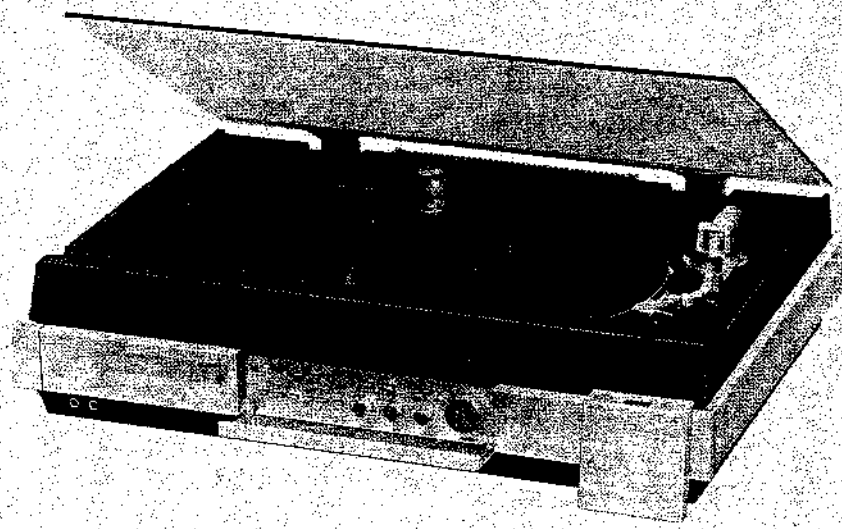
HMK-9000

AEP Model
E Model
UK Model

673



STEREO MUSIC SYSTEM

SPECIFICATIONS

TUNER SECTION

FM tuner section

Tuning range	87.5–108 MHz
Antenna terminals	300-ohm balanced
	75-ohm unbalanced (UK model)
Intermediate frequency	
	10.7 MHz
Usable sensitivity	1.8 μV, S/N = 30 dB
Sensitivity at 50 dB quieting	
	3.5 μV, 16.1 dBf (mono)
	10 μV, 25 dBf (stereo)
Signal-to-noise ratio	75 dB (mono)
Harmonic distortion	at 400 Hz
	0.1% (mono)
	0.5% (stereo)
Separation	Better than 40 dB
Frequency response	30 Hz–15 kHz ±3 dB
Muting threshold	Approx. 7 μV

MW/LW tuner section

	MW	LW (AEP, UK model)
Tuning range	522 kHz–1,602 kHz	150 kHz–350 kHz
Antenna	Built-in ferrite bar antenna, External antenna terminal	
Intermediate frequency	450 kHz	
Usable sensitivity	50 dB/m, built-in antenna (1,000 kHz) 150 μV, external antenna (1,000 kHz)	55 dB/m, built-in antenna (250 kHz) 150 μV, external antenna (250 kHz)
Signal-to-noise ratio	55 dB (50 mV/m)	
Harmonic distortion	0.5% (50 mV/m, 400 Hz)	
Selectivity	45 dB (9 kHz)	

SAFETY-RELATED COMPONENT WARNING !!

COMPONENTS IDENTIFIED BY SHADING AND MARK ⚠ ON THE SCHEMATIC DIAGRAMS, EXPLODED VIEWS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

– Continued on page 2 –

SONY®

SERVICE MANUAL

CASSETTE RECORDER SECTION

Fast-forward and rewind time
Approx. 70 sec. (with C-60)

Recording system: 4-track 2-channel stereo

Bias frequency: 105 kHz

Signal-to-noise ratio:
DOLBY NR OFF
•With TYPE III cassette
(Sony FeCr cassette)
58 dB (NAB)
56 dB (DIN, 1975 rev.)
•With TYPE II cassette
(Sony CD-α cassette)
56 dB (NAB)
DOLBY NR ON
Improved by 5 dB at 1 kHz,
10 dB above 5 kHz

Total harmonic distortion
1.5% (with Sony FeCr cassette)

Frequency response:
DOLBY NR OFF
•With TYPE IV cassette
(Sony METALLIC cassette)
20–19,000 Hz
30–17,000 Hz (±3 dB)
30–13,000 Hz (±3 dB, 0 VU recording)
•With TYPE III cassette
(Sony FeCr cassette)
30–17,000 Hz (±3 dB)
•With TYPE II cassette
(Sony CD-α cassette)
30–16,000 Hz (±3 dB)
•With TYPE I cassette
(Sony BHF cassette)
20–15,000 Hz

Wow and flutter: 0.04% WRMS (NAB)
±0.14% (DIN)

TURNTABLE SYSTEM SECTION

Turntable

Platter: 31.8 cm (12½ in.), aluminum-alloy diecast
Motor: Linear BSL (brushless and slotless)
Drive system: Direct drive
Servo system: Xtal-lock, Magnedisc servo control
Speeds: 33⅓ rpm, 45 rpm
Wow and flutter: 0.03% (WRMS)
±0.045% (DIN)
Signal-to-noise ratio: 70 dB (DIN-B)
Automatic system: Lead-in, return, reject, repeat, record size and speed selection

Tonearm

Type: Electronically controlled, universal
Pivot-to-stylus length
216.5 mm (8½ in.)
Overhang: 16.5 mm (21/32 in.)
Tracking force adjustment range
0–3 g
Headshell weight: 10.5 g
Cartridge weight range (with headshell)
14.5–20.5 g

Cartridge VL-34G

Type: Moving-magnet type
Frequency response: 10 Hz–30 kHz
Channel separation: Better than 25 dB at 1 kHz
Output voltage: 3 mV at 1 kHz, 5 cm/sec, 45°
Tracking force: 1.5–2.5 g (2 g recommended)
Stylus: Sony ND-134G (Conical 0.6 mil diamond)
Weight: 5.5 g

AMPLIFIER SECTION

Continuous RMS power output (less than 0.2% THD, both channels driven simultaneously)
at 20 Hz–20 kHz
40 + 40 watts (8 ohms)
50 + 50 watts (4 ohms)

Music power: 120 watts
(8 ohms, THD 0.2%)

Power bandwidth (IHF) 20 Hz–20 kHz

Inputs

	Sensitivity	Impedance	S/N
PHONO (phono jacks)	3.5 mV	47 kilohms	65 dB
AUX (phono jacks)	250 mV	47 kilohms	70 dB
MIC (phone jacks)	1 mV	for low-impedance microphone	60 dB

Outputs

REC OUT (phono jacks)	output voltage 250 mV	impedance 10 kilohms
HEADPHONES	Accepts headphones of 8 ohms or more	
SPEAKER	Accepts speakers of 4–8 ohms	

Frequency response: PHONO: RIAA curve ±2 dB
AUX: 20 Hz–50 kHz ±2 dB

Tone controls: BASS: ±10 dB at 100 Hz
TREBLE: ±10 dB at 10 kHz

Loudness control (att. 30 dB)
+ 7 dB at 100 Hz
+ 2 dB at 10 kHz

REMOTE CONTROL SECTION

Remote control system
Infrared control

Control range: Up to 7 m (23 feet)

Dimensions: Approx. 95 × 100 × 30 mm (w/h/d)
(3¾ × 4 × 1⅛ inches)
incl. projecting parts and controls

Weight: Approx. 190 g (6.7 oz)

TIMER SECTION

Clock system: Synchronized with power line frequency

Control time: 12-hour system (UK model)
24-hour system (AEP, E model)

GENERAL

System: Superheterodyne FM/AM tuner
Direct coupled complementary symmetry power amplifier circuit (SEPP OCL)

Power requirements: 240 V ac~, 50 Hz (UK model)
220 V ac, 50 Hz (AEP model)
110 – 120 V ac or 220 – 240 V ac, 50/60 Hz (E model)

Power consumption: 360 watts

Dimensions: Approx. 690 × 160 × 545 mm (w/h/d)
(27⅛ × 6¼ × 21⅜ inches)
incl. projecting parts and controls

Weight: Approx. 25 kg (55 lb 2 oz) net
Approx. 28.5 kg (62 lb 14 oz) in shipping carton

0 dB = 0.775 V

TABLE OF CONTENTS

Handling Precautions for MOS ICs

Generally, the insulation resistance of the oxide layer in MOS IC structures is very high, and the oxide layer is very thin. Because of this, it is possible that the static voltages usually present on clothes and the human body will be enough to generate a potential difference across the insulator, high enough to cause a breakdown of the insulating layer.

The following precautions should be taken while handling these ICs.

(Particular care should be taken under conditions of low humidity.)

Precautions in Replacing MOS ICs

1. Store new ICs by inserting them into a urethane-polyester cushion (which is somewhat conductive), or wrapping it in aluminum foil, so that all the pins are at the same potential.
   (The ICs should be stored in that manner until mounted on the circuit board.)

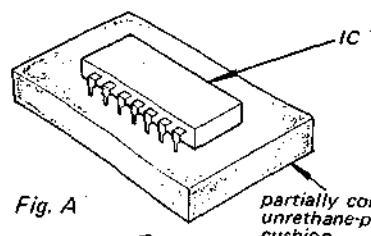


Fig. A

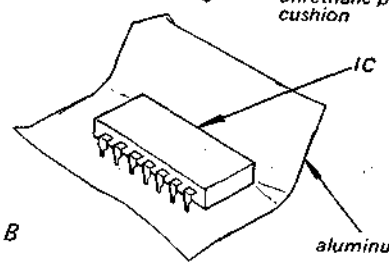


Fig. B

2. Check the soldering iron for possible power-line leakage current. Make sure that there is no leakage path by connecting an ohmmeter to the tip of the soldering iron and the plug as shown in Fig. C. If there is a leakage path, use some other soldering iron.

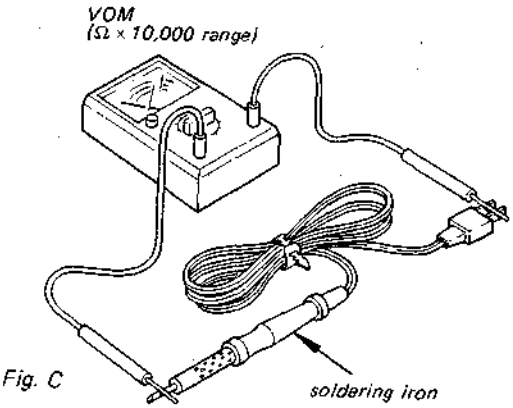


Fig. C

3. Equalize any potential difference between the clothes, the tools in use, the work beneh, the set being worked on, and the packaged IC by touching them all in succession with the hands or a conductive wire or tool.

4. The following are effective methods for handling ICs that remove the potential difference across the oxide layer.
   - Use a paper clip modified by soldering in a wire braid insert.

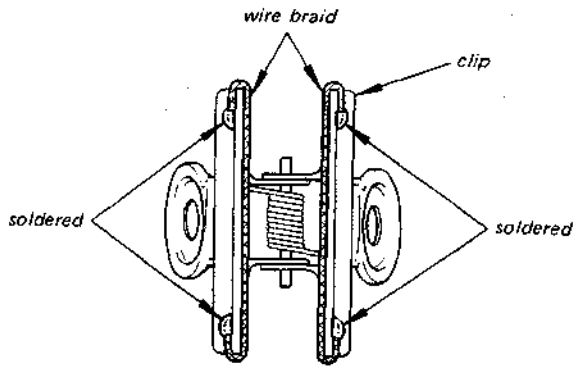


Fig. D

Make sure that there is no solder on the inside.

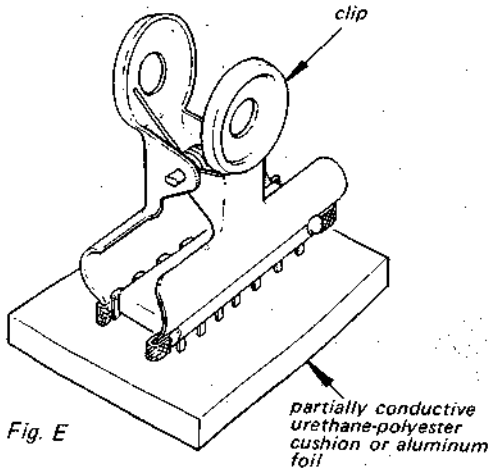


Fig. E

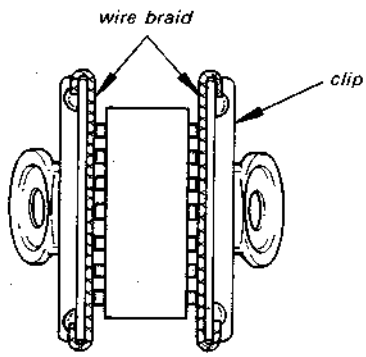


Fig. F

- Take a short length of fine bare wire and wind it around the IC so that it shorts all the pins of the IC, while it is still in the urethane-polyester cushion or aluminum foil. This ensures that all the pins are at the same potential.

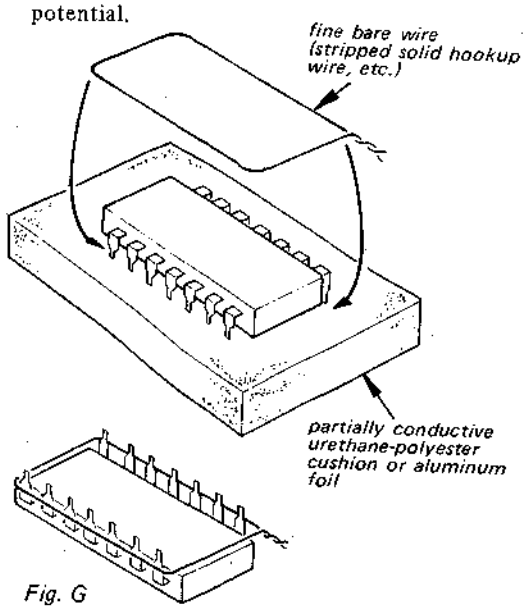


Fig. G

- When it is necessary to handle the IC with the fingers, do not touch any pin, and hold the IC at the ends of its plastic-package case as shown in Fig. H.

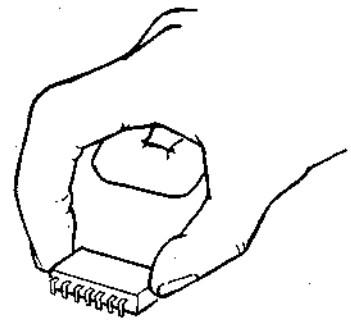


Fig. H

5. Method of Mounting
Insert the IC while holding it with the modified clip, and solder all the pins with the clip still shorting the pins. (Similarly, solder all the pins while the bare shorting wire is still wound around them.). Remove the clip or the bare shorting wire only after all the pins have been soldered.

Precaution while Checking C-MOS ICs

The C-MOS ICs (Complementary MOS) are MOS ICs that have their output sections made up of N-channel and P-channel push-pull stages to increase their speed of operation. If the output terminal of these ICs comes into contact with B+ or B– voltage, then the FET which is ON at that time will either become shorted or open.

This is valid for all the output sections that are connected together by the interconnections. Even the circuits that are physically separated (and not on the same board) can be destroyed simultaneously.

Example:

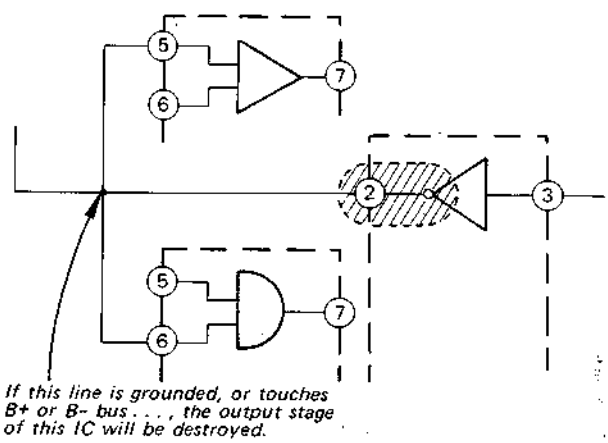


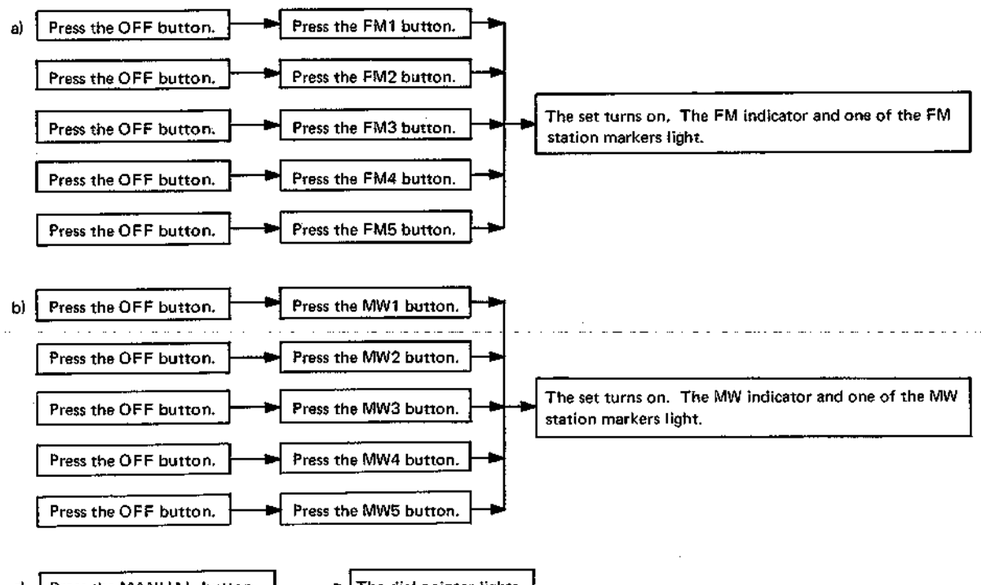
Fig. I

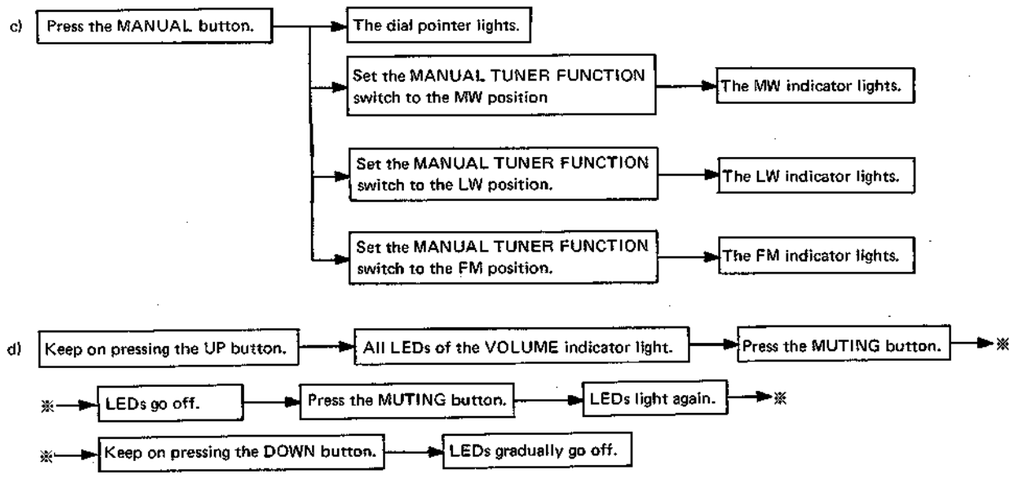
SECTION 1
OUTLINE

1-1. OPERATING CHECKOUT

1. Receiver Section

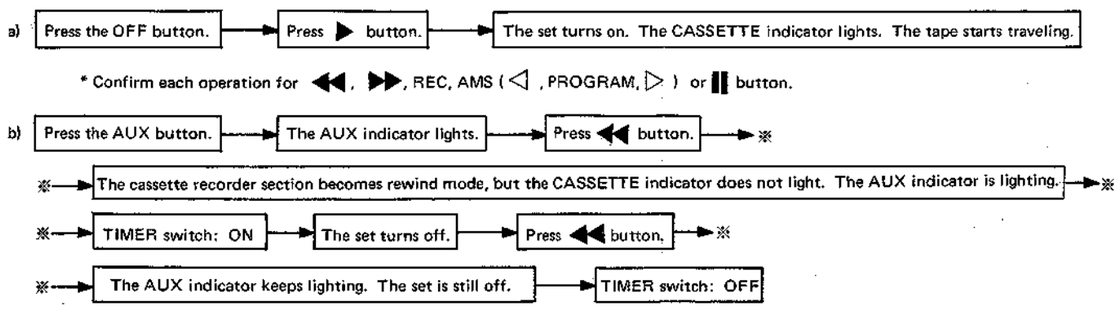
Setting: Control Unit: attached on the set
STAND BY switch: ON
TIMER switch: OFF
SLEEP switch: OFF
PRESET VOL control: MAX





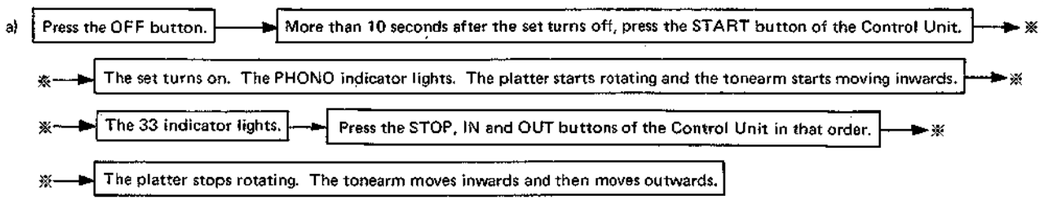
2. Cassette Recorder Section

Setting: Insert a cassette tape.
Control Unit: attached on the set
STAND BY switch: ON
TIMER switch: OFF
SLEEP switch: OFF



3. Turntable Section (controlled with Control Unit)

Setting: Place a 30 cm disc on the platter.
Control Unit: attached on the set
STAND BY switch: ON
TIMER switch: OFF
SLEEP switch: OFF



* Perform the same procedures for 17 cm and 25 cm discs.

4. Turntable Section (controlled with the buttons of the turntable)

Setting: Place a 30 cm disc on the platter. Insert a cassette tape.
STAND BY switch: ON
TIMER switch: OFF
SLEEP switch: OFF

a) Press the OFF button. → Press the START button of the turntable. → The set does not turn on. → ※
※ → Press the AUX button of the Control Unit. → The set turns on. The AUX indicator lights. → ※
※ → Press the START button of the turntable. → The PHONO indicator lights. The platter starts rotating at 33 rpm. → ※
※ → The tonearm moves inwards. The 33 indicator lights. → Press the STOP, IN and OUT buttons of the turntable in that turn. → ※
※ → The platter stops rotating. The tonearm moves inwards and then moves outwards. → ※
※ → When the tonearm returns to the arm rest, the 33 indicator goes off.

b) Place a 17 cm disc on the platter. → Press the START button of the turntable. → ※
※ → The PHONO indicator lights. The platter starts rotating at 45 rpm. → Press the SPEED button several times. → ※
※ → The 33 and the 45 indicators go on and off alternately. → Press the STOP button of the turntable. → ※
※ → The 33 or the 45 indicator keeps lighting. → Press the OFF button. → Press the AUX button. → ※
※ → The 33 or the 45 indicator goes off.

c) Press the REC SYNC and the START buttons at the same time. → The platter starts rotating. → ※
※ → When the tonearm lowers onto the disc, the cassette recorder starts recording. → ※
※ → When the tonearm returns to the arm rest, the cassette recorder stops recording.

d) Press the REPEAT button. → The REPEAT indicator lights. The repeat operation starts. → ※
※ → Press the STOP button of the turntable. → The REPEAT indicator goes off. → The tonearm returns to the arm rest.

5. Timer Section

Setting: Control Unit: attached on the set

a) Disconnect the power cord. → Connect the power cord. → Figures starts blinking on the display window. → ※
※ → Depress the TIMER button. → The TIMER indicator lights. → ※
※ → While pressing the TIMER/SLEEP SET button, press the FASTor the SLOW button to obtain 10:00 AM. → ※
※ → Press ▶ button. → The CASSETTE indicator lights. → Remove the Control Unit from the set. → ※
※ → The tape recorder becomes playback mode. → Attach the Control Unit to the set again. → The set turns off. → ※
※ → While pressing the CLOCK SET button, keep on pressing the FAST or the SLOW button. → ※
※ → The tape recorder becomes playback mode at 10:00 AM. → The set turns off at 10:59 AM. → Press the FM1 button. → ※
※ → The FM indicator lights. → Press the REC buttons. → The REC indicator lights. → Release the TIMER button. → ※
※ → The tape recorder becomes record mode and records the FM1 signal. → Depress the SLEEP button. → ※
※ → While pressing the TIMER/SLEEP SET button, keep on pressing the FAST or the SLOW button. → ※
※ → The set turns off at 00 indication in the timer display and turns on at 59 indication.

b) Cover the DIMMER window by hand. → The timer display dims.

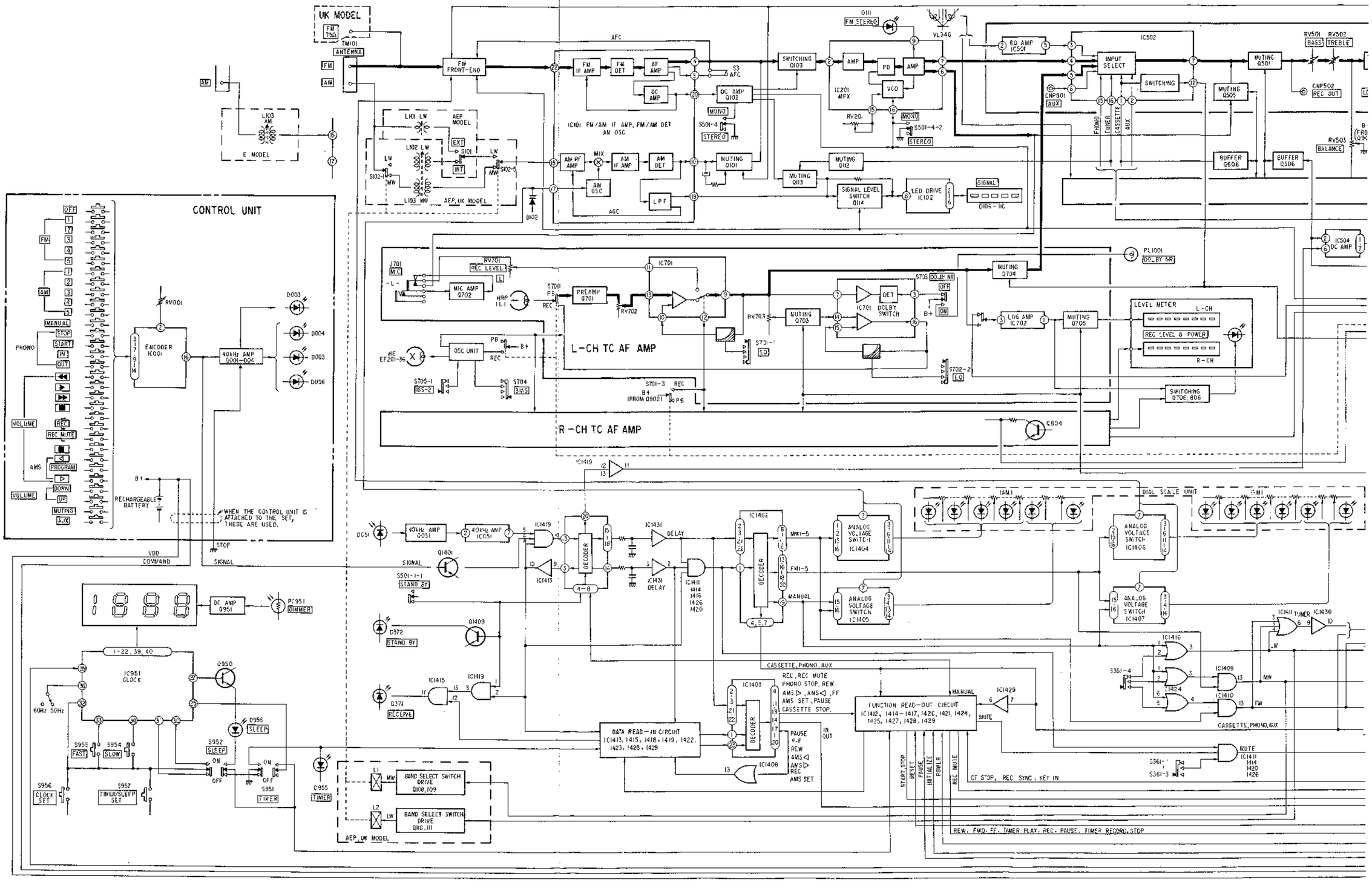
6. Stand By Operation

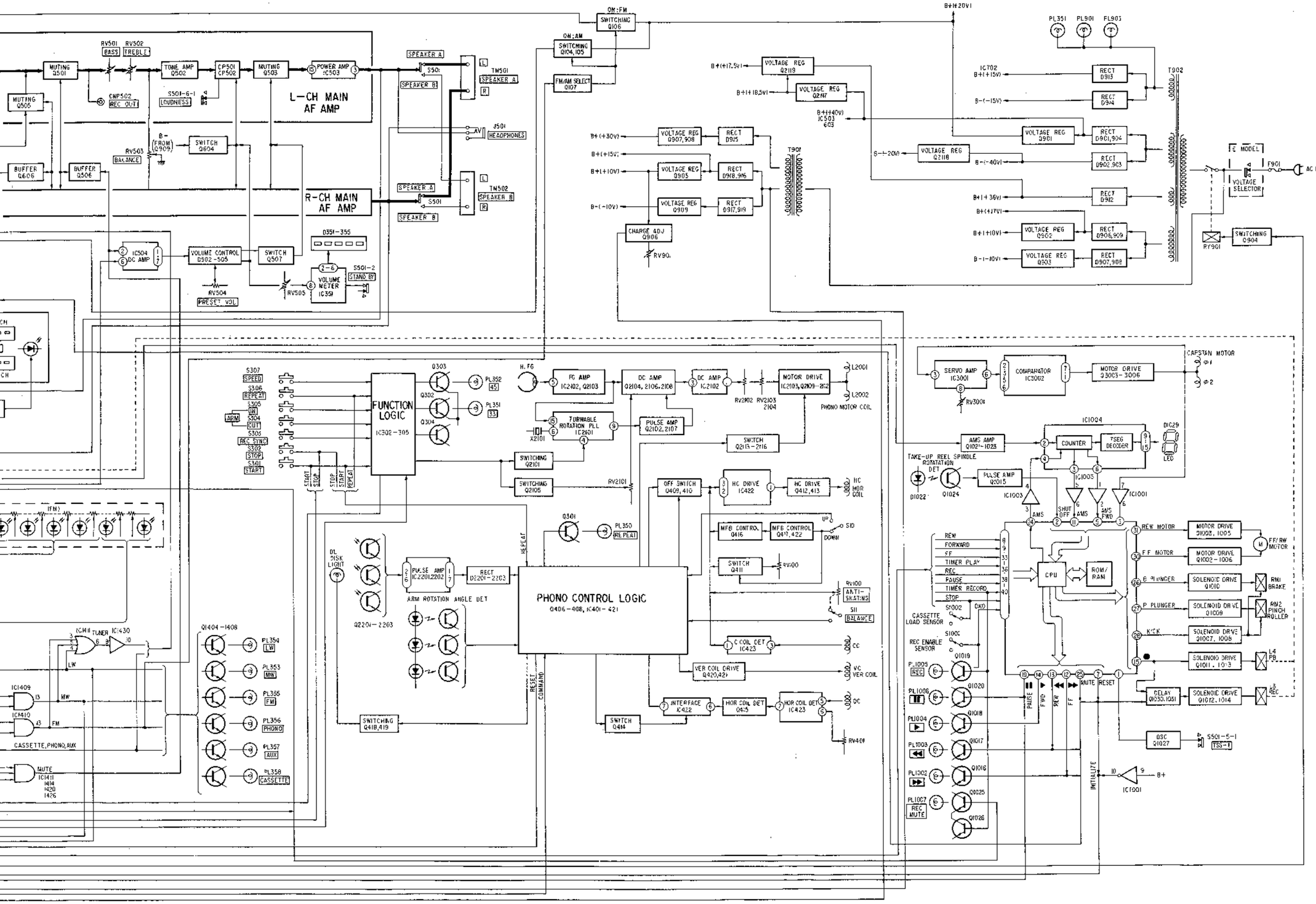
a) Press the FM1 button. → Release the STAND BY button. → The FM1 indicator goes off. → ※
※ → Press the FM1 button. → The FM1 indicator does not light. → Depress the STAND BY button. → ※
※ → Only the VOLUME indicator lights at the same level as before. → Press the FM1 button. → ※
※ → The FM1 indicator lights.

7 Control Unit Operation

a) Hold the Control Unit by hand. → Press the FM1 button. → The set is tuned to FM1 signal and the FM indicator lights.

1-2. BLOCK DIAGRAM

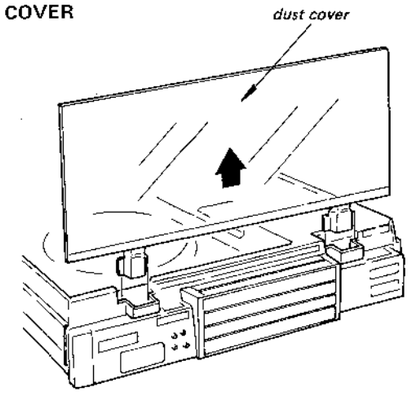



L-CH MAIN AF AMP
R-CH MAIN AF AMP
MUTING Q501
MUTING Q505
BUFFER Q506
BUFFER Q506
RV501 BASS
RV502 TREBLE
TONE AMP Q502
CP501 CP502
MUTING Q503
POWER AMP IC503
CNP502 REC OUT
S501-6-1 LOUDNESS
RV503 BALANCE
B- (FROM Q909)
SWITCH Q604
SPEAKER A
S501 SPEAKER B
TM501 SPEAKER A R
TM502 SPEAKER B R
J501 HEADPHONES
IC504 DC AMP
VOLUME CONTROL Q502-505
RV504 PRESET VOL
SWITCH Q507
D351-355
VOLUME METER IC351
S501-2 STAND BY
RV505
ON:FM SWITCHING Q106
ON:AM SWITCHING Q104,105
FM/AM SELECT Q107
B+(+20V)
B+(+17.5V) VOLTAGE REG Q2119
B+(+18.5V) VOLTAGE REG Q2117
B+(+40V) IC503 603
B+(+30V) VOLTAGE REG Q907,908
B+(+15V)
B+(+10V) VOLTAGE REG Q905
B-(-10V) VOLTAGE REG Q909
RECT D915
RECT D918,916
RECT D917,919
T901
CHARGE ADJ Q906
RV906
S-(-20V) VOLTAGE REG Q2118
IC702 B+(+15V) RECT D913
B-(-15V) RECT D914
VOLTAGE REG Q901
RECT D901,904
B-(-40V) RECT D902,903
B+(+36V) RECT D912
B+(+17V)
B+(+10V) VOLTAGE REG Q902
B-(-40V) VOLTAGE REG Q903
RECT D906,909
RECT D907,908
T902
PL351 PL901 PL903
E MODEL
VOLTAGE SELECTOR
F901
AC IN
RY901
SWITCHING Q904
S307 SPEED
S306 REPEAT
S303 IN
ARM
S304 OUT
S305 REC SYNC
S302 STOP
S301 START
FUNCTION LOGIC IC302-305
Q303
Q302
Q304
PL352 45
PL351 33
START STOP
STOP START REPEAT
H. FG
FG AMP IC2102, Q2103
DC AMP Q2104, 2106, 2108
DC AMP IC2102
MOTOR DRIVE IC2103, Q2109-2112
L2001
L2002
PHONO MOTOR COIL
RV2102 RV2103 2104
TURNABLE ROTATION PLL IC2101
X2101
PULSE AMP Q2102, 2107
SWITCH Q2115-2116
SWITCHING Q2101
SWITCHING Q2105
RV2101
OFF SWITCH Q409, 410
HC DRIVE IC422
HC DRIVE Q412, 413
HC MOR COIL
Q301
PL350 REPEAT
MFB CONTROL Q416
MFB CONTROL Q417, 422
SW
DOWN
SWITCH Q411
RV400
RV100 ANTI-SKATING
SW BALANCE
C COIL DET IC423
CC
VCR COIL DRIVE Q420, 421
VC VER COIL
INTERFACE IC422
HOR COIL DET Q415
HOR COIL DET IC423
QC
SWITCH Q414
RV401
DL DISK LIGHT
PULSE AMP IC2201, 2202
RECT D2201-2203
ARM ROTATION ANGLE DET
Q2204-2203
HI-REPEAT
PHONO CONTROL LOGIC
Q406-408, IC401-421
RESET COMMAND
SWITCHING Q418, 419
IFM3
IC1409 MW
IC1410 FM
CASSETTE, PHONO, AUX
MUTE IC1411 1418 1420 1426
IC1430 TUNER
LW
Q1404-1408
PL354 LW
PL353 MW
PL355 FM
PL356 PHONO
PL357 AUX
PL358 CASSETTE
SERVO AMP IC3001
RV3001
COMPARATOR IC3002
MOTOR DRIVE Q3003-3006
CAPSTAN MOTOR
IC1004
AMS AMP Q1021-1025
COUNTER
TSEG DECODER
DIC29
LED
TAKE-UP REEL SPINDLE ROTATATION DET
D1022
Q1024
PULSE AMP Q2015
IC1003
IC1001
REW
FORWARD
FF
TIMER PLAY
REC
PAUSE
TIMER RECORD
STOP
S1002
CASSETTE LOAD SENSOR
S1001
REC ENABLE SENSOR
Q1019
P.1009 REC
PL1006
Q1020
PU1004
Q1018
PL1003
Q1017
PL1002
Q1016
PL1007 REC MUTE
Q1025
Q1026
CPU
ROM/ RAM
REW MOTOR
MOTOR DRIVE Q1002, 1005
FF/RW MOTOR
F.F MOTOR
MOTOR DRIVE Q1002-1006
R PLUNGER
SOLENOID DRIVE Q1010
RM1 BRAKE
P PLUNGER
SOLENOID DRIVE Q1009
RM2 PINCH ROLLER
KICK
SOLENOID DRIVE Q1007, 1008
SOLENOID DRIVE Q1011, 1013
L-R FB
SOLENOID DRIVE Q1012, 1014
RM3 REC
DELAY Q1030, 1031
MUTE
RESET
PAUSE
FWD
REW
FF
OSC Q1027
S501-5-1 TSS-1
INITIALIZE
B+
IC1001

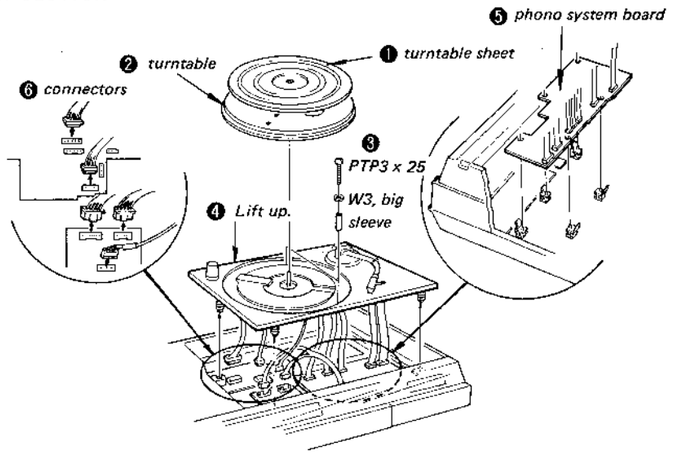
SECTION 2
DISASSEMBLY

Note: Follow the disassembly procedure in the numerical order given.

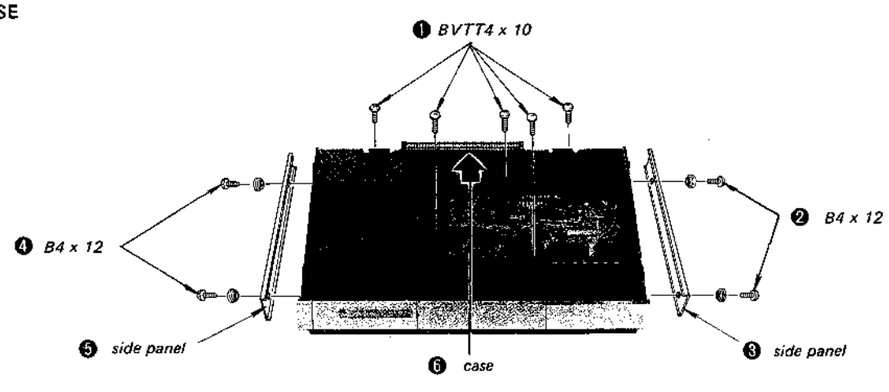
DUST COVER



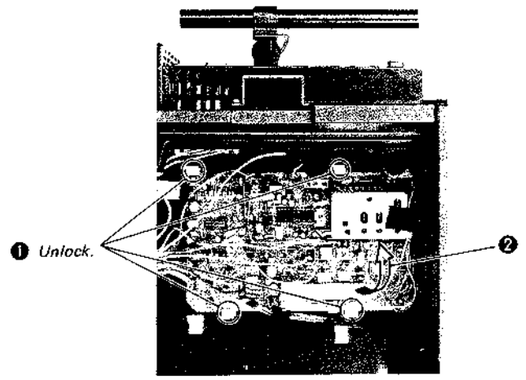
RECORD PLAYER SECTION



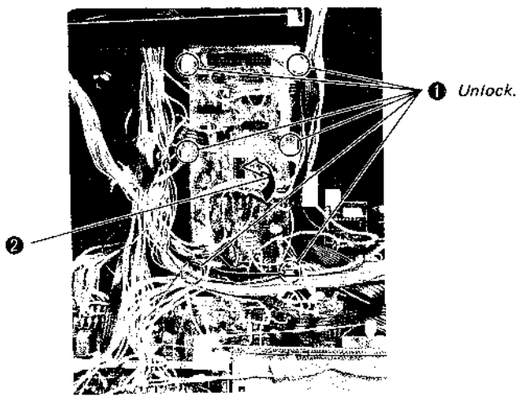
CASE



TUNER BOARD

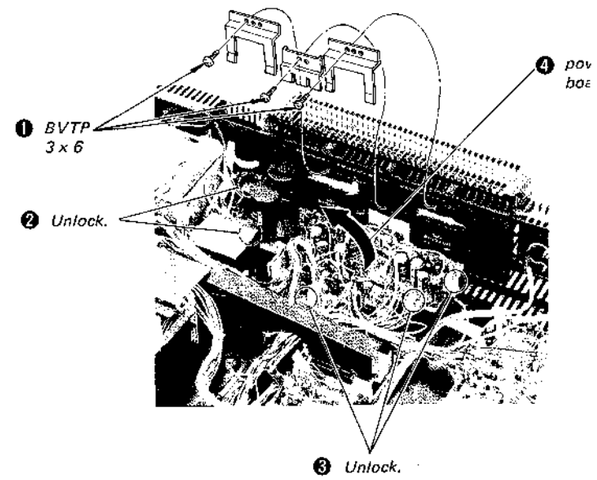


EQ FUNCTION BOARD

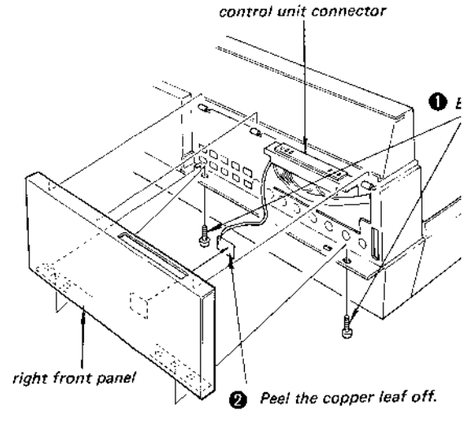


SIGNAL INDICATOR BOARD
LAMP BOARD
INFRARED RAY RECEIVER
RECEIVE INDICATOR BOARD
• See page 16 to 18.
ORNAMENT
• See page 19.
CASSETTE RECORDER SECTION
• See page 21.

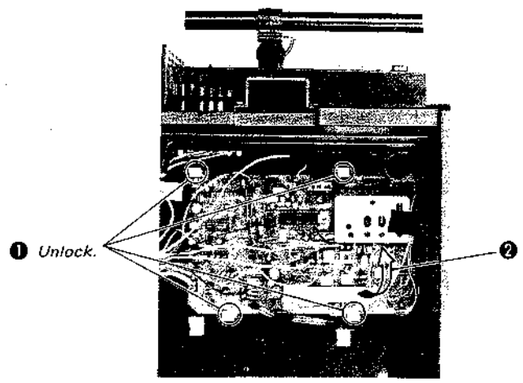
POWER AMP BOARD



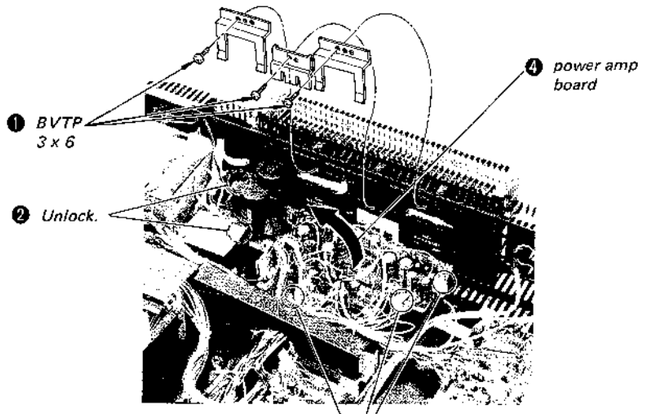
RIGHT FRONT PANEL



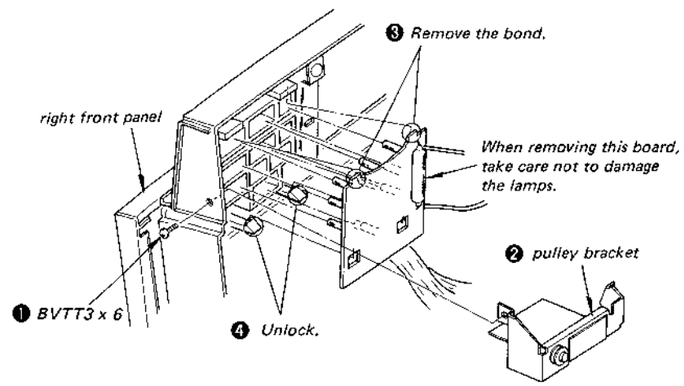
TUNER BOARD



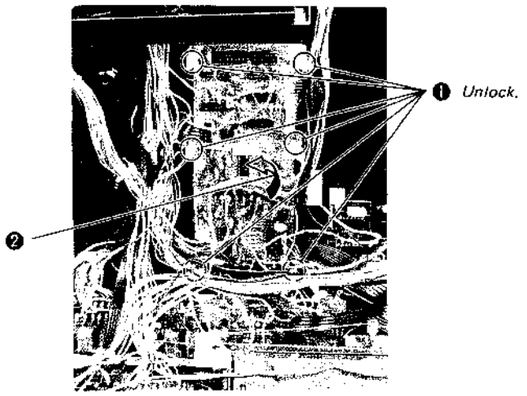
POWER AMP BOARD



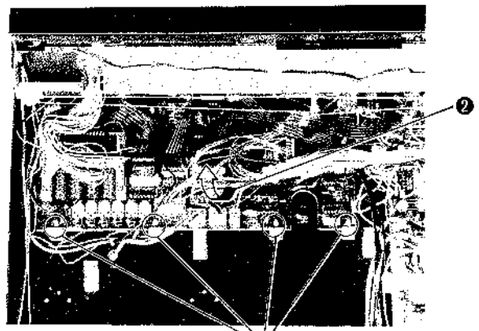
FUNCTION INDICATOR BOARD



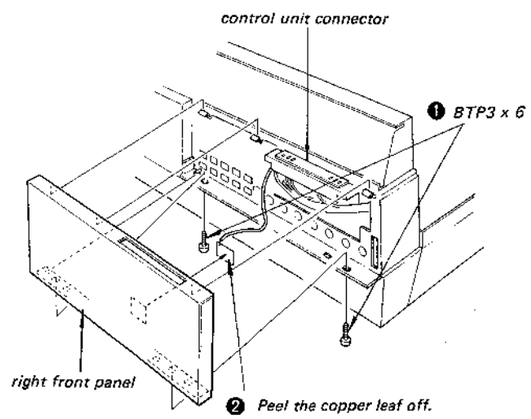
EQ FUNCTION BOARD



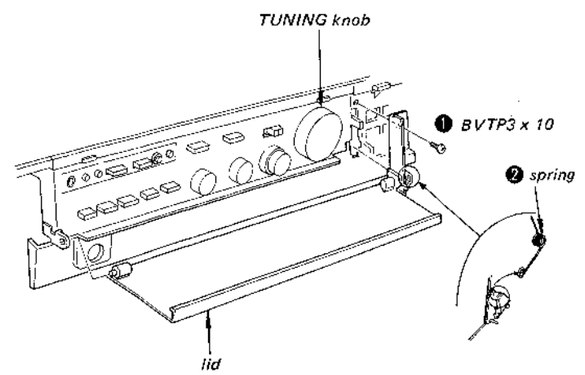
REMOTE CONTROL LOGIC BOARD



RIGHT FRONT PANEL



LID



SIGNAL INDICATOR BOARD
LAMP BOARD
INFRARED RAY RECEIVER
RECEIVE INDICATOR BOARD
• See page 16 to 18.
ORNAMENT
• See page 19.
CASSETTE RECORDER SECTION
• See page 21.

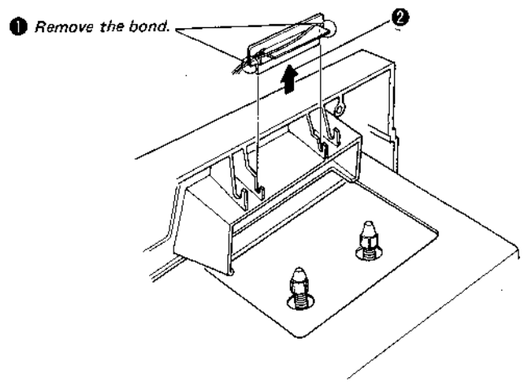
CASE
- See page 13.

SIGNAL

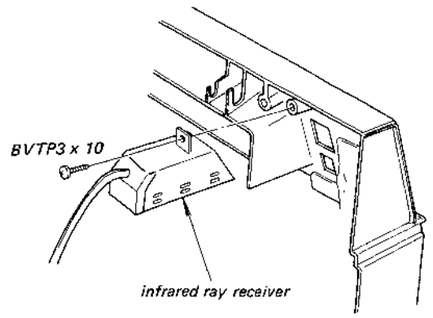
TIMER (

TIMER (

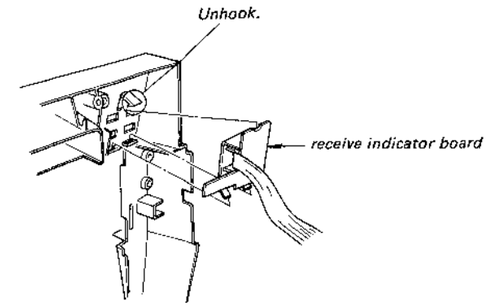
LAMP BOARD



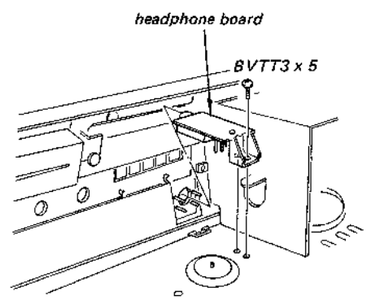
INFRARED RAY RECEIVER



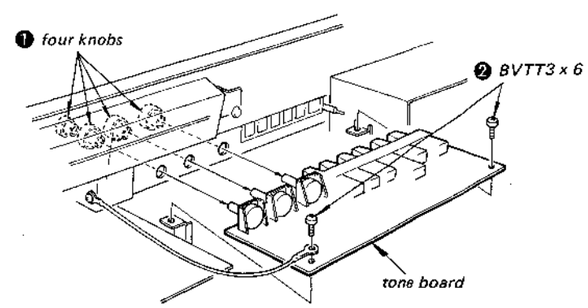
RECEIVE INDICATOR BOARD

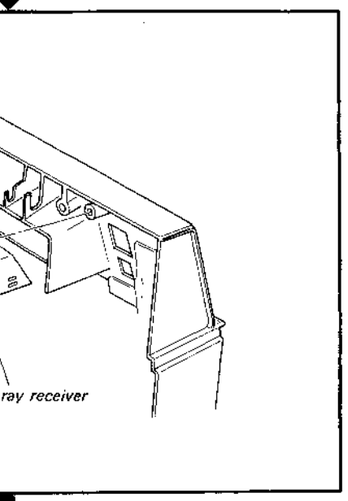


HEADPHONE BOARD

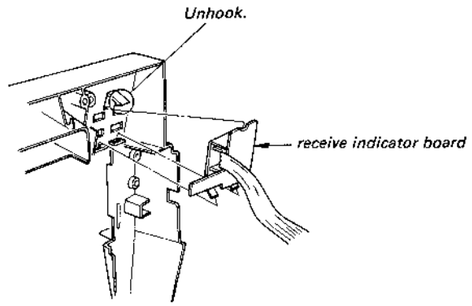


TONE BOARD

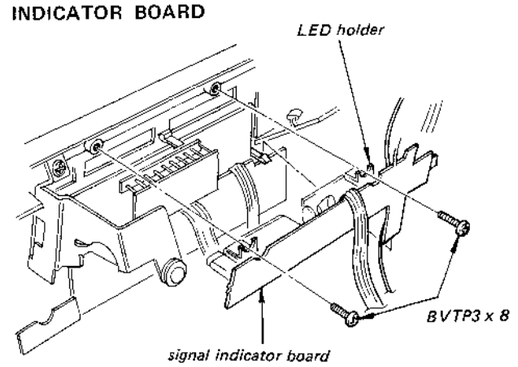




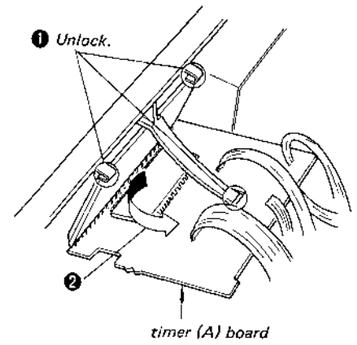
RECEIVE INDICATOR BOARD



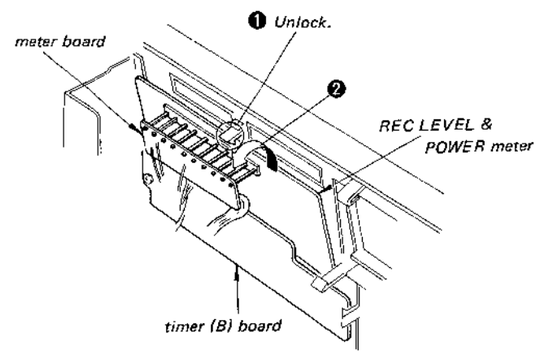
SIGNAL INDICATOR BOARD



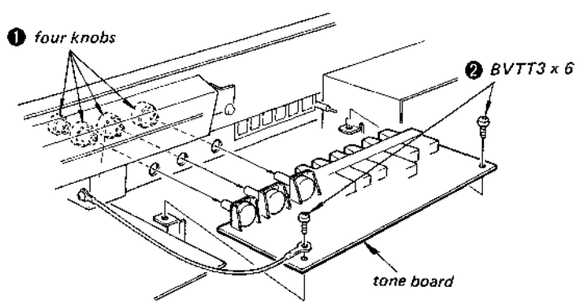
TIMER (A) BOARD



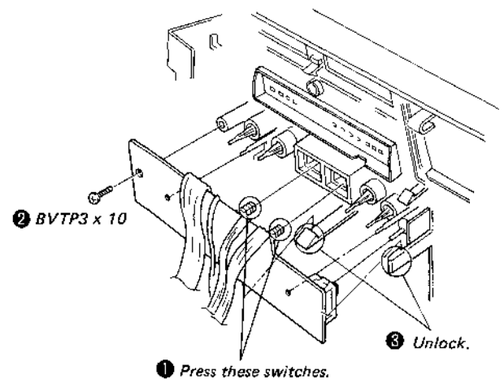
METER BOARD



TONE BOARD

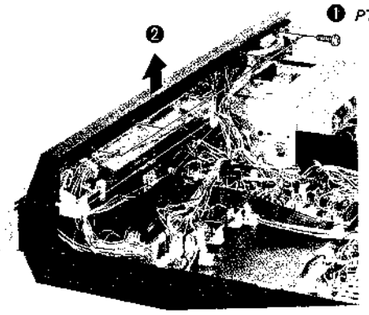


TIMER (B) BOARD

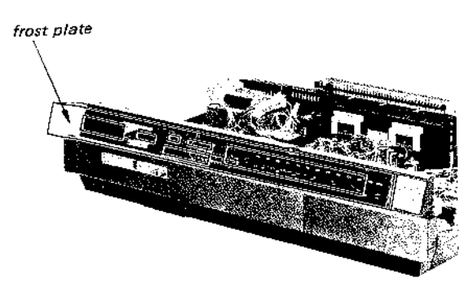


CASE
See page 13.

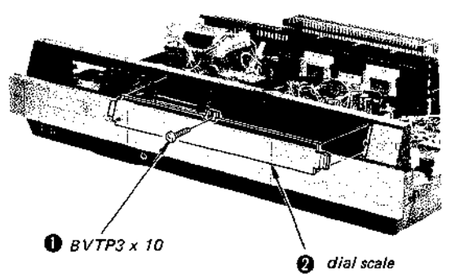
ORNAMENT



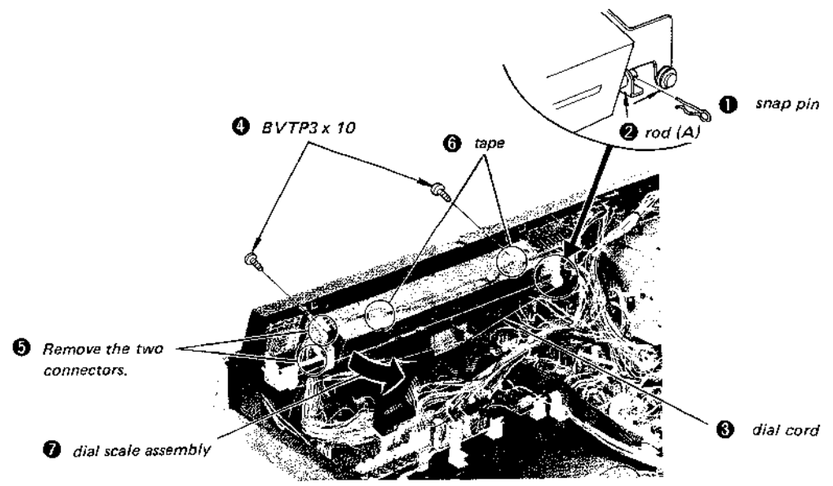
FROST PLATE



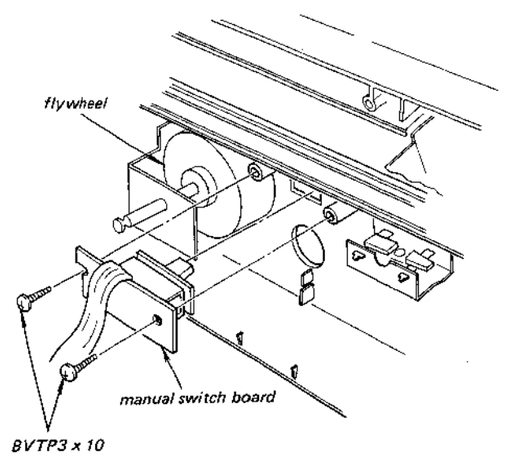
DIAL SCALE



DIAL SCALE ASSEMBLY

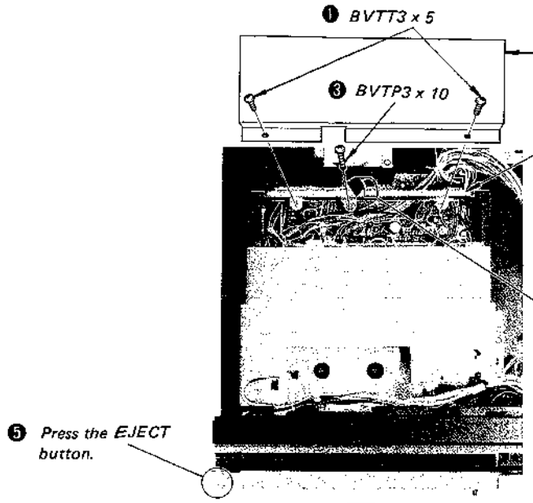


MANUAL SWITCH BOARD



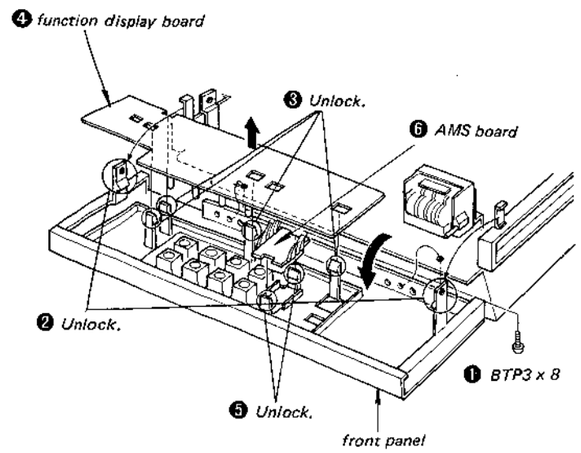
CASE
See page 13.

CASSETTE RECORDER SECTION

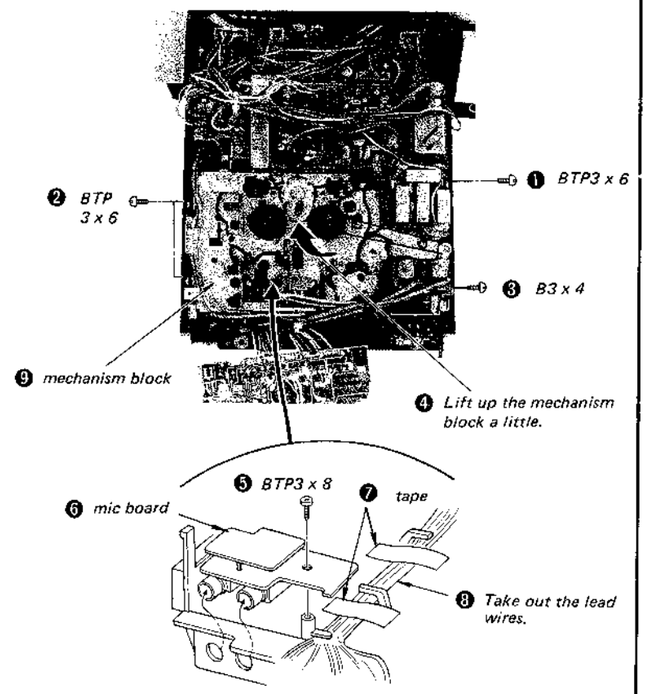


❻ Pull out the cassette recorder section.

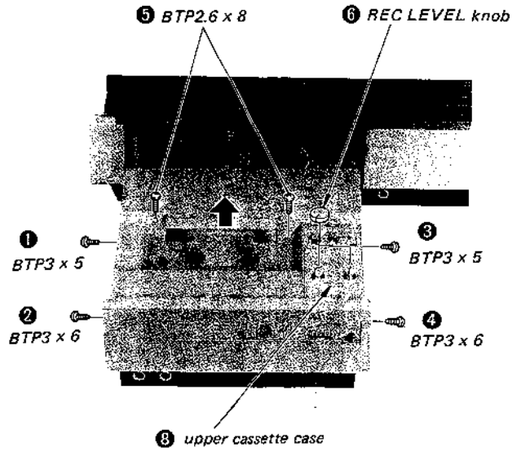
FRONT PANEL



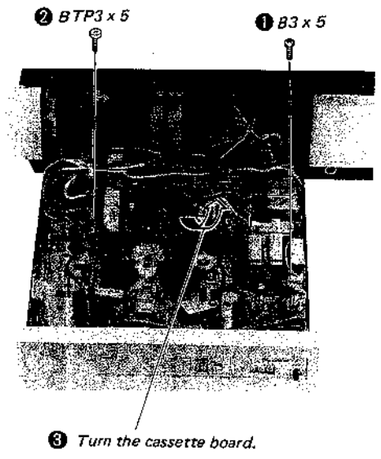
MECHANISM BLOCK



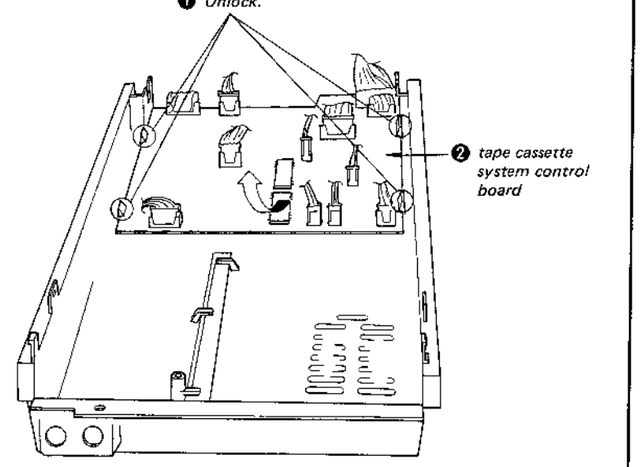
UPPER CASSETTE CASE



CASSETTE BOARD

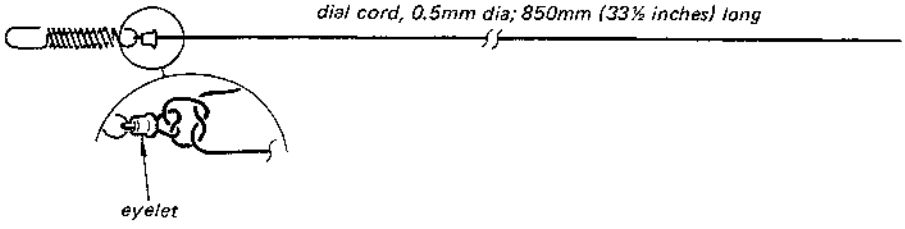


TAPE CASSETTE SYSTEM CONTROL BOARD

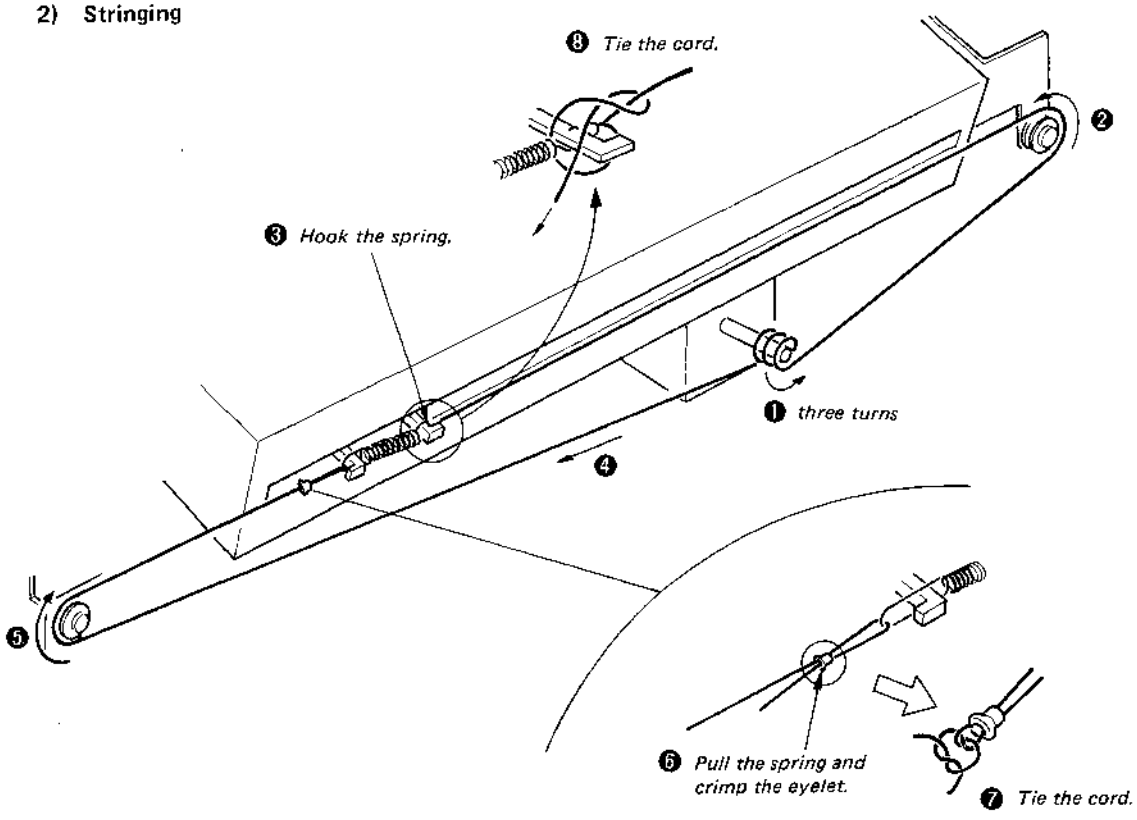


Dial Cord Stringing

1) Preparation

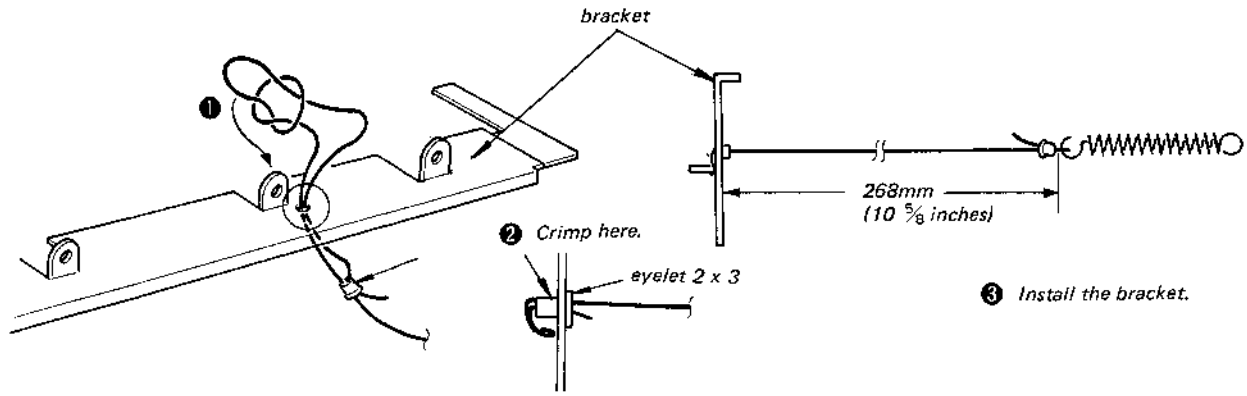


2) Stringing

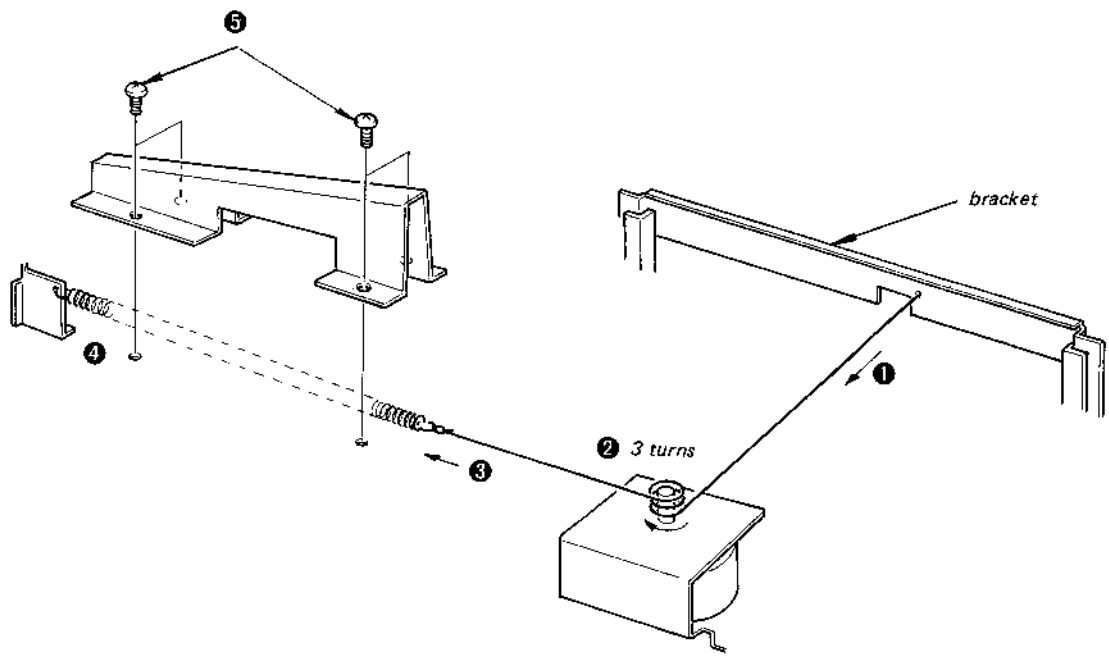


Loading Cord Stringing

1) Preparation



2) Stringing



SECTION 3
ADJUSTMENTS

3-1. MECHANICAL ADJUSTMENTS

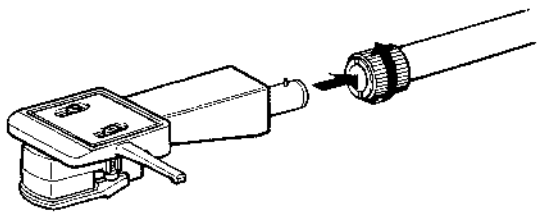
• RECORD PLAYER SECTION

TONEARM ADJUSTMENT

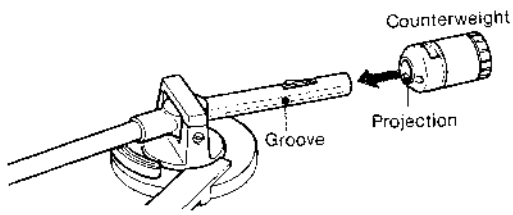
The following procedures should be performed on a level surface. Be careful not to damage the stylus tip while making adjustment.

Preparation

❶ Secure the tonearm to the armrest.
❷ Plug the supplied headshell into the tonearm and turn the locking collar counterclockwise until the headshell is firmly locked.



❸ Insert the counterweight by matching the projection to the groove as illustrated.

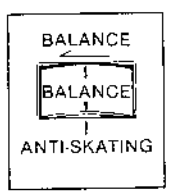


❹ Remove the stylus guard.

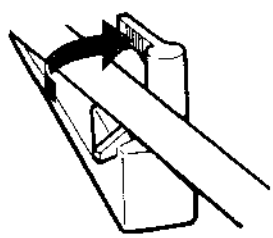
Longitudinal balance adjustment *1

Before making this adjustment, connect the power cord and check that the STAND BY switch is depressed.

❶ Set the ANTI-SKATING gauge to the BALANCE position.



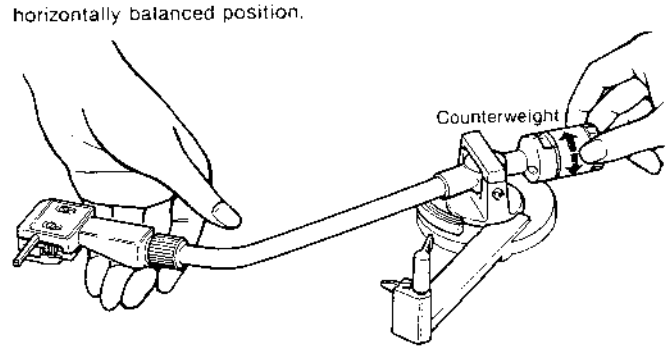
❷ Press the PHONO-START button of the control unit.
The tonearm platform will lower to permit easy adjustment.
❸ Release the tonearm from the arm rest.

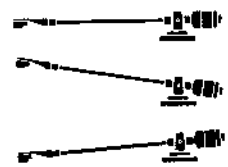


***1 Longitudinal balance adjustment**

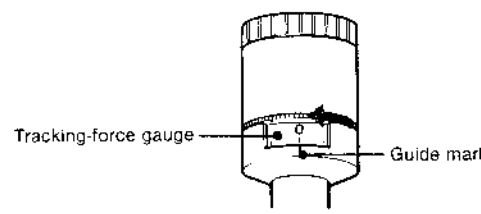
While playing the record, the weight of the tonearm is supported by the arm pivot and only tracking force is applied to the stylus tip. To accomplish this, the tonearm must first be balanced horizontally, with the tracking force indicator set at "0".

❹ Turn the counterweight as required until the tonearm is in a horizontally balanced position.



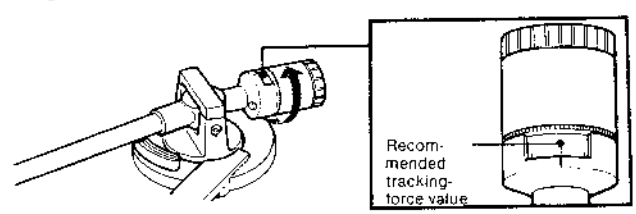


❺ Secure the tonearm to the arm rest.
❻ While holding the counterweight at the balanced position, separately turn the tracking-force gauge until the "0" indication is aligned with the red guide mark.



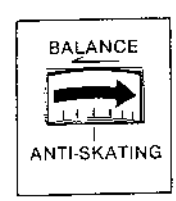
Tracking-force adjustment *2

Turn the counterweight in the direction indicated by the arrow so that the recommended tracking-force value for the supplied cartridge (2 g) is aligned with the red guide mark.



Anti-skating compensation *3

Turn the ANTI-SKATING gauge so that the tracking-force value used (2 g) is aligned with the guide mark.
● If the BALANCE position is aligned with the guide mark, play will not begin with the START button.



***2 Tracking force**

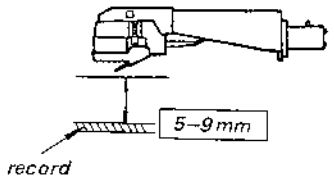
After the longitudinal balance adjustment, apply the recommended tracking force weight so that the stylus tip will trace the music groove accurately.

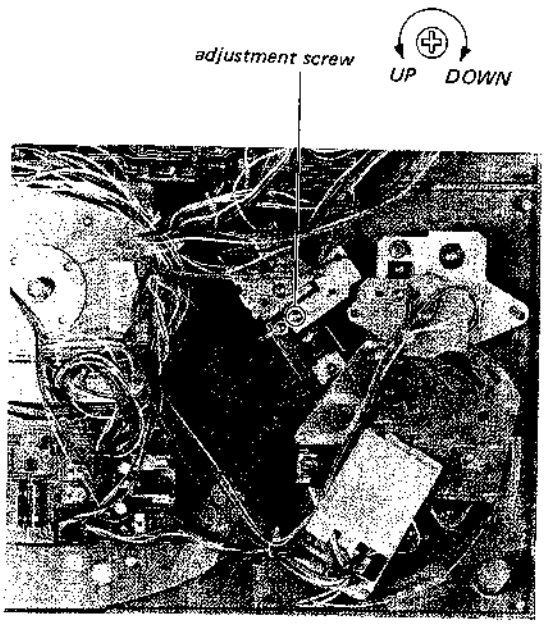
***3 Anti-skating compensation**

While the record is being played, the frictional force between the record groove and the stylus produces a force that tends to drive the tonearm toward the center of the record. The anti-skating compensation cancels the above mentioned force, and is applied in accordance with the tracking force.
Incorrect anti-skating compensation results in sound distortion and uneven wear on both the stylus and the record.

Stylus Height Adjustment

1. Place the tonearm over the record.
2. Confirm that there is 5–9 mm clearance between the stylus tip and the record.
3. If necessary, adjust by turning the adjustment screw.

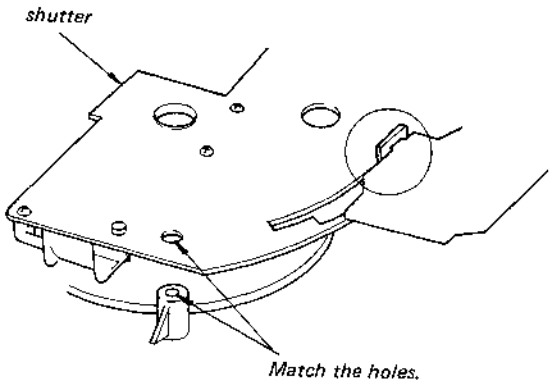




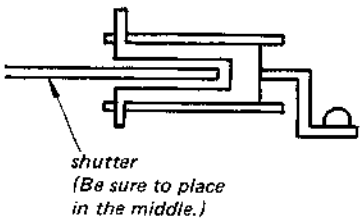
Shutter Position Adjustment

When installing the shutter, install as follows.

1. Fix the tonearm to the tonearm rest.
2. Install the shutter so that the hole of the shutter matches with the screw hole in the frame.



Note: Confirm that the shutter plate is placed accurately.



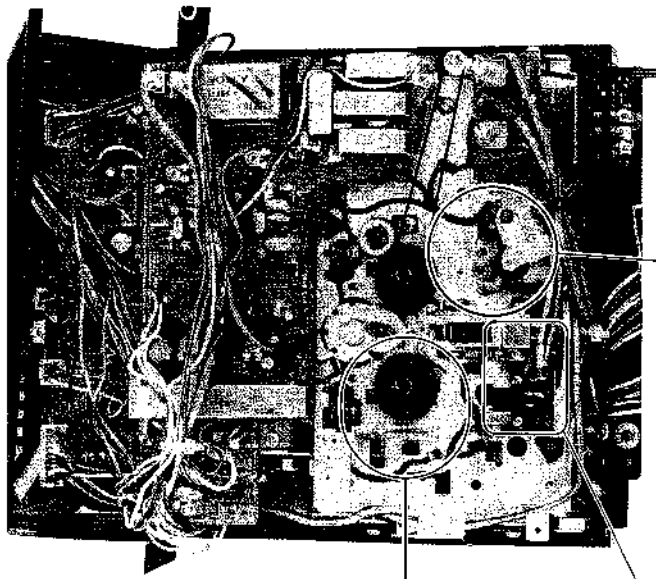
• CASSETTE RECORDER SECTION

PRECAUTION

1. Clean the following parts with a denatured-alcohol-moistened swab:

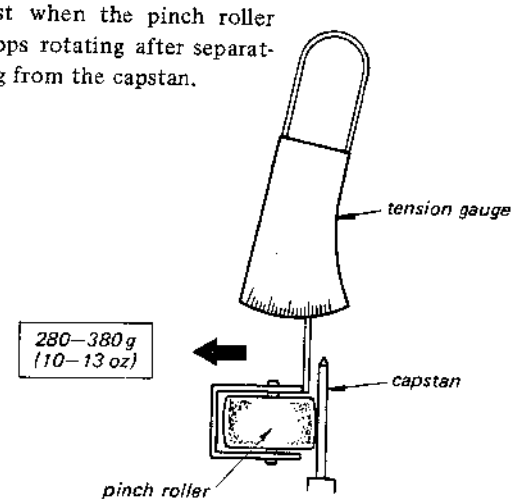
record/playback head	pinch roller
erase head	rubber belts
capstan	idlers

2. Demagnetize the record/playback head with a head demagnetizer.
3. Do not use a magnetized screwdriver for the adjustments.
4. After the adjustments, apply a suitable locking compound to the parts adjusted.
5. The adjustments should be performed with the rated power supply voltage unless otherwise noted.



Pinch Roller Pressure Measurement
– Forward Mode –

Slowly pull the pinch roller and read the tension gauge just when the pinch roller stops rotating after separating from the capstan.

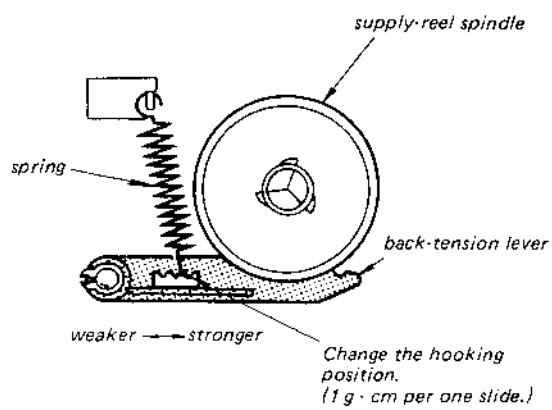


Torque Measurement and Back Tension Torque Adjustment

1.

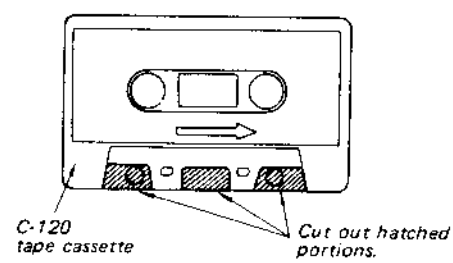
Torque	Torque meter	Meter reading
Forward	CQ-102C	30–55 g · cm (0.42–0.76 oz · inch)
Back tension	CQ-102C	2.5–4.5 g · cm (0.04–0.06 oz · inch)

2. If the specified back-tension torque is not obtained, change the hooking position.

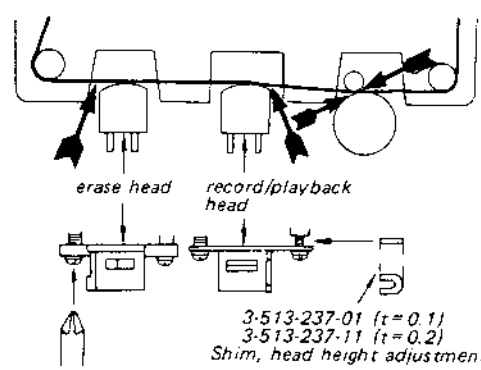


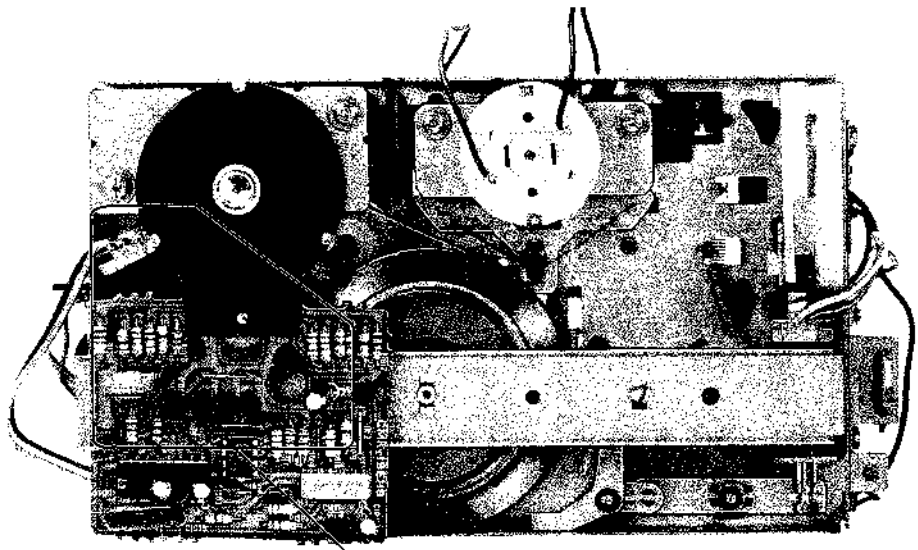
Head Height Adjustment

1. Prepare an adjustment cassette as shown below.



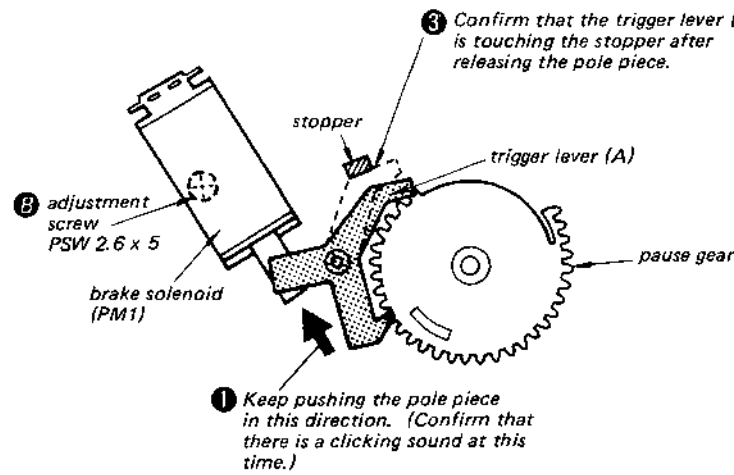
2. In record mode and viewing from the front, adjust the head heights to eliminate tape curl and tape twist at portions shown by the arrows.

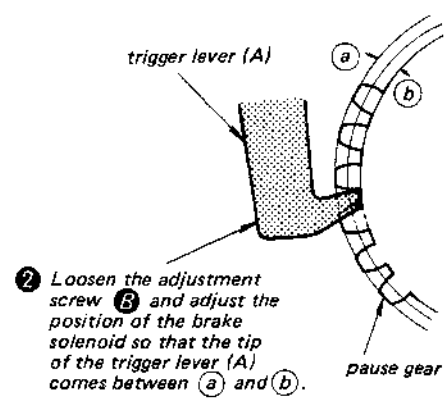


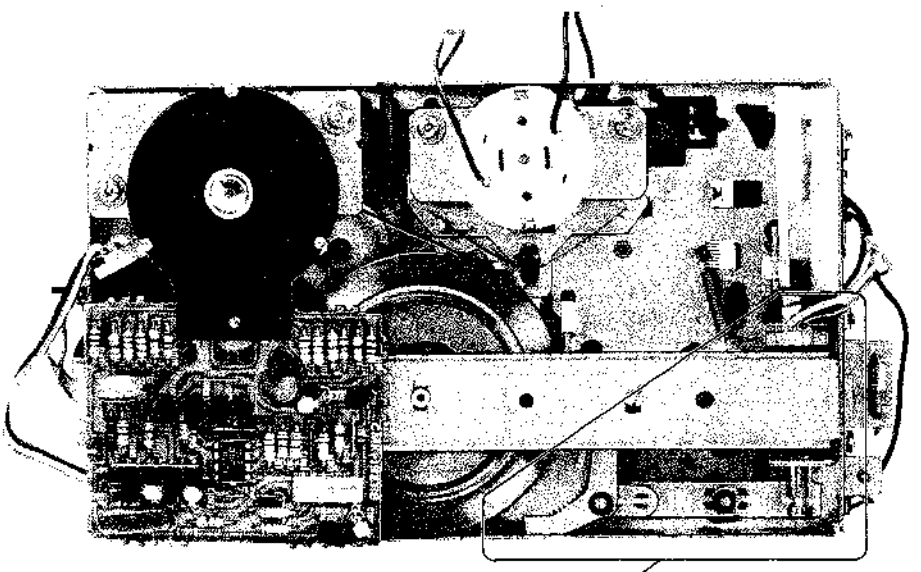


Brake Solenoid (PM1) Position Adjustment

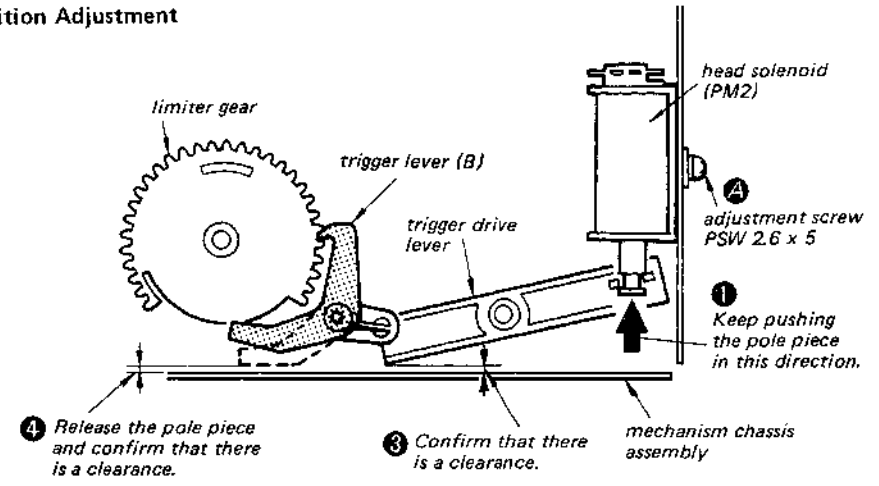
– Stop Mode –

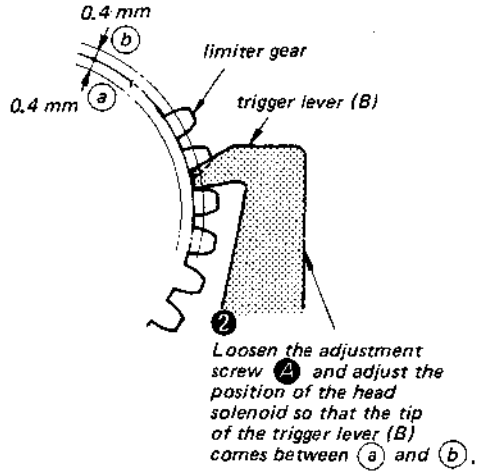






Head Solenoid (PM2) Position Adjustment
– Stop Mode –





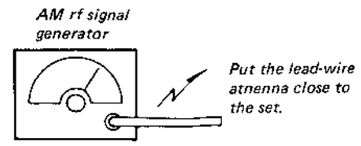
3-2. ELECTRICAL ADJUSTMENTS

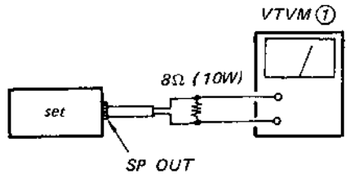
• TUNER SECTION

AM SECTION

Setting:

Control Unit: attached on the set (manual operation)
MANUAL TUNER FUNCTION siwtch: MW
MODE switch: MONO





- Repeat the procedures in each adjustment several times, and the frequency coverage and tracking adjustments should be finally done by the trimmer capacitors.

MW FREQUENCY COVERAGE ADJUSTMENT

Tuning Control Voltage Adjustment	Dial Indication	Digital VOM Reading	Adjustment Part
	maximum frequency	25V	RV1402
	minimum frequency	1V	RV1404
	Adjust for a specified reading on digital VOM.		

Local Oscillator Frequency Adjustment	Dial Indication	AM Rf Signal Generator Frequency	Adjustment Part
	minimum frequency	515kHz	L105
	maximum frequency	1660kHz	CT104
	Adjust for a maximum reading on VTVM ①.		

Dial Pointer Setting	Dial Indication	AM Rf Signal Generator Frequency	Adjustment Part
	1000kHz	1000kHz	RV1403
	Adjust for a maximum reading on VTVM ①.		

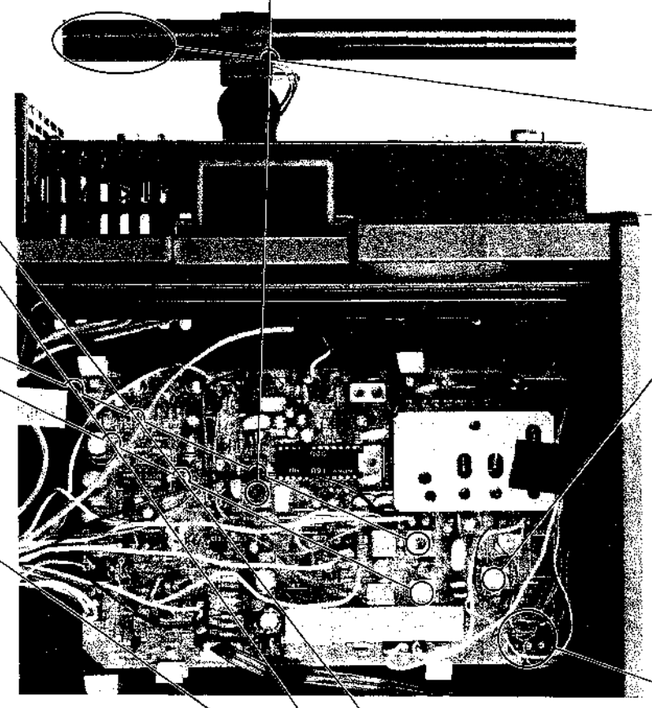
Note:
Be sure to perform the LW frequency coverage adjustment after the tuning control voltage adjustment.

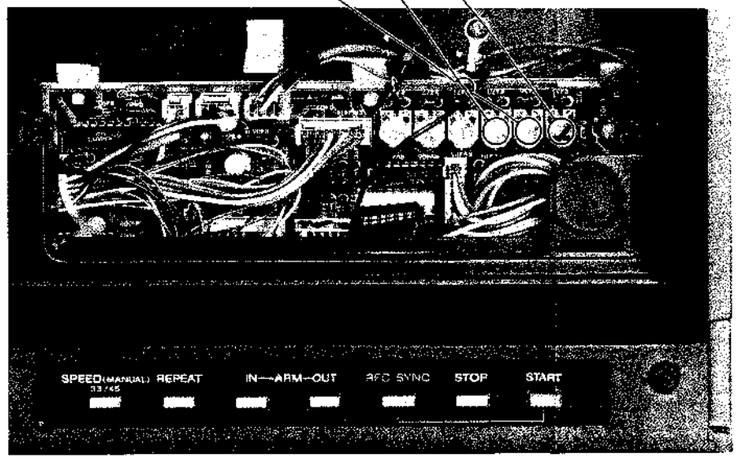
AM IF ALIGNMENT

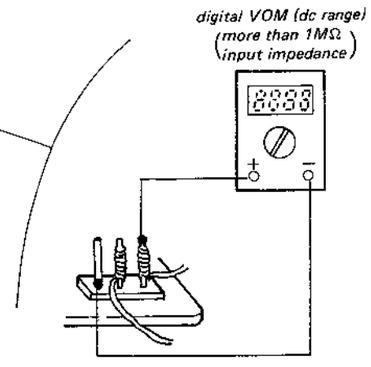
Adjust for a maximum reading on VTVM ①.
450kHz
IFT101

MW TRACKING ADJUSTMENT

Adjust for a maximum reading on VTVM ①.	
L103	600kHz
CT101	1,400kHz

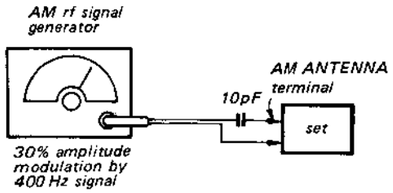


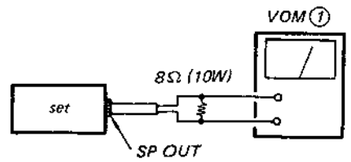




Setting:

Control Unit: attached on the set (manual operation)
MANUAL TUNER FUNCTION switch: LW
MODE switch: MONO
LW antenna selector: EXT ANT (AEP model)

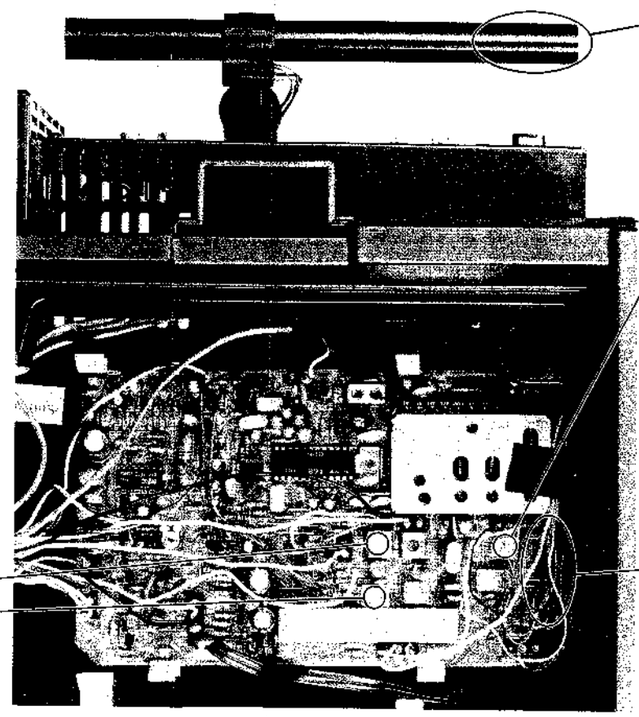




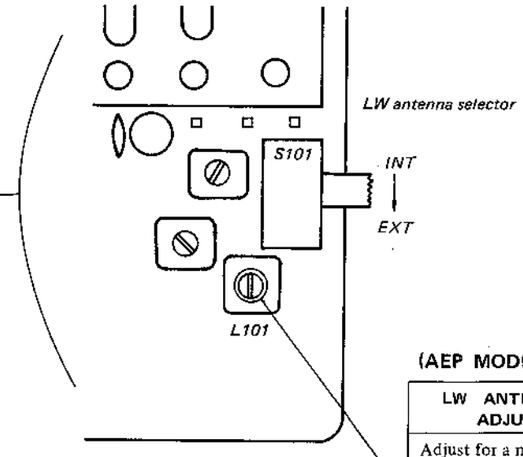
- Repeat the procedures in each adjustment several times, and the frequency coverage and tracking adjustments should be finally done by the trimmer capacitors.

DIAL INDICATION	LW FREQUENCY COVERAGE ADJUSTMENT	
	Adjust for a maximum reading on VOM ①.	
150kHz	L104	150kHz
310kHz	CT103	310kHz

AEP, UK model



LW TRACKING ADJUSTMENT	
Adjust for a maximum reading on VOM ①.	
L102	190kHz
CT102	310kHz



(AEP MODEL)

LW ANTENNA COIL ADJUSTMENT	
Adjust for a maximum reading on VOM ①.	
L101	190kHz

FM SECTION

FM DISCRIMINATOR ALIGNMENT 1

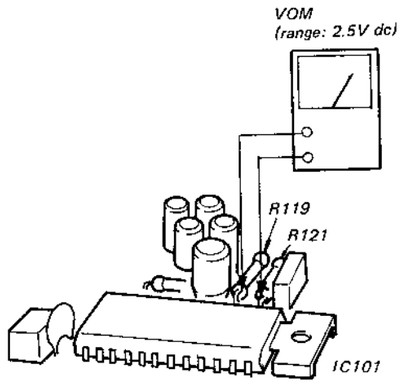
Setting:

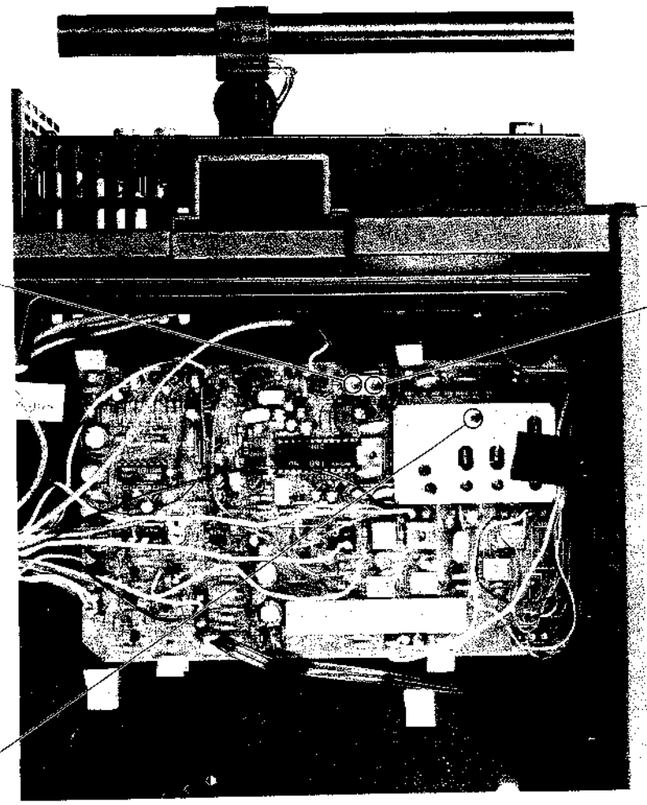
Control Unit: attached on the set (manual operation)
MANUAL TUNER FUNCTION switch: FM
MODE switch: MONO
TUNING: Detuned position

Procedure:

Adjust the orange core (primary-side) of L110 for 0V reading on VOM.

Note: When replacing the ceramic filter (CFU101), perform this alignment.

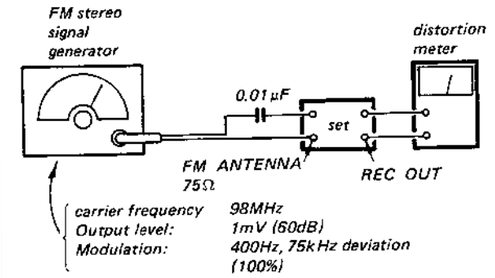




FM DISCRIMINATOR ALIGNMENT 2

Setting:

Control Unit: attached on the set (manual operation)
MANUAL TUNER FUNCTION switch: FM
MODE switch: MONO



Procedure:

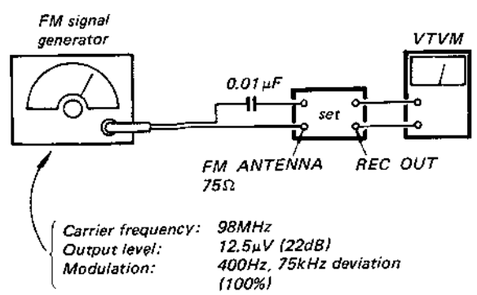
Adjust the black core (secondary side) of L110 for minimum distortion.

Since the FM front-end is supplied as an adjusted block part, FM IF ALIGNMENT, FM FREQUENCY COVERAGE ADJUSTMENT (1) and FM TRACKING ADJUSTMENT are unnecessary for ordinary service.

FM IF ALIGNMENT

Setting:

Control Unit: attached on the set (manual operation)
MANUAL TUNER FUNCTION switch: FM
MODE switch: MONO



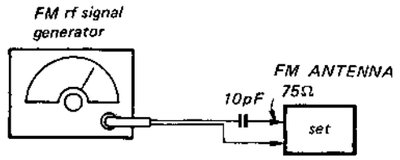
Procedure:

Adjust T1 for a maximum reading on VTVM.

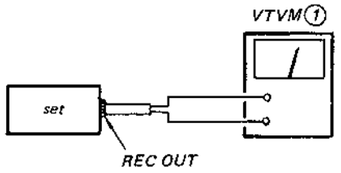
Since the FM front-end is supplied as an adjusted block part, FM IF ALIGNMENT, FM FREQUENCY COVERAGE ADJUSTMENT (1) and FM TRACKING ADJUSTMENT are unnecessary for ordinary service.

Setting:

Control Unit: attached on the set (manual operation)
MANUAL TUNER FUNCTION switch: FM
MODE selector: MONO

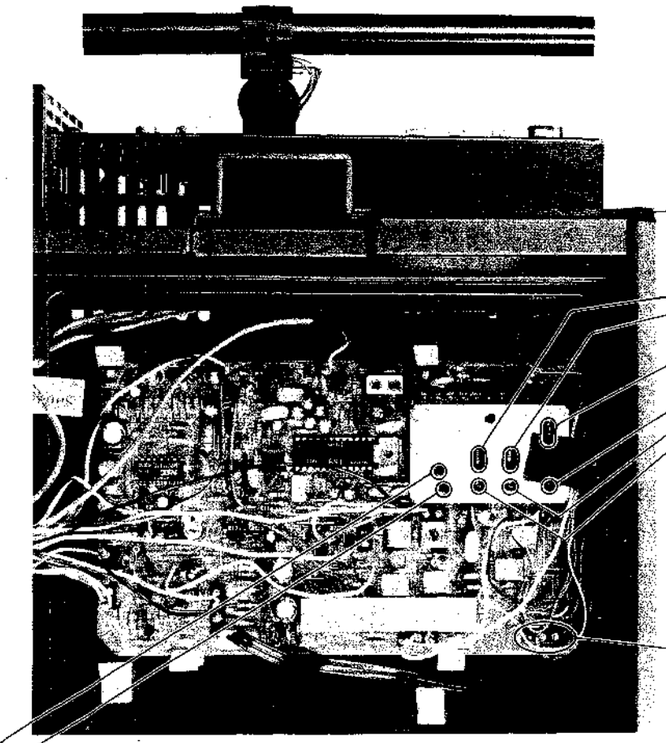


Modulation: 400Hz, 75kHz deviation (100%)



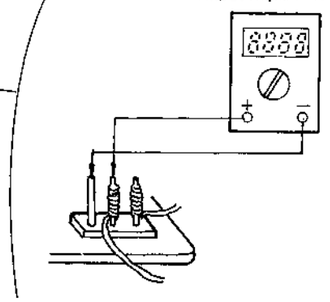
- Repeat the procedures in each adjustment several times, and the frequency coverage and tracking adjustments should be finally done by the trimmer capacitors.

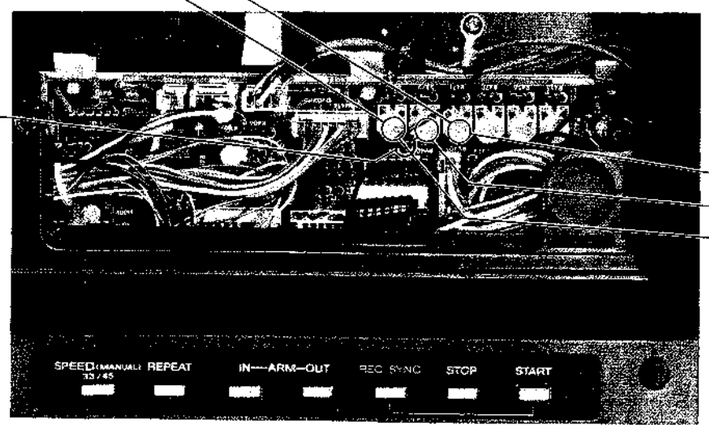
FM FREQUENCY COVERAGE ADJUSTMENT (1)			
Tuning Control Voltage Adjustment	Dial Indication	Digital VOM Reading	Adjustment Part
	maximum frequency	23V	RV1405
	minimum frequency	2.75V	RV1407
	Adjust for a specified reading on digital VOM.		
Local Oscillator Frequency Adjustment	Dial Indication	FM Rf Signal Generator Frequency	Adjustment Part
	90MHz	90MHz	L7
	106MHz	106MHz	TC4
	Adjust for a maximum reading on VTVM ① .		
Dial Pointer Setting	Dial Indication	FM Rf Signal Generator Frequency	Adjustment Part
	98MHz	98MHz	RV1406
	Adjust for a maximum reading on VTVM ① .		



FM TRACKING ADJUSTMENT	
Adjust for a maximum reading on VTVM① .	
L2/L4/L5	90MHz
TC1/TC2/TC3	106MHz

digital VOM (dc range)
(more than 1MΩ)
(input impedance)





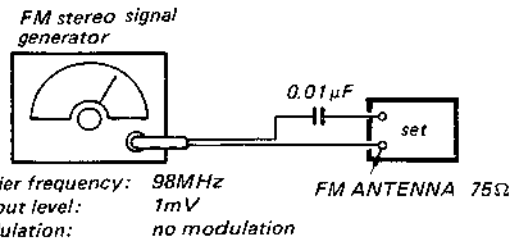
FM FREQUENCY COVERAGE ADJUSTMENT (2)		DIAL INDICATION
Adjust for a maximum reading on VOM① .		
RV405	106MHz	106MHz
RV406	98MHz	98MHz
RV407	90MHz	90MHz

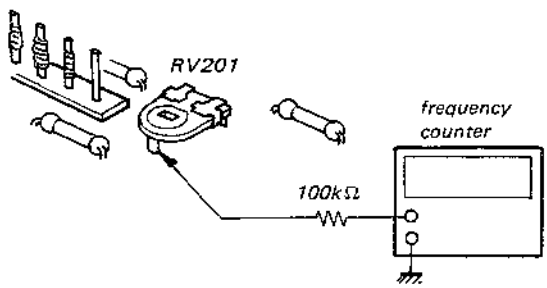
VCO Adjustment

Setting:

Control Unit: attached on the set (manual operation)
MANUAL TUNER FUNCTION switch: FM
MODE switch: STEREO/FM-AM MUTING

A) Regular Method





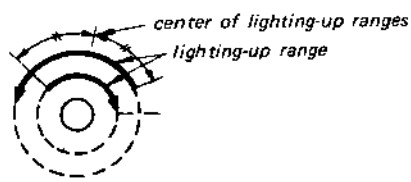
Procedure:

Adjust RV201 for 76kHz ±100Hz on the frequency counter.

B) Simple Method

Procedure:

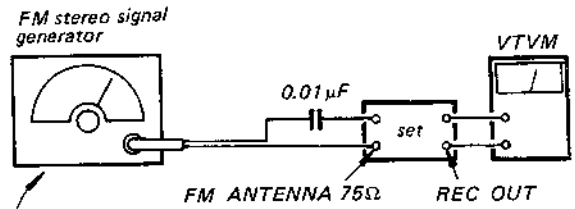
1. Tune the set to the FM stereo broadcasting signal.
2. Turn RV201 clockwise or counterclockwise and memorize the lighting-up range of STEREO lamp.
3. Secure at the center in lighting-up range of both turns as shown below.



FM Stereo Separation Adjustment

Setting:

Control Unit: attached on the set (manual operation)
MANUAL TUNER FUNCTION switch: FM
MODE switch: STEREO/FM-AM MUTING



Carrier frequency: 98MHz
Output level: 1mV (60dB)
Modulation:
Audio (400Hz): 20kHz deviation (50%)
Pilot (19kHz): 6.3kHz deviation (16%)
Sub channel (38kHz): 20kHz deviation (50%)

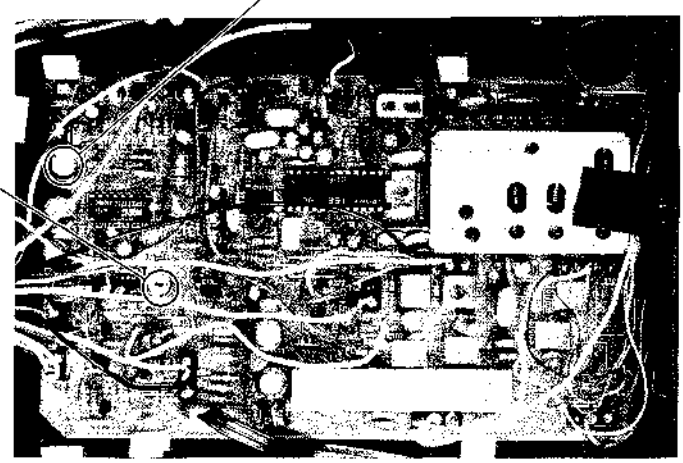
Procedure:

FM stereo signal generator output channel	VTVM connection	VTVM reading (dB)
L-CH	L-CH	Ⓐ
R-CH	L-CH	Ⓑ Adjust RV202 for minimum reading;
R-CH	R-CH	Ⓒ
L-CH	R-CH	Ⓓ Adjust RV202 for minimum reading.

L-CH Stereo separation: Ⓐ – Ⓑ
R-CH Stereo separation: Ⓒ – Ⓓ

The separations of both channels should be equal.

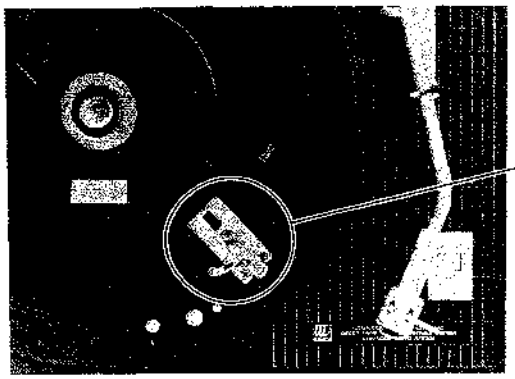
The difference between separations Ⓐ–Ⓑ and Ⓒ–Ⓓ are to be equal.

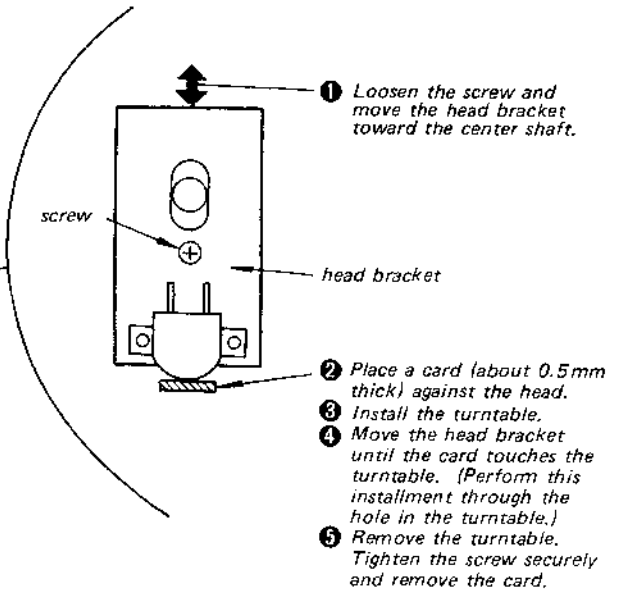


• RECORD PLAYER SECTION

Speed Detection Head Output Adjustment

Note: Before performing the adjustment, install the speed detection head as shown below. (Follow the numerical order given.)



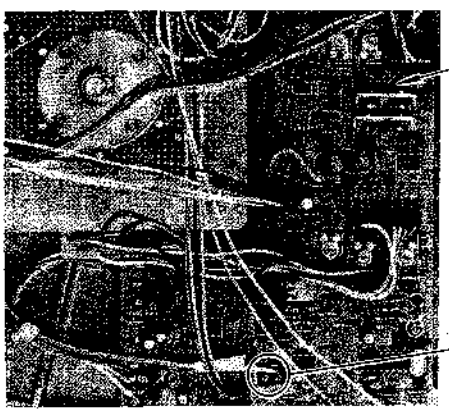


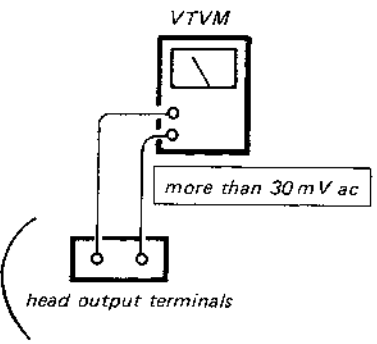
Setting:

speed: 33 rpm
turntable: rotating

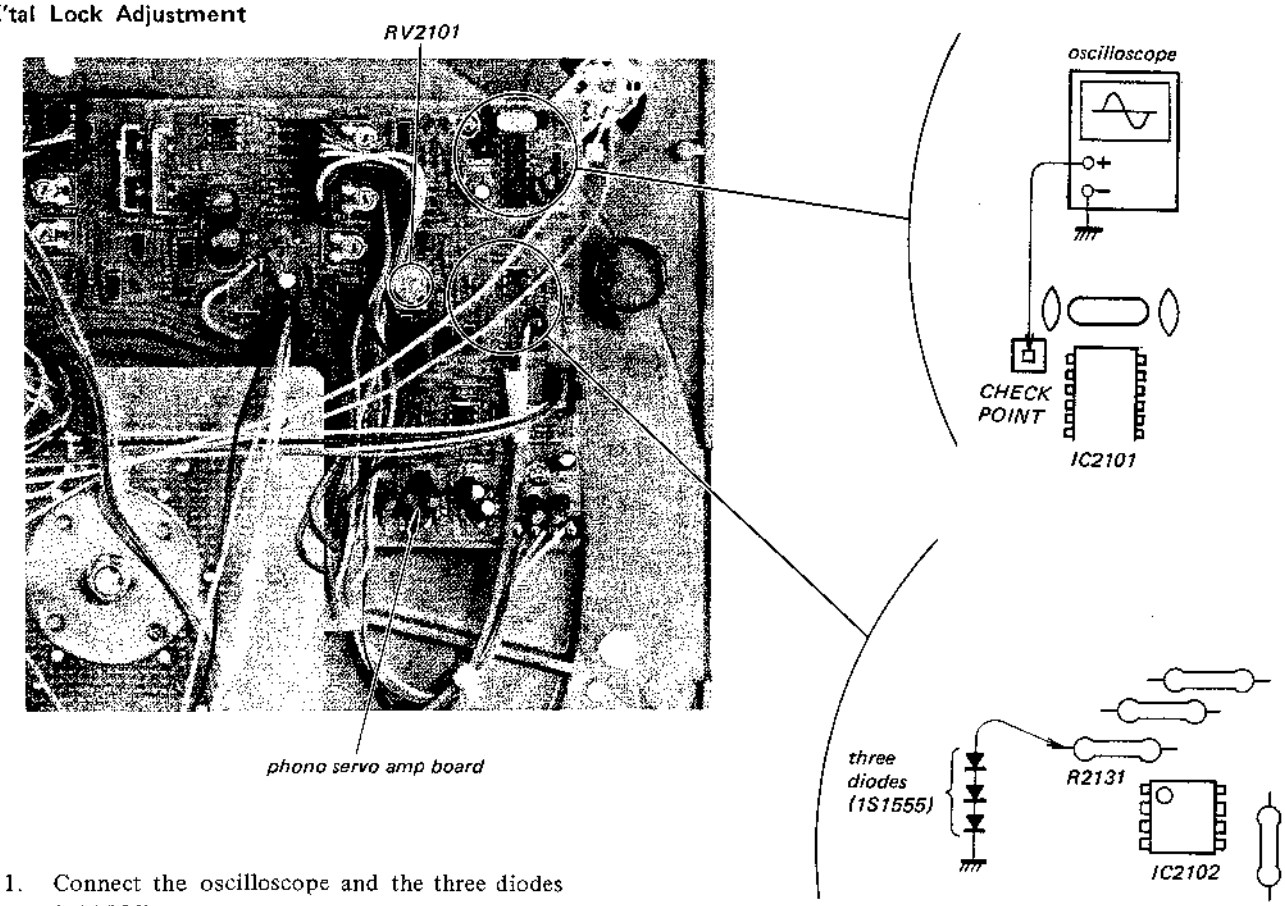
1. Loosen the screw and adjust the position of the head bracket to obtain more than 30mV ac at the head output terminals.
2. After performing the adjustment, confirm that the rotation of the turntable is normal. If the adjustment is not proper, it will result in worse wow and flutter.

Note: Confirm that there is more than 0.3 mm clearance between the magnetic coated rim of the turntable and the speed detection head.





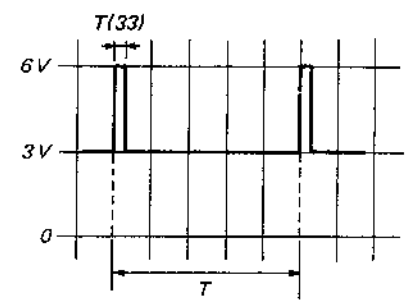
X'tal Lock Adjustment



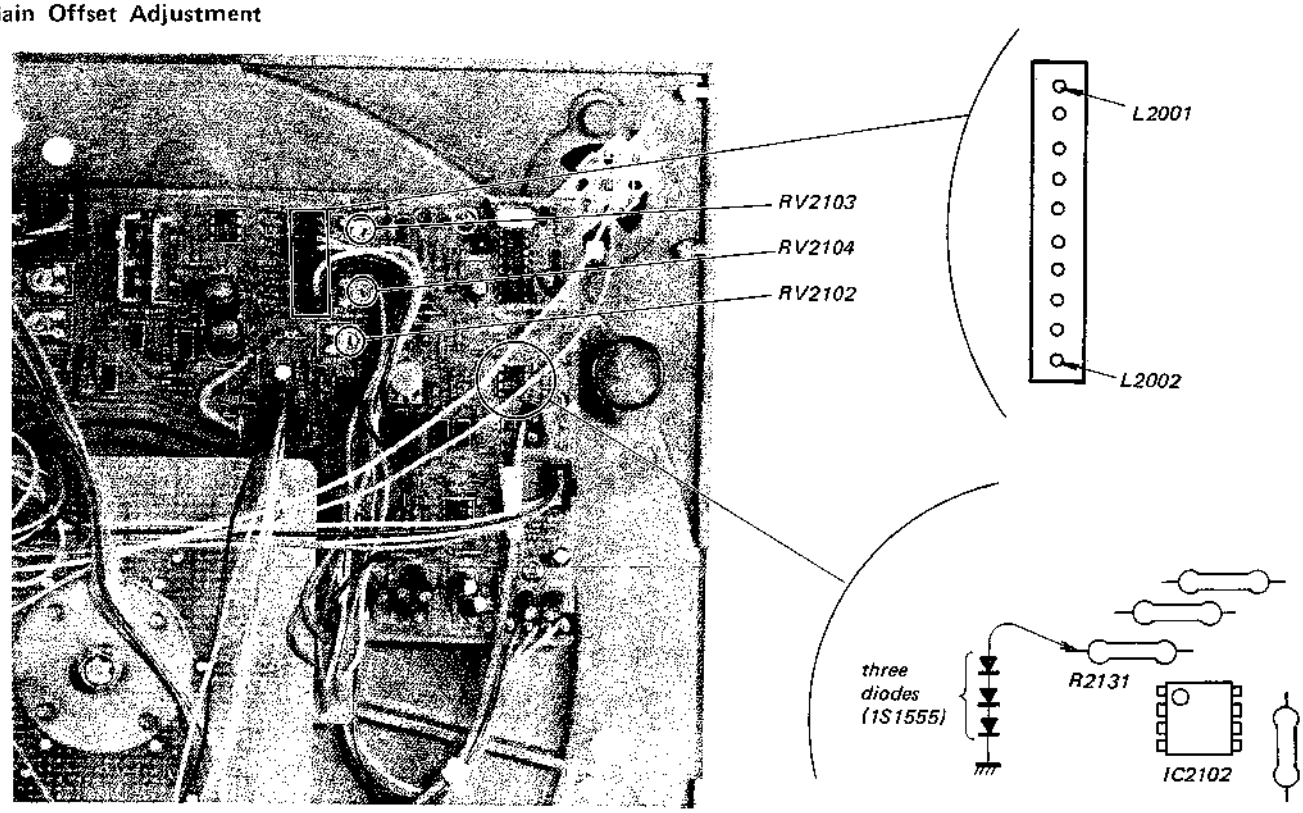
1. Connect the oscilloscope and the three diodes (1S1555).
2. Adjust RV2101 so that the waveform on the oscilloscope becomes as shown on the right at 33 rpm.

- The waveform on the oscilloscope:

$$\frac{T(33)}{T} \times 100 = 5(\%)$$



Gain Offset Adjustment

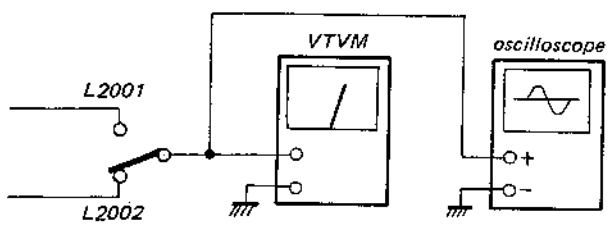


Hall Device Gain Adjustment

Setting:

SPEED switch: 33

1. Connect VTVM or oscilloscope to L2001 and read it.
2. Connect VTVM or oscilloscope to L2002 and adjust RV2102 for the same reading in step 1.



Motor Amp Offset Adjustment

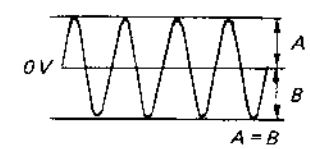
Setting:

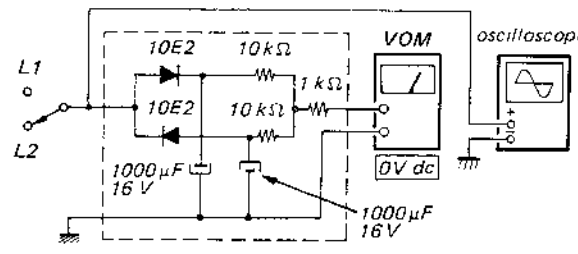
SPEED switch: 33

1. Connect VOM or oscilloscope to L2001 and adjust RV2103 for 0V dc VTVM reading or for the waveform on oscilloscope as shown below.
2. Connect VTVM or oscilloscope to L2002 and adjust RV2104 for 0V dc VTVM reading or for the waveform on oscilloscope as shown below.

Waveform on Oscilloscope:

Note: Set the sweep time longer for easy waveform checking.



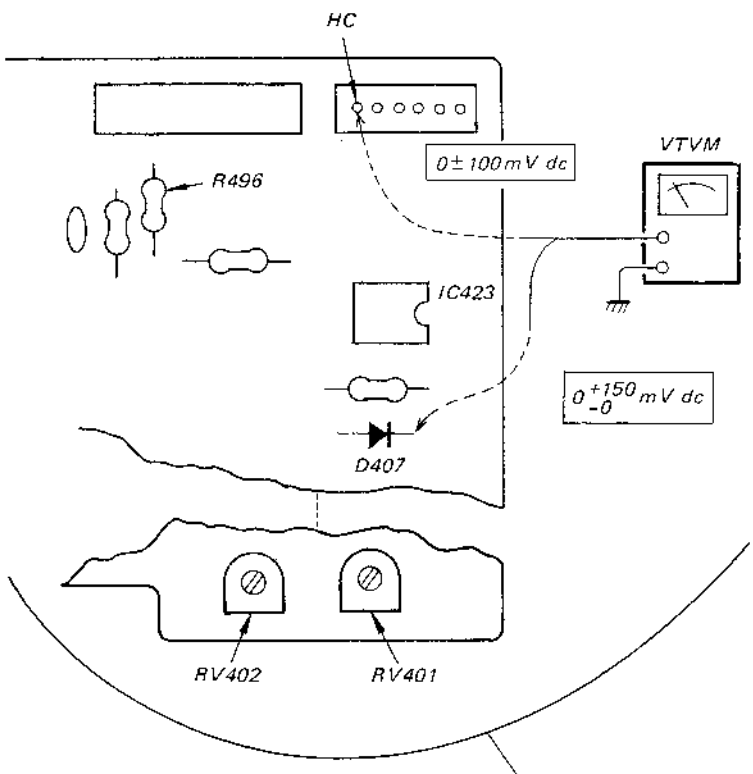


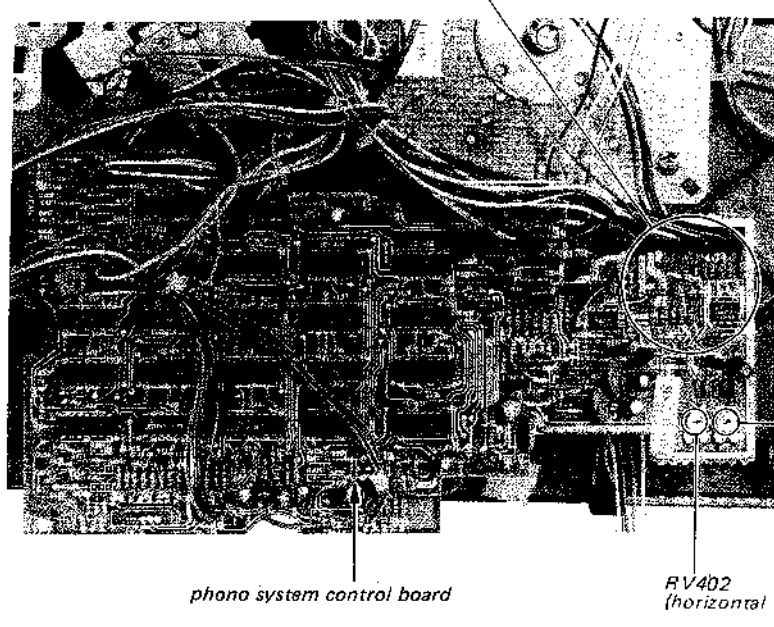
Horizontal Offset Adjustment

1. Set the ANTI-SKATING knob to the position other than BALANCE.
2. Fix the tonearm to the tonearm rest.
3. Adjust RV402 so that the HC voltage is within 0 ± 100 mV dc.

Return Detection Offset Adjustment

1. Set the ANTI-SKATING knob to the 'BALANCE' position.
2. Fix the tonearm to the tonearm rest.
3. Adjust RV401 to obtain 0^{+150}_{-0} mV dc at D407 (cathode side).

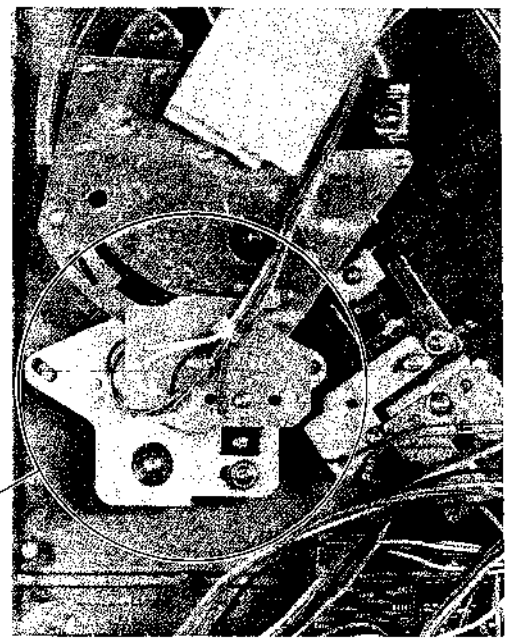


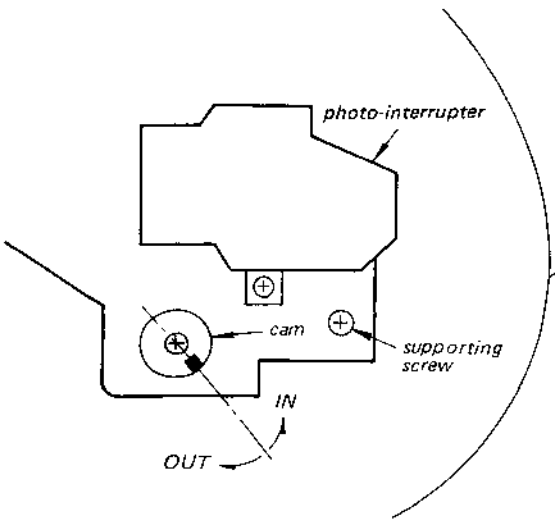


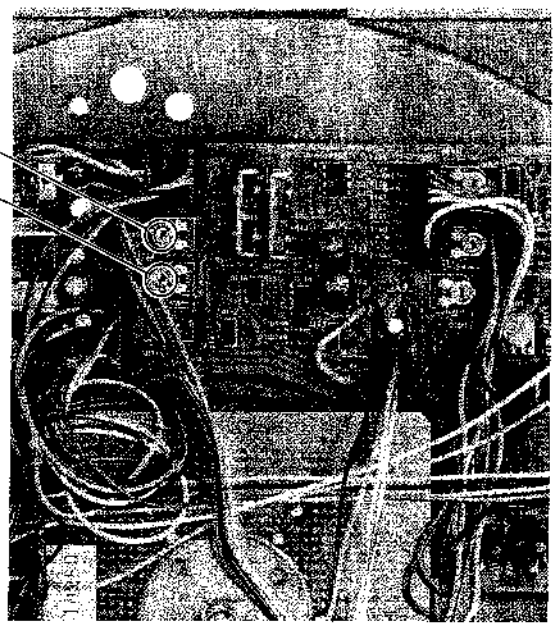
Lead-in Adjustment

To adjust 30, 25, 17cm lead-in position at the same time, adjust by moving the position of the photo-interrupter.

1. Loosen the supporting screw.
2. Adjust the lead-in position by moving the cam IN or OUT.
3. Tighten supporting screw securely.







- **25 cm lead-in**
  To adjust only the 25 cm lead-in position, adjust RV2202.
- **17 cm lead-in**
  To adjust only the 17 cm lead-in position, adjust RV2203.

• CASSETTE RECORDER SECTION

Note: The adjustment should be performed in the order given in this service manual. The adjustments should be performed for both L-CH and R-CH.

• Set the BIAS and EQ switches according to the tape as follows.

Tape	BIAS switch	EQ switch
CS-10	MED	TYPE I
CS-20	HIGH	TYPE II
CS-30	MED	TYPE III
CS-40	METAL	TYPE IV

• Switches and controls should be set as follows unless otherwise specified.

DOLBY NR. . . . . .OFF
EQ . . . . . .TYPE
BIAS. . . . . .MED
TIMER REC . . . . . .OFF
REC MUTE. . . . . .OFF

• Standard Record:

Deliver the standard input signal level to the input jack and set the REC LEVEL control to obtain the standard output signal level.

Standard Input Level

	MIC	AUX
source impedance	600Ω	600Ω
input level	0.77mV (−60dB)	25mV (−30dB)

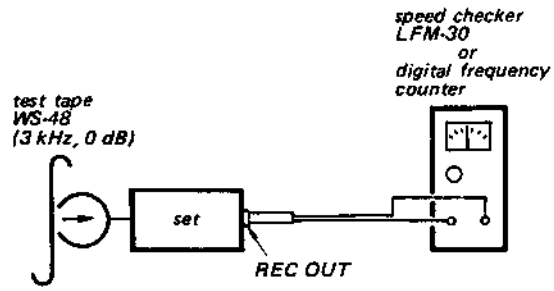
Standard Output Level

	REC OUT
load impedance	47kΩ
output level	0.14V (−15dB)

Tape Speed Adjustment

Procedure:

Mode: playback

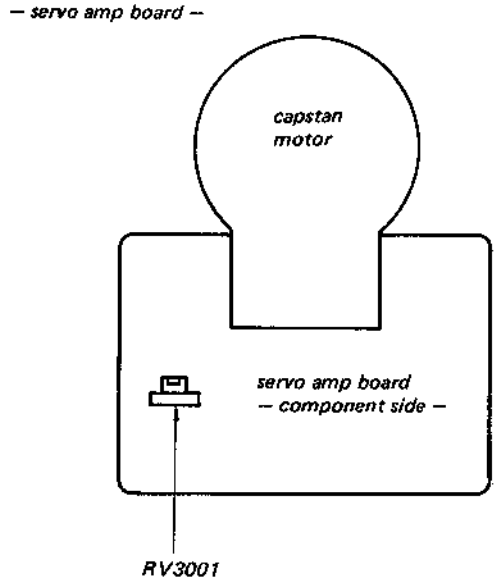


Specification:

Speed checker	Digital frequency counter
−0.7 to +0.7%	2,980 to 3,020Hz

Frequency difference between the beginning and the end of the tape should be within 0.7% (20 Hz).

Adjustment Location:

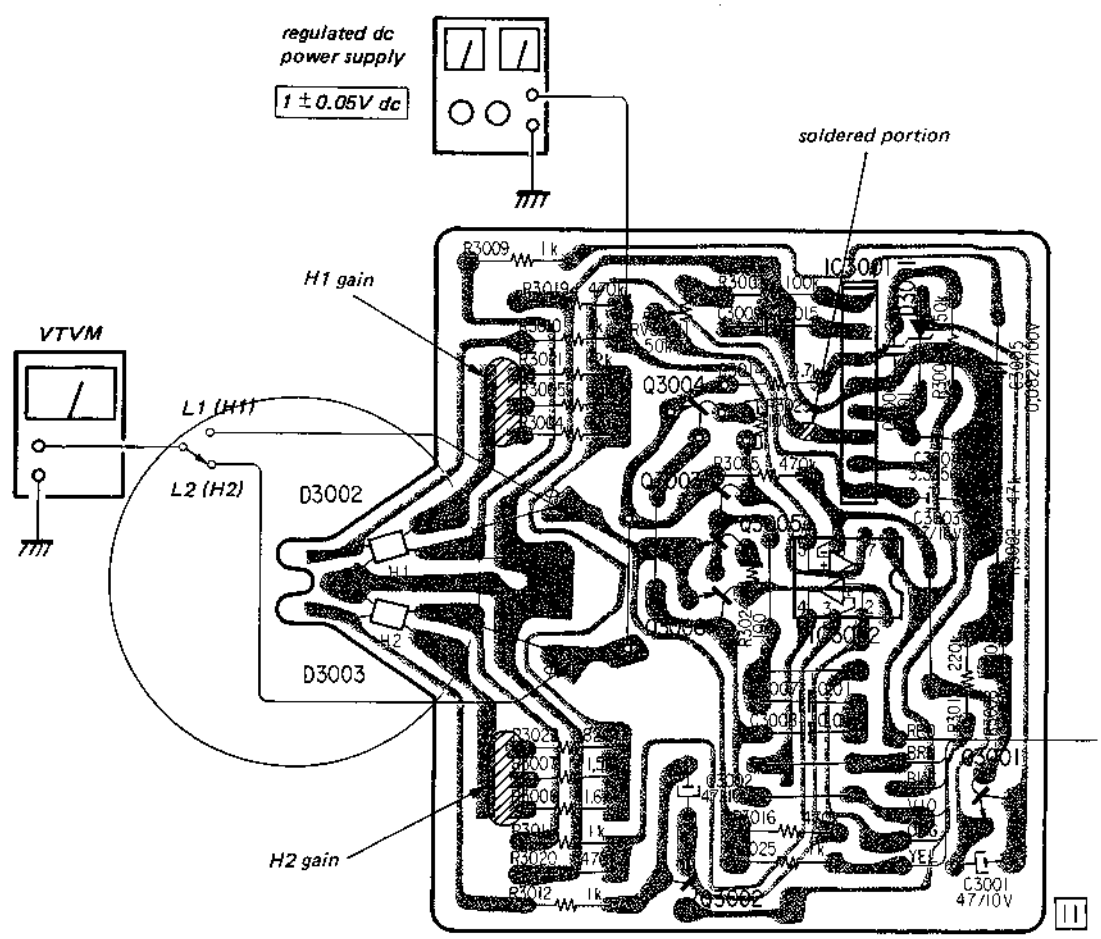


Capstan Motor Gain Adjustment

Procedure:

Mode: playback

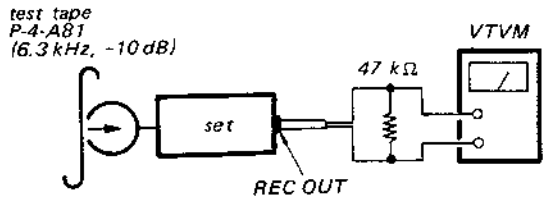
1. Unsolder the soldered portion as shown below and connect the regulated power supply.
2. Connect VTVM to L1 and change the pattern connection for 2.83 ± 0.25V ac on the VTVM.
3. Connect VTVM to L2 and change the pattern connection for 2.83 ± 0.25V ac on the VTVM.
4. Solder the portion which has been unsoldered



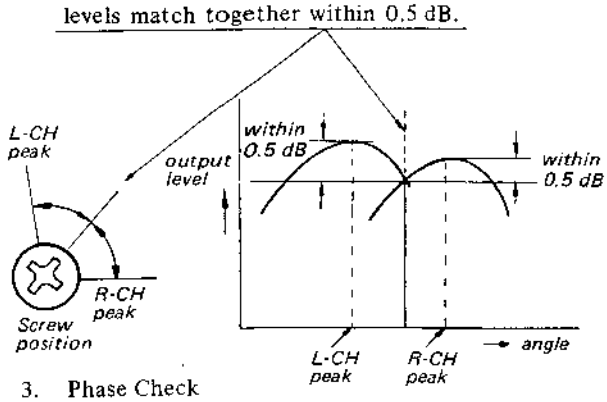
Record/playback Head Azimuth Adjustment

Procedure:

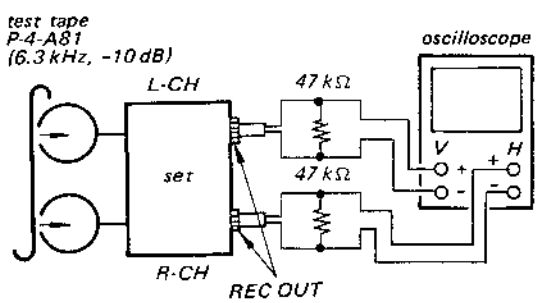
1. Mode: playback

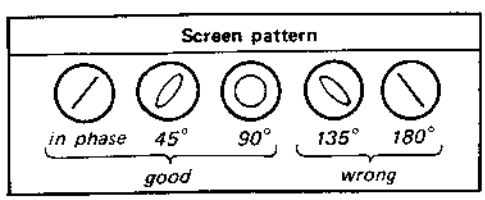


2. Turn the adjustment screw for the maximum output levels. If these levels do not match, turn the adjustment screw until both of output levels match together within 0.5 dB.

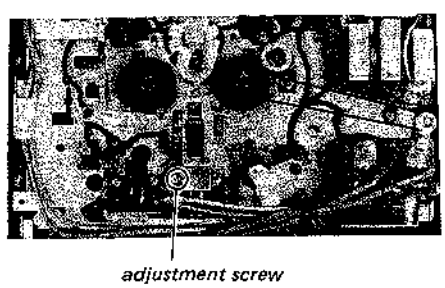


3. Phase Check
   Mode: playback





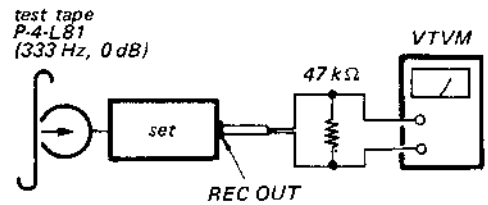
Adjustment Location:



Playback Level Adjustment

Procedure:

Mode: playback

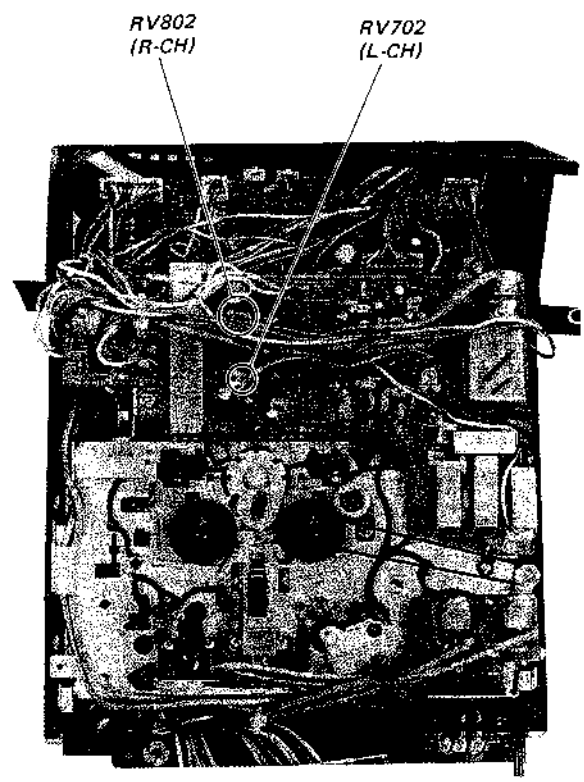


Specification:

REC OUT level: 0.52 – 0.59 V
(−3.5 to −2.5 dB)
Level difference between channels:
less than 0.5 dB
Check that the REC OUT level does not change in playback mode while changing the mode from playback to stop several times.

Adjustment Location:

– cassette board –



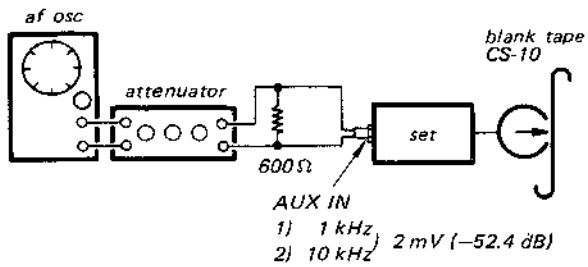
Record Bias Adjustment

Setting:

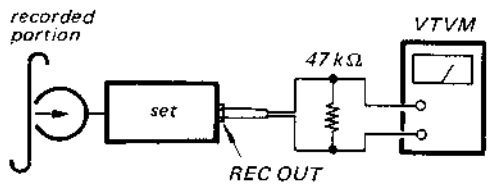
REC LEVEL control: standard record
(See page 45.)

Procedure:

1. Mode: record



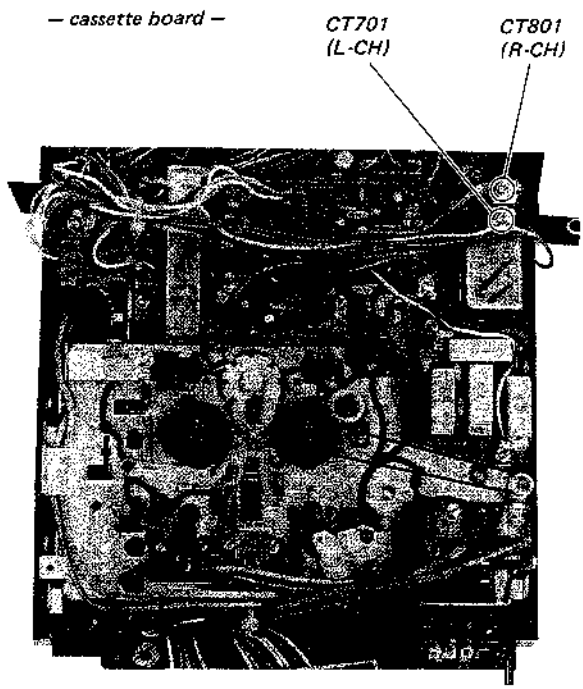
2. Mode: playback



Confirm that the REC OUT level of 10kHz signal is –0.5 ± 0.5 dB relative to that of 1 kHz.
If necessary, adjust CT701 (L-CH) and CT801 (R-CH) and repeat steps 1 and 2.

Adjustment Location:

– cassette board –



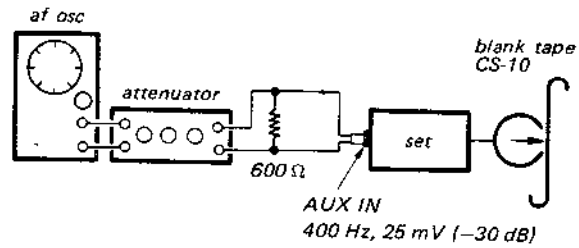
Record Level Adjustment

Setting:

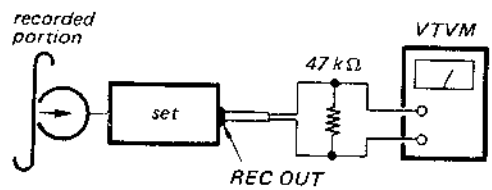
DOLBY switch: OFF
REC LEVEL control: standard record
(See page 45.)

Procedure:

1. Mode: record



2. Mode: playback

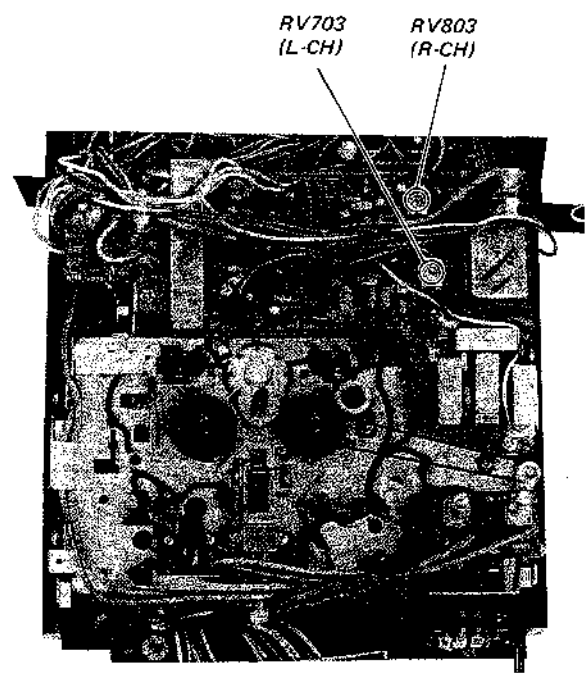


Specification:

REC OUT level: 0.14V (–15dB)

Adjustment Location:

– cassette board –

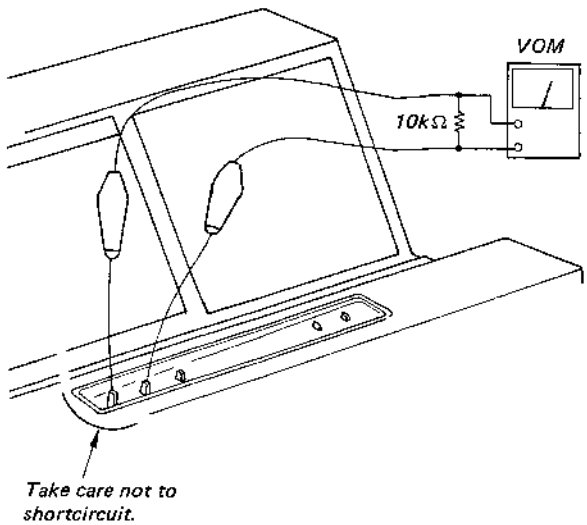


OTHER SECTION

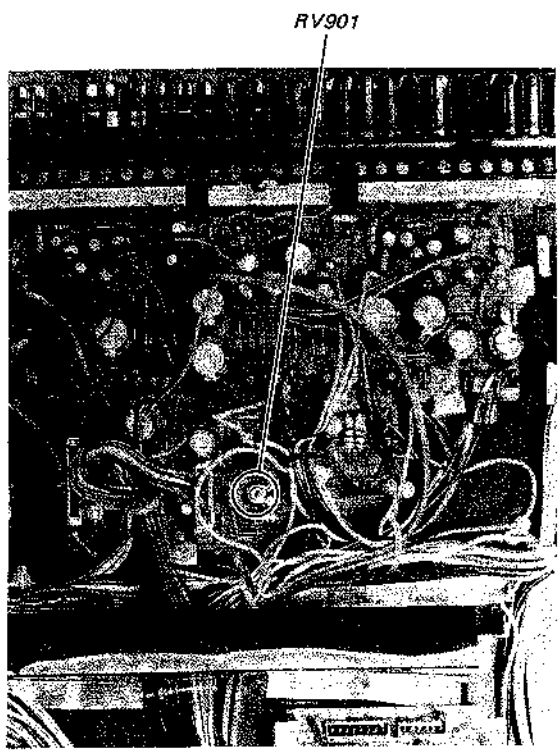
Control Unit Charging Adjustment

Procedure:

Adjust RV901 for 4.1 – 4.2V VOM reading.



Adjustment Location: power board

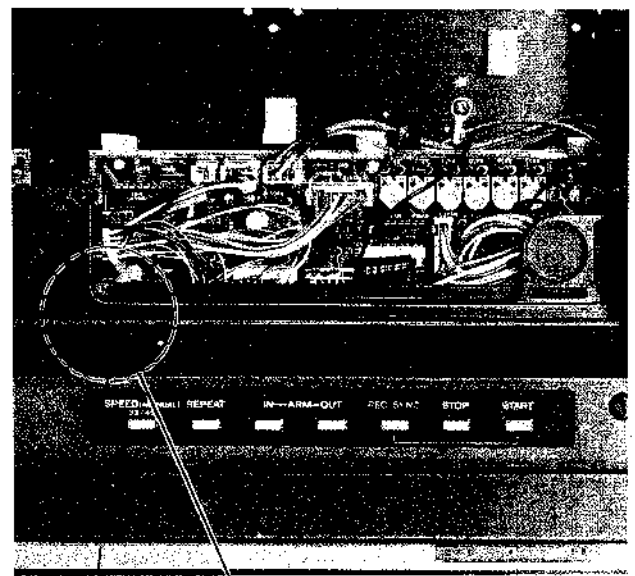


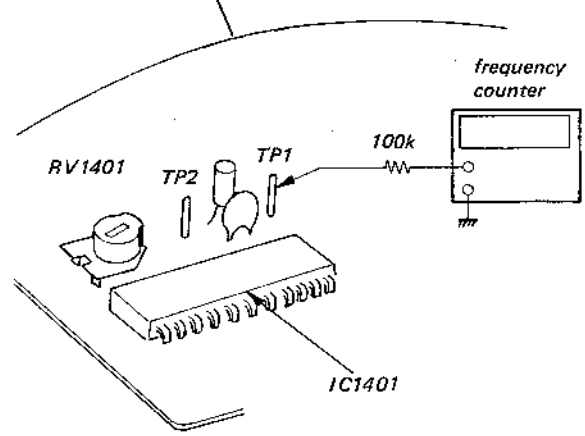
Control Unit Receiving Clock Adjustment

Procedure:

1. Press the VOLUME UP or DOWN button so that the 1 to 4 VOLUME indicator elements light.
2. Adjust RV1401 for 11,000 ± 100Hz reading on the frequency counter.

Adjustment Location: remote control logic board





VOLUME Indicator Adjustment

Setting:

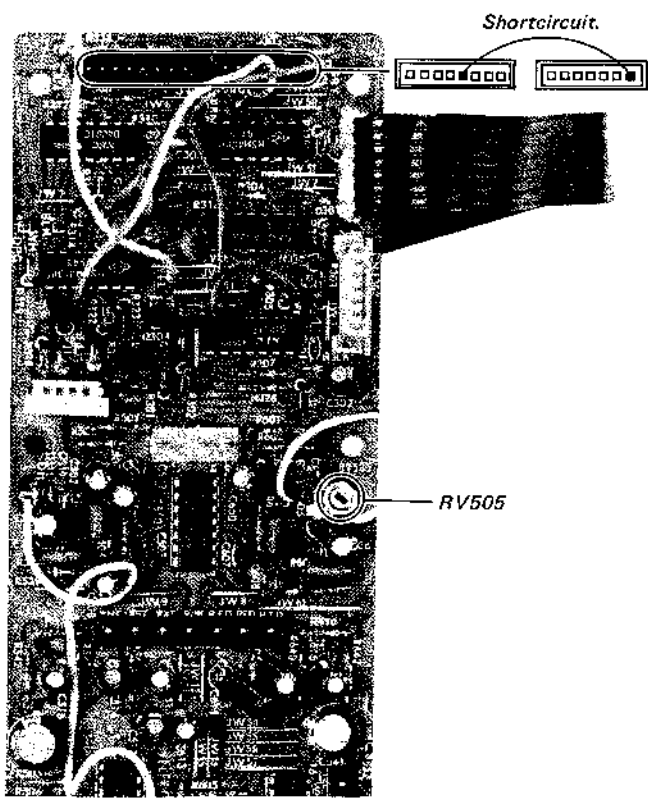
Control Unit: AUX
VOLUME UP (for maximum)
PRESET VOL: MAX

Procedure:

1. Shortcircuit as shown below.
2. Turn RV505 fully clockwise.
3. Turn RV505 counterclockwise and stop it just when the five VOLUME indicator elements light.
4. Press the OFF button and confirm that the five elements light. If necessary, turn RV505 counterclockwise a little so that the fifth element lights.
5. Confirm as follows.

Step	Pressed button	Lighting elements
1	VOLUME DOWN	5 → 0
2	VOLUME UP	0 → 5
3	MUTING	0
4	MUTING	5

Adjustment Location: EQ function board

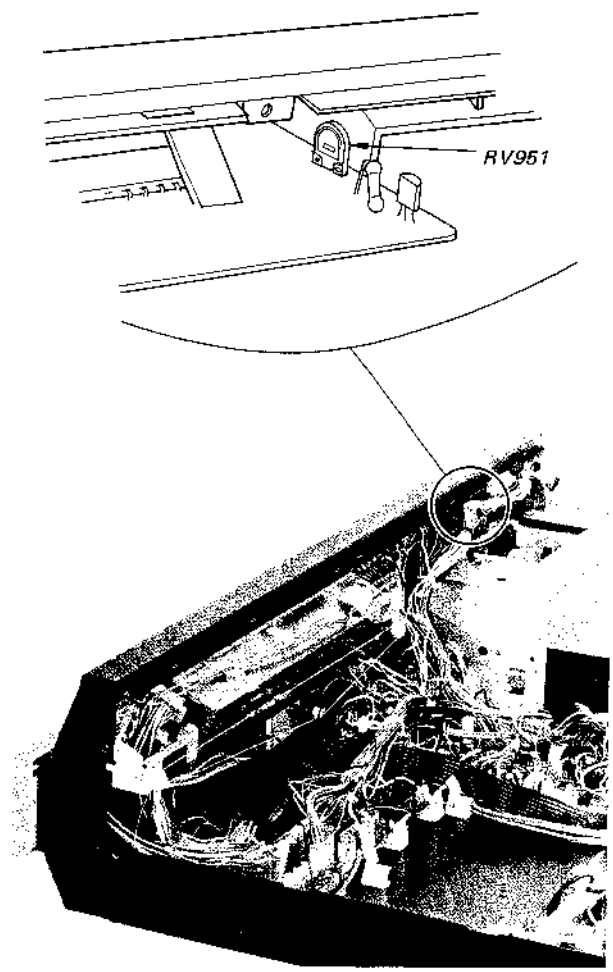


Dimmer Adjustment

Procedure:

Cover the DIMMER window (PC951) by hand and adjust RV951 to dim the time display. Confirm that the time display is brightened automatically when moving the hand.

Adjustment Location: timer (A) board



SECTION 4
DIAGRAMS

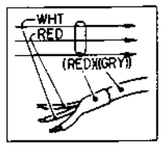
Note For Schematic Diagrams:

- All capacitors are in μF unless otherwise noted. pF : μμF
  50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in ohms, ¼W unless otherwise noted.
  kΩ : 1000Ω, MΩ : 1000kΩ
- : nonflammable resistor.
- : fusible resistor.
- △ : internal component.
- : panel designation.
- : adjustment for repair.
- ——: B+ bus.
- — — —: B- bus.
- Voltages are dc with respect to ground unless otherwise noted.
- Readings are taken under no-signal (detuned) conditions with a VOM (20kΩ/V).
  ( ) : AM
- , : signal path

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

Note For Mounting Diagrams:

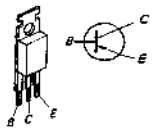
- Color code of sleeving over the end of the jacket.



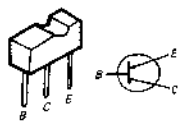
- ■ : part mounted on the conductor side.
- : indicates side identified with part number.
- ▲ : nonflammable resistor.
- Ⓕ : fusible resistor.
- ⊗ : Through hole.
- : B + pattern
- : B — pattern
- : signal path
- : L-CH signal path
- : R-CH signal path
- ——— : component side pattern.

SEMICONDUCTOR LEAD LAYOUTS

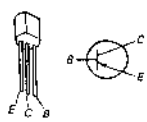
2SA671
2SA755



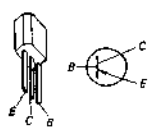
2SA786
2SB642
2SB793



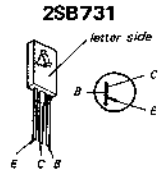
2SA952
2SA1015Y



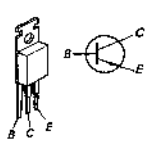
2SA1027R



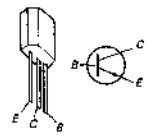
2SB548
2SB731



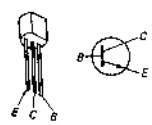
2SB834
2SC1061
2SC1419
2SD880



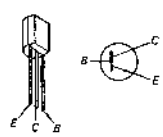
2SC634



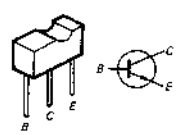
2SC1362
2SC1364
2SC1475
2SC1632
2SC1815
2SC1815Y



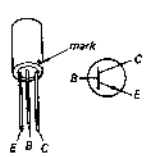
2SC1959
2SD789



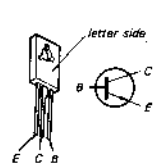
2SC2021
2SD637
2SD973



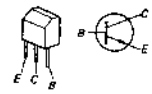
2SD187



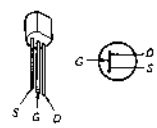
2SD414
2SD809
2SD998



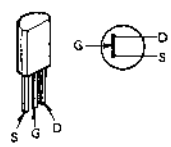
2SD774



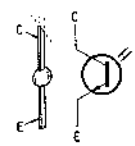
2SK30A



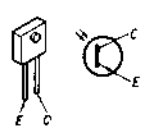
2SK117BL



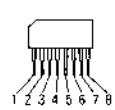
PH101



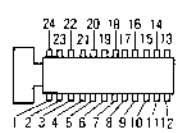
PH103



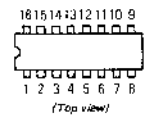
CX069



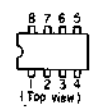
CX168



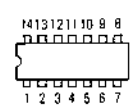
CX174
MSM5811
MSM5953
SN76043N
TC40175BP
μPC1161C
μPD4049C
μPD4050C



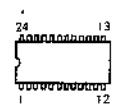
NJM4558
NJM4558DFA
TL489CP
μPC4558
μPC4558C



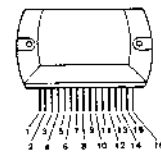
LA3122
MSM4001
MSM4011
MSM4013
MSM4023
MSM4025
MSM4069
TC4078BP
TC4093BP
μPD4001C
μPD4011C
μPD4013C
μPD4023C
μPD4025C
μPD4069C
μPD4071C
μPD4081C



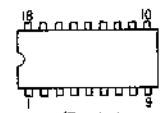
MSM4514



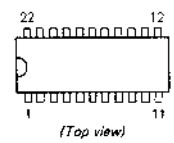
SI1340H



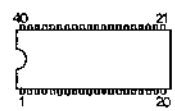
S2600



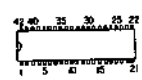
S2601



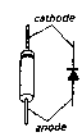
TMS1943N2L



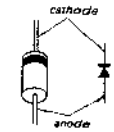
μPD547C042



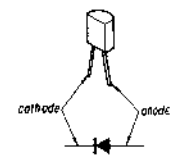
1N60
1S1555
1T22AM
1T261
10E2
HZ33-1
HZ33-2
HZ33-1L
HZ33-2L
HZ33-3L
HZ6B1L
HZ6B2L
RD5.6E27S
RD5.6EB2Z
RD20E5
RM1Z



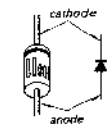
1S18B5
S2V20
SR105D



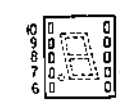
1SV118



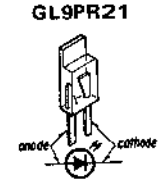
EQA01-06R
EQB01-06
EQB01-07
EQB01-11Z
EQB01-18
EQB01-21
EQB01-32



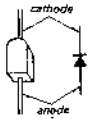
GL9N03DS



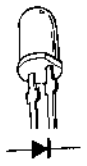
GL9NG521
GL9PR21



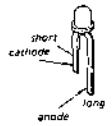
RA1Z



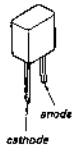
SE303A



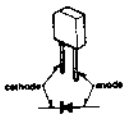
SR105D



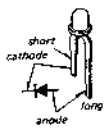
SR110



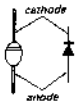
PH302A



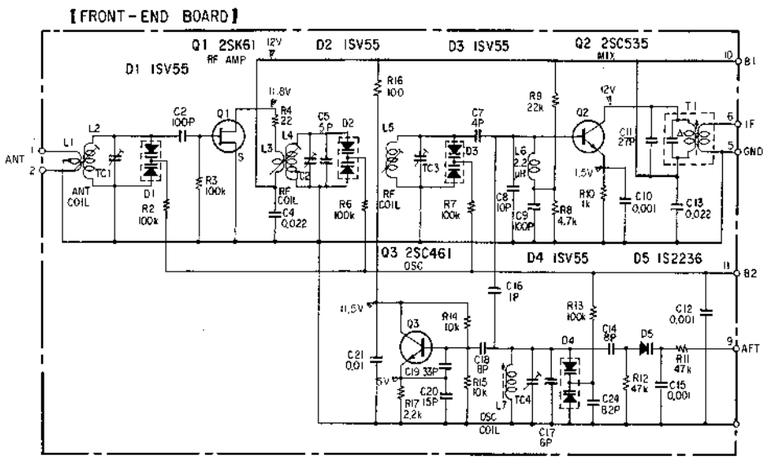
TLR124



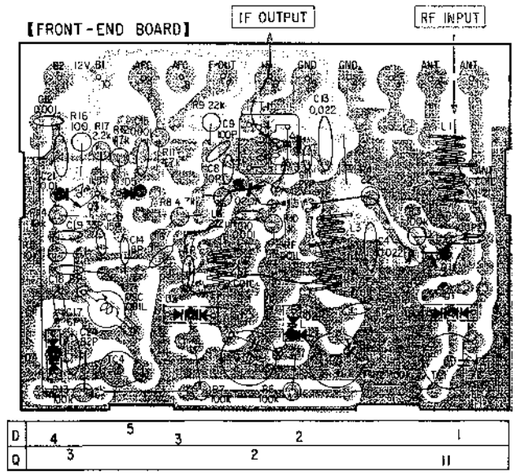
GH3F
U05G



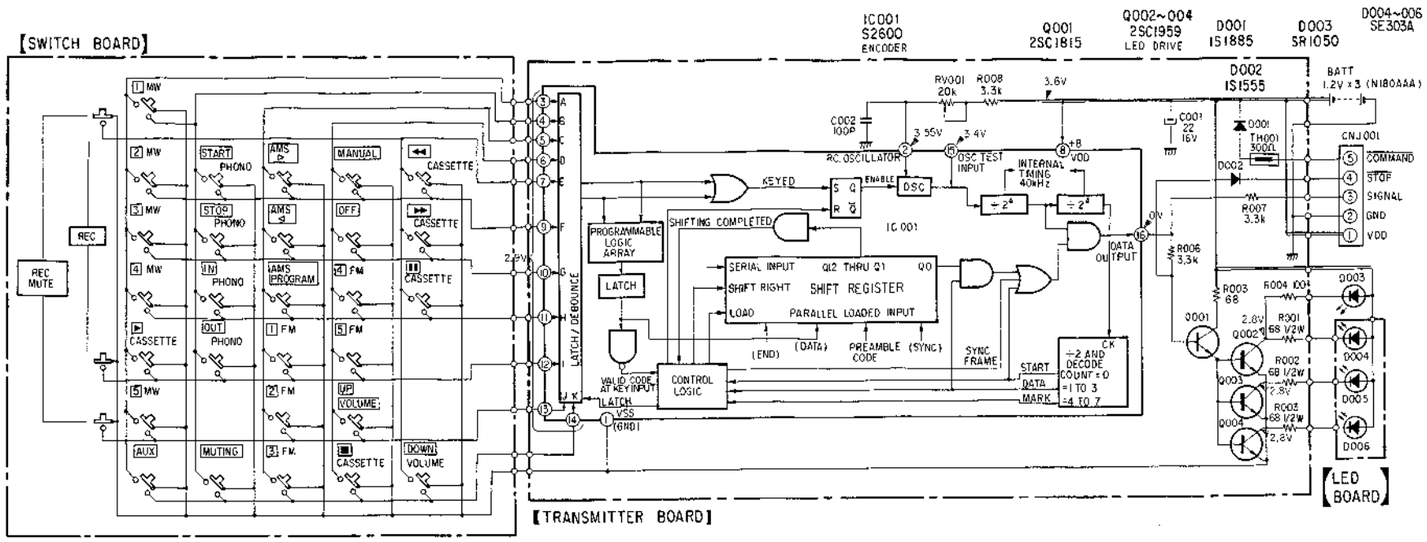
4-1. SCHEMATIC DIAGRAM



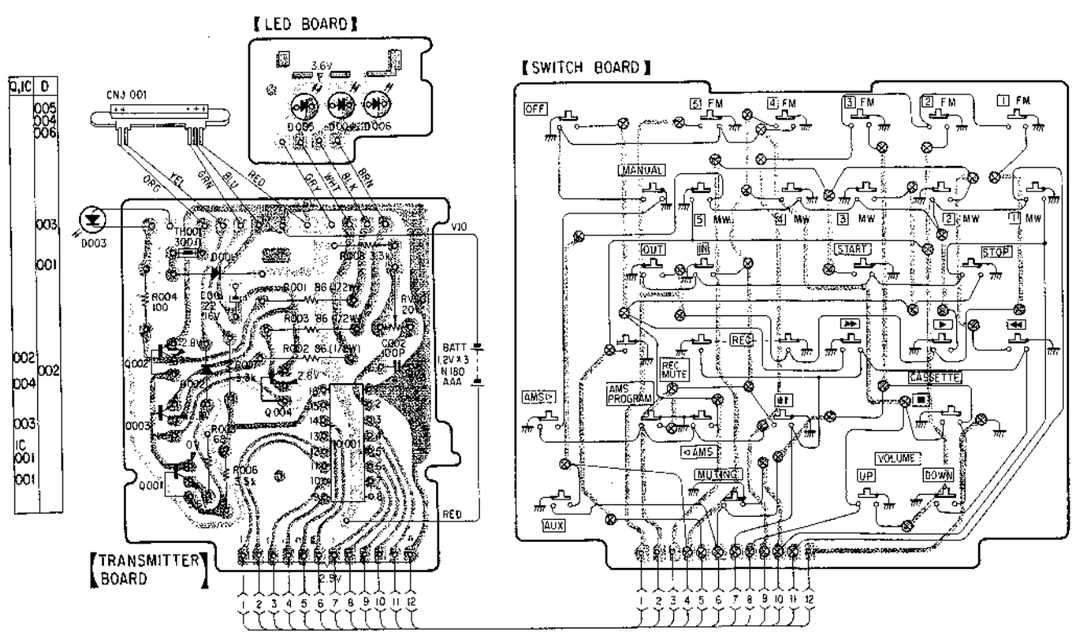
4-2. MOUNTING DIAGRAM



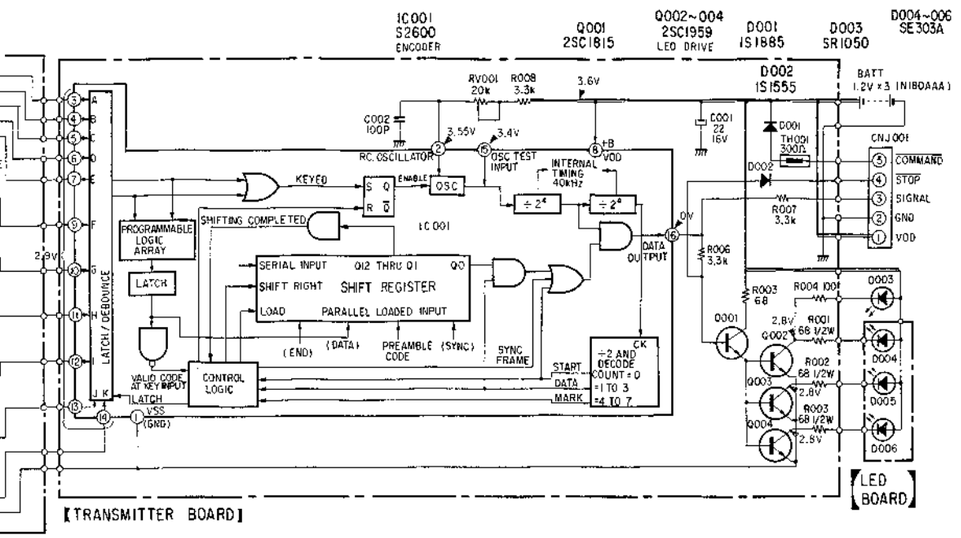
4-3. SCHEMATIC DIAGRAM

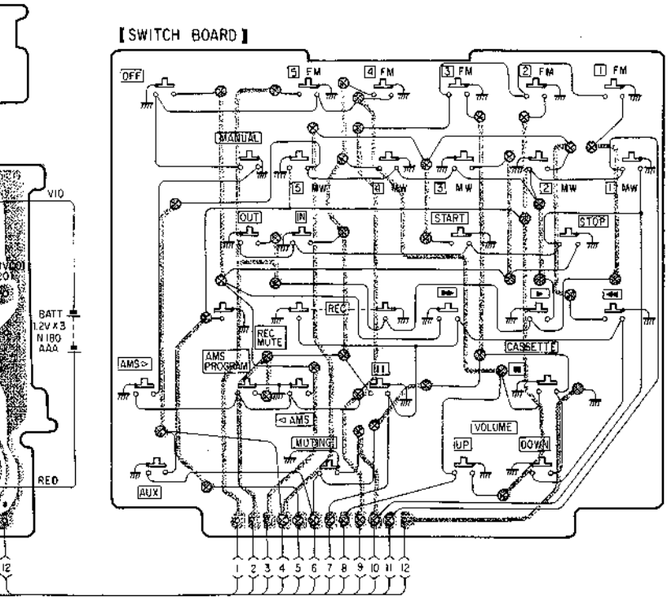


4-4. MOUNTING DIAGRAM



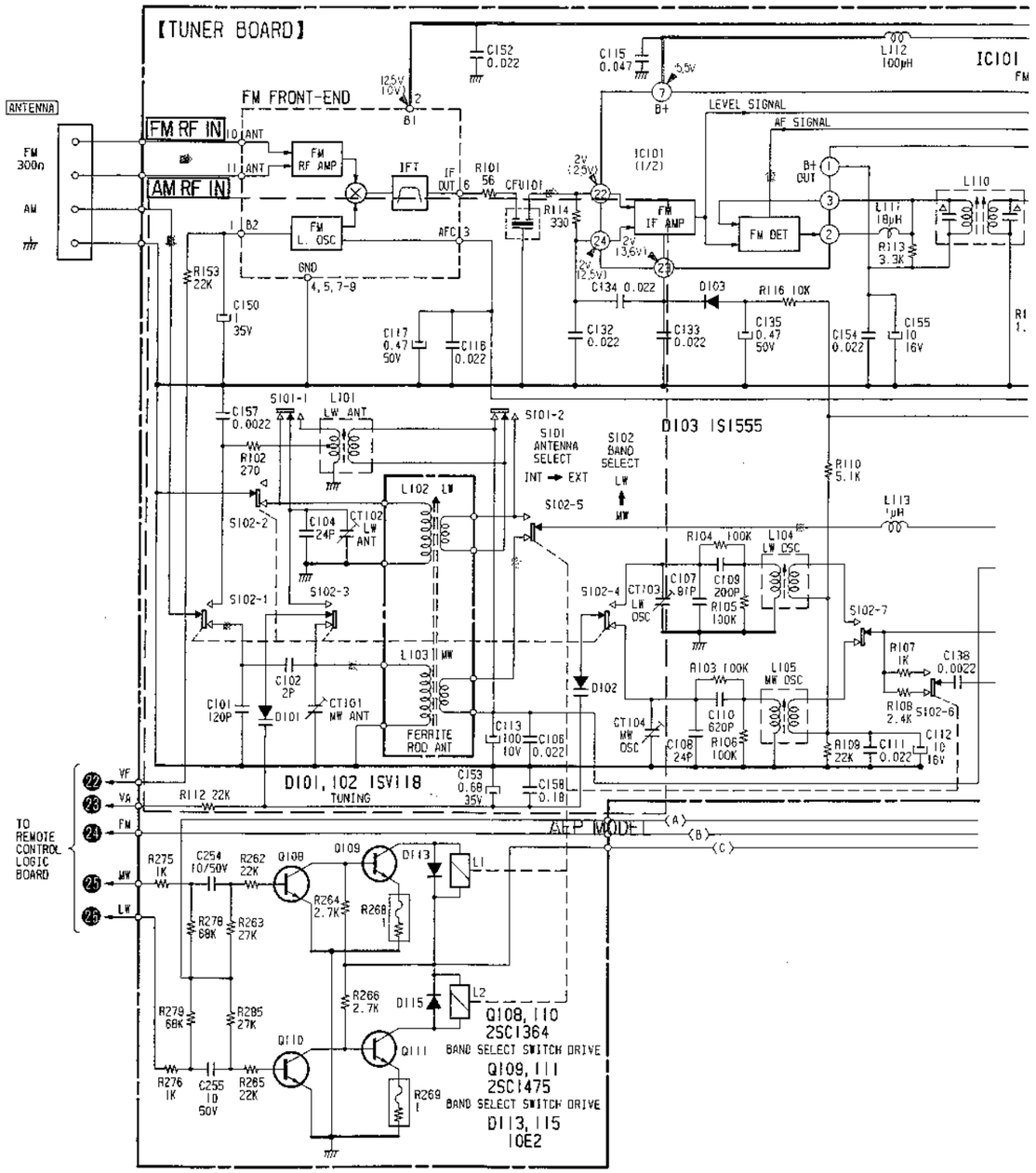
F G H





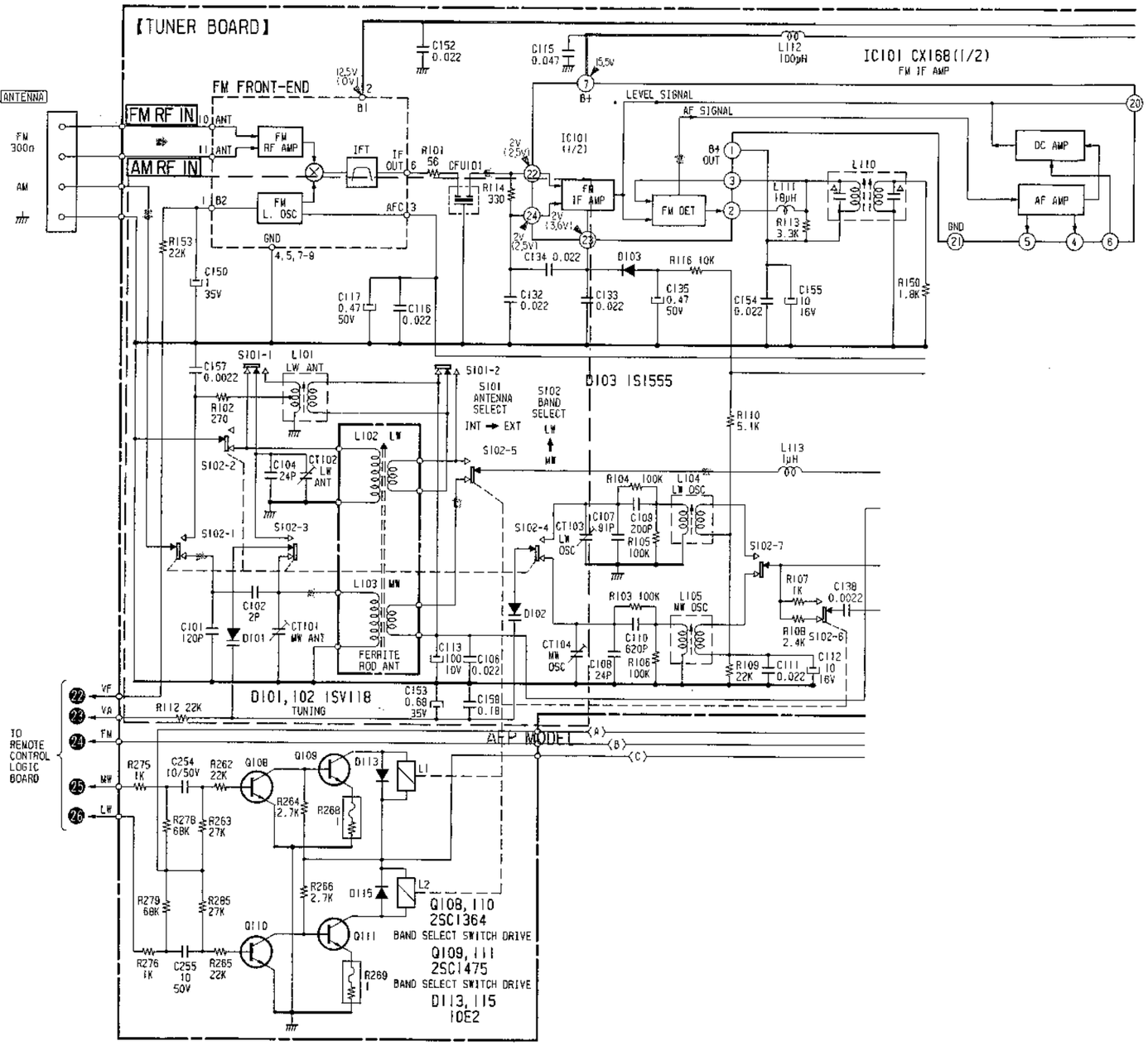
A B C D

4-5. SCHEMATIC DIAGRAM

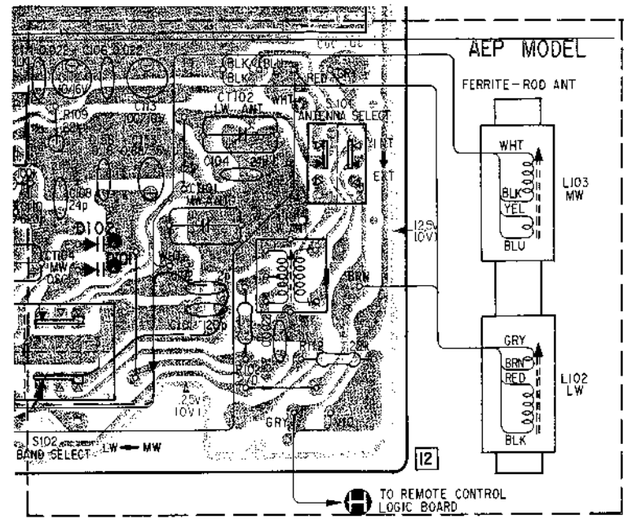


A B C D E F G H

4-5. SCHEMATIC DIAGRAM



4-6. MOUNTING DIAGRAM



1 2 3 4 5

4-7. SCHEMATIC DIAGRAM

TC AMP/TUNER/AUDIO AMP (AEP, UK MODEL) HMK-9000 HMK-9000 TC AMP/TUNER/AUDIO AMP (AEP,

TC AMP/TUNER/AUDIO AMP (AEP, UK MODEL) HM

F G H I J K L M

【SIGNAL INDICATOR BOARD (1/2)】

【EQ FUNCTION BOARD】 IC501 LA3122 EQ AMP IC502, 602 SN76043 INPUT SELECT

【TONE BOARD】 IC504 μPC4558 DC AMP

【POWER BOARD】

【METER BOARD】

Q101, 103 2SC1362 MUTING

Q112, 113 2SC1362 MUTING

Q114 2SC1364 SIGNAL LEVEL SWITCH

D106-110 GL9NG521 SIGNAL

IC102 TL488 LED DRIVE

D111 GL9PR21 FM STEREO

D116 IS1555

D117 IS1555

IC201 μPC1161C MPX

Q104, 105 2SC1364 SWITCHING

Q106 2SC1364 SWITCHING

Q107 2SC1364 FM/AM SELECT

Q501, 601 2SC1364 MUTING

Q505, 605 2SC1364 MUTING

D510-512 IS1555

Q506 2SA733 BUFFER

Q606 2SA733 BUFFER

0502-506, 509 IS1555

Q704, 804 2SC1364 MUTING

Q803 2SC1364 MUTING

IC702 μPC4558 DC AMP

D701, 702 D801, 802 D707, 708 D807, 808 IS1555

D704, 804 1T22

D703, 803 1T22

D705, 805 IS1555

Q705, 805 2SC1364 MUTING

Q904 2SD438 SWITCHING

Q905 2SD414 VOLTAGE REG

Q908 2SB548 VOLTAGE REG

Q906 2SC1475 CHARGE ADJ

TO PHONO BOARD

TO TAPE CASSETTE SYSTEM CONTROL BOARD

TO REMOTE CONTROL LOGIC BOARD

TO FUNCTION DISPLAY BOARD

LEVEL METER REC LEVEL & POWER

J K L M N O P Q

1 2 3 4 5

IC501 LA3122 EQ AMP

IC502, 602 SN76043 INPUT SELECT

Q505, 605 2SC1364 MUTING

Q501, 601 2SC1364 MUTING

D510-512 1S1555

Q606 2SA733 BUFFER

Q506 2SA733 BUFFER

[TONE BOARD]

TO TAPE CASSETTE SYSTEM CONTROL BOARD

Q502, 602 2SC1362 TONE AMP

Q604 2SA733 SWITCH

IC504 μPC4558 DC AMP

BASS TREBLE BALANCE

D502-506, 509 1S1555

STANDBY

TO REMOTE CONTROL LOGIC BOARD

[POWER BOARD]

Q503, 603 2SA733 MUTING

IC503, 603 SI1340H POWER AMP

Q507 2SC1364 SWITCH

D501, 601 EQA01-21R

D602 EQA01-07R

[HEADPHONE BOARD]

J501 HEADPHONES

TM501 L-CH AF OUT

TM601 R-CH AF OUT

SPEAKER A SPEAKER B

[TONE BOARD]

[EQ FUNCTION BOARD]

D356 EQA01-07R

D351-355 GL8PR21

VOLUME

IC351 TL488 VOLUME METER

[SIGNAL INDICATOR BOARD(1/2)]

TO REMOTE CONTROL LOGIC BOARD

TO PHONO SERVO AMP BOARD

TO TAPE CASSETTE SYSTEM CONTROL BOARD

TO REMOTE CONTROL LOGIC BOARD

TO EQ FUNCTION BOARD

[METER BOARD]

Q705, 805 2SC1384 MUTING

LEVEL METER REC LEVEL & POWER

PEAK HOLD

TO TAPE CASSETTE SYSTEM CONTROL BOARD

[POWER BOARD]

Q908 2SC1384 VOLTAGE DET

Q907 2SD414 VOLTAGE REG

D923 EQA01-32R

Q904 2SD438 SWITCHING

D920 10E2

Q905 2SD414 VOLTAGE REG

D921 EQA01-11R D924 EQA01-06R

D916-919 10E2 RECT

D915 10E2 RECT

Q906 2SC1475 CHARGE ADJ

Q909 2SB548 VOLTAGE REG

D925 EQA01-11R

TO REMOTE CONTROL LOGIC BOARD

TO TAPE CASSETTE SYSTEM CONTROL BOARD

TO PHONO SERVO AMP BOARD

TO TIMER A BOARD

Q901 2SC1061 VOLTAGE REG

Q902 2SC1061 VOLTAGE REG

D905 EQA01-21R

D901-904 S2V20 RECT

[FUNCTION INDICATOR BOARD]

[SIGNAL INDICATOR BOARD(1/3)] [LAMP BOARD]

PL351 PL901 PL903

D913, 914 10E2 RECT

D912 10E2 RECT

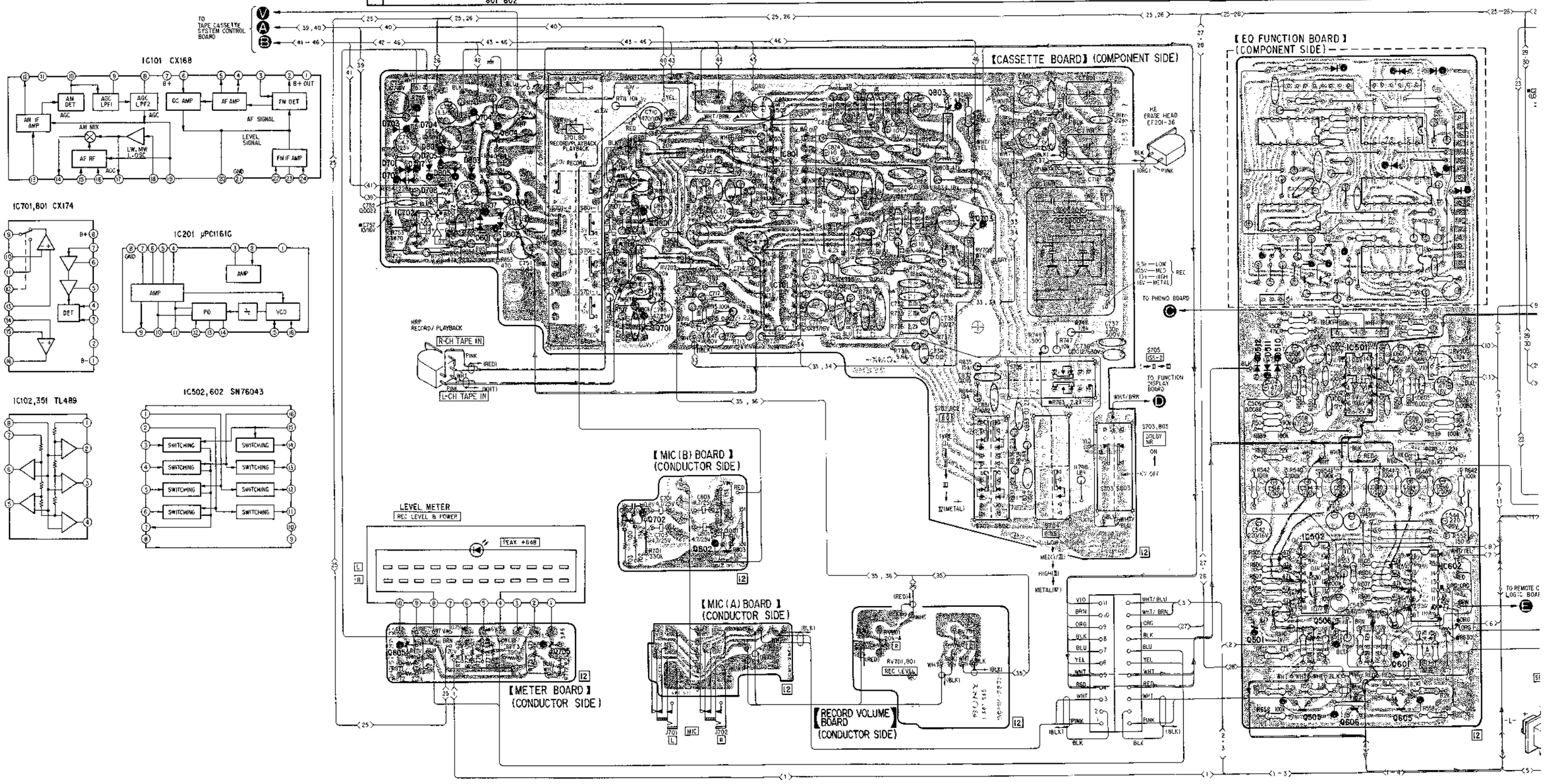
Q903 2SA755 VOLTAGE REG

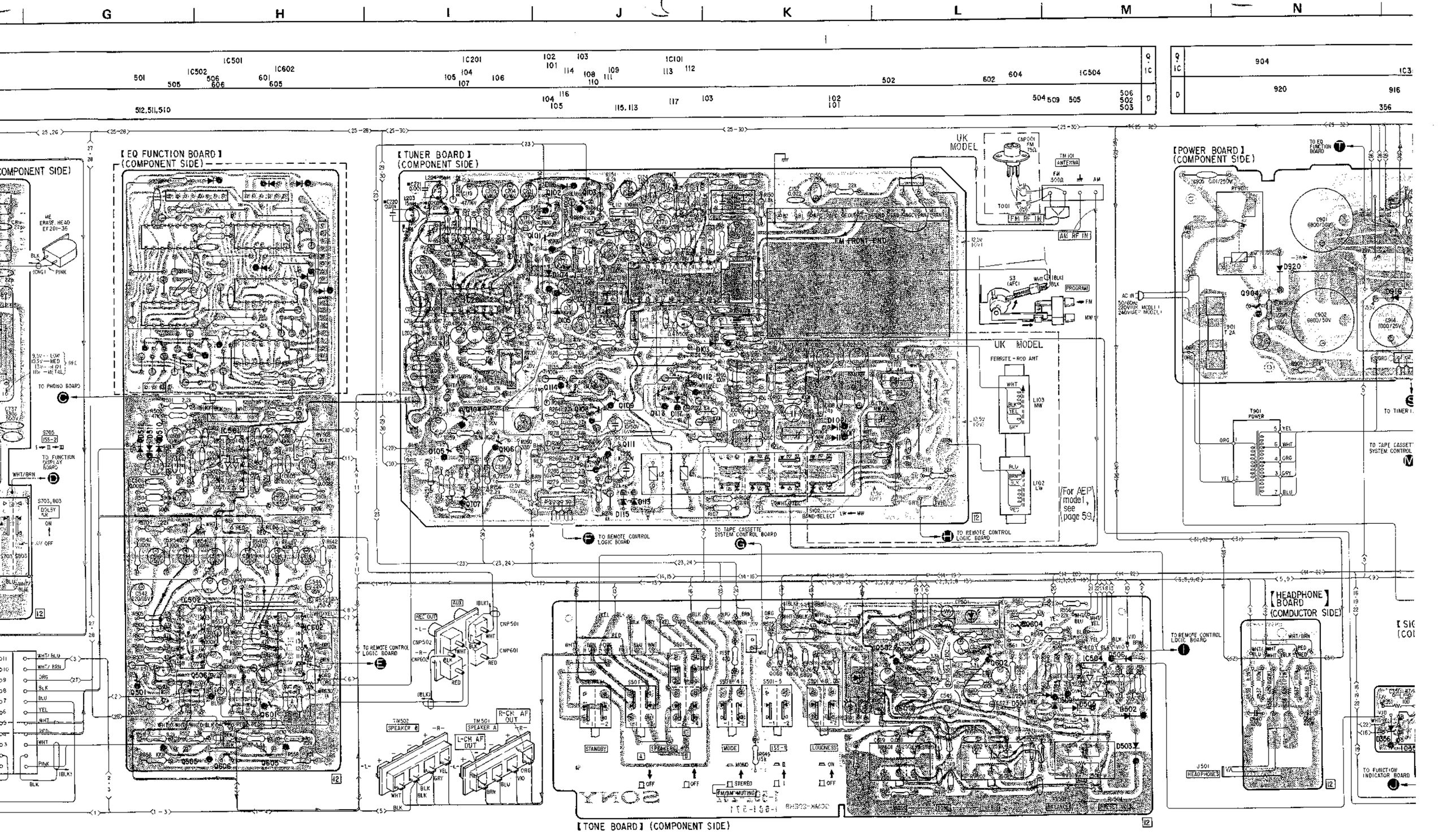
D906-908 10E2 RECT D910, 911 EQA01-11R

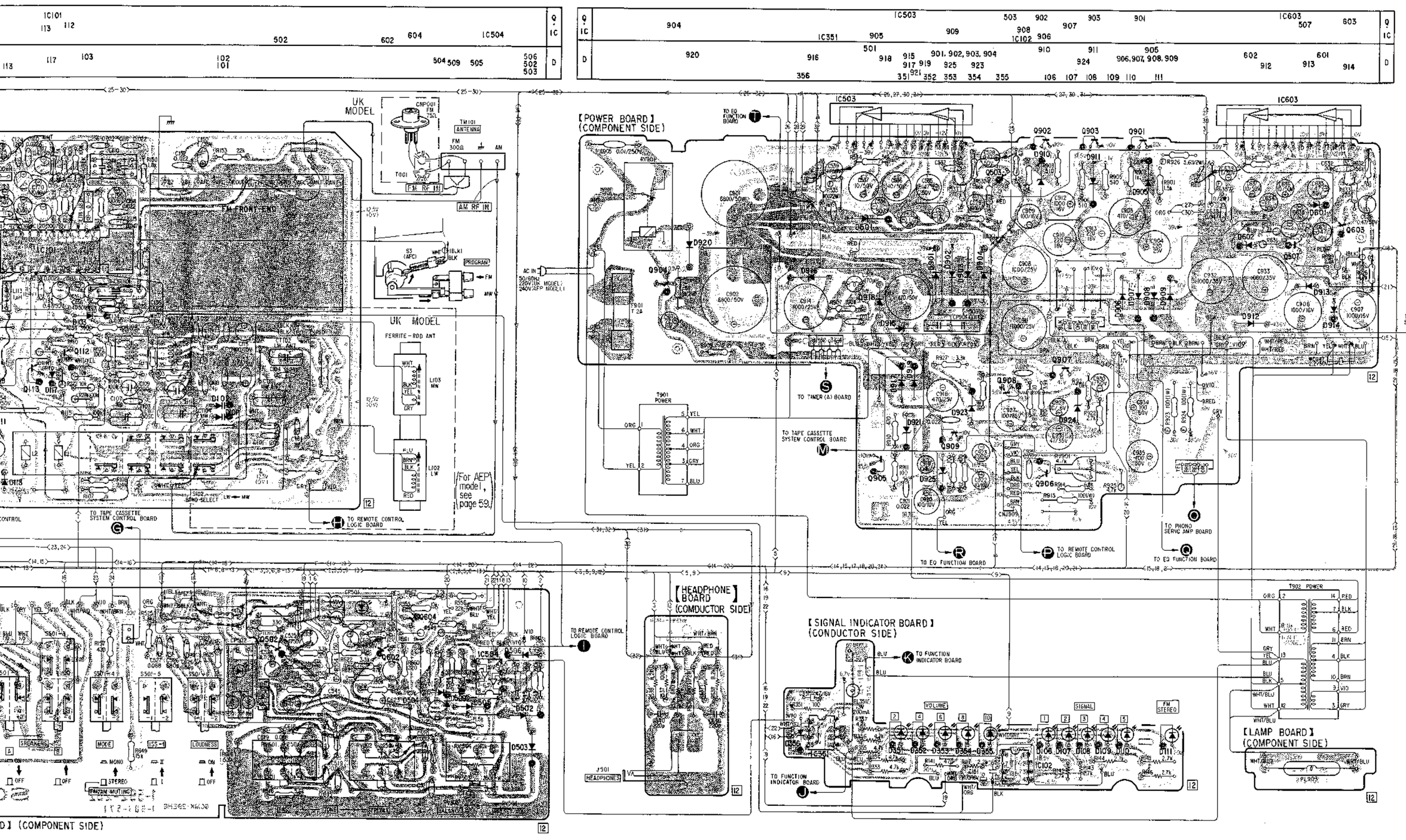
TO TAPE CASSETTE SYSTEM CONTROL BOARD

TO TAPE CASSETTE SYSTEM CONTROL BOARD

4-8. MOUNTING DIAGRAM

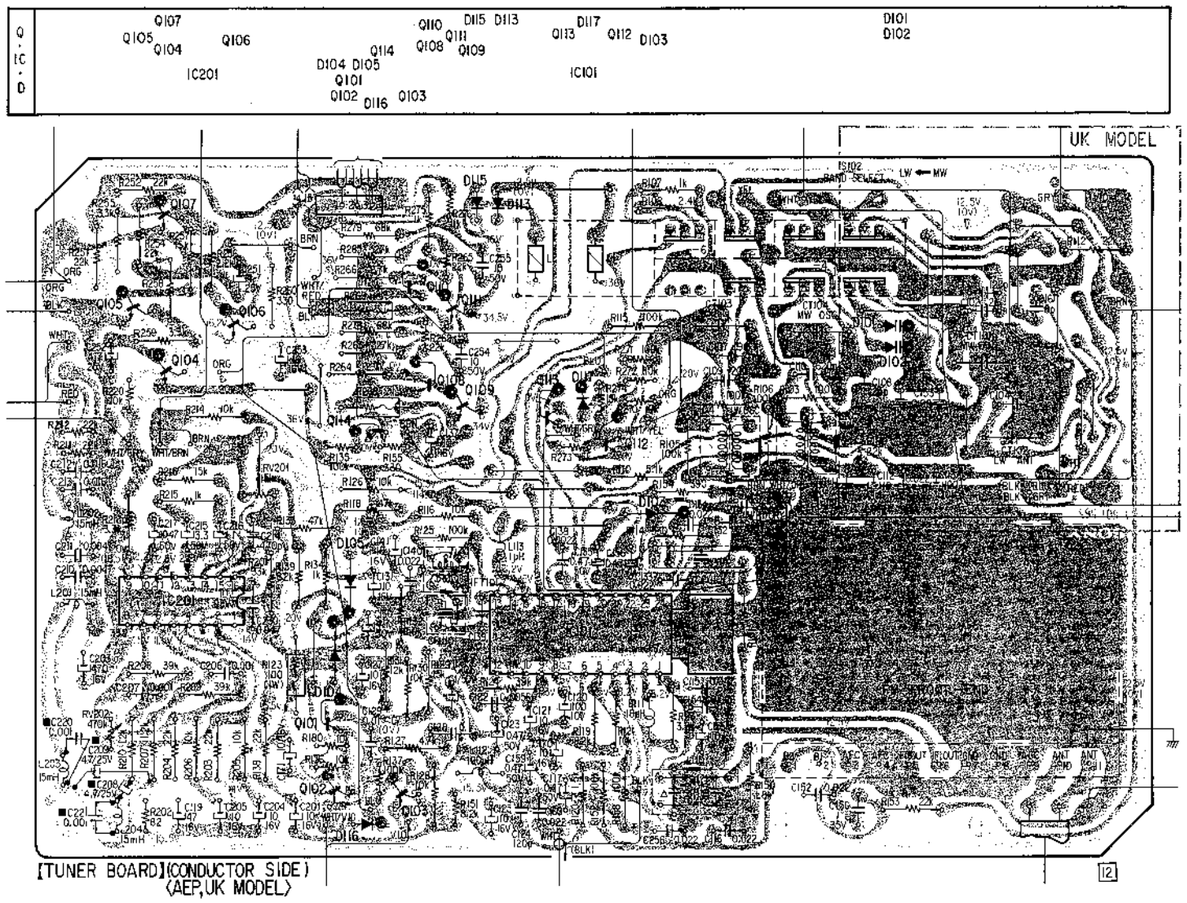


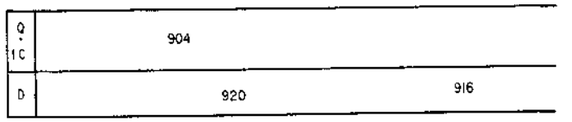

G
H
I
J
K
L
M
N
IC501
IC502
IC602
IC201
IC101
IC504
512,511,510
IC
D
904
920
916
356
【EQ FUNCTION BOARD】
(COMPONENT SIDE)
【TUNER BOARD】
(COMPONENT SIDE)
UK MODEL
FM FRONT END
FERRITE-ROD ANT
【POWER BOARD】
(COMPONENT SIDE)
【HEADPHONE BOARD】
(COMDUCTOR SIDE)
【TONE BOARD】 (COMPONENT SIDE)
HE ERASE HEAD EF201-36
TO PHONO BOARD
TO FUNCTION DISPLAY BOARD
TO REMOTE CONTROL LOGIC BOARD
TO TAPE CASSETTE SYSTEM CONTROL BOARD
TO EQ FUNCTION BOARD
TO TIMER
TO FUNCTION INDICATOR BOARD
(For AEP model, see page 59)
STANDBY
SPEAKERS
MODE
LOUDNESS
TONE
BALANCE
FAST VOL
J501 HEADPHONES
T901 POWER
T901 T 2A
AC IN

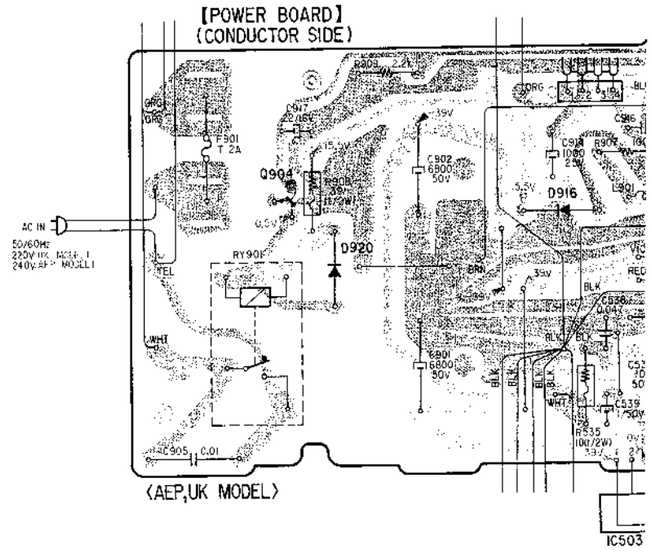

K
L
M
N
O
P
Q
R
1
2
3
4
5
IC101
IC503
IC603
IC351
IC504
IC602
IC584
IC102
UK MODEL
FM FRONT END
FERRITE-ROD ANT
TO TAPE CASSETTE SYSTEM CONTROL BOARD
TO REMOTE CONTROL LOGIC BOARD
(For AEP model, see page 59.)
[POWER BOARD] (COMPONENT SIDE)
TO EQ FUNCTION BOARD
TO TUNER (A) BOARD
TO TAPE CASSETTE SYSTEM CONTROL BOARD
TO REMOTE CONTROL LOGIC BOARD
TO EQ FUNCTION BOARD
TO PHONO SERVO AMP BOARD
[HEADPHONE BOARD] (COMDUCTOR SIDE)
[SIGNAL INDICATOR BOARD] (CONDUCTOR SIDE)
TO FUNCTION INDICATOR BOARD
[LAMP BOARD] (COMPONENT SIDE)
T901 POWER
T902 POWER
VOLUME
SIGNAL
FM STEREO
BALANCE
PROGRAM
BAND SELECT
LOUDNESS
MODE
PHONO MUTING

TC AMP/TUNER/AUDIO AMP (AEP, UK MODEL) HMK-9000 HMK-9000 TC AMP/TUNER/AUDIO AMP (AE

4-9. MOUNTING DIAGRAMS

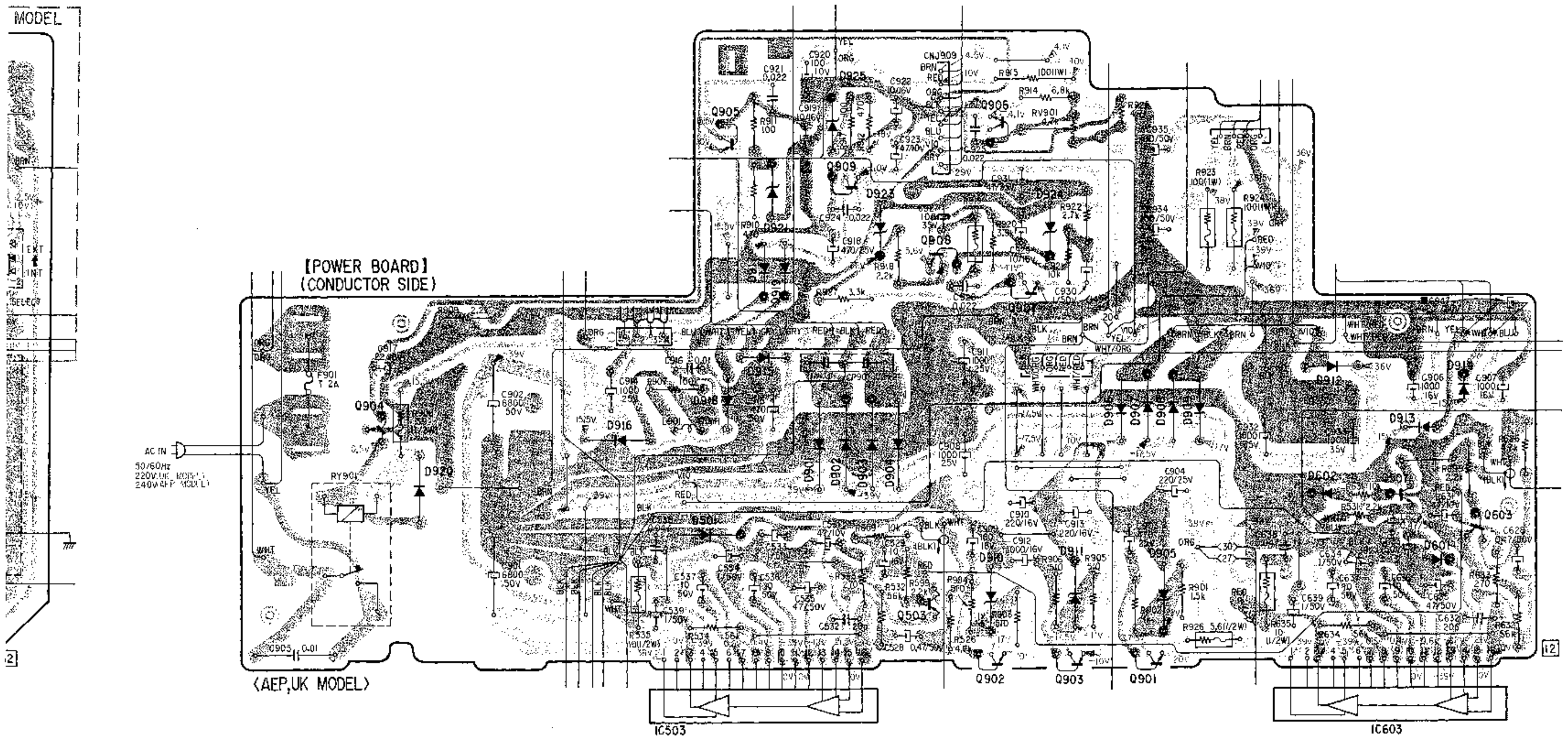


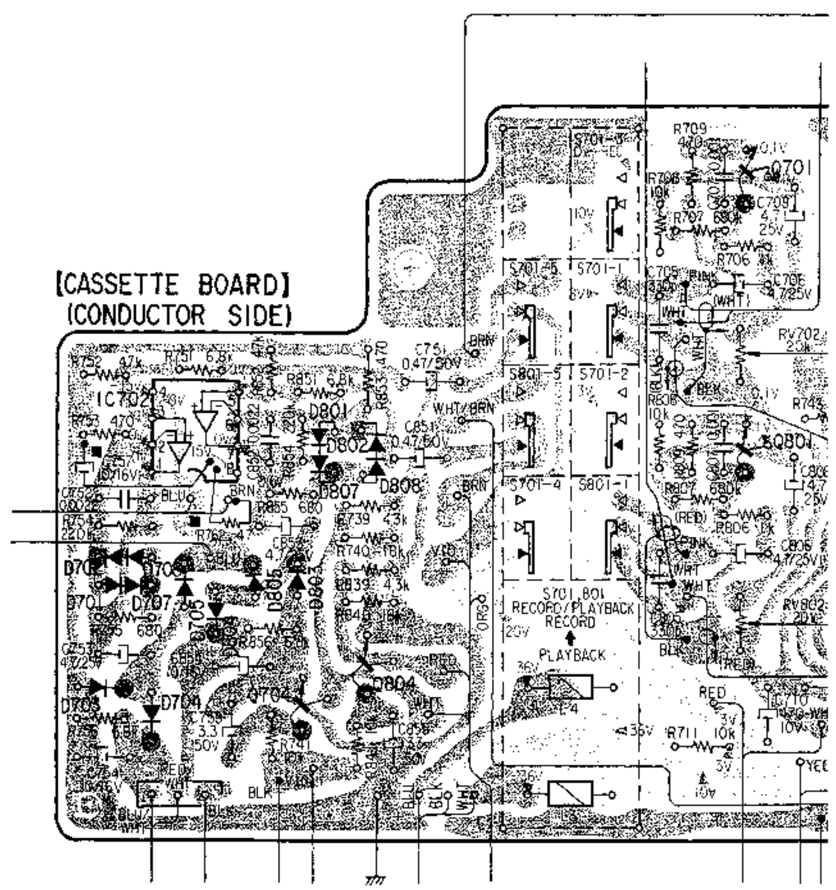


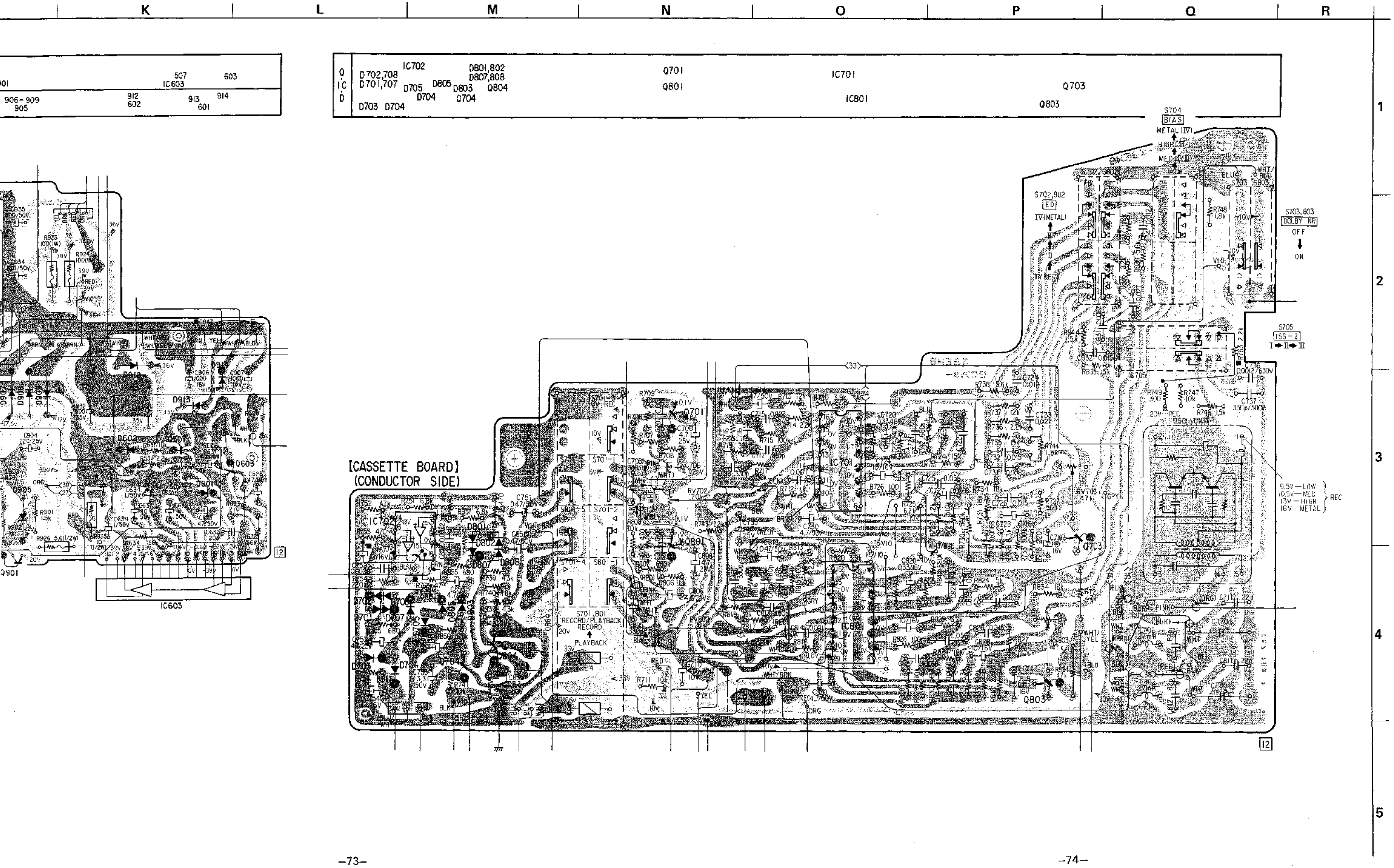


	F	G	H	I	J	K
Q·IC		904		905, 909, 908, IC503, 503	906, 907, 902, 903, 901	507, IC603, 603
D		920	916	501, 918, 921, 917, 919, 915, 925, 901–904, 923	910, 924, 911, 906–909, 905	912, 602, 913, 601, 914

	L	M	N
Q·IC·D	D702,708 D701,707 D703 D704	IC702 D705 D805 D704 D801,802 D807,808 D803 Q804 Q704	Q701 Q801





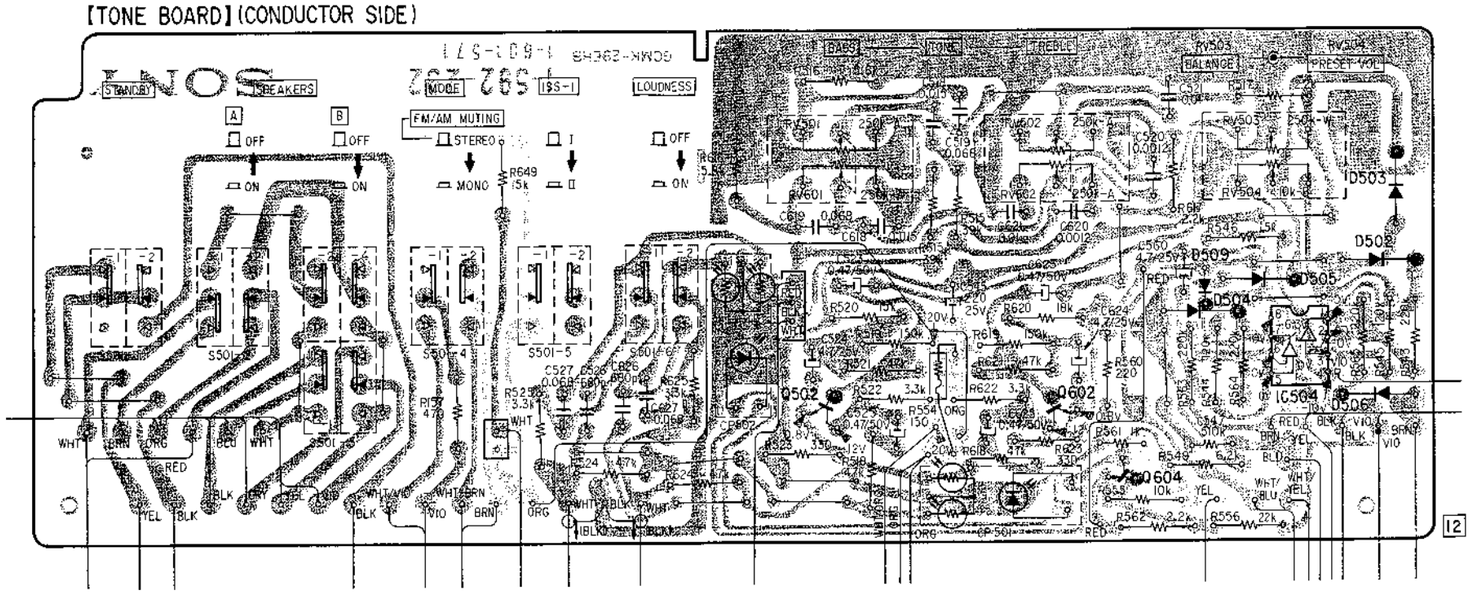

K
L
M
N
O
P
Q
R
1
2
3
4
5
901
507
IC603
603
906-909
905
912
602
913
601
914
Q
IC
D
D702,708
D701,707
IC702
D705
D704
D805
D803
D801,802
D807,808
Q804
Q704
D703 D704
Q701
Q801
IC701
IC801
Q703
Q803
S704
BIAS
METAL (IV)
HIGH (II)
MED (I/III)
LOW
S702,902
EQ
IV (METAL)
III
II
TYPE I
S703,803
DOLBY NR
OFF
ON
S705
ISS-2
I → II → III
[CASSETTE BOARD]
(CONDUCTOR SIDE)
S701,801
RECORD/PLAYBACK
RECORD
PLAYBACK
OSC UNIT
9.5V—LOW
10.5V—MED
13V—HIGH
16V METAL
REC
IC603
12

4-10. MOUNTING DIAGRAMS

Q・IC・D

D503
D509, D505
D502
D504
Q502
Q602
Q604
IC504
D506

【TONE BOARD】(CONDUCTOR SIDE)



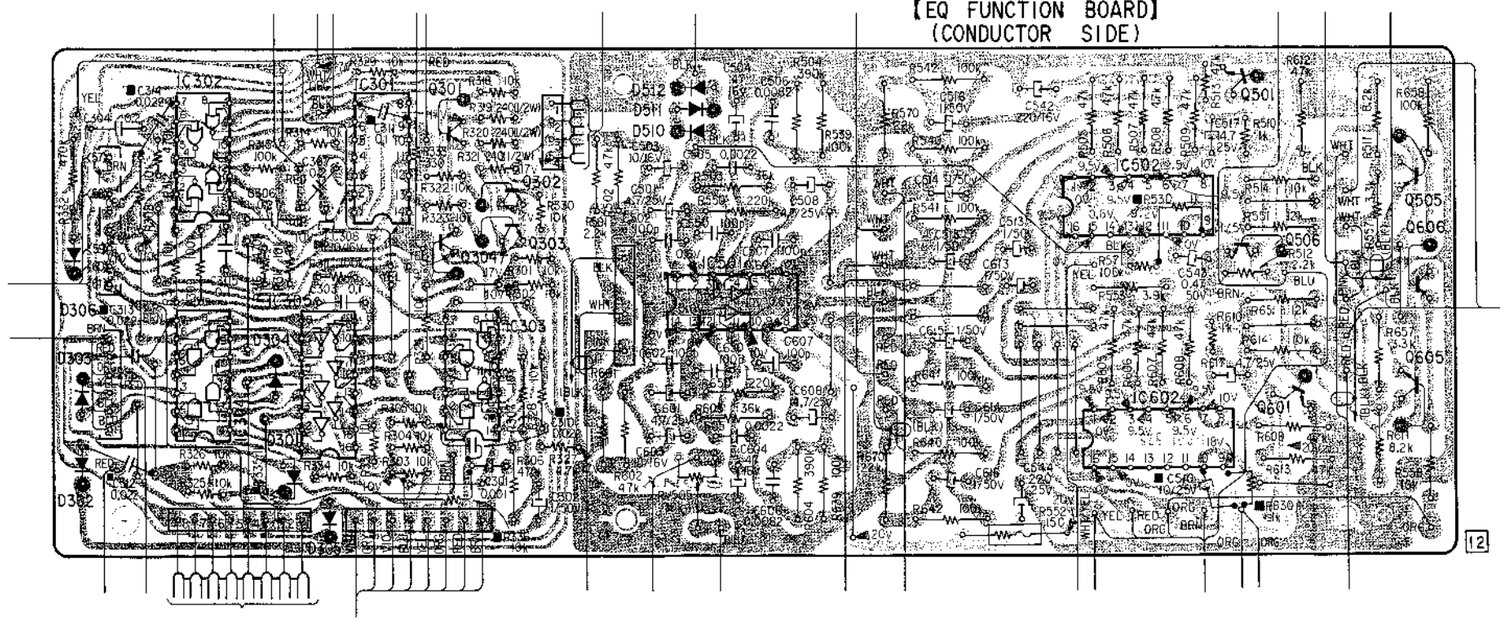
Q・IC

IC302
IC304
IC301
IC305
301 302
304 303
IC303
IC501
IC502
IC602
501
506
601
505
606
605

D

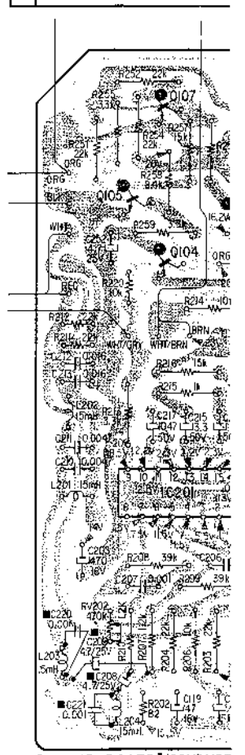
306
303
302
304
301
305
512
511
510

【EQ FUNCTION BOARD】
(CONDUCTOR SIDE)



Q・IC・D

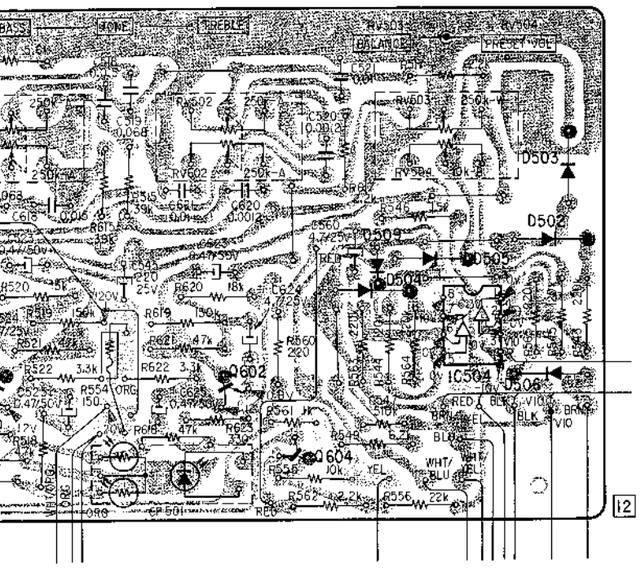
Q107
Q105
Q104
IC201



【TUNER BOARD】(CONDUCT
(E MODE

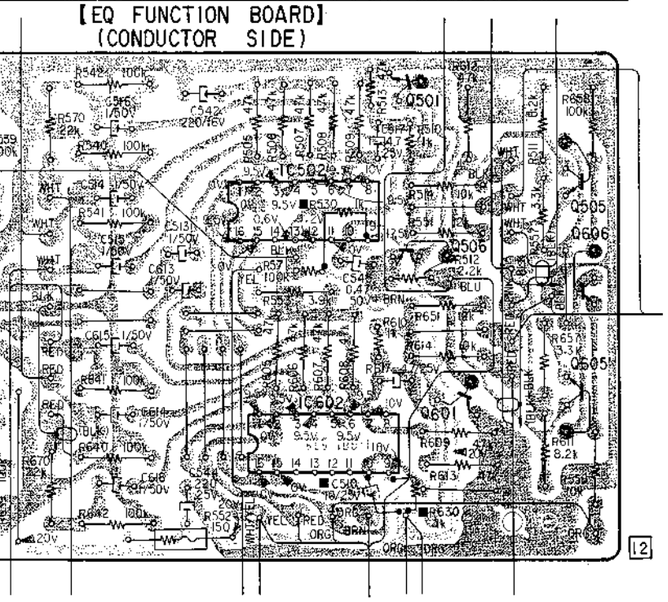
E F G H I J K L M

D503
D502
D509, D505
D504
Q602
Q604
IC504
D506



IC502 501 506 505 606
IC602 601 605

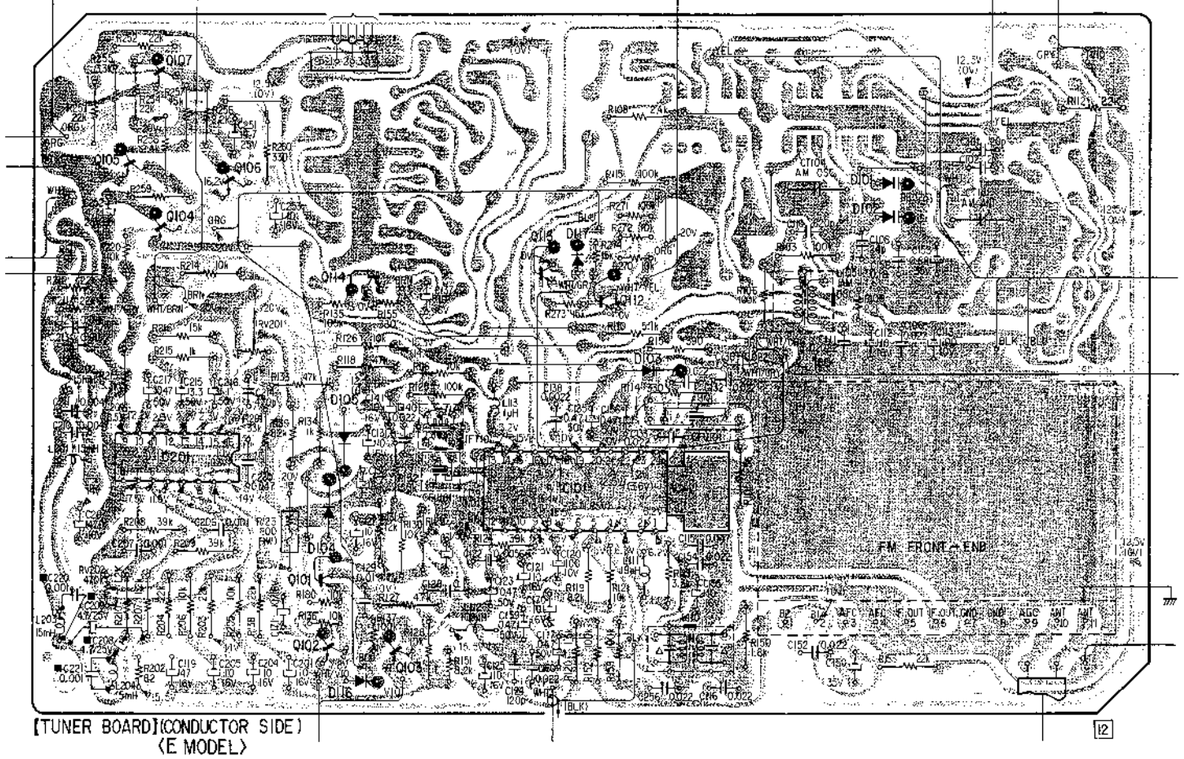
【EQ FUNCTION BOARD】
(CONDUCTOR SIDE)



Q·IC·D

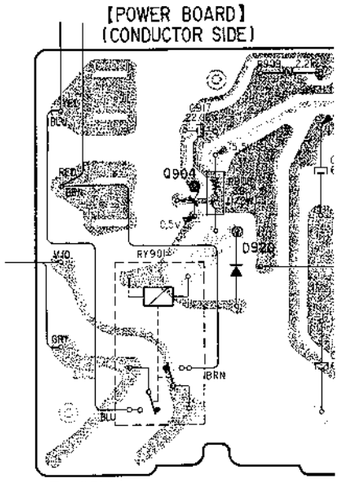
Q107 Q105 Q104 Q106 IC201 Q114 D104 D105 Q101 Q102 D116 Q103 D117 Q113 Q112 D103 IC101 D101 D102

Q·IC	904
D	920



【TUNER BOARD】(CONDUCTOR SIDE)
〈E MODEL〉

【POWER BOARD】
(CONDUCTOR SIDE)

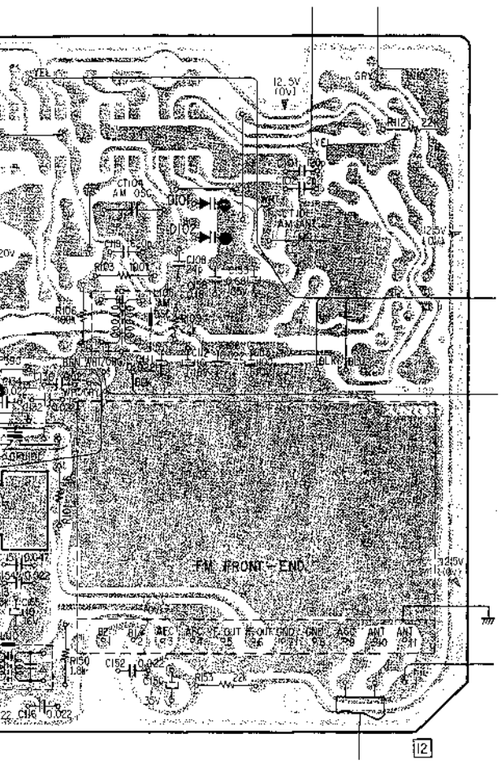


〈E MODEL〉

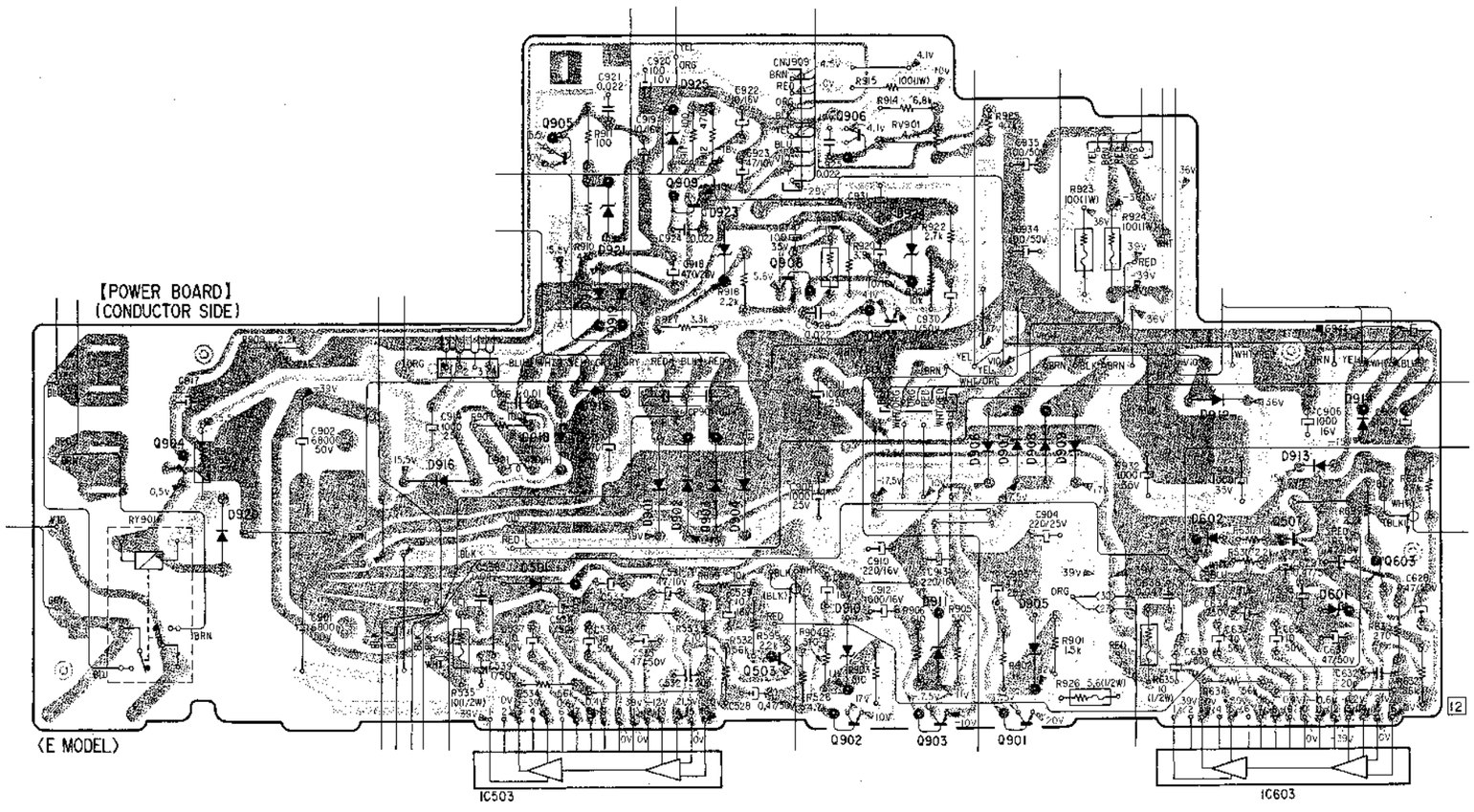
J K L M N O P Q

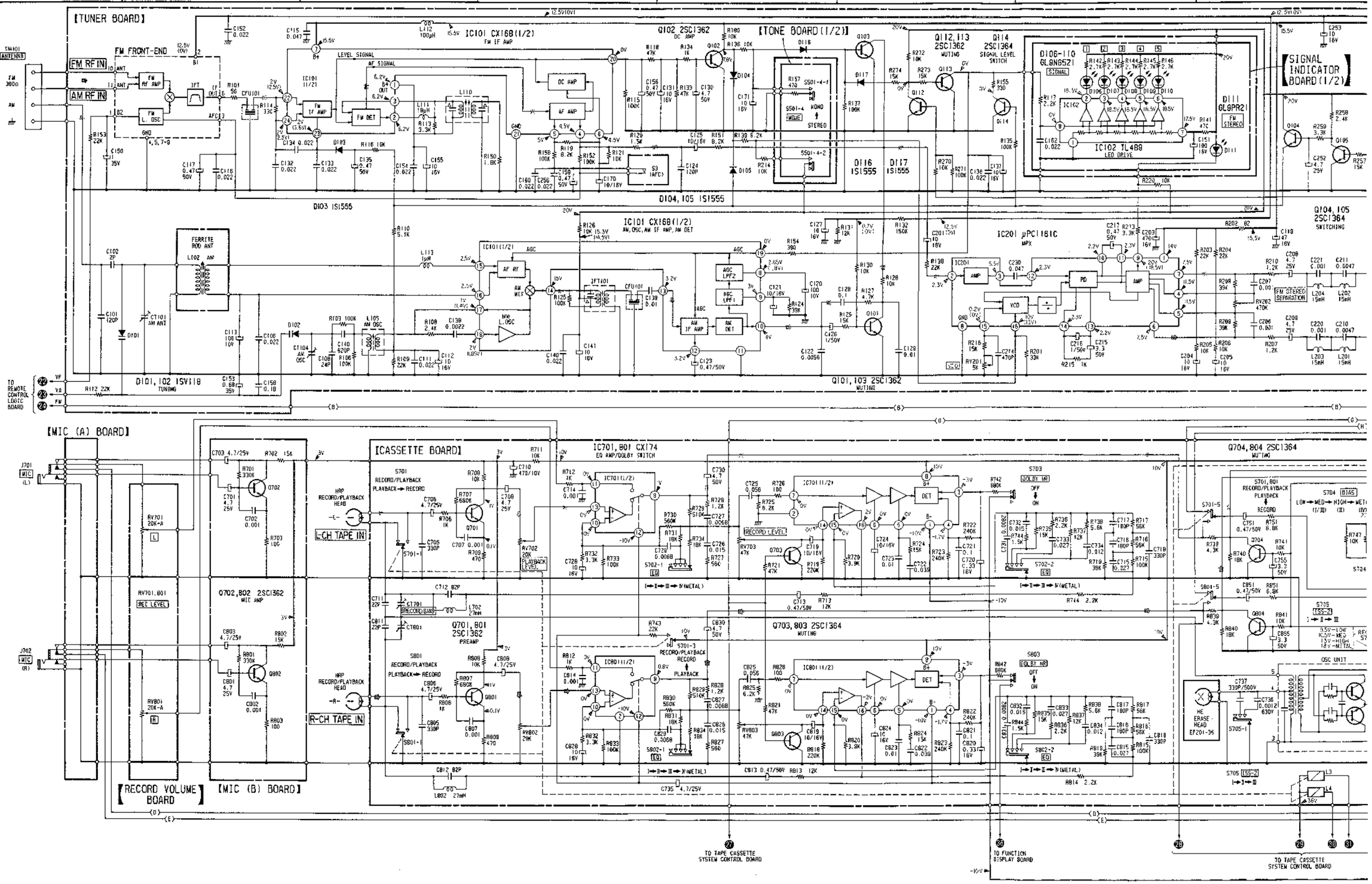
1 2 3 4 5

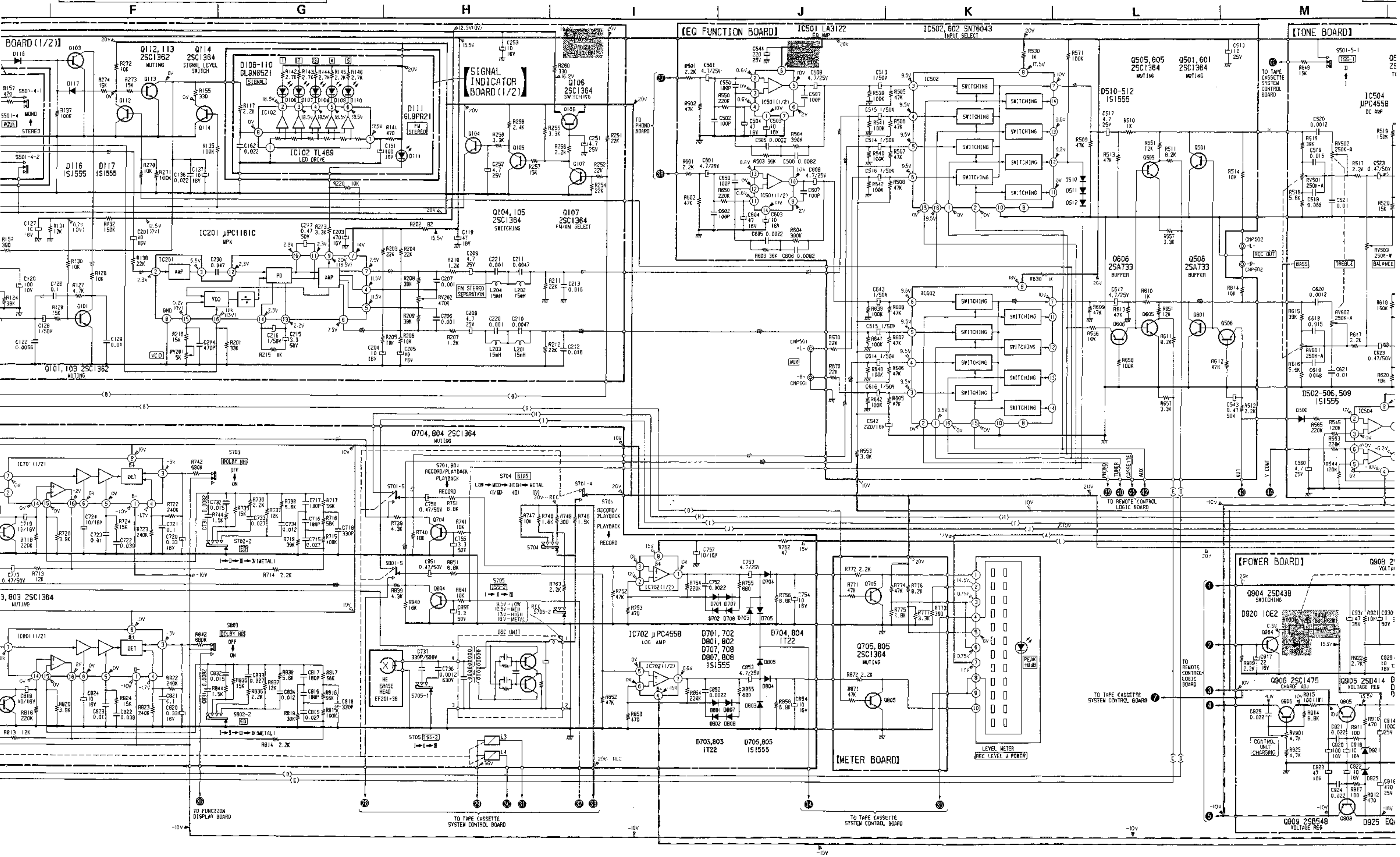
D101
D102



Q IC: 904 905 909 908 906 907 IC503 503 902 903 901 507 IC603 603
D: 920 916 501 918 921 917 919 915 925 923 901–904 910 924 911 906–909 905 912 602 913 914 601




[TUNER BOARD]
FM FRONT-END
FM RF IN
AM RF IN
IC101 CX168(1/2)
FM IF AMP
Q102 2SC1362
DC AMP
[TONE BOARD(1/2)]
Q112,113 2SC1362
MUTING
Q114 2SC1364
SIGNAL LEVEL SWITCH
D106-110 GL9N652I
SIGNAL
D111 GL9PR21
FM STEREO
IC102 TL489
LED DRIVE
[SIGNAL INDICATOR BOARD(1/2)]
D103 1SI555
D104,105 1SI555
D116 1SI555
D117 1SI555
IC101 CX168(1/2)
AM, OSC, AM IF AMP, AM DET
IC201 μPC1181C
MPX
Q104,105 2SC1364
SWITCHING
FERRITE ROD ANT
D101, 102 1SV118
TUNING
Q101,103 2SC1362
MUTING
TO REMOTE CONTROL LOGIC BOARD
[MIC (A) BOARD]
[CASSETTE BOARD]
IC701,801 CX174
EQ AMP/DOLBY SWITCH
Q704,804 2SC1364
MUTING
HRP RECORD/PLAYBACK HEAD
L-CH TAPE IN
R-CH TAPE IN
Q702,802 2SC1362
MIC AMP
Q701,801 2SC1362
PREAMP
Q703,803 2SC1364
MUTING
OSC UNIT
HE ERASE HEAD EF2D1-36
[RECORD VOLUME BOARD]
[MIC (B) BOARD]
TO TAPE CASSETTE SYSTEM CONTROL BOARD
TO FUNCTION DISPLAY BOARD
TO TAPE CASSETTE SYSTEM CONTROL BOARD


F
G
H
I
J
K
L
M
BOARD (1/2)
Q112, 113 2SC1362 MUTING
Q114 2SC1364 SIGNAL LEVEL SWITCH
D106-110 GL9NG52I
SIGNAL
SIGNAL INDICATOR BOARD (1/2)
D111 GL9PR21
FM STEREO
IC102 TL489 LED DRIVE
D116 1S1555
D117 1S1555
Q106 2SC1364 SWITCHING
Q104, 105 2SC1364 SWITCHING
Q107 2SC1364 FM/AM SELECT
IC201 μPC1161C MPX
VCO
PD
AMP
FM STEREO SEPARATION
Q101, 103 2SC1362 MUTING
[EQ FUNCTION BOARD]
IC501 LA3122 EQ AMP
IC502, 602 SN76043 INPUT SELECT
SWITCHING
TO PHONO BOARD
CNP501 -L-
AUX
-R- CNP601
D510-512 1S1555
Q505, 605 2SC1364 MUTING
Q501, 601 2SC1364 MUTING
Q606 2SA733 BUFFER
Q506 2SA733 BUFFER
CNP502 -L-
REC OUT
-R- CNP602
[TONE BOARD]
TO TAPE CASSETTE SYSTEM CONTROL BOARD
S501-5-1
IC504 μPC4558 DC AMP
BASS
TREBLE
BALANCE
D502-506, 509 1S1555
Q704, 804 2SC1364 MUTING
IC701 (1/2)
DET
S703 DOLBY NR OFF ON
S701, 801 RECORD/PLAYBACK PLAYBACK RECORD
S704 BIAS LOW → MED → HIGH → METAL
S701-4
S705 RECORD/PLAYBACK PLAYBACK RECORD
S702-2 EQ
I → II → III → IV (METAL)
3, 803 2SC1364 MUTING
IC801 (1/2)
S803 DOLBY NR OFF ON
S802-2 EQ
S705 1SS-2
9.5V-LOW 10.5V-MED 13V-HIGH 18V-METAL
OSC UNIT
HE ERASE HEAD EF201-36
IC702 μPC4558 LOG AMP
D701, 702 D801, 802 D707, 708 D807, 808 1S1555
D704, 804 1T22
D703, 803 1T22
D705, 805 1S1555
Q705, 805 2SC1364 MUTING
[METER BOARD]
LEVEL METER REC LEVEL & POWER
PEAK +8dB
TO FUNCTION DISPLAY BOARD
TO TAPE CASSETTE SYSTEM CONTROL BOARD
PHONO
TUNER
CASSETTE
AUX
NUT
V CONT
TO REMOTE CONTROL LOGIC BOARD
[POWER BOARD]
Q904 2SD438 SWITCHING
D920 10E2
Q906 2SC1475 CHARGE ADJ
Q905 2SD414 VOLTAGE REG
Q909 2SB548 VOLTAGE REG
CONTROL UNIT CHARGING
D925
Q908

J K L M N O P Q

1 2 3 4 5

IC501 LA3122 EQ AMP

IC502, 602 SN76043 INPUT SELECT

IC502 SWITCHING

IC602 SWITCHING

Q505, 605 2SC1364 MUTING

Q501, 601 2SC1364 MUTING

Q502, 602 2SC1362 TONE AMP

Q604 2SA733 SWITCH

IC504 μPC4558 DC AMP

D510-512 1S1555

Q506 2SA733 BUFFER

Q606 2SA733 BUFFER

D502-506, 509 1S1555

[TONE BOARD]

[POWER BOARD]

Q503, 603 2SA733 MUTING

IC503, 803 SI1340H POWER AMP

Q507 2SC1364 SWITCH

Q501, 601 EQA01-21R

D602 EQA01-07R

[HEADPHONE BOARD]

J501 HEADPHONES

L-CH AF OUT

R-CH AF OUT

TM501 SPEAKER A

TM502 SPEAKER B

[TONE BOARD]

[EQ FUNCTION BOARD]

VOLUME INDICATOR

[SIGNAL INDICATOR BOARD(1/2)]

D356 EQA01-07R

D351-355 GL9PR21

VOLUME

IC351 TL489 VOLUME METER

TO REMOTE CONTROL LOGIC BOARD

PHONO TUNER CASSETTE AUX

MUT

V CONT

STANDBY

PRESET VOL

TO TAPE CASSETTE SYSTEM CONTROL BOARD

[METER BOARD]

Q705, 805 2SC1364 MUTING

LEVEL METER

REC LEVEL & POWER

PEAK +8dB

[POWER BOARD]

Q904 2SD438 SWITCHING

Q908 2SC1364 VOLTAGE DET

Q907 2SD414 VOLTAGE REG

D923 EQA01-32R

Q906 2SC1475 CHARGE ADJ

Q905 2SD414 VOLTAGE REG

D924 EQA01-06R

D921 EQA01-11R

D916-919 10E2 RECT

D915 10E2 RECT

Q909 2SB548 VOLTAGE REG

D925 EQA01-11R

CONTROL UNIT CHARGING

TO REMOTE CONTROL LOGIC BOARD

TO TAPE CASSETTE SYSTEM CONTROL BOARD

TO PHONO SERVO AMP BOARD

TO EQ FUNCTION BOARD

TO TIMER A BOARD

Q901 2SC1061 VOLTAGE REG

Q902 2SC1061 VOLTAGE REG

D905 EQA01-21R

D901-904 S2V20 RECT

[FUNCTION INDICATOR BOARD]

[SIGNAL INDICATOR BOARD(1/3)]

[LAMP BOARD]

PL351 PL901 PL903

D913, 914 10E2 RECT

D912 10E2 RECT

Q902 2SA755 VOLTAGE REG

D906-909 10E2 RECT

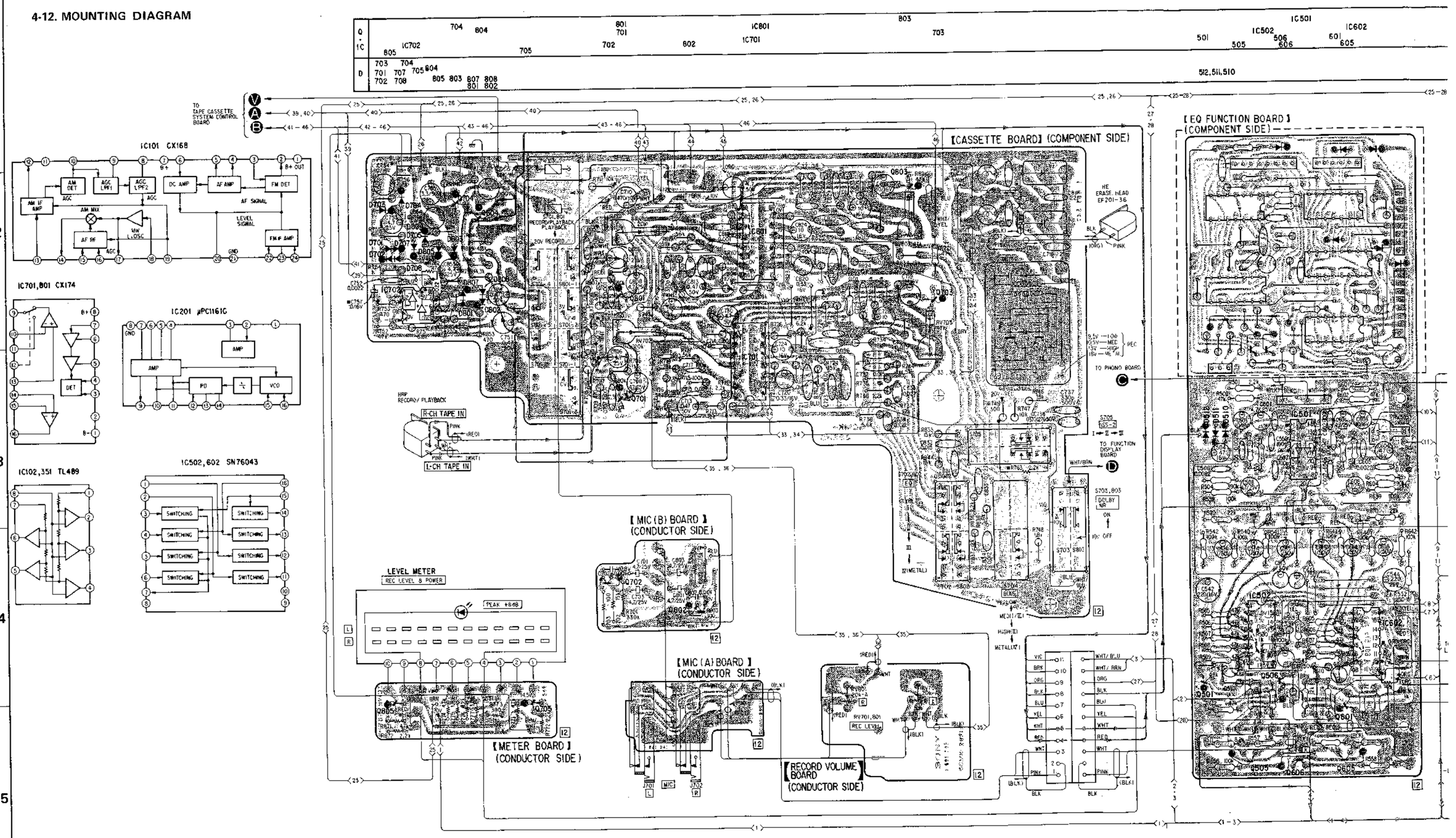
D910, 911 EQA01-11R

VOLTAGE SELECTOR

110V 220V 240V

(EXCEPT FOR U MODEL)

4-12. MOUNTING DIAGRAM



F G H I J K L M

【CASSETTE BOARD】(COMPONENT SIDE)

【EQ FUNCTION BOARD】
(COMPONENT SIDE)

【TUNER BOARD】
(COMPONENT SIDE)

【POWER BOARD
(COMPONENT SI

【TONE BOARD】(COMPONENT SIDE)

K L M N O P Q R

1 2 3 4 5

【POWER BOARD】
(COMPONENT SIDE)

【HEADPHONE】
BOARD
(COMDUCTOR SIDE)

【SIGNAL INDICATOR BOARD】
(CONDUCTOR SIDE)

【LAMP BOARD】
(COMPONENT SIDE)

(COMPONENT SIDE)

TO TAPE CASSETTE SYSTEM CONTROL BOARD

TO REMOTE CONTROL LOGIC BOARD

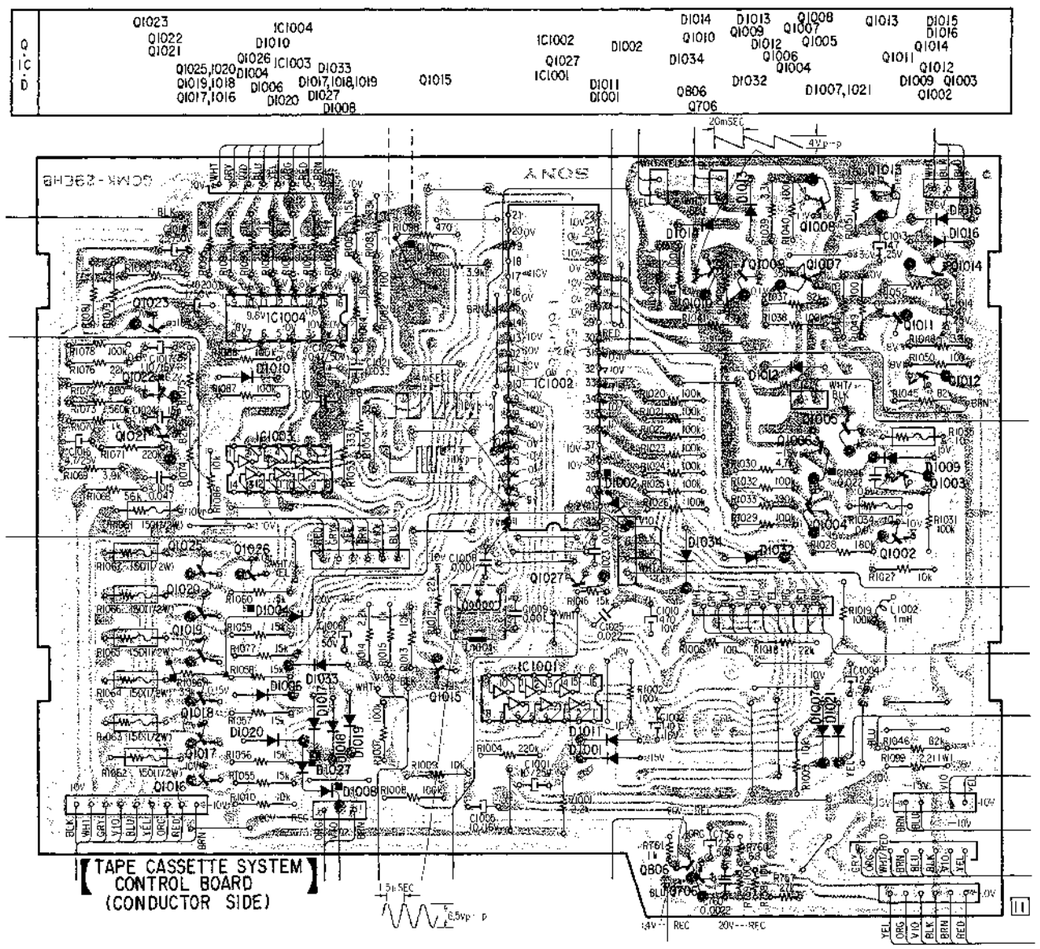
TO TIMER (A) BOARD

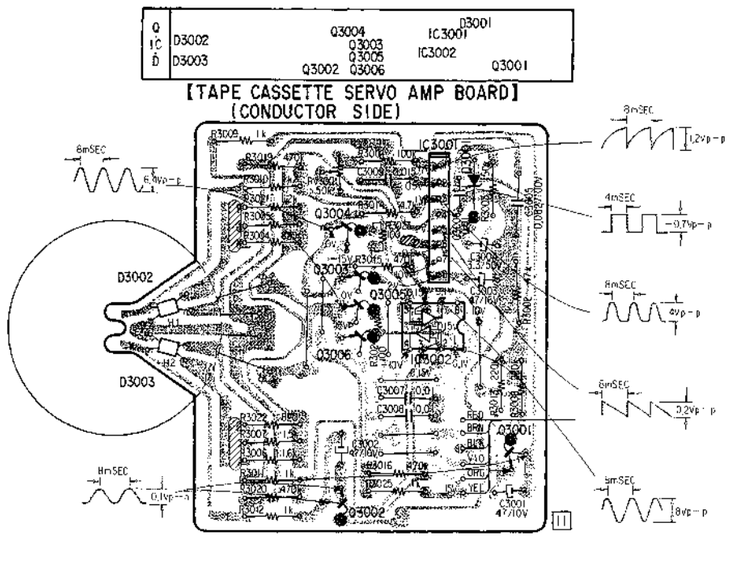
TO EQ FUNCTION BOARD

TO PHONO SERVO AMP BOARD

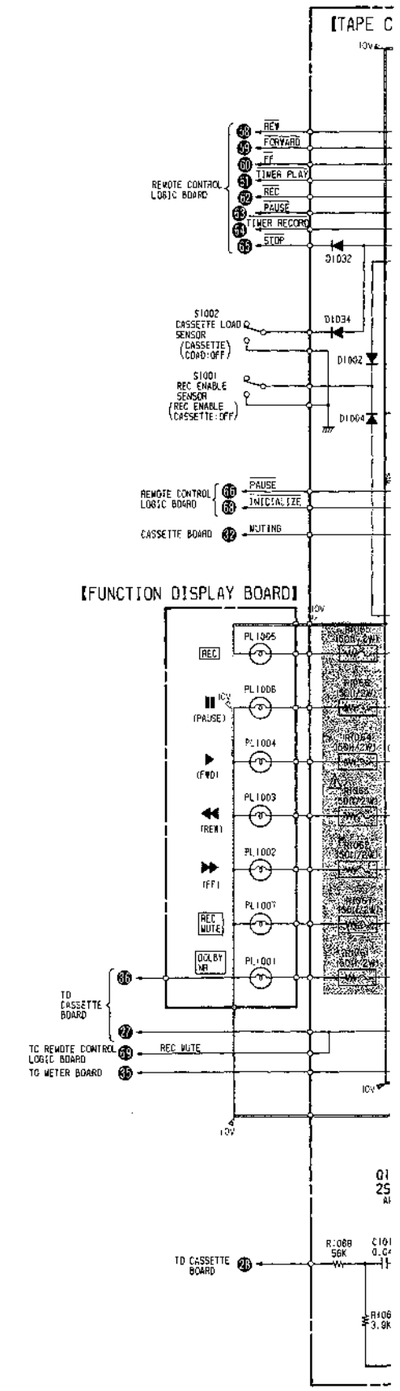
TO FUNCTION INDICATOR BOARD

4-13. MOUNTING DIAGRAM



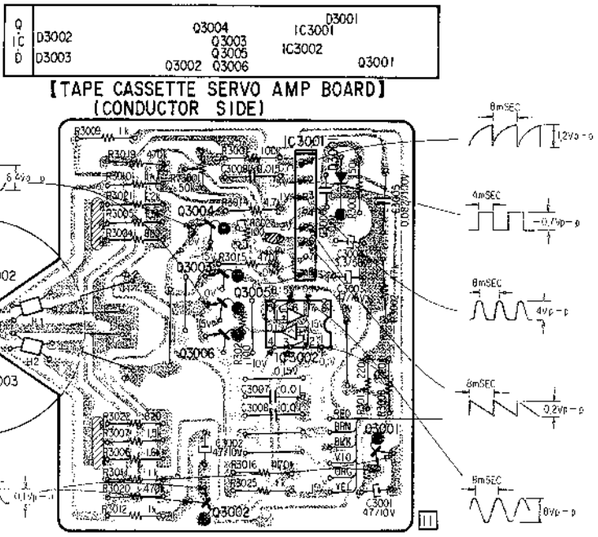


4-14. SCHEMATIC DIAGRAM



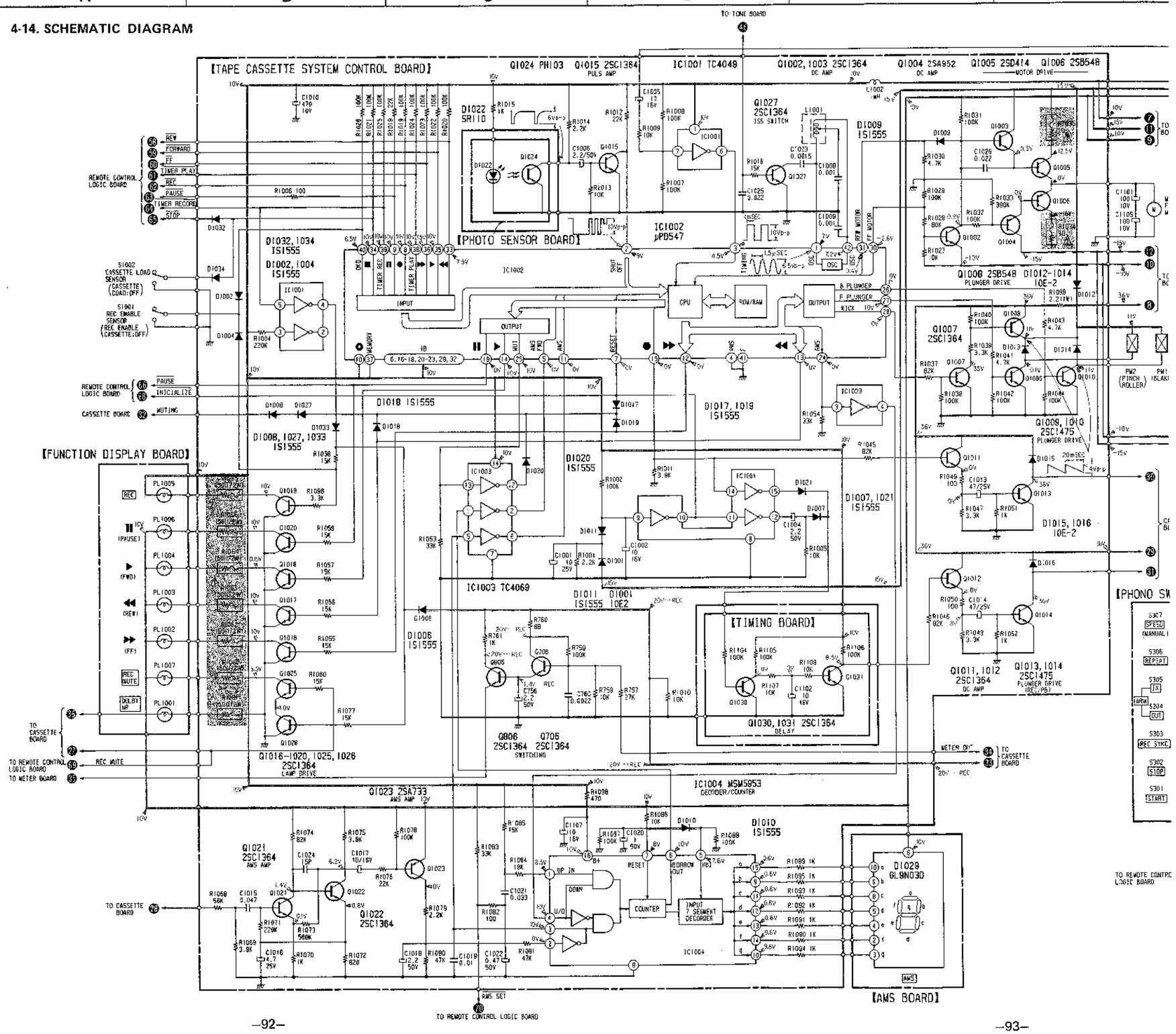
E F

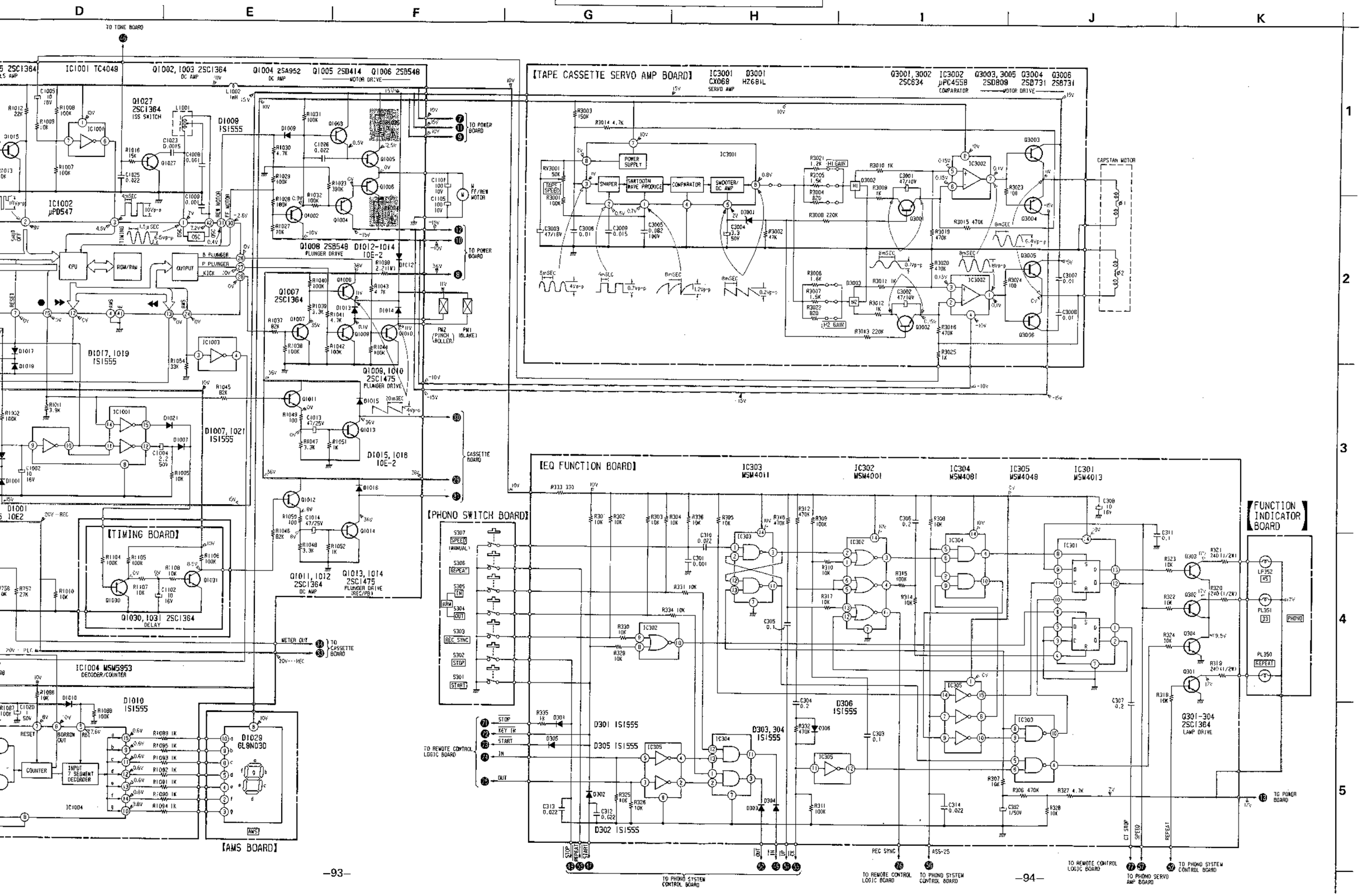
【TAPE CASSETTE SERVO AMP BOARD】
(CONDUCTOR SIDE)



A B C D E F

4-14. SCHEMATIC DIAGRAM




D E F G H I J K
1 2 3 4 5
TO TONE BOARD
IC1001 TC4049
Q1002, 1003 2SC1364 DC AMP
Q1004 2SA952 DC AMP
Q1005 2SD414 Q1006 2SB548 MOTOR DRIVE
Q1027 2SC1364 ISS SWITCH
D1009 1S1555
IC1002 μPD547
CPU
ROM/RAM
OUTPUT
B PLUNGER
P PLUNGER
KICK
Q1008 2SB548 D1012-1014 1OE-2 PLUNGER DRIVE
Q1007 2SC1364
Q1009, 1010 2SC1475 PLUNGER DRIVE
D1017, 1019 1S1555
IC1003
D1007, 1021 1S1555
D1001 1OE2
【TIMING BOARD】
Q1030, 1031 2SC1364 DELAY
Q1011, 1012 2SC1364 DC AMP
Q1013, 1014 2SC1475 PLUNGER DRIVE (REC/PB)
D1015, 1016 1OE-2
IC1004 MSM5953 DECODER/COUNTER
D1010 1S1555
D1029 GL9N03D
【AMS BOARD】
【TAPE CASSETTE SERVO AMP BOARD】
IC3001 CX068 SERVO AMP
D3001 HZ6BTL
Q3001, 3002 2SC634
IC3002 μPC4558 COMPARATOR
Q3003, 3005 2SD809 Q3004 Q3006 2SB731 MOTOR DRIVE
POWER SUPPLY
SWAPER
SAWTOOTH WAVE PRODUCE
COMPARATOR
SWOOTER/ DC AMP
CAPSTAN MOTOR
【EQ FUNCTION BOARD】
IC303 MSM4011
IC302 MSM4001
IC304 MSM4081
IC305 MSM4049
IC301 MSM4013
【PHONO SWITCH BOARD】
S307 SPEED MANUAL
S306 REPEAT
S305 IN
S304 OUT
S309 REC SYNC
S302 STOP
S301 START
D301 1S1555
D305 1S1555
D302 1S1555
D303, 304 1S1555
D306 1S1555
【FUNCTION INDICATOR BOARD】
Q301-304 2SC1364 LAMP DRIVE
TO POWER BOARD
TO CASSETTE BOARD
TO REMOTE CONTROL LOGIC BOARD
TO PHONO SYSTEM CONTROL BOARD
TO PHONO SERVO AMP BOARD
REC SYNC
AS5-25
CT STOP
SPEED
REPEAT

4-15. MOUNTING DIAGRAM

【PHOTO SENSOR BOARD】
(CONDUCTOR SIDE)

【FUNCTION DISPLAY BOARD】
(CONDUCTOR SIDE)

【TAPE CASSETTE SERVO AMP BOARD】
(COMPONENT SIDE)

【PHONO SWITCH BOARD】
(CONDUCTOR SIDE)

IC1004
MSM5953

IC1002
μPD547

Q , IC	D
706	
806	
	1008
1016	1027
	1001
1017	1020 1011
	1017-1019,1021
1018 IC1001	1006 1007
1015	
1019	1033
1020	1004
1027	
1025 1026	1034,1032
1002	
1004	1029 1002
1003	
IC1003 1006	1009
1021 1005	
1022 1012	
IC1002	1010 1012
1023, IC1004,1011	
1030 1007	
1010, 1009, 1014	
	1016
1014	1015
1031	1009
1008	1013
1013	

【AMS BOARD】
(CONDUCTOR SIDE)

【TIMING BOARD】
(CONDUCTOR SIDE)

【TAPE CASSETTE SYSTEM CONTROL BOARD】
(COMPONENT SIDE)

IC3001 CX069

IC301 MSM4013

S1001
REC ENABLE SENSOR
(REC ENABLE CASSETTE : OFF)

FUNCTION/CASSETTE PLAYER SYSTEM CONTROL HMK-9000

D E F G H I J K

1 2 3 4 5

【PHOTO SENSOR BOARD】
(CONDUCTOR SIDE)

【TAPE CASSETTE SERVO AMP BOARD】
(COMPONENT SIDE)

【PHONO SWITCH BOARD】
(CONDUCTOR SIDE)

S307 SPEED (MANUAL) S306 REPEAT ARM IN PLAY S303 REC SYNC S302 STOP S301 START

BRN RED ORG YEL BLU VIO GRY WHT

IC3001 CX069
POWER SUPPLY
SMOOTER/ DC AMP
COMPARATOR
SAWTOOTH WAVE PRODUSE
SHAPER

IC301 MSM4013

【EQ FUNCTION BOARD】
(COMPONENT SIDE)

【TAPE CASSETTE SYSTEM CONTROL BOARD】
(COMPONENT SIDE)

S1001 REC ENABLE SENSOR (REC ENABLE CASSETTE : OFF)
S1002 CASSETTE LOAD SENSOR (CASSETTE LOAD: OFF)

IC302 IC301 301	302	304 303	306	IC304 IC305 IC303	303	304	302 301	305	Q IC
									D

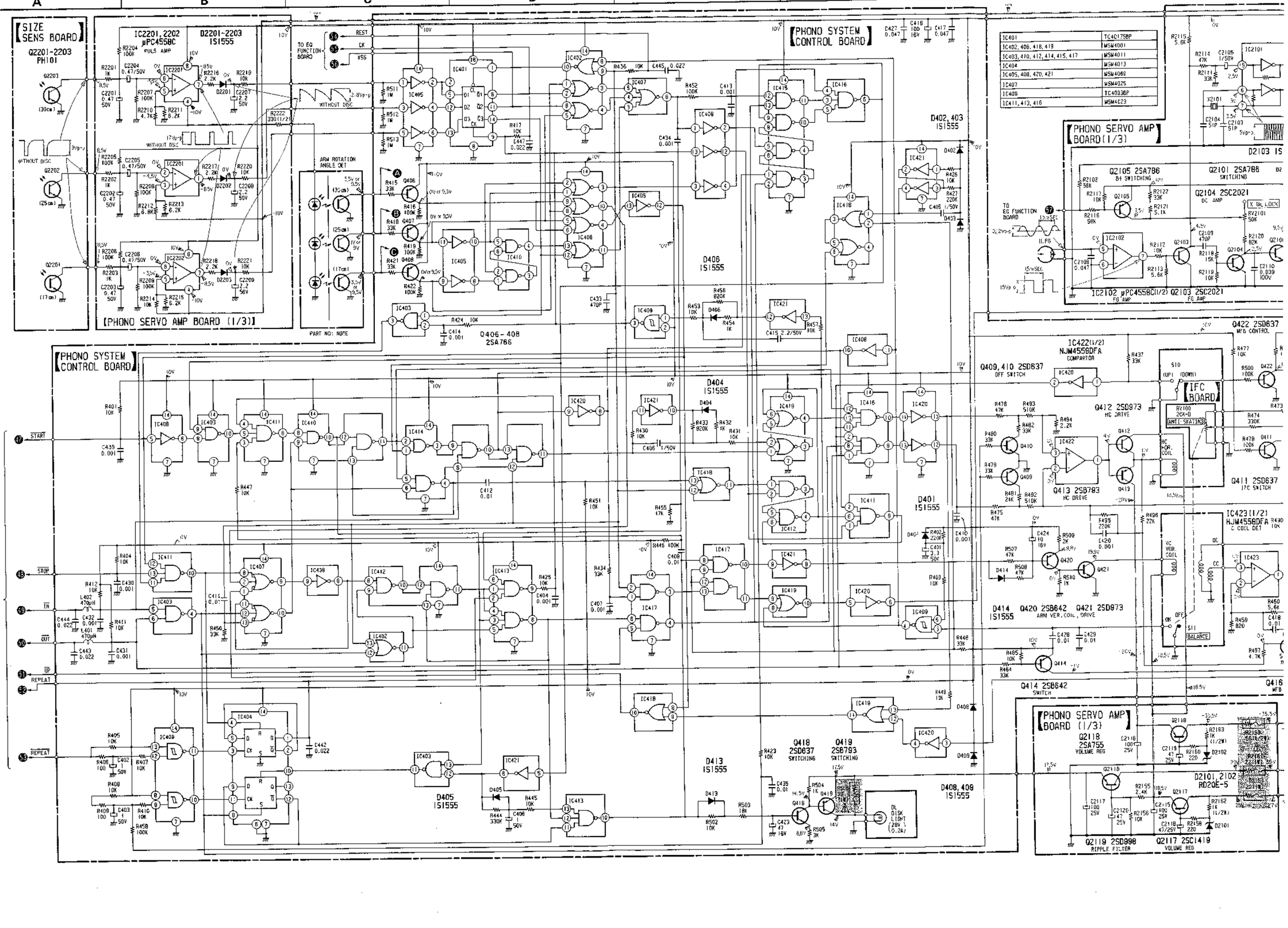
M FF/REW MOTOR

PM2 (PINCH ROLLER)
PM1 (BLAKE)

【FUNCTION INDICATOR BOARD】
(CONDUCTOR SIDE)

PHONO
TAPE
REPEAT
FM
LW
MW
AUX
PHONO
CASSETTE
FUNCTION

TO TONE BOARD
TO POWER BOARD
TO CASSETTE BOARD
TO PHONO SYSTEM CONTROL BOARD
TO REMOTE CONTROL LOGIC BOARD
TO SIGNAL INDICATOR BOARD
TO CASSETTE BOARD


【SIZE SENS BOARD】
Q2201-2203 PH101
IC2201,2202 μPC4558C PULS AMP
D2201-2203 1S1555
【PHONO SERVO AMP BOARD (1/3)】
ARM ROTATION ANGLE DET
PART NO: NOTE
TO EG FUNCTION BOARD
【PHONO SYSTEM CONTROL BOARD】
Q406-408 2SA786
D402,403 1S1555
D406 1S1555
D404 1S1555
D401 1S1555
D405 1S1555
D413 1S1555
D408,409 1S1555
Q418 2SD637 SWITCHING
Q419 2SB793 SWITCHING
DL DISK LIGHT (28V 0.2A)
IC401 TC4C175BP
IC402,406,418,419 MSM4001
IC403,410,412,414,415,417 MSM4011
IC404 MSM4013
IC405,408,420,421 MSM4069
IC407 MSM4025
IC409 TC4093BP
IC411,413,416 MSM4023
【PHONO SERVO AMP BOARD(1/3)】
Q2105 2SA786 B4 SWITCHING
Q2101 2SA786 SWITCHING
Q2104 2SC2021 DC AMP
IC2102 μPC4558C(1/2) FG AMP
Q2103 2SC2021 FG AMP
IC422(1/2) NJM4558DFA COMPARTOR
Q409,410 2SD637 DFF SWITCH
【IFC BOARD】
Q412 2SD973 MC DRIVE
Q413 2SB793 MC DRIVE
Q411 2SD637 IFC SWITCH
IC423(1/2) NJM4558DFA C COIL DET
D414 1S1555
Q420 2SB642 Q421 2SD873 ARM VER. COIL, DRIVE
Q414 2SB642 SWITCH
【PHONO SERVO AMP BOARD (1/3)】
Q2118 2SA755 VOLUME REG
D2101,2102 RD20E-5
Q2119 2SD998 RIPPLE FILTER
Q2117 2SC1419 VOLUME REG
START
STOP
EN
OUT
UP
REPEAT
REPEAT
REST
CK
ASS
WITHOUT DISC
WITH DISC

D E F G H I J K

1 2 3 4 5

[PHONO SYSTEM CONTROL BOARD]

IC401	TC40175BP
IC402, 406, 418, 419	MSM4001
IC403, 410, 412, 414, 415, 417	MSM4011
IC404	MSM4013
IC405, 408, 420, 421	MSM4069
IC407	MSM4025
IC409	TC4083BP
IC411, 413, 416	MSM4023

IC2101 MSW5811 TURNTABLE ROTATION PLL

[PHONO SERVO AMP BOARD(1/3)]

IC2102 μPC4558C(1/2) FG AMP

Q2103 2SC2021 FG AMP

Q2105 2SA786 B+ SWITCHING

Q2101 2SA786 SWITCHING

Q2104 2SC2021 DC AMP

Q2106 2SC2021 DC AMP

Q2108 2SA786 DC AMP

IC2102 μPC4558C(1/2) DC AMP

Q2102, 2107 2SC2021

Q2113, 2115 2SA786 SWITCHING

Q2114, 2116 2SC2021 SWITCHING

Q2109, 2111 2SD414 MOTOR DRIVE

Q2110, 2112 2SB548 MOTOR DRIVE

IC2103 μPC4558C SWITCHING

[MOTOR BOARD]

IC4221(2) NJM4558DFA COMPARTOR

Q409, 410 2SD637 OFF SWITCH

Q422 2SD637 MFB CONTROL

Q417 2SB642 MFB CONTROL

D410 RD5.6E27S

Q412 2SD973 HC DRIVE

Q413 2SB793 HC DRIVE

Q411 2SD637 FFD SWITCH

IC423(1/2) HJM4558DFA C COIL DET

IC423(1/2) NJM4558DFA HOR COIL DET

D414 1S1555 Q420 2SB642 Q421 2SD973 ARM VER. COIL DRIVE

Q414 2SB642 SWITCH

Q416 2SK30A MFB CONTROL

D412 1S1555

D411 RD5.6E27S

D407, 415 1S1555

Q415 2SB642 HOR COIL DET

IC422(1/2) NJM4558DFA INTER FACE

[PHONO SERVO AMP BOARD (1/3)]

Q2118 2SA755 VOLUME REG

Q2118 2SD998 RIPPLE FILTER

Q2117 2SC1419 VOLUME REG

D2101, 2102 RD20E-5

[PHONO BOARD]

CONNECTOR HEAD SHELL

-100-

4-17. MOUNTING DIAGRAM

Q,IC	2117-2119 2109 2110 IC2103 2102 2108 2107 2105 IC2101 2101 2113 2114 2116 2115 IC2202 2106 2104 2103 IC2102 IC2201
D	2101 2102 2103 2203 2202 2201

【IFC BOARD】 (CONDUCTOR SIDE)

【PHOTO INTERRUPTER(A)】 (CONDUCTOR SIDE)

【PHOTO INTERRUPTER(B)】 (CONDUCTOR SIDE)

【PHONO SERVO AMP BOARD】 (COMPONENT SIDE)

【PHONO SYSTEM CONTROL BOARD】 (COMPONENT SIDE)

【PHONO BOARD】 (CONDUCTOR SIDE)

Q,IC	406-408 IC401-404 IC405-409 IC410-413 IC414-417 IC418-421 420 418 421 419 410 414 409 412 413 411 422 IC422 417 416 IC423 415
D	401 405 406 404 413 414 402 403 408 409 412 415 410 411 407

	E	F	G	H	I	J	K
Q,IC	2117-2119	2109 2110 IC2103 2111 2112 2113 2114 2116 2115	2108 2107 2102 2106 2105 2104 2103 IC2101 IC2102 2101 IC2202 IC2201				
D	2101 2102		2203 2202 2201				2103

【PHONO SERVO AMP BOARD】
(COMPONENT SIDE)

IC2101 MSM5811

【MOTOR BOARD】
(CONDUCTOR SIDE)

【SIZE SENS BOARD】(CONDUCTOR SIDE)

【PHONO BOARD】
(CONDUCTOR SIDE)

	E	F	G	H	I	J	K
IC	IC418-421	420 421 418 419 410 409 414	412 413 411 IC422 417 416 422	IC423 415			
D	404	413 414 402 403 408 409 412 415 410 411 407					

REMOTE CONTROL LOGIC HMK-9000 HMK-9

4-18. MOUNTING DIAGRAM

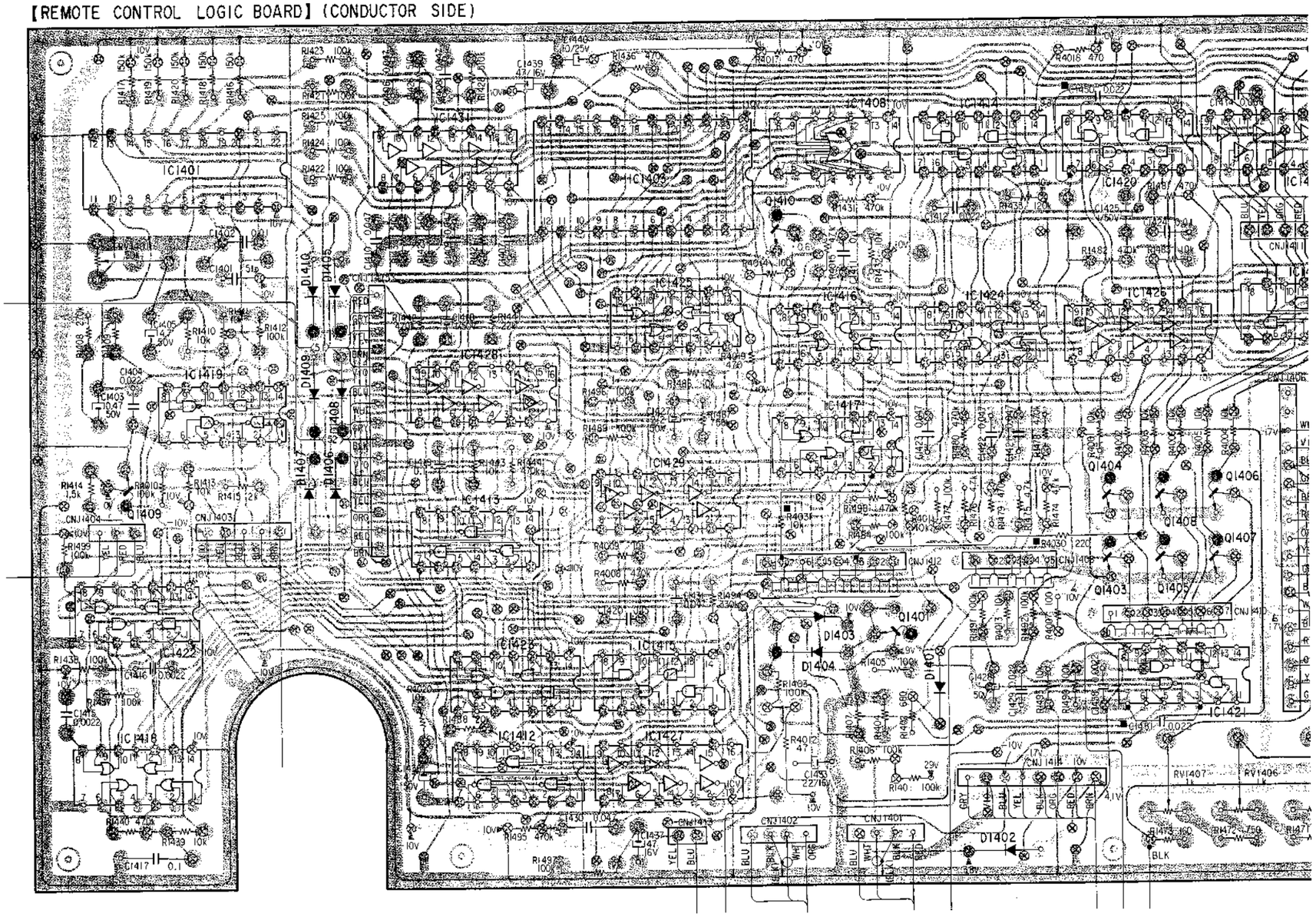
A B C D E F G

1 2 3 4 5

Q IC: IC1401, I409, IC1422, IC1418, IC1419, IC1431, IC1428, IC1413, IC1423, IC1412, IC1403, IC1425, IC1429, IC1415, IC1427, I410, IC1408, IC1416, IC1417, IC1414, IC1424, I401, IC1420, IC1426, I404, I403, I408, I405, I406, I407, IC1421, IC1430, IC141

D: I410, I405, I409, I408, I407, I406, I403, I404, I401, I402

【REMOTE CONTROL LOGIC BOARD】(CONDUCTOR SIDE)

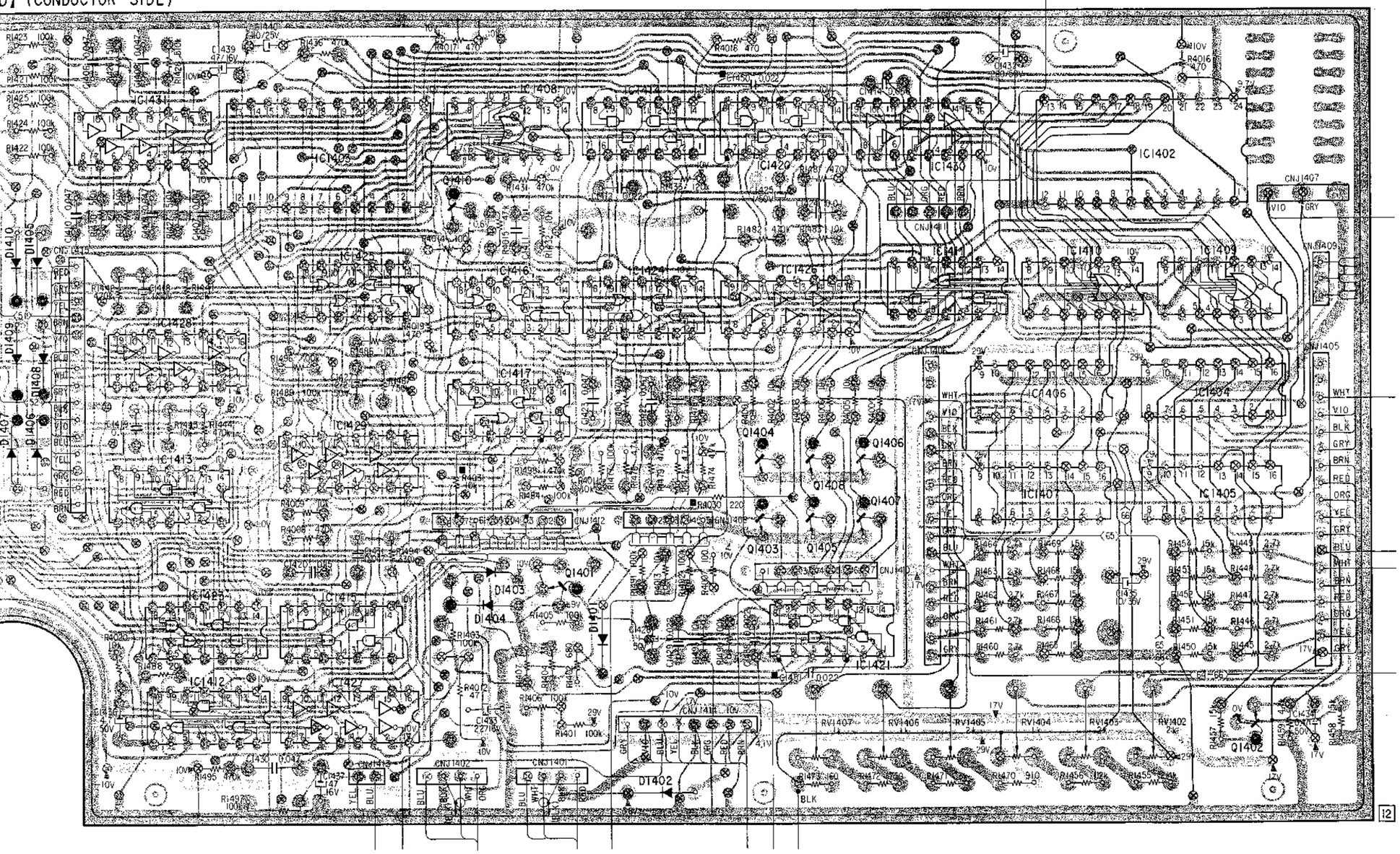


C D E F G H I J

IC1431 IC1428 IC1413 IC1423 IC1412 IC1403 IC1425 IC1429 IC1415 IC1427 1410 IC1408 IC1416 IC1417 1401 IC1414 IC1424 IC1420 IC1426 1404 1403 1408 1405 IC1421 1406 1407 IC1430 IC1411 IC1406 IC1407 IC1410 IC1402 IC1409 IC1404 IC1405 1402

10 1405 09 1408 07 1406 1403 1404 1401 1402

D】(CONDUCTOR SIDE)



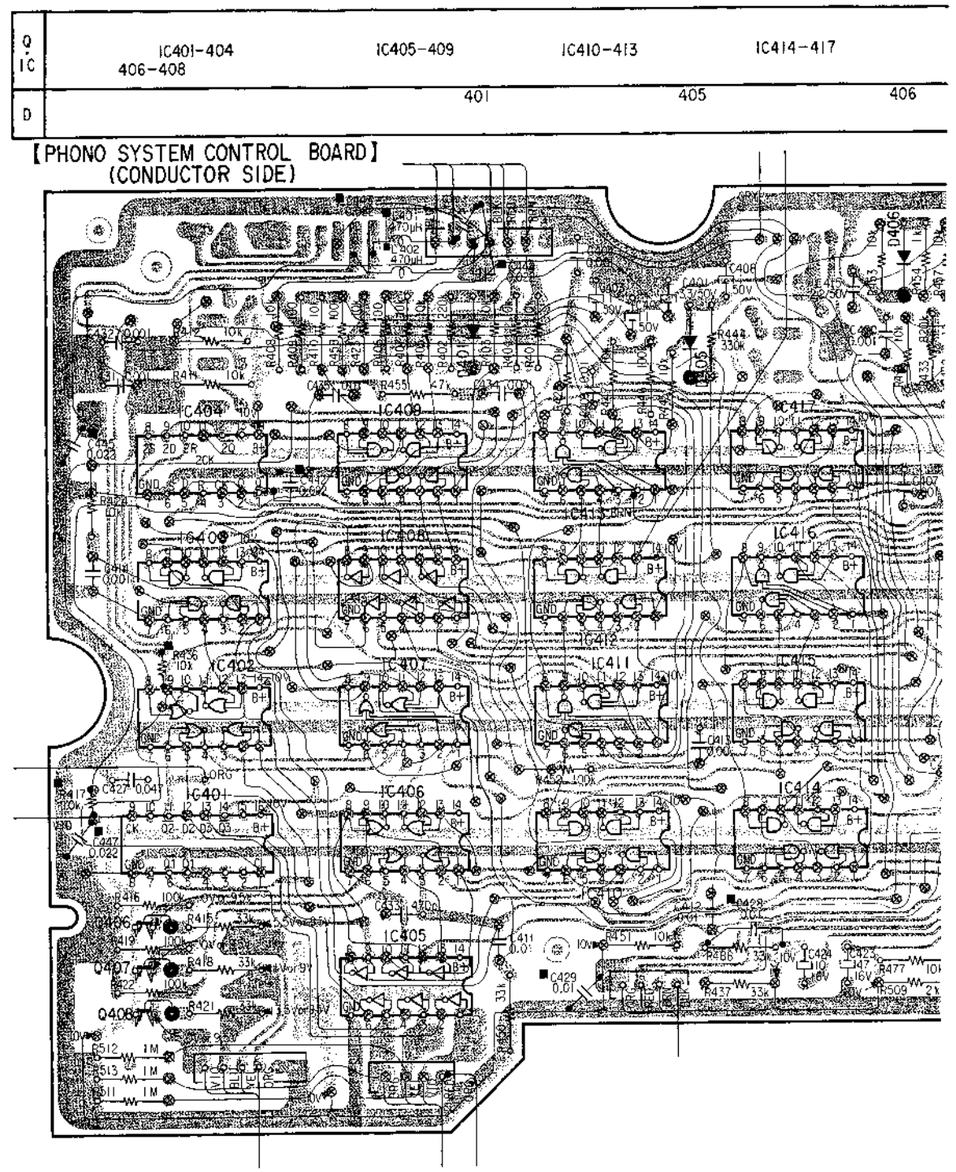
12

1 2 3 4 5

A B C D

1 2 3 4 5

4-19. MOUNTING DIAGRAMS



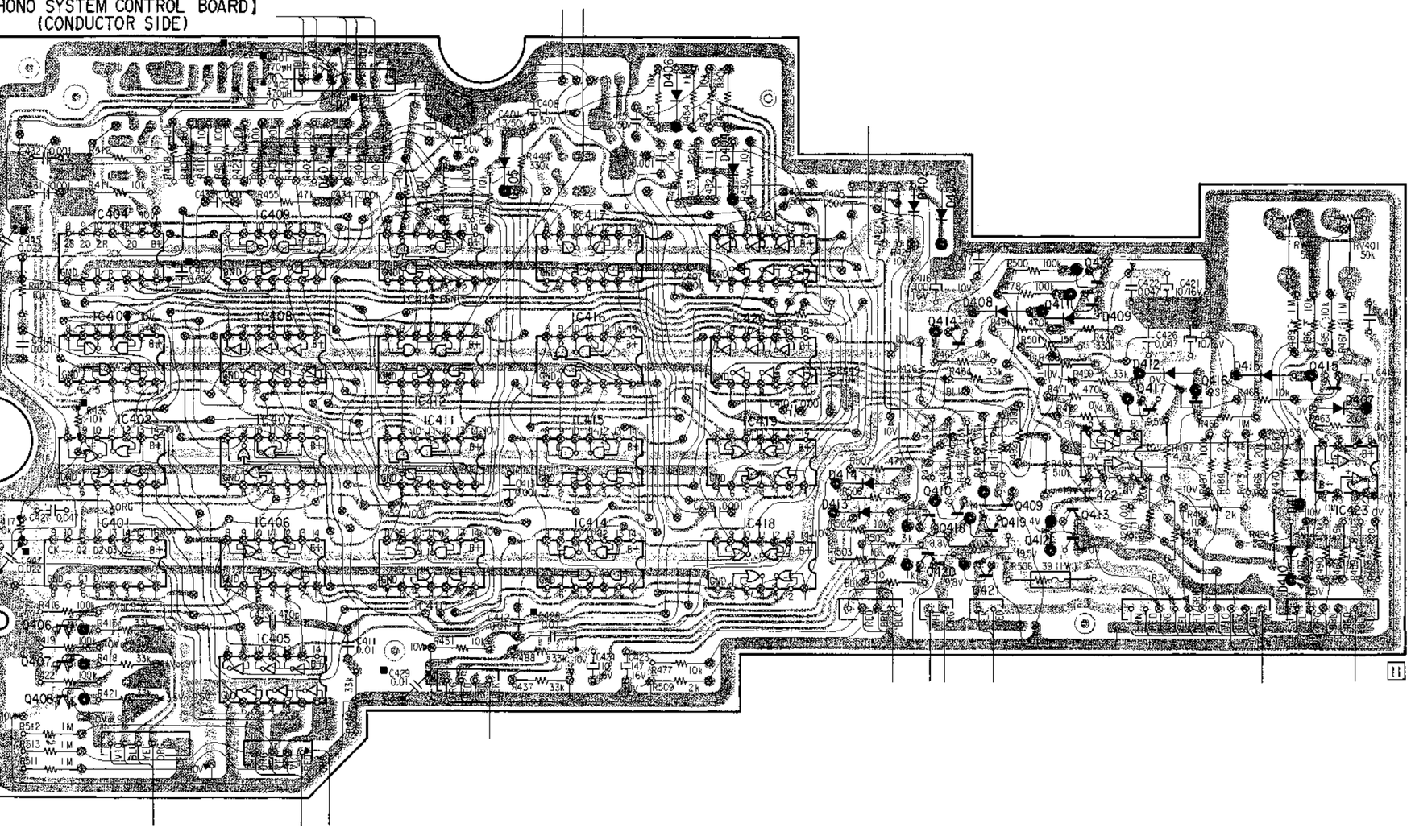
B C D E F G H I

DIAGRAMS

IC401-404
406-408
IC405-409
IC410-413
IC414-417
IC418-421
414 410 409 418 420 419 421 422 411 413 412 IC422 417 416 415 IC423
401 405 406 404 414 413 402 403 408 409 412 415 411 410 407

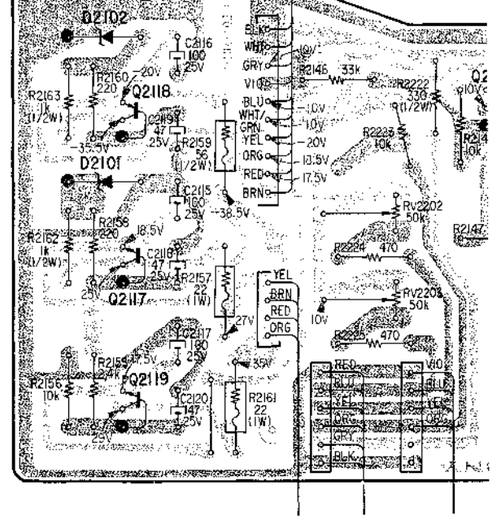
Q · IC · D
D2102 Q2118 D2101 Q2117 Q2119 Q2

HONO SYSTEM CONTROL BOARD]
(CONDUCTOR SIDE)



CHASSIS

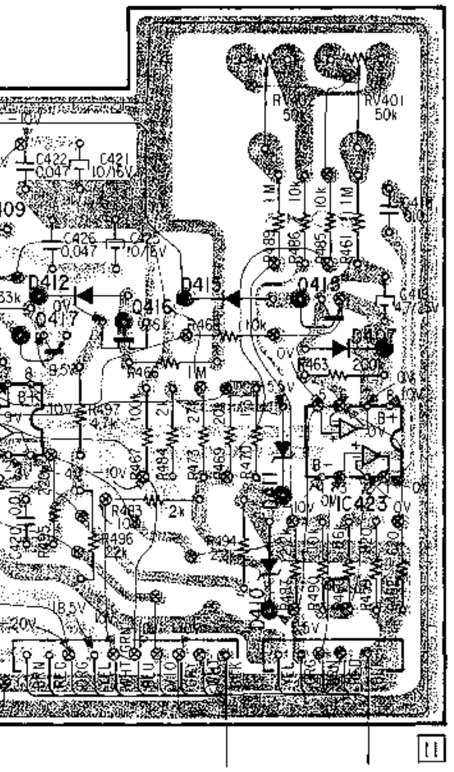
[PHONO SEI
(CONDUC

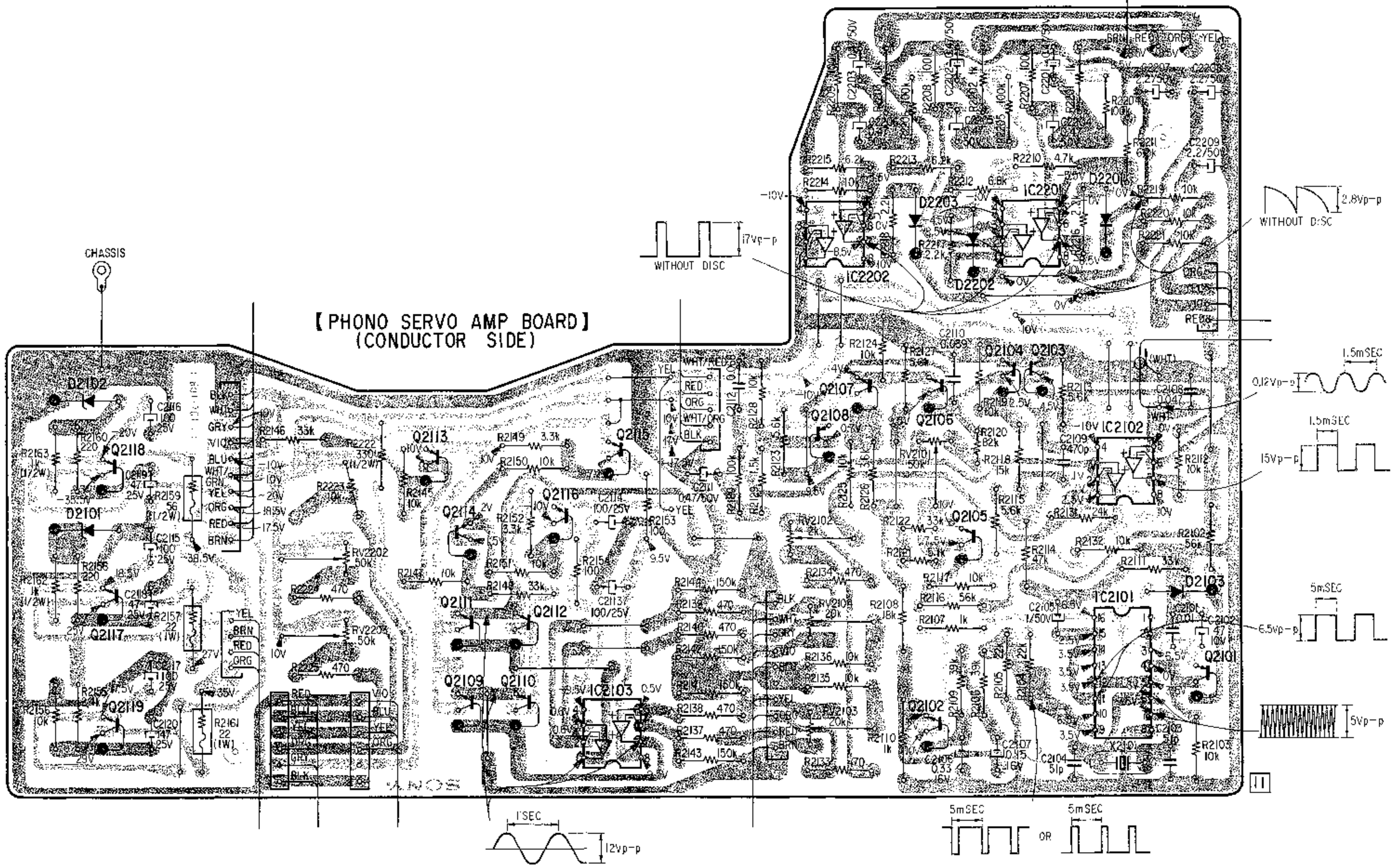


RECORD PLAYER | HMK-9000

	F	G
Q · IC	422 417 416	415 IC423
D	412	415 411 410 407

	H	I	J	K	L	M
Q · IC · D	D2102 Q2118 D2101 Q2117 Q2119		Q2113 Q2114 Q2111 Q2109 Q2116 Q2112 Q2110 Q2115 IC2103	IC2202 Q2107 Q2108 D2203 Q2106 D2202 Q2105 Q2102	IC2201 Q2104 Q2103 D2201 IC2102 IC2101 D2103 Q2101	

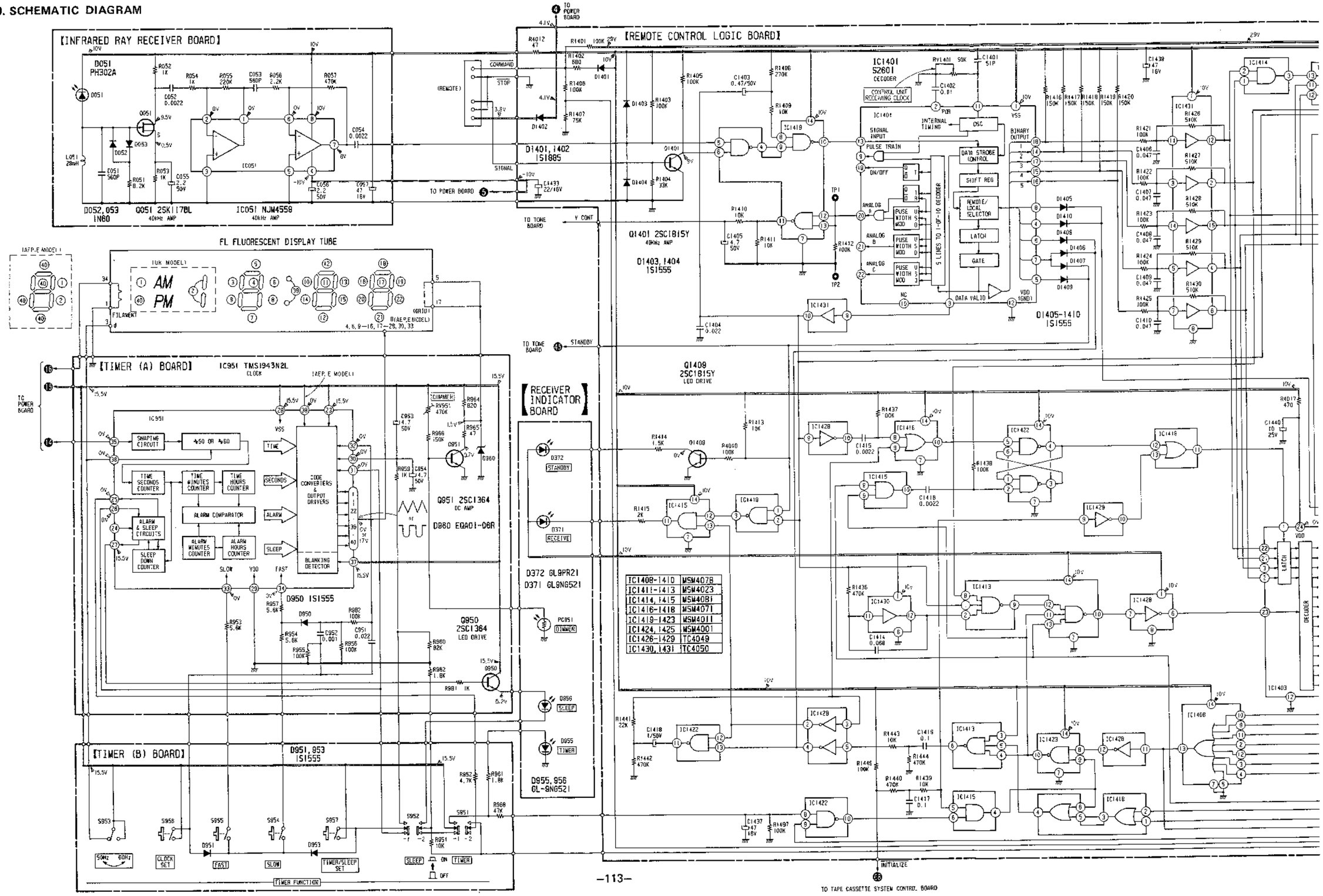




【PHONO SERVO AMP BOARD】
(CONDUCTOR SIDE)

REMOTE CONTROL LOGIC HMK-9000 HMK-9000 REMOTE CONTROL LOGIC

4-20. SCHEMATIC DIAGRAM



E F G H I J K L M

IC BOARD]

TO TUNER BOARD

TO POWER BOARD

TO TUNER

IC1401 S2801 DECODER

CONTROL UNIT RECEIVING CLOCK

INTERNAL TIMING

OSC

POR

SIGNAL INPUT

PULSE TRAIN

ON/OFF

ANALOG A

ANALOG B

ANALOG C

PULSE WIDTH MOD

5 LINES TO 1-OF-10 DECODER

DATA STROBE CONTROL

SHIFT REG

REMOTE/ LOCAL SELECTOR

LATCH

GATE

DATA VALID

BINARY OUTPUT

D1405-1410 1S1555

IC1402 MSM5514 DECODER

LATCH

DECODER

MW1
MW2
MW3
MW4
CASSETTE
MW5
AUX
PHONO
FM1
FM2
FM3
MANUAL
OFF
FM4
FM5

IC1403 MSM5514 DECODER

PHONO STOP
UP
DOWN
AMS ▶
AMS ◀
AMS SET
REW
FF
PAUSE
REC

CASSETTE STOP

REC MUTE

DIAL SCALE UNIT

IC1404-1407 SN76043N ANALOG VOLTAGE SWITCHES

SWITCHING

OUTPUT LOAD

Q1402 2SA1015Y LED DRIVE

INITIALIZE

TO TAPE CASSETTE SYSTEM CONTROL BOARD

AMS SET

T.R

REW FF PAUSE REC

TO TAPE CASSETTE SYSTEM CONTROL BOARD

CT STOP

REC SYNC

TO EQ FUNCTION BOARD

TIMER PLAY

REC

FORWARD STOP REC MUTE PAUSE

TO TAPE CASSETTE SYSTEM CONTROL BOARD

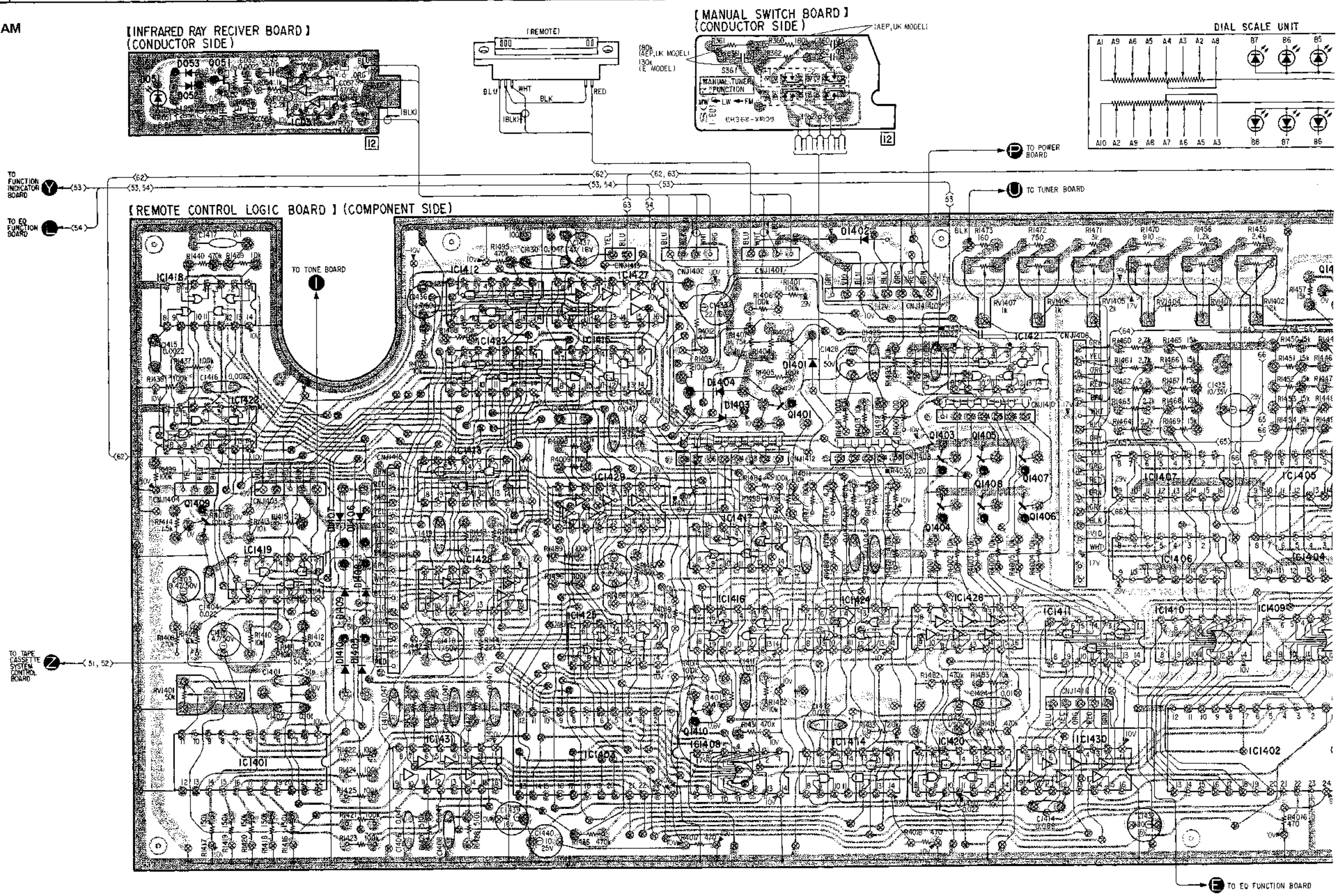
J K L M N O P Q

1 2 3 4 5

TO TUNER BOARD
TO POWER BOARD
TO TUNER BOARD
DIAL SCALE UNIT
【MANUAL SWITCH BOARD】
【FUNCTION INDICATOR BOARD (1/2)】
IC1404-1407 SN76043N ANALOG VOLTAGE SWITCHES
Q1402 2SA1015Y LED DRIVE
Q1403-1408 2SC1815Y LAMP DRIVE
Q1410 2SC1815Y INVERTER
TO TUNER BOARD
TO EQ FUNCTION BOARD
TO EQ FUNCTION BOARD
TO TAPE CASSETTE SYSTEM CONTROL BOARD
TO TAPE CASSETTE SYSTEM CONTROL BOARD
TO PHONO SYSTEM CONTROL BOARD
TO POWER BOARD

A B C D E F G H

4-21. MOUNTING DIAGRAM



1 2 3 4 5

Q · IC	051 IC1418 IC1422 1409	IC1401	IC051 IC1419	IC1413 IC1428 IC1431	IC1412 IC1423	IC1427 IC1415 IC1429 IC1425 IC1403	1410	IC1417 IC1416 IC1408	1401	IC1424 IC1414	1403 1404	IC1421 1405 1408 IC1426 IC1420	1407 1406 IC1430 IC1411	IC1407 IC1406 IC1410 IC1402 IC1405 IC1404 IC140(14
D	051	053 052	1407 1409 1410	1406 1408 1405				1404 1403	1401	1402				

H I J K L M N O

DIAL SCALE UNIT

AEP,E MODEL

FLUORESCENT DISPLAY TUBE

UK MODEL

IC951
TMS1943NL2

IC1404–1407
SN76043N

IC1402, 1403
MSM4514

IC1401
S2601

[TIMER (A) BOARD]
(CONDUCTOR SIDE)

[RECEIVE INDICATOR BOARD]
(CONDUCTOR SIDE)

[TIMER (B) BOARD]
(CONDUCTOR SIDE)

TIMER/SLEEP SET | CLOCK SET | SLEEP | TIMER | FAST | SLOW | 60Hz 50Hz

TIMER FUNCTION

TO POWER BOARD

TO TUNER BOARD

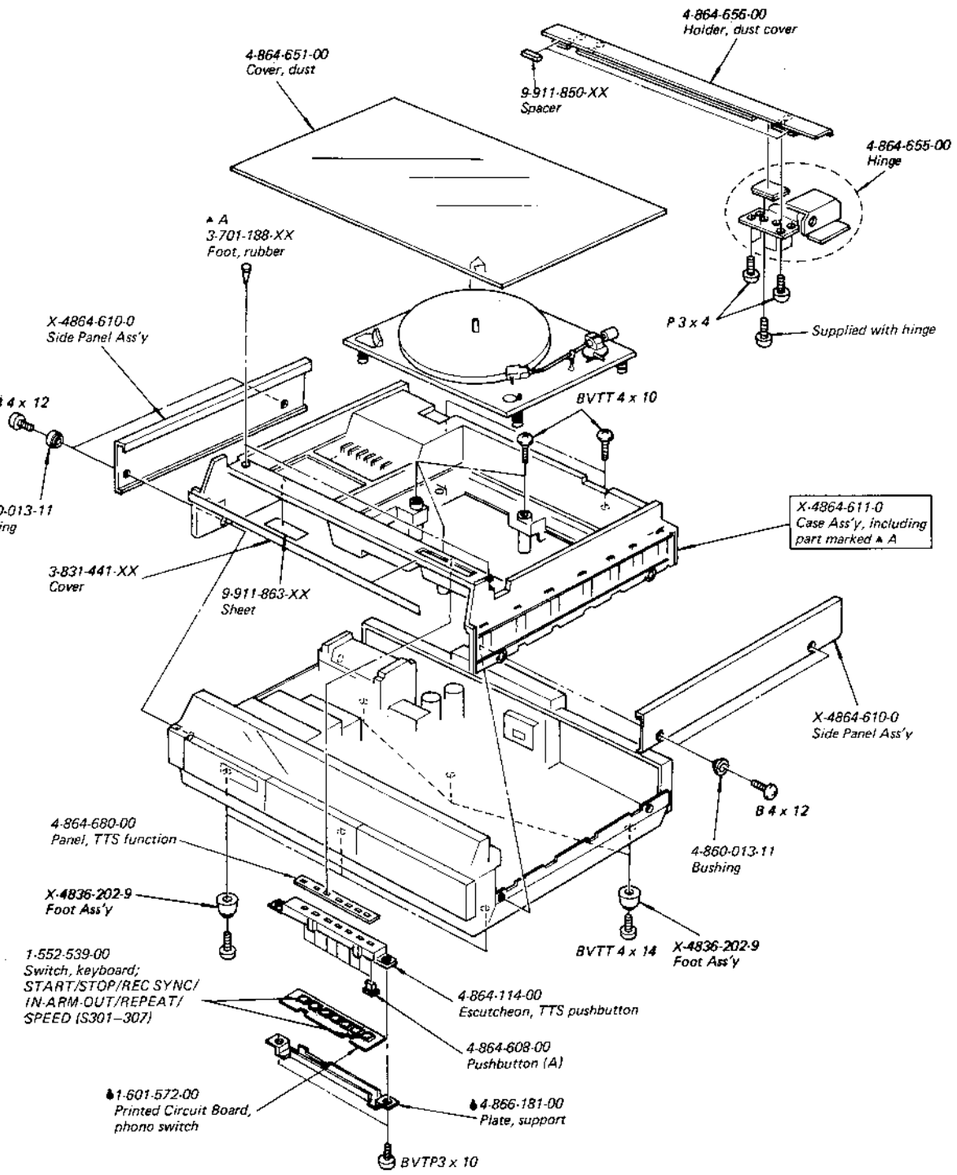
TO EQ FUNCTION BOARD

Q·IC	1C1410 1C1405 1402 1C1404 1C1409 1C1402 951 950 IC951
D	960 953 951 950 371 372 956 955

SECTION 5
EXPLODED VIEWS

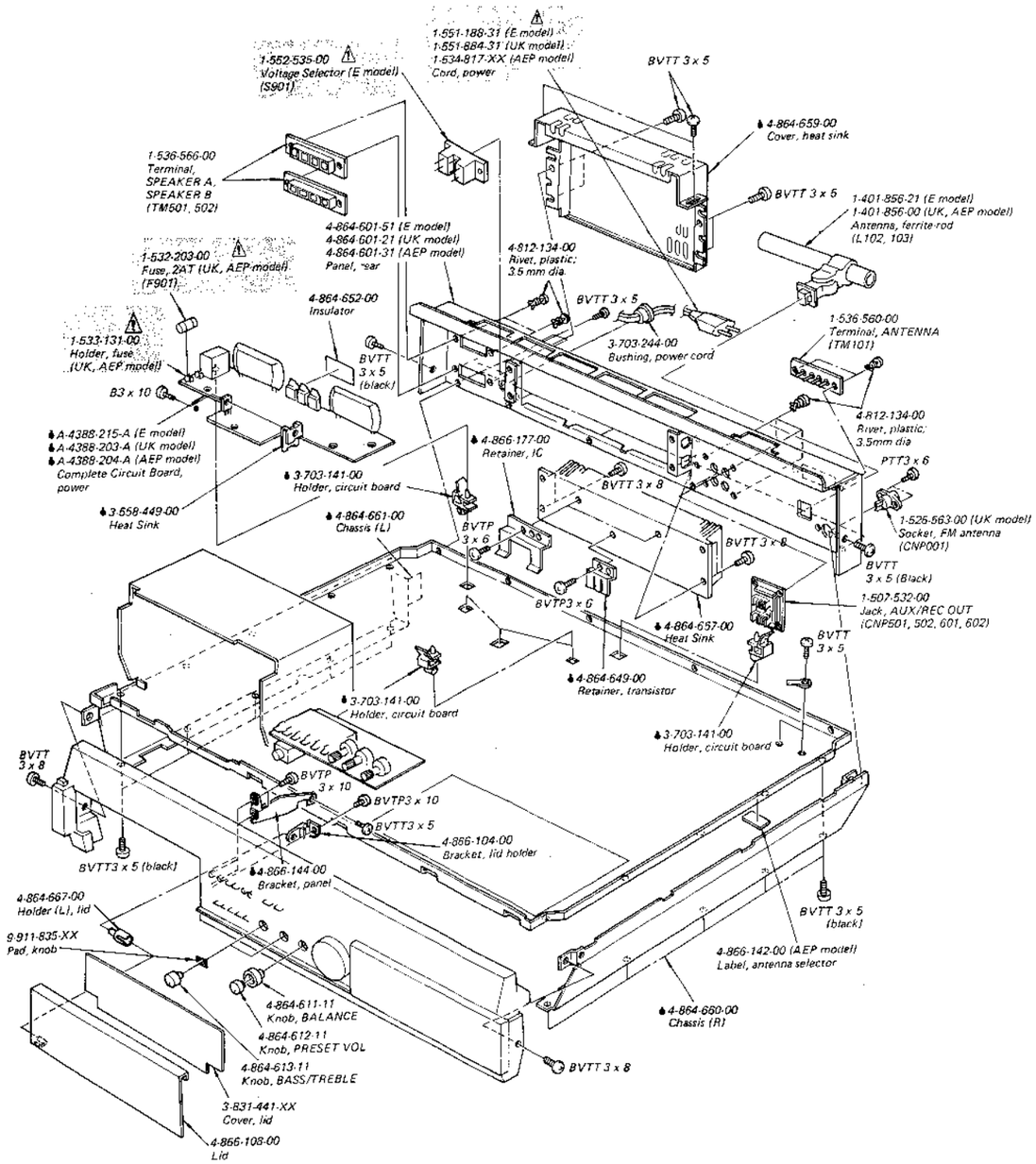
(1)

Note:
- Items marked "♦" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- All screws are Phillips (cross recess) type unless otherwise noted.
(–) = slotted head

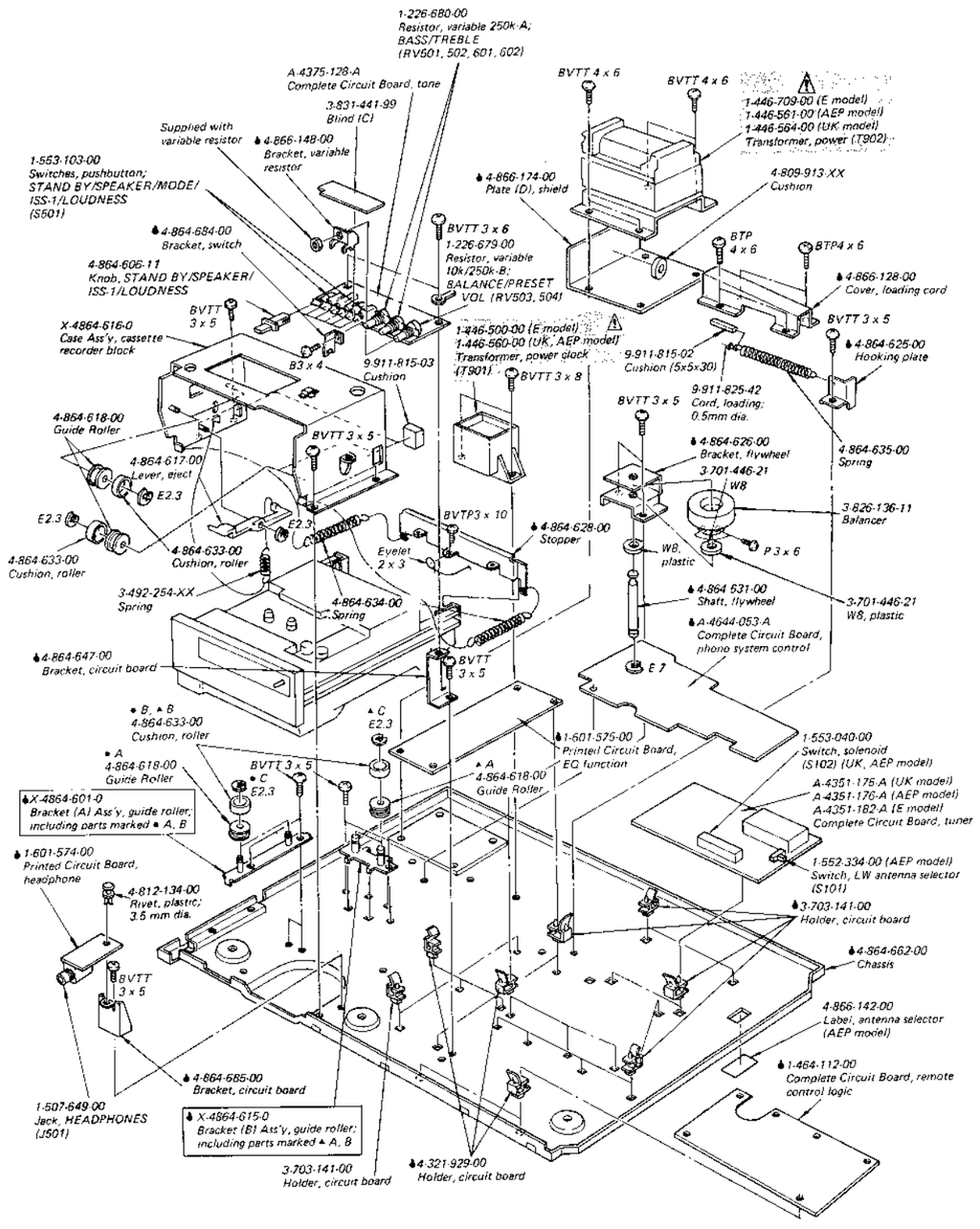


Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

(2)



(3)



BASE POST, CONNECTOR ETC.

Part No.	Description	Fig.
1-508-704-00	terminal with base 3P	D
1-535-115-00	terminal with base 2P	D
1-535-116-00	terminal with base 3P	D
1-535-117-00	terminal with base 4P	D
1-535-118-00	terminal with base 5P	D
1-535-119-00	terminal with base 6P	D
1-535-120-00	terminal with base 7P	D
1-535-121-00	terminal with base 8P	D
1-560-003-00	connector pin 10P	B
1-561-123-00	connector plug 3P	A
1-561-124-00	connector plug 4P	A
1-561-125-00	connector plug 5P	A
1-561-126-00	connector plug 6P	A
1-561-128-00	connector plug 8P	A
1-561-129-00	connector plug 9P	A
1-561-281-00	connector pin 5P	B
1-561-282-00	connector pin 7P	B
1-561-283-00	connector pin 8P	B
1-561-286-00	connector pin 2P	B
1-561-289-00	connector plug 18P	A
1-561-290-00	connector plug 2P	A
1-561-439-00	connector socket 3P	C
1-561-440-00	connector socket 4P	C
1-561-441-00	connector socket 5P	C
1-561-443-00	connector socket 7P	C
1-561-444-00	connector socket 8P	C

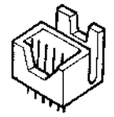


Fig. A

Fig. B

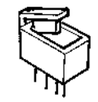


Fig. C

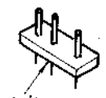
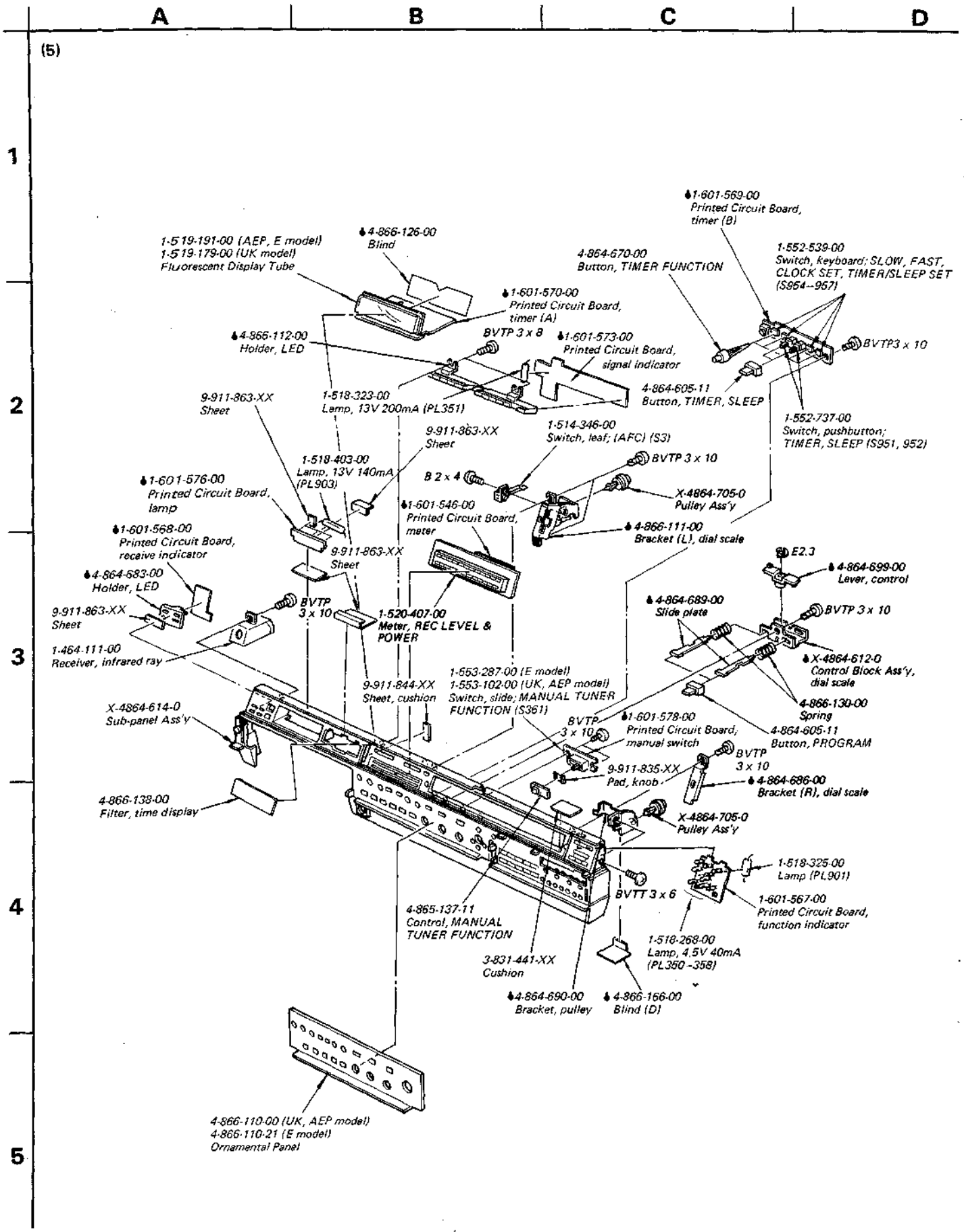


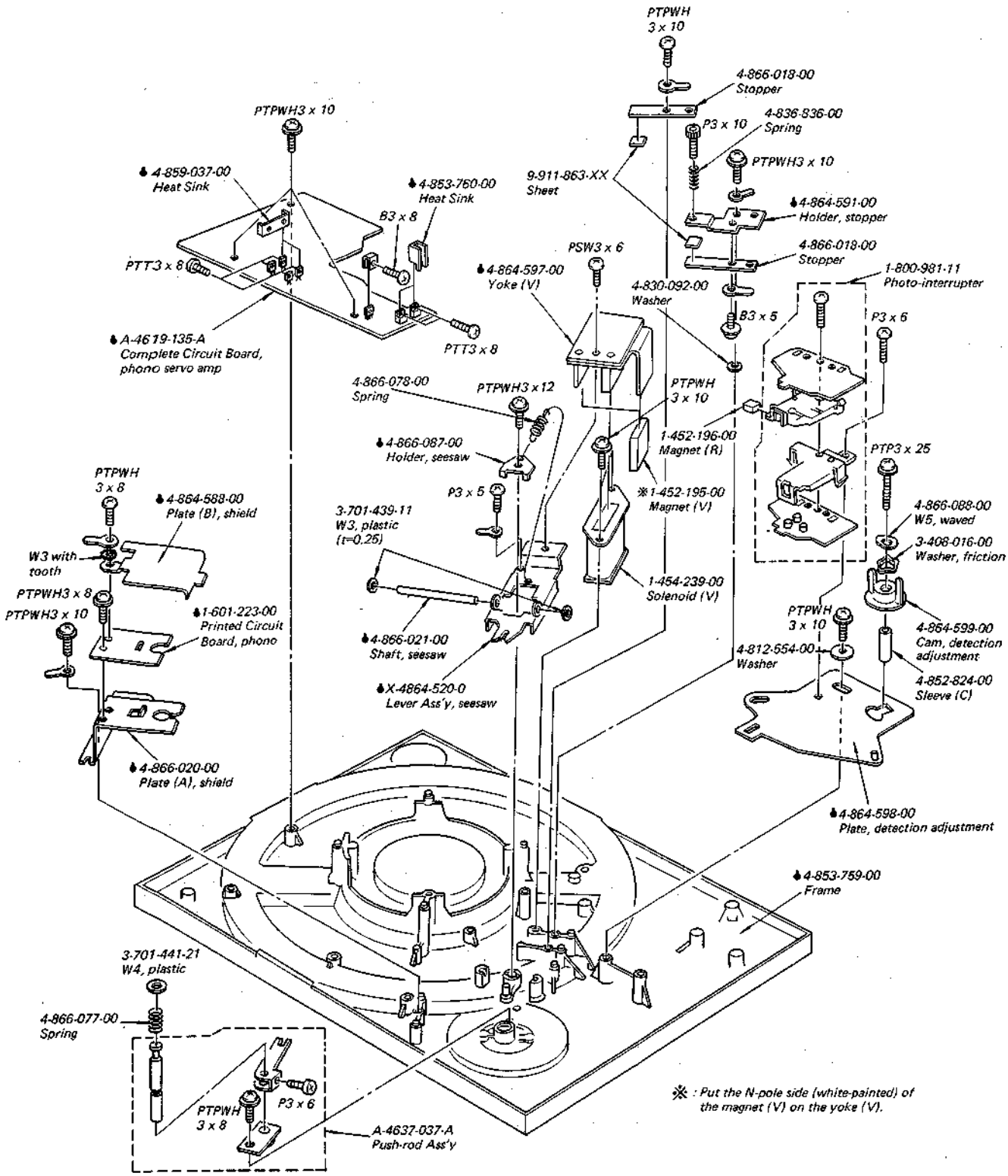
Fig. D


A
B
C
D
1
2
3
4
5
(5)
1-519-191-00 (AEP, E model)
1-519-179-00 (UK model)
Fluorescent Display Tube
4-866-126-00
Blind
1-601-569-00
Printed Circuit Board, timer (B)
4-864-670-00
Button, TIMER FUNCTION
1-552-539-00
Switch, keyboard; SLOW, FAST, CLOCK SET, TIMER/SLEEP SET (S954–957)
1-601-570-00
Printed Circuit Board, timer (A)
4-866-112-00
Holder, LED
BVTP 3 x 8
1-601-573-00
Printed Circuit Board, signal indicator
BVTP3 x 10
4-864-605-11
Button, TIMER, SLEEP
1-552-737-00
Switch, pushbutton; TIMER, SLEEP (S951, 952)
9-911-863-XX
Sheet
1-518-323-00
Lamp, 13V 200mA (PL351)
9-911-863-XX
Sheet
1-514-346-00
Switch, leaf; (AFC) (S3)
1-518-403-00
Lamp, 13V 140mA (PL903)
B 2 x 4
BVTP 3 x 10
1-601-576-00
Printed Circuit Board, lamp
X-4864-705-0
Pulley Ass'y
1-601-546-00
Printed Circuit Board, meter
4-866-111-00
Bracket (L), dial scale
1-601-568-00
Printed Circuit Board, receive indicator
9-911-863-XX
Sheet
E2.3
4-864-699-00
Lever, control
4-864-583-00
Holder, LED
BVTP 3 x 10
1-520-407-00
Meter, REC LEVEL & POWER
4-864-689-00
Slide plate
BVTP 3 x 10
9-911-863-XX
Sheet
1-464-111-00
Receiver, infrared ray
X-4864-612-0
Control Block Ass'y, dial scale
4-866-130-00
Spring
1-553-287-00 (E model)
1-553-102-00 (UK, AEP model)
Switch, slide; MANUAL TUNER FUNCTION (S361)
9-911-844-XX
Sheet, cushion
X-4864-614-0
Sub-panel Ass'y
BVTP 3 x 10
1-601-578-00
Printed Circuit Board, manual switch
4-864-605-11
Button, PROGRAM
BVTP 3 x 10
9-911-835-XX
Pad, knob
4-864-686-00
Bracket (R), dial scale
4-866-138-00
Filter, time display
X-4864-705-0
Pulley Ass'y
1-518-325-00
Lamp (PL901)
BVTT 3 x 6
1-601-567-00
Printed Circuit Board, function indicator
4-865-137-11
Control, MANUAL TUNER FUNCTION
1-518-268-00
Lamp, 4.5V 40mA (PL350 -358)
3-831-441-XX
Cushion
4-864-690-00
Bracket, pulley
4-866-166-00
Blind (D)
4-866-110-00 (UK, AEP model)
4-866-110-21 (E model)
Ornamental Panel

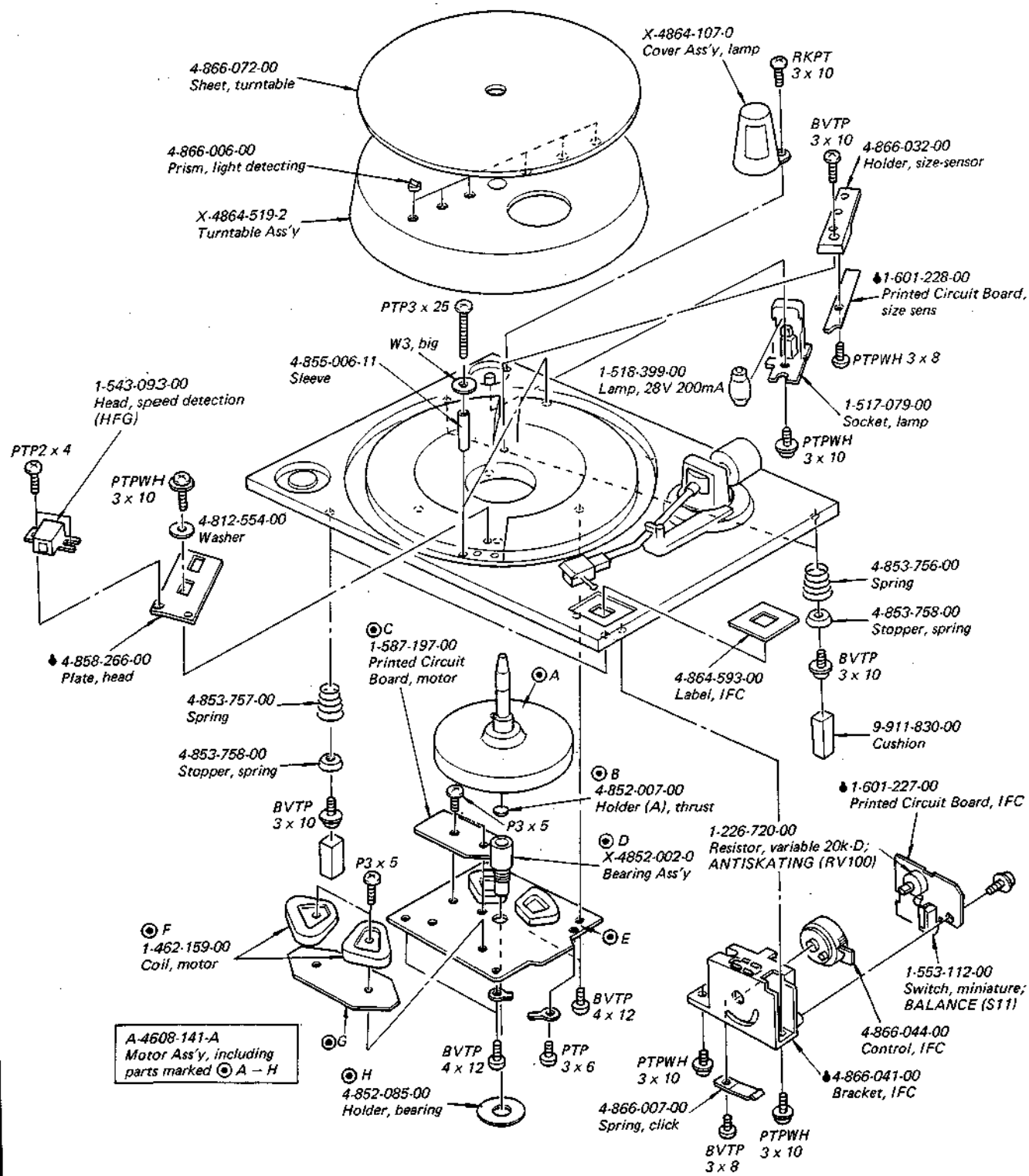
A B C D

1 2 3 4 5

(6)

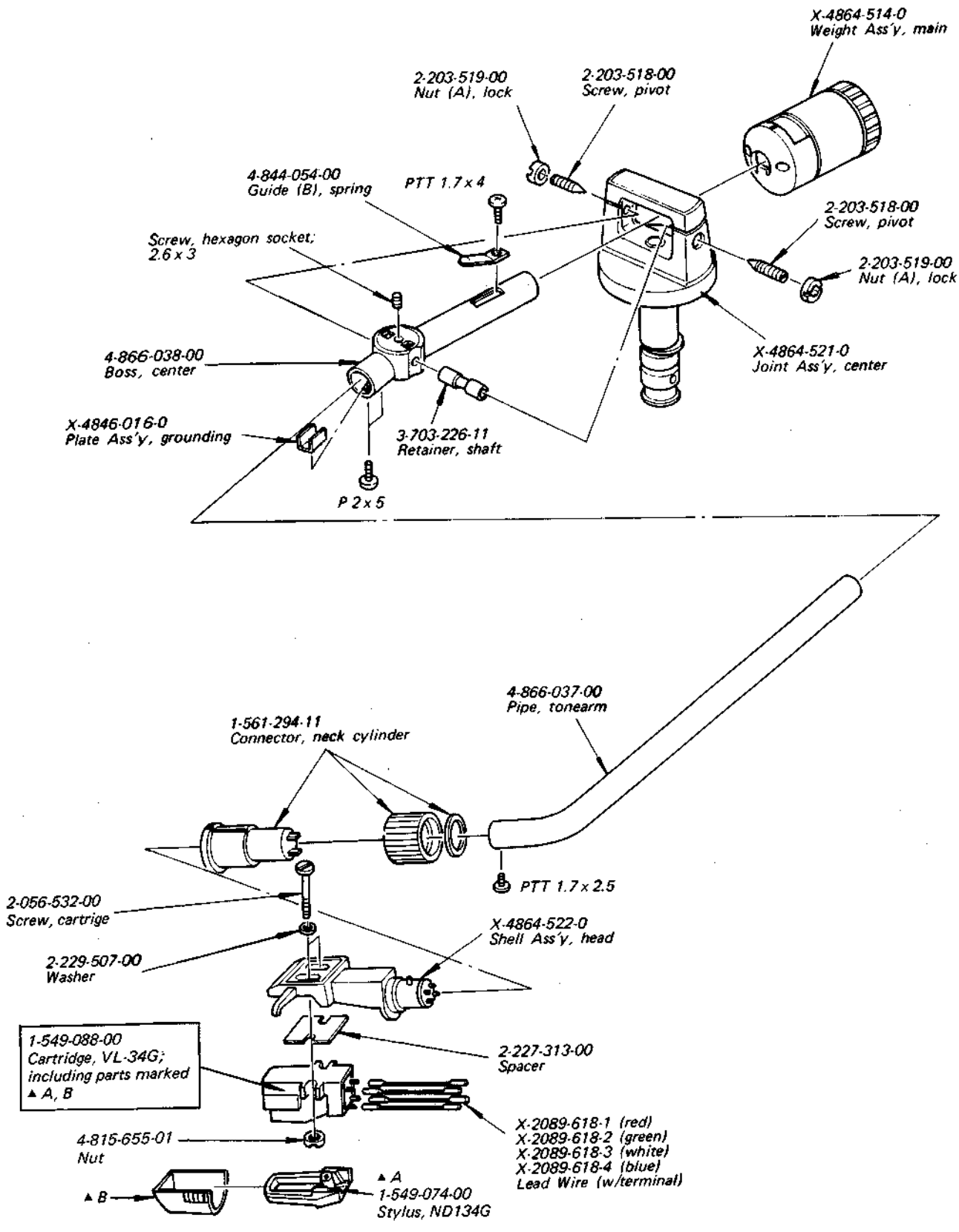

PTPWH 3 x 10
4-866-018-00 Stopper
4-836-836-00 Spring
P3 x 10
PTPWH3 x 10
9-911-863-XX Sheet
4-864-591-00 Holder, stopper
4-866-018-00 Stopper
1-800-981-11 Photo-interrupter
PTPWH3 x 10
4-859-037-00 Heat Sink
4-853-760-00 Heat Sink
B3 x 8
PTT3 x 8
PSW3 x 6
4-864-597-00 Yoke (V)
4-830-092-00 Washer
B3 x 5
P3 x 6
A-4619-135-A Complete Circuit Board, phono servo amp
PTT3 x 8
4-866-078-00 Spring
PTPWH3 x 12
PTPWH 3 x 10
4-866-087-00 Holder, seesaw
1-452-196-00 Magnet (R)
PTP3 x 25
P3 x 5
※1-452-195-00 Magnet (V)
PTPWH 3 x 8
4-864-588-00 Plate (B), shield
3-701-439-11 W3, plastic (t=0.25)
4-866-088-00 W5, waved
3-408-016-00 Washer, friction
W3 with tooth
PTPWH3 x 8
PTPWH3 x 10
1-601-223-00 Printed Circuit Board, phono
1-454-239-00 Solenoid (V)
PTPWH 3 x 10
4-866-021-00 Shaft, seesaw
4-864-599-00 Cam, detection adjustment
4-812-554-00 Washer
X-4864-520-0 Lever Ass'y, seesaw
4-852-824-00 Sleeve (C)
4-866-020-00 Plate (A), shield
4-864-598-00 Plate, detection adjustment
4-853-759-00 Frame
3-701-441-21 W4, plastic
4-866-077-00 Spring
PTPWH 3 x 8
P3 x 6
A-4637-037-A Push-rod Ass'y
※ : Put the N-pole side (white-painted) of the magnet (V) on the yoke (V).

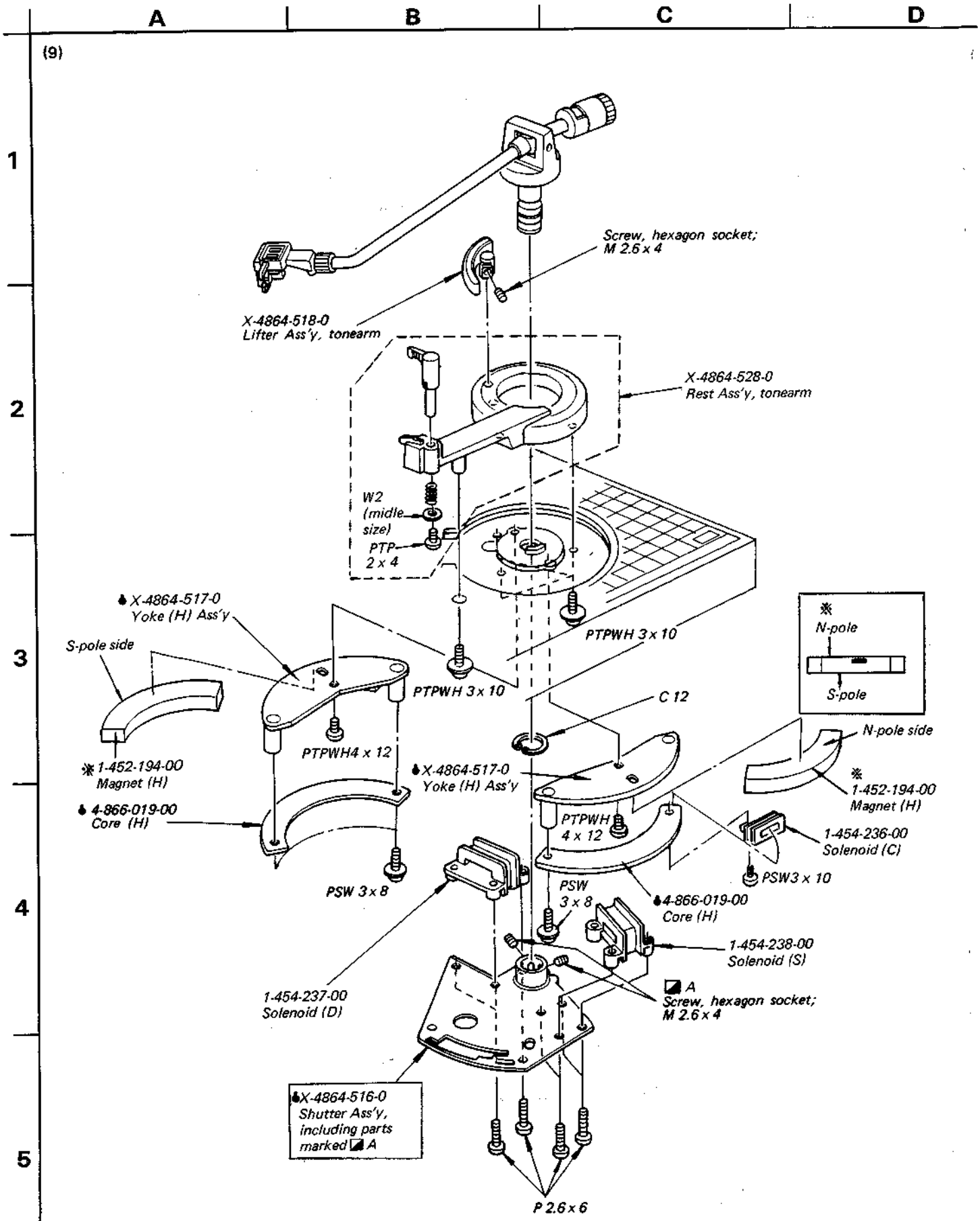
(7)


4-866-072-00
Sheet, turntable
X-4864-107-0
Cover Ass'y, lamp
RKPT
3 x 10
BVTP
3 x 10
4-866-032-00
Holder, size-sensor
4-866-006-00
Prism, light detecting
X-4864-519-2
Turntable Ass'y
1-601-228-00
Printed Circuit Board, size sens
PTP3 x 25
W3, big
4-855-006-11
Sleeve
1-518-399-00
Lamp, 28V 200mA
PTPWH 3 x 8
1-517-079-00
Socket, lamp
PTPWH
3 x 10
1-543-093-00
Head, speed detection (HFG)
PTP2 x 4
PTPWH
3 x 10
4-812-554-00
Washer
4-858-266-00
Plate, head
4-853-756-00
Spring
4-853-758-00
Stopper, spring
BVTP
3 x 10
9-911-830-00
Cushion
4-864-593-00
Label, IFC
C
1-587-197-00
Printed Circuit Board, motor
A
4-853-757-00
Spring
4-853-758-00
Stopper, spring
BVTP
3 x 10
B
4-852-007-00
Holder (A), thrust
P3 x 5
1-601-227-00
Printed Circuit Board, IFC
D
X-4852-002-0
Bearing Ass'y
1-226-720-00
Resistor, variable 20k-D; ANTISKATING (RV100)
P3 x 5
F
1-462-159-00
Coil, motor
E
1-553-112-00
Switch, miniature; BALANCE (S11)
BVTP
4 x 12
4-866-044-00
Control, IFC
G
BVTP
4 x 12
PTP
3 x 6
PTPWH
3 x 10
4-866-041-00
Bracket, IFC
H
4-852-085-00
Holder, bearing
4-866-007-00
Spring, click
BVTP
3 x 8
PTPWH
3 x 10
A-4608-141-A
Motor Ass'y, including parts marked A – H

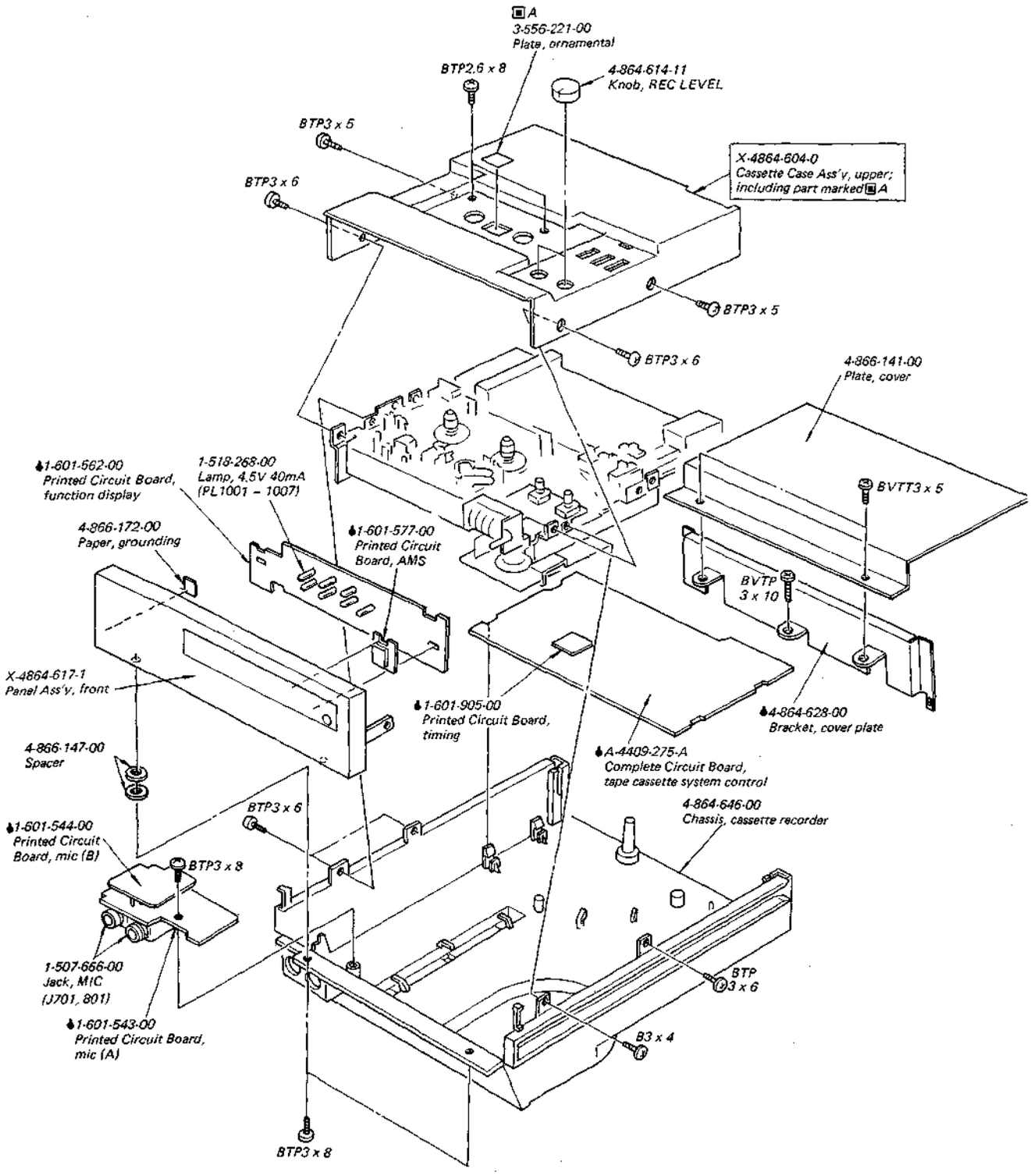
A B C D

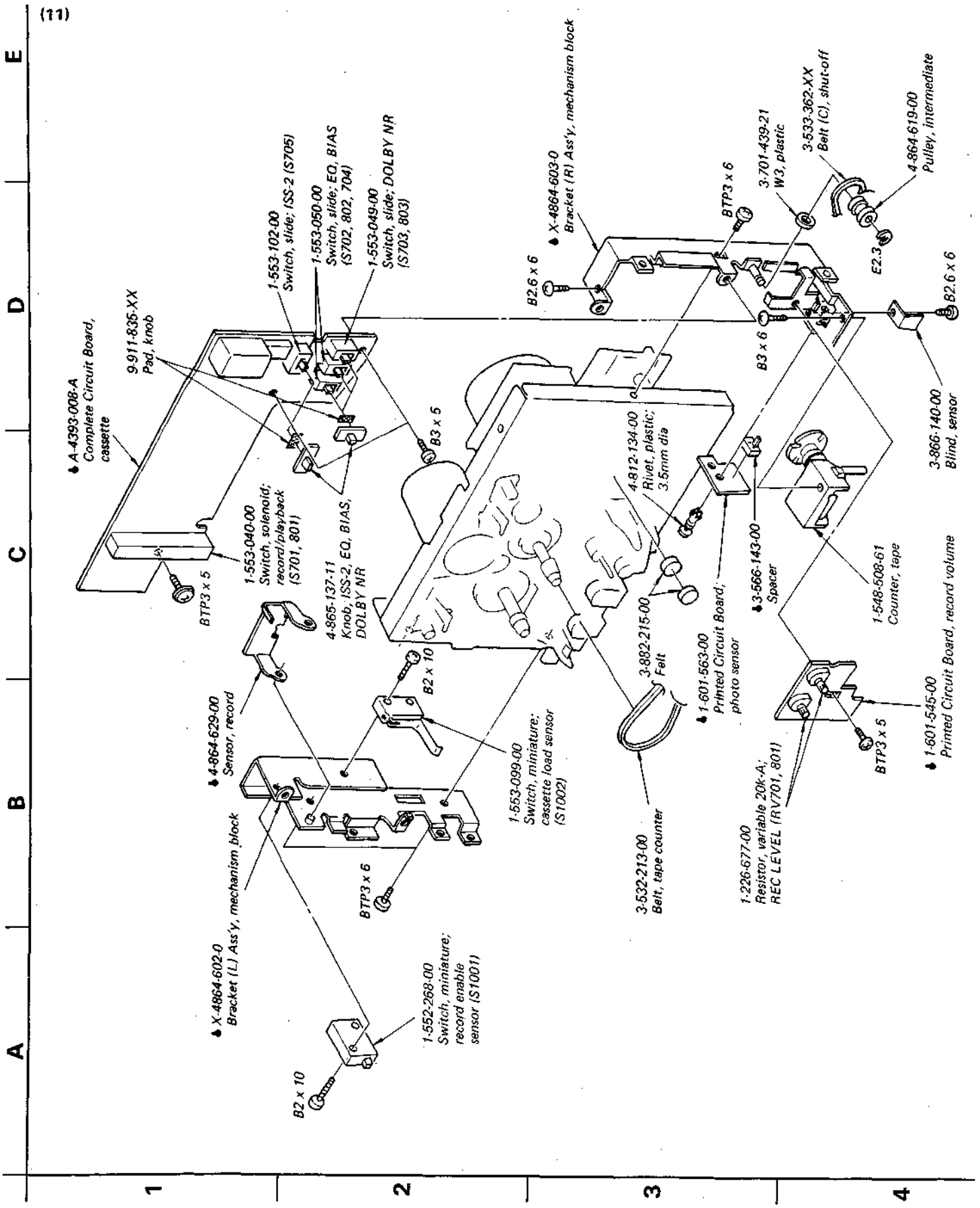
(8)


X-4864-514-0
Weight Ass'y, main
2-203-519-00
Nut (A), lock
2-203-518-00
Screw, pivot
4-844-054-00
Guide (B), spring
PTT 1.7x4
Screw, hexagon socket;
2.6x3
2-203-518-00
Screw, pivot
2-203-519-00
Nut (A), lock
4-866-038-00
Boss, center
X-4864-521-0
Joint Ass'y, center
X-4846-016-0
Plate Ass'y, grounding
3-703-226-11
Retainer, shaft
P 2x5
4-866-037-00
Pipe, tonearm
1-561-294-11
Connector, neck cylinder
PTT 1.7x2.5
2-056-532-00
Screw, cartrige
X-4864-522-0
Shell Ass'y, head
2-229-507-00
Washer
1-549-088-00
Cartridge, VL-34G;
including parts marked
▲A, B
2-227-313-00
Spacer
X-2089-618-1 (red)
X-2089-618-2 (green)
X-2089-618-3 (white)
X-2089-618-4 (blue)
Lead Wire (w/terminal)
4-815-655-01
Nut
▲A
1-549-074-00
Stylus, ND134G
▲B

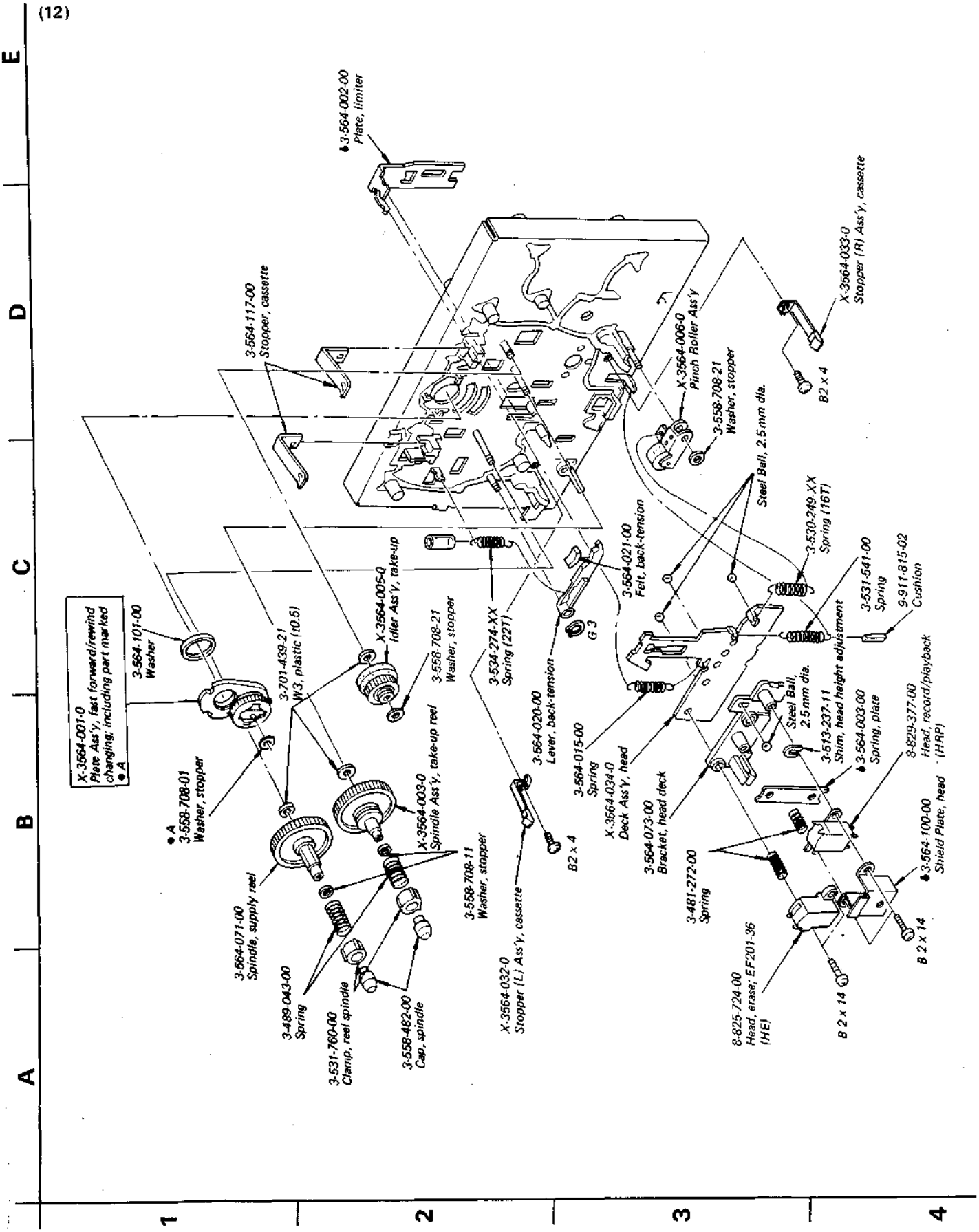

A
B
C
D
1
2
3
4
5
(9)
Screw, hexagon socket; M 2.6 x 4
X-4864-518-0 Lifter Ass'y, tonearm
X-4864-528-0 Rest Ass'y, tonearm
W2 (midle size)
PTP 2 x 4
PTPWH 3 x 10
X-4864-517-0 Yoke (H) Ass'y
S-pole side
PTPWH 3 x 10
C 12
※ N-pole
S-pole
N-pole side
※ 1-452-194-00 Magnet (H)
PTPWH4 x 12
X-4864-517-0 Yoke (H) Ass'y
※ 1-452-194-00 Magnet (H)
4-866-019-00 Core (H)
PTPWH 4 x 12
1-454-236-00 Solenoid (C)
PSW 3 x 8
PSW3 x 10
PSW 3 x 8
4-866-019-00 Core (H)
1-454-238-00 Solenoid (S)
1-454-237-00 Solenoid (D)
◪ A Screw, hexagon socket; M 2.6 x 4
X-4864-516-0 Shutter Ass'y, including parts marked ◪ A
P 2.6 x 6

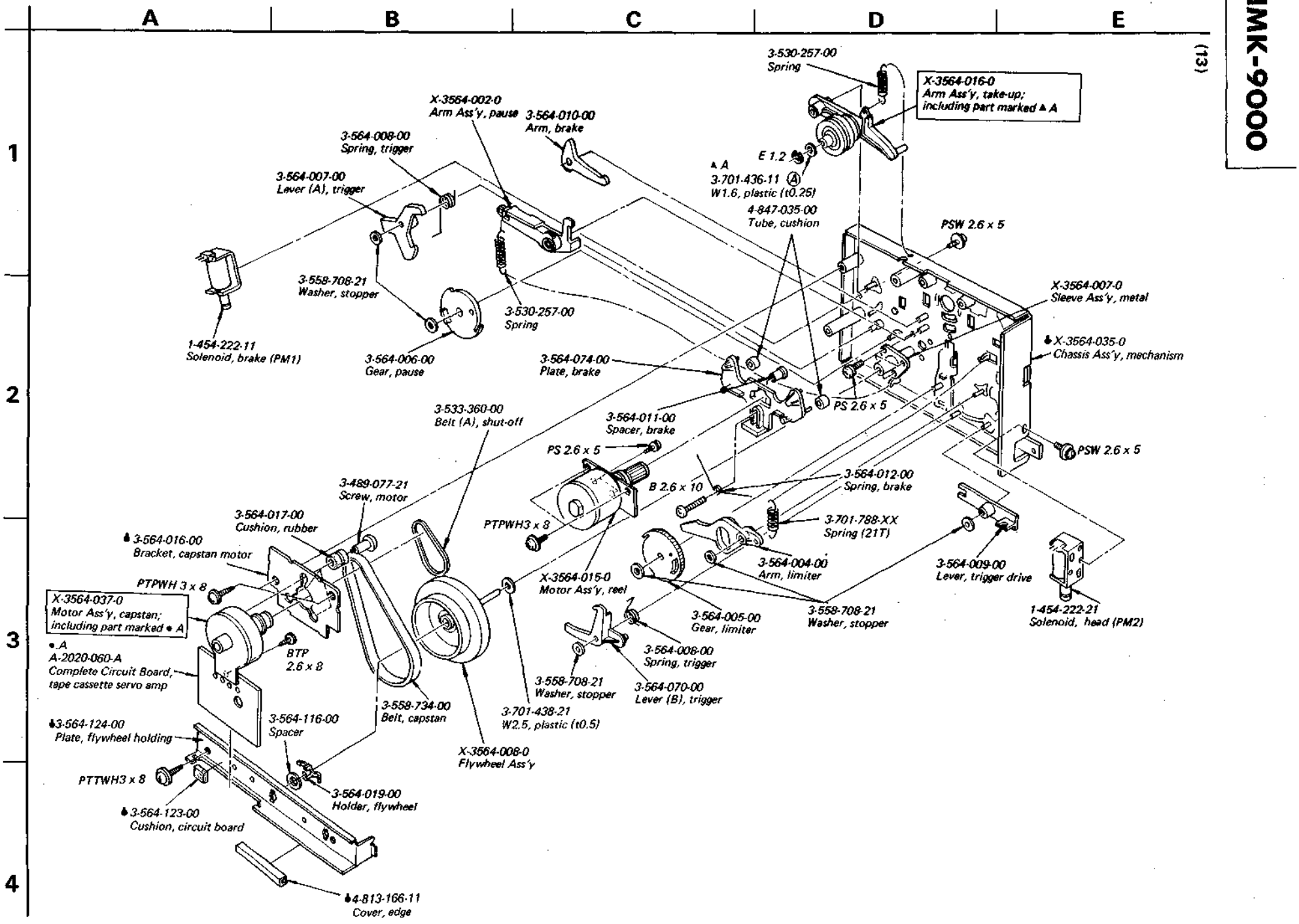
(10)

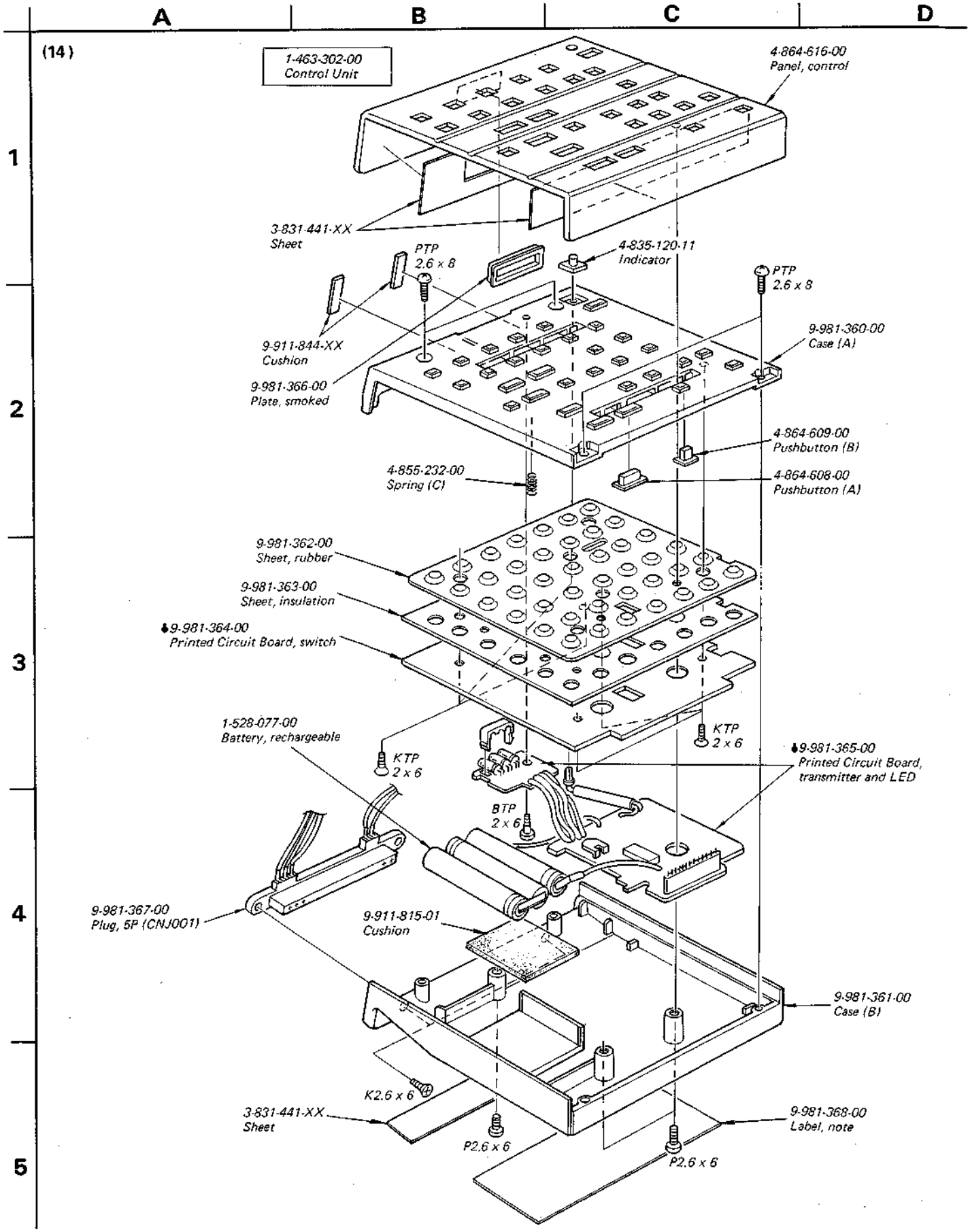

■A
3-556-221-00
Plate, ornamental
BTP2.6 x 8
4-864-614-11
Knob, REC LEVEL
BTP3 x 5
BTP3 x 6
X-4864-604-0
Cassette Case Ass'y, upper;
including part marked ■A
BTP3 x 5
BTP3 x 6
4-866-141-00
Plate, cover
♦1-601-562-00
Printed Circuit Board,
function display
1-518-268-00
Lamp, 4.5V 40mA
(PL1001 – 1007)
4-866-172-00
Paper, grounding
♦1-601-577-00
Printed Circuit
Board, AMS
BVTT3 x 5
BVTP
3 x 10
X-4864-617-1
Panel Ass'y, front
♦1-601-905-00
Printed Circuit Board,
timing
♦4-864-628-00
Bracket, cover plate
4-866-147-00
Spacer
♦A-4409-275-A
Complete Circuit Board,
tape cassette system control
4-864-646-00
Chassis, cassette recorder
BTP3 x 6
♦1-601-544-00
Printed Circuit
Board, mic (B)
BTP3 x 8
BTP
3 x 6
1-507-666-00
Jack, MIC
(J701, 801)
♦1-601-543-00
Printed Circuit Board,
mic (A)
B3 x 4
BTP3 x 8


(11)
A
B
C
D
E
1
2
3
4
♦ A-4393-008-A
Complete Circuit Board, cassette
9-911-835-XX
Pad, knob
1-553-102-00
Switch, slide; ISS-2 (S705)
1-553-050-00
Switch, slide; EQ, BIAS (S702, 802, 704)
1-553-049-00
Switch, slide; DOLBY NR (S703, 803)
♦ X-4864-603-0
Bracket (R) Ass'y, mechanism block
3-701-439-21
W3, plastic
3-533-362-XX
Belt (C), shut-off
4-864-619-00
Pulley, intermediate
3-866-140-00
Blind, sensor
1-553-040-00
Switch, solenoid; record/playback (S701, 801)
4-865-137-11
Knob, ISS-2, EQ, BIAS, DOLBY NR
4-812-134-00
Rivet, plastic; 3.5mm dia
3-882-215-00
Felt
♦ 1-601-563-00
Printed Circuit Board, photo sensor
♦ 3-566-143-00
Spacer
1-548-508-61
Counter, tape
♦ 1-601-545-00
Printed Circuit Board, record volume
♦ 4-864-629-00
Sensor, record
1-553-099-00
Switch, miniature; cassette load sensor (S1002)
3-532-213-00
Belt, tape counter
1-226-677-00
Resistor, variable 20k-A; REC LEVEL (RV701, 801)
♦ X-4864-602-0
Bracket (L) Ass'y, mechanism block
1-552-268-00
Switch, miniature; record enable sensor (S1001)
BTP3 x 5
B3 x 5
B2.6 x 6
BTP3 x 6
B3 x 6
E2.3
B2 x 10

(12)


A
B
C
D
E
1
2
3
4
X-3564-001-0
Plate Ass'y, fast forward/rewind changing; including part marked •A
•A
3-564-101-00
Washer
•A
3-558-708-01
Washer, stopper
3-564-071-00
Spindle, supply reel
3-489-043-00
Spring
3-531-760-00
Clamp, reel spindle
3-558-482-00
Cap, spindle
3-701-439-21
W3, plastic (t0.5)
X-3564-005-0
Idler Ass'y, take-up
3-558-708-21
Washer, stopper
X-3564-003-0
Spindle Ass'y, take-up reel
3-558-708-11
Washer, stopper
X-3564-032-0
Stopper (L) Ass'y, cassette
3-534-274-XX
Spring (22T)
3-564-020-00
Lever, back-tension
G 3
B2 x 4
3-564-015-00
Spring
X-3564-034-0
Deck Ass'y, head
3-564-073-00
Bracket, head deck
3-481-272-00
Spring
8-825-724-00
Head, erase; EF201-36 (HE)
B 2 x 14
3-564-117-00
Stopper, cassette
3-564-002-00
Plate, limiter
3-564-021-00
Felt, back-tension
X-3564-006-0
Pinch Roller Ass'y
3-558-708-21
Washer, stopper
Steel Ball, 2.5mm dia.
3-530-249-XX
Spring (16T)
3-531-541-00
Spring
9-911-815-02
Cushion
Steel Ball, 2.5mm dia.
3-513-237-11
Shim, head height adjustment
3-564-003-00
Spring, plate
8-829-377-00
Head, record/playback (HRP)
3-564-100-00
Shield Plate, head
B 2 x 14
X-3564-033-0
Stopper (R) Ass'y, cassette
B2 x 4


A
B
C
D
E
1
2
3
4
3-530-257-00
Spring
X-3564-016-0
Arm Ass'y, take-up;
including part marked ▲A
X-3564-002-0
Arm Ass'y, pause
3-564-010-00
Arm, brake
3-564-008-00
Spring, trigger
3-564-007-00
Lever (A), trigger
E 1.2
▲A
3-701-436-11 Ⓐ
W1.6, plastic (t0.25)
4-847-035-00
Tube, cushion
PSW 2.6 x 5
3-558-708-21
Washer, stopper
3-530-257-00
Spring
X-3564-007-0
Sleeve Ass'y, metal
1-454-222-11
Solenoid, brake (PM1)
3-564-006-00
Gear, pause
3-564-074-00
Plate, brake
♦X-3564-035-0
Chassis Ass'y, mechanism
PS 2.6 x 5
3-533-360-00
Belt (A), shut-off
3-564-011-00
Spacer, brake
PS 2.6 x 5
PSW 2.6 x 5
3-489-077-21
Screw, motor
B 2.6 x 10
3-564-012-00
Spring, brake
3-564-017-00
Cushion, rubber
PTPWH3 x 8
3-701-788-XX
Spring (21T)
♦3-564-016-00
Bracket, capstan motor
X-3564-015-0
Motor Ass'y, reel
3-564-004-00
Arm, limiter
3-564-009-00
Lever, trigger drive
PTPWH 3 x 8
X-3564-037-0
Motor Ass'y, capstan;
including part marked ●A
3-564-005-00
Gear, limiter
3-558-708-21
Washer, stopper
1-454-222-21
Solenoid, head (PM2)
●A
A-2020-060-A
Complete Circuit Board,
tape cassette servo amp
BTP
2.6 x 8
3-564-008-00
Spring, trigger
3-564-070-00
Lever (B), trigger
3-558-708-21
Washer, stopper
3-558-734-00
Belt, capstan
3-701-438-21
W2.5, plastic (t0.5)
♦3-564-124-00
Plate, flywheel holding
3-564-116-00
Spacer
X-3564-008-0
Flywheel Ass'y
PTTWH3 x 8
3-564-019-00
Holder, flywheel
♦3-564-123-00
Cushion, circuit board
♦4-813-166-11
Cover, edge


A
B
C
D
1
2
3
4
5
(14)
1-463-302-00
Control Unit
4-864-616-00
Panel, control
3-831-441-XX
Sheet
PTP
2.6 x 8
4-835-120-11
Indicator
PTP
2.6 x 8
9-981-360-00
Case (A)
9-911-844-XX
Cushion
9-981-366-00
Plate, smoked
4-864-609-00
Pushbutton (B)
4-855-232-00
Spring (C)
4-864-608-00
Pushbutton (A)
9-981-362-00
Sheet, rubber
9-981-363-00
Sheet, insulation
♦9-981-364-00
Printed Circuit Board, switch
1-528-077-00
Battery, rechargeable
KTP
2 x 6
KTP
2 x 6
♦9-981-365-00
Printed Circuit Board,
transmitter and LED
BTP
2 x 6
9-981-367-00
Plug, 5P (CNJ001)
9-911-815-01
Cushion
9-981-361-00
Case (B)
K2.6 x 6
3-831-441-XX
Sheet
P2.6 x 6
9-981-368-00
Label, note
P2.6 x 6

SECTION 6
ELECTRICAL PARTS LIST

Ref. No.	Part No.	Description
	SEMICONDUCTORS	
	Transistors	
Q001	8-729-663-47	2SC1364
Q002–004	8-729-818-70	2SD187
Q051	8-729-203-04	2SK30A
Q101–103	8-729-665-47	2SC1362
Q104–107	8-729-663-47	2SC1364
Q108	8-729-663-47	2SC1364 (AEP, UK model)
Q109	8-760-413-10	2SC1475 (AEP, UK model)
Q110	8-729-663-47	2SC1364 (AEP, UK model)
Q111	8-760-413-10	2SC1475 (AEP, UK model)
Q112, 113	8-729-663-47	2SC1364
Q114	8-729-663-47	2SC1364
Q301–304	8-729-663-47	2SC1364
Q406–408	8-729-978-62	2SA786
Q409–411	8-729-902-11	2SC2021
Q412	8-729-497-32	2SD973
Q413	8-729-479-32	2SB793
Q414, 415	8-729-978-62	2SA786
Q416	8-729-203-04	2SK30A
Q417	8-729-978-62	2SA786
Q418	8-729-902-11	2SC2021
Q419	8-729-479-32	2SB793
Q420	8-729-978-62	2SA786
Q421	8-729-497-32	2SD973
Q422	8-729-902-11	2SC2021
Q501, 601	8-729-663-47	2SC1364
Q502, 602	8-729-665-47	2SC1362
Q503, 603	8-729-612-77	2SA1027R
Q505, 605	8-729-663-47	2SC1364
Q506	8-729-612-77	2SA1027R
Q507	8-729-663-47	2SC1364
Q604, 606	8-729-612-77	2SA1027R
Q701, 801 Q702, 802	8-729-665-47	2SC1362
Q703–706 Q803–806	8-729-663-47	2SC1364
Q901, 902	8-729-316-12	2SC1061
Q903	8-729-317-12	2SA671
Q904	8-760-413-10	2SC1475
Q905	8-729-141-43	2SD414
Q906	8-760-413-10	2SC1475
Q907	8-729-141-43	2SD414
Q908	8-729-663-47	2SC1364
Q909	8-729-154-83	2SB548
Q950, 951	8-729-663-47	2SC1364
Q1002,1003	8-729-663-47	2SC1364
Q1004	8-729-195-23	2SA952
Q1005	8-729-141-43	2SD414
Q1006	8-729-154-83	2SB548
Q1007	8-729-663-47	2SC1364
Q1008	8-729-154-83	2SB548
Q1009,1010	8-760-413-10	2SC1475
Q1011,1012	8-729-663-47	2SC1364
Q1013,1014	8-760-413-10	2SC1475
Q1015–Q1022	8-729-663-47	2SC1364
Q1023	8-729-612-77	2SA1027R
Q1024	8-729-101-13	PH103
Q1025–Q1027	8-729-663-47	2SC1364
Q1030,1031	8-729-663-47	2SC1364
Q1401	8-729-663-47	2SC1364
Q1402	8-729-612-77	2SA1027R
Q1403–Q1408	8-729-663-47	2SC1364
Q1409,1410	8-729-663-47	2SC1364
Q2101	8-729-978-62	2SA786
Q2102,2103	8-729-902-11	2SC2021
Q2104	8-729-902-11	2SC2021
Q2105	8-729-978-62	2SA786
Q2106	8-729-902-11	2SC2021
Q2107	8-729-902-11	2SC2021
Q2108	8-729-978-62	2SA786
Q2109	8-729-141-43	2SD414
Q2110	8-729-154-83	2SB548

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

• Items marked "•" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

Ref. No.	Part No.	Description
Q2111	8-729-141-43	2SD414
Q2112	8-729-154-83	2SB548
Q2113	8-729-978-62	2SA786
Q2114	8-729-902-11	2SC2021
Q2115	8-729-978-62	2SA786
Q2116	8-729-902-11	2SC2021
Q2117	8-729-316-12	2SC1061
Q2118	8-729-317-12	2SA671
Q2119	8-729-199-80	2SD998
Q2201–Q2203	8-729-101-01	PH101
Q3001,3002	8-729-663-47	2SC1364
Q3003	8-729-180-93	2SD809
Q3004	8-729-173-13	2SB731
Q3005	8-729-180-93	2SD809
Q3006	8-729-173-13	2SB731
		ICs
IC001	8-759-926-00	S2600
IC051	8-759-145-58	μPC4558C
IC101	8-751-680-01	CX168
IC102	8-759-904-89	TL489CP
IC201	8-759-111-61	μPC1161C
IC301	8-759-140-13	μPD4013C
IC302	8-759-140-01	μPD4001C
IC303	8-759-140-11	μPD4011C
IC304	8-759-140-81	μPD4081C
IC305	8-759-140-49	μPD4049C
IC351	8-759-904-89	TL489CP
IC401	8-759-241-75	TC40175BP
IC402	8-759-140-01	μPD4001C
IC403	8-759-140-11	μPD4011C
IC404	8-759-140-13	μPD4013C
IC405	8-759-140-69	μPD4069C
IC406	8-759-140-01	μPD4001C
IC407	8-759-140-25	μPD4025C
IC408	8-759-140-69	μPD4069C
IC409	8-759-240-93	TC4093BP

Ref. No.	Part No.	Description
IC410	8-759-140-11	μPD4011C
IC411	8-759-140-23	μPD4023C
IC412	8-759-140-11	μPD4011C
IC413	8-759-140-23	μPD4023C
IC414, 415	8-759-140-11	μPD4011C
IC416	8-759-140-23	μPD4023C
IC417	8-759-140-11	μPD4011C
IC418, 419	8-759-140-01	μPD4001C
IC420, 421	8-759-140-69	μPD4069C
IC422, 423	8-759-145-58	μPC4558C
IC501	8-759-831-22	LA3122
IC502, 602	8-759-960-43	SN76043N
IC503, 603	8-759-313-40	SI1340H
IC504	8-759-145-58	μPC4558C
IC701, 801	8-759-101-74	CX174
IC702	8-759-145-58	μPC4558C
IC951	8-759-994-32	TMS1943N2L
IC1001	8-759-140-69	μPD4049C
IC1002	8-759-147-42	μPD547C042
IC1003	8-759-904-69	MSM4069
IC1004	8-759-959-53	MSM5953
IC1401	8-759-926-01	S2601
IC1402,1403	8-759-945-14	MSM4514
IC1404–IC1407	8-759-960-43	SN76043N
IC1408–IC1410	8-759-240-78	TC4078BP
IC1411–IC1413	8-759-140-23	μPD4023C
IC1414,1415	8-759-140-81	μPD4081C
IC1416–IC1418	8-759-140-71	μPD4071C
IC1419–IC1423	8-759-140-11	μPD4011C
IC1424,1425	8-759-140-01	μPD4001C
IC1426–IC1429	8-759-140-49	μPD4049C
IC1430,1431	8-759-140-50	μPD4050C
IC2101	8-759-958-11	MSM5811

Ref. No.	Part No.	Description
IC2102,2103	8-759-145-58	μPC4558C
IC2201,2202	8-759-145-58	μPC4558C
IC3001	8-750-690-00	CX069
IC3002	8-759-145-58	μPC4558C
	Diodes	
D001	8-719-305-15	GH3F
D002	8-719-815-55	1S1555
D003	8-719-812-41	TLR124
D004–006	8-719-103-03	SE303A
D051	8-719-100-33	PH302A
D052, 053	8-719-026-11	1T261
D101, 102	8-719-100-81	1SV118
D103–105	8-719-815-55	1S1555
D106–110	8-719-909-24	GL9NG521
D111	8-719-909-21	GL9PR21
D113, 115	8-719-200-02	10E2 (AEP, UK model)
D116, 117	8-719-815-55	1S1555
D301–306	8-719-815-55	1S1555
D351–355	8-719-909-21	GL9PR21
D356	8-719-931-07	EQB01-07
D371	8-719-909-24	GL9NG521
D372	8-719-909-21	GL9PR21
D401–409	8-719-815-55	1S1555
D410, 411	8-719-156-25	RD5.6EB2Z
D412–415	8-719-815-55	1S1555
D501	8-719-815-55	1S1555 (TONE BOARD)
D501, 601	8-719-931-21	EQB01-02 (POWER BOARD)
D502–506	8-719-815-55	1S1555
D602	8-719-931-07	EQB01-07
D509–512	8-719-815-55	1S1555
D701, 801, D702, 802	8-719-815-55	1S1555
D703, 803, D704, 804	8-719-422-21	1T22AM
D705, 805	8-719-815-55	1S1555
D706	8-719-812-41	TLR124
D707, 807, D708, 808	8-719-815-55	1S1555
⚠ D901–904	8-719-911-55	U05G
D905	8-719-931-21	EQB01-21
⚠ D906, 909	8-719-200-02	10E2
D910, 911	8-719-930-11	EQB01-11Z
⚠ D912–920	8-719-200-02	10E2
D921	8-719-930-11	EQB01-11Z
D923	8-719-931-32	EQB01-32
D924	8-719-931-06	EQB01-06
D925	8-719-930-11	EQB01-11Z
D950, 951, D953	8-719-815-55	1S1555
D955, 956	8-719-909-24	GL9NG521
D960	8-719-931-06	EQB01-06
D1001	8-719-200-02	10E2
D1002	8-719-815-55	1S1555
D1004	8-719-815-55	1S1555
D1006–D1011	8-719-815-55	1S1555
D1012–D1016	8-719-200-02	10E2
D1017–D1021	8-719-815-55	1S1555
D1022	8-719-101-11	SR110
D1027	8-719-815-55	1S1555
D1029	8-719-909-04	GL9N03DS
D1032–D1034	8-719-815-55	1S1555
D1101	8-719-815-55	1S1555
D1401–D1410	8-719-815-55	1S1555
D2101,2102	8-719-931-18	EQB01-18
D2103	8-719-815-55	1S1555
D2201–D2203	8-719-815-55	1S1555
D3001	8-719-910-65	HZ6B2L

Ref. No.	Part No.	Description			
CAPACITORS					
All capacitors are in μF and ceramic unless otherwise noted. 50WV or less are not indicated except for electrolytics and tantalums. Common capacitors are omitted. Refer to the lists on page 142 and 143 for their part numbers. p : μμF, elect : electrolytic					
C254, 255	1-123-234-00	10		elect (nonpolarized)	
C303	1-101-797-00	0.1			
C304	1-101-798-00	0.2			
C305	1-101-797-00	0.1			
C306, 307	1-101-798-00	0.2			
C360	1-161-025-00	0.1 (AEP, UK model)			
C361, 362	1-161-025-00	0.1			
C406	1-123-228-00	1	50V	elect (nonpolarized)	
C415	1-123-230-00	2.2	50V	elect (nonpolarized)	
C720, 820	1-131-454-00	0.33	16V	tantalum	
C905	⚠1-130-455-00	0.01 (AEP, UK model)	250V	film	
C947	1-123-230-00	2.2	50V	elect (nonpolarized)	
C2103,2104	1-102-491-00	51p			
C2106	1-131-454-00	0.33	16V	tantalum	
C2107	1-131-452-00	0.15	16V	tantalum	
C2108	1-101-006-00	0.047			
C2110	1-130-140-00	0.039	100V	film	
CP901	⚠1-102-355-00	0.01	500V		
CT101	1-141-171-XX	Trimmer			
CT102,103	1-141-171-XX	Trimmer (AEP, UK model)			
CT104	1-141-171-XX	Trimmer			
CT701,801	1-141-215-XX	Trimmer, record bias			
RESISTORS					
All resistors are in ohms. Common ¼W carbon resistors are omitted. Refer to the list on the last page for their part numbers.					

Ref. No.	Part No.	Description			
RESISTORS					
All resistors are in ohms. Common ¼W carbon resistors are omitted. Refer to the list on page 143 for their part numbers.					
R123	⚠1-213-084-00	100	1W	fusible	
R268, 269	⚠1-217-422-00	1 (AEP, UK model)	½W	fusible	
R506	⚠1-213-074-00	39	1W	fusible	
R535, 635	⚠1-212-958-00	10	½W	fusible	
R552	⚠1-212-885-00	150	¼W	fusible	
R554	⚠1-212-885-00	150	¼W	fusible	
R908	⚠1-212-972-00	39	½W	fusible	
R919	⚠1-212-857-00	10	¼W	fusible	
R923, 924	⚠1-213-084-00	100	1W	fusible	
R926	⚠1-217-431-00	5.6	½W	fusible	
R1034,1035	⚠1-212-857-00	10	¼W	fusible	
R1061–R1067	⚠1-212-986-00	150	½W	fusible	
R2157	⚠1-213-068-00	22	1W	fusible	
R2159	⚠1-212-976-00	56	½W	fusible	
R2161	⚠1-213-068-00	22	1W	fusible	
RV001	1-226-237-00	20k-B, adjustable; (remote control unit)			
RV100	1-226-720-00	20k-D, variable; ANTISKATING			
RV201	1-226-235-00	5k-B, adjustable; VCO			
RV202	1-226-686-00	470k-B, adjustable; FM Stereo Separation			
RV401,402	1-226-238-00	50k-B, adjustable; Return Detection/ Horizontal Offset			
RV501,601 RV502,602	1-226-680-00	250k-A, variable; BASS/TREBLE			
RV503,504	1-226-679-00	10k-B/250k-W, variable; BALANCE/ PRESET VOL			
RV505	1-226-239-00	100k-B, adjustable; Volume Indicator			
RV701, 801	1-226-677-00	20k-A, variable; REC LEVEL			
RV702, 802	1-226-237-00	20k-B, adjustable; Playback Level			
RV703, 803	1-226-238-00	50k-B, adjustable; Record Level			
RV901	1-226-235-00	5k-B, adjustable; Control Unit Charging			
RV951	1-226-686-00	470k-B, adjustable; Dimmer			

Ref. No.	Part No.	Description
RV1401	1-226-741-00	50k-B, adjustable; Control Unit Receiving Clock
RV1402, RV1403	1-226-664-00	2k-B, adjustable; AM Frequency Coverage
RV1404	1-226-663-00	1k-B, adjustable; AM Frequency Coverage
RV1405	1-226-664-00	2k-B, adjustable; FM Frequency Coverage
RV1406, RV1407	1-226-663-00	1k-B, adjustable; FM Frequency Coverage
RV2101	1-226-741-00	50k, adjustable; X'tal Lock
RV2102	1-226-234-11	2k-B, adjustable; GAIN
RV2103, RV2104	1-226-237-00	20k-B, adjustable; OFFSET
RV2202, RV2203	1-226-238-00	50k-B, adjustable; Lead-In
RV3001	1-226-433-00	50k-B, adjustable; TAPE SPEED
MISCELLANEOUS		
CFU101	1-527-481-00	AM Filter, ceramic
CNJ001	9-981-367-00	Plug, 5P
CNP001	1-526-563-00	Socket, FM antenna (UK model)
CNP501 CNP601 CNP502 CNP602	1-507-532-00	Jack, AUX/REC OUT
CP501, 502	1-226-693-00	Photocoupler
F901	⚠1-532-203-00	Fuse, T2A (AEP, UK model)
HE	8-825-724-00	Head, erase; EF201-36
HFG	1-543-093-00	Head, speed detection
HRP	8-829-377-00	Head, record/playback
IFT101	1-404-232-00	AM Coil, IF
J501	1-507-649-00	Jack, HEADPHONES
J701, 801	1-507-666-00	Jack, MIC
L101	1-401-834-00	Coil, LW ANT (AEP model)
L102, 103	1-401-856-00	Antenna, ferrite-rod (AEP, UK model)
L102	1-401-856-21	Antenna, ferrite-rod (E model)
L104	1-405-891-00	Coil, OSC LW (AEP, UK model)
L105	1-405-890-00	Coil, MW OSC
L110	1-404-157-00	Transformer, discriminator
L111	1-407-741-00	18μH, microinductor

Ref. No.	Part No.	Description
L112	1-407-169-XX	100μH, microinductor
L113	1-407-178-XX	1μH, microinductor
L201–204	1-407-963-00	15mH, microinductor
L702, 802	1-407-878-00	27mH, microinductor
L901	1-407-488-00	470μH, microinductor
L1001	1-405-800-00	OSC
L1002	1-408-209-00	1mH, microinductor
PC951	1-800-779-00	Photoconductive Cell
PL350–358	1-518-268-00	Lamp, PHOTO/FUNCTION (FUNCTION INDICATOR BOARD)
PL351	1-518-323-00	Lamp, 13V 200mA (SIGNAL INDICATOR BOARD)
PL901	1-518-325-00	Lamp
PL903	1-518-403-00	Lamp, 13V 140mA
PL1001–PL1007	1-518-268-00	Lamp, 4.5V 40mA
PM1	1-454-222-11	Solenoid, brake
PM2	1-454-222-21	Solenoid, pinch roller
RY901	⚠1-515-357-00	Relay (AEP, UK model)
RY901	⚠1-515-345-00	Relay (E model)
S3	1-514-346-00	Switch, leaf; AFC
S11	1-553-112-00	Switch, miniature; BALANCE
S101	1-552-334-00	Switch, antenna select (AEP model)
S102	1-553-040-00	Switch, solenoid; band select (AEP, UK model)
S301–307	1-552-539-00	Switch, keyboard; START, STOP, REC SYNC, IN-ARM-OUT, REPEAT, SPEED
S361	1-553-102-00	Switch, slide; MANUAL TUNER FUNCTION (AEP, UK model)
S361	1-553-287-00	Switch, slide; MANUAL TUNER FUNCTION (E model)
S501	1-553-103-00	Switch, pushbutton; STAND BY/ SPEAKER/MODE/ISS-1/LOUDNESS
S701, 801	1-553-040-00	Switch, solenoid; record/playback
S702, 802	1-553-050-00	Switch, slide; EQ
S703, 803	1-553-049-00	Switch, slide; DOLBY NR
S704	1-553-050-00	Switch, slide; BIAS
S705	1-553-102-00	Switch, slide; ISS-2
S901	⚠1-552-535-00	Voltage Selector (E model)

Ref. No.	Part No.	Description
S951, 952	1-552-737-00	Switch, pushbutton; TIMER, SLEEP
S953	1-226-694-00	Switch, 50Hz/60Hz SELECT
S954–957	1-552-539-00	Switch, keyboard; SLOW, FAST, CLOCK SET, TIMER/SLEEP SET
S1001	1-552-268-00	Switch, slide; record enable sensor
S1002	1-553-099-00	Switch, micro; cassette lead sensor
T001	1-417-014-31	Transformer, antenna matching (UK model)
T901	⚠1-446-500-00	Transformer, power (E model)
T901	⚠1-446-560-00	Transformer, power (AEP, UK model)
T902	⚠1-446-561-00	Transformer, power (AEP model)
T902	⚠1-446-564-00	Transformer, power (UK model)
T902	⚠1-446-709-00	Transformer, power (E model)
TH001	1-800-071-XX	Thermister, S300-01
TM101	1-536-560-00	Terminal, ANTENNA
TM501,502	1-536-566-00	Terminal, SPEAKER A/B
X2101	1-527-348-00	Crystal Oscillator
	A-4608-141-A	Motor Ass'y, phono
	including;	
	X-4852-002-0	Bearing Ass'y
	1-462-159-00	Coil, motor
	1-587-197-00	Printed Circuit Board, motor
	4-852-007-00	Holder (A), thrust
	4-852-085-00	Holder, bearing
	X-2089-618-1	Lead Wire (w/terminal), red
	X-2089-618-2	Lead Wire (w/terminal), green
	X-2089-618-3	Lead Wire (w/terminal), white
	X-2089-618-4	Lead Wire (w/terminal), blue
	1-452-194-00	Magnet (H)
	1-452-195-00	Magnet (V)
	1-452-196-00	Magnet (R)
	1-454-236-00	Solenoid (C)
	1-454-237-00	Solenoid (D)
	1-454-238-00	Solenoid (S)
	1-454-239-00	Solenoid (V)
	1-462-159-00	Coil, motor; phono
	1-463-287-00	FM Front End
	1-464-099-00	Bias Osc Unit
	1-464-111-00	Receiver, infrared ray

Ref. No.	Part No.	Description
	1-517-079-00	Socket, lamp
	1-518-399-00	Lamp, 28V 200mA
	1-519-179-00	Tube, fluorescent (UK model)
	1-519-191-00	Tube, fluorescent (AEP, E model)
	1-520-407-00	Meter, REC LEVEL & POWER
	1-527-278-XX	Filter, solid state
	⚠1-533-131-00	Holder, fuse (AEP, UK model)
	⚠1-534-817-XX	Cord, power (AEP model)
	1-549-074-00	Stylus, ND134G
	1-549-088-00	Cartridge, VL34G
	including;	
	1-549-074-00	Stylus, ND134G
	⚠1-551-188-31	Cord, power (E model)
	⚠1-551-884-31	Cord, power (UK model)
	1-555-145-00	Lead Wire with connector
	1-560-297-00	Connector, control unit
	1-561-294-11	Connector, neck cylinder
	1-800-981-11	Interrupter, photo

COMPLETE CIRCUIT BOARDS

♦ A-2020-060-A	Tape Cassette Servo Amp
♦ A-4351-175-A	Tuner (UK model)
♦ A-4351-176-A	Tuner (AEP model)
♦ A-4351-182-A	Tuner (E model)
♦ A-4375-128-A	Tone
♦ A-4388-203-A	Power (UK model)
♦ A-4388-204-A	Power (AEP model)
♦ A-4388-215-A	Power (E model)
♦ A-4393-008-A	Cassette
♦ A-4409-275-A	Tape Cassette System Control
♦ A-4619-135-A	Phono Servo Amp
♦ A-4644-053-A	Phono System Control

PRINTED CIRCUIT BOARDS

♦ 1-464-112-00	Remote Control Logic
♦ 1-587-197-00	Motor
♦ 1-600-393-00	Servo
♦ 1-601-223-00	PHONO
♦ 1-601-227-00	IFC

Ref. No.	Part No.	Description
	1-601-228-00	Size Sens
	1-601-543-00	Mic (A)
	1-601-544-00	Mic (B)
	1-601-545-00	Record Volume
	1-601-546-00	METER
	1-601-562-00	Function Display
	1-601-563-00	Photo Sensor
	1-601-567-00	Function Indicator
	1-601-568-00	Receive Indicator
	1-601-569-00	Timer (B)
	1-601-570-00	Timer (A)
	1-601-572-00	Phono Switch
	1-601-573-00	Signal Indicator
	1-601-574-00	Headphone
	1-601-575-00	EQ Function
	1-601-576-00	Lamp
	1-601-577-00	AMS
	1-601-578-00	Manual Switch
	1-601-905-00	Timing
	9-981-364-00	Switch
	9-981-365-00	Transmitter and LED

Ref. No.	Part No.	Description

ACCESSORIES AND PACKING MATERIALS

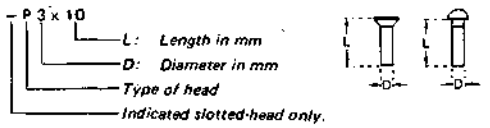
Part No.	Description
1-463-302-00	Control Unit
1-501-161-00	Antenna, feeder
⚠1-526-565-00	Adaptor, AC plug (E model)
⚠1-528-077-00	Battery, rechargeable
3-701-630-00	Bag, polyethylene
3-701-806-00	Adaptor, 45 (E model)
3-783-010-11	Manual, instruction (AEP model)
3-783-010-41	Manual, instruction (UK model)
3-783-010-51	Manual, instruction (E model)
3-794-123-11	Label, caution
3-794-628-11	Leaflet
4-827-486-00	Washer, plastic
4-834-105-00	Sheet, polyethylene
4-834-720-00	Cover, turntable
4-853-189-00	Screw
4-862-043-00	Cushion, arm
4-864-608-00	Pushbutton (A)
4-864-609-00	Pushbutton (B)
4-864-616-00	Panel, control
4-866-072-11	Sheel, turntable
4-866-151-00	Carton
4-866-152-00	Cushion, upper; remote control unit
4-866-153-00	Cushion, lower; remote control unit
4-866-156-00	Sheet, protection, deck panel
4-866-157-00	Sheet, protection, deck panel
4-866-158-00	Cushion, upper (front)
4-866-159-00	Cushion, upper (rear)
4-866-160-00	Cushion, lower (front)
4-866-161-00	Cushion, lower (rear)
4-866-162-00	Holder, turntable
4-866-163-00	Bag, protection (main)
4-866-169-00	Sheet, protection
4-866-170-00	Holder, knob
4-866-175-00	Sheet, polyethylene (main)

1/4 WATT CARBON RESISTORS

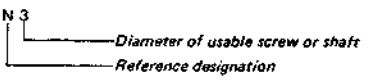
Ω	Part No.	Ω	Part No.	Ω	Part No.	Ω	Part No.	Ω	Part No.	Ω	Part No.	Ω	Part No.
1.0	1-246-401-00	10	1-246-425-00	100	1-246-449-00	1.0k	1-246-473-00	10k	1-246-497-00	100k	1-246-521-00	1.0M	1-246-545-00
1.1	1-246-402-00	11	1-246-426-00	110	1-246-450-00	1.1k	1-246-474-00	11k	1-246-498-00	110k	1-246-522-00	1.1M	1-210-814-00
1.2	1-246-403-00	12	1-246-427-00	120	1-246-451-00	1.2k	1-246-475-00	12k	1-246-499-00	120k	1-246-523-00	1.2M	1-210-815-00
1.3	1-246-404-00	13	1-246-428-00	130	1-246-452-00	1.3k	1-246-476-00	13k	1-246-500-00	130k	1-246-524-00	1.3M	1-210-816-00
1.5	1-246-405-00	15	1-246-429-00	150	1-246-453-00	1.5k	1-246-477-00	15k	1-246-501-00	150k	1-246-525-00	1.5M	1-210-817-00
1.6	1-246-406-00	16	1-246-430-00	160	1-246-454-00	1.6k	1-246-478-00	16k	1-246-502-00	160k	1-246-526-00	1.6M	1-210-818-00
1.8	1-246-407-00	18	1-246-431-00	180	1-246-455-00	1.8k	1-246-479-00	18k	1-246-503-00	180k	1-246-527-00	1.8M	1-210-819-00
2.0	1-246-408-00	20	1-246-432-00	200	1-246-456-00	2.0k	1-246-480-00	20k	1-246-504-00	200k	1-246-528-00	2.0M	1-210-820-00
2.2	1-246-409-00	22	1-246-433-00	220	1-246-457-00	2.2k	1-246-481-00	22k	1-246-505-00	220k	1-246-529-00	2.2M	1-210-821-00
2.4	1-246-410-00	24	1-246-434-00	240	1-246-458-00	2.4k	1-246-482-00	24k	1-246-506-00	240k	1-246-530-00	2.4M	1-244-754-00
2.7	1-246-411-00	27	1-246-435-00	270	1-246-459-00	2.7k	1-246-483-00	27k	1-246-507-00	270k	1-246-531-00	2.7M	1-244-755-00
3.0	1-246-412-00	30	1-246-436-00	300	1-246-460-00	3.0k	1-246-484-00	30k	1-246-508-00	300k	1-246-532-00	3.0M	1-244-756-00
3.3	1-246-413-00	33	1-246-437-00	330	1-246-461-00	3.3k	1-246-485-00	33k	1-246-509-00	330k	1-246-533-00	3.3M	1-244-757-00
3.6	1-246-414-00	36	1-246-438-00	360	1-246-462-00	3.6k	1-246-486-00	36k	1-246-510-00	360k	1-246-534-00	3.6M	1-244-758-00
3.9	1-246-415-00	39	1-246-439-00	390	1-246-463-00	3.9k	1-246-487-00	39k	1-246-511-00	390k	1-246-535-00	3.9M	1-244-759-00
4.3	1-246-416-00	43	1-246-440-00	430	1-246-464-00	4.3k	1-246-488-00	43k	1-246-512-00	430k	1-246-536-00	4.3M	1-244-760-00
4.7	1-246-417-00	47	1-246-441-00	470	1-246-465-00	4.7k	1-246-489-00	47k	1-246-513-00	470k	1-246-537-00	4.7M	1-244-761-00
5.1	1-246-418-00	51	1-246-442-00	510	1-246-466-00	5.1k	1-246-490-00	51k	1-246-514-00	510k	1-246-538-00	5.1M	1-244-762-00
5.6	1-246-419-00	56	1-246-443-00	560	1-246-467-00	5.6k	1-246-491-00	56k	1-246-515-00	560k	1-246-539-00		
6.2	1-246-420-00	62	1-246-444-00	620	1-246-468-00	6.2k	1-246-492-00	62k	1-246-516-00	620k	1-246-540-00		
6.8	1-246-421-00	68	1-246-445-00	680	1-246-469-00	6.8k	1-246-493-00	68k	1-246-517-00	680k	1-246-541-00		
7.5	1-246-422-00	75	1-246-446-00	750	1-246-470-00	7.5k	1-246-494-00	75k	1-246-518-00	750k	1-246-542-00		
8.2	1-246-423-00	82	1-246-447-00	820	1-246-471-00	8.2k	1-246-495-00	82k	1-246-519-00	820k	1-246-543-00		
9.1	1-246-424-00	91	1-246-448-00	910	1-246-472-00	9.1k	1-246-496-00	91k	1-246-520-00	910k	1-246-544-00		

HARDWARE NOMENCLATURE

Screw:



Nut, Washer, Retaining ring:



Reference Designation	Shape	Description	Remarks
SCREWS			
P		pan-head screw	binding-head (B) screw for replacement
PWH		pan-head screw with washer face	binding-head (B) screw and flat washer for replacement
PS PSP		pan-head screw with spring washer	binding-head (B) screw and spring washer for replacement
PSW PSPW		pan-head screw with spring and flat washers	binding-head (B) screw and spring and flat washers for replacement
R		round-head screw	binding-head (B) screw for replacement
K		flat-countersunk-head screw	
RK		oval-countersunk-head screw	
B		binding-head screw	
T		truss-head screw	binding-head (B) screw for replacement
F		flat-fillister-head screw	
BF		fillister-head screw	
BV		brazier-head screw	

Reference Designation	Shape	Description	Remarks
SELF-TAPPING SCREWS			
TA		self-tapping screw	ex: TA, P 3 x 10
PTP		pan-head self-tapping screw	binding-head self-tapping (TA, B) screw for replacement
PTPWH		pan-head self-tapping screw with washer face	binding-head self tapping (TA, B) screw and flat washer for replacement
PTTWH		pan-head thread-rolling screw with washer face	binding-head (B) screw and flat washer for replacement
SET SCREWS			
SC		set screw	
SC		hexagon-socket set screw	ex: SC 2.6 x 4, hexagon socket
NUT			
N		nut	
WASHERS			
W		flat washer	
SW		spring washer	
LW		internal-tooth lock washer	ex: LW3, internal
LW		external-tooth lock washer	ex: LW3, external
RETAINING RINGS			
E		retaining ring	
G		grip-type retaining ring	

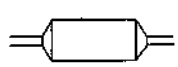
MYLAR CAPACITORS

CAP. (μF)	RATING 50 VOLT. PART No.	100 VOLT. PART No.	200 VOLT. PART No.	CAP. (μF)	50 VOLT. PART No.	100 VOLT. PART No.	200 VOLT. PART No.	CAP. (μF)	50 VOLT. PART No.	100 VOLT. PART No.	200 VOLT. PART No.
0.001	1-108-227-00	1-108-365-00	1-108-409-00	0.01	1-108-239-00	1-108-377-00	1-108-421-00	0.1	1-108-251-00	1-108-389-00	1-108-433-00
0.0012	1-108-351-00	1-108-366-00	1-108-410-00	0.012	1-108-357-00	1-108-378-00	1-108-422-00	0.12	1-108-363-00	1-108-390-00	1-108-434-00
0.0015	1-108-228-00	1-108-367-00	1-108-411-00	0.015	1-108-240-00	1-108-379-00	1-108-423-00	0.15	1-108-252-00	1-108-391-00	1-108-435-00
0.0018	1-108-352-00	1-108-368-00	1-108-412-00	0.018	1-108-358-00	1-108-380-00	1-108-424-00	0.18	1-108-364-00	1-108-392-00	1-108-436-00
0.0022	1-108-230-00	1-108-369-00	1-108-413-00	0.022	1-108-242-00	1-108-381-00	1-108-425-00	0.22	1-108-254-00	1-108-393-00	1-108-437-00
0.0027	1-108-353-00	1-108-370-00	1-108-414-00	0.027	1-108-359-00	1-108-382-00	1-108-426-00	0.27	1-108-854-00	–	–
0.0033	1-108-232-00	1-108-371-00	1-108-415-00	0.033	1-108-244-00	1-108-383-00	1-108-427-00	0.33	1-108-855-00	–	–
0.0039	1-108-354-00	1-108-372-00	1-108-416-00	0.039	1-108-360-00	1-108-384-00	1-108-428-00	0.39	1-108-856-00	–	–
0.0047	1-108-234-00	1-108-373-00	1-108-417-00	0.047	1-108-246-00	1-108-385-00	1-108-429-00	0.47	1-108-857-00	–	–
0.0056	1-108-355-00	1-108-374-00	1-108-418-00	0.056	1-108-361-00	1-108-386-00	1-108-430-00				
0.0068	1-108-237-00	1-108-375-00	1-108-419-00	0.068	1-108-249-00	1-108-387-00	1-108-431-00				
0.0082	1-108-356-00	1-108-376-00	1-108-420-00	0.082	1-108-362-00	1-108-388-00	1-108-432-00				

TANTALUM CAPACITORS

→: Use the high voltage rated one.

CAP. (μF)	RATING 3.15 VOLT. PART No.	6.3 VOLT. PART No.	10 VOLT. PART No.	16 VOLT. PART No.	20 VOLT. PART No.	25 VOLT. PART No.	35 VOLT. PART No.
0.01					→	→	1-131-396-00
0.015						→	1-131-397-00
0.022						→	1-131-398-00
0.033						→	1-131-399-00
0.047						→	1-131-400-00
0.068					→	→	1-131-401-00
0.1					→	→	1-131-402-00
0.15					→	→	1-131-403-00
0.22					→	→	1-131-404-00
0.33					→	1-131-409-00	1-131-405-00
0.47	–	–	–	–	1-131-412-00	→	1-131-406-00
0.68	–	–	–	1-131-415-00	→	1-131-410-00	1-131-407-00
1.0	–	–	1-131-418-00	–	1-131-413-00	→	1-131-408-00
1.5	–	1-131-421-00	–	1-131-416-00	→	1-131-411-00	1-131-348-00
2.2	1-131-424-00	–	1-131-419-00	–	1-131-414-00	1-131-355-00	1-131-349-00
3.3	–	1-131-422-00	–	1-131-417-00	1-131-362-00	1-131-356-00	1-131-350-00
4.7	1-131-425-00	–	1-131-420-00	1-131-369-00	1-131-363-00	1-131-357-00	1-131-351-00
6.8	–	1-131-423-00	1-131-376-00	1-131-370-00	1-131-364-00	1-131-358-00	1-131-352-00
10	1-131-426-00	1-131-383-00	1-131-377-00	1-131-371-00	1-131-365-00	1-131-359-00	1-131-353-00
15	1-131-390-00	1-131-384-00	1-131-378-00	1-131-372-00	1-131-366-00	1-131-360-00	–
22	1-131-391-00	1-131-385-00	1-131-379-00	1-131-373-00	1-131-367-00		
33	1-131-392-00	1-131-386-00	1-131-380-00	1-131-374-00			
47	1-131-393-00	1-131-387-00	1-131-381-00	–			
68	1-131-394-00	1-131-388-00	–	–			
100	1-131-395-00	–	–	–			



TANTALUM CAPACITORS

CAP. (μF)	RATING 3 VOLT. PART No.	6.3 VOLT. PART No.	10 VOLT. PART No.	16 VOLT. PART No.	20 VOLT. PART No.	35 VOLT. PART No.
0.033						1-131-273-00
0.047						1-131-274-00
0.068						1-131-275-00
0.1						1-131-276-00
0.15						1-131-277-00
0.22			–	–	1-131-262-00	1-131-278-00
0.33			–	–	1-131-263-00	1-131-279-00
0.47			1-131-169-00	–	1-131-264-00	1-131-280-00
0.68			–	1-131-258-00	1-131-265-00	1-131-281-00
1.0			1-131-254-00	–	1-131-266-00	1-131-282-00
1.5		1-131-250-00	–	–	1-131-267-00	1-131-283-00
2.2		–	–	1-131-259-00	1-131-268-00	1-131-284-00
3.3		–	1-131-255-00	–	1-131-269-00	–
4.7		1-131-251-00	1-131-171-00	–	1-131-270-00	–
6.8		–	–	1-131-260-00	1-131-271-00	–
10	–	–	1-131-256-00	–	1-131-272-00	–
15	–	1-131-252-00	–	1-131-261-00		
22	–	–	1-131-257-00	–		
33	1-131-176-00	1-131-253-00	1-131-173-00	–		
47	1-131-288-00	1-131-174-00	–	–		
100	1-131-177-00					

ELECTROLYTIC CAPACITORS

RATING → : Use the high voltage rated one.

CAP. (μF)	6.3 VOLT.	10 VOLT.	16 VOLT.	25 VOLT.	35 VOLT.	50 VOLT.
	PART No.	PART No.	PART No.	PART No.	PART No.	PART No.
0.47					→	1-121-726-00
1.0					→	1-121-391-00
2.2					→	1-121-450-00
3.3	→	→	→	1-121-392-00	→	1-121-393-00
4.7	→	→	→	1-121-395-00	→	1-121-396-00
10	→	→	1-121-651-00	1-121-398-00	→	1-121-738-00
22	→	→	1-121-479-00	1-121-480-00	1-121-662-00	1-121-152-00
33	→	→	1-121-403-00	1-121-404-00	1-121-652-00	1-121-405-00
47	→	1-121-352-00	1-121-409-00	1-121-410-00	1-121-653-00	1-121-411-00
100	→	1-121-414-00	1-121-415-00	1-121-416-00	1-121-357-00	1-121-417-00
220	1-121-419-00	1-121-420-00	1-121-421-00	1-121-422-00	1-121-261-00	1-121-423-00
330	1-121-751-00	1-121-805-00	1-121-521-00	1-121-654-00	1-121-655-00	1-121-656-00
470	1-121-424-00	1-121-425-00	1-121-426-00	1-121-733-00	1-121-361-00	1-121-810-00
1000	–	1-121-736-00	1-121-245-00	1-121-657-00	1-121-388-00	1-123-061-00
2200	1-121-658-00	1-121-659-00	1-121-660-00	1-123-067-00	1-121-984-00	–
3300	1-121-661-00	1-123-075-00	1-123-071-00	–	–	–

CAP. (μF)	100 VOLT.	160 VOLT.	250 VOLT.	350 VOLT.
	PART No.	PART No.	PART No.	PART No.
0.47	–	–	–	–
1.0	1-123-249-00	1-123-252-00	1-123-003-00	1-121-168-00
2.2	1-123-250-00	1-123-026-00	–	1-123-028-00
3.3	1-121-995-00	–	1-123-004-00	1-123-006-00
4.7	1-123-255-00	1-121-246-00	1-121-759-00	1-123-007-00
10	1-121-126-00	1-121-999-00	1-123-254-00	1-123-008-00
22	1-121-996-00	1-123-253-00	1-123-005-00	1-123-022-00
33	1-121-997-00	1-121-757-00	–	–
47	1-123-251-00	1-121-919-00	–	–
100	1-123-084-00	–	–	–

CERAMIC CAPACITORS

RATING

CAP. (pF)	50 VOLT.	CAP. (pF)	50 VOLT.	CAP. (pF)	50 VOLT.	CAP. (μF)	50 VOLT.
	PART No.		PART No.		PART No.		PART No.
0.5	1-101-837-00	22	1-102-959-00	150	1-101-361-00	0.001	1-102-074-00
0.75	1-101-586-00	24	1-102-960-00	160	1-101-367-00	0.0012	1-102-118-00
1.0	1-102-934-00	27	1-102-961-00	180	1-102-976-00	0.0015	1-102-119-00
1.5	1-101-576-00	30	1-102-962-00	200	1-102-977-00	0.0018	1-102-120-00
2.0	1-102-935-00	33	1-102-963-00	220	1-102-978-00	0.0022	1-102-121-00
3	1-102-936-00	36	1-102-964-00	240	1-102-979-00	0.0027	1-102-122-00
4	1-102-937-00	39	1-102-965-00	270	1-102-980-00	0.0033	1-102-123-00
5	1-102-942-00	43	1-102-966-00	300	1-102-981-00	0.0039	1-102-124-00
6	1-102-943-00	47	1-101-880-00	330	1-102-820-00	0.0047	1-102-125-00
7	1-102-944-00	51	1-101-882-00	360	1-102-821-00	0.0056	1-102-126-00
8	1-102-945-00	56	1-101-884-00	390	1-102-822-00	0.0068	1-102-127-00
9	1-102-946-00	62	1-101-886-00	430	1-102-823-00	0.0082	1-102-128-00
10	1-102-947-00	68	1-101-888-00	470	1-102-824-00	0.01	1-102-129-00
11	1-102-948-00	75	1-101-890-00	510	1-101-059-00	0.022	1-101-005-00
12	1-102-949-00	82	1-102-971-00	560	1-102-115-00	0.047	1-101-006-00
13	1-102-950-00	91	1-102-972-00	680	1-102-116-00		
15	1-102-951-00	100	1-102-973-00	820	1-102-117-00		
16	1-102-952-00	110	1-102-815-00				
18	1-102-953-00	120	1-102-816-00				
20	1-102-958-00	130	1-101-081-00				

0.001μF = 1,000pF

CERAMIC (SEMICONDUCTOR) CAPACITORS

RATING → : Use the high voltage rated one.

CAP. (μF)	25 VOLT.	50 VOLT.	CAP. (μF)	25 VOLT.	50 VOLT.
	PART No.	PART No.		PART No.	PART No.
0.001	→	1-161-039-00	0.018	1-161-016-00	1-161-054-00
0.0012	→	1-161-040-00	0.022	1-161-017-00	1-161-055-00
0.0015		1-161-041-00	0.027	1-161-018-00	1-161-056-00
0.0018		1-161-042-00	0.033	1-161-019-00	1-161-057-00
0.0022		1-161-043-00	0.039	1-161-020-00	1-161-058-00
0.0027	→	1-161-044-00	0.047	1-161-021-00	1-161-059-00
0.0033	→	1-161-045-00	0.056	→	1-161-060-00
0.0039	→	1-161-046-00	0.068	→	1-161-061-00
0.0047	→	1-161-047-00	0.082	1-161-024-00	1-161-062-00
0.0056	→	1-161-048-00	0.1	1-161-025-00	1-161-063-00
0.0068	→	1-161-049-00			
0.0082	1-161-012-00	1-161-050-00			
0.01	1-161-013-00	1-161-051-00			
0.012	→	1-161-052-00			
0.015	1-161-015-00	1-161-053-00			

Sony Corporation

9-958-788-01

80J0491-1
Printed in Japan

STEREO MUSIC SYSTEM HMK-9000

AEP Model
UK Model
E Model

No. 1
November, 1980

SUPPLEMENT

File this supplement with the service manual.

CIRCUIT OPERATION

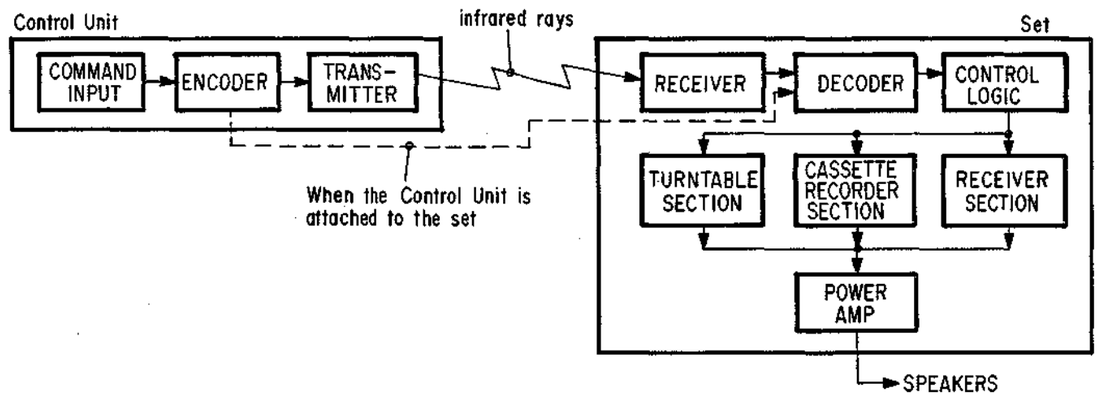
TABLE OF CONTENTS

SONY
SERVICE MANUAL

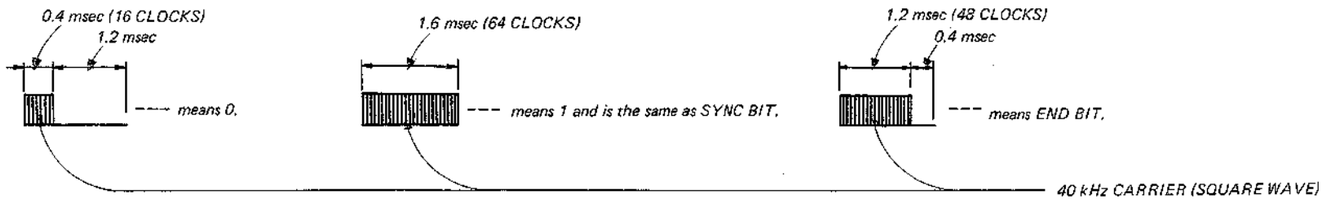
CONTROL SECTION

1. Control System

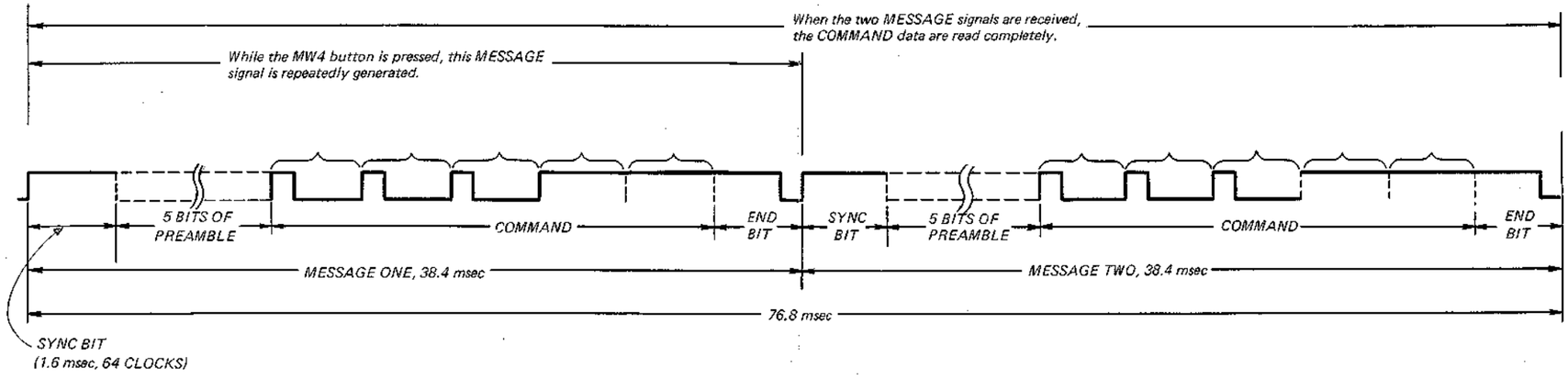
When the Control Unit is used as a remote control unit, the Control Unit controls the set by infrared rays. When the Control Unit is attached to the set, the encoder and the decoder are directly connected, and the rechargeable battery in the Control Unit is charged.



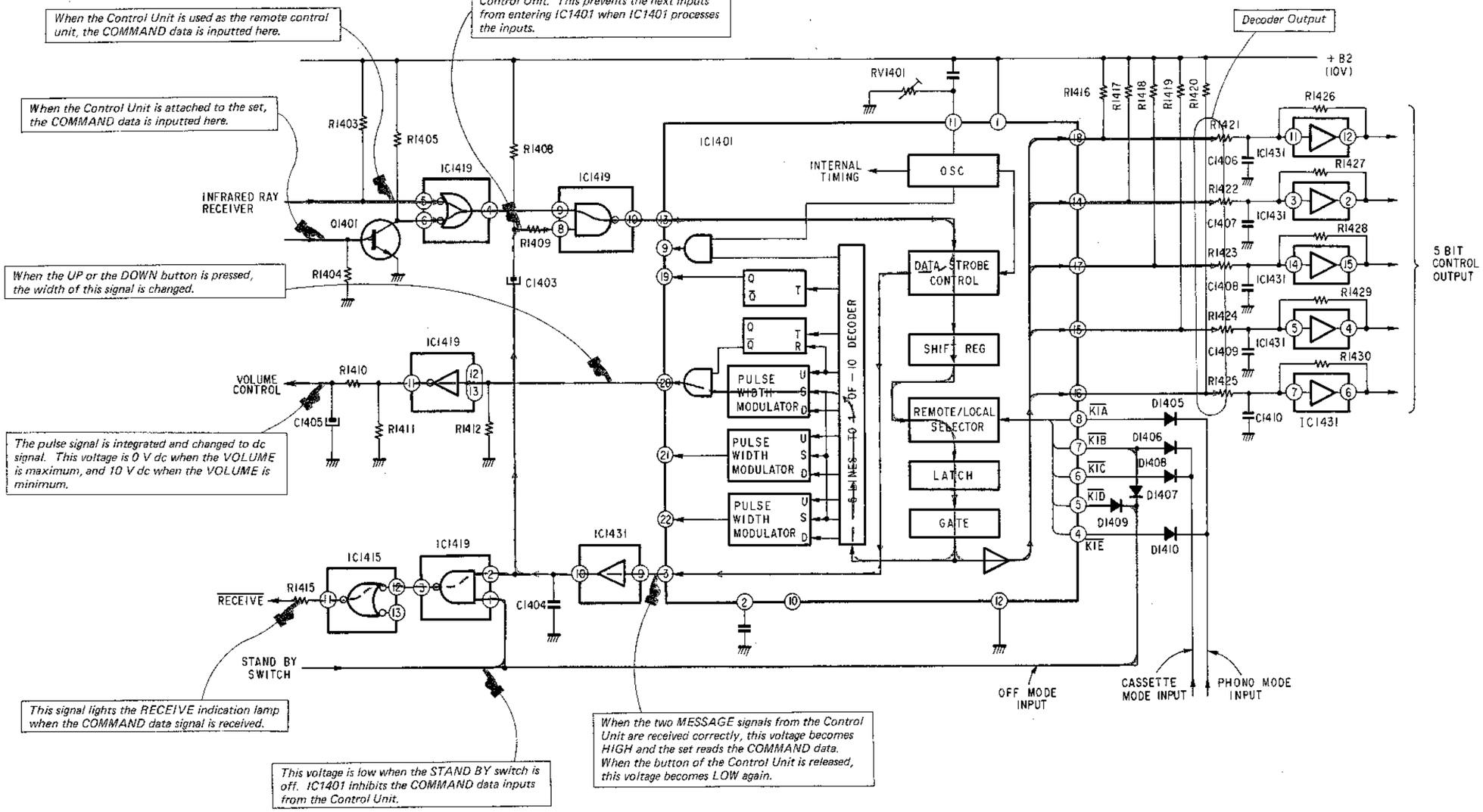
2. Message Format for Remote Control Unit Output



The below waveform means 00011 code (MW4 operation).



3. COMMAND Data Reading from Control Unit

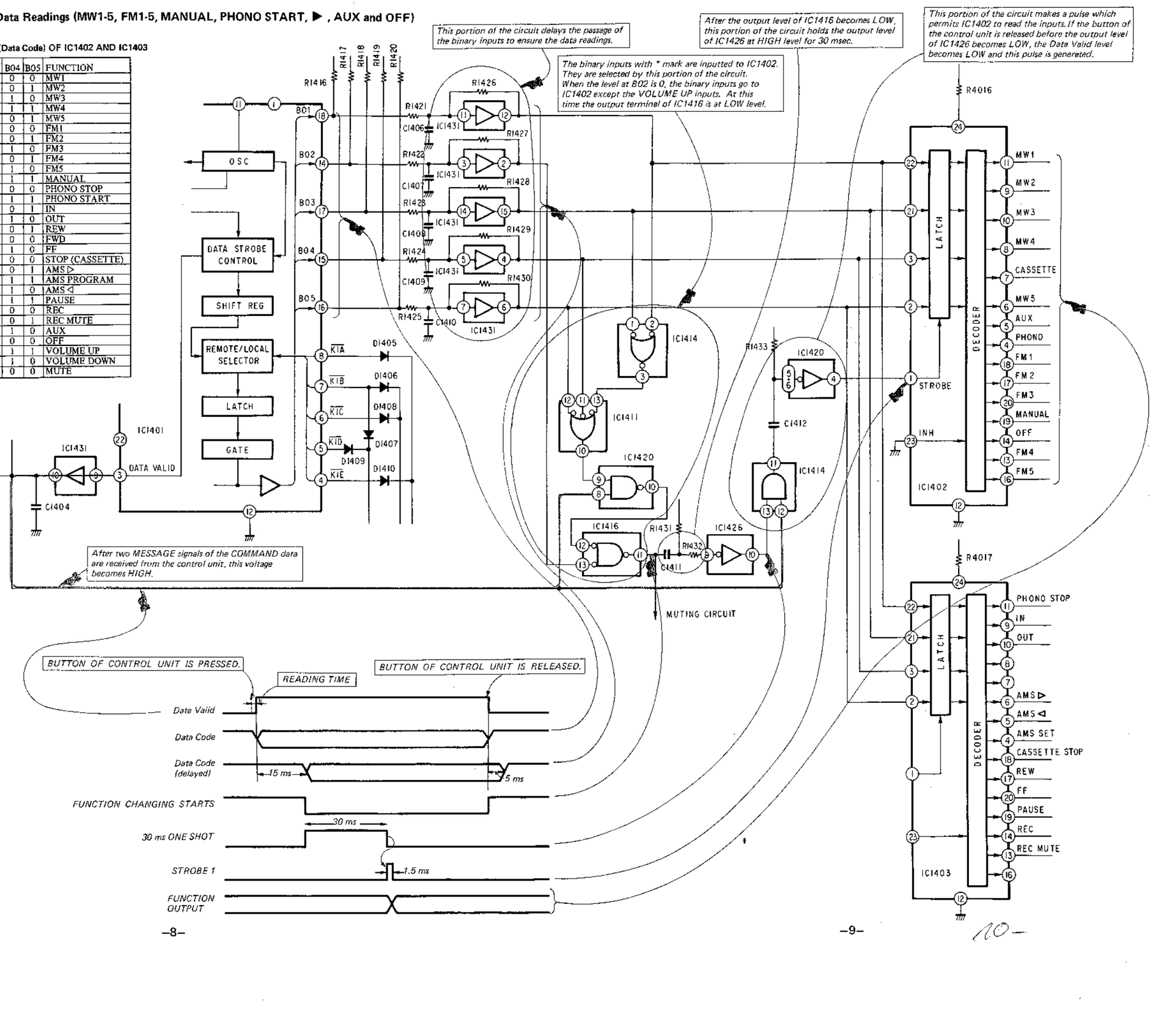


HMK-9000

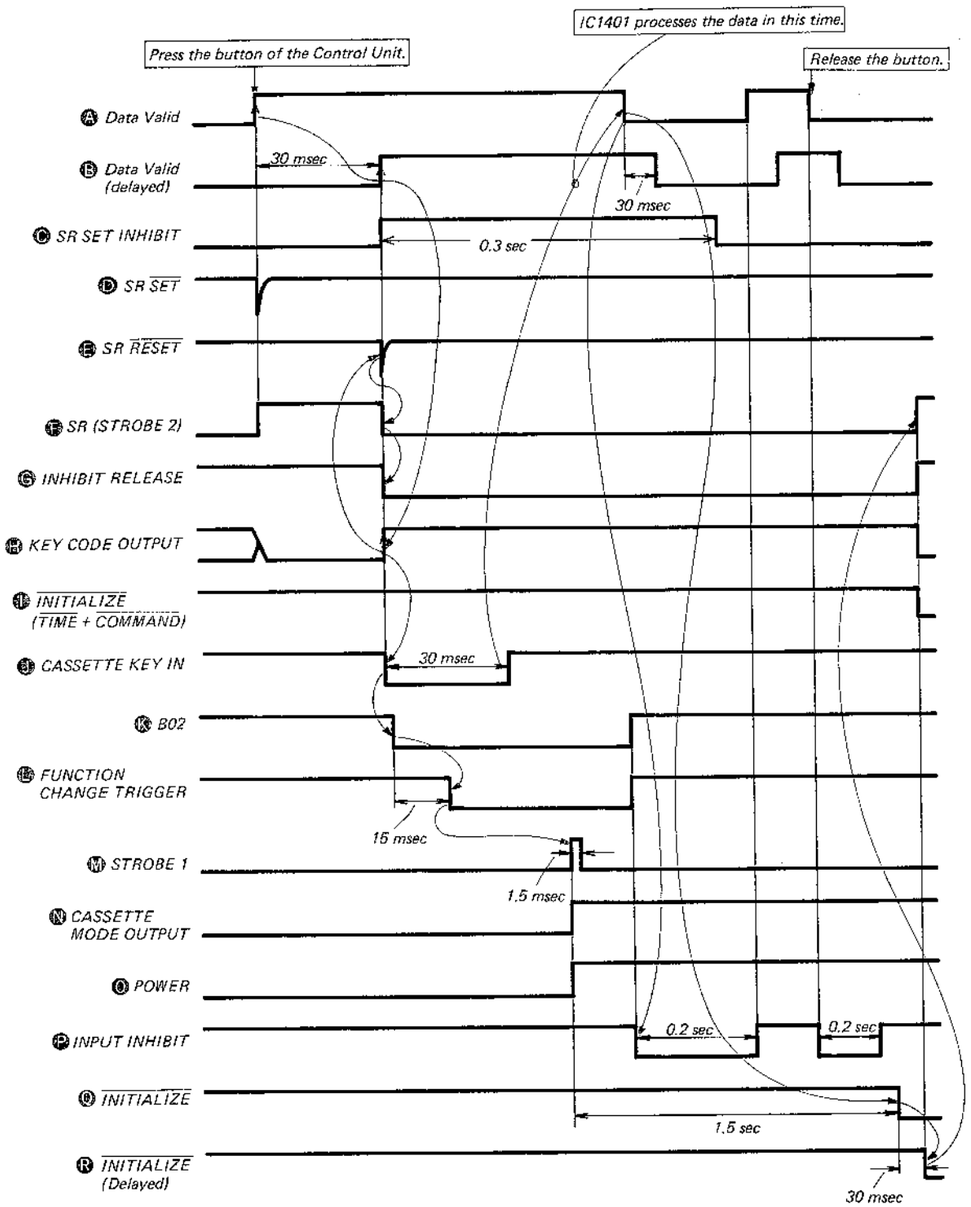
4. COMMAND Data Readings (MW1-5, FM1-5, MANUAL, PHONO START, ▶ , AUX and OFF)

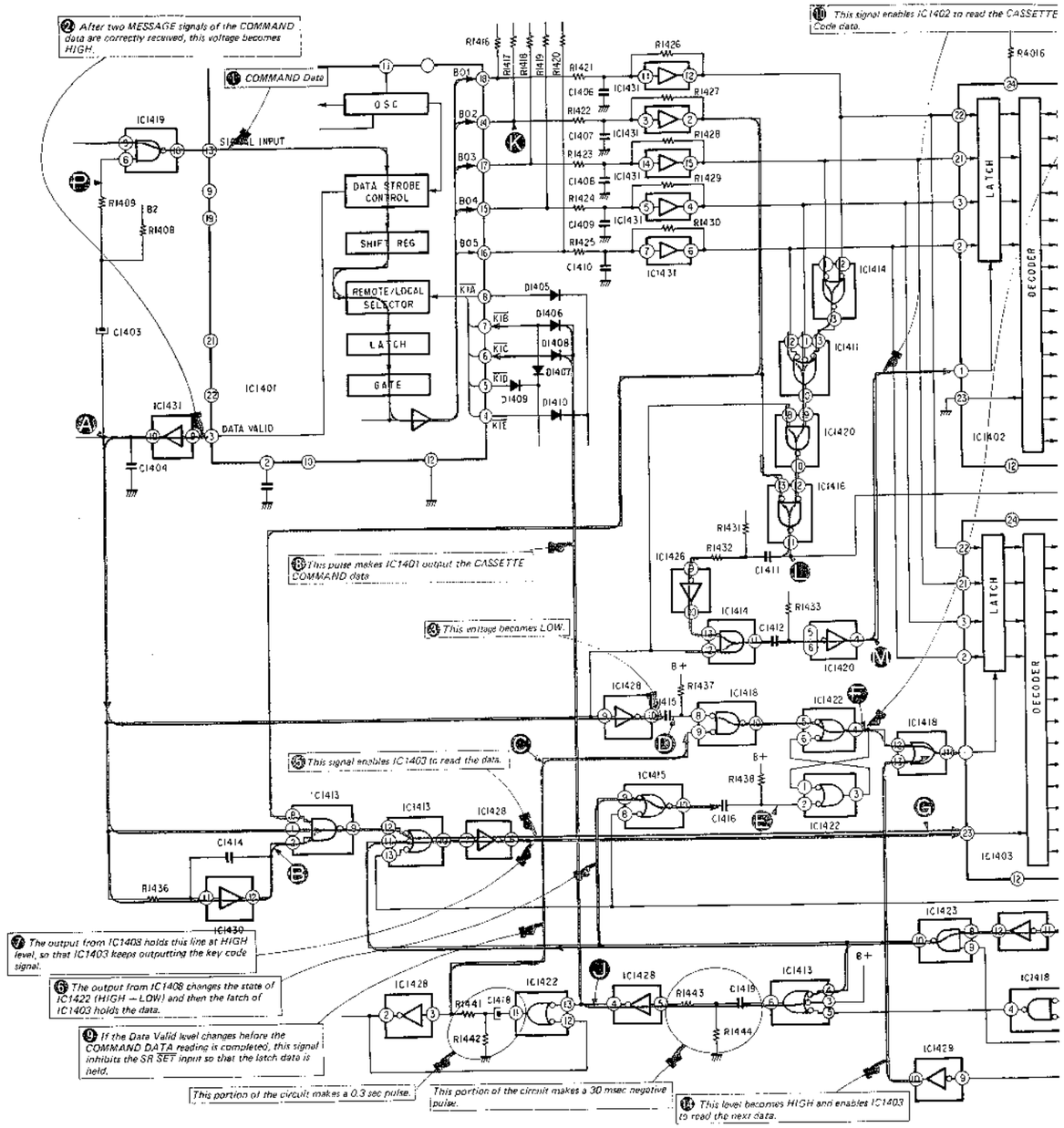
BINARY INPUTS (Data Code) OF IC1402 AND IC1403

	B01	B02	B03	B04	B05	FUNCTION
*	0	0	0	0	0	MW1
*	0	0	0	0	1	MW2
*	0	0	0	1	0	MW3
*	0	0	0	1	1	MW4
*	0	0	1	0	1	MW5
*	1	0	0	0	0	FM1
*	1	0	0	0	1	FM2
*	1	0	0	1	0	FM3
*	1	0	1	0	1	FM4
*	1	0	1	1	0	FM5
*	1	0	0	1	1	MANUAL
	0	1	0	0	0	PHONO STOP
*	0	0	1	1	1	PHONO START
	0	1	0	0	1	IN
	0	1	0	1	0	OUT
	1	1	0	0	1	REW
*	0	0	1	0	0	FWD
	1	1	0	1	0	FF
	1	1	0	0	0	STOP (CASSETTE)
	0	1	1	0	1	AMS ▷
	0	1	1	1	1	AMS PROGRAM
	0	1	1	1	0	AMS ◁
	1	1	0	1	1	PAUSE
	1	1	1	0	0	REC
	1	1	1	0	1	REC MUTE
*	0	0	1	1	0	AUX
*	1	0	1	0	0	OFF
	1	0	1	1	1	VOLUME UP
	1	1	1	1	0	VOLUME DOWN
	0	1	1	0	0	MUTE

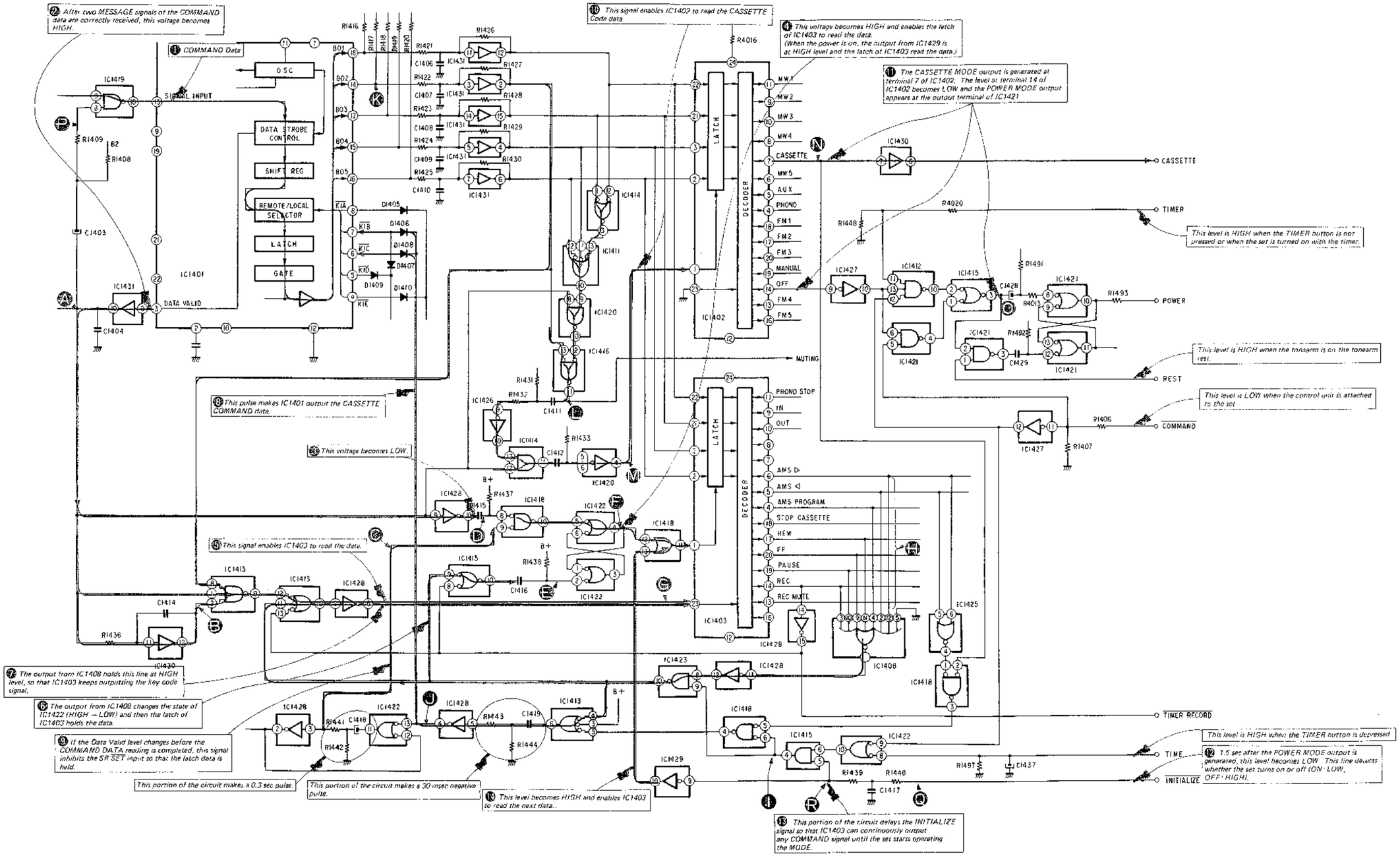


5. COMMAND Data Readings in Power-off Mode (Fast Forward, Rewind, Pause, AMS ▷ , AMS PROGRAM, AMS ◁ and Record)





(Record)


2 After two MESSAGE signals of the COMMAND data are correctly received, this voltage becomes HIGH.
1 COMMAND Data
10 This signal enables IC1402 to read the CASSETTE Code data
4 This voltage becomes HIGH and enables the latch of IC1403 to read the data. (When the power is on, the output from IC1429 is at HIGH level and the latch of IC1403 read the data.)
11 The CASSETTE MODE output is generated at terminal 7 of IC1402. The level at terminal 14 of IC1402 becomes LOW and the POWER MODE output appears at the output terminal of IC1421
OSC
SIGNAL INPUT
DATA STROBE CONTROL
SHIFT REG
REMOTE/LOCAL SELECTOR
LATCH
GATE
DATA VALID
IC1401
LATCH
DECODER
MW1
MW2
MW3
MW4
CASSETTE
MW5
AUX
PHONO
FM1
FM2
FM3
MANUAL
OFF
FM4
FM5
MUTING
CASSETTE
TIMER
This level is HIGH when the TIMER button is not pressed or when the set is turned on with the timer.
POWER
This level is HIGH when the tonearm is on the tonearm rest.
REST
This level is LOW when the control unit is attached to the set.
COMMAND
PHONO STOP
IN
OUT
AMS ▷
AMS ◁
AMS PROGRAM
STOP CASSETTE
REW
FF
PAUSE
REC
REC MUTE
TIMER RECORD
This level is HIGH when the TIMER button is depressed
TIME
INITIALIZE
12 1.5 sec after the POWER MODE output is generated, this level becomes LOW. This line detects whether the set turns on or off (ON : LOW, OFF : HIGH).
3 This pulse makes IC1401 output the CASSETTE COMMAND data.
This voltage becomes LOW.
5 This signal enables IC1403 to read the data.
7 The output from IC1408 holds this line at HIGH level, so that IC1403 keeps outputting the key code signal.
6 The output from IC1408 changes the state of IC1422 (HIGH → LOW) and then the latch of IC1403 holds the data.
9 If the Data Valid level changes before the COMMAND DATA reading is completed, this signal inhibits the SR SET input so that the latch data is held.
This portion of the circuit makes a 0.3 sec pulse.
This portion of the circuit makes a 30 msec negative pulse.
13 This level becomes HIGH and enables IC1403 to read the next data.
13 This portion of the circuit delays the INITIALIZE signal so that IC1403 can continuously output any COMMAND signal until the set starts operating the MODE.

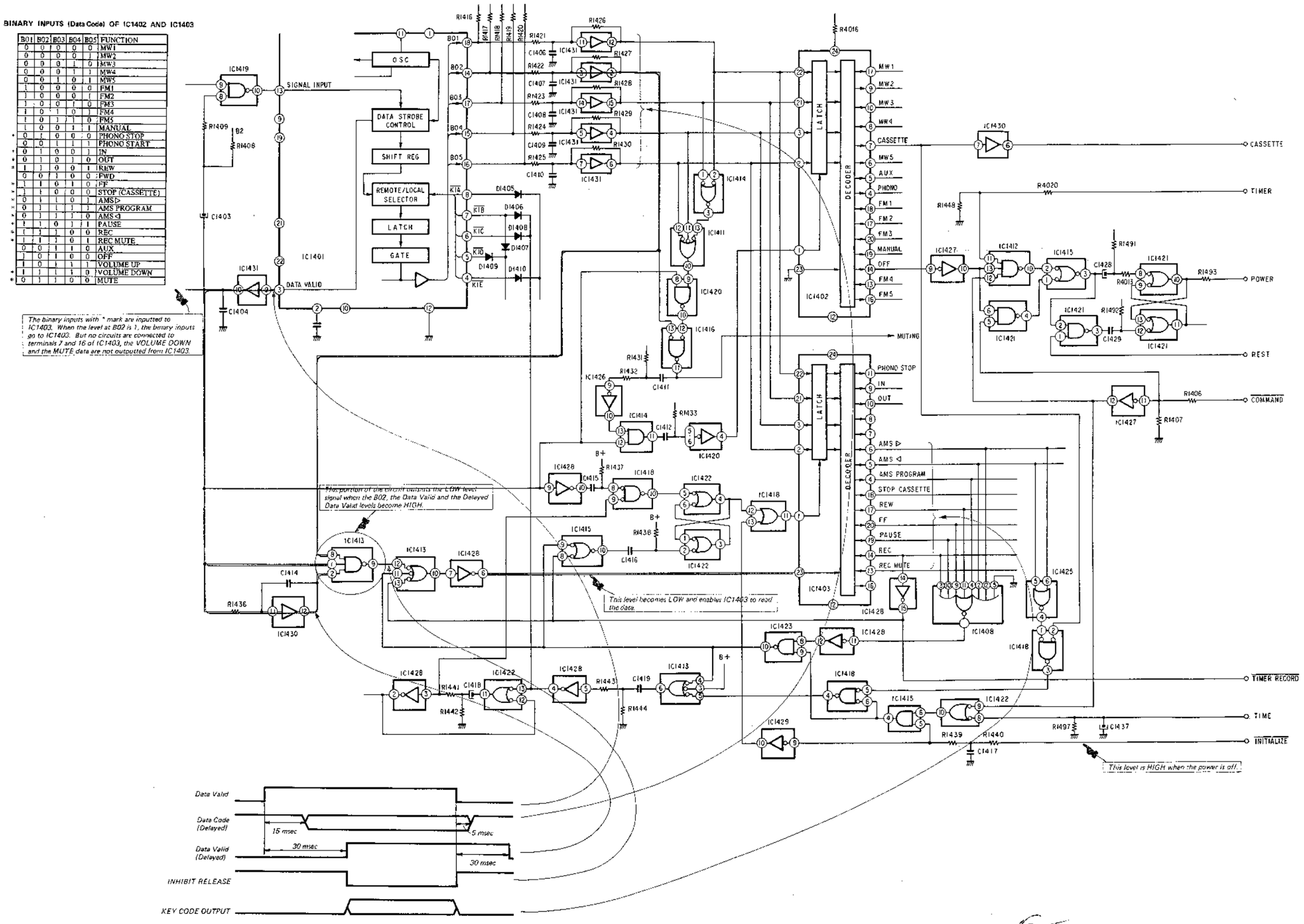
HMK-9000

6. COMMAND Data Readings (PHONO STOP, IN, OUT, Rewind, Fast Forward, Stop: cassette, AMS ▷ , AMS PROGRAM, AMS ◁ , Pause, Record and REC MUTE)

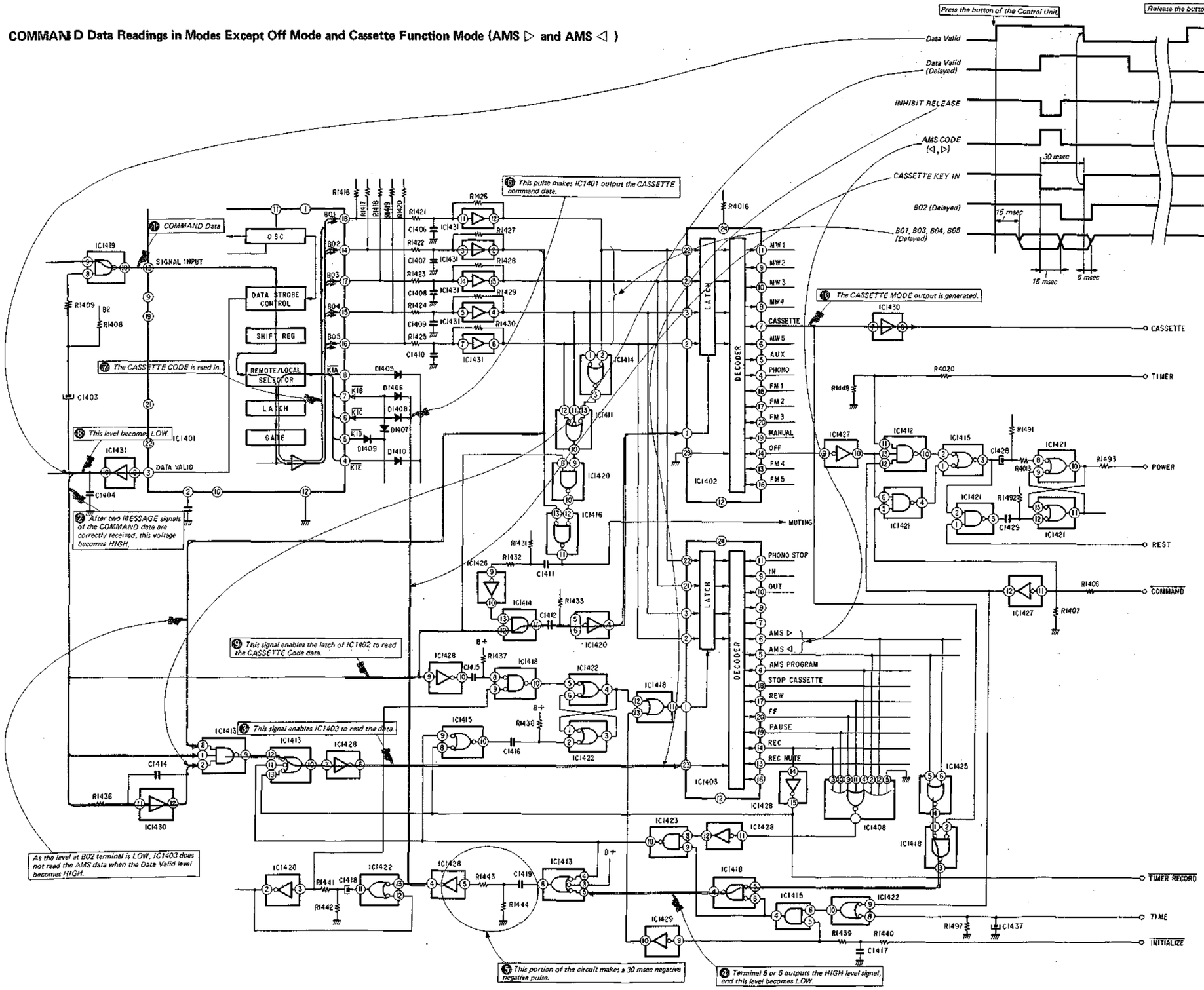
BINARY INPUTS (Data Code) OF IC1402 AND IC1403

B01	B02	B03	B04	B05	FUNCTION
0	0	0	0	0	MW1
0	0	0	0	1	MW2
0	0	0	1	0	MW3
0	0	0	1	1	MW4
0	0	1	0	1	MW5
1	0	0	0	0	FM1
1	0	0	0	1	FM2
1	0	0	1	0	FM3
1	0	0	1	1	FM4
1	0	1	0	1	FM5
1	0	0	1	1	MANUAL
* 0	1	0	0	0	PHONO STOP
0	0	1	1	1	PHONO START
* 0	1	0	0	1	IN
* 0	1	0	1	0	OUT
* 1	1	0	0	1	REW
0	0	1	0	0	FWD
* 1	1	0	1	0	FF
* 1	1	0	0	0	STOP (CASSETTE)
* 0	1	1	0	1	AMS ▷
* 0	1	1	1	1	AMS PROGRAM
* 0	1	1	1	0	AMS ◁
* 1	1	0	1	1	PAUSE
* 1	1	1	0	0	REC
* 1	1	1	0	1	REC MUTE
0	0	1	1	0	AUX
1	0	1	1	0	OFF
1	0	1	1	1	VOLUME UP
* 1	1	1	1	0	VOLUME DOWN
* 0	1	1	0	0	MUTE

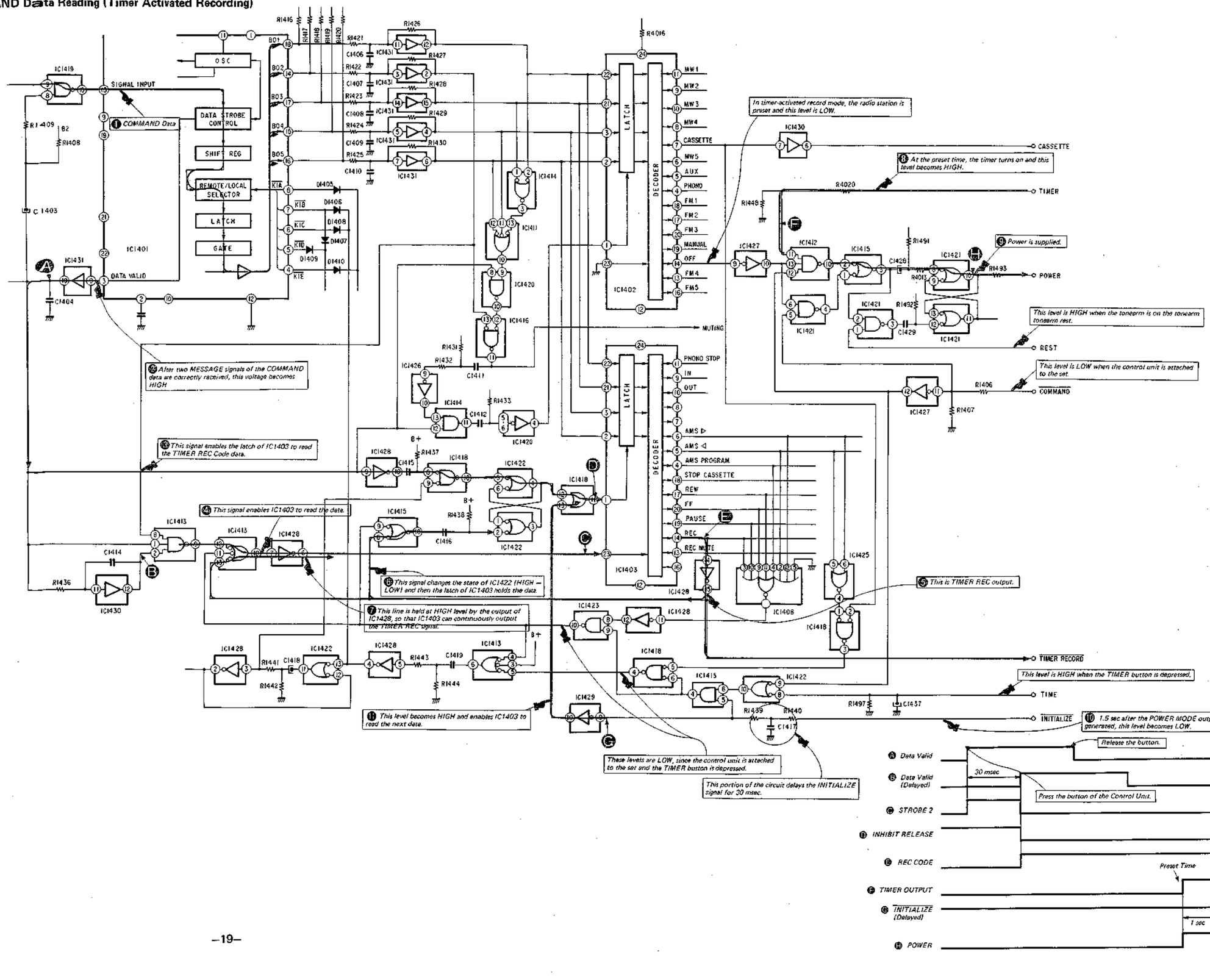
*The binary inputs with * mark are inputted to IC1403. When the level at B02 is 1, the binary inputs go to IC1403. But no circuits are connected to terminals 7 and 16 of IC1403, the VOLUME DOWN and the MUTE data are not outputted from IC1403.*



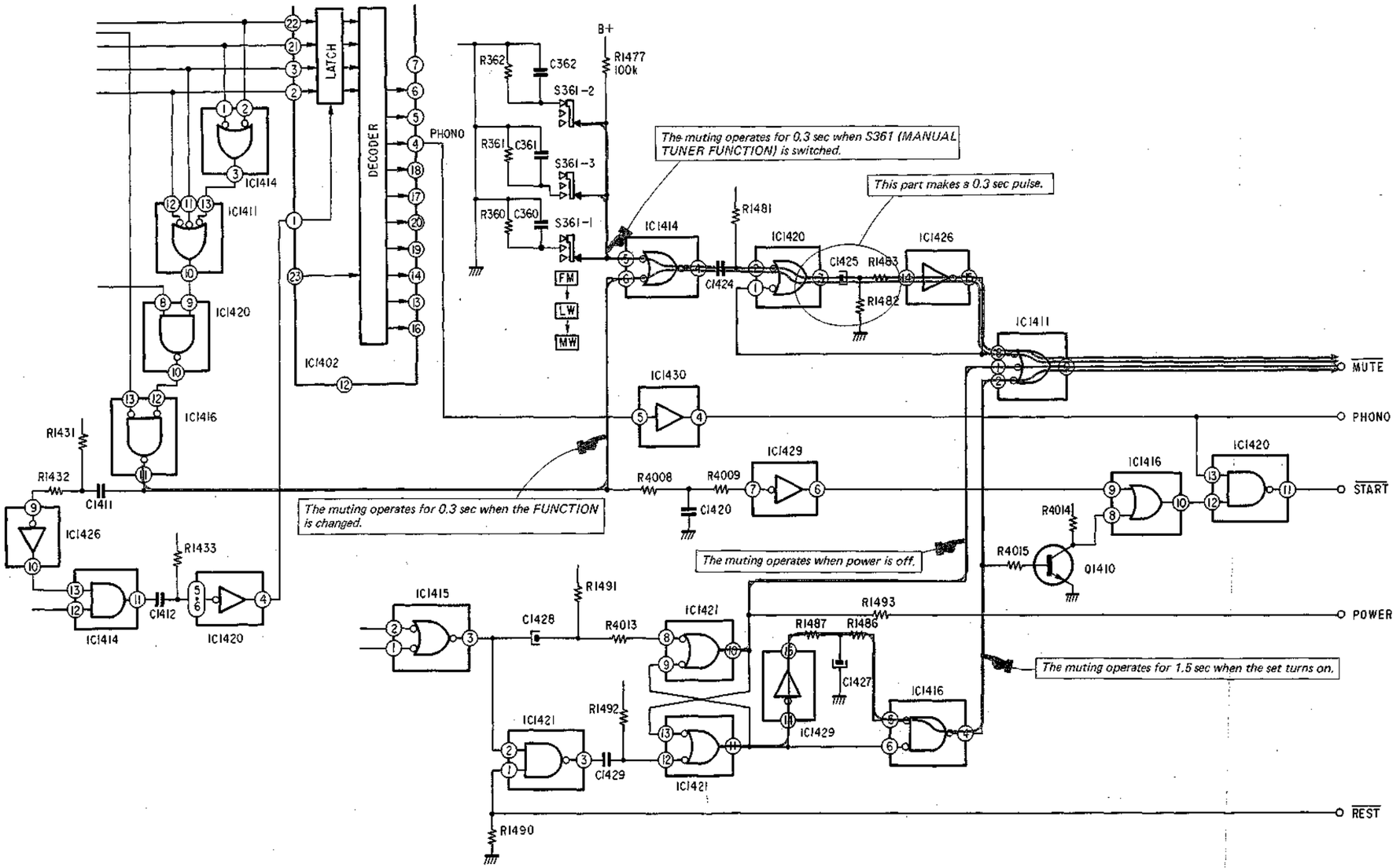
7. COMMAND Data Readings in Modes Except Off Mode and Cassette Function Mode (AMS ▷ and AMS ◁)



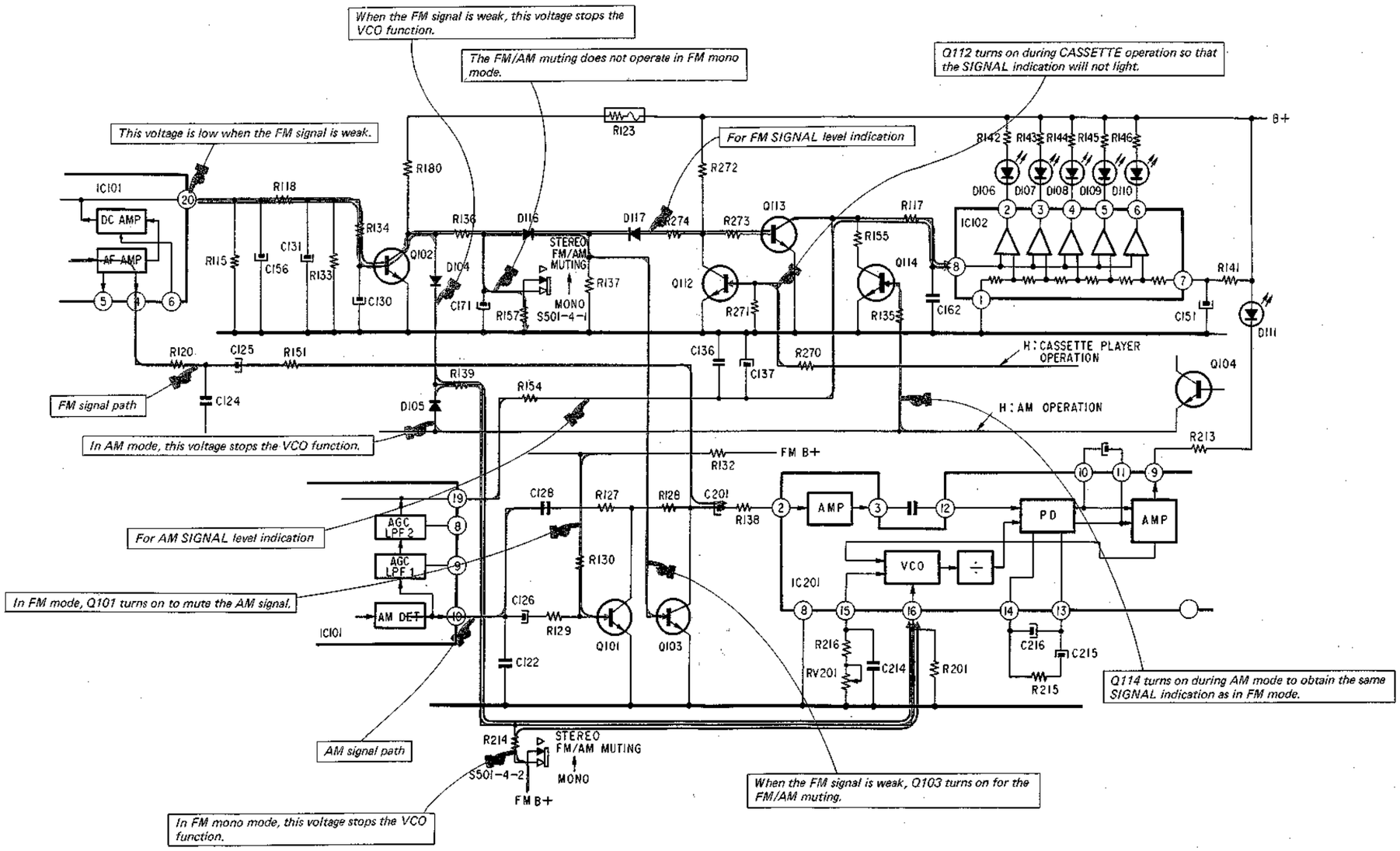
8. COMMAND Data Reading (Timer Activated Recording)



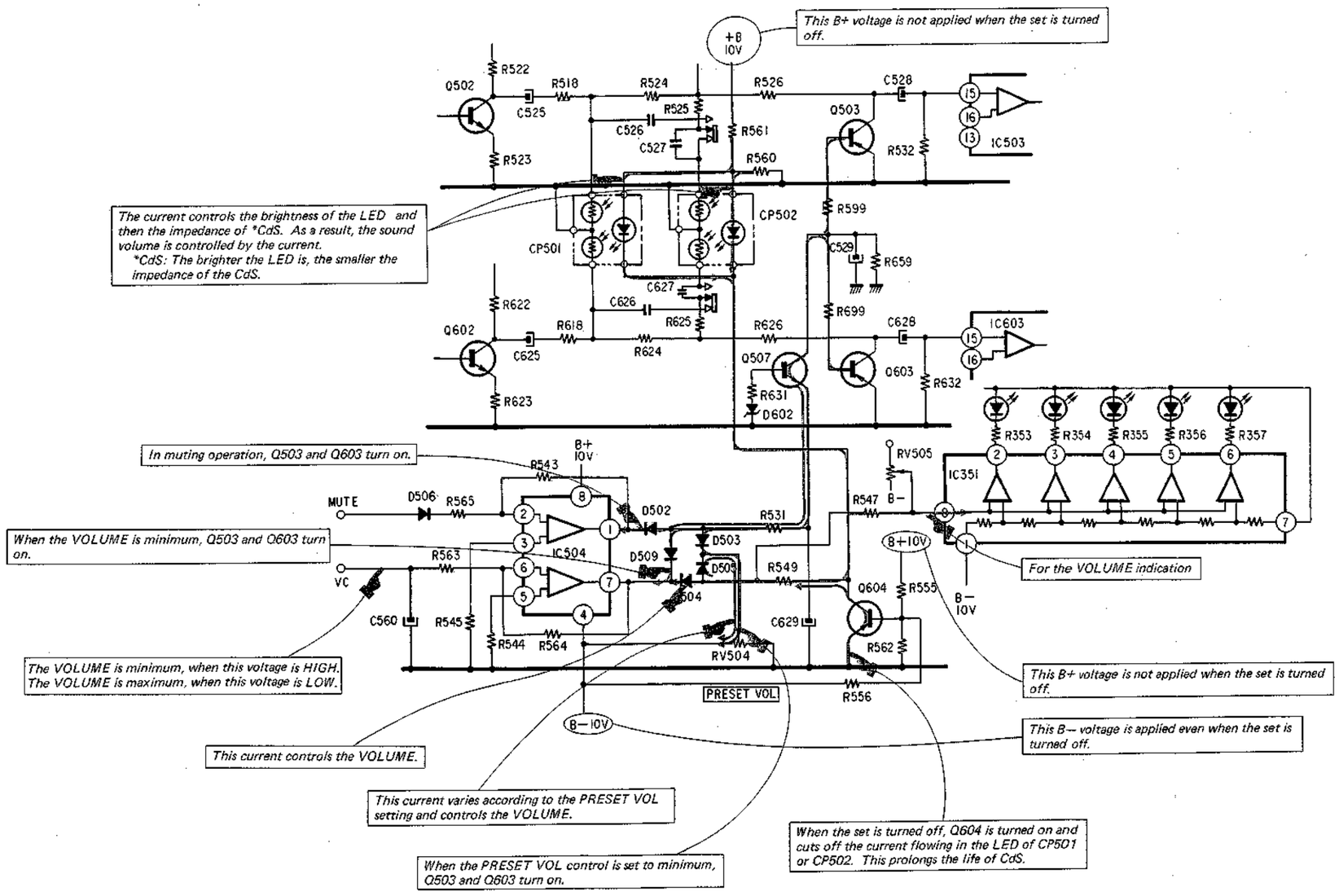
9. Muting


LATCH
DECODER
PHONO
IC1414
IC1411
IC1420
IC1416
IC1402
R1431
R1432
C1411
IC1426
R1433
C1412
IC1414
IC1420
B+
R362
C362
R1477
100k
S361-2
R361
C361
S361-3
R360
C360
S361-1
FM
LW
MW
The muting operates for 0.3 sec when S361 (MANUAL TUNER FUNCTION) is switched.
This part makes a 0.3 sec pulse.
IC1414
R1481
IC1420
C1425
R1483
IC1426
C1424
R1482
IC1411
IC1430
MUTE
PHONO
IC1429
R4008
R4009
C1420
The muting operates for 0.3 sec when the FUNCTION is changed.
IC1416
IC1420
R4014
R4015
Q1410
START
The muting operates when power is off.
IC1415
R1491
C1428
R4013
IC1421
R1493
POWER
R1487
R1486
C1427
IC1416
The muting operates for 1.5 sec when the set turns on.
R1492
IC1421
IC1429
C1429
IC1421
REST
R1490

10. Stereo/Mono Selection Circuit



11. Volume Control Circuit



RECORD PLAYE R SECTION

Note on Polarities of the Horizontal Drive Components

Confirm that the polarities of the two magnets are as shown in Fig. 1- 1 when mounting the arm drive and the sensor coils.

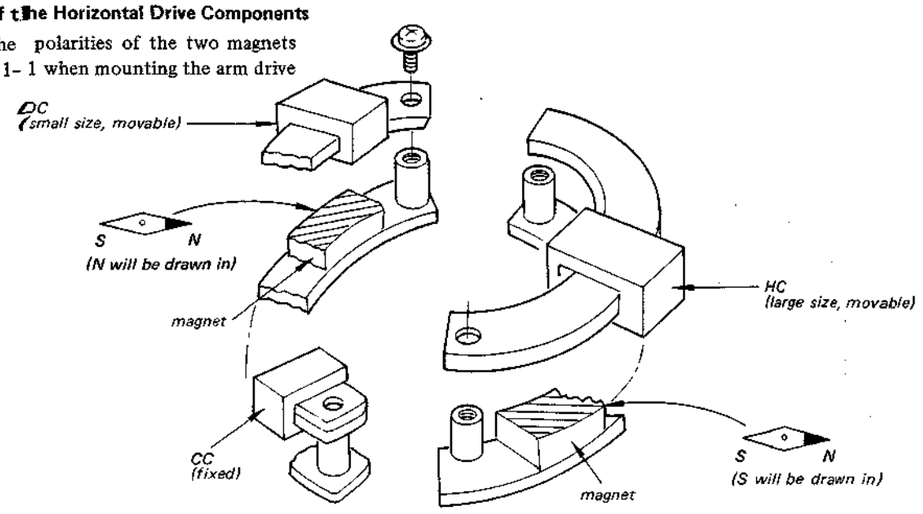


Fig. 1-1

The terminal connections on the phono system control board are as shown in Fig. 1-2. The colors of the wires are indicated in the mounting diagram.

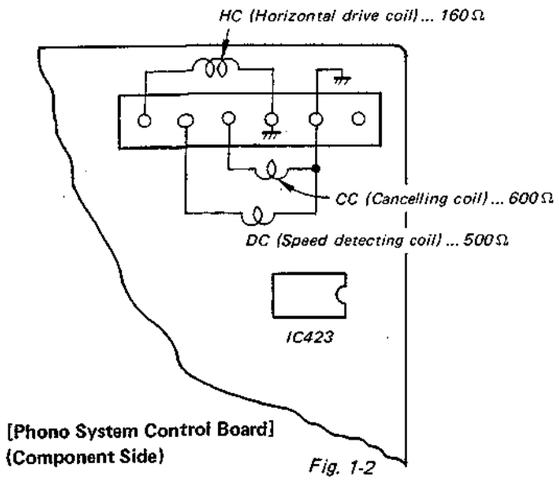


Fig. 1-2

– Testing Method –

Check the following under power OFF condition.

+1 V DC applied to HC.....Arm moves inwards.
+1 V DC applied to DC.....Arm moves inwards.
+1 V DC applied to CC.....Arm does not move.

1. Introduction

- **The Symbols Used in the System Control Section**

1. D-Flip Flop (abbreviated hereafter as FF)

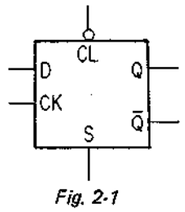


Fig. 2-1

- The CL (R) (clear or reset) and the S (set) input in a D type FF get the priority over the D (data) and the CK (clock) inputs. That is, the D and CK inputs will be ignored if the CL (R) or the S input is present.
- The input symbol represents that the input is active **HIGH** if there is no circle at the input at the gate and if a circle is present, then that input will be active **LOW**. For example, the FF in Fig. 2-1 is cleared when the CL (clear) input drops LOW.
- Fig. 2-2 shows the timing chart of the operations of a D type FF shown in Fig. 2-1.

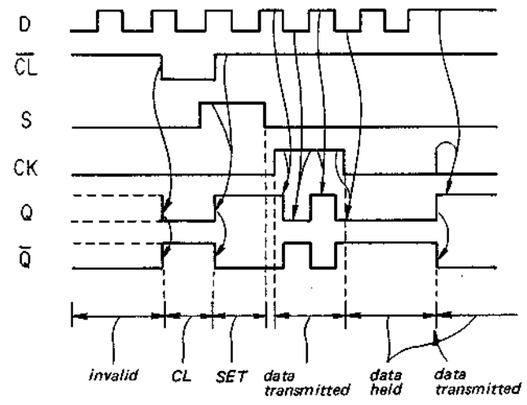


Fig. 2-2

2. Inverter
The circle at the input or the output indicates the purpose of using the inverter; that is, the gate in Fig. 2-3 is an inverter for giving output "0" while the gate in Fig. 2-4 is used for giving output "1".

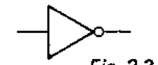


Fig. 2-3

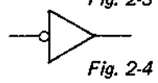


Fig. 2-4

3. AND Gate
The output of this circuit will be "1" when both inputs are "0" and will be "0" when any one of the inputs is "1".

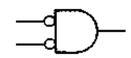


Fig. 2-5

4. NOR Gate
This gate has the function of OR + NOT.
The output is "0" when either one of the inputs is "1". Although a different symbol is used in Fig. 2-5 and Fig. 2-6, it is because the purpose is not the same and the same IC is used in both cases.

Fig. 2-6

5. NAND Gate
This gate has the function of AND + NOT.

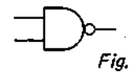


Fig. 2-7

6. OR Gate
This is an OR gate for getting a "0" output, that is, the output will be "1" if either one of the inputs is "0". The same IC as for the NAND gate is used here but a different symbol is used because of the different purpose.

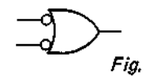


Fig. 2-8

Although the symbols above appear to be very confusing because they represent the same IC using different symbols, they are extremely useful in tracing the circuit in smaller units.

● **Combined Operation**

Although a variety of functions can be realized by combining the IC's, the following major combinations are used in the system control section.

1. Fig. 2-9 shows a controllable oscillator.
   IC421 is an MOS type of oscillator circuit in which the first stage gate operates as an analog amplifier due to the negative feedback by R and oscillates due to the positive feedback provided by C.
   The frequency can be controlled by the value of RC because the feedback is given in either the "0" or the "1" mode.

   Note: Low frequency (or low duty cycle) oscillations can be obtained easily by using MOS ICs.
   IC418 is a gate for controlling the oscillator output. Because of the circles at the inputs, the oscillator output will be transmitted when the gating input is "0".

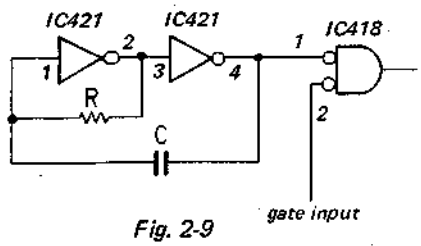


Fig. 2-9

2. Fig. 2-10 shows a Set-reset type of FF basically constituted by IC410(b) and IC414 (both set and reset are zero priority inputs) with the gate IC410(a) added for determining the priority of the inputs.
   The circuit in this example is a reset priority type of RS FF because the S input will be ineffective when $\overline{R}$ is 1 (that is R = 0).

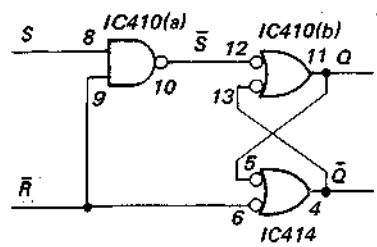


Fig. 2-10

3. The circuits of Figs. 2-11 and 2-12 are not oscillators but are integrators using the very high input impedance of MOS ICs. The purpose of using these circuits is to obtain some delay which is achieved by C and R.

A square wave input applied to these circuits results in a triangular wave output. However, because of the diode (D), the resistor R' will only be included in either the charging or the discharging path of the capacitor and hence the output will be a triangular wave only during the positive or the negative portion of the input wave, depending on the polarity of the diode. The waveforms of these circuits will be as shown in Fig. 2-13 if we assume R ≫ R'.

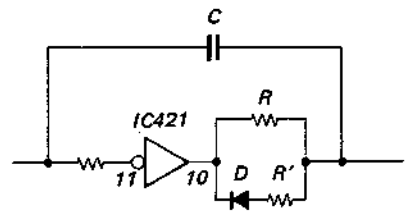


Fig. 2-11

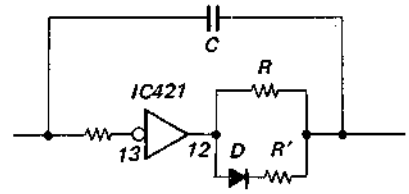


Fig. 2-12

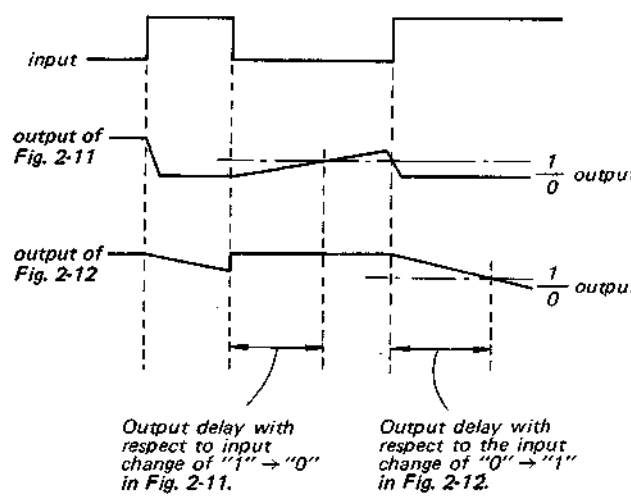


Fig. 2-13

4. The connection of Fig. 2-14 is used for eliminating any narrow pulses superimposed on the input or for obtaining short delays of the rising and falling edges, etc. This circuit is very useful in preventing the oscillation of the entire system (racing), or for preventing chattering of the inputs, etc.

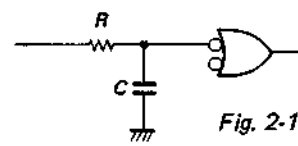


Fig. 2-14

5. The circuit in Fig. 2-15 operates only when the input mode changes from "0" or "1". The gate is operated by the falling edge "1"→"0" in the combination RC, and by the rising edge "0"→"1" in the condition R'C'.

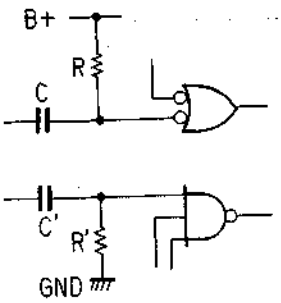


Fig. 2-15

2. Record Size Detection

This function is used for:

- detecting whether a record is placed on turntable or not.
- detecting the record size (30, 25, 17 cm).

A disk light (DL) illuminates the face of the turntable. This light passes through the turntable prism and reaches the sensors Q2201–2203 of the size sens board.

The outputs of Q2201–2203 will be as follows.

Output / Record	Q2203	Q2202	Q2201
30 cm	1	1	1
25 cm	0	1	1
17 cm	0	0	1
No record	0	0	0

These signals determine the turntable speed.

The sensor output is amplified in the size sens board by the operational amplifiers IC201, 202 which supply a positive pulse output when the signal pulse at the ⊖ terminal drops lower than the bias applied to the ⊕ terminal.

The bias applied to the ⊕ terminal will be different for different disk sizes as follows.

For a 30 cm disk (terminal 5 of IC2201) –
bias voltage: –7 V

For a 25 cm disk (terminal 3 of IC2201) –
bias voltage: –5.8 V

For a 17 cm disk (terminal 5 of IC2202) –
bias voltage: –4 V

These bias voltages are different because the amount of light reaching the sensor from the disk lamp (DL) differs in each case.

The record size detecting signal is supplied to the D type FF IC401 via IC405 in the phono system control board. This FF is used for ignoring the input for about 2 seconds until the turntable starts rotating.

3. Tonearm Position Detector

The tonearm position is detected by the tonearm position sensor. This detects the position of the tonearm by means of three rows of slits which are provided on a shutter attached below the tonearm. The following sensor outputs are obtained, in which "0" denotes that the light was received from two slits and in which "1" denotes that no light was received.

Sensor output / Tonearm position	Sensor A	Sensor B	Sensor C
Arm at rest	1	0	0
Between the rest and the record edge (30 cm)	0	0	0
30 cm	0	0	1
25 cm	0	1	1
17 cm	0	1	0
Beginning of END	1	1	0
END complete	1	1	1

The outputs of the arm position sensor are supplied to IC405, 406 via Q406–408 and the Rest, Beginning of END, and END complete signals are generated in these ICs.

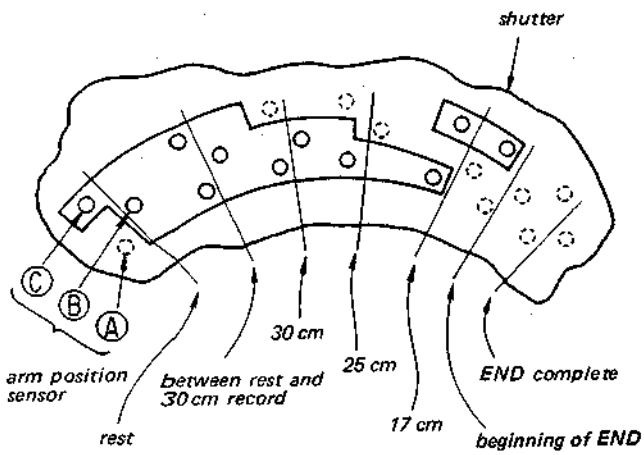


Fig. 2-16 *Actually the shutter moves with respect to the sensor but the figure shown here indicates the position by changing the position of the arm position sensor.*

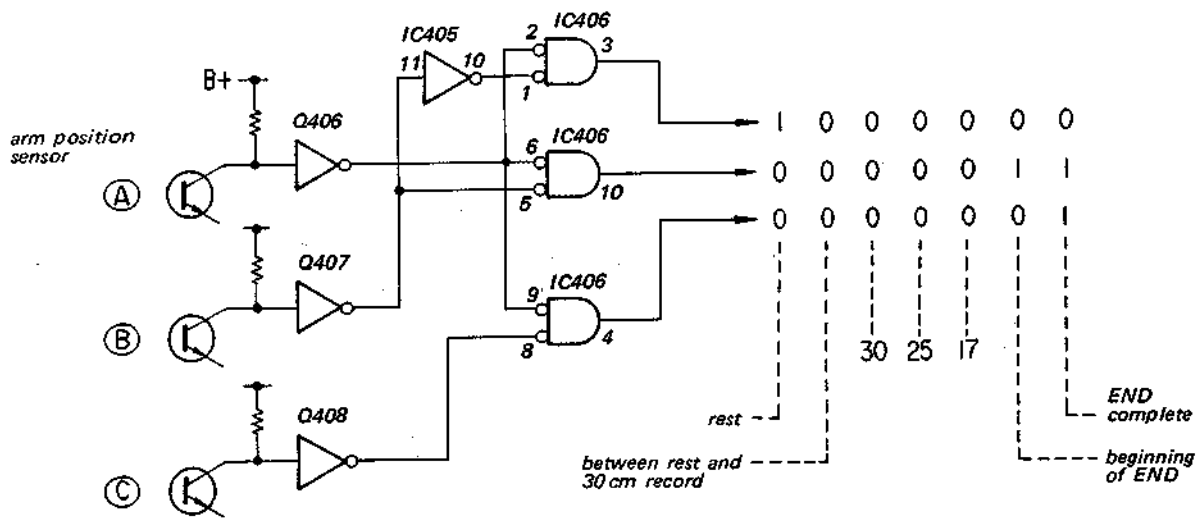


Fig. 2-17

The outputs of the tonearm position sensor and the record size detector are combined together to generate the drop point output.

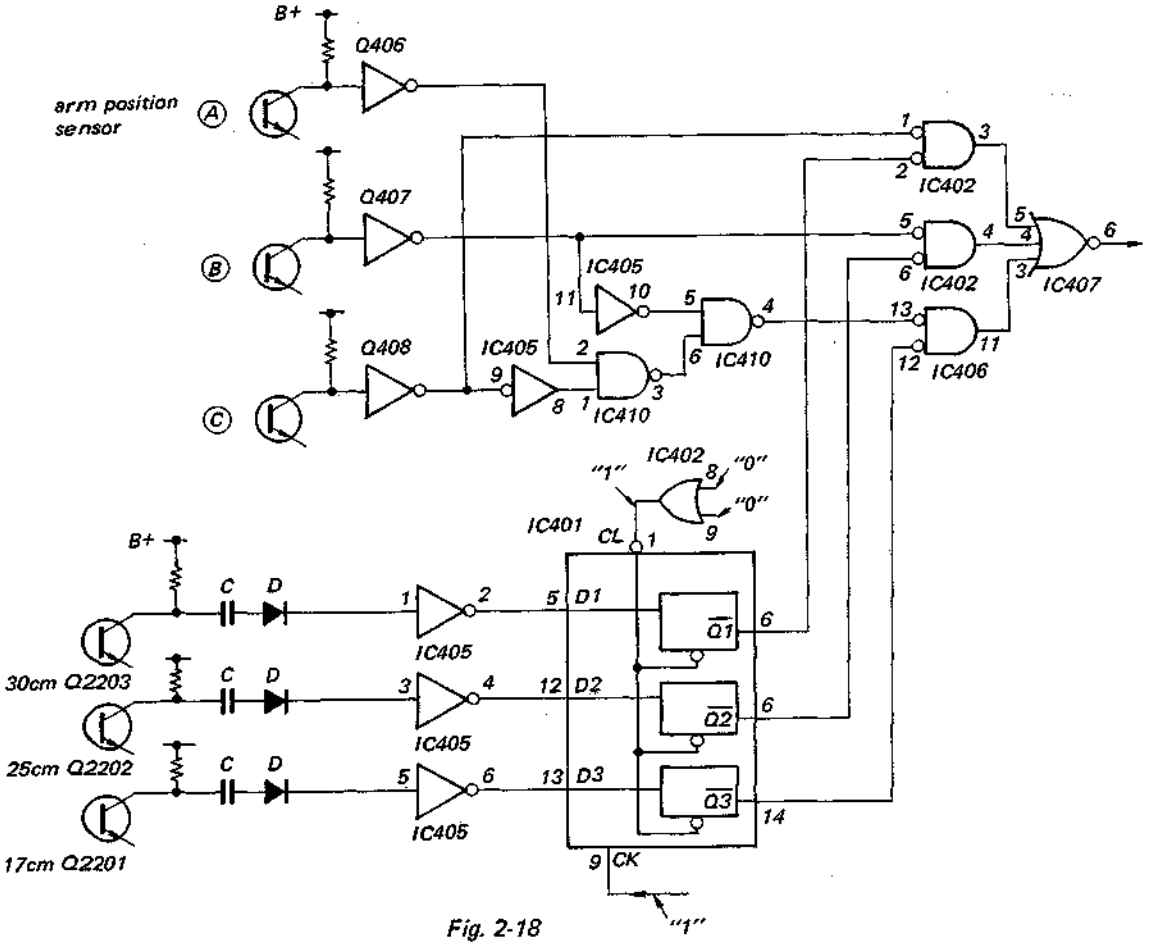


Fig. 2-18

The outputs of the tonearm position sensor and of the record size detector are combined as follows.

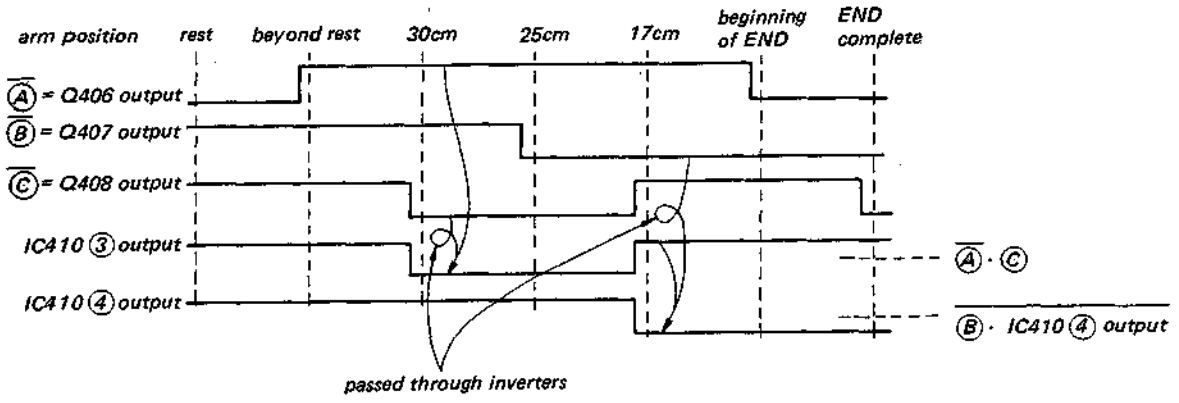


Fig. 2-19

The 410 ④ output changes from "1" to "0" when the tonearm reaches the 17cm position.

The record size detector signal is obtained from IC401 as follows when the clear input (CL) to IC401 is "1" (that is, the data will not be cleared) and the CK input is "1" (strobe clock signal; D input is valid). Thus when the record size is detected and the drop point has been reached, the outputs IC402 ③, ④ and IC406 ⑪ are combined to give the negative drop point signal at IC407 ⑥.

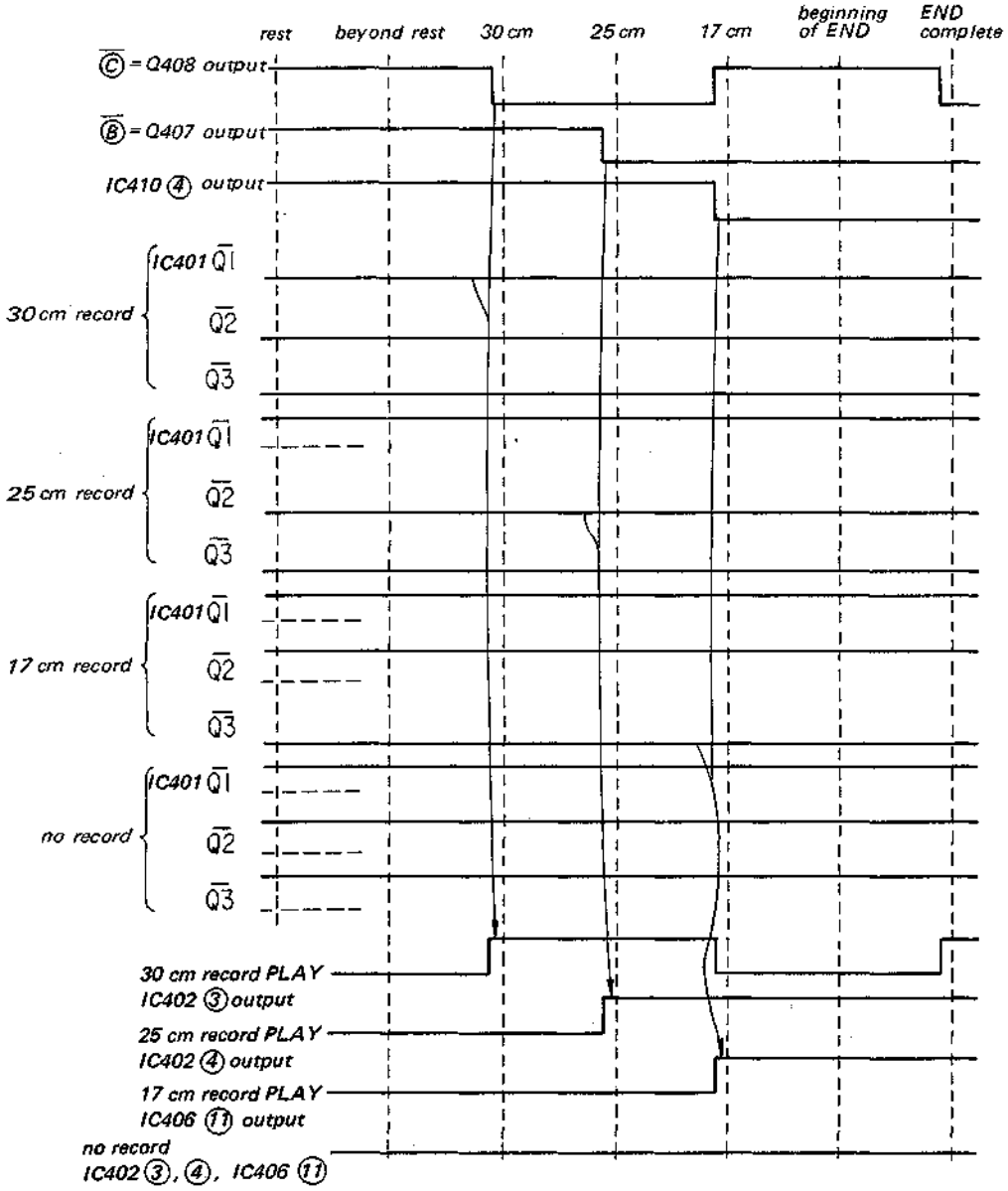


Fig. 2-20

4. "No Record" Detection

The size of the standard records placed on the turntable is detected by the amount of light cut off by the record. When a record of a certain size is placed on the turntable, the lights for the smaller record size is also cut off. Therefore, the absence of a record can be determined from the signal for the 17 cm record size detector.

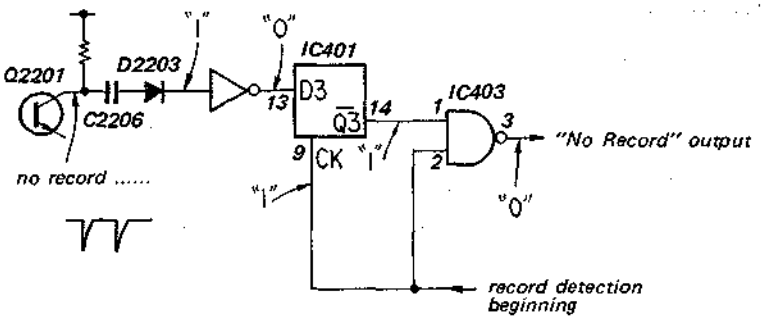


Fig. 2-21

The turntable does not start rotating immediately after the START button is pressed. Therefore, the "No Record" detection is not performed until the turntable starts rotating. IC401 is used for this purpose. Therefore, it is evident that the turntable stops rotating after about 2 seconds if the START button is pressed without record placed on the turntable.

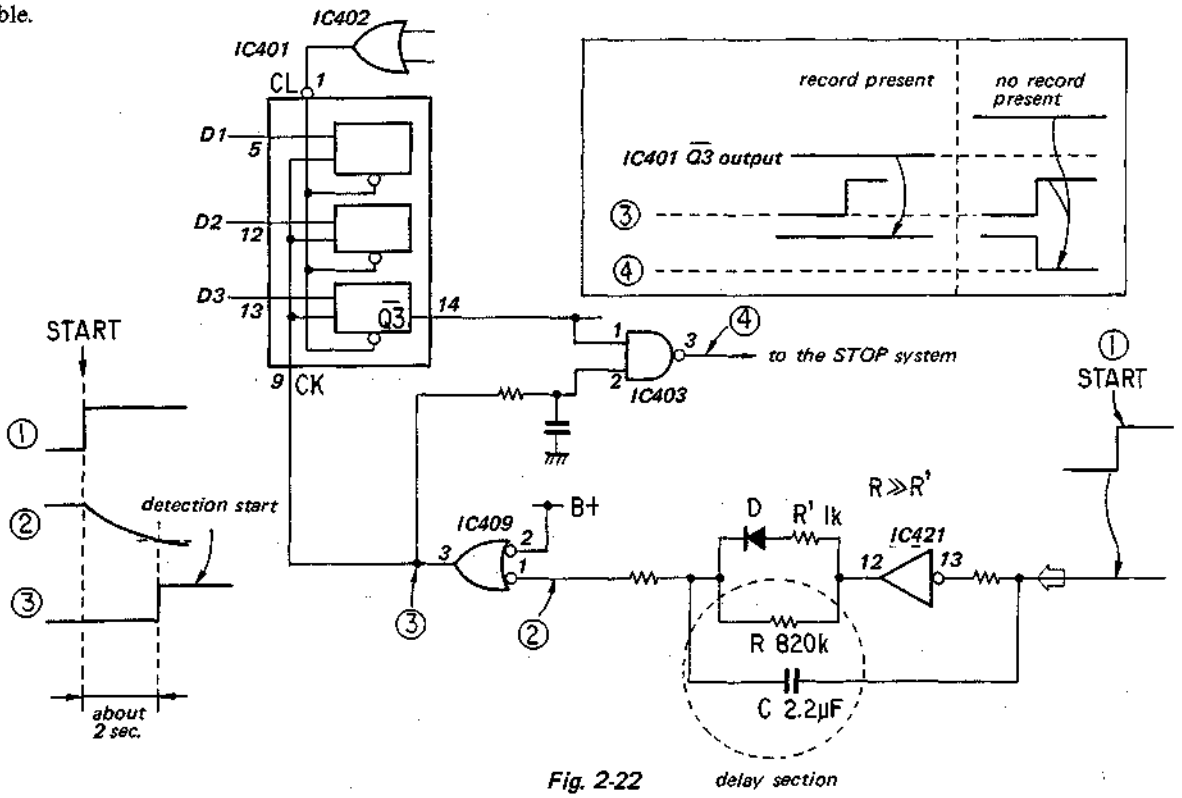


Fig. 2-22

5. System Reset During Power On

The following discussion explains the power on system reset operations when the zero balance knob is not in the anti-skating position. See the diagram "MODE: POWER ON" (on pages 38, 39 and 40) for the explanations of the various circuits.

The reset signal is generated by IC409 and resets all the locations.

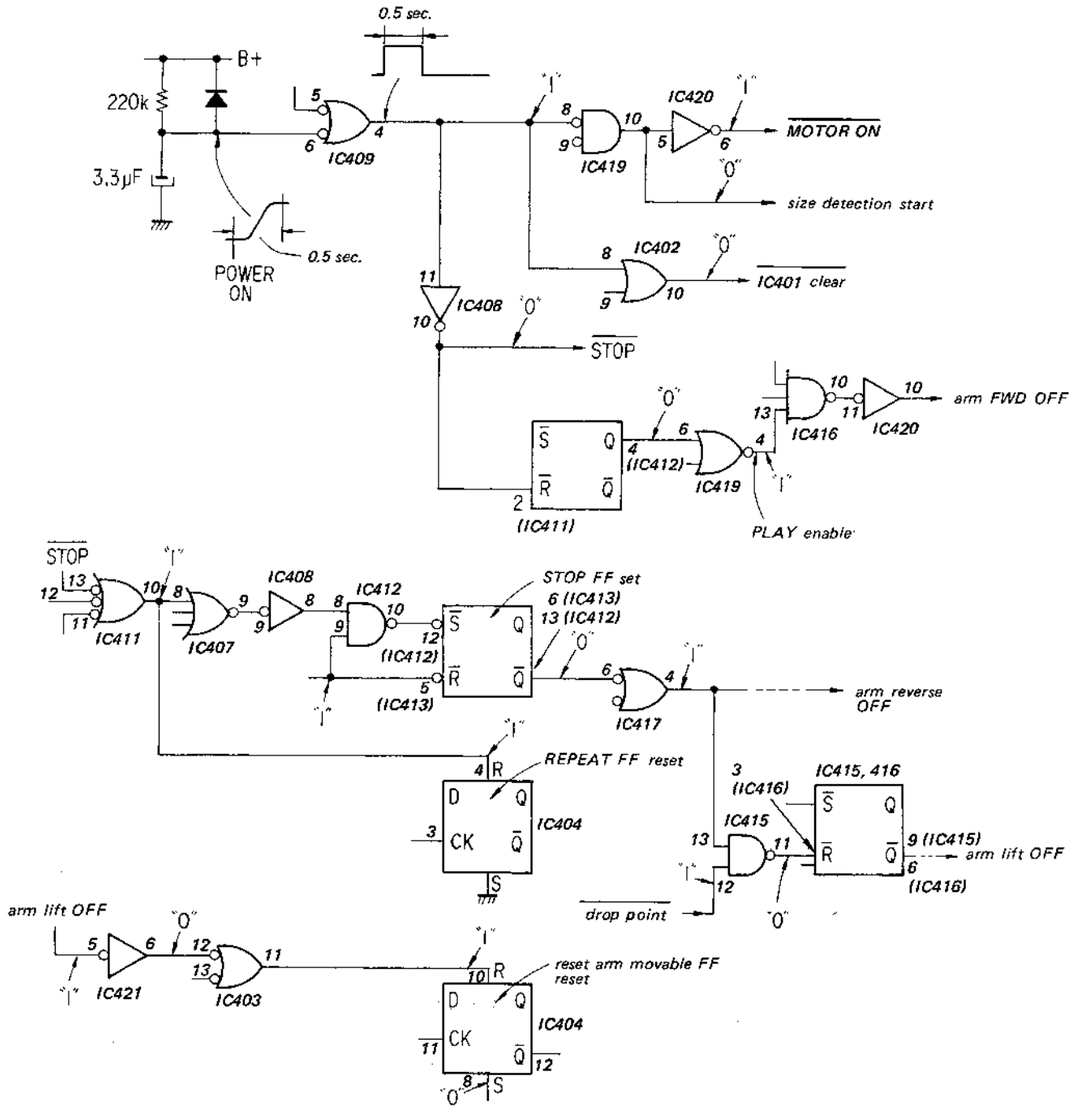


Fig. 2-23

6. Tonearm Position During Power On

The tonearm does not move in either direction during POWER ON because both the arm FWD and the arm REVERSE signals would be off. This is indicated in Fig. 2-24.

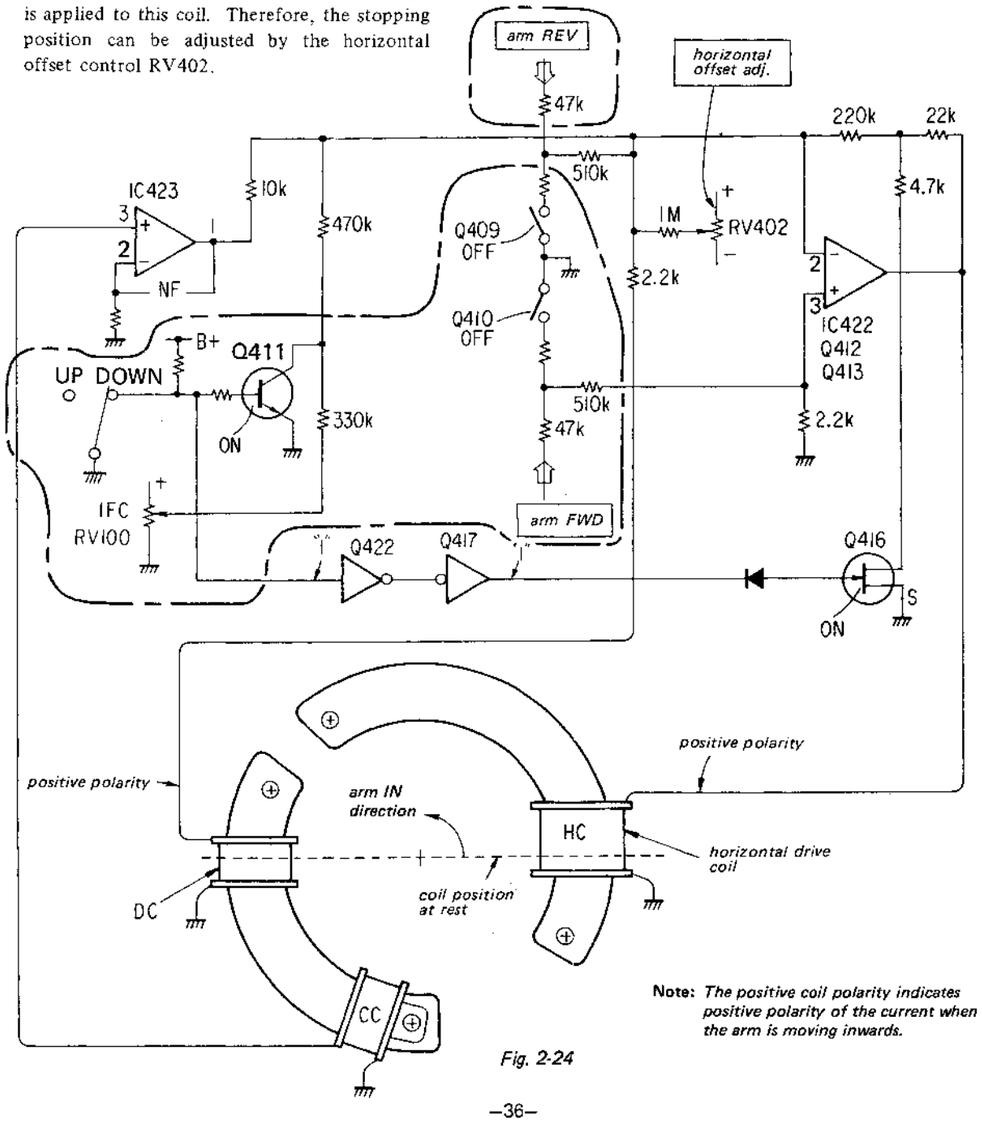
As shown in Fig. 2-24, the portion enclosed within the line —·—— will be ignored during POWER ON because of the negative feedback (NF) provided by a coil to the high gain amplifier (IC422, Q412, Q413).

Since the drive to the tonearm is given via the horizontal drive coil (HC) the arm does not move if neither a positive nor a negative voltage is applied to this coil. Therefore, the stopping position can be adjusted by the horizontal offset control RV402.

The voltage output by the speed detecting coil (DC) is supplied to the servo amplifier as the negative feedback signal and acts as a brake on the movement of the arm.

There is a cancel coil (CC) apart from the fixed coils HC and DC.

The purpose of this cancel coil is to neutralize within the servo system the component of the signal when the arm is moving at a constant speed. Because of this it becomes possible to extract only the variation in the speed from the DC coil system.



Note: *The positive coil polarity indicates positive polarity of the current when the arm is moving inwards.*

Fig. 2-24

6. Tonearm Position During Power On

The tonearm does not move in either direction during POWER ON because both the arm FWD and the arm REVERSE signals would be off. This is indicated in Fig. 2-24.

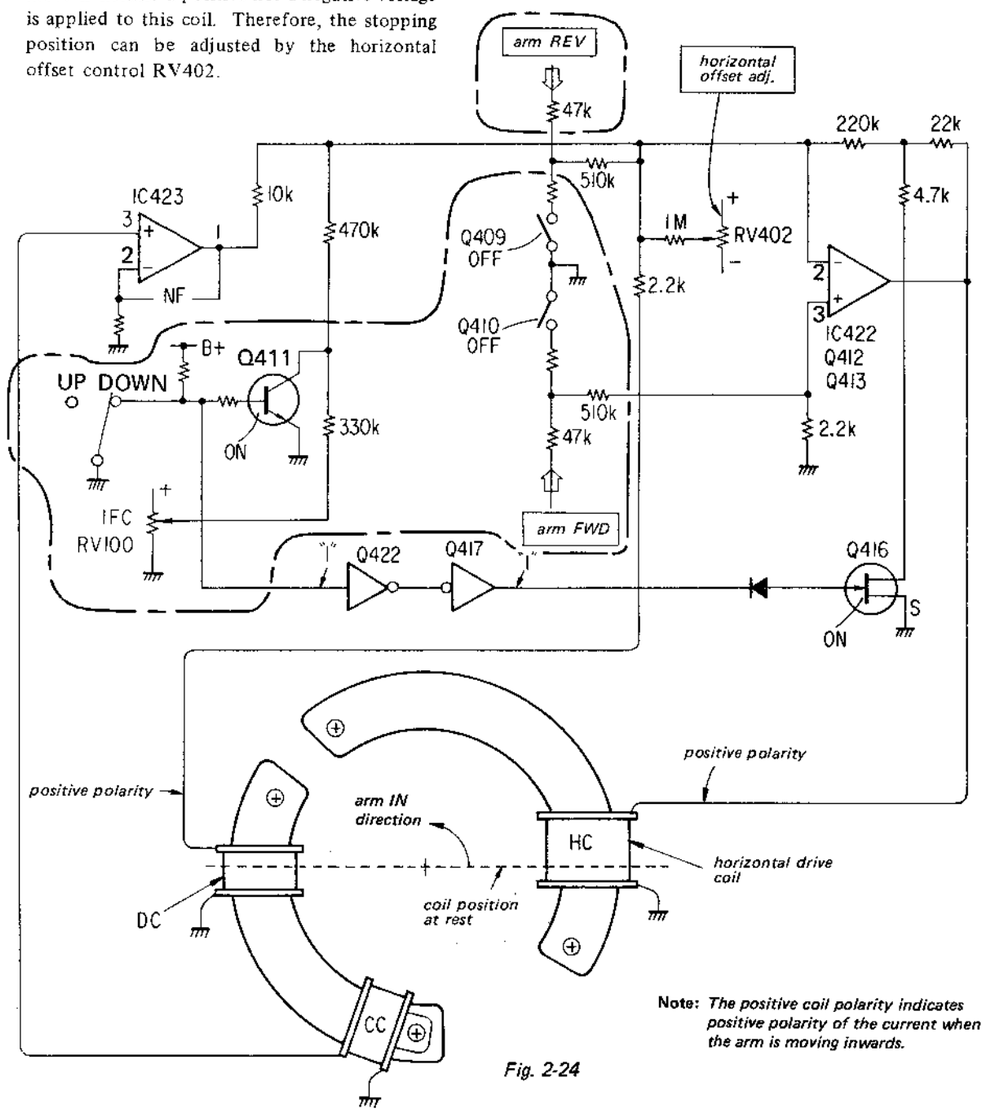
As shown in Fig. 2-24, the portion enclosed within the line —·—· will be ignored during POWER ON because of the negative feedback (NF) provided by a coil to the high gain amplifier (IC422, Q412, Q413).

Since the drive to the tonearm is given via the horizontal drive coil (HC) the arm does not move if neither a positive nor a negative voltage is applied to this coil. Therefore, the stopping position can be adjusted by the horizontal offset control RV402.

The voltage output by the speed detecting coil (DC) is supplied to the servo amplifier as the negative feedback signal and acts as a brake on the movement of the arm.

There is a cancel coil (CC) apart from the fixed coils HC and DC.

The purpose of this cancel coil is to neutralize within the servo system the component of the signal when the arm is moving at a constant speed. Because of this it becomes possible to extract only the variation in the speed from the DC coil system.



Note: *The positive coil polarity indicates positive polarity of the current when the arm is moving inwards.*

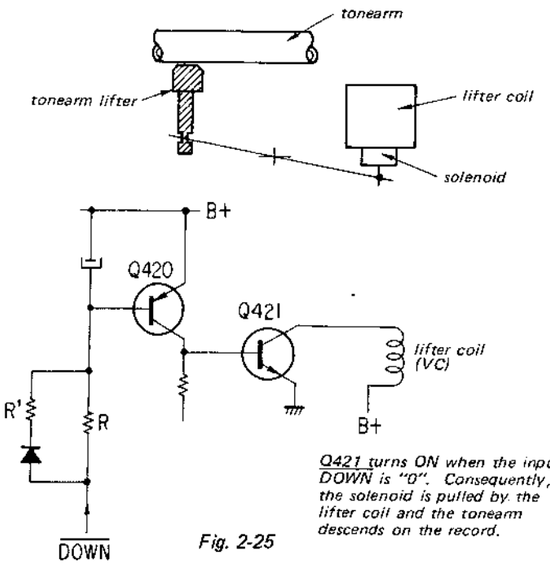
Fig. 2-24

7. Disk Light Circuit

The disk light (DL) brightness is reduced after leading in because then it is no longer necessary. The transistors Q418, 419 in the phono system control board are used when the full voltage is to be applied to the disk light and when these are OFF, the current flows through R506.

8. Lifter Coil Circuit

The lifter coil circuit is as shown in Fig. 2-25.



Q421 turns ON when the input DOWN is "0". Consequently, the solenoid is pulled by the lifter coil and the tonearm descends on the record.

Fig. 2-25

9. Return Detection

The return detection is performed as shown in Fig. 2-26 by IC423, Q414, Q415, IC422, etc., in the phono system control board.

Q414 turns OFF and Q415 turns ON in the PLAY zone because "Beginning of END" will be "1", and therefore there will be no gain in IC423.

When the "Beginning of END" signal is applied and Q414 turns ON, Q415 turns OFF and IC423 is in the high gain state. In this state, IC423 amplifies the voltage generated by the speed detection coil (DC). Consequently, a pulse output is obtained from IC422. The "0" level portion of this pulse output is used as the END signal.

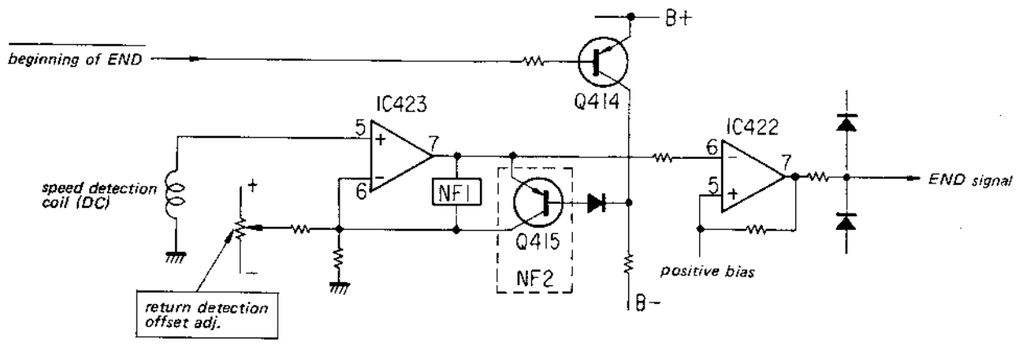
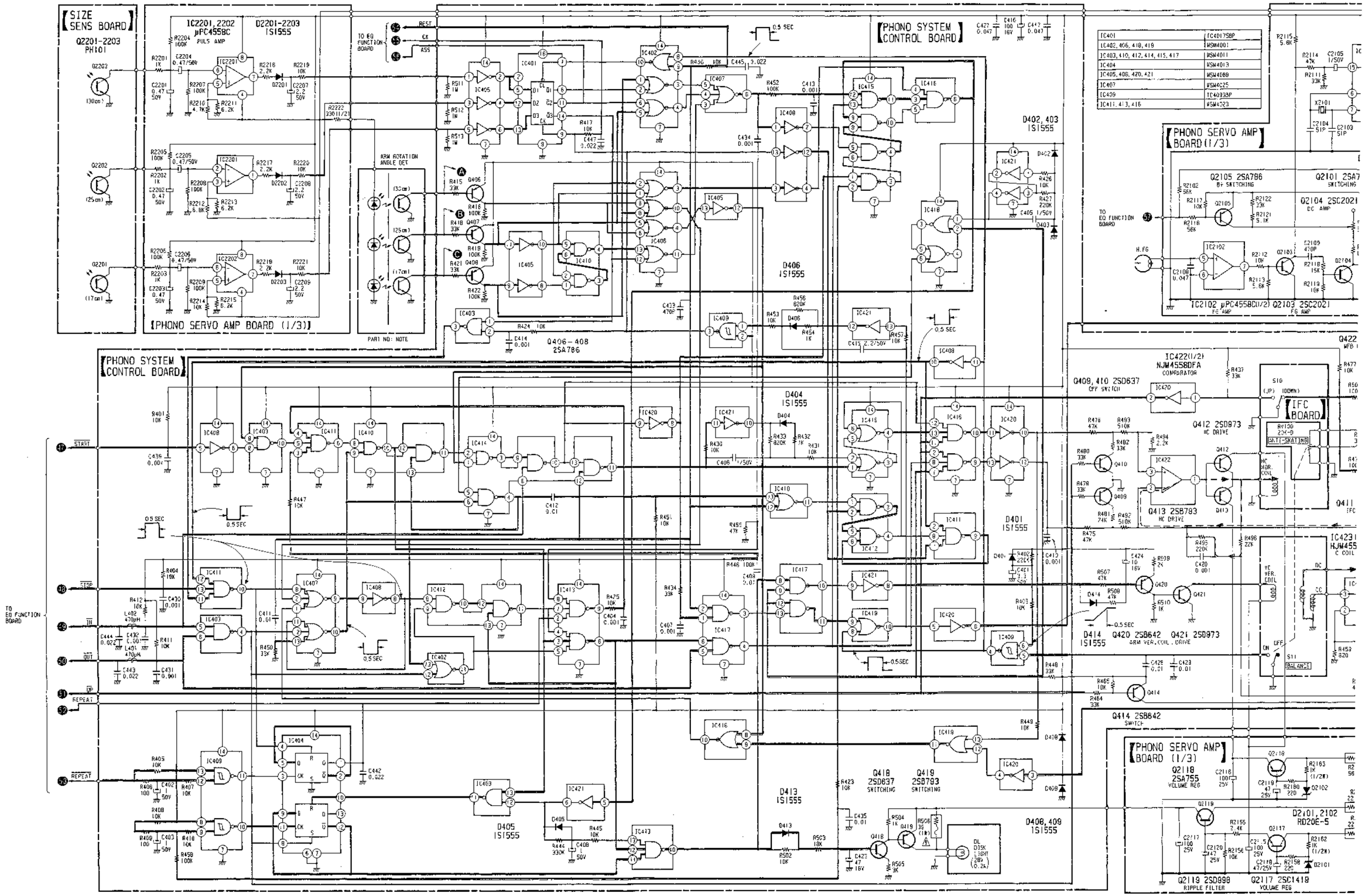


Fig. 2-26

REFERENCE DATA

1. Phono Power On/Balance Off

——— : "1" (high voltage)
——— : "0" (low voltage)



——— : "1" (high voltage)
——— : "0" (low voltage)

IC401	TC4017BP
IC402, 406, 418, 419	MSM4001
IC403, 410, 412, 414, 415, 417	MSM4011
IC404	MSM4013
IC405, 408, 420, 421	MSM4069
IC407	MSM4025
IC409	TC4093BP
IC411, 413, 416	MSM4023

【PHONO SYSTEM CONTROL BOARD】

【PHONO SERVO AMP BOARD (1/3)】

【IFC BOARD】

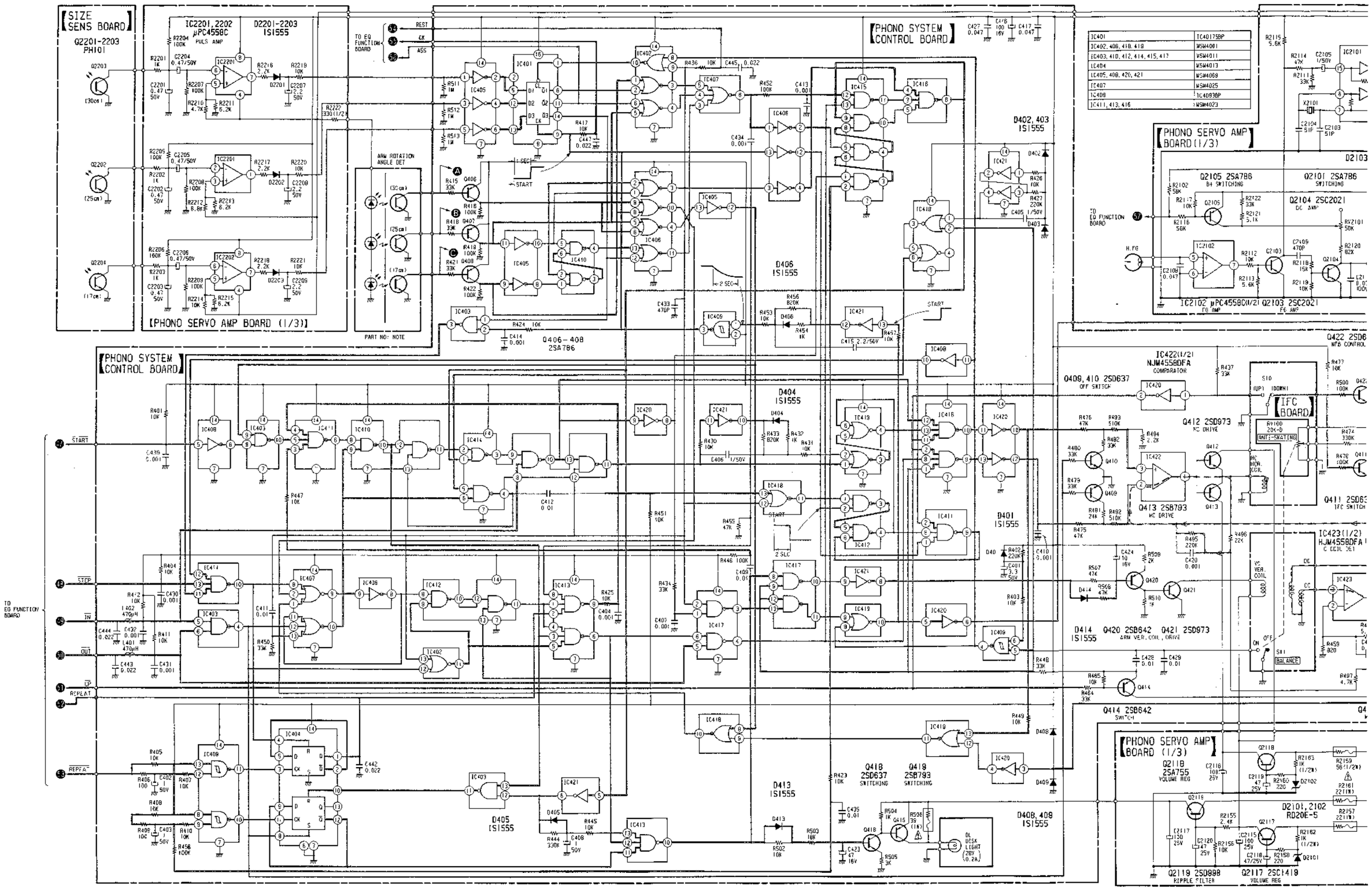
【MOTOR BOARD】

【PHONO SERVO AMP BOARD (1/3)】

【PHONO BOARD】

2. Phono Start 30cm

——— : "1" (high voltage)
——— : "0" (low voltage)



IC401	IC40175BP
IC402, 406, 418, 419	MSM4001
IC403, 416, 412, 414, 415, 417	MSM4011
IC404	MSM4013
IC405, 408, 420, 421	MSM4069
IC407	MSM4025
IC409	TC40936P
IC411, 413, 416	MSM4023

【PHONO SYSTEM CONTROL BOARD】

【PHONO SERVO AMP BOARD (1/3)】

【IFC BOARD】

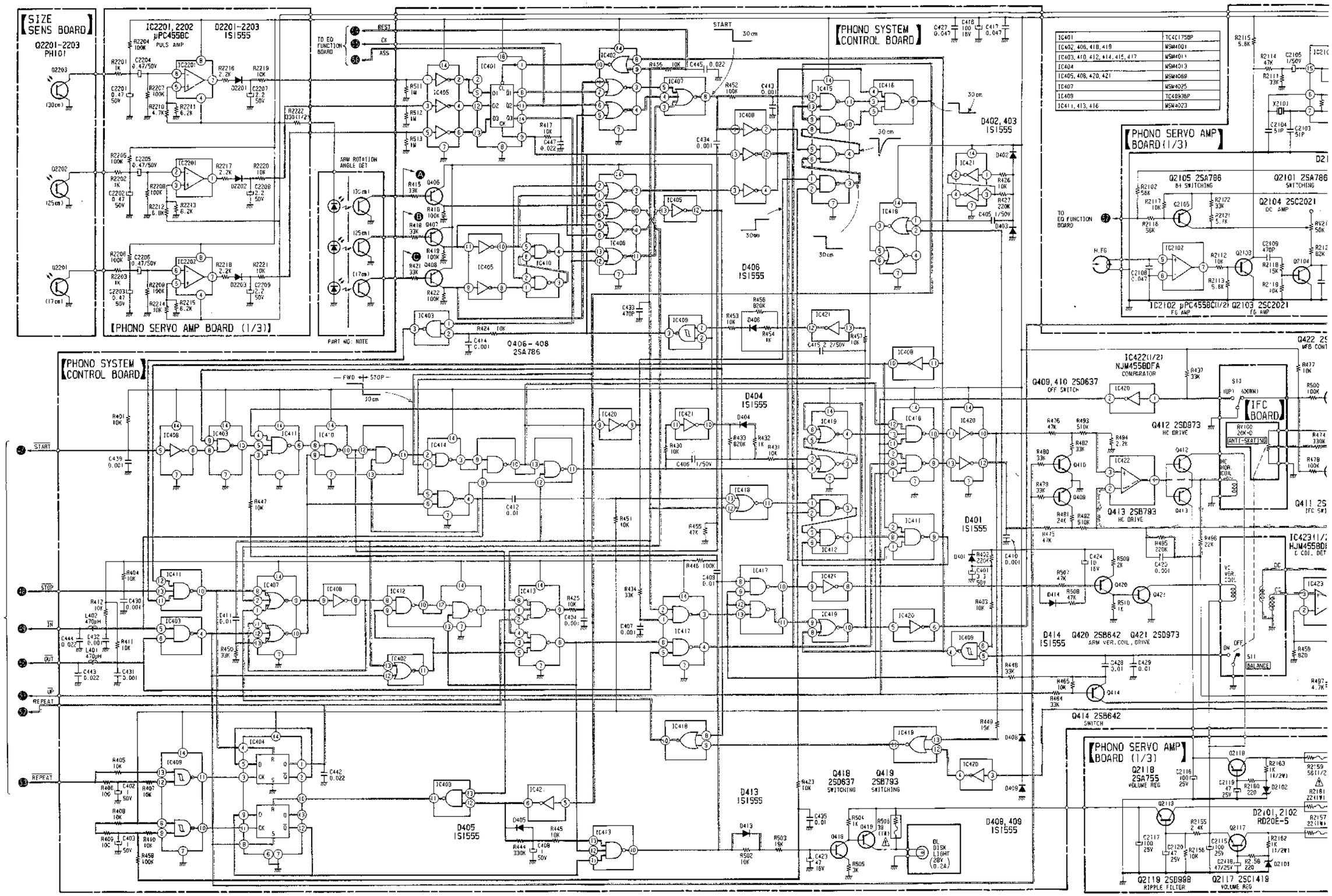
【MOTOR BOARD】

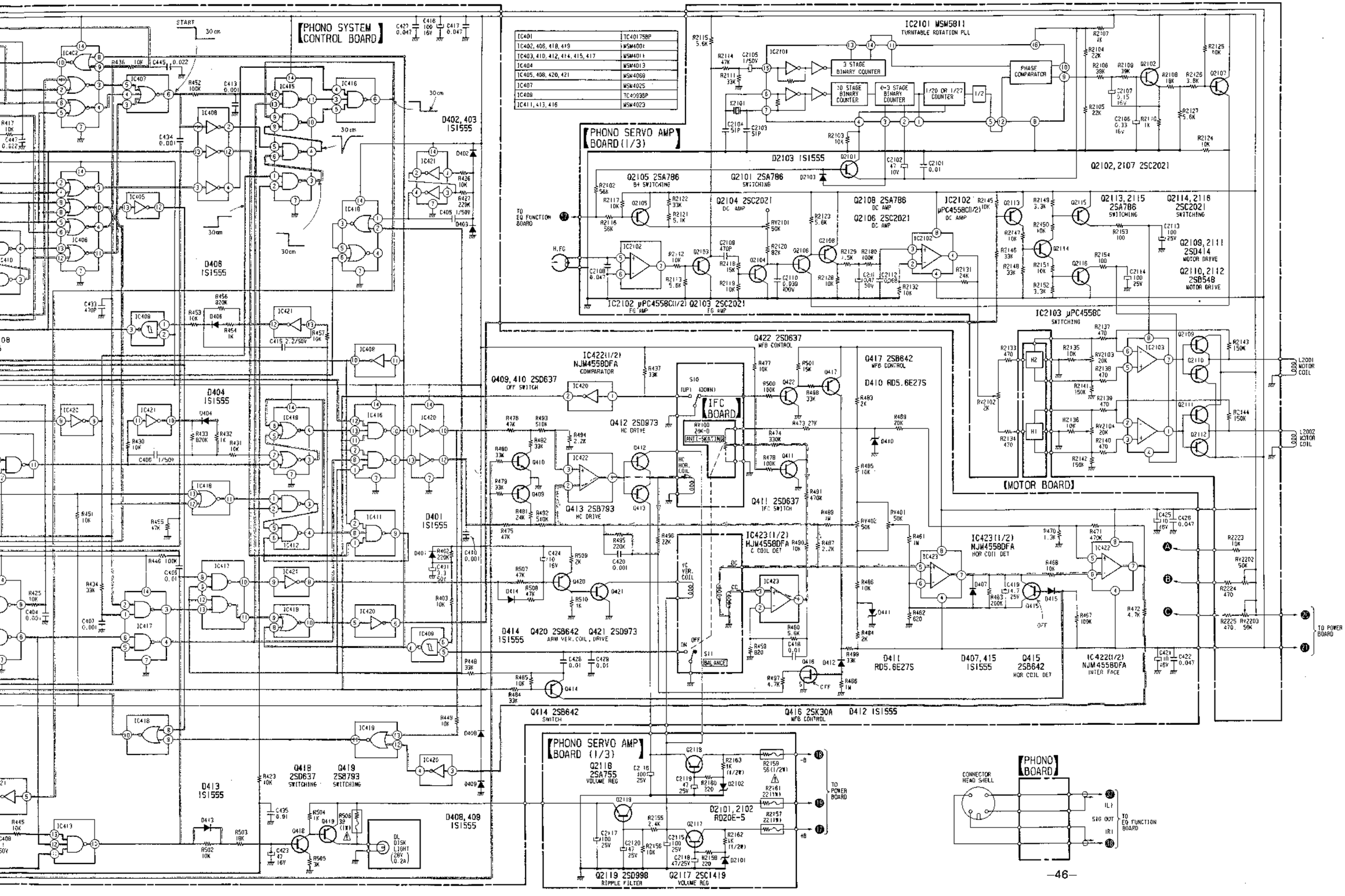
【PHONO SERVO AMP BOARD (1/3)】

【PHONO BOARD】

3. Phono Down 30cm

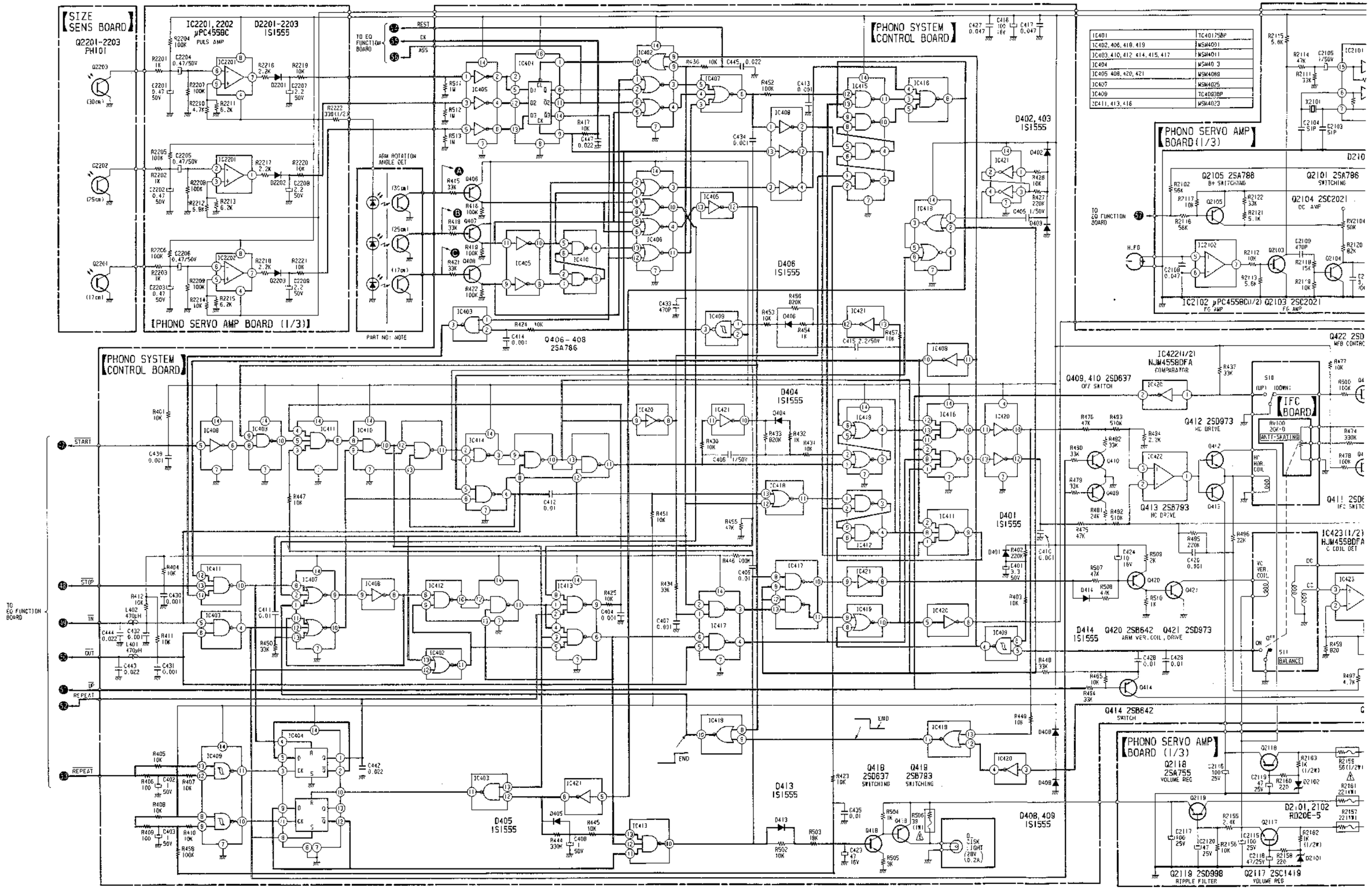
——— : "1" (high voltage)
——— : "0" (low voltage)




[PHONO SYSTEM CONTROL BOARD]
[PHONO SERVO AMP BOARD (1/3)]
[IFC BOARD]
[MOTOR BOARD]
[PHONO BOARD]
IC2101 MSM5811 TURNTABLE ROTATION PLL
IC2102 μPC4558C(1/2) FG AMP
IC2103 μPC4558C SWITCHING
IC422(1/2) NJM4558DFA COMPARATOR
IC423(1/2) NJM4558DFA H COIL DET
IC423(1/2) NJM4558DFA C COIL DET
IC422(1/2) NJM4558DFA INTER FACE
Q2102, 2107 2SC2021
Q2105 2SA786 B+ SWITCHING
Q2101 2SA786 SWITCHING
Q2104 2SC2021 DC AMP
Q2108 2SA786 DC AMP
Q2106 2SC2021 DC AMP
Q2113, 2115 2SA786 SWITCHING
Q2114, 2116 2SC2021 SWITCHING
Q2109, 2111 2SD414 MOTOR DRIVE
Q2110, 2112 2SB548 MOTOR DRIVE
Q422 2SD637 MFB CONTROL
Q417 2SB642 MFB CONTROL
Q409, 410 2SD637 OFF SWITCH
Q412 2SD973 HC DRIVE
Q413 2SB793 HC DRIVE
Q411 2SD637 IFC SWITCH
Q414 2SB642 SWITCH
Q416 2SK30A MFB CONTROL
Q418 2SD637 SWITCHING
Q419 2SB793 SWITCHING
Q420 2SB642 ARM VER. COIL DRIVE
Q421 2SD973 ARM VER. COIL DRIVE
Q2118 2SA755 VOLUME REG
Q2119 2SD998 RIPPLE FILTER
Q2117 2SC1419 VOLUME REG
D2101, 2102 RD20E-5
D410 RD5.6E27S
D411 RD5.6E27S
D407, 415 1S1555
D415 2SB642 HOR COIL DET
D402, 403 1S1555
D404 1S1555
D406 1S1555
D401 1S1555
D413 1S1555
D408, 409 1S1555
D414 1S1555
D412 1S1555
D2103 1S1555
IC401 TC40175BP
IC402, 406, 418, 419 MSM4001
IC403, 410, 412, 414, 415, 417 MSM4011
IC404 MSM4013
IC405, 408, 420, 421 MSM4069
IC407 MSM4025
IC409 TC4093BP
IC411, 413, 416 MSM4023
TO EQ FUNCTION BOARD
TO POWER BOARD
TO EQ FUNCTION BOARD
CONNECTOR HEAD SHELL
L2001 MOTOR COIL
L2002 MOTOR COIL
H.FG
SW1 (UP) (DOWN)
S11 BALANCE
DL DISK LIGHT (28V 0.2A)

4. Phono End

: "1" (high voltage)
: "0" (low voltage)



HMK-9000

IC401	TC40175BP
IC402, 406, 418, 419	MSM4001
IC403, 410, 412, 414, 415, 417	MSM4011
IC404	MSM4013
IC405, 408, 420, 421	MSM4069
IC407	MSM4025
IC409	TC4093BP
IC411, 413, 416	MSM4023

【PHONO SYSTEM CONTROL BOARD】

【PHONO SERVO AMP】BOARD (1/3)

IC2101 MSM5811 TURNTABLE ROTATION PLL

Q2103 1S1555

Q2105 2SA786 B+ SWITCHING

Q2101 2SA786 SWITCHING

Q2104 2SC2021 DC AMP

Q2108 2SA786 DC AMP

Q2106 2SC2021 DC AMP

IC2102 μPC4558C(1/2) DC AMP

Q2102, 2107 2SC2021

Q2113, 2115 2SA786 SWITCHING

Q2114, 2116 2SC2021 SWITCHING

Q2109, 2111 2SD414 MOTOR DRIVE

Q2110, 2112 2SB548 MOTOR DRIVE

IC2102 μPC4558C(1/2) FB AMP

Q2103 2SC2021 FG AMP

IC2103 μPC4558C SWITCHING

【MOTOR BOARD】

L2001 MOTOR COIL

L2002 MOTOR COIL

Q422 2SD637 MFB CONTROL

Q417 2SB642 MFB CONTROL

D410 RD5.6E27S

IC4221(1/2) NJM4558DFA COMPARATOR

Q409, 410 2SD637 OFF SWITCH

【IFC BOARD】

Q412 2SD973 HC DRIVE

Q411 2SD637 IFC SWITCH

Q413 2SB793 HC DRIVE

IC423(1/2) NJM4558DFA C COIL DET

Q414, 420, 421 2SD637, 2SB642, 2SD973 ARM VER. COIL DRIVE

IC423(1/2) NJM4558DFA HOR COIL DET

D411 RD5.6E27S

D407, 415 1S1555

Q415 2SB642 HOR COIL DET

IC422(1/2) NJM4558DFA INTER FACE

TO POWER BOARD

TO FD FUNCTION BOARD

Q414 2SB642 SWITCH

Q416 2SK30A MFB CONTROL

D412 1S1555

【PHONO SERVO AMP】BOARD (1/3)

Q2118 2SA755 VOLTAGE REG

D2101, 2102 RD20E-5

Q2119 2SD998 RIPPLE FILTER

Q2117 2SC1419 VOLTAGE REG

【PHONO】BOARD

CONNECTOR HEAD SHELL

SIG OUT

TO FD FUNCTION BOARD

D402, 403 1S1555

D406 1S1555

D404 1S1555

D401 1S1555

D413 1S1555

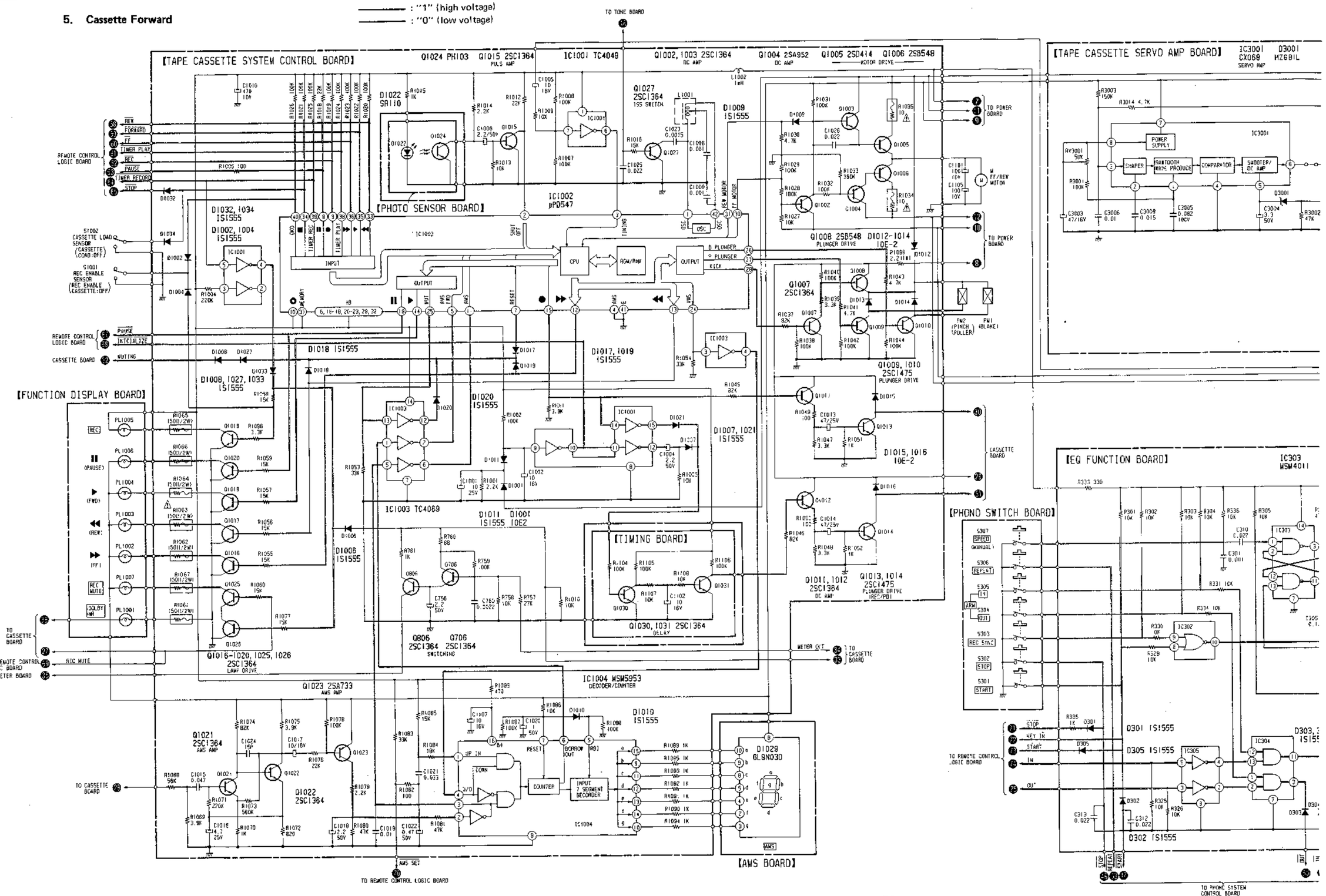
D408, 409 1S1555

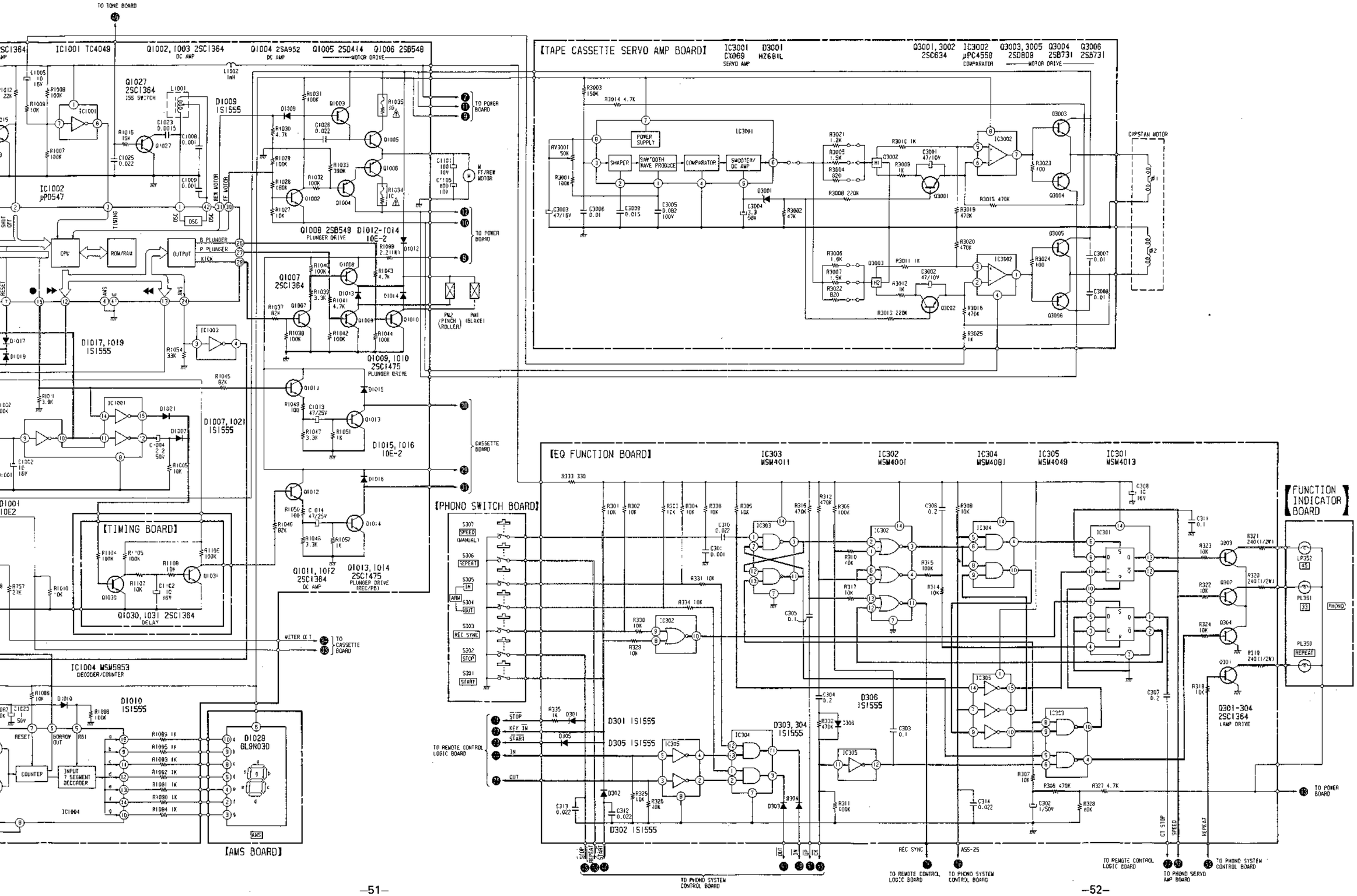
Q418 2SD637 SWITCHING

Q419 2SB793 SWITCHING

5. Cassette Forward

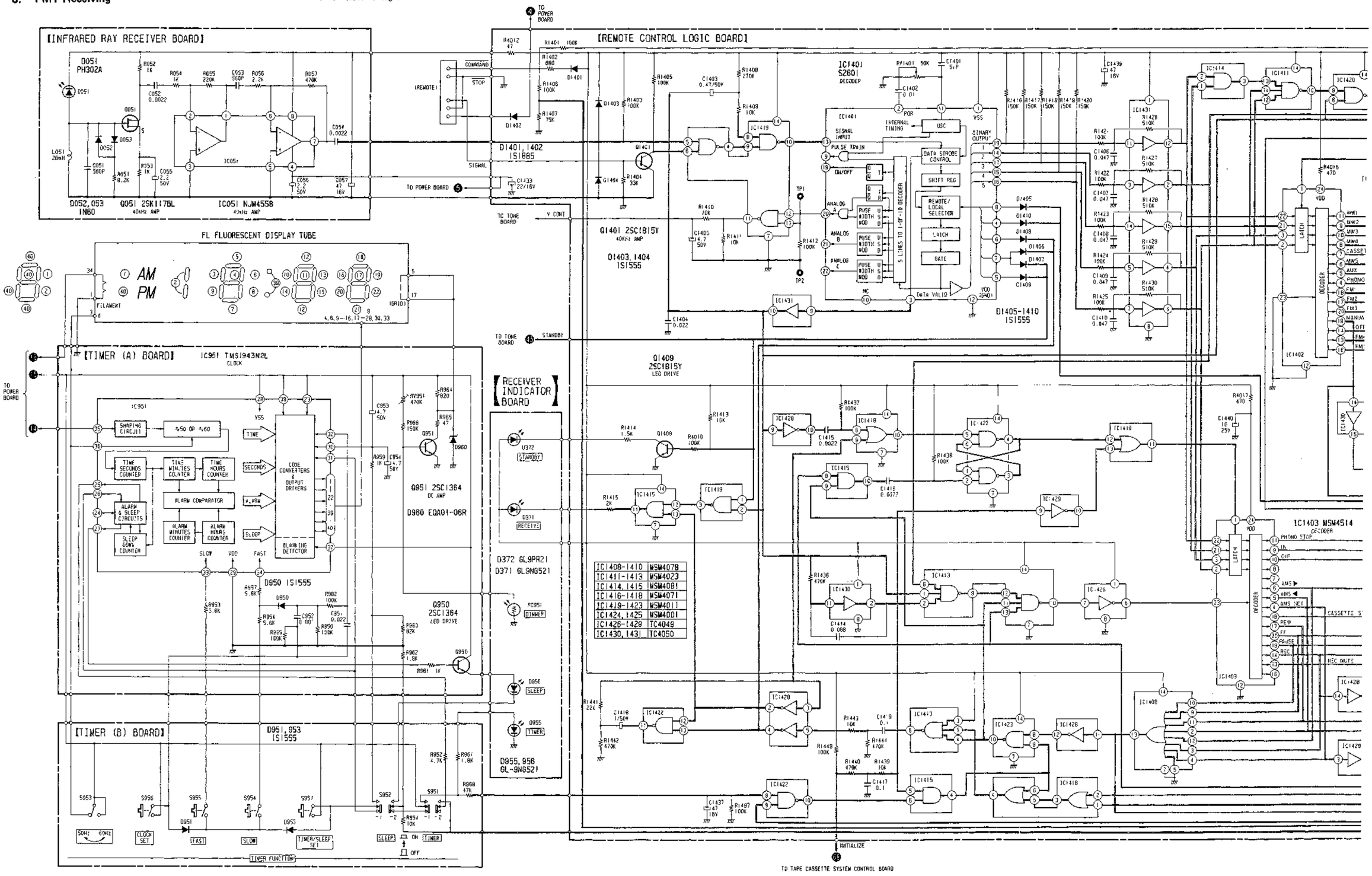
——— : "1" (high voltage)
——— : "0" (low voltage)




TO TONE BOARD
IC1001 TC4049
Q1002, 1003 2SC1364
DC AMP
Q1004 2SA952
DC AMP
Q1005 2SD414
Q1006 2SB548
MOTOR DRIVE
Q1027
2SC1364
ISS SWITCH
D1009
1S1555
IC1002
μPD547
CPU
ROM/RAM
OUTPUT
B PLUNGER
P PLUNGER
KICK
REC MOTOR
FF MOTOR
Q1008 2SB548
PLUNGER DRIVE
D1012-1014
1OE-2
Q1007
2SC1364
Q1009, 1010
2SC1475
PLUNGER DRIVE
TO POWER BOARD
PN2 (PINCH ROLLER)
PN1 (BLAKE)
D1017, 1019
1S1555
D1007, 1021
1S1555
D1015, 1016
1OE-2
CASSETTE BOARD
[TIMING BOARD]
Q1030, 1031 2SC1364
DELAY
Q1011, 1012
2SC1364
DC AMP
Q1013, 1014
2SC1475
PLUNGER DRIVE
(REC/PB)
TO CASSETTE BOARD
IC1004 MSM5853
DECODER/COUNTER
D1010
1S1555
D1029
GL9N030
COUNTER
INPUT 7 SEGMENT DECORDER
[AMS BOARD]
[TAPE CASSETTE SERVO AMP BOARD]
IC3001 CX069 SERVO AMP
D3001 HZ6B1L
Q3001, 3002 2SC634
IC3002 μPC4558 COMPARATOR
Q3003, 3005 2SD809
Q3004 2SB731
Q3006 2SB731
MOTOR DRIVE
POWER SUPPLY
SHAPER
SAWTOOTH WAVE PRODUC
COMPARATOR
SWOOTER/ DC AMP
CAPSTAN MOTOR
[EQ FUNCTION BOARD]
IC303 MSM4011
IC302 MSM4001
IC304 MSM4081
IC305 MSM4049
IC301 MSM4013
[PHONO SWITCH BOARD]
S307 SPEED (MANUAL)
S306 REPEAT
S305 IN
S304 OUT
S303 REC SYNC
S302 STOP
S301 START
TO REMOTE CONTROL LOGIC BOARD
D301 1S1555
D305 1S1555
D303, 304 1S1555
D302 1S1555
D306 1S1555
TO PHONO SYSTEM CONTROL BOARD
REC SYNC
AS5-25
TO REMOTE CONTROL LOGIC BOARD
TO PHONO SYSTEM CONTROL BOARD
[FUNCTION INDICATOR BOARD]
Q301-304
2SC1364
LAMP DRIVE
TO PHONO SERVO AMP BOARD
TO PHONO SYSTEM CONTROL BOARD
TO POWER BOARD

6. FM1 Receiving

——— : "1" (high voltage)
——— : "0" (low voltage)



HMK-9000 HMK-9000

L LOGIC BOARD)

IC1401 S2601 DECODER

IC1402 MSM4514 DECODER

IC1403 MSM4514 DECODER

DIAL SCALE UNIT

IC1404-1407 SN76043N ANALOG VOLTAGE SWITCHS

Q1402 2SA1015Y LED DRIVE

D1405-1410 1S1555

TO TUNER BOARD

TO POWER BOARD

TO TUNER BOARD

INITIALIZE

TO TAPE CASSETTE SYSTEM CONTROL BOARD

AMS SET

T.R

TO TAPE CASSETTE SYSTEM CONTROL BOARD

CT STOP

REC SYNC

TO EQ FUNCTION BOARD

TIMER PLAY

REC

TO TAPE CASSETTE SYSTEM CONTROL BOARD

TO POWER BOARD

TO TUNER BOARD

DIAL SCALE UNIT

【MANUAL SWITCH BOARD】

【FUNCTION INDICATOR BOARD (1/2)】

IC1404-1407
SN76043N
ANALOG VOLTAGE SWITCHES

Q1402
2SA1015Y
LED DRIVE

Q1403-1408
2SC1815Y
LAMP DRIVE

Q1410
2SC1815Y
INVERTER

TO TAPE CASSETTE SYSTEM CONTROL BOARD

TO TAPE CASSETTE SYSTEM CONTROL BOARD

TO PHONO SYSTEM CONTROL BOARD

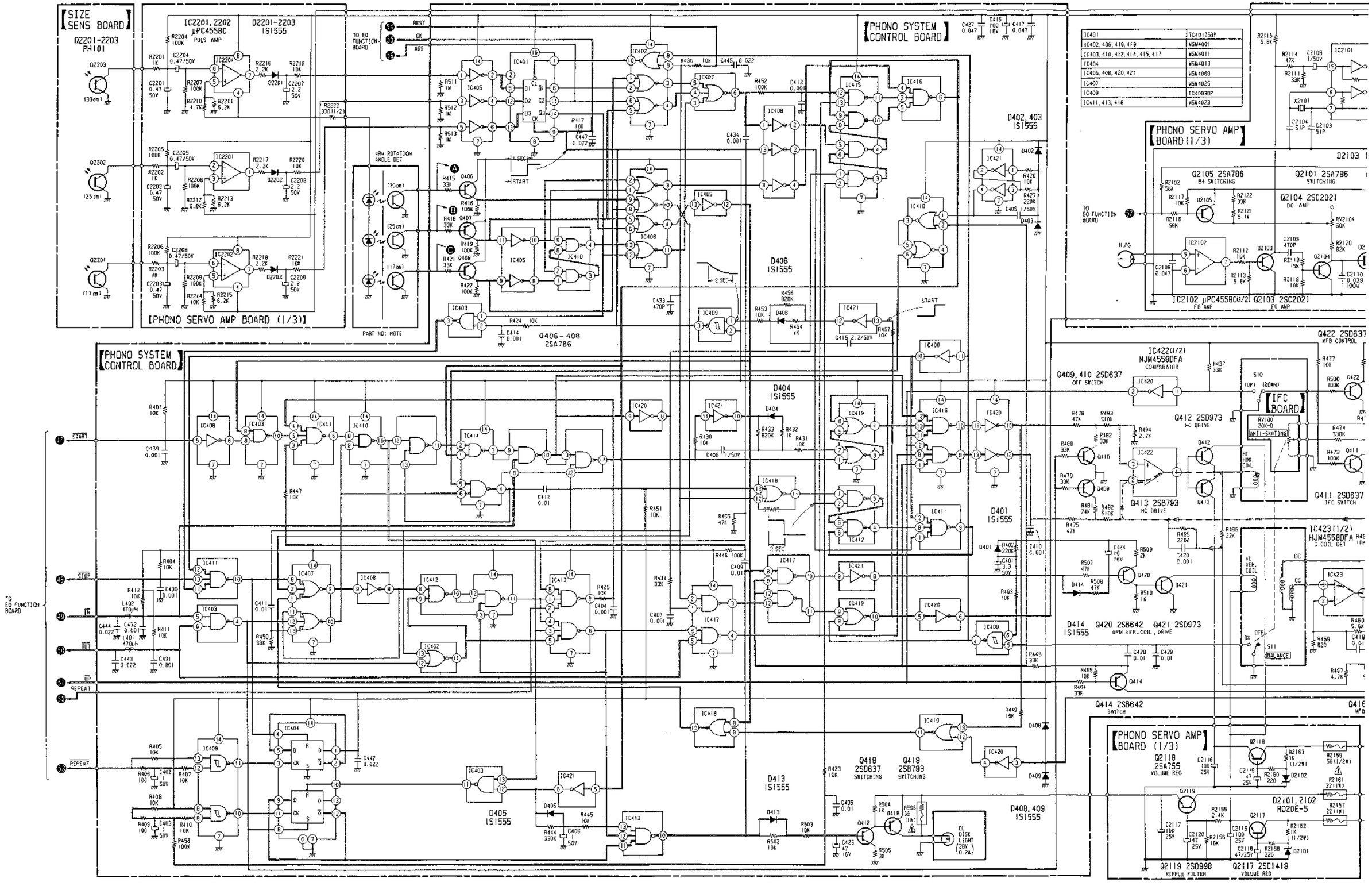
TO POWER BOARD

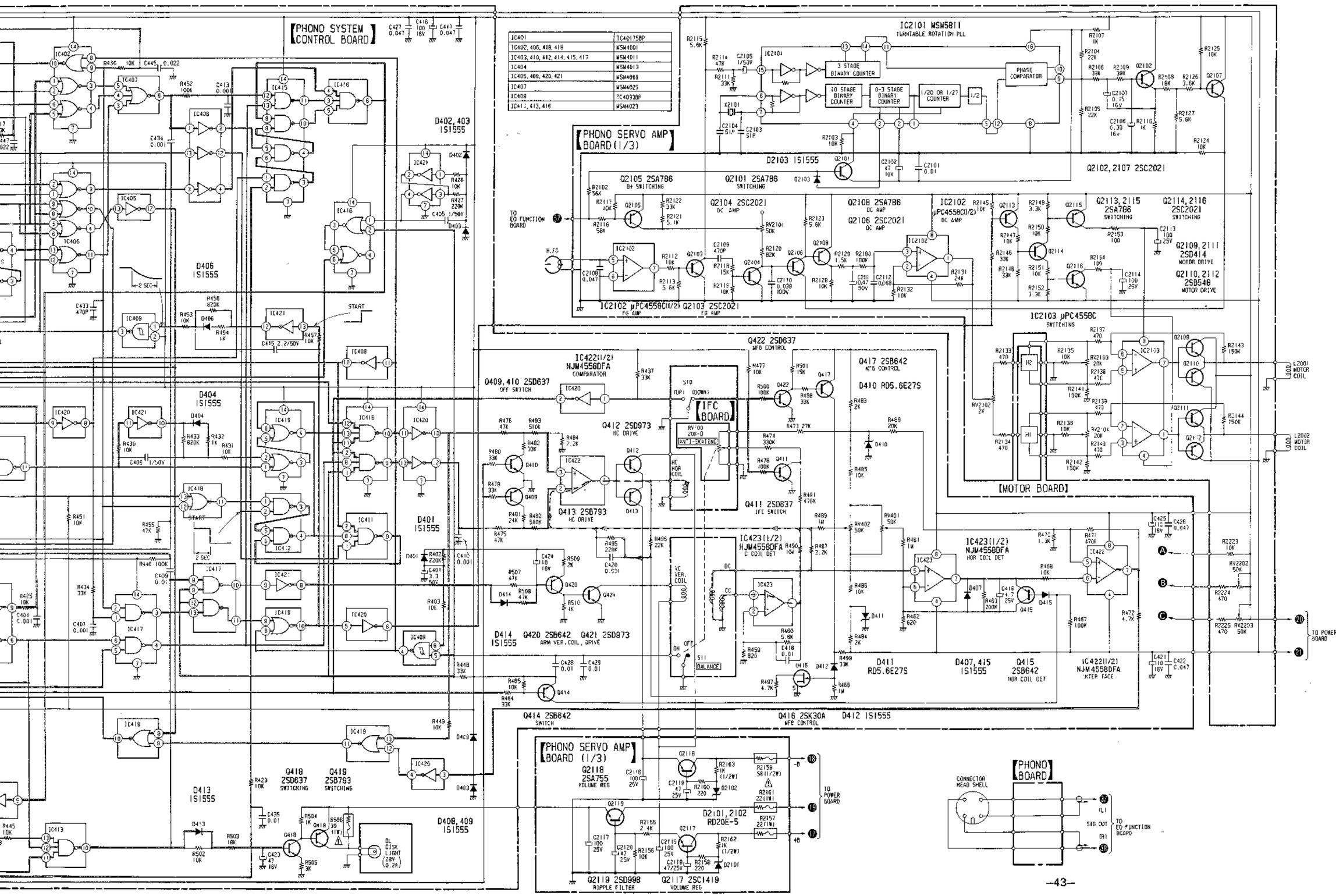
TO EQ FUNCTION BOARD

TO EQ FUNCTION BOARD

2. Phono Start 30cm

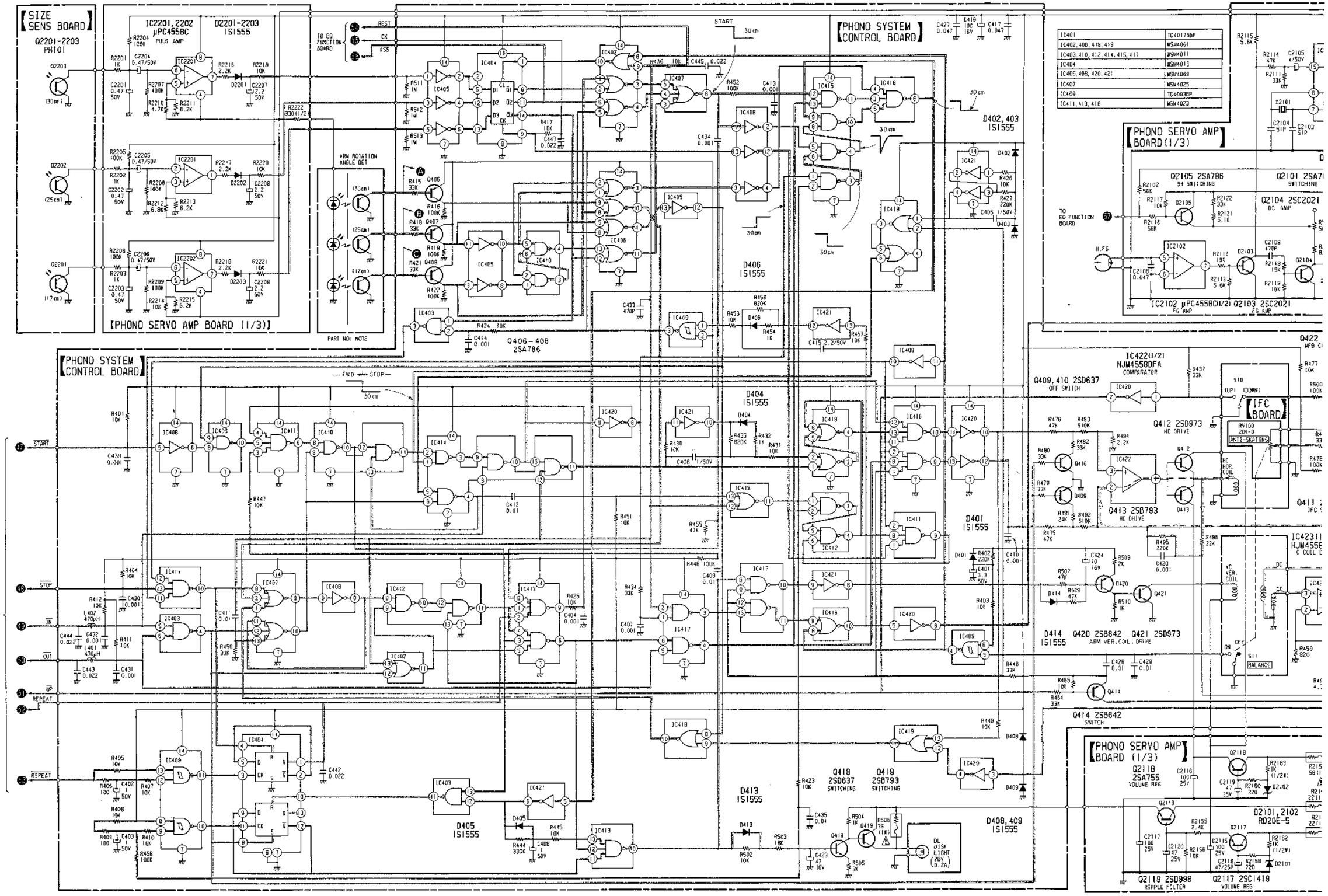
——— : "1" (high voltage)
——— : "0" (low voltage)

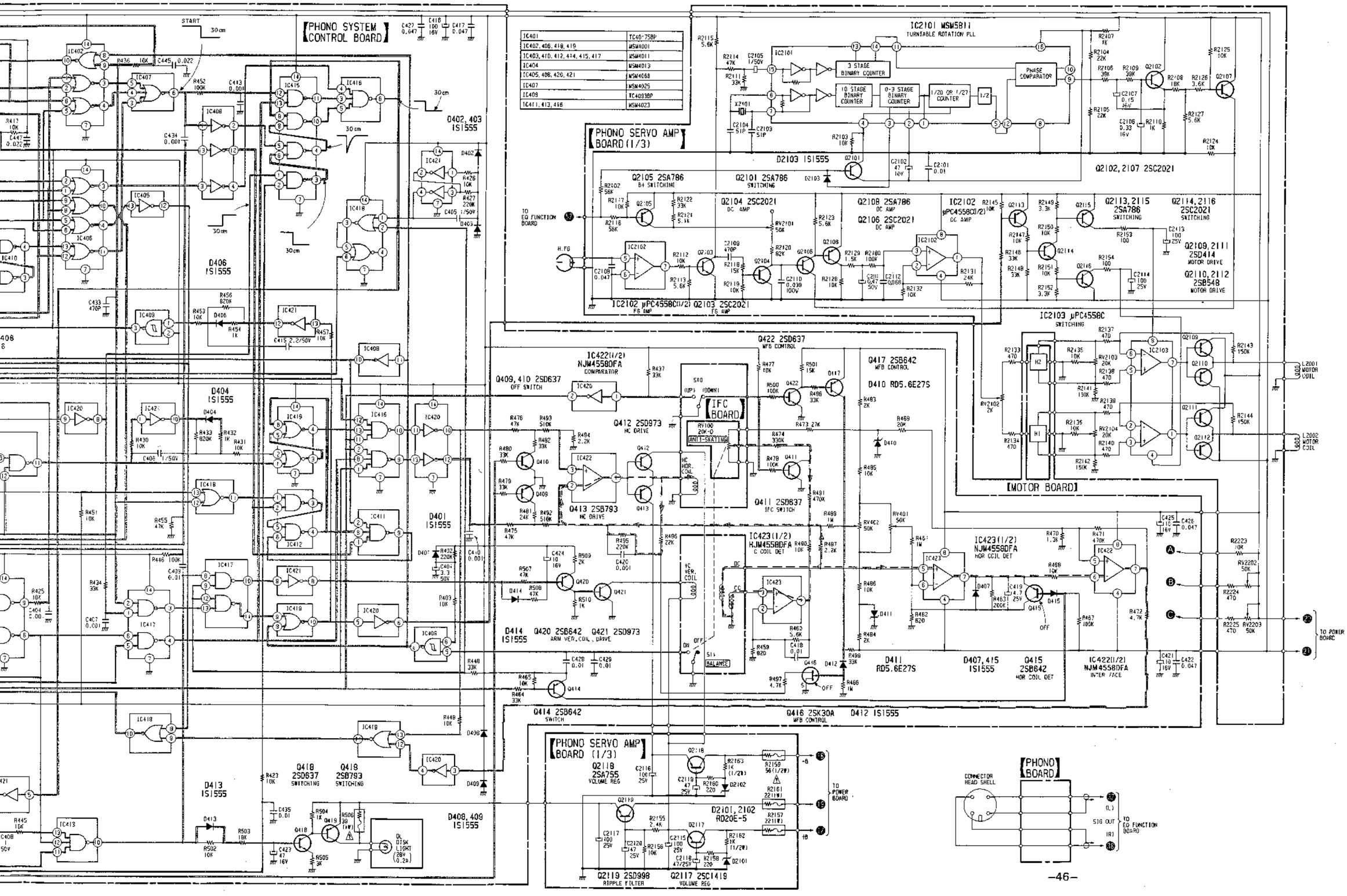



[PHONO SYSTEM CONTROL BOARD]
[PHONO SERVO AMP BOARD (1/3)]
[IFC BOARD]
[MOTOR BOARD]
[PHONO SERVO AMP BOARD (1/3)]
[PHONO BOARD]
IC2101 MSM5811 TURNTABLE ROTATION PLL
D2103 1S1555
Q2101 2SA786 SWITCHING
Q2102,2107 2SC2021
Q2105 2SA786 B+ SWITCHING
Q2104 2SC2021 DC AMP
Q2108 2SA786 DC AMP
Q2106 2SC2021 DC AMP
IC2102 μPC4558C(1/2) DC AMP
Q2113,2115 2SA786 SWITCHING
Q2114,2116 2SC2021 SWITCHING
Q2109,2111 2SD414 MOTOR DRIVE
Q2110,2112 2SB548 MOTOR DRIVE
IC2102 μPC4558C(1/2) Q2103 2SC2021 FG AMP
IC2103 μPC4558C SWITCHING
Q422 2SD637 MFB CONTROL
Q417 2SB642 MFB CONTROL
D410 RD5.6E27S
IC422(1/2) NJM4558DFA COMPARATOR
Q412 2SD973 HC DRIVE
Q413 2SB793 HC DRIVE
Q411 2SD637 IFC SWITCH
IC423(1/2) NJM4558DFA HOR COIL DET
IC423(1/2) HJM4558DFA C COIL DET
D414 1S1555 Q420 2SB642 Q421 2SD873 ARM VER. COIL DRIVE
D411 RD5.6E27S
D407,415 1S1555
Q415 2SB642 HOR COIL DET
IC422(1/2) NJM4558DFA INTER FACE
Q414 2SB842 SWITCH
Q416 2SK30A MFB CONTROL
D412 1S1555
Q418 2SD637 SWITCHING
Q419 2SB793 SWITCHING
D413 1S1555
D408,409 1S1555
D401 1S1555
D404 1S1555
D406 1S1555
D402,403 1S1555
Q2118 2SA755 VOLUME REG
Q2119 2SD998 RIPPLE FILTER
Q2117 2SC1419 VOLUME REG
D2101,2102 RD20E-5
CONNECTOR HEAD SHELL
TO POWER BOARD
TO EQ FUNCTION BOARD
TO EQ FUNCTION BOARD
MOTOR COIL
MOTOR COIL
DL DISK LIGHT (28V) (0.2A)
START
2 SEC
IC401 TC40175BP
IC402, 406, 418, 419 MSM4001
IC403, 410, 412, 414, 415, 417 MSM4011
IC404 MSM4013
IC405, 408, 420, 421 MSM4068
IC407 MSM4025
IC409 TC4093BP
IC411, 413, 416 MSM4023

3. Phono Down 30cm

——— : "1" (high voltage)
——— : "0" (low voltage)




【PHONO SYSTEM CONTROL BOARD】
【PHONO SERVO AMP BOARD (1/3)】
【IFC BOARD】
【MOTOR BOARD】
【PHONO SERVO AMP BOARD (1/3)】
【PHONO BOARD】
IC2101 MSM5811 TURNTABLE ROTATION PLL
IC2103 μPC4558C SWITCHING
IC2102 μPC4558C(1/2) Q2103 2SC2021
IC422(1/2) NJM4558DFA COMPARATOR
IC423(1/2) NJM4558DFA H&R COIL DET
IC423(1/2) NJM4558DFA C COIL DET
IC422(1/2) NJM4558DFA INTER FACE
Q2101 2SA786 SWITCHING
Q2102, 2107 2SC2021
Q2105 2SA786 B+ SWITCHING
Q2104 2SC2021 DC AMP
Q2108 2SA786 DC AMP
Q2106 2SC2021 DC AMP
Q2113, 2115 2SA786 SWITCHING
Q2114, 2116 2SC2021 SWITCHING
Q2109, 2111 2SD414 MOTOR DRIVE
Q2110, 2112 2SB548 MOTOR DRIVE
Q422 2SD637 WFB CONTROL
Q417 2SB642 WFB CONTROL
Q409, 410 2SD637 OFF SWITCH
Q412 2SD973 HC DRIVE
Q413 2SB793 HC DRIVE
Q411 2SD637 IFC SWITCH
Q414 2SB642 SWITCH
Q416 2SK30A WFB CONTROL
Q420 2SB642 Q421 2SD973 ARM VER. COIL DRIVE
Q418 2SD637 SWITCHING
Q419 2SB793 SWITCHING
Q2118 2SA755 VOLTAGE REG
Q2119 2SD998 RIPPLE FILTER
Q2117 2SC1419 VOLTAGE REG
D2103 1S1555
D2101, 2102 RD20E-5
D401 1S1555
D402, 403 1S1555
D404 1S1555
D406 1S1555
D407, 415 1S1555
D408, 409 1S1555
D410 RD5.6E27S
D411 RD5.6E27S
D412 1S1555
D413 1S1555
D414 1S1555
IC401 TC40-758P
IC402, 406, 418, 419 MSM4001
IC403, 410, 412, 414, 415, 417 MSM4011
IC404 MSM4013
IC405, 408, 420, 421 MSM4068
IC407 MSM4025
IC409 TC4093BP
IC411, 413, 416 MSM4023
3 STAGE BINARY COUNTER
10 STAGE BINARY COUNTER
0-3 STAGE BINARY COUNTER
1/20 OR 1/27 COUNTER
PHASE COMPARATOR
TO EQ FUNCTION BOARD
TO POWER BOARD
L2001 MOTOR COIL
L2002 MOTOR COIL
CONNECTOR HEAD SHELL
SIG OUT
H.FG
FG AMP
ANTI-SKATING
BALANCE
OFF
ON
30cm
START