ORDER NO. ARD81030031C8-24

Service Manual

Cassette Deck

RS-M270X

(Silver Face / Black Face)

dbx Equipped Direct Drive Cassette Deck with Peak Hold FL Meters, Solenoid Controls and Dolby Noise Reduction

DOLBY SYSTEM

This is the Service Manual for the following areas.
[D] ········· For all European areas except United Kingdom.
[B] ········· For United Kingdom.
[A] ········· For Australia.

RS-M85 MECHANISM SERIES

Specifications

Track system:	4-track 2-channel stereo recording and playback
Tape speed:	4.8 cm/s
Wow and flutter:	0.035% (WRMS), ±0.1% (DIN)
Frequency response:	Metal tape; 20 – 20,000 Hz 25 – 18,000 Hz (DIN) 30 – 17,000 Hz ±3 dB CrO_2 tape; 20 – 19,000 Hz 25 – 18,000 Hz (DIN) 30 – 16,000 Hz ±3 dB Normal tape; 20 – 17,000 Hz 25 – 16,000 Hz (DIN) 30 – 15,000 Hz ±3 dB
Dynamic range:	110 dB (at 1 kHz)
Max. input level:	10 dB or more improved with dbx* in (at 1 kHz)
Signal-to-noise ratio:	dbx in; 92 dB Dolby** NR in; 68 dB (above 5 kHz) Dolby NR out; 58 dB (signal level = max. recording level, CrO_2 type tape)
Fast forward and rewind time:	Approx. 85 seconds with C-60 cassette tape
Inputs:	MIC; sensitivity 0.25 mV, input impedance 100 kΩ applicable microphone impedance 400Ω – 10 kΩ LINE; sensitivity 60 mV, input impedance 47 kΩ
Outputs:	LINE; output level 400 mV, output impedance 2.5 kΩ or less, load impedance 22 kΩ over HEADPHONES; output level 125 mV, load impedance 8 Ω
Bias frequency:	85 kHz
Motor:	2-motor system 1-FG servo controlled direct-drive DC motor 1-DC motor for reel-table drive
Heads:	2-head system 1-SX (Sendust Extra) head for record/playback 1-sendust/ferrite double-gap head for erasure
Power requirement:	AC; 110/125/220/240 V, 50-60 Hz Preset power voltage 240 V for Australia and United Kingdom
Power consumption:	30 W
Dimensions:	43.0 cm (W) × 9.8 cm (H) × 35.0 cm (D)
Weight:	6.2 kg

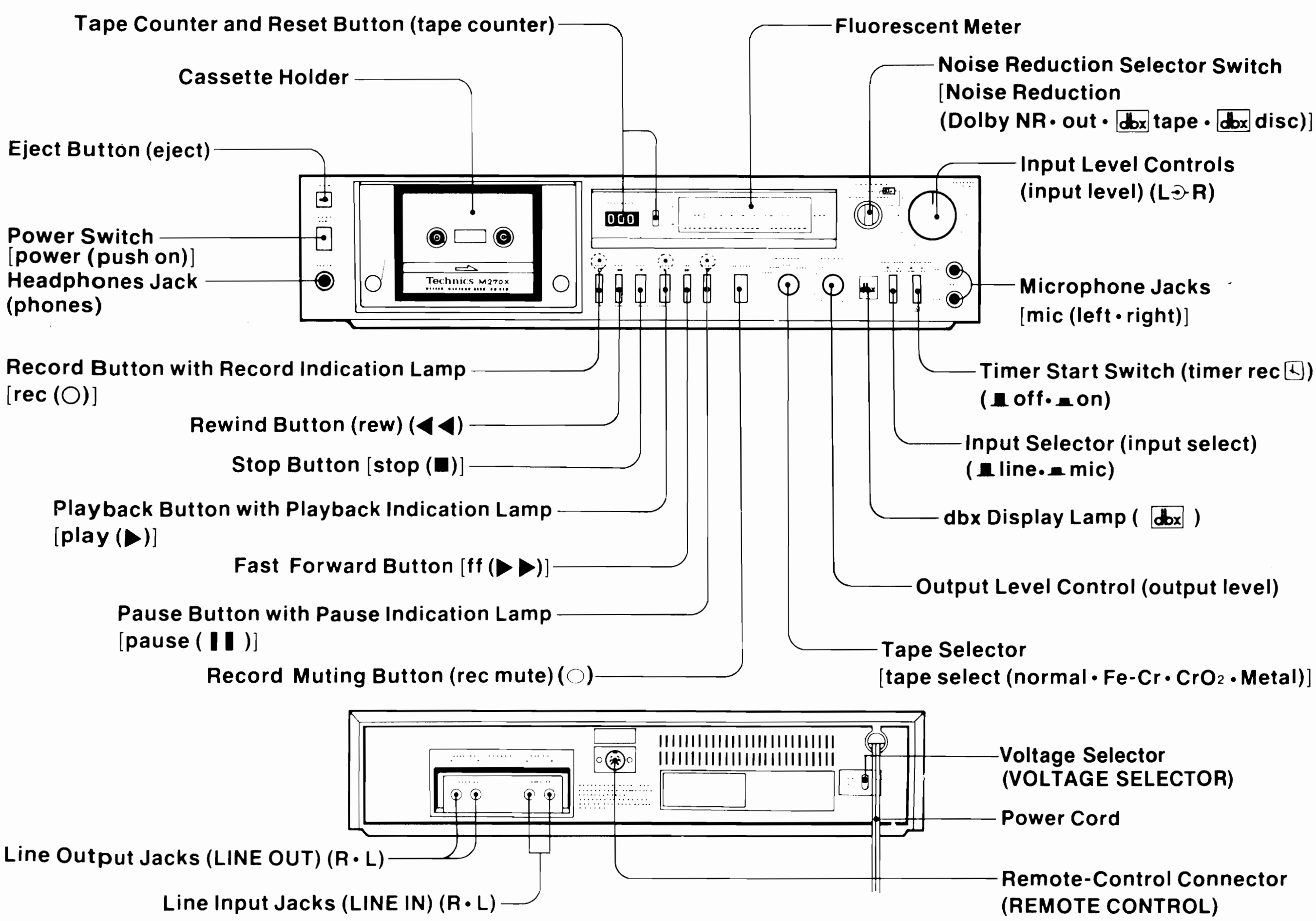
Specifications are subject to change without notice.
* The term dbx is a registered trademark of dbx Inc.
** 'Dolby' and the double-D symbol are trademarks of Dolby Laboratories.

Technics

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

CONTENTS

LOCATION OF CONTROLS AND COMPONENTS



DISASSEMBLY INSTRUCTIONS

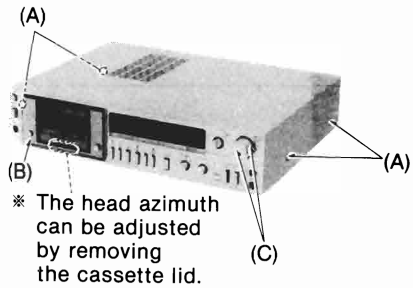


Fig. 1

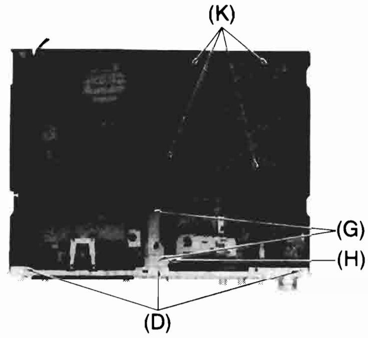


Fig. 2

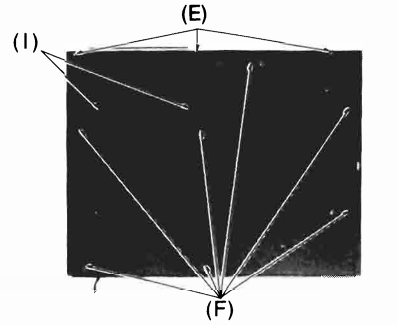


Fig. 3

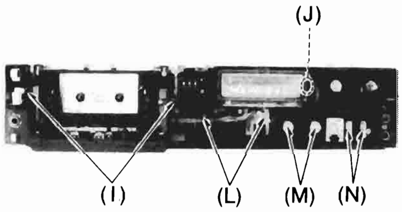


Fig. 4

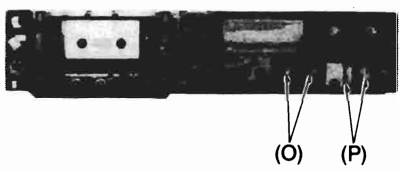


Fig. 5

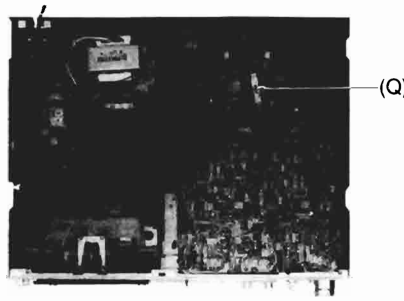


Fig. 6

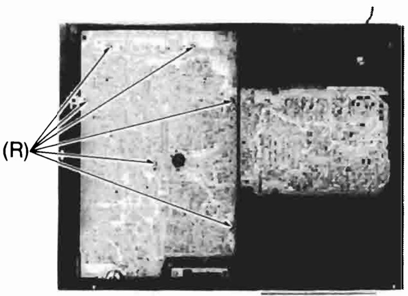


Fig. 7

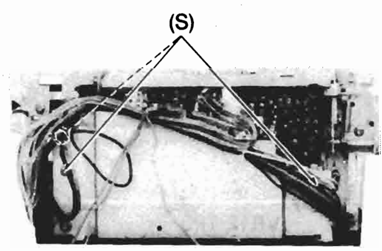


Fig. 8

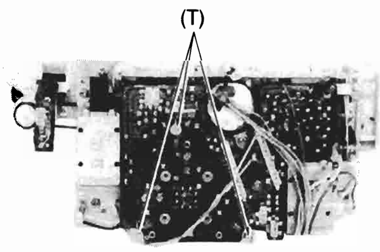
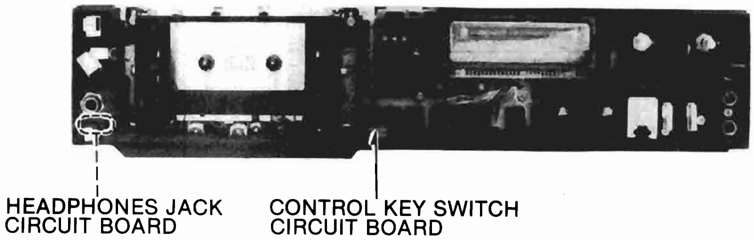


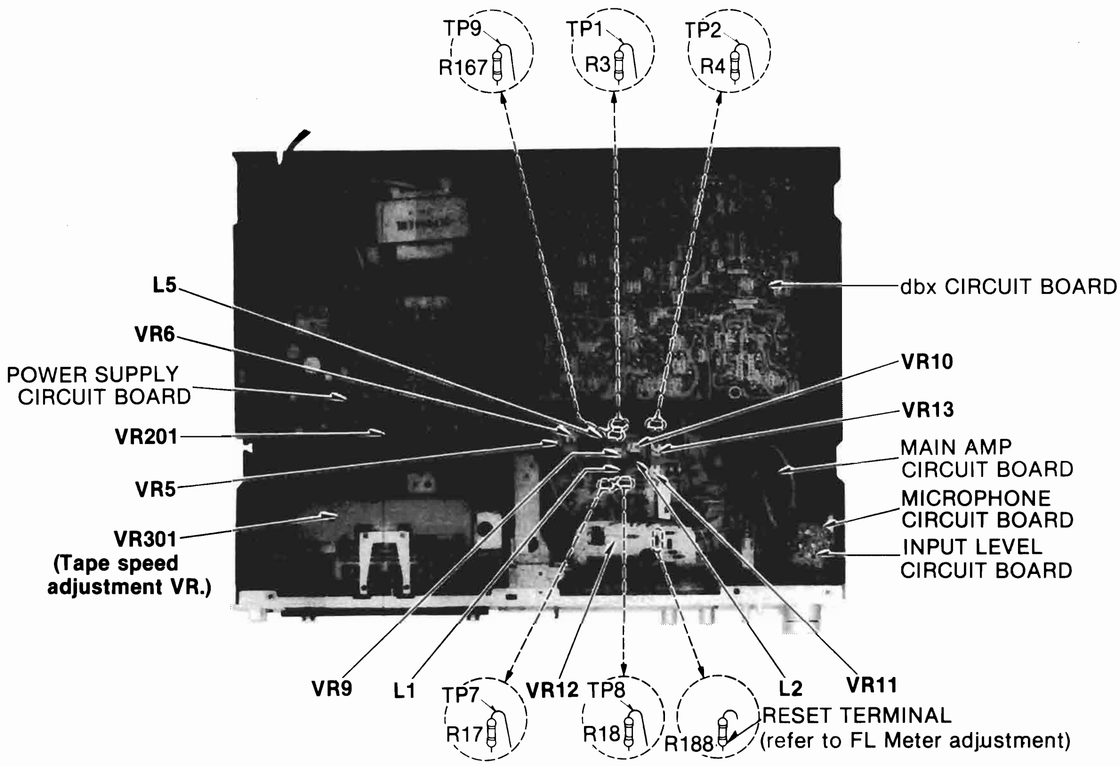
Fig. 9

Ref. No.	Procedure	To remove ——.	Remove ——.	Shown in fig. ——.
1	1	Case cover	• 4 screws ········· (A)	1
2	1→2	Front panel	• Cassette lid ········· (B) • 2 volume knobs ········· (C) • 3 red screws ········· (D) • 3 black screws ········· (E)	1 1 2 3
3	3	Bottom cover	• 7 red screws ········· (F)	3
4	1→2→4	Mechanism	• 2 red screws ········· (G) • 1 red screw ········· (H) • 4 red screws ········· (I)	2 2 3, 4
5	1→2→5	FL meter	• 1 meter holder ········· (J)	4
6	1→6	dbx circuit board	• 4 screws ········· (K)	2
7	1→2→5→7	Control key switch circuit board	• 2 screws ········· (L)	4
8	1→2→3→6→8	Main amp. circuit board	• 2 knobs ········· (M) • 2 push button ········· (N) • 2 nuts ········· (O) • 2 screws ········· (P) • Rotary selector ········· (Q) • 6 screws ········· (R)	4 4 5 5 6 7
9	1→2→4→9	Capstan motor circuit board	• 3 screws ········· (S) • 3 screws ········· (T)	8 9

MEASUREMENT AND ADJUSTMENT METHODS (WITH OUT dbx SYSTEM)

- **CIRCUIT BOARDS AND ADJUSTMENT PARTS LOCATION**





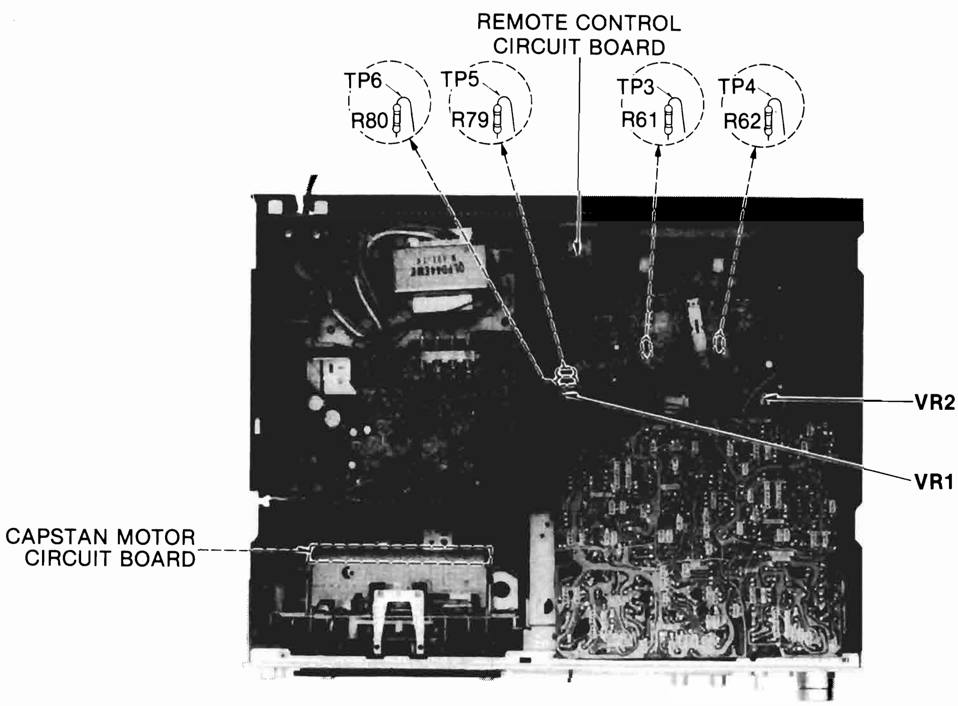
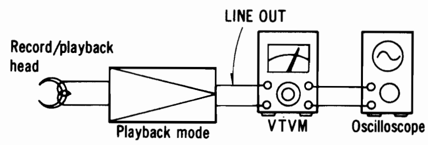
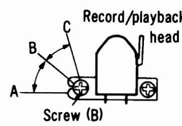
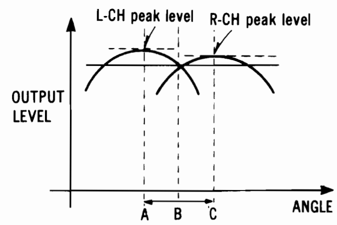
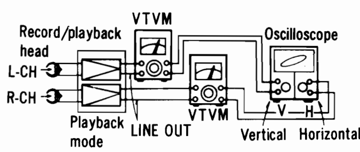
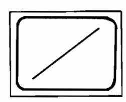
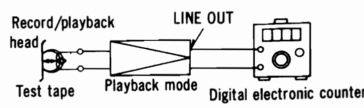


Fig. 1

• MEASUREMENT AND ADJUSTMENT METHODS

NOTES: Keep good condition, set switches and controls in the following positions, unless otherwise specified.

- Make sure heads are clean.
- Make sure capstan and pressure roller are clean.
- Judgeable room temperature: 20±5°C (68±9°F)
- NR switch: OUT
- Tape selector: Normal
- Input selector: Line in
- Input level controls: Maximum
- Output level control: Maximum

ITEM	MEASUREMENT & ADJUSTMENT
Ⓐ Takeup tension Condition: * Playback mode Equipment: * Cassette torque meter (QZZSRKCT)	1. Mount cassette torque meter on UNIT. 2. Place UNIT into playback mode and read takeup torque. 3. Measure several times and determine the mean value. **Standard value: 35±5 g-cm** 4. If measured value is not within standard, adjust VR201 (Shown in fig. 1).
Ⓑ Head azimuth adjustment Condition: * Playback mode Equipment: * VTVM * Oscilloscope * Test tape (azimuth) ··· QZZCFM	**L-CH/R-CH output balance adjustment** 1. Make connections as shown in fig. 2. 2. Playback the 8 kHz signal from the test tape (QZZCFM). Adjust screw (B) in fig. 3 for maximum output L-CH and R-CH levels. When the output levels of L-CH and R-CH are not at maximum at the same time, readjust as follows. 3. Turn the screw (B) shown in fig. 3 to find angles A and C (points where peak output levels for left and right channels are obtained). Then, locate the angle B between angles A and C, i.e., a point where L-CH and R-CH output levels come together at maximum (Refer to figs. 3 and 4).  Fig. 2  Fig. 3  Fig. 4 **L-CH/R-CH phase adjustment** 1. Make connections as shown in fig. 5. 2. Playback the 8 kHz signal from the test tape (QZZCFM). Adjust screw (B) shown in fig. 3 so that pointers of the two VTVMs swing to maximum and a waveform as illustrated in fig. 6 is obtained on the oscilloscope.  Fig. 5  Fig. 6
Ⓒ Tape speed Condition: * Playback mode Equipment: * Digital electronic counter * Test tape ··· QZZCWAT	**Tape speed accuracy** 1. Test equipment connection is shown in fig. 7. 2. Playback test tape (QZZCWAT 3,000 Hz), and supply playback signal to digital electronic counter. 3. Measure this frequency. 4. On the basis of 3,000 Hz, determine value by following formula: $\text{Tape speed accuracy} = \frac{f - 3,000}{3,000} \times 100\ (\%)$ where, f = measured value 5. Take measurement at middle section of tape. **Standard value: ±0.5%** 6. If measured value is not within standard, adjust VR301.  Fig. 7 **Tape speed fluctuation** Make measurements in same manner as above (beginning, middle and end of tape), and determine the difference between maximum and minimum values and calculate as follows: $\text{Tape speed fluctuation} = \frac{f_1 - f_2}{3,000} \times 100\ (\%)$ f_1 = maximum value, f_2 = minimum value **Standard value: Less than 0.3%**

ITEM	MEASUREMENT & ADJUSTMENT

D Playback frequency response

Condition:
* Playback mode
* Tape selector
  ··· Normal position

Equipment:
* VTVM * Oscilloscope
* Test tape ··· QZZCFM

1. Test equipment connection is shown in fig. 2.
2. Place UNIT into playback mode.
3. Playback the frequency response test tape (QZZCFM).
4. Measure output level at 12.5kHz, 8kHz, 4kHz, 1kHz, 250Hz, 125Hz and 63Hz, and compare each output level with the standard frequency 315Hz, at LINE OUT.
5. Make measurement for both channels.
6. Make sure that the measured value is within the range specified in the frequency response chart.

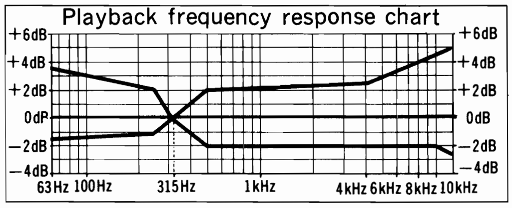


Fig. 8

Adjustment method

If the measured value decreases at high frequency range, as shown in fig. 9, P.C.B. connection points (A) (L-CH) and (A') (R-CH) should be shorted (See fig. 11).

Compensation

4kHz	6kHz	8kHz	10kHz	12.5kHz
around +0.1dB	around +0.2dB	around +0.5dB	around +1.0dB	around +1.5dB

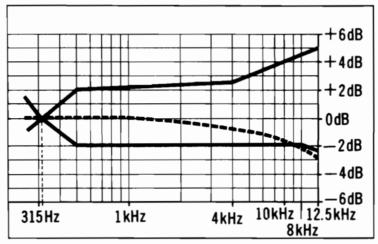


Fig. 9

If the measured value increases at middle frequency range, as shown in fig. 10, P.C.B. connection points (B) (L-CH) and (B') (R-CH) should be shorted (See fig. 11).

Compensation

700Hz	1kHz	2kHz	4kHz	10kHz
around −0.1dB	around −0.2dB	around −0.5dB	around −0.6dB	around −0.8dB

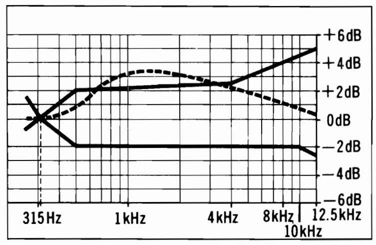


Fig. 10

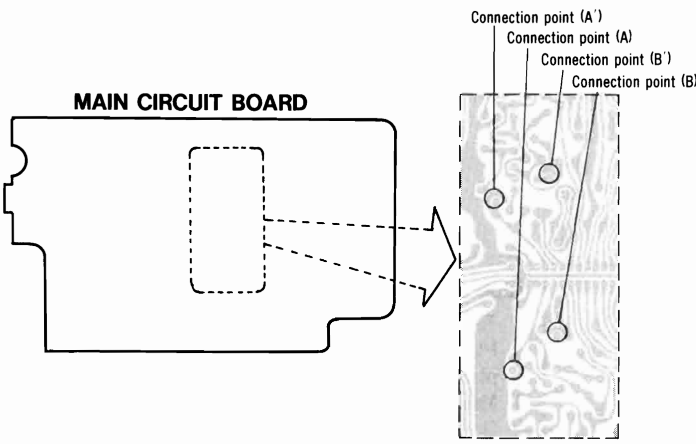


Fig. 11

E Playback gain

Condition:
* Playback mode
* Tape selector
  ··· Normal position

Equipment:
* VTVM * Oscilloscope
* Test tape ··· QZZCFM

1. Test equipment connection is shown in fig. 2.
2. Playback standard recording level portion on test tape (QZZCFM 315Hz), and using VTVM measure the output level at LINE OUT.
3. Make measurement for both channels.

Standard value: 0.4V ± 1dB 〔around 0.42V: at test points TP3 (L-CH) and TP4 (R-CH)〕

Adjustment

1. If measured value is not within standard, adjust VR1 (L-CH), VR2 (R-CH) (See fig. 1 on page 3).
2. After adjustment, check "Playback frequency response" again.

ITEM	MEASUREMENT & ADJUSTMENT

F Bias leakage

Condition:
* Record mode
* Input level controls ··· MAX
* Tape selector
  ··· Metal position

Equipment:
* VTVM * Oscilloscope

1. Test equipment connection is shown in fig. 12.
2. Press the record and playback buttons.
3. Adjust trap coils L1 (L-CH), L2 (R-CH), so that measured value becomes minimum.
4. Make adjustment for both channels.

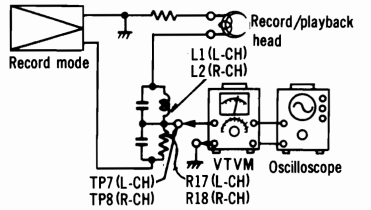


Fig. 12

G Erase current

Condition:
* Record mode
* Tape selector
  ··· Metal position

Equipment:
* VTVM * Oscilloscope

1. Test equipment connection is shown in fig. 13.
2. Press the record and playback button, then measure voltage at test point 9.
3. Determine erase current with the following formula:

$$\text{Erase current (A)} = \frac{\text{Voltage across both ends of R167}}{1\ (\Omega)}$$

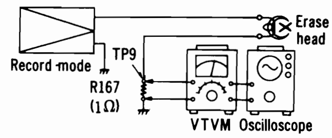


Fig. 13

Standard value: 95±5 mA (Tape selector ··· Metal)

4. If measured value is not within standard, adjust VR11.

H Overall frequency response

Condition:
* Record/playback mode
* Tape selector
  ··· Normal position
  ··· CrO_2 position
  ··· Fe-Cr position
  ··· Metal position
* Input level controls ··· MAX

Equipment:
* VTVM * AF oscillator
* ATT * Oscilloscope
* Resistor (600 Ω)
* Test tape
  (reference blank tape)
  ··· QZZCRA for Normal
  ··· QZZCRX for CrO_2
  ··· QZZCRY for Fe-Cr
  ··· QZZCRZ for Metal

Note 1:
Before measuring and adjusting, make sure of the playback frequency response (For the method of measurement, please refer to the playback frequency response).

Note 2:
Test tape QZZCRA to be supplied after July 1980 has higher recording sensitivity in the middle and high frequency range.

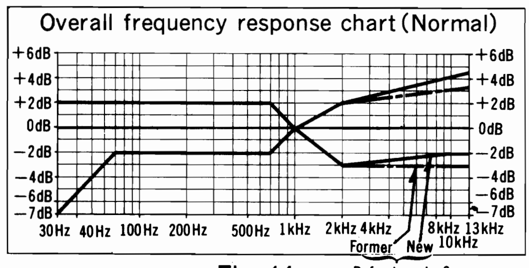
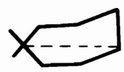


Fig. 14

Refer to note 2

*  This chart indicates the standard values for the new type of QZZCRA when in use.
*  This chart indicates the standard values for the former type of QZZCRA when in use.

The new type of QZZCRA is marked as shown in fig. 15.

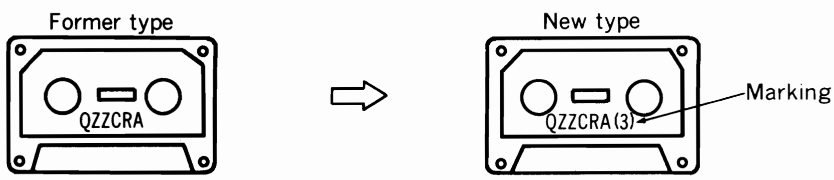


Fig. 15

Overall frequency response adjustment by recording bias current

Note 1:
On RS-M270, overall frequency response is adjusted with tape selector set at Normal.

Note 2:
Recording equalizer is fixed.

1. Make connections as shown in fig. 16.
2. Input a 1 kHz, −24 dB signal through LINE IN.
   Place the set in record mode.
3. Fine adjust the attenuator to obtain 0.4 V LINE OUT output.
   * Make sure that the input signal level is −24±4 dB with 0.4 V output voltage.

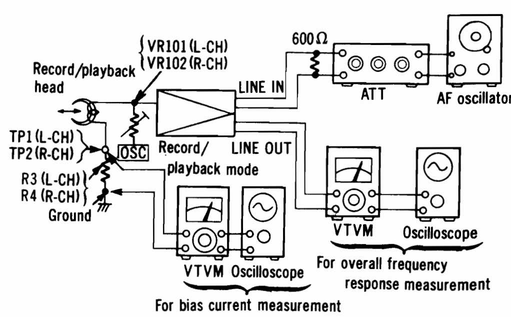


Fig. 16

ITEM	MEASUREMENT & ADJUSTMENT
	(see below)

4. Set the tape selector to Normal, and load the test tape (QZZCRA).
5. Adjust the attenuator to reduce the input signal level by 20 dB.
6. Adjust the AF oscillator to generate 30 Hz, 40 Hz, 100 Hz, 200 Hz, 500 Hz, 1 kHz, 4 kHz, 8 kHz, 10 kHz and 13 kHz signals, and record these signals on the test tape.
7. Playback the signals recorded in step 6, and check if the frequency response curve is within the limits shown in the overall frequency response chart for Normal tapes (fig. 14).
   (If the curve is within the charted specifications, proceed to steps 8, 9 and 10.)
   If the curve is not within the charted specifications, adjust as follows;

Adjustment Ⓐ:
When the curve exceeds the overall frequency response chart specifications (fig. 14) as shown in fig. 17.

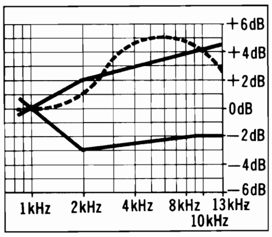


Fig. 17

1) Increase bias current by turning VR9 (L-CH) and VR10 (R-CH).
   (See fig. 1 on page 3.)
2) Repeat steps 6 and 7 to confirm.
   (Proceed to steps 8, 9 and 10 if the curve is now within the charted specifications in fig. 14.)
3) If the curve still exceeds the specifications (fig. 14), increase bias current further and repeat steps 6 and 7.

Adjustment Ⓑ:
When the curve falls below the overall frequency response chart specifications (fig. 14) as shown in fig. 18.

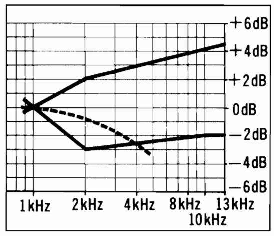


Fig. 18

1) Reduce bias current by turning VR9 (L-CH) and VR10 (R-CH).
2) Repeat steps 6 and 7 to confirm.
   (Proceed to steps 8, 9 and 10 if the curve is now within the charted specifications in fig. 14.)
3) If the curve still falls below the charted specifications (fig. 14), reduce bias current further and repeat steps 6 and 7.

8. Switch the tape selector to CrO_2, change test tape to QZZCRX, and record 30 Hz, 40 Hz, 100 Hz, 200 Hz, 500 Hz, 1 kHz, 4 kHz, 8 kHz, 10 kHz and 14 kHz signals. Then, playback the signals and check if the curve is within the limits shown in the overall frequency response chart for CrO_2 tapes (fig. 19).

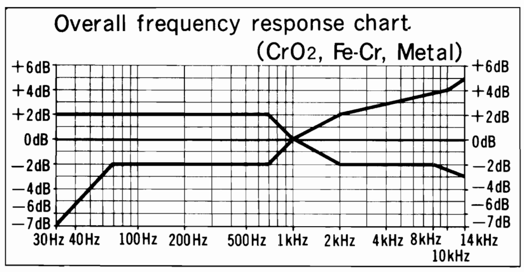
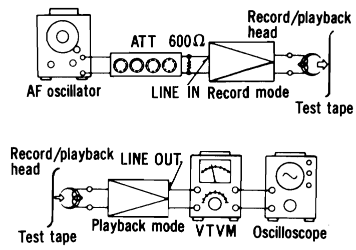
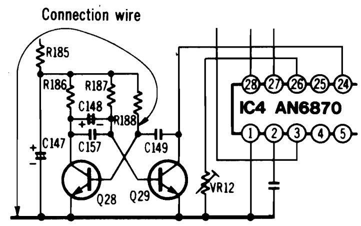
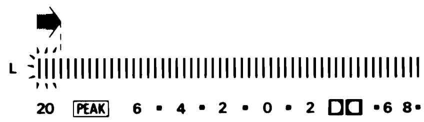
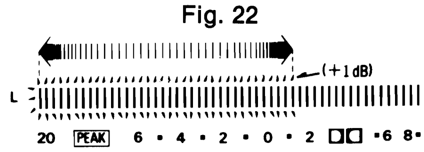
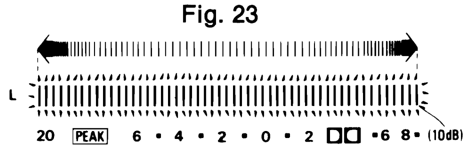
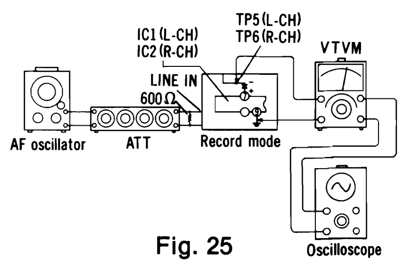


Fig. 19

9. Switch the tape selector to Fe-Cr, change test tape to QZZCRY, and record 30 Hz, 40 Hz, 100 Hz, 200 Hz, 500 Hz, 1 kHz, 4 kHz, 8 kHz, 10 kHz and 14 kHz signals. Then, playback the signals and check if the curve is within the limits shown in the overall frequency response chart for Fe-Cr tapes (fig. 19).
10. Switch the tape selector to Metal, change test tape to QZZCRZ, and record 30 Hz, 40 Hz, 100 Hz, 200 Hz, 500 Hz, 1 kHz, 4 kHz, 8 kHz, 10 kHz and 14 kHz signals. Then, playback the signals and check if the curve is within the limits shown in the overall frequency response chart for Metal tapes (fig. 19).
11. Confirm that bias currents are approximately as follows when the tape selector is set at different positions.
   * Read voltage on VTVM and calculate bias current by following formula:

$$\text{Bias current (A)} = \frac{\text{Value read on VTVM (V)}}{10\ (\Omega)}$$

around 355μA (Normal position) around 360μA (Fe-Cr position) around 440μA (CrO_2 position) around 700μA (Metal position)	: measured at TP1 (L-CH) and TP2 (R-CH)

ITEM	MEASUREMENT & ADJUSTMENT
Ⓘ Overall gain Condition: * Record/playback mode * Input level controls ··· MAX * Standard input level; MIC········ −72±4 dB LINE IN ··· −24±4 dB Equipment: * VTVM * AF oscillator * ATT * Oscilloscope * Resistor (600 Ω) * Test tape (reference blank tape) ··· QZZCRA for Normal	1. Test equipment connection is shown in fig. 20. 2. Place UNIT into record mode, and tape selector to Normal position. 3. Supply 1 kHz signal (−24 dB) from AF oscillator, through ATT to LINE IN. 4. Adjust ATT until monitor level at LINE OUT becomes 0.4 V. 5. Using test tape, make recording. 6. Playback recorded tape, and make sure the value at LINE OUT on VTVM becomes 0.4 V. 7. If measured value is not 0.4 V, adjust VR5 (L-CH), VR6 (R-CH) (See fig. 1). 8. Repeat from step 2.  Fig. 20
Ⓙ Fluorescent meter Condition: * Record mode * Input level controls ··· MAX * Output level control ··· MAX * Tape selector ··· Normal position Equipment: * VTVM * AF oscillator * ATT * Oscilloscope * Resistor (600 Ω)	1. Test equipment connection is shown in fig. 20. 2. As shown in fig. 21, connecting the base of Q28 and ground stops the oscillation of the astable multivibrator comprising Q28 and Q29. 3. Supply 1 kHz signal (−24 dB) to the LINE IN jack, then press the record button. 4. Adjust the ATT so that the output level at LINE OUT jack becomes 0.4 V (The input level at this condition is termed the standard input level). 5. Adjustment at "−20 dB": A. Adjust the ATT so that input level is −20 dB below standard recording level. B. Adjust VR13 so that the −20 dB segment lights up in the −20±0.8 dB range (L-CH ONLY) (See fig. 22). 6. Adjustment at "0 dB": A. Adjust the ATT so that the output level at LINE OUT jack becomes 0.4 V. (The input level at this condition is termed the standard input level.) B. Adjust VR12 so that the +1 dB segment lights up in the 0±0.2 dB range of the standard input level (See fig. 23). 7. Repeat twice between steps 5 and 6 above. 8. Adjust ATT and check that all segments light up when an input signal level is increased to 10 dB higher than the standard input level (See fig. 24).  Fig. 21  Fig. 22  Fig. 23  Fig. 24
Ⓚ Dolby NR circuit Condition: * Record mode * NR switch ··· Dolby IN/OUT * Input level controls ··· MAX Equipment: * VTVM * AF oscillator * ATT * Oscilloscope * Resistor (600 Ω)	1. Test equipment connection is shown in fig. 25. 2. Place UNIT into record mode, set the NR switch to OUT position and supply to LINE IN to obtain −35 dB (17.5 mV) at TP5 (L-CH), TP6 (R-CH) (frequency 5 kHz). 3. Confirm that the value at Dolby IN position is 8.2±2 dB greater than the value at Dolby OUT position of NR switch.  Fig. 25

OUTLINE OF dbx SYSTEM

In 1971, the dbx company of Massachusetts, U.S.A., succeeded in developing a logarithmic compression/expansion system for audio signals which extends across an extremely wide amplitude range and results in a very low distortion rate.
In this system, the dynamic range of the input signal is compressed to 1/2 its original level (measured in decibels), and then recorded. The recorded signal is then expanded (2x) prior to playback, in order to restore it to the original level. By this process, a dynamic range exceeding 100dB can be easily obtained by using an ordinary tape recorder.
This system is referred to as a decilinear noise reduction system, but is generally called the "dbx system", the name being derived from the dbx company.

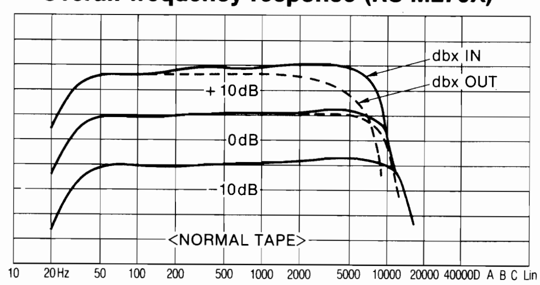
• The features of the dbx system

1. A significant noise reduction (approximately 30dB or more) is obtained over the entire audible frequency range.

Noise reduction mode	S/N ratio RS-M270X	Remarks
Noise reduction "OUT"	58dB	CrO_2 tape, peak level
Dolby NR "IN"	66dB	CrO_2 tape, peak level
dbx "IN"	92dB	CrO_2 tape, peak level

2. A great improvement in the dynamic range makes it possible to extend the range to 110dB (at 1kHz, CrO_2 tape).
3. The direct logarthmic method of compression and expansion protects against problems caused by level mismatching.
4. Even if phase distortion occurs in the signal transmission system, precise operation is maintained by means of the RMS level detector.
5. A low distortion rate is maintained throughout the frequency range.
   - Improvement of high frequency response. The dbx system solves the problem of deteriorated high frequency at higher input levels which is an inherent fault of cassette tape equipment. The response at approx. 8,000Hz at 10dB input is improved as much as 14dB. As a result, flatter response is obtained at both low and high input levels.

Overall frequency response (RS-M270X)

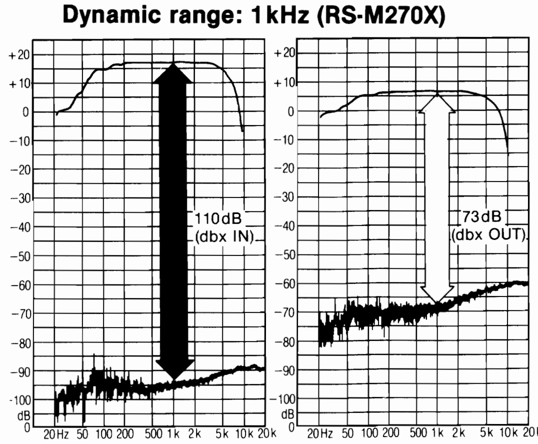


• Remarkable dynamic range of 110dB

About dynamic range:

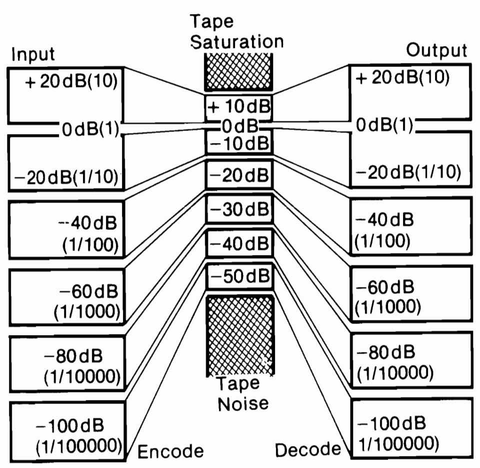
The dynamic range refers to the output range of an audio transmission system, extending from the lowest recognizable level to the highest possible level produced. Dynamic range is one of the values used to express the degree of fidelity of an audio transmission system.

Dynamic range: 1kHz (RS-M270X)

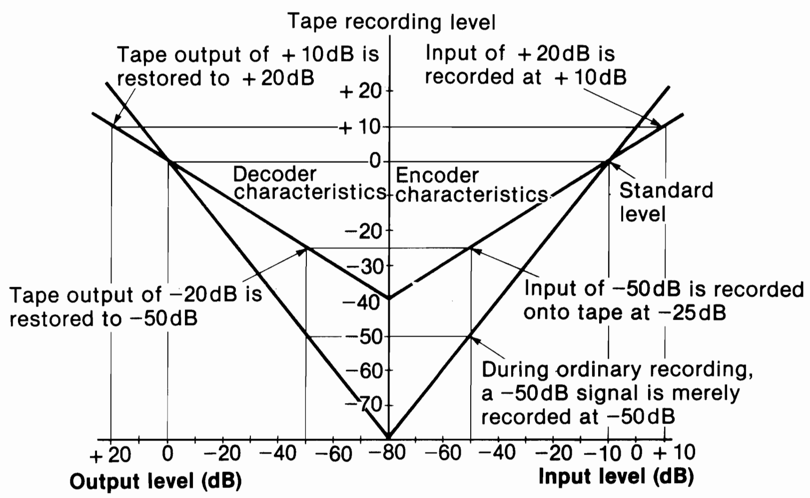


- **Compressing the dynamic range to 1/2 before recording, and then expanding it (by 2x) before playback produces the remarkable dynamic range of the dbx system.**
  - The dynamic range of cassette tape with a saturation level of +10dB and a noise level of −45dB (such as Technics CrO_2 position tape) is 55dB. Any sounds with a level greater than +10dB will result in considerable distortion, and any sounds less than −45dB will be inaudible due to the effect of noise, making high-fidelity reproduction impossible.
  The dbx system, however, linearly compresses the input level by a ratio of 1/2 in decibels prior to recording it onto the tape. A +20dB sound is thus compressed to +10dB, a −20dB sound is compressed to −10dB, and a −90dB sound is compressed to −45dB.
  As a result, a signal with a dynamic range extending from −90dB to +20dB (a 110dB dynamic range) can be contained within a range which extends from −45dB to +10dB (a 55dB dynamic range). Recording onto a cassette tape with a 55dB dynamic range is then possible.
  Prior to playback, the exact opposite process occurs and the sound levels are expanded. The +10dB sound is restored to its original level of +20dB, the −10dB sound is restored to −20dB, and the −45dB sound is restored to −90dB.
  Therefore, the basic principle of the dbx system, as described above, is to compress the 110dB dynamic range by 1/2 to 55dB prior to recording, and then the expand it (by 2x) prior to playback.

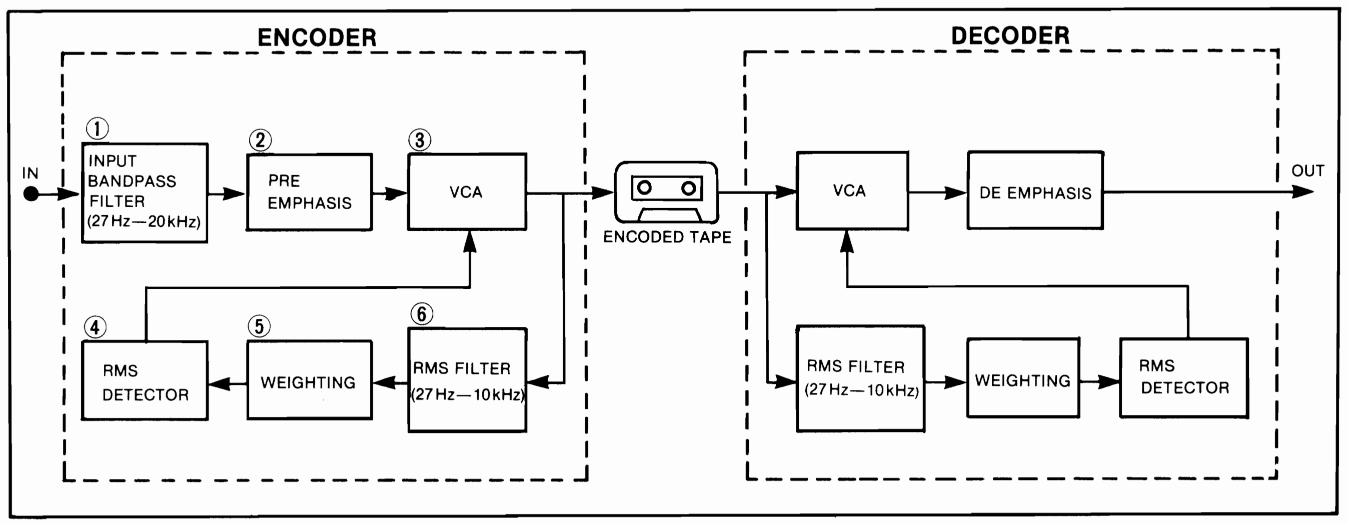
dbx system function diagram



Level compression/expansion diagram



THE BLOCK DIAGRAM OF dbx SYSTEM



(Block configuration change for dbx circuit Encode/Decode is electrically performed by switching transistors between blocks.)

ENCODER

- The portion of the dbx system with compresses the volume level of the input signal by 1/2 (measured in decibels), before seding it to the recording system, is called the encoder.

① INPUT BANDPASS FILTER (27Hz—20kHz)

To prevent pulse noise or other types of interference from causing erroneous operation of the dbx system, all signals outside the 27Hz—20kHz audio band range are eliminated here.

② PRE-EMPHASIS

The high frequency range, where hiss noise is prominent, is emphasized here during recording. The end result is that, although the dbx system is effective in reducing noise across entire frequency band, noise in the high frequency range is reduced still more by this pre-emphasis circuitry.

③ VCA (voltage-controlled amplifier/attenuator)

This is an extremely important circuitry in the construction of the dbx system. In response to the incoming DC control voltage, the VCA varies the degree of amplification logarithmically in the same manner as the direct current, resulting in compression and expansion of the input signal's dynamic range.

④ RMS DETECTOR (RMS: root mean square)

This is an important element in the composition of the dbx system, because its circuitry generates a DC voltage (the voltage that controls the degree of amplification in the VCA) in proportion to the size of the input signal.
It does this by detecting the root mean square value of the input signal, and then converting it to a DC voltage in proportion to the logarithm of the detected level.
Erroneous operation due to phase shift is prevented by monitoring of the voltage level derived from the root mean square value.

⑤ WEIGHTING

To prevent the saturation level of the tape deck in high frequencies, this increases the RMS DETECTOR high frequency sensitivity and decreases the VCA high frequency gain. As a result, the linearity of the tape deck is enhanced in the high frequency range.

⑥ RMS FILTER (27Hz to 10kHz)

This filter cuts any signal other than 27Hz to 10Hz that mixes in input signals to prevent the RMS DETECTOR from malfunctioning. Those to be cut include an FM tuner STEREO PILOT signal, tape deck bias leakage and record player motor rotational noise. In addition, the signal in the frequency range (27Hz to 10kHz) passing through the BAND PASS FILTER is comparatively small in level variations when handled by the tape deck.
This ensures correct complementarity in the operation of the RMS DETECTOR and VCA during Encoding and Decoding.

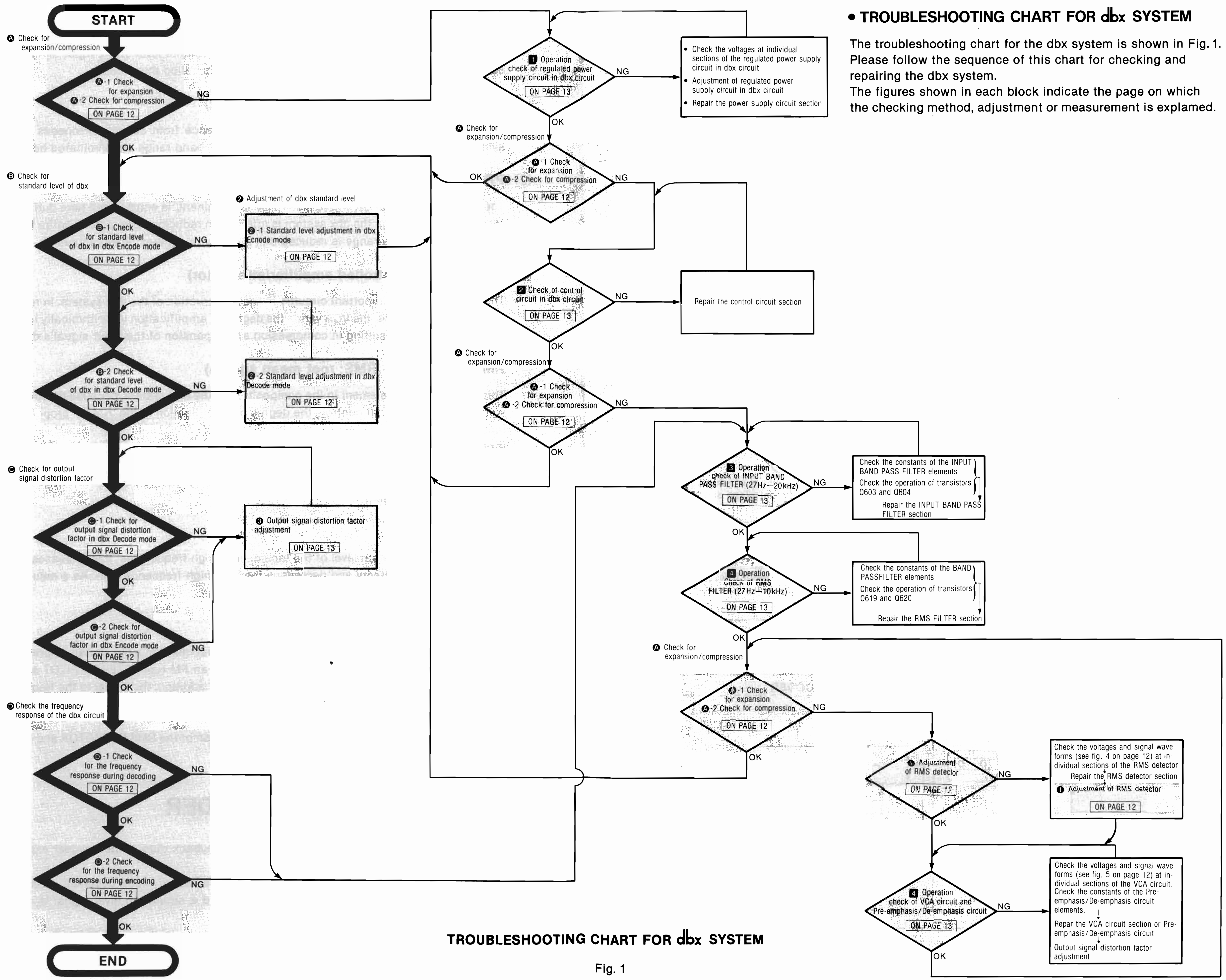
DECODER

As shown in the diagram on the previous page, for playback output, the decoder expands the constantly changing level to double the decibel range.
For example, 2 −30dB signal is expanded to −60dB, and a level of −45dB becomes −90dB. On the other hand, a playback output +10dB is expanded to +20dB, and a saturation level signal is also correspondingly increased.
In terms of the system's operation, the decoder's function is the exact opposite of the function of the previously mentioned encoder.

MEASUREMENT AND ADJUSTMENT METHODS (FOR dbx SYSTEM)

• TROUBLESHOOTING CHART FOR dbx SYSTEM

The troubleshooting chart for the dbx system is shown in Fig. 1. Please follow the sequence of this chart for checking and repairing the dbx system.
The figures shown in each block indicate the page on which the checking method, adjustment or measurement is explamed.



TROUBLESHOOTING CHART FOR dbx SYSTEM

Fig. 1

• ADJUSTMENT PARTS LOCATION OF dbx SYSTEM

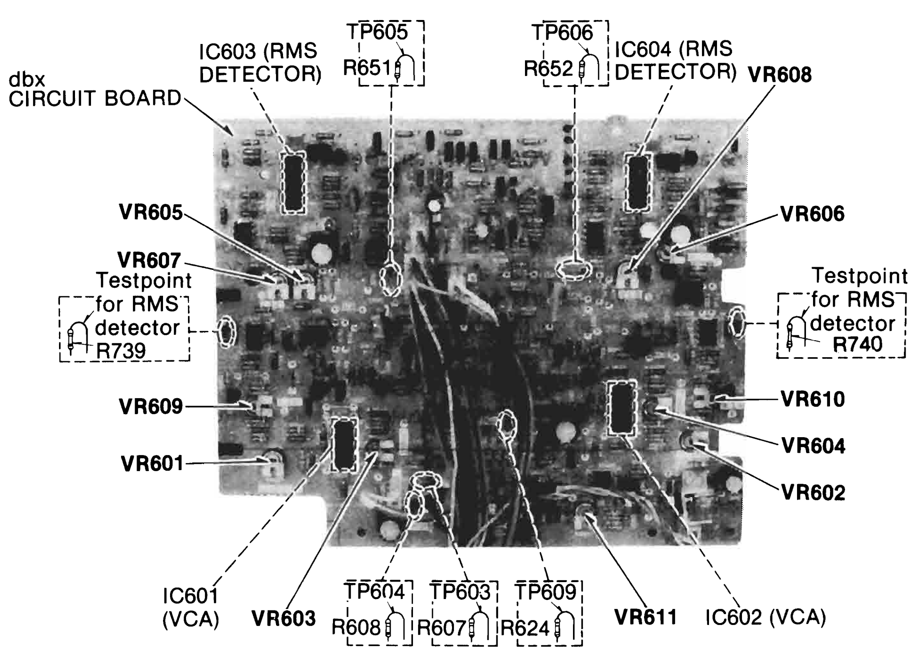


Fig. 2

• SIGNAL WAVE FORMS AT INDIVIDUAL SECTIONS OF THE RMS DETECTOR CIRCUIT & VCA CIRCUIT (FOR OPERATION CHECK OF dbx SYSTEM)

Figures 4 and 5 show the signal waveforms at pins of the major ICs when an input signal (1kHz, 300mV) shown in Fig. 3 is applied to the input terminals TP603 (L-CH) and TP604 (R-CH) of the dbx system.

Input signal wave form at TP603 (L-CH), TP604 (R-CH)

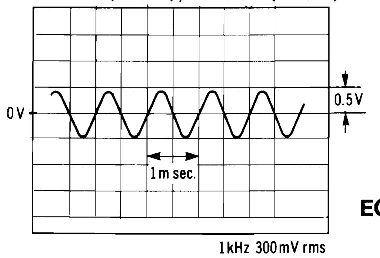


Fig. 3

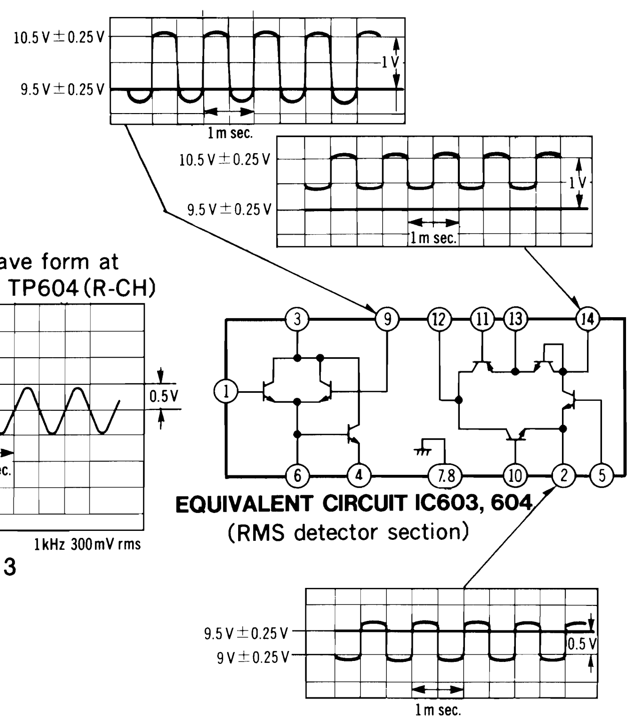


Fig. 4

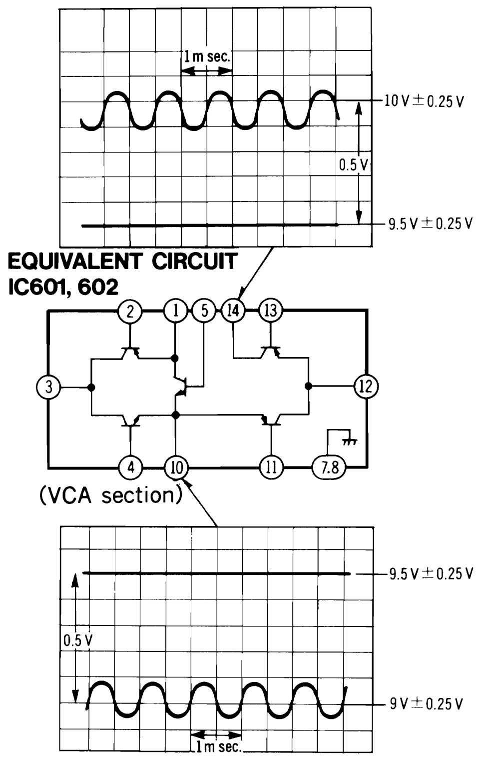


Fig. 5

Measurement Method and condition

1. Make the connections as shown in fig. 6, and apply 1kHz −27dB signal from LINE IN, and set the noise reduction selector to dbx tape position.
2. Set the unit to record mode, adjust ATT so that the signal level at TP603 (L-CH) and TP604 (R-CH) is 300mV.

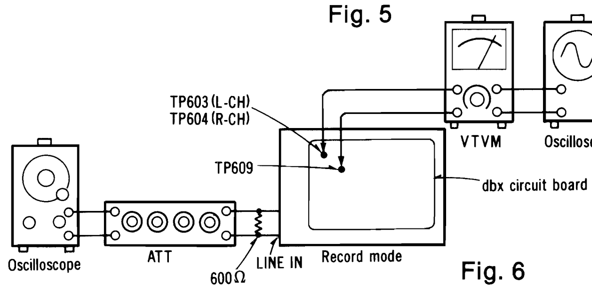
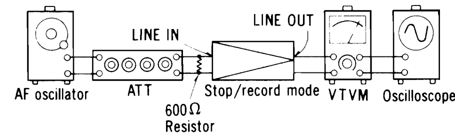
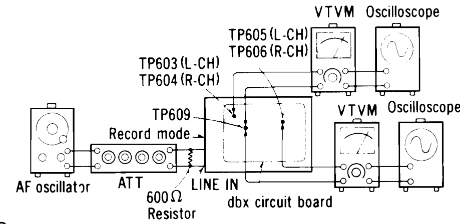
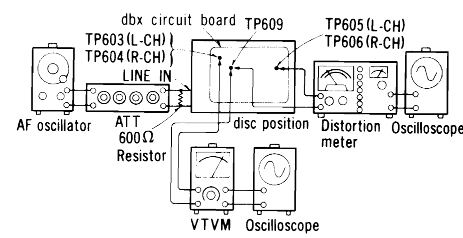


Fig. 6

• dbx SYSTEM CHECKING METHOD

NOTES: Keep good condition, set switches and controls in the following positions, unless otherwise specified.

• Input selector: Line in • Input level controls: Maximum • Output level control: Maximum

ITEM	CHECKING METHOD
Ⓐ Check for expansion/compression Condition: * Stop/record mode * Input level controls ··· MAX * Output level control ··· MAX * Noise reduction selector ··· disc/dbx tape Equipment: * VTVM * AF oscillator * ATT * Oscilloscope * Resistor (600Ω)	Ⓐ-1 Check for expansion 1. Make the connections as shown in fig. 7 and apply 1kHz −27dB signal from LINE IN, and set the noise reduction selector to disc position. 2. Adjust ATT, increase input signal level by 10dB, and make sure that the reading for VTVM increases by 20dB±1dB. 3. Adjust ATT, decrease the input signal level, and make sure that the reading for VTVM decreases by 20dB±1dB.  Fig. 7 Ⓐ-2 Check for compression 1. Make the connections as shown in fig. 8 and apply 1kHz −27dB signal from LINE IN, and set the noise reduction selector to dbx tape position. 2. Set the unit to record mode. 3. Adjust ATT, increase input signal level by 10dB, and make sure that the reading for VTVM at TP605 (L-CH) and TP606 (R-CH) increases by 5dB±1dB. 4. Adjust ATT, decrease the input signal level by 10dB, and make sure that the reading for VTVM at TP605 (L-CH) and TP606 (R-CH) decreases by 5dB±1dB.
Ⓑ Check for standard level of dbx Condition: * Stop/record mode * Input level controls ··· MAX * Noise reduction selector ··· disc/dbx tape Equipment: * VTVM * AF oscillator * ATT * Oscilloscope * Resistor (600Ω)	Ⓑ-1 Check for standard level of dbx in dbx Encode mode 1. Make the connections as shown in fig. 8 and apply 1kHz −27dB signal from LINE IN, and set the noise reduction selector to dbx tape position. 2. Set the unit to record mode, adjust ATT so that the signal level at TP603 (L-CH) and TP604 (R-CH) is 300mV. 3. Make sure that the signal level at TP605 (L-CH) and TP606 (R-CH) is 300mV±0.5dB.  Fig. 8 Ⓑ-2 Check for standard level of dbx in dbx Decode mode 1. Make the connections as shown in fig. 8 and apply 1kHz −27dB signal from LINE IN, and check as follows: 2. Set the noise reduction selector to disc position and adjust ATT so that the signal level at TP603 (L-CH) and TP604 (R-CH) becomes 300mV. 3. Make sure that the signal level at TP605 (L-CH) and TP606 (R-CH) is 300mV±0.5dB.
Ⓒ Check for output signal distortion factor (Check for distortion factor of VCA) Condition: * Stop/record mode * Input level controls ··· MAX * Noise reduction selector ··· disc/dbx tape Equipment: * VTVM * AF oscillator * ATT * Oscilloscope * Resistor (600Ω) * Distortion meter	Ⓒ-1 Check for output signal distortion factor in dbx Decode mode 1. Make the connections as shown in fig. 9 and apply 1kHz −27dB signal from LINE IN, and check as follows: 2. Set the noise reduction selector to disc position, and adjust ATT so that the signal level at TP603 (L-CH) and TP604 (R-CH) becomes 300mV. 3. Measure the distortion factor of output signal at TP605 (L-CH) and TP606 (R-CH), and make sure that the distortion factor is less than 0.2%.  Fig. 9 4. Next, adjust ATT to raise the output signal level by 5dB and measure the distortion of output factor at TP605 (L-CH) and TP606 (R-CH). Make sure that the distortion is less than 0.8%. 5. Adjust ATT to set the output signal at a level 5dB lower than the dbx reference level (300mV), and measure the output signal distortion at TP605 (L-CH) and TP606 (R-CH) to check that it is less than 0.3%. Ⓒ-2 Check for output signal distortion factor in dbx Encode mode 1. The connection is the same as above, as is the input signal. 2. Set the noise reduction selector to dbx tape position, and the unit to record mode. 3. Adjust ATT so that the signal level at TP603 (L-CH) and TP604 (R-CH) is 300mV. 4. Measure the distortion factor of output signal at TP605 (L-CH) and TP606 (R-CH), and make sure that the distortion factor is less than 0.25%.

Ⓓ Check respon circuit
Condition:
* Stop/rec
* Input lev
* Noise re
Equipment
* VTVM
* ATT
* Resistor

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❶ Adjust detect
Condition:
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Equipment
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* ATT
* Resistor

❷ Adjust standa

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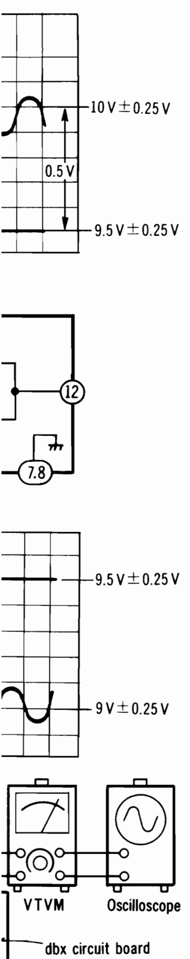
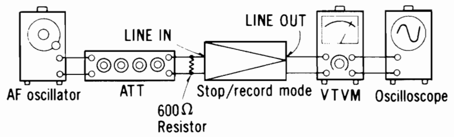
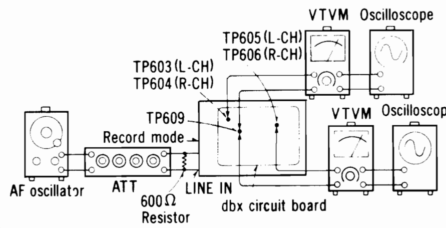
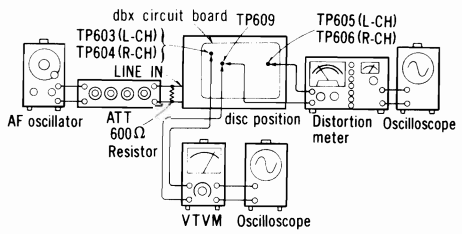


Fig. 6

• dbx SYSTEM CHECKING METHOD

NOTES: Keep good condition, set switches and controls in the following positions, unless otherwise specified.

• Input selector: Line in • Input level controls: Maximum • Output level control: Maximum

ITEM	CHECKING METHOD
Ⓐ Check for expansion/ compression Condition: • Stop/record mode • Input level controls ··· MAX • Output level control ··· MAX • Noise reduction selector ··· disc/dbx tape Equipment: • VTVM • AF oscillator • ATT • Oscilloscope • Resistor (600Ω)	Ⓐ-1 Check for expansion 1. Make the connections as shown in fig. 7 and apply 1kHz −27dB signal from LINE IN, and set the noise reduction selector to disc position. 2. Adjust ATT, increase input signal level by 10dB, and make sure that the reading for VTVM increases by 20dB±1dB. 3. Adjust ATT, decrease the input signal level, and make sure that the reading for VTVM decreases by 20dB±1dB.  Fig. 7 Ⓐ-2 Check for compression 1. Make the connections as shown in fig. 8 and apply 1kHz −27dB signal from LINE IN, and set the noise reduction selector to dbx tape position. 2. Set the unit to record mode. 3. Adjust ATT, increase input signal level by 10dB, and make sure that the reading for VTVM at TP605 (L-CH) and TP606 (R-CH) increases by 5dB±1dB. 4. Adjust ATT, decrease the input signal level by 10dB, and make sure that the reading for VTVM at TP605 (L-CH) and TP606 (R-CH) decreases by 5dB±1dB.
Ⓑ Check for standard level of dbx Condition: • Stop/record mode • Input level controls ··· MAX • Noise reduction selector ··· disc/dbx tape Equipment: • VTVM • AF oscillator • ATT • Oscilloscope • Resistor (600Ω)	Ⓑ-1 Check for standard level of dbx in dbx Encode mode 1. Make the connections as shown in fig. 8 and apply 1kHz −27dB signal from LINE IN, and set the noise reduction selector to dbx tape position. 2. Set the unit to record mode, adjust ATT so that the signal level at TP603 (L-CH) and TP604 (R-CH) is 300mV. 3. Make sure that the signal level at TP605 (L-CH) and TP606 (R-CH) is 300mV±0.5dB.  Fig. 8 Ⓑ-2 Check for standard level of dbx in dbx Decode mode 1. Make the connections as shown in fig. 8 and apply 1kHz −27dB signal from LINE IN, and check as follows: 2. Set the noise reduction selector to disc position and adjust ATT so that the signal level at TP603 (L-CH) and TP604 (R-CH) becomes 300mV. 3. Make sure that the signal level at TP605 (L-CH) and TP606 (R-CH) is 300mV±0.5dB.
Ⓒ Check for output signal distortion factor (Check for distortion factor of VCA) Condition: • Stop/record mode • Input level controls ··· MAX • Noise reduction selector ··· disc/dbx tape Equipment: • VTVM • AF oscillator • ATT • Oscilloscope • Resistor (600Ω) • Distortion meter	Ⓒ-1 Check for output signal distortion factor in dbx Decode mode 1. Make the connections as shown in fig. 9 and apply 1kHz −27dB signal from LINE IN, and check as follows: 2. Set the noise reduction selector to disc position, and adjust ATT so that the signal level at TP603 (L-CH) and TP604 (R-CH) becomes 300mV. 3. Measure the distortion factor of output signal at TP605 (L-CH) and TP606 (R-CH), and make sure that the distortion factor is less than 0.2%.  Fig. 9 4. Next, adjust ATT to raise the output signal level by 5dB and measure the distortion of output factor at TP605 (L-CH) and TP606 (R-CH). Make sure that the distortion is less than 0.8%. 5. Adjust ATT to set the output signal at a level 5dB lower than the dbx reference level (300mV), and measure the output signal distortion at TP605 (L-CH) and TP606 (R-CH) to check that it is less than 0.3%. Ⓒ-2 Check for output signal distortion factor in dbx Encode mode 1. The connection is the same as above, as is the input signal. 2. Set the noise reduction selector to dbx tape position, and the unit to record mode. 3. Adjust ATT so that the signal level at TP603 (L-CH) and TP604 (R-CH) is 300mV. 4. Measure the distortion factor of output signal at TP605 (L-CH) and TP606 (R-CH), and make sure that the distortion factor is less than 0.25%.

ITEM	CHECKING METHOD
	5. Adjust ATT so that the signal level at TP603 (L-CH) and TP604 (R-CH) becomes 300mV+15dB. 6. Make sure that the distortion factor of output signal is less than 0.8%.
Ⓓ Check the frequency response of the dbx circuit Condition: • Stop/record mode • Input level controls ··· MAX • Noise reduction selector ··· disc/dbx tape Equipment: • VTVM • AF oscillator • ATT • Oscilloscope • Resistor (600Ω)	Ⓓ-1 Check the frequency response during decoding 1. Make the connections as shown in fig. 8 and apply 1kHz −27dB signal from LINE IN, and check as follows: 2. Set the noise reduction selector to disc position, and adjust ATT so that the signal level at TP603 (L-CH) and TP604 (R-CH) becomes 300mV. 3. With the signal level at TP605 (L-CH) and TP606 (R-CH) as 0dB, change the signal frequency to 100Hz, 20Hz and 7kHz respectively. Read signal levels at TP605 (L-CH) and TP606 (R-CH) and check that they are within the specifications-1. Ⓓ-2 Check the frequency response during encoding 1. Make the connections as shown in fig. 8 and apply 1kHz −27dB signal from LINE IN, and check as follows: 2. Set the noise reduction selector to dbx tape position, and the unit to record mode. 3. Adjust ATT so that the signal level at TP603 (L-CH) and TP604 (R-CH) is 300mV. 4. With the signal level at TP605 (L-CH) and TP606 (R-CH) as 0dB, change the signal frequency to 100Hz and 7kHz respectively. Read signal levels at TP605 (L-CH) and TP606 (R-CH) and check that they are within the specifications-2.

Specifications-1

Frequency	Signal levels at TP605 and TP606
1kHz	0dB (300mV)
100Hz	−0.5dB±1dB
20Hz	−28dB±5dB
7kHz	+7dB±1dB

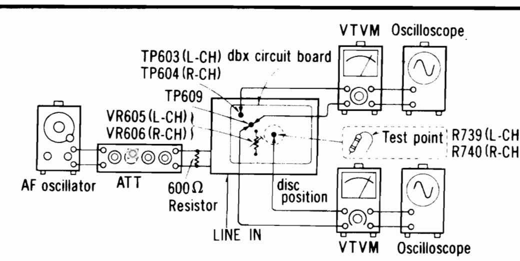
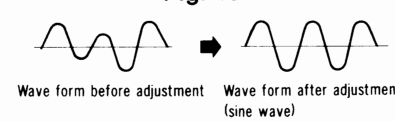
Specifications-2

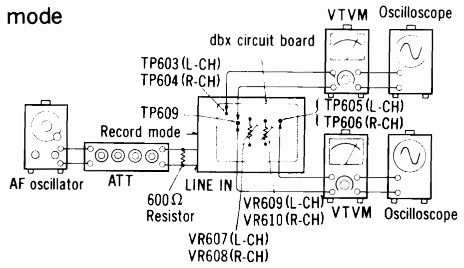
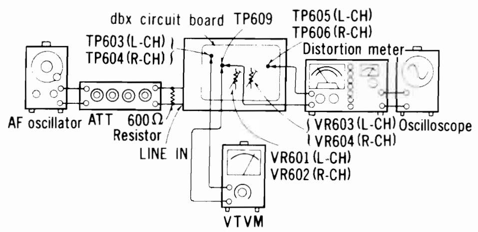
Frequency	Signal levels at TP605 and TP606
1kHz	0dB (300mV)
100Hz	+0.5dB±1dB
7kHz	−3.5dB±1dB

NOTES:
• If the results of the above checks Ⓐ, Ⓑ, Ⓒ and Ⓓ do not satisfy the specifications, perform the following adjustments. If the specifications are not satisfied even after the adjustments, follow the checking procedure for problems.
• If the output signal is not produced or is extremely distorted, follow the checking procedure for problems.

• ADJUSTMENT OF dbx SYSTEM

NOTES: When adjusting the circuit of the dbx system, be sure to perform the adjustments in the following order:
1) Adjustment of RMS detector, 2) Adjustment of dbx standard level
3) Adjustment of output signal distortion factor.
Keep good condition, set switches and controls in the following positions, unless otherwise specified.
• Input selector: Line in • Input level controls: Maximum

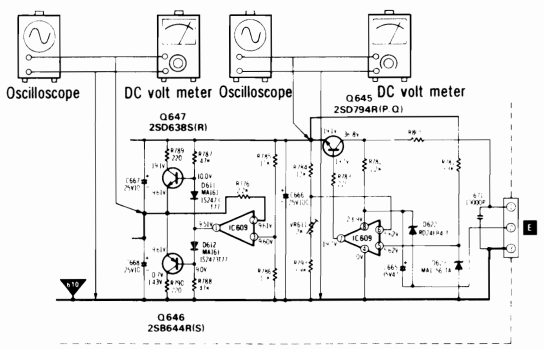
ITEM	ADJUSTMENT
① Adjustment of RMS detector Condition: • Stop mode • Input level controls ··· MAX • Noise reduction selector ··· disc Equipment: • VTVM • AF oscillator • ATT • Oscilloscope • Resistor (600Ω)	1. Make the connections as shown in fig. 10, and set the noise reduction selector to disc position. 2. Apply 50Hz −27dB signal from LINE IN. 3. Adjust ATT so that the signal level at TP603 (L-CH) and TP604 (R-CH) becomes 300mV. 4. Make sure that the output signal at R739 (L-CH) and R740 (R-CH) (Shown in fig. 2) is at 100Hz sine wave. If the output signal is not sinusoidal as shown in fig. 11, adjust VR605 (L-CH) and VR606 (R-CH) to make it sinusoidal.  Fig. 10  Fig. 11 NOTE: The voltage of the output signal after adjustment is about 0.8 to 1.1mVrms.
② Adjustment of dbx standard level	NOTE: Be sure to perform the standard level adjustment in dbx Encode, followed by the standard level adjustment in dbx Decode.

ITEM	ADJUSTMENT
Condition: • Record/stop mode • Input level controls ··· MAX • Noise reduction selector ··· disc/dbx tape Equipment: • VTVM • AF oscillator • ATT • Oscilloscope • Resistor (600Ω)	**❷-1 Standard level adjustment in dbx Encode mode** 1. Make the connection as shown in fig. 12 and apply 1kHz −27dB signal from LINE IN, and set the noise reduction selector to dbx tape position. 2. Set unit to record mode, adjust ATT so that the signal level at TP603 (L-CH) and TP604 (R-CH) is 300mV. 3. Adjust VR607 (L-CH) and VR608 (R-CH) so that the output signal level at TP605 (L-CH) and TP606 (R-CH) becomes 300mV±0.5dB.  Fig. 12 **❷-2 Standard level adjustment in dbx Decode mode** 1. Make the connection as shown in fig. 12 and apply 1kHz −27dB signal from LINE IN, and perform the following adjustments. 2. Set the noise reduction selector to disc position, and adjust ATT so that the signal level at TP603 (L-CH) and TP604 (R-CH) becomes 300mV. 3. Adjust VR609 (L-CH) and VR610 (R-CH) so that the output signal level at TP605 (L-CH) and TP606 (R-CH) becomes 300mV±0.5dB.
❸ Adjustment of output signal distortion factor Condition: • Stop mode • Input level controls ··· MAX • Noise reduction selector ··· disc Equipment: • VTVM • AF oscilloscope • ATT • Oscilloscope • Resistor (600Ω) • Distortion meter	1. Make the connection as shown in fig. 13 and apply 1kHz −27dB signal from LINE IN, and perform the following adjustments. 2. Set the noise reduction selector to disc position, and adjust ATT so that the signal level at TP603 (L-CH) and TP604 (R-CH) becomes 300mV−3dB. 3. Adjust VR601 (L-CH) and VR602 (R-CH) so that output signal distortion at TP605 (L-CH) and TP606 (R-CH) is minimized.  Fig. 13 4. Adjust ATT so that the signal level at TP603 (L-CH) and TP604 (R-CH) becomes 300mV+2dB. 5. Adjust VR603 (L-CH) and VR604 (R-CH) so that output signal distortion at TP605 (L-CH) and TP606 (R-CH) is minimized. 6. Repeat adjustments 2 through 5 until the distortion factor is minimized.

NOTE:
After adjustments ❶, ❷ and ❸, re-check according to "dbx SYSTEM CHECKING METHOD".
If the specifications are not satisfied, perform the adjustments again.

• CHECKING PROCEDURE FOR PROBLEMS

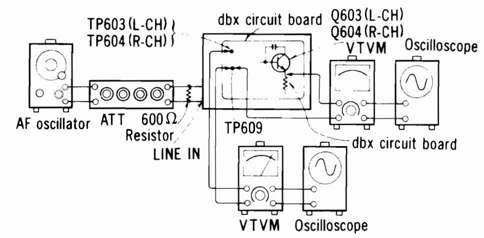
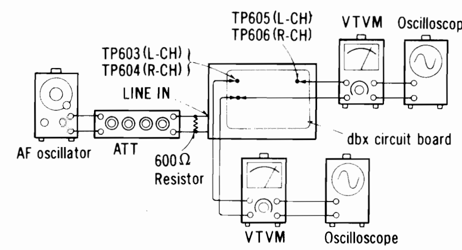
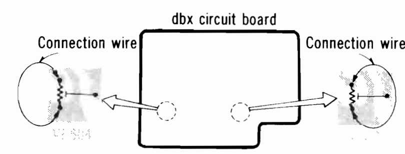
NOTES: Find defective parts according to the circuit operation checking method given below, and use the results for your reference during repair. Remember to adjust after repair.
Keep good condition, set switches and controls in the following positions, unless otherwise specified.
• Input selector: Line in • Input level controls: Maximum

ITEM	CHECKING METHOD
1 Operation check of regulated power supply circuit in dbx circuit Equipment: • DC volt meter • Oscilloscope	**1-1 Check of 19V voltage** Make the connection as shown in fig. 14 and make sure that the emitter voltage of Q645 is +19V±0.5V. (If the voltage is deflected slightly from +19V±0.5V, it can be adjusted by VR611.) **1-2 Check of 9.5V voltage** Make the connection as shown in fig. 14 and make sure that the emitter voltage of Q647 is around 9.5V.  Fig. 14

ITEM	CHECKING METHOD
2 Check of control circuit in dbx circuit Equipment: • DC volt meter	**E.C.B (G.S.D) voltage check of each switching transistor for Encode/Decode** The terminal voltage of each switching transistor in Encode/Decode mode are shown in the table below.

Transistor Ref. No.	Encode			Decode		
	E (G)	C (S)	B (D)	E (G)	C (S)	B (D)
Q7, 8	0V	0V	0V	0V	0V	0.7V
Q9, 10, 11, 12	0V	9.5V	9.5V	0V	9.5V	9.5V
Q601, 602	0V	9.43V	9.43V	0V	9.54V	9.52V
Q605, 606	10.7V	9.7V	0V	10.7V	10.7V	11.3V
Q607, 608	10.7V	10.7V	11.3V	0.3V	10.7V	0V
Q615, 616	0V	9.61V	0V	9.61V	9.61V	10.2V
Q617, 618	9.61V	9.61V	10.1V	10.6V	9.61V	0V
Q627, 628	0V	9.61V	9.47V	0V	9.59V	9.58V
Q637	0V	0.2V	0V	0V	0.6V	0V
Q638	0V	0V	0.7V	0V	0V	0V
Q640	0V	12.8V	0V	0V	9.15V	0V
Q641	0V	0V	0.7V	0V	14.2V	0V
Q642	19.1V	19.1V	18.4V	19.1V	0V	19.0V
Q643	0V	19.1V	0.7V	0V	0V	0V
Q644	0V	0.7V	0V	0V	0.1V	0V

NOTE:
If no abnormality is found in steps 1 and 2, check the operation for each part as follows:

ITEM	CHECKING METHOD
3 Operation check of INPUT BAND PASS FILTER circuit (27Hz–20kHz) Condition: • Record mode • Input level controls ··· MAX • Noise reduction selector ··· dbx tape Equipment: • VTVM • AF oscillator • ATT • Oscilloscope • Resistor (600Ω)	1. Make the connections as shown in fig. 15, and apply 100Hz −27dB signal from LINE IN, and set the noise reduction selector to dbx tape position. 2. Set the unit to record mode. 3. Adjust ATT so that the signal level at TP603 (L-CH) and TP604 (R-CH) is 300mV. 4. Make sure that the emitter signal level of Q603 (L-CH) and Q604 (R-CH) is 300mV.  Fig. 15 5. Set the input signal frequency to 5kHz and make sure that the emitter signal of Q603 (L-CH) and Q604 (R-CH) remains at the same level (300mV).
4 Operation check of VCA circuit and Pre-emphasis/De-emphasis circuit Condition: • Stop/record mode • Input level controls ··· MAX • Noise reduction selector ··· disc/dbx tape Equipment: • VTVM • AF oscillator • ATT • Oscilloscope • Resistor (600Ω)	**4-1 Operation check of VCA circuit and Pre-emphasis circuit** 1. Make the connections as shown in fig. 16, and apply 100Hz −27dB signal from LINE IN. 2. Short-circuit both terminals of VR603 (L-CH) and VR604 (R-CH) as shown in fig. 17 to make the VCA control voltage 1/2Vcc (9.5V), so that the gain of VCA does not change. 3. Set the unit to record mode, and set the noise reduction selector to dbx tape position. 4. Adjust ATT so that the signal level at TP603 (L-CH) and TP604 (R-CH) is 300mV. 5. Make sure that the output signals at TP605 (L-CH) and TP606 (R-CH) are sinusoidal. (The operation of VCA can then be checked.)  Fig. 16  Fig. 17

ITEM
5 Operation ch... RMS FILTER (27Hz–10k... Condition: • Stop mode • Input level contr... • Noise reduction... Equipment: • VTVM • A... • ATT • O... • Resistor (600Ω...)

ITEM	CHECKING METHOD
2 Check of control circuit in dbx circuit Equipment: • DC volt meter	**E.C.B (G.S.D) voltage check of each switching transistor for Encode/Decode** The terminal voltage of each switching transistor in Encode/Decode mode are shown in the table below.

Transistor Ref. No.	Encode			Decode		
	E(G)	C(S)	B(D)	E(G)	C(S)	B(D)
Q7, 8	0V	0V	0V	0V	0V	0.7V
Q9, 10, 11, 12	0V	9.5V	9.5V	0V	9.5V	9.5V
Q601, 602	0V	9.43V	9.43V	0V	9.54V	9.52V
Q605, 606	10.7V	9.7V	0V	10.7V	10.7V	11.3V
Q607, 608	10.7V	10.7V	11.3V	0.3V	10.7V	0V
Q615, 616	0V	9.61V	0V	9.61V	9.61V	10.2V
Q617, 618	9.61V	9.61V	10.1V	10.6V	9.61V	0V
Q627, 628	0V	9.61V	9.47V	0V	9.59V	9.58V
Q637	0V	0.2V	0V	0V	0.6V	0V
Q638	0V	0V	0.7V	0V	0V	0V
Q640	0V	12.8V	0V	0V	9.15V	0V
Q641	0V	0V	0.7V	0V	14.2V	0V
Q642	19.1V	19.1V	18.4V	19.1V	0V	19.0V
Q643	0V	19.1V	0.7V	0V	0V	0V
Q644	0V	0.7V	0V	0V	0.1V	0V

NOTE:
If no abnormality is found in steps 1 and 2, check the operation for each part as follows:

3 Operation check of INPUT BAND PASS FILTER circuit (27 Hz–20 kHz)

Condition:
- Record mode
- Input level controls ··· MAX
- Noise reduction selector ··· dbx tape

Equipment:
- VTVM
- AF oscillator
- ATT
- Oscilloscope
- Resistor (600 Ω)

1. Make the connections as shown in fig. 15, and apply 100 Hz –27 dB signal from LINE IN, and set the noise reduction selector to dbx tape position.
2. Set the unit to record mode.
3. Adjust ATT so that the signal level at TP603 (L-CH) and TP604 (R-CH) is 300 mV.
4. Make sure that the emitter signal level of Q603 (L-CH) and Q604 (R-CH) is 300 mV.
5. Set the input signal frequency to 5 kHz and make sure that the emitter signal of Q603 (L-CH) and Q604 (R-CH) remains at the same level (300 mV).

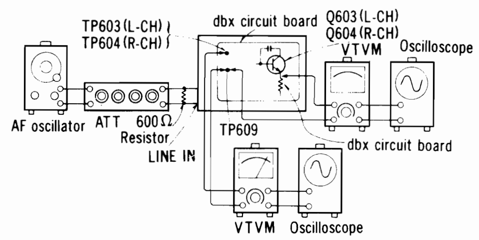


Fig. 15

4 Operation check of VCA circuit and Pre-emphasis/ De-emphasis circuit

Condition:
- Stop/record mode
- Input level controls ··· MAX
- Noise reduction selector ··· disc/dbx tape

Equipment:
- VTVM
- AF oscillator
- ATT
- Oscilloscope
- Resistor (600 Ω)

4-1 Operation check of VCA circuit and Pre-emphasis circuit

1. Make the connections as shown in fig. 16, and apply 100 Hz –27 dB signal from LINE IN.
2. Short-circuit both terminals of VR603 (L-CH) and VR604 (R-CH) as shown in fig. 17 to make the VCA control voltage 1/2 Vcc (9.5 V), so that the gain of VCA does not change.
3. Set the unit to record mode, and set the noise reduction selector to dbx tape position.
4. Adjust ATT so that the signal level at TP603 (L-CH) and TP604 (R-CH) is 300 mV.
5. Make sure that the output signals at TP605 (L-CH) and TP606 (R-CH) are sinusoidal.
   (The operation of VCA can then be checked.)

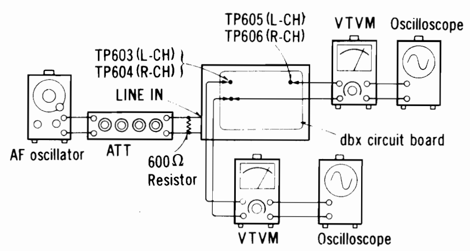


Fig. 16

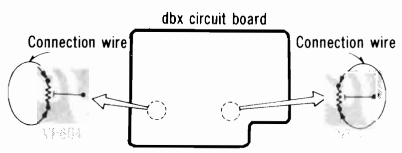


Fig. 17

6. Shift the frequency of input signal to 5 kHz, and make sure that the output signal levels at TP605 (L-CH) and TP606 (R-CH) are increased by about 12 dB.
   (The operation of the Pre-emphasis circuit can then be checked.)

4-2 Operation check of VCA circuit and De-emphasis circuit

1. The procedure is the same as 1–2 for the above VCA circuit and Pre-emphasis circuit.
2. Set the noise reduction selector to disc position.
3. Adjust ATT so that the signal level at TP603 (L-CH) and TP604 (R-CH) is 300 mV.
4. Make sure that the output signals at TP605 (L-CH) and TP606 (R-CH) are sinusoidal.
   (The operation of VCA can then be checked.)
5. Change the frequency of input signal to 5 kHz and make sure that the output signal level at TP605 (L-CH) and TP606 (R-CH) is decreased by about 12 dB.
   (The operation of the De-emphasis circuit can then be checked.)

NOTE: After check, disconnect the short-circuited terminals of VR603 (L-CH) and VR604 (R-CH).

5 Operation check of RMS FILTER circuit (27 Hz–10 kHz)

Condition:
- Stop mode
- Input level controls ··· MAX
- Noise reduction selector ··· disc

Equipment:
- VTVM
- AF oscillator
- ATT
- Oscilloscope
- Resistor (600 Ω)

1. Make the connections as shown in fig. 18, and apply 100 Hz –27 dB signal from LINE IN.
2. Set the noise reduction selector to disc position.
3. Adjust ATT so that the signal level at TP603 (L-CH) and TP604 (R-CH) is 300 mV.
4. Make sure that the emitter signal level of Q619 (L-CH) and Q620 (R-CH) is around 300 mV.
5. Change the frequency of input signal to 5 kHz and make sure that the emitter signal of Q619 (L-CH) and Q620 (R-CH) remains at the same level (300 mV).

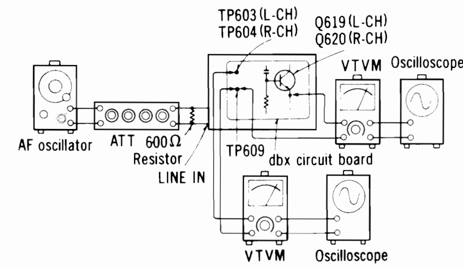
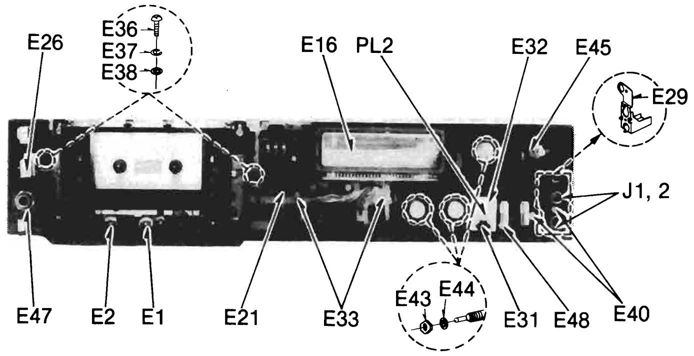
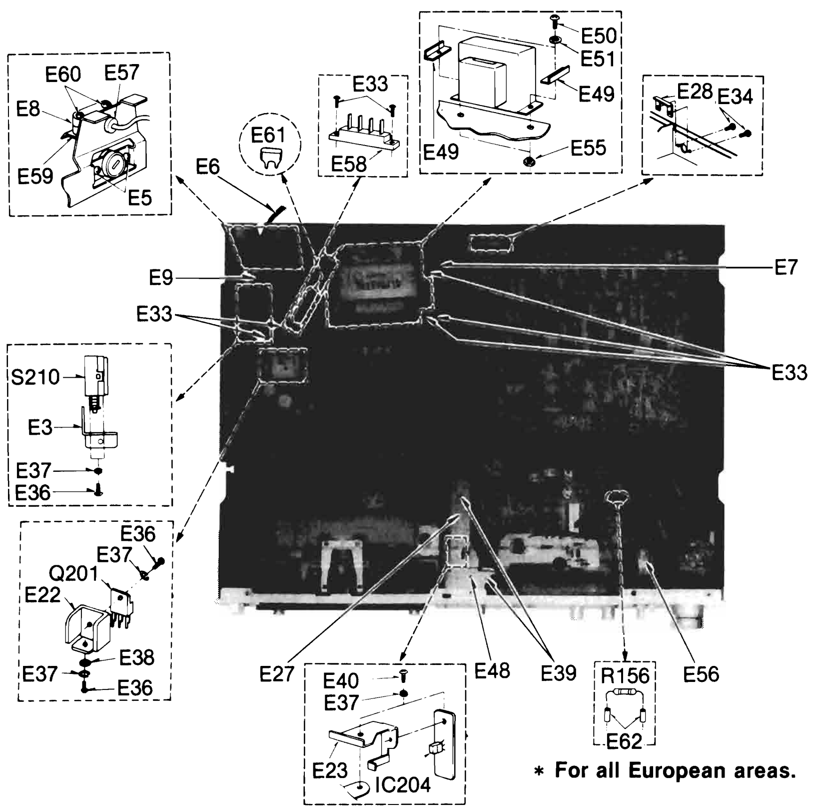


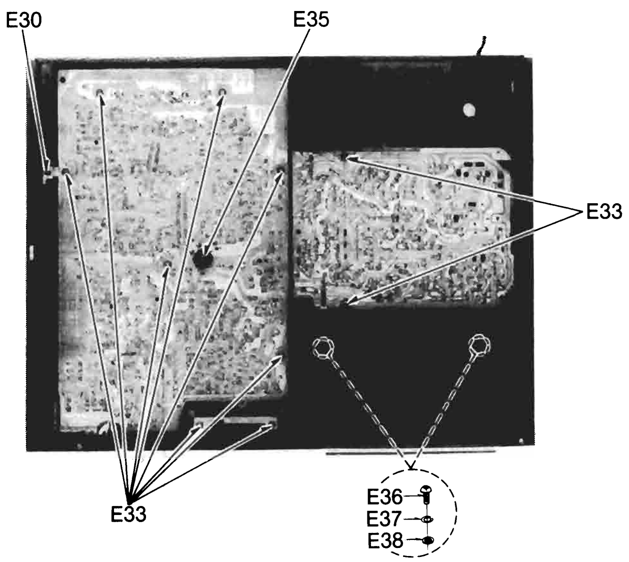
Fig. 18

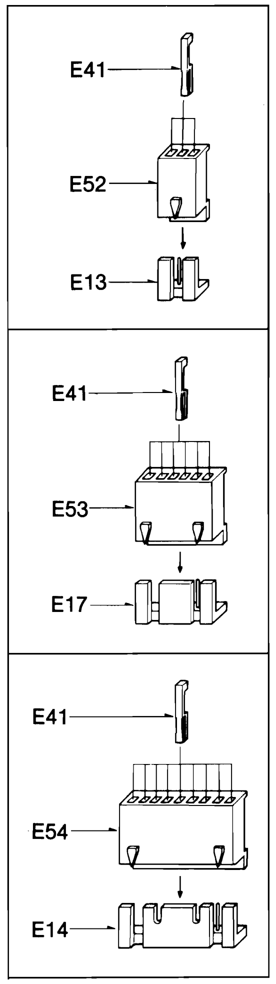
ELECTRICAL PARTS LOCATION

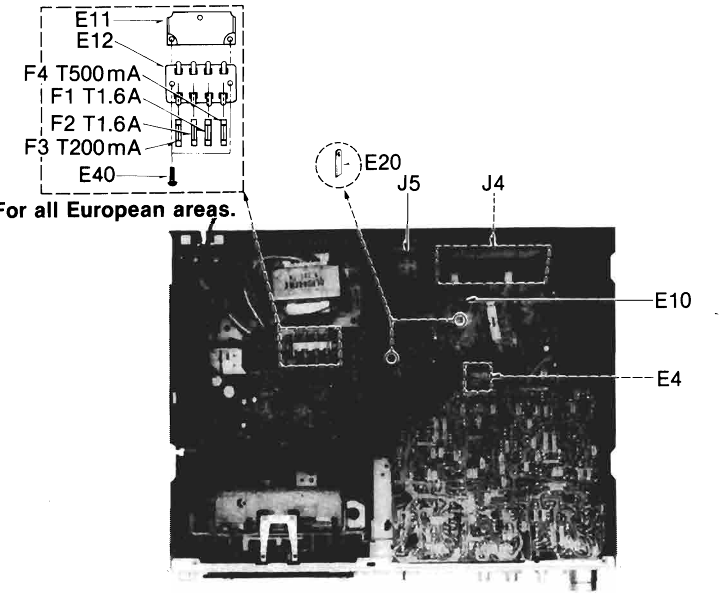




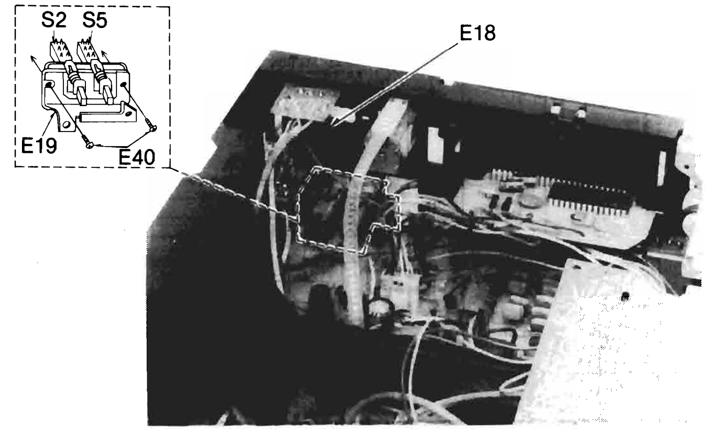
* For all European areas.

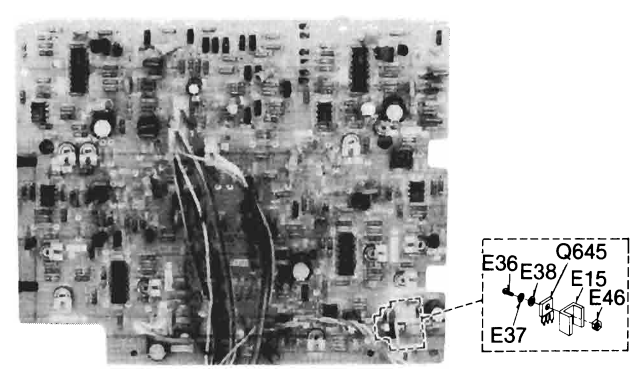


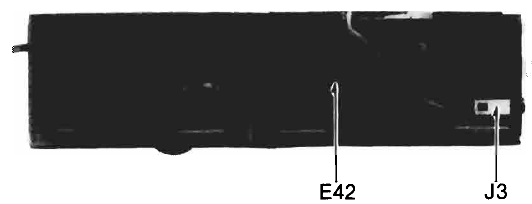


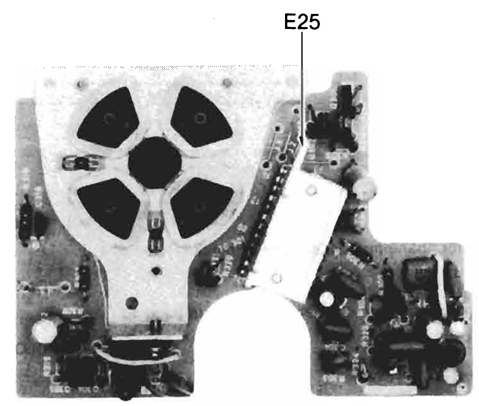


* For all European areas.







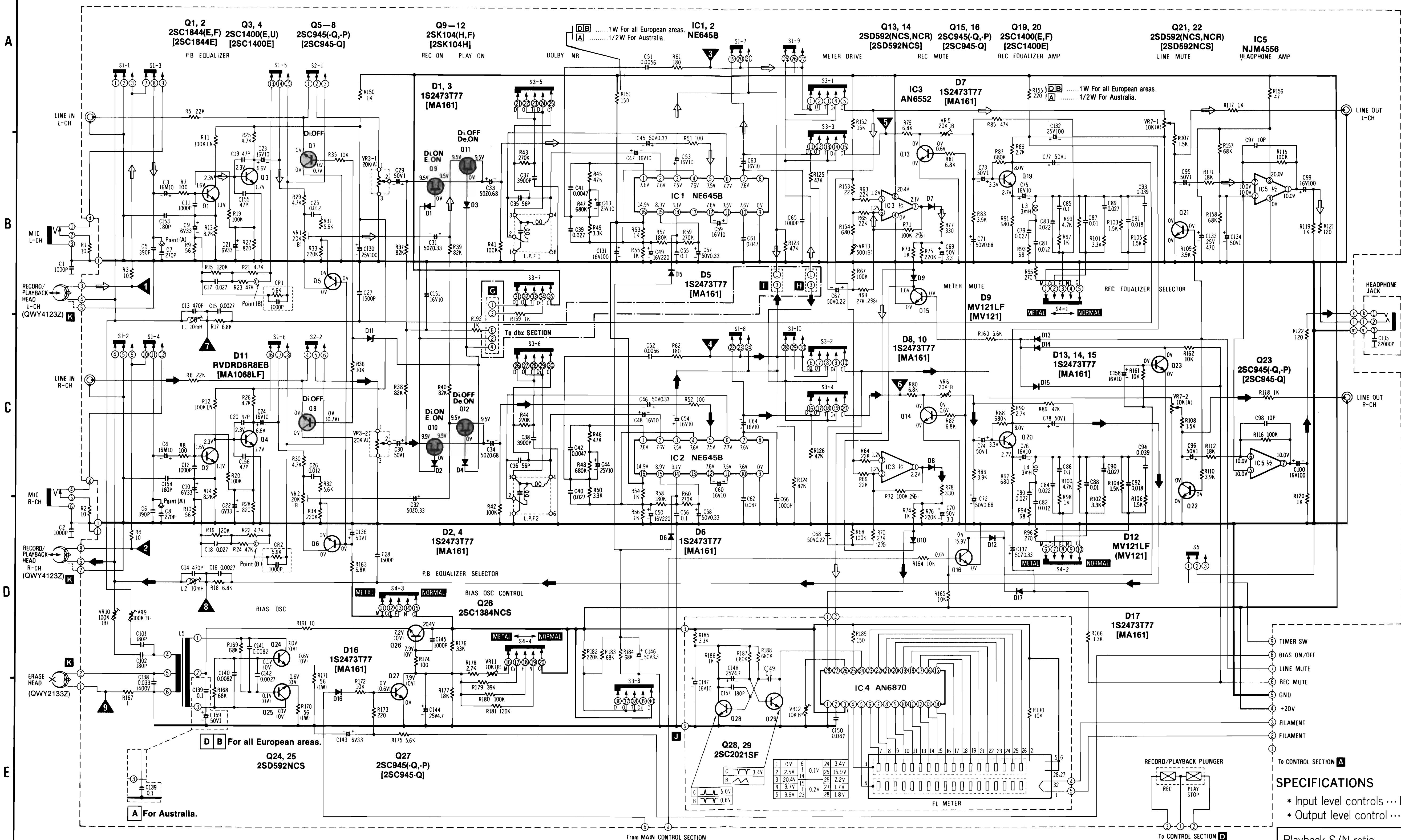


REPLACEMENT PARTS LIST

Important safety notice
Components identified by ⚠ mark have special characteristics important for safety.
When replacing any of these components, use only manufacturer's specified parts.

Ref. No.	Part No.	Part Name & Description
	ELECTRICAL PARTS	
E1	QWY4123Z	Record/Playback Head
E2	QWY2133Z	Erase Head
E3	QMA3578	Power Switch Angle
E4	EMR201	Plunger
E5	XTN3+6B	Screw ⊕3×6
E6 [D] ⚠	SJA88	AC Power Cord
*For all European aréas except United Kingdom.		
[B] ⚠	QFC1205M	〃
*For United Kingdom.		
[A] ⚠	QFC1208M	〃
*For Australia.		
E7	QTSM0054	Shield Plate
E8	QTD1164	Cord Clamper
E9	QMA3577	Transformer Angle
E10	QTSM0050	Shield Plate
E11 [D][B]	QMA3944	Fuse Angle
*For all European areas.		
E12 [D][B] ⚠	QTF1039	Fuse Holder
*For all European areas.		
E13	QJP1921TN	3 Pin Post
E14	QJP1923TN	9 Pin Post
E15	QTHM0010	Heat Sink
E16	QSLS006RF	Fluorescent Level Meter
E17	QJP1922TN	6 Pin Post
E18	QTS1494	Shield Plate (for Input Level Control VR)
E19	QMAM0131	Push Switch Angle (for S2 and S5)
E20	QJT1067	Check Pin
E21	QKJ0388	LED Holder (for D225, D226 and D227)
E22	QTH1088	Heat Sink
E23	QMA3866	Hall IC Angle
E25	QTH1151	Heat Sink (for IC301)
E26	QGOM0041	Push Button (for S210)
E27	QMA3867	Angle
E28	QMA3872	Jack Holder
E29	QJC0021	Earth Plate
E30	QJC0020	〃
E31	QBG1366	Rubber Cushion
E32	QKJM0051	Pilot Lamp Cover
E33	XTN3+10B	Screw ⊕3×10
E34	XSN3+10BVS	〃
E35	QBG1228	Rubber Bush
E36	XSN3+8S	Screw ⊕3×8
E37	XWA3B	Washer
E38	XWG3	〃
E39	XTS3+10B	Screw ⊕3×10
E40	XSN3+6S	Screw ⊕3×6
E41	QJT1054	Contact
E42	QMR1825	Switch Rod
E43	XNS8	Nut
E44	XWS8AW	Washer
E45	XNS9	Nut
E46	XNG3ES	〃
E47	QNQ1070	〃
E48	XSS3+6S	Screw ⊕3×6
E49	QTTM011	Spacer
E50	XSN4+10	Screw ⊕4×10
E51	XWA4B	Washer
E52	QJS1921TN	3 Pin Housing
E53	QJS1922TN	6 Pin Housing
E54	QJS1923TN	9 Pin Housing
E55	XNG4ES	Nut
E56	QSR0401	Rotary Selector (for Switching S3)
E57	QBJ1425	Cord Bushing
E58	QJT4017	4 Pin Terminal
E59	QMA3945	Terminal Angle
E60	XSB3+20BNS	Screw ⊕3×20
E61	QTW1195	Spark Killer Cover
E62 [D][B]	QZE0003	Porcelain Tube
*For all European areas.		

SCHEMATIC DIAGRAM
MAIN AMP SECTION



NOTES:

- (2%) presents allowable resistance range of resistor used.
  e.g. R665 220 (2%) → 220±4.4(Ω)
- Mark [symbol] represents switching transistor for changing connections of blocks in the dbx circuit.
- Circuit constructions for encoding, decoding and disc are different as shown in page 10.

e.g. "E.ON" shows ON condition during Encode mode. → E.ON

"De.ON" shows ON condition during Decode mode. → De.ON

"Di.ON" shows ON condition during Disc mode. → Di.ON

"Di.OFF" shows OFF condition during Disc mode. → Di.OFF

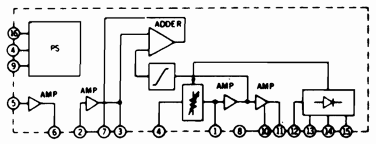
SPECIFICATIONS

- Input level controls ··· MAX
- Output level control ··· MAX

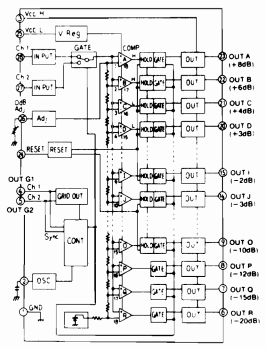
Playback S/N ratio Test tape ··· QZZCFM	Greater than 47 dB
Overall distortion Test tape ··· QZZCRA for Normal ··· QZZCRX for CrO_2 ··· QZZCRY for Fe-Cr ··· QZZCRZ for Metal	Less than 3% (Normal) Less than 3.5% (CrO_2, Fe-Cr, Metal)
Overall S/N ratio Test tape ··· QZZCRA	Greater than 45 dB (without NAB filter)

EQUIVALENT CIRCUIT

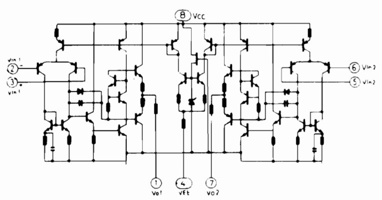
IC1, 2 NE645B



IC4 AN6870



IC5 AN6552



NOTES:

- S1-1—S1-10......Record/Playback select switch (shown in playback position).
- S2-1, S2-2.........Input select switch (shown in Line position).
- S3-1—S3-8 ......Noise reduction select switch (shown in dolby in position). (D...DOLBY NR IN, O...OUT, T...dbx tape, Di...dbx disc, C...Common)
- S4-1—S4-4 ......Tape select switch (shown in metal position). (M...Metal, Cr...CrO_2, F...FeCr, N...Normal, C...Common)
- S5..................Timer record switch (shown in out position).
- VR1, VR2.........Playback gain adjustment VR.
- VR3-1, VR3-2 ...Input level controls.
- VR5, VR6.........Overall gain adjustment VR.
- VR7-1, VR7-2 ...Output level controls.
- VR9, VR10 ......Bias current adjustment VR (for normal tape).
- VR11 ....Erase current adjustment VR (for metal tape).
- VR12 ....FL meter adjustment VR (for 0dB indication).
- VR13 ....FL meter adjustment VR (for −20dB indication).
- L1, L2 ....Bias trap adjustment coil.
- Connection points (A) (A′) (B) and (B′)...For playback frequency response adjustment points.
- Resistance are in ohms (Ω), 1/4 watt unless specified otherwise. 1K = 1,000(Ω), 1M = 1,000k(Ω).
- Capacity are in microfarads (μF) unless specified otherwise. P = Pico-farads.
- The mark (▼) shows test point. e.g. ∇ = Test point 1.
- All voltage values shown in circuitry are under no signal condition and record mode with volume control at minimum position. However, the voltage in playback mode is indicated in ( ) when it differs from that in record mode. For measurement, use VTVM.
- (⇨) this arrow indicates the flow of the playback signal.
- (➡) this arrow indicates the flow of the recording signal.
- Described in the schematic diagram are two types of numbers; the supply parts number and production parts number for transistors and diodes. One type of number is used for supply parts number and production parts number when they are identical.

e.g. Q27
2SC945(Q,P) ← Production parts number
[2SC945Q] ← Supply parts number

1S2473T77 ← Production parts number
[MA161] ← Supply parts number

- **The supply parts number is described alone in the replacement parts list.**

NOTES: RESISTORS
- ERD...Carbon
- ERG...Metal-oxide
- ERS...Metal-oxide
- ERO...Metal-film
- ERX...Metal-film
- ERQ...Fuse type metallic
- ERC...Solid
- ERF...Cement

CAPACITORS
- ECBA......Ceramic
- ECG□......Ceramic
- ECK□......Ceramic
- ECC□......Ceramic
- ECF□......Ceramic
- ECQM......Polyester film
- ECQE......Polyester film
- ECQF......Polypropylene
- ECE□......Electrolytic
- ECE□N ...Non polar electrolytic
- ECQS......Polystyrene
- ECS□......Tantalum
- QCS ......Tantalum

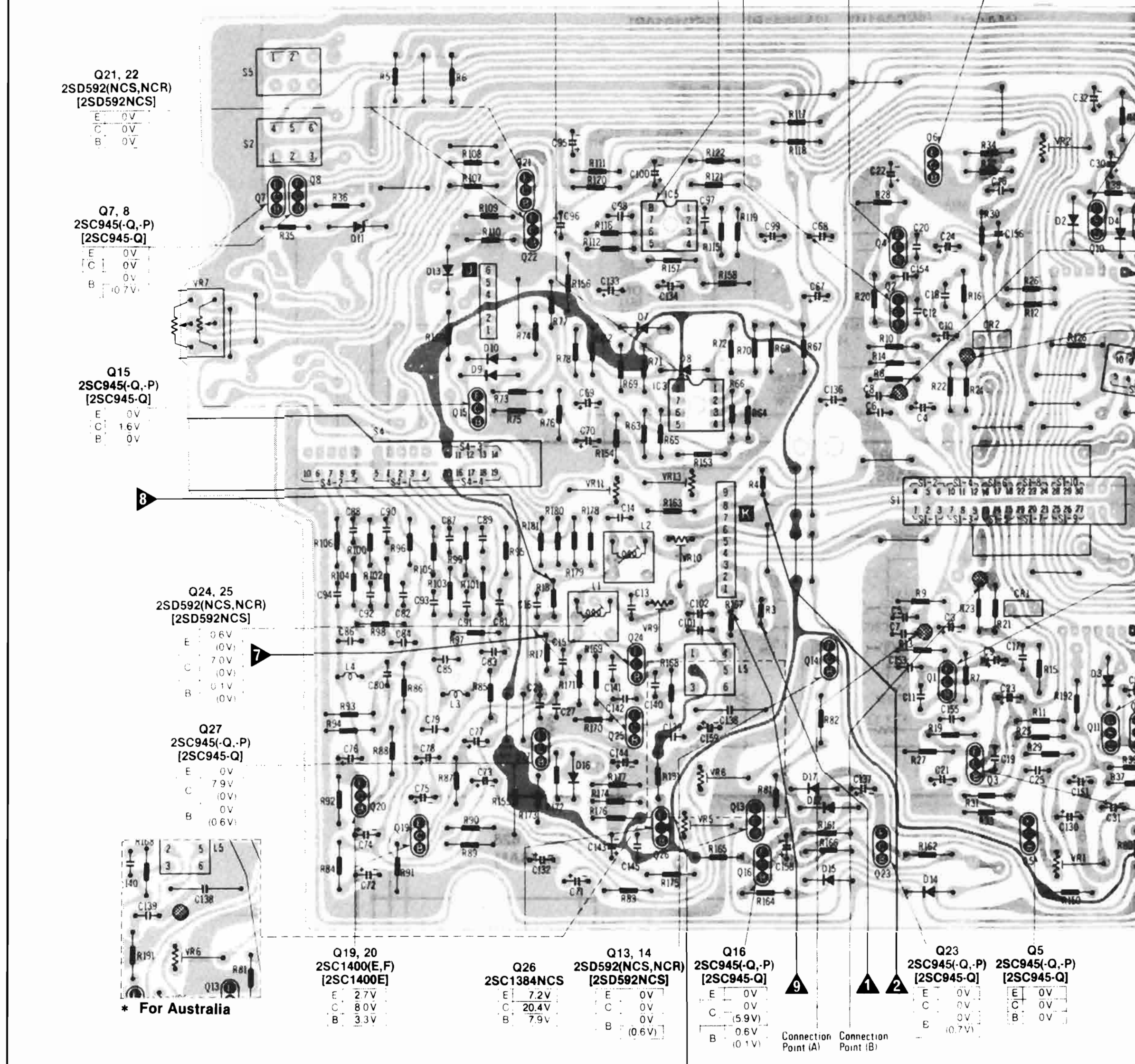
REPLACEMENT PARTS LIST

Important safety notice
Components identified by △ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.

Ref. No.	Part No.
RESISTORS	
R1, 2, 3, 4	ERD25FJ100
R5, 6	ERD25TJ223
R7, 8	ERD25TJ101
R9, 10	ERD25FJ560
R11, 12	ERD25CKF1003
R13, 14	ERD25FJ822
R15, 16	ERD25TJ124
R17, 18	ERD25FJ682
R19, 20	ERD25TJ104
R21, 22	ERD25FJ472
R23, 24	ERD25TJ473
R25, 26	ERD25FJ472
R27, 28	ERD25FJ821
R29, 30	ERD25FJ472
R31, 32	ERD25FJ562
R33, 34	ERD25TJ224
R35, 36	ERD25FJ103
R37, 38, 39, 40	ERD25TJ823
R41, 42	ERD25TJ104
R43, 44	ERD25TJ274
R45, 46	ERD25TJ473
R47, 48	ERD25TJ684
R49, 50	ERD25FJ332
R51, 52	ERD25FJ101
R53, 54, 55, 56	ERD25FJ102
R57, 58	ERD25TJ184
R59, 60	ERD25TJ274
R61, 62	ERD25FJ181
R63, 64, 65, 66	ERD25TJ223
R67, 68	ERD25TJ104
R69, 70	ERO25TKG2702
R71, 72	ERO25TKG1003
R73, 74	ERD25FJ102
R75, 76	ERD25TJ224
R77, 78	ERD25FJ331
R79, 80, 81, 82	ERD25FJ682
R83, 84	ERD25FJ392
R85, 86	ERD25TJ473
R87, 88	ERD25TJ684
R89, 90	ERD25FJ272
R91, 92	ERD25FJ681
R93, 94	ERD25FJ680
R95, 96	ERD25FJ271
R97, 98	ERD25FJ102
R99, 100	ERD25FJ472
R101, 102	ERD25FJ332
R103, 104, 105, 106, 107, 108	ERD25FJ152
R109, 110	ERD25FJ392
R111, 112	ERD25TJ183
R115, 116	ERD25TJ104
R117, 118, 119, 120	ERD25FJ102
R121, 122	ERD25FJ121
R123, 124, 125, 126	ERD25TJ473
R150	ERD25FJ102
R151 [DB]	ERG1ANJ151
*For all European areas.	
[A]	ERD25FJ151
*For Australia.	
R152	ERD25TJ153
R153	ERD25FJ220
R154	ERD25FJ681
R155 [DB]	ERG1ANJ221
*For all European areas.	
[A]	ERD25FJ221
*For Australia.	
R156 [DB]	ERQ14AJ470P
*For all European areas.	
[A]	ERD25FJ470
*For Australia.	
R157, 158	ERD25TJ683
R159	ERD25FJ102
R160	ERD25FJ562
R161, 162	ERD25FJ103
R163	ERD25FJ682
R164, 165	ERD25FJ103
R166	ERD25FJ332
R167	ERD25FJ1R0
R168, 169	ERD25TJ683
R170, 171 [DB]	ERD1ANJ560
*For all European areas.	
[A]	ERD25FJ560
*For Australia.	
R172	ERD25FJ103
R173	ERD25FJ221
R174	ERD25FJ101
R175	ERD25FJ562
R176	ERD25TJ333
R177	ERD25TJ223
R178	ERD25FJ272
R179	ERD25TJ393
R180	ERD25TJ104
R181	ERD25TJ124
R182	ERD25TJ224
R183, 184	ERD25TJ683
R185	ERD25FJ332
R186	ERD25FJ102
R187, 188	ERD25TJ684
R189 [DB]	ERQ14AJ151P
*For all European areas.	
[A]	ERD25FJ151
*For Australia.	
R190	ERD25FJ103
R191	ERD25FJ100
R192	ERD25FJ102
R201 △	ERD25FJ392
R202	ERG1ANJ150
R203 △	ERG2ANJ471
R204 △	ERD25TJ183
R205	ERD25FJ392
R206A [DB]	ERD25FJ822
*For all European areas.	
R206B [DB]	ERD25TJ103
*For all European areas.	
R206 [A]	ERD25TJ183
*For Australia.	
R207	ERD25FJ822
R208	ERG1ANJ560
R209A, 209B [DB]	ERD25FJ182
*For all European areas.	
R209 [A]	ERD25FJ392
*For Australia.	
R210	ERD25FJ330
R211 [DB]	ERQ14AJ100P
*For all European areas.	
[A]	ERD25FJ100
*For Australia.	
R212	ERD25TJ104
R213	ERD25TJ473
R214, 215	ERD25FJ822
R216	ERD25FJ103
R217	ERD25TJ123
R218	ERG2ANJ121
R219 [DB]	ERG12ANJ102
*For all European areas.	
[A]	ERD25FJ102
*For Australia.	
R220	ERD25TJ223
R221	ERD25FJ331
R222	ERD25FJ561
R223	ERG2ANJ151
R224 [DB]	ERG12ANJ102
*For all European areas.	
[A]	ERD25FJ102
*For Australia.	
R225	ERD25TJ223
R226	ERD25FJ331
R227	ERD25FJ561
R228	ERD25FJ562
R229	ERD25FJ222
R230	ERD25FJ101
R231	ERG12ANJ220
R232	ERD25FJ2R2
R233, 234	ERD25FJ102
R235	ERD25FJ2R2
R236 [DB]	ERD25FJ222
*For all European areas.	
[A]	ERD25FJ152
*For Australia.	
R237	ERD25FJ332
R238 [DB]	ERD25FJ561
*For all European areas.	
[A]	ERD25FJ102
*For Australia.	
R239	ERD25FJ102
R240	ERD25TJ473
R241A [DB]	ERD25FJ151
*For all European areas.	
R241B [DB]	ERD25FJ181
*For all European areas.	
R241 [A]	ERD25FJ331
*For Australia.	
R242	ERD25FJ103
R243	ERD25FJ472
R244, 245	ERD25FJ103
R246	ERD25FJ331
R247	ERD25TJ183
R248	ERD25TJ473
R249, 250	ERD25FJ562
R251, 252	ERD25FJ182
R253	ERD25TJ183
R254	ERD25FJ562
R255	ERD25TJ334
R256	ERD25TJ274
R257, 258, 259	ERD25FJ472
R260	ERD25FJ271
R261	ERD25FJ681
R262	ERD25FJ331
R263	ERD25FJ472
R264, 265	ERD25TJ473
R266	ERD25FJ103
R272	ERD25FJ101
R273, 274	ERD25TJ473
R275	ERD25FJ331
R276	ERD25TJ473
R277	ERD25FJ101
R278	ERD25TJ183
R279	ERD25TJ683
R280	ERD25FJ562
R281	ERD25TJ473
R282	ERD25TJ153
R283, 284	ERD25FJ103
R285, 286, 287, 288, 289, 290	ERD25FJ101
R291, 292	ERD25FJ102
R293, 294 [DB]	ERQ14AJ181
*For all European areas.	
[A]	ERD25FJ181
*For Australia.	
R301	ERD25FJ151
R302	ERD25FJ150
R303	ERD25TJ104
R304	ERD25FJ682
R305	ERD25FJ472
R306	ERD25TJ333
R307	ERD25FJ472
R308, 309	ERD25FJ270
R310, 311, 312, 313	ERD25FJ471
R314, 315, 316, 317	ERD25FJ103
R318	ERX12ANJ1R0
R320	ERD25FJ391
R321 [DB]	ERQ14AJ680
*For all European areas.	
[A]	ERD25FJ680
*For Australia.	
R322	ERD25FJ391
R323	ERD25TJ123
R324	ERO25VKG1203
R601, 602	ERD25FJ390
R607, 608	ERD25FJ101
R611, 612, 613, 614	ERD25TJ224
R615, 616	ERD25TJ474
R617, 618	ERD25FJ472
R619, 620	ERD25TJ333
R621, 622	ERD25FJ103
R623, 624	ERD25TJ824
R625, 626	ERD25FJ822
R627, 628	ERD25TJ393
R629, 630	ERD25TJ683
R631, 632	ERD25TJ333
R633, 634, 635, 636	ERD25FJ103
R637, 638	ERD25FJ221
R639, 640	ERD25FJ332
R641, 642	ERD25FJ391
R643, 644	ERD25FJ102
R645, 646	ERD25FJ103
R647, 648	ERO25TKG3302
R649, 650, 651, 652	ERD25TJ473
R653, 654	ERD25FJ391
R655, 656	ERD25FJ102
R657, 658	ERO25TKG2200
R659, 660	ERD25TJ224
R661, 662	ERD25FJ472
R663, 664	ERD25FJ390
R665, 666, 667, 668, 669, 670	ERO25TKG2200
R671, 672	ERD25TJ473
R673, 674	ERD25TJ333
R675, 676	ERD25TJ224
R677, 678	ERD25FJ472
R679, 680	ERD25TJ184
R681, 682	ERD25TJ333
R683, 684	ERD25FJ682
R685, 686	ERD25FJ822
R687, 688	ERD25FJ332
R689, 690	ERD25TJ333
R691, 692	ERD25FJ391
R693, 694	ERD25FJ181
R695, 696	ERD25FJ103
R697, 698	ERD25FJ221
R699, 700	ERD25FJ332
R701, 702	ERD25FJ391
R703, 704	ERD25FJ392
R705, 706	ERD25TJ473
R707, 708	ERO25TKG1002
R709, 710	ERD25TJ225
R711, 712	ERO25TKG2002
R713, 714	ERD25TJ105
R715, 716	ERD25FJ392
R717, 718	ERD25FJ332
R719, 720	ERD25FJ3R3
R721, 722	ERD25TJ564
R723, 724	ERD25FJ103
R725, 726	ERD25TJ224
R727, 728, 729, 730	ERD25FJ103
R731, 732	ERD25TJ104
R733, 734	ERD25TJ105
R735, 736, 737, 738	ERD25TJ473
R739, 740	ERO25TKG3901
R741, 742	ERO25TKG4701
R743, 744	ERO25TKG5100
R745, 746	ERO25TKG4701
R747, 748	ERD25FJ122
R761	ERD25TJ153
R762	ERD25TJ104
R763, 764	ERD25TJ473
R766, 767	ERD25TJ473
R768	ERD25FJ682
R770, 771	ERD25TJ104
R772, 773, 774	ERD25TJ473
R775	ERD25TJ333
R776	ERD25FJ222
R777	ERD25TJ473
R778	ERD25FJ392
R779, 780	ERD25TJ393
R781	ERD25FJ332
R782	ERD25FJ122
R783	ERD25FJ221
R784	ERD25TJ123
R785, 786	ERD25FJ103
R787, 788	ERD25TJ473
R789, 790	ERD25FJ221
R791, 792	ERD25FJ390
R793	ERD25FJ392
R797, 798, 799	ERD25TJ223
R800	ERD25TJ153
R801	ERD25FJ103
R802	ERD25TJ473
R803, 804	ERD25FJ222
R805 [DB]	ERQ14AJ100P
*For all European areas.	
R809, 810	ERD25TJ225
VARIABLE RESISTORS	
VR1, 2	EVNM4AA00B24
VR3	QWKNXAF22A24
VR5, 6	EVNM4AA00B24
VR7	QWKGTA024A14
VR9, 10	EVNM4AA00B15
VR11, 12	EVNM4AA00B14
VR13	EVNM4AA00B52
VR201	EVNM4AA00B53
VR301	EVNM0AA00B14
VR601, 602	EVNM4AA00B54
VR603, 604	EVNM4AA00B14
VR605, 606, 607, 608, 609, 610	EVNM4AA00B54
VR611	EVNM4AA00B23
CAPACITORS	
C1, 2	ECKD1H102KB
C3, 4	ECEA16M10R
C5, 6	ECKD1H391KB
C7, 8	ECKD1H271KB
C9, 10	ECEA1CS330
C11, 12	ECKD1H102KB
C13, 14	ECQP1471JZ
C15, 16	ECQM1H272KZ
C17, 18	ECQM1H273JZ
C19, 20	ECCD1H470K
C21, 22	ECEA1CS330
C23, 24	ECEA1HS100
C25, 26	ECQM1H123KZ
C27, 28	ECKD1H152KB
C29, 30	ECEA2AS010
C31, 32	ECEA50ZR33
C33, 34	ECEA50ZR68
C35, 36	ECCD1H560K
C37, 38	ECQP1392JZ
C39, 40	ECQM1H273JZ
C41, 42	ECQM1H472JZ
C43, 44	ECEA25M10R
C45, 46	ECEA50MR33R
C47, 48	ECEA1HS100
C49, 50	ECEA1AS221
C51, 52	ECQM1H562JZ
C53, 54	ECEA1HS100
C55, 56	ECFDD104KXY
C57, 58	ECEA50ZR33
C59, 60	ECEA1HS100
C61, 62	ECQM1H473KZ
C63, 64	ECEA1HS100
C65, 66	ECKD1H102KB
C67, 68	ECEA50ZR22
C69, 70	ECEA50Z3R3
C71, 72	ECEA50ZR68
C73, 74	ECEA50Z1
C75, 76	ECEA1HS100
C77, 78	ECEA50Z1
C79, 80	ECQM1H273JZ
C81, 82	ECQM1H123KZ
C83, 84	ECQM1H223KZ
C85, 86	ECQV05104JZ
C87, 88	ECQM1H103KZ
C89, 90	ECQM1H273JZ
C91, 92	ECQM1H183KZ
C93, 94	ECQM1H393KZ
C95, 96	ECEA2AS010
C97, 98	ECCD1H100KD
C99, 100	ECEA1ES101
C101, 102	ECCD1H181K
C130, 131, 132	ECEA1ES101
C133	ECEA1ES471
C134	ECEA50Z1
C135	ECKD1H223ZF
C136	ECEA50Z1
C137	ECEA50ZR33
C138	ECQF4333KZH
C139	ECFDD104KXY
C140, 141	ECQM1H822KZ
C142	ECQM1H272KZ
C143	ECEA1CS330
C144	ECEA1JS4R7
C145	ECKD1H102KB
C146	ECEA50Z3R3
C147	ECEA1HS100
C148	ECEA25Z4R7
C149	ECFDD104KXY
C150	ECQM1H473KZ
C151	ECEA1HS100
C153, 154	ECCD1H181K
C155, 156	ECCD1H470K
C157	ECCD1H181K
C158	ECEA1HS100
C159 [DB]	ECEA50Z1
*For all European areas.	
C201 △	ECEA1ES222
C202 △	ECEA1HS102
C203 △	ECEA1HS470
C204, 205	ECEA1ES101
C206, 207	ECEA1HS100
C208	ECEA50Z1
C209	ECEA1JS330
C210	ECEA1JS220
C211	ECEA0JS102
C212	ECKD1H222ZF
C213	ECEA1AS101
C214	ECKD1H271KB
C215	ECEA1ES331
C216, 217	ECEA25Z4R7
C218	ECKD1H333ZF
C219	ECEA1HS100
C220	ECEA50Z2R2
C221	ECEA1HS100
C222, 223, 224, 225, 226, 227, 228	ECKD1H223ZF
C229	ECEA1HS100
C230	ECKD1H103ZF
C231	ECEA1HS100
C232	ECEA1ES470
C233	ECFDD104KXY
C234	ECKD1H333ZF
C236, 237	ECKD1H561KB
C238	ECKD1H102ZF
C301	ECEA50M1R
C302	ECQM1H562KZ
C303	ECQM1H153KZ
C304	ECKD1H102MD
C305	ECQM1H392KZ
C306	ECQM1H473KZ
C307	ECEA50ZR33
C308	ECQM1H223KZ
C309	ECEA50Z1
C310	ECSF35E47
C311, 312	ECEA25N4R7
C313	ECSF25E10
C314	ECSF35E1
C315	ECQM1H562KZ
C316	ECSF10E3R3
C317	ECQS1682JZ
C318	ECKD1H103MD
C607, 608	ECEA1HS100
C609, 610	ECEA1CS221
C611, 612	ECQV05823JZ
C613, 614	ECQV05104JZ
C615, 616	ECEA25Z4R7
C617, 618	ECQM1H122KZ
C619, 620	ECCD1H121KD
C621, 622	ECQM1H122KZ
C623, 624	ECQV05334JZ
C625, 626	ECCD1H221KD
C627, 628	ECQM1H103KZ
C629, 630	ECKD1H102KB
C631, 632, 633, 634	ECCD1H101KD
C635, 636	ECQM1H103KZ

7 6 5 4

CIRCUIT BOARD
MAIN AMP CIRCUIT BOARD



* For all European areas

Ref. No.	Part No.
C637, 638	ECEA1HS100
C639, 640, 641, 642	ECQV05104JZ
C643, 644	ECQM1H332KZ
C645, 646	ECKD1H331KB
C647, 648	ECQM1H332KZ
C649, 650	ECEA1CS221
C651, 652	ECQM1H103KZ
C653, 654	ECQV05104JZ
C655, 656	ECCD1H221KD
C657, 658	ECEA16M22RK
C663	ECEA50ZR22
C664	ECEA50ZR1
C665	ECEA1HS470
C666	ECEA1ES101
C667, 668	ECEA1HS100
C669	ECEA25Z4R7
C670	ECEA1ES470
C671	ECKD1H103ZF
COMBINATION PARTS	
CR1, 2	EXRP102K562
RX-1	RM6562K
Z1, 2 △	QCR0011
TRANSISTORS	
Q1, 2	2SC1844E
Q3, 4	2SC1400E
Q5, 6, 7, 8	2SC945-Q
Q9, 10, 11, 12	2SK104H
Q13, 14	2SD592NCS
Q15, 16	2SC945-Q
Q19, 20	2SC1400E
Q21, 22	2SD592NCS
Q23	2SC945-Q
Q24, 25	2SD592NCS
Q26	2SC1384NCS
Q27	2SC945-Q
Q28, 29	2SC2021SF
Q201	2SD836Q
Q202 [DB]	2SC945-Q
*For all European areas.	
[A]	2SC2021SF
*For Australia.	
Q203, 204	2SD638R
Q205, 206	2SD946AR
Q207, 208, 209, 210, 211, 212	2SC2021SF
Q213	2SA786RF
Q214	2SB744R
Q215	2SD638R
Q216	2SB744R
Q217	2SD638R
Q218	2SC1846R
Q219	2SC2021SF
Q221 [DB]	2SB744R
*For all European areas.	
[A]	2SB636S
*For Australia.	
Q222	2SD638S
Q223 [DB]	2SB744R
*For all European areas.	
[A]	2SB643S
*For Australia.	
Q224 [DB]	2SC1383Q
*For all European areas.	
[A]	2SD638R
*For Australia.	
Q225	2SA786RF
Q226, 227, 228, 229	2SC2021SF
Q230	2SA786RF
Q231	2SC2021SF
Q232	2SA786RF
Q233	2SC2021SF
Q301, 302, 303, 304	2SB643Q
Q305	2SB744Q
Q601, 602	2SK68AM
Q603, 604	2SC2021SF
Q605, 606, 607, 608	2SD1010R
Q609, 610	2SK30AO
Q611, 612	2SD661U
Q613, 614	2SB641R
Q615, 616, 617, 618	2SD1010R
Q619, 620	2SC2021SF
Q621, 622	2SK30AO
Q623, 624	2SD661U
Q625, 626	2SB641R
Q627, 628	2SK68AM
Q637, 638, 639, 640, 641	2SC2021SF
Q642	2SB641R
Q643, 644	2SC2021SF
Q645	2SD794R
Q646	2SB644R
Q647	2SD638S
Q648, 649, 650	2SC2021SF
DIODES & RECTIFIERS	
D1, 2, 3, 4, 5, 6, 7, 8	MA161
D9	MV121
D10	MA161
D11	RVDRD6R8EB
D12	MV121
D13, 14, 15, 16, 17	MA161
D201, 202, 203, 204 △	SM112
D205	MA1056
D206, 207	SM112
D208, 209, 210	MA161
D211, 212, 213, 214	SM112
D215	MA161
D216	SM112
D217	RVDRD12FB
D218	MA161
D219	MA1100
D220	MA161
D221	MA1056
D223, 224	MA161
D225	TLY206
D226	TLR206
D227	TLG206
D601, 602, 603, 604, 605, 606, 607, 608, 611, 612, 613, 614, 615, 616, 617	MA161
D622	RD24EB4
D623	MA1056
D624 [DB]	RVDRD12FB
*For all European areas.	
INTEGRATED CIRCUITS	
IC1, 2	NE645B
IC3	AN6552
IC4	AN6870
IC5	NJM4556
IC201	AN6251
IC202	M53200P
IC203	M53204P
IC204	DN6838
IC301	AN6633
IC601, 602	BA651
IC603, 604	BA652
IC605, 606	NJM4558D
IC607, 608	NJM4558DF
IC609	NJM4558D
HALL ELEMENTS	
H1, 2	QVZVHE610D

RS-M270X
RS-M270X

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e

t for safety.
cified parts.

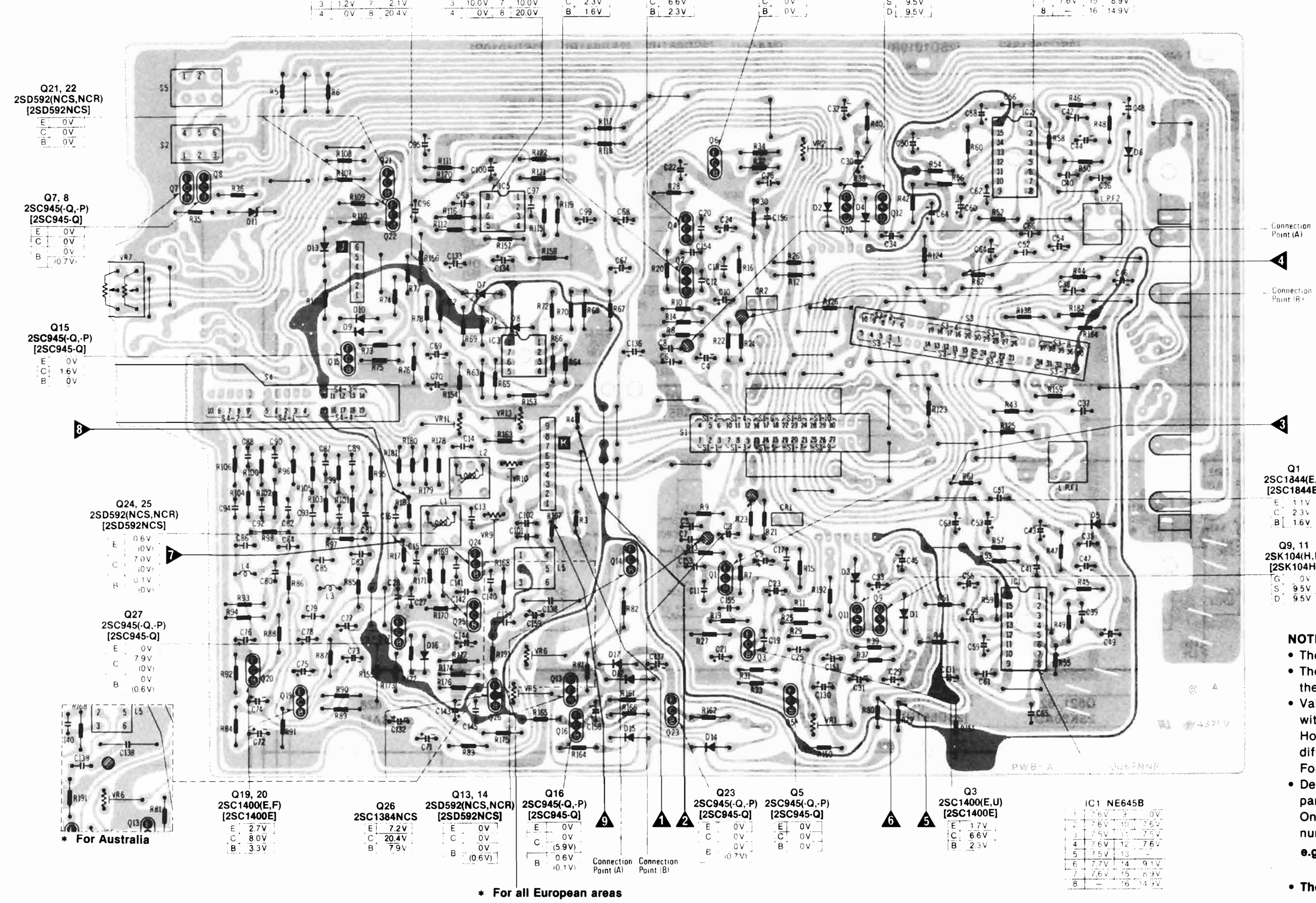
Part No.
RD25FJ561
RD25FJ562
RD25FJ222
RD25FJ101
RG12ANJ220
RD25FJ2R2
RD25FJ2R2
RD25FJ2R2
RD25FJ222
ropean areas.
RD25FJ152
alia.
RD25FJ332
RD25FJ102
RD25FJ561
ropean areas.
RD25FJ102
alia.
RD25FJ102
RD25TJ473
RD25FJ102
RD25FJ151
ropean areas.
RD25FJ181
ropean areas.
RD25FJ331
alia.
RD25FJ103
RD25FJ472
RD25FJ103
RD25TJ331
RD25TJ183
RD25TJ473
RD25FJ562
RD25FJ182
RD25TJ183
RD25FJ562
RD25TJ334
RD25TJ274
9
RD25FJ472
RD25FJ271
RD25FJ681
RD25FJ331
RD25FJ472
RD25TJ473
RD25FJ103
RD25FJ101
RD25TJ473
RD25FJ331
RD25TJ473
RD25FJ101
RD25TJ183
RD25TJ683
RD25FJ562
RD25TJ473
RD25TJ153
RD25FJ103
RD25FJ101
RD25FJ102
, 288, 289, 290
RQ14AJ181
ropean areas.
RD25FJ181
alia.
RD25FJ151
RD25FJ150
RD25TJ104
RD25FJ682
RD25FJ472
RD25TJ333
RD25FJ472
RD25FJ270
, 313
RD25FJ471
, 317
RD25FJ103
RX12ANJ1R0

Ref. No.	Part No.
R320	ERD25FJ391
R321 DB	ERQ14AJ680
*For all European areas.	
A	ERD25FJ680
*For Australia.	
R322	ERD25FJ391
R323	ERD25TJ123
R324	ERO25VKG1203
R601, 602	ERD25FJ390
R607, 608	ERD25FJ101
R611, 612, 613, 614	ERD25TJ224
R615, 616	ERD25TJ474
R617, 618	ERD25FJ472
R619, 620	ERD25TJ333
R621, 622	ERD25FJ103
R623, 624	ERD25FJ824
R625, 626	ERD25FJ822
R627, 628	ERD25TJ393
R629, 630	ERD25TJ683
R631, 632	ERD25TJ333
R633, 634, 635, 636	ERD25FJ103
R637, 638	ERD25FJ221
R639, 640	ERD25FJ332
R641, 642	ERD25FJ391
R643, 644	ERD25FJ102
R645, 646	ERD25FJ103
R647, 648	ERO25TKG3302
R649, 650, 651, 652	ERD25FJ473
R653, 654	ERD25FJ391
R655, 656	ERD25FJ102
R657, 658	ERO25TKG2200
R659, 660	ERD25TJ224
R661, 662	ERD25FJ472
R663, 664	ERD25FJ390
R665, 666, 667, 668, 669, 670	ERO25TKG2200
R671, 672	ERD25TJ473
R673, 674	ERD25TJ333
R675, 676	ERD25TJ224
R677, 678	ERD25FJ472
R679, 680	ERD25TJ184
R681, 682	ERD25TJ333
R683, 684	ERD25FJ682
R685, 686	ERD25FJ822
R687, 688	ERD25FJ332
R689, 690	ERD25TJ333
R691, 692	ERD25FJ391
R693, 694	ERD25FJ181
R695, 696	ERD25FJ103
R697, 698	ERD25FJ221
R699, 700	ERD25FJ332
R701, 702	ERD25FJ391
R703, 704	ERD25FJ392
R705, 706	ERD25TJ473
R707, 708	ERO25TKG1002
R709, 710	ERD25TJ225
R711, 712	ERO25TKG2002
R713, 714	ERD25TJ105
R715, 716	ERD25FJ392
R717, 718	ERD25FJ332
R719, 720	ERD25FJ3R3
R721, 722	ERD25TJ564
R723, 724	ERD25FJ103
R725, 726	ERD25TJ224
R727, 728, 729, 730	ERD25FJ103
R731, 732	ERD25TJ104
R733, 734	ERD25TJ105
R735, 736, 737, 738	ERD25TJ473
R739, 740	ERO25TKG3901
R741, 742	ERO25TKG4701
R743, 744	ERO25TKG5100
R745, 746	ERO25TKG4701
R747, 748	ERD25FJ122
R761	ERD25TJ153
R762	ERD25TJ104
R763, 764	ERD25TJ473
R766, 767	ERD25TJ473
R768	ERD25FJ682
R770, 771	ERD25TJ104
R772, 773, 774	ERD25TJ473
R775	ERD25TJ333
R776	ERD25FJ222
R777	ERD25TJ473

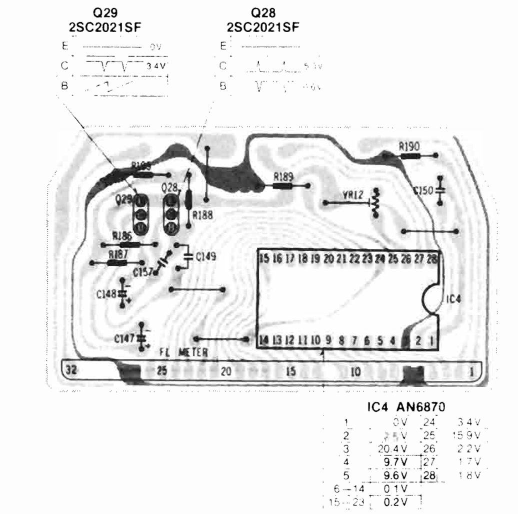
Ref. No.	Part No.
R778	ERD25FJ392
R779, 780	ERD25TJ393
R781	ERD25FJ332
R782	ERD25FJ122
R783	ERD25FJ221
R784	ERD25TJ123
R785, 786	ERD25FJ103
R787, 788	ERD25TJ473
R789, 790	ERD25FJ221
R791, 792	ERD25FJ390
R793	ERD25FJ392
R797, 798, 799	ERD25TJ223
R800	ERD25TJ153
R801	ERD25FJ103
R802	ERD25TJ473
R803, 804	ERD25FJ222
R805 DB	ERQ14AJ100P
*For all European areas.	
R809, 810	ERD25TJ225
VARIABLE RESISTORS	
VR1, 2	EVNM4AA00B24
VR3	QWKNXAF22A24
VR5, 6	EVNM4AA00B24
VR7	QWKGTA024A14
VR9, 10	EVNM4AA00B15
VR11, 12	EVNM4AA00B14
VR13	EVNM4AA00B52
VR201	EVNM4AA00B53
VR301	EVNM0AA00B14
VR601, 602	EVNM4AA00B54
VR603, 604	EVNM4AA00B14
VR605, 606, 607, 608, 609, 610	EVNM4AA00B54
VR611	EVNM4AA00B23
CAPACITORS	
C1, 2	ECKD1H102KB
C3, 4	ECEA16M10R
C5, 6	ECKD1H391KB
C7, 8	ECKD1H271KB
C9, 10	ECEA1CS330
C11, 12	ECKD1H102KB
C13, 14	ECQP1471JZ
C15, 16	ECQM1H272KZ
C17, 18	ECQM1H273JZ
C19, 20	ECCD1H470K
C21, 22	ECEA1CS330
C23, 24	ECEA1HS100
C25, 26	ECQM1H123KZ
C27, 28	ECKD1H152KB
C29, 30	ECEA2AS010
C31, 32	ECEA50ZR33
C33, 34	ECEA50ZR68
C35, 36	ECCD1H560K
C37, 38	ECQP1392JZ
C39, 40	ECQM1H273JZ
C41, 42	ECQM1H472JZ
C43, 44	ECEA25M10R
C45, 46	ECEA50MR33R
C47, 48	ECEA1HS100
C49, 50	ECEA1AS221
C51, 52	ECQM1H562JZ
C53, 54	ECEA1HS100
C55, 56	ECFDD104KXY
C57, 58	ECEA50ZR33
C59, 60	ECEA1HS100
C61, 62	ECQM1H473KZ
C63, 64	ECEA1HS100
C65, 66	ECKD1H102KB
C67, 68	ECEA50ZR22
C69, 70	ECEA50Z3R3
C71, 72	ECEA50ZR68
C73, 74	ECEA50Z1
C75, 76	ECEA1HS100
C77, 78	ECEA50Z1
C79, 80	ECQM1H273JZ
C81, 82	ECQM1H123KZ
C83, 84	ECQM1H223KZ
C85, 86	ECQV05104JZ
C87, 88	ECQM1H103KZ
C89, 90	ECQM1H273JZ
C91, 92	ECQM1H183KZ
C93, 94	ECQM1H393KZ
C95, 96	ECEA2AS010
C97, 98	ECCD1H100KD

Ref. No.	Part No.
C99, 100	ECEA1ES101
C101, 102	ECCD1H181K
C130, 131, 132	ECEA1ES101
C133	ECEA1ES471
C134	ECEA50Z1
C135	ECKD1H223ZF
C136	ECEA50Z1
C137	ECEA50ZR33
C138	ECQF4333KZH
C139	ECFDD104KXY
C140, 141	ECQM1H822KZ
C142	ECQM1H272KZ
C143	ECEA1CS330
C144	ECEA1JS4R7
C145	ECKD1H102KB
C146	ECEA50Z3R3
C147	ECEA1HS100
C148	ECEA25Z4R7
C149	ECFDD104KXY
C150	ECQM1H473KZ
C151	ECEA1HS100
C153, 154	ECCD1H181K
C155, 156	ECCD1H470K
C157	ECCD1H181K
C158	ECEA1HS100
C159 DB	ECEA50Z1
*For all European areas.	
C201 △	ECEA1ES222
C202 △	ECEA1ES102
C203 △	ECEA1HS470
C204, 205	ECEA1ES101
C206, 207	ECEA1HS100
C208	ECEA50Z1
C209	ECEA1JS330
C210	ECEA1JS220
C211	ECEA0JS102
C212	ECKD1H222ZF
C213	ECEA1AS101
C214	ECKD1H271KB
C215	ECEA1ES331
C216, 217	ECEA25Z4R7
C218	ECKD1H333ZF
C219	ECEA1HS100
C220	ECEA50Z2R2
C221	ECEA1HS100
C222, 223, 224, 225, 226, 227, 228	ECKD1H223ZF
C229	ECEA1HS100
C230	ECKD1H103ZF
C231	ECEA1HS100
C232	ECEA1ES470
C233	ECFDD104KXY
C234	ECKD1H333ZF
C236, 237	ECKD1H561KB
C238	ECKD1H102ZF
C301	ECEA50M1R
C302	ECQM1H562KZ
C303	ECQM1H153KZ
C304	ECKD1H102MD
C305	ECQM1H392KZ
C306	ECQM1H473KZ
C307	ECEA50ZR33
C308	ECQM1H223KZ
C309	ECEA50Z1
C310	ECFSF35E47
C311, 312	ECEA25N4R7
C313	ECSF25E10
C314	ECSF35E1
C315	ECQM1H562KZ
C316	ECSF10E3R3
C317	ECQS1682JZ
C318	ECKD1H103MD
C607, 608	ECEA1HS100
C609, 610	ECEA1CS221
C611, 612	ECQV05823JZ
C613, 614	ECQV05104JZ
C615, 616	ECEA25Z4R7
C617, 618	ECQM1H122KZ
C619, 620	ECCD1H121KD
C621, 622	ECQM1H122KZ
C623, 624	ECQV05334JZ
C625, 626	ECCD1H221KD
C627, 628	ECQM1H103KZ
C629, 630	ECKD1H102KB
C631, 632, 633, 634	ECCD1H101KD
C635, 636	ECQM1H103KZ

CIRCUIT BOARD
MAIN AMP CIRCUIT BOARD



FL METER CIRCUIT BOARD



NOTES:
- The circuit shown in ▬ on the conductor is +B (bias) circuit.
- The circuit shown in ▬ on the conductor indicates printed circuit on the back side of the printed circuit board.
- Values indicated in ▭ are under no signal condition and record mode with volume control at minimum position.
  However, the voltage in playback mode is indicated in ( ) when it differs from that in record mode.
  For measurement, use VTVM.
- Described in the circuit board diagram are two types of numbers; the supply parts number and production parts number for transistors.
  One type of number is used for supply parts number and production parts number when they are identical.
  e.g. 2SC1400(E,U) ←— Production parts number
  [2SC1400E] ←— Supply parts number
- **The supply parts number is described alone in the replacement parts list.**

Ref. No.	Part No.
C637, 638	ECEA1HS100
C639, 640, 641, 642	ECQV05104JZ
C643, 644	ECQM1H332KZ
C645, 646	ECKD1H331KB
C647, 648	ECQM1H332KZ
C649, 650	ECEA1CS221
C651, 652	ECQM1H103KZ
C653, 654	ECQV05104JZ
C655, 656	ECCD1H221KD
C657, 658	ECEA16M22RK
C663	ECEA50ZR22
C664	ECEA50ZR1
C665	ECEA1HS470
C666	ECEA1ES101
C667, 668	ECEA1HS100
C669	ECEA25Z4R7
C670	ECEA1ES470
C671	ECKD1H103ZF
COMBINATION PARTS	
CR1, 2	EXRP102K562
RX-1	RM6562K
Z1, 2 △	QCR0011
TRANSISTORS	
Q1, 2	2SC1844E

Ref. No.	Part No.
Q3, 4	2SC1400E
Q5, 6, 7, 8	2SC945-Q
Q9, 10, 11, 12	2SK104H
Q13, 14	2SD592NCS
Q15, 16	2SC945-Q
Q19, 20	2SC1400E
Q21, 22	2SD592NCS
Q23	2SC945-Q
Q24, 25	2SD592NCS
Q26	2SC1384NCS
Q27	2SC945-Q
Q28, 29	2SC2021SF
Q201	2SD836Q
Q202 DB	2SC945-Q
*For all European areas.	
A	2SC2021SF
*For Australia.	
Q203, 204	2SD638R
Q205, 206	2SD946AR
Q207, 208, 209, 210, 211, 212	2SC2021SF
Q213	2SA786RF
Q214	2SB744R
Q215	2SD638R
Q216	2SB744R
Q217	2SD638R
Q218	2SC1846R

Ref. No.	Part No.
Q219	2SC2021SF
Q221 DB	2SB744R
*For all European areas.	
A	2SB636S
*For Australia.	
Q222	2SD638S
Q223 DB	2SB744R
*For all European areas.	
A	2SB643S
*For Australia.	
Q224 DB	2SC1383Q
*For all European areas.	
A	2SD638R
*For Australia.	
Q225	2SA786RF
Q226, 227, 228, 229	2SC2021SF
Q230	2SA786RF
Q231	2SC2021SF
Q232	2SA786RF
Q233	2SC2021SF
Q301, 302, 303, 304	2SB643Q
Q305	2SB744Q
Q601, 602	2SK68AM
Q603, 604	2SC2021SF
Q605, 606, 607, 608	2SD1010R

Ref. No.	Part No.
Q609, 610	2SK30AO
Q611, 612	2SD661U
Q613, 614	2SB641R
Q615, 616, 617, 618	2SD1010R
Q619, 620	2SC2021SF
Q621, 622	2SK30AO
Q623, 624	2SD661U
Q625, 626	2SB641R
Q627, 628	2SK68AM
Q637, 638, 639, 640, 641	2SC2021SF
Q642	2SB641R
Q643, 644	2SC2021SF
Q645	2SD794R
Q646	2SB644R
Q647	2SD638S
Q648, 649, 650	2SC2021SF
DIODES & RECTIFIERS	
D1, 2, 3, 4, 5, 6, 7, 8	MA161
D9	MV121
D10	MA161
D11	RVDRD6R8EB
D12	MV121
D13, 14, 15, 16, 17	MA161

Ref. No.	Part No.
D201, 202, 203, 204 △	SM112
D205	MA1056
D206, 207	SM112
D208, 209, 210	MA161
D211, 212, 213, 214	SM112
D215	MA161
D216	SM112
D217	RVDRD12FB
D218	MA161
D219	MA1100
D220	MA161
D221	MA1056
D223, 224	MA161
D225	TLY206
D226	TLR206
D227	TLG206
D601, 602, 603, 604, 605, 606, 607, 608, 611, 612, 613, 614, 615, 616, 617	MA161

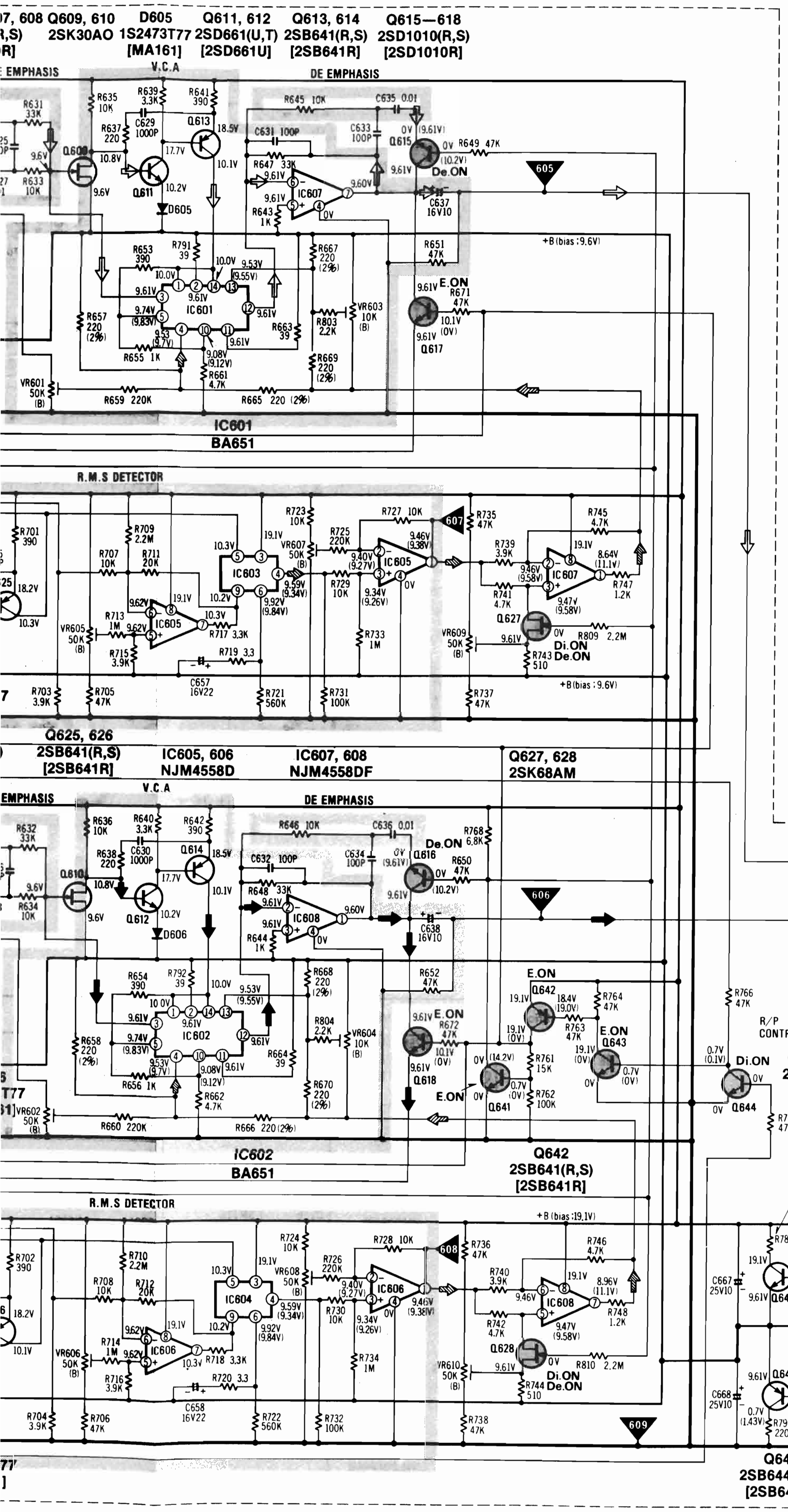
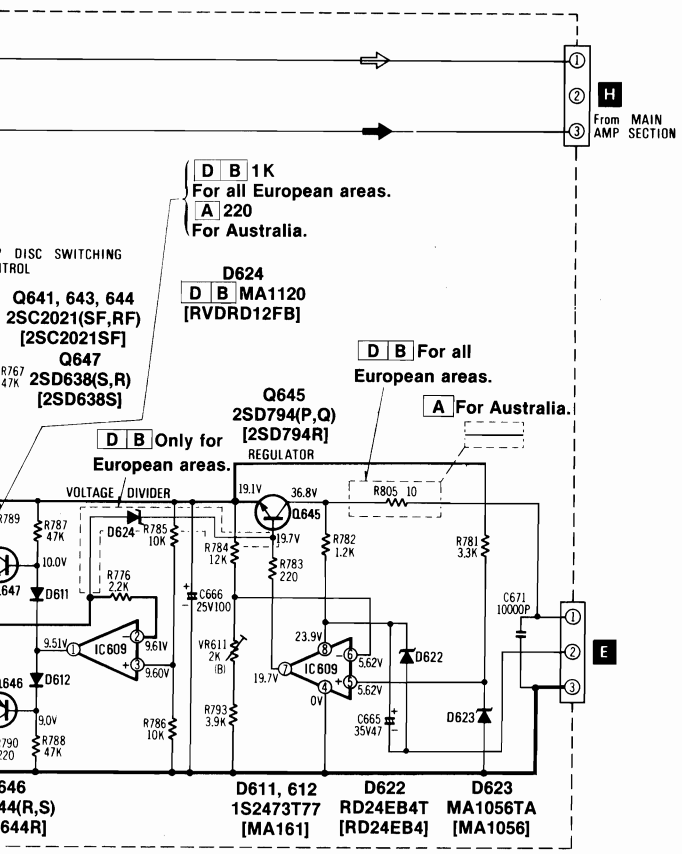
Ref. No.	Part No.
D622	RD24EB4
D623	MA1056
D624 DB	RVDRD12FB
*For all European areas.	
INTEGRATED CIRCUITS	
IC1, 2	NE645B
IC3	AN6552
IC4	AN6870
IC5	NJM4556
IC201	AN6251
IC202	M53200P
IC203	M53204P
IC204	DN6838
IC301	AN6633
IC601, 602	BA651
IC603, 604	BA652
IC605, 606	NJM4558D
IC607, 608	NJM4558DF
IC609	NJM4558D
HALL ELEMENTS	
H1, 2	QVZVHE610D3

Ref. No.	Part No.	Part Name & Description
TRANSFORMER		
T1 DB △	QLPD44EME	AC Power Transformer
*For all European areas.		
A △	QLPA53EME	〃
*For Australia.		
COILS		
L1, 2	QLQX1032W	Bias Trap Coil
L3, 4	QLQX0332K	Peaking Coil
L5	QLB0194K	Bias Oscillation Coil
L8	QZE0013	FG Coil
L201	QLQZ1014D	Choke Coil
L.P.F 1, 2	SLMZ19	MPX Filter Coil
SWITCHES		
S1	ESA29238	Slide Switch (Record/Playback Selector)
S2, 5	QSWY204	Push Switch (Input Select, Timer Rec)
S3	QSS8403	Slide Switch (Noise Reduction Selector)
S4	QSR6402	Rotary Switch (Tape Selector)
S201, 202, 203, 204, 205, 206, 207	QSW1111	Push Switch (Control Key Switch)
S208	QSB0238	Leaf Switch (Cassette Detection Switch)
S209	QSM0067	Micro Switch (Accidental Erase Prevention Switch)

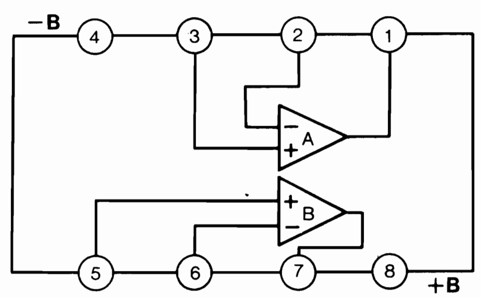
Ref. No.	Part No.	Part Name & Description
S210 △	QES1525	Push Switch (Power ON/OFF Switch)
S211 △	QSR1407H	Rotary Switch (AC Power Voltage Selector)
JACKS		
J1, 2	QJA0257	Microphone Jack
J3	QJA0249	Headphones Jack
J4	QEJ5003H	Jack Board
J5	QJS1955H	Remote Control Socket
PILOT LAMPS		
PL1	XAMQ44S600	Mechanism Lamp
PL2	XAMQ23P500	NR Indication Lamp
FUSES		
F1, 2 DB △	XBAQ0010	Fuse (T1.6A)
*For all European areas.		
F3 DB △	XBAQ0013	Fuse (T200mA)
*For all European areas.		
F4 DB △	XBAQ0003	Fuse (T500mA)
*For all European areas.		

4 5 6 7 8

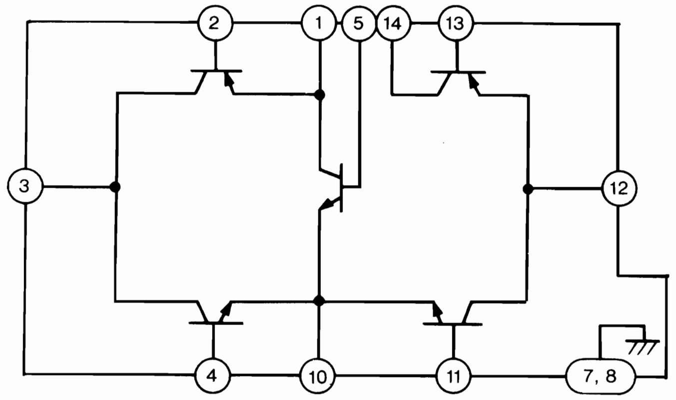
EQUIVALENT CIRCUIT

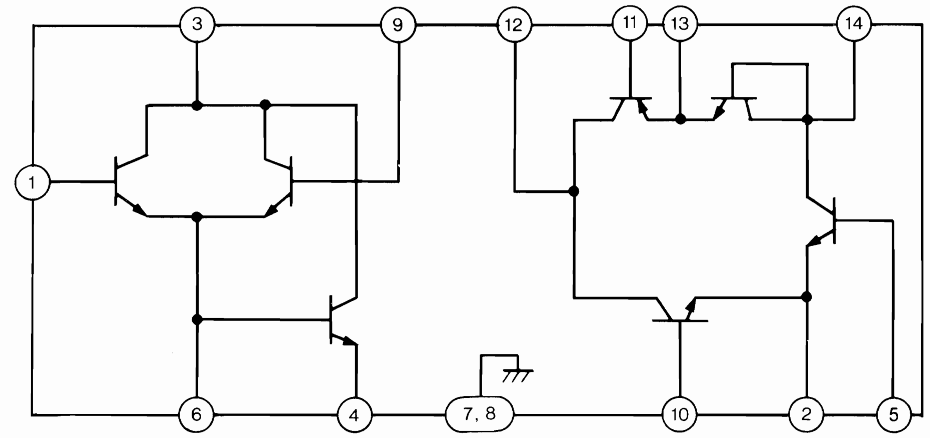
IC605, 606, 607, 608, 609



IC601, 602



IC603, 604



NOTES:

- VR601, VR602......VCA distortion adjustment VR.
- VR603, VR604......VCA distortion adjustment VR.
- VR605, VR606......RMS distortion adjustment VR.
- VR607, VR608......dbx standard input level adjustment VR (Encode).
- VR609, VR610......dbx standard level adjustment VR (Decode).
- VR611 ....DC voltage adjustment VR.
- Resistance are in ohms (Ω), 1/4 watt unless specified otherwise.
  1K = 1,000(Ω), 1M = 1,000k(Ω).
- Capacity are in microfarads (μF) unless specified otherwise.
  P = Pico-farads.
- The mark (▼) shows test point. e.g. ∇ = Test point 1.
- All voltage values shown in circuitry are under no signal condition and record mode with volume control at minimum position.
  However, the voltage in playback mode is indicated in (   ) when it differs from that in record mode.
  For measurement, use VTVM.
- (⇨) this arrow indicates the flow of the playback signal.
- (➡) this arrow indicates the flow of the recording signal.
- (▨▷) this arrow indicates the flow of V.C.A. control signal.
- Described in the schematic diagram are two types of numbers; the supply parts number and production parts number for transistors and diodes.
  One type of number is used for supply parts number and production parts number when they are identical.

e.g. Q619, 620
2SC2021(SF,RF) ← Production parts number
[2SC2021SF] ← Supply parts number
D602, 604
1S2473T77 ← Production parts number
[MA161] ← Supply parts number

- **The supply parts number is described alone in the replacement parts list.**
- (2%) presents allowable resistance range of resistor used.
  e.g. R665 220 (2%) → 220±4.4(Ω)
- Mark represents switching transistor for changing connections of blocks in the dbx circuit.
- Circuit constructions for encoding, decoding and disc are different as shown in page 10.

e.g. "E.ON" shows ON condition during Encode mode. → E.ON

"De.ON" shows ON condition during Decode mode. → De.ON

"Di.ON" shows ON condition during Disc mode. → Di.ON

"Di.OFF" shows OFF condition during Disc mode. → Di.OFF

9 8 7 6 5 4 3 2 1

CIRCUIT BOARD
dbx CIRCUIT BOARD

Q642 2SB641(S,R) [2SB641R]

E	19.1V
C	19.1V (0V)
B	18.4V (19.0V)

Q643 2SC2021(SF,RF) [2SC2021SF]

E	0V
C	19.1V (0V)
B	0.7V (0V)

Q639 2SC2021(SF,RF) [2SC2021SF]

E	0V
C	0V
B	0.7V

Q637 2SC2021(SF,RF) [2SC2021SF]

E	0V
C	0.2V
B	0V

Q621 2SK30AO

D	0.8V
G	9.61V
S	9.61V

Q624 2SD661(U,T) [2SD661U]

E	10.2V
C	17.6V
B	10.8V

Q626 2SB641(S,R) [2SB641R]

E	18.2V
C	10.3V
B	17.6V

Q644 2SC2021(SF,RF) [2SC2021SF]

E	0V
C	0.7V
B	0V

Q640 2SC2021(SF,RF) [2SC2021SF]

E	0V
C	12.8V
B	0V

Q619 2SC2021(SF, RF) [2SC2021SF]

E	9.43V
C	19.1V
B	9.92V

Q623 2SD661(U,T) [2SD661U]

E	10.2V
C	17.6V
B	10.8V

Q625 2SB641(S,R) [2SB641R]

E	18.2V
C	10.3V
B	17.6V

Q620 2SC2021(SF,RF) [2SC2021SF]

E	9.43V
C	19.1V
B	9.92V

Q622 2SK30AO

D	10.8V
G	9.61V
S	9.61V

IC604 BA652

1	9.96V	7	9.61V
2	9.33V	8	9.61V
3	19.1V	9	10.2V
4	9.59V (9.34V)	10	9.61V
		11	9.61V
5	9.84V	12	9.62V
6	9.92V (9.92V)	13	9.90V
		14	10.2V

Q641 2SC2021(SF,RF) [2SC2021SF]

E	0V
C	0V (14.2V)
B	0.7V (0V)

IC606 NJM4558D

1	9.46V (9.38V)	4	0V
		5	9.62V
2	9.40V (9.27V)	6	9.62V
		7	10.3V
3	9.34V (9.26V)	8	19.1V

Q638 2SC2021(SF,RF) [2SC2021SF]

E	0V
C	0V
B	0.7V

IC608 NJM45580DF

1	9.60V	6	9.46V
2	9.61V	7	8.96V (11.1V)
3	9.61V		
4	0V	8	19.1V
5	9.47V (9.58V)		

Q616 2SD1010(S,R) [2SD1010R]

E	9.61V
C	9.61V
B	10.2V

Q628 2SK68AM

D	9.47V (9.58V)
G	0V
S	9.61V

Q618 2SD1010(S,R) [2SD1010R]

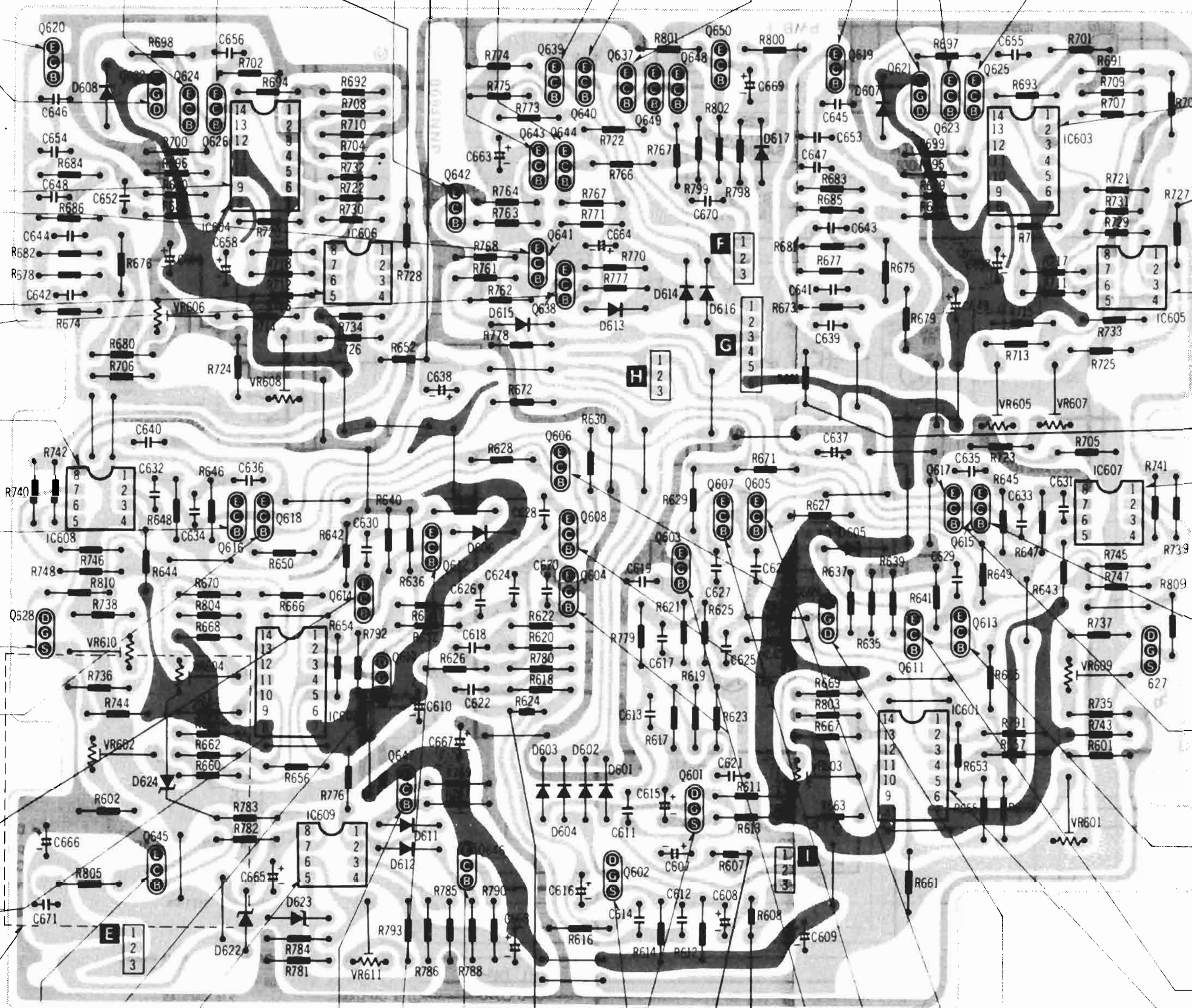
E	9.61V
C	9.61V
B	10.1V

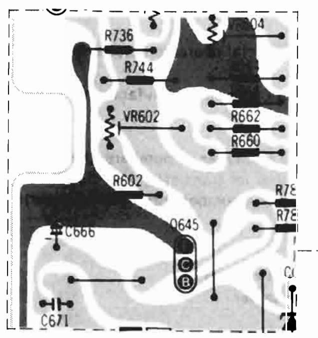
Q614 2SB641(S,R) [2SB641R]

E	18.5V
C	10.1V
B	17.7V

IC602 BA651

1	10.0V	8	9.61V
2	9.61V	9	—
3	9.61V	10	9.12V (9.12V)
4	9.53V (9.7V)	11	9.61V
5	9.83V (9.83V)	12	9.61V
		13	9.53V (9.55V)
6	—		
7	9.61V	14	10.0V





* For Australia

IC603 BA652

1	9.96V	8	9.61V
2	9.33V	9	10.2V
3	19.1V	10	9.61V
4	9.34V (9.34V)	11	9.61V
		12	9.62V
5	10.3V	13	9.90V
6	9.84V	14	10.2V
7	9.61V		

IC605 NJM4558D

1	9.46V (9.38V)	4	0V
		5	9.62V
2	9.40V (9.27V)	6	9.62V
		7	10.3V
3	9.34V (9.26V)	8	19.1V

IC607 NJM4558D

1	8.64V (11.1V)	4	0V
		5	9.61V
2	9.46V (9.58V)	6	9.61V
		7	9.60V
3	9.47V (9.58V)	8	19.1V

Q615 2SD1010(S,R) [2SD1010R]

E	0V (9.61V)
C	9.61V
B	0V (10.2V)

Q617 2SD1010(S,R) [2SD1010R]

E	9.61V
C	9.61V
B	10.1V (0V)

Q613 2SB641(S,R) [2SB641R]

E	18.5V
C	10.1V
B	17.7V

Q611 2SD661(U,T) [2SD661U]

E	10.2V
C	17.7
B	10.8V

Q645 2SD794R(P,Q) [2SD794R]

E	19.1V
C	36.8V
B	19.7V

IC609

1	9.51V	5	5.62V
2	9.61V	6	5.62V
3	9.60V	7	19.7V
4	0V	8	23.9V

Q647 2SD638(S,R) [2SD638S]

E	9.61V
C	19.1V
B	10.0V

Q646 2SB644(S,R) [2SB644R]

E	0V (9.61V)
C	1.43V
B	0V (9.0V)

Q601, 602 2SK68AM

D	9.43V (9.52V)
G	0V
S	9.43V (9.54V)

Q603, 604 2SC2021(SF,RF) [2SC2021SF]

E	10.7V
C	19.1V
B	11.1V

Q605, 606 2SD1010(S,R) [2SD1010Q]

E	10.7V
C	9.7V
B	0V

IC601 BA651

1	10.0V	8	9.61V
2	9.61V	9	—
3	9.61V	10	9.08V (9.12V)
4	9.53V (9.7V)	11	9.61V
5	9.83V (9.83V)	12	9.61V
		13	9.53V (9.55V)
6	—		
7	9.61V	14	10.0V

* For all European areas

Q610 2SK30AO

D	10.8V
G	9.6V
S	9.6V

Q612 2SD661(U,T) [2SD661U]

E	10.2V
C	10.8V
B	10.8V

Q607, 608 Q2SD1010(S,R) [2SD1010R]

E	10.7V
C	10.7V
B	11.3V

Q609 2SK30AO

D	10.8V
G	9.6V
S	9.6V

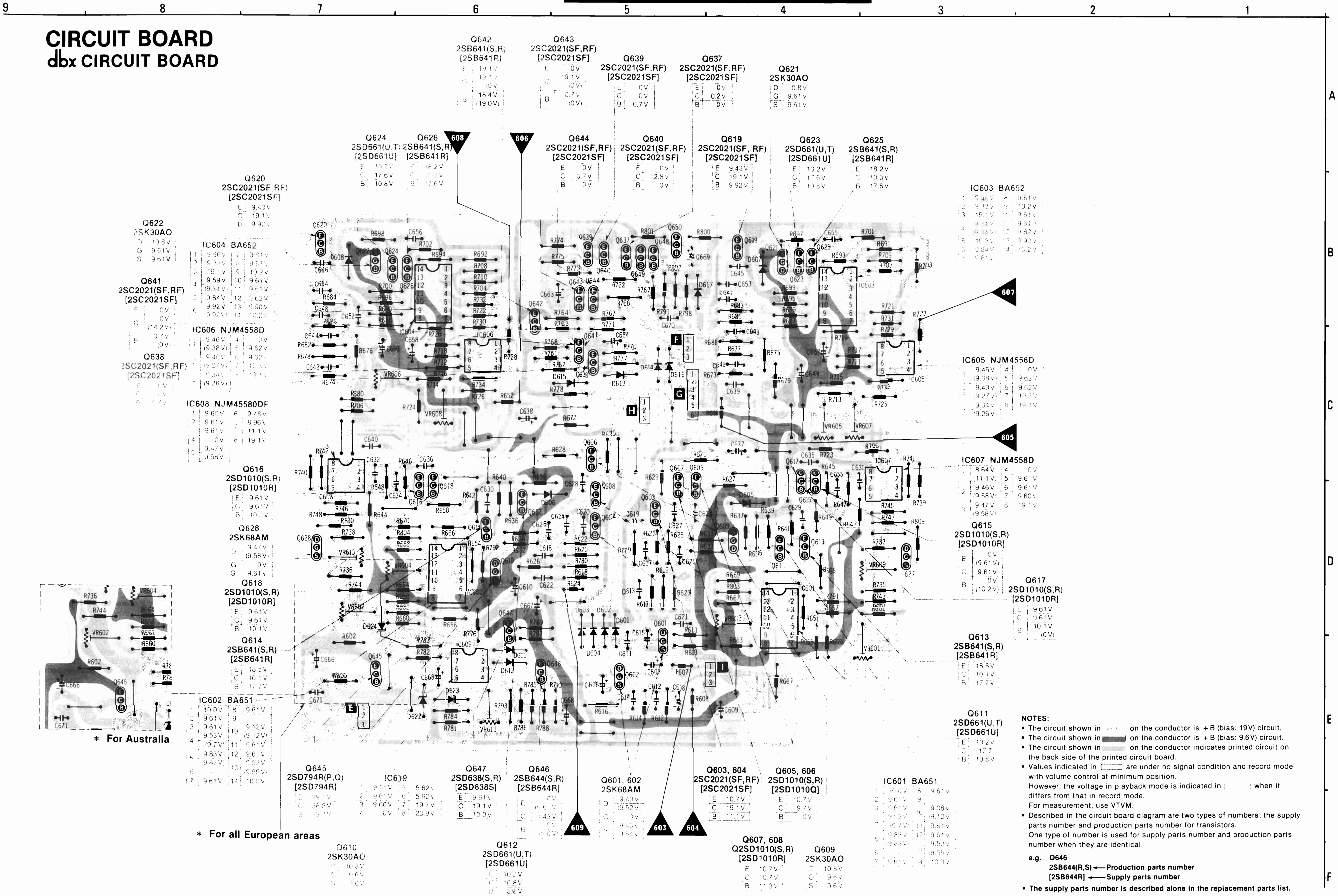
NOTES:

- The circuit shown in ▭ on the conductor is +B (bias: 19V) circuit.
- The circuit shown in ▬ on the conductor is +B (bias: 9.6V) circuit.
- The circuit shown in ▭ on the conductor indicates printed circuit on the back side of the printed circuit board.
- Values indicated in ▭ are under no signal condition and record mode with volume control at minimum position. However, the voltage in playback mode is indicated in ( ) when it differs from that in record mode. For measurement, use VTVM.
- Described in the circuit board diagram are two types of numbers; the supply parts number and production parts number for transistors. One type of number is used for supply parts number and production parts number when they are identical.

  e.g. Q646
  2SB644(R,S) ←— Production parts number
  [2SB644R] ←— Supply parts number
- **The supply parts number is described alone in the replacement parts list.**

A B C D E F

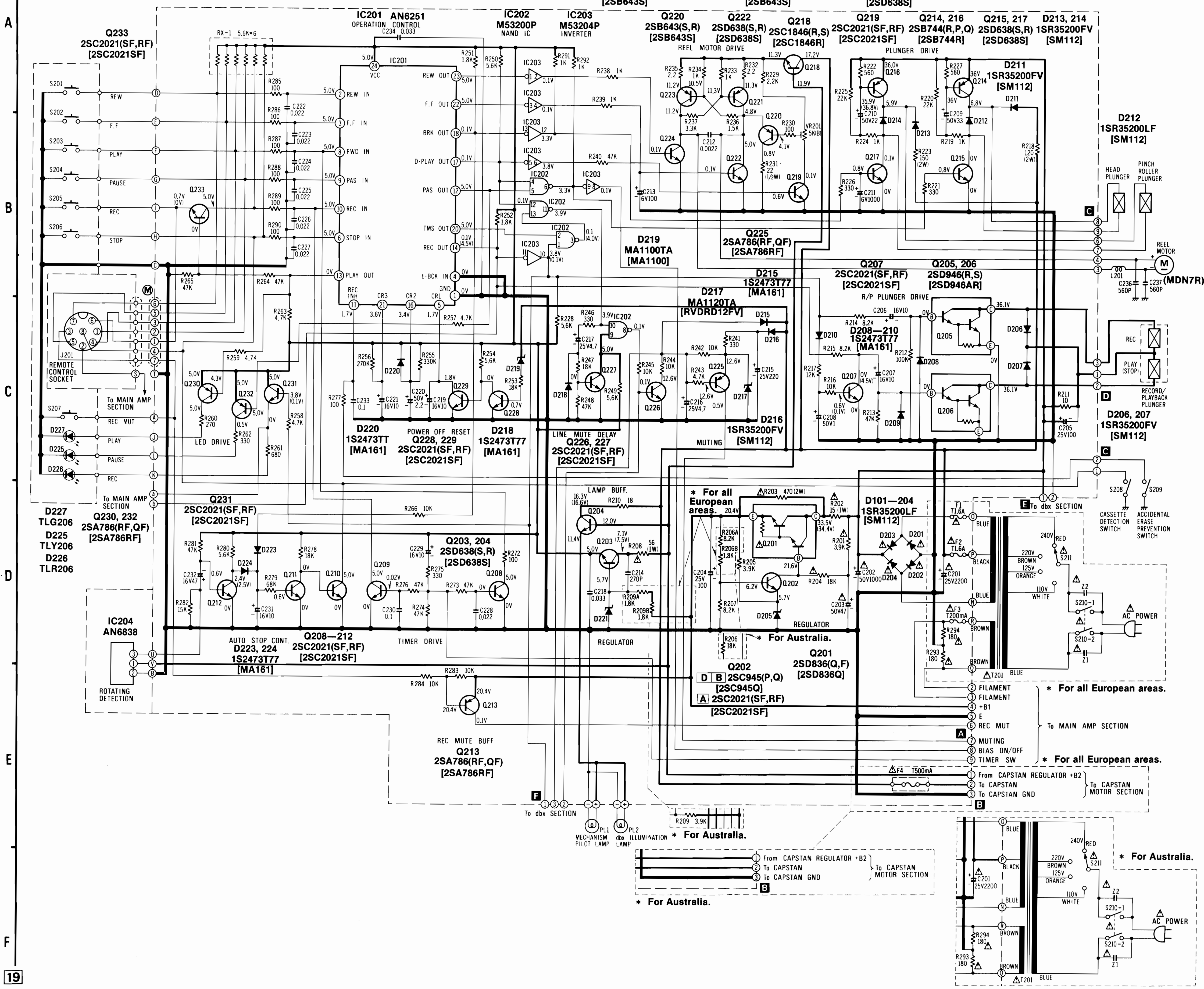
CIRCUIT BOARD
dbx CIRCUIT BOARD



NOTES:
- The circuit shown in [ ] on the conductor is +B (bias: 19V) circuit.
- The circuit shown in [ ] on the conductor is +B (bias: 9.6V) circuit.
- The circuit shown in [ ] on the conductor indicates printed circuit on the back side of the printed circuit board.
- Values indicated in [ ] are under no signal condition and record mode with volume control at minimum position.
  However, the voltage in playback mode is indicated in ( ) when it differs from that in record mode.
  For measurement, use VTVM.
- Described in the circuit board diagram are two types of numbers; the supply parts number and production parts number for transistors.
  One type of number is used for supply parts number and production parts number when they are identical.

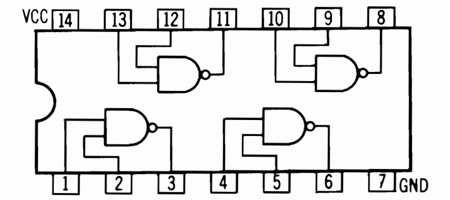
  e.g. **Q646**
  2SB644(R,S) ←— Production parts number
  [2SB644R] ←— Supply parts number
- **The supply parts number is described alone in the replacement parts list.**

SCHEMATIC DIAGRAM
POWER SUPPLY & MAIN CONTROL SECTION

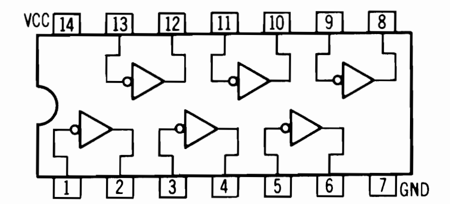


EQUIVALENT CIRCUIT

IC202



IC203



NOTES:

- S201 ....Rewind button switch.
- S202 ....Fast forward button switch.
- S203 ....Playback button switch.
- S204 ....Pause button switch.
- S205 ....Record button switch.
- S206 ....Stop button switch.
- S207 ....Record mute button switch.
- S208 ....Cassette detection switch.
- S209 ....Accidental erase prevention switch.
- S210 ....Power ON/OFF switch.
- S211 ....AC power voltage select switch.
- VR201 ......Takeup torque adjustment VR.
- Resistance are in ohms (Ω), 1/4 watt unless specified otherwise.
  1K = 1,000Ω, 1M = 1,000k(Ω).
- Capacity are in microfarads (μF) unless specified otherwise.
  P = Pico-farads.
- All voltage values shown in circuitry are under no signal condition and stop mode with volume control at minimum position.
  However, the voltage in playback mode is indicated in (   ) when it differs from that in record mode.
  For measurement, use VTVM.

- Important safety notice
  Components identified by ⚠ mark have special characteristics important for safety.
  When replacing any of these components, use only manufacturer's specified parts.

- Described in the schematic diagram are two types of numbers; the supply parts number and production parts number for transistors and diodes. One type of number is used for supply parts number and production parts number when they are identical.

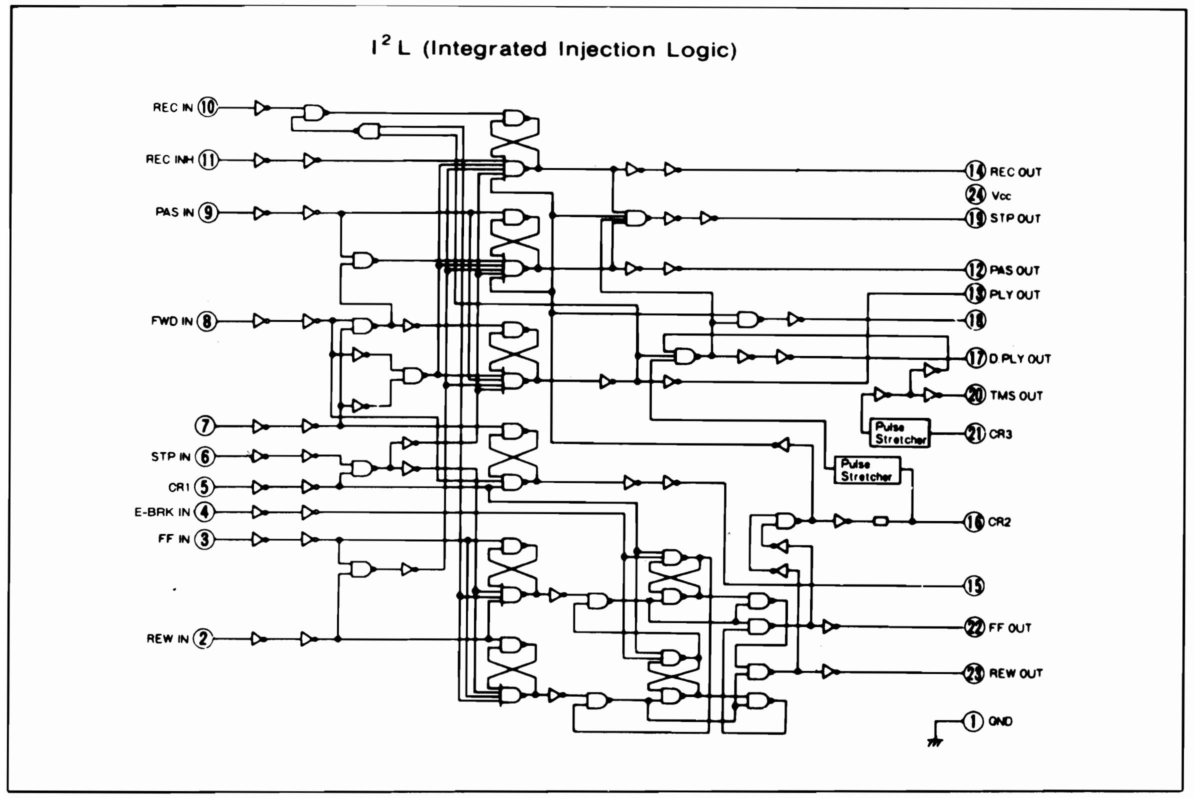
  e.g. Q213
  2SA786(RF,QF) ←— Production parts number
  [2SA786RF] ←— Supply parts number

  1S2473T77 ←— Production parts number
  [MA161] ←— Supply parts number

- **The supply parts number is described alone in the replacement parts list.**

DB ········ For all European areas.
A ········ For Australia.

IC201 (AN6251) equivalent circuit



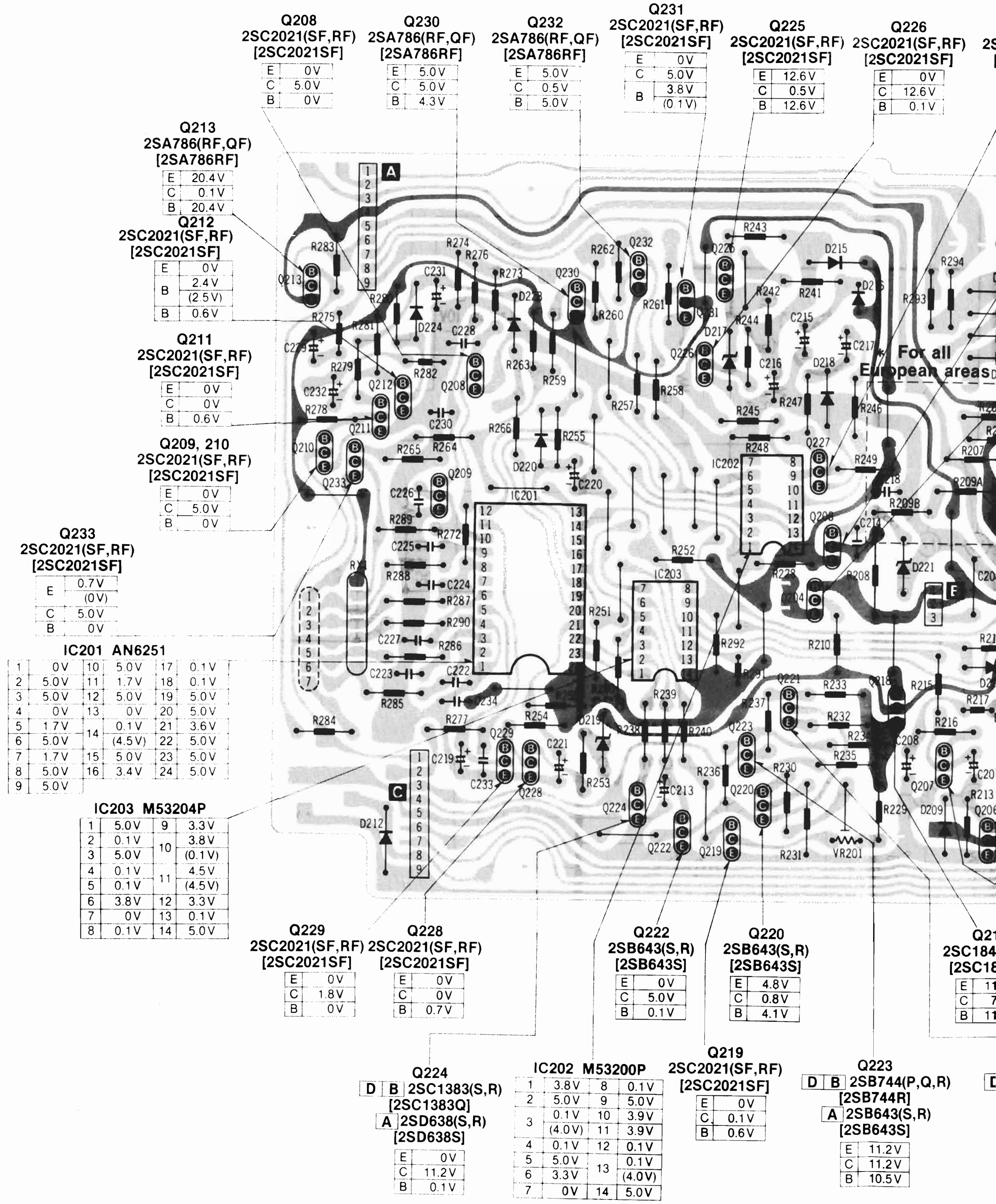
Relationship of each operation mode with input/output

Operation mode	Input terminal	IC (AN6251)							
		Output terminal							
		(12) PAUSE OUT	(13) PLAY OUT	(14) REC OUT	(17) D-PLAY OUT	(18) BRK OUT	(20) TMS OUT	(22) FF OUT	(23) REW OUT
REW	(2) REW IN	Ⓗ	Ⓗ	Ⓗ	Ⓗ	Ⓛ	Ⓗ	Ⓗ	Ⓛ
FF	(3) FF IN	Ⓗ	Ⓗ	Ⓗ	Ⓗ	Ⓛ	Ⓗ	Ⓛ	Ⓗ
PLAY	(8) FWD IN	Ⓗ	Ⓛ	Ⓗ	Ⓛ	Ⓛ	Ⓗ	Ⓗ	Ⓗ
PAUSE	(9) PAS IN	Ⓛ	Ⓗ	Ⓗ	Ⓗ	Ⓗ	Ⓗ	Ⓗ	Ⓗ
REC	(10) REC IN	Ⓗ	Ⓗ	Ⓛ	Ⓗ	Ⓗ	Ⓗ	Ⓗ	Ⓗ
STOP	(6) STOP IN	Ⓗ	Ⓗ	Ⓗ	Ⓗ	Ⓗ	Ⓗ	Ⓗ	Ⓗ

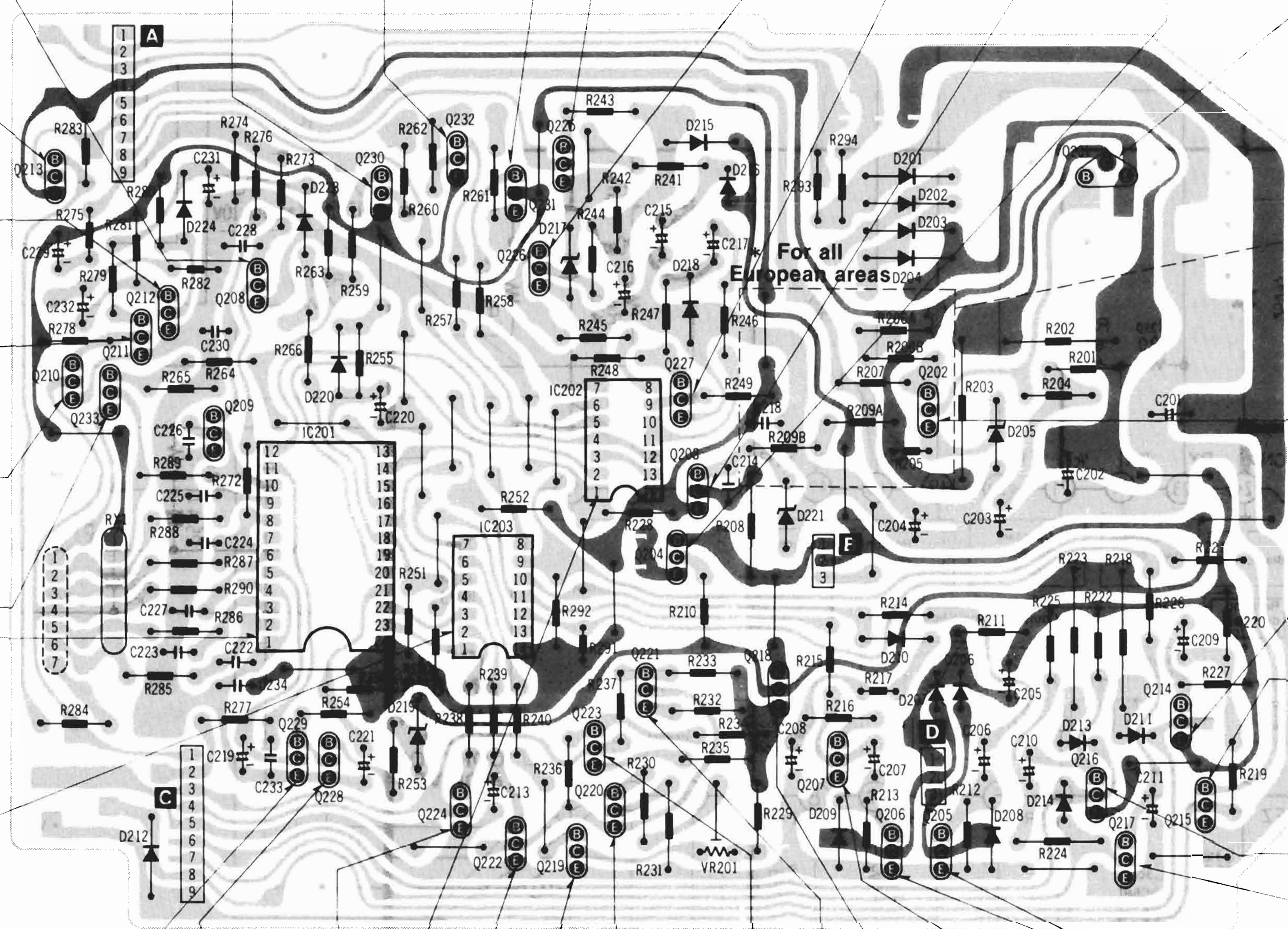
* Doesn't become "L" immediately even if playback button pushed; becoming "L" after a slight delay.

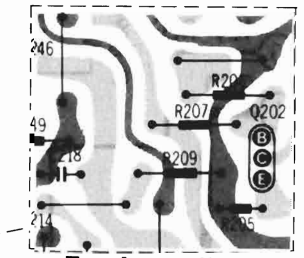
CIRCUIT BOARD

POWER SUPPLY & MAIN CONTROL CIRCUIT BOARD



CIRCUIT BOARD
POWER SUPPLY & MAIN CONTROL CIRCUIT BOARD





Q208 2SC2021(SF,RF) [2SC2021SF]

E	0V
C	5.0V
B	0V

Q230 2SA786(RF,QF) [2SA786RF]

E	5.0V
C	5.0V
B	4.3V

Q232 2SA786(RF,QF) [2SA786RF]

E	5.0V
C	0.5V
B	5.0V

Q231 2SC2021(SF,RF) [2SC2021SF]

E	0V
C	5.0V
B	3.8V (0.1V)

Q225 2SC2021(SF,RF) [2SC2021SF]

E	12.6V
C	0.5V
B	12.6V

Q226 2SC2021(SF,RF) [2SC2021SF]

E	0V
C	12.6V
B	0.1V

Q227 2SC2021(SF,RF) [2SC2021SF]

E	0V
C	5.0V
B	0V

Q203 2SD638(S,R) [2SD638S]

E	5.0V
C	7.1V (7.5V)
B	5.7V

Q204 2SD638(S,R) [2SD638S]

E	11.4V
C	16.3V (16.6V)
B	12.0V

Q201 2SD836(Q,P) [2SD836Q]

E	20.4V
C	34.4V (34.4V)
B	21.6V

Q213 2SA786(RF,QF) [2SA786RF]

E	20.4V
C	0.1V
B	20.4V

Q212 2SC2021(SF,RF) [2SC2021SF]

E	0V
B	2.4V (2.5V)
B	0.6V

Q211 2SC2021(SF,RF) [2SC2021SF]

E	0V
C	0V
B	0.6V

Q209, 210 2SC2021(SF,RF) [2SC2021SF]

E	0V
C	5.0V
B	0V

Q233 2SC2021(SF,RF) [2SC2021SF]

E	0.7V (0V)
C	5.0V
B	0V

IC201 AN6251

1	0V	10	5.0V	17	0.1V
2	5.0V	11	1.7V	18	0.1V
3	5.0V	12	5.0V	19	5.0V
4	0V	13	0V	20	5.0V
5	1.7V	14	0.1V (4.5V)	21	3.6V
6	5.0V			22	5.0V
7	1.7V	15	5.0V	23	5.0V
8	5.0V	16	3.4V	24	5.0V
9	5.0V				

IC203 M53204P

1	5.0V	9	3.3V
2	0.1V	10	3.8V (0.1V)
3	5.0V		
4	0.1V	11	4.5V (4.5V)
5	0.1V		
6	3.8V	12	3.3V
7	0V	13	0.1V
8	0.1V	14	5.0V

...2) ...OUT	(23) REW OUT
Ⓗ	Ⓛ
Ⓛ	Ⓗ
Ⓗ	Ⓗ
Ⓗ	Ⓗ
Ⓗ	Ⓗ
Ⓗ	Ⓗ

Q202 2SC2021(SF,RF) [2SC2021SF]

E	5.7V
C	21.6V
B	6.2V

Q214 2SB744R(P,Q) [2SB744R]

E	36.0V
C	6.8V
B	36.0V

Q215 2SD638(S,R) [2SD638S]

E	0V
C	0.1V
B	0.8V

Q216 2SB744R(P,Q) [2SB744R]

E	36.0V
C	5.9V
B	35.9V

Q217 2SD638(R,S) [2SD638S]

E	0V
C	0.1V
B	0.8V

Q229 2SC2021(SF,RF) [2SC2021SF]

E	0V
C	1.8V
B	0V

Q228 2SC2021(SF,RF) [2SC2021SF]

E	0V
C	0V
B	0.7V

Q222 2SB643(S,R) [2SB643S]

E	0V
C	5.0V
B	0.1V

Q220 2SB643(S,R) [2SB643S]

E	4.8V
C	0.8V
B	4.1V

Q218 2SC1846(R,S) [2SC1846R]

E	11.3V
C	7.2V
B	11.9V

Q207 2SC2021(SF,RF) [2SC2021SF]

E	0V
C	0V
B	0.6V

Q205, 206 2SD946(R,S) [2SD946R]

E	0V
C	36.1V
B	0V

Q224 D B 2SC1383(S,R) [2SC1383Q] A 2SD638(S,R) [2SD638S]

E	0V
C	11.2V
B	0.1V

IC202 M53200P

1	3.8V	8	0.1V
2	5.0V	9	5.0V
3	0.1V (4.0V)	10	3.9V
		11	3.9V
4	0.1V	12	0.1V
5	5.0V	13	0.1V (4.0V)
6	3.3V		
7	0V	14	5.0V

Q219 2SC2021(SF,RF) [2SC2021SF]

E	0V
C	0.1V
B	0.6V

Q223 D B 2SB744(P,Q,R) [2SB744R] A 2SB643(S,R) [2SB643S]

E	11.2V
C	11.2V
B	10.5V

Q221 D B 2SB774(P,S,R) [2SB774R] A 2SB643(S,R) [2SB643S]

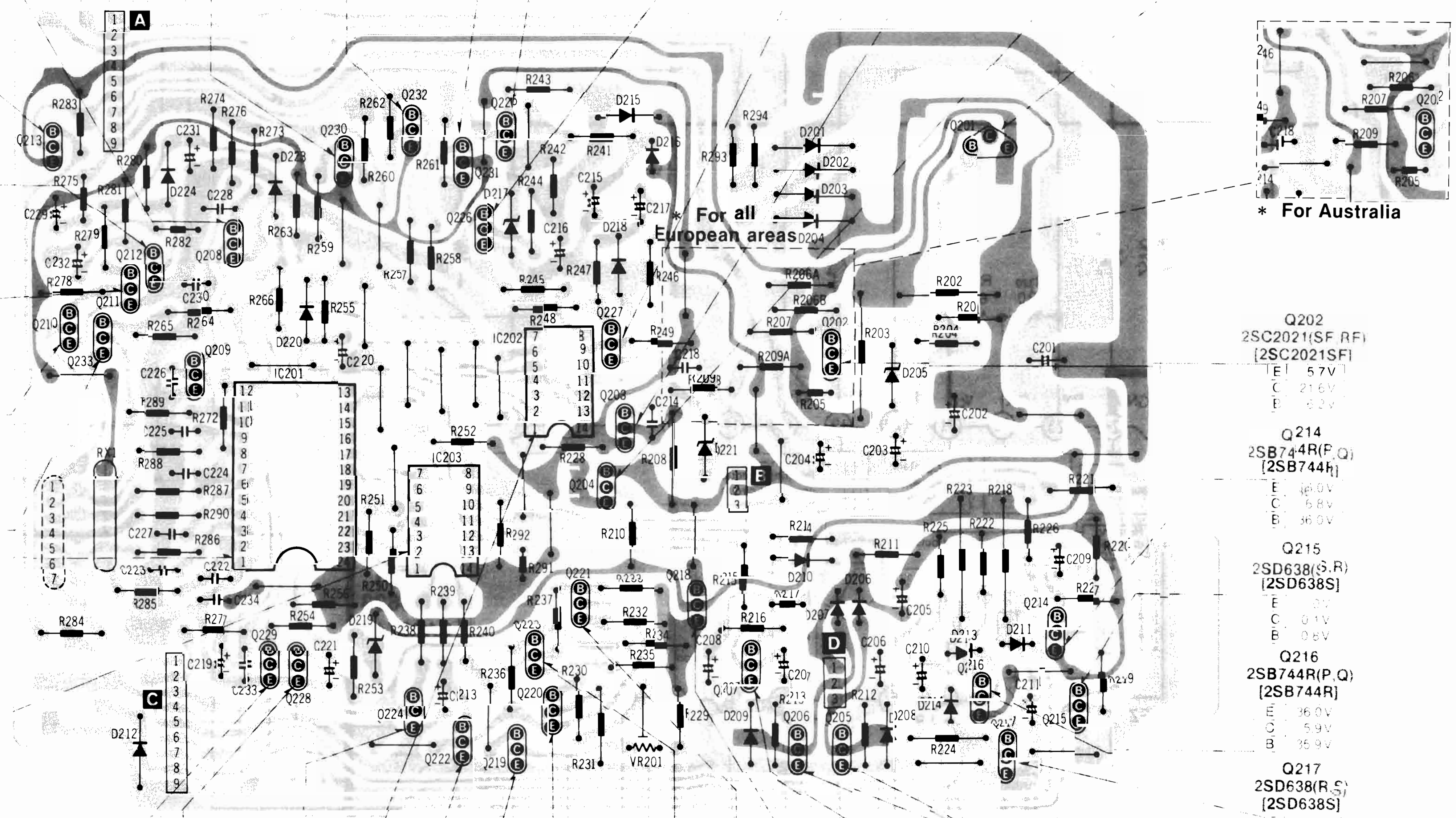
E	11.3V
C	4.8V
B	11.3V

NOTES:
- The circuit shown in ▬ on the conductor is +B (bias) circuit.
- The circuit shown in ▬ on the conductor indicates printed circuit on the back side of the printed circuit board.
- Values indicated in ▭ are under no signal condition and record mode with volume control at minimum position.
  However, the voltage in playback mode is indicated in ( ) when it differs from that in record mode.
  For measurement, use VTVM and oscilloscope.
- Described in the circuit board diagram are two types of numbers; the supply parts number and production parts number for transistors.
  One type of number is used for supply parts number and production parts number when they are identical.
  e.g. Q207
  2SC2021(SF,RF) ←— Production parts number
  [2SC2021SF] ←— Supply parts number
- The supply parts number is described alone in the replacement parts list.

- D B ......For all European areas.
- A ....For Australia

CIRCUIT BOARD

POWER SUPPLY & MAIN CONTROL CIRCUIT BOARD



Q208 2SC2021(SF,RF) [2SC2021SF] — E 0V, C 5.0V, B 0V

Q230 2SA786(RF,QF) [2SA786RF] — E 5.0V, C 5.0V, B 4.3V

Q232 2SA786(RF,QF) [2SA786RF] — E 5.0V, C 0.5V, B 5.0V

Q231 2SC2021(SF,RF) [2SC2021SF] — E 0V, C 5.0V, B 3.8V (0.1V)

Q225 2SC2021(SF,RF) [2SC2021SF] — E 13.6V, C 0.5V, B 12.6V

Q226 2SC2021(SF,RF) [2SC2021SF] — E 0V

Q227 2SC2021(SF,RF) [2SC2021SF] — E 0V

Q203 2SD638(S,R) [2SD638S] — E 5.0V, B 5.7V

Q204 2SD638(S,R) [2SD638S] — E 11.4V, B 12.0V

Q201 2SD836(Q,P) [2SD836Q] — E 20.4V, C 34.4V (34.4V), B 21.6V

Q213 2SA786(RF,QF) [2SA786RF] — E 20.4V, C 0.1V, B 20.4V

Q212 2SC2021(SF,RF) [2SC2021SF] — E 0V, B 2.4V (2.5V), B 0.6V

Q211 2SC2021(SF,RF) [2SC2021SF] — E 0V, C 0V, B 0.6V

Q209, 210 2SC2021(SF,RF) [2SC2021SF] — E 0V, C 5.0V

Q233 2SC2021(SF,RF) [2SC2021SF] — E 0.7V (0V), C 5.0V, B 0V

Q202 2SC2021(SF,RF) [2SC2021SF] — E 5.7V

Q214 2SB744R(P,Q) [2SB744R]

Q215 2SD638(S,R) [2SD638S]

Q216 2SB744R(P,Q) [2SB744R]

Q217 2SD638(R,S) [2SD638S] — E 0V, B 0.8V

IC201 AN6251

1	0V	10	5.0V	17	0.1V
2	5.0V	11	1.7V	18	0.1V
3	5.0V	12	5.0V	19	5.0V
4	0V	13	0V	20	5.0V
5	1.7V	14	0.1V	21	3.6V
6	5.0V		(4.5V)	22	5.0V
7	1.7V	15	5.0V	23	5.0V
8	5.0V	16	3.4V	24	5.0V
9	5.0V				

IC203 M53204P

1	5.0V	9	3.3V
2	0.1V	10	3.8V
3	5.0V		(0.1V)
4	0.1V	11	4.5V
5	0.1V		(4.5V)
6	3.8V	12	3.3V
7	0V	13	0.1V
8	0.1V	14	5.0V

Q229 2SC2021(SF,RF) [2SC2021SF] — E 0V, C 1.8V, B 0V

Q228 2SC2021(SF,RF) [2SC2021SF] — E 0V, C 0V, B 0.7V

Q222 2SB643(S,R) [2SB643S] — E 0V, C 5.0V, B 0.1V

Q220 2SB643(S,R) [2SB643S] — E 4.8V, C 0.8V, B 4.1V

Q218 2SC1846(R,S) [2SC1846R] — E 11.3V, C 7.2V, B 11.9V

Q207 2SC2021(SF,RF) [2SC2021SF] — E 0V, C 0V, B 0.6V

Q205, 206 2SD946(R,S) [2SD946R] — E 0V, C 36.1V, B 0V

Q224 D B 2SC1383(S,R) [2SC1383Q] A 2SD638(S,R) [2SD638S] — E 0V, C 11.2V, B 0.1V

IC202 M53200P

1	3.8V	8	0.1V
2	5.0V	9	5.0V
3	0.1V	10	3.9V
	(4.0V)	11	3.9V
4	0.1V	12	0.1V
5	5.0V	13	0.1V
6	3.3V		(4.0V)
7	0V	14	5.0V

Q219 2SC2021(SF,RF) [2SC2021SF] — E 0V, C 0.1V, B 0.6V

Q223 D B 2SB744(P,Q,R) [2SB744R] A 2SB643(S,R) [2SB643S] — E 11.2V, C 11.2V, B 10.5V

Q221 D B 2SB774(P,S,R) [2SB774R] A 2SB643(S,R) [2SB643S] — E 11.3V, C 4.8V, B 11.3V

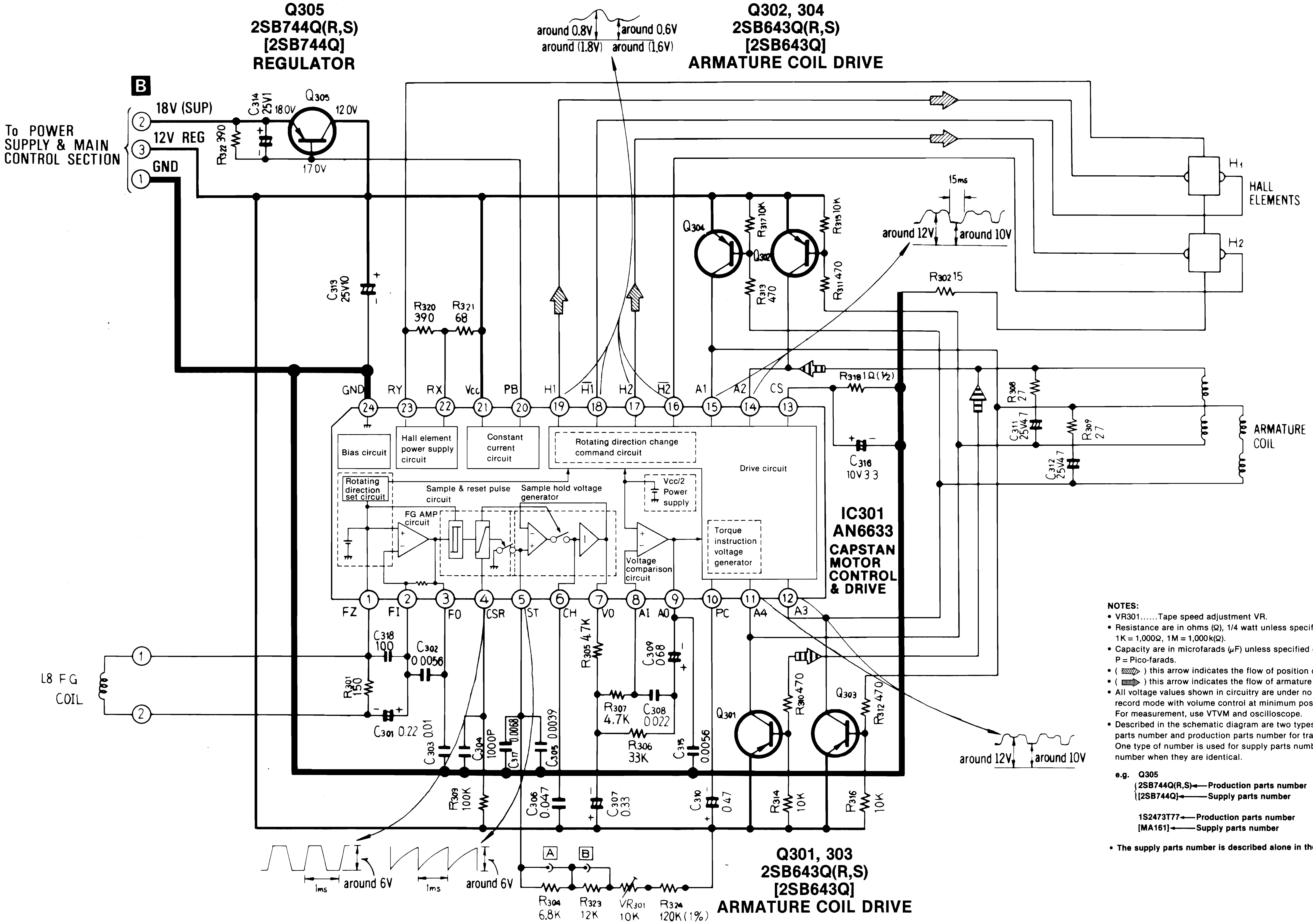
NOTES:

- The circuit shown in ▬ on the conductor is +B (bias) circuit.
- The circuit shown in ░ on the conductor indicates printed circuit on the back side of the printed circuit board.
- Values indicated in ☐ are under no signal condition and record mode with volume control at minimum position.
  However, the voltage in playback mode is indicated in ( ) when it differs from that in record mode.
  For measurement, use VTVM and oscilloscope.
- Described in the circuit board diagram are two types of numbers; the supply parts number and production parts number for transistors.
  One type of number is used for supply parts number and production parts number when they are identical.
  e.g. Q207
  2SC2021(SF,RF) ← Production parts number
  [2SC2021SF] ← Supply parts number
- **The supply parts number is described alone in the replacement parts list.**

- D B ......For all European areas.
- A ....For Australia

RS-M270X

SCHEMATIC DIAGRAM
CAPSTAN MOTOR SECTION



NOTES:
- VR301......Tape speed adjustment VR.
- Resistance are in ohms (Ω), 1/4 watt unless specified otherwise. 1K = 1,000Ω, 1M = 1,000k(Ω).
- Capacity are in microfarads (μF) unless specified otherwise. P = Pico-farads.
- (hatched arrow) this arrow indicates the flow of position detection signal.
- (striped arrow) this arrow indicates the flow of armature coil driving signal.
- All voltage values shown in circuitry are under no signal condition and record mode with volume control at minimum position. For measurement, use VTVM and oscilloscope.
- Described in the schematic diagram are two types of numbers; the supply parts number and production parts number for transistors and diodes. One type of number is used for supply parts number and production parts number when they are identical.

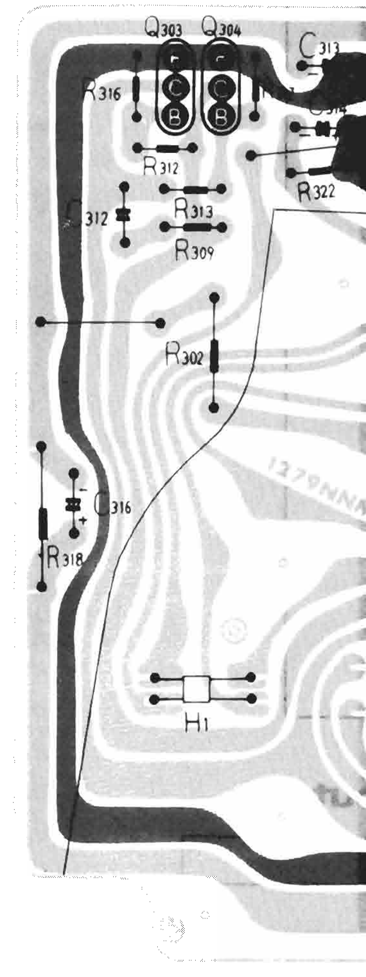
e.g. Q305
2SB744Q(R,S)←Production parts number
[2SB744Q]←Supply parts number

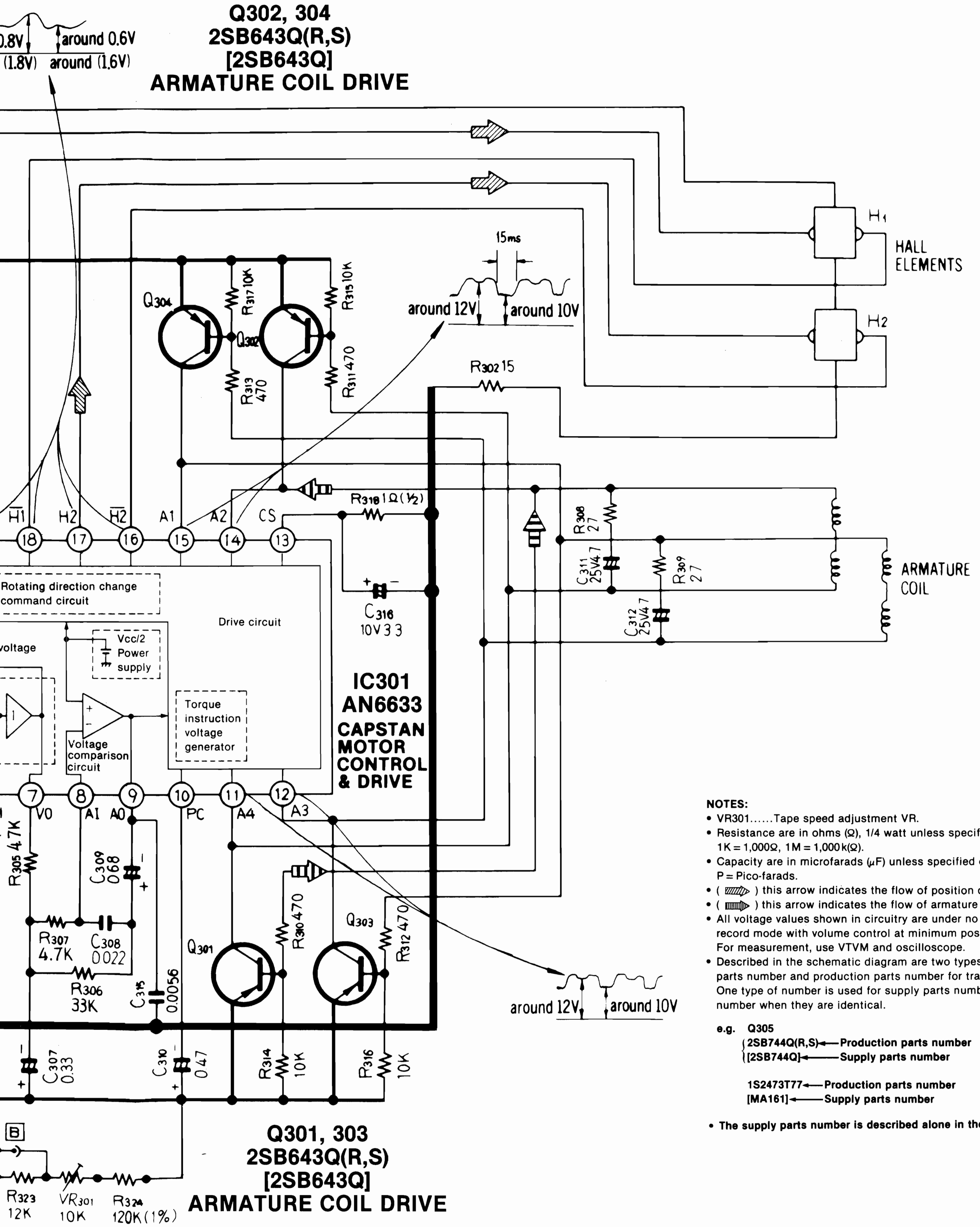
1S2473T77←Production parts number
[MA161]←Supply parts number

- **The supply parts number is described alone in the replacement parts list.**

CIRCUIT BOARD
CAPSTAN MOTOR

Q303, 304
2SB643Q(R,S)
[2SB643Q]





NOTES:

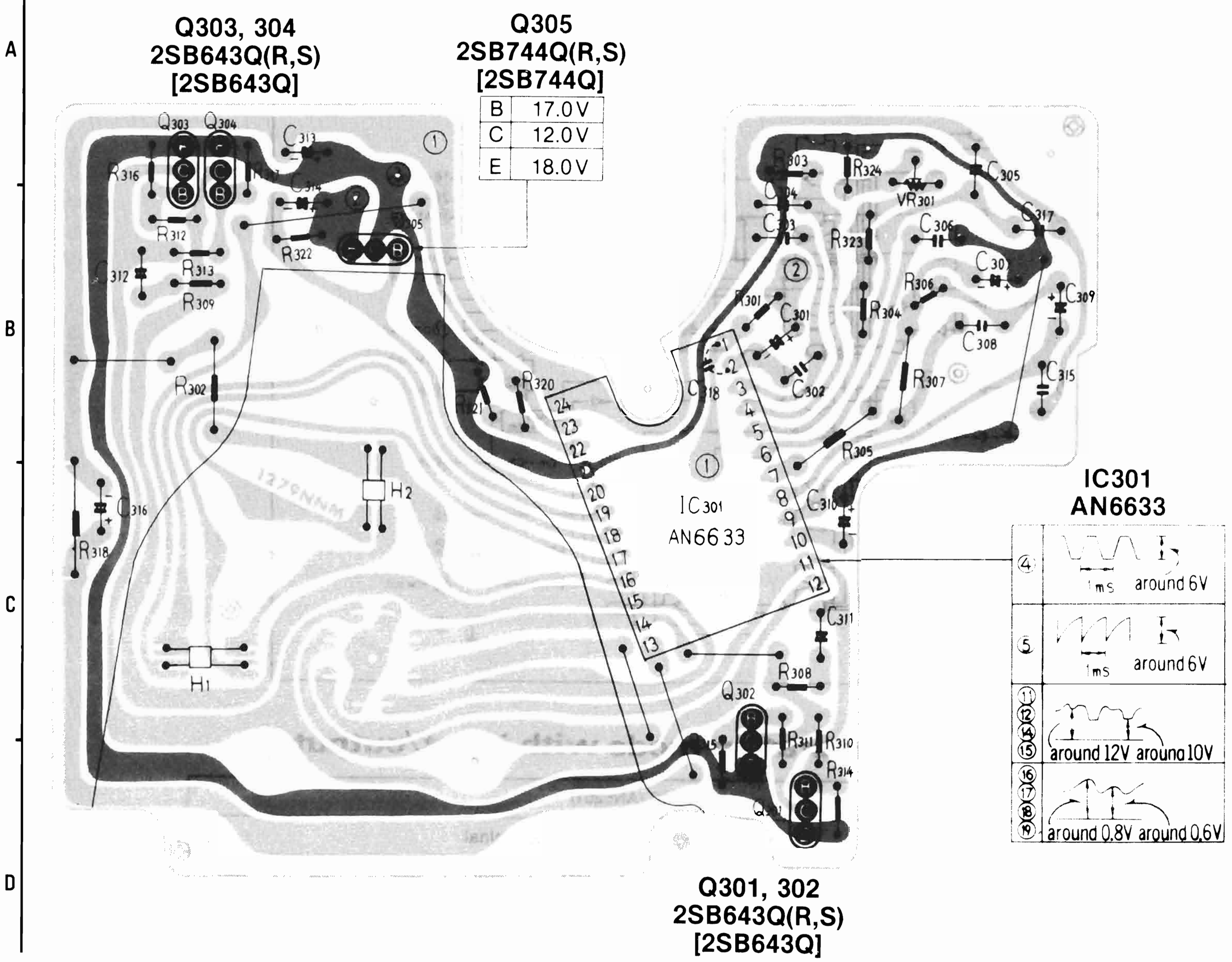
- VR301......Tape speed adjustment VR.
- Resistance are in ohms (Ω), 1/4 watt unless specified otherwise. 1K = 1,000Ω, 1M = 1,000k(Ω).
- Capacity are in microfarads (μF) unless specified otherwise. P = Pico-farads.
- ( ) this arrow indicates the flow of position detection signal.
- ( ) this arrow indicates the flow of armature coil driving signal.
- All voltage values shown in circuitry are under no signal condition and record mode with volume control at minimum position. For measurement, use VTVM and oscilloscope.
- Described in the schematic diagram are two types of numbers; the supply parts number and production parts number for transistors and diodes. One type of number is used for supply parts number and production parts number when they are identical.

e.g. Q305
2SB744Q(R,S)←—Production parts number
[2SB744Q]←—Supply parts number

1S2473T77←—Production parts number
[MA161]←—Supply parts number

- **The supply parts number is described alone in the replacement parts list.**

CIRCUIT BOARD
CAPSTAN MOTOR CIRCUIT BOARD



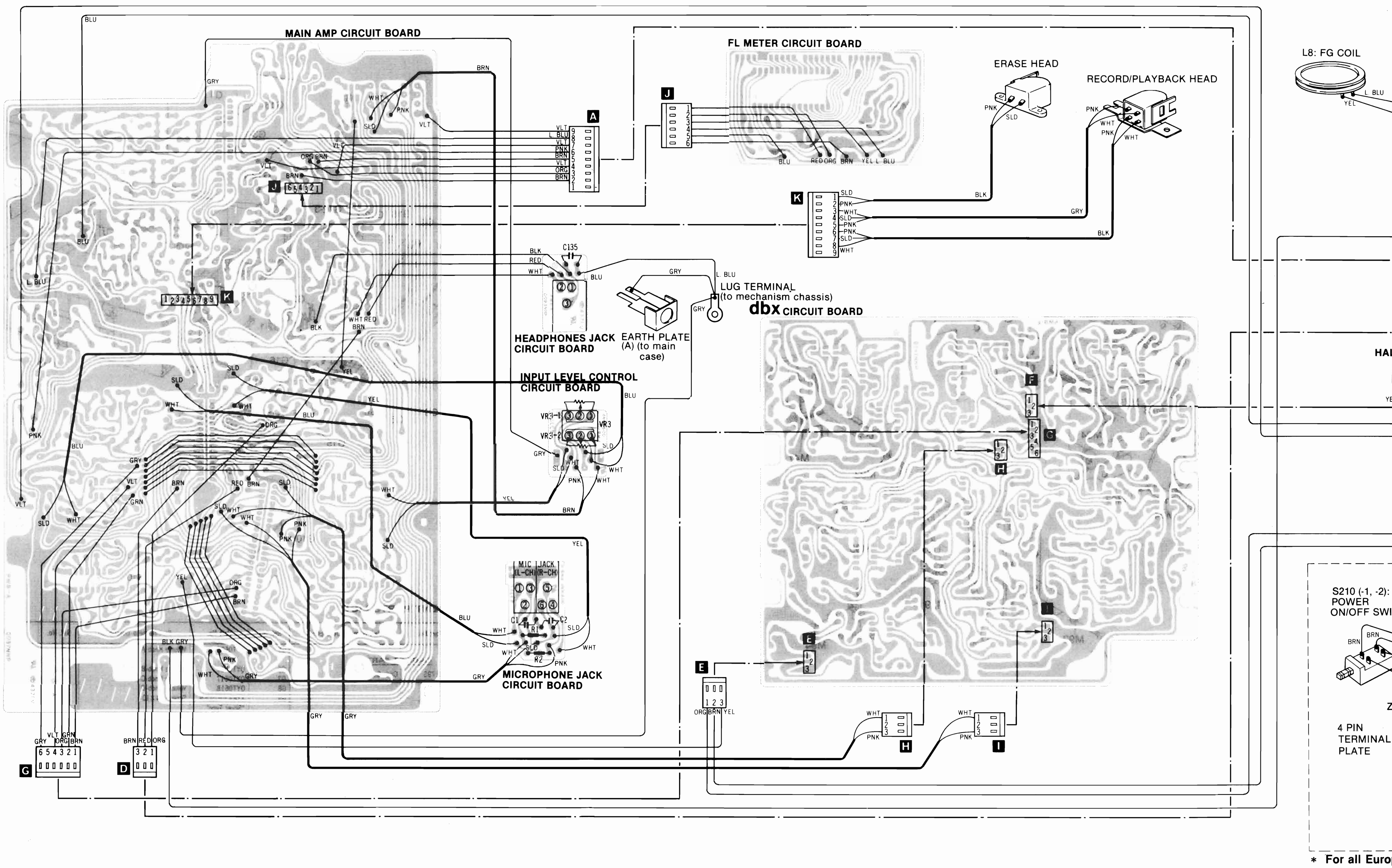
NOTES:

- The circuit shown in ▬ on the conductor is + B (bias) circuit.
- The circuit shown in ▬ on the conductor indicates printed circuit on the back side of the printed circuit board.
- Values indicated in ▭ are under no signal condition and record mode with volume control at minimum position. For measurement, use VTVM and oscilloscope.
- Described in the circuit board diagram are two types of numbers; the supply parts number and production parts number for transistors. One type of number is used for supply parts number and production parts number when they are identical.

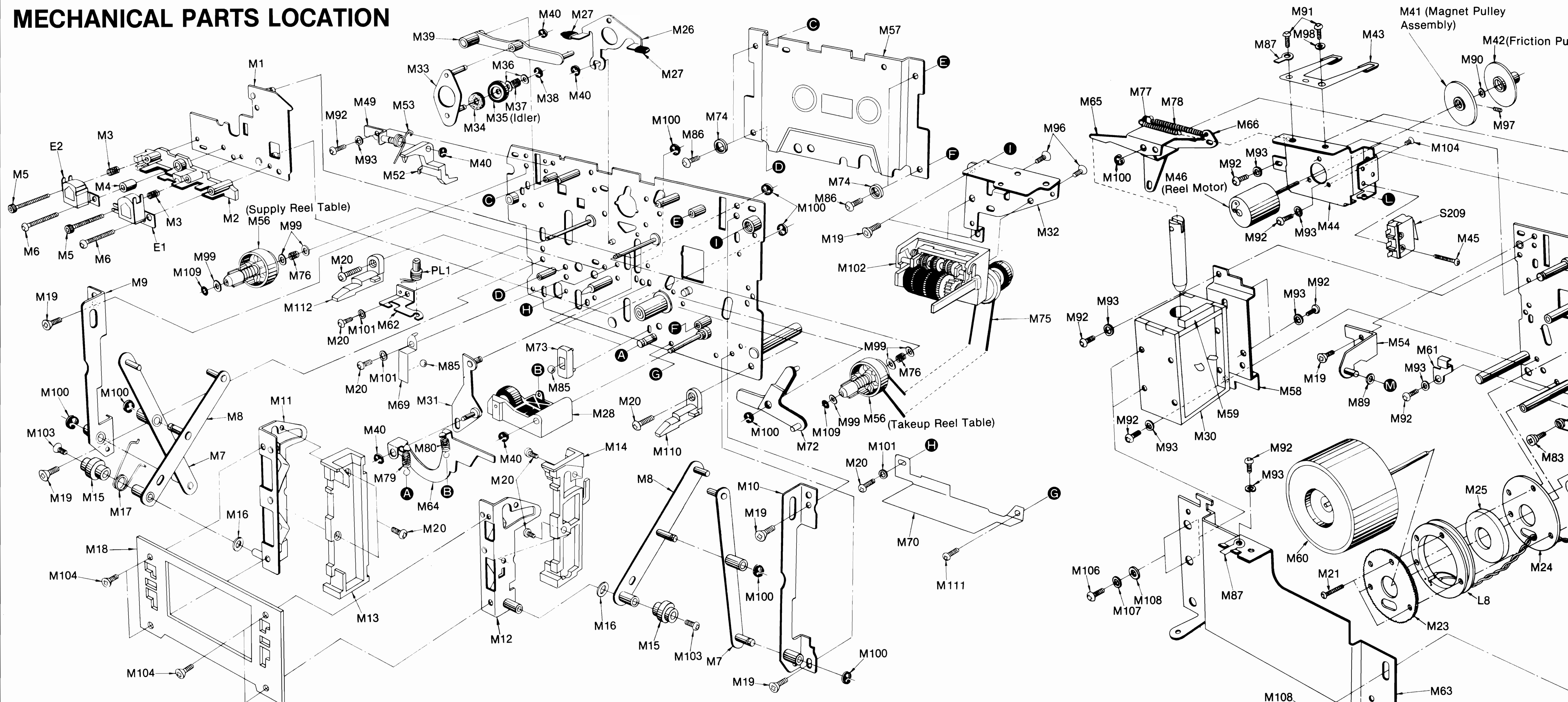
e.g. Q305
2SB744Q(R,S)←—Production parts number
[2SB744Q]←—Supply parts number

- **The supply parts number is described alone in the replacement parts list.**

WIRING CONNECTION DIAGRAM



MECHANICAL PARTS LOCATION

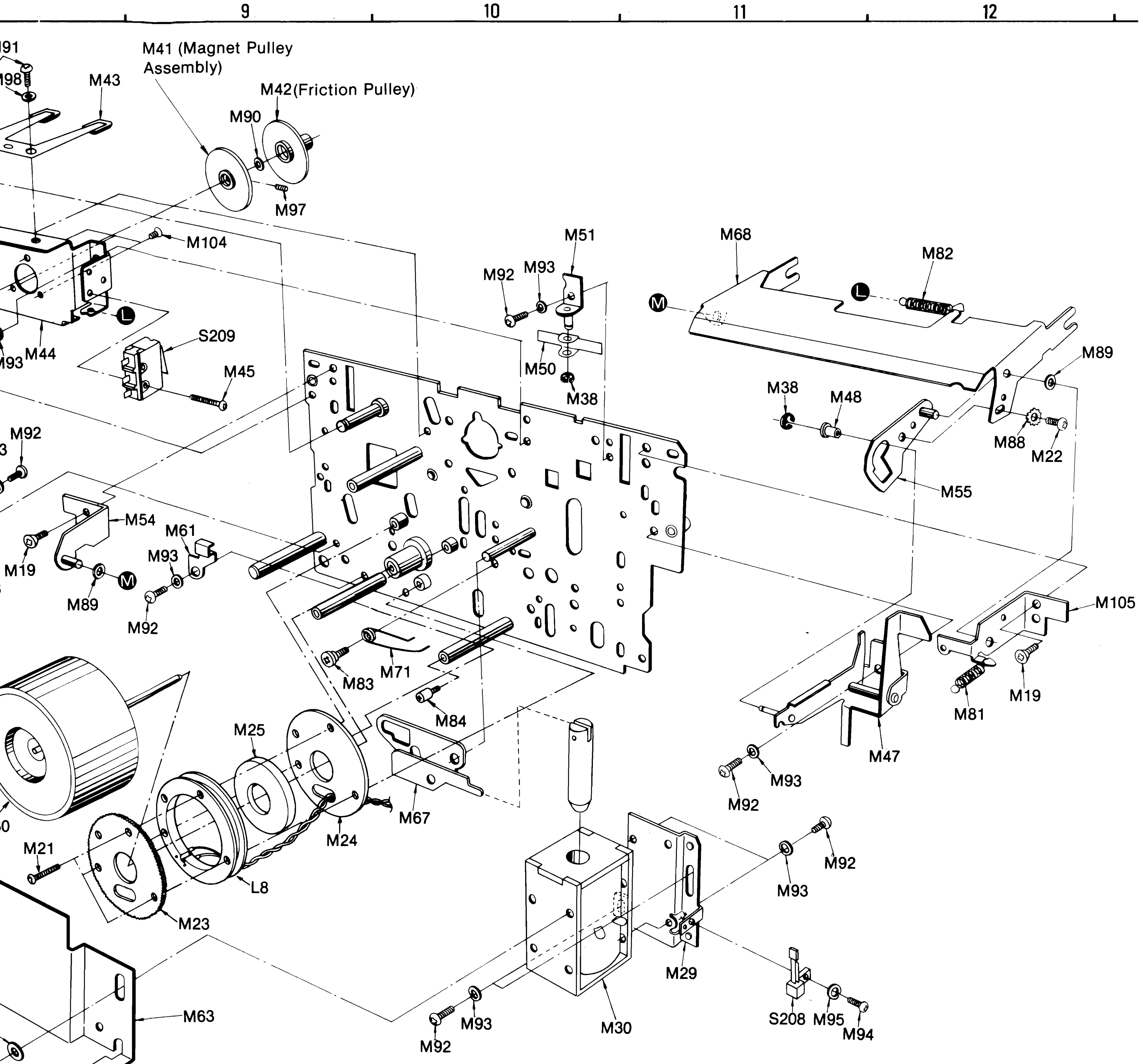


REPLACEMENT PARTS LIST

Ref. No.	Part No.	Part Name & Description
	MECHANICAL PARTS	
M1	QXK2203	Head Base Plate
M2	QMZ1238	Head Holder
M3	QBCA0008	Head Spring
M4	QMC0104	Collar
M5	QHQ1296	Head Adjustment Screw
M6	XSN2+14	Screw ⊕2×14
M7	QXL1191	Link Lever-A Assembly
M8	QXL1190	Link Lever-B Assembly
M9	QXA0703	Angle-L Assembly
M10	QXA0704	Angle-R Assembly
M11	QXA1006	Holder Angle-L Assembly
M12	QXA1005	Holder Angle-R Assembly
M13	QMH2027	Cassette Holder-L
M14	QMH2028	Cassette Holder-R
M15	QKJ0384	Cover
M16	QBP1135	Spring Washer
M17	QBN1734	Cassette Holder Spring
M18	QMF2200	Cassette Holder Plate
M19	XSS3+6S	Screw ⊕3×6
M20	XSN26+4	Screw ⊕2.6×4
M21	XSN2+8	Screw ⊕2×8
M22	XSN3+6S	Screw ⊕3×6
M23	QDG1128	FG Plate-1
M24	QMF2096	FG Plate-2
M25	QSF0013	FG Magnet
M26	QML3273	Brake
M27	QBG1132	Stopper Rubber
M28	QXL1335	Pressure Roller Assembly
M29	QMA3591	Plunger Angle-L
M30	QME0147BG	Plunger
M31	QXR0540	Connection Rod Assembly
M32	QMA3588	Counter Angle
M33	QXL1337	Idler Lever Assembly
M34	QBF1260	Idler Felt
M35	QXi0101	Idler Assembly
M36	QBW2015	Poly Washer
M37	QBC1308	Idler Spring
M38	XUC2FT	Stop Ring 2ϕ
M39	QML3578	Brake Lever
M40	XUC25FT	Stop Ring 2.5ϕ
M41	QXP0599	Magnet Pulley Assembly
M42	QXP0600	Friction Pulley
M43	QXH0321	Cassette Holding Cushion
M44	QMA3849	Motor Angle
M45	QHQ1182	Step Screw
M46	MDN7R	Reel Motor
M47	QXL1188	Eject Lever Assembly
M48	QDP1758	Roller
M49	QXA0714	Detection Angle Assembly
M50	QML3284	Release Lever
M51	QXA0713	Angle Assembly
M52	QML3285	Detection Lever
M53	QBN1573	Detection Lever Spring
M54	QXA0702	Connector-R Angle Assembly
M55	QXL1173	Lock Lever Assembly
M56	QXD0087	Reel Table Assembly
M57	QXH0277	Mechanism Cover
M58	QMA3312	Plunger Angle-R
M59	QBG1593	Cushion Rubber
M60	QXF0160	Flywheel Assembly
M61	QMA3851	Cord Clamper
M62	QMA3321	Lamp Angle
M63	QMA3852	Mechanism Angle
M64	QML3571	Pressure Roller Lever Assembly
M65	QML3269	Lever-B Assembly
M66	QML3572	Lever-A Assembly
M67	QML3574	Plunger Lever
M68	QML3575	Connector Lever
M69	QBP1872	Steel Ball Holder
M70	QTS1491	Shield Plate
M71	QBN1750	Head Base Plate Spring
M72	QML3577	Connection Lever
M73	QMH2009	Steel Ball Holder
M74	QMZ1213	Spacer
M75	QDB0215	Counter Belt
M76	QBC1272	Back Tension Spring
M77	QBT1713	Record Spring
M78	QBT1405	Lever Spring
M79	QBT1773	Eject Lever Spring
M80	QBT1441	Pressure Roller Spring
M81	QBT1369	Playback Rod Spring
M82	QBT1642	Record Lever Spring
M83	QHQ1177S	Step Screw
M84	QHQ1297	〃
M85	QDK1006	Steel Ball 3ϕ
M86	QHQ1185	Step Screw
M87	QTD1001	Lug Terminal
M88	XWC3B	Washer
M89	QBW2019	Poly Washer
M90	QBW2013	Poly Washer
M91	XSN26+6	Screw ⊕2.6×6
M92	XSN3+5S	Screw ⊕3×5
M93	XWA3B	Spring Washer
M94	XSN2+6	Screw ⊕2×6
M95	XWA2B	Spring Washer
M96	XSS3+8S	Screw ⊕3×8
M97	XXE26D3FZ	Screw with Hexagon Hole
M98	QBJ3224	Washer
M99	QBW2012	Poly Washer
M100	XUC3FT	Stop Ring 3ϕ
M101	XWA26B	Spring Washer
M102	QXC0069	Tape Counter
M103	XSS2+4	Screw ⊕2×4
M104	XQS26+3FZ	Screw ⊕2.6×3
M105	QMA3850	Connector Lever Angle-L
M106	XSN3+6S	Screw ⊕3×6
M107	XWA3B	Spring Washer
M108	XWG3B	Washer
M109	QBW2008	〃
M110	QMG0054	Cassette Guide
M111	XSS26+8	Screw ⊕2.6×8

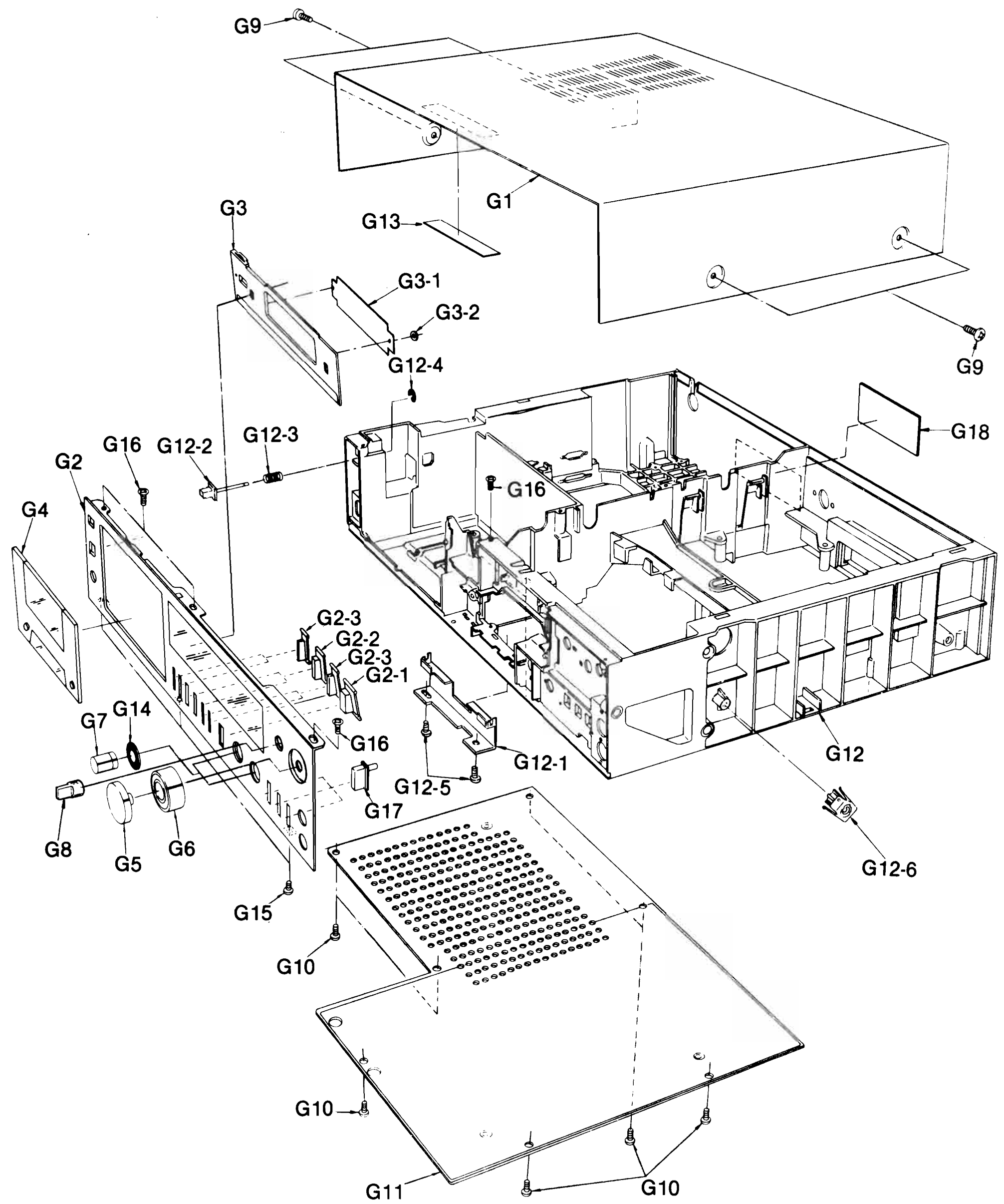
SPECIFICATION

Pressure of pressure roller	400±50 g
Wow and flutter (JIS) Test tape … QZZCWAT	Less than 0.05% (WRMS)



400±50g
Less than 0.05% (WRMS)

CABINET PARTS LOCATION



REPLACEMENT PARTS LIST

Ref. No.	Part No.	Part Name & Description
	CABINET PARTS	
G1	QGC1179S "Silver Type"	Case Cover
	QGC1179K "Black Type"	〃
G2	QYPM0047 "Silver Type"	Front Panel Assembly
	QYPM0044K "Black Type"	〃
G2-1	QGOM0044	Push Button (rec-mute)
G2-2	QGOM0045	Push Button (stop, play)
G2-3	QGOM0046	Push Button (rec, rew, ff, pause)
G3	QYKM0010 "Silver Type"	Meter Cover Assembly
	QYKM0010K "Black Type"	〃
G3-1	QKJ0387	Meter Cover
G3-2	QBW2008	Washer
G4	QYFM0050 "Silver Type"	Cassette Lid
	QYFM0050K "Black Type"	〃

Ref. No.	Part No.	Part Name & Description
G5	QYT0590	Volume Knob-A
G6	QYT0591	Volume Knob-B
G7	QYT0617	Volume Knob-C
G8	QYT0618	Volume Knob-D
G9	XYA4+BJ10FN "Silver Type"	Screw ⊕4×10
	XYA4+BJ10FZ "Black Type"	〃
G10	XTN3+10B	Screw ⊕3×10
G11	QYCM0022	Bottom Cover Assembly
G12	QYMM0077K	Main Case
G12-1	QMA3865	Control Key Switch Circuit Board Angle
G12-2	QXBM0022	Eject Button
G12-3	QBC1189	Eject Button Spring
G12-4	XUC25FT	Stop Ring
G12-5	XTN3+10B	Tapping Screw ⊕3×10
G12-6	QJC0025	Earth Plate
G13	QBH2043	Spacer
G14	QBH0115	〃
G15	XTN3+8B	Tapping Screw ⊕3×8
G16	XTS3+10B	Tapping Screw ⊕3×10

Ref. No.	Part No.	Part Name & Description
G17	QGOM0043	Push Button
G18 [D]	QGSM0147	Main Name Plate
※For all European areas except United Kingdom.		
[B][A]	QGSM0139	〃
※For United Kingdom and Australia.		
	ACCESSORIES	
A1	RP023A	Connection Cord
A2 [D]	QQT3049	Instruction Book
※For all European areas except United Kingdom.		
[B]	QQT3097	
※For United Kingdom.		
[A]	QQT3011	〃
※For Australia.		
	PACKINGS	
P1	QPNM0167	Inside Carton
P2	QPA0450	Cushion-L
P3	QPA0451	Cushion-R
P4	XZB50X65A02	Poly Bag
P5	QPG1985	Pad
P6	QPA0461	Spacer
P7	QPSM0008	Spacer (for Volume Knob)

MNE Y.F D DK BK A Printed in Japan

ORDER NO. ARD83110313S9-01

Service Manual

Supplement-1

Cassette Deck

RS-M270X

(Silver Face
Black Face)

dbx* Equipped Direct Drive Cassette Deck with Peak Hold FL Meters, Solenoid Controls, and Dolby Noise Reduction

** DOLBY SYSTEM

RS-M85 MECHANISM SERIES

- For D B A mark areas, use this manual together with the service manual for model No. RS-M270X (Original) order No. ARD81030031C8-24.
- For N F J mark areas, use this manual together with the service manual for model No. RS-M270X (Original) order No. ARD81020019C7-24.

This is the Service Manual for the following areas.

D ...For all European areas except United Kingdom.

B ...For United Kingdom.

N ...For Asia, Latin America, Middle East and Africa areas.

A ...For Australia.

F ...For Asian PX.

J ...For European PX.

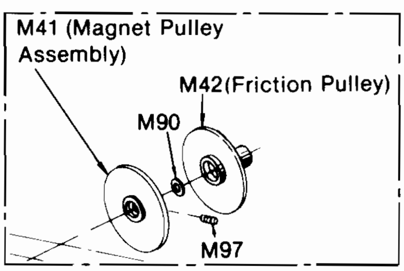
PARTS COMPARISON TABLE:

Please revise the original parts list in the Service Manual (RS-M270X) to conform to the changes shown herein.
If new part numbers are shown, be sure to use them when ordering parts.

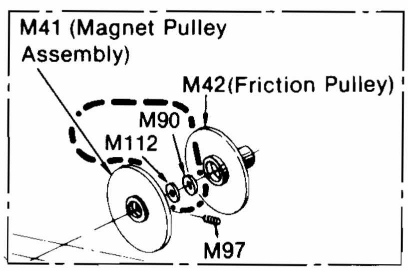
Ref. No.	Part Name & Description	Part Numbers	
		Former Type	**New Type**
M35	Idler Assembly	QXi0101	**QXi0118**
M77	Record Spring	QBT1713	**QBT1273**
M90	Poly Washer	QBW2013	**QBW2049**
M112	Cushion (Added)	——	**QBW2026**

MECHANICAL PARTS LOCATION

(ADDITION)



Former Type



New Type

*The term dbx is a registered trademark of dbx Inc.
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Technics

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

(MNE, H.M) Printed in Jap...