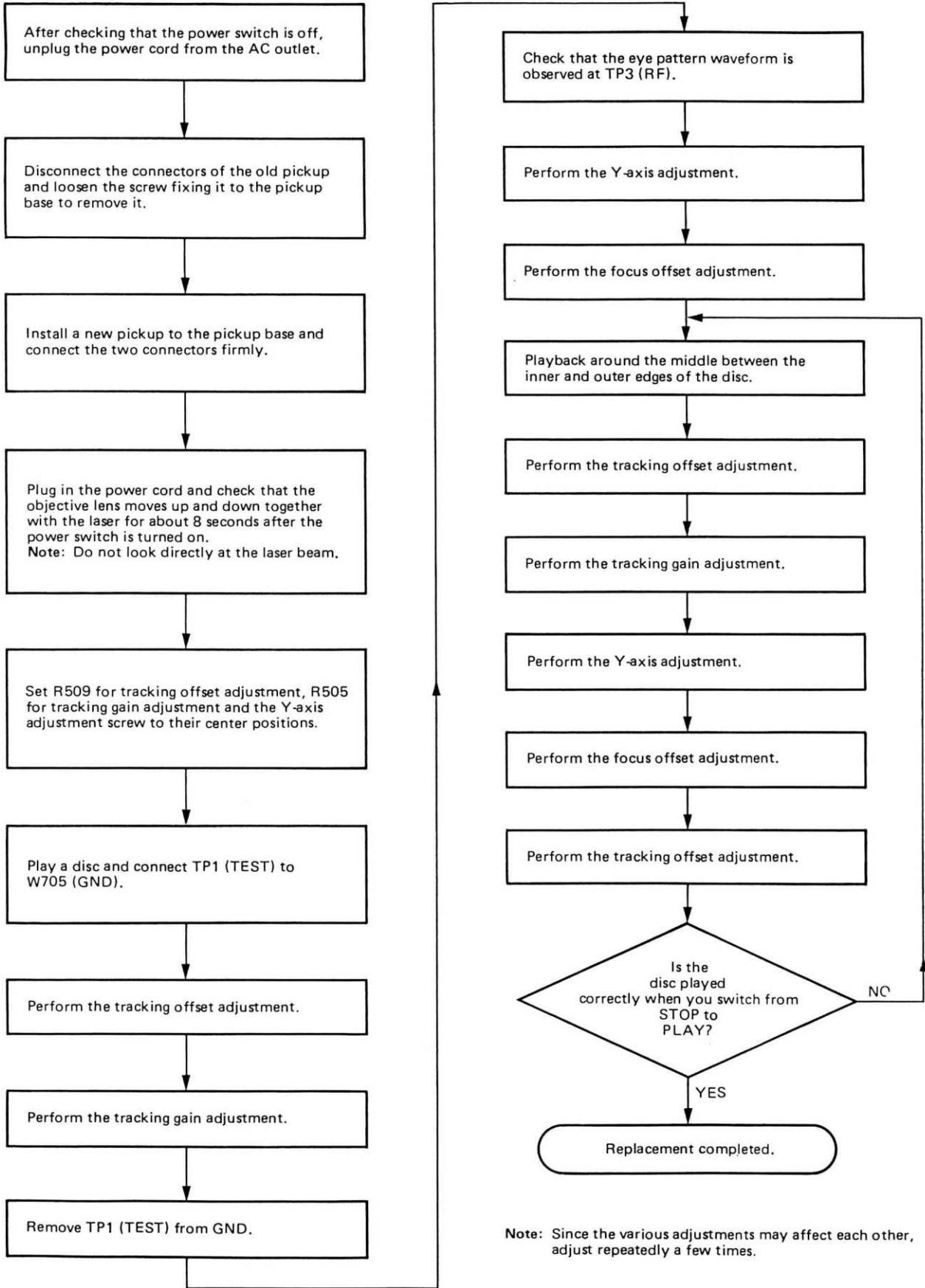


NG



NG

Replacement of Laser Pickup



Note: Since the various adjustments may affect each other, adjust repeatedly a few times.

Adjustment Procedures

(1) PLL freerunning adjustment

- 1) Adjustment instrument
Frequency counter
- 2) Adjustment procedure
 1. Remove the tray assembly. (Refer to item (2) on page 1-12.)
 2. Connect a frequency counter between TP6 (CK) and W705 (GND) on the main PC board.
 3. Short TP3 (RF) and W705 (GND).
 4. Using the alignment rod, adjust L401 for a frequency counter reading of 4.332 ± 0.001 MHz.
 5. Perform this adjustment immediately after the power is turned on.

(2) Clock frequency adjustment

- 1) Adjustment instrument
Frequency counter
- 2) Adjustment procedure
 1. Remove the LCD PC board. (Refer to item (3) on page 1-12.)
 2. Connect TEST2 (R206) on the LCD PC board to GND.
 3. Connect a frequency counter between SCK (FW202 pin ③) and GND.
 4. Turn the POWER switch ON.
 5. Adjust R204 located on the LCD PC board so that the value indicated by the frequency counter becomes $200 \text{ kHz} \pm 4 \text{ kHz}$.
 6. Turn the POWER switch OFF.
 7. Disconnect TEST2 (R206) from GND pin.

(3) Y-axis adjustment

- 1) Adjustment instruments
Oscilloscope, Flat-bladed screwdriver, Normal disc
- 2) Adjustment procedure
 1. Remove the tray assembly. (Refer to item (2) on page 1-12.)
 2. Connect an oscilloscope between TP3 (RF) and W705 (GND) on the main PC board.
 3. Play the disc.
 4. Turn the Y-axis adjusting screw located on the pick-up base so that the amplitude of the RF signal (waveform on the oscilloscope) becomes maximum with the clearest possible waveform.

(4) Focus offset adjustment

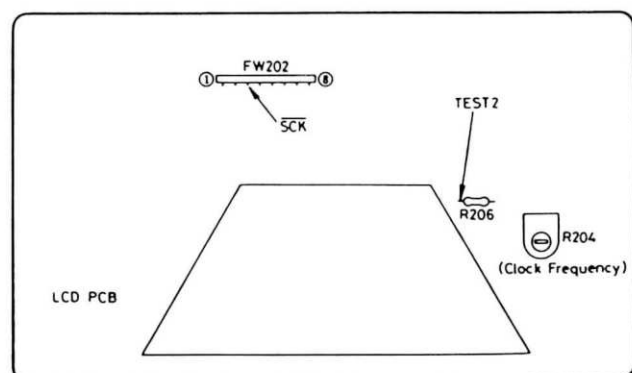
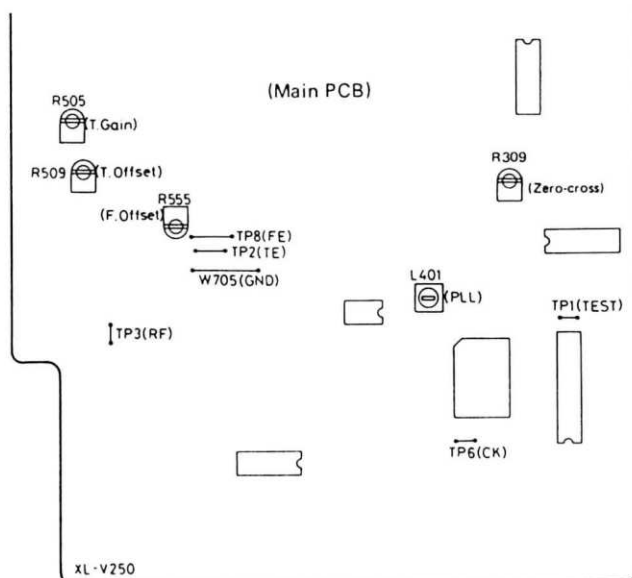
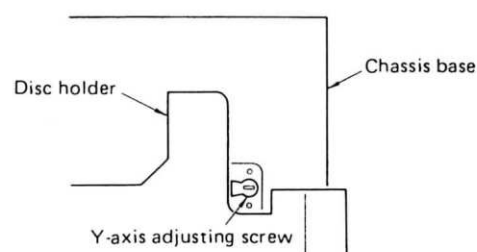
- 1) Adjustment instruments
Oscilloscope, Normal disc
- 2) Adjustment procedure
 1. Connect an oscilloscope between TP3 (RF) and W705 (GND) on the main PC board.
 2. Play the disc.
 3. Adjust R555 so that the amplitude of the RF signal (waveform on the oscilloscope) becomes maximum with the clearest possible waveform.

(5) Tracking gain adjustment

- 1) Adjustment instruments
Oscilloscope, Normal disc
- 2) Adjustment procedure
 1. Connect an oscilloscope between TP2 (TE) and W705 (GND) on the main PC board.
 2. Play the disc.
 3. Short TP1 (TEST) to W705 (GND).
 4. Adjust R505 so that the tracking error signal (waveform on the oscilloscope) is 2 Vp-p.

(6) Tracking offset adjustment

- 1) Adjustment instruments
Oscilloscope, Normal disc
 - 2) Adjustment procedure
 1. Connect an oscilloscope between TP2 (TE) and W705 (GND) on the main PC board.
 2. Play the disc.
 3. Short TP1 (TEST) to W705 (GND).
 4. Adjust R509 so that the DC level of the tracking error signal (waveform on the oscilloscope) becomes 0.
- Note: Adjust R509 so that the waveform becomes symmetrical around the 0 level.



(7) Audio circuit adjustment (Zero-cross distortion)

- Refer to page 1-15.

Flow of Operation Until TOC is Read

