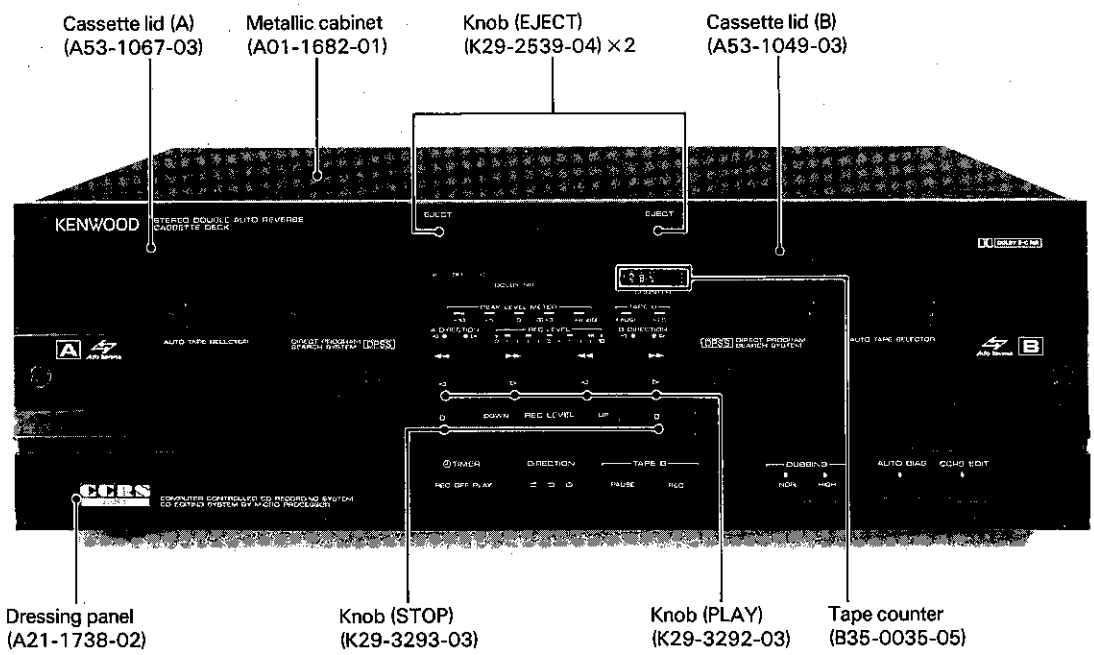
STEREO DOUBLE AUTO REVERSE CASSETTE DECK

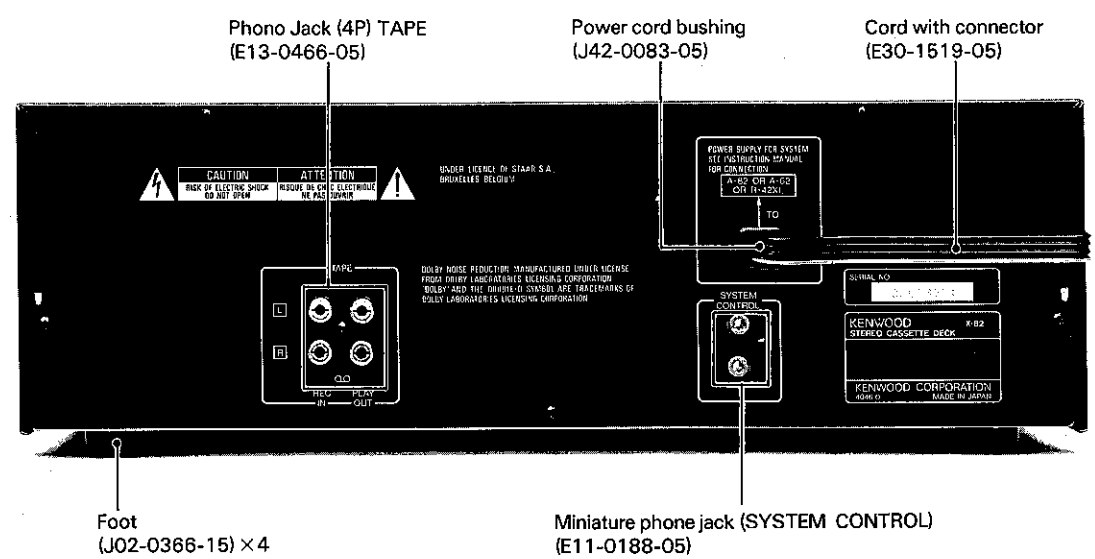
X-82

SERVICE MANUAL

KENWOOD

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CAUTION

In the MIDI systems, no power supply is provided with the cassette deck, to which the power is supplied from the amplifier. For this reason, when servicing, supply the power to the cassette deck using the amplifier, or temporary power supply as noted in the service manual of each model.

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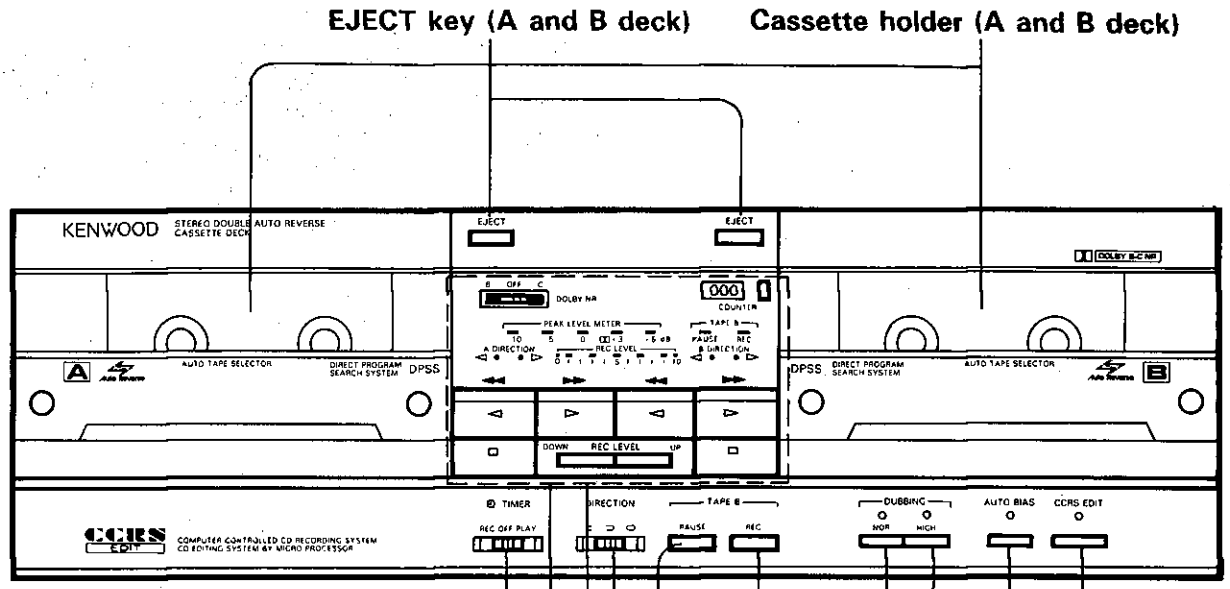
POWER SUPPLYING METHOD WHEN REPAIRING

Since this unit does not provide the power supply, supply the power in either of the following:

1. Supply the power from the amplifier (A-62 ~ A-92, R-42) included in the MIDI system.
2. Supply the AC voltage to the AC pin on the printed circuit board. (**AC 15V**)

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CONTROL AND INDICATOR



TIMER switch
OFF:
PLAY:
REC:

CCRS EDIT key
(for B deck only)

AUTO BIAS key
(for B deck only)

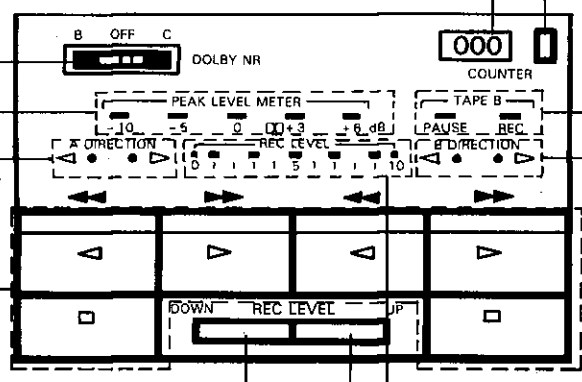
REC key
(for B deck only)

DUBBING keys
NOR. key:
HIGH key:

PAUSE key (for B deck only)

DIRECTION switch
Normal mode (⇄):
Reverse mode (⇉):
Endless mode (↻):

COUNTER Reset button
(for B deck only)



DOLBY NR B/C switch

PEAK LEVEL METER

DIRECTION indicator
(A deck)

REC indicators/
PAUSE indicators
(for B deck only)

DIRECTION indicator
(B deck)

Control keys (common
to both A and B decks)
Stop key (□)
Rewind key (◄◄)
Fast-forward key (►►)
Reverse play key (◁)
Play key (▷)

REC LEVEL meters (for B deck only)

REC LEVEL control (for B deck only)

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OPERATION

■ Operation of the CD REC key

With this function, you can listen to the sound from any source other than tape while recording from the CD player (optional) onto the cassette deck.

1. **Load the CD to be recorded into the CD player.**
2. **Press the EJECT key(s) of the cassette deck(s) to be used, and insert a tape that can be used for recording.**
3. **Set the DIRECTION switch as required.**

   For one-side recording ... ⇄
   For two-side recording ... ⊃

4. **When the use of the dolby noise reduction system is required, set the DOLBY NR switch to B or C.**
5. **Press the CD REC key on the amplifier.**
6. **Press the PLAY/PAUSE key of the CD player twice to set the CD player to the play-pause mode.**
7. **While pressing the PAUSE key of the recording deck, press the REC key to set the deck to the record-pause mode.**
8. **Press the PLAY/PAUSE key of the CD player.**
   - The CD player starts playing, and at the same time, the cassette deck starts recording.
   - When the CD player finishes playing, the cassette deck will enter the stop mode after leaving a blank (non-recorded) section of about four seconds.
9. **In the above condition, you can select any source other than CD or TAPE to be listened to, with the input selector switches of the amplifier.**
10. **After recording is over, press the CD REC key of the amplifier to release CD REC operation.**
    - The CD REC key cannot be released before releasing the recording mode on the cassette deck.

■ CCRS (Computer-controlled CD recording system) EDIT (Deck B only)

The CD playback sound can automatically be edited and recorded at the optimum level.

How to operate

1. **Properly load a CD into the CD player.**
2. **Insert a tape that can be used for recording into deck B.**
   - Rewind the tape completely before inserting it.
3. **Set the DIRECTION switch as required.**

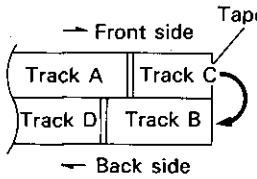
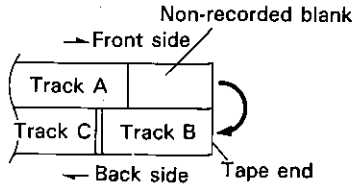
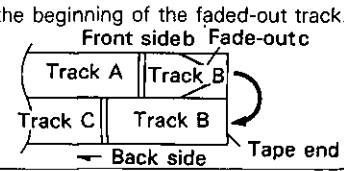
   For one-side recording ..... ⇄
   For two-side recording ..... ⊃

4. **When the use of the dolby noise reduction system is required, set the DOLBY NR switch to B or C.**
5. **Referring to "Types of edited recording", set the CD player's play mode as required.**
6. **Press the CCRS EDIT key on the cassette deck.**
   - The CD player starts a search operation, to set the optimum level, and then the cassette deck starts the auto bias operation.
   - These settings are completed in about 120 seconds, at which time recording from the CD player to deck B starts automatically.
   - To stop the CCRS EDIT function, open the disc tray or press the stop (□) key.

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OPERATION

■ Types of edited recording

CD Player Mode	PGM EDIT mode (Both PGM and EDIT indicators lit)	PGM mode (PGM indicator lit)	TRACK mode (TRACK indicator lit)
Editing Content	Arranges the order of the tracks in the specified period of time, so that no track ends in the middle of any tape end. 	Records tracks in the same order as on the CD, in a way that no track ends in the middle of a tape end. 	Records tracks in the same order as on the CD, so that any track which should end in the middle of a tape end* fades out, and go that the back side starts with the beginning of the faded-out track. 
Setting Method	1. Press the CD player's EDIT key. 2. Within 5 seconds after pressing the EDIT key, enter the recording time of the tape to be used with the CD player's numeric keys, 1 to 0 and +10.	Press the CD player's P.MODE key for programming.	Press the CD player's P.MODE key so that the TRACK indicator lights on the display.

* Fade-out: Gradual decrease in the sound until a final disappearance.

Notes:

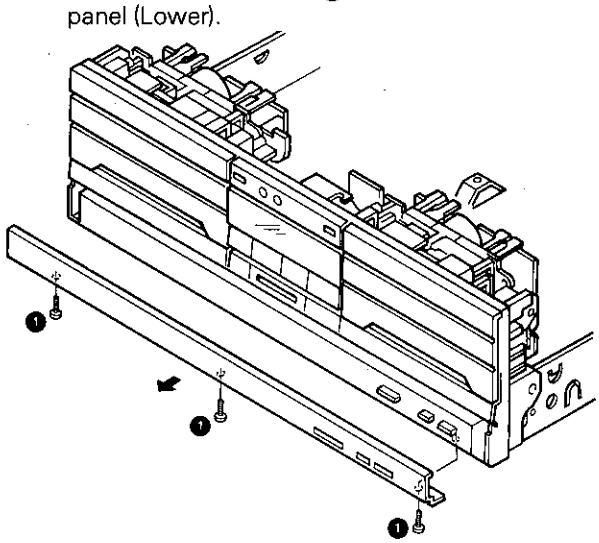
1. **When the CCRS EDIT key is pressed during a CD playback, the CD player stops playback and starts the CCRS EDIT operation.**
2. **When the remaining tape is short, the CCRS operation may be released mid-way.**
3. **Since the CCRS operates to search the peak level of the source signal, an optimum level may not be obtained. In this case, record with the normal recording operation.**
4. **The recording level cannot be adjusted while recording with the CCRS.**
5. **The CCRS level is canceled when the OPEN/CLOSE key of the CD player is pressed, or its power is switched off. If the AUTO BIAS has been set with the cassette deck (which is indicated by the lighting of its AUTO BIAS indicator), the bias setting is maintained, even after canceling the CCRS.**
6. **The AUTO BIAS setting of the cassette deck is canceled by pressing the EJECT key of deck B.**
7. **In the case where a track on a CD lasts for a period longer than the recording time of one side of a tape, which may occur when recording classical music, the CCRS EDIT function cannot be used with the CD. In such a case, record the CD as follows.**
   - **(1) If CCRS recording is required, press the deck's CCRS EDIT key. When, in about 120 seconds, the CD player's play indicator (►) lights up, press the CD player's STOP key just before playback starts. If CCRS recording is not required, skip this step and start with step (2).**
   - **(2) While holding down the cassette deck's PAUSE key, press the REC key to enter Record-pause mode.**
   - **(3) Press the CD player's PLAY/PAUSE key.**

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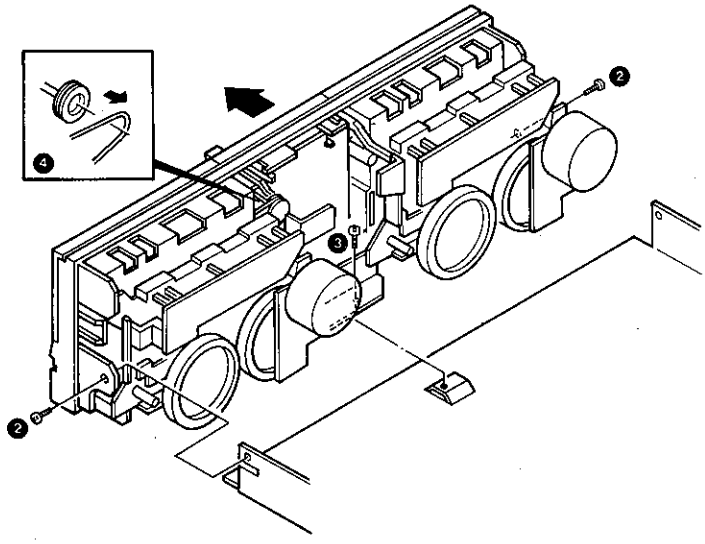
DISASSEMBLY FOR REPAIR

Remove the cases before proceeding to the following.

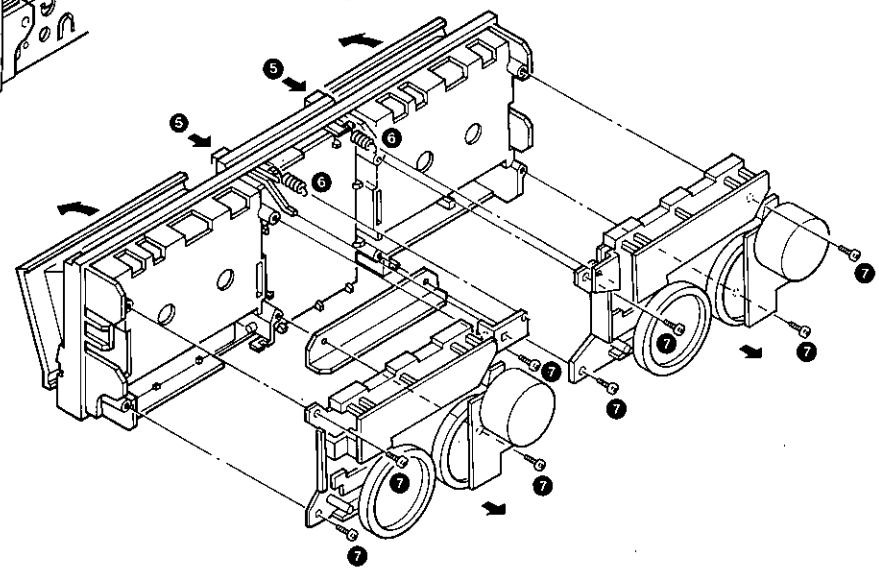
1. Remove the 3 screws ❶ , and take out the dressing panel (Lower).



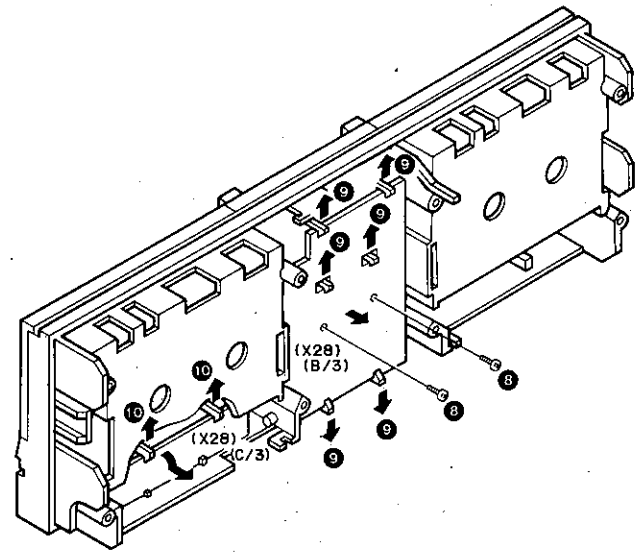
2. Remove the 2 screws ❷ .
3. Remove the screw ❸ , and take out the sub-panel in the direction of the arrow.
4. Remove the tape counter belt ❹ .



5. Press the EJECT key ❺ to open the cassette holder.
6. Remove the spring ❻ .
7. Remove the 4 screws ❼ , and take out the Mechanism Ass'y (common procedure for mechanisms A and B).

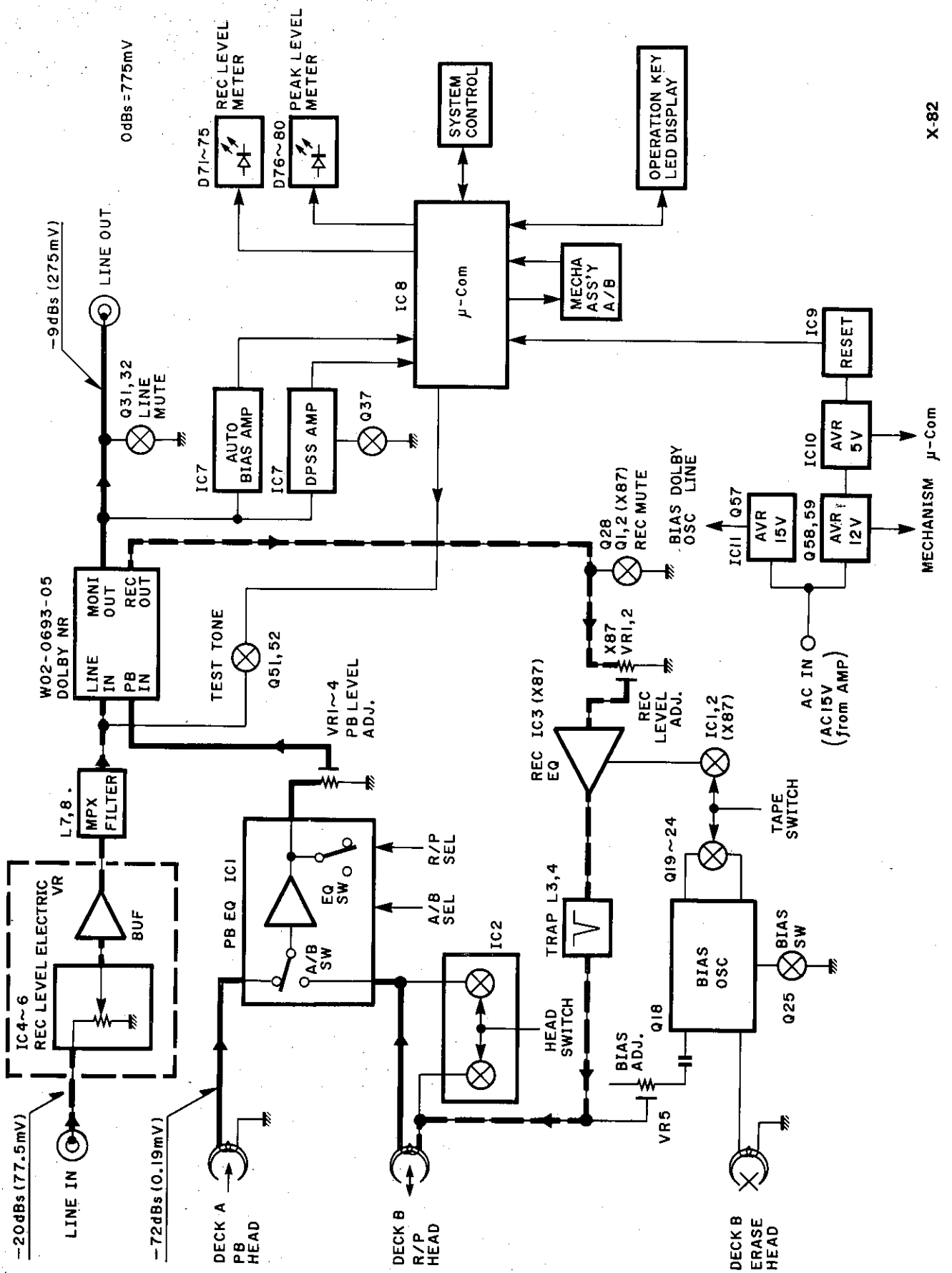


8. Remove the 2 screws ❽ .
9. Disengage the 6 claws ❾ , and take out the Record/Play Amp Unit (B/3).
10. Disengage the 2 claws ❿ , and take out the Record/Play Amp Unit (C/3).



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BLOCK LEVEL DIAGRAM



X-82

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CIRCUIT DESCRIPTION

DESCRIPTION OF COMPONENTS

Record/playback amplifier unit (X28-1940-00)

Components	Parts No.	Use/Function	Operation/Conditions/Interchangeability
Q1, 2	2SC945(A)(Q, P)	Play of deck A at high-speed dubbing, high frequency compensation selection	OFF only at high-speed dubbing, and ON at other modes
Q3~6	2SC945(A)(Q, P)	Playback output level adjustment selection	At play of deck A . . Q3 and Q4: ON, Q5 and Q6: OFF At play of deck B . . Q3 and Q4: OFF, Q5 and Q6: ON
Q7~8	DTC124EN	Playback output mute	ON at recording, and OFF at other modes
Q9	DTC124EN	Playback EQ selection	ON at 120 μ, and OFF at 70 μ (chrome, metal)
Q10, 11	DTC124EN	Deck A/B selection	At play of deck A . . . Q10: ON, Q11: OFF At play of deck B . . . Q10: OFF, Q11: ON
Q12	DTC124EN	Dolby recording/playback selection	OFF at recording, and ON at other modes
Q13,14	2SC1845(F, E)	Recording bias current adjustment	ON at 120 μ, and OFF at 70 μ
Q15	2SA992(F, E)	Driver of Q13 and Q14	
Q16	DTC124EN	Inverter	Logic setting for Q15 drive
Q18	2SD863	Bias oscillation circuit	
Q19	2SC2320(E, F)	Bias current selection	With metal tape . . . Q19: ON, Q20: OFF
Q20	2SC945(A)(Q, P)		With other tapes . . . Q19: OFF, Q20: ON
Q21~24	2SC2320(E, F)	Auto bias, bias current selection	With normal tape . . . Q22: ON, Others: OFF With chrome tape . . . Q24: ON, Others: OFF When auto bias is set . . . one is ON, or all are OFF.
Q25	2SC2320 (E, F)	Bias current switch	ON at recording (dubbing), and OFF at other modes
Q26, 27	DTC124EN	Recording EQ, high-speed selection	At normal speed . . . Q26: OFF, Q27: ON At high speed . . . Q26: ON, Q27: OFF
Q28	2SA733(A)(Q, P)	Recording mute driver	OFF at recording (dubbing, recording pause), and ON at other modes
Q29	2SC945(A)(Q, P)	Dolby NR OFF switch	ON at dubbing, and OFF at other modes
Q30	2SA733(A)(Q, P)	Line output mute driver	ON at stop mode, and OFF at other modes (ON when auto bias CCRS setting is made)
Q31, 32	2SD1302 (S, T)	Line output muting	ON at stop mode, and OFF at other modes (ON when auto bias CCRS setting is made)
Q33	2SC954(A)(Q, P)	DPSS sensitivity selection	ON at normal running, and OFF at QUE or REV mode
Q34	2SA733(A)(Q, P)	DPSS driver	Change of DPSS signal to 5 V system
Q35	2SC954(A)(Q, P)	Level amplifier sensitivity selection	ON when auto bias is set, and OFF at other times
Q36	2SC945(A)(Q, P)	Level amplifier driver	OFF when auto bias is set, and ON at other times
Q37	2SC954(A)(Q, P)	Level amplifier sensitivity selection	ON at normal running, and otherwise OFF
Q39	2SC954(A)(Q, P)	Motor speed selection A	ON at normal speed, and OFF at high speed
Q40	2SA733(A)(Q, P)		
Q41	2SC945(A)(Q, P)	Motor speed selection B	ON at normal speed, and OFF at high speed
Q42	2SA733(A)(Q, P)		
Q43, 44	2SC3246	Motor switches A and B	ON at running, and OFF at stop
Q45, 47	2SC3246	Solenoid 1 switches A and B	ON when solenoid 1 is kicked, and OFF at other times
Q46, 48	2SC3246	Solenoid 2 switches A and B	ON when solenoid 2 is kicked, and OFF at other times
Q49, 50	DTA124EN	LED drivers	For D109—D112
Q51, 52	2SC945(A)(Q, P)	Auto bias OSC filter switch	ON at 400 Hz oscillation, and OFF at other times
Q53	2SC945(A)(Q, P)	Auto bias signal level shifter	Conversion of DC level from 0 V to 7 V
Q54	2SA733(A)(Q, P)		
Q55	2SC945(A)(Q, P)	Auto bias signal coming-in switch	OFF when auto bias is set, and ON at other times
Q57	2SD1266(Q, P)	15 V AVR emitter-follower	
Q58	2SC1845(F, E)	12 V AVR emitter-follower	Darlington connection
Q59	2SD1266(Q, P)		

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CIRCUIT DESCRIPTION

Components	Parts No.	Use/Function	Operation/Conditions/Interchangeability
Q60	2SA937F	Bias current adjustment OR circuit	ON when one of REC EQ Normal-speed and High-speed Chromes and Metals is "H"
Q61~64	2SA937F	LED drivers	For D71—D86
IC1	LA3246	Playback amplifier	With A/B selection
IC2	μPC1330HA	Deck B head selection	
IC3	TD62554S	Recording EQ selection	
IC4	TC9213P	Recording VOL	Microprocessor controlled
IC5, 6	NJM4558D-A	Buffers for IC4	Voltage follower
IC7	NJM4558D	DPSS amplifier, Level amplifier	Amplification, Pseudo logarithmic amplifier
IC8	μPD75108CW-218	Microprocessor	
IC9	M51951ASL	Microprocessor reset	"L" reset type
IC10	μPC7805HF	5 V constant voltage	
IC11	TA78L05AP	15 V constant voltage	

Record amplifier unit (X87-1140-05)

Components	Parts No.	Use/Function	Operation/Conditions/Interchangeability
Q1, 2	2SC2713	Signal muting	When pin 5 of CN2 becomes "H", Q1 and Q2 turn ON so that muting is applied to the input signals from pin 1 of CN1 and pin 9 of CN2.
IC1, 2	BA6251F	Equalizer selection	Pins 1-7 of IC1(2) for which pins 6 and 7 of CN1 and pins 1-4 of CN2 are in connection are controlled to turn ON/OFF each equalizer. When each input pin becomes "H", the corresponding output side (pin 10 to 16 of each IC) conducts to GND(8) to determine the NF constant of IC3.
IC3	M5218P-A	Recording equalizer amplifier	Operation on a single power. The input voltage is pulled up to 1/2 Vn for use. The NF constant is determined by IC1 and IC2 to obtain the recording equalizer property.

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CIRCUIT DESCRIPTION

Microprocessor Operation Specifications

1. Outline of Features

1-1 Microprocessors Used

(1) μPD75108CW-229
The master microprocessor for use in the control of the cassette mechanism (EX-8RII), record/play circuitry and electronic VR circuitry (TC9213P).

1-2 Function Description

(1) Each of Decks A and B is equipped with 7 operation keys, which are used for the FWD PLAY, RVS PLAY, FF, REW, REC, REC PAUSE, PLAY PAUSE and STOP operations.

(2) Relay Play
Provided that cassettes are present in both A and B and the direction mode is ⇄ or ⇉, when the end of the tape is reached in the playback of a deck, the playback of the other deck starts automatically.

(3) Dubbing
Normal dubbing or high-speed dubbing from Deck A to B is possible using the DUBBING key or HI-DUBBING key.

(4) DPSS mode
Skip search, 1-program repeat, dash & play, full-repeat, rewind play, re-rec standby and auto-rec muting operations are possible by pressing a key twice or pressing a key in the middle of an operation.

(5) Timer operation
Timer recording and timer playback are possible by setting the Timer SW.

(6) Auto bias
The optimum bias for each tape can be set by detecting the recording and playback levels at 400 Hz and 10 kHz (Normal tape only).

(7) C.C.R.S.
When the MIDI Amplifier and MIDI CD player are used together with the unit, the CD source can automatically be recording with the optimum level and optimum bias.

(8) Serial communication
When the unit is connected to a system equipped with the serial communication bus, full remote control, bi-directional easy operation and CD player synchro recording are possible.

2. Key description

Key Name	Function	Display
FWD PLAY ▶ (Commom for A and B)	Provided that a cassette is present, this key activates playback in FWD direction. Pressing the key during FWD playback activates 1-program repeat. This key is inhibited while the other deck is in the REC or REC PAUSE mode.	
RVS PLAY ◀ (Common for A and B)	Provided that a cassette is present, this key activates playback in RVS direction. Pressing the key during RVS playback activates 1-program repeat. This key is inhibited while the other deck is in the REC or REC PAUSE mode.	
FF ▶▶ (Common for A and B)	Winds tape to the right reel. Pressing the key during playback activates skip search. Pressing the key during RVS recording activates Re-Rec Standby.	
REW ◀◀ (Common for A and B)	Winds tape high speed to the left reel. Pressing the key during playback activates skip search. Pressing the key during FWD recording activates Re-Rec Standby.	
STOP ■ (Common for A and B)	Interrupts any operation and stops tape.	
REC/ARM ●/◆ (B only)	Starts recording in the current head direction. Pressing the key during recording activates ARM.	The REC indicator (●) lights up. It blinks during ARM, and lights steadily after its end (▮▮●).
PAUSE ▮▮ (Common for A and B)	Changes the mode from REC to REC PAUSE, or from PLAY to PLAY PAUSE.	The PAUSE indicator lights (▮▮).
REC LEVEL UP	Increments the recording level from −∞ to 0 in 1 dB steps. Holding the key for more than 0.35 second increases the level in 0.12 second intervals.	

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CIRCUIT DESCRIPTION

Key Name	Function	Display
REC LEVEL DOWN	Decrements the recording level from 0 to —∞ in 1 dB steps. Holding the key for more than 0.35 second decreases the level in 0.12 second intervals.	
AUTO BIAS (B only)	Activates auto-bias adjustment provided that a recordable cassette is inserted.	The lighting REC indicator goes off, the AUTO BIAS indicator blinks, and it lights steadily after completion of setting.
CCRS (B only)	In interlocked operation with the CD player, adjusts the CD recording level automatically.	The CCRS indicator blinks at high speed. It blinks at low speed during edit recording after completion of setting.
NOR SPEED DUBBING	Starts normal speed dubbing from A→B. Pressing the key during normal dubbing activates ARM on Deck B, and pressing the key again resumes normal dubbing.	The DUBB, NOR and (B)REC (●) indicators light. During ARM, only the (B)REC indicator blinks.
HIGH SPEED DUBBING	Starts high-speed dubbing from A→B. Pressing the key during high-speed dubbing activates ARM on Deck B.	The DUBB, HIGH and (B)REC (●) indicators light. During ARM, only the (B)REC indicator blinks.
DIRECTION SW	Selects one of the following operations to be executed at the time of auto-stop detection. ⇀ ... One-way ⇄ ... Reverse ⟲ ... Endless	
TIMER START SW	Sets the operation mode to be performed at Power ON. PLAY . Playback, provided that a cassette is inserted (priority on Deck A). OFF . . . Not started. REC . . . Recording, provided that a cassette is inserted (priority on Deck A).	
DOLBY SW	Sets the Dolby NR mode. B. . . . . Dolby ON, B type. OFF . . Dolby OFF. C. . . . . Dolby ON, C type.	
CASSETTE DETECT SW	Turns ON when a cassette shell is present. While this switch is OFF, the keys of the deck and the DUBBING key are inhibited. In case of Deck B, the AUTO BIAS and CCRS keys are also inhibited.	
FWD REC PERMIT SW	Turns ON when recording permission tab for FWD direction is present. Recording in the FWD direction is inhibited while this SW is OFF.	
RVS REC PERMIT SW	Turns ON when recording permission tab for RVS direction is present. Recording in the RVS direction is inhibited while this SW is OFF.	
DIRECTION SW	Detects the head direction. ON with RVS, and OFF with FWD direction. However, the signal is input to the microprocessor only at the an instant of the time of Power ON.	

Function	Key names	Description
REWIND PLAY	◀◀+▶ or ▶▶+◀	Tape rewinds until the end, the first program is searched, and playback is started as soon as it is detected.
DASH & PLAY	◀◀+▶▶	When a portion without recorded program has lasted for more than 10 seconds during playback, cueing is started, and playback resumes from the position where the beginning of the next program is detected. The full-repeat function can be used according to the Reverse Mode SW setting. ⇀ ..... One-side full repeat × 8 times ⇄ ..... Two-side full repeat × 8 times (16 sides) ⟲ ..... Two-side relay repeat × 29 to 31 sides in total on A and B. If cassette is not present in one deck, playback ends at the RVS end (i.e. after 1 or 2 times).

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CIRCUIT DESCRIPTION

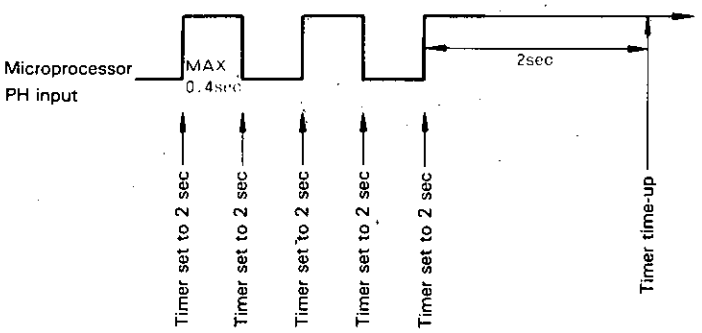
3 Function details

3-1 Auto stop

In a tape travel status other than STOP, REC PAUSE and PLAY PAUSE, when the signal from the photo-reflector attached to the mechanism reel stand keeps "H" or "L" for more than 2 sec the tape stops or the head is reversed.

As shown above, each time that the output of the photo-reflector attached to the rear side of the reel stand is reversed, the software timer of which the set time is 2 sec is started. When the reel stand is rotating, that is when the output of the photo-reflector is reversed within 2 sec, the timer is successively updated so that the timer does not stop.

When the output of the photo-reflector keeps a fixed value for more than 2 sec the timer operates. Then, this operation is detected and the auto stop process is performed.



3-2 Timer Function

When the power is turned ON with the timer switch set to PLAY or REC position, the designated operation starts after the initial delay period (approx. 4 seconds).

In timer recording mode, approx. 1.5 seconds after the power is turned ON, the "TUNER PLAY" 28 H signal is output to set the input selector of the amplifier to TUNER.

Timer operation sequence table

Condition				TIMER SW		
Cassette in deck A	Cassette in deck B	Safety tab of cassette A	Safety tab of cassette B	T. PLAY	T. REC [⇄ or ⇉]	T. REC [⇨]
×	×					
○	×	○		A. PLAY		
○	×	×		A. PLAY		
×	○		○	B. PLAY	B. REC	B. REC
×	○		×	B. PLAY		
○	○	○	○	A. PLAY	B. REC	B. REC
○	○	○	×	A. PLAY		
○	○	×	○	A. PLAY	B. REC	B. REC
○	○	×	×	A. PLAY		

○: Available ×: Not available ／: Not concerned

3-3 Relay play and relay recording

(1) With the reverse mode switch set to ⇄ or ⇉ and cassettes loaded in both decks, when the deck in play reaches the tape end, the other deck starts play.

i) ⇄: When the deck in play reaches the end of that side of the tape, this deck rewinds the tape. In this connection, when the other deck is in stop, the playback in the head direction displayed at present is entered.

ii) ⇉: When the deck in play reaches the end of the reverse (rear) side of the tape, this deck stops. In this connection, when the other deck is in stop, the forward play (FWD PLAY) is entered.

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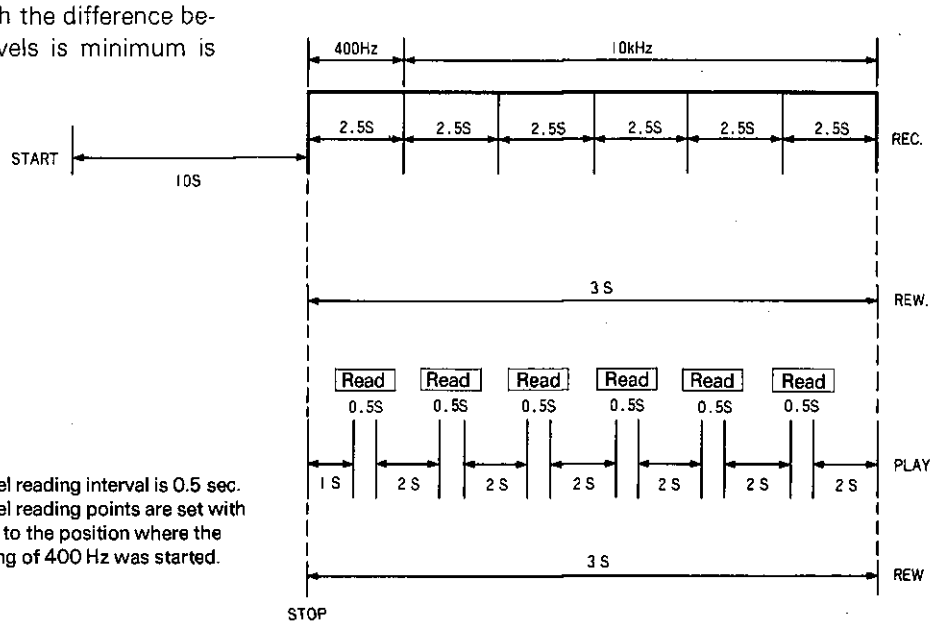
CIRCUIT DESCRIPTION

3-4 Auto-Bias Adjustment (Deck B only)

Signals of 400 Hz and 10 kHz are recorded while varying the bias in 5 steps, their playback levels are A/D converted and read, and the bias value that can minimize the level difference between 400 Hz and 10 kHz is set based on the data. This function is activated with any type of tape, but it is only with normal tapes that the bias is actually varied.

1) While REC MUTE is kept ON, signal is recorded with the standard bias for approx. 10 seconds (no-sound recording). The electronic volume is also set to $-\infty$ during this time (minimum position).
2) The 400 Hz signal is recorded with the standard bias for 2.5 seconds.
3) Then the 10 kHz signal is recorded, starting with the smallest bias and by deepening it every 2.5 seconds.
4) The tape is rewound to the position where the recording of the 400 Hz signal was started, and played back.
5) The level of 400 Hz signal and the levels of 10 kHz signal with different biases are read for 0.5 second each, and the bias value with which the difference between the 400 Hz and 10 kHz levels is minimum is selected.
6) The tape is rewound to the position where the recording of the 400 Hz signal was started, and it is stopped.

- The AUTO BIAS indicator blinks during operations from 1) to 6), and lights steadily when they have been completed. During 1) to 6), the key inputs are inhibited except for the STOP key of Deck B, Deck A, ▶▶, ◀◀ and ■ keys, DISPLAY key and RESET key.
- The AUTO BIAS key is accepted only when both of Decks A and B are in the Stop mode.
- The time required for the adjustment is about 25 seconds for recording, 16 seconds for playback, 3 seconds × 2 for rewindings, that is, about 47 seconds in total.

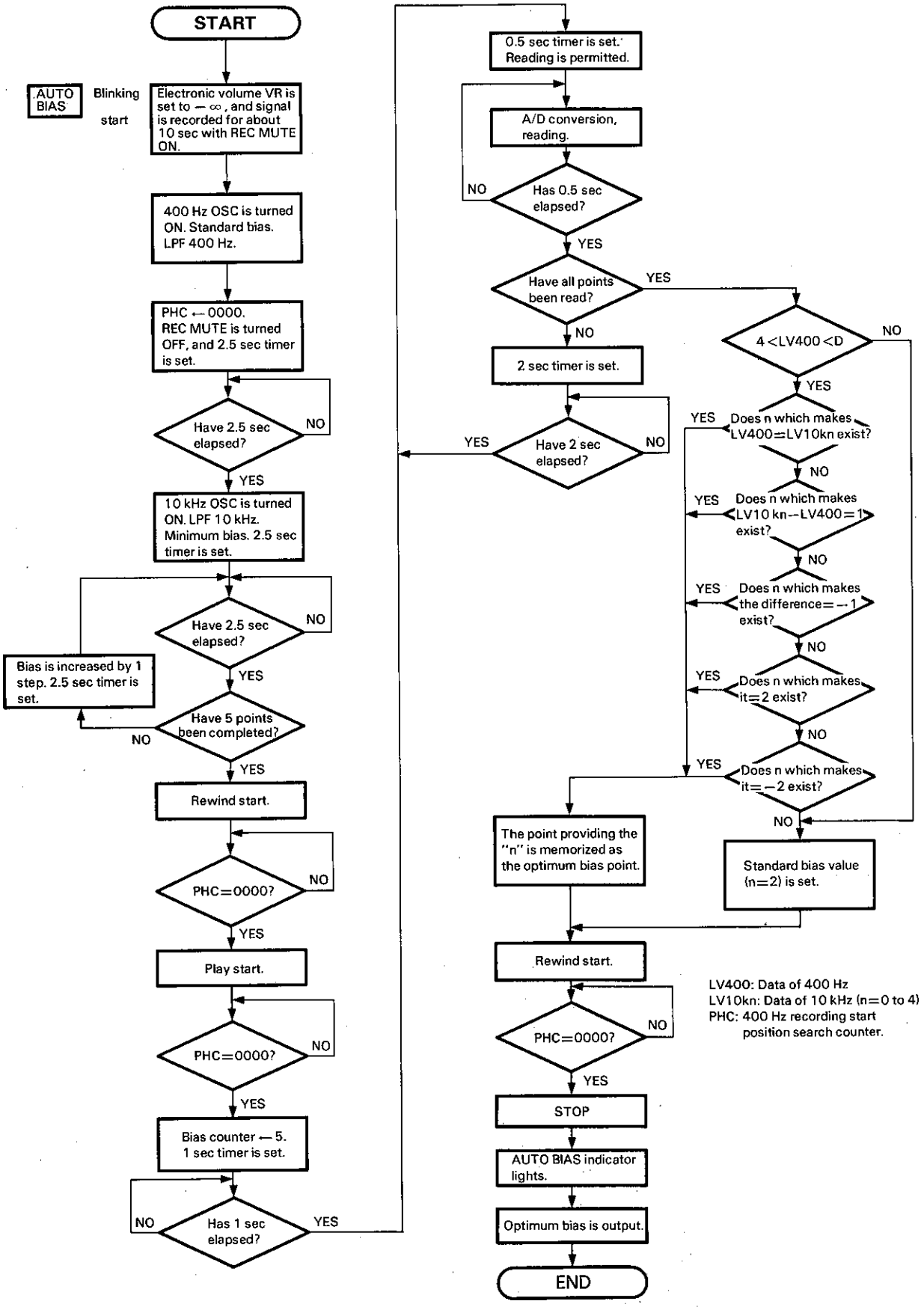


- The level reading interval is 0.5 sec.
- The level reading points are set with respect to the position where the recording of 400 Hz was started.

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CIRCUIT DESCRIPTION

Auto-Bias Adjustment Operation Flowchart



LV400: Data of 400 Hz
LV10kn: Data of 10 kHz (n=0 to 4)
PHC: 400 Hz recording start position search counter.

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CIRCUIT DESCRIPTION

3-5 CCRS Editing

A variety of synchro operations between the CD player, amplifier and cassette decks are performed.
With the CCRS, the Edit Recording facility is provided in addition to the previous level adjustment functions. While the level adjustments have previously been performed using the DACs of models equipped with them (CD players or amplifiers), the level adjustment with this model is performed using the electronic volume VR for the decks.

1) Types of synchro recording

Name	Operation Method	Description
(a) NORMAL Conventinal synchro recording	Play the CD and press the REC key of the cassette deck.	The cassette deck performs REC and ARM in interlocked operation with PLAY, PAUSE and STOP of the CD player. The recording level is fixed if it is a level set with CCRS.
(b) CCRS EDIT (Fade-out mode)	1) Set the CD player to the TRACK mode. 2) Press the CCRS EDIT key of the cassette deck.	The recording level is set automatically, then the auto-bias adjustment is performed, and CD recording is started after it. If the end of tape is reached during recording of a program, the tape is rewound until its beginning, and its recording is re-started in such way that sound is faded out as the end of tape approaches. After tape direction reversal, recording is resumes started with that program.
(c) CCRS EDIT Erase mode	1) Set the CD player mode to the PGM mode, and store programs in memory. 2) Press the CCRS EDIT key of the cassette deck.	The recording level is set automatically, then the auto-bias adjustment is performed, and CD recording is started after it. If the end of tape is reached during recording of a program, the tape is rewound until its beginning, and the program is erased. During this period, the CD player stands by in the PAUSE mode. After tape direction reversal, CD playback is resumes and recording starts with that program.
(d) CCRS EDIT Edit mode	1) Press the EDIT key of the CD player, and enter the duration of the tape to be used (46 min). 2) After editing, press the CCRS EDIT key of the cassette deck.	The recording level is set automatically, then the auto-bias adjustment is performed, and CD recording is starts after that. The progrmas on side A of the CD are recorded on side A (FWD side) of tape. After the end of side A programs, the CD player stands by in the Pause mode at the first program of side B, and cassette deck continues recording until the end of tape. After tape direction reversal, side B programs are played and recorded. When the end of tape is reached in the middle of a program, the same operations as (c) are performed. At the same time, the EDIT mode of the CD player is canceled, and it enters the normal PGM mode.

2) CCRS key acceptance condition

(i) X-82, X-92 Both Decks A and B shall be in the Stop mode, and a recordable tape shall be present in Deck B.

3) Operations of CCRS (outline) ... Refer to the flowchart for details.

The CD player searches & plays the final 15 seconds of the first to third programs and last program.
The cassette enters the REC PAUSE mode, checks the recording level, and controls electronic volume VR to avoid excessive input level even in the peaks.
The amplifier locks the input selector to CD in accordance with the CD STANDBY signal, and turns MUTING ON. At this time, the CCRS indicator blinks at high speed (0.25 sec).
After the adjustment, the CD player enters the PLAY mode, amplifier turns MUTE OFF, and the cassette deck enters CD REC mode.
After the above, synchro edit recording in the AUTO FADE OUT mode or AUTO ERASE mode is performed. During this time, the CCRS indicator blinks at low speed (0.5 sec).

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CIRCUIT DESCRIPTION

4) Key input inhibition

(i) CD ..... During CCRS adjustment and CCRS edit recording, all operation keys are inhibited except for the STOP and OPEN/-CLOSE keys.

(ii) Amplifier.. After the CD input selector is pressed, one of the STOP codes is adjusted during CCRS adjustment, and the input selector keys are inhibited until the cassette deck STOP code is input after the adjustment.

(iii) Cassette deck ..... During CCRS adjustment and CCRS edit recording, all keys are inhibited except for the STOP key of the deck used for recording and the FF, REW and STOP keys of the other deck.

5) CCRS cancellation condition

(1) During REC level condition

1) Cancellation by key operation ... When the STOP key of the cassette deck or the STOP or OPEN/-CLOSE key of the CD player is pressed, a STOP code is output.
The Stop code cancels the CCRS adjustment mode of the involved equipment and stops it (with the amplifier, MUTE is turned OFF).
However, if the cassette deck is performing the auto-bias adjustment after the completion of level adjustment, the STOP code only stops it, and the level set with the deck and the display are maintained. (The CD player TRAY OPEN code also cancels it.)

2) Cancellation with the timer in the cassette deck ...
When the cassette deck detects the CD standby code within 30 seconds after the CCRS start code is output, or when it does not detect the second CD standby code within 180 seconds after the first CD standby code is output, the cassette deck outputs the STOP code to cancel the CCRS adjustment mode.

(2) After completion of level setting
The cassette deck cancels the level setting when the CD player TRAY OPEN code or CD ON code is input.

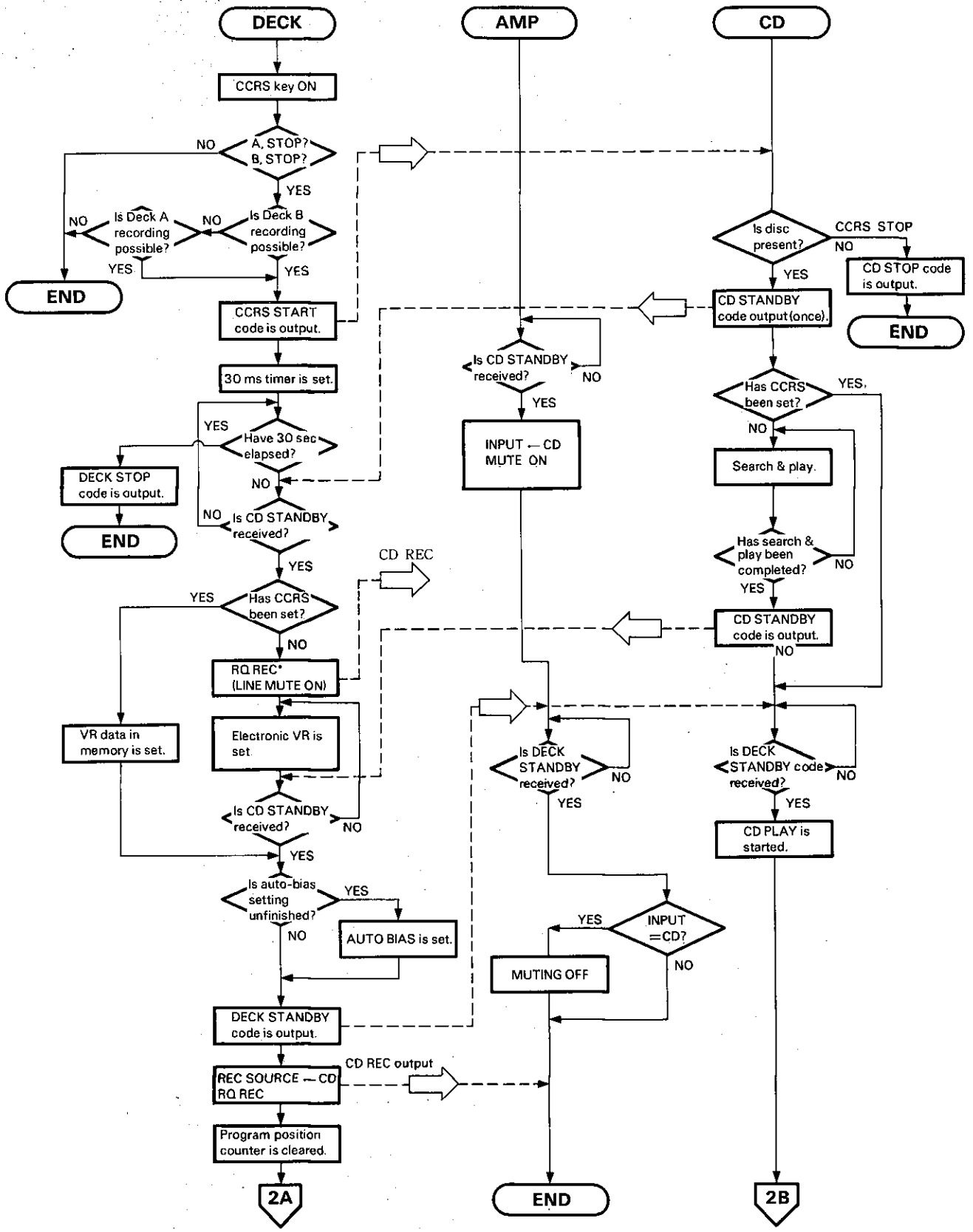
6) Condition for CCRS EDIT cancellation

(Fade-out mode, Erase mode)
During synchro recording, the synchro operation is canceled and stopped by the ON code or STOP code from the CD player or cassette deck.
When the CD player tray is opened, both the SERS and level setting are canceled.

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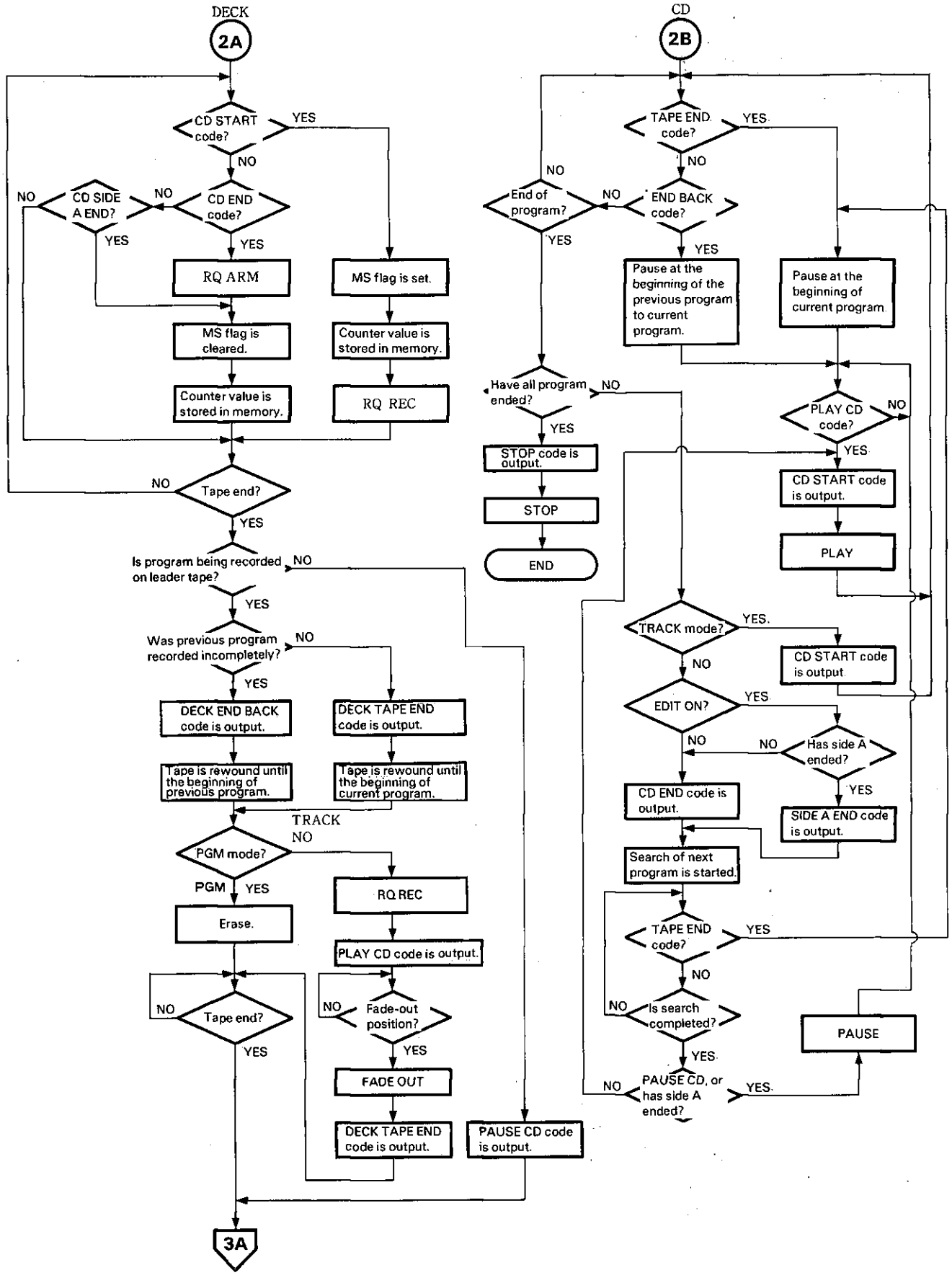
CIRCUIT DESCRIPTION

CCRS EDIT Operation Flowchart (1)



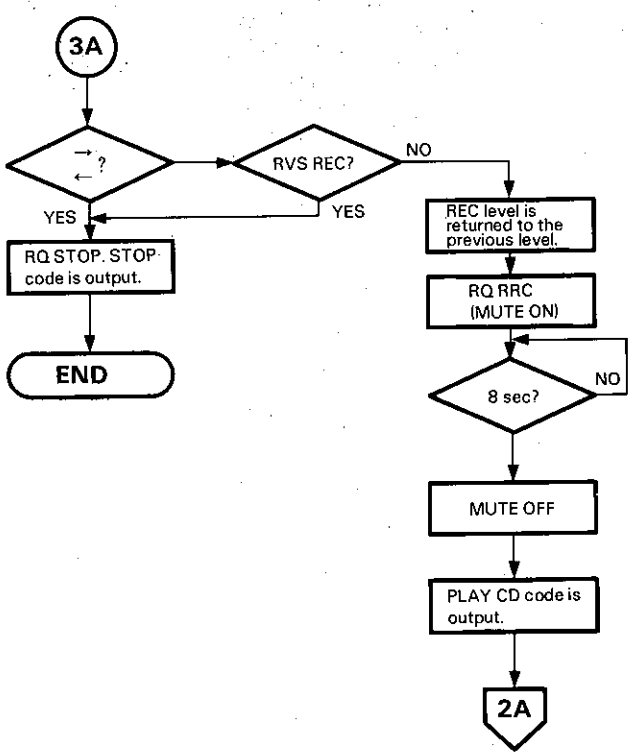
CIRCUIT DESCRIPTION

Flowchart (2)



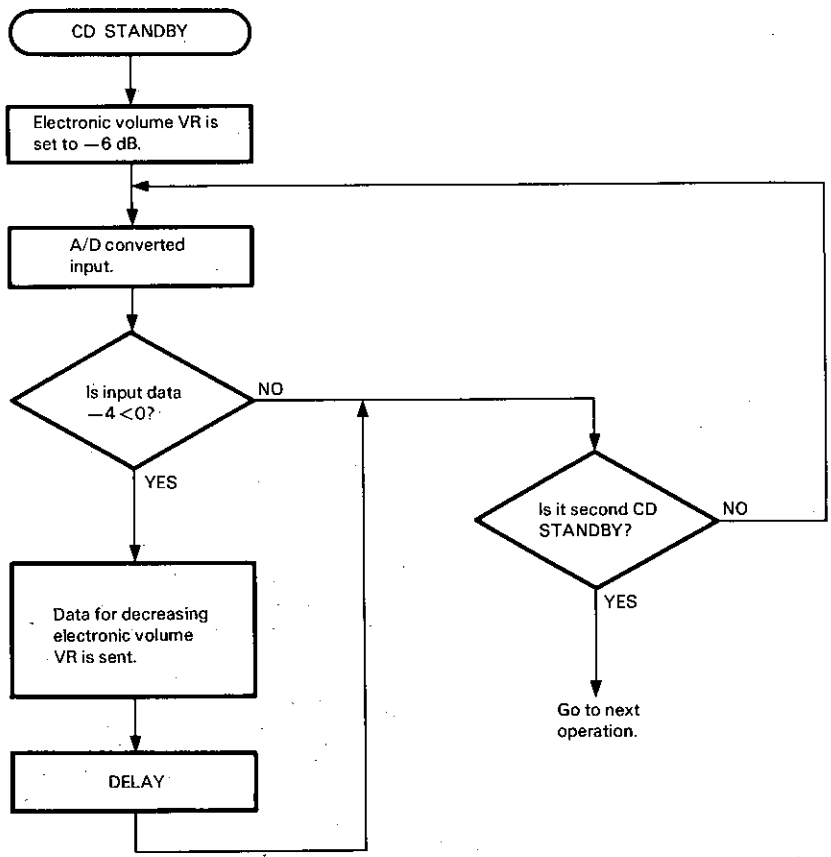
CIRCUIT DESCRIPTION

Flowchart (3)



RQ REC: REC start.
RQ ARM: Auto Rec Mute start.
RQ RRC: RVS REC start.

Automatic Level Setting (in CCRS) Flowchart



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CIRCUIT DESCRIPTION

4. TEST1 mode (KR1 and KS1 shorted)

(1) With timer REC SW ON

a) When power is turned ON with the timer REC SW set to ON

In the same manner as in AUTO BIAS, the microprocessor works to oscillate 400 Hz and 10 kHz test tones alternately 1 second by 1 second to record them. After recording for 15 seconds, the tape is rewound to the recording start position and stops.

b) When timer REC SW is ON with KR1 and KS1 shorted by diode

- When HI. DUBBING SW is set to ON . . .
  Deck B performs the play operation.
- When NOR DUBBING SW is set to ON . . .
  Deck B, after recording for 5 seconds, rewinds the tape to the recording start position and performs the play operation.

(2) Test program feasible if in TEST1 mode

a) When AUTO BIAS SW is set to ON

The test tone sampling/recording time is reduced to half of that of normal operaiton.

b) When CCRS SW is set to ON

A deck performs the CCRS operation singly, and the recording level is set according to the level of the signal entered from LINE IN. The initial set value of the recording level is max. 0 dB. (—6 dB for normal operation)

In cases where this unit is in the serial communication code connection with the CD player, the sampling termination code is sent from the CD player and, the operation ends therewith.

However, when a deck is used singly, no code is sent as a matter of course so that the operation does not end.

To cancel the operation, setting the STOP SW of deck B to ON suffices. However, in this case, the effect is the same as when sampling is unterminated. Thus, CCRS is not completely set.

c) When DIRECTION SW is switched

- With reverse mode SW at ⇄
  Of direction LEDs on deck A, FWD and RVS go out.
- With reverse mode SW at ⇉
  Of direction LEDs on both decks A and B, FWD and RVS light.
- With reverse mode SW at ↻
  Of direction LEDs on deck A, FWD and RVS go out. Of those on deck B, FWD and RVS light.

TEST2 mode (KR1 and KS2 shorted)

When the power is turned ON with KR1 and KS2 shorted, the TEST2 mode is engaged.

In the TEST2 mode, all LEDs light in about 1 second after power ON. To cancel the status that all LEDs are lighting, available are two methods: one is to set the deck A's REW SW to ON to enter the LED sequential lighting mode, and the other is to set the deck B's STOP switch to ON to cancel the TEST2 mode.

When the deck A's REW switch is set to ON on the status that all LEDs are lighting, the LED sequential lighting mode is entered, in which the LEDs go, in turn, to light one after one on the panel from right to left and from downside to upside.

The LED sequential lighting mode is canceled by setting any switch on decks A and B to ON to provide the normal indication status. At this time, when any other than the deck B's STOP switch is set to ON, the TEST2 mode is not canceled. Even without a cassette tape, deck A performs the play operation. Thus, the tape selector selects the normal tape and the PBEQ pin is set to "H" (120 μsec).

To cancel the operation, an operation switch or VR DOWN switch on deck A is pressed. Even when the operation is canceled, the test mode is not canceled.

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CIRCUIT DESCRIPTION

TEST1 mode

SW \ POSITION	TIMER PLAY	TIMER REC	TIMER OFF
—	—	The 400 Hz and 10 kHz test tones generated by the microprocessor itself on deck B are recorded alternately for 15 seconds. After that, the tape is rewound and stops. Test Tone 15-sec REC — REW — STOP	—
DUBBING	—	The play operation is entered.	—
HI-DUBBING	—	5-sec REC—REW—PLAY	—
VR UP △	MAXIMUM 0 dB △ ▽ −22 dB △ ▽ MINIMUM −79 dB		
VR DOWN ▽			
⇄	DIRECTION LED A Dedk ◀ ▶ B Deck ◁ ▷		
⊃	◀ ▶ ◀ ▶		
⊂	◁ ▷ ◀ ▶		
AUTO BIAS	Auto Bias time reduced		
CCRS	A deck enters the CCRS operation singly, and the recording level is set according to the level of the signal entered from LINE IN.		

TEST2 mode

SW	
—	All LEDs light.
A Deck REW	LEDs light orderly. (It is possible to shift to this status only from the status that all LEDs are lightling.)
B Deck PLAY REC	Mode can be directly changed between play and recording.
VR UP VR DOWN	Same as TEST1

A DECK operates with or without tape (functions as 120 μsec.)

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CIRCUIT DESCRIPTION

5. Pin Functions

Pin No.	Pin Name	I/O	Name	Functions	
1~4	P13~P10	I	KR8~KR5	Key Return input	H: Without input L: With input
5	PTH03	I	PHA	Mechanism A rotation detection input	H-L, L-H In rotation
6	PTH02	I	PHB	Mechanism B rotation detection photosensor input	H-L, L-H In rotation
7	PTH01	I	DPSS IN	Between-tunes detection signal input	H: With sound L: Without sound
8	PTH00	I	LEVEL IN	Meter level/CD playback signal level At AUTO BIAS, test tone recording/playback signal level input	
9	TI0	I	—	Unused	
10	TI1	I	—	Unused	
11	P23	O	NORMAL OSC	Level detection amplifier sensitivity selection Input signal selection at AUTO BIAS	H: At NORMAL-CCRS L: At AUTO BIAS
12	P22	O	LEVEL sensitivity	Level detection amplifier sensitivity selection	H: At NORMAL L: At AUTO BIAS-CCRS
13	P21	O	400/10K	400 Hz/10 kHz filter selection	H: 400 Hz L: 10 kHz
14	P20	O	TEST TONE	At AUTO BIAS, 400 Hz/10 kHz square wave output	
15~18	P03~P00	I	KR4~KR1	Key Return input	H: Without input L: With input
19~22	P123~P120	O	KS4~KS1	Key Scan	H: OFF L: ON
23	P133	O	KS5		
24	P132	O	—	Unused	
25	P131	O	—	Unused	
26	P130	O	LED5	LED matrix output Dynamic drive by combination with KS1—KS4	H: ON L: OFF
27~30	P143~P140	O	LED4~LED1	LED matrix output Dynamic drive by combination with KS1—KS4	H: ON L: OFF
31	NC	—	—	Unused	
32	V_{DD}	—	V_{DD}	Power pin +5 V	
33	P33	O	RMUTE	Deck B REC mute control	H: Mute OFF L: Mute ON
34	P32	O	EQSP	Deck B REC EQ selection	H: High-speed REC L: Normal REC
35	P31	O	BCrO$_2$	Deck B REC EQ selection	H: Other tapes L: CrO$_2$
36	P30	O	BMET	Deck B REC EQ selection	H: Other tapes L: Metal
37	P43	O	BIAS4	Bias selection output (OFF at initial setting)	H: ON L: OFF
38	P42	O	BIAS3	Bias selection output (ON at initial setting)	H: ON L: OFF
39	P41	O	BIAS2	Bias selection control (OFF at initial setting)	H: ON L: OFF
40	P40	O	BIAS1	Bias selection control (OFF at initial setting, ON at CrO$_2$ or METAL setting)	H: ON L: OFF
41	P53	O	BIAS	Deck B bias oscillation control	H: BIAS ON L: BIAS OFF

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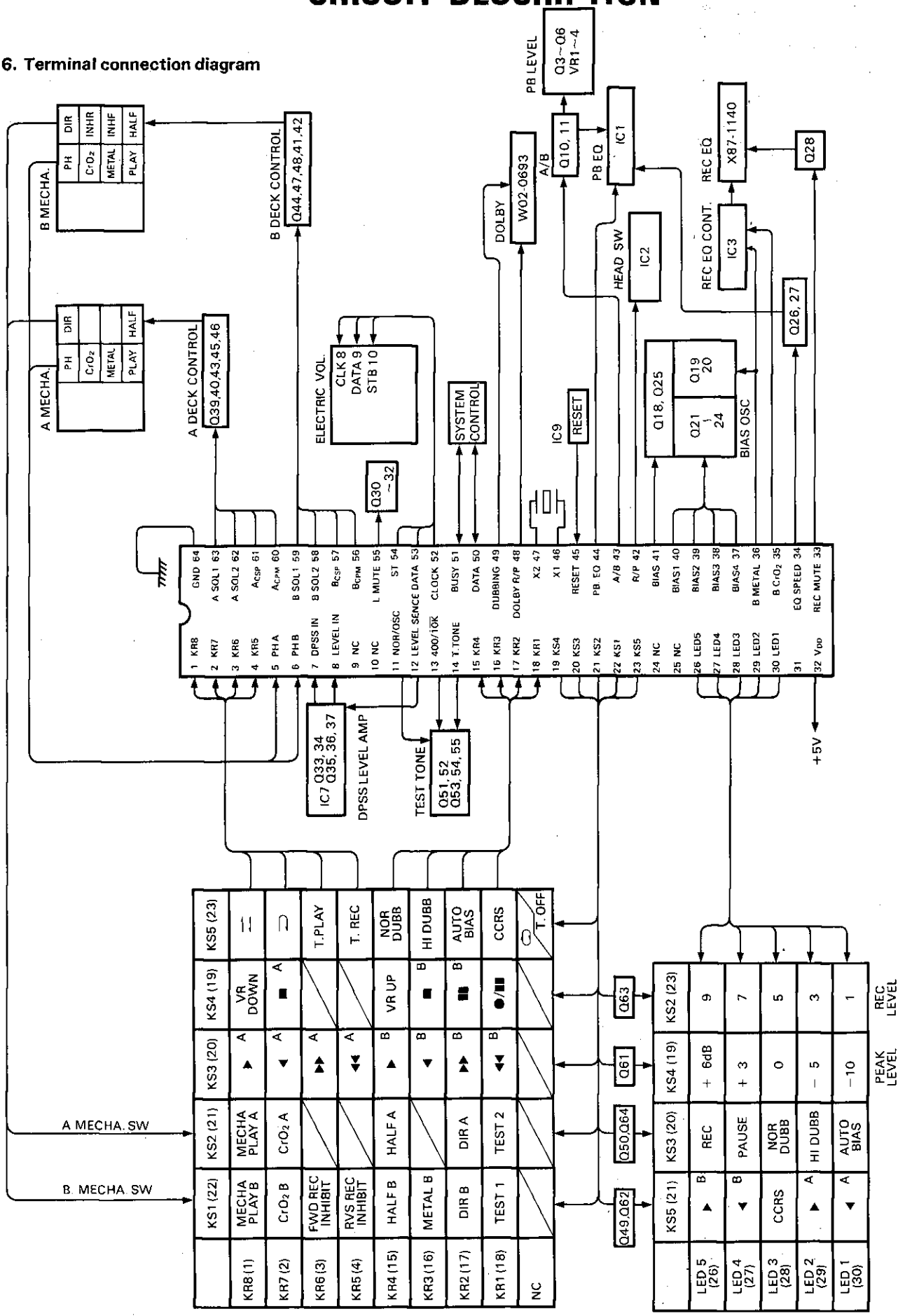
CIRCUIT DESCRIPTION

Pin No.	Pin Name	I/O	Name	Functions	
42	P52	O	R/P	Deck B R/P selection control	H: REC L: OTHERS
43	P51	O	A/B	Playback EQ A/B selection control	H: A DECK L: B DECK
44	P50	O	PBEQ	Playback EQ 120 μsec/70 μsec selection control	H: 120 μsec L: 70 μsec
45	RESET	I	RESET	Reset signal input	H: NORMAL L: RESET
46, 47	X1, X2		—	Oscillator connection pin 4.19 MHz, ceramic	
48	P63	O	DOLBY R/P	Dolby R/P selection control	H: Others/dubbing L: Recording (dubbing excluded)
49	P62	O	DUB	Dubbing selection control	H: Dubbing L: Oters
50	P61	I/O	DATA	System control serial data I/O	
51	P60	I/O	BUSY	System control busy signal I/O	
52	P73	O	CLOCK	Electronic VR control clock pulse output	
53	P72	O	VRDATA	Electronic VR control serial data output	
54	P71	O	ST	Electronic VR control strobe signal output	
55	P70	O	LMUTE	Deck B line mute control	H: MUTE OFF L: MUTE ON
56	P83	O	BCPM	Deck B capstan motor control	H: ON L: OFF
57	P82	O	BCSP	Deck B capstan motor speed selection control	H: Normal speed L: High speed
58	P81	O	BSOL2	Deck B solenoid 2 control	H: ON L: OFF
59	P80	O	BSOL1	Deck B solenoid 1 control	H: ON L: OFF
60	P93	O	ACPM	Deck A capstan motor control	H: ON L: OFF
61	P92	O	ACSP	Deck A capstan motor speed selection control	H: Normal speed L: High speed
62	P91	O	ASOL2	Deck A solenoid 2 control	H: ON L: OFF
63	P90	O	ASOL1	Deck A solenoid 1 control	H: ON L: OFF
64	Vss		GND	GND	

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CIRCUIT DESCRIPTION

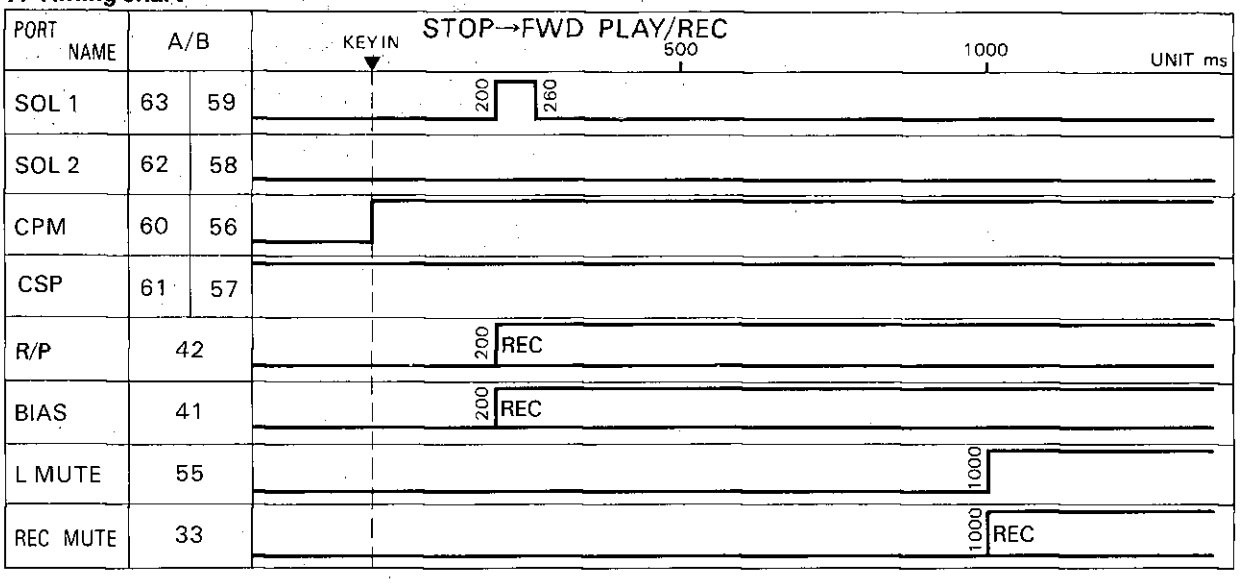
6. Terminal connection diagram

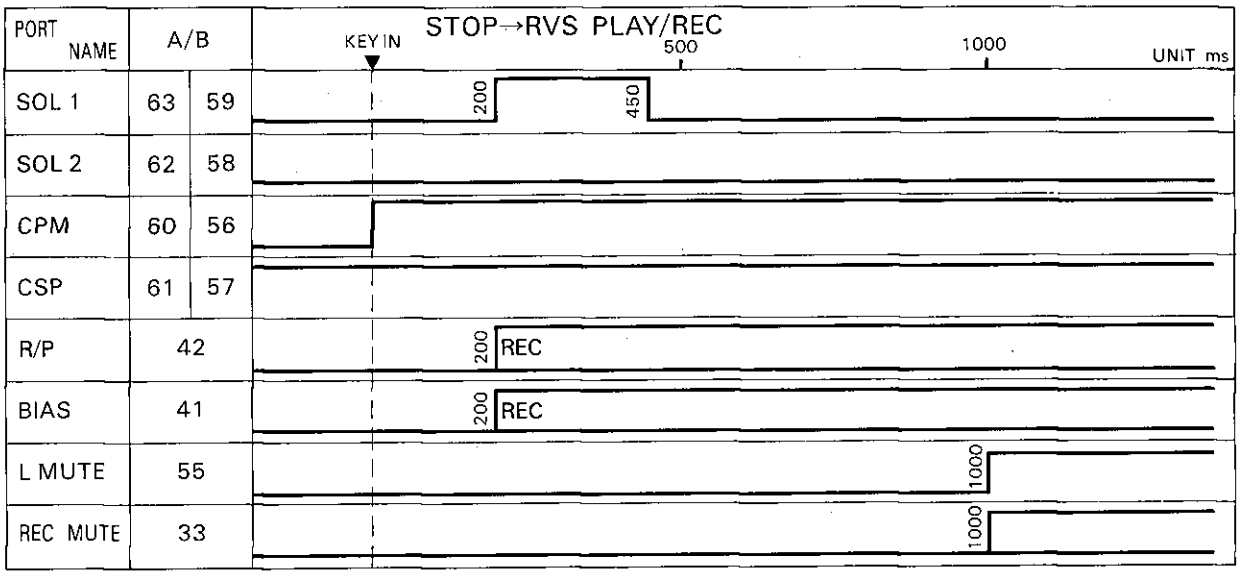


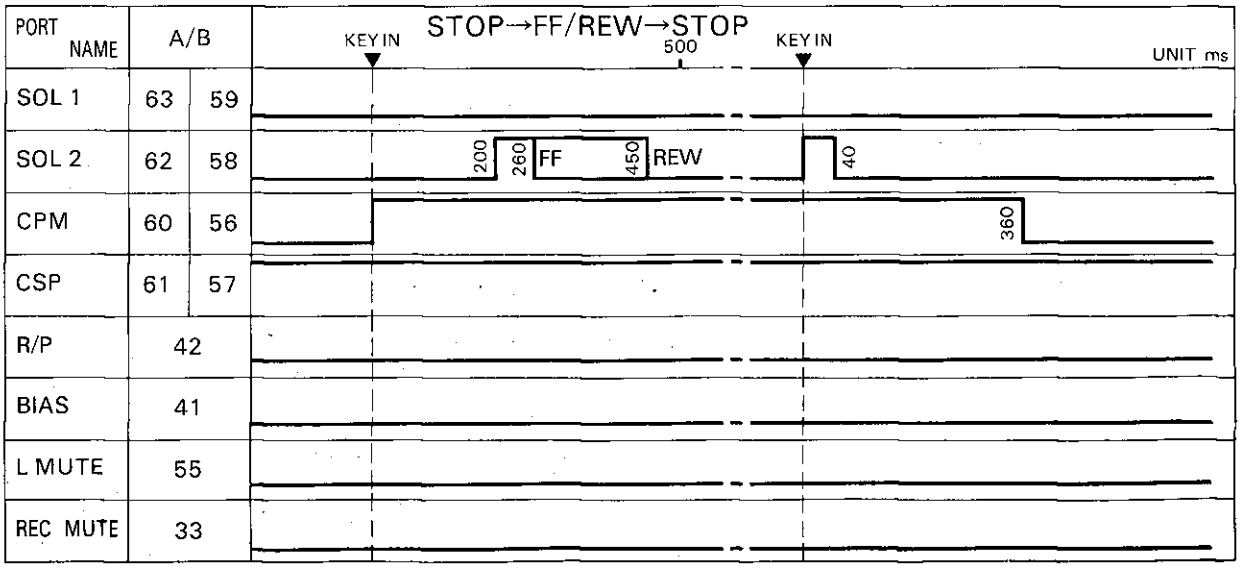
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CIRCUIT DESCRIPTION

7. Timing chart

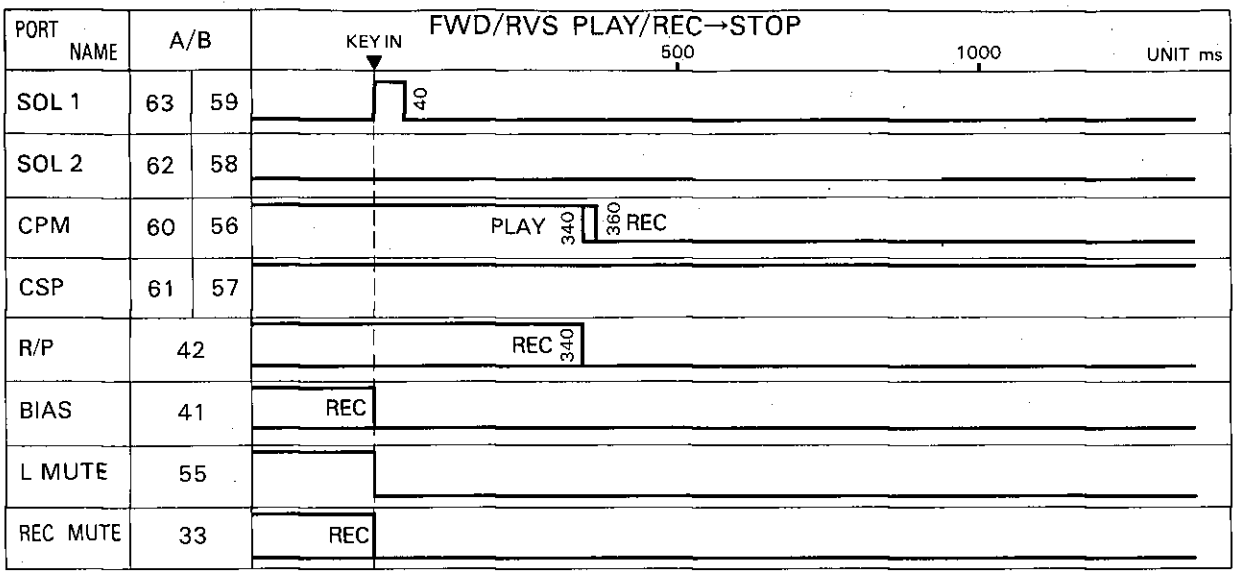


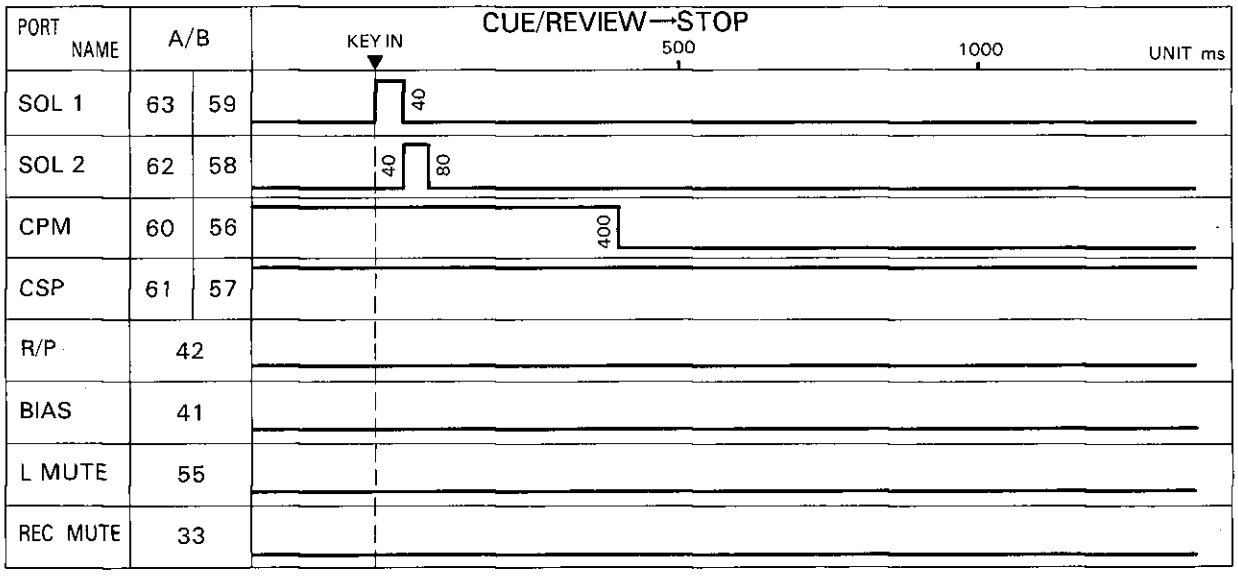


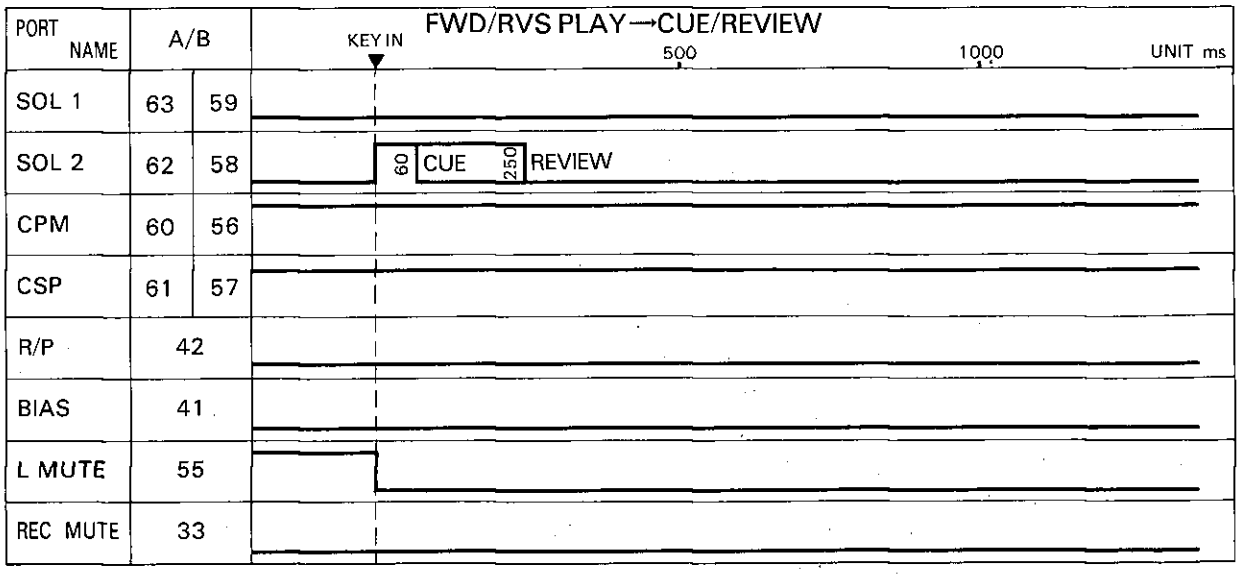


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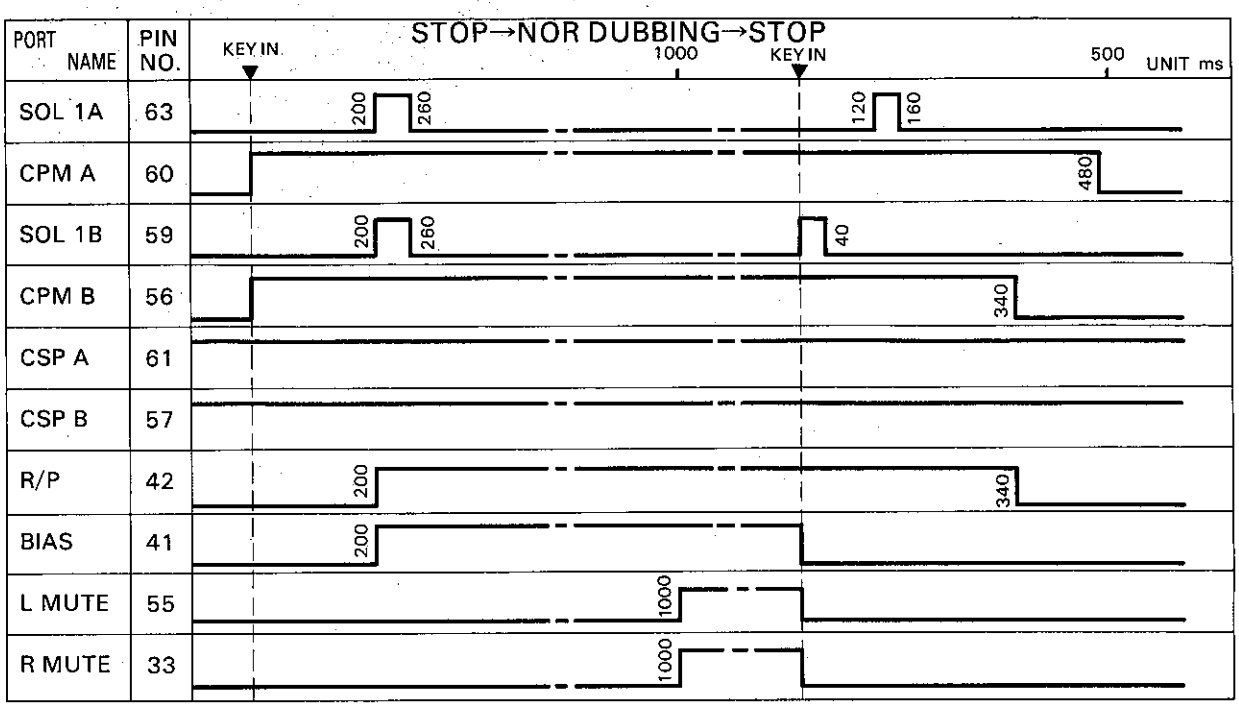
CIRCUIT DESCRIPTION

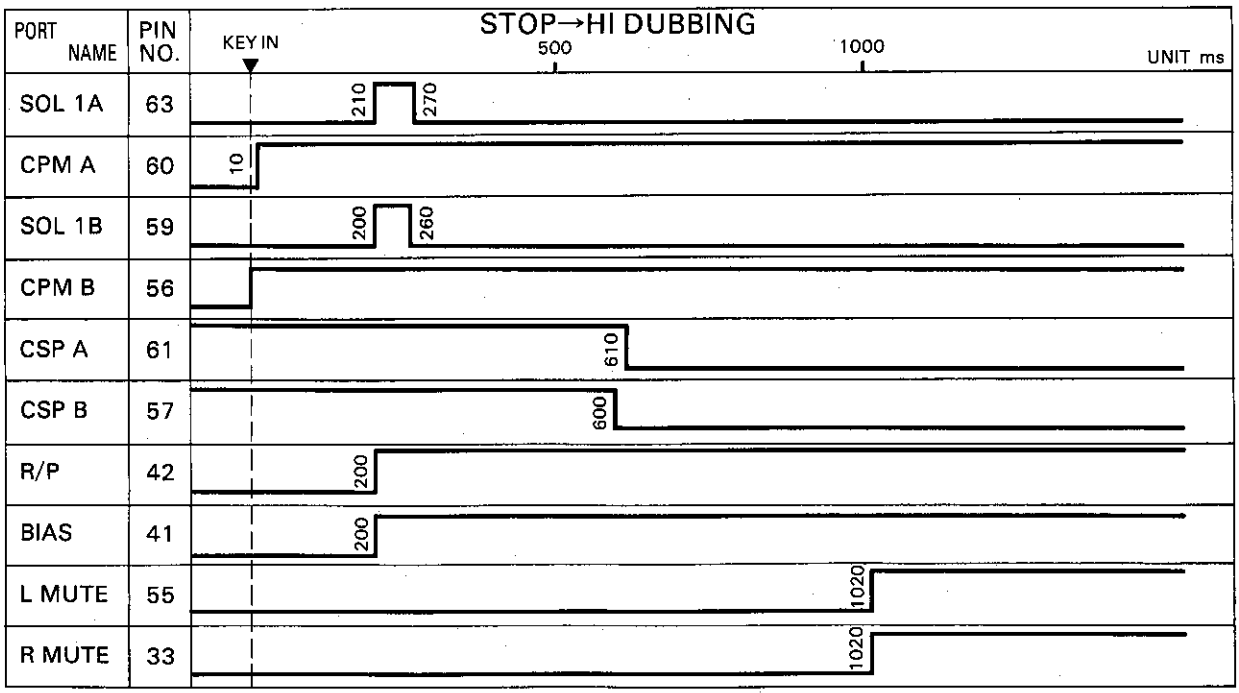






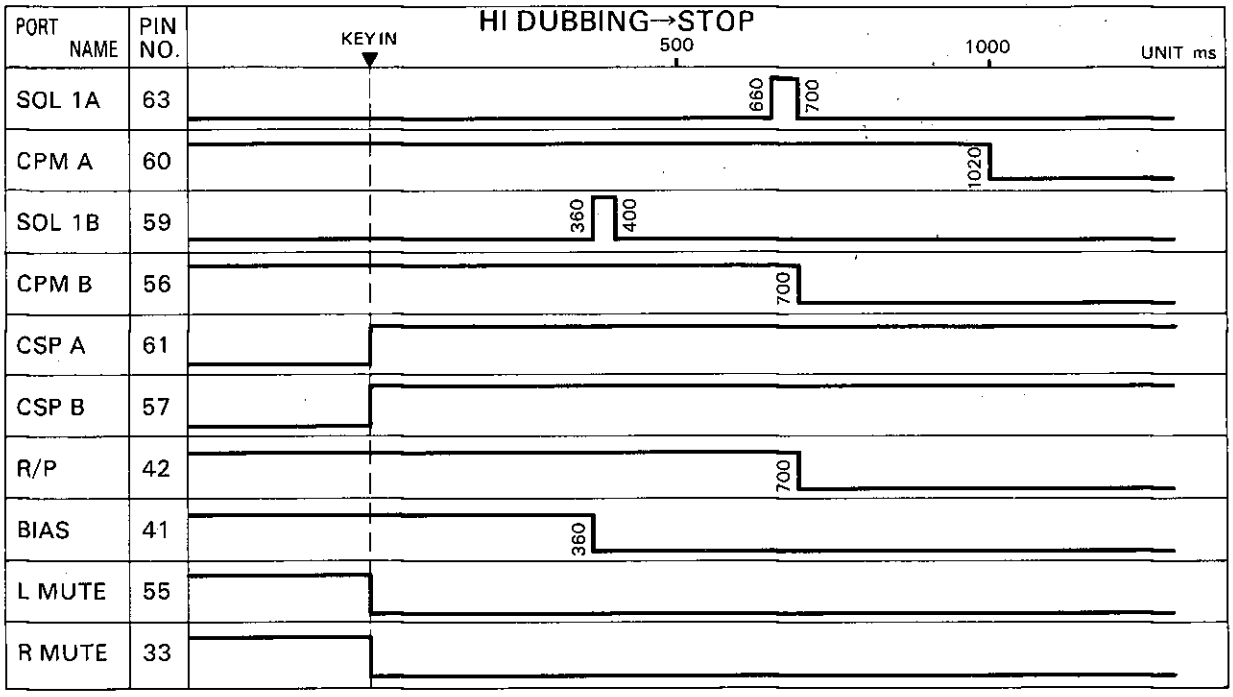
CIRCUIT DESCRIPTION





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CIRCUIT DESCRIPTION



Electronic VR IC (TC9213P)

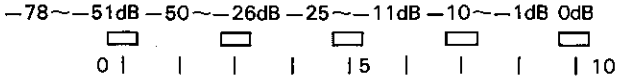
Electronic VR (for recording level)

The VR value can be set in steps of 1 dB. However, the VR values goes up and down in steps of 1 dB between 0 dB (maximum) and −30 dB, and in steps of 2 dB between −31 dB and −79 dB (minimum).

At the time of power ON or microprocessor reset, the VR set value is −15 dB. When the VR value arrives at the upper or lower limit by continuous pressure of the VR UP/DOWN switch, any further pressure of the same switch does not cause the VR value to change.

When the VR UP/DOWN switch is continuously pressed, the VR value stepped up/down interval is 120 msec. When this switch is simply pressed, the period of time until the reception of the next switch ON after the switch OFF is 340 msec. (In case of the simple pressure, the VR value cannot go up or down before the passage of 340 msec.)

The VR value read by the recording level indicator LED section is as shown below.

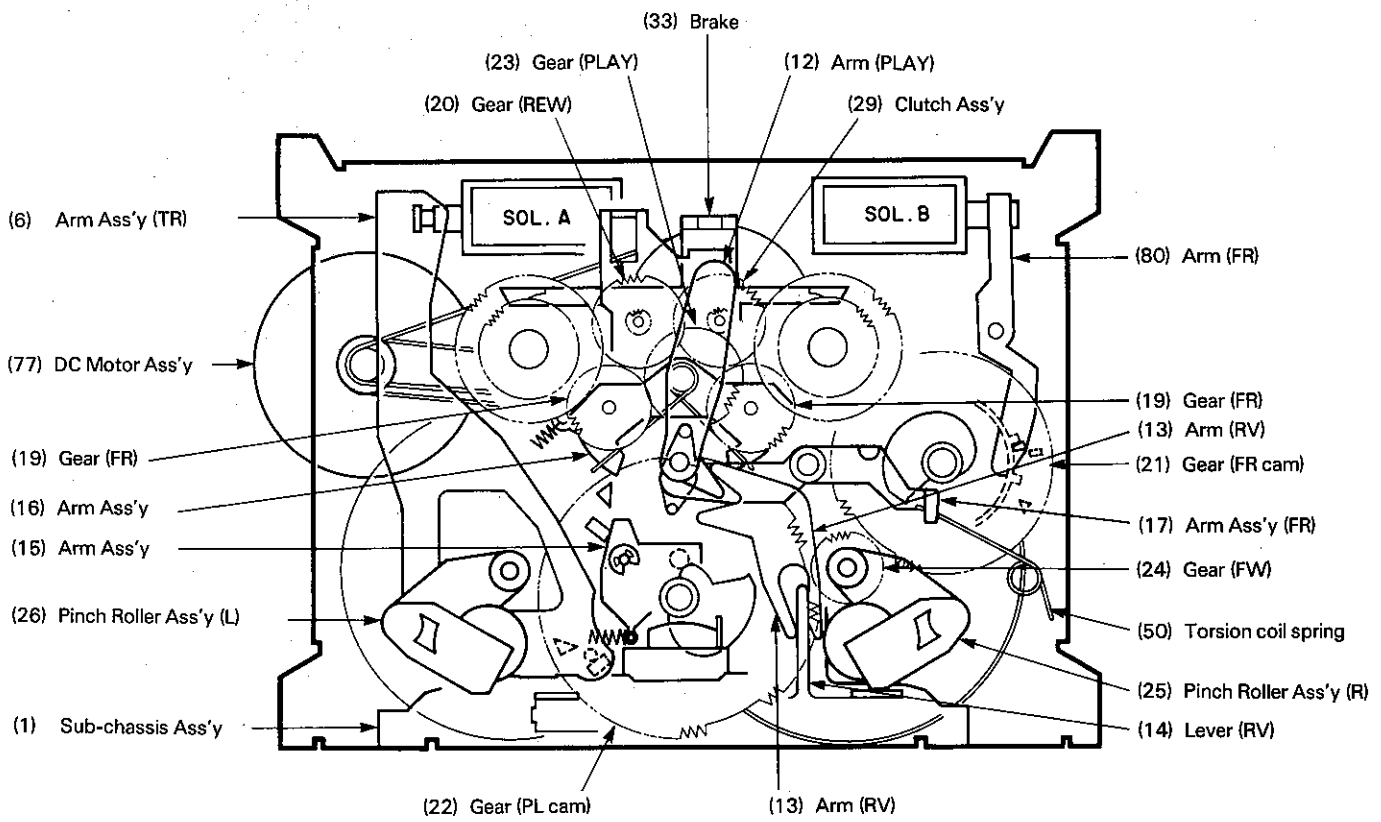


It is at the point of 1.4 sec later from power ON or microprocessor reset that the initial data of the VR value is transferred to the electronic VR IC TC9213P from the microprocessor uPD75108. After that, when the VR UP/DOWN switch is pressed, when the recording level is set with CCRS being engaged, or when the fade-out or auto recording mute operation is applied at the end of the tape with the CCRS recording being made, the VR value data is transferred to the electronic VR IC from the microporcessor.

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MECHANISM OPERATION DESCRIPTION

Figures inside ( ) in the diagram indicate the Ref. Nos. in the parts list. The illustrations are perspectives from the front unless otherwise specified.



Parts Layout (Front perspective)

Driving power:	**130 g-cm or more**
Take up torque:	**35~75 g-cm**
FF/REW torque:	**70~160 g-cm**
Back tension torque:	**3~8 g-cm**

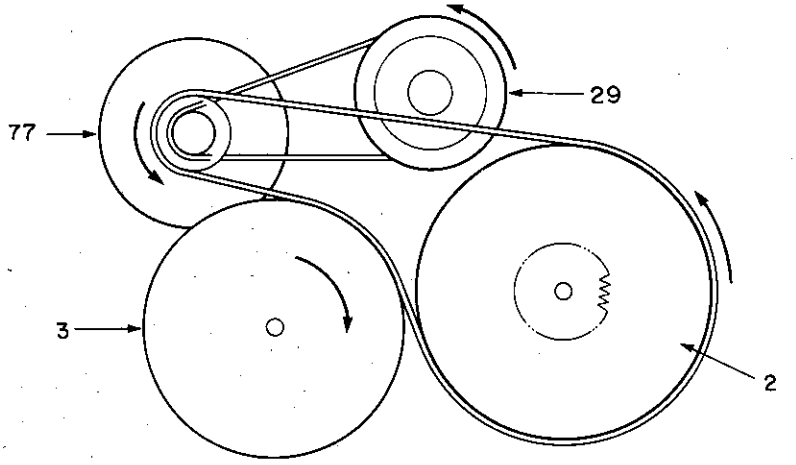


Fig. 1 Transmission of Rotation

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MECHANISM OPERATION DESCRIPTION

1. STOP → PLAY/REC operation

1-1 By the signal from the microprocessor, the SOL.A is turned ON then immediately OFF.
This causes the shaft Ⓒ caulked on the TR Arm Ass'y to be released from the stopper Ⓐ on the play cam gear (22).
As the play cam gear (22) is pushed toward the direction of the arrow ❷ by the boss Ⓓ of the shift arm shaft (15), the play cam gear (22) is rotated slightly in the direction of the arrow ❸ and meshed with the flywheel gear (24).

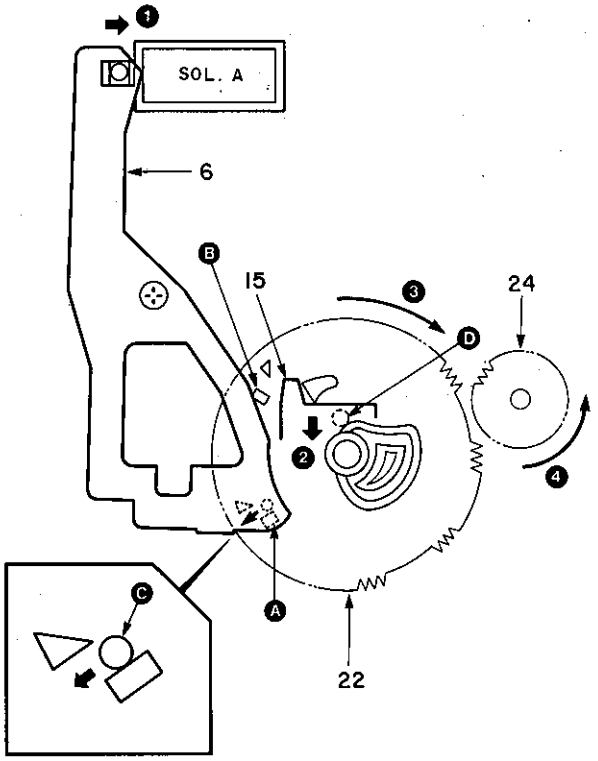


Fig. 2

1-2 When the flywheel gear (24) and play cam gear (22) are meshed, the shift arm shaft (15) is pulled up in the direction of the arrow ❻ by the cam Ⓔ on the play cam gear (22) until the caulked shaft Ⓒ on the TR Arm Ass'y (6) comes in contact with the stopper Ⓑ.
Similarly, the head chassis (1) connected to it is also moved upward.

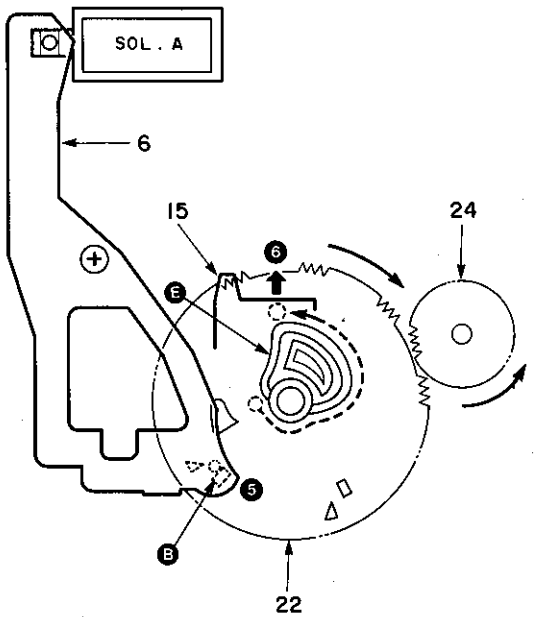


Fig. 3

MECHANISM OPERATION DESCRIPTION

1-3. When the head chassis (1) is moved up, the brake arm (33) is also pushed up in the direction of the arrow ❼ and released from the reel.
Then, the RV lever B (14) pushes the spring of the pinch roller (25) upward until it is pressed against the capstan, and tape starts to run at this time. At the same time, the play gear (12) is tilted toward the direction of the arrow ❾ by the center notch of the head chassis (1), the play gear arm (23) is meshed with the Reel Ass'y (79), it is rotated in the direction shown in the illustration, and tape starts to be wound.

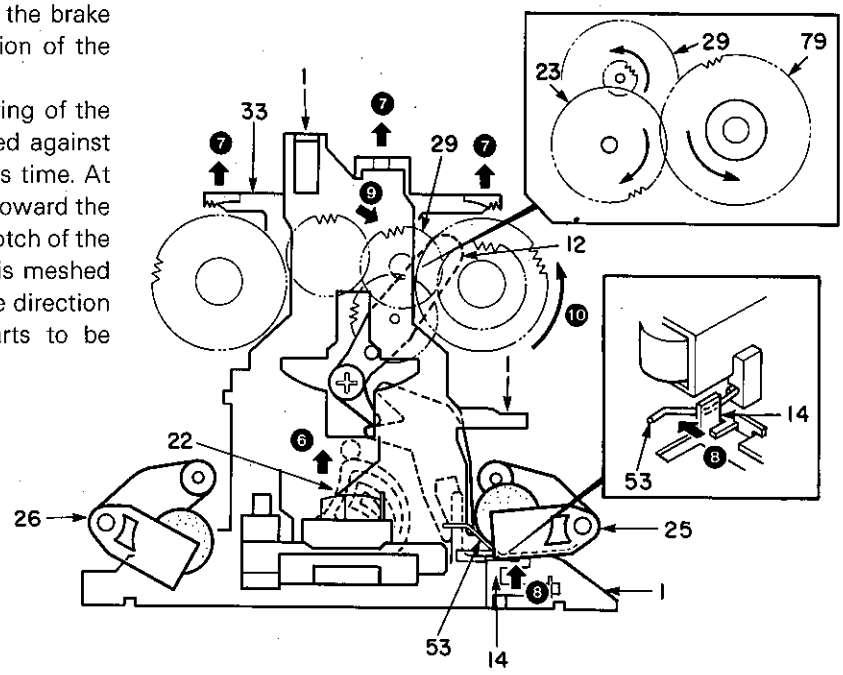


Fig. 4

2. PLAY/REC → STOP operation

When the SOL.A is turned ON again during play, the caulked shaft Ⓒ on the TR Arm Ass'y (6) is released from the stopper Ⓑ on the play cam gear (22), the play cam gear (22) starts rotation in the direction of the arrow, and it is stopped at the position of the stopper Ⓐ.
At this time, the head chassis is returned by the spring in the direction of the arrow ❹ until the stop position.

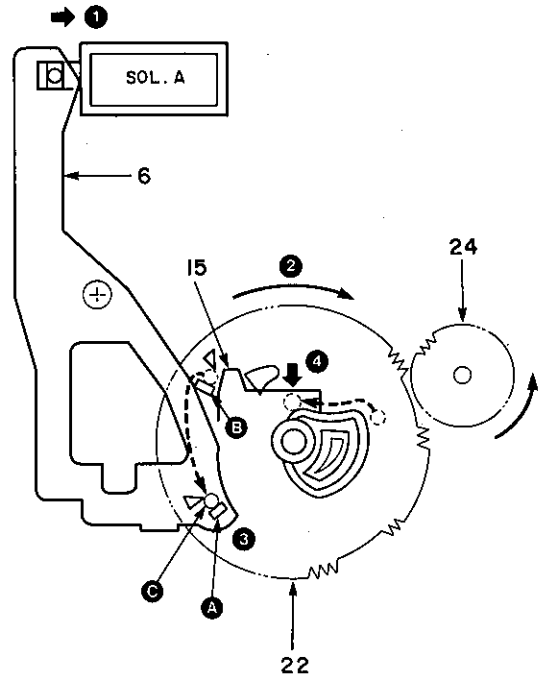


Fig. 5

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MECHANISM OPERATION DESCRIPTION

3. FF/REW operations

By the signal from the microprocessor, the SOL.B is turned ON then immediately OFF. The trigger arm FR (80) is moved in the direction ❶, the projection Ⓕ is moved in the direction ❷ and released from the stopper Ⓗ.
As the FR cam gear (21) is pushed in the direction of the arrow ❸ by the FR shift arm (17) and spring (84), the gear is moved slightly and meshed with the flywheel gear (24). The FR cam gear is further rotates, and is stopped at the position where the boss Ⓕ of the trigger arm FR (80) comes in contact with the stopper Ⓖ.

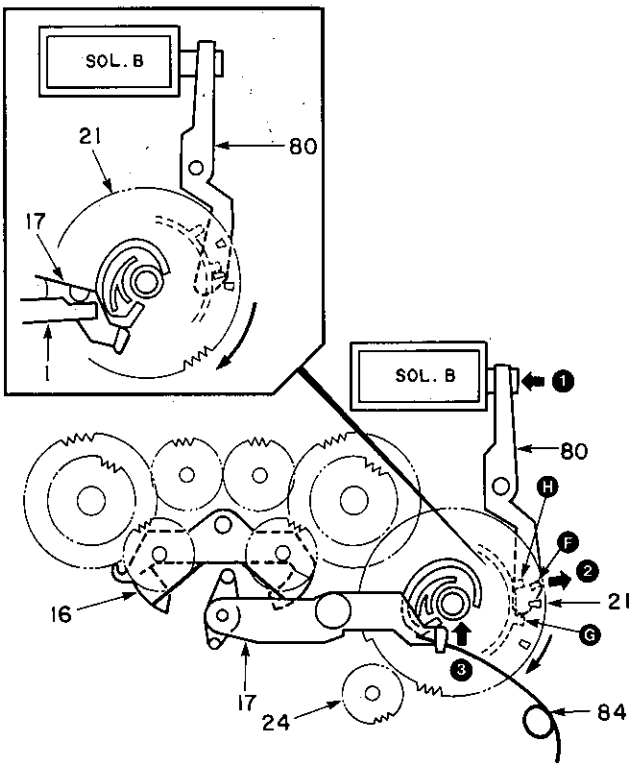


Fig. 6

4. FF operation

The FR shift arm (17) is moved in the direction of the arrow ❻ by the cam Ⓛ on the FR cam gear (21).
Then, the select arm (11) moves up along the shape of the mechanism base, and pushes up the FR arm spring (48). This causes the FR gear (19) on the FR arm (16) to be meshed with the clutch gear (29) and reel gear (79), which rotates in the direction of the arrow thereby putting the reel (79) into the FF operation.

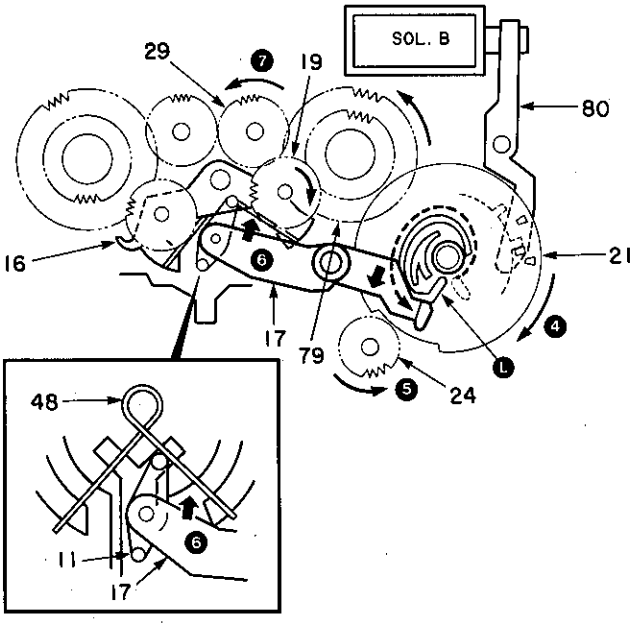


Fig. 7

MECHANISM OPERATION DESCRIPTION

5. REW operation

Similarly to the FF operation, the select arm (11) moves up in the direction of the arrow ❻ along the shape of the mechanism base, and pushes up the FR arm spring (48). This causes the FR gear (19) to be meshed with the REW gear (20) and reel gear (79), which rotates in the direction of the arrow thereby putting the reel (79) into the FF operation.

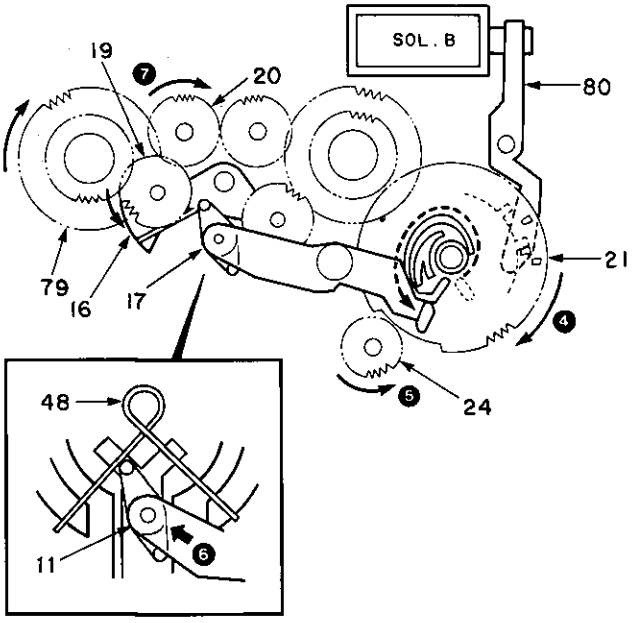


Fig. 8

6. Braking operation

When the select arm (11) moves upward, the "◿" portion of the select arm comes in contact with the "⌓" portion of the brake arm (33), and disengages the brake arm by lifting it in the direction of the arrow ❾.

7. FF/REW switching

The FF and REW operations are switched by varying the tilting angle of the selector arm (11).

FF operation..... The SOL.B is turned OFF at the moment the trigger arm FR (80) is released from the stopper on the FR cam gear. As the FR lever (9) is still pulled by the spring (44), the select arm (11) moves upward in the direction of the arrow Ⓐ.

REW operation ... Similarly, when the SOL.B is maintained ON for a while, the select arm (11) moves upward with the FR lever (9) in the position indicated by the dotted line, so it moves up in the direction of the arrow Ⓑ causing the REW operation.

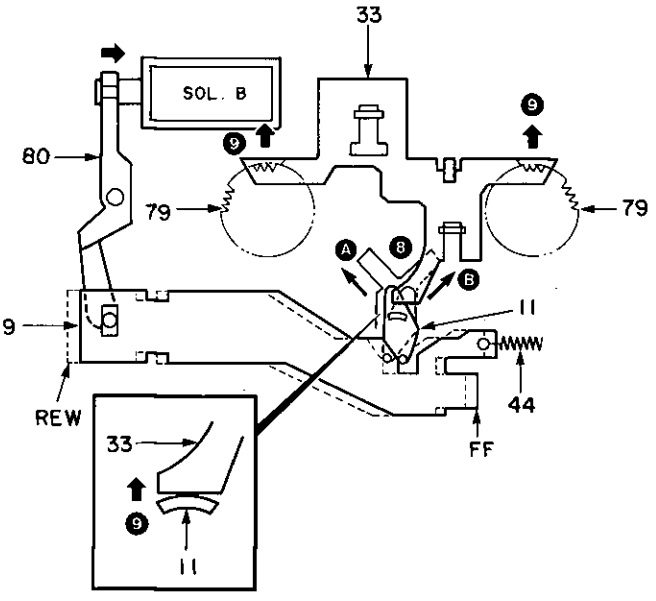


Fig. 9 (Rear perspective)

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MECHANISM OPERATION DESCRIPTION

8. PLAY → CUE/REVIEW operation

8-1 When the SOL.B is turned ON during play, the FR cam gear (21) is meshed with the flywheel gear, and the FR shirt arm (17) is pushed down in the direction of the arrow ❷ by the cam on the FR cam gear (21). At this time, the select arm (11) on the other end of the FR shift arm (17) is pushed up in the direction of the arrow ❹, so that the cue operation takes place in the condition of Fig. 10 and the review operation takes place in the condition of Fig. 11.

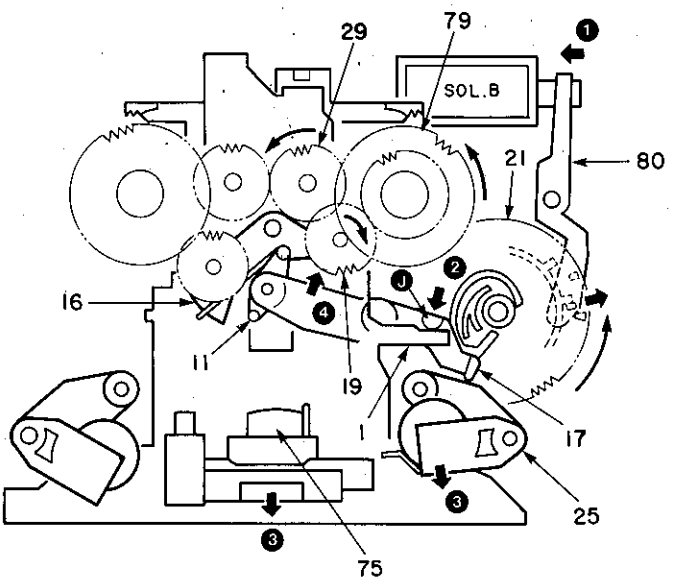


Fig. 10

8-2 The head chssis (1) is pushed down by the boss ❶ on the FR shift arm (17), and the Head Ass'y (75), tape and pinch roller (25) are released from the pressure against the capstan shaft.
The play gear arm (12) is located on the other end of the select arm (11) of the FR shift arm. When the head chassis (1) moves downward, the boss ❶ of the play gear arm (12) is moves along the center notch of the head chassis, thereby disengaging the play gear (23) an reel (79).
In Cue/Review operation, the reel is operated by the FR gear (19) similarly to the case of FF/REW operation.

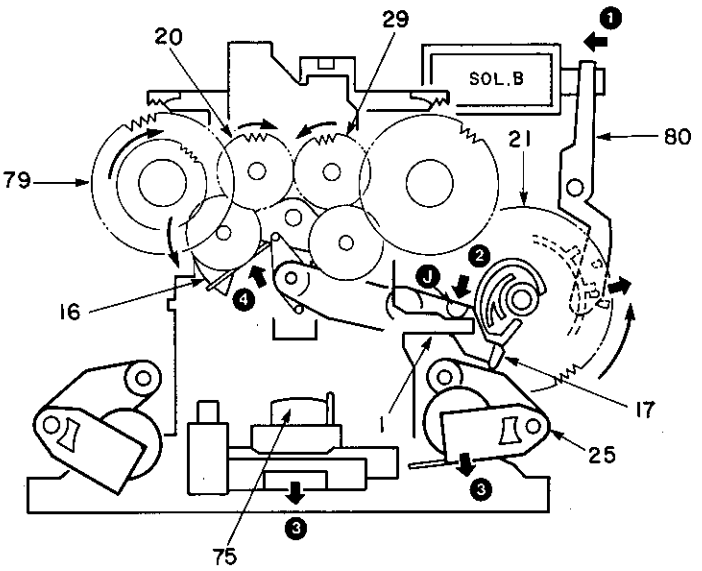


Fig. 11

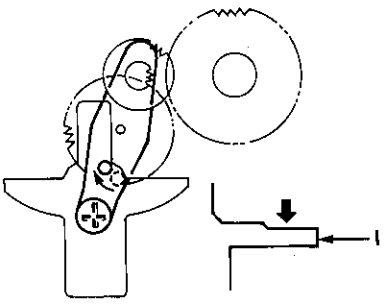


Fig. 12 CUE/REVIEW

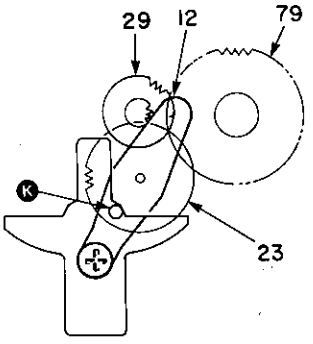


Fig. 13 PLAY

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MECHANISM OPERATION DESCRIPTION

9. CUE/REVIEW → PLAY operation

When the SOL.B is turned ON, the trigger arm FR (80) moves in the direction of the arrow ❶, so the boss Ⓕ is moved in the direction of the arrow ❷ and released from the stopper Ⓖ. As the cam of the FR cam gear (21) is kept pushed in the direction of the arrow ❸ by the FR shift arm (17), the gear continues rotation until the boss Ⓕ comes in contact with the stopper Ⓗ.

When the FR shift arm (17) moves in the direction of the arrow ❸, the select arm (11) is moved down in the direction of the arrow, and the FR arm (16) is released from the reel.

As the head chassis (1) is no longer pushed by the boss Ⓙ of the FR shift arm (17), the chassis also moves up, the pinch roller is pushed against the capstan, the tape against the head, and the play operation starts.

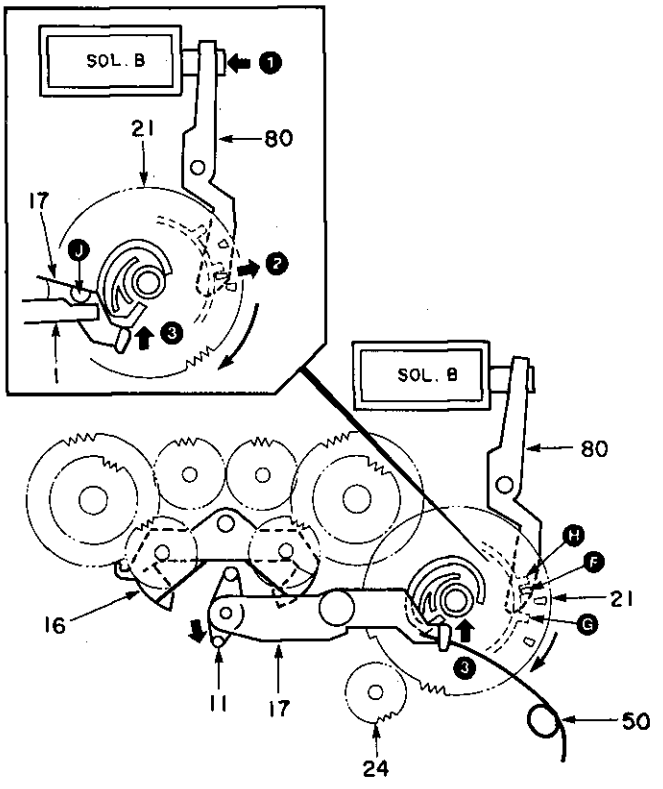


Fig. 14

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MECHANISM OPERATION DESCRIPTION

10. FWD ↔ RVS switching

10-1 When the play cam gear (22) starts rotation in the direction of the arrow ❸, the boss Ⓜ of the RV lever A (5) moves to the left and right along the shape of the cam. Finally, when the play cam gear (22) has rotated by a 1/4 turn, one of the two tracks is selected.
The track to be selected is dependent on the operation of the SOL.A.

FWD direction

The SOL.A is turned OFF immediately after it is turned ON.
As the RV lever A (5) which is pulled by the spring (45) is in the FWD position, the boss Ⓜ moves along the outer track.
Because the RV lever A (5) and RV lever B (14) are connected as shown in the illustration, the RV lever B (14) also comes in the FWD position. The RV arm (13) and play gear arm (14), which are operated by the projection on the RV lever B (14), are moved in the directions of the arrows ❷ ❸, so the play gear (23) in the FWD mode is meshed with the Reel Ass'y (79) and clutch gear (29), rotating the Reel Ass'y in the FWD direction.
At this time, the head is also put in the FWD direction (position shown in the illustration) by the head select gear (34).

RVS direction

The SOL.A is maintained ON for a while after it is turned ON. Therefore, the TR Arm Ass'y (6) moves in the direction of the arrow ❷ as shown in the illustration, and the RV lever A (5) is pushed by it and moves in the RVS direction.

10-2 The boss Ⓜ on the RV lever A (5) moves along the inner track shown in the illustration, so the RV lever A (5) is fixed in the RV position shown in the illustration. The RV lever B (14) is also put in the RVS position shown in the illustration. As the projection on the RV lever B moves the RV arm (13) and play gear arm in the directions of the arrow ❷ ❸, the play gear (23) in the RVS mode is meshed with the REW gear (20) and Reel Ass'y (79), rotating the Reel Ass'y (79) in the RVS direction.
At this time, the head is also put in the RVS direction by the head select gear (34).

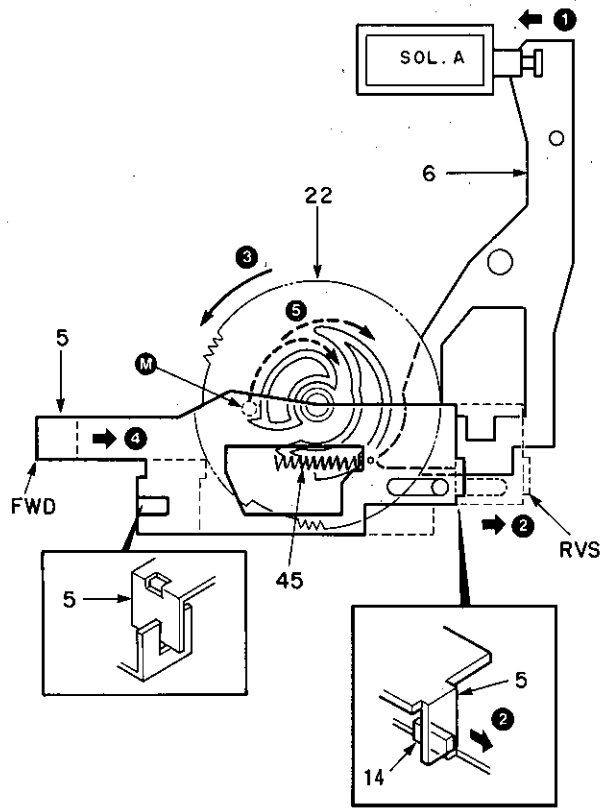


Fig. 15 (Rear perspective)

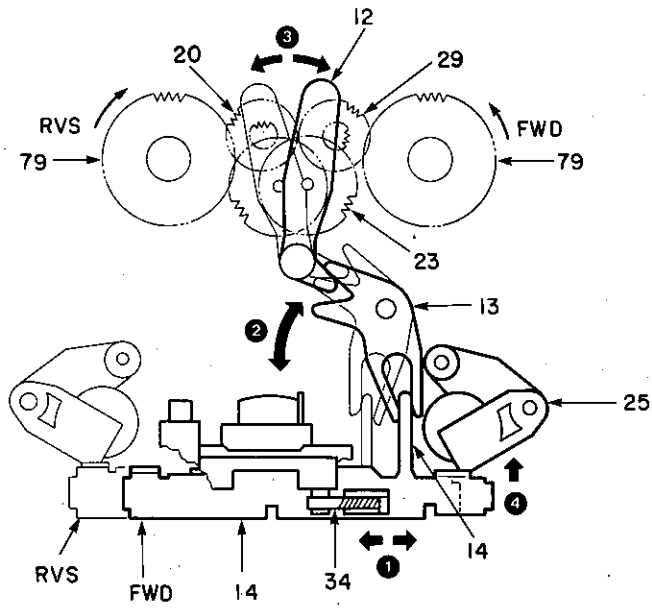
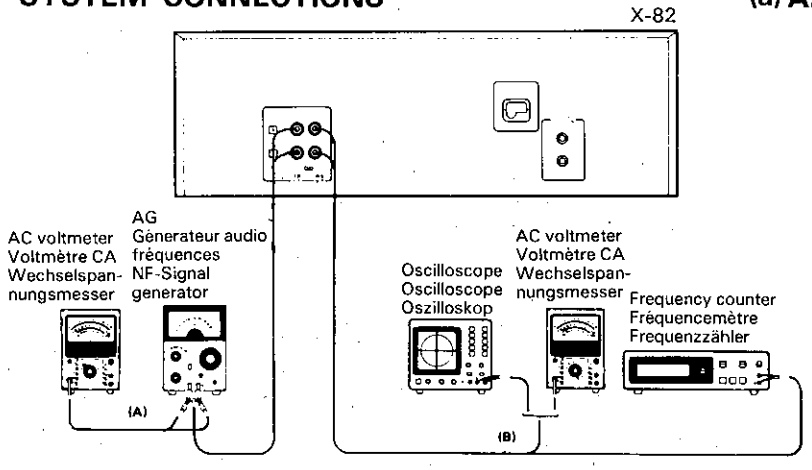


Fig. 16

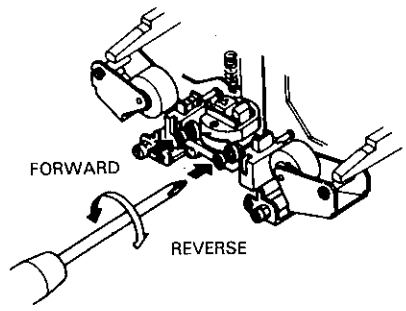
ADJUSTMENT

No.	ITEM	INPUT SETTINGS	OUTPUT SETTINGS	CASSETTE TAPE DECK SETTINGS	ALIGNMENT POINTS	ALIGN FOR	FIG.
CASSETTE DECK SECTION		TAPE: NORMAL, DOLBY: OFF, INPUT: LINE					0dBs = 0.775V
I REC/PLAY HEAD							
[1]	DEMAGNETIZATION	–	–	POWER: OFF Remove the cassette door.	REC/PLAY head	Demagnetize the REC/PLAY head with a head demagnetizer.	
[2]	CLEANING	–	–	PLAY	REC/PLAY head erase head, capstan, pinch roller.	Clean the REC/PLAY head erase head, capstan and pinch roller using a cotton swab slightly damped with alcohol.	
[3]	AZIMUTH	MTT-114 10kHz,-10dB	(B)	PLAY	Azimuth adjustment screw	Maximum output.	(a)
II PC BOARD (X28-1940-00)							
(1)	TAPE SPEED (HI SPEED)	MTT-111 3kHz	(B)	Connect a jumper between GND and TP4/5. PLAY	DECK A: VR7 DECK B: VR8	Adjust the tape speed so that a 6kHz signal is produced at the center of the tape.	
(2)	TAPE SPEED (NORMAL)	MTT-111, TCC-110 3kHz	(B)	PLAY	DECK A: VR9 DECK B: VR10	Adjust the tape speed so that a 3kHz signal is produced at the center of the tape.	
III PC BOARD (X28-1940-00, X87-1140-05)							
<1>	PLAYBACK LEVEL	MTT-150 400Hz(200nWb)	(B)	PLAY	DECK A: VR1 (L) VR2 (R) DECK B: VR3 (L) VR4 (R) (X28-1940)	Output level: -6.0dBs	
		MTT-256 315Hz(160nWb)				Output level: -9.0dBs	
		MTT-256U,TCCC-160 315Hz(220nWb)				Output level: -5.0dBs	
<2>	BIAS CURRENT	(A) 1kHz,-30dBs 10kHz,-30dBs	(B)	Adjust VR7 so that the REC monitor output becomes -29dBs at 1kHz, then record and reproduce signal of 1kHz and 10kHz in alternation.	VR5 (L) VR6 (R) (X28-1940)	Record 1kHz and 10kHz in alternation and adjust the variable resistors which control the bias current so that the same playback level is obtained.	
<3>	RECORD LEVEL	(A) 1kHz,-10dBs	(B)	Record and reproduce a 1kHz signal under the conditions set in <2>.	VR1 (L) VR2 (R) (X87-1140)	Adjust the variable resistors so that a playback level of -9dBs is obtained.	

SYSTEM CONNECTIONS



(a) AZIMUTH ADJUSTMENT SCREW



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REGLAGE

N°	ITEM	REGLAGE DE L'ENTREE	REGLAGE DE LA SORTIE	REGLAGE DU MAGNETO -PHONE A CASSETTE	POINTS DE L'ALIGNEMENT	ALIGNER POUR	FIG.
SECTION DU MAGNETOPHONE		TAPE: NORMAL, DOLBY: OFF, ENTREE: LINE				0dBs=0.775V	
I TETE D'ENREGISTREMENT/LECTURE							
[1]	DEMAGNETISATION	–	–	POWER: OFF Eloigner la porte.	Tête D'ENREGISTREMENT/ LECTURE	Demagnétiser la tête D'ENREGISTREMENT/LECTURE avec un démagnétiseur de tête.	
[2]	NETTOYAGE	–	–	PLAY	Tête D'ENREGISTREMENT/ LECTURE tête d'effacement, cabestan, galetpresseur.	Nettoyer la tête D'ENREGISTREMENT/LECTURE la tête d'effacement, le cabestan et le galetpresseur avec un coton-tige légèrement imbibé d'alcool.	
[3]	AZIMUT	MTT-114, TCC-153 10kHz,-10dB	(B)	PLAY	Vis d'azimut	Sortie maximer.	(a)
II PLAQUE IMPRIMEE (X28-1940-00)							
(1)	VITESSE DE DEFILEMENT (HI SPEED)	MTT-111, TCC-110 3kHz	(B)	Connecter un cablage entre les GND et TP4/5. PLAY	DECK A: VR7 DECK B: VR8	Régler la vitesse de bande de façon qu'un signal de 6kHz soit produit au centre de la bande.	
(2)	VITESSE DE DEFILEMENT (NORMAL)	MTT-111, TCC-110 3kHz	(B)	PLAY	DECK A: VR9 DECK B: VR10	Régler la vitesse de bande de façon qu'un signal de 3kHz soit produit au centre de la bande.	
III PLAQUE IMPRIMEE (X28-1940-00, X87-1140-05)							
<1>	NIVEAU DE LECTURE	MTT-150 400Hz(200nWb)	(B)	PLAY	DECK A: VR1 (G) VR2 (D) DECK B: VR3 (G) VR4 (D) (X28-1940)	Niveau de sortie: -6.0dBs	
		MTT-256 315Hz(160nWb)				Niveau de sortie: -9.0dBs	
		MTT-256U,TCC-160 315Hz(220nWb)				Niveau de sortie: -5.0dBs	
<2>	COURANT DE POLARISATION	(A) 1kHz,-30dBs 10kHz,-30dBs	(B)	Régler VR7 de façon que la sortie de moniteur REC soit de -29dBs à 1kHz, puis en registrer et reproduire des signaux de 1kHz et 10kHz en alternance.	VR5 (G) VR6 (D) (X28-1940)	Enregistrer un signal de 1kHz et 10kHz en alternance et ajuster les résistances variables qui commandent le courant de polarité de façon à obtenir le même niveau de lecture.	
<3>	NIVEAU D'ENREGISTREMENT	(A) 1kHz,-10dBs	(B)	Enregistrer et reproduire un signal de 1kHz dans les conditions précisées en <2>.	VR1 (G) VR2 (D) (X87-1140)	Ajuster les résistances variables de façon à obtenir un niveau de lecture de -9dBs.	

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ABGLEICH

NR.	GEGENSTAND	EINGANGS-EINSTELLUNG	AUSGANGS-EINSTELLUNG	KASSETTENGERÄT-EINSTELLUNG	ABGLEICH PUNKTE	ABGLEICHEN FÜR	ABB.
CASSETTEN-DECK ABTEILUNG		TAPE: NORMAL, DOLBY: OFF, EINGANG: LINE				0dBs = 0,775V	
I AUFNAHME/WIEDERGABE KOPF							
[1]	ENTMAGNETISIERUNG	–	–	POWER: OFF Den Kassettenfachdeckel oben herausziehen.	AUFNAHME/WIEDERGABE-Kopf	Entmagnetisierung von dem AUFNAHME/WIEDERGABE Kopf mit einem Tonkopf Entmagnetisierungsdrossel.	
[2]	REINIGUNG	–	–	PLAY	AUFNAHME/WIEDERGABE-Kopf Löschkopf, Tonwelle, Andruckrolle.	AUFNAHME/WIEDERGABE-Kopf, Löschkopf, Tonwelle und Andruckrolle mit einem leicht mit Alkohol befeuchteten Wattebausch reinigen.	
[3]	AZIMUT-EINSTELLUNG	MTT-114,TCC-153 10kHz.-10dB	(B)	PLAY	Azimut-Einstellschraube	Maximal Ausgang.	(a)
II GEDRUCKTE SCHALTPLATTE (X28-1940-00)							
(1)	BANDGESCHWINDIGKEIT (HI SPEED)	MTT-111,TCC-110 3kHz	(B)	Einen Schaltdraht zwischen GND und TP4/5 anschließen. PLAY	DECK A: VR7 DECK B: VR8	Die Bandgeschwindigkeit so justieren, daß ein 6kHz Signal auf der Mitte des Bands erzeugt wird.	
(2)	BANDGESCHWINDIGKEIT (NORMAL)	MTT-111,TCC-110 3kHz	(B)	PLAY	DECK A: VR9 DECK B: VR10	Die Bandgeschwindigkeit so justieren, daß ein 3kHz Signal auf der Mitte des Bands erzeugt wird.	
III GEDRUCKTE SCHALTPLATTE (X28-1940-00, X87-1140-05)							
<1>	WIEDERGABE-PEGEL	MTT-150 400kHz(200nWb)	(B)	PLAY	DECK A: VR1 (L) VR2 (R) DECK B: VR3 (L) VR4 (R) (X28-1940)	Ausgangspegel: -6,0dBs	
		MTT-256 315kHz(160nWb)				Ausgangspegel: -9,0dBs	
		MTT-256U,TCC-160 315kHz(220nWb)				Ausgangspegel: -5,0dBs	
<2>	LEERLAUFSTROM	(A) 1kHz.-30dBs 10kHz.-30dBs	(B)	VR7 so justieren, daß der REC Monitorausgang -29dBs bei 1kHz wird, und danach abwechselnd Signale von 1kHz und 10kHz aufnehmen und wiedergeben.	VR5 (L) VR6 (R) (X28-1940)	Signale von 1kHz und 10kHz abwechselnd aufnehmen und die Regelwiderstände, die den Vormagnetisierugsstrom regeln, so justieren, daß der gleiche Wiedergabepegel erzielt wird.	
<3>	AUFNAHMEPEGEL	(A) 1kHz.-10dBs	(B)	Ein 1kHz Signal unter den in Punkt <2> beschriebenen Bedingungen aufnehmen und reproduzieren.	VR1 (L) VR2 (R) (X87-1140)	Die Regelwiderstände so justieren, daß ein wiedergabepegel von -9dBs erzielt wird.	

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VOLTAGE CHECK TABLE

X28-1940-00

	E	B	C	
Q3	0 V	0.7 V	—	A. PLAY ON
Q4	0 V	0.7 V	—	A. PLAY ON
Q5	0 V	0.7 V	—	B. PLAY ON
Q6	0 V	0.7 V	—	B. PLAY ON
Q13	—	0.7 V	—	NOR ON
Q14	—	0.7 V	0 V	NOR ON
Q15	14.1 V	13.5 V	—	NOR ON
Q18	—	—	14.1 V	
Q19	—	1.0	0.4 V	MET ON
			6 V	CrO_2
			7.5 V	NOR
Q20	0 V	0 V	—	MET OFF
Q25	0 V	0.7 V	—	REC ON
Q28	3.8 V	4.8 V	—	REC OFF
Q29	0 V	0.6 V	—	DUBB ON
Q30	3.8 V	3.0 V	3.8 V	STOP OFF
Q31	—	0.7 V	0 V	STOP ON
Q32	—	0.7 V	0 V	STOP ON
Q33	0 V	0 V	—	CUE, REVIEW OFF
Q35	0 V	0.7 V	—	AUTO BIAS
Q36	0 V	0 V	—	AUTO BIAS OFF
Q37	0 V	0 V	—	AUTO BIAS OFF
Q39	0 V	0.7 V	—	NOR ON
	0 V	0 V	—	HI
Q40	0 V	0.7 V	—	NOR ON
Q41	—	10.4 V	—	NOR ON
	—	11.7 V	—	HI OFF
Q51	0 V	0.7 V	—	AUTO BIAS 400 Hz
Q52	0 V	0.7 V	—	ON
Q53	0 V	0 V	—	AUTO BIAS OFF
Q54	14.1 V	—	—	
Q55	—	6.9 V	—	AUTO BIAS
Q56				
Q57	14.2 V	—	40.4 V	
Q58	—	—	20.8 V	
Q59	12.4 V	—	20.8 V	
Q61～	5.1 V			
Q64				

IC-1

1～5	—	
6	5.1 V	HI-SPEED
7～8	—	
9	5.1 V	A. PLAY
10	0 V	
11	8.2 V	
12～14	—	
15	5.1 V	MET
16～20	—	

IC-2

1	—	
2	0 V	
3	—	
4	4.9 V	REC
5	0 V	
6	10.3 V	
7	—	
8	0 V	
9	—	

X87-1140-05
IC-3

1	7.1 V
2	7 V
3	7.1 V
4	0 V
5	7 V
6	7.1 V
7	7.0 V
8	11 V

IC-4

1	0 V
2～6	—
7	0 V
8～10	—
11	8.2 V
12～15	—
16	14.1 V

IC-5

1	8.2 V
2	8.2 V
3	5.8 V
4	0 V
5	—
6	8.2 V
7	—
8	14.1 V

IC-7

1	7.1 V
2	7.2 V
3	3.7 V
4	0 V
5	—
6	5.8 V
7	7.1 V
8	14.2 V

IC-10

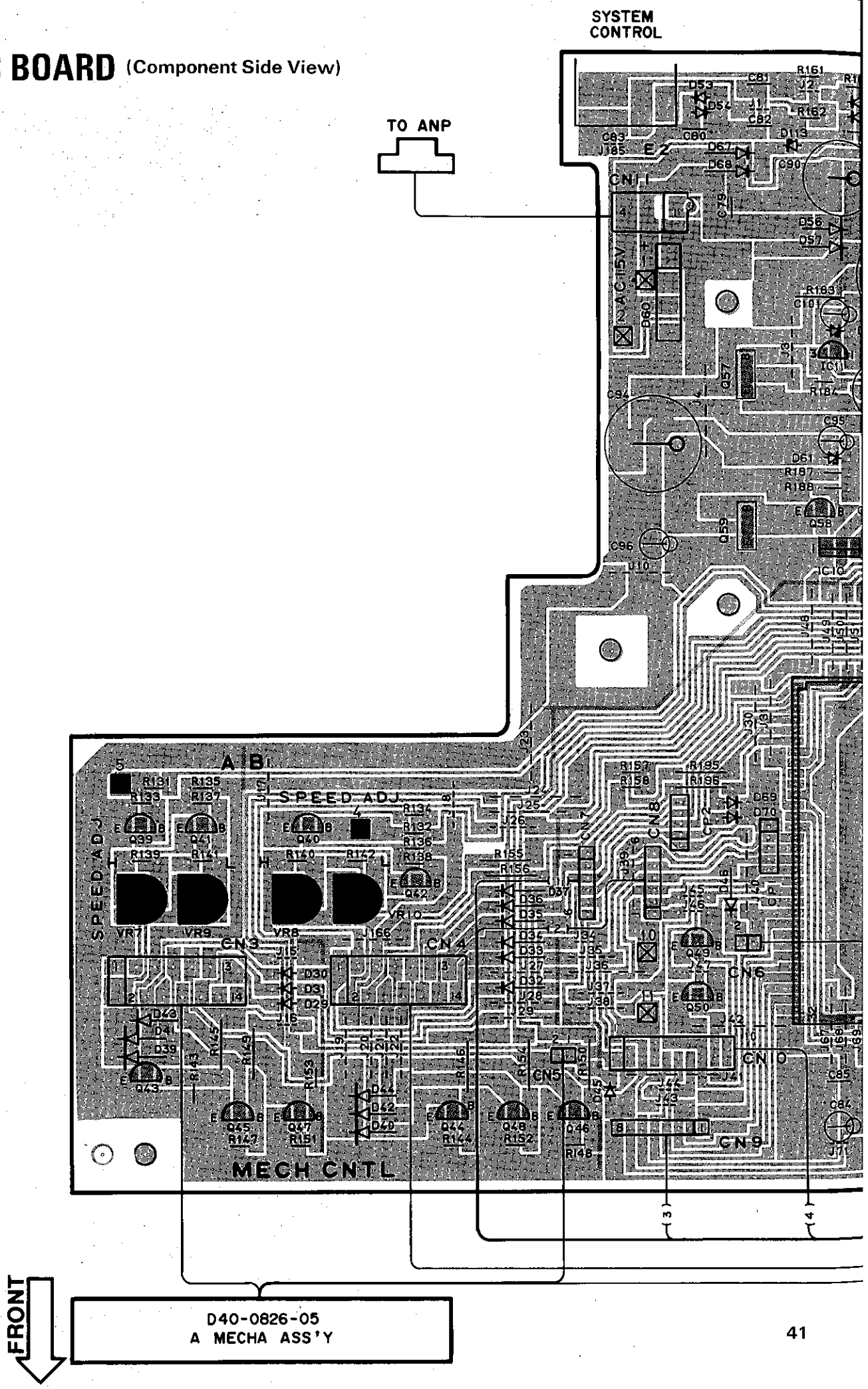
1	12.4 V
2	0 V
3	5.1 V

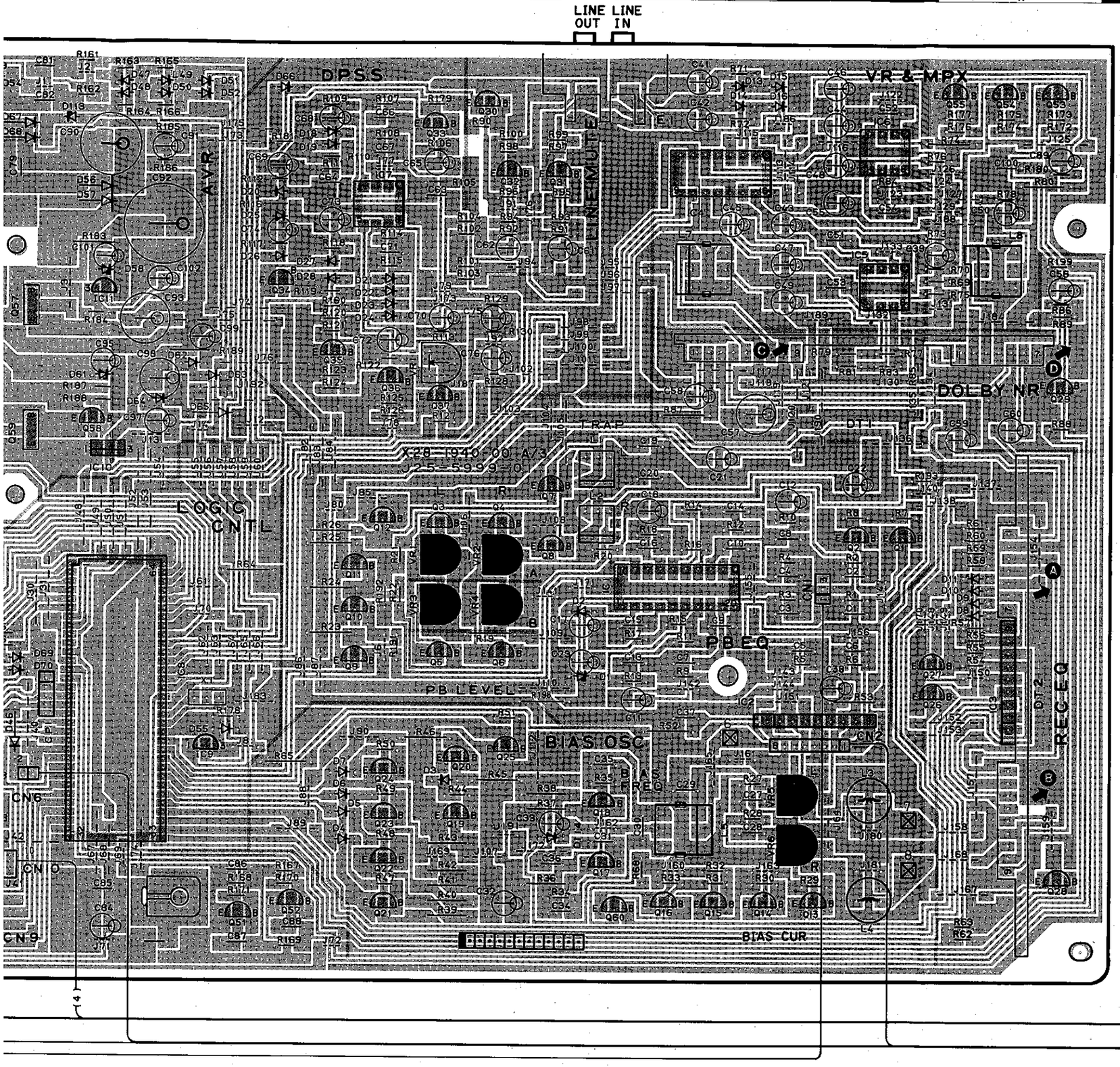
IC-11

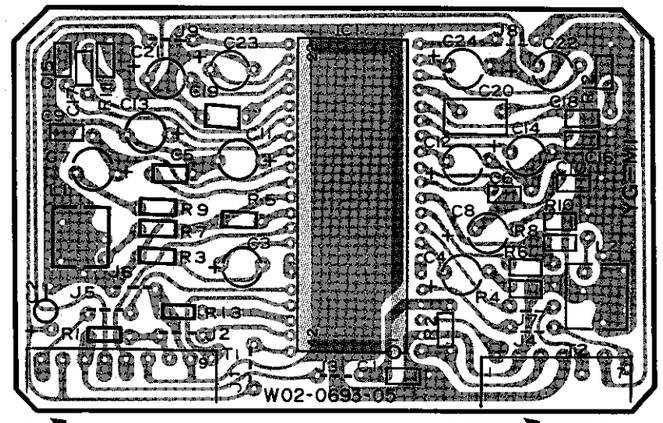
1	28 V
2	0 V
3	14.9 V

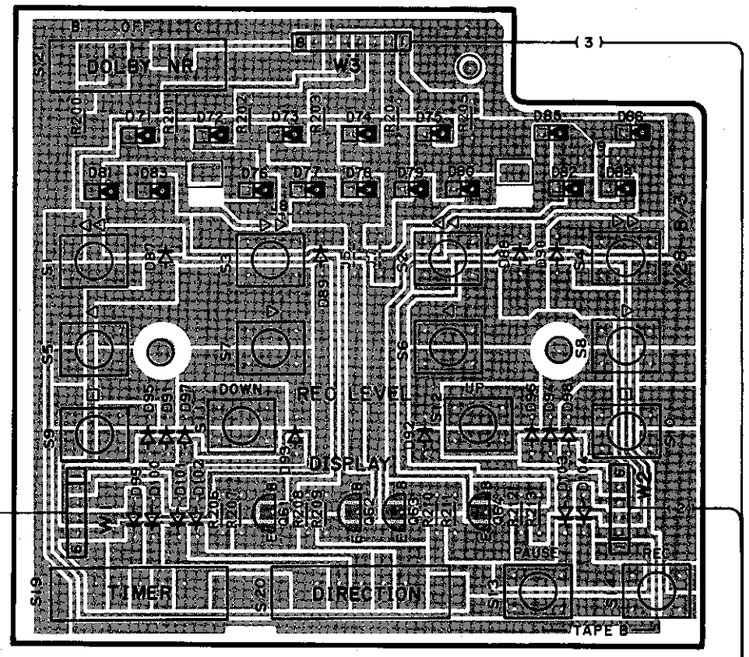
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PC BOARD (Component Side View)

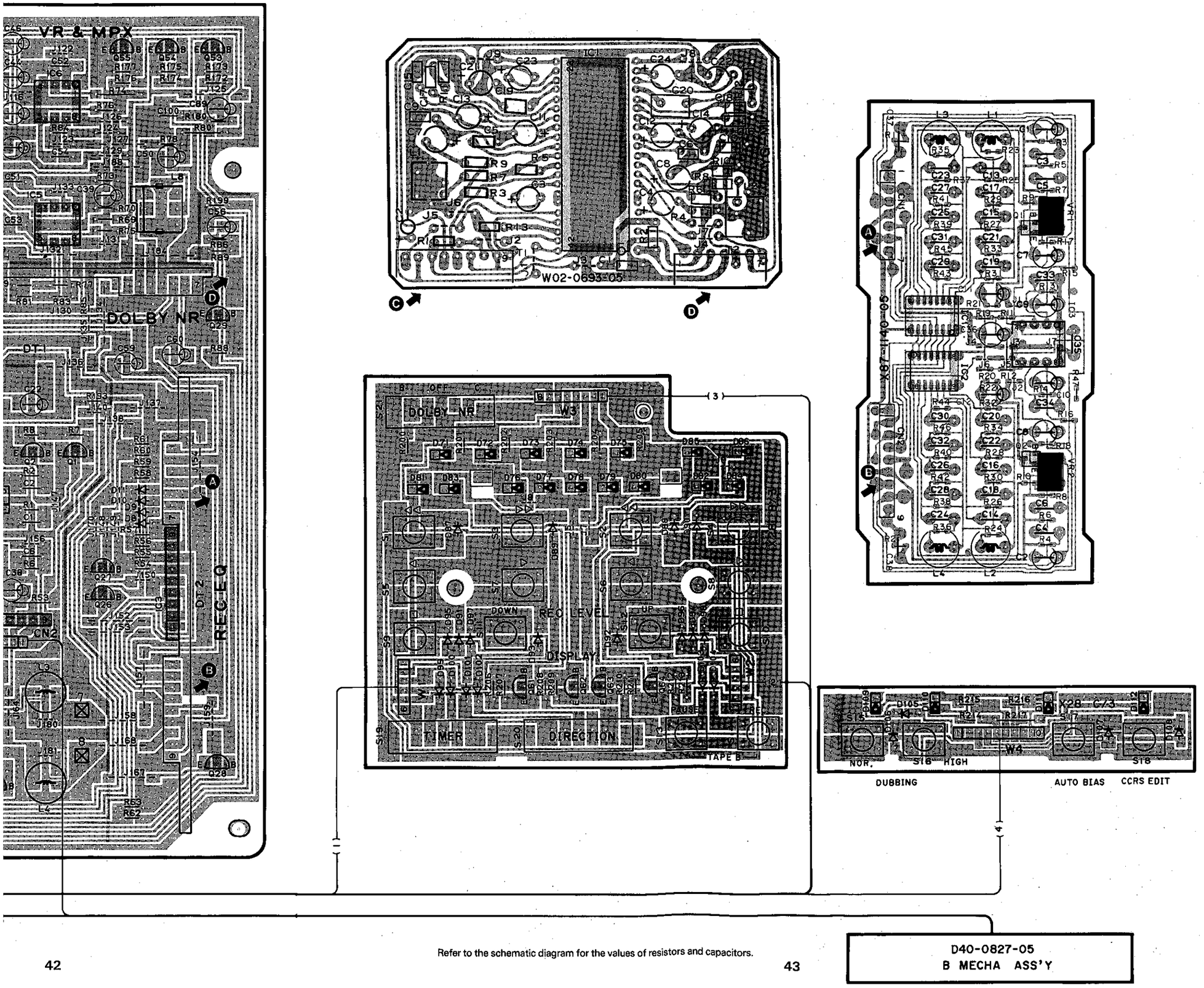








Refer to the schematic diagram for the values of resistors and capacitors.



Refer to the schematic diagram for the values of resistors and capacitors.

D40-0827-05
B MECHA ASS'Y

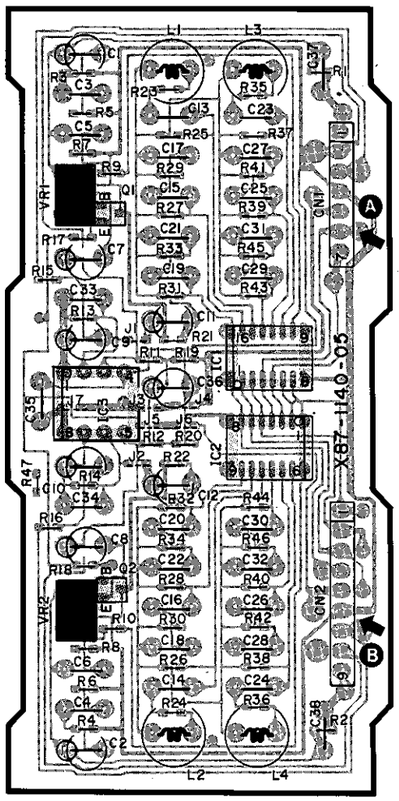
X28-1940-00

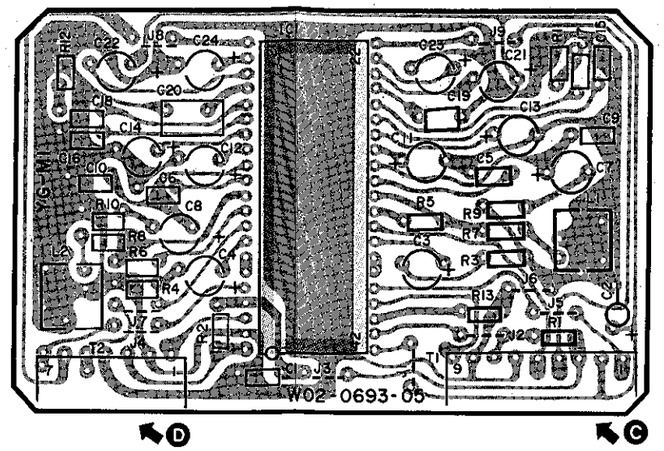
Ref. No. IC	Ref. No. Q	Address
	1	4J
	2	4J
	3	4G
	4	4H
	5	5G
	6	5H
	7	4H
	8	4H
	9	5G
	10	4G
	11	4G
	12	4G
	13	6J
	14	6I
	15	6I
	16	6I
	17	6H
	18	5H
	19	5H
	20	5H
	21	6G
	22	6G
	23	6G
	24	5G
	25	5H
	26	5J
	27	5J
	28	6K
	29	3K
	30	1H
	31	2H
	32	2H
	33	1G
	34	2F
	35	3G
	36	3G
	37	3G
	39	5B
	40	5C
	41	5B
	42	5C
	43	6B
	44	6C
	45	6B
	46	6D
	47	6C
	48	6D
	49	5E
	50	6E
	51	6F
	52	6G
	53	1K
	54	1K
	55	1K
	57	2E
	58	3E
	59	3E
	60	6I
	61	5M
	62	5N
	63	5N
	64	5N
1		4I
2		5J
3		5K
4		2I
5		2J
6		1J
7		2G
8	•	5E
9		5F
10		3E
11		2E

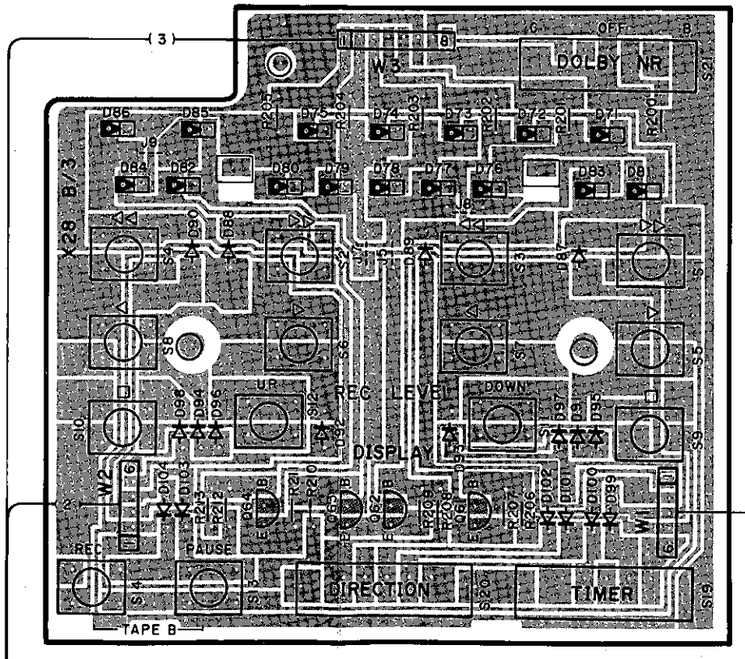
X87-1140-05

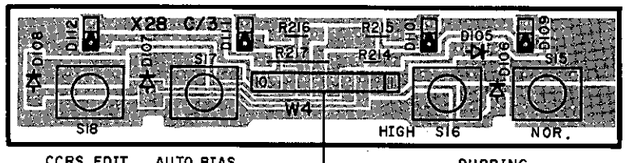
Ref. No. IC	Ref. No. Q	Address
	1	2Q
	2	4Q
1		3P
2		3P
3		3Q

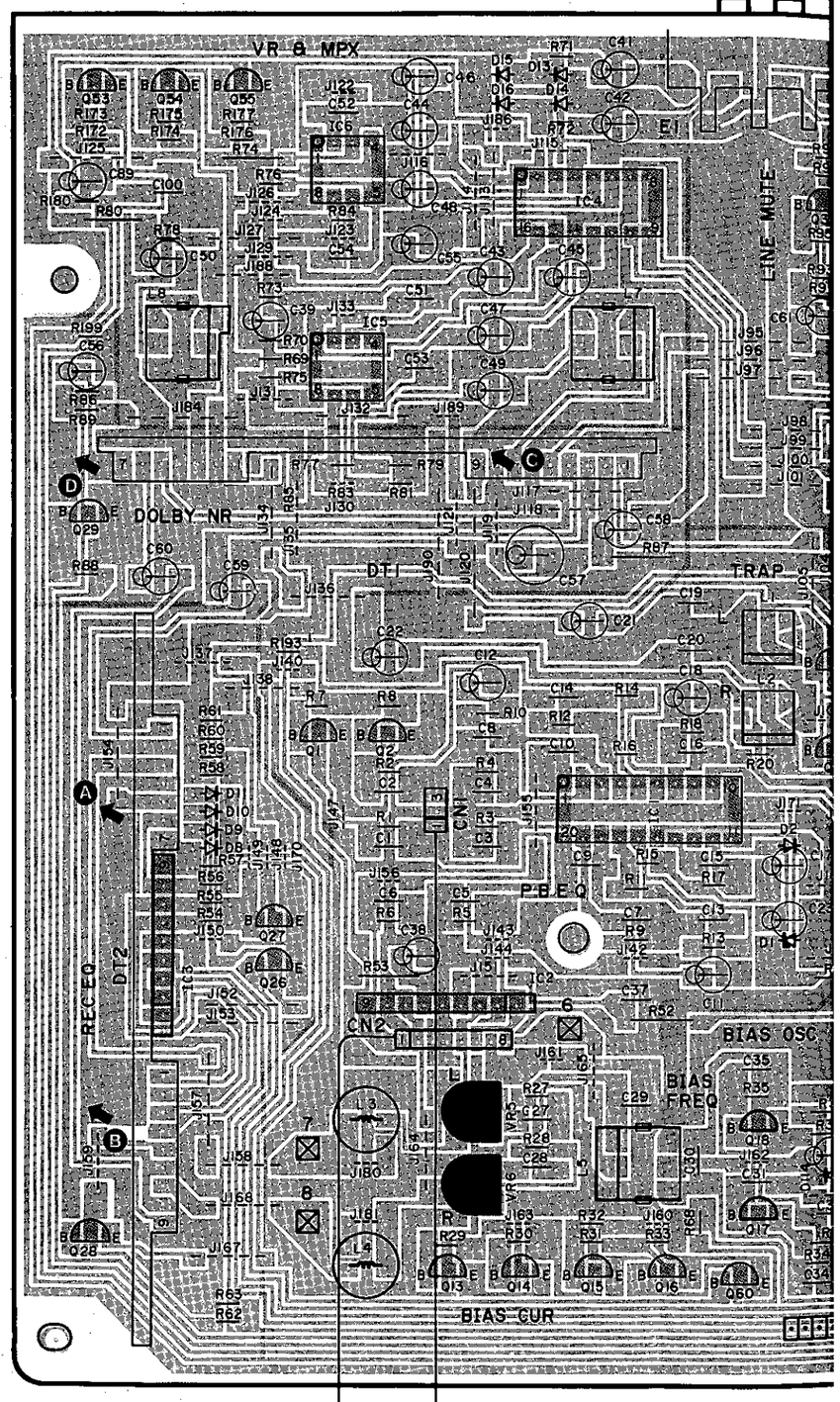
PC BOARD (Foil Side View)





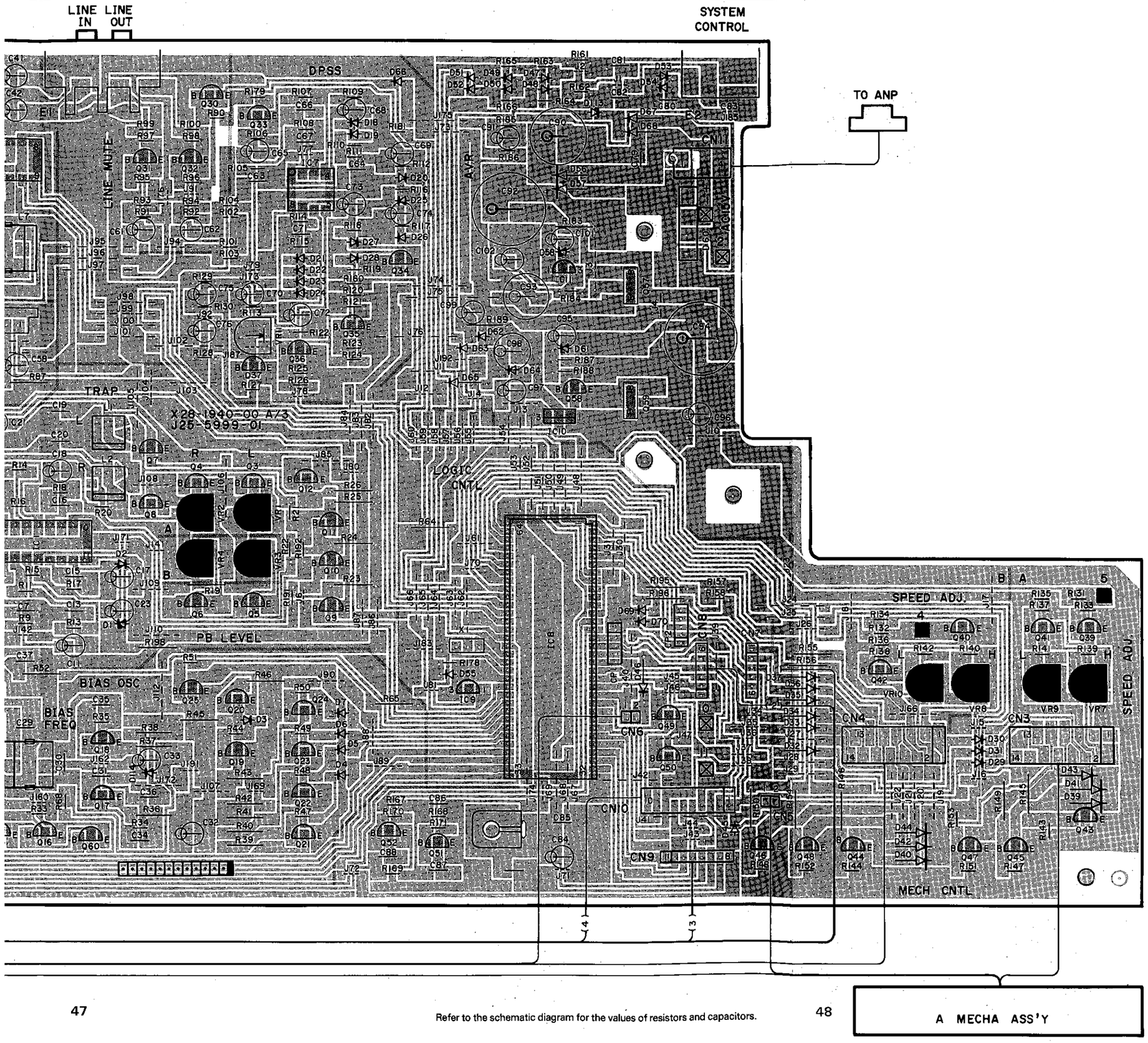






FRONT

D40-0827-05
B MECHA ASS'Y



X28-1940-00

Ref. No. IC	Ref. No. Q	Address
	1	4A C
	2	4A C
	3	4A F
	4	4A F
	5	4A F
	6	4A F
	7	4A E
	8	4A E
	9	4A F
	10	4A F
	11	4A F
	12	4A F
	13	6A D
	14	6A D
	15	6A D
	16	6A E
	17	6A E
	18	5A E
	19	6A F
	20	5A F
	21	6A F
	22	6A F
	23	6A F
	24	5A F
	25	5A F
	26	5A C
	27	5A C
	28	6A B
	29	3A B
	30	1A F
	31	2A E
	32	1A F
	33	1A F
	34	2A G
	35	2A G
	36	3A F
	37	3A F
	39	5A L
	40	5A K
	41	5A K
	42	5A J
	43	6A L
	44	6A J
	45	6A K
	46	6A I
	47	6A K
	48	6A J
	49	5A I
	50	6A I
	51	6A G
	52	6A G
	53	1A B
	54	1A B
	55	1A C
	57	2A I
	58	3A H
	59	3A I
	60	6A E
	61	5Z
	62	5Z

Ref. No. IC	Ref. No. Q	Address
	63	5Y
	64	5Y
1		4A D
2		5A D
3		5A B
4		2A D
5		2A C
6		1A C
7		1A F
8		• 5A H
9		5A G
10		3A H
11		2A H

X87-1140-05

Ref. No. IC	Ref. No. Q	Address
	1	2W
	2	4W
1		3W
2		3W
3		3W

Refer to the schematic diagram for the values of resistors and capacitors.

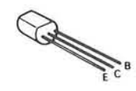
A MECHA. ASS'Y (D40-0826-05)

B MECHA. ASS'Y (D40-0827-05)

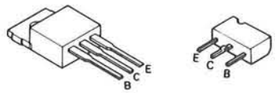
(X28-1940-00) (A/3)

DTA124EN

DTC124EN
2SA733(A)
2SA992
2SC1845
2SC2320
2SC3246
2SC945(A)
2SD1302
2SD863

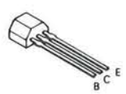


2SD1266



2SA937F

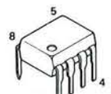
2SA933S
2SC1740S



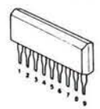
2SC2713



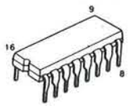
NJM4558D
NJM4558D-A



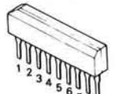
UPC1330HA



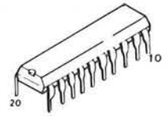
TC9213P



TD62554S



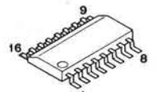
LA3246



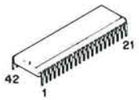
M5218P-A



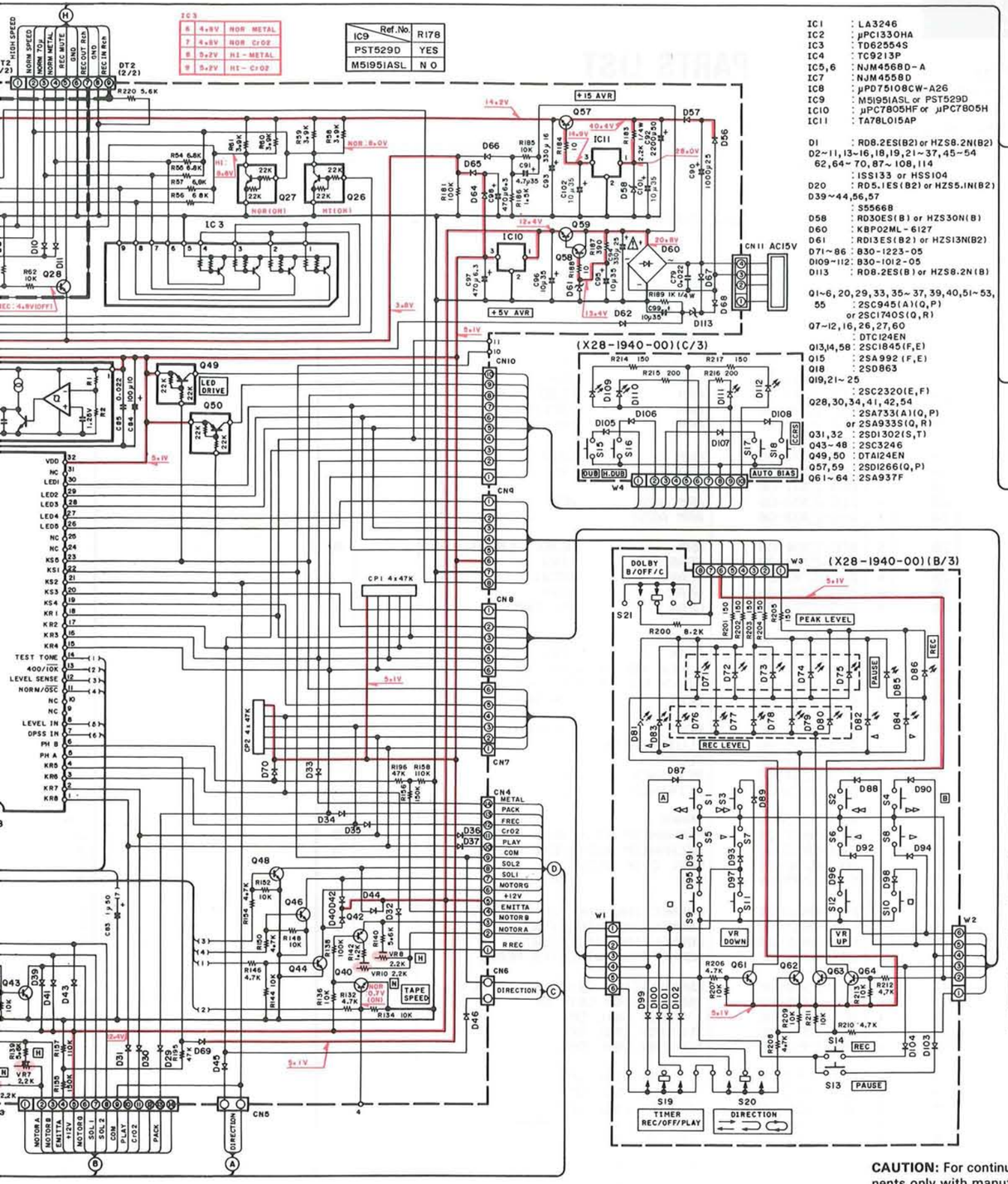
BA6251F



HA12088ANT



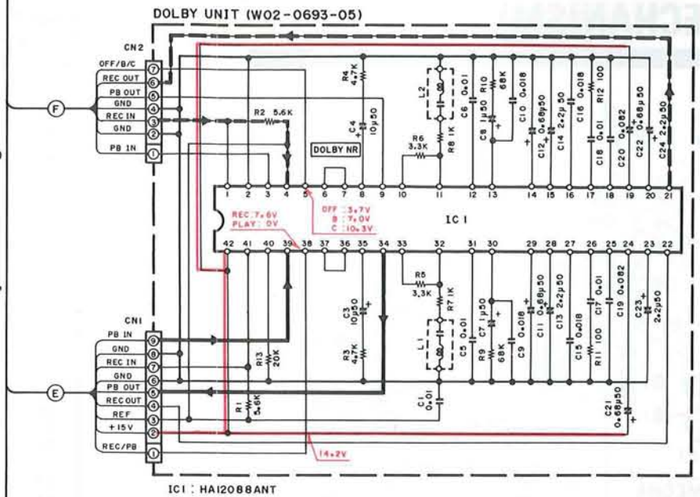
UPC7805

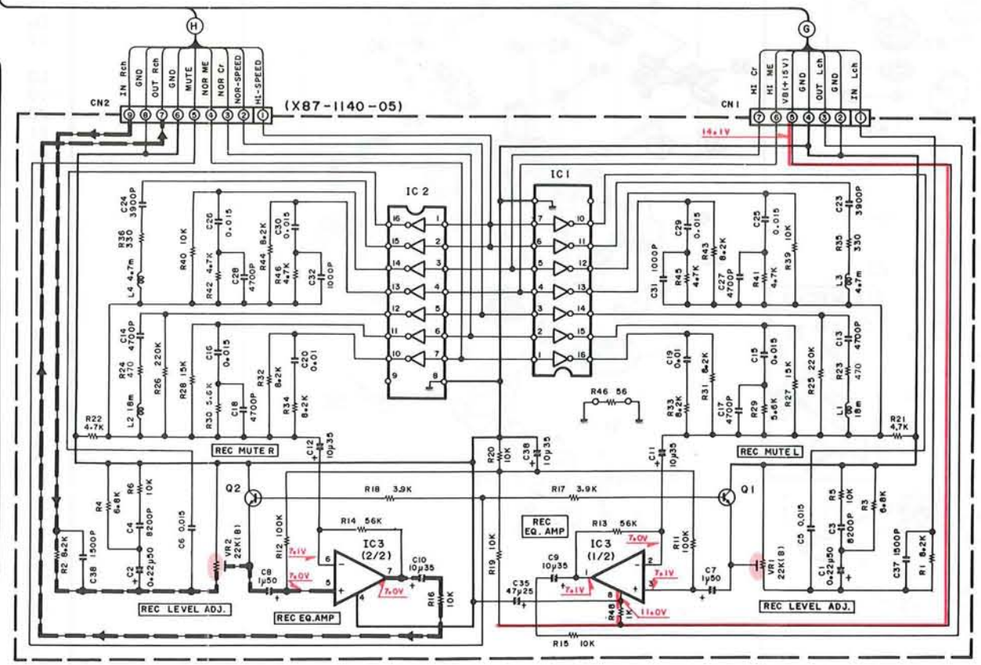


IC1 : LA3246
IC2 : μPC1330HA
IC3 : TD62554S
IC4 : TC9213P
IC5,6 : NJM4568D-A
IC7 : NJM4558D
IC8 : μPD75108CW-A26
IC9 : M51951ASL or PST529D
IC10 : μPC7805HF or μPC7805H
IC11 : TA78L015AP

DI : RD8.2ES(B2) or HZS8.2N(B2)
D2~11,13~16,18,19,21~37,45~54,62,64~70,87~108,114 : ISS133 or HSS104
D20 : RD5.1ES(B2) or HZS5.1N(B2)
D39~44,56,57 : S55668
D58 : RD30ES(B) or HZS30N(B)
D60 : KBP02ML-6127
D61 : RD13ES(B2) or HZS13N(B2)
D71~86 : B30-1223-05
D109~112 : B30-1012-05
D113 : RD8.2ES(B) or HZS8.2N(B)

Q1~6,20,29,33,35~37,39,40,51~53,55 : 2SC945(A)(Q,P) or 2SC1740S(Q,R)
Q7~12,16,26,27,60 : DTC124EN
Q13,14,58 : 2SC1845(F,E)
Q15 : 2SA992(F,E)
Q18 : 2SD863
Q19,21~25 : 2SC2320(E,F)
Q28,30,34,41,42,54 : 2SA733(A)(Q,P) or 2SA933S(Q,R)
Q31,32 : 2SD1302(S,T)
Q43~48 : 2SC3246
Q49,50 : DTA124EN
Q57,59 : 2SD2666(Q,P)
Q61~64 : 2SA937F





IC1,2 : BA6251F
IC3 : M5218P-A

Q1,2 : 2SC2713

X87-1140 IC1	1,2	3	4	5	6	7
NOR NOR	0V	0V	0V	7.4V	0V	0V
HI NOR	7.8V	0V	0V	0V	0V	0V
NOR CrO2	0V	0V	0V	8.1V	4.8V	0V
HI CrO2	8.7V	5.3V	0V	0V	0V	0V
NOR MET	0V	0V	0V	8.1V	0V	4.9V
HI MET	8.7V	0V	5.3V	0V	0V	0V

DC voltages are as measured with a high impedance voltmeter with a cassette loaded at playback mode. Values may vary slightly due to variations between individual instruments or/and units. Bias circuit DC voltages are as measured while in the record mode.

Les tensions c.c. doivent être mesurées avec un voltmètre à haute impédance, une cassette étant insérée en mode du lecture. Les valeurs peuvent différer légèrement du fait des variations inhérentes aux appareils et aux instruments de mesure individuels.
Les tensions c.c. du circuit de polarité doivent être mesurées, l'appareil étant en mode d'enregistrement.

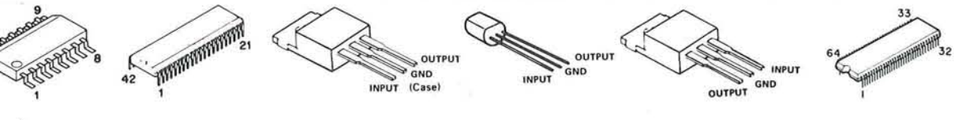
Die angegebenen Gleichspannungswerte wurden bei eingesetzter Cassette in der Wiedergabe mit einem hochohmigen Spannungsmesser gemessen. Dabei schwanken die Meßwerte aufgrund von Unterschieden zwischen einzelnen Instrumenten oder Geräten u. U. geringfügig. Die angegebenen Gleichspannungswerte der Vormagnetisierungsschaltung wurden in der Aufnahme-Betriebsart gemessen.

SIGNAL LINE
REC LINE
GND LINE
+B LINE

X-82

CAUTION: For continued safety, replace safety critical components only with manufacturer's recommended parts (refer to parts list). ⚠ Indicates safety critical components. To reduce the risk of electric shock, leakage-current or resistance measurements shall be carried out (exposed parts are acceptably insulated from the supply circuit) before the appliance is returned to the customer.

BA6251F HA12088ANT UPC7805HF M51951ASL TA78L015AP UPD75108CW-218



Kenwood follows a policy of continuous advancements in development.
For this reason specifications may be changed without notice.
DOLBY and the double-D symbol are trademarks of Dolby Laboratories Licensing Corporation.
Noise reduction circuit made under license from Dolby Laboratories Licensing Corporation.

Kenwood poursuit une politique de progrès constants en ce qui concerne le développement.
Pour cette raison, les spécifications sont sujettes à modifications sans préavis.
La marque DOLBY et le double "D" sont des marques déposées des Dolby Laboratories.
Le système de réduction du bruit de fond est fabriqué sous license des Dolby Laboratories.

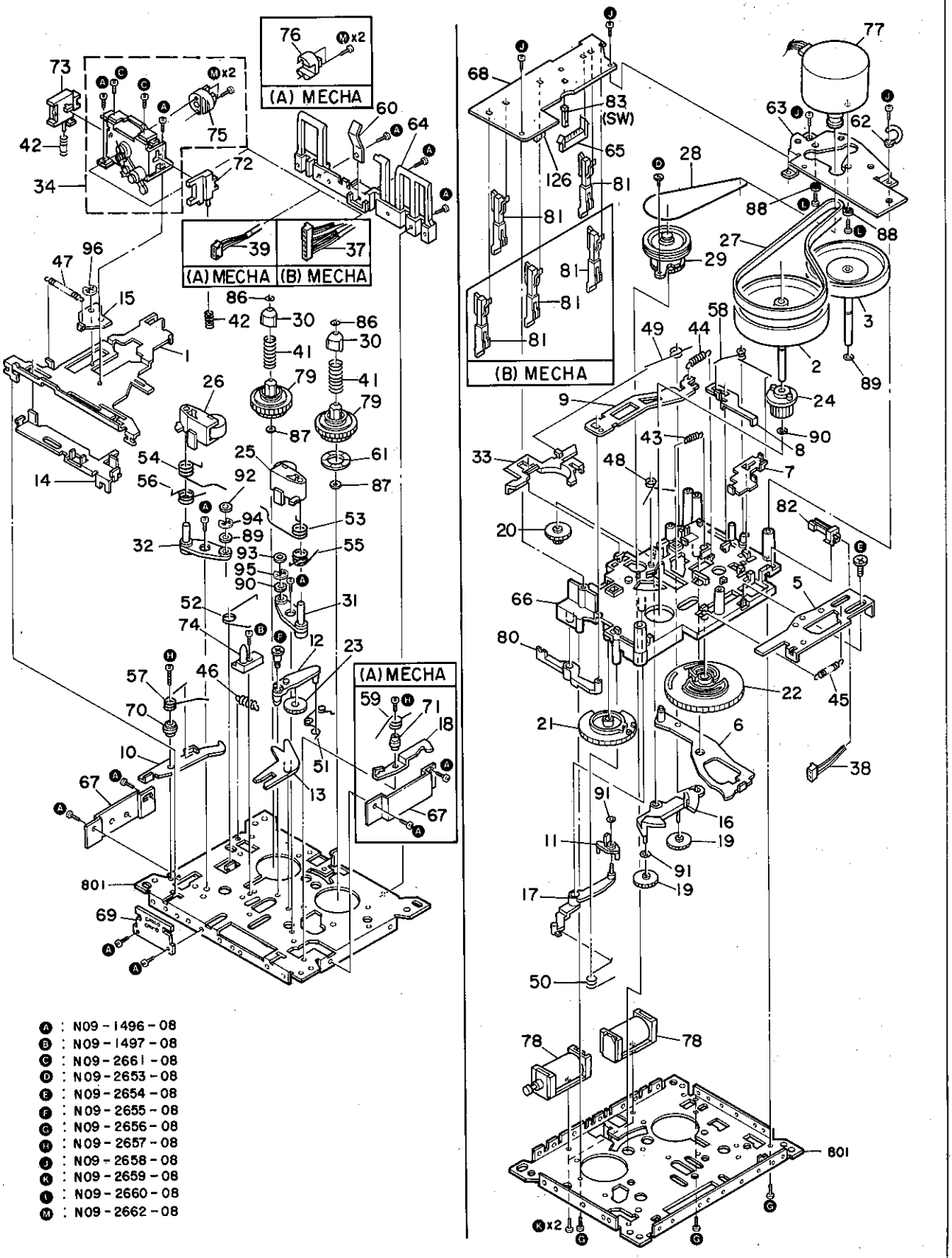
Kenwood strebt ständige Verbesserungen in der Entwicklung an.
Daher bleiben Änderungen der technischen Daten jederzeit vorbehalten.
DOLBY und Doppel-D-Symbol sind eingetragene Warenzeichen der Dolby Laboratories.
Dolby-Rauschunterdrückung mit Lizenz der Dolby Laboratories gefertigt.

X-82

KENWOOD

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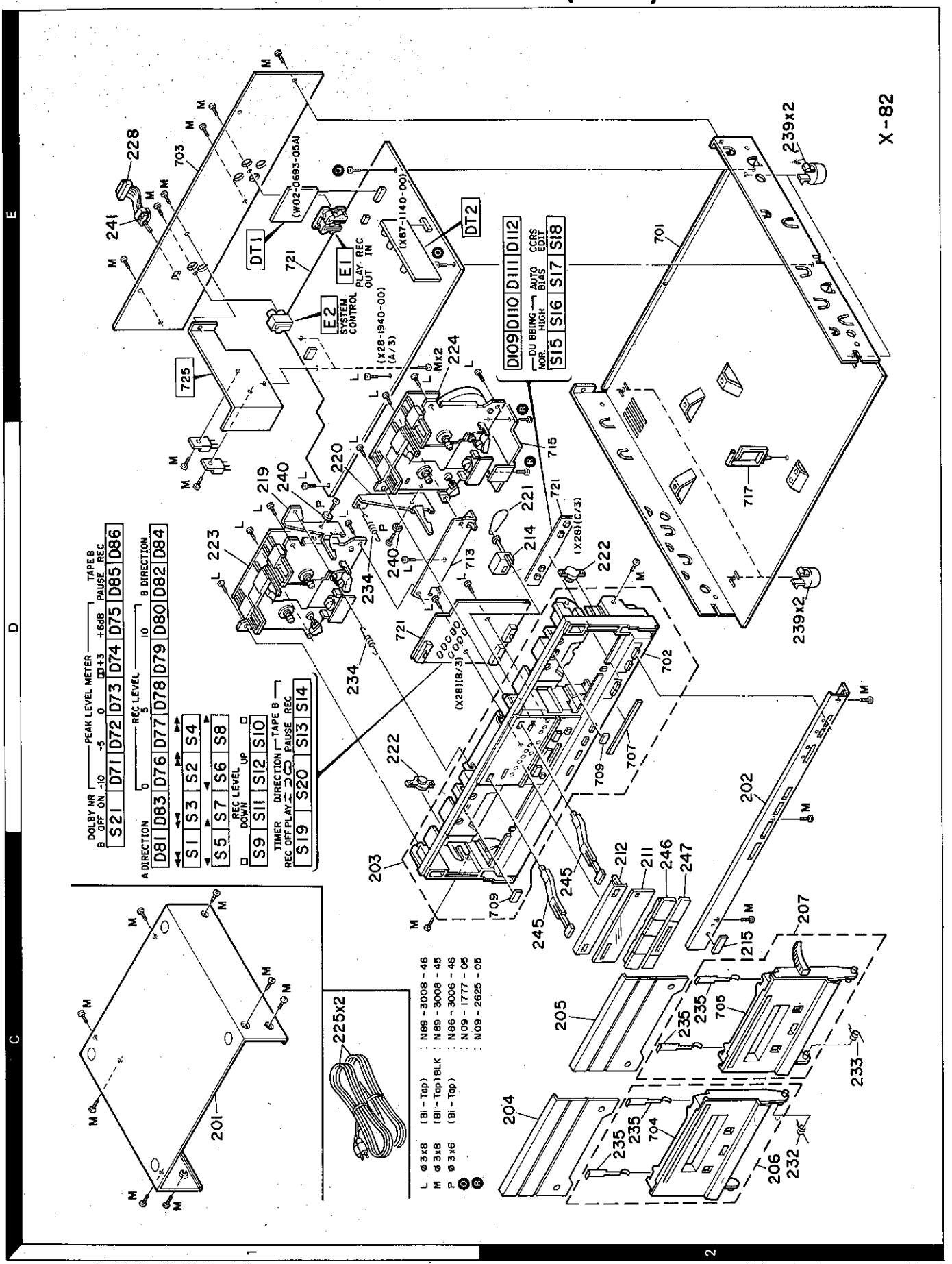
EXPLODED VIEW (MECHANISM)



Parts with the exploded numbers larger than 700 are not supplied.

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EXPLODED VIEW (UNIT)



Parts with the exploded numbers larger than 700 are not supplied.

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PARTS LIST

* New Parts
Parts without Parts No. are not supplied.
Les articles non mentionnes dans le Parts No. ne sont pas fournis.
Teile ohne Parts No. werden nicht geliefert.

Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名／規格	Destination 仕向	Remarks 備考
			X-82			
201	1C	*	A01-1682-01	METALLIC CABINET		
202	2D		A21-1738-02	DRESSING PANEL		
203	1C		A22-1000-03	SUB PANEL ASSY	UUEMXT	
203	1C		A22-1000-03	SUB PANEL ASSY	E1	
204	2C	*	A53-1067-03	CASSETTE LID(A)		
205	2C		A53-1049-03	CASSETTE LID(B)		
206	2C		A53-1050-03	CASSETTE HOLDER ASSY(A)		
207	2C		A53-1051-03	CASSETTE HOLDER ASSY(B)		
211	2C		B03-2480-04	DRESSING PLATE		
212	2C		B07-1833-04	ESCUTCHEON		
214	2D		B35-0035-05	TAPE COUNTER		
215	2D		B43-0285-04	BADGE		
-			B46-0094-03	WARRANTY CARD	UUE	
-			B46-0095-03	WARRANTY CARD	UUE	
-			B46-0096-13	WARRANTY CARD	X	
-			B46-0122-13	WARRANTY CARD	E1E2	
-			B46-0143-03	WARRANTY CARD	T1T2	
219	1D	*	D10-2215-14	LEVER(A)		
220	1D		D10-2216-04	LEVER(B)		
221	2D		D16-0189-04	BELT		
222	1D,2D		D39-0176-05	DAMPER		
225	1C		E30-0615-05	AUDIO CORD		
228	1E		E30-1519-05	CORD WITH CONNECTOR		
232	2C		G01-2270-04	TORSION COIL SPRING(A)		
233	2C		G01-2271-04	TORSION COIL SPRING(B)		
234	1D		G01-2272-04	EXTENSION SPRING		
235	2C		G02-0394-14	FLAT SPRING		
-		*	H01-7959-04	ITEM CARTON CASE		
-			H10-3672-12	POLYSTYRENE FOAMED FIXTURE		
-			H10-3673-12	POLYSTYRENE FOAMED FIXTURE		
-			H20-0417-14	PROTECTION COVER(460X370X360)	M	
-			H25-0232-04	PROTECTION BAG (235X350X0.03)		
-			H25-0304-04	PROTECTION BAG	UUEXT1	
-			H25-0304-04	PROTECTION BAG	E1T2E2	
239	2D,2E		J02-0366-15	FOOT		
240	1D		J31-0498-04	COLLAR		
⚠ 241	1E		J42-0083-05	POWER CORD BUSHING		
-			J61-0307-05	WIRE BAND		
245	2C		K29-2539-04	KNOB(EJECT)		
246	2C		K29-3292-03	KNOB(PLAY)		
247	2C		K29-3293-03	KNOB(STOP)		
Q			N09-1777-05	SEMS (TAPTITE SCREW)		
R		*	N09-2625-05	TAPTITE SCREW		
			RECORD/PLAYBACK UNIT (X28-1940-00)			
D71 -86			B30-1223-05	LED(LN21CPH(V)-C)		
D109-112			B30-1012-05	LED(SLP-981C-50)		
C1 ,2			CC45FSL1H561J	CERAMIC 560PF J		
C3 ,4			CC45FSL1H121J	CERAMIC 120PF J		
C5 ,6			CK45FB1H681K	CERAMIC 680PF K		
C7 -10			CK45FB1H391K	CERAMIC 390PF K		

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C11 ,12			CE04KW1A101M	ELECTRO	100UF	10WV		
C13 ,14			CF92FV1H103J	MF	0.01UF	J		
C15 ,16			CF92FV1H153J	MF	0.015UF	J		
C17 ,18			CE04KW1V4R7M	ELECTRO	4.7UF	35WV		
C19 ,20			CK45FB1H102K	CERAMIC	1000PF	K		
C21 ,22			CE04KW1H010M	ELECTRO	1.0UF	50WV		
C23			CE04KW1A101M	ELECTRO	100UF	10WV		
C27 ,28			CC45FSL2H221J	CERAMIC	220PF	J		
C29			C91-0775-05	POLYPRO	1500PF	J		
C32			CE04KW1E330M	ELECTRO	33UF	25WV		
C33			CE04KW1E470M	ELECTRO	47UF	25WV		
C34			CF92FV1H332J	MF	3300PF	J		
C36			CF92FV1H222J	MF	2200PF	J		
C37			CF92FV1H104J	MF	0.10UF	J		
C38			CE04KW1C470M	ELECTRO	47UF	16WV		
C41 -44			CE04KW1H010M	ELECTRO	1.0UF	50WV		
C45 ,46			CE04KW1V100M	ELECTRO	10UF	35WV		
C47 ,48			CE04KW1H010M	ELECTRO	1.0UF	50WV		
C49 ,50			CE04KW1V100M	ELECTRO	10UF	35WV		
C55			CE04KW1C101M	ELECTRO	100UF	16WV		
C56			CE04KW1C220M	ELECTRO	22UF	16WV		
C57			CE04KW1A331M	ELECTRO	330UF	10WV		
C58			CE04KW1C101M	ELECTRO	100UF	16WV		
C59 -62			CE04KW1V4R7M	ELECTRO	4.7UF	35WV		
C63			CK45FB1H332K	CERAMIC	3300PF	K		
C64			CC45FSL1H221J	CERAMIC	220PF	J		
C65			CE04KW1H010M	ELECTRO	1.0UF	50WV		
C66			CF92FV1H104J	MF	0.10UF	J		
C67			CC45FSL1H221J	CERAMIC	220PF	J		
C68			CE04KW1V100M	ELECTRO	10UF	35WV		
C69			CE04KW1H010M	ELECTRO	1.0UF	50WV		
C70			CE04KW1V100M	ELECTRO	10UF	35WV		
C71			CK45FB1H681K	CERAMIC	680PF	K		
C72 -76			CE04KW1V100M	ELECTRO	10UF	35WV		
C79			CK45FF1H223Z	CERAMIC	0.022UF	Z		
C83			CE04KW1H010M	ELECTRO	1.0UF	50WV		
C84			CE04KW1A101M	ELECTRO	100UF	10WV		
C85			CK45FF1H223Z	CERAMIC	0.022UF	Z		
C86			CF92FV1H152J	MF	1500PF	J		
C87 ,88			CF92FV1H393J	MF	0.039UF	J		
C89			CE04KW1V100M	ELECTRO	10UF	35WV		
C90			CE04KW1E102M	ELECTRO	1000UF	25WV		
C91			CE04KW1V4R7M	ELECTRO	4.7UF	35WV		
C92			C90-1591-05	ELECTRO	2200UF	50WV		
C93			CE04KW1C331M	ELECTRO	330UF	16WV		
C94			CE04KW1E332M	ELECTRO	3300UF	25WV		
C95 ,96			CE04KW1V100M	ELECTRO	10UF	35WV		
C97 ,98			CE04KW0J471M	ELECTRO	470UF	6.3WV		
C99			CE04KW1V100M	ELECTRO	10UF	35WV		
C100			CF92FV1H152J	MF	1500PF	J		
C101,102			CE04KW1V100M	ELECTRO	10UF	35WV		
C103			CK45FF1H103Z	CERAMIC	0.010UF	Z		
C104			CE04KW1H010M	ELECTRO	1.0UF	50WV		
E1			E13-0446-05	PHONO JACK	(4P)			

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E2			E11-0188-05	MINIATURE PHONE JACK		
L1 ,2			L39-0145-05	LW OSCILLATING COIL		
L3 ,4			L39-0171-05	TRAP COIL		
L5			L32-0356-05	BIAS OSCILATING COIL		
L7 ,8			L79-0720-05	LC FILTER		
X1			L78-0209-05	RESONATOR (4.194MHZ)		
CP1 ,2			R90-0487-05	MULTI-COMP 47KX4 J 1/6W		
VR1 -4			R12-3128-05	TRIMMING POT. PB LEVEL		
VR5 ,6			R12-5071-05	TRIMMING POT. BIAS		
VR7 -10			R12-1100-05	TRIMMING POT. TAPE SPEED		
S1 -18			S40-1064-05	PUSH SWITCH		
S19 -21			S31-1017-05	SLIDE SWITCH		
D1			HZS8.2N(B2)	ZENER DIODE		
D1			RD8.2ES(B2)	ZENER DIODE		
D2 -11			HSS104	DIODE		
D2 -11			1SS133	DIODE		
D13 -16			HSS104	DIODE		
D13 -16			1SS133	DIODE		
D18 ,19			HSS104	DIODE		
D18 ,19			1SS133	DIODE		
D20			HZS5.1N(B2)	ZENER DIODE		
D20			RD5.1ES(B2)	ZENER DIODE		
D21 -37			HSS104	DIODE		
D21 -37			1SS133	DIODE		
D39 -44			S5566B	DIODE		
D45 -54			1SS133	DIODE		
D45 -55			HSS104	DIODE		
D56 ,57			S5566B	DIODE		
D58			HZS30N(B)	ZENER DIODE		
D58			RD30ES(B)	ZENER DIODE		
D60			KBP02ML-6127	DIODE		
D61			HZS13N(B2)	ZENER DIODE		
D61			RD13ES(B2)	ZENER DIODE		
D62			HSS104	DIODE		
D62			1SS133	DIODE		
D64 -70			HSS104	DIODE		
D64 -70			1SS133	DIODE		
D87 -108			HSS104	DIODE		
D87 -108			1SS133	DIODE		
D113			HZS8.2N(B)	ZENER DIODE		
D113			RD8.2ES(B)	ZENER DIODE		
D114-116			HSS104	DIODE		
D114-116			1SS133	DIODE		
IC1			LA3246	IC(PREAMP X2)		
IC2			UPC1330HA	IC(2CH HEAD SWITCHING)		
IC3			TD62554S	IC(4CH TRANSISTOR ARRAY)		
IC4			TC9213P	IC(2CH ELECTRONIC VOLUME)		
IC5 ,6			NJM4558D-A	IC(OP AMP X2)		
IC7			NJM4558D	IC(OP AMP X2)		
IC8			UPD75108CW-218	IC(MICROPROCESSOR)		
IC9			MS1951ASL	IC(SYSTEM RESET)		
IC10			UPC7805HF	IC(VOLTAGE REGULATOR/ +5V)		
IC11			TA78L015AP	IC(VOLTAGE REGULATOR/ +15V)		

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Q1 -6			2SC1740S(Q,R)	TRANSISTOR		
Q1 -6			2SC945(A)(Q,P)	TRANSISTOR		
Q7 -12			DTC124EN	DIGITAL TRANSISTOR		
Q13 ,14			2SC1845(F,E)	TRANSISTOR		
Q15			2SA992(F,E)	TRANSISTOR		
Q16			DTC124EN	DIGITAL TRANSISTOR		
Q18			2SD863	TRANSISTOR		
Q19			2SC2320(E,F)	TRANSISTOR		
Q20			2SC1740S(Q,R)	TRANSISTOR		
Q20			2SC945(A)(Q,P)	TRANSISTOR		
Q21 -25			2SC2320(E,F)	TRANSISTOR		
Q26 ,27			DTC124EN	DIGITAL TRANSISTOR		
Q28			2SA733(A)(Q,P)	TRANSISTOR		
Q28			2SA933S(Q,R)	TRANSISTOR		
Q29			2SC1740S(Q,R)	TRANSISTOR		
Q29			2SC945(A)(Q,P)	TRANSISTOR		
Q30			2SA733(A)(Q,P)	TRANSISTOR		
Q30			2SA933S(Q,R)	TRANSISTOR		
Q31 ,32			2SD1302(S,T)	TRANSISTOR		
Q33			2SC1740S(Q,R)	TRANSISTOR		
Q33			2SC945(A)(Q,P)	TRANSISTOR		
Q34			2SA733(A)(Q,P)	TRANSISTOR		
Q34			2SA933S(Q,R)	TRANSISTOR		
Q35 -37			2SC1740S(Q,R)	TRANSISTOR		
Q35 -37			2SC945(A)(Q,P)	TRANSISTOR		
Q39			2SC1740S(Q,R)	TRANSISTOR		
Q39 ,40			2SC945(A)(Q,P)	TRANSISTOR		
Q40			2SC1740S(Q,R)	TRANSISTOR		
Q41			2SA933S(Q,R)	TRANSISTOR		
Q41 ,42			2SA733(A)(Q,P)	TRANSISTOR		
Q42			2SA933S(Q,R)	TRANSISTOR		
Q43 -48			2SC3246	TRANSISTOR		
Q49 ,50			DTA124EN	DIGITAL TRANSISTOR		
Q51 -53			2SC1740S(Q,R)	TRANSISTOR		
Q51 -53			2SC945(A)(Q,P)	TRANSISTOR		
Q54			2SA733(A)(Q,P)	TRANSISTOR		
Q54			2SA933S(Q,R)	TRANSISTOR		
Q55			2SC1740S(Q,R)	TRANSISTOR		
Q55			2SC945(A)(Q,P)	TRANSISTOR		
Q57			2SD1266(Q,P)	TRANSISTOR		
Q58			2SC1845(F,E)	TRANSISTOR		
Q59			2SD1266(Q,P)	TRANSISTOR		
Q60			DTC124EN	DIGITAL TRANSISTOR		
Q61 -64			2SA937F	TRANSISTOR		
RECORD AMPLIFIER UNIT (X87-1140-05)						
C1 ,2			CE04KW1HR22M	ELECTRO 0.22UF 50WV		
C3 ,4			CF92FV1H822J	MF 8200PF J		
C7 ,8			CE04KW1H010M	ELECTRO 1.0UF 50WV		
C9 -12			CE04KW1V100M	ELECTRO 10UF 35WV		
C13 ,14			CF92FV1H472J	MF 4700PF J		
C15 ,16			CF92FV1H153J	MF 0.015UF J		
C17 ,18			CF92FV1H472J	MF 4700PF J		
C19 ,20			CF92FV1H103J	MF 0.010UF J		
C23 ,24			CF92FV1H392J	MF 3900PF J		
C25 ,26			CF92FV1H153J	MF 0.015UF J		

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C27 ,28			CF92FV1H472J	MF 4700PF J		
C29 ,30			CF92FV1H153J	MF 0.015UF J		
C31 ,32			CF92FV1H102J	MF 1000PF J		
C35			CE04KW1E470M	ELECTRO 47UF 25WV		
C36			CE04KW1V100M	ELECTRO 10UF 35WV		
C37 ,38			CF92FV1H152J	MF 1500PF J		
L1 ,2		*	L40-1835-29	SMALL FIXED INDUCTOR(18MH,G)		
L3 ,4			L40-4725-29	SMALL FIXED INDUCTOR(4.7MH,J)		
J1 -6			R92-0350-05	JUMPER WIRE (RESISTOR TYPE)		
R1 ,2			RD41FB2B822J	CYLND CHIP R 8.2K J 1/8W		
R3 ,4			RD41FB2B682J	CYLND CHIP R 6.8K J 1/8W		
R5 ,6			RD41FB2B103J	CYLND CHIP R 10K J 1/8W		
R11 ,12		*	RD41FB2B104J	CYLND CHIP R 100K J 1/8W		
R13 ,14		*	RD41FB2B563J	CYLND CHIP R 56K J 1/8W		
R15 ,16			RD41FB2B103J	CYLND CHIP R 10K J 1/8W		
R17 ,18		*	RD41FB2B392J	CYLND CHIP R 3.9K J 1/8W		
R19 ,20			RD41FB2B103J	CYLND CHIP R 10K J 1/8W		
R21 ,22			RD41FB2B472J	CYLND CHIP R 4.7K J 1/8W		
R23 ,24			RD41FB2B471J	CYLND CHIP R 470 J 1/8W		
R25 ,26			RD41FB2B224J	CYLND CHIP R 220K J 1/8W		
R27 ,28			RD41FB2B153J	CYLND CHIP R 15K J 1/8W		
R29 ,30			RD41FB2B562J	CYLND CHIP R 5.6K J 1/8W		
R31 -34			RD41FB2B822J	CYLND CHIP R 8.2K J 1/8W		
R35 ,36			RD41FB2B331J	CYLND CHIP R 330 J 1/8W		
R39 ,40			RD41FB2B103J	CYLND CHIP R 10K J 1/8W		
R41 ,42			RD41FB2B472J	CYLND CHIP R 4.7K J 1/8W		
R43 ,44			RD41FB2B822J	CYLND CHIP R 8.2K J 1/8W		
R45 ,46			RD41FB2B472J	CYLND CHIP R 4.7K J 1/8W		
R48			RD41FB2B102J	CYLND CHIP R 1.0K J 1/8W		
VR1 ,2			R12-3101-05	TRIMMING POT.(22K欧) REC LEVEL		
IC1 ,2			BA6251F	IC(7CH TRANSISTOR ARRAY)		
IC3			M5218P-A	IC(OP AMP X2)		
Q1 ,2			2SC2713	TRANSISTOR		
ELECTRIC CIRCUIT MODULE (W02-0693-05)						
C1			CK45F1H103Z	CERAMIC 0.010UF Z		
C3 ,4			CE04FW1H100M	ELECTRO 10UF 50WV		
C5 ,6			CQ92M1H103J	MYLAR 0.010UF J		
C7 ,8			CE04FW1H010M	ELECTRO 1.0UF 50WV		
C9 ,10			CQ92M1H183J	MYLAR 0.018UF J		
C11 ,12			CE04FW1HR68M	ELECTRO 0.68UF 50WV		
C13 ,14			CE04FW1H2R2M	ELECTRO 2.2UF 50WV		
C15 ,16			CQ92M1H183J	MYLAR 0.018UF J		
C17 ,18			CQ92M1H103J	MYLAR 0.010UF J		
C19 ,20			CQ92M1H823J	MYLAR 0.082UF J		
C21 ,22			CE04FW1HR68M	ELECTRO 0.68UF 50WV		
C23 ,24			CE04FW1H2R2M	ELECTRO 2.2UF 50WV		
L1 ,2			L39-0106-05	TRAP COIL 19K		
IC1			HA12088ANT	IC(DOLBY B/C NOISE REDUCTION)		
MECHANISM ASS'Y (D40-0826-05: A, 0827-05: B)						
1	1A	*	A11-0610-08	SUB CHASSIS ASSY		

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2	1B	*	D01-0108-08	FLYWHEEL ASSY (RE)		
3	1B	*	D01-0109-08	FLYWHEEL ASSY (LF)		
5	2B	*	D10-2294-08	LEVER (RV)		
6	2B	*	D10-2300-08	ARM ASSY (TR)		
7	2B	*	D10-2292-08	LEVER (A)		
8	2B	*	D10-2293-08	LEVER (B)		
9	1B	*	D10-2290-08	LEVER (FR)		
10	2A	*	D10-2295-08	ARM (EJECT LOCK)		B
11	2B	*	D10-2296-08	ARM (SELECT)		
12	2A	*	D10-2297-08	ARM (PLAY)		
13	2A	*	D10-2298-08	ARM (RV)		
14	2A	*	D10-2291-08	LEVER (RV)		
15	1A	*	D10-2301-08	ARM ASSY		
16	2B	*	D10-2302-08	ARM ASSY (FR)		
17	3B	*	D10-2303-08	ARM ASSY		
18	2A	*	D10-2304-08	ARM (EJECT LOCK)		A
19	3B	*	D13-0789-08	GEAR (FR)		
20	2B	*	D13-0790-08	GEAR (REW)		
21	2B	*	D13-0791-08	GEAR (FR)		
22	2B	*	D13-0792-08	GEAR (PL CAM)		
23	2A	*	D13-0793-08	GEAR (PLAY)		
24	1B	*	D13-0794-08	GEAR (FW)		
25	2A	*	D14-0297-08	PINCH ROLLER ASSY (R)		
26	1A	*	D14-0298-08	PINCH ROLLER ASSY (L)		
27	1B	*	D16-0200-08	BELT (DRIVE)		
28	1B	*	D16-0271-08	BELT (CLUTCH)		
29	1B	*	D19-0255-08	CLUTCH ASSY		
30	1A	*	D19-0256-08	CLUTCH		
31	2A	*	D23-0244-08	RETAINER (R)		
32	2A	*	D23-0245-08	RETAINER (L)		
33	2B	*	D30-0023-08	BRAKE		
34	1A	*	D40-0849-08	MECHANISM ASSY(HEAD ASSY)		B
34	1A	*	D40-0850-08	MECHANISM ASSY(HEAD ASSY)		A
79	1A	*	D03-0276-08	REEL DISK ASSY		
80	2B	*	D10-2299-08	ARM (FR)		
37	1A	*	E31-4862-08	CONNECTING WIRE (P/R HEAD)		B
38	2B	*	E31-4863-08	CONNECTING WIRE (SW)		B
38	2B	*	E31-4865-08	CONNECTING WIRE (SW)		A
39	1A	*	E31-4864-08	CONNECTING WIRE (PB HEAD)		A
41	1A	*	G01-2348-08	COMPRESSION COIL SP (REEL)		
42	1A	*	G01-2349-08	COMPRESSION COIL SP		
43	2B	*	G01-2350-08	TENSION COIL SP		
44	1B	*	G01-2351-08	TENSION COIL SP		
45	2B	*	G01-2352-08	TENSION COIL SP		
46	2A	*	G01-2353-08	TENSION COIL SP		
47	1A	*	G01-2354-08	TENSION COIL SP		
48	2B	*	G01-2355-08	TORSION COIL SP		
49	1B	*	G01-2356-08	TORSION COIL SP (BRAKE)		
50	3B	*	G01-2357-08	TORSION COIL SP		
51	2A	*	G01-2358-08	TORSION COIL SP		
52	2A	*	G01-2359-08	TORSION COIL SP		
53	2A	*	G01-2360-08	TORSION COIL SP		
54	2A	*	G01-2361-08	TORSION COIL SP		
55	2A	*	G01-2362-08	TORSION COIL SP		

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56	2A	*	G01-2363-08	TORSION COIL SP		
57	2A	*	G01-2364-08	TORSION COIL SP		B
58	1B	*	G01-2365-08	TORSION COIL SP		
59	2A	*	G01-2366-08	TORSION COIL SP		A
60	1A	*	G02-0913-08	FLAT SPRING		
61	2A	*	G16-0727-08	SHEET		
62	1B		J11-0097-08	CLAMPER		
63	1B	*	J19-3130-08	HOLDER (MOTOR)		
64	1A	*	J19-3131-08	HOLDER		
65	1B	*	J19-3132-08	LEAD HOLDER		
66	2B	*	J19-3133-08	HOLDER ASSY		
67	2A	*	J21-5310-08	MOUNTING HARDWARE		
68	1B	*	J25-6085-08	PRINTED WIRING BOARD (SW)		
69	3A	*	J25-6086-08	PRINTED WIRING BOARD (HEAD)		
70	2A	*	J31-0824-08	COLLAR		B
71	2A	*	J31-0825-08	COLLAR		A
72	1A	*	J90-0631-08	GUIDE (R)		
73	1A	*	J90-0632-08	GUIDE (L)		
74	2A	*	J90-0633-08	GUIDE (CASSETTE)		
86	1A		N19-1031-08	FLAT WASHER		
87	2A	*	N19-1198-08	FLAT WASHER		
88	1B	*	N19-1199-08	FLAT WASHER		
89	2A,1B	*	N19-1200-08	FLAT WASHER		
90	2A,1B	*	N19-1201-08	FLAT WASHER		
91	2B	*	N19-1202-08	FLAT WASHER		
92	2A	*	N19-1203-08	FLAT WASHER		
93	2A	*	N19-1204-08	FLAT WASHER		
94	2A		N29-0205-04	E-RING		
95	2A		N29-0206-04	E-RING		
96	1A		N29-0207-04	E-RING		
A			N09-1496-08	SCREW		
B			N09-1497-08	SCREW		
C		*	N09-2661-08	SCREW		
D		*	N09-2653-08	SCREW		
E		*	N09-2654-08	SCREW		
F		*	N09-2655-08	SCREW		
G		*	N09-2656-08	SCREW		
H		*	N09-2657-08	SCREW		
J		*	N09-2658-08	SCREW		
K		*	N09-2659-08	SCREW		
L		*	N09-2660-08	SCREW		
M		*	N09-2662-08	SCREW (HEAD)		
81	1B	*	S46-1125-08	LEAF SWITCH (REC)		
82	2B	*	S46-1126-08	LEAF SWITCH		
83	1B	*	S46-1127-08	LEAF SWITCH		
75	1A	*	T39-0008-08	REC/PLAYBACK HEAD		B
76	1A	*	T31-0054-08	PLAYBACK HEAD		A
77	1B	*	T42-0522-08	DC MOTOR ASSY		
78	3B	*	T94-0215-08	SOLENOID		
126	1B	*	NJL5765K(A,B)	PHOTO REFRECTER		

E: Scandinavia & Europe K: USA P: Canada
U: PX(Far East, Hawaii) T: England M: Other Areas
UE: AAFES(Europe) X: Australia

⚠ indicates safety critical components.

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SPECIFICATIONS

Type ..Front Loading Auto-Reverse & Double Stereo Cassette Deck
Track system.....4-Track,
2-Channel stereo/mono,
recording/playback
Recording system.....AC bias system (Bias frequency: 105 kHz)
Erasing system.....AC system
Tape speed.....4.76 cm/sec (1-7/8 ips)
Heads.....Hard permalloy playback/record head × 1
Hard permalloy playback head × 1
Double gap ferrite erasing head × 1
Motor.....2-Speed DC servo motor × 2
Fast winding time.....Approx. 110 seconds with C-60 tape
Frequency response:
Normal tape..20 Hz to 15,000 Hz (30 Hz to 14,000 Hz, ±3 dB)
CrO_2 tape.....20 Hz to 16,000 Hz (30 Hz to 15,000 Hz, ±3 dB)
Metal tape....20 Hz to 16,000 Hz (30 Hz to 15,000 Hz, ±3 dB)
Signal-to-Noise ratio:
Dolby C type NR ON.....72 dB (Metal tape)
Dolby B type NR ON.....65 dB (Metal tape)
Dolby NR OFF.....57 dB (Metal tape)
Harmonic distortion.....Less than 1.0%
(at 1 kHz, 0 VU 3rd H.D. normal tape)
Wow and flutter.....0.09% (W.R.M.S.), ±0.23% (DIN)
Input sensitivity/impedance: LINE × 2.....77.5 mV/50 kohms
Output level/load impedance: LINE × 2.....270 mV/13.9 kohms
Dimensions.....W: 360 mm (14-3/16″)
H: 119 mm (4-11/16″)
D: 354 mm (14″)
Weight (Net).....4.2 kg (9.24 lb)
Reference tapes.....Normal: KENWOOD ND-60, TDK AD C-60
CrO_2: KENWOOD CD-60, TDK SA C-60
Metal: KENWOOD MD-60, TDK MA C-60

Note:
We follow a policy of continous advancements in development. For this reason specifications may be changed without notice.

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Note:
Component and circuitry are subject to modification to insure best operation under differing local conditions. This manual is based on the Europe (E) standard, and provides information on regional circuit modification through use of alternate schematic diagrams, and information on regional component variations through use of parts list.

KENWOOD CORPORATION
Shionogi Shibuya Building, 17-5, 2-chome Shibuya, Shibuya-ku, Tokyo 150, Japan
KENWOOD U.S.A. CORPORATION
COMMUNICATIONS & TEST EQUIPMENT GROUP
P.O. BOX 22745, 2201 East Dominguez St., Long Beach, CA 90801-5745, U.S.A.
KENWOOD ELECTRONICS DEUTSCHLAND GMBH
Rembrücker Str. 15, 6056 Heusenstamm, West Germany
KENWOOD ELECTRONICS BENELUX N.V.
Mechelsesteenweg 418 B-1930 Zaventem, Belgium
TRIO-KENWOOD FRANCE S.A.
13 Boulevard Ney, 75018 Paris, France
KENWOOD ELECTRONICS NEDERLAND B.V.
Turfstekerstraat 46-1431 GE AALSMEER, Nederland
KENWOOD ELECTRONICS AUSTRALIA PTY. LTD.
(INCORPORATED IN N.S.W.)
4E. Woodcock Place, Lane Cove, N.S.W. 2066, Australia
KENWOOD & LEE ELECTRONICS, LTD.
Wang Kee Building, 4th Floor, 34-37, Connaught Road, Central, Hong Kong
KENWOOD ELECTRONICS CANADA INC.
P.O. BOX 1075, 959 Gana Court, Mississauga, Ontario, Canada L4T 4C2

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