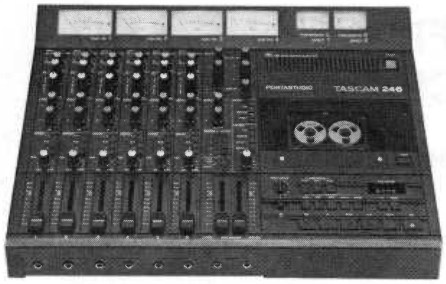


TASCAM

TEAC Professional Division

SERVICE MANUAL

246

PORTASTUDIO

Effective: September, 1985

5704026800

TABLE OF CONTENTS

PRECAUTIONS

- Value of "dB" in the Data refers to 0 dB (1V), except where specified.
- The AC voltmeter used in the procedures must have an input impedance of 1 M-ohms or more.
- Resistor values are in ohms (k = 1,000 ohms, M = 1,000,000 ohms).
- All capacitor values are in microfarads (p = picofarads).
- ⚠ parts marked with this sign are safety critical components . They must always be replaced with identical components – refer to the TEAC parts list and ensure exact replacement.
- Improvements may result in Specifications and Service Data changes.
- dbx noise reduction system made under license from dbx, incorporated. The name "dbx" and the dbx symbol are trademarks of dbx, Incorporated.

1. SPECIFICATIONS AND SERVICE DATA

MECHANICAL CHARACTERISTICS

Tape	Compact cassette, 70 μs, Hi-bias (Type II) tape
Track Format	4-track, 4-channel
Head Configuration	1 Erase, 1 Record/ Reproduce
Motors	1 FG Servo-controlled DC Capstan; 1 DC Reel; 1 DC ancillary
Tape Speeds3)	3-3/4 ips (9.5 cm/s) and 1-7/8 ips (4.8 cm/s)
Speed Accuracy	±1.0 % deviation
Pitch Control	±12 %
Fast Wind Time	Approx. 85 seconds for C-60
Pause Start Time	Less than 0.5 sec. to reach standard Wow and Flutter
Dimensions (W x H x D)	500 x 401 x 123 mm (19-11/16" x 15-13/16" x 4-13/16")
Weight (net)	10.3 kg (22.7 lbs)

ELECTRICAL CHARACTERISTICS

MIXER SECTION	
MIC/LINE Input	
Input Impedance	100k ohms, unbalanced
Source Impedance	Less than 10k ohms
Nominal Input Level	-60 dBV (1 mV), MIC (Trim max.) -10 dBV (0.3 V), LINE (Trim min.)
Maximum Input Level	+15 dBV (5.6 V)
LINE B Input	
Input Impedance	28k ohms
Nominal Input Level	-10 dBV (0.3 V)
Maximum Input Level	+15 dBV (5.6 V)
PGM Buss Input	
Input Impedance	22k ohms
Nominal Input Level	-10 dBV (0.3 V)
Maximum Input Level	+15 dBV (5.6 V)
INSERTION	
SEND (Tip)	
Output Impedance	100 ohms
Nominal Load Impedance	10k ohms
Minimum Load Impedance	1.7k ohms
Nominal Output Level	-10 dBV (0.3 V)
Maximum Output Level	+15 dBV (5.6 V)
RECEIVE (Ring)	
Input Impedance	68k ohms
Nominal Input Level	-10 dBV (0.3 V)
Maximum Input Level	+15 dBV (5.6 V)
PGM/EFFECT/MONITOR Output	
Output Impedance	100 ohms
Nominal Load Impedance	10k ohms
Minimum Load Impedance	1.7 kohms
Nominal Output Level	-10 dBV (0.3 V)
Maximum Output Level	+15 dBV (5.6 V)
HEADPHONES Output	
Nominal Load Impedance	8 ohms, stereophones
Maximum Output Level	100 mW/ch. (8 ohms)

Equalizer	
Type	2-band, peak/dip, sweepable
Frequencies	Low/Mid; 62 Hz to 1.5 kHz Mid/High; 1 kHz to 8 kHz
Boost/Cut Range	±12 dB
Input Overload Indicator	Activates at 24 dB above nominal
PGM Buss Peak Indicator	Activates at 8 dB above nominal

RECORDER SECTION

Tape Out	
Output Impedance	100 ohms
Nominal Load Impedance	10k ohms
Minimum Load Impedance	1.7k ohms
Nominal Output Level	-10 dBV (0.3 V)
Maximum Output Level	+15 dBV (5.6 V)
Bias Frequency	85 kHz
Equalization	High Speed; 3,180 μs + 35 μs Low Speed; 3,180 μs + 70 μs
Record Level Calibration	160 nWb/m (0 VU reference)
Noise Reduction	4 Channel, dbx II, dual process
Power Requirements	
USA/CANADA	120 V AC, 60 Hz
EUROPE	220 V AC, 50 Hz
UK/AUSTRALIA	240 V AC, 50 Hz
GENERAL EXPORT	100/120/220/240 V AC, 50/60 Hz
Power Consumption	40 W

TYPICAL PERFORMANCE CHARACTERISTICS

MIXER SECTION

Frequency Response	20 Hz – 20 kHz ±1 dB
Signal-to-Noise Ratio	IHF A WTD/UNWTD (20 – 20 kHz)
1 Mic to PGM Out	68 dB/65 dB
1 Line to PGM Out	85 dB/80 dB
Total Harmonic Distortion[2]	0.05 %, nominal level
Crosstalk[2]	65 dB

RECORDER SECTION

Wow and Flutter[3] HIGH speed	0.04 % (NAB weighted) ±0.06 % peak (DIN/IEC/ANSI weighted)
LOW speed	0.05 % (NAB weighted) ±0.1 % peak (DIN/IEC/ANSI weighted)
Frequency Response[4] (Record/Reproduce)	
HIGH speed	20 Hz – 18 kHz 40 Hz – 14 kHz, ±3 dB
LOW speed	40 Hz – 14 kHz 40 Hz – 12.5 kHz, ±3 dB
Signal-to-Noise Ratio[4] (Reference to 3 % THD)	IHF A WTD/UNWTD (20 – 20 kHz)
HIGH speed	95 dB/90 dB with dbx* 58 dB/55 dB without dbx
LOW speed	93 dB/88 dB with dbx 57 dB/54 dB without dbx
Total Harmonic Distortion[1, 4]	
HIGH speed	1.0 %, 0 VU, with/without dbx
LOW speed	1.0 %, 0 VU, with/without dbx
Adjascent Channel Separation[2] (0 VU)	70 dB with dbx 55 dB without dbx
Erasure (referenced to 3 % THD level)	70 dB at 1 kHz

SERVICE DATA

Tape Speed:	
Deviation:	3,000 Hz ±30 Hz
Width of deviation:	Within 30 Hz
Pitch Control:	
Minimum:	Less than 2,610 Hz
Maximum:	More than 3,390 Hz
Take-up Torque:	
At play and record:	40 to 50 g-cm (0.49 to 0.7 oz-inch)
At FF:	Higher than 55 g-cm (0.76 oz-inch)
At REW:	80 to 150 g-ms (1.11 to 2.08 oz)
Pinch Roller Pressure:	350 to 500 g-ms (12.34 to 17.64 oz)
Wow & Flutter:	Refer to Section 4-4-9
Frequency Response:	
Mic/Line INPUT → PGM OUT, EFFECT OUT, MONITOR OUT	20 Hz to 20,000 Hz ±1 dB
Parametric EQ:	Refer to Section 4-5-7
Overall:	Refer to Section 4-6-7
Overall SN Ratio:	Refer to Section 4-6-9
Overall Distortion:	Refer to Section 4-6-8
Erasing Ratio:	Refer to Section 4-6-10
Headphones (L, R):	Maximum 900mV at 8 ohms

2. CIRCUIT DESCRIPTION

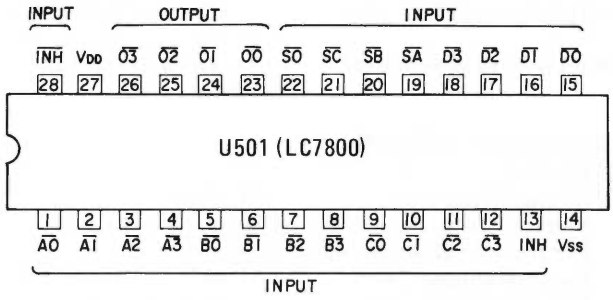
2-1 OUTLINE

Electric circuit section consists of an amplifier circuit section, control circuit section which processes operation modes of the tape deck and associated control signals, driver section which drives motor, and power supply circuits which supply power to each circuit.

The amplifier circuit section contains mixer amplifiers, recording/-reproducing amplifiers, dbx encoders, dbx decoders, recording bias circuit, meter amplifiers and monitor amplifiers.

The control circuit consists of a main unit composed of four-bit single tip microcomputer, input-port extension interface IC and output-port extension interface IC, and logic circuits.

Pin Layout



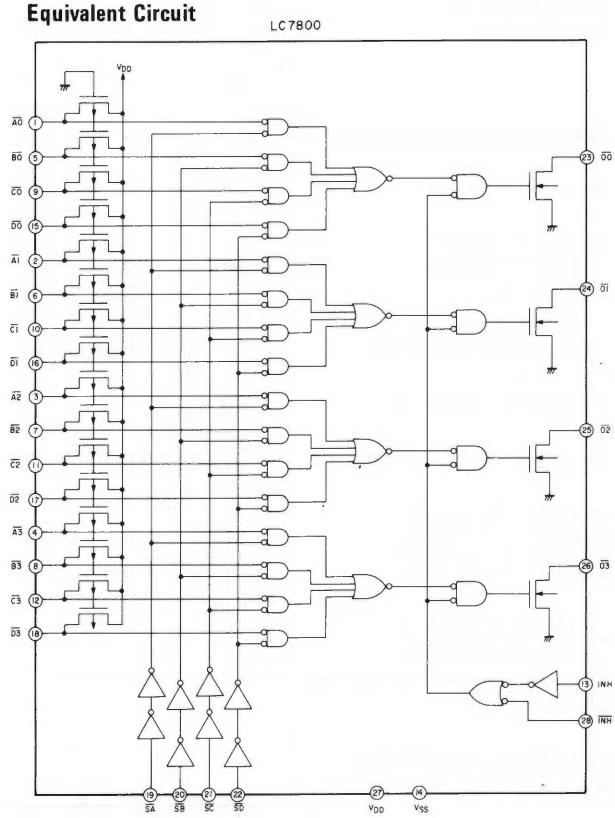
2-2 CONTROL CIRCUIT

The control circuit, as shown in Fig. 2-2, consists of the main unit composed of four-bit single tip microcomputer (U502), input-port extension interface IC (U501), and output-port extension interface IC (U503), and the logic circuits.

1. Reading of operation input

1) The input-port extension IC U501 is composed as shown in Fig. 2-1 and operation switches of the deck are connected to its input terminals as shown in Fig. 2-2.
2) Output terminals (C0 – C3) of the microcomputer U502 generates four-phase scanning pulses as shown in Fig. 2-2, and they are connected to the terminals SA – SD of U501.
3) U501 makes logical operations on the input (L level) from the operation switch(es) of the deck and the scanning pulses, sending the result from the O0 – O3 terminals to the A0 – A3 terminals of the microcomputer. The microcomputer analyzes the signals and knows which one of the operation switches was pressed, thereby generating an output required for the specified operation according to the inner program.
4) However, as for zero stop, zero play, memory stop and memory REW, U501 is not used but a separate circuit is used as shown in Fig. 2-2.

Equivalent Circuit



Truth Table

INPUT																		OUTPUT			
DATA INPUT																SELECT INPUT				INHIBIT INPUT							
A				B				C				D															
A0	A1	A2	A3	B0	B1	B2	B3	C0	C1	C2	C3	D0	D1	D2	D3	SA	SB	SC	SD	INH	INH	O0	O1	O2	O3
0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	0	1	0	1	1	1
1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	0	1	1	0	1	1
1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	0	1	1	1	0	1
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1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0	1	0	1	1	1
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1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	0	1	0	1	1	1	1	0
1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	0	0	1	0	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	0	0	1	1	0	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	0	0	1	1	1	0	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	0	0	1	1	1	1	0
*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	1	0	1	1	1	1
*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	1	*	1	1	1	1
*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	0	1	1	1	1

Note: 1: "H" level, 0: "L" level, *: don't care

Fig. 2-1
U501 (LC7800)

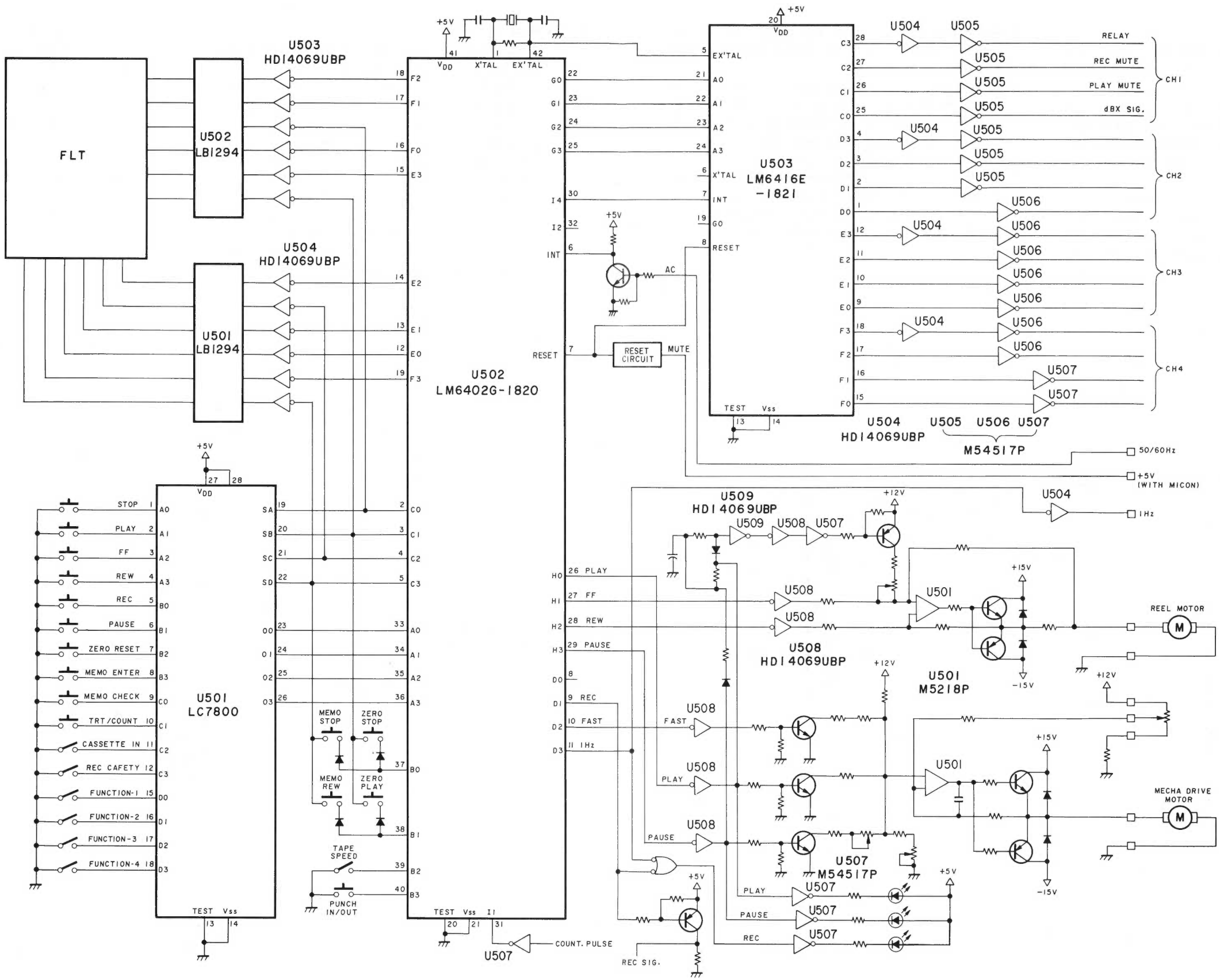
U503
HD14069UBP
FLT
U502
LB1294
U504
HD14069UBP
U501
LB1294
U502
LM6402G-1820
U503
LM6416E
-1821
U504
HD14069UBP
U505
M54517P
U506
U507
U501
LC7800
STOP
PLAY
FF
REW
REC
PAUSE
ZERO RESET
MEMO ENTER
MEMO CHECK
TRT/COUNT
CASSETTE IN
REC CAFETY
FUNCTION-1
FUNCTION-2
FUNCTION-3
FUNCTION-4
MEMO STOP
ZERO STOP
MEMO REW
ZERO PLAY
TAPE SPEED
PUNCH IN/OUT
RESET CIRCUIT
MUTE
AC
RELAY
REC MUTE
PLAY MUTE
dBX SIG.
CH1
CH2
CH3
CH4
50/60Hz
+5V (WITH MICON)
1Hz
U509
HD14069UBP
U508
HD14069UBP
U501
M5218P
U507
M54517P
REEL MOTOR
MECHA DRIVE MOTOR
FAST
PLAY
PAUSE
REC
REC SIG.
COUNT. PULSE

Fig. 2-2

A. PLAY Mode

1) When the PLAY switch is pressed, PLAY terminal in the Fig. 2-2 turns to L and A1 terminal of U501 also turns to L (refer to Fig. 2-3).
2) As a result, pin 26 H0(PLAY) of U502 turns to L, and output pin 2 of inverter U508 turns to H. Transistor Q506 turns "ON", determining voltage on the mode terminal. This mode control voltage is supplied to the driver section via P504.
3) The mode control voltage supplied to the driver section is input to pin 3 of U501 in the drive PCB and compared with voltage applied to pin 2, and the resultant difference output voltage drives Q501 (Q502) which in turn drives the mecha-driver motor (i.e. mode setting cam), thus setting the PLAY mode.
4) As pin 2 of U508 turns to H level, pin 16 of U507 in the CONT (A) PCB Assembly turns to L level, lighting PLAY LED D505 as a result.
5) As was described previously, output pin 2 of U508 turns to H level in the PLAY mode, output pin 8 of U509 turns to L, output pin 4 of U508 turns to H and output pin 11 of U507 turns to L, as the result, Q504 turns "ON". Consequently, FWD terminal of P504 turns to H level.
6) The H level voltage from FWD terminal of P504 is applied to the input pin 5 of the operational amplifier U501 (5, 6, 7) in the motor drive PCB assembly circuit on the drive PCB, and rotates the reel motor in the forward direction.

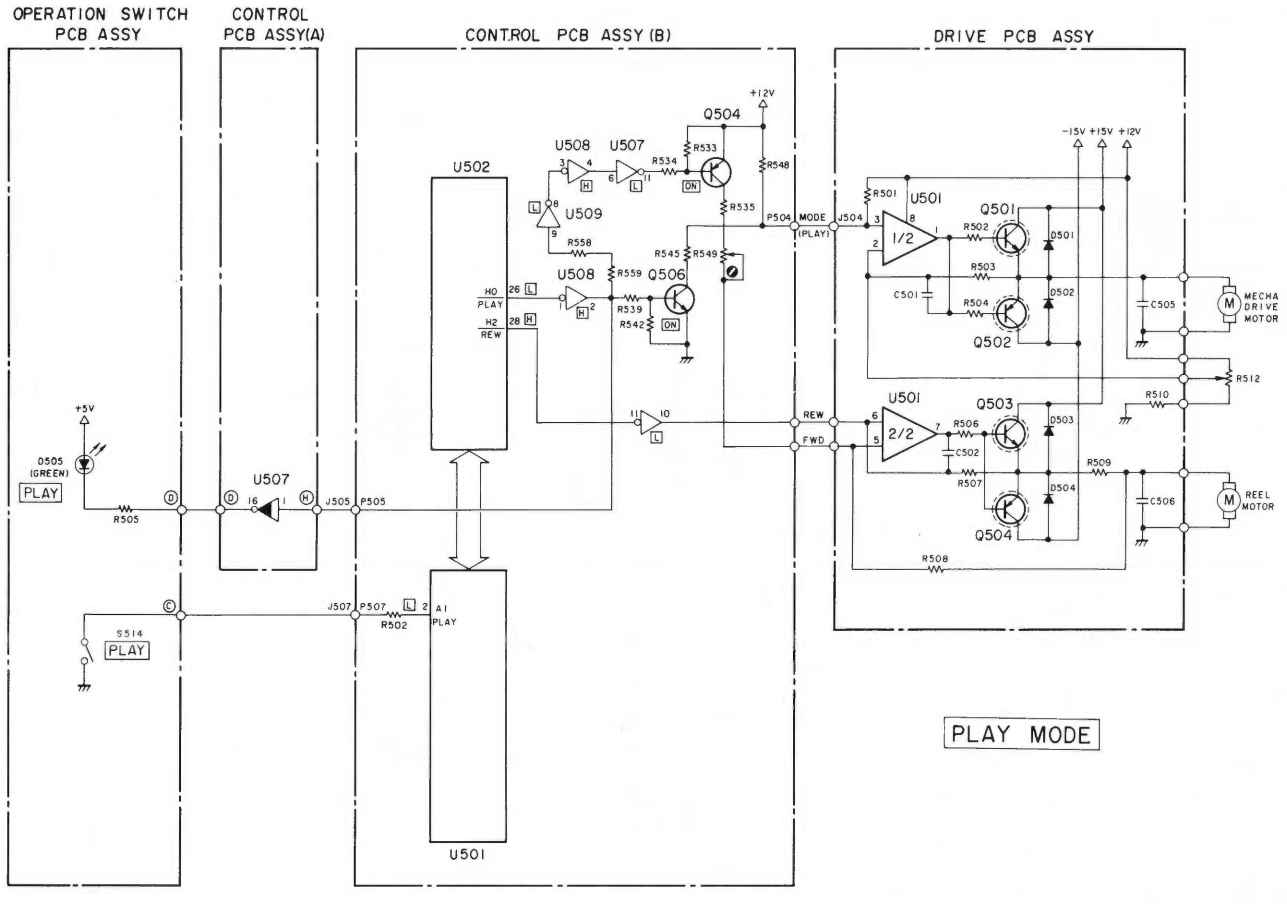

Fig. 2-3

B. REC Mode

1) The B0 terminal of U501 turns to L level when REC and PLAY switches are pressed to start recording function. This turns D1 (REC) terminal of U502 to L level and conducts the upper side of diode D 508 connected to the D1 terminal, turning the transistor Q501 "ON".
   Consequently LED terminal of P501 turns to H level. This signal is applied to REC function switch as a REC mode signal used for lighting LEDs, etc.
2) The L level signal from the D1 terminal is also applied to Q503 base, conducting Q503. This turns Q503 collector to H level, and output pin 10 of the next inverter U507 to H level. This signal is then inverted by the inverter U507 on the CONT (A) PCB Assembly to light REC.LED (D507).
3) The H level signal from Q503 collector is also applied to the REC terminal of P501, and is used as a control signal for the amplifier circuit.
4) The H level signal from output pin 2 of U508 on control PCB assembly (B) is applied to PLAY.LED via the inverter U507 (1, 16) as was described in the PLAY mode, and lights up the LED. Also the signal turns on Q504 via U509 (9, 8), U508 (3, 4) and U507 (6, 11), and turns FWD terminal of P504 to H level to generate control voltage for the REEL motor to rotate in the forward direction.

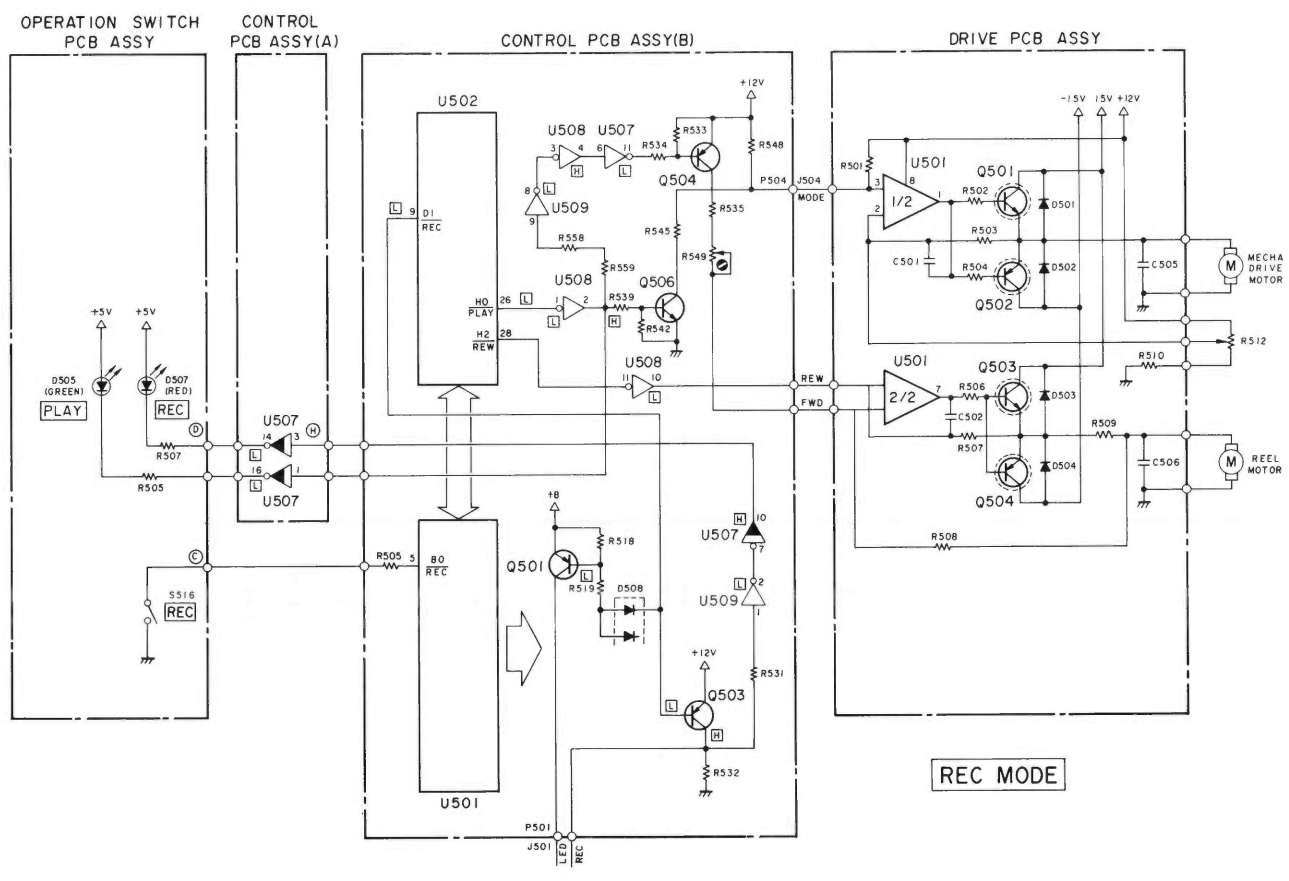

Fig. 2-4

C. PAUSE Mode

1) When the PAUSE switch is pressed, B1 of U501 turns to L level along with H3 (PAUSE) of U502. Consequently output pin 8 of U508 turns to H level, turning on the transistor Q507. As a result, voltage for PAUSE mode is generated at the mode terminal of P504. This voltage is then transmitted to pin 3 of the operational amplifier U501 in the driver section to set the mode control cam to the PAUSE mode.
2) The H level voltage from pin 8 of U508 is also applied to pin 2 of U507 on CONT (A) PCB Assembly, turning pin 15 to L level. Consequently PAUSE LED (D506) on the OPE SW PCB lights up.
3) 1 Hz pulse is always output from terminal D3 of U502 and input to pin 11 of U504. The inverted output is then input to the right diode of D509 from pin 10 and applied to the REC.LED via U507 (3 – 14), turning the LED on or off.
4) When PAUSE switch is pressed, L level signal from H0 terminal of U502 turns to H level. Q504 turns off as a result and FWD terminal of P504 turns to L level.
REW terminal of P504, on the other hand, has been maintained at L level, therefore electrical potential difference between the two terminals becomes zero. In other words, the input electrical potential difference between two input terminals of the operational amplifier for the reel motor control circuit on the driver section reduces to zero, thus the REEL motor stops.

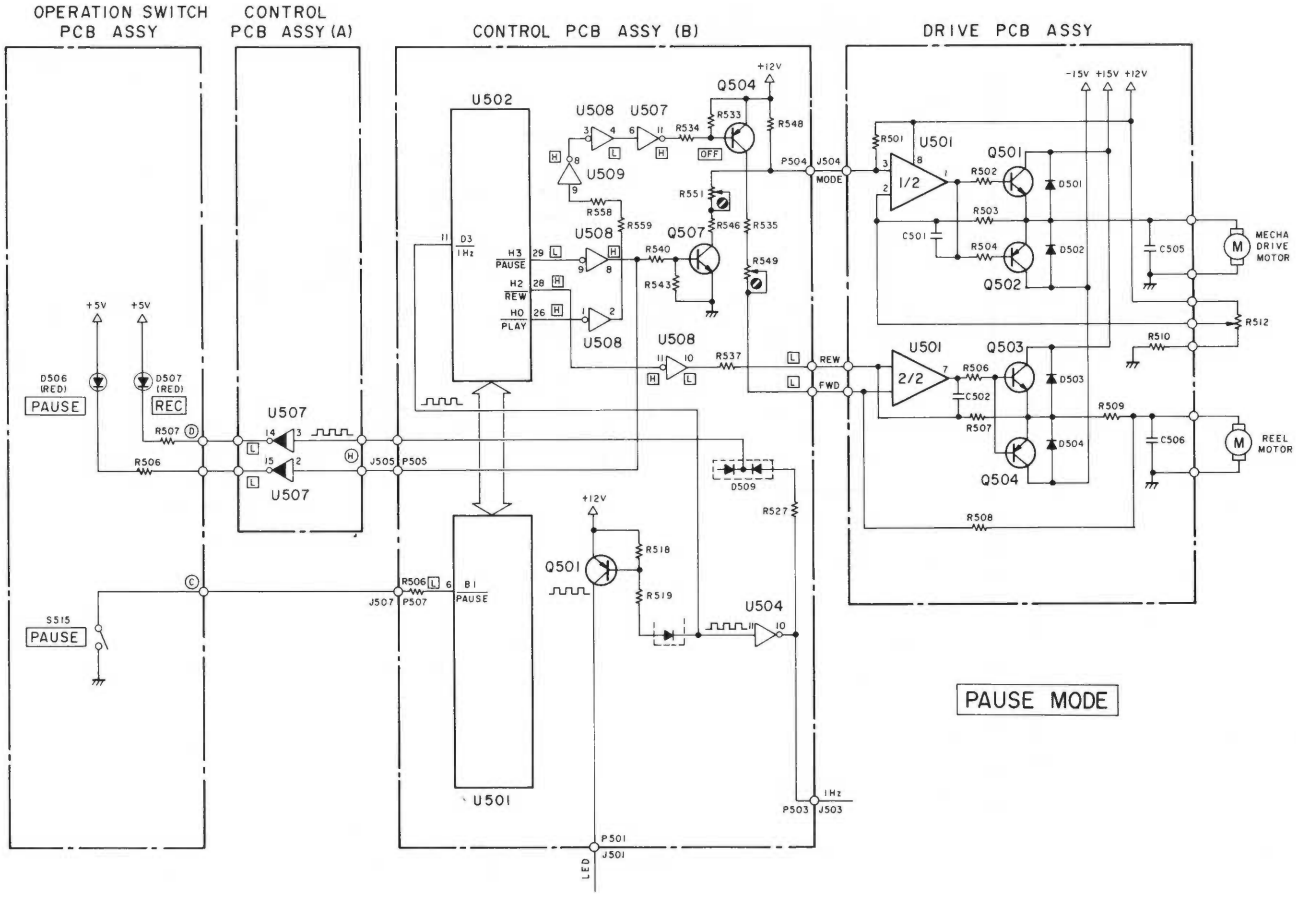

Fig. 2-5