TASCAM

TEAC Production Products

32

2-Track Recorder/Reproducer



OPERATION/MAINTENANCE

5700029101

MAINTENANCE

Note:
Parts reference numbers used in the circuit description may not always correspond to those of the Model 32, except for the following sections: 1-5 Reel Motor Drive Circuit, 1-9 F.F and REW Operation, 1-10 Electrical Brake System, 1-13 Edit Control Circuit and 1-16 Amplifier Circuit Description.

NOTES

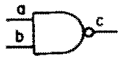
- ★ All resistors are 1/4 watts, 5 %, unless marked otherwise. Resistor values are in ohms (K=1,000-ohms, M=1,000,000 ohms).
- ★ All capacitor values are in microfarads (p=pico-farads).
- ★ ⚠ Parts marked with this sign are safety critical components. They must always be replaced with indentical components – refer to the TEAC Parts List and ensure exact replacement.
- ★ 0 dB is referenced to 1 V in this manual unless otherwise specified.
- ★ PC boards shown viewed from foil side.

1. CIRCUIT DESCRIPTION

Signal flow and functions of the various control circuits of the tape deck are explained in detail in this section. These should be of help in analyzing any trouble which may occur and in correcting the malfunctioning circuit.

1-1. LOGIC USED IN THE TAPE DECK

(a) 2 INPUT NAND GATE



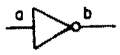
a	b	c
H	H	L
H	L	H
L	H	H
L	L	H

(b) 2 INPUT NOR GATE



a	b	c
H	H	L
H	L	H
L	H	H
L	L	H

(c) INVERTER



a	b
L	H
H	L

Note: H level = 3.4 V ~ 5 V
L level = 0 V ~ 0.6 V

1-2. SYSTEM CONTROL IC

1-2-1. Pin Assignments and Their Functions

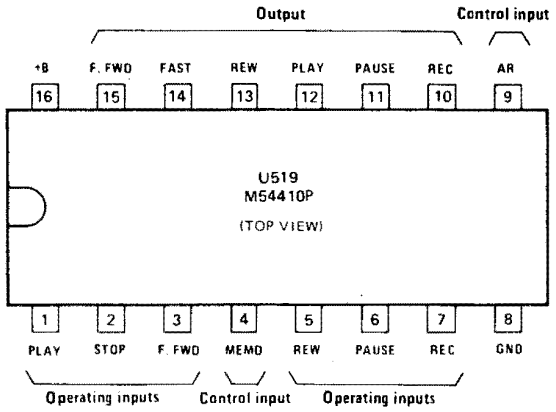


Fig. 1-1. Pin Assignments

	Pin No.	Pin name	Function	
Operation inputs	1	PLAY	Reproduce start signal input terminal.	Signal level: L
	2	STOP	Stop signal input terminal	Signal level: L
	3	F.FWD	Fast-forward signal input terminal.	Signal level: L
	5	REW	Rewind signal input terminal.	Signal level: L
	6	PAUSE	Pause signal input terminal.	Signal level: L
	7	REC	Record signal input terminal.	Signal level: L
Control inputs	4	MEMO	Memory input terminal (resets rewind mode when at L level)	
	9	AR	Record inhibit signal input terminal (L level: record inhibited, H level: record enabled)	
Outputs power	10	REC	H-level signal output terminal during record/reproduce or record/pause mode	
	11	PAUSE	H-level signal output terminal during pause mode	
	12	PLAY	H-level signal output terminal during reproduce mode.	
	13	REW	H-level signal output terminal during rewind mode.	
	14	FAST	H-level signal output terminal during rewind or fast-forward mode.	
	15	F.FWD	H-level signal output terminal during fast-forward mode.	
Power	8	GND	Ground terminal.	
	16	+B	Power supply terminal (standard: +5 V +/-10%, absolute maximum: +7.0 V)	

1-2-2. Block Diagram

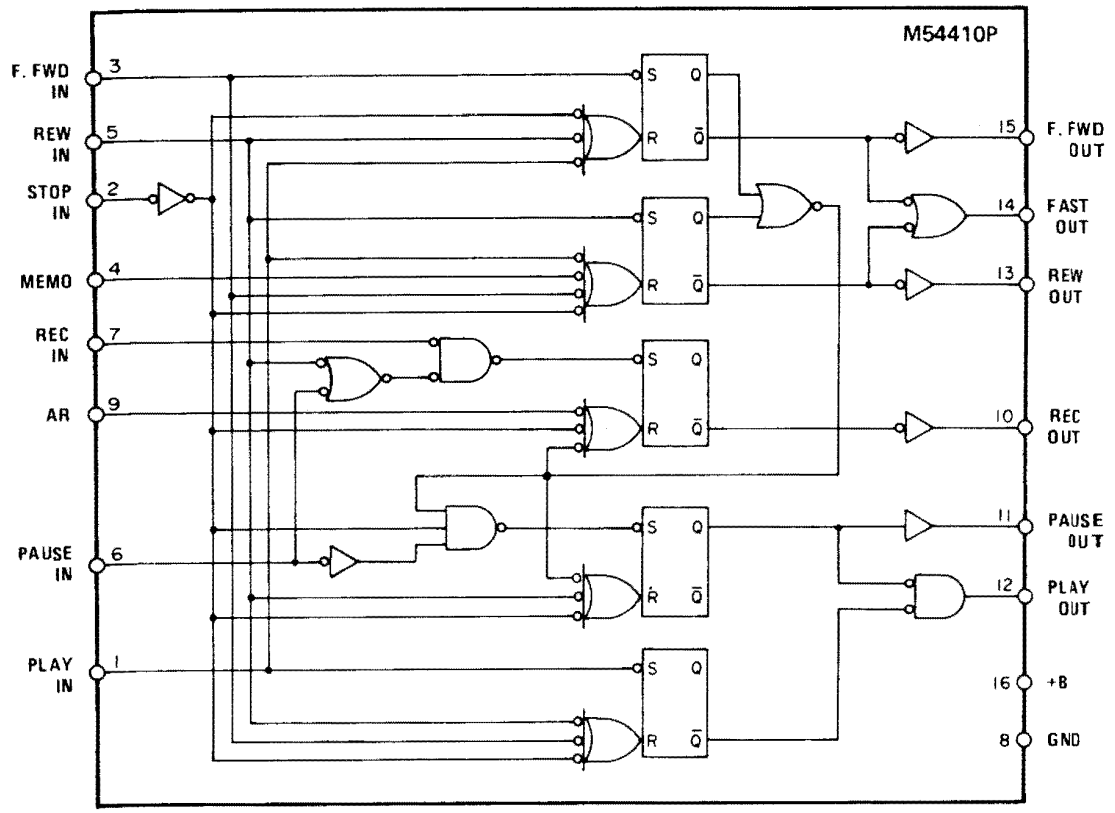


Fig. 1-2. Block Diagram

1-2-3. Input Signals and Resulting Modes

Output signal / Input signal	REC	PAUSE	PLAY	REW	FAST	F. FWD	Operating mode
PLAY	L	L	H	L	L	L	PLAY mode
STOP	L	L	L	L	L	L	STOP mode
F.FWD	L	L	L	L	H	H	F.FWD mode
REW	L	L	L	H	H	L	REW mode
PAUSE	L	H	L	L	L	L	PAUSE mode
REC and PLAY	H	L	H	L	L	L	REC/PLAY mode
REC and PAUSE	H	H	L	L	L	L	REC/PAUSE mode

Notes 1. The mode is set at the decaying edge of the input signal waveform.
2. The output retains the current mode until an input signal indicating a different mode is received.
3. Output REC remains at L as long as input AR is L.
4. Output REW remains at L as long as input MEMO is L.

1-2-4. Mode Transition

The table below summarizes transition from one to another due to an input signal.

Input signal \ Current Mode	STOP	F.FWD	REW	PLAY	PAUSE	REC/PLAY	REC/PAUSE
STOP		STOP	STOP	STOP	STOP	STOP	STOP
F.FWD	F.FWD		F.FWD	F.FWD	F.FWD	F.FWD	F.FWD
REW	REW	REW		REW	REW	REW	REW
PLAY	PLAY	PLAY	PLAY		PLAY		REC/PLAY
PAUSE	PAUSE			PAUSE		REC/PAUSE	
REC and PLAY	REC/PLAY	REC/PLAY	REC/PLAY	REC/PLAY	REC/PLAY		REC/PLAY
REC and PAUSE	REC/PAUSE			REC/PAUSE	REC/PAUSE	REC/PAUSE	

Note. A diagonal line indicates that the current mode remains unchanged.

1-2-5. Operation with more than One Input Signal

When more than one input signal is received simultaneously, the deck enters the mode indicated below. When input signals applied simultaneously are removed in sequence, the mode indicated by the last signal to be removed is normally enabled. If REC and PLAY or REC and PAUSE are combined, the record/reproduce or record/pause mode will be enabled regardless of the sequence in which the input signals are removed. If F.FWD (REW) and REC or PAUSE are combined, the fast-forward (rewind) mode will be enabled regardless of the sequence in which the input signals are removed.

Input signal A	Input signal B	Resulting mode
STOP	Any combination of F.FWD, REW, REC, PAUSE, and PLAY	STOP mode
F.FWD	REW	STOP mode
	REC and/or PAUSE	F.FWD mode
	PLAY	STOP mode
REW	REC and/or PAUSE	REW mode
	PLAY	STOP mode
REC	PAUSE	REC/PAUSE mode
	PLAY	REC/PLAY mode
	PAUSE and PLAY	REC/PAUSE mode
PAUSE	PLAY	REC/PLAY mode

1-2-6. Input/Output Levels

Input/output levels and voltages are given below.

Item	Minimum	Standard	Maximum	Absolute maximum
Maximum supply voltage	–	–	–	7.0 V
Maximum input voltage	–	–	–	5.5 V
Recommended supply voltage	4.5 V	5.0 V	5.5 V	–
H-level input voltage	2.0 V	–	–	–
L-level, input voltage	–	–	0.8 V	–
Open-input voltage	3.2 V	–	–	–
H-level output voltage	2.9 V	–	–	–
L-level output voltage	–	–	0.4 V	–

1-2-7. Initial Reset Circuit

See Fig. 1-3.

The initial reset circuit generates a signal which puts the deck in the stop mode as soon as the power is turned on, preventing incorrect operation during the time the DC supply voltage is unstable.

When power is turned on, current from the IC U519 charges the noise suppression capacitors (C502 ~ C507). It takes only about 20 msec to charge C502 ~ C507 because of their low capacity. When the capacitors are fully charged, the PLAY, PAUSE, F.F, REW, and REC input terminals become HIGH. However, it takes approximately 100 msec for the STOP input terminal to rise to HIGH because of the large capacity of C507. Since STOP takes longer to become HIGH than the other input terminals, a flip-flop is set in U519 when power is turned on and the deck enters the stop mode.

Unless C507 is fully charged and the STOP input terminal is HIGH, U519 does not switch from the stop mode to any other mode even if operation signals are input.

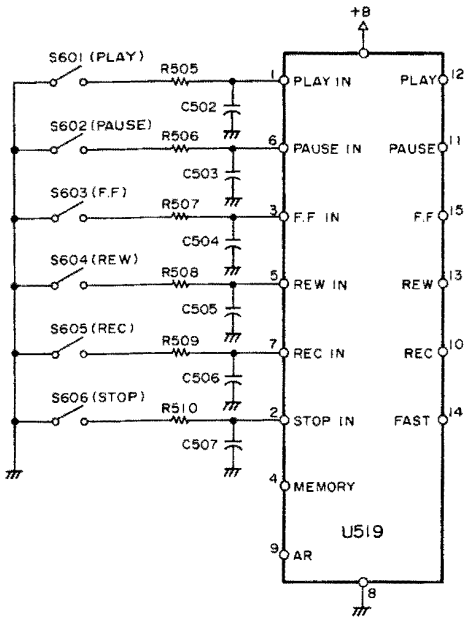


Fig. 1-3. System Control IC Input Circuit

1-3. POWER SHUT-OFF CIRCUIT

See Fig. 1-4.

A photo interruptor type shut-off switch is interlocked with the right tension arm.

1. When the tension arm deviates from its normal position, the light beam falling on the photo transistor is interrupted and the photo transistor output voltage drops, turning off Q516 and Q517. When Q516 is cut off, Q813 is also turned off and no power is supplied to terminal 6 of capstan motor assembly, and the capstan motor is deenergized.
2. When Q517 goes off, base bias current flows to the base of Q518 through R551 and R552 and Q518 goes on. Since the collector of Q518 is connected to the STOP mode switch, the tape deck is set to the STOP mode. Thus, the entire system stops when the tension arm is not set in its specified position due to tape slackness or other trouble.

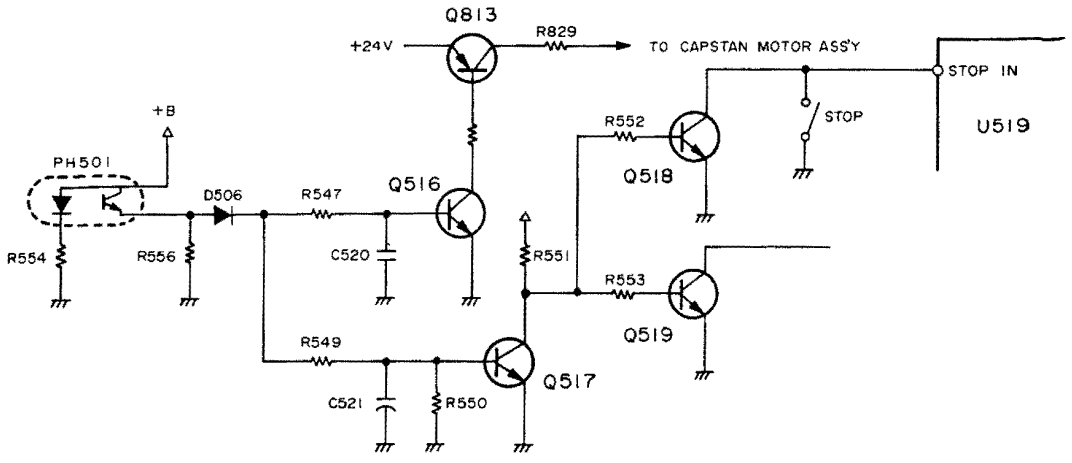


Fig. 1-4. Power Shut-Off Circuit

3. When the tension arm is in its normal position, the photo transistor receives the light beam and outputs a high level voltage to make Q516 and Q517 conduct.
4. When Q516 goes on, the Q813 base bias circuit is grounded and Q813 supplies current to the capstan motor.
5. When Q517 goes on, Q518 and Q519 are turned off, disconnecting Q518 from the stop mode switch and Q519 from the speed sensing circuit.

1-4. CAPSTAN AND BRAKE SOLENOID DRIVE CIRCUIT

The tape deck uses two solenoids; their drive circuits are shown in Fig. 1-5 (B).

1) Capstan solenoid
   This solenoid operates in the PLAY mode to activate the pinch roller. The solenoid goes off in the PAUSE mode.
2) Brake solenoid
   In the PLAY, F.F, and REW modes, this solenoid operates to release the reel motor brakes. The solenoid goes off in the PAUSE, STOP, F.F., and REWIND mode.

These solenoids operate as described below:

1. When the deck is in the STOP mode and the PLAY button is pressed, pin 12 of U519 goes HIGH.
2. When pin 12 goes HIGH, Q537 goes on and current flows to the base of Q538 and Q538 goes on.
3. When Q538 goes on, the ground side of the capstan solenoid coil is connected to the ground.
4. When pin 12 of U519 goes HIGH, Q539 goes on,followed by Q541 so that R614, C531 and the brake solenoid are grounded through the collector-emitter path of Q541.
5. When Q541 goes on, charging current flows to C531 through route (1) and Q535 goes on for approximately 200 msec. Then Q536 also goes on and supplies the capstan and brake solenoids with +24 V. A large solenoid current flows to ensure activation of the solenoids. Refer to Fig. 1-5(A)
6. When the charge current stops flowing, Q535 and Q536 go off, disconnecting +24 V supply. However, +12 V is supplied through D514 and solenoid activation is maintained with minimal voltage.
7. Thus, the solenoid voltage applied during activation is reduced for holding, maximizing the activation force to ensure positive action but minimizing heating of the solenoid during holding.

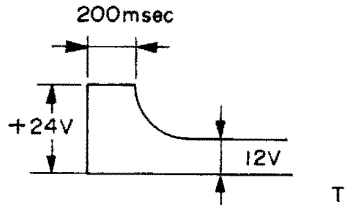


Fig. 1-5 (A). Flashing & Steady State Voltage

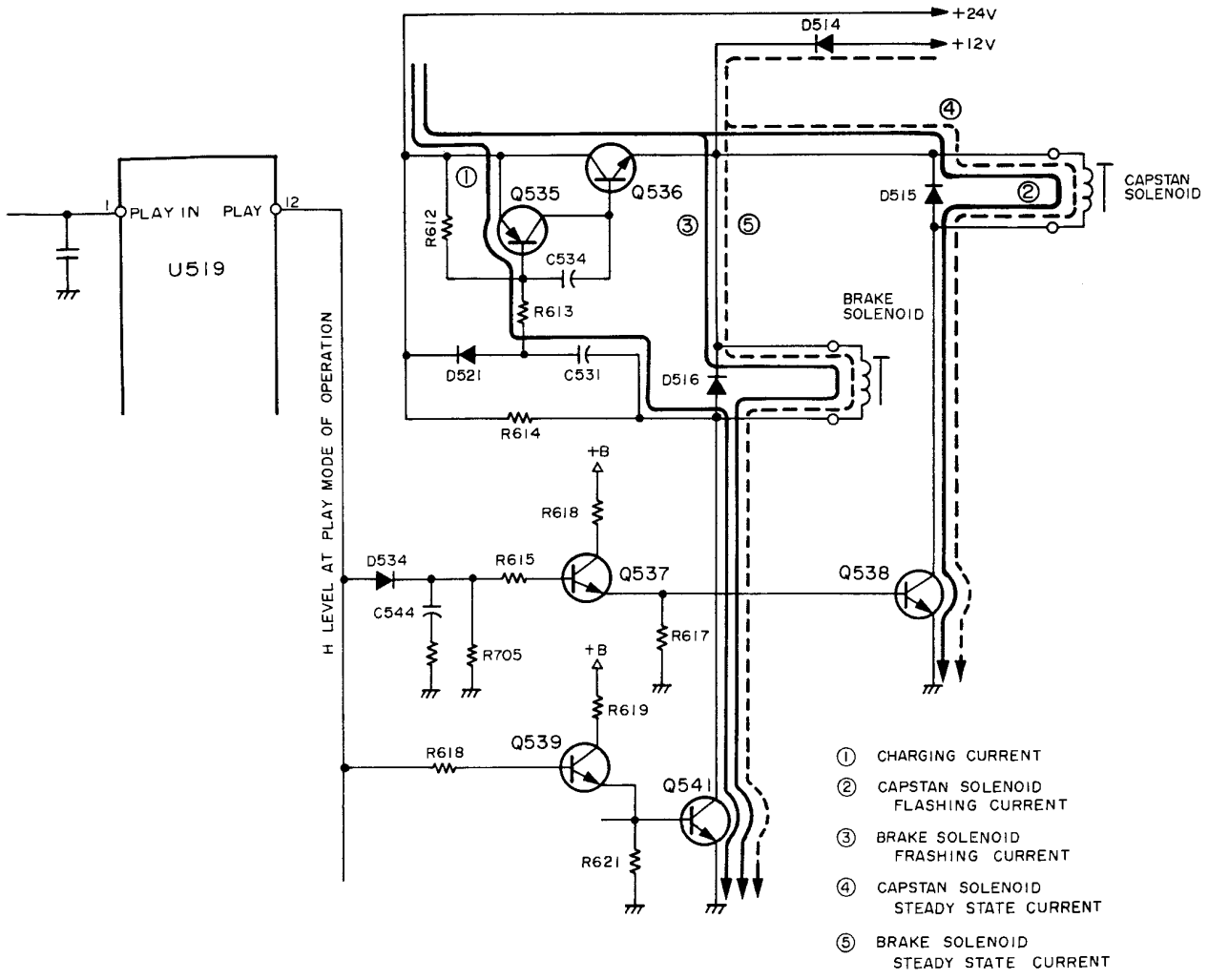


Fig. 1-5 (B). Solenoid Drive Circuit

1-5 REEL MOTOR DRIVE CIRCUIT

Reproduce (Record) Operation

See Fig. 1-6.

1. Before the PLAY button has been pushed, Q547 is cut off, and Q548, Q549 go on causing a 20 V line voltage to be applied to the hot sides of both reel motors through the collector-emitter paths of Q549 and D525. Since the opposite sides of the motor are not connected to the circuit ground through its corresponding drive circuit (Q556 and Q557, or Q560 and Q561), the motors are unable to be rotated.
2. When the PLAY button is pushed, the H level voltage is applied to the base of Q550 making it conductive. Q551 goes on and a charging current flows to the base of Q552 from the emitter-collector path of Q551, C535 and R671 for a short period (1 second) of which length is determined by the value of C535. Q552 then goes on, followed by Q553 which supplies +24 V to the hot sides of both motors until the charging current to C535 is stopped and the flashing current which is required to start the motors is provided.
3. At the same time, the H level voltage is also applied to the base of Q547 making it conductive, turning off Q548 and Q549, which in turn, cuts off the 20 V line voltage which was applied to the motor circuit.
4. Then the H level voltage is applied to the base of Q554 to turn it on, followed by Q555. When Q555 goes on, a base bias current is supplied to both right and left motor drive circuits (Q556, Q557, and Q560, Q561) through routes 1 and 2 causing the drive circuits to initiate motor driving.
5. Meanwhile, the H level voltage is differentiated by C536 and the resultant short impulse turns Q558 and Q559 on. Since the right reel motor is connected to the Q559 collector at time of PLAY start, it is driven with a higher current than that of the left, so it is able to develop more take-up torque, resulting in a smoother starting operation without tape slack.
6. The REEL size selector switch S611 determines the amount of bias current which is to be fed to both motor drive circuits by switching R680 and R698 on and off to enable proper reel drive torque.
7. After the transient or flashing current has stopped, a steady 12 V current is supplied to the motors through D524.

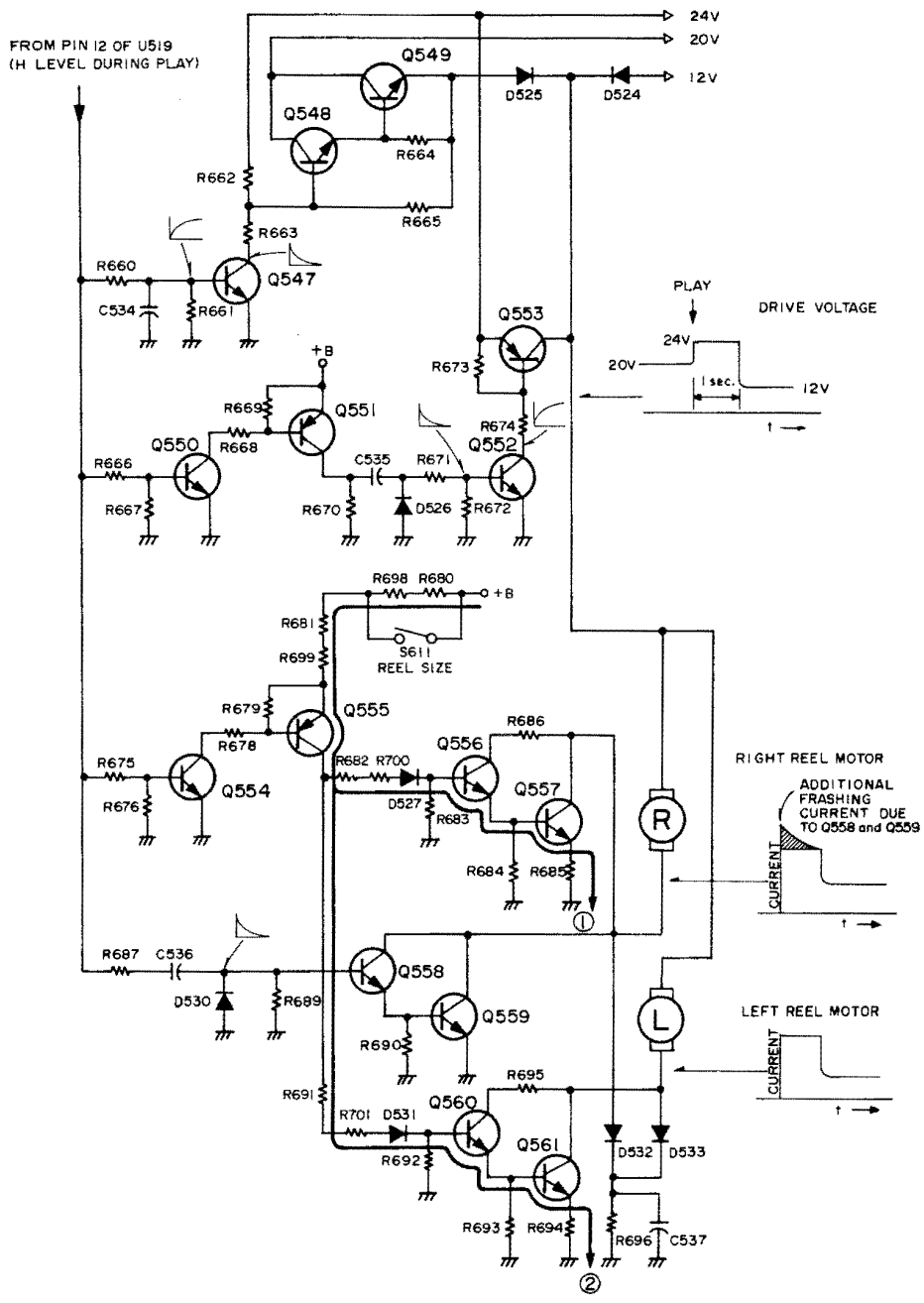


Fig. 1-6 Reel Motor Drive Circuit

1-6. TAPE DIRECTION SENSING AND COUNTER CLOCK GENERATION CIRCUIT

See Fig. 1-7.

This tape deck employs photo-sensing circuits which detect whether the tape is running or stationary and the direction in which it is running. This function is performed by two pairs of photo-interruptors, each consisting of an LED and a photo transistor. The LED and the photo transistor are respectively mounted on the upper and lower sides of a rotating disc which has four openings and is coupled to the right reel motor shaft. The second pair of photo-couplers is mounted in a similar manner, but in such a way that both output pulses produced by the two photo transistors are 90° out of phase when the disc rotates and the openings pass between each pair of LEDs and photo transistors. Thus, the pulses output represent tape speed, and the higher the pulse frequency, the higher the tape speed. The pulse output obtained from the first photo-transistor (PH502) is applied to pin 2 of U517 (an amplifier/wave shaper) and the wave-shaped pulse output developed at pin 1 of U517 is further applied to the base of Q530, then to pin 11 of U505 (the clock terminal of flip-flop U505). The pulse output by the second photo transistor is applied to pin 6 of U517, then to pin 12 of U505 after wave-shaped in the same way as the pulse applied to pin 11 of the same flip-flop. The flip-flop checks the phase (high, low) relationship between the two input pulses applied to pins 11 and 12 and produces a high level output at pin 9 when the tape is running in forward direction and a low level output when the tape is running in reverse direction. The high level signal produced at pin 9 of U505 turns on Q532, which in turn makes Q533 conductive so that the instruction required to increment the tape counter is issued to the counter UP/DOWN input terminal. In a similar way, when the tape is running in reverse direction, the low level output is applied to the UP/DOWN input terminal to decrement the tape counter.

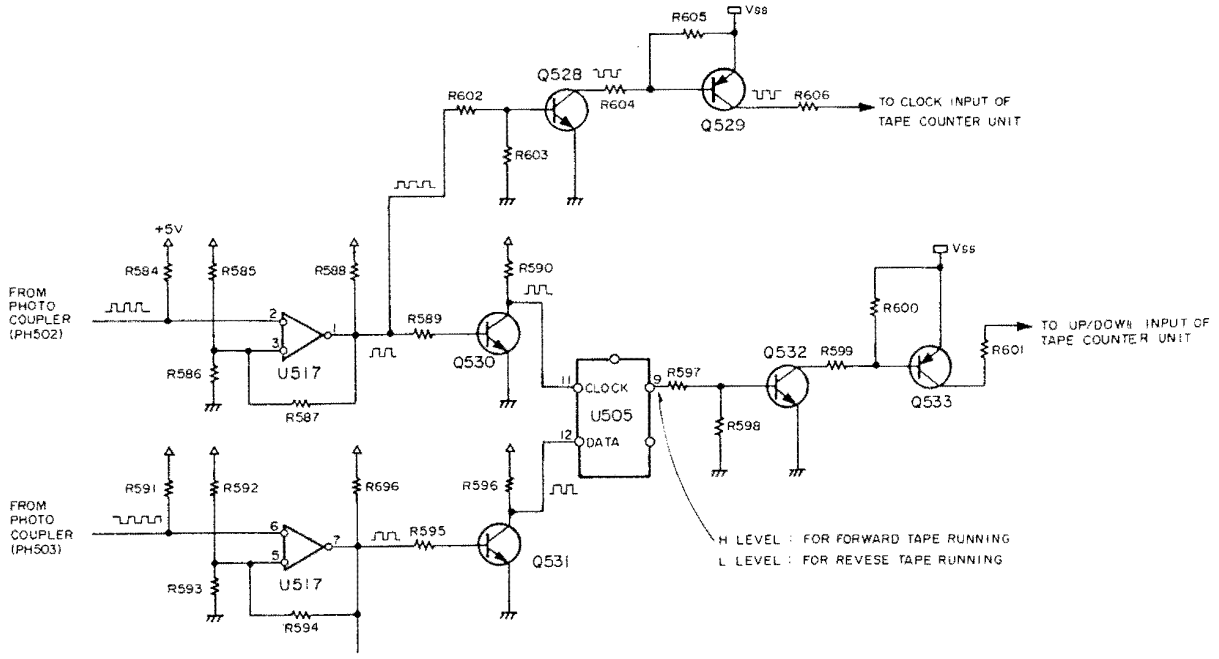


Fig. 1-7. Tape Direction Sensing and Tape Counter Clock Generation Circuit

1-7. COUNTER CLOCK PULSE

See Fig. 1-7.

The wave-shaped pulse output developed at pin 1 of U517 is also applied to the base of Q528 to turn Q528 on or off, along with Q529. The pulse output thus obtained at the Q529 collector is applied to the clock input terminal of the electronic tape counter as a clock pulse.

1-8. MOTION SENSING CIRCUIT

See Fig. 1-8.

1. The wave-shaped pulse output from pin 7 of U517 to represent the tape speed is differentiated by C525, then applied to the base of Q527 to turn it on and off at a frequency corresponding to the tape speed at that time. Thus, C523 is repeatedly charged and discharged. However, C523 does not charge when Q527 goes on and off repeatedly at high speed or when the tape is running at high speed, and pin 6 of U516 (comparator) goes HIGH so that pin 7 of U516 goes HIGH. On the other hand, pin 7 goes LOW when tape is running at low speed. (Pin 7 may develop HIGH and LOW output in alternation when the tape runs at a threshold speed.)
2. Since the voltage developed at pin 7 of U516 is applied to the base of Q521 through R566 and D507, Q521 goes on at high tape speeds and off at low speed. Consequently, pin 1 of U516 also outputs H at high speed and L at low speed as long as Q520 is off.
3. The two signals obtained at pins 7 and 1 of U516 are used as motion control signals, as described later.
4. The motion sensing circuit does not operate in the PLAY and PAUSE modes because pin 12 (PLAY OUT) and pin 11 (PAUSE) of U519 are connected to D508 and D509, respectively, and Q526 is forced to go on when the PLAY or PAUSE button is pushed.

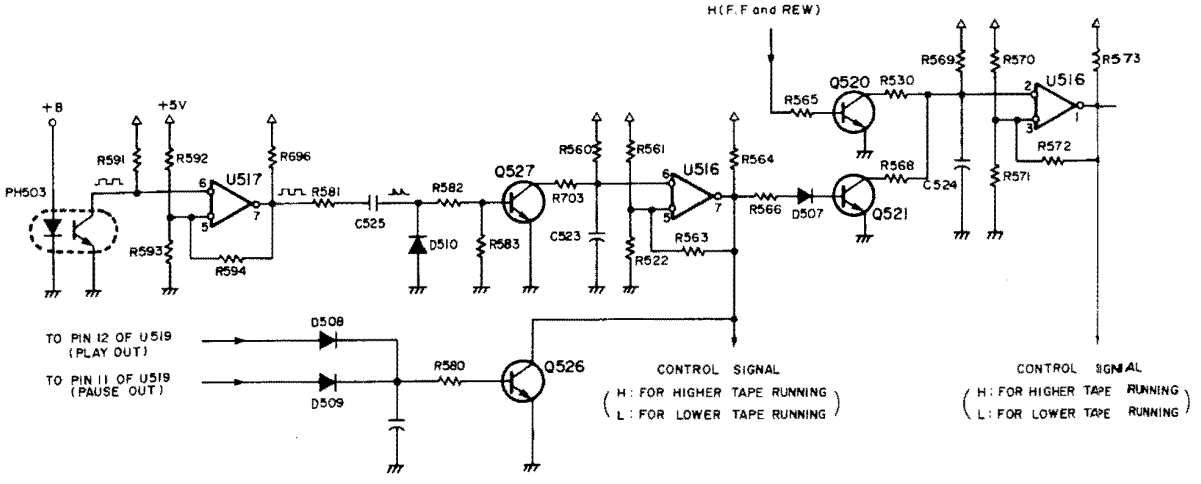


Fig. 1-8. Motion Sensing Circuit

1-9. F.F. AND REW OPERATION

See Fig. 1-9

1. As previously mentioned, both pin 3 and pin 6 of U514 develops an H level voltage during the F.F. and REW operations.
2. Q547 goes off during F.F. and REW operations, and Q548, Q549 go on supplying 20 V line voltage to the hot sides of both reel motors.
3. When the F.F. button is pushed, the H level voltage developed through pin 3 of U514 is applied to the base of Q543, turning it on, which in turn, makes Q544 go on. When Q544 goes on, 5 V is applied to the base of Q556 and Q557 through route 1 to enable the energizing of the right reel motor through its own drive circuit (Q556 and Q557).
4. At the same time, the base of Q560 and Q561 are also biased through route 2 to enable the energizing of the left reel motor through its drive circuit (Q560 and Q561).
5. As shown in the schematic diagram, the overall resistance of bias route 1 is lower than that of route 2, signifying that the right reel motor drive circuit is able to supply more current to the right motor. Consequently, the right reel motor rotates with higher torque than that of the left reel motor. The left reel motor is only driven to develop proper back tension torque.
6. When the REW button is pushed, the H level voltage is applied to the base of Q545 turning it on, followed by Q546. Then the manner which the bias current is applied above in the F.F. operation is reversed. The bias current is now applied to the base of Q556 through R659, R658, R656 and D522 while at the same time is fed to the base of Q560 through R657 and D523. This being the case, the left reel motor now rotates with higher torque than that of the right reel motor in this case.

1-10. ELECTRICAL BRAKE SYSTEM

See Fig. 1-9

The electrical braking system functions when a fast operation mode is changed to any other mode and continues to function until the tape speed drops to a predetermined speed and the motion sensing circuit develops an L level signal. The case in which the mode is changed from REW to STOP is described below.

1. When the STOP button is depressed in the REW mode of operation, pin 13 of U519 goes LOW, then pin 12 of U513 goes LOW to make pins 11, 5 and 10 of U513 and pin 4 of U514 go HIGH. When pin 4 of U514 goes HIGH, pin 6 of U514 goes LOW and Q545 and Q546 are turned off.
2. While the logic state at pin 6 of U513 is set to HIGH by the H level output from the motion sensing circuit during REW mode of operation, pin 8 of U513 (and thus, pin 2 of U514) goes LOW when the STOP button is depressed. Then pin 3 of U514 goes H.
3. Thus, the mode of operation is temporarily changed from REW to F.F and electrical braking is applied to the reel motors to reduce tape speed rapidly.
4. When tape speed has been considerably reduced by applying the electrical brake to the reel motors, the motion sensing circuit outputs an L level signal to the reset terminal (pin 1 of U513) and the flip-flop output (pin 6 of U513) goes L; then, pin 8 of U513 goes H and pin 3 of U514 goes L. Thus, both pins 3 and 6 of U514 are set to L (pin 6 of U514 is set to L when the REW mode is changed to the F.F mode).
5. When pin 3 of U514 goes L, Q541 base bias is cut, and Q541 and Q542 go off to disconnect the ground side of the brake solenoid and apply mechanical braking to the reel motors.

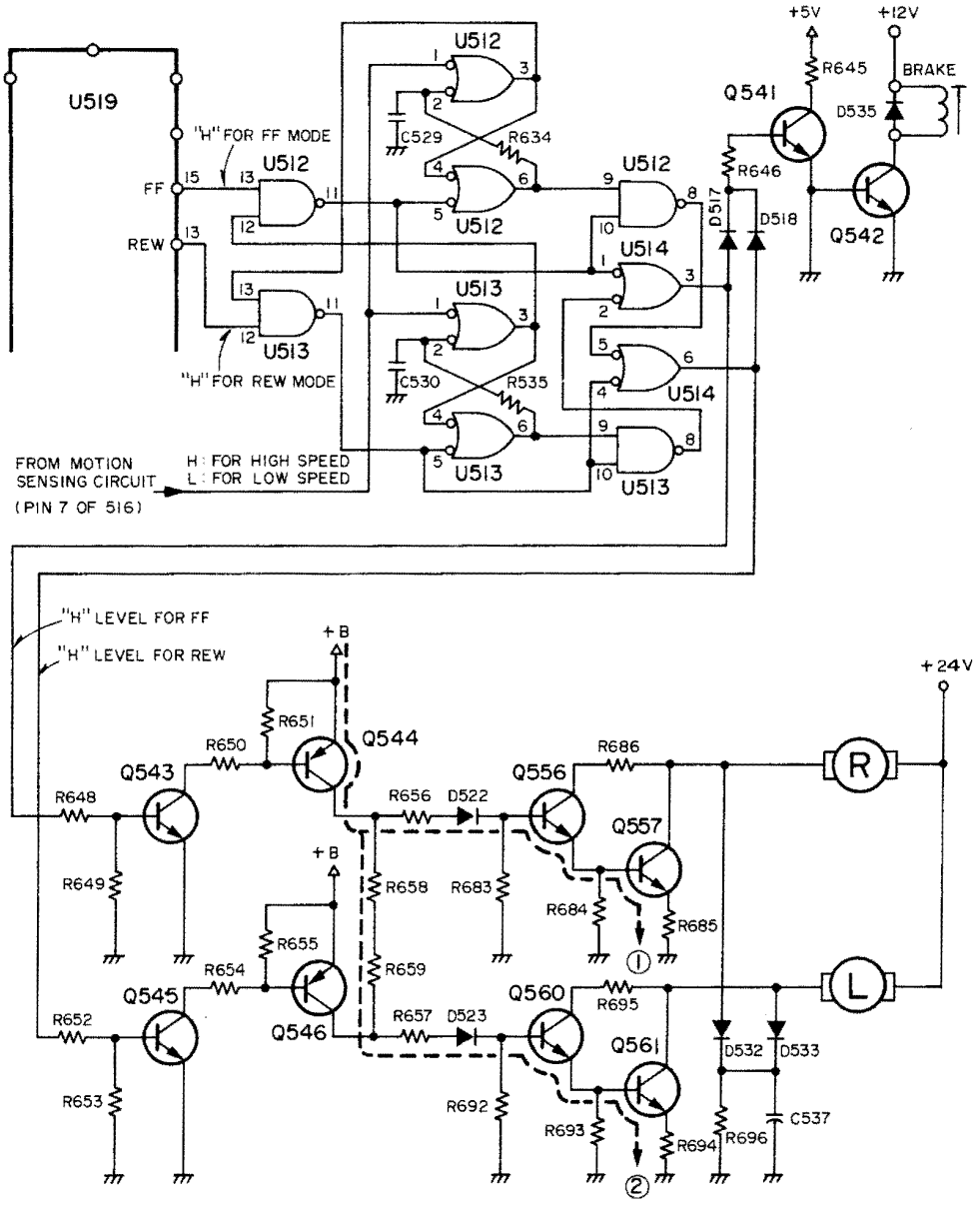


Fig. 1-9. FF and REW Mode Operation Control Circuits

1-11. COUNTER ZERO RETURN

See Fig. 1-10.

If ZERO RETURN switch S609 is set to ON, the tape stops automatically when the electronic counter reading reaches zero during the REW mode of operation. The electronic counter is designed to produce one H level pulse when its reading reaches zero. The zero return operation functions as follows:

1. When the REW mode is set, an H level voltage is applied to the base of Q509 to turn it on. Thus, pin 11 of U510, pin 10 of U510, and pin 12 of U506 are set to H. While the tape is running at high speed, the motion sensing circuit also outputs an H level signal, which is applied to pin 5 of U507 and pin 5 of U509. While in the REW mode, the electronic counter is decremented and, when it reaches zero, it generates one H level pulse. This pulse is applied to the base of Q507 to turn it on, which in turn makes pin 6 of U506 HIGH; this HIGH pulse is applied to pin 13 of U506. Since pin 12 of U506 has already been set to H, pin 11 of U506 goes L, then pin 8 of U506 goes H to turn on Q510. As Q510 collector is connected in parallel to the F.F button, the tape deck operation mode is changed from REW to F.F mode electronically.
2. When pin 11 of U506 goes L, the flip-flop is set, pin 3 of U507 goes H, pin 6 of U507 goes L, then pin 8 of U507 goes H and pin 12 of U507 is set to H.
3. When tape deck operation mode changes from REW to F.F, the electro-magnetic braking system starts to function but the tape does not stop immediately because of high rotational inertia and the tape counter continues to be decremented. When the inertia decreases the tape stops, then starts to run in the forward direction (the F.F mode is set at this time).
4. When the F.F mode is set, an H level signal is applied to the base of Q508 to turn it on, then pin 3 of U508 (pin 12 of U508) goes H. Now the tape counter is being incremented and, when the reading reaches zero, the counter outputs one H level pulse. This pulse is applied to pin 13 of U508 to make pin 11 of U508 go L. Pin 8 of U508 then goes H to set pin 13 of U507 to H. As pin 12 of U507 has already been set to H, pin 11 of U507 goes L and pin 6 of U508 goes H, turning Q511 on or changing the tape deck operation mode from F.F to REW.
5. On the other hand, when pin 11 of U507 goes L the flip-flop consisting of two U509 units is set and pin 3 of U509 is set to H and pin 6 of the same is set to L.
6. When the REW mode is set, pin 11 of U510 goes H again and pin 10 of U510 is set to H. Now the counter is being decremented and, when it reaches zero, one pulse is generated and applied to pin 9 of U510. Pin 8 of U510 then goes L, pin 3 of U510 goes H, and pin 8 of U509 goes L.
7. Meanwhile, when pin 3 of U511 is set to L (as started below), pin 6 of U510 goes H to turn on Q512, which in turn closes the STOP mode switch. Thus, the tape is stopped at a gradually decreasing speed when the counter reaches zero.
8. However, when the position in which the tape is to be stopped is within 3 or 4 seconds of that at which the REW mode is set, the tape can be directly stopped without repeating the REW/F.F./REW/STOP operation described above. This operation is conducted as follows: When the rewind mode is set, an H level signal is applied to C542 and a differentiated impulse is applied to the base of Q561 to turn it on, decreasing voltage at pin 2 of U515 and setting pin 1 of U515 to H for 3 ~ 4 seconds. When the tape counter reaches zero within this period, its zero pulse is applied to pin 2 of U511, setting pin 3 of U511 to L, causing pin 6 of U510 to go HIGH and to turn Q512 on. Thus, the REW mode is changed directly to the STOP mode if the counter zero pulse is generated within 3 ~ 4 seconds after the REW mode is set.

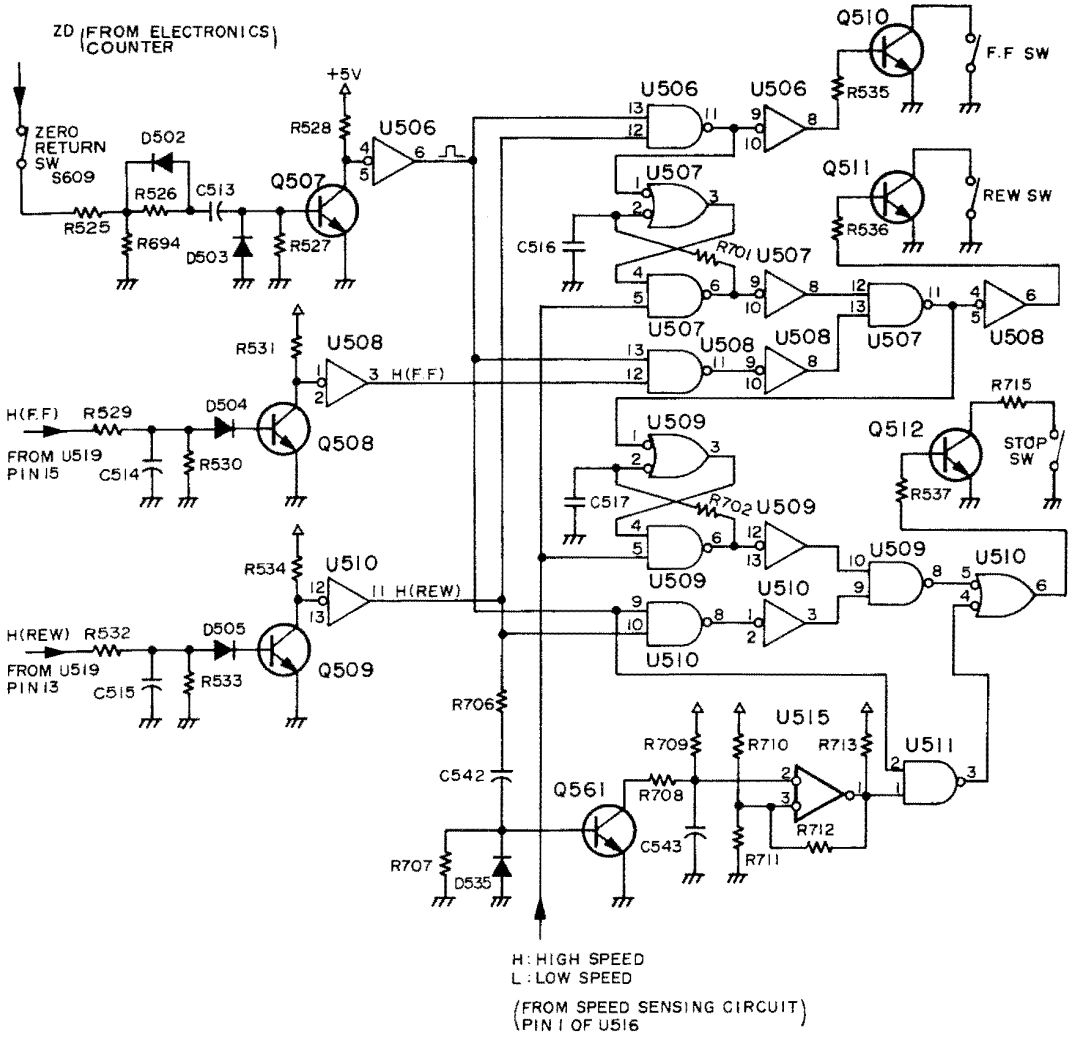


Fig. 1-10. Counter Zero Return Control Circuit

1-12. PUNCH IN/OUT CONTROL CIRCUIT

See Fig. 1-11

1. The PUNCH IN/OUT switching pulse circuit consists of Q901, Q902, U506 and a momentary switch. When the punch in/out switch is pushed once, Q901 goes off, Q902 goes on and U506 generates an H level pulse.
2. In the PLAY mode, pin 1/2 of U502 is L and pin 12 of U502 is H, so pin 2 of the U505 flip-flop is H. Under this condition, a H level pulse is applied to pin 3 of U505 if the punch in/out switch is pushed, then the flip-flop output (pin 5) changes from L to H, pin 6 of U502 goes L because pin 5 of U502 is set to H through pin 12 of U519, and pin 8 of U502 goes H so that Q505 goes on. Since the Q505 collector is connected to both the PLAY and REC mode switches, the operation mode is changed from PLAY to REC/PLAY.
3. At the same time, another flip-flop in U503 changes its logic state and outputs L at pin 6 of U503 . Then, pin 8 of U503 goes H and sets pin 13 of U503 to H. Further, pin 1/2 of U502 goes H, changing the logic state at pin 2 of U505 from H to L.
4. When the PUNCH IN/OUT switch is pushed once more, a positive pulse is applied to pin 3 of U505 which changes output from H to L because of pin 2 of U505 is at this time set to L. Then pin 1/2 of U504 goes L and pin 3 of U504 (and pin 12 of U503) goes H. Since pin 13 of U503 has already been set to H, pin 11 of U503 goes L and pin 6 of U504 goes H. Thus, the H level pulse obtained is finally applied to the base of Q506, turning it on and operating the AR circuit of U519 to inhibit recording.
5. Three diodes (D537-D539) connected to the CLEAR terminal of U505 are inserted to avoid erroneous PUNCH IN operation which would be caused during operation mode switching (F.F, REW & STOP).

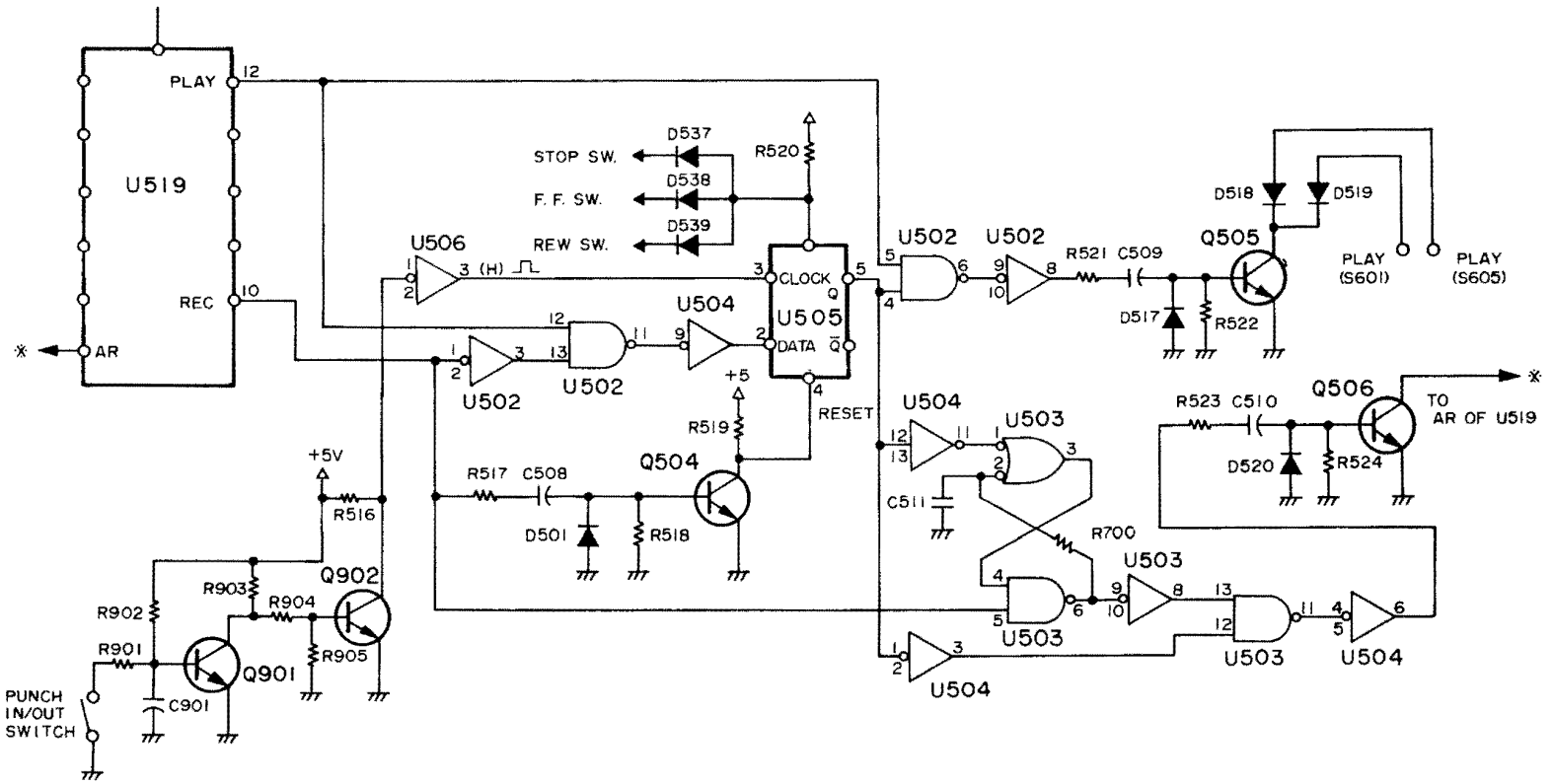


Fig. 1-11. Punch In/Out Control Circuit

1-13. EDIT CONTROL CIRCUIT

See control section of the inserted circuit diagrams.

1. When the EDIT switch is on, Q509 and Q510 go on, followed by Q512. With Q512 turned on, the Q813 base bias circuit on PCB assembly power supply is closed and Q813 supplies DC power to the capstan motor circuit to actuate the motor. At the same time, Q511 also goes on to turn off Q514 to release the STOP mode.
2. At the same time, when Q509 goes on, Q556, and Q558 are grounded through D528, D527, D529 and through the collector-emitter path of Q509, to stop the take-up reel motor.
3. During the EDIT mode of operation, no F.F or REW mode is available because the F.F IN and REW IN circuits are opened by the EDIT switch being set on.

1-14. REC AND PLAY MUTE SIGNALS

See Fig. 1-12.

1. REC signal
   When the REC button is depressed, pin 10 of U519 outputs an H level signal, which is applied to the base of Q524 to turn it on. When Q524 goes on, Q525 base current flows and Q525 also goes on. The +24 V line is then connected to R579 for use as a control voltage to actuate amplifier circuits associated with recording.
2. Play Mute Signal
   When the PLAY button is depressed, pin 12 of U519 outputs an H level signal, which is applied to the base of Q534 to turn it on, grounding the PLAY MUTE terminal. This low level state is also used to control the amplifier circuit (as described later). The CUE switch connected in parallel with Q534 serves the same function as the PLAY MUTE signal when it is closed.

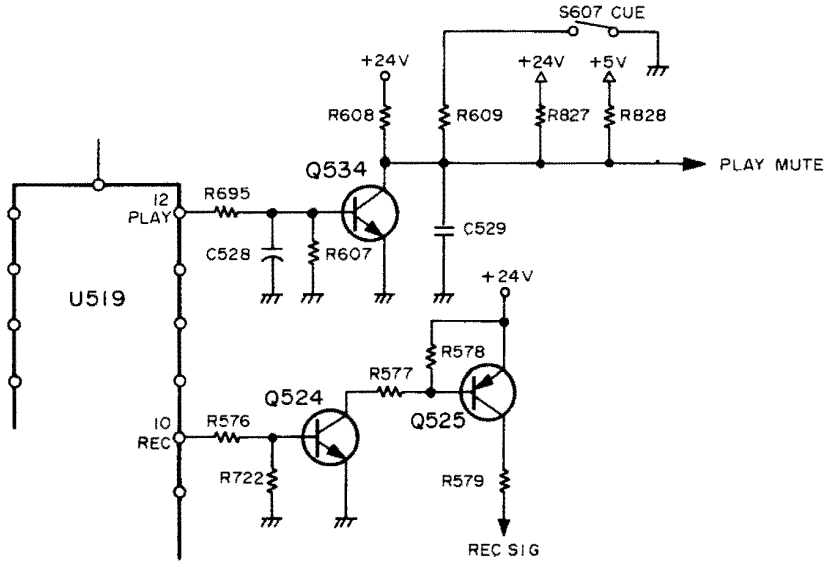


Fig. 1-12. Rec & Play Mute Circuit

1-15. DISPLAY CIRCUIT

See Fig. 1-13.

A. RECORD LED

1. The comparator of U515 with pins 5, 6, and 7 constitutes a square wave oscillator and outputs a pulse signal at pin 7. When the REC button is depressed, pin 9 of U511 is set to H and the pulse output is obtained at pin 8 of U511. The pulse signal is then fed to gate pin 5 of Q501. Meanwhile, as the REC button is on, pin 1 of U501 is set to H.
2. If one or more of the record function switches are switched on, a L level signal is applied to R511 as the REC MODE signal, causing pin 11 of U511 (pin 2 of U501) to go H. Then, pin 3 of U501 (pin 4 of U501) goes L, setting pin 6 of U501 to H and turning Q501 on. Thus, the REC LED (D601) lights.
3. Next, assume that none of the record function switches are on; an H level signal is then applied to pins 12/13 of U511 through R511 so that pin 11 of U511 (pin 2 of 501) goes L. Since pin 1 of U501 is set to H, pin 3 of U501 (pin 4 of U501) goes H and the output gate (pin 6 of U501) opens. Then, the pulse signal applied to pin 5 of U501 is output from pin 6 of U501, turning Q501 on and off and making the REC LED flash to indicate that the tape deck is in the REC mode but that no recording channel is designated.

B. PAUSE LED

When the REC and the PAUSE buttons are on, pins 12 and 13 of U501 are set to H and an L level signal is output at pin 11 of U501. Then, pin 8 of U501 goes H, turning on Q502 and lighting PAUSE LED D602.

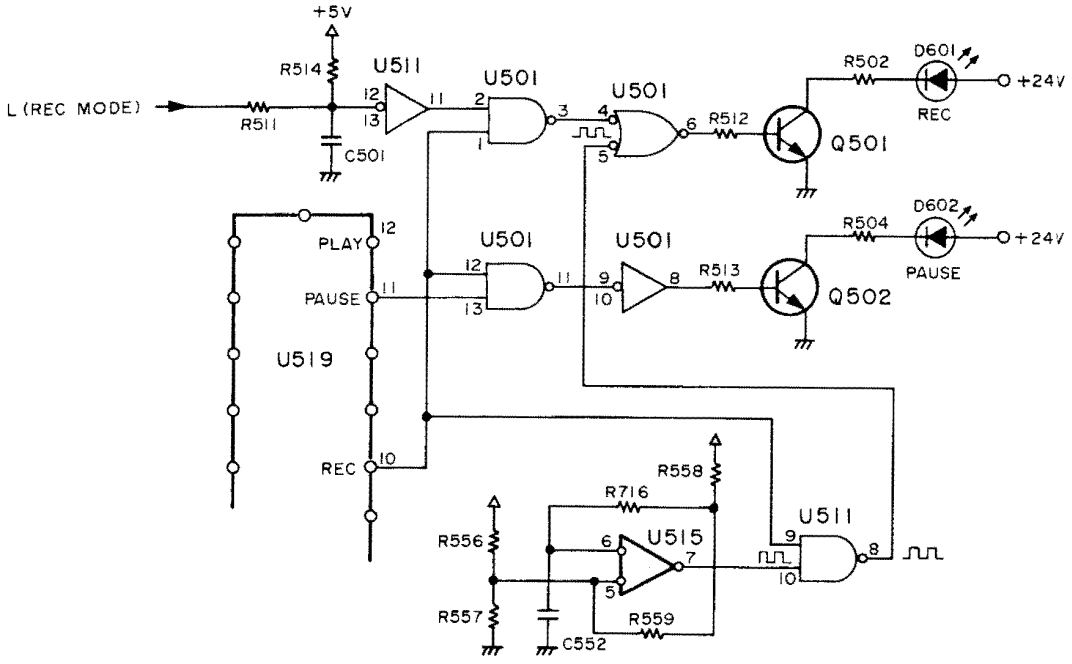


Fig. 1-13. Display Circuit

1-16. AMPLIFIER CIRCUIT DESCRIPTION

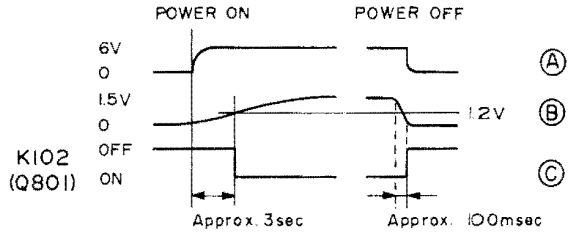
This description covers only one channel, with the exception of several switching circuits which are assembled on the FUNCTION PCB, MASTER OSC PCB, IN/OUT SELECT PCB, and LED indicators.

1-16-1. Power Muting Circuit

See Fig. 1-14.

K102 is a muting relay which protects the output line from impulse noise occurring when the power switch is turned on or off. When power supply starts, +6 V (VU meter lamp power) rises rapidly, charging C802 through R801. When the voltage across C802 reaches about 1.2 V, Q801 goes on and K102 operates to connect the OUTPUT terminal to the output circuit of the OUTPUT amplifier. It takes about 3 seconds for K102 to go on after power supply starts. The power lines of the deck's amplifier reach a steady state during this time. Thus, the audio output line is protected from transient noise.

When power is turned off, the +6 V applied to the VU meter lamp falls rapidly, and C802 quickly discharges through D805 and the meter lamp; Q801 and K102 go off immediately before the amplifier power line voltage falls. Thus, the output line is also protected from transient noise.



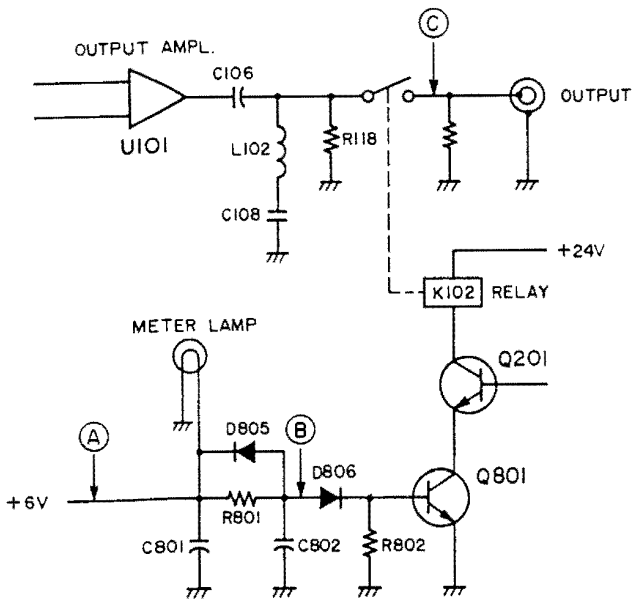


Fig. 1-14. Power Muting Circuit

1-16-2. Bias and Record Control Circuit

See Figs. 1-15(A) and 1-15(B).

1. As previously described, when the unit is in REC mode, REC SIG (+24 V) is produced at Q525 collector. This signal is applied to the FUNCTION switches. If any one (or more) of the switches (for example F) is set to ON or into the record mode: (1) the common terminal of Fa is connected to a +24 V line and voltage is supplied to D109, D117 and D115. Thus, Q108, Q109 and Q120 go on, and Q118, Q119 also go on. (2) The Fb common terminal is grounded, causing REC LED indicator to light continuously as described in section 1-15 "Display Circuit".

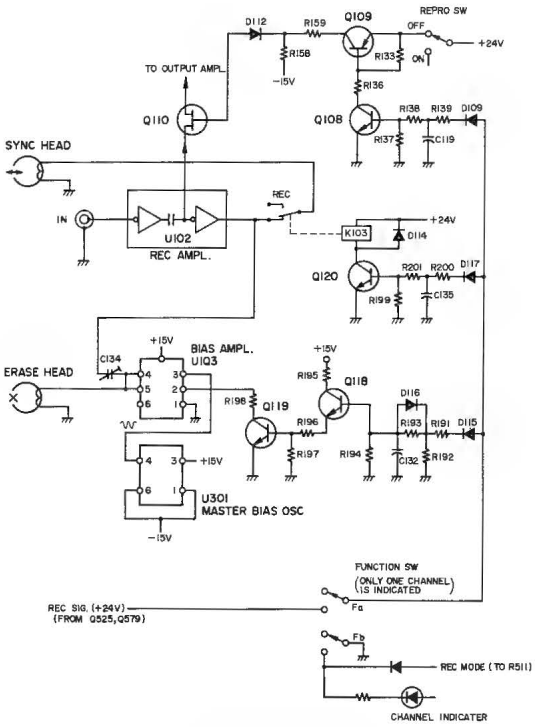


Fig. 1-15(A). Bias and Record Control Circuit

2 When Q109 is turned on, FET switching transistor Q110 is on and part of the recording signal is applied to the OUTPUT amplifier, allowing recording to be monitored. When Q120 goes on, REC relay K103 is energized, the record head is switched to the record amplifier, and the cold side of the erase head is grounded. Thus recording is made. On the other hand, when Q119 goes on, bias oscillator amplifier unit U103 starts to amplify the bias signal supplied from master bias oscillator U301 and the amplified output is supplied to both the record and erase heads.

3. The on and off switching timings for all above circuits (the bias switching circuit comprising Q118 & Q119, the REC relay switching circuits comprising Q120, and the OUTPUT (SYNC – INPUT) switching circuits comprising Q108 & Q109) are suitably fixed so that transient noise has no undesirable influence on recorded sound quality. The switching timings (delay time periods) of the circuits depend on the values of C132, C135 and C119, respectively. For details on the relationship between these, refer to Fig. 1-15(B).

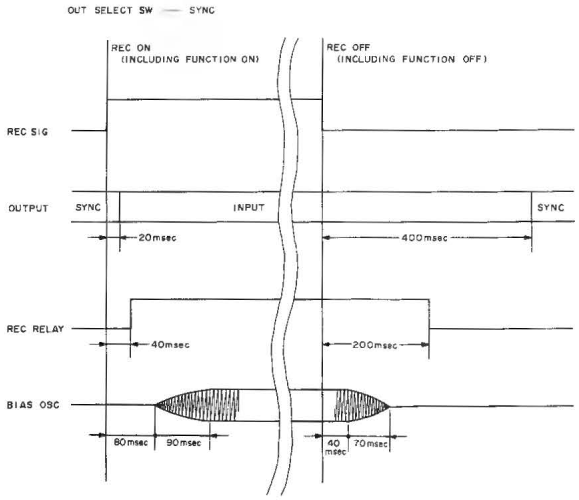


Fig. 1-15 (B). Record Circuit Switching Timing Diagram

1-16-3 Reproduce Amplifier Circuit

See Fig. 1-17 (A) and (B).

1. The reproduce amplifier consists of an 18 dB Step-up Transformer, a Reproduce EQ Amplifier, a Meter Amplifier and FET switching transistors which controls the function of the reproduce amplifier depending on the mode of operation and the tape speed selected.
2. Let's assume that the SPEED selector has been set to HIGH (15 ips – 38 cm/sec.) and that the play button is on.
3. When OUTPUT SELECT is set to INPUT, +24 V is applied to the base of Q201 through R358 and D356 to turn it on. The +24 V is applied to energize the POWER MUTE RELAY, K102. (This part of the circuit is not shown in Fig. 1-16(A)). The relay connects the amplifier output (pin 1) of U101(2/2) to the LINE OUT jack. When OUTPUT SELECT is set to REPRO or SYNC, Q201 and K102 go on in the same way.
4. At the same time, +24 V is also applied to the cathode side of D112 from a1 through D118, R204 and R159 to set the gate potential of Q110 to zero, turning it on. The input audio signals (previously selected through the INPUT switch) coming from the LINE IN jack are fed from the INPUT VR through pin 7 of U102(1/2) to R202, R156 and then sent to the OUTPUT VR to be amplified to pin 1 of U101 for routing to LINE OUT.
5. Meanwhile, the signals selected through the INPUT select switch are supplied to the motor circuits from pin 7 of U102(1/2) through R140 and a2 of the INPUT select switch.
6. Now, assume that the SPEED selector has been set to HIGH and that OUTPUT SELECT is set to REPRO.
7. When OUTPUT SELECT is set to REPRO, +24 V is supplied through c1 of REPRO to the cathode side of D102 to set the gate potential of Q101 to zero, turning it on. Switching Q101 on allows the reproduced frequency response to be modified to precisely match the tape speed and the reproduce head which is to be used. During the low speed (7-1/2 ips – 19 cm/sec.), this modifying is done by Q102 being turned on.
8. Meanwhile, when OUTPUT SELECT has been set to REPRO, Q105 is turned on to connect the EQ amplifier output signals to the input terminal (pin 3) of U101(2/2) through the OUTPUT VR for final routing to the LINE OUT jack.
9. Then, because the play mode operation has been selected, the muting inhibit-signal (ca. -6.5 V) is applied to the gate of Q107 from pin 8 of the power supply unit PC board, which in turn, cuts off Q107. By Q107 being cut off, muting is inhibited and the audio signals are transmitted to the next stage.
10. When OUTPUT SELECT has been set to SYNC, Q204 is turned on and the SYNC RELAY K101 is energized. (This part of the circuit is not shown in Fig. 1-16(A)). When this relay is activated, the input pin of the primary side of the step-up transformer (T101), is disconnected from the reproduce head and is connected to one of the terminals of the REC relay circuit on the K103 side. Under this condition, the SYNC head will be connected through K103 to the input terminal of the primary side of T101 and the audio signals which are picked up by the SYNC head are reproduced through the reproduce amplifier if the REC mode is not selected. However, if the REC mode is selected, the SYNC head will be connected through K103 to the record amplifier output circuit as described in "1-16-2 Bias and Record Control Circuit".
11. When the SPEED selector has been set to HIGH and OUTPUT SELECT is set to SYNC, +24 V is applied to the cathode side of D104 through b1 of the SYNC switch which sets the gate potential of Q103 to zero, turning it on. This allows the reproduced frequency response to be modified to precisely match the tape speed and the reproduce head used. When the low speed is selected, Q104 is turned on to obtain this modifying and matching result in the same way.
12. When OUTPUT SELECT has been set to SYNC, Q106 is turned on and the reproduce EQ amplifier output signals are fed to pin 3 of U101(2/2) through OUTPUT VR to be finally outputed through LINE OUT.
13. In the SYNC mode of operation, one channel may be operated in the PLAY mode while the other channel is in the REC mode of operation. In this situation, the recording bias signal may flow into the adjacent channel

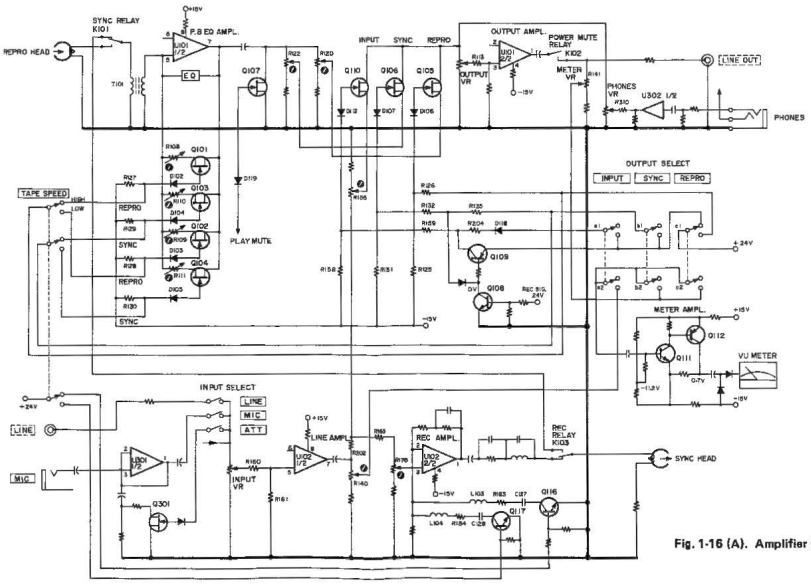


Fig. 1-16 (A). Amplifier Circuit Diagram

head which is operating as reproduce head and cause degrading of the sound quality (SN). To prevent this, three bias traps consisting of a choke coil and two capacitors (L101, C136, C101, etc.)

14. The on and off timings of the SYNC relay are so adjusted as to prevent switching noise during circuit muting as shown in Fig. 1-16(B). The SYNC relay on and off timing depends on R363, C354, and by C354, R361 respectively, of the SYNC relay drive circuits including Q202. (This part of the circuit is now shown in Fig. 1-16(A)).

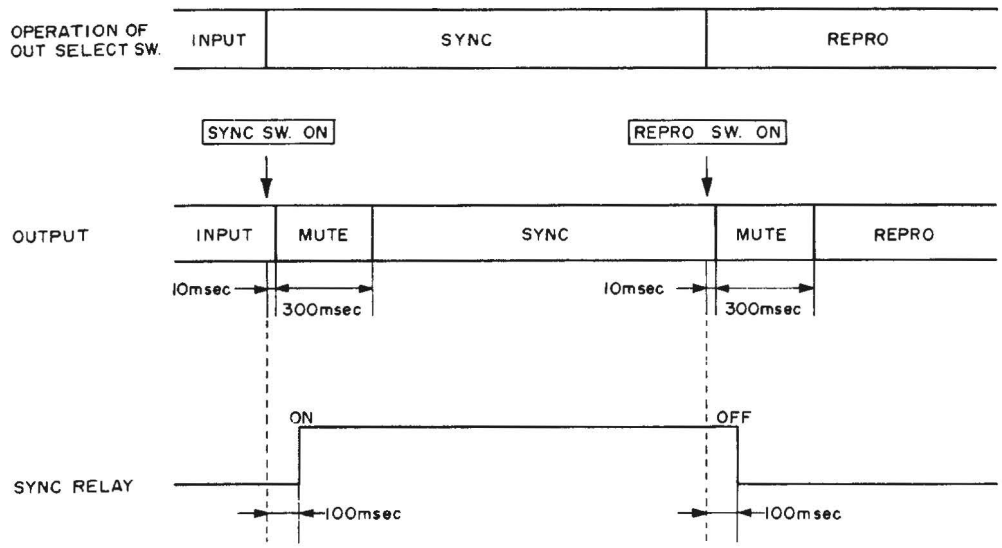


Fig. 1-16 (B). SYNC Relay Operation Timing Chart

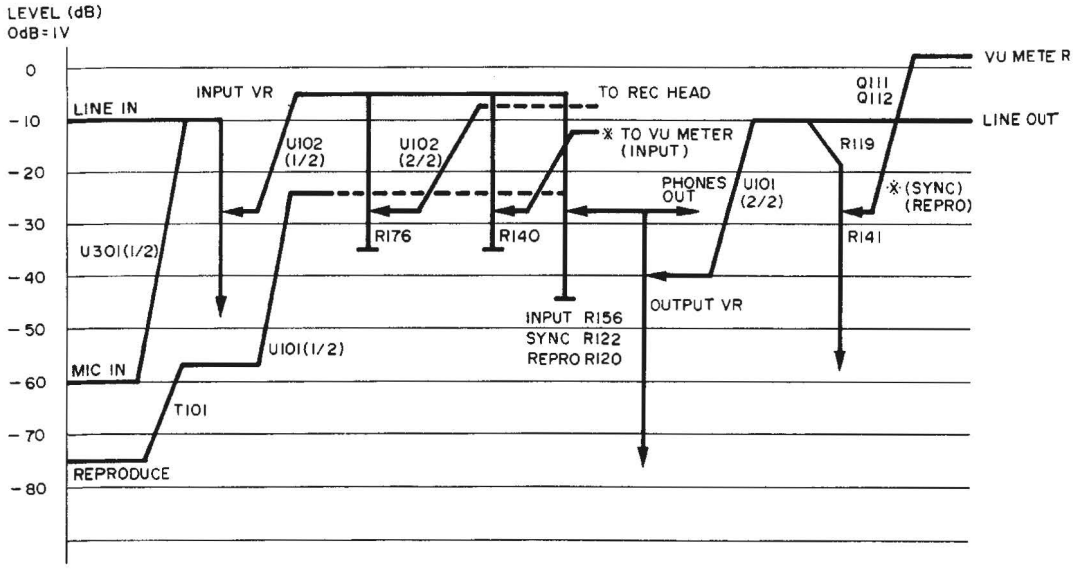


Fig. 1-17. Level Diagram

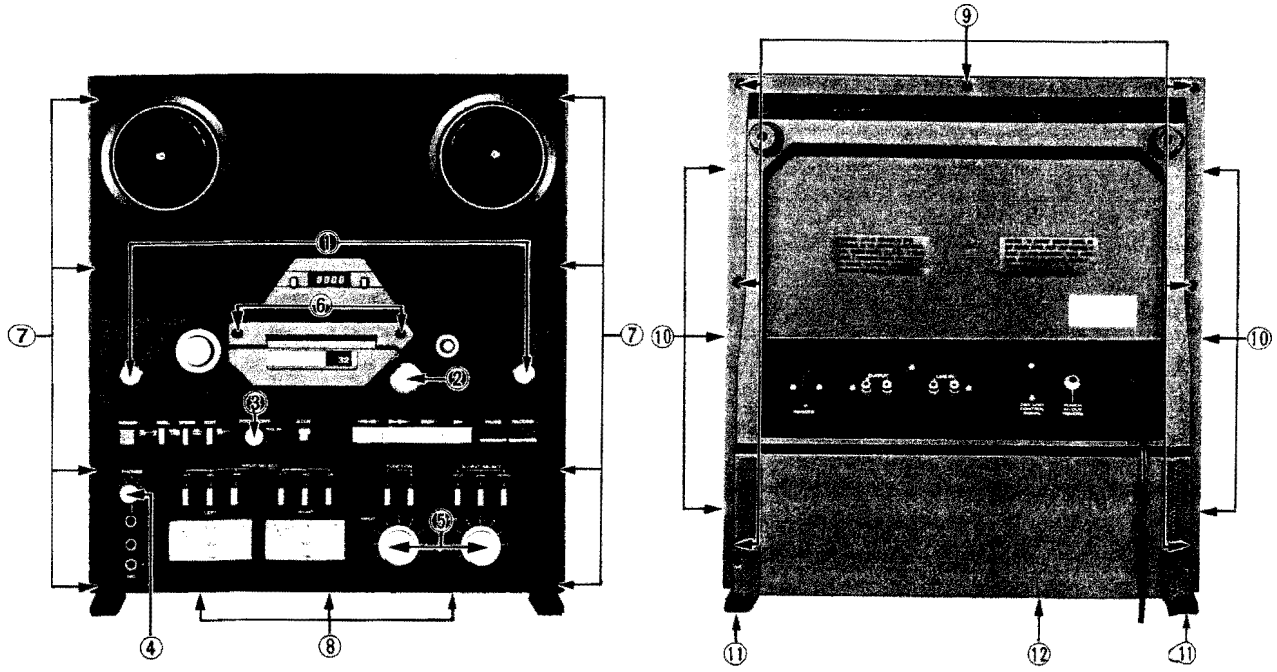
2. CHECKS AND ADJUSTMENTS

2-1. ESSENTIAL TEST EQUIPMENT REQUIRED

Wow & Flutter Meter	Meguro Denpa Sokki K.K., Model MK-668C (JAPAN), or Mincom Division, 3M Co., Model 8155 (U.S.A)
Audio Oscillator	Hewlett Packard, Model 204C or equivalent
Digital Frequency Counter	Range: 10 Hz ~ 100 kHz; sensitivity; 0.1 Vrms; imp.: > 1 MΩ, < 25 pF
Band-Pass-Filter	1 kHz narrow band pass type
AF Level Meter	Range; -80 dB ~+40 dB; imp.: > 1 MΩ, < 25 pF (example—HP 400GL)
Distortion Meter	General purpose (400 Hz, 1 kHz)
Oscilloscope	General purpose
Attenuator	General purpose
Tools	Spring scale: 0 ~8 lbs (0 ~ 4 kg) 0 ~2.2 lbs (0 ~ 1 kg) Hex head Allen wrenches, Plastic alignment tool
Cleaning fluid:	TEAC TZ-261 or equivalent TEAC Spindle Oil TZ-255 or equivalent
Head Demagnetizer	TEAC E-3 or equivalent
Test Tapes	Tape Speed/Wow-Flutter Test Tape TEAC YTT-2004 (for tape speed 15 ips) TEAC YTT-2003 (for tape speed 7-1/2 ips) Reproduce Alignment Test Tape TEAC YTT-1004 (for tape speed 15 ips, NAB Equalization 3180 + 50 μsec) TEAC YTT-1003 (for tape speed 7-1/2 ips, NAB Equalization 3180 +50 μsec) TEAC YTT-1044 (for tape speed 15 ips, IEC Equalization ∞ + 35 μsec) TEAC YTT-10432 (for tape speed 7-1/2 ips, IEC Equalization ∞ + 70 μsec) Reference fluxivity is 185 nWb/m; reference output level is 3 dB lower compared with 250 nWb/m fluxivity. Calibration level under "Reproduce Calibration" refers 0 VU as 250 nWb/m. Blank Test Tape (Recording) TEAC YTT-8063

2-2. REMOVING THE PANELS OF THE DECK

1. Dress Panels
   1) Remove the left and right tension arm tape guides ① by turning the tape guide caps counterclockwise.
   2) Turn the pinch roller cap ② counterclockwise to remove the pinch roller.
   3) Remove the pitch control knob ③ with a 1.5 mm hex-head wrench and loosen to remove the nut directly behind it.
   4) Remove the headphone knob ④, INPUT and OUTPUT knobs ⑤ with a 1.5 mm hex-head wrench.
      Note: Pull out the inner knobs (left channel) of the INPUT and OUTPUT controls.
   5) Remove the housing by loosening the two hex screws ⑥ with a 3 mm hex-head wrench.
   6) Remove the eight hex screws ⑦ from both sides with a 2.5 mm hex-head wrench, and then remove the three screws ⑧ holding the dress panel. Remove the dress panel by pulling out in the direction of the bottom cover. To completely remove, disconnect the connector coupling the transport control assembly to the main assembly.
2. Rear Panel
   Remove the seven ⑨ holding screws from the rear panel.
3. Bonnet Panel
   1) After removing the rear panel, go on to removing the bonnet panel.
   2) Remove the six screws ⑩ (both sides) holding the bonnet panel.
4. Bottom Panel
   1) Remove the eight screws ⑪ from the feet attached to the bottom panel.
   2) Remove the screw ⑫ holding the bottom panel.



2-3. CAPSTAN THRUST CLEARANCE

1. There must be a clearance of 0.05 to 0.15 mm between the capstan shaft and the thrust plate. Check to see that the clearance is within this range. If not, loosen the two screws on the flywheel, adjust the clearance, and retighten the screws.

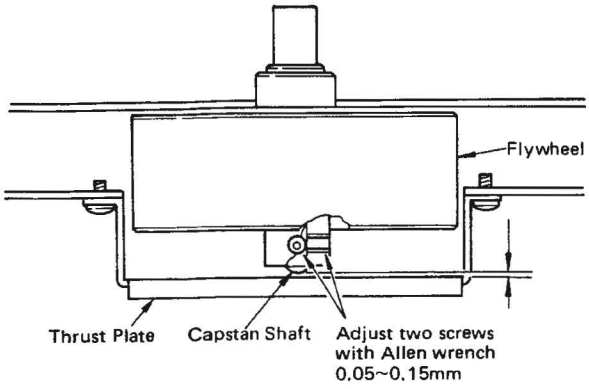


Fig. 2-1.

2-4. BRAKE MECHANISM

Note: Be sure that the power is turned off prior to making any adjustments to the brakes.

1. Screw (A) for the left brake (as viewed from the front) must be adjusted so that there is a clearance (a) of 1 mm between lever (C) and lever (E). Screw (A) for the right brake must then be adjusted so that lever (B) is parallel to lever (C). See Fig. 2-2.
2. When there is contact at (a), position the solenoid housing so that the gap at (f) (the distance between the plunger and solenoid washer) is 3 mm.

2-5. BRAKE TORQUE

Note: Before making any brake adjustments or measurements, make sure the power is off.

1. Mount an empty 7" reel onto either reel table and attach a spring scale to the reel with a string. See Fig. 2-3.
2. Smoothly pull the scale away from the reel under test and note the torque value when the reading on the scale is steady. The proper torque values are given in the chart below.

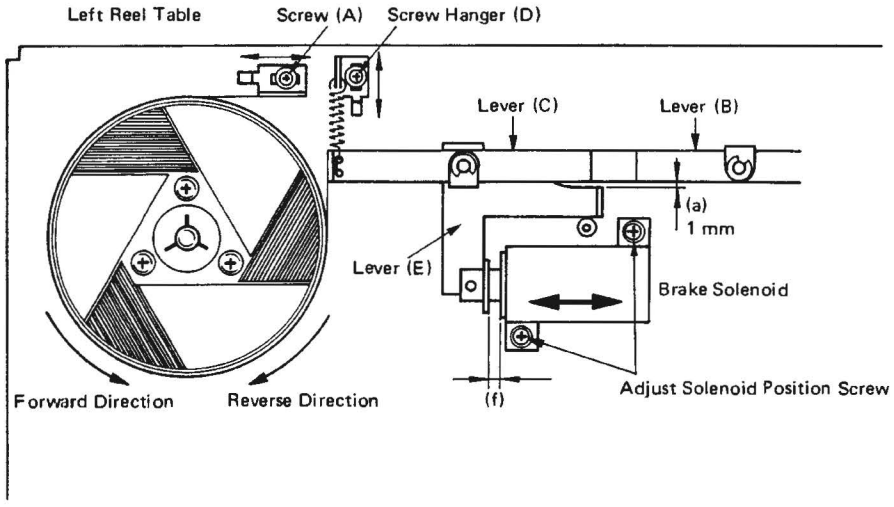


Fig. 2-2.

3. Follow steps 1 and 2 for each measuring condition; i.e., (A) through (D) in Fig. 2-3.
4. If the forward-direction torque is not correct, change the hooking position of the spring hanger (reference (D) in Fig. 2-2) for the corresponding brake requiring adjustment. If, after the forward-direction torque has been properly adjusted, the reverse-direction torque is not correct, or the forward-direction torque is still not correct, replace the brake felt pad with a new one after cleaning the inner-side of the brake belt with an alcohol cleaning solution, and also check that the brake mechanism is properly aligned as explained in Section 2-4, "Brake Mechanism". If necessary, replace the entire reel table.

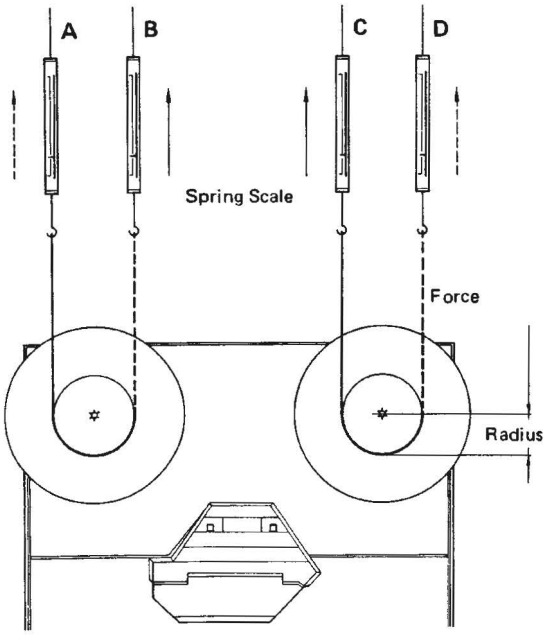


Fig. 2-3.

Forward direction (B) (C)	1700 – 2100 g-cm (23.6 – 29.2 oz-inch)
Reverse direction (A) (D) (Reference values)	650 – 800 g-cm (9.0 – 11.1 oz-inch)
Left/Right deviation	200 g-cm (2.78 oz-inch)

Torque calculating formulas:
1. Torque (in g-cm or oz-inch)
   = Force or Weight (in g or oz) x Radius (in cm or inch)
2. Conversion of g-cm to oz-inch:
   g-cm x 0.0139 = oz-inch

2-6. REEL MOTOR TORQUE

Note: *For torque calculation, refer to the said formulas.
*There is no specially-provided adjustment for take-up torque, so if correction is needed, repair or replace the defective part and/or circuit.

2-6-1 Take-up Torque

1. Hold the right tension arm up with a rubber band.
2. Mount an empty 7" reel onto the take-up (right) reel table, and attach a spring scale to the reel with a string.
3. Place the deck in the reproduce mode.
4. Allow the rotation of the reel to slowly pull the scale toward the reel.
5. Hold the spring scale with enough force to allow steady reading. See Fig. 2-4.
6. The calculated value should be approx:

REEL SW	TAKE-UP TENSION
LARGE	550 to 650 g-cm (7.64 to 9.03 oz-in)
SMALL	300 to 400 g-cm (4.17 to 5.55 oz-in)

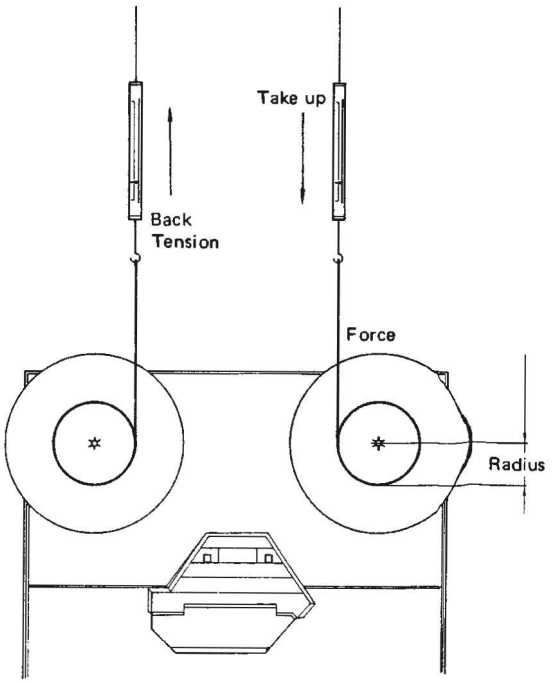


Fig. 2-4.

2-6-2 Back Tension

1. Hold the right tension arm up with a rubber band.
2. Mount an empty 7" reel onto the supply (left) reel table, and attach a spring scale to the reel with a string.
3. Place the deck in the reproduce mode.
4. Using a steady, smooth motion, pull against the motor torque to draw the scale away from the reel.
5. After making sure that the reel motion is smooth (the string should not be rubbing against the reel flanges), note the value indicated on the scale. See Fig. 2-4.
6. The calculated value should be approx:

REEL SW	BACK TENSION
LARGE	350 to 400 g-cm (4.86 to 5.55 oz-in)
SMALL	200 to 250 g-cm (2.78 to 3.47 oz-in)

2-7. PINCH ROLLER PRESSURE

Note: Pinch roller pressure is supplied by the pinch roller spring arm and it is most important that the solenoid plunger be fully bottomed before taking pressure measurement.

1. Hold the right tension arm up with a rubber band, string, etc.
2. Place the deck in the reproduce mode without threading the tape.
3. Attach a spring scale to the pinch roller as shown in Fig. 2-6.
4. Pull the pinch roller away from the capstan shaft (on a plane intersecting the center of the capstan shaft and the pinch roller) until the capstan shaft and the pinch roller are separated.
5. Ease pressure on the scale until the pinch roller just begins to turn. The scale should then be read 1.5 kg to 1.7 kg (3.3 lbs to 3.74 lbs).
6. If necessary, adjust the adjust screws for proper pressure.

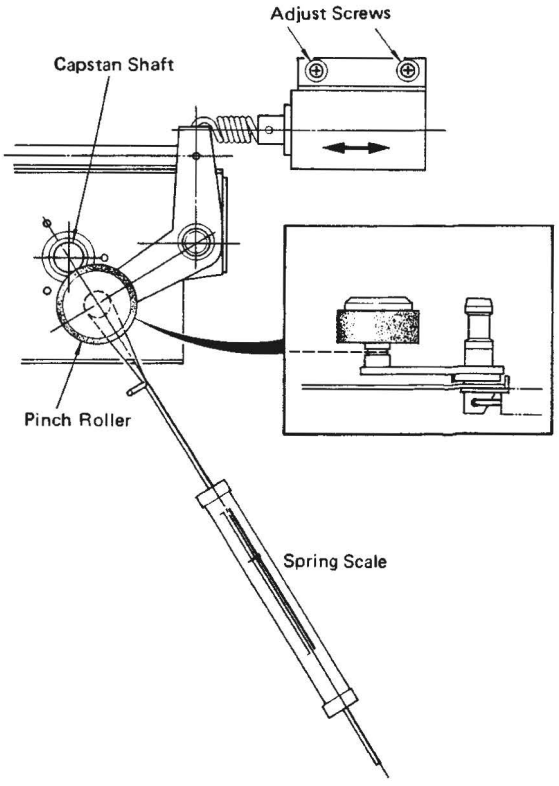


Fig. 2-5.

2-8. REEL TABLE HEIGHT ADJUSTMENT

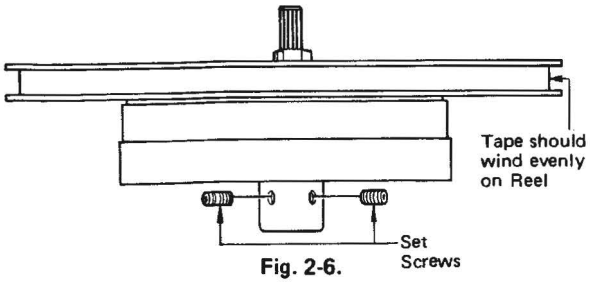


Fig. 2-6.

Reel height adjustment is required only if a motor has been replaced or if tape rubs excessively against the reel flanges.
Adjustment is accomplished by loosening the reel set screws and moving the reel table on the motor shaft as shown in Fig. 2-6.
Remove the bonnet panel on the left or right of the unit for access to the set screws (2) in the reel motor shaft. Reel table should be adjusted using standard NAB 7" reels. With a tape loaded on the machine, position the reel table height for smooth tape travel. Be sure to tighten the set screws after each adjustment is made. Refer to page 78 (section 2-2).

2-9. TAPE SPEED

Tape speed is measured by using flutter test tape, which contain a highly accurate, continuous 3 kHz tone.
Test Tape: TEAC YTT-2004 (for tape speed 15 ips)
TEAC YTT-2003 (for tape speed 7-1/2 ips)

1. Connect a digital frequency counter to either OUTPUT.
2. The indicated frequency should be 3 kHz, ±0.8 % for all speeds.
3. Play the middle of the test tape at high speed 15 ips (38 cm/sec) and adjust the HIGH speed trimmer resistor until the frequency counter indicates a reading of 3000 Hz. Use the LOW speed trimmer resistor for low speed adjustment 7-1/2 ips (19 cm/sec). See Fig. 2-7. (CAUTION: Use an insulated screwdriver to prevent shorting.)
4. Playing the tape at both the beginning and the end, check that the tape speed does not vary any more than the limits prescribed in the specifications, so that there is never a total deviation of more than ±0.8 Hz from the 3000 Hz test tone.
5. If tape speed is greatly offset from the specification, check pinch roller pressure and takeup tension for correct values, and see that the tape path is clean.

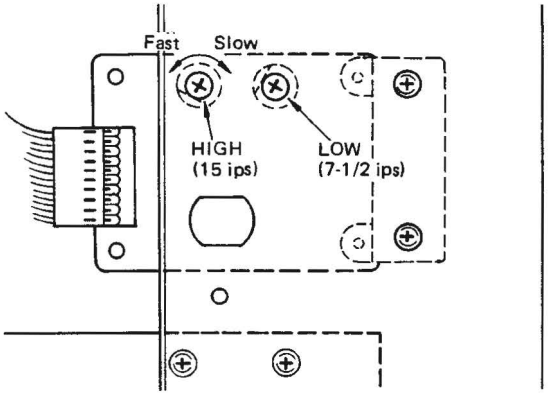


Fig. 2-7.

2-10. WOW AND FLUTTER CHECK (Reproduce Method)

1. Connect a Wow-and-Flutter Meter to the deck as shown in Fig. 2-8.
   These meters will measure the ANSI peak value or the NAB rms value depending on the switch selection on the meter.
2. Playback the appropriate wow-and-flutter test tape.
3. If the peak or rms weighted value is to be read, set the Wow-and-Flutter Meter for the "Weighted" readings and also make sure that the meter is properly calibrated.
4. As the measured results may vary with respect to the location on the tape at which the measurement is taken, at least two locations – at the beginning and near the end of the tape – should be checked. There may also be slight differences in absolute values measured according to the brand of the meter being used.

Values should be as shown:

Tape speed	DIN/IEC/ANSI (peak value)		NAB (rms value)	
	Weighted	Unweighted	Weighted	Unweighted
HIGH	±0.06 %	±0.09 %	0.05 %	0.07 %
LOW	±0.09 %	±0.12 %	0.07 %	0.09 %

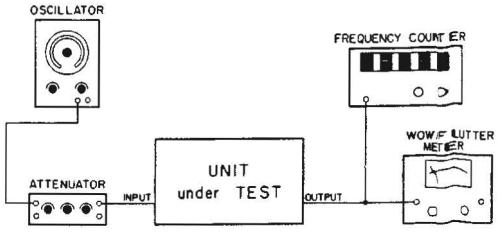


Fig. 2-8.

2-11. RECORD/REPRODUCE AMPLIFIER CHECKS AND ADJUSTMENTS

Preliminary Adjustments

A. Before proceeding with any electrical performance checks or adjustments, make sure the tape transport mechanism has been completely aligned as mentioned in the preceeding section, or at least make sure that the tape path and head contact are aligned correctly by the following methods:

TAPE PATH

1. Advance the tape in the play mode and check to see that the tape is not curled on the edges of the tape guide poles which are located on either side of the head assembly.
2. If curling at the left tape guide is evident, adjust the height of the guide by inserting a shim of appropriate thickness ($\phi 5 \times \phi 8 \times 0.5^t$ or 0.25^t) into "A" of the left tension arm. The same procedures should be followed for the right tension arm height adjustment. See Fig. 2-9.

HEAD CONTACT

1. Load a prerecorded tape with a constant level tone and reproduce at high speed 15 ips (38 cm/sec).
2. While observing the VU meter, temporarily increase back tension to the left reel by lightly applying pressure by hand. If sufficient contact pressure is applied to the head while the tape is running, no change will be noticed on the meter when back tension is increased. However, if in sufficient pressure is applied to the head, the deflection needle will show increased deflection due to contact pressure caused by the back tension. This method will help determine whether head contact is properly adjusted or not. To adjust, loosen the retaining screws (A) for that head (Shown in Fig. 2-12) and change the direction of the head for proper alignment.

Note: The amount of pressure to be applied to the reel is very important; too strong of pressure lowers the speed of the tape, while too light of pressure does not ensure contact. However, by practicing a few times, you will be able to judge approximate pressure to be applied.

HEAD AZIMUTH ADJUSTMENT

1. Connect the OUTPUT jack for channel L of the deck to the vertical input terminals of an oscilloscope.
2. Connect the OUTPUT jack for channel R of the deck to the horizontal input terminals for the oscilloscope.
3. Connect an AF level meter and a 50k ohm load to the OUTPUT jack(s) as shown in Fig. 2-10.

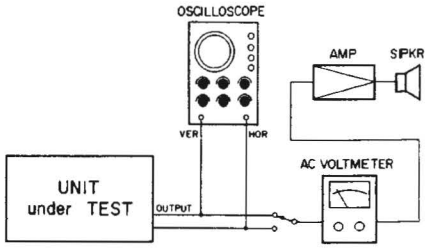


Fig. 2-10. Head Azimuth Test Set-Up

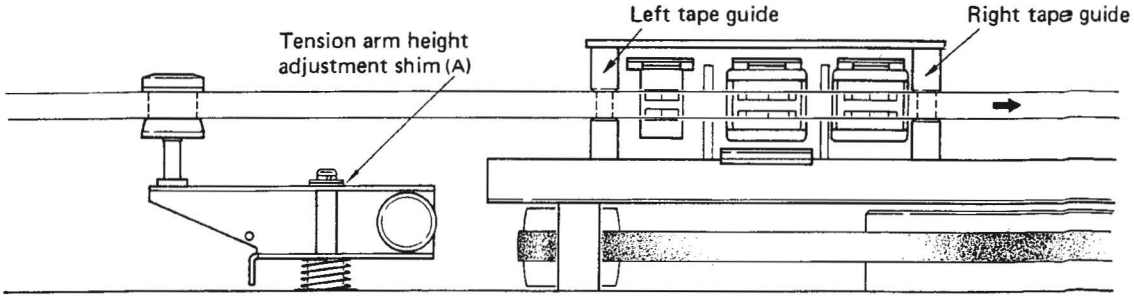


Fig. 2-9. Tape Path Adjustment

4. Switch OUTPUT SELECT to REPRO.
5. Load the reproduce alignment test tape to reproduce at high speed 15 ips (38 cm/sec). Then, a scope display reading showing phase relations between both channels will be obtained as shown in Fig. 2-11.
6. Adjust the REPRO head azimuth screw until the scope display shows less than 90 degree at 12.5 kHz out of phase with the AF level meter showing approximately maximum value for both channels.
7. Switch OUTPUT SELECT to SYNC, and adjust the RECORD SYNC head azimuth screw the same way.

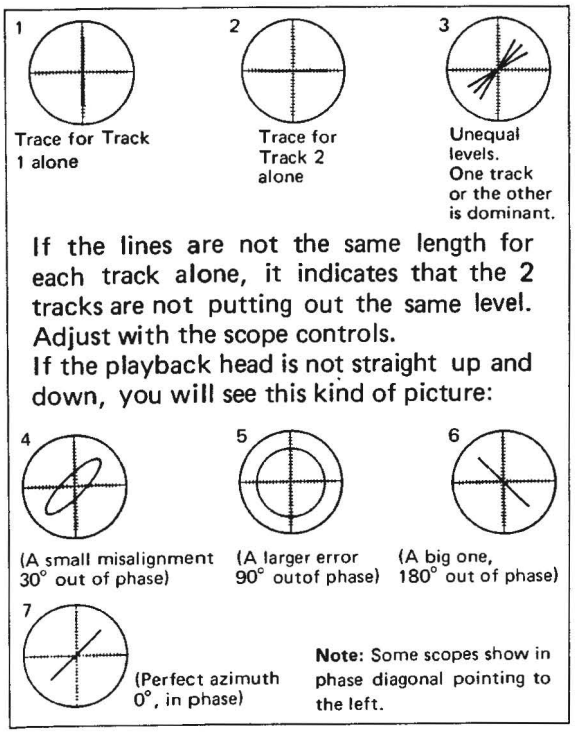
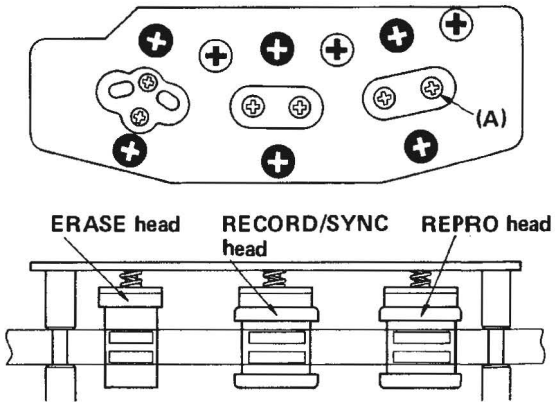


Fig. 2-11 Phase Shift



⊕ AZIMUTH ADJ. SCREWS
⊕ HEIGHT AND TILT ADJ. SCREWS
⊛ TANGENCY ADJ. NUTS (A)

Fig. 2-12

B. To get at the trim pots for record/reproduce amplifier circuit adjustments, remove the bottom cover by removing the holding screws. With the cover removed, you will see the amplifier boards to which the trim pots are mounted as shown in the photograph. The boards are identical and are exclusively used for both channels. See page 85.
Record/reproduce amplifier checks and adjustments are given for only one of the channels but they should be applied for the other channel as well.
Before beginning any adjustments thoroughly demagnetize and clean the heads, tape guide, etc.

C. Line Output Load Impedance of the Deck: This deck has been preadjusted and set for a 50k ohm load, when switched from this adjustment, for example, to a 10k ohm load, the output level results in a 0.5 dB reduction. When connecting less than a 50k ohm load, readjust the deck to match the applied load.

D. The nominal input/output levels of this deck has been determined with the INPUT and OUTPUT control knobs set at position "7". The following checks and adjustments should be made with these controls in this position, unless otherwise noted.

2-11-1 Input Level Calibration

1. Connect the test equipment as shown in Fig. 2-13.
2. Apply a 400 Hz, -10 dB (0.3 V) test signal to the LINE IN jack on rear panel, switch INPUT SELECT to LINE and OUTPUT SELECT to INPUT, and set the INPUT and OUTPUT control knobs to position "7".
3. Make sure the AF level meter reads -10 dB (0.3 V) output. If it doesn't, adjust the (R156) trim pot until the -10 dB indication on the level meter is obtained.

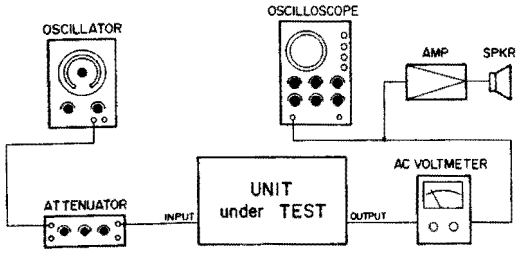


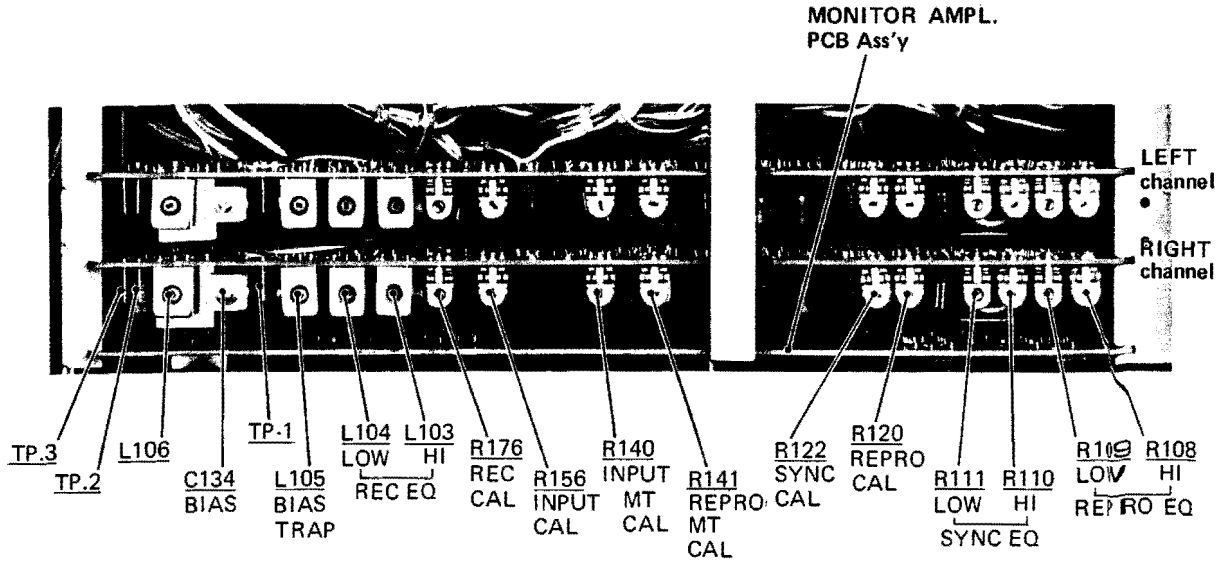
Fig. 2-13 Input Level Calibration

2-11-2 Input Meter Calibration

1. The meter is designed to indicate 0 VU when -10 dB signal is connected to the input terminals and the INPUT control knob is set to position "7".
2. Therefore, make sure that the meter indicates 0 VU after completion of the above 2-11-1 (2-3). If the meter does not indicate 0 VU, adjust R140 to obtain the 0 VU indication.

2-11-3 Reproduce Level Calibration

1. Connect the AF level meter (oscilloscope), and a 50k ohm load to the OUTPUT jack on the rear panel.
2. Switch OUTPUT SELECT to REPRO and set the OUTPUT control knob to position "7".
3. Load the reproduce alignment test tape for high speed 15 ips (38 cm/sec) and reproduce. Observe the AF level meter, it should indicate -10 dB, if not, adjust the (R120) trim pot to obtain the -10 dB output indication.
4. Switch OUTPUT SELECT to SYNC and reproduce the same tape. Check the AF level meter, it should read -10 dB. If not, adjust the (R122) trim pot.



2-11-4 Reproduce Meter Calibration

1. The meter is designed to indicate 0 VU when the reproduce amplifier produces -10 dB output into a 50k ohm load.
2. Therefore, make sure that the meter indicates 0 VU after completion of the above 2-11-3 (2-3). If the meter does not indicate 0 VU, adjust R141 to obtain the 0 VU indication.

2-11-5 Reproduce Frequency Response

1. Connect the AF level meter, (oscilloscope), and a 50k ohm load to the OUTPUT jack.
2. Load the reproduce alignment test tape onto the tape deck.
3. Switch OUTPUT SELECT to REPRO and set the OUTPUT control knob to position "7".
4. Run the tape, then check the frequency response while noting the output level.
   Test tapes: TEAC YTT-1004/YTT-1003 NAB standard 3180 + 50 μsec (Tape Speed 15 ips/7-1/2 ips).
   TEAC YTT-1044: IEC-1 standard ∞ + 35 μsec (Tape Speed 15 ips).
   TEAC YTT-10432: EQ IEC-1 standard ∞ + 70 μsec (Tape Speed 7-1/2 ips).
5. If the AF level meters are not within the specified range, adjust R108 for 15 ips (38 cm/sec) and R109 for 7-1/2 ips (19 cm/sec).

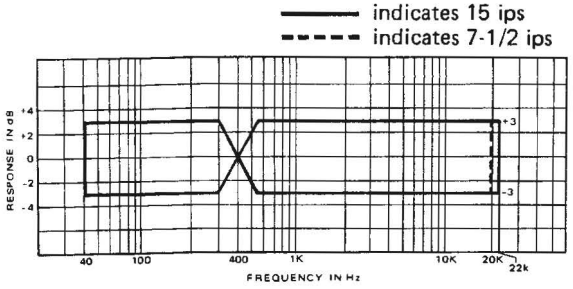


Fig. 2-14. Reproduce Frequency Response

6. Switch OUTPUT SELECT to SYNC.
7. Reproduce the same tape and also read the output levels the same way to learn whether the frequency response is within the above specified limit. If the frequency response is not within the specified limit, adjust the R110 for 15 ips (38 cm/sec), and R111 for 7-1/2 ips (19 cm/sec).
8. If the specifed frequency response cannot be obtained with the trim pot(s) adjusted;
   * Check and compare the measurements of the other channel. If they stand up to spec, correct or replace the off spec channel record/reproduce amplifier PCB.
   * If both channels are off spec, check power line, incorrect head adjustment, or whether heads should be cleaned.
   * Demagnetize the heads.
   * Finally, if all else fails, replace the heads.

2-11-6 Bias Tuning and Bias Trap Adjustments

These adjustments have been made at the factory and realignment will not be necessary except for the following circumstances:

* When the SYNC head, ERASE head and/or bias amplifier is replaced.
* When the MASTER BIAS PC card or MASTER BIAS unit is replaced.

Use the following procedures to adjust.

A. BIAS TUNING

1. Place both channels FUNCTION switches to ON and set the tape deck into the REC PAUSE mode.
2. Connect a DC volt-meter between TP(2) and TP(3). Adjust L106 to obtain a minimum reading on the DC meter by using an insulate screwdriver. Be sure to use a non-conductive screwdriver (i.e. wood, plastic, etc.).

CAUTION: Do not try to obtain maximum reading on the DC volt-meter, which would occasion an extreme amount of Bias Amp output load.

B. BIAS TRAP

1. Connect an "AC" level meter between TP(1) and ground.
2. Place both FUNCTION switches to ON and set the deck into the REC PAUSE mode.
3. Adjust L105 to obtain a minimum reading on the level meter.

2-11-7 Recording Bias Adjustment

This adjustment is made while you are recording a tone on the type of tape you'll be using for the session. It will be different for each brand of tape. Before proceeding with this adjustment, make sure that the tape path and head contact have been adjusted correctly as mentioned earlier and that no tape curling is noticed.

1. Connect an AF level meter and a 50k ohm-load to the OUTPUT jacks as shown in Fig. 2-13, then load a blank test tape.
2. Set the INPUT and OUTPUT control knobs to position "7", tape speed to LOW, switch INPUT SELECT to LINE.
3. Adjust the AF oscillator to apply a 7 kHz, -20 dB (0.1 V, -10 VU) signal to the LINE IN jack on rear panel.
4. Switch OUTPUT SELECT to REPRRO and set both FUNCTION switches to ON.
5. Begin recording. Now adjustments can be made while recording a 7 kHz tone.
6. Begin adjustment by turning the trimmer (C134) completely counterclockwise. Next, loosen and turn the trimmer clockwise and the AF level meter will rise to give peak reading. Slowly continue the clockwise rotation until the reading on the level meter drops 4 – 6 dB from the peak reading as shown in Fig. 2-15.

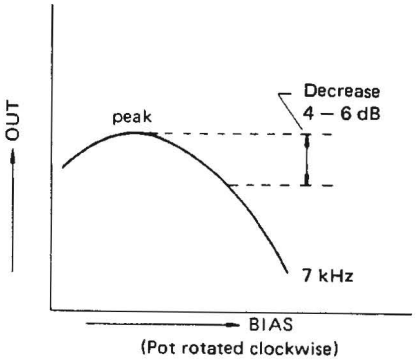


Fig. 2-15. Bias Limit Chart

2-11-8 Recording Level Adjustment

Recording level adjustments should be done only after the reproduce level and recording bias have been properly set as specified above.

1. Connect the AF oscillator, oscilloscope, AF level meter, and a 50k ohm load to the tape deck as shown in Fig. 2-13.
2. Apply a 400 Hz, -10 dB (0.3 V) signal to the LINE IN jack.
3. Switch INPUT SELECT to LINE, OUTPUT SELECT to REPRO, set both FUNCTION switches to ON, and the INPUT and OUTPUT knobs to position "7".
4. Record the 400 Hz input signal on the specified recording test tape.
5. Check the AF level meter, it should indicate -10 dB (0.3 V). If not, adjust the (R176) trim pot to obtain the -10 dB indication. At this time, make sure that the VU meter on the front panel indicates 0 VU.
6. Switch OUTPUT SELECT to SYNC and record the 400 Hz input signal for a brief period of time. Then rewind the tape just recorded and reproduce it. Make sure that both the AF level meter and the VU meter indicate -10 dB and 0 VU, respectively.
7. If it's impossible to obtain a VU meter reading of 0 VU in steps 5 and 6 above, check to see whether the reproduce meter is set properly as described under 2-11-2. "Input Meter Calibration".

2-11-9 Frequency Response (OVERALL)

After completion of the recording level check and adjustment, proceed to the overall frequency response check.

1. Connect the test equipment to the tape deck as shown in Fig. 2-13 and load a blank test tape onto the tape deck.
2. Set the INPUT and OUTPUT select control knobs and both FUNCTION switches to ON, then set the OUTPUT SELECT switches to REPRO.
3. Record and reproduce an input signal of 400 Hz, -10 dB (0.3 V) at 15 ips (38 cm/sec), then change the frequency and check that the output is still within specification. If not, adjust REC EQ coil L103 using a frequency higher than 22 kHz.
4. For a tape speed of 7-1/2 ips (19 cm/sec), record and reproduce an input signal of 400 Hz, -20 dB (0.1 V), then change the frequency and check that the output is still within specification. If not, adjust REC EQ coil L104 using a frequency higher than 20 kHz.
   Blank test tape: YTT-8063.
5. Switch OUTPUT SELECT to SYNC and record the test signals the same as above. When the recording is finished, rewind the tape just recorded and reproduce it. Measure that reproduced output levels at the proper test frequencies, and make sure that the frequency response is within the specified limit shown.
6. If the frequency response reading is not within the specified limit, readjust the bias level setting within its specified range by refering to 2-11-7 "Recording bias adjustment". If the bias level is readjusted, the recording level adjustment will be upset, so repeat the recording level adjustment again as described in 2-11-8. "Recording Level Adjustment".

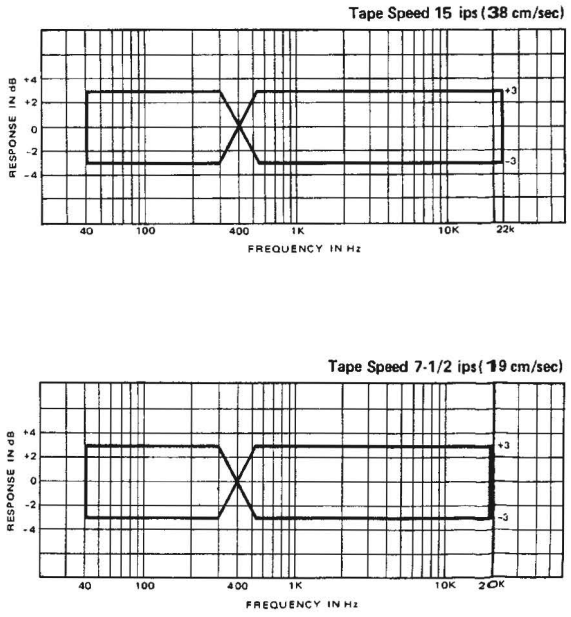


Fig. 2-16. Overall Frequency Response

2-11-10 Signal-to-Noise Ratio (OVERALL)

Prior to measurement, demagnetize all heads and tape guides.

1. Connect the AF oscillator, oscilloscope, AF level meter, and a 50k ohm load to the tape deck as shown in Fig. 2-13.
2. Apply a 400 Hz, -10 dB (0.3 V) signal to the LINE IN jack.
3. Switch OUTPUT SELECT to REPRO, INPUT SELECT to LINE. Set both FUNCTION switches to ON, INPUT and OUTPUT knob to "7" and record a short length of the input signal, then, while still in the recording mode, set INPUT knobs to minimum, and make another length of no-signal recording.
4. Rewind the recording made in step 3 (above) to the beginning and reproduce.
5. While making sure the reproduce output of the previously recorded 400 Hz 0 VU signal is -10 dB, raise the sensitivity of the AF level meter and measure the level of the no-signal portion of the tape.
6. With -10 dB (0 VU) as the reference level, the SN (signal-to-noise) ratio, as measured by the AF level meter, should be better than 50 dB.
7. If it is off spec,
   * Check and compare the measurement of the other channel. If this stands up to spec, correct or replace the off spec channel record/reproduce amplifier PCB.
   * Demagnetize the heads.
   * Check erasure, refer to item 2-11-11.
   * Check for proper adjustment of the bias trap.
   * Try another tape of the same type number.

2-11-11 Erase Ratio

1. Connect test equipment to the tape deck as shown in Fig. 2-17.
2. Use a 1 kHz bandpass filter to check the erasing ratio.
3. Switch OUTPUT SELECT to SYNC and record a short length of the 1 kHz, 0 dB (1 V) signal. Set INPUT knobs to minimum.
4. Rewind the tape to the beginning of the recorded section.
5. Record a no-signal portion over the recording of the 1 kHz signal.
6. Measure the difference between the 1 kHz signal level and the no-signal portion. The difference should be at least 65 dB.
7. If the level difference is below this specification, check erase head terminal voltage for 60 – 70 V using an AC volt-meter.

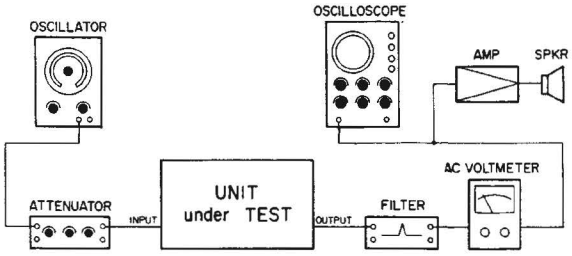


Fig. 2-17. Erase Ratio Test Set-Up

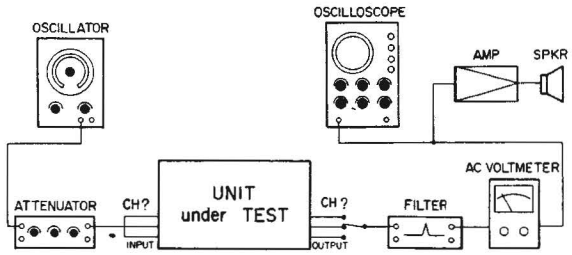


Fig. 2-18. Crosstalk Measurement Set-Up

2-11-12 Channel Crosstalk

1. Connect test equipment as shown in Fig. 2-18.
2. Switch INPUT SELECT to LINE and set both FUNCTION switches to ON.
3. Switch OUTPUT SELECT to REPRO and set the INPUT control knob to position "7".
4. While recording a "no-signal" recording on one of the channels, apply a 1 kHz, -10 dB (0.3 V) test signal to the other channel.
5. Reproduce the tape with REPRO (OUTPUT SELECT) button depressed, after which, measure the output of the "no signal" recorded channel.
6. Measure the output of the other channel. The difference should be 50 dB or greater.

2-11-13 Distortion

1. Connect test equipment as shown in Fig. 2-19.
2. Switch INPUT SELECT to LINE, OUTPUT SELECT to SYNC and set both channel FUNCTION switches to ON and the INPUT and OUTPUT control knobs to position "7".

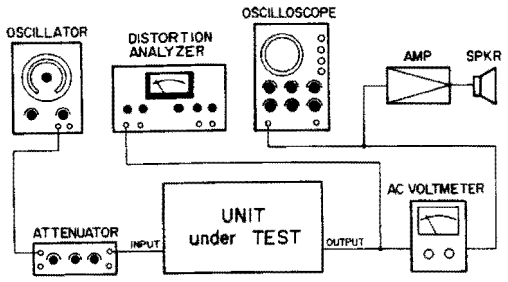


Fig. 2-19. Distortion Measurement Set-Up

3. Apply a 1 kHz, -10 dB (0.3 V) test signal to the LINE IN jack and record.
4. Stop the recording, rewind the tape to its beginning and reproduce. Measure the distortion of the reproduced output.
5. The distortion measured should be less than 0.8 %.
6. If the distortion is off spec;
   * Check and compare the measurement of the other channel. If it is off spec, correct or replace the off spec channel record/reproduce amplifier PCB.
   * Check bias level setting and readjust if necessary.
   * Demagnetize the heads.
   * Replace the heads.

2-11-14 Headphones Output Level

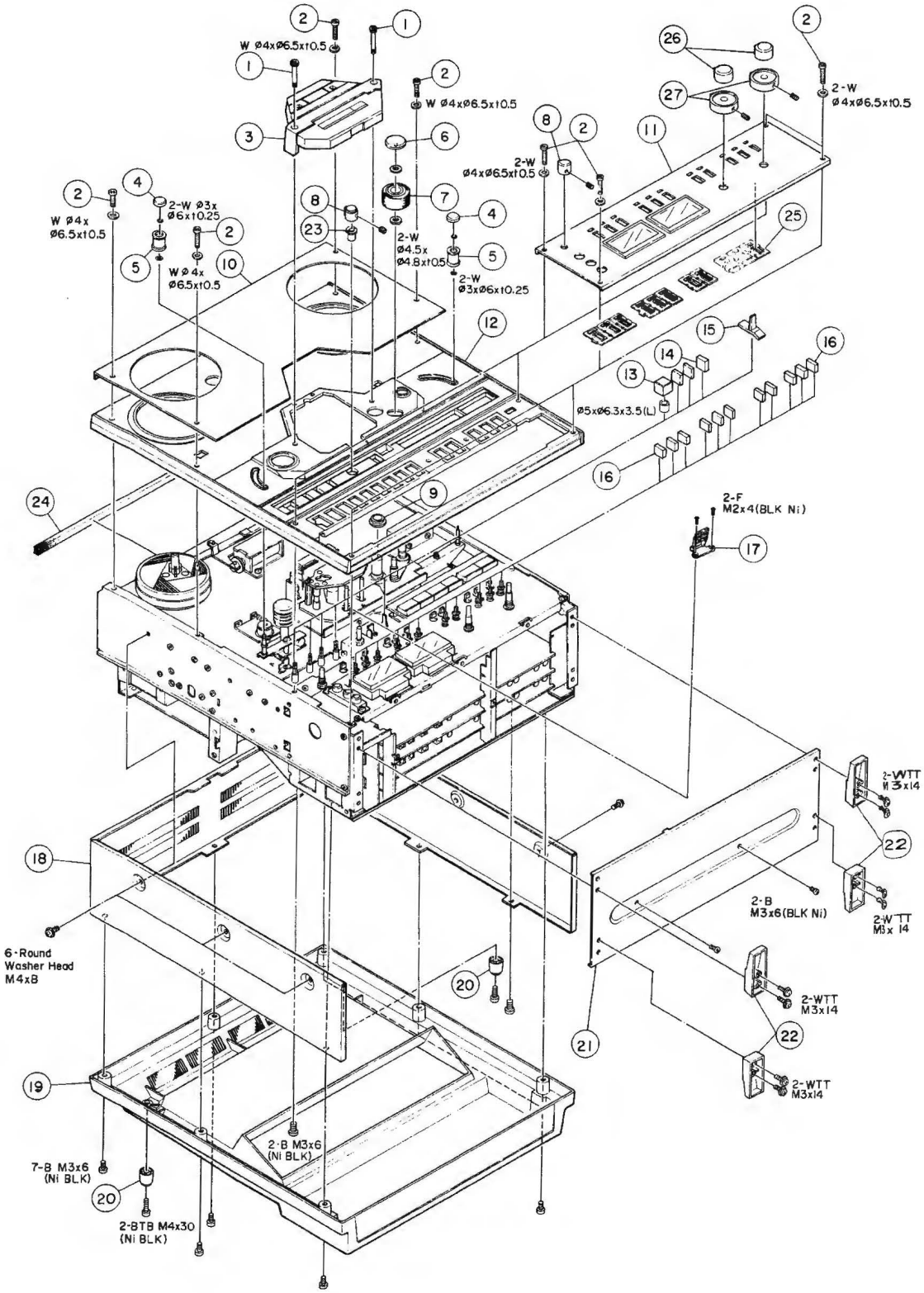
1. Connect an 8 Ω dummy resistor to the headphones terminal.
2. Set the INPUT SELECT switches to LINE, OUTPUT SELECT to INPUT.
3. Apply a 400 Hz, -10 dB (0.3 V) input signal through the LINE IN jacks with the INPUT control knob at position 7, and turn up (CW) the volume control knob for the headphones and measure the headphones output level just before the wave form begins to clip.
   Max. output level: More than 894 mV

2-11-15 Mic Level Check

1. Make sure that a correct input level calibration has been obtained (Step 2-11-1) before attempting MIC level check.
2. Apply a 400 Hz, -60 dB (1 mV) test signal to MIC L jack on front panel.
3. Change INPUT SELECT from LINE to MIC and set MIC ATT to OFF.
4. At this time, line out level should be -13 dB ~ -7 dB.
5. When MIC ATT is set to ON, the output level should be -20 dB lower than the reading obtained in step 4.

3. EXPLODED VIEWS AND PARTS LIST

EXPLODED VIEW–1



EXPLODED VIEW–1

Parts marked with * require longer delivery time.

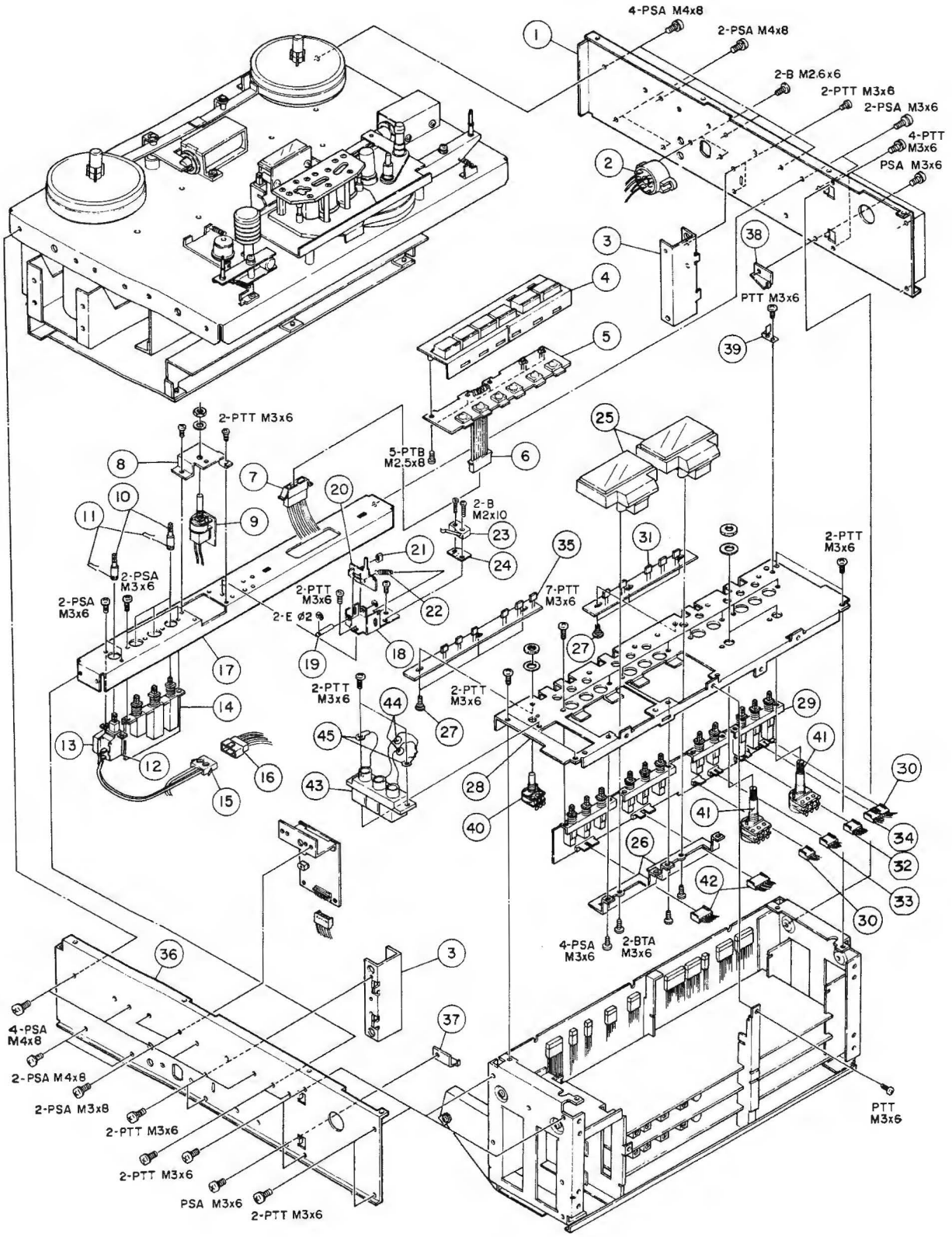
REF. NO.	PARTS NO.	DESCRIPTION	REMARKS
1 - 1	*5800307000	Screw, Head Housing	
1 - 2	*5800306900	Screw, Top Panel	
1 - 3	*5800312400	Housing Assy, Head; (5) [J]	
	*5800312500	Housing Assy, Head; (6) [All except J]	
1 - 4	5800311900	Cap, Tension Roller; (A)	
1 - 5	5504843000	Roller Assy, Tension	
1 - 6	*5800312100	Cap, Pinch Roller	
1 - 7	5800352900	Pinch Roller	
1 - 8	5800288000	Knob, Pitch Control	
1 - 9	*5800288600	Cap, Dust	
1 - 10	*5800293000	Panel, Transport	
1 - 11	*5800309600	Panel Assy, Ampl; (C)	
1 - 12	*5800309900	Panel Assy, Top; (4)	
1 - 13	5800173100	Button, Power Switch	
1 - 14	5800288200	Button, Switch	
1 - 15	5800288100	Knob, Cue	
1 - 16	5800288300	Button, Push	
1 - 17	*5800301200	Shield Assy, Front	
1 - 18	*5800308900	Bonnet, (A)	
1 - 19	*5800294300	Panel, Rear; (4)	
1 - 20	*5800307100	Collar, Foot; (A)	
1 - 21	*5800348200	Bottom Assy; (A)	
1 - 22	*5800288500	Foot	
1 - 23	*5800067700	Nut	
1 - 24	*5800289500	Cushion, Bonnet	
1 - 25	*5800287400	Escutcheon; BL	
1 - 26	*5800315500	Knob, (L)	
1 - 27	*5800315600	Knob, (R)	

INCLUDED ACCESSORY

PARTS NO.	DESCRIPTION	REMARKS
*5740002700	10-inche Reel Set	
*5101708000	Open Reel Supplement	
*5744023200	Clamper, Reel; B (TZ-613)	
*5032301100	Rubber, Cushion	
*5350008500	Cord, In-Output Connection [All except U]	

[U]: U.S.A. [C]: CANADA [GE]: GENERAL EXPORT
[A]: AUSTRALIA [E]: EUROPE [UK]: U.K.
[L]: LIMITED AREA

EXPLODED VIEW–2



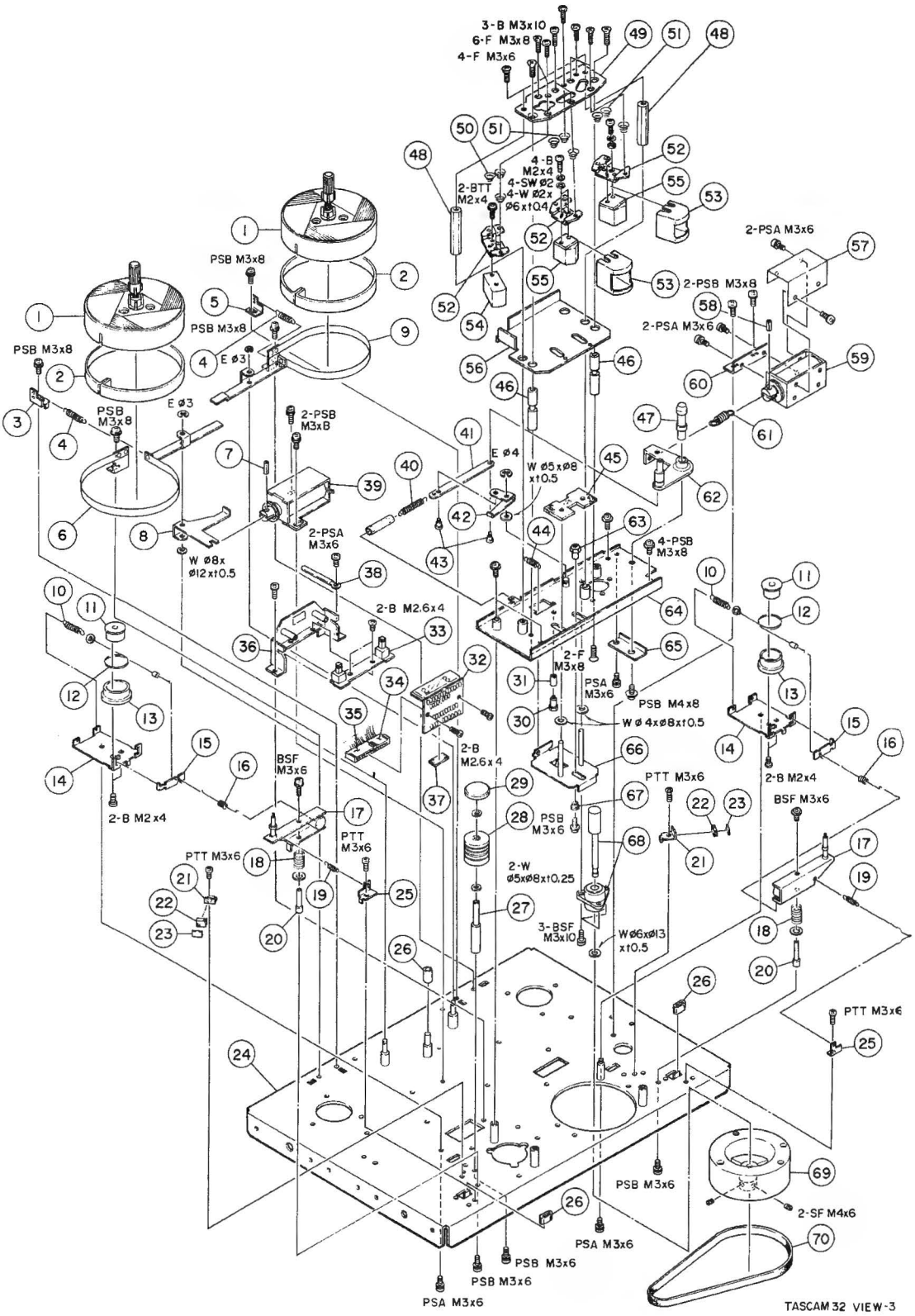
EXPLODED VIEW–2

Parts marked with * require longer delivery time.

REF. NO.	PARTS NO.	DESCRIPTION	REMARKS
2 - 1	*5800293900	Chassis, Side; R	
2 - 2	⚠ 5302101200	Switch, Voltage Selector [GE]	
2 - 3	*5800308100	Bracket, CONTROL PCB	
2 - 4	*5800287000	Button Assy, Control	
2 - 5	*5200073600	PCB Assy, Operation	
2 - 6	*5336112000	Connector Socket, 10P (WHT)	
2 - 7	*5336114000	Connector Plug, 10P (WHT)	
2 - 8	*5800288700	Bracket, PITCH CONTROL PCB	
2 - 9	*5168938000	PCB Assy, Pitch Control	
2 - 10	*5534713000	Rod, Switch; (C)	
2 - 11	*5786360500	Pin, Snap; ϕ5	
2 - 12	⚠ 5300027300	Switch, POWER [J]	
	⚠ 5300027400	Switch, POWER [U, C]	
	⚠ 5300027500	Switch, POWER [E, UK, A, GE]	
2 - 13	⚠ 5052907000	Spark Killer, 0.01μF + 300Ω/300V [J; GE]	
	⚠ 5052910000	Spark Killer, 0.033μF + 120Ω/125V [U]	
	⚠ 5292002600	Spark Killer, 0.033μF + 120Ω/125V [C]	
	⚠ 5267702500	Spark Killer, 0.0047μF 250V [E, UK, A]	
2 - 14	*5200074500	PCB Assy, SPEED SWITCH	
2 - 15	*5122261000	Connector Plug, 4P	
2 - 16	*5122262000	Connector Socket, 4P	
2 - 17	*5800069901	Chassis, Control	
2 - 18	*5800298800	Bracket, Cue	
2 - 19	*5800298600	Pin, Guide	
2 - 20	*5800298700	Lever, Cue	
2 - 21	*5534850000	Cushion, Stopper	
2 - 22	*5800303800	Spring, Cue	
2 - 23	5301456100	Switch, Micro; SS-5GL13-3	
2 - 24	*5800299200	Plate, Insulating	
2 - 25	5165068000	Meter, VU	
2 - 26	*5800308700	Escutcheon, Meter	
2 - 27	*5800002600	Screw, Shoulder; F	
2 - 28	*5800310200	Chassis, Ampl; 2	
2 - 29	*5200078000	PCB Assy, IN/OUT SELECTOR	
2 - 30	*5122166000	Connector Socket, 4P (WHT)	
2 - 31	*5200078400	PCB Assy, FUNCTION LED	
2 - 32	*5122169000	Connector Socket, 7P (WHT)	
2 - 33	*5122168000	Connector Socket, 6P (WHT)	
2 - 34	*5122167000	Connector Socket, 5P (WHT)	
2 - 35	*5200078300	PCB Assy, INPUT LED	
2 - 36	*5800293800	Chassis, Side; L	
2 - 37	*5800289200	Bracket, L	
2 - 38	*5800289300	Bracket, R	
2 - 39	*5800289800	Spring, Earth; (B)	
2 - 40	5282408300	Var. Res., 100kΩ x 2; 1-2	
2 - 41	5282706300	Var. Res., 100kΩ x 1; 2-2	
2 - 42	*5122172000	Connector Socket, 10P (WHT)	
2 - 43	5124063000	Jack, 3-gang	
2 - 44	5054204000	Ceramic Capacitor 0.01μF 50V	
2 - 45	*5786701100	Leg, GND ϕ3	

[U]: U.S.A. [C]: CANADA [GE]: GENERAL EXPORT
[A]: AUSTRALIA [E]: EUROPE [UK]: U.K.
[L]: LIMITED AREA

EXPLODED VIEW–3



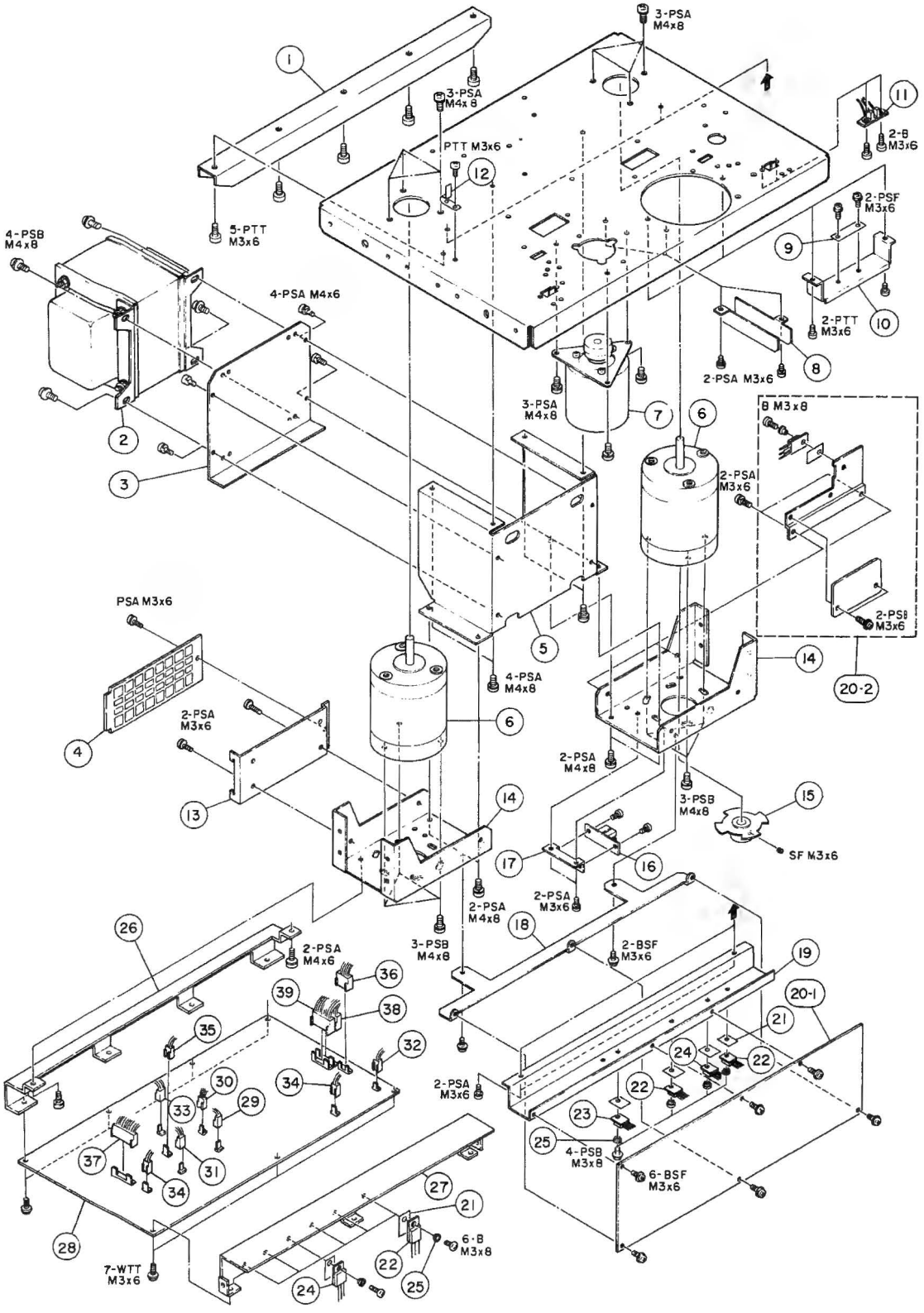
EXPLODED VIEW–3

Parts marked with * require longer delivery time.

REF. NO.	PARTS NO.	DESCRIPTION	REMARKS
3 - 1	5800311401	Table Assy, Reel	
3 - 2	5800295700	Felt, Brake	
3 - 3	*5555929000	Hook, Spring	
3 - 4	*5800301700	Spring, Brake; B	
3 - 5	*5800295801	Hook, Spring	
3 - 6	*5800295201	Band Assy, Brake; (L)	
3 - 7	*5786303012	Pin, Spring; ϕ3 x 12	
3 - 8	*5800299000	Lever, Brake Actuating	
3 - 9	*5800295301	Band Assy, Brake; (R)	
3 - 10	*5800301800	Spring, Damper	
3 - 11	*5800305600	Shaft, Damper	
3 - 12	*5800301000	String Assy, Damper	
3 - 13	*5800301100	Drum, Damper	
3 - 14	*5800300800	Base, Damper	
3 - 15	*5800300900	Arm, Damper	
3 - 16	*5800302000	Spring	
3 - 17	5504842001	Arm Assy, Tension	
3 - 18	*5524289000	Spring, Bias	
3 - 19	*5524106000	Spring, Hook Plate	
3 - 20	*5800299100	Shaft, Tension Arm	
3 - 21	*5555930000	Stopper, Arm	
3 - 22	*5800298400	Damper	
3 - 23	*5800298500	Plate, Damper	
3 - 24	*5800300300	Chassis Assy, Main	
3 - 25	*5555929000	Hook, Spring	
3 - 26	*5534850000	Cushion, Stopper	
3 - 27	*5545182000	Shaft, Guide Roller	
3 - 28	5504839000	Roller Assy, Lapping	
3 - 29	*5800312200	Cap, Guide Roller	
3 - 30	*5800290400	Stopper, Lifter	
3 - 31	*5800316000	Cushion, Stopper	
3 - 32	5312000100	Counter, FL4028	
3 - 33	*5200074000	PCB Assy, Counter	
3 - 34	*5122170000	Connector Socket, 8P	
3 - 35	*5122172000	Connector Socket, 10P	
3 - 36	*5800294900	Base Assy, Counter	
3 - 37	*5555570000	Cushion; B	
3 - 38	*5581038000	Clamper, Cord	
3 - 39	5313001500	Solenoid, Brake	
3 - 40	*5524288000	Spring, Return	
3 - 41	*5555926000	Arm, Joint; B	
3 - 42	*5555925000	Arm, Joint; A	
3 - 43	*5581056000	Screw, Shoulder; A	
3 - 44	*5800301900	Spring, Lifter	
3 - 45	*5800303600	Cover, Lifter	
3 - 46	5545181000	Guide, Tape	
3 - 47	*5800310900	Post, Guide (1/4")	
3 - 48	*5800311000	Post, Head Base	
3 - 49	*5800311100	Base, Head	
3 - 50	*5022050000	Spring (B)	
3 - 51	*5520182000	Spring (D)	
3 - 52	*5800311200	Bracket, Head	
3 - 53	*5800329200	Head Shield	
3 - 54	5378301900	Head, Erase (2Tr - 2ch)	
3 - 55	5378301800	Head, Rec/Play (2Tr-2ch)	

(Continued on page 100)

EXPLODED VIEW–4



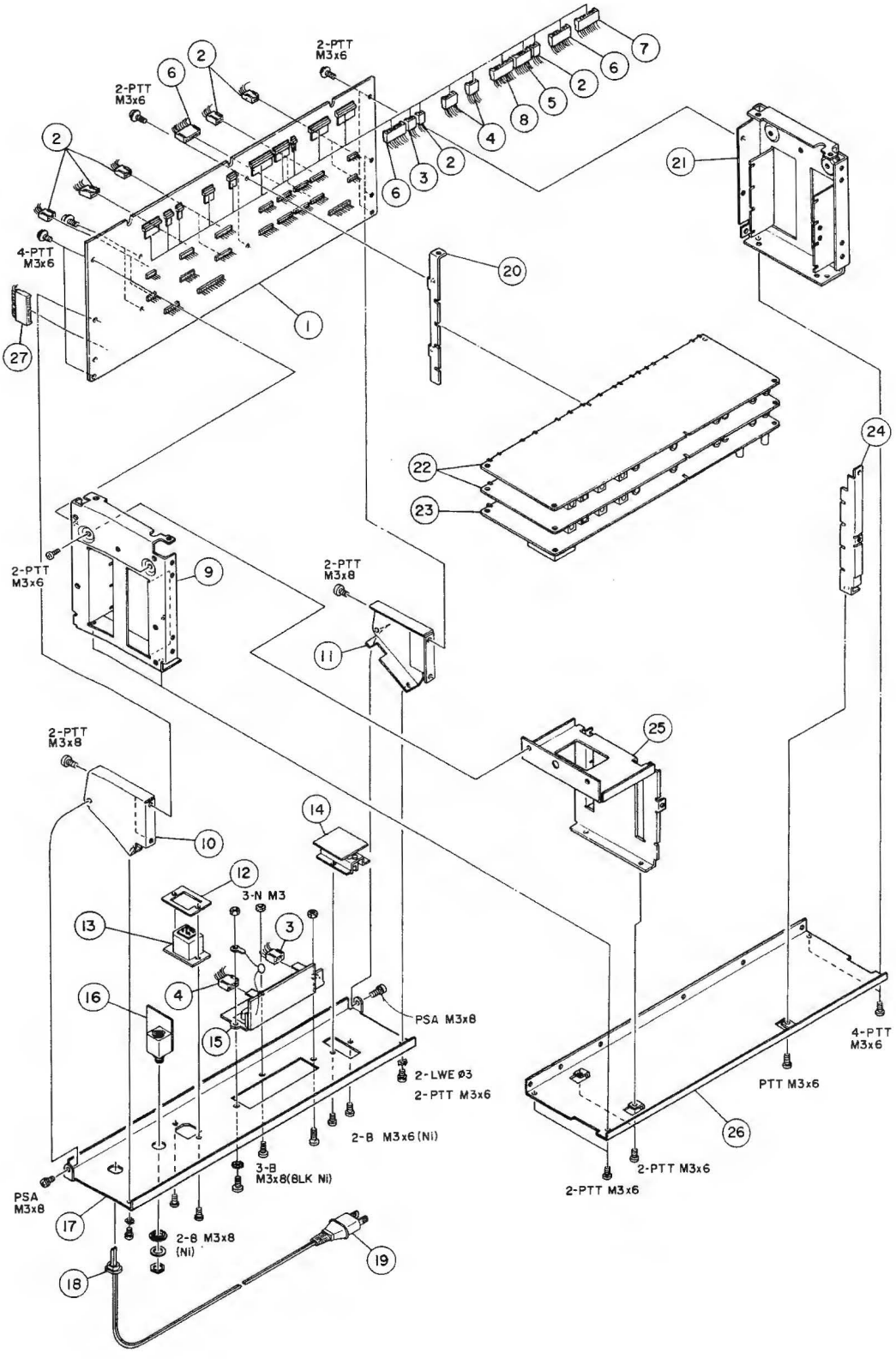
EXPLODED VIEW–4

Parts marked with * require longer delivery time.

REF. NO.	PARTS NO.	DESCRIPTION	REMARKS
4 - 1	*5800300200	Angle, Main Chassis	
4 - 2	*5320015100	Transformer, Power [J]	
	*5320015200	Transformer, Power [U, C]	
	*5320015300	Transformer, Power [GE]	
	*5320015400	Transformer, Power [E]	
	*5320015500	Transformer, Power [UK, A]	
4 - 3	*5800311700	Holder, Transformer; A	
4 - 4	*5200078510	PCB Assy, Fuse [J, GE, U, C]	
	*5200078520	PCB Assy, Fuse [E, UK, A]	
4 - 5	*5800311600	Holder, Transformer	
4 - 6	5370002800	DC Motor, Reel (1/4")	
4 - 7	5370002900	Motor Assy, DC Capstan	
4 - 8	*5800299700	Holder, Cord	
4 - 9	*5555921000	Plate, Thrust	
4 - 10	*5555920001	Angle, Thrust	
4 - 11	*5200073800	PCB Assy, SHUT OFF	
4 - 12	*5800289600	Spring, Earth; (A)	
4 - 13	*5800311800	Bracket, Fuse	
4 - 14	*5800300000	Holder, Motor	
4 - 15	*5800299400	Encoder Assy	
4 - 16	*5200073900	PCB Assy, SENSOR	
4 - 17	*5800299300	Bracket, SENSOR PCB	
4 - 18	*5800303400	Bracket, POWER SUPPLY PCB	
4 - 19	*5800303500	Heatsink	
4 - 20-1	*5200074301	PCB Assy, POWER SUPPLY	
4 - 20-2	*5200086000	PCB Assy, AUXILIARY POWER SUPPLY	
4 - 21	5033291000	Plate, Insulating	
4 - 22	5145087000	Transistor; 2SD313E	
4 - 23	5220405100	IC, μPC78M05H	
4 - 24	5145129000	Transistor; 2SB507E	
4 - 25	*5033295000	Tube, Insulating	
4 - 26	*5800294100	Bracket, CONTROL PCB	
4 - 27	*5800293500	Heatsink	
4 - 28	*5200074200	PCB Assy, CONTROL	
4 - 29	*5122280000	Connector Socket; 2P (RED)	
4 - 30	*5122164000	Connector Socket; 2P (WHT)	
4 - 31	*5336109200	Connector Socket; 2P (YEL)	
4 - 32	*5122165000	Connector Socket; 3P (WHT)	
4 - 33	*5336109300	Connector Socket; 3P (YEL)	
4 - 34	*5122166000	Connector Socket; 4P (WHT)	
4 - 35	*5122166000	Connector Socket; 4P (WHT)	
4 - 36	*5122168000	Connector Socket; 6P (WHT)	
4 - 37	*5122169000	Connector Socket, 7P (WHT)	
4 - 38	*5122288000	Connector Socket, 10P (RED)	
4 - 39	*5122172000	Connector Socket, 10P (WHT)	

[U]: U.S.A. [C]: CANADA [GE]: GENERAL EXPORT
[A]: AUSTRALIA [E]: EUROPE [UK]: U.K.
[L]: LIMITED AREA

EXPLODED VIEW–5



EXPLODED VIEW–5

Parts marked with * require longer delivery time.

REF. NO.	PART NO.	DESCRIPTION	REMARKS
5 - 1	*5200077900	PCB Assy, MOTHER AMPL.	
5 - 2	*5122164000	Connector Socket, 2P (WHT)	
5 - 3	*5122165000	Connector Socket, 3P (WHT)	
5 - 4	*5122166000	Connector Socket, 4P (WHT)	
5 - 5	*5122169000	Connector Socket, 7P (WHT)	
5 - 6	*5122170000	Connector Socket, 8P (WHT)	
5 - 7	*5122171000	Connector Socket, 9P (WHT)	
5 - 8	*5122173000	Connector Socket, 10P (WHT)	
5 - 9	*5800293100	Frame, Ampl; FL	
5 - 10	*5800288900	Bracket, MOTHER PCB; L	
5 - 11	*5500289000	Bracket, MOTHER PCB; R	
5 - 12	*5555700000	Plate, Nut	
5 - 13	*5122338000	Connector Socket, 8P	
5 - 14	*5200073700	PCB Assy, REMOTE	
5 - 15	*5200078100	PCB Assy, IN/OUT	
5 - 16	*5200077700	PUNCH IN/OUT PCB Assy	
5 - 17	*5800309200	Panel, Connector, 2	
5 - 18	*5534660000	Strain Relief, AC Power Cord [All except UK]	
	*5534661000	Strain Relief, AC Power Cord [UK]	
5 - 19	△*5127248000	Cord, AC Power [J]	
	△*5128083000	Cord, AC Power [U, C]	
	△*5128095000	Cord, AC Power [UK]	
	△*5350008200	Cord, AC Power [E]	
	△*5350008400	Cord, AC Power [A]	
5 - 20	*5800289900	Bracket, PCB; A	
5 - 21	*5800293200	Frame, Ampl; FR	
5 - 22	*5200074820	PCB Assy, REC/PLAY	
5 - 23	*5200078200	PCB Assy, MONITER AMPL.	
5 - 24	*5800290000	Bracket, PCB; B	
5 - 25	*5800309000	Holder, PCB	
5 - 26	*5800310400	Chassis, Back	

(Continued from page 99)

REF. NO.	PARTS NO.	DESCRIPTION	REMARKS
3 - 56	*5800311300	Base, Lower	
3 - 57	*5800317700	Plate, Shield; Solenoid	
3 - 58	*5788303012	Pin, Spring; φ3 x 12	
3 - 59	5313001600	Solenoid, Pinch Roller	
3 - 60	*5800171000	Bracket, Solenoid	
3 - 61	*5524266001	Spring, Pressure	
3 - 62	*5800310700	Arm Assy, Pinch Roller	
3 - 63	*5800290200	Collar, Head Base; A	
3 - 64	*5800310500	Base Assy, Capstan	
3 - 65	*5800302700	Plate, Pinch Roller Arm	
3 - 66	*5800290500	Base Assy, Lifter	
3 - 67	*5800290600	Collar, Lifter Base	
3 - 68	5800311500	Capstan Assy	
3 - 69	5534849000	Flywheel	
3 - 70	5534468000	Belt, Capstan	

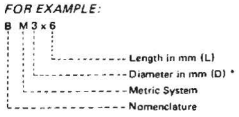
[U]: U.S.A. [C]: CANADA [GE]: GENERAL EXPORT
[A]: AUSTRALIA [E]: EUROPE [UK]: U.K.
[L]: LIMITED AREA

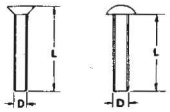
ASSEMBLING HARDWARE CODING LIST

All screws conform to ISO standards, and have crossrecessed heads, unless otherwise noted. ISO screws have the head inscribed with a point as in the figure to the right.



FOR EXAMPLE:





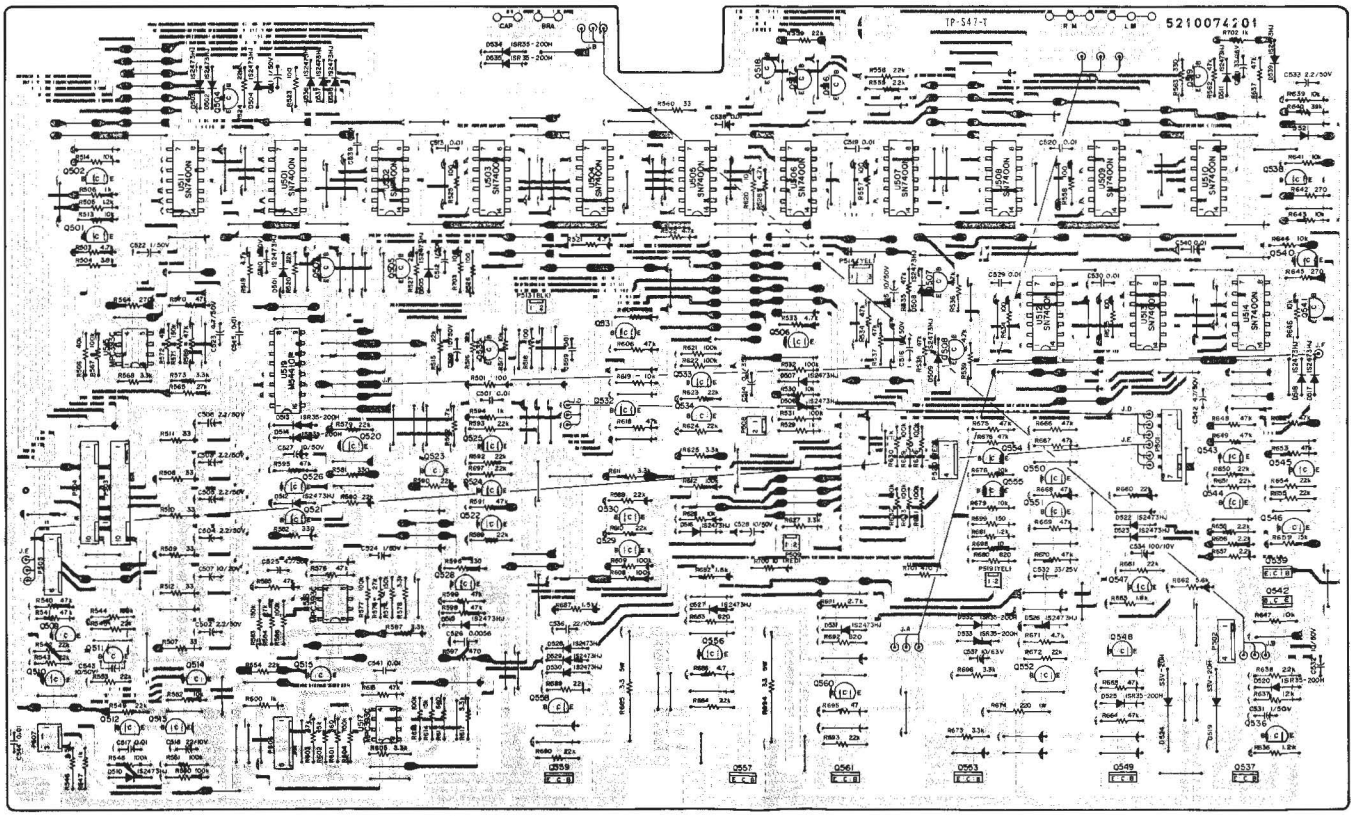
* Inner dia. for washers and nuts

	Code	Name	Type
MACHINE SCREW	R	Round Head Screw	
	P	Pan Head Screw	
	T	Stove Head Screw (Truss)	
	B	Binding Head Screw	
	F	Flat Countersunk Head Screw	
	O	Oval Countersunk Head Screw	
WOOD SCREW	RW	Round Head Wood Screw	
TAPTITE SCREW	PTT	Pan Head Taptite Screw	
	WTT	Washer Head Taptite Screw	
SEMS SCREW	BSA	Binding Head SEMS Screw(A Type)	
	BSB	Binding Head SEMS Screw(B Type)	
	BSF	Binding Head SEMS Screw(F Type)	
	PSA	Pan Head SEMS Screw(A Type)	
	PSB	Pan Head SEMS Screw(B Type)	

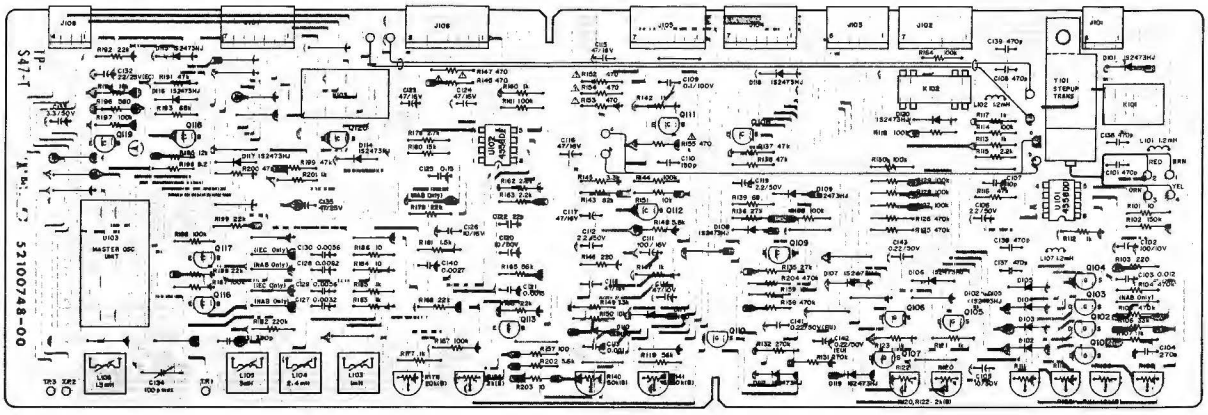
	Code	Name	Type
TAPPING SCREW	BTA	Binding Head Tapping Screw(A Type)	
	BTB	Binding Head Tapping Screw(B Type)	
	RTA	Round Head Tapping Screw(A Type)	
	RTB	Round Head Tapping Screw(B Type)	
SETSCREW	SF	Hex Socket Setscrew(Flat Point)	
	SC	Hex Socket Setscrew(Cup Point)	
	SS	Slotted Socket Setscrew(Flat Point)	
WASHER	E	E-Ring (Retaining Washer)	
	W	Flat Washer (Plain)	
	SW	Lock Washer (Spring)	
	LWI	Lock Washer (Internal Teeth)	
	LWE	Lock Washer (External Teeth)	
	TW	Trim Washer (Countersunk)	
NUT	N	Hex Nut	

4. PC BOARDS AND PARTS LIST

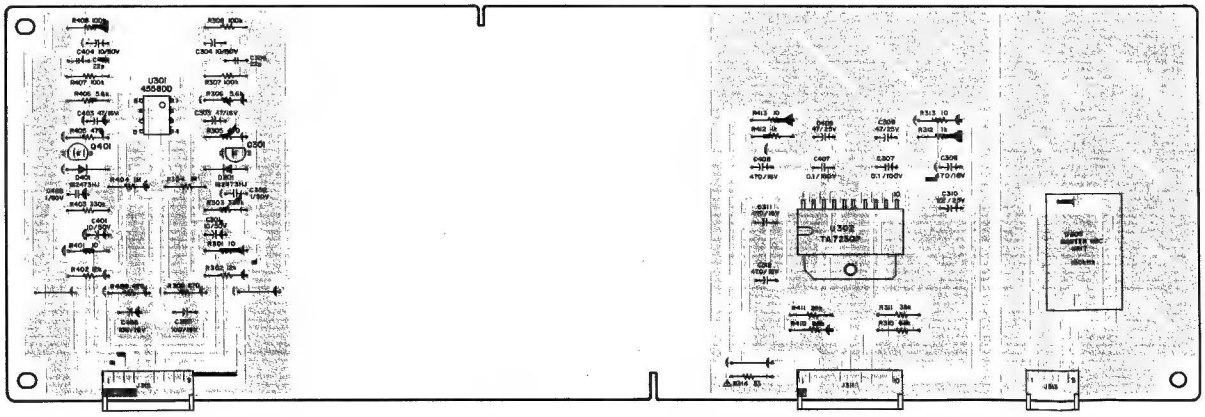
1. CONTROL PCB ASSY



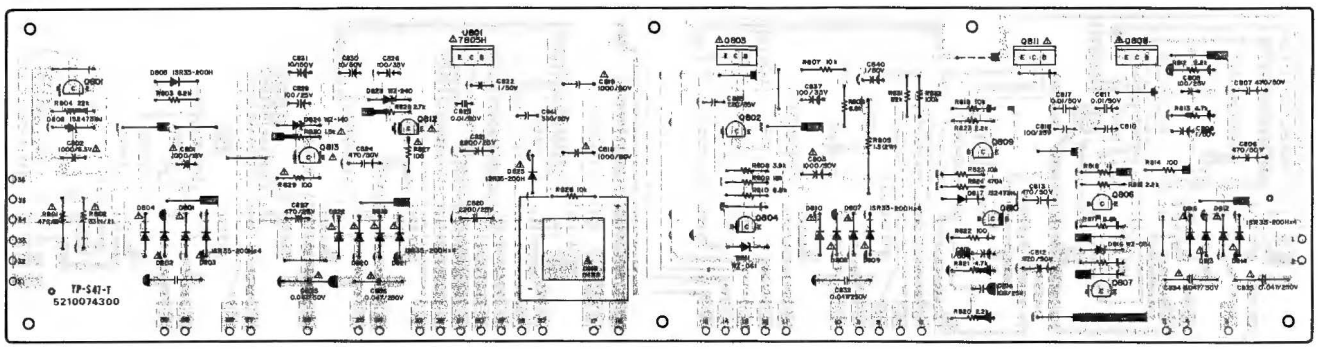
2. REC/PLAY PCB ASSY



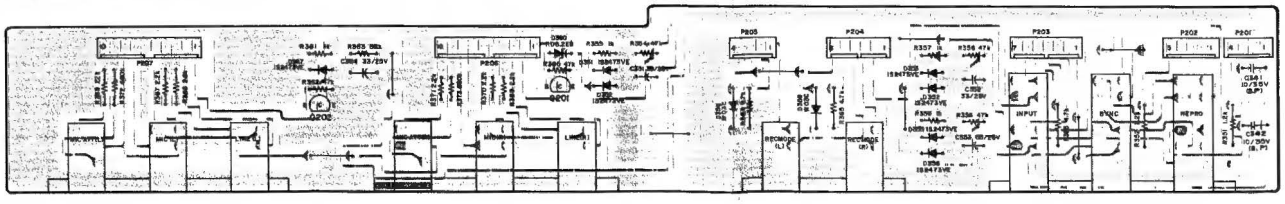
3. MONITOR AMPL. PCB ASSY



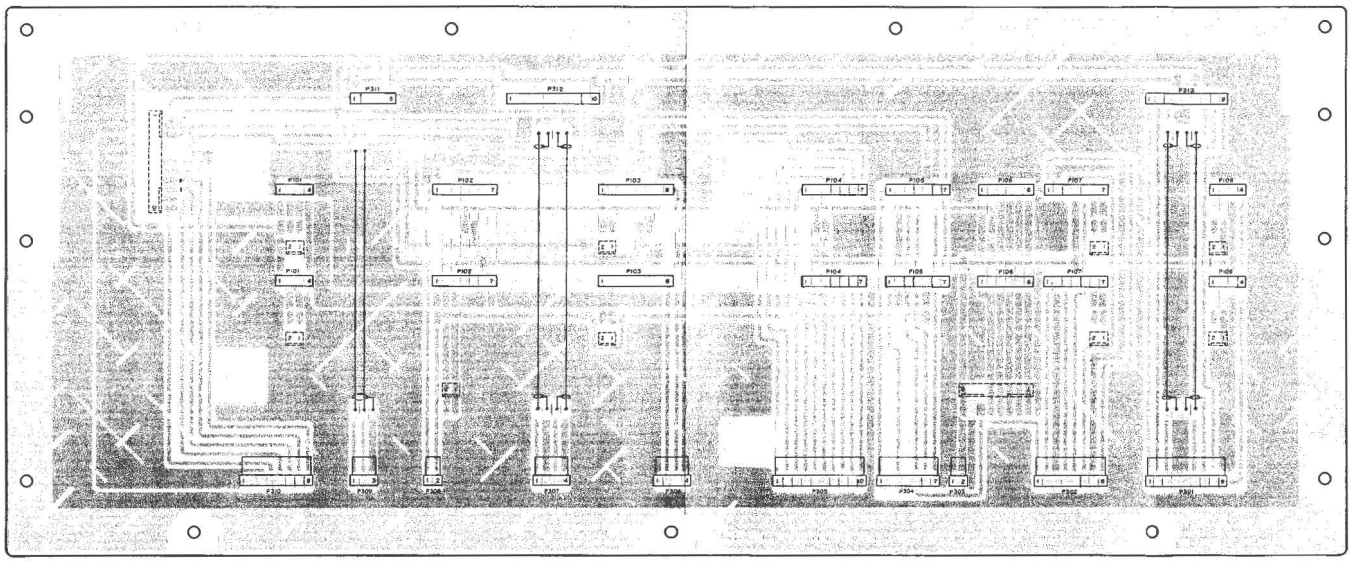
4. POWER SUPPLY PCB ASSY



5. IN/OUT SELECT PCB ASSY



6. MOTHER PCB ASSY



CONTROL PCB ASSY

REF. NO.	PARTS NO.	DESCRIPTION
	5200074201	PCB Assy, Control
	5210074201	PCB
	IC's	
U501~U504	5042712000	SN-7400N
U505	5220019900	SN-7474N
U506~U514	5042712000	SN-7400N
U515~U517	5220012500	μPC-393C
U519	5147047000	M-54410P
	TRANSISTORS	
Q501~Q509	5145178000	2SC-1684S
Q510	5042553000	2SA-733P
Q511	5145178000	2SC-1684S
Q512	5145091000	2SC-945AK
Q513~Q523	5145178000	2SC-1684S
Q524	5145091000	2SC-945AK
Q525	5042553000	2SA-733P
Q526	5145178000	2SC-1684S
Q528	5145178000	2SC-1684S
Q529	5145091000	2SC-945AK
Q530	5042553000	2SA-733P
Q531, Q532	5145178000	2SC-1684S
Q533	5145091000	2SC-945AK
Q534	5042553000	2SA-733P
Q535	5145091000	2SC-945AK
Q536	5145043000	2SA-720Q
Q537	5145087000	2SD-313E
Q538	5145178000	2SC-1684S
Q539	5231755400	2SD794Q
Q540, Q541	5145178000	2SC-1684S
Q542	5231755400	2SD794Q
Q543	5145091000	2SC-945AK
Q544	5042553000	2SA-733P
Q545	5145091000	2SC-945AK
Q546	5042563000	2SA-733P
Q547	5145091000	2SC-945AK
Q548	5042625000	2SC-1318S
Q549	5145087000	2SD-313E
Q550	5145091000	2SC-945AK
Q551	5042553000	2SA-733P
Q552	5042625000	2SC-1318S
Q553	5145129000	2SB-507E
Q554	5145091000	2SC-945AK
Q555	5042553000	2SA-733P
Q556	5042625000	2SC-1318S
Q557	△ 5145087000	2SD-313E
Q558	5042625000	2SC-1318S
Q559	5145087000	2SD-313E
Q560	5042625000	2SC-1318S
Q561	△ 5145087000	2SD-313E
	DIODES	
D501~D512	5143118000	1S2473HJ
D513, D514	5224014500	1SR35-200H
D515~D518	5143118000	1S2473HJ
D519	5224014700	S3V-20H
D520	5224014500	1SR35-200H
D521~D523	5143118000	1S2473HJ
D524	5224014700	S3V-20H
D525	5224014500	1SR35-200H
D526~D531	5143118000	1S2473HJ
D532~D535	5224014500	1SR35-200H
D536~D539	5143118000	1S2473HJ

REF. NO.	PARTS NO.	DESCRIPTION
	CARBON RESISTORS	
R501	5183058000	100Ω
R502, R503	5183098000	4.7kΩ
R504	5183098000	3.9kΩ
R505	5183084000	1.2kΩ
R506	5183082000	1.0kΩ
R507~R512	5183048000	33Ω
R513, R514	5183108000	10kΩ
R515, R516	5183114000	22kΩ
R517	5183106000	10kΩ
R518	5183058000	100Ω
R519	5183098000	4.7kΩ
R520	5183114000	22kΩ
R521, R522	5183098000	4.7kΩ
R523	5183058000	100Ω
R524	5183114000	22kΩ
R526, R526	5183058000	100Ω
R527	5183114000	22kΩ
R528	5183098000	4.7kΩ
R529	5183082000	1.0kΩ
R530	5183108000	10kΩ
R531, R532	5183130000	100kΩ
R533	5183098000	4.7kΩ
R534, R535	5183122000	47kΩ
R536	5183098000	4.7kΩ
R537, R538	5183122000	47kΩ
R539	5183098000	4.7kΩ
R540, R541	5183122000	47kΩ
R542, R543	5183114000	22kΩ
R544	5183130000	100kΩ
R545	6183114000	22kΩ
R546	5183086000	1.5kΩ
R547	5183082000	1.0kΩ
R548	5183130000	100kΩ
R549	5183114000	22kΩ
R550, R551	5183130000	100kΩ
R552	5183106000	10kΩ
R553~R556	5183114000	22kΩ
R557, R558	5183058000	100Ω
R559	5183114000	22kΩ
R560	5183046000	33Ω
R561, R562	6183122000	47kΩ
R563	5183070000	330Ω
R564	5183140000	270kΩ
R565	5183116000	27kΩ
R568	5183122000	47kΩ
R567	5183130000	100kΩ
R568	5183094000	3.3kΩ
R569, R570	5183122000	47kΩ
R571	5183134000	150kΩ
R572	5183122000	47kΩ
R573	5183094000	3.3kΩ
R574	5183134000	150kΩ
R575	5183116000	27kΩ
R576	5183122000	47kΩ
R577	5183130000	100kΩ
R578	5183094000	3.3kΩ
R579, R580	5183114000	22kΩ
R581, R582	6183070000	330Ω
R583	5183134000	150kΩ
R584	5183116000	27kΩ
R585	5183122000	47kΩ

REF. NO.	PARTS NO.	DESCRIPTION
R586	5183130000	100kΩ
R587	5183094000	3.3kΩ
R588~R590	5183114000	22k
R591	5183122000	47kΩ
R592, R593	5183114000	22kΩ
R594	5183082000	1.0kΩ
R595	5183122000	47kΩ
R596	5183070000	330Ω
R597	5183074000	470Ω
R598, R599	5183122000	47kΩ
R600	5183082000	1.0kΩ
R601	5183076000	560Ω
R602	5183110000	15kΩ
R603	5183122000	47kΩ
R604	5183130000	100kΩ
R605	5183094000	3.3kΩ
R606	5183122000	47kΩ
R607	5183106000	10kΩ
R608, R609	5183130000	100kΩ
R610	5183114000	22kΩ
R611	5183094000	3.3kΩ
R612	5183130000	100kΩ
R613	5183076000	560Ω
R614	5183110000	15kΩ
R615	5183122000	47kΩ
R616	5183130000	100kΩ
R617	5183094000	3.3kΩ
R618	5183122000	47kΩ
R619, R620	5183106000	10kΩ
R621, R622	5183130000	100kΩ
R623, R624	5183114000	22kΩ
R625	5183094000	3.3kΩ
R626	5183130000	100kΩ
R627	5183094000	3.3kΩ
R628	5183106000	10kΩ
R629	5183130000	100kΩ
R630	5183082000	1.0kΩ
R631~R633	5183130000	100kΩ
R634, R636	5183068000	100Ω
R636	5183084000	1.2kΩ
R637	5183108000	12kΩ
R638	5183114000	22kΩ
R639	5183106000	10kΩ
R640	5183120000	39kΩ
R641	5183106000	10kΩ
R642	5183068000	270Ω
R643, R644	5183106000	10kΩ
R645	5183068000	270Ω
R646, R647	5183106000	10kΩ
R648, R649	5183122000	47kΩ
R650, R651	5183114000	22kΩ
R652, R653	5183122000	47kΩ
R654, R655	5183114000	22kΩ
R656~R658	5183090000	2.2kΩ
R659	5183110000	15kΩ
R660, R661	5183114000	22kΩ
R662	5183100000	5.6kΩ
R663	5183088000	1.8kΩ
R664~R670	6183122000	47kΩ
R671	5183098000	4.7kΩ
R672	5183114000	22kΩ
R673	5183094000	3.3kΩ
R674	△ 5184753000	220Ω 1W Nonflammable
R675	5183122000	47kΩ
R676	5183122000	47kΩ

REF. NO.	PARTS NO.	DESCRIPTION
R678, R679	5183106000	10kΩ
R680	5183080000	820Ω
R681	5183084000	1.2kΩ
R682	5183088000	1.8kΩ
R683	5183060000	820Ω
R684	5183114000	22kΩ
R685	△ 5184410000	3.3Ω 5W
R686	5183050000	47Ω
R687	5183086000	1.5kΩ
R689, R690	5183114000	22kΩ
R691	5183092000	2.7kΩ
R692	5183080000	620Ω
R693	5183114000	22kΩ
R694	△ 5184410000	Cement 3.3Ω 5W 10%
R695	5183050000	47Ω
R696	5183094000	3.3kΩ
R697	5183114000	22kΩ
R698	5183034000	10Ω
R699	5183082000	150Ω
R700	5183034000	10Ω
R701	5183074000	470Ω
R702	5183082000	1kΩ
R703	5183058000	100Ω
	CAPACITORS	
C501	5054204000	Ceramic 0.01μF 50V ±10%
C502~C508	5172996000	Elec. 2.2μF 50V
C507, C506	5173013000	Elec. 10μF 50V
C508	5054204000	Ceramic 0.01μF 50V ±10%
C510~C512	5172992000	Elec. 1μF 50V
C513	5054204000	Ceramic 0.01μF 50V ±10%
C514	5054664100	Dip. Tant. 0.1μF 35V ±20%
C515, C516	5173013000	Elec. 10μF 50V
C517	5054204000	Ceramic 0.01μF 50V ±10%
C518	5173017000	Elec. 22μF 10V
C519, C520	5054204000	Ceramic 0.01μF 50V ±10%
C521	5260222800	Elec. (LL) 33μF 15V
C522	5172992000	Elec. 1μF 50V
C523	5173008000	Elec. 4.7μF 50V
C524	5172992000	Elec. 1μF 50V
C525	5173006000	Elec. 4.7μF 50V
C526	5170489000	Mylar 0.0056μF 100V ±10%
C527, C528	5173013000	Elec. 10μF 50V
C529, C530	5054204000	Ceramic 0.01μF 50V ±10%
C531	5172992000	Elec. 1μF 50V
C532	5173013000	Elec. 10μF 50V
C533	5172996000	Elec. 2.2μF 50V
C534	5172933000	Elec. 100μF 10V
C535	5172917000	Elec. 33μF 25V
C536	5173017000	Elec. 22μF 10V
C537	5172904000	Elec. 10μF 63V
C538~C541	5054204000	Ceramic 0.01μF 50V ±10%
C542	5173006000	Elec. 4.7μF 50V
C543	5173013000	Elec. 10μF 50V
C544, C545	5054204000	Ceramic 0.01μF 50V
	CONNECTOR PLUGS	
P501	5122131000	7P(WHT)
P502	5122128000	4P(WHT)
P503, P504	5122134000	10P(WHT)
P505	5122130000	6P(WHT)
P506	5122128000	4P(WHT)

REF. NO.	PARTS NO.	DESCRIPTION
P507	5122127000	3P(WHT)
P508	5122126000	2P(WHT)
P509	5122299000	2P(RED)
P513	5122183000	2P(BLK)
P514	5336107300	3P(YEL)
P519	5336107200	2P(YEL)
P520	5122301000	4P(RED)
	MISCELLANEOUS	
	5800293500	Heat Sink
	5800294100	Bracket, Control PCB
	5033291000	Plate, Insulating
	5033295000	Tube, Insulating

REC/PLAY PCB ASSY

REF. NO.	PARTS NO.	DESCRIPTION
	5200074821	PCB Assy
	5210074800	PCB
	IC's	
U101	5147028000	JRC-4558D-D
U102	5147064000	JRC-4559D-D
	TRANSISTORS	
Q101~Q107	5145103000	FET, 2SK-68AM
Q108	5147178000	2SC-1684S
Q109	5042553000	2SA-733P
Q110	5145103000	FET, 2SK-68AM
Q111	5145178000	2SC-1684S
Q112	5042553000	2SA-733P
Q113	5145178000	2SC-1684S
Q116~Q118	5143178000	2SC-1684S
Q119	5042625000	2SC-1318S
Q120	5145178000	2SC-1684S
	DIODES	
D101~D109	5143118000	1S2473HJ
D110, D111	5042213000	IN60
D112	5143118000	1S2473HJ
D114~D119	5143118000	1S2473HJ
	CARBON RESISTORS	
R101	5183034000	10Ω
R102	5183013800	220kΩ
R103	5183072000	390Ω
R104, R105	5183146000	470kΩ
R106	5183118000	33kΩ
R107	5183082000	1.0kΩ
R112, R113	5183082000	1.0kΩ
R114	5183130000	100kΩ
R115	5183090000	2.2kΩ
R116	5183122000	47kΩ
R117	5183082000	1.0kΩ
R118	5183030000	100kΩ
R119	5183124000	56kΩ
R121	5183082000	1.0kΩ
R123	5183082000	1.0kΩ

REF. NO.	PARTS NO.	DESCRIPTION	
R125, R126	5183146000	470kΩ	
R127~R130	5183130000	100kΩ	
R131, R132	5183140000	270kΩ	
R133	5183130000	100kΩ	
R135, R136	5183116000	27kΩ	
R137, R138	5183122000	47kΩ	
R139	5183054000	68Ω	
R142	5183082000	1.0kΩ	
R143	5183128000	82kΩ	
R144	5183130000	100kΩ	
R145	5183094000	3.3kΩ	
R146	5183066000	220Ω	
R147	5183082000	1.0kΩ	
R148	5183100000	5.6kΩ	
R149	5183094000	3.3kΩ	
R150, R151	5183106000	10kΩ	
R152~R155 ⚠	5183074000	470Ω	
R157	5183058000	100Ω	
R158	5183146000	470kΩ	
R159	5183106000	10kΩ	
R160	5183082000	1.0kΩ	
R161	5183130000	100kΩ	
R162	5183090000	2.2kΩ	
R163	5183114000	22kΩ	
R164	5183130000	100kΩ	
R165	5183124000	56kΩ	
R166	5183108000	12kΩ	
R167	5183130000	100kΩ	
R168	5183114000	22kΩ	
R174, R175 ⚠	5183074000	470Ω	
R177	5183082000	1.0kΩ	
R178	5183092000	2.7kΩ	
R179	5183114000	22kΩ	
R180	5183110000	15kΩ	
R181	5183086000	1.5kΩ	
R182	5183138000	220kΩ	
R183	5183082000	100Ω	
R184	5183034000	10Ω	
R185	5183082000	1kΩ	
R186	5183034000	10Ω	
R187, R188	5183130000	100kΩ	
R189, R190	5183114000	22kΩ	
R191	5183122000	47kΩ	
R192	5183114000	22kΩ	
R193	5183126000	68kΩ	
R194	5183112000	18kΩ	
R195	5183108000	12kΩ	
R196	5183076000	560Ω	
R197	5183130000	100kΩ	
R198 ⚠	5184223000	8.2Ω	Nonflammable
R199, R200	5183122000	47kΩ	
R201	5183082000	1.0kΩ	
R202	5183100000	5.6kΩ	
R203	5183034000	10Ω	
R204	5183014600	470kΩ	

CAPACITORS

C101	5263107010	Polyst.	470pF	100V	±5%
C102	5173044000	Elec.	100μF	10V	
C103	5170427000	Mylar	0.012μF	100V	±5%
C104	5172317000	Ceramic	270pF	50V	±10%
C105	5173013000	Elec.	10μF	50V	

MONITOR AMPL, PCB ASSY

REF. NO.	PARTS NO.	DESCRIPTION
C106	5172996000	Elec. 2.2μF 50V
C107	5172300000	Ceramic 10pF 50V ±10%
C108	5173728000	Polyst. 470pF 100V ±5%
C109	5170449000	Mylar 0.1μF 100V ±5%
C110	5172314000	Ceramic 150pF 50V ±10%
C111	5173045000	Elec. 100μF 16V
C112	5172996000	Elec. 2.2μF 50V
C113	5170401000	Mylar 0.001μF 100V ±5%
C114	5173035000	Elec. 47μF 10V
C115~C118	5173036000	Elec. 47μF 16V
C119	5172996000	Elec. 2.2μF 50V
C120	5173013000	Elec. 10μF 50V
C121	5170405000	Mylar 0.0015μF 100V
C122	5172300000	Ceramic 10pF 50V
C123, C124	5173036000	Elec. 47μF 16V
C125	5170453000	Mylar 0.15μF 100V ±5%
C126	5171565000	Elec. 10μF 16V (LR)
C127	5170419000	0.0056μF 100V ±5%
C128	5170423000	0.0082μF 100V ±5%
C129	5170413000	0.0033μF 100V ±5%
C130	5170419000	Mylar 0.0056μF 100V ±5%
C131	5263106810	Polyst. 390pF 100V ±5%
C132	5260080800	Elec. (EU) 3.3μF 25V
C133	5173000000	Elec. 3.3μF 50V
C134	5267205800	TRIMMER M-291009
C135	5260082200	Elec. (EU) 22μF 25V
C136~C139	5263107010	Polyst. 470pF 100V ±5%
C140	5170411000	Mylar 0.0027μF 100V ±5%
C141~C143	5260080200	Elec. (EU) 0.22μF 50V ±10%
	VARIABLE RESISTORS	
R108	5150154000	Semi-fixed 10kΩ(B)
R109	5280001100	Semi-fixed 20kΩ(B)
R110	5150154000	Semi-fixed 10kΩ(B)
R111	5280001100	Semi-fixed 20kΩ(B)
R120	5150152000	Semi-fixed 2kΩ(B)
R122	5150152000	Semi-fixed 2kΩ(B)
R140	5150157000	Semi-fixed 100kΩ(B)
R141	5150156000	Semi-fixed 50kΩ(B)
R176	5280001102	Semi-fixed 20kΩ(B)
	COILS	
L101, L102	5160107000	Choke, 1.2 mH ±5%
L103	5286010900	Choke, 1.0mH
L104	5286011000	Choke, 2.4mH
L105	5160044000	Trap, 3mH
L106	5286011400	Choke, 1.3 mH
L107	5160107000	Choke, 1.2 mH ±5%
	MISCELLANEOUS	
K101	5290009500	Relay, 24V G2E-182P-H
K102	5290009600	Relay, Reed; RRD51A24
K103	5290008900	Relay, 24V G2V-2
U103	5292201600	BIAS Ampl. module
J101	5122375000	Connector Socket, 4P
J102	5122378000	Connector Socket, 7P
J103	5122377000	Connector Socket, 6P
J104, J105	5122378000	Connector Socket, 7P
J106	5122379000	Connector Socket, 8P
J107	5122378000	Connector Socket, 7P
J108	5122375000	Connector Socket, 4P
T101	5320200300	Step-up Transformer
	5800289400	Step-up Metal Fitting

REF. NO.	PARTS NO.	DESCRIPTION
	5200078200	PCB Assy
	5210078200	PCB
	IC's	
U301	5147064000	JRC-4559D-D
U302	5220406800	TA7230P
	TRANSISTORS	
Q301, Q401	5145103000	FET, 2SK-68AM
	DIODES	
D301, D401	5143118000	1S2473HJ
	CARBON RESISTORS	
R301, R401	5183034000	10Ω
R302, R402	5183108000	12kΩ
R303, R403	5183142000	330kΩ
R304, R404	5183154000	1.0MΩ
R305, R405	5183074000	470Ω
R306, R406	5183100000	5.6kΩ
R307, R407	5183130000	100kΩ
R308, R408	5183130000	100kΩ
R309, R409 ⚠	5183074000	470Ω
R310, R410	5183126000	68kΩ
R311, R411	5183120000	39kΩ
R312, R412	5183082000	1.0kΩ
R313, R413	5183034000	10Ω
R314	⚠ 5184237000	33Ω Nonflammable
	CAPACITORS	
C301, C401	5173013000	Elec. 10μF 50V
C302, C402	5260065610	Elec. (B.P) 1μF 50V
C303, C403	5173036000	Elec. 47μF 16V
C304, C404	5173013000	Elec. 10μF 50V
C305, C405	5173045000	Elec. 100μF 16V
C307, C407	5170449000	Mylar 0.1μF 100V ±5%
C308, C408	5173072000	Elec. 470μF 16V
C309, C409	5173037000	Elec. 47μF 25V
C311, C312	5173072000	Elec. 470μF 16V
	MISCELLANEOUS	
U303	5292201500	OSC Unit, 150kHz
	5122380000	Connector Socket, 9P
	5122381000	Connector Socket, 10P
	5122376000	Connector Socket, 5P

POWER SUPPLY PCB ASSY

REF. NO.	PARTS NO.	DESCRIPTION
	5200074301	PCB Assy
	5210074300	PCB
	IC	
U801	⚠5220405100	UPC-78M05H
	TRANSISTORS	
Q801	5145133000	2SC-1645B
Q802	5042625000	2SC-1318S
Q803	⚠5145087000	2SD-313E
Q804	5145091000	2SC-945AK
Q806, Q807	5145091000	2SC-945AK
Q808	⚠5145087000	2SD-313E
Q809, Q810	5042553000	2SA-733P
Q811	⚠5145129000	2SB-507E
Q812, Q813	⚠5145091000	2SC-945AK
	DIODES	
D801~D805	⚠5224014500	1SR35-200H
D806	5143118000	1S2473HJ
D807~D810	⚠5224014500	1SR35-200H
D811	5042514000	WZ-061, Zener
D812~D815	⚠5224014500	1SR35-200H
D816	5042514000	WZ-061, Zener
D817	5143118000	1S2473HJ
D818	⚠5228007200	D4BB, Silicon Stad
D819~D822	⚠5224014500	1SR35-200H
D823	⚠5143297000	WZ-240, Zener
D824	5143283000	WZ-140, Zener
D825	⚠5224014500	1SR35-200H
	CARBON RESISTORS	
R801	⚠5180050000	47Ω 1/2W
R802	⚠5180046000	33Ω 1/2W
R803	5183104000	8.2kΩ
R804	5183114000	22kΩ
R805	⚠5184302000	1.5Ω Cement 2W ±10%
R806	5183102000	6.8kΩ
R807	5183106000	10kΩ
R808	5183096000	3.9kΩ
R809	5183112000	18kΩ
R810	5183102000	6.8kΩ
R812	5183090000	2.2kΩ
R813	5183098000	4.7kΩ
R814	5183058000	100Ω
R815	5183090000	2.2kΩ
R816	5183082000	1.0kΩ
R817	5183102000	6.8kΩ
R818	5183100000	5.6kΩ
R819	5183106000	10kΩ
R820	5183090000	2.2kΩ
R821	5183098000	4.7kΩ
R822	5183058000	100Ω
R823	5183090000	2.2kΩ
R824	5183146000	470kΩ
R825, R826	5183106000	10kΩ
R827	⚠5184249000	100Ω Nonflammable
R828	5183092000	2.7kΩ
R829	⚠5184249000	100Ω Nonflammable
R830	5183086000	1.5kΩ
R831	5183128000	82kΩ
R832	5183130000	100kΩ

REF. NO.	PARTS NO.	DESCRIPTION
	CAPACITORS	
C801	⚠5173081000	Elec. 1000μF 16V
C802	⚠5173079000	Elec. 1000μF 6.3V
C803	⚠5173084000	Elec. 1000μF 50V
C805	5173056000	Elec. 220μF 35V
C806, C807	5173075000	Elec. 470μF 50V
C808	5173046000	Elec. 100μF 25V
C809	5172992000	Elec. 1μF 50V
C810	5173046000	Elec. 100μF 25V
C811	5054204000	Ceramic 0.01μF 50V ±10%
C812, C813	5173075000	Elec. 470μF 50V
C814	5173046000	Elec. 100μF 25V
C815	5172992000	Elec. 1μF 50V
C816	5173046000	Elec. 100μF 25V
C817	5054204000	Ceramic 0.01μF 50V ±10%
C818, C819	⚠5173084000	Elec. 1000μF 50V
C820, C821	⚠5173089000	Elec. 2200μF
C822	5172992000	Elec. 1μF 50V
C823	5054204000	Ceramic 0.01μF 50V ±10%
C824	5173075000	Elec. 470μF 50V
C826	⚠5173047000	Elec. 100μF 35V
C827	5173073000	Elec. 470μF 25V
C829	5173046000	Elec. 100μF 25V
C830, C831	5173013000	Elec. 10μF 50V
C832~C836	⚠5263164500	Metalized 0.047μF 250V ±10%
C837	⚠5173047000	Elec. 100μF 35V
C838	⚠5263164500	Metalized 0.047μF 250V ±10%
C840	5172992000	Elec. 1μF 50V
C841	5173066000	Elec. 330μF 50V
	MISCELLANEOUS	
	5800303400	Bracket, Power Supply PCB
	5800303500	Heat Sink
	5033291000	Plate, Insulating; 1S-313D
	5033295000	Tube, Insulating; P

AUXILIARY POWER SUPPLY PCB ASSY

REF. NO.	PARTS NO.	DESCRIPTION
	5200086000	PCB Assy
	5210086000	PCB
	TRANSISTORS	
Q851	5145087000	2SD313E
	5033291000	Plate, insulate, A-18
	5033295000	Tube, insulate, A-24B
Q852	5145091000	2SC945AK
Q853	5145043000	2SA720Q
	DIODE	
D851	504251400	WZ-061, Zener

REF. NO.	PARTS NO.	DESCRIPTION
		CARBON RESISTORS
R851	5183084000	1.2kΩ
R852	5183092000	2.7kΩ
R853	5183082000	1kΩ
R854	⚠ 5183562000	22kΩ Nonflammable
		CAPACITORS
C851	5173013000	Elec. 10μF 50V
C852	5172992000	Elec. 1μF 50V
C853	5173047000	Elec. 100μF 35V
		MISCELLANEOUS
	5800369000	Holder, PCB assy

IN/OUT SELECT PCB ASSY

REF. NO.	PARTS NO.	DESCRIPTION
	5200078000	PCB, Assy
	5210078000	PCB
		TRANSISTORS
Q201, Q202	5145178000	2SC-1684S
		DIODES
D351~D357	5042517000	1S2473VE
D358, D359	5143315000	WO3C
D360	5042554000	RD6.2EB, 3%; Zener
		CARBON RESISTORS
R351	5183092000	4.7kΩ
R352	5183090000	2.2kΩ
R353	5183084000	1.2kΩ
R354	5240172200	47kΩ
R355	5240168200	1.0kΩ
R356	5240172200	47kΩ
R357	5240168200	1.0kΩ
R358	5240172200	47kΩ
R359	5240168200	1.0kΩ
R360	5240172200	47kΩ
R361	5240168200	1.0kΩ
R362	5240172200	47kΩ
R363	5240172400	56kΩ
R364, R365	5183092000	4.7kΩ
R366~R371	5240169000	2.2kΩ
R372, R373	5240175000	680kΩ
		CAPACITORS
C341, C342	5260067310	Elec. 10μF 50V ±20%
C351~C354	5173028000	Elec. 33μF 25V
		CONNECTOR PLUGS
P201	5122128000	4P(WHT)
P202	5122129000	5P(WHT)
P203	5122131000	7P(WHT)
P204	5122130000	6P(WHT)
P205	5122128000	4P(WHT)
P206, P207	5122134000	10P(WHT)

SPEED SW PCB ASSY (PC Board Omitted)

REF. NO.	PARTS NO.	DESCRIPTION
	5200074500	PCB Assy, Speed Switch
	5210074500	PCB
	5300027700	Push Switch, 3-gang

MOTHER PCB ASSY

REF. NO.	PARTS NO.	DESCRIPTION
	5200077900	PCB Assy
	5210077900	PCB
		CONNECTOR PLUGS
P101	5122356000	4P
P102	5122359000	7P
P103	5122358000	6P
P104, P105	5122359000	7P
P106	5122360000	8P
P107	5122359000	7P
P108	5122356000	4P
P111~P114	5122126000	2P(WHT)
P171	5122135000	11P(WHT)
P191	5122132000	8P(WHT)
P192	5122126000	2P(WHT)
P301	5122152000	9P(WHT)
P302	5122151000	8P(WHT)
P303	5122145000	2P(WHT)
P304	5122150000	7P(WHT)
P305	5122153000	10P(WHT)
P306, P307	5122147000	4P(WHT)
P308	5122145000	2P(WHT)
P309	5122146000	3P(WHT)
P310	5122151000	8P(WHT)
P311	5122361000	9P
P312	5122362000	10P
P313	5122357000	5P

PUNCH IN/OUT PCB ASSY (PC Board Omitted)

REF. NO.	PARTS NO.	DESCRIPTION
	5200077700	PCB Assy
	5210077700	PCB
Q901, Q902	5145178000	Transistor, 2SC-1684S
R901	5183034000	Resistor, Carbon 10Ω
R902	5183122000	Resistor, Carbon 47kΩ
R903	5183098000	Resistor, Carbon 4.7kΩ
R904	5183106000	Resistor, Carbon 10kΩ
R905	5183122000	Resistor, Carbon 47kΩ
C901	5172996000	Capacitor Elec. 2.2μF 50V
	5330008300	Jack, Mic

TASCAM 32
TEAC Production Products

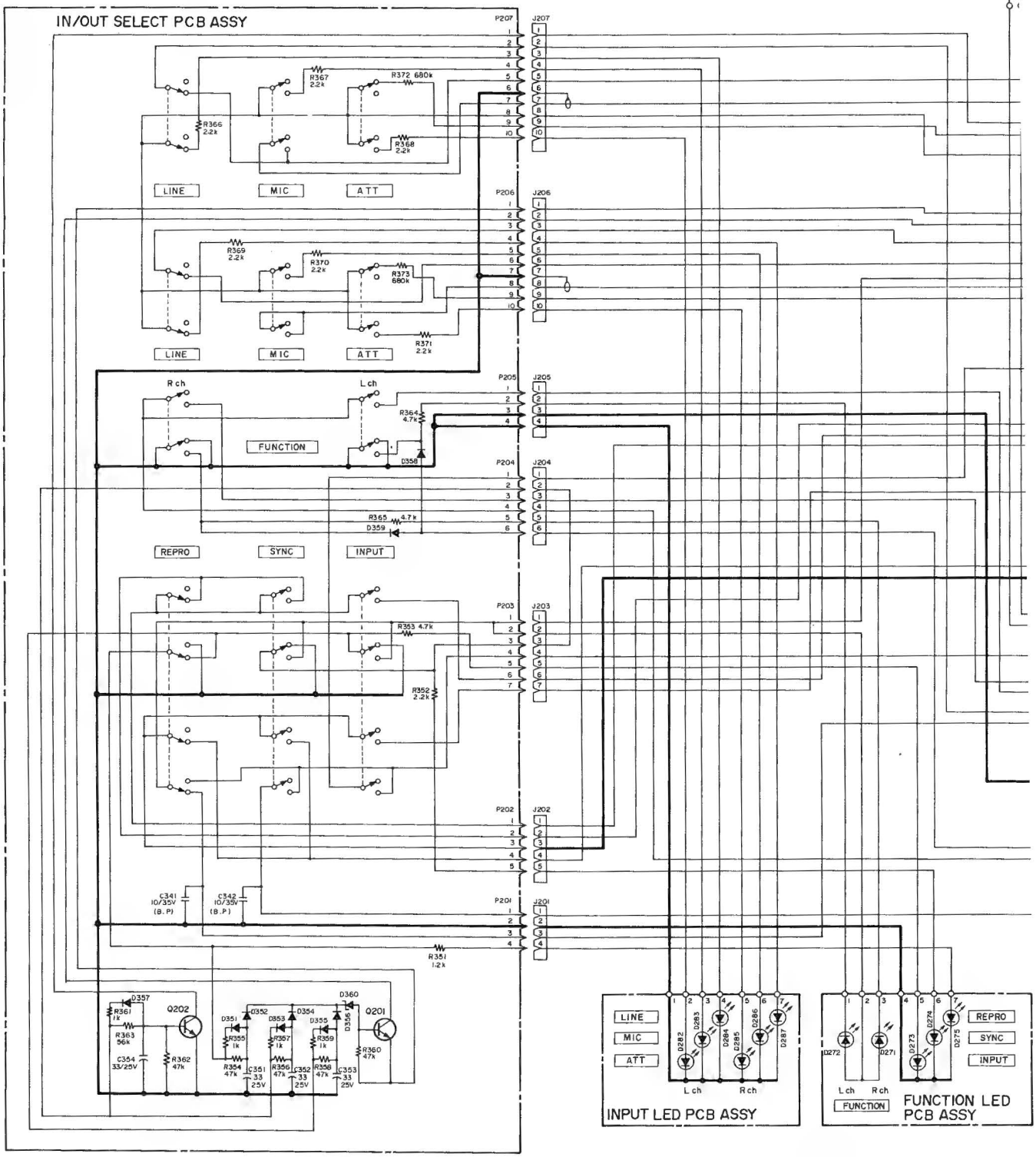
WIRING CIRCUIT DIAGRAM

IN/OUT SELECT PCB ASSY
Q201,Q202 2SC1684S

D351∿D357 IS2473VE
D358,D359 W03C
D360 RD6.2EB

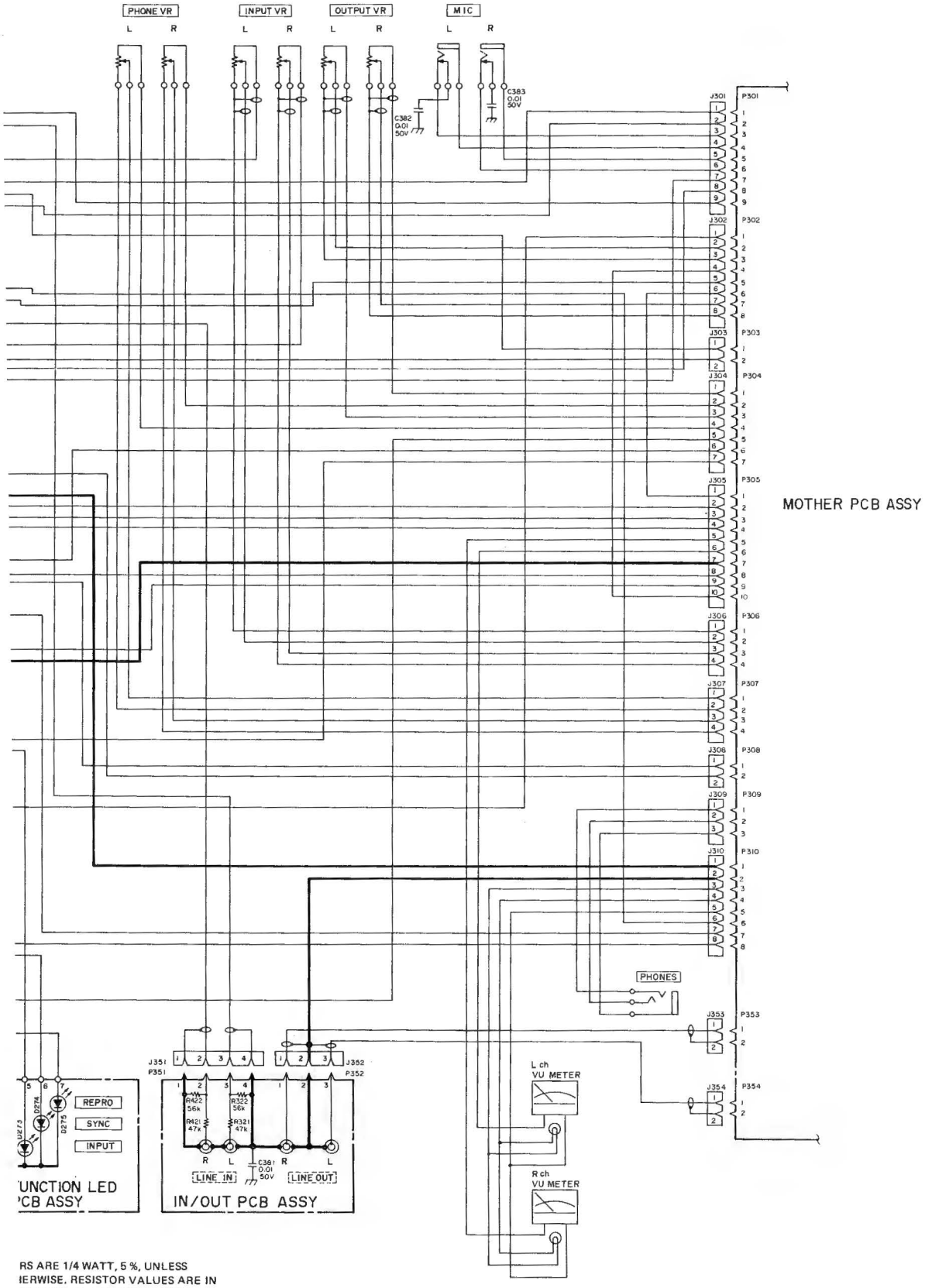
FUNCTION LED PCB ASSY
D271∿D275 GL-9PR2

INPUT LED PCB ASSY
D282∿D284, D286∿D288 GL-9PR2



NOTES

1. ALL RESISTORS ARE 1/4 WATT, 5 %, MARKED OTHERWISE. RESISTOR VA OHMS (k = 1,000 OHMS, M = 1,000,000
2. ALL CAPACITOR VALUES ARE IN MI (p = PICOFARADS).
3. ⚠ PARTS MARKED WITH THIS SIGN CRITICAL COMPONENTS – REFER T PARTS LIST AND ENSURE EXACT RE



RS ARE 1/4 WATT, 5 %, UNLESS
IERWISE. RESISTOR VALUES ARE IN
00 OHMS, M = 1,000,000 OHMS).
OR VALUES ARE IN MICROFARADS
ADS).
RKED WITH THIS SIGN ARE SAFETY
MPONENTS – REFER TO THE TEAC
ND ENSURE EXACT REPLACEMENT.

TASCAM 32 AMPLIFIER SCHEMATIC DIAGRAM

TEAC Production Products

REC/PLAY AMPL. PCB ASSY

U101	JRC-4558D-D
U102	455900
U103	BIAS OSC AMPL
Q101~Q107	2SK68AM
Q108	2SC1684S
Q109	2SA733P
Q110	2SK68AM
Q112	2SA733P
Q113	2SC1684S
Q115~Q118	
Q119	2SC1318S
Q120	2SC1684S
D101~D108	IS2473HJ
D110, D111	IN60
D114~D119	IS2473HJ

MONITOR AMPL. PCB ASSY

U301	455900
U302	TA7230P
U303	BIAS OSC MASTER
Q301, Q401	2SK68AM
D301, D401	IS2473HJ

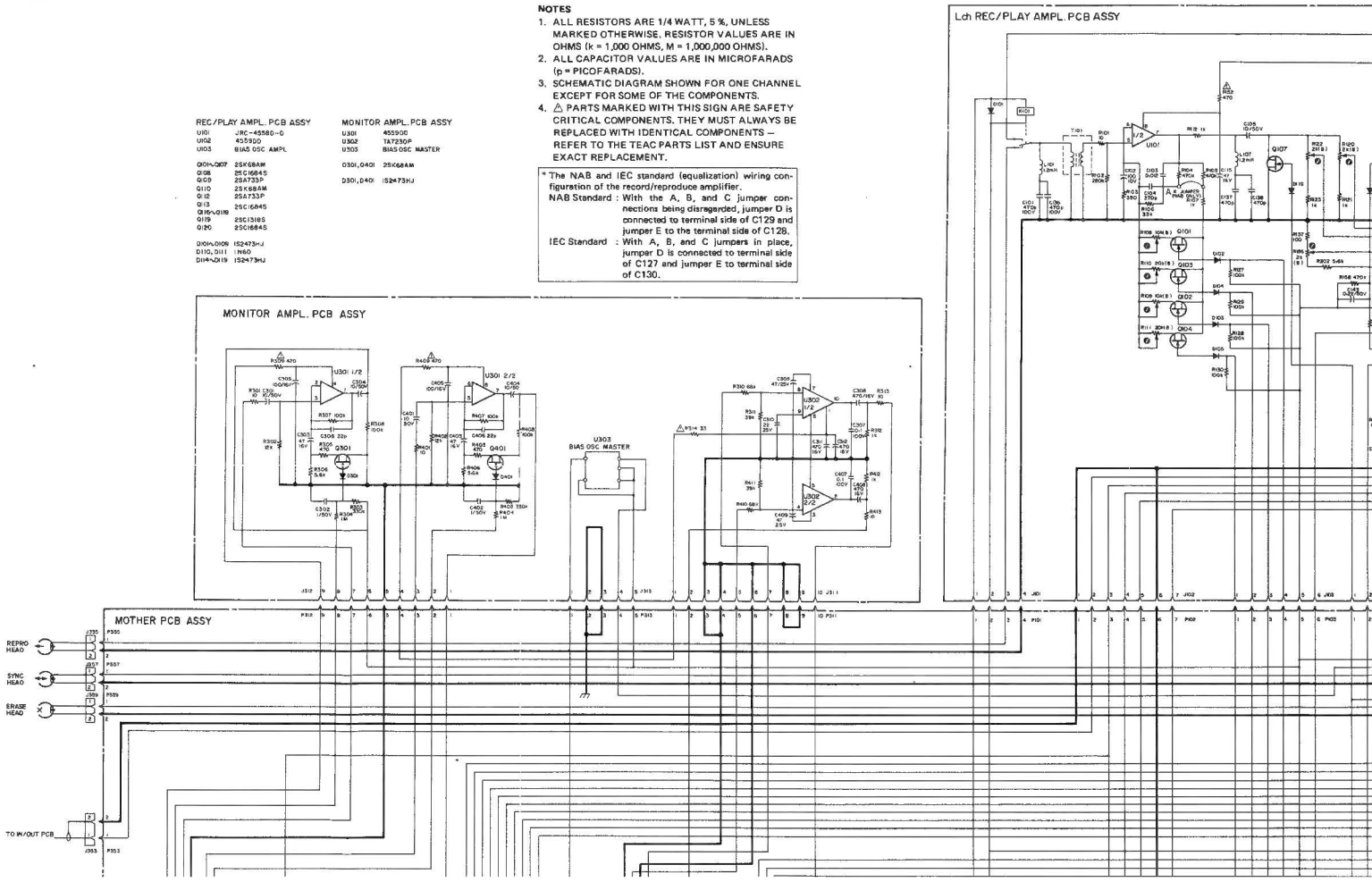
NOTES

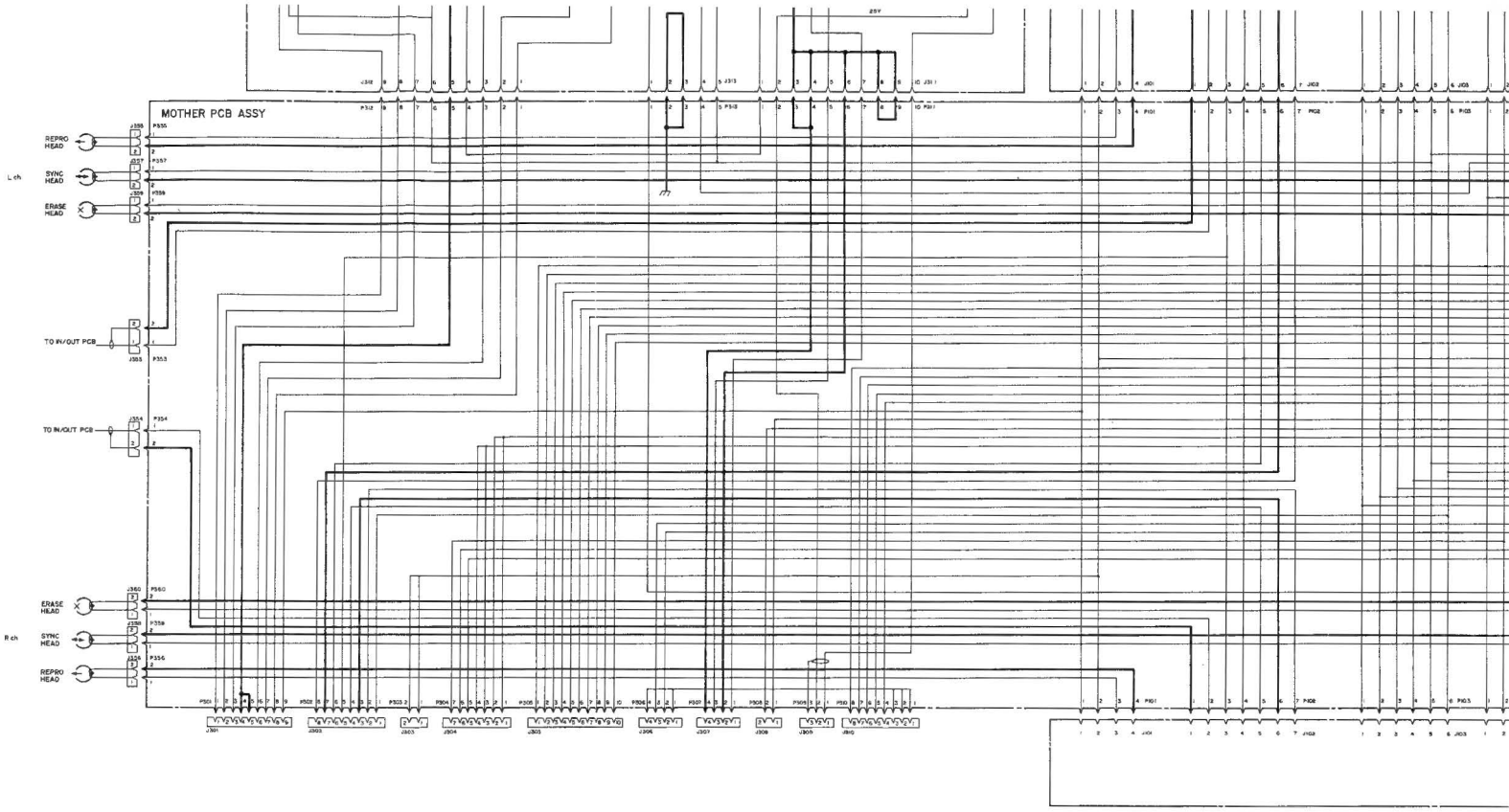
1. ALL RESISTORS ARE 1/4 WATT, 5 %, UNLESS MARKED OTHERWISE. RESISTOR VALUES ARE IN OHMS (k = 1,000 OHMS, M = 1,000,000 OHMS).
2. ALL CAPACITOR VALUES ARE IN MICROFARADS (p = PICOFARADS).
3. SCHEMATIC DIAGRAM SHOWN FOR ONE CHANNEL EXCEPT FOR SOME OF THE COMPONENTS.
4. △ PARTS MARKED WITH THIS SIGN ARE SAFETY CRITICAL COMPONENTS. THEY MUST ALWAYS BE REPLACED WITH IDENTICAL COMPONENTS — REFER TO THE TEAC PARTS LIST AND ENSURE EXACT REPLACEMENT.

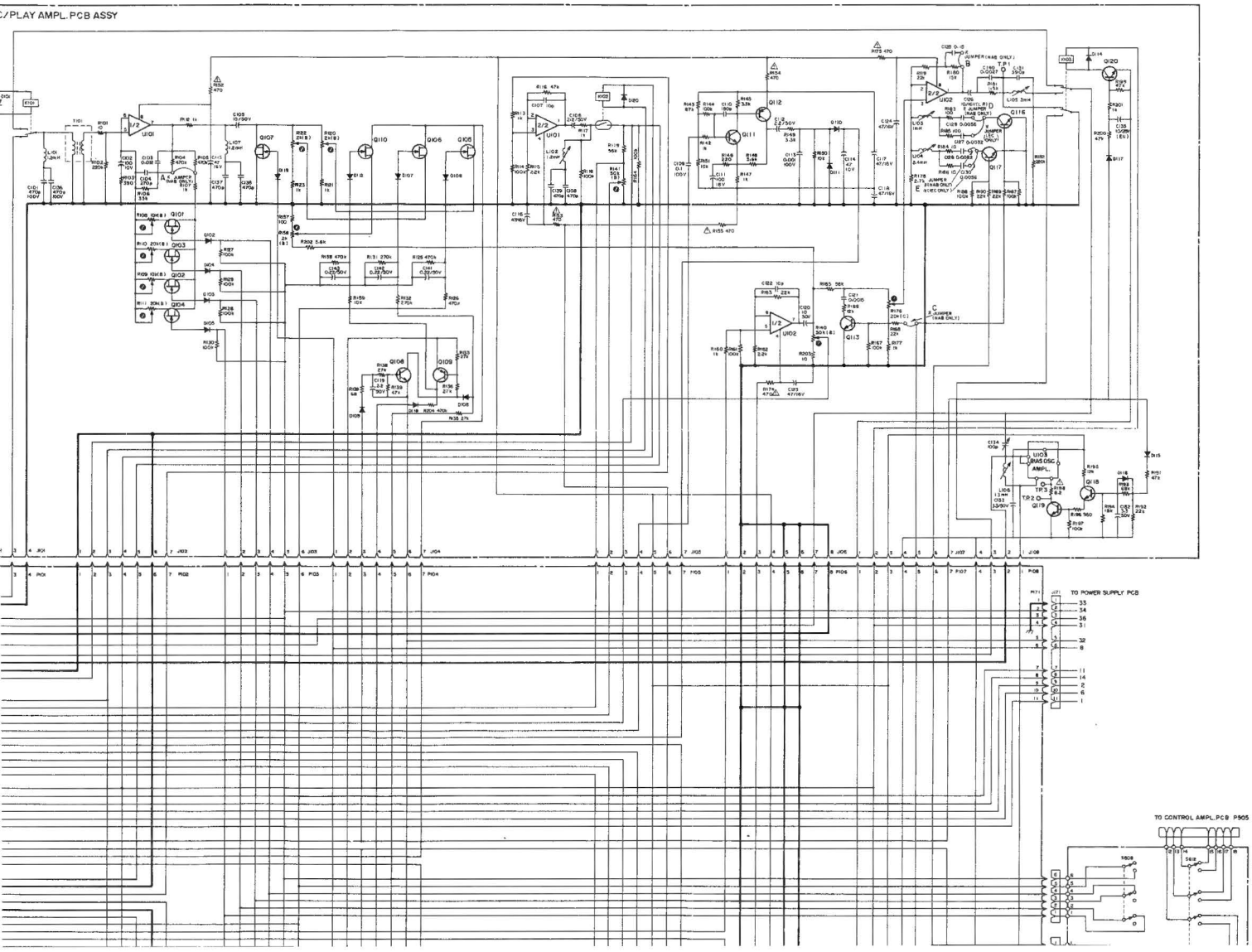
* The NAB and IEC standard (equalization) wiring configuration of the record/reproduce amplifier.

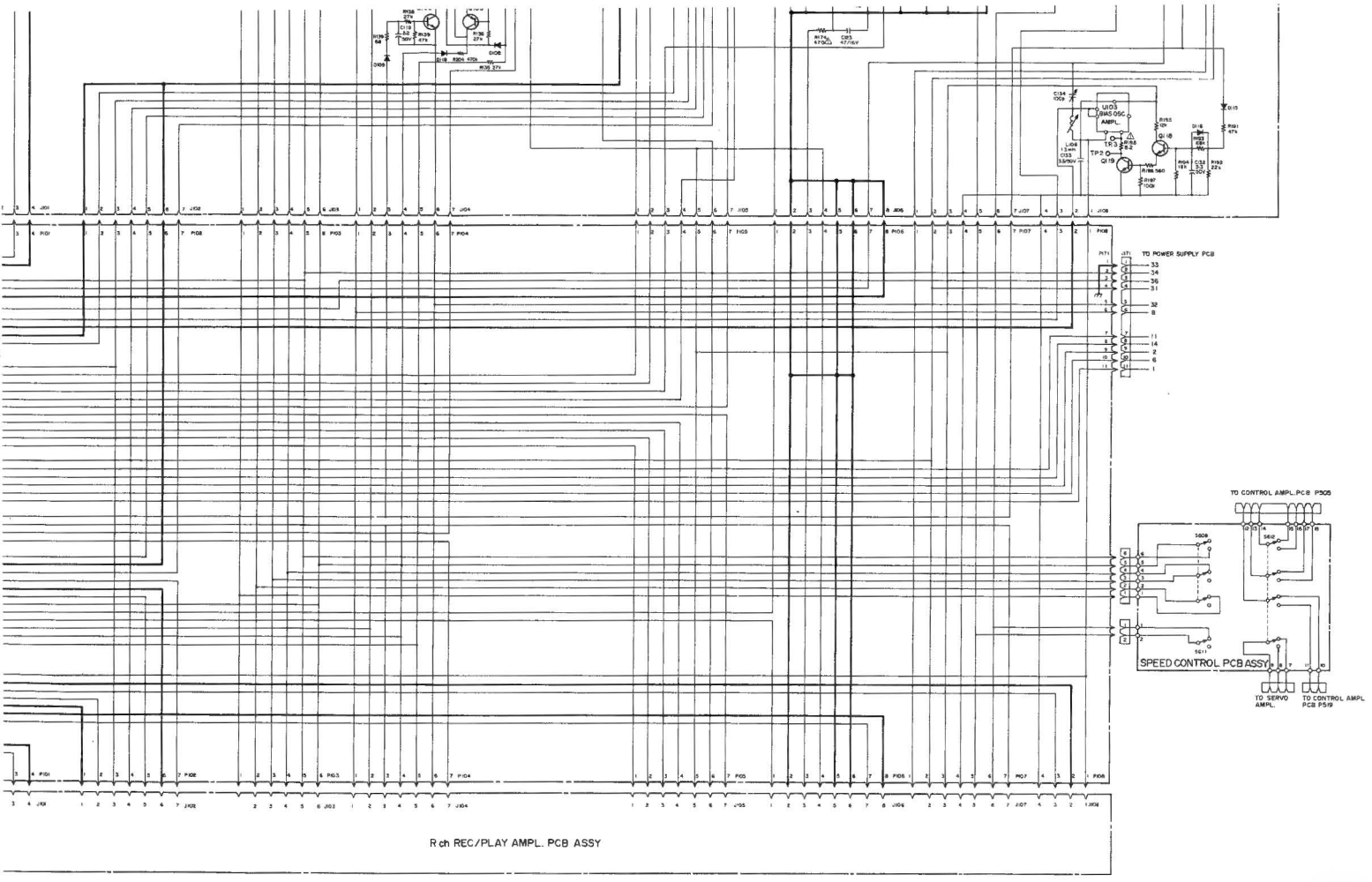
NAB Standard : With the A, B, and C jumper connections being disregarded, jumper D is connected to terminal side of C129 and jumper E to the terminal side of C128.

IEC Standard : With A, B, and C jumpers in place, jumper D is connected to terminal side of C127 and jumper E to terminal side of C130.




MOTHER PCB ASSY
REPRO HEAD
SYNC HEAD
ERASE HEAD
L ch
TO IN/OUT PCB
TO IN/OUT PCB
ERASE HEAD
SYNC HEAD
REPRO HEAD
R ch

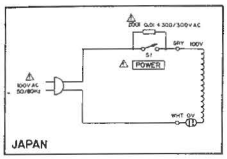

C/PLAY AMPL. PCB ASSY
TO POWER SUPPLY PCB
TO CONTROL AMPL. PCB P505

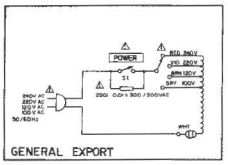

TO POWER SUPPLY PCB
TO CONTROL AMPL. PCB P305
SPEED CONTROL PCB ASSY
TO SERVO AMPL.
TO CONTROL AMPL PCB P5/9
R ch REC/PLAY AMPL. PCB ASSY

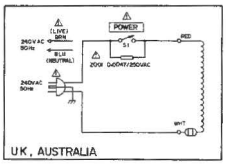
TASCAM 32

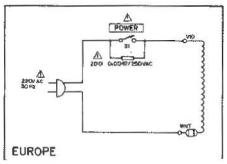
TEAC Production Products

TAPE TRANSPORT
SCHEMATIC DIAGRAM









CONTROL PCB

Q501~Q509	2SC1684S
Q510	2SA733P
Q511	2SC1684S
Q513~Q523	2SC1684S
Q524	2SC945AK
Q525	2SA733P
Q526	2SC1684S
Q528	2SC1684S
Q529	2SC945AK
Q530	2SA733P
Q531, Q532	2SC1684S
Q533	2SC945AK
Q534	2SA733P
Q535	2SC945AK
Q536	2SA1200
Q537	2SD313E
Q538	2SC1684S
Q539	2SD794Q
Q540	2SC1684S
Q541	2SC1684S
Q542	2SD794Q
Q543	2SC945AK
Q544	2SA733P
Q545	2SC945AK
Q546	2SA733P
Q547	2SC945AK
Q548	2SC1815
Q549	2SD313E
Q550	2SC945AK
Q551	2SA733P
Q552	2SC1815
Q553	2SB507E
Q554	2SC945AK
Q555	2SA733P
Q556	2SC1815
Q557	2SD313E
Q558	2SC1815
Q559	2SD313E
Q560	2SC1815
Q561	2SD313E
D501~D512	IS2473HJ
D513, D514	ISR35-200H
D515~D518	IS2473HJ
D519	33V-20H
D520	ISR35-200H
D521~D523	IS2473HJ
D524	33V-20H
D525	ISR35-200H
D526~D531	IS2473HJ
D532~D535	ISR35-200H
D536~D539	IS2473HJ
U501~U504	SN7400N
U505~U514	SN7400N
U515	SN7474N
U516~U517	μPC393
U519	M54410P

POWER SUPPLY PCB

Q801	2SC1645
Q802	2SC1815
Q803	2SD313E
Q804	2SC945AK
Q806, Q807	2SC945AK
Q808	2SD313E
Q809, Q810	2SA733P
Q811	2SB507E
Q812, Q813	2SC945AK
D801~D804	ISR35-200H
D805	ISR35-200H
D806	IS2473HJ
D807~D810	ISR35-200H
D811	W2-06I
D812~D815	ISR35-200H
D816	W2-06I
D817	IS2473HJ
D818	D4BB
D819~D822	ISR35-200H
D823	W2-240
D824	W2-140
D825	ISR35-200H
U801	7805H
Q851	2SD313E
Q852	2SC945AK
Q853	2SA1200
D851	W2-06I

PUNCH IN/OUT PCB

Q901,Q902	2SC1684S

SENSER /SHUT OFF PCB

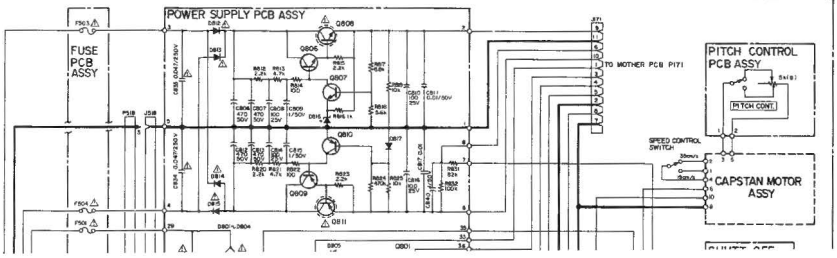
PH501	SN38
PH502,PH503	SJ3W

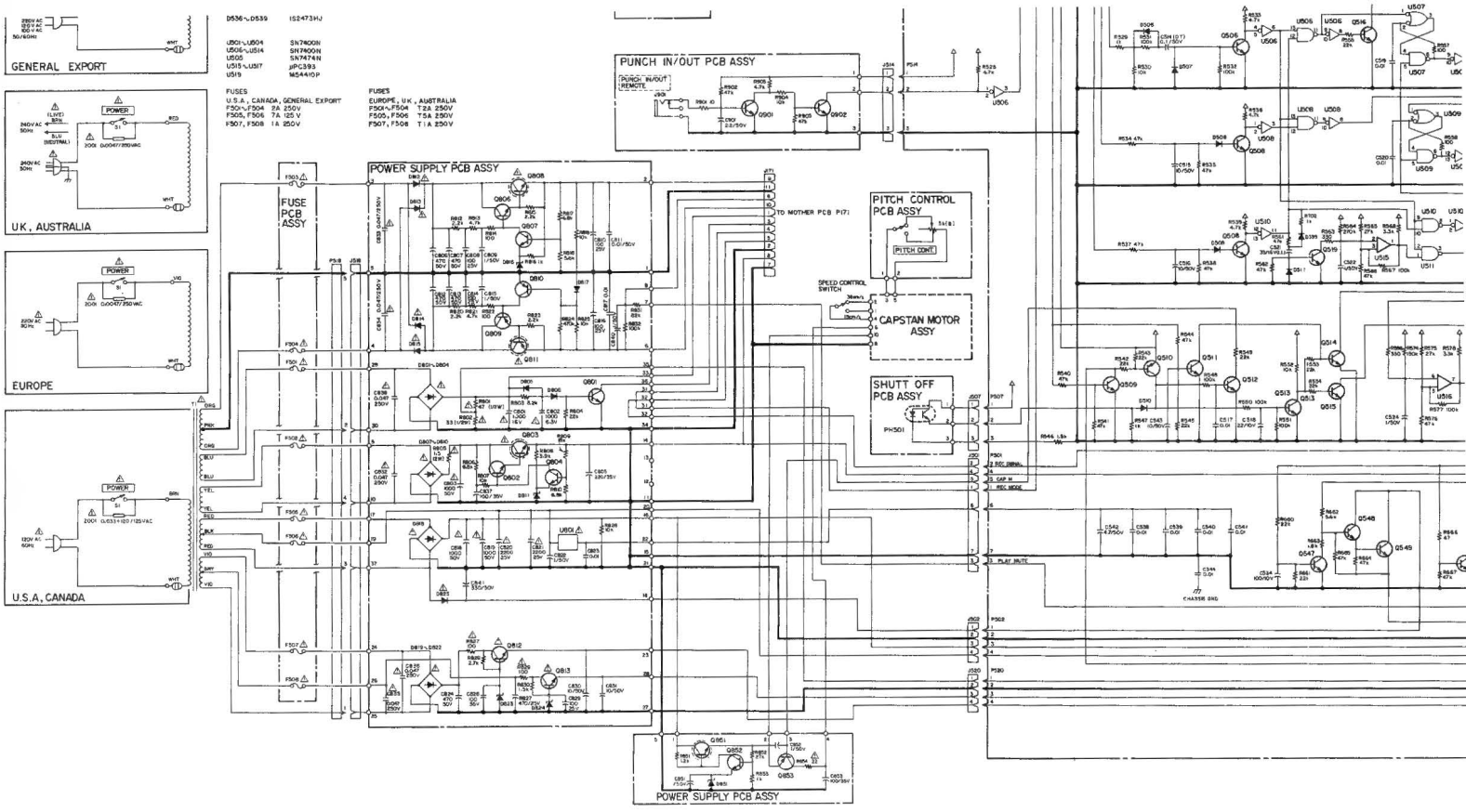
FUSES
U.S.A., CANADA, GENERAL EXPORT

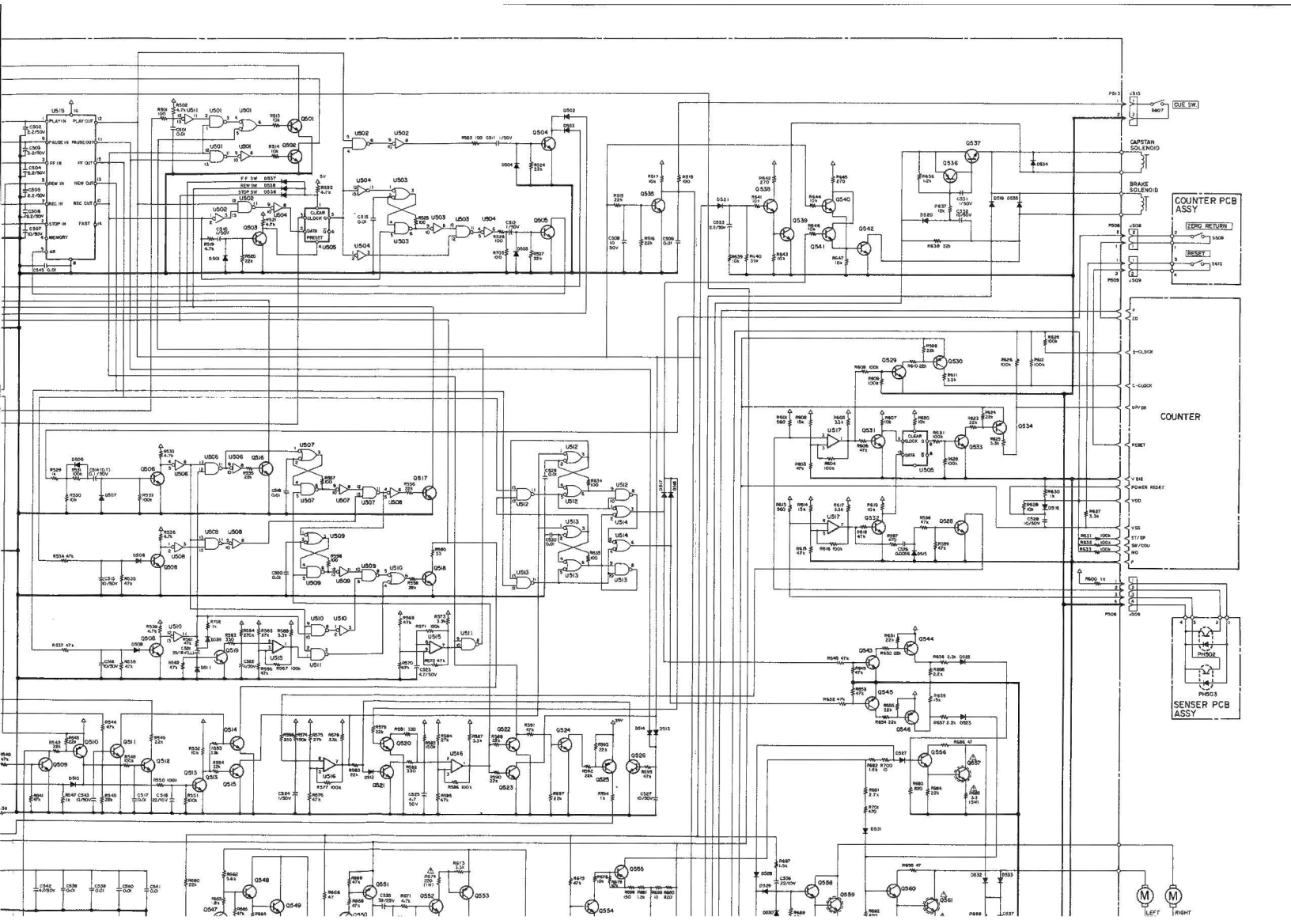
F501~F504	2A 250V
F505, F506	7A 125 V
F507, F508	1A 250V

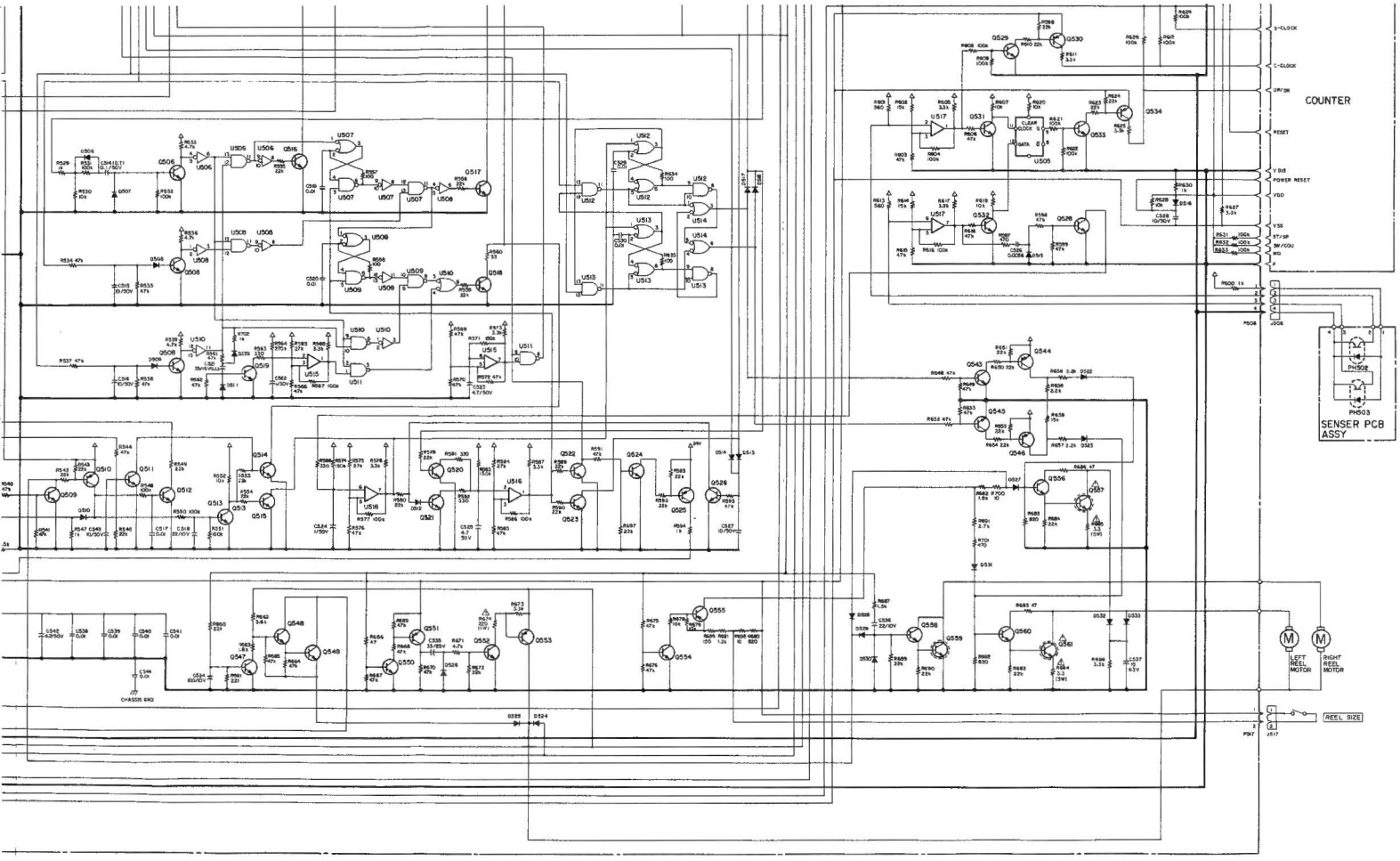
FUSES
EUROPE, U.K., AUSTRALIA

F501~F504	T2A 250V
F505, F506	T5A 250V
F507, F508	T1A 250V




GENERAL EXPORT
UK, AUSTRALIA
EUROPE
U.S.A, CANADA
FUSE PCB ASSY
POWER SUPPLY PCB ASSY
PUNCH IN/OUT PCB ASSY
PUNCH IN/OUT REMOTE
PITCH CONTROL PCB ASSY
PITCH CONT
SPEED CONTROL SWITCH
CAPSTAN MOTOR ASSY
SHUTT OFF PCB ASSY
TO MOTHER PCB P171
CHASSIS GND
FUSES
U.S.A., CANADA, GENERAL EXPORT
F501~F504 2A 250V
F505, F506 7A 125 V
F507, F508 1A 250V
FUSES
EUROPE, UK, AUSTRALIA
F501~F504 T2A 250V
F505, F506 T5A 250V
F507, F508 T1A 250V


CUE SW
CAPSTAN SOLENOID
BRAKE SOLENOID
COUNTER PCB ASSY
ZERO RETURN
RESET
COUNTER
SENSER PCB ASSY
LEFT
RIGHT


COUNTER
S-CLOCK
C-CLOCK
UP/DN
RESET
V DIS
POWER RESET
VDD
VSS
ST/SP
3M/COU
MIG
SENSER PCB ASSY
PH502
PH503
LEFT REEL MOTOR
RIGHT REEL MOTOR
REEL SIZE

REMOTE PCB ASSY (PC Board Omitted)

REF. NO.	PARTS NO.	DESCRIPTION
	5200073700	PCB Assy
	5210073700	PCB
J902	5334010100	Connector Socket, 12P
	5554099100	Bracket, Connector

SENSOR PCB ASSY (PC Board Omitted)

REF. NO.	PARTS NO.	DESCRIPTION
	5200073900	PCB Assy
	5210073900	PCB
PH502, PH503	5228007500	Photo Interrupter, SJ3W
	5800299300	Bracket, Photo Interrupter

SHUT OFF PCB ASSY (PC Board Omitted)

REF. NO.	PARTS NO.	DESCRIPTION
	5200073800	PCB Assy
	5210073800	PCB
PH501	5228007400	Photo Interrupter, SM3B

COUNTER PCB ASSY (PC Board Omitted)

REF. NO.	PARTS NO.	DESCRIPTION
	5200074000	PCB Assy, Counter
	5210074000	PCB
S609	5300025700	Push SW, 2-2
S610	5300028100	Push SW, 2-2 Non lock

PITCH CONTROL PCB ASSY (PC Board Omitted)

REF. NO.	PARTS NO.	DESCRIPTION
	5168938000	PCB Assy, Pitch Control
	5167938000	PCB
	5150239000	Variable Resistor, Semi-fixed; 5kΩ(B)

INPUT LED PCB ASSY (PC Board Omitted)

REF. NO.	PARTS NO.	DESCRIPTION
	5200078300	PCB Assy
	5210075700	PCB, Function
D282~D284	5225007900	Diode, GL-9PR2
D286~D288	5225007900	Diode, GL-9PR2

FUSE PCB ASSY (PC Board Omitted)

REF. NO.	PARTS NO.	DESCRIPTION
	5200078510	PCB Assy [U, C, GE]
	5200078520	PCB Assy [E, UK, A]
	5210078500	PCB [U, C, GE]
	5210076400	PCB [E, UK, A]
	FUSES	
F501~F504	⚠5307004100	2A 250V [U, C, GE]
F505, F506	⚠5307004700	7A 125V [U, C, GE]
F507, F508	⚠5307003600	1A 250V [U, C, GE]
F501~F504	⚠5142189000	T2A 250V [E, UK, A]
F505, F506	⚠5142193000	T5A 250V [E, UK, A]
F507, F508	⚠5041140000	T1A 250V [E, UK, A]
	MISCELLANEOUS	
	5041237000	Fuse Holder [U, C, GE]
	5332014200	Fuse Holder [E, UK, A]

FUNCTION LED PCB ASSY (PC Board Omitted)

REF. NO.	PARTS NO.	DESCRIPTION
	5200078400	PCB Assy
	5210078400	PCB
D271~D275	5225007900	Diode, LED GL-9PR2

IN/OUT PCB ASSY (PC Board Omitted)

REF. NO.	PARTS NO.	DESCRIPTION
	5200078100	PCB Assy
	5210078100	PCB
R321, R421	5183122000	47kΩ
R322, R422	5183124000	56kΩ
C381	5054204000	Ceramic Capacitor 0.01μF 50V ±10%
P311	5122128000	Connector Plug 4P(WHT)
P312	5122127000	Connector Plug 3P(WHT)
	5126038000	Terminal, In/Out

OPERATION PCB ASSY (PC Board Omitted)

REF. NO.	PARTS NO.	DESCRIPTION
	5200073600	PCB Assy
	5210073600	PCB
S601~S606	5138011000	Takt Switch, AKC-8C
D601	5225007900	Diode, LED GL-9PR2 (RED)
D602	5225007100	Diode, LED GL-9NG2 (GRN)