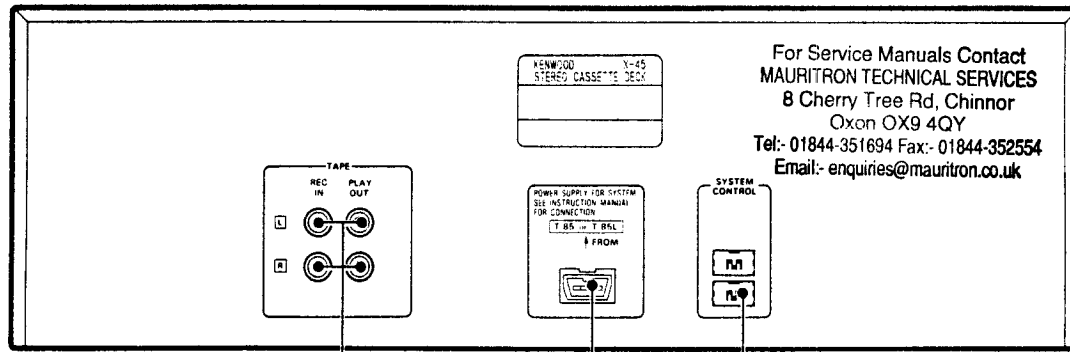
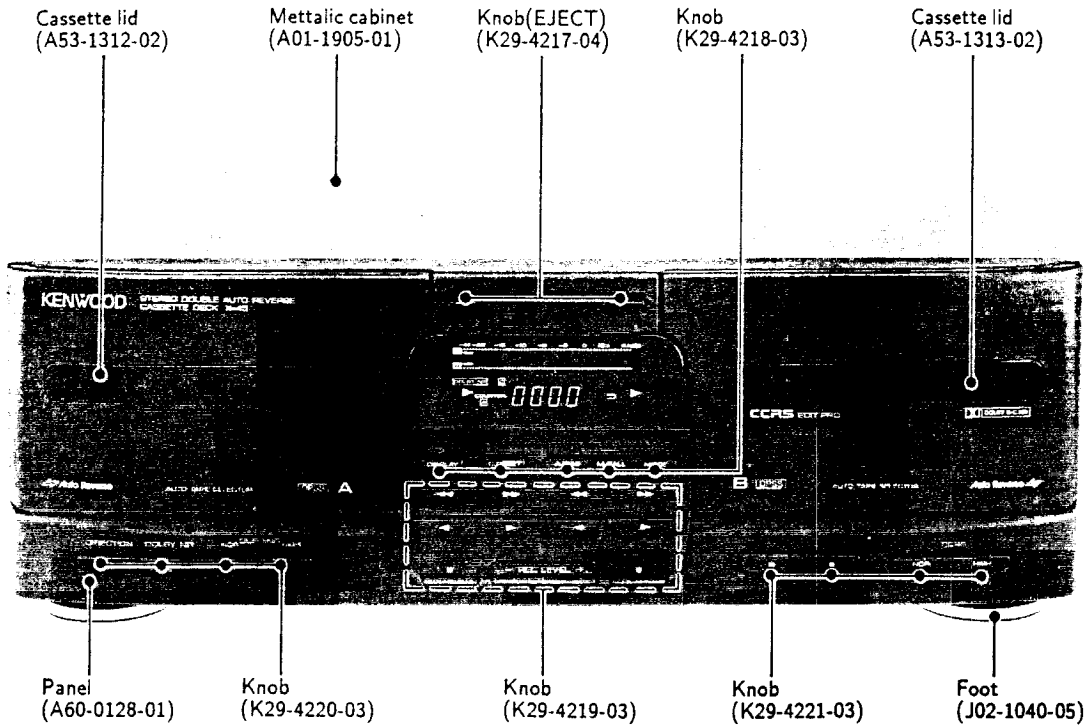


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SERVICE MANUAL

KENWOOD

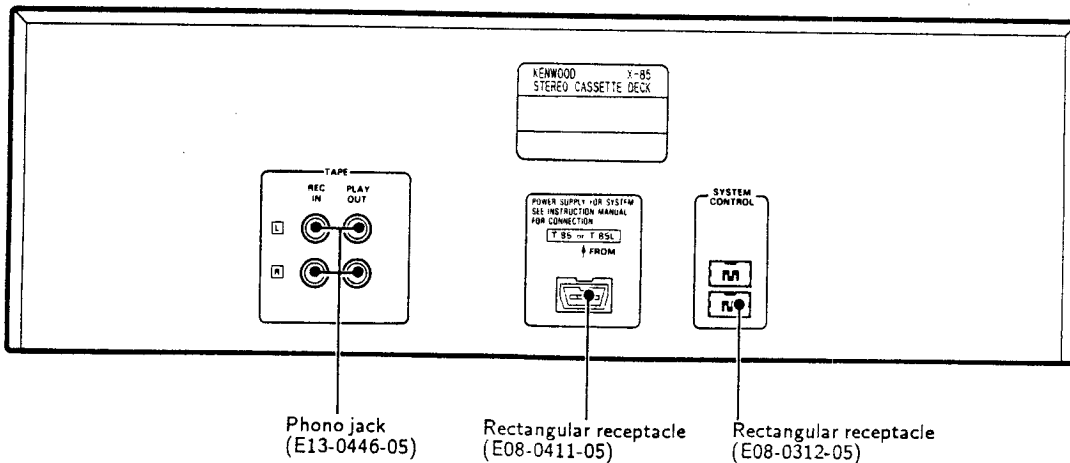
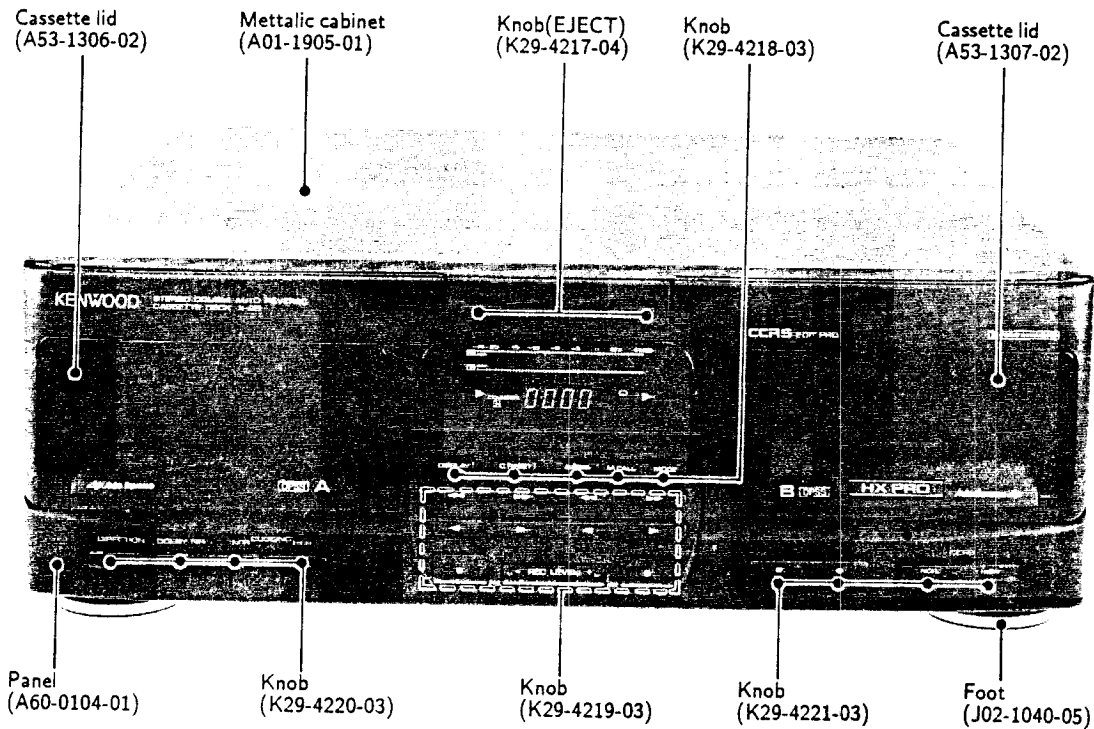
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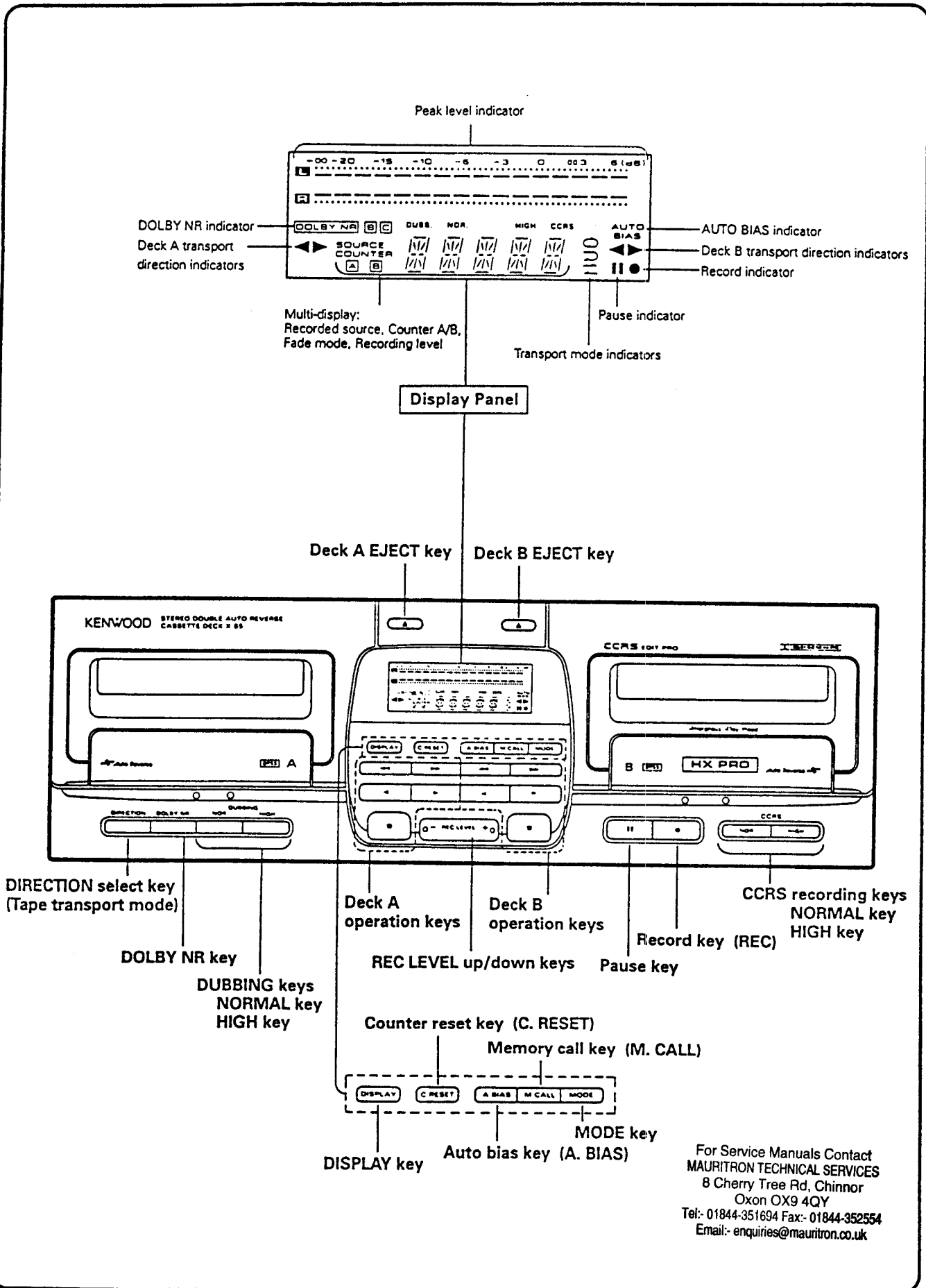
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CONTROL AND OPERATIONS



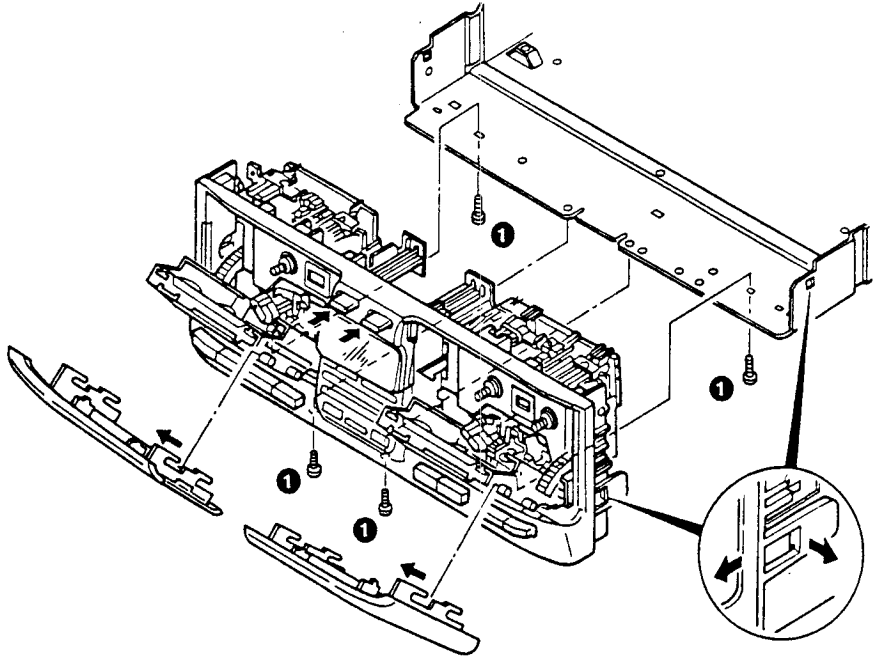
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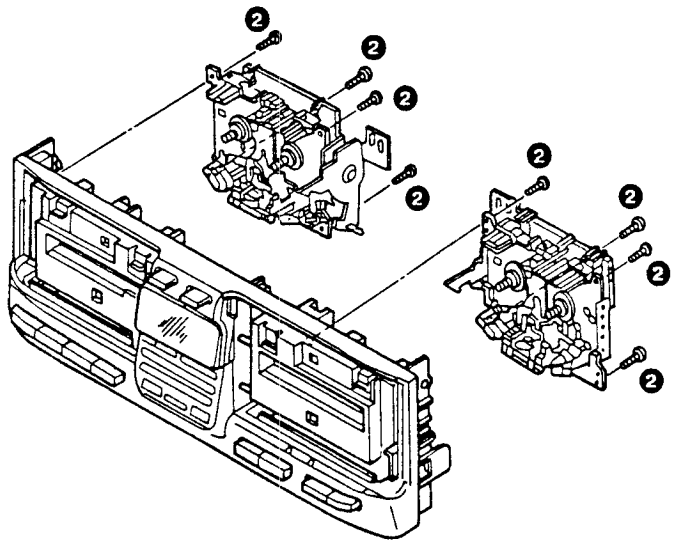
DISASSEMBLY FOR REPAIR

1. Remove the four screws **1** and remove the front panel.
2. Press the EJECT Key, and open the cassette holder.
3. Press the four claws on the side, and remove the cassette lid.

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4. Remove the eight screws **2** and remove the mechanism unit.



OPERATION

CD recording (CCRS)

Fade-out edit recording (FADE) — Record the disc, starting with the first track. When the end of the tape is reached, the current track is faded out and recording continues on the other side of the tape.

Erase edit recording (ERASE) — If the end of the tape is reached in the middle of a track, the incomplete track is erased and recorded again from the beginning on the other side.

Cross-fade edit recording (CROSS) — The end of each track is faded into the beginning of the next to produce no breaks between tracks.

Normal edit recording (EDIT) — The recording time having

been specified, the tracks are arranged so that the last track is not broken in the middle. Up to 20 tracks can be recorded.

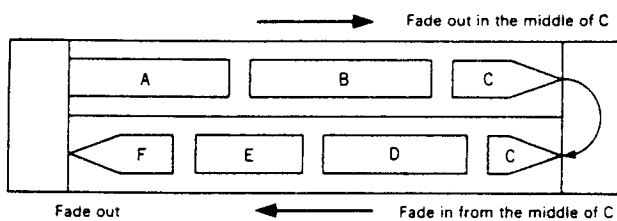
AI edit recording (AI EDIT) — If the disc is longer than the tape, all the tracks are recorded on one cassette by fading out each track early.

Multi-disc edit recording (MULTI EDIT) — Tracks on several discs can be recorded on one cassette. Fade-out and cross-fade edit recording can be used.

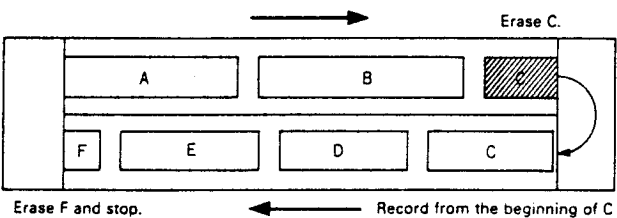
CCRS — double-speed recording — The disc is recorded at double speed. The graphic equalizer is also designed for double-speed operation. Dolby NR recording is not possible.

(Cross-fade recording cannot be performed.)

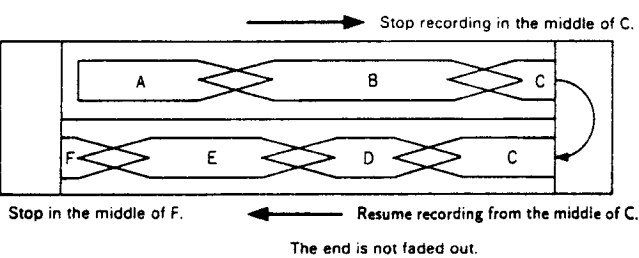
(FADE)



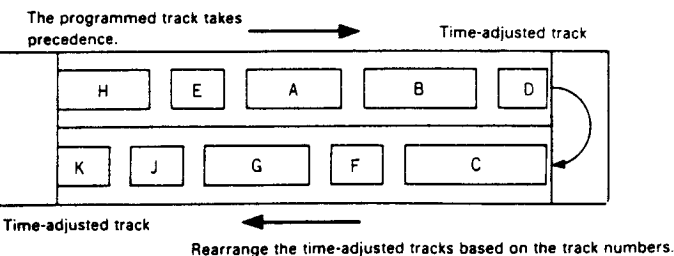
(ERASE)



(CROSS)

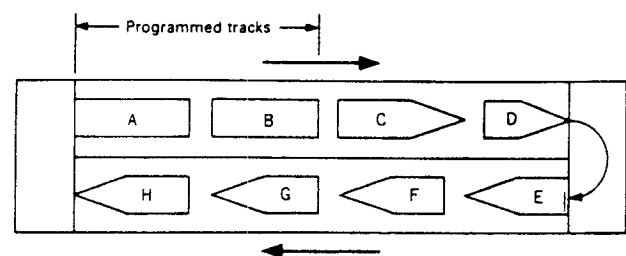


(EDIT)



Stop automatically when recording ends.

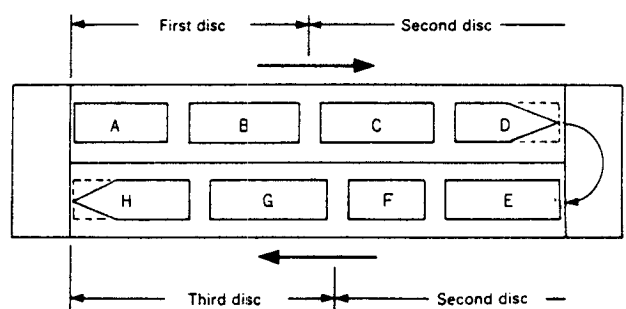
(AI EDIT)



- Programmed tracks are recorded without cutting with precedence. The ends of the other tracks are cut and edited.
- If there is enough tape, all tracks are recorded to the end.
- Recording stops automatically when it ends.

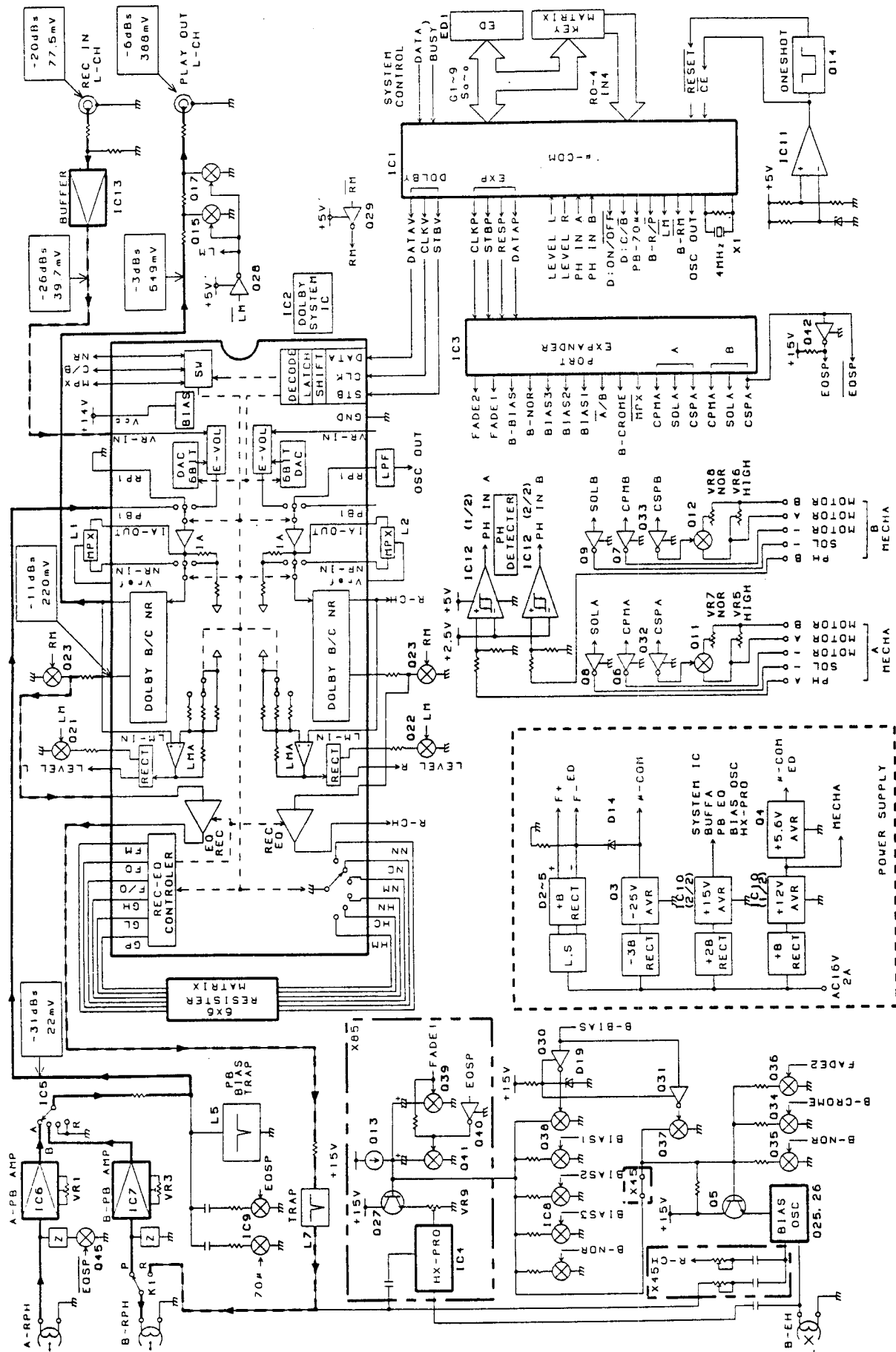
(MULTI EDIT)

Tracks are recorded as follows (when three discs are recorded in this example).



- When recording of the selected tune is finished, both the CD player and cassette deck stop. The CD player tray opens automatically.
- Fades out for recording when a tune is halfway completed at the end of the tape.

BLOCK AND LEVEL DIAGRAM



CIRCUIT DESCRIPTION

RECORD/PLAYBACK AMPLIFIER UNIT (X28-2380-00)

Ref. No.	Function	Description
IC1	Microcomputer	See page 19
IC2	System IC(Including Dolby system)	
IC3	Expansion I/O	
IC4	Dolby HX-Pro	
IC5	PB A/B SW	Pins 9 and 10 are controlled by ports A and B of IC3.
IC6	A - P.B. EQ	
IC7	B - P.B. EQ	
IC8	B - AUTO BIAS SW	Pin 3 is high, and pins 1 and 2 are low (center value).
IC9	EQ SW	Pins 2 and 4 are controlled by ACSP of IC3, and pins 1 and 3 by 70 μ of IC1.
IC10	+15V AVR	
IC11	C.E	<p>For Service Manuals Contact MAURITRON TECHNICAL SERVICES 8 Cherry Tree Rd, Chinnor Oxon OX9 4QY Tel:- 01844-351694 Fax:- 01844-352554 Email:- enquiries@mauritron.co.uk</p>
IC12	REEL COMP	
IC13	INPUT BUFFER	
Q1	+12V AVR	
Q2	+15V AVR	
Q3	-22V AVR	
Q4	+5.6V AVR	
Q5	BIAS OSC CONTROL (B)	Controlled by Q37. On during B-REC.
Q6	A MOTOR ON/OFF CONTROL	Controlled by pin 13 of IC3.
Q7	B MOTOR ON/OFF CONTROL	Controlled by pin 16 of IC3.
Q8	A SOL ON/OFF CONTROL	Controlled by pin 14 of IC3.
Q9	B SOL ON/OFF CONTROL	Controlled by pin 17 of IC3.
Q10	+12V AVR	Controlled by pin 1 of IC10
Q11	A MECHA HI/NOR SPEED	Controlled by Q32. On during NOR SPEED.
Q12	B MECHA HI/NOR SPEED	Controlled by Q33. On during NOR SPEED.
Q13	CONSTANT CURRENT (FADE)	Always on.
Q14	POWER ON RESET	Controlled by pin 7 of IC11. Temporarily on during the power-on sequence.
Q15 - Q18	PLAY OUT MUTING	Controlled by Q28.
Q19	PB EQ R/P SW	Controlled by pin 12 of IC1. Off during REC only.
Q20	Remaining LED control	Controlled by pin 55 of IC1.
Q21, Q22	LEVEL AMP CONTROL	Controlled by Q28.
Q23, Q24	B-REC MUTING	Controlled by Q29. Off during B-REC only.
Q25, Q26	B-EH BIAS OSC	Controlled by Q5.
Q27	HX BUFFER	Controlled by Q13.
Q28	PLAY OUT MUTING DRIVER	Controlled by pin 10 of IC1.

CIRCUIT DESCRIPTION

Ref. No.	Function	Description
Q29	B-REC MUTING DRIVER	Controlled by pin 11 of IC1.
Q30	BIAS ON/OFF CONTROL	Controlled by pin 8 of IC3. Off during REC only.
Q31	B-BIAS CONTROL	Controlled by pin 4 of IC3. Off during B-REC only.
Q32	A-SPEED CONTROL	Controlled by pin 15 of IC3. Off during twice the normal speed only.
Q33	B-SPEED CONTROL	Controlled by pin 18 of IC3. Off during twice the normal speed only.
Q34	ERASE BIAS CONTROL	Controlled by pin 19 of IC3. On during CrO ₂ only.
Q35	ERASE BIAS CONTROL	Controlled by pin 7 of IC3. On during NOR only.
Q36	ERASE BIAS ON/OFF CONTROL	Controlled by pin 10 of IC3. Off during REC only.
Q37	B-EH BIAS OSC CONTROL	Controlled by Q31. Off during B-REC only.
Q38	BIAS ON/OFF CONTROL	Controlled by Q30. On during NOR only.
Q39	FADE ON/OFF CONTROL	Controlled by pin 9 of IC3. On during fade.
Q40	EQSP inverter	Controlled by Q42. On at high speed.
Q41	HIGH SPEED FADE ON/OFF CONTROL	Controlled by pin 9 of IC3 and Q40. On during high-speed fade.
Q42	EQSP inverter	Controlled by pin 15 of IC3. Off at high speed.
Q43	A/B SW	Controlled by pin 3 of IC3. Off during A-playback only.
Q44	B-HEAD R/P CONTROL	Controlled by pin 12 of IC1. On during B-REC only.
Q45, Q46	HIGH SPEED HEAD EQ	Controlled by pin 15 of IC3. Off at high speed only.


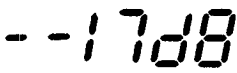
CIRCUIT DESCRIPTION

Description of functions

1. **FWD PLAY, RVS PLAY, FF, REW, REC PAUSE, PLAY PAUSE, and STOP operations are performed with the keys of five A decks and seven B decks.**
2. **Relay play**
When both decks contain cassettes and the direction mode is \Leftarrow or \Rightarrow , when the deck playing reaches the end of tape, the other deck plays automatically.
3. **Dubbing**
Normal dubbing and high-speed dubbing from A to B are possible with the DUBBING and HIGH-DUBBING keys.
4. **DPSS mode**
Skip selection, one-track repeat, dash and play, full repeat, rewind play, rerecord standby, and autorecord mute operations are performed by pressing two keys at the same time or pressing keys while the deck is operating.
5. **Auto bias**
The 400-Hz and 10-kHz record/play levels are determined to set the optimum bias for the tape. (Normal tape)
6. **CCRS**
The CD can be recorded automatically at the optimum level and bias.
7. **Serial communication function**
Full remote control, bidirectional easy operation, and CD player synchronized recording are possible by combining with a system with a serial communication bus. Timer recording and playback are set with a tuner with a timer (T-xxx), and instructions are transmitted to the deck by serial communication.
8. **CCRS operation mode setting function**
Three states, FADE OUT, ERASE, CROSS FADE, can be set with the FADE MODE key.
9. **Auto-bias recall function**
The bias value of the previous auto-bias can be recalled with the MEMORY RECALL. A reset can be performed immediately when the same tape is used.
10. **Save function**
The tape direction and the recording level for each recording source are saved.
 - i) The tape direction of the last play/record is saved.
 - ii) The recording level is saved for each source. When the REC VR key is pressed and the recording level changes, the recording level data for the currently selected source is rewritten. The recording source is the tuner when the power is switched on because the source in the deck amplifier selector memory is selected. Then, the source selected with the amplifier selector becomes effective.
11. **Multiplex automatic on/off**
In the REC mode, a multiplex on/off pin (IC3) is set low to control IC2 (system IC) when the amplifier selector memory of a deck is set as a tuner. It is set high when normal operation mode and the selector is set as other than a tuner in REC mode.
12. **Two speeds (double-speed recording), NORMAL and HIGH, can be selected with the CCRS start key.**
13. **CCRS allows one or more discs to be used in each edit mode when MULTI-DISC EDIT is selected. (FADE OUT and CROSS-FADE modes only)**

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CIRCUIT DESCRIPTION

Key name	Function	Display
FWD PLAY "▶" (common to decks A and B)	With a cassette half, the tape is played in the forward direction. When this key is pressed during forward play, that one tune is repeated to play. While the other deck is in recording or recording pause, the operation of this key is disabled.	The counter display of the deck of which the key is pressed is engaged.
RVS PLAY "◀" (common to decks A and B)	With a cassette half, the tape is played in the reverse direction. When this key is pressed during reverse play, that one tune is repeated to play. While the other deck is in recording or recording pause, the operation of this key is disabled.	The counter display of the deck of which the key is pressed is engaged.
FF "▶▶" (common to decks A and B)	The tape is fast wound up to the right reel. When this key is pressed during play, the skip music scan is made, whereas when it is pressed during reverse recording, the re-recording standby mode is engaged.	The counter display of the deck of which the key is pressed is engaged.
REW "◀◀" (common to decks A and B)	The tape is wound up to the left reel. When this key is pressed during play, the skip music scan is made, whereas when it is pressed during forward recording, the re-recording standby mode is engaged.	The counter display of the deck of which the key is pressed is engaged.
STOP "■" (common to decks A and B)	All operation is stopped.	
REC "●/◆" (deck B)	Recording is made in the current head direction. If in recording, ARM is engaged.	The counter display of the deck of which the key is pressed is engaged. REC indicator lights (●). Flickers during ARM and lights after termination. (●).
PAUSE " " (deck B)	If in recording, the recording pause mode is engaged, while if in play, the play pause mode is engaged.	PAUSE indicator lights ().
REC LEVEL UP	When this key is pressed continuously for more than 0.5 second, the recording level is raised up in intervals of 0.13 second. It increases in 2dB units for $-\infty$ to -20 dB and in 1dB units for -20 to 0 dB.	Example) 
REC LEVEL DOWN	When this key is pressed continuously for more than 0.5 second, the recording level is lowered down in intervals of 0.13 second. It increases in 2dB units for $-\infty$ to -20 dB and in 1dB units for -20 to 0 dB.	Example) 
AUTO BIAS (deck B only)	If both decks are stopped and deck B has a recordable tape, automatic bias adjustment takes place.	AUTO BIAS indicator flickers, and then lights upon the completion of bias setting.
NOR SPEED DUBBING	Dubbing is made from deck A to B at normal speed. When this key is pressed during normal dubbing, deck B enters ARM. When it is pressed again, normal dubbing is restored.	DUBB. [NOR] and (B) REC (●) indicators light. During ARM, REC indicator only flickers.
HIGH SPEED DUBBING	Dubbing is made from deck A to B at double speed. When this key is pressed during double-speed dubbing, deck B enters ARM.	DUBB. [HIGH] and REC (●) indicators light. During ARM, (B) REC indicator only flickers.

CIRCUIT DESCRIPTION

Key name	Function	Display
DISPLAY	The display contents of the FL counter display section is changed in the following manner: <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 5px auto;"> → Deck A counter → Deck B counter → Recording source ← Recording level </div>	No level is displayed when the selector is set as a tape.
C. RESET	When this key is pressed during counter display, the counter is reset to "0000".	Example) <div style="text-align: center; margin: 5px 0;"> A 00 00 </div>
Direction	A following operation mode is selected at the time of auto stop detection. <div style="margin-left: 20px;"> One-way operation Reverse operation Endless operation </div>	Changes in cycles. <div style="text-align: center; margin: 5px 0;"> → → → </div>
Dolby	The Dolby noise reduction mode is set. B Dolby B noise reduction ON OFF Dolby noise reduction OFF C Dolby C noise reduction ON	Changes in cycles. <div style="text-align: center; margin: 5px 0;"> → OFF → B → C </div>
M CALL (B ONLY)	If both decks are stopped and deck B has a recordable tape, the last set bias value is recalled.	The AUTO BIAS indicator lights.
MODE	Select the CCRS edit mode. The modes are changed in cycles. <div style="border: 1px solid black; padding: 2px 5px; width: fit-content; margin: 5px auto;"> → FADE (OUT) → ERASE → CROSS (FADE) </div>	FADE, ERASE, or CROSS is displayed on the character display.
N. CCRS (NORMAL)	The CD recording level is automatically adjusted in synchronization with the CD. — The recording speed is normal.	Speed indicator NOR lights.
H. CCRS (HIGH)	Above operation — The recording speed is double speed.	Above display Speed indicator HIGH lights.

Mechanism switch name	Function	Display												
Cassette half detection switch	This switch turns ON when provided with a cassette half With this switch OFF, the operations of any key and the dubbing key of that deck are disabled. For deck B, the operations of the AUTO BIAS and CCRS keys are also disabled.	Example) <div style="text-align: center; margin: 5px 0;"> A - - - - - ● - - - - - </div> Display for without cassette half on deck A												
Forward recording enable switch (B deck)	This switch turns ON when provided with a click for enabling recording in the forward direction. With this switch OFF, the forward recording is disabled.													
Reverse recording enable switch (B deck)	This switch turns ON when provided with a click for enabling recording in the reverse direction. With this switch OFF, the reverse recording is disabled.													
CrO ₂ detection switch	<table border="1" style="width: 100%; border-collapse: collapse; margin: 5px 0;"> <thead> <tr> <th style="width: 25%;">Tape</th> <th style="width: 25%;">CrO₂</th> <th style="width: 25%;">Metal</th> </tr> </thead> <tbody> <tr> <td>Metal</td> <td style="text-align: center;">OFF</td> <td style="text-align: center;">OFF</td> </tr> <tr> <td>CrO₂</td> <td style="text-align: center;">OFF</td> <td style="text-align: center;">ON</td> </tr> <tr> <td>Normal</td> <td style="text-align: center;">ON</td> <td style="text-align: center;">ON</td> </tr> </tbody> </table>	Tape	CrO ₂	Metal	Metal	OFF	OFF	CrO ₂	OFF	ON	Normal	ON	ON	<p style="text-align: center; margin: 0;"> For Service Manuals Contact MAURITRON TECHNICAL SERVICES 8 Cherry Tree Rd, Chinnor Oxon OX9 4QY Tel:- 01844-351694 Fax:- 01844-352554 Email:- enquiries@mauritron.co.uk </p>
Tape	CrO ₂	Metal												
Metal	OFF	OFF												
CrO ₂	OFF	ON												
Normal	ON	ON												
Metal detection switch														

CIRCUIT DESCRIPTION

Function name	Key symbol	Function
Rewind play	"◀◀+▶▶" or "▶▶+◀◀"	After the tape is rewound up to the tape end, the first tune is searched for and then is played after its searching out.
Dash and play (Full repeat)	◀◀+▶▶	When the no-tune state continues for more than 10 seconds during the play mode, the tape is cued. When the head of the next tune is thus scanned out, the play mode is restored. A full repeat function is also provided by means of the reverse mode switch. UOne side full repeat, 8 times UDouble-side full repeat, 8 times (16 sides of tape) UDouble-side relay repeat (29 to 31 sides A and B of tape). When the other deck is not loaded with a cassette half, the tape stops at the RVS end (1 to 2 sides of tape).
Zero stop	"◀◀+■" or "▶▶+■"	After the tape is rewound or fast forwarded until the counter goes to "0000", the tape stops. However, one deck is subject to the zero stop operator, after which the use of counter is changed to the counter of the other deck. Then, when the associated keys of that deck are pressed, this latter deck can also be subject to the zero stop operation parallelly.
Rerec standby	(●)▶▶ ... ◀◀ ◀◀(●) ... ▶▶	Performed by pressing the rewind key while recording. The tape is rewound, the end of the previous track is detection, a two-second blank section is found, and the deck stops.

KEY MATRIX

	G1	G2	G3	G4	G5	G6	G7
KR 5	X-85	TPLAY	TREC	B HEAD	A HEAD	TEST	
KR 4	CCRS MODE	AUTO BIAS	M CALL	B METAL	A HALF	DISP	C RESET
KR 3	B FWD	B STOP		B HALF	A CrO2	A STOP	A FWD
KR 2	B RVS	B REC	NCCRS	B RINH	NDUBB	DOLBY	A RVS
KR 1	B FF	B PAUSE	HCCRS	B CrO2	HDUBB	DIR	A FF
KR 0	B RWD	VR UP		B FINH		VR DWN	A RWD

CIRCUIT DESCRIPTION

Synchronous recording (CD/LD and deck, and player and deck)

The deck can obtain the current REC source by continuously analyzing the selector code from the amplifier. The REC source may not change after the deck enters the REC mode. As a result, the deck can be synchronized by analyzing the code from the unit presently in the REC mode.

(A) Synchronized Operation between CD and deck.

CD operation Deck State	STOP→PLAY	PAUSE→PLAY	PLAY→PAUSE	PLAY→STOP	PAUSE→STOP	PLAY → Tray open	PAUSE → Tray open
REC (transport state)	Unchanged	Unchanged	Enters REC PAUSE mode 4 seconds after ARM state is entered.	Enters STOP mode 4 seconds after ARM state is entered.	←	←	←
ARM (auto REC muting)	Stops ARM and enters REC mode.	←	Enters REC PAUSE mode after current ARM time-up.	Enters STOP mode after current ARM time-up.	←	←	←
REC PAUSE	Enters REC mode	←	Unchanged	STOP	←	←	←

(B) Synchronized Operation between player and deck.

Player operation Deck State	UP→DOWN (MUTE ON→OFF)	DOWN→UP (MUTE OFF→ON)	Arm return (returns to arm rest)
REC (transport state)	Unchanged	Enters ARM state. Enters REC PAUSE mode after time-up (4 seconds).	Enters STOP mode 4 seconds after ARM state is entered
ARM (auto REC muting)	Stops ARM and returns to REC mode.	Enter REC PAUSE mode after the current ARM time-up.	Enter STOP mode after the current ARM time-up
REC PAUSE	Enter REC mode.	Unchanged	STOP

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CIRCUIT DESCRIPTION

Audio Signal Processing System IC for Cassette Deck (HA12157NT)

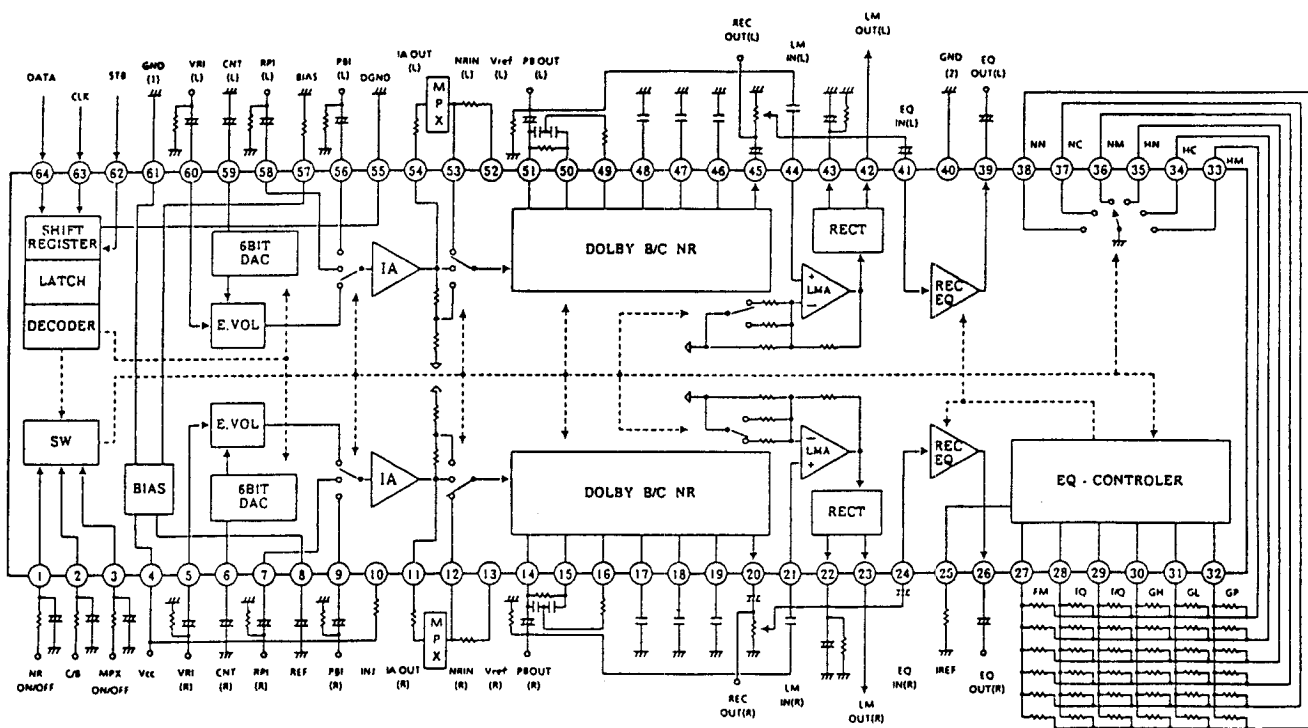
The HA12157NT is an audio signal processing LSI chip integrates potentiometers, recording equalizers, level meters, and Dolby noise reduction systems on one chip.

Internal Functions :

- Recording equalizer × 2 channels
- Dolby B/C noise reduction × 2 channels
- Potentiometer × 2 channels
- Level meter × 2 channels

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Block Diagram



CIRCUIT DESCRIPTION

Description of pins [HA12157NT]

Pin No.	Name	Function
1	NR ON/OFF	Mode Control input
2	C/B	
3	MPX ON/OFF	
4	VCC	Power Supply
5	VRI	Volume input
60		
6	CNT	DAC output Volume control input
59		
7	RPI	Recording input
58		
8	REF	Ripple filter
9	PBI	Playback input
56		
10	INJ	Injection current input for I _L
11	IA OUT	Input amplifier output
54		
12	NR IN	Noise reduction processor input
53		
13	VREF	Reference voltage buffer output
52		
14	PB OUT	Playback (Decode) output
51		
15	SS1	Spectral skewing amplifier input
50		
16	SS2	Spectral skewing amplifier output
49		
17	CCR	Current controlled resistor output
48		
18	HLS DET	Time constant pin for rectifier
47		
19	LLS DET	
46		

Pin No.	Name	Function
20	REC OUT	Recording (Encode) output
45		
21	LM IN	Level meter input
44		
22	LMD	Time constant pin for level meter
43		
23	LM OUT	Level meter output
42		
24	EQ IN	Equalizer input
41		
25	IREF	EQ reference current input
26	EQ OUT	Equalizer output
39		
27	FM	EQ parameter current input
28	fQ	
29	f/Q	
30	GH	
31	GL	
32	GP	
33	HM	EQ parameter selector
34	HC	
35	HN	
36	NM	
37	NC	
38	NN	
40	GND	Ground
61		
55	D GND	Digital (Logic) ground
57	BIAS	Dolby NR reference current input
62	STB	Mode control input
63	CLK	
64	DATA	

Operating Mode Control

Electronic switches are used in the HA12157. Noise reduction ON/OFF, C/B, and Multiplex ON/OFF signals controlled by parallel data (DC voltage) and a switch controlled by serial data are provided in the operating mode.

Control Using Parallel Data

Dolby noise reduction and multiplex filter are controlled by the input signal at pins ①, ②, and ③.

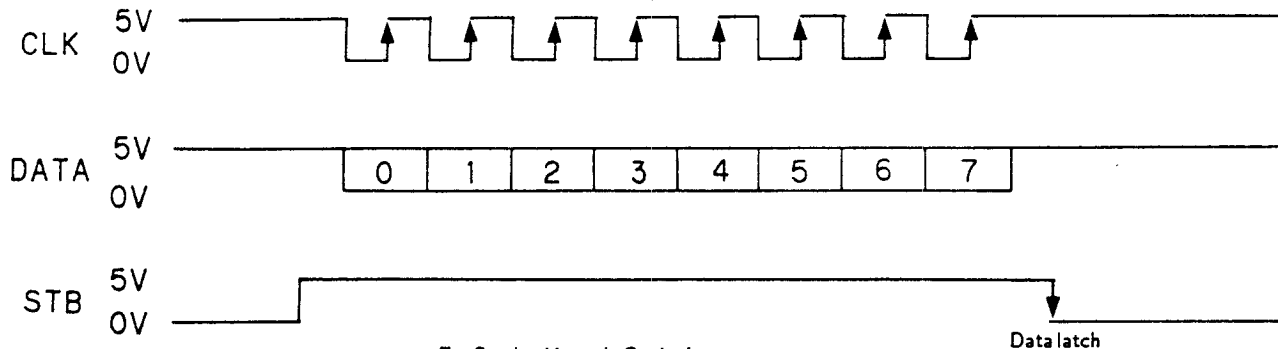
Pin No.	Lo	Hi
①	NR-OFF	NR-ON
②	B-NR	C-NR
③	MPX-ON	MPX-OFF

CIRCUIT DESCRIPTION

Serial Data Format

An 8-bit shift register is used as the serial data format.

The shift register fetches CLK and DATA signals only when the STB signal is high, then latches data at the falling edge of the STB signal.



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The following control is performed according to the data contents :

bit No.	Control register				Volume register																																																																																		
0	TAPE SELECT 1	H	<table border="1"> <tr> <td>TS 2</td> <td>TS 1</td> <td>H</td> <td>L</td> </tr> <tr> <td>H</td> <td>METAL</td> <td>NORMAL</td> <td></td> </tr> <tr> <td>L</td> <td>CrO₂</td> <td>NORMAL</td> <td></td> </tr> </table>		TS 2	TS 1	H	L	H	METAL	NORMAL		L	CrO ₂	NORMAL		DAC 0		<table border="1"> <tr> <th colspan="6">bit No.</th> <th>Gain</th> </tr> <tr> <td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td> <td>High</td> </tr> <tr> <td>L</td><td>L</td><td>L</td><td>L</td><td>L</td><td>L</td> <td>↑</td> </tr> <tr> <td>L</td><td>L</td><td>L</td><td>L</td><td>H</td><td>L</td> <td></td> </tr> <tr> <td>L</td><td>L</td><td>L</td><td>L</td><td>H</td><td>H</td> <td></td> </tr> <tr> <td colspan="6" style="text-align:center">~~~~~</td> <td></td> </tr> <tr> <td>H</td><td>H</td><td>H</td><td>H</td><td>L</td><td>H</td> <td>↓</td> </tr> <tr> <td>H</td><td>H</td><td>H</td><td>H</td><td>H</td><td>L</td> <td>Low</td> </tr> <tr> <td>H</td><td>H</td><td>H</td><td>H</td><td>H</td><td>H</td> <td>Mute</td> </tr> </table>						bit No.						Gain	5	4	3	2	1	0	High	L	L	L	L	L	L	↑	L	L	L	L	H	L		L	L	L	L	H	H		~~~~~							H	H	H	H	L	H	↓	H	H	H	H	H	L	Low	H	H	H	H	H	H	Mute
		TS 2	TS 1	H	L																																																																																		
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H	H	H	H	H	H	Mute																																																																																	
L					DAC 1																																																																																		
1	TAPE SELECT 2	H			DAC 2																																																																																		
		L			DAC 3																																																																																		
2	TAPE SPEED	H	Twice normal speed selection		DAC 4																																																																																		
		L	Normal speed selection		DAC 5																																																																																		
3	METER SENSITIVITY	H	Meter sensitivity improved by 20 dB		R/L SELECT																																																																																		
		L	Meter sensitivity normal		L																																																																																		
4	INPUT SELECT 1	H	<table border="1"> <tr> <td>IS 2</td> <td>IS 1</td> <td>H</td> <td>L</td> </tr> <tr> <td>H</td> <td>PBI</td> <td>VRI</td> <td></td> </tr> <tr> <td>L</td> <td>RPI</td> <td>VRI</td> <td></td> </tr> </table>		IS 2	IS 1	H	L	H	PBI	VRI		L	RPI	VRI		H		R-channel register selection																																																																				
		IS 2	IS 1	H	L																																																																																		
H	PBI	VRI																																																																																					
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L					L		L-channel register selection																																																																																
5	INPUT SELECT 2	H			REGISTER SELECT		L																																																																																
		L																																																																																					
6	REC/PB	H	Playback mode selection																																																																																				
		L	Recording mode selection																																																																																				
7	REGISTER SELECT	H	Control register selection																																																																																				
		L																																																																																					

* Whether to control the condition or volume control is judged by the content of bit 7.



## CIRCUIT DESCRIPTION

## Test Mode

## Setting method :

TEST(pin 10 and pin 7) ⑩ → ⑦

TIMER PLAY(pin 9 and pin 7) ⑨ → ⑦

TIMER REC(pin 8 and pin 7) ⑧ → ⑦

The mode is set by shorting the above two pins with a diode, then switch the power on.

To start during the power-on sequence, supply AC power while pressing the STOP key of deck A.

## Cancel method :

Press the pause key(for both decks) to cancel the test mode.

## Test mode operation

- (1) Lamp display : All the indicators turn on 500 ms after the power is switched on and remain on for 1500 ms.
- (2) Mechanical switch display : Each switch state is displayed on the level meter when the line muting signal is on.
 

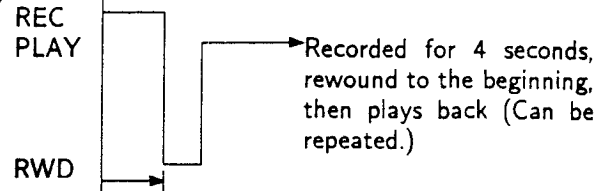
F.REC INH	CrO ₂	Metal	R.REC INH
(-6 dB)	(-3 dB)	(0 dB)	(+6 dB)

The level meter lights when the mechanical switch is set to ON. Deck A set to the left channel and deck B to the right channel.
- (3) Recording level : The recording level is changed to three steps ( $-\infty$ dB $\leftrightarrow$ -22 dB $\leftrightarrow$ 0 dB) with the UP/DOWN key.

(4) Twice speed recording : Recording is initiated at HIGH speed with the H.CCRS key.

(5) Direct change : The REC key can be accepted from the play mode.

(6) Record for 4 seconds :



(7) Playback speed switching : The tape is played back at high speed in the forward direction by pressing the FF key. (The Forward PLAY, Reverse PLAY, and RWD keys cannot be used for playback.)

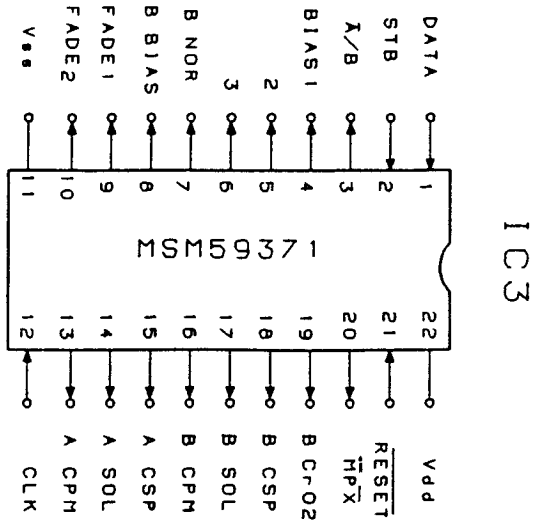
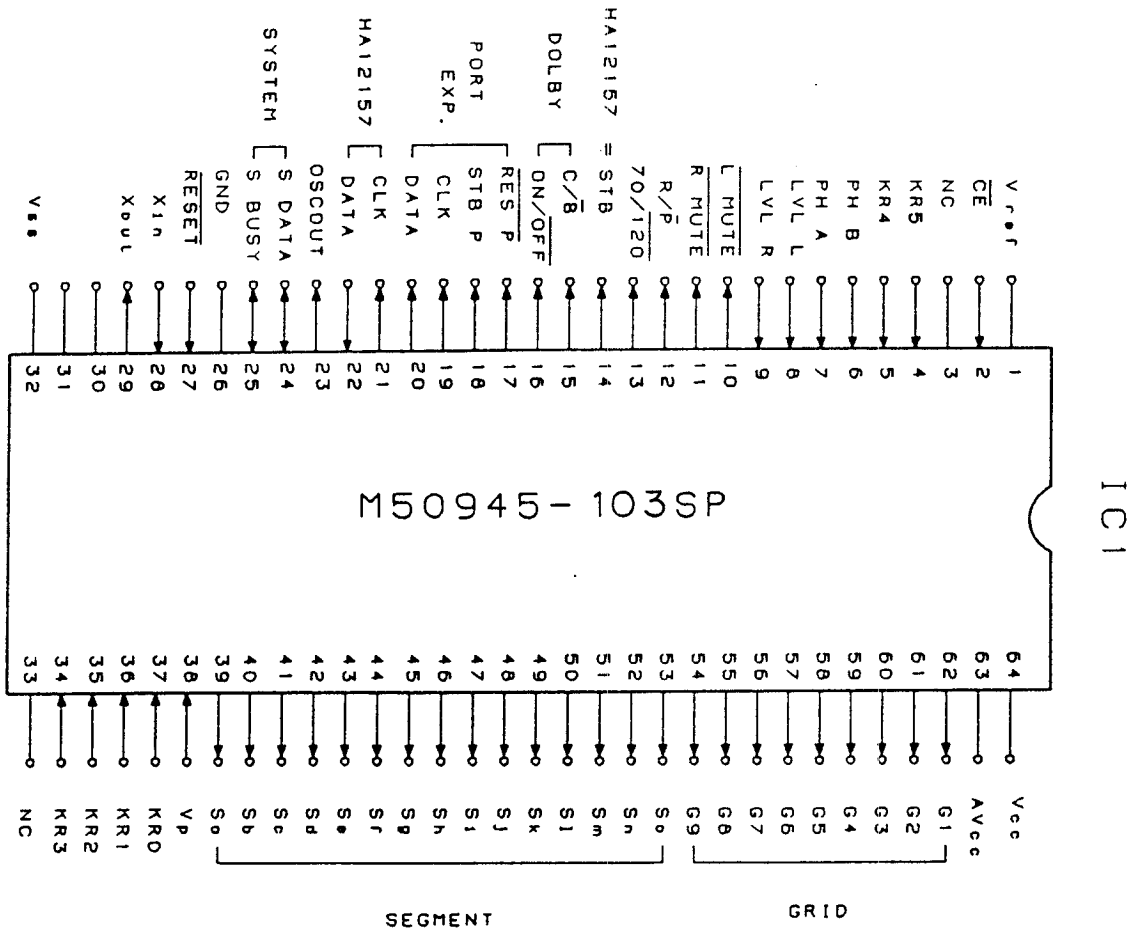
(8) Input level attenuation : The REC PAUSE mode is entered by pressing the N : CCRS key. In this case, an attenuator is activated so that the output is -4 dBm when a signal is input. (When deck A stops and deck B has a recordable tape)

(9) Auto bias : Enters the mode that is completed in half (20 seconds) the usual time. (When deck A stops and deck B has a recordable tape)

## CIRCUIT DESCRIPTION

Microprocessor [M50945-103SP]

Pin description



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 Oxon OX9 4QY  
 Tel:- 01844-351694 Fax:- 01844-352554  
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## CIRCUIT DESCRIPTION

## Description of pins

[M50945-103SP]

Pin No.	Pin name	I/O	Name	Function	
1	V _{REF}		V _{REF}	Standard Voltage for A/D Converter (5.0 V)	
2	IN7	I	$\overline{CE}$	Back up detection input	0: BACKUP 1: NORMALLY
3	IN6	I	NC		
4	IN5	I	KR5	Key return input	Active: High
5	IN4	I	KR4	Key return input	Active: High
6	IN3	I	PHIN B	B mechanism rotation detection sensor input	
7	IN2	I	PHIN A	A mechanism rotation detection sensor input	
8	IN1	I	LEVEL L	Music signal input L ch	
9	IN0	I	LEVEL R	Music signal input R ch	
10	P47	O	L MUTE	Line mute control output	0: ON 1: OFF
11	P46	O	R MUTE	B mechanism record mute	0: ON 1: OFF
12	P45	O	R/P	B mechanism REC/PLAY selection	0: PLAY 1: REC
13	P44	O	PEQ	PLAY EQ selection	0: 120 $\mu$ 1: 70 $\mu$
14	P43	O	STB	STBP Output (System IC control)	
15	P42	O	DOL C/ $\overline{B}$	DOLBY B/C selection	0: B 1: C
16	P41	O	DOL ON/ $\overline{OFF}$	DOLBY ON/OFF selection	0: OFF 1: ON
17	P40	O	RESP	Reset terminal for P.EXP	0: reset 1: xxx
18	P37	O	STBP	STBP output for output port extension IC Connected to STBP of P.EXP	
19	P36	O	CLK	Clock pulse output for output port extension IC Connected to CLK of P.EXP	
20	P35	O	DATA	Data output for output port extension IC Connected to DATA of P.EXP	
21	P34	O	CLK	System IC clock	
22	P33	I	DATA	System IC data	
23	P32	O	OSC OUT	AUTO BIAS square wave output	
24	P31	I/O	S. DATA	System control serial data I/O	
25	P30	I/O	S. BUSY	System control serial busy I/O	
26	CNVss	I		NC	GND
27	RESET	I	RESET	Reset signal input	
28	XIN	I	X in	System clock input	
29	XOUT	O	X out	System clock output	
30	XCIN	I		NC	GND
31	XCOU	O		NC	OPEN
32	Vss			GND pin	GND
33	$\phi$	O		NC	OPEN
34	R3	I	KR3	Key return input	Active: High
35	R2	I	KR2	Key return input	Active: High
36	R1	I	KR1	Key return input	Active: High
37	R0	I	KR0	Key return input	Active: High

## CIRCUIT DESCRIPTION

Pin No.	Pin name	I/O	Name	Function
38	VP	I	-30V	Pull down input for P0, P1 and P2 (–30V)
39	P17	O	Sa	Fluorescent display segment drive output
40	P16	O	Sb	Fluorescent display segment drive output
41	P15	O	Sc	Fluorescent display segment drive output
42	P14	O	Sd	Fluorescent display segment drive output
43	P13	O	Se	Fluorescent display segment drive output
44	P12	O	Sf	Fluorescent display segment drive output
45	P11	O	Sg	Fluorescent display segment drive output
46	P10	O	Sh	Fluorescent display segment drive output
47	P07	O	Si	Fluorescent display segment drive output
48	P06	O	Sj	Fluorescent display segment drive output
49	P05	O	Sk	Fluorescent display segment drive output
50	P04	O	Sl	Fluorescent display segment drive output
51	P03	O	Sm	Fluorescent display segment drive output
52	P02	O	Sn	Fluorescent display segment drive output
53	P01	O	So	Fluorescent display segment drive output
54	P00	O	G9	Fluorescent display grid drive output for key scan
55	P27	O	G8	Fluorescent display grid drive output for key scan
56	P26	O	G7	Fluorescent display grid drive output for key scan
57	P25	O	G6	Fluorescent display grid drive output for key scan
58	P24	O	G5	Fluorescent display grid drive output for key scan
59	P23	O	G4	Fluorescent display grid drive output for key scan
60	P22	O	G3	Fluorescent display grid drive output for key scan
61	P21	O	G2	Fluorescent display grid drive output for key scan
62	P20	O	G1	Fluorescent display grid drive output for key scan
63	AVcc		AVcc	Power supply for A/D converter (5V)
64	Vcc		Vcc	Power supply pin (5V)

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## CIRCUIT DESCRIPTION

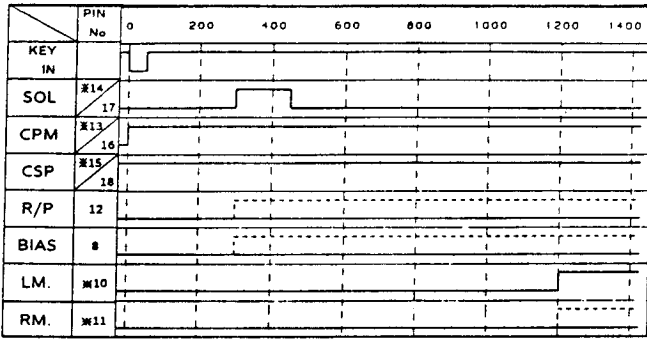
## Expansion IC [MSM59371]

## Description of pins

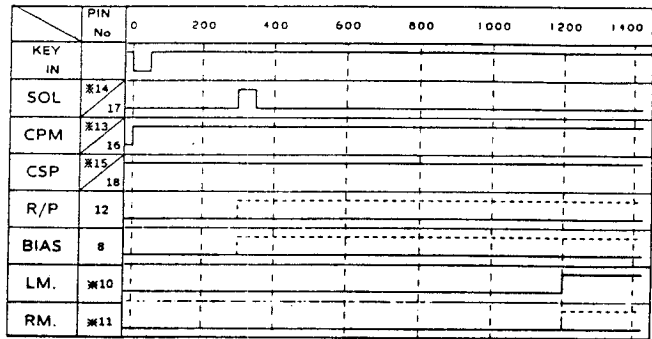
Pin No.	Name	I/O	Function																												
1	DATA	I	Data input pin																												
2	STB	I	Strobe input pin																												
3	$\bar{A}/B$	O	PB EQ A/B select control H: B L: A																												
4	BIAS 1	O	<table border="1"> <thead> <tr> <th></th> <th>1</th> <th>2</th> <th>3</th> <th>4</th> <th>5</th> <th>6</th> </tr> </thead> <tbody> <tr> <td>BIAS 1</td> <td>0</td> <td>1</td> <td>0</td> <td>1</td> <td>0</td> <td>0</td> </tr> <tr> <td>BIAS 2</td> <td>1</td> <td>0</td> <td>0</td> <td>1</td> <td>1</td> <td>0</td> </tr> <tr> <td>BIAS 3</td> <td>1</td> <td>1</td> <td>1</td> <td>0</td> <td>0</td> <td>0</td> </tr> </tbody> </table> A BIAS : 1 - 5 NOR, CrO ₂ : 3 METAL : 6		1	2	3	4	5	6	BIAS 1	0	1	0	1	0	0	BIAS 2	1	0	0	1	1	0	BIAS 3	1	1	1	0	0	0
	1	2		3	4	5	6																								
BIAS 1	0	1		0	1	0	0																								
BIAS 2	1	0	0	1	1	0																									
BIAS 3	1	1	1	0	0	0																									
5	BIAS 2	O																													
6	BIAS 3	O																													
7	B NOR	O	Tape selection H: NOR L: CrO ₂ , MET																												
8	B BIAS	O	BIAS ON/OFF H: REC L: PLAY																												
9	FADE 1	O	H: SLOW L: NOR																												
10	FADE 2	O	EH bias ON/OFF																												
11	V _{ss}		GND																												
12	CLK	I	Clock input pin																												
13	A CPM	O	Capstan motor ON/OFF control H: ON L: OFF																												
14	A SOL	O	Solenoid ON/OFF control H: ON L: OFF																												
15	A CSP	O	Capstan motor speed control H: NOR L: HI																												
16	B CPM	O	Capstan motor ON/OFF control H: ON L: OFF																												
17	B SOL	O	Solenoid ON/OFF control H: ON L: OFF																												
18	B CSP	O	Capstan motor speed control H: NOR L: HI																												
19	B CrO ₂	O	Tape selection H: CrO ₂ L: NOR, MET																												
20	$\bar{MPX}$	O	H: OTHERS L: TUNER																												
21	RESET	I	Reset : L																												
22	V _{dd}		Power supply																												

## CIRCUIT DESCRIPTION

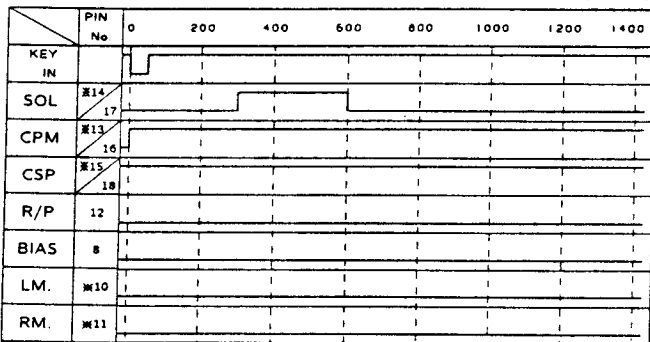
STOP TO FWD PLAY/REC(---) UNIT #5



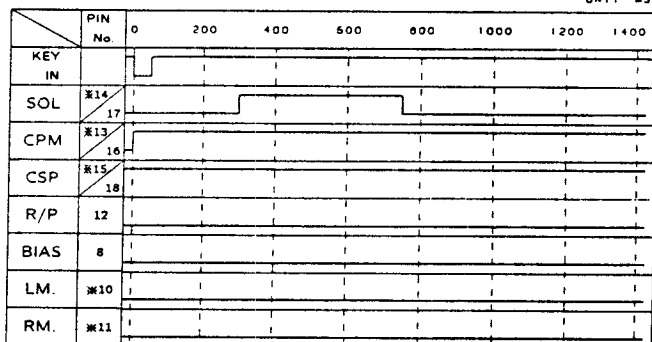
STOP TO RVS PLAY/REC(---) UNIT #5



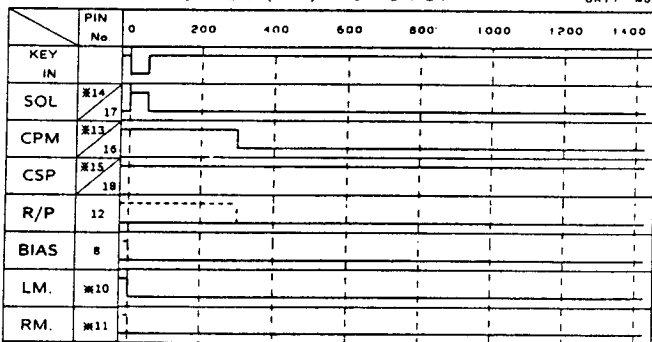
STOP TO FF UNIT #5



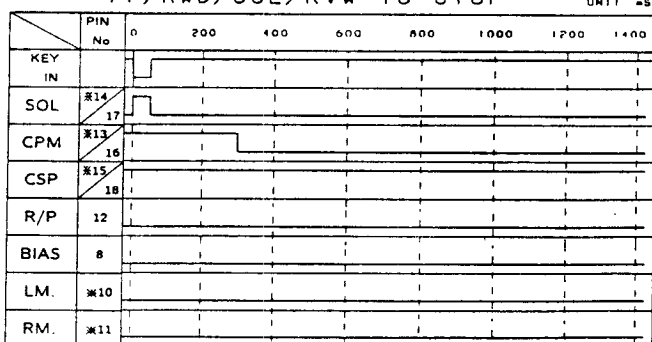
STOP TO RWD UNIT #5



PLAY/REC(---) TO STOP UNIT #5



FF/RWD/CUE/RW TO STOP UNIT #5

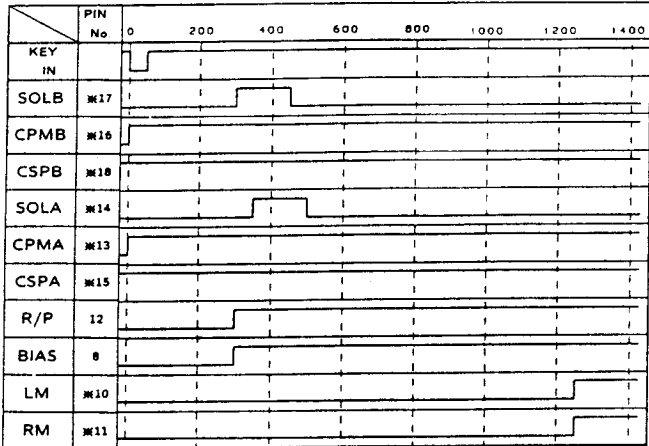


※MSM59371 PIN No.

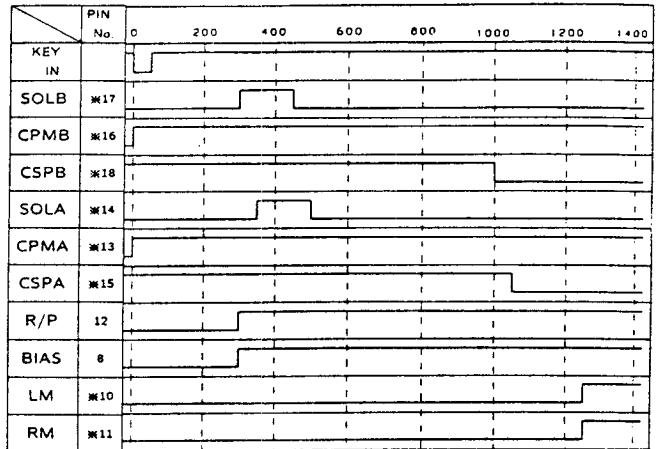
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## CIRCUIT DESCRIPTION

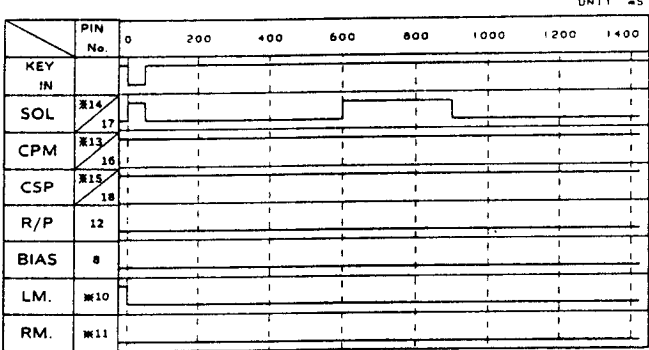
### STOP TO NOR DUBBING



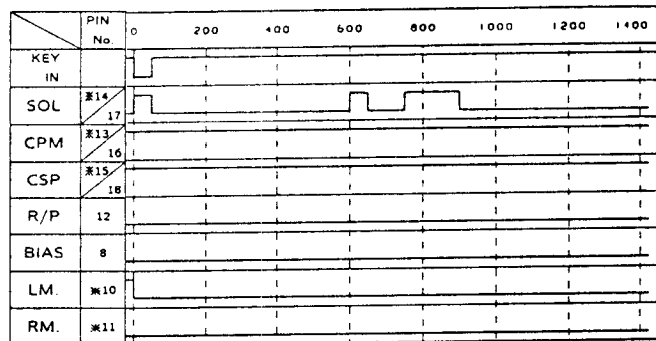
### STOP TO HI DUBBING



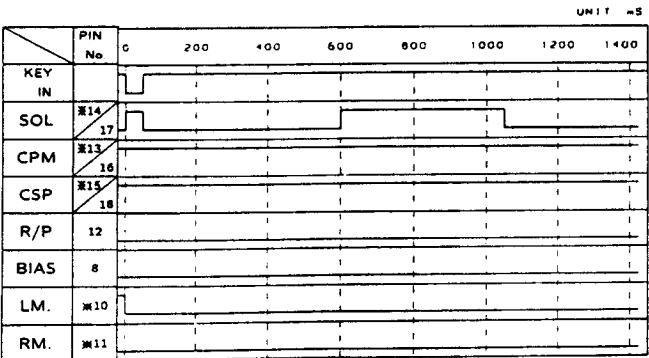
### FWD PLAY TO CUE



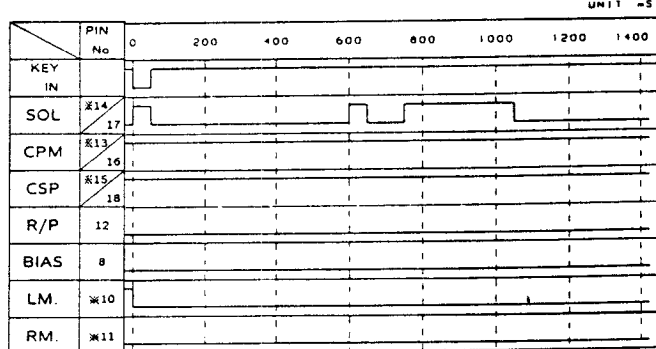
### RVS PLAY TO CUE



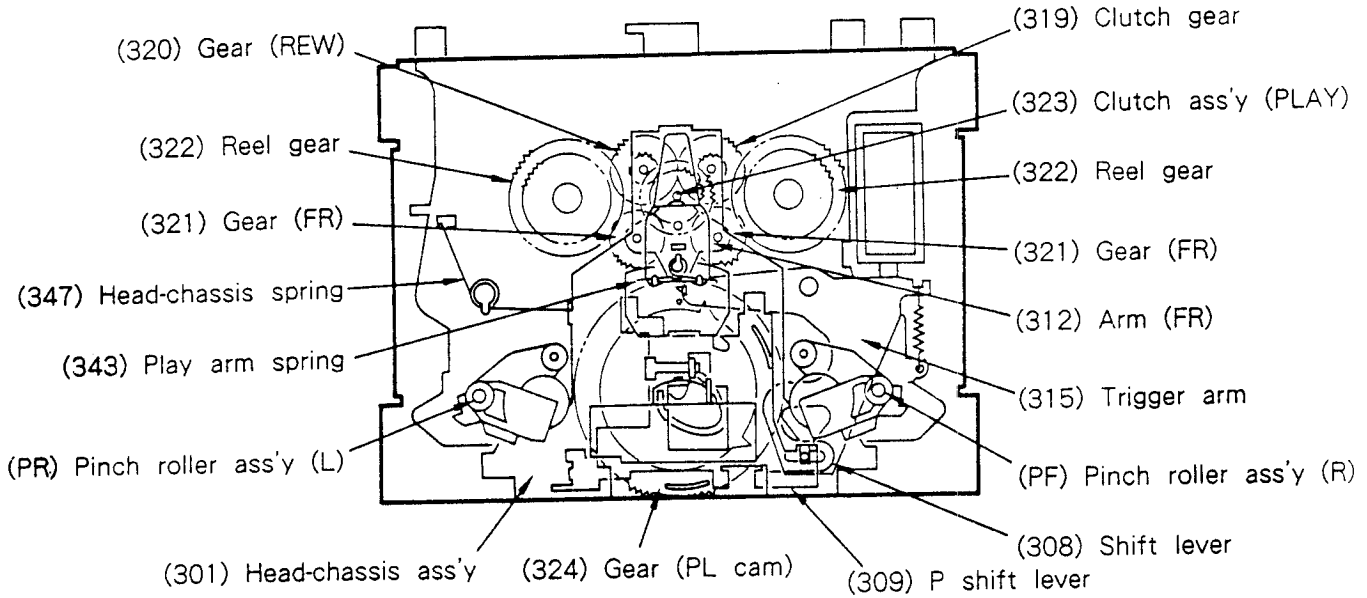
### FWD PLAY TO REVIEW



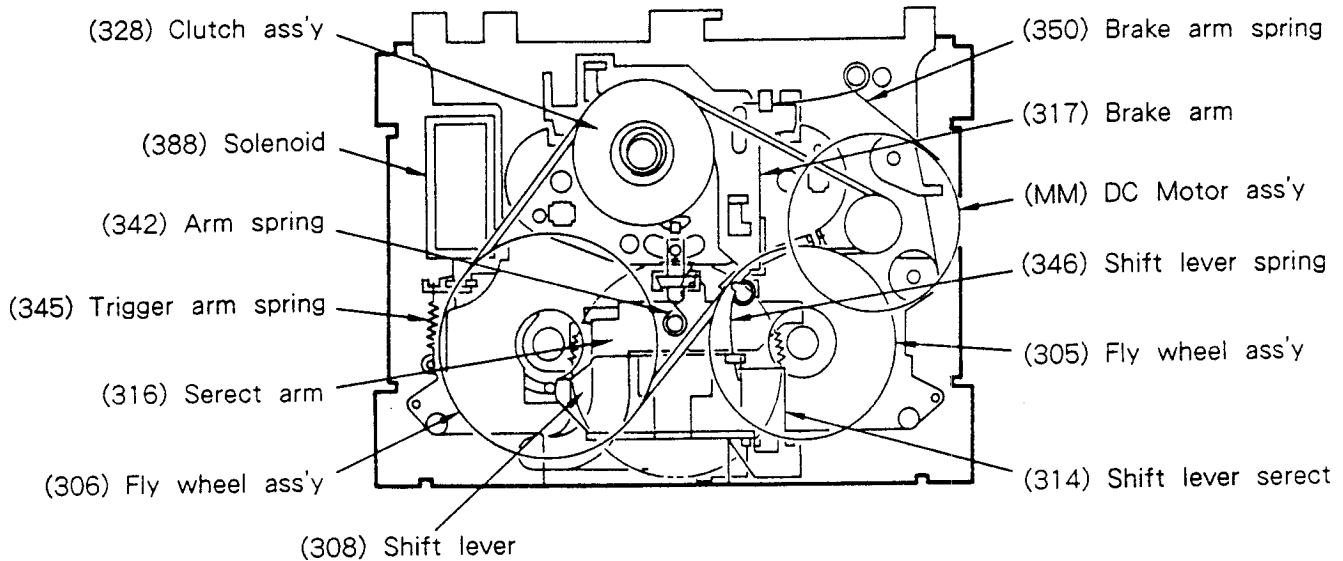
### RVS PLAY TO REVIEW



## MECHANISM DESCRIPTION



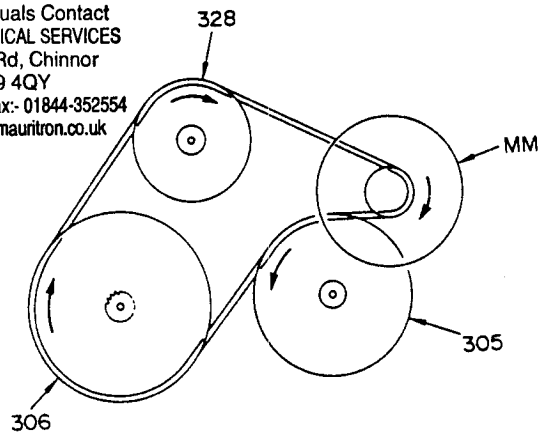
**Parts Layout (Front perspective)**



**Parts Layout (Rear perspective)**

Driving power	: 130g-cm more
Take up torque	: 35-75g-cm
FF/REW torque	: 70-160g-cm
Back tension torque	: 1.5-6g-cm

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**Transmission of Rotation**



## MECHANISM DESCRIPTION

STOP → FWD PLAY / REC (The head is in the forward – transport position when the drive stops.)

- 1 Press the key. The CPM starts running.
- 2 After about 300 ms, the solenoid is energized for 150 ms, and the boss **A** of the trigger arm (315) disengages from the stop lever **B** of the play cam gear (314).

Fig. 1

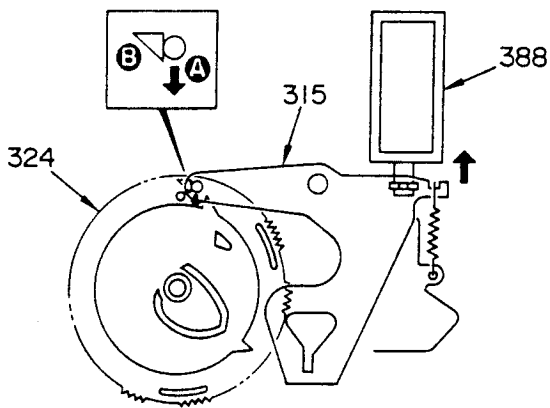


Fig. 1

- 3 The head chassis assembly (301) is pushed down by the spring (347), so the cam gear (324) rotates slightly, the FW (R) gear engages with the cam gear, and the gears start rotating.

Fig. 2

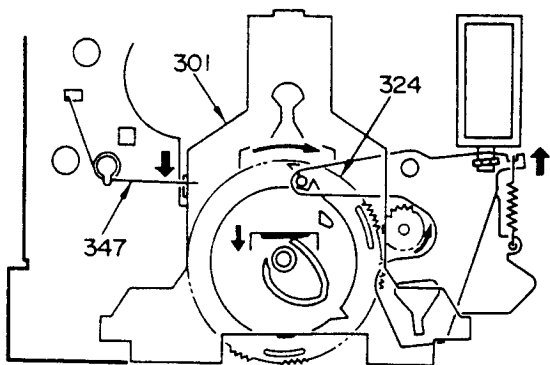


Fig. 2

- 4 Since the entrance of the inner track of the cam gear (324) passes when the solenoid is energized for 150 ms, the boss **A** of the shift lever selector (314) moves along the outer track, and the P shift lever (309) remains stationary.

Fig. 3

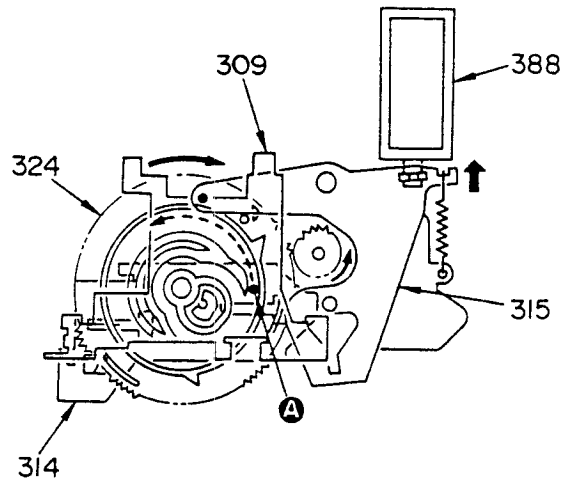


Fig. 3

- 5 The shift lever is lifted by the cam of the play cam gear, and the head chassis assembly is raised.

Fig. 4

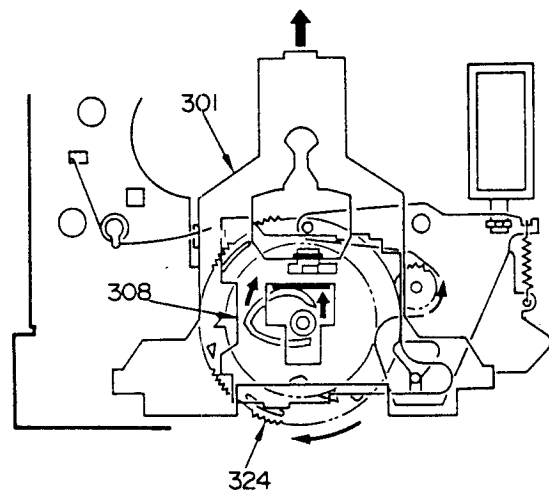


Fig. 4

## MECHANISM DESCRIPTION

6 The play arm spring is pushed by the protection **A** of the P shift lever (309), the play arm tilts along the inner surface of the head chassis, the clutch gear (323), play clutch gear, and hub engage, and the hub starts rotating.  
Fig. 5

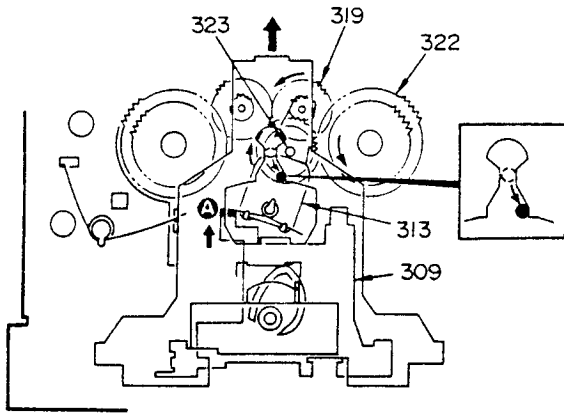


Fig. 5

7 The brake arm (317) is lifted by the bent part **A** of the shift lever (308) to release the brake from the hub.  
Fig. 6

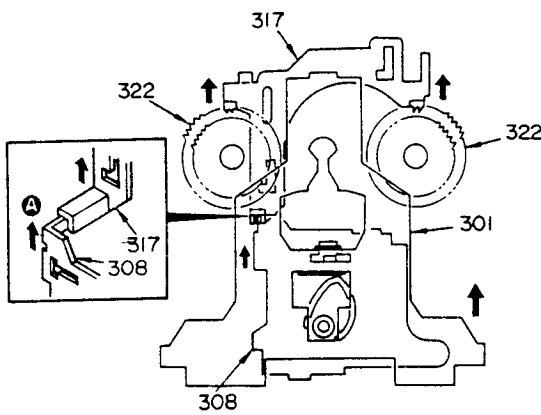


Fig. 6

8 The forward – transport pinch roller (PR) is raised by the bent part **A** of the P shift lever (309), and the pinch roller contacts the capstan.  
Fig. 7

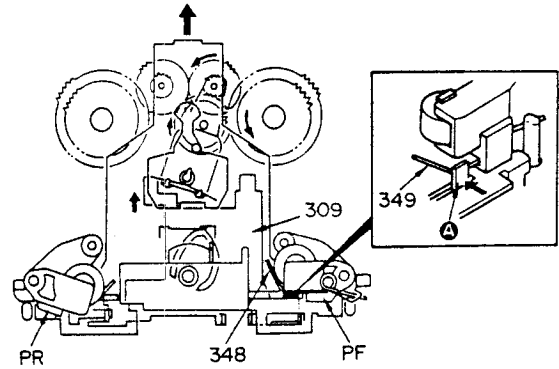


Fig. 7

STOP → RVS PLAY / REC

- 1 Press the key.
- 2 After about 300 ms, the solenoid is energized for 50 ms, then deenergized.
- 3 Since the solenoid is deenergized immediately after the play cam gear starts turning, the boss **A** of the shift lever selector (314), pushed by the trigger arm boss **B**, passes along the inner track of the play cam gear, so the play shift lever also moves, and the head is rotated into the reverse – transport position by the return gear.

Fig. 8

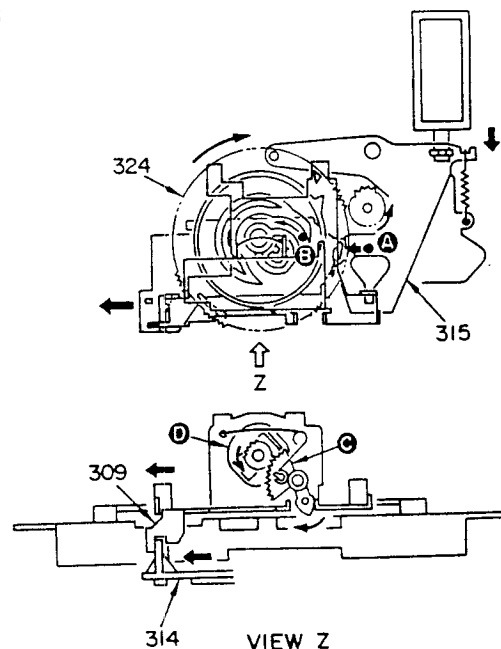


Fig. 8

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## MECHANISM DESCRIPTION

4 The rotating play cam gear lifts the shift lever (308), raising the head chassis assembly.

Fig. 9

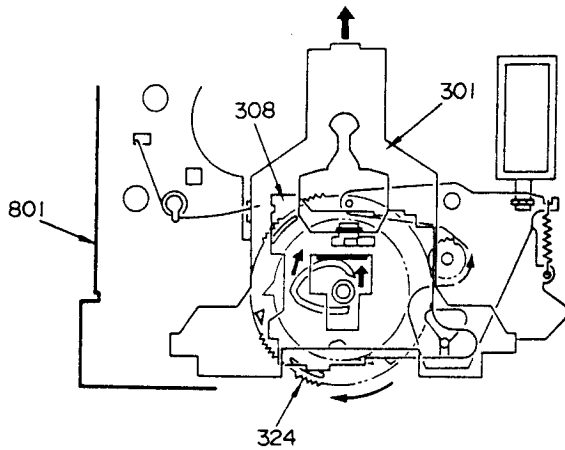


Fig. 9

5 The play arm spring pushed by the projection **A** of the P shift lever (309), the play arm tilts along the inner surface of the head chassis, the REW gear (320), play clutch gear, and hub engage, and the hub starts rotating.

Fig. 10

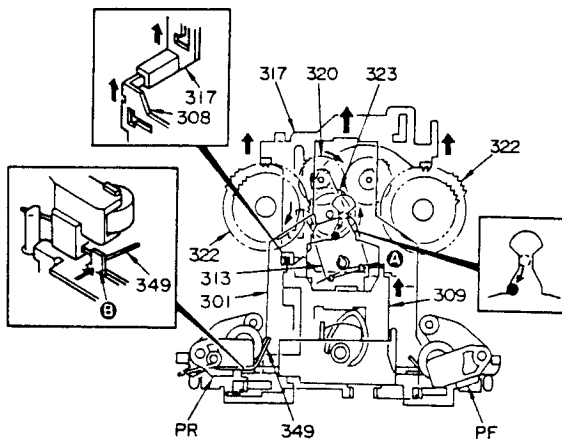


Fig. 10

6 The brake arm (317) is lifted by the shift lever to release the brake from the hub.

7 The spring of the reverse - transport pinch roller (PR) is lifted by the bent part **B** of the P shift lever (309), and the pinch roller contacts the capstan.

STOP → FF

1 Press the ►► key.

2 After 300 ms, the solenoid is energized for 300 ms, the selector arm (316) is held by the concave part of the trigger arm (315), and the head chassis assembly starts rising.

Fig. 11

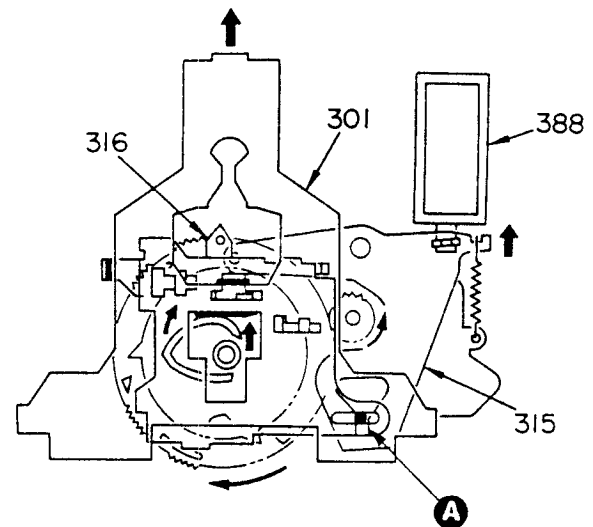


Fig. 11

3 The boss **A** of the selector arm (316) enters the holder on the mechanism base, and is lifted further.

Fig. 12

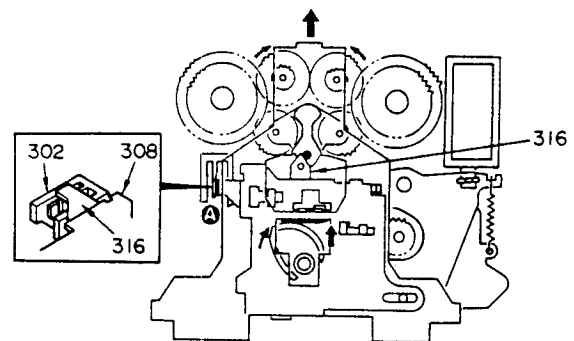


Fig. 12

## MECHANISM DESCRIPTION

- 4 The projection of the selector arm touches the boss **A** of the FR arm (312), the selector arm rises and tilts, the FR gear (321), clutch gear, and hub gear engage, and the forward – transport take – up hub starts rotating.

Fig. 13

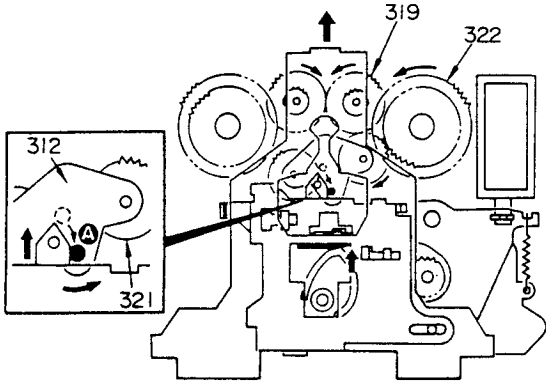


Fig. 13

- 5 When the shift lever is raised to its limit by the play cam gear cam, the selector arm hole and head chassis assembly boss **A** are positioned as shown in the figure below. The pinch roller does not touch the capstan, and fast – forwarding takes place.

Fig. 14

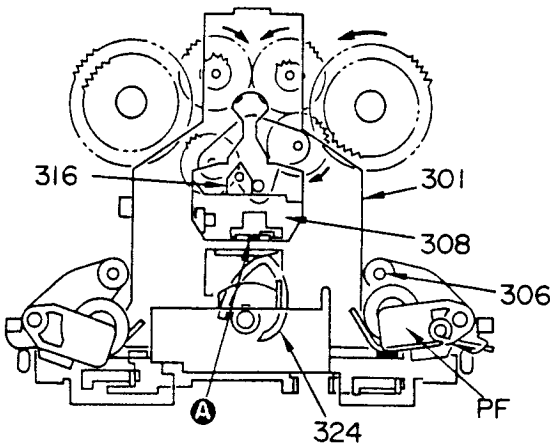


Fig. 14

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### STOP → RWD

- 1 Press the ◀◀ key.
- 2 After 300 ms, the solenoid is energized for 450 ms, the select arm (316) is held by the concave part of the trigger arm, and the head chassis assembly starts rising.
- 3 Since the selector arm is held, the projection touches the FR arm boss, the FR arm tilts, the FR gear (321), REW gear, and hub gear engage, and the RWD hub starts rotating.

Fig. 15

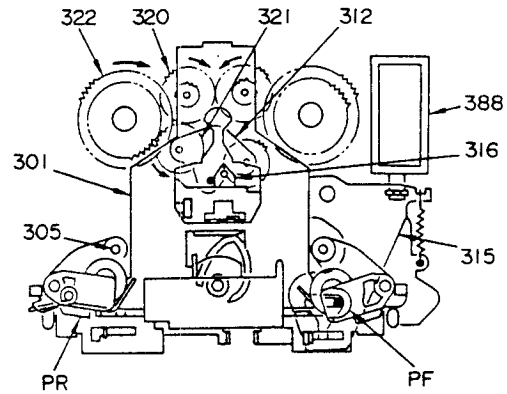


Fig. 15

- 4 The pinch roller does not touch the capstan, as in the fast forward operation, and rewinding takes place.

### F PLAY → CUE / RWD

- 1 The solenoid is energized for 50 ms during forward play to stop operation.
- 2 The solenoid is energized for 300 ms to fast – forward (CUE).  
The solenoid is energized for 50 ms to rewind (RWD).

### R. PLAY → RWD

- 1 The solenoid is energized for 50 ms during reverse play to stop operation.
- 2 The solenoid is energized for 50 ms to rotate the head into the reverse – transport position.
- 3 The solenoid is deenergized for 100 ms, then reenergized for 150 ms to fast – forward.

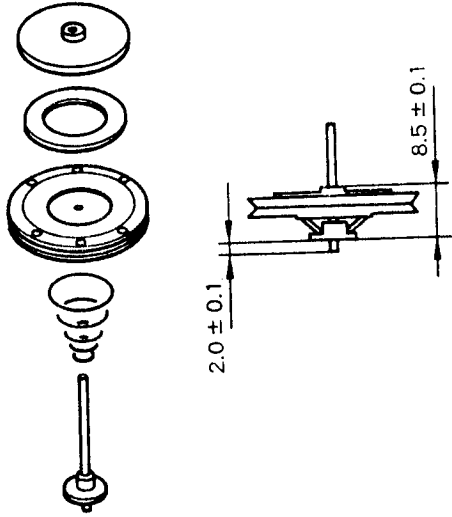
### RVS PLAY → CUE

- 1 The solenoid is energized for 50 ms during reverse play to stop operation.
- 2 The solenoid is energized for 50 ms to rotate the head into the reverse – transport position.
- 3 The solenoid is deenergized for 100 ms, then reenergized for 300 ms to rewind.

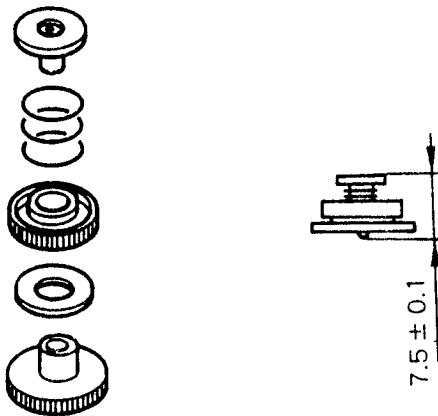
## MECHANISM DESCRIPTION

### Assembly Procedure

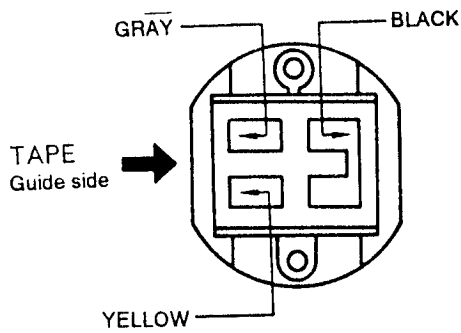
(1) CLUTCH ASS'Y



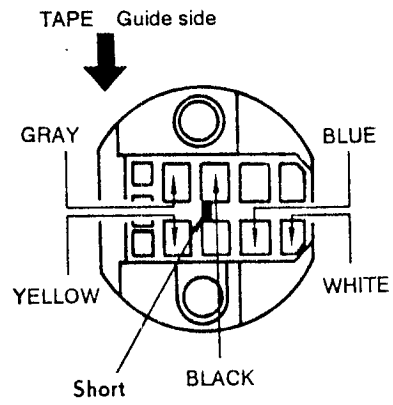
(2) PLAY CLUTCH ASS'Y



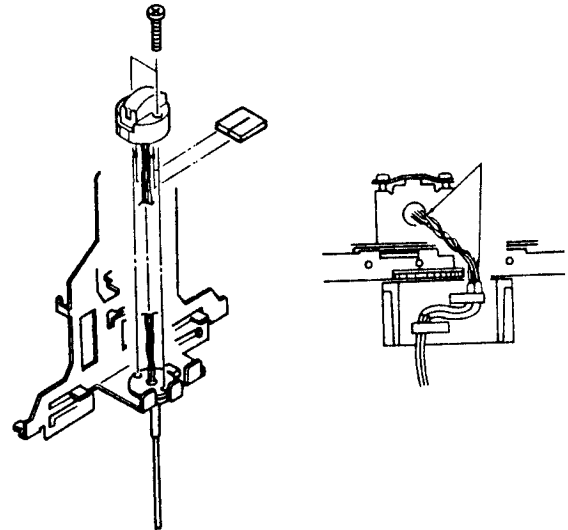
(3) PLAY BACK head lead



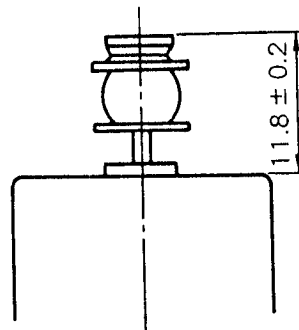
(4) RECORD/PLAY BACK head lead



(5) Head Ass'y



(6) MOTOR PULLY

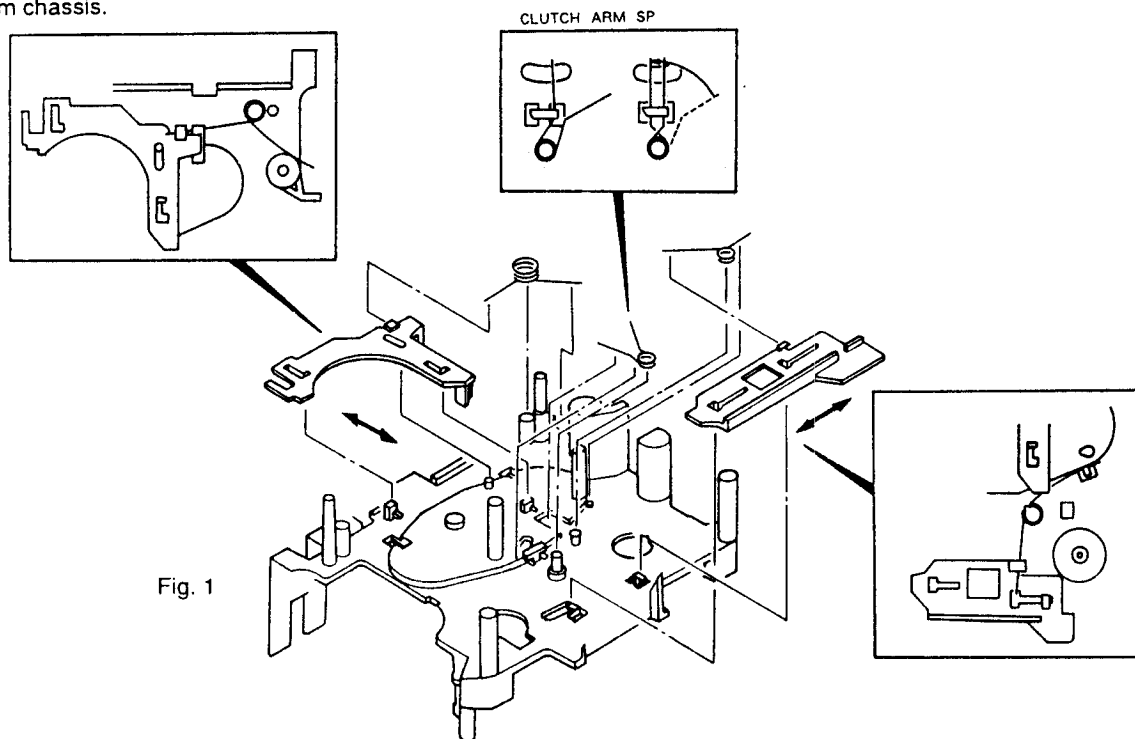


## MECHANISM DESCRIPTION

### Assembly procedure

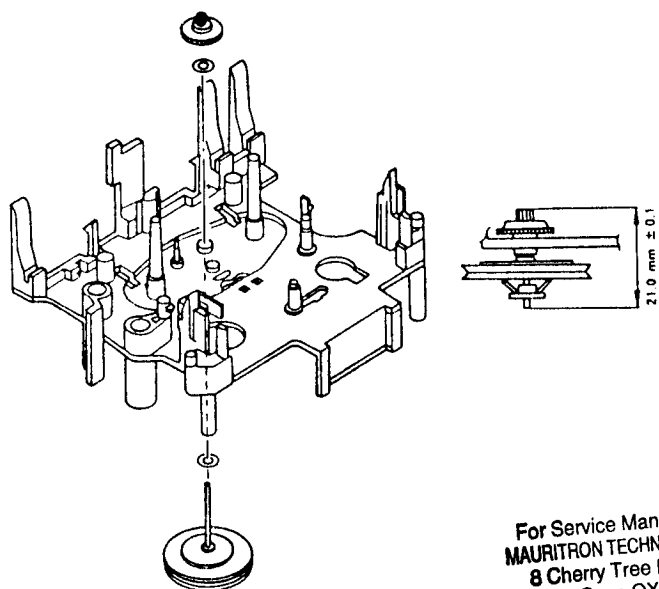
- 1 Install the brake arm and its spring the clutch arm spring, and the shift lever selector, and its spring on the mechanism chassis.

Fig. 1



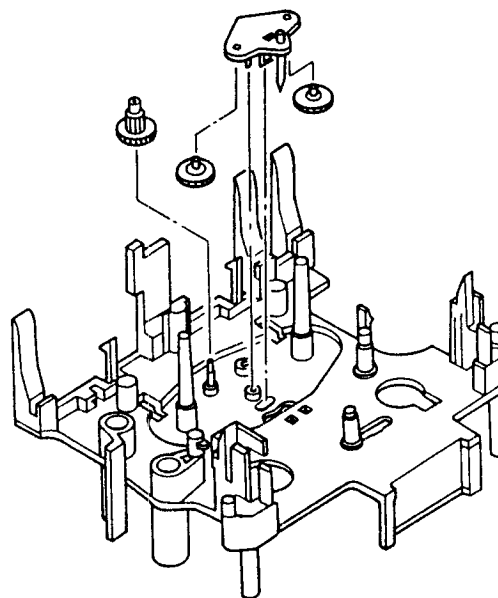
- 2 Install the clutch assembly on the mechanism chassis.

Fig. 2



- 3 Install the FR arm, FR gear, and REW gear on the mechanism chassis.

Fig. 3



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## MECHANISM DESCRIPTION

4 Install the hub assemblies (left and right).

Fig. 4

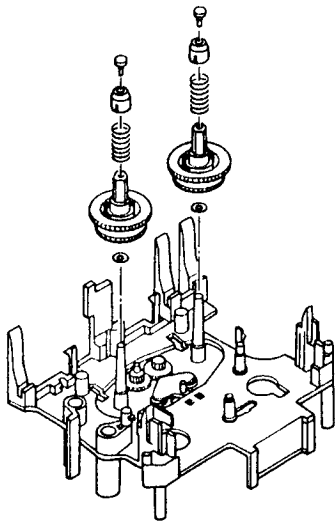


Fig. 4

7 Install the chassis on the mechanism chassis.

Fig. 7

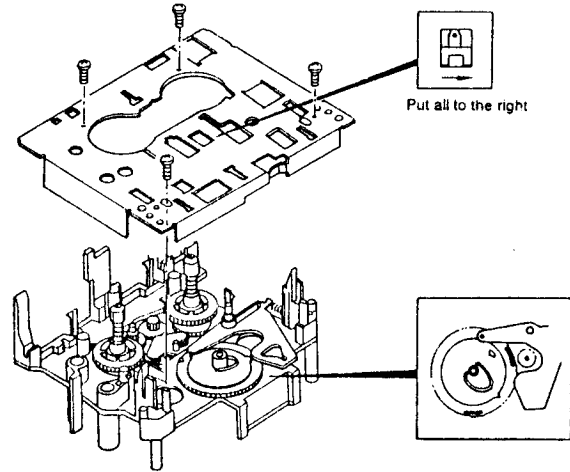


Fig. 7

5 Install the play cam gear and the trigger arm and its spring on the mechanism chassis.

Fig. 5

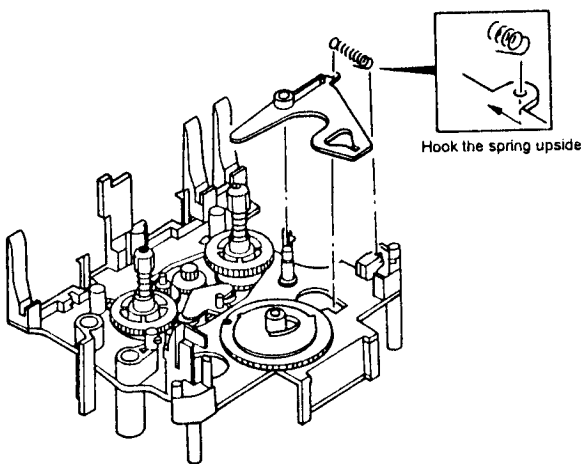


Fig. 5

8 Install the housings (left and right) on the chassis.

Fig. 8

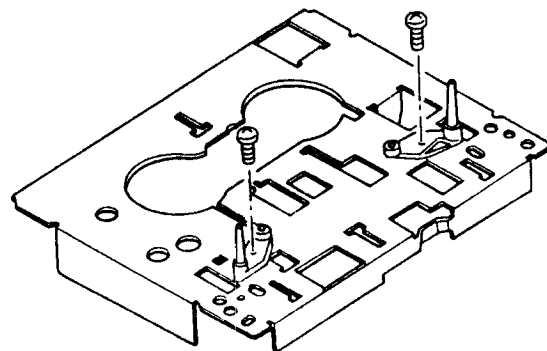


Fig. 8

9 Install the solenoid on the mechanism chassis.

Fig. 9

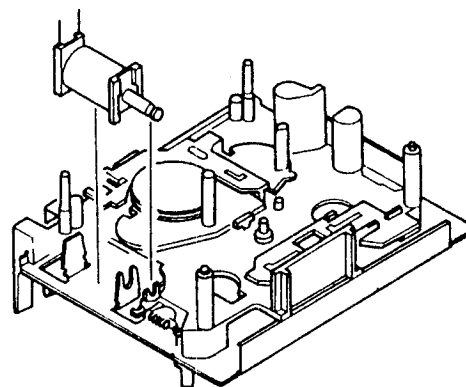


Fig. 9

6 Install the shift assembly and its spring on the chassis.

Fig. 6

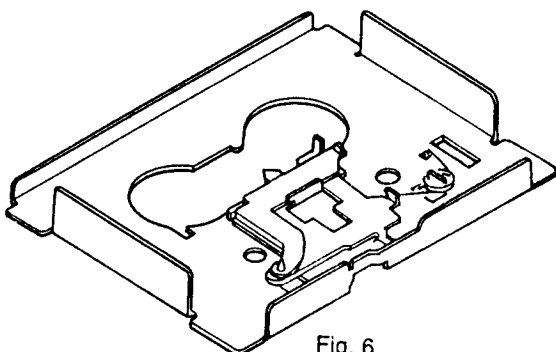


Fig. 6

10 Install the flywheels (left and right).

## MECHANISM DESCRIPTION

11 Install the play arm, play clutch assembly, and the head chassis and its spring on the chassis, and install the cassette guide.

Fig. 10

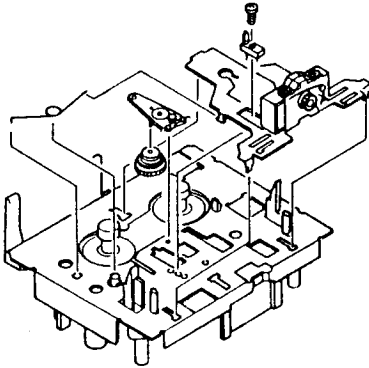


Fig. 10

12 Install the pinch rollers (left and right).

Fig. 11

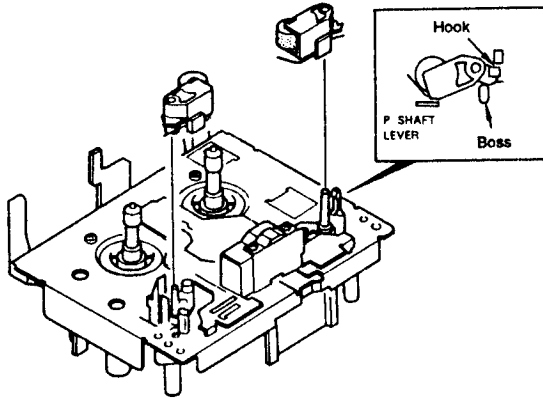


Fig. 11

13 Install the interlock and its spring.

Fig. 12

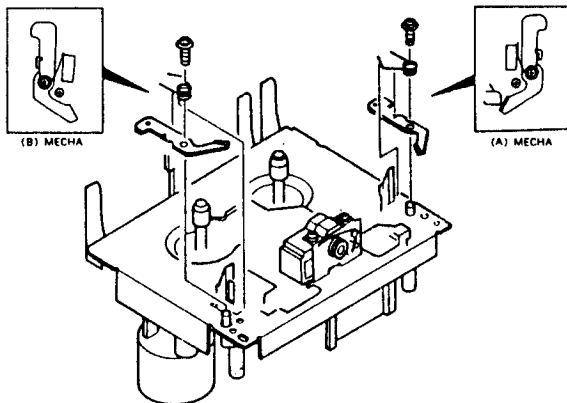


Fig. 12

14 Install the belt temporarily

Fig. 13

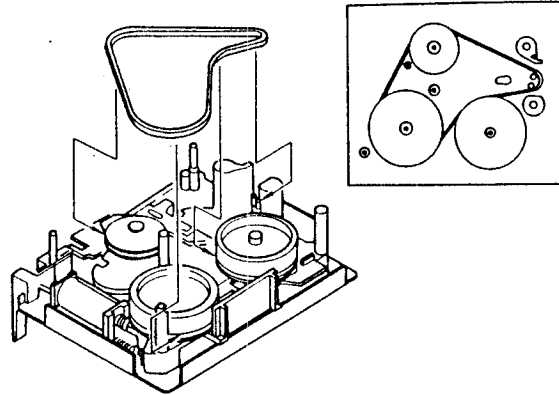


Fig. 13

15 Install the PCB.

16 Install the CPM and belt.

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## ADJUSTMENT

Order	Item	Input setting	Output setting	Deck setting	Adjustment points	Adjustment method	Fig.
Unless otherwise specified, set the respective switches as follows:							0 dBs=0.775 V
I. Cassette mechanism section (R/P head adjustment)							
[1]	Degaussing and cleaning	—	—	Power OFF. Degaussing Cleaning Play	Recording head, Erase head, Capstan, Pinch roller (Decks A and B)	Degauss R/P head by head eraser. Clean R/P head, erase head, capstan, pinch roller by a cotton swab soaked with alcohol	
[2]	R/P head azimuth	TCC-153, SCC-1727 MTT-114 10 kHz, -10 dB	(B)	PLAY	Azimuth adjustment screw (Decks A and B) (FWD, RVS)	Maximize the output and adjust so that Lissajous pattern on oscilloscope nears a line slanted 45°	(a)
II. Mechanism adjustment (X28-238)							
<1>	Tape speed (double speed)	TCC-110, SCC-1727 MTT-111 3 kHz	(B)	Connect R229(A) and R230(B) to GND. Play or TEST 1 MODE.	Deck A : VR5 Deck B : VR6	Adjust so that frequency is 6 kHz at tape center.	
<2>	Tape speed (normal speed)	TCC-110, SCC-1727 MTT-111 3 kHz	(B)	Play	Deck A : VR7 Deck B : VR8	Adjust so that frequency is 3 kHz at tape center.	
III. Printed board adjustment (X28-238)							
<1>	Playback level	MTT-150 400 Hz (200nWb) MTT-256, SCC-1727 315 Hz (160nWb) MTT-256U, TCC-160 315 Hz (250nWb)	(B)	PLAY	Deck A : VR1(L) VR2(R) Deck B : VR3(L) VR4(R)	Adjust so that playback output is -3.5 dB Adjust so that playback output is -6.0 dB Adjust so that playback output is -2.5 dB	
<2>	Bias current	(A) 1 kHz, -30 dBs 10 kHz, -30 dBs	(B)	Adjust the electronic volume control so that recording monitor output is -2 dBs at 1 kHz, and record and playback 1 kHz and 10 kHz alternately	X-45 Deck B : VR11(L) VR12(R) X-85 Deck B : VR9(L) VR10(R)	Record 1 kHz and 10 kHz alternately, and adjust so that playback level is identical between them.	

## REGLAGE

Ordre	Sujet	Réglage d'entrée	Réglage de sortie	Réglage de platine	Points d'ajustement	Méthode d'ajustement	Figure
Sauf indication contraire, régler les commutateurs respectifs comme suit I Section de mécanisme de cassette (ajustement de tête E/L) 0 dBs - 0.775 V							
[1]	Démagnétisation et nettoyage	—	—	Alimentation OFF, démagnétisation, nettoyage, lecture	Tête d'enregistrement, tête d'effacement, cabestan, galet presseur (platines A et B)	Démagnétiser la tête E/L avec un démagnétiseur de tête. Nettoyer la tête E/L, la tête d'effacement, le cabestan, le galet presseur avec un coton-tige imbibé d'alcool.	
[2]	Azimet de tête E/L	TCC-153, SCC-1727 MTT-114 10 kHz, -10 dB	(B)	PLAY	Vis d'ajustement de l'azimet (platines A et B) (FWD, RVS)	Maximiser la sortie et ajuster pour que la forme Lissajous sur l'oscilloscope soit proche d'une ligne inclinée à 45°	(a)
<b>II Ajustement de mécanisme (X28-238)</b>							
<1>	Vitesse de bande (vitesse double)	TCC-110, SCC-1727 MTT-111 3 kHz	(B)	Connecter R229(A) et R230(B) à GND. Lire / *TEST 1.	Platine A : VR5 Platine B : VR6	Ajuster pour que la fréquence soit 6 kHz au centre de bande.	
<2>	Vitesse de bande (vitesse normale)	TCC-110, SCC-1727 MTT-111 3 kHz	(B)	Lire	Platine A : VR7 Platine B : VR8	Ajuster pour que la fréquence soit 3 kHz au centre de bande.	
<b>III Ajustement de plaquette imprimée (X28-238)</b>							
<1>	Niveau de lecture	MTT-150 400 Hz (200nWb)	(B)	PLAY	Platine A : VR1 (G), VR2 (D) Platine B : VR3 (G), VR4 (D)	Ajuster pour que la sortie de lecture soit -3.5 dB.	
		MTT-256, SCC-1727 315 Hz (160nWb)				Ajuster pour que la sortie de lecture soit -6.0 dB.	
		MTT-256U, TCC-160 315 Hz (250nWb)				Ajuster pour que la sortie de lecture soit -2.5 dB.	
<2>	Courant de polarisation	(A) 1 kHz, -30 dBs 10 kHz, -30 dBs	(B)	Ajuster la commande de volume électronique pour que la sortie de contrôle d'enregistrement soit de -2 dBs à 1 kHz et l'enregistrement et la lecture 1 kHz et 10 kHz alternativement	X-45 Platine B : VR11(L)VR12(R) X-85 Platine B : VR9(L)VR10(R)	Enregistrer 1 kHz et 10 kHz alternativement et ajuster pour que le niveau de lecture soit identique entre eux.	

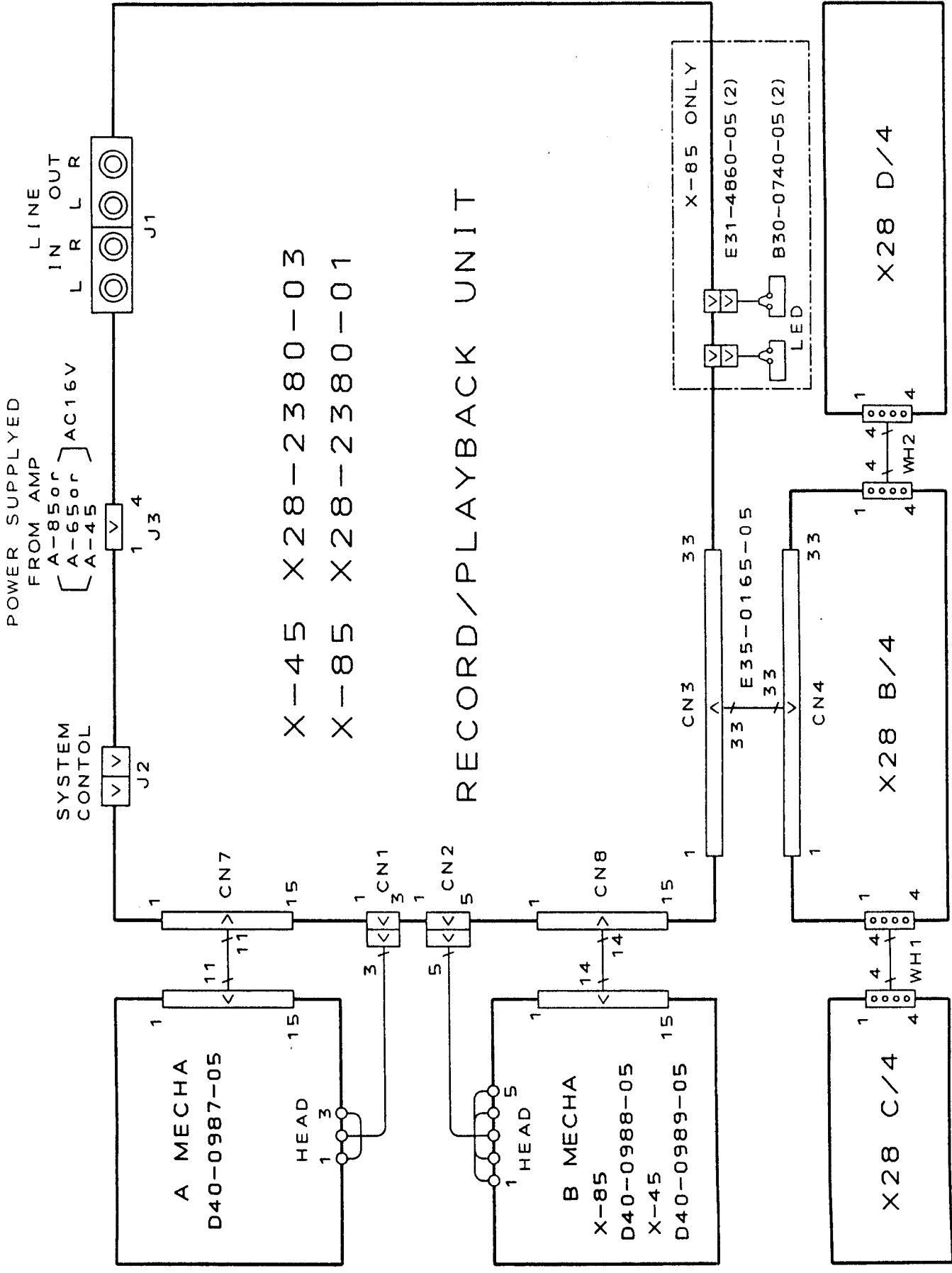
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## ABGLEICH

Reihenfolge	Gegenstand	Eingangs-Einstellung	Ausgangs-Einstellung	Deck-Einstellung	Abgleichpunkte	Abgleichmethode	Abbildung
Wenn nicht anders angegeben, die einzelnen Schalter wie folgt einstellen I Kassetten-Mechanismus (A/W-Kopf-Einstellung)							0 dBs = -0,775 V
[1]	Entmagnetisierung und Reinigung	—	—	Spannungsversorgung OFF. Entmagnetisierung, Reinigung, Wiedergabe	A/W-Kopf, Löschkopf, Tonwelle, Andruckrolle (Deck A und B)	A/W-Kopf mit Tonkopf-Entmagnetisierer entmagnetisieren A/W-Kopf, Löschkopf, Tonwelle, Andruckrolle mit einem leicht mit Alkohol befeuchteten Wattebausch reinigen	
[2]	A/W-Kopf-Azimuth	TCC-153, SCC-1727 MTT-114 10 kHz, -10 dB	(B)	PLAY	Azimuth-Einstellschraube (Deck A und B) (FWD, RVS)	Den Ausgang maximieren und so einstellen, daß die Lissajous-Figur auf dem Oszilloskop einer um 45° geneigten Geraden angenähert wird	(a)
<b>II. Mechanismus-Abgleichung (X28-238)</b>							
<1>	Bandgeschwindigkeit (doppelte Geschwindigkeit)	TCC-110, SCC-1727 MTT-111 3 kHz	(B)	R230(B) und R229(A) mit GND verbinden. Wiedergabe *TEST 1.	Deck A: VR5 Deck B: VR6	So einstellen, daß die Frequenz in der Bandmitte 6 kHz beträgt	
<2>	Bandgeschwindigkeit (normale Geschwindigkeit)	TCC-110, SCC-1727 MTT-111 3 kHz	(B)	Wiedergabe	Deck A: VR7 Deck B: VR8	So einstellen, daß die Frequenz in der Bandmitte 3 kHz beträgt	
<b>III. Abgleich der Leiterplatte (X28-238)</b>							
<1>	Wiedergabepegel	MTT-150 400 Hz (200nWb)	(B)	PLAY	Deck A: VR1 (L), VR2 (R) Deck B: VR3 (L), VR4 (R)	So einstellen, daß der Wiedergabe-Ausgang -3,5 dB beträgt	
		MTT-256, SCC-1727 315 Hz (160nWb)				So einstellen, daß der Wiedergabe-Ausgang -6,0 dB beträgt	
		MTT-256U, TCC-160 315 Hz (250nWb)				So einstellen, daß der Wiedergabe-Ausgang -2,5 dB beträgt	
<2>	Vormagnetisierungsstrom	(A) 1 kHz, -30 dBs 10 kHz, -30 dBs	(B)	Den elektronischen Lautstärkereger so einstellen, daß der Aufnahmeüberwachungs-Ausgang -2 dBs bei 1 kHz beträgt, und danach abwechselnd signal von 1 kHz und 10 kHz aufnehmen und wiedergeben	X-45 Deck B: VR11(L) VR12(R) X-85 Deck B: VR9(L) VR10(R)	1 kHz und 10 kHz abwechselnd aufnehmen und so einstellen, daß der Wiedergabepegel in beiden Fällen gleich ist	

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WIRING DIAGRAM



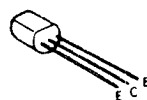
Les tensions c.c. doivent être mesurées avec un voltmètre à haute impédance, une cassette étant insérée en mode de lecture. Les valeurs peuvent différer légèrement du fait des variations inhérentes aux appareils et aux instruments de mesure individuels.

Les tensions c.c. du circuit de polarité doivent être mesurées, l'appareil étant en mode d'enregistrement.

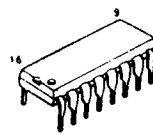
Die angegebenen Gleichspannungswerte wurden bei eingesetzter Cassette in der Wiedergabe mit einem hochohmigen Spannungsmesser gemessen. Dabei schwanken die Meßwerte aufgrund von Unterschieden zwischen einzelnen Instrumenten oder Geräten u. U. geringfügig. Die angegebenen Gleichspannungswerte der Vormagnetisierungsschaltung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

DESTINATION		UNIT NAME	
COUNTRY	ABB.	X-45	X-85
ENGLAND	T	X28-2380-03	X28-2380-01
EUROPE	E	X28-2380-03	X28-2380-01
AUSTRALIA	X	X28-2380-03	X28-2380-01
GENERAL MARKET	M	X28-2380-03	X28-2380-01

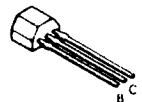
REF.	X-45	X-85	ADDRESS
IC4	NO	YES	I-6
Q13, 27	NO	YES	J-6
Q20	NO	YES	I-5
Q30	NO	YES	Q-6
Q34-36	NO	YES	F, Q-7
Q38-41	NO	YES	H, I-6
D20	NO	YES	M-6
D58	NO	YES	N-3
D60, 61	NO	YES	M, I-5
C5	560P	1000P	C-3
C6	560P	600P	C-4
C71, 72	820P	470P	M-2
C118	6000P	0.01µ	H-6
C119, 120	YES	NO	H-6
C121, 122	NO	YES	I-6
C124	NO	YES	L-7
C123-137	NO	YES	I-6
R1	100K	43K	
R2	68K	100K	J-2
R3	43K	62K	
R4	62K	47K	
R5	43K	56K	K-2
R6	220K	220K	
R7	100K	220K	
R8	130K	100K	J-2
R9	91K	150K	
R10	62K	47K	
R11	43K	56K	K-2
R12	220K	220K	
R13	75K	120K	
R14	120K	150K	J-3
R15	110K	130K	
R16	33K	60K	
R17	68K	33K	K-3
R18	220K	220K	
R19	82K	27K	
R20	62K	91K	J-3
R21	43K	47K	
R22	39K	12K	
R23	27K	56K	K-2
R24	100K	100K	
R25	82K	100K	
R26	91K	160K	J-3
R27	82K	100K	
R28	27K	12K	
R29	39K	56K	K-2
R30	100K	100K	
R31	150K	33K	
R32	130K	160K	J-3
R33	91K	110K	
R34	18K	12K	
R35	33K	56K	K-2
R36	100K	100K	
R45, 46	68	47	D-4
R49, 50	6.8K	6.2K	D-4
R52	6.2K	4.7K	M-2
R93	15K	16K	H-4
R131-134	NO	YES	I-5
R135-139	NO	YES	H-5
R141	12K	82K	
R142	5.1K	39K	E-5
R143	2.4K	22K	
R144	2.2K	27K	
R145, 146	NO	YES	F-6
R149	NO	YES	J-6
R152	NO	YES	H-5
R153, 154	15K	27K	J-6
R155, 156	3.3 1/4W	5.6 1/4W	H-6
R191, 192	NO	YES	J-5
R244, 245	NO	YES	L-7
CMS, 6	NO	YES	J-7
L3, 4	NO	YES	I-6
L9	L32-0535-05	L32-0388-05	M-6
VR9, 10	NO	YES	
VR11, 12	YES	NO	I-6
W1, 2	YES	NO	
W3	NO	YES	I-7



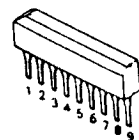
2SA999  
2SC3246  
2SC3940A



TC4052BP



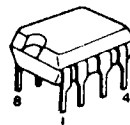
DTA124ES  
DTC124ES  
UN4112  
2SA933S  
2SC1740S



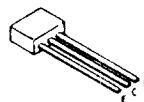
TA8125S  
TD62554S



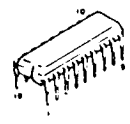
2SD2061



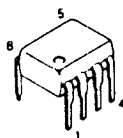
BA10393  
RC4565D  
RC4565D-D



UN4212  
2SA1309A  
2SC3311A



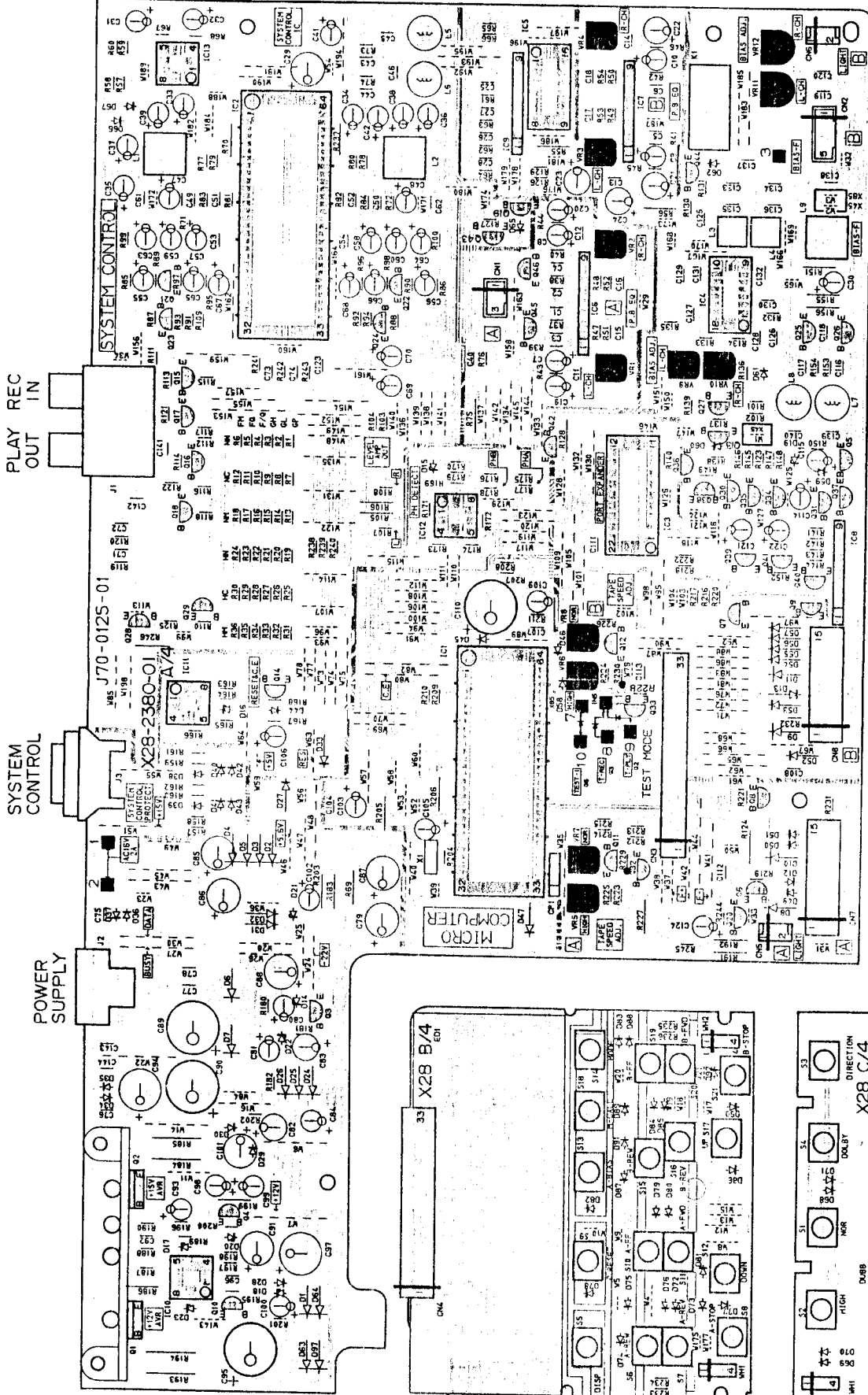
UP1297CA



NJM4565D  
NJM4565D-D

**X-45/85**  
**KENWOOD**

PC BOARD (Component side view)



For Service Manuals Contact  
**MAURITRON TECHNICAL SERVICES**  
 8 Cherry Tree Rd, Chinnor  
 Oxon OX9 4QY  
 Tel: 01844-351894 Fax: 01844-352554  
 Email: enquiries@mauritron.co.uk

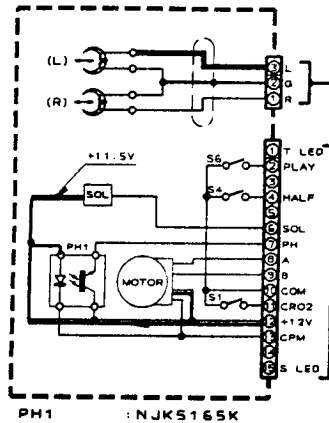
IC1 : MS0945-103SP  
 IC2 : HA12157NT  
 IC3 : MSM59371  
 IC4 : MPC1297CA

IC5 : XRU40528  
 or TC40528P  
 IC6, 7 : TA8125S  
 IC8, 9 : TD62554S

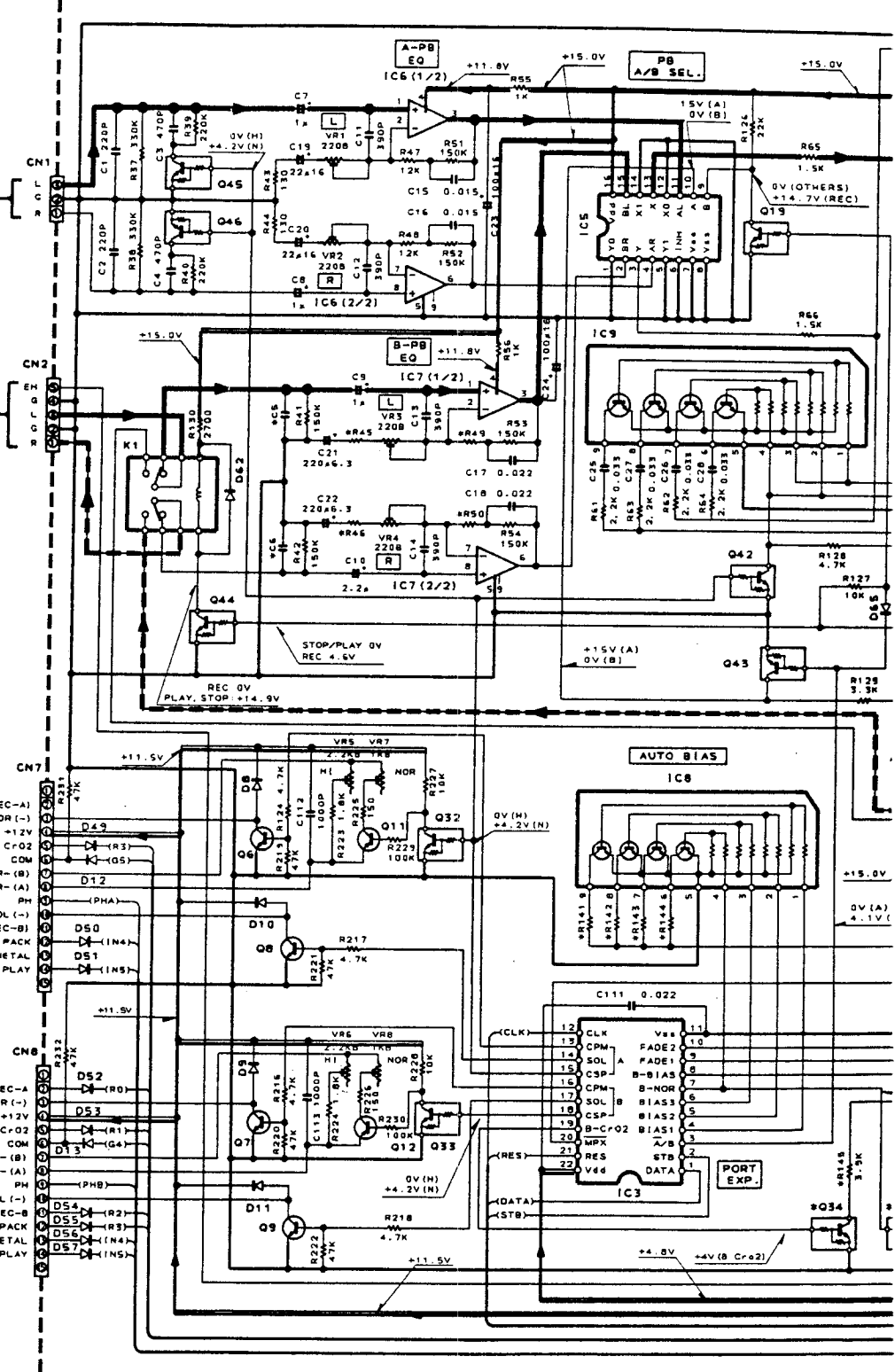
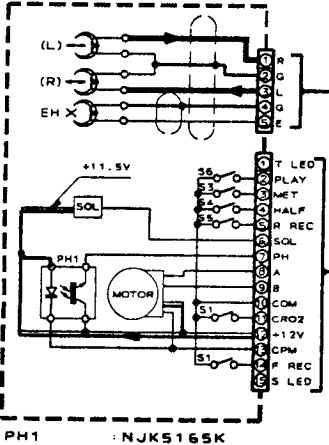
IC10  
 IC11, 1  
 IC13

(X2B-2380-XX) (A/4)

**A MECHA ASS'Y**  
 D40-0987-05



**B MECHA ASS'Y**  
 D40-0988-05 (X-85)  
 D40-0989-05 (X-45)



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 Oxon OX9 4QY  
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 Email: enquiries@mauritron.co.uk

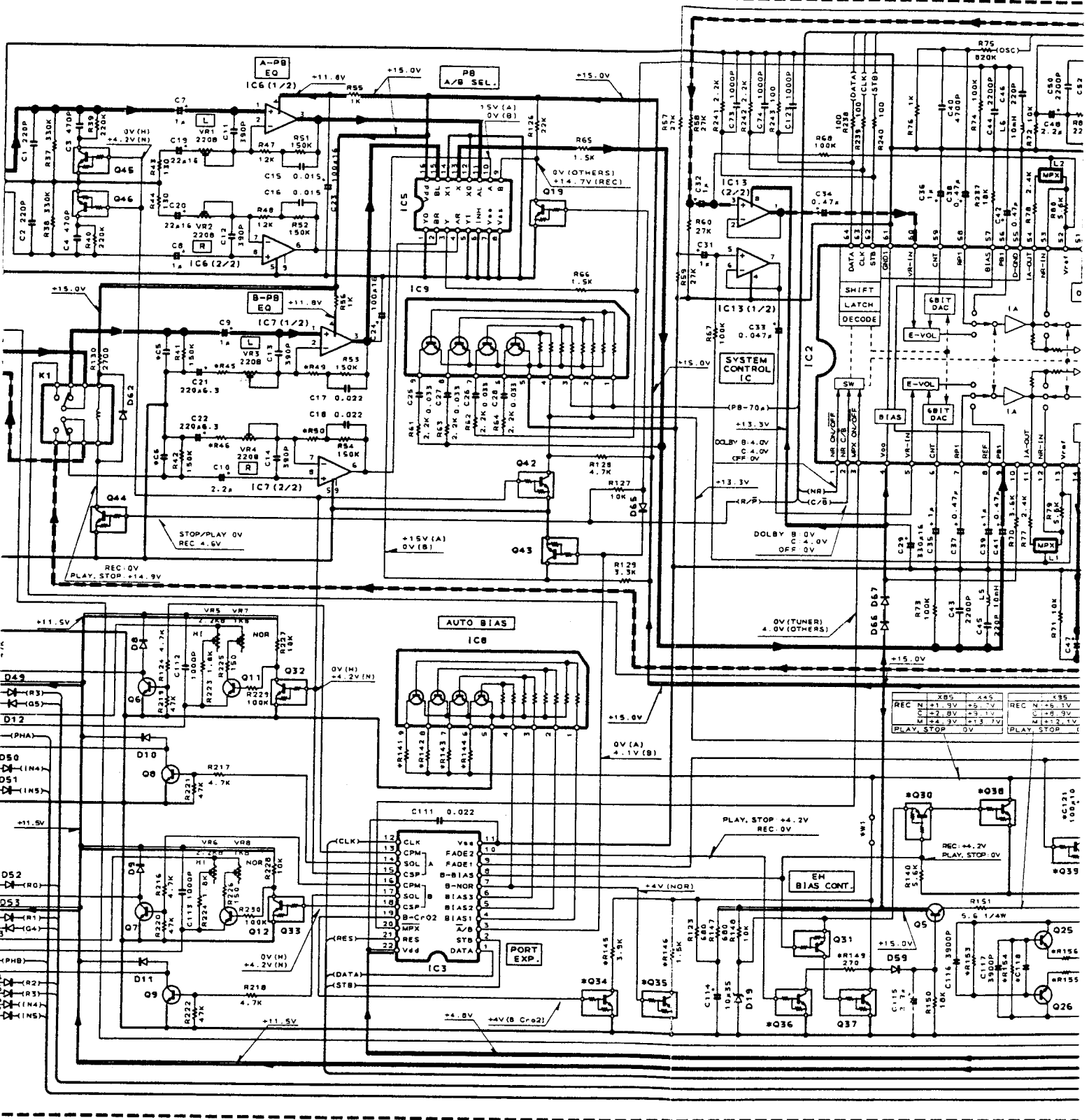
IC1 : M50945-103SP  
 IC2 : HA12157NT  
 IC3 : MS59371  
 IC4 : PC1297CA

IC5 : XRU40528  
 or TC40528P  
 IC6, 7 : TA8125S  
 IC8, 9 : TD62554S

IC10 : RC4565D or NJM4565D  
 IC11, 12 : BA10393  
 IC13 : RC4565D-D or NJM4565D-D

Q1 : 2SB941  
 Q2 : 2SD1266  
 Q3, 10 : 2SA999  
 Q4, 5 : 2SC3940A

2B-2380-XX (A/4)





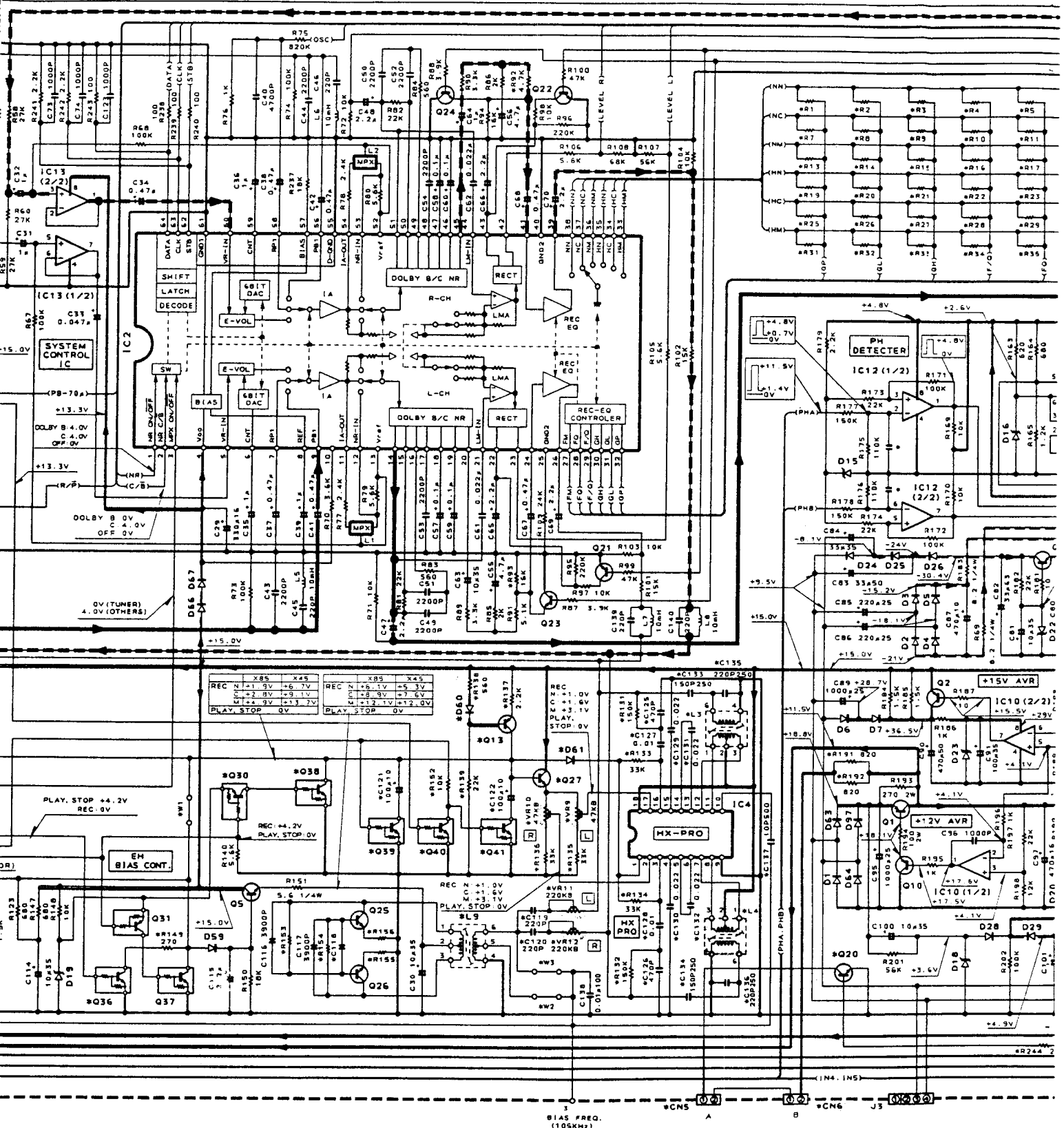
4565D or NJM4565D  
 10393  
 4565D-D or NJM4565D-D

Q1 : 25B941  
 Q2 : 25D1266  
 Q3, 10 : 25A999  
 Q4, 5 : 25C3940A

Q6-9 : 25C3246  
 Q11-13 : 25A1309A (Q, R)  
 or 25A9335 (Q, R)  
 Q14-18 : 25C311A (Q, R)  
 or 25C1740S (Q, R)  
 20-27

Q28-31 : UN4112  
 or DTA124ES  
 Q19, 32-46 : UN4212  
 or OTC124ES

D1-11, 63 : 15R139-100  
 64, 97 : or 556888  
 D12, 13 : R87210  
 D14-16 : RD2.7ES (B2)  
 or HZ52.7N (B2)



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 Email: enquiries@mauritron.co.uk

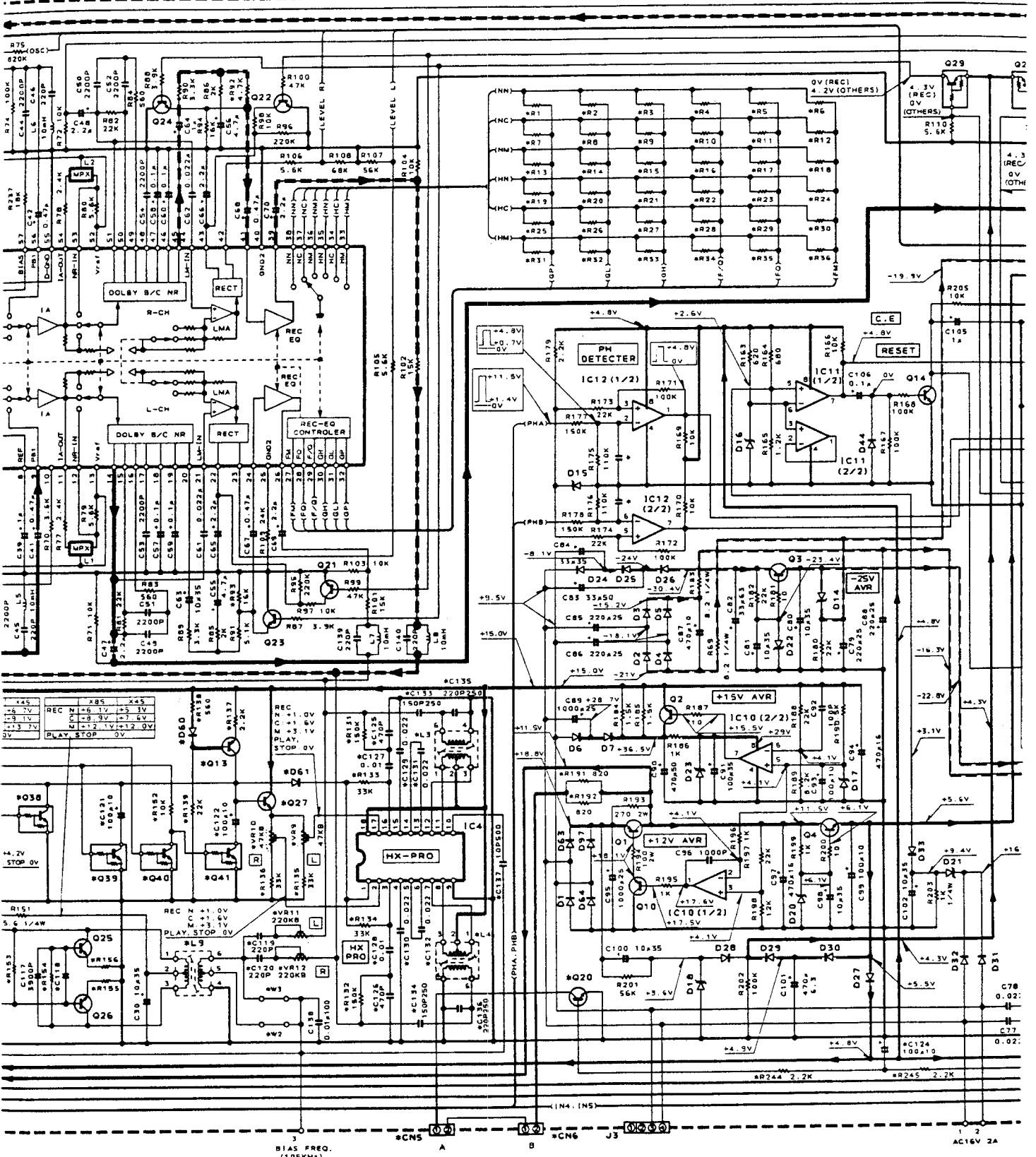
258941  
2501266  
25A999  
25C3940A

Q6-9 : 25C3246  
Q11-13 : 25A1309A (O. R)  
or 25A9335 (O. R)  
Q14-18 : 25C3311A (O. R)  
20-27 : or 25C17405 (O. R)

Q28-31 : UN4112  
or DTA124ES  
Q19, 32-46 : UN4212  
or DTC124ES

D1-11, 63 : 1SR139-100  
64, 97 : or S56888  
D12, 13 : R87210  
D14-16 : RD2.7ES (B2)  
or HZS2.7N (B2)

D17 : RD3.9ES (B2)  
or HZS3.9N (B2)  
D18, 19 : RD4.7ES (B)  
or HZS4.7N (B)



BIAS FREQ.  
(105KHz)

A

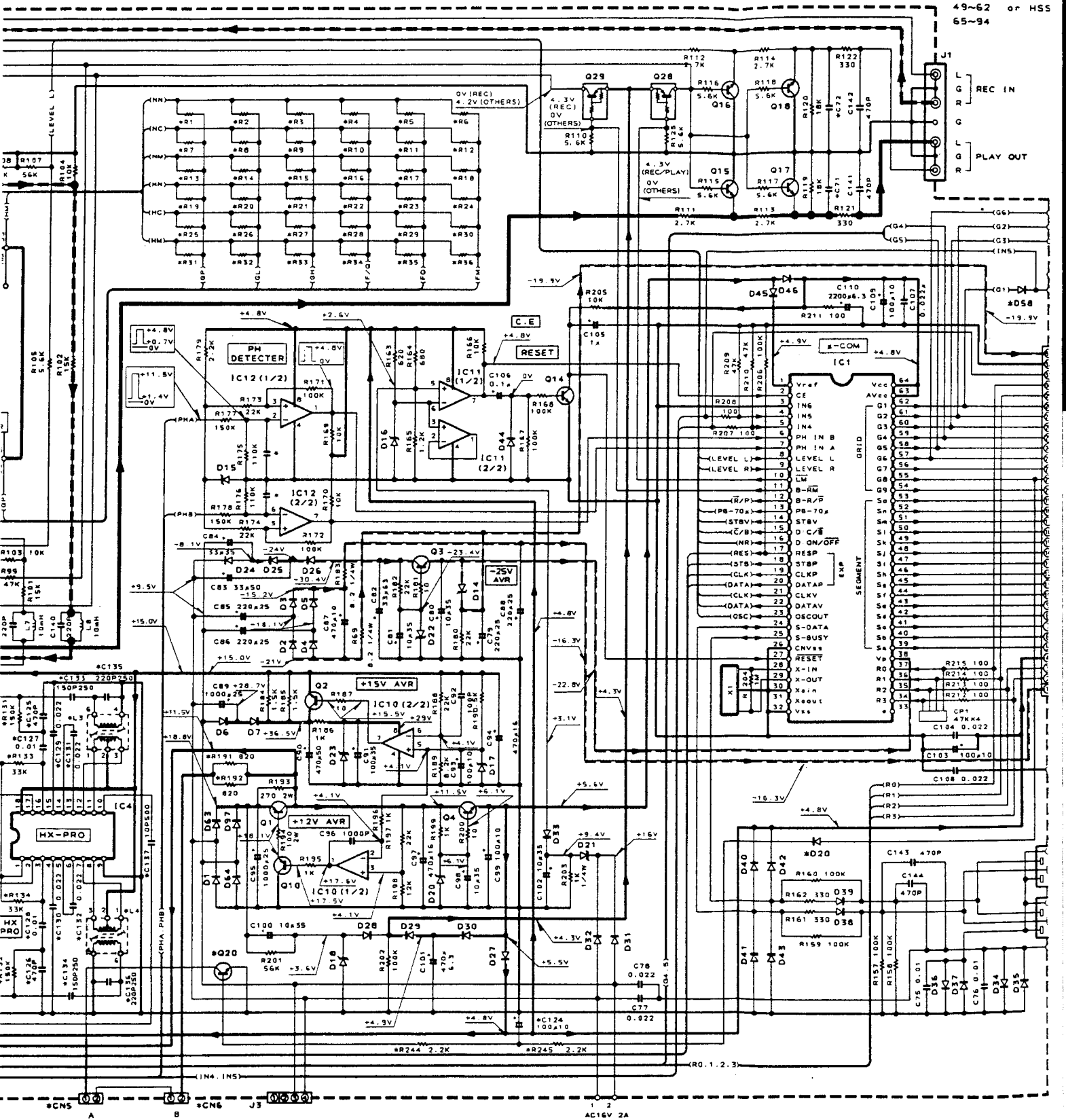
B

J3

AC16V 2A

CAUTION: For components only with m parts list. ⚠ (Indicates risk of electric shock shall be carried out the supply circuit) later.

- |                                    |                                            |                                         |                                       |                                          |
|------------------------------------|--------------------------------------------|-----------------------------------------|---------------------------------------|------------------------------------------|
| Q28-31 : UN4112<br>or DTA124ES     | D1-11, 63 : 1SR139-100<br>64, 97 or S56888 | D17 : RD3.9ES (B2)<br>or HZ53.9N (B2)   | D20 : RD6.2ES (B2)<br>or HZ56.2N (B2) | D22 : RD24ES1<br>or HZ5                  |
| Q19, 32-46 : UN4212<br>or DTC124ES | D12, 13 : RB7210                           | D18, 19 : RD4.7ES (B)<br>or HZ54.7N (B) | D21 : RD8.2ES (B2)<br>or HZ58.2N (B2) | D23 : RD30ES1<br>or HZ5                  |
|                                    | D14-16 : RD2.7ES (B2)<br>or HZ52.7N (B2)   |                                         |                                       | D24-47 : 1SS133<br>49-62 or HSS<br>65-94 |



(IN4, IN5)      A      B      J3      1 2      AC16V 2A

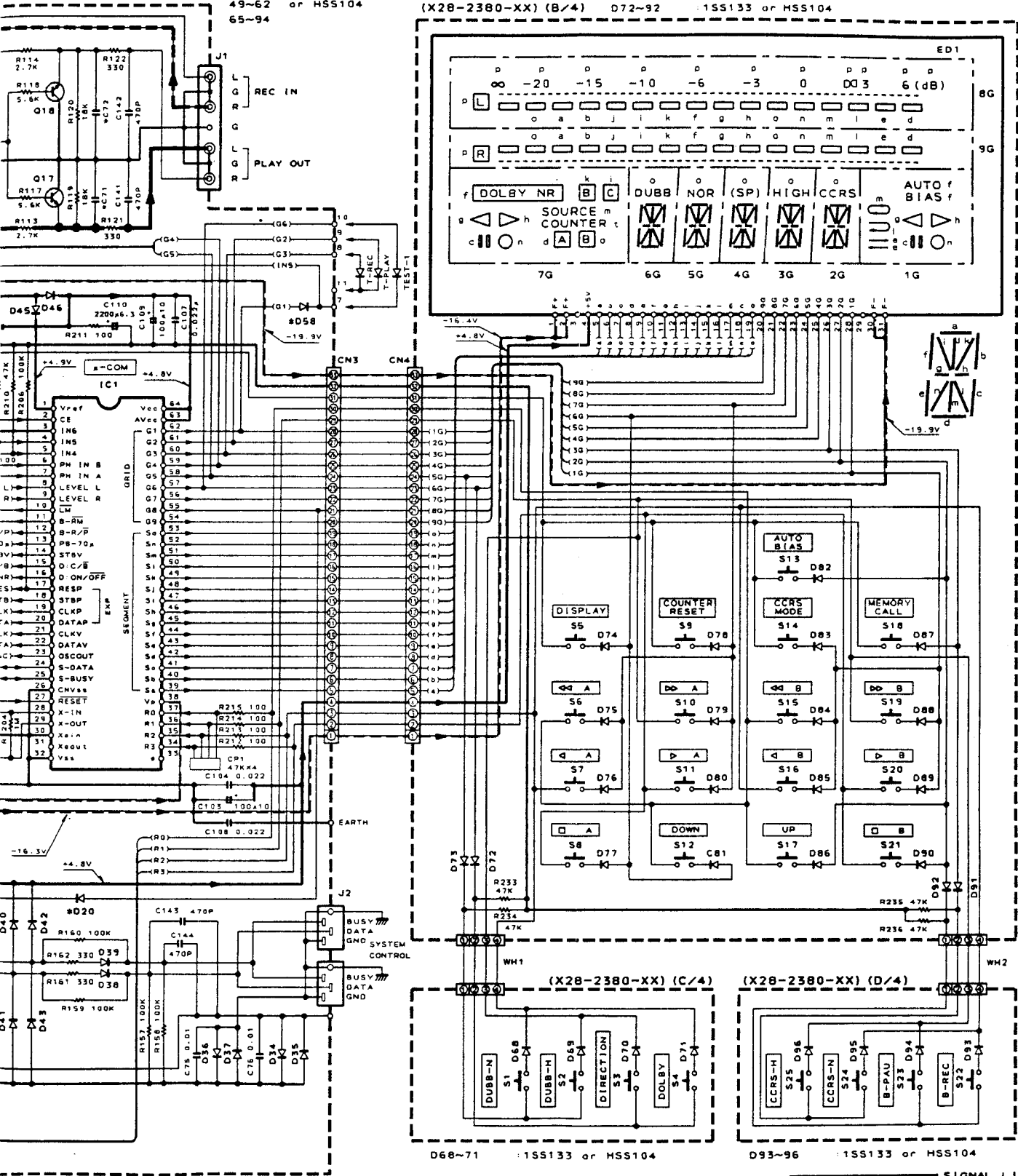
**CAUTION:** For continued safety, replace safety critical components only with manufacturer's recommended parts (refer to parts list).  $\Delta$  Indicates safety critical components. To reduce the risk of electric shock, leakage-current or resistance measurements shall be carried out (exposed parts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

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.

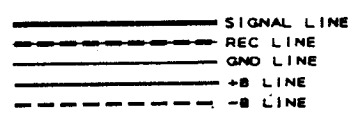
- RD6. 2ES (B2)
- or HZS6. 2N (B2)
- RD8. 2ES (B2)
- or HZS8. 2N (B2)

- D22 : RD24ES (B)
- or HZS24N (B)
- D23 : RD30ES (B)
- or HZS30N (B)
- D24-47 : 1SS133
- 49-62 or HSS104
- 65-94

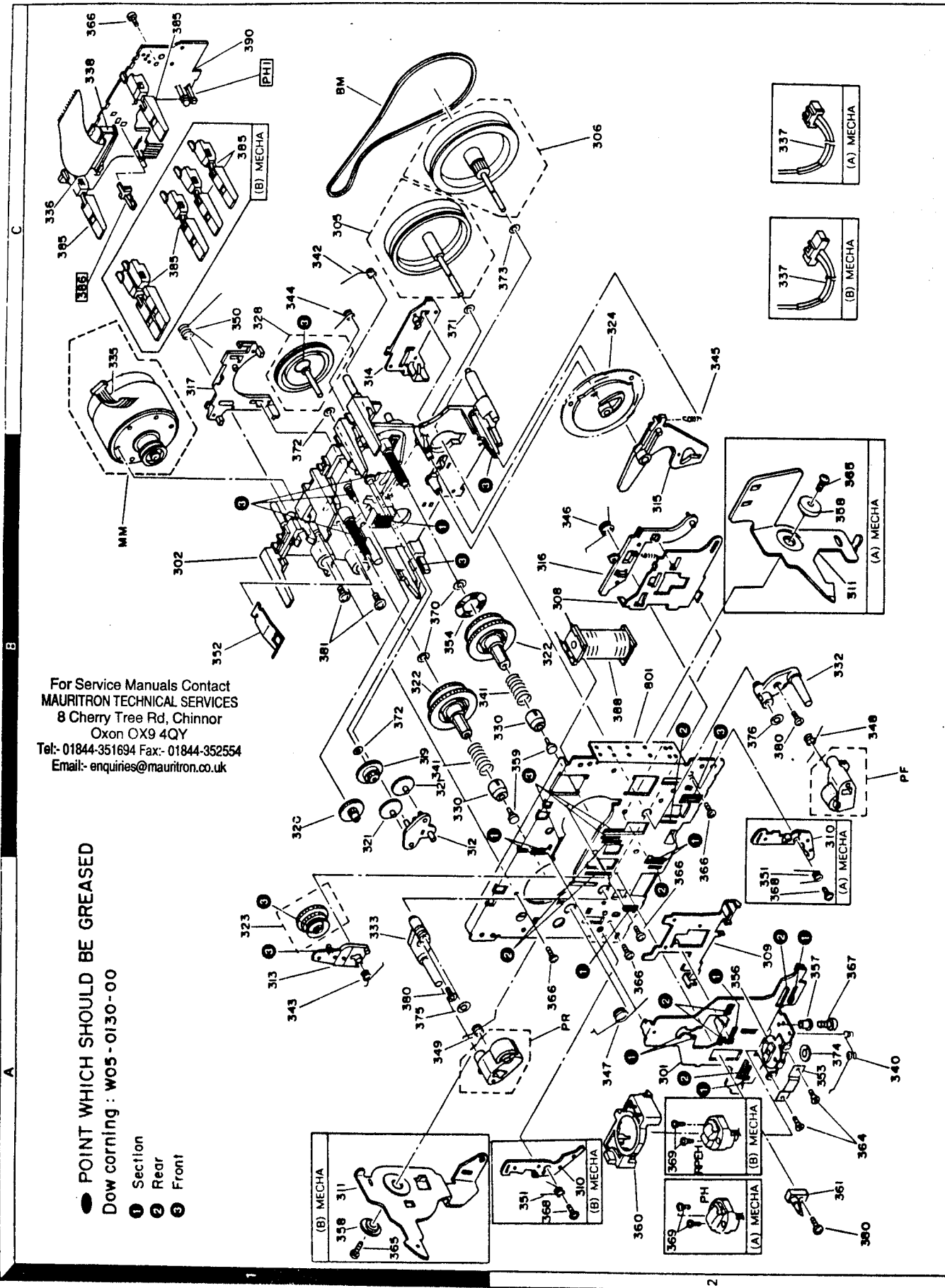
(X28-2380-XX) (B/4) D72-92 : 1SS133 or HSS104



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 Tel: 01844 351804 Fax: 01844 352554  
 E-mail: enquiries@mauritron.co.uk

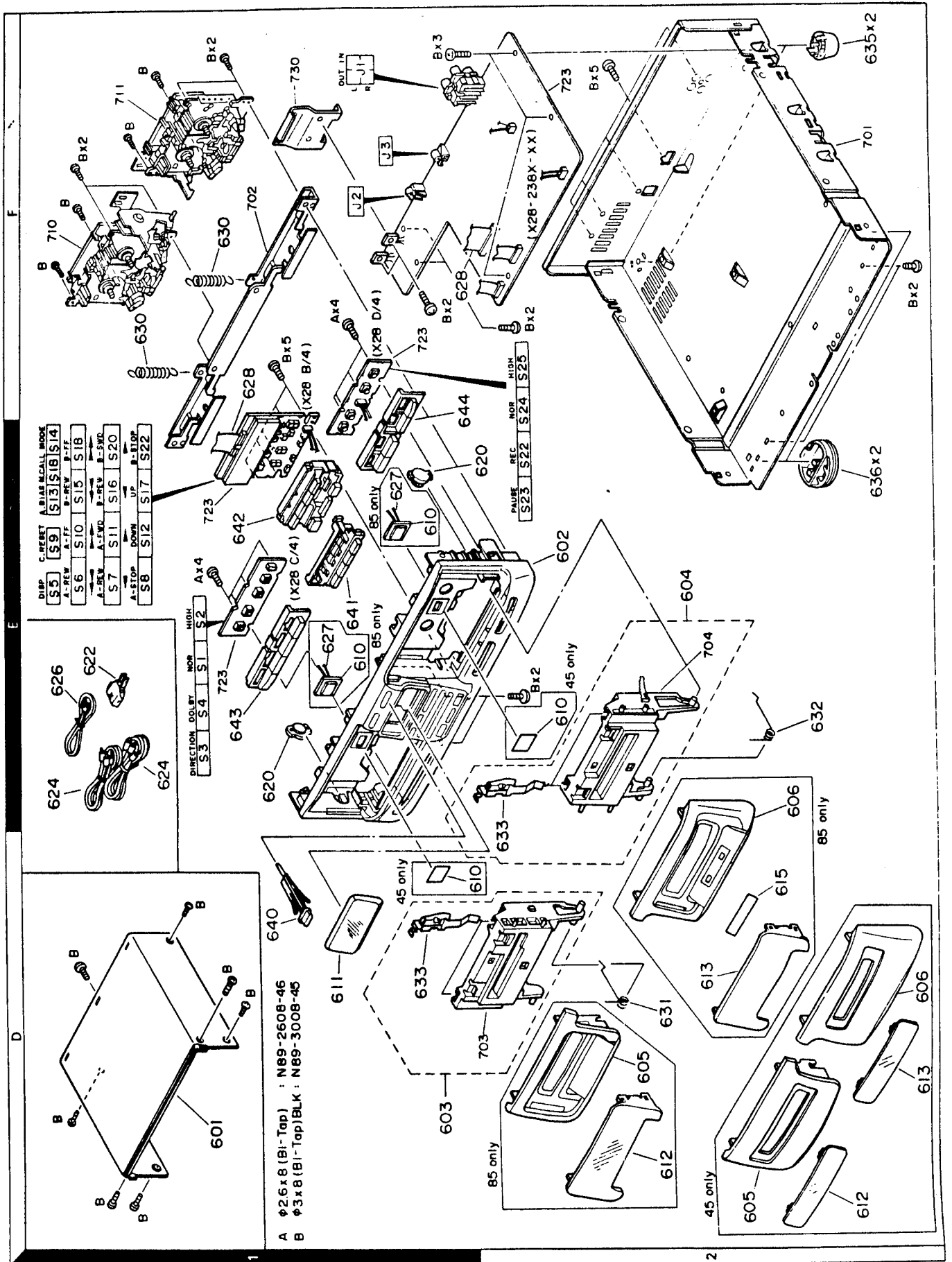


## EXPLODED VIEW (MECHANISM UNIT)



# X-45/85

## EXPLODED VIEW (UNIT)



## PARTS LIST

No.2

✧ New Parts

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

Ref. No. 参照番号	Address 位置	Parts No. 部品番号	Description 部品名/規格	Deati- nation 仕向番号
615	2D	B43-0289-04	BADGE	X
-	-	B46-0096-23	WARRANTY CARD	E
-	-	B46-0122-13	WARRANTY CARD	T
-	-	B46-0143-13	WARRANTY CARD	
620	1E	039-0176-05	DAMPER	M
622	1E	503-0115-05	AC PLUG ADAPTER	
624	1E	530-0615-05	AUDIO CORD	
626	1E	E30-2827-05	CORD WITH CONNECTOR (SYNCRØ)	
627	1E	E31-4869-05	WIRING HARNESS (LED LEAD)	
628	1E, 1F	E35-0165-05	FLAT CABLE (CN3-CN4) 33P	
630	1F	G01-3405-04	EXTENSION SPRING	A
631	2D	G01-3406-04	TORSION COIL SPRING	B
632	2E	G01-3407-04	TORSION COIL SPRING	
633	1D, 2E	G02-0944-04	FLAT SPRING	
-	-	H50-0128-04	ITEM CARTON CASE	
-	-	H10-5170-02	POLYSTYRENE FOAMED FIXTURE L	
-	-	H10-5171-02	POLYSTYRENE FOAMED FIXTURE R	
-	-	H21-0279-04	PROTECTION SHEET	M
-	-	H25-0232-04	PROTECTION BAG (235X350X0.03)	MXE
-	-	H25-0382-04	PROTECTION BAG (0232 PRINTED)	XTE
-	-	H25-0651-04	PROTECTION BAG	T
635	2F	J02-0366-15	FØØT	
636	2E	J02-1040-05	FØØT	
640	1D	K29-4217-04	KNØB EJECT	
641	1E	K29-4218-03	KNØB DISP./C.RES/A.BIAS/M.CALL	
642	1E	K29-4219-03	KNØB PLAY/STOP/REC LEVEL	
643	1E	K29-4220-03	KNØB DERECTION/DØLBY/DUBBING	
644	1E, 1F	K29-4221-03	KNØB PAUSE/CCRS	
A	1E, 1F	N89-2608-46	BINDING HEAD TAPITTE SCREW	
B	1D, 1F	N89-3008-45	BINDING HEAD TAPITTE SCREW	
<b>RECORD/PLAY BACK AMPLIFIER UNIT (X28-2380-01 : 8, 0-03 : 4)</b>				
C1	2	CG45FSL1H221J	CERAMIC	
C3	4	CK45FBIH471K	CERAMIC	J
C5	5	CK45FBIH102K	CERAMIC	K
C5	6	CK45FBIH561K	CERAMIC	K
C6	6	CK45FBIH681K	CERAMIC	K
C7	8	CE04KWIH101M	ELECTRØ	50WV
C9	10	CE04KWIH282M	ELECTRØ	2.2UF 50WV
C11	14	CK45FBIH391K	CERAMIC	390PF K
C15	16	C992FMIH153J	MYLAR	0.015UF J
C17	18	C992FMIH233J	MYLAR	0.022UF J
C19	20	CE04KVI1C220M	ELECTRØ	22UF 16WV
C21	22	CE04KVI1C221M	ELECTRØ	22UF 6.3WV
C23	24	CE04KVI1C191M	ELECTRØ	100UF 16WV
C25	26	CF92FMIH333J	CERAMIC	0.033UF J
C27	28	CK45FFI1H333Z	CERAMIC	0.033UF Z
C29		CE04KVI1C331M	ELECTRØ	330UF 16WV
C30		CE04KVI1V100M	ELECTRØ	100UF 35WV
C31	32	CE04KWI1H101M	ELECTRØ	1.0UF 50WV
C33	34	CE04KWI1HR47M	ELECTRØ	1.0UF 50WV
C35	36	CE04KWI1HR10M	ELECTRØ	1.0UF 50WV
C37	38	CE04KWI1HR47M	ELECTRØ	0.47UF 50WV

A: A DECK  
B: B DECK  
4: X-45  
6: X-85  
△ indicates safety critical components

No.1

✧ New Parts

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

Ref. No. 参照番号	Address 位置	Parts No. 部品番号	Description 部品名/規格	Deati- nation 仕向番号
<b>X-45</b>				
601	1D	A01-1905-01	METALLIC CABINET	A
602	2E	A60-0128-01	PANEL	B
603	1D	A53-1308-03	CASSETTE HOLDER ASSY	B
604	2E	A53-1310-03	CASSETTE L1D	A
605	2D	A53-1312-02	CASSETTE L1D	A
606	2D	A53-1313-02	CASSETTE L1D	B
610	1D, 2E	B07-1720-04	ESCUTCHEØN	
611	1D	B10-1868-04	FRONT GLASS	
612	2D	B10-1869-04	FRONT GLASS	
613	2D	B10-1870-04	FRONT GLASS	
-	-	B46-0096-23	WARRANTY CARD	X
-	-	B46-0122-13	WARRANTY CARD	E
-	-	B46-0143-13	WARRANTY CARD	T
620	1E	039-0176-05	DAMPER	M
622	1E	503-0115-05	AC PLUG ADAPTER	
624	1E	530-0615-05	AUDIO CORD	
626	1E	E30-2827-05	CORD WITH CONNECTOR (SYNCRØ)	
628	1E, 1F	E35-0165-05	FLAT CABLE (CN3-CN4) 33P	
630	1F	G01-3405-04	EXTENSION SPRING	A
631	2D	G01-3406-04	TORSION COIL SPRING	B
632	2E	G01-3407-04	TORSION COIL SPRING	
633	1D, 2E	G02-0944-04	FLAT SPRING	
-	-	H50-0129-04	ITEM CARTON CASE	
-	-	H10-5170-02	POLYSTYRENE FOAMED FIXTURE L	
-	-	H10-5171-02	POLYSTYRENE FOAMED FIXTURE R	
-	-	H21-0279-04	PROTECTION SHEET	M
-	-	H25-0232-04	PROTECTION BAG (235X350X0.03)	MXE
-	-	H25-0382-04	PROTECTION BAG (0232 PRINTED)	XTE
-	-	H25-0651-04	PROTECTION BAG	T
635	2F	J02-0366-15	FØØT	
636	2E	J02-1040-05	FØØT	
640	1D	K29-4217-04	KNØB EJECT	
641	1E	K29-4218-03	KNØB DISP./C.RES/A.BIAS/M.CALL	
642	1E	K29-4219-03	KNØB PLAY/STOP/REC LEVEL	
643	1E	K29-4220-03	KNØB DERECTION/DØLBY/DUBBING	
644	1E, 1F	K29-4221-03	KNØB PAUSE/CCRS	
A	1E, 1F	N89-2608-46	BINDING HEAD TAPITTE SCREW	
B	1D, 1F	N89-3008-45	BINDING HEAD TAPITTE SCREW	
<b>X-85</b>				
601	1D	A01-1905-01	METALLIC CABINET	A
602	2E	A60-0128-01	PANEL	B
603	1D	A53-1308-03	CASSETTE HOLDER ASSY	B
604	2E	A53-1310-03	CASSETTE L1D	A
605	2D	A53-1306-02	CASSETTE L1D	A
606	2E	A53-1307-02	CASSETTE L1D	B
610	1E	B30-0740-05	LED(SLF-201C)	
611	1D	B10-1868-03	FRONT GLASS	
612	2D	B10-1867-03	FRONT GLASS	
613	2D	B10-1868-04	FRONT GLASS	

A: A DECK  
B: B DECK  
4: X-45  
6: X-85  
△ indicates safety critical components

## PARTS LIST

### No. 4

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

Ref. No. 参照番号	Address 位置	Parts No. 部品番号	Description 部品名 / 規格	Desti- nation 仕	Re- marks 備考
C119, 120		CC45FSL1H221J	220PF J		4
C121, 122		CE04KV1A101M	100V K		6
C123		CK45FB1H222K	2200PF K		6
C124		CE04KV1A101M	100V K		6
C125, 126		CK45FB1H471K	470PF K		6
C127, 128		CK45FF1H103Z	0.010UF Z		6
C129-132		CK45FF1H232Z	0.022UF Z		6
C133, 134		C91-1A34-05	150PF J		6
C135, 136		C91-1A36-05	220PF J		6
C137		CC45FSL2H100D	10PF D		6
C138		C993H2A103J	0.010UF J		6
C139, 140		CK45FSL1H221J	220PF J		6
C141-144		CK45FB1H471K	470PF K		6
J1		E13-0446-05	PHONE JACK		
J2		E08-0312-05	RECTANGULAR RECEPTACLE		
J3		E08-0411-05	RECTANGULAR RECEPTACLE SYSTEM		
L1	2	L79-0720-05	LC FILTER		6
L3	4	L32-0377-05	BIAS OSCILLATING COIL		6
L5	8	L40-1035-29	SMALL FIXED INDUCTOR (10MH, J)		6
L9		L32-0368-05	BIAS OSCILLATING COIL		6
L9		L32-0536-05	BIAS OSCILLATING COIL		6
X1		L76-0244-05	RESONATOR 4.0MHz		4
B	1F, 2F	N89-3008-45	BINDING HEAD TAP TITE SCREW		
CP1		R90-0467-05	MULTI-COMP 47KX4		J 1/6W
R184, 185		RS14KB3D152J	FL-PROOF RS 1.5K		J 2W
R193		RS14KB3D271J	FL-PROOF RS 270		J 2W
R194		RS14KB3D101J	FL-PROOF RS 100		J 2W
VR1	4	R12-0605-05	TRIMMING POT. (220K)		
VR5	6	R12-1617-05	TRIMMING POT. (2.2K)		
VR7	8	R12-1616-05	TRIMMING POT. (1K)		
VR9	10	R12-3688-05	TRIMMING POT. (47K)		
VR11, 12		R12-5071-05	TRIMMING POT. (220K)		
S1	-25	S51-2089-05	MAGNETIC RELAY		
S1		S40-1064-05	PUSH SWITCH		
D1	-11	S5546B	DIODE		
D1	-11	TSR139-100	DIODE		
D12	-13	RB7310	DIODE		
D14	-16	HZ52.7N(B2)	ZENER DIODE		
D14	-16	RD2.7ES(B2)	ZENER DIODE		
D17		HZ53.9N(B2)	ZENER DIODE		
D17		RD3.9ES(B2)	ZENER DIODE		
D18	19	HZ54.7N(B)	ZENER DIODE		
D18	19	RD4.7ES(B)	ZENER DIODE		
D20		HZ56.2N(B2)	ZENER DIODE		
D20		RD6.2ES(B2)	ZENER DIODE		
D21		HZ56.2N(B2)	ZENER DIODE		
D21		RD6.2ES(B2)	ZENER DIODE		
D22		HZ524N(B)	ZENER DIODE		
D22		RD24ES(B)	ZENER DIODE		
D23		HZ530N(B)	ZENER DIODE		
D23		RD30ES(B)	ZENER DIODE		
D24	-46	H55104	ZENER DIODE		4

L:Scandinavia  
 T:PX(F or East, Hawaii)  
 Y:AMFES(Europe)  
 R:USA  
 T:England  
 X:Australia  
 P:Canada  
 E:Europe  
 M:Other Areas  
 A: A DECK  
 B: B DECK  
 4: X-45  
 8: X-85  
 Δ indicates safety critical components

### No. 3

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

Ref. No. 参照番号	Address 位置	Parts No. 部品番号	Description 部品名 / 規格	Desti- nation 仕	Re- marks 備考
C39		CE04KV1H010M	1.0UF 50WV		
C40		CK45FF1H472Z	4700PF Z		
C41	42	CE04KV1H472M	0.47UF 50WV		
C43	44	CK45FB1H222K	2200PF K		
C45	46	CC45FSL1H221J	220PF J		
C47	48	CE04KV1H2R2M	2.2UF 50WV		
C49	54	C92FM1H222J	2200PF J		
C55	56	CE04KV1A7M	4.7UF 35WV		
C57	60	CE04KV1HOR1M	0.1UF 50WV		
C61	62	CK45FF1H223Z	0.022UF Z		
C63	64	CE04KV1V100M	10UF 35WV		
C65	66	CE04KV1H2R2M	2.2UF 50WV		
C67	68	CE04KV1H472M	0.47UF 50WV		
C69	70	CE04KV1H2R2M	2.2UF 50WV		
C71	72	CK45FB1H471K	470PF K		
C73	74	CK45FB1H821K	820PF K		
C75	76	CK45FF1H103Z	0.010UF Z		
C77	78	CK45FF1H223Z	0.022UF Z		
C79		CE04KV1E221M	220UF 25WV		
C80	81	CE04KV1V100M	10UF 35WV		
C82		CE04KV1J330M	33UF 43WV		
C83		CE04KV1H330M	33UF 50WV		
C84		CE04KV1V330M	33UF 35WV		
C85	86	CE04KV1V101M	100UF 35WV		
C87		CE04KV1A471M	470UF 10WV		
C88		CE04KV1E221M	220UF 25WV		
C89		CE04KV1E102M	1000UF 25WV		
C90		CE04KV1H471M	470UF 50WV		
C91		CE04KV1V101M	100UF 35WV		
C92		CC45FSL1H101J	100PF J		
C93		CE04KV1A101M	100UF 10WV		
C94		CE04KV1C471M	470UF 16WV		
C95		CE04KV1E102M	1000UF 25WV		
C96		CK45FB1H102K	1000PF K		
C97		CE04KV1C471M	470UF 16WV		
C98		CE04KV1V100M	100UF 35WV		
C99		CE04KV1A101M	100UF 10WV		
C100		CE04KV1V100M	100UF 35WV		
C101		CE04KV0J471M	470UF 6.3WV		
C102		CE04KV1V100M	10UF 35WV		
C103		CE04KV1A101M	100UF 10WV		
C104		CK45FF1H223Z	0.022UF Z		
C105		CE04KV1H010M	1.0UF 50WV		
C106		CE04KV1HOR1M	0.1UF 50WV		
C107, 108		CK45FF1H223Z	0.022UF Z		
C109		CE04KV1A101M	100UF 10WV		
C110		CE04KV0J221M	2200UF 6.3WV		
C111		CK45FF1H223Z	0.022UF Z		
C112, 113		CK45FB1H102K	1000PF K		
C114		CE04KV1V100M	10UF 35WV		
C115		CE04KV1H2R2M	2.2UF 50WV		
C116, 117		CK45FB1H392K	3900PF K		
C118		CK45FB1H662K	6600PF K		
C118		CK45FF1H103Z	0.010UF Z		6

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# PARTS LIST

## No.6

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Ref. No. 参照番号	Address 位置	Parts No. 部品番号	Description 部品名 / 規格	Desti- nation 仕向
Q32 -46		DTC124ES	DIGITAL TRANSISTOR	B
Q32 -46		UN4212	DIGITAL TRANSISTOR	B
Q32 -33		DTC124ES	DIGITAL TRANSISTOR	4
Q32 -33		UN4212	DIGITAL TRANSISTOR	4
Q37		DTC124ES	DIGITAL TRANSISTOR	4
Q37		UN4212	DIGITAL TRANSISTOR	4
Q42 -46		DTC124ES	DIGITAL TRANSISTOR	4
Q42 -46		UN4212	DIGITAL TRANSISTOR	4
<b>MECHANISM ASSEMBLY (D40-0987-05 : A, D40-0988-05 : B)</b>				
301	2A, 2B	A10-2922-08	HEAD CHASSIS CALKED ASSY	A
302	1B, 2B	A11-0756-08	HEAD CHASSIS ASSY	B
303	1C	D01-0138-08	FLYWHEEL ASSY LEFT	A
306	1C, 2C	D01-0139-08	FLYWHEEL ASSY RIGHT	B
308	2B	D10-3210-08	SHIFT LEVER	B
309	2A	D10-3211-08	PLAY SHIFT LEVER	A
310	2A	D10-3212-08	INTER LOCK LEVER	A
310	2A	D10-3220-08	INTER LOCK LEVER	A
311	2B	D10-3213-08	EJECT LEVER	B
311	1A	D10-3221-08	EJECT LEVER	B
312	1A, 1B	D10-3214-08	FR ARM	A
313	1A	D10-3215-08	PLAY ARM	A
314	1C	D10-3216-08	SHIFT SELECT LEVER	A
315	2B	D10-3217-08	TRIGGER ARM	B
316	2B	D10-3218-08	SELECT ARM	B
317	1B, 1C	D10-3219-08	BRAKE ARM	A
319	1B	D13-0965-08	CLUTCH GEAR	A
320	1C	D13-0966-08	REV GEAR	A
321	1B	D13-0967-08	FR GEAR	A
322	1B, 2B	D13-0968-08	REEL GEAR	A
323	1A	D13-0969-08	PLAY GEAR ASSY	B
324	2B, 2C	D13-0970-08	PLAY CAM GEAR	B
328	1C	D13-0971-08	CLUTCH PULLEY ASSY	B
330	2B	D19-0270-08	REEL CAP	B
332	2B	D23-0269-08	HOUSING ASSY RIGHT	B
333	1A	D23-0270-08	HOUSING ASSY LEFT	B
335	1C	E35-0264-08	MOTOR WIRE	A
336	1C	E35-0265-08	FLAT WIRE 1SP	B
337	1C	E35-0267-08	FLAT WIRE 1SP	A
337	2C	E35-0266-08	HEAD WIRE 3P	A
337	2C	E35-0268-08	HEAD WIRE 5P	B
340	2A	G01-3428-08	RETURN GEAR SPRING	B
341	1B, 2B	G01-3429-08	REEL SPRING	B
342	1A	G01-3431-08	CLUTCH ARM SPRING	B
343	1A	G01-3432-08	PLAY ARM SPRING	B
344	1C	G01-3433-08	SHIFT SELECT LEVER SPRING	B
345	2B, 2C	G01-3434-08	TRIGGER ARM SPRING	B
346	2B	G01-3435-08	SHIFT LEVER SPRING	B
347	2A	G01-3436-08	HEAD CHASSIS SPRING	B
348	2B	G01-3437-08	PINCH ROLLER ARM SPRING RIGHT	B
349	1A, 2A	G01-3438-08	PINCH ROLLER ARM SPRING LEFT	B
350	1C	G01-3439-08	BRAKE ARM SPRING	B
351	2A	G01-3440-08	INTER LOCK LEVER SPRING RIGHT	B
351	2A	G01-3441-08	INTER LOCK LEVER SPRING LEFT	B
352	1B	G02-0913-08	PACK LOCK FLAT SPRING	B

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## No.5

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Ref. No. 参照番号	Address 位置	Parts No. 部品番号	Description 部品名 / 規格	Desti- nation 仕向
D24 -46		1SS133	DIODE	4
D24 -47		HSS104	DIODE	8
D24 -47		1SS133	DIODE	8
D49 -57		HSS104	DIODE	4
D49 -57		1SS133	DIODE	4
D49 -62		HSS104	DIODE	6
D49 -62		1SS133	DIODE	6
D59		HSS104	DIODE	4
D59		1SS133	DIODE	4
D62		HSS104	DIODE	4
D62		1SS133	DIODE	4
D63 -64		5S546B	DIODE	4
D63 -64		5S8139-100	DIODE	4
D65 -96		HSS104	DIODE	4
D65 -96		1SS133	DIODE	4
D97		5S546B	DIODE	4
D97		1S8139-100	DIODE	4
E01		FLP946R	FLUORESCENT INDICATOR TUBE	4
IC1		MS094S-103SP	IC	
IC2		HA12157NT	IC	
IC3		MSM9371	IC(EXPANSION IC)	
IC4		UPC1297CA	IC(DBL HX PRG SYSTEM)	
IC5		TC4052BP	IC(4CH HPX/DE-RPX)	
IC5		XRU4052B	IC	
IC6 ,7		TAB1255	IC(2CH PRE AMP)	
IC8 ,9		T062554S	IC(4CH TRANSISTOR ARRAY)	
IC10		NJM4565D	IC(OP AMP X2)	
IC10		RC4565D	IC(OP AMP X2)	
IC11,12		BA10393	IC(DUAL COMPALATOR)	
IC13		NJM4565D-D	IC(OP AMP X2)	
IC13		RC4565D-D	IC(OP AMP X2)	
Q1		2B81370	TRANSISTOR	8
Q2		2D2061	TRANSISTOR	8
Q3		2SA999(E,F)	TRANSISTOR	8
Q4 ,5		2SC3940A	TRANSISTOR	4
Q6 -9		2SC3246	TRANSISTOR	4
Q10		2SA999(E,F)	TRANSISTOR	8
Q11 -13		2SA1309A(Q,R)	TRANSISTOR	8
Q11 -13		2SA933S(Q,R)	TRANSISTOR	8
Q11 ,12		2SA1309A(Q,R)	TRANSISTOR	4
Q11 ,12		2SA933S(Q,R)	TRANSISTOR	4
Q14 -18		2SC1740S(Q,R)	TRANSISTOR	8
Q14 -18		2SC3311A(Q,R)	TRANSISTOR	8
Q19		DTC124ES	DIGITAL TRANSISTOR	4
Q19		UN4212	DIGITAL TRANSISTOR	4
Q20 -27		2SC1740S(Q,R)	TRANSISTOR	8
Q20 -27		2SC3311A(Q,R)	TRANSISTOR	8
Q21 -26		2SC1740S(Q,R)	TRANSISTOR	4
Q21 -26		2SC3311A(Q,R)	TRANSISTOR	4
Q28 -31		DTA124ES	DIGITAL TRANSISTOR	8
Q28 -31		UN4112	DIGITAL TRANSISTOR	8
Q28 ,29		DTA124ES	DIGITAL TRANSISTOR	4
Q28 ,29		UN4112	DIGITAL TRANSISTOR	4
Q31		DTA124ES	DIGITAL TRANSISTOR	4
Q31		UN4112	DIGITAL TRANSISTOR	4

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For Service Manuals Contact  
MAURITRON TECHNICAL SERVICES  
8 Cherry Tree Rd, Chinnor  
Oxon OX9 4QY  
Tel: 01844-351694 Fax: 01844-352554  
Email: enquiries@mauritron.co.uk

## PARTS LIST

No.7

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Ref. No. 参照番号	Address 位置	Parts No. 部品番号	Description 部品名 / 規格	Disti- nation 仕
353	2A	G02-0974-08	AZINUTH SPRING	
354	1B, 2B	G16-0780-08	REFLECT SEAL	
355	2A	J21-5789-08	HEAD PLATE ASSY	
356	2A	J31-0850-08	RETURN GEAR COLLAR	
357	1A, 2B	J31-0851-08	EJECT LEVER COLLAR	
359	2B	J42-0184-08	REEL CAP BUSHING	
360	1A	J90-0679-08	TAPE GUIDE	
361	1A	J90-0680-08	TAPE GUIDE	
364	2A	N09-2883-08	AZINUTH SCREW M2.6X5	
365	1A, 2B	N09-2870-08	SCREW	
366	2B, 1C	N09-2871-08	SCREW M2X6	
367	2A	N09-2872-08	SCREW M1.7X8	
368	2A	N09-2873-08	SCREW Ø2X6	
369	2A	N09-2876-08	HEAD SCREW	
370	1B	N19-1224-08	FLAT WASHER Ø4.1X6.5X0.25	
371	1C, 2C	N19-1225-08	FLAT WASHER Ø2.1X4.0X0.25	
372	1B	N19-1285-08	FLAT WASHER Ø1.6X3.0X0.13	
373	2C	N19-1286-08	FLAT WASHER Ø2.3X4.0X0.25	
374	2A	N19-1287-08	FLAT WASHER Ø3.5X6.5X0.25	
375	1A	N19-1288-08	FLAT WASHER Ø1.6X3.5X0.5	
376	2B	N19-1289-08	FLAT WASHER Ø1.8X6.0X0.5	
380	2A, 2B	N09-2877-08	TAP TITE SCREW M2X6	
381	1B	N35-2604-46	BINDING HEAD	
395	1C	S74-0006-08	LEAF SWITCH	
396	1C	S74-0007-08	LEAF SWITCH	
398	2B	T94-0226-08	SOLENOID ASSY	
399	1C	402-1130-08	ELECTRIC UNIT	
BM	1C	D16-0326-08	BELT	
PF	2B	D14-0361-08	PINCH ROLLER ASSY	
PR	2A	D14-0340-08	PINCH ROLLER ASSY	
MM	1B, 1C	T42-0599-08	DC MOTOR ASSY	A
PH	2A	T31-0066-08	PLAYBACK HEAD	B
RPEH	2A	T39-0015-08	REC/PLAYBACK/ERASE HEAD	4 B
RPEH	2A	T39-0020-08	REC/PLAYBACK/ERASE HEAD	6 B
PHI	1C	NJL5165K	PHOTO REFLECTOR	

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## SPECIFICATIONS

### X - 45

Type..... 4-track, 2-channel stereo.

Recording system ** AC bias system (Bias frequency: 105kHz)

Tape speed..... 4.76cm/sec. (1 - 7/8 ips)

#### Heads

Playback/Record head..... 1 (B deck)

Playback head..... 1 (A deck)

Erasing head..... 1 (B deck)

Motors..... 1 (each deck)

Fast winding time..... Approx. 110 seconds with C - 60 tape

#### Frequency response (B deck)

Normal tape..... 30Hz to 18,000Hz  $\pm$  3dB

CrO₂ tape..... 30Hz to 19,000Hz  $\pm$  3dB

Metal tape..... 30Hz to 20,000Hz  $\pm$  3dB

#### Signal to noise ratio

Dolby C NR ON..... 75dB (Metal tape)

Dolby B NR ON..... 67dB (Metal tape)

Dolby NR OFF..... 58dB (Metal tape)

Harmonic distortion..... Less than 0.8%

(at 1kHz, 0dB 3rd H.D. Metal/Normal tape)

Wow and flutter..... 0.08% (W.R.M.S.),

$\pm$  0.16% (DIN)

#### General

Power consumption..... AC 16V, 2.0A

Dimensions..... W: 360 mm

H: 120 mm

D: 357 mm

Weight (net)..... 3.6 kg

### X - 85

Type..... 4-track, 2-channel stereo.

Recording system *** AC bias system (Bias frequency: 105kHz)

Tape speed..... 4.76cm/sec. (1 - 7/8 ips)

#### Heads

Playback/Record head..... 1 (B deck)

Playback head..... 1 (A deck)

Erasing head..... 1 (B deck)

Motors..... 1 (each deck)

Fast winding time..... Approx. 110 seconds with C - 60 tape

#### Frequency response (B deck)

Normal tape..... 30Hz to 18,000Hz  $\pm$  3dB

CrO₂ tape..... 30Hz to 19,000Hz  $\pm$  3dB

Metal tape..... 30Hz to 20,000Hz  $\pm$  3dB

#### Signal to noise ratio

Dolby C NR ON..... 75dB (Metal tape)

Dolby B NR ON..... 67dB (Metal tape)

Dolby NR OFF..... 58dB (Metal tape)

Harmonic distortion..... Less than 0.7%

(at 1kHz, 0dB 3rd H.D. Metal/Normal tape)

Wow and flutter..... 0.08% (W.R.M.S.),

$\pm$  0.16% (DIN)

#### General

Power consumption..... AC 16V, 2.0A

Dimensions..... W: 360 mm

H: 120 mm

D: 357 mm

Weight (net)..... 3.7 kg

#### Accessories

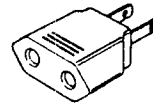
System control cord ..... 1  
(E30-2627-05)



Audio cord ..... 3  
(E30-0615-05)



AC plug adaptor ..... 1  
(except for some areas)  
(E03-0115-05)



For the unit with a European AC plug in areas other than Europe.

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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 U.S.A. (K) 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

Shinjogu, Shibuya Building, 17-5, 2-chome Shibuya, Shibuya-ku, Tokyo 150, Japan

KENWOOD USA CORPORATION  
2201 East Dominguez Street, Long Beach, CA 90810,  
550 Clark Drive, Mount Olive, NJ 07828, U.S.A.

KENWOOD ELECTRONICS CANADA INC  
P.O. BOX 1075, 959 Gana Court, Mississauga, Ontario, Canada L4T 4C2

TRIO-KENWOOD UK LIMITED  
KENWOOD House, Dwight Road, Watford, Herts., WD1 8EB United Kingdom

KENWOOD ELECTRONICS BENELUX N.V.  
Mechelsesteenweg 418 B-1930 Zaventem, Belgium

KENWOOD ELECTRONICS DEUTSCHLAND GMBH  
Rembruncker-Str. 15, 6056 Heusenstamm, West Germany

TRIO-KENWOOD FRANCE S.A.  
13 Boulevard Ney, 75018 Paris, France

KENWOOD LINEAR S.p.A.

20125, MILANO-VIA ARBE, 50, ITALY

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