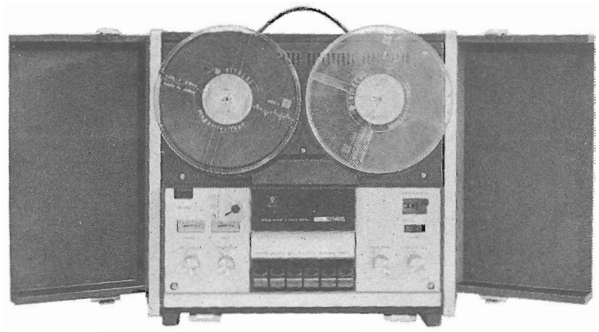

HITACHI
Hitachi, Ltd. Tokyo Japan

TRANSISTOR STEREO TAPE RECORDER

MODEL TRQ-717

SERVICE MANUAL

No. 168 1986

SPECIFICATIONS

ELECTRICAL CHARACTERISTICS

POWER SUPPLY RATING ..... AC: 120V 50/60⁀ or 210V/230V 50⁀

POWER CONSUMPTION 60W

RECORDING SYSTEM ..... AC bias

ERASING SYSTEM ..... AC erase

AUDIO OUTPUT ..... 1.5 W x 2

FREQUENCY RANGE ..... 50~15,000 cps at $7^1/_2$ ips speed
50~9,500 cps at $3^3/_4$ ips speed
50~5,500 cps at $1^7/_8$ ips speed

INPUT IMPEDANCE
- MICROPHONE TERMINAL 6kΩ
- LINE-IN TERMINAL 330kΩ
- REC./P.B. SOCKET 6kΩ

OUTPUT IMPEDANCE
- EXT. SPEAKER TERMINAL ... 8Ω
- REC./P.B. TERMINAL 600Ω

MECHANICAL CHARACTERISTICS

TAPE SPEED ..... $7^1/_2$ ips (19cm/s)
$3^3/_4$ ips (9.5cm/s)
$1^7/_8$ ips (4.75cm/s)

TAPE REEL ..... 7″ (18cm), 5″ (13cm) & $3^1/_3$″ (8.5cm)

RECORDING OR PLAYING TIME ..... Stereo (using 7″, 35μ tape)
1.5 hr at $7^1/_2$ ips speed
3 hr at $3^3/_4$ ips speed
6 hr at $1^7/_8$ ips speed
Monaural (using 7″, 35μ tape)
3 hr at $7^1/_2$ ips speed
6 hr at $3^3/_4$ ips speed
12 hr at $1^7/_8$ ips speed

REWINDING TIME ..... Less than 4 min. using 7″, 50μ tape

FAST FORWARDING TIME ... Less than 4 min. using 7″, 50μ tape

COMPONENTS USED

TRANSISTORS ..... 2SB73 (B) x 2, 2SB75 (C) x 4
2SB89 (C) x 2, 2SB367 (B) x 4
2SB370 (A) x 1, 2SB370 (B) x 2

DIODES ..... IN34A x 4,
IS310 x 4

THERMISTORS ..... D-IE x 5

LOUDSPEAKER ..... 4″ × 6″ PM × 2

MICROPHONE ..... Dynamic microphone × 2

MISCELLANEOUS

TRACK SYSTEM ..... 4 track stereo

DIMENSIONS ..... $13^7/_{16}$″ (H) x $15^5/_{16}$″ (W) x $7^3/_8$″ (D)
(34.7 X 38.9 X 18.6cm)

WEIGHT ..... 24.2 lbs (11kg)

DESCRIPTION

Special Features

1. 4-track, 2-channel system for stereo recording and reproducing.
2. Levelmatic device
   Since the level adjustment during recording is automatic, a recording without distortion can be performed, even when a sound of great intensity enters into the machine suddenly.
3. All-transistor system, maximum total output of 3W.
4. Tone quality control
   Depending on preference, the machine can be controlled for soft or sharp tones or for a variation of tone in between.
5. Recording and playback terminals according to DIN standard
   If the stereo set has recording and playback terminals of the same standard, the connection for recording and player can be performed with one cord, regardless of stereo or monaural sound.

CONTROLS

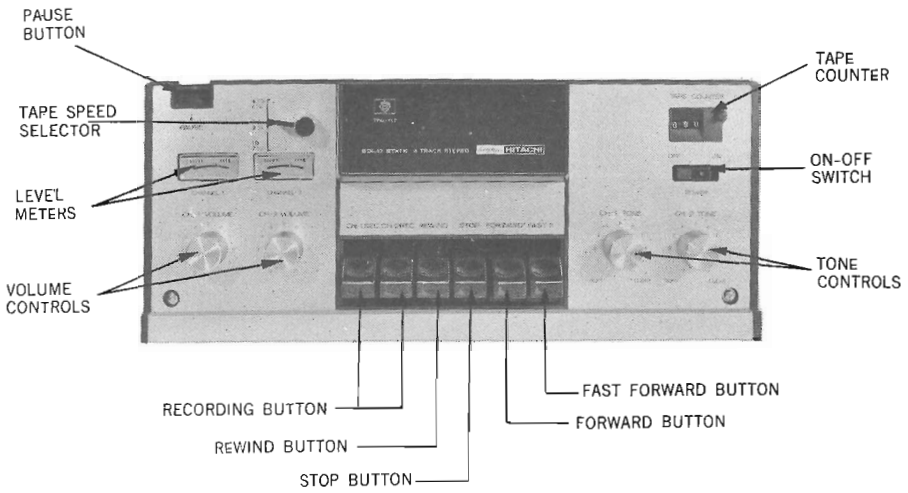

Fig. 1

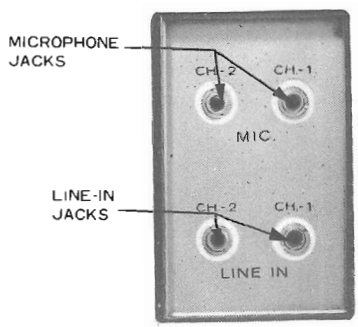

Fig. 2

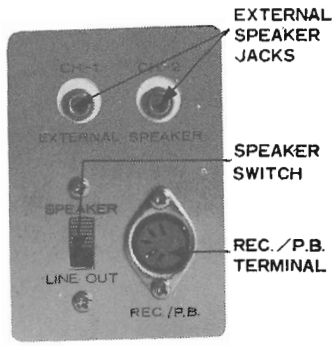

Fig. 3

DISASSEMBLY

When inspecting, repairing and lubricating, disassemble the machine in the following manner:

1. Removing the front panel.

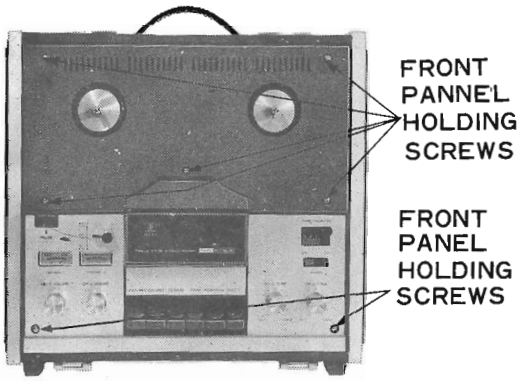

Fig. 4

Remove setscrews (7 pcs) as shown in Fig. 4, after removing the volume control knob, tone control knob, speed selector and head cover.

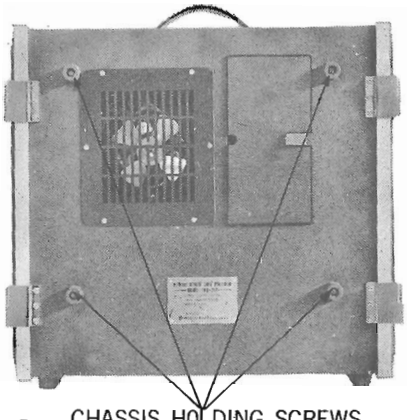

Fig. 5

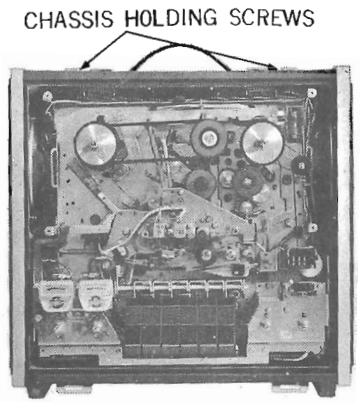

Fig. 6

2. Pulling out the chassis

Upon removing the rubber legs and chassis setscrews (4 pcs) located on the bottom of the case, shown in Fig. 5 and chassis holding screws (2 pcs) shown in Fig. 6, the chassis can be removed from the case body.

3. Removing the circuit board

Remove screws (5 pcs) shown in Fig. 7.

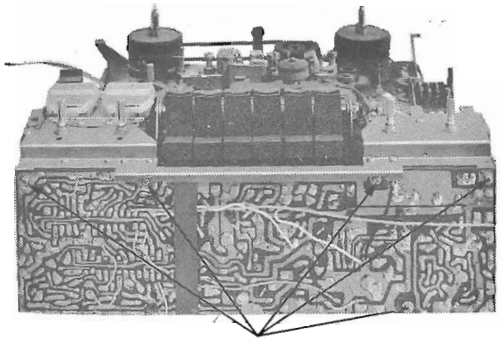

Fig. 7

LUBRICATING

Lubricate each part shown in Fig. 8, when repairing.

Lubricate to each revolving part with one drop of pan motor oil and use a suitable quantity of grease on each sliding part.

On the shafts of the idler, pinch roller and capstan, oilless metal is used, ensuring stable operation without the use of feeding oil.

(Note) If oil is deposited on belts, idler, capstan, pinch roller and so on, they will slip. Be sure to remove the oil with alcohol.

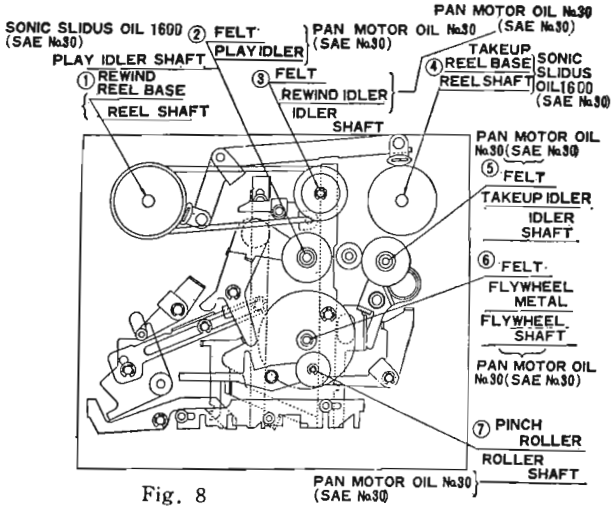

Fig. 8

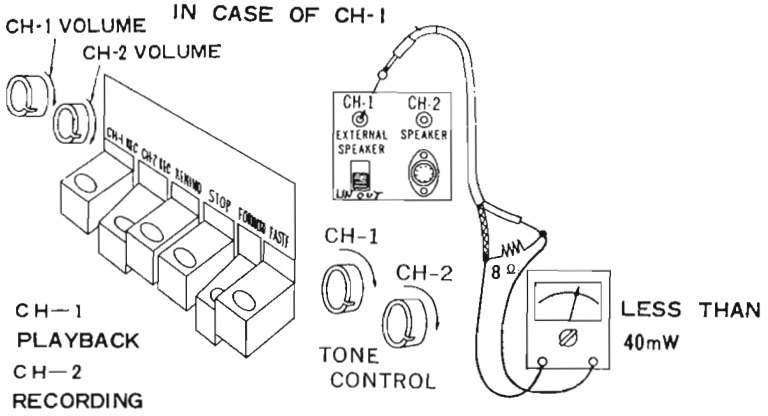

Fig.15

Adjustment for mechanical sections

1) Pressing force on each section

a) Pinch roller Pressing force·····1.0kg $^{+0.3}_{-0.1}$kg.

Measuring method

Arrange so that the pinch roller presses against the capstan shaft (playback condition), and pull the pinch roller in a right angle direction against the pinch roller arm. Then measure the slight value remaining, occasioned by using a bar pressure of the pinch roller against the capstan shaft.

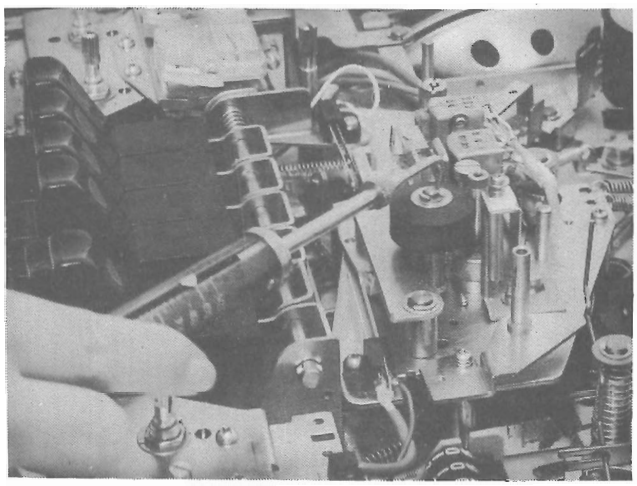

Fig.16

b) Pad pressing force 50gr ±10gr

c) Winding idler pressing force ·····150gr±30gr

Measuring method

Lock the machine by depressing the play button (FORWARD) (play condition).

Measure the value when the winding idler disengages from the motor pulley and the winding pulley at the same time.

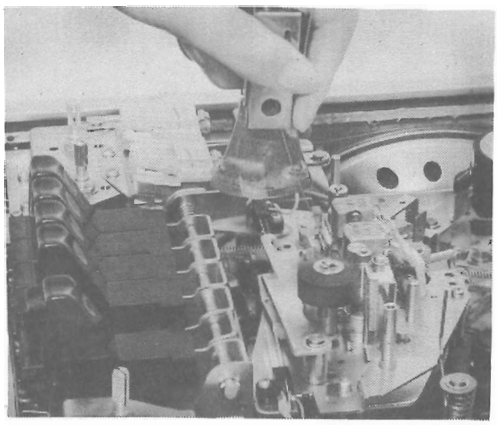

Fig.17

d) Playback idler pressing force
When the tape speed is 19 cm/sec·····200gr ±40gr
When the tape speed is 9.5 cm/sec·····175gr ±40gr
When the tape speed is 4.75 cm/sec···150gr ±40gr
Measuring method
Lock the machine by depressing the play button (FORWARD) (play condition). Measure the value when the playback idler disengages from the flywheel and the motor pulley at the same time.

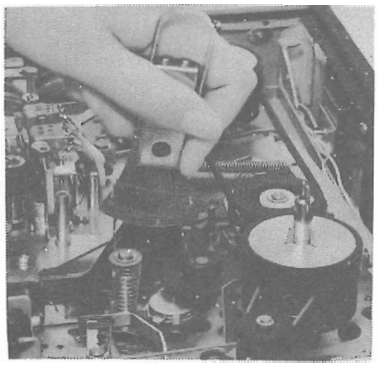

Fig. 18

e) Rewinding (R) idler pressing force····· 550gr ±50gr
Measuring method
Lock the machine by depressing the rewinding button (REWIND) (rewinding condition). Measure the value when the rewinding idler disengages from the motor pulley.

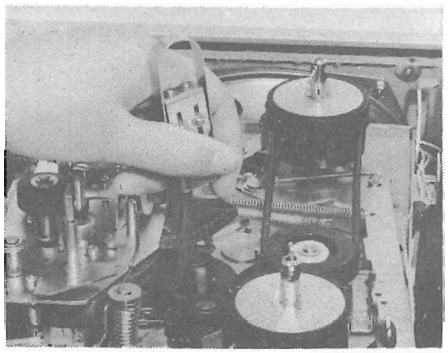

Fig. 19

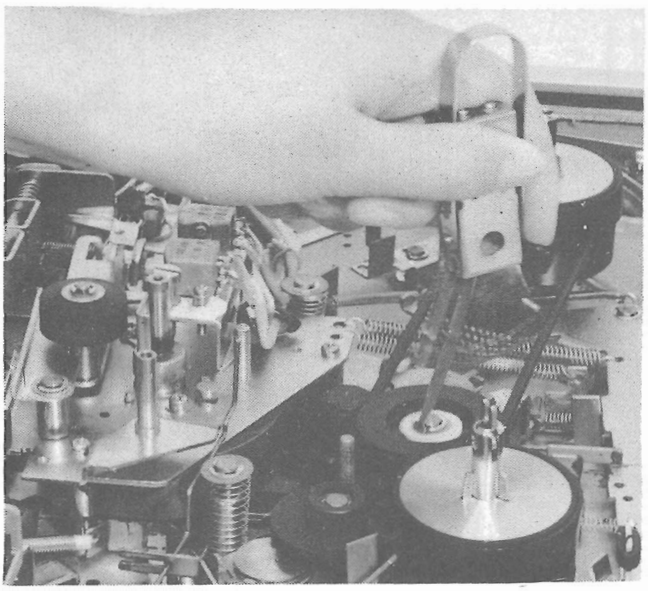

Fig. 20

2) Torque of each section

a) Winding torque·····50-90gr

Measuring method

Place the machine in a horizontal position and turn the power source to ON position: then place the 7″ empty reel on the winding side reel shaft Wind a thread inside it and measure the winding torque in a play condition (FORWARD).

b) Winding and supplying friction coupling torque Takeup or rewinding torque·····200~300gr

Measuring method

Place the machine in a vertical position, and throw the power source to ON position. Wind a thread inside the 7″ empty reel and measure the torque in a fast forwarding condition of the takeup Place in a rewinding condition for the rewinding

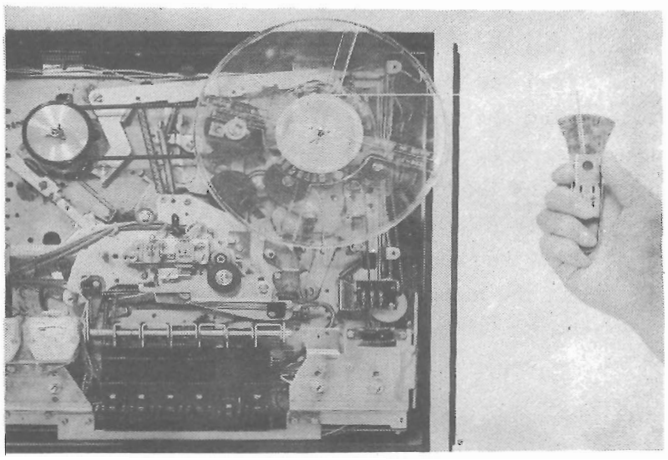

Fig.21

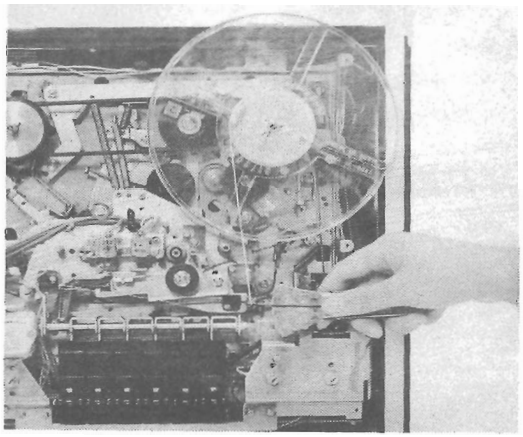

Fig. 22

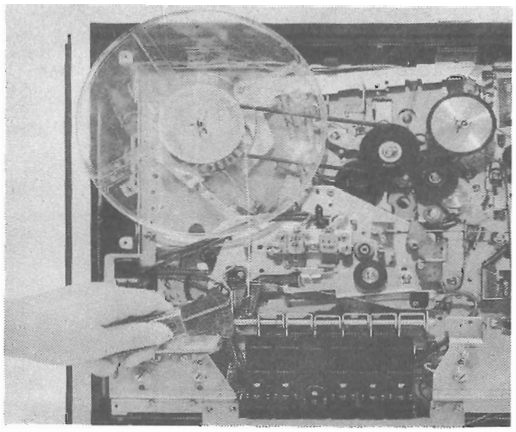

Fig. 23

c) Back tension ·····15-36gr

Place empty reel on the rewinding reel shaft after winding a thread. Set the machine to play condition. Measure the force when pulling out the thread.

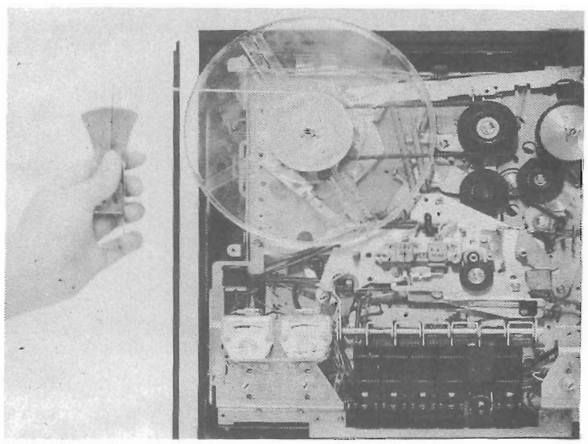

Fig.24

d) Takeup back tension·····15~35gr

Place 7″ empty reel on the takeup reel shaft after winding a thread. Set the machine to rewinding condition. Measure the force when pulling out the thread.

e) Push button operating force···Under 3.5kg

Place the machine in a horizontal position. Apply the bar gauge to the tip of the push button and measure the force until the button is locked.
Note) When applying the bar gauge directly to the push button, the push button may be damaged. To prevent any possible damage, use a rubber sheet between the gauge and the button.

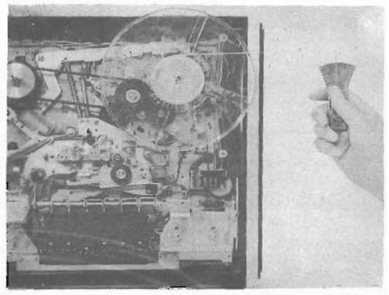

Fig.25

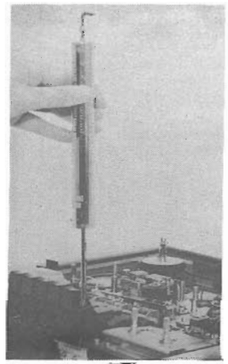

Fig.26

3) Adjustment of installation position

a) Installation position of the muting switch

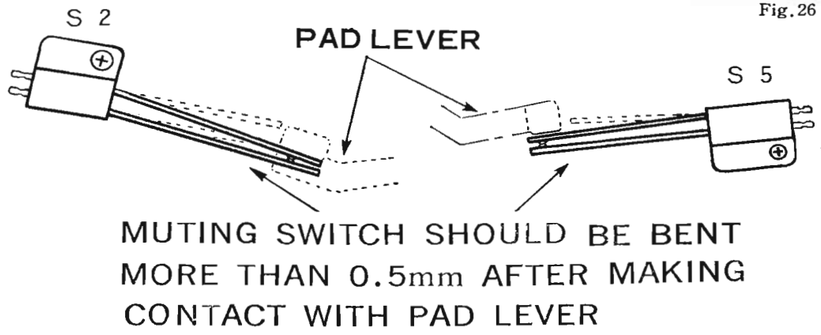

Fig. 27

b) Installation position of motor pulley

The standard distance between the chassis and the motor pulley is 2 ± 0.1mm. After installing the pulley in this position, try the speed change and adjust the position, while confirming that the Playback idler correctly enters each stage of the motor pulley.

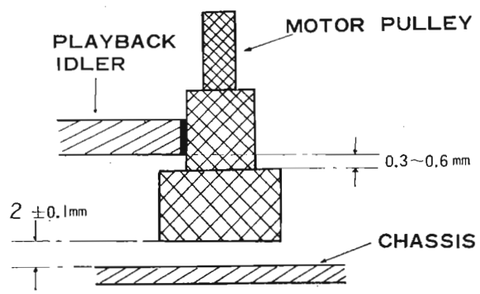

Fig.28

TROUBLE-SHOOTING

The following are important malfunctions and their countermeasures.

While reproduciug	Cause	Countermeasures
Tape does not run.	Pinch roller does not press, or it slips.	Is pressing force normal? Is the spring disconnected? Does oil adhere to the pinch roller and the capstan?
Speeds do not coincide. Unstable revolution	Heights of the playback idler and the motor pulley do not coincide Winding torque is large. Insufficient oil on the capstan shaft.	Pulley is lowered because of loose screwing of the motor pulley. Check the pressing force on each section. Check relative mechanisms of the winding reel base Oiling.
Disabled fast forward	Check the supply back tension. Check the winding coupling torque.	Oiling. When the torque and tension are too weak, replace the assembly.
Disabled rewinding	Check slipping portion. Check the supply coupling torque and winding side back tension. Check the pressing force of playback idler	When it is weak and does not conform to designated value, replace the assembly. Oiling. Confirm any deformation of the spring.

CIRCUIT BOARD DIAGRAM