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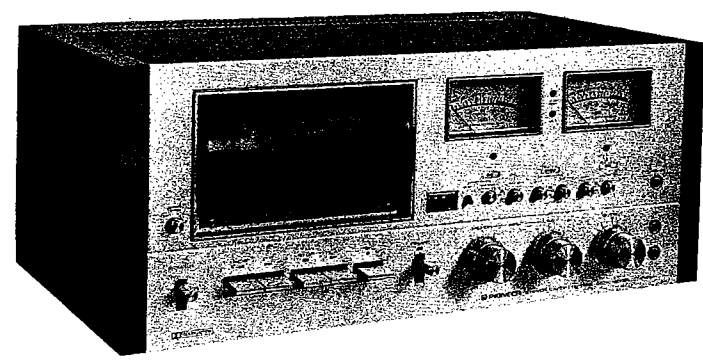
CP

CASSETTE TAPE DECK

CT-F9191

FV, KCU

ART138-0 9
<ART-13



 **PIONEER®**

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1. SPECIFICATIONS

System	Compact cassette, 2-channel stereo
Motor	Electronically-controlled DC motor (built-in generator) x 1; (4.8cm/s speed drive) DC torque motor x 1; (Fast forward and rewind drive)
Heads	"Ferrite Solid" recording / playback head x 1 Ferrite erasing head x 1
Operation	Solenoid drive, direct switchable and timer play presettable
Fast Winding Time	Approximately 65 seconds (C-60 tape)
Wow and Flutter	No more than 0.07% (WRMS)
Frequency Response	Standard, LH tapes: 25 to 16,000Hz (35 to 13,000Hz \pm 3dB) Chromium dioxide tape: 20 to 17,000Hz (30 to 14,000Hz \pm 3dB)
Signal-to-Noise Ratio	Dolby OFF: More than 52dB Dolby ON: More than 62dB (over 5kHz, standard, LH tapes) (When chromium dioxide tape is used, signal-to-noise ratio is further improved by 4.5dB over 5kHz)
Harmonic Distortion	No more than 1.7% (0dB)
Inputs (Sensitivity/Maximum allowable input/Impedance)	MIC x 2; 0.22mV/100mV/30k Ω , 6mm ϕ jack (Reference MIC impedance; 600 Ω to 30k Ω) LINE x 4 (2-channel stereo, Parallel connection system); 65mV/25V/100k Ω REC/PB x 1; Input & output, 5p jack (DIN standard)
Outputs (Reference level/Maximum level/Load impedance)	LINE x 4; 315mV/530mV/50k Ω (2-channel stereo, Parallel connection system) HEADPHONE x 1; 40mV/65mV/8 Ω With output level controls.
Semiconductors	
Amplifier Section	Transistors x 74 (including FETs x 6), Diodes x 80 (including Zener Diodes x 5, LEDs x 2)
Motor control Section	Transistors x 3, Diodes x 2
Subfunctions	<ul style="list-style-type: none"> • Dolby system (ON-OFF) with indicator lamp • MPX Filter (ON-OFF) • Tape Selector (STD/CrO₂) with indicator lamps Automatic tape selector for CrO₂ tape, and Manual tape selector of independently BIAS/EQ (Ferri-chrome tape available) • Cassette compartment illumination • Mixing control used for MIC and LINE input • Tape counter with rewind Memory switch (ON-OFF) for starting point [REW – STOP/PLAY (REC)] • Recording limiter (ON-OFF) • Wide scale level meter (-40 to +5dB) • Recording Peak level indicator (Lightable level; +5dB) • Level Memory Marker for inputs and output
Power Requirements	AC. 120V, 50 ~ 60Hz (KCU model) AC 110, 120, 130, 220, 240V (Switchable) 50/60Hz (FV model)
Power Consumption	53 watts, Max.
Dimensions	457 (W) x 197 (H) x 315 (D)mm. Max. 17-7/8 x 7-7/8 x 12-3/8 in.
Weight	13.2kg/29 lb (Without package), 15.4kg/34 lb (With package)
Furnished parts	Stereo connecting cord with pin plugs x 2 Head cleaning kit x 1 (Pioneer PP-203) Operating instructions x 1

NOTES:

1. Reference tape: standard, LH tapes are DIN no. 45513.
: chrome tape is DIN no. 4513 (CrO₂).
2. Reference recording level: meter 0dB level (equivalent to 160 pwb/mm)
3. Reference signal: 333Hz.
4. Wow & Flutter: at 3kHz weighted rms.
5. Frequency response: measured at -20dB level, DOLBY OFF, MPX Filter OFF. Level deviation is \pm 6dB without indication.
6. Signal-to-Noise ratio: measured at +4dB level (equivalent to 250 pwb/mm with weighted IEC A curve, MPX Filter OFF.
7. Sensitivity: Input level (mV) for reference recording measured with input (recording) level control set at maximum position.
8. Maximum allowable input level: measured at the point where the output signal wave is clipped while gradually turning the input level control.
9. Reference output level: meter 0dB level.
10. Maximum output (playback) level: Output level to reference recording level, measured with output (playback) level control set at maximum position.

NOTE:

Specifications and the design subject to possible modification without notice due to improvements.

2. FRONT PANEL FACILITIES

POWER SWITCH

Power is supplied when set to ON, at which time the level meter lamps and internal illuminating lamp light.

DOOR OPEN BUTTON

Press to open the cassette door. Close the cassette door by gently sliding it downward by hand.

CASSETTE DOOR

Keep door closed to protect the transport and head assembly from dust.

REC INDICATOR

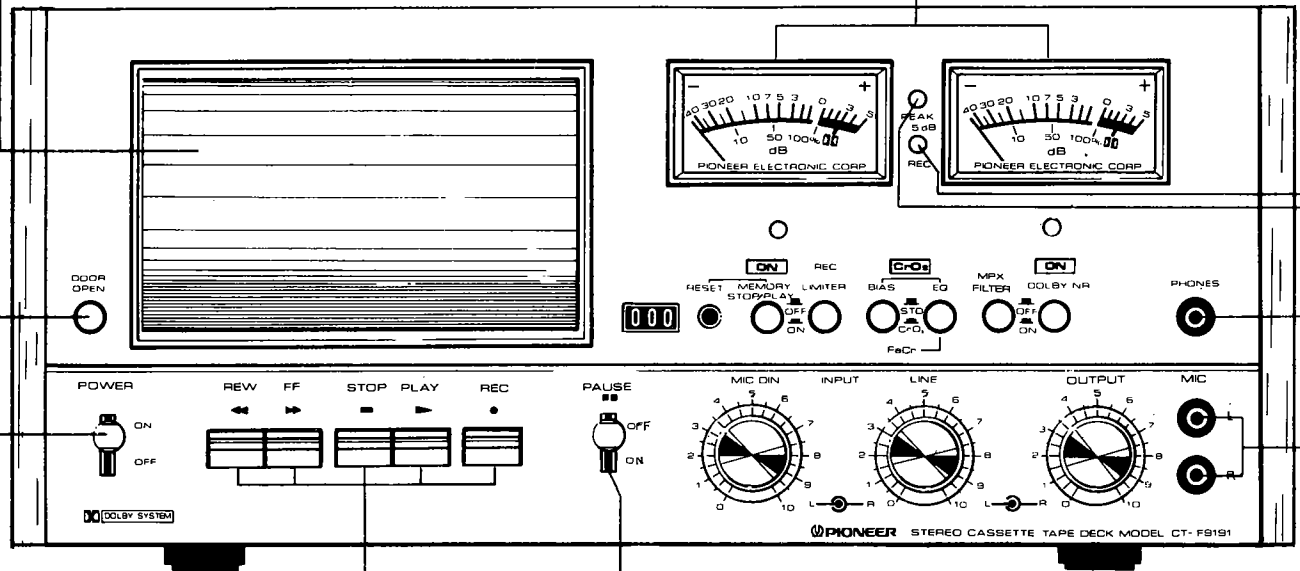
Lights red during recording.

NOTE:

Be sure to confirm REC indicator lighting before proceeding to record.

LEVEL METERS

Display input level during recording and output level during playback.



OPERATING LEVERS

- REW** ◀◀ (Rewind): Press downward to rewind tape. (Tape travels from right to left.)
- FF** ▶▶ (Fast Forward): Press downward for tape fast forward. (Tape travels from left to right.)
- STOP** ■: Press downward to stop tape motion; this will also release other operating levers.
- PLAY** ▶: Press downward to play tape. To record, press simultaneously with the REC lever. (Tape travels from left to right.)
- REC** ● (Record): Press downward simultaneously with the PLAY lever to perform recording.

NOTES:

1. Avoid simultaneously depressing two or more levers (except for the PLAY and REC levers when recording).
2. With the CT-F9191, it is not necessary to depress the STOP lever when switching between modes.

PAUSE SWITCH

Set to ON to temporarily stop the tape motion during record or playback. Return it to OFF to resume tape motion. This switch does not function during fast forward or rewind.

MIC JACKS

Microphone recording input jacks. Independent left (L) and right (R) channel jacks are provided.

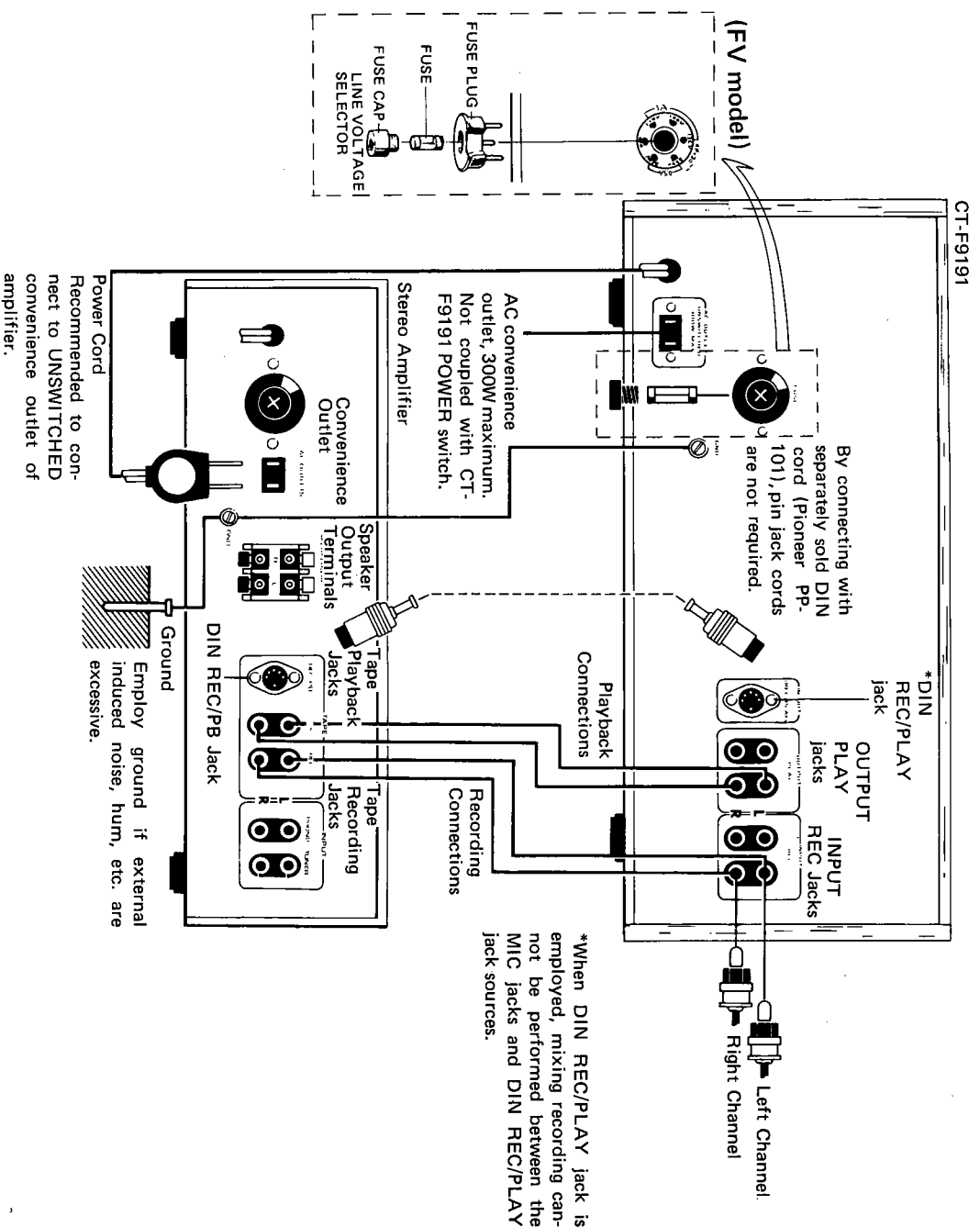
PHONES JACK

Stereo headphones can be plugged into this jack for private listening or monitoring a recording.

PEAK +5dB INDICATOR

Lights when +5dB over level is reached during recording. When recording, adjust MIC/DIN or LINE controls so that it does not light continuously.

3. CONNECTION DIAGRAM



MEMORY INDICATOR LAMP

Lights when MEMORY button is depressed.

COUNTER RESET BUTTON

Depressing button resets counter indication to 000.

TAPE COUNTER

Indicates tape running position.

MEMORY BUTTON

When set to ON (depressed), the tape running position during record or playback corresponding to the 000 counter indication is registered. Memory play and memory stop functions can then be performed.

REC LIMITER BUTTON

When recording sources with large level variations which cause over levels and render control adjustment difficult, depress this button for easier recording.

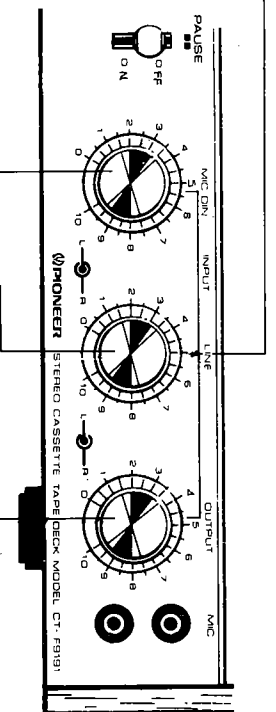
CrO₂ INDICATOR LAMP

Lights to indicate chromium dioxide tape.

Also lights when cassette has not been installed.

MEMORY MARKER DIALS

Set these outer rings to mark preferred control positions.



MIC/DIN RECORDING LEVEL CONTROLS

Adjust the input signal from the front panel MIC jacks or rear panel DIN REC/PLAY jack. The outer knob controls the right (R) channel, while the inner knob controls the left (L) channel.

LINE RECORDING LEVEL CONTROLS

Adjust input signal from the INPUT (REC) jacks. The outer knob controls the right (R) channel while the inner knob controls the left (L) channel.

MPX FILTER BUTTON
FM stereo broadcast pilot signal (19KHz) is blocked when button is set to ON (depressed). Use only for FM Dolby recording and set to OFF (undeprssed) at other times.

DOLBY INDICATOR LAMP

Lights when DOLBY NR button is depressed.

DOLBY NR BUTTON

Depress for Dolby recording and for playback of Dolby recorded tape.

EQ (EQUALIZATION) SELECTOR BUTTON

Employ according to tape. Depress for chrome or ferrichrome tape. Set to OFF (undeprssed) to play chrome tape recorded to earlier specifications (120µs).

BIAS SELECTOR BUTTON

Employ according to tape. Depress when using chrome tape.

NOTE:

If a chrome tape is provided with index holes, EQ and BIAS selection becomes automatic. It is not necessary in this case to depress the EQ and BIAS buttons.

OUTPUT LEVEL CONTROLS

Adjust the output signal level during playback. The outer knob controls the right (R) channel while the inner knob controls the left (L) channel.

NOTE:

LEVEL controls can be employed for adjusting R and L channels independently. If there is a difference in input or output levels, turn one of the controls so that the levels become equal.

INPUT & OUTPUT JACKS

2 sets each of INPUT and OUTPUT jacks, which are connected in parallel, plus a DIN REC/PLAY jack are provided on the CT-F9191.

INPUT Jack Connections

Connect one set of INPUT jacks to the tape recording output jacks of a stereo amplifier. Since the INPUT jacks are connected in parallel, the recording input jacks of an additional tape deck (open reel or cassette) can be connected to one set to allow simultaneous recording of the same program source together with the CT-F9191.

OUTPUT Jack Connections

Connect one set of OUTPUT jacks to the TAPE PB jacks of a stereo amplifier. If a second tape

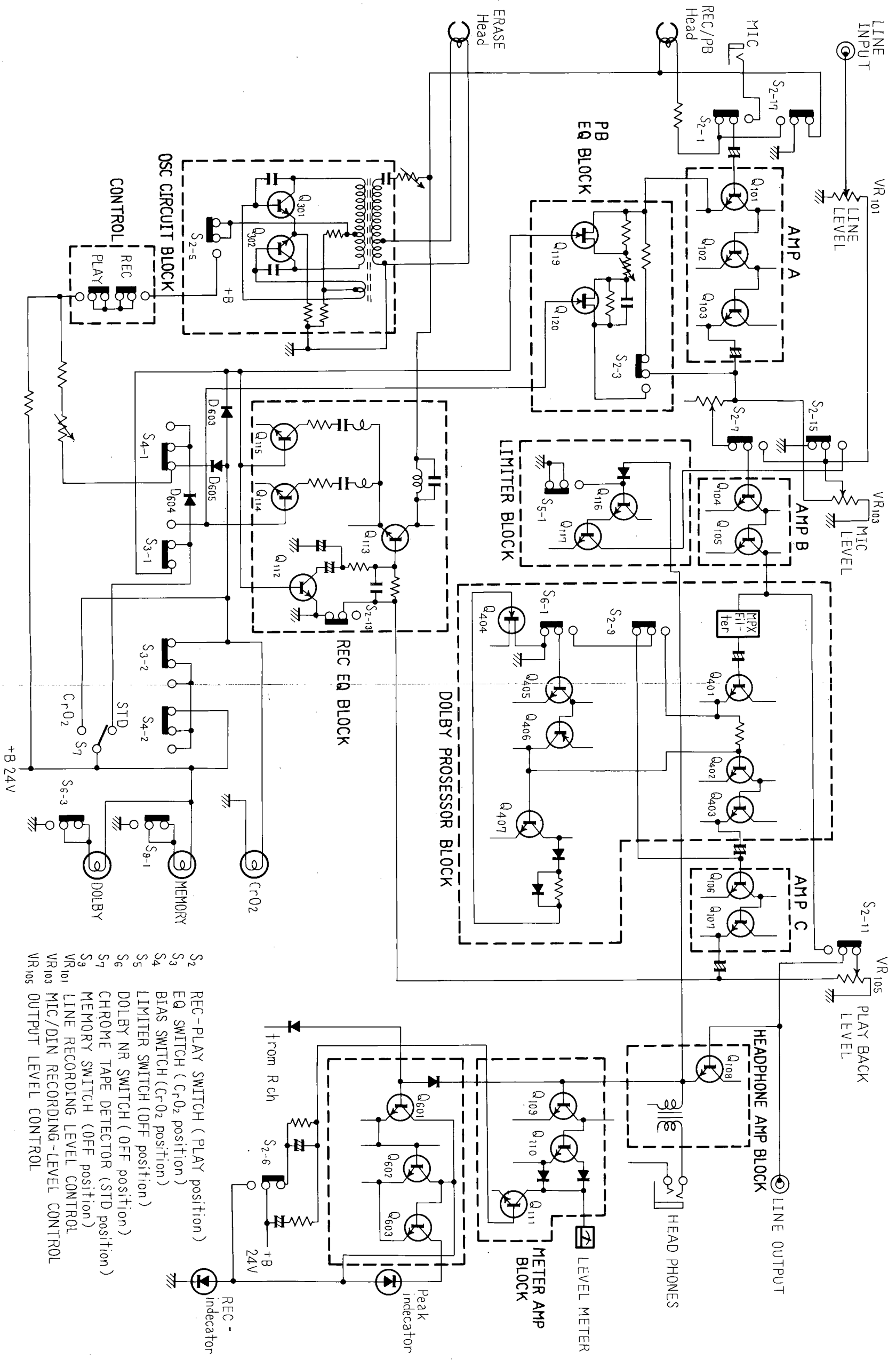
deck is available, its recording input jacks can be connected with the other set of OUTPUT jacks. This will allow a tape played on the CT-F9191 to be duplicated onto another tape by the second deck.

DIN REC/PLAY Jack

By connecting this jack to a program source, mixing recording can be performed with a program source connected to the INPUT (REC) jacks. Adjust the recording level of a source connected to the DIN REC/PLAY jack with the MIC/DIN controls.

If microphones are connected to MIC jacks, recording cannot be performed from source connected to this jack.

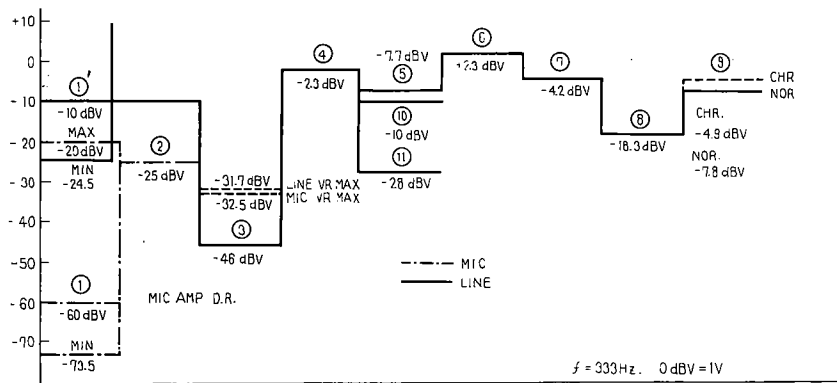
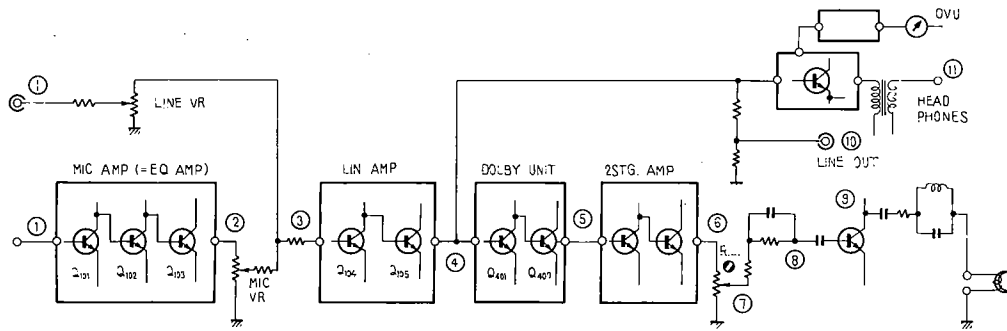
BLOCK DIAGRAM



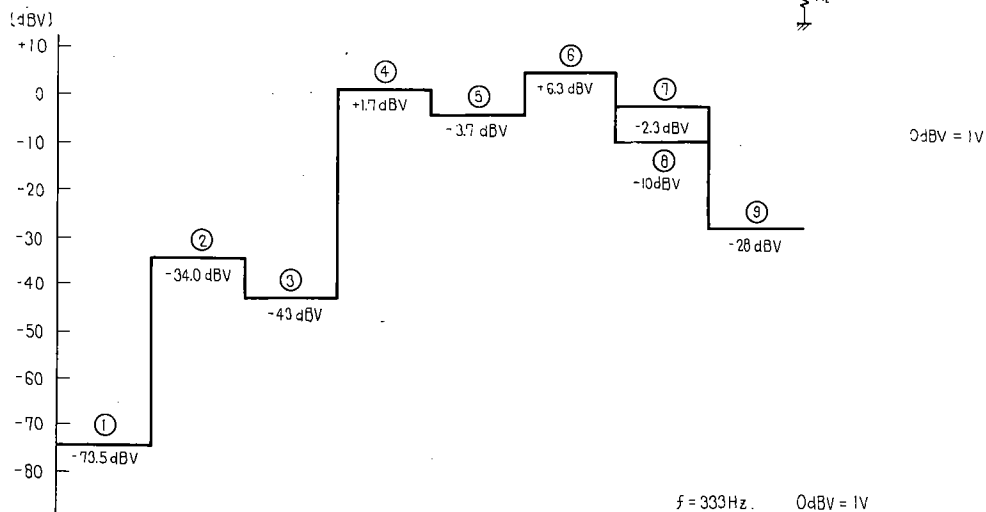
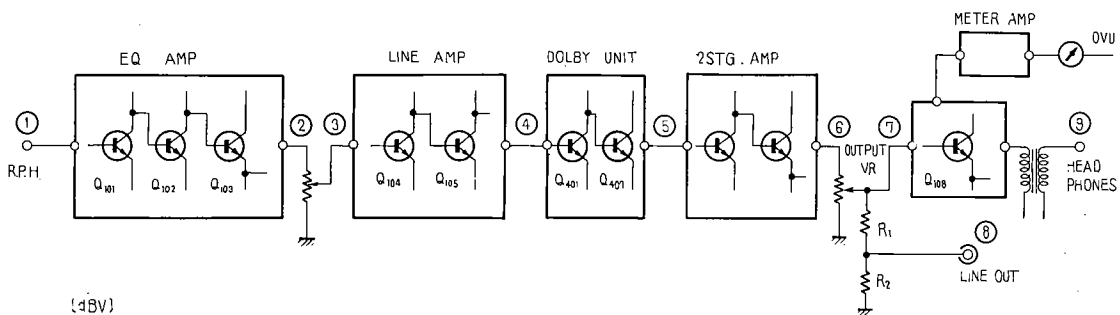
- S2 REC-PLAY SWITCH (PLAY position)
- S3 EQ SWITCH (C-r-02 position)
- S4 BIAS SWITCH (C-r-02 position)
- S5 LIMITER SWITCH (OFF position)
- S6 DOLBY NR SWITCH (OFF position)
- S7 CHROME TAPE DETECTOR (STD position)
- S9 MEMORY SWITCH (OFF position)
- VR101 LINE RECORDING LEVEL CONTROL
- VR103 MIC/DIN RECORDING-LEVEL CONTROL
- VR105 OUTPUT LEVEL CONTROL

5. LEVEL DIAGRAMS

REC



P.B.



6. CIRCUIT DESCRIPTIONS

This circuit description consists of Sections 6.1 — 6.13.

Use care in regard to the following symbols and expressions which appear in the text.

$+B_1, +B_2, +B_3$: Indicate fixed voltage lines as illustrated in Fig. 1.

$S_{12-3,4}$: Appears as a single switch in the schematic, but actually two identical switches are employed in parallel.

Route: Refers to current path of $+B$, etc.

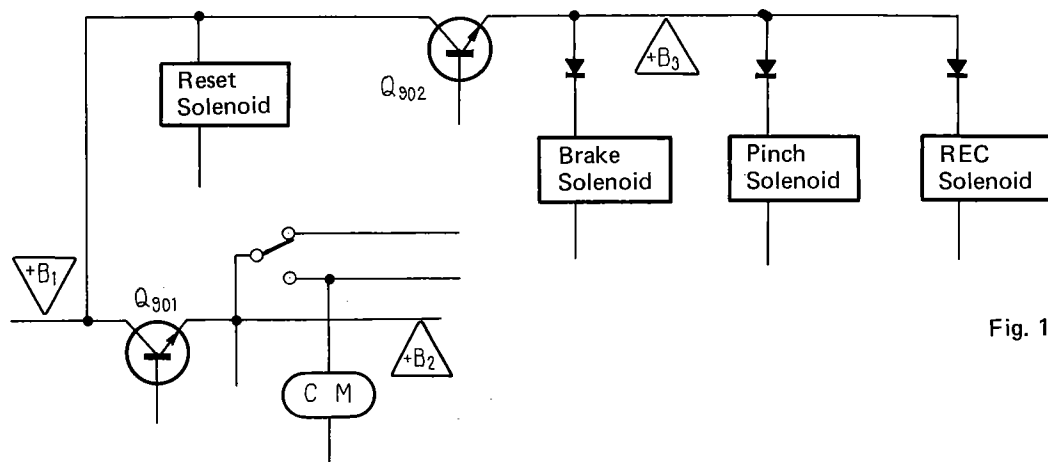


Fig. 1

6.1 STOP-PLAY (Fig. 2)

1. With the Power switch ON and a cassette installed, S_{14} is switched ON and the main motor (CM) rotates.
2. Capacitor C_{814} charging current is obtained from $+B_2$ by two routes: $C_{814} - D_{814} - R_{829} - Q_{809}$ base and $C_{814} - D_{815} - R_{831} - Q_{810}$ base. Q_{809} and Q_{810} are switched ON.
3. C_{814} charging is completed in approximately 2 seconds. Although Q_{809} and Q_{810} would be expected to switch OFF, since R_{829} (680Ω) is less than R_{831} ($1.5k\Omega$), Q_{809} remains ON and Q_{802} switches OFF. Also Q_{810} switches OFF and Q_{803} ON.

4. With Q_{810} in the OFF state, its collector potential rises and base potential is applied to Q_{809} by the route $+B_2 - R_{834} - R_{833}$ to maintain Q_{809} in the ON condition.

Normally: Q_{810} is OFF and Q_{803} ON
 Q_{809} is ON and Q_{802} OFF

5. When the Play lever is pressed at this point, S_{10-4} is switched ON and current flows from $+B_3$ by the route $D_{902} - \text{pinch solenoid} - Q_{804} - S_{10-4} - S_{12-3,4} - S_{11-4} - Q_{803}$ to operate the pinch solenoid and tape running starts.

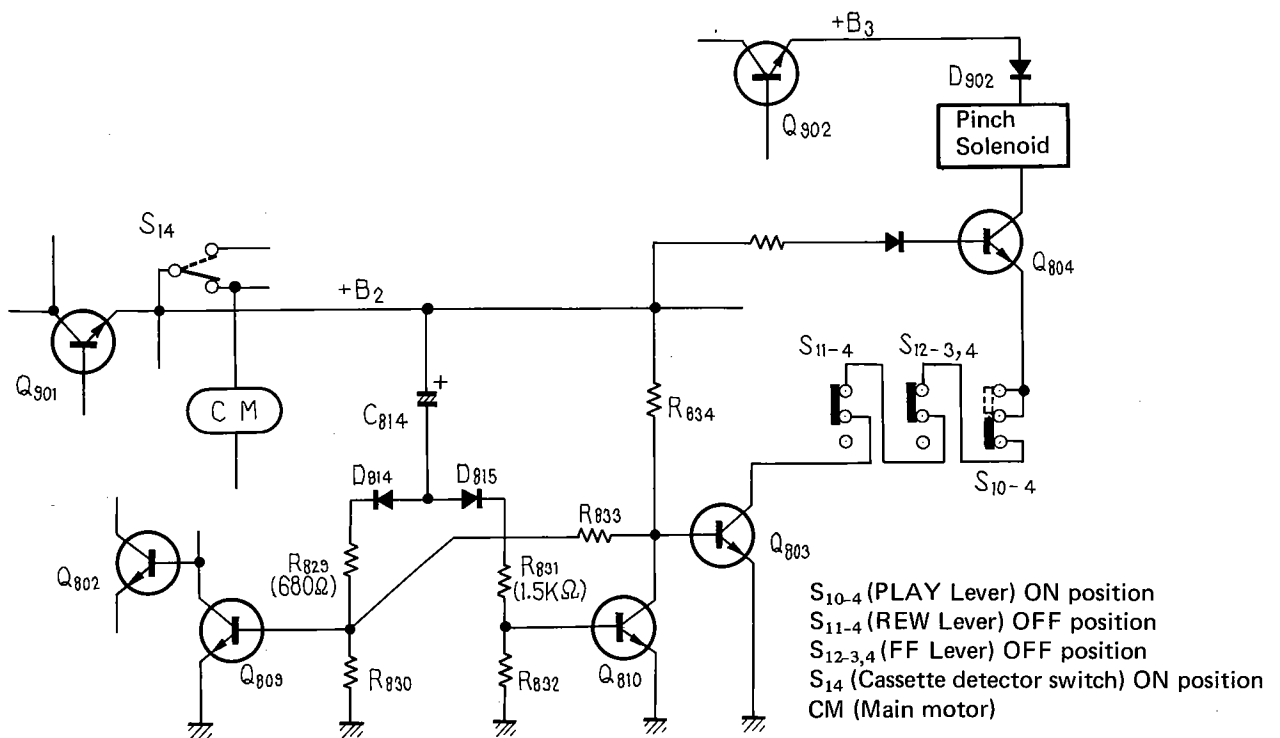
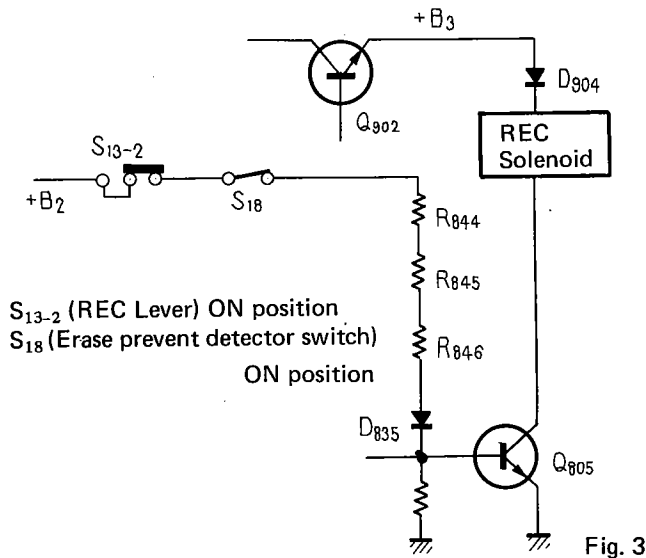


Fig. 2

6.2 STOP – REC (Fig. 3)

1. Play and REC levers are pressed simultaneously. Although the pinch solenoid operation is the same as described in Section 6.1, the REC lever also switches on S_{13-2} and current flows by the route $+B_3 - D_{904} - \text{REC solenoid} - Q_{805}$ to operate the REC solenoid.
2. The REC solenoid operates to switch the record/play amplifier assembly (RWF-041) to the record mode.

* S_{18} is an accidental erase preventing switch. If the erase preventing tab of the installed cassette is broken off, S_{18} is not closed and the REC solenoid does not operate.



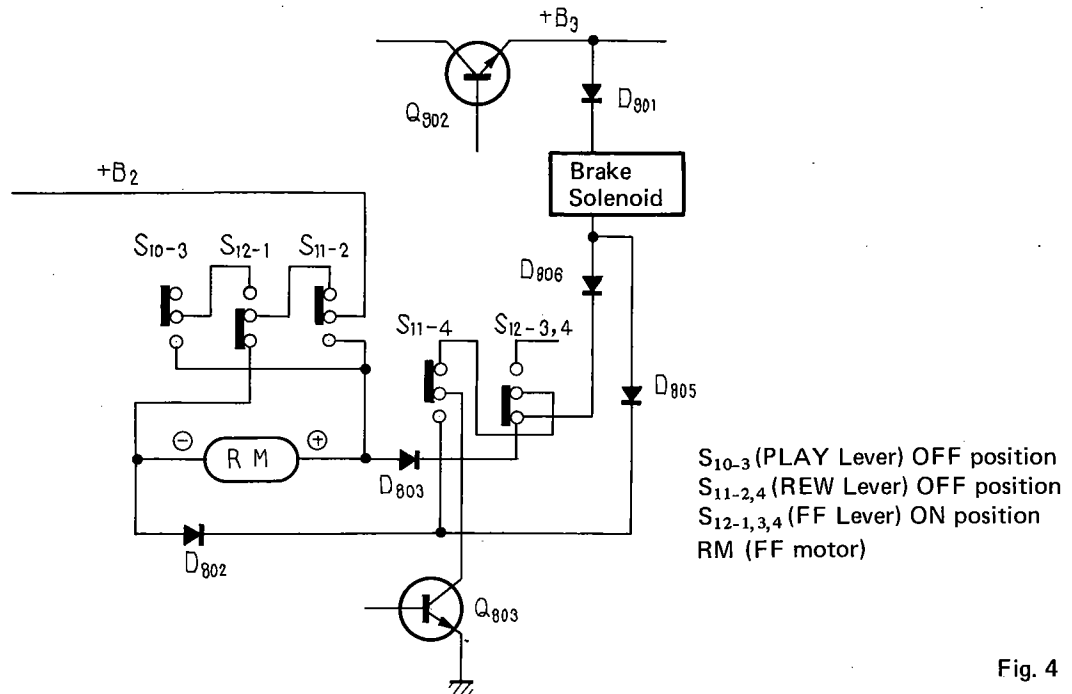
S_{13-2} (REC Lever) ON position
 S_{18} (Erase prevent detector switch) ON position

6.3 STOP – FF (Fig. 4)

1. Pressing the FF lever (S_{12}) causes current from $+B_3$ to flow by the route $D_{901} - \text{brake solenoid} - D_{806} - S_{12-3,4} - S_{11-4} - Q_{803}$. The brake solenoid operates to release the brake.
2. Current is applied to the FF (REW) motor RM from $+B_2$ by the route $S_{11-2} - S_{12-1} - \text{RM} - D_{803} - S_{12-3,4} - S_{11-4} - Q_{803}$ and the tape fast forward is performed.

6.4 STOP – REW (Fig. 4)

1. When the REW lever is pressed, current flows from $+B_3$ by the route $D_{901} - \text{brake solenoid} - D_{805} - S_{11-4} - Q_{803}$ and the brake solenoid operates to release the brake.
2. Current is applied to the REW (FF) motor RM from $+B_2$ by the route $S_{11-2} - \text{RM} - D_{802} - S_{11-4} - Q_{803}$ and the tape rewind is performed.



S_{10-3} (PLAY Lever) OFF position
 $S_{11-2,4}$ (REW Lever) OFF position
 $S_{12-1,3,4}$ (FF Lever) ON position
 RM (FF motor)

3.5 MEMORY PLAY (Fig. 5)

1. When the memory switch $S_{9-3,4}$ is depressed and the REW lever pressed, C_{817} instantaneously charges by the route $+B_2 - S_{9-4} - S_{11-1} - C_{817}$.
2. Afterwards, pressing the Play lever sets S_{11-1} off and S_{10-1} on. C_{817} is discharged by the route $C_{817} - D_{817} - S_{10-1} - S_{12-2} - R_{835} - Q_{810}$ and Q_{810} is switched ON.
3. With Q_{810} in the ON state, its collector potential drops, causing Q_{809} to switch OFF and Q_{802} ON. Current from $+B_2$ is applied to the reel motor by the route $S_{11-2} - S_{12-1} - S_{10-3} - RM - D_{802} - Q_{802}$ and rewind is performed.
4. For this reason, even if S_{11-4} is returned to the off position, the route $+B_3 - \text{brake solenoid} - D_{805} - Q_{802}$ is formed and rewind operation continues.

5. The tape rewinds to "999" on the counter and S_{16} is closed. Q_{809} base current is obtained from $+B_2$ by the route $S_{9-3} - S_{16} - C_{812} - S_{11-3} - D_{813} - R_{823} - Q_{809}$. Q_{809} is switched ON, Q_{802} OFF and motor RM stops, completing rewind operation.
6. When Q_{809} switches ON, its collector potential drops, turning Q_{810} OFF and Q_{803} ON. This causes current from $+B_3$ to flow by the route $D_{902} - \text{pinch solenoid} - Q_{804} - S_{10-4} - S_{12-3,4} - S_{11-4} - Q_{803}$. The pinch solenoid operates and play begins.

Memory Stop

In this mode, when the tape counter reaches "999" S_{16} is switched on. Current flows from $+B_2$ via $S_{9-3} - S_{16} - C_{812} - S_{11-3} - D_{812} - R_{813} - Q_{801}$. The reset solenoid then functions to stop all operations.

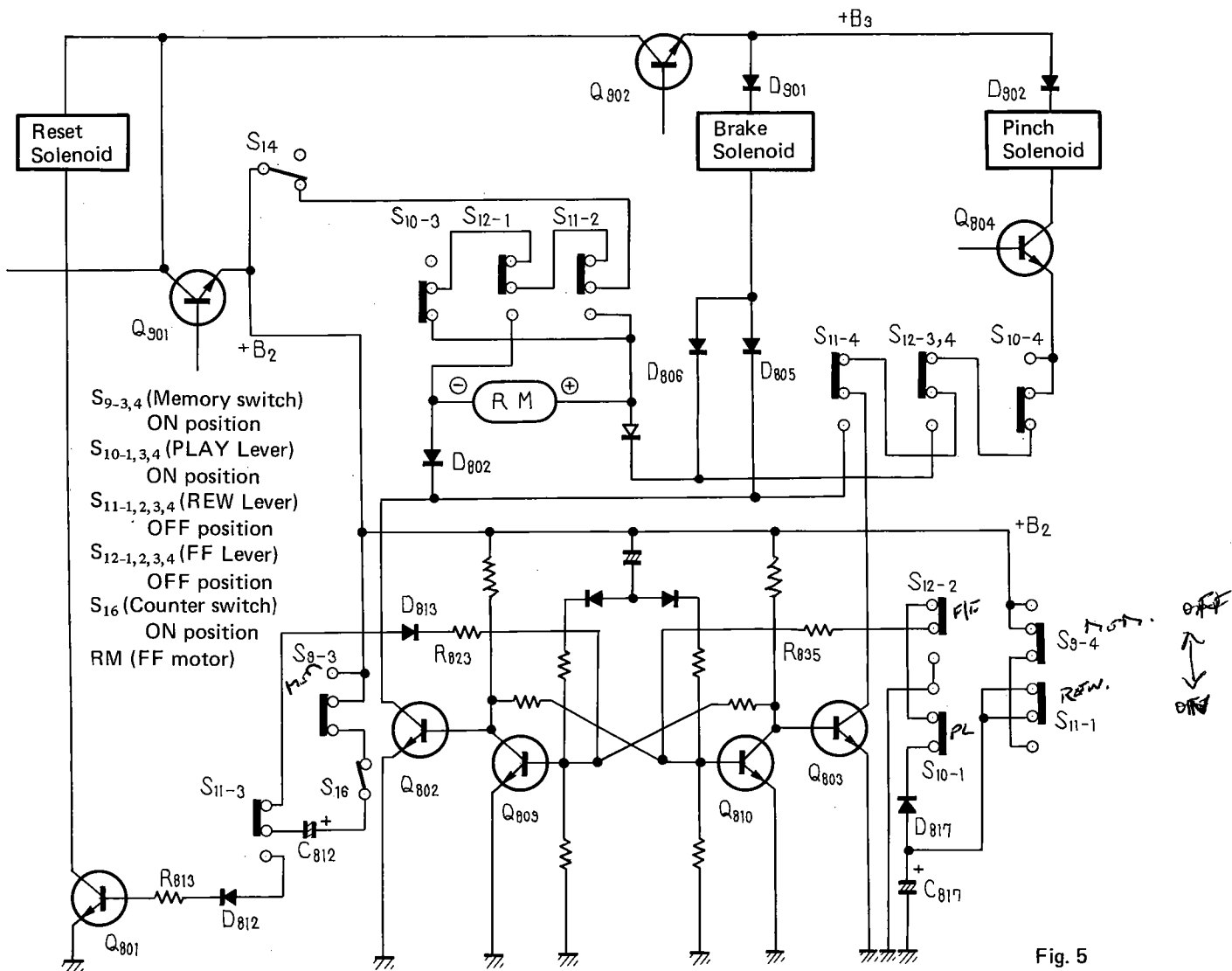


Fig. 5

6.6 PAUSE (Figs. 6, 8)

1. During playing and recording, base current from $+B_2$ flows by the route $R_{842} - D_{831} - Q_{804}$ and Q_{804} is switched ON.
2. When the Pause switch S_{17} is set to ON, $+B_2$ current flows through $R_{842} - S_{17} - \text{ground}$ and Q_{804} base current ceases. Q_{804} switches OFF, the pinch solenoid resets and tape running stops.
3. If the Pause switch is set to ON during recording, since the REC solenoid operates from a different circuit, the recording circuit is not affected.
4. In modes other than record and play, C_{822} is charged (reverse bias with respect to Q_{811}) and Q_{811} is switched OFF. When the Play and Rec levers are pressed, C_{822} is discharged through R_{858} or R_{859} and during this approximately 100msec interval, Q_{811} continues in the OFF condition.

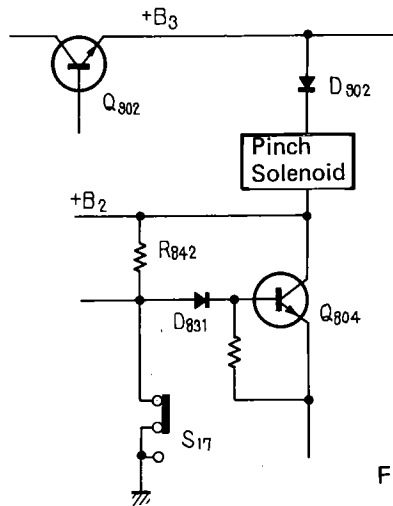


Fig. 6

S_{17} (Pause Lever) ON position

6.7 AUTO STOP (Fig. 7)

1. S_{15} repeatedly switches ON-OFF while the tape runs, producing a type of AC signal. This signal also switches Q_{807} ON - OFF.
2. When tape running stops, S_{15} stops in either the ON or OFF position and Q_{807} is switched OFF.
3. With Q_{807} OFF, C_{810} is charged by the route $+B_2 - R_{815} - D_{809} - C_{810}$. Approximately 2 to 3 seconds later Q_{808} switches ON.
4. Accompanying this, current flows from $+B_2$ to Q_{806} base - $R_{806} - Q_{808} - R_{819}$ and Q_{806} also switches ON.
5. Q_{806} collector current flows through $+B_2 - Q_{806} - R_{803} - C_{805} - Q_{801}$ base and charges C_{805} . In the interval until the charging is completed, Q_{801} is switched ON, the reset solenoid operates and Stop condition is obtained. Q_{801} switches OFF after C_{805} is completely charged.

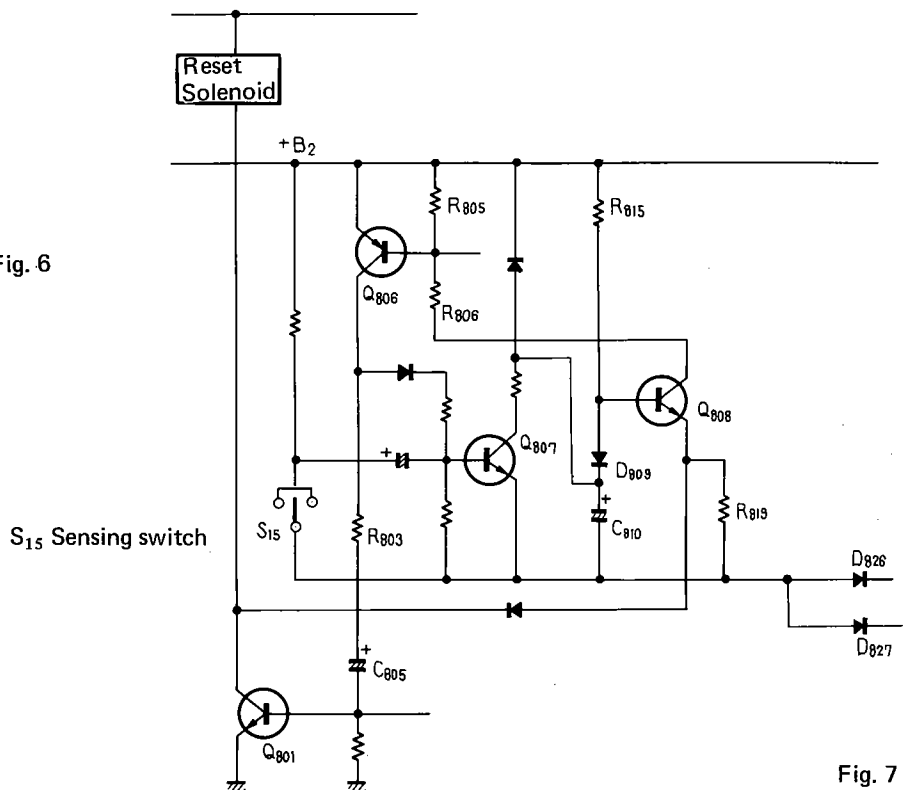


Fig. 7

6.8 MUTING (Fig. 8)

This function serves to suppress output noise during fast forwarding and rewinding, record to stop switching, and power switch operation.

1. During Stop, FF and Rewind, Q_{811} is reverse biased and OFF. Q_{118} and Q_{218} are switched ON, shorting the output and performing the muting function.
2. Pressing the Play lever causes base current to flow to Q_{811} via $+B_2 - Q_{811} - D_{825} - R_{858} - Q_{804}$ and Q_{811} is switched ON. When the REC lever is pressed, the route becomes $+B_2 - Q_{811} - D_{824} - R_{859} - Q_{805}$ and Q_{811} is switched ON.
3. With Q_{811} ON, the bases of Q_{118} and Q_{218} in the record/play amplifier assembly (RWF-041) become reverse biased, switching them OFF. Muting is therefore released and the output signals are obtained.

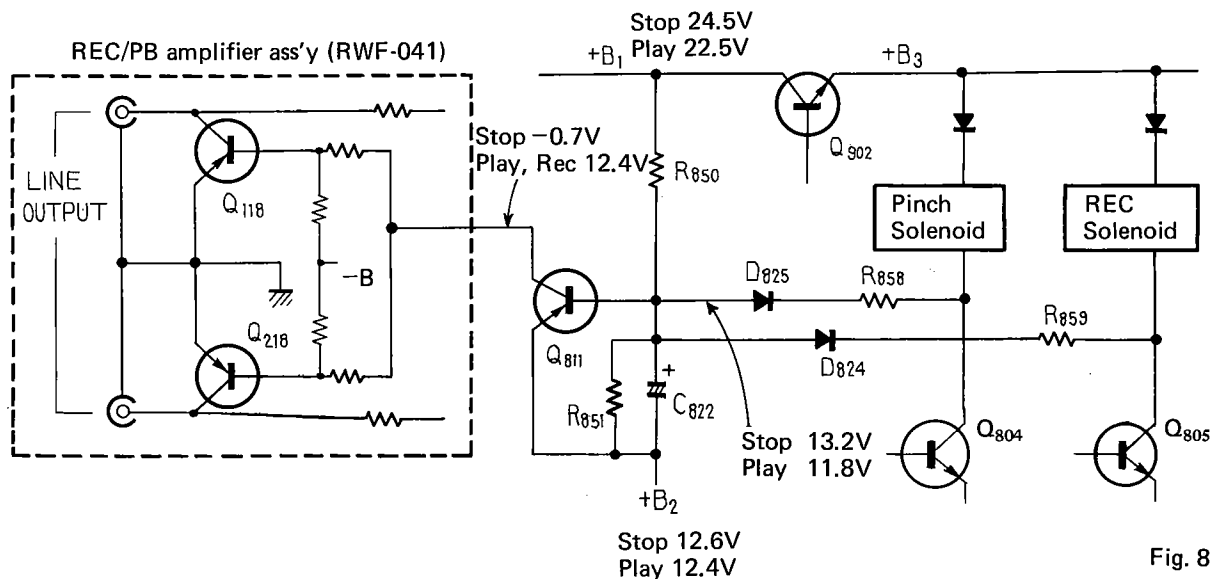
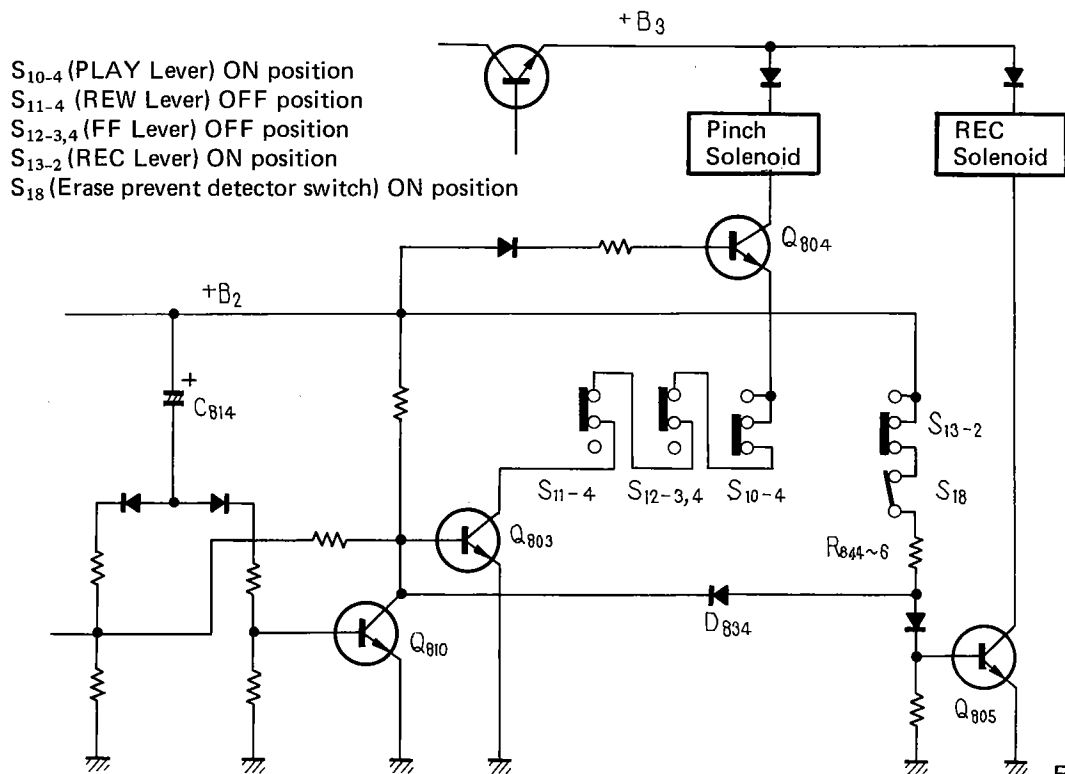


Fig. 8

6.9 UNATTENDED RECORDING (Fig. 9)

A timer can be employed to turn on the power at a desired time to perform unattended recording. The Play and REC levers are pressed and the Power switch set to ON after setting the timer.

1. When power is supplied, C_{814} charging begins as described in Section 6.1. Q_{810} are switched ON during this interval, while Q_{803} switches OFF, the pinch solenoid does not operate. Neither does the REC solenoid operate, since the $+B_2$ of Q_{805} is coupled through $S_{13-2} - S_{18} - R_{834-6} - D_{834} - Q_{810}$.
2. Q_{810} switches OFF when C_{814} charging is completed, after which Q_{803} and Q_{805} switch ON. Since Q_{805} switches ON prior to Q_{803} , the REC and pinch solenoids operate in succession.



6.10 SOLENOID DRIVE CIRCUIT (Fig. 10)

Current increases during solenoid operation to raise its attractive force. After operation, the current returns to normal in order to prevent solenoid heating.

1. With the Play lever pressed, in the operation described in Section 6.1, current flows via $+B_3 - D_{902} - \text{pinch solenoid} - Q_{804} - S_{10-4} - S_{12-3,4} - S_{11-4} - Q_{803}$ and the pinch solenoid operates.
2. C_{824} is charged by the route $+B_1 - Q_{812} - R_{852} - D_{822} - C_{824}$. This charging current becomes the Q_{812} base current, switching Q_{812} ON.
3. As Q_{812} switches ON, the base potential of Q_{902} rises and Q_{902} collector current increases. In this manner, large current flow is obtained only during solenoid operation.

4. C_{824} charging is completed approximately 1 second after solenoid operation. Q_{812} base current then ceases and Q_{812} switches OFF.
5. In the OFF state, Q_{812} base potential is maintained by ZD_{802} . Both the collector current and the current flowing through the solenoid are therefore returned to normal to avoid heating.
6. In addition to the pinch solenoid, the brake and REC solenoids also operate on the same principle.

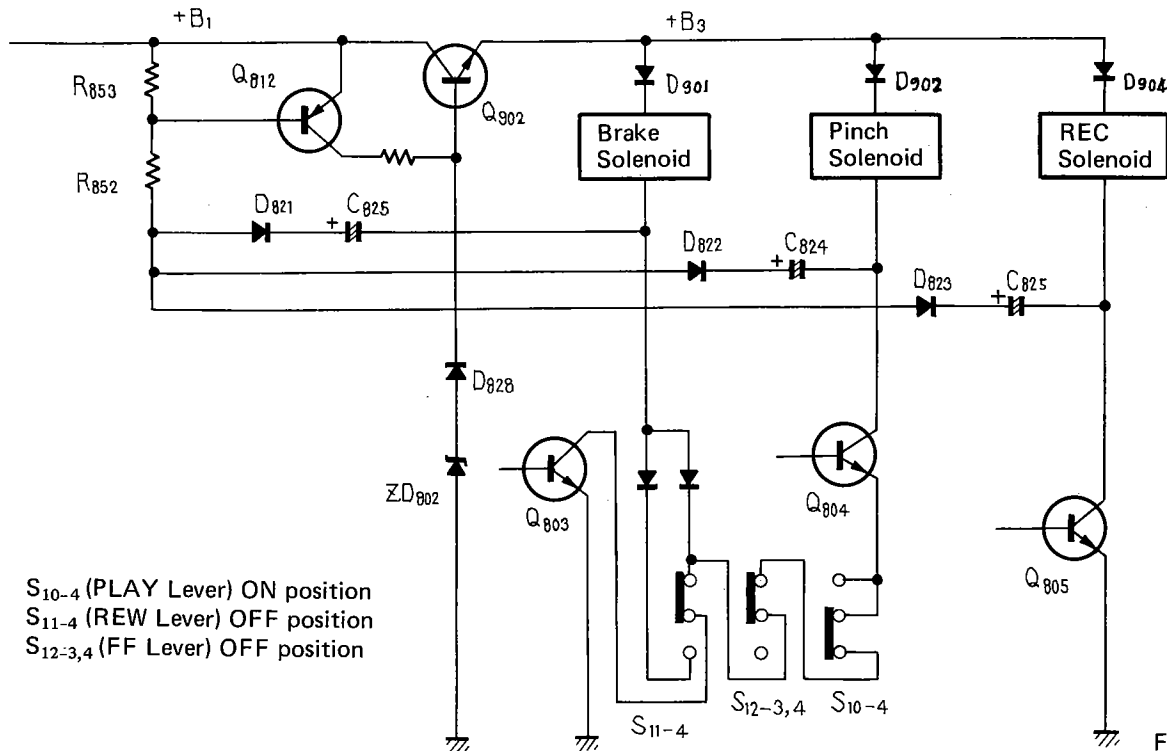


Fig. 10

6.11 PINCH SOLENOID TIMING CIRCUIT (Fig. 11)

This circuit functions to prevent tape damage or slackening when the set is switched directly from FF or REW to Play.

1. As described in Section 6.1, during fast forwarding, current flows via $+B_3 - D_{901} -$ brake solenoid $- D_{806} - S_{12-3,4} - S_{11-4} - Q_{803}$, releasing the brake and motor RM rotates.
2. C_{819} is charged at this time by the route $+B_2 - R_{841} - C_{819} - D_{829} - D_{806} - S_{12-3,4} - S_{11-4} - Q_{803}$.
3. When the Play lever is pressed during FF or REW operation, Q_{804} emitter approaches ground potential, while one side of C_{819} is temporarily brought below ground potential to a minus value.
4. For this reason, current flows in the route $+B_2 - R_{842} - D_{830} - C_{819}$, Q_{804} base current ceases and Q_{804} is switched OFF. With Q_{804} OFF, even if the Play lever is pressed, since the pinch solenoid does not operate, tape running stops.
5. About 0.5 second after C_{819} discharges, Q_{804} base current flows and Q_{804} switches ON. The pinch solenoid operates and play begins.

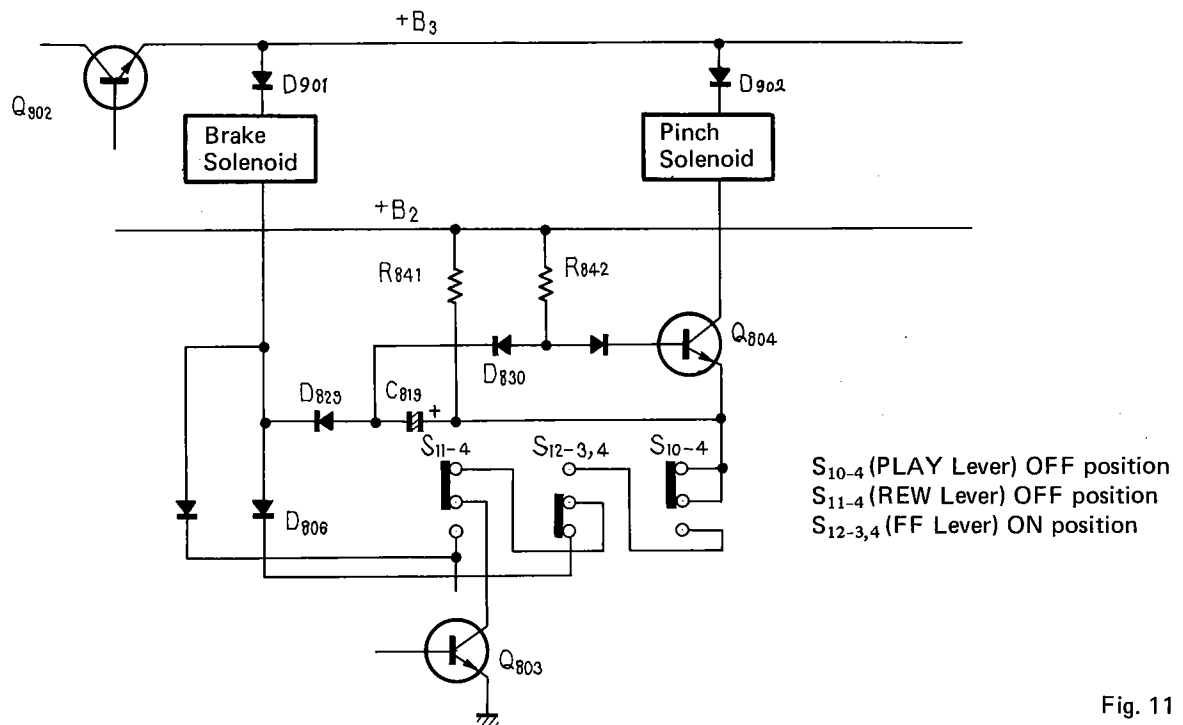


Fig. 11

6.12 REC SOLENOID TIMING CIRCUIT

(Fig. 12)

Incorrect REC solenoid return timing can cause noise to be recorded onto the tape when switching from REC to Stop, Play, FF or REW. This circuit prevents such noise by setting the oscillator circuit OFF before returning the REC solenoid.

1. As described in Section 6.2, the REC solenoid operates during recording by the route $+B_3 - D_{904} - \text{REC solenoid} - Q_{805}$. At the same time, $+B_2$ charges C_{820} via $S_{13-2}, S_{18} - R_{844} - C_{820}$.
2. When Stop, FF or REW lever is pressed during recording, S_{13-1} and S_{10-2} are switched OFF and $+B$ to the oscillator circuit stops. Although S_{13-2} is also switched OFF, since C_{820} is discharged via $C_{820} - R_{845} - R_{846} - D_{835} - Q_{805}$, Q_{805} remains in the ON condition for about 10ms during this discharge time.
3. The oscillator circuit is thus stopped about 10ms before the REC solenoid operates.

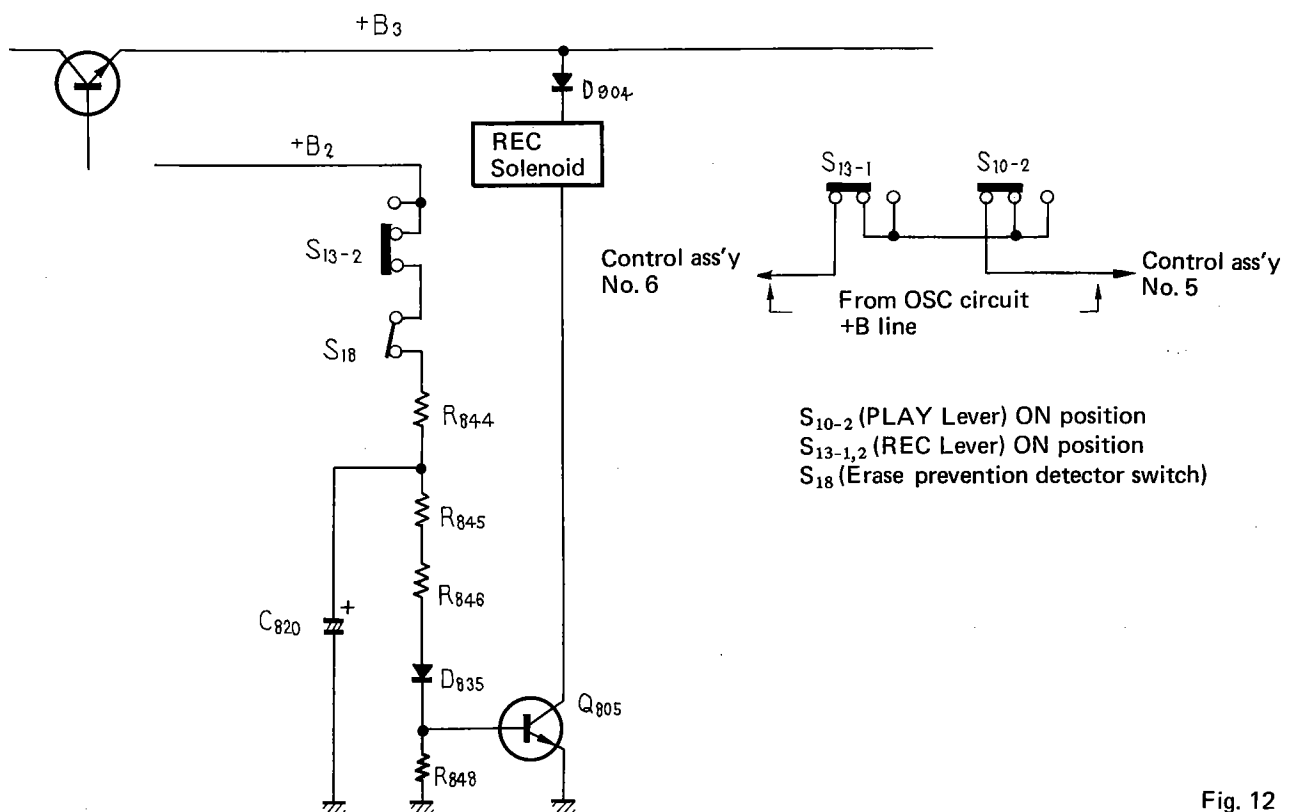


Fig. 12

6.13 ERASE PREVENTING CIRCUIT (Fig. 13)

This circuit prevents the record mode from engaging in case the FF (REW) lever is pressed together with the REC and Play levers.

1. When the REC lever is pressed, Q_{805} is switched ON via $+B_2 - S_{13-2} - S_{18} - R_{844} - R_{845} - R_{846} - D_{835} - Q_{805}$ and the REC solenoid operates.
2. If the FF lever is also pressed at this time, current will flow through $+B_2 - S_{13-2} - S_{18} - R_{844} - R_{845} - D_{832} - S_{12-3,4} - S_{11-4} - Q_{803} - Q_{805}$ is switched OFF, the REC solenoid returns, and FF operation only is performed.
3. In this mode, since the REC solenoid is not operating, the recording, bias and oscillator circuits also do not operate.

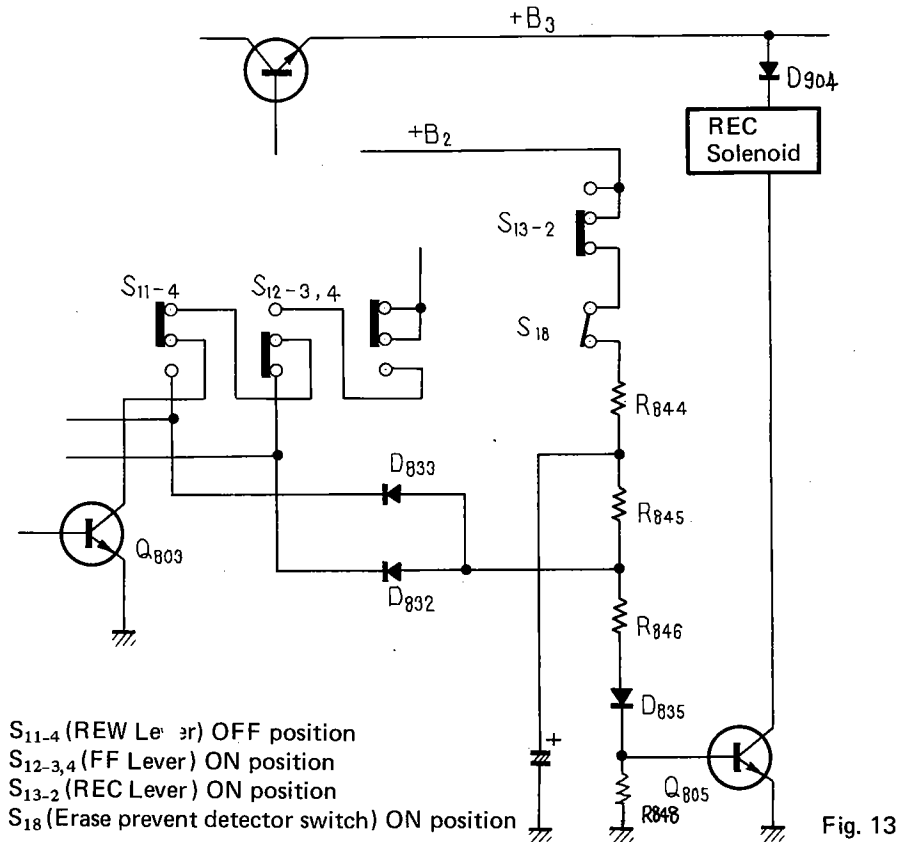


Fig. 13

7. DISASSEMBLY

7.1 BONNET CASE

- Remove 10 screws securing the bonnet case.

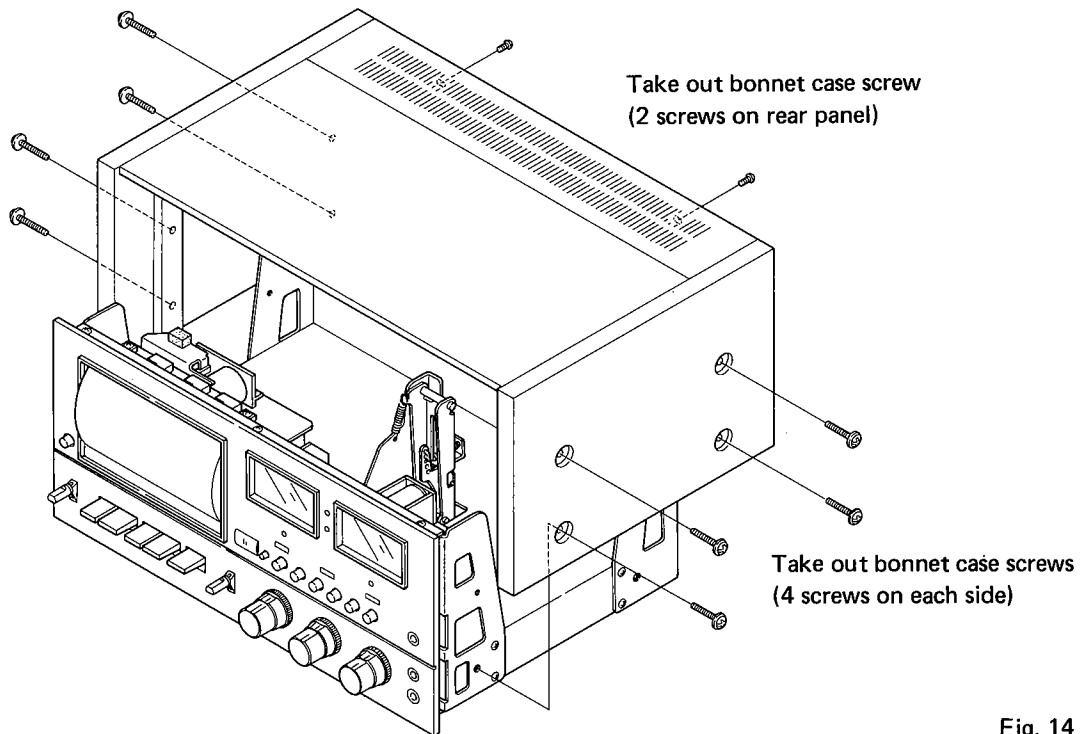


Fig. 14

7.2 BOTTOM PLATE

- Take out 7 screws securing the bottom plate.

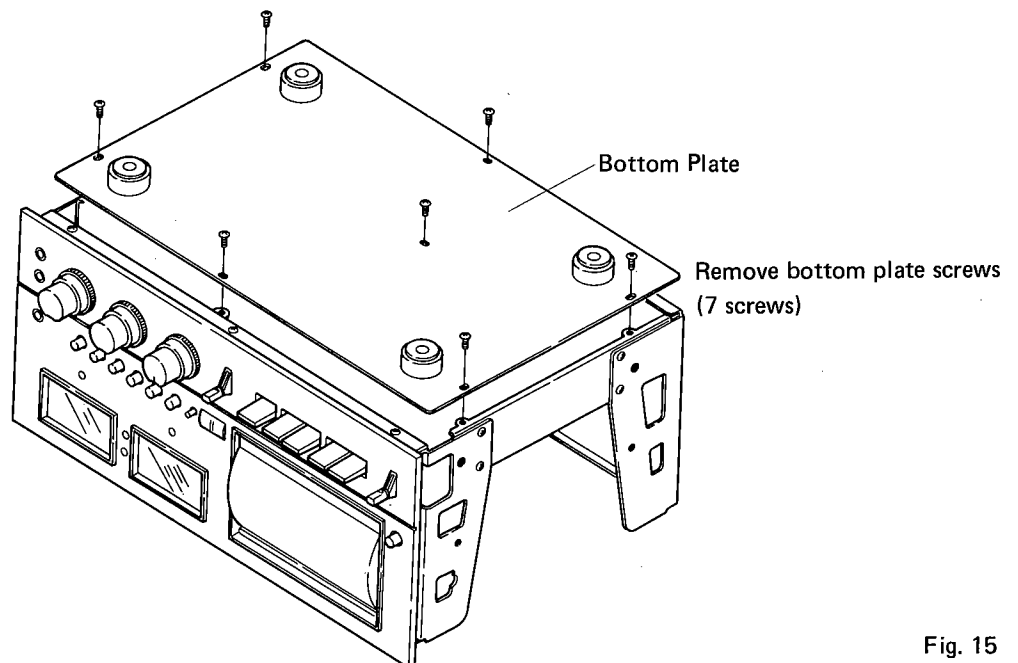


Fig. 15

